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Data Sheet

XMC-270

High-performance Frame Grabber



Features

- Eight lane PCI Express® (PCIe) interface supporting x1, x2, x4 and x8 link widths
- Capability for one of the following streams:
  - Dual DVI inputs up to 1600 x 1200 @ 60Hz (reduced blank)
  - Dual progressive RGB inputs up to 1280 x 1024 @ 60Hz
  - Six NTSC, PAL or RS-170 inputs
  - Consult the factory for RS-343 and STANAG 3350 A/B/C interlaced video format support
- Color depths include (not applicable to all inputs):
  - 8-bit YCbCr (BT.656-4)
  - 32-bit RGB:8888 (with Alpha)
  - 16-bit RGB:565
  - 8-bit Mono (green only)
- Capture modes include:
  - Full frame rate
  - Reduced frame rate (user programmable)
  - Snap shot (frame grabber mode)
- A Xilinx® Virtex®-5 FPGA is utilized on-board to provide the video capture functionality and the ability for enhanced and customized operations
- Flexible I/O via PN6, PN4 or front panel
- Available in various air and conduction-cooled ruggedization levels
- Path to certifiability for DO-254 and DO-178B
- Legacy interrupt support
- Operating systems:
  - VxWorks® 6.x
  - Wind River® Linux® (call for availability)

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Overview

The XMC-270 is a VITA 42.3, PCIe XMC form factor, ruggedized, high-performance video capture and frame grabber. The XMC-270 supports high-resolution digital and analog video, including legacy interlaced formats.

The XMC-270 is based on the Xilinx Virtex-5, a high-performance field programmable gate array with advanced serial connectivity and a built in PCIe core. Curtiss-Wright Controls Embedded Computing video IP leverages this powerful FPGA to provide industry leading video capture and frame grabbing capabilities, with capacity for additional enhancement and customization.

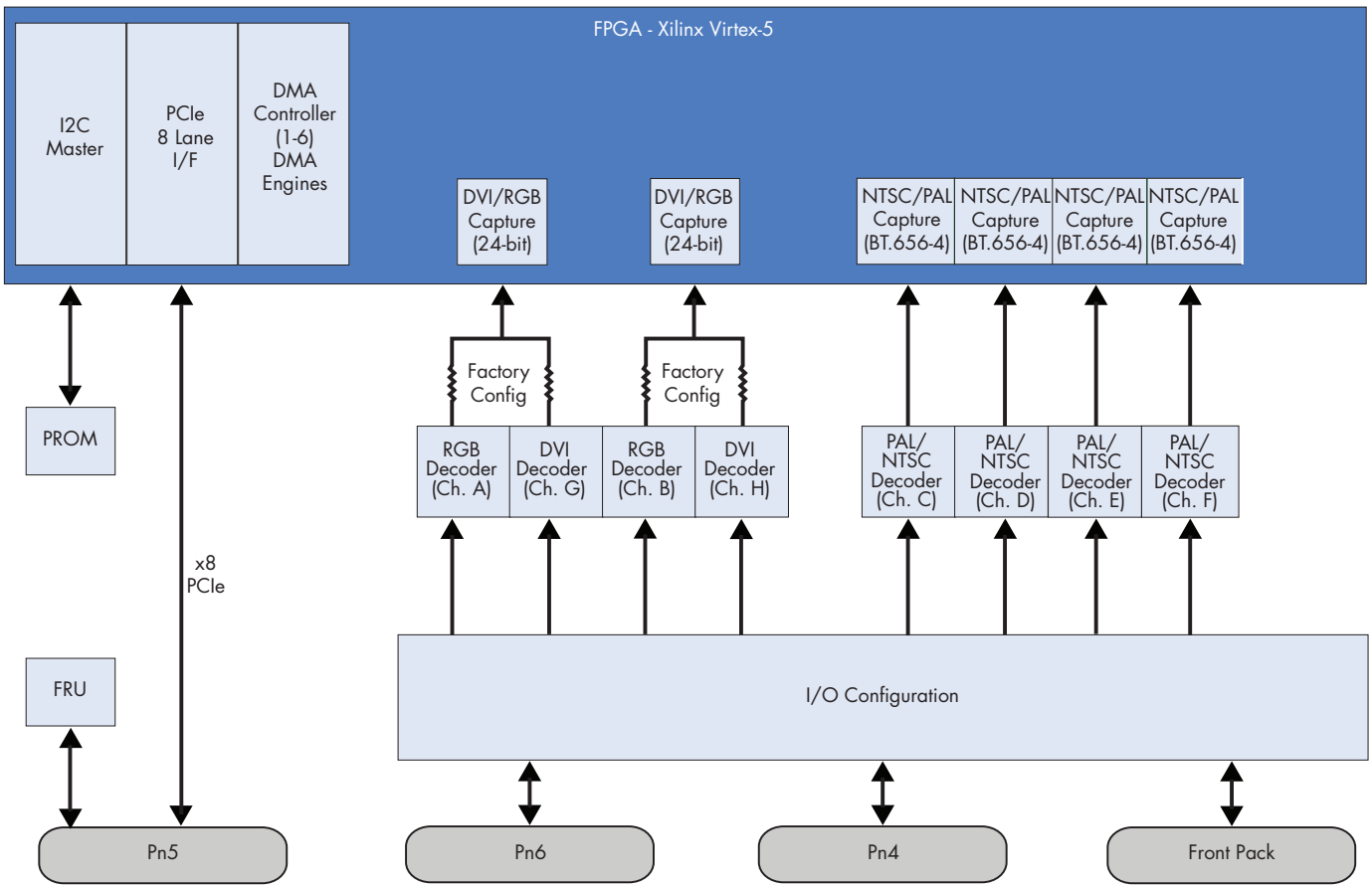
The XMC-270 comes with a comprehensive software application interface to control and utilize the capabilities of the hardware.

This software can be used standalone or in conjunction with graphic display card video APIs such as the Presagis SeaWind X Window System Video Interface. Support is available for VxWorks with Curtiss-Wright Controls PowerPC™ single board computers (SBCs).

The XMC-270 allows you to get the most out of applications by providing the ability to simultaneously store multiple inputs into memory, efficiently and quickly.

Multiple applications (processing and display) can access this memory independently.

Figure 1: XMC-270 Block Diagram





SAMPLE APPLICATION – 360° Virtual Vision

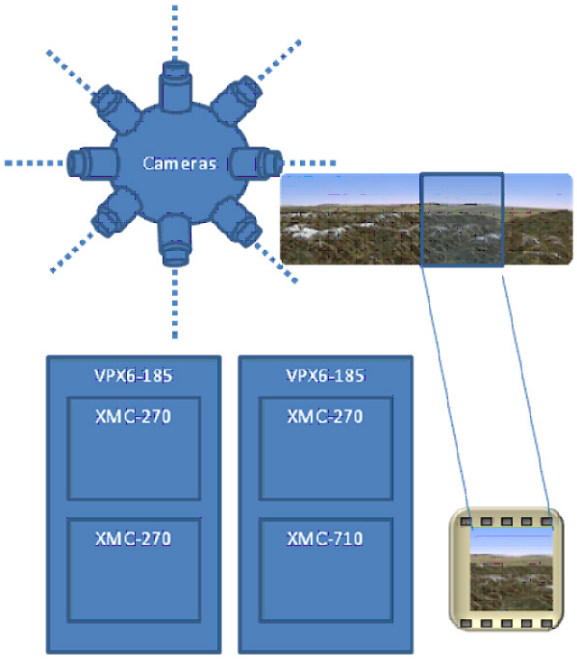
A set of XMC-270s can be used to provide 360° vision. In this way a tank commander could have a day or night panoramic view of the surrounding area, in favorable or adverse weather conditions.

This view is created through the ability of the XMC-270 to continually store a number of different images into memory. The XMC-270, as a component of a complete image processing application, stores images created by a series of cameras set up to look out of the tank at all angles and with different spectrums.

- Visible light for daytime
- Thermal imaging for nighttime and
- Short Wave Infared for foggy, sandy and misty conditions

The tank operator then uses a sophisticated video merging and stitching application to enable him to control what he sees. Other users can access the same memory components to independently display what they want to see. These users can be within the same tank or geographically dispersed and may look at single or multiple feeds.

Figure 2: 360° Virtual Vision Diagram



SAMPLE APPLICATION – Video Conversion

The XMC-270 is designed to store all video in the same raw data format. This raw data format can easily be read by graphics cards such as the XMC-710 which is extremely versatile in its ability to display many different video formats.

Operating together, these two cards provide a very valuable video conversion function, which can be used in retrofitting systems with older legacy video formats.

This allows for cameras and display units to be upgraded at different time frames when budget or timing is more favorable.

It also allows for a new display component to be used when an earlier technology is no longer available for display, without removing the existing cameras.

Figure 3: Video Conversion Diagram

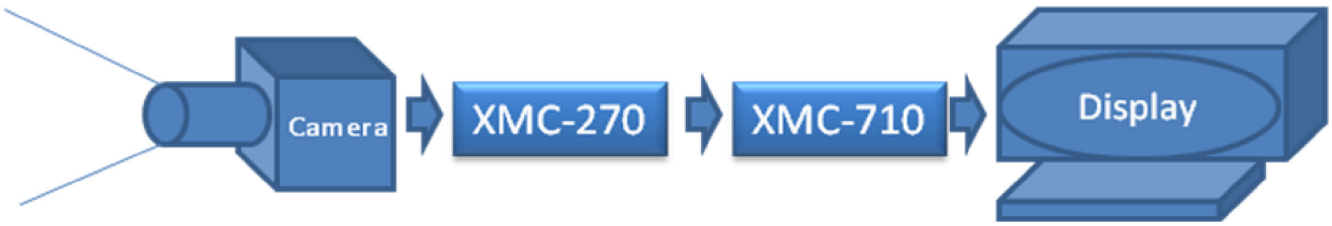
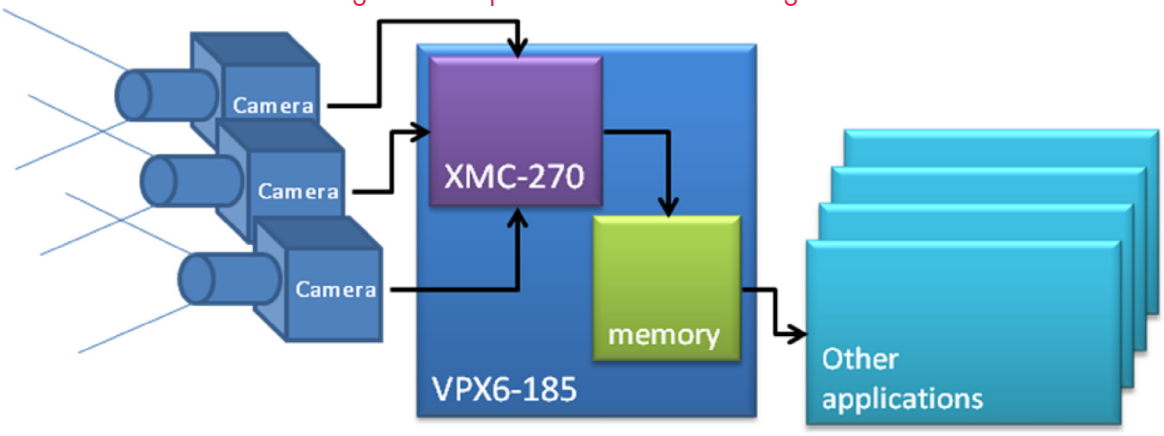




Figure 4: Simple Mission Recorder Diagram



SAMPLE APPLICATION – A Simple Mission Recorder

The XMC-270 is easy to use, making the building of a basic mission recorder a simple task.

Video images captured from an XMC-270 are sent through direct memory access to the memory of a SBC. These are recorded along with GPS and time data.

The data from a mission is later uploaded for playback.

Software for the XMC-270

The XMC-270 Video Capture Driver provides the necessary software to support applications written to utilize the XMC-270 Advanced Frame Grabber.

The XMC-270 Video Capture Software Driver allows your application to:

- Control multiple video capture XMCs (XMC-27x product family) from a single API
- Control multiple video capture channels from a single API (up to six capture channels per XMC)
- Specify multiple DMA memory buffers (up to six) for each capture channel
- Set the video mode and pixel encoding of the received data for each capture channel
- Modify the attributes on each NTSC/PAL/RS-170 channel including hue, contrast and brightness
- Modify sampling phase on each RGB capture channel
- Modify signal equalization on each DVI capture channel
- Set a callback routine which will be triggered at the end of each DMA transfer with configurable priority
- Get the number of completed DMA transfers since the last start call

Capture Modes Supported:

- Full frame rate
- Reduced frame rate
- Snap shot

Operating Systems Supported:

- Wind River VxWorks
- Linux
- Green Hills® INTEGRITY®
- Windows

Consult factory for OS driver availability.

A sample program is included with each driver that will demonstrate capture to system memory.

A sample program is included with each driver that demonstrates capture to system memory (simple mission recorder).

An application note describing the detailed implementation of the XMC-270 inter-working with the XMC-710 is also available (video conversion).





Table 1: Video format types that can be captured with the XMC-270 Video Capture Driver[1]

Video Format	Maximum Channels Supported	Bytes per pixel
NTSC, PAL	6	2
RGB	2	2/4
DVI	2	1/2/3/4
STANAG 3350 A	2	1/2/3/4
STANAG 3350 B	6	2
STANAG 3350 C	6	2
RS-343	2	1/2/3/4
RS-170	6	2
User Defined Interlaced[2]	N/A	N/A
User Defined Non-Interlaced[2]	N/A	N/A

Notes:
1. Please consult specific Product Release Note to determine supported video formats per variant.
2. Available upon request.

Table 2: XMC-270 Specifications

Ruggedization Levels		
Levels		Available in Levels 0 and 200
Estimated Power Requirements		
VPWR	Typical	1.4A @5V, 0.58A @12V
	Maximum	1.65A @5V, 0.7A @12V
3.3V	Typical	110 mA
	Maximum	150 mA
3.3V Aux	Typical	30 mA
	Maximum	100 mA
Dimensions		
Air-cooled	Size	144 x 74mm
	Weight	208.79g
Conduction-cooled	Size	144 x 74mm
	Weight	126.2g

Table 3: Standard Product Variants

Standard Product Variants	Cooling	Level	I/O	Video Input/Channels
XMC-270-A0000	Air	0	Front Panel	Analog A/B/C/D/E/F
XMC-270-A0001	Air	0	Front Panel	RGB A/B
XMC-270-A0002	Air	0	Front Panel	DVI G/H
XMC-270-C2400	Conduction	200	Pn4	Analog A/B/C/D/E/F
XMC-270-C2401	Conduction	200	Pn4	RGB A/B
XMC-270-C2402	Conduction	200	Pn4	DVI G/H
XMC-270-C2600	Conduction	200	Pn4	Analog A/B/C/D/E/F
XMC-270-C2601	Conduction	200	Pn4	RGB A/B
XMC-270-C2602	Conduction	200	Pn4	DVI G/H





XMC-270 Variants

The following represents the variant scheme

XMC - 270 - WXYZZ

- ZZ
  - 00: Analog A/B/C/D/E/F
  - 01: RGB A/B
  - 02: DVI G/H
- Y
  - 0: Front Panel I/O
  - 4: PN4 I/O
  - 6: PN6 I/O
  - 8: Custom Variant
- X
  - 0: Level 0
  - 2: Level 200
- W
  - A: Air-cooled
  - C: Conduction-cooled

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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