Data Sheet

VPX3-216

3U VPX/VPX-REDI ExpressReach XMC Carrier Card

Features

Mezzanine Support

- Single XMC site with PN5-PN6 connectors
- 78-bits of XMC I/O routed as per VITA 46.9
- High-performance XMC site supporting x8 PCI Express® (PCIe) link as per VITA 42.3
- XMC site supports +5V/+12V and +/- 12V_AUX power

I/O Configuration

- XMC I/O
  - Single XMC site with 78 I/O routed to the backplane as per VITA 46.9 X8+12D38S pinout
  - This provides x20 100 Ohm different pairs and 38 single-ended signals with a nominal impedance of 50 Ohms

Other Features

- +5V or 12V XMC operation (build option)
- Power management features thru IPMI
- Available in a range of ruggedization levels
  - Air-cooled Level 0 and 100, and conduction-cooled Level 100 and 200 per VITA 46.0 (.8" pitch)
  - Conduction-cooled per VITA 48.2, Type 1 card (.85" pitch with top and bottom covers, compatible with 1.0" pitch usage) upon customer request
- Utility Features
  - IPMI controller
    - Provides ability to power on and off the XMC, control of the status LEDs, ability to read XMC FRU and ability to read temp sensors
- Front Panel Indicator Provisions
  - A red Fail LED is provided that can be set by the I2C bus, the default state is OFF
  - A green LED is provided that goes on when all on-board power supplies are within specification

Overview

Curtiss-Wright Controls Embedded Computing's VPX3-216 is one of a family of modules from Curtiss-Wright Controls to employ the new open architecture VITA 46 standard and OpenVPX. VITA 46, also known as "VPX" was collaboratively developed by COTS industry leaders which included prime military integrators to marry high-speed serial interconnect such as Serial RapidIO® (SRIO) and PCI Express® (PCIe). It is well suited to the embedded rugged applications which can take advantage of and utilize this form factor and feature set in their demanding applications.

The VPX3-216 3U VPX ExpressReach carrier card is a member of the 3U VPX line of embedded ruggedized products. Designed to integrate with Curtiss-Wright Controls mezzanine cards (XMCs), as well as other third party cards,

VPX VPX REDI OpenVPX OpenVPX Ready

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this fully ruggedized carrier card, expands functionality of its host single board computer (SBC) by providing the ability to expand I/O capability without requiring additional SBCs.

The VPX3-216 has been designed to handle a single XMC mezzanine cards providing a host SBC to easily expanded its I/O capability. The VPX3-216 is a passive XMC carrier in that it does not deploy a switch between the mezzanine and the fabric port, hence it can be used to host mezzanines of various fabric types (PCIe, SRIO). It also provides a IPMI management interface design to VITA 46.11 requirements.

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 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 CompactPCI (CPCI) modules. The VPX standard, in short provides:

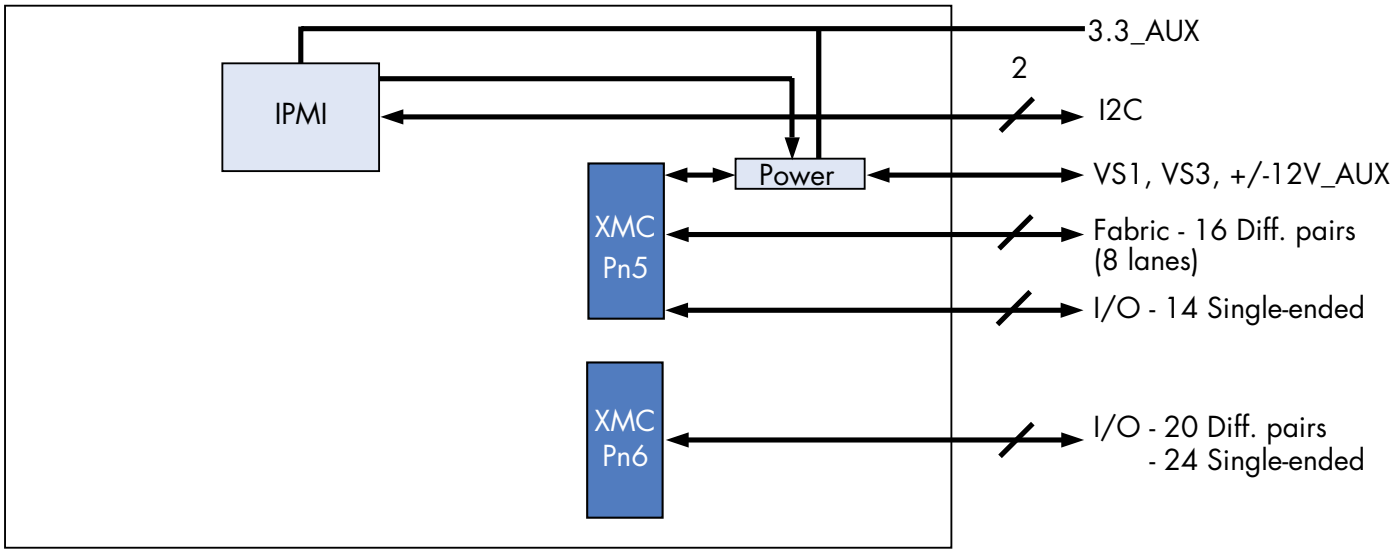
- 3U and 6U Eurocard form factors preserve chassis mechanical designs
- Support up to x8 serial interfaces as the primary fabric
- Support of higher power modules and improved cooling
- Improved logistics with two-level maintenance and keying

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

Backplane Fabric Ports

The VPX3-216 connects to another card via a single up to 8-lane fabric port thru the VITA 46 P1 connector (ports A,B). As the port does not terminate on a switch or re-drivers but is routed directly to the XMC site, it can be used for various fabrics such as SRIO or PCIe.

Figure 1: VPX3-216 Block Diagram



XMC Site

The VPX3-216 is equipped with one mezzanine site capable of supporting a VITA 42.2 XMC module. The XMC site is connected to the backplane through an 8-lane host interface on the Pn5 connector. As this is a passive carrier, it could also be used with SRIO as per 42.3 for one x4 lane port.

The VPX3-216 is available in one I/O variant. The I/O is mapped according to the VITA 46.9 draft specification which provides for controlled impedance, matched length differential pairs. It is routed as per the X8+12D38S pattern.

On conduction-cooled cards, the XMC site adheres to the VITA 20- 2001 (R2005) Conduction-cooled PMC standard specifications. To optimize the thermal transfer from XMC/PMC modules to the basecard the standard VPX3-216 thermal frame incorporates both the primary and secondary thermal interfaces as defined by VITA 20-2001.

Table 1: XMC site specifications provides details on the capability of the mezzanine site.

Table 1: XMC Site Specifications

Function	Site 1
Fabric Interface	16 100 Ohm differential pairs (eight fabric lanes)
Pn6 I/O	78 signals to VITA 46 P1 & P2 per VITA 46.9, pattern X8+12D38S
Differential Routing	100 Ohm differential, 50 Ohm nominal for Pn6 I/O signals
XMC Power	5V or 12V (build option)
Power	Designed to support a 25W XMC

Reference Clock

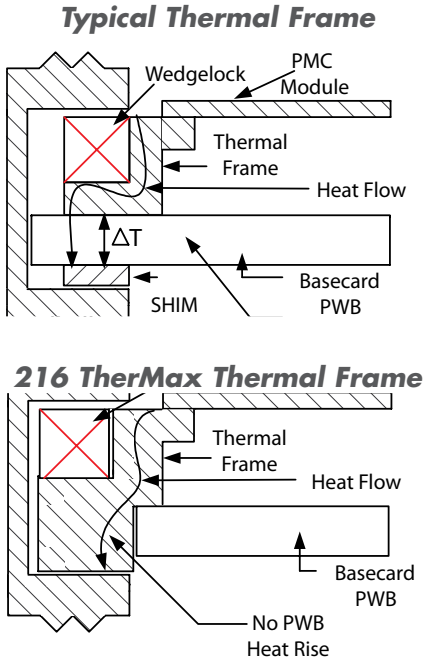
For applications running with PCIe fabrics and require a reference clock - the VPX3-216 provides a 100MHZ reference clock on the PN5 connector. Note: this reference clock is not referenced to another clocks, hence cannot be used for data recovery.

TherMax-style Thermal Frame

A TherMax™ thermal frame provides an unbroken metallic path from the XMC sites and shunted components to the back- side cooling surface of the card therefore minimizing the temperature rise to these devices. In comparison, a typical thermal frame simply sits on top of the PWB and forces heat to flow through the PWB which has a high-thermal resistance compared to aluminum.

Figure 2: TherMax Diagram

A TherMax thermal frame eliminates the PWB heat rise inherent in a standard thermal frame

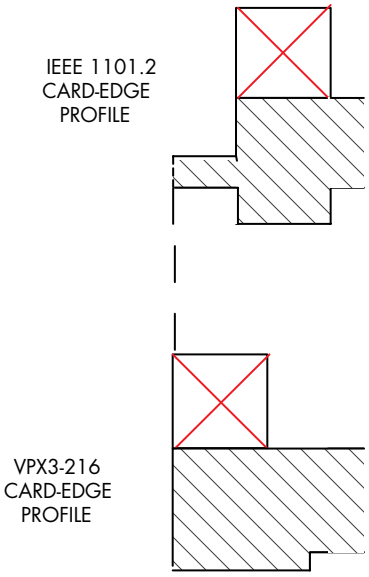


Full-width Thermal Interface to Back-side Slot Wall

To minimize the temperature rise from the mating slot wall of conduction-cooled enclosures to the back-side thermal interface region of the VPX3-216, the VPX3-216 thermal frame maximizes the thermal interface area by extending the frame to the full width of the card, as illustrated in Figure 3. This deviation from the IEEE 1101.2 standard, which calls for the thermal frame to be notched for compatibility with card guides in standard air-cooled chassis, has the benefit of lower card operating temperatures and increased long-term reliability. During test and integration activities where it may be desirable to install a conduction-cooled VPX3-216 into an air-cooled card-cage, this can normally be accomplished simply by removing the card guides.

Figure 3: Card-edge profile deviates from IEEE 1101.2

VPX3-216 Card-Edge Profile is Optimized to Provide a Full-width Thermal Interface to the Back-side Slot Wall



Status Indicators & Controls

The VPX3-216 supports two front panel indicator LEDS. A red fail LED is provided that can be set via IPMI controller, the default state is OFF. A green LED is provided that goes on when all backplane power supplies are within specification. Should any of the on-board power supplies fail; the LED will not be lit.

IPMI Interface

The VPX3-216 supports a IPMI interface as per VITA46.11. The IPMI interface is capable of:

- reading the temp sensor, and reporting fault conditions.
- enabling or disabling the power to the XMC site.
- reading the board current.
- of reporting the card status.
- controlling the front panel leds.
- reporting PBIT results upon request.
- reporting state of XMC Present.
- reporting the XMC FRU.
- reporting the state of the XMC MBIST signal.

As per VITA 46, the IPMI controller is powered off the 3.3V_AUX.

The VPX3-216 can also be used without IPMI controller thru a strapping option.

Power Requirements

The XMC site can be powered by either 5V or 12V thru a build option. Power is sequenced to the XMC site thru a backplane power monitor. The power to the site can also be enabled and disabled via the IPMI controller.

The XMC site is also provided with +/-12V_AUX, as well as 3.3V_AUX.



Specifications

The tables below show the power, dimensions and weight characteristics of the card.

Table 2: VPX3-216 Power Requirements

Voltage	Current (A)
3.3V_AUX	< 1A
5.0V	Not used - routed to XMC Site. Variant dependent.
12V (VS1/VS2)	Not used - routed to XMC Site. Variant dependent.
12V_AUX	Not used - routed to XMC Site.
-12V_AUX	Not used - routed to XMC Site.

Table 3: VPX3-216 Dimensions & Weight

Option	Dimensions	Weight (grams)
Air-cooled 1.0″ option	Per VITA 48.1 1.0″ pitch	240
Conduction-cooled	Per VITA 46 0.8″ pitch	285
Conduction-cooled LRM	Per VITA 48.1 0.85″ pitch	420

Notes:
1. The air-cooled format is designed to fit chassis with 0.8″ slot pitch. For convenience it is shipped with a 1″ front panel to accommodate installation in 1″ pitch chassis.
2. Air-cooled cards available in temperature ranges 0 and 1.
3. Conduction-cooled cards available in temperature ranges 1 and 2.
4. Conduction cooled cards available in a covered, 2-level maintenance LRM configuration.
5. Refer to Ruggedization Guidelines factsheet for more information.

Table 4: VPX3-216 Cooling Air Requirements

Configuration	Temperature Range	Air-Flow
Stand alone with no XMC	-40°C to 71°C	dependent on XMC installed

Notes:
The temperature refers to the inlet temperature at the card. The VPX6-216 has low air-flow requirements. The air-flow requirements for the XMC is what should be taken into consideration when calculating air flow.

Ruggedization Levels

Air-cooled cards are available in Levels 0, 100. Conduction-cooled cards are available in Levels 100 and 200 and a 2-level maintenance (LRM) configuration with ESD protective covers. See the Curtiss-Wright Controls ruggedization guidelines fact sheet for more information.

Circuit card assembly is done to Class 3 standards of IPC-A-610C, Acceptability of Electronic Assemblies. Standard conformal coating is acrylic PWB meets UL 94 V-0 flammability rating.



Ordering Information

The VPX3-216 is ordered with the following part numbers.

Part Numbers

See chart below.

VPX3 - 216 - u v w x y zz

- zz: Standard Prefix for 3U VPX cards
- 216: Model Number
- u: Cooling Method:
  - A: Air-cooling
  - C: Conduction-cooling
- v: Temperature Range:
  - 0: 0° - 50°C (Air-cooled only)
  - 1: -40° to +71°C (Air-cooled only)
  - 2: -40° to +85°C
  - 5: -25° to +50°C (Level 50) (Customer Specific only)
- w: Mechanical
  - 1: 0.8" pitch, no 2-level maintenance support, 1" faceplate air-cooled
  - Format:
  - 3: 0.85" pitch, 2-level maintenance support (covers)
- x: Backplane I/F:
  - A: fabric ports
  - 16 fabric ports routed as per VITA 46.3/4
- y: Reserved
- I/O mode
  - 0: XMC with VITA 46.9 X8+12D38S, 12V power (standard product)
  - 1: XMC with VITA 46.9 X8+12D38S, 5V power

Standard Product limitations:
- 2 level maintenance covers (LRM) are only available with conduction-cooled variants.
- Level 100 conduction-cooled will be available as customer specific variants with CM Service

Warranty

This product has a one year warranty.

Contact Information

To find your appropriate sales representative, please visit:

Website: www.cwcembedded.com/sales

Email: sales@cwcembedded.com

Technical Support

For technical support, please visit:

Website: www.cwcembedded.com/support1

Email: support1@cwcembedded.com

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