

MAXIM

MAX9311 Evaluation Kit

Evaluates: MAX9311-MAX9314

General Description

The MAX9311 evaluation kit (EV kit) includes the MAX9311 low-skew, 1-to-10 differential driver designed for clock distribution. The MAX9311 EV kit supports LVPECL/LVPECL testing up to 3GHz. The kit allows selection of two sources and reproduces the selected signal at 10 identical differential outputs. Inputs can be differential or single ended. Single-ended input operation is achieved by using the on-chip reference, V_{BB} .

The MAX9311 EV kit can also be used to evaluate the MAX9312, MAX9313, and MAX9314.

Component List

| DESIGNATION | QTY | DESCRIPTION |
|----------------------------------|-----|---|
| C1, C7 | 2 | 10 μ F, 10V tantalum capacitors (B case) AVX TAJB106K010R Sprague 293D106X9016B2T |
| C2, C6, C9, C11, C12, C14 | 6 | 0.1 μ F ceramic capacitors (0603) |
| C3, C4, C5, C8, C10, C13, C15 | 7 | 0.01 μ F ceramic capacitors (0603) |
| R1-R9, R30-R34 | 14 | 100 Ω \pm 1% 1/8W resistors (1206) |
| R10-R29 | 20 | 49.9 Ω \pm 1% 1/16W resistors (0603) |
| J1-J26 | 26 | SMA connectors (PC edge mount) EFJohnson 142-0701-801 |
| U1 | 1 | MAX9311 (32 LQFP) (no exposed paddle) |

Component Suppliers

| SUPPLIER | PHONE | FAX | WEBSITE |
|----------------|--------------|--------------|-----------------|
| AVX | 843-946-0238 | 843-626-3123 | www.avxcorp.com |
| Sprague-Vishay | 402-563-6866 | 402-563-6296 | www.vishay.com |

Note: When contacting suppliers, please indicate that you are using the MAX9311-MAX9314.

Features

- ◆ **Controlled 50 Ω Impedance: Microstrip**
- ◆ **Input/Output Line Lengths Matched to < 1.5ps**
- ◆ **LVPECL/LVECL and Differential HSTL Supply Range**
 $V_{CC} - V_{EE} = 2.25V - 3.8V$
- ◆ **Footprint Compatible with MC100LVEP111 (MAX9311)**
- ◆ **Fully Assembled and Tested**

Ordering Information

| PART | TEMP. RANGE | IC PACKAGE |
|--------------|------------------------------------|------------|
| MAX9311EVKIT | 0 $^{\circ}$ C to +70 $^{\circ}$ C | 32 LQFP |

Quick Start

The MAX9311 is specified with outputs terminated with 50 Ω to $V_{CC} - 2V$. This EV kit sets $V_{CC} = +2V$ and uses the 50 Ω -to-ground inputs of an oscilloscope to both measure and terminate the MAX9311 outputs. With $V_{CC} = +2V$ and V_{EE} varied from -0.25V to -1.8V, the device sees a supply of 2.25V to 3.8V with the output termination voltage equaling zero ($V_{CC} - 2V$).

For 3.3V operation, for example, set $V_{CC} = +2V$ and $V_{EE} = -1.3V$. Use 50 Ω coax cables to connect the MAX9311 outputs to a scope with inputs set for 50 Ω . The scope inputs provide a 50 Ω termination to zero. Input signals are referred to the shifted V_{CC} and V_{EE} supplies. The coax cables and 50 Ω scope input provide a high bandwidth connection without the use of probes.

The MAX9311 EV kit is fully assembled and tested. **Do not turn on the power supplies until all connections are complete.**

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Minimum Required Equipment

- Five matched SMA-male-to-SMA-male 50Ω coax cables for inputs: CLKSEL, CLK0, $\overline{\text{CLK0}}$, CLK1, and $\overline{\text{CLK1}}$
- Two matched SMA-male-to-SMA-male 50Ω coax cables for outputs: Q0 and $\overline{\text{Q0}}$
- Two differential adjustable clock sources like the Agilent 8133A 3GHz pulse generator
- One single-ended adjustable clock select (CLKSEL) source
- One 10GHz bandwidth oscilloscope with 50Ω input impedance like the Tektronix 11801C digital sampling oscilloscope with the SD-24 sampling head
- Two power supplies
 - Power supply 1: +2V with 1A current capability
 - Power supply 2: adjustable -0.25V to -1.8V with 1A current capability

Procedure

- 1) Connect two of the five matched input cables to the first differential clock source. Then connect the other end of the cables to CLK0 and $\overline{\text{CLK0}}$ on the MAX9311 EV kit board.
- 2) Connect two of the five matched input cables to the second differential clock source. Then connect the other end of the cables to CLK1 and $\overline{\text{CLK1}}$ on the MAX9311 EV kit board.
- 3) Connect one of the five matched input cables to the single-ended clock select source. Then connect the other end of the cable to CLKSEL on the MAX9311 EV kit board.
- 4) Unsolder and remove the termination resistors located on the Q0 and $\overline{\text{Q0}}$ outputs (R28 and R29). Make sure the input impedance of the oscilloscope is 50Ω.
- 5) Connect the two matched output cables to the oscilloscope. Then connect the other end of the cables to Q0 and $\overline{\text{Q0}}$ on the MAX9311 EV kit board.
- 6) Connect a +2VDC power supply to the pads labeled VCC on the MAX9311 EV kit board. This ensures that the outputs are loaded with 50Ω to VCC - 2V.
- 7) Connect a -1.3VDC power supply to the pads labeled VEE on the MAX9311 EV kit board.
- 8) Configure the adjustable clock sources to the desired input levels defined in the MAX9311/ MAX9313 IC data sheet. Note that VCC = +2V.
- 9) Enable all clock sources.
- 10) Verify the timing of the waveforms using the oscilloscope.

Detailed Description

Clock and Clock Select Inputs

All clock inputs are located on the left edge of the MAX9311 EV kit board. The board provides SMA connectors and 50Ω termination for all clock inputs. The MAX9311 features an on-chip reference voltage, V_{BB}, allowing single-ended operation. Connect V_{BB} to one of the differential inputs for single-ended operation. Single-ended operation is limited to $3V \leq (V_{CC} - V_{EE}) \leq 3.8V$. Differential operation can be used throughout the full supply range: $2.25V \leq (V_{CC} - V_{EE}) \leq 3.8V$.

The clock select input accepts a single-ended input referenced to V_{CC}. The clock select input has its own SMA connector and 50Ω termination on the board.

Outputs

The 10 differential outputs are in numeric order and are located on the top, right, and bottom edges of the MAX9311 EV kit board. All outputs are terminated with 50Ω on the board. **Note:** When analyzing an output, remove the corresponding output termination resistor on the MAX9311 EV kit board. (The output is connected to test equipment that has a 50Ω input impedance.)

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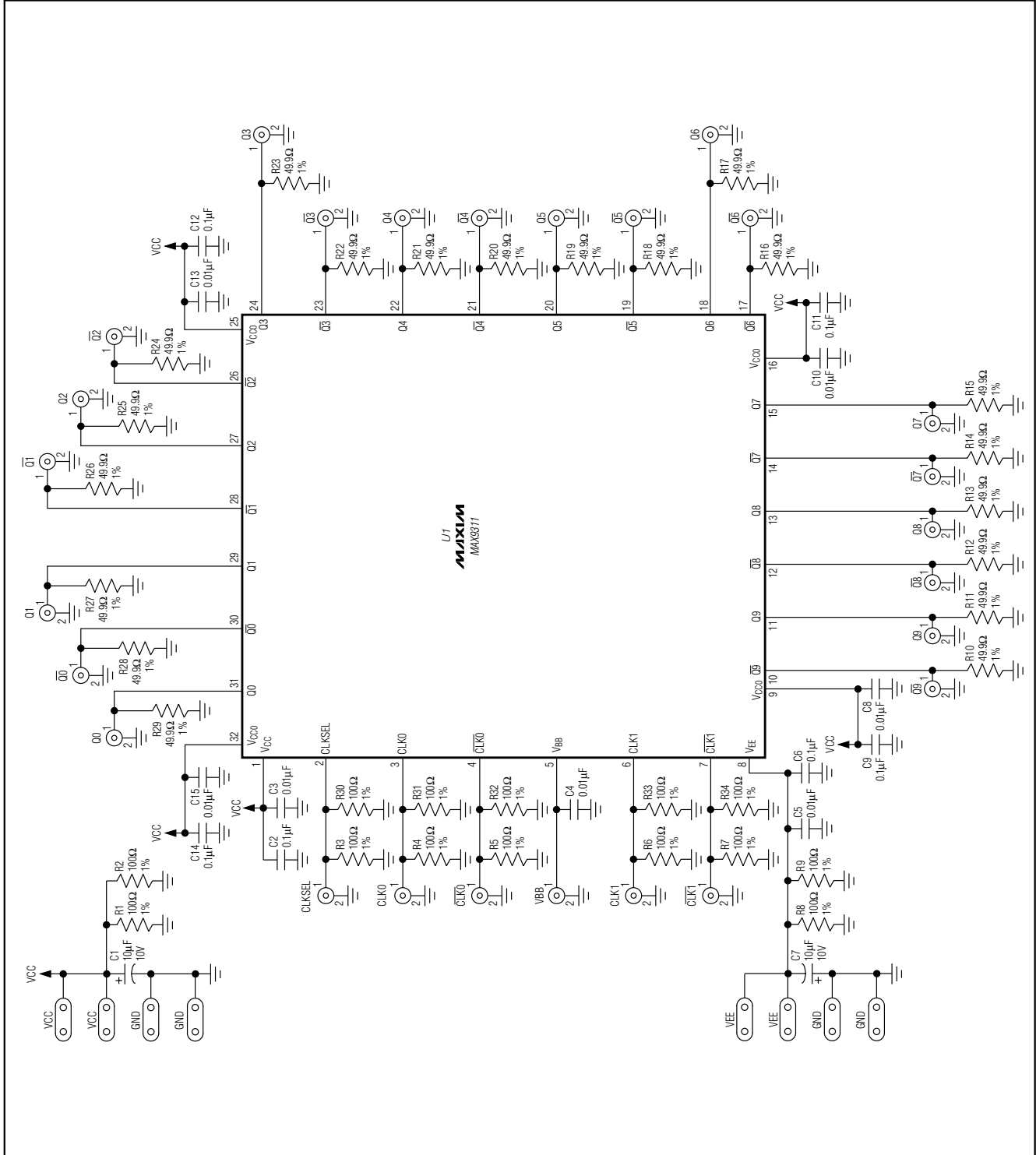


Figure 1. MAX9311 EV Kit Schematic

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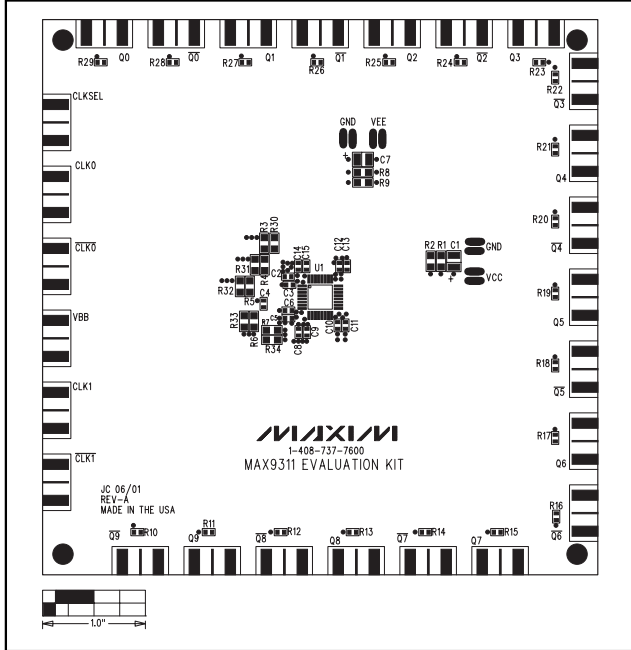


Figure 2. MAX9311 EV Kit Component Placement Guide—Component Side

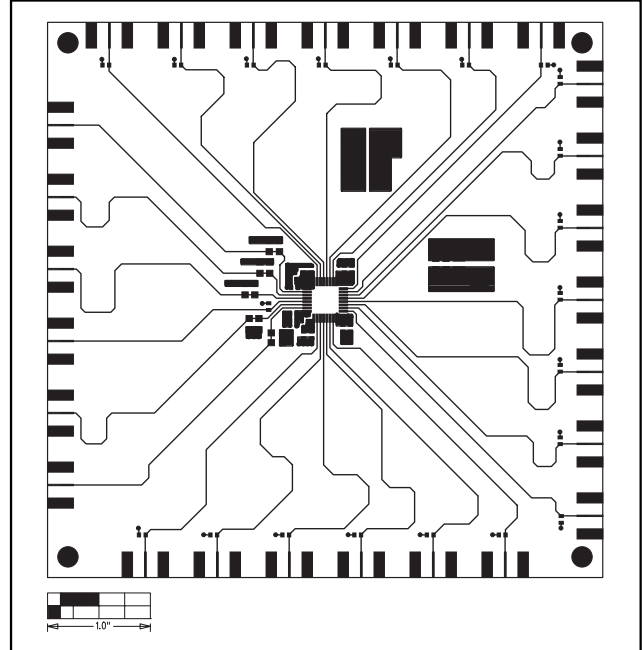


Figure 3. MAX9311 EV Kit PC Board Layout—Component Side

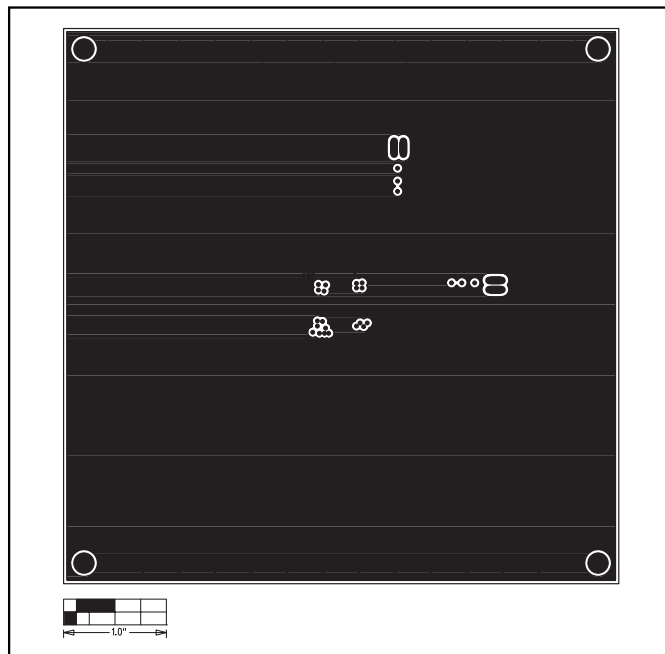


Figure 4. MAX9311 EV Kit PC Board Layout—Inner Layer 2 (GND)

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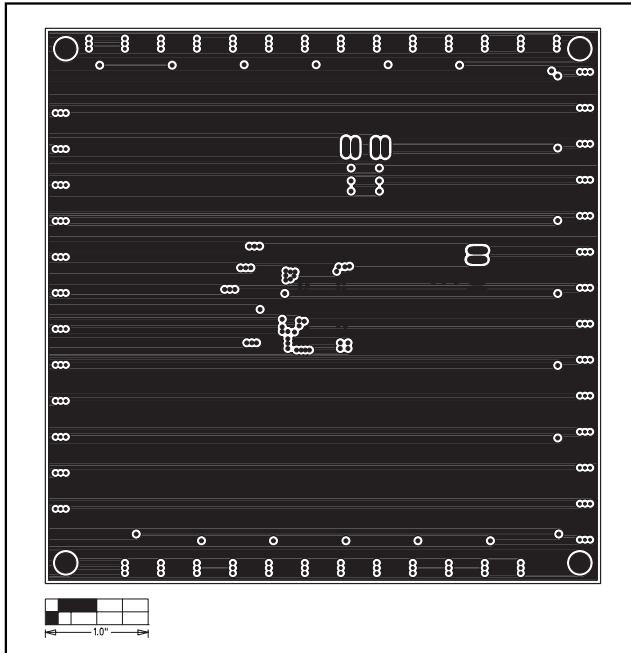


Figure 5. MAX9311 EV Kit PC Board Layout—Inner Layer 3 (VCC)

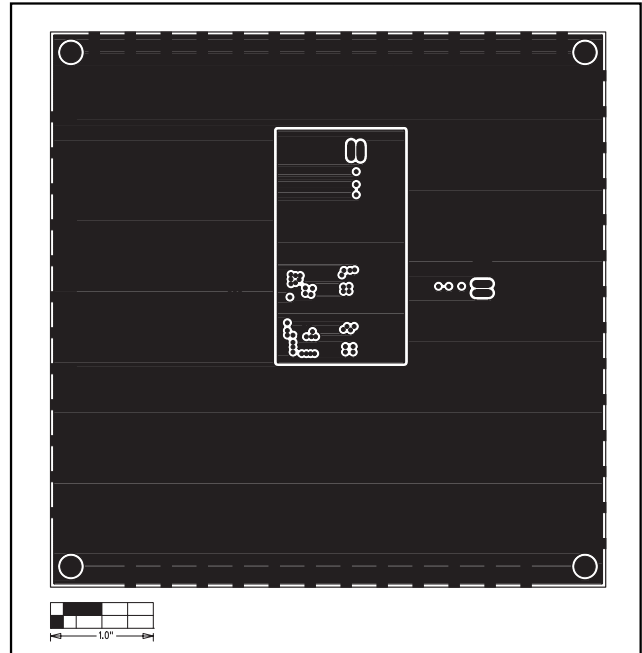


Figure 6. MAX9311 EV Kit PC Board Layout—Solder Side (VEE/GND)

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