Reference Manual

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VL-EPHs-P1

SUMIT-micro Mini PCIe adapter board for SUMIT-enabled SBCs

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Product Release Notes

Rev 1.0 Release

Initial commercial release.

Support

The VL-EPHs-P1 support page, at **http://www.versalogic.com/private/ephsp1support.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-P1 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.

VersaTech KnowledgeBase

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Introduction 1

Description

The VL-EPHs-P1 expansion module is a "SUMIT-micro" card that provides a Mini PCIe interface for SUMIT-enabled embedded systems. Designed for full industrial (-40° to +85°C) temperature operation; the VL-EPHs-P1 meets MIL-STD-202G specifications for mechanical shock and vibration for use in harsh environments.

The VL-EPHs-P1 features high reliability design and construction. VL-EPHs-P1 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
Weight:
VL-EPHs-P1E –0.035 lb (0.016 kg)

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

Specifications are subject to change without notification.

RoHS Compliance

The VL-EPHs-P1 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-P1 product support web page below. The support page provides links to this manual, product advisories, and the VersaTech KnowledgeBase.

VL-EPHs-P1 Support Page

http://www.versalogic.com/private/ephsp1support.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-EPHs-P1.

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-EPHs-P1 complies with SUMIT-micro dimensional standards. Dimensions are given below to help with pre-production planning and layout.

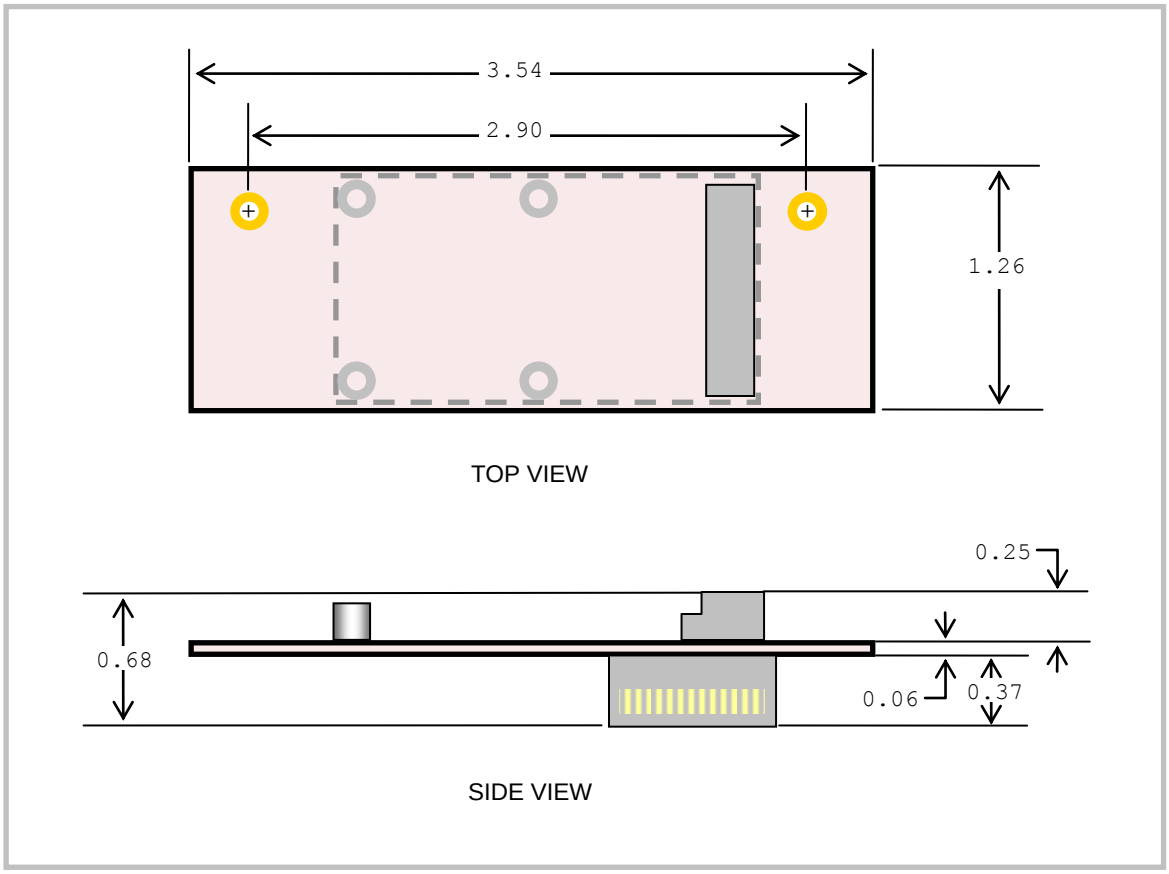

Figure 1. VL-EPHs-P1 Dimensions and Mounting Holes

(Not to scale. All dimensions in inches.)

HARDWARE ASSEMBLY

The VL-EPHs-P1 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.

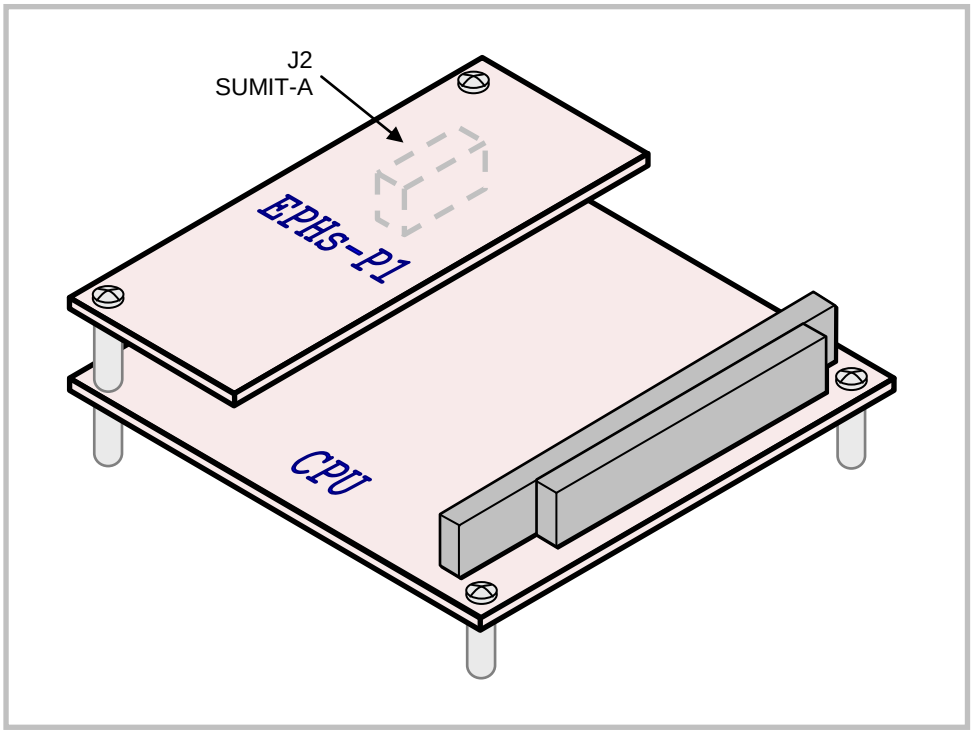

Figure 2. VL-EPHs-P1 Hardware Assembly

External Connectors

VL-EPHs-P1 Connector Locations

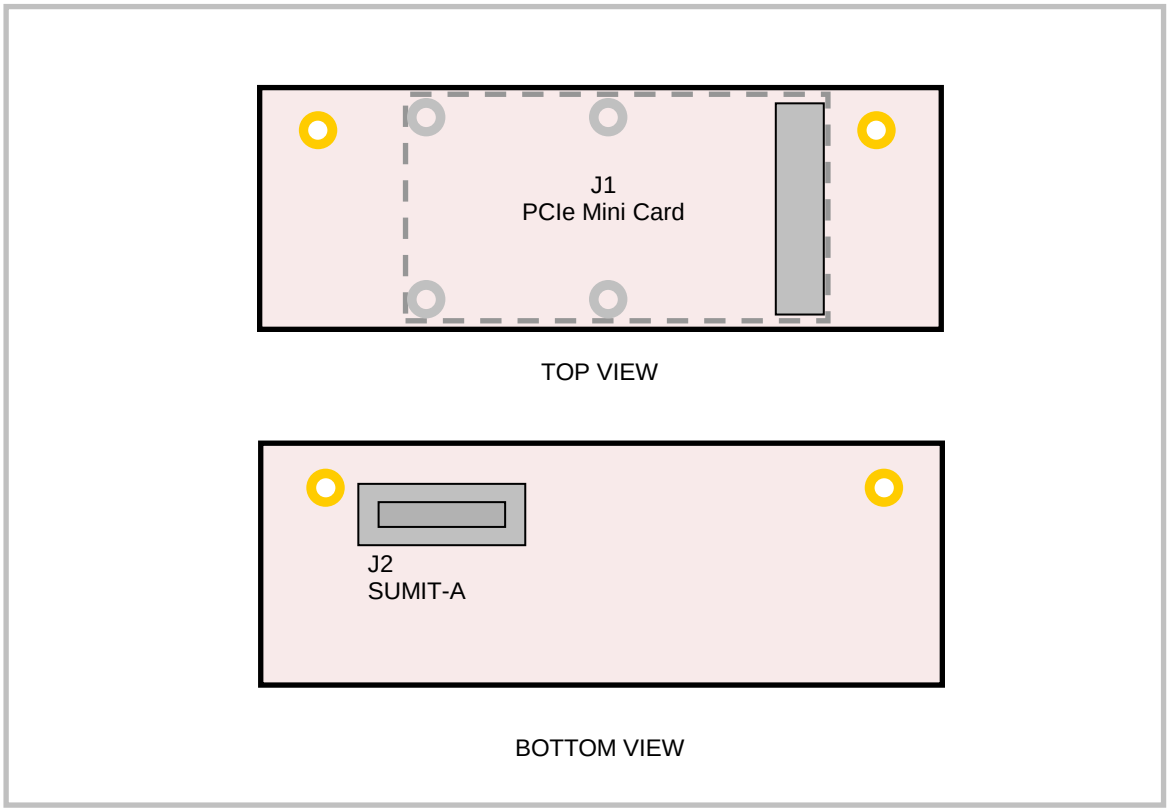

Figure 3. Connector Locations

VL-EPHs-P1 Connector Functions and Interface Cables

Table 1 provides information about the function, mating connectors, and transition cables for VL-EPHs-P1 connectors.

Table 1: Connector Functions and Interface Cables

Connector	Function	Mating Connector/Device	Transition Cable	Cable Description
J1	PCIe Mini Card	Full-height PCIe Mini Card	—	—
J2	SUMIT-A Bottom	Samtec ASP-129646-01	—	—

SUMIT Connector

The SUMIT-A bottom connector (J2) provides one PCI Express (PCIe) lane and +5V power to the VL-EPHs-P1, as shown in the following table. See the SUMIT Specification for a complete description of the SUMIT interface.

Table 2: VL-EPHs-P1 SUMIT-A Bottom Connector (J2) Pinout

Pin	Signal Name	Function
1	NC	No connect
3	3.3V	+3.3V power
5	3.3V	+3.3V power
7	NC	No connect
9	NC	No connect
11	NC	No connect
13	NC	No connect
15	+5V	+5V power
17	NC	No connect
19	NC	No connect
21	+5V	+5V power
23	NC	No connect
25	NC	No connect
27	+5V	+5V power
29	NC	No connect
31	NC	No connect
33	+5V	+5V power
35	USB0+	USB0 data +
37	USB0-	USB0 data –
39	GND	Ground
41	A_PETp0	Link A, lane 0 transmit +
43	A_PETn0	Link A, lane 0 transmit –
45	GND	Ground
47	PERST#	Reset
49	WAKE#	PCIe Wake
51	+5V	+5V power

Pin	Signal Name	Function
2	NC	No connect
4	SMB/I2C_DATA	SMBus data
6	SMB/I2C_CLK	SMBus clock
8	NC	No connect
10	NC	No connect
12	NC	No connect
14	NC	No connect
16	NC	No connect
18	NC	No connect
20	NC	No connect
22	NC	No connect
24	NC	No connect
26	NC	No connect
28	NC	No connect
30	NC	No connect
32	NC	No connect
34	NC	No connect
36	NC	No connect
38	NC	No connect
40	GND	Ground
42	A_PERp0	Link A, lane 0 receive +
44	A_PERn0	Link A, lane 0 receive –
46	APRSNT#/GND	Link A card present
48	A_CLKp	Link A clock +
50	A_CLKn	Link A clock –
52	GND	Ground

PCI Express Mini Card Socket

The PCI Express Mini Card connector at J2 accepts a full-height PCI Express Mini Card. The interface includes one PCIe x1 lane, one USB 2.0 channel, and the SMBus interface. The socket is compatible with 802.11a/b/g Wi-Fi network adapters that operate in both the 2.4 and 5.0 GHz spectra, GPS radio cards that enable time/date stamps and global location applications, 3G modems, solid-state drives (SSDs), and USB (2.0) cards.

An optional PCI Express WiFi Mini Card is available for the VL-EPHs-P1 as VersaLogic part number VL-WD10-CBN. A WiFi antenna (VL-CBR-ANT01) and a 12" WiFi card to bulkhead RP-SMA transition cable (VL-CBR-0201) are also available. For more information, contact Sales@VersaLogic.com.

To secure a Mini Card to the VL-EPHs-P1 use two screws (M2 x 5mm, Philips, pan head, 4mm, stainless) and two washers (M2, split lock, OD 4.4mm, stainless). Screw and washer sets are available in 10-count packages as part number VL-HDW-107.

Table 3: PCIe Mini Card Pinout

Pin	Signal Name	Function
1	WAKE#	Wake
3	NC	Not connected
5	NC	Not connected
7	CLKREQ#	Reference clock request
9	GND	Ground
11	REFCLK-	Reference clock input –
13	REFCLK+	Reference clock input +
15	GND	Ground
17	NC	Not connected
19	NC	Not connected
21	GND	Ground
23	PERn0	Lane 0 receive –
25	PERp0	Lane 0 receive +
27	GND	Ground
29	GND	Ground
31	PETn0	PCIe lane 0 transmit –
33	PETp0	PCIe lane 0 transmit +
35	GND	Ground
37	GND	Ground
39	3.3VAUX	3.3V auxiliary source
41	3.3VAUX	3.3V auxiliary source
43	GND	Ground
45	NC	Not connected
47	NC	Not connected
49	NC	Not connected
51	NC	Not connected

Pin	Signal Name	Function
2	3.3VAUX	3.3V auxiliary source
4	GND	Ground
6	1.5V	1.5V power
8	NC	Not connected
10	NC	Not connected
12	NC	Not connected
14	NC	Not connected
16	NC	Not connected
18	GND	Ground
20	W_DISABLE#	Wireless disable
22	PERST#	Card reset
24	3.3VAUX	3.3V auxiliary source
26	GND	Ground
28	1.5V	1.5V power
30	SMB_CLK	SMBus clock
32	SMB_DATA	SMBus data
34	GND	Ground
36	USB_D-	USB data –
38	USB_D+	USB data +
40	GND	Ground
42	LED_WWAN#	Wireless WAN LED
44	LED_WLAN#	Wireless LAN LED
46	LED_WPAN#	Wireless PAN LED
48	1.5V	1.5V power
50	GND	Ground
52	3.3VAUX	3.3V auxiliary source

LED_WWAN#, LED_WLAN#, AND LED_WPAN# SIGNALS

The LED status indicator signals are provided to enable wireless communications add-in cards to provide status indications via the built-in LEDs at positions D1 and D2 on the VL-EPMs-E1. The behavior of the LEDs is determined by the add-in card manufacturer. The table below shows the routing of the D1 and D2 LEDs to the Mini Card LED status signals.

Table 4: WiFi Mini Card LED Functions

LED	Color	J2 Pin	Function
D1	Green	46	Defined by Mini Card device LED_WPAN# implementation.
D1	Orange	44	Defined by Mini Card device LED_WLAN# implementation.
D2	Green	42	Defined by Mini Card device LED_WWAN# implementation.
D2	Orange	–	Power status indicator.

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