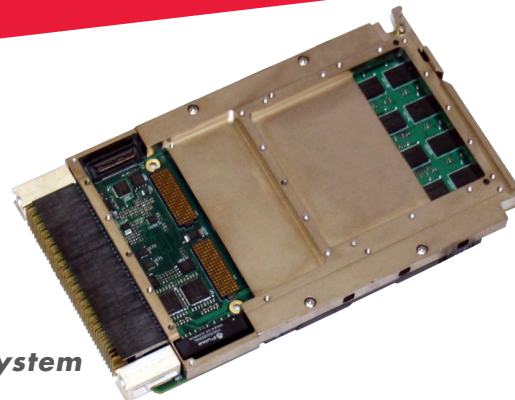# VPX3-1256
VPX™ Intel® Core™ i7 Quad-Core Single Board Computer

Features

Intel® Core™ i7 Quad-core Processor

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

Memory

- Up to 16 GB DDR3 SDRAM
- 16 GB NAND flash drive
- Memory bank DDR3 SDRAM up to 1066 MHz

I/O

- (2) Gigabit Ethernet (SerDes option available)
- (1) AC97 Stereo Audio port
- (2) EIA-232
- (2) EIA-422
- (4) GPIO
- (4) USB
- (4) Serial ATA (SATA)
- Intel Graphics (2) DVI

Backplane Fabric

- (2) 4x PCI Express (PCIe) Gen2

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

Introduction

The VPX3-1256 is a rugged, high performance 3U OpenVPX™ single board computer (SBC) based on the new Intel® Core™ i7 next-generation quad-core processor. The VPX3-1256 is a full featured 3U 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 in a lightweight, compact configuration ideal for size, weight, and power (SWaP) constrained applications. With a wide complement of on-board I/O, Gen2 PCIe fabric and XMC expansion, the VPX3-1256 satisfies the most demanding fielded applications for unmanned aerial and ground vehicles, tactical aircraft, armored vehicles and rugged naval systems.

Learn More
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Above & Beyond

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Embedded Computing
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Available in a full range of air- and conduction-cooled configurations, the rugged VPX3-1256 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 3U 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 VPX3-1256 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, four (4) USB 2.0 ports, and an XMC/PMC site supported with eight (8) 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 VPX3-1256 features high-bandwidth fabric to the backplane via Gen2 PCIe to the P1 connector. This provides high-bandwidth connectivity between the VPX3-1256 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 incorporating 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 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 VPX3-1256 provides two x4 PCIe Gen2 ports to the backplane on all I/O modes. Both ports are routed to the P1 backplane connector and follow the pin out as defined by VITA 46.4. These interfaces can be used to interconnect VPX3-1256's together or to expand PMC/XMC capability using the VPX3-215 3U ExpressReach Carrier.

XMC Site

The VPX3-1256 is equipped with one mezzanine site 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 VPX3-1256 thermal frame incorporates both the primary and secondary thermal interfaces as defined by VITA 20-2001.

Software Support

Continuum Software Architecture (CSA)

The VPX3-1256 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 VPX3-1256 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 VPX3-1256.

◆ VxWorks 6.9 from Curtiss-Wright

◆ Wind River Linux 4.0 Linux BSP from Curtiss-Wright
  Windows 7 Embedded

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 L0 and level L100. Conduction-cooled cards are available in level 200 and L300, a 2-level maintenance (LRM) configuration with ESD protective covers.

Power Consumption

See the following table for power consumption estimate figures for the VPX3-1256 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	55 W
Level 100 Air-Cooled	57 W
Level 200 Conduction-Cooled	60 W

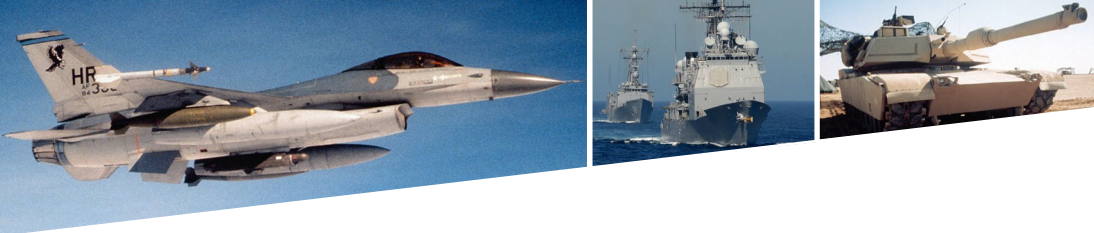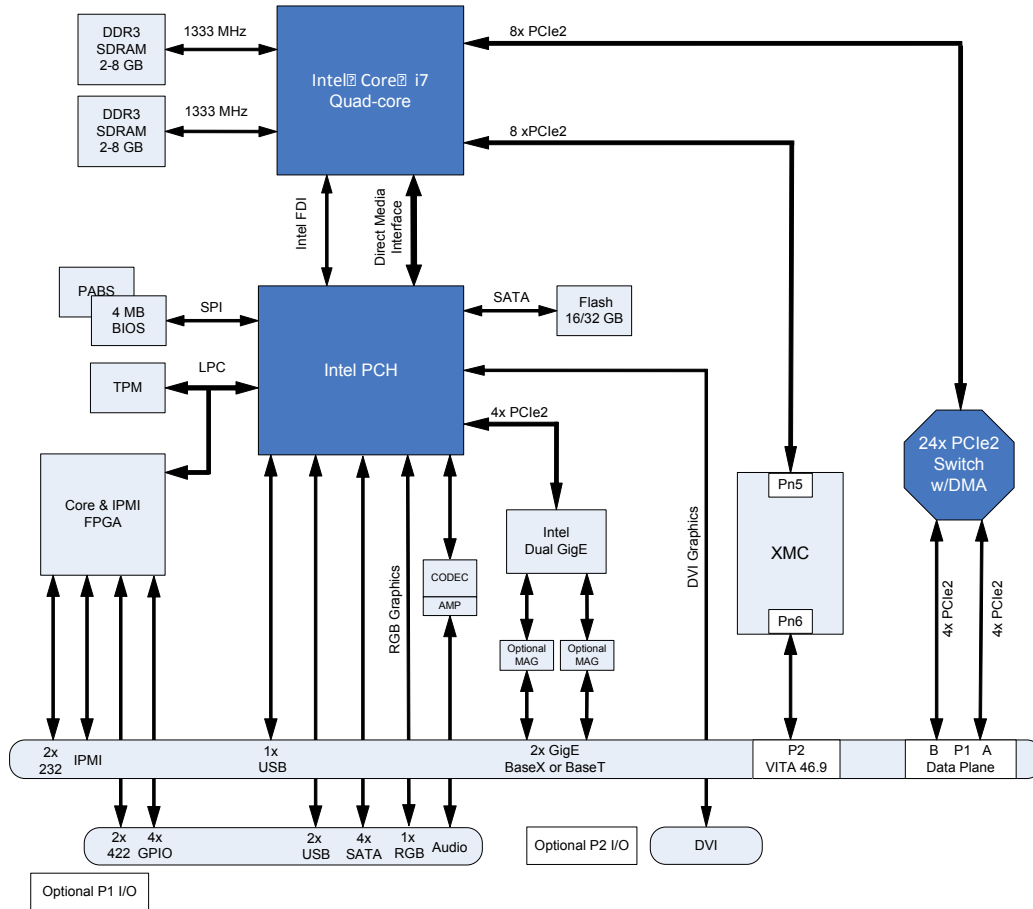## Figure 1: VPX3-1256 Block Diagram

Figure 1: VPX3-1256 Block Diagram

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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