User's Guide
BOOSTXL-TPS65033 User's Guide

TEXAS INSTRUMENTS

ABSTRACT

This document outlines the basic hardware and software components for the BOOSTXL-TPS65033 Socketed Programming Board. The BoosterPack enables pre-assembly programming for both the TPS650320-Q1 and the TPS65033x-Q1 devices. The TPS65032001-Q1 and TPS65033000-Q1 are re-configurable PMICs for prototyping various device settings. The settings can then be provided to TI for a final production PMIC. Alternatively, the TPS65032001-Q1 and TPS65033000-Q1 devices can be programmed in production to match a wide range of application requirements. The non-safety versions of the TPS650320-Q1 and TPS65033x-Q1 will similarly allow programming of production units.

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1 BOOSTXL-TPS65033 Components and Environment

The TPS65032001-Q1 and TPS65033x-Q1 family of PMICs are configurable and programmable only through I2C instructions. The BOOSTXL-TPS65033 socketed board is designed to act as a BoosterPack to the low cost TI LaunchPads, enabling a LaunchPad to act as the USB-to-I2C interface for communication with a personal computer. This separation reduces the cost of prototyping and enables experimentation with various TI devices, including custom software development using existing LaunchPad tools. Many of these tools can be found online at TI DevTools. The programming GUI is also available in the TI DevTools Gallery. This GUI is compatible with both the MSP430F5529LP and the MSP432E401Y LaunchPads.

2 BOOSTXL-TPS65033 Board Information

The BOOSTXL-TPS65033 is designed to stack on top of a LaunchPad, connecting the relevant power and MCU pins to the PMIC through the headers J1/J3 and J2/J4. Power is delivered to the PMIC from the USB port of a PC through the the LaunchPad 5 V and 3.3 V rails. The following block diagram demonstrates how the LaunchPad interfaces with the PC and the PMIC.
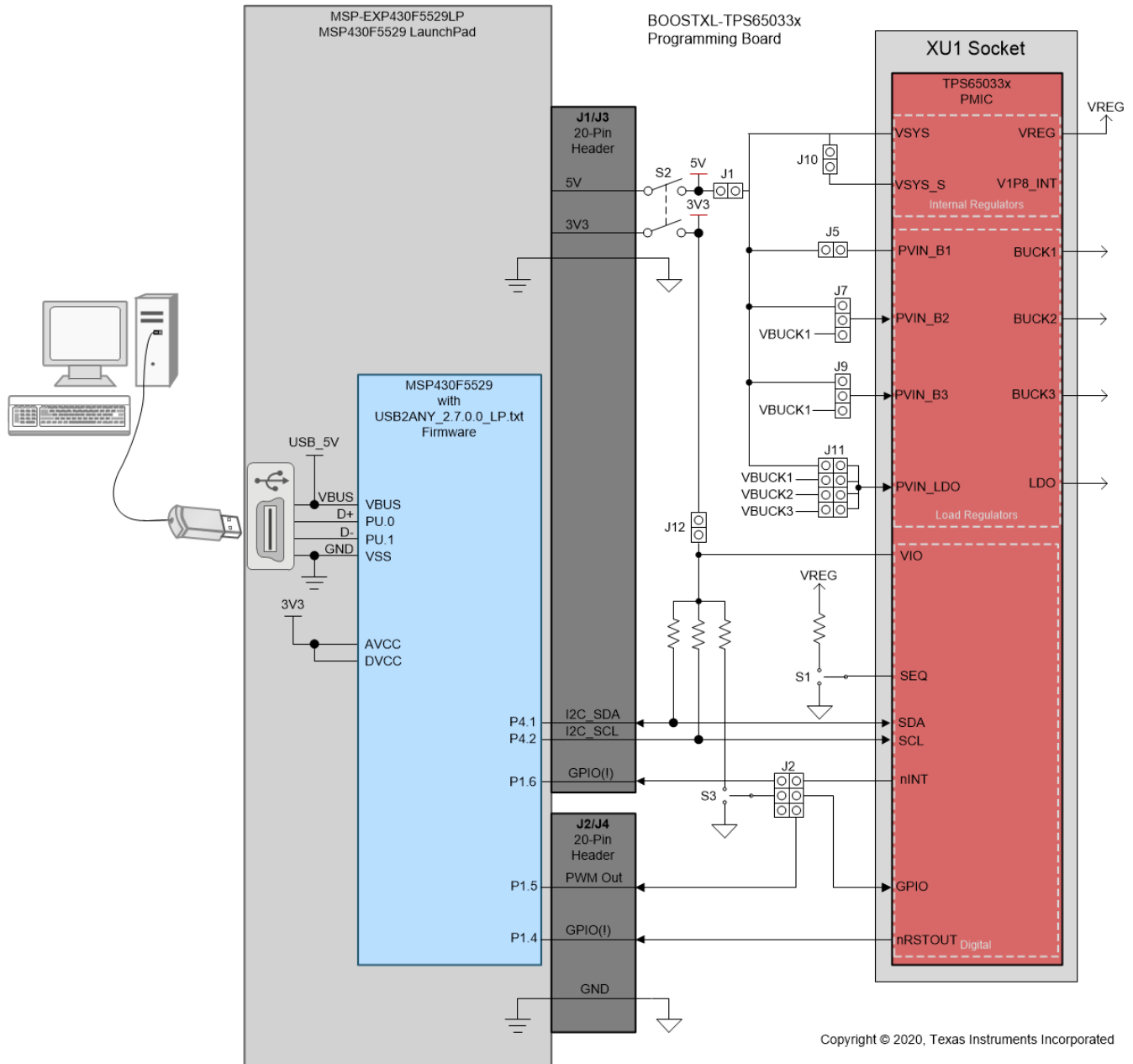
Figure 2-1. Programming Board and LaunchPad Connections

2.1 Critical Socketed Board Connections

Critical connections for operating the socketed board are the 5 V rail, the 3.3 V rail, and the I2C pins. The remaining connections to the LaunchPad are left available for future experimentation. Note: I2C pull-ups must be pulled up to VIO. This can optionally be pulled up to 3.3 V (default) or an alternate rail through the J12.

By default, the 3.3 V rail must be present to power the VIO and GPIO pins to fully enable the PMIC. If evaluation without a PC is desired, both the 5 V and the VIO domains should be externally supplied. If VIO is supplied by a voltage other than 3.3 V, J12 should be left open to prevent potential current paths to the MCU 3.3 V. For most configurations, the PMIC can supply VIO when externally connected to an appropriate test point, for example the Buck 1 output if configured for 3.3 V, or the Buck 2 output if configured for 1.8 V.

2.1.1 Power Switches

Both the 5 V and 3.3 V rails connect to the PMIC through separate current limiting load switches. The load switches are simultaneously enabled with the S2 toggle switch on the top left area of the board. See Section 5 for the complete BOOSTXL-TPS65033 schematic. It is recommended to keep S2 open when connecting the LaunchPad to the PC to reduce the initial current draw from the USB port.
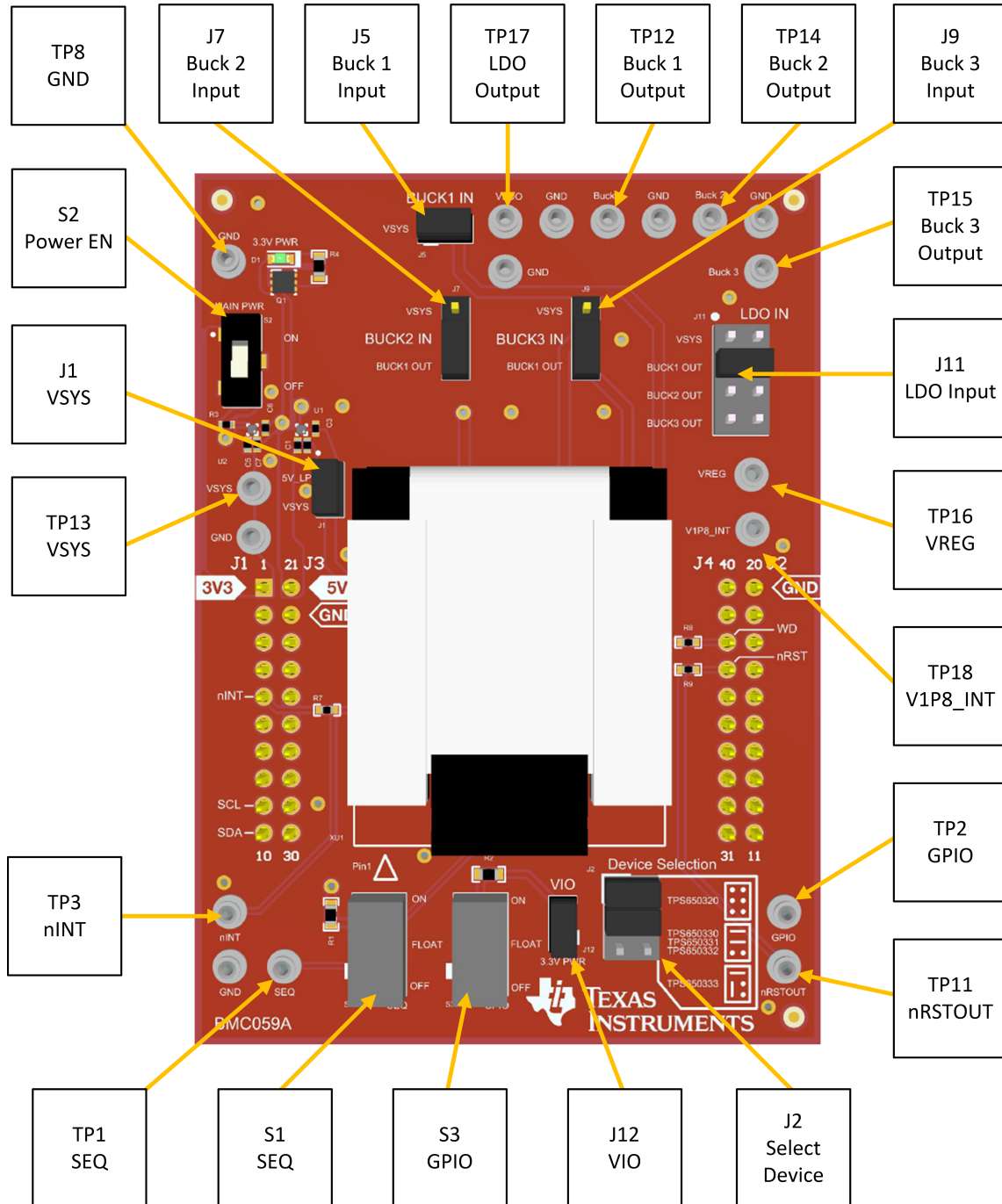
2.2 Jumpers and Test Points

Figure 2-2. Programming Board Test Points and Jumpers

3 Programming GUI Operation

3.1 Initial Set-up

3.1.1 Finding the GUI

The Graphical User Interface (GUI) for the BOOSTXL-TPS65033 can be found in the Gallery at TI DevTools. This GUI will connect to the BOOSXL-TPS65033 provided a compatible I2C controller is connected (MSP430F5529LP, MSP432E401Y, or USB2ANY). This GUI is also compatible with the TPS650320Q1EVM and TPS650330Q1EVM, which both have on-board MSP432E401Y MCUs.

The GUI can be operated through Google Chrome™ or Mozilla Firefox™ web browsers. To run the GUI in the browser, click the thumbnail and follow the prompted instructions for first time installation. The GUI requires both a browser plugin and the TI Cloud Agent software for access to the local USB ports. The GUI can also be downloaded for offline operation by hovering over the downward arrow in the GUI thumbnail and selecting the desired platform – Windows®, macOS®, or Linux®.

3.1.2 Offline Installation

To download the offline installer, click the downward arrow on the below the thumbnail and select the relevant operating system for the destination PC.

Figure 3-1. Standalone Installer Download Icon

The platform downloads will include the GUI Composer runtime installer if internet access is available during installation. If the PC has no internet access at time of installation, the runtime installer may need to be downloaded in advance using the additional links below the platform installation URLs.
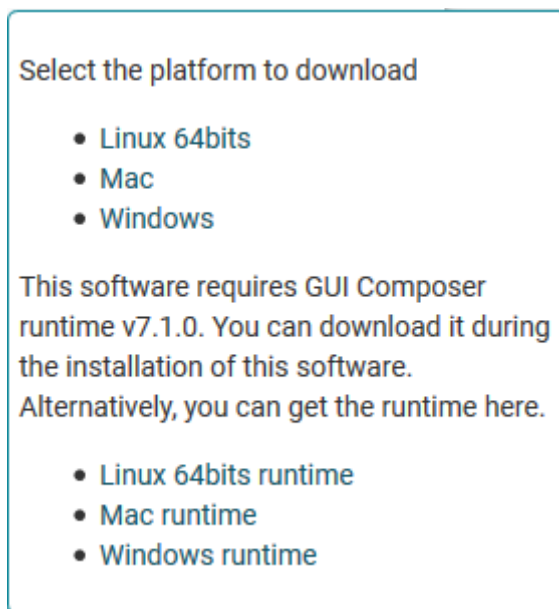

Figure 3-2. Standalone Installer Operating System Options

3.1.3 Flashing the MSP430F5529 LaunchPad

Initial operation with the MSP430F5529 LaunchPad requires downloading pre-configured firmware into the MSP430 in order to be recognized by the GUI.

The GUI incorporates a tool to flash the MSP430F5529 LaunchPad, located under the File tab in the top menu. This tool is pre-configured to flash the MSP430F5529LP only, and cannot be used with other LaunchPads.
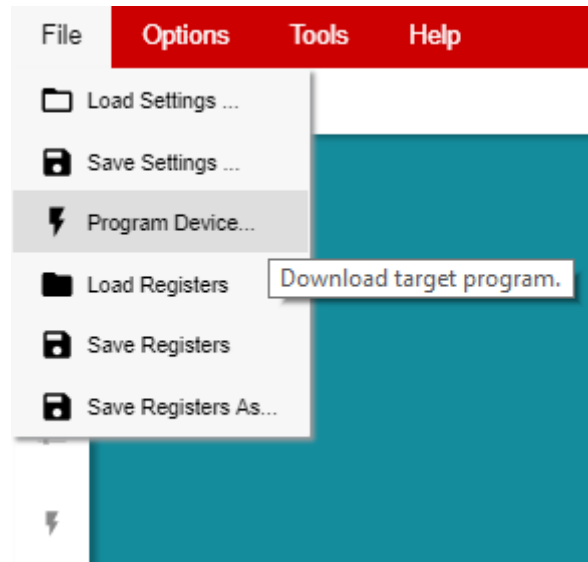

Figure 3-3. LaunchPad Firmware Flashing Tool

To flash the LaunchPad, first connect the MSP430F5529LP to the PC using a micro-USB cable, then select File > Program Device. The GUI will automatically download the firmware, recognize the LaunchPad, and flash the board.

Afterwards the LaunchPad will be recognized as the specific USB-to-I2C interface for operating with the TPS65032001-Q1 and TPS65033x-Q1 PMICs.

3.1.4 Flashing the MSP432E401Y Launch Pad

Initial operation with the MSP432E401Y LaunchPad requires downloading pre-configured firmware into the MSP432 in order to be recognized by the GUI. See Section 3.1.2 about how this firmware must be accessed by installing the GUI for offline operation.

1. Once downloaded, the MSP432 firmware file, acctrl_4_18.bin, can be found at:`{Installation Directory}\install_image_TPS6503xx-Q1_GUI.zip\TPS6503xx-Q1_GUI\app\firmware`
2. Install UniFlash, a free firmware flashing tool from TI.
3. Connect the LaunchPad to the PC. Use the USB port on the MSP432E401Y LaunchPad that is opposite the Ethernet port.
4. Run UniFlash. The program should automatically detect the connected MSP432E401Y LaunchPad. Once detected, click *Start*.
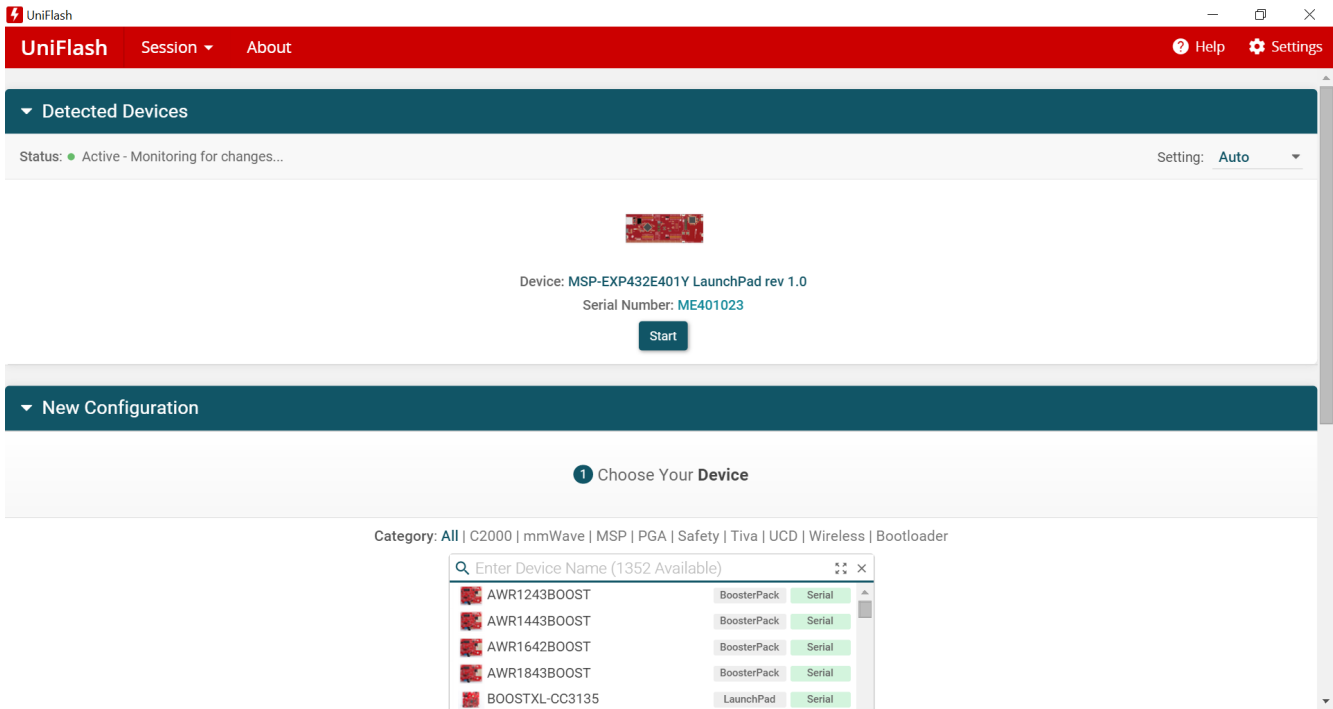
Figure 3-4. UniFlash Initial Setup

5. On the next page, browse to the binary file downloaded in Step 1 and click *Load Image*.
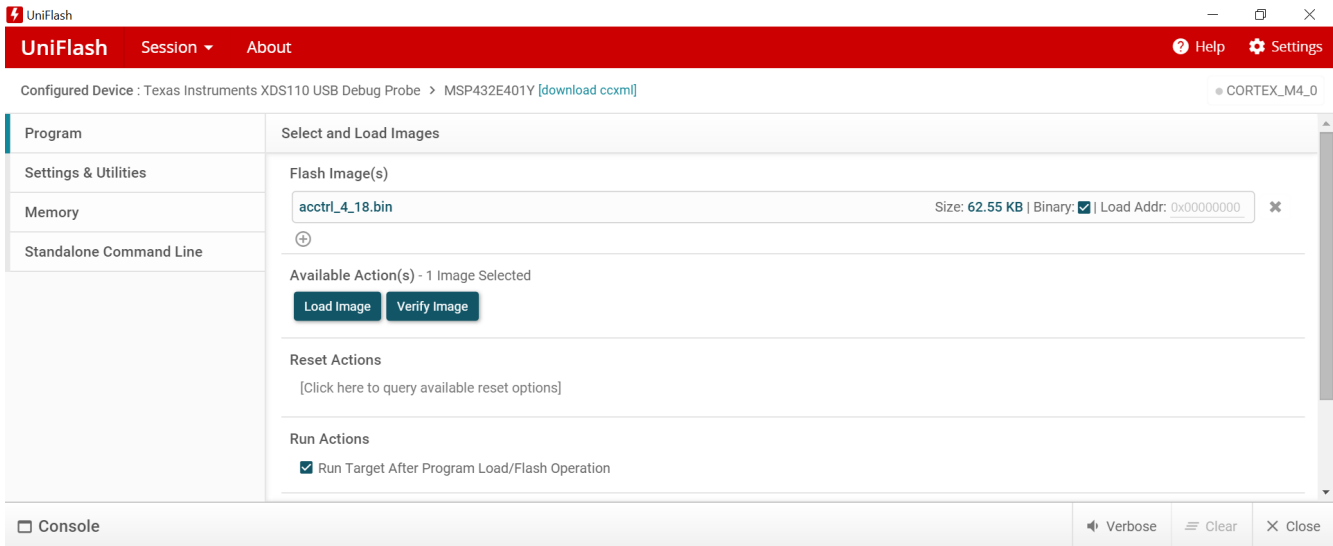

Figure 3-5. UniFlash Load Firmware Image

6. If prompted, update the XDS110 Debugger firmware. After accepting the update, UniFlash will update the firmware automatically and continue to load the binary image. The console will indicate a successful program.

☐ Console		🔊 Verbose	☰ Clear	✕ Close

[10/5/2020, 1:12:36 PM] [WARNING] CS_DAP_0: Warning: A firmware update is required for the XDS110 probe. The current firmware is version 2.3.0.9. The probe must be upgraded to firmware version 3.0.0.12 to be compatible with this software. Click the "Update" button to update the firmware. DO NOT UNPLUG THE DEBUG PROBE DURING THE UPDATE. (Emulation package 9.1.1.00002)
[10/5/2020, 1:12:58 PM] [INFO] CORTEX_M4_0: GEL Output: Memory Map Initialization Complete
[10/5/2020, 1:13:01 PM] [SUCCESS] Program Load completed successfully.

Figure 3-6. UniFlash Successful Program

7. Unplug the micro USB cable from the MSP432E401Y LaunchPad.
8. Now plug the USB cable in to the micro USB port adjacent to the Ethernet port.
9. Install jumper on pins 3-4 (USB-OTG) of JP1 to supply the target 5 V supply through USB.

After completing this process, the GUI will recognize the LaunchPad as a USB-to-I2C interface. Next, stack the BOOSTXL-TPS65033 on top of the MSP432E401Y LaunchPad. The headers should align according to Table 3-1.

Table 3-1. BoosterPack to MSP432E401Y LaunchPad Connections

BOOSTXL-TPS65033 Pin Header	MSP432E401Y LaunchPad Pin Header
J1	J5
J2	J6
J3	J7
J4	J8

Note there may be two separate interfaces (or COM ports) recognized by the GUI. If one is failing to connect, use the GUI to switch to an alternate port.

1. Click the Options menu at the top of the GUI, select *Serial Port*.
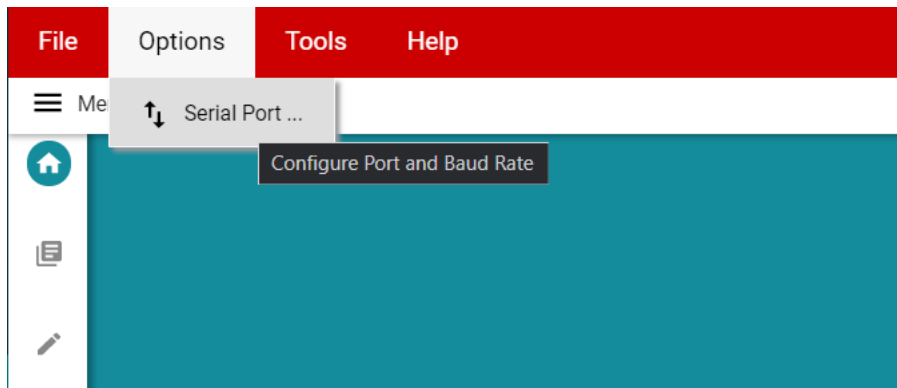
Figure 3-7. Serial Port Options

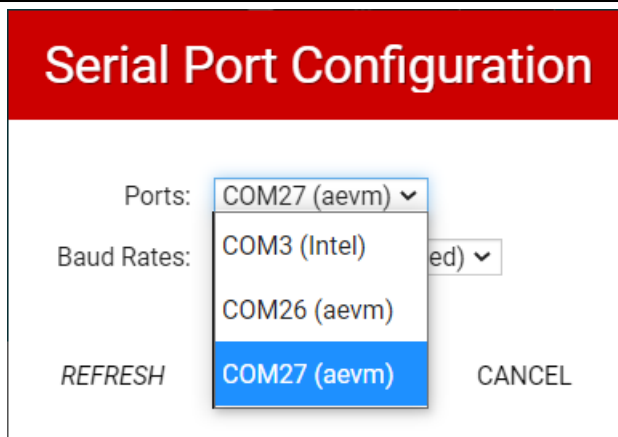2. Use the Ports dropdown to select the alternative interface.

Figure 3-8. GUI Serial Port Selection

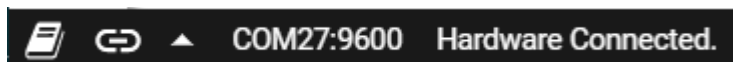3. The GUI will indicate a successful connection through the black connection toolbar.

Figure 3-9. Hardware Connected Indicator

3.2 Connection Debugging

The connection link in the black toolbar at the bottom of the GUI can be toggled to refresh the connection to the LaunchPad. The flow chart in Figure 3-11 can aid in debugging potential connection issues with the BOOSTXL-TPS65033.
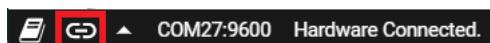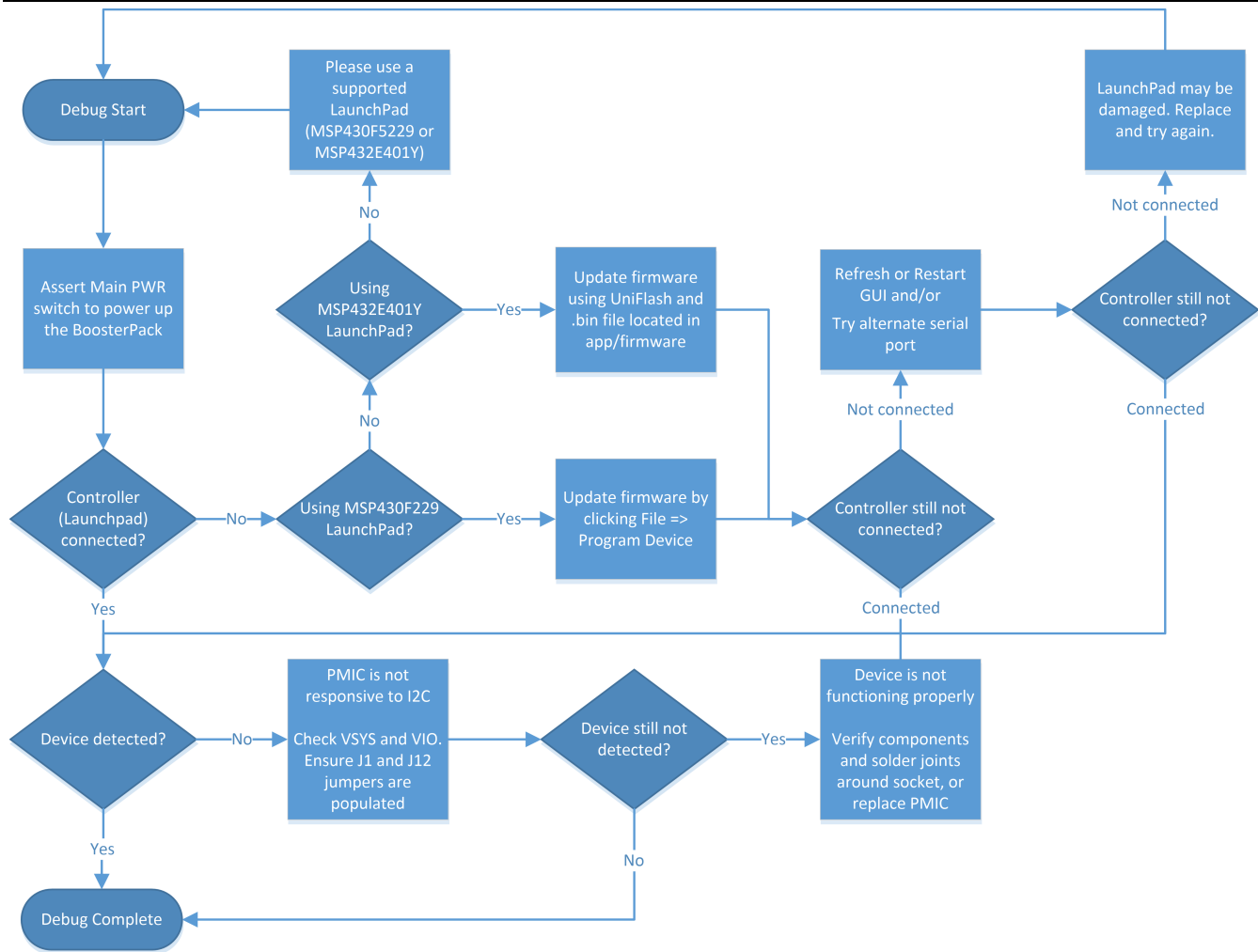

Figure 3-10. Refreshing the GUI-to-MCU Connection

Figure 3-11. BOOSTXL-TPS65033 Connection Debug Flow Chart

3.3 Basic Operation of the GUI

The GUI displays a README.md prompt each time the GUI is launched. The prompt can be disabled for subsequent sessions by selecting the I checkbox at the bottom of the window. The README.md information is always available in the Help tab at the top of the GUI.

The GUI automatically attempts to connect to the flashed LaunchPad, with the connection status displayed in the bottom left hand corner of the GUI window. Once connected to the LaunchPad, the GUI attempts to read the register information of the PMIC populated in the socket. If the PMIC appears unresponsive, verify the serial port connection and confirm that all relevant shunts are populated according to Figure 2-2. If all shunts are populated properly, pressing the RST button on the LaunchPad (S3) below the socketed board can often recover USB communication.

3.3.1 Home

The Home section is the landing page of the GUI. Here the GUI presents an overview of the EVM and Programming BoosterPack (BOOSTXL-TPS65033), and emphasize navigation to the remaining four sections through the tiles on the bottom of the page.

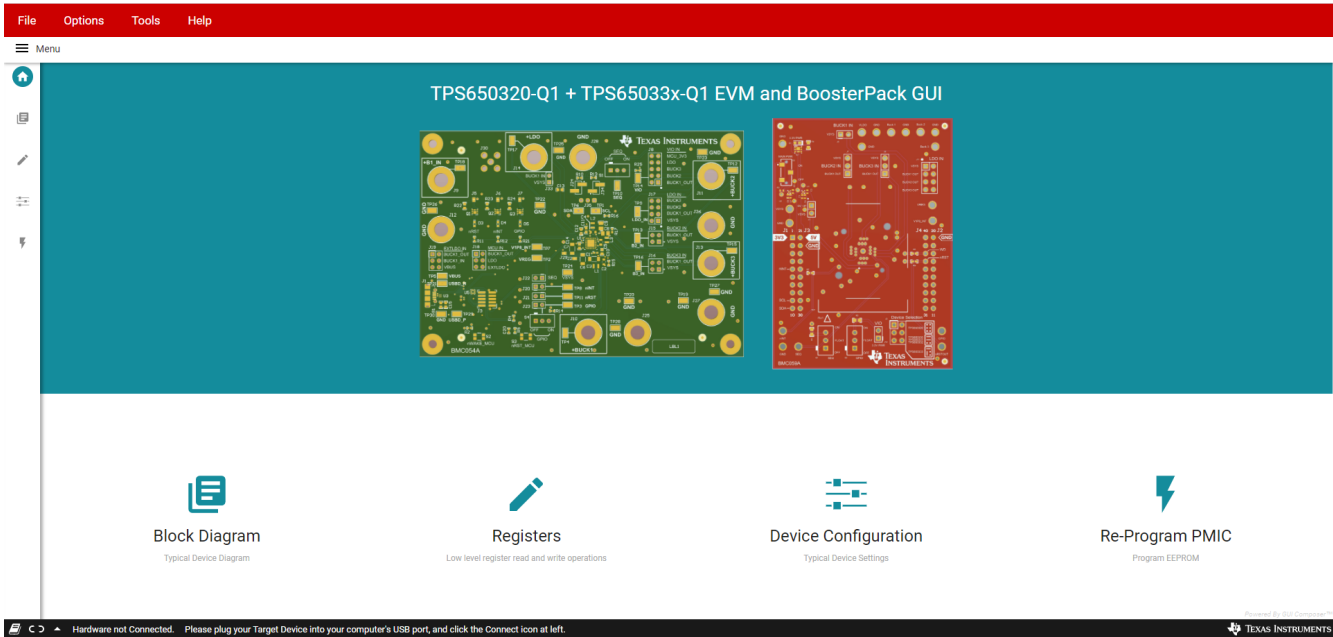**Figure 3-12. TPS6503xx-Q1 GUI Home Screen**

3.3.2 Block Diagram

The Block Diagram section displays the typical components and functional blocks of the PMIC. A block diagram for the Programming BoosterPack is also shown.
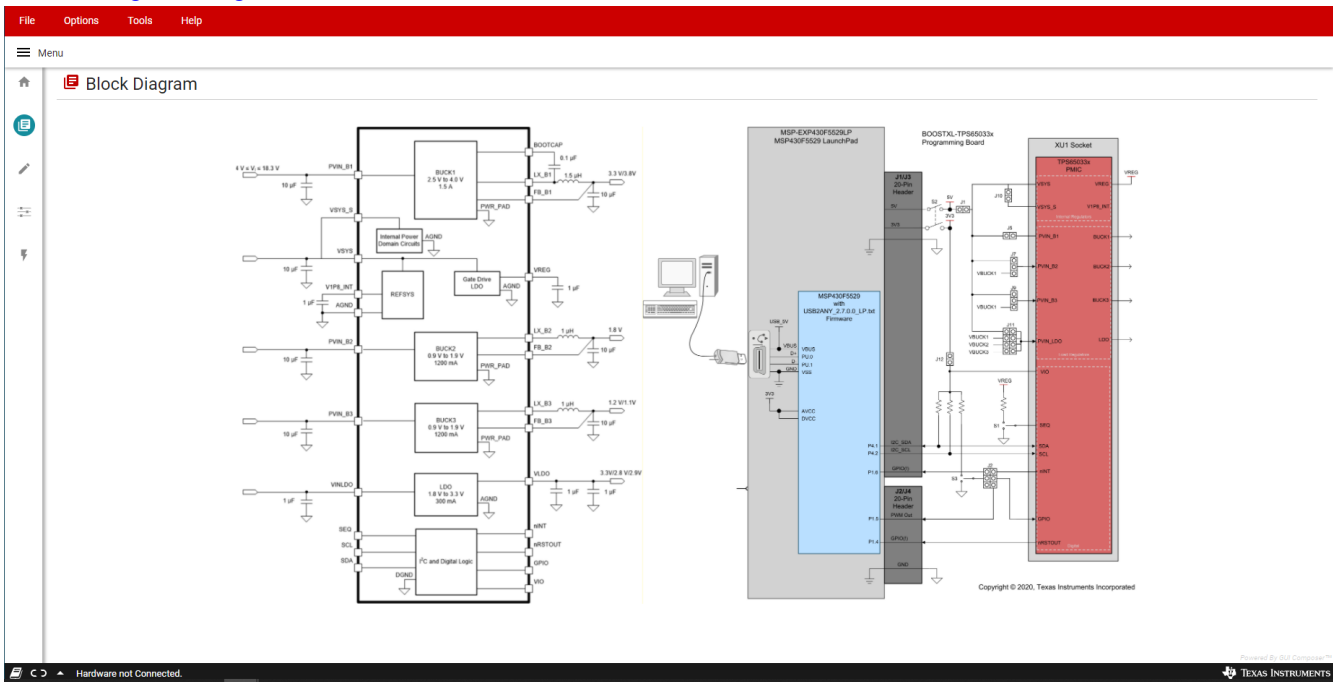

Figure 3-13. TPS6503xx-Q1 GUI Block Diagram Page

3.3.3 Registers

The Registers section provides an overview of the internal register map, and includes basic interfaces for each PMIC register. Figure 3-14 illustrates the register page and the primary interactive regions.
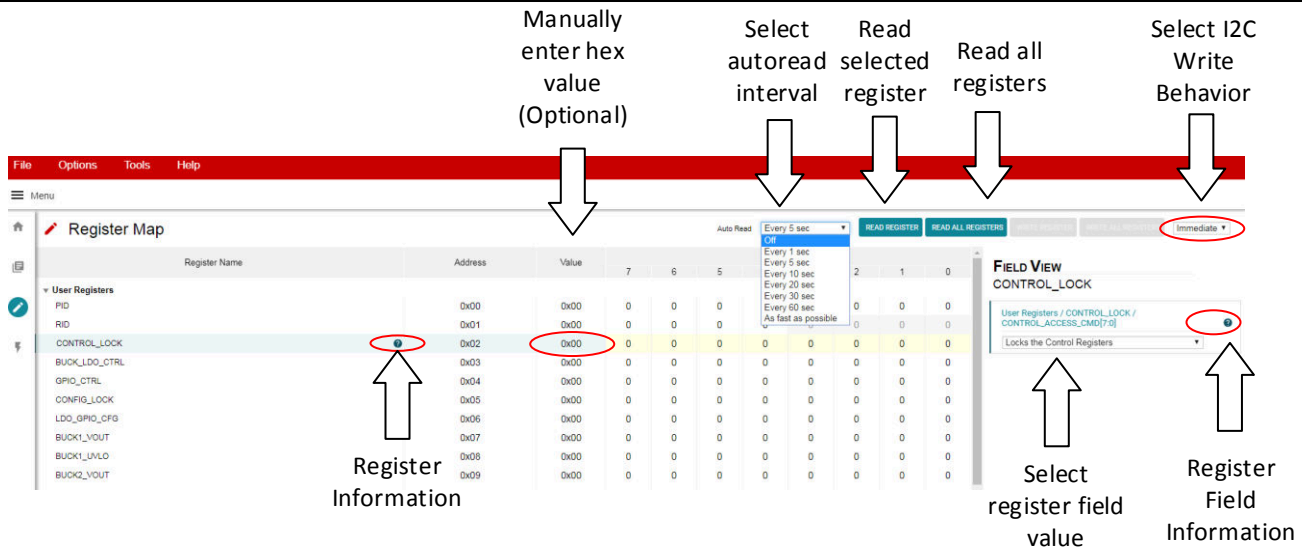
Figure 3-14. Register Page Interfaces

The register table displays each register name, address, last known value from the PMIC, and corresponding bit values. Selecting a title or bit fields in the table will update the Field View column on the right side of the GUI. The Field View displays the individual fields contained within the associated register address. Within the register page, clicking a blue icon containing a question mark (?) will expand additional descriptions if available. The expanded description views can then be closed by clicking the red (x) icon.

This register page can poll the device periodically using the *Auto Read* feature in the top right corner, or allow manual read instructions using the *Read Register* and *Read All Registers* buttons.

A drop-down menu selection at the top right of the register map indicates how the registers are written as the user interacts with the register page. With *Immediate* selected, any update to the register page is automatically sent to the PMIC, whereas *Deferred* will wait for the *Write Register* or *Write All Registers* instructions before communicating with the device. After each write, the register page will automatically read the affected register address to confirm the latest value in the device.

3.3.4 Device Configuration

The Device Configuration section is organized into selectable tabs at the top of the page, where only the contents of the blue tab is actively displayed. Each tab contains categorized visual instruments relating to individual bit fields within the register map. Each instrument is linked to the latest bit values in the register map table, and can be used to alter settings within the PMIC through the dropdown menus or check box features. If the *Auto Read* function in the register map is inactive, the *Read All Registers* button in the top right area of the Device Configuration page can be used to manually refresh the register page, which will then update the instruments with the latest device values.

The PMIC incorporates *Control Lock* and *Configuration Lock* features that can prevent I^{2}C writes to various registers within the device. The status of these locks will always be displayed in the top right hand corner of the Device Configurations page, and can be toggled by clicking their associated checkbox. When the GUI is properly connected to the EVM and write instructions appear to be ignored by the PMIC, confirm the status of these indicators to verify the device is able to accept new write instructions.
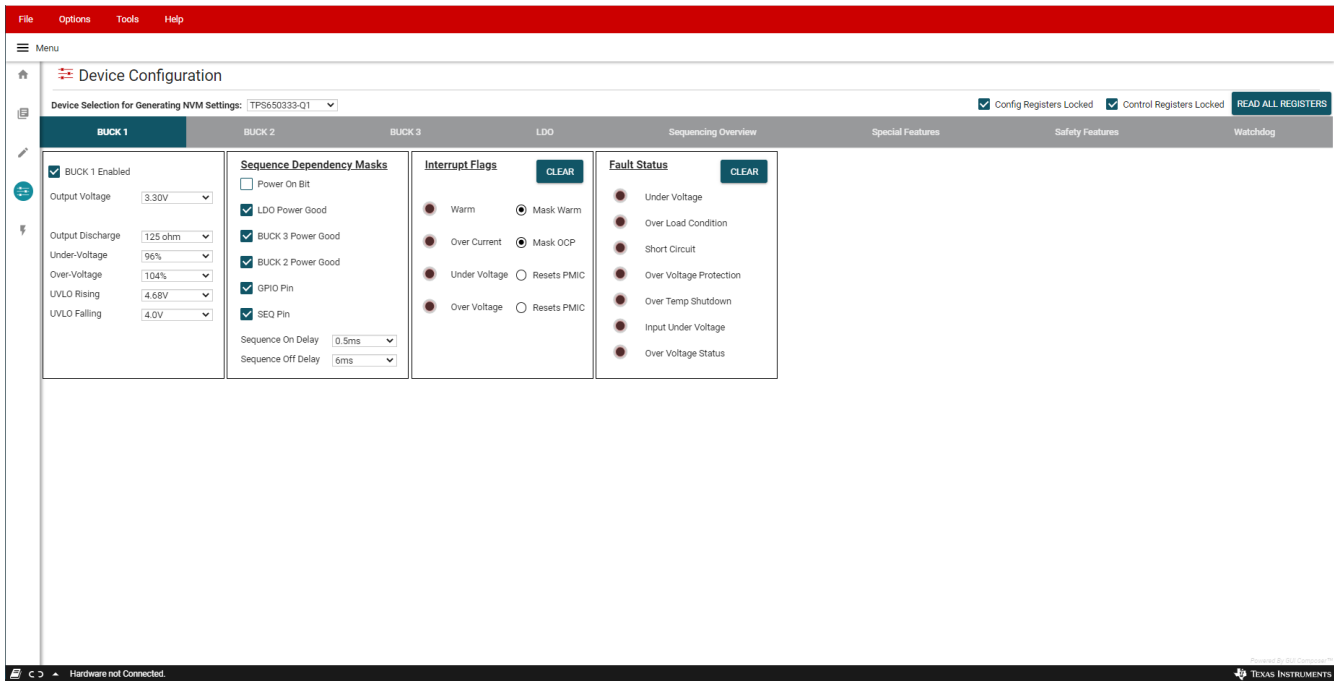
Figure 3-15. TPS6503xx-Q1 GUI Device Configuration Page

3.3.4.1 Using Device Configuration to Define Spin Settings

In some circumstances, TI may provide customized, pre-programmed devices for the camera application. Contact a local TI sales representative for more information.

The Device Configuration tabs in the GUI can be used to define custom settings for TI to pre-program into the device Non-Volatile Memory (NVM). Before beginning the spin definition, see the Camera PMIC Spin Selection Guide to determine if there is an exisiting spin that is already compatible with the target application and the image sensor or both.

Since the visual instruments in the Device Configuration page link directly to the corresponding bits and registers in the Register Map page, the Device Configuration page can be used to quickly define desired OTP register settings.

1. Select the desired camera PMIC from the drop-down menu above the tab indicators to start. The GUI will automatically show, hide, or disable features corresponding to the selected PMIC. This drop down box will not be adjustable if a device is connected to the GUI.
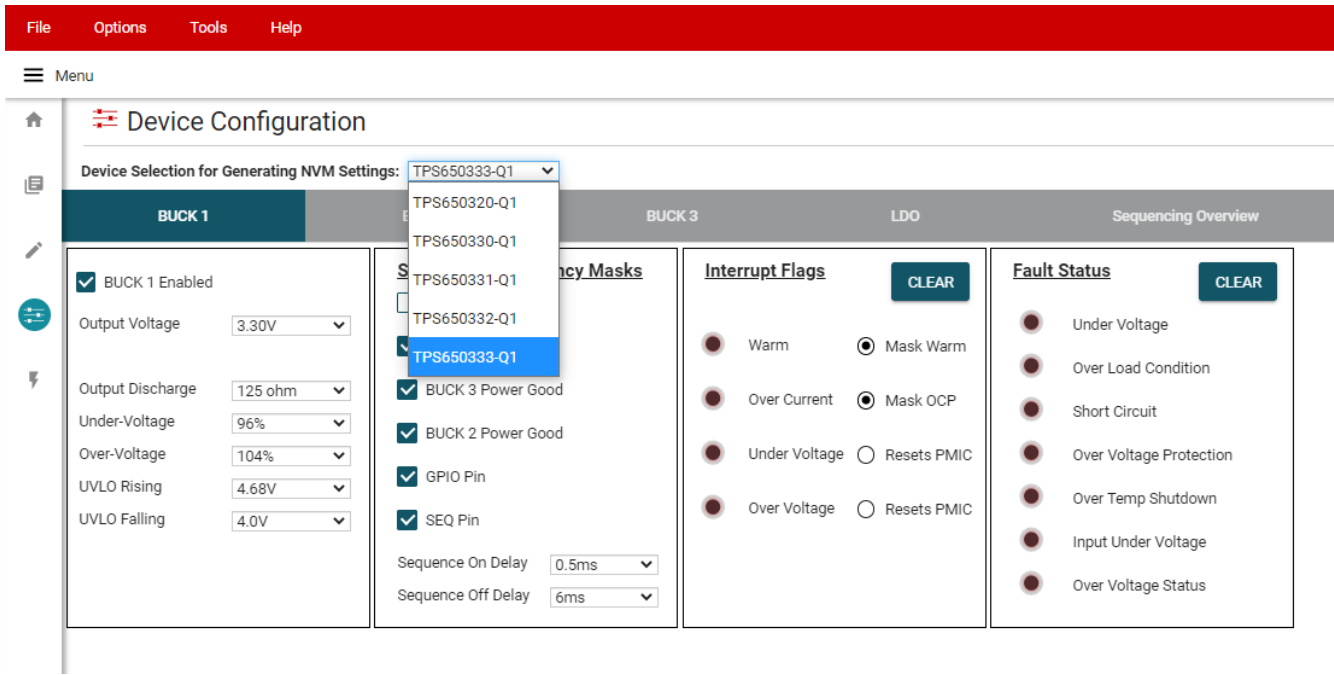
Figure 3-16. Device Selection for Generating NVM Settings

2. Select the desired regulator, sequencing, and additional feature settings in each of the tabs. These changes will be reflected in the Register Map page. For determining the power sequence settings, see Section 3.3.4.2.

3. Click File > Save Settings in the top left corner of the GUI. This exports the register settings in a JSON file that is provided to generate the NVM spin.
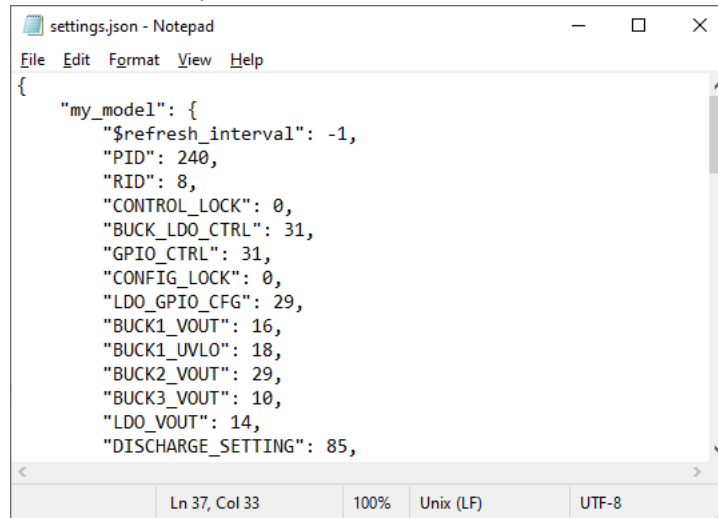
Figure 3-17. Example Settings Output

3.3.4.2 Configuring the Power Sequence

The *Sequencing Overview* tab includes instruments to customize the power sequence of the PMIC. Note that the check boxes are power sequence *masks*. If a particular logic signal needs to be included as part of the regulator or logic power up sequence, leave the box next to the logic signal unchecked. TI recommends to set *Power On Bit* unmasked for each rail that is required in the application.
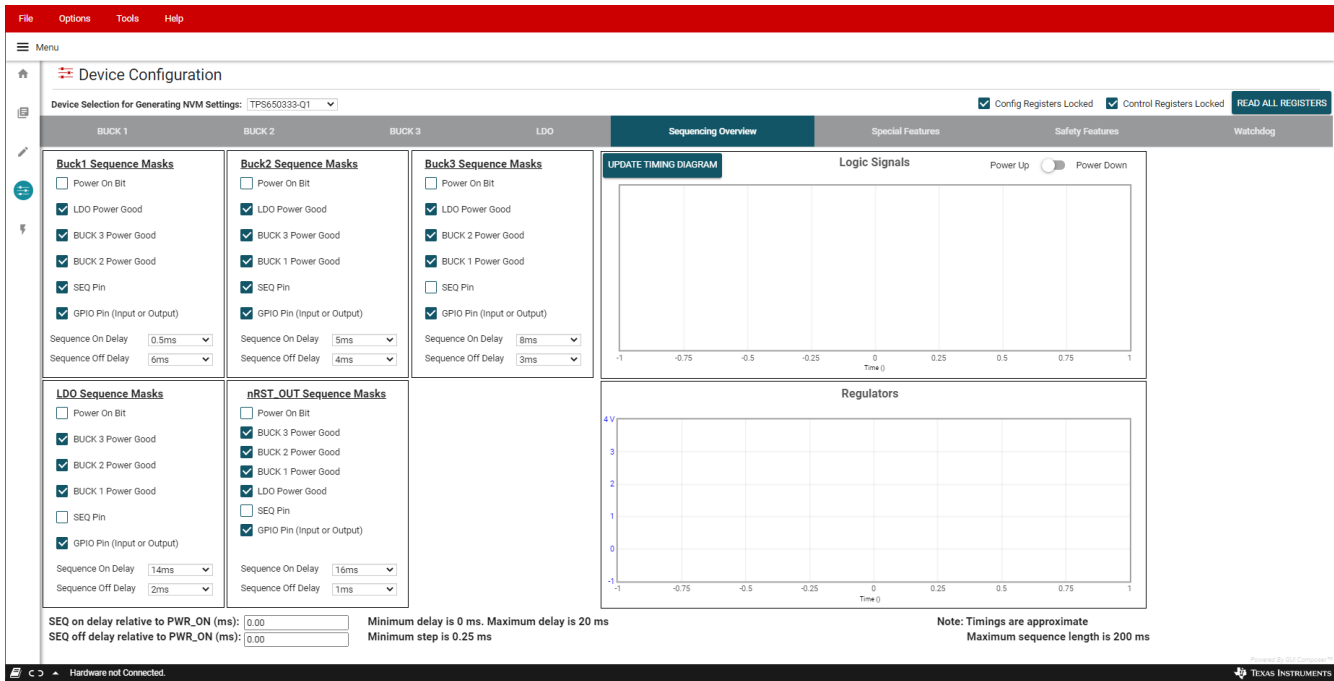
Figure 3-18. Sequencing Overview Tab

When using a TPS65033x-Q1 device, the GPIO pin can also be used for power sequencing of an external regulator or other device. In the *Special Features* tab, configure GPIO as an output to include its sequencing in the *Sequencing Overview* tab. Note that when using GPIO for sequencing, the GPIO Function must be *Enabled*.
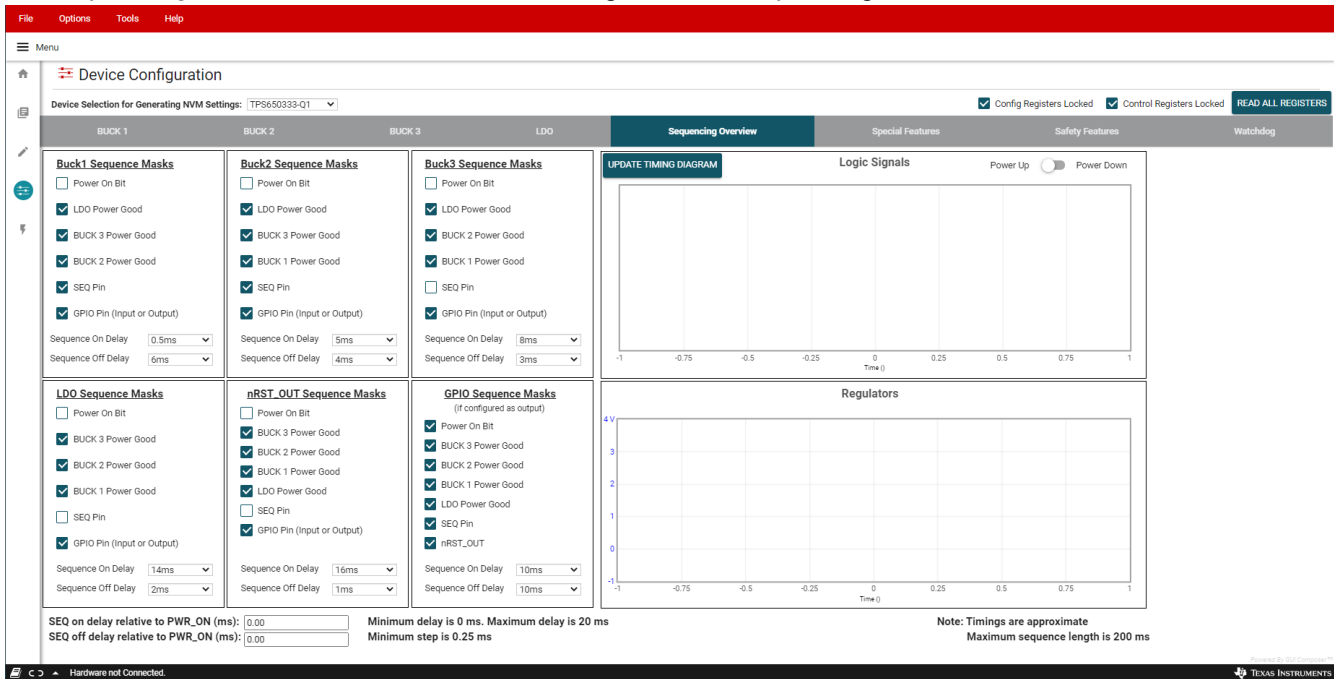
Figure 3-19. Sequencing Overview Including GPIO

For reference, the GUI can generate example power-up and power-down timing diagrams based on the sequence settings present when the *UPDATE TIMING DIAGRAM* button is clicked. As noted, rise and fall times are approximate, and the maximum sequence length is 200 ms. Changes to regulator enable and output discharge settings are reflected in the timing diagram. If the sequence settings are not valid, the GUI will provide a notifying message and the timing diagram will not be updated. For example, if a regulator is enabled but fails to power-up within 200 ms, the sequence settings are not valid.
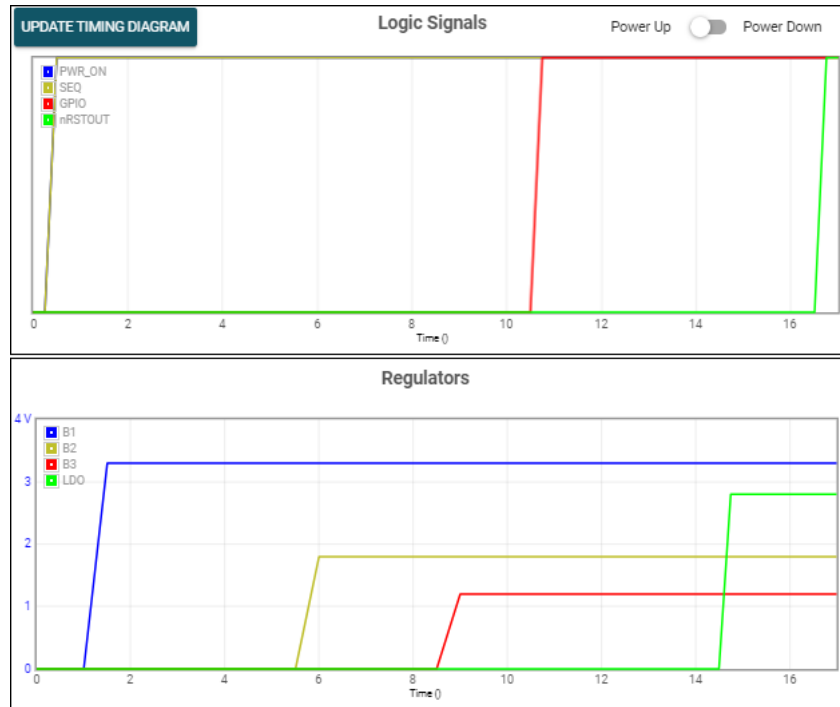
Figure 3-20. GUI Generated Timing Diagram

3.4 Scripting

The GUI includes a scripting feature in the tools menu at the top of the window. Scripting enables automated writes and reads to the PMIC, allowing sequential instructions to be sent to the PMIC. Scripts can be saved as a .js or .txt file, and imported using the *Upload* arrow at the top of the scripting window. Scripting allows the re-configuration of multiple PMICs before sending to assembly or populating on a PCB.
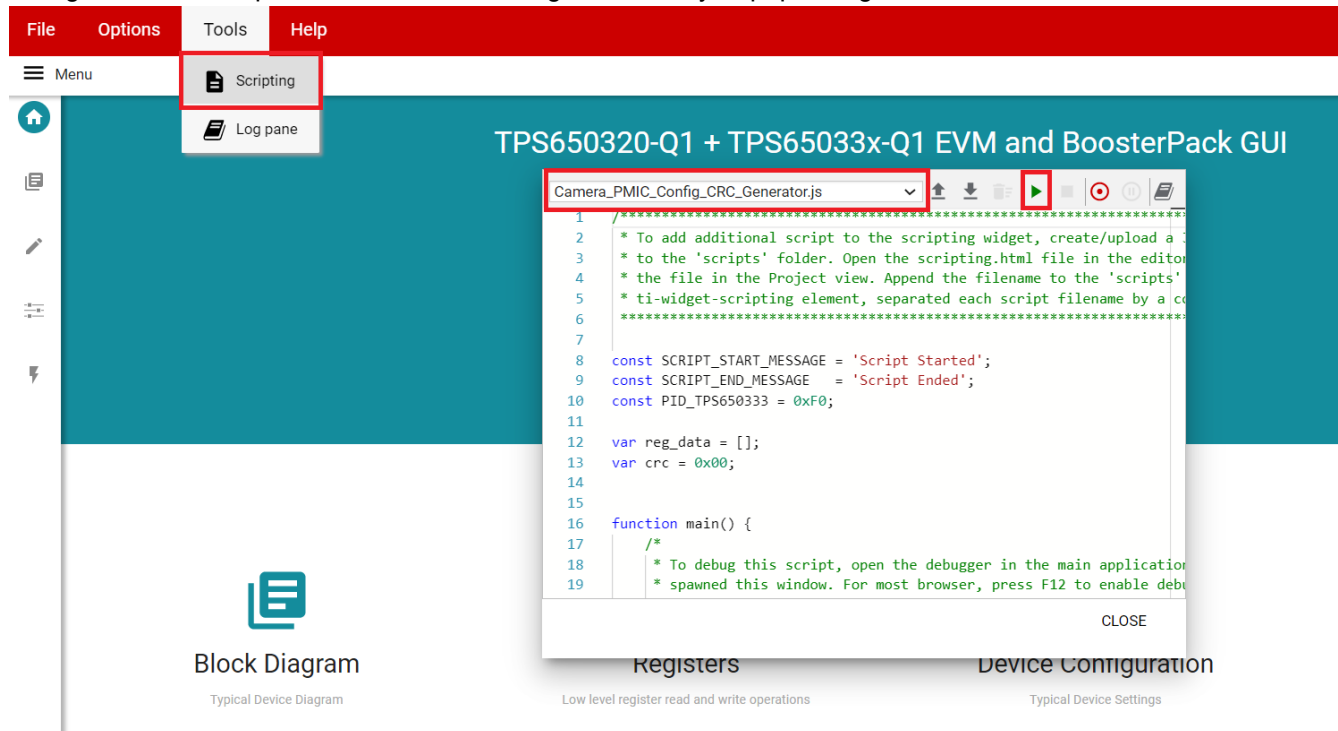
Figure 3-21. TPS6503xx-Q1 GUI Scripting Window

An example script for re-programming a device can be seen below, where output voltages and sequencing settings are reconfigured from the default settings.

```
/* Entry point for the script, which will be executed when the user presses the PLAY button in the
Scripting Dialog. */
function main() {
write('CONTROL_LOCK', 0xDD);      // Unlock control registers
write('CONFIG_LOCK', 0xAA);       // Unlock configuration registers
write('GPIO_CTRL',2);             // Disable configuration CRC
write('BUCK_LDO_CTRL',0x00);      // Turn off all regulators to prevent faults
write('BUCK3_VOUT',6);            // Change Buck 3 output voltage
write('LDO_VOUT',8);              // Change LDO output voltage
write('SEQ_TRIG_BUCK2',10);       // Update Buck 2 sequence dependencies
write('SEQ_TRIG_BUCK3',2);        // Update Buck 3 sequence dependencies
write('SEQ_TRIG_LDO',26);         // Update LDO sequence dependencies
write('SEQ_TRIG_nRSTOUT',2);      // Update nRSTOUT sequence dependencies
write('BUCK1_SEQ_DLY',145);       // Update Buck 1 sequence delay
write('BUCK2_SEQ_DLY',86);        // Update Buck 2 sequence delay
write('BUCK3_SEQ_DLY',54);        // Update Buck 3 sequence delay
write('LDO_SEQ_DLY',118);         // Update LDO sequence delay
write('nRSTOUT_SEQ_DLY',6);       // Update nRSTOUT sequence delay
write('BUCK_LDO_CTRL',31);        // Re-enable all regulators
write('EEPROM_PROG_CMD',45);      // Burn settings into EEPROM
}
```

Figure 3-22 details the typical device programming flow. Most blocks can be executed with one or more register write commands in the script file. Only the J2 configuration and GPIO trigger application cannot be done via scripting.
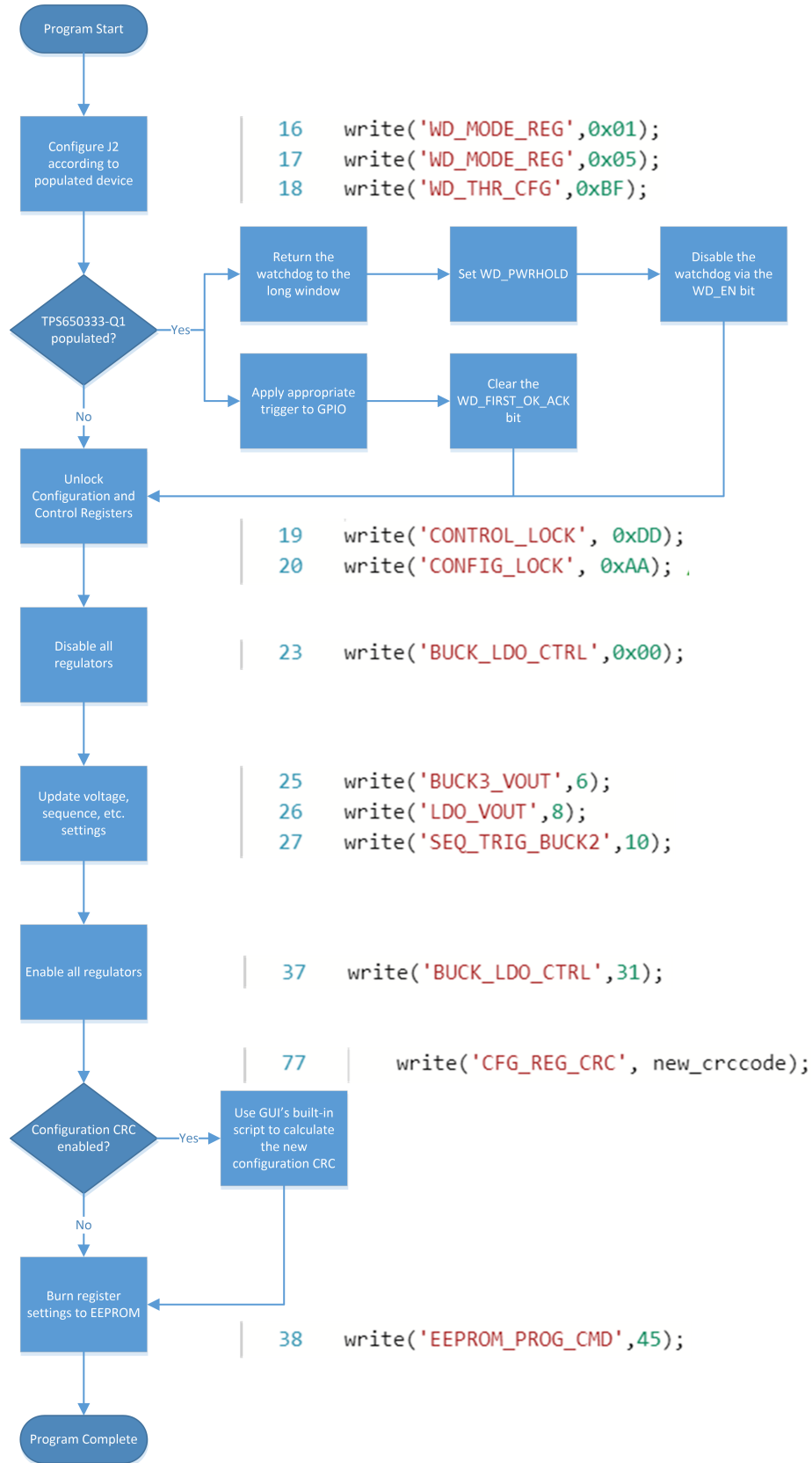
Figure 3-22. Example Script Program Flow

4 Recommended Operating Procedure

- Due to the parasitic elements introduced by the BOOSTXL-TPS65033 socket, it is recommended to use the BOOSTXL-TPS65033 board primarily for digital evaluation. This includes features like NVM programming, state machine behavior, diagnostics, and fault handling.
- For analog performance evaluation of the PMIC, please refer to the TPS650320-Q1 EVM and the TPS650330-Q1 EVM.

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1. Connect the socketed board to the MSP430F5529 LaunchPad by aligning placing the socketed board on top of the LaunchPad, aligning the J1/J3 and J2/J4 headers, and pressing the two boards together. For the MSP432E401Y, align with the J5/J7 and J6/J8 headers.
2. Ensure S1, S2, and S3 of the socketed board are not asserted (down position), and connect the LaunchPad to the PC using a micro-USB cable. A TPS65032001-Q1 or TPS65033x-Q1 device may be inserted into the socket at any time that S2 is open and proper ESD considerations are observed. Ensure the unit's Pin 1 indicator is aligned with the Pin 1 silkscreen indicator on the lower left corner of the socketed board.
3. Ensure the *Device Selection* jumper (J2) matches the generic part number of the device populated in the socket.
4. If this is the first time using the LaunchPad with the TPS6503xx-Q1 GUI, flash the LaunchPad using the steps outlined in Section 3.1.3 or Section 3.1.4. This will permanently configure the LaunchPad to act as a USB-to-I2C adapter and will not be necessary for subsequent sessions.
5. Set S2 to the active position. The D1 LED will indicate when power is supplied to the socket.
6. Verify the connection status of the adapter in the bottom left corner of the GUI window. If *Hardware not Connected* is displayed, toggle the connection icon once to refresh the adapter connection. With the D1 LED active and the adapter recognized by the GUI, I2C communication should be available to the PMIC. The adapter will disconnect if I2C communication fails. Verify that the I2C pull-up voltage is available (J12 and VIO test point) if the GUI consistently disconnects after read or write attempts.
7. Navigate to the Register Map or Device Configuration page, and select the *Read All Registers* button in the top right corner of the GUI window.
8. The Register Map will populate with the returned values as the PMIC replies to the I2C read requests. The Register Map can directly interact with the PMIC through drop down menus for each register field or by directly writing into the value column for the individual registers. For a graphical representation of common device settings, select the slider icon below the pencil icon in the left toolbar to navigate to the *Device Configuration* view. These visual indicators are linked directly to the respective bits or bitfields in the register map.
9. Selecting the tabs at the top of the Device Configuration view will navigate through the categorized register fields.
10. By default, the Control and Configuration registers of the PMIC are always locked after a re-start event, preventing accidental I2C writes to the device. The check-boxes in the top right corner of the *Device Configuration* view can verify if critical registers are accepting write instructions from the I2C master. These check boxes can also be used to lock and unlock the associated registers.
11. By default, certain regulators are dependent on either the status of SEQ (S1), or the status of SEQ and GPIO (S3). All sequencing dependencies are visible in the regulator's respective tab, or by using the *Sequencing Overview* tab within the *Device Configuration* view.
12. When registers are unlocked, any changes to the device registers will take effect immediately.
13. The PMIC will always return to default settings if a fault occurs that forces a transition to the RESET state.
14. Register changes will not be stored in EEPROM unless the programming instruction has been sent to the PMIC through the I2C.
15. The EEPROM is programmed when a hex value of 0x2D is written to register 0x4A. In the GUI, this can be done directly through the register map or by clicking the *Flash EEPROM* button in the *Re-Program PMIC* view of the GUI.
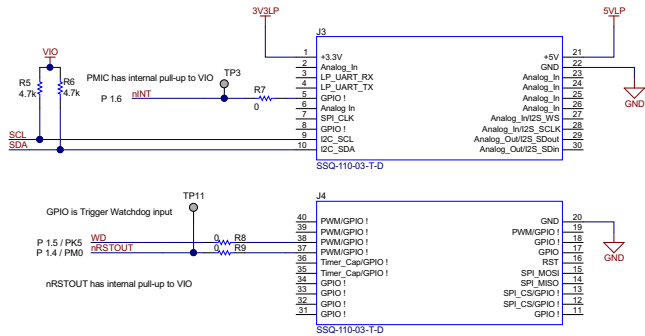
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5 BOOSTXL-TPS65033 Schematic

Board Power (Switches and I-Limiting)

SEQ, GPIO, and VSYS Selection
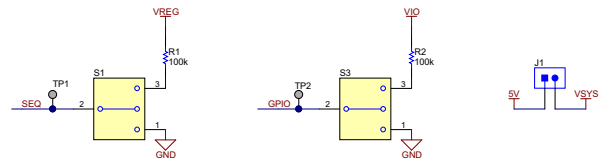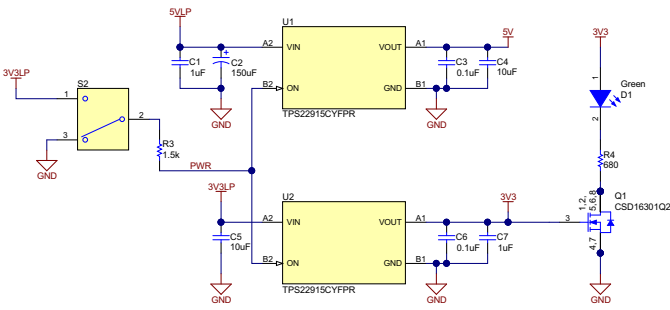
Launchpad Connectors

TPS65033x Socket

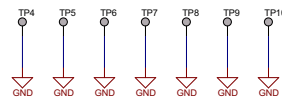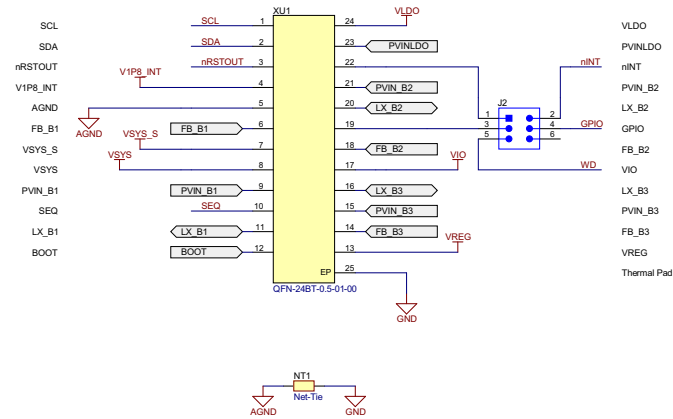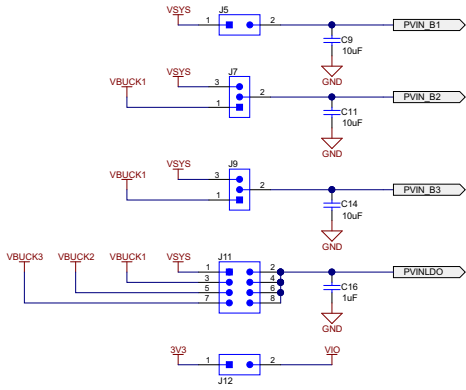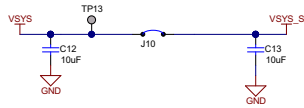**Figure 5-1. BOOSTXL-TPS65033 LaunchPad and Socket Connections**

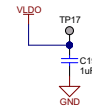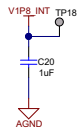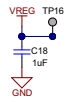## Regulator Input Supply Selection

VSYS_S Selection

Internal Supply Capacitors
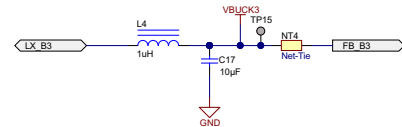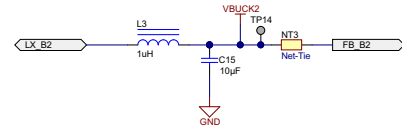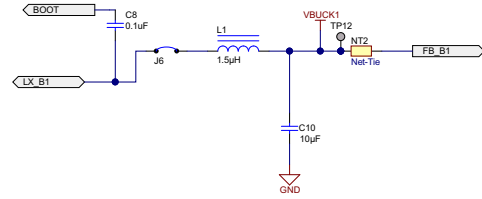

Regulator Output Filters

Figure 5-2. BOOSTXL-TPS65033 Power Supplies
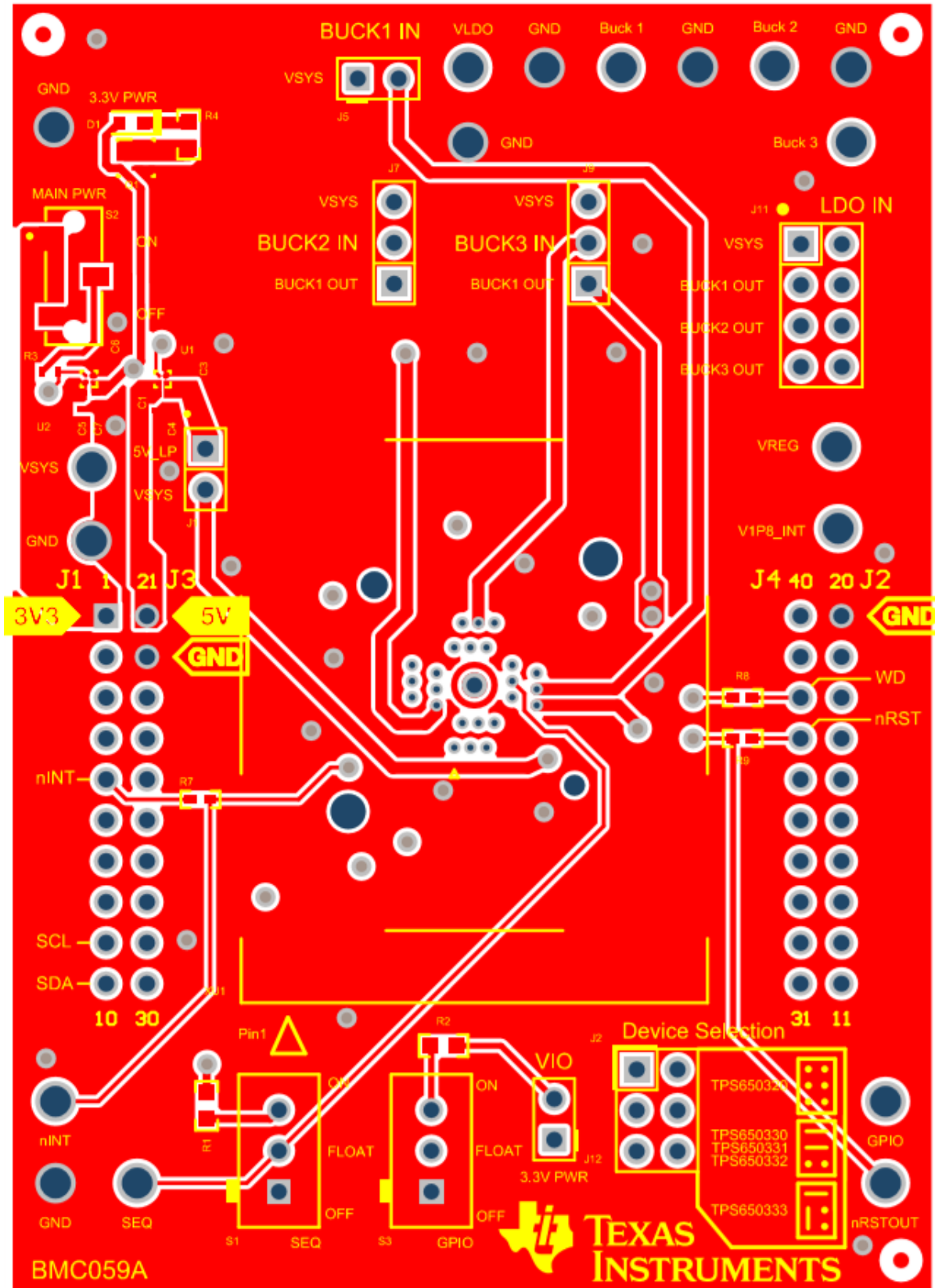
6 BOOSTXL-TPS65033 Board Layers
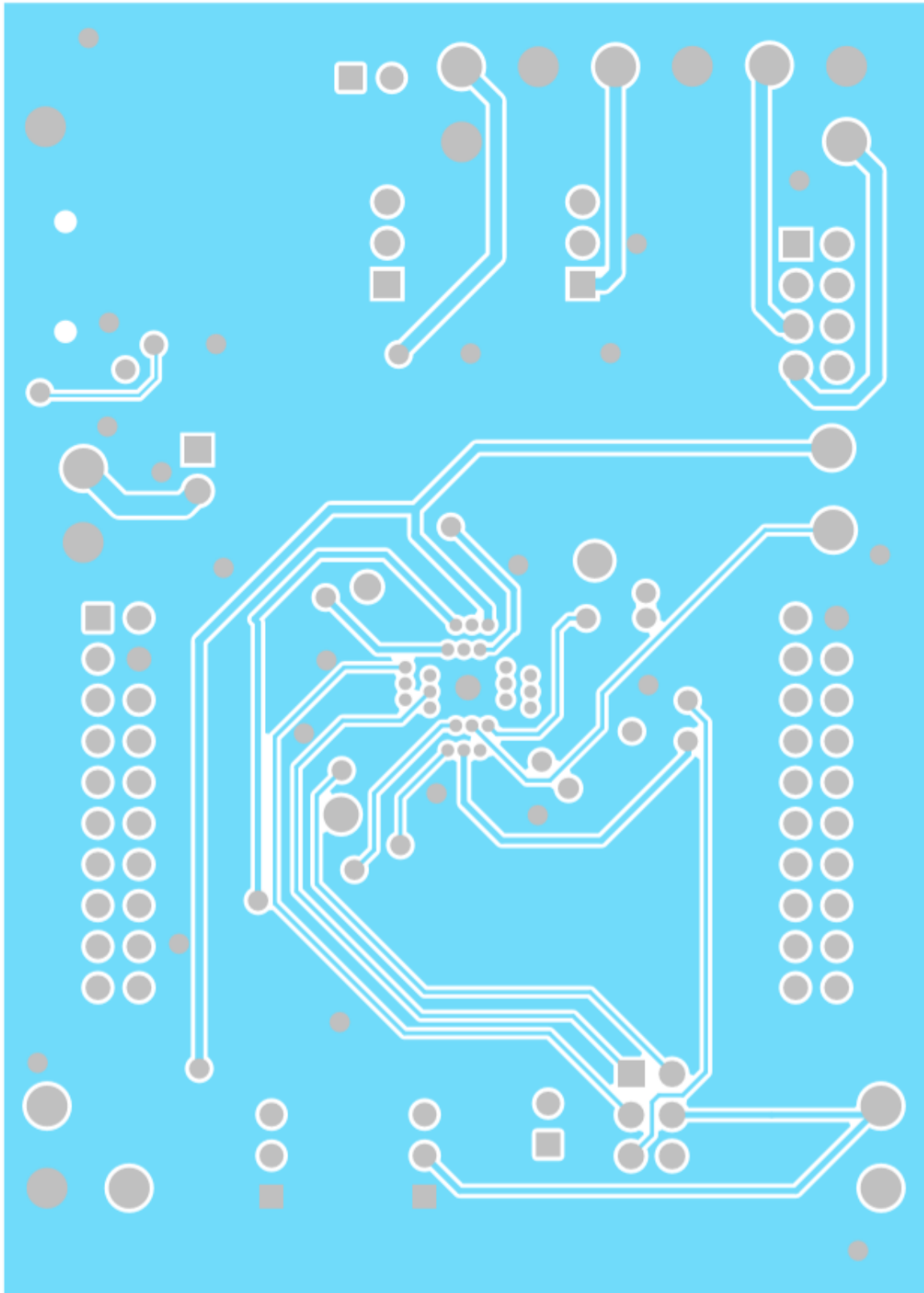

Figure 6-1. Top Layer
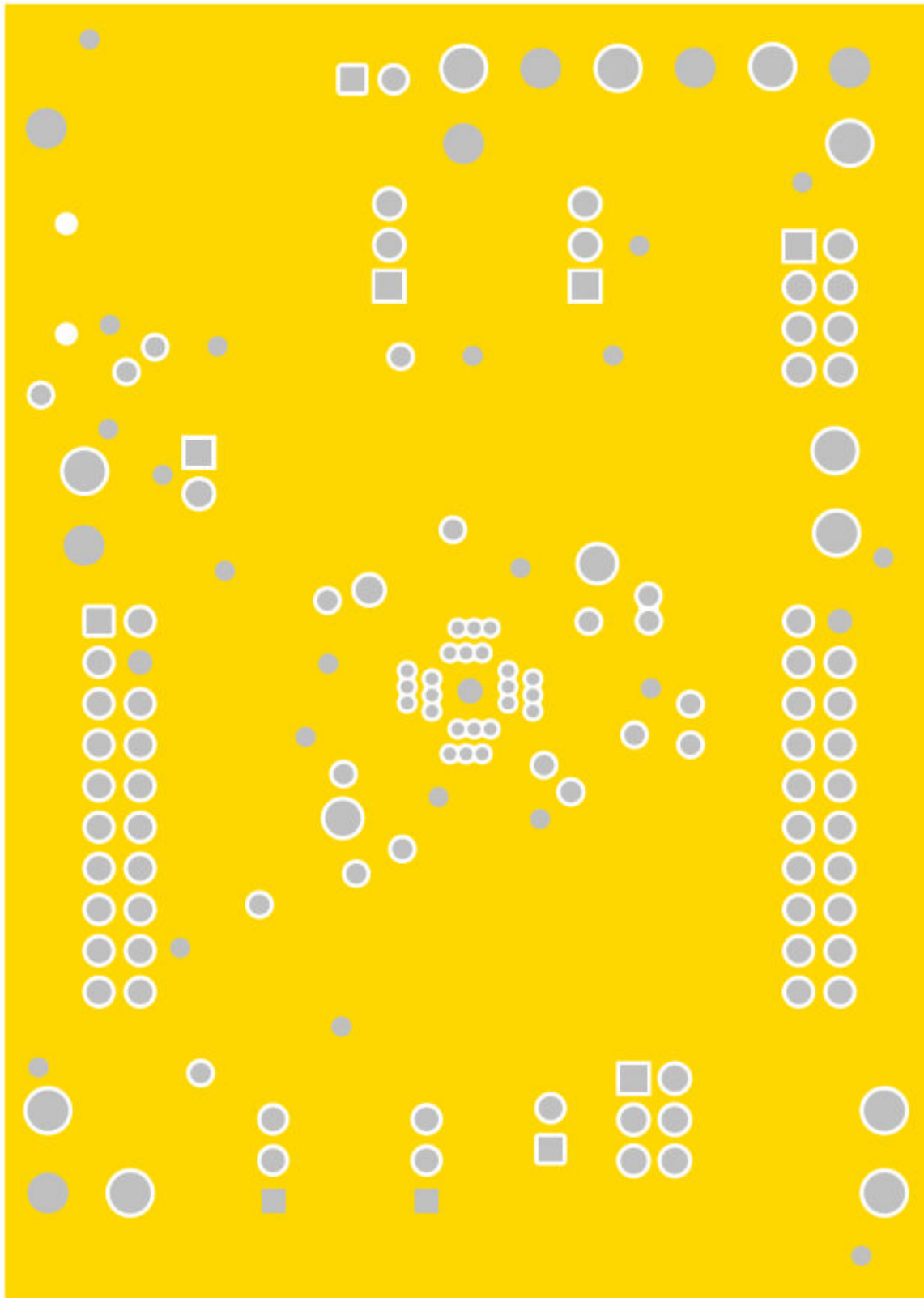
Figure 6-2. Mid-Layer 1

Figure 6-3. Mid-Layer 2
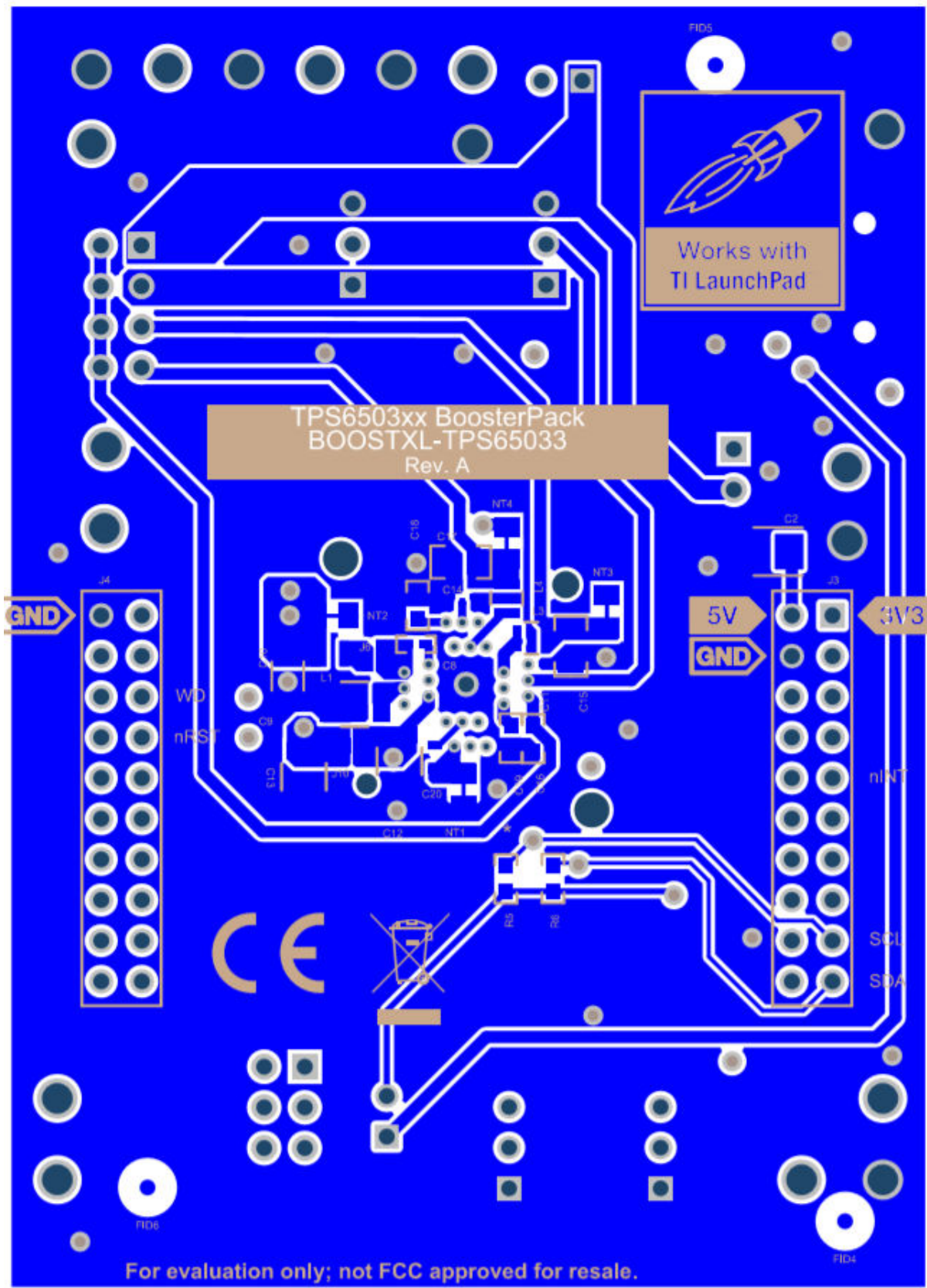
Figure 6-4. Bottom Layer (Mirrored)

7 BOOSTXL-TPS65033 Bill of Materials

Table 7-1. BOOSTXL-TPS65033 Bill of Materials (BOM)

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
!PCB1	1		Printed Circuit Board		BMC059	Any
C1, C7	2	1 µF	CAP, CERM, 1 µF, 35 V, ± 20%, X5R, 0402	0402	GRM155R6YA105ME1 1D	MuRata
C2	1	150 µF	CAP, TA, 150 µF, 6.3 V, ± 20%, 0.025 Ω, SMD	3528-21	T520B157M006ATE025	Kemet
C3, C6	2	0.1 µF	CAP, CERM, 0.1 µF, 10 V, ± 20%, X5R, 0402	0402	885012105010	Wurth Elektronik
C4, C5, C11, C14	4	10 µF	CAP, CERM, 10 µF, 10 V, ± 20%, X5R, 0402	0402	CL05A106MP5NUNC	Samsung Electro-Mechanics
C8	1	0.1 µF	CAP, CERM, 0.1 µF, 50 V, ± 20%, X7R, AEC-Q200 Grade 1, 0402	0402	CGA2B3X7R1H104M0 50BB	TDK
C9, C12, C13	3	10 µF	CAP, CERM, 10 µF, 25 V, ± 20%, X7R, AEC-Q200 Grade 1, 1210	1210	CGA6P1X7R1E106M2 50AC	TDK
C10	1	10 µF	CAP, CERM, 10 µF, 10 V,± 20%, X7R, AEC-Q200 Grade 1, 1206	1206	LMK316AB7106MLHT	Taiyo Yuden
C15, C17	2	10 µF	CAP, CERM, 10 µF, 6.3 V,± 10%, X7R, AEC-Q200 Grade 1, 0805	0805	JMJ212CB7106KGHT	Taiyo Yuden
C16, C18, C19, C20	4	1 µF	CAP, CERM, 1 µF, 10 V, ± 10%, X7R, AEC-Q200 Grade 1, 0603	0603	LMK107B7105KAHT	Taiyo Yuden
D1	1	Green	LED, Green, SMD	0.8x1.6 mm	HSMG-C190	Avago
H1	1		IC to place in Socket XU1		TPS650330QRGEQ1	Texas Instruments
J1	1		Header, 100 mil, 2x1, Tin, TH	Header 2x1	90120-0122	Molex
J2	1		Header, 100 mil, 3x2, Tin, TH	3x2 Header	PEC03DAAN	Sullins Connector Solutions
J3, J4	2		Receptacle, 2.54 mm, 10x2, Tin, TH	10x2 Receptacle	SSQ-110-03-T-D	Samtec
J5, J12	2		Header, 100 mil, 2x1, Tin, TH	Header, 2 PIN, 100 mil, Tin	PEC02SAAN	Sullins Connector Solutions
J7, J9	2		Header, 100 mil, 3x1, Gold, TH	PBC03SAAN	PBC03SAAN	Sullins Connector Solutions
J11	1		Header, 100 mil, 4x2, Tin, TH	Header, 4x2, 100 mil, Tin	PEC04DAAN	Sullins Connector Solutions
L1	1	1.5 µH	Inductor, Shielded, Metal Composite, 1.5 µH, 2.3 A, 0.11 Ω, AEC-Q200 Grade 0, SMD	0806	TFM201610ALMA1R5 MTAA	TDK
L3, L4	2	1 µH	Inductor, 1 µH, 3.1 A, 0.06 Ω, SMD	2.0x1.6x1.0 mm	TFM201610GHM-1R0 MTAA	TDK
Q1	1	25 V	MOSFET, N-CH, 25 V, 5 A, DQK0006C (WSON-6)	DQK0006C	CSD16301Q2	Texas Instruments
R1, R2	2	100 k	RES, 100 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW0603100KJNEA	Vishay-Dale
R3	1	1.5 k	RES, 1.5 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW04021K50JNED	Vishay-Dale
R4	1	680	RES, 680, 5%, 0.1 W, 0603	0603	RC0603JR-07680RL	Yageo
R5, R6	2	4.7k	RES, 4.7 k, 5%, 0.1 W, 0603	0603	RC0603JR-074K7L	Yageo

Table 7-1. BOOSTXL-TPS65033 Bill of Materials (BOM) (continued)

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
R7, R8, R9	3	0	RES, 0, 5%, 0.063 W, 0402	0402	RC0402JR-070RL	Yageo America
S1, S3	2		Switch, Slide, SPDT, On-Off-On, 3 Pos, 0.05 A, 48 V, TH	9.5x5 mm	AS1E-2M-10-Z	Copal Electronics
S2	1		Switch, Slide, SPDT, 0.2 A, J Lead, SMD	SMD, 3-Leads, Body 8.5x3.5 mm, Pitch 2.5 mm	CL-SB-12A-01T	Copal Electronics
SH-J1, SH-J2, SH-J3, SH-J4, SH-J5, SH-J6, SH-J7, SH-J8	8	1x2	Shunt, 100 mil, Flash Gold, Black	Closed Top 100 mil Shunt	SPC02SYAN	Sullins Connector Solutions
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18	18		PCB Pin, Swage Mount, TH	PCB Pin(2505-2)	2505-2-00-44-00-00-07-0	mill-Max
U1, U2	2		5.5 V, 2 A, 38 mΩ Load Switch With Quick Output Discharge, YFP0004AAAA (DSBGA-4)	YFP0004AAAA	TPS22915CYFPR	Texas Instruments
XU1	1		Socket, QFN-24, 0.5 mm Pitch	Socket, QFN-24, 0.5 mm Pitch	QFN-24BT-0.5-01-00	Enplas Tech Solutions

8 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

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