MAXPICO2PMB Adapter Board Evaluates: MAXPICO2PMB#

General Description

The MAXPICO2PMB adapter board is a fully assembled and tested PCB that provides an I^{2}C interface to quickly interact with an evaluation kit (EV kit) or a demo board connected through the Pmod™ connector.

The adapter board features a rapid development platform - the MAX32625PICO microcontroller, jumpers and a Pmod connector. The user can select on-board pullup resistors on the I^{2}C lines by configuring jumpers. It also features an option to select the pullup voltage for the I^{2}C lines through the power rail jumper. The Pmod connector provides one I^{2}C port and two SPI ports for convenient evaluation.

The MAXPICO2PMB Register Map Tool is a Windows application that interfaces with the MAXPICO2PMB adapter board. The user can import *.regmap files that contain the unique I^{2}C register map information and register field descriptions of an integrated circuit. The application sends commands to the MAX32625PICO microcontroller on the MAXPICO2PMB adapter board over a virtual serial port. The MAX32625PICO microcontroller sends I^{2}C commands to communicate with the EV kit or demo board connected through the Pmod connector.

Features

- USB-Powered Operation
- USB to I^{2}C and SPI Interface
- Pmod Compatible Form Factor
- Flexible Configuration
- MAX32625PICO Rapid Development Platform
- Drag-and-Drop Programming
- Small PCB Area
- Windows® 8/10-Compatible GUI Software
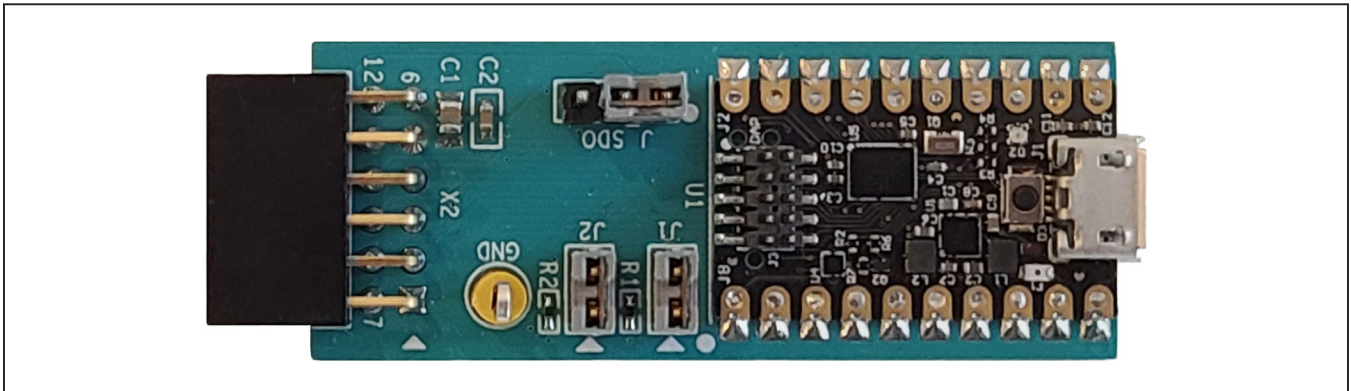- Fully Assembled and Tested

Adapter Board Contents

- MAXPICO2PMB Adapter Board
- USB A to Micro-B Cable

MAXPICO2PMB Adapter Board Files

FILE	DESCRIPTION
PicoRegMapToolSetup.exe	PC GUI Program

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

MAXPICO2PMB Adapter Board Photo

Windows is a registered trademark and registered service mark of Microsoft Corporation.

Pmod is a trademark of Digilent Inc.

maxim integrated™

Quick Start

Required Equipment

Note: In the following sections, software-related items are identified by **bold** text. Text in **bold** refers to items directly from the install of adapter board software. Text which is **bold and underlined** refers to items from the Windows operating system.

- MAXPICO2PMB adapter board with the latest firmware
- USB A to Micro-B cable
- Windows 8/10 PC with USB ports
- EV kit or demo board under evaluation

Procedure

The adapter board is fully assembled and tested. Use the following steps to verify board operation. **Caution: Do not turn on the power supply until all connections are completed**.

1) Visit **https://www.maximintegrated.com** to download the latest version of the adapter board software, PicoRegMapToolVxxx.ZIP located on the MAXPICO2PMB adapter board web page. Download the adapter board software to a temporary folder and unzip the ZIP file.

2) Install the adapter board software on your computer by running the PicoRegMapToolSetupVxxx.EXE program inside the temporary folder.

3) Verify that all jumpers are in their default positions, as shown in Table 1.

4) Connect the Pmod port of the MAXPICO2PMB board to the Pmod connector on the EV kit or demo board under evaluation.

5) Connect the USB A to Micro-B cable to the PC and to the MAXPICO2PMB adapter board's USB Micro-B port located at U1. LED D2 on the MAX32625PICO microcontroller flashes blue.

6) Run the previously installed GUI program.

7) If connection between the PC and the adapter board is successfully established, the status bar at the bottom displays **I2C Slave Not Found** (see Figure 1).

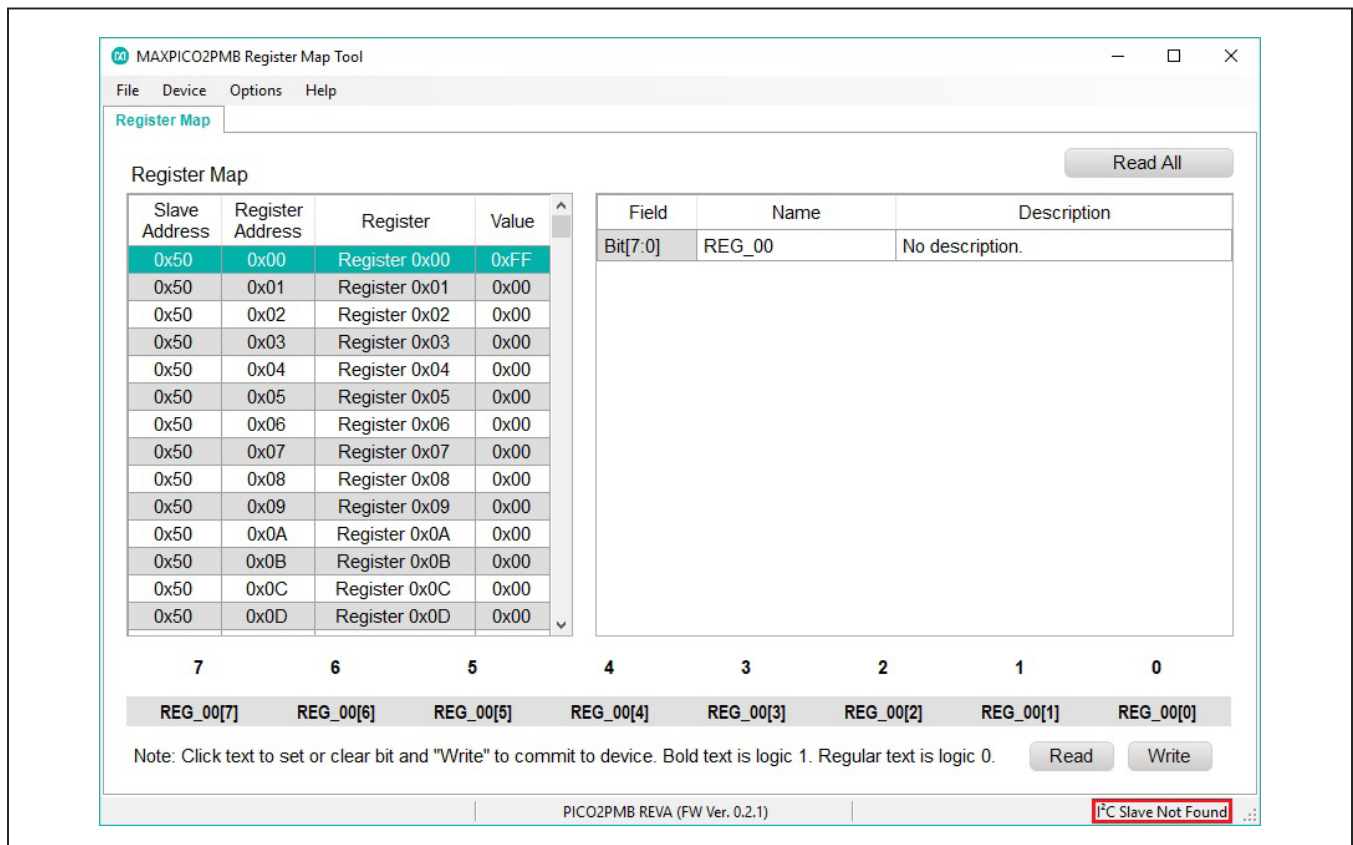8) The adapter board is now ready for additional evaluations with a specific EV kit or demo board.

Figure 1. The Status of the GUI Shows I^{2}C Slave Not Found Ready for Further Evaluations

Detailed Description of Software

Software Startup

Upon starting the program, the **MAXPICO2PMB Register Map Tool** automatically searches for the virtual serial port of the MAX32625PICO microcontroller. Ensure that **I²C Slave Not Found** or **Connected**, with an EV kit or demo board connected at the Pmod connector, is shown in the status strip of the GUI. If any other message is displayed, check all connections, and verify that the steps in the *Quick Start* section were followed in the correct order.

When the application is opened for the first time, a default register map is loaded with a default 7-bit slave address of 0b0101000 (shown as 0x50, the 8-bit write address). Follow the steps in the next section to open the register map for the EV kit or demo board under evaluation.

The **Read All** button reads all the registers 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**.

Opening a Register Map

To open a register map file, simply drag and drop the .regmap file anywhere into the application, or manually open the file by following these steps:

1) Open the **File** menu in the top left corner of the application and select **Open Register Map**.

2) Click the **Browse**… button and open the targeted *.regmap file.

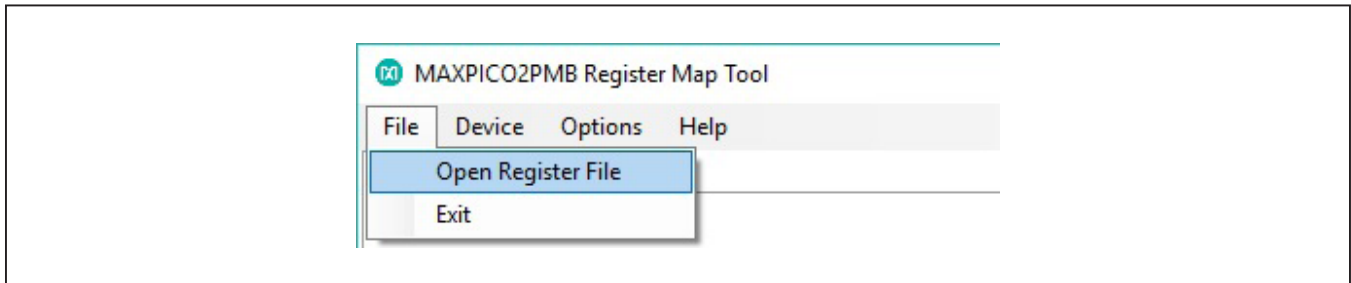3) Click the **OK** button to load the register map.
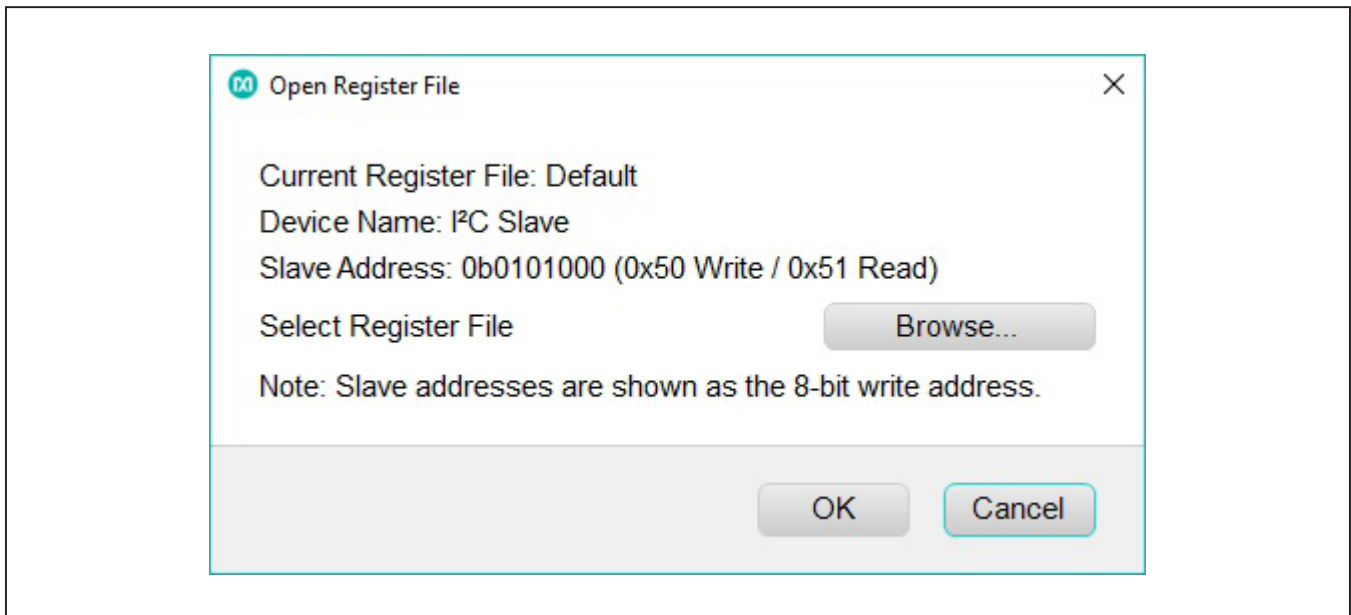

Figure 2. Open Register File

*Figure 3. Browse and Open the *.regmap File*

ToolStrip Menu Bar

The **Toolstrip** menu bar (Figure 4) is located at the top of the GUI window. This bar comprises **File**, **Device**, **Options**, and **Help** menus whose functions are detailed in the following sections.

File Menu

The **File** menu contains the option to open a register map and exit out of the GUI program.

Device Menu

The **Device** menu provides the ability to connect or disconnect the adapter board to the GUI. If the board is disconnected while the GUI is open, the GUI displays **Not Connected** in the lower right corner. If the adapter board is then plugged back in, the bottom right corner of the GUI displays **I2C Slave Not Found** or **Connected**.

Options Menu

The **Options** menu provides additional setting 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.

Help Menu

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

Register Map

The **Register Map** tab (Figure 5) displays all register fields and their corresponding descriptions and allows the user to read or write all I2C registers. The user can click **Read All** on the top right corner to perform a burst read of all registers.
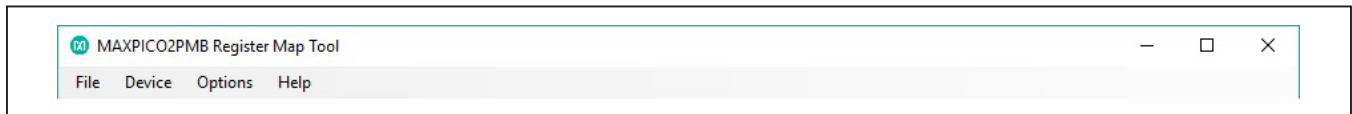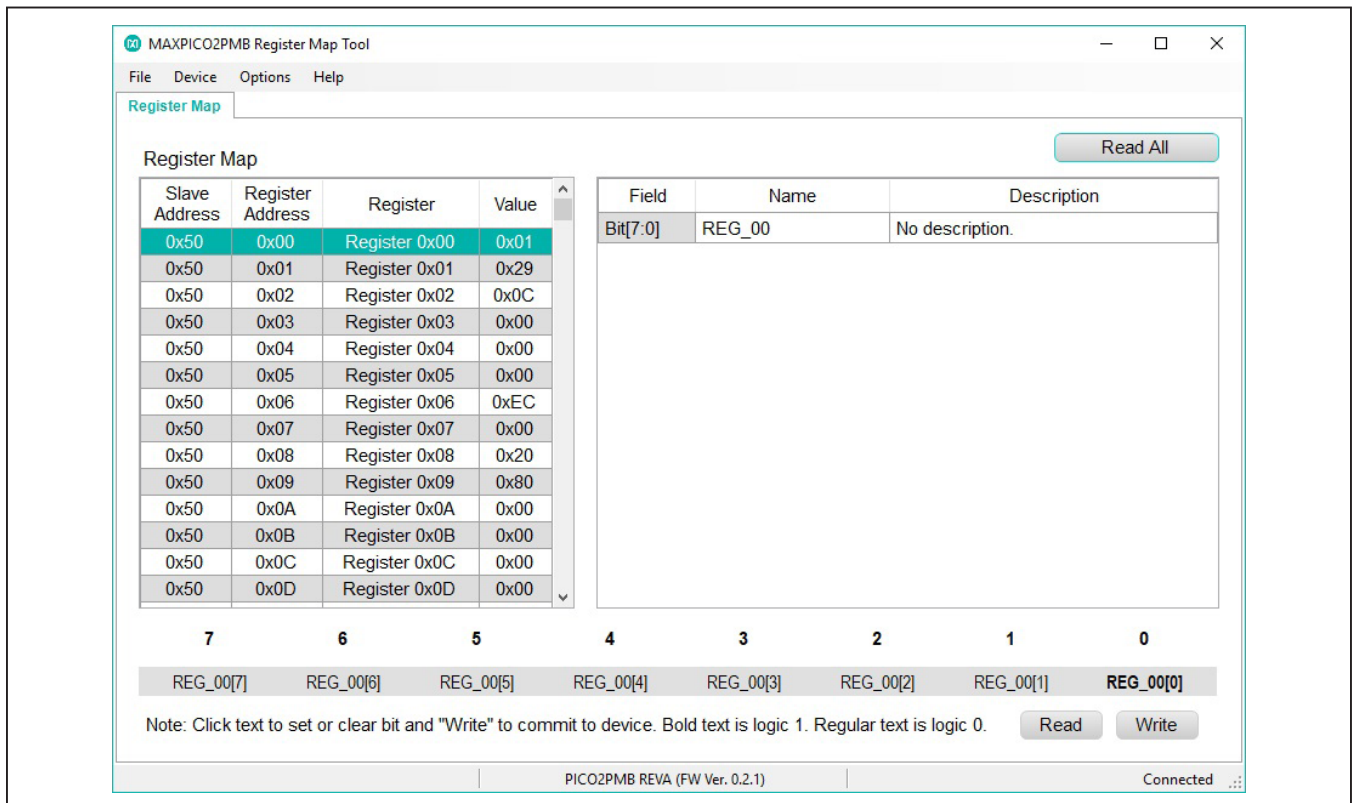

Figure 4. The ToolStrip Menu Items

Figure 5. Register Map Tab

The left table shows the register to be read from or written to. 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.

Detailed Description of Hardware

The MAXPICO2PMB adapter board provides a convenient way to evaluate the EV kit or demo board connected at the Pmod connector. The adapter board features the MAX32625PICO microcontroller and various jumpers for flexible configurations. The user can select on-board pull-up resistors on the I2C lines by configuring jumpers J1 and J2. It also features an option to select the pullup voltage for the I2C lines through the power rail jumper J3. The Pmod connector provides one I2C port and two SPI ports for convenient evaluation. The MAXPICO2PMB adapter board operates from the USB +5V DC and therefore does not require an external power supply. Figure 6 shows the pin configuration for the I2C/SPI compatible connector at the MAXPICO2PMB2# board.

Firmware Update

This section covers the procedure to update the MAXPICO2PMB adapter board with the latest firmware by programming a firmware image file (**.bin**) onto the on-board MAX32625PICO microcontroller.
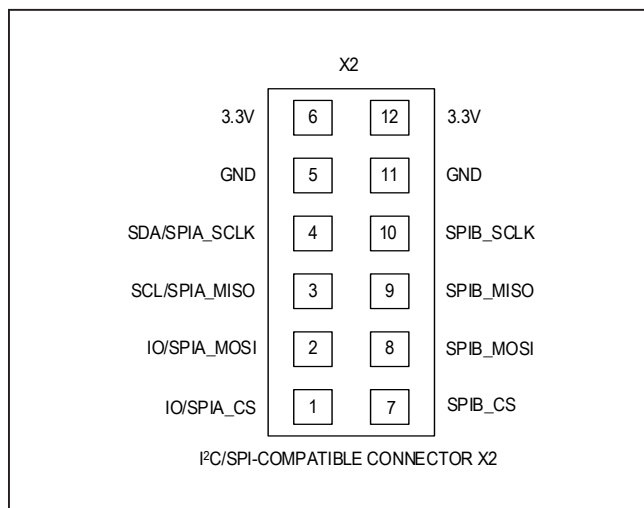
1) Put the board in maintenance mode by holding the button while the board is being connected to the computer. It can be easier to hold the button while inserting the USB cable at the computer end rather than the micro USB connector end (see Figure 7).

2) If the board enters bootloader mode successfully, the LED on the board turns red and the board appears to the computer as a USB drive named **MAINTENANCE**.

3) Drag and drop the firmware image file (**.bin**) into the **MAINTENANCE** drive and the board installs the new firmware.
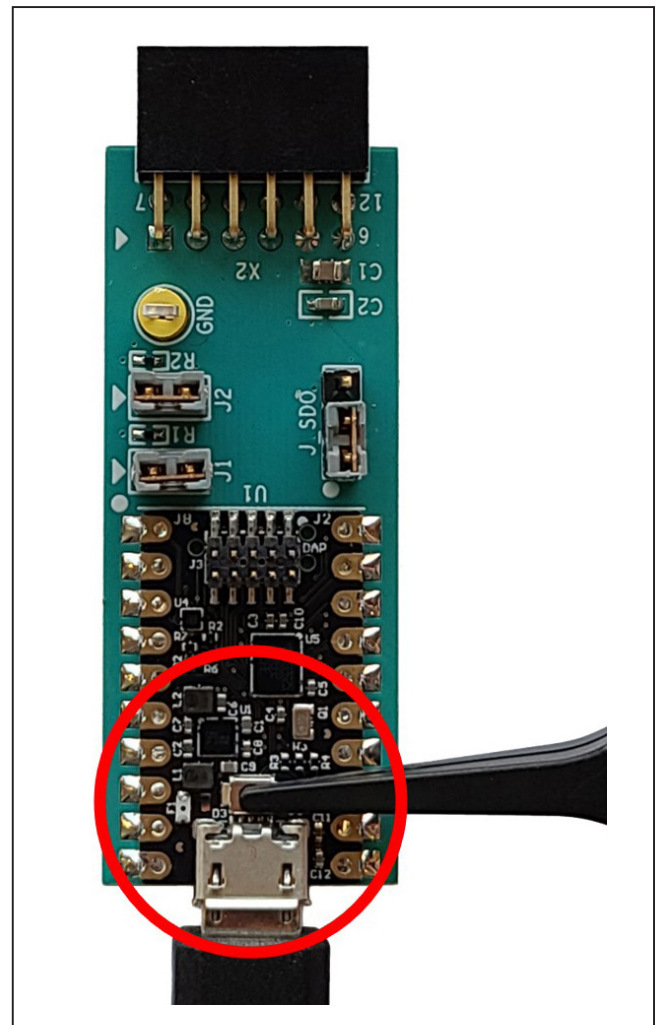

Figure 7. Enter Maintenance Mode on the MAX32625PICO

Figure 6. X2 Pmod I2C/SPI Connector Pin Configuration

Using the Register Map Tool with MAX20342EVKIT

This section covers an example of opening the MAX20342 regmap file in the MAXPICO2PMB **Register Map** tool to interface with the MAX20342EVKIT (read and write register).

Hardware setting

1) Follow the default jumper settings from Table 1 and the setup *Procedure*.

2) Follow the default jumper settings on the MAX20342EVKIT.

3) Connect the MAXPICO2PMB adapter board to the MAX20342EVKIT through the Pmod connector (see Figure 8).

4) Connect a Micro-B cable to the USB1 port of the MAX20342EVKIT to power the EV kit. LED D4 of the MAX20342EVKIT lights up green.
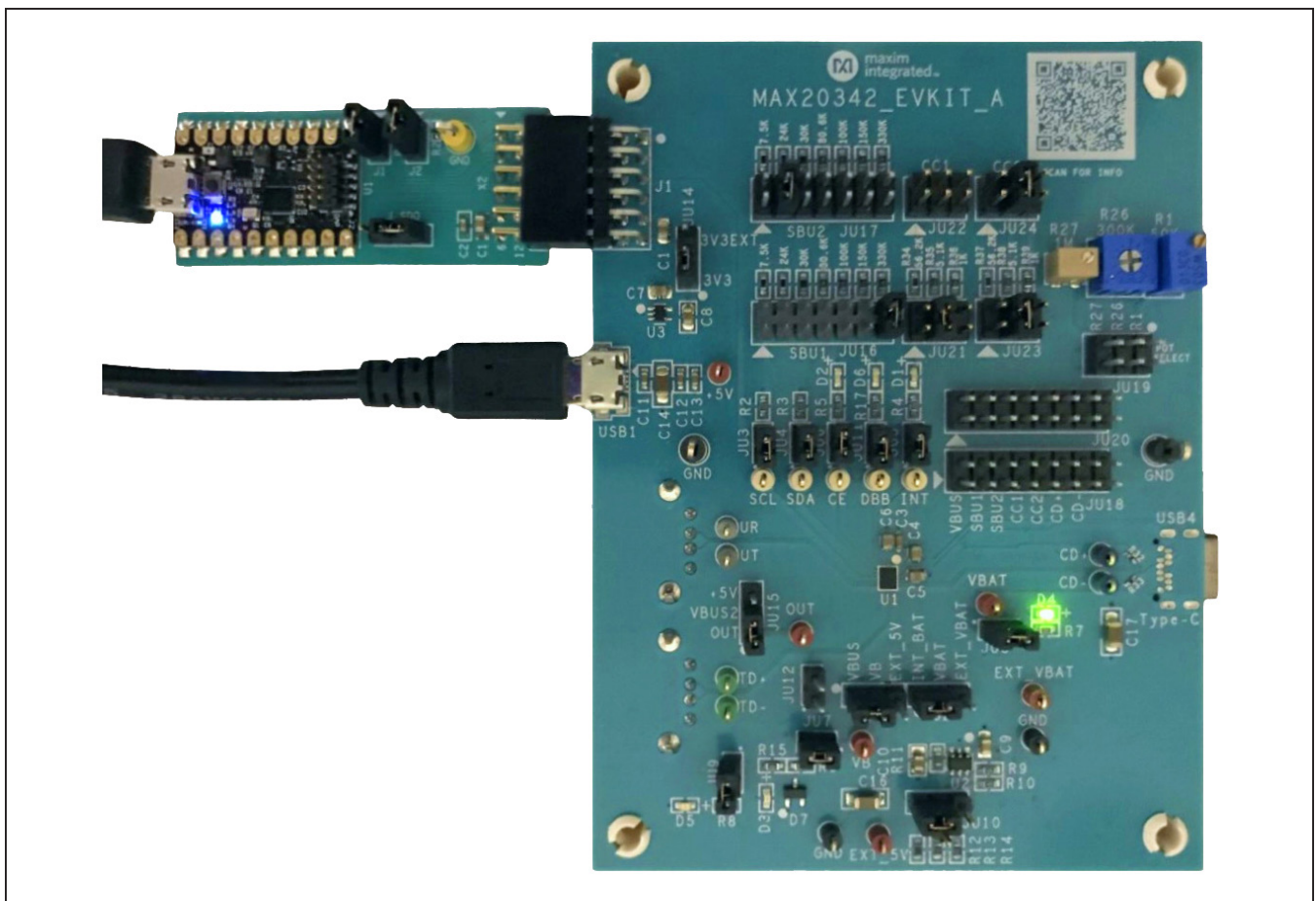

Figure 8. Using the MAXPICO2PMB Adapter Board with MAX20342EVKIT

Table 1. Jumper Table (J1-J3)

JUMPER	SHUNT POSITION	DESCRIPTION
J1	1-2*	Connect 4.7kΩ pullup resistor to the SDA line
J2	1-2*	Connect 4.7kΩ pullup resistor to the SCL line
J3	1-2	Connect VIO to 3.3V of the MAX32625PICO microcontroller
	2-3*	Connect VIO to 1.8V of the MAX32625PICO microcontroller

*Default position

MAXPICO2PMB Register Map Tool GUI

Follow these steps to use the MAX20342 regmap file:

1) Follow the *Procedure* and the status of the GUI shows **I2C Slave Not Found**.

2) Under **File**, choose **Open Register File**, **Browse** for the MAX20342 regmap file, then click **OK**. The status shows **Connected**. The **Slave Address** column reflects the 8-bit I2C slave address of the MAX20342

0x6A. All MAX20342 specific details are filled in the **Register Map** tab, and default register values are loaded (see Figure 9).

3) Go to Register Address 0x16 COMM_CTRL2 and locate bit 3 (Enable Force DB Output). Click on the **DBFrc** bit so it becomes bold and click **Write** to set this bit. Locate bit 4 (DB Output) and set this bit. LED D6 of the MAX20342EVKIT turns red (see Figure 10).
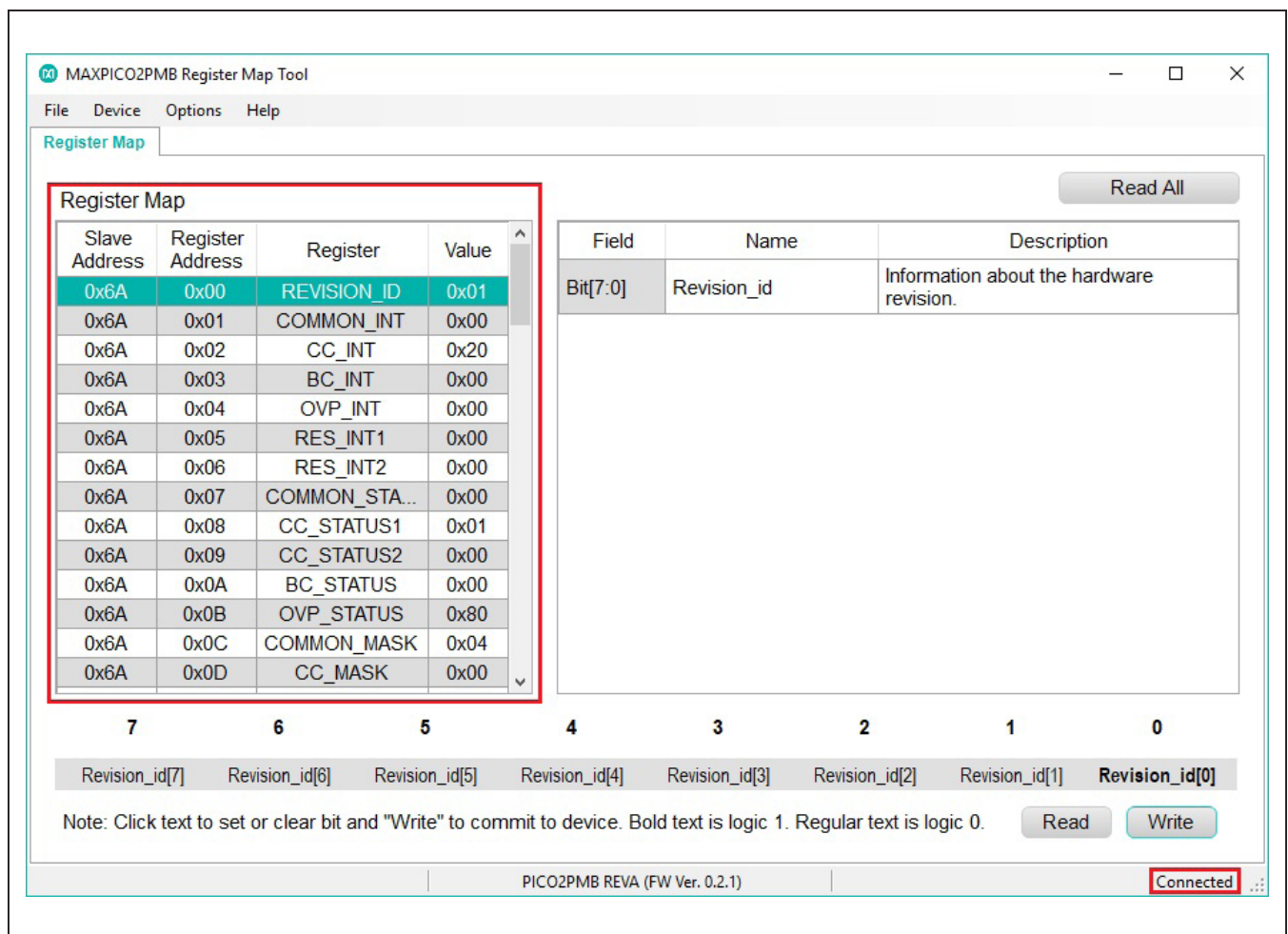

Figure 9. Open the MAX20342 Regmap File in MAXPICO2PMB Register Map Tool
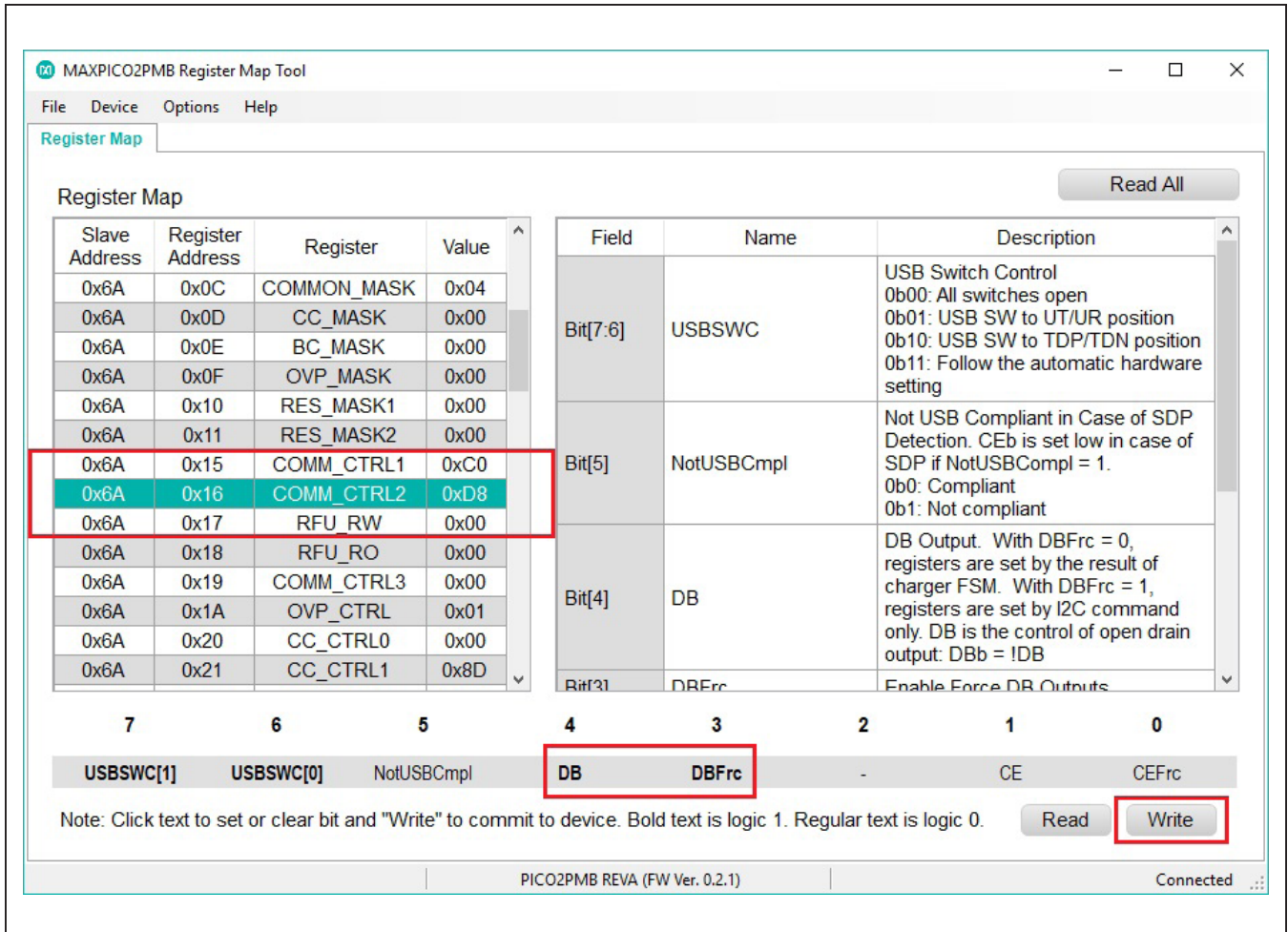
Figure 10. An Example of Setting Bits with the MAX20342 Regmap

Ordering Information

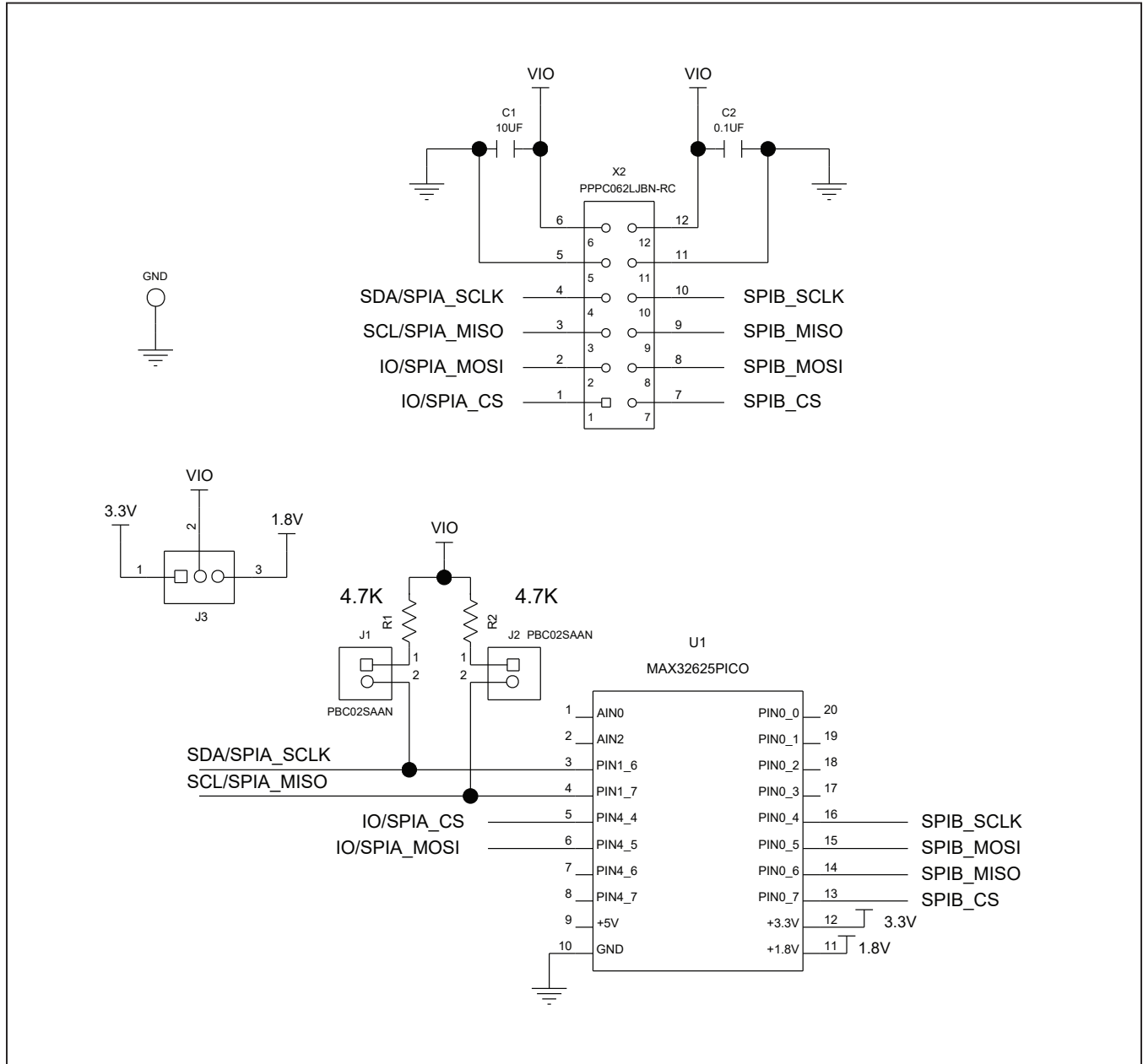| PART	TYPE
MAXPICO2PMB#	Adapter Board

#Denotes RoHS compliance.

MAXPICO2PMB Adapter Board Bill of Materials

| ITEM	REF_DES	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	C1	1	CL21A106KOQNNN; GRM21BR61C106KE15; EMK212ABJ106KD	SAMSUNG ELECTRONICS;MURATA; TAIYO YUDEN	10UF	CAP; SMT (0805); 10UF; 10%; 16V; X5R; CERAMIC
2	C2	1	C0603C104K5RAC;C1608X7R1H104K; ECJ-1VB1H104K;GRM188R71H104KA93; CGJ3E2X7R1H104K080AA; C1608X7R1H104K080AA; CL10B104KB8NNN;CL10B104KB8NFN; 06035C104KAT2A	KEMET;TDK;PANASONIC;MURATA; TDK;TDK;SAMSUNG;SAMSUNG;AVX	0.1UF	CAP; SMT (0603); 0.1UF; 10%; 50V; X7R; CERAMIC;
3	GND	1	5011	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
4	J1, J2	2	PBC02SAAN	SULLINS ELECTRONICS CORP.	PBC02SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 2PINS
5	J3	1	PCC03SAAN	SULLINS	PCC03SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 3PINS; -65 DEGC TO +125 DEGC
6	R1, R2	2	CRCW04024K70FK; MCR01MZPF4701	VISHAY DALE; ROHM SEMICONDUCTOR	4.7K	RES; SMT (0402); 4.7K; 1%; +/-100PPM/DEGC; 0.0630W
7	U1	1	MAX32625PICO	MAXIM	MAX32625PICO	MODULE; BOARD; MAX32625PICO BOARD DESIGN FOR MAX32625 ARM CORTEX-M4F; BOARD; LAMINATED PLASTIC WITH COPPER CLAD;
8	X2	1	PPPC062LJBN-RC	SULLINS ELECTRONICS CORP.	PPPC062LJBN-RC	CONNECTOR; FEMALE; THROUGH HOLE; 0.1IN CC; HEADER; 2 ROW; RIGHT ANGLE; 12PINS
9	PCB	1	MAXPICO2PMB_APPS_A	MAXIM	PCB	PCB:MAXPICO2PMB_APPS_A
TOTAL		11				

MAXPICO2PMB Adapter Board Schematic

VIO   VIO

C1   C2
10UF   0.1UF

X2
PPPC062LJBN-RC

6   12

6   12

5   11

5   11

SDA/SPIA_SCLK   4   10   SPIB_SCLK

GND   4   10

SCL/SPIA_MISO   3   9   SPIB_MISO

3   9

IO/SPIA_MOSI   2   8   SPIB_MOSI

2   8

IO/SPIA_CS   1   7   SPIB_CS

1   7

VIO

3.3V   1.8V
                VIO

2

1   3

J3

4.7K   4.7K

R1   R2

J1   J2 PBC02SAAN

1   1   U1
2   2
                           MAX32625PICO
PBC02SAAN

1   AIN0   PIN0_0   20

2   AIN2   PIN0_1   19

SDA/SPIA_SCLK   3   PIN1_6   PIN0_2   18

SCL/SPIA_MISO   4   PIN1_7   PIN0_3   17

IO/SPIA_CS   5   PIN4_4   PIN0_4   16   SPIB_SCLK

IO/SPIA_MOSI   6   PIN4_5   PIN0_5   15   SPIB_MOSI

7   PIN4_6   PIN0_6   14   SPIB_MISO

8   PIN4_7   PIN0_7   13   SPIB_CS

9   +5V   +3.3V   12   3.3V

10 GND   +1.8V   11   1.8V
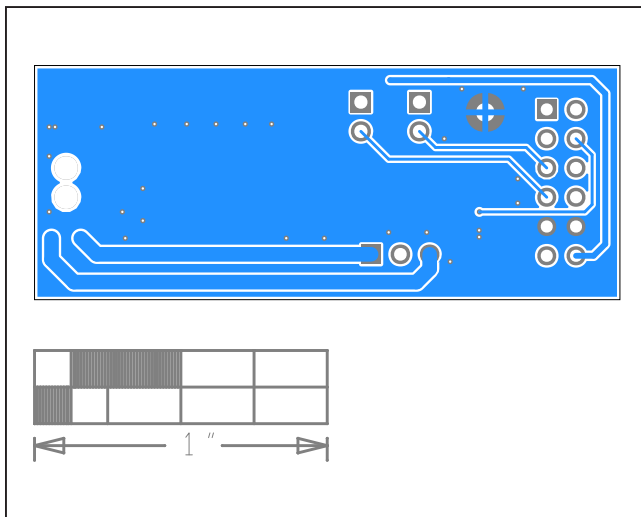
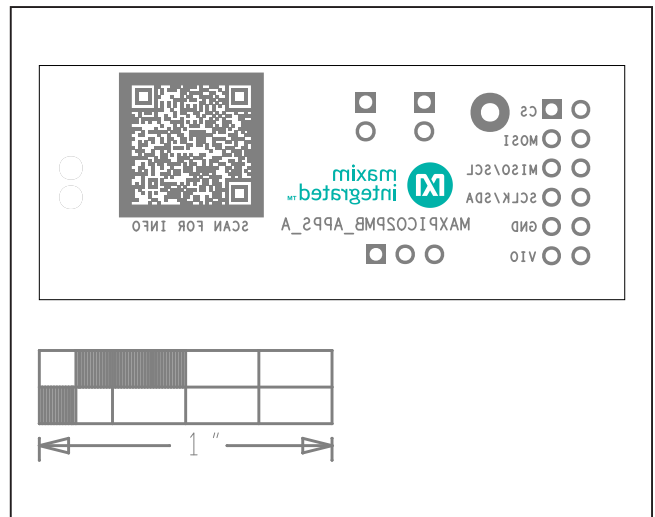## MAXPICO2PMB Adapter Board PCB Layouts

MAXPICO2PMB Adapter Board PCB Layout—Top Silkscreen
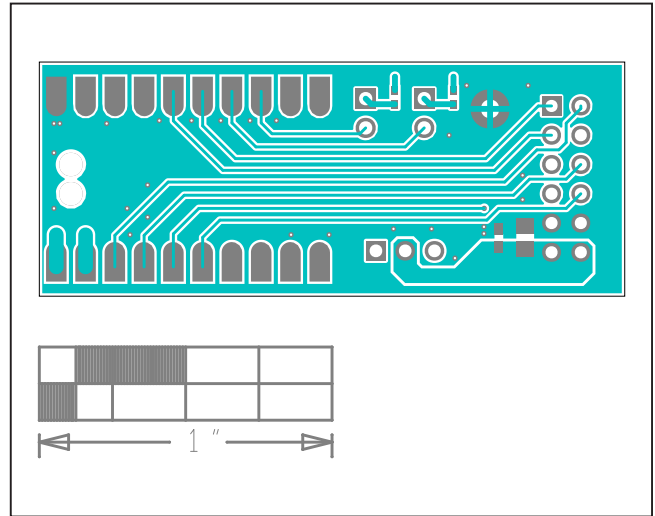
MAXPICO2PMB Adapter Board PCB Layout—Top

MAXPICO2PMB Adapter Board PCB Layout—Bottom

MAXPICO2PMB Adapter Board PCB Layout—Bottom Silkscreen

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	1/21	Initial release	—