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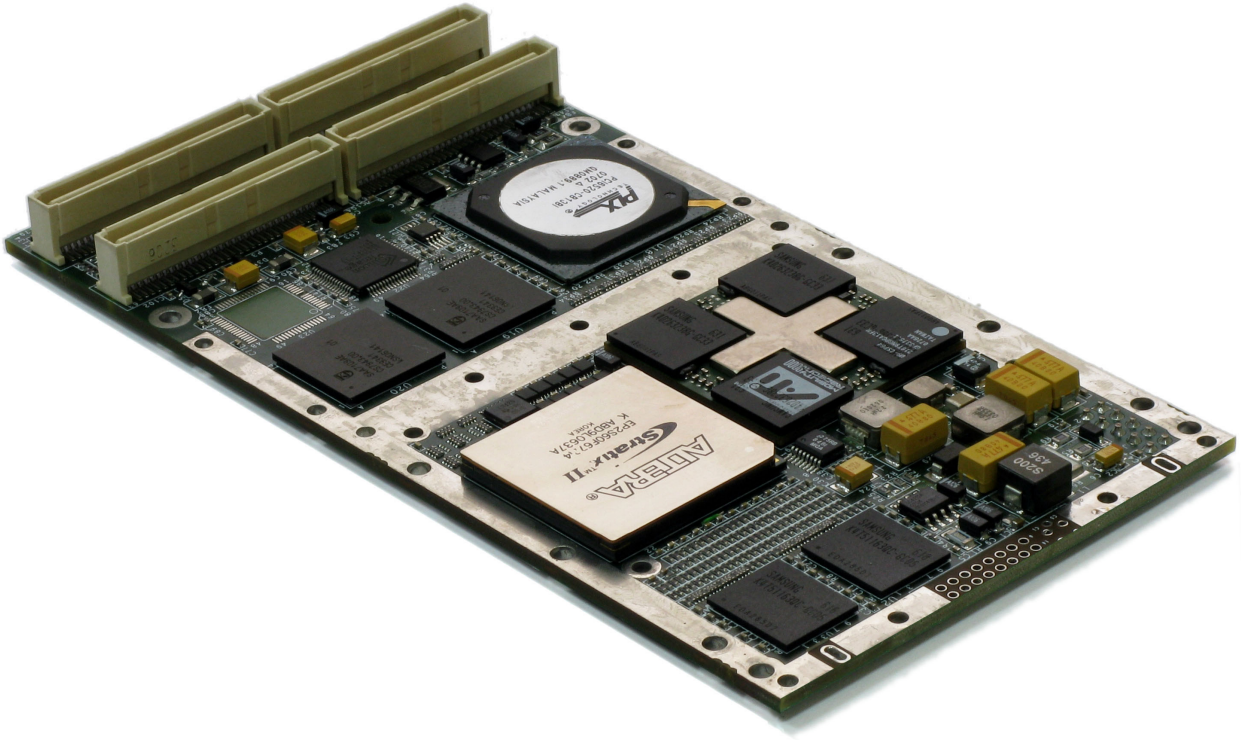
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Find the *Aitech Defense Systems 2M590-R3-11* at our website: *Click HERE*

M590
Multi-Standard Graphics and Video PMC



- ATI M9 Graphics Processor
- On-Chip 64 MB DDR Frame Buffer
- 2D and 3D Processing Capabilities
- Dual Independent Graphic Heads
- Video Output Channels
  - 3 DVI
  - 1 LVDS Single/Double Link
  - 2 Progressive RGBHV/RGsB
  - 3 Composite/S-Video Supporting RS-170/NTSC/PAL
  - 1 RGBHV Modified/RS-343
- Video Input Channels
  - RS-170/NTSC/PAL
  - DVI Channel
  - LVDS Single Link
  - RGBHV/RGsB Progressive
  - RS-343
  - External Sync
- 1:1 Aspect Ratio Support for Analog Video Output Channels
- Independent Video Overlay Functionality for Both Graphic Heads
- Universal PMC, PCI-X Rev. 1.0b and PCI Rev. 2.3 Compliant
- ALT Software Drivers for VxWorks and Integrity
  - OpenGL 2D/3D (“Genesis”)
  - DO-178B OpenGL (“Orion”)
- 2D Drivers for VxWorks WindML
- Video Output Routed to Front Panel and P4 I/O Connector
- Conduction and Air-Cooled Versions
- Vibration and Shock Resistant

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Dual Head - Multi-Standard Graphics - Powerful 2D/3D Processing

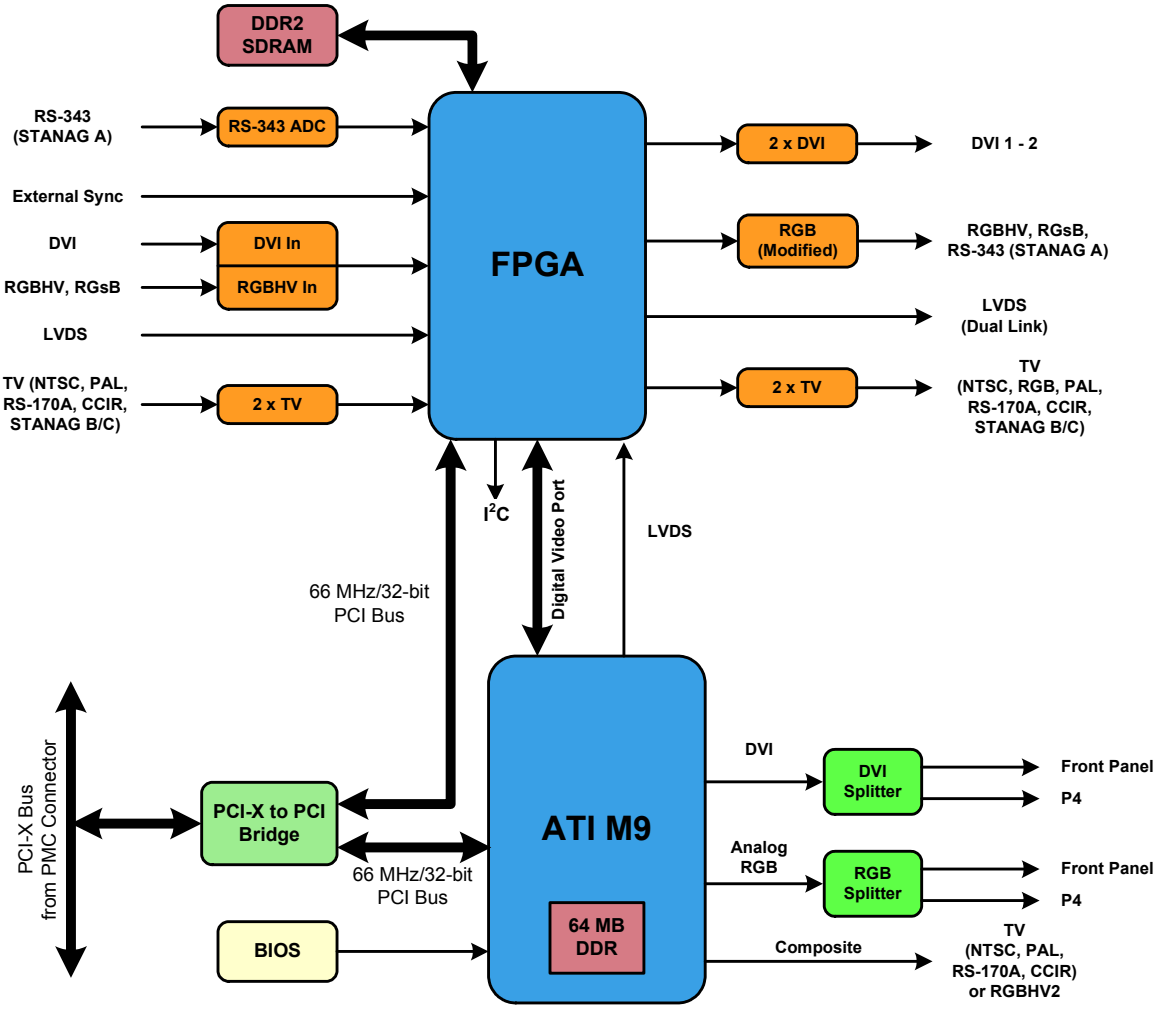
The M590 Multi-Standard Graphics and Video PMC is powered by the ATI advanced M9 graphics processor. The M9 processor, with its 64 MB frame buffer array, easily supports high-resolution 2D and 3D applications.

This high performance graphics PMC has dual independent video head outputs that enable two different information streams to be simultaneously output to two different monitors, analog and/or digital. The M590 supports a wide variety of monitors, both interlaced (NTSC, PAL, RS-343) and advanced non-interlaced (VGA, RGBHV, RGsB, DVI, LVDS).

In addition, the M590 PMC provides advanced video overlay functionality. The M9 processor generates the graphics images, superimposes an input from one of the various video formats, and drives the result to a monitor. A second overlay process can be implemented simultaneously on the independent second stream, using a different video input. This process is routed to the FPGA for output.

The M590 is designed for maximum performance in harsh environment applications.

The M590 software package supports all on-board capabilities, including OpenGL and standard VGA.



M590 Block Diagram

Functional Features

Graphics Processor

The M590 PMC graphics engine features the ATI Mobility Radeon 9000 (M9) high performance graphics processor. This device performs high quality 3D polygon and texture acceleration, and incorporates an integrated VGA core and dual RAMDAC units. Supporting an extensive function set for 2D and 3D graphics, the M590 unifies 2D, 3D, and video operations in multiple execution pipelines, while enabling high-flexibility data handling and preventing overloading of specific data paths.

The 64 MB of on-chip DDR SDRAM operating at 200 MHz clock and 128-bit width is used by the M9 for processing operations, frame buffer, texture buffer, and overlay buffer.

The M590 PMC provides dual progressive RGBHV outputs with HSYNC and VSYNC through the two RAMDAC units integrated in the M9 (triple 10-bit palette DAC at 400 MHz).

Supported resolutions and refresh rates include:

Resolution	Bits per Pixel	Refresh Rates (Hz)
2048 by 1536	16, 32	60 – 85
1920 by 1440	16, 32	60 – 90
1920 by 1200	16, 32	60 – 100
1920 by 1200	16, 32	60 – 120
1600 by 1200	16, 32	60 – 120
1280 by 1024	16, 32	60 – 160
1152 by 870	16, 32	60 – 200
1080 by 808	16, 32	60
1024 by 768	16, 32	60 – 200
832 by 624	16, 32	60 – 200
800 by 600	16, 32	60 – 200
640 by 480	16, 32	60 – 200
640 by 480	16, 32	60 Interlaced
632 by 480	16, 32	60
512 by 512	16, 32	30, 60

RGB signals are available both at the PMC front panel and P4 I/O connector.

With its versatile video capabilities, the M590 supports various interlaced and non-interlaced display interfaces, as well as video input with video overlay functionality.

The M590 can simultaneously accept 2 video heads from an external source (through its video input interfaces), manipulate them (video overlay or other image processing), and drive those video streams out to its video output interfaces.

In addition, the M590's dual independent video output heads can drive 2 distinct streams to 2 separate monitors of supported types. The M590 can also condition its analog output interface to specific levels as required by RS-170A/NTSC/PAL or RS-343. Special I/O conditioning capabilities may be included upon request.

Video Overlay

The M590 PMC can overlay video from an external source onto graphic images generated by the system. The graphics/video combination is displayed on screen by means of the M9 graphic processor.

This functionality may be used in applications that require two image sources to be combined into a single display. The M9 graphic processor performs the overlay and allows the video input to be manipulated and displayed on top of the image displayed from the frame buffer. The high performance of the graphic processor allows extensive manipulation of the video input data as well as the selection of the exact overlay data format.

The video overlay function can be applied to a second distinct output simultaneously. For the second stream the overlay function is performed by the M9, which combines a second internally generated graphics stream with video input that it receives from the FPGA via the PCI bridge.

Progressive (Non-Interlaced) Interfaces

The M590 PMC provides several progressive I/O interfaces to enable the attachment of various inputs and display types.

RGBHV/RGsB/DVI Input

The M590 provides one progressive RGBHV, RGsB (sync-on-green) or DVI input via an on-board analog RGB/DVI-to-digital converter device. RGB/DVI input resolution should not exceed XGA.

DVI Outputs

The M590 implements up to three DVI digital output links, one of which is available at the front panel. The physical interface is a TDMS controlled by one on-chip controller for the rear connection (P4 PMC I/O connector), and a second external PanelLink transmitter for the front panel DVI connection (on air-cooled versions).

LVDS I/O

The M590 provides an LVDS (Low Voltage Differential Signal) transmitter/receiver for LVDS flat panel display supporting up to UXGA resolution.

The M590 LVDS output supports the following:

a. Dual Pixel – Conversion of 48-bit (two 24-bit color pixels) CMOS/TTL data into 8 LVDS data outputs and one differential clock output.

b. Single Pixel – Conversion of 24-bit color data (single pixel) into 4 LVDS data outputs and one differential clock output.

The M590 LVDS input supports single pixel operation, accepting an LVDS input stream at up to 85 MHz and converting it to 24-bit color data.

Interlaced Interfaces

The M590 provides analog interlaced input and output interfaces, enabling attachment of interlaced monitors and video sources.

Composite/S-Video Inputs

The M590 provides up to nine PAL (CCIR/ STANAG B) and NTSC (RS-170A/STANAG C) Composite Video inputs, some of which may be configured by software as S-Video inputs. The number of S-Video inputs that can be made available is dependent on the M590 Configuration Type.

Configuration Types 1 and 3 can provide 6 Composite Video inputs, **or** 2 S-Video and 2 Composite Video inputs, **or** 1 S-Video and 4 Composite Video inputs.

Configuration Type 2 can provide 3 Composite Video inputs or 1 S-Video input.

The M590 PMC supports video injection into the graphics subsystem. This input may be used for overlay functionality.

RGB Inputs

In addition to the Composite/S-Video inputs, the M590 also has an RS-343 (STANAG A) interlace input.

Analog Video Outputs

The M590 PMC provides three Composite, S-Video, and RGB outputs to support PAL (CCIR/STANAG B) and NTSC (RS-170A/ STANAG C) interlaced monitors. One stream is derived from a dedicated M9 output and the other two through an external video encoder.

A fourth analog video output, provided by another external video encoder, provides a modified RGB output to drive various interlaced (e.g. RS-343/STANAG A) or non-interlaced RGB monitors.

Signal Conditioning Module

A signal-conditioning module is used to enable attachment of monitors that are compliant with physical interfaces other than the NTSC/PAL standards.

The signal-conditioning module enables the output video signal levels to adjust to a specific required level (including RS-343).

The output levels are hardware-configured at the factory, as per customer request.

Aspect Ratio 1:1

The M590 supports interlaced video display aspect ratio selection ranging between 4:3 (default) and 1:1. Selection is performed either by software or hardware (default).

External Sync Mode

The M590 includes an external sync operation mode, enabling the synchronization of M590 analog input to a single external video sync source. This function can be used for systems requiring multiple video source displays on a single video monitor.

On-Board Logic

All logic devices on-board the M590 are implemented through the FPGA device.

The FPGA is used as a video multiplexer and switch matrix for the video streams coming into the M590 and going out of it.

Most FPGA functionalities and matrix interconnections are software-controlled through the PCI Rev. 2.2 bus.

PCI Bus Interface

The M9 and the FPGA interconnect to the PCI bus through a PCI-X to PCI Bus Bridge. The PMC host interface (Bridge primary port) fully complies with PCI-X Rev. 1.0b and PCI Rev. 2.3. The host interface supports 64/32-bit PCI-X/PCI operation at 33 MHz through 133 MHz.

This bus design enables the M590 to be inserted into a PCI-X system without degrading it to PCI, even though the internal resources of the M590 reside on a PCI bus configured for 32-bit PCI operation at 66 MHz.

The M590 PMC is a universal PMC driving +3.3 V PCI signaling level, and it is +5.0 V tolerant. It does not utilize the PCI V_I/O power.

Software Drivers

The M590 is supported by the ALT Software Embedded OpenGL package, with the following features:

- INTEGRITY® (GHS) and VxWorks® (Wind River Systems) RTOS Support
- Dual Display Support
- Support for OpenGL 1.3, OpenGL ES
- Support for GLUT 3.7, GLU 1.3, GLX 1.2
- High Performance WindML Display Drivers

For systems requiring DO-178B certification, the ALT Software DO-178B OpenGL package is available.

Mechanical Features

The M590 PMC is available in two mechanical formats:

- Air-cooled per IEEE 1386-2001 for installation on commercial and rugged air-cooled carrier boards.
- Conduction cooled per ANSI/VITA20-2001 for installation on IEEE 1101.2 conduction-cooled carrier boards.

High power components are cooled by an aluminum heatsink.

Dimensions

Air-cooled:	per IEEE 1386-2001
Conduction cooled:	per ANSI/VITA 20-2001

Power Requirements

The M590 draws its power from the host +5 V and +3.3 V power supply. On-board power circuits supply other required voltages.

Power consumption: 15 W

Environmental Features

Please, refer to the Aitech ruggedization datasheet.

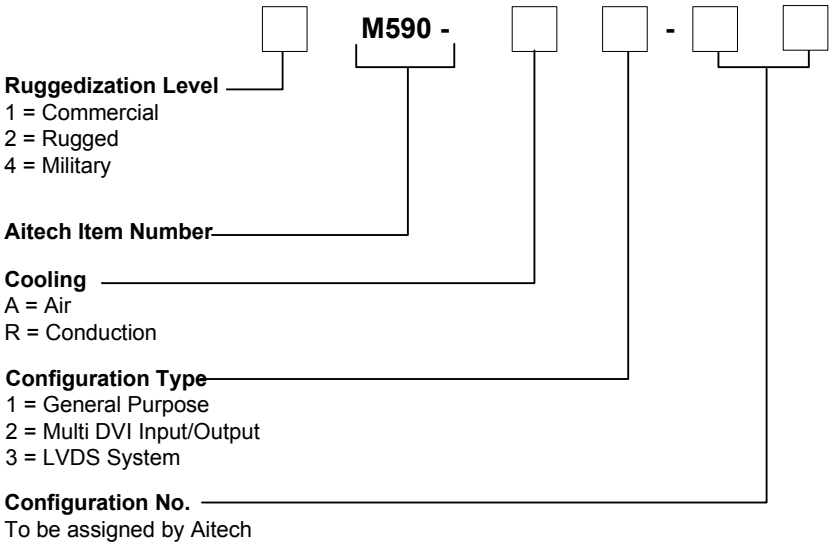
Configuration Options

The M590 is available in three standard configurations, as shown in the table below. For additional custom configurations, please contact your Aitech Defense Systems representative.

		Configuration 1 General Purpose	Configuration 2 Multi DVI I/O	Configuration 3 LVDS System
Outputs	RGBHV	2 (one may be RGsB)	1	1 (may be RGsB)
	DVI	2	3	0
	Composite/S-Video	3	3	3
	LVDS Single/ Double Link	0	0	1
Inputs	Composite Video (see note)	6	3	6
	RGBHV/RGsB - Non-Interlaced	1	0	0
	RS-343	1	1	1
	External Sync	0	1	0
	DVI	0	1	0
	LVDS Single Link	0	0	1

Note: Some of the Composite Video inputs may be configured by software as S-Video inputs.

Ordering Information for the M590



Example: 2M590-R1-00

For more information about the M590 or any Aitech product, please contact Aitech Defense Systems sales department at (888) Aitech-8 (248-3248).

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