19-5263; Rev 0; 5/10

# MAX9268 Evaluation Kit

Evaluates: MAX9268

## General Description

The MAX9268 evaluation kit (EV kit) provides a proven design to evaluate the MAX9268 gigabit multimedia serial link (GMSL) with spread spectrum and full-duplex control channel. The EV kit also includes Windows XP®-, Windows Vista®-, and Windows® 7-compatible software that provides a simple graphical user interface (GUI) for exercising the features of the MAX9268.

The MAX9268 EV kit comes with a MAX9268GCM/V+ installed.

For complete GMSL evaluation, order both the MAX9268 EV kit and its companion board, the MAX9249 EV kit or the MAX9259 EV kit.

## Features

- **Drives LVDS Video and I²S Audio**
- **On-Board I²S Audio DAC (MAX9850)**
- **On-Board Class D Audio Power Amplifier (MAX9701)**
- **Windows XP-, Windows Vista-, and Windows 7-Compatible Software**
- **USB-PC Connection (Cable Included)**
- **USB Powered**
- **Proven PCB Layout**
- **Fully Assembled and Tested**

## Ordering Information

| PART | TYPE |
|---|---|
| MAX9268EVKIT+ | EV Kit |

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

***Note:*** *The MAX9268 EV kit should be ordered with its companion board, the MAX9249 EV kit or the MAX9259 EV kit.*

## Component List

| DESIGNATION | QTY | DESCRIPTION |
|---|---|---|
| C1–C7 | 7 | 0.01µF ±10%, 25V X7R ceramic capacitors (0402) Murata GRM155R71E103K |
| C8–C14, C101–C105, C121, C131, C141, C151, C257, C258, C259, C291–C294 | 23 | 0.1µF ±10%, 16V X7R ceramic capacitors (0603) Murata GRM188R71C104K |
| C19, C20 | 2 | 0.22µF ±10%, 50V X7R ceramic capacitors (0805) Murata GRM21BR71H224K |
| C21 | 1 | 4.7µF ±20%, 25V X7R ceramic capacitor (1206) Murata GCM31CR71E475M |
| C22, C24, C25, C26, C109 | 5 | 10µF ±20%, 16V X5R ceramic capacitors (1206) Murata GRM31CR61C106M |
| C23 | 0 | Not installed, capacitor (1206) |
| C106, C107, C122, C123 | 4 | 22pF ±5%, 50V C0G ceramic capacitors (0603) TDK C1608C0G1H220J |
| C108 | 1 | 1µF ±10%, 16V X5R ceramic capacitor (0603) TDK C1608X5R1C105K |
| C110 | 1 | 0.033µF ±10%, 25V X7R ceramic capacitor (0603) Murata GRM188R71E333K |
| C111 | 0 | Not installed, capacitor (0603) |
| C200, C203–C209, C216, C217 | 10 | 1µF ±10%, 6.3V X5R ceramic capacitors (0402) Murata GRM155R60J105K |
| C201 | 1 | 2.2µF ±20%, 6.3V X5R ceramic capacitor (0603) TDK C1608X5R0J225M |
| C202 | 1 | 0.47µF ±20%, 16V X7R ceramic capacitor (0603) TDK C1608X7R1C474M |

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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)

| DESIGNATION | QTY | DESCRIPTION |
|---|---|---|
| C210, C211 | 2 | 220µF ±20%, 6.3V low-ESR tantalum capacitors (C case) AVX TPSC227M006R0070 |
| C212, C213 | 0 | Not installed, capacitors (C case) |
| C214, C215 | 2 | 10µF ±20%, 6.3V X5R ceramic capacitors (0805) TDK C2012X5R0J106M |
| C250 | 1 | 100pF ±5%, 50V C0G ceramic capacitor (0603) TDK C1608C0G1H101J |
| C251–C254 | 4 | 1µF ±10%, 6.3V X5R ceramic capacitors (0603) TDK C1608X5R0J105K |
| C255 | 0 | Not installed, capacitor (0805) |
| C256 | 1 | 10µF ±10%, 6.3V X5R ceramic capacitor (0805) Murata GRM21BR60J106K |
| H1 | 1 | 10-pin header (2 x 5) |
| H20 | 1 | 8-pin header |
| J1 | 1 | High-speed automotive connector Rosenberger D4S20F-40MA5-Z |
| J10 | 1 | USB type-B, right-angle female receptacle |
| J201–J204 | 4 | Phono jacks |
| J206 | 1 | 3.5mm stereo headphone jack |
| JU1–JU6, JU9, JU11, JU121, JU151, JU152, JU252, JU253, JU254, JU206, JU290–JU293, SW1 | 20 | 3-pin headers |
| JU7, JU8 | 2 | 4-pin headers |
| JU10, JU21, JU22, JU23, JU153, JU154, JU191–JU194, JU202–JU205, JUCNTL0, JUCNTL1, JUCNTL2 | 17 | 2-pin headers |
| JU101–JU108, JU141–JU144, JU255, JU256, JU294 | 0 | Not installed, 2-pin headers—shorted with PCB trace |
| JU201 | 1 | 6-pin header (2 x 3) |
| JU251 | 1 | 5-pin header |
| L21, L22, L23, L101 | 4 | Ferrite beads (0603) TDK MMZ1608R301A |
| L251–L255 | 5 | 100Ω, 3A ferrite beads (0603) TDK MPZ1608S101A |
| LED1, LED3, LED4, LED120, LED151–LED158 | 12 | Red LEDs (0805) |
| LED2 | 1 | Green LED (0805) |
| Q1–Q5 | 5 | n-channel MOSFETs (SOT23 Central Semi 2N7002 |
| R1, R2 | 2 | 49.9kΩ ±1% resistors (0603) |
| R3–R8 | 6 | 2.2kΩ ±5% resistors (0603) |
| R11–R15, R123, R151–R158, R201, R202 | 16 | 1kΩ ±5% resistors (0603) |
| R101, R102 | 2 | 27Ω ±5% resistors (0603) |
| R103 | 1 | 1.5kΩ ±5% resistor (0603) |
| R104 | 1 | 470Ω ±5% resistor (0603) |
| R111, R112 | 0 | Not installed, resistors (0603) |
| R121 | 1 | 1.1kΩ ±5% resistor (0603) |
| R122 | 1 | 10kΩ ±5% resistor (0603) |
| R191, R192 | 2 | 4.7kΩ ±5% resistors (0603) |
| R251 | 1 | 49.9Ω ±1% resistor (0603) |
| RT100–RT104 | 0 | Not installed, 100Ω ±5% resistors (0402) |
| SW122, SW150–SW157 | 9 | Momentary pushbutton switches (6mm) |
| U1 | 1 | Gigabit multimedia serial link, LVDS outputs (48 TQFP-EP*) Maxim MAX9268GCM/V+ |
| U2 | 1 | 3.3V, 500mA LDO regulator (8 µMAX®-EP*) Maxim MAX1792EUA33+ (Top Mark: AAAC) |

## Component List (continued)

| DESIGNATION | QTY | DESCRIPTION |
|---|---|---|
| U10 | 1 | UART-to-USB converter (32 TQFP) |
| U11 | 0 | Not installed, 93C46-type 3-wire EEPROM 16-bit architecture (8 SO) |
| U12 | 1 | Ultra-high-speed microcontroller (44 TQFP) Maxim DS89C450-ENL+ |
| U13 | 1 | Three-state quad buffer (14 SO) Fairchild 74AC125SC |
| U14 | 1 | Level translator (14 TSSOP) Maxim MAX3378EEUD+ |
| U15 | 1 | I²C I/O expander (24 QSOP) Maxim MAX7324AEG+ |
| U19 | 1 | Dual bidirectional level translator (8 SOT23) Maxim MAX3373EEKA+ (Top Mark: AAKS) |
| U20 | 1 | Stereo audio DAC with DirectDrive® headphone amplifier (28 TQFN-EP*) Maxim MAX9850ETI+ |
| U25 | 1 | 1.3W filterless, stereo Class D audio power amplifier (24 TQFN-EP*) Maxim MAX9701ETG+ |
| U29 | 0 | Not installed, multiple-output clock generator with dual PLLs and OTP (20 TQFN-EP*) Maxim MAX9471ETP4X+ |
| Y10 | 1 | 6MHz crystal (HCM49) Hong Kong X'tals SSL60000N1HK188F0-0 |
| Y12 | 1 | 14.7456MHz crystal (HCM49) Hong Kong X'tals SSM14745N1HK188F0-0 |
| — | 1 | USB high-speed A-to-B cable, 6ft |
| — | 1 | Cable assembly (2m) MD Electronik PT1482 |
| — | 37 | Shunts |
| — | 1 | PCB: MAX9268 EVALUATION KIT+ |

**EP = Exposed pad.*

## Component Suppliers

| SUPPLIER | PHONE | WEBSITE |
|---|---|---|
| AVX Corporation | 843-946-0238 | www.avxcorp.com |
| Central Semiconductor Corp. | 631-435-1110 | www.centralsemi.com |
| Fairchild Semiconductor | 888-522-5372 | www.fairchildsemi.com |
| Hong Kong X'tals Ltd. | 852-35112388 | www.hongkongcrystal.com |
| MD Elektronik GmbH | 011-49-86-38-604-0 | www.md-elektronik-gmbh.de |
| Murata Electronics North America, Inc. | 770-436-1300 | www.murata-northamerica.com |
| Rosenberger Hochfrequenztechnik GmbH | 011-49-86 84-18-0 | www.rosenberger.de |
| TDK Corp. | 847-803-6100 | www.component.tdk.com |

***Note:*** *Indicate that you are using the MAX9268 when contacting these component suppliers.*

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## MAX9268 EV Kit Files

| FILE | DESCRIPTION |
|---|---|
| INSTALL.EXE | Installs the EV kit files on your computer |
| MAX9268.EXE | Application program |
| CDM20600.EXE | Installs the USB device driver |
| UNINSTALL.EXE | Uninstalls the EV kit software |
| USB_Driver_Help_200.PDF | USB driver installation help file |

## Quick Start

### Required Equipment

- MAX9268 EV kit (USB cable included)
- MAX9249 EV kit (USB cable included)
- 2m Rosenberger cable assembly (included in the MAX9268 EV kit)
- Data source (such as digital video)
- Optional: I²S or S/PDIF audio source
- Optional: Pair of 8Ω speakers
- Optional: 3.5mm stereo headphones (16Ω or greater)
- User-supplied PC with a spare USB port (direct 500mA connection required; do not use a hub)

**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 MAX9268 EV kit is fully assembled and tested. Follow the steps below to verify board operation:

1) Visit **www.maxim-ic.com/evkitsoftware** to download the latest version of the EV kit software, 9268Rxx.ZIP. Save the EV kit software to a temporary folder and uncompress the ZIP file.

2) Install the EV kit software and USB driver on your computer by running the INSTALL.EXE program inside the temporary folder. The program files are copied to your PC and icons are created in the Windows **Start | Programs** menu. During software installation, some versions of Windows may show a warning message indicating that this software is from an unknown publisher. This is not an error condition and it is safe to proceed with installation. Administrator privileges are required to install the USB device driver on Windows.

3) Verify that all jumpers are in their default positions, as shown in Table 1.

4) Connect the Rosenberger cable from MAX9249 EV kit connector J1 to MAX9268 EV kit connector J1.

5) Connect the LVDS data source to header H1 of the MAX9249 EV kit.

*6) Optional Audio Demo:* Connect the S/PDIF audio source (e.g., DVD player digital output) to MAX9249 EV kit phono jack J21. Or, connect I²S audio source to header H1 and remove jumper JU210. Connect speakers to MAX9268 EV kit SPKR_L+/SPKR_L- and SPKR_R+/SPKR_R- oval pads, or plug headphones into J206 headphone jack.

7) Connect the USB cable from the PC to the EV kit board. A Windows message appears when connecting the EV kit board to the PC for the first time. Each version of Windows has a slightly different message. If you see a Windows message stating **ready to use** then proceed to the next step. Otherwise, open the USB_Driver_Help_200.PDF document in the Windows **Start | Programs** menu to verify the USB driver was installed successfully.

8) Verify that MAX9249 EV kit LED120 lights up, indicating that the microcontroller is powered and enabled.

9) Verify that MAX9268 EV kit LED120 lights up, indicating that the microcontroller is powered and enabled.

10) Verify that MAX9268 EV kit LED2 lights up, indicating that the link has been successfully established. If LED2 is off or LED1 is on, double-check that PCLK_IN signal is clocking data.

11) *Optional Audio Demo:* Press and release switch SW122 on both of the MAX9249 and MAX9268 EV kits to enable the S/PDIF-to-I²S and I²S-to-audio DAC demonstration circuitry. If I²S or S/PDIF audio was provided to the MAX9249 EV kit, audio should now be heard from the speakers or headphones previously connected to the MAX9268 EV kit.

12) Start the MAX9249 EV kit software by opening its icon in the Windows **Start | Programs** menu. The EV kit software configuration window appears, as shown in Figure 7.

13) Press the **Connect** button and the configuration window disappears.

14) The EV kit software main window appears, as shown in Figure 1.

15) Press the **Read All** button to read all registers on the MAX9249 and MAX9268.

16) *I2C Slave Device Demo:* Make sure MAX9268 EV kit headers JU151–JU154 are in the 1-2 position.

17) In the software's **MAX7324** tab (Figure 4), press the **Search for MAX7324** button. Verify that the **MAX7324 Device Address** drop-down list shows **0xDA (JU151=1-2 JU152=1-2)**.

18) Press the **LED151-LED158 ON** button. Verify that MAX9268 EV kit LED151–LED158 turn on.

19) Press the **LEDs Alternating** button. Verify that MAX9268 EV kit LED151, LED153, LED156, and LED158 turn off.

20) *GPIO Demo:* In the software's **MAX9268** tab (Figure 3), scroll down to **Register 0x06**. Uncheck the **GPIO1OUT** checkbox and press the **Write** button. Verify that MAX9268 EV kit LED4 turns off.

21) Uncheck the **GPIO0OUT** checkbox and press the **Write** button. Verify that MAX9268 EV kit LED3 turns off.

22) Check the **GPIO1OUT** checkbox and press the **Write** button. Verify that MAX9268 EV kit LED4 turns on.

23) Check the **GPIO0OUT** checkbox and press the **Write** button. Verify that MAX9268 EV kit LED3 turns on.

24) *INT Demo:* Toggle MAX9268 EV kit switch SW2 up. Verify that MAX9249 EV kit LED1 turns on, indicating that MAX9268 INT input is asserted.

25) In the software's **MAX9268** tab, scroll to **Register 0x06** and press the **Read** button. Verify that the **INT** checkbox is checked, indicating that MAX9268 INT input is asserted.

26) Toggle MAX9268 EV kit switch SW2 down. Verify that MAX9249 EV kit LED1 turns off, indicating that MAX9268 INT input is not asserted.

27) In the software's **MAX9268** tab, scroll to **Register 0x06** and press the **Read** button. Verify that the **INT** checkbox is not checked, indicating that MAX9268 INT input is not asserted.

## Detailed Description of Software

The main window of the evaluation software (Figure 1) shows a block diagram representing the MAX9249/MAX9268 system. The left column shows MAX9249 input data sources, and the right column shows MAX9268 output data sinks.

The **Change Configuration** button (Figure 1) brings up the **Configuration** window (Figure 7), allowing the software GUI to select into which side of the link the USB cable should be plugged. Controlling from the MAX9268 side requires changing some jumper settings as described in this window. If the MAX9249 and MAX9268 device addresses have been previously changed from their factory power-on-reset values, the new addresses must be specified in the **Configuration** window to allow register access.

The **Baud Rate** drop-down list sets the communications baud rate. The USB link uses the same baud rate as the MAX9249/MAX9268. Note that the baud rate should only be changed one step at a time.

The **Read All** button reads all the MAX9249 and MAX9268 device registers. **Reset to Default Values** restores recommended factory settings, and **Write All** writes all MAX9249/MAX9268 device registers with the values shown in the GUI.

The **MAX9249** tab sheet (Figure 2) provides direct access to all registers of the MAX9249, and the **MAX9268** tab sheet (Figure 3) provides direct access to all registers of the MAX9268. Each register has its own **Read** and **Write** button. The small circle next to the **Read** button turns yellow to indicate an attempt to read or write, red to indicate a failed read or write, and green to indicate a successful read or write operation.

The **MAX7324** tab sheet (Figure 4) controls the I2C I/O expander on the remote side of the link. When the USB is plugged into the MAX9249 EV kit, the **MAX7324** tab sheet controls the MAX7324 (U15) on the MAX9268 EV kit. Note that the MAX7324 actually has two device addresses; for simplicity, the software GUI only displays the device address associated with MAX7324 outputs. For details, refer to the MAX7324 IC data sheet.

The **PRBS Test** tab sheet (Figure 5) uses the MAX9268 registers to perform a pseudorandom bit sequence (PRBS) error-rate test. Select the test duration (maximum 32,767sec = 9.1hrs) and press the **Start** button. The software GUI configures the MAX9268 to begin the PRBS test, counts down the specified delay time, and then reports the final value of the MAX9268 PRBSERR register.

The **Interface History and Low Level Access** tab sheet (Figure 6) shows the recent low-level communications activity between the software GUI and the MAX9249/MAX9268. The **Register Access** group box provides arbitrary device read/write control, supporting additional user-supplied devices besides the on-board MAX9249, MAX9268, and MAX7324. The **Device Address**, **Register**, and **Data** drop-down lists specify the device address and the register within the device, as well as one optional byte of data to be written. Pressing the **Write Register** button writes one byte of data to the specified device register. **Read Register** reads the specified device register and reports the results into the **Interface History** window. Devices that are not register-based (such as the MAX7324) are supported by **Send Data (no register)** and **Receive Data (no register)**. User-supplied devices requiring other interface protocols must use **Raw TX byte codes** to communicate. Note that in bypass mode, raw data is passed to the user-supplied slave device directly without modification.

## _Detailed Description of Hardware

The MAX9268 EV kit provides a proven layout for the MAX9268. On-board level translators, I²S stereo audio DAC, Class D audio power amplifier, and easy-to-use USB-PC connection are included on the EV kit.

The MAX9268 EV kit board layout is divided into four principal sections.

From header H1 to connector J1 are the support components specific to the MAX9268. On-board LDO regulator U2 powers the AVDD, DVDD, and IOVDD supplies from VIN. Jumper JU9 optionally connects VIN to the link cable, powering the remote EV kit board.

Below header H1, the board layout has three sections: microcontroller (U10–U14), I²C slave device (U15), and audio (U20–U25). The microcontroller and I²C slave device sections are identical to the MAX9249 and MAX9268 EV kits.

The audio section of the MAX9249 and MAX9259 EV kits contain S/PDIF-to-I²S audio converter circuits (U20–U25), which an be disabled by JU210 for applications already having I²S audio.

The audio section of the MAX9268 EV kit contains an I²S-to-audio DAC circuit (U20) and a Class D stereo power amplifier (U25). The audio DAC circuits are similar to the MAX9850 EV kit, and the power amplifier circuit is similar to the MAX9701 EV kit.

### User-Supplied Interface

To use the MAX9268 EV kit with a user-supplied interface, first cut the PCB traces at jumpers JU141 and JU142. Next, apply your own TX/SCL signal at the U1 side of JU141 and RX/SDA at the U1 side of JU142. Refer to the MAX9249, MAX9259/MAX9260, and MAX9268 IC data sheets for details about UART protocol for base mode, write data format, read data format, selecting base mode or bypass mode, and selecting UART or I²C slave device.

### User-Supplied Power Supply

The MAX9249 and MAX9268 EV kits are powered completely from the USB port by default. The 5V USB bus power is supplied to the remote EV kit over the link cable by default. Jumper JU10 powers the link cable (VBUS) from the 5V USB supply, and jumper JU9 connects the link cable VBUS to the VIN power supply.

To provide external power to each EV kit's VIN, and still power both microcontrollers from USB, remove the shunt from JU9, but leave the shunt at JU10 installed. The link cable carries the USB 5V bus power to the remote EV kit board, but external user-supplied VIN supplies are required to power the MAX9249 and the MAX9268.

To provide different power supplies to DVDD, AVDD, and IOVDD, remove the shunts from jumpers JU21, JU22, and JU23, and apply external user-supplied power at the DVDD, AVDD, and IOVDD oval pads.

The I²S audio link demonstration requires both MAX9249 EV kit and MAX9268 EV kit microcontrollers (U12) to be powered; otherwise, the on-board S/PDIF-to-I²S converter or the I²S audio DAC does not initialize.

## _Detailed Description of Firmware

The DS89C450 microcontroller (U12) runs custom firmware, which ensures that no breaks occur within register read/write commands. The firmware records 9-bit even-parity data received from the USB interface while RTS is set, and plays back the 9-bit data with 1.5 stop bits timing when RTS is cleared. Data received from the MAX9268 is relayed to USB immediately.

The audio chips are initialized by an I²C command sequence sent by the firmware when the microcontroller is reset. The same firmware runs on both the MAX9249 and MAX9268 EV kit boards, so this initialization sequence covers both the S/PDIF-to-I²S converter and the MAX9850 I²S stereo audio DAC. Pressing switch SW122 resets the microcontroller, resending the audio I²C initialization commands.

The firmware also supports a small set of commands, available when RTS is clear. Since all register read/write requests are sent with RTS set, there is no conflict between register data and firmware commands. These firmware commands are issued automatically by the MAX9249 EV kit software GUI. The following information is provided for reference only.

Firmware command "?" prints the firmware version banner message and brief command list.

Firmware command "B" changes the baud rate by changing the internal TH1 baud-rate divisor. Refer to firmware help command "?" for details. Pressing switch SW122 resets the USB baud rate to 921,600 baud. The software GUI automatically sends the baud-rate change command.

Firmware command "T" supports waking up the MAX9249 from the MAX9268 side of the link. Command "T" performs a dummy read, followed by a delay on the order of 1ms to 8ms, and finally writes a register value. For example, send "T810558800483" to read from device address 0x81 register 0x05, delay 4ms, then write to device address 0x80 register 0x04 data 0x83. This is the MAX9249 wake-up sequence for the default device addresses. The software GUI automatically sends this command when the **Wake Up MAX9249** button is pressed.

## Table 1. MAX9268 EV Kit Jumper Descriptions

| JUMPER | SIGNAL | SHUNT POSITION | DESCRIPTION |
|---|---|---|---|
| JU1 | CDS | 1-2 | CDS = high; ECU attached to MAX9268; connects the USB to the MAX9268 EV kit |
| | | 2-3* | CDS = low; optional peripheral attached to the MAX9268 |
| | | Open | Reserved |
| SW1 | MS | 1-2 (toggle switch up) | MS = high; full-duplex bypass mode; device registers not accessible |
| | | 2-3* (toggle switch down) | MS = low; half-duplex base mode; required when writing to device registers or when using external I²C peripheral |
| JU2 | BWS | 1-2* | BWS = high |
| | | 2-3 | BWS = low |
| JU3 | EQS | 1-2* | EQS = high |
| | | 2-3 | EQS = low |
| JU4 | DRS | 1-2* | DRS = high |
| | | 2-3 | DRS = low |
| JU5 | SSEN | 1-2* | SSEN = high |
| | | 2-3 | SSEN = low |
| JU6 | $\overline{PWDN}$ | 1-2* | $\overline{PWDN}$ = high |
| | | 2-3 | $\overline{PWDN}$ = low |
| JU7 | ADD1 | 1-2 | ADD1 = IOVDD (see Table 2) |
| | | 1-3 | ADD1 = Open (see Table 2) |
| | | 1-4* | ADD1 = GND (see Table 2) |
| JU8 | ADD0 | 1-2 | ADD0 = IOVDD (see Table 2) |
| | | 1-3 | ADD0 = Open (see Table 2) |
| | | 1-4* | ADD0 = GND (see Table 2) |
| JU9 | Bus power | 1-2* | J1 pin 4 connects to VIN |
| | | 2-3 | J1 pin 4 connects to GND |
| | | Open | J1 pin 4 unconnected |
| JU10 | Bus power | 1-2* | J1 pin 1 connects to USB+5V |
| | | Open | USB power is not connected to link cable power |

**Table 1. MAX9268 EV Kit Jumper Descriptions (continued)**

| JUMPER | SIGNAL | SHUNT POSITION | DESCRIPTION |
|---|---|---|---|
| JU11 | INT | 1-2 | INT = high |
| | | 2-3 | INT = low |
| JU21 | AVDD | 1-2* | AVDD power from 3.3V LDO U2, powered by VIN |
| | | Open | AVDD must be provided from an external source |
| JU22 | DVDD | 1-2* | DVDD power from 3.3V LDO U2, powered by VIN |
| | | Open | DVDD must be provided from an external source |
| JU23 | IOVDD | 1-2* | IOVDD power from 3.3V LDO U2, powered by VIN |
| | | Open | IOVDD must be provided from an external source |
| JU121 | Reserved | Not installed* | Reserved for factory diagnostic tests |
| JU141 | TX/SCL | Not installed* | Connects U1–U12 through level translator U14 |
| JU142 | RX/SDA | Not installed* | Connects U1–U12 through level translator U14 |
| JU143 | LFLT | Not installed* | Connects U1 to the USB through level translator U14 |
| JU144 | INT | Not installed* | Connects U1 to the USB through level translator U14 |
| JU151 | U15 AD2 | 1-2* | Selects U15 I²C device address |
| | | 2-3 | Selects U15 I²C device address |
| | | Open | Reserved for factory diagnostic tests |
| JU152 | U15 AD0 | 1-2* | Selects U15 I²C device address |
| | | 2-3 | Selects U15 I²C device address |
| | | Open | Reserved for factory diagnostic tests |
| JU153 | U15 SDA | 1-2* | Connects U15 MAX7324 to the I²C bus; MS must be low (SW1) and CDS must be low (JU1 = 2-3 on both boards) |
| | | Open | Disconnects U15 MAX7324 from the I²C bus; MS can be high (SW1) |
| JU154 | U15 SCL | 1-2* | Connects U15 MAX7324 to the I²C bus; MS must be low (SW1) and CDS must be low (JU1 = 2-3 on both boards) |
| | | Open | Disconnects U15 MAX7324 from the I²C bus; MS can be high (SW1) |
| JU191 | AUDIO_SCL | 1-2* | U12 sends I²C initialization commands to audio chip U20 |
| | | Open | Disconnects the audio I²C bus pullup resistor |
| JU192 | AUDIO_SCL | 1-2* | U12 sends the I²C initialization commands to audio chip U20 |
| | | Open | Disconnects the audio I²C bus |
| JU193 | AUDIO_SDA | 1-2* | U12 sends the I²C initialization commands to audio chip U20 |
| | | Open | Disconnects the audio I²C bus pullup resistor |
| JU194 | AUDIO_SDA | 1-2* | U12 sends the I²C initialization commands to audio chip U20 |
| | | Open | Disconnects the audio I²C bus |
| JU201 | U20 ADD | 1-2* | U20 ADD = GND<br>Selects U20 device address 0010 000x (0x20) (on audio I²C bus) |
| | | 3-4 | U20 ADD = IOVDD<br>Selects U20 device address 0010 001x (0x22) (on audio I²C bus) |
| | | 5-6 | U20 ADD = AUDIO_SDA<br>Selects U20 device address 0010 011x (0x26) (on audio I²C bus) |
| | | Open | Reserved |
| JU202 | HPS | 1-2* | U20 MAX9850 headphone sense controlled by the insertion of headphones |
| | | Open | U20 MAX9850 headphone sense switch forced open |

## Table 1. MAX9268 EV Kit Jumper Descriptions (continued)

| JUMPER | SIGNAL | SHUNT POSITION | DESCRIPTION |
|---|---|---|---|
| JU203 | I2S SD | 1-2* | U1 I²S audio drives U20 MAX9850 audio DAC |
| | | Open | Disconnects the I²S signals |
| JU204 | I2S SCK | 1-2* | U1 I²S audio drives U20 MAX9850 audio DAC |
| | | Open | Disconnects the I²S signals |
| JU205 | I2S WS | 1-2* | U1 I²S audio drives U20 MAX9850 audio DAC |
| | | Open | Disconnects the I²S signals |
| JU206 | MCLK | 1-2* | U20 MCLK = PLL_OUT_MCLK from 4x PLL U29 |
| | | 2-3 | U20 MCLK = CNTL2/MCLK from U1 |
| JU251 | U25 SYNC | 1-2* | U25 operates in spread-spectrum mode with $f_{OSC}$ = 1200kHz ±60kHz |
| | | 1-3 | U25 operates in fixed-frequency mode with $f_{OSC}$ = 1400kHz |
| | | 1-4 | U25 operates in fixed-frequency mode with $f_{OSC}$ = external TTL-compatible clock frequency |
| | | 1-5 | U25 operates in fixed-frequency mode with $f_{OSC}$ = 1100kHz |
| | | Open | Reserved |
| JU252 | U25 $\overline{SHDN}$ | 1-2* | U25 $\overline{SHDN}$ = high, enables speaker driver |
| | | 2-3 | U25 $\overline{SHDN}$ = low, disables speaker driver |
| | | Open | Reserved |
| JU253 | U25 GAIN2 | 1-2* | JU253 and JU254 set the gain of U25 |
| | | 2-3 | JU253 and JU254 set the gain of U25 |
| | | Open | Reserved |
| JU254 | U25 GAIN1 | 1-2* | JU253 and JU254 set the gain of U25 |
| | | 2-3 | JU253 and JU254 set the gain of U25 |
| | | Open | Reserved |
| JU255 | U25 INL- | Not installed* | U25 input INL is ground referenced |
| | | Open | Reserved |
| JU256 | U25 INR- | Not installed* | U25 input INR is ground referenced |
| | | Open | Reserved |

**Default position.*

## Table 2. Address-Select Jumpers (JU7, JU8)

| JU7 SHUNT POSITION | ADD1 | JU8 SHUNT POSITION | ADD0 | MAX9268 ADDRESS |
|---|---|---|---|---|
| 1-2 | IOVDD | 1-2 | IOVDD | 0xD4 |
| | | 1-3 | Open | 0xD8 |
| | | 1-4 | GND | 0xD0 |
| 1-3 | Open | 1-2 | IOVDD | 0x54 |
| | | 1-3 | Open | 0x58 |
| | | 1-4 | GND | 0x50 |
| 1-4* | GND | 1-2 | IOVDD | 0x94 |
| | | 1-3 | Open | 0x98 |
| | | 1-4* | GND | 0x90 |

**Device address is determined when power is applied.*

# MAX9268 Evaluation Kit

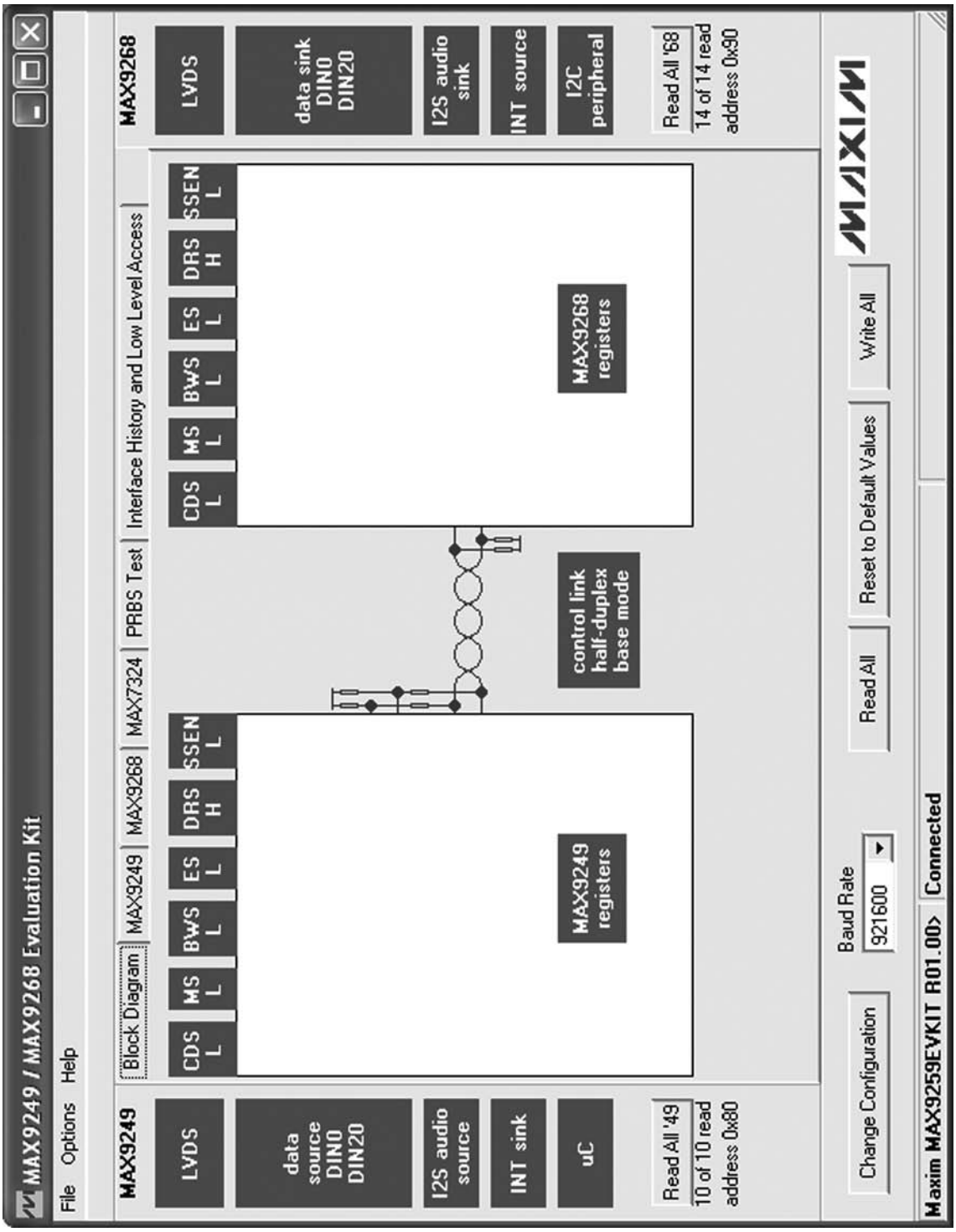


*Figure 1. MAX9249/MAX9268 EV Kit Software Main Window (Block Diagram Tab)*

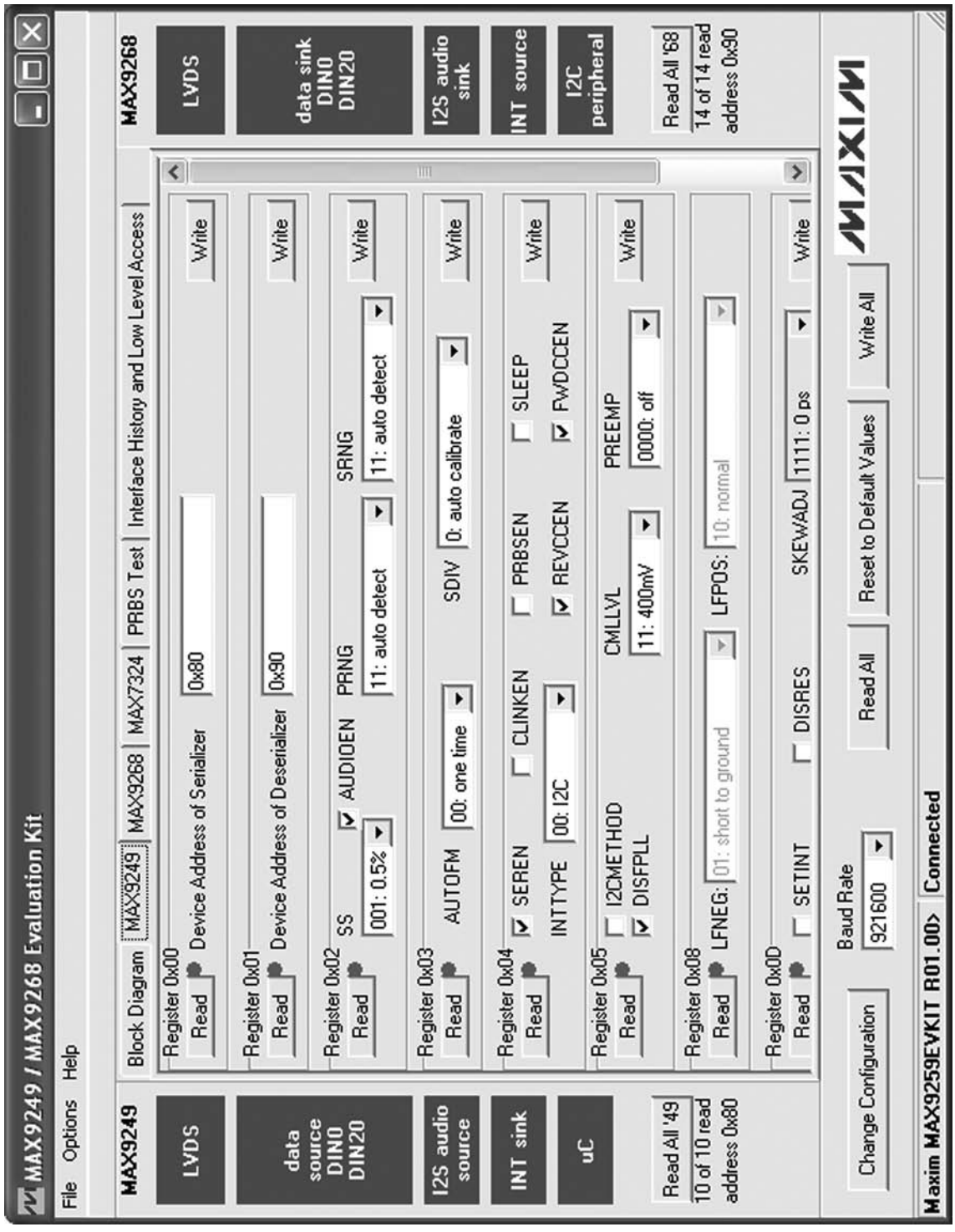


*Figure 2. MAX9249/MAX9268 EV Kit Software Main Window (MAX9249 Tab)*

# MAX9268 Evaluation Kit

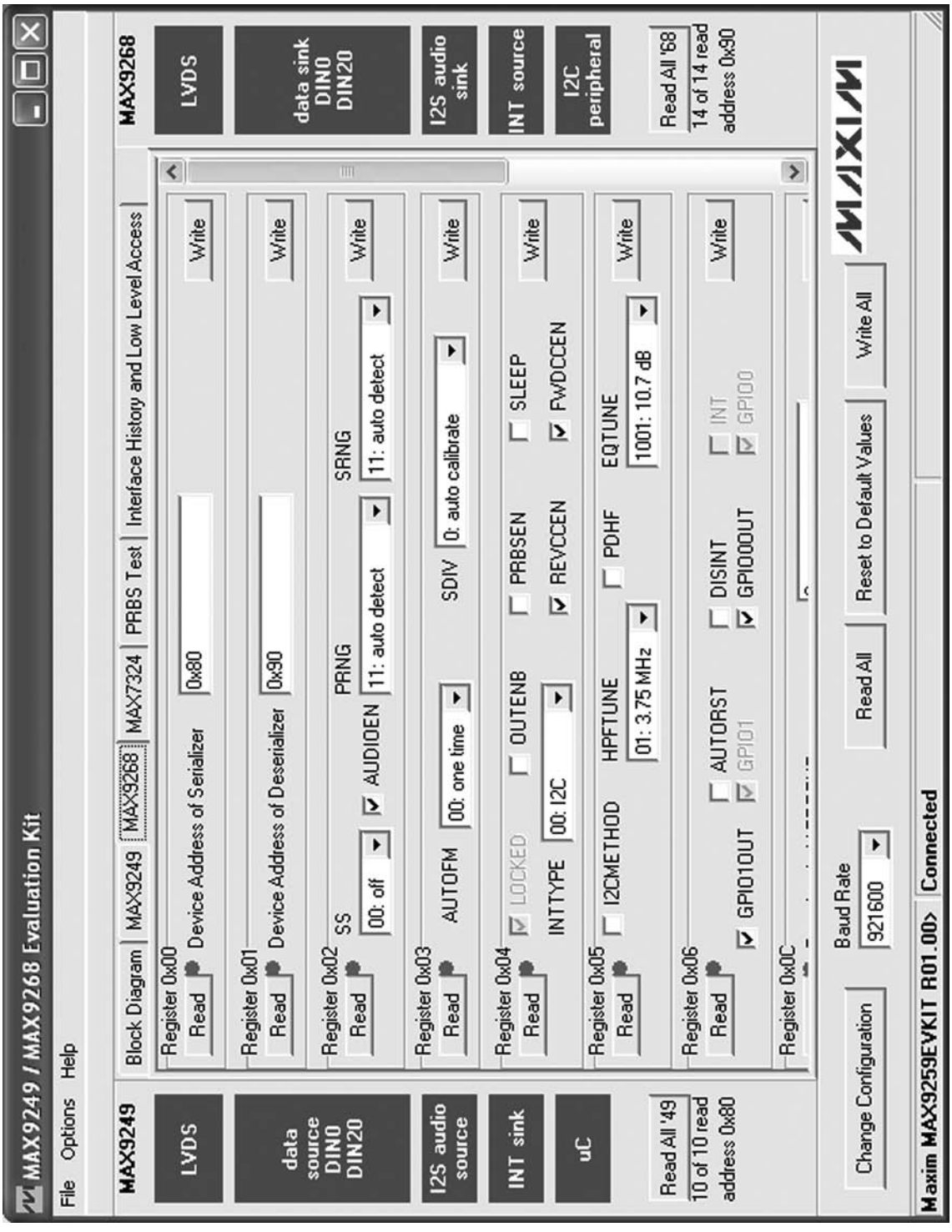


*Figure 3. MAX9249/MAX9268 EV Kit Software Main Window (MAX9268 Tab)*

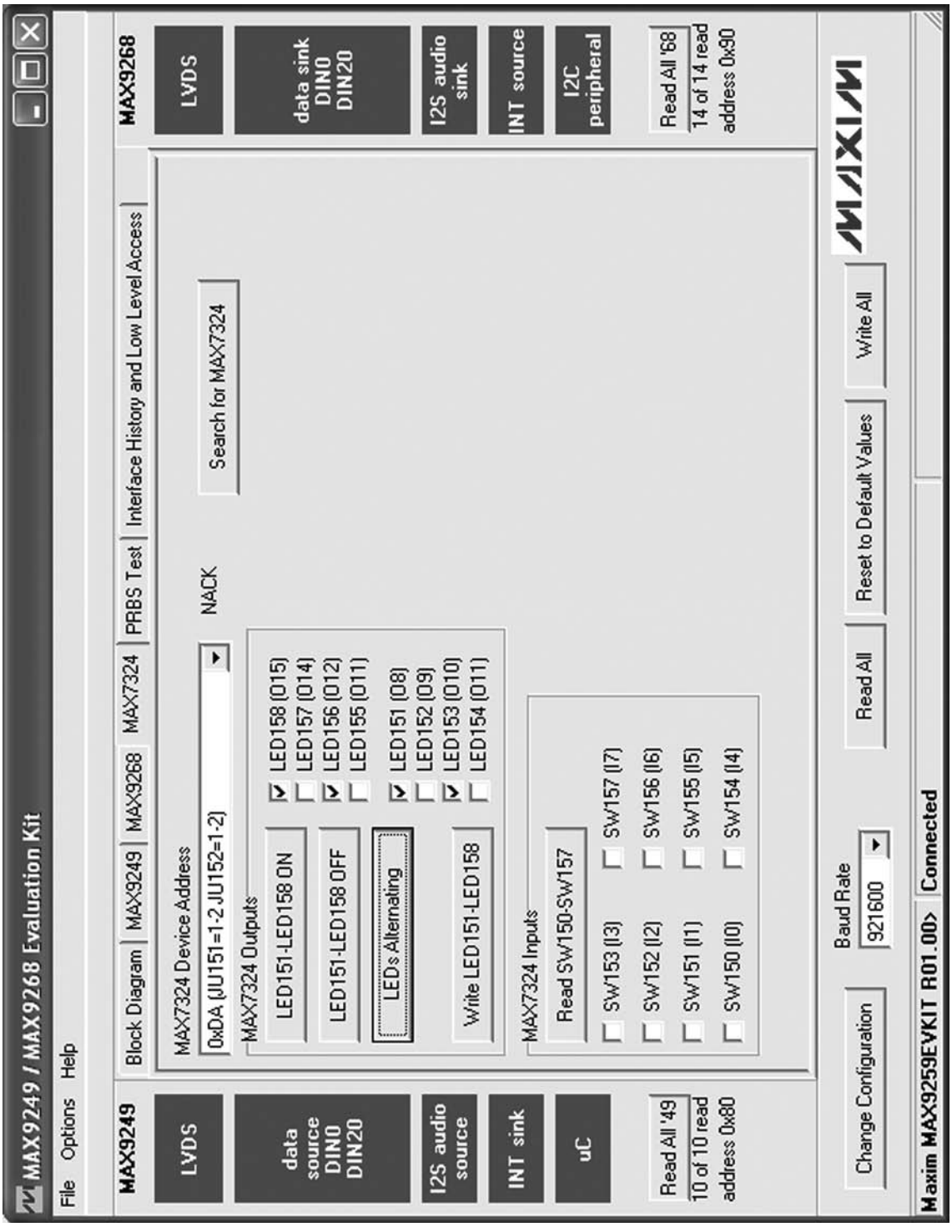


*Figure 4. MAX9249/MAX9268 EV Kit Software Main Window (MAX7324 Tab)*

# MAX9268 Evaluation Kit

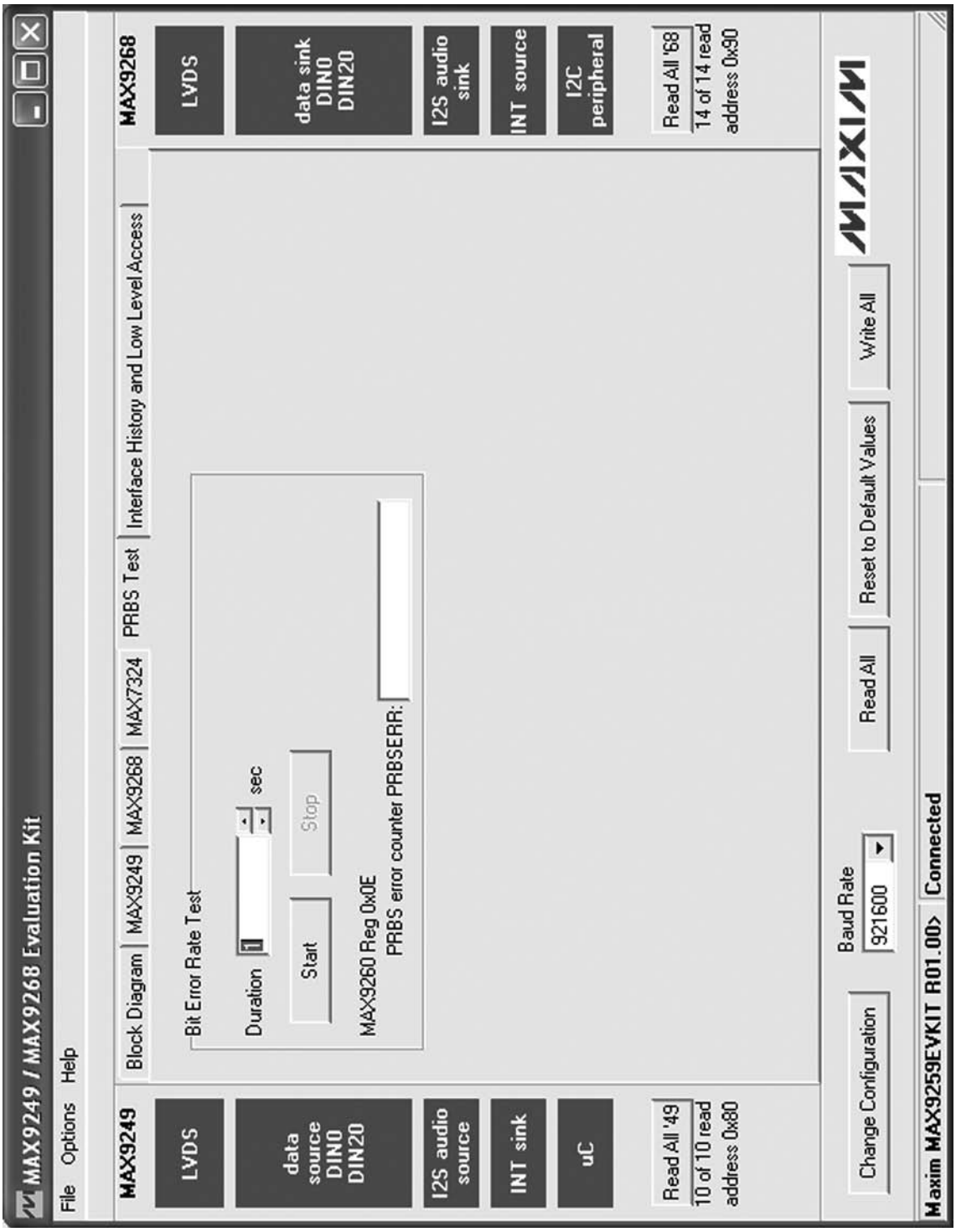


*Figure 5. MAX9249/MAX9268 EV Kit Software Main Window (PRBS Test Tab)*

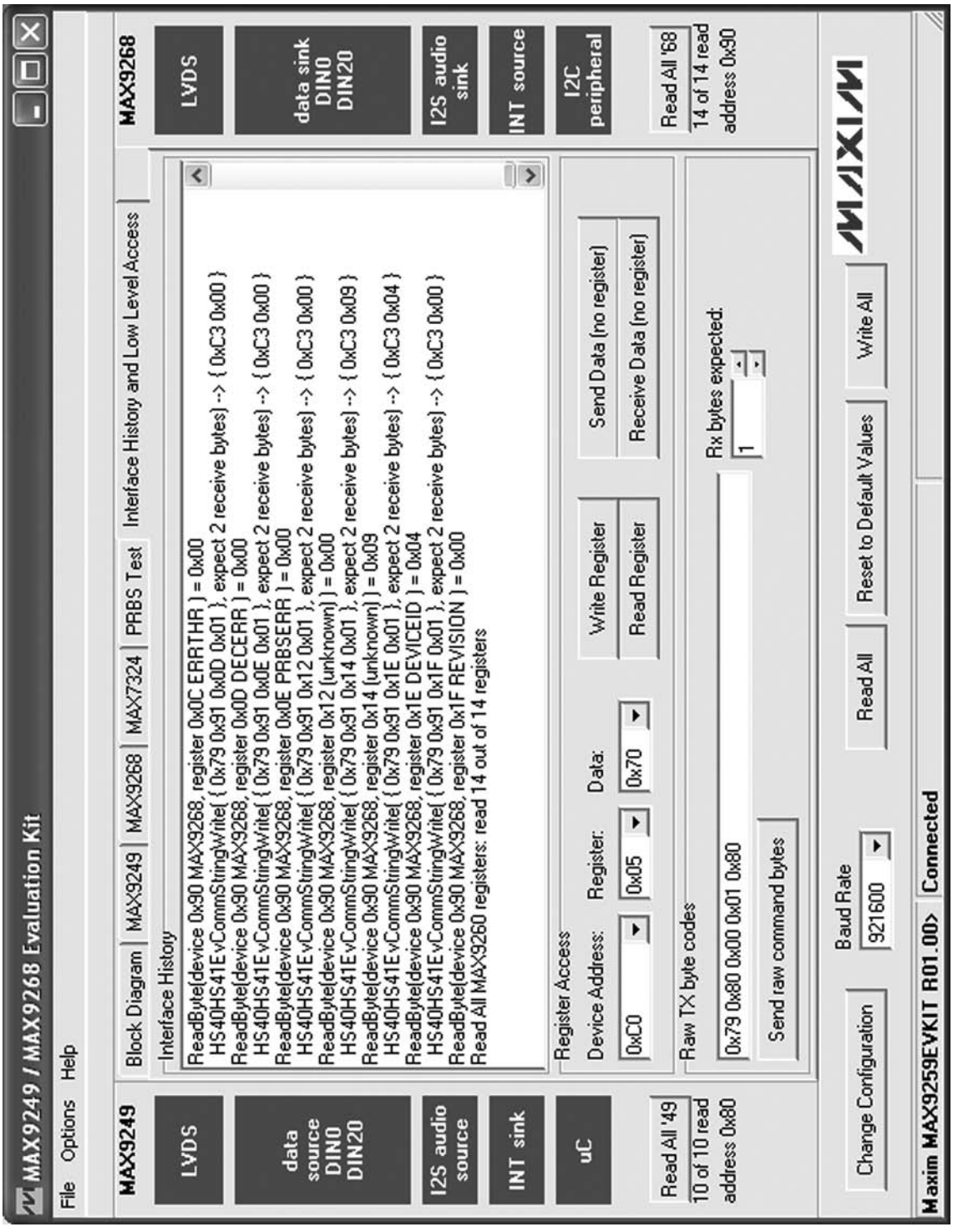


*Figure 6. MAX9249/MAX9268 EV Kit Software Main Window (Interface History and Low Level Access Tab)*

# MAX9268 Evaluation Kit

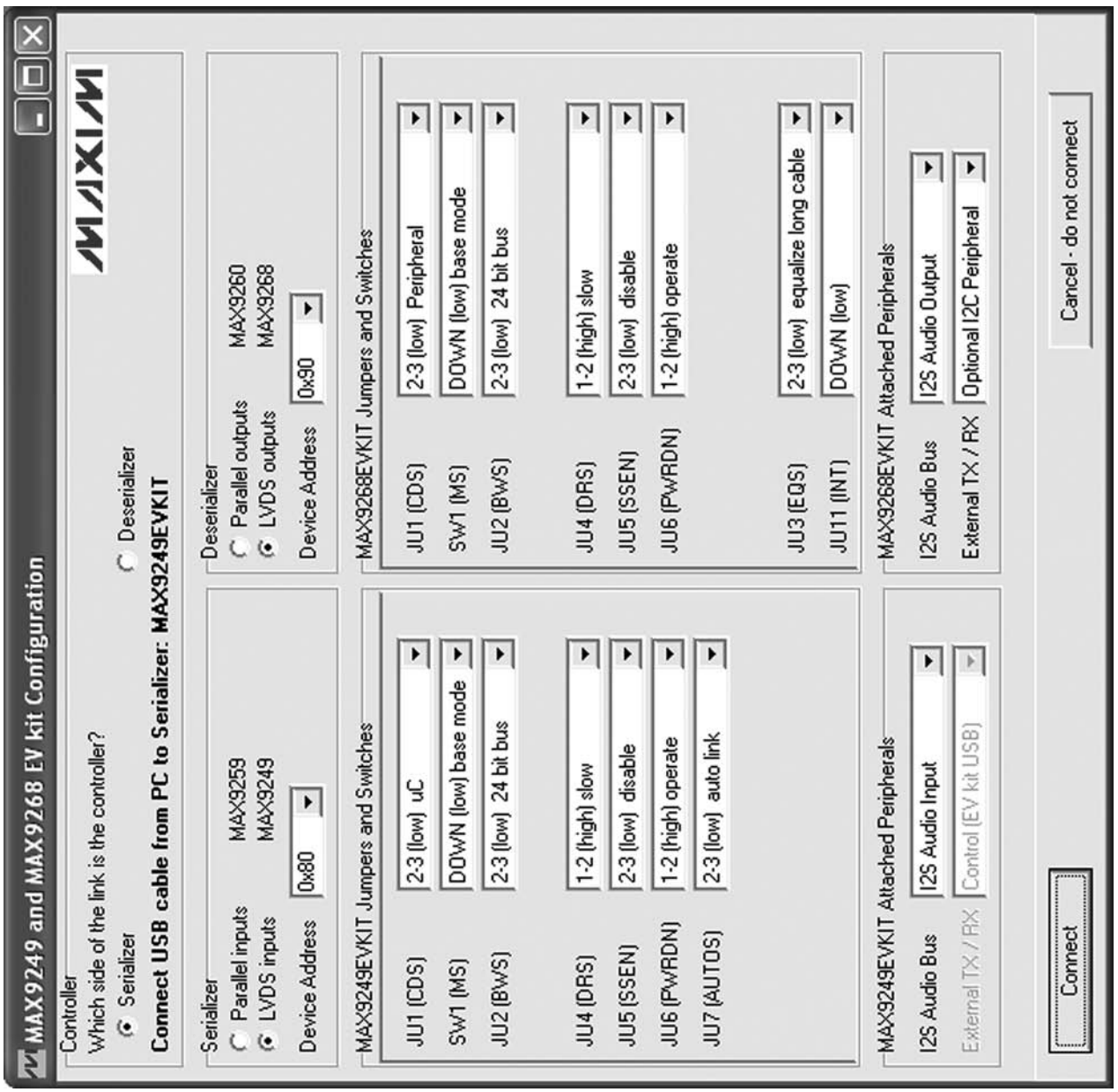


*Figure 7. MAX9249/MAX9268 EV Kit Software Configuration Window*

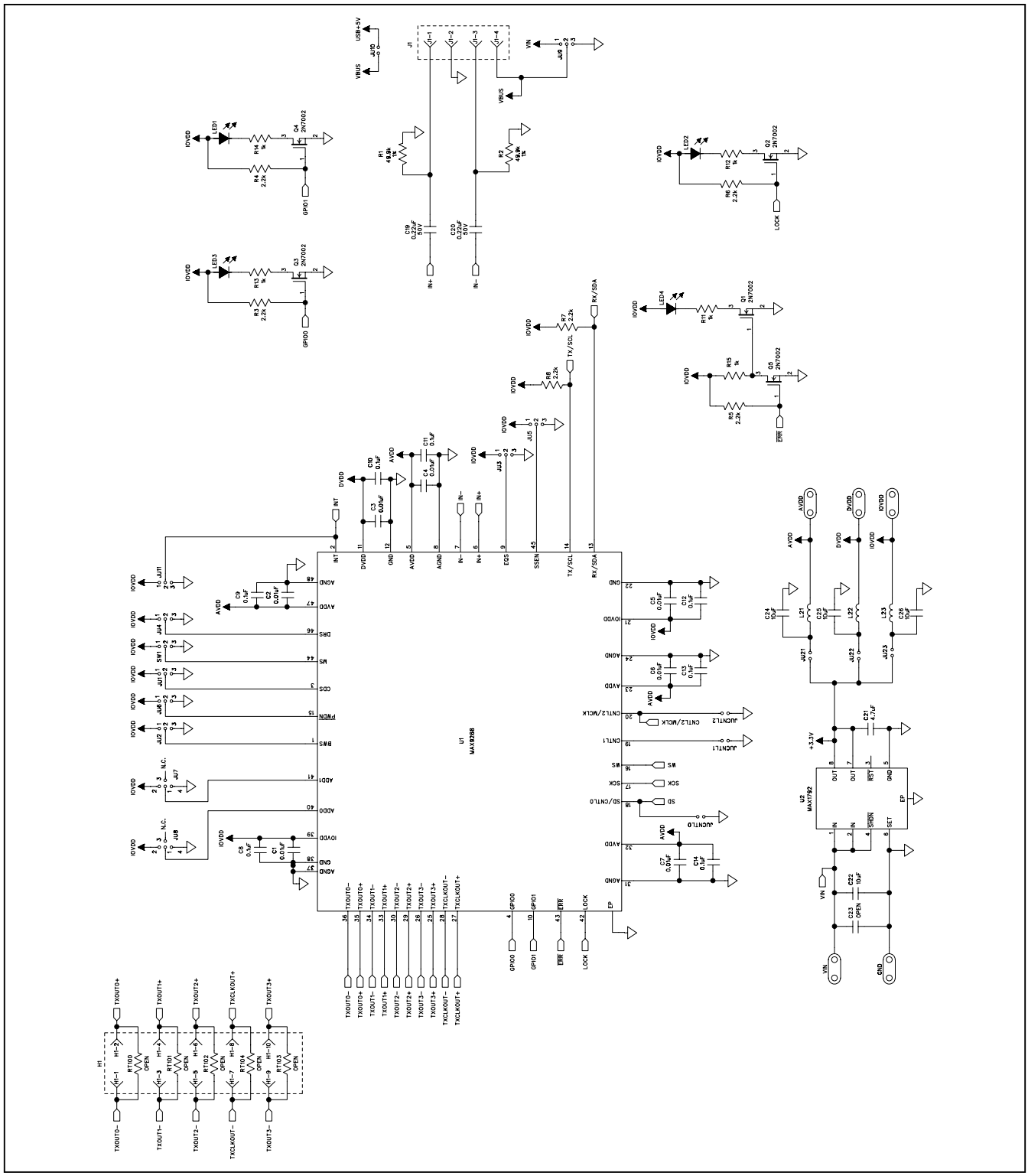

*Figure 8a. MAX9268 EV Kit Schematic (Sheet 1 of 3)*

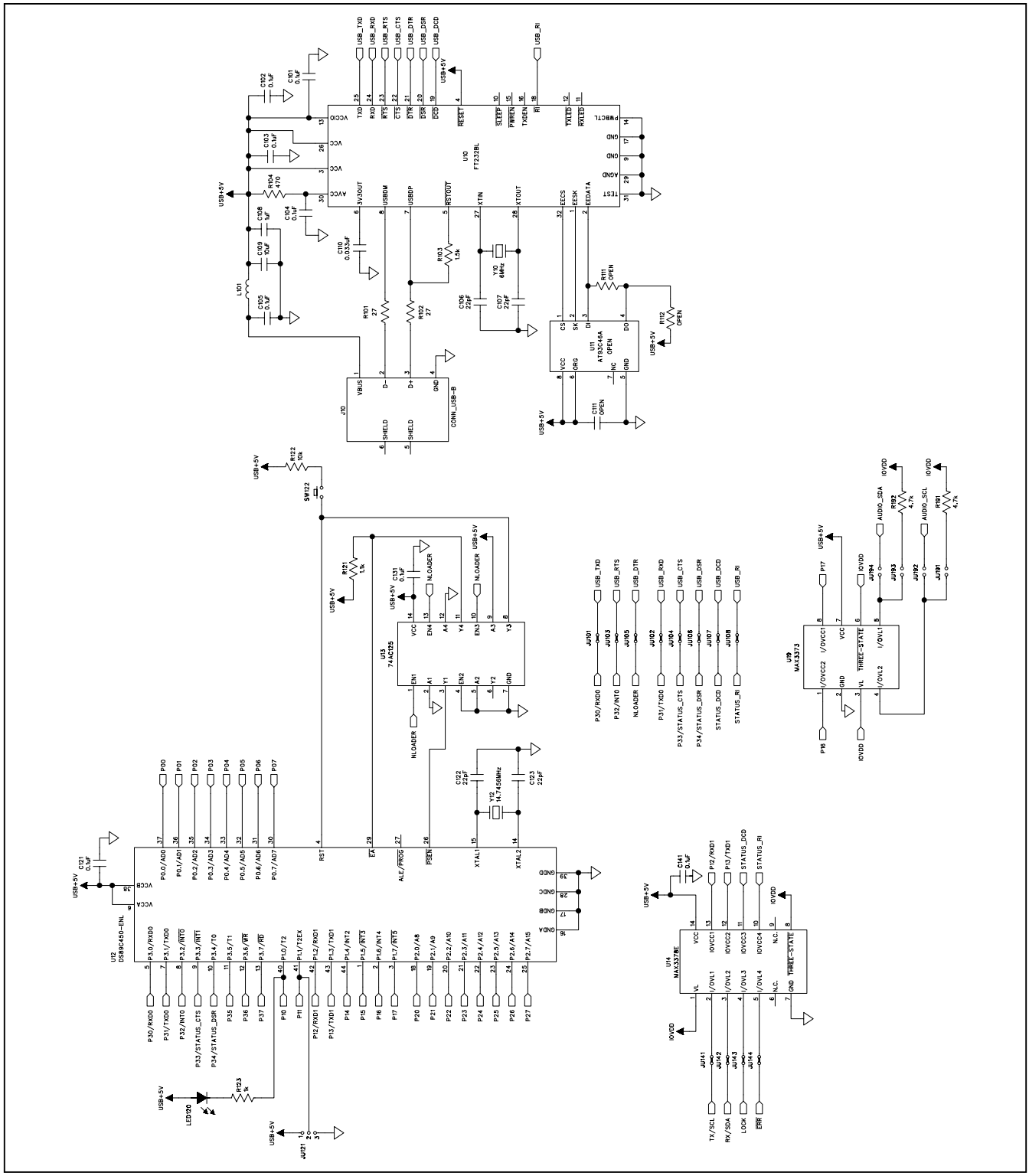

Figure 8b. MAX9268 EV Kit Schematic (Sheet 2 of 3)

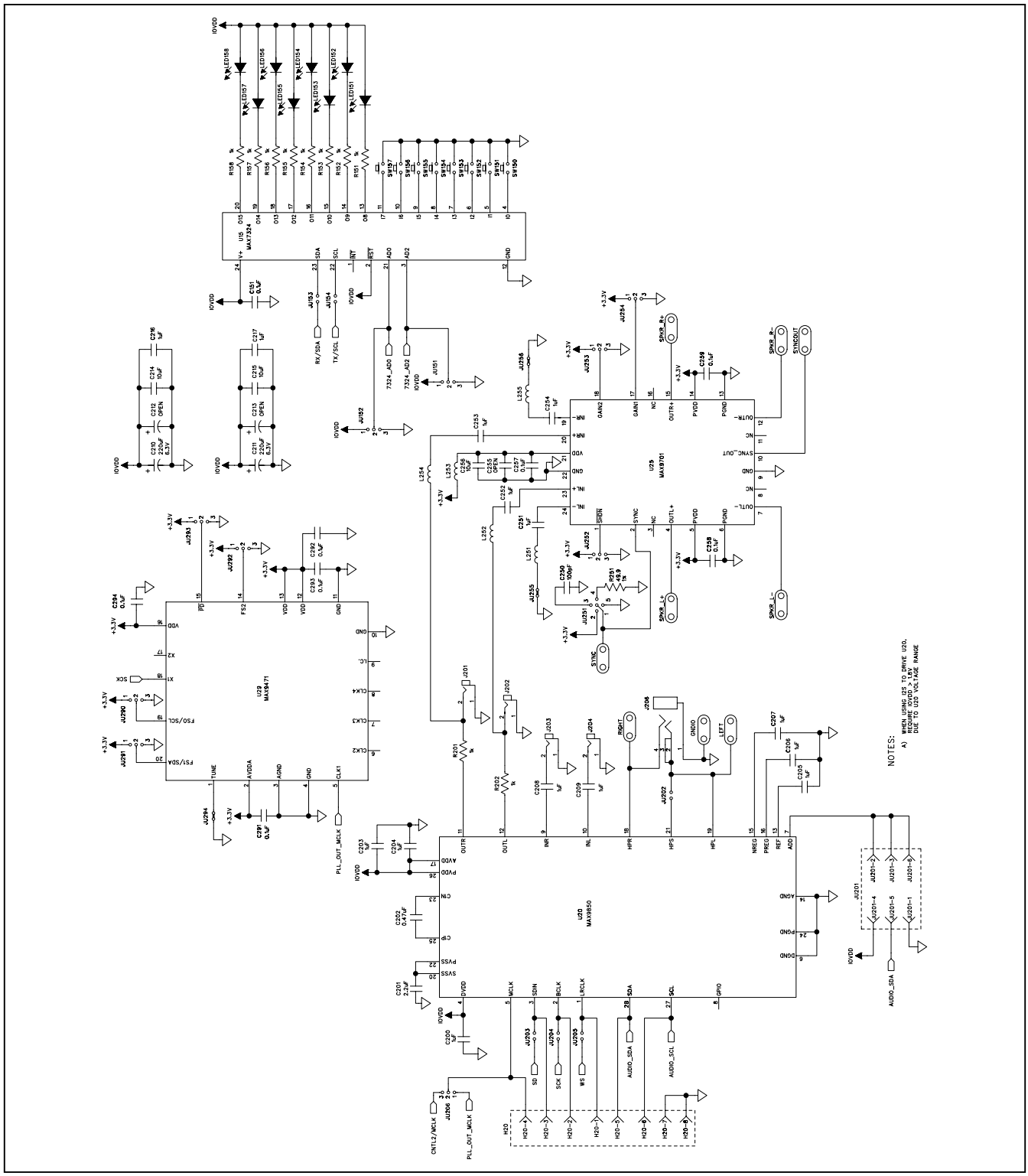

Figure 8c. MAX9268 EV Kit Schematic (Sheet 3 of 3)

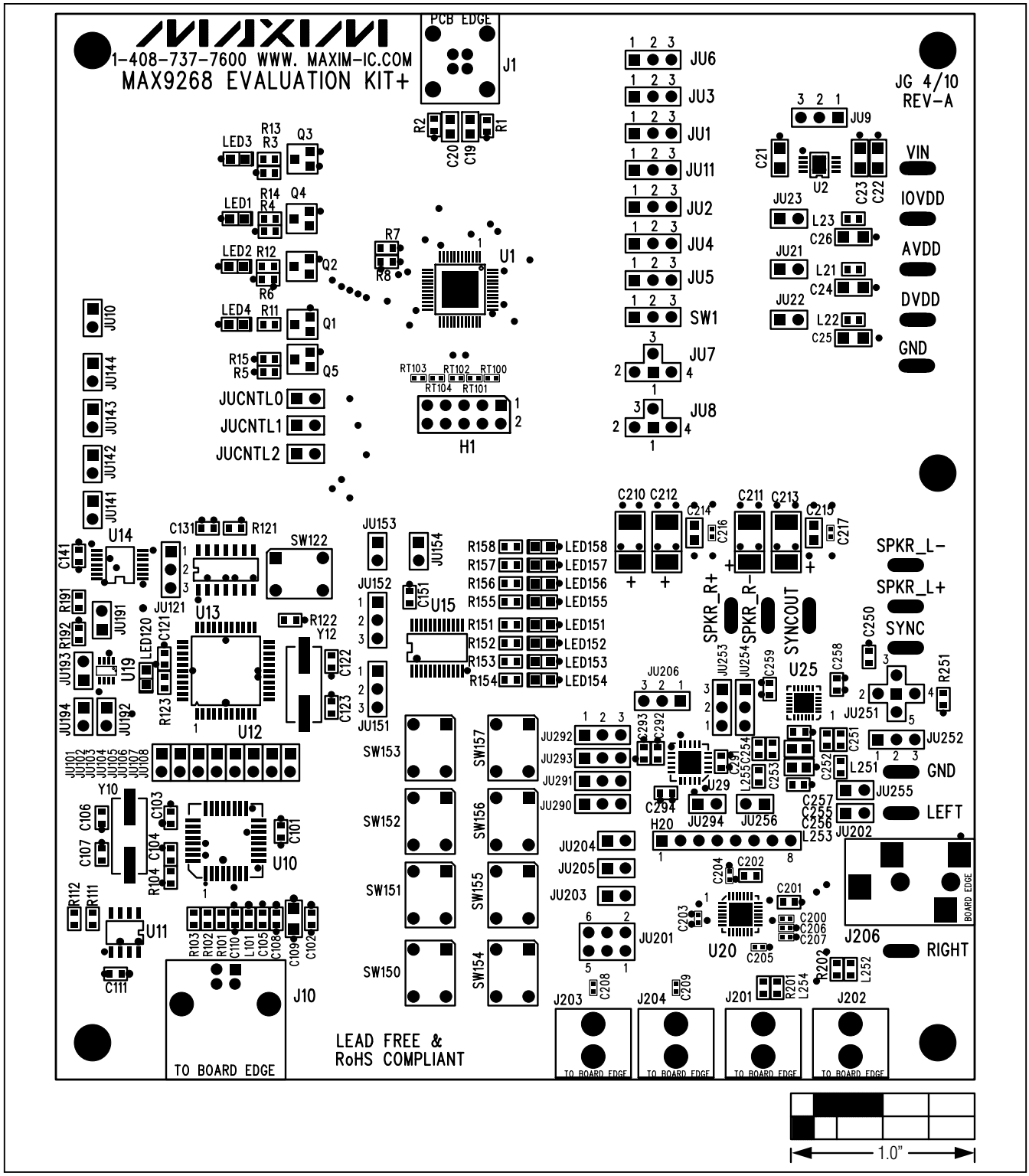


*Figure 9. MAX9268 EV Kit Component Placement Guide—Component Side*

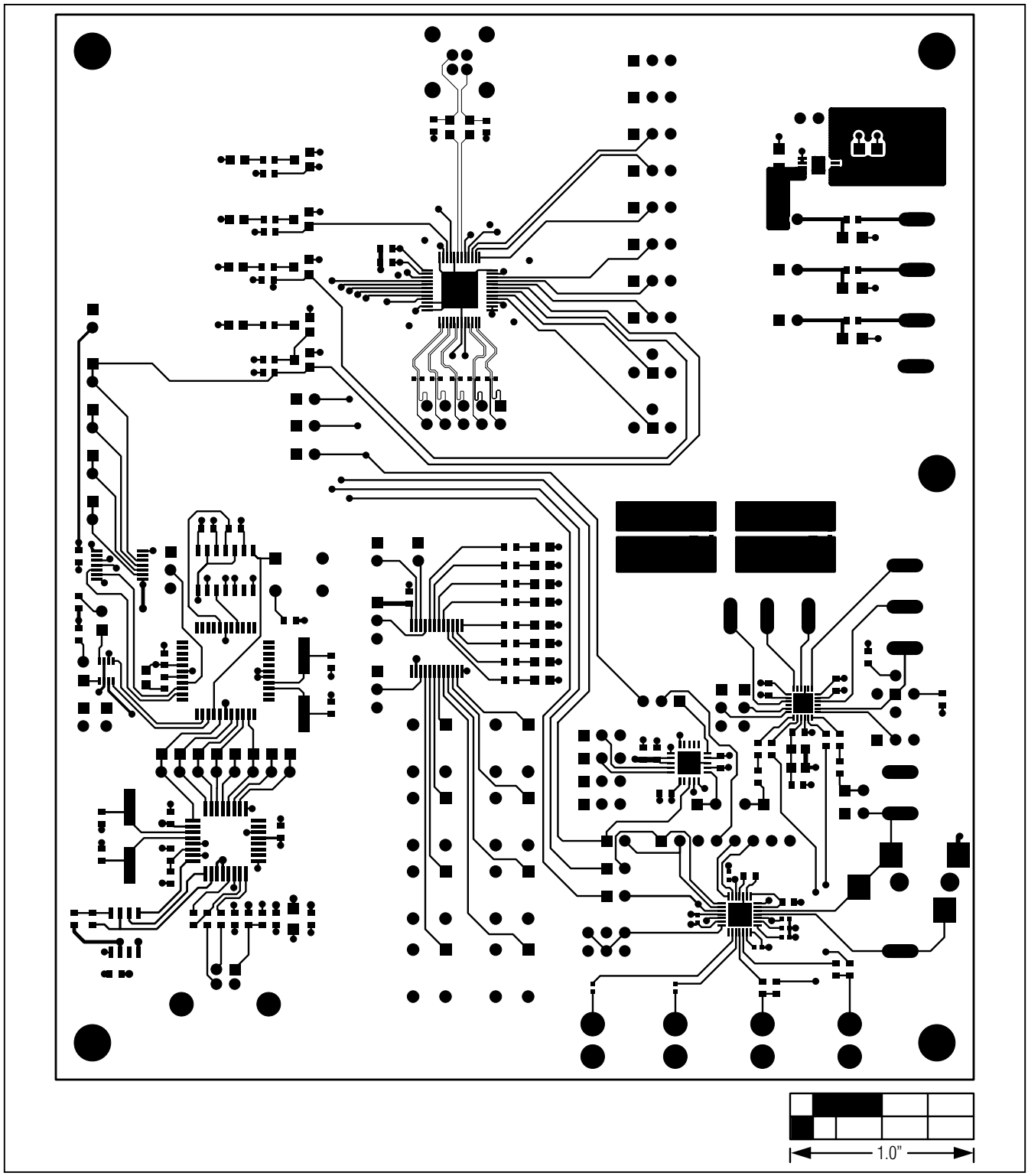


*Figure 10. MAX9268 EV Kit PCB Layout—Component Side*

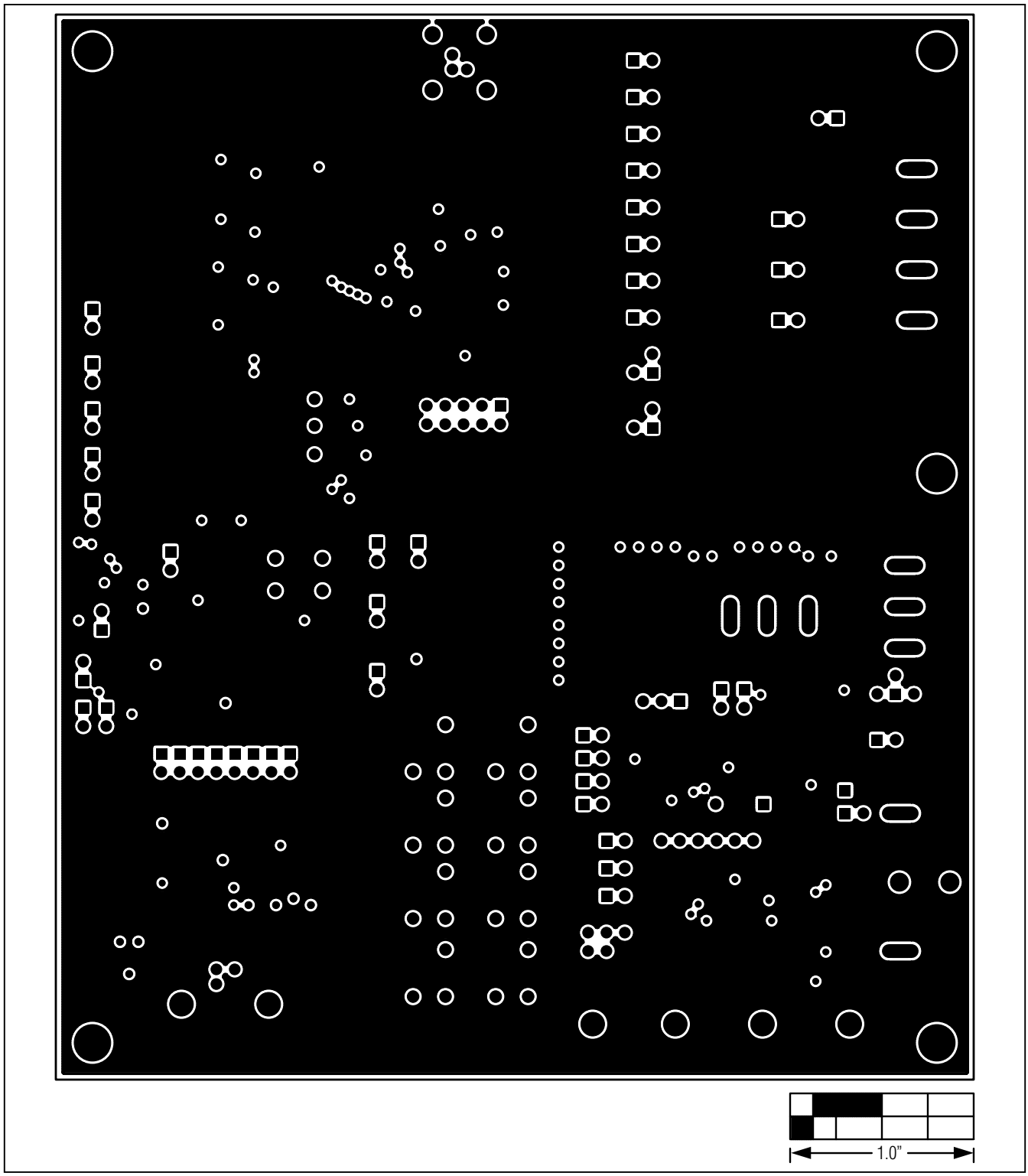


*Figure 11. MAX9268 EV Kit PCB Layout—Ground Layer 2*

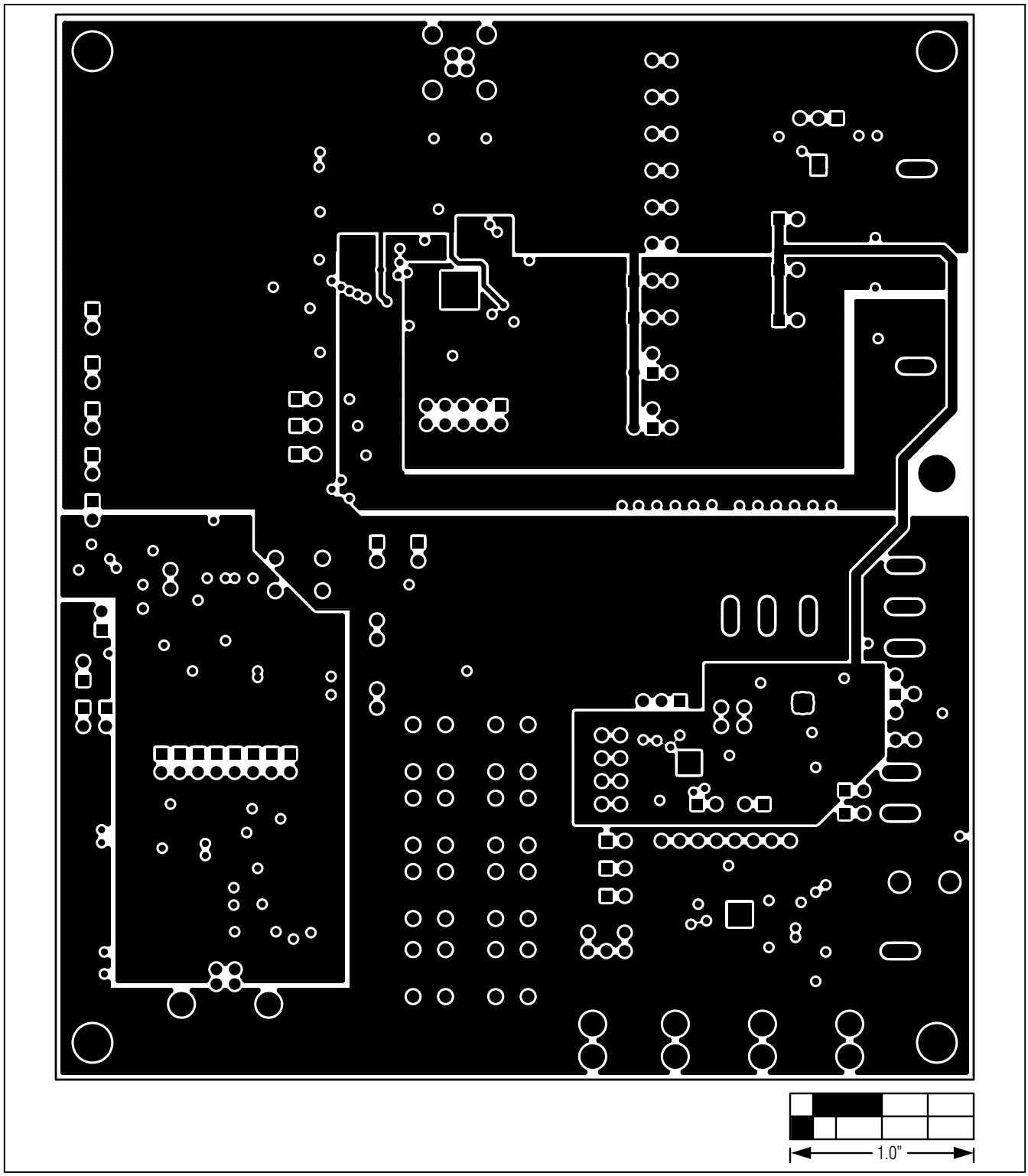


*Figure 12. MAX9268 EV Kit PCB Layout—Power Layer 3*

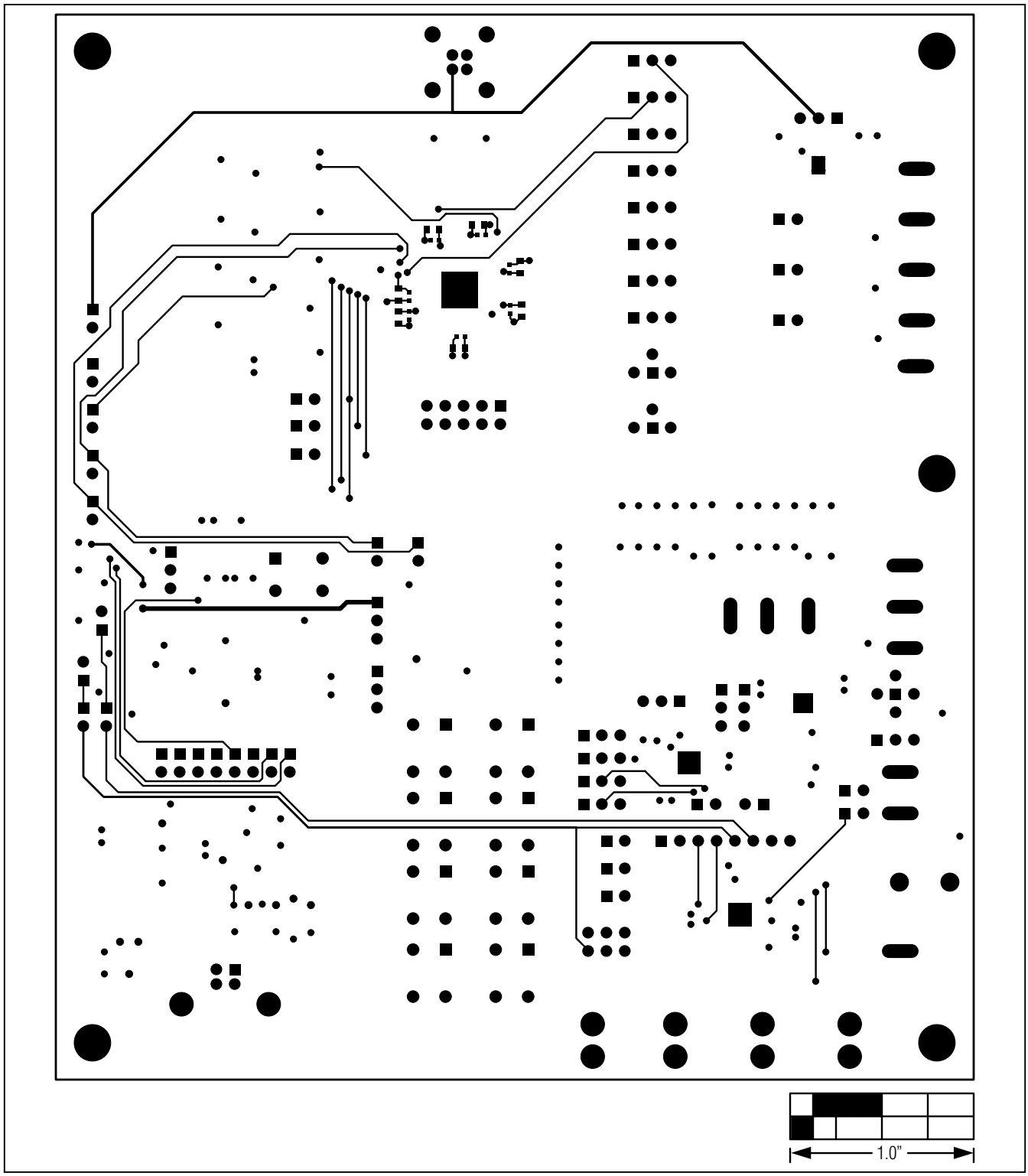


*Figure 13. MAX9268 EV Kit PCB Layout—Solder Side*

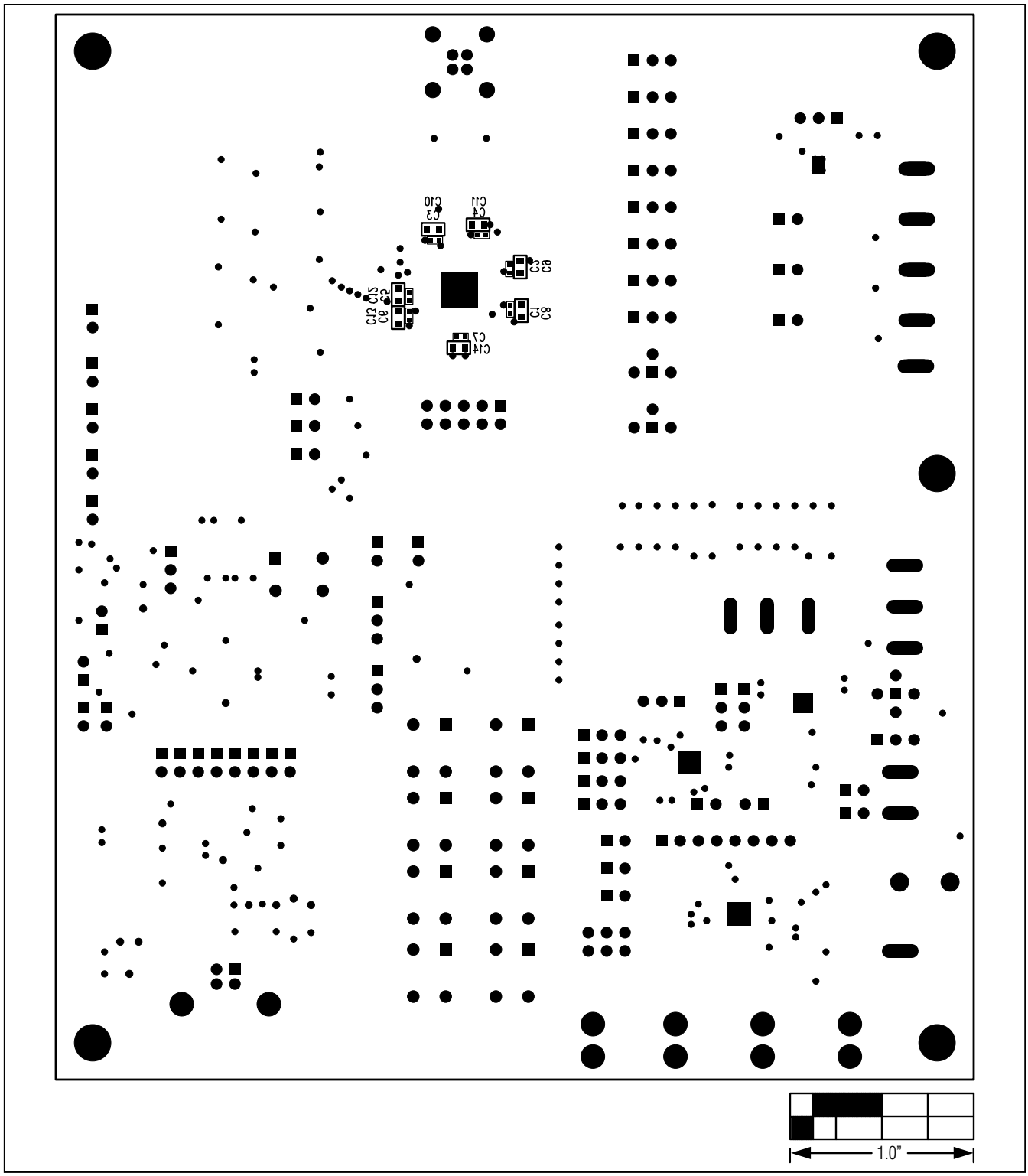


*Figure 14. MAX9268 EV Kit Component Placement Guide—Solder Side*

## Revision History

| REVISION NUMBER | REVISION DATE | DESCRIPTION | PAGES CHANGED |
|---|---|---|---|
| 0 | 5/10 | Initial release | — |

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