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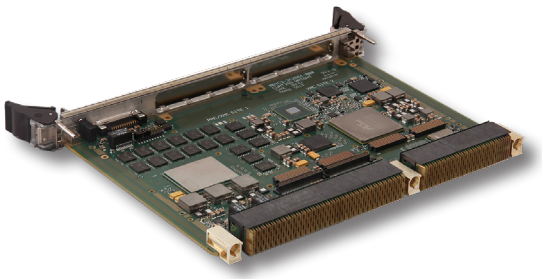
Find the *Curtiss-Wright VPX6-1958-A0* at our website: ***Click HERE***

VPX6-1958

6U VPX™ 4th Gen Intel® Core™ i7 Single Board Computer

CURTISS-WRIGHT

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Key Features

- Intel Core i7 “Haswell” 4th Gen processor
- Quad-Core (8-thread) i7-4700EQ at 2.4 GHz with Turbo up to 3.4 GHz
- Up to 16 GB DDR3
- Up to 128 GB SATA NAND flash
- Supports two PMC/XMC expansion mezzanines
- Available in air-cooled and conduction-cooled versions
- Supports Linux® (Fedora™ and Red Hat® Enterprise Linux (RHEL)), VxWorks®, Microsoft® Windows® Embedded, and LynxOS®

Applications

- High Performance Embedded Computing (HPEC) systems
- General computing and mission processing
- Multi-SBC systems for advanced processing and ISR applications

This product is a member of Curtiss-Wright’s Fabric40™ Program

- Offering end-to-end support for both 10/40 Gbps Ethernet and InfiniBand fabrics, with proven performance OpenVPX Gen3 signaling and reduced signal integrity risks
- Enhancing interoperability and ensuring optimal configuration of all aspects of the data fabric technology

Overview

The VPX6-1958 from Curtiss-Wright Defense Solutions is a rugged, high performance 6U OpenVPX™ Single Board Computer (SBC) that combines Intel’s powerful Core i7 processor with the power and flexibility of the VPX platform’s high speed fabric interconnects.

The VPX6-1958 supports Intel’s latest mobile processor technology, the 4th Generation Core i7-4700EQ processor. Utilizing this advanced Quad-Core CPU and Curtiss-Wright’s proven ruggedization technology, the VPX6-1958 excels in harsh environments, making it ideal for architecting high performance computing and processing systems utilizing DSP, GPGPU and FPGA modules, and/or multiple SBC processors.

With a high speed, dual-channel DDR3 memory subsystem connected directly to the processor supporting up to 16 GB SDRAM, the VPX6-1958 is able to maximize the performance of the multiple processing and GPU cores and AVX2 floating-point processing units of the Core i7 processor. The Core i7 is also equipped with L3 cache, allowing it to process larger vectors at peak rates than previous processor technologies.

Up to 128 GB of SATA NAND flash memory make the VPX6-1958 an ideal SBC for handling applications with demanding storage, data logging and sensor processing requirements.

The VPX6-1958 includes dual mezzanine sites supporting two XMC or one PMC and one XMC module, supporting a wide variety of mezzanine daughter cards.

For Data Plane connectivity, the VPX6-1958 supports dual 40 gigabit fabric ports, supporting 10G and 40G Ethernet as well as InfiniBand® SDR, DDR, QDR and FDR-10 (40G) modes. For Expansion Plane connectivity, the VPX6-1958 supports 16 lanes of PCI Express® (PCIe), with flexible port configurations (1x16, 2x8, 4x4) and speeds up to Gen3 (8GT/s). Data can also flow from the VPX backplane to the XMC site to support demanding high bandwidth applications such as sensor and data processing or video/graphics mezzanines. The VPX6-1958 supports a host of standard I/O including four independent Gigabit Ethernet ports, multiple RS-232, RS-422, SATA and USB ports, discrete DIO, DVI and dual-mode DisplayPort™ and VGA, and analog audio ports. A wide range of popular operating systems are supported, including Linux (Fedora and RHEL), VxWorks, Microsoft Windows Embedded Standard and LynxOS.

Features and Specifications

Form Factor

- 6U OpenVPX, supporting module format MOD6-PAY-4F1Q2U2T

Processor

- Intel Core i7 'Haswell' 4th Gen processor
  - + Quad-Core (8 thread) i7-4700EQ @ 2.4 GHz with Turbo up to 3.4 GHz
  - + 256 KB L2 cache per core, 6 MB Intel Smart Cache
  - + Intel Streaming SIMD Extensions (SSE 4.1/4.2)
  - + Intel Advanced Vector Extensions (AVX and AVX2) floating-point
  - + Intel Trusted Execution Technology (TxT)
  - + Intel Virtualization Technology (VT-x)
  - + Intel HD Graphics 4600 (GT2)

Platform

- 8 Series QM87 Chipset PCH

SDRAM Memory

- 8 or 16GB dual channel DDR3 at 1600 MT/s with ECC

Non-Volatile Memory

- 8 – 128 GB SATA NAND (SLC) flash
- 16 MB SPI flash for BIOS functions

Backplane Fabrics

- 2 x 40 gigabit Data Plane ports supporting 10/40G Ethernet and InfiniBand
- 16 lane PCIe Gen3 Expansion Plane supporting 1x16, 2x8, and 4x4 configurations

Dual Mezzanine Sites

- PMC/XMC Mezzanine Site # 1
  - + 64-bit, 133 MHz PCI-X to PMC
  - + 8-lane PCIe Gen2 to XMC, optional Gen3 with VITA 61 connectors
  - + Jn4 and Jn6 I/O supporting VITA 46.9 mapping P5w1-P64s+X12d+X8d
- XMC Mezzanine Site # 2
  - + 8-lane PCIe Gen2 to XMC, optional Gen3 with VITA 61 connectors
  - + Jn6 I/O supporting VITA 46.9 mapping P3w3-X38s+P4w1-X12d+X8d
- Maximum power for mezzanine sites = 15 watts each

Ethernet Ports

- 2 x Gigabit Ethernet ports supporting tri-speed 10/100/1000BASE-T operation with auto negotiation and auto-MDIX
- 2 x Gigabit Ethernet ports supporting 1000BASE-X (SerDes)
- 1 x 10/100/1000BASE-T Ethernet port is accessible on the front panel (air-cooled only) – re-routed from one backplane BASE-T port

Front I/O (air-cooled only)

- 2 x RS-232 serial channels
- 1 x USB 2.0 port
- 1 x Gigabit Ethernet port (10/100/1000BASE-T)
- 1 x DVI-D graphics port
- Board local reset

Rear I/O

- 2 x RS-232 serial channels
- 2 x RS-422 serial channels
- 8 x Discrete I/O
- 2 x USB 2.0 ports, 1 x USB 2.0/3.0 port
- 4 x SATA 2.0 ports
- 4 x Gigabit Ethernet ports – 2x BT and 2x BX
- 2 x Dual-mode DisplayPort graphics ports
- 1 x RGB/VGA graphics port
- Intel HD audio input and stereo output

Optional Interfaces

- Trusted Platform Module (TPM) support

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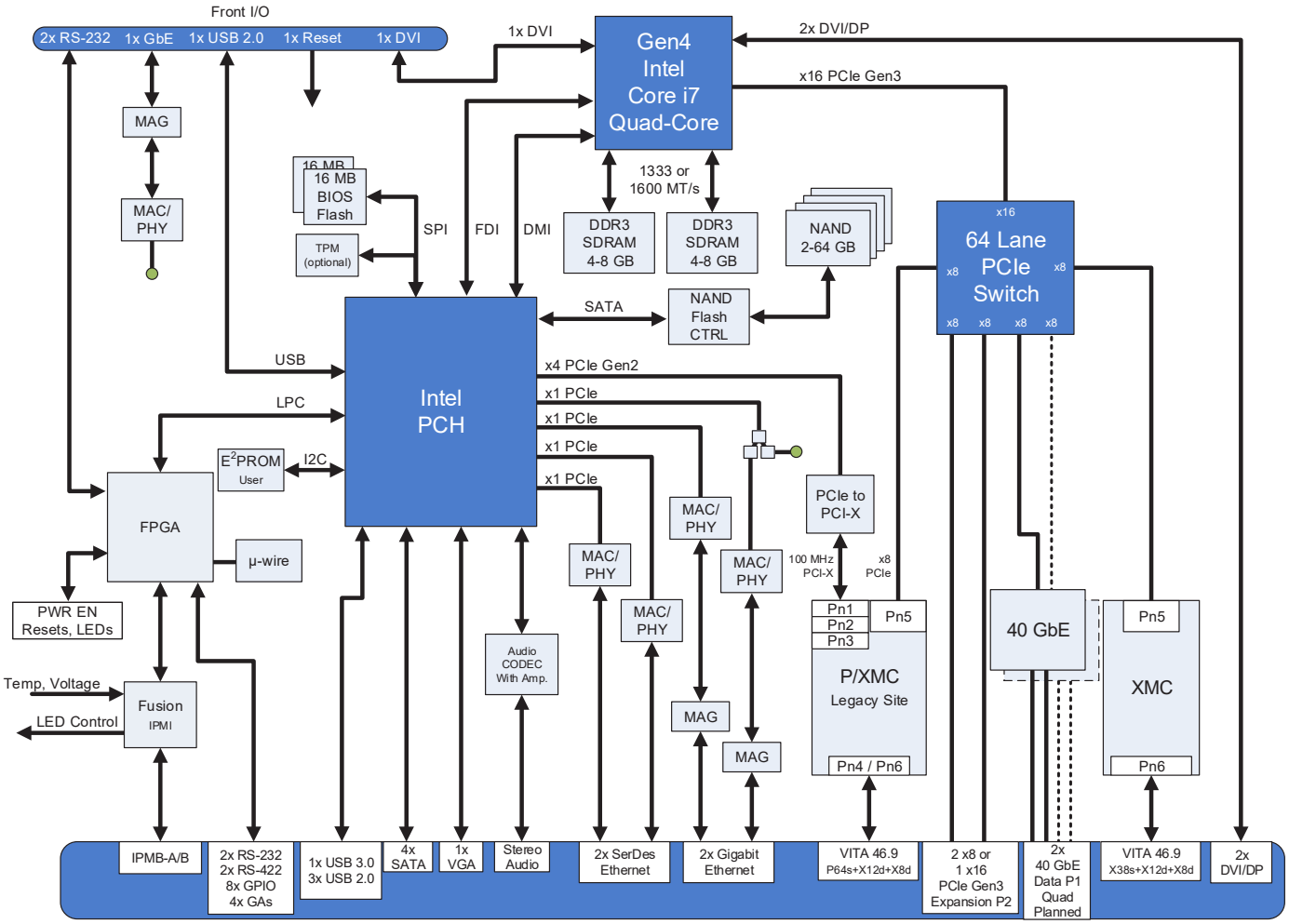


Figure 1: VPX6-1958 block diagram

Software Support

- Linux Fedora and RHEL
- Wind River® VxWorks
- Microsoft Windows Embedded Standard
- LynxOS

Built-in Test

- Power-up BIT (PBIT)
- User Initiated BIT (IBIT)
- Continuous BIT (CBIT)

Power

Power consumption will vary based on operational loading. Values below are guidelines for operation with four cores @ 2.4 GHz at room temperature (23°C) – contact Curtiss-Wright for more details on power consumption.

- Idle power consumption = 24 – 26 watts
- Typical power consumption = 53 watts
- Maximum power consumption = 71 watts

Note: power consumption is exclusive of optional mezzanine power

Environmental

- Air-cooled: available in Level 0 and Level 100
- Conduction-cooled: available in Level 200 and Level 300
- Air-flow Through also available

Weight

- Air-cooled Level 0: 24 oz (665 g)
- Air-cooled Level 100: 42 oz (1203 g)
- Conduction-cooled Level 200: 4.037 lb (1833 g)
- Conduction-cooled Level 300: 4.520 lb (2052 g)

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 required for high performance computing. The VPX standard was developed by the leading providers of rugged embedded commercial-off-the-shelf (COTS) modules to incorporate high speed serial interconnects, as well as incorporate numerous improvements learned after years of integrating VME and CompactPCI® (cPCI) modules.

- 3U and 6U Eurocard form factors, preserving legacy VME chassis mechanical designs
- Support for high speed serial interfaces, with separate fabrics for control, data and expansion planes
- Support of higher power modules and improved cooling
- Improved logistics with two-level maintenance and module keying

The VPX module format provides many benefits to integrators of high performance multi-processor systems for general purpose computing, ISR and radar processing, and signal intelligence applications. In particular, 40 Gbps fabrics and PCIe interconnects offer fast connections between processing modules, supporting both parallel processing and sequential (pipelined) processing architectures.

VPX6-1958 Features

Powerful 4th Gen Intel Core i7 CPU

The Intel Core i7 processor is based on Intel's industry-leading silicon technology and the latest micro-architecture enhancements. This 4th Generation Core i7 processor builds on the tremendous success of the revolutionary micro-architecture and marks the next step in Intel's continual cadence for delivering contemporary technology to the aerospace and defense industry. Intel's 4th Generation Core i7 delivers unmatched performance at the manageable power levels required to support today's size, weight and power (SWaP) sensitive designs.

The VPX6-1958 processor includes the following features:

- Quad-Core (8 thread) i7-4700EQ @ 2.4 GHz with Turbo mode
- Integrated two-channel memory controller with ECC
- 256 KB L2 cache per core, 6 MB Intel Smart Cache
- Intel Streaming SIMD Extensions (SSE 4.1/4.2)
- Intel Advanced Vector Extensions (AVX and AVX2) floating-point
- Intel Trusted Execution Technology (TxT)
- Intel Virtualization Technology (VT-d)
- Intel HD Graphics 4600 (GT2)

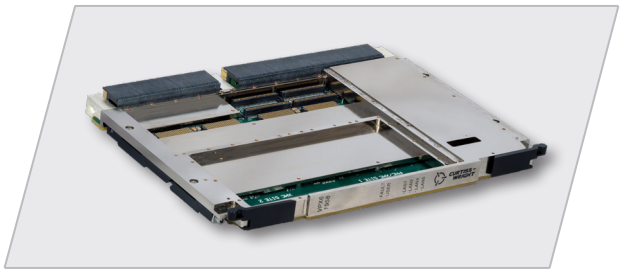


Figure 2: VPX6-1958 conduction-cooled

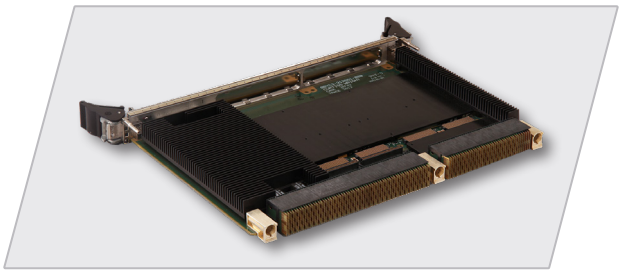


Figure 3: VPX6-1958 air-cooled Level 0

Power Consumption and CPU Tuning

The VPX6-1958 provides extremely flexible and dynamic methods of controlling power consumption. From statically parking cores in the BIOS to dynamically adjusting CPU clocks at run time, the VPX6-1958 performance can be tailored to meet a wide range of processing and power requirements.

Intel 4th Generation Platform Controller Hub

The VPX6-1958 employs the Intel 8 Series QM87 PCH Chipset. This highly integrated PCH handles much of the flow of information between the board's I/O interfaces and the Intel Core i7 Processor.

Dual Data Rate (DDR3) SDRAM

The VPX6-1958 has two independent DDR3 memory controllers supporting independent banks of 72-bit DDR3 SDRAM (64-bit plus ECC). The VPX6-1958 may be fitted with 8 or 16 GB of DDR3 SDRAM.

To preserve data integrity, the SDRAM is provided with ECC circuitry that detects and corrects all single-bit data errors, detects all double-bit errors, and detects all 3-bit and 4-bit errors within the same nibble. The SDRAM is accessible from the processor as well as from the 40G data plane, the Ethernet and PCIe interfaces.

Flash Memory

The VPX6-1958 is configured with 8 to 128 GB of SATA NAND flash memory, as well as 16 MB SPI flash for BIOS functions. Using SLC technology to enhance reliability, the flash will retain data for a minimum of 20 years at +85°C. Read performance of the flash array is optimized in order to minimize system boot up time for applications such as avionics mission computers where fast restarts after power interruptions are critical.

For absolute security against inadvertent flash programming or corruption, a hardware jumper is provided to disable writing to flash. The firmware provides flash programming functions with support for downloading flash images over Ethernet.

Fabric Ports

The VPX6-1958 provides 16 lanes of PCIe to the VPX Expansion Plane, used primarily to connect at the highest possible speeds to an adjacent VPX module. Supporting a flexible configuration of 1x 16-lane, 2x 8-lane, or 4x 4-lane ports, the PCIe ports operate at Gen1 (2.5 GT/s), Gen2 (5.0 GT/s) or Gen3 (8.0 GT/s) speeds, for a throughput of up to 15.7 GB/s for extremely fast data transfers. When connecting multiple SBCs together, a Non-Transparent Bridge (NTB) can be configured on any port. Common uses of the VPX Expansion Plane are to connect the SBC to sensor or signal acquisition modules, or to augment the SBC processor with a powerful graphics module or dedicated GPGPU or FPGA offering additional computational power.

The VPX6-1958 also supports dual data plane fabric ports supporting Ethernet or InfiniBand protocols. For Ethernet connectivity, the ports can be configured to operate at 10G or 40G speeds. For InfiniBand connectivity, the ports can be configured at SDR (5G), DDR (10G), QDR (20G), or FDR-10 (40 Gbps) speeds. Powered by a Mellanox® ConnectX®-3 fabric controller, these fabric ports offer flexible VPX connectivity in distributed mesh or centralized star and dual star architectures.

These fabric interfaces can be used to interconnect multiple VPX6-1958 SBCs together, or to interoperate with Curtiss-Wright CHAMP-AV series DSP processors, GPGPU modules, FPGA modules, and fabric switches.

Dual Mezzanine Sites

The VPX6-1958 is equipped with two mezzanine sites capable of supporting VITA 42 XMC modules. Each XMC site supports x8 lanes of PCIe Gen1, Gen2 or Gen3 rates directly to the on-board PCIe switch. Support for Gen1 and Gen2 rates is with the standard VITA 42 connectors, and support for Gen3 is with optional VITA 61 connectors. Contact Curtiss-Wright for VITA 61 ordering options.

One XMC site provides full Pn6 I/O with VPX backplane signal mapping per VITA 46.9 as X38s+X12d+X8d. The second XMC site provides both Pn4 and Pn6 I/O with VPX backplane signal mapping as P64s+X12d+X8d.

The second mezzanine site also supports a PMC module with PCI-X bus access up to 133 MHz and 3.3V I/O.

On the conduction-cooled card configuration, the mezzanine sites adhere to the VITA 20-2001 (R2005) conduction-cooled PCI Mezzanine Card standard specifications. To optimize the thermal transfer from XMC modules to the base card, the VPX6-1958 thermal frame incorporates both the primary and secondary thermal interfaces as defined by VITA 20-2001.

Four Gigabit Ethernet interfaces

The VPX6-1958 provides four independent Ethernet controllers using Intel i210 devices. Two ports support tri-speed 10/100/1000BASE-T offering full gigabit performance as well as legacy 10/100 compatibility, with auto-negotiation and auto-MDI/MDIX. The other two ports support 1000BASE-X (SerDes) interfaces for board-to-board backplane connections or to directly drive 1000BASE-SX optical transceivers.

Each Ethernet port occupies a separate PCIe domain for multi-enclave systems. For air-cooled modules, one of the backplane 1000BASE-T Ethernet ports is re-directed to the front panel.

The Ethernet controllers integrate a number of features designed to minimize processor loading due to Ethernet traffic. These include dedicated DMA engines, support for jumbo packets up to 9KB, efficient buffer management schemes, checksum calculation for IP, TCP, and UDP, and interrupt coalescence.

Serial ports

The VPX6-1958 provides two RS-232 and two RS-422 serial channels to the VPX backplane, as well as providing access to the two RS-232 serial channels on the front panel for air-cooled modules. The serial ports support asynchronous communications with baud rates independently configurable from 300 to 115200 KBaud.

Discrete Digital I/O (DIO)

The VPX6-1958 provides 8 independent discrete digital I/O signals supported from the core functions FPGA. All DIOs are individually programmable as inputs or outputs. Each DIO is capable of triggering an interrupt upon a change of state, programmable to detect either rising or falling edge. All DIOs are 5V-tolerant.

USB ports

The VPX6-1958 provides four USB 2.0 ports with one backplane port capable of operating as a USB 3.0 port. Two USB 2.0 ports and one USB 2.0/3.0 port are available on the rear VPX backplane, and one USB 2.0 port is available on the front panel on air-cooled modules. All ports include +5V VBUS power.

Each port can handle low speed (1.5 Mbps), full speed (12 Mbps), and high speed (480 Mbps) operation. When operating at low speed or full speed, each port is managed by independent OHCI-compliant controllers internal to the device. One EHCI-compliant controller manages any ports operating in high speed mode.

Four SATA ports

The VPX6-1958 provides four SATA 2.0 interfaces on the rear VPX backplane. Each interface incorporates several performance-enhancing features such as:

- Independent DMA channel with 2K FIFO
- Independent command fetch, scatter/gather, and command executions

An additional SATA port is used internally for SATA NAND flash.

Display interfaces

The VPX6-1958's CPU supports Intel HD Graphics 4600 (GT2), which includes a 400 MHz base clock with up to 1 GHz performance, and 20 graphics execution units with up to 320 GFLOPS performance. The VPX6-1958 provides four display interfaces – two dual-mode DisplayPort and one RGB/VGA port to the backplane, as well as one DVI-D port to the front panel in air-cooled modules. For native DVI support on the backplane, contact Curtiss-Wright for more information.

Depending on the operating system, up to three independent display ports can operate simultaneously.

Audio and stereo interfaces

The VPX6-1958 provides Intel HD Audio, offering 24-bit input and stereo output with a built-in headphone amplifier. One microphone input supporting up to 30 dB pre-amp boost is also provided.

Temperature sensors

The VPX6-1958 provides temperature sensors to measure board and processor temperatures. There is a sensor at each edge of the card and sensors built into the CPU. The card edge sensors can be read by software and they can be configured to generate an interrupt in case of an over temperature condition.

Timers

The VPX6-1958 includes 8 general purpose, high-resolution timers as well as a hardware watchdog timer.

Software can select whether a watchdog exception event causes a software interrupt, a processor reset, a card reset or a system reset.

The watchdog timer can be used in two ways. As a standard watchdog timer, a single time period is programmed which defines a maximum interval between writes to the watchdog register. For increased system integrity, the watchdog can optionally be configured to operate in “Avionics” mode whereby a minimum interval between writes to the watchdog register is also enforced. In other words, writing to the watchdog register too soon or too late causes an exception event.

Multi-board Synchronous Clock

The VPX6-1958 includes a special purpose counter which may be synchronized with corresponding counters on other boards in the same system. This common time base allows a developer to time-stamp messages and/or data buffers, with the knowledge that the local time is maintained at the same value by all the boards in the system. The counter can be set to roll-over to a pre-load value and interrupt on roll-over. This feature is typically most valuable for debugging and instrumenting multi-board applications code, which can present challenges in coordinating the distribution of data items between processors. The MBSC makes use of the VITA 46 25 MHz reference clock and does not require any special backplane wiring.

Optional Interfaces

Trusted Platform Module (TPM) Support

The VPX6-1958 can support an optional Trusted Platform Module (TPM) device. The TPM can be used to create a secure computing environment, ensuring only trusted and signed BIOS and software can execute on the board. Please contact Curtiss-Wright for details on TPM operation and availability.

Software Support

Continuum™ Software Architecture (CSA)

The VPX6-1958 is supported by a suite of firmware, Operating Systems (OS), 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 all SBC (VME, cPCI and VPX) and multi-processor 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 Built-in Test (BIT)

Continuum Built-in Test (BIT) is a library of diagnostic routines to support Power-up BIT (PBIT), Initiated BIT (IBIT), and Continuous BIT (CBIT) for health management of the module. BIT operations are supported through BIOS and software APIs, and can be accessed in customer developed applications.

- Built-in Test PBIT for power-up self-test
- IBIT for user-initiated self-test
- CBIT for continuous self-test

Operating System Software

The VPX6-1958 is supported with an extensive array of software items, which cover all facets of developing and running application code for the board. The following operating systems are currently supported for the VPX6-1958:

- Linux Fedora Core 21 remix, 64-bit (pre-installed from the factory)
- Wind River VxWorks 6.9, 64-bit
- Microsoft Windows Embedded 8 Standard (WES8), 64-bit
- Red Hat Enterprise Linux (RHEL) 7.1, 64-bit
- LynxOS 7

For information regarding additional operating systems support, please contact Curtiss-Wright.

Software drivers for most popular operating systems are also available:

- OpenGL® for graphics performance available for Linux and VxWorks
- OpenCL™ for computational GPGPU performance available for Linux
- Built-in graphics acceleration for Microsoft Windows

Front Panel I/O

To simplify the use of front-panel I/O in a development or lab environment, Curtiss-Wright offers a front panel breakout cable, model CBL-1958-0003. This cable breaks out the front panel’s RS-232, 1000BASE-T Ethernet, USB and DVI-D ports to industry standard connectors. A board reset pushbutton is also provided.

Ruggedization Levels

To cost-effectively address a diverse range of applications, the VPX6-1958 is available in a range of ruggedization levels and mechanical formats. Air-cooled cards are available at Level 0 (0 to 50°C) and Level 100 (-40 to +71°C) and conduction-cooled cards are available at Level 200 (-40 to +85°C). The VPX6-1958 is also available in an Air-flow Through (AFT) design. Full details of Curtiss-Wright's standard Ruggedization Guidelines can be found on the Curtiss-Wright website.

Conduction-cooled modules are also offered with VITA 48 2-level maintenance covers to create a truly field-serviceable LRM.

Rear Transition Module

For building systems in the lab environment, Curtiss-Wright provides a Rear Transition Module (RTM), part number RTM-1958-0000, that plugs into the backside of the VPX6-1958's backplane and provides access to most of the board connections on industry standard connectors. A picture of the RTM6-1958 is shown above in Figure 5.

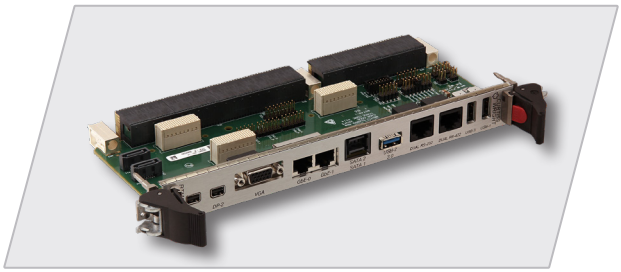


Figure 4: RTM6-1958

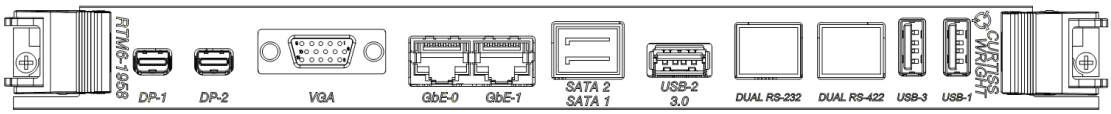


Figure 5: VPX6-1958 Rear Transition Module

Power Consumption

Power consumption of an Intel Core i7 SBC can vary greatly, depending on the processor configuration and loading characteristics. Curtiss-Wright has extensive background in characterizing Intel SBCs and can provide a detailed power calculator to better understand the power vs. performance tradeoffs when designing systems around the VPX6-1958 module.

Table 1 outlines common operating configurations and power measurements for the VPX6-1958. These power figures are actual measured values taken while executing a test application generating CPU processing loads and data traffic representative of a typical customer application.

Although power consumption increases as operating temperature rises, Intel processors may hit a thermal limit, after which they will throttle the processor performance to reduce operational power. The measurements below were determined at 23°C room temperature in an air-cooled environment.

The VPX6-1958 BIOS provides a rich set of controls to statically or dynamically control CPU core parking, CPU clock speed, and Turbo Mode operation.

As CPU clock speeds and board performance may vary depending on the thermal environment. Please consult Curtiss-Wright for additional details.

TABLE 1 Power consumption under various loading conditions

PROCESSOR CONFIGURATION	TYPICAL POWER Note 1	HIGH CPU, NO GFX Note 2	MAX POWER Note 3
4 cores @ 2.4 GHz	53W	60W	71W
2 cores @ 2.4 GHz	45W	47W	65W
2 cores @ 800 MHz	37W	36W	55W

Notes:

1. CPU cores 50%, GFX cores 60%, memory r/w stress test
2. CPU cores 100%, GFX cores 0%, memory r/w stress test
3. CPU cores 100%, GFX cores 100%, memory r/w stress test

Ordering Information

The VPX6-1958 is ordered with the following part number convention. Not all possible configurations are offered – see Ordering Configurations below or contact Curtiss-Wright for additional configurations.

TABLE 2	VPX6 - 1958 – uvwxyz
PART NUMBER	DESCRIPTION
VPX6-1958-A0wxyz	Air-cooled Level 0, 0 to 50°C
VPX6-1958-A1wxyz	Air-cooled Level 100, -40 to +71°C
VPX6-1958-C2wxyz	Conduction-cooled Level 200, -40 to +85°C card edge
VPX6-1958-F1wxyz	Air-flow Through (AFT)
w: Mechanical format	1: 1.0” (25.4 mm) pitch front panel and metalwork for air-cooled modules, 0.8” (22.32 mm) pitch for conduction-cooled modules 3: 0.85” (21.59 mm) pitch for conduction-cooled modules with 2LM covers 7: Air-flow Through (AFT) configuration
x: Memory configuration	DRAM / Flash › 8: 8 GB SDRAM / 8 GB Flash › A: 16 GB SDRAM / 16 GB Flash
y: Processor options	1: Quad-core Intel 4th Gen Haswell @ 2.4 GHz
z: I/O Mode	0: Dual 40G data plane 1: No data plane fabric

Ordering configurations

A summary of popular ordering configurations are shown below. For other models or configurations, consult Curtiss-Wright for availability.

TABLE 3				
MEMORY		RUGGEDIZATION		
DRAM	FLASH	AIR-COOLED		CONDUCTION-COOLED
		LEVEL 0	LEVEL 100	LEVEL 200
8 GB	8 GB	VPX6-1958-A01811	VPX6-1958-A11811	VPX6-1958-C21811
16 GB	16 GB	VPX6-1958-A01A11	VPX6-1958-A11A11	VPX6-1958-C21A11

TABLE 4	Models with dual port 40G data plane fabric		
MEMORY	RUGGEDIZATION		
DRAM	FLASH	AIR-COOLED		CONDUCTION-COOLED
		LEVEL 0	LEVEL 100	LEVEL 200
8 GB	8 GB	VPX6-1958-A01810	VPX6-1958-A11810	VPX6-1958-C21810
16 GB	16 GB	VPX6-1958-A01A10	VPX6-1958-A11A10	VPX6-1958-C21A10

TABLE 5 Accessories	
PART NUMBER	DESCRIPTION
CBL-1958-0003	› VPX6-1958 Front Panel Breakout Cable › Provides access for: 2 x RS-232 ports on DB-9, 1 x GbE port on RJ45 jack, 1 x USB on USB plug, 1 x push button reset switch, and 1 x DVI-D connector
RTM-1958-0000	› Rear Transition Module for VPX6-1958 › Provides breakout connectors for most 1958 board I/O

TABLE 6 Software	
PART NUMBER	DESCRIPTION
DSW-1958-6210-FED6	Fedora 21 64-bit BSP for VPX6-1958, includes driver source code
DSW-1958-0690-VXW6	Wind River VxWorks 6.9 64-bit BSP for VPX6-1958
DSW-1958-6730-RHL6	Red Hat Enterprise Linux (RHEL) 7.3 64-bit BSP for VPX6-1958, includes driver source code
DSW-1958-7700-WES6	Microsoft Windows Embedded 7 Standard 64-bit (WES8)
MNT-1958-LNX	Annual maintenance and Software Upgrade Program (SUP) for VPX6-1958 Linux (Fedora and RHEL)
MNT-1958-VXW	Annual maintenance and Software Upgrade Program (SUP) for VPX6-1958 Wind River VxWorks
MNT-1958-WES	Annual maintenance and Software Upgrade Program (SUP) for VPX6-1958 Microsoft Windows Embedded Standard
DSW-MATH-INTEL-LNX	Linux optimized MATH software (API) for x86 supporting VSIPL, FFTW and VECTOR libraries. Optimized for Intel processors with SSE and AVX 2.0 instruction set extensions. Development license permits software development for one project with unlimited users and no run-time fees.
MNT-MATH-INTL-LNX1	Annual maintenance and Software Upgrade Program (SUP) for DSW-MATH-INTEL-LNX. 1-year term.
MNT-MATH-INTL-LNX3	Annual maintenance and Software Upgrade Program (SUP) for DSW-MATH-INTEL-LNX. 3-year term.

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