

Reference Manual

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VL-EPM-V4

PC/104-Plus Video Module



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CORPORATION



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Product Release Notes

Rev 1.00 – Initial commercial release.

Support

The VL-EPM-V4 support page, at <http://www.versalogic.com/private/epmv4support.asp>, contains additional information and resources for this product including:

- Reference Manual (PDF format)
- Software driver and video BIOS information and downloads
- Data sheets and manufacturers' links for chips used in this product

This is a private page for VL-EPM-V4 users that can be accessed only by entering this address directly. It cannot be reached from the VersaLogic homepage.

The VersaTech KnowledgeBase is an invaluable resource for resolving technical issues with your VersaLogic product.

[VersaTech KnowledgeBase](#)

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Description

The VL-EPM-V4 model is a high speed SVGA interface for PC/104-*Plus* (PCI + ISA) systems. It is fully compatible with popular operating systems such as QNX; Windows 95/98, 2000, CE, NT and XP; Linux; and VXWorks.

The board features outputs for standard analog display monitors and LVDS flat panel displays. A selection of operating modes allows the display to be tailored to a variety of OEM requirements.

The VL-EPM-V4 features high-reliability design and construction and 100% functional testing. It is backed by a two-year limited warranty and VersaLogic's outstanding service and support.

- High-Speed PC/104-*Plus* interface
- Fully SVGA compatible
- Standard analog video monitor support
- LVDS flat panel display support
- 8 MB VRAM
- Up to 1280 x 1024 VGA resolution with 24-bit color; up to 1920 x 1200 VGA resolution with 16-bit color
- Up to 1024 x 768 LVDS resolution with 18-bit color

VGA/SVGA CONTROLLER AND ROM BIOS

A single SiS Volari Z9M graphics controller chip provides VESA-standard VGA and SVGA graphics modes and registers. Custom BIOS support can be added to allow the use of VGA and SVGA flat panel displays.

SOFTWARE DRIVER AND VIDEO BIOS DOWNLOADS

Software drivers and video BIOS images are available for download on the [VL-EPM-V4 support page](#). The VL-EPM-V4 is shipped with the standard VGA video BIOS installed. The standard VGA BIOS can be overwritten with an LVDS BIOS, which supports cloned output on both the LVDS and VGA interfaces; however, the resolution on both outputs is limited to the LVDS resolution.

Technical Specifications

Specifications are typical at 25° C with 5.0 V supply unless otherwise noted.

Board Size:

3.55" x 3.78" (PC/104 standard)

Storage Temperature:

-40° C to 85° C

Free Air Operating Temperature:

-40° C to 85° C

Power Requirements:

VL-EPM-V4E: +5 V \pm 5% @ 0.37A (1.85W max.)

Video Controller:

SiS Volari Z9M video controller

Video RAM:

8 MB standard

Video Modes (resolution, maximum color depth):

VGA:

Up to 1280 x 1024 16M colors

Up to 1920 x 1200 64K colors

FPD:

800 x 600, 18-bit color

1024 x 768, 18-bit color

Video Outputs:

Standard SVGA analog

LVDS flat panel drive

Video BIOS:

32 KB at address C0000h

Video BIOS Compatibility:

X86-compatible processor with PCI-compatible BIOS

External Connectors:

Analog VGA: 12-pin 2 mm latching header

Flat Panel: 20-pin flat panel LVDS header

Bus Compatibility:

PC/104 (pass-through)

PC/104-Plus

Specifications are subject to change without notification.

RoHS Compliance

The VL-EPM-V4 is RoHS compliant.

ABOUT RoHS

In 2003, the European Union issued Directive 2002/95/EC regarding the Restriction of the use of certain Hazardous Substances (RoHS) in electrical and electronic equipment.

The RoHS directive requires producers of electrical and electronic equipment to reduce to acceptable levels the presence of six environmentally sensitive substances: lead, mercury, cadmium, hexavalent chromium, and the presence of polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE) flame retardants, in certain electrical and electronic products sold in the European Union (EU) beginning July 1, 2006.

VersaLogic Corp. is committed to supporting customers with high-quality products and services meeting the European Union's RoHS directive.

Warnings

ELECTROSTATIC DISCHARGE

Warning! Electrostatic discharge (ESD) can damage circuit boards, disk drives, and other components. The circuit board must only be handled at an ESD workstation. If an approved station is not available, some measure of protection can be provided by wearing a grounded antistatic wrist strap. Keep all plastic away from the board, and do not slide the board over any surface.

After removing the board from its protective wrapper, place the board on a grounded, static-free surface, component side up. Use an antistatic foam pad if available.

The board should also be protected inside a closed metallic antistatic envelope during shipment or storage.

HANDLING CARE

Warning! Care must be taken when handling the board not to touch the exposed circuitry with your fingers. Though it will not damage the circuitry, it is possible that small amounts of oil or perspiration on the skin could have enough conductivity to cause the contents of CMOS RAM to become corrupted through careless handling, resulting in CMOS resetting to factory defaults.

EARTH GROUND REQUIREMENT

Warning! All mounting standoffs should be connected to earth ground (chassis ground). This provides proper grounding for ESD and EMI purposes.

Technical Support

If you are unable to solve a problem after reading this manual, please visit the VL-EPM-V4 product support web page below. The support page provides links to component datasheets, device drivers, and BIOS and PLD code updates.

[VL-EPM-V4 Support Page](http://www.versalogic.com/private/epmv4support.asp)

<http://www.versalogic.com/private/epmv4support.asp>

The VersaTech KnowledgeBase contains a wealth of technical information about VersaLogic products, along with product advisories. Click the link below to see all KnowledgeBase articles related to the VL-EPM-V4.

[VersaTech KnowledgeBase](#)

If you have further questions, contact VersaLogic Technical Support at (503) 747-2261. VersaLogic support engineers are also available via e-mail at Support@VersaLogic.com.

REPAIR SERVICE

If your product requires service, you must obtain a Returned Material Authorization (RMA) number by calling (503) 747-2261. Please provide the following information:

- Your name, the name of your company, your phone number, and e-mail address
- The name of a technician or engineer that can be contacted if any questions arise
- Quantity of items being returned
- The model and serial number (barcode) of each item
- A detailed description of the problem
- Steps you have taken to resolve or recreate the problem
- The return shipping address

Warranty Repair All parts and labor charges are covered, including return shipping charges for UPS Ground delivery to United States addresses.

Non-warranty Repair All non-warranty repairs are subject to diagnosis and labor charges, parts charges, and return shipping fees. Please specify the shipping method you prefer and provide a purchase order number for invoicing the repair.

Note: Please mark the RMA number clearly on the outside of the box before returning.

Dimensions and Mounting

The VL-EPM-V4 complies with PC/104-*Plus* dimensional standards. Dimensions are given below to help with pre-production planning and layout.

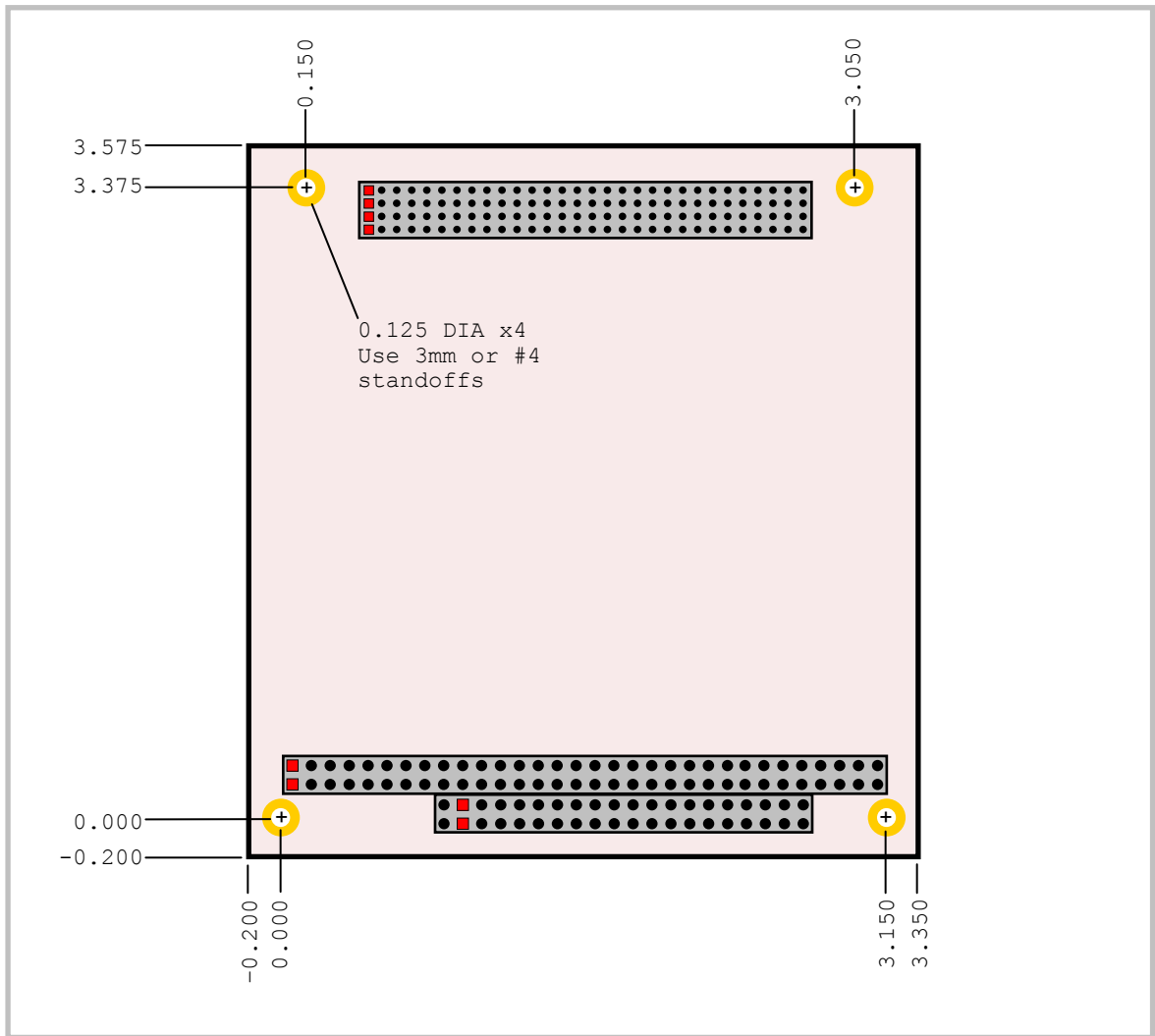


Figure 1. VL-EPM-V4 Dimensions and Mounting Holes
(Not to scale. All dimensions in inches.)

HARDWARE ASSEMBLY

The VL-EPM-V4 uses both ISA and PCI connectors so that the module can be installed in PCI stack position 0-3. As shipped, the VL-EPM-V4 is configured for position 0. PC/104 (ISA only) modules must not be positioned between the VL-EPM-V4 and any PC/104-*Plus* (PCI + ISA) or PCI-104 (PCI only) modules on the stack.

The entire assembly can sit on a table top or be secured to a base plate. When bolting the unit down, make sure to secure all four standoffs to the mounting surface to prevent circuit board flexing. Standoffs are secured to the top circuit board using four pan head screws. Standoffs and screws are available as part number VL-HDW-105 (metric thread) or VL-HDW-106 (English thread).

An extractor tool is available (part number VL-HDW-201) to separate the PC/104 modules from the stack. Use caution when using the extractor tool not to damage any board components.

STACK ARRANGEMENT EXAMPLE

The figure below shows the VL-EPM-V4 installed on top of the CPU board in the PC/104-*Plus* stack. The module can be installed in slots 0-3. Jumper block V1 must be configured to match the module's stack position.

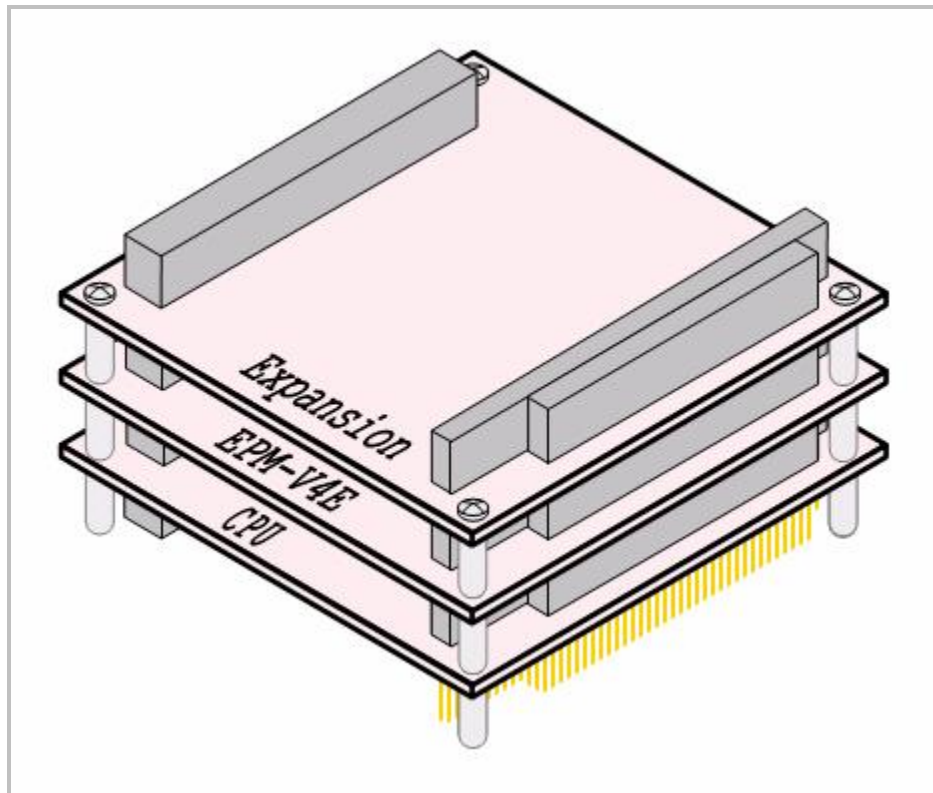


Figure 2. Stack Arrangement Example

External Connectors and Jumper Block

CONNECTORS AND JUMPER BLOCK

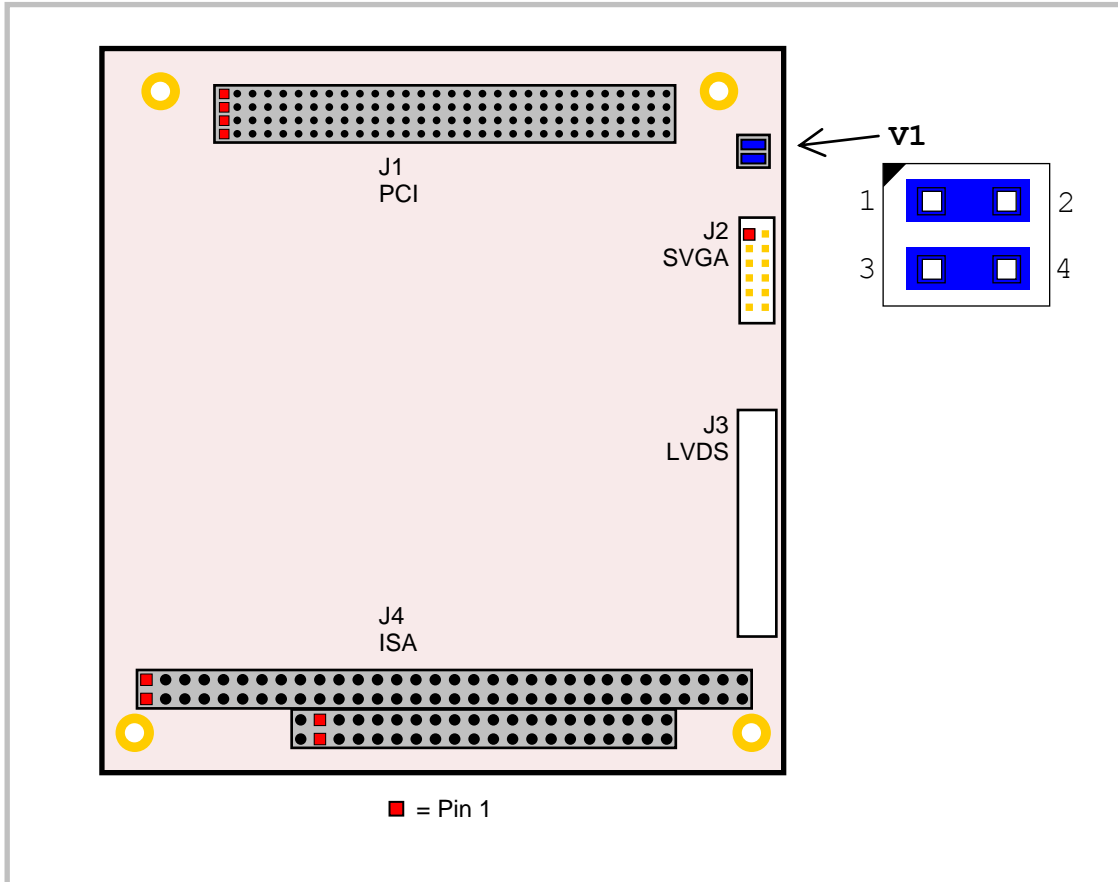


Figure 3. VL-EPM-V4 Connectors and Jumper Block – Top Side

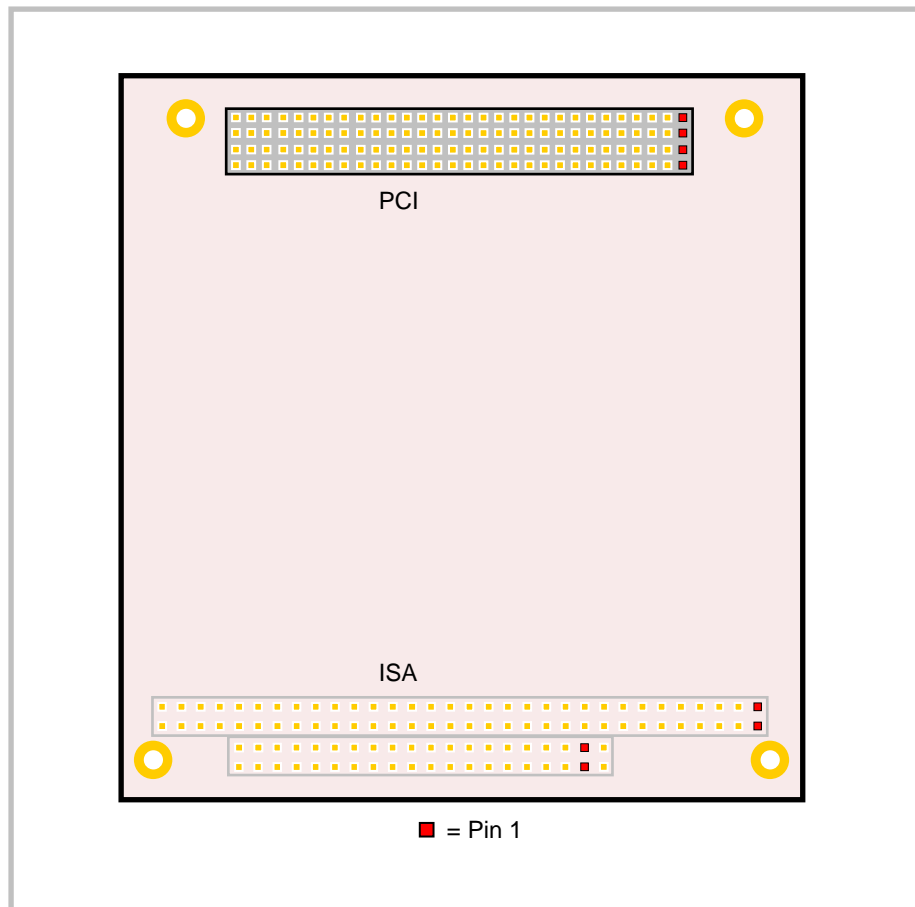


Figure 4. VL-EPM-V4 Connectors – Bottom Side

CONNECTOR FUNCTIONS AND INTERFACE CABLES

Table 1 provides information about the function, mating connectors, and transition cables for VL-EPM-V4 connectors.

Table 1: Connector Functions and Interface Cables

Connector	Function	Mating Connector	Transition Cable	Cable Description	Pin 1 Location ¹		Page
					x coord.	y coord.	
J1	PCI	AMP 1375799-1	—	—	0.450	3.139	—
J2	SVGA	FCI 89361-712LF or FCI 89947-712LF	VL-CBR-1201	12" 12-pin 2 mm IDC to 15-pin HD D-Sub VGA	3.178	2.625	10
J3	LVDS	Molex 51146-2000 (housing) Molex 50641-8041 (pins)	VL-CBR-2010 or VL-CBR-2011	18-bit TFT FPD using 20-pin Hirose conn. or 18-bit TFT FPD using 20-pin JAE conn.	3.079	0.635	11
J4	ISA	AMP 1375795-2	—	—	0.050	0.200	—

1. Origin is the lower left mounting hole as shown in Figure 1. All coordinates in inches.

JUMPER SUMMARY

Table 2: Jumper Summary

Jumper Block	Description	As Shipped
V1[1-2] V1[2-3]	PCI Slot Assignment. <u>PC/104-Plus Slot</u> <u>V1[3-4]</u> <u>V1[1-2]</u> Slot 0 In In Slot 1 In Out Slot 2 Out In Slot 3 Out Out	Slot 0

Connecting the Video Display

Any standard VGA monitor or flat panel display that uses SVGA control signals may be connected to the VL-EPM-V4. Adapter cable VL-CBL-1201 is used to convert the dual-row connector J2 to a standard 15-pin mini-D connector.

Warning! Do not connect or disconnect a monitor from the VL-EPM-V4 while the module power is on.

SVGA OUTPUT

A 12-pin header connector at J2 provides the SVGA output signals.

Table 3: SVGA Output Pinout

J2 Pin	Signal Name	Description	Mini DB15 Pin
1	GND	Red ground	6
2	CRED	Red video	1
3	GND	Green ground	7
4	CGRN	Green video	2
5	GND	Blue ground	8
6	CBLU	Blue video	3
7	GND	Digital ground	5
8	CHSYNC	Horizontal sync	13
9	SGND	Sync return (digital ground)	10
10	CVSYNC	Vertical sync	14
11	DDC2C	DDC interface clock	15
12	DDC1D	DDC interface data	12
—	—	—	4
—	—	—	9
—	—	—	11

LVDS FLAT PANEL DISPLAY CONNECTOR

The integrated LVDS flat panel display in the VL-EPM-V4 is an ANSI/TIA/EIA-644-1995 specification-compliant interface. It can support up to 18 bits of RGB pixel data plus 3 bits of timing control (HSYNC/VSYNC/DE) on the three active differential data output pairs. The LVDS clock frequency ranges from 25 MHz to 85 MHz. Adapter cable VL-CBL-2010 or VL-CBL-2011 can be used to connect J3 to the flat panel display connector.

Note Though four differential pairs are defined on the LVDS connector (see the table below), the fourth pair (LVDSA3 and LVDSA3#) is always idle on the VL-EPM-V4.

The 3.3V power provided to pins 19 and 20 of J4 is protected.

Table 4: LVDS Flat Panel Display Pinout

J3 Pin	Signal Name	Function	Hirose or JAE Connector
1	GND	Ground	20
2	NC	No Connection	19
3	LVDSA3	Diff. Data 3 (+) (idle)	18
4	LVDSA3#	Diff. Data 3 (-) (idle)	17
5	GND	Ground	16
6	LVFSCLK	Differential Clock (+)	15
7	LVDSCLK#	Differential Clock (-)	14
8	GND	Ground	13
9	LVDSA2	Diff. Data 2 (+)	12
10	LVDSA2#	Diff. Data 2 (-)	11
11	GND	Ground	10
12	LVDSA1	Diff. Data 1 (+)	9
13	LVDSA1#	Diff. Data 1 (-)	8
14	GND	Ground	7
15	LVDSA0	Diff. Data 0 (+)	6
16	LVDSA0#	Diff. Data 0 (-)	5
17	GND	Ground	4
18	GND	Ground	3
19	+3.3V*	Protected Power Supply	2
20	+3.3V*	Protected Power Supply	1

* A custom +5V option is available. Contact [Sales](#) for information.

Software Installation

Drivers and video BIOS images are available for download on the [VL-EPM-V4 product support page](#).

Appendix A – References



SiS Volari Z9M Series GPU

[*Volari Z9M Series GPU Databook*](#)