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MAX7454 Evaluation Kit

Evaluates: MAX7454/MAX7455

General Description

The MAX7454 evaluation kit (EV kit) is a fully assembled and tested surface-mount circuit board that contains a MAX7454. The MAX7454 is a triple video reconstruction filter and buffer for high-definition (HD) and standard-definition (SDi and SDp) television applications. The filter cutoff frequency is programmable to 30MHz (HDTV) or 10MHz (SDTV) applications. The MAX7454 includes a +6dB output buffer capable of driving a 2V$_{P-P}$ video signal into a standard 150Ω load.

Video input signals to the EV kit can be DC-coupled, or AC-coupled with a user-provided DC clamp-bias voltage. The EV kit's input terminals can be 75Ω or high-impedance terminated. The EV kit's output terminals can be series terminated with a 75Ω resistor or connected directly to the load. The EV kit operates from a single 5V power supply. The MAX7454 EV kit can also evaluate the MAX7455.

Features

♦ **Single 5V Supply Operation**

♦ **Output Buffer Drives a 150Ω Standard Video Load with a +6dB Gain**

♦ **High-Definition TV 30MHz Filter**

♦ **Standard-Definition TV 10MHz Filter**

♦ **Input DC-Coupled or AC-Coupled with User-Provided DC Clamp-Bias Voltage**

♦ **Standard 75Ω Input/Output Termination**

♦ **Also Evaluates the MAX7455**

♦ **Surface-Mount Components**

♦ **Fully Assembled and Tested**

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C2	2	0.01µF ±10%, 50V X7R ceramic capacitors (0603) TDK C1608X7R1H103K
C3, C4, C8, C9, C10	5	1µF ±10%, 10V X5R ceramic capacitors (0603) TDK C1608X5R1A105K
C5, C6, C7	3	0.1µF ±10%, 25V X7R ceramic capacitors (0603) TDK C1608X7R1E104K
D1, D2, D3	3	75V, 150mA, high-speed switching diodes (SOD-123) Central Semiconductor CMHD4448
R1–R6	6	75.0Ω ±1% resistors (0805)
R7, R8, R9	3	10MΩ ±5% resistors (0805)
U1	1	MAX7454UUP (20-pin TSSOP with exposed paddle)
INPUT1, INPUT2, INPUT3, OUTPUT1, OUTPUT2, OUTPUT3	6	75Ω BNC PC board-mount jack connectors
JU1–JU5	5	3-pin headers
JU6–JU11	6	2-pin headers
None	11	Shunts (see Tables 1-4 for jumper selection)
None	1	MAX7454 PC board

Ordering Information

PART	TEMP RANGE	IC PACKAGE
MAX7454EVKIT	0°C to +70°C*	20 TSSOP-EP**

*This limited temperature range is for the EV kit PC board only. The MAX7454 IC temperature range is 0°C to +85°C.
**EP = Exposed paddle.

Quick Start

Recommended Equipment

- 5V, 1A DC power supply (V$_{CC}$)
- 200mV to 500mV, 10mA biasing supply (clamp biasing)
- Video signal generator (e.g., Tektronix TG-2000)
- Video measurement equipment (e.g., Tektronix VM-700A)

Procedure

The MAX7454 EV kit is fully assembled and tested. Follow these steps to verify board operation. **Do not turn on the power supply until all connections are completed:**

1) Verify that a shunt is installed across pins 2 and 3 of jumper JU1 (HDTV).

2) Verify that a shunt is installed across pins 1 and 2 of jumper JU2 (HD high frequency).

3) Verify that a shunt is installed across pins 2 and 3 of jumper JU3 (channel 1 video input signal is AC-coupled with a DC clamp-bias voltage).

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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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_____**Component Suppliers**

SUPPLIER	PHONE	FAX	WEBSITE
Central Semiconductor	631-435-1110	631-435-1824	www.centralsemi.com
TDK	847-803-6100	847-390-4405	www.component.tdk.com

Note: Indicate that you are using the MAX7454 EV kit when contacting these suppliers.

4) Verify that a shunt is installed across jumper JU6. (Channel 1 video input signal is terminated at 75Ω.)

5) Verify that a shunt is NOT installed across jumper JU9. (Channel 1 video output signal passes through a 75Ω series termination resistor.)

6) Connect the output of the video signal generator to the INPUT1 BNC connector on the MAX7454 EV kit.

7) Connect the OUTPUT1 BNC connector on the EV kit to the input of the video measurement equipment.

8) Connect both power-supply grounds to the EV kit's GND pads.

9) Connect the 5V supply to the V_CC pad on the EV kit.

10) Connect the 200mV to 500mV biasing supply to the CLAMP_BIAS_1 pad on the EV kit. Set the biasing supply to 400mV initially.

11) Set the video signal generator for the desired video input signal, such as multiburst sweep. This signal must contain sync information (i.e., CVBS or Y).

12) Turn on both power supplies, and enable the video signal generator.

13) Analyze the video output signal with the VM-700A video measurement equipment.

_____Detailed Description

The MAX7454 EV kit is a fully assembled and tested surface-mount circuit board that contains the MAX7454. The MAX7454 is a configurable, triple video reconstruction filter and buffer for HD, SDi, and SDp TV applications. The filter cutoff frequency is programmable with jumpers. The device includes a +6dB output buffer capable of driving a 2V_P-P video signal into a standard 150Ω load.

Each of the three input signals to the EV kit can be DC-coupled, or AC-coupled with a user-provided DC clamp-bias voltage. Each DC clamp-bias network consists of two capacitors, one diode, and one resistor. One of the capacitors is used to decouple the biasing source, while the other capacitor is used to AC-couple the input signal. The diode is used to clamp the negative peak of the input signal. The resistor is used to provide a bias current to charge the input capacitor on startup and/or step

change. The DC clamp-bias voltage must be in the 200mV to 500mV range. This biasing network is intended for the input signal with sync (i.e., Y or CVBS). For bipolar input signals (i.e., Pb, Pr, C), replace the diode with a resistor that is greater than 1MΩ.

Each of the EV kit's input terminals can be 75Ω or high-impedance terminated. The EV kit's output terminals can be series terminated with a 75Ω resistor or directly connected to the load. All three video inputs and outputs on the EV kit are identical.

The EV kit can also evaluate the MAX7455 after replacing the IC (U1). See the *Evaluating the MAX7455* section for further details.

_____Jumper Selection

Frequency Selection
The MAX7454 EV kit features an option to set the -3dB cutoff frequency of the reconstruction filter. Jumpers JU1 and JU2 select the filter frequency of the MAX7454. Table 1 lists the selectable jumper options.

Table 1. JU1 and JU2 Jumper Selection

JU1 SHUNT POSITION SD/$\overline{HD}$ PIN	JU2 SHUNT POSITION FSEL PIN	EV KIT FUNCTION
2-3 (SD/$\overline{HD}$ = low)	2-3 (FSEL = low)	HD low frequency
2-3 (SD/$\overline{HD}$ = low)	1-2 (FSEL = high)	HD high frequency
1-2 (SD/$\overline{HD}$ = high)	2-3 (FSEL = low)	SD low frequency
1-2 (SD/$\overline{HD}$ = high)	1-2 (FSEL = high)	SD high frequency

Input Coupling
The MAX7454 EV kit features an option to individually select the video input-signal coupling for each input channel. Each input channel to the EV kit can be DC-coupled, or AC-coupled with a user-provided DC clamp-bias voltage. Jumpers JU3, JU4, and JU5 set the input coupling for channels 1, 2, and 3, respectively. Table 2 lists the selectable jumper options.

For the Pb, Pr, or C input signals, set jumpers JU3, JU4, or JU5 to pins 2 and 3, and replace diodes D1, D2, or D3 with a resistor that is greater than 1MΩ.

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Table 2. JU3, JU4, and JU5 Jumper Selection

SHUNT POSITION	INPUT CHANNEL COUPLING
1-2	DC
2-3	AC with user-provided DC clamp-bias voltage (200mV to 500mV) at the CLAMP_BIAS_X* pads

*Where X is 1, 2, or 3.

Table 3. JU6, JU7, and JU8 Jumper Selection

SHUNT POSITION	VIDEO INPUT TERMINATION
Installed	75Ω
Not installed	High impedance

Table 4. JU9, JU10, and JU11 Jumper Selection

SHUNT POSITION	VIDEO OUTPUT TERMINATION
Installed	Direct connection
Not installed	75Ω

Input Termination

The MAX7454 EV kit features an option to individually terminate each video input channel to 75Ω or high impedance. Jumpers JU6, JU7, and JU8 select each input termination for channels 1, 2, and 3, respectively. Table 3 lists the selectable jumper options.

Output Termination

The MAX7454 EV kit features an option to individually terminate each video output channel to 75Ω or direct connection. Jumpers JU9, JU10, and JU11 select each output termination for channels 1, 2, and 3, respectively. Table 4 lists the selectable jumper options.

Evaluating the MAX7455

The MAX7454 EV kit can also evaluate the MAX7455. To evaluate the MAX7455, replace IC U1 with a MAX7455 and refer to the MAX7454/MAX7455 data sheet for the IC specifications.
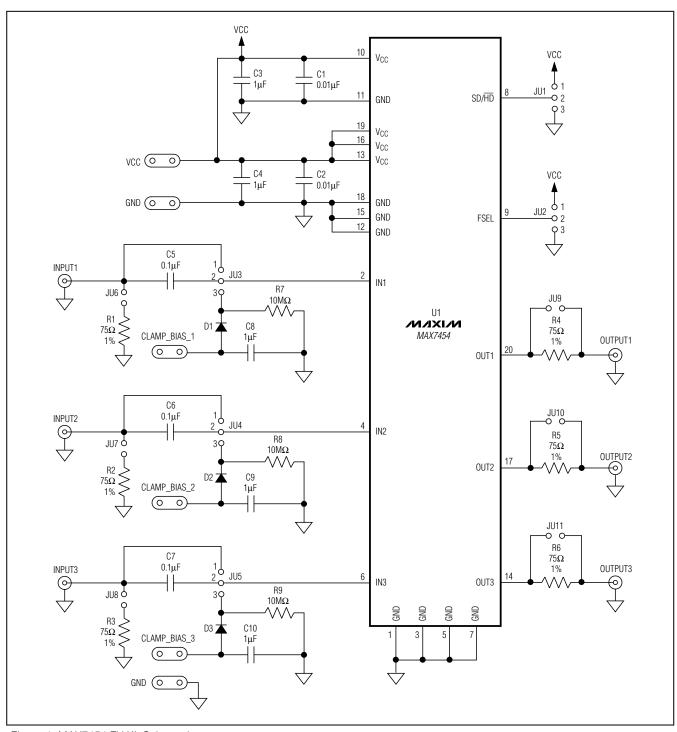
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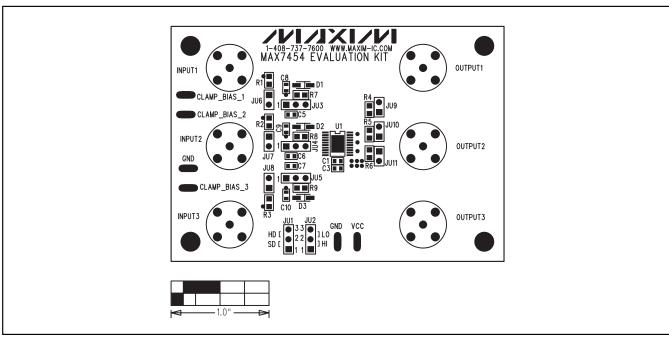# MAX7454 Evaluation Kit

Figure 1. MAX7454 EV Kit Schematic

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Figure 2. MAX7454 EV Kit Component Placement Guide—Component Side

Figure 3. MAX7454 EV Kit PC Board Layout—Component Side
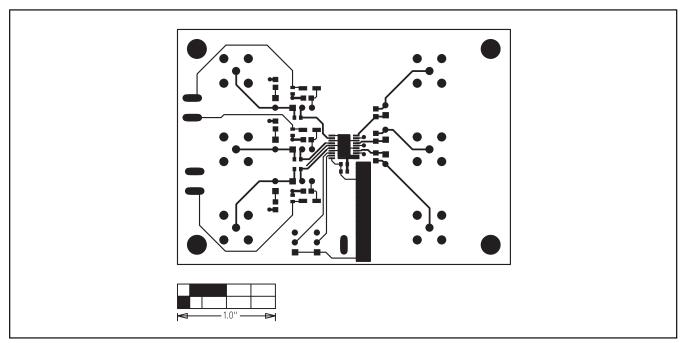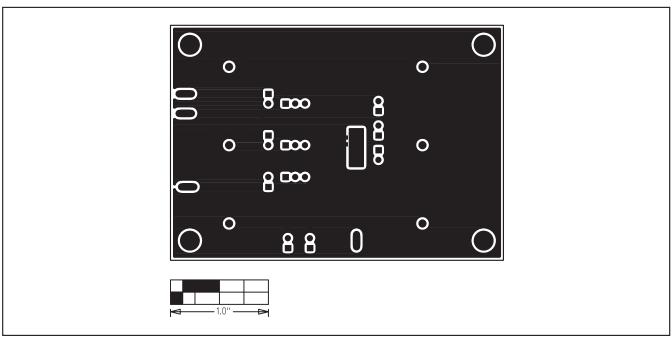
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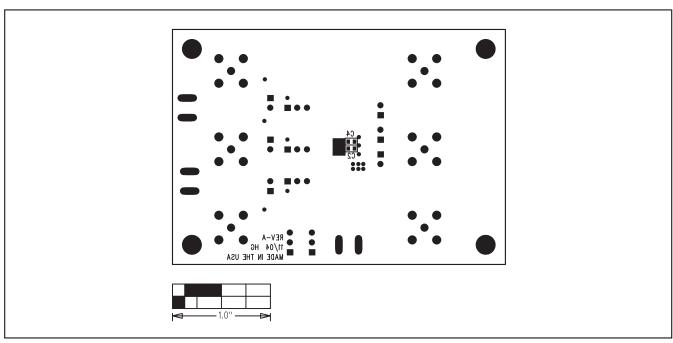Figure 4. MAX7454 EV Kit PC Board Layout—Solder Side

Figure 5. MAX7454 EV Kit Component Placement Guide—Solder Side

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