User Guide

mEZDPD3603A Evaluation Kit (PKT-mEZDPD3603A)

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Overview

Introduction

The PKT-mEZDPD3603A is an evaluation kit for mEZDPD3603A. The mEZDPD3603A is a programmable DC/DC power supply up to 3A and 0.6 - 12V output voltage. This part has a multiple-time programmable memory and a simple programmable GUI.

The GUI includes a modeling software for verification of the part performance. During bench evaluations, different configurations can be obtained easily through the I2C interface. This allows users to optimize each output for their requirements. All non-programmed parts (mEZDPD3603A-XXXX) parts require only current and output voltage values to begin the evaluation. The other parameters, as defined in the GUI, have default settings that can be modified by the user, if needed.

Kit Contents

PKT- mEZDPD3603A Kit contents: (Items below can be ordered separately).

#	Part Number	Item	Quantity
1	EVmEZDPD3603A-00A	mEZDPD3603A evaluation board	1
2	mEZDPD3603A-0001	mEZDPD3603A modules with default configuration	1
3	EVKT-USBI2C-02	USB to I2C communication interface device kit, includes one USB to I2C communication interface device, USB cable, and ribbon cable	1
4	Tdrive-mEZDPD3603A	USB thumb drive that stores the GUI installation file and supplemental documents	1

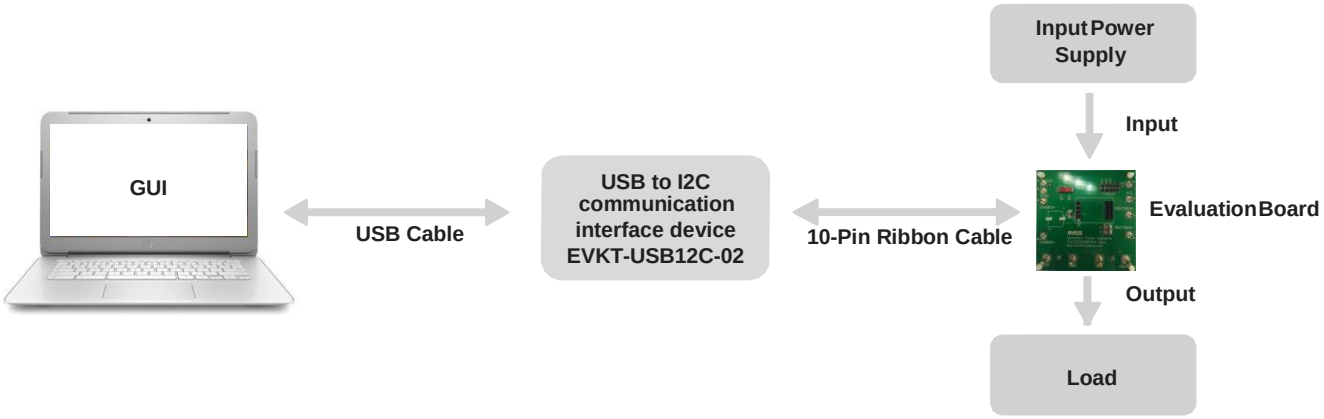


Figure 1: PKT-MEZDPD3603A Evaluation Kit Set-Up

Features and Benefits

The mEZDPD3603A is highly customizable. Users can program the module via the MPS I2C GUI and one-time programming (OTP).

⚠ All changes made in I2C mode will NOT be retained once the EVB is powered down.
⚠ Information written in OTP mode CANNOT be changed.

Features adjustable under each method are outlined below.

I2C	OTP
• Output voltage • Output current limit • Switching frequency • Multiple protection modes • Compensation	• Output voltage • Output current limit • Switching frequency • Multiple protection modes • Compensation

Kit Specifications

Features	Specification
Supply for board (V_{IN})	4.5V - 36V
Operating input voltage	4.5V - 36V
Operating systems supported	Windows XP, 7 or later
System requirements	Minimum 17.6 MB free
GUI software	8 register controls: output voltage, mode, compensation, switching, VIN/EN threshold, power good, SS time, protection
EVB size (L x W)	6.4cm x 6.4cm

Section 1. Hardware Specifications

1.1 Personal Computer Requirements

The following must be minimally met to use the PKT-mEZDPD3603A.

- Operating system of Windows XP, 7 or later
- Net Framework 4.0
- PC with a minimum of one available USB port
- At least 17.6 MB of free space

1.2 EVmEZDPD3603A-00A Specifications

The EVmEZDPD3603A-00A is an evaluation board for the mEZDPD3603A. For more information, please refer to the EVmEZDPD3603A-00A datasheet.

Figure 2: EVmEZDPD3603A-00A Evaluation Board

Feature	Specification
Supply for Evaluation Board	4.5V - 36V
Operating Input Voltage	4.5V - 36V
EVB Size (L x W)	6.4cm x 6.4cm

1.3 EVKT-USBI2C-02 Specifications

The EVKT-USBI2C-02 refers to the communication interface device, which connects the EVB, the PC, and its supporting accessories. It provides I2C and PMBus capabilities. Together with MPS Virtual Bench Pro and GUI tools, 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 3: EVKT-USBI2C-02 Communication Interface Device

Section 2. Software Requirements

2.1 Software Installation Procedure

Programming occurs through the MPS I2C GUI. Follow the instructions below to install the software.

Note: In the near future, this software can be downloaded from the MPS website. For now, it is provided on a USB thumb drive.

1. Plug the USB thumb drive into the computer using any available USB port.
2. Browse to the folder containing the thumb drive contents.
3. Double click the .exe file to open the set-up guide (see Figure 4).
4. Follow the prompts in the set-up guide.
5. Wait for status screen to verify that installation is complete.

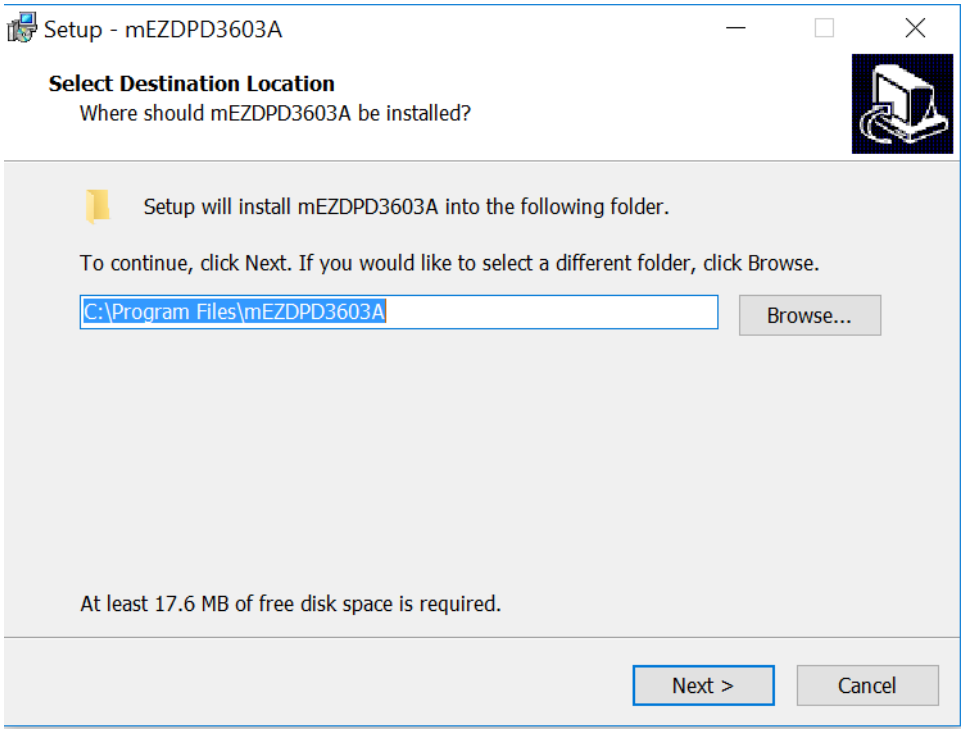


Figure 4: MPS I²C GUI Set-Up Guide

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. Locate the proper wires to connect the EVB to the EVKT-USBI2C-02 communication interface device.
2. Connect SCL, SDA, and GND (see Figure 5). If needed, refer to the datasheet for further clarification.
3. Use the USB cable to connect the EVKT-USBI2C-02 communication interface device to the PC, and follow the instructions below to set up the EVB.

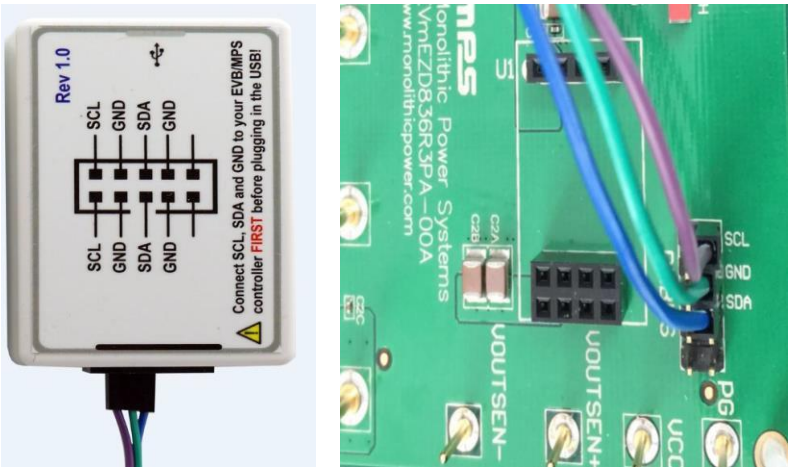


Figure 5: EVB to MPS I²C Communication Interface Device Wire Connection

3.2 Powering up the EVB

1. Connect the positive and negative terminals of the load to the VOUT and GND pins, respectively.
2. Preset the power supply output between 4.5V and 36V and turn off the power supply.
3. Connect the positive and negative terminals of the power supply output to the VIN and GND pins, respectively.
4. Turn the power supply on.

3.3 Software Set-Up

After connecting the hardware according to steps above, follow the steps below to use the GUI software.

1. Start the software. It will display the version (see Figure 6).

Figure 6: Appearance after Starting the Software

2. Click the "Direct Programming Mode" button. The register control menu will appear on the version (see Figure 7 and Figure 8).

Figure 7: Program Button

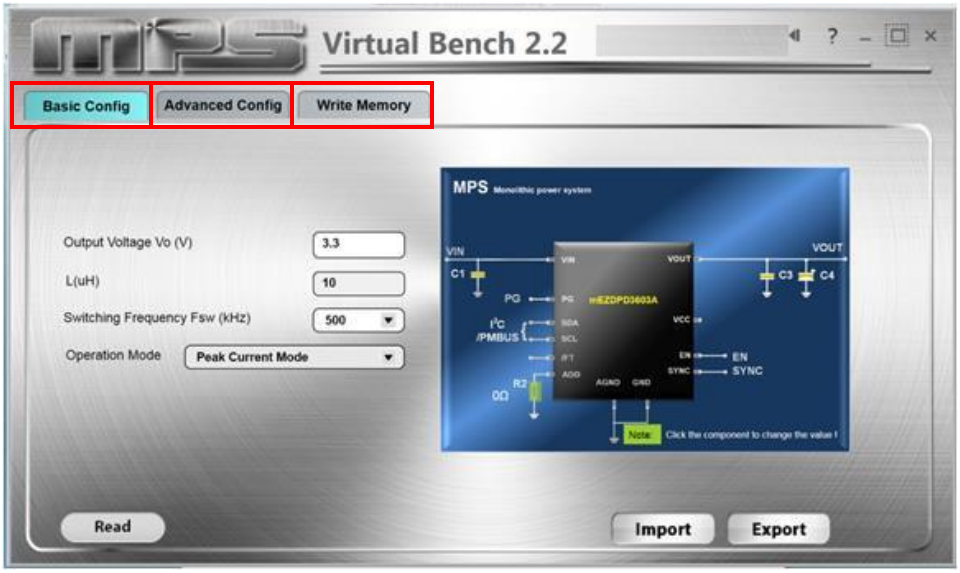


Figure 8: Values from I2C Shown in Table

3. Find the item you want to change and write or select the desired value from the drop-down menu (see Figure 9).

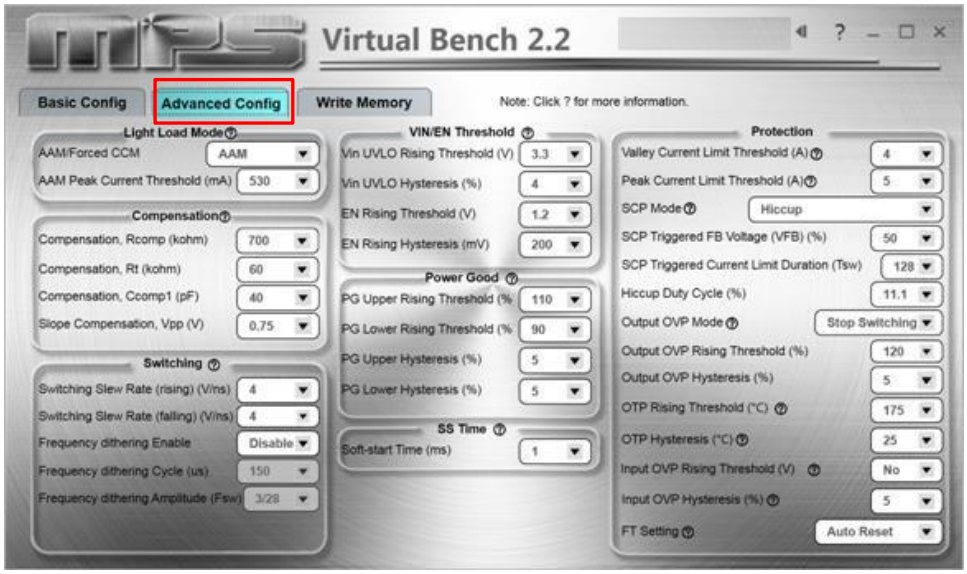


Figure 9: Values from I2C Shown in Table

4. Click the “RAM Mode” button and then click the "write" button to update values (see Figure 10). A successful writing is shown in Figure 11. If the writing is wrong, check your connection and restart your writing.

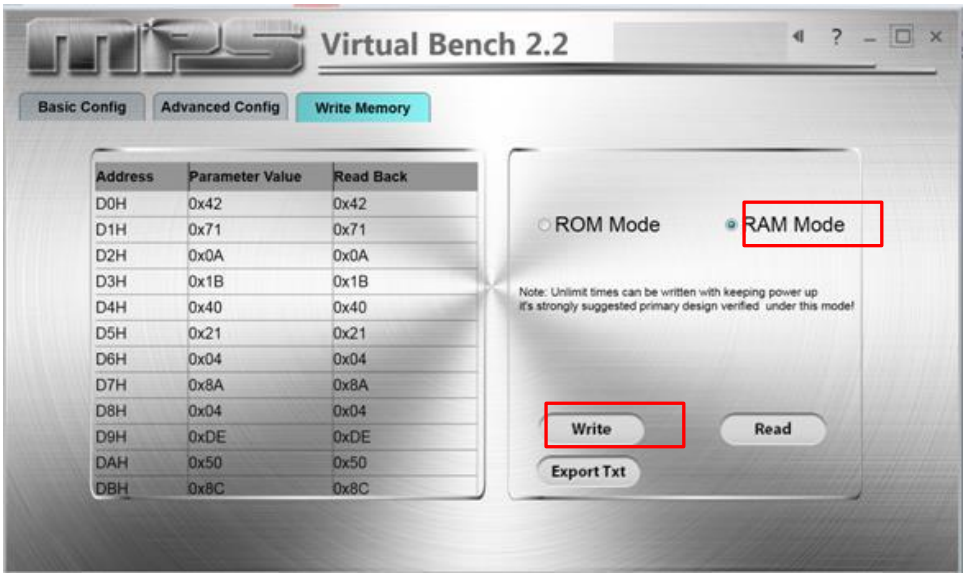


Figure 10: RAM Mode Write Version

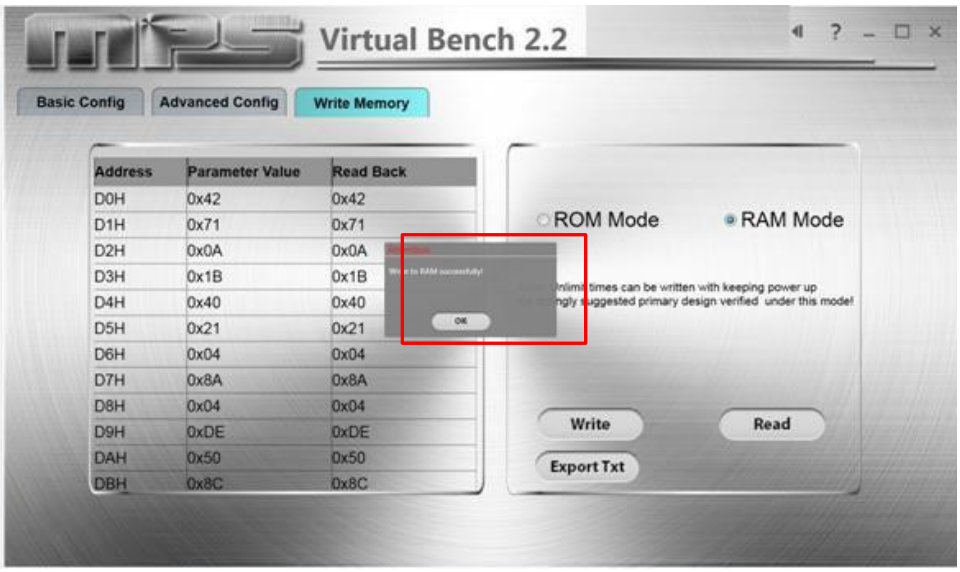


Figure 11: RAM Mode Write Successfully

5. Click the "Read" button to read back the values (see Figure 12 and Figure 13).

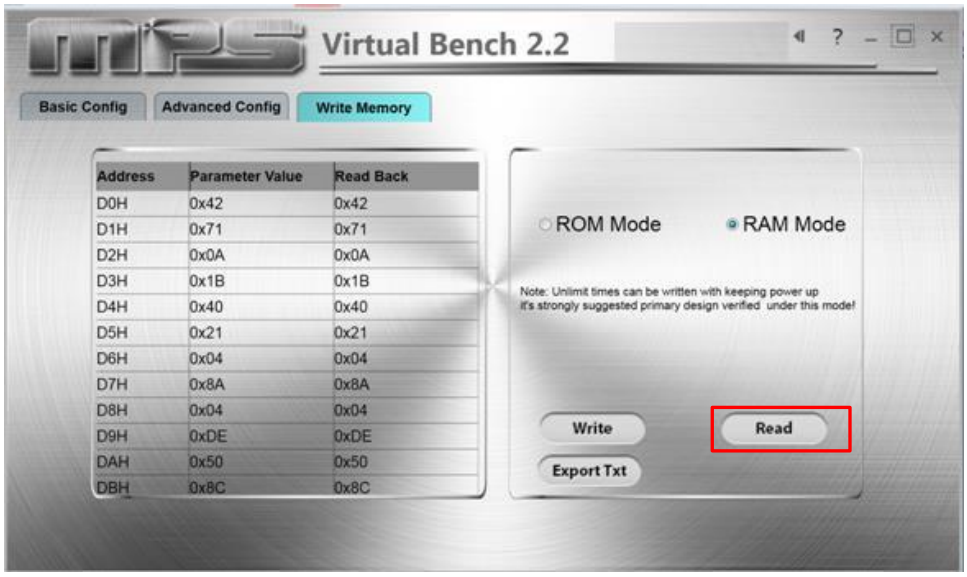


Figure 12: Read Version

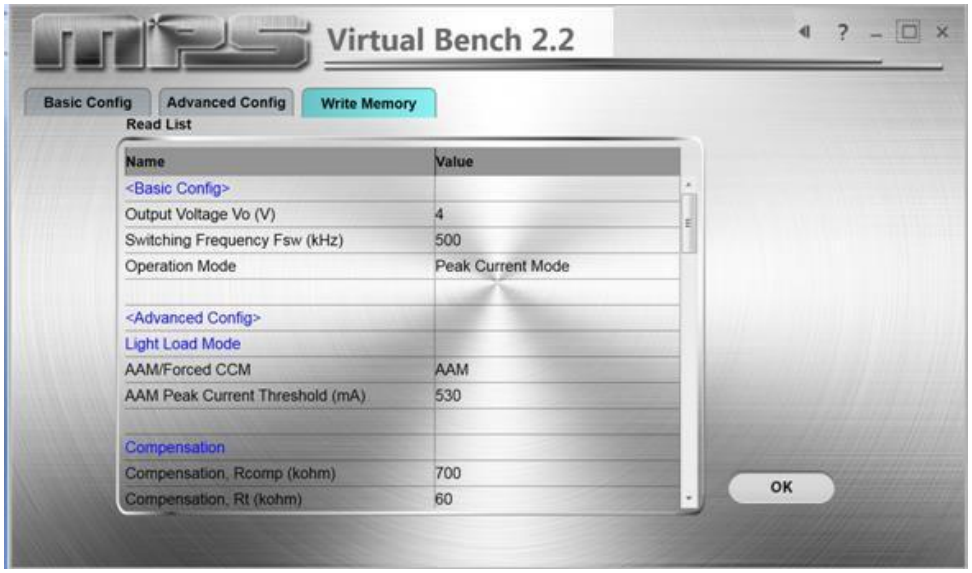


Figure 13: Read Back Data

6. Click the "Export" button to export the data of your setting (see Figure 14).

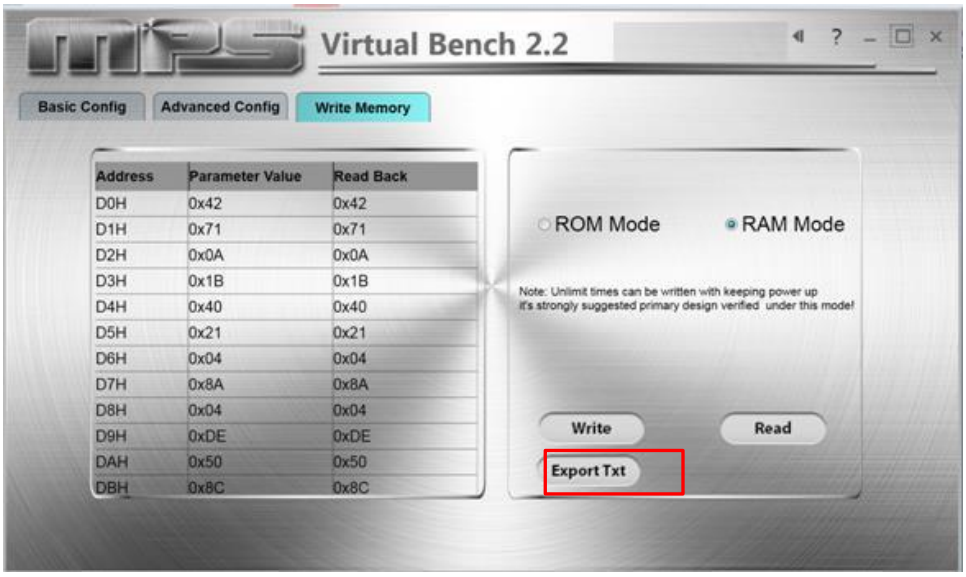


Figure 14: Export Version

⚠ All changes made via I2C will be restored to default values once the EVB is powered down.

3.4 Device Programming Instructions

The mEZDPD3603A can be custom-programmed. Follow the instructions below to create and export customized configurations.

1. Using a computer, open the MPS GUI software. Make sure you have powered on the EVB.
2. Ensure connection between the EVB and computer.
3. Set the OTP values the same as the I2C setting.

   After setting your optional values, click "Rom Mode" and click the "write" button. The writing is finished (see Figure 15 and Figure 16).

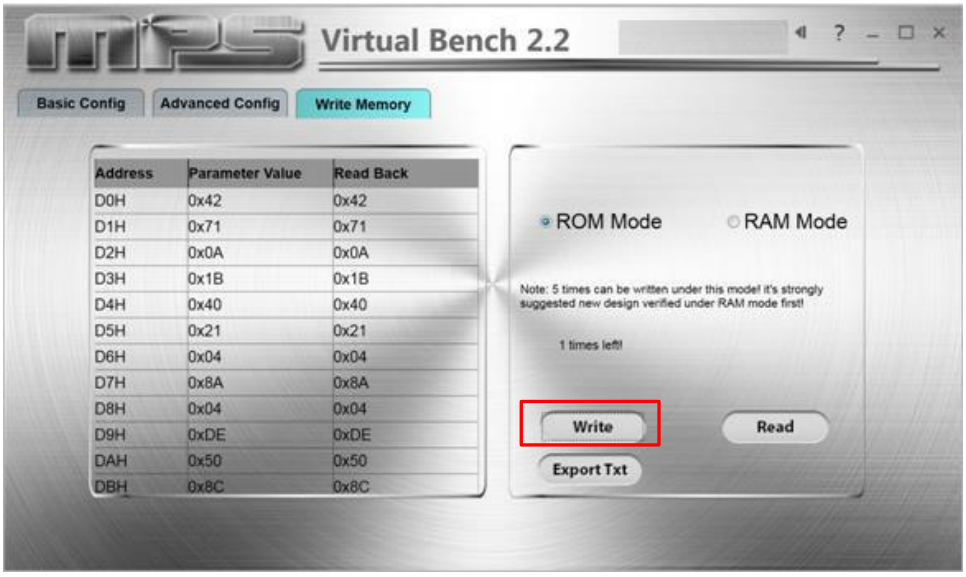


Figure 15: OTP Mode Write

Note: you must set 8V < VIN < 36V.

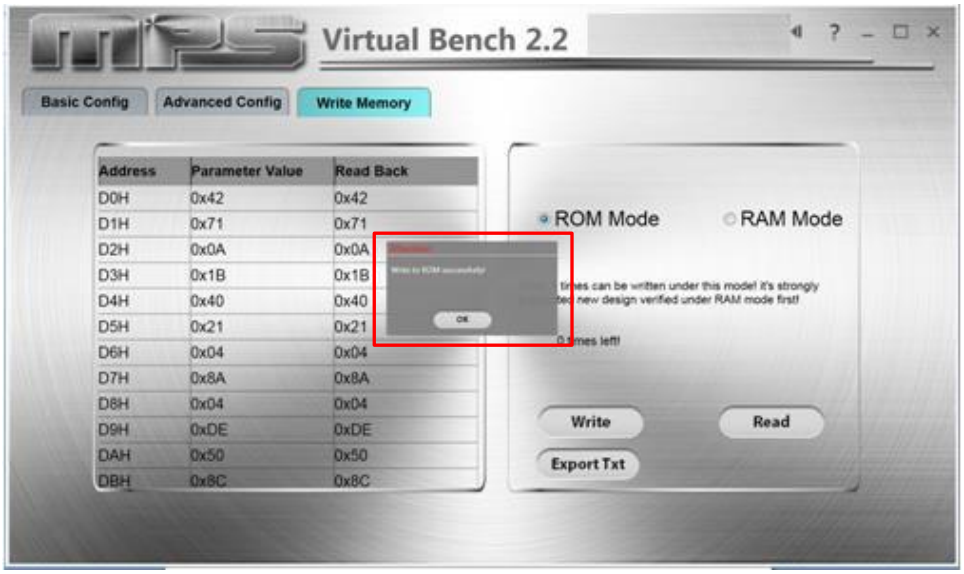


Figure 16: OTP Successful Write

4. Turn off power and restart.

The remaining steps are optional and instruct how to check that new configurations have been programmed.

Notes:

- Unlike in I2C, not all of the configurations you set in OTP mode will be displayed until you write to mZEDPD3603A and cycle the power.
- After OTP, users are still able to change values using the I2C.
- If you try to perform OTP on a previously programmed device, the GUI software will allow you to proceed normally. However, your configurations will NOT be saved.

3.5 Troubleshooting Tips

Note: USBI2C-02 and USBI2C-01 drivers are not compatible. USBI2C-02 uses USBXpress and USBI2C uses Cyusb3. USBI2C-02 is the recommended device for MPS PMBus and I2C.

EVKT-USBI2C-01

In case that 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 17).
2. Click “Browse my computer for driver software”, find the driver located on thumb drive and install.

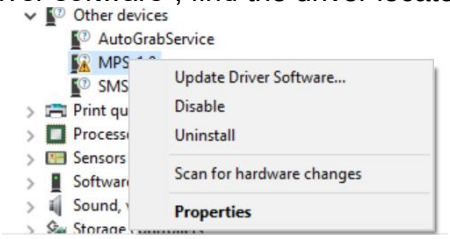
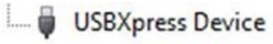


Figure 17

EVKT-USBI2C-02

In the case that the USBI2C-02 driver is not properly installed, manual installation is required. Follow the steps below.

Note: Check 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 18)

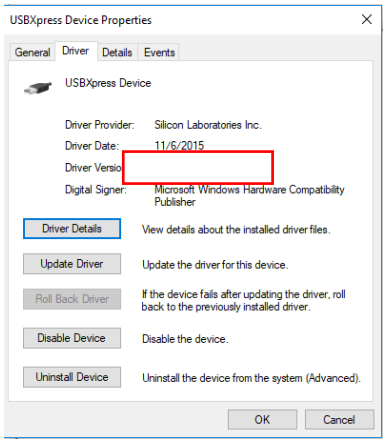


Figure 18

1. Browse the thumb drive contents and open the driver's folder.
2. Install the correct USBXpress ".exe" file
   Choose either 32 bit or 64 bit operating system.
   32-bit: USBXpressInstaller_x86.exe
   64-bit: USBXpressInstaller_x64.exe
3. Connect the EVKT-USBI2C-02 Dongle to the PC with the USB cable.

- **No Supply**

The module input pin has an under-voltage lockout (UVLO) detection circuit. If the input voltage (VIN) is lower than the UVLO rising threshold, the module's functions are disabled.

- **Shutdown Event**

If the module detects that the input voltage is lower than the UVLO falling threshold (enter no supply state) or over- temperature protection is triggered (enter power off state), the module switches to no supply state or power-off state, regardless of the current state.

- **Thermal Recovery**

If the mEZDPD3603A is in a power-off state due to the die temperature exceeding the thermal protection threshold, the part enters a power-on sequence when the die's temperature decreases.

- **Shutdown Sequence**

When the input voltage is lower than the UVLO falling threshold or the IC is over-temperature, the part enters the shutdown sequence directly.