

Evaluation Board for the AD5428/AD5440/AD5447EB 8-Bit/10-Bit/12-Bit, Parallel Input, Dual-Channel, Current Output DAC

FEATURES

- Operates from dual ± 12 V and +5 V supplies
- On-board reference and output amplifiers
- Direct hookup to printer port of PC
- PC software for control of DAC

APPLICATIONS

- Portable battery-powered applications
- Waveform generators
- Analog processing
- Instrumentation applications
- Programmable amplifiers and attenuators
- Digitally controlled calibration
- Programmable filters and oscillators
- Composite video
- Ultrasound
- Gain, offset, and voltage trimming

GENERAL DESCRIPTION

This user guide describes the evaluation board hardware and software for the AD5428/AD5440/AD5447DACs.

The AD5428/AD5440/AD5447 devices are CMOS 8-bit, 10-bit, and 12-bit, current output, digital-to-analog converters (DACs). They operate from a 2.5 V to 5.5 V power supply, making them suited to battery-powered and other applications, such as analog processing, waveform generators, and programmable attenuators.

On power-up, the internal register and latches are filled with 0s and the DAC outputs are at zero scale. As a result of being manufactured on a CMOS submicron process, the parts offer excellent 4-quadrant multiplication characteristics, with large-signal multiplying bandwidths of up to 10 MHz.

The applied voltage reference determines the full-scale output current. An integrated feedback resistor (R_{FB}) provides temperature tracking and full-scale voltage output when combined with an external I-to-V precision amplifier.

Full data on the DACs is available in the [AD5428/AD5440/AD5447](#) data sheet, which should be consulted in conjunction with this user guide when using the evaluation board.

FUNCTIONAL BLOCK DIAGRAM

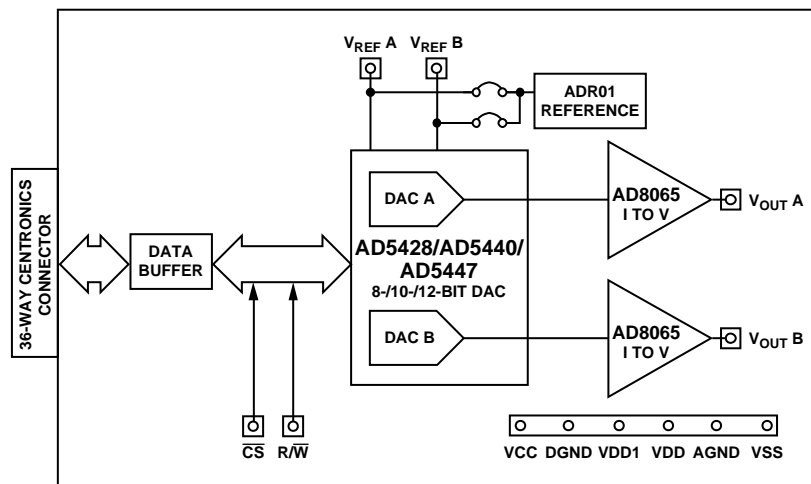


Figure 1.

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REVISION HISTORY

4/11—Rev. 0: Rev. A

Updated Format.....	Universal
Added Applications Section.....	1

1/05—Revision 0: Initial Version

HARDWARE

The evaluation board consists of the DAC (AD5428, AD5440, or AD5447), two AD8065 op amps, and a 10 V reference, the ADR01. An external reference can also be applied via an SMB input connector. Digital buffering is supplied on board. Though excellent for dc performance, the bandwidth performance of the combined DAC and amplifier is limited to approximately 8 MHz.

EVALUATION BOARD POWER SUPPLIES

The evaluation board requires ± 12 V and +5 V supplies. The +12 V (V_{DD}) and -12 V (V_{SS}) are used to power the output

amplifier. The +5 V is used to power the DAC (V_{DD1}) and the transceivers (V_{CC}). All supplies are decoupled to ground with 10 μ F tantalum and 0.1 μ F ceramic capacitors.

TEST POINT SETUP

The test point pins are connected on the evaluation board to the respective DAC, as shown in Table 1. For example, the least significant bit (LSB) of the AD5440, DB0, is connected to the DB2 test point.

Table 1. Test Point Setup

Part	Test Point											
	DB11	DB10	DB9	DB8	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
AD5447	DB11	DB10	DB9	DB8	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
AD5440	DB9	DB8	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	NC	NC
AD5428	DB7	DB6	DB5	DB4	NC	NC	NC	NC	DB3	DB2	DB1	DB0

SOFTWARE

The evaluation kit includes a CD-ROM with self-installing software to control the DAC. The software allows you to choose which device type you have and to load each DAC, in the dual-channel setup, with a digital word.

SETUP

The evaluation kit includes self-installing software on a CD-ROM. The software is compatible with Windows® 95/97/2000/NT/XP.

If the setup file does not automatically run when you insert the CD, you can run the **setup.exe** file from the CD-ROM.

INSTALLING AND USING THE SOFTWARE

To operate the evaluation software:

1. Ensure that the Centronics cable connects the PC to the evaluation board.
2. From the **Analog Devices** menu, click **Start>All Programs >Analog Devices>AD5428_40_47>AD5428_40_47 Evaluation Software**.
For older PCs, click **Start>Programs > Analog Devices> AD5428_40_47->AD5428_40_47 Evaluation Software**

The **AD5428/40/47** dialog box opens, as shown in Figure 2.

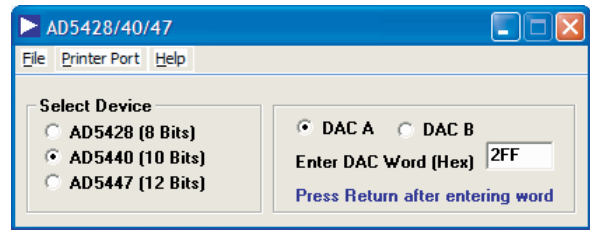


Figure 2. Dialog Box

3. To select the resolution of the part on the evaluation board, click the appropriate button under **Select Device**.
4. Click either **DAC A** or **DAC B**. DAC A and DAC B are both configured to give an output voltage range of 0 V to –10 V.
5. In the **Enter DAC Word [Hex]** field, type a data-word to the DAC. You must enter the 8-bit/10-bit/12-bit word in hexadecimal format.
6. Press **Enter** on the keyboard to load the DAC and update the selected output.
7. From the drop-down **Printer Port** menu, select the printer port address from the list of available addresses.
8. Click **File>Exit**.

EVALUATION BOARD SCHEMATIC

000-90860

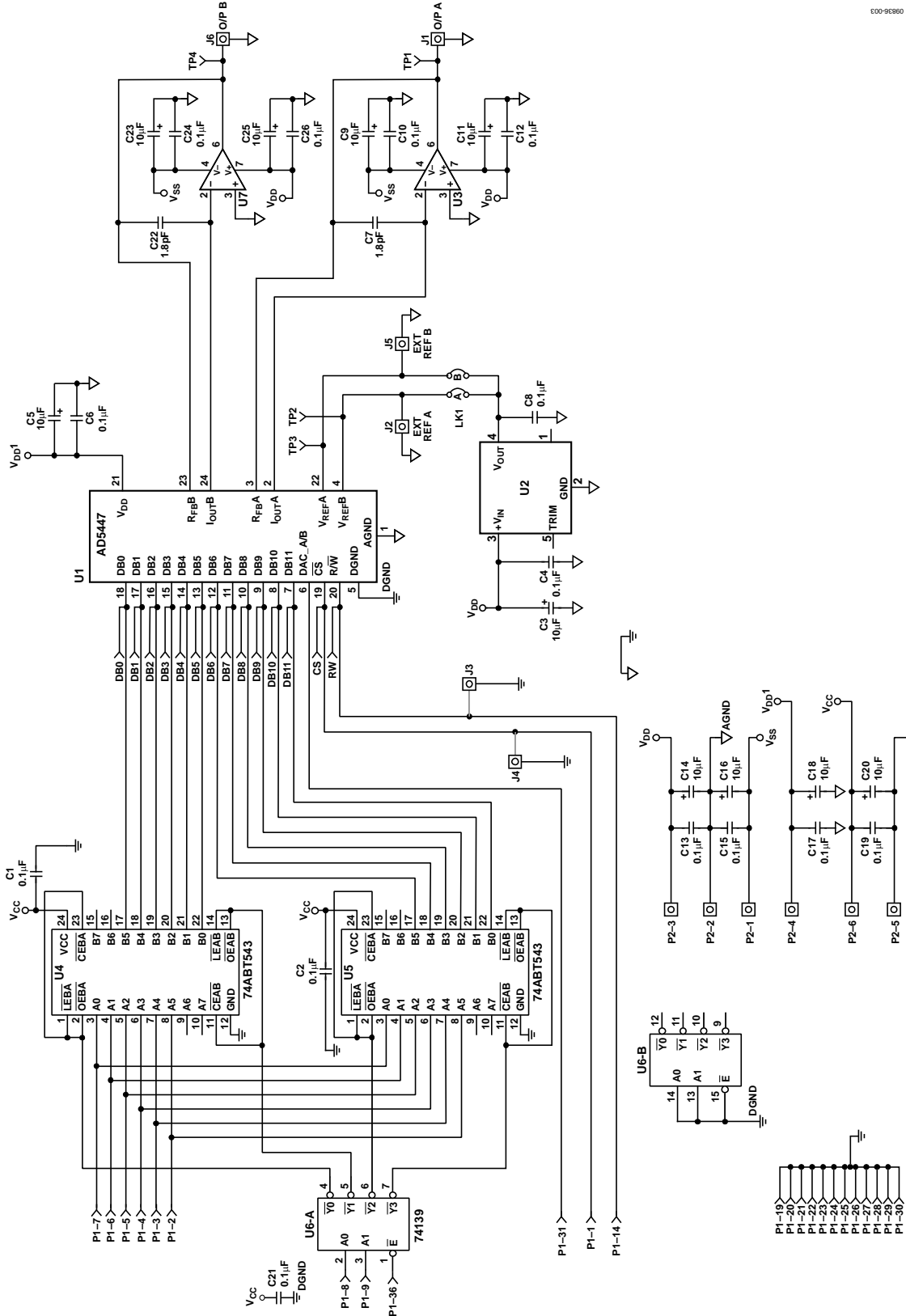


Figure 3. Evaluation Board Schematic

EVALUATION BOARD PCB LAYERS

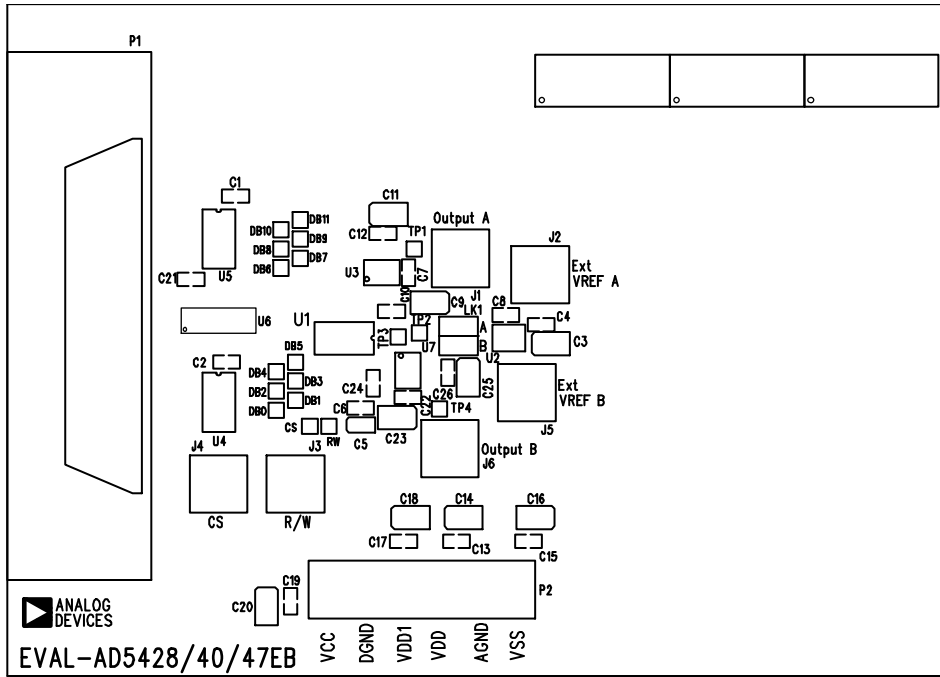


Figure 4. Component Placement Diagram

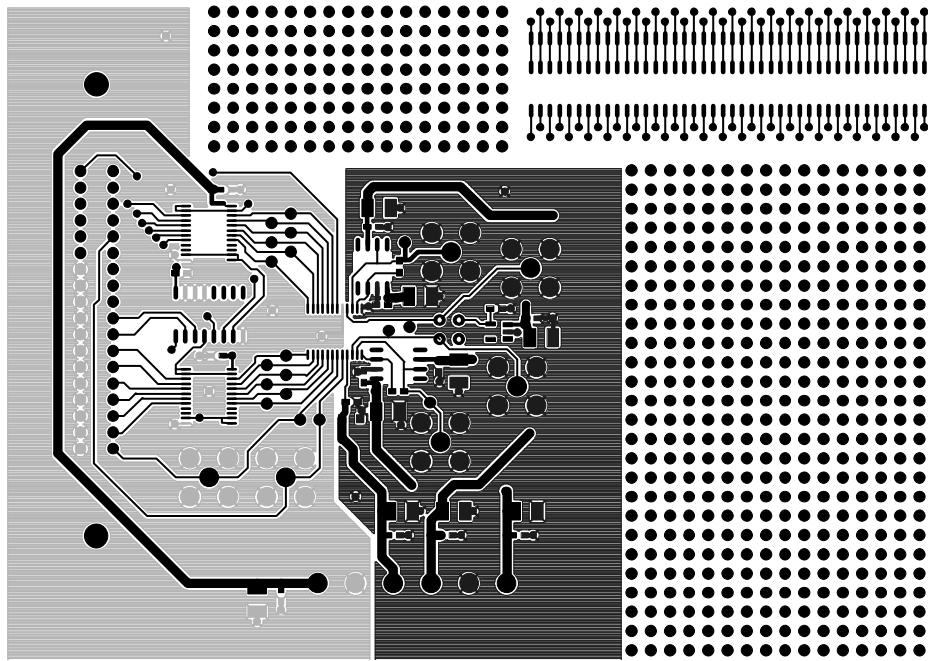


Figure 5. Component-Side PCB Layer

09B36-005

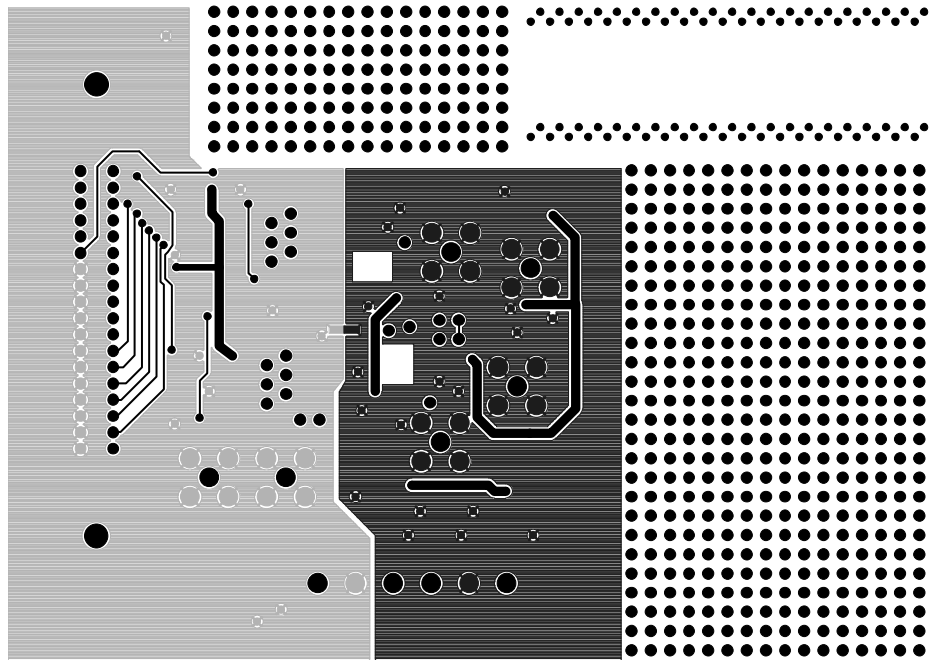


Figure 6. Solder-Side PCB Layer

ORDERING INFORMATION**BILL OF MATERIALS**

Table 2.

Name	Part Description	Value	Tolerance (%)	Stock Code
C1	X7R ceramic capacitor	0.1 μ F	10	FEC 499-675
C2	X7R ceramic capacitor	0.1 μ F	10	FEC 499-675
C3	Tantalum capacitor—Taj Series	10 μ F, 20 V	10	FEC 197-427
C4	X7R ceramic capacitor	0.1 μ F	10	FEC 499-675
C5	Tantalum capacitor—Taj Series	10 μ F, 10 V	10	FEC 197-130
C6	X7R ceramic capacitor	0.1 μ F	10	FEC 499-675
C7	NPO ceramic capacitor	1.8 pF	10	FEC 721-876
C8	X7R ceramic capacitor	0.1 μ F	10	FEC 499-675
C9	Tantalum capacitor—Taj Series	10 μ F, 20 V	10	FEC 197-427
C10	X7R ceramic capacitor	0.1 μ F	10	FEC 499-675
C11	Tantalum capacitor—Taj Series	10 μ F, 20 V	10	FEC 197-427
C12	X7R ceramic capacitor	0.1 μ F	10	FEC 499-675
C13	X7R ceramic capacitor	0.1 μ F	10	FEC 499-675
C14	Tantalum capacitor—Taj Series	10 μ F, 20 V	10	FEC 197-427
C15	X7R ceramic capacitor	0.1 μ F	10	FEC 499-675
C16	Tantalum capacitor—Taj Series	10 μ F, 20 V	10	FEC 197-427
C17	X7R ceramic capacitor	0.1 μ F	10	FEC 499-675
C18	Tantalum capacitor—Taj Series	10 μ F, 20 V	10	FEC 197-427
C19	X7R ceramic Capacitor	0.1 μ F	10	FEC 499-675
C20	Tantalum capacitor—Taj Series	10 μ F, 20 V	10	FEC 197-427
C21	X7R ceramic capacitor	0.1 μ F	10	FEC 499-675
C22	NPO ceramic capacitor	1.8 pF	10	FEC 721-876
C23	Tantalum capacitor—Taj Series	10 μ F, 20 V	10	FEC 197-427
C24	X7R ceramic capacitor	0.1 μ F	10	FEC 499-675
C25	Tantalum capacitor—Taj Series	10 μ F, 20 V	10	FEC 197-427
C26	X7R ceramic capacitor	0.1 μ F	10	FEC 499-675
CS, DB0 to DB11	Red Test Point			FEC 240-345 (pack)
J1 to J6	SMB socket			FEC 310-682
J2	SMB socket			FEC 310-682
J3	SMB socket			FEC 310-682
J4	SMB socket			FEC 310-682
J5	SMB socket			FEC 310-682
J6	SMB socket			FEC 310-682
LK1	3-pin header (2 \times 2)			FEC 511-791&528-456
P1	36-pin centronics connector			FEC 147-753
P2	6-pin terminal block			FEC 151-792
RW	Red test point			FEC 240-345 (pack)
TP1 to TP4	Red test point			FEC 240-345 (pack)
U1	AD5428/AD5440/AD5447			AD5428YRU/AD5440YRU/AD5447YRU
U2	ADR01			ADR01AR
U3	AD8065			AD8065AR
U4, U5	74ABT543			Fairchild 74ABT543CMTC
U6	74139			CD74HCT139M
U7	AD8065			AD8065AR
Each Corner	Rubber stick-on feet			FEC 148-922

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**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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