



**ORION**  
TECHNOLOGIES



## VME7651

Rugged Conduction or Air Cooled 6U Second  
Generation Intel® Core™ i7  
Single Board Computer for VME



# FEATURES

## POWER AND FLEXIBILITY

Orion's VME7651 is a high-performance Intel® Second Generation Core™ i7-based VME64x single board computer (SBC). As a single-width, 6U height board, this high-performance SBC is designed for embedded applications that require significant processing power and system flexibility. Additionally, the conduction cooled rugged version satisfies the most demanding environmental applications.

The VME7651 is designed for both commercial and rugged environments applying BGA CPU packaging and rugged connector systems. By incorporating the power of the Intel® Second Generation Core™ i7 and the unparalleled complement of configurable I/O via the "Personality Modules", the VME7651 can adapt to almost any Military, Industrial or Commercial application. The VME7651's Gb Ethernet ports, four Serial ports, three USB 2.0

Dual or Quad Core Second Generation Intel® Core™ i7 up to 2.2 GHz	Mobile Intel® 6 Series Chipset	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 Design	On-board temperature monitoring	35W typical power dissipation	Up to 8GB of DDR3 SDRAM with ECC	Up to 16GB of on-board NAND Flash
Trusted Platform Module	Two 64-bit/133MHz PCI-X PMC slots (PrPMC)	Two 8-lane PCIe XMC slots (Vita 42.3)	Four Gigabit Ethernet ports	One 10 Gigabit Ethernet port
Four Serial ports: 2x RS232, 2x configurable	Twenty-four General Purpose I/O, configurable	Three USB 2.0 ports	Four SATA ports: 2x 6Gbps, 2x 3Gbps	One VGA Video port
Two Digital Video ports	One Digital Audio port	PMC/XMC front panel & Rear I/O	On-board Real-Time Clock	Various Operating System Software Support

## HARDWARE SPECIFICATIONS

### Peripherals Per FPGA

#### Four 10/100/1000 Ethernet Ports

- Controller: Intel® Integrated MAC/PHY
- Configuration: Auto Negotiating 10/100/1000
- Access: Two VME P0, Two Configurable-Front panel or VME P0

#### Dual Serial Ports

- Controller Type: Two LPC Super I/O Dual UART
- Configuration: DTE
- Access: VMEBus
- Signal Levels: Two ports RS-232, Two ports Configurable by Personality Module

#### General Purpose I/O

- Controller Type: LPC Super I/O
- Access: VME Bus
- Configuration: Up to twenty-four configurable GPIO (Inputs may generate Interrupts)

#### Three USB 2.0 Ports

- Controller: Integrated on Chipset
- Configuration: Host, USB 2.0
- Access: 2x VMEBus, 1x Front Panel

#### Four SATA Ports

- Controller: Integrated on Chipset
- Access: VMEBus
- Speed: Two 6Gbps, two 3Gbps

### Processing Capabilities

#### Processor

- Intel®: Dual or Quad Core Second Generation Core™ i7
- Processor Speed: 1.5GHz to 2.2GHz
- Inst. Cache: 32KB
- Data Cache: 32KB
- L2 Cache: 256KB
- L3 Cache: Up to 8MB shared

#### Processor Features

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

#### VME Bus

- VME Bus Frequency: 33MHz
- VME Address Bus Width: A32
- VME Data Bus Width: D64
- VME Compliance: VME64x 5-row connector
- VME System Controller: Yes, Auto detection
- VME Peripheral Controller: Yes, Auto detection

#### Local XMC Bus

- XMC Bus Frequency: 100MHz
- XMC Bus Width: Double FAT Pipe (x8 Lanes)
- XMC Signal Voltage: +3.3V

#### Local PMC Bus

- PCI Bus Frequency: 66MHz or 33MHz
- PCI Bus Width: 32-bit
- PMC Signal Voltage: +3.3V
- PCI Compliance: PCISIG PCI R3.0
- PMC I/O Access: VME P2
- PCI-X Bus Frequency: 133MHz
- PCI-X Bus Width: 64-bit

#### Memory

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

#### Security

- Trusted Platform Module: Atmel AT97SC3204 (I2C)

### Miscellaneous

#### Real-Time Clock

- Integrated on chipset

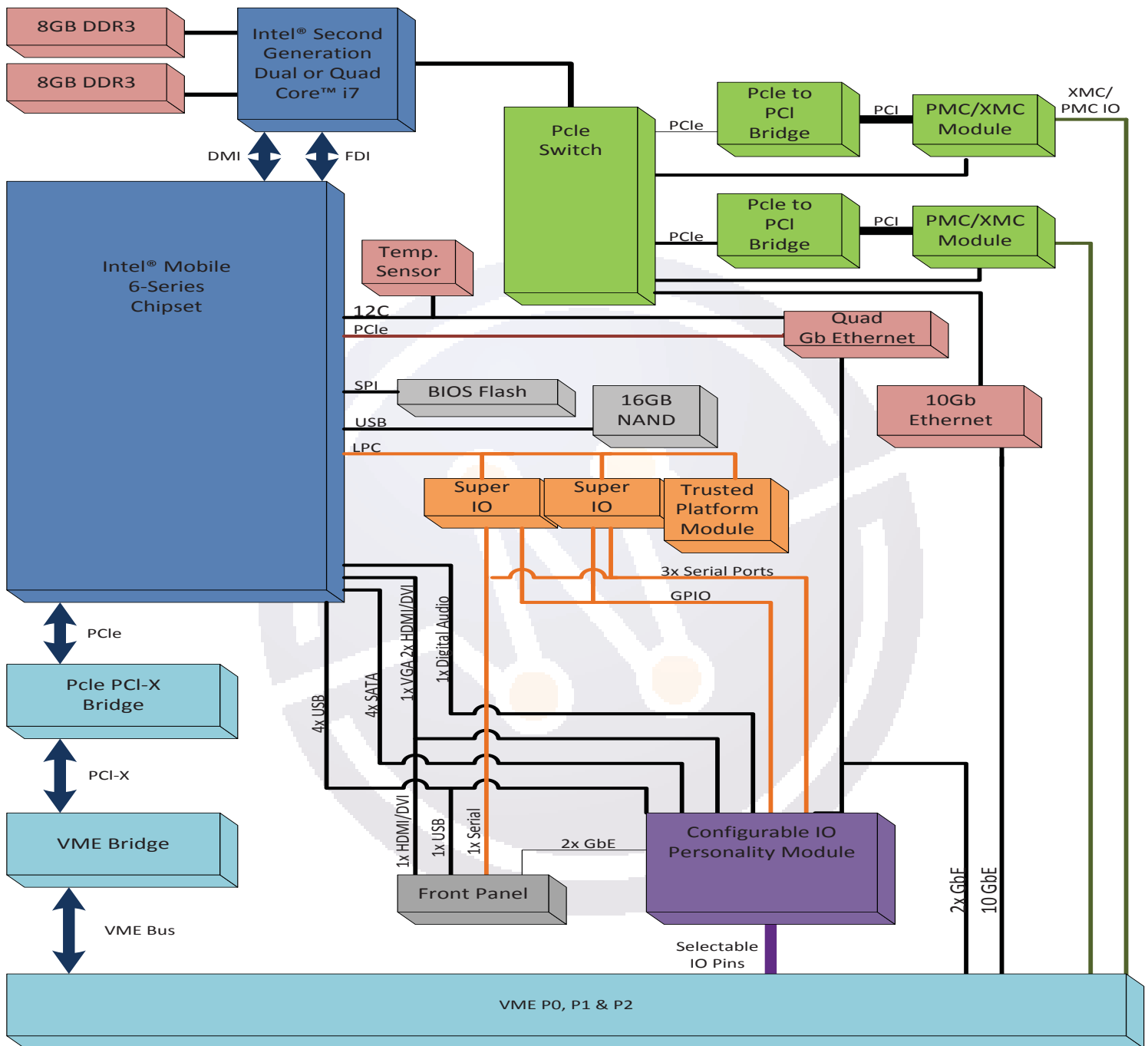
#### Reset

- Front panel & VME P2 reset generates VME system reset when System Controller. Resets local logic when Peripheral controller.

#### LEDS

- Power Good LED
- SATA Active LED
- 6 Ethernet LEDS

# BLOCK DIAGRAM



## Environmental

Level 1	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 saw-tooth 11 ms duration	20g Peak saw-tooth 11 ms duration	20g Peak saw-tooth 11 ms duration	40g Peak saw-tooth 11 ms duration	40g Peak saw-tooth 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

# ORDERING GUIDE

VME7651 – A B C D

## Base Model Number

## Processor Options

- 1 = 1.5 GHz Dual Core Second Generation Core™ i7 (i7-2610UE)
- 2 = 2.2 GHz Dual Core Second Generation Core™ i7 (i7-2655LE)
- 3 = 2.1 GHz Quad Core Second Generation Core™ i7 (i7-2710QE)

## Memory Options

- 1 = 2GB DDR3, 8GB NAND Flash
- 2 = 8GB DDR3, 16GB NAND Flash

## Reserved

Must be 0

## Environmental Options

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

### Contact Us

2100 N. Alafaya Trail Suite 100, Orlando, FL 32826

Tel: (407) 476-2120 Fax: (407) 203-7659

Email: [info@oriontechnologies.com](mailto:info@oriontechnologies.com)

[www.oriontechnologies.com](http://www.oriontechnologies.com)

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 singleboard 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.