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GENERAL MICRO SYSTEMS
INCORPORATED

GMS PMC VGA

Revision C February 11, 2000

“Da Vinci”

Procedure # 000-027-01.1

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Cirrus Logic®	CL-GD5446 Technical Reference Manual

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ABOUT THIS MANUAL

OVERVIEW

The purpose of this manual is to guide the user in the set up and use of the General Micro Systems, Inc. **PMC VGA Video Graphic Board "Da Vinci"**. The manual is sectioned as follows:

About this Manual:

Contains explanations of conventions used, and contact information in the event the user requires additional information.

Introduction:

Presents the PMC VGA Video Graphic board and discusses its features.

Hardware Preparation:

Provides preparation, installation and hardware configuration instructions.

Software Setup & Configuration:

Describes the PMC VGA Video Graphic board system configuration.

Appendix A:

Provides connector pin assignments.

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RELATED DOCUMENTS

- Intel® Corporation, 82559 (10Base-T/100 Base-TX LAN).
- Intel® Corporation, 21150 (PCI-to-PCI Bridge).
- Microsoft® Corporation, (Windows NT™).
- AutoDesk® AutoCAD®
- IBM® Corporation OS/2®
- QNX® Software Sys, LTD QNX™
- Cirrus Logic® CL-GD5446

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SUPPORT

Additional copies of this document, or further information can be obtained by contacting General Micro Systems through the following channels:

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909/980-4VME (4863)

Facsimile:

909/987-4VME (4863)

Web Site:

GMS - www.gms4vme.com
Cirrus Logic – **www.cirrus.com/prodtech** (for additional Driver support).

E-Mail:

GMS - sales@gms4vme.com

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INTRODUCTION

VGA Graphics Module

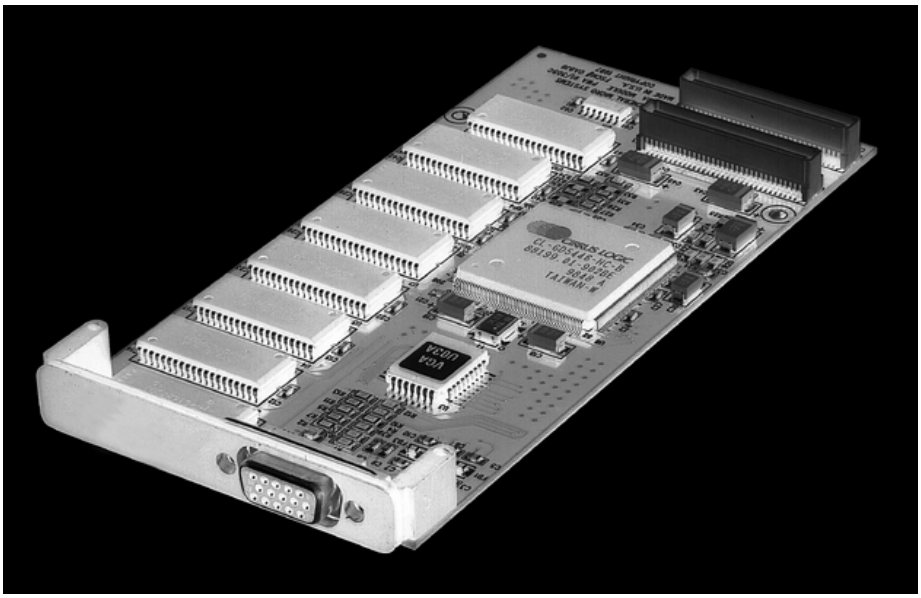
GENERAL

The PCI specification defines a 4.2-inch by 12.3-inch board that plugs in perpendicular to the motherboard. Full size PCI boards are impractical for VME applications due to their length relative to the depth of a standard VME card frame. Even if a reduced size PCI card is used, the 4.2-inch height of the PCI card interferes with six adjacent VME slots. Recognizing the need for smaller form-factor PCI cards, the IEEE proposed a draft standard (P1386) defining a Common Mezzanine Carrier concept leading to the development of PMC (PCI Mezzanine Carrier) boards. PMC cards use the logical and electrical layers of the PCI cards but are smaller and coplanar to the host assembly board. PMC boards are functionally equivalent to standard PCI without the mechanical problems in a VME environment.

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The **PMC VGA Video Graphic board "Da Vinci"** in Figure 1 provides:

- Ultra High Resolution Video.
- Support for 1280 x 864 at 16 million colors.
- 64-bitBLT graphic engine with 2/4-MB of RAM.
- Support for Windows NT™, QNX®, and Real I/X operating systems.



Note: PMC VGA supports +5 Volt Interface

Figure 1. GMS PMC VGA Video Graphic Board

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PMC VGA "Da Vinci" System Block Architecture

A simplified perspective of the PMC VGA "Da Vinci" system architecture is illustrated in Figure 2. The following subsections provide an overview of the major components comprising the PMC VGA architecture.

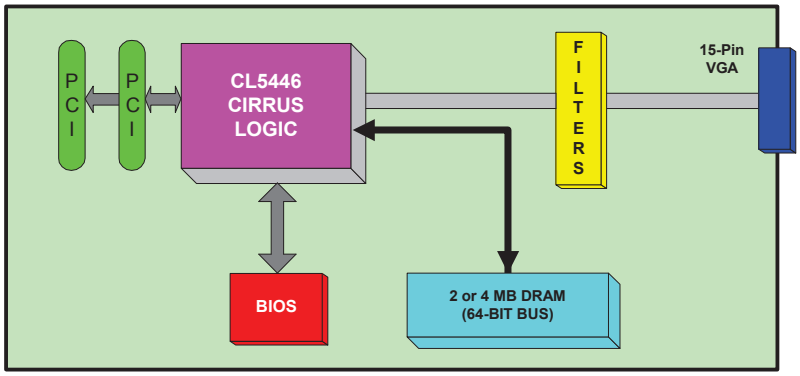


Figure 2. GMS PMC VGA Video Graphic Board Block Diagram

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SVGA CONNECTOR

The PMC VGA Video Graphic board “Da Vinci” is attached to PMC compliant board using a SVGA Connector (DB-15 Female) as shown in Figure 3. Refer to Appendix B, Table B.1., for the SVGA Connector pin assignments.

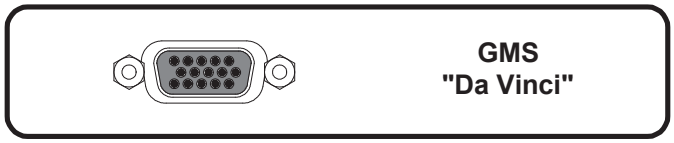


Figure 3. GMS PMC VGA Bezel

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PMC INSTALLATION

The PMC VGA Video Graphic board installs in a PMC slot that supports a +5 Volts interface. A mounting illustration is shown in Figure 4 below.

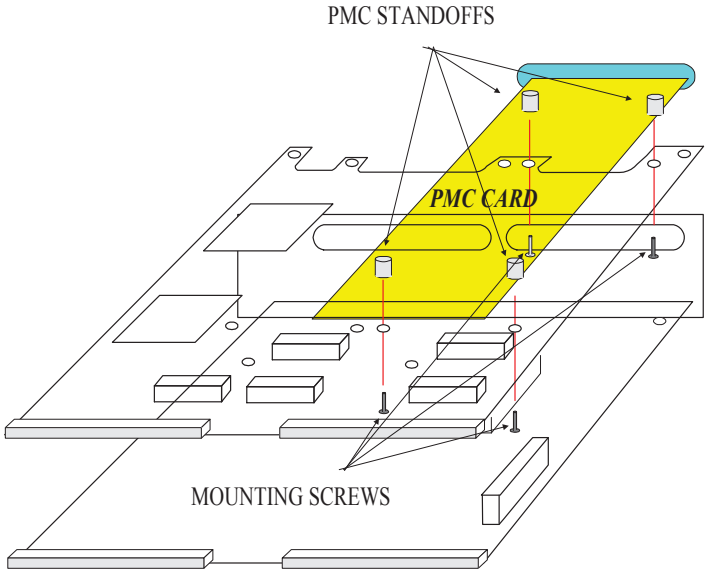


Figure 4. PMC VGA Mounting Illustration

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CL-GD5446 VisualMedia™ Accelerator

OVERVIEW

The CL-GD5446 VisualMedia accelerator is a 64-bit DRAM based SVGA controller with hardware-accelerated BitBLT, video playback, and up to 4-MB RAM.

The CL-GD5446 features a 64-bit GUI BitBLT engine with double-buffered, memory-mapped control registers. Transparency is supported with color expansion for all color depths, and supported without color expansion for 8 and 16-bpp graphics mode.

Features

Table 1. Presents a list of the major features of the CL-GD5446 VisualMedia accelerator.

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Features	CL-GD5446
GUI accelerator width (in bits)	64-bits
Maximum dot clock	135 MHz
Maximum memory clock	80 MHz
Multimedia ready	Yes
Color key, chroma key occlusion support	Yes
YUV and AccuPak	Yes
Unique planar assist video support	Yes
Multi-format frame buffer	Yes
Color space conversion	Yes
Interpolated zooming (independent for X and Y)	Yes
Transparent source BitBLT	Yes
Active display line readback	Yes
'Page flip' support	Yes
I2C support	Yes
8 or 16-bit General-Purpose I/O bus	Yes
DDC2B support	Yes
'Green PC' power-saving features	Yes
Direct PCI bus interface (2.1-compliant)	Yes
Resolutions up to 1280 x 1024	Yes
Integrated triple 8-bit DAC	Yes
Programmable dual-clock synthesizer	Yes
64-bit DRAM display memory interface	Yes
Memory size (Mbytes)	2-MB or 4-MB
4, 16-bit-wide DRAMs	Yes
EDO DRAM support	Yes
128K x 16, 128K x 32 DRAM support	Yes

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16-bit Pixel bus	Yes
CL-GD542X register and software-compatible	Yes
Low-power CMOS, 208-pin PQFP	Yes
100% hardware and BIOS compatible with IBM® VGA display standards	Yes
PC97 compliance	Revision B

Table 1. CL-GD5446 Features List

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64-bit VisualMedia™ Accelerator

The CL-GD5446 delivers high-performance graphics and TV-quality, full-motion, full-screen video playback in an integrated, single-chip device. The CL-GD5446 VisualMedia™ accelerator integrated into a cost-effective personal computer, plays CD-ROM video clips and disk-based video files (including MPEG titles), in full screen at up to 30 frames per second with fully synchronized sound. At the same time, the CL-GD5446 delivers exceptional system throughput with minimal impact to system operation. Transparent BitBLT and page-flipping features provide outstanding DirectDraw™ and games performance.

The CL-GD5446 supports pixel resolutions of up to 1280 x 1024, and 16.8 million colors at resolutions of up to 1024 x 768.

The CL-GD5446 features an integrated dual-frequency synthesizer with on-chip oscillator and filters, as well as a triple 8-bit palette DAC with on-chip current reference. Green-PC power-management features help make systems based on the CL-GD5446 compliant with the Energy Star Program.

The CL-GD5446 is software and pin-compatible with the industry-standard alpine family of VGA controllers from Cirrus Logic. It comes with the same Cirrus Logic quality software, applications support, and documentation. Refer to Figure 5 for the CL-GD5446 Block Diagram.

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Features

The features for the 64-bit VisualMedia™ Accelerator are explained in the following paragraphs:

- High-throughput PCI bus Interface optimized for video playback

  - Large writes buffer allows sustained zero-wait-state bursts.
  - Independent memory apertures for BitBLT and CPU/video allow concurrent operation for optimized video playback.
  - Byte-swapping for PowerPC™ support.
  - PCI v2.1-compliant.

Advanced 64-bit BitBLT engine for Windows™ 95

  - Transparent source data BitBLT for DirectDraw™.
  - Color expansion for all graphics modes.
  - Large data buffers for fast screen-to-screen BitBLT.
  - Double-buffered, memory-mapped registers with AutoStart™.
  - Optimized color 8 x 8 PatCopy.
  - Accelerated Packed-24 modes.

- 64-Bit DRAM interface optimized for EDO DRAM.

  - 80-MHz MCLK offers up to 320 Mbytes/sec., peak bandwidth.
  - Supports new 128K x 16, 128K x 32 DRAM.

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- PC97-compliant (Revision B).

- Cirrus Logic provides enabling software drivers (visit their website www.cirrus.com/prodtech).

  - Windows® 95/98, Windows® NT 4.0, Windows NT™, OS/2®, and AutoCAD®.

Unique Features

- Outstanding VisualMedia™ Acceleration.

  - High- throughput PCI bus interface.
  - Advanced 64-bit BitBLT engine with transparent BitBLT and page-flip support.
  - Optimized EDO DRAM interface.
  - 128K x 16/32-bit DRAM interface.

- Superior TV-Like-Quality Video Performance.

  - Hardware video window.
  - X and Y linear interpolated scaling.
  - YUV planar assist, AccuPak™ encoding.
  - Multiformat frame buffer.
  - Color key, chroma key.

- Foundation for Differentiation.

  - I2C interface.

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- Compatibility.

  - Compatible with VGA standards.
  - Drivers supplied at various resolutions for Windows® 95/98, Windows NT™, AutoCAD®, OS/2®, and other popular applications.

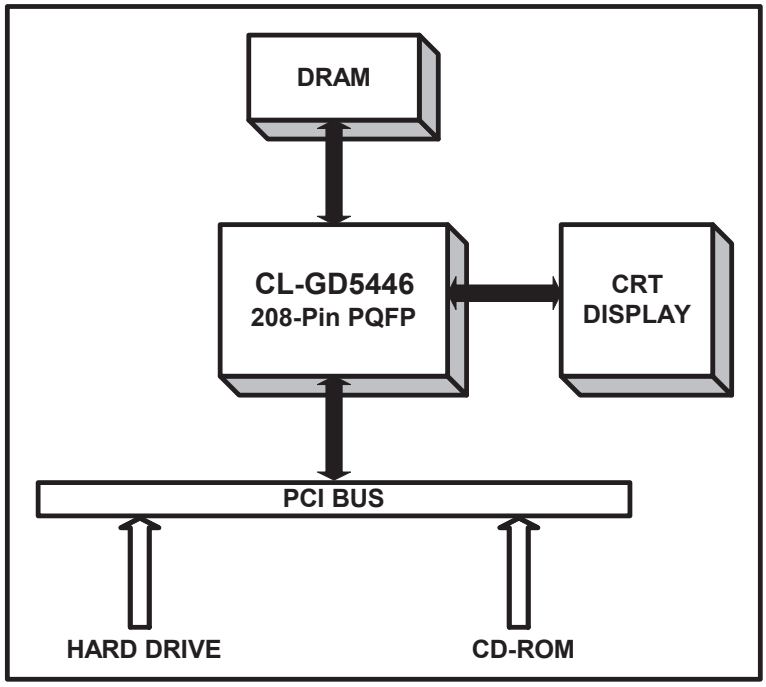


Figure 5. CL-GD5446 Block Diagram

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SOFTWARE SETUP

Cirrus Logic provides an extensive and expanding range of software drivers to enhance the resolution and performance of many popular software packages. Note that the CL-GD5446 VGA graphics portion of a system does not require software drivers to run applications in standard-resolution modes. Refer to Cirrus Logic website for software setup assistance.

Cirrus Logic software drivers for the CL-GD5446 include support for the following resolutions as shown in Table 2.

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Software Drivers	Resolution Supported (Note at bottom)	Number of Colors
Microsoft® / Intel® DCI (display control interface), DirectDraw™	640 x 480, 800 x 600, 1024 x 768, 1152 x 864, 1280 x 1024.	256
	640 x 480, 800 x 600, 1024 x 768, 1152 x 864, 1280 x 1024.	65,536
	640 x 480, 800 x 600, 1024 x 768.	16.8 million

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Microsoft® Windows® v3.x Microsoft® Windows® 95	640 x 480, 800 x 600, 1024 x 768, 1152 x 864, 1280 x 1024.	256
	640 x 480, 800 x 600, 1024 x 768, 1152 x 864, 1280 x 1024.	65,536
	640 x 480, 800 x 600, 1024 x 768.	16.8 million

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Microsoft® Windows NT™ v3.5, v3.51, v4.0	640 x 480, 800 x 600, 1024 x 768, 1152 x 864, 1280 x 1024.	16 and 256
	640 x 480, 800 x 600, 1024 x 768, 1152 x 864, 1280 x 1024.	65,536
	640 x 480, 800 x 600, 1024 x 768.	16.8 million

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OS/2® v2.11, v3.0	640 x 480, 800 x 600, 1024 x 768, 1152 x 864, 1280 x 1024.	256
	640 x 480, 800 x 600, 1024 x 768, 1152 x 864, 1280 x 1024.	65,536
	640 x 480, 800 x 600, 1024 x 768.	16.8 million

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AutoCAD® v12.0, v13.0 AutoshADe® v2.0 with Renderman 3D Studio™ v1.0, v2.0, v3.0, v4.0	640 x 480, 800 x 600, 1024 x 768, 1152 x 864, 1280 x 1024.	16
	640 x 480, 800 x 600, 1024 x 768, 1152 x 864, 1280 x 1024.	256
	640 x 480, 800 x 600, 1024 x 768.	32,768
	640 x 480, 800 x 600, 1024 x 768.	65,536
	640 x 480, 800 x 600, 1024 x 768.	16.8 million

Note: All monitor types do not support all resolutions; 640 x 480 drivers will run on PS/2® – type monitors. Extended resolutions are dependent upon monitor type and VGA driver for the system.

Table 2. Software Support

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APPENDIX A

SYSTEM SPECIFICATIONS

This section provides hardware performance, electrical and environmental (non-operating) specifications for the PMC VGA.

Physical Specifications

Dimensions of the GMS PMC VGA assembly are provided in Table A.1.

Dimension	Measurement
Height	0.650 in
Length	5.865 in
Width	2.912 in

Table A.1. PMC VGA Physical Specifications

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Electrical Specifications

Electrical specifications for the GMS PMC VGA assembly are provided in Table A.2.

Characteristic	Typical Value	Maximum Value
Power Consumption	4 Watts	6 Watts
Supply Voltage	5 Volts	5.25 Volts
Temperature	0 ℃	60 ℃
Humidity (non-condensing)	5%	95%
Altitude Range	0 feet (0 meters)	10,000 feet (3,408 m)
Shock	N/A	5 g pk, 10 msec, 1/2 sine wave

Table A.2. PMC VGA Electrical Specifications

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Environmental Specifications

Table A.3. Displays the environmental specifications for the PMC VGA board under non-operating conditions.

Characteristic	Minimum Value	Maximum Value
Temperature	-55 ℃	150 ℃
Humidity (non-condensing)	5%	95%
Altitude Range	0 feet (0 meters)	40,000 ft (12,192 m)
Shock	N/A	20g pk, 30msec

Table A.3. PMC VGA Non-Operating Specifications

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APPENDIX B

CONNECTOR PIN ASSIGNMENTS

This section provides connector pin assignments for the **PMC VGA** Video mezzanine board. Refer to the Tables for the connector pin assignments.

SVGA Connector (DB-15 Female) J1 Pin Assignments

Pin #	Description
1	Red
2	Green
3	Blue
4	ID2
5	Ground
6	Ground
7	Ground
8	Ground
9	+5 Volts
10	Ground
11	ID0
12	DATA I/O
13	Horizontal Sync
14	Vertical Sync
15	Data Clock

Table B.1. SVGA (DB-15 Female) Connector J1

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PMC1 Interface Connector J3 Pin Assignments

Pin #	Description	Pin #	Description
1	No Connection	33	FRAME#
2	No Connection	34	Ground
3	Ground	35	Ground
4	No Connection	36	IRDY#
5	No Connection	37	DEVSEL#
6	No Connection	38	+5 Volts
7	Bus Mode 1	39	Ground
8	+5 Volts	40	No Connection
9	No Connection	41	SDONE
10	No Connection	42	SBO#
11	Ground	43	PAR
12	No Connection	44	Ground
13	PCI CLOCK	45	Voltage I/O 3
14	Ground	46	AD15
15	Ground	47	AD12
16	No Connection	48	AD11
17	No Connection	49	AD9
18	+5 Volts	50	+5 Volts
19	Voltage I/O 1	51	Ground
20	AD31	52	C/BE0#
21	AD28	53	AD6
22	AD27	54	AD5
23	AD25	55	AD4
24	Ground	56	Ground
25	Ground	57	Voltage I/O 4
26	C/BE3#	58	AD3
27	AD22	59	AD2
28	AD21	60	AD1
29	AD19	61	AD0
30	+5 Volts	62	+5 Volts
31	Voltage I/O 2	63	Ground
32	AD17	64	No Connection

Table B.2. PMC1 Interface Connector J3

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PMC2 Interface Connector J4 Pin Assignments

Pin #	Description	Pin #	Description
1	No Connection	33	Ground
2	No Connection	34	No Connection
3	No Connection	35	TRDY#
4	TDO (NC)	36	+3.3 Volts
5	TDI (NC)	37	Ground
6	Ground	38	STOP#
7	Ground	39	No Connection
8	No Connection	40	Ground
9	No Connection	41	+3.3 Volts
10	No Connection	42	No Connection
11	No Connection	43	C/BE1#
12	+3.3 Volts	44	Ground
13	PCIRST#	45	AD14
14	Bus Mode 3	46	AD13
15	+3.3 Volts	47	Ground
16	Bus Mode 4	48	AD10
17	No Connection	49	AD8
18	Ground	50	+3.3 Volts
19	AD30	51	AD7
20	AD29	52	No Connection
21	Ground	53	+3.3 Volts
22	AD26	54	No Connection
23	AD24	55	No Connection
24	+3.3 Volts	56	Ground
25	IDSEL	57	No Connection
26	AD23	58	No Connection
27	+3.3 Volts	59	Ground
28	AD20	60	No Connection
29	AD18	61	No Connection
30	Ground	62	+3.3 Volts
31	AD16	63	Ground
32	C/BE2#	64	No Connection

Table B.3. PMC2 Interface Connector J4

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NOTES:

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V255 - "MUSTANG II" Single/Dual Pentium MMX SBC.
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V157 - "MARINER" Single Slot Celeron or Coppermine - 128 Processor SBC.
V2P3 - "HYDRA" Single/Dual Pentium III/Slot-1 SBC.
V2P4 - "ATLAS" Single/Dual Coppermine - 256 Embedded Pentium SBC.

COMPACT PCI CPU MODULES

C2P3 - "JUDGEMENT DAY" Single/Dual Pentium III / Slot-1 SBC.
C2P4 - "ATLAS" Single/Dual Coppermine - 256 Embedded Pentium SBC.
C157 - "MARINER II" CPCI Single Slot Single Celeron or Coppermine - 128 Processor SBC.
C130 - "ELIMINATOR" CPMC Expansion Module.

PMC MODULES

ENET 2 "NetMinder II" Support for One 10/100 Base-Tx Ethernet with RJ-45 Front Panel Connector.
ENET 3 "NetDoubler" Support for Two 10/100 Base-Tx Ethernet with RJ-45 Front Panel Connector.
ENET 8 "Octopus" Support for Eight 10/100 Base-Tx Ethernet with Four RJ-45 on the Front and Four via Rear Panel.
PMC QUADSIO "Commander" QuadSync/Async Serial I/O.
PMC VIDEO "DaVinci" Hi-Performance Video with 4MB RAM.
PMC SCSI "Newton" Hi-Performance Ultra Wise SCSI Interface.
PMC ATM "RoadWarrior" Single/Multi-Mode ATM with Fiber/Copper.

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DDrive 2 "Mini-DDrive" Support for One Micro Floppy/LS120 and One 2.5" IDE HDD.

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Please call 1-800-307-4863 for details. Please visit our website at: www.gms4vme.com.

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