

User Guide

MP8847 Evaluation Kit (EVKT-8847)



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Overview

Introduction

The EVKT-8847 is an evaluation kit for MP8847.The MP8847 is a highly integrated, high-frequency, synchronous, step-down switcher with an I²C control interface. The MP8847 can support up to 6A of current from a wide 2.7Vto 6V range with excellent load and line regulation. This kit allows for quick evaluation of the MP8847. By using the I²C, users can set the switching frequency, slew rate, work mode, and the output voltage.

Kit Content

EVKT-8847 kit contents: (items below can be ordered separately).

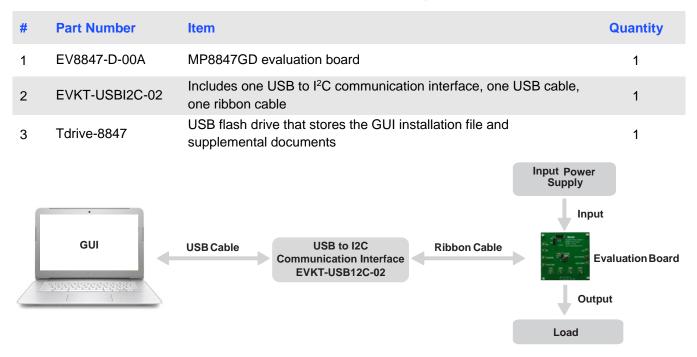


Figure 1: EVKT-8847 Evaluation Kit Set-Up



Features and Benefits

The MP8847 is highly customizable. Users can program the IC via the MPS I²C GUI.

 \triangle 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

- Selectable the output voltage
- Selectable transition response
- Selectable slew rate
- Selectable switching frequency
- Selectable output discharge
- Selectable VIN_OVP
- Selectable PG function
- Selectable mode (PFM & CCM)
- System enable
- Status indication: ILIM, UVLO, VIN & Vout OVP, Vout UVP, PG, OTW

Kit Specifications

Feature	Specification
Supply for Board	2.7V - 6V
Operating Input Voltage	2.7V - 6V
Operating Systems Supported	Windows XP, 7, and later
System Requirements	Minimum 22.2MB free
GUI Software	3 Register Controls: VSEL, System 1, System 2
EVB Size (L x W)	6.3 cm x 6.3 cm



Section 1. Hardware Specifications

1.1 Personal Computer Requirements

The following must be minimally met to use the EVKT-8847.

- 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 EV8847-D-00A Specifications

The EV8847-D-00A is an evaluation board for the MP8847GD. For more information, please refer to the EV8847-D-00Adatasheet.



Feature	Specification
Supply for Board	2.7V - 6V
Operating Input Voltage	2.7V - 6V
EVB Size (L x W)	6.3 cm x 6.3 cm

Figure 2: EV8847-D-00A Evaluation Board

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.







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 status screen to verify that installation is complete (see Figure 5).

15 Setup - MPS IIC Interface	- • •
Select Destination Location Where should MPS IIC Interface be installed?	
Setup will install MPS IIC Interface into the following folder.	
To continue, click Next. If you would like to select a different folder, click	Browse.
C:\Program Files (x86)\MPS IIC Interface	Browse
At least 13.1 MB of free disk space is required.	
Next >	Cancel

Figure 4: MPS I²C GUI Set-Up Guide



Figure 5: MPS I²C Set-Up Success



Section 3. Evaluation Kit Test Set-Up

3.1 Hardware Set-Up

The hardware must be properly configured 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.
- 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 to between 2.7V and 6V, 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 and make the EN voltage more than the threshold. The IC will enter the power-on sequence 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 will automatically check the EVB connection.
 - If connection is successful, the address will be listed in the "Slave Address" (see Figure 7).



ME MPS	5 IIC GUI-MP886	1 2.85V - 18V, 6A, High-Ef	ficiency, Wid	de-Input, Synchronous	Step-D	lown C	onvert	er with	Integr	ate [•	• 🗙
File	PartSelect I	Help										
Syste	MP8843											
_ (MP8845				_			3				
	MP8869	1)	•		_		_					
	MP8861		·	Monolithic F	owe	r Svs	tems	M	P88(61 II	СG	UI
	MP8869V	N (00)	•									
	MP88695	d Soft Stop	•	SlaveAddr:	68				Scan		VALI	5
	MP8868	ey 8.4A	•	SlaveAuui.								
	MP8867	/rite		ReadBox								
	MP8865	Inte		System Control								
- \	MP8864			regName	D7	D6	D5	D4	D3	D2	D1	D0
	MP8846		•	VSEL	NA	NA	NA	NA	NA	NA	NA	NA
	MP8847	Write		SysCntlreg1	NA	NA	NA	NA	NA	NA	NA	NA
		write		SysCntlreg2	NA	NA	NA	NA	NA	NA	NA	NA
- S	SysCntireg1			Output Current	NA	NA	NA	NA	NA	NA	NA	NA
	Enable	Enabled	-	Output Voltage	NA	NA	NA	NA	NA	NA	NA	NA
	Go Bit	Go Bit = 0	•	ID1	NA	NA	NA	NA	NA	NA	NA	NA
	- Slew Rate	5mV/us (100)	_	Status	NA	NA	NA	NA	NA	NA	NA	NA
			•				-	1		<u> </u>	-	
	OVP Mode	Auto Recovery Mode(1	•					Read	4	E	dit Re	qs
	OCP Mode	Hiccup Mode (1)	•									
1	Mode	Auto PFM/PWM Mode (•									
		Write										
		write										_
Com	munication Bo	ard is Connected	EVB is Co	nnected								

Figure 7: Appearance of Address Shows Successful Connection

- If the connection is not successful, a warning will appear at the bottom. There are two warnings a user can expect (see Figure 8). Each of the warnings mean an invalid connection.
 - 1) "EVB is Disconnected!" This means that the evaluation board is not connected.
 - 2) "Communication Board is Disconnected!" This means that the USB I²C communication interface is not connected.

Transient PG_LOHI	1.25MHz • Normal • Set PGOOD to detect p • Disable VIN OVP functi •	Monolithic F SlaveAddr:	ower		tems		288 / Scan	47	C G	_	Invalid Slave Add
Mode	Enable PFM Mode 👻	ReadBox System Control1									
	Write	regName	D7	D6	D5	D4	D3	D2	D1	D0	
VSEL		Status	NA	NA	NA	NA	NA	NA	NA	NA	
EN	Enabled 👻	VSEL	NA	NA	NA	NA	NA	NA	NA	NA	
Output	0.950 V 👻	SysCntlreg1	NA	NA	NA	NA	NA	NA	NA	NA	
	Write	SysCntlreg2 ID1	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	
SysCntireg2		ID2	NA	NA	NA	NA	NA	NA	NA	NA	
Go	GO_Bit=0(Vout lock) -					Read		[_	dit Ree		
Out-Discharge	Output Discharged By 👻					кеас			ait Keg	IS	
GI_filt	Disable PGOOD Delay 👻									^	
	32mV/us										
	Enable PG Function -									Ŧ	
PG Set	PG will be low when P(👻										
	Write										
on la										_	
Communication Boa	rd is Disconnected	Disconnected		EV/F	ic I	Disc	onn	ecte	he		
Fig	EVD IS	Disconnected		- • -			JTIT				



- 2. If 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.
- Click the **PartSelect** button to select the MP8867 (see Figure 7) (The default GUI window is for the MP8861). The Register Control menu will appear on the left side. The I²C register values will be read and displayed on the right side after clicking the **Read** button (see Figure 9).

	Help									
tem Control1			_			Ð				
SysCntireg1			-	\mathbf{L}						
Switch	1.25MHz •					м	088	47 II	сg	
Transient	Normal 👻	Monolithic F	owe	r Sys	tems	IVII	00.	+/ 11		
PG_LOHI	Set PGOOD to detect p 👻	SlaveAddr:	60				Scan		VALI	2
Vinovp	Disable VIN OVP functi 👻	oluveriudi.								
Mode	Enable PFM Mode 👻	ReadBox								
	Write	System Control1]							
	Willie	regName	D7	D6	D5	D4	D3	D2	D1	D0
VSEL		Status	0	0	0	0	0	1	0	1
EN	Enabled 👻	VSEL	1	1	0	0	0	1	1	0
Output	0.950 V -	SysCntlreg1	1	0	0	0	1	1	0	0
		SysCntlreg2	0	0	0	0	0	0	0	1
	Write	ID1	0	0	0	0	0	0	0	1
SysCntireg2		ID2	0	0	0	1	0	0	0	1
Go	GO_Bit=0(Vout lock) +					Read	-		dit Re	~
Out-Discharge	Output Discharged By 👻					Read	<u> </u>		une rece	1 9
GI filt	Disable PGOOD Delay -	The part is Enabl	ea							^
Slew Rate										
PG Control	Enable PG Function 👻									Ŧ
PG Set	PG will be low when PC 👻									
	Write									

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** button to update the values. The changed information of the item will appear on the right side (see Figure 10).

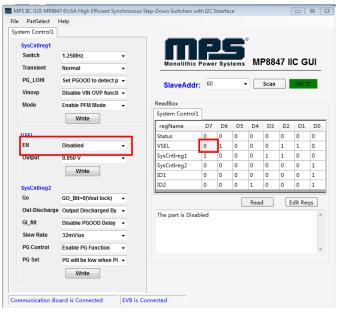


Figure 10: Refer to Datasheet to Translate 0's and 1's

▲ 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-01 uses Cyusb3. USBI2C-02 is the recommended device for the MPS PMBus and I²C.

EVKT-USBI2C-01

In case 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."
- 3. Find the driver located on thumb drive.
- 4. Install.

EVKT-USBI2C-02

In case 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.

🛄 🕛 USBXpress Device

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 the 32 bit or 64 bit operating system:

32-bit: USBXpressInstaller_x86.exe 64-bit: USBXpressInstaller_x64.exe

3. Connect the EVKT-USBI2C-02 communication interface to the PC with the USB cable.

No Supply

The MP8847's input pin has an under-voltage lockout

(UVLO) detection circuit. If the input voltage (AVIN) is lower than the UVLO rising threshold, the MP8847's functions are disabled.

Shutdown Event

If the MP8847 detects that the input voltage is lower than the UVLO falling threshold (it enters a no supply state) or over-temperature protection is triggered (it enters a power-off state), the MP8847 switches to no supply state or power-off state, regardless of the current state.

Thermal Recovery

If the MP8847 is in a power-off state due to the die temperature exceeding the thermal protection threshold, the MP8847 enters a power-on sequence when the die's temperature decreases.

Other device Other device AutoGr	
MPS SMS	Update Driver Software
> 🖻 Print qu	Disable
Process	Uninstall
Sensors	Scan for hardware changes
Sound,	Properties

USBXpress Device Propert	ies	×
General Driver Details	Events	
USBXpress Dev	ice	
Driver Provider:	Silicon Laboratories Inc.	
Driver Date:	11/6/2015	
Driver Version:	6.7.2.0	
Digital Signer:	Microsoft Windows Hardware Co Publisher	mpatibility
Driver Details	View details about the installed drive	er files.
Update Driver	Update the driver for this device.	
Roll Back Driver	If the device fails after updating the back to the previously installed drive	
Disable Device	Disable the device.	
Uninstall Device	Uninstall the device from the system	(Advanced).
	ОК	Cancel

Figure 12: Correct Driver Version



Shutdown Sequence

When the input voltage is lower than the UVLO falling threshold, or the IC is over-temperature, the MP8847 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-8847	Complete evaluation kit
Contents of EVKT-8847	
EV8847-D-00A	MP8847GD evaluation board
EVKT-USBI2C-02	Includes one USB to I ² C communication interface, one USB cable, one ribbon cable
Tdrive-8847	USB flash drive that stores the GUI installation file and supplemental documents

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Monolithic Power Systems (MPS): EVKT-8847