LM10524EVM User Guide

User's Guide

Literature Number: SNVU314
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LM10524EVM User Guide

The LM10524 is an advanced PMU containing three configurable, high efficiency buck regulators for supplying variable voltages. The device is ideal for supporting ASIC and SOC designs for SSD and Flash drives.

Topic **Page**

1 **Evaluation Kit Overview** 3
2 **Evaluation Software** 4
3 **Hardware Set Up** 4
4 **Using the Evaluation Software** 4
5 **Menus** 7
6 **Using the Evaluation Hardware** 7
7 **Schematics** 10
8 **PCB Layers** 12

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1 Evaluation Kit Overview

LM10524EVM board operates through the USB port. The Evaluation Kit consists of:

- LM10524EVM Board
- USB Interface Cable
- Evaluation Kit Document (this document).

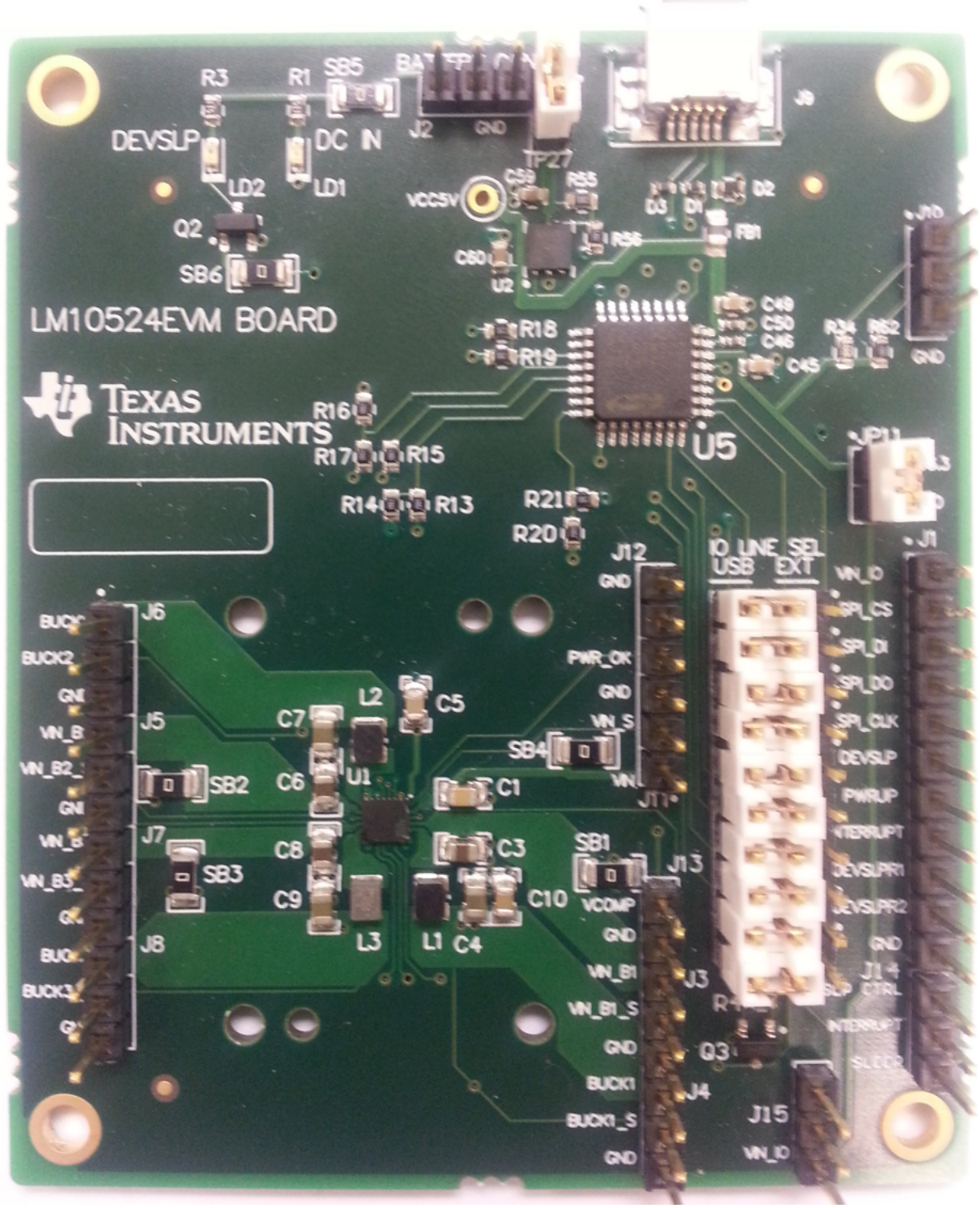


Figure 1. LM10524EVM Board

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2 Evaluation Software

LM10524 evaluation software is supplied together with documentation regarding the circuit. Download the software to your PC's hard disk. Run the software by double clicking the icon of lm10524.exe found in the folder. The software does not require any installation.

The evaluation software (GUI) allows control of all registers necessary to program the device. To simplify the use of the GUI, the registers are set by directly named controls. The user does not need the register value as this is handled by the software. For example, to change BUCK3 output voltage to 1.0 V, choose the related value and the software will send the correct value to the BUCK3 control register to update the output level on Buck 3. To observe the corresponding change in the probes, check the Poll Status box at bottom left.

3 Hardware Set Up

Please use ESD protection when handling the evaluation boards to prevent any damage due to ESD events!

Connect the LM10524 Evaluation board to the USB port of a PC using the USB cable.

When the USB board is plugged in for the first time, the operating system prompts for "New hardware found" and installs the USB driver. If this does not happen, try unplugging and plugging in the cable again.

Always disconnect the USB cable from the computer when changing jumper settings.

If the evaluation board is not responding or the evaluation software hangs up, disconnect the USB cable for 5 seconds.

4 Using the Evaluation Software

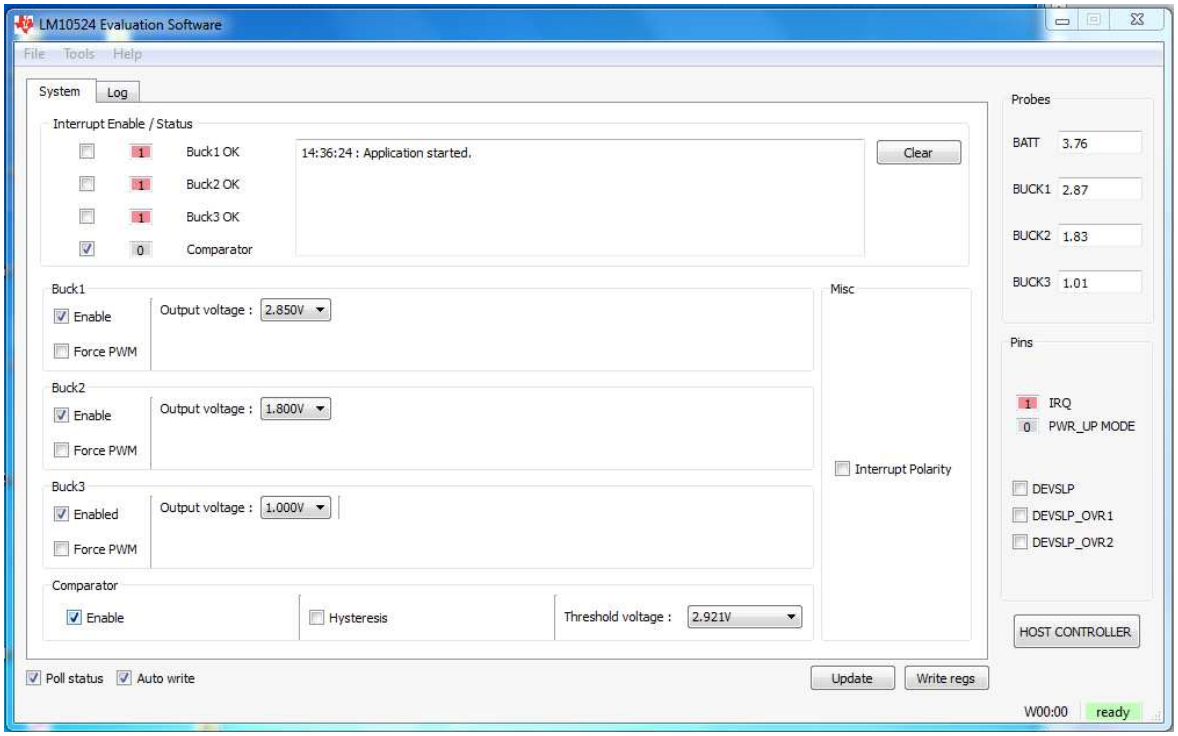


Figure 2. System Settings Tab

The graphical user interface has a main screen with two tab screens which allow control and indication for different functions of the device.

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4.1 Operation

Once the evaluation board is connected to the PC, use the software interface to control the device.

The LM10524 should become active as soon as the USB cable is plugged in and 'Power Up Mode' is clicked.

To Enable DEVSLP mode, PWR_UP mode should be pulled low using PWR_UP Pulse Button.

When the USB cable is plugged in, an orange led LD1 (DC IN) is lit. When the device starts up correctly, a green LED, LD1 (PWR_OK), is lit. When the LM10524 is in devsleep mode, A red LED, LD2 (DEVSLP), is lit. All the device functions can be accessed via the control buttons.

4.2 Main Screen (Figure 2 & Figure 3)

The right and lower part of screen is visible as the background for both tab screens. Common functions can be controlled here.

4.3 Right Part of Screen

The Probe frame contains the results of the voltage measurements. Values can be read when the device becomes active.

The Pins frame shows the status of IRQ pin & PWR_UP mode. It also contains checkboxes to control DEVSLEEP and PWR_UP PULSE signals.

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4.4 Lower Part of Screen

This part of the screen contains the following checkboxes and buttons:

- ''Poll status'' checkbox: Allows continuous reading of the evaluation chip status register, the state of I/O pins, and the voltage measurement results.
- ''Auto write'' checkbox: If this box is checked, any change to registers will be written to the device immediately. Otherwise, the user must press "Write regs" button to update registers. This way, the user can change values in several registers and update changes simultaneously.
- ''Update'' button: Reads content of every register and updates screen accordingly.
- ''Write regs'' button: If Auto write checkbox is disabled, the user can press this button to update the content of every register.

The status bar at the bottom right corner of the window indicates whether or not the connection to the evaluation board has been established, and displays information about the last register write/read operation. Register information is given in the format: "R/WXX:YY", where first letter indicates operation (Read or Write), XX is the register address, and YY is data.

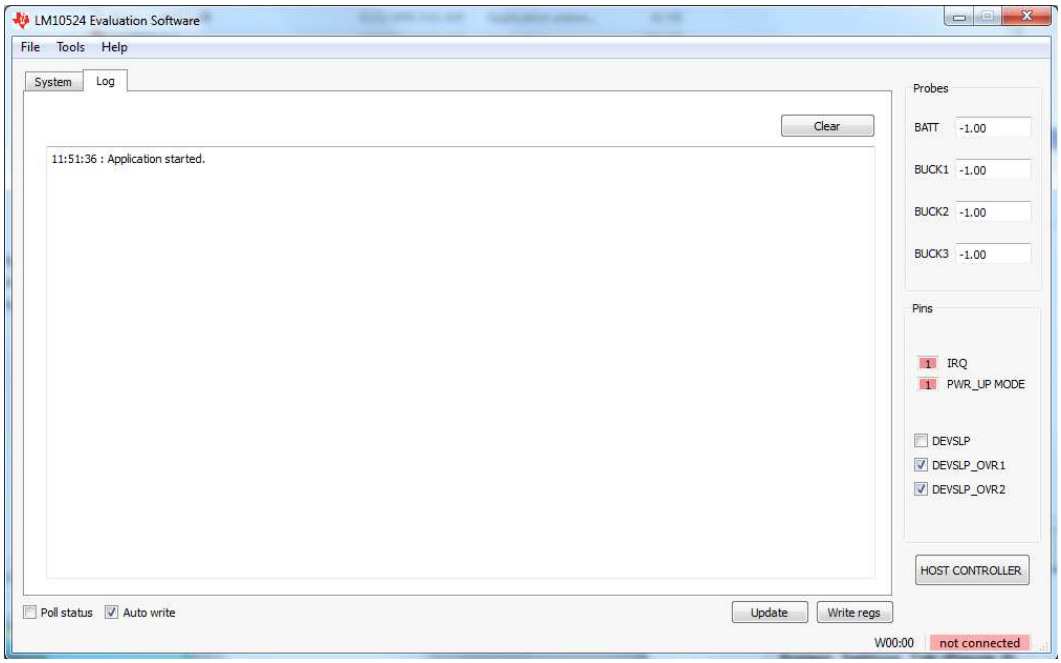


Figure 3. Log Tab

4.5 System Settings Tab (Figure 2)

Selecting this tab allows access to the controls of Buck1, Buck2 and Buck3 regulators, comparator Disable, and PWR_OK pin polarity. It also shows a log of occurred events.

In System status/events frame, the user can observe the Status bits. Also, the user can enable Poll status checkbox at the lower left corner of the window to get continuous status updates (1 update/sec).

In the Buck1, Buck2 and Buck3 frames, the user can set the output voltage of each buck regulator, enable each regulator, or force it to PWM mode. Also in Buck3, user can set the output voltage for normal mode and DevSleep mode.

"Misc Frame" contains controls for Interrupt pin polarity.

4.6 Log tab (Figure 3)

This tab records all SPI transfers. The user can copy write or read sequences to clipboard. The log window can be cleared by pressing clear button.

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5 Menus

Under the “File” menu the user can save and load contents of register map.

Under the “Tools” menu, the user can open “Direct Register Access” dialog, shown in Figure 4.

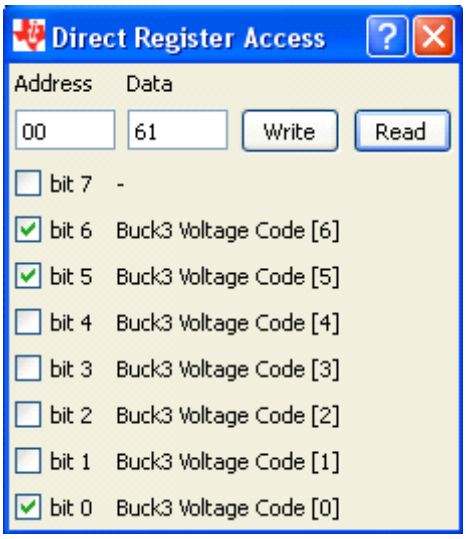


Figure 4. Direct Register access

The registers may read and write binary data. Use hexadecimal values in address and data fields. Correct data value can also be created by setting and clearing individual bits. Value is immediately written to the device by pressing the "Write" button, and read from the device by pressing the "Read" button. Next to each bit is a description.

6 Using the Evaluation Hardware

Connectors are provided to allow a battery connection and output voltage measurement. Jumpers allow selectable or USB controlled settings for device functions.

6.1 Power Supply

The evaluation board may be powered from a battery connector or from the USB interface.

Set jumper between J2 pin2 and TP27 to use supply from USB. Maximum current for USB supply is 500 mA.

Table 1. BATTERY CONNECTOR J2
Battery connector pins

Pin	Function
1	Battery (+) Terminal
2	GND

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6.2 Control

A green LED (PWR_OK) will be illuminated once the LM10524 has started up. JP11 and J13 should be set accordingly.

The logic signals can be controlled either by the evaluation software or externally through the connector labeled 'I/O LINE SEL'. Set the jumper block from JP2 to JP9 accordingly.

Table 2. USER CONNECTOR J1
User Connector Pins

Pin	Function
1	VIN_IO
2	SPI_CS
3	SPI_DI
4	SPI_DO
5	SPI_CLK
6	DEVSLP
7	PWRUP
8	INTERRUPT
9	DEVSLP_OVR1
10	DEVSLP_OVR2
11	GND

For accessing the signals externally via this connector, jumpers from JP2 to JP10 should be set to EXT position.

Table 3. CONNECTOR J3 Pins

Pin	Function
1	VIN_B1
2	VIN_B1 sense
3	GND

Table 4. CONNECTOR J4 Pins

Pin	Function
1	BUCK1
2	BUCK1 sense
3	GND

Table 5. CONNECTOR J Pins

Pin	Function
1	VIN_B2
2	VIN_B2 sense
3	GND

Table 6. CONNECTOR J6 Pins

Pin	Function
1	BUCK2
2	BUCK2 sense
3	GND

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Table 7. CONNECTOR J7 Pins

Pin	Function
1	VIN_B3
2	VIN_B3 sense
3	GND

Table 8. CONNECTOR J8 Pins

Pin	Function
1	BUCK3
2	BUCK3 sense
3	GND

Table 9. CONNECTOR J11 Pins

Pin	Function
1	VIN
2	VIN_sense
3	GND

Table 10. CONNECTOR J12 Pins

Pin	Function
1	Power_OK
2	
3	GND

Table 11. CONNECTOR J13 Pins

Pin	Function
1	VCOMP
2	GND

Table 12. CONNECTOR J14 Pins

Pin	Function
1	SLEEP_EN
2	IRQx
3	DEVSLP_CTRLx

Table 13. CONNECTOR J15 Pins

Pin	Function
1	VIN_IO
2	ALLOW_SLEEP_EXT
3	GND

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7 Schematics

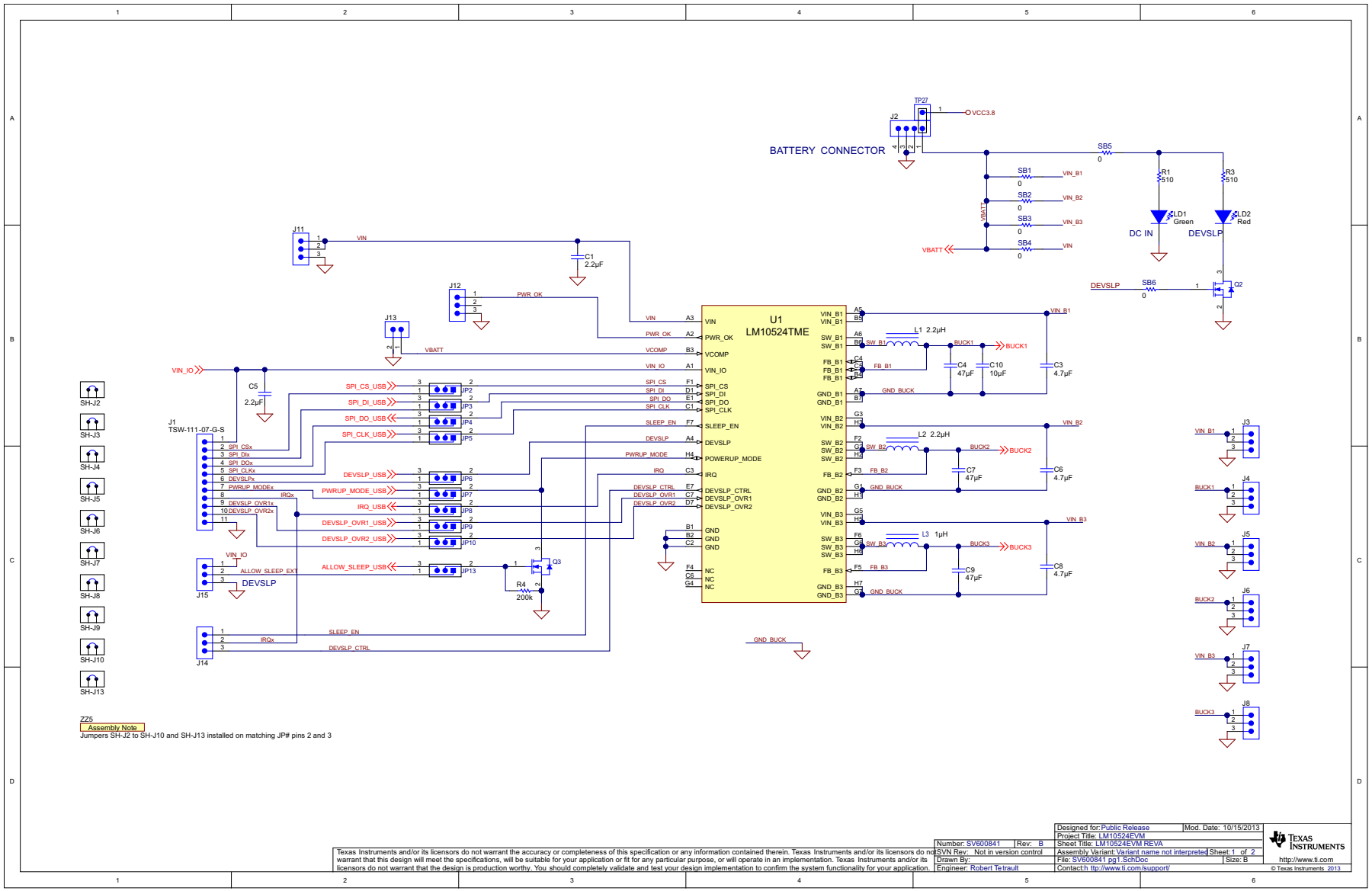


Figure 5. LM10524EVM Schematic

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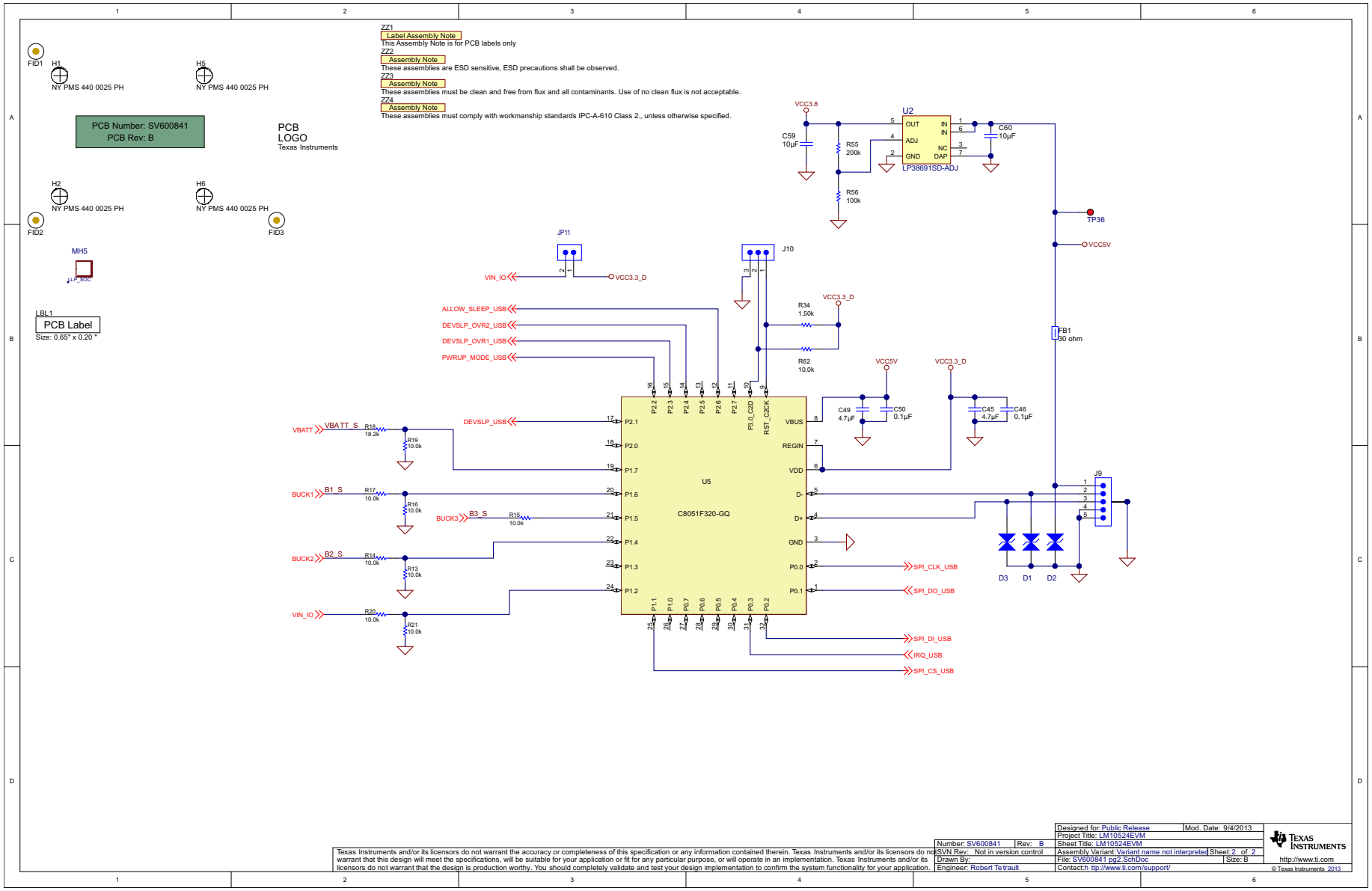


Figure 6. LM10524EVM Schematic

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8 PCB Layers

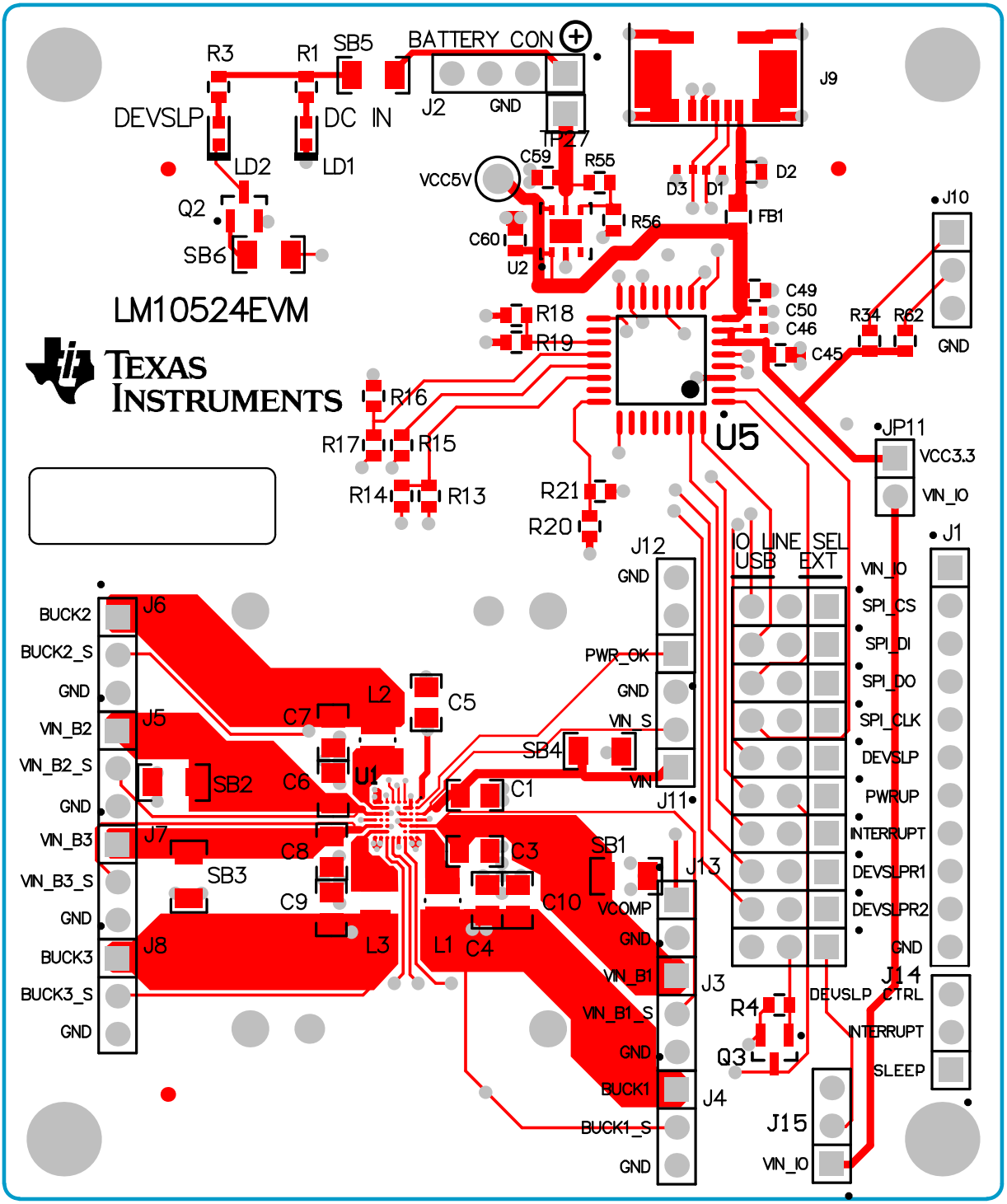


Figure 7. Top Layer

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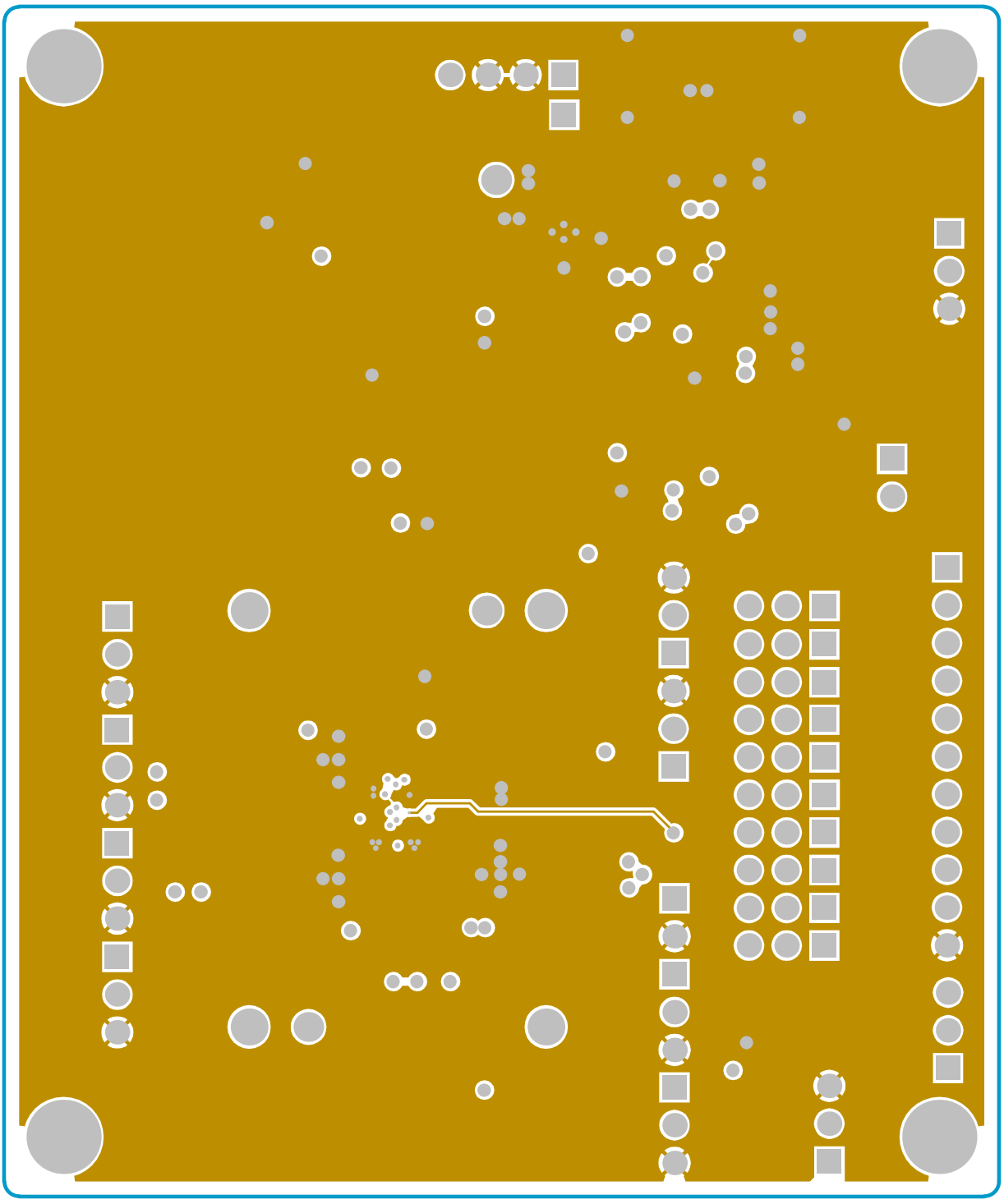


Figure 8. Middle Layer

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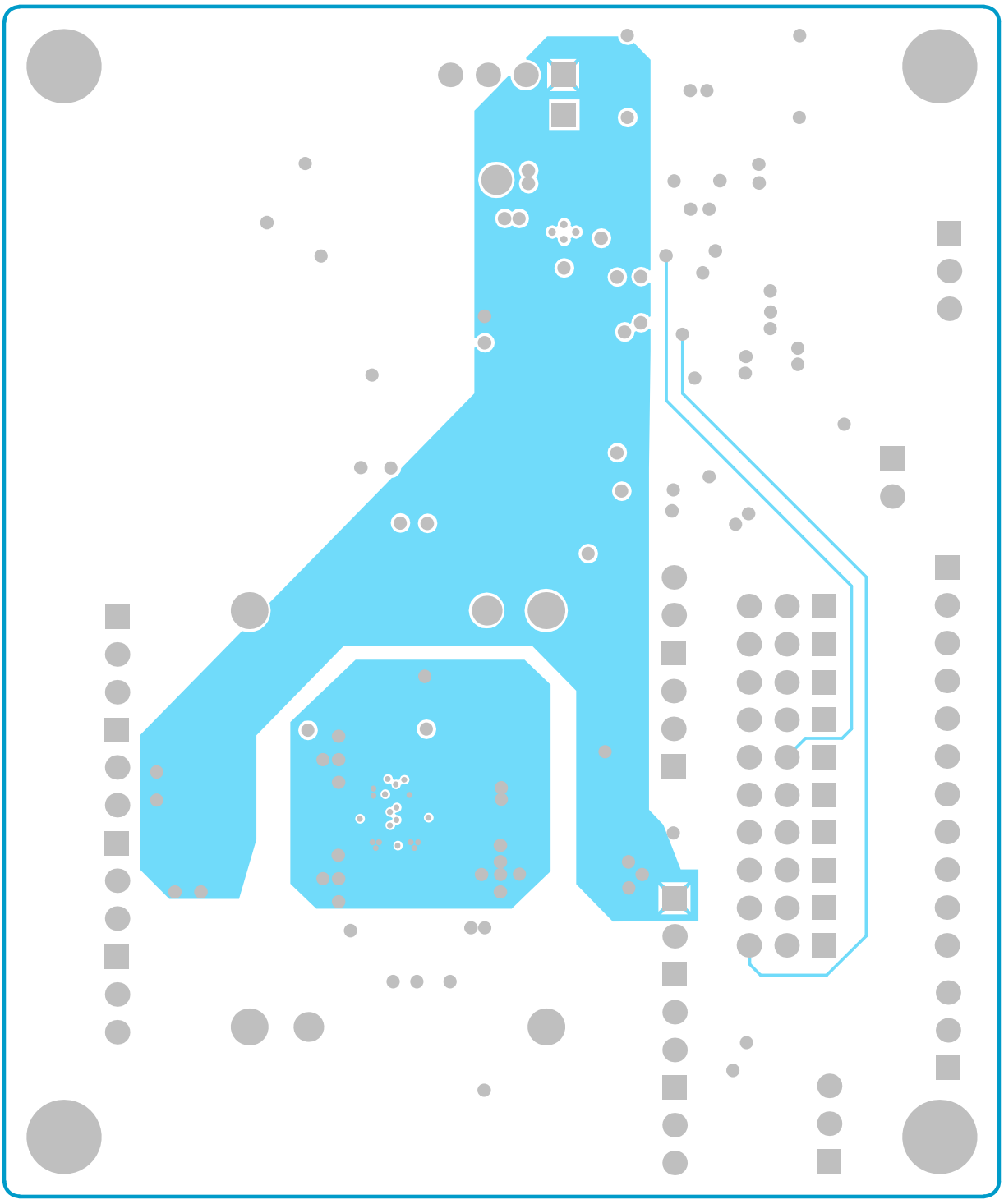


Figure 9. Middle Layer

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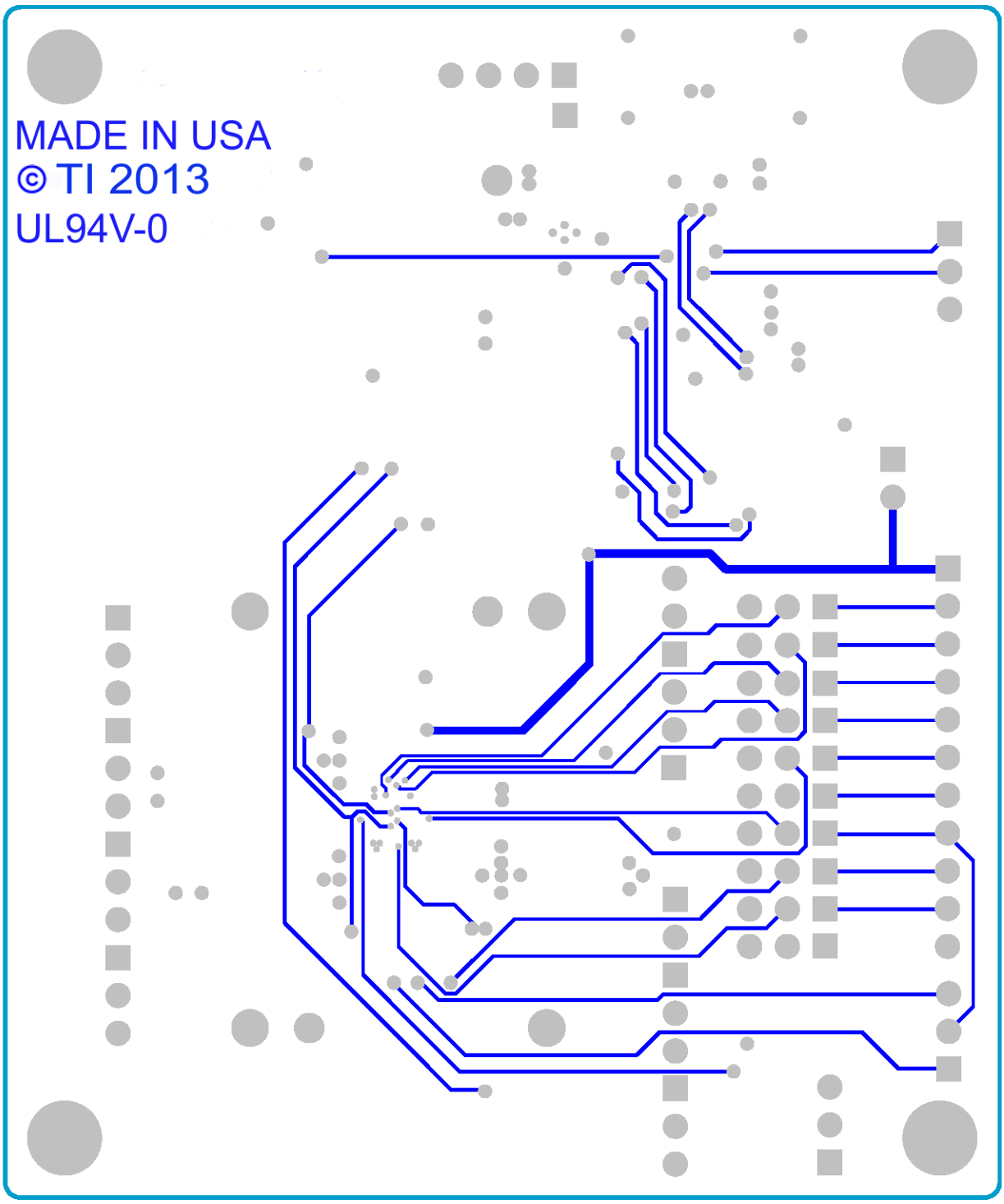


Figure 10. Bottom Layer

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      Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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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.*

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Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur

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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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