

# MAXIM

## MAX4410 Evaluation Kit

**Evaluates: MAX4410**

### General Description

The MAX4410 evaluation kit (EV kit) is a fully assembled and tested surface-mount circuit board that evaluates the MAX4410 DirectDrive stereo headphone amplifier. DirectDrive eliminates the two large DC-blocking capacitors typically required between the output of the amplifier and the headphones. The MAX4410 EV kit is designed to be driven by the lineout of a CD player or directly connected to any stereo audio source. The MAX4410 EV kit includes RCA jacks on the input and a 3.5mm headphone jack on the output to facilitate easy connections to the circuit board.

### Features

- ◆ No DC-Blocking Capacitors Required
- ◆ 1.8V to 3.6V Single-Supply Operation
- ◆ 80mW Per Channel into 16Ω
- ◆ 0.003% THD + N at 1kHz
- ◆ Low-Profile (1.2mm max) Design
- ◆ Ultra-Compact Solution
- ◆ Fully Assembled and Tested Surface-Mount Board
- ◆ Independent Left/Right Shutdown Controls

### Ordering Information

PART	TEMP RANGE	IC PACKAGE
MAX4410EVKIT	0°C to +70°C	14 TSSOP

### Component Suppliers

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 MAX4410 when contacting these component suppliers.

### Component List

DESIGNATION	QTY	DESCRIPTION
A1	1	MAX4410EBE (16-pin UCSP)
C1, C2	2	1.0μF ±20%, 10V tantalum capacitors (R-Case) AVX TAJR105M010R
C3, C4	2	100pF ±5%, 50V C0G ceramic capacitors (0402) TDK C1005C0G1H101J
C5, C6, C7	3	2.2μF ±10%, 6.3V X5R ceramic capacitors (0603) TDK C1608X5R0J225K Taiyo Yuden JMK107BJ225KA
C8	1	10μF ±20%, 6.3V X5R ceramic capacitor (0805) TDK C2012X5R0J106M Taiyo Yuden JMK212BJ106MG

DESIGNATION	QTY	DESCRIPTION
J1	1	Phono jack (side-entry PC board mount) white
J2	1	Phono jack (side-entry PC board mount) red
J3	1	Stereo headphone jack (3.5mm dia.)
JU1, JU2	2	3-pin headers
R1–R4	4	10kΩ ±1% resistors (0402)
None	2	Shunts
None	1	MAX4410 EV kit PC board
None	1	MAX4410 EV kit data sheet
None	1	MAX4410 data sheet
U1	1	MAX4410EUD (14-pin TSSOP)

**Note:** A1 is for display purposes only (not a functional component).

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## Quick Start

### Recommended Equipment

- One pair of 16 $\Omega$  or 32 $\Omega$  headphones
- One variable DC power supply capable of supplying between 1.8V and 3.6V at 300mA
- One stereo audio source

### Procedure

The MAX4410 EV kit is fully assembled and tested. Follow the steps below to verify board operation. **Do not turn on the power supply until all connections are completed:**

- 1) Plug the headphones into the 3.5mm headphone jack.
- 2) Ensure that the stereo audio source is turned off.
- 3) Connect the disabled stereo audio source through the RCA phono jacks.
- 4) Ensure that shunts JU1 and JU2 are installed in position 1-2.
- 5) Connect the 1.8V to 3.6V DC power supply to the VCC and GND pads.
- 6) Turn on the DC power supply.
- 7) Enable the stereo audio source.

## Detailed Description

The MAX4410 EV kit is a stereo, single-supply headphone amplifier. The MAX4410 EV kit is designed to be driven by the stereo lineout of a CD player or directly connected to any stereo audio source. The input impedance is 10k $\Omega$ . The -3dB corner frequencies are approximately 16Hz and 159kHz and are dependent on components R1–R4 and C1–C4. The MAX4410 EV kit has a gain of -1 and can be powered with a 1.8V to 3.6V supply.

### Shutdown Control

The MAX4410 EV kit provides two shutdown pins ( $\overline{\text{SHDNL}}$ ,  $\overline{\text{SHDNR}}$ ) to disable the outputs. Jumpers JU1 and JU2 control the left and right channels, respectively (see Table 1 for shutdown shunt positions).

Shorting pin 2 of JU1 to pin 2 of JU2 allows the user to control both channels' shutdown pins simultaneously by driving the provided user pad  $\overline{\text{SHDN}}$  with an external source (see Figure 1 for shunt configuration).  $\overline{\text{SHDNL}}$  and  $\overline{\text{SHDNR}}$  are CMOS logic-level inputs.

Table 1. Shutdown Selection

JUMPER	SHUNT POSITION	DESCRIPTION
JU1	1-2	Left channel enabled
	2-3	Left channel disabled
JU2	1-2	Right channel enabled
	2-3	Right channel disabled

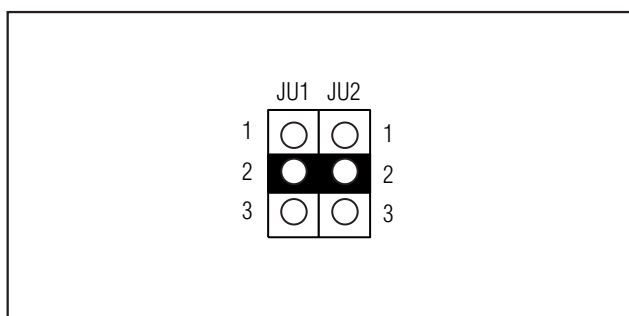


Figure 1. Simultaneous Shutdown Control

### Layout Considerations

To optimize the audio performance of the MAX4410, it is important to follow these layout guidelines. The MAX4410 EV kit uses two ground planes to minimize switching noise from the charge pump coupling into the audio signal. The two planes are star-connected at one point (GND pad). Capacitors C5, C6, and C7 should be placed close to the IC and connected with wide traces. Short, wide traces should be used to connect the power pins of the IC to the power supply.

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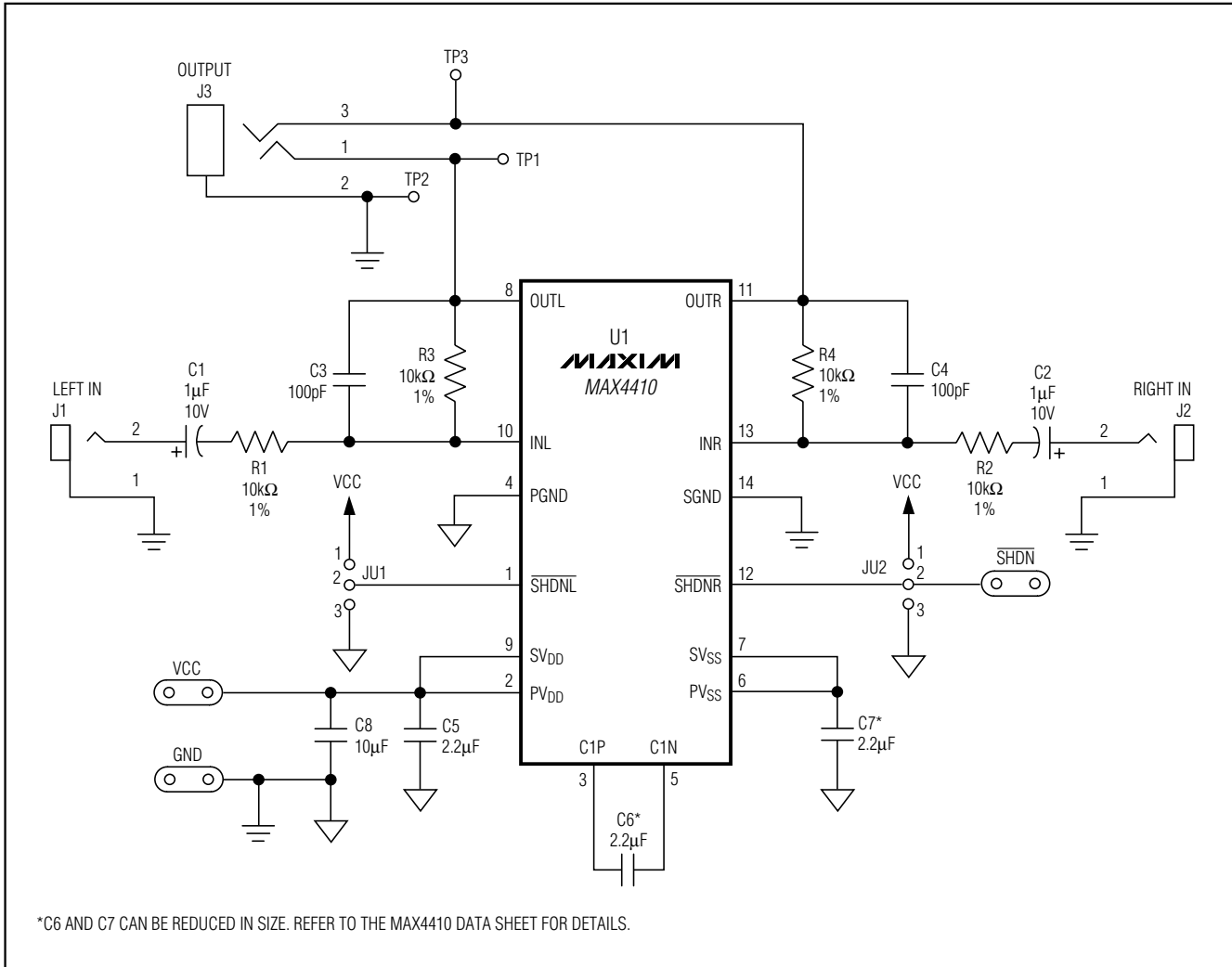


Figure 2. MAX4410 EV Kit Schematic

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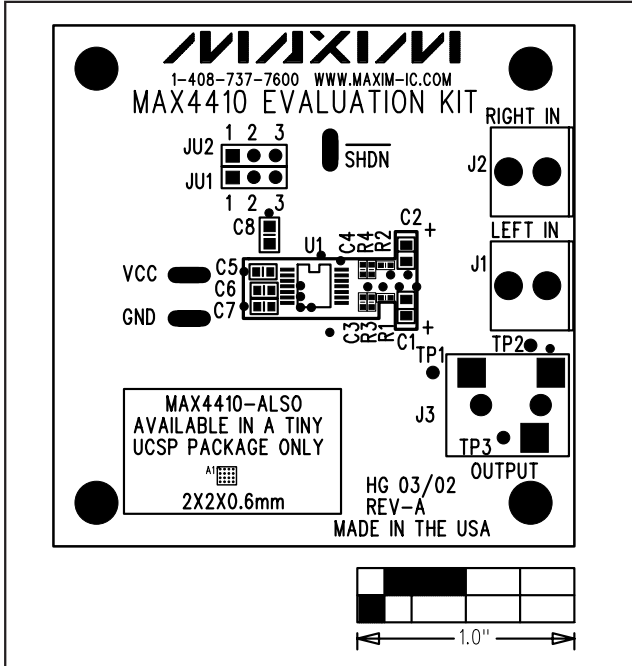


Figure 3. MAX4410 EV Kit Component Placement Guide—Component Side

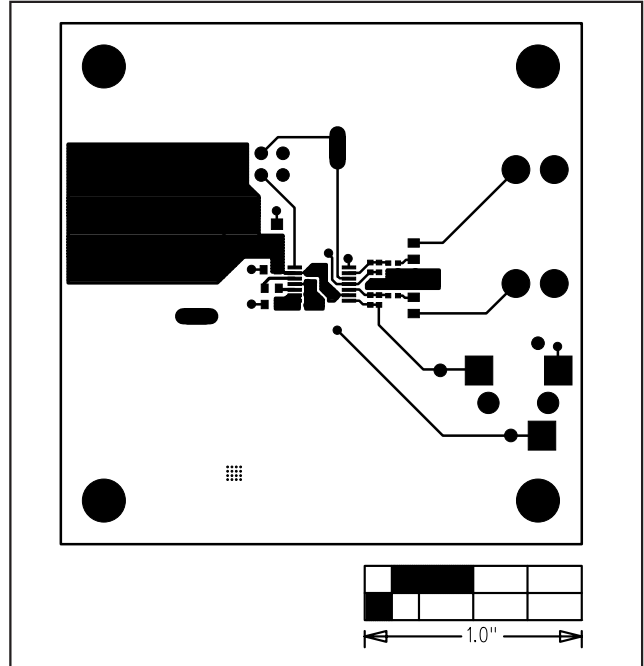


Figure 4. MAX4410 EV Kit PC Board Layout—Component Side

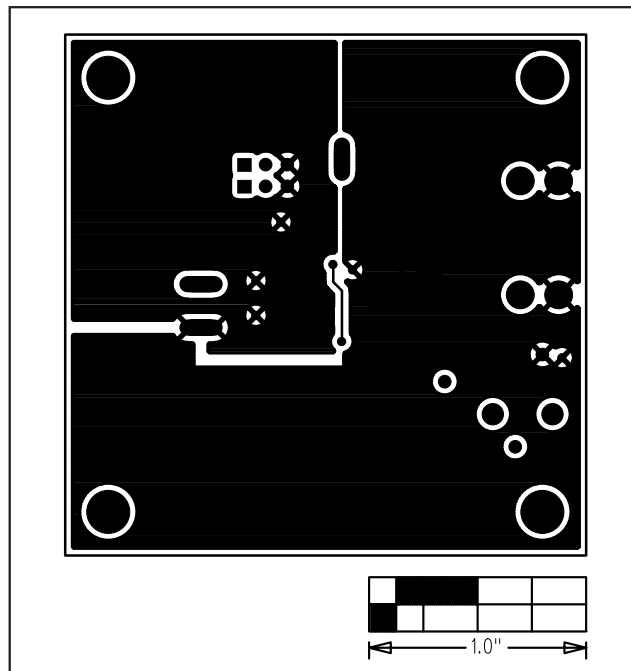


Figure 5. MAX4410 EV Kit PC Board Layout—Solder Side

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