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MAX7327 Evaluation Kit/Evaluation System

Evaluate: MAX7324–MAX7327

General Description

The MAX7327 evaluation kit (EV kit) is a fully assembled and tested circuit board that demonstrates the capabilities of the MAX7327 I²C port expander with 12 push-pull outputs and 4 open-drain I/O ports. The MAX7327 EV kit also includes Windows® 98SE/2000/XP-compatible software, which provides a simple graphical user interface (GUI) for exercising the MAX7327's features.

The MAX7327 evaluation system (EV system) includes a MAX7327 EV kit and a Maxim CMAXQUSB serial interface board.

The CMAXQUSB board connects to a PC's USB port and allows the transfer of I²C commands to the MAX7327 EV kit.

The EV kit comes with the MAX7327ATG+ installed. The MAX7327 EV kit can also be used to evaluate the MAX7324/MAX7325/MAX7326. Contact the factory for free samples of the pin-compatible MAX7324ATG+/ MAX7325ATG+/MAX7326ATG+ to evaluate these parts.

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Features

♦ **400kHz, 2-Wire Serial Interface**

♦ **1.71V to 5.5V Operation**

♦ **12 Push-Pull Output Ports, Rated at 20mA Sink Current**

♦ **4 Open-Drain I/O Ports, Rated at 20mA Sink Current**

♦ **Proven PCB Layout**

♦ **Windows 98SE/2000/XP-Compatible Evaluation Software**

♦ **Fully Assembled and Tested**

♦ **EV System: USB PC Connection**

Ordering Information

PART	TYPE	INTERFACE
MAX7327EVKIT+	EV kit	User-supplied I²C interface
MAX7327EVCMAXQU+	EV system	CMAXQUSB board

+Denotes a lead-free and RoHS-compliant EV kit.
Note: *The MAX7327 EV kit software is designed for use with the complete EV system. The EV system includes both the Maxim CMAXQUSB board and the EV kit. If the Windows software will not be used, the EV kit board can be purchased without the Maxim CMAXQUSB board.*

Component List

MAX7327 EV System

PART	QTY	DESCRIPTION
MAX7327EVKIT+	1	MAX7327 EV kit
CMAXQUSB+	1	Serial interface board

MAX7327 EV Kit

DESIGNATION	QTY	DESCRIPTION
C1	1	10µF ±10%, 10V X5R ceramic capacitor (0805) TDK C2012X5R1A106K
C2	1	0.1µF ±10%, 25V X7R ceramic capacitor (0603) TDK C1608X7R1E104K
C3	1	47pF ±10%, 50V C0G ceramic capacitor (0603) TDK C1608C0G1H470J
D1, D3	2	Red LEDs (PLCC4) OPTEK OVSASBC2R8

MAX7327 EV Kit (continued)

DESIGNATION	QTY	DESCRIPTION
D2, D4	2	Green LEDs (PLCC4) OPTEK OVSAGBC2R8
D5, D6	2	White LEDs (PLCC2) OPTEK OVS9WBCR9
J1	1	2 x 10 right-angle female receptacle
JU1, JU2	2	5-pin headers
JU3	1	2-pin header
JU4	1	3-pin header
R1, R3	2	150Ω ±5% resistors (0603), lead-free
R2, R4	2	82Ω ±5% resistors (0603), lead-free
R5, R6	2	100Ω ±5% resistors (0603), lead-free
R7, R8, R9	3	10kΩ ±5% resistors (0603), lead-free

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For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim's website at www.maxim-ic.com.

Component List (continued)
MAX7327 EV Kit (continued)

DESIGNATION	QTY	DESCRIPTION
R10, R11	0	Not installed (0603), resistors
R12	1	2kΩ ±5% resistor (0603), lead-free
S1–S4	4	Pushbutton switches
U1	1	MAX7327ATG+ (24-pin TQFN, 4mm x 4mm)
—	1	MAX7327 EV kit+ PCB

Component Suppliers

SUPPLIER	PHONE	WEBSITE
OPTEK	800-341-4747	www.optekinc.com
TDK	847-803-6100	www.component.tdk.com

Note: *Indicate you are using the Maxim MAX7327 when contacting these component suppliers.*

MAX7327 EV Kit Files

FILE	DESCRIPTION
INSTALL.EXE	Installs the EV kit files on your computer
MAX7327.EXE	Application program
FTD2XX.INF	USB device driver file
UNINST.INI	Uninstalls the EV kit software
TROUBLESHOOTING_USB.PDF	USB driver installation help file

Quick Start

Recommended Equipment
- The MAX7327 EV system:

  MAX7327 EV kit

  Maxim CMAXQUSB board

  USB cable (included with CMAXQUSB)
- A user-supplied Windows 98SE/2000/XP PC with a spare USB port

Note: In the following section(s), software-related items are identified by bolding. Text in **bold** refers to items directly from the EV kit software. Text in **bold and underline** refers to items from the Windows 98SE/2000/XP operating system.

Procedure

1) Visit the Maxim website (www.maxim-ic.com/evkit-software) to download the most recent revision of the EV kit software 7327Rxx.ZIP.

2) Install the MAX7327 evaluation software on your computer by running the INSTALL.EXE program. The program files are copied and icons are created in the Windows **Start** Menu.

3) Enable the I^2C pullup resistors on the CMAXQUSB board by setting the DIP switches on SW1 to the ON position.

4) For the MAX7327 EV kit, make sure the shunts of all jumpers are in the following default positions:

   JU1: (1-3) Combined with JU2 makes I^2C address = 0xC0, 0xA0

   JU2: (1-4) Combined with JU1 makes I^2C address = 0xC0, 0xA0

   JU3: (Open) Normal operation

   JU4: (2-3) CMAXQUSB provides the power supply

5) Connect the boards by aligning the MAX7327 EV kit's 20-pin connector with the 20-pin connector of the CMAXQUSB board.

6) Connect the USB cable from the PC to the CMAXQUSB board. A **Building Driver Database** window should pop up in addition to a **New Hardware Found** message, if this is the first time it is used on this PC. If you do not see a window that is similar to the one described above after 30 seconds, try removing the USB cable from the CMAXQUSB and reconnect it. Administrator privileges are required to install the USB device driver on Windows 2000 and XP. Refer to the document TROUBLESHOOTING_USB.PDF included with the software if you have any problems during this step.

7) 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\MAX7327** (default installation directory) using the **Browse** button.

8) Start the MAX7327 EV kit software by opening its icon in the **Start** menu. The GUI main window appears as in Figure 1.

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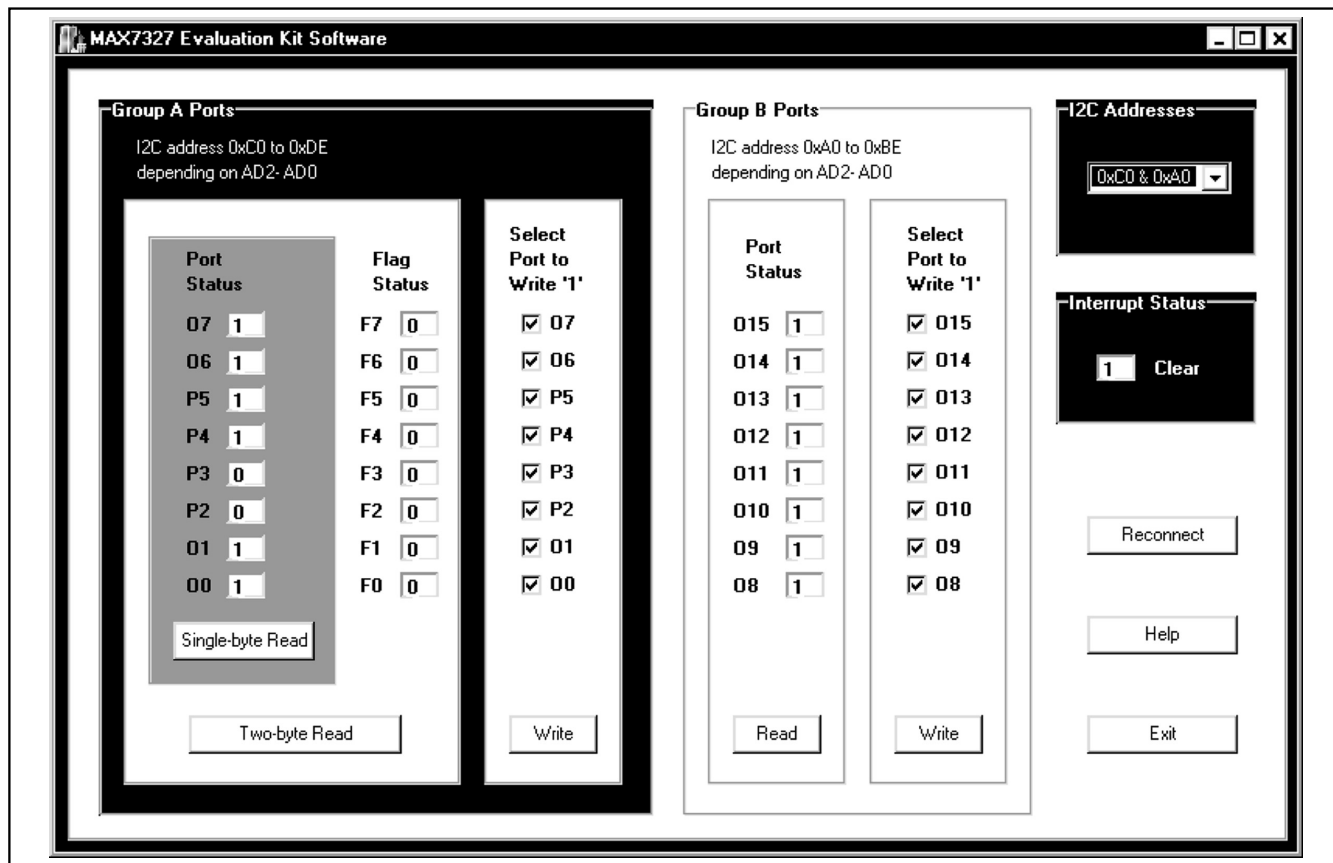
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Figure 1. MAX7327 Evaluation Software Main Window

9) Check or uncheck the checkbox O0, O1, P2, and P3 above the **Write** button, which is inside the **Group A Ports** groupbox. Press the **Write** button and observe the light change of the LEDs on the EV kit board.

___Detailed Description of Software

To start the MAX7327 EV kit software, double-click the MAX7327 EV kit icon that is created during installation. The GUI main window appears as shown in Figure 1. The user will have to wait approximately two seconds while the MAX7327 EV kit software connects to the CMAXQUSB board.

There are four groupboxes on the MAX7327 EV kit GUI software: **Group A Ports**, **Group B Ports**, **I2C Addresses**, and **Interrupt Status**.

Also there are three buttons on the EV kit GUI software: **Reconnect**, **Help**, and **Exit**.

Group A Ports Groupbox

The **Group A Ports** groupbox shown in Figure 1 contains the read panel and write panel. The read panel consists of two sections: **Port Status** and **Flag Status**.

Pressing the **Single-byte Read** button only reads the port status. Pressing the **Two-byte Read** button will read both **Port Status** and **Flag Status**.

Check or uncheck the desired checkboxes in the write panel and press the **Write** button to write those settings to the hardware.

Group B Ports Groupbox

The **Group B Ports** groupbox also contains the read panel and write panel.

Press the **Read** button to read the port status.

Check or uncheck the desired checkboxes in the write panel and press the **Write** button to write those settings to the hardware.

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I2C Addresses Groupbox

The **I2C Addresses** pull-down menu autodetects the MAX7327's I2C slave address when the GUI software starts. If multiple devices are connected to the I2C bus, the user can use this pull-down menu to manually change the device's I2C slave address according to the shunt position of JU1 and JU2 as shown in Table 1.

Table 1. I2C Address Configuration

SHUNT POSITION		I²C ADDRESS
JU2	JU1	
1-4 (SCL)*	1-3 (GND)*	1100000x (0xC0) and 1010000x (0xA0)
1-4 (SCL)	1-2 (VCC)	1100001x (0xC2) and 1010001x (0xA2)
1-4 (SCL)	1-4 (SCL)	1100010x (0xC4) and 1010010x (0xA4)
1-4 (SCL)	1-5 (SDA)	1100011x (0xC6) and 1010011x (0xA6)
1-5 (SDA)	1-3 (GND)	1100100x (0xC8) and 1010100x (0xA8)
1-5 (SDA)	1-2 (VCC)	1100101x (0xCA) and 1010101x (0xAA)
1-5 (SDA)	1-4 (SCL)	1100110x (0xCC) and 1010110x (0xAC)
1-5 (SDA)	1-5 (SDA)	1100111x (0xCE) and 1010111x (0xAE)
1-3 (GND)	1-3 (GND)	1101000x (0xD0) and 1011000x (0xB0)
1-3 (GND)	1-2 (VCC)	1101001x (0xD2) and 1011001x (0xB2)
1-3 (GND)	1-4 (SCL)	1101010x (0xD4) and 1011010x (0xB4)
1-3 (GND)	1-5 (SDA)	1101011x (0xD6) and 1011011x (0xB6)
1-2 (VCC)	1-3 (GND)	1101100x (0xD8) and 1011100x (0xB8)
1-2 (VCC)	1-2 (VCC)	1101101x (0xDA) and 1011101x (0xBA)
1-2 (VCC)	1-4 (SCL)	1101110x (0xDC) and 1011110x (0xBC)
1-2 (VCC)	1-5 (SDA)	1101111x (0xDE) and 1011111x (0xBE)

*Default position.

Interrupt Status Groupbox

The **Interrupt Status** groupbox shows the current status of the MAX7327 $\overline{INT}$ pin, which reflects the latched transition detection of four I/O ports.

Reconnect, Help, and Exit Buttons

Press the **Reconnect** button to reestablish the connection between the EV kit GUI software and the MAX7327 EV kit hardware.

Press the **Help** button to show the MAX7327 EV kit software revision and Maxim's website information.

Press the **Exit** button to quit the MAX7327 EV kit GUI software.

__Detailed Description of Hardware

The MAX7327 is an I2C interfaced port expander with 12 push-pull outputs and 4 open-drain I/O ports. The MAX7327 EV kit board provides a proven layout for evaluating the MAX7327. The EV kit comes with a MAX7327ATG+ installed.

Hardware Reset Control

The hardware reset function is controlled by jumper JU3 as shown in Table 2. Putting the shunt in the 1-2 position resets and disables the I2C interface.

Table 2. $\overline{RST}$ Jumper Configuration

JUMPER	SHUNT POSITION	DESCRIPTION
JU3	1-2	Reset
	Open*	Normal operation

*Default position.

I2C Address Configuration

The combinations of the shunt position of jumper JU1 and JU2 determine the I2C slave address of the MAX7327 EV kit. See Table 1 to select the appropriate setting.

Power Supplies

The MAX7327 EV kit can be either powered from the CMAXQUSB (2.5V, 3.3V, and 5V) or from a user-supplied 1.71V to 5.5V power supply connecting to VDD, as shown in Table 3.

If using a user-supplied power supply, make sure the voltage setting is compatible with the CMAXQUSB JU1 setting.

Table 3. V+ Selection Configuration

JUMPER	SHUNT POSITION	DESCRIPTION
JU4	1-2	User-provided 1.71V to 5.5V power supply (VDD)
	2-3*	Powered by CMAXQUSB

*Default position.

User-Supplied I2C Interface

To use the MAX7327 EV kit with a user-supplied I2C interface, install the shunt on jumper JU4's 1-2 position. Connect SDA, SCL, and GND lines from the user-supplied I2C interface to the SDA, SCL, and GND pads on the MAX7327 EV kit. Apply a 1.71V to 5.5V power supply to the VDD pad of the MAX7327 EV kit. Depending on the configuration of the user-supplied I2C interface, it may be necessary to install the I2C pullup resistors R10 and R11.

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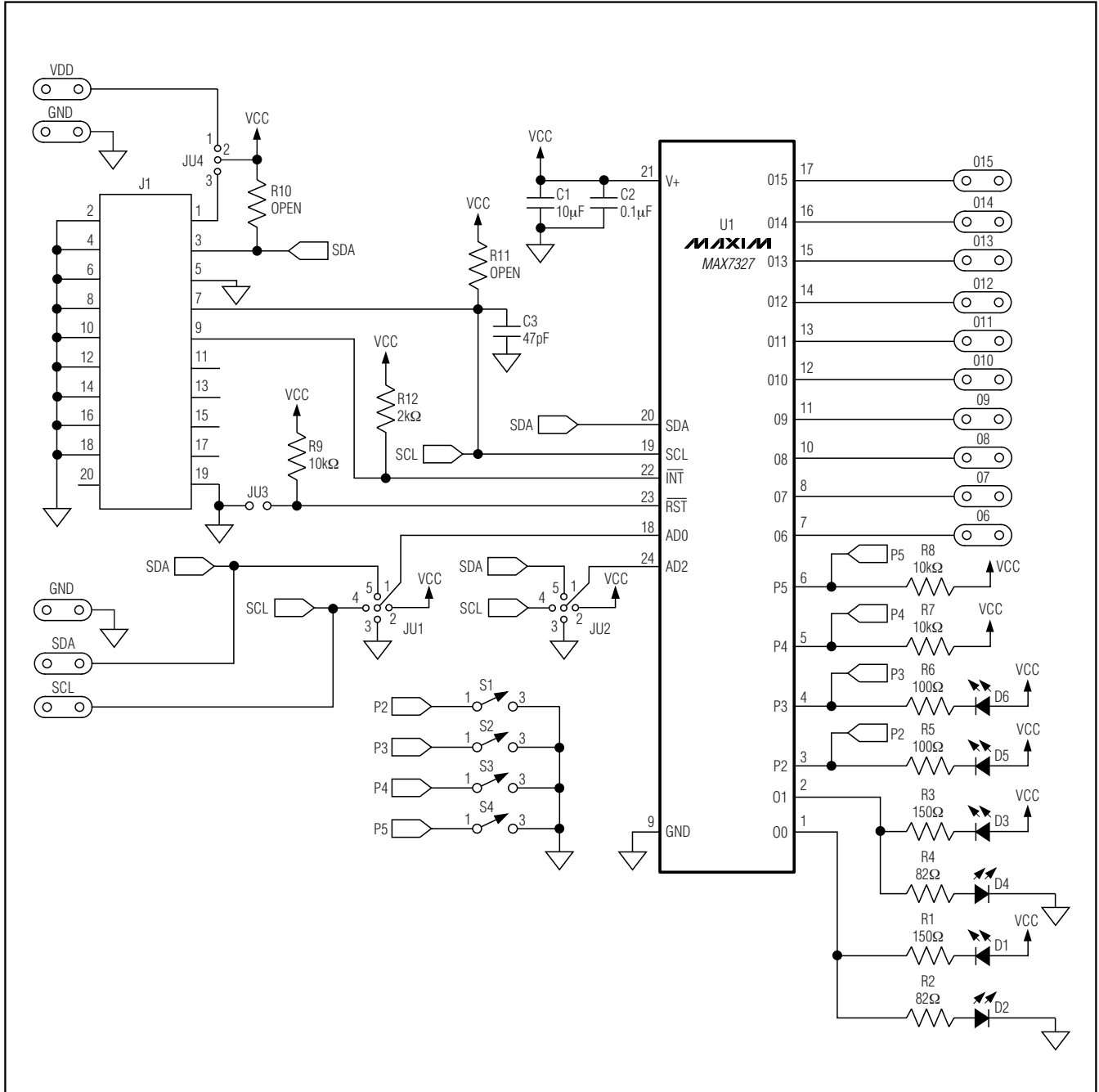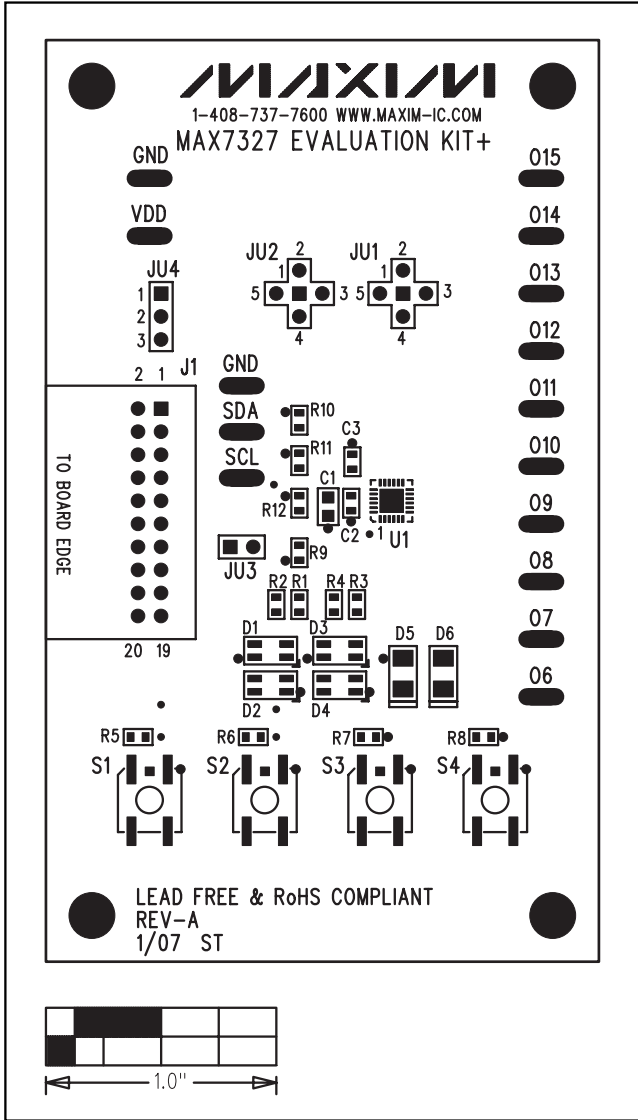
Figure 2. MAX7327 EV Kit Schematic

Figure 3. MAX7327 EV Kit Component Placement Guide—Component Side

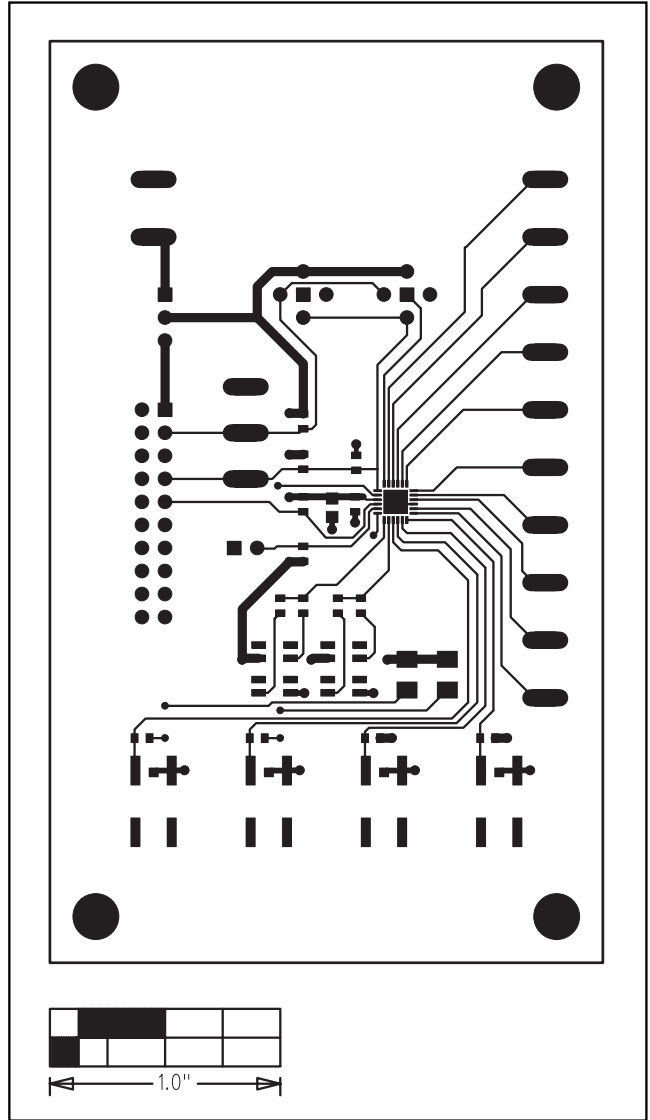

Figure 4. MAX7327 EV Kit PCB Layout—Component Side
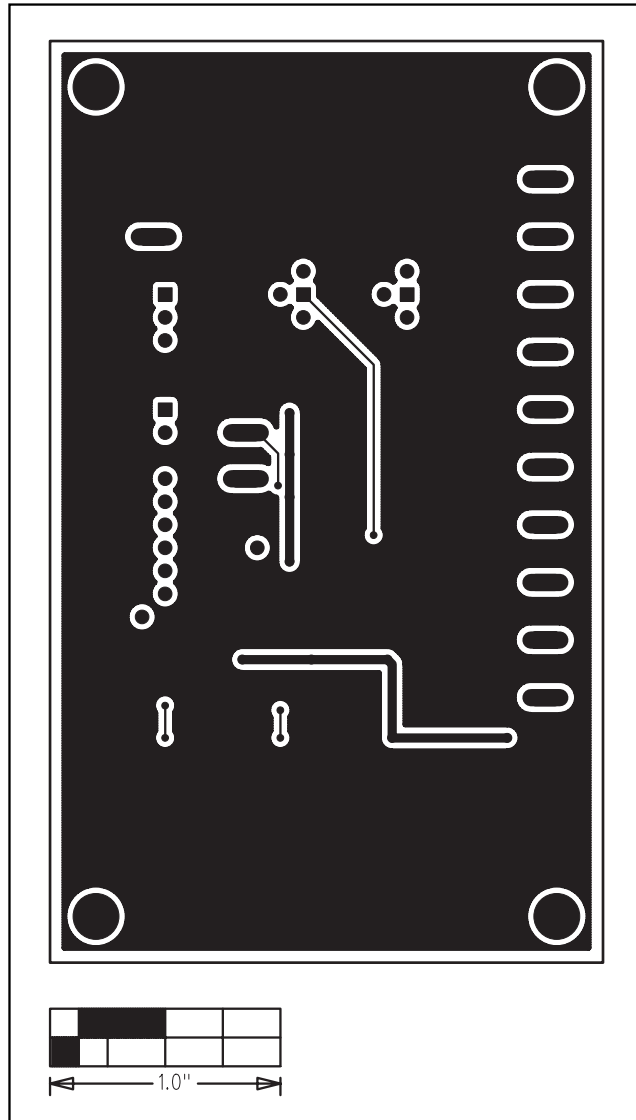
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Figure 5. MAX7327 EV Kit PCB Layout—Solder Side

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