

Reference Manual

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VL-EPM-P2

PC/104-*Plus* Dual Mini PCIe
Adapter



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CORPORATION



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Product Release Notes

Rev 1.0 Release

Initial commercial release.

Support

The VL-EPM-P2 support page, at <http://www.versalogic.com/private/epme2support.asp>, contains additional information and resources for this product including:

- Reference Manual (PDF format)
- Operating system information and software drivers
- Datasheets and manufacturers' links for chips used in this product

This is a private page for VL-EPM-P2 users that can be accessed only by entering this address directly. It cannot be reached from the public VersaLogic website.

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-P2 module provides a dual PCI Express (PCIe) Mini Card interface for PC/104-*Plus* systems. It is fully compatible with a wide selection of popular operating systems such as Windows, Windows Embedded, Linux, VxWorks, and QNX. Its features include:

- High-speed PCI interface
- Pass-through ISA interface
- Two PCI Express Mini Card interfaces compatible with WiFi, MIL-STD-1553 bus, cell modem, flash, and other PCIe Mini Card devices

The VL-EPM-P2 features high-reliability design and construction. VL-EPM-P2 boards are subjected to 100% functional testing and are backed by a limited two-year warranty. Careful part sourcing and US-based technical support ensure the highest possible quality, reliability, service, and product longevity for this exceptional module.

Technical Specifications

Board Size:

90 mm x 96 mm (3.55" x 3.775")

Storage Temperature:

-40° to +85°C

Operating Temperature:

-40° to +85°C

Power Requirements:

+5V supplied from PC/104-*Plus* interface

Compatibility:

PC/104-*Plus* (PCI + ISA)

Weight (*no PCIe Mini Card installed*):

VL-EPM-P2A – 0.168 lb (0.076 kg)

Specifications are subject to change without notification.

RoHS Compliance

The VL-EPM-P2 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-P2 product support web page below. The support page provides links to component datasheets, device drivers, and BIOS and PLD code updates.

[VL-EPM-P2 Support Page](http://www.versalogic.com/private/epmp2support.asp)

<http://www.versalogic.com/private/epmp2support.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-P2.

[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-P2 complies with PC/104 dimensional standards. Dimensions are given below to help with pre-production planning and layout.

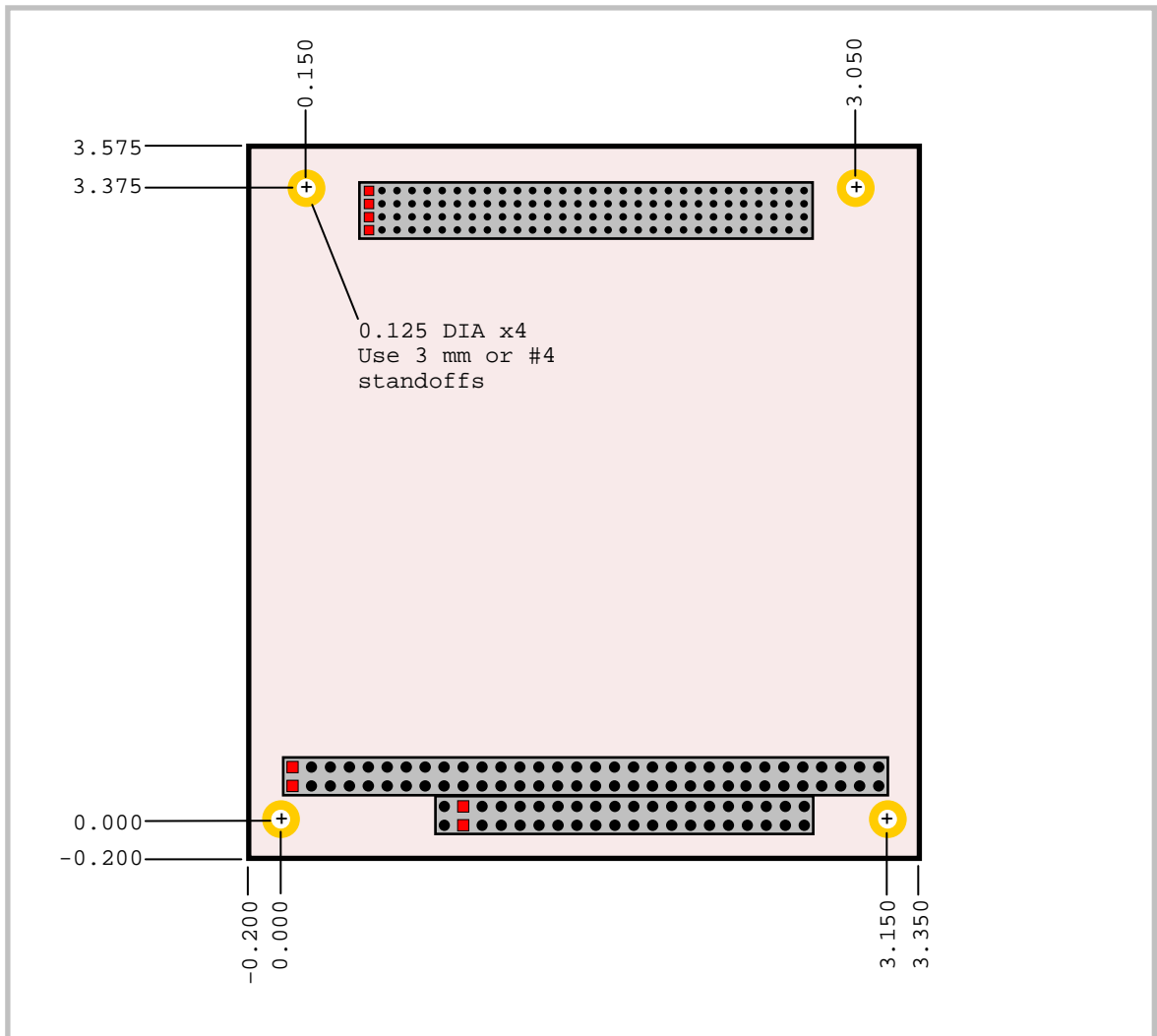


Figure 1. VL-EPM-P2 Dimensions and Mounting Holes

(Not to scale. All dimensions in inches.)

HARDWARE ASSEMBLY

The VL-EPM-P2 uses both PC/104-*Plus* (PCI + ISA) connectors so that the module can be installed in PCI stack position 0-3. As shipped, the VL-EPM-P2 is configured for position 0 (first on the stack adjacent to the CPU board). Make sure that jumper V2 matches the chosen stack position (see Jumper Summary). PC/104 (ISA) modules must not be positioned between the VL-EPM-P2 and any PC/104-*Plus* (PCI + ISA) 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-203) to separate 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-P2 installed above the CPU board in the PC/104-*Plus* stack. The module can be installed in slots 0-3. Jumper block V2 must be configured to match the module's stack position.

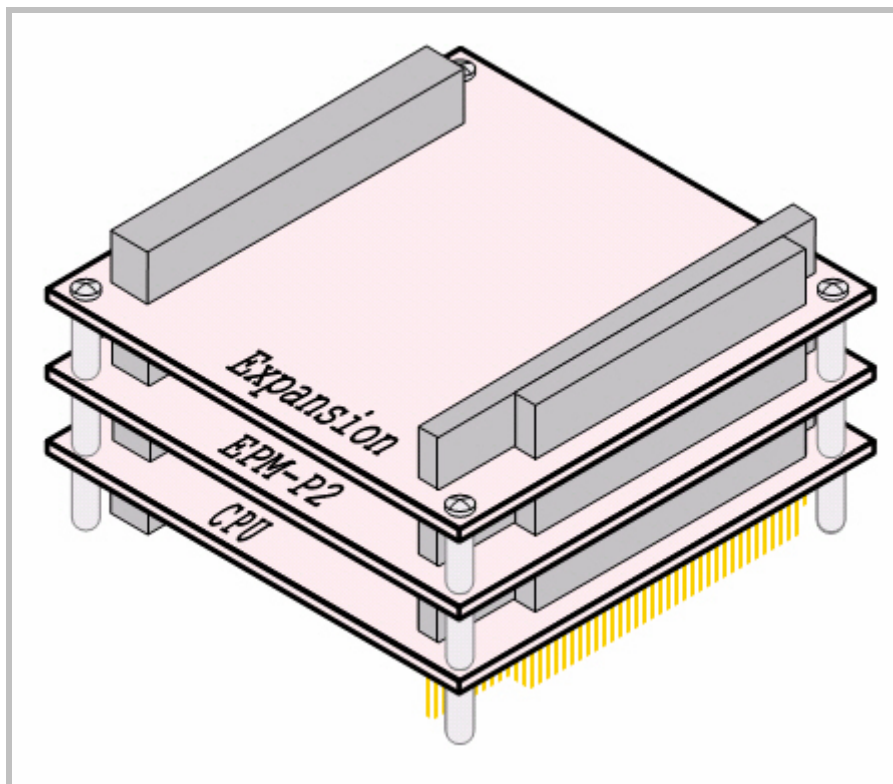


Figure 2. Stack Arrangement Example

External Connectors and Jumper Block

CONNECTORS AND JUMPER BLOCK

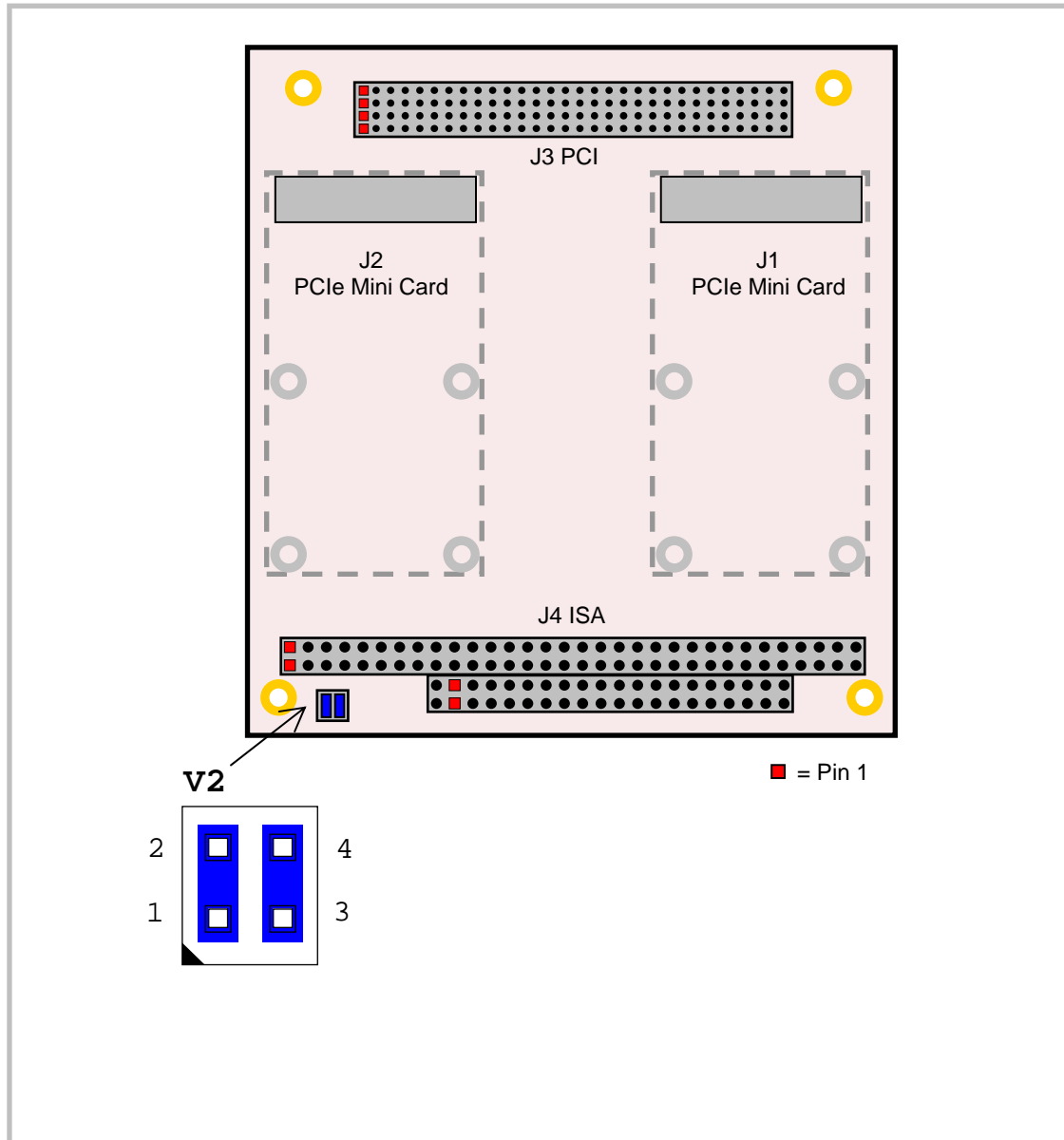


Figure 3. VL-EPM-P2 Connectors and Jumper Blocks – Top Side

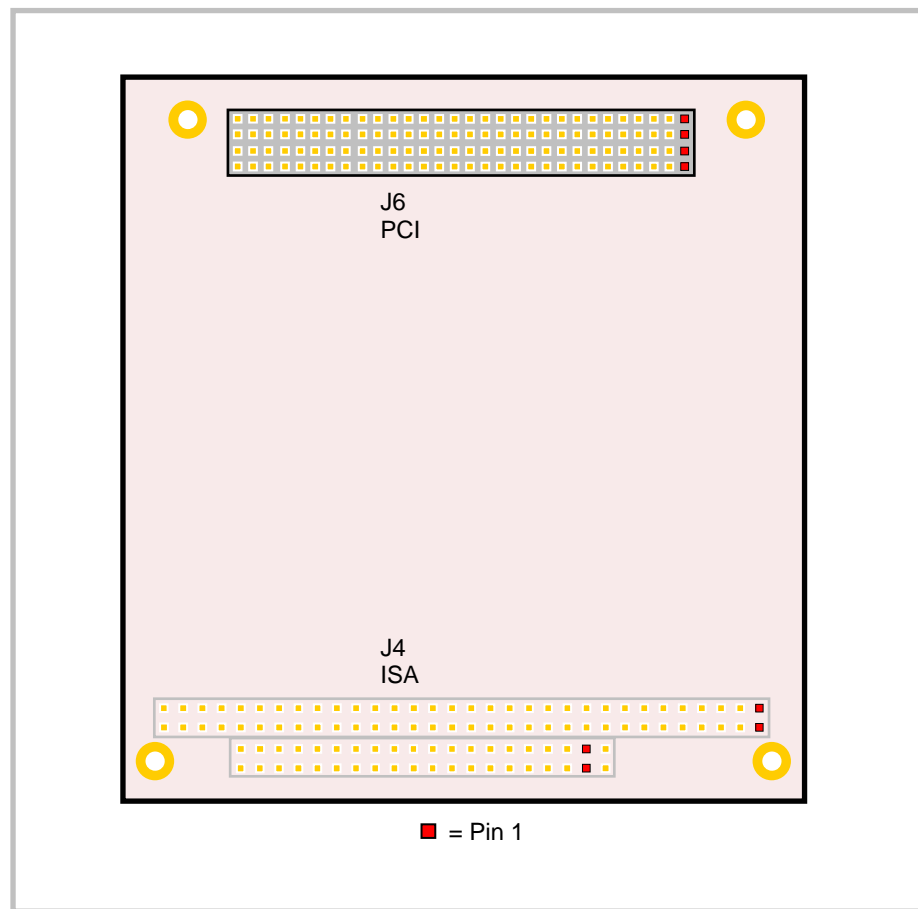


Figure 4. VL-EPM-P2 Connectors – Bottom Side

CONNECTOR FUNCTIONS AND INTERFACE CABLES

Table 1 provides information about the function, mating connectors, and transition cables for VL-EPM-P2 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	PCIe Mini Card	—	—	—	3.100	2.700	9
J2	PCIe Mini Card	—	—	—	1.000	2.700	9
J3	PCI	AMP 1375799-1	—	—	0.450	3.139	—
J4	ISA	AMP 1375795-2	—	—	0.050	0.200	—

1. Origin is the lower left mounting hole as shown in Figure 3. All coordinates in inches.

JUMPER SUMMARY

Table 2: Jumper Summary

Jumper Block	Description	As Shipped															
V2[1-2] V2[3-4]	PCI Slot Assignment. <table><tr><th><u>PCI Slot</u></th><th><u>V1[3-4]</u></th><th><u>V1[1-2]</u></th></tr><tr><td>Slot 0</td><td>In</td><td>In</td></tr><tr><td>Slot 1</td><td>In</td><td>Out</td></tr><tr><td>Slot 2</td><td>Out</td><td>In</td></tr><tr><td>Slot 3</td><td>Out</td><td>Out</td></tr></table>	<u>PCI 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
<u>PCI 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															

PCI Express Mini Card Sockets

The PCI Express Mini Card connectors at J1 and J2 accept a full-height PCI Express Mini Card. Each interface includes one PCIe x1 lane. 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, and solid-state drives (SSDs).

Table 3: PCIe Mini Card Pinout

Pin	Signal Name	Function	Pin	Signal Name	Function
1	WAKE#	Wake	2	3.3VAUX	3.3V auxiliary source
3	NC	Not connected	4	GND	Ground
5	NC	Not connected	6	1.5V	1.5V power
7	CLKREQ#	Reference clock request	8	NC	Not connected
9	GND	Ground	10	NC	Not connected
11	REFCLK-	Reference clock input –	12	NC	Not connected
13	REFCLK+	Reference clock input +	14	NC	Not connected
15	GND	Ground	16	NC	Not connected
17	NC	Not connected	18	GND	Ground
19	NC	Not connected	20	W_DISABLE#	Wireless disable
21	GND	Ground	22	PERST#	Card reset
23	PERn0	Lane 0 receive –	24	3.3VAUX	3.3V auxiliary source
25	PERp0	Lane 0 receive +	26	GND	Ground
27	GND	Ground	28	1.5V	1.5V power
29	GND	Ground	30	NC	Not connected
31	PETn0	PCIe lane 0 transmit –	32	NC	Not connected
33	PETp0	PCIe lane 0 transmit +	34	GND	Ground
35	GND	Ground	36	NC	Not connected
37	GND	Ground	38	NC	Not connected
39	3.3VAUX	3.3V auxiliary source	40	GND	Ground
41	3.3VAUX	3.3V auxiliary source	42	LED_WWAN#	Wireless WAN LED
43	GND	Ground	44	LED_WLAN#	Wireless LAN LED
45	NC	Not connected	46	LED_WPAN#	Wireless PAN LED
47	NC	Not connected	48	1.5V	1.5V power
49	NC	Not connected	50	GND	Ground
51	NC	Not connected	52	3.3VAUX	3.3V auxiliary source

An optional Intel WiFi Link 5300 PCI Express Mini card is available for the VL-EPM-P2 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-EPM-P2 use two screws (M2.5 x 6mm, Philips, pan head, 4mm, stainless) and two washers (M2.5, split lock, OD 4.4mm, stainless). Nylon screws are available in 10-count packages as part number VL-HDW-108.

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 (for J1) and D3 and D4 (for J2) on the VL-EPM-P2. 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.

Appendix A – References



PC/104 Interface

[PC/104 Specification](#)

PC/104-*Plus* Interface

[PC/104-*Plus* Specification](#)