



MAX7302 Evaluation Kit

General Description

The MAX7302 evaluation kit (EV kit) provides a proven design to evaluate the MAX7302 9-port, level-translating GPIO and LED driver device. The EV kit also includes Windows® 2000/XP/Vista-compatible software that provides a simple graphical user interface (GUI) for exercising the features of the MAX7302.

The MAX7302 EV kit has a built-in USB interface, allowing a PC to control the internal registers of the MAX7302, as well as providing the power for the EV kit.

The EV kit is configured to drive three RGB LEDs. Pads and jumpers are provided to modify the board to the numerous configurations available for the MAX7302.

Features

- ◆ Windows 2000/XP/Vista (32-Bit)-Compatible Software
- ◆ USB PC Connection (Cable Included)
- ◆ USB Powered
- ◆ Lead-Free and RoHS-Compliant
- ◆ Proven PCB Layout
- ◆ Fully Assembled and Tested

Ordering Information

PART	TYPE
MAX7302EVKIT+	EV Kit

+Denotes lead-free and RoHS-compliant.

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C2, C101, C103, C105–C108, C112, C115, C116, C117	12	0.1 μ F \pm 10%, 16V X7R ceramic capacitors (0603) Murata GRM188R71C104K
C3, C102, C104, C118	4	10 μ F \pm 10%, 10V X5R ceramic capacitors (0805) Murata GRM21BR61A106K
C4, C5	2	1 μ F \pm 10%, 10V X5R ceramic capacitors (0603) Murata GRM188R61A105K
C109	1	0.033 μ F \pm 10%, 25V X7R ceramic capacitor (0603) Murata GRM188R71E333K
C110, C111	2	22pF \pm 5%, 50V C0G ceramic capacitors (0603) Murata GRM1885C1H220J
C113, C114	2	10pF \pm 5%, 50V C0G ceramic capacitors (0603) Murata GRM1885C1H100J
D1, D2, D3	3	RGB LEDs
D101	1	Red LED (0603)
D102	1	Green LED (0603)
FB101, FB102	2	220 Ω , 200mA ferrite beads (0603) Murata BLM18AG221SN1D

DESIGNATION	QTY	DESCRIPTION
J1, J2	2	8-pin, single-row headers
J101	1	USB type-B right-angle female receptacle
J102	0	Not installed, dual-row header (2 x 5)
JU1–JU9, JU11, JU12, JU13, JU101, JU102	14	2-pin headers
JU10	1	4-way header
R1, R4, R7	3	270 Ω \pm 5% resistors (0603)
R2, R5, R8	3	240 Ω \pm 5% resistors (0603)
R3, R6, R9	3	160 Ω \pm 5% resistors (0603)
R10, R106	2	10k Ω \pm 5% resistors (0603)
R11, R12	2	4.7k Ω \pm 5% resistors (0603)
R101	1	470 Ω \pm 5% resistor (0603)
R102, R103	2	27 Ω \pm 5% resistors (0603)
R104	1	1.5k Ω \pm 5% resistor (0603)
R105	1	2.2k Ω \pm 5% resistor (0603)
R107	1	130 Ω \pm 5% resistor (0603)
R108	1	100 Ω \pm 5% resistor (0603)
R109–R113	0	Not installed, resistor (0603), short PCB trace
SW1	1	Momentary pushbutton switch
U1	1	9-port I ² C GPIO (16-pin TQFN) Maxim MAX7302ATE+

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Component List (continued)

DESIGNATION	QTY	DESCRIPTION
U101	1	2.5V LDO regulator (5-pin SC70-5) Maxim MAX8511EXK25+
U102	1	3.3V LDO regulator (5-pin SC70-5) Maxim MAX8511EXK33+
U103	1	Microcontroller (68-pin QFN-EP) Maxim MAXQ2000-RAX+
U104	1	USB-to-UART converter (32-pin TQFP) FTDI FT232BL
U105	1	93C46 type 3-wire EEPROM (8-pin SO-8) Atmel AT93C46A-10SU-2.7

DESIGNATION	QTY	DESCRIPTION
Y101	1	6MHz crystal (HCM49) Hong Kong X'tals Ltd. SSL6000000E18FAF
Y102	1	16MHz crystal (HCM49) Hong Kong X'tals Ltd. SSM1600000E18FAF
—	15	Shunts
—	1	USB high-speed A-to-B cables, 6ft
—	1	PCB: MAX7302 Evaluation Kit+

Component Suppliers

SUPPLIER	PHONE	WEBSITE
Hong Kong X'tals Ltd.	852-35112388	www.hongkongcrystal.com
Murata Mfg. Co., Ltd.	770-436-1300	www.murata.com

Note: Indicate that you are using the MAX7302 when contacting these component suppliers.

MAX7302 EV Kit Files

FILE	DESCRIPTION
INSTALL.EXE	Installs the EV kit files on your computer
MAX7302.EXE	Application program
FTD2XX.INF	USB device driver file
UNINST.INI	Uninstalls the EV kit software
USB_Driver_Help.PDF	USB driver installation help file

Quick Start

Required Equipment

- MAX7302 EV kit (USB cable included)
- A user-supplied Windows 2000/XP/Vista PC with a spare USB port

Note: In the following sections, software-related items are identified by bolding. Text in **bold** refers to items directly from the EV kit software. Text in **bold and underlined** refers to items from the Windows operating system.

Procedure

- 1) Visit www.maxim-ic.com/evkitsoftware to download the latest version of the EV kit software, 7302Rxx.ZIP. Save the EV kit software to a temporary folder and uncompress the ZIP file.
- 2) Install the EV kit software on your computer by running the INSTALL.EXE program inside the temporary folder. The program files are copied and icons are created in the Windows **Start | Programs** menu.
- 3) Verify that all jumpers (JU1–JU13, JU101, and JU102) are in their default positions, as shown in Table 1.
- 4) Connect the USB cable from the PC to the EV kit board. A **Building Driver Database** window will pop up in addition to a **New Hardware Found** message when installing the USB driver for the first time. If you do not see a window that is similar to the one described above after 30 seconds, remove the USB cable from the board and reconnect it. Administrator privileges are required to install the USB device driver on Windows.
- 5) Follow the directions of the **Add New Hardware Wizard** to install the USB device driver. Choose the **Search for the best driver for your device** option. Specify the location of the device driver to be **C:\Program Files\MAX7302** (default installation directory) using the **Browse** button. During device driver installation, Windows may show a warning message indicating that the device driver Maxim uses does not contain a digital signature. This is not an error condition and it is safe to proceed with installation. Refer to the USB_Driver_Help.PDF document for additional information.

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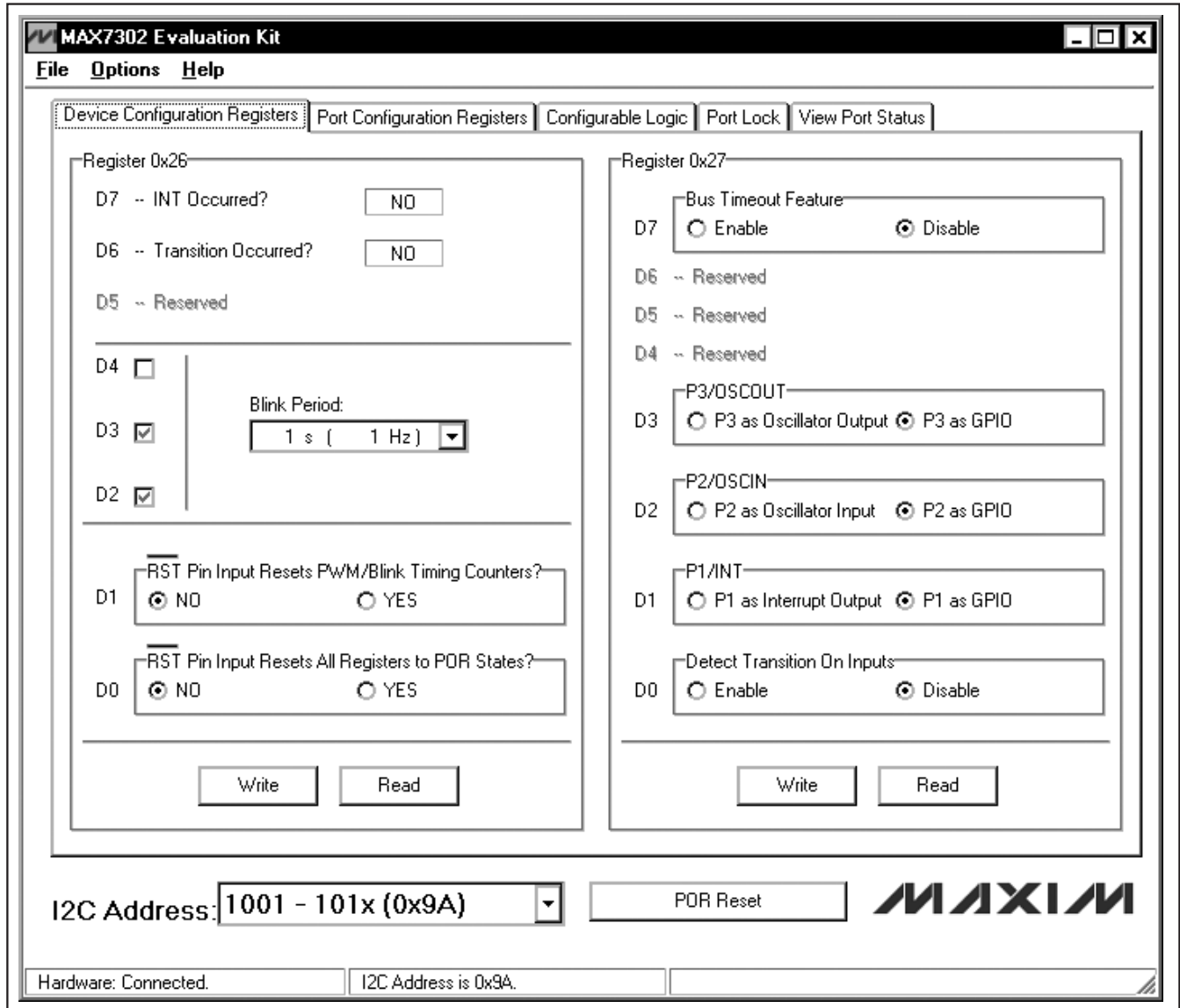


Figure 1. Device Configuration Registers Tab

- 6) Verify that the EV kit's LED D101 is lit, indicating that the USB is communicating to the EV kit board.
- 7) Start the MAX7302 EV kit software by opening its icon in the **Start | Programs** menu. The EV kit software main window appears as shown in Figure 1.
- 8) Switch to the **Port Configuration Registers** tab as shown in Figure 2. Check the **Output** radio button in the **Port Index** group box and click the **Write** button. Observe the red LED on port 1 turning on.

Detailed Description of Software

The software main window includes five tabs. They are **Device Configuration Registers**, **Port Configuration Registers**, **Configurable Logic**, **Port Lock**, and **View Port Status**. At the bottom of the window, there is an **I2C Address** drop-down list and a **POR Reset** button.

Device Configuration Registers Tab

The **Device Configuration Registers** tab shown in Figure 1 contains two group boxes: **Register 0x26** and **Register 0x27**.

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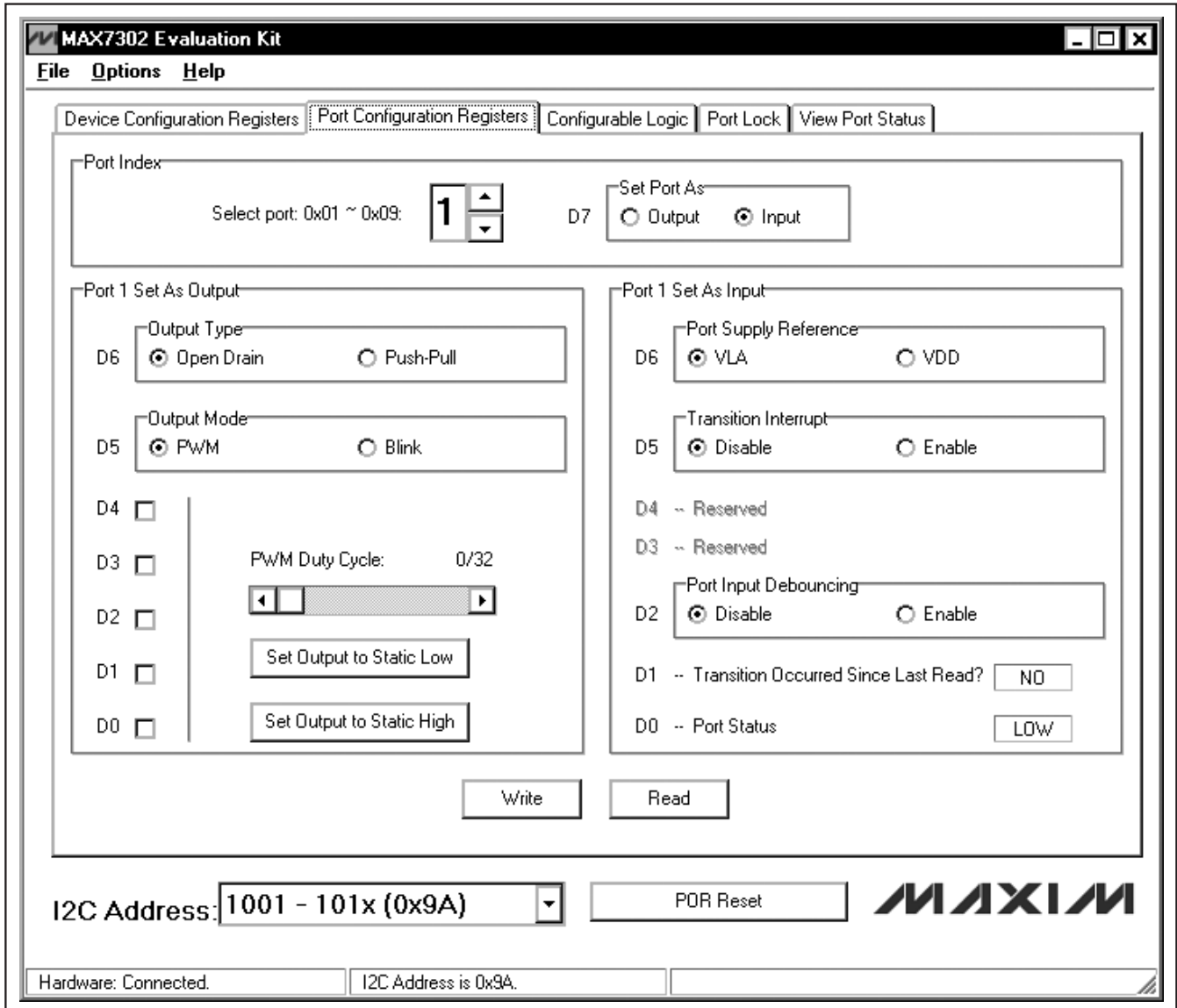


Figure 2. Port Configuration Registers Tab

Clicking the **Read** button reads the current hardware register settings. Clicking the radio buttons or selecting the drop-down list inside the **Register 0x26** group box followed by clicking the **Write** button writes the new settings to the respective device register.

Port Configuration Registers Tab

The **Port Configuration Registers** tab shown in Figure 2 contains the **Port Index**, **Port *n* Set As**

Output, and **Port *n* Set As Input** group boxes. There is also a single pair of **Read** and **Write** buttons.

The spin box selects the port a user wants to configure. The **Set Port As** group box configures the selected port either as an output or an input port.

Clicking the **Read** button reads the current hardware register settings. Clicking the **Write** button writes the new settings to the hardware register.

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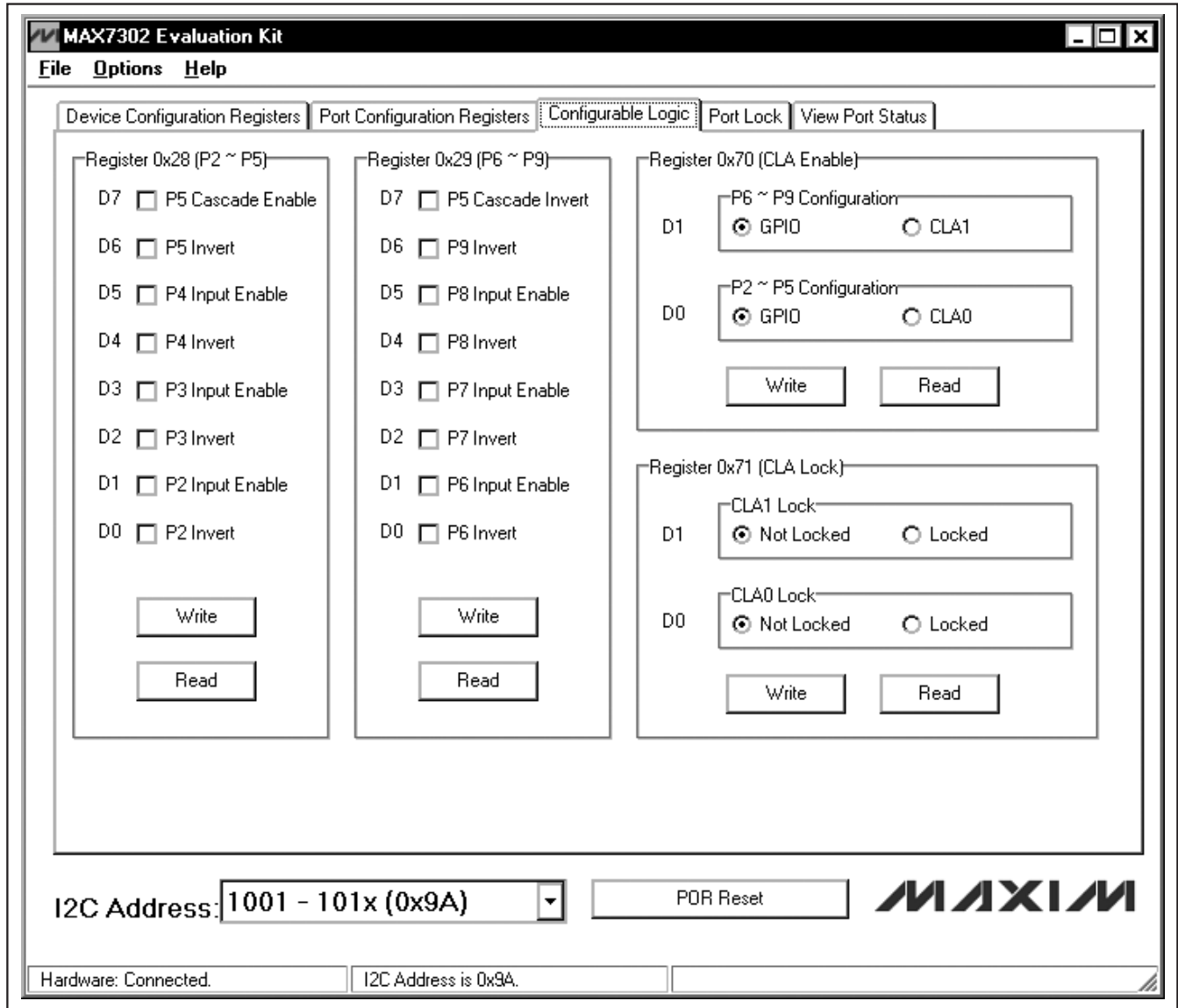


Figure 3. Configurable Logic Tab

Configurable Logic Tab

The **Configurable Logic** tab shown in Figure 3 contains four group boxes: **Register 0x28 (P2 ~ P5)**, **Register 0x29 (P6 ~ P9)**, **Register 0x70 (CLA Enable)**, and **Register 0x71 (CLA Lock)**.

Clicking the **Read** button reads the current hardware register settings. Clicking the **Write** button after the desired settings are chosen writes the new settings to a respective hardware register.

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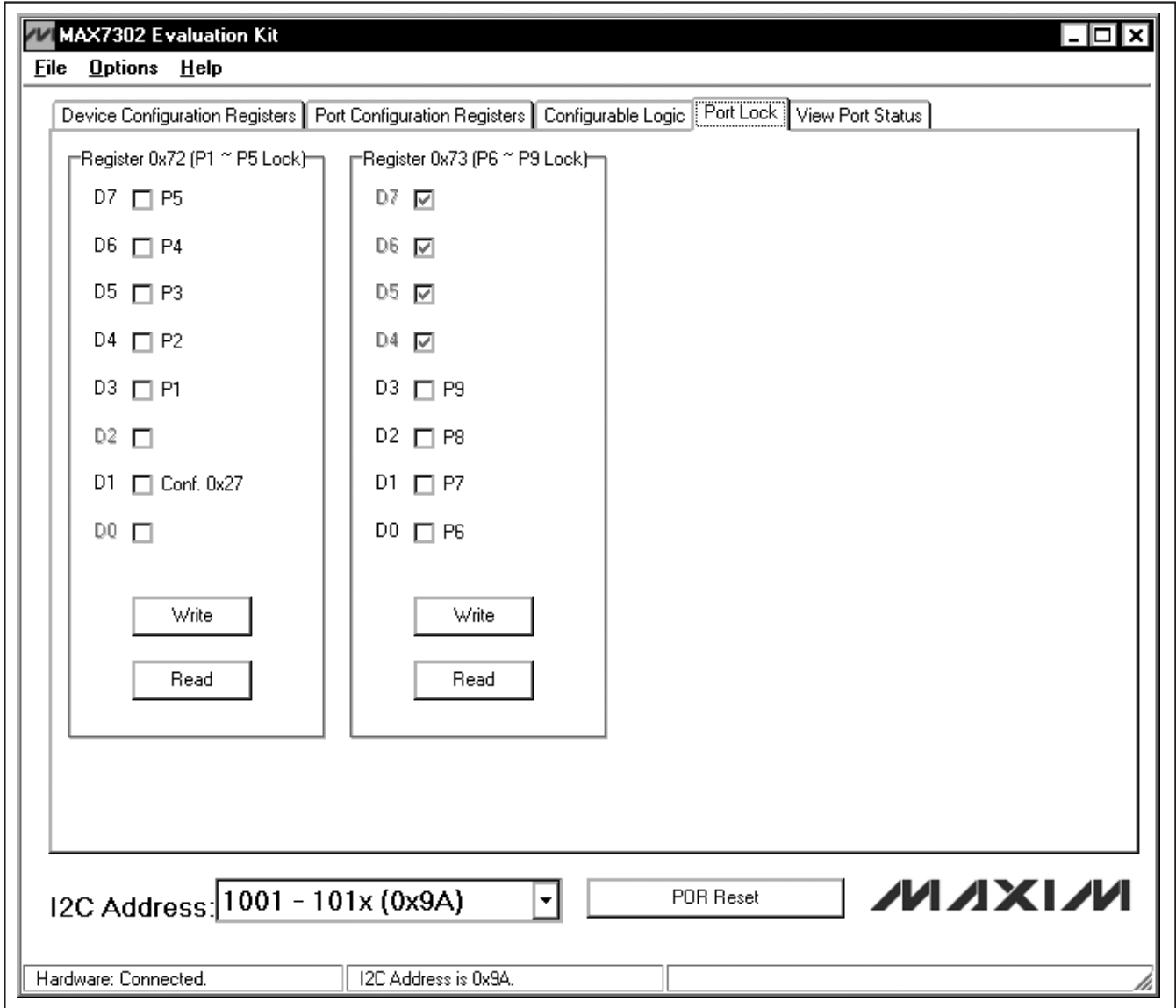


Figure 4. Port Lock Tab

Port Lock Tab

The **Port Lock** tab shown in Figure 4 contains two group boxes: **Register 0x72 (P1 ~ P5 Lock)** and **Register 0x73 (P6 ~ P9 Lock)**.

Clicking the **Read** button reads the current hardware register setting. Clicking the **Write** button after the desired settings are chosen writes the new settings to a respective hardware register.

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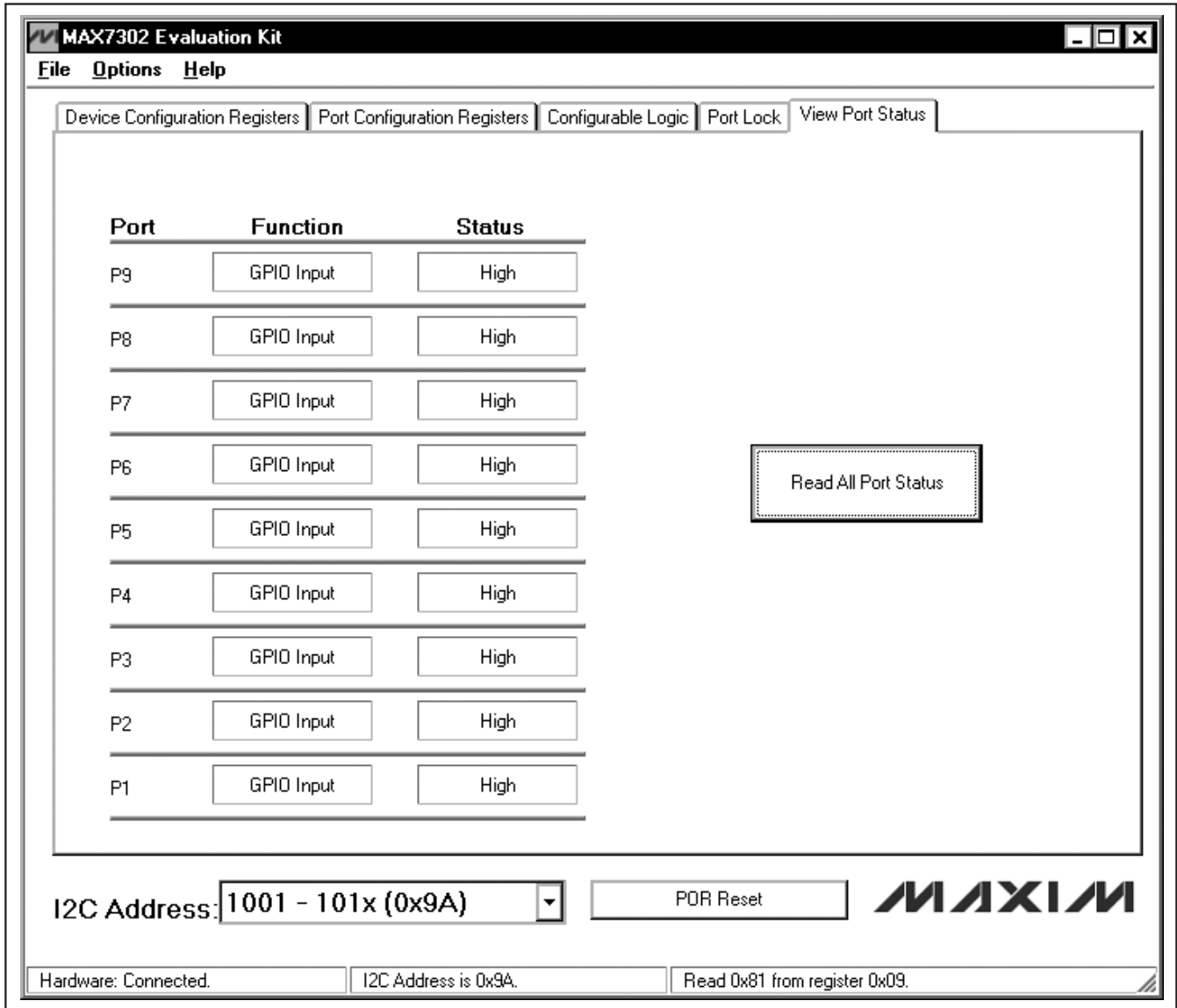


Figure 5. View Port Status Tab

View Port Status Tab

The **View Port Status** tab shown in Figure 5 displays the port functions and their status. Click the **Read All Port Status** button to update all port status.

I2C Address Drop-Down List

Configure the MAX7302 slave address by selecting the appropriate address in the **I2C Address** drop-down list.

See Table 1, JU10 settings, for possible MAX7302 I²C slave address configurations.

POR Reset Button

Click the **POR Reset** button to re-establish the connection between the EV kit software and the MAX7302 EV kit hardware. The software GUI is reset to the POR state.

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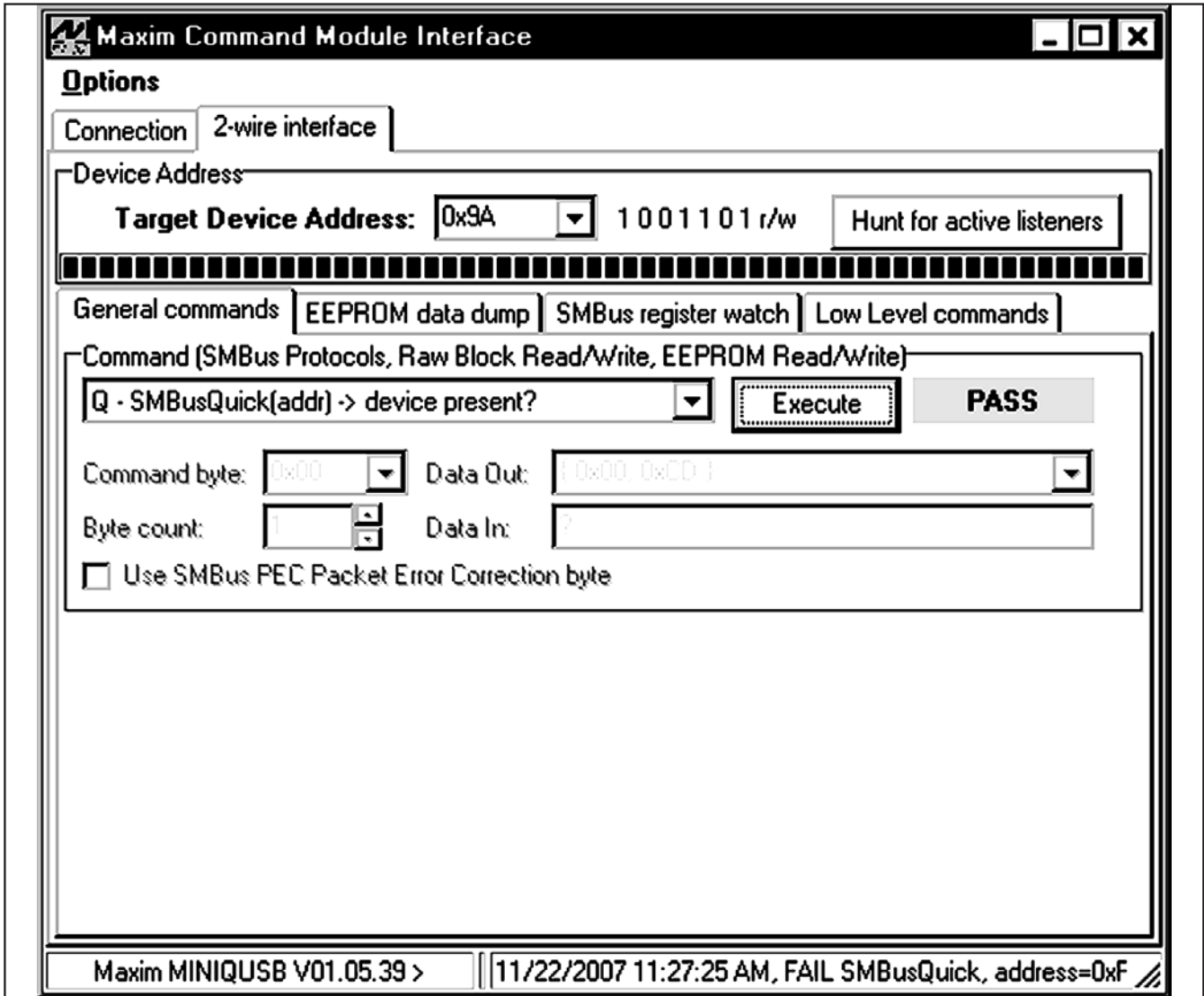


Figure 6. Maxim Command Module Interface Window

Software Menu Bar

There are three menu items on the menu bar: **File**, **Options**, and **Help**.

Select **File | Exit** to exit the application.

Select **Options | Interface (Advanced User)** to bring up the **Maxim Command Module Interface** as shown

in Figure 6. This interface allows I²C commands to be entered manually.

The **Help** menu item gives information about this EV kit software.

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Detailed Description of Hardware

The MAX7302 is a 9-port level-translating GPIO with latching transition detection, blink, and PWM features. The MAX7302 EV kit board provides a proven layout for evaluating the device. The EV kit comes with one MAX7302ATE+ installed.

Hardware Reset

Press SW1 to reset the MAX7302 device on the EV kit. Refer to the *RST Input* section of the IC data sheet for detailed reset functions.

Power Supplies

The MAX7302 has separate VDD and VLA power supplies. VLA is the port I/O supply and VDD powers the rest of the MAX7302 circuitry. On the MAX7302 EV kit, VDD is powered by a 3.3V LDO, MAX8511 chip. VLED and VLA are powered by the USB port directly, i.e. 5V. VDD, VLA, and VLED can also be supplied externally through corresponding on-board pads. Pre-installed jumpers on JU11, JU12, and JU13 headers should be removed before connecting external power supplies.

User-Supplied I²C Interface

To use the MAX7302 EV kit with a user-supplied I²C interface, connect SDA, SCL, and GND lines from the user-supplied I²C interface to the SDA, SCL, and GND pads on the MAX7302 EV kit. The shunts on JU101 and JU102 should be removed.

Table 1. MAX7302 EV Kit Jumper Descriptions

JUMPER	SHUNT POSITION	DESCRIPTION
JU1–JU9	1-2*	Ports P1–P9 use preconfigured settings on the EV kit.
	Open	Ports P1–P9 input or output connected through the P1–P9 pads.
JU10	1-2*	AD0 connected to VDD. Slave address is 0x9A.
	1-3	AD0 connected to GND. Slave address is 0x98.
	1-4	AD0 connected to SCL. Slave address is 0x9C.
	1-5	AD0 connected to SDA. Slave address is 0x9E.
JU11	1-2*	VLED connected to VUSB (5V).
	Open	VLED applied externally through the VLED pad.
JU12	1-2*	VDD connected to the on-board 3.3V power supply.
	Open	VDD applied externally through the VDD pad.
JU13	1-2*	VLA connected to VUSB (5V).
	Open	VLA applied externally through the VLA pad.
JU101, JU102	1-2*	On-board I ² C master is connected to the MAX7302.
	Open	User-supplied I ² C master is connected to the MAX7302.

*Default position.

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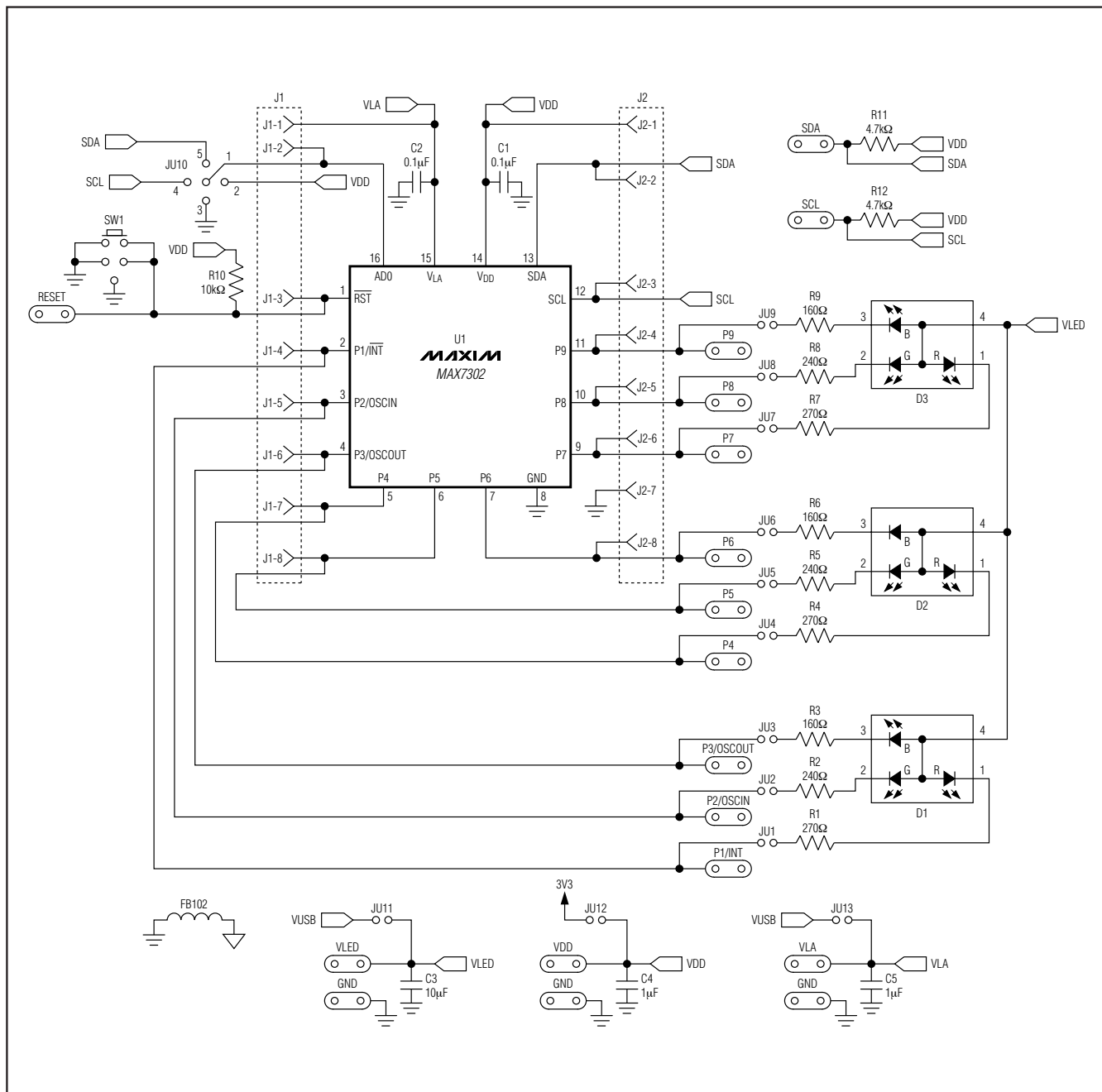


Figure 7. MAX7302 EV Kit Schematic (Sheet 1 of 3)

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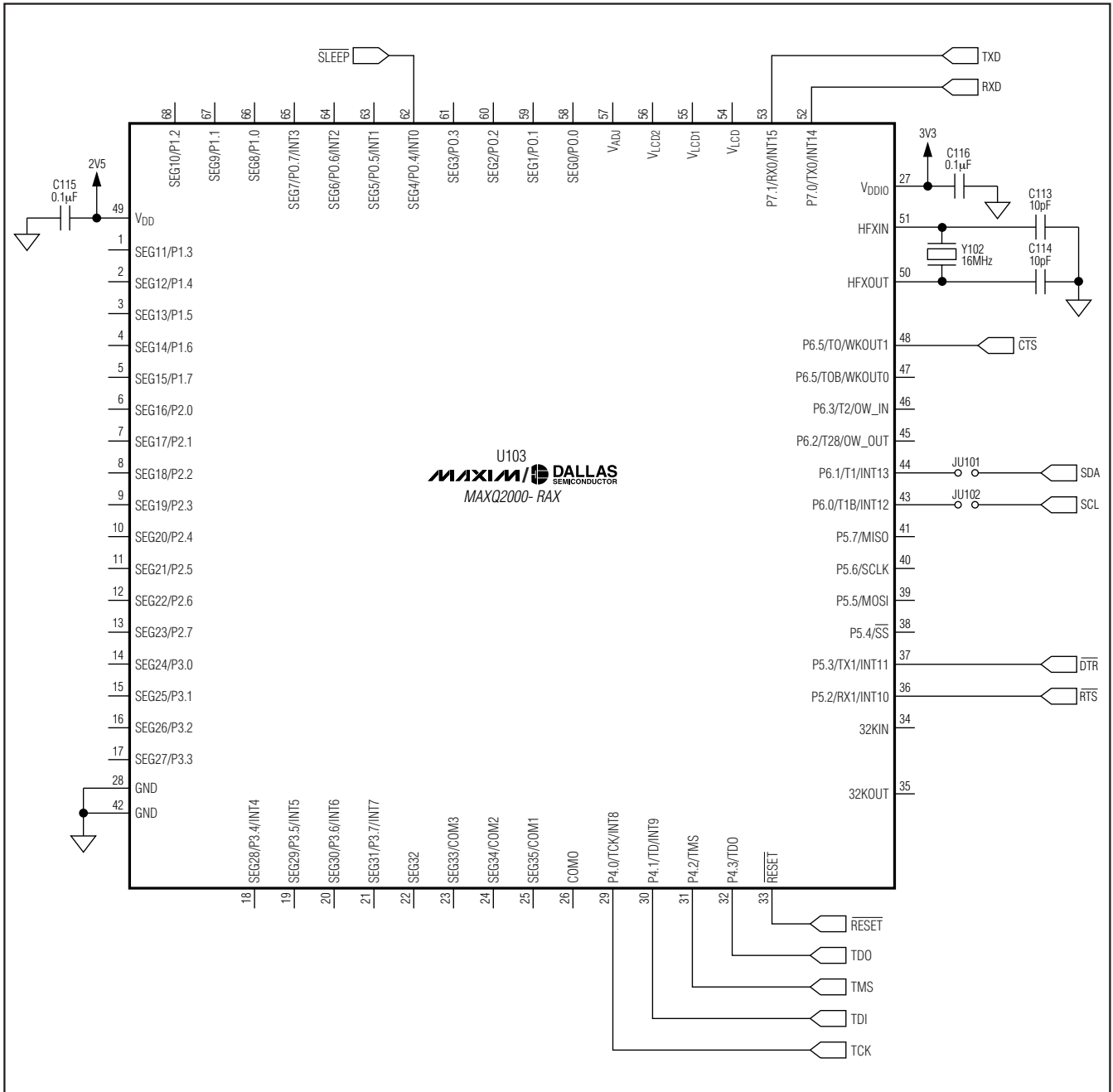


Figure 8. MAX7302 EV Kit Schematic (Sheet 2 of 3)

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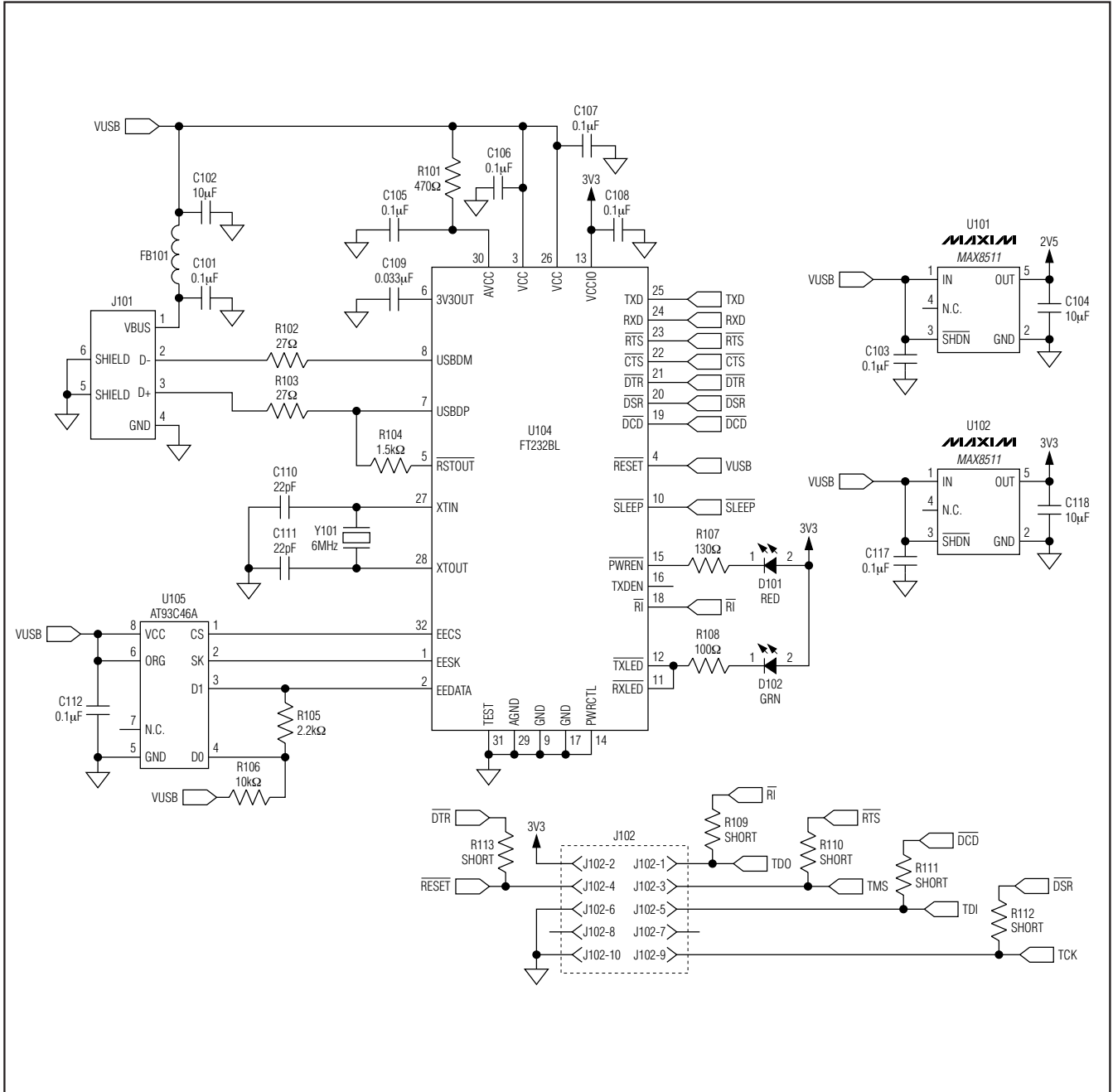


Figure 9. MAX7302 EV Kit Schematic (Sheet 3 of 3)

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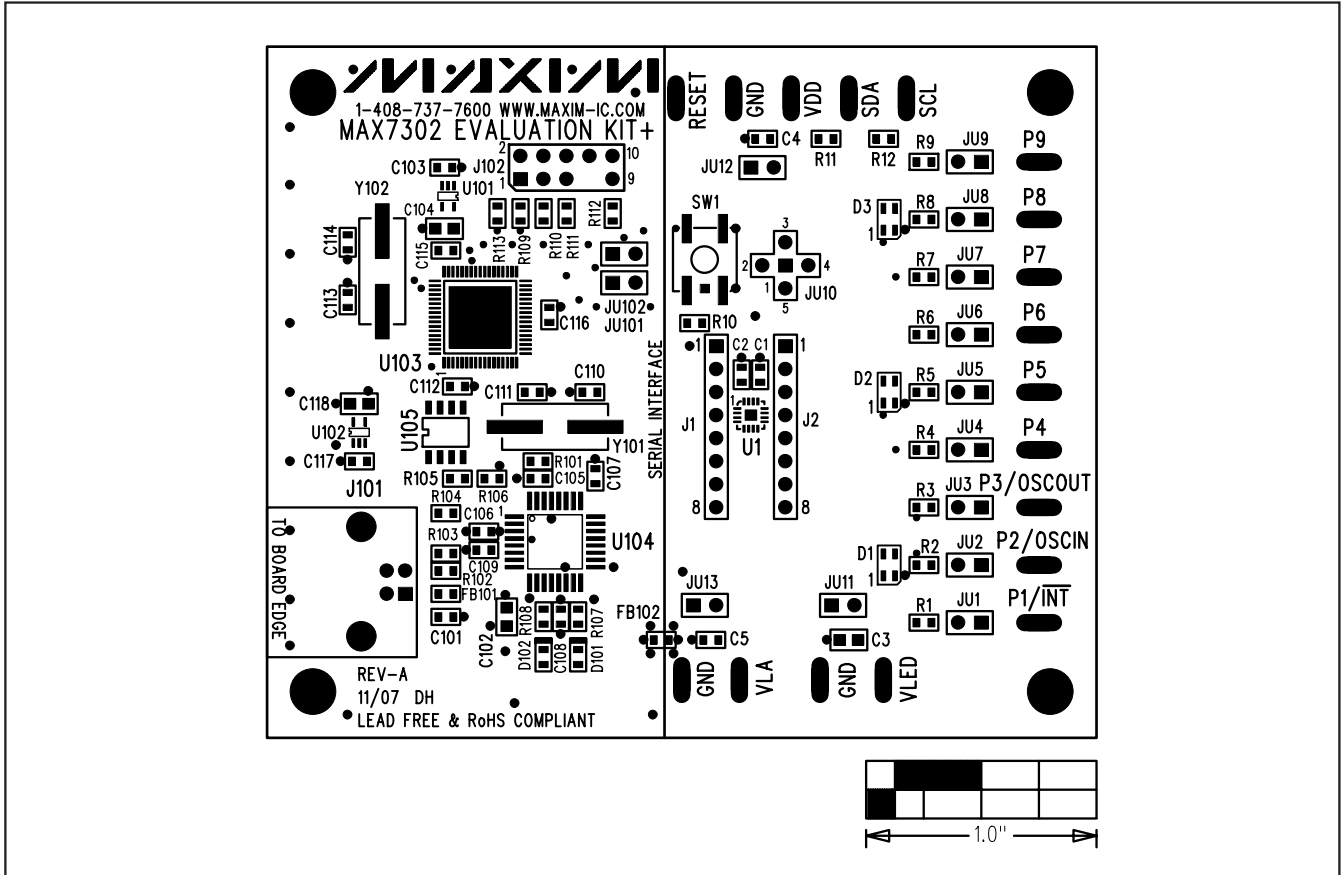


Figure 10. MAX7302 EV Kit Component Placement Guide—Component Side

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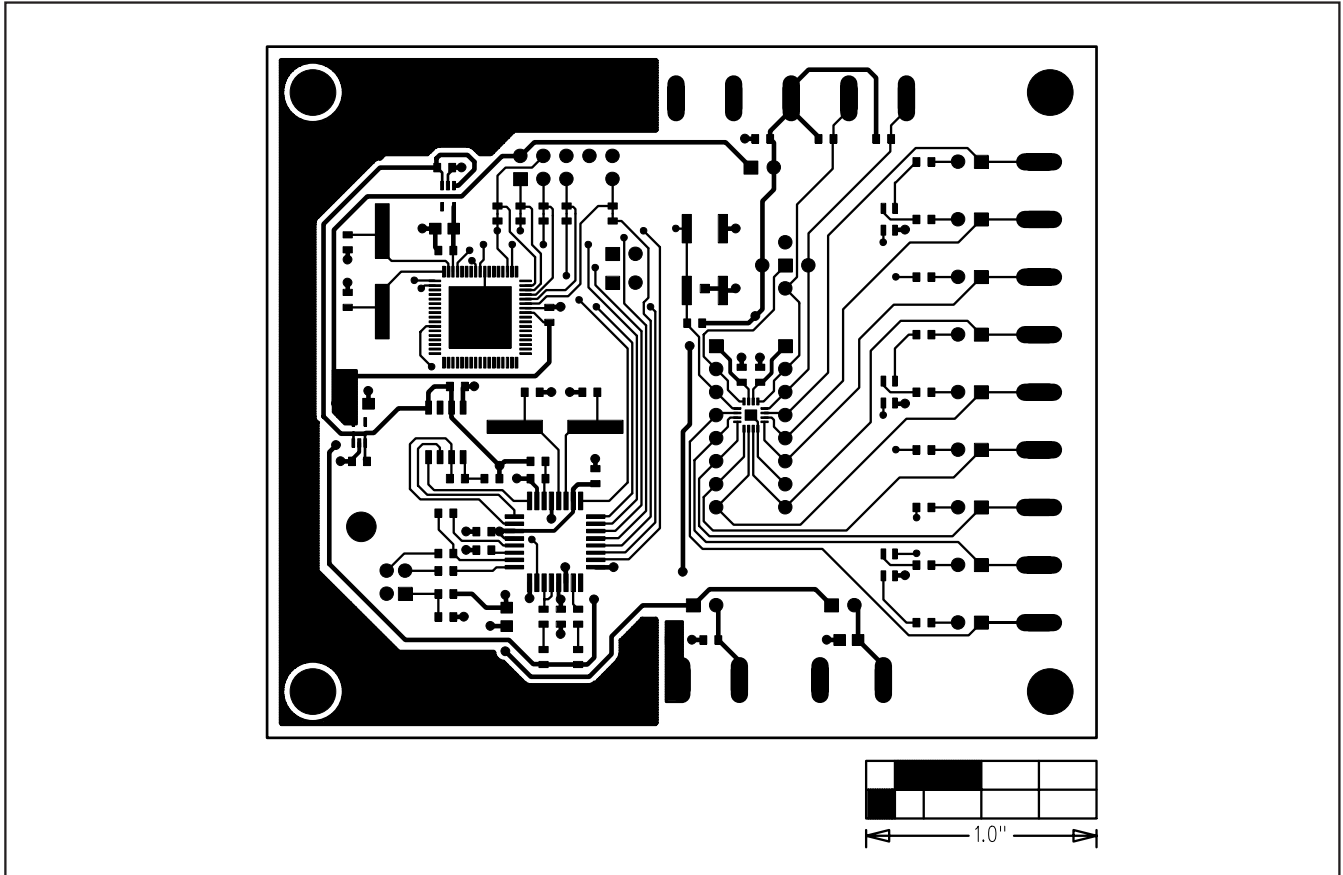


Figure 11. MAX7302 EV Kit PCB Layout—Component Side

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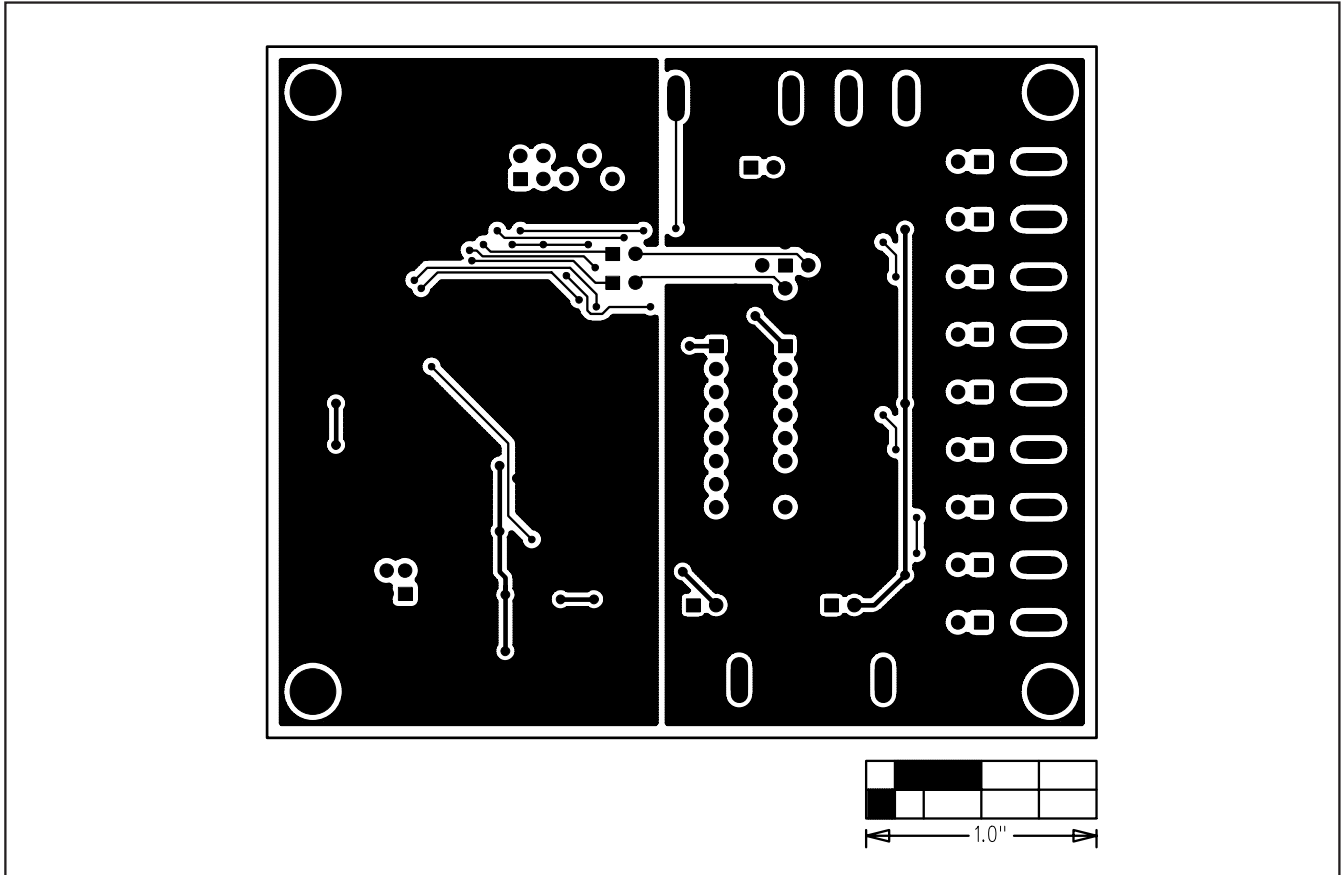


Figure 12. MAX7302 EV Kit PCB Layout—Solder Side

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