

# Using the LP8731-Q1 Evaluation Board

## User's Guide



Literature Number: SNVU458  
November 2014

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<b>1</b>	<b>Introduction</b> .....	<b>3</b>
<b>2</b>	<b>Hardware Setup</b> .....	<b>3</b>
2.1	Jumper Settings .....	3
2.2	Connect USB2ANY box to LP8731YZREVM.....	3
<b>3</b>	<b>Board Layout and Bill of Materials</b> .....	<b>5</b>
3.1	Bill of Materials for LP8731-Q1EVM.....	6
<b>4</b>	<b>LP8731-Q1EVM PCB Layout and Layers</b> .....	<b>7</b>
<b>5</b>	<b>Graphic User Interface (GUI)</b> .....	<b>8</b>
5.1	Overview .....	8
5.2	PC Requirement.....	8
5.3	Start-Up.....	8
<b>6</b>	<b>General Control and LDO Settings</b> .....	<b>9</b>
6.1	USBAny Control .....	9
6.2	GPIO Enable Control .....	9
6.3	General Control and LDO Settings .....	9
6.4	System Control.....	10
6.5	LDO Output Control .....	10
6.6	Buck Voltage & Ramp Rate Control.....	10
6.7	Buck Function .....	11
6.8	Misc Page.....	12

## **LP8731-Q1 Evaluation Board**

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### **1 Introduction**

The Texas Instrument LP8731YZREVM evaluation module (EVM) helps designers evaluate the operation and performance of the LP8731-Q1 dual high current step down DC/DC and dual linear regulators with I<sup>2</sup>C interface.

The EVM contains one LP8731-Q1 (see [Table 1](#)):

**Table 1.**

PART NUMBER	PACKAGE	BODY SIZE (MAX)
LP8731-Q1	DSBGA (25)	2.52 mm x 2.52 mm

### **2 Hardware Setup**

This section describes the jumpers and connectors on the EVM as well as how to properly connect, set up, and use the LP8731YZREVM. The LP8731YZREVM package should include: one LP8731YZREVM, one USB2ANY box set.

As [Figure 2](#) shows, the USB2ANY box set contains six (A-F) parts, and only three parts (A, B, C) are required for LP8731YZREVM evaluation.

#### **2.1 Jumper Settings**

Place all the jumpers with dark red (power) and light blue (Enable) color mark as shown in [Figure 1](#) .

#### **2.2 Connect USB2ANY box to LP8731YZREVM**

1. Connect USB cable (A) and one side of 30-pin ribbon cable (B) to USB2ANY box(C).
2. Connect another side of the 30-pin ribbon cable(B) to USB2ANY box(C) 30-pin connector.

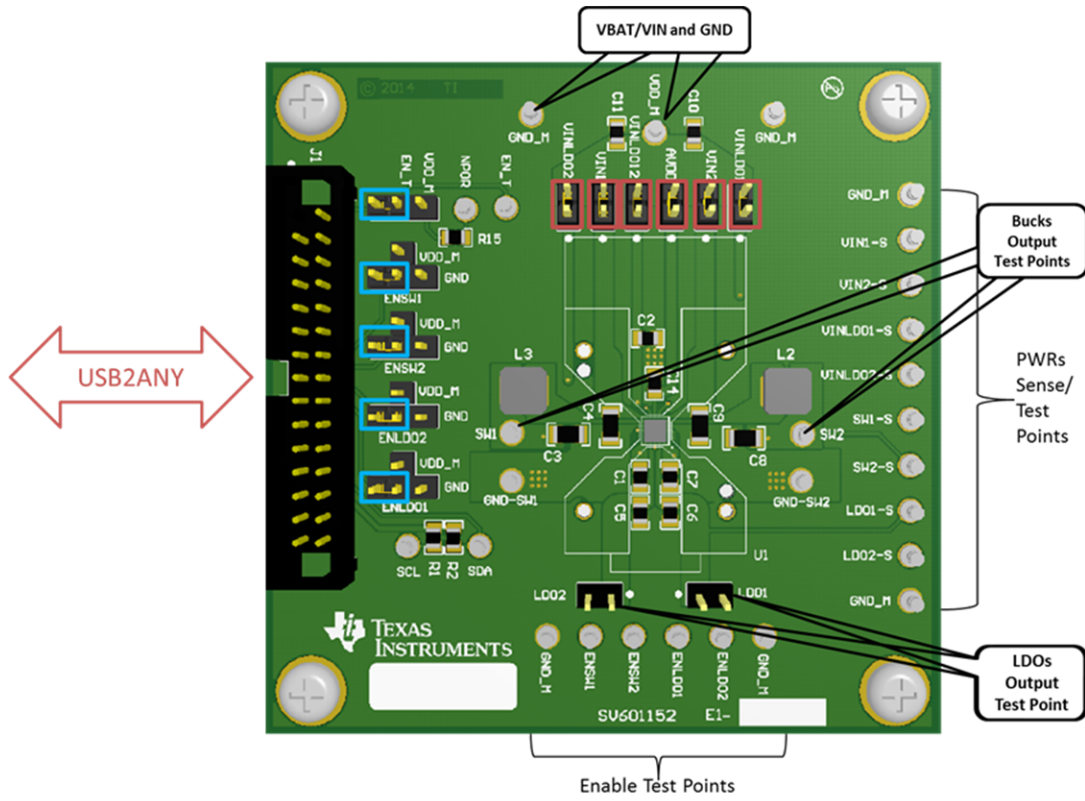


Figure 1.

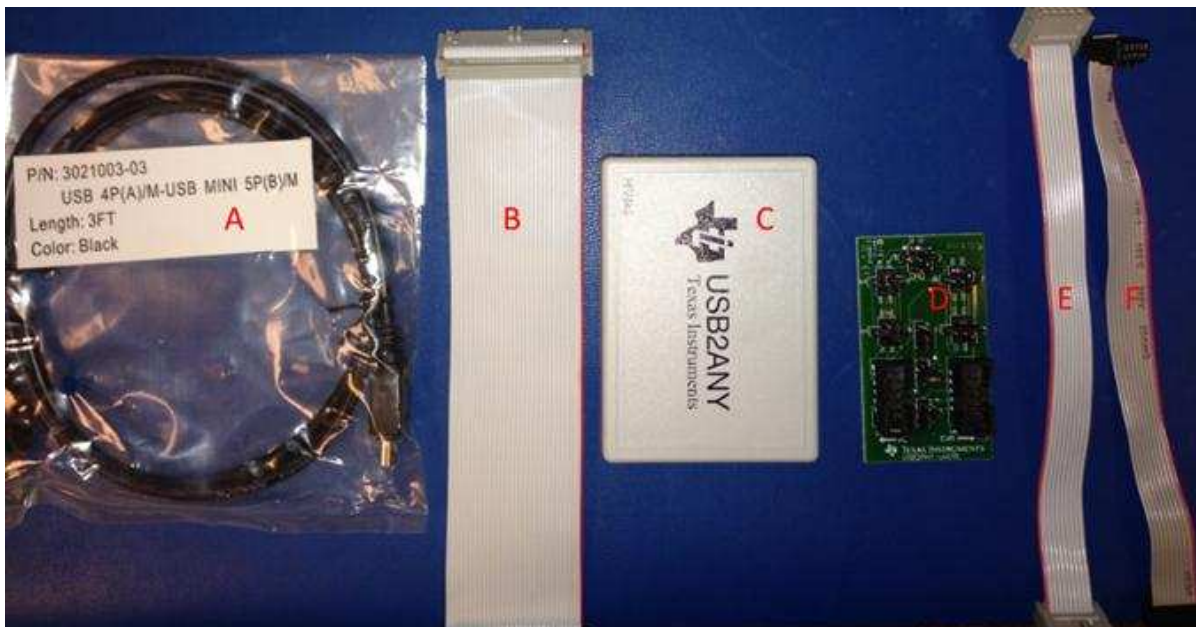


Figure 2.

### 3 Board Layout and Bill of Materials

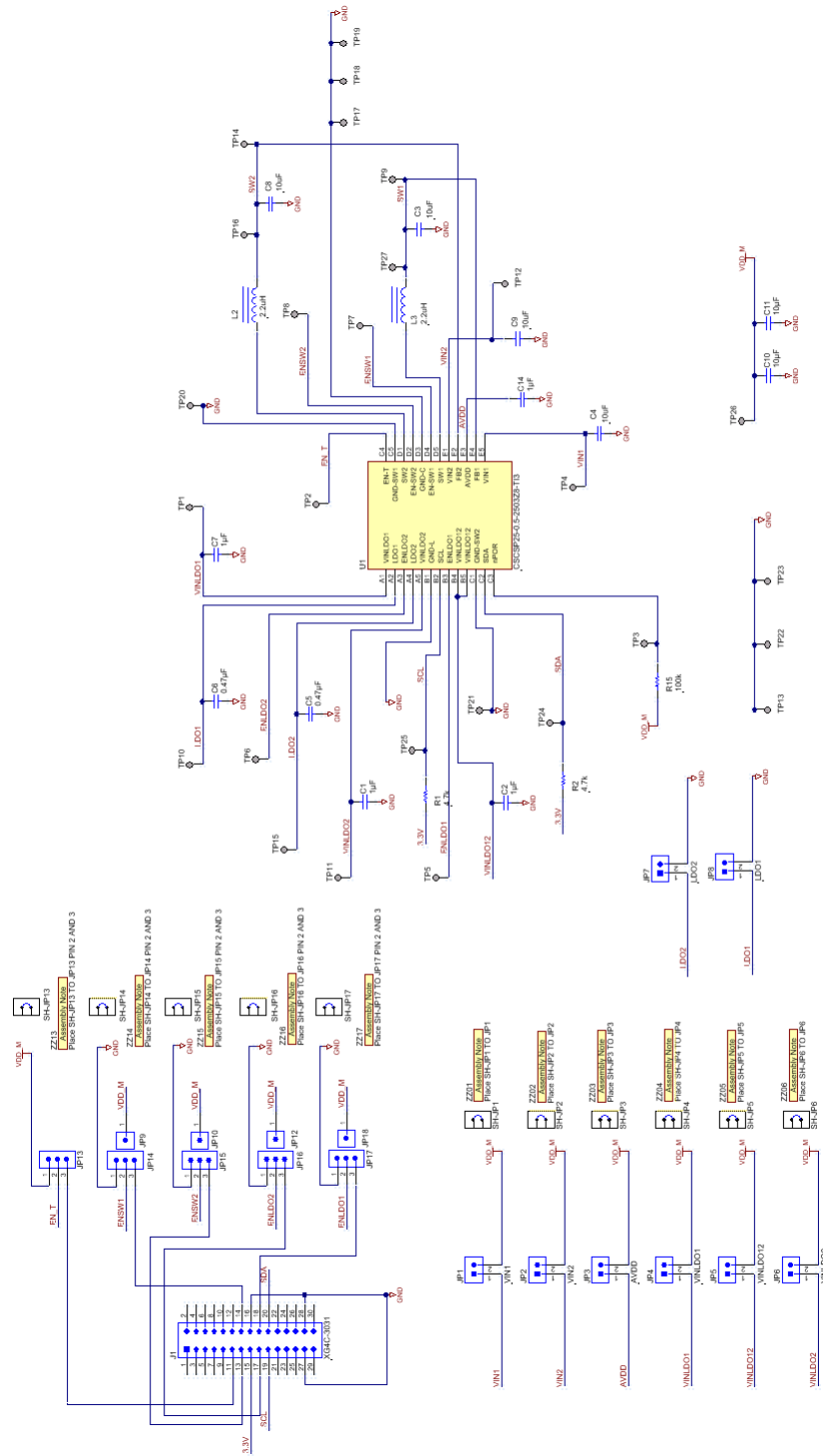


Figure 3. LP8731-Q1 Schematic

### 3.1 Bill of Materials for LP8731-Q1EVM

ITEM	DESIGNATOR	QTY	VALUE	PART NUMBER	MANUFACTURER	DESCRIPTION
1	C1, C2, C7, C14	4	1 $\mu$ F	08055C105KAT2A	AVX	CAP, CERM, 1 $\mu$ F, 50 V, +/- 10%, X7R, 0805
2	C3, C4, C8, C9	4	10 $\mu$ F	C3216X7R1C106M	TDK	CAP, CERM, 10 $\mu$ F, 16V, +/-20%, X7R, 1206
3	C5, C6	2	0.47 $\mu$ F	C2012X7R1E474K	TDK	CAP, CERM, 0.47 $\mu$ F, 25 V, +/- 10%, X7R, 0805
4	C10, C11	2	10 $\mu$ F	EMK212BB7106MG-T	Taiyo Yuden	CAP, CERM, 10 $\mu$ F, 16 V, +/- 20%, X7R, 0805
5	J1	1		XG4C-3031	Omron Electronic Components	Connector, 15x2, 3A 300V STRT DIP, TH
6	JP1, JP2, JP3, JP4, JP5, JP6, JP7, JP8	8		5-146261-1	TE Connectivity	Header, 100mil, 2x1, Gold plated, TH
7	JP9, JP10, JP12, JP18	4		TSW-101-07-G-S	Samtec	Header, 100mil, 1pos, Gold, TH
8	JP13, JP14, JP15, JP16, JP17	5	1 x 3	PBC03SAAN	Sullins Connector Solutions	Header, TH, 100mil, 1x3, Gold plated, 230 mil above insulator
9	L2, L3	2	2.2 $\mu$ H	VLCF5020T-2R2N2R6-1	TDK Corporation	INDUCTOR POWER 2.2UH 2.6A SMD
10	R1, R2	2	4.7 k	CRCW08054K70JNEA	Vishay-Dale	RES, 4.7k $\Omega$ , 5%, 0.125W, 0805
11	R15	1	100 k	CRCW0805100KFKEA	Vishay-Dale	RES, 100k $\Omega$ , 1%, 0.125W, 0805
12	SH-JP1, SH-JP2, SH-JP3, SH-JP4, SH-JP5, SH-JP6, SH-JP13, SH-JP14, SH-JP15, SH-JP16, SH-JP17	11	1 x 2	2SN-BK-G	Samtec	Shunt, 2mm, Gold plated, Black
13	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21, TP22, TP23, TP24, TP25, TP26, TP27	27	Double	1593-2	Keystone	Terminal, Turret, TH, Double
14	U1	1		LP8731Q1YZR	TEXAS INSTRUMENTS	Dual Step-Down DC/DC and Linear Reg

## 4 LP8731-Q1EVM PCB Layout and Layers

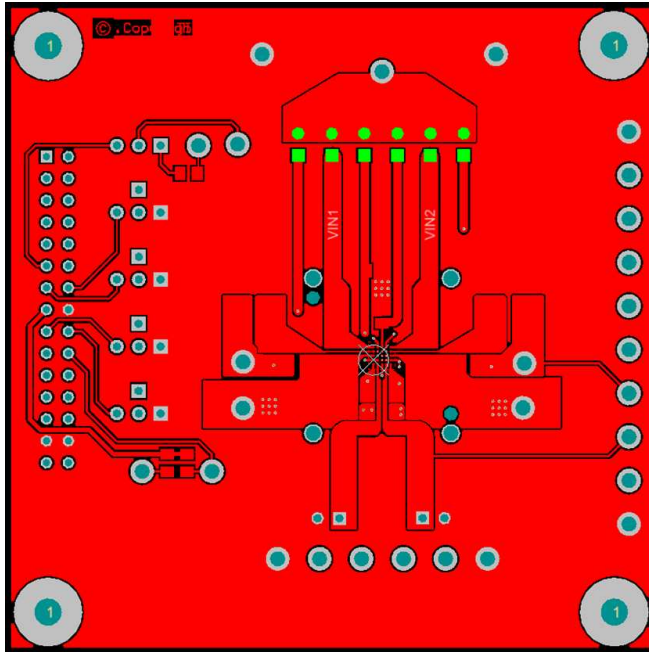


Figure 4. Top Layer

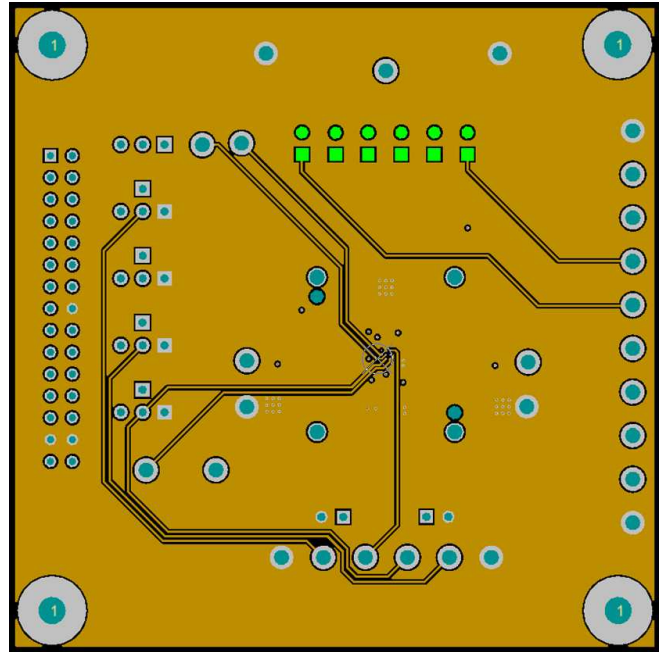


Figure 5. Mid-Layer 1

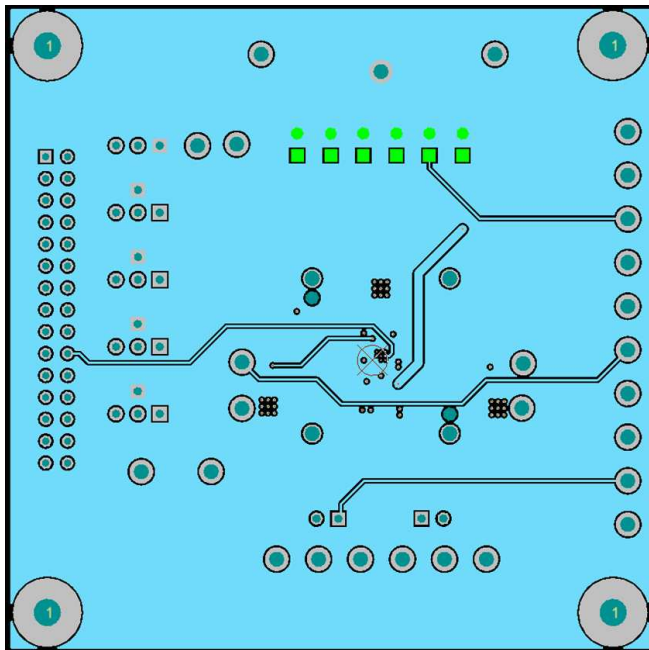


Figure 6. Mid-Layer 2

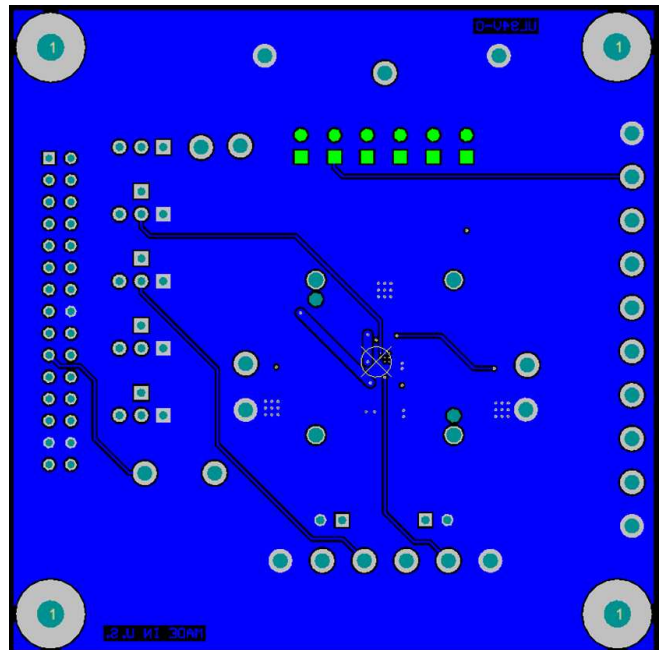


Figure 7. Bottom Layer



## 5 Graphic User Interface (GUI)


### 5.1 Overview

Texas Instruments has created a graphic user interface (GUI) and USB2ANY box that can help exercise the part in a simple way. This section describes in detail of how to use the GUI to communicate with the LP8731YZREVM.

### 5.2 PC Requirement

Windows 7, Microsoft .net framework 4.0

### 5.3 Start-Up

1. Complete the hardware setup following previous setup section.
2. Apply recommended voltage (see LP8731-Q1 data sheet ([SNVSA28](#)) for details) to LP8731YZREVM.
3. Launch the GUI by double clicking the Icon  LP8731Q1\_eval
4. The GUI then launches as picture shows below

**NOTE:** At the first time use, the USB2ANY firmware update message window pops up, please simply follow the screen instruction to complete the update.

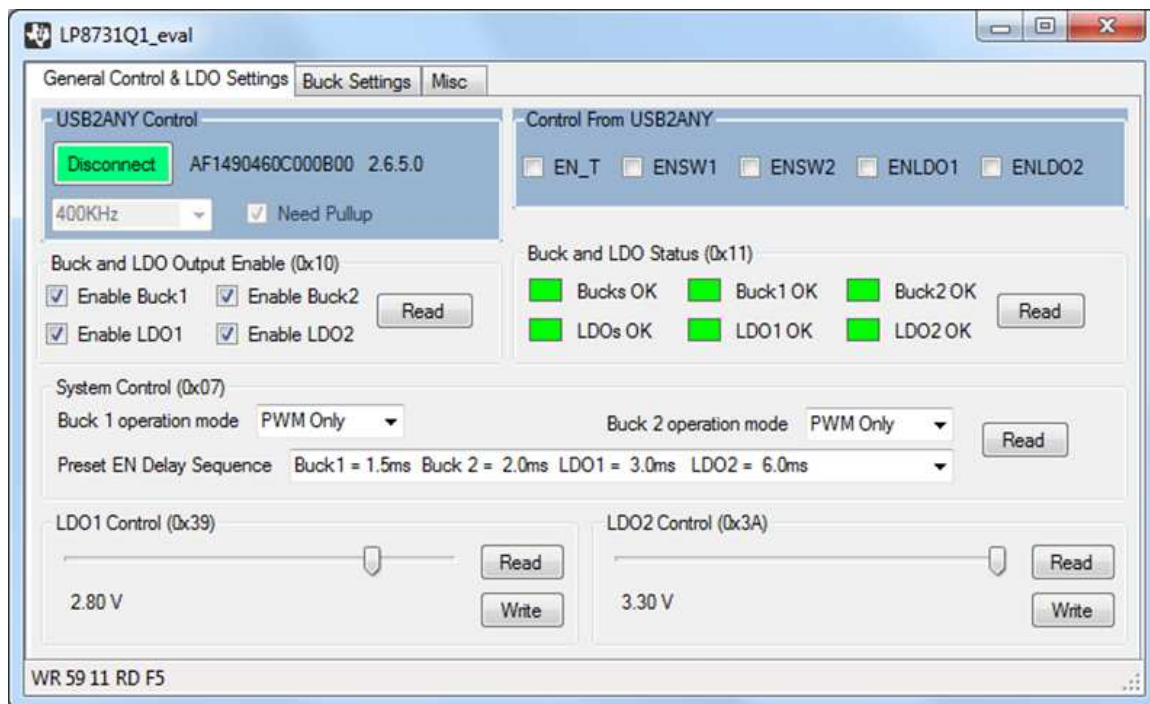


Figure 8.



## 6 General Control and LDO Settings

### 6.1 USBAny Control

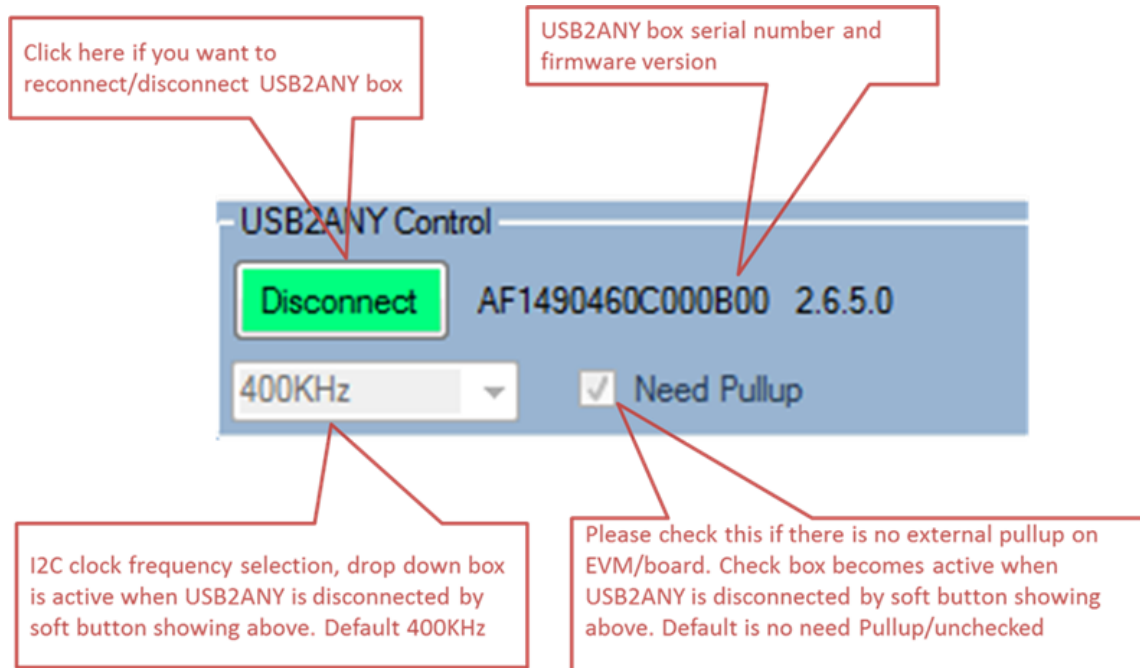


Figure 9. USB2ANY Control

### 6.2 GPIO Enable Control



Figure 10.

**NOTE:** In order to have the control works correctly, please place the jumpers according to [Section 2](#).

### 6.3 General Control and LDO Settings

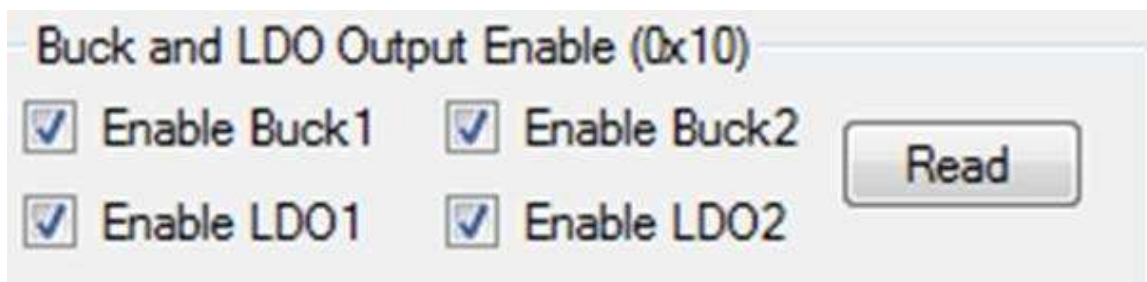
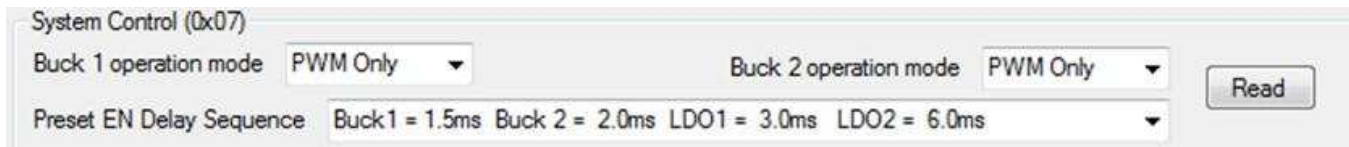


Figure 11.

Individual enable register for each power rail, default are all enabled.

## 6.4 System Control



System Control (0x07)

Buck 1 operation mode: PWM Only

Buck 2 operation mode: PWM Only

Preset EN Delay Sequence: Buck1 = 1.5ms Buck 2 = 2.0ms LDO1 = 3.0ms LDO2 = 6.0ms

Read

Figure 12.

Two dropdown boxes for selecting buck power operating mode PWM Only or Auto (note the default is PWM mode) — please contact TI sales office if the auto/PFM mode is needed. The third dropdown box is used for selecting power up/down sequence delay when EN\_T control is used.

## 6.5 LDO Output Control



LDO1 Control (0x39)

2.80 V

Read

Write

LDO2 Control (0x3A)

3.30 V

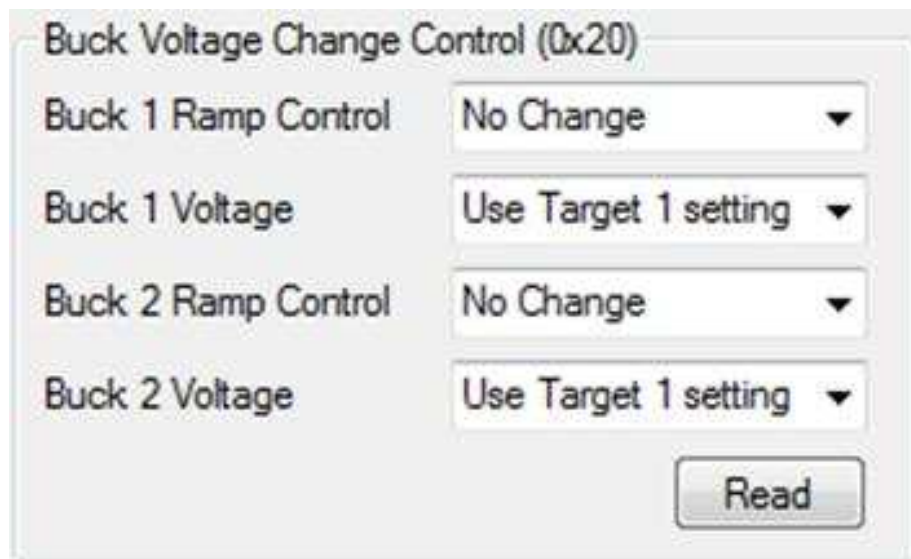
Read

Write

Figure 13.

Two slide bars are used to change the LDO outputs.

## 6.6 Buck Voltage & Ramp Rate Control



Buck Voltage Change Control (0x20)

Buck 1 Ramp Control: No Change

Buck 1 Voltage: Use Target 1 setting

Buck 2 Ramp Control: No Change

Buck 2 Voltage: Use Target 1 setting

Read

Figure 14.

These four drop-down boxes are used to select target voltage and ramp for both buck regulators, please read the LP8731Q datasheet link for detail information. Read button is for updating/reading the latest register values.

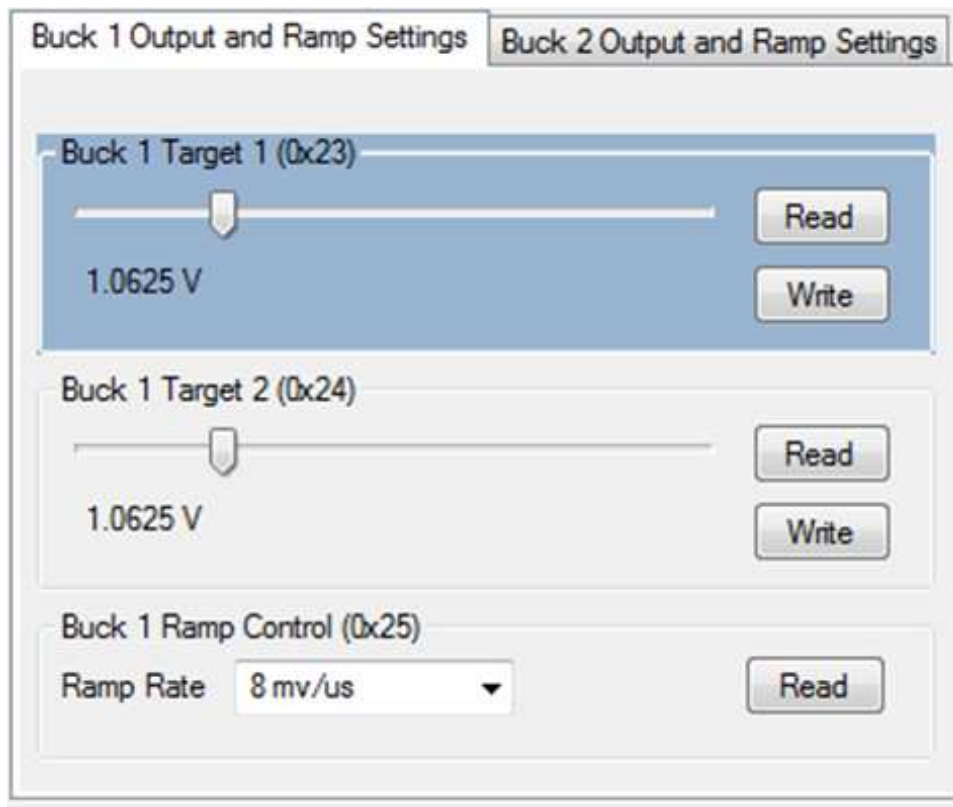


Figure 15.

### 6.7 Buck Function

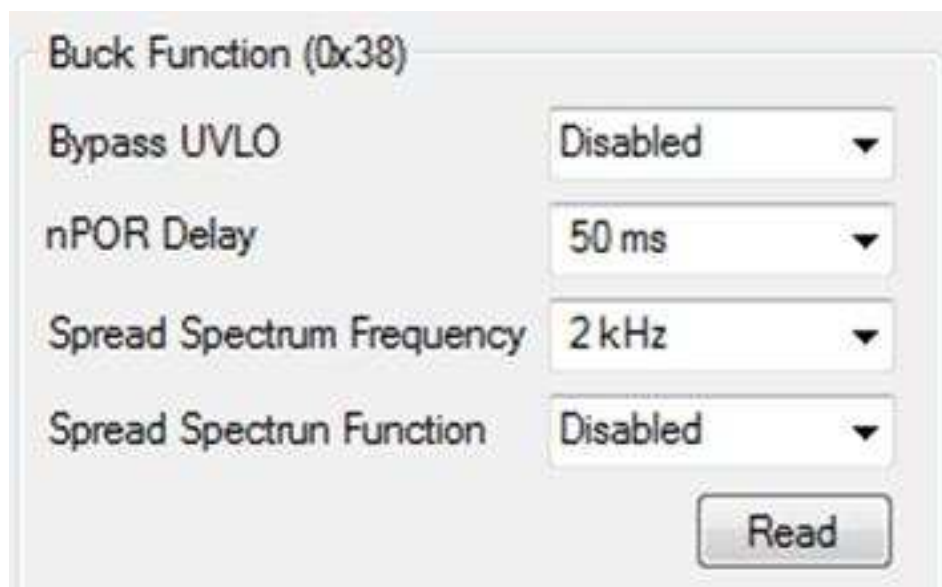


Figure 16.

This section is used to interface with UVLO enable, nPOR delay, buck spread spectrum enable and frequency registers.

### 6.8 Misc Page

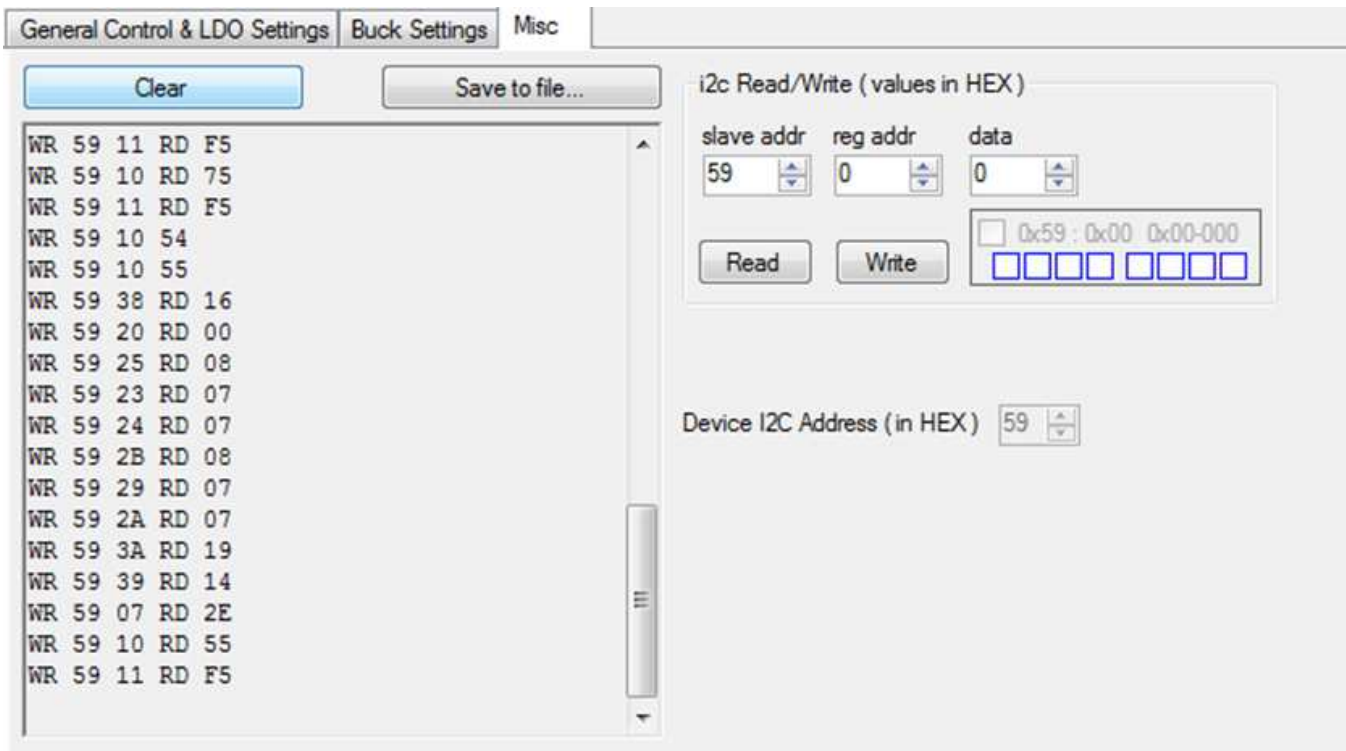


Figure 17.

This page contains the I<sup>2</sup>C log on the left and a manual I2C Read/Write tool on the right side, default I<sup>2</sup>C address is 59.

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- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### 3.2 Canada

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2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.



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