

## Power & Flexibility

### Second Generation Core™ i7

The Orion VPX7650 Single Board Computer (SBC) is the industry's most flexible, rugged, high-performance Multi-Core SBC in today's embedded marketplace.

By incorporating the power of the Intel Second Generation Core™ i7 and the unparalleled complement of I/O via the customer configurable "**Personality Modules**", it can be adapted to practically any Military, Industrial or Commercial application.



Available in 4 levels of ruggedization, from commercial temperature air-cooled (0.8" pitch) to extended temperature REDI (Vita 48.2, 0.85" pitch).



With Three Open VPX 4-lane PCI express v2.0 fabric ports and an 8-lane PCI express v2.0 XMC slot, the VPX7650 design has streamlined high-speed board-to-board communication.

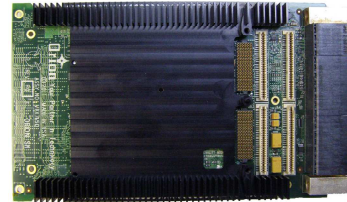
The VPX7650's 2 Gb Base-Bx ports, 2 serial ports, 2 USB 2.0, 8 general purpose I/O and PMC P14 or XMC P16 I/O are all accessible through VPX connectors P1 and P2.



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# VPX7650

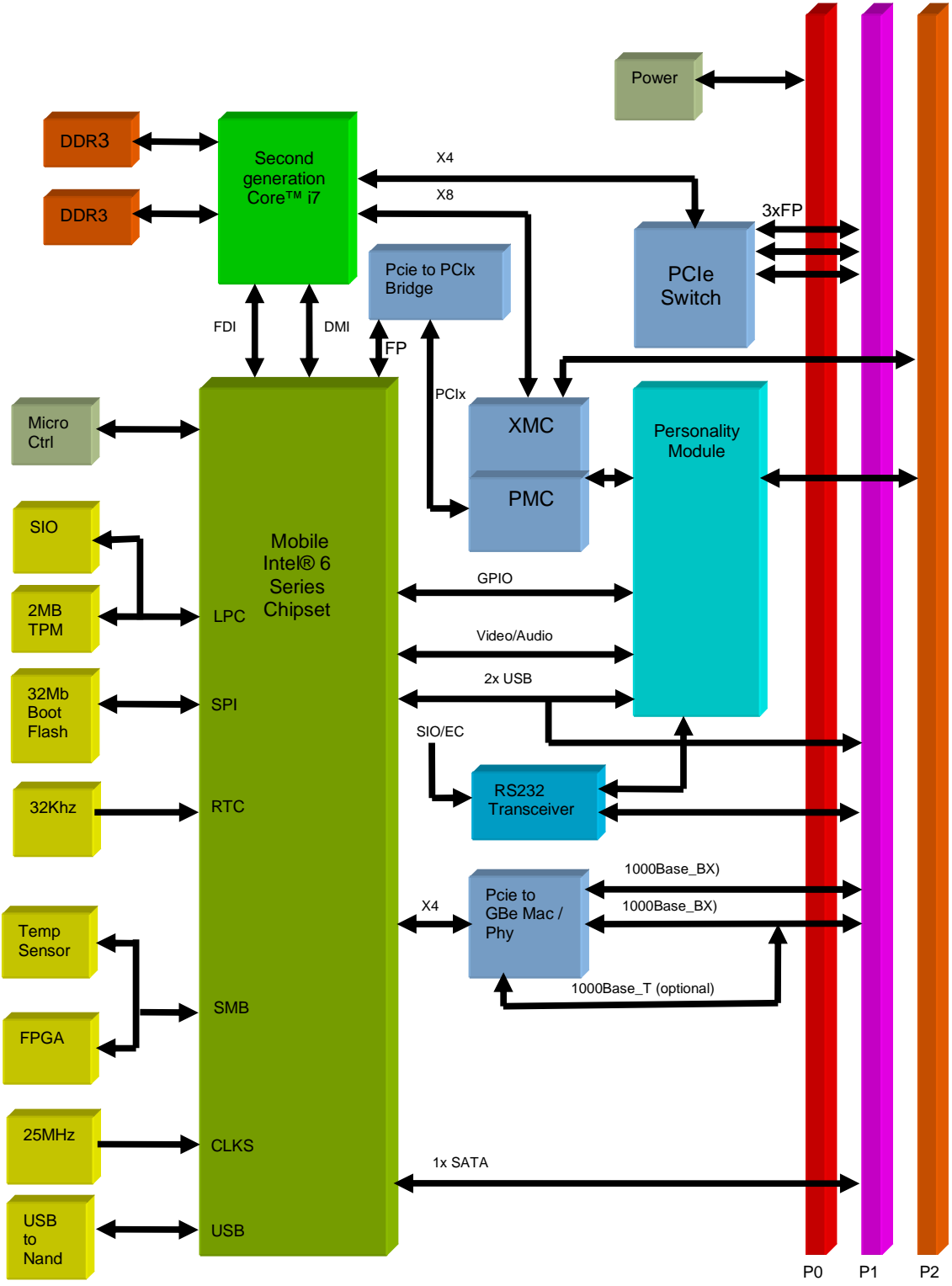
## Multi-Core REDI (Vita 48) 3U Open VPX 2nd Generation Intel® Core™ i7 SBC



### Features:

- ◆ Multi-Core 2<sup>nd</sup> 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 **REDI (Vita 48.2)**
- ◆ On-board temperature monitoring
- ◆ 35W typical power dissipation
- ◆ Up to 8 GB of soldered DDR3 SDRAM with ECC
- ◆ Up to 16 GB of on-board NAND Flash
- ◆ Trusted Platform Module
- ◆ 64-bit/133MHz PCI-X PMC slot (**PrPMC**)
- ◆ **One** 8-lane PCIe XMC slot (**Vita 42.3**)
- ◆ **Three** 4-lane PCIe v2.0 ports on VPX P1 (**Vita 46.4**)
- ◆ **Two** 10/100/1000 Base-BX ports (**Vita 46.9**)
- ◆ **Two** Serial ports, 1x RS232, 2<sup>nd</sup> configurable
- ◆ **Eight** General purpose I/O, configurable
- ◆ **Two** USB 2.0 ports
- ◆ **One** SATA 6.0 Gb/s port
- ◆ PCIe Switch to Open VPX Back Plane
- ◆ PMC/XMC front panel & P14/P16 Rear I/O
- ◆ RTC
- ◆ Various Operating System Software Support
- ◆ Digital Video & Audio ports available
- ◆ Orion's Three-Year warranty & support

**Orion** ...Your partner in technology



VPX7650 BLOCK DIAGRAM

VPX

# Hardware Specifications

## Processor:

Intel:	Dual or Quad Core 2 <sup>nd</sup> 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-core with hyper-threading technology  
Integrated Graphics Controller  
Intel HM65 Chipset  
Dual channel integrated memory controller

## VPX Connector:

Three PCI Express Fat Pipes Version 2.0

## Open VPX profiles:

MOD3-PAY-2F1F2U-16.2.1	MOD3-PAY-1F2F2U-16.2.2
MOD3-PAY-2F2U-16.2.3	MOD3-PAY-1F1F2U-16.2.4
MOD3-PAY-2F-16.2.7	MOD3-PAY-1F4U-16.2.8
MOD3-PAY-8U-16.2.9	MOD3-PER-2F-16.3.1
MOD3-PER-1F-16.3.2	MOD3-PER-1U-16.3.3

## 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. Non-monarch
PMC IO access:	Standard front panel, VPX P2

## Local XMC Bus:

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

## Memory:

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

## PCIe Switch:

PCIe lanes:	Three x4 lanes v2.0
Access:	VPX Connectors P1
DMA support:	Yes

## Peripherals:

### SATA Port:

Controller:	Integrated on Chipset
Speed:	6.0 Gb/s
Access:	VPX Connector P1

### Two 10/100/1000 Base-BX Ports:

Controller:	Intel Integrated MAC/PHY
Configuration:	Auto Negotiating 10/100/1000
Access:	VPX Connector P1

### Dual Serial Ports:

Controller Type:	Integrated on SIO
Signal levels:	Standard RS232
Access:	VPX Connectors P1/P2

### Two USB Ports:

Controller:	Integrated on Processor
Version:	2.0
Access:	VPX Connector P1

### General Purpose I/O:

Configuration:	8 GPIOs
Signal levels:	Configurable by Personality Module
Access:	VPX Connector P2

## Miscellaneous:

Real Time Clock:	Integrated on Chipset
Reset:	Power on reset, Push button reset and VPX backplane reset.
XPD/JTAG:	Processor XPD/JTAG emulator interface
LEDS:	◆ Runtime Status LEDES (front panel) ◆ RJ-45 Ethernet LEDES (front panel)

## Specifications:

Power:	1.5GHz	2.2GHz
VPX Typical +3.3v:	TBD	TBD
VPX Maximum +3.3v:	TBD	TBD
VPX Typical +5v:	TBD	TBD
VPX Maximum +5v:	TBD	TBD
VPX Typical +12v	TBD	TBD
VPX Maximum +12v:	TBD	TBD
Typical Power Dissipation:	TBD	TBD
Max Power Dissipation:	TBD	TBD

## Environmental:

Operating Temperature:	0° to 70°C (commercial) -40° to 85°C (Conduction, measured at the rail)
Storage Temperature:	-40° to 85°C
Relative Humidity:	5% to 95% non-condensing
Board Size:	Single-slot 3U VPX 160mm x 100mm
Weight:	TBD oz, TBD grams with conduction cooled heat frame



# Ordering Information

The following figure illustrates valid VPX7650 model numbers available for ordering.

**VPX7650-xxxx**

**Base Model Number** \_\_\_\_\_

**Processor Options** \_\_\_\_\_

- 0 = 1.5GHz Intel Dual Core 2<sup>nd</sup> Generation Core i7
- 1 = 2.2GHz Intel Dual Core 2<sup>nd</sup> Generation Core i7
- 2 = 2.1GHz Intel Quad Core 2<sup>nd</sup> Generation Core i7
- (A) = Customer specific board configuration

**Memory Options** \_\_\_\_\_

- 0 = 2GB DDR2, 8GB User NAND Flash
- 1 = 8GB DDR2, 16GB User NAND Flash
- \*\* Will have different meaning if Processor option is an "A"

**Temperature/ Ruggedization Options** \_\_\_\_\_

- 0 = Commercial Temperature (0<sup>C</sup> - 70<sup>C</sup>), Air Cooled
- 1 = Extended Temperature (-40<sup>C</sup> -85<sup>C</sup>), Air Cooled
- 2 = Extended Temperature (-40<sup>C</sup> -85<sup>C</sup>), Conduction Cooled
- 3 = Extended Temperature (-40<sup>C</sup> -85<sup>C</sup>), Rugged, Conduction Cooled, REDI
- \*\* Will have different meaning if Processor option is an "A"

**Reserved** \_\_\_\_\_

Must be 0

We will gladly modify any of our products to meet your requirements. Just ask.

At Orion Technologies, our goal is to serve you, our customers. We are dedicated to finding high-quality, cost-effective solutions to meet your application. We will modify any Orion Technologies product or will design a custom solution to fill your requirements.

## Orion Technologies, Incorporated

...Your Partner In Technology

690 Cone Park Court  
Merritt Island, FL 32952  
Phone: 321-452-1670  
Fax: 321-452-1678  
Email: [info@OTIsolutions.com](mailto:info@OTIsolutions.com)  
Web: [www.OTIsolutions.com](http://www.OTIsolutions.com)