User Guide

MP8861 Evaluation Kit (EVKT-8861)

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Overview

Introduction

The EVKT-8861 is an evaluation kit for the MP8861, The MP8861 is a highly integrated, high- frequency, synchronous, step-down switcher with an I2C control interface. The MP8861 is optimized to support up to 6A continuous output current over an input supply range from 2.85V to 18V with excellent load and line regulation. This kit allows for quick evaluation of the MP8861. By using the I2C, users can set the current limit, slew rate, work mode, and output voltage. This device also features telemetry, which provides output voltage and output current monitoring via I2C.

Kit Contents

EVKT-8861 kit contents: (items below can be ordered separately).

#	Part Number	Item	Quantity
1	EV8861-L-00A	MP8861GL evaluation board	1
2	EVKT-USBI2C-02	Includes one USB to I2C communication interface, one USB cable, one ribbon cable	1
3	Tdrive-8861	USB flash drive that stores the GUI installation file and supplemental documents	1

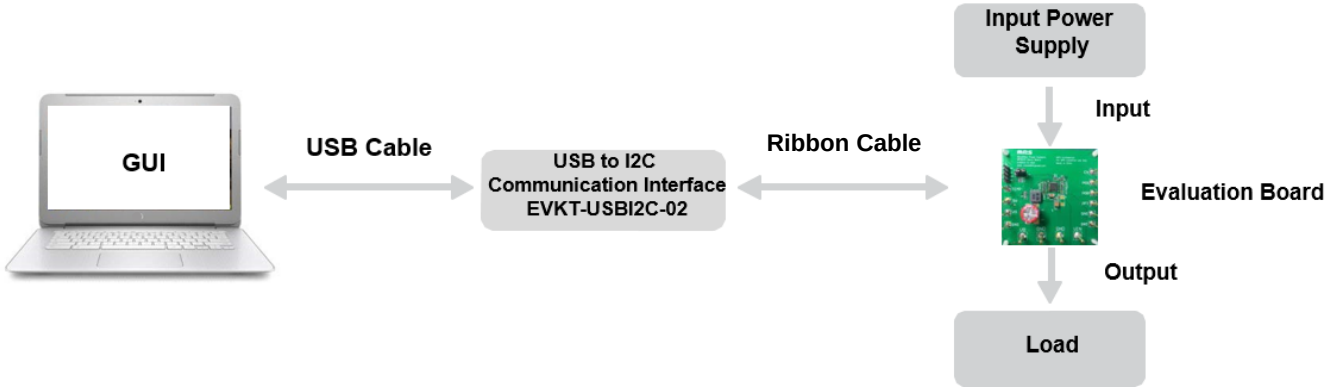


Figure 1: EVKT-8861 Evaluation Kit Set-Up

Features and Benefits

The MP8861 is highly customizable. Users can program the MP8861 via the MPS I2C GUI.

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

Features adjustable under each method are outlined below.

I2C
• Adjustable output voltage • Slew rate • Selectable OVP, OCP mode • Selectable PFM mode • Selectable PG deglitch time • Selectable frequency • Soft stop • Adjustable current limit • Output current/voltage monitor • System enable (EN bit) • Status indication: OC, OTEW, OT, PG

Kit Specifications

Features	Specification
Supply for Board (V_{IN})	2.85V - 18V
Operating Input Voltage	2.85V - 18V
Output Voltage (V_{OUT})	1V
Continuous Output Current (I_{OUT})	6A
System Requirements	Minimum 22.2 MB free
GUI Software	3 Register Controls: VSEL, SysCntlreg1, SysCntlreg2
EVB Size (L x W)	8.5 cm x 8.5 cm

Section 1. Hardware Specifications

1.1 Personal Computer Requirements

The following must be minimally met to use the EVKT-8861.

- Operating System of Windows XP, 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 EV8861-L-00A Specifications

The EV8861-L-00A is an evaluation board for MP8861GL. For more information, please refer to the EV8861-L-00A datasheet.

Figure 2: EV8861-L-00A Evaluation Board

Feature	Specification
Supply for Evaluation Board	2.85V - 18V
Operating Input Voltage	2.85V - 18V
Output Voltage (V_{OUT})	1V
Continuous Output Current (I_{OUT})	6A
EVB Size (L x W)	8.5 cm x 8.5 cm

1.3 EVKT-USBI2C-02 Specifications

The EVKT-USBI2C-02 refers to the communication interface, 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

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 thumb drive into the computer using any available USB port.
2. Locate 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 the status screen to verify that installation is complete (see Figure 5).

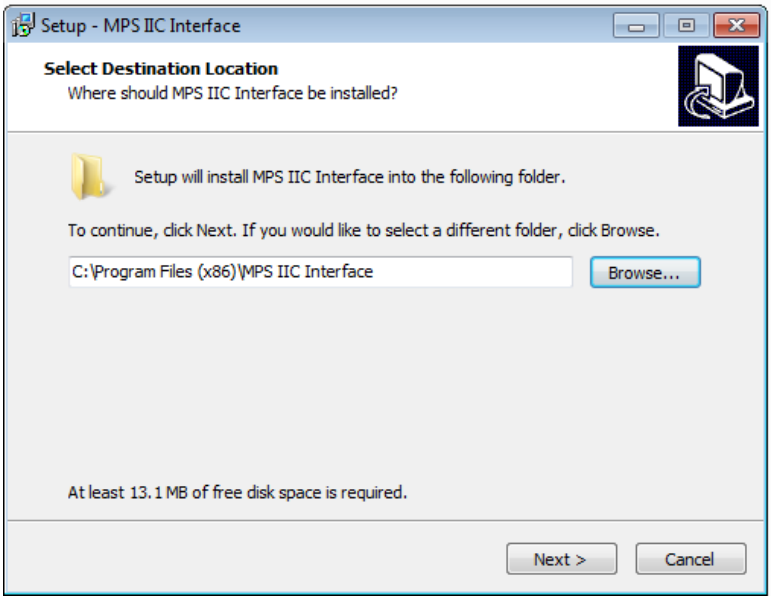


Figure 4: MPS I²C GUI Set-Up Guide

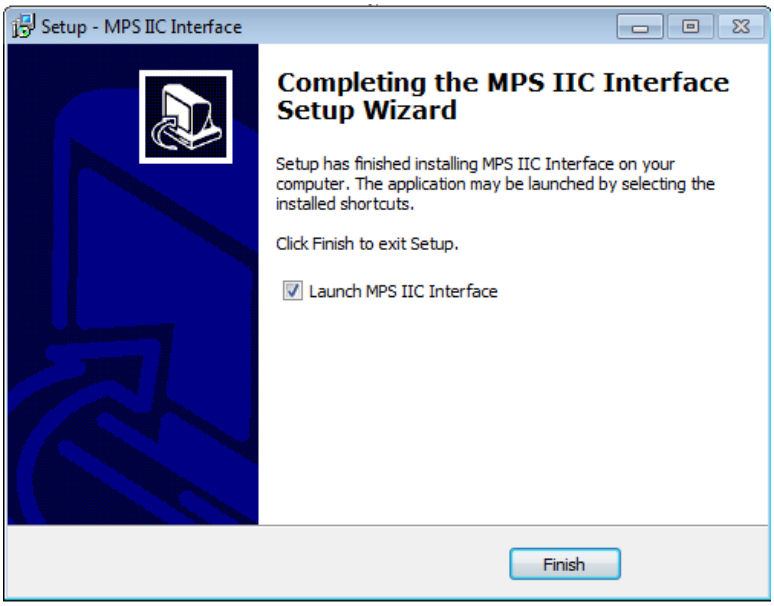


Figure 5: I²C GUI Set-Up Success

Section 3. Evaluation Kit Test Set-Up

3.1 Hardware Set-Up

The hardware must be configured properly prior to use. 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.

1. Locate the proper wires to connect the EVB to the EVKT-USBI2C-02 communication interface and PC.
2. Connect SCL, SDA, and GND (see Figure 6). If needed, refer to the datasheet for further clarification.

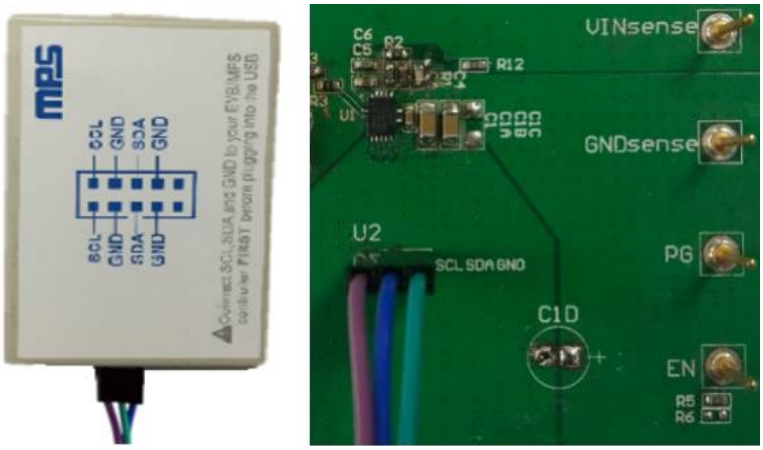


Figure 6: EVB to MPS I²C Communication Interface Wire Connection

3.2 Powering up the EVB

1. Connect the positive and negative terminals of the load to the VOUT and GND pins, respectively.
2. Preset the power supply output 2.85V to 18V, 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 MP8861 will enter the power-on sequence automatically.

3.3 Software Set-Up

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

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

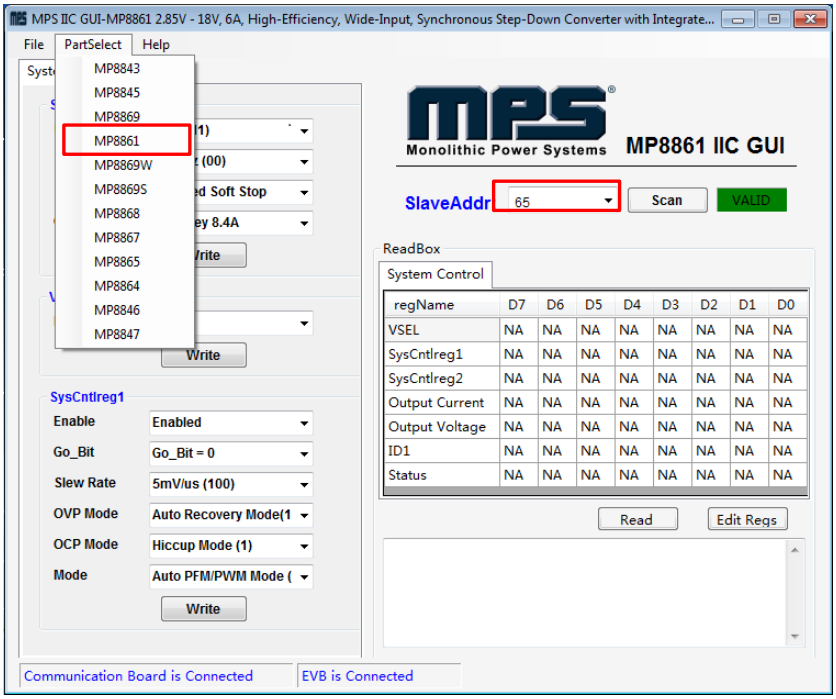


Figure 7: Appearance of Address Shows Successful Connection

- If not, a warning will appear at the bottom. There are two warnings users can expect.
  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 is not connected (see Figure 9).

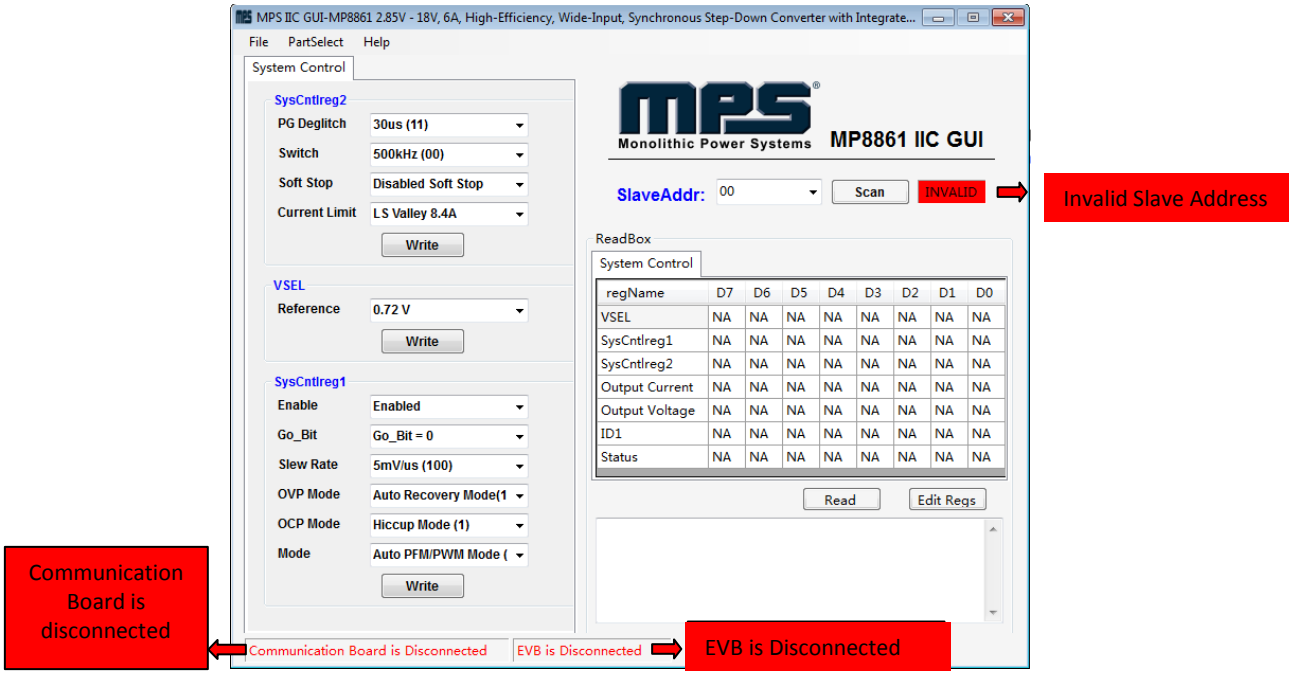


Figure 8: Warning Indicates Unsuccessful Connection – Evaluation Board not Connected

2. If the connection is successful, proceed to Step 3. Otherwise, check connections between the EVB, communication interface, and PC. Re-plug the USB into the computer and restart the GUI.
3. Click the "**PartSelect**" button to select the MP8861 (see Figure 7). The Register Control menu will appear on the left side. I2C register values will be read and displayed on the right side after clicking the "**Read**" button (see Figure 9).

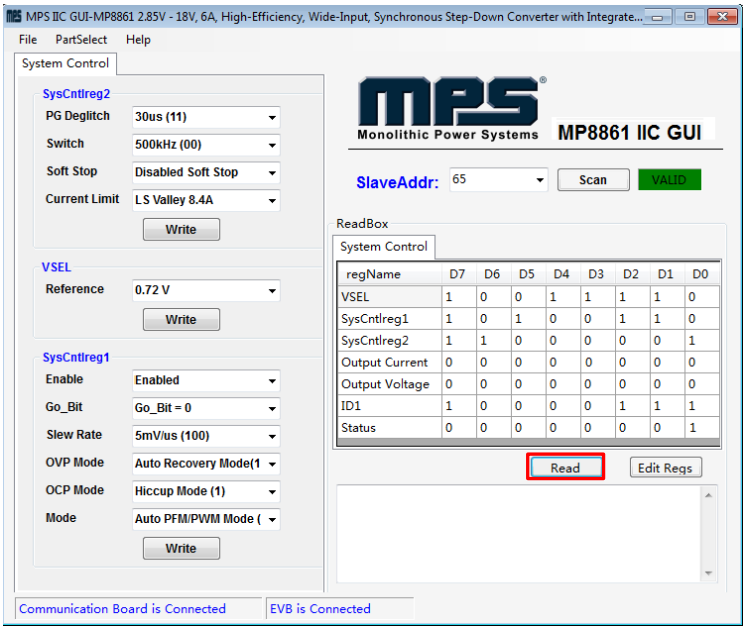


Figure 9: Values from I2C Shown in Table

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 10).

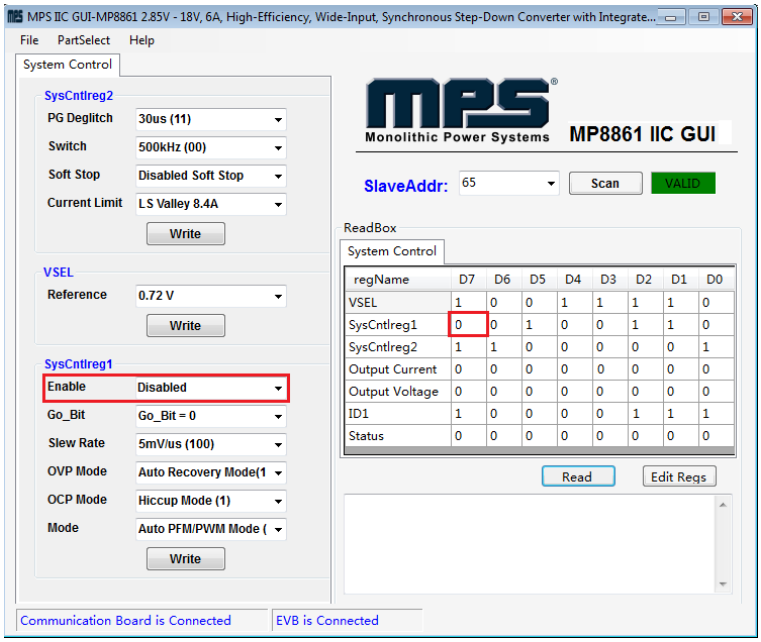


Figure 10: Refer to Datasheet to Translate 0's and 1's

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

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 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 11).
2. Click “Browse my computer for driver software”, find the driver located on thumb drive and install.

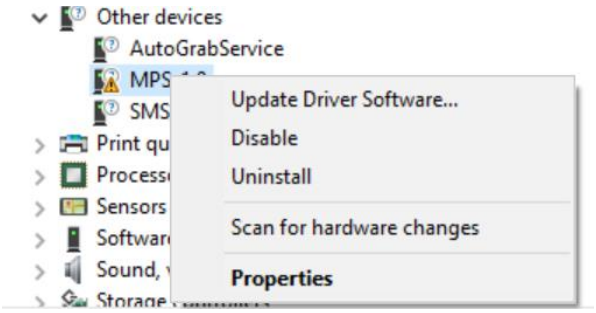
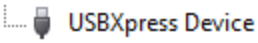


Figure 11: Updating the Driver Software

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 12).

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.

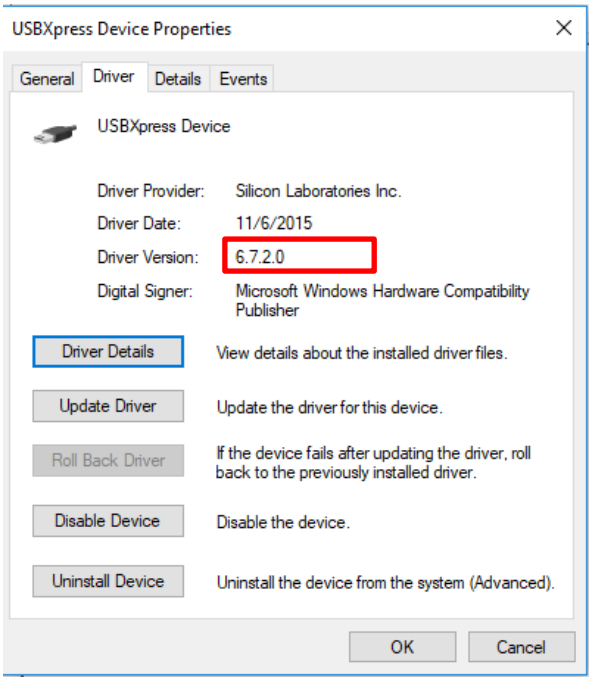


Figure 12: Correct Driver Version

- **No Supply**

The MP8861’s input pin has an under-voltage lockout (UVLO) detection circuit. If the input voltage (AVIN) is lower than the UVLO rising threshold, the MP8861’s functions are disabled.

- **Shutdown Event**

If the MP8861 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 MP8861 switches to no supply state or power-off state, regardless of the current state.

- **Thermal Recovery**

If the MP8861 is in a power-off state due to the die temperature exceeding the thermal protection threshold, the MP8861 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 MP8861 enters the shutdown sequence directly.

Section 4. Ordering Information

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

Part Number	Description
EVKT-8861	Complete evaluation kit
Contents of EVKT-8861	
EV8861-L-00A	MP8861GL-CCCC evaluation board
EVKT-USBI2C-02	Includes one USB to I2C communication interface, one USB cable, one ribbon cable
Tdrive-8861	USB flash drive that stores the GUI installation file and supplemental documents

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EVKT-8861