

# MAX6581 Evaluation Kit

## Evaluates: MAX6581

### General Description

The MAX6581 evaluation kit (EV kit) is an assembled and tested PCB used to evaluate the MAX6581 8-channel temperature sensor. The device monitors its own die temperature and the temperatures of up to seven external diode-connected transistors. It converts the temperature to 8-bit or 11-bit 2-wire serial data that can be accessed over a 2-wire serial bus.

The EV kit also includes Windows® 2000-, Windows XP®, and Windows Vista®-compatible software, which provides a simple user interface for exercising the features of the device. The program is menu driven and offers a graphical user interface (GUI) complete with control buttons and status display.

### Features

- ◆ Seven Remote Temperature Sensors
- ◆ Local Temperature Sensor
- ◆ Programmable Undertemperature and Overtemperature Alerts
- ◆ Two Open-Drain Alarm Outputs (ALERT and OVERT)
- ◆ On-Board Microcontroller to Generate SMBus™/I<sup>2</sup>C Commands
- ◆ Easy-to-Use, Menu-Driven Software
- ◆ Fully Assembled and Tested

### Ordering Information

| PART          | TYPE   |
|---------------|--------|
| MAX6581EVKIT+ | EV Kit |

+Denotes lead(Pb)-free and RoHS compliant.

### Component List

| DESIGNATION              | QTY | DESCRIPTION  |
|--------------------------|-----|--|
| C1, C4–C8, C12, C17, C19 | 9   | 0.1µF ±10%, 16V X7R ceramic capacitors (0603)<br>TDK C1608X7R1C104K<br>Murata GRM188R71C104K   |
| C2, C13, C15             | 3   | 10µF ±20%, 16V X5R ceramic capacitors (1206)<br>Murata GRM31CR61C106M or<br>TDK C3216X5R1C106M |
| C3                       | 1   | 4.7µF ±10%, 6.3V X5R ceramic capacitor (0603)<br>TDK C1608X5R0J475K<br>Murata GRM188R60J475K   |
| C9                       | 1   | 0.033µF ±10%, 16V X5R ceramic capacitor (0603)<br>Murata GRM188R71E333K<br>TDK C1608X7R1E333K  |
| C10, C11                 | 2   | 22pF ±5%, 50V C0G ceramic capacitors (0603)<br>Murata GRM1885C1H220J<br>TDK C1608C0G1H220J     |

| DESIGNATION | QTY | DESCRIPTION   |
|-------------|-----|---|
| C14         | 1   | 1µF ±10%, 16V X5R ceramic capacitor (0603)<br>TDK C1608X5R1C105K<br>Murata GRM188R61C105K   |
| C16, C18    | 2   | 10pF ±5%, 50V C0G ceramic capacitors (0603)<br>Murata GRM1885C1H100J<br>TDK C1608C0G1H100J  |
| C20–C26     | 7   | 100pF ±5%, 50V C0G ceramic capacitors (0603)<br>Murata GRM1885C2A101J<br>TDK C1608C0G1H101J |
| D1, D2      | 2   | Red LEDs (0805)   |
| D3          | 1   | Green LED (0805)  |
| FB1         | 1   | 70Ω, 4A ferrite bead (0603)<br>TDK MMZ1608R301A<br>Murata BLM18SG700 TN1                    |
| H1          | 0   | Not installed, 2 x 5-pin JTAG header  |
| JU1–JU8     | 8   | 2-pin headers   |
| JU9         | 1   | 3-pin header  |

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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.maximintegrated.com](http://www.maximintegrated.com).**

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### Component List (continued)

| DESIGNATION      | QTY | DESCRIPTION   |
|------------------|-----|---|
| P1               | 1   | USB type-B right-angle PC-mount receptacle  |
| Q1-Q7            | 7   | 2N3906-type pnp transistors (SOT23)<br>Central Semi CMPT3906<br>Diodes Inc. MMBT3906    |
| R1, R2           | 2   | 27 $\Omega$ $\pm$ 5% resistors (0603)   |
| R3, R17, R18     | 3   | 1.5k $\Omega$ $\pm$ 5% resistors (0603)   |
| R4, R7, R19, R20 | 4   | 470 $\Omega$ $\pm$ 5% resistors (0603)  |
| R5               | 1   | 2.2k $\Omega$ $\pm$ 5% resistor (0603)  |
| R6, R21          | 2   | 10k $\Omega$ $\pm$ 5% resistors (0603)  |
| R8               | 1   | 0 $\Omega$ resistor (0603)  |
| R9, R10, R11-R16 | 0   | Not installed, resistors (0603)<br>R9, R10, R11 are open;<br>R12-R16 are short PC trace |
| U1               | 1   | 8-channel temp sensor (24 TQFN)<br>Maxim MAX6581TG9A+                                   |

| DESIGNATION | QTY | DESCRIPTION   |
|-------------|-----|---|
| U2          | 1   | LDO regulator (5 SC70)<br>Maxim MAX8511EXK33+                 |
| U3          | 1   | Microcontroller (68 QFN-EP*)<br>Maxim MAXQ2000-RAX+           |
| U4          | 1   | LDO regulator (5 SC70)<br>Maxim MAX8511EXK25+                 |
| U5          | 1   | USB-to-UART converter (32 TQFP)                               |
| U6          | 1   | 93C46-type 3-wire EEPROM (8 SO)                               |
| Y1          | 1   | 16MHz crystal (HCM49)<br>Hong Kong X'tals<br>SSM1600000E18FAF |
| Y2          | 1   | 6MHz crystal (HCM49)<br>Hong Kong X'tals<br>SSL600000E18FAF   |
| —           | 9   | Shunts (JU1-JU9)  |
| —           | 1   | PCB: MAX6581 EVALUATION KIT+                                  |

\*EP = Exposed pad.

### Component Suppliers

| SUPPLIER                               | PHONE        | WEBSITE                     |
|--|--------------|-----------------------------|
| Central Semiconductor Corp.            | 631-435-1110 | www.centralsemi.com         |
| Diodes Incorporated                    | 805-446-4800 | www.diodes.com              |
| Hong Kong X'tals Ltd.                  | 852-35112388 | www.hongkongcrystal.com     |
| Murata Electronics North America, Inc. | 770-436-1300 | www.murata-northamerica.com |
| TDK Corp.                              | 847-803-6100 | www.component.tdk.com       |

**Note:** Indicate that you are using the MAX6581 when contacting these component suppliers.

### MAX6581 EV Kit Files

| FILE                | DESCRIPTION                                |
|---------------------|--|
| INSTALL.EXE         | Installs the EV kit files on your computer |
| MAX6581.EXE         | Application program                        |
| FTD2XX.INF          | USB driver file                            |
| UNINST.INI          | Uninstalls the EV kit software             |
| USB_Driver_Help.PDF | USB driver installation help file          |

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### Quick Start

#### Recommended Equipment

- MAX6581 EV kit (USB cable included)
- User-supplied Windows 2000, Windows XP, or Windows 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

The EV kit is fully assembled and tested. Follow the steps below to verify board operation. **Caution: Do not turn on power supply until all connections are completed.**

- 1) Visit [www.maximintegrated.com/evkitsoftware](http://www.maximintegrated.com/evkitsoftware) to download the latest version of the EV kit software, 6581Rxx.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 all jumpers (JU1–JU9) are in their default positions, as shown in Table 1.
- 4) Connect the USB cable from the PC to the EV kit board. A **New Hardware Found** window pops up when installing the USB driver for the first time. If a window that is similar to the one described above is not seen after 30s, 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\MAX6581** (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 included with the software for additional information.

- 6) Start the EV kit software by opening its icon in the **Start | Programs** menu. The EV kit software main window appears, as shown in Figure 1. Observe as the program automatically detects the address of the device and starts the main program.

### Detailed Description of Software

#### User Interface

The MAX6581 EV kit user interface is easy to operate. Each button corresponds to bits in the command and configuration byte. By pressing them, the correct I<sup>2</sup>C-compatible write operation is generated to update the internal registers of the MAX6581.

#### Automatic Read

The program polls the device for the new temperature and status data a maximum of two times per second (2Hz). To disable the polling of data, uncheck the **Auto Read** checkbox located at the top of the program.

#### Data Logging

Check the **Data Logging** checkbox located at the top of the program to activate data logging. Data logging saves temperature and status data to a text file that includes a time/date stamp next to each data point. If the **Auto Read** checkbox is checked, data is sampled at 2Hz; however, the data is logged to the file only if the temperature or status has changed. This slows the

**Table 1. Jumper Description (JU1–JU9)**

| JUMPER  | SHUNT POSITION | DESCRIPTION   |
|---------|----------------|---|
| JU1–JU7 | Installed*     | The EV kit uses the 2N3906 transistors as the external diode-connected transistors. |
|         | Not installed  | The EV kit uses user-supplied external diode-connected transistors.                 |
| JU8     | Installed      | $\overline{\text{STBY}}$ logic-low places the device in standby mode.               |
|         | Not installed* | $\overline{\text{STBY}}$ logic-high places the device in normal mode.               |
| JU9     | 1-2*           | Connects the device to the on-board 3.3V supply.                                    |
|         | 2-3            | Connects the device to the user-supplied (3V to 3.6V) supply.                       |

\*Default position.

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growth of the data-logging file. When the **Auto Read** checkbox is unchecked, the data is logged each time **Read All** is selected from the **Options** menu bar. To stop data logging, uncheck the **Data Logging** checkbox.

### Temperature

The remote-diode-measurement channels can provide 11 bits of data (1 LSB = +0.125°C). The 8 most significant bits (MSBs) can be read from the local temperature and remote temperature registers. The remaining 3 bits for remote can be read from the extended temperature register. Extended resolution is enabled by checking the **Enable Extended Resolution (0x57)** checkbox within the **Temperature** tab sheet (Figure 1).

Read a temperature by pressing the **Read** button. The temperature (in Celsius) reading is shown to the right of the GUI.

### ALERT and OVERT Temperature Limits

All temperature channels have programmable alert (ALERT) and overtemperature (OVERT) thresholds. Both alert and overtemperature limits can be set in the **ALERT Temperature Limit (0x17)** and **OVERT Temperature Limit (0x20)** group boxes within the **Temperature** tab sheet (Figure 1).

Read a limit by pressing the **Read** button. The value (in Celsius) is shown in the edit field. Change a limit by entering the value (in Celsius) into the appropriate edit field and pressing the **Write** button.

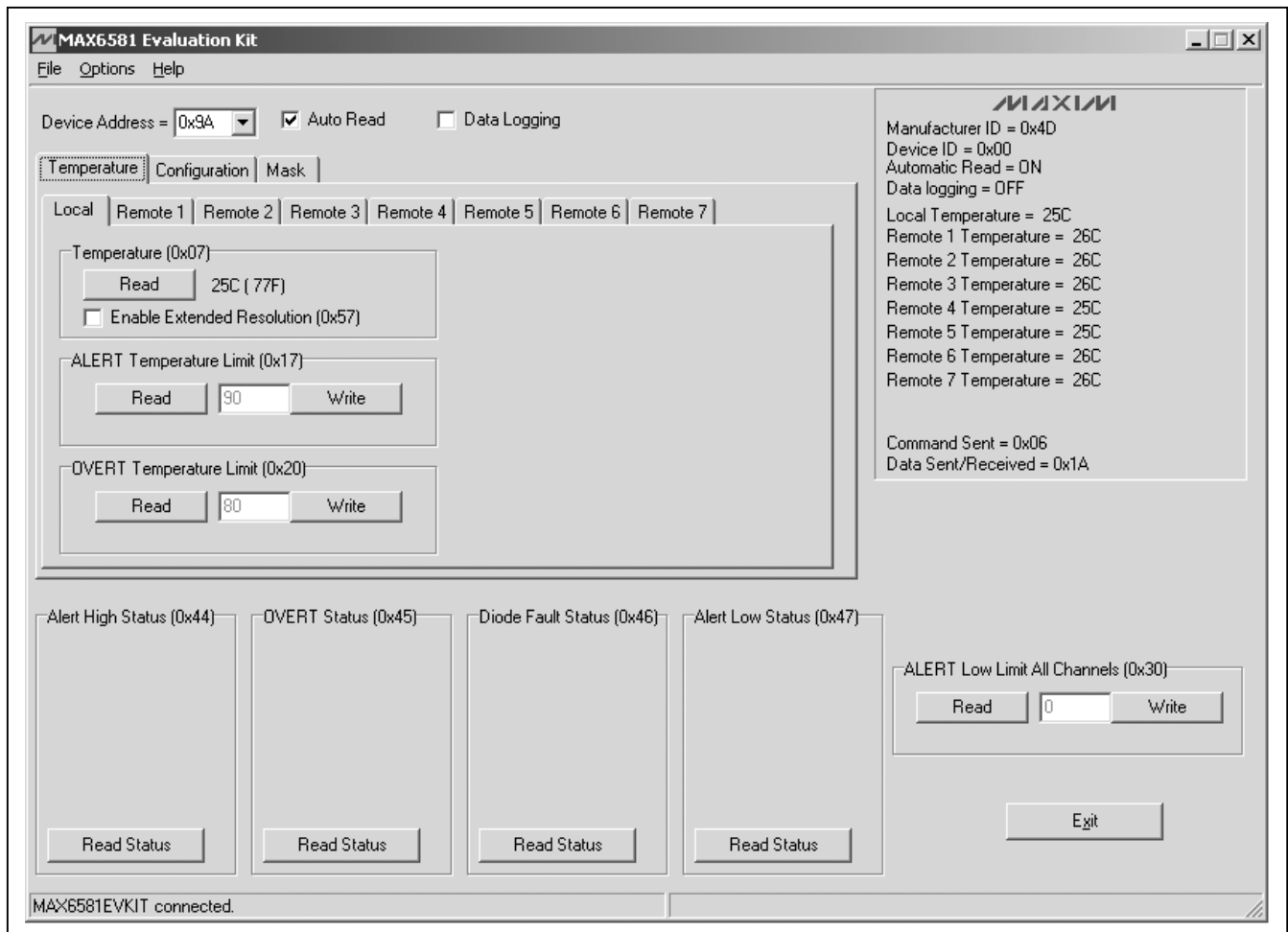


Figure 1. MAX6581 EV Kit Software Main Window (Temperature Tab)

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### Configuration, ALERT Mask, and OVERT Mask Registers

The configuration register controls the standby-mode bit, the power-on-reset bit, the SMBus timeout enable bit, and the extended-range enable bit. The ALERT mask register enables or disables the ALERT interrupt output. The OVERT mask register enables or disables the OVERT interrupt output.

Figure 2 shows the checkboxes for the configuration register. Each checkbox corresponds to a bit in the register. Tables 2, 3, and 4 describe the function for each checkbox in the Configuration tab's group boxes.

Read the register by pressing the **Read** button. Change the register by selecting or deselecting the desired functions and pressing the **Write** button.

### Status Register Functions

The **Alert High Status (0x44)**, **OVERT Status (0x45)**, **Diode Fault Status (0x46)**, and **Alert Low Status (0x47)** group boxes monitor the four status registers and display the critical and fault conditions that occur. See Tables 5–8 for a list of the status conditions.

Read the status of each register by pressing the **Read Status** button within each group box.

The **Alert High Status (0x44)** group box indicates whether a measured local or remote temperature has exceeded the associated threshold limit set in an ALERT High Limit register.

The **OVERT Status (0x45)** group box indicates whether a measured temperature has exceeded the associated threshold limit set in an OVERT High Limit register.

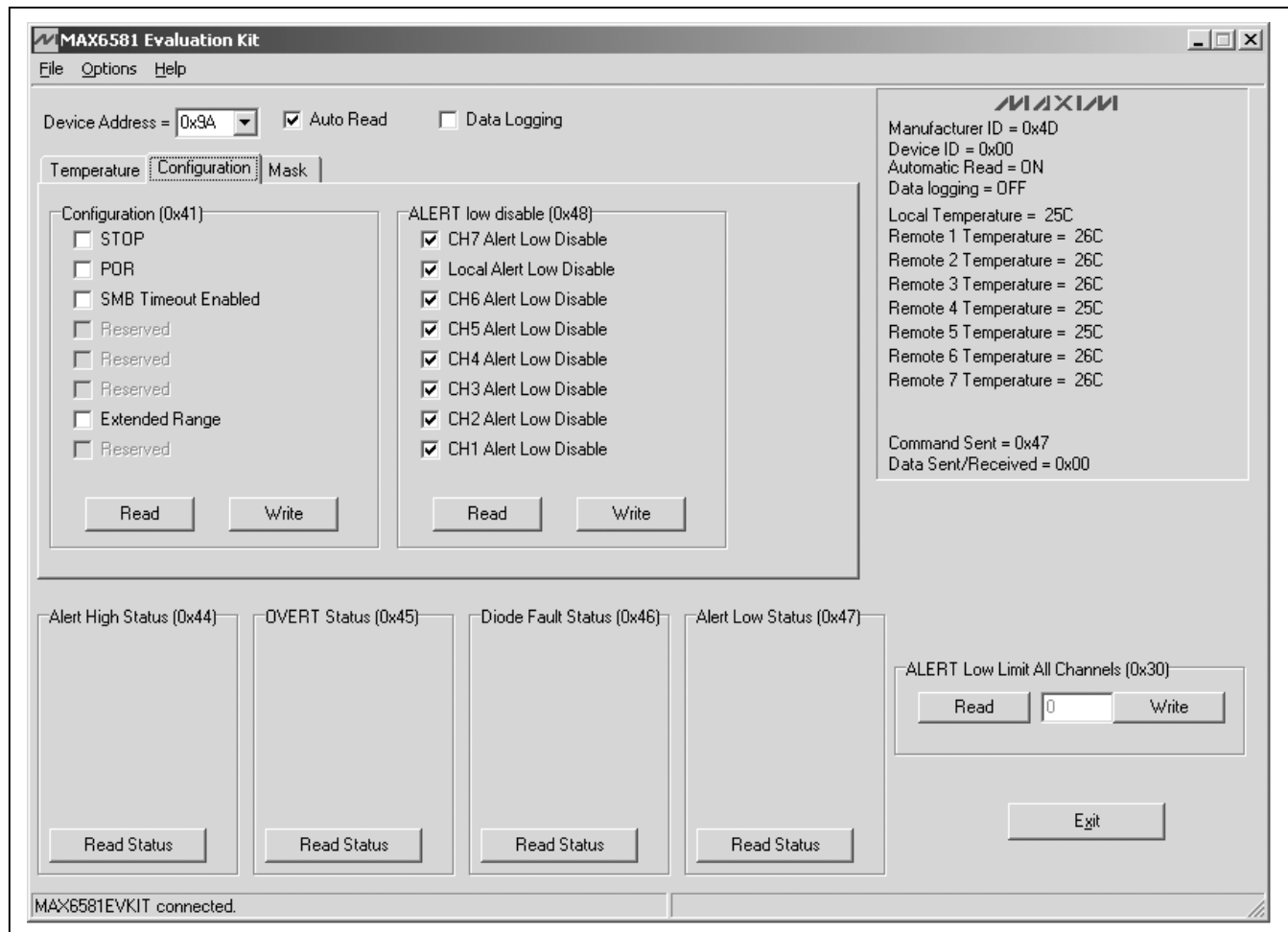


Figure 2. MAX6581 EV Kit Software Main Window (Configuration Tab)

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**Table 2. Configuration Register Checkboxes**

| BIT | NAME     | STATE      | DESCRIPTION   |
|-----|----------|------------|---|
| 7   | STOP     | Checked    | Places the device in software standby mode.   |
|     |          | Unchecked* | Places the device in operational mode.  |
| 6   | POR      | Checked    | Resets all registers to their default values, including the global configuration register. After selecting the POR checkbox, the checkbox returns to the unchecked state. |
|     |          | Unchecked* | Normal operation.   |
| 5   | TIMEOUT  | Checked    | Disables SMBus timeout.   |
|     |          | Unchecked* | Enables the SMBus timeout.  |
| 4   | RESERVED | N/A        | Not used.   |
| 3   | RESERVED | N/A        | Not used.   |
| 2   | RESERVED | N/A        | Not used.   |
| 1   | EXTRANGE | Checked    | Temperature and limit data range set to -64°C to +191°C.  |
|     |          | Unchecked* | Temperature and limit data range set to 0 to +255°C.  |
| 0   | RESERVED | N/A        | Not used.   |

\*Power-on-reset (POR) state.

**Table 3. ALERT Mask Register Checkboxes**

| BIT | NAME                                 | STATE      | DESCRIPTION  |
|-----|--------------------------------------|------------|--|
| 7   | Mask $\overline{\text{ALERT}}_7$     | Checked    | Disables the remote-diode 7 $\overline{\text{ALERT}}$ interrupt. |
|     |                                      | Unchecked* | Enables the remote-diode 7 $\overline{\text{ALERT}}$ interrupt.  |
| 6   | Mask Local $\overline{\text{ALERT}}$ | Checked    | Disables the local $\overline{\text{ALERT}}$ interrupt.          |
|     |                                      | Unchecked* | Enables the local $\overline{\text{ALERT}}$ interrupt.           |
| 5   | Mask $\overline{\text{ALERT}}_6$     | Checked    | Disables the remote-diode 6 $\overline{\text{ALERT}}$ interrupt. |
|     |                                      | Unchecked* | Enables the remote-diode 6 $\overline{\text{ALERT}}$ interrupt.  |
| 4   | Mask $\overline{\text{ALERT}}_5$     | Checked    | Disables the remote-diode 5 $\overline{\text{ALERT}}$ interrupt. |
|     |                                      | Unchecked* | Enables the remote-diode 5 $\overline{\text{ALERT}}$ interrupt.  |
| 3   | Mask $\overline{\text{ALERT}}_4$     | Checked    | Disables the remote-diode 4 $\overline{\text{ALERT}}$ interrupt. |
|     |                                      | Unchecked* | Enables the remote-diode 4 $\overline{\text{ALERT}}$ interrupt.  |
| 2   | Mask $\overline{\text{ALERT}}_3$     | Checked    | Disables the remote-diode 3 $\overline{\text{ALERT}}$ interrupt. |
|     |                                      | Unchecked* | Enables the remote-diode 3 $\overline{\text{ALERT}}$ interrupt.  |
| 1   | Mask $\overline{\text{ALERT}}_2$     | Checked    | Disables the remote-diode 2 $\overline{\text{ALERT}}$ interrupt. |
|     |                                      | Unchecked* | Enables the remote-diode 2 $\overline{\text{ALERT}}$ interrupt.  |
| 0   | Mask $\overline{\text{ALERT}}_1$     | Checked    | Disables the remote-diode 1 $\overline{\text{ALERT}}$ interrupt. |
|     |                                      | Unchecked* | Enables the remote-diode 1 $\overline{\text{ALERT}}$ interrupt.  |

\*Power-on-reset (POR) state.

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**Table 4.  $\overline{\text{OVERT}}$  Mask Register Checkboxes**

| BIT | NAME                                 | STATE      | DESCRIPTION  |
|-----|--------------------------------------|------------|--|
| 7   | Mask $\overline{\text{OVERT}}$ 7     | Checked    | Disables the remote-diode 7 $\overline{\text{OVERT}}$ interrupt. |
|     |                                      | Unchecked* | Enables the remote-diode 7 $\overline{\text{OVERT}}$ interrupt.  |
| 6   | Mask Local $\overline{\text{OVERT}}$ | Checked    | Disables the local $\overline{\text{OVERT}}$ interrupt.          |
|     |                                      | Unchecked* | Enables the local $\overline{\text{OVERT}}$ interrupt.           |
| 5   | Mask $\overline{\text{OVERT}}$ 6     | Checked    | Disables the remote-diode 6 $\overline{\text{OVERT}}$ interrupt. |
|     |                                      | Unchecked* | Enables the remote-diode 6 $\overline{\text{OVERT}}$ interrupt.  |
| 4   | Mask $\overline{\text{OVERT}}$ 5     | Checked    | Disables the remote-diode 5 $\overline{\text{OVERT}}$ interrupt. |
|     |                                      | Unchecked* | Enables the remote-diode 5 $\overline{\text{OVERT}}$ interrupt.  |
| 3   | Mask $\overline{\text{OVERT}}$ 4     | Checked    | Disables the remote-diode 4 $\overline{\text{OVERT}}$ interrupt. |
|     |                                      | Unchecked* | Enables the remote-diode 4 $\overline{\text{OVERT}}$ interrupt.  |
| 2   | Mask $\overline{\text{OVERT}}$ 3     | Checked    | Disables the remote-diode 3 $\overline{\text{OVERT}}$ interrupt. |
|     |                                      | Unchecked* | Enables the remote-diode 3 $\overline{\text{OVERT}}$ interrupt.  |
| 1   | Mask $\overline{\text{OVERT}}$ 2     | Checked    | Disables the remote-diode 2 $\overline{\text{OVERT}}$ interrupt. |
|     |                                      | Unchecked* | Enables the remote-diode 2 $\overline{\text{OVERT}}$ interrupt.  |
| 0   | Mask $\overline{\text{OVERT}}$ 1     | Checked    | Disables the remote-diode 1 $\overline{\text{OVERT}}$ interrupt. |
|     |                                      | Unchecked* | Enables the remote-diode 1 $\overline{\text{OVERT}}$ interrupt.  |

**Table 5.  $\overline{\text{ALERT}}$  High Status Register**

| BIT | NAME                               | FUNCTION   |
|-----|------------------------------------|--|
| 7   | Remote $\overline{\text{ALERT}}$ 7 | The channel 7 remote-diode temperature exceeds the programmed temperature threshold limit in the remote 7 $\overline{\text{ALERT}}$ High Limit register. |
| 6   | Local $\overline{\text{ALERT}}$    | The local temperature exceeds the temperature threshold limit in the local $\overline{\text{ALERT}}$ High Limit register.                                |
| 5   | Remote $\overline{\text{ALERT}}$ 6 | The channel 6 remote-diode temperature exceeds the programmed temperature threshold limit in the remote 6 $\overline{\text{ALERT}}$ High Limit register. |
| 4   | Remote $\overline{\text{ALERT}}$ 5 | The channel 5 remote-diode temperature exceeds the programmed temperature threshold limit in the remote 5 $\overline{\text{ALERT}}$ High Limit register. |
| 3   | Remote $\overline{\text{ALERT}}$ 4 | The channel 4 remote-diode temperature exceeds the programmed temperature threshold limit in the remote 4 $\overline{\text{ALERT}}$ High Limit register. |
| 2   | Remote $\overline{\text{ALERT}}$ 3 | The channel 3 remote-diode temperature exceeds the programmed temperature threshold limit in the remote 3 $\overline{\text{ALERT}}$ High Limit register. |
| 1   | Remote $\overline{\text{ALERT}}$ 2 | The channel 2 remote-diode temperature exceeds the programmed temperature threshold limit in the remote 2 $\overline{\text{ALERT}}$ High Limit register. |
| 0   | Remote $\overline{\text{ALERT}}$ 1 | The channel 1 remote-diode temperature exceeds the programmed temperature threshold limit in the remote 1 $\overline{\text{ALERT}}$ High Limit register. |

\*Power-on-reset (POR) state.

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**Table 6.  $\overline{\text{OVERT}}$  Status Register**

| BIT | NAME                               | FUNCTION  |
|-----|------------------------------------|---|
| 7   | Remote $\overline{\text{OVERT}}$ 7 | The channel 7 remote-diode temperature exceeds the temperature threshold limit in the remote 7 $\overline{\text{OVERT}}$ High Limit register.   |
| 6   | Local $\overline{\text{OVERT}}$    | Local Channel Overtemperature Status Bit. This bit is set to logic 1 when the local temperature exceeds the temperature threshold limit in the local $\overline{\text{OVERT}}$ High Limit register. |
| 5   | Remote $\overline{\text{OVERT}}$ 6 | The channel 6 remote-diode temperature exceeds the temperature threshold limit in the remote 6 $\overline{\text{OVERT}}$ High Limit register.   |
| 4   | Remote $\overline{\text{OVERT}}$ 5 | The channel 5 remote-diode temperature exceeds the temperature threshold limit in the remote 5 $\overline{\text{OVERT}}$ High Limit register.   |
| 3   | Remote $\overline{\text{OVERT}}$ 4 | The channel 4 remote-diode temperature exceeds the temperature threshold limit in the remote 4 $\overline{\text{OVERT}}$ High Limit register.   |
| 2   | Remote $\overline{\text{OVERT}}$ 3 | The channel 3 remote-diode temperature exceeds the temperature threshold limit in the remote 3 $\overline{\text{OVERT}}$ High Limit register.   |
| 1   | Remote $\overline{\text{OVERT}}$ 2 | The channel 2 remote-diode temperature exceeds the temperature threshold limit in the remote 2 $\overline{\text{OVERT}}$ High Limit register.   |
| 0   | Remote $\overline{\text{OVERT}}$ 1 | The channel 1 remote-diode temperature exceeds the temperature threshold limit in the remote 1 $\overline{\text{OVERT}}$ High Limit register.   |

**Table 7. Diode Fault Status Register**

| BIT | NAME          | FUNCTION   |
|-----|---------------|--|
| 7   | RESERVED      | Not used.  |
| 6   | Diode Fault 7 | DXP7 and DXN7 are open circuit or when DXP7 is connected to VCC. |
| 5   | Diode Fault 6 | DXP6 and DXN6 are open circuit or when DXP6 is connected to VCC. |
| 4   | Diode Fault 5 | DXP5 and DXN5 are open circuit or when DXP5 is connected to VCC. |
| 3   | Diode Fault 4 | DXP4 and DXN4 are open circuit or when DXP4 is connected to VCC. |
| 2   | Diode Fault 3 | DXP3 and DXN3 are open circuit or when DXP3 is connected to VCC. |
| 1   | Diode Fault 2 | DXP2 and DXN2 are open circuit or when DXP2 is connected to VCC. |
| 0   | Diode Fault 1 | DXP1 and DXN1 are open circuit or shorted together.              |

The **Diode Fault Status (0x46)** group box indicates whether there is a diode fault (open or short) in any of the remote-sensing channels.

The **Alert Low Status (0x47)** group box indicates whether a measured local or remote temperature has fallen below the threshold limit set in the  $\overline{\text{ALERT}}$  Low Limit register (**ALERT Low Limit All Channels (0x30)**).

### **Resistance Cancellation**

Resistance cancellation is available for all remote channels and compensates for high series resistance in circuit-board traces and thermal diodes. Table 9 describes the function for each checkbox in the **Resistance Cancellation (0x4A)** tab.

Read the register by clicking on the **Read** button. Change the register by selecting or deselecting the desired functions and pressing the **Write** button.



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**Table 8. ALERT Low Status Register**

| BIT | NAME                               | FUNCTION   |
|-----|------------------------------------|--|
| 7   | Remote $\overline{\text{ALERT}}$ 7 | The channel 7 remote-diode temperature falls below the programmed temperature threshold limit in the remote 7 $\overline{\text{ALERT}}$ Low Limit register.  |
| 6   | Local $\overline{\text{ALERT}}$    | The local channel remote-diode temperature falls below the programmed temperature threshold limit in the local $\overline{\text{ALERT}}$ Low Limit register. |
| 5   | Remote $\overline{\text{ALERT}}$ 6 | The channel 6 remote-diode temperature falls below the programmed temperature threshold limit in the remote 6 $\overline{\text{ALERT}}$ Low Limit register.  |
| 4   | Remote $\overline{\text{ALERT}}$ 5 | The channel 5 remote-diode temperature falls below the programmed temperature threshold limit in the remote 5 $\overline{\text{ALERT}}$ Low Limit register.  |
| 3   | Remote $\overline{\text{ALERT}}$ 4 | The channel 4 remote-diode temperature falls below the programmed temperature threshold limit in the remote 4 $\overline{\text{ALERT}}$ Low Limit register.  |
| 2   | Remote $\overline{\text{ALERT}}$ 3 | The channel 3 remote-diode temperature falls below the programmed temperature threshold limit in the remote 3 $\overline{\text{ALERT}}$ Low Limit register.  |
| 1   | Remote $\overline{\text{ALERT}}$ 2 | The channel 2 remote-diode temperature falls below the programmed temperature threshold limit in the remote 2 $\overline{\text{ALERT}}$ Low Limit register.  |
| 0   | Remote $\overline{\text{ALERT}}$ 1 | The channel 1 remote-diode temperature falls below the programmed temperature threshold limit in the remote 1 $\overline{\text{ALERT}}$ Low Limit register.  |

**Table 9. Resistance Cancellation Register (4Ah)**

| BIT | NAME                      | STATE      | DESCRIPTION                                 |
|-----|---------------------------|------------|---|
| 7   | X                         | —          | Not used.                                   |
| 6   | RESISTANCE CANCELLATION 7 | Checked    | Enables channel 7 resistance cancellation.  |
|     |                           | Unchecked* | Disables channel 7 resistance cancellation. |
| 5   | RESISTANCE CANCELLATION 6 | Checked    | Enables channel 6 resistance cancellation.  |
|     |                           | Unchecked* | Disables channel 6 resistance cancellation. |
| 4   | RESISTANCE CANCELLATION 5 | Checked    | Enables channel 5 resistance cancellation.  |
|     |                           | Unchecked* | Disables channel 5 resistance cancellation. |
| 3   | RESISTANCE CANCELLATION 4 | Checked    | Enables channel 4 resistance cancellation.  |
|     |                           | Unchecked* | Disables channel 4 resistance cancellation. |
| 2   | RESISTANCE CANCELLATION 3 | Checked    | Enables channel 3 resistance cancellation.  |
|     |                           | Unchecked* | Disables channel 3 resistance cancellation. |
| 1   | RESISTANCE CANCELLATION 2 | Checked    | Enables channel 2 resistance cancellation.  |
|     |                           | Unchecked* | Disables channel 2 resistance cancellation. |
| 0   | RESISTANCE CANCELLATION 1 | Checked    | Enables channel 1 resistance cancellation.  |
|     |                           | Unchecked* | Disables channel 1 resistance cancellation. |

X = Don't care.

\*Power-on-reset (POR) state.

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### Advanced User Interface

There are two methods for communicating with the device: through the normal user-interface main window or through the SMBus/I<sup>2</sup>C commands available by selecting **Options | Interface (Advanced Users)** from the menu bar. An **Advanced User Interface** window pops up with the **2-wire interface** tab selected, which allows the SMBus/I<sup>2</sup>C-compatible protocols, such as read byte and write byte, to be executed. The only SMBus/I<sup>2</sup>C-compatible protocols used by the device are:

- 1 - SMBusWriteByte(addr,cmd,data8)
- 4 - SMBusReadByte(addr,cmd) → data8

The combo and edit boxes accept numeric data in hexadecimal and should be prefixed by 0x. See Figure 3 for an example of this tool.

In this example, the software is reading from **Device Address 10011010 r/w** (binary), and register address 0x07.

### Detailed Description of Hardware

The MAX6581 EV kit is an assembled and tested PCB used to evaluate the MAX6581 8-channel temperature sensor. The device monitors its own die temperature and the temperatures of up to seven external diode-connected transistors. The EV kit features an on-board microcontroller that receives commands from a PC through the USB port. The EV kit can be powered directly from the USB or from a 3.3V single-supply voltage.

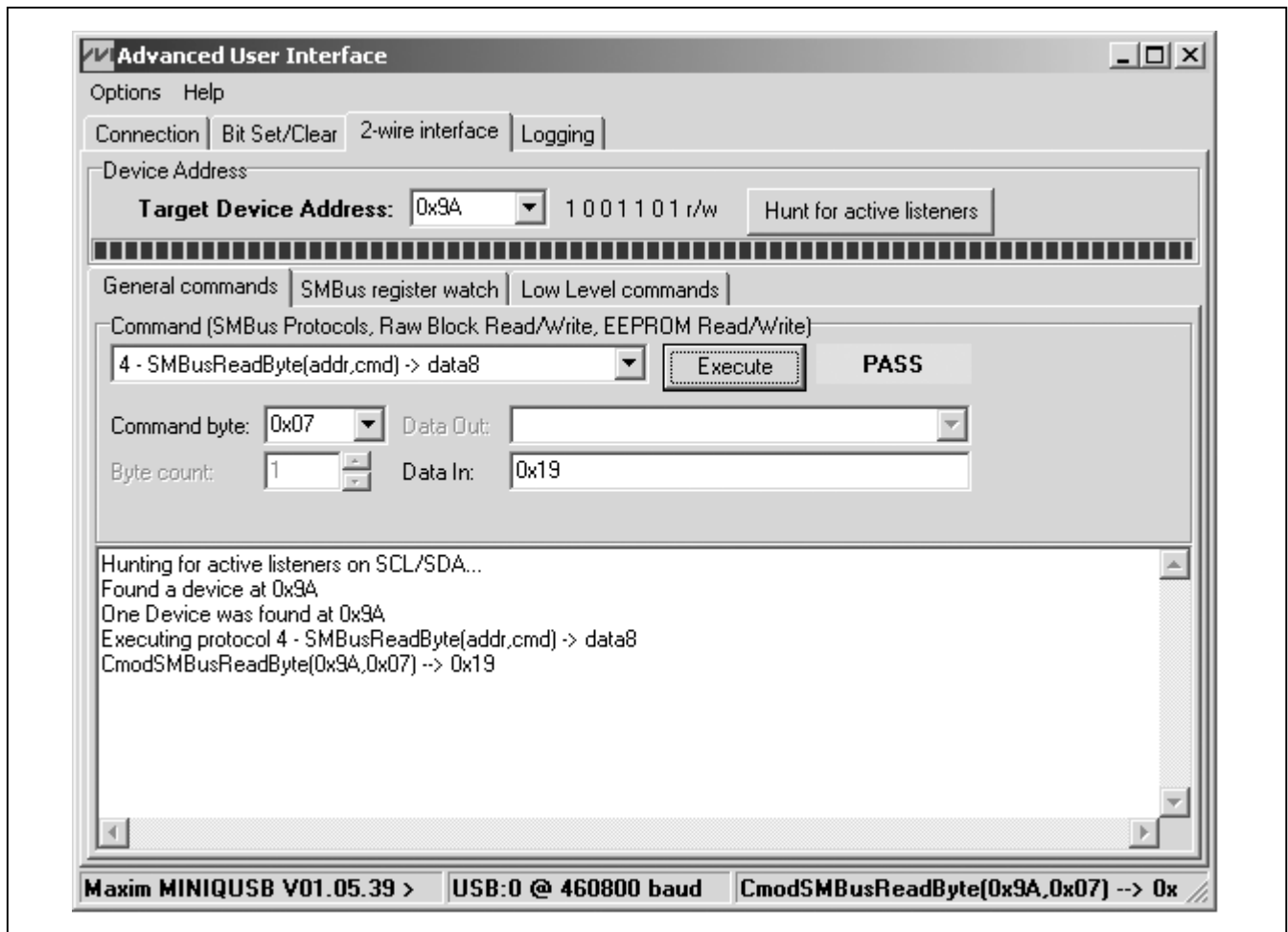


Figure 3. Example of a Simple SMBusReadByte Operation Using the Advanced User Interface

# **MAX6581 Evaluation Kit**

## **Evaluates: MAX6581**

### **Replacing Diodes**

Jumpers JU1–JU7 connect the 2N3906 transistors as the external diodes. To use different diodes, remove Q1–Q7 and connect the diodes (through twisted-pair wire) across the DXP1–DXP7 and DXN1–DXN7 pads.

### **User-Supplied Power Supply**

The EV kit is powered completely from the USB port by default. To power the EV kit externally, move the shunt on jumper JU9 to the 2-3 position and apply a user-supplied 3.3V power supply at the VCC and GND pads.

# MAX6581 Evaluation Kit

## Evaluates: MAX6581

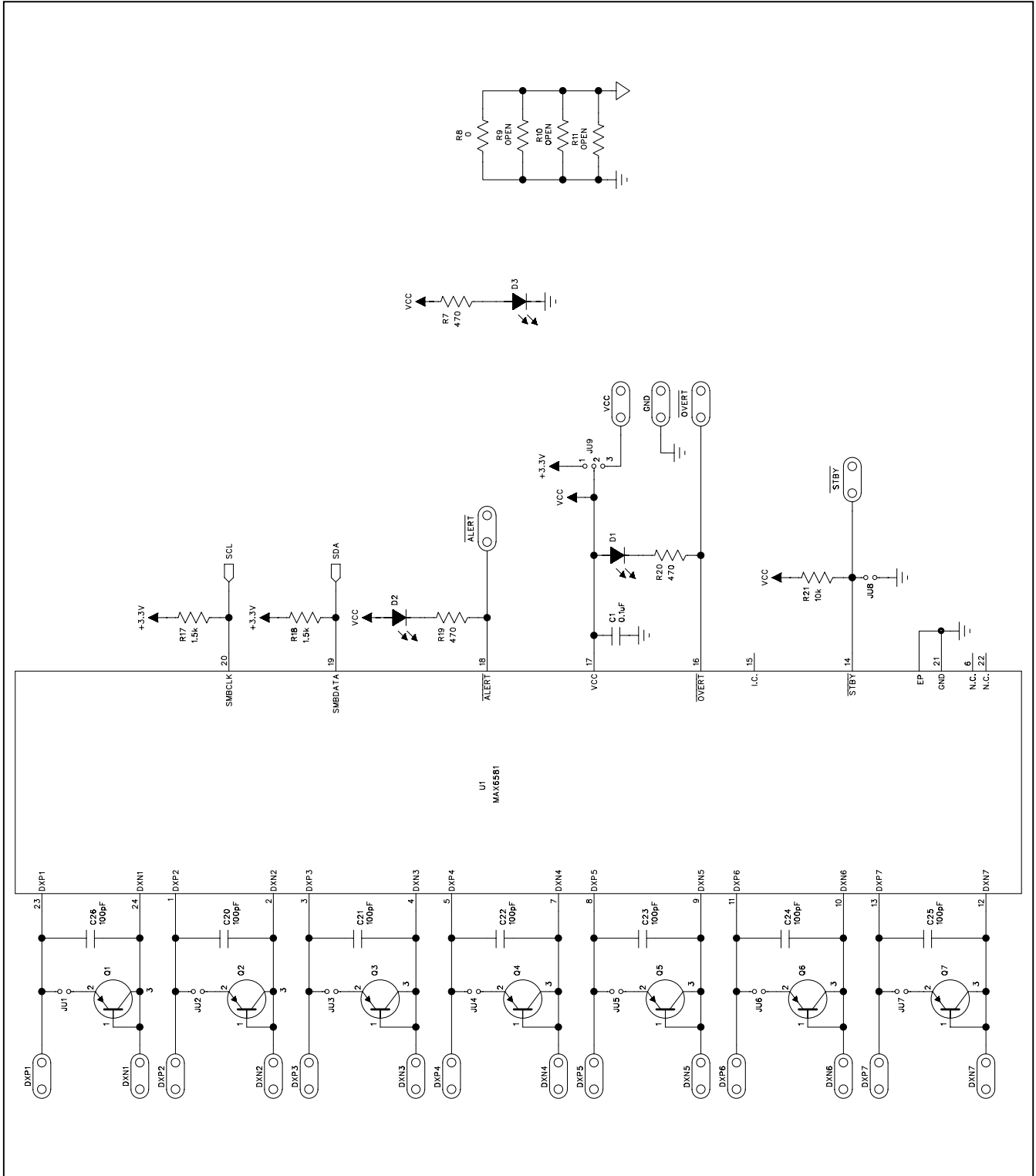


Figure 4a. MAX6581 EV Kit Schematic (Sheet 1 of 2)



# MAX6581 Evaluation Kit

## Evaluates: MAX6581

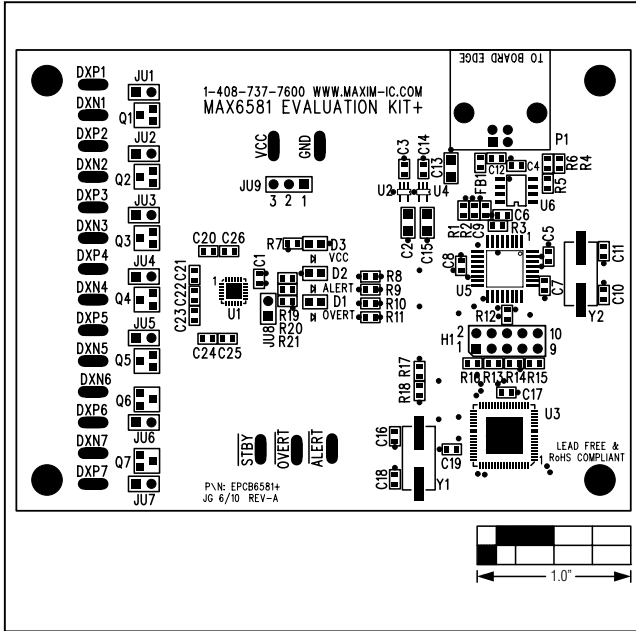


Figure 5. MAX6581 EV Kit Component Placement Guide—Component Side

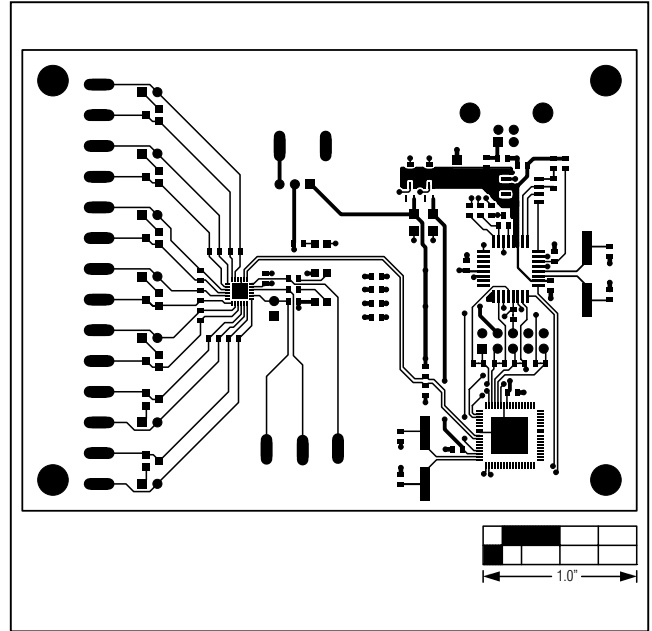


Figure 6. MAX6581 EV Kit PCB Layout—Component Side

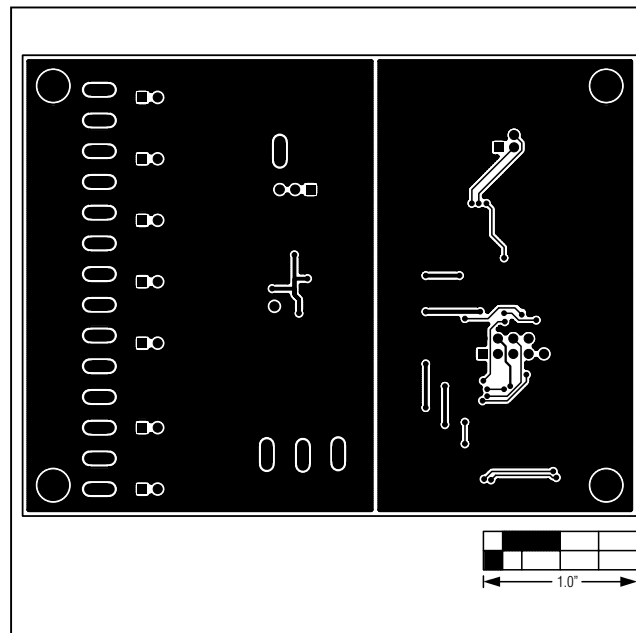


Figure 7. MAX6581 EV Kit PCB Layout—Solder Side