

MAXIM

MAX4063 Evaluation Kit

Evaluates: MAX4063

General Description

The MAX4063 evaluation kit (EV kit) is a fully assembled and tested circuit board that uses the MAX4063 low-noise microphone amplifier IC designed for a single 2.4V to 5.5V application. The MAX4063 IC contains two microphone amplifiers. The main amplifier is typically used to sense an internal (built-in) system microphone, and an auxiliary amplifier that can be used to sense an external (plug-in) microphone. The differential and single-ended gains of the amplifiers are adjustable with jumpers and resistors. The differential output allows the EV kit to drive a load at up to 6V_{P-P}. The EV kit also features low quiescent current and a shutdown control to minimize power consumption.

The EV kit demonstrates how the MAX4063 can provide a complete microphone solution for a notebook PC. The MAX4063 is available in 14-pin TSSOP and 16-pin QFN (4mm x 4mm x 0.8mm) packages.

Features

- ◆ 2.4V to 5.5V Single-Supply Operation
- ◆ High 95dB PSRR
- ◆ Low-Noise Integrated Microphone Bias
- ◆ Single-Ended and Differential Inputs
- ◆ Differential Output
- ◆ Externally Adjustable Gain
- ◆ 0.3μA Shutdown Current
- ◆ Small 14-Pin TSSOP Package
- ◆ Fully Assembled and Tested

Ordering Information

PART	TEMP RANGE	IC PACKAGE
MAX4063EVKIT	0°C to +70°C	14 TSSOP

Component List

DESIGNATION	QTY	DESCRIPTION
C1	1	0.1μF ±10%, 16V X7R ceramic capacitor (0603) Taiyo Yuden EMK107BJ104KA
C2, C3, C4	3	10μF ±10%, 10V tantalum capacitors (Case A) AVX TAJA106K010R
C5, C6	2	1.0μF ±10%, 6.3V X5R ceramic capacitors (0603) Taiyo Yuden JMK107BJ105KA
C7, C8	2	1.0μF ±10%, 16V tantalum capacitors (Case A) AVX TAJA105K016R
C9	1	10pF ±5%, 50V C0G ceramic capacitor (0603) TDK C1608COG1H100J

DESIGNATION	QTY	DESCRIPTION
J1	1	3.5mm stereo jack
J2	1	Nonswitched PC mount jack, red
R1, R6	2	2kΩ ±1% resistors (0805)
R2	1	4.75kΩ ±1% resistor (0805)
R3	1	18.2kΩ ±1% resistor (0805)
R4, R5, R7, R9, R10	5	100kΩ ±5% resistors (0805)
R8, R11	0	Not installed resistors (0805)
JU1, JU2, JU3	3	2-pin headers
JU4, JU5	2	3-pin headers
U1	1	MAX4063EUD (14-pin TSSOP)
None	3	Shunts (JU1, JU4, JU5)
None	1	MAX4063 PC board

Component List

SUPPLIER	PHONE	FAX	WEBSITE
AVX	843-946-0238	843-626-3123	www.avxcorp.com
Taiyo Yuden	800-348-2496	847-925-0899	www.t-yuden.com
TDK	847-803-6100	847-390-4405	www.component.tdk.com

Note: Please indicate that you are using the MAX4063 when contacting these component suppliers.

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For pricing, delivery, and ordering information, please contact Maxim/Dallas Direct! at 1-888-629-4642, or visit Maxim's website at www.maxim-ic.com.

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Quick Start

The MAX4063 EV kit is fully assembled and tested. Follow the steps listed below to verify board operation. **Do not turn on the power supply until all connections are completed.**

Recommended Equipment

- 5V power supply
- AC source – 100mVAC, 1kHz sine wave
- Oscilloscope

Procedures

- 1) Install a shunt across pins 1 and 2 of jumper JU4 (EV kit ON).
- 2) Install a shunt across pins 1 and 2 of jumper JU5 (INT mode).
- 3) Install a shunt across jumper JU1 (20dB gain).
- 4) Connect channel 1 of the oscilloscope to the $\overline{\text{OUT}}$ pad, and channel 2 of the oscilloscope to the $\overline{\text{OUT}}$ pad. Connect the oscilloscope ground leads to the EV kit GND connection.
- 5) Connect the 5V terminal of the power supply to the VCC pad and the ground terminal of the power supply to the GND pad. Turn on the power supply.
- 6) Connect the 100mV, 1kHz AC source sine wave across the IN+ and IN- pads.
- 7) Verify that the output across the OUT and $\overline{\text{OUT}}$ pads is a 1VAC, 1kHz sine wave.
- 8) Remove the shunt from pins 1 and 2 of JU5 and install the shunt across pins 2 and 3 of JU5 (AUX mode).
- 9) Connect the 100mV, 1kHz AC source sine wave across the AUXIN jack (see Figure 1).
- 10) Verify that the output across the OUT and $\overline{\text{OUT}}$ pads is a 2VAC, 1kHz sine wave.

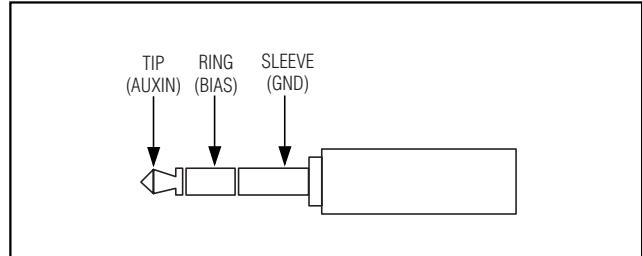


Figure 1. Typical Microphone Jack

Detailed Description

The MAX4063 microphone preamplifier features two selectable inputs, differential outputs, adjustable gain, an integrated low-noise bias source, and a low-power shutdown mode. Two input paths provide both differential and single-ended microphone sensing. The high noise rejection of the differential input is ideally suited to an internal microphone where system noise and long-run PC board traces can degrade low-level signals. The single-ended input provides a simple connection to an external microphone.

The differential and single-ended inputs have independent, adjustable gains. The Differential Gain Setting on the EV kit is controlled by jumpers JU1, JU2, and JU3 to select from three preset gains (20dB, 40dB, and 60dB); see Table 1. The single-ended (AUX) gain is set to the default 26dB. This can be changed by adding resistor R8:

$$R8 = 2M\Omega / (A_{VAUX} - 26)$$

$$A_{VAUX} = 20 \text{LOG} \left[\frac{V_{\text{OUT}} - V_{\overline{\text{OUT}}}}{V_{\text{AUX_IN}}} \right]$$

and A_{VAUX} must be greater than 26dB. When R8 is opened, the gain A_{VAUX} is 26dB.

Differential outputs provide a full-scale signal of up to 6V_{P-P} from a single 3V, supply optimizing the dynamic range of the amplified signal. The EV kit operates from a single 2.4V to 5.5V supply.

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Jumper Selection

Differential Gain

JU1, JU2, and JU3 select the differential gain for the MAX4063 EV kit. **JU1, JU2, and JU3 should all be left open or installed one at a time.** See Table 1 for shunt positions.

Table 1. JU1, JU2, JU3 Jumper Selection

JUMPER	SHUNT POSITION	DIFFERENTIAL GAIN (dB)
JU1	Installed (JU2 and JU3 open)	+20
JU2	Installed (JU1 and JU3 open)	+30
JU3	Installed (JU1 and JU2 open)	+40
JU1, JU2, JU3	None	+6

Shutdown

Jumper JU4 controls the shutdown pin ($\overline{\text{SHDN}}$) on the MAX4063 IC. The shutdown function may be activated on the EV kit by installing a shunt across pins 2 and 3 of JU4. The shutdown function may also be controlled by an external controller connected to the $\overline{\text{SHDN}}$ pad and removing the shunt on JU4. See Table 2 for shunt positions.

Table 2. JU4 Jumper Selection

SHUNT POSITION	$\overline{\text{SHDN}}$ PIN	EV KIT FUNCTION
1-2 ($\overline{\text{SHDN}}$ = high)	Pulled up to V_{CC}	EV kit ON.
2-3 ($\overline{\text{SHDN}}$ = low)	Pulled down to GND	EV kit OFF.
None. External controller connected to $\overline{\text{SHDN}}$ pad.	External controller controls	$\overline{\text{SHDN}}$ driven by external source. Shutdown is active low.

Input Mode

Jumper JU5 provides an option to select between single-ended mode (AUX) and differential mode (INT) inputs. The input mode ($\overline{\text{INT/AUX}}$) may also be controlled by an external controller connected to the ($\overline{\text{INT/AUX}}$) pad and removing the shunt on JU5. See Table 3 for shunt positions.

Table 3. JU5 Jumper Selection

SHUNT POSITION	$\overline{\text{INT/AUX}}$ PIN	EV KIT INPUT MODE
1-2 ($\overline{\text{INT}}$)	Pulled down to GND	Differential
2-3 (AUX)	Pulled up to V_{CC}	Single ended
None. External controller connected to ($\overline{\text{INT/AUX}}$) pad.	External controller controls	($\overline{\text{INT/AUX}}$) driven by external source

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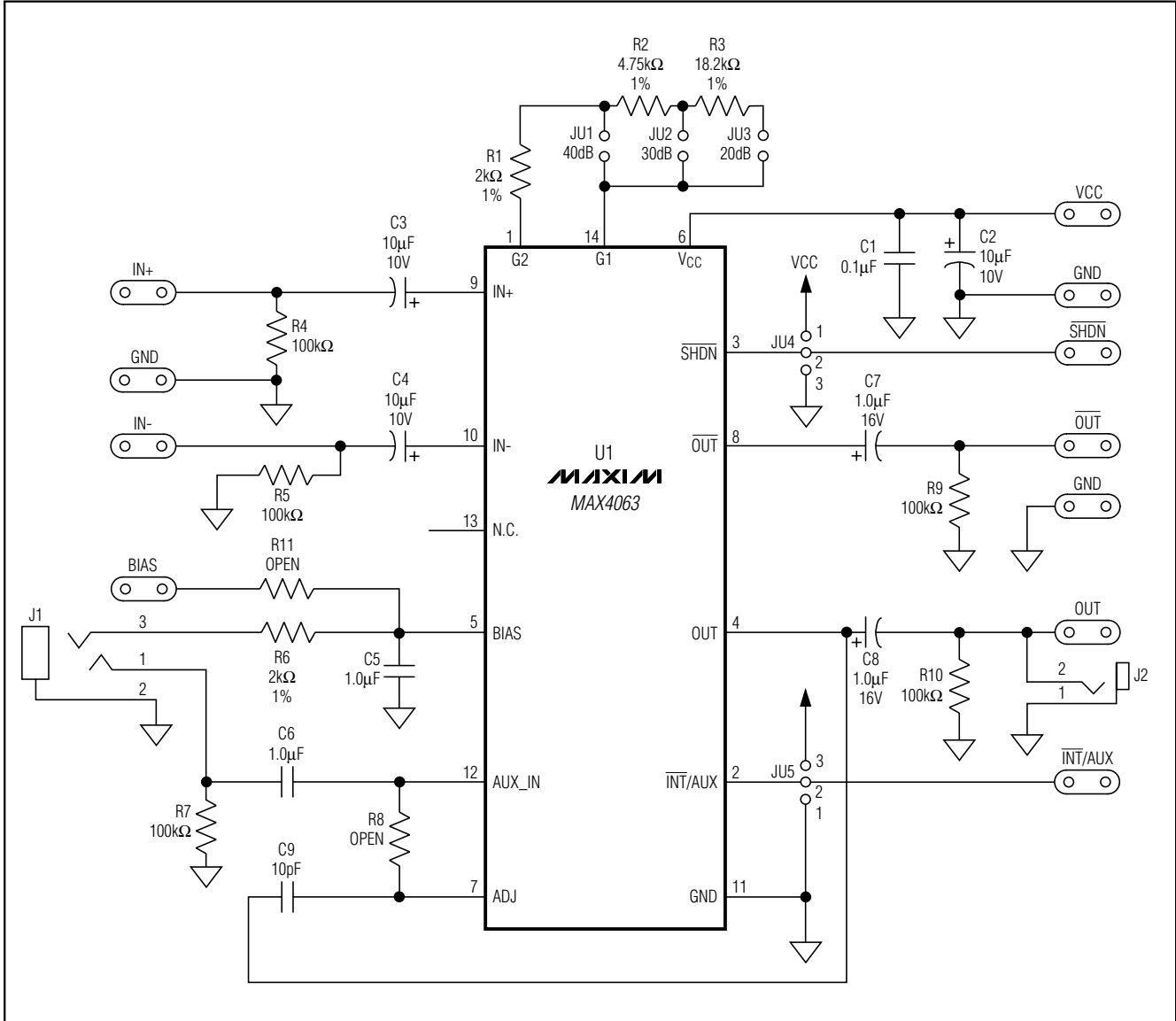


Figure 2. MAX4063 EV Kit Schematic

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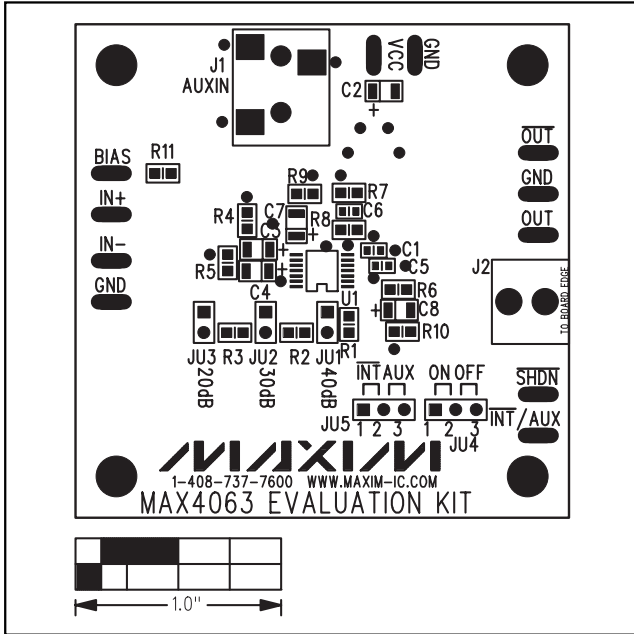


Figure 3. MAX4063 EV Kit Component Placement Guide—Component Side

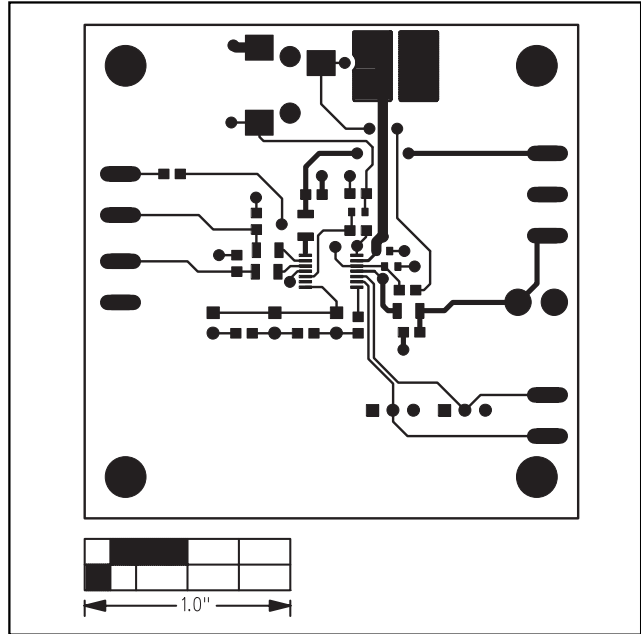


Figure 4. MAX4063 EV Kit PC Board Layout—Component Side

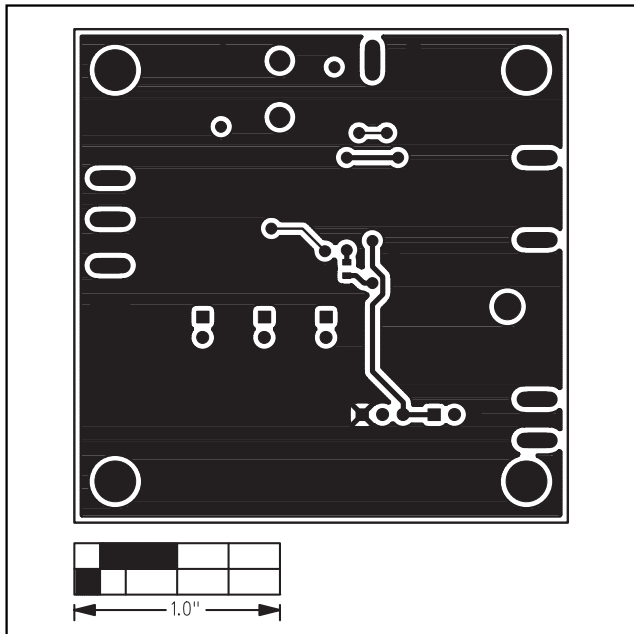


Figure 5. MAX4063 EV Kit PC Board Layout—Solder Side

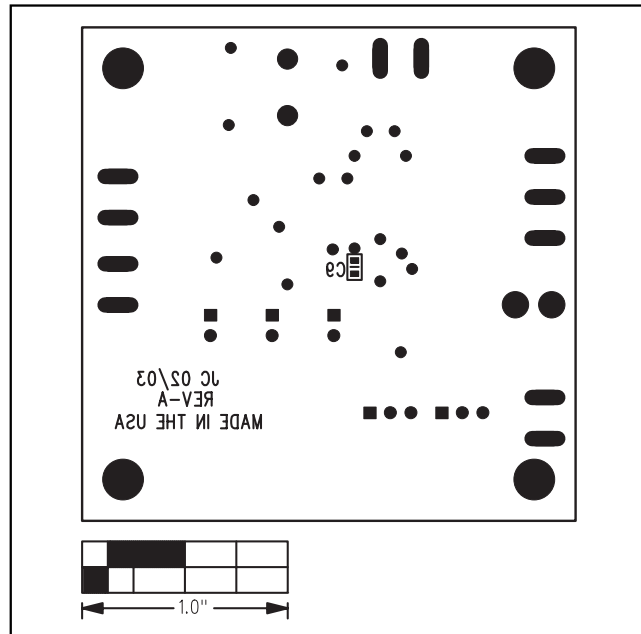


Figure 6. MAX4063 EV Kit Component Placement Guide—Solder Side

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