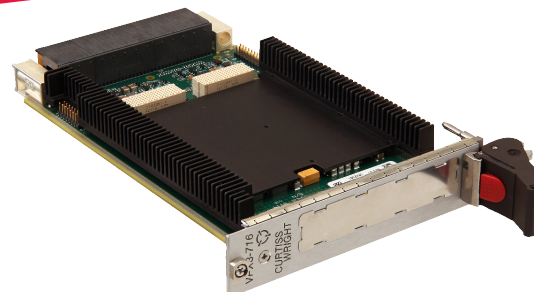




VPX3-716

High Performance Graphics Processor



Features

- ◆ 3U OpenVPX™ ANSI/VITA 65
 - MOD3-PAY-1D-16.2.6-1,2
 - MOD3-PAY-2F-16.2.7-1,2
 - MOD3-PER-2F-16.3.1-2,3
- ◆ AMD Radeon™ E8860 GPU (575E/1125M)
 - 768 GFLOPS SPFP
- ◆ Six independent display outputs:
 - Single/dual link DVI
 - DisplayPort™ 1.2
 - Non-interlaced Analog RGB
 - Interlaced Analog – STANAG 3350, RS-170, RS-343
- ◆ 2 GB dedicated video memory (72 GBps)
- ◆ Universal Video Decoder supporting dual HD streams
- ◆ Universal Video Encoder
- ◆ One XMC site including monarch mezzanine and peer-peer support
- ◆ X86 Windows® 7/8 and Linux® driver support
- ◆ RTOS driver support for Power Architecture® and Intel®
- ◆ Wind River® VxWorks®, Green Hills® Software, INTEGRITY® and others
- ◆ Multicore/hypervisor support for VxWorks
- ◆ FAA DO-178C/EASA ED-12C level A certifiability
- ◆ Available in air-cooled level 0 and conduction-cooled level 200 ruggedization levels
- ◆ 15 year longevity
- ◆ Lead-free
- ◆ Rear Transition Module for access to I/O during development

Overview

The VPX3-716 is an industry-leading rugged 3U OpenVPX, high performance graphics processor based on the AMD E8860 Graphics Processing Unit (GPU). The E8860 is the latest embedded discrete GPU from AMD that meets the long lifecycle availability required for military programs through the use of a suite of CoreAVI® software drivers and 20-year component supply program. It features six independent graphics outputs, 2 GB of dedicated video memory, universal video decoders, universal video encoder and an XMC site supporting both peripheral and processor mezzanines. Its large complement of dedicated video memory, combined with its very high bandwidth, make it ideal for use in GPGPU compute and demanding graphics-rich applications that require extensive video processing and display capabilities. The VPX3-716 is especially well-suited to support embedded training, moving maps, Geographic Information Systems (GIS), 360 degree situational awareness, Diminished Vision Enhancement (DVE) and other graphics, video and compute intensive applications.

VPX™ Module Format

The VPX standard provides support for higher power modules and improved cooling, among other benefits. This capability enables running the E8860 GPU at higher core clock frequencies than could be afforded with the lower thermal management capability for mezzanines while maintaining full rugged conduction cooled compliance.

The additional board space of a 3U VPX module permits the optional function to convert two E8860 GPU outputs to those typically used today such as DVI and STANAG 3350 to harness the E8860 features such as its high count independent output heads.

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The VPX3-716 was designed with standard processor mezzanine support so a single slot high performance graphics solution is available. With a P2020 based XMC-109, for example, this effectively inverts the traditional graphics mezzanine on a processor card and in so doing tips the performance to the graphics functionality while providing sufficient processing capability to manage the application.

Video Interfaces

The VPX3-716 provides six independent heads of graphics output with the physical outputs having the following configuration:

1. Two heads can be configured for two single link DVI or as a single dual link DVI. These GPU direct DVI outputs are converted on board to true DVI electrical interfaces, eliminating the need for external dual mode adapters.
2. Two heads can be individually configured to a single link DVI or an analog output
3. Two heads that are DisplayPort. These two outputs have a factory configuration option to route directly to the XMC site (default is to the backplane)

Interlaced and Custom Video Modes

The ability of a graphics solution to easily handle unique legacy video interfaces is a critical requirement to system integrators. Curtiss-Wright Defense Solutions IP provides unique advantages to the user, allowing generation of interlaced video outputs that support standard and custom interlaced video formats. These outputs can be used simultaneously with the latest high performance interfaces offered by the VPX3-716.

Universal Video Decoder

The Universal Video Decoder (UVD) on the E8860 is improved over previous generations with added support for MPEG2 in addition to the existing H.264 capabilities. Along with the MPEG2 support the HD stream handling doubled to two 1080p streams to support Multiview Video Coding (MVC) which is used commercially in 3D Blu-ray.

At lower resolutions the design handles up to 10 streams simultaneously with the total resolution not greater than two HD decodes.

Fabric Ports

The VPX3-716 provides two x4 PCIe Gen2 ports (or one x8 PCIe Gen2 port) 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.

XMC Site

The VPX3-716 is equipped with one mezzanine site capable of supporting VITA 61 XMC modules and follows the 46.9 Pn6 pin mapping strategy by providing 8 single-ended and 12 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 VPX3-716 thermal frame incorporates both the primary and secondary thermal interfaces as defined by VITA 20-2001 and can support mezzanines with a Total Dissipated Power (TDP) of up to 25W with full L200 conduction-cooled environment compliance.

Table 1: Output Interfaces

Interface Type	Maximum Pixel Rate	Format/Resolution
Digital Single Link DVI	162 MP/s (megapixels per second) for 24 bpp output	Standard VESA resolutions up to 1920x1200 @ 60 Hz reduced blanking
Digital Dual Link DVI	268.5 MP/s for 24 bpp output	Standard VESA resolutions up to 2560x1600 @ 60 Hz
Digital Display Port	Four, two or one link at 5.4 GHz link rate per link	Standard VESA resolutions up to 2560x1600 @ 60 Hz
Analog RGB HV	164 MHz	<ul style="list-style-type: none"> ◆ Interlaced: <ul style="list-style-type: none"> - RS-170 640x480, - STANAG 3350 Class A, - STANAG 3350 Class B and - STANAG 3350 Class C ◆ Non-interlaced: <ul style="list-style-type: none"> - Standard VESA resolutions up to 1600x1200 @ 60 Hz



The VITA 61 connector provides designed-in support for PCI Express® (PCIe) 2.0 and high bandwidth signals with a baseline of 5+ GHz throughput versus the 3.125 GHz of the VITA 42 connector. In addition, durability is also enhanced with a rated 500 mating cycles versus 100 for the VITA 42 connector. Although the VITA 61 and VITA 42 connectors are not intermateable, the VITA 61 connector utilizes the exact same board footprint as the VITA 42 connector. As a result, no changes to the printed circuit board layouts are necessary to upgrade existing mezzanine modules to VITA 61.

In addition to supporting peripheral mezzanines, the VPX3-716 mezzanine site also fully supports processor mezzanines. This effectively inverts the traditional graphics mezzanine hosted on a processor card to unleash uncompromised graphics and video processing while not occupying any additional slots within a system.

To support additional graphics and video processing, two of the GPU DisplayPort outputs can be routed directly to the XMC site with a factory build option. This feature provides a mechanism for additional video output format conversions, video capture and overlay to cross domain guard and further customization by either Curtiss-Wright or the system integrator.

Peer-peer transfers are supported to transfer data directly to the GPU dedicated video memory through the onboard PCIe switch.

Driver Software Support

The VPX3-716 is supported by CoreAVI's suite of embedded software drivers, including OpenGL® ES 2.0, OpenGL SC 1.0, OpenGL 1.3, OpenCL™ 1.2 and H.264/MPEG 2 video decode. The CoreAVI software drivers are designed to enable advanced graphics, video support and power management on all popular real-time and safety critical operating systems including Wind River VxWorks. These drivers are available from Curtiss-Wright, simplifying procurement and support with a single point of contact.

The drivers also include an extensive library of Built-In Tests (BIT).

For Intel architecture platforms running Windows or Linux, there are alternative drivers available to download directly from AMD supporting OpenGL 4.2, OpenCL 1.2, DirectX® 11.1 and H.254/MPEG 4 video decode.

Safety Certification

For applications that require safety certification, CoreAVI's software suite includes FAA RTCA DO-178C/EASA ED-12C driver certification packages supporting up to and including level A certifications.

For DO-254, a certification package will be available from CoreAVI for the GPU supporting up to Design Assurance Level (DAL) C.

Variants and Customization

The VPX3-716 is available in two main configurations, one being the full configuration and the second being a GPU/XMC site-only configuration (i.e. no video converter).

Please contact Curtiss-Wright if there are additional requirements as we are continuously monitoring the market to assess if and when variants with different features should be introduced. Technologies that we are watching to determine applicability to the VPX3-716 include: NTSC/PAL/RS-170 video capture, HD-SDI and ARINC-818.

Curtiss-Wright also has a Modified COTS (MCOTS) program where standard COTS products can be modified for simple changes such as matching existing system pinouts up to more complex modifications like form factor and/or functional customizations. Please contact Curtiss-Wright to discuss your program requirements.

Ruggedization Levels

Air-cooled cards are available at level L0. Conduction-cooled cards are available in level 200. Please contact Curtiss-Wright if additional ruggedization level support is required.



Specifications

Table 2: VPX3-716 Power Requirements

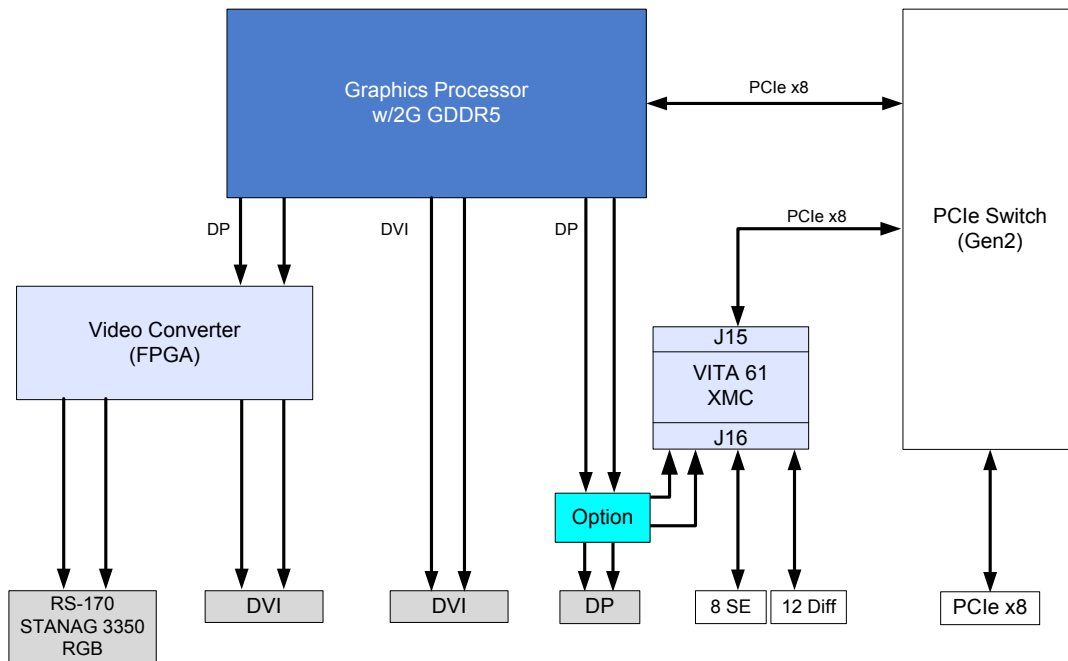
Ruggedization Level	Maximum Power
Level 0 Air-cooled	47W
Level 200 Conduction-cooled	47W

Table 3: VPX3-716 Size and Weight

Cooling	Dimensions (l x w)	Weight
Air-cooled	160 mm x 100 mm	< 450 g
Conduction-cooled	160 mm x 100 mm	< 700 g

The graphics drivers include support for power management which can be utilized to reduce power.

VPX3-716 Block Diagram



Warranty

This product has a one year warranty.

Contact Information

To find your appropriate sales representative:

Website: www.curtisswrightds.com/sales

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Technical Support

For technical support:

Website: www.cwcdefense.com/support

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