

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 AC to point-of-load 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™ and PFM™ in a VIA™ package that provide full-wave rectification, EMI Filtering and power factor correction that may be connected to worldwide AC mains. A HUB is included to provide proper hold up for the PFM.

The PoL chassis has an input board and three ZVS Buck Regulator evaluation boards. The input board interfaces with the front-end chassis and HUB to provide a 24V or 48V voltage rail on the PoL chassis. The included ZVS Regulators provide 3.3, 5 and 12V outputs.

Please visit www.vicorpower.com for data sheets 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

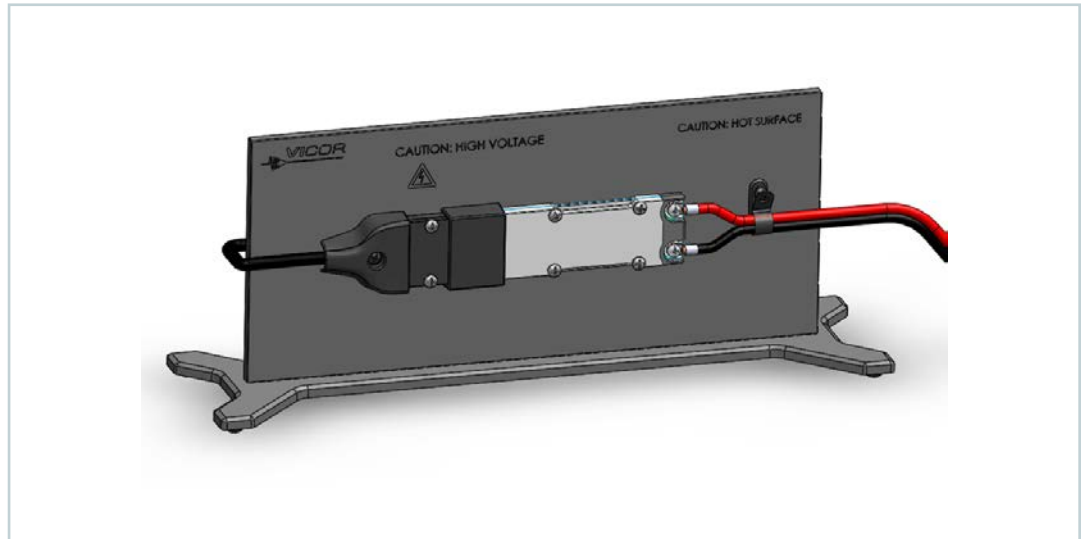
The Vicor Development Kit is meant for bench evaluation purposes only. A power supply with an adjustable current limit must be used when powering the Development Kit.

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 400W 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 or 48V (model dependent) secondary output.

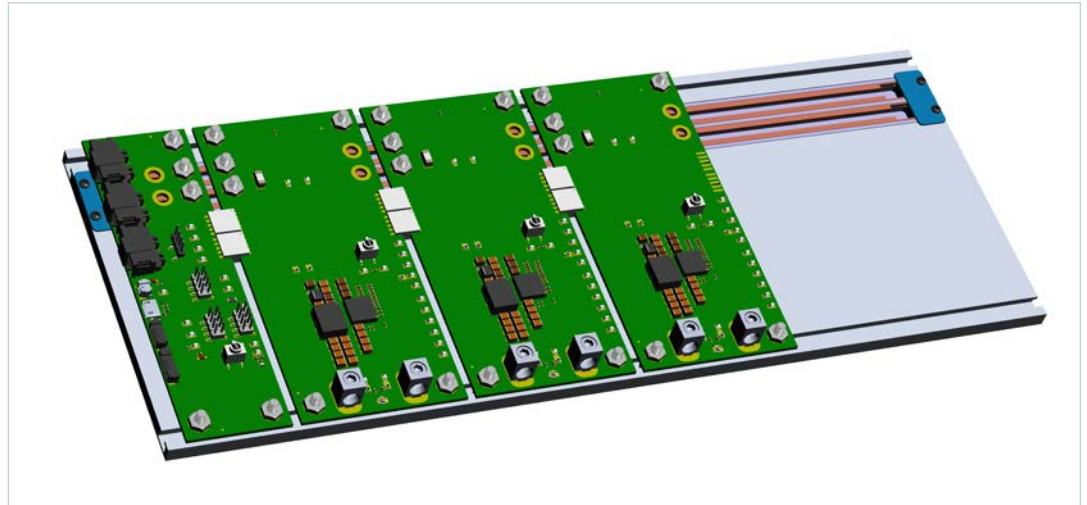
These modules are mounted on the Front End Chassis of the Development Kit to showcase their efficient, simple, and cost effective AC-DC solution compliant to IEC 61000-3-2 Class B EMC standard. The metallic stand acts as a heat sink for the AIM and PFM. Please use caution not to touch the Front-End chassis 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 mounted on the PoL Chassis and have 3.3, 5 and 12V 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 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 ZVS Regulator converters.

Set-Up Instructions

Figure 3
Front-end chassis set up

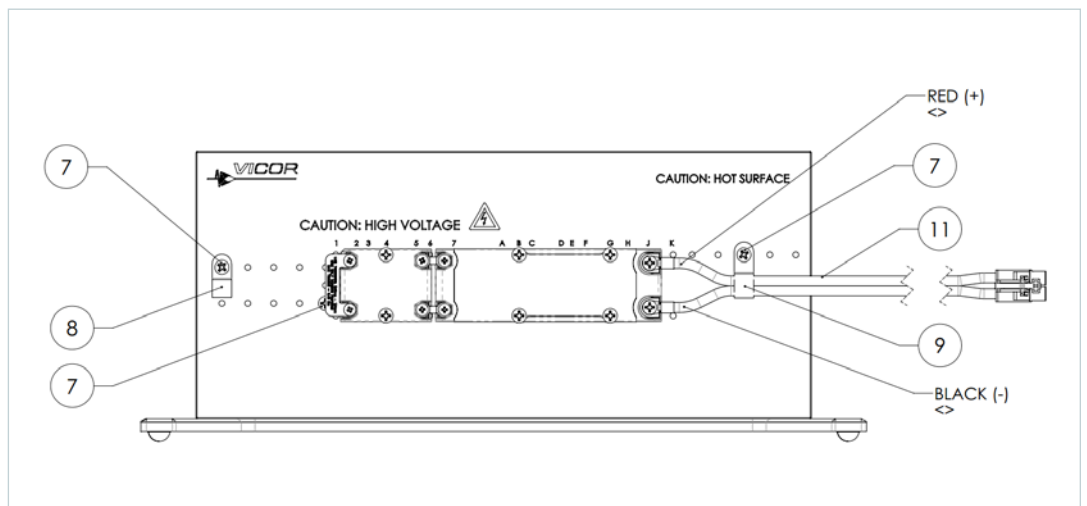


Figure 4
PoL chassis set up

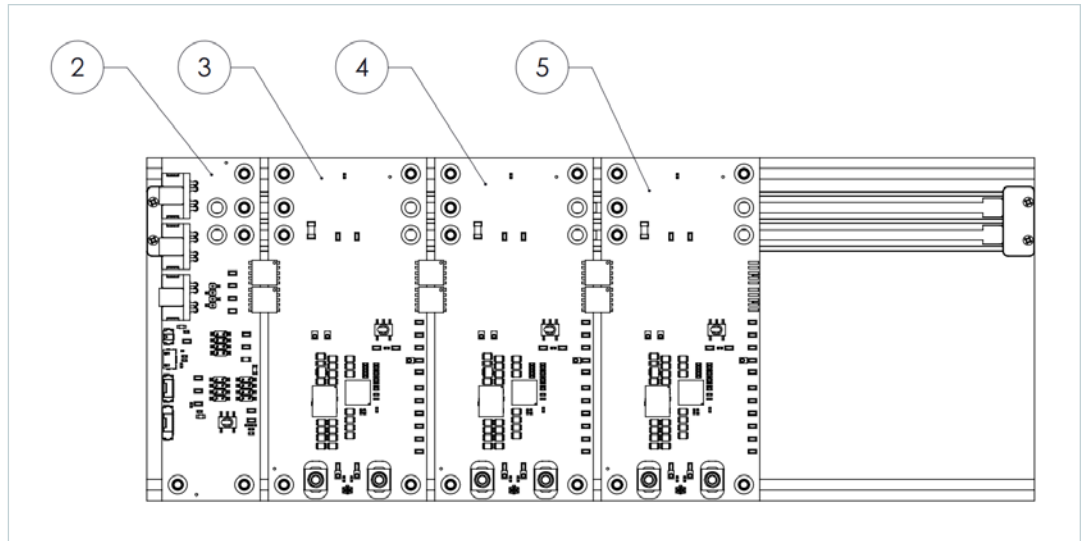


Figure 5
Cover accessory kit,
funnel cover (top),
snap-on cover (bottom)



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 supplied screw that is mounted in front of the AIM in a VIA™ package 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. A cover accessory kit is included in the Development Kit box, refer to Figure 5. Place the funnel cover over the input terminals of the AIM in a VIA package and use the included screw to secure the cover. The screw hole is centered between the input terminals of the AIM on the Front End Chassis. Place the snap-on cover between the AIM and PFM™ in a VIA package. The cover should snap down securely on the metal jumpers that connect terminals of the AIM and PFM.

6. Ensure all screws are secure on the Front-End Chassis.
7. 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.
8. 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.
9. Connect the AC cord to a bench power supply.
10. 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	145078
M3.5x8 SSTL PH PHILLIPS SCREW, BLACK	Fastenal	145082
CLAMP .375 PA66 BLACK .250 BUNDLE DIA	HellermannTyton	T3D02500M4
CLAMP .375 PA66 BLACK .375 BUNDLE DIA	HellermannTyton	T3D03750M4
AC LINE CORD KIT	Quail Electronics	2573.048S
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	9.15901E+12
ACCESSORY COVER KIT	Vicor	43916
JUMPER TERMINAL BLOCK.413 PITCH .150 ID	Vicor	43055

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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