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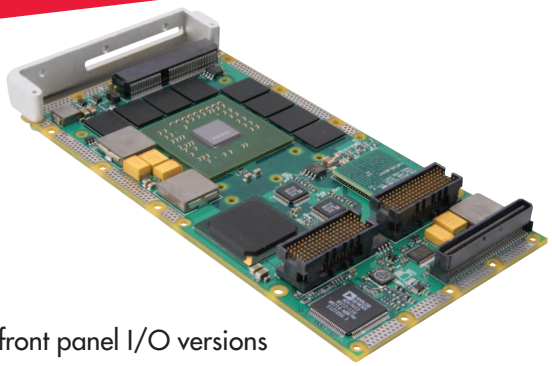




Data Sheet

XMC-710

Dual Independent Output Graphics Controller with Capture Capability



Features

- NVIDIA® GeForce® Go 7700 GPU (G73M) with x8 PCI Express® (PCIe) interface
- 512MB DDR2 SDRAM
- Dual independent video output channels:
  - Non-interlaced RGB HV (up to two channels)
  - Single-link DVI (up to two channels)
  - Dual-link DVI
  - Interlaced outputs supporting RS-343, STANAG 3350 (A, B and C), and RS-170 (up to two channels)
  - TV output supporting NTSC or PAL
  - User-defined interlaced and non-interlaced modes (up to two channels)
- Analog output synchronization support
  - Separate H & V
  - Composite
  - Sync-on-Green or Sync-on-All (red/green/blue)
- One video capture input channel:
  - Interlaced TV(NTSC/PAL), RS-170 and STANAG B&C
  - For other video capture input, Curtiss-Wright Controls Embedded Computing offers the XMC-270, a high-end video frame grabber
- PCIe rev 1.0a
- Voltage requirements:
  - VPWR (5V or 12V), 3.3V and 3.3V AUX
  - +12V and -12V required for analog output channels F and G
- Rear and front panel I/O versions available
- Available in air- and conduction-cooled ruggedization levels
- Available software includes:
  - RTOS: Wind River® VxWorks® 6.x, GPPLE Wind River® GPP Linux®
  - X11R6, OpenGL ES 2.0, SC 1.0, EGL 1.3, ES Shader Language 1.0
  - Linux® and Windows® XP drivers (as provided by NVIDIA®)
- Supported on various PPC and x86 host cards

Overview

The XMC-710 is the first high-performance Graphics Controller XMC that supports dual independent graphics outputs with capture capability. The XMC-710 is targeted for the rugged deployed military and aerospace graphics sub-systems where high-performance and small form factor are key requirements. Based on the industry standard ANSI-VITA 42.3- XMC PCI Express® (PCIe) Protocol Layer Standard, the XMC-710 can be integrated with most host cards with a compliant XMC interface. Combined with the high-performance NVIDIA® GeForce® Go 7700 (G73M) GPU and Curtiss-Wright Controls' proven video capture and unique video processing IP, the XMC-710 is a high-performance solution with the capability to support the popular legacy and modern video interfaces seen in today's demanding and complex land, naval, and avionics graphics and imaging applications.

Learn More
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Figure 1: XMC-710 Block Diagram

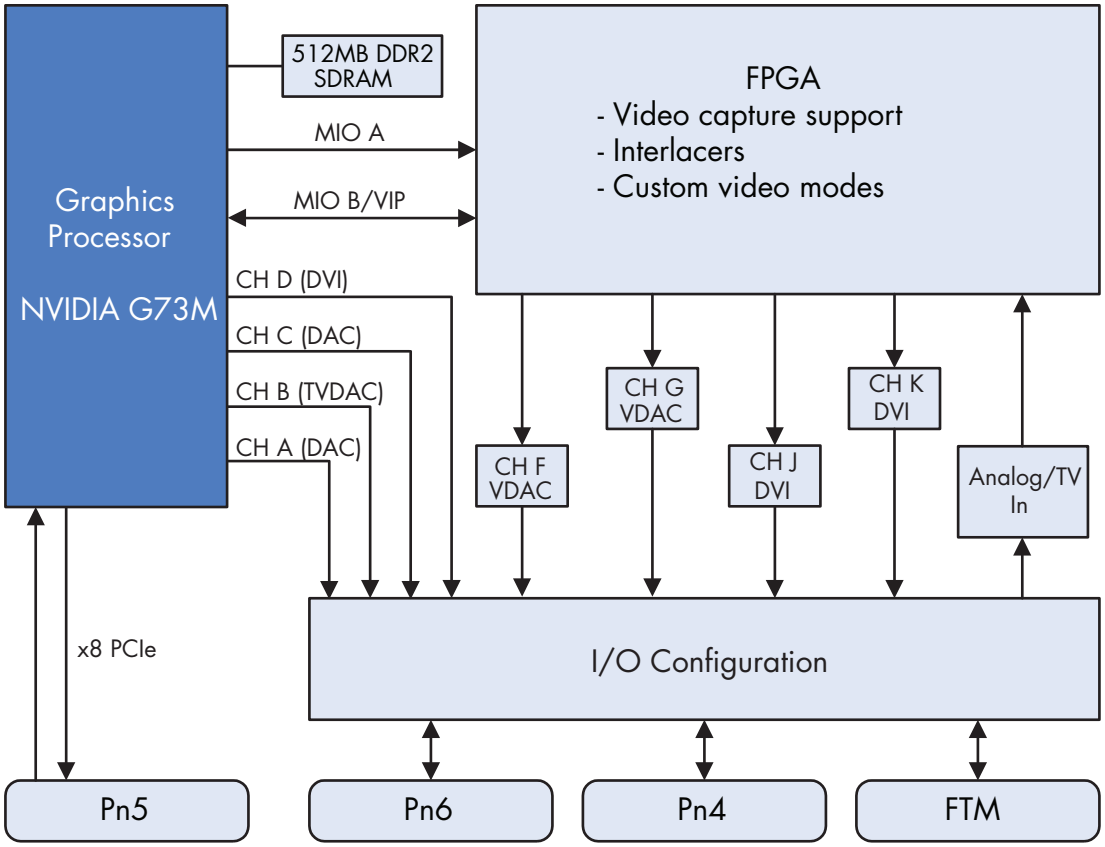


Table 1: XMC-710 Input & Output Channels

Channel	Format	Source/Destination
Channel A	Analog; RGB HV	Integrated G73M DAC
Channel B	Analog; TV	Integrated G73M TV DAC
Channel C	Analog; RGB HV	Integrated G73M DAC
Channel D	Digital; DVI	Integrated G73M TMDS transmitter (Note 1)
Channel F	Analog; RGB HV	FPGA output with Video DAC
Channel G	Analog; RGB HV	FPGA output with Video DAC
Channel J	Digital; DVI	External TMDS transmitter for FPGA outputs
Channel K	Digital; DVI	External TMDS transmitter for FPGA outputs
Analog TV In	Analog; TV	G73 VIP via FPGA (Note 2)

Notes
1. Channel D can support dual-link DVI.
2. When input channel is used, only one FPGA output is available.

Graphics Processor

The XMC-710 utilizes the NVIDIA® GeForce® Go 7700 (G73M) Graphics Processor Unit (GPU) which delivers cutting-edge 3D graphics performance, through a native PCIe interface and the latest OpenGL 2.0 shader architecture.

The G73M provides dual independent graphics channels, a high-bandwidth memory interface for maximum performance and the latest manufacturing technology in order to minimize power. These features make the G73M a compelling solution for high-performance embedded graphics applications.

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Memory

The XMC-710 provides the largest amount of dedicated GPU memory currently available on a G73M based graphics controller product, with 512MB of DDR2 SDRAM supported. This amount of dedicated graphics memory better supports memory intensive applications with large or multiple texture processing requirements such as digital map systems. The memory allows data that would normally have to be transferred from system memory to the GPU, to be held in local graphics memory where it can be accessed more efficiently for improved performance.

Host Interface

The XMC-710 supports an 8-lane PCIe host interface compliant to the ANSI-VITA 42.3 Standard. The host interface is able to automatically operate at four lanes or eight lanes depending upon the capabilities of the host board. The PCIe host interface provides a peak bandwidth of 2GB/s in both the transmit and receive directions, which is eight times more than a typical PCI-based graphics solution. This high-bandwidth allows a large amount of video data to be passed in to the GPU where it can be treated as textures, manipulated and mixed with the graphics.

Interlaced & Custom Video Modes

Curtiss-Wright Controls has developed video processing IP which has been continually enhanced throughout the evolution of the graphics product family.

The ability of a graphics solution to easily handle unique legacy video interfaces (output and input) is a critical requirement to system integrators. Curtiss-Wright Controls IP provides unique advantages to the user, allowing generation of interlaced video outputs supporting standard and custom interlaced video formats. These outputs can be used simultaneously with the latest high-performance interfaces offered by the XMC-710.

Interoperability

The XMC-710 and associated software are designed to support PowerPC™ and Intel based host cards in various form factors.

The XMC-710 inter-operates with Curtiss-Wright Controls host cards that support XMC mezzanine cards.

With XMC being the defacto standard for high-performance mezzanine interface, system integrators have more choices and flexibility to implement XMC-710 on a variety of host cards and operating systems.

XMC-710 I/O Configuration

The XMC-710 includes a highly flexible I/O management element called the 'I/O Configuration'. The I/O configuration allows the I/O of the XMC-710 to be routed to any of the three I/O connectors supported by the card:

- Pn4
- Pn6
- Front Panel

The I/O configuration allows all of the I/O connectors to be fully utilized thus ensuring that the XMC-710 can be used on any XMC compatible host card, regardless of the connectors or specific pins supported.

If required, the I/O from the XMC-710 can be routed to a mixture of the three connector interfaces.

Curtiss-Wright Controls provides a variety of standard I/O mappings that support common configurations, however, if your application needs a different I/O configuration, please contact your local Curtiss-Wright Controls sales representative who will be able to assist you.

Figure 2: Front Transition Module



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Front Panel Connector I/O Access

The XMC-710 uses an innovative front panel I/O access adaptor which can support the different I/O combinations that can be provided by the XMC-710. The adaptor, known as the Front Transition Module (FTM), is available to support several common configurations using industry standard video connectors and cables. For non-standard I/O configurations or in cases where special mechanical requirements exist, Curtiss-Wright Controls can make the mechanical data available for customers to design their own custom FTM.

The standard product air-cooled Level 0 variant of the XMC-710, is shipped with an FTM and break-out cable to allow the user to rapidly get the system up and running with easy access to a select set of popular video interfaces.

Video Output Interfaces

The XMC-710 provides a comprehensive set of video output interfaces capable of supporting a broad range of requirements from PAL/NTSC interlaced analog formats up to high-resolution dual-link DVI.

Video Input Interfaces

For most video inputs, Curtiss-Wright Controls provides the XMC-270, a high-end Video Frame Grabber. The XMC-710 does have the ability to take capture NTSC, PAL and RS-170 analog inputs. It can also provide custom interlaced video modes if based on the above standards. Examples of custom interlaced modes include:

- Square pixel formats
- Non-standard voltage levels
- Custom timing parameters

Please contact your local sales representative if custom modes are required.

Table 2: XMC-710 Video Outputs

Channel	Interface Type	Description	Format / Resolution and Support
A	Analog; RGB HV	DAC interface supporting pixel rates up to 400MHz	Standard VESA modes and resolutions up to 2048 x 2048 @ 60Hz
B	Analog	TV format output	NTSC and PAL
C	Analog; RGB HV	DAC interface supporting pixel rates up to 400MHz	Standard VESA modes and resolutions up to 2048 x 2048 @ 60Hz
D	Digital; DVI 1.0	Single link DVI interface OR	Standard VESA resolutions up to 1600 x 1200 @ 60Hz, reduced blanking
		Dual link DVI interface	Resolutions up to 2560 x 1600 @ 60Hz and 2048 x 2048 @ 60Hz
F	Analog; RGB HV	Generic VDAC interface supporting pixel rates up to 110MHz	1. Standard VESA resolutions up to 1280 x 1024 @ 60Hz 2. Standard interlaced modes including: a. STANAG 3350B Class A, B and C b. RS-170 c. RS-343 3. Custom Interlaced video modes including: a. Square pixel formats b. Non-standard voltage levels c. Custom timing parameters 4. Support for Sync-On-Green, Sync-on-All, and sync polarity inversion
G	Analog; RGB HV	Generic VDAC interface supporting pixel rates up to 110MHz	1. Standard VESA resolutions up to 1280 x 1024 @ 60Hz 2. Standard interlaced modes including: a. STANAG 3350B Class A, B and C b. RS-170 c. RS-343 3. Custom Interlaced video modes including: a. Square pixel formats b. Non-standard voltage levels c. Custom timing parameters 4. Support for Sync-On-Green, Sync-on-All, and sync polarity inversion
J	Digital; DVI 1.0	Single link DVI interface	Standard VESA resolutions up to 1600 x 1200 @ 60Hz, reduced blanking.
K	Digital; DVI 1.0	Single link DVI interface	Standard VESA resolutions up to 1600 x 1200 @ 60Hz, reduced blanking.

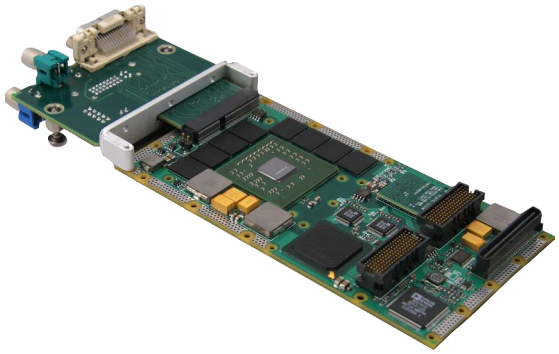
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Graphics Software Support

The XMC-710 is available through Curtiss-Wright Controls and third party software providers. Please see the XMC-710 software product datasheets for further information.

Figure 3: Photograph of an air-cooled XMC-710 (Variant with Front Transition Module)



Typical XMC-710 Applications

The XMC-710 is designed to support applications that require flexible, high-performance, high-integration solutions for their rugged graphics systems.

In addition, the XMC-710 has been specifically designed to support both legacy system upgrades as well as to support the very latest high-performance graphics and video applications.

Support for a Legacy Display System

As the upgrade of platform display systems is often very expensive, many upgrades require the latest graphics controllers to be able to support both the legacy formats and interfaces as well as offer the high-performance and enhanced features required. The XMC-710 is designed to support these systems.

For example, a system may require:

Output 1, Pilot Display	- STANAG 3350B Class A, B or C
Output 2, Co-Pilot Display	- STANAG 3350B Class A, B or C
I/O	- Pn4

Figure 4: Support for a Legacy Display System

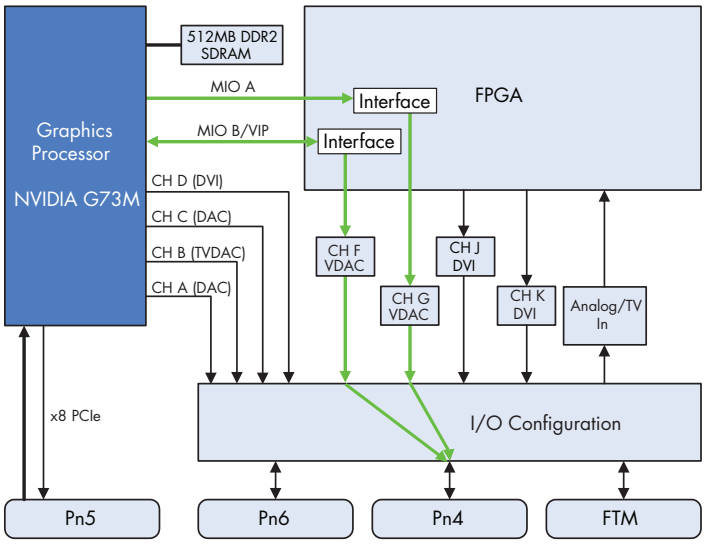
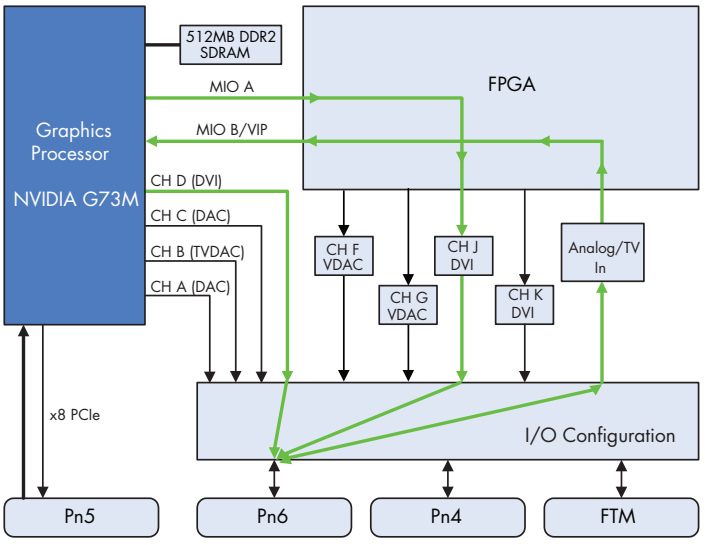


Figure 5: Support for a High-resolution Display System



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Ordering Information

The XMC-710 is available in both air-cooled (AC) and conduction-cooled (CC) variants. A select set of standard variants are listed below.

Table 3: XMC-710 Standard Variants

Ruggedization	Part Number	Brief Description
Air-cooled L0	XMC-710-A0001	Front I/O Output channels: A, B, C, D, J
Air-cooled L0	XMC-710-A0002	Front I/O Output channels: A, B, C, D, J Input: PAL, NTSC, RS-170
Air-cooled L0	XMC-710-A0004	Front I/O Output channels: B, F, G, J, K Input: PAL, NTSC, RS-170
Conduction-cooled L200	XMC-710-C2401	Rear I/O (PN4) Output channels: A, B, C, D, J
Conduction-cooled L200	XMC-710-C2402	Rear I/O (PN4) Output channels: A, B, C, D, J Input: PAL, NTSC, RS-170
Conduction-cooled L200	XMC-710-C2404	Rear I/O (PN4) Output channels: B, F, G, J, K Input: PAL, NTSC, RS-170

Specifications

Table 4: XMC-710 Power Rail Requirements

Supply Rail	Typical Current (mA)
VPWR	2900 @ 5V or 1310 @ 12V
3.3V	500
3.3 AUX	30
+12V (See Note)	80
-12V (See Note)	80

Note : +12V and -12V are required for video channels F and G only

Table 5: XMC-710 Dimensions

XMC-710	Length	Width
Air-cooled	144mm (PWB only)	74mm
Conduction-cooled	144mm	74mm

Table 6: XMC-710 Weight

XMC-710	Weight
Air-cooled with FTM installed	< 200g
Conduction-cooled	< 145g

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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