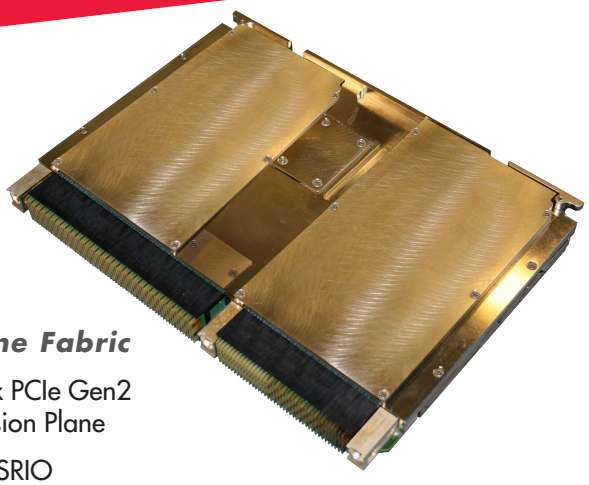
Data Sheet

# VPX6-1956

## VPX Intel® Core™ i7 Quad-Core Single Board Computer



VPX™ VPX REDI™ OpenVPX™

### Features

#### *Intel® Core™ i7 Quad-core Processor*

- 2.1 GHz
- Quad-core CPU
- 6 MB L3 Cache
- Intel® Advanced Vector Extensions (AVX) Floating-point

#### *Memory*

- Up to 16 GB DDR3 SDRAM at 1066 MHz
- Up to 32 GB NAND flash drive

#### *I/O*

- (2) Gigabit Ethernet (SerDes option available)
- (1) AC97 Stereo Audio port
- (4) EIA-232
- (3) EIA-422
- (8) DIO
- (2) Diff I/O
- (4) USB
- (4) Serial ATA (SATA)
- Intel Graphics (2) DVI

#### *Backplane Fabric*

- (1) 16x PCIe Gen2 Expansion Plane
- (4) 4x SRIO

#### *Operating System*

- Windows®
- VxWorks™
- Linux®

#### *Built-in Test*

- BIT Compliant with COTS Continuum features
- CBIT
- IBIT
- PBIT

#### *Ruggedization Levels*

- Air-cooled
- Conduction-cooled
- Conduction-cooled VPX REDI LRM

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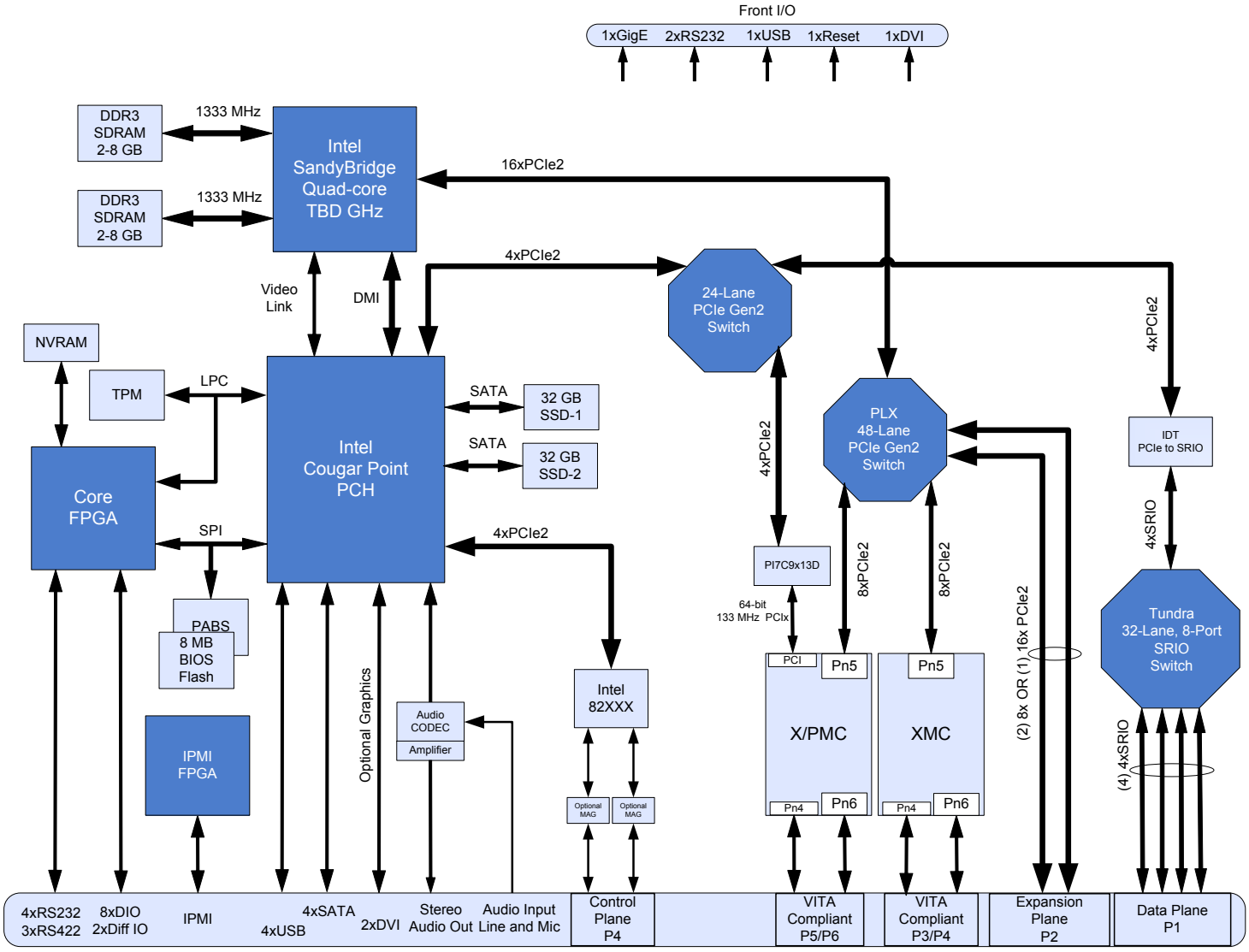
## Introduction

The VPX6-1956 is a rugged, high performance 6U OpenVPX™ single board computer (SBC) based on the new Intel® Core™ i7 next-generation quad-core processor. The VPX6-1956 is a full featured 6U OpenVPX SBC, designed for harsh-environment, air and conduction-cooled aerospace and defense applications. Each of the Core i7's four cores delivers 2.1 GHz of performance, providing advanced Intel Architecture processing on the increasingly popular 6U OpenVPX form factor.

With a wide complement of on-board I/O, Gen2 PCIe fabric, SRIO and XMC expansion, the VPX6-1956 satisfies the most demanding fielded applications for unmanned aerial and ground vehicles, tactical aircraft, armored vehicles and rugged naval systems.

Figure 1: VPX6-1956 Block Diagram





Available in a full range of air- and conduction-cooled configurations, the rugged VPX6-1956 combines the significantly improved floating-point performance of the recently introduced Intel Core i7 processor with the substantial bandwidth and system-enabling features of the 6U OpenVPX form factor. The board's quad-core processor features the new Intel Advanced Vector Extensions (AVX) floating-point instructions, and delivers unmatched performance. The VPX6-1956 is available with up to 16 GB of high-bandwidth DDR3 SDRAM (1333 MHz) and comes with a rich complement of high-speed I/O, including dual gigabit Ethernet, Gen2 PCIe, SRIO, four USB 2.0 ports, one XMC/PMC site, and one XMC site, each supported with eight lanes of Gen2 PCI Express (PCIe). The board's integral high-speed gigabit Ethernet, PCI express (PCIe) fabric and XMC/PMC mezzanine module connectivity enables high bandwidth data flows. Data can also flow from the VPX backplane to the XMC site to support demanding high bandwidth applications such as video acquisition, processing & distribution, and radar and sonar. The VPX6-1956 features high-bandwidth fabric to the backplane via Gen2 PCIe or SRIO to the expansion and data plane connectors. This provides high-bandwidth connectivity between the VPX6-1956 and additional boards in a computing environment.

## VPX Module Format

The Versatile Performance Switching (VPX) module format, governed by the VITA 46 specification and the associated VITA 48 Ruggedized Enhanced Design Implementation (REDI) was established to address the fundamental requirement to provide open-architecture modules that incorporate the high-speed serial interconnect technology that is becoming pervasive in high performance computing. The VPX standard was developed by the leading providers of military commercial-off-the-shelf (COTS) modules to address the major issue of high-speed serial interconnect, as well as incorporate numerous improvements learned after years of integrating VME and cPCI modules. The VPX standard provides:

- 3U and 6U Eurocard form factors, preserving chassis mechanical designs
- Support of four x4 serial interfaces as the primary fabric
- Support of higher power modules and improved cooling
- Improved logistics with two-level maintenance and keying

The VPX module format provides many benefits to integrators of high performance multi-processor systems for radar, electro-optical and signal intelligence applications.

In particular, PCIe functions as a fast connection between processors and the new generation of XMC modules which can easily be placed on VPX format carrier cards.

## Fabric Ports

The VPX6-1956 provides a x16 PCIe Gen2 port (configurable as two x8 PCIe ports) to the backplane on all I/O modes. PCIe channels are routed to the Expansion Plane backplane connector and follow the pin out as defined by VITA 46.4.

Optionally, four 4x SRIO ports are available on the Data Plane backplane connector, also defined by VITA 46.3

These interfaces can be used to interconnect VPX6-1956 SBCs together or to expand PMC/XMC capability using the VPX6-215 6U ExpressReach Carrier.

## XMC Sites

The VPX6-1956 is equipped with two mezzanine sites capable of supporting VITA 42.3 XMC modules and follows the 46.9 pin mapping strategy by providing 24 single-ended and 20 pairs of differential I/O from the mezzanine site to the backplane connectors. On the conduction-cooled card configuration, the XMC site adheres to the VITA 20-2001 (R2005) conduction-cooled PCI Mezzanine Card standard specifications. To optimize the thermal transfer form XMC modules to the base card, the standard VPX6-1956 thermal frame incorporates both the primary and secondary thermal interfaces as defined by VITA 20-2001.

## Software Support

### *Continuum Software Architecture (CSA)*

The VPX6-1956 is supported by a suite of firmware, RTOS board support packages (BSP), communication libraries and signal processing libraries. The Continuum Software Architecture is Curtiss-Wright's suite of firmware and BSP APIs that is common to SBC (VME, cPCI and VPX) and multiprocessor boards. Developers of mixed systems will find a common set of features and software interfaces for all future processing products from Curtiss-Wright. The Continuum Software Architecture is comprised of Continuum Firmware Monitor, Operating System Software, and Continuum Vector Library.



### *Continuum Firmware Monitor*

The monitor provides a command line interface over serial port or Ethernet to allow a user to perform a variety of system integration activities with the card. The monitor provides debug and display commands, diagnostic results display and exerciser controls, non-volatile memory programming and declassification and programming of parameters used to control boot-up and diagnostics. Continuum Built-in-Test (BIT) is a library of diagnostic routines to support Power-up BIT (PBIT), Initiated BIT (IBIT), and Continuous BIT (CBIT) designed to provide 95% fault coverage.

### *Operating System Software*

The VPX6-1956 is supported with an extensive array of software items, which cover all facets of developing application code for the board. Users have the option of choosing to develop with a variety of operating systems and development tools. The following operating systems are supported or planned for the VPX6-1956.

- VxWorks® 6.9
- Wind River® Linux® 4.0 Linux BSP
- Windows® 7 Embedded
- Red Hat® Linux®

### *Continuum Vector Library*

Continuum Vector provides the user with a choice of APIs with support for the Vector Signal Image Processing Library (VSIPL, Core Lite) standard and the popular API established by Floating Point Systems Inc. See the Continuum Vector data sheet for detailed information.

### *Ruggedization Levels*

Air-cooled cards are available at Level 0 and 100. Conduction-cooled cards are available in Level 200 and 300, a 2-level maintenance (LRM) configuration with ESD protective covers.

### Power Consumption

See the following table for power consumption estimate figures for the VPX6-1956 standard product variant base-cards. Power consumption increases as operating temperature rises. Table 1 figures are for the highest rated operating temperature while executing a test application generating CPU processing loads and data traffic representative of a typical customer application. The listed power requirement estimates are based on variants with all four processing cores enabled.

Table 1: Standard Product Variant Power Requirements

| Ruggedization Level | Typical Power (W) |
|---|---|
| Level 0 Air-Cooled | 65 W |
| Level 100 Air-Cooled | 67 W |
| Level 200 Conduction-Cooled | 70 W |

### Warranty

This product has a one year warranty.

### Contact Information

To find your appropriate sales representative:

Website: www.cwcembedded.com/sales

Email: sales@cwcembedded.com

### Technical Support

For technical support:

Website: www.cwcembedded.com/support

Email: support1@cwcembedded.com

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