

EnsembleSeries™ SCFE6120

Configurable, low-latency, OpenVPX™ FPGA processing module



- Multi-channel, highly configurable FMC carrier
- Virtex® UltraScale+™ FPGA processing power
- Processing subsystem in data path for max performance
- OpenVPX™ compliant for easy integration
- Multiple high-reliability cooling options

Mercury's EnsembleSeries™ SCFE6120 is a versatile OpenVPX FPGA processing module designed for high performance and agile system integration. Incorporating Virtex® Ultrascale+™ FPGA processing power and a updated architecture, this advanced module maximizes performance by locating the processing subsystem directly in the data path. Two FMC ANSI/VITA 57.4 sites enable maximum customization and can support high-speed digitization cards. With multiple cooling options available, the SCFE6120 is ideal for applications that require high-performance operation in harsh environments.

Advanced FPGA Functionality

Mercury's processing modules are built around our EchoCore® FPGA IP to provide basic infrastructure functionality right out of the box. Mercury facilitates the re-use of common IP across FPGAs to optimize time-to-market and reduce development time. EchoCore IP allows customers to focus on their application while building upon the groundwork provided.

Mercury simplifies application integration by providing a standard control plane interface using AXI4-Lite control plane connectivity. Mercury uses a simple AXI4-Stream interface for our data plane with AXI4-Stream switches for routing data within the FPGA and to external interfaces, such as PCIe. Our customers can choose their tool of choice, such as parameterizable Xilinx IPs, HLS, or RTL to generate signal processing algorithms. The cores are then instantiated into a reserved user block and compiled into the FPGAs.

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.

Specifications

Physical

Single Slot 6U OpenVPX form factor
OpenVPX interface compliant with ANSI/VITA 65-2010 (R2013)

FMC sites

Two FMC ANSI/VITA 57.4 sites
Support single and double width FMC cards

Backplane Interface

VITA 65.0 SLT6-PAY-4F1Q2U2T-10.2.1 Slot Profile

FPGA processors

Two Xilinx Virtex® Ultrascale+™ VU9P Prosecutors
One Xilinx Zynq® Ultrascale+™ ZU11EG Governor

Memory

20 GB of DDR4 SDRAM

Other

Vita 46.11 IPMI controller
Sensor interface to monitor temperature, voltage
Power sequencing
Secure JTAG
Manufactured in an AS9100D facility
Advanced FPGA Functionality



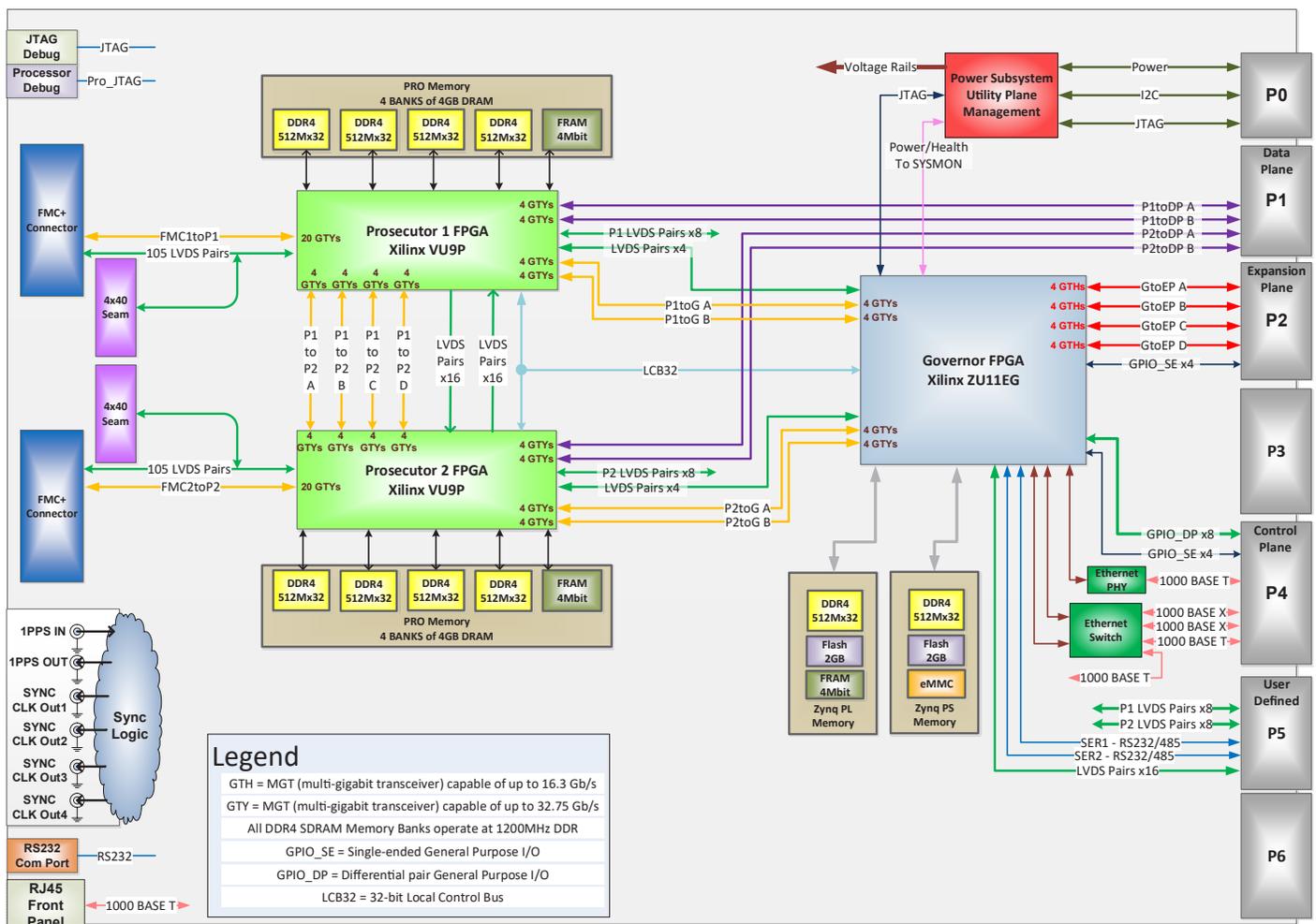
Application Notes

Multiple generations of this product family protect our nation's war-fighters by providing the signal processing functionality that enables systems to nimbly respond to emerging threats. Examples include:

- Wideband search using full sample-rate FFTs and threshold detection processing
- Channelizers and multiple independent/coherent digital down/up converter channels with integrated filtering, gain balancing, high precision receive time tagging and transmit scheduling, VITA 49.2 signal data and context packet generation and reception / depacketizing
- Non-coherent and low latency coherent EA technique generation
- Communications modem functions

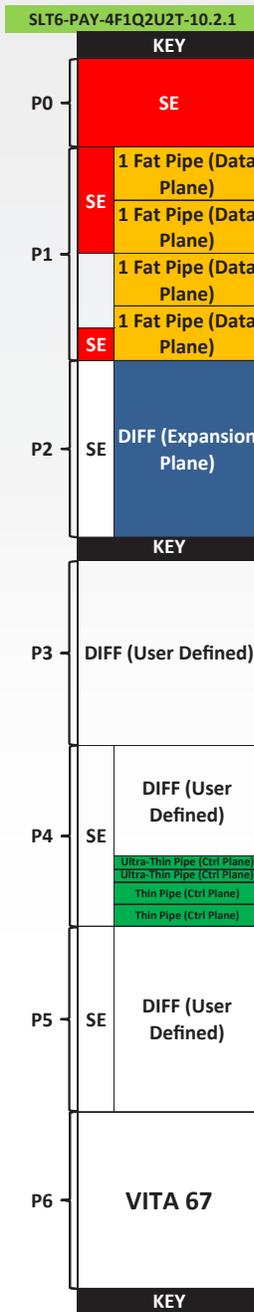
Instantaneous Bandwidths (IBW) in excess of 1 GHz have been implemented and transferred, as well as multiple simultaneous down-converted signal streams of over 100 MHz IBW.

Mercury delivers a full suite of software libraries to facilitate quick customer application development via an application programming interface (API). The product is pre-loaded with diagnostic application software to fully exercise the product capabilities, such as packing and checking of interface links, verifying external memory and monitoring system health. The SCFE6120 Zynq subsystem is loaded with embedded Linux to allow customization of system management and control. A Linux board support package (BSP) as well as a full set of source code is distributed with the product.



SCFE6120 functional block diagram

SCFE6120 slot profile



Environmental

		VITA - Standard Product Environmental Qualification Levels
		Conduction-cooled
		Rugged Level
		Rugged L3**
Temperature	Operating	-40°C to +71°C (at module edge)
	Storage	-55°C to +125°C
	Max Rate of Change	10°C/min
Humidity	Operating*	5-95%, non-condensing
	Storage	100% condensing
Altitude	Operating*	0-70,000ft
	Storage	0-70,000ft
Vibration	Random	0.1 g2/Hz; 5-2000 Hz, 1 hr/axis
	Sine	10G peak; 5-2000 Hz, 1 hr/axis
	Shock	z-axis: 50g; x and y-axes: 80g; (11ms, 1/2-sine pulse, 3 positive, 3 negative)
Salt/Fog		10% NaCl
VITA 47		Contact Factory

* Customer must maintain required cfm level. Consult factory for the required flow rates.

** Card edge should be maintained below 71°C

*** Dependant upon flow rate and coolant

Storage Temperature is defined per MIL-STD-810F, Method 502.4, para 4.5.2, where the product under non-operational test is brought to an initial high temperature cycle to remove moisture. Then the unit under non-operational test will be brought to the low storage temperature. The low temperature test is maintained for 2 hours. The product is then brought to the high storage temperature and is maintained for 2 hours. The product is then brought back to ambient temperature. All temperature transitions are at a maximum rate of 10°C/min. One cold/hot cycle constitutes the complete non-operational storage temperature test. This assumes that the board level products are individually packaged in accordance with ASTM-D-3951 approved storage containers. These tests are not performed in Mercury shipping containers, but in an unrestrained condition. Please consult the factory if you would like additional test details.

All products manufactured by Mercury meet elements of the following specifications: MIL-STD-454, MIL-STD-883, MIL-HDBK-217F, and MIL-I-46058 or IPC-CC-830, and various IPC standards. Mercury's inspection system has been certified in accordance with MIL-I-45208A.

Need More Help? Need a Variant of This Product?

Contact Mercury's Mixed Signal Engineering team at: digital.rf@mercy.com or visit www.mercy.com/mixed-signal-processing for a detailed listing of OpenVPX products

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