19-2280; Rev 0; 1/02

MAXIM
MAX9315 Evaluation Kit

Evaluates: MAX9315/MAX9316

General Description

The MAX9315 evaluation kit (EV kit) includes the MAX9315, a 1-to-5 low-skew differential clock driver with two differential clock inputs. The MAX9315 EV kit accepts one or two LVECL/LVPECL or HSTL differential inputs and reproduces the selected input at five differential outputs. The EV kit operates up to 1.5GHz. Inputs can be single ended by connecting the on-chip V$_{BB}$ reference to one side of a differential input.

The MAX9315 EV kit can be modified to evaluate the MAX9316. The MAX9316 has one differential clock input and one single-ended input.

Features

♦ **Controlled 50Ω Microstrip Traces**
♦ **Input Trace Lengths Matched to <2mils**
♦ **Output Trace Lengths Matched to <1mil**
♦ **Board Frequency: Up to 1.5GHz**
♦ **2.375V (V$_{CC}$ - V$_{EE}$) Supply Voltage**
♦ **20-Pin TSSOP Package**
♦ **Fully Assembled and Tested**

Ordering Information

PART	TEMP RANGE	IC PACKAGE
MAX9315EVKIT	0°C to +70°C	20 TSSOP

Note: To evaluate the MAX9316, request a MAX9316EUP free sample with the MAX9315EVKIT.

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C2	2	10µF ±10%, 10V tantalum capacitors (Case B) AVX TAJB106K010R or Kemet T494B106K010AS
C3, C4, C5	3	0.1µF ±10%, 16V X7R ceramic chip capacitors (0603) Taiyo Yuden EMK107BJ104KA or Murata GRM39X7R104K016AD
C6–C9	4	0.01µF ±10%, 16V X7R ceramic chip capacitors (0402) Taiyo Yuden EMK105BJ103KW or Murata GRM36X7R103K016AD
C10	0	Not installed, capacitor (0402)
JU1, JU2	2	3-pin jumpers
R1, R2	0	Not installed, resistor (0402)
R3–R10	8	49.9Ω ±1% resistors (0402)

DESIGNATION	QTY	DESCRIPTION
R11, R12	0	Not installed, resistor (1210)
R13–R22	10	100Ω ±1% 1/4W resistors (1210) Digi-Key P100AACT-ND or equivalent
Q0, $\overline{Q0}$, Q1, $\overline{Q1}$, Q2, $\overline{Q2}$, Q3, $\overline{Q3}$, Q4, $\overline{Q4}$, CLK0, $\overline{CLK0}$, CLK1, $\overline{CLK1}$, VBB	15	SMA edge-mount connectors Digi-Key J502-ND
CLKSEL	0	Not installed, SMA edge-mount connector
U1	1	MAX9315EUP (20-pin TSSOP)
None	2	Shunts
None	1	MAX9315 PC board
None	1	MAX9315 EV kit data sheet
None	1	MAX9315 data sheet

Component Suppliers

SUPPLIER	PHONE	FAX	WEBSITE
AVX	843-946-0238	843-626-3123	www.avxcorp.com
Kemet	864-963-6300	864-963-6322	www.kemet.com
Murata	770-436-1300	770-436-3030	www.murata.com
Taiyo Yuden	800-348-2496	847-925-0899	www.t-yuden.com

Note: *Please indicate that you are using the MAX9315/MAX9316 when contacting these component suppliers.*

Quick Start

The MAX9315 EV kit is fully assembled and tested. **Do not turn on the power supplies until all connections are completed.**

Recommended Equipment

- One 1.5GHz (min) differential signal generator (e.g., Agilent 8133A)

- One 8GHz (min) bandwidth oscilloscope with internal 50Ω input termination (e.g., Tektronix 11801C digital sampling oscilloscope with SD-24 sampling head)

- Two power supplies
  a) One 2V ± 0.05V with 500mA current capability
  b) One adjustable -1.8V to -0.375V with 500mA current capability

- Matched male-SMA-to-male-SMA 50Ω coax cables
  a) Matched SMA 50Ω coax cables for input CLK0 and $\overline{\text{CLK0}}$
  b) Matched SMA 50Ω coax cables for output Q0 and $\overline{\text{Q0}}$

Evaluating the MAX9315 with One Differential Input

1) Verify that shunts are across pins 2 and 3 of jumper JU1 ($\overline{\text{EN}}$), and pins 2 and 3 of jumper JU2 (CLKSEL).

2) Connect two matched coax cables to the oscilloscope. Connect the other end of the cables to Q0 and $\overline{\text{Q0}}$ on the EV kit board.

3) Connect a 2.0V power supply to the VCC pad. Connect the supply ground to the GND pad closest to VCC.

4) Connect a -1.3V adjustable power supply to the pad labeled VEE. Connect the supply ground to the GND pad closest to VEE.

5) Adjust the differential signal generator to the following settings:
   a) $V_{IH} = 1.0V$
   b) $V_{IL} = 0.3V$
   c) Duty cycle = 50%
   d) Frequency = 1.5GHz

6) Connect one pair of matched coax cables to the differential signal generator. Connect the other end of the cables to CLK0 and $\overline{\text{CLK0}}$ on the EV kit.

7) Turn on the power supplies, enable the generator, and verify that the output signals meet the following specifications:
   a) V_{OH}: $0.855V < V_{OH} < 1.135V$
   b) V_{OL}: $0.055V < V_{OL} < 0.305V$
   c) $V_{OH} - V_{OL}$: $550mV < (V_{OH} - V_{OL}) < 910mV$

Notes:

1) To verify output signals other than Q0 and $\overline{\text{Q0}}$, remove the corresponding 50Ω output termination resistor, and make sure the untested output signals are terminated with 50Ω resistors.

2) For other input levels, refer to the MAX9315 and MAX9316 data sheets, setting $V_{CC} = 2.0V$.

3) To evaluate the MAX9316, see the *Evaluating the MAX9316* section.

Detailed Description

Power Supply

In order to terminate outputs with 50Ω to (V_{CC} - 2V) using the 50Ω oscilloscope input, V_{CC} is set to 2.0V. In an actual application, V_{CC} and V_{EE} can have different supplies; refer to the MAX9315 and MAX9316 data sheets.

V_{BB} is an on-chip reference output voltage. Connect V_{BB} to the inverting or noninverting clock input to provide a reference for single-ended operation. For V_{CC} = 2.0V, the MAX9315 EV kit provides a V_{BB} from 0.475V to 0.675V.

Enable

The MAX9315 EV kit features a DC logic-level $\overline{EN}$ function using jumper JU1. Table 1 shows the $\overline{EN}$ settings and its corresponding functions.

Clock Select

Input CLKSEL pin selects channel 0 (CLK0 and $\overline{CLK0}$) or channel 1 (CLK1 and $\overline{CLK1}$). The MAX9315 EV kit can either provide an internal DC select signal by using jumper JU2, or accept an AC external signal from an SMA connector CLKSEL. **(Before connecting the external signal to the CLKSEL connector, verify there is no shunt across jumper JU2)**. Table 2 shows the functions of jumper JU2.

Evaluating the MAX9316

The MAX9315 EV kit can also be used to evaluate the MAX9316, which has one differential LVECL/LVPECL, HSTL input, or single-ended input for scan clock. To evaluate the MAX9316, the following modifications have to be made:

1) Replace the MAX9315EUP with the MAX9316EUP.

2) Remove R19, R20, and C8.

3) Add 100Ω resistors on R11 and R12 and a 0.01µF capacitor on C10.

Table 1. Jumper JU1 Functions

SHUNT LOCATION	$\overline{EN}$ PIN	MAX9315 FUNCTION
1 and 2	Connect to V_{CC}	MAX9315 output disable
2 and 3	Connect to V_{EE}	MAX9315 output enable

Table 2. Jumper JU2 Functions

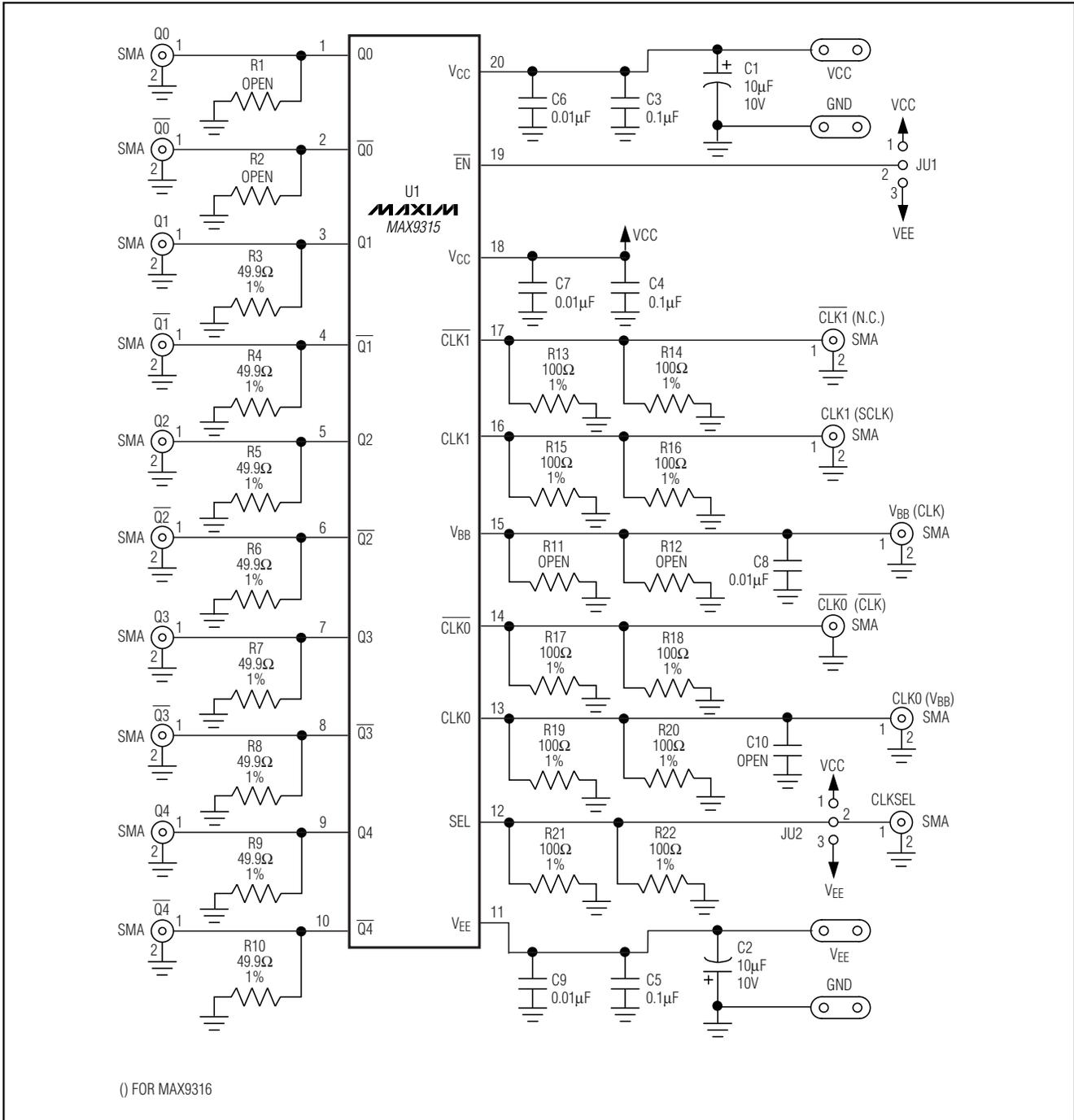| SHUNT LOCATION	CLKSEL PIN	INPUT SOURCE
1 and 2	Connect to V_{CC}	CLK1 and $\overline{CLK1}$
2 and 3	Connect to V_{EE}	CLK0 and $\overline{CLK0}$
No shunt	Driven by external AC signal	Selected by AC signal level

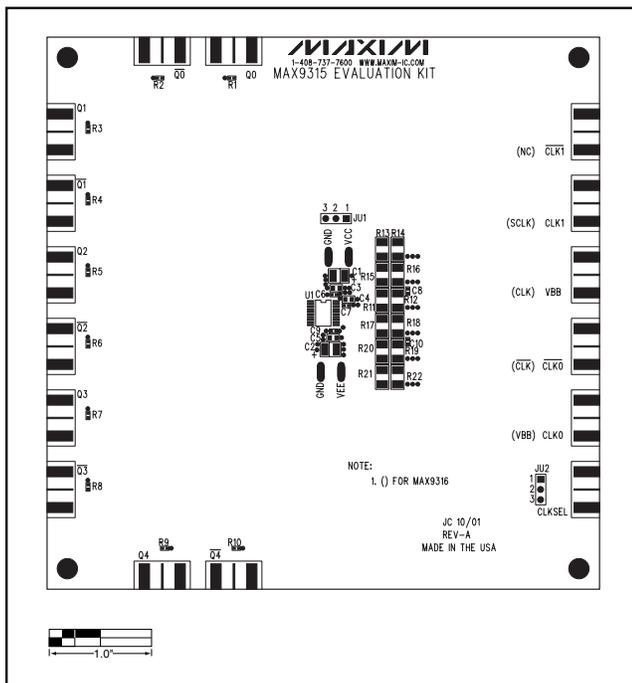# MAX9315 Evaluation Kit

Figure 1. MAX9315 EV Kit Schematic

Figure 2. MAX9315 EV Kit Component Placement Guide—
Component Side

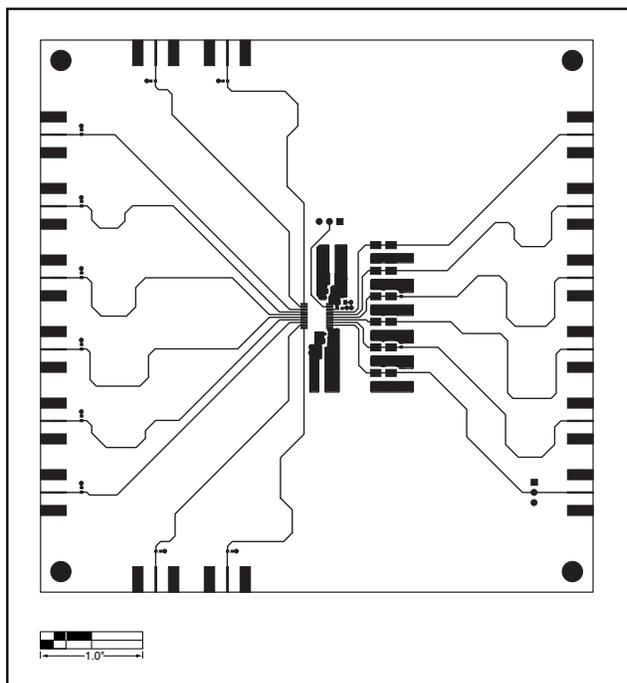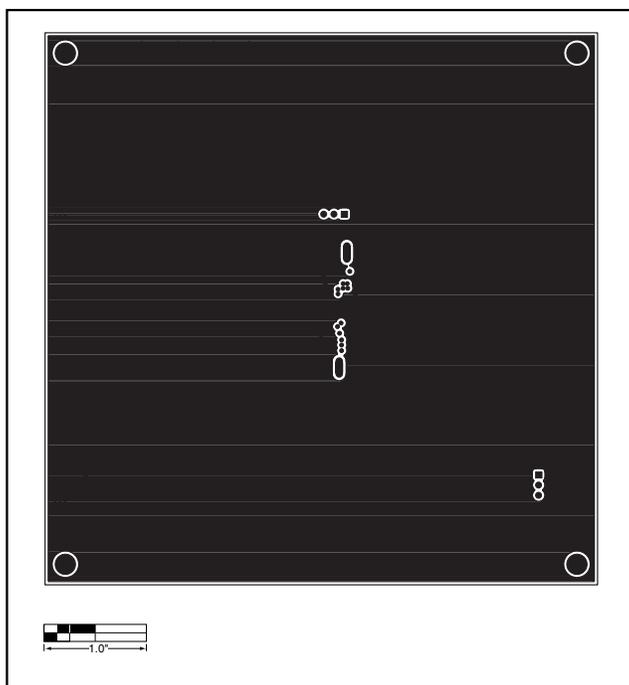Figure 3. MAX9315 EV Kit PC Board Layout—Component Side

Figure 4. MAX9315 EV Kit PC Board Layout—Inner Layer 2
(Ground Layer)

Evaluates: MAX9315/MAX9316
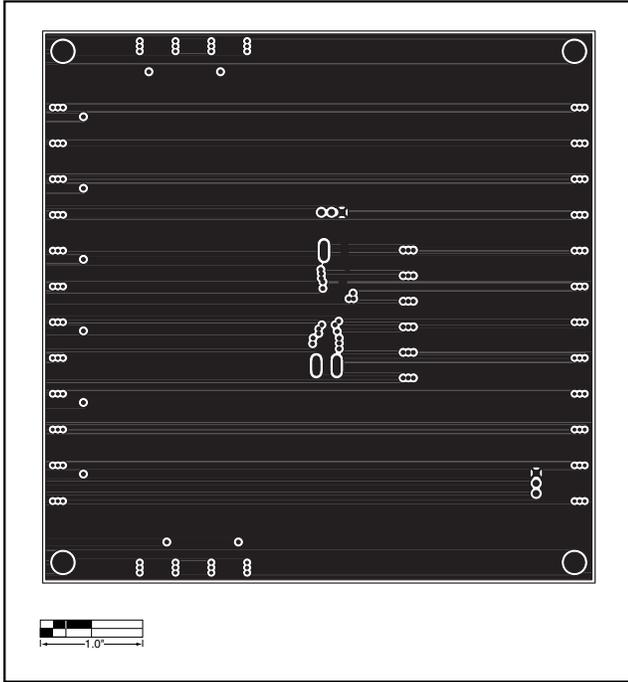

Figure 5. MAX9315 EV Kit PC Board Layout—Inner Layer 3 (V$_{CC}$ Layer)
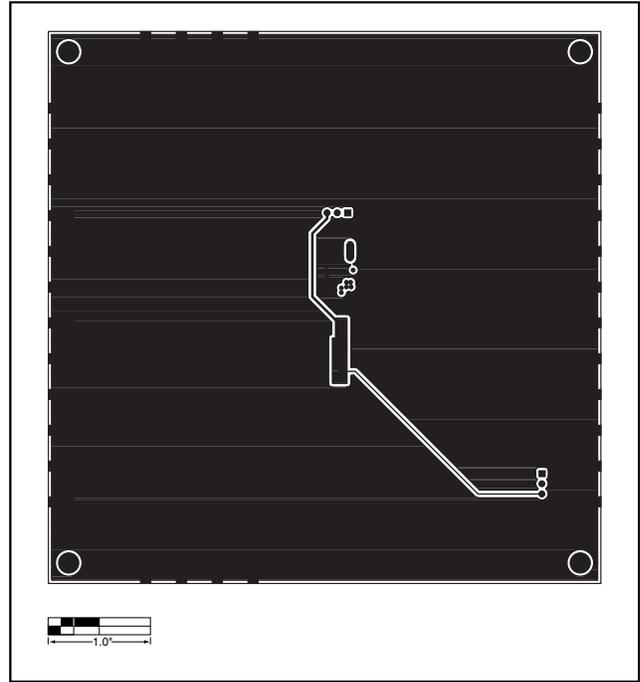
Figure 6. MAX9315 EV Kit PC Board Layout—Solder Side