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Evaluation Board for the AD8147/AD8148 Triple Differential Drivers for Wideband Video

FEATURES

Full featured evaluation board for the AD8147/AD8148
Uses VGA as input and Cat-5 as output
Single 5 V or dual ±2.5 V/±5 V operation

EVALUATION KIT CONTENTS

AD8147-EVALZ/AD8148-EVALZ evaluation board
Instruction guide for user guide download

EQUIPMENT NEEDED

Signal source or video pattern generator and signal analyzer
Power supply options: +5 V/1 A, ±2.5 V/1 A, or ±5 V/1 A
Female to male VGA cable for input
Cat-5 cable for output

GENERAL DESCRIPTION

The AD8147/AD8148 are high speed triple, differential or single-ended input to differential output drivers. The AD8147 has a fixed gain of 2, and the AD8148 has a fixed gain of 4. The AD8147 and AD8148 devices are designed for the highest resolution component video signals but can be used for any type of analog signals or high speed data transmission over either a Category 5 UTP (Cat-5) cable or differential printed circuit board (PCB) transmission lines.

These drivers can be used with the AD8145 triple, differential to single-ended receiver, and the AD8117 crosspoint switch, to produce a video distribution system capable of supporting UXGA or 1080p signals.

Manufactured on the Analog Devices, Inc., second generation XFCB bipolar process, the drivers have large signal bandwidths of 700 MHz and fast slew rates. They have an internal common-mode feedback feature that provides output amplitude and phase matching that is balanced to −60 dB at 50 MHz, suppressing even order harmonics and minimizing radiated electromagnetic interference (EMI).

Both the AD8147 and AD8148 encode vertical and horizontal sync signals on the common-mode voltages of the outputs. All outputs can be independently set to low voltage states to be used with series diodes for line isolation, allowing easy, differential multiplexing over the same twisted pair cable.

The AD8147/AD8148 are available in a 24-lead LFCSP and operate over a temperature range of −40°C to +85°C.

This user guide provides all supporting documents for evaluating the AD8147/AD8148. Consult the AD8147 and AD8148 data sheets, which provide additional information, when working with the evaluation board.

EVALUATION BOARD PHOTOGRAPH AND BLOCK DIAGRAM

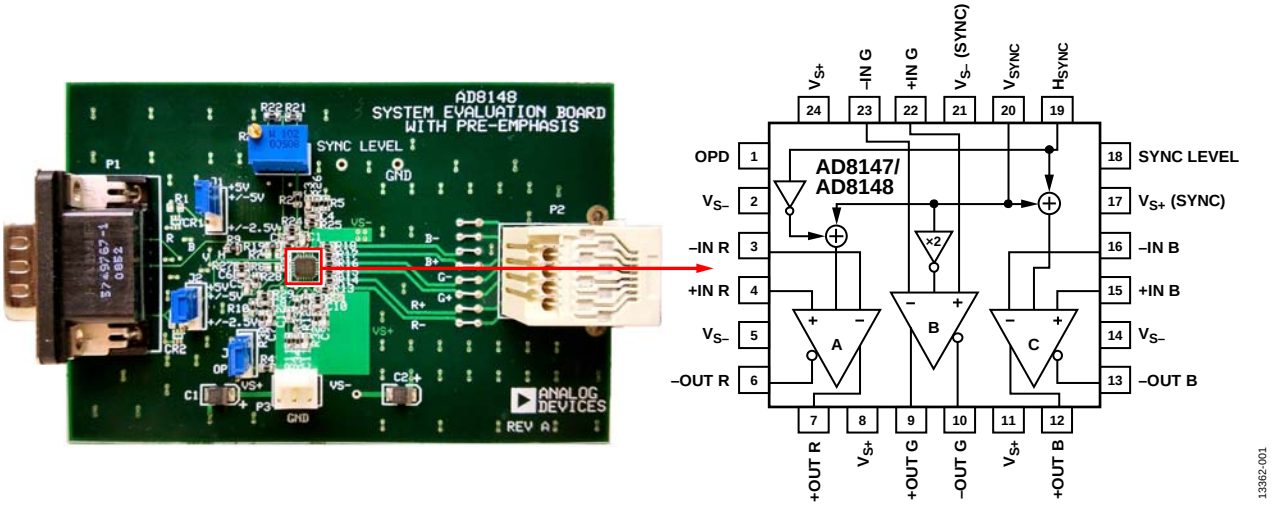

Figure 1.

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REVISION HISTORY

9/15—Revision 0: Initial Version

EVALUATION BOARD HARDWARE

INTRODUCTION

The AD8147-EVALZ/AD8148-EVALZ evaluation board allows the user to easily evaluate the AD8147/AD8148 in both single and dual supply operation and through a Cat-5 UTP cable.

Figure 2 shows the typical bench setup used to evaluate the triple differential drivers.

POWER SUPPLY

This evaluation board requires either a single +5 V or a dual ±2.5 V/±5 V power supply. Connectors J1 and J2 in the evaluation board must be set according to the supply used. If using a ±5 V power supply, follow the connections shown in Figure 2.

ANALOG INPUTS

Drive the input, P1, with a video pattern generator, a video signal, or any signal source that can provide an input voltage of ±5 V for a ±5 V supply and 0 V to 5 V for single 5 V or ±2.5 V supply.

ANALOG OUTPUT

The output of the evaluation board, P2, produces differential red (R), green (G), and blue (B) signals that are approximately ±3 V for ±5 V supplies and approximately ±1 V using ±2.5 V supplies. The waveform signal from this output can be checked using a signal analyzer, such as an oscilloscope or a display/monitor.

OUTPUT PULL-DOWN (OPD) LOGIC INPUT

The OPD pin is a binary input that controls the state of the outputs. Its binary input level is referenced to GND. When the OPD input is driven to its low state, the output is enabled and operates normally. When the OPD input is driven to its high state, the outputs of the drivers are forced to a low voltage, thus presenting high impedance.

QUICK START GUIDE

To begin, take the following steps:

1. Remove the AD8147/AD8148 from the box.
2. Connect +5 V to VS+, −5 V to VS−, and GND to GND (the center pin of P3).
3. Connect a shunt onto the ±5 V or +5 V side of both J1 and J2. Connect another shunt on the opposite side of OPD of J3.
4. Connect a video signal from a monitor/laptop or video pattern generator on P1 (VGA port).

Using the AD8143/AD8145 video receiver, take the following steps:

1. Connect +5 V to VCC, −5 V to VEE, and GND to the center pin of P2 of the AD8143/AD8145 evaluation board.
2. Connect a Cat-5 UTP cable between P2 and P1 of the AD8143/AD8145 evaluation board.
3. Connect an oscilloscope or a display/monitor to J1 of the AD8143/AD8145 evaluation board through a VGA cable.
4. Turn on the power supply. The typical current of VCC/VS+ is 143 mA; the typical current of VEE/VS− is −122 mA.
5. The output must produce the same signal as the input.

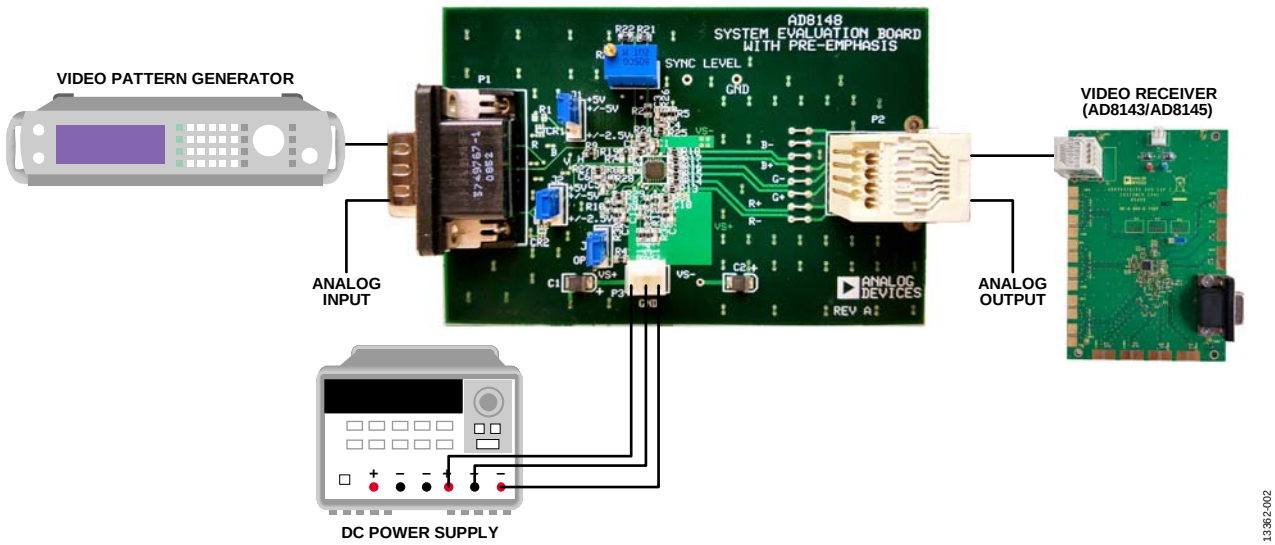

Figure 2. Typical Evaluation Setup

EVALUATION BOARD SCHEMATICS AND ARTWORK

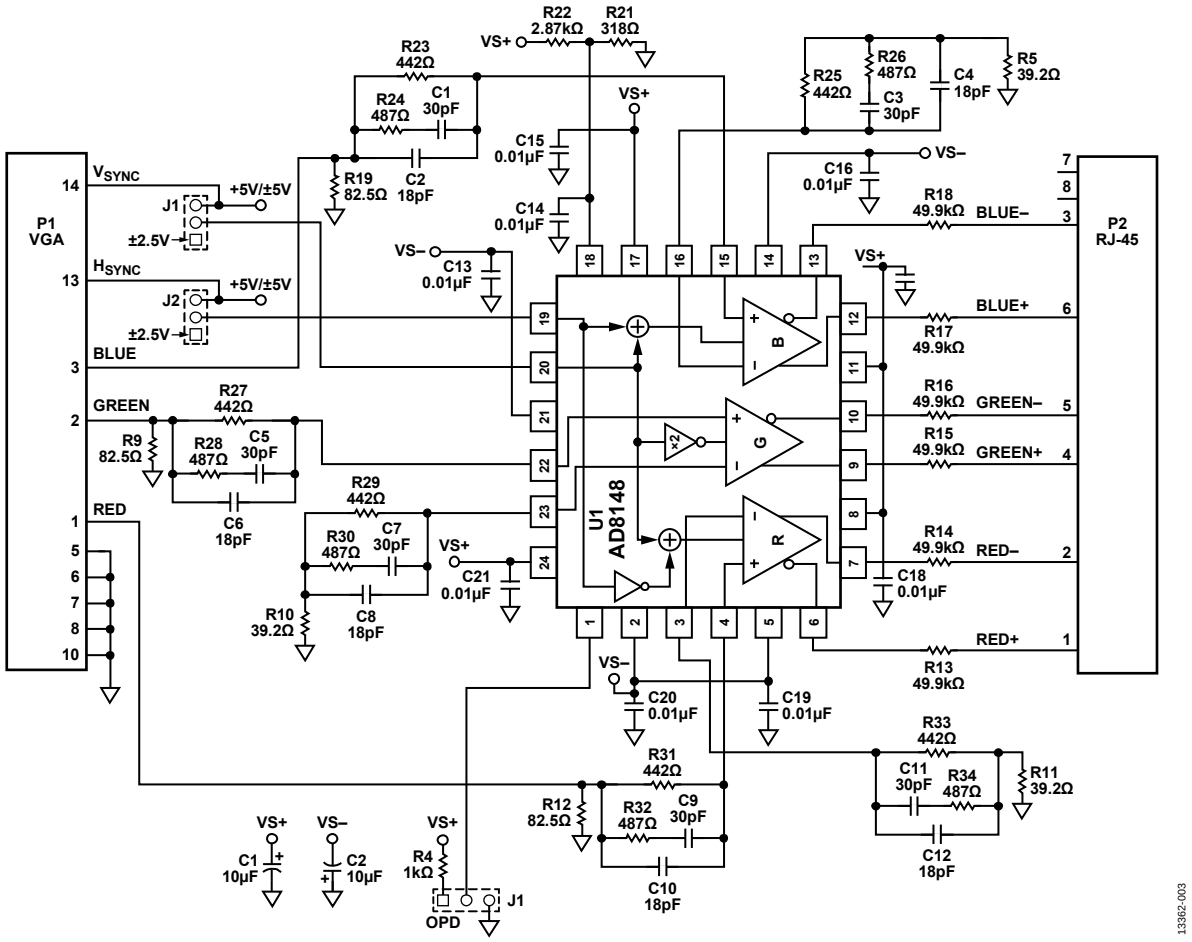

Figure 3. Evaluation Board Schematic

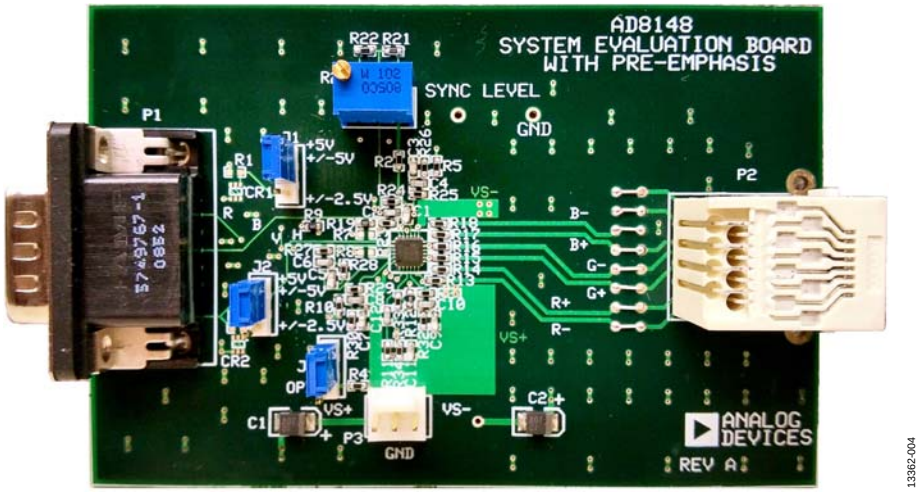

Figure 4. AD8147-EVALZ/AD8148-EVALZ Evaluation Board, Front Side

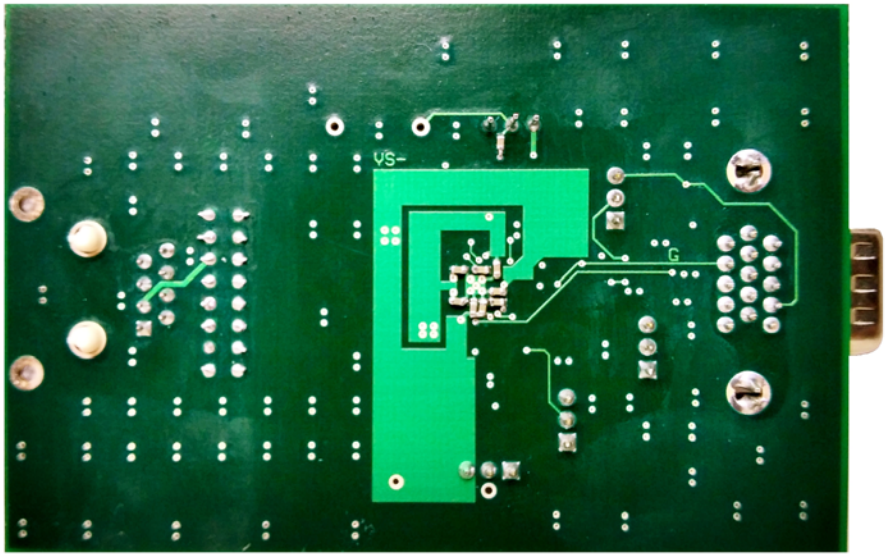

Figure 5. AD8147-EVALZ/AD8148-EVALZ Evaluation Board, Rear Side

BILL OF MATERIALS

Table 1.

Item	Qty	Reference Designator	Description	Manufacturer	Part Number
1	6	R23, R25, R27, R29, R31, R33	Resistor, standard thick film chip, R0402, 442 Ω	Vishay	CRCW0402442RFKED
2	6	R24, R26, R28, R30, R32, R34	487 Ω	Bourns	CR0402-FX-4870GLF
3	6	C1, C3, C5, C7, C9, C11	30 pF	Murata	GRM1555C1H300FA01D
4	6	C2, C4, C6, C8, C10, C12	Capacitor, ceramic chip mono, C0G, 0402, 18 pF	Murata	GJM1555C1H180JB01
5	3	R9, R12, R19	Resistor, precision thick film chip, R0402, 82.5 Ω	Panasonic	ERJ-2RKF82R5X
6	3	R5, R10, R11	Precision thick film chip, R0402, 39.2 Ω	Panasonic	ERJ-2RKF39R2X
7	1	R21	316 Ω	Vishay	CRCW0402316RFKED
8	1	R22	Resistor, standard thick film chip, R0402, 2.87 kΩ	Vishay	CRCW04022K87FKED
9	9	C13 to C21	Capacitor, ceramic chip, X8R, C0402 0.01 µF	TDK	C1005X8R1E103K
10	2	C1, C2	Capacitor, tantalum, C3528, 10 µF	AVX	TAJB106K016R
11	3	J1 to J3	Connector-PCB header, 2.54 mm, 3 position vertical	Molex	22-03-2031
12	1	P3	Connector-PCB header, friction lock, 3 position	Molex	22-11-2032
13	1	P1	D-sub connector plug, male pins, 15 position through hole, right angle solder	TE Connectivity	5749767-1
14	1	P2	Connector-PCB unfiltered modification jack	TE Connectivity	RJ45-8X
15	1	R20	Resistor, variable, 3/8" square top, adjustable, 1k	Bourns	3299W-1-102LF
16	1	U1	Analog Devices IC triple differential driver for wideband video	Analog Devices	AD8147ACPZ/AD8148ACPZ
17	2	R1, R3	Resistor, precision thick film chip, R0402, 301 Ω	Panasonic	ERJ-2RKF3010X
18	2	CR1, CR2	Diode surface mount, fast switching array	Diodes Incorporated	BAS16TW-7-F

ESD Caution

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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