

VIA™ Package PMBus Interface and Accessories User Guide

Jon Siegers
Ankur Patel
Applications Engineering



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Introduction

The PMBus-USB Adapter (I2C-ADAPTER-A00) enables communication with the PMBus® interface of Vicor power modules in a VIA package using a Host PC. The PMBus control interface provides digital management capabilities and access to the telemetry monitoring and status reporting offered by the product.

The PMBus-USB Adapter converts the PMBus interface to a USB communication protocol using an internal isolated controller, allowing users to easily connect to a Host PC (no driver installation is required with Windows operating systems). A GUI, available for download on the Vicor website, provides a convenient means for monitoring and control of the power module.

The signal interface of a VIA™ is used for PMBus communication purposes with the provided GUI installed on the user's PC. All PMBus capabilities and features of the connected power module are available through the GUI, allowing users to read and write into the status configuration registers of the module, observe input and output telemetry, monitor faults and obtain other additional device information. The PMBus-USB Adapter enables easy evaluation of the PMBus digital interface offered on select Vicor products in a test environment.

Please note that this User Guide applies only to the operation of the I2C-ADAPTER-A00 PMBus-USB Adapter with Vicor converters in a VIA package. Support for all other Vicor products that include I²C™ or PMBus communication capabilities is provided by the I2C-ADAPTER-A02 PMBus-USB Adapter (see reference document [UG:901](#)).



IMPORTANT NOTICE:

Hazardous voltages may be present on the interfaced Vicor power module.

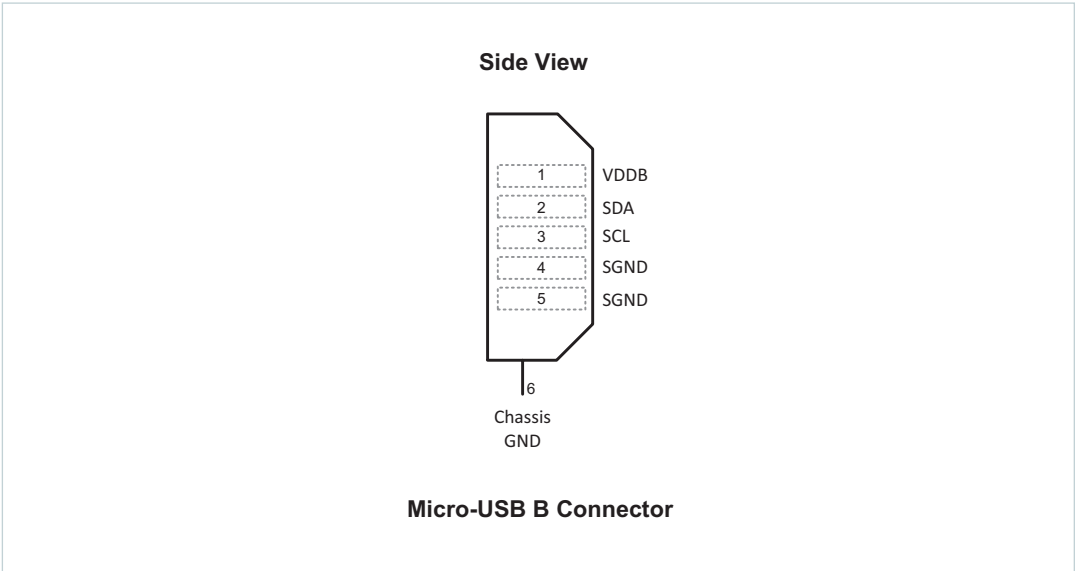
PERSONAL CONTACT WITH LINE VOLTAGE MAY RESULT IN SEVERE INJURY, DISABILITY, OR DEATH. IMPROPER OR UNSAFE HANDLING OF THIS ACCESSORY AND RELATED POWER MODULE(S) MAY RESULT IN SERIOUS INJURY OR DEATH

Read the precautions below entirely BEFORE using the PMBus-USB Adapter. Do not operate the PMBus-USB Adapter unless you have the appropriate precautions in place on your bench to guarantee safety.

The list below is not comprehensive and is not a substitute for common sense and good practice.

- During operation, the power devices and surrounding structures can be operated safely at high temperatures.
- Remove power from the converter and use caution when connecting and disconnecting test probes and interface lines to avoid inadvertent short circuits and contact with hot surfaces.
- Never use a jumper in place of a fuse.
- Always use approved safety glasses when testing electronic products. Follow good laboratory practice and procedures.
- Avoid creating ground loops when making measurements of the isolated input or output voltage and signals.
- Care should be taken to protect the user from accidental contact with electrical terminals when operating under power.
- Care should be taken to avoid reversing polarities if connecting to the opposite (solder) side of the board.
- The PMBus-USB Adapter described in this document is designed for general laboratory evaluation, and is not suitable for installation in end user equipment or applications.
- Refer to the specific Vicor power module data sheet of the interfaced product(s) for electrical, thermal, and mechanical product details.
- Signal cables 43503-01 and 43503-02 are rated up to five insertions and extractions into the VIA™ signal cable receptacle. Insert and extract the VIA signal connector cables by firmly grasping the connector body housing. To avoid unnecessary stress on the connector, the cable should be appropriately strain relieved.

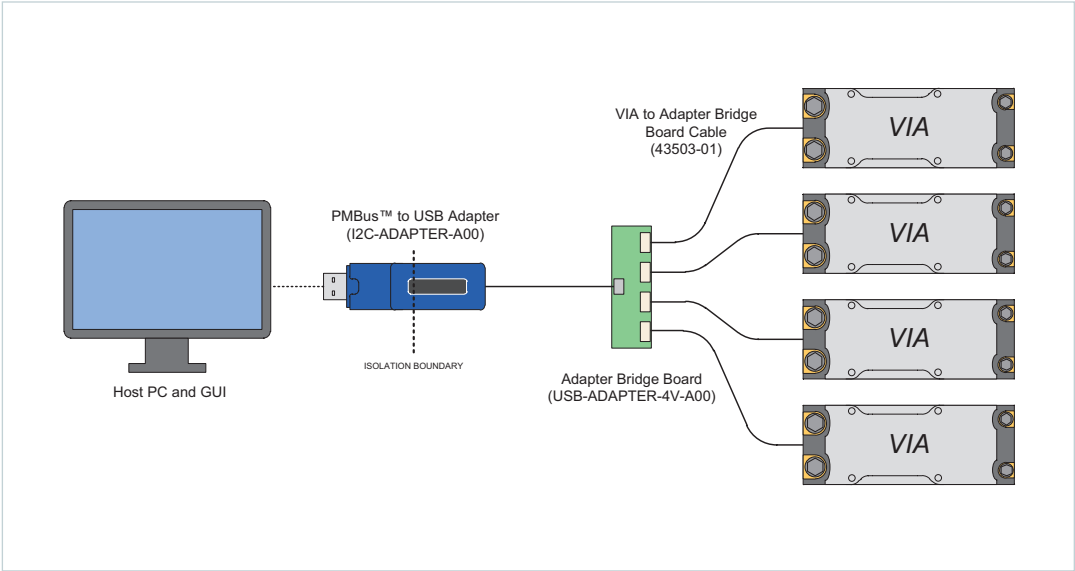
Connector Information – PMBus-USB Adapter



Pin Number	Signal Name	Type	Function
1	VDDB	OUTPUT	5V supply output
2	SDA	INPUT/OUTPUT	I ² C™ Data PMBus® compatible
3	SCL	OUTPUT	I ² C Clock PMBus compatible
4	SGND	SIGNAL RETURN	Signal ground
5	SGND	SIGNAL RETURN	Signal ground
6	Chassis GND	SHIELD	Connector housing ground

Figure 1

Host PC to VIA™ power module array connection, PMBus communication interface accessories shown as a typical application set up



Application Details

The PMBus-USB Adapter, along with the listed companion accessories and Vicor Digital Interface Demo GUI, provides a convenient means to demonstrate the PMBus® digital interface offered on Vicor VIA™ power modules in an evaluation environment. With these tools, the user can quickly get started with evaluating the features offered by the PMBus interface and determining the needs of a final production power system.

Features

- Easily configure and monitor PMBus-enabled Vicor power modules in a VIA package
 - Vicor Digital Interface Demo Board GUI for PMBus control interface (available on Vicor website HV BCM family page)
- USB connection to host PC
- Provides 5V external bias (VDDDB)
- Internal 10kΩ clock and data signal line (SCL and SDA) pull-up resistors to 5V VDDDB
- Isolated PMBus to Host interface (4242V_{DC})
- Measurement of input and output parameters, including but not limited to:
 - Voltage
 - Current
 - Power
 - Temperature
- Fault monitoring, including but not limited to:
 - Overvoltage / Undervoltage
 - Overcurrent
 - Overtemperature
- Enable / Disable control

Table 1
VIA package PMBus
companion accessories

Part Number	Description
USB-ADAPTER-1V-B00	Adapter bridge board, for use with single chassis-mount VIA
USB-ADAPTER-4V-A00	Adapter bridge board, for use with up to four chassis-mount VIAs
43503-01	VIA Signal Connector cable with Molex® Micro-Lock™ connector (600mm length)
43503-02	VIA Signal Connector cable with Molex® Micro-Lock™ connector (200mm length)
I2C-ADAPTER-A00	PMBus-USB Adapter
Software Interface	Vicor digital interface demo board GUI

VIA™ to Adapter Bridge Board

The Typical Application diagram in Figure 1 shows the connections required to establish PMBus® communication between PMBus-enabled VIA modules and a host PC. The setup for this configuration includes directly connecting the VIA Signal Connector cable to the PMBus signal port on the VIA. The Adapter Bridge Board, as shown in Figure 2 and Figure 3, provides the necessary connections between the VIA Signal Connector Cable and the PMBus-USB Adapter. On Adapter Bridge Board USB-ADAPTER-1V-B00, the VIA PMBus address is programmed to 51h by a pre-installed resistor R02. On the Adapter Bridge Board USB-ADAPTER-4V-A00, the four VIA PMBus addresses are programmed to 51h, 53h, 54h, 55h by pre-installed resistors R02-R05. An LED provides visual indication that VDDB (5V) is present.

Lastly, the PMBus-USB Adapter connects to the user's computer where the provided Vicor Digital Interface Demo GUI is installed.

Figure 2
USB-ADAPTER-1V-B00
Assembly Drawing and
Schematic

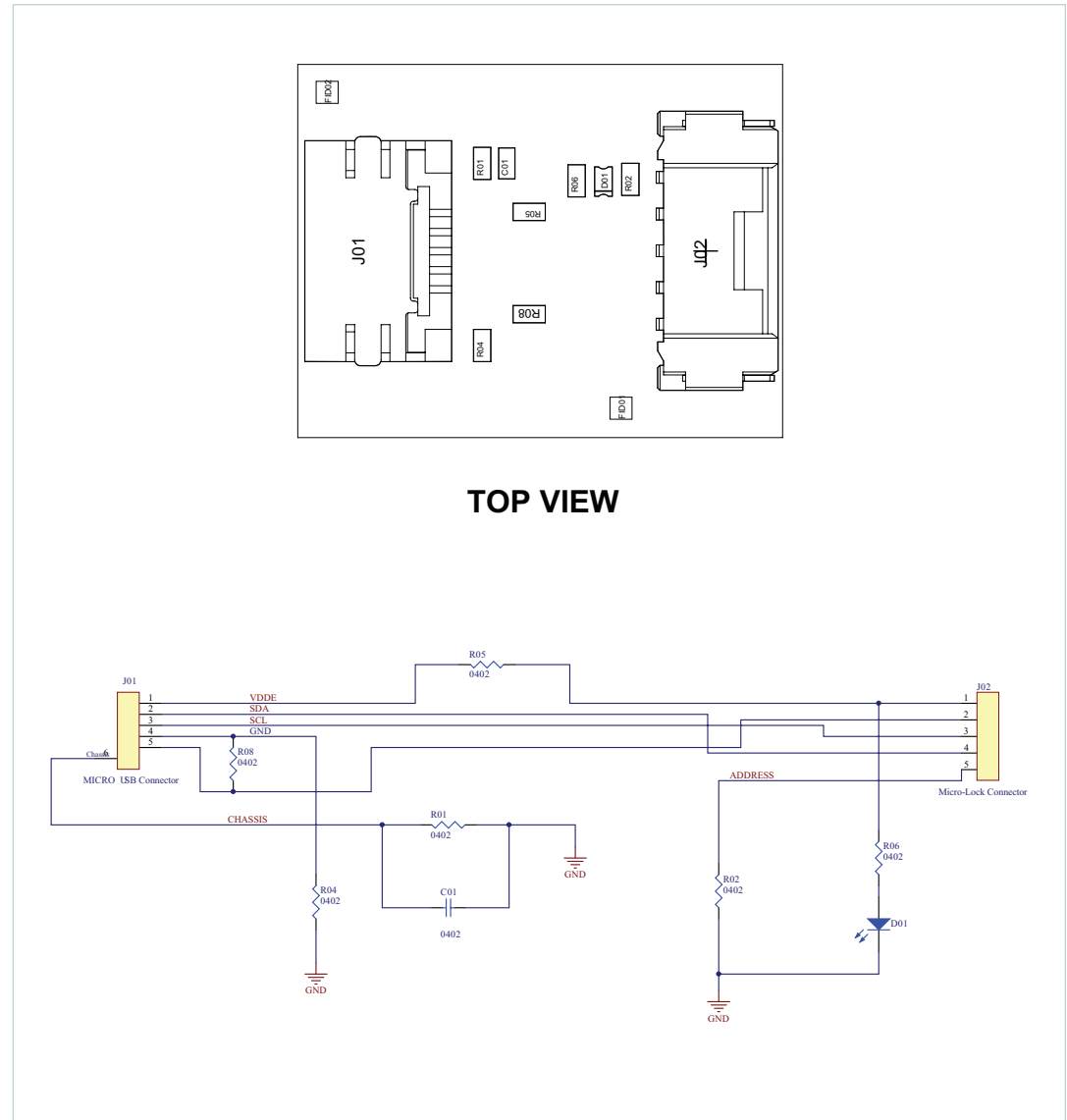
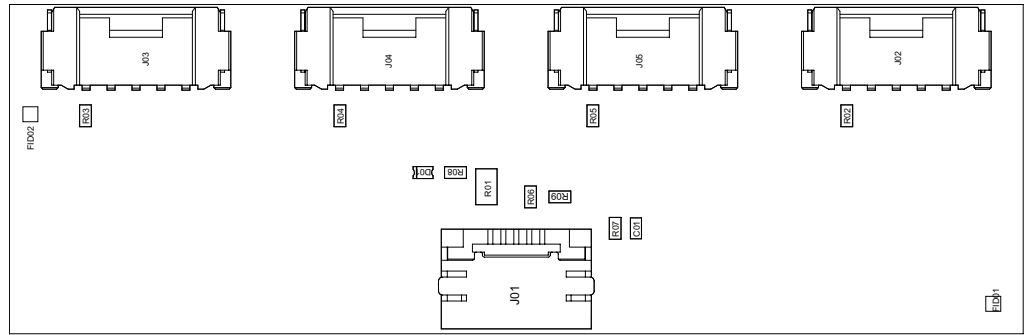
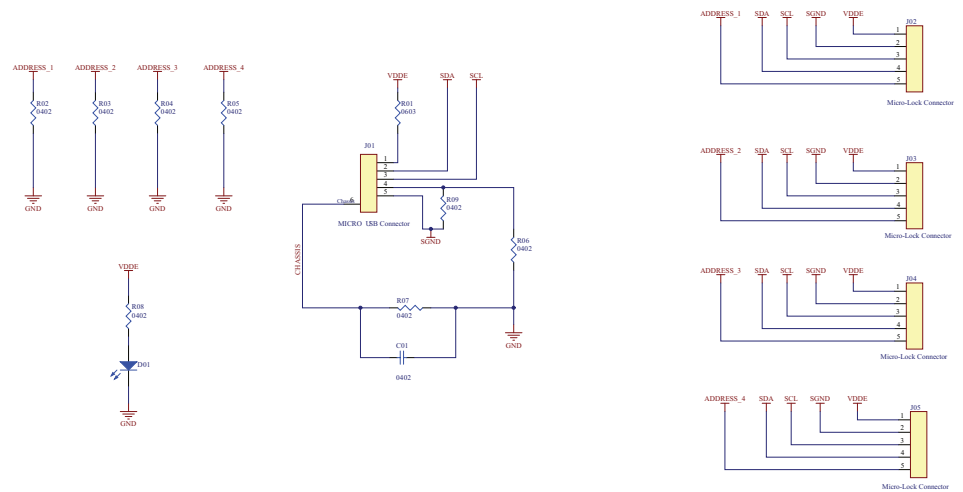


Figure 3
USB-ADAPTER-4V-A00
assembly drawing
and schematic



TOP VIEW



The following is a list of all connectors and components present on the USB-ADAPTER-1V-B00 and USB-ADAPTER-4V-A00 Adapter Bridge Boards.

Table 2
USB-ADAPTER-1V-B00
components

Reference Designator	Description	Manufacturer	Manufacturer Part Number
R04, R05, R08	RES 0Ω 1/16W 1% 0402	KOA Speer	RK73Z1ETTP
R06	RES 1kΩ 1/16W 1% 0402	KOA Speer	RK73H1ETTP1001F
R01	RES 10kΩ 1/16W 1% 0402	KOA Speer	RK73H1ETTP1002F
R02	RES 1.05kΩ 1/16W 1% 0402	KOA Speer	RK73H1ETTP1051F
C01	CAP X7R 0.1μF 10% 16V 0402	Murata	GRM155R71C104KA88D
D01	DLED RED SMD 0402	Panasonic	LNJ247W82RA
J01	CONN MICRO-B USB SMD	TE Connectivity	2174507-2
J02	CONN MICRO HDR 5POS 1.25mm SINGLE ROW RA	Molex	504195-0570

Table 3
USB-ADAPTER-4V-A00
components

Reference Designator	Description	Manufacturer	Manufacturer Part Number
R01	RES 0Ω JUMPER 1A 0603	KOA Speer	RK73Z1JTDD
R06, R09	RES 0Ω 1/16W 1% 0402	KOA Speer	RK73Z1ETTP
R08	RES 1kΩ 1/16W 1% 0402	KOA Speer	RK73H1ETTP1001F
R07	RES 10kΩ 1/16W 1% 0402	KOA Speer	RK73H1ETTP1002F
R02	RES 1.05kΩ 1/16W 1% 0402	KOA Speer	RK73H1ETTP1051F
R03	RES 2.8kΩ 1/16W 1% 0402	KOA Speer	RK73H1ETTP2801F
R04	RES 3.92kΩ 1/16W 1% 0402	KOA Speer	RK73H1ETTP3921F
R05	RES 5.23kΩ 1/16W 1% 0402	KOA Speer	RK73H1ETTP5231F
C01	CAP X7R 0.1μF 10% 16V 0402	Murata	GRM155R71C104KA88D
D01	DLED RED SMD 0402	Panasonic	LNJ247W82RA
J01	CONN MICRO-B USB SMD	TE Connectivity	2174507-2
J02, J03, J04, J05	CONN MICRO HDR 5POS 1.25mm SINGLE ROW RA	Molex	504195-0570

GUI Configuration

Figure 4
GUI configuration

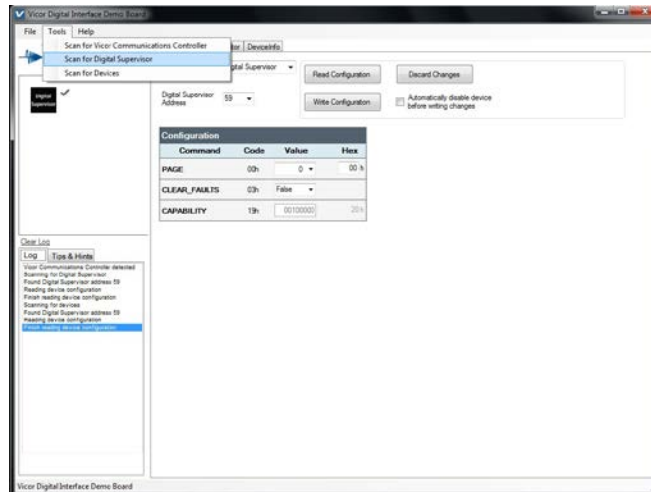


Figure 4.1

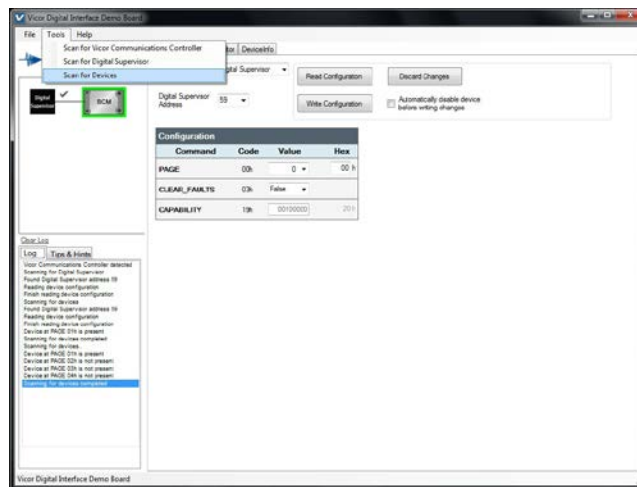


Figure 4.2

After making the necessary connections, follow the guidelines for configuring the GUI and to ensure establishment of communication between the power module and the host PC.

1. Confirm illumination of the LED on the Adapter Bridge Board as a visual indication that VDDb bias is present.
2. Power up module within the input voltage continuous operating range specified by the device data sheet.
3. Open the Vicor Digital Interface Demo Board software installed on the connected host PC.
4. Go to Tools -> Scan for Digital Supervisor to detect Digital Supervisor as shown in Figure 4.1.
5. Go to Tools -> Scan for Devices and select desired power module device as shown in Figure 4.2.
6. Verify the desired power module device is selected (highlighted in green) for communication through the GUI.

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Vicor Corporation

25 Frontage Road
Andover, MA, USA 01810
Tel: 800-735-6200
Fax: 978-475-6715
www.vicorpower.com

email

Customer Service: custserv@vicorpower.com
Technical Support: apps@vicorpower.com

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