



PRODUCT DATASHEET



AtlasPMC

High Performance Dual VGA/DVI Graphics plus
Audio I/O, Video Digitizer, and USB 2.0

- ATI Technologies RADEON™ Mobility 9000 (M9) Visual Processor Unit
64 Mbytes integrated high-speed DDR SDRAM
Hardware 2D and 3D (DirectX and OpenGL) acceleration
- Flexible Output Configurations
Dual Interlaced/Non-Interlaced Analog outputs support resolution up to 1920x1200@24bpp
Analog outputs support separate horizontal & vertical, composite, or sync-on-RGB
Dual DVI outputs support up to 1600x1200@24 bpp
Dual DVI outputs support up to 1920x1200@24 bpp using reduced blanking intervals
Single NTSC, PAL, RS-170 and S-Video Video Output (sub for one analog or digital out)
- Multi-Input Video Digitizer
Simultaneous real-time video capture, synthetic overlay, and display
NTSC, PAL, RS-170, S-Video, RGB, or DVI capture
RGB or DVI capture up to 1024 x 768
- VGA and FCode BIOS support
- USB 2.0 host controller
- Full-function Audio CODEC provides Stereo I/O and Mono Mic
- Thermal sensor allows monitoring of board temperature
- Flexible power management capabilities
- PCI/PCI-X compliant, 32/64-bit 33/66/100/133 MHz capable
- Front Panel Connector Access for All Functions
Breakout cables are required to utilize some features
- Graphics only and fully-populated variants
- Comprehensive software support
X Server with OpenGL and Xv video input extensions
OpenGL/GLX server with Xv video input for VxWorks and Linux
Windows 2K/XP drivers including accelerated DirectX and OpenGL
Audio and USB 2.0 support for Solaris, Linux, and Windows
- Operating System Compatibility (contact factory for availability)
VxWorks PowerPC
Linux x86 and PowerPC
Windows 2000 and XP
Solaris SPARC



Actual Side 1 Photo



Overview

The Curtiss Wright Controls Embedded Computing (CWCEC) Graphics and Imaging (CWGxI) AtlasPMC fulfills the very highest performance requirements for a complete graphics and video acquisition solution commonly found in Solaris, VxWorks, LynxOS, Linux, and Windows. It is targeted at applications requiring high-speed presentation of synthetic graphics where the output require video capture overlay. It can output two independent digital or analog displays and accept one video input whose source is NTSC, PAL, DVI, or RGBHV.

Using the industry leading ATI Radeon Mobility 9000 (M9) Visual Processing Unit (VPU), the AtlasPMC supports 2D, 3D, OpenGL, and DirectX compatible displays with screen resolutions up to 1920x1200 with up to 16.7 million colors (24 bpp). The M9 features 64 MB of integrated memory, reduced-power optimizations, video overlay, integrated video input and output, advanced de-interlacing hardware, and quad-pipeline 2D/3D/Video acceleration. ATI has committed to provide the M9 for an extended period of time to satisfy product life-cycle requirements typical of the embedded computing market.

Monitor support includes analog VGA and Sync-On-Green (SOG), video (NTSC/PAL), and digital (DVI). A combination VGA/FCode BIOS enables the AtlasPMC to operate in virtually any x86 or SPARC system using VGA, SOG, or DVI displays.

Other features of the AtlasPMC include optional video input, USB, and audio subsystems. Included are a Conexant Bt878A

video digitizer with external Analog Devices AD9882 RGB/DVI digitizer for capturing up to 1024x768x16bpp (preliminary), an NEC uPD720101 USB 2.0 host controller, and Micronas UAC 3555B USB Stereo Audio CODEC.

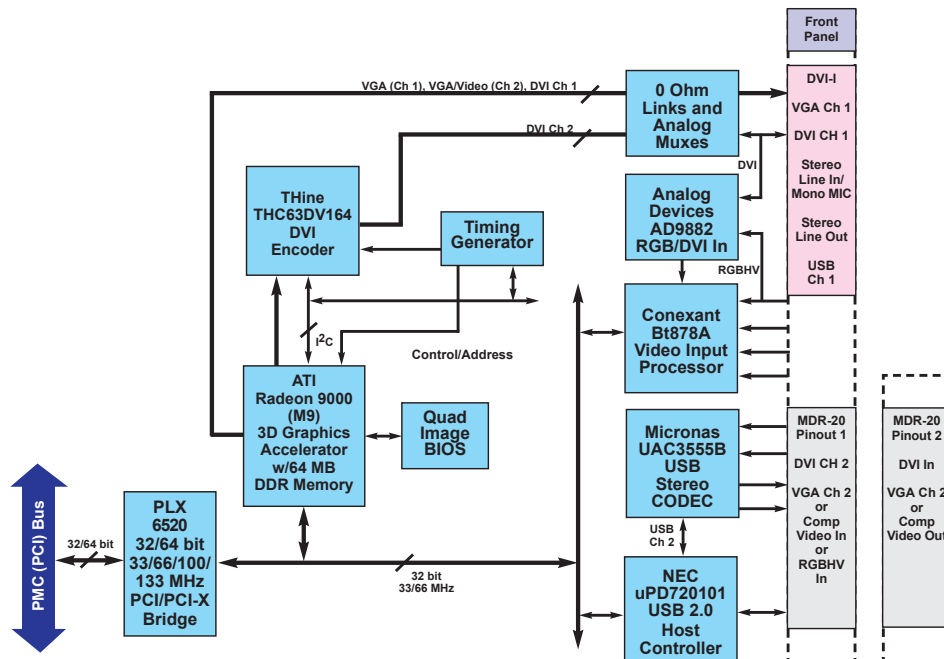
A USB port is dedicated to providing a low overhead, audio solution demonstrated to work on Windows and Solaris. The UAC 3555B supports mono MIC or stereo line-in and stereo line-out, 5-band equalizer, volume, balance, and tone controls.

A unique asynchronous PCI bridge design supports all PMC host-side interfaces from 32-bit, 33 MHz PCI to 64-bit, 133 MHz PCI-X. The local bus runs at 32-bit, 66 MHz.

Although not a conduction cooled design, the AtlasPMC is laid out in a Conduction Cooled PMC (CCPMC) compatible format with Primary and Secondary Thermal Interface area for easy use in all environments.

CWGxI offers a broad line of graphics and video-related PMC, PCI, and CompactPCI boards for single, dual, and quad monitor applications. CWGxI's PMC carriers for PCI and CompactPCI can be used to integrate AtlasPMC into systems which employ these popular embedded board formats. Visit our website at <http://www.cwembedded.com> for more information.

Figure 1: AtlasPMC General Block Diagram





AtlasPMC/1 Overview

The AtlasPMC/1 is the ideal solution for the graphics applications that do not require video input.

Each VGA output can display up to 1900x1200@24bpp. Each single link DVI port controls displays up to 1600x1200@24bpp using standard timing or up to 1920x1200@24bpp using reduced blanking interval timing.

Analog monitor support includes analog VGA and Sync-On-Green (SOG), NTSC/PAL video (Ch 2 only), and high-speed interlaced and non-interlaced displays.

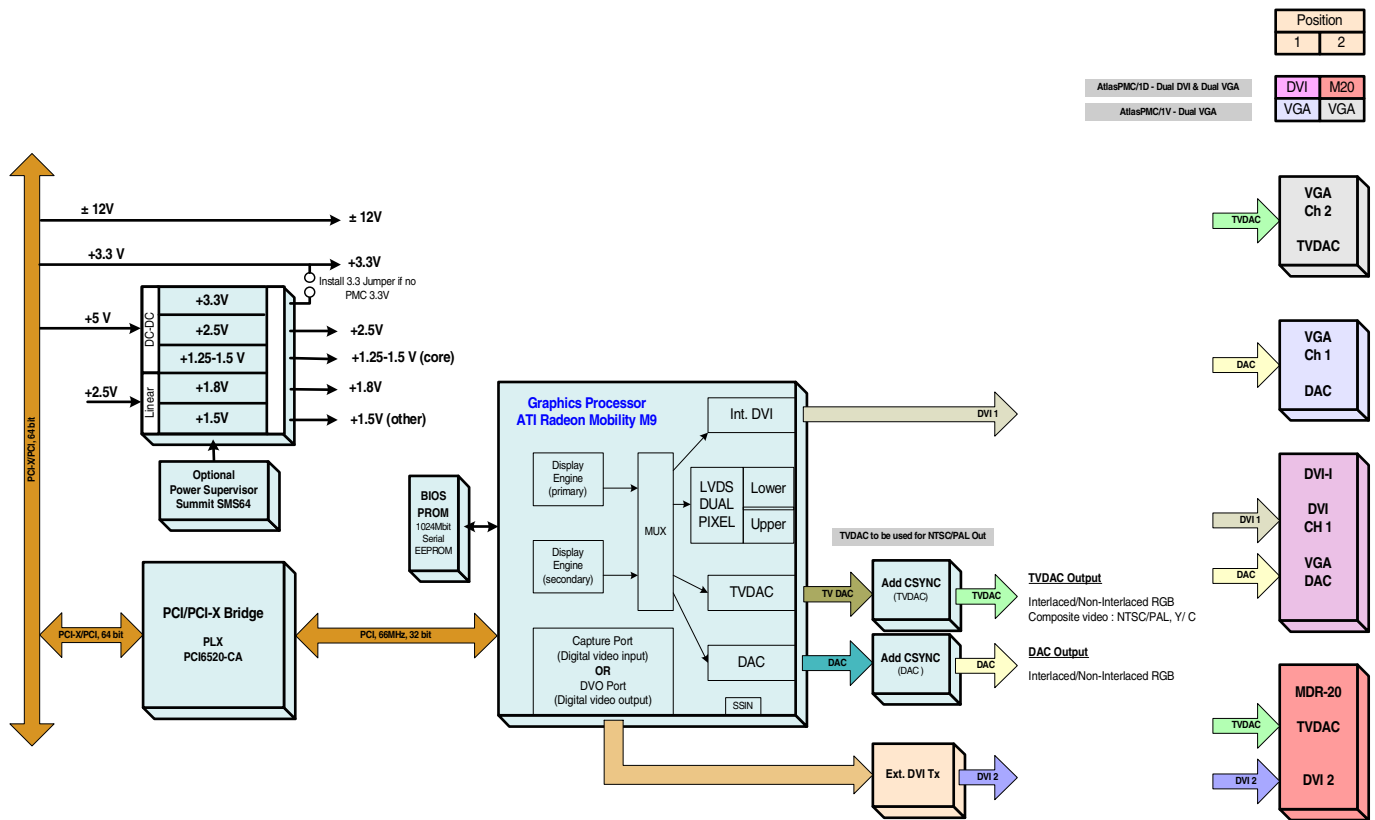
There are two standard versions of AtlasPMC/1:

AtlasPMC/1V supports dual channel VGA outputs using standard VGA connectors that are provided on the front panel.

AtlasPMC/1D supports dual channel VGA output and adds dual channel single link DVI. Using a breakout cable, a front panel DVI-I connector provides Graphics Ch 1 DVI and VGA outputs. Using a second breakout cable, the front panel MDR-20 connector provides Graphics Ch 2 DVI and VGA outputs.

In the figure below, both connector solutions are shown. Use the connector color chart above the connector blocks to determine which connectors are used.

Figure 2: AtlasPMC/1 Block Diagram





AtlasPMC/2 Overview

The AtlasPMC/2 series boards provide not only outstanding graphics display capabilities but also NTSC/PAL/S-Video output and a choice of NTSC/PAL/S-Video and high speed RGBHV and DVI inputs. In conjunction with the MDR-20 connector, one of two different sets of hardware jumpers (determined at time of order) select the basic feature set of the board. Software controlled multiplexers are then used to configure the board for the particular input and output signals that are required. Tables on the following pages describe in detail many of the common modes.

Like the AtlasPMC/1 boards, each VGA output can display up to 1900x1200@24bpp. Each single link DVI port controls displays up to 1600x1200@24bpp using standard timing or up to 1920x1200@24bpp using reduced blanking interval timing.

Analog monitor support includes VGA and Sync-On-Green (SOG), NTSC/PAL video (Ch 2 only), and high-speed interlaced

and non-interlaced displays. Dual-link DVI is not available.

There are two standard versions of the AtlasPMC/2. Common to both boards are an MDR-20 connector (see Table 3 for details) and the DVI-I connector-based, which include Graphics Ch 1 VGA and DVI and stereo audio I/O and a USB 2.0 port.

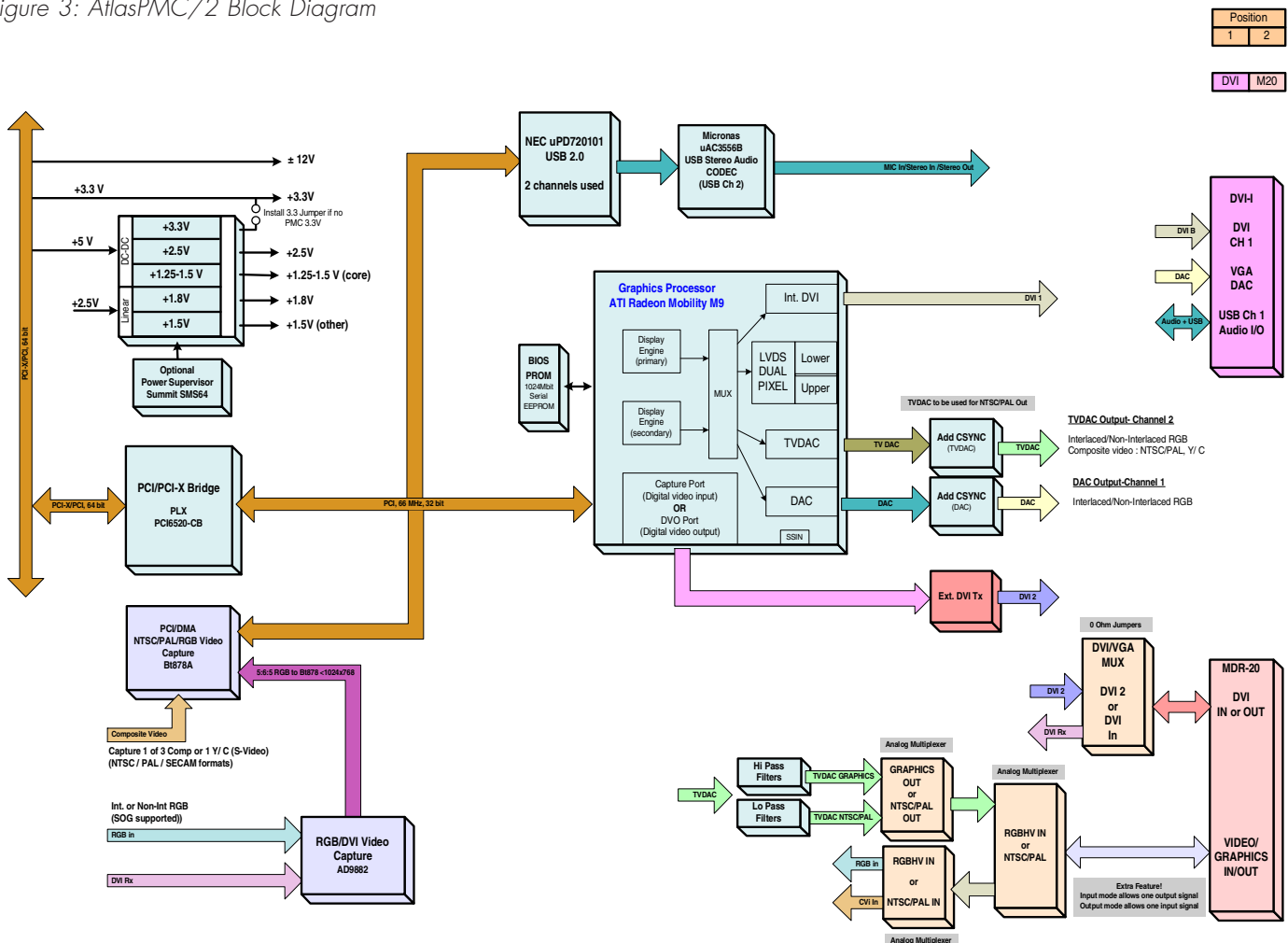
Note that breakout cables (see pages 5-6) are required to obtain full use of the AtlasPMC/2 features.

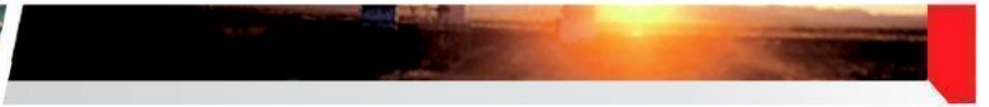
AtlasPMC/2A provides the DVI-I based features, and, on the MDR-20 connector, Ch 2 DVI *out* and a variety of other signal sets .

AtlasPMC/2B provides the DVI-I based features, and, on the MDR-20 connector, DVI *in* and a variety of other signal sets.

In the figure below, the functional options are all shown. Use the connector color chart above the connector blocks to determine which connectors are used.

Figure 3: AtlasPMC/2 Block Diagram





I/O Information

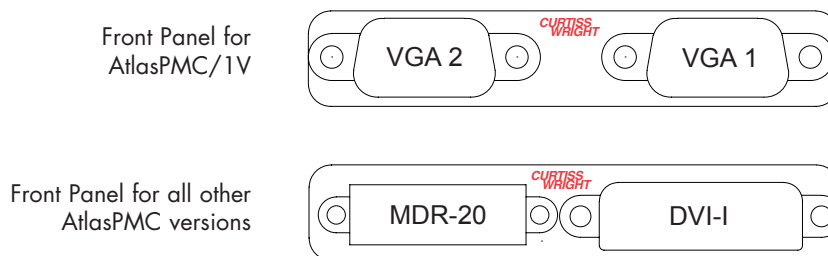
A combination of selective component loading, 0 Ohm links, and analog multiplexers are used to create the different versions of Atlas. The following table illustrates the range of I/O choices

available on AtlasPMC. **Other choices are available** - please contact the factory. Refer to system block diagrams on Pages 3 and 4 for more information.

Table 1: AtlasPMC Configurations and Front Panel Connector Use

Atlas Version	Use Breakout Cable(s)	MDR-20 Pinout	VGA out Ch 1	VGA out Ch 2 or NTSC/PAL out	DVI Out Ch 1	DVI Out Ch 2	RGBHV/NTSC/PAL In	DVI In	USB	Audio I/O
AtlasPMC/1V	no		VGA 1	VGA 2						
AtlasPMC/1D	MDR: E-A310001	A	DVI-I		DVI-I	MDR-20				
AtlasPMC/1D	MDR: see Table 3	A	DVI-I	MDR-20 (see Table 3)	DVI-I	MDR-20				
AtlasPMC/2A	DVI: E-A310002 MDR: see Table 3	A	DVI-I	MDR-20 (see Table 3)	DVI-I	MDR-20	MDR-20 (see Table 3)		DVI-I	DVI-I
AtlasPMC/2B	DVI: E-A310002 MDR: see Table 3	B	DVI-I	MDR-20 (see Table 3)	DVI-I			MDR-20	DVI-I	DVI-I

Figure 4: AtlasPMC Connectors



DVI-I Connector

The DVI-I connector normally supplies VGA and DVI. Since the AtlasPMC does not support dual link DVI, there are some pins left over. These are used to provide access to the Stereo Audio

In and Out and one high speed USB 2.0 port. A custom breakout cable (see below) is necessary to utilize the extra signals.

Table 2: AtlasPMC DVH Breakout Cable (CWCEC P/N E-A310002)

- 1 x DVI-D (24+0) Plug (female)
- 1 x USB is Series A Receptacle
- 1 x 3.5mm Stereo Jack
- 1 x 3.5mm Stereo Jack
- 1 x VGA HD15S Plug (female)



MDR-20 Connector

The MDR-20 connector has two pinouts. They are controlled by board based jumpers and are denoted in the table as **Pinout**. Within a given Pinout, there are several **software-controlled** input and output modes that are denoted in the table as

SWMODE. The tables show the more usable versions. Some estoeirc combinations (including single composits graphics in or out) are also available. Contact the factory for more information.

Table 3: MDR-20 Utilization

Atlas Model	/1D	/1D	/1D	/2A	/2A	/2A	/2A	/2B	/2B
Pinout	A	A	A	A	A	A	A	B	B
SWMODE	D1	D1	D2	A2	A4	A6	A8	B2	B4
Breakout Cable	E-A310001	E-A310003	E-A310004	E-A310003	E-A310004	E-A310004	E-A310004	E-A310003	E-A310004
Hi Speed Input						5:6:5 [RGBHV]		DVI	DVI
NTSC/PAL Video Input(s)				Single Composite	Single Composite		1 of 3 Composite or S Video		
Graphics Ch 2 Output(s)	DVI	DVI and VGA	DVI	DVI and VGA	DVI	DVI	DVI	VGA	
NTSC/PAL Video Output(s)			Composite or S-Video		Composite or S-Video	Composite or S-Video	Composite or S-Video		Composite or S-Video

Table 4: AtlasPMC MDR-20 Breakout Cables

Atlas MDR-20 DVI Breakout Cable (CWCEC P/N E-A310001)

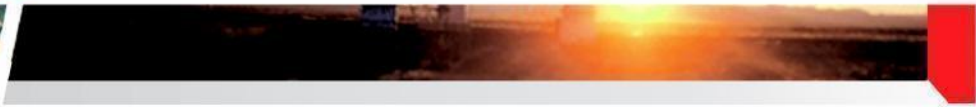
1 x DVI-D (24+0) Plug (female)

Atlas MDR-20 DVI/VGA Breakout Cable (CWCEC P/N E-A310003)

1 x DVI-D (24+0) Plug (female)
 1 x VGA HD15S Plug (female)
 1 x BNC (female) - not used with Pinout B

Atlas MDR-20 DVI/Video Breakout Cable (CWCEC P/N E-A310004)

1 x DVI-D (24+0) Plug (female) DVI in or out **DVI in and any Analog In cannot be used at the same time!!**
 1 x S-Video (MD-4S) S-Video In
 1 x BNC (female) Composite Video Out
 1 x BNC (female) Vertical Sync In
 1 x BNC (female) Horizontal Sync In/TVIN1/YIN
 1 x BNC (female) Blue In/CIN
 1 x BNC (female) Green In/TVIN2
 1 x BNC (female) Red/TVIN3



USB 2.0 and Audio I/O

USB 2.0 Ports

USB 2.0 supports data rates in excess of 400 Mbit/s, which makes it useful for video input and other demanding applications. It also supports low speed devices such as mouse, trackball, keyboard, and scanner. The AtlasPMC uses the **NEC uPD 720101 USB Host Controller** which is both USB 2.0 and 1.1 compatible. Two channels are implemented on AtlasPMC. USB data transmission uses a bidirectional differential data/clock line pair. Peripheral power is supplied through software enabled 5V.

Audio Input/Output

Audio functions are provided by a **Micronas UAC 3555B USB Stereo CODEC**. Controlled by the CPU via a USB port, this intelligent subsystem supplies a low overhead, software compatible, full function solution. It includes mono microphone or stereo line-in and stereo line-out, programmable 5-band equalizer, volume, balance, tone controls, and dynamic range.

Connectors

Due to limitations in front panel space, Audio I/O and USB are brought out on the DVI-I spare pins and require a breakout cable.

Graphics Output

Analog Interlaced/Non-Interlaced Graphics Output

The AtlasPMC provides 1 or 2 display channels, each of which supports analog graphics from 640x480 to 1920x1200. Outputs modes are VGA (RGBHV), RGB with Sync-On-Green, and RGB with separate composite sync.

Digital DVI Output

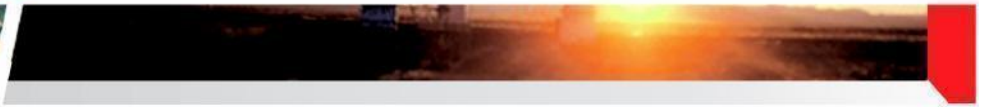
The AtlasPMC also provides 1 or 2 DVI output channels, each of which utilizes a four differential pair interface supporting resolutions up to 1600x1280 at 60 Hz. Special reduced-blanking modes allow DVI to range up to 1920x1200.

Connectors

Using 0 Ohm links and analog multiplexers, the VGA and DVI outputs are directed to the front panel connectors, which can be a DVI + VGA, VGA + VGA, or DVI + MDR-20, depending on the board configuration.

Table 5: AtlasPMC Standard Graphics Output Modes

Video Mode	Resolution	Color (bpp)	Channel	Windows/RTOS	Solaris		
Analog NonInterlaced				Format	Refresh Freq. (Hz)	Index	Refresh Freq. (Hz)
	640x480	8,16,32	1, 2	VGA	60, 75, 85	8 9	60 75
	800x600	8,16,32	1, 2	SVGA	60, 75, 85	6 7	60 75
	1024x768	8,16,32	1, 2	XVGA	60, 75, 85	0 1	60 75
	1152x864	8,16,32	1, 2	Sun	126	2 - default 3	60 75
	1280x1024	8,16,32	1, 2	SXGA	60, 75, 85	4 5	60 75
	1600x1200	8,16,32	1, 2	UXGA	60, 75	C	60
	1920x1080	8,16,32	1, 2	HDTV	83	n/a	n/a
	1920x1200	8,16,32	1, 2	WUXGA	77	D	60
Analog Interlaced	up to 1920x1200	8,16,32	1, 2	Contact Factory			30
Digital (DVI)	up to 1600x1280	8,16,32	1, 2	UXGA	60 max.	F	60
(with reduced blanking)	1920x1200	8,16,32	1, 2	UXGA	60 max.	n/a	60



NTSC/PAL/RS-343/RS-170 Output

The AtlasPMC Graphics Channel 2 can be used to provide composite video output such as NTSC, PAL, S-Video, RS-170, and RS-343. The following table shows some of the more common

modes. Please contact the factory if you need a format not shown here.

Table 6: AtlasPMC Composite Video Output Modes

Video Mode	Resolution	Pixel Size (bits)	Refresh Freq. (Hz)	Output Channel
Analog Interlaced	RS-170 640x480	8,16,32	30	2
	RS-343 875 Line	8,16,32	30	2
	PAL 768x575	8,16,32	25	2
	NTSC	8,16,32	30	2
	S-Video (Y/C)	8,16,32	30	2

Video Input Capabilities

The AtlasPMC provides both a **Conexant Bt878 Video Quad-input Digitizer** and an **Analog Devices AD9882 High Speed RGB/DVI Digitizer**. Together, these devices provide digitized Composite RS-170, NTSC/PAL/SECAM composite video or S-Video, and 1024x768x16 bpp RGBHV and DVI to the AtlasPMC using the Bt878 DMA transport. The Bt878 also performs “on-the-fly” image scaling and clipping.

Connectors

Video and DVI input signals can be accessed through the front panel MDR-20 connector and breakout cable. The MDR-20 connector supports Bt878 video inputs MUX0-MUX2, and CIN. MUX0 and CIN are used for S-Video. MUX3 is wired to CIN, and does not have a low pass filter, somewhat limiting its utility.

The AD9882 RGBHV shares the MUXn and CIN pins. The DVI In function replaces the secondary DVI out pins.

Table 7: AtlasPMC Video Input Modes

Video Mode	Resolution	Scan Lines	Frame Rate (Hz)	Color (bpp)	Effective Rate MPixels/Sec
NTSC SQ Pixel	640x480	525	30	8,16,32	12.27
NTSC CCIR601	720x480	525	30	8,16,32	13.50
PAL CCIR 601	720x576	625	25	8,16,32	14.20
PAL SQ Pixel	768x576	625	25	8,16,32	14.75
SECAM SQ Pixel	768x576	625	25	8,16,32	14.75
S-Video SQ Pixel	640x480	525	30	8,16,32	12.27
S-Video CCIR601	720x480	525	30	8,16,32	13.50
RGBHV or DVI	1024 x 768	800	60	8,16	53

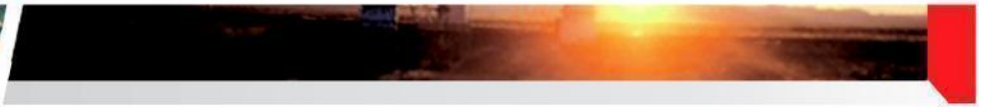


Specifications

Graphics Controller	ATI Radeon 9000 (M9)
Maximum Dot Clock	330 MHz
Horizontal Scan Rates	31.5 to 115 KHz
Display Memory	64 MB DDR
Display Colors	16.7 Million @ 24-bits, 256 @ 8-bits
PCI Bus Interface	PLX PCI6520-CB, 32/64-bit, 33/66/100/133 MHz PCI/PCI-X
USB 2.0 Host Controller	NEC uPD 720101 EHCI/OHCI, 2 channels utilized, USB 2.0, USB 1.1 compliant
Video Digitizers	Conexant Bt878, 3 Composite, 1 S-Video, PAL/NTSC/SECAM Analog Devices AD9882 RGBHV + DVI, 1024x768x16bpp
Environment	
Temperature	0°C to +70°C, operating; -55°C to +85°C, storage
Humidity	5% - 95% non-condensing
Power Requirements	AtlasPMC/2: +5V ±5%, 2.2 A (est.) [<i>exceeds PMC power spec - check your host CPU for PMC slot current limiting</i>] AtlasPMC/1: +5V ±5%, 1.5 A (est.)
PMC Compatibility	IEEE 1386-2001 [<i>except Side 2 max component height is approx. 3.1 mm instead of 2.1 mm. This is not a significant issue.</i>]
Dimensions	149 mm x 74 mm
PCI/PMC Host Bus	33/66/100/133 MHz, 32/64-bit, PCI/PCI-X compatible Universal PCI Bus signaling (5V and 3.3V)
PCI Device IDs and Interrupts	PCI Bridge: IDSEL = PMC IDSEL M9 Graphics Controller IDSEL - secondary A16, INTA uPD721010 USB Controller IDSEL - secondary A20, INTA, INTB, INTC Bt878A Video Digitizer IDSEL - secondary A24, INTA LM75 Thermal Sensor INTA (jumper installed)
PCI Subsystem Vendor ID	0x10F0 (CWGxl Vendor Code)
PCI Subsystem Device ID	0x00C6 (AtlasPMC Identifier)
I/O Connectors	AtlasPMC/1: VGA + VGA or DVI-I + MDR-20 AtlasPMC/2: DVI-I + MDR-20
DVI-I Breakout Cable	DVI Ch 1, VGA Ch 1, Audio, USB
MDR-20 Breakout Cable	Several available - contact factory for details
Analog Monitor Support	Dual, VGA or Sync-On-Green up to 1920x1200@24 bpp, interlaced/non-interlaced, separate or composite syncs
Digital Monitor Support	Dual, DVI up to 1600x1280@24 bpp, up to 1920x1200 with reduced sync/blanking intervals
VGA and FCode BIOS	Proprietary combination VGA/FCode BIOS supports analog (VGA or Sync-On-Green) and DVI for both x86 and SPARC systems.
Maintenance Features	DDC-2B control enables system software to interrogate monitor for type and capabilities; LM75 thermal sensor can report board temperature. Depending on the operating system support, most devices can be at least partially powered down.

Non-standard Versions








If you have special configuration requirements that do not appear to be covered by the standard versions, please contact the sales department for assistance.

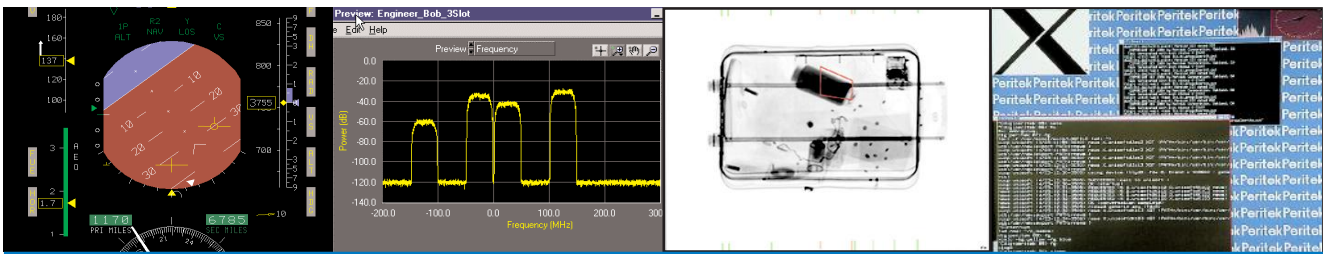


Graphics Software Support

Accelerated X Server with OpenGL and Xv video input extensions
 Standalone accelerated OpenGL driver for VxWorks
 Windows 2K/XP drivers including accelerated DirectX and OpenGL
 Audio and USB 2.0 support

Table 8: Software Support Matrix

				Audio	Video Input	DirectX 9a	
Solaris SPARC		✓	✓ (Q3/05)	✓	✓		✓
VxWorks PowerPC			✓ (Q3/05)		✓		✓
Windows 2K/XP			✓	✓	✓	✓	✓
Linux x86/PowerPC		✓ (Q3/05)	✓ (Q3/05)		✓		✓





Ordering Information

Standard Board Configurations:

AtlasPMC/1V - (CWCEC P/N E-AE40004)

ATI Radeon 9000 (M9) Graphics Accelerator, 64 MB DDR, dual Analog VGA displays. Front panel dual VGA connectors. BIOS supports analog and digital displays for FCode (Solaris) and VGA.

AtlasPMC/1D - (CWCEC P/N E-AE40001)

As above, adds dual DVI output, utilizes front panel DVI-I and MDR-20 connectors.

AtlasPMC/2A - (CWCEC P/N E-AE40003)

AtlasPMC/2B - (CWCEC P/N E-AE40005)

As above, adds Conexant Bt878 video and Analog Devices AD9882 RGB/DVI digitizers, Micronas UAC3555B Stereo CODEC, and NEC uPD720101USB 2.0 host controller. **[A-B]** indicate different MDR-20 pin assignments - see Tables 1 and 3.

Standard Breakout Cables:

AtlasPMC DVI-I Breakout Cable - (CWCEC P/N E-A310002)

1 foot in length, DVI-I to DVI-D, VGA, USB, 3.5 mm Stereo In and Out Jacks (see Table 2 for more information)

AtlasPMC MDR20 DVI/VGA Breakout Cable - (CWCEC P/N E-A310003)

1 foot in length, MDR20 to DVI-D, VGA, single BNC (see Table 4 for more information)

AtlasPMC MDR20 DVI/Video Breakout Cable - (CWCEC P/N E-A310004)

1 foot in length, MDR20 to DVI-D, S-Video, six BNCs (see Table 4 for more information)

AtlasPMC MDR20 DVI Breakout Cable - (CWCEC P/N E-A310001)

9 feet in length, MDR20 to DVI-D (see Table 4 for more information)

Software:

Windows Drivers

Display, video input, and accelerated OpenGL and DirectX 0a drivers for Windows 2000 and XP. USB and Audio are built into the OS.

DDX/SO/RX.X

Video input and 2D accelerated X-Windows DDX drivers for SPARC Solaris 2.6, 7, 8, 9, and 10.

GL/SO/RX.X

Accelerated 3D/OpenGL DDX driver for SPARC Solaris 2.6, 7, 8, 9, and 10.

DRV/LN/RX.X

Video input and 2D accelerated X-Windows DDX drivers for x86 or PowerPC Linux.

GL/LN/RX.X

Accelerated 3D/OpenGL DDX driver for x86 or PowerPC Linux.

NOTE: /RX.X is software revision number, subject to change.

Disclaimers and Copyrights

Specifications are subject to change without notice.

The information in this document is subject to change without notice and should not be construed as a commitment by Curtiss-Wright Controls Embedded Computing (CWCEC) group. While reasonable precautions have been taken, CWCEC assumes no responsibility for any errors that may appear in this document.

All products shown or mentioned are trademarks or registered trademarks of their respective owners.

Trademarks and Logotypes are the property of their respective owners.

Simulator photo courtesy eNGENUITY Technologies, Inc.; waveform photo courtesy Celerity Systems/Aeroflex; x-ray baggage photo courtesy InVision Technologies, Inc.

© 2006 Curtiss-Wright Controls, Inc. All Rights Reserved



Parhelia B.V.
Phone : +31(0)10 284 95 46
The Netherlands
www.parhelia-bv.com