

EVAL-AD5428/AD5440/AD5447EB

FEATURES

Operates from dual $\pm 12\text{ V}$ and $+5\text{ V}$ supplies
 On-board reference and output amplifiers
 Direct hookup to printer port of PC
 PC software for control of DAC

DESCRIPTION

This data sheet describes the evaluation board hardware and software for the AD5428/AD5440/AD5447 DACs briefly highlighted below.

The AD5428/AD5440/AD5447 devices are CMOS 8-, 10-, 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 manufacture 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 data sheet when using the evaluation board.

FUNCTIONAL BLOCK DIAGRAM

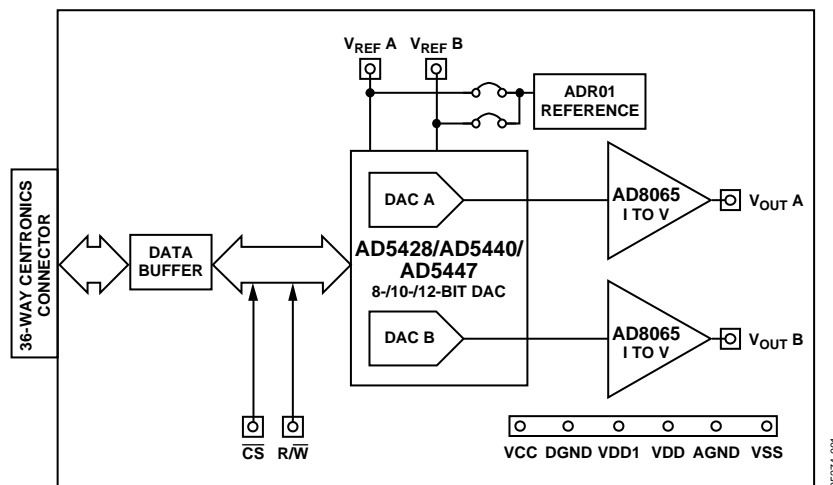


Figure 1.

Rev. 0

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REVISION HISTORY

1/05—Revision 0: Initial Version

HARDWARE

The evaluation board consists of the AD5428, AD5440 or AD5447 DAC, 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

| 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.

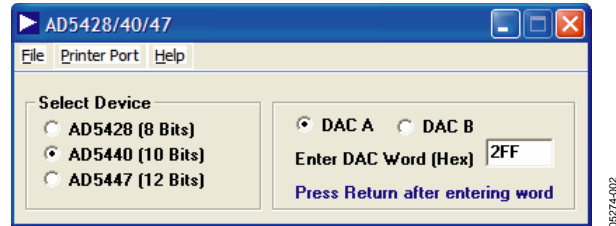


Figure 2. Dialog Box

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-/10-/12-bit word in hexadecimal.
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

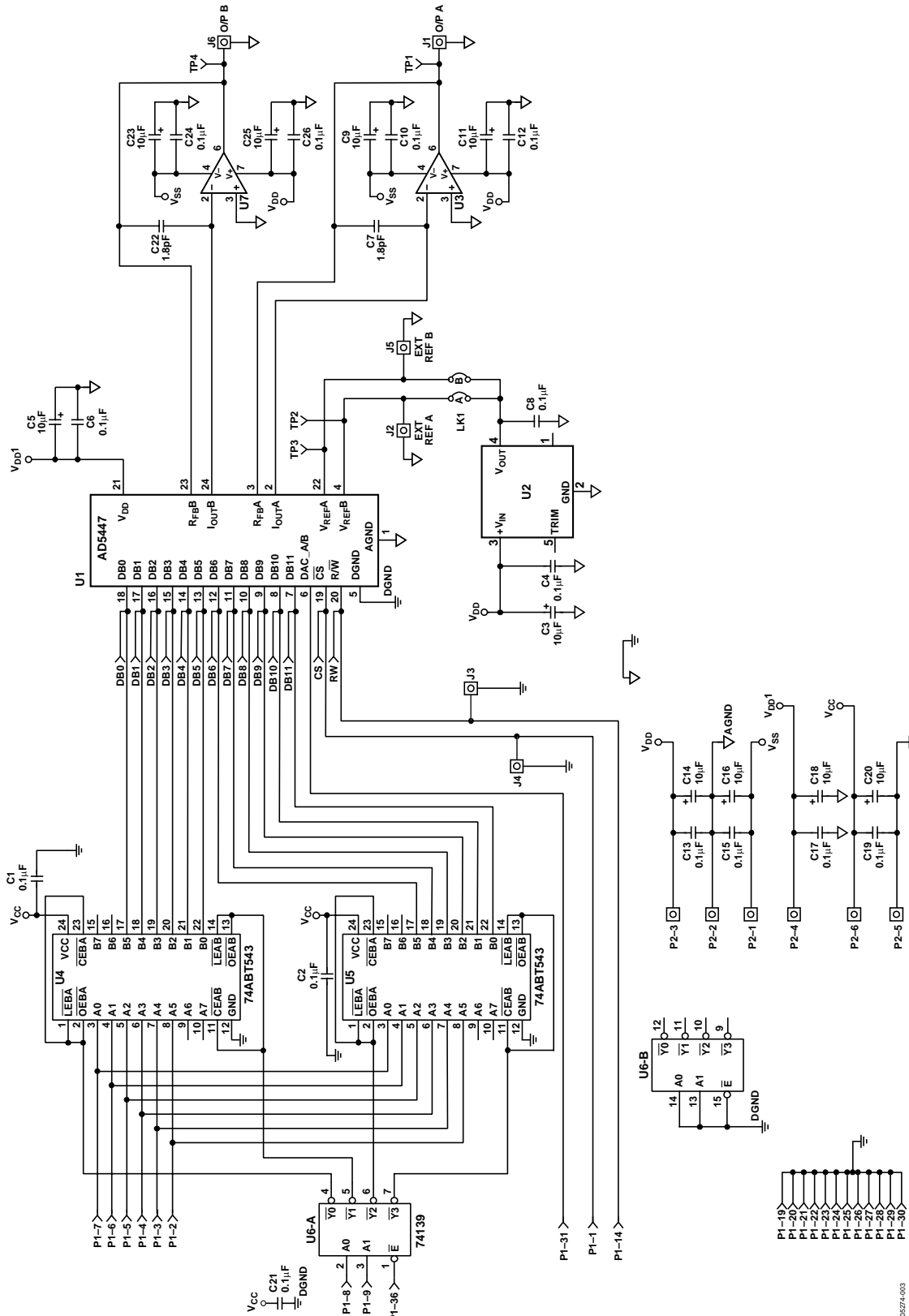


Figure 3. Evaluation Board Schematic

06274-003

EVAL-AD5428/AD5440/AD5447EB

EVALUATION BOARD PCB LAYERS

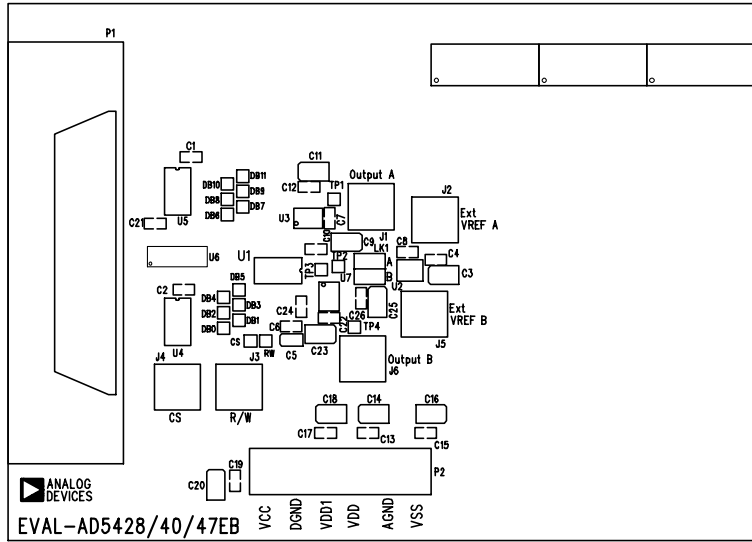


Figure 4. Component Placement Diagram

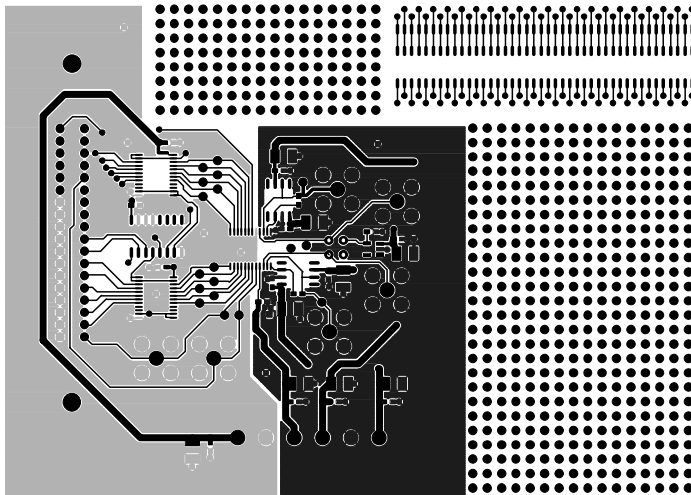


Figure 5. Component-Side PCB Layer

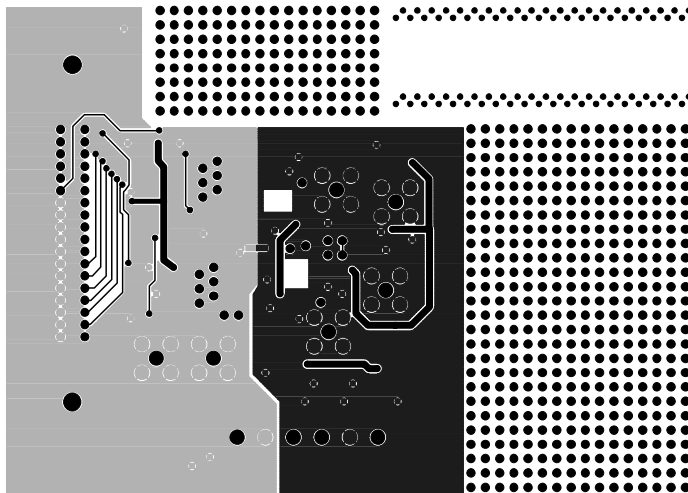


Figure 6. Solder-Side PCB Layer

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 x 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 |

EVAL-AD5428/AD5440/AD5447EB

ORDERING GUIDE

| Model | Description |
|---------------|------------------|
| EVAL-AD5428EB | Evaluation Board |
| EVAL-AD5440EB | Evaluation Board |
| EVAL-AD5447EB | Evaluation Board |

ESD CAUTION

ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000 V readily accumulate on the human body and test equipment and can discharge without detection. Although this product features proprietary ESD protection circuitry, permanent damage may occur on devices subjected to high energy electrostatic discharges. Therefore, proper ESD precautions are recommended to avoid performance degradation or loss of functionality.

