

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).



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 (Vout)	1V
Continuous Output Current (Iout)	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.



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

Figure 2: EV8861-L-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 the status screen to verify that installation is complete (see Figure 5).

📴 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: 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).



·	001 111 000	12.001 101, 0H, Thg	n-eniciency, wit	ie-input, synchronous	step-L	own C	onvert	er with	Integr	rate		
File P	PartSelect	Help										
Syste	MP8843											
- •	MP8845				-	T		8				
	MP8869	11)			-		-					
	MP8861		•	Monolithic	Powe	r Svs	tems	M	P88(61 II	C G	UI
	MP8869\	W (00)	•									
	MP88695	S ed Soft Stop	•	SlaveAddr	65				Scan		VALT	D
	MP8868	ey 8.4A	•	SlaveAuu	05				ooun			
	MP8867	-		ReadBox								
	MP8865	Inte		System Control								
~	MP8864											
	MP8846		-	regName	07	Do	05	04	D3	02	DI	DO
	MP8847			VSEL	NA	NA	NA	NA	NA	NA	NA	NA
		Write		SysCntireg1	NA	NA	NA	NA	NA	NA	NA	NA
Svs	Cottrea1			SysCntireg2	NA	NA	NA	NA	NA	NA	NA	NA
En	able	Enabled		Output Current	NA	NA	NA	NA	NA	NA	NA	NA
-	abic	Lilablea	-	Output Voltage	NA	NA	NA	NA	NA	NA	NA	NA
Go	_Bit	Go_Bit = 0	•	ID1	NA	NA	NA	NA	NA	NA	NA	NA
Sle	ew Rate	5mV/us (100)	•	Status	NA	NA	NA	NA	NA	NA	NA	NA
OV	/P Mode	Auto Recovery Mod	le(1 -					Read	ł	E	dit Re	gs
00	CP Mode	Hiccup Mode (1)	-									
Mo	ode	Auto PFM/PWM Mo	de (🔻									
		Write										
												-

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).

MPS IIC GUI-MP886	51 2.85V - 18V, 6A, High-Efficiency,	Wide-Input, Synchronous	Step-D	own C	onvert	er with	Integr	ate	-		3
File PartSelect	Help										
System Control				_		_					
SysCntireg2			_	T,	=	Ð					
PG Deglitch	30us (11) 👻				-						
Switch	500kHz (00) 🗸	Monolithic I	Power	Sys	tems	MF	-886	51 II	CG	UI	
Soft Stop	Disabled Soft Stop										
3011 3100	Disableu son stop	SlaveAddr	00		•	·	Scan		INVAL	ID 🗖	Invalid Slave Add
Current Limit	LS Valley 8.4A 👻										
	Write	ReadBox									
		System Control									
VSEL		regName	D7	D6	D5	D4	D3	D2	D1	D0	
Reference	0.72 V -	VSEL	NA	NA	NA	NA	NA	NA	NA	NA	
	Write	SysCntlreg1	NA	NA	NA	NA	NA	NA	NA	NA	
Sur Catler of		SysCntlreg2	NA	NA	NA	NA	NA	NA	NA	NA	
Syschuregh	Fachlad	Output Current	NA	NA	NA	NA	NA	NA	NA	NA	
Ellable	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	
OVP Mode	Auto Recovery Mode(1 👻				[Read		F	dit Ree	as	
OCP Mode	Hiccup Mode (1) -										
Mode	Auto DEM/DM/M Mode (
Mode	Auto PriviPvvili Mode (+										
	Write										
										~	
Communication Po	ard is Disconnected		FVB	is E)isco	onne	octe	d			

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.
- 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).

e PartSelect ystem Control	Help										
SysCntlreg2 PG Dealitch	30us (11)	•		-		5	8				
Switch	500kHz (00)		Monolithic I	Powe	r Sys	tems	Μ	P88	61 II	CG	U
Soft Stop	Disabled Soft Stop	•	SlaveAddr	65				Scan		VALI	D
Current Limit	LS Valley 8.4A	•	ReadBox								
	write		System Control								
VSEL			regName	D7	D6	D5	D4	D3	D2	D1	D0
Reference	0.72 V	-	VSEL	1	0	0	1	1	1	1	0
	Write		SysCntlreg1	1	0	1	0	0	1	1	0
			SysCntlreg2	1	1	0	0	0	0	0	1
SysCntireg1			Output Current	0	0	0	0	0	0	0	0
Enable	Enabled	-	Output Voltage	0	0	0	0	0	0	0	0
Go_Bit	Go_Bit = 0	-	ID1	1	0	0	0	0	1	1	1
Slew Rate	5mV/us (100)	•	Status	0	0	0	0	0	0	0	1
OVP Mode	Auto Recovery Mode	1 🗸					Read	ł.	E	dit Re	gs
OCP Mode	Hiccup Mode (1)	-									
Mode	Auto PFM/PWM Mode	(-									
	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 All** button to update values. The changed information of the item will appear on the right side (see Figure 10).

ile PartSelect System Control	Help										
SysCntlreg2 PG Deglitch Switch Soft Stop Current Limit	30us (11) - 500kHz (00) - Disabled Soft Stop - LS Valley 8.4A -	•	Monolithic F	owe	r Syst	B tems	M	P88 Scan	61 II	C G	UI
	Write		ReadBox								
VSEL			System Control	07	D.C.	- 0.5		DC	DC	Di	
Reference	0.72 V		regName	D7	D6	D5	D4	D3	D2	D1	DO
			VSEL	1	0	0	1	1	1	1	0
	Write		SysCntlreg1	0	0	1	0	0	1	1	0
SysCottreg1			SysCntireg2	1	1	0	0	0	0	0	1
Enable	Disabled -	1	Output Voltage	0	0	0	0	0	0	0	0
Go Bit	Go Pit - 0		ID1	1	0	0	0	0	1	1	1
00_01	00_bit=0		Status	0	0	0	0	0	0	0	0
Slew Rate	5mV/us (100) -			-	-	-	-	-	-	-	-
OVP Mode	Auto Recovery Mode(1 -						Read	ł	E	dit Re	qs
OCP Mode	Hiccup Mode (1) -										
Mode	Auto PFM/PWM Mode (-										
	Write										
											Ŧ

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.

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.

🛄 🏺 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 32 bit or 64 bit operating system.

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

 Connect the EVKT-USBI2C-02 Dongle to the PC with the USB cable.

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.



Figure 11: Updating the Driver Software

USBXpres	s Device	Propert	ies				×	
General	Driver	Details	Events					
I	USBXp	ress Dev	ice					
	Driver I	Provider:	Silico	n Laborato	ries Inc.			
	Driver I	Date:	11/6	/2015				
	Driver	Version:	6.7.2	.0				
	Digital	Signer:	Micro Publis	soft Windo sher	ws Hardware Co	ompatibility		
Driv	ver Detail	s	View de	tails about	the installed drive	er files.		
Upo	date Drive	er	Update	the driver f	or this device.			
Roll	Back Driv	/er	If the de back to	vice fails a the previou	fter updating the usly installed drive	driver, roll er.		
Disa	ble Devid	ce -	Disable the device.					
Unin	stall Devi	ce	Uninstal	the device	e from the system	n (Advanced)).	
					ОК	Cancel		

Figure 12: Correct Driver Version



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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