

### 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

### INTRODUCTION

This data sheet describes the evaluation board for the AD5429/AD5439/AD5449 DACs. The AD5429/AD5439/AD5449 are CMOS 8-/10-/12-bit current output digital-to-analog converters (DACs), respectively. They operate from a 2.5 V to 5.5 V power supply, making them suited to battery-powered and other applications.

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 external reference input voltage ( $V_{REF}$ ) determines the full-scale output current. An integrated feedback resistor (RFB) provides temperature tracking and full-scale voltage output when combined with an external I-to-V precision amplifier.

The board consists of the AD5429/AD5439/AD5449 and a current-to-voltage amplifier, AD8065. Note that, while excellent for dc performance, the bandwidth performance of the combined DAC and amplifier is limited to approximately 8 MHz per DAC output. Included on the evaluation board is a 10 V reference, ADR01. An external reference can also be applied via an SMB input connector. LK1 A and LK1 B connect the on-board reference to the  $V_{REF A}$  and  $V_{REF B}$  inputs, respectively. To utilize the on-board reference, these links should be inserted. Otherwise, they should be removed.

The evaluation kit includes a CD-ROM with self-installing software to control the DAC. The software allows you to exercise all functions of the AD5429/AD5439/AD5449.

Full data on the DACs is available in their respective data sheets, which should be consulted in conjunction with this data sheet when using the evaluation board.

### EVALUATION BOARD FUNCTIONAL BLOCK DIAGRAM

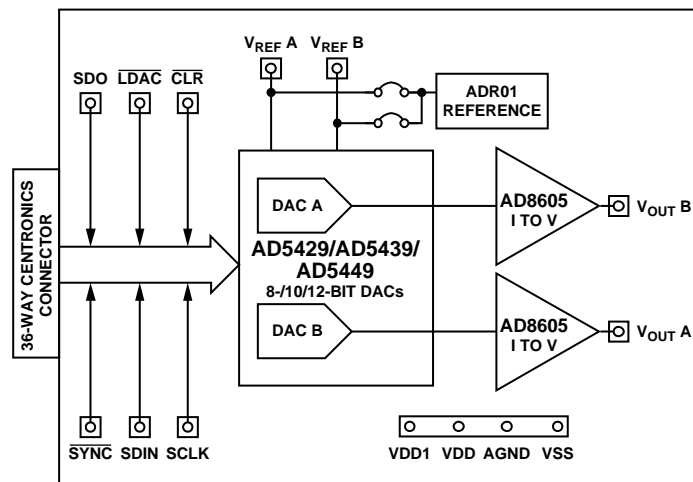


Figure 1.

### Rev. 0

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## **REVISION HISTORY**

**10/04—Revision 0: Initial Version**

## OPERATING THE EVALUATION BOARD

The evaluation board requires  $\pm 12\text{ V}$  and  $+5\text{ V}$  supplies. The  $+12\text{ V } V_{DD}$  and  $-12\text{ V } V_{SS}$  are used to power the output amplifier. The  $+5\text{ V } V_{DD1}$  is used to power the DAC. All supplies are decoupled to ground with  $10\text{ }\mu\text{F}$  tantalum and  $0.1\text{ }\mu\text{F}$  ceramic capacitors.

### SOFTWARE INSTALLATION

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

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

### OPERATING THE EVALUATION SOFTWARE

To operate the evaluation software:

1. Ensure that the centronics cable connects the PC to the evaluation board.
2. Run the program file from the **Analog Devices** menu. The **AD5429/39/49 Device Selection** dialog box is displayed, as shown in Figure 2.

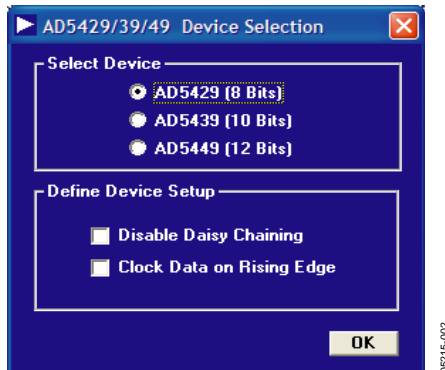


Figure 2. AD5429/39/49 Device Selection Dialog Box

3. In the **Select Device** area, select the 8-, 10-, or 12-bit device.
4. In the **Define Device Setup** area, the default settings are daisy chaining enabled and data clocked on falling edge. Click the checkbox next to one or both of these functions, if you do not want the default setting.
5. Click **OK** to open the **AD5429/39/49 Evaluation Software** dialog box with drop-down **File**, **Printer Port**, and **Help** menus, as shown in Figure 3.

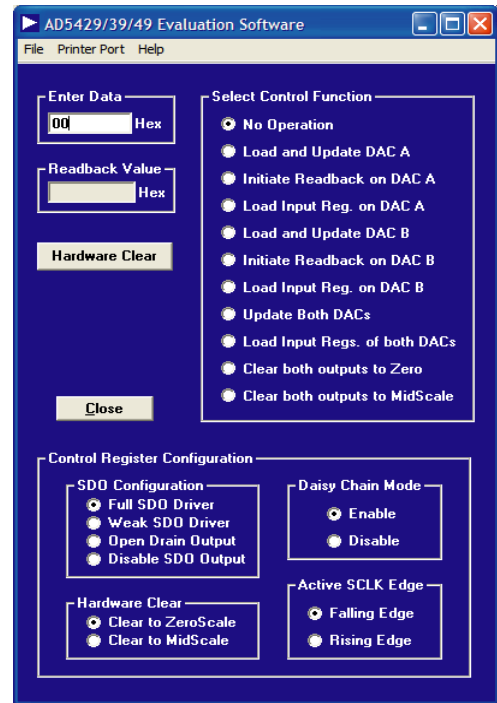


Figure 3. AD5429/39/49 Evaluation Software Dialog Box

### EVALUATION AD5429/AD5439/AD5449 FUNCTIONS AND REGISTERS

From the **AD5429/39/49 Evaluation Software** dialog box, you can write a data-word to either or both DACs. Type the 8-, 10-, 12-, or 14-bit word in hexadecimal in the **Enter Data** box.

The **AD5429/39/49 Evaluation Software** dialog box allows you to evaluate all the functions of the AD5429/AD5439/AD5449. Table 1 and Table 2 describe the control functions and the control registers, respectively.

The dropdown **Printer Port** menu allows you to select the printer port address from a list of available addresses.

# EVAL-AD5429/AD5439/AD5449EB

**Table 1. Control Functions**

<b>Control Function</b>	<b>Description</b>
Load and Update DAC A	Loads the DAC A register with the entered data-word and updates the DAC A output, irrespective of the state of $\overline{\text{LDAC}}$ .
Initiate Readback on DAC A	Reads the contents of the DAC A input register and displays the value on-screen.
Load Input Register of DAC A	Loads the DAC A register with the entered data-word. The DAC A output is updated only if $\overline{\text{LDAC}}$ is low.
Load and Update DAC B	Loads the DAC B register with entered data-word and updates the DAC B output, irrespective of the state of $\overline{\text{LDAC}}$ .
Initiate Readback on DAC B	Reads the contents of the DAC B input register and displays the value on-screen.
Load Input Register of DAC B	Loads DAC B register with entered data-word. The DAC B output is updated only if $\overline{\text{LDAC}}$ is low.
Update Both DACs	Updates both DAC outputs with the entered data-word, irrespective of the state of $\overline{\text{LDAC}}$ .
Load Input Registers of Both DACs	Loads the input registers of both DACs with the entered data-word. Both outputs are updated only if $\overline{\text{LDAC}}$ is low.
Clear Both Outputs to Zero Scale	Loads both DACs and updates their outputs with zero-scale code, irrespective of the state of $\overline{\text{LDAC}}$ .
Clear Both Outputs to Midscale	Loads both DACs and updates their outputs with midscale code, irrespective of the state of $\overline{\text{LDAC}}$ .

**Table 2. Control Register**

<b>Control Register</b>	<b>Description</b>
SDO Configuration	The SDO bits enable you to control the SDO output driver strength, disable the SDO output, or configure it as an open-drain driver. The strength of the SDO driver affects timing. A stronger SDO output driver allows a faster clock cycle to be used.
Daisy-Chain Mode	Enables or disables daisy-chain functionality.
Hardware Clear	Sets the value to which the outputs are cleared on the falling edge of the $\overline{\text{CLR}}$ signal. The value can be either zero scale or midscale.
Active SCLK Edge	Selects the edge of SCLK on which data is clocked into the input register. Data is clocked out from SDO on the opposite edge.



## EVALUATION BOARD PCB LAYERS

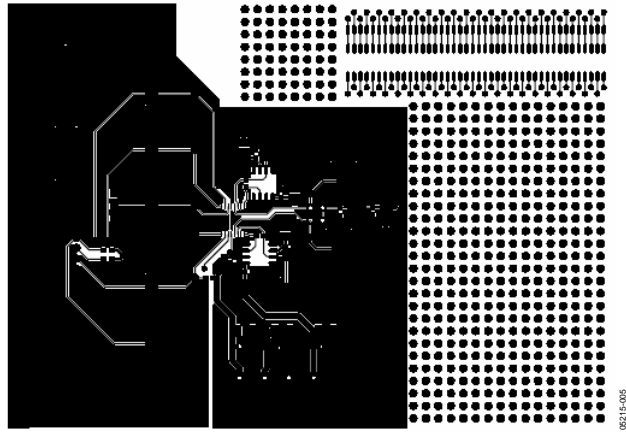


Figure 5. Component-Side Artwork

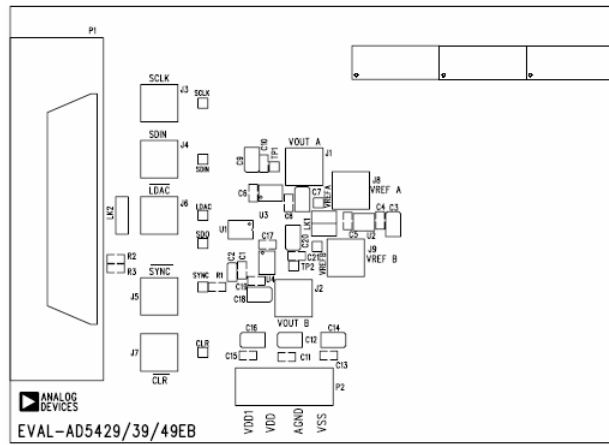


Figure 6. Silkscreen - Component-Side View (Top)

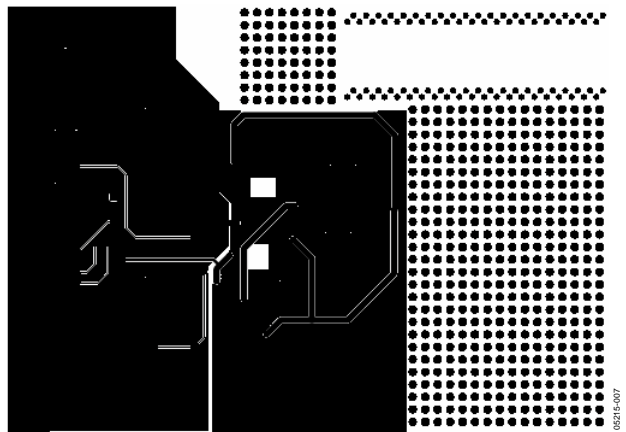


Figure 7. Solder-Side Artwork

# ORDERING INFORMATION

## BILL OF MATERIALS

Name	Part Type	Value	Tolerance	PCB Decal	Stock Code	SMD	Layer Name
C1	X7R Ceramic Capacitor	0.1 $\mu$ F	10%	0603	FEC 499-675	Yes	Top
C2	Tantalum Capacitor—Taj Series	10 $\mu$ F 10 V	10%	CAP\TAJ_A	FEC 197-130	Yes	Top
C3	Tantalum Capacitor—Taj Series	10 $\mu$ F 20 V	10%	CAP\TAJ_B	FEC 197-427	Yes	Top
C4	X7R Ceramic Capacitor	0.1 $\mu$ F	10%	0603	FEC 499-675	Yes	Top
C5	X7R Ceramic Capacitor	0.1 $\mu$ F	10%	0603	FEC 499-675	Yes	Top
C6	NPO Ceramic Capacitor	1.8 pF	10%	0603	FEC 721-876	Yes	Top
C7	Tantalum Capacitor—Taj Series	10 $\mu$ F 20 V	10%	CAP\TAJ_B	FEC 197-427	Yes	Top
C8	X7R Ceramic Capacitor	0.1 $\mu$ F	10%	0603	FEC 499-675	Yes	Top
C9	Tantalum Capacitor—Taj Series	10 $\mu$ F 20 V	10%	CAP\TAJ_B	FEC 197-427	Yes	Top
C10	X7R Ceramic Capacitor	0.1 $\mu$ F	10%	0603	FEC 499-675	Yes	Top
C11	X7R Ceramic Capacitor	0.1 $\mu$ F	10%	0603	FEC 499-675	Yes	Top
C12	Tantalum Capacitor—Taj Series	10 $\mu$ F 20 V	10%	CAP\TAJ_B	FEC 197-427	Yes	Top
C13	X7R Ceramic Capacitor	0.1 $\mu$ F	10%	0603	FEC 499-675	Yes	Top
C14	Tantalum Capacitor—Taj Series	10 $\mu$ F 20 V	10%	CAP\TAJ_B	FEC 197-427	Yes	Top
C15	X7R Ceramic Capacitor	0.1 $\mu$ F	10%	0603	FEC 499-675	Yes	Top
C16	Tantalum Capacitor—Taj Series	10 $\mu$ F 20 V	10%	CAP\TAJ_B	FEC 197-427	Yes	Top
C17	NPO Ceramic Capacitor	1.8 pF	10%	0603	FEC 721-876	Yes	Top
C18	Tantalum Capacitor—Taj Series	10 $\mu$ F 20 V	10%	CAP\TAJ_B	FEC 197-427	Yes	Top
C19	X7R Ceramic Capacitor	0.1 $\mu$ F	10%	0603	FEC 499-675	Yes	Top
C20	Tantalum Capacitor—Taj Series	10 $\mu$ F 20 V	10%	CAP\TAJ_B	FEC 197-427	Yes	Top
C21	X7R Ceramic Capacitor	0.1 $\mu$ F	10%	0603	FEC 499-675	Yes	Top
J1	SMB Socket			SMB	FEC 310-682	No	Top
J2	SMB Socket			SMB	FEC 310-682	No	Top
J3	SMB Socket			SMB	FEC 310-682	No	Top
J4	SMB Socket			SMB	FEC 310-682	No	Top
J5	SMB Socket			SMB	FEC 310-682	No	Top
J6	SMB Socket			SMB	FEC 310-682	No	Top
J7	SMB Socket			SMB	FEC 310-682	No	Top
J8	SMB Socket			SMB	FEC 310-682	No	Top
J9	SMB Socket			SMB	FEC 310-682	No	Top
LK1	4-Pin Header (2 $\times$ 2)			2 $\times$ 2 Way Jumper	FEC 511-791 and 528-456	No	Top
LK2	3-Pin Header (3 $\times$ 1)			LINK-3P-NOTEXT	FEC 511-717 and 150-411	No	Top
P1	36-Pin Centronics Connector			36WAY	FEC 147-753	No	Top
P2	4-Pin Terminal Block			CON\POWER6	FEC 151-791	No	Top
R1	0.063 W Resistor	10 k $\Omega$	1%	0603	FEC 911-355	Yes	Top
R2	0.063 W Resistor	10 k $\Omega$	1%	0603	FEC 911-355	Yes	Top
R3	0.063 W Resistor	10 k $\Omega$	1%	0603	FEC 911-355	Yes	Top
CLR	Red Testpoint			TESTPOINT	FEC 240-345 (Pack)	No	Top
SCLK	Red Testpoint			TESTPOINT	FEC 240-345 (Pack)	No	Top
SDIN	Red Testpoint			TESTPOINT	FEC 240-345 (Pack)	No	Top
SDO	Red Testpoint			TESTPOINT	FEC 240-345 (Pack)	No	Top
LDAC	Red Testpoint			TESTPOINT	FEC 240-345 (Pack)	No	Top
SYNC	Red Testpoint			TESTPOINT	FEC 240-345 (Pack)	No	Top
TP1	Red Testpoint			TESTPOINT	FEC 240-345 (Pack)	No	Top
TP2	Red Testpoint			TESTPOINT	FEC 240-345 (Pack)	No	Top
VREFA	Red Testpoint			TESTPOINT	FEC 240-345 (Pack)	No	Top
VREFB	Red Testpoint			TESTPOINT	FEC 240-345 (Pack)	No	Top
U1	AD5429/39/49			TSSOP16	AD5429/39/49YRU	Yes	Top
U2	ADR01			TSOT5	ADR01AUJ	Yes	Top

# EVAL-AD5429/AD5439/AD5449EB

Name	Part Type	Value	Tolerance	PCB Decal	Stock Code	SMD	Layer Name
U3	AD8065			SO8NB	AD8065AR	Yes	Top
U4	AD8065			SO8NB	AD8065AR	Yes	Top
Each Corner	Rubber Stick-on Feet				FEC 148-922		

## ORDERING GUIDE

Model	Description
EVAL-AD5429EB	Evaluation Board
EVAL-AD5439EB	Evaluation Board
EVAL-AD5449EB	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.

