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Development Kit User Guide

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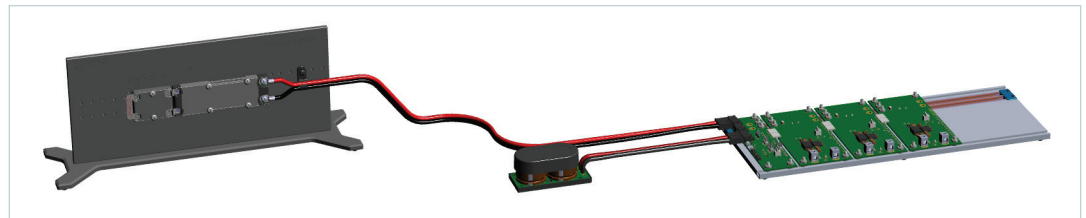
Features

- From bulk power distribution to Point-of-Load in two simple steps
- Universal AC input
- Multiplicity of Point-of-Load options
- Small size, low profile, easy-to-use, highly flexible



IMPORTANT NOTICE:

Please read this user guide before operating the Vicor Development Kit. The Development Kit is for evaluation purposes only. Compliance testing on the Development Kit is not permissible.



Introduction

The Vicor Development Kit contains a Front-End (FE) Chassis, a Hold-up Bank (HUB), and a Point-of-Load (PoL) Chassis. The Front End Chassis has chassis mount versions of the AIM in a VIA package and PFM in a VIA package that may be connected to worldwide AC mains. A HUB is included to provide proper holdup for the PFM.

The PoL Chassis has an Input Board and three Picor Cool-Power ZVS Buck Regulator evaluation boards. The Input Board interfaces with the Front End Chassis and HUB to provide a 24 V or 48 V voltage rail on the PoL Chassis. The included Picor regulators provide 3.3 V, 5 V, and 12 V outputs.

Please visit www.vicorpower.com for datasheets and more information on the individual products used in the Development Kit. Part numbers can be found in the Bill of Materials on Page 5.

⚠ DANGER! HIGH VOLTAGE! ⚠ DANGER! HOT SURFACE!

The Development Kit contains exposed hazardous voltages on the Front-End Chassis. The Front-End Chassis may be operating at surface temperatures which may pose a thermal hazard to the operator. Please use caution not to touch the Front-End Chassis unless the power is disconnected and the Front-End Chassis has been given sufficient time to cool.

⚠ IMPORTANT NOTICE:

AC Input Fusing

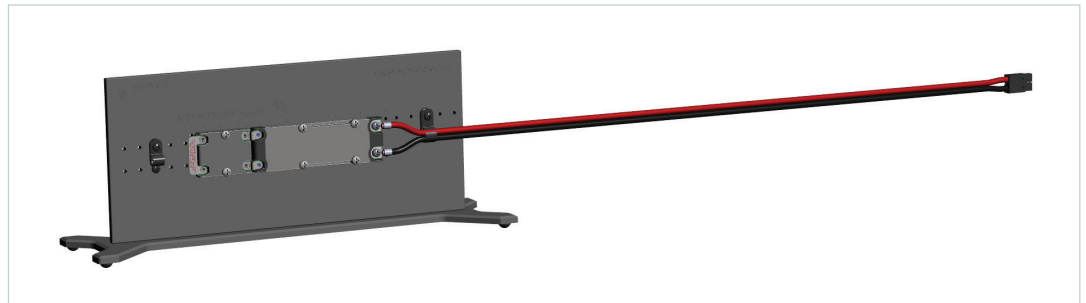
The Vicor Development Kit is meant for bench evaluation purposes only. A power supply with an adjustable current limit must be used when powering the Development Kit.

Although a 7A input fuse is installed in the AC cord adapter, this fuse does not meet safety approvals outlined for the AIM and PFM. It is the user's responsibility to select proper fusing at the system level to meet the desired application requirements. Please refer to the section titled Input Fuse Selection on page 16 in the PFM data sheet for guidelines on proper fuse selection.

System Overview

Front-End (FE) Chassis

Figure 1.
Front-End Chassis



Vicor AIM and PFM in a VIA package chassis mount modules are mounted on the Front-End Chassis of the Development Kit. The AIM interfaces directly with worldwide AC mains and provides a rectified AC input for the PFM. The AIM combines a bridge rectifier, EMI filter, and surge protection circuitry in an easy to use VIA plastic housing.

The PFM in a VIA package is a 400 W power factor corrected AC-DC converter operating from a rectified universal AC input which delivers an isolated and regulated Safety Extra-Low Voltage (SELV) 24 V or 48 V (model dependent) secondary output.

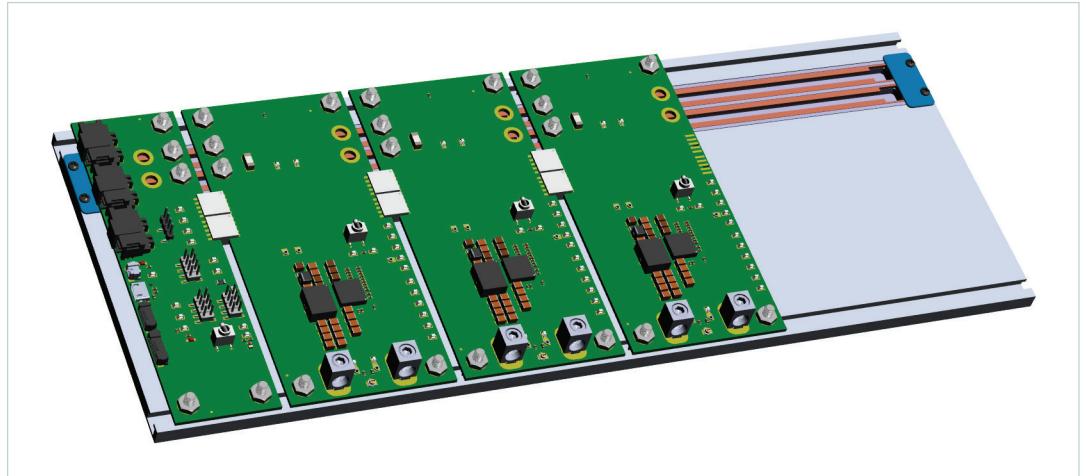
These modules are mounted on the Front End Chassis of the Development Kit to showcase their efficient, simple, and cost effective AC-DC solution compliant to IEC 61000-3-2 Class B EMC standard. The metallic stand acts as a heat sink for the AIM and PFM. Please use caution not to touch the Front End chassis unless the power is disconnected and the front end chassis has been given sufficient time to cool.

Hold-up Bank (HUB)

The PFM uses secondary-side energy storage to maintain output hold up through line dropouts and brownouts. A hold-up capacitor bank is included in the kit to achieve the required hold up functionality. Moreover, the HUB provides a viable path for the second harmonic due to the PFM power factor correction function.

Point-of-Load (PoL) Chassis

Figure 2.
PoL Chassis



Point-of-Load evaluation boards are on mounted on the PoL Chassis and have 3.3 V, 5 V, and 12 V outputs. The Input Board, on the left side of the PoL Chassis, interfaces with the Front-End Chassis and HUB using the three black right angle connectors. The PoL Chassis showcases Vicor's high power density, flexible, and high-efficiency Point-of-Load offerings.

A communications port is available on the Input Board which can be connected to the VIA module mounted on the Front-End Chassis.

Note: This feature will be available in the future.

I²C communications will be available in the future for V_{OUT} margining, fault reporting, and EN pin polarity for the Picor converters.

Set-up Instructions

Figure 3.
Front-End Chassis Set Up

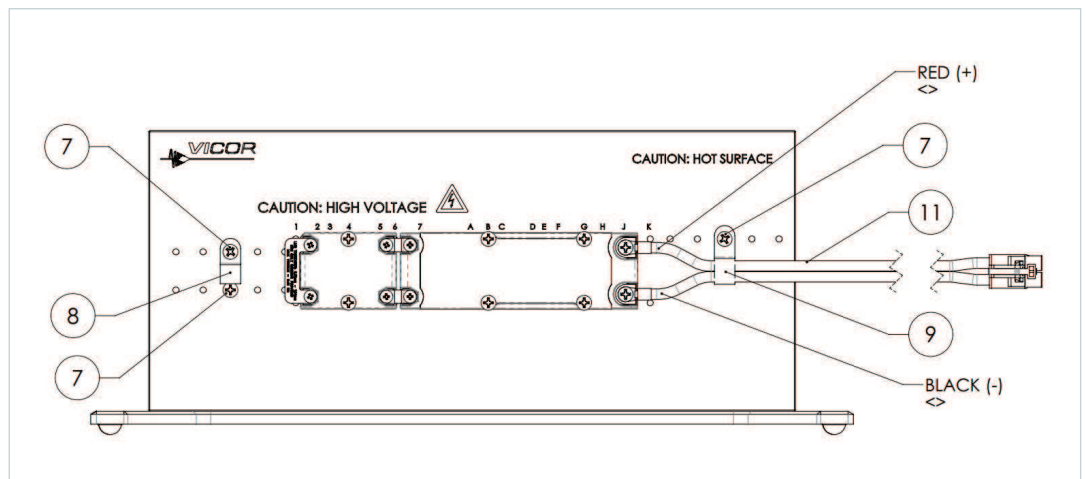
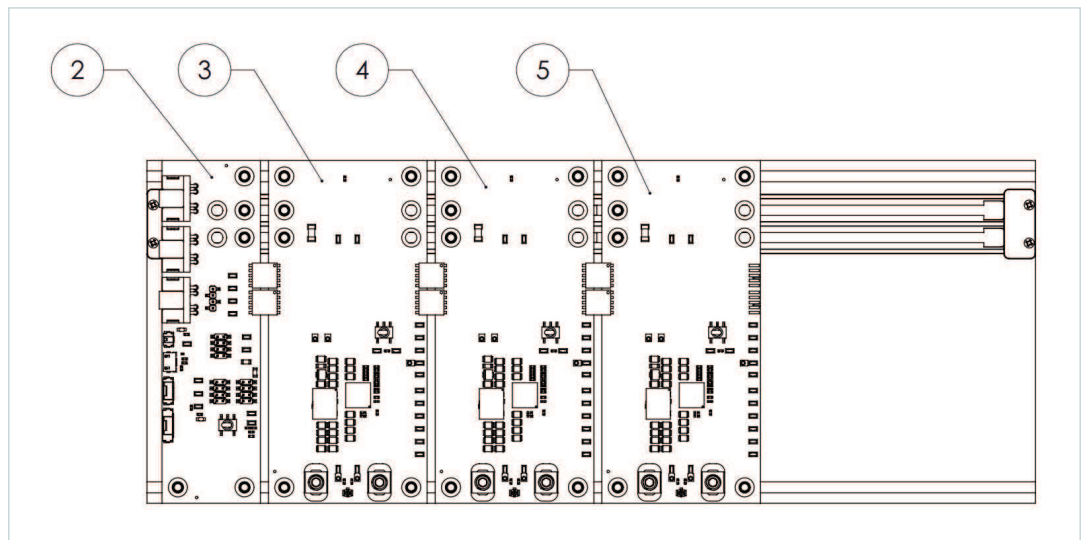


Figure 4.
PoL Chassis Setup



1. Ensure the evaluation boards on the PoL Chassis are securely plugged into the white plastic board-to-board edge connectors and that all nuts on the evaluation boards are screwed down. The toggle switches on the evaluation boards control the enable for each PoL converter.
Note: Any load connected to the PoL converters should be off or disabled until the Front-End Chassis has been powered on.
2. Connect the red and black HUB cable to one of the black right angle connectors on the Input Board of the PoL Chassis. Input Board is labeled 2 in Figure 4.
3. Remove black plastic cable retainer on the Front-End Chassis, labeled 8 in Figure 3, and the plastic insert that is screwed down on the AIM input. The plastic insert can be discarded.
4. Insert provided AC cord into the cord retainer. The AC cord should be fed through the retainer to the location where the black insulation ends and the Line, Neutral, and Ground wires are exposed. Screw retainer back to the Front-End Chassis and screw down the Ground wire ring lug using the screw hole below the retainer as seen in Figure 3. Install the Line/Black wire to the top terminal of the AIM and install the Neutral/White wire to the bottom terminal of the AIM.
5. Ensure all screws are secure on the Front-End Chassis.
6. Plug in the red and black Front-End Chassis output cable, labeled 11 in Figure 3, to one of the black right angle connectors on the Input Board of the PoL Chassis.
7. Connect the outputs of the PCBs on the PoL Chassis to the desired load(s) via the large screw-down output connectors. Test points are available near the top of each PoL PCB to observe the output voltage from the Front-End chassis, and test points between the output connectors are available to observe the output voltage from the PoL converter.
8. Connect the AC cord to a bench power supply.
9. Once power has been applied to the Front-End Chassis, the load(s) connected to PoL Chassis can be enabled.

Bill of Materials

Table 1.
Hardware Bill of Materials
common to all Development Kits

| Description | Manufacturer | Manufacturer Part Number |
|--|-------------------|--------------------------|
| M3.5 X 14 SSTL PH PHILLIPS SCREW | Fastenal | 0145078 |
| M3.5x8 SSTL PH PHILLIPS SCREW, BLACK | Fastenal | 0145082 |
| CLAMP .375 PA66 BLACK .250 BUNDLE DIA | HellermannTyton | T3D02500M4 |
| CLAMP .375 PA66 BLACK .375 BUNDLE DIA | HellermannTyton | T3D03750M4 |
| AC LINE CORD KIT | Quail Electronics | 2573.0485 |
| UNIVERSAL AC ADAPTER TO UK | Quail Electronics | 0522.B |
| UNIVERSAL AC ADAPTER TO EURO SCHUKO | Quail Electronics | 0521.B |
| INTERCONNECT TO POL ASSEMBLY | Vicor | 42982 |
| TIM PAD, VIA, 4414PFM | Vicor | 43151 |
| TIM PAD, VIA, 1714 | Vicor | 43150 |
| M4x12 SSTL HEX HEAD CAP SCREW | McMaster-Carr | 91287A113 |
| SPACER, 8 mm OD, 4.2 mm ID, 2.5 mm HT | Vicor | 42603 |
| M4 SSTL THIN HEX NUT | McMaster-Carr | 90710A035 |
| 10 Position Open Edge Board to Board Connector | AVX | 9159010061916 |

Table 2.
Development Kit Bill of Materials

| Development Kit Part Number | Description | Front-End / PoL Chassis Part Number | VIA package/PoL Converter or HUB Part Number | | |
|-----------------------------|-------------------|-------------------------------------|--|--------------------|-----------------|
| DKIT-AC-24-POL-00 | Front End Chassis | PFM4414EB6M24D0T00 | AIM1714VB6MC7D5T00 | PFM4414VB6M24D0T00 | HUB30-24 |
| | PoL Chassis | PI33-24-3-5-12-00 | PI3301-00-EVAL2 | PI3302-00-EVAL2 | PI3303-00-EVAL2 |
| DKIT-AC-48-POL-00 | Front End Chassis | PFM4414EB6M48D0T00 | AIM1714VB6MC7D5T00 | PFM4414VB6M48D0T00 | HUB13-48 |
| | PoL Chassis | PI35-48-3-5-12-00 | PI3543-00-EVAL2 | PI3545-00-EVAL2 | PI3546-00-EVAL2 |

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