

## VPX7657

### Dual Processor REDI 6U OpenVPX Third Generation Intel® Core™ i7 Single Board Computer Module

#### Power and Flexibility

The Orion VPX7657 single board computer (SBC) is the industry's most flexible, rugged, high-performance, two processor SBC in today's embedded marketplace.

By incorporating the power of the Third Generation Intel® Core™ i7, flexibility with OpenVPX profiles, and unparalleled complement of I/O configurable via the customer defined "Personality Modules", it can adapt to practically any Military, Industrial or Commercial application.

Available in 5 levels of ruggedization from commercial temperature air cooled (0.8" pitch) to extended temperature REDI (Vita 48.2, 0.85" pitch).

With eight VPX 4-lane PCI express fabric ports and an 8-lane PCI express XMC slot, the VPX7657 design has streamlined high-speed board-to-board communication.

The VPX7657's four SATA 6.0Gb/s ports, four Gb Base-Bx ports, two Gb Base-Tx ports, four Serial ports, twelve USB 2.0 ports, forty General Purpose I/O, PMC P14 and XMC P16 I/O are all accessible through the VPX connectors.

#### Features

- Two Third Generation Intel® Core™ i7 Dual or Quad Core Processors
- Two Intel® QM67 PCHs
- 32KB L1 data and instruction caches per core
- 256KB internal L2 cache per core
- Up to 8MB shared data and instruction L3 cache
- Extended Temperature & Rugged REDI (Vita 48)
- OpenVPX System Root Complex, Root Complex, or Peripheral
- Fits multiple OpenVPX profiles
- Host Failover with recovery of many on-board systems by surviving processor
- On-board temperature monitoring
- 70W typical power dissipation
- Up to 8GB DDR3 SDRAM with ECC (per processor) (RS-DIMMs)
- Up to 16GB of on-board NAND Flash (per processor)
- Trusted Platform Module (per processor)
- One 64-bit/133MHz PCI-X PMC slot (PrPMC)
- One 8-lane PCIe XMC slot (Vita 42.3)
- Eight 4-lane PCIe ports on VPX P2/P3 (Vita 46.4)
- Six 10/100/1000 ports (4 Base-BX, 2 Base-TX) (Vita 46.6)
- Four configurable Serial ports (RS-232/RS-422/etc.)
- Forty General Purpose I/O, configurable
- Up to twelve USB 2.0 ports, four configurable
- Four SATA 6.0Gb/s ports
- PCIe Switch to VPX backplane (NTB and DMA options)
- Two Digital Video ports (HDMI/DVI)
- Two Analog Video ports (VGA)
- Two Digital Audio ports
- PMC/XMC P14/P16 Rear I/O (Vita 46.9)
- Various Operating System Software Support
- SRIO (Serial Rapid I/O) Options available

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## Hardware Specifications

### Processor

- Intel®: Two Third Generation Intel® Core™ i7 Processors
- Processor Speed: 1.7GHz to 2.7GHz
- Inst. Cache: 32KB (per core)
- Data Cache: 32KB (per core)
- L2 Cache: 256KB (per core)
- L3 Cache: Up to 8GB shared (per processor)

### Processor Features

- Dual or Quad Core with hyper-threading technology
- Integrated Graphics Controller
- Intel® QM67 Chipset
- Dual channel integrated memory controller

### VPX Connector

- Eight PCI Express Fat Pipes from PCIe Switch

### Local PMC Bus

- PMC Bus Frequency: 33/66/133MHz
- PMC Bus Width: 64-bit
- PMC Signal Voltage: +3.3V
- PCI Compliance: PCISIG PCI R2.2, PCI-X
- PrPMC Support: Yes. Monarch or non-monarch
- PMC I/O access: Standard front panel, VPX P3/P4

### Local XMC Bus

- XMC Bus Frequency: 100MHz
- XMC Bus Width: Double FAT Pipe (x8 Lanes)
- XMC Signal Voltage: +3.3V
- XMC Compliance: Vita 42.0, 42.3, 46.9

### Memory

- DRAM Memory Type: DDR3 SDRAM
- DRAM Memory Size: Up to 8GB per processor
- On-Board User FLASH: Up to 16GB per processor
- Boot EEPROM: 32Mbit

### OpenVPX Profiles

- System Root Complex, Root Complex, or Peripheral

### Payload Slots

- SLT6-PAY-4F1Q2U2T-10.2.1
- SLT6-PAY-4F2T-10.2.2
- SLT6-PAY-8F-10.2.3

### Peripheral Slot

- SLT6-PER-2F-10.3.2

### Supported Backplanes

- BKP6-CEN16-11.2.2-n
- BKP6-CEN10-11.2.4-n
- BKP6-CEN10-11.2.6-n
- BKP6-CEN06-11.2.8-n
- BKP6-DIS06-11.2.10-n
- BKP6-DIS06-11.2.15-n
- BKP6-CEN20-11.2.3-n
- BKP6-CEN05-11.2.5-n
- BKP6-CEN10-11.2.7-n
- BKP6-CEN12-11.2.9-n
- BKP6-HYB17-11.2.11-n

### As either Payload or Peripheral

- BKP6-HYB08-11.2.12-n
- BKP6-CEN09-11.2.13-n
- BKP6-CEN06-11.2.14-n

### Peripherals

#### Four SATA Ports (two per processor)

- Controller: Integrated on PCH
- Speed: 6.0Gb/s
- Access: VPX Connectors P5/P6

#### Four 10/100/1000 Base-BX and Two 10/100/1000 Base-T Ports

- Controller: Intel® Integrated MAC/PHY
- Configuration: Auto Negotiating 10/100/1000
- Access: VPX Connector P4

#### Four Serial Ports

- Controller Type: Integrated on SIO
- Signal levels: Configurable by Personality Module
- Access: Configurable by Personality Module

#### Twelve USB Ports (six per processor)

- Controller: Integrated on PCH
- Version: 2.0
- Access: Eight via VPX P5/P6, four configurable

### General Purpose I/O

- Configuration: 40 GPIO (20 per processor)
- Signal levels: Configurable by Personality Module
- Access: Configurable by Personality Module



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## Hardware Specifications (Cont'd.)

### Miscellaneous

#### Real-Time Clock

- Integrated on PCH

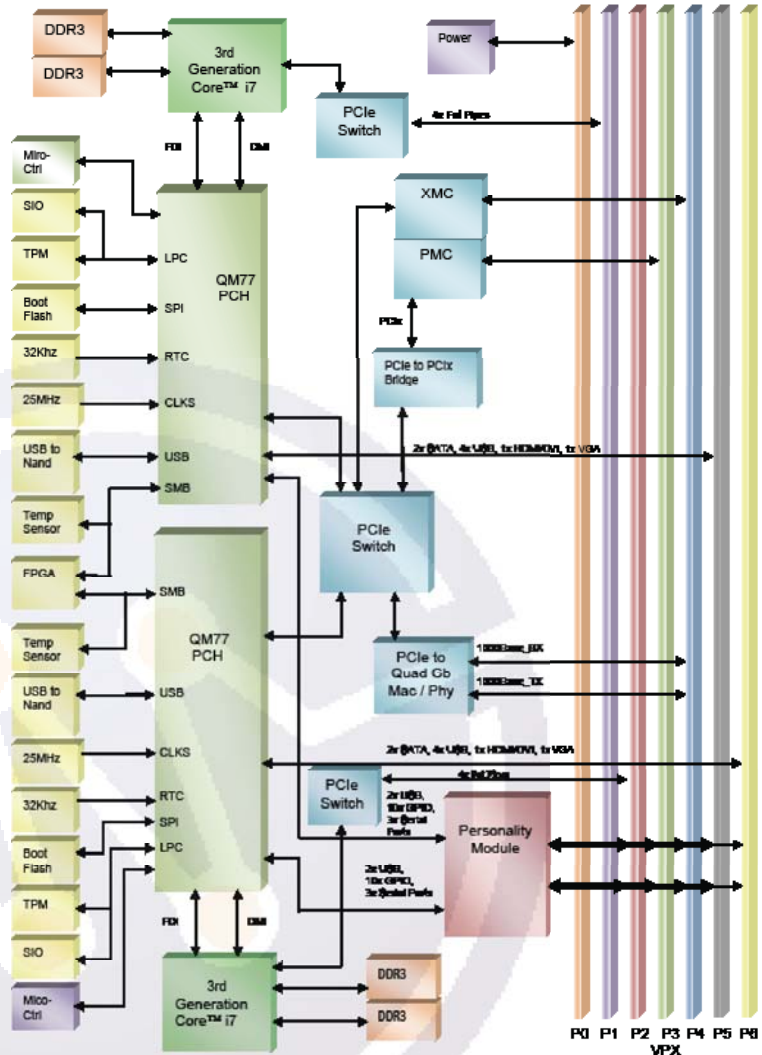
#### Reset

- Power on reset, Push button reset and VPX backplane reset

#### XPD/JTAG

- Processor XPD/JTAG emulator interface

## Block Diagram



## Environmental

	Level 1	Level 2	Level3	Level 4	Level 5
Cooling Method	Air-Cooled	Air-Cooled	Air-Cooled	Conduction	Conduction
Conformal Coating	Standard	Standard	Standard	Standard	Standard
Operating Temperature	0 to +55°C	-40 to 55° C	-40 to 70° C	-40 to 70° C	-40 to 85° C
Vibration	0.002g <sup>2</sup> /Hz*	0.002g <sup>2</sup> /Hz*	0.04g <sup>2</sup> /Hz*	0.1g <sup>2</sup> /Hz*	0.1g <sup>2</sup> /Hz*
Shock	20g Peak sawtooth 11 ms duration	20g Peak sawtooth 11 ms duration	20g Peak sawtooth 11 ms duration	40g Peak sawtooth 11 ms duration	40g Peak sawtooth 11 ms duration
Humidity	0% to 95%, non-condensing	0% to 95%, non-condensing	0% to 95%, non-condensing	0% to 95%, non-condensing	0% to 95%, non-condensing

\*Flat response to 1000 Hz



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## Ordering Information

VPX7657 – A B C D

### Base Model Number

### Processor Options (Dual Processors)

- 1 = 1.7 GHz Dual Core 3<sup>rd</sup> Generation Core I7 (i7-3517UE)
- 2 = 2.5 GHz Dual Core 3<sup>rd</sup> Generation Core I7 (i7-3555LE)
- 3 = 2.3 GHz Quad Core 3<sup>rd</sup> Generation Core I7 (i7-3615QE)

### Memory Options

- 1 = 4GB DDR3, 8GB NAND Flash per processor
- 2 = 8GB DDR3, 16GB NAND Flash per processor

### Reserved

Must be 0

### Environmental Options

- 1 = Level 1
- 2 = Level 2
- 3 = Level 3
- 4 = Level 4
- 5 = Level 5

Orion has successfully generated products utilizing an extensive assortment of microprocessors since 1990. Our design experience ranges from the development of a single, very low power processors to the latest, high-performance, multi-core, multi-processor products. Our single board computer product offering includes both custom and standard form factors such as VPX, VME, CompactPCI and PMC. The majority of our products are offered in five ruggedization levels from standard commercial to rugged, extended temperature with conduction cooling.

We guarantee all of our products are free of manufacturing and design defects, and we provide real customer service and support. Whether it's a small quantity, one-time requirement or a high volume product for years to come, we would like to be your partner in embedded solutions.



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