



MAX7324 Evaluation Kit/Evaluation System

Evaluate: MAX7324

General Description

The MAX7324 evaluation kit (EV kit) is a fully assembled and tested printed-circuit board (PCB) that demonstrates the capabilities of the MAX7324 I²C port expander with eight push-pull outputs and eight inputs. The MAX7324 EV kit also includes Windows® 2000/XP/Vista-compatible software that provides a simple graphical user interface (GUI) for exercising the MAX7324's features.

The MAX7324 evaluation system (EV system) includes a MAX7324 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 MAX7324 EV kit.

The EV kit comes with the MAX7324AEG+ installed.

Features

- ◆ 400kHz, 2-Wire Serial Interface
- ◆ 1.71V to 5.5V Operation
- ◆ 8 Push-Pull Output Ports
- ◆ 8 Input Ports with Maskable Latching-Transition Detection
- ◆ Input Ports are Overvoltage Protected to 6V
- ◆ Proven PCB Layout
- ◆ Windows 2000/XP/Vista (32-Bit)-Compatible Software
- ◆ Fully Assembled and Tested
- ◆ EV System: USB PC Connection

Ordering Information

PART	TYPE
MAX7324EVKIT+	EV Kit
MAX7324EVCMAXQU+	EV System

+Denotes lead-free and RoHS-compliant.

Note: The MAX7324 EV kit software is designed for use with the complete EV system (MAX7324EVCMAXQU+). The EV system includes both the Maxim CMAXQUSB board and the EV kit (MAX7324EVKIT+). If the Windows software will not be used, the EV kit board can be purchased without the Maxim CMAXQUSB board.

Component List

MAX7324 EV System

PART	QTY	DESCRIPTION
MAX7324EVKIT+	1	MAX7324 EV kit
CMAXQUSB+	1	Serial-interface board

MAX7324 EV Kit

DESIGNATION	QTY	DESCRIPTION
C1	1	10µF ±10%, 6.3V X5R ceramic capacitor (0805) TDK C2012X5R0J106K
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 (PLCC)

DESIGNATION	QTY	DESCRIPTION
D2, D4	2	Green LEDs (PLCC)
J1	1	2 x 10 right-angle female receptacle
JU1, JU2	2	5-pin, 4-way headers
JU3	1	2-pin header
JU4	1	3-pin header
R1–R4	4	150Ω ±5% resistors (0603)
R5–R9	5	10kΩ ±5% resistors (0603)
R10, R11	0	Not installed, resistors (0603)
R12	1	2kΩ ±5% resistor (0603)
S1–S4	4	Pushbutton switches
U1	1	Maxim I ² C port expander with 8 push-pull outputs and 8 inputs MAX7324AEG+ (24-pin QSOP)
—	1	PCB: MAX7324 Evaluation Kit+

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

MAX7324 Evaluation Kit/Evaluation System

Component Suppliers

SUPPLIER	PHONE	WEBSITE
TDK Corp.	847-803-6100	www.component.tdk.com

Note: Indicate that you are using the MAX7324 when contacting this component supplier.

MAX7324 EV Kit Files

FILE	DESCRIPTION
INSTALL.EXE	Installs the EV kit files on your computer
MAX7324.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

Recommended Equipment

Before beginning, the following equipment is needed:

- The MAX7324 EV system
 - MAX7324 EV kit
 - Maxim CMAXQUSB board
 - USB cable (included with CMAXQUSB)
- A user-supplied Windows 2000/XP/Vista-compatible 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

- Visit www.maxim-ic.com/evkitsoftware to download the latest version of the EV kit software, 7324Rxx.ZIP. Save the EV kit software to a temporary folder and uncompress the ZIP file.
- Install the MAX7324 evaluation 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.
- Enable the I²C pullup resistors on the CMAXQUSB board by setting the DIP switches on SW1 to the ON position.
- For the MAX7324 EV kit, make sure the shunts of all jumpers are in the following default positions:
 - JU1: (1-3) Combined with JU2 makes I²C address = 0xC0, 0xA0
 - JU2: (1-4) Combined with JU1 makes I²C address = 0xC0, 0xA0
 - JU3: (Open) Normal operation
 - JU4: (2-3) CMAXQUSB provides the power supply
- Connect the boards by aligning the MAX7324 EV kit's 20-pin connector with the 20-pin connector of the CMAXQUSB board.
- Connect the USB cable from the PC to the CMAXQUSB board. A **Building Driver Database** window pops 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 30s, remove the USB cable from the CMAXQUSB and reconnect it. Administrator privileges are required to install the USB device driver on Windows 2000/XP/Vista.
- 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\MAX7324** (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.
- Start the MAX7324 EV kit software by opening its icon in the **Start** menu. The GUI main window will appear, as shown in Figure 1.
- Check or uncheck the **O8** and **O9** checkboxes above the **Write** button, which is inside the **Output Ports** group box. Press the **Write** button and observe the light change of the LEDs on the EV kit board.

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Detailed Description of Software

To start the MAX7324 EV kit software, double click the MAX7324 EV kit icon that is created during installation. The GUI main window appears, as shown in Figure 1.

There are four group boxes on the MAX7324 EV kit GUI software: **Input Ports**, **Output Ports**, **I2C Addresses**, and **Interrupt Status**.

Input Ports Group Box

The **Input Ports** group box shown in Figure 1 contains the **Write** group box and the **Read** group box. The **Read** group box consists of two sections: **Port Status** and **Flag Status**.

Check or uncheck the desired checkboxes in the **Write** group box and press the **Write** button to write the port settings to the device.

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. Refer to the MAX7324 IC data sheet for a detailed description.

Output Ports Group Box

The **Output Ports** group box also contains the **Write** group box and the **Read** group box.

Check or uncheck the desired checkboxes in the **Write** group box and press the **Write** button to write the port settings to the device.

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

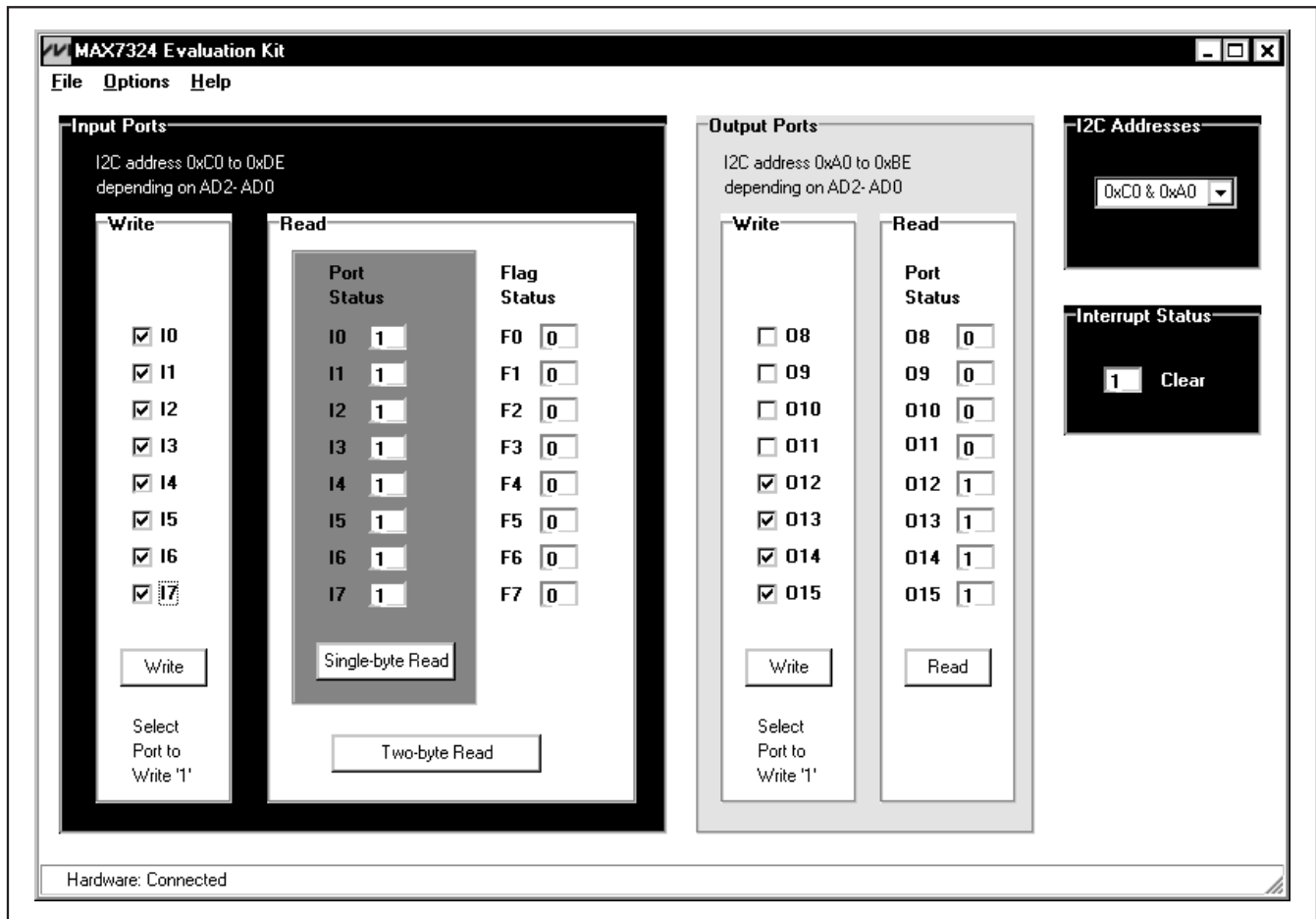


Figure 1. MAX7324 Evaluation Software Main Window

MAX7324 Evaluation Kit/Evaluation System

I2C Addresses Group Box

The **I2C Addresses** drop-down list automatically detects the MAX7324's I²C slave address when the GUI software starts. If multiple devices are connected to the I²C bus, the user can use this drop-down list to manually change the device's I²C slave address according to the shunt position of JU1 and JU2, as shown in Table 1.

Interrupt Status Group Box

The **Interrupt Status** group box shows the current status of the MAX7324 $\overline{\text{INT}}$ pin (active-low, programmable latching transition-detection interrupt output).

Table 1. The I²C Address Configuration

SHUNT POSITION		I ² C 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.

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Detailed Description of Hardware

The MAX7324 has eight push-pull outputs and eight inputs. The MAX7324 EV kit board provides a proven layout for evaluating the MAX7324. The EV kit comes with a MAX7324AEG+ installed.

Hardware-Reset Control

The hardware-reset function is controlled by jumper JU3, as shown in Table 2. Putting a shunt in the 1-2 position resets all registers and puts the device in the power-on-reset state.

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

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

*Default position.

I²C Address Configuration

The combination of shunt positions of jumpers JU1 and JU2 determine the I²C slave address of the MAX7324 EV kit. See Table 1 to select the appropriate setting.

Power Supplies

The MAX7324 EV kit can either be 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 a user-supplied power supply is used, ensure that the voltage setting is compatible with the CMAXQUSB JU1 setting.

Table 3. V+ Selection Configuration

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

*Default position.

User-Supplied I²C Interface

To use the MAX7324 EV kit with a user-supplied I²C interface, install a 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 MAX7324 EV kit. Apply a 1.71V to 5.5V power supply to the VDD pad of the MAX7324 EV kit. Depending on the configuration of the user-supplied I²C interface, it may be necessary to install the I²C pull-up resistors, R10 and R11.

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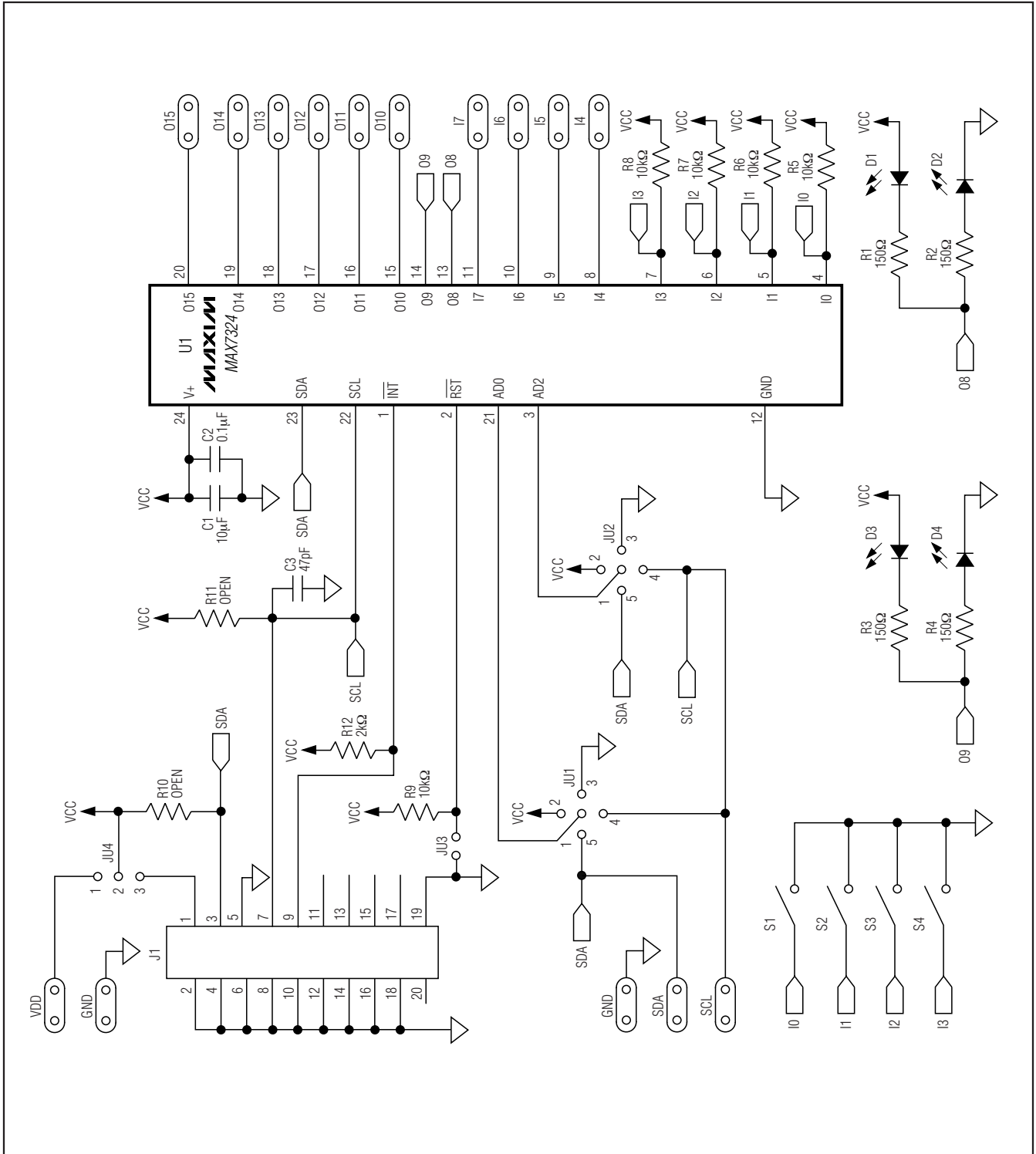


Figure 2. MAX7324 EV Kit Schematic

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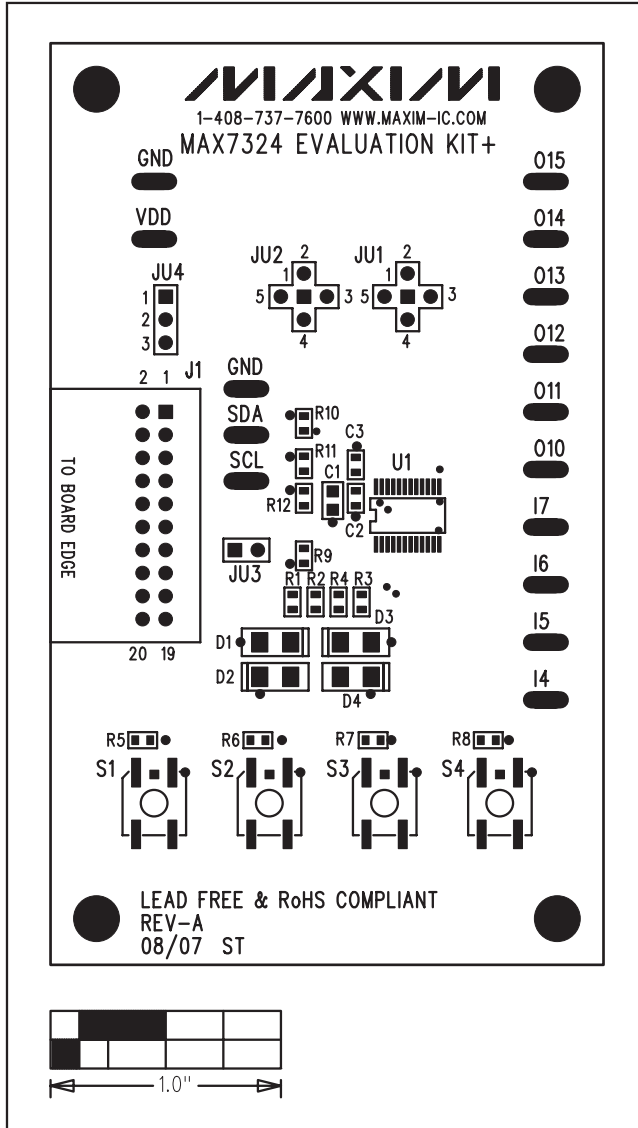


Figure 3. MAX7324 EV Kit Component Placement Guide—Component Side

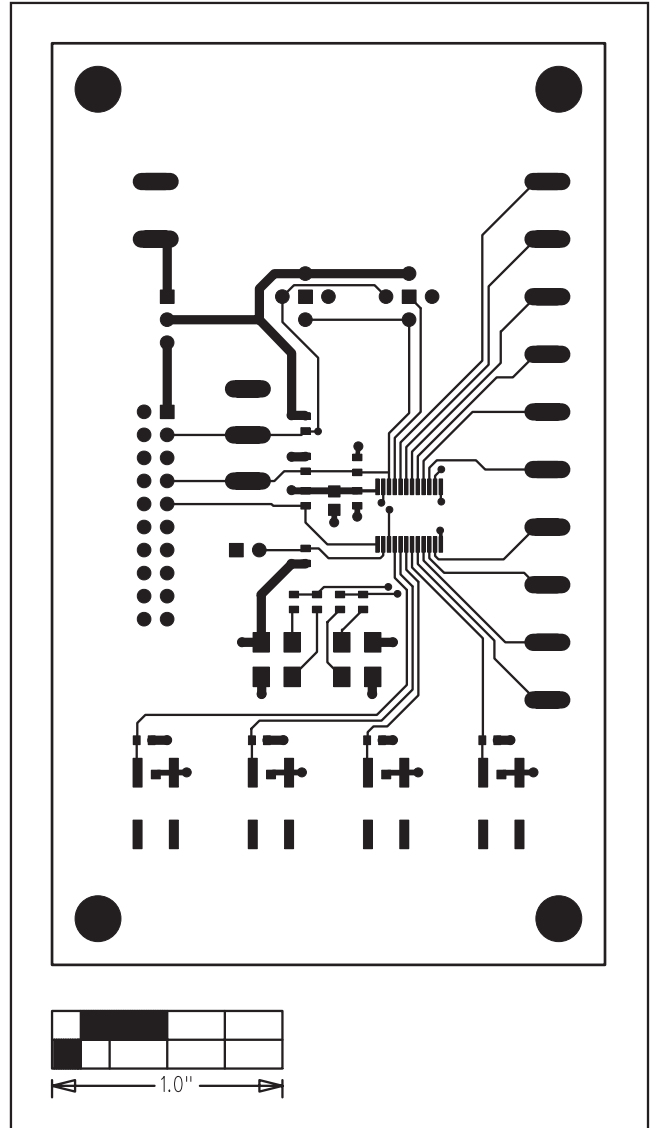


Figure 4. MAX7324 EV Kit PCB Layout—Component Side

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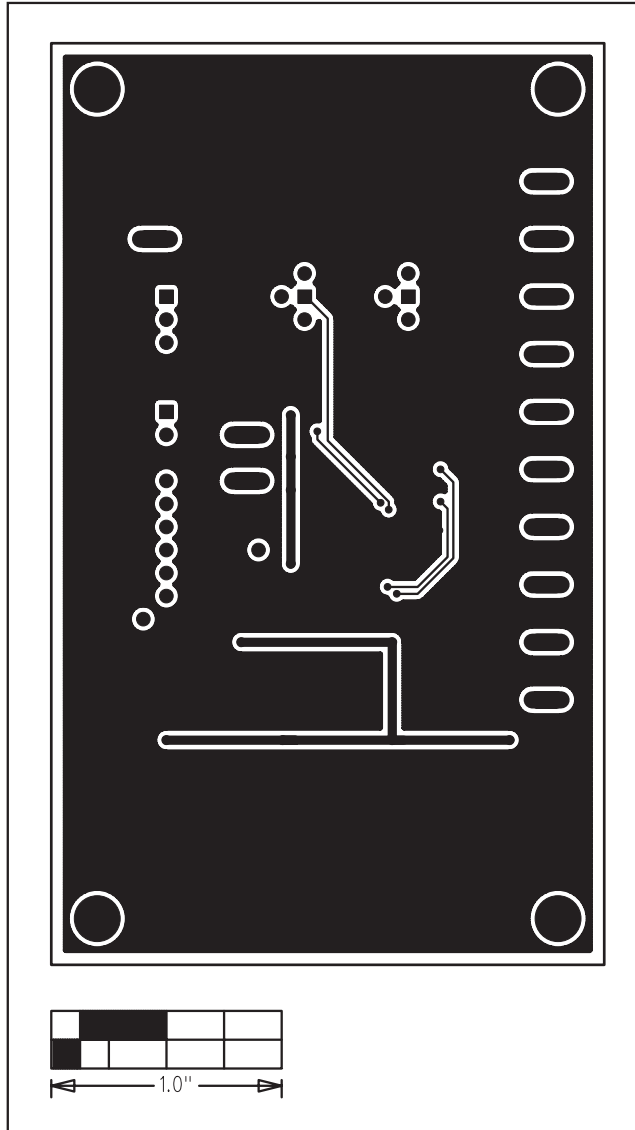


Figure 5. MAX7324 EV Kit PCB Layout—Solder Side

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