19-2186; Rev 0; 10/01

MAXIM

MAX9311 Evaluation Kit

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 LVECL/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.

Features

- **Controlled 50Ω 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**

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C7	2	10µF, 10V tantalum capacitors (B case) AVX TAJB106K010R Sprague 293D106X9016B2T
C2, C6, C9, C11, C12, C14	6	0.1µF ceramic capacitors (0603)
C3, C4, C5, C8, C10, C13, C15	7	0.01µF ceramic capacitors (0603)
R1–R9, R30–R34	14	100Ω ±1% 1/8W resistors (1206)
R10–R29	20	49.9Ω ±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.*

Ordering Information

PART	TEMP. RANGE	IC PACKAGE
MAX9311EVKIT	0°C to +70°C	32 LQFP

Quick Start

The MAX9311 is specified with outputs terminated with 50Ω to V_{CC} - 2V. This EV kit sets V_{CC} = +2V and uses the 50Ω-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 50Ω coax cables to connect the MAX9311 outputs to a scope with inputs set for 50Ω. The scope inputs provide a 50Ω termination to zero. Input signals are referred to the shifted V_{CC} and V_{EE} supplies. The coax cables and 50Ω 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**.

Minimum Required Equipment

- Five matched SMA-male-to-SMA-male 50Ω coax cables for inputs: CLKSEL, CLK0, $\overline{CLK0}$, CLK1, and $\overline{CLK1}$
- Two matched SMA-male-to-SMA-male 50Ω coax cables for outputs: Q0 and $\overline{Q0}$
- 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 $\overline{CLK0}$ 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 $\overline{CLK1}$ 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 $\overline{Q0}$ 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 $\overline{Q0}$ 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 V_{CC} - 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 V_{CC} = +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 ≤ (V_{CC} - V_{EE}) ≤ 3.8V. Differential operation can be used throughout the full supply range: 2.25V ≤ (V_{CC} - V_{EE}) ≤ 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.)

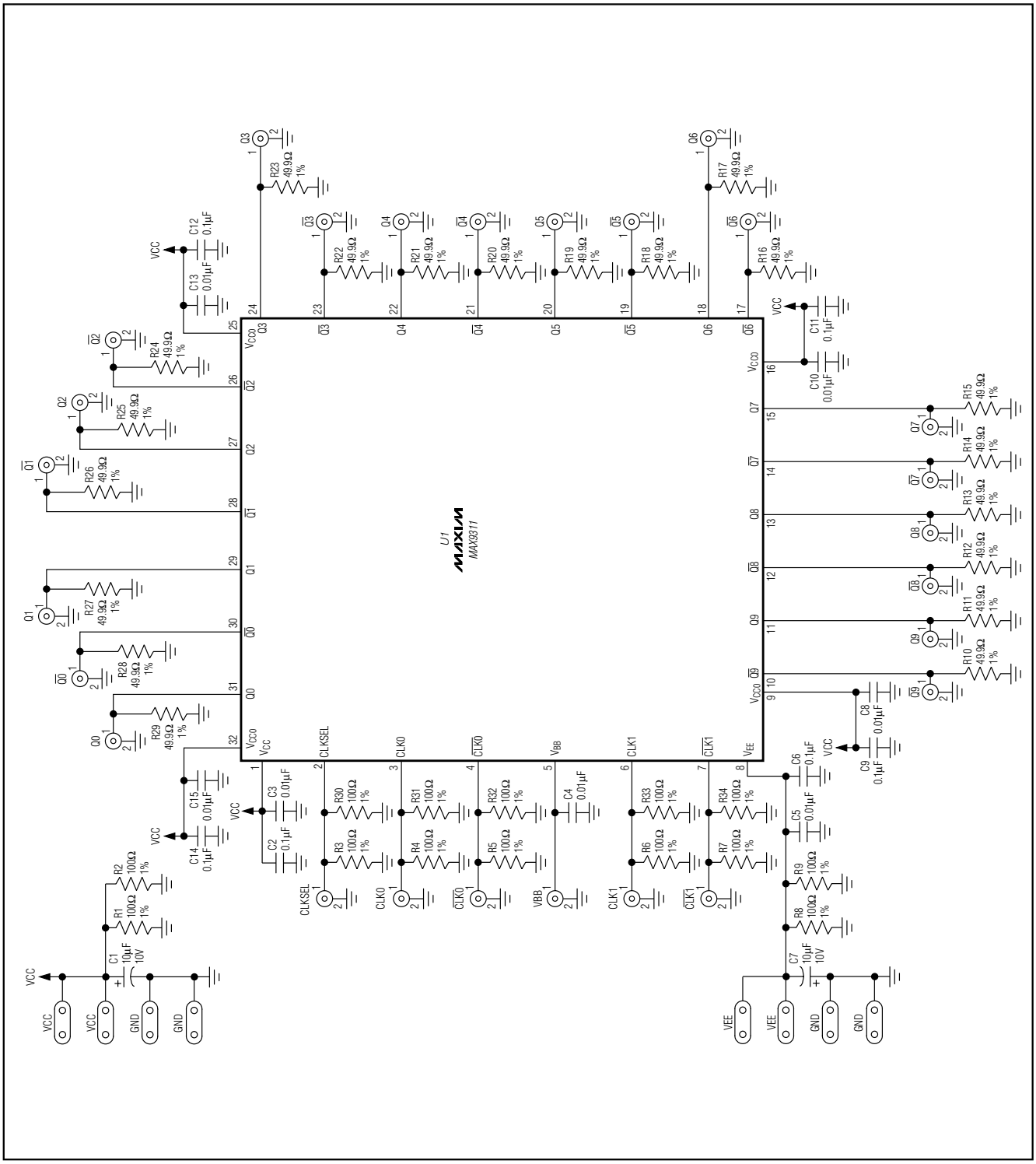

Figure 1. MAX9311 EV Kit Schematic

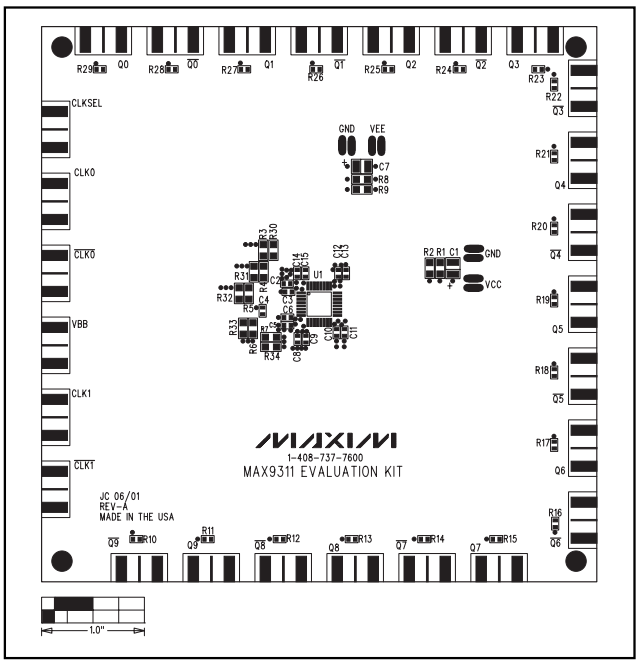

Figure 2. MAX9311 EV Kit Component Placement Guide—Component Side

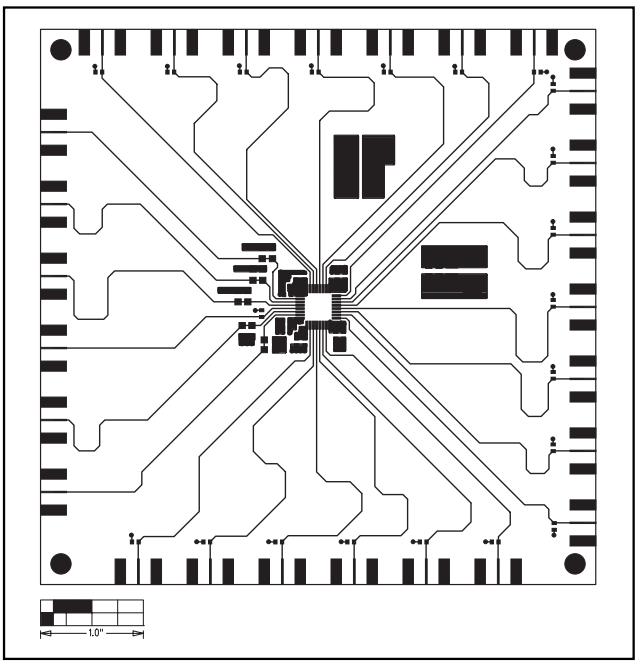

Figure 3. MAX9311 EV Kit PC Board Layout—Component Side

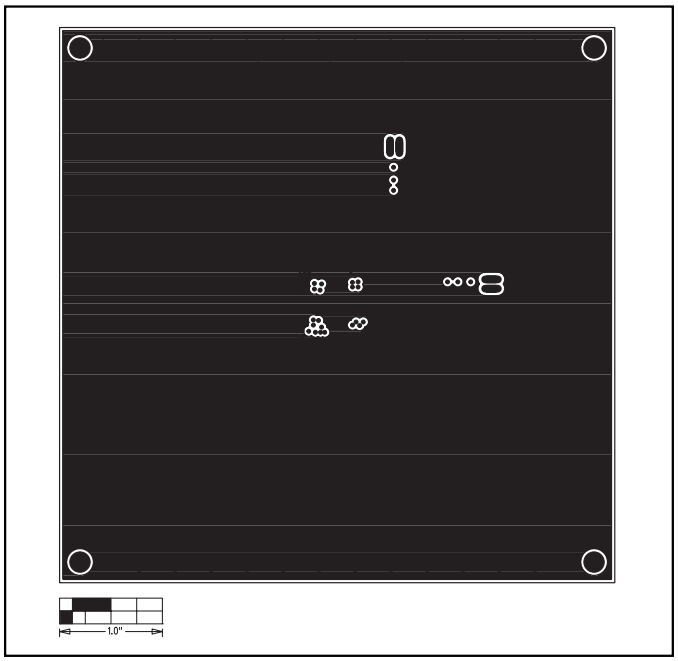

Figure 4. MAX9311 EV Kit PC Board Layout—Inner Layer 2 (GND)

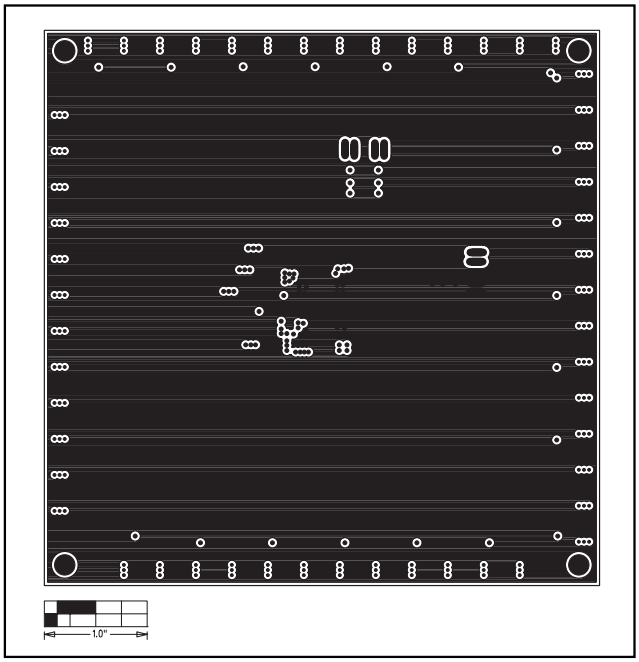

Figure 5. MAX9311 EV Kit PC Board Layout—Inner Layer 3 (V_{CC})

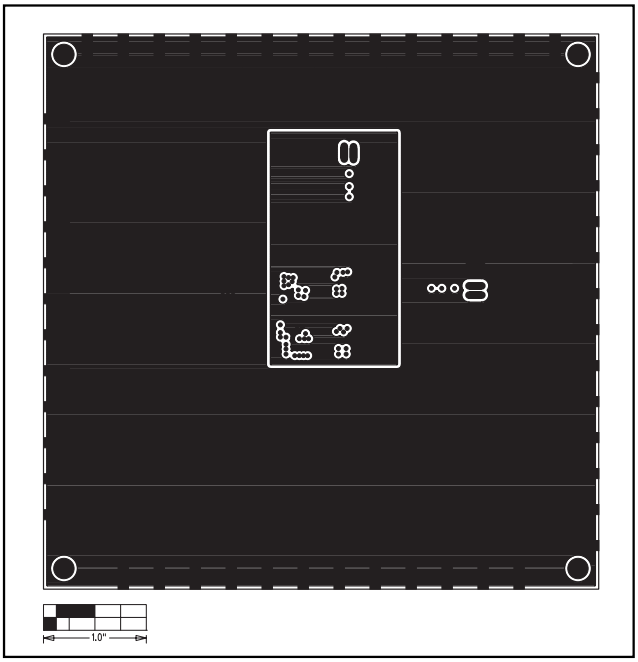

Figure 6. MAX9311 EV Kit PC Board Layout—Solder Side (V_{EE}/GND)