Evaluates: MAX20303

MAX20303 Evaluation System

General Description

The MAX20303 evaluation system (EV system) is a fully assembled and tested circuit board that demonstrates the MAX20303 ultra-low-power wearable power-management integrated circuit (PMIC). The MAX20303 includes voltage regulators such as bucks, boost, buck-boost and linear regulators, and a complete battery management solution with battery seal, charger, power path and fuel gauge.

The MAX20303 EV system comes with the MAX20303 board, the MAXPICO2PMB# board, and two micro-B cables. The EV system comes with the MAX20303BEWN+ installed. The MAX20303 is configurable through an I²C interface that allows for programming various functions and reading the device status. The EV system GUI application sends commands to the MAXPICO2PMB# adapter board to configure the device.

Features

- USB Power Option
- Flexible Configuration
- On-Board LED Current Sink and Battery Simulation
- Sense Test Point for Output-Voltage Measurement
- Filter Test Point for Haptic Waveform Measurement
- Windows® 8/10-Compatible GUI Software
- Fully Assembled and Tested

***Ordering Information** appears at end of data sheet.*

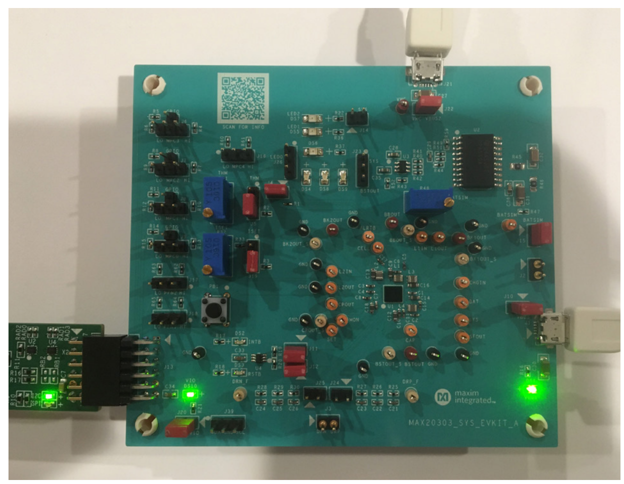
EV System Contents

- MAX20303 EV system
- MAXPICO2PMB# board
- Two USB A-to-USB micro-B cables

EV System Contents

FILE	DESCRIPTION
MAX20303EVKitSetupVxxx.exe	PC GUI Program

MAX20303 EV System Board Pic



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319-100749; Rev 1; 8/21

Quick Start

Required Equipment

Note: In the following sections, text in **bold** refers to items directly from the EV system software installation.

- MAX20303 EV system
- Windows PC with USB ports
- One USB A-to-USB Micro-B Cable and MAXPICO2PMB# adapter board
- One USB A-to-USB Micro-B Cable or Power Supply (for battery simulation or battery voltage)
- (Optional) One USB A-to-USB Micro-B Cable or Power Supply (for charger input CHGIN)
- One voltmeter

Procedure

The EV system is fully assembled and tested. Follow the steps below to verify board operation:

1) Visit **https://www.maximintegrated.com** to download the latest version of the EV system software, MAX20303EVKitSetupVxxx.zip located on the MAX20303 EV system web page. Download the EV system software to a temporary folder and unzip the zip file.
2) Install the EV system software on your computer by running the MAX20303EVKitSetupVxxx.exe program inside the temporary folder.
3) Verify that all jumpers are in their default positions, as shown in Table 1.
4) Connect the type-A end of a cable to the PC and micro-USB end of a cable to the MAXPICO2PMB# board, and connect the MAXPICO2PMB# to J13 located on the lower left of the EV system board.
5) Connect a USB A-to-micro-B cable from the computer to J21 on the upper-right corner of the EV system board to use USB VBUS to power the battery simulation circuits on the board, or to power the battery simulation circuits from the VHC test point. (The user can also use a Li-ion battery or power source to evaluate the device if not using the battery simulation circuits. Connect the battery or power source to J2 on the EV system board. Skip step 6 if not using the battery simulation.)
6) Use a voltmeter to check that VHC is about 5V and the BATSIM test point is about 3.7V. To adjust the BATSIM voltage, turn the R48 BATSIM potentiometer. Place a shunt on J15, then confirm that TP BAT is equal to the BATSIM voltage.
7) On the computer, open the MAX20303 GUI. It should look like Figure 1; the status bar on the bottom displays **MAX20303 Not Found**.
8) Press the PB1 ($\overline{\text{KIN}}$) button until the device enters ON mode. The GUI then shows **Connected** and the registers are read and displayed (Figure 2).
9) The EV system is now ready for additional evaluation.
10) To evaluate the battery charger, the user can shunt J10 and plug in a USB micro-B cable to J1 of the EV system to use the USB VBUS power, or externally supply the charging power on TP CHGIN.

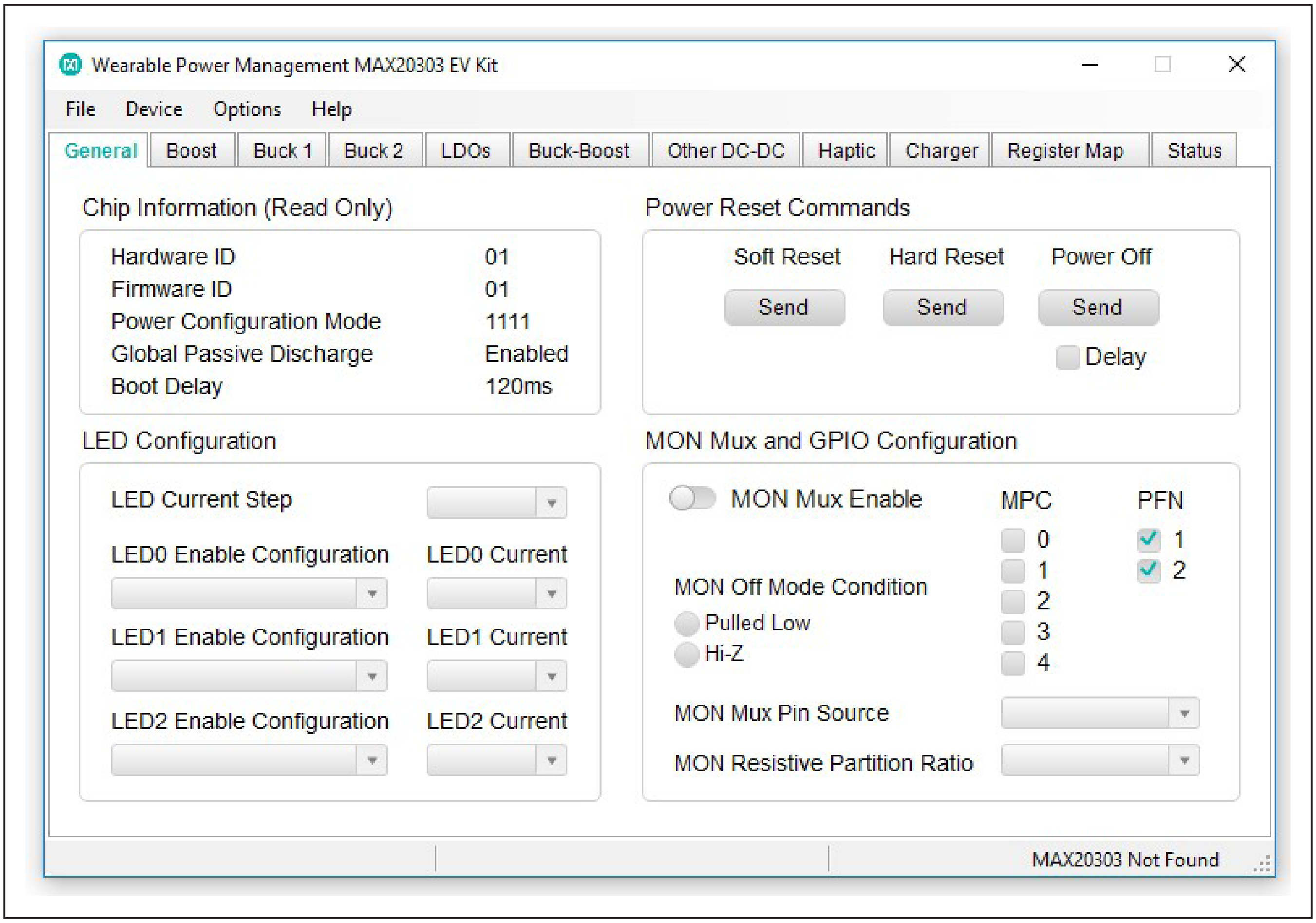


Figure 1. MAX20303 Not Found Status

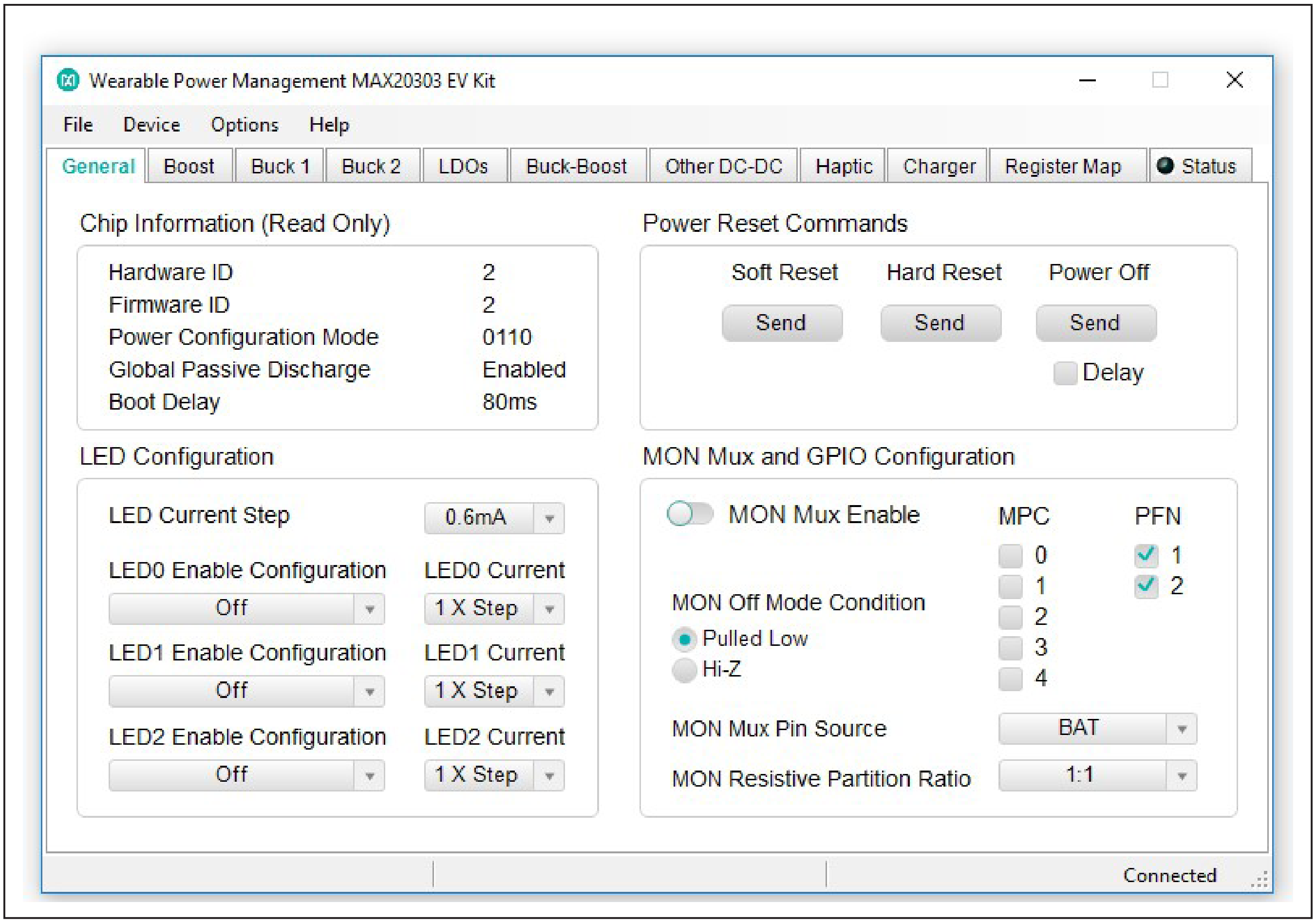


Figure 2. MAX20303 Connected Status

Detailed Description of Software

Software Startup

Upon starting the program, the EV system software automatically searches for the USB interface circuit and then for the IC device addresses. The EV system enters normal operating mode when the connection is established and addresses are found. If the USB connection is not detected, the status bar displays **Not Connected**. If the USB connection is detected, but the MAX20303 is not found, the status bar shows **MAX20303 Not Found**.

ToolStrip Menu Bar

The ToolStrip menu bar (Figure 3) is located at the top of the GUI window. This bar is comprised of **File**, **Device**, **Options**, and **Help** menus whose functions are detailed in the following sections.

File Menu

The **File** menu contains the option to exit out of the GUI program.

Device Menu

The **Device** menu provides the ability to connect or disconnect the EV system to the GUI. The **Advanced** → **Use USB2PMB2#** option should be checked if using with the USB2PMB2# adapter board.

Options Menu

The **Options** menu provides several settings to access more features offered by the GUI. The **Disable Polling** option lets the user read the registers manually instead of getting automatically frequent register updates from the IC. The **Disable Fuel Gauge** option allows the user to set the fuel gauge to sleep mode through the I^2C and the quiescent current decreases when setting the fuel gauge to sleep mode.

Help Menu

The **Help** menu contains the **About** option, which displays the GUI splash screen indicative of the GUI version being used.

Tab Controls

The MAX20303 EV system software GUI provides a convenient way to test the features of the MAX20303. Each tab contains controls relevant to various blocks of the device. Changing these interactive controls triggers a write operation to the MAX20303 to update the register contents. The **Read All Registers** button reads all the configuration registers that are visible on the current tab page. All statuses are polled continuously. The polling feature can be disabled in the **Options** section of the menu bar by selecting **Disable Polling**.

General Tab

The **General** tab (Figure 4) provides information on device info, set power reset command, enable LEDs, and LED current sink setting, MON setting, PFNs, and MPCs status and configuration.

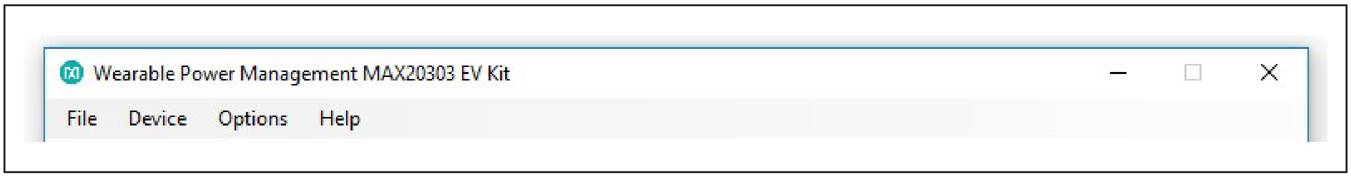


Figure 3. The ToolStrip Menu Items

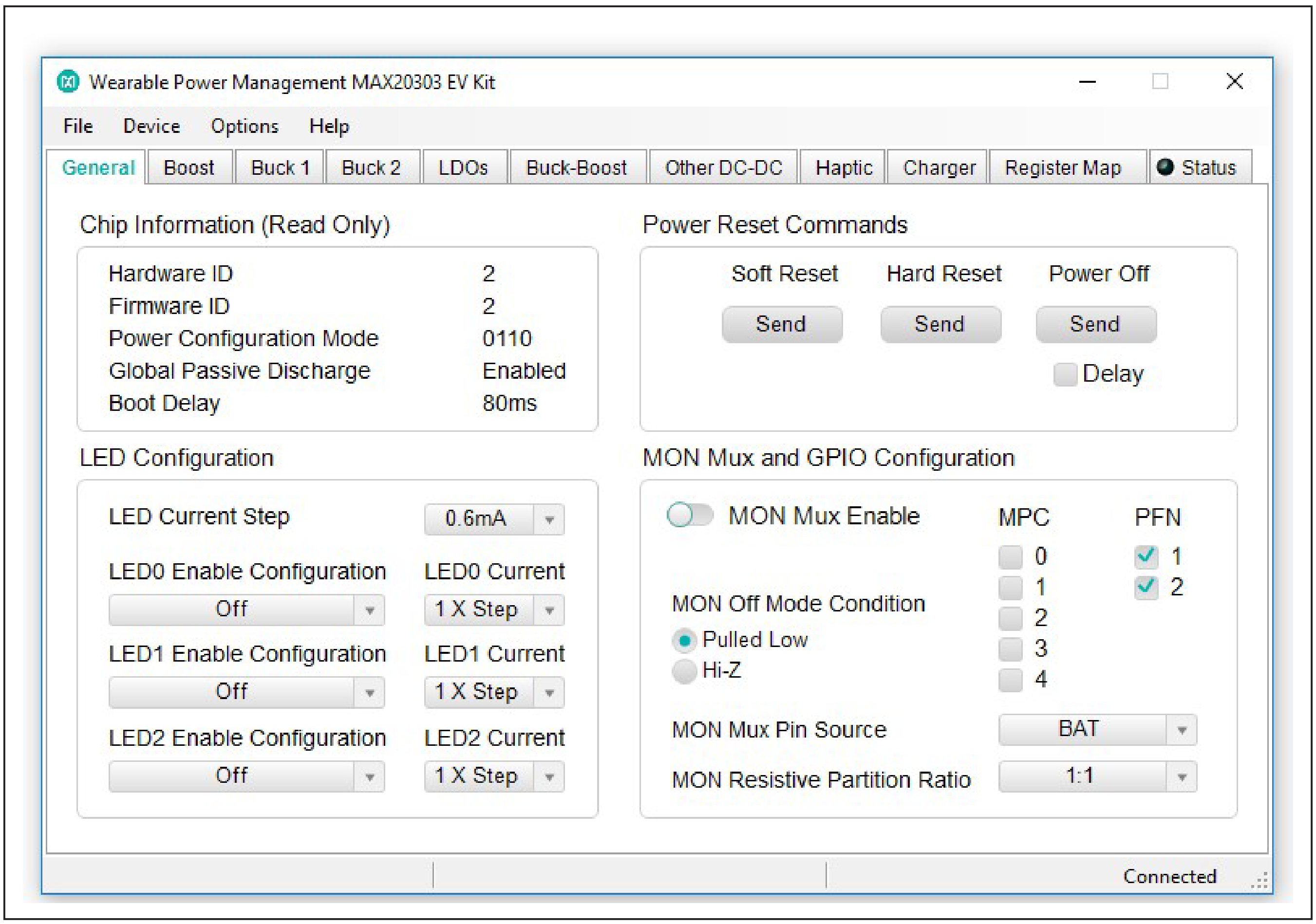


Figure 4. General Tab

Boost Tab

In the **Boost** tab (Figure 5), the user can enable boost, set boost voltage, and inductor current settings.

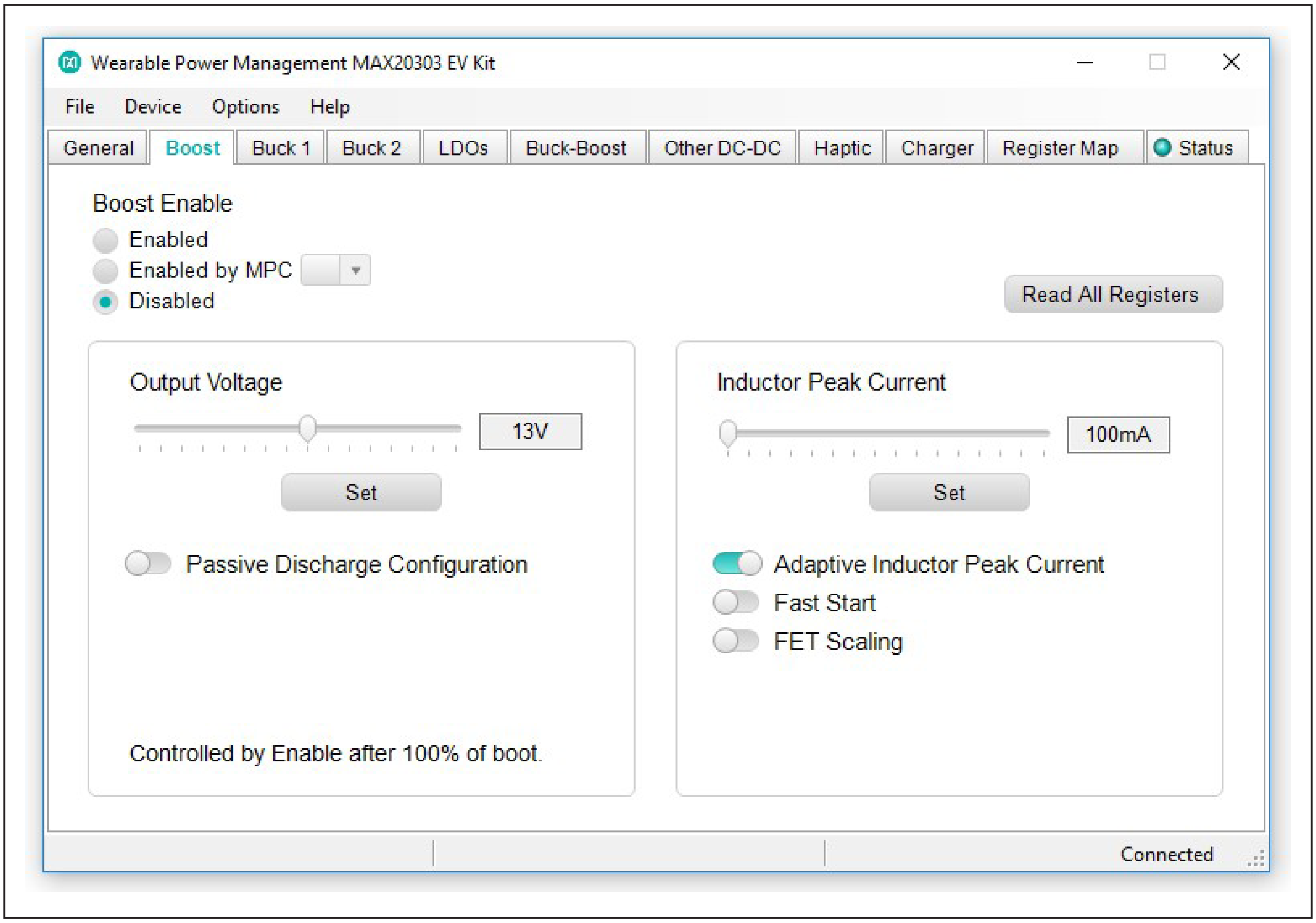


Figure 5. Boost Tab

Buck1/2 Tab

In the **Buck1** and **Buck2** tabs (Figures 6 and 7), the user can enable bucks, set buck voltages, inductor current settings, DVS mode and voltage setting, and some additional settings.

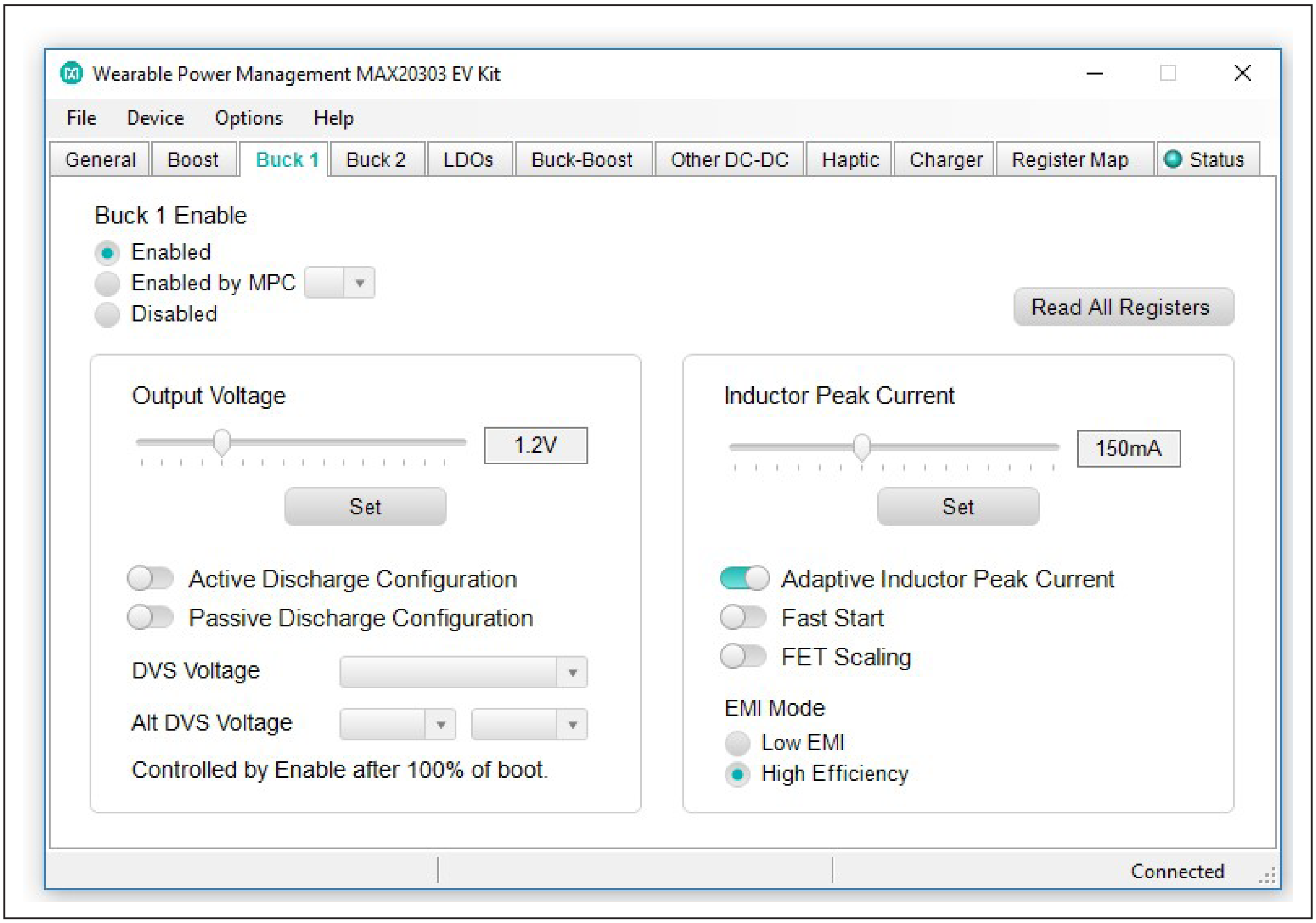


Figure 6. Buck1 Tab

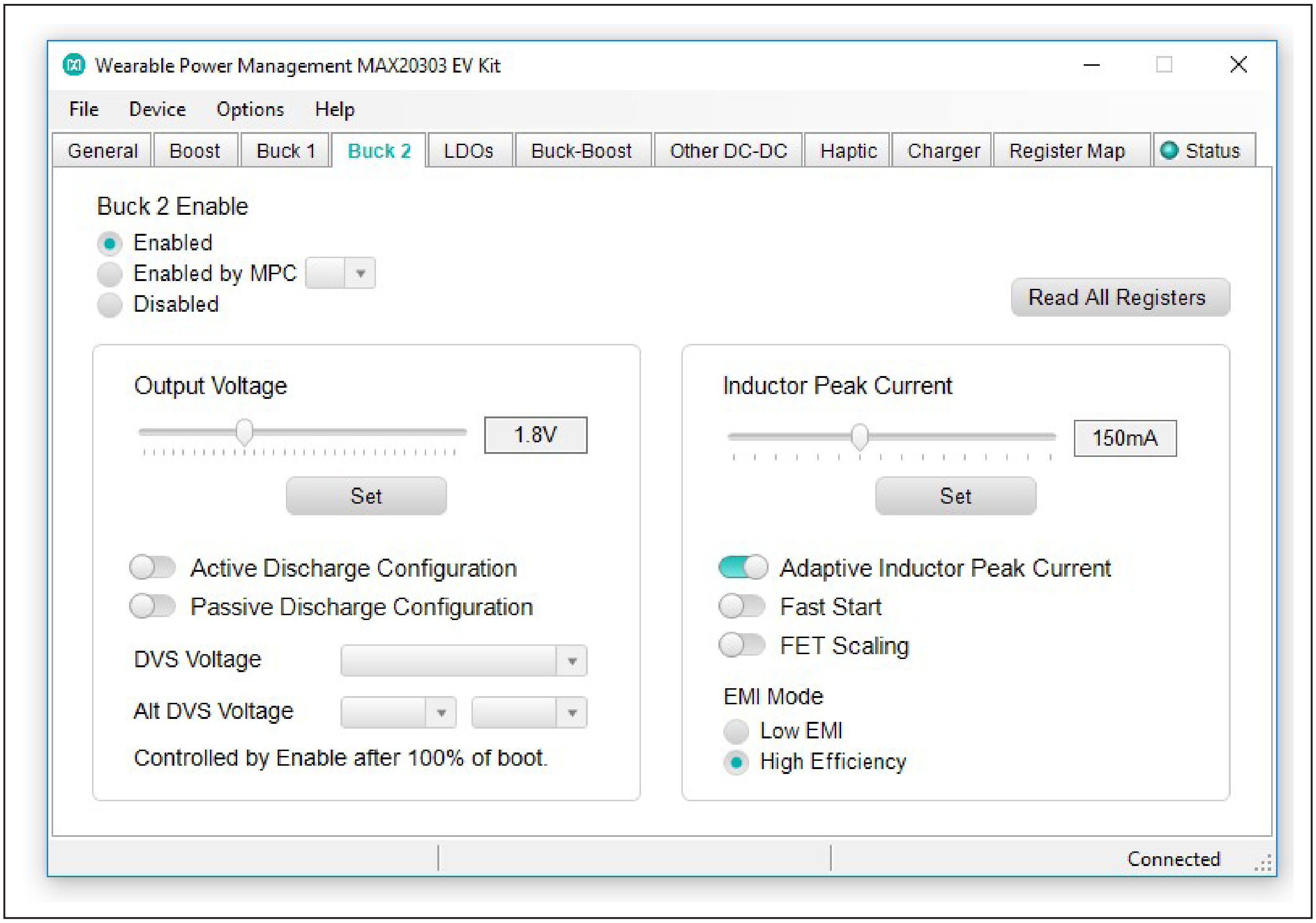


Figure 7. Buck2 Tab

LDOs Tab

The **LDOs** tab (Figure 8) lets the user enable LDOs, set LDO voltages, and change to load switch mode.

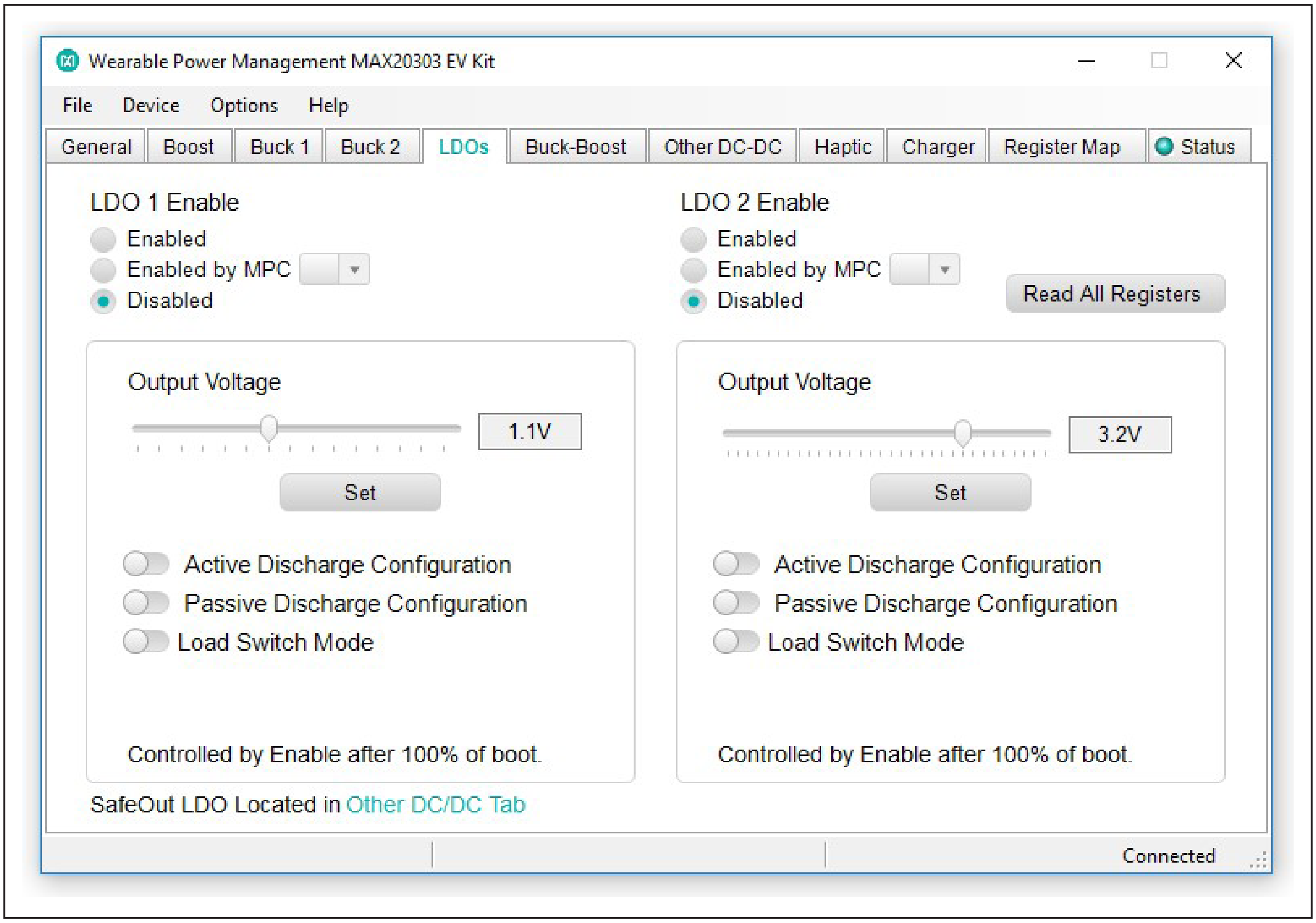


Figure 8. LDOs Tab

Buck Boost Tab

In the **Buck Boost** tab (Figure 9), the user can enable buck boost, set buck boost voltage, and inductor current settings.

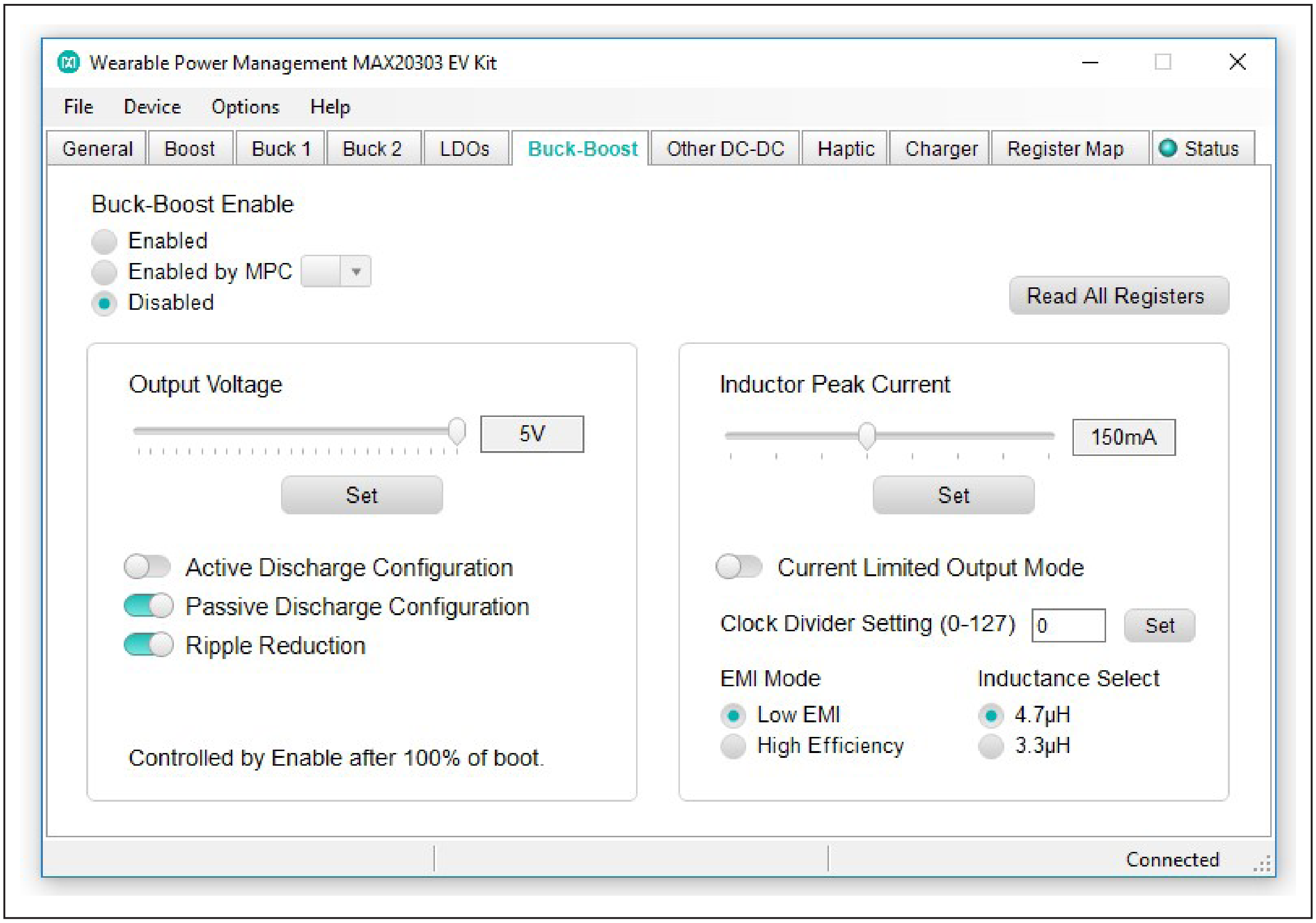


Figure 9. Buck Boost Tab

Other DC-DC Tab

The **Other DC-DC** tab (Figure 10) includes the Charge Pump and SFOUT settings.

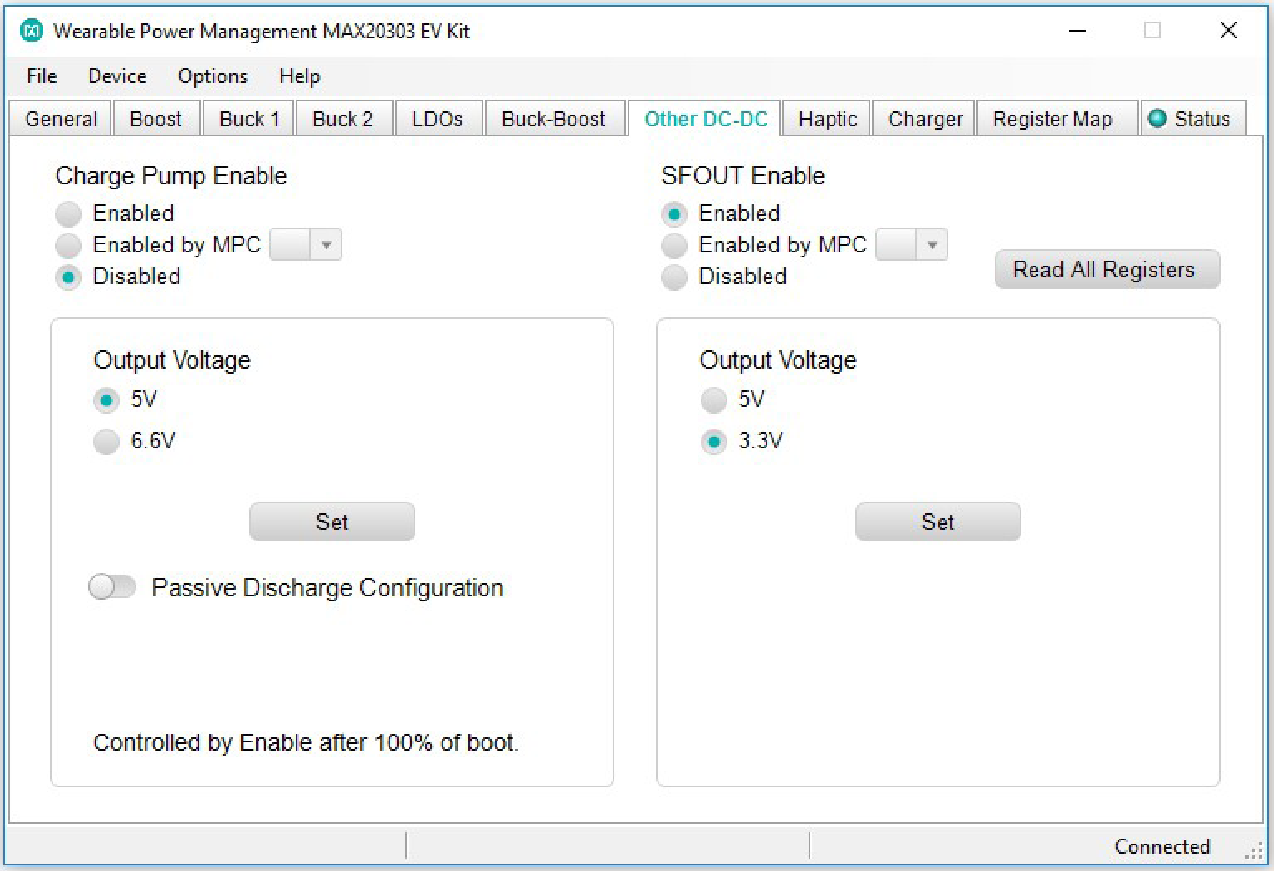


Figure 10. Other DC-DC Tab

Haptic Tab

The **Haptic** tab (Figure 11) lets the user choose the actuator type, haptic driver mode, and different settings for each mode.

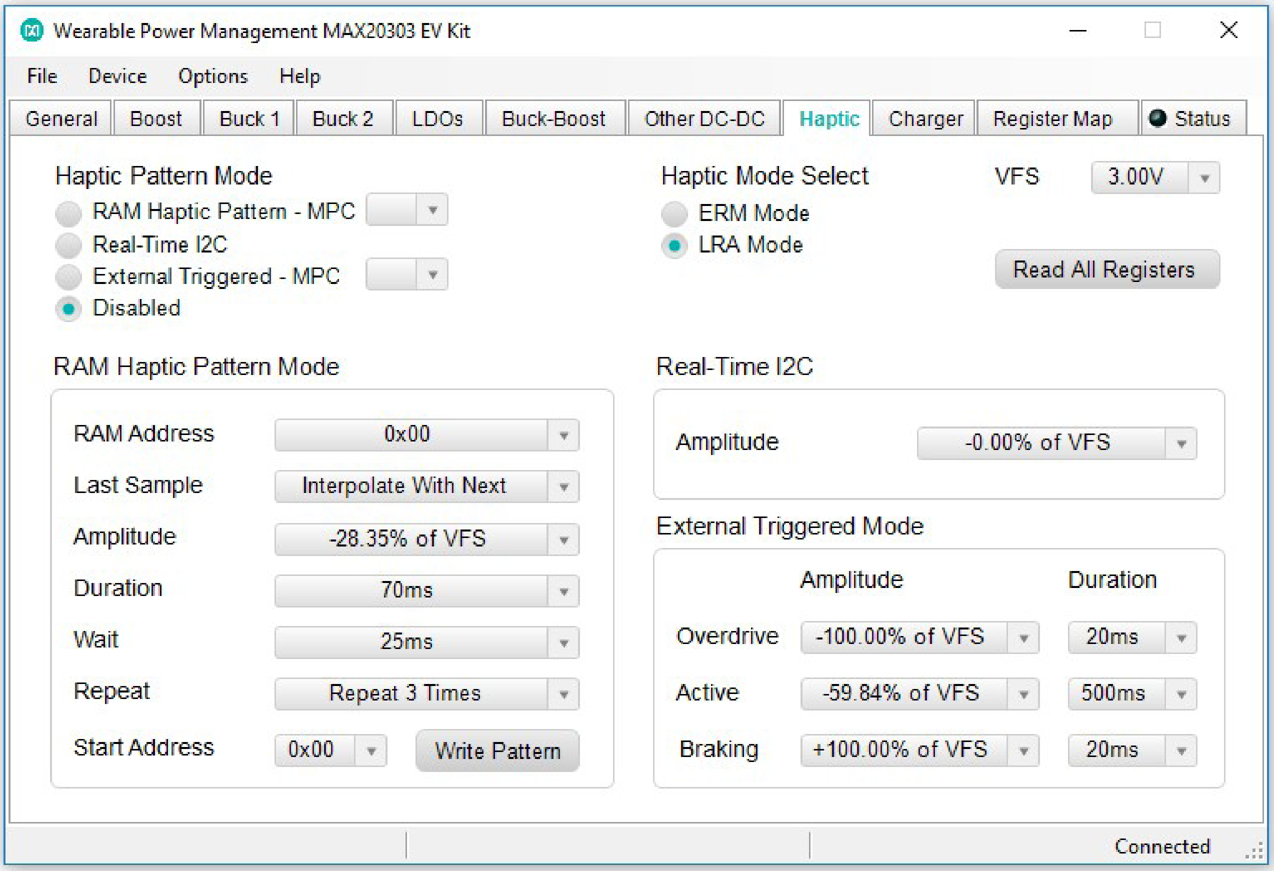


Figure 11. Haptic Tab

Charger Tab

The **Charger** tab (Figure 12) lets the user set charger and thermistor monitor configurations. The charger and thermistor status section constantly polls the charger and thermistor status and displays any changes. The polling happens even when the **Charger** tab is not selected. The polling can be disabled by selecting **Disable Polling** in the **Options** menu at the top of the application.

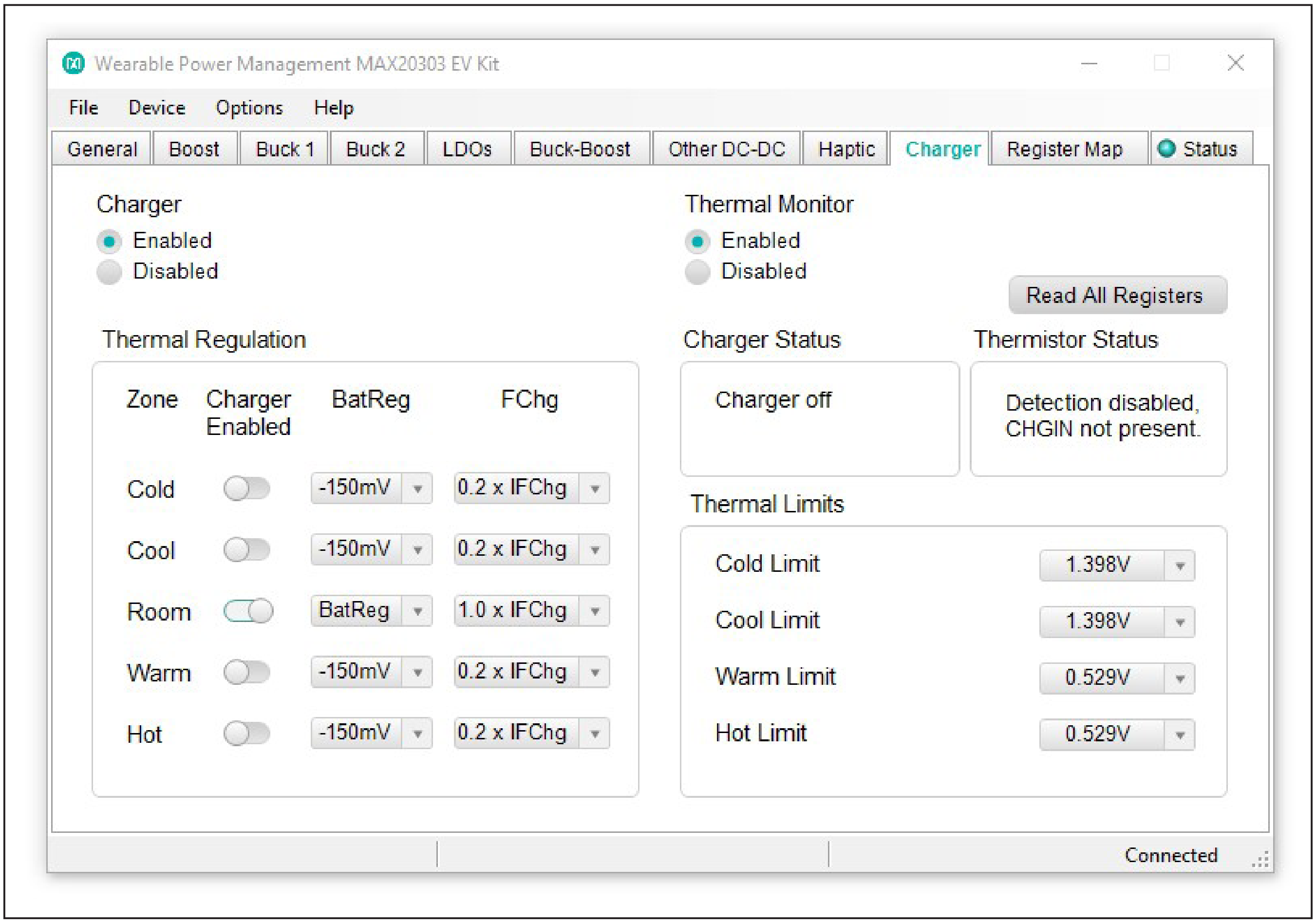


Figure 12. Charger Tab

Register Map Tab

The **Register Map** tab allows for the configuration of all I2C registers and AP Commands, including those not configurable in other tabs. In the top right corner of the tab page, the user can select between direct I2C registers and AP commands.

For direct I2C (Figure 13), the register to be read from or written to can be selected in the left table. The right table contains descriptions for each register field of the selected 8-bit register. All bits, along with their field names, are displayed at the bottom of the page.

To set a bit, click the bit label. **Bold** text represents logic 1 and regular text represents logic 0. To configure the changes to the device, click the **Write** button at the bottom right.

The user can click **Read All** to perform a burst read of all registers.

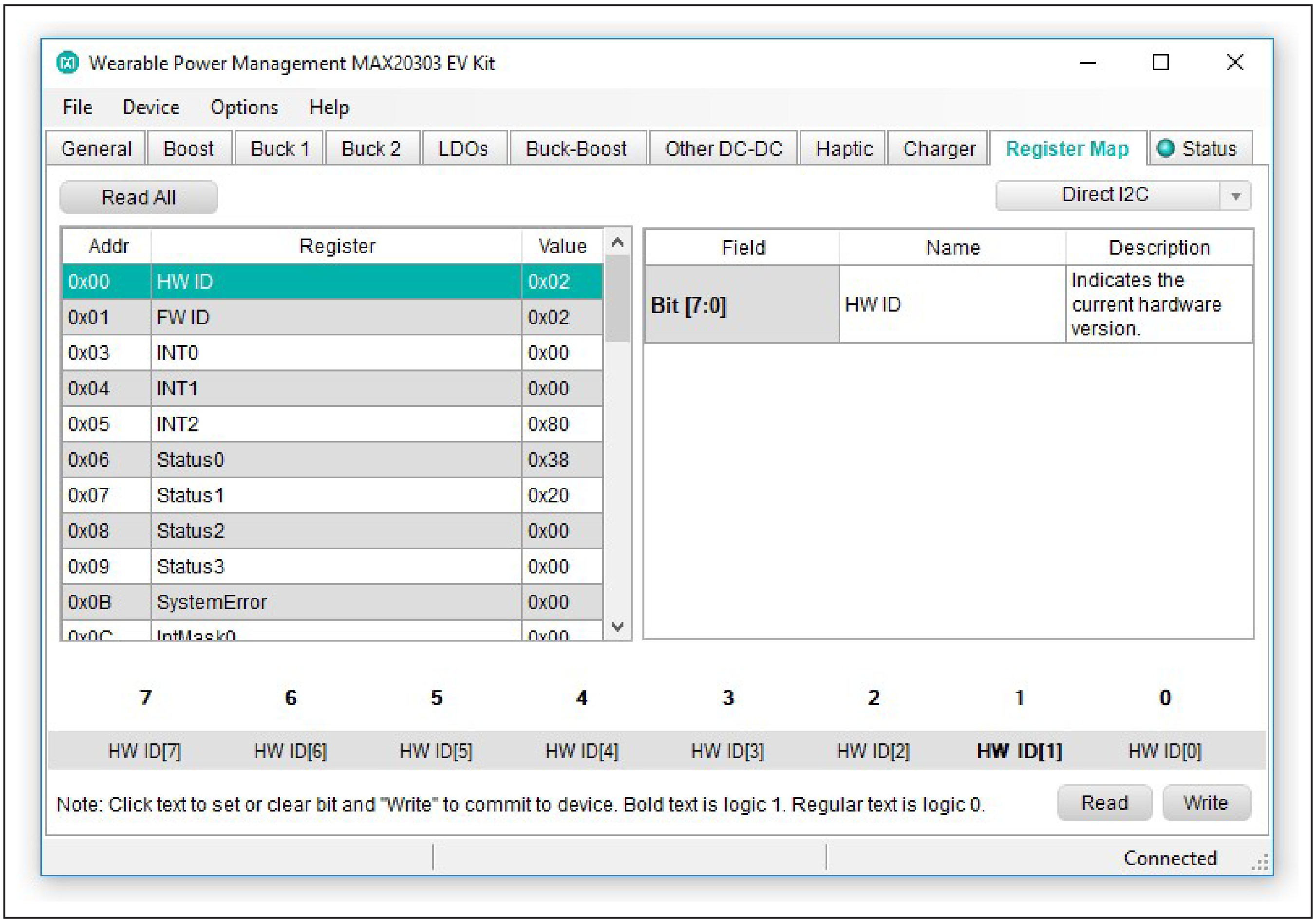


Figure 13. Register Map Tab Direct I2C

For AP commands (Figure 14), the left table is populated with all AP commands in the order of their operation codes. When an AP command is selected, its APDataOut/In registers expand under it. Selecting an APData register shows the individual bit descriptions and allows the user to read/write individual bits just like the direct I2C option. After writing or before reading the APData registers, the user can send the operation code for the selected AP command by clicking the **Send Opcode** button at the bottom right of the tab page.

A common action when sending AP commands manually is to send a read opcode, modify one specific setting (like VSet or BstEn), then send the corresponding write opcode. To speed up this read/modify/write action, the **APDataIn** to **APDataOut** button in the top left of the tab page can copy all APDataIn registers to the APDataOut registers.

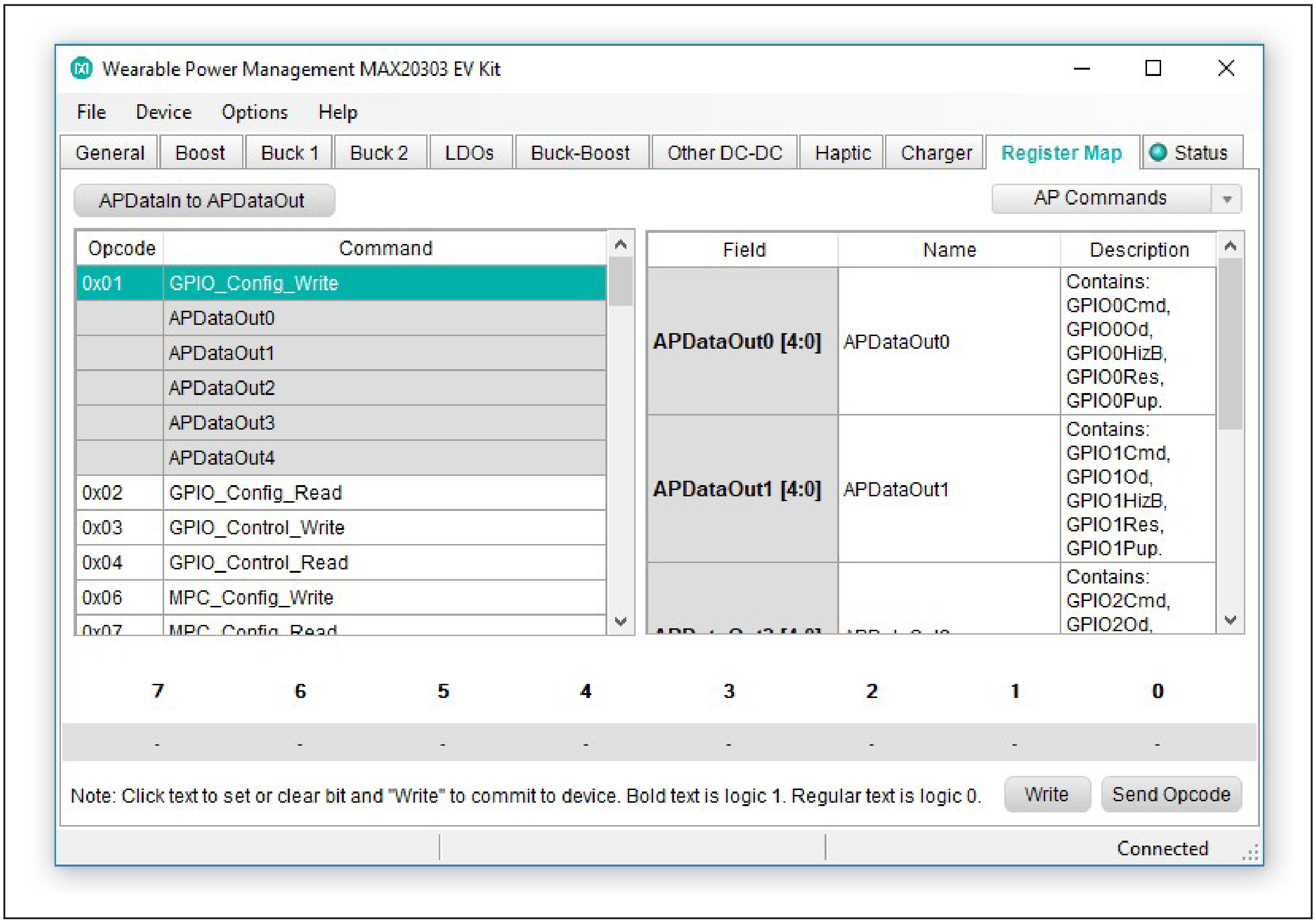


Figure 14. Register Map Tab AP Commands

Status Tab

The **Status** tab (Figure 15) shows the user the state of the interrupt registers, INT0–INT2, and the status registers, Status0–Status3. The **Read Interrupts** button reads all INT and STATUS registers and updates the text color to teal to indicate a 1 was read. Interrupt polling can be disabled by selecting **Disable Polling** in the **Options** menu at the top of the application.

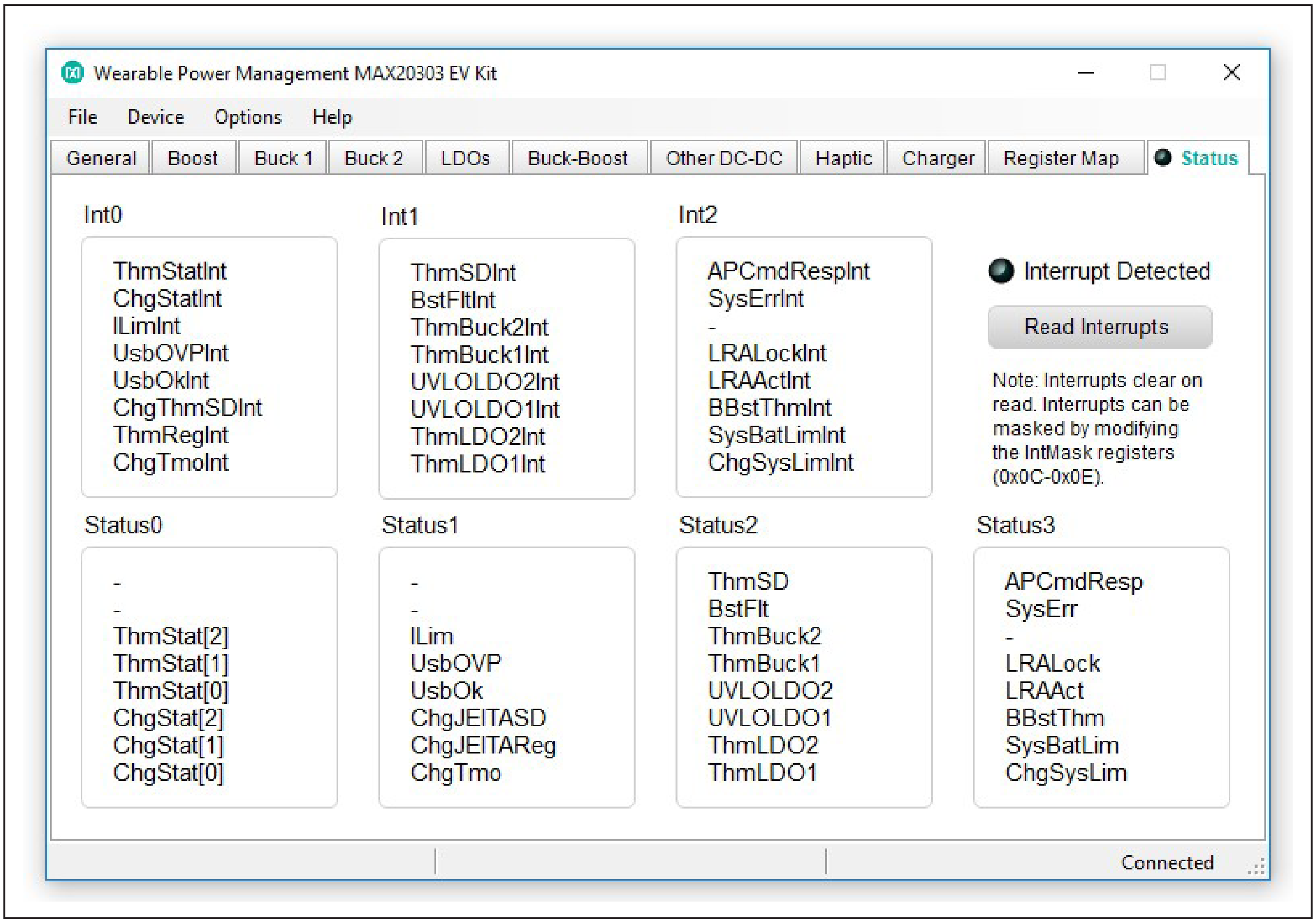


Figure 15. Status Tab

Detailed Description of Hardware

The MAX20303 EV system evaluates the MAX20303 ultra-low-power wearable PMIC, which communicates over the I2C interface. The EV system demonstrates the IC features such as boost, bucks, linear regulators, buck-boost, LED current sink, battery charger, and haptic driver. The EV system uses the IC in a 56-bump wafer-level package on a proven, four-layer PCB design. The EV system can use USB VBUS +5V DC for battery and charger input-power source. Alternatively, the EV system can be powered from an external power supply. Figure 16 shows the EV system block annotated pictures (see the *MAX20303 EV System Board Pic*).

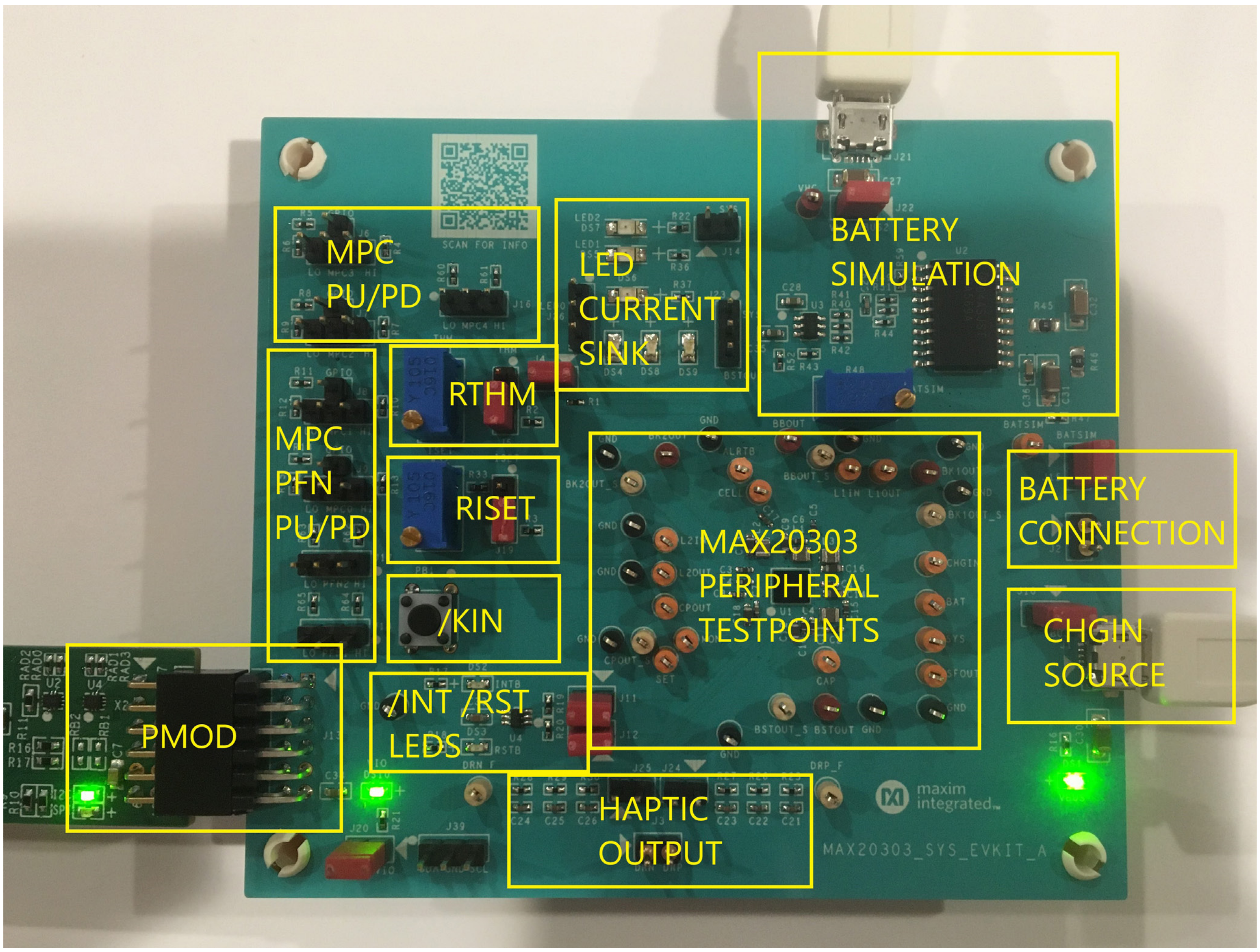


Figure 16. MAX20303 EVSYSKIT Block Annotated Picture

Hardware Setup

To use the EV system with the GUI, connect the MAXPICO2PMB# to the PMOD connector in the bottom left corner of the board. The MAXPICO2PMB# also provides 3.3V to the logic voltage VIO of the EV system when shunting J20. The user can use J21 USB VBUS to power the battery simulation circuits on the EV system to supply BAT of the IC. Turning the R48 potentiometer can change the BATSIM voltage. Connect BATSIM to BAT of the IC with a shunt on J15. Alternatively, instead of using battery simulation circuits on the board, the user can connect their Li-ion battery on the J2 connector. The user can use the J1 USB VBUS as the CHGIN source and place a shunt on J10.

PFNs and MPCs States

The PFNs and MPCs can be pulled up to VIO through a 100kΩ resistor, or connected to ground through a 100kΩ resistor.

Regulators and Peripherals

All regulator outputs are made available on test points. The inputs to the LDO1, and LDO2 must be supplied externally through test points. Bucks, buck-boost, boost, and charge pump outputs have sense test points which provide easy voltage measuring.

Thermistor and SET Adjustment

When the J4 shunt is installed, THM is pulled up to TPU through a 10kΩ resistor. Header J5 is used to select the pull-down resistor for THM. When pin 1 and 2 is shunted, potentiometer R31 is used to simulate a thermistor at THM. When pin 2 and 3 is shunted, a fixed 10kΩ resistor is connected between THM and ground.

Header J19 is used to select the resistor for R_{ISET}, which sets the fast charge current (I_{FCHG}). Shunting pin 1 and 2 selects potentiometer R33 and the user can change R_{ISET} to change I_{FCHG}. Shunting pin 2 and 3 selects a fixed 39kΩ resistor, which sets the fast charge current to 51mA.

$\overline{INT}$ and $\overline{RST}$ LED Indicators

Shunts can be installed on J11 and J12 to show the status of $\overline{INT}$ and $\overline{RST}$ as LED indicators, DS2 and DS3. When the corresponding LED luminates, it means the active-low output is pulled low.

Haptic Driver

The haptic driver output is on J3 where an LRA or ERM vibration motor can be connected. By shunting J24 and J25, the user can measure the haptic waveform with the on-board low-pass filters, which convert PWM to a sine wave.

LED Current Sink

The EV system includes multiple LEDs to test the LED0, LED1, and LED2 current sinks. The current source for LED1 and LED2 can be connected to SYS by shunting J14. The current source for LED0 can be selected between SYS and BSTOUT by J23. Using J24, the user can select between sinking the current from one LED or three LEDs for LED0.

Jumper Setting

Table 1 shows the detailed jumper setting, and Table 2 shows the connector description.

Fuel Gauge Software

The MAX20303 integrates the MAX17048, a fuel gauge IC which implements the Maxim ModelGauge™ algorithm. Use the MAX20303 Fuel Gauge GUI and MAXPICO2PMB to evaluate the ModelGauge™ fuel gauge.

Software Installation

Visit **https://www.maximintegrated.com** to download the latest version of the Fuel Gauge EV kit software, MAX20303FuelGaugeSetupVxxx.exe located on the MAX20303 EV Kit web page. Download the software to a temporary folder and unzip the zip file. Install the Fuel Gauge EV kit software on your computer by running the MAX20303FuelGaugeSetupVxxx.exe program inside the temporary folder.

Hardware Setup

The following procedure applies to the MAX20303 EVKIT:

1) Connect the MAXPICO2PMB Adapter Board to J13 of the MAX20303 EVKIT.
2) Connect jumper J10 and remove jumper J15.
3) Connect the application's battery to jumper J2 and ensure the battery's polarity connection.
4) Connect the MAXPICO2PMB Adapter Board to the computer USB port via USB A to USB Micro-B cable.

Table 1. Jumper Setting

JUMPER	SHUNT POSITION	DESCRIPTION
J4	1–2*	Connect THM to TPU for thermistor monitoring
J5	1–2	Connect THM to a potentiometer
	2–3*	Connect THM to 10kΩ (50%/room zone)
J6	1–2	Pull down MPC3 to ground
	1–3	Connect MPC3 connect to GPIO4
	1–4	Pull up MPC3 to VIO
J7	1–2	Pull down MPC2 to ground
	1–3	Connect MPC2 to GPIO3
	1–4	Pull up MPC2 to VIO
J8	1–2	Pull down MPC1 to ground
	1–3	Connect MPC1 to GPIO2
	1–4	Pull up MPC1 to VIO
J9	1–2	Pull down MPC0 to ground
	1–3	Connect MPC0 to GPIO1
	1–4	Pull up MPC0 to VIO
J10	1–2	Connect CHGIN to USB VBUS from J1
J11	1–2*	Connect $\overline{INT}$ to pull up VIO and DS2
J12	1–2*	Connect $\overline{RST}$ to pull up VIO and DS3
J14	1–2	Supply LED1/LED2 from SYS voltage
J15	1–2	Connect BATSIM to BAT
J16	1–2	Pull up MPC4 to VIO
	2–3	Pull down MPC4 to ground
J17	1–2	Pull up PFN2 to VIO
	2–3	Pull down PFN2 to ground
J18	1–2	Pull up PFN1 to VIO
	2–3	Pull down PFN1 to ground
J19	1–2	Connect SET to potentiometer
	2–3*	Connect SET to 39kΩ (fast charge current 0.05A)
J20	1–2*	Connect VIO to 3.3V from PMOD
J22	1–2*	Connect VHC to USB VBUS from J21
J23	1–2	Supply LED0 from SYS
	2–3	Supply LED0 from BSTOUT
J24	1–2	Connect DRP to a low-pass filter, which converts PWM to a sine wave. The measures are a filtered waveform at DRP_F.
J25	1–2	Connect DRN to a low-pass filter, which converts PWM to a sine wave. The measures are a filtered waveform at DRN_F.
J26	1–2	Connect LED0 to one LED
	2–3	Connect LED0 to three LEDs
J39	1–2	Connect SDA to ground
	2–3	Connect SCL to ground

**Default position.*

Table 2. Connectors Description

CONNECTOR	DESCRIPTION
J1	Connect to the USB cable for CHGIN voltage
J2	Connect to Battery
J3	Connect to the LRA/ERM haptic actuator
J13	Connect to MAXPICO2PMB#
J21	Connect to the USB cable for battery simulation

Communication Port

The Fuel Gauge software automatically finds the MAXPICO2PMB adapter when connected to any USB port. Communication status is shown on the left-hand side of the bottom status bar. See Figure 17. If communication is valid, a green bar updates as the software continuously reads the IC registers.

Main Window

Most major functionality is available from the main window. (see Figure 18).

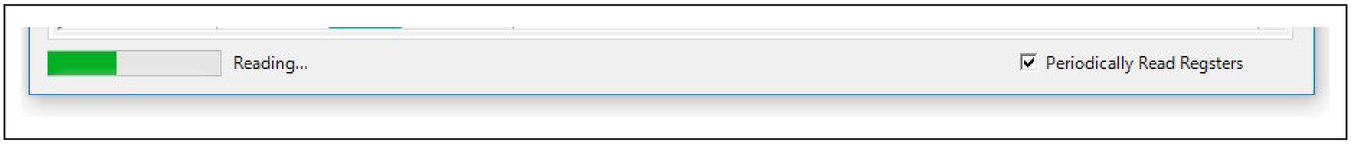


Figure 17. Bottom Status Bar

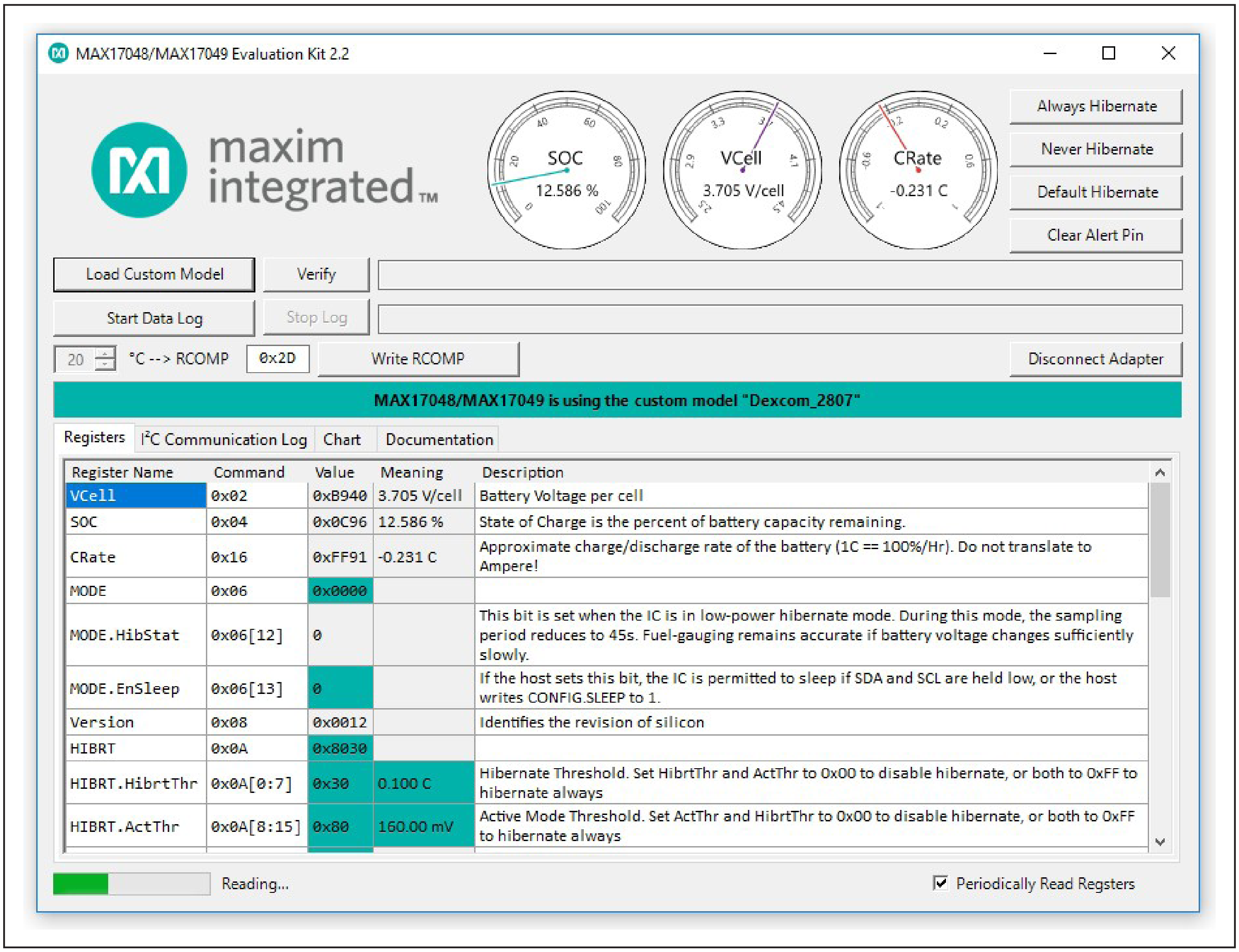


Figure 18. Main Window

Loaded Custom Model

This group displays any custom model that has been loaded onto the part by the software. If the device resets, this model is automatically reloaded. If you are using the default model, nothing is displayed here. Any changes to the configuration file are not reloaded automatically.

Start Data Log

This group displays the file path to which the software is recording the registers. If this box is blank, no file is being saved.

RCOMP Configuration

You can enter a byte here and press the **Write RCOMP** button to write it to the device. This is not the same as writing the value into the register map, because RCOMP is part of a larger 2-byte register.

If you have a custom model, you can also change the temperature, which adjusts the fuel gauge for proper temperature performance. Changing this value immediately calculates a new value of RCOMP and displays it in the box. This value is not written to the device until you press the **Write RCOMP** button. A change to RCOMP is not reflected in the temperature.

Registers Tab

Notation used for name and address should be familiar to C programmers with one small change. The register map lists:

- Register Name: A dot indicates that a single address has multiple meanings. This is similar to how the C firmware might access the bits.
- Command/Address: A colon indicates the 0-indexed location, not the size of the bit field. A colon indicates a range of values (e.g., 0x0C[0:4] is a 5-bit value, offset 0 bits at address 0x0C).
- Value: The raw hex value as read directly from the device.
- Meaning: A conversion of the raw hex value, usually with units. Alert bit flags are blank when inactive, or show text when they are alerting.
- Description: Reminders of the functionality. For full details, refer to the MAX17048/MAX17049 IC data sheet. The user can write values to the device directly through the register map. To write a raw hex value, select the cell in the Value column, overwrite the value, and press the Enter or Tab key. You will be prompted to write to the device. Normal communication will pause, and you will see a corresponding blank spot in the graph.

For registers with a conversion factor (e.g., Hibernate Threshold or VAlertMax, you can also modify the Meaning column. The software converts the value back to the raw hex value, and prompts to verify that you are writing what you expect. Remember that not all registers are writable.

I2C Communication Log Tab

Here you can see a log of traffic that you initiate, as well as any time the device is programmed. It describes each step in detail, including the particular values read or written. This can help remove uncertainty about how to communicate with the device. This log does not show the standard reading events.

Chart Tab

The chart is interactive: You can zoom into the time axis by left-clicking and dragging anywhere in the plot area. You will see the region highlighted as you drag. You can zoom out either by clicking the small button in the bottom left, or by right-clicking in the plot area. Plotted information not in a log file cannot be recovered once the application closes. The top and bottom plots are synchronized in time, so zooming one zooms the other. The y axes are fixed scale, and you cannot modify which registers are plotted, or where.

Ordering Information

PART	TYPE
MAX20303EVSYS#	EVKIT

#Denotes RoHS compliant.

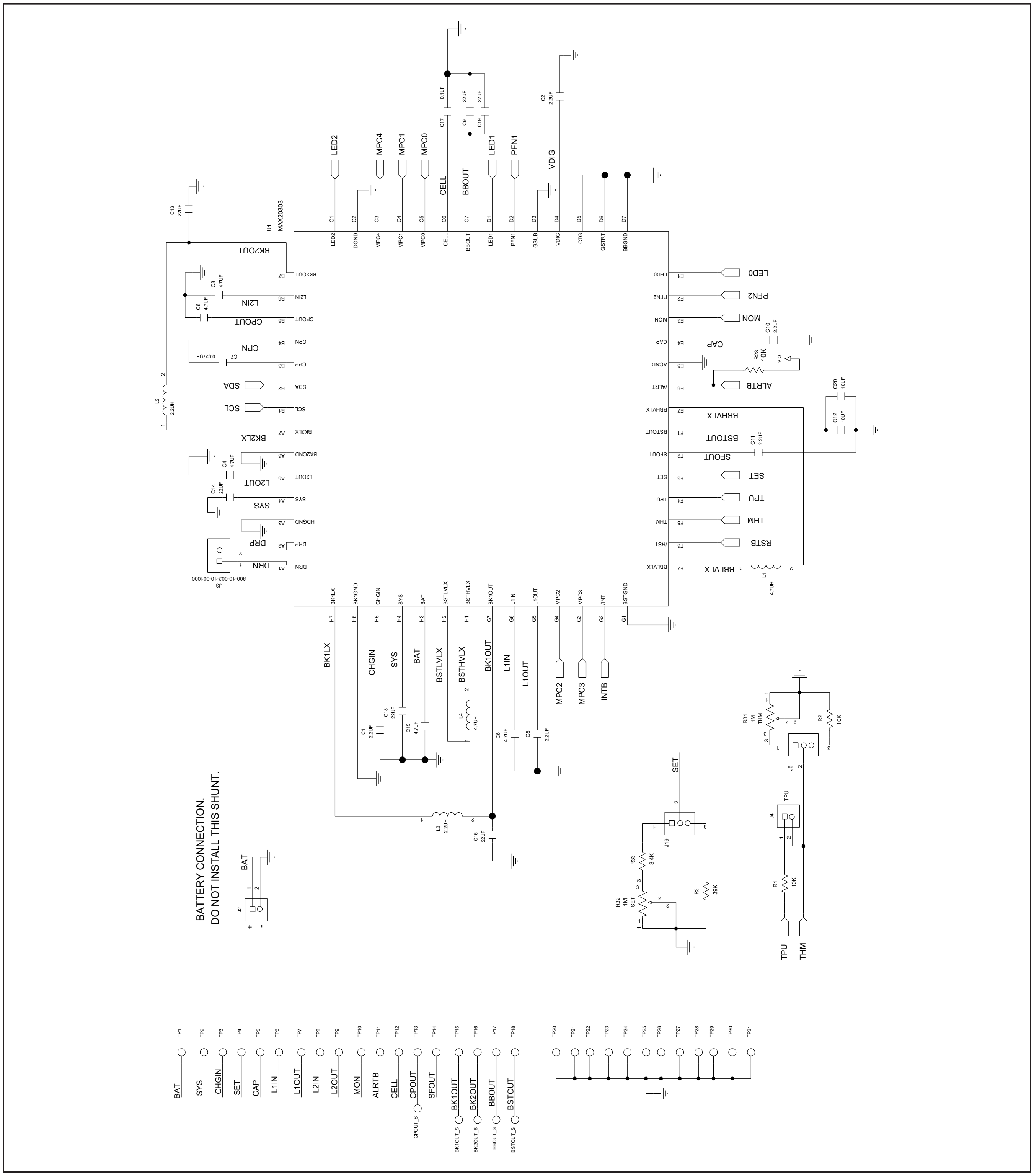
MAX20303 EV System Bill of Materials

ITEM	REF_DES	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	BATSIM, TP1-TP14	15	5003	KEYSTONE	N/A	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; ORANGE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
2	BBOUT_S, BK1OUT_S, BK2OUT_S, BSTOUT_S, CPOUT_S, DRN_F, DRP_F	7	5002	KEYSTONE	N/A	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; WHITE; PHOSPHOR BRONZE WIRE SILVER;
3	C1, C2, C5, C10, C11	5	C1005X5R1V225M050BC	TDK	2.2UF	CAP; SMT (0402); 2.2UF; 20%; 35V; X5R; CERAMIC
4	C3, C4, C6, C8, C15	5	C1005X5R0J475K050BC	TDK	4.7UF	CAP; SMT (0402); 4.7UF; 10%; 6.3V; X5R; CERAMIC
5	C7	1	C0402C273K4RAC	KEMET	0.027UF	CAP; SMT (0402); 0.027UF; 10%; 16V; X7R; CERAMIC
6	C9, C13, C14, C16, C18, C19	6	GRM188R60J226ME15	MURATA	22UF	CAP; SMT (0603); 22UF; 20%; 6.3V; X5R; CERAMIC
7	C12, C20	2	C1608X5R1E106M080AC; CL10A106MA8NRNC; GRM188R61E106MA73; ZRB18AR61E106ME01; GRT188R61E106ME13	TDK;SAMSUNG ELECTRONICS; MURATA;MURATA;MURATA	10UF	CAP; SMT (0603); 10UF; 20%; 25V; X5R; CERAMIC
8	C17	1	GRM155R71A104KA01; C1005X7R1A104K050BB; C0402C104K8RAC	MURATA;TDK;KEMET	0.1UF	CAP; SMT (0402); 0.1UF; 10%; 10V; X7R; CERAMIC
9	C21-C26	6	C1005X7R1C104K050BC; ATC530L104KT16; 0402YC104KAT2A; C0402X7R160-104KNE; CL05B104KO5NNNC; GRM155R71C104KA88; C1005X7R1C104K; CC0402KRX7R7BB104; EMK105B7104KV; CL05B104KO5	TDK;AMERICAN TECHNICAL CERAMICS;AVK;VENKEL LTD.;SAMSUNG ELECTRONICS;MURATA;TDK;YAGEO PHICOMP;TAIYO YUDEN;SAMSUNG ELECTRONICS	0.1UF	CAP; SMT (0402); 0.1UF; 10%; 16V; X7R; CERAMIC
10	C27, C30	2	GRM31CR71H475KA12; GRJ31CR71H475KE11; GXM31CR71H475KA10; UMK316AB7475KL	MURATA;MURATA;MURATA; TAIYO YUDEN	4.7UF	CAP; SMT (1206); 4.7UF; 10%; 50V; X7R; CERAMIC
11	C28	1	C0603C225K9PAC; GRM188R60J225KE01; C1608X5R0J225K080AB	KEMET;MURATA;TDK	2.2UF	CAP; SMT (0603); 2.2UF; 10%; 6.3V; X5R; CERAMIC;
12	C29	1	C0402X7R500-222KNE; GRM155R71H222KA01; C1005X7R1H222K050BA	VENKEL LTD.;MURATA;TDK	2200PF	CAP; SMT (0402); 2200PF; 10%; 50V; X7R; CERAMIC
13	C31	1	C3216X5R1C476M160AB; GRM31CR61C476ME44	TDK;MURATA	47UF	CAP; SMT (1206); 47UF; 20%; 16V; X5R; CERAMIC
14	C32	1	C3216X5R1H106K160AB; GRM31CR61H106KA12	TDK;MURATA	10UF	CAP; SMT (1206); 10UF; 10%; 50V; X5R; CERAMIC
15	C33	1	C1608X5R1H104K080AA	TDK	0.1UF	CAP; SMT (0603); 0.1UF; 10%; 50V; X5R; CERAMIC
16	C34	1	GRM188R60J105KA01	MURATA	1UF	CAP; SMT (0603); 1UF; 10%; 6.3V; X5R; CERAMIC;
17	C35	1	C0603C475K9PAC	KEMET	4.7UF	CAP; SMT (0603); 4.7UF; 10%; 6.3V; X5R; CERAMIC;
18	C36	1	C0603C104K8RAC	KEMET	0.1UF	CAP; SMT (0603); 0.1UF; 10%; 10V; X7R; CERAMIC
19	DS1-DS3, DS10	4	LG L29K-G2J1-24	OSRAM	LG L29K-G2J1-24	DIODE; LED; SMT (0603); Vf=1.7V; If(test)=0.002A; -40 DEGC TO +100 DEGC
20	DS4, DS8, DS9	3	LTST-C171TBKT	LITE-ON ELECTRONICS INC.	LTST-C171TBKT	DIODE; LED; SMD LED; BLUE; SMT (0805); PIV=5V; IF=0.020A
21	DS5-DS7	3	LTST-C150KRKT	LITE-ON ELECTRONICS INC.	LTST-C150KRKT	DIODE; LED; STANDARD; RED; SMT (1206); PIV=2V; IF=0.02A; -30 DEGC TO +85 DEGC
22	J1, J21	2	ZX62D-B-5P8	HIROSE ELECTRIC CO LTD.	ZX62D-B-5P8	CONNECTOR; MALE; SMT; MICRO UNIVERSAL SERIES BUS B-TYPE CONNECTOR; RIGHT ANGLE; 5PINS
23	J2, J3	2	800-10-002-10-001000	MILLMAX	800-10-002-10-001000	CONNECTOR; MALE; TH; SINGLE ROW; STRAIGHT; 2PINS
24	J4, J10-J12, J14, J15, J20, J22, J24, J25	10	PBC02SAAN	SULLINS ELECTRONICS CORP.	PBC02SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 2PINS
25	J5, J16-J19, J23, J26, J39	8	PBC03SAAN	SULLINS	PBC03SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 3PINS; -65 DEGC TO +125 DEGC

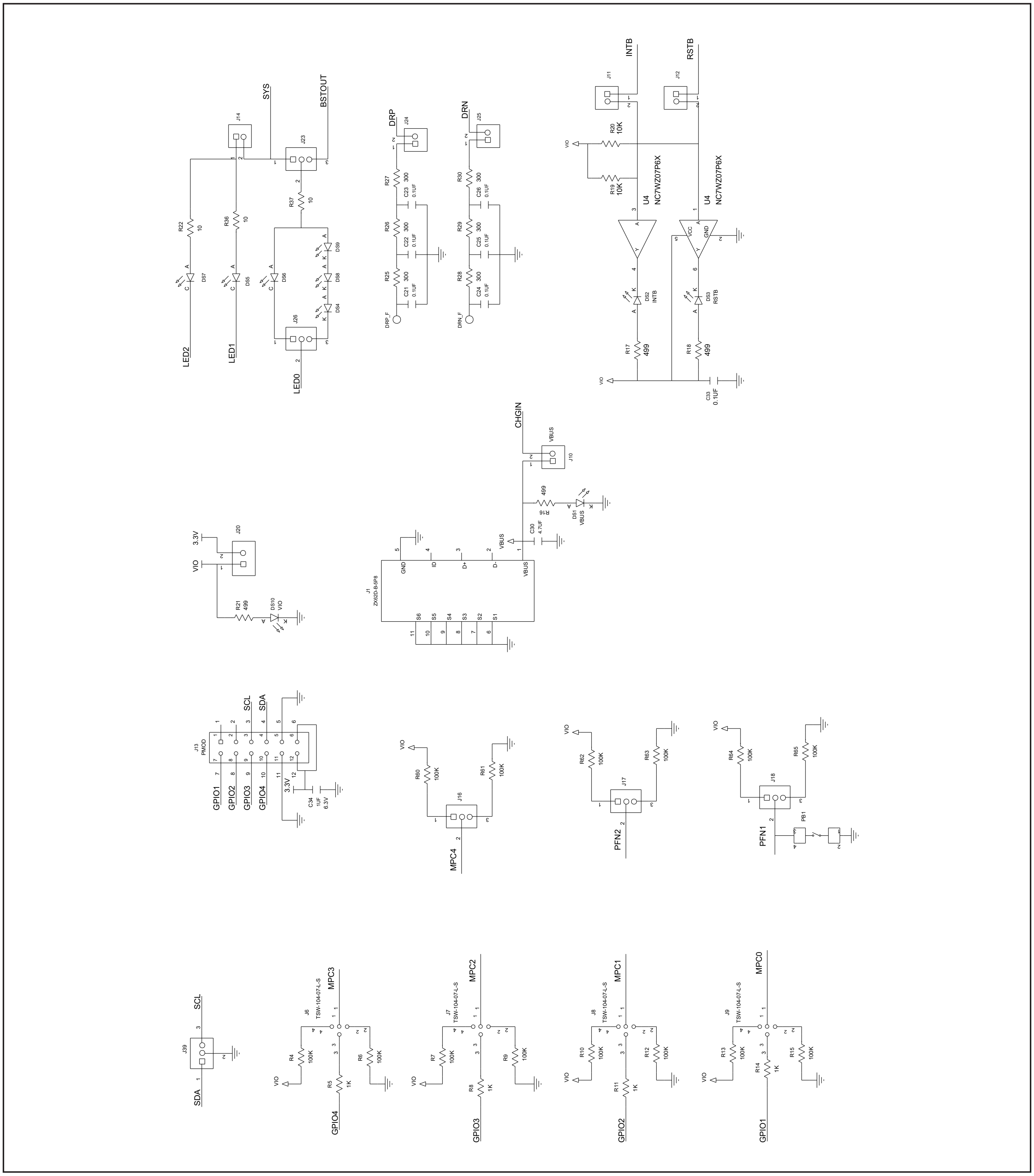
MAX20303 EV System Bill of Materials (continued)

ITEM	REF_DES	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
26	J6-J9	4	TSW-104-07-L-S	SAMTEC	TSW-104-07-L-S	EVKIT PART-CONNECTOR; MALE; THROUGH HOLE; TSW SERIES; SINGLE ROW; STRAIGHT; 4PINS
27	J13	1	PBC06DBAN	SULLINS ELECTRONICS CORP.	PBC06DBAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; RIGHT ANGLE; 12PINS; 12PINS - ALTERNATE PIN NUMBERING
28	L1, L4	2	DFE201610E-4R7M=P2	MURATA	4.7UH	INDUCTOR; SMT (2016); METAL ALLOY CHIP; 4.7UH; TOL=+/-20%; 1.3A
29	L2, L3	2	DFE201612E-2R2M	MURATA	2.2UH	INDUCTOR; SMT (0806); WIREWOUND CHIP; 2.2UH; TOL=+/-20%; 1.8A
30	PB1	1	1825910-6	TE CONNECTIVITY	1825910-6	SWITCH; SPST; THROUGH HOLE; 24V; 0.05A; TACTILE SWITCH; RCOIL=0 OHM; RINSULATION=100M OHM; TE CONNECTIVITY
31	R1, R2, R19, R20, R23, R44, R49	7	CRCW040210K0FK; RC0402FR-0710KL	VISHAY DALE; YAGEO PHICOMP	10K	RES; SMT (0402); 10K; 1%; +/-100PPM/DEGC; 0.0630W
32	R3	1	ERJ-2RKF3902X; CRCW040239K0FK	PANASONIC;VISHAY DALE	39K	RES; SMT (0402); 39K; 1%; +/-100PPM/DEGC; 0.0630W
33	R4, R6, R7, R9, R10, R12, R13, R15, R40-R43, R47, R60-R65	19	ERJ-2GEJ104	PANASONIC	100K	RES; SMT (0402); 100K; 5%; +/-200PPM/DEGC; 0.1000W
34	R5, R8, R11, R14	4	ERJ-2RKF1001	PANASONIC	1K	RES; SMT (0402); 1K; 1%; +/-100PPM/DEGC; 0.1000W
35	R16-R18, R21	4	CRCW0402499RFK	VISHAY DALE	499	RES; SMT (0402); 499; 1%; +/-100PPM/DEGC; 0.0630W
36	R22, R36, R37	3	CRCW040210R0JNEDHP	VISHAY DRALORIC	10	RES; SMT (0402); 10; 5%; +/-200PPM/DEGK; 0.2000W
37	R25-R30	6	ERJ-2RKF3000	PANASONIC	300	RES; SMT (0402); 300; 1%; +/-100PPM/DEGC; 0.1000W
38	R31, R32	2	PV36Y105C01B00	MURATA	1M	RESISTOR; THROUGH-HOLE-RADIAL LEAD; PV36 SERIES; 1M OHM; 10%; 100PPM; 0.5W; TRIMMER POTENTIOMETER; 25 TURNS; MOLDER CERAMIC OVER METAL FILM
39	R33	1	CRCW04023K40FK	VISHAY DALE	3.4K	RES; SMT (0402); 3.4K; 1%; +/-100PPM/DEGC; 0.0630W
40	R45, R46	2	WSL0805R1000FEA18	VISHAY DALE	0.1	RES; SMT (0805); 0.1; 1%; +/-75PPM/DEGC; 0.1250W
41	R48	1	3296Y-1-253LF	BOURNS	25K	RESISTOR; THROUGH-HOLE-RADIAL LEAD; 3296 SERIES; 25K OHM; 10%; 100PPM; 0.5W; SQUARE TRIMMING POTENTIOMETER; 25 TURNS; MOLDER CERAMIC OVER METAL FILM
42	R51	1	ERJ-2GE0R00	PANASONIC	0	RES; SMT (0402); 0; JUMPER; JUMPER; 0.1000W
43	R52	1	ERJ-2RKF5100	PANASONIC	510	RES; SMT (0402); 510; 1%; +/-100PPM/DEGC; 0.1000W
44	R59	1	ERJ-2RKF1152	PANASONIC	11.5K	RES; SMT (0402); 11.5K; 1%; +/-100PPM/DEGC; 0.1000W
45	SPACER1-SPACER4	4	9032	KEYSTONE	9032	MACHINE FABRICATED; ROUND-THRU HOLE SPACER; NO THREAD; M3.5; 5/8IN; NYLON
46	TP15-TP19	5	5000	KEYSTONE	N/A	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; RED; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
47	TP20-TP31	12	5001	KEYSTONE	N/A	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
48	U1	1	MAX20303BEWN+	MAXIM	MAX20303BEWN+	IC; PWRM; WEARABLE POWER MANAGEMENT SOLUTION; WLP56
49	U2	1	OPA569AIDWPR	TEXAS INSTRUMENTS	OPA569AIDWPR	IC; AMP; RAIL-TO-RAIL I/O; POWER AMPLIFIER; WSOIC20-EP 300MIL
50	U3	1	MAX8880EUT+	MAXIM	MAX8880EUT+	IC; VREG; ULTRA-LOW-IQ LOW-DROPOUT LINEAR REGULATOR WITH POK; SOT23-6
51	U4	1	NC7WZ07P6X	FAIRCHILD SEMICONDUCTOR	NC7WZ07P6X	IC; BUF; TINY LOGIC ULTRA-HIGH SPEED DUAL BUFFER; SC70-6
52	PCB	1	MAX20303SYS	MAXIM	PCB	PCB:MAX20303SYS
53	MISC1, MISC2	2	3025010-03	QUALTEK ELECTRONICS CORP	3025010-03	CONNECTOR; MALE; USB-A_MINI-B; USB 4P(A)/M - USB MINI 5P(B)/M; STRAIGHT; 36IN
54	MISC3	1	MAXPICO2PMB#	MAXIM	MAXPICO2PMB#	ACCESSORY; BRD; PACKOUT; PICO2PMB ADAPTER BOARD
TOTAL		182				

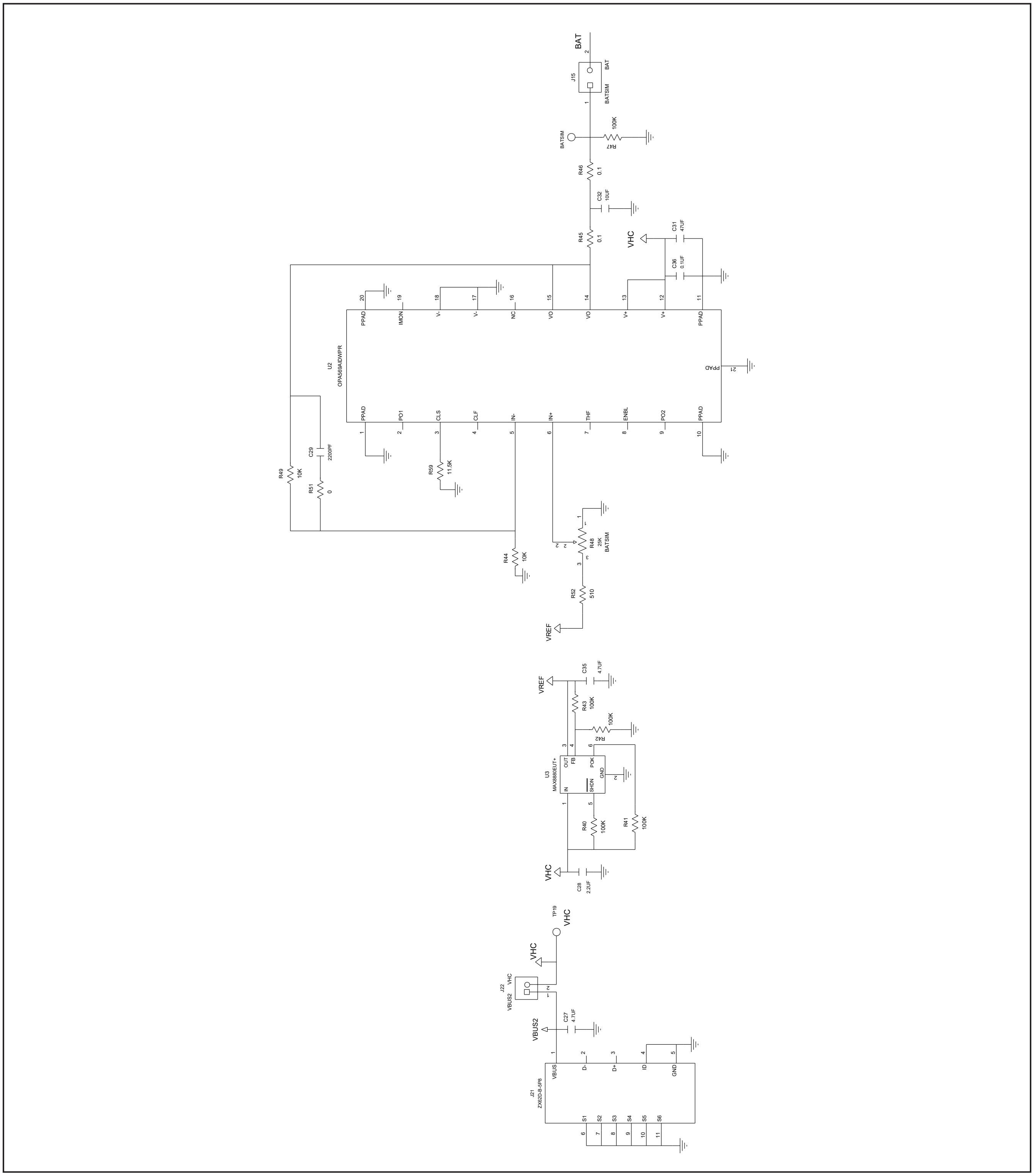
MAX20303 EV System Schematic



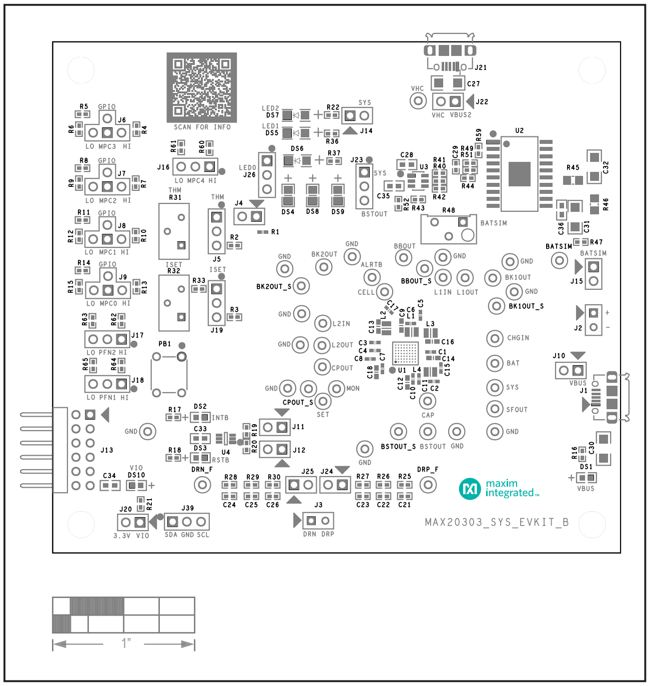
MAX20303 EV System Schematic (continued)



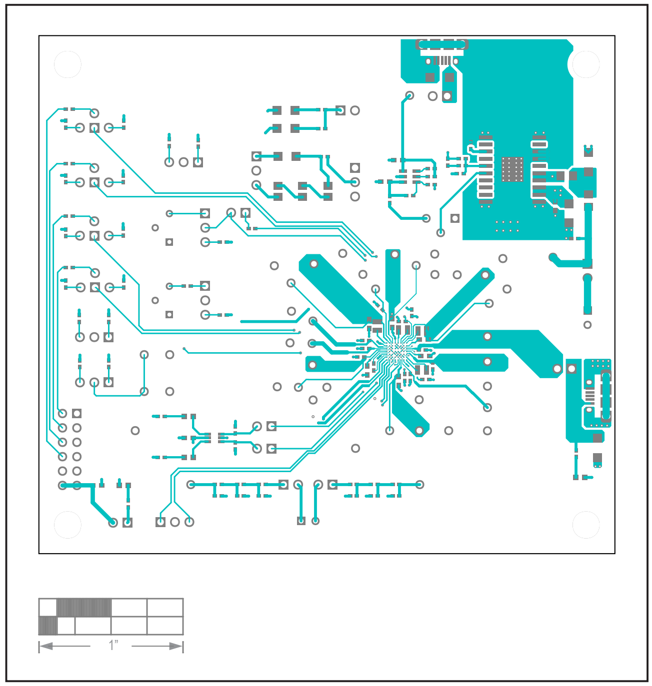
MAX20303 EV System Schematic (continued)



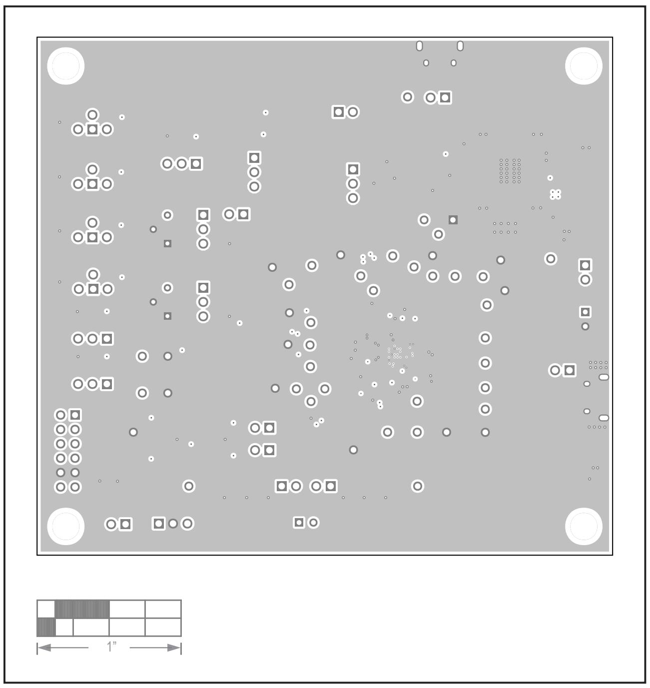
MAX20303 EV System PCB Layout



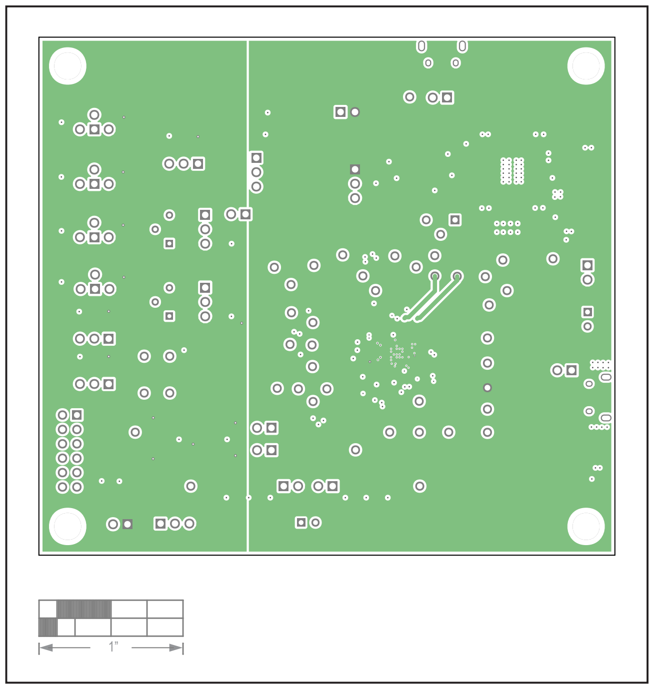
MAX20303 EV System—Silkscreen Top



MAX20303 EV System—Top Layer

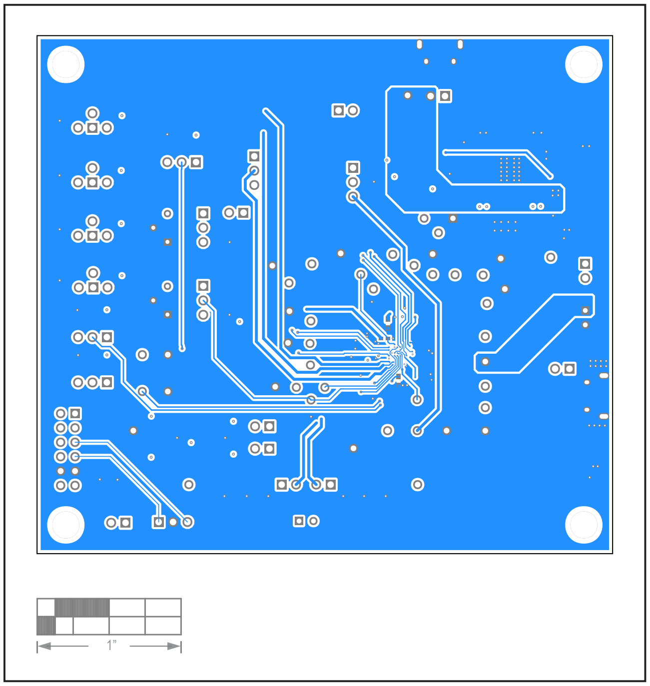


MAX20303 EV System—GND Layer

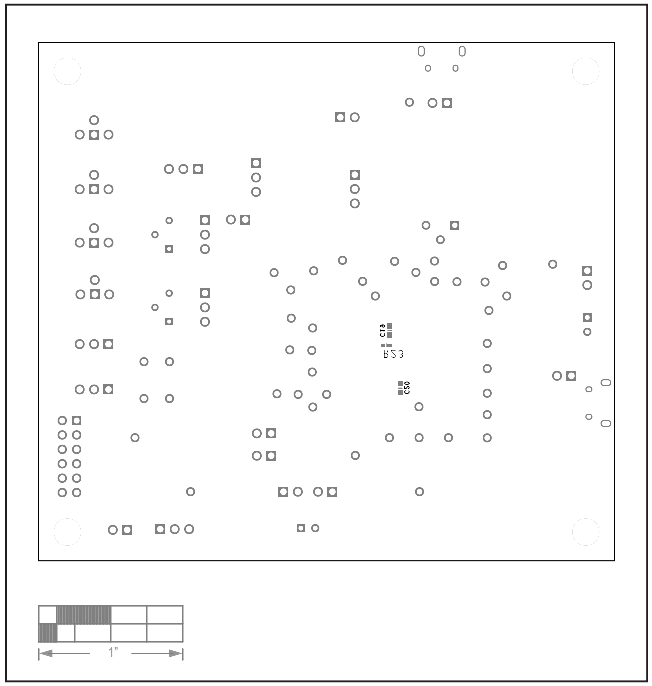


MAX20303 EV System—SYS Layer

MAX20303 EV System PCB Layout (continued)



MAX20303 EV System—Bottom Layer



MAX20303 EV System—Silkscreen Bottom

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	4/21	Initial release	—
1	8/21	Updated *General Description*, *EV System Contents*, *Quick Start*, and *Detailed Description of Software* sections, Figures 2 and 4-15, and *Bill of Materials;* Added *Fuel Gauge* section	1-16, 18, 20, 23