

# MAXIM

## MAX1038 Evaluation Kit

**Evaluates: MAX1038**

### General Description

The MAX1038 evaluation kit (EV kit) is designed to evaluate the MAX1038. The MAX1038 is an 8-bit, 12-channel (six-differential-channel) ADC with a 2-wire serial interface. The MAX1038 EV kit board supports three standard 2-wire serial interface speeds: standard mode (S-Mode), fast mode (F-Mode), and high-speed mode (HS-Mode); however, the software provided with this EV kit only supports standard mode.

The provided Windows 95/98<sup>®</sup> software uses the parallel (printer) port of an IBM-compatible PC to emulate a processor with a 2-wire serial interface (S-Mode). The Windows software also provides a friendly graphical user interface (GUI) to exercise the features of the MAX1038 with control buttons and pulldown menus.

Order the MAX1038EVKIT for comprehensive evaluation of the MAX1038, using a personal computer with an available parallel port.

### MAX1038 EV Kit Files

PROGRAM	FUNCTION
INSTALL.EXE	Installs the EV kit files on your computer
MAX1038.EXE	Application program

### Features

- ◆ Proven PC Board Layout
- ◆ Windows 95/98 Evaluation Software
- ◆ 2-Wire Serial Interface
- ◆ Fully Assembled and Tested

### Ordering Information

PART	TEMP RANGE	IC PACKAGE
MAX1038EVKIT	0°C to +70°C	16 QSOP

### Component Suppliers

SUPPLIER	PHONE	WEBSITE
Diodes Inc.	805-446-4800	www.diodes.com
TDK	847-803-6100	www.component.tdk.com

**Note:** Please indicate that you are using the MAX1038 when contacting these component suppliers.

### Component List

DESIGNATION	QTY	DESCRIPTION
C1-C12	12	0.22 $\mu$ F $\pm$ 10%, 16V X7R ceramic capacitors (0603) TDK C1608X7R1C224KT
C13	1	100pF $\pm$ 5%, 50V COG ceramic capacitor (0603) TDK C1608C0G1H101JT
C14, C15	2	0.1 $\mu$ F $\pm$ 10%, 16V X7R ceramic capacitors (0603) TDK C1608X7R1C104KT
D1, D2, D3, D4	4	Zener diodes, Vz = 5.1V (3-pin SOT23) Diodes Inc. BZX84C5V1 Top mark: KZ2/Z2
J1	1	Male DB25 right-angle plug

DESIGNATION	QTY	DESCRIPTION
R1-R12	12	14 $\Omega$ $\pm$ 1% resistors (0603)
R13, R17, R19, R23	4	100 $\Omega$ $\pm$ 5% resistors (1206)
R14, R15, R20, R21	4	47k $\Omega$ $\pm$ 5% resistors (1206)
R16, R22	2	Open (1206) (not installed)
R18, R24	2	4.7k $\Omega$ $\pm$ 5% resistors (0603)
U1	1	MAX1038AEEE (16-pin QSOP)
U2	1	Logic inverter (14-pin SO), open drain 74HC05
None	1	PC board, MAX1038 EV kit
None	1	3.5in software disk, MAX1038 EV kit
None	1	MAX1038 data sheet

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# MAX1038 Evaluation Kit

## Quick Start

### Recommended Equipment

Before you begin, you will need the following equipment:

- MAX1038EVKIT
- A 5V DC power supply
- An IBM-compatible PC with Windows 95/98
- An available parallel port (DB25 female connector on back of PC)
- A standard 25-pin, straight-through, male-to-female cable to connect the computer's parallel port to the MAX1038 EV kit board.

### Procedure

- 1) Connect a cable from the computer's parallel port to the MAX1038 EV kit board. Use a 25-pin straight-through, female-to-male cable.
- 2) Install the MAX1038 EV kit software on your computer by running the INSTALL.EXE program on the floppy disk. The program files are copied and icons are created in the *Programs* section within the Start menu.
- 3) Connect a 5V DC power supply between the pads labeled +5 and GND on the MAX1038 EV kit board.
- 4) Apply an analog input voltage (0 to VREF) to the pad labeled AIN0 (with respect to the pad labeled GND) of the MAX1038 EV kit board.
- 5) Start the MAX1038 EV kit program by double clicking its icon located in the **Programs** section within the **Start** menu.
- 6) The program automatically detects the MAX1038 EV kit board and displays **2-wire Hardware Detected** in a green font. The **AIN0** label (main window) should automatically display the voltage applied to the pad labeled AIN0 on the MAX1038 EV kit board.

## Detailed Description of Software

The evaluation software's main window (Figure 1) controls the **setup** byte and **config** byte. It also displays the voltage and output code of the input signal(s), depending on the configuration of the MAX1038.

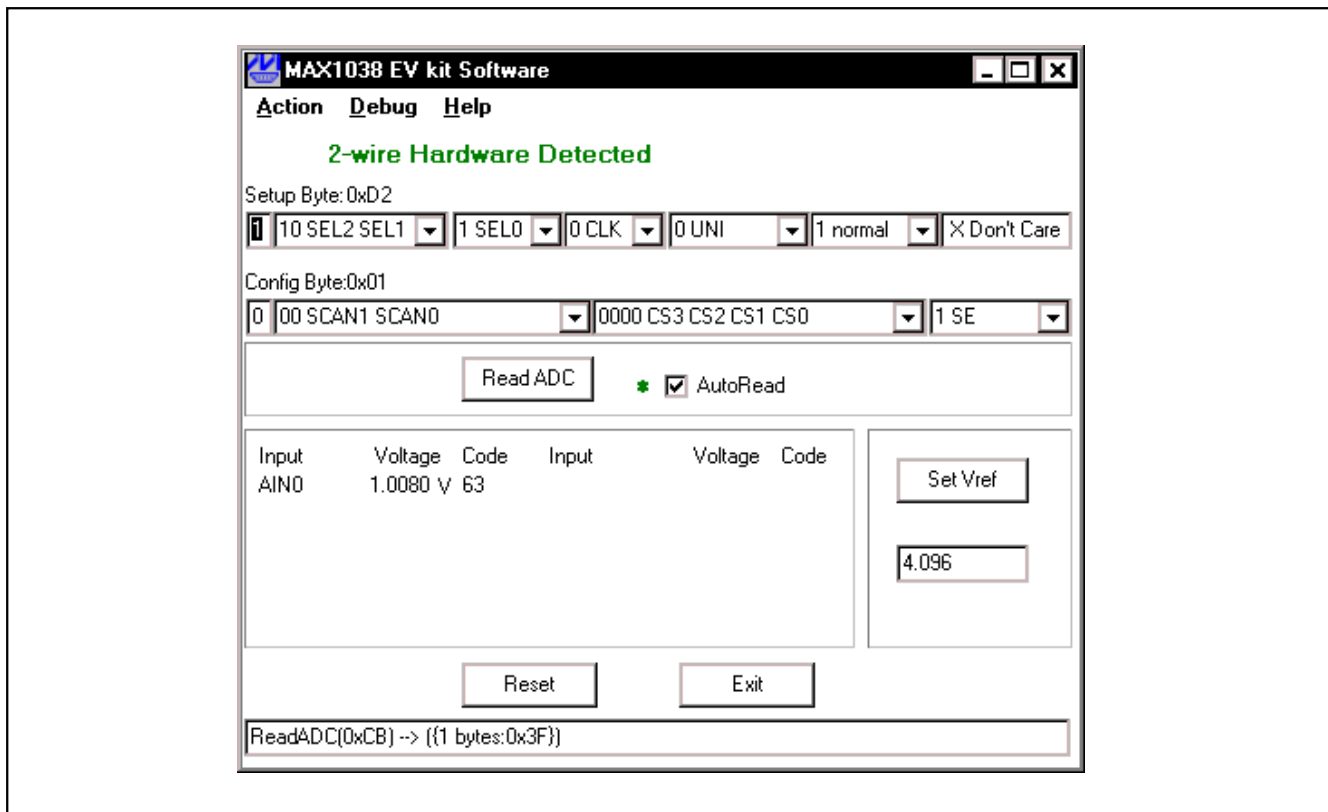


Figure 1. MAX1038 Evaluation Software's Main Window

# MAX1038 Evaluation Kit

## Read ADC

The **Read ADC** button manually reads the MAX1038 while using the current setup and configuration byte settings. When the **AutoRead** checkbox is checked, the software automatically reads the MAX1038 approximately every 300ms. **AutoRead** allows users to modify the setup and configuration bytes on-the-fly without having to manually press the **Read ADC** button each time.

## Setup Byte

The **Setup Byte** always begins with a start bit value of 1. The **SEL2**, **SEL1**, and **SEL0** bits control the state of the reference. The **CLK** bit selects either internal clock or external clock mode. The **UNI/BIP** bit selects either unipolar or bipolar mode. Setting **RST** to zero resets the configuration register. The setup register remains unchanged. The **X Don't Care** bit can be ignored. Refer to the MAX1038 data sheet for more information on the **SEL2**, **SEL1**, and **SEL0** bits within the **Setup Byte**.

## Configuration Byte

The **Config Byte** always begins with a start bit value of zero. The **SCAN1** and **SCAN0** bits select the scanning mode. The **CS3**, **CS2**, **CS1**, and **CS0** bits select one of the twelve analog input channels. The **SE/DIFF** bit selects either single-ended or differential mode. Refer to the MAX1038 data sheet for more information on the **SCAN1**, **SCAN0**, **CS3**, **CS2**, **CS1**, and **CS0** bits within the **Config Byte**.

## Reference Voltage

The evaluation software assumes a 4.096V reference voltage, unless otherwise specified. To override the internal 4.096V reference value, ensure bit **SEL2** equals zero and bit **SEL1** equals 1 within the **Setup Byte**. Then, apply the new reference voltage at the VREF pad on the board, type in the new reference voltage, without the volt unit, and press the **Set Vref** button. The EV kit software uses the value typed in the Vref field to translate the digital code to a voltage.

## Keyboard Navigation

When you type on the keyboard, the system must know which control should receive the keystrokes. Press the **TAB** key to move the keyboard's focus from one control to the next. The focused control is indicated by a dotted outline. **SHIFT+TAB** moves the focus to the previously focused control. Buttons respond to the keyboard's **SPACE** bar. Some controls respond to the keyboard's **UP** and **DOWN** arrow keys. Activate the program's menu bar by pressing the **F10** key, then press the letter of the menu item you want. Most menu items have one letter underlined, indicating their shortcut key.

## Detailed Description of Hardware

The MAX1038 is a twelve channel (six-differential-channel) 8-bit ADC with a 2-wire serial interface. The open-collector inverter (U2) interfaces the PC parallel port to the 2-wire serial interface. U2 and the associated circuitry are only required when interfacing to the parallel port. Power the MAX1038 EV kit from a 5V DC power supply.

## User-Supplied 2-Wire Interface

The MAX1038 EV kit provides a proven PC board layout and software to evaluate the features of the MAX1038. The Windows software only supports a 2-wire serial interface in S-Mode. To evaluate the MAX1038 with a user-supplied 2-wire serial interface in F-Mode or HS-Mode, do the following:

- 1) Disconnect the MAX1038 EV kit from the PC parallel port.
- 2) Install 3k $\Omega$  resistors at locations R16 and R22. (This resistor value may require optimization for each system.)
- 3) Connect the 2-wire bus to the SDA, SCL, and GND pads.
- 4) Refer to the MAX1038 data sheet to ensure all timing specifications are met.

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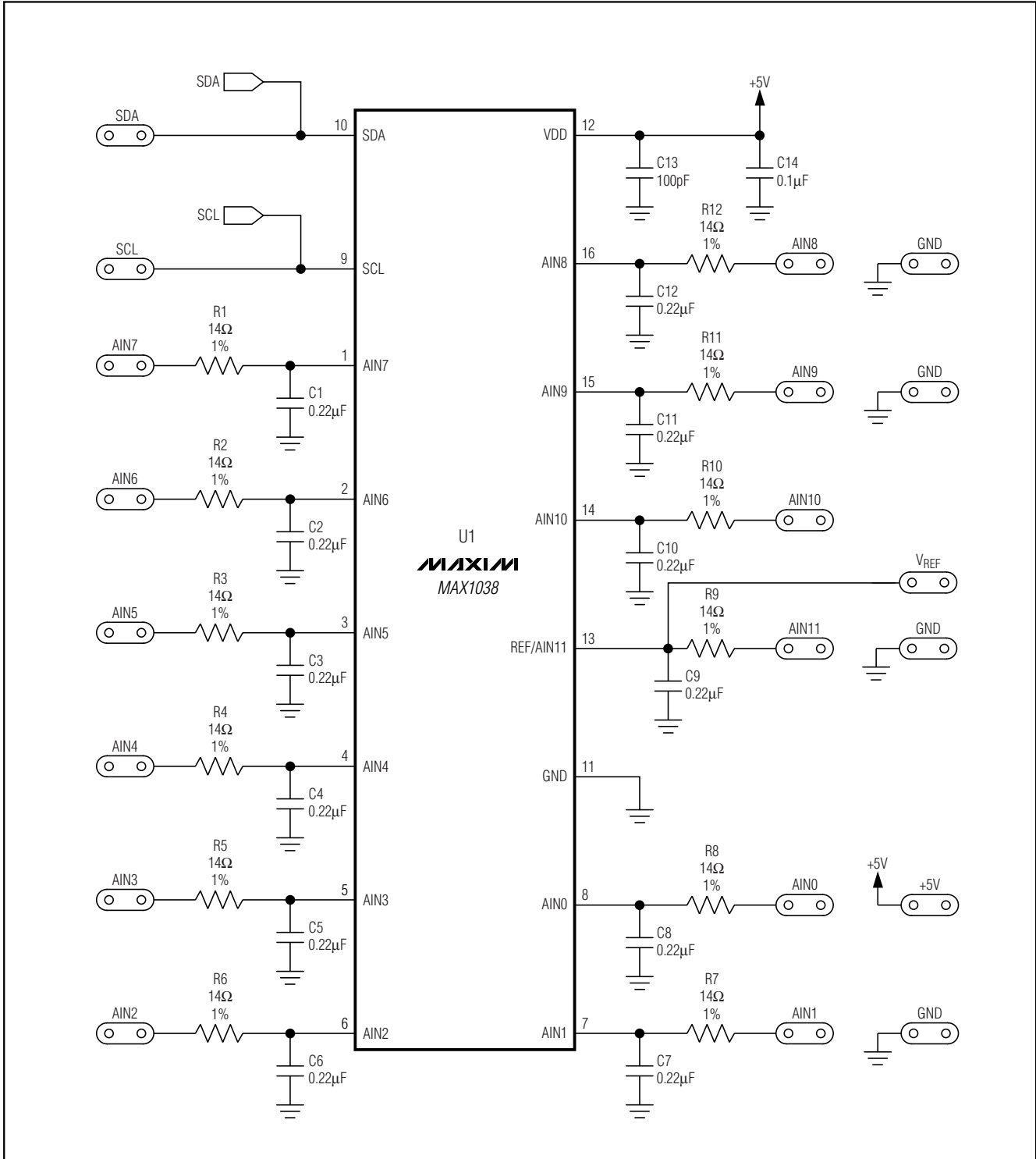


Figure 2. MAX1038 EV Kit Schematic (Sheet 1 of 2)

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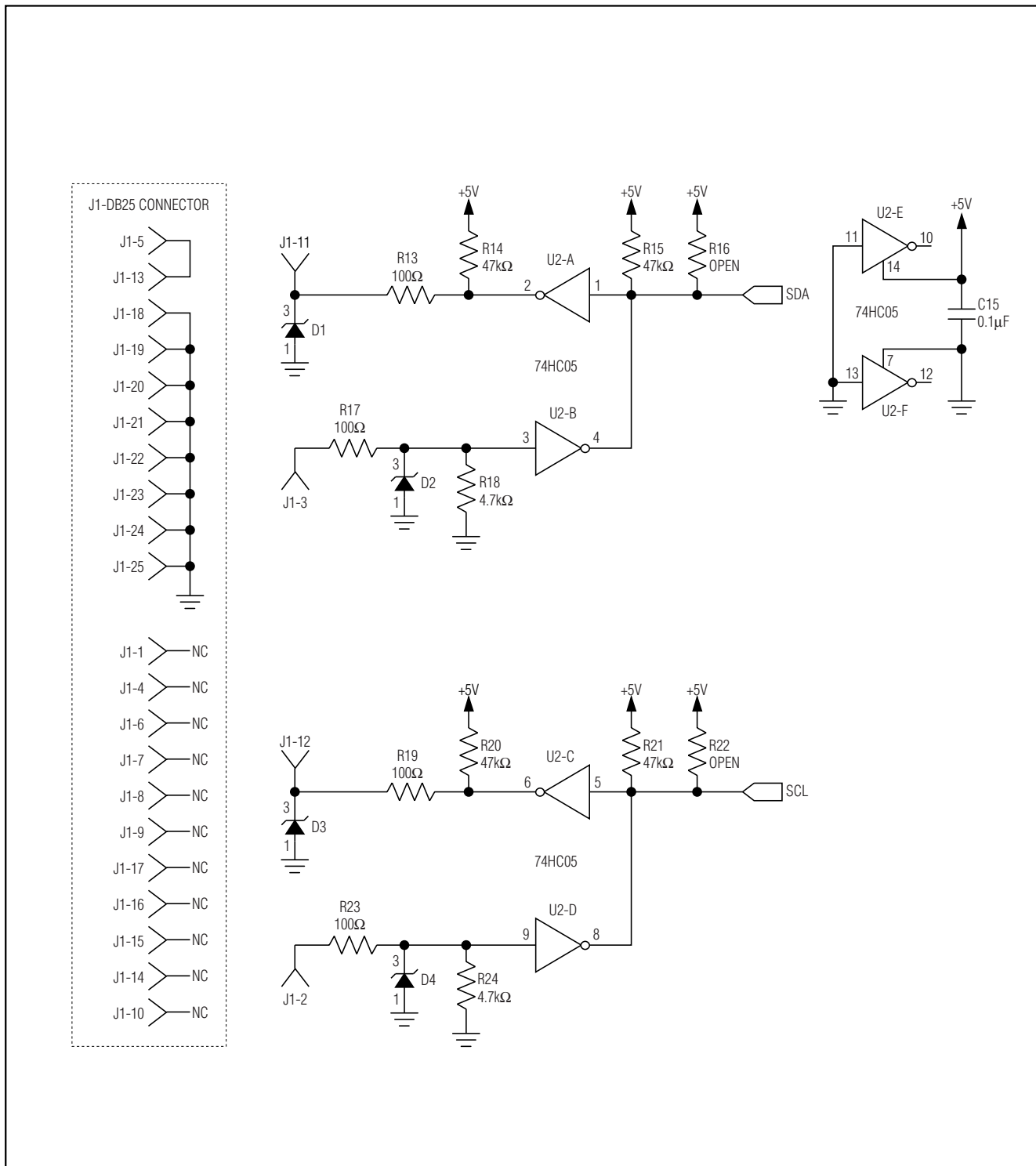


Figure 2. MAX1038 EV Kit Schematic (Sheet 2 of 2)

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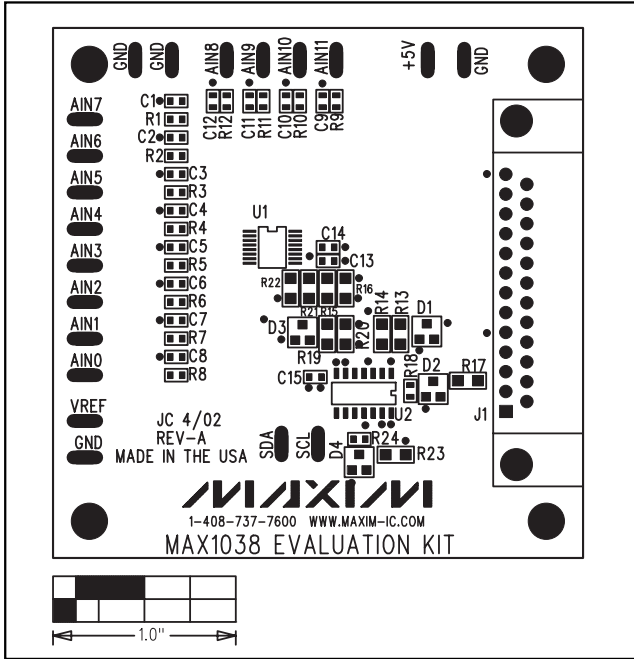


Figure 3. MAX1038 EV Kit Component Placement Guide—Component Side

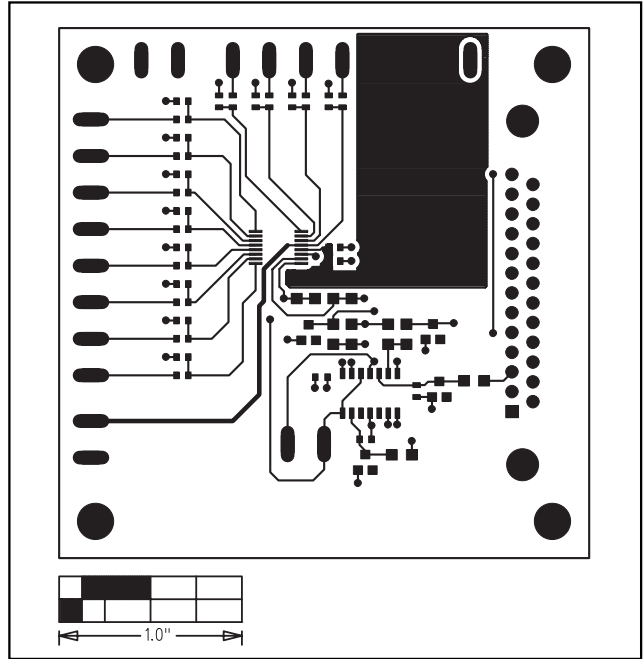


Figure 4. MAX1038 EV Kit PC Board Layout—Component Side

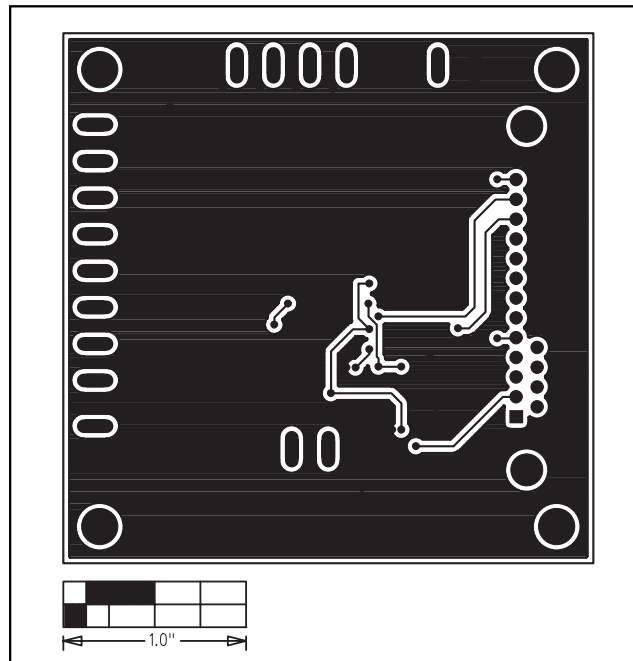


Figure 5. MAX1038 EV Kit PC Board Layout—Solder Side

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