

MAXIM

MAX3872/MAX3874 Evaluation Kits

General Description

The MAX3872/MAX3874 evaluation kits (EV kits) simplify evaluation of the MAX3872 and MAX3874 clock and data recovery with limiting amplifier ICs. These EV kits enable testing of all MAX3872 and MAX3874 functions. SMA connectors are provided for the differential inputs and outputs. All high-speed inputs and outputs have on-board AC-coupling capacitors to allow direct connection to 50Ω test equipment.

Features

- ◆ **SMA Connectors for All High-Speed I/Os**
- ◆ **Operational Mode Select Pins**
- ◆ **Loss-of-Lock LED**
- ◆ **Single +3.3V Power-Supply Operation**
- ◆ **Fully Assembled and Tested**

Ordering Information

PART	TEMP. RANGE	IC PACKAGE
MAX3872EVKIT	-40°C to +85°C	32 QFN
MAX3874EVKIT	-40°C to +85°C	32 QFN

Component Suppliers

SUPPLIER	PHONE	FAX
AVX	843-448-9411	843-626-3123
Coilcraft	847-639-6400	847-639-1469
Digi-Key	800-344-4539	218-681-3380
EF Johnson	402-474-4800	402-474-4858
Murata	770-436-1300	770-436-3030

Note: Please indicate that you are using the MAX3872/MAX3874 when ordering from these suppliers.

Component List

DESIGNATION	QTY	DESCRIPTION
C1–C7, C17–C19, C22, C24, C26, C28	14	0.1μF ±10% ceramic capacitors (0402) Murata GRM36X7R104K016A
C8–C13	6	0.001μF ±10% ceramic capacitors (0402) Murata GRM36X7R102K016A
C14	1	33μF ±10% tantalum capacitor AVX TAJB336K016
C15	1	2.2μF ±10% tantalum capacitor AVX TAJB225K016
C16	1	0.82μF ceramic capacitor (0603) (MAX3872EVKIT) 0.068μF ceramic capacitor (0402) (MAX3874EVKIT)
D1	1	Red LED
D2	1	Not installed
R2–R5	4	Not installed
R6	1	910Ω ±5% resistor (0402)
R7	1	Not installed
R8	1	50kΩ variable resistor BOURNS 3296W-203
R9	1	Not installed
L1–L3	3	56nH inductors (0805) Coilcraft CS-560XKBC

DESIGNATION	QTY	DESCRIPTION
J1–J8, J25, J26	10	SMA connectors (edge-mount, round-pin) EF JOHNSON 142-0701-851
J9, J12–J15, J17–J19	8	3-pin headers (0.1in centers)
J10	1	2-pin headers (0.1in centers)
J11, J16, J22, J23	4	Not installed
J20, J21	2	Test points Digi-Key 5000K-ND
J24	1	Not installed
J9, J10, J12–J15, J17–J19	9	Shunts
U1	1	MAX3872EGJ, 32-pin QFN (MAX3872EVKIT) MAX3874EGJ, 32-pin QFN (MAX3874EVKIT)
None	1	MAX3872/MAX3874 EV kit circuit board, Rev C
None	1	MAX3872 datasheet (MAX3872EVKIT) MAX3874 datasheet (MAX3874EVKIT)



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Detailed Description

The MAX3872/MAX3874 EV Kit is a fully assembled and factory tested demonstration board that enables testing of all MAX3872 and MAX3874 functions.

Test Equipment Required

- +3.3V power supply with 200mA current capability
- Signal-source, 2.7Gbps minimum capability
- Jitter analyzer capable of 2.7Gbps performance
- Oscilloscope with at least 3GHz performance

Test Equipment Interface

The serial inputs (SDI $\pm$, SLBI $\pm$) and serial outputs (SDO $\pm$, SCLKO $\pm$) have on-board AC-coupling capacitors to allow direct connection to 50 Ω test equipment. The EV kit also has pads on the serial data and clock outputs (SDO $\pm$, SCLKO $\pm$) to allow on-board termination for coupling to high-impedance oscilloscopes.

Quick Start (MAX3872 & MAX3874)

This procedure will set up the evaluation board for 2.48832Gbps normal operation mode, with input threshold adjust disabled.

- 1) Place a shunt across pins 2 (SIS) and 3 (GND) of J13.
- 2) Place a shunt across pins 1 (VCC) and 2 (LREF) of J14.
- 3) Place a shunt across pins 2 and 3 of J15.
- 4) Place a shunt across pins 2 (RS1) and 3 (GND) of J17.
- 5) Place a shunt across pins 2 (RS2) and 3 (GND) of J18.
- 6) Place a shunt across pins 2 (RATESET) and 3 (GND) of J19.
- 7) Place a shunt across pins 1 (VCC) and 2 (VCTRL) of J9.
- 8) Remove the shunt from J10.
- 9) Place a shunt across pins 2 (FREFSET) and 3 (GND) of J12.
- 10) Connect a 2.48832Gbps PRBS NRZ signal to the serial data inputs (SDI $\pm$) with 50 Ω cables. Leave the SLBI $\pm$ inputs unconnected.
- 11) Connect the serial data and clock outputs (SDO $\pm$, SCLKO $\pm$) to a 50 Ω high-speed oscilloscope. Terminate any unused outputs with 50 Ω to GND.
- 12) Connect +3.3V to J20 (VCC) and ground to J21 (GND).

Jitter analysis and product performance can also be observed by appropriately interfacing the EV kit with a bit-error-rate tester (BERT) and a jitter analyzer.

Operational Modes

The MAX3872/MAX3874 has three modes of operation: normal, system loopback, and clock holdover. The three operational modes are programmed by connecting the appropriate pins of JU13 (SIS) and JU14 (LREF). See Table 1. Normal operation mode requires a serial data stream at the SDI $\pm$ inputs, system loopback mode requires a serial data stream at the SLBI $\pm$ inputs, and clock holdover mode requires a reference clock signal at the SLBI $\pm$ inputs.

Normal and System Loopback Settings

Three jumpers (RS1, RS2, RATESET) are available for setting the SDI $\pm$ or SLBI $\pm$ inputs to receive the appropriate data rate (Table 2). The FREFSET pin can be set high or low while in normal or system loopback mode.

Clock Frequencies in Holdover Mode

Set the incoming reference clock frequency and outgoing serial clock frequency by setting RS1, RS2, RATESET, and FREFSET appropriately. See Table 3.

Auto Switch to Clock Holdover Mode

To switch from normal mode to clock holdover mode automatically when there are no data transitions applied to the SDI $\pm$ inputs connect LOL directly to LREF by placing a shunt across pins 1 and 2 of J15.

Vertical Threshold Adjustment

To compensate for optical noise presented on the data logic high caused by EDFAs in a WDM transmission system, an external analog control input is provided for adjusting the data decision threshold to an optimum level.

To enable data decision threshold adjustment, place a shunt across pins 2 and 3 of J9 and shunt pins 1 and 2 of J10. Set the decision threshold by adjusting the potentiometer R8. The center point for the decision threshold is 1.2V at the VCTRL pin.

Jumpers, Controls, Test Points

Table 4 summarises the functions of all jumpers, controls, and test points of the MAX3872/MAX3874 EV Kit.

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Evaluate: MAX3872/MAX3874

Table 1. Operational Mode Settings

MODE	SHUNT POSITIONS	
	LREF (JU14)	SIS (JU13)
Normal	1 and 2	2 and 3
System Loopback	1 and 2	1 and 2
Clock Holdover	2 and 3	(1 and 2) or (2 and 3)

Table 2. Data Rate Settings

INPUT DATA RATE	SHUNT POSITIONS		
	RS1	RS2	RATESET
2.666Gbps	2 and 3	2 and 3	1 and 2
2.488Gbps/2.5Gbps	2 and 3	2 and 3	2 and 3
1.244Gbps/1.25Gbps*	1 and 2	1 and 2	2 and 3
666.51Mbps*	2 and 3	1 and 2	1 and 2
622.08Mbps*	2 and 3	1 and 2	2 and 3
166.63Mbps*	1 and 2	2 and 3	1 and 2
155.52Mbps*	1 and 2	2 and 3	2 and 3

*Setting not available on the MAX3874

Table 3. Clock Holdover Frequency Settings

REFERENCE CLOCK FREQUENCY	SCLKO FREQUENCY	SHUNT POSITIONS			
		RS1	RS2	RATESET	FREFSET
666.51MHz	2.666GHz	2 and 3	2 and 3	1 and 2	2 and 3
666.51MHz*	666.51MHz	2 and 3	1 and 2	1 and 2	2 and 3
666.51MHz*	166.63MHz	1 and 2	2 and 3	1 and 2	2 and 3
622.08MHz/625MHz*	1.244GHz/1.25GHz	1 and 2	1 and 2	2 and 3	2 and 3
622.08MHz/625MHz	2.488GHz/2.5GHz	2 and 3	2 and 3	2 and 3	2 and 3
622.08MHz*	622.08MHz	2 and 3	1 and 2	2 and 3	2 and 3
622.08MHz*	155.52MHz	1 and 2	2 and 3	2 and 3	2 and 3
166.63MHz	2.666GHz	2 and 3	2 and 3	1 and 2	1 and 2
166.63MHz*	666.51MHz	2 and 3	1 and 2	1 and 2	1 and 2
166.63MHz*	166.63MHz	1 and 2	2 and 3	1 and 2	1 and 2
155.52MHz/156.25MHz*	1.244GHz/1.25GHz	1 and 2	1 and 2	2 and 3	1 and 2
155.52MHz/156.25MHz	2.488GHz/2.5GHz	2 and 3	2 and 3	2 and 3	1 and 2
155.52MHz*	622.08MHz	2 and 3	1 and 2	2 and 3	1 and 2
155.52MHz*	155.52MHz	1 and 2	2 and 3	2 and 3	1 and 2

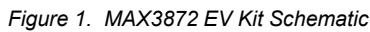
*Setting not available on the MAX3874

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Table 4. Jumpers, Controls, Test Points

NAME	TYPE	DESCRIPTION	NORMAL POSITION
J9	3 Pin Header	Enables/disables threshold adjust. Shunt is required on J10 when threshold adjust is enabled.	Shunt pins 1 and 2 Threshold control disabled
J10	2 Pin Header	Connects VREF to VCTRL through R8 when threshold adjust is enabled.	Open
J11	3 Pin Header	Not installed	—
J12	3 Pin Header	Sets the reference clock frequency	Shunt pins 2 and 3 See Tables 2 and 3
J13	3 Pin Header	Selects between SDI and SLBI inputs	Shunt pins 2 and 3 See Table 1
J14	3 Pin Header	Enables/disables clock holdover mode	Shunt pins 1 and 2 See Table 1
J15	3 Pin Header	Connects $\overline{\text{LOL}}$ to $\overline{\text{LREF}}$ for automatic clock holdover mode or provides connection of J14 to LREF input.	Shunt pins 2 and 3 $\overline{\text{LOL}}$ not connected to $\overline{\text{LREF}}$
J16	2 Pin Header	Not installed	Open
J17	3 Pin Header	Multi-Rate Select Input 1	Shunt pins 2 and 3 See Tables 2 and 3
J18	3 Pin Header	Multi-Rate Select Input 2	Shunt pins 2 and 3 See Tables 2 and 3
J19	3 Pin Header	VCO Select Input	Shunt pins 2 and 3 See Tables 2 and 3
J20	Test Point	Power supply connection to VCC.	Connected to VCC
J21	Test Point	Power supply connection to GND.	Connected to GND
J22	2 Pin Header	Not installed	Open
J23	2 Pin Header	Not installed	Open
J24	Test Point	Not installed	—
R8	Potentiometer	Threshold Control Potentiometer. Used in conjunction with J10 and J9 to set the SDI input threshold.	—

Evaluate: MAX_{3872}/MAX_{3874}



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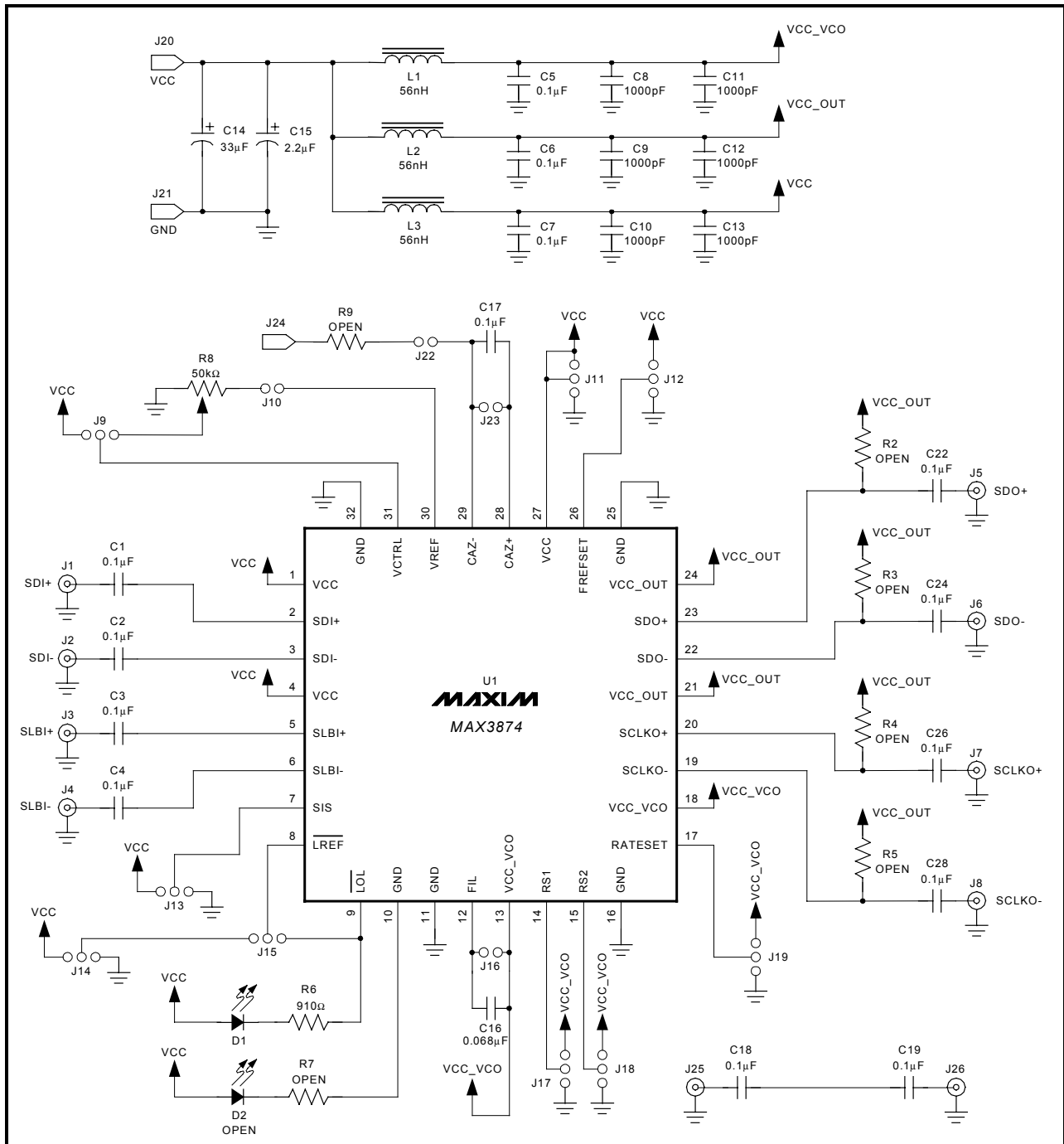


Figure 2. MAX3874 EV Kit Schematic

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Evaluate: MAX3872/MAX3874

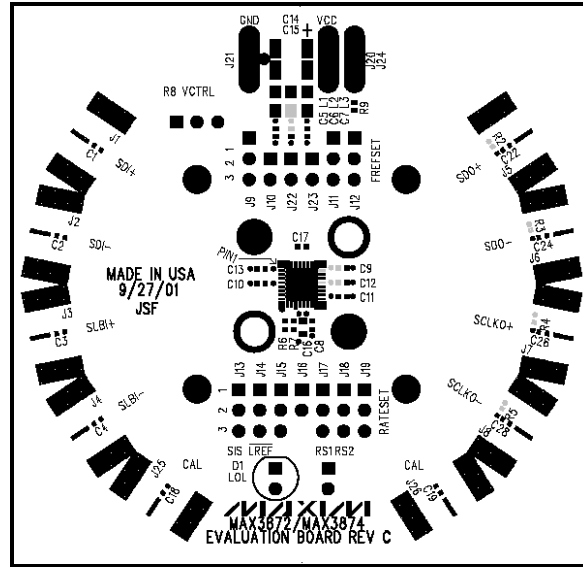


Figure 3. MAX3872/MAX3874 EV Kit Component Placement Guide—Component Side

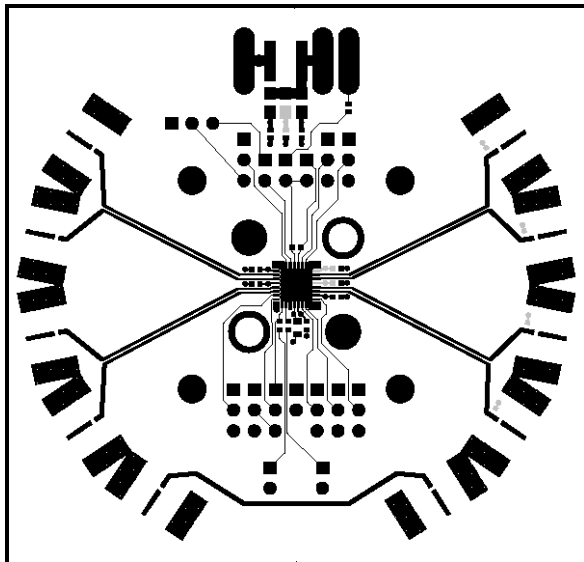


Figure 4. MAX3872/MAX3874 EV Kit PC Board Layout—Component Side

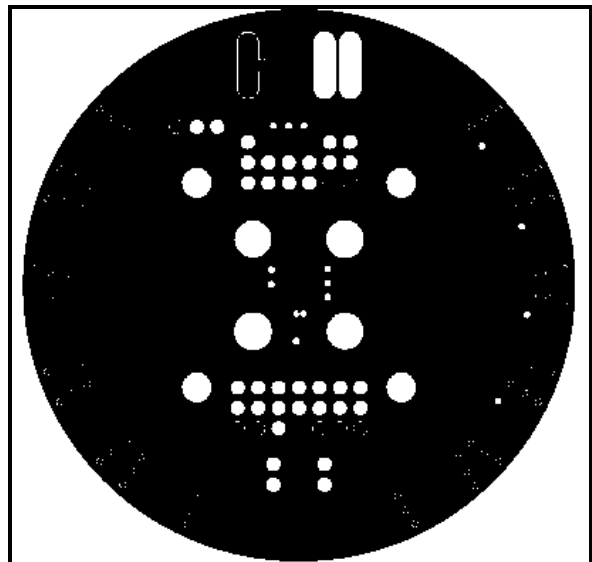


Figure 5. MAX3872/MAX3874 EV Kit PC Board Layout—Ground Plane

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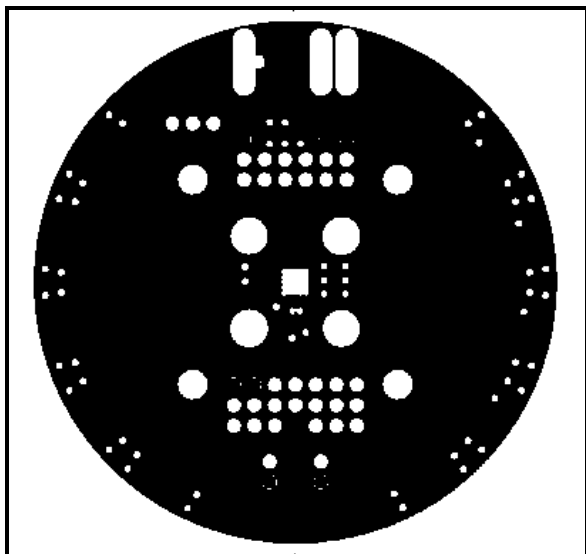


Figure 6. MAX3872/MAX3874 EV Kit PC Board Layout—Power Plane

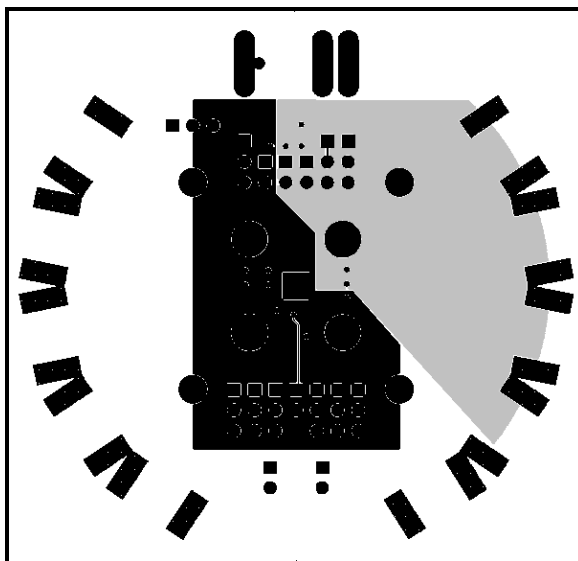


Figure 7. MAX3872/MAX3874 EV Kit PC Board Layout—Solder Side

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