



## **User Guide**

**MP2980 Evaluation Kit (EVKT-MP2980)**

## Table of Contents

Overview.....	3
Introduction .....	3
Kit Contents .....	3
Features and Benefits .....	4
Kit Specifications.....	4
Section 1. Hardware Specifications.....	5
1.1 Personal Computer Requirements .....	5
1.2 EV2980-R-00A Specifications .....	5
1.3 EVKT-USB12C-02 Specifications.....	5
Section 2. Software Requirements.....	6
2.1 Software Installation Procedure.....	6
Section 3. Evaluation Kit Test Set-Up .....	7
3.1 Hardware Set-Up.....	7
3.2 Powering Up the EVB.....	7
3.3 Software Set-Up.....	7
3.4 Troubleshooting Tips.....	10
Section 4. I <sup>2</sup> C Transfer Data .....	12
Section 5. Ordering Information .....	13

## Overview

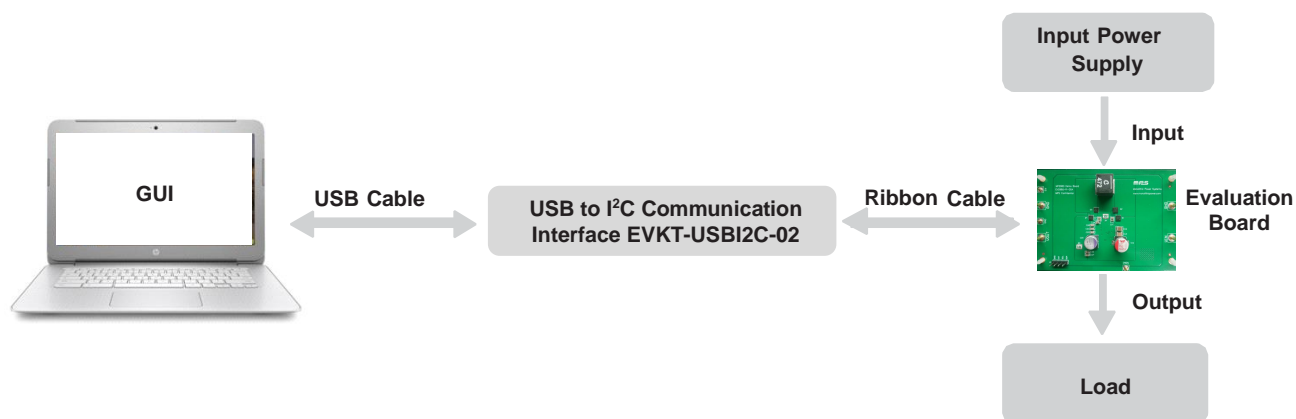
### Introduction

The EVKT-MP2980 is an evaluation kit for the MP2980, which is a synchronous, four-switch, buck-boost controller capable of regulating different output voltages. It offers a 5V to 36V wide input voltage range, high efficiency, and an I<sup>2</sup>C interface.

### Kit Contents

EVKT-MP2980 kit contents (items listed below can be ordered separately, and the GUI installation file and supplemental documents can be downloaded from the MPS website):

#	Part Number	Item	Quantity
1	EV2980-R-00A	MP2980GR evaluation board	1
2	EVKT-USBI2C-02	Includes one USB to I <sup>2</sup> C Communication interface device, one USB cable, and one ribbon cable	1



**Figure 1: EVKT-MP2980 Evaluation Kit Set-Up**

## Features and Benefits

The MP2980 is highly customizable. Users can program the MP2980 via the MPS I<sup>2</sup>C GUI.

*⚠ All changes made in I<sup>2</sup>C mode will not be retained once the EVB powers down.*

Adjustable features are outlined below.

I <sup>2</sup> C
<ul style="list-style-type: none"> <li>• Program Output Voltage</li> <li>• Enable/Disable Power Output</li> <li>• Select V<sub>OUT</sub> Changing Slew Rate</li> <li>• Enable/Disable Output Discharge Function</li> <li>• Enable/Disable Switching Frequency Spread Spectrum Function</li> <li>• Select Switching Frequency</li> <li>• Select OCP Protection Mode</li> <li>• Select OVP Protection Mode</li> <li>• Select Average Current Limit</li> </ul>

## Kit Specifications

Features	Specification
Start-Up Input Voltage	6V to 36V
Operation Input Voltage	5V to 36V
Output Voltage	3V to 20V
Output Current	0A to 5A
Operating Systems Supported	Windows XP, 7, or later
System Requirements	Minimum 21.4MB free
GUI Software	3 register controls: REF, CONTROL, INTERRUPT
EVB Size (LxW)	9.14 cmx6.6cm

## Section 1. Hardware Specifications

### 1.1 Personal Computer Requirements

The following minimum requirements must be met to use the EVKT-MP2980:

- Operating system of Windows XP, 7, or later
- Net framework 4.0
- PC with a minimum of one available USB port
- At least 21.4MB of free space

### 1.2 EV2980-R-00A Specifications

The EV2980-R-00A is an evaluation board for the MP2980GR. For more information, refer to the EV2980-R-00A datasheet.



Figure 2: EV2980-R-00A Evaluation Board

Feature	Specification
Start-Up Input Voltage	6V to 36V
Operation Input Voltage	5V to 36V
Output Voltage	3V to 20V
Output Current	0A to 5A
EVB Size (LxW)	9.14cmx6.6cm

### 1.3 EVKT-USBI2C-02 Specifications

The EVKT-USBI2C-02 refers to the USB to I<sup>2</sup>C communication interface device, which connects the EVB and the PC, and its supporting accessories. The device provides I<sup>2</sup>C and PMBus capabilities. Together with MPS's 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

## Section 2. Software Requirements

### 2.1 Software Installation Procedure

Programming occurs through the MPS I<sup>2</sup>C GUI. Follow the instructions below to install the software:

*Note: This software can be downloaded from the [MPS website](#).*

1. Download the GUI installation file titled “MP2980 GUI” from the URL above.
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 (see Figure 5).

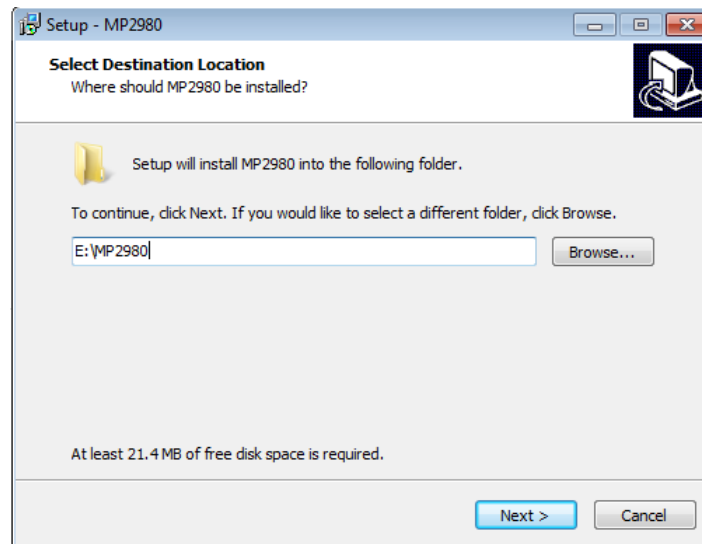


Figure 4: MPS I<sup>2</sup>C GUI Set-Up Guide

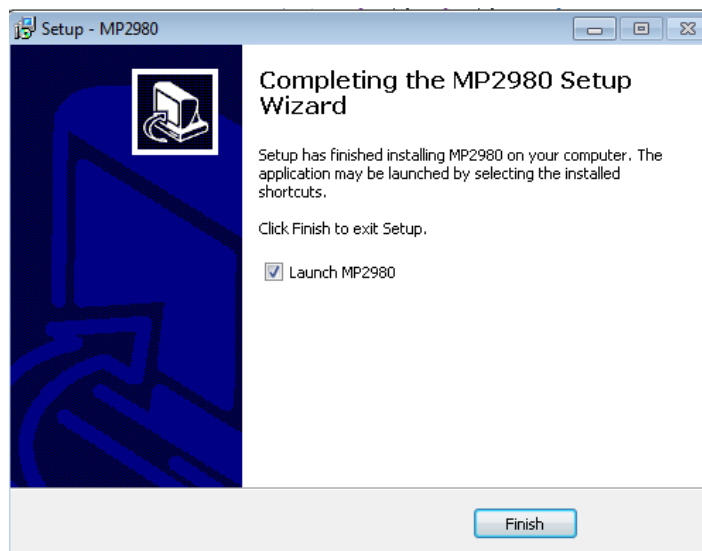


Figure 5: Successful Driver Set-Up

## 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.
2. Connect SCL, SDA, and GND (see Figure 6). Refer to the datasheet for further clarification.
3. Use the USB cable to connect the EVKT-USBI2C-02 communication interface to the PC, and follow the instructions below to set up the EVB.

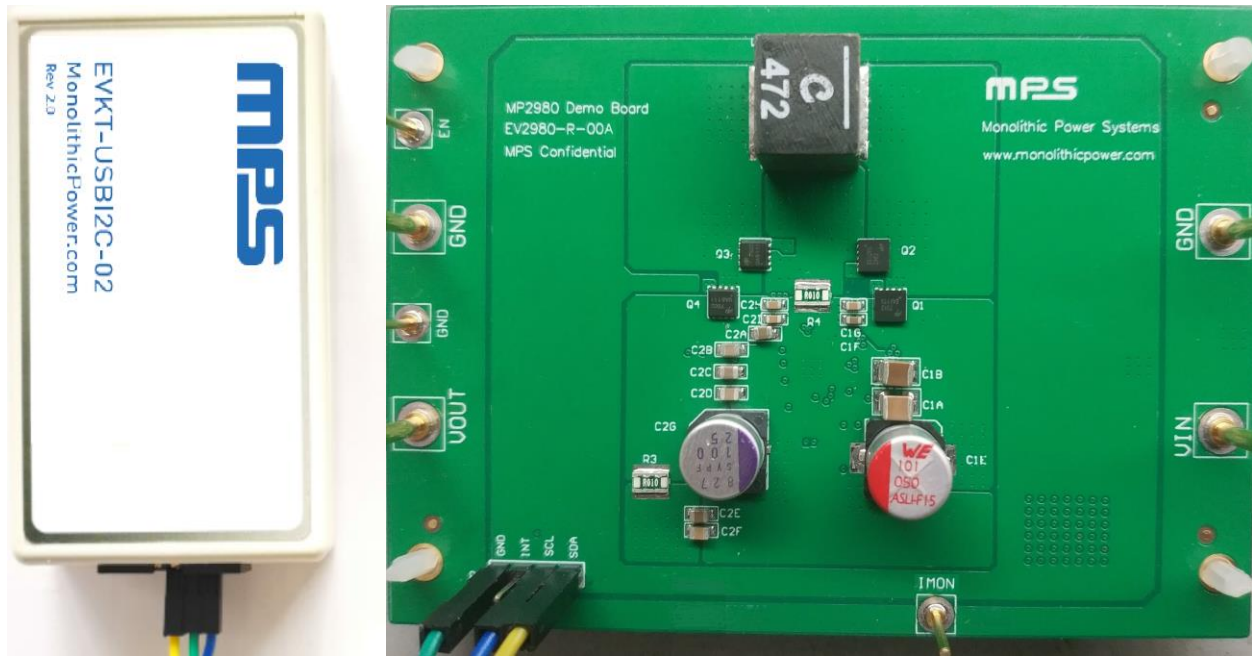


Figure 6: EVB to MPS I<sup>2</sup>C Communication Interface Device Wire Connection

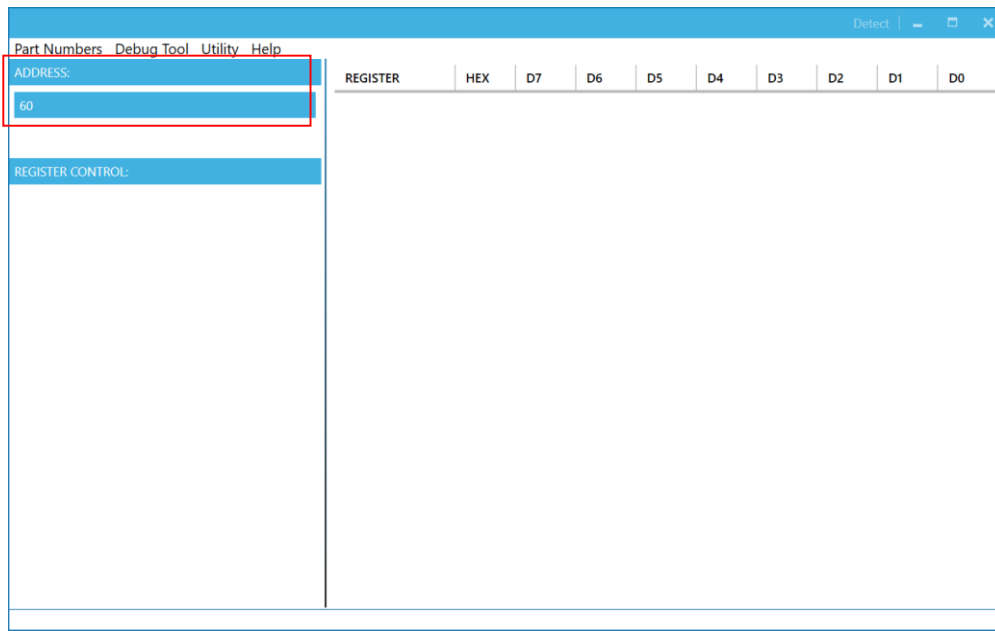
### 3.2 Powering Up the EVB

1. Preset the power supply between 6V and 36V.
2. Turn the power supply off.
3. Connect the positive and negative terminals of the power supply to the VIN and GND pins, respectively.
4. Connect the positive and negative terminals of the load to the VOUT and GND pins, respectively.
5. Turn the power supply on after making the connections. The board should start up automatically.

### 3.3 Software Set-Up

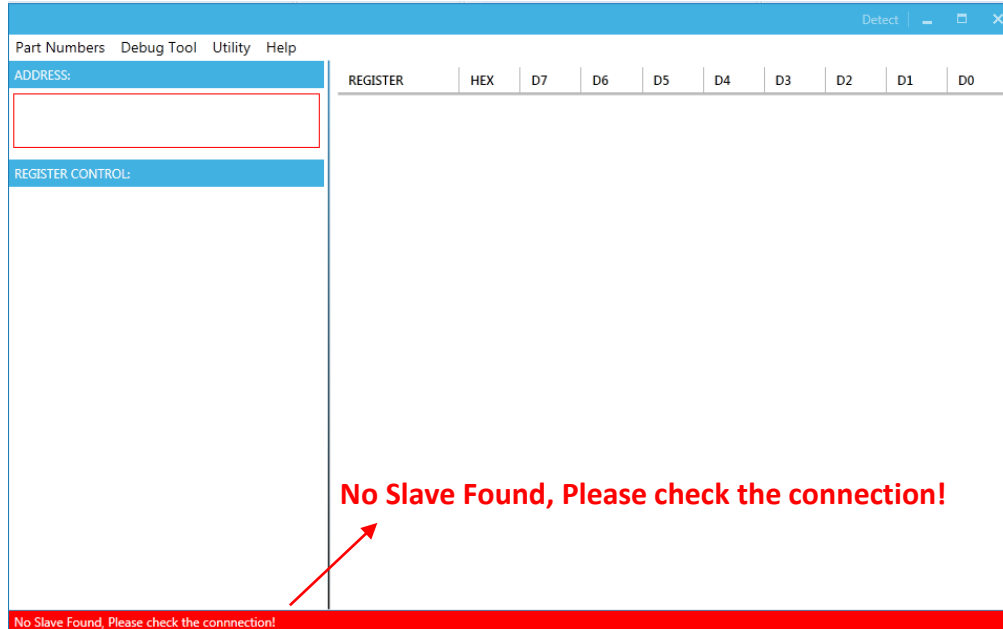
After connecting the hardware according to steps above, follow the steps below to use the GUI software:

1. Start the software. It should automatically check the EVB connection.
  - If the connection is successful, the address will be listed in the section titled “Slave Address” (see Figure 7).



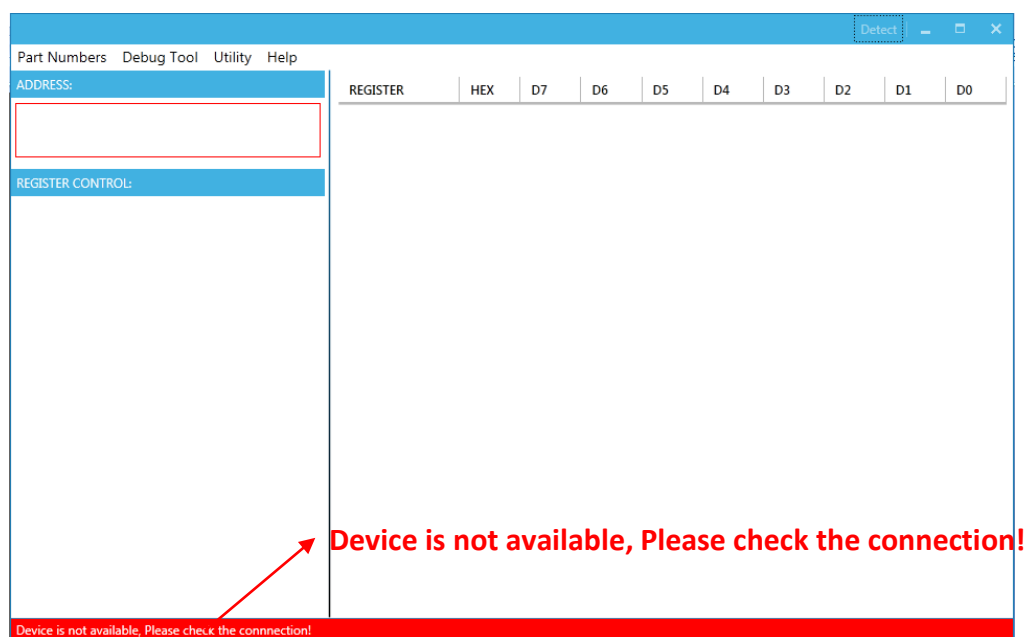
**Figure 7: Appearance of Address Shows Successful Connection**

- If not, one of two warnings will appear at the bottom:
  - “No Slave Found. Please check the connection!” means that the evaluation board is not connected (see Figure 8).
  - “Device is not available, Please check the connection!” means that the USB I<sup>2</sup>C communication interface device is not connected (see Figure 9).



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





**Figure 9: Warning Indicates Unsuccessful Connection – USB I<sup>2</sup>C Communication Interface Not Connected**

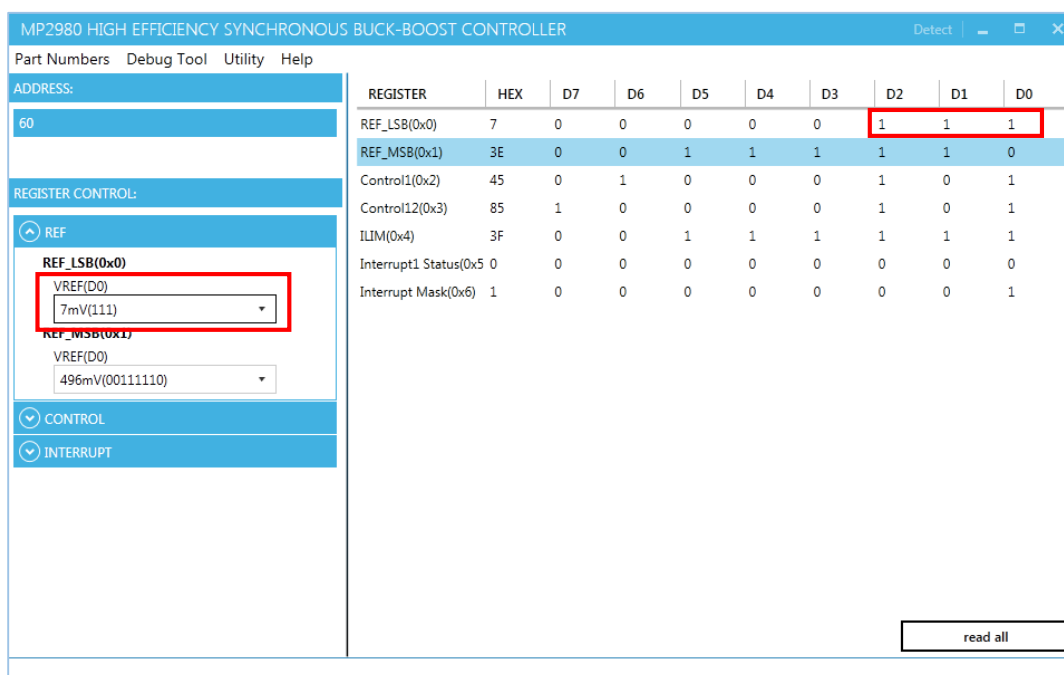
2. Establish a successful connection. If there is no connection, check connections between the EVB, communication interface device, and PC. Re-plug the USB into the PC and restart the GUI.
3. Select the MP2980 from under the drop-down menu titled “Part Numbers.” The Register Control menu will appear on the left side, and the I<sup>2</sup>C register values will be read automatically and displayed on the right (see Figure 10).

MP2980 HIGH EFFICIENCY SYNCHRONOUS BUCK-BOOST CONTROLLER										
Part Numbers Debug Tool Utility Help										
ADDRESS:	REGISTER	HEX	D7	D6	D5	D4	D3	D2	D1	D0
60	REF_LSB(0x0)	4	0	0	0	0	0	1	0	0
	REF_MSB(0x1)	3E	0	0	1	1	1	1	1	0
	Control1(0x2)	45	0	1	0	0	0	1	0	1
	Control12(0x3)	85	1	0	0	0	0	1	0	1
	ILIM(0x4)	3F	0	0	1	1	1	1	1	1
	Interrupt1 Status(0x5)	0	0	0	0	0	0	0	0	0
	Interrupt Mask(0x6)	1	0	0	0	0	0	0	0	1

read all

**Figure 10: I<sup>2</sup>C Values Shown in Table**

4. Find the item you want to change, then select the desired value from the drop-down menu. The changed information of the item will appear on the right side (see Figure 11).



**Figure 11: Refer to Datasheet to Translate**

⚠ All changes made via the  $\mu$ C will be restored to default values once the EVB is powered down.

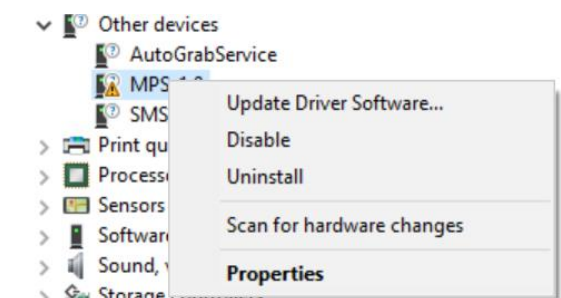
## 3.4 Troubleshooting Tips

*Note: The USBI2C-02 and USBI2C-01 drivers are not compatible. USBI2C-02 uses USBXpress, and USBI2C uses Cyusb3. USBI2C-02 is the recommended device for the MPS PMBus and  $\mu$ 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 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. Ensure the driver version matches the newest version (See Figure 13).*

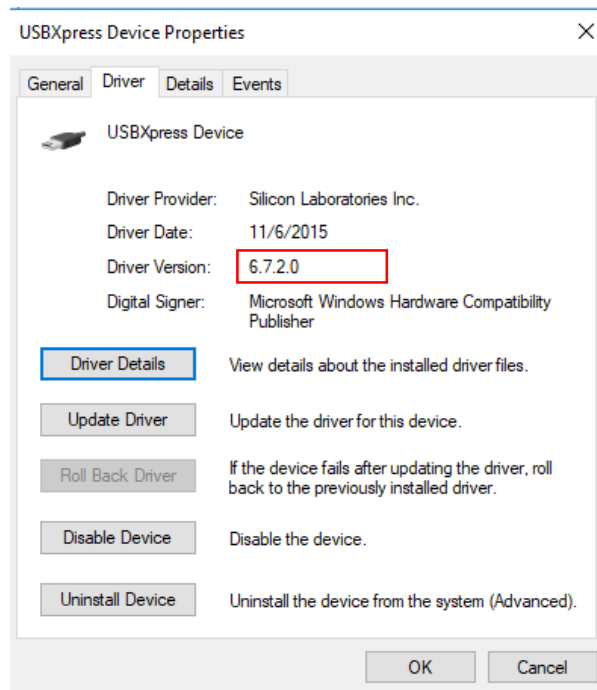
1. Install the correct USBXpress “.exe” file.

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.

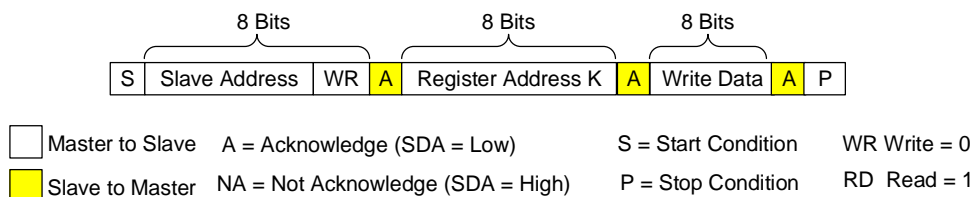


**Figure 13: Updating the Driver Software**

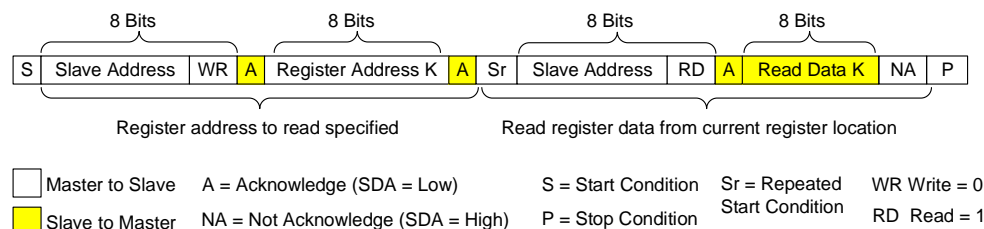
## Section 4. I<sup>2</sup>C Transfer Data

The MP2980 includes a full I<sup>2</sup>C slave controller. The I<sup>2</sup>C slave fully complies with the I<sup>2</sup>C specification requirements. It requires a start condition, a valid I<sup>2</sup>C address, a register address byte, and a data byte for a single data update. After receiving each byte, the MP2980 acknowledges by pulling the SDA line low during the high period of a single clock pulse. A valid I<sup>2</sup>C address selects the MP2980. The MP2980 then performs an update on the falling edge of the LSB byte.

Figure 14 and Figure 15 show examples of the I<sup>2</sup>C read and write commands.



**Figure 14: I<sup>2</sup>C Write Example**



**Figure 15: I<sup>2</sup>C Read Example**

## Section 5. Ordering Information

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

Part Number	Description
EVKT-MP2980	Complete evaluation kit
<b>Contents of EVKT-MP2980</b>	
EV2980-R-00A	EV2980 evaluation board
EVKT-USBI2C-02	Includes one USB to I <sup>2</sup> C communication interface device, one USB cable, and one ribbon cable

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