



MAX9511 Evaluation Kit

General Description

The MAX9511 evaluation kit (EV kit) is a fully assembled and tested surface-mount circuit board that contains a MAX9511 IC. The MAX9511 is a complete solution to interface a video graphic controller to a VGA port and/or docking station that requires adjustable electromagnetic interference (EMI) suppression. The MAX9511 includes external load-detection circuitry. The MAX9511 also features logic translation for the sync and display data channel (DDC).

The MAX9511 EV kit provides standard VGA (HD Sub-D) connectors for the video input and output signals for ease of operation. Each of the video input and output signals can also be accessed individually. The EV kit operates from two 5V power supplies and a 2.7V to 3.6V power supply.

Features

- ◆ RGB Drivers with Adjustable Slew Rate for EMI Control
- ◆ H and V Sync Drivers with Level Translation
- ◆ Bidirectional Level Translator for DDC Support
- ◆ Simultaneously Drives External Monitor/Projector and Docking Station Without Analog RGB Switches—No Stub Reflection
- ◆ Small 24-Pin QSOP Package
- ◆ Standard VGA (HD Sub-D) Input/Output Connectors for Normal Operation
- ◆ Test BNC Connector Pads for All Input/Output Channels
- ◆ Surface-Mount Components
- ◆ Fully Assembled and Tested

Ordering Information

PART	TEMP RANGE	IC PACKAGE
MAX9511EVKIT	0°C to +70°C	24 QSOP

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C2, C3	3	4.7 μ F \pm 20%, 6.3V X5R ceramic capacitors (0805) TDK C2012X5R0J475M
C4, C5, C6	3	0.22 μ F \pm 10%, 10V X7R ceramic capacitors (0603) TDK C1608X7R1A224K
C7, C8	2	270pF \pm 5%, 50V C0G ceramic capacitors (0603) TDK C1608C0G1H271J
C9	1	0.1 μ F \pm 10%, 25V X7R ceramic capacitor (0603) TDK C1608X7R1E104K
R1–R6	6	75 Ω \pm 1% resistors (0805)
R7–R13	7	0 Ω \pm 5% resistors (0805)
R14–R23	0	Not installed, resistors (0805)
R24	1	4.99k Ω \pm 1% resistor (0805)
R25	1	50k Ω , 19-turn, 3/8in, cermet potentiometer
U1	1	MAX9511CEG (24-pin QSOP)

DESIGNATION	QTY	DESCRIPTION
R_IN, R_OUT, G_IN, G_OUT, B_IN, B_OUT, DDC_CLK_IN, DDC_CLK_OUT, DDC_DATA_IN, DDC_DATA_OUT, H_SYNC_INPUT, H_SYNC_OUTPUT, V_SYNC_INPUT, V_SYNC_OUTPUT	0	Not installed, BNC connectors, 75 Ω BNC PC-board-mount jack connectors
VGA_IN	1	HD Sub-D, 15-pin male connector
VGA_OUT	1	HD Sub-D, 15-pin female connector
JU1	1	2-pin header
JU2	0	Not installed, 2-pin header
None	1	Shunt
None	1	MAX9511 PC board

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Component Suppliers

SUPPLIER	PHONE	FAX	WEBSITE
TDK	847-803-6100	847-390-4405	www.component.tdk.com

Note: Indicate that you are using the MAX9511 EV kit when contacting this supplier.

Quick Start

Recommended Equipment:

- Three adjustable 5V, 1A DC power supplies
- Desktop PC (or notebook computer) with a VGA output
- Computer monitor
- VGA Sub-D extension cable

The MAX9511 EV kit is fully assembled and tested. Follow these steps to verify board operation. **Do not turn on the power supply until all connections are completed.**

- 1) Verify that a shunt is installed across jumper JU1 (EV kit ON).
- 2) Connect the output of the video graphic controller on the desktop PC to the VGA_IN connector on the MAX9511 EV kit with the VGA extension cable.
- 3) Connect the VGA_OUT connector on the MAX9511 EV kit to the VGA input of the monitor.
- 4) Connect the negative terminal of the first power supply to the AGND pad on the EV kit, and the positive terminal to the VCC pad on the EV kit.
- 5) Connect the negative terminal of the second power supply to the DGND pad on the EV kit, and the positive terminal to the VDD pad on the EV kit.
- 6) Connect the negative terminal of the third power supply to the DGND pad on the EV kit, and the positive terminal to the VDD2 pad on the EV kit.
- 7) Set the VCC and VDD1 power supplies to 5V, and the VDD2 power supply to 3V. Turn off all three power supplies.
- 8) Turn on the desktop PC and computer monitor.
- 9) Turn on all three power supplies.

Detailed Description

The MAX9511 EV kit is a fully assembled and tested surface-mount circuit board that contains a MAX9511 IC. The MAX9511 is a complete solution to interface a video graphic controller to a VGA port and/or docking station. The EV kit features adjustable EMI suppression, external load-detection circuitry, and logic translation for the sync and display data channel (DDC) of a connected monitor.

The EV kit operates from two 5V power supplies and a 2.7V to 3.6V power supply. The video drivers, output sync, and DDC operate from 5V power supplies (VCC, VDD1). The input sync and DDC operate from a 2.7V to 3.6V power supply (VDD2). Due to maximum power dissipation, limitation of the external terminating resistors R1–R6 limit the RGB input DC level on the VGA_IN_1, VGA_IN_2, and VGA_IN_3 to lower than 2V. Note that this is not the limitation of the MAX9511 IC.

The MAX9511 suppresses EMI by limiting the video signal slew rate. The slew rate is adjusted by potentiometer R25. Refer to the *Slew-Rate Limiting* section in the MAX9511 data sheet for additional information.

The MAX9511 IC includes external load-detection circuitry. Refer to the *Load Detection* section in the MAX9511 data sheet for additional details.

The MAX9511 also features logic-level translation between the inputs and outputs of the sync and DDC. The input sync and DDC can be operated at a lower logic level (2.7V to 3.6V), and the output sync and DDC can be operated at a higher logic level (5V). Refer to the *Display Data Channel (DDC)* section and the *Vertical and Horizontal SYNC* section in the MAX9511 data sheet for additional information.

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Table 1. BNC and Resistor Connections for Normal and Test Operation

DESIGNATION BNC CONNECTOR/RESISTOR	NORMAL OPERATION (DEFAULT)	TEST OPERATION
R_IN, R_OUT, G_IN, G_OUT, B_IN, B_OUT, DDC_CLK_IN, DDC_CLK_OUT, DDC_DATA_IN, DDC_DATA_OUT, H_SYNC_INPUT, H_SYNC_OUTPUT, V_SYNC_INPUT, V_SYNC_OUTPUT	Not installed, BNC connectors	User-installed 75Ω BNC connectors. Recommended: A/D Electronics 580-072-10 or equivalent
R4, R5, R6	75Ω	Not installed
R7–R13	0Ω	Not installed
R14, R15, R16	Not installed	75Ω
R17–R23	Not installed	0Ω

Table 2. JU1 Jumper Selection

SHUNT POSITION	MAX9511 $\overline{\text{SHDN}}$ PIN CONNECTED TO	EV KIT FUNCTION
Installed (default)	VDD2	EV kit enabled
Not installed	DGND (internally)	Shutdown mode
Not installed. External logic controller connected to $\overline{\text{SHDN}}$ pad.	External logic controller	$\overline{\text{SHDN}}$ driven by external logic controller. Shutdown is active low.

The MAX9511 EV kit provides standard VGA (HD Sub-D) connectors for the video input and output signals. For ease of testing, BNC connector PC board pads are provided for each of the video input and output signals. To access the input and output signals at the BNC connector pad, install the BNC connectors, and reconfigure resistors R4–R23. See Table 1 for the BNC and resistor connections for normal and test operation.

Note: Removing resistors R4–R13 will disconnect all the input and output signals from the VGA_IN and VGA_OUT connectors. Thus, a computer monitor cannot receive the signals.

Jumper Selection

Shutdown Mode ($\overline{\text{SHDN}}$)

Jumper JU1 controls the shutdown pin ($\overline{\text{SHDN}}$) of the MAX9511 IC. The shutdown pin can also be controlled by an external logic controller connected to the EV kit $\overline{\text{SHDN}}$ pad. Remove the shunt from jumper JU1 before connecting an external controller to the $\overline{\text{SHDN}}$ pad. See Table 2 for shunt positions.

AGND and DGND Connection

The MAX9511 EV kit features an option to connect or isolate the AGND and DGND PC board planes. Jumper JU2 selects the connection or isolation of the AGND and DGND on the EV kit. Table 3 lists the selectable jumper options.

Note that jumper JU2 is not installed and there is a PC board trace shorting pin holes 1 and 2. To utilize jumper JU2, cut open the PC board trace shorting pin holes 1 and 2.

Table 3. JU2 Jumper Selection

SHORT POSITION	AGND and DGND
Short (default)	Connected at JU2
Open (cut open PC board trace)	Isolated

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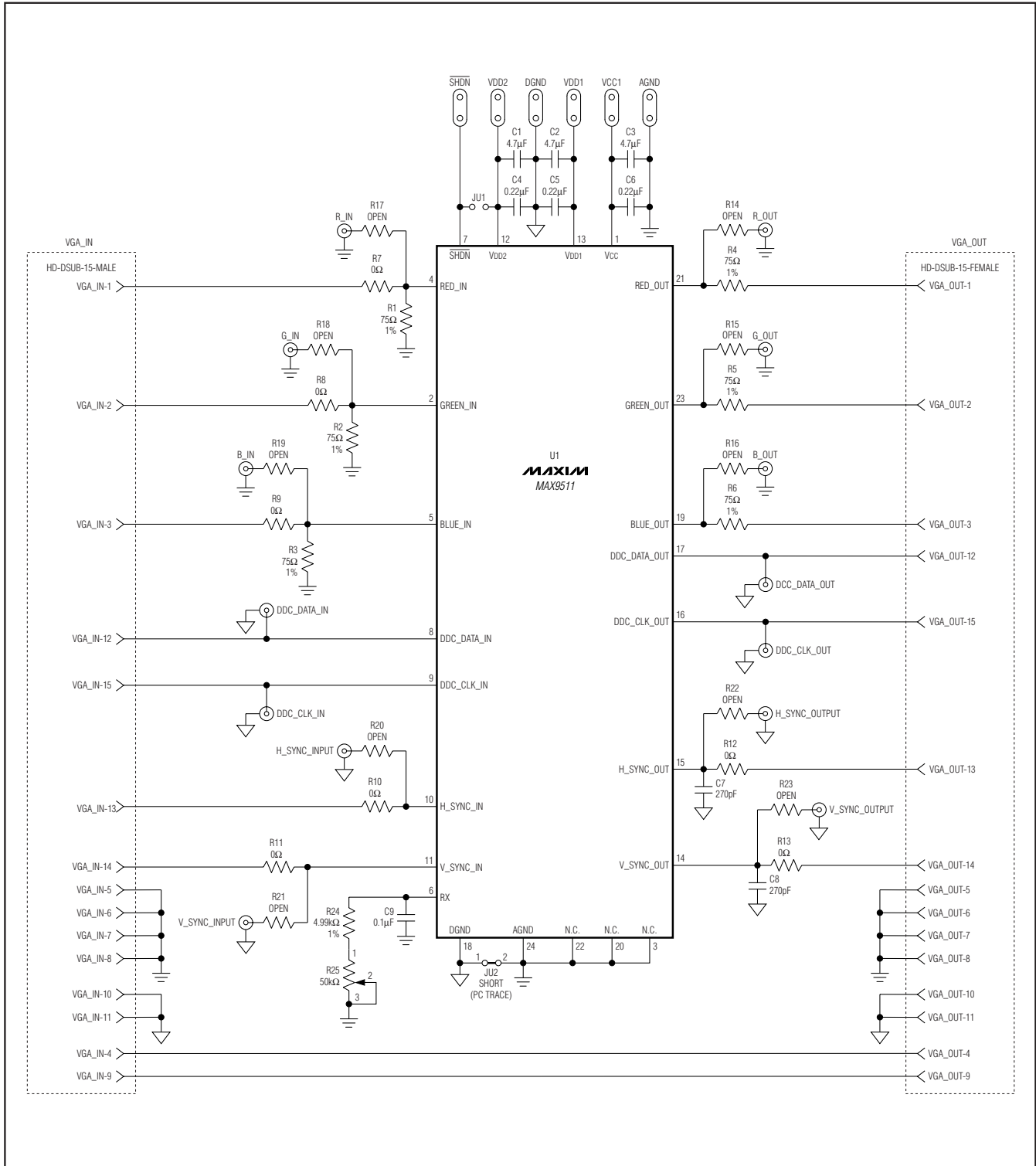


Figure 1. MAX9511 EV Kit Schematic

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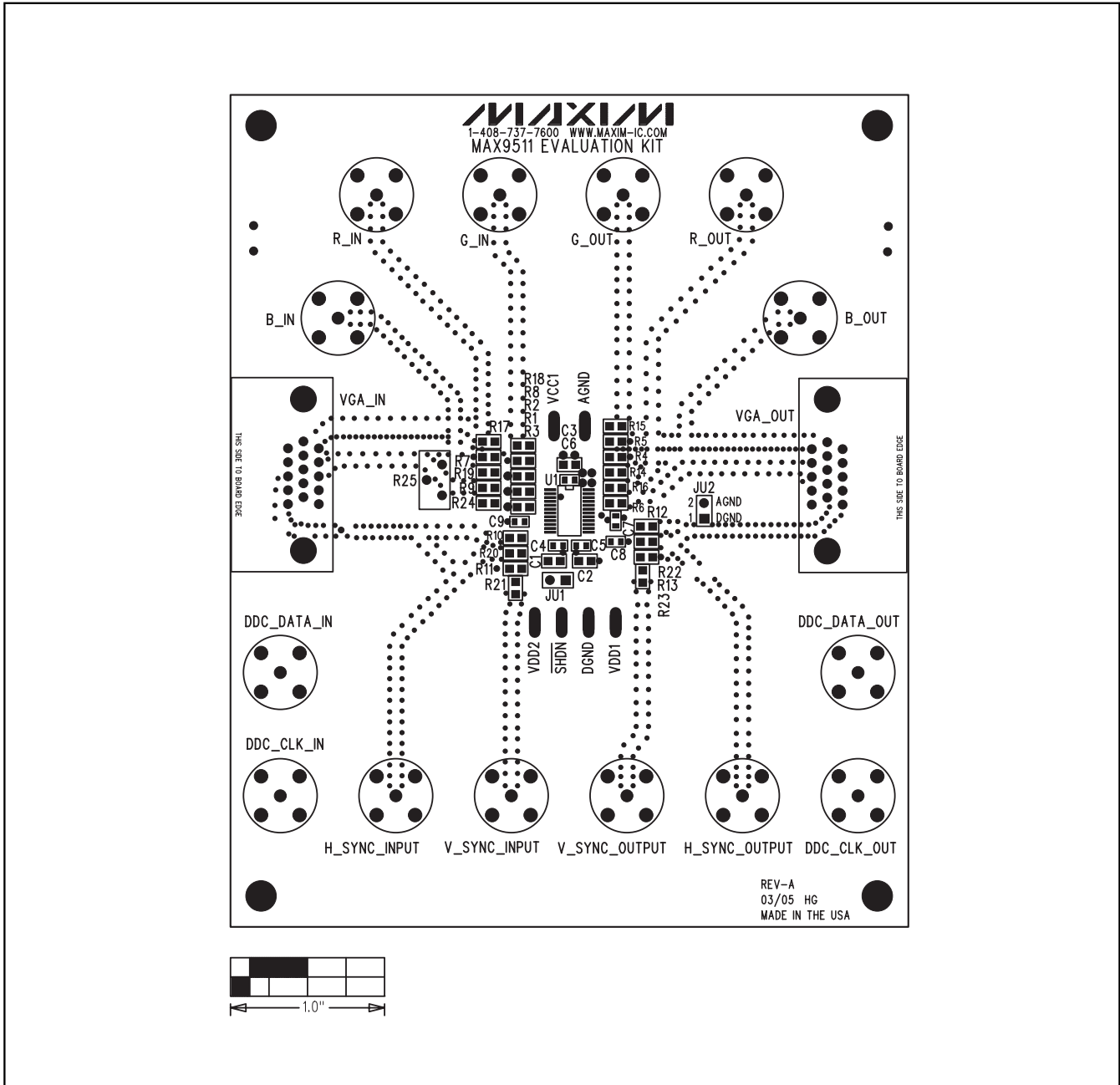


Figure 2. MAX9511 EV Kit Component Placement Guide—Component Side

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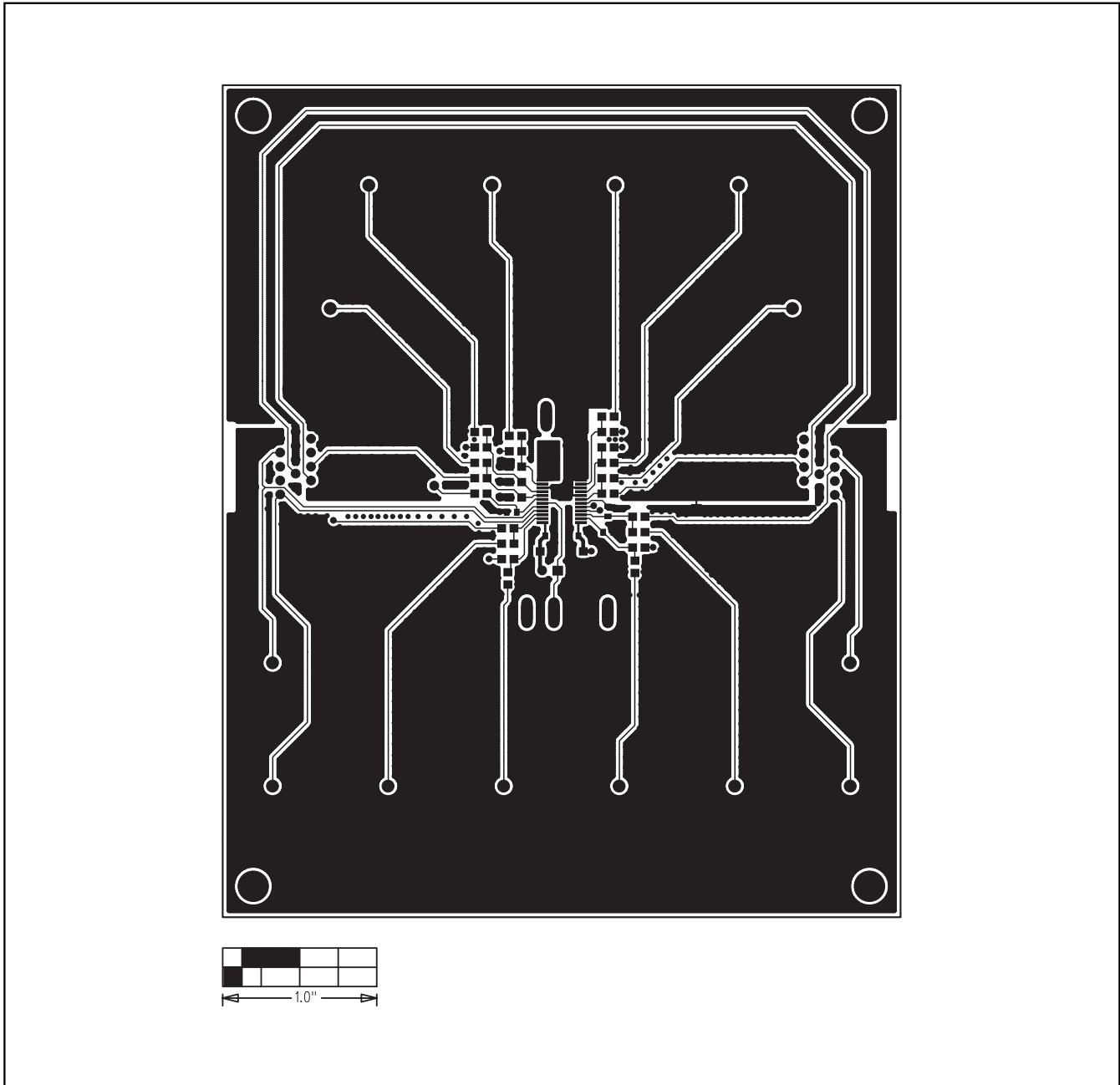


Figure 3. MAX9511 EV Kit PC Board Layout—Component Side

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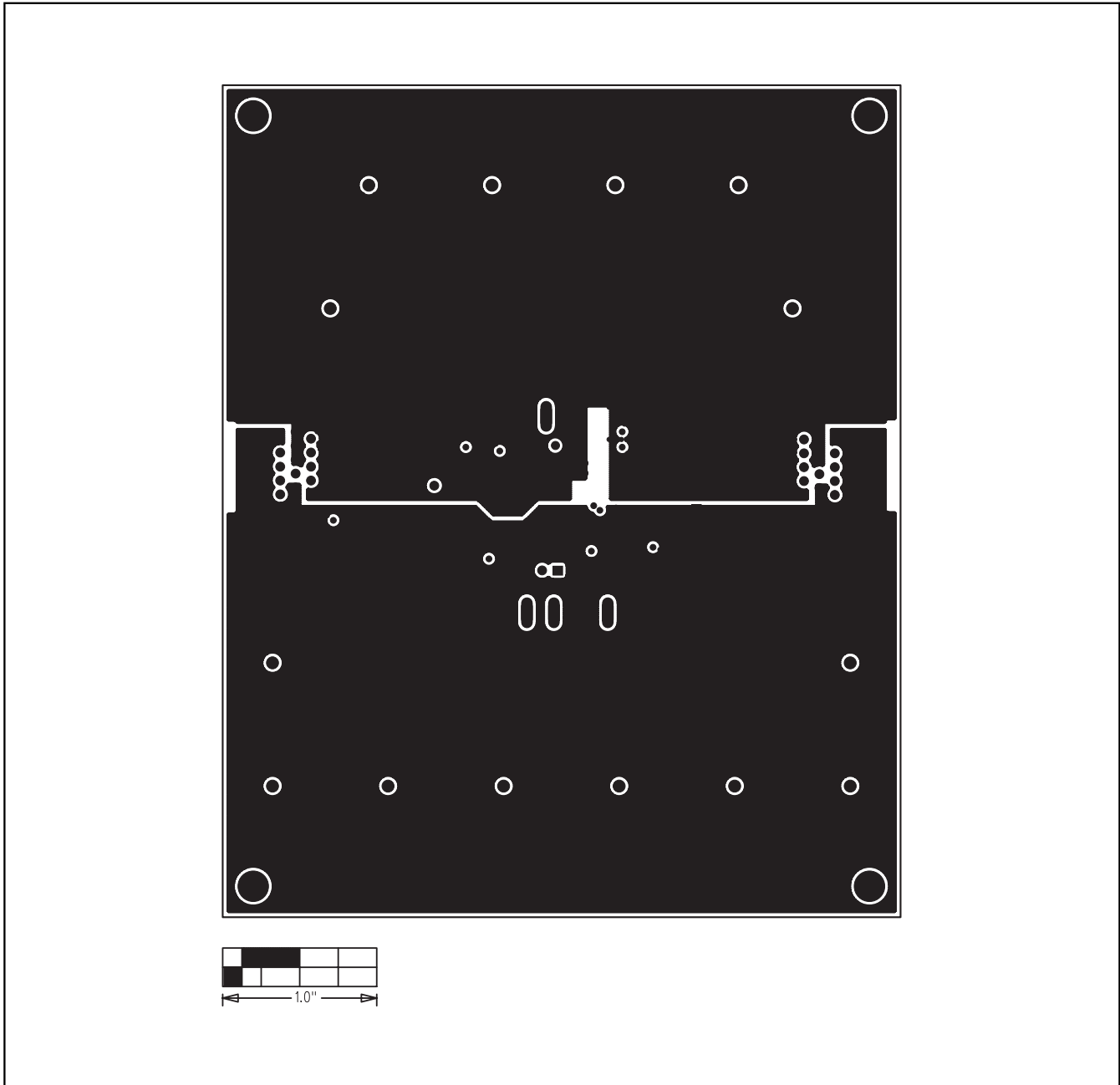


Figure 4. MAX9511 EV Kit PC Board Layout—GND Layer 2

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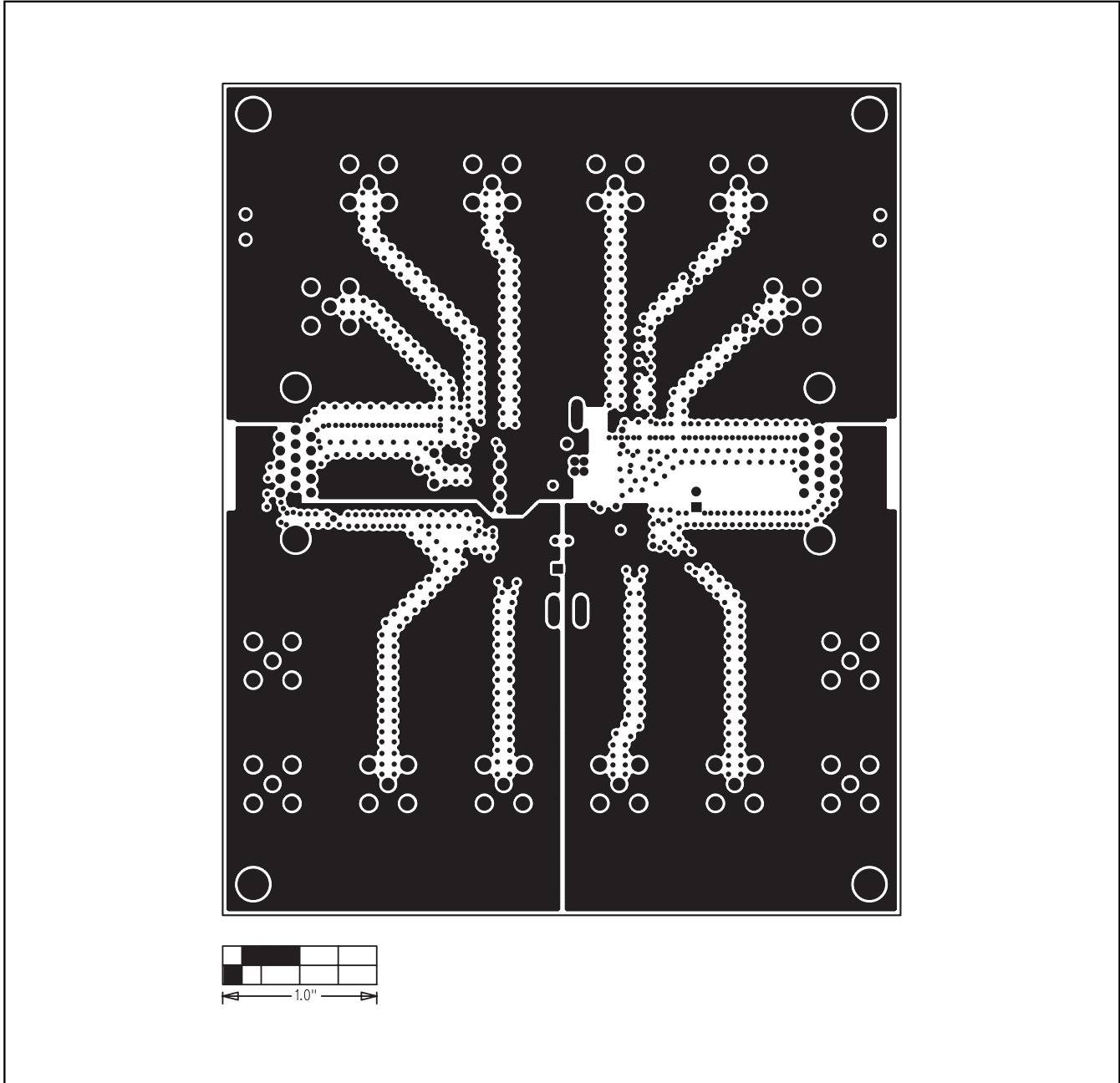


Figure 5. MAX9511 EV Kit PC Board Layout—VCC Layer 3

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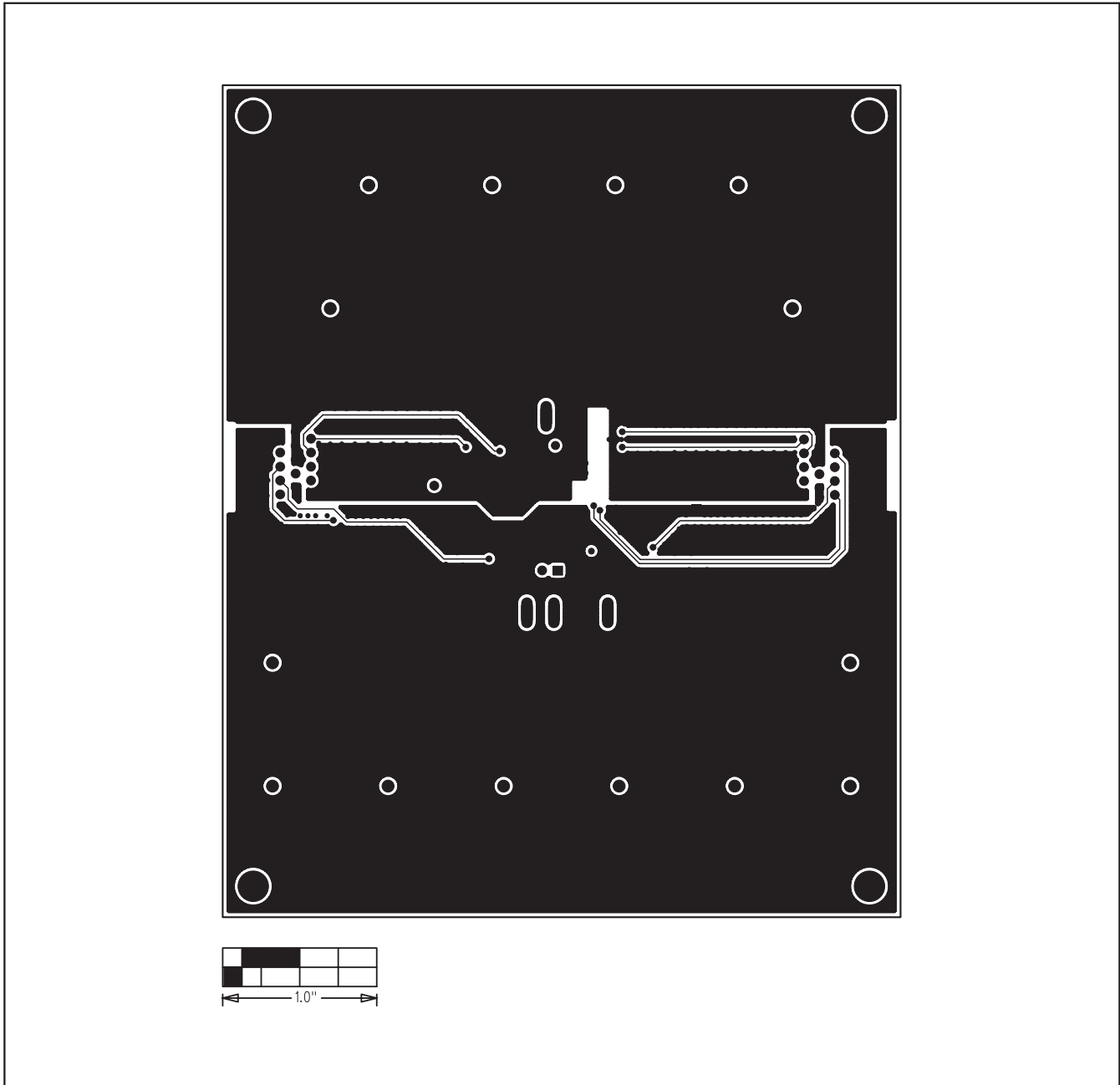


Figure 6. MAX9511 EV Kit PC Board Layout—Solder Side

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