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SCFE6921

Configurable, low-latency, 6U OpenVPX™ optical fiber FPGA processing module

High performance in harsh environments

- Virtex® UltraScale+™ FPGA processing power
- Processing subsystem in data path for maximum performance
- OpenVPX™ compliant for easy integration
- Multiple high-reliability cooling options

SCFE6921 with front panel MPO connectors

Mercury's SCFE6921 is a versatile OpenVPX™ FPGA processing module designed for high performance and agile system integration with built-in mid-board fiber transceivers. Incorporating Virtex® Ultrascale+™ FPGA processing power and an updated architecture, this advanced module maximizes performance by locating the processing subsystem directly in the data path.

Mid-board fiber transceivers enable maximum customization and can support high-speed digitization cards. With multiple cooling options available, the SCFE6921 is ideal for applications that require high-performance operation in harsh environments.

SPECIFICATIONS

Physical

- Single-slot 6U OpenVPX form factor
- OpenVPX interface compliant with ANSI/VITA 65-2010 (R2019)

Optical mid-board

- Up to 12 Rx/Tx mid-board fiber transceivers per prosecutor FPGA

Backplane interface

- VITA 65 slot profile SLT6-PAY-4F1Q1H2U2T1H-10.6.1-n
- VITA 66.x capable on P3 and P6

Front panel

- Two MPO-24 fiber connections if front I/O version

Memory

- 20 GB of DDR4 SDRAM

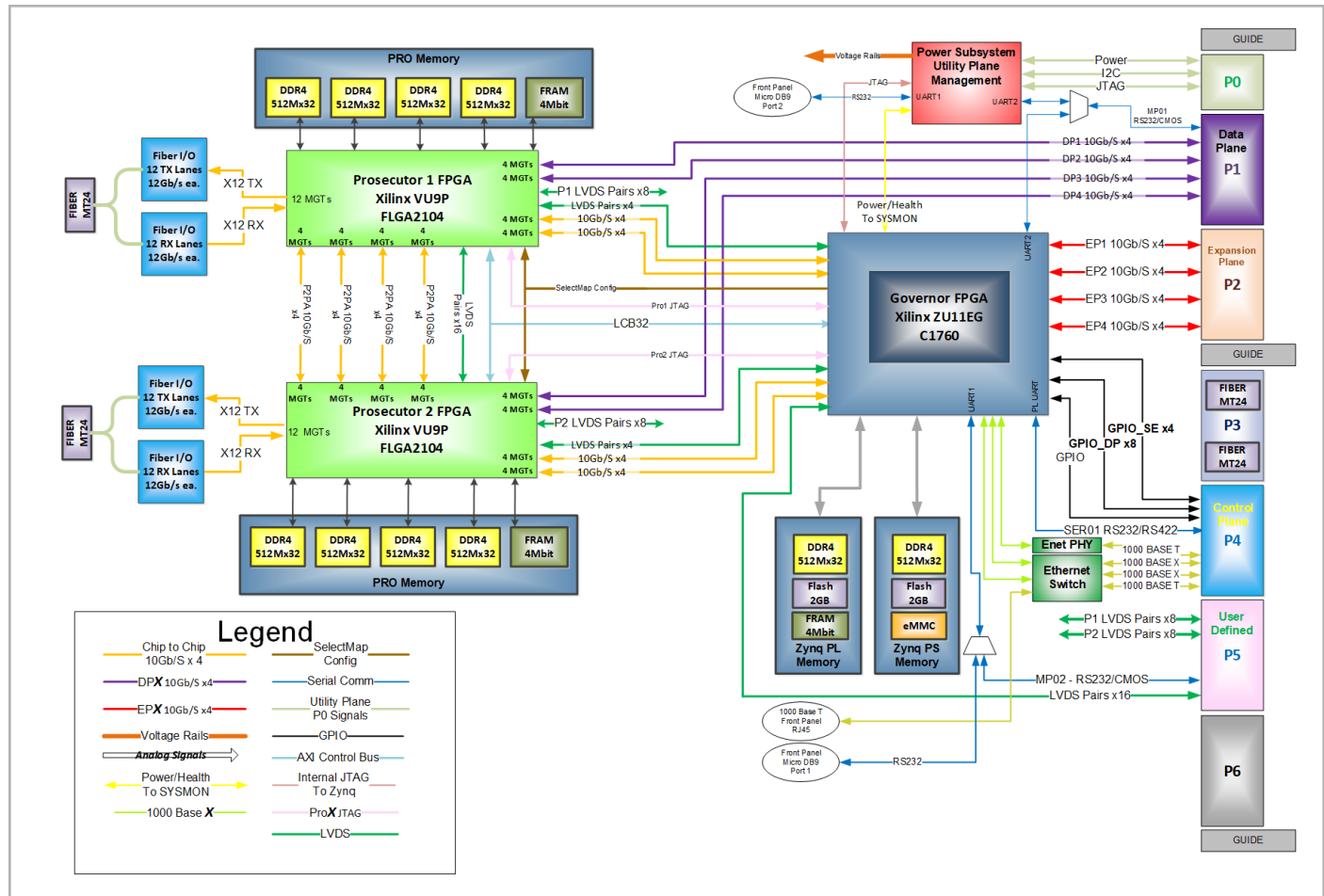**FPGA processors**

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

Other

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

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SCFE6921 BLOCK DIAGRAM

SCFE6921 Functional block diagram

HIGH DATA RATE OPTICAL INTERFACE

Currently implemented at 12.5 Gbps maximum, the SCFE6921 has integrated mid-board fiber transceivers for connectivity to external system components via VITA 66.x or front panel MPO connectors.

PORTABILITY

Multiple generations of this product family provide 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.x 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.

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 use 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.

SCFE6921 SLOT PROFILE
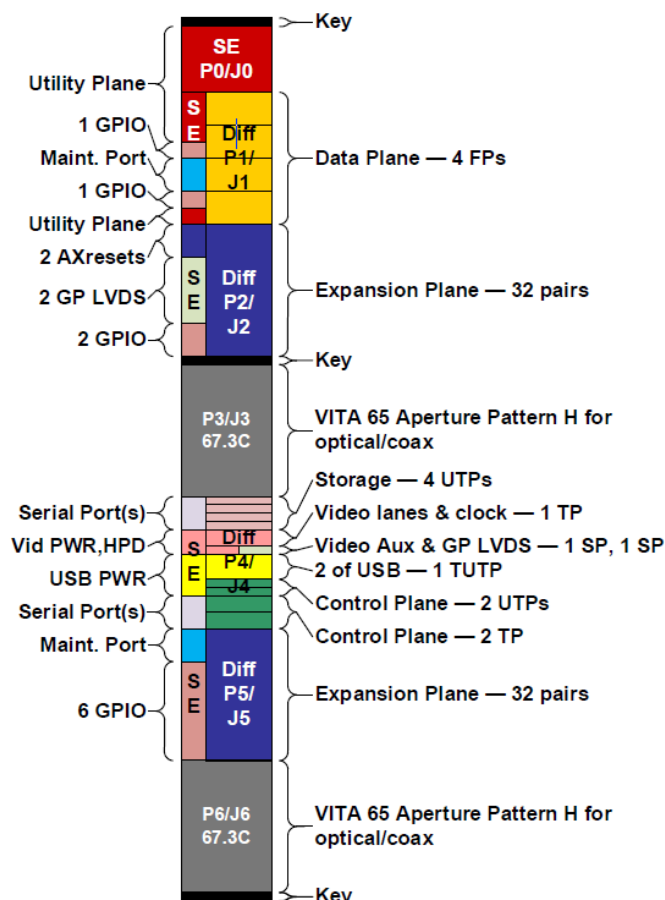
ORDERING INFORMATION

Part Number	Description
910-56160-04	EnsembleSeries SCFE6921 6U OpenVPX in conduction cooled MOTS w/ rear I/O RJ45, DB9, 2 VU9P Prosecutor FPGAs, 1 ZU11EG Governor FPGA,16 MB QDR4, 1.5 GB DDR4, 32 GB SSD w/ integrated fiber channels
910-56160-05	EnsembleSeries SCFE6921 6U OpenVPX in air flow by MOTS w/ rear I/O RJ45, DB9, 2 VU9P Prosecutor FPGAs, 1 ZU11EG Governor FPGA, 16 MB QDR4, 1.5 GB DDR4, 32 GB SSD w/ integrated fiber channels

ENVIRONMENTAL

VITA - Standard Product Environmental Qualification Levels

Rugged Level		Conduction-cooled Rugged L3**	Air Flow-By Rugged L4*
Temperature	Operating	-40° C to +71° C (at module edge)	-40° C to +55C (at air intake)
	Storage	-55° C to +125° C	-55° C to +125° C
	Max. Rate of Change	10° C/min	10° C/min
Humidity	Operating*	5-95%, non-condensing	5-95%, non-condensing
	Storage	100% condensing	100% condensing
Altitude	Operating*	0-70,000 ft	0-70,000 ft
	Storage	0-70,000 ft	0-70,000 ft
Vibration	Ran	0.1 g2/Hz; 5–2000 Hz, 1 hr/axis	0.1 g2/Hz; 5–2000 Hz, 1 hr/axis
	Sine	10G peak; 5–2000 Hz, 1 hr/axis	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

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.

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For technical details, contact:
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