



- **Based on Fujitsu's MB86298 'Ruby' Graphics Processing Unit**
- **512MB of on-board DDR2 Memory**
- **OpenGL ES 2.0 compliant**
- **PCIe - x1 PCI-Express (PCIe base specification 1.0a) Interface**
- **2D/3D graphics engine**
- **Two display controllers with display resolutions of 1280x1024 or 1600x600**
- **Four Independent Video Capture input channels**
  - > **Two DVI-D inputs**
  - > **One Analog RGB input**
  - > **One CVBS/S-Video/Component-Video (NTSC/PAL/SECAM) input**
- **Component and Composite Video Capture**
- **Two Independent Video Output Channels to connect standard monitors**
- **Provision for 24bit RGB Digital Output**
- **Independent Video Overlay of 8 layers on each display controller**
- **Air Cooled and Conduction cooled versions**
- **Driver and OpenGL support for Windows Xp, Linux 2.6.x, WindRiver VxWorks, Green Hills INTEGRITY, and their safety critical variants (Wind River 653, Green Hills INTEGRITY- 178B)**

## OVERVIEW

The AT-XMC-GRA is a new dual display graphics module providing a versatile, high performance graphics subsystem featuring high speed switched XMC Mezzanine module for Graphics solutions, with PCIe as the bus interface. Using MB86298 'Ruby' Graphics controller from Fujitsu, the module enables these systems to take full advantage of Fujitsu's advanced graphics technology. A ruggedized, high-performance, low power dissipation, flexibility and other features of the card, makes it ideal for use in various high reliability embedded systems. These high-density high-performance cards are suitable for applications ranging from test equipment to rugged deployable systems. The AT-XMC-GRA module supports two independent high-resolution dual screen displays, each either VGA or DVI-D. The Module supports two DVI-D outputs and two Analog VGA outputs on P16 Connector. Two micro-HDMI connectors with DVI interface and VGA connectors may optionally be installed in the front panel area for development use. This module plugs into a standard XMC site on any compatible carrier and drives two independent displays through the full-size DVI-I and VGA ports on its front panel. Displays can have independent refresh rates, resolutions, and color controls, offering great flexibility.

## Hardware

The MB86298 'Ruby' Graphics Display Controller combines high-performance New 2D/3D graphics engine with a general-purpose, programmable Unified Shader including support for the OpenGL shading language with a shading language compiler (SL Compiler) with an integrated DDR-2 SDRAM controller and a high speed x1 PCI-Express communications link. The GPU has two display controllers with maximum resolution of 1280 x 1024 or 1600 x 600 pixels with 8 layers of overlay per display controller. 4 alpha planes, either a constant alpha value or alpha from pixel data are available for blending on each layer. Four independent Video capture channels supporting SD video input with embedded syncs according to the ITU-R BT.656 standard, PAL and NTSC resolutions and frame rates, HD video input 720p progressive format according to the SMPTE 296M standard (50 and 60Hz frame rates) and DRGB888 type video input with dedicated sync signals are also available. The Module supports two DVI-D inputs from P16 Connector, RGsB (sync on green) input and one analog interlaced input PAL (CCIR/STANAG B) / NTSC (RS-170A/STANAG -C) composite video / S-VIDEO / Component Video. Optional 24bit RGB [888] output for direct digital interface to standard LCD modules. A combination of an intelligent board along with this module provides for a ready solution to build Rugged Smart Multi Function Display systems. All logic functionality on-board the module are implemented through an FPGA device. The FPGA is used as an I2C master to alternatively configure and control peripheral video processing devices. It also interfaces to GPIOs for interrupts and SPI Debug Interface from Ruby controller.

## Software

AT-XMC-GRA drivers are available for Windows XP/7, Linux 2.x running on Intel x86 platforms. Embedded graphics driver support including OpenGL ES 2.0, DO-178B Level A support is provided through Altsoft. Support for VxWorks 6.x, Integrity, VxWorks653 (Safety Critical) is also available.

# AT-XMC-GRA

## RUBY GPU Based High-Performance Graphics card

### Applications

- Military / Aerospace
- Industrial Control and Instrumentation
- Telecom / Datacomm
- Medical Imaging

### PRODUCT SPECIFICATIONS

#### Bus Interface

- XMC - x1 lane PCIe, 2.5Gbps (PCIe base specification 1.0a)

#### Graphics Controller

- MB86298 'Ruby' Graphics Display Controller
- Two independent display engines
- Multi-display capability (this lowers the maximum available resolution, color depth and refresh rate)
- OpenGL ES2.0 compliant
- 2D/3D graphics engine
- Display resolutions of 1280 x 1024 or 1600 x 600
- Two display controllers with display resolutions of 1280x1024 or 1600x600
- 24-bit color
- Independent Video Overlay of 8 layers on each display controller
- PCI Express interface
- 512MB of on-board DDR2 Memory

#### Video Inputs

- Two DVI-D inputs
- One RGB (Sync-on-Green) video input
- One Analog Interlaced PAL/NTSC/S-Video/Component Video Input
- All Video inputs on P16 Connector

#### Video Outputs

- Two DVI-D outputs
- Two Analog VGA outputs
- All Video outputs on P16 Connector
- Optional 24bit Digital RGB [888] output
- Optional Front panel VGA connectors and micro-HDMI connectors for DVI-D

### ORDERING INFORMATION

#### Hardware Selection

AT-XMC -GRA - F - D - R

A=Air-Cooled  
R=Conduction-Cooled

0 = Without RGB Display Connector Mounted  
1 = With RGB Display Connector Mounted

0 = Without Front Panel Connectors Mounted  
1 = With Front Panel Connectors Mounted

- Embedded test systems
- Rugged deployed systems
- Demanding requirements
- Avionics upgrades and retrofits

#### Memory

- 512MB of on-board DDR2 Memory

#### Software

- Drivers for Windows XP/windows7, Linux
- OpenGL ES 2.0 from Altsoft
- Other multi OS/RTOS support
- Driver and OpenGL support for Windows XP, Linux 2.6.x, WindRiver VxWorks, Green Hills INTEGRITY, and their safety critical variants (Wind River 653, Green Hills INTEGRITY-178B)

#### Physical

- Standard XMC Card Size (143.75mm x 74mm)
- Complaint to IEEE 1386.1
- 10mm Stacking Height
- Conduction Cooled XMC without Bezel

#### Environmental

	Air-Cooled	Conduction-Cooled
Operating Temperature	-0°C to + 60°C	-40°C to + 85°C

#### Power

- Primary Supply +3.3V from XMC Connectors (P15), all other voltages internally derived

#### Warranty

- 1 year limited warranty

- Contact sales for support for other Operating Systems
- Contact sales for configuration of front and rear I/O configuration
- Contact sales for environmental options



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