



MAX1363 Evaluation Kit

General Description

The MAX1363 evaluation kit (EV kit) is a fully assembled and tested PC board that evaluates the MAX1363 12-bit, 4-channel system monitor. The EV kit also includes Windows® 98 SE-/2000-/XP-compatible software, which provides a simple graphical user interface (GUI) for exercising the MAX1363's features.

The EV kit comes with the MAX1363EUB installed. The MAX1363 EV kit can also be used to evaluate the MAX1361 10-bit, 4-channel system monitor. Contact the factory for free samples of the pin-compatible MAX1361EUB, MAX1361_EUB, and MAX1363_EUB to evaluate these parts. See Table 1 for ordering different address options.

Features

- ◆ 4-Channel Single-Ended or 2-Channel Fully Differential Inputs
- ◆ 12-Bit, I²C-Compatible ADC
- ◆ Single Supply, 2.7V to 3.6V
- ◆ 2.048V Internal Reference
- ◆ 1V to V_{DD} External Reference
- ◆ USB Interface
- ◆ USB Powered
- ◆ Proven PC Board Layout
- ◆ Windows 98 SE-/2000-/XP-Compatible Evaluation Software
- ◆ Fully Assembled and Tested

Ordering Information

PART	TYPE	INTERFACE
MAX1363EVKIT	EV kit	I ² C 2-wire interface

Component List

DESIGNATION	QTY	DESCRIPTION
C1–C4	4	10nF ±15%, 10V X7R ceramic capacitors (0603) TDK 1608X7R1H103K
C5, C8, C9, C11, C12, C14–C17, C21	10	0.1µF ±15%, 10V X7R ceramic capacitors (0603) TDK C1608X7R1C104K
C6, C13, C24, C25	4	22µF ±15%, 10V X7R ceramic capacitors (1210) TDK C3225X7R1C226K
C7, C27, C28	3	1µF ±10%, 10V X7R ceramic capacitors (0603) TDK C1608X7R1C105K
C10, C18	2	10pF ±5%, 10V C0G ceramic capacitors (0603) TDK C1608C0G1H100J
C19, C20	2	22pF ±5%, 10V C0G ceramic capacitors (0603) TDK C1608C0G1H220J
C22	1	33nF ±10%, 10V X7R ceramic capacitor (0603) TDK C1608X7R1H333K
GP1, GP2	0	Not installed

DESIGNATION	QTY	DESCRIPTION
INT	1	Red LED (0603)
J1	1	USB series "B" right-angle PC-mount receptacle connector
J2	0	Not installed
JU1	1	3-pin single-row header
JU2–JU6	5	2-pin single-row headers
L1	1	Ferrite bead (0603) TDK MMZ1608R301A
PWR	1	Red-orange LED (0603)
R1, R3, R5, R6, R15, R16, R17	7	51Ω ±5% resistors (0603)
R2, R4, R7	0	Not installed
R8, R20, R21, R23	4	220Ω ±5% resistors (0603)
R9	1	470Ω ±5% resistor (0603)
R10, R11	2	27Ω ±5% resistors (0603)
R12, R19, R24	3	1.5kΩ ±5% resistors (0603)
R13	1	2.2kΩ ±5% resistor (0603)

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Component List (continued)

DESIGNATION	QTY	DESCRIPTION
R14	1	10k Ω \pm 5% resistor (0603)
R18	1	1k Ω \pm 5% resistor (0603)
R22	1	47k Ω \pm 5% resistor (0603)
TP1	0	Not installed
TRX	1	Yellow LED (0603)
U1	1	MAX1363EUB (10-pin μ MAX [®])
U2	1	MAX6018AEUR21 (3-pin SOT23)
U3	1	MAXQ2000-RAX (68-pin QFN-EP)
U4	1	FTDI FT232BL (7mm x 7mm 32-lead TQFP)
U5	1	AT93C46A type 3-wire EEPROM (8-pin SO)
U7	1	MAX8511EXK33-T (5-pin SC70) Top mark: AEI
U8	1	MAX8511EXK25-T (5-pin SC70) Top mark: ADV
Y1	1	20MHz crystal
Y2	1	6MHz crystal
—	6	Shunts
—	1	MAX1363 EV kit PC board
—	1	MAX1363 EV kit software CD-ROM

Component Suppliers

SUPPLIER	PHONE	WEBSITE
Citizen America Corporation	949-428-3700	www.citizencrystal.com
TDK	847-803-6100	www.component.tdk.com

Note: Indicate you are using the MAX1363 when contacting these component suppliers.

Quick Start

Recommended Equipment

- MAX1363 EV kit
- Signal source from 0 to 3.6V
- Windows 98 SE-/2000-/XP-compatible PC
- Spare USB port on the PC

MAX1363 EV kit Files

FILE	DESCRIPTION
INSTALL.EXE	Installs the EV kit files on your computer
MAX1363.EXE	Application program
HELPPFILE.HTM	Help file
FTDIBUS.INF	USB device-driver file
FTDIPOINT.INF	VCP device-driver file
UNINST.INI	Uninstalls the EV kit software
TROUBLESHOOTING_USB.PDF	USB driver installation help file

Procedure

- 1) Make sure the shunts of all jumpers are in the right position.
JU1: (1-2) I²C slave address = 0x6A
JU2: (Open) AIN3 is an input
JU3: (1-2) USB powered
JU4: (1-2) SDA connected to on-board microcontroller (μ C)
JU5: (1-2) SCL connected to on-board μ C
JU6: (1-2) $\overline{\text{INT}}$ connected to on-board μ C
See Table 1 when using the MAX1361EUB, MAX1361_EUB, and MAX1363_EUB.
- 2) Connect the GND terminal of the signal source to the AGND pad and the signal source to the AIN0 pad. Connect AIN1, AIN2, and AIN3 to GND.
- 3) Set the signal source to 1V.
- 4) Install the MAX1363 evaluation software on your computer by running the INSTALL.EXE program on the installation CD-ROM. The program files are copied and icons are created in the Windows **Start** menu.
- 5) Connect the USB cable from the PC to the MAX1363 EV kit. A **Building Driver Database** window pops up in addition to a **New Hardware Found** message. If you do not see a window that is similar to the one described above after 30 seconds, remove the USB cable from the MAX1363 EV kit and reconnect it again. Administrator privileges are required to install the USB device driver on Windows 2000 and Windows XP. Refer to the TROUBLESHOOTING_USB.PDF document included with the software for more information.

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- 6) 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\MAX1363** (default installation directory) using the **Browse** button.
- 7) Start the MAX1363 EV kit software by opening its icon in the **Start** menu.
- 8) In the middle of the main window, as shown in Figure 1, set the **Configuration Byte | D2-D1** pull-down menu to **00 CS1 CS0**. Set the **Setup Byte | D0** pull-down menu to **1 Monitor Setup**. The **Configuring Monitor Mode** window pops up as shown in Figure 2.
- 9) In the **AIN0 Thresholds** box, set the **LOWER** and **UPPER** edit fields to 0.9V and 1.1V, respectively. Press the **OK** button in the bottom of the **Configuring Monitor Mode** window.
- 10) Press the **Execute** button located at the right side of the **Configuration Byte** pull-down menus.
- 11) Set the **Setup Byte | D0** pull-down menu to **0 No Action**, the **Configuration Byte | D6 - D5** pull-down menu to **10 SCAN1 SCAN0 Monitor Mode**, and

press the **Execute** button. The MAX1363 enters the monitor mode and the **Reading in Monitor Mode** window pops up as shown in Figure 3. This window displays the **Alarm-Status**, **Latched-Fault**, and **Current-Conversion** boxes. Press the **Read** button or check the **Auto Read** checkbox to update all three boxes.

- 12) Increase the signal source connected to AIN0 to 1.5V. Press the **Read** button or check the **Auto Read** checkbox in the **Reading in Monitor Mode** window to read the alarm status.

Detailed Description of Software

The evaluation software's main window is shown in Figure 1. The device's I²C address, reference voltage value, and **Timer Interval** pull-down menu are located at the top of the main window. The **Setup Byte** pull-down menus, **Configuration Byte** pull-down menus, and **Execute** button are located in the middle section. The **ADC Value Display** box is located at the bottom of the main window. The **Interrupt Status** indicator, **Send SMBus™ Alert** button, and **Exit** button are at the lower-right side of the main window.

SMBus is a trademark of Intel Corp.

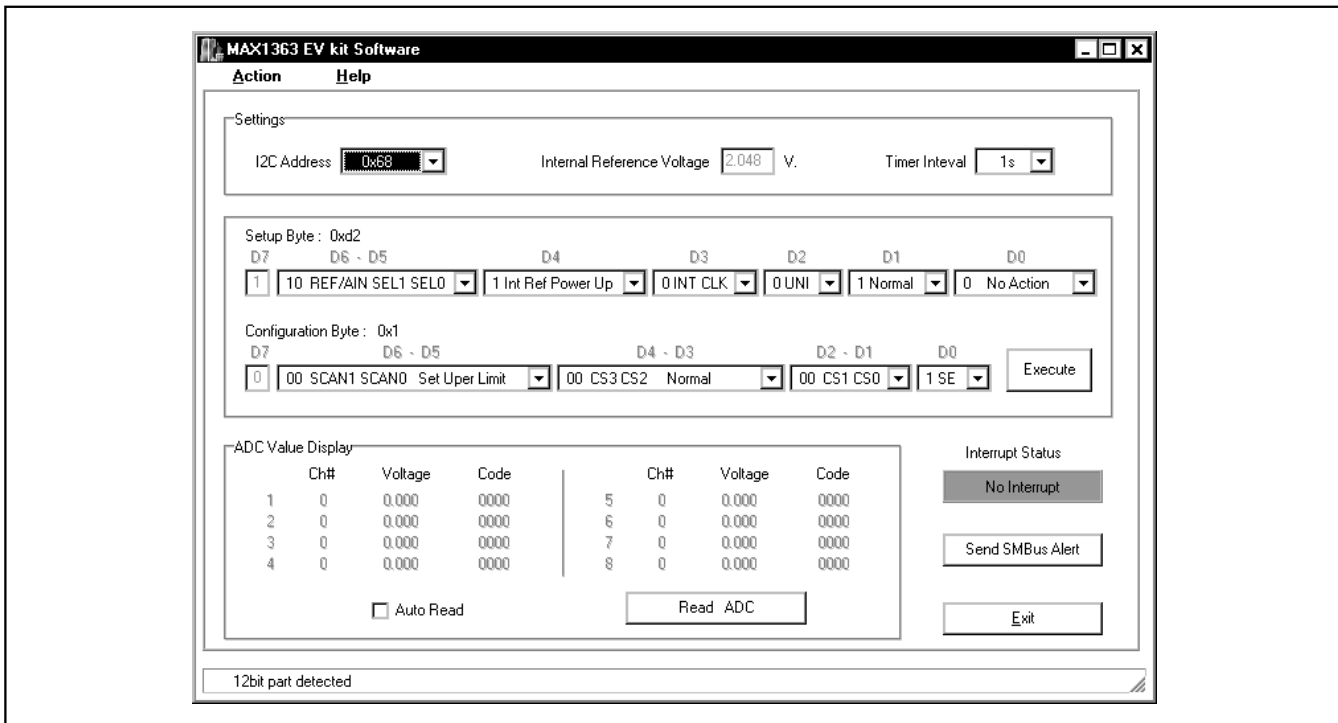


Figure 1. MAX1363 Evaluation Software Main Window

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Device I²C Address

The **I²C Address** pulldown menu shown in the top-left corner of Figure 1 autodetects the lowest MAX1361/MAX1363 device I²C address. If more than one MAX1361/MAX1363 device is connected to the I²C bus, the user can use the **I²C Address** pulldown menu to manually change the device's I²C address as shown in Table 1.

Table 1. SMBus/I²C Slave Address

JUMPER	IC	SHUNT POSITION	ADDRESS
JU1	MAX1361EUB	1-2*	6A
	MAX1363EUB	2-3	68
	MAX1361KEUB	1-2	62
	MAX1363KEUB	2-3	60
	MAX1361LEUB	1-2	66
	MAX1363LEUB	2-3	64
	MAX1361MEUB	1-2	6E
	MAX1363MEUB	2-3	6C

*Default configuration.

Reference Voltage Information

On the right side of the **I²C Address** pulldown menu is the reference voltage information. It displays either **Internal Reference Voltage** or **External Reference Voltage** depending on the **Setup Byte | D6 - D5** pulldown menu setting. If the current setting is external reference mode, the user has two external reference options as shown in Table 2.

Table 2. External Reference Selection (JU2)

JUMPER	SHUNT POSITION	DESCRIPTION
JU2	1-2	On-board external reference connected to AIN3/REF
	Open*	User-supplied external reference to AIN3/REF

*Default configuration.

Timer Interval

Use the **Timer Interval** pulldown menu to set the interval value of the **Auto Read** timer. The choices are 0.5s, 1s, 2s, 3s, 4s, 5s, and 6s. There are two **Auto Read** checkboxes that use this timer interval value. The first **Auto Read** checkbox is located in the **ADC Value Display** box of the main window, and the other is located in the **Reading in Monitor Mode** window.

Setup Byte and Configuration Byte

In the middle of the main window are the **Setup Byte** and **Configuration Byte** pulldown menus and a corresponding **Execute** button. Refer to MAX1363 data sheet for a detailed description of the **Setup Byte** and **Configuration Byte** registers.

Configuring Monitor Mode

If the **1 Monitor Setup** is selected in the **Setup Byte | D0** pulldown menu, the **Configuring Monitor Mode** window pops up as shown in Figure 2. The user can reset the channel alarm bits by checking the proper channel in the **Alarm Reset** box. Select the **Scan Speed** pulldown-menu setting. Enable the interrupt by checking the **INT_EN** checkbox, and set the **LOWER** and **UPPER** edit fields to the desired value in the **AIN_ Thresholds** box. Depending on the **Setup Byte | D2 - D1** and **Setup Byte | D0** pulldown-menu settings, the threshold values for some of the channels may be grayed out.

Whenever the **Setup Byte** or the **Configuration Byte** pulldown-menu settings have been modified, the user MUST PRESS the **Execute** button to synchronize the software settings with the hardware.

Readback Mode

If the **Configuration Byte | D6 - D5** pulldown menu is set to **10 SCAN1 SCAN0 Monitor Mode**, the **Configuration Byte | D4 - D3** pulldown menu is set to **11 CS3 CS2 RD MON Setup**, and the **Execute** button is pressed, the **Readback Mode** window pops up. The **Readback Mode** window shows the current scan speed and alarm threshold(s). Both the **Auto Read** checkbox and the **Read ADC** button are disabled in this mode.

Reading in Monitor Mode

If the **Configuration Byte | D6 - D5** pulldown menu is set to **10 SCAN1 SCAN0 Monitor Mode**, the **Configuration Byte | D4 - D3** pulldown menu is set to **00 CS3 CS2 Normal**, and the **Execute** button is pressed, the **Reading in Monitor Mode** window pops up as shown in Figure 3. Both the **Auto Read** checkbox and the **Read ADC** button are disabled in this mode.

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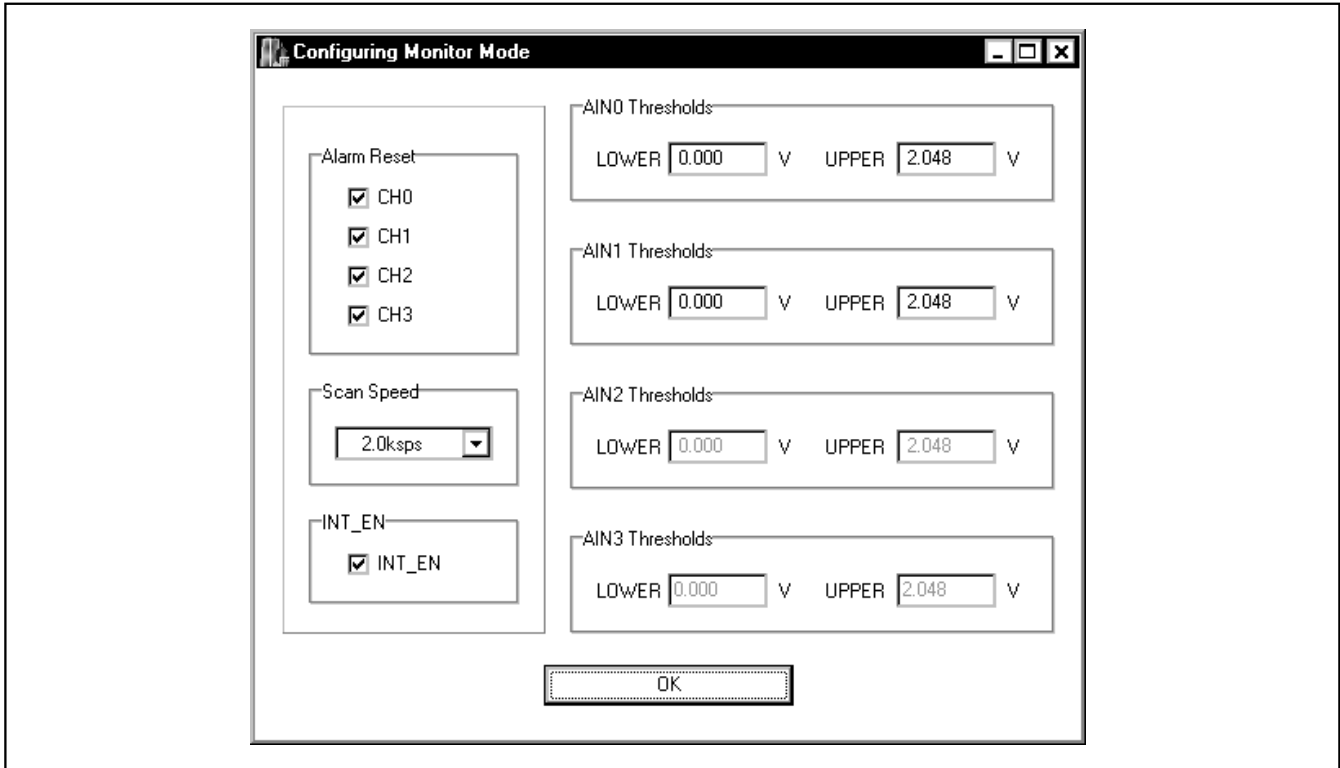


Figure 2. Configuring Monitor-Mode Window

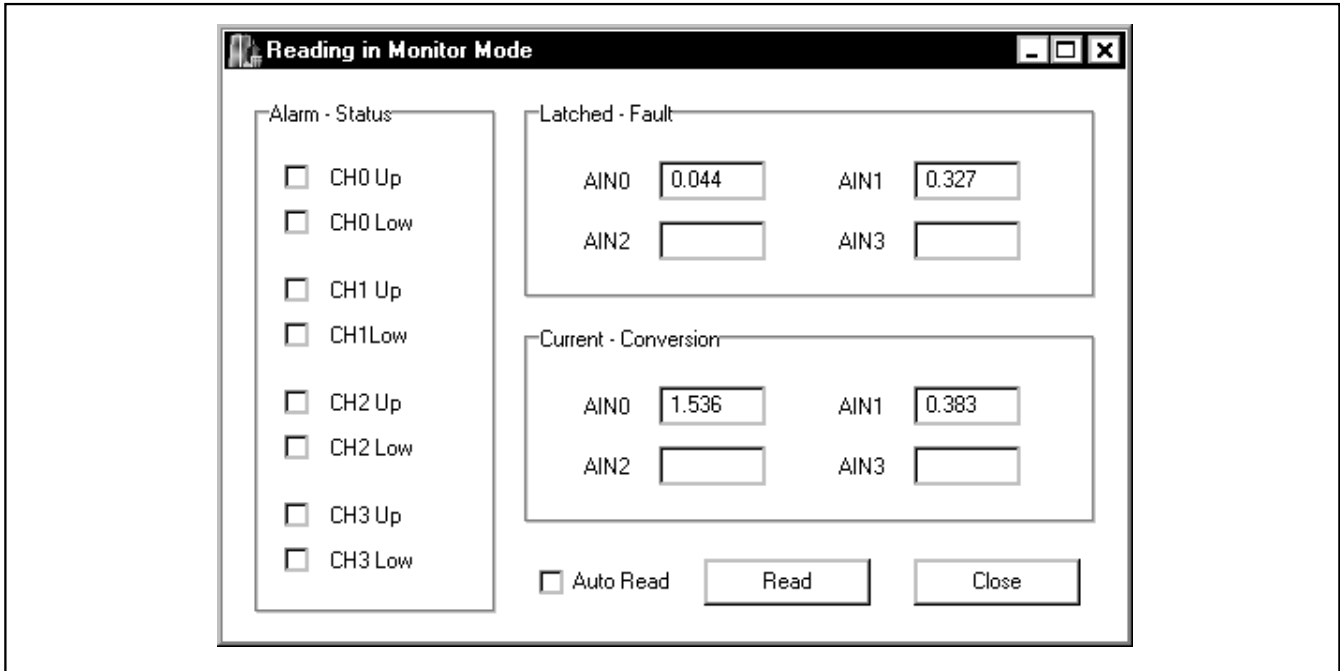


Figure 3. Reading in Monitor-Mode Window

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ADC Value Display

The **ADC Value Display** box shown in the main window displays the channel number (CH#), the voltage, and the code. Pressing the **Read ADC** button updates the status of the **ADC Value Display** box. There may be lines in the **ADC Value Display** box that are grayed out due to the **Setup Byte** and **Configuration Byte** settings.

Check the **Auto Read** checkbox to automatically read the current ADC value at a rate set by the **Timer Interval** pulldown menu. When this **Auto Read** checkbox is checked, the **Read ADC** button is disabled.

Interrupt

The **Interrupt Status** indicator is located in the lower right of the main window. It indicates the current status of the MAX1363's interrupt pin and is updated at a rate based on the value in the **Timer Interval** pulldown menu. The hardware interrupt is active only when **INT_EN** is checked in the **Configuring Monitor Mode** window.

When an interrupt occurs, the $\overline{\text{INT}}$ LED on the MAX1363 EV kit board lights up in real time.

SMBus Alert

When the **Send SMBus Alert** button is pressed, the **SMBus Alert** window pops up and displays the alert-device address as shown in Figure 4. If there is no alarm, the **Alert Device Address** field shows the highest SMBus address, which is 0xfe.

ADC Data Block Sampling

Accessing the **Action | Block Sample** menu results in the **Block Sampling** window popping up as shown in Figure 5. The user can change the sample rate and sampling length. Pressing the **Sample** button starts sampling and changes the **Configuration Byte | D6 - D5** pulldown menu to 11 SCAN1 SCAN0 single conversion. After sampling is finished, the user can save the data to a file by pressing the **Save** button. The **Save** button is not active until the sampling is done.

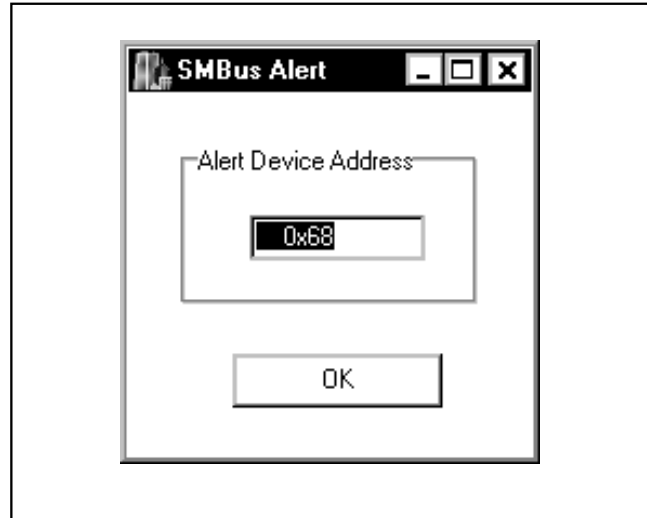


Figure 4. SMBus-Alert Window

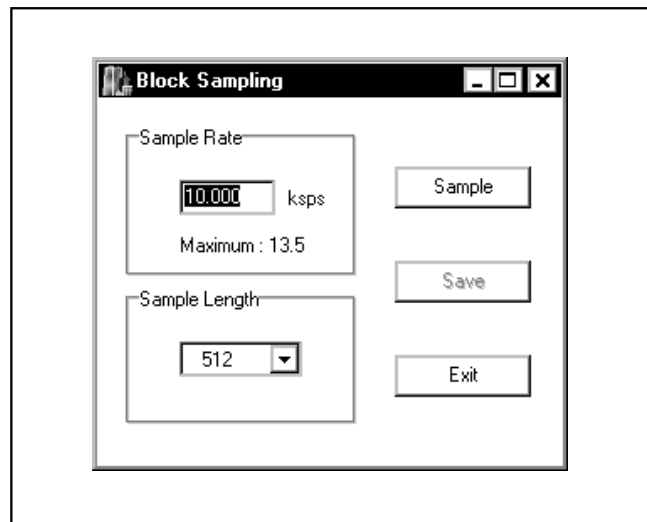


Figure 5. Block-Sampling Window

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Connecting Multiple MAX1363 EV Kits on the I²C Bus

Select one MAX1363 EV kit as the primary board. Remove the shunts on jumpers JU3–JU6 of all nonprimary EV kit boards. See Table 3 for JU3–JU6 descriptions. A dedicated 3.3V power supply is required to power up all nonprimary EV kit boards.

Table 3. External Reference Selection (JU3–JU6)

JUMPER	SHUNT POSITION	DESCRIPTION
JU3	1-2*	USB powered
	Open	User-supplied power supply
JU4	1-2*	SDA connected to on-board μ C
	Open	User-supplied I ² C interface
JU5	1-2*	SCL connected to on-board μ C
	Open	User-supplied I ² C interface
JU6	1-2*	$\overline{\text{INT}}$ connected to on-board μ C
	Open	User-supplied interrupt input

*Default configuration.

Connect the corresponding SDA, SCL, $\overline{\text{INT}}$, and GND signals of all the EV kits together. Make sure all of the MAX1363 EV kits have a unique I²C address. Only connect the USB cable from the PC to the primary EV kit board and run the MAX1363 EV kit software.

First, manually enter the correct value into the **I²C Address** pulldown menu for the corresponding MAX1363 EV kit. Second, select the desired settings in the **Setup Byte** and **Configuration Byte** pulldown menus for each MAX1363 EV kit. Make sure to press the **Execute** button to synchronize the software with the hardware of each MAX1363 EV kit.

Detailed Description of Hardware

MAX1363 EV Kit

The MAX1363 EV kit board provides a proven layout for evaluating the MAX1361/MAX1363. The EV kit comes with the MAX1363EUB installed. The MAX1363EUB (U1) is powered from the USB supply regulated to 3.3V.

To use the MAX1363 EV kit with a user-supplied I²C interface, remove the shunts on jumpers JU3–JU6. Connect SDA, SCL, and GND lines from the user-supplied I²C interface to the corresponding pads on the MAX1363 EV kit board. Populate R2, R4, and R7 as needed on SCL, SDA, and $\overline{\text{INT}}$. Apply a 2.7V to 3.6V power supply to the V_{DD} and GND pads of the MAX1363 EV kit.

On-Board External Voltage Reference

The on-board MAX6018 provides a precision external voltage reference for the MAX1363 EV kit. Short JU2 on the MAX1363 EV kit to use the on-board external voltage reference. Program the device by setting the **Setup Byte | D6 - D5** pulldown menu to **01 REF/AIN SEL1 SEL0**.

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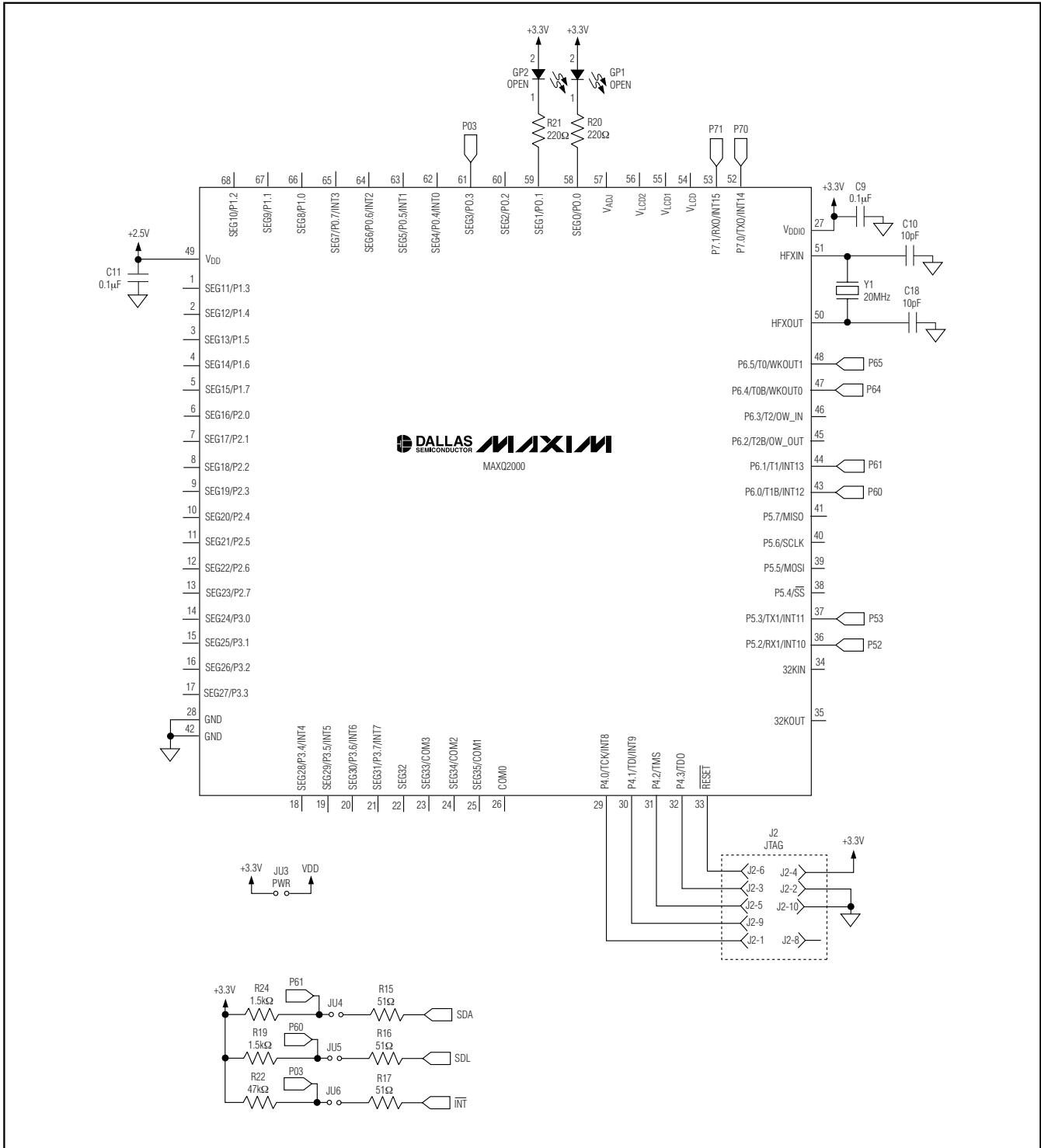


Figure 6. MAX1363 EV Kit Schematic (Sheet 2 of 2)

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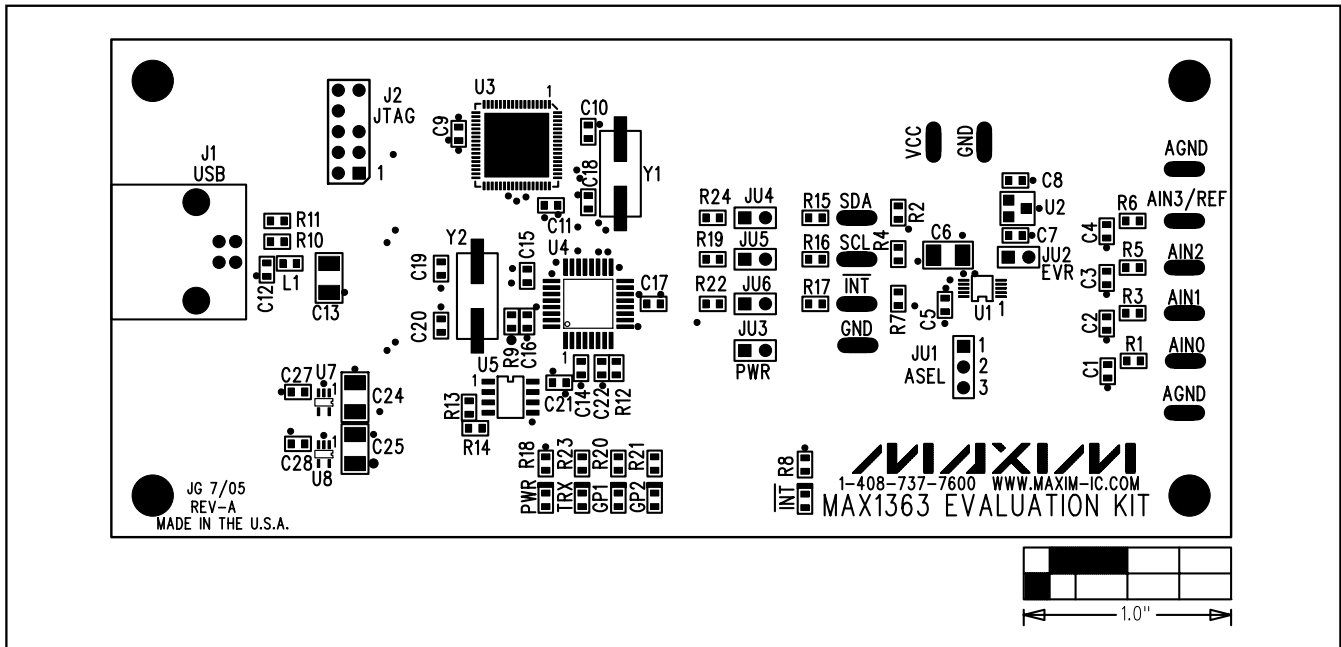


Figure 7. MAX1363 EV Kit Component Placement Guide—Component Side

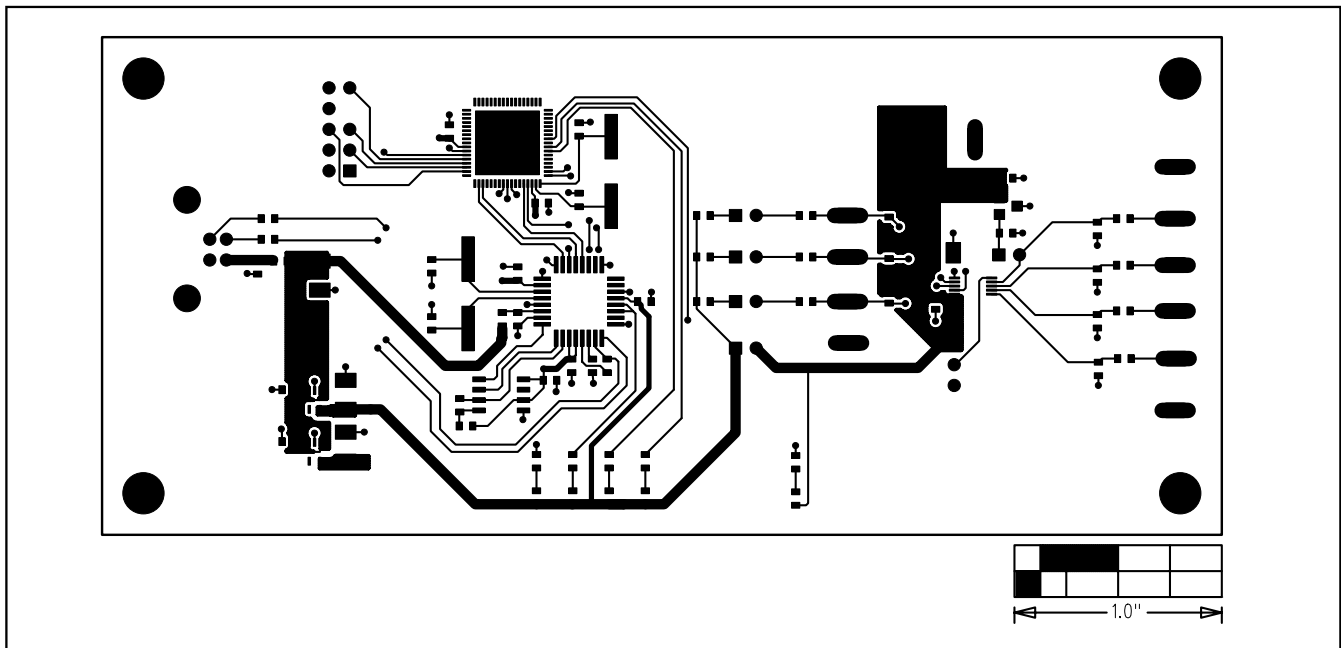


Figure 8. MAX1363 EV Kit PC Board Layout—Component Side

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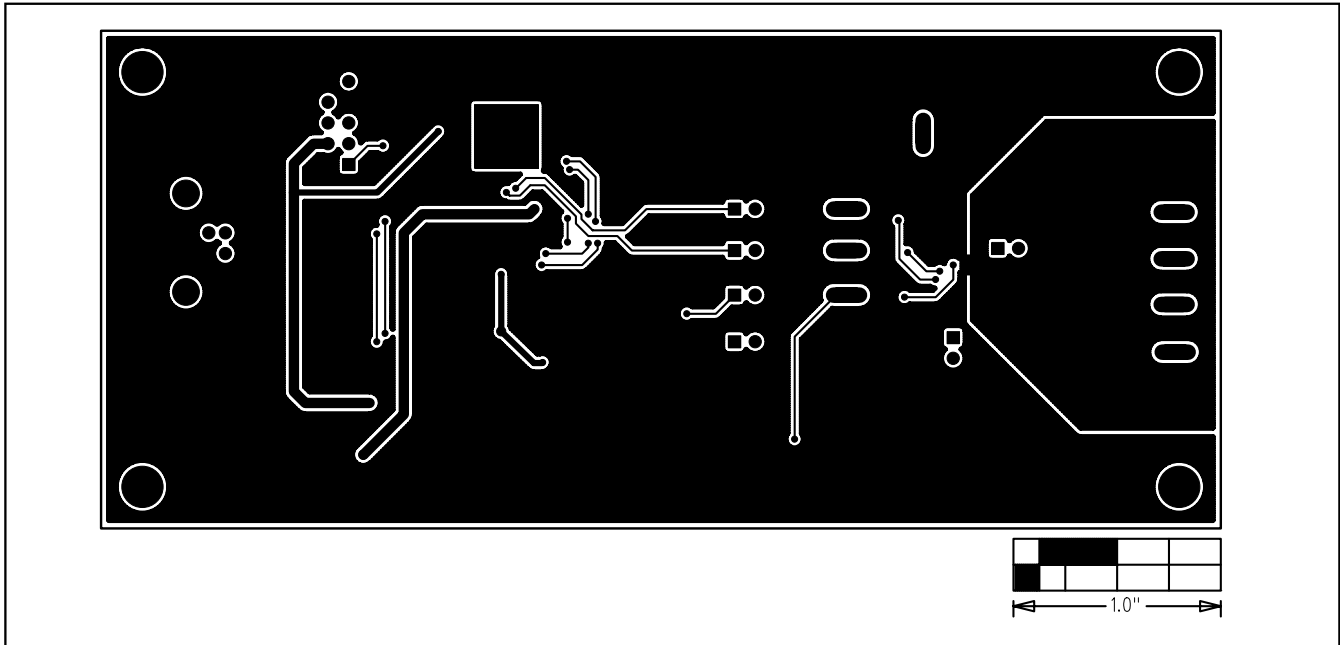


Figure 9. MAX1363 EV Kit PC Board Layout—Solder Side

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