

User Guide

MP8862 Evaluation Kit (EVKT-MP8862)

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Overview

Introduction

The EVKT-MP8862 is an evaluation kit for the MP8862, a synchronous, 4-switch, integrated, buck-boost converter capable of regulating the output voltage from a wide 2.8V to 22V input voltage range with high efficiency. The MP8862 provides flexible system configurations via the I2C. This kit allows for quick evaluation of the MP8862, supporting a wide range of designs.

Kit Contents

EVKT-MP8862 kit contents: (Items listed below can be ordered separately, GUI installation file and supplemental documents can be downloaded from the MPS website)

#	Part Number	Item	Quantity
1	EV8862-Q-00A	MP8862GQ-0000 evaluation board	1
2	EVKT-USBI2C-02	Includes one USB to I2C communication interface device, one USB male A to B cable, one 3-pin ribbon cable	1



Figure 1: EVKT-MP8862 Evaluation Kit Set-Up

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Features and Benefits

The MP8862 is highly customizable. Users can configure the MP8862 via the MPS I2C GUI.

⚠ *All changes made in I2C mode will NOT be retained once the EVB is powered down.*

Adjustable features are outlined below.

I2C
• Output voltage setting • PG delay enable • Output current limit • Part enable • OCP and OVP mode • Discharge enable • Mode • Frequency • Line drop compensation • Soft-start time • Read status and ID • Interrupt • Mask

Kit Specifications

Features	Specification
Operating input voltage	2.8V - 22V
Operating systems supported	Windows 7 or later
System requirements	Minimum 22.2 MB free
GUI software	5 register controls: Interrupt, Vout, current, control, mask
EVB size (L x W)	6.35cm x 6.35cm

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Section 1. Hardware Specifications

1.1 Personal Computer Requirements

The following must be minimally met to use the EVKT-MP8862.

- Operating system of Windows 7 or later
- Net Framework 4.0
- PC with a minimum of one available USB port
- At least 22.2 MB of free space

1.2 EV8862-Q-00A Specifications

The EV8862-Q-00A is an evaluation board for the MP8862GQ-0000. For more information, please refer to the EV8862-Q-00A datasheet.

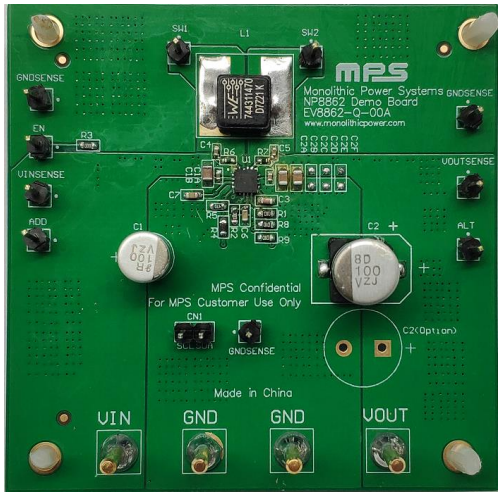


Figure 2: EV8862-Q-00A Evaluation Board

Feature	Specification
Operating input voltage	2.8V - 22V
EVB size (L x W)	6.35cm x 6.35cm

1.3 EVKT-USBI2C-02 Specifications

The EVKT-USBI2C-02 refers to the USB to I2C 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

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Section 2. Software Requirements

2.1 Software Installation Procedure

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

1. Double click the .exe file to open the set-up guide (see Figure 4).
2. Follow the prompts in the set-up guide.
3. Wait for status screen to verify that installation is complete (see Figure 5).

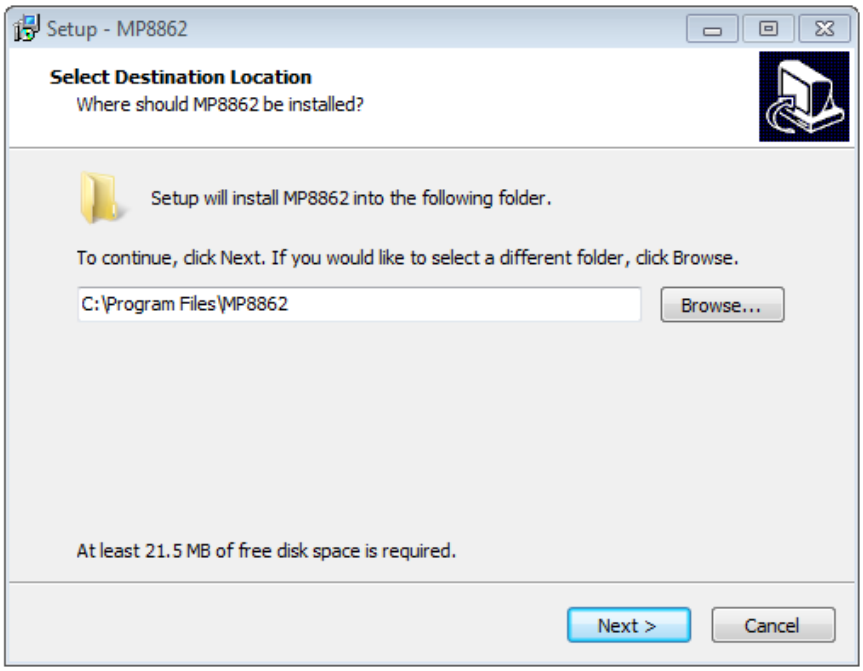


Figure 4: MPS I²C GUI Set-Up Guide

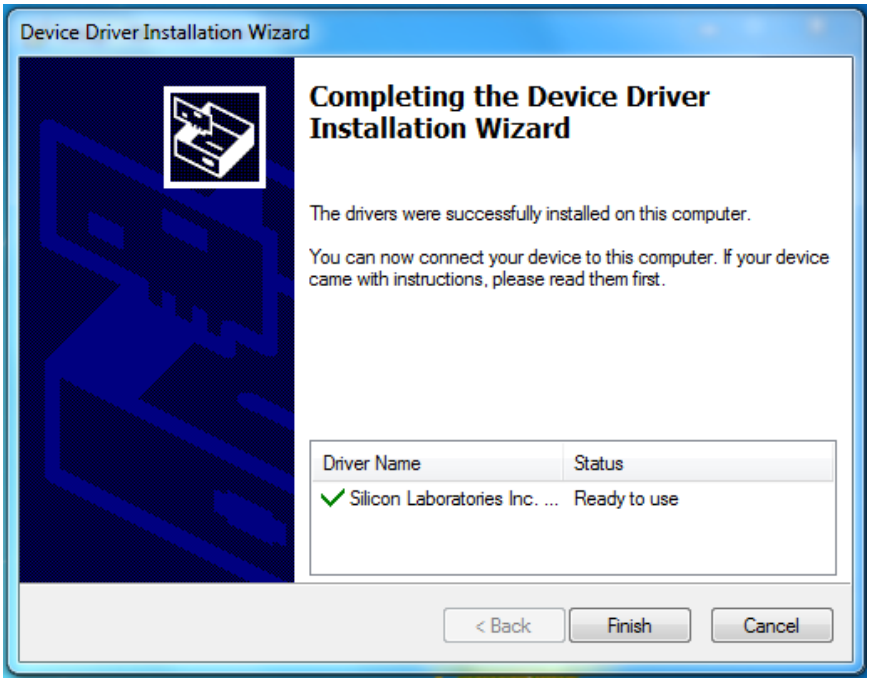


Figure 5: Driver Set-Up Success

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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 6). 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 6: 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 2.8V and 22V, and then 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, the board will start up automatically with the default settings.

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 check the EVB connection automatically.
   - If the connection is successful, the address will be listed in the “Slave Address” (see Figure 7).

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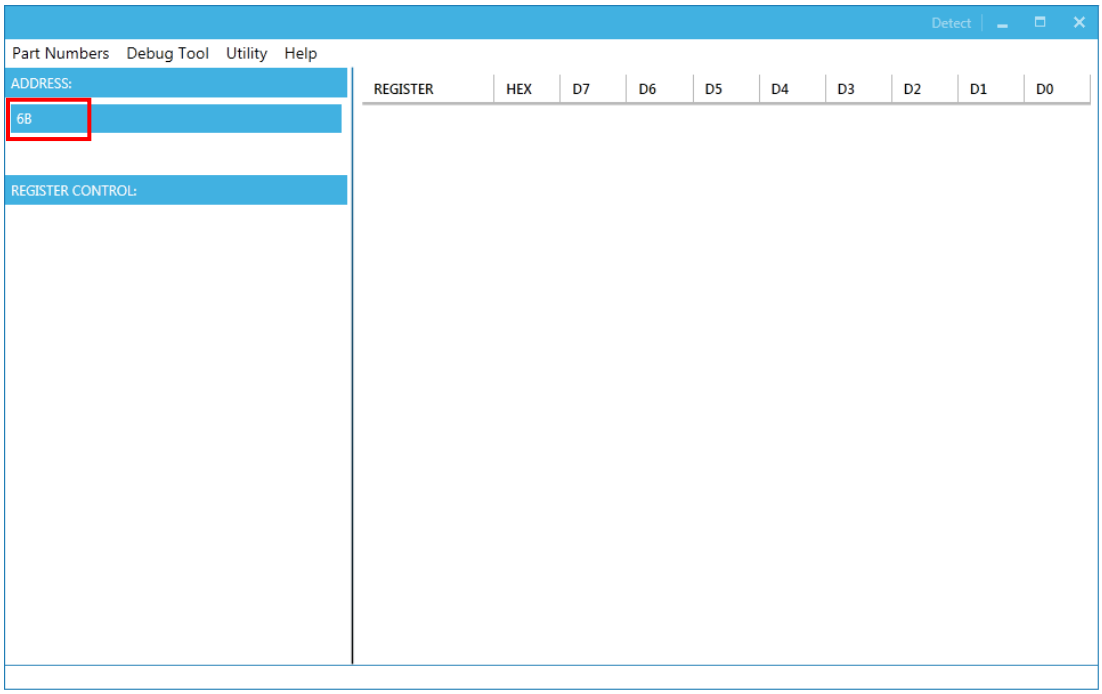


Figure 7: Appearance of Address Shows Successful Connection

- If not, one of two warnings will appear at the bottom:
  1) "No Slave Found. Please Check the Connection!" This means that the evaluation board is not connected (see Figure 8).
  2) "Device is not available. Please check the Connection!" This means that the USB I2C communication interface device is not connected (see Figure 9).

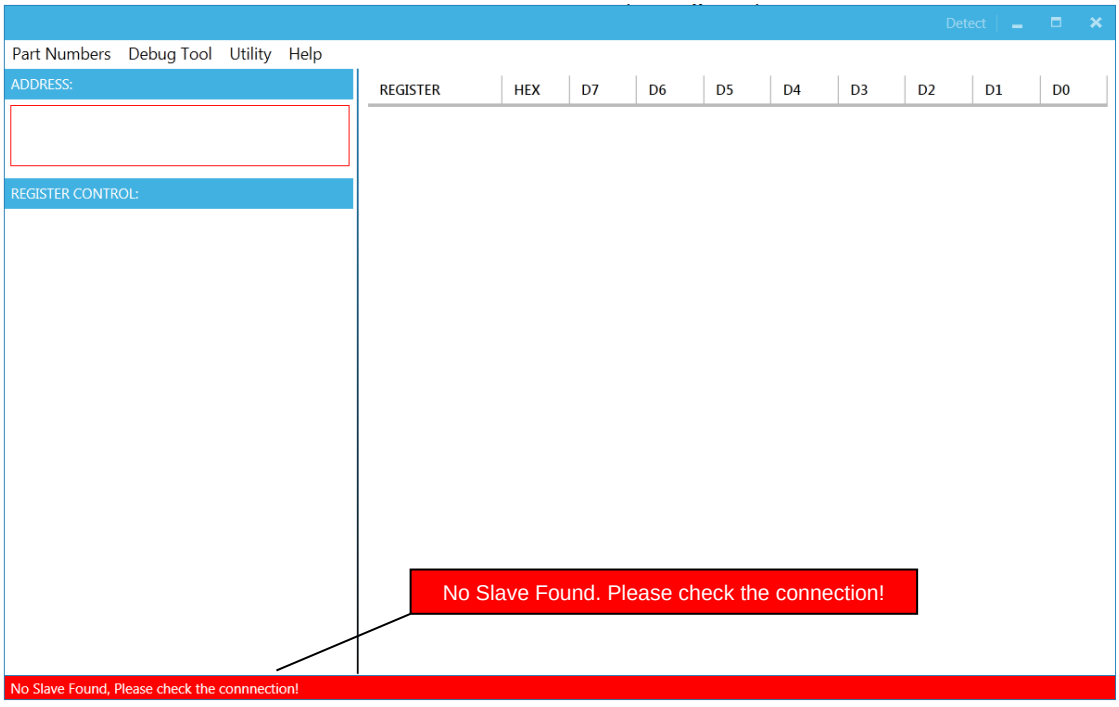


Figure 8: Warning Indicates Unsuccessful Connection – Evaluation Board Not Connected

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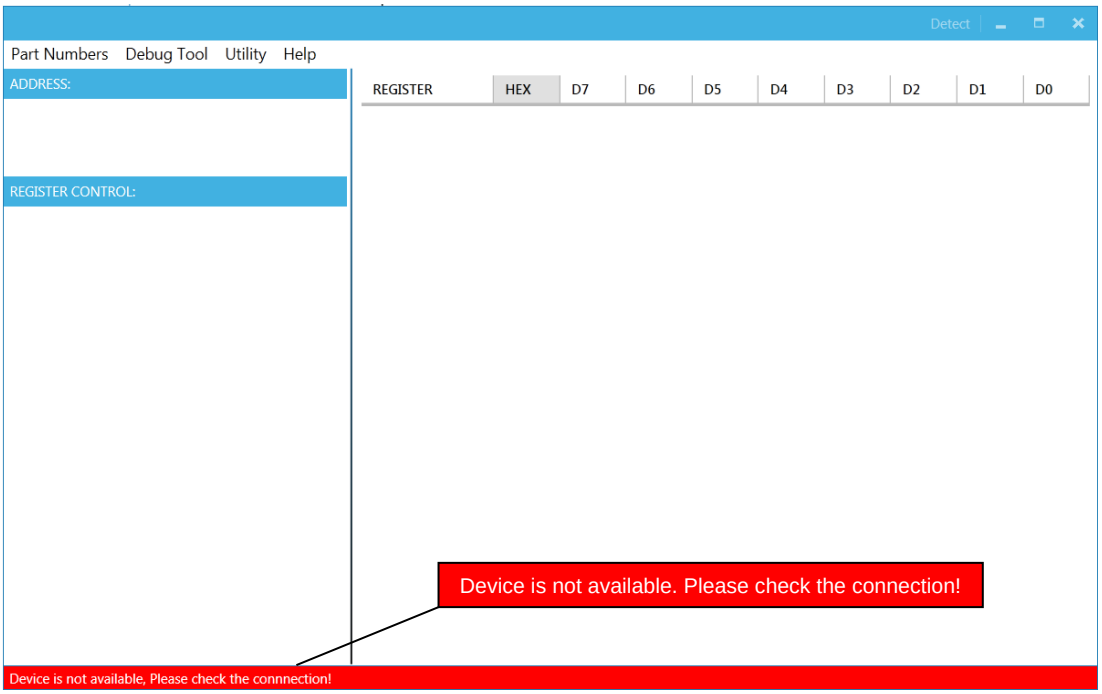


Figure 9: Warning Indicates Unsuccessful Connection – USBI2C Communication Interface Device is Not Connected

2. If the connection is successful, proceed to Step 3. Otherwise, check the connections between the EVB, communication interface device, and PC. Re-plug the USB into the computer and restart the GUI.
3. Select MP8862 from under Part Numbers. The Register Control menu will appear on the left side. The I2C register values will be read automatically and displayed on the right (see Figure 10).

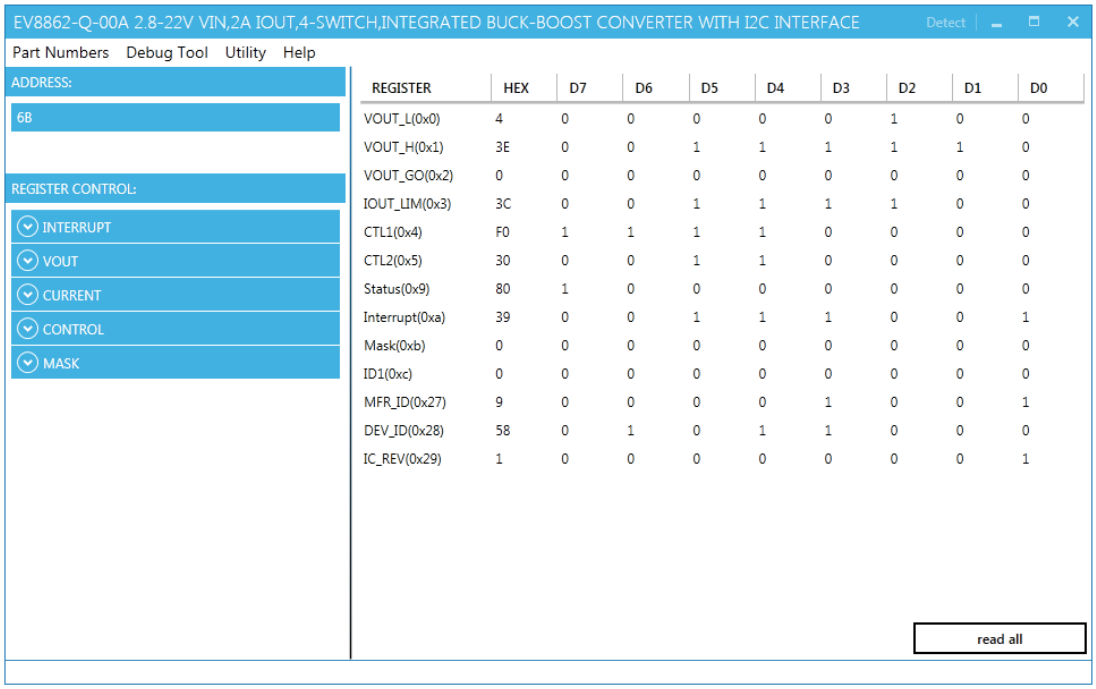


Figure 10: Values from I2C Shown in Table

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4. Find the item you want to change and select the desired value from the drop-down menu.
5. Click the “Read All” button to update values. The changed information of the item will appear on the right side (see Figure 11).

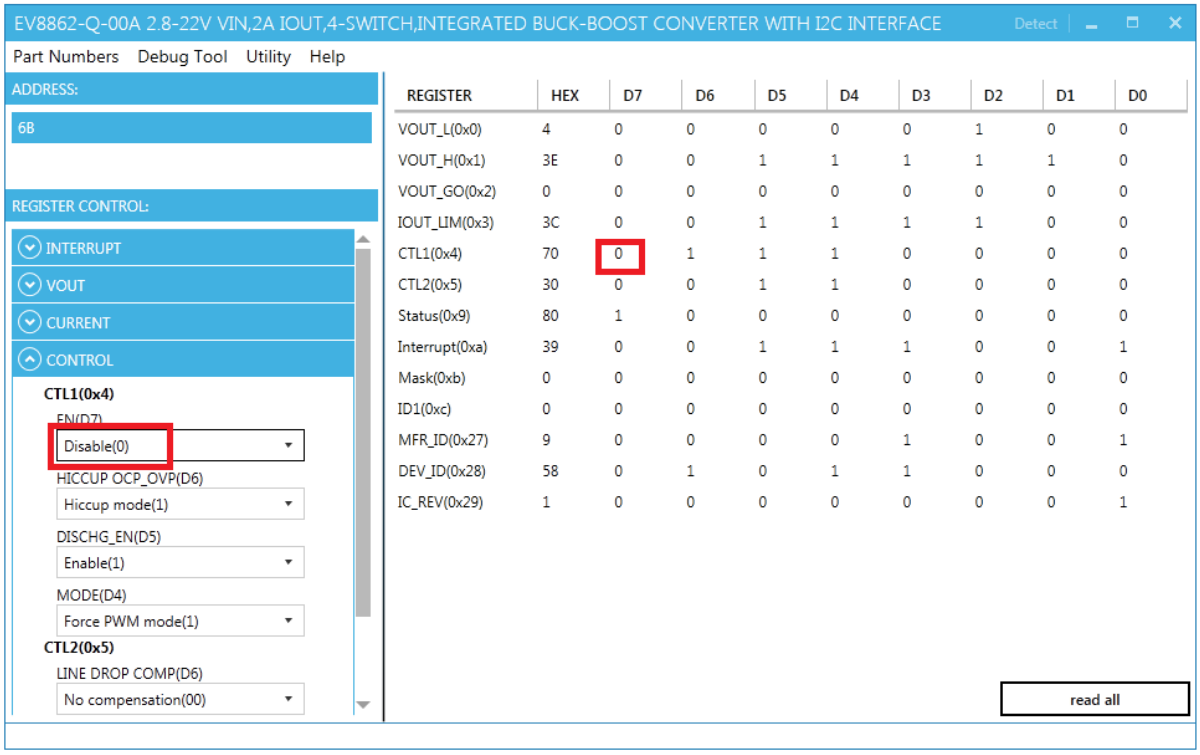


Figure 11: Refer to Datasheet to Translate 0’s and 1’s

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

3.4 Troubleshooting Tips

- **EVKT-USBI2C-02 Driver Problem**

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 12).
2. Click “Browse my computer for driver software”.
3. Find the driver and install.

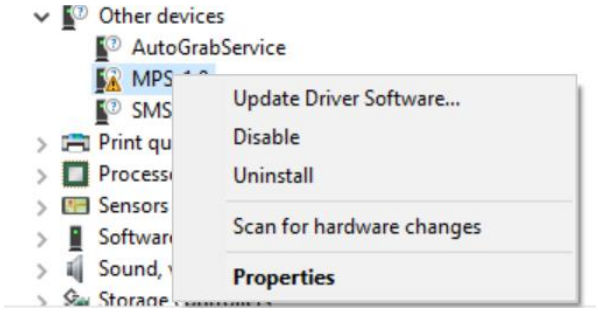


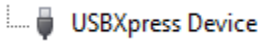
Figure 12: Updating the Driver Software

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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 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 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 device to the PC with the USB cable.

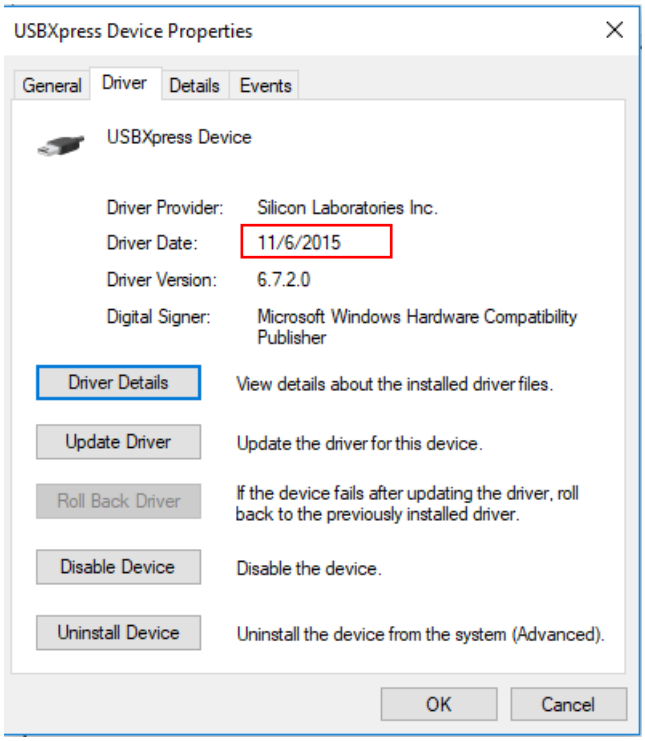


Figure 13: Updating the Driver Software

- **No Supply**

The MP8862's input pin has an under-voltage lockout (UVLO) detection circuit. If the input voltage (VIN) is lower than the UVLO falling threshold, the MP8862's functions are disabled.

- **Shutdown Event**

Three events can shut down the chip: EN low, V_{IN} low, and thermal shutdown. During shutdown, the signaling path is blocked to avoid any fault triggering. Then V_{COMP} and the internal supply rail are pulled down. The floating driver is not subject to this shutdown command.

- **Thermal Recovery**

When the silicon die temperature exceeds 150°C, the entire chip shuts down. When the temperature falls below its lower threshold (typically 130°C), the chip is enabled.

- **OCP and OVP Mode**

When OCP or OVP are triggered, the MP8862 enters hiccup mode or latch-off mode. In hiccup mode, the MP8862 stops switching and recovers automatically with 12.5% duty cycles. In latch-off mode, the MP8862 stops switching until the IC restarts (V_{IN}, EN, or EN bit toggle). For MP8862GQ-0000, the default mode is hiccup mode.

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Section 4. Ordering Information

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

Part Number	Description
EVKT-MP8862	Complete evaluation kit
Contents of EVKT-MP8862	
EV8862-Q-00A	MP8862GQ-0000 evaluation board
EVKT-USBI2C-02	Includes one USB to I2C communication interface device, one USB male A to B cable, one 3-in ribbon cable

Order directly from MonolithicPower.com or our distributors.

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