User Guide

MP8833 Evaluation Kit (EVKT-MP8833)

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Overview

Introduction

The EVKT-MP8833 is an evaluation kit for the MP8833, which is a monolithic thermoelectric cooler controller with built-in internal power MOSFETs. The MP8833 provides features such as TEC voltage/current limiting, and can be controlled through an I²C serial interface.

Kit Contents

EVKT-MP8833 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	EV8833-D-01B	MP8833GD evaluation board	1
2	EVKT-USBI2C-02	Includes one USB to I²C communication interface, one USB cable, and one ribbon cable	1

Figure 1: EVKT-MP8833 Evaluation Kit Set-Up

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Features and Benefits

The MP8833 is highly customizable. Users can program the MP8833 via the MPS I²C GUI.

⚠ *Any changes made in I²C mode are not retained once the EVB shuts down.*

Adjustable features are outlined below.

I²C

- Selectable soft-start current
- System on/off control
- Discharge time set after system shutdown
- Selectable heating/cooling output current limit
- Enable or disable heating/cooling output current limit
- Enable or disable VIN over-voltage protection (OVP)
- Selectable heating/cooling output voltage limit
- Enable or disable heating/cooling output voltage limit
- Selectable LDO hiccup current limit
- Selectable buck hiccup current limit
- TEC voltage/current monitor
- Status monitor

Kit Specifications

Features	Specification
Start-Up Voltage	2.7V to 5.5V
Output Voltage	Cooling voltage limit to heating voltage limit
Operating Systems Supported	Windows XP, 7, or later
System Requirements	Minimum 15 MB free
GUI Software	11 register controls: ILIMT, VLIMIT, IMON, VTEC, STATUS
EVB Size (LxW)	6.3cmx6.3cm

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Section 1. Hardware Specifications

1.1 Personal Computer Requirements

The following requirements must be met to use the EVKT-MP8833:

- Operating system of Windows XP, 7, or later
- Net Framework 4.0
- PC with a minimum of one available USB port
- At least 1 MB of free space

1.2 EV8833-D-01B Specifications

The EV8833-D-01B is an evaluation board for the MP8833GD. For more information, refer to the EV8833-D-01B datasheet.

Figure 2: EV8833-D-01B Evaluation Board

Feature	Specification
Start-Up Voltage	2.7V to 5.5V
Output Voltage	Cooling voltage limit to heating voltage limit
EVB Size (LxW)	6.3cmx6.3cm

1.3 EVKT-USBI2C-02 Specifications

The EVKT-USBI2C-02 refers to the USB to I^2C communication interface device, which connects the EVB, the PC, and its supporting accessories. It provides I^2C and PMBus capabilities. Together with the 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

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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:

Note: This software can be downloaded from the MPS website.

1. Download the GUI installation file tiled “MP8833 GUI” from the MPS website.
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. Wait for the status screen to verify that installation is complete (see Figure 5).

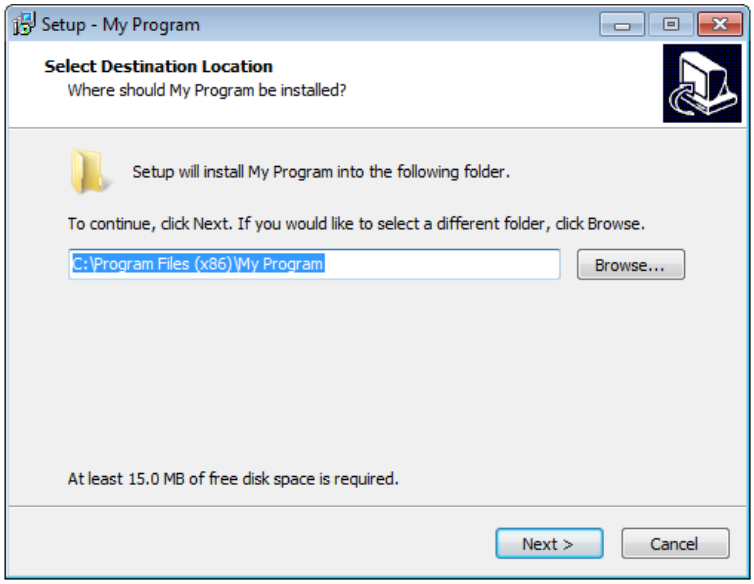

Figure 4: MPS I²C GUI Set-Up Guide

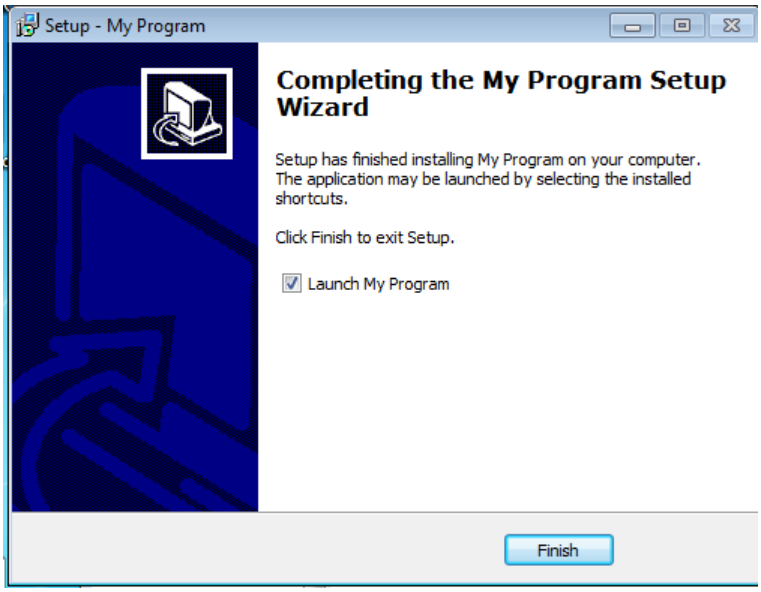

Figure 5: Driver Set-Up Success

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Section 3. Evaluation Kit Test Set-Up

3.1 Hardware Set-Up

The hardware must be configured properly 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 evaluation board datasheet for further clarification.
3. Use the USB cable to connect the EVKT-USBI2C-02 communication interface to the PC.

Figure 6: EVB to MPS I²C Communication Interface Wire Connection

3.2 Powering Up the EVB

1. Preset the power supply between 2.7V and 5.5V.
2. Turn the power supply off.
3. Connect the power supply terminals to:
   a. Positive (+): VIN
   b. Negative (-): GND
4. Connect the load to:
   a. Positive (+): TEC+
   b. Negative (-): TEC-
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 the steps above, follow the steps below to use the GUI software:

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

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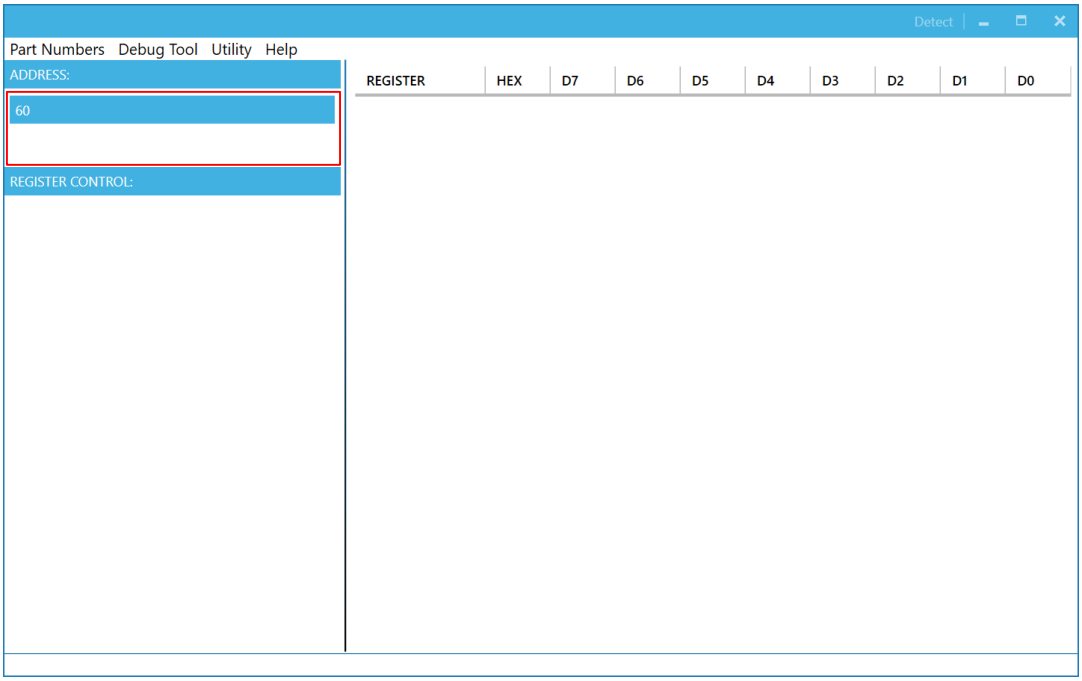

Figure 7: Appearance of Address Indicates Successful Connection

- If the connection fails, one of two warnings can appear at the bottom of the screen:
  - "No Slave Found, Please check the connection!" This means that the evaluation board is not connected (see Figure 8).
  - "Device is not available, Please check the connection!" This means that the USB I^2C communication interface is not connected (see Figure 9).

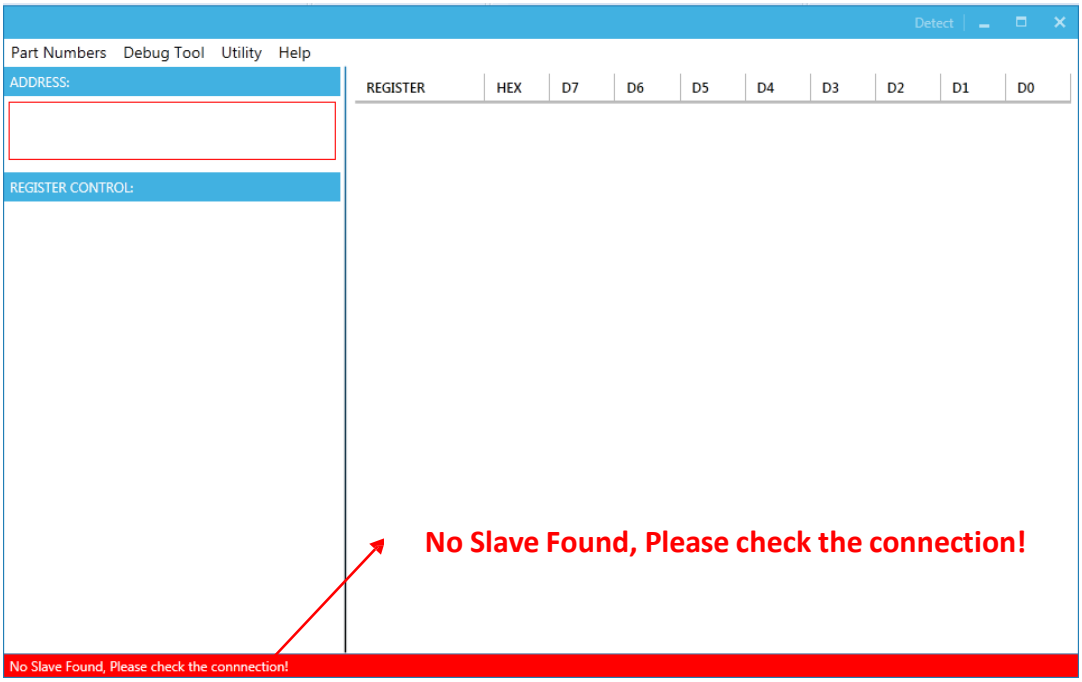

Figure 8: Warning Indicates Unsuccessful Connection – Evaluation Board Not Connected

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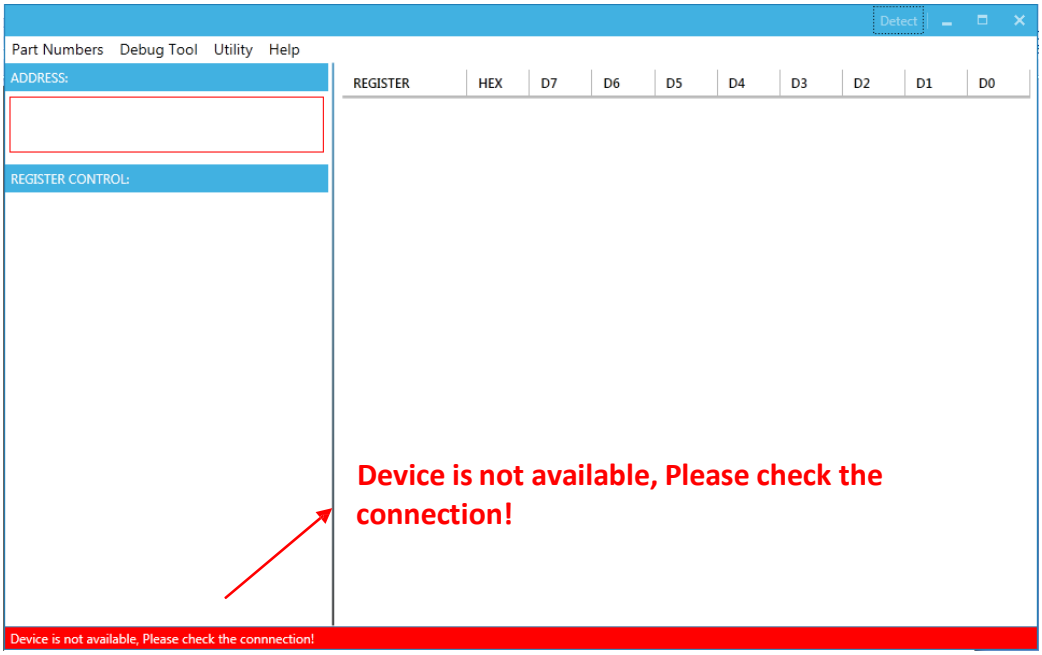

Figure 9: Warning Indicates Unsuccessful Connection – USB I²C Communication Interface Not Connected

2. Establish a successful connection, then proceed to Step 3. If there is no connection, check the connections between the EVB, communication interface, and PC. Re-plug the USB into the PC and restart the GUI.
3. Select the MP8833 from the drop-down menu titled “Part Numbers.” The Register Control menu should appear on the left side. The I²C register values should be read automatically and displayed on the right (see Figure 10).

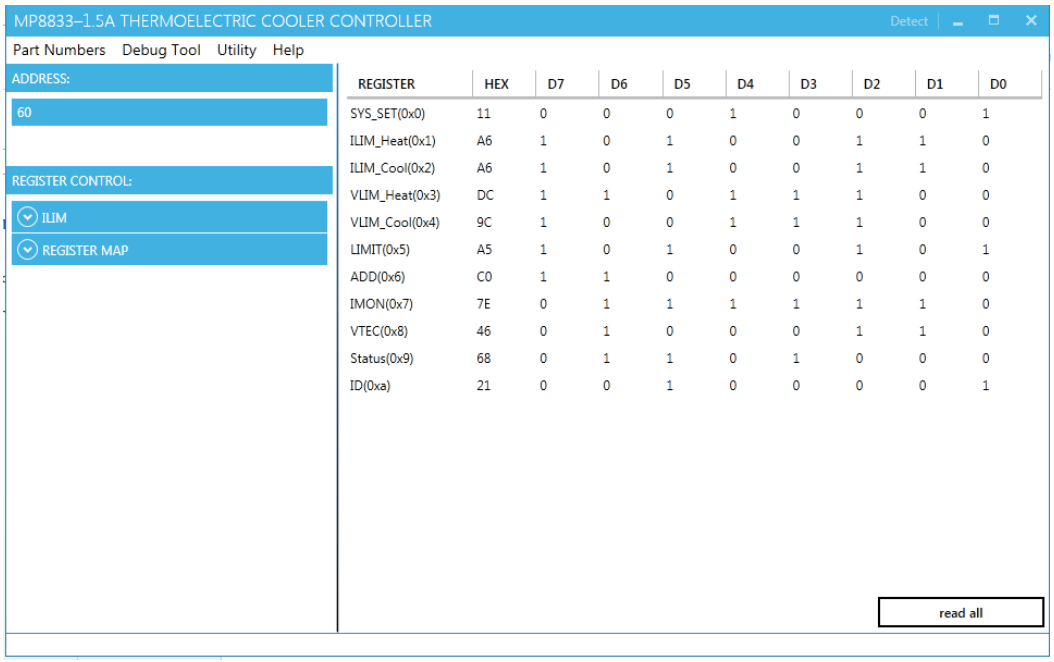

Figure 10: Values from I²C Shown in Table

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4. Find the item to change, then choose a value from the drop-down menu. The item's changed information should appear on the right side (see Figure 11).

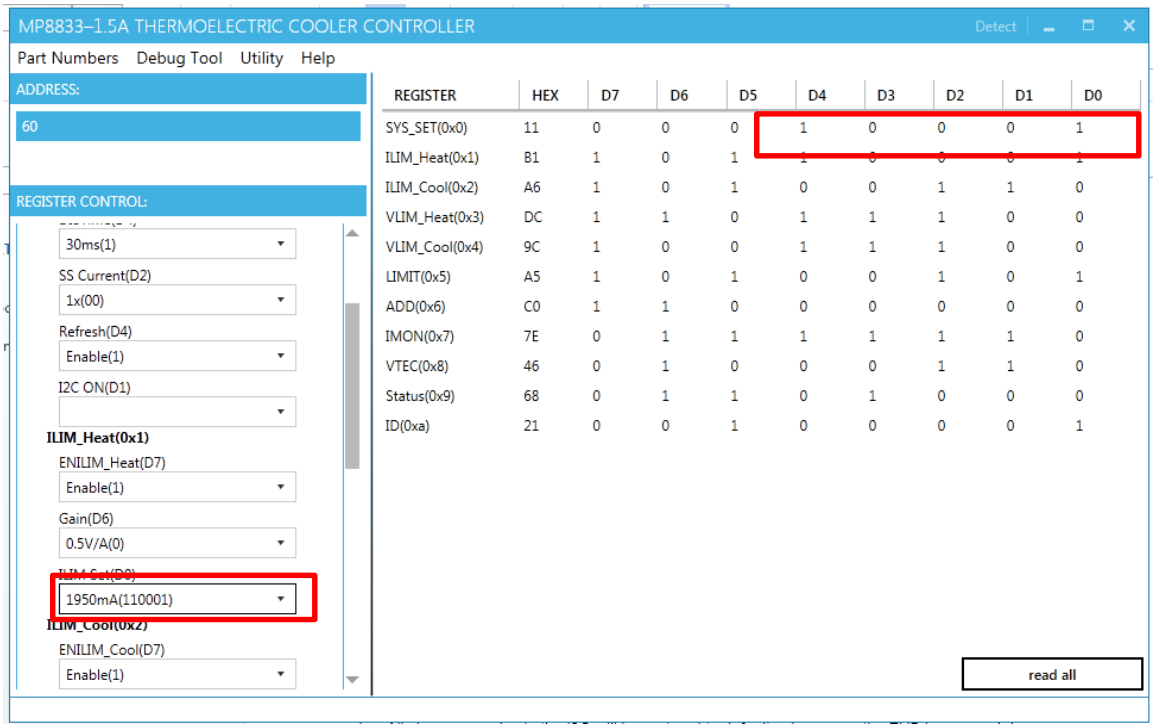

Figure 11: Changing Values Using the Software

⚠ *All changes made via the I²C will be restored to default values once the EVB turns off.*

3.4 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 the MPS PMBus and I²C.

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.

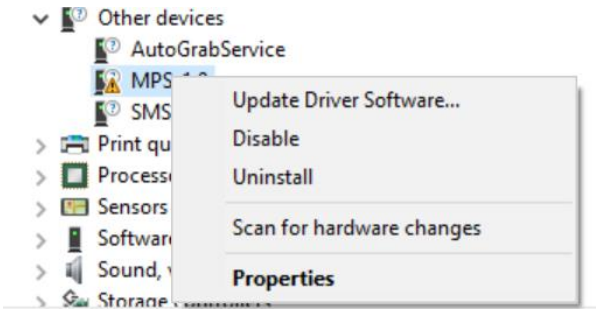

Figure 12: Updating the Driver Software

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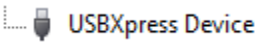
EVKT-USBI2C-02

If 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. Ensure 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 to the PC with the USB cable.

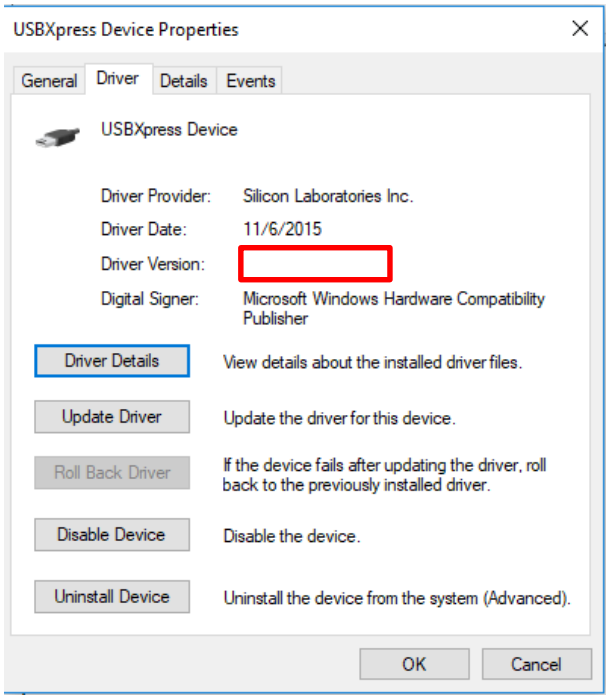


Figure 13: Determining the Driver Software

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Section 4. I²C Transfer Data

The MP8833 includes a full I²C slave controller. The I²C slave fully complies with the I²C specification requirements. It requires a start condition, valid I²C address, register address byte, and data byte for a single data update. After receiving each byte, the MP8833 acknowledges by pulling the SDA line low during the high period of a single clock pulse. A valid I²C address selects the MP8833. The MP8833 then performs an update on the falling edge of the LSB byte. Figure 14 and Figure 15 show examples of the I²C read and write commands.

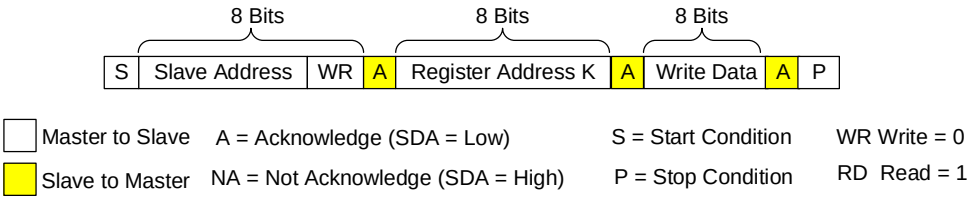

Figure 14: I²C Write Example

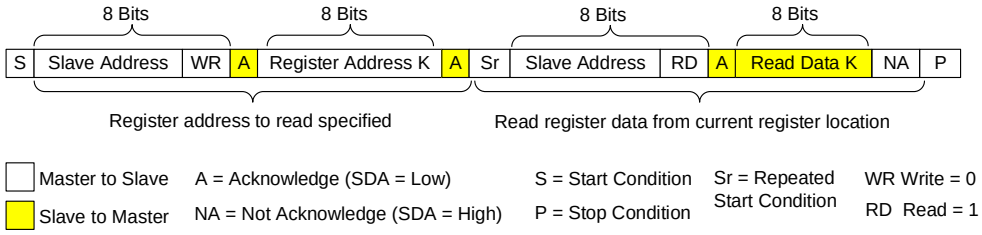

Figure 15: I²C Read Example

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Section 5. Ordering Information

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

Part Number	Description
EVKT-MP8833	Complete evaluation kit
Contents of EVKT-MP8833	
EV8833-D-01B	MP8833GD evaluation board
EVKT-USBI2C-02	Includes one USB to I^2C communication interface device, one USB cable, and one ribbon cable

Order directly from MonolithicPower.com or our distributors.

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