Reference Manual

DOC. REV. 4/9/2013

VL-EPHs-S1

SUMIT-micro SATA adapter
board for SUMIT-enabled SBCs

Sumit™

VERSALOGIC
CORPORATION

VERSA**L**OGIC
C O R P O R A T I O N

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Notice:

Product Release Notes

Rev 1.0 Release

Initial commercial release.

Support

The VL-EPHs-S1 support page, at **http://www.versalogic.com/private/ephss1support.asp**, contains additional information and resources for this product including:

- Reference Manual (PDF format)
- Links to product advisories and KnowledgeBase articles
- Photograph of the circuit board

This is a private page for VL-EPHs-S1 users that can be accessed only by entering this address directly. It cannot be reached from the VersaLogic's public website.

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

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VersaTech KnowledgeBase

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Contents

Description

The VL-EPHs-S1 expansion module is a "SUMIT-micro" card that provides additional SATA capabilities for SUMIT-enabled embedded systems. The on-board SATA controller provides access to two SATA drives with support for RAID 0 (Fast) and RAID 1 (Safe). Designed for full industrial (-40° to +85°C) temperature operation; the VL-EPHs-S1 meets MIL-STD-202G specifications for mechanical shock and vibration for use in harsh environments

The VL-EPHs-S1 features high reliability design and construction. VL-EPHs-S1 boards are subjected to 100% functional testing and are backed by a limited two-year warranty. Careful parts sourcing and US-based technical support ensure the highest possible quality, reliability, service, and product longevity for this module.

Technical Specifications

Board Size:
32 mm x 90 mm (3.54" x 1.26")

Storage Temperature:
-40° to +85°C

Operating Temperature:
-40° to +85°C

Power Requirements:
+5V ± 5%

Hardware Compatibility:
SUMIT

SATA:
Two SATA headers
Supports SATA I & II
Supports RAID 0 (striped)
Supports RAID 1 (mirrored)

BIOS Compatibility:
BIOS must support Plug and Play (PnP) and shadowing of option ROMs

Driver/OS Compatibility:
Windows XP – Compatible
Windows 7, 32-bit – Compatible
Windows 7, 64-bit – Compatible (Windows forces use of 32-bit driver)
Debian Linux – Not compatible with VL-EPHs-S1 driver, but a native RAID driver is built in to the Linux kernel
Suse Linux – Driver provided, not tested
Red Hat Linux – Driver provided, not tested

Weight:
VL-EPHs-S1E – TBD 0.0xx lb (0.0xx kg)

SUMIT Resources		
Form Factor: SUMIT-micro		
	SUMIT A	**SUMIT B**
PCIe x1	1	
PCIe x4		
USB	–	
ExpressCard	–	
LPC	–	
SPI / uWire	–	
SMBus/ I^{2}C	–	
+12V	–	
+5V	✓	
+5Vsb	–	
+3.3V	–	

Specifications are subject to change without notification.

RoHS Compliance

The VL-EPHs-S1 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-EPHs-S1 product support web page below. The support page provides links to this manual, product advisories, and the VersaTech KnowledgeBase .

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VL-EPHs-S1 Support Page

http://www.versalogic.com/private/ephss1support.asp

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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-EPHs-S1.

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VersaTech KnowledgeBase

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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-EPHs-S1 complies with SUMIT-micro dimensional standards. Dimensions are given below to help with pre-production planning and layout.
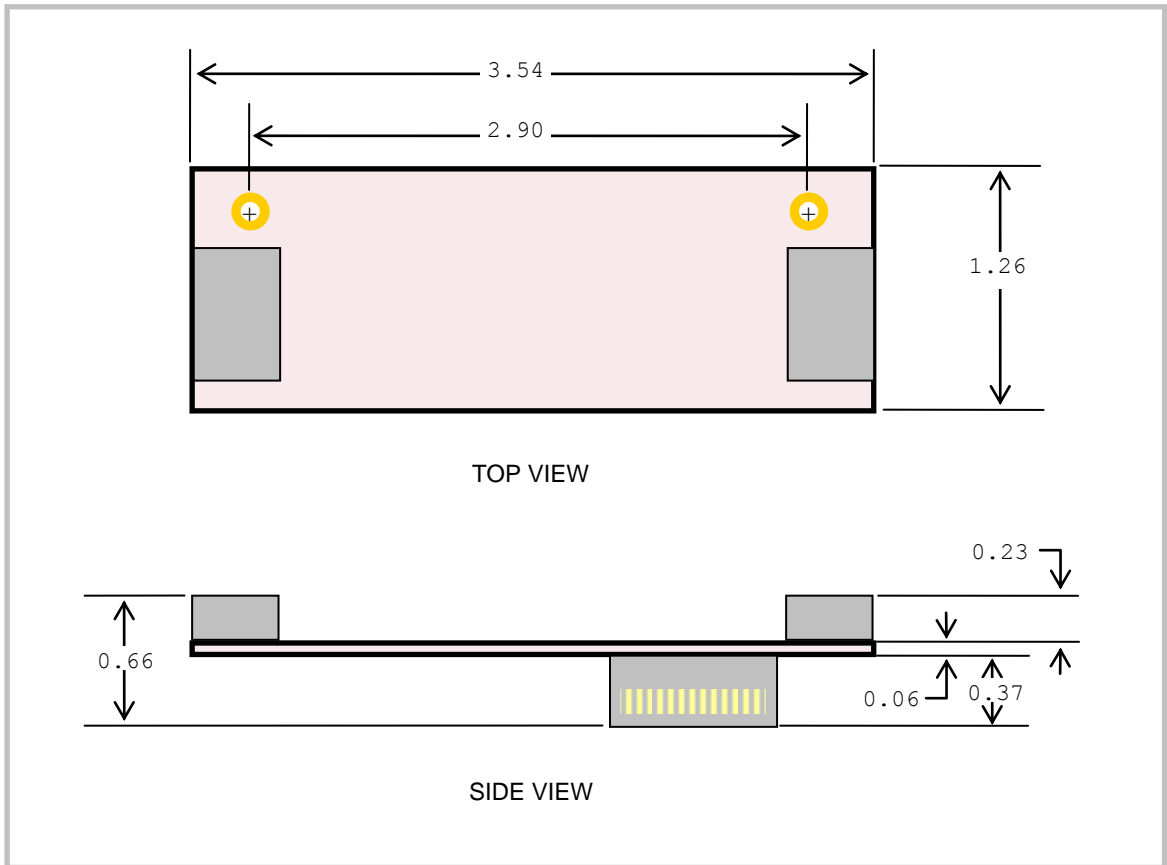
Figure 1. VL-EPHs-S1 Dimensions and Mounting Holes
(Not to scale. All dimensions in inches.)

HARDWARE ASSEMBLY

The VL-EPHs-S1 uses a SUMIT-A bottom connector that attaches to the top of the stack. The board is secured using two hardware standoffs on the corner mounting holes. These standoffs are attached to the CPU board using pan head screws. Standoffs and screws are available as part number VL-HDW-105 (metric thread) or VL-HDW-106 (English thread). The figure below shows a typical installation.
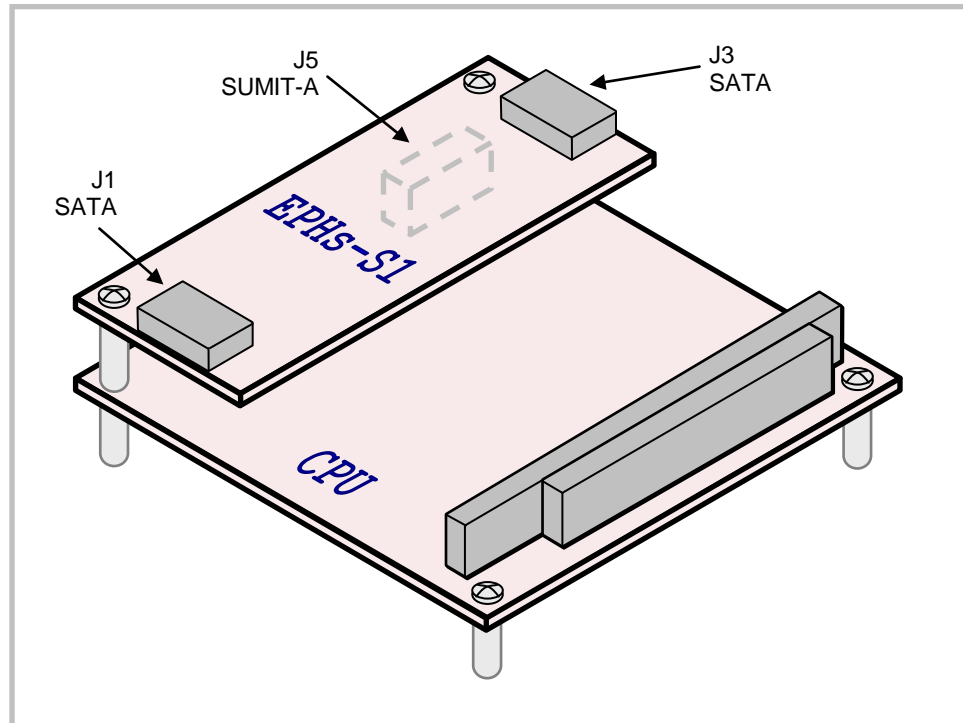

Figure 2. VL-EPHs-S1 Hardware Assembly

Attach one or two SATA drives to the VL-EPHs-S1 using the VL-CBR-0701 data cable. Supply power from an ATX power supply to the SATA drives using the VL-CBR-0401 power cable.

External Connectors

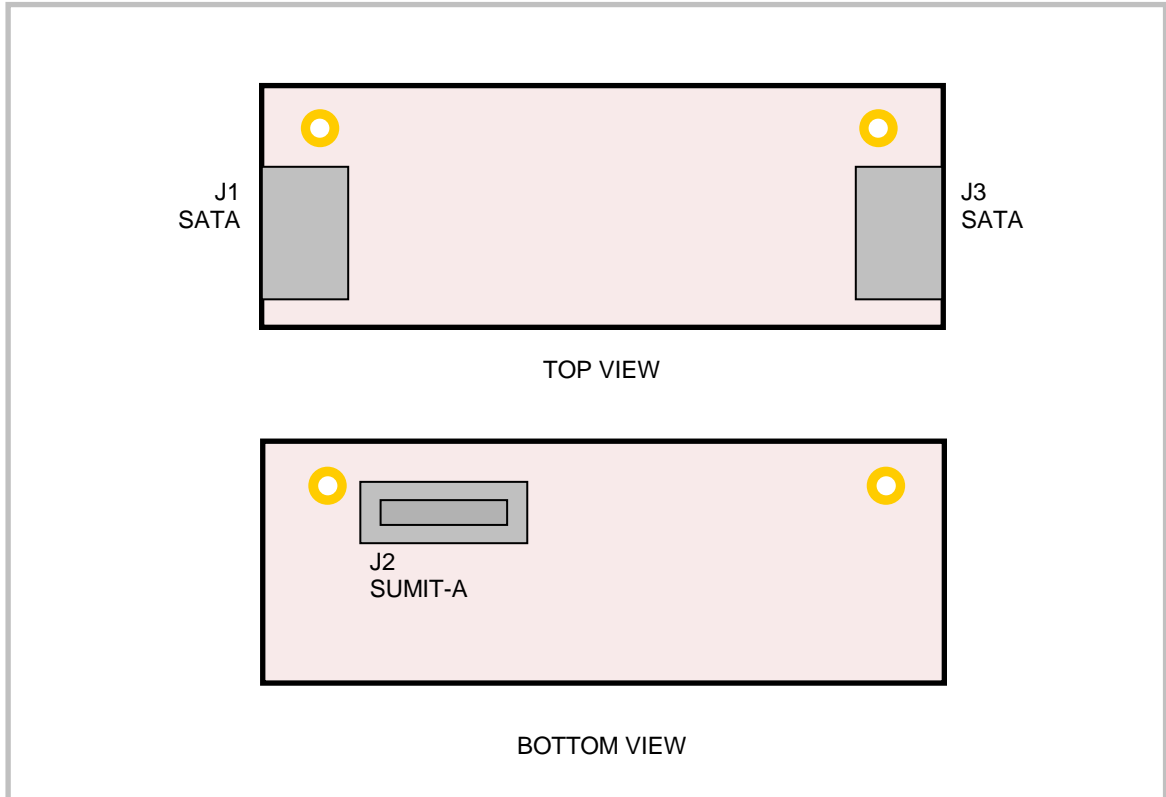**VL-EPHs-S1 CONNECTOR LOCATIONS**

Figure 3. Connector Locations

VL-EPHs-S1 Connector Functions and Interface Cables

Table 1 provides information about the function, mating connectors, and transition cables for VL-EPHs-S1 connectors.

Table 1: Connector Functions and Interface Cables

Connector	Function	Mating Connector/Device	Transition Cable	Cable Description
J1	SATA	Standard SATA	VL-CBR-0701 or VL-CBR-0702 VL-CBR-0401	500 mm (19.75") 7-pin, straight-to-straight SATA data, friction or mechanical latching ATX to SATA power adapter
J2	SUMIT A – 2 SATA, +5V	Samtec ASP-129646-01	—	—
J3	SATA	Standard SATA	VL-CBR-0701 or VL-CBR-0702 VL-CBR-0401	500 mm (19.75") 7-pin, straight-to-straight SATA data, friction or mechanical latching ATX to SATA power adapter

Interfaces and Connectors

SUMIT Connector

The SUMIT-A bottom connector (J2) provides one PCI Express (PCIe) lane and +5V power to the VL-EPHs-S1, as shown in the following table. See the SUMIT Specification for a complete description of the SUMIT interface.

Table 2: VL-EPHs-S1 SUMIT-A Bottom Connector (J5) Pinout

Pin	Signal Name	Function	Pin	Signal Name	Function
1	NC	No connect	2	NC	No connect
3	NC	No connect	4	NC	No connect
5	NC	No connect	6	NC	No connect
7	NC	No connect	8	NC	No connect
9	NC	No connect	10	NC	No connect
11	NC	No connect	12	NC	No connect
13	NC	No connect	14	NC	No connect
15	+5V	+5V power	16	NC	No connect
17	NC	No connect	18	NC	No connect
19	NC	No connect	20	NC	No connect
21	+5V	+5V power	22	NC	No connect
23	NC	No connect	24	NC	No connect
25	NC	No connect	26	NC	No connect
27	+5V	+5V power	28	NC	No connect
29	NC	No connect	30	NC	No connect
31	NC	No connect	32	NC	No connect
33	+5V	+5V power	34	NC	No connect
35	NC	No connect	36	NC	No connect
37	NC	No connect	38	NC	No connect
39	GND	Ground	40	GND	Ground
41	A_PETp0	Link A, lane 0 transmit +	42	A_PERp0	Link A, lane 0 receive +
43	A_PETn0	Link A, lane 0 transmit –	44	A_PERn0	Link A, lane 0 receive –
45	GND	Ground	46	APRSNT#/GND	Link A card present
47	PERST#	Reset	48	A_CLKp	Link A clock +
49	NC	No connect	50	A_CLKn	Link A clock –
51	+5V	+5V power	52	GND	Ground

SATA Interface

The VL-EPHs-S1 provides two serial ATA (SATA) ports, which communicate at a rate of up to 3.0 GB/s (SATA 2). The SATA connectors at locations J1 and J3 are standard 7-pin right-angle SATA connectors with friction latching (with cable VL-CBR-0701) or mechanical latching (VL-CBR-0702).

Configuring the SATA RAID set is accomplished by entering the RAID Configuration Utility at boot. Press F4 or CTRL+S when prompted. (See Configuring a SATA RAID Set.)

Note: In standard mode (non-RAID) only the drive attached to connector J1 is bootable. The drive attached to connector J3 does not support booting in standard mode.

Power to SATA drives is supplied by the ATX power supply. Note that the standard SATA drive power connector is different than the common 4-pin Molex connector used on IDE drives. Most current ATX power supplies provide SATA connectors, and many SATA drives provide both types of power connectors. If the power supply you are using does not provide SATA connectors, adapters are available. The pinout for connectors J1 and J3 is provided below.

Table 3: J1 and J3 SATA Connector Pinout

J1 or J3 Pin	Signal Name	Function
1	GND	Ground
2	TX+	Transmit +
3	TX-	Transmit -
4	GND	Ground
5	RX-	Receive -
6	RX+	Receive +
7	GND	Ground

Software Requirements

The VL-EPHs-S1 is compatible with any VersaLogic CPU board with a SUMIT interface, though some OS and BIOS restrictions apply, as described below.

BIOS REQUIREMENTS

The CPU board BIOS must support Plug and Play (PnP) (or at least the PnP header) and the shadowing of option ROMs. At the time of publication, two VersaLogic CPU boards are compatible with the VL-EPHs-S1. The required BIOS versions of these boards are shown below.

- Ocelot (VL-EPMs-21) — BIOS Rev. 6.5.102 or later
- Komodo (VL-EPICs-36) — BIOS Rev. 6.5.104 or later

OPERATING SYSTEM COMPATIBILITY

Operating system compatibility with the VL-EPHs-S1 SATA RAID driver is shown below.

- Windows XP – Compatible
- Windows 7, 32-bit – Compatible
- Windows 7, 64-bit – Compatible (Windows forces use of 32-bit driver)
- Debian Linux – Not compatible with VL-EPHs-S1 driver, but a native RAID driver is built in to the Linux kernel
- SUSE Linux – Driver provided, not tested
- Red Hat Linux – Driver provided, not tested

Configuring a SATA RAID Set

To configure a SATA RAID set for two drives, perform the following steps. This procedure assumes that you have installed the VL-EPHs-S1 on a VersaLogic SBC and attached power and data cables to two SATA drives.

Warning!   Performing these steps will delete any existing data on the drives.

1. Turn on the host computer.

2. Early in the boot cycle, press CTRL+S or F4 to enter the RAID Configuration Utility.

3. From the Main Menu, select "Create RAID set."

4. Select either RAID0 or RAID1, depending on your application.

    RAID0 = Striped, combines two hard disks into one

    RAID1 = Mirrored, copies the contents of one hard disk to another

5. Select whether you want the RAID set to be automatically or manually configured.

6. If you choose to configure the RAID set manually, the utility will prompt you to input the settings for the type of RAID set you selected.

7. Type Y when prompted to create the RAID set.

After the RAID set is created, install the operating system from a CD-ROM drive attached to the CPU board.