1 General Description

The LM10502 is an advanced PMU containing two configurable, high efficiency buck regulators for supplying variable voltages plus a low drop-out linear regulator. The device is ideal for supporting ASIC and SOC designs for SSD and Flash drives.

2 Evaluation Kit Overview

The LM10502 evaluation kit is a single-board solution allowing control and measurement from a user interface software. The board operates either from PC control via the USB port or as a separately powered stand-alone evaluation platform.

The evaluation kit consists of

- LM10502 Evaluation board REV 1
- USB Interface cable
- Evaluation software
- A copy of the LM10502 User Guide (this document)

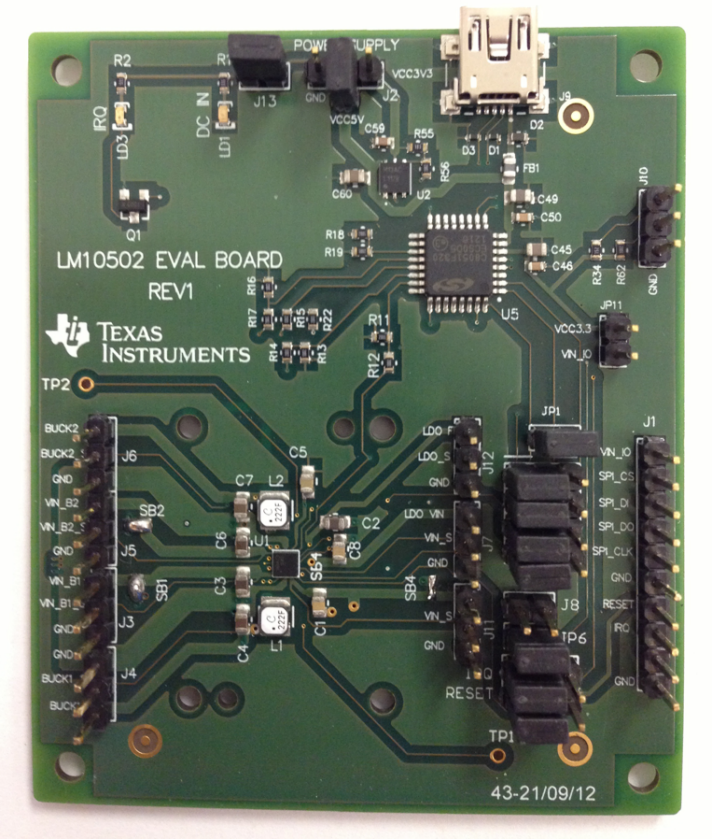

Figure 1. LM10502 Evaluation Board

3 Evaluation Software

The LM10502 evaluation software is supplied together with documentation regarding the circuit. Copy the folder “LM10502” to your PC’s hard disk. The software is run by double-clicking the icon of the ***LM10502.exe*** found in the folder. The software does not require any installation.

The evaluation software allows control of all registers necessary to program the device. To simplify use of the software, the registers are set by directly named controls. The user does not need the register value as this is taken care of by the software; e.g., to change BUCK1 output voltage to 1.2V, choose the related value, and software will send the correct value to the BUCK1 control register. To observe corresponding change in the probes, the Poll Status must be set.

4 Hardware Setup

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

Connect the LM10502 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.

5 Using the Evaluation Software

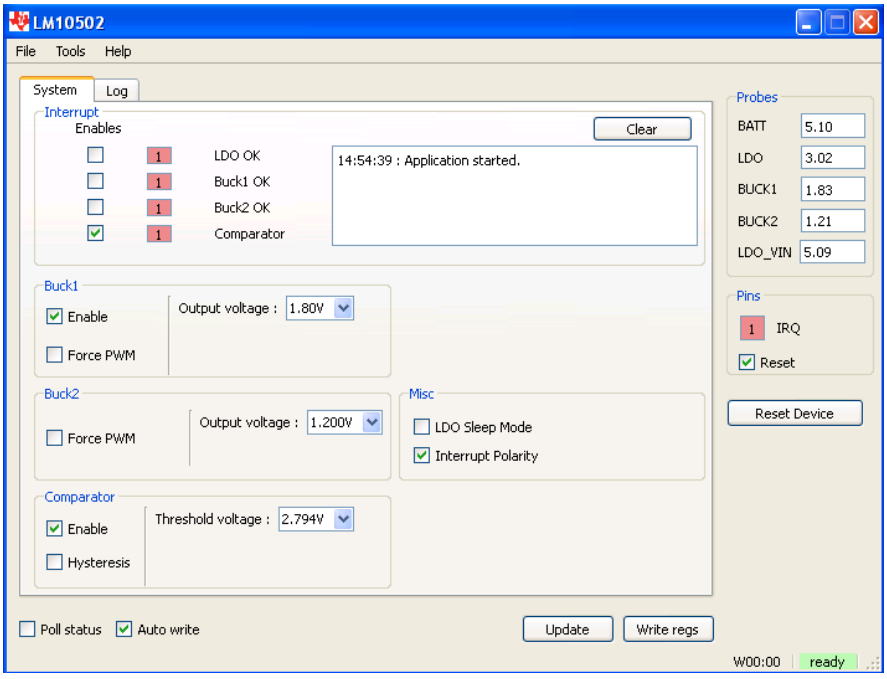

Figure 2. System Settings Tab

The graphical user interface has a main screen with 2 tab screens which allow control and indication for different functions of the device.

Once the evaluation board is connected to the PC, device can be controlled via the software interface.

The LM10502 should become active as soon as the USB cable is plugged in. When device starts up correctly, a yellow LED LD1 and green LED LD3 is illuminated. All the device functions can be accessed via the control buttons.

5.1 Main Screen (Figures 2 & 3)

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

5.2 Right Part of Screen

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

The **Pins** frame shows the status of the **IRQ** and **Reset** pins.

Pressing the **RESET_DEVICE** button causes a 50-ms negative pulse in reset pin.

5.3 Lower Part of Screen

This part of the screen contains following check-boxes and buttons:

Poll status checkbox:

Allows continuous reading of the evaluation chip status register, state of I/O pins, and voltage measurement results

Auto write checkbox:

If this box is checked, any change to registers will be written to the device immediately. Otherwise, user must press **Write regs** button to update registers. This way, 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, user can press this button to update content of every register.

There is a status bar at the bottom of the screen. It shows if connection to evaluation board is established, and 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 register address and YY is data.

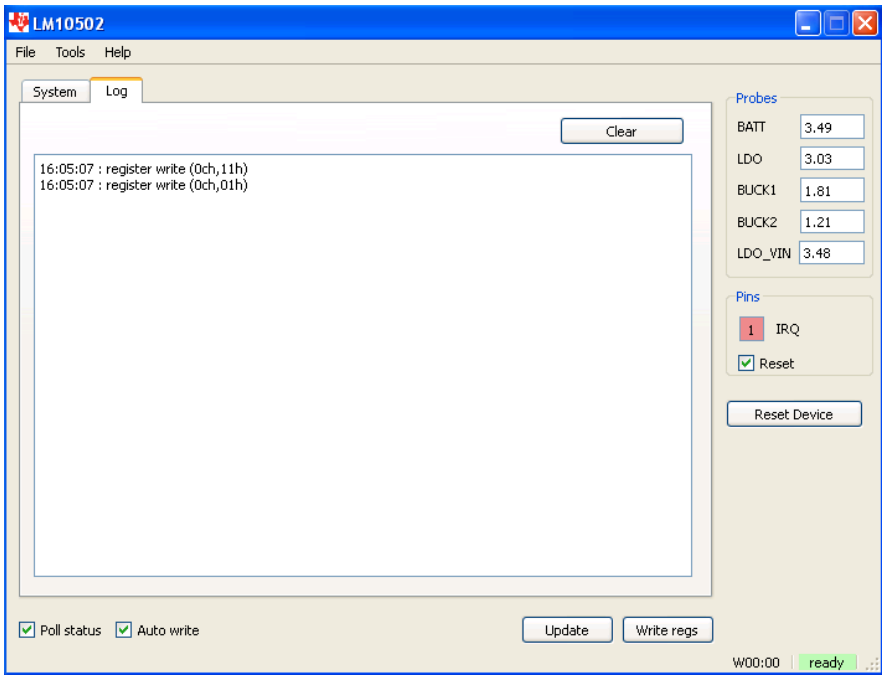

Figure 3. Log Tab

5.4 System Settings Tab (Figure 2)

Selecting this tab allows access to the controls of Buck1, Buck2, Comparator, LDO Sleep Mode, and Interrupt pin polarity. It also shows a log of occurred events.

In the System **Interrupt** frame, the user can choose to enable the output monitor function in the **Enables** checkboxes and can observe the output **Status** bits. Also, if the **Poll status** checkbox is checked at lower part of screen, this frame will get continuous status updates (1 update/sec).

In the **Buck1** and **Buck2** frames the user can set the output voltage of the buck regulator, enable regulator for Buck1, or force it to PWM mode.

In the **Comparator** frame the user can **enable** the comparator, set the **threshold voltage**, and enable **hysteresis**.

The **Misc** frame contains controls for **LDO Sleep Mode** bit and **Interrupt pin polarity**.

5.5 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.

5.6 Menus

Under “File” menu user can save and load contents of register map. Under “Tools” menu user can open “Direct Register Access” dialog, shown in Figure 4.

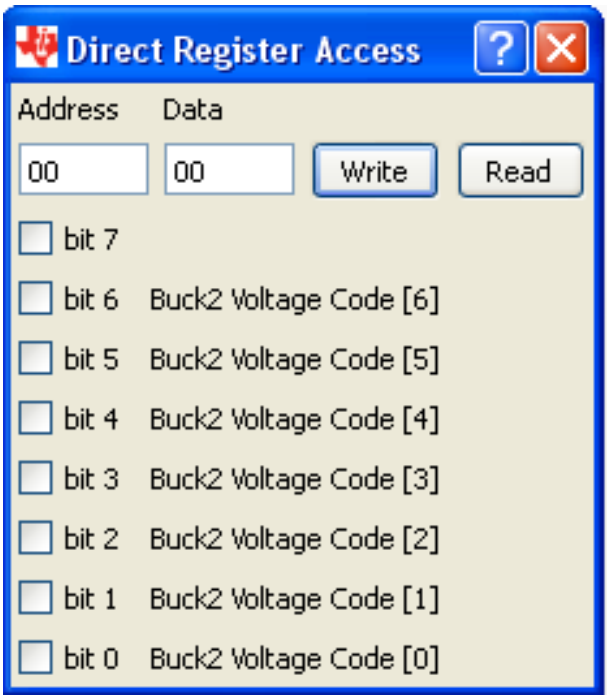

Figure 4. Direct Register Access

Binary data may be written and read from the registers. 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 ‘Write’ button and read from the device by pressing ‘Read’ button. Next to each bit is a description of that particular bit.

6 Using the Evaluation Hardware

Connectors are provided to allow a battery connection and output voltage measurement. Jumpers allow user-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 TP36 to use 5V supply from USB. Maximum current for USB supply is 500 mA. Alternatively moving the jumper to pins 1 and 2 will provide a 3.3V supply to the device.

Table 1. Battery Connector J2

Pin	Function
1	VCC3V3
2	Battery (+) terminal
3	GNC
TP36	VCC5V

6.2 Control

A green and a yellow LED will be illuminated once the LM10502 has started up. Place a jumper on JP1 to connect VIN_IO to LDO_OUT. Otherwise, to power VIN_IO from the on-board 3.3V supply, place a jumper on JP11; JP1 should be open in this case.

6.3 Logic Connectors

The logic signals can be controlled either by the evaluation software or externally through connector labeled. Set the jumper block shown accordingly.

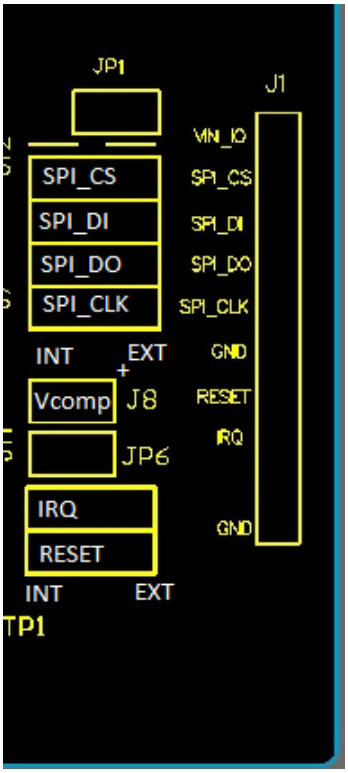

Figure 5. Logic Signal Jumper Detail

Table 2. Logic Jumpers

Jumper		Control
JP2	SPI_CS	Int / Ext
JP3	SPI_DI	Int / Ext
JP4	SPI_DO	Int / Ext
JP5	SPI_CLK	Int / Ext
JP7	IRQ	Int / Ext
JP8	RESET	Int / Ext

Table 3. Other Jumper Connections

Jumper	Option
JP1	Connect LDO_OUT to VIN_IO
JP6	Connect VIN to VCOMP
JP9	Connect LDO_VIN to VIN via JP6 and VCOMP

6.4 Board Power INPUT and OUTPUT Connectors

Table 4. Connector J3

Pin	Function
1	VIN_B1
2	VIN_B1 sense
3	GND

Table 5. Connector J4

Pin	Function
1	BUCK1
2	BUCK1 sense
3	GND

Table 6. Connector J5

Pin	Function
1	VIN_B2
2	VIN_B2 sense
3	GND

Table 7. Connector J6

Pin	Function
1	BUCK2
2	BUCK2 sense
3	GND

Table 8. Connector J7

Pin	Function
1	LDO_VIN
2	LDO_VIN sense
3	GND

Table 9. Connector J8

Pin	Function
1	VCOMP
2	VIN_B1 sense

Table 10. Connector J11

Pin	Function
1	VIN
2	VIN sense
3	GND

Table 11. Connector J12

Pin	Function
1	LDO
2	LDO sense
3	GND

6.5 User Connector J1

For accessing the signals externally via this connector, jumpers from JP2 to JP5 and JP7 and JP8 should be set to EXT position.

Table 12. User Connector Pins

Pin	Function
1	VIN_IO
2	SPI_CS
3	SPI_DI
4	SPI_DO
5	SPI_CLK
6	GND
7	RESET
8	IRQ
9	
10	GND

7 Evaluation Board Layer

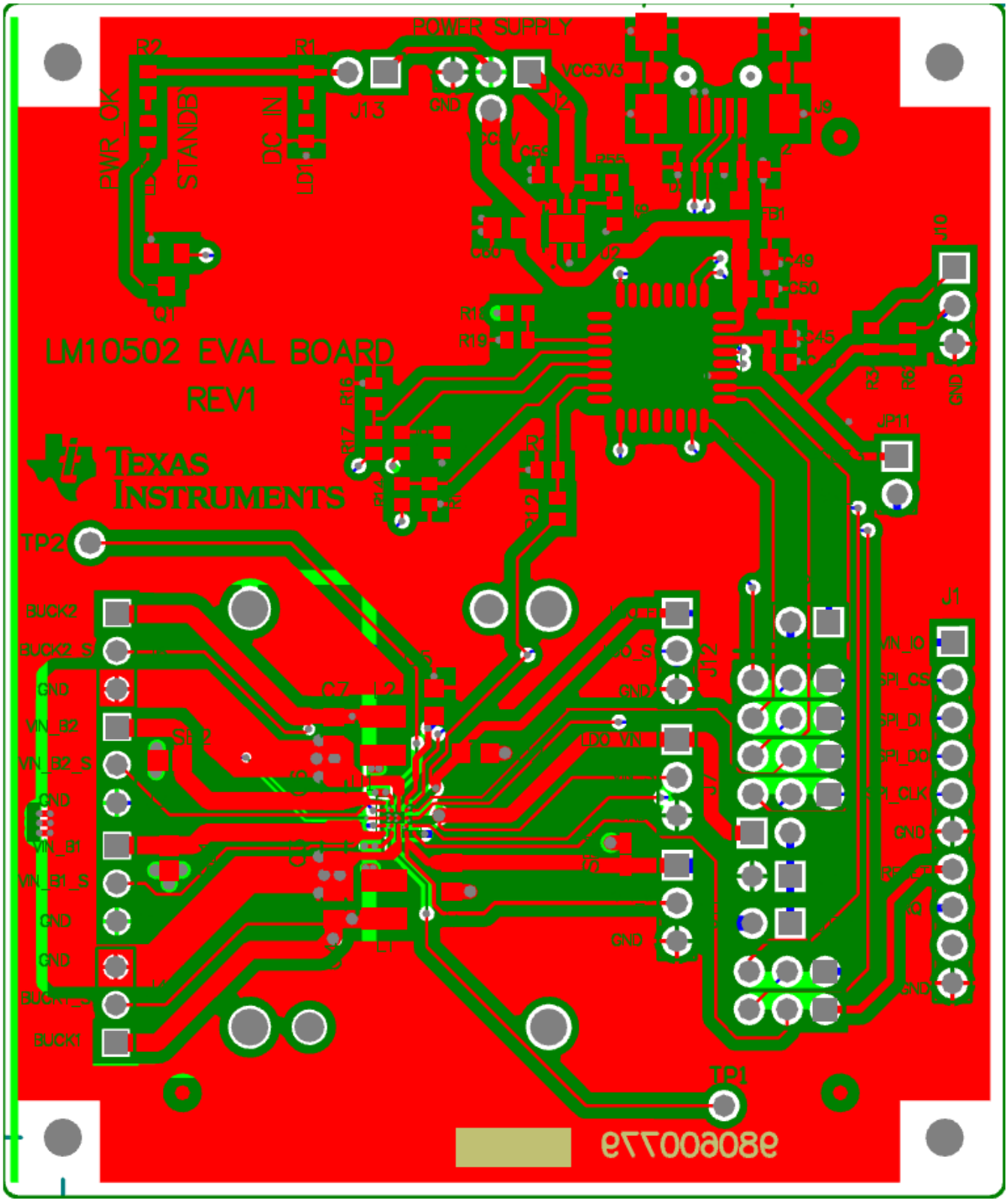

Figure 6. LM10502 Board Top Layer

8 Schematics of the LM10502 Evaluation Board

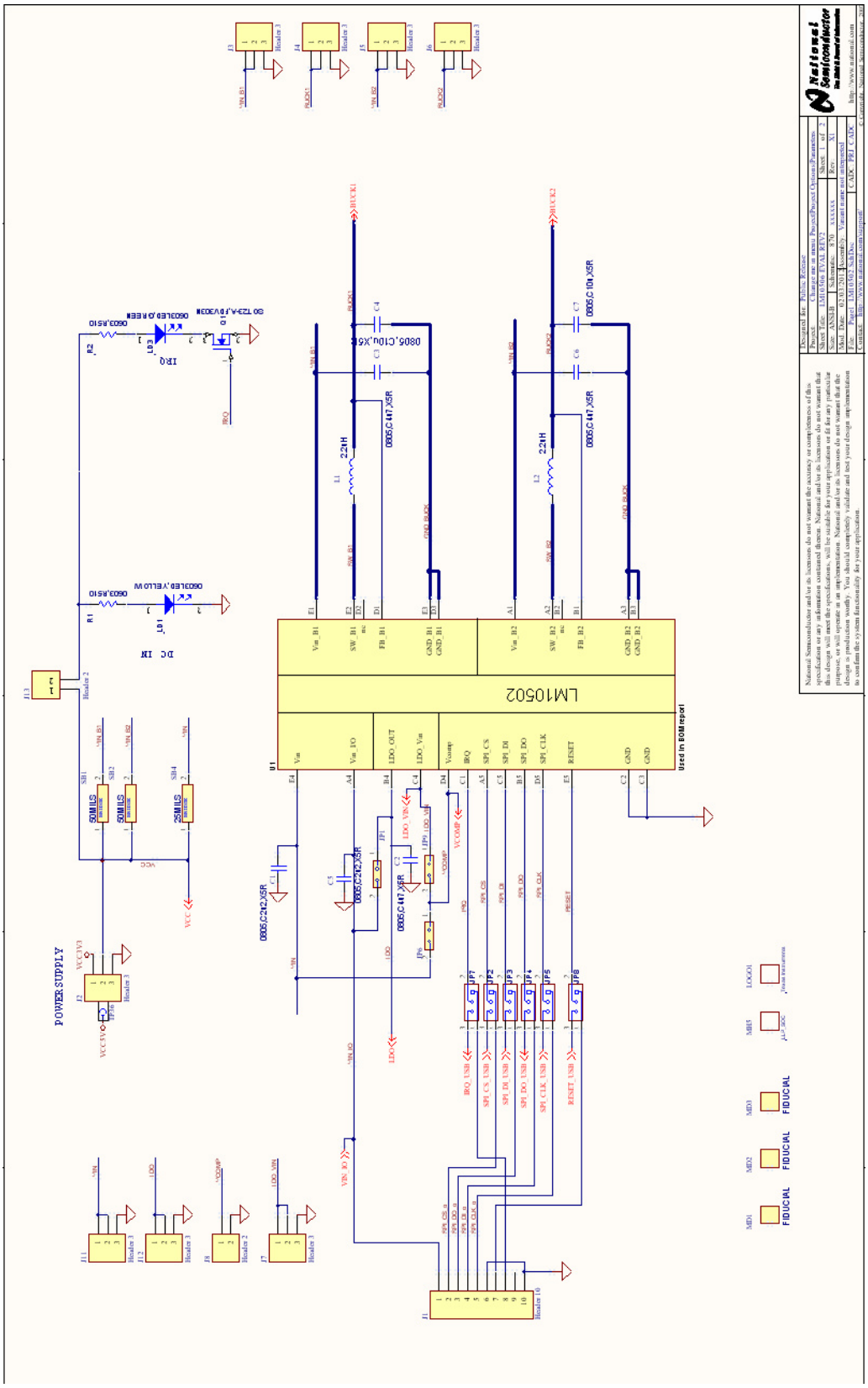

Figure 7.

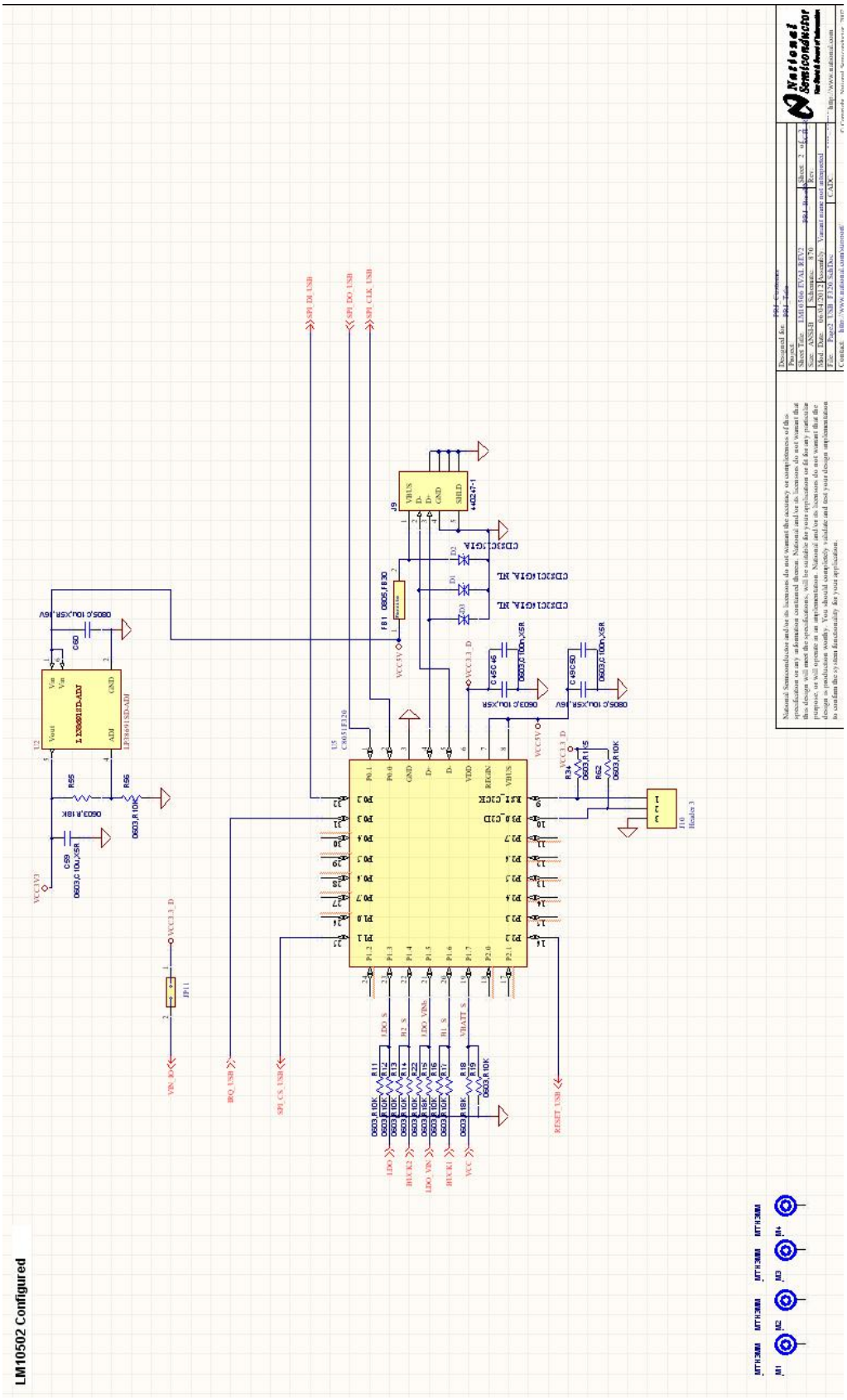

Figure 8.

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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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