



**MPS**

**User Guide**

**mEZDPD1620A Evaluation Kit (PKT-mEZDPD1620A)**



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## Overview

### Introduction

The PKT-mEZDPD1620A is an evaluation kit for the mEZDPD1620A, a scalable and fully integrated power module with a PMBus interface, which offers a complete power solution that achieves up to 25A of peak output current with excellent load and line regulation over a wide input voltage range. The kit allows for quick evaluation of the module and offers multiple-time programming (MTP) capabilities, which allows users to program custom configurations, supporting a wide range of designs.

### Kit Contents

PKT-mEZDPD1620A kit contents (items below can be ordered separately, and GUI installation file and supplemental documents can be downloaded from the MPS website):

#	Part Number	Item	Quantity
1	EVmZDPD1620A-00A	EVmZDPD1620A evaluation board	1
2	EVKT-USBI2C-02	Includes one USB to I <sup>2</sup> C communication interface, one USB Male A to B cable, one 10-pin ribbon cable, and one 3-pin ribbon cable	1
3	mEZDPD1620A-0000	mEZDPD1620A module with default configuration	1



Figure 1: PKT-mEZDPD1620A Evaluation Kit Set-Up

### Features and Benefits

The mEZDPD1620A is highly customizable. Users can program the power module via the PMBus and MTP.

*⚠ Values written to the registers via PMBus will NOT be retained once the module is powered down unless they are written into the MTP memory.*

*⚠ To write to the MTP memory, the input voltage must be greater than 8V.*

Key programmable features:

- | PMBus   |
|---|
| <ul style="list-style-type: none"> <li>• Current limit</li> <li>• Switching frequency</li> <li>• Operation mode (PSM or CCM)</li> <li>• Output voltage</li> <li>• Soft-start time</li> <li>• Fault threshold</li> </ul> |

### Kit Specifications

Feature	Specification
<b>Input Voltage</b>	4V to 16V (without external VCC) 3V to 16V (with external 3.3V VCC)
<b>Output Voltage</b>	0.5V to 5V (default: 1.8V)
<b>Maximum Output Current</b>	20A continuous, 25A peak
<b>Default Switching Frequency</b>	600kHz
<b>Operating Systems Supported</b>	Windows 7 or later
<b>System Requirements</b>	Minimum 15.6MB free
<b>EVB Size (LxW)</b>	6.4cmx6.4cm

## Section 1. Hardware Specifications

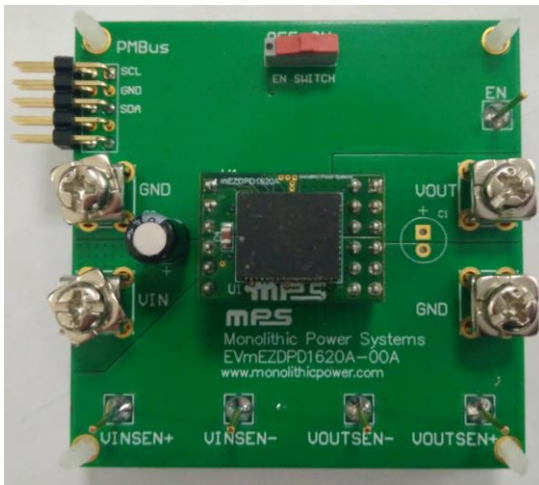
### 1.1 Personal Computer Requirements

The following minimum requirements must be met to use the PKT-mEZDPD1620A:

- Operating system of Windows XP, 7, or later
- Net framework 4.0
- At least 15.6MB of free space

### 1.2 EVmEZDPD1620A-00A Specifications

The EVmEZDPD1620A-00A is the evaluation board for the mEZDPD1620A. For more information regarding the evaluation board, refer to the EVmEZDPD1620A-00A datasheet.



Feature	Specification
<b>Input Voltage</b>	4V to 16V (without external VCC) 3V to 16V (with external 3.3V VCC)
<b>Output Voltage</b>	0.5V to 5V (default: 1.8V)
<b>Maximum Output Current</b>	20A continuous, 25A peak
<b>EVB Size (LxW)</b>	6.4cmx6.4cm

**Figure 2: EVmEZDPD1620A-00A Evaluation Board**

### 1.3 EVKT-USBI2C-02 Specifications

The EVKT-USBI2C-02 is the PMBus and I<sup>2</sup>C communication interface device, which connects the EVB and the PC, and its supporting accessories. Together with the eMotion System™ Virtual Bench Pro GUI tool, it provides a quick and easy way to evaluate the performance of MPS digital products. For more details, refer to the EVKT-USBI2C-02 datasheet.



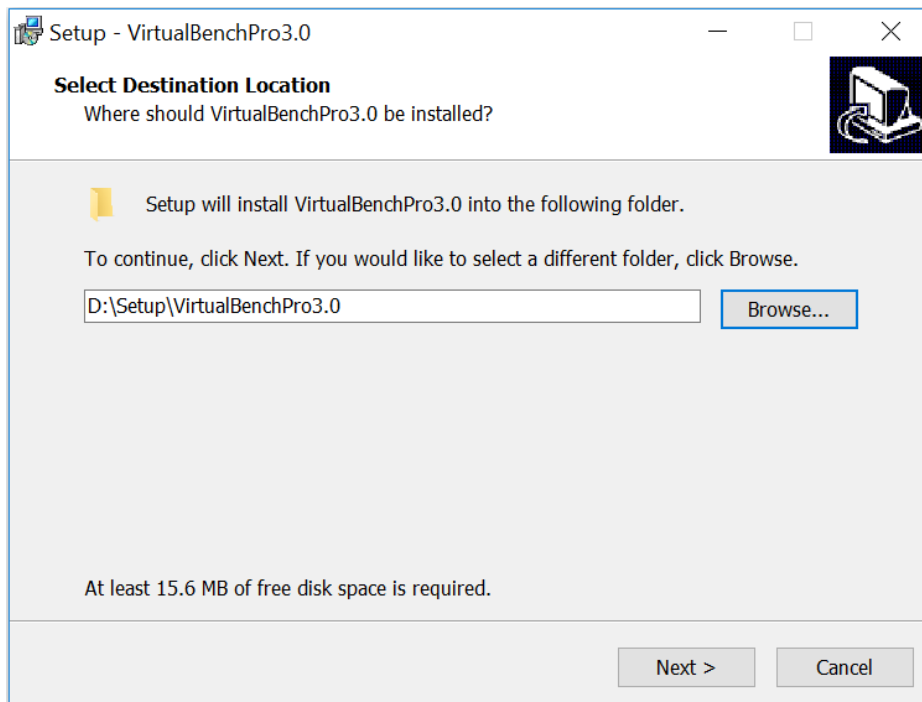
**Figure 2: EVKT-USBI2C-02 Communication Interface**

## Section 2. Software Requirements

### 2.1 Software Installation

The eMotion System™ Virtual Bench Pro GUI tool provides an easy way to access the registers, program the MTP memory, and monitor the key parameters of MPS power modules. Follow the instructions below to install the software:

1. Download the GUI installation file, “Virtual Bench Pro 3.0,” from the MPS website at: <https://www.monolithicpower.com/en/virtual-bench-pro-3-0.html>
2. Extract the zip package and double-click the .exe file to open the set-up guide (see Figure 4). If a protection window comes up, click “More info,” then click “Run anyway.”
3. Follow the prompts in the set-up guide.
4. Wait for the status screen to verify that installation is complete.



**Figure 3: eMotion System™ Virtual Bench Pro GUI Set-Up Guide**

## Section 3. Evaluation Kit Test Set-Up

### 3.1 Hardware Set-Up

The hardware must be properly configured prior to use. Follow the instructions below to set up the EVB:

1. Connect the PMBus cable to the evaluation board and the EVKT-USBI2C-02 communication interface.
2. Connect the EVKT-USBI2C-02 communication interface to the PC using the USB cable.



Figure 5: EVB to MPS I<sup>2</sup>C Communication Interface Wire Connection

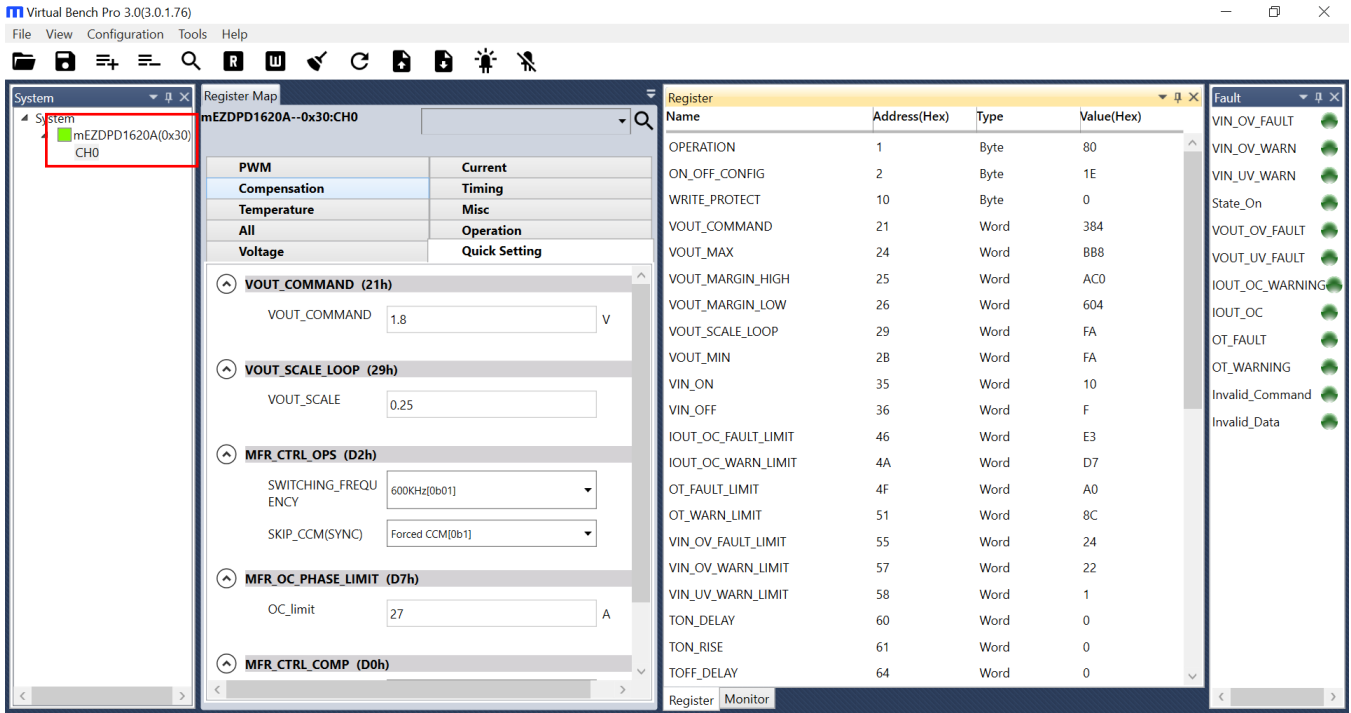
### 3.2 Powering Up the EVB

1. Connect the positive and negative terminals of the load to the VOUT and GND pins, respectively.
2. Set the output voltage of the bench power supply between 4V and 16V before connecting to the EVB to prevent damage, then turn off the power supply.
3. Connect the positive and negative terminals of the power supply to the VIN and GND pins, respectively.
4. Turn the power supply on. The EVB will power up automatically.

### 3.3 Software Set-Up

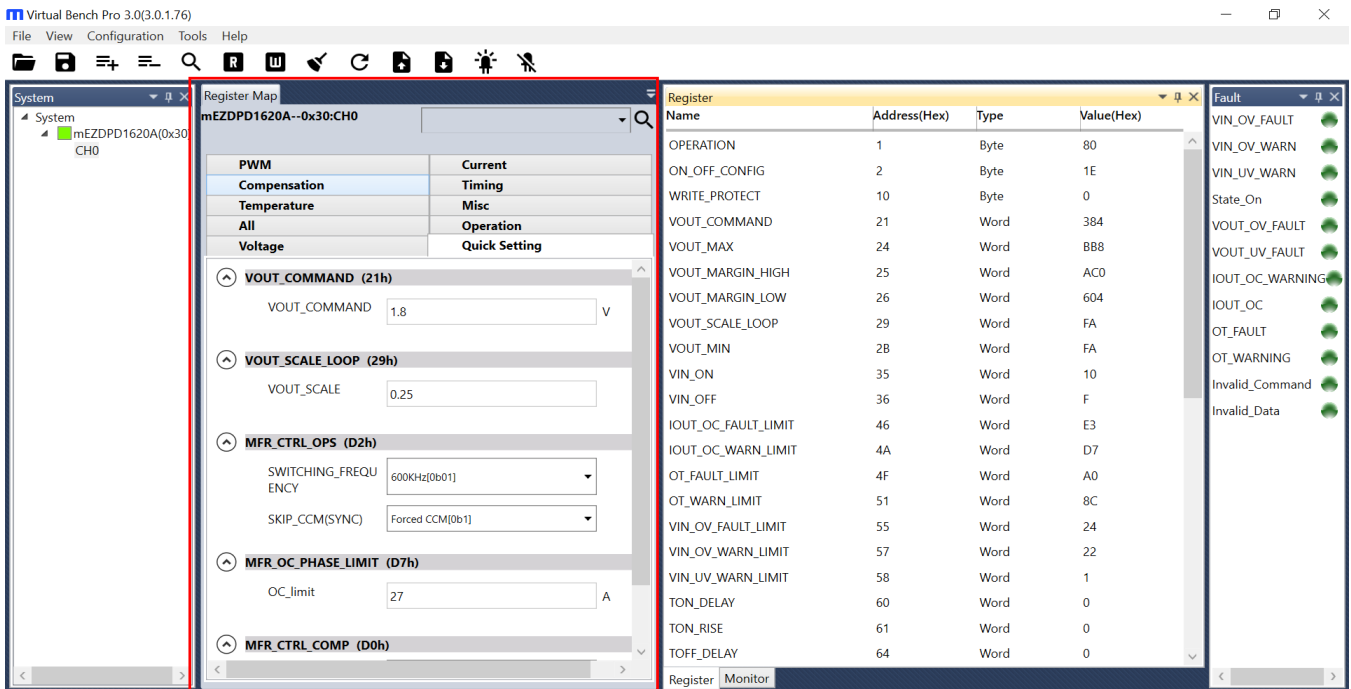
After connecting the hardware using the steps above, follow the steps below to set up software:

1. Open eMotion System™ Virtual Bench Pro. The software will scan the connected power modules.
  - a. If the GUI detects the power module, “mEZDPD1620A” will appear on the left panel and the indicator to the left of “mEZDPD1620A” will turn green (see Figure 6).
  - b. Refer to the troubleshooting section if the power module is not detected automatically.



**Figure 6: Green Indicator Shows Successful Connection**

- The Register Control menu will appear in the middle panel. The values stored in the registers of the module are read automatically (see Figure 7).



**Figure 7: Values Displayed in the Register of the Module**

- Change the register value as desired. A valid input must be entered. Otherwise, an alert will appear, and the entered value will not be accepted (see Figure 8).



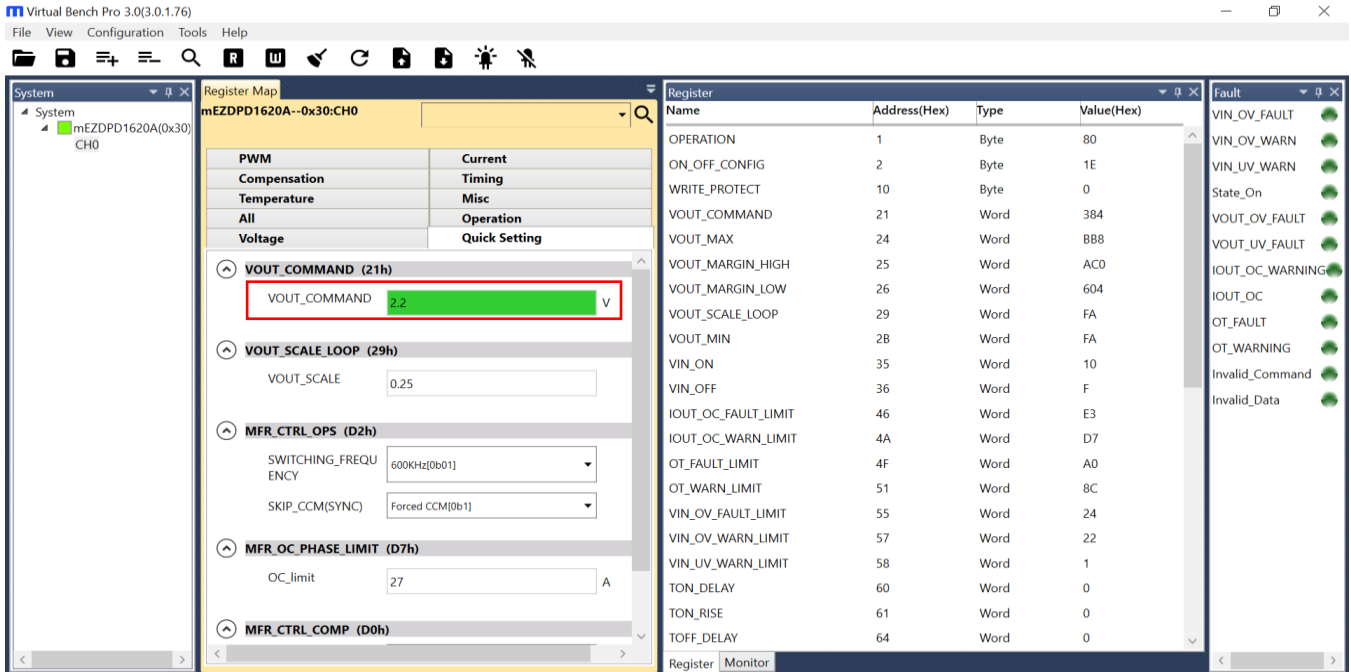


Figure 8: Enter Desired Values in the Register

4. Click the “Write to Chip” button to write values to the register (see Figure 9).

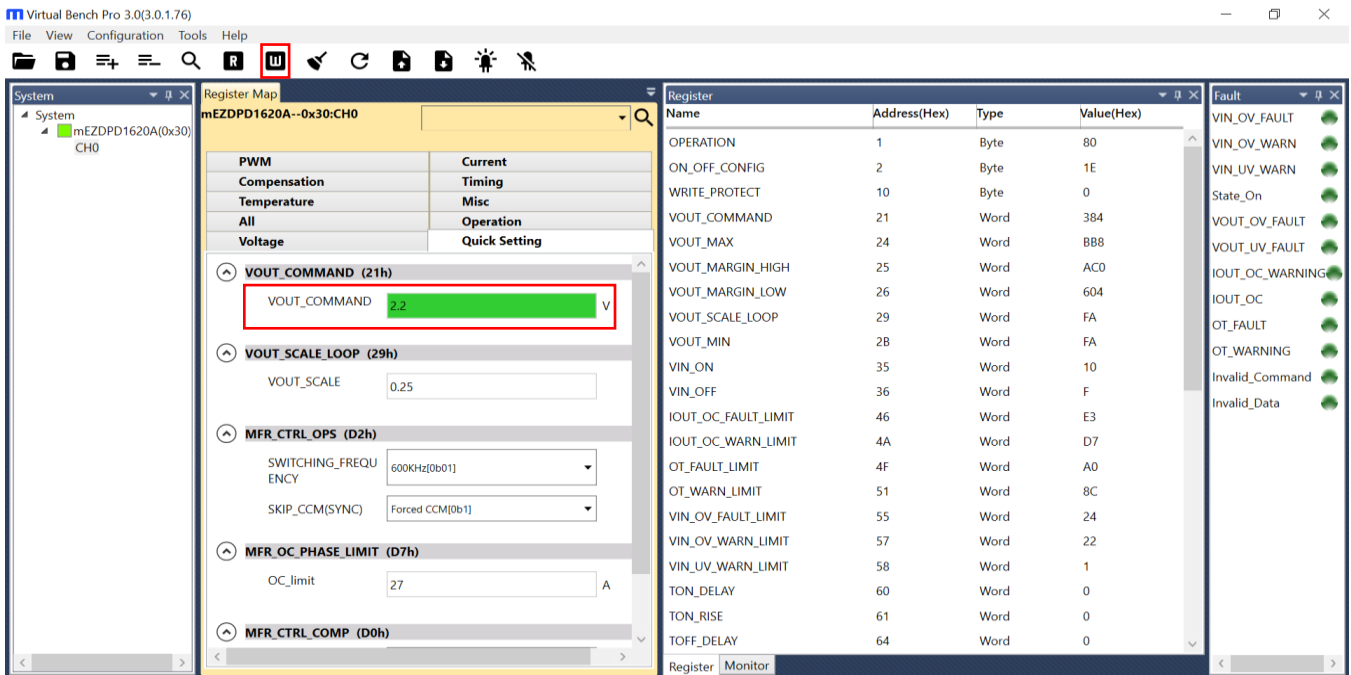


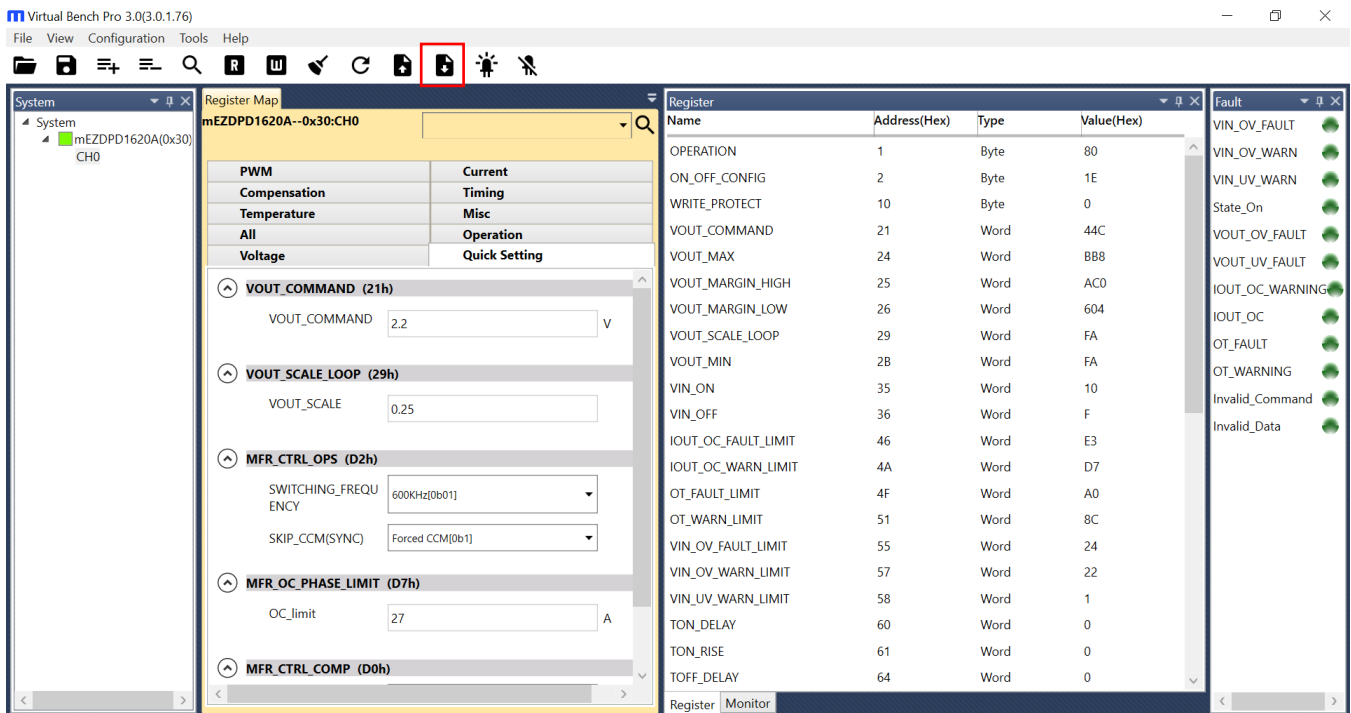
Figure 9: Write Values Steps Shown in Table

*⚠ Note that the values written to the registers will NOT be saved once the EVB is powered down unless they are written into the MTP memory (see Section 3.4).*

### 3.4 Device Programming Instructions

The MTP memory of the mEZDPD1620A can be custom programmed. Follow the instructions below to create and export customized configurations:

1. Connect the EVB to a PC following the steps in Section 3.3.
2. Set the register values as desired, and upload them into the registers (steps 3-4 in Section 3.3).
3. Increase the input voltage of the EVB to about 7V to 16V.
4. Click the “Write to MTP” button and wait until the writing action is completed (see Figure 10).
5. Turn off the power supply to the EVB, wait 3 seconds, and turn it on for the new configuration to take effect.



**Figure 10: Write to the MTP Memory**

6. Export the configuration by clicking “Save Project.” Select the desired directory for the exported file and click “OK.” New configurations will be saved in a text file (see Figure 11).

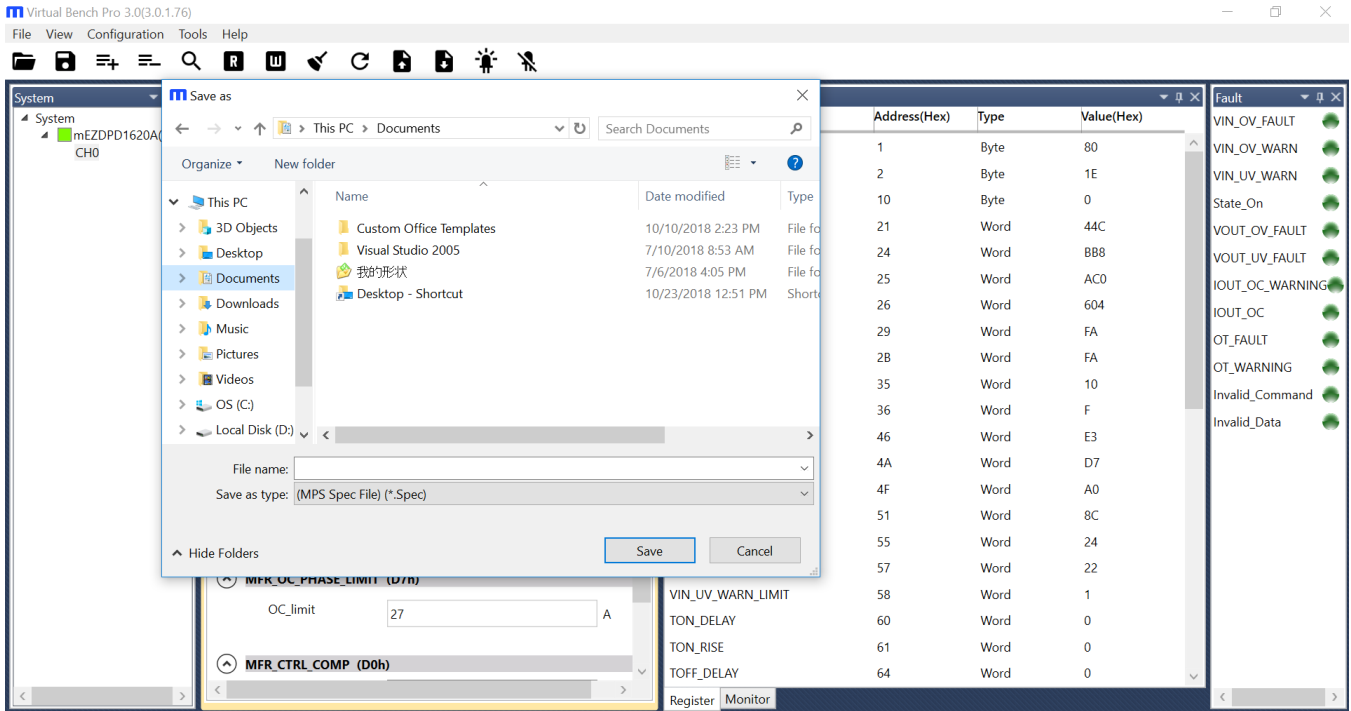


Figure 11: Select the Directory for Configuration File

### 3.5 Troubleshooting Tips

*Note: USBI2C-02 and USBI2C-01 drivers are not compatible. USBI2C-02 uses USBXpress and USBI2C-01 uses Cyusb3. USBI2C-02 is the recommended device for the PMBus and I<sup>2</sup>C.*

#### EVKT-USBI2C-01

If the USBI2C-01 driver is not properly installed, manual installation is required. Follow the steps below:

1. Open the Device Manager and select “Update Driver Software” (see Figure 12).
2. Click “Browse My Computer for Driver Software,” find the downloaded driver, and install.

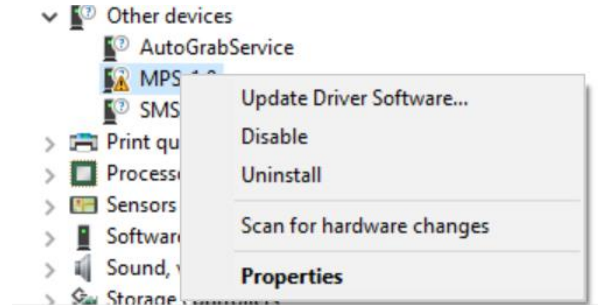
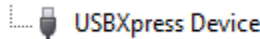


Figure 12: Updating the Driver Software

#### EVKT-USBI2C-02

If the USBI2C-02 driver is not properly installed, manual installation is required. Follow the steps below:

*Note: Check the driver version. Find “USBXpress Device” in the Device Manager under USB controllers.*



*Right-click and view properties. Check to make sure the driver version matches the newest version (see Figure 13).*

1. Install the correct USBXpress “.exe” file.  
 Choose either the 32-bit or 64-bit operating system:  
 32-bit: USBXpressInstaller\_x86.exe  
 64-bit: USBXpressInstaller\_x64.exe
2. Connect the EVKT-USBI2C-02 communication interface to the PC with the USB cable.

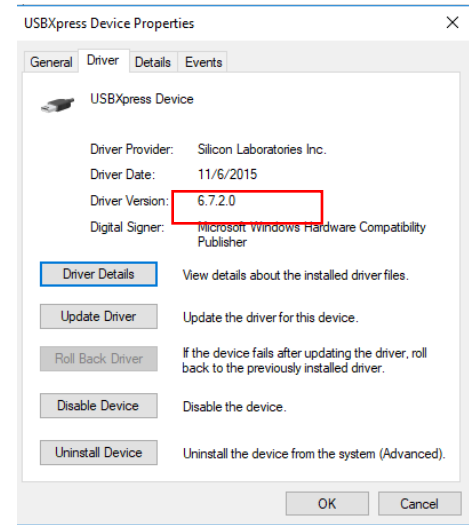


Figure 13: Correct Driver Version

#### EVB Connection Issue

If the power module is not automatically detected, follow the steps below to troubleshoot:

1. Click on “Tools” → “PMBus Tool” → “Scan,” then read the value of the slave (0x).
2. Right-click the “mEZDPD1620A” on the left panel. Click “Change Chip Address” and enter the value of “slave (0x)” (see Figure 14). The module will be added manually.

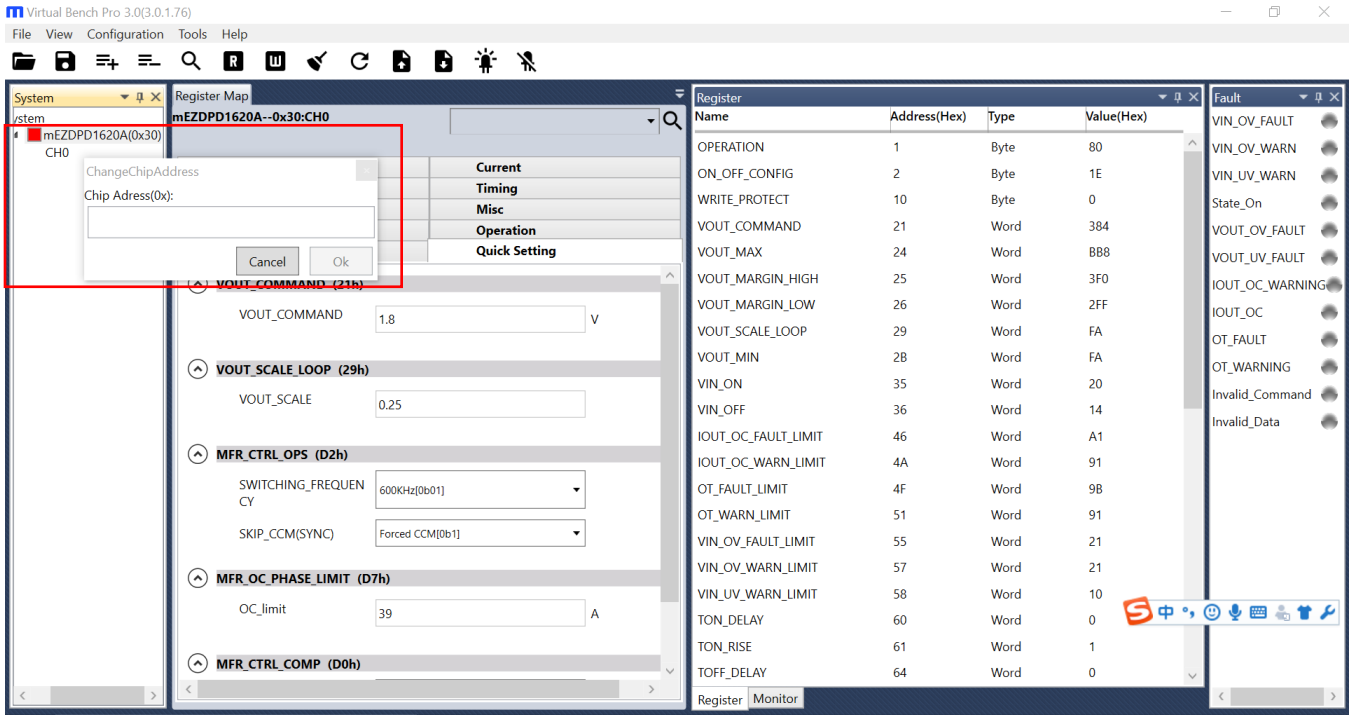


Figure 14: Change the Chip Address and the Indicator Turns Green to Show Successful Connection

3. If the power module still is not detected, check the connections between the EVB, communication interface, and PC. Re-plug the USB into the computer and restart the GUI.

### No Output Voltage

The mEZDPD1620A offers many protection features. If any of the protection functions are triggered, the power module may latch off. The indicator on the right panel indicates the specific fault. A red indicator signifies that a fault has been triggered. Refer to the mEZDPD1620A datasheet for details regarding specific faults.

## Section 4. PMBUS Interface

The power management bus (PMBus) is a two-wire, bidirectional serial interface, consisting of a data line (SDA) and a clock line (SCL). The lines are externally pulled to a bus voltage when they are idle. Connecting to the line, a master device generates the SCL signal and device address, and arranges the communication sequence. It is based on the principles of I<sup>2</sup>C operation.

The mEZDPD1620A interface is a PMBus slave, which supports both standard mode (100kHz) and fast mode (400kHz and 1000KHz). The PMBus interface adds flexibility to the power supply solution.

## Section 5. Ordering Information

The components of the evaluation kit can be purchased separately, depending on user needs.

Part Number	Description
PKT-mEZDPD1620A	Complete evaluation kit
<b>Contents of PKT-mEZDPD1620A</b>	
EVmEZDPD1620A-00A	mEZDPD1620A evaluation board
EVKT-USBI2C-02	Includes one USB to I <sup>2</sup> C communication interface, one USB Male A to B cable, one 10-pin ribbon cable, and one 3-pin ribbon cable
mEZDPD1620A-0000	mEZDPD1620A module with default configuration

**Order directly from [MonolithicPower.com](http://MonolithicPower.com) or our distributors.**