

### FEATURES

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

### INTRODUCTION

This data sheet describes the evaluation board for the AD5405 DAC. The AD5405 is a CMOS 12-bit, current output digital-to-analog converter (DAC). It operates from a 2.5 V to 5.5 V power supply, making it suited to battery-powered and other applications.

This DAC utilizes data readback, which allows you to read the contents of the DAC register via the DB pins. 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 AD5405 offers 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. In addition, this device contains all the 4-quadrant resistors necessary for bipolar operation and other configuration modes.

The evaluation board consists of the AD5405, three AD8065 op amps, and a 10 V reference, ADR01. An external reference can also be applied via an SMB input connector. Digital buffering is supplied on-board. Note that, while excellent for dc performance, the bandwidth performance of the combined DAC and amplifier is limited to approximately 8 MHz.

The evaluation kit includes a CD-ROM with self-installing software to control the DAC. The software allows you to load each DAC with a digital word and then read back the contents of the input registers.

Full data on the DAC is available in the AD5405 data sheet, which should be consulted in conjunction with this data sheet when using the evaluation board.

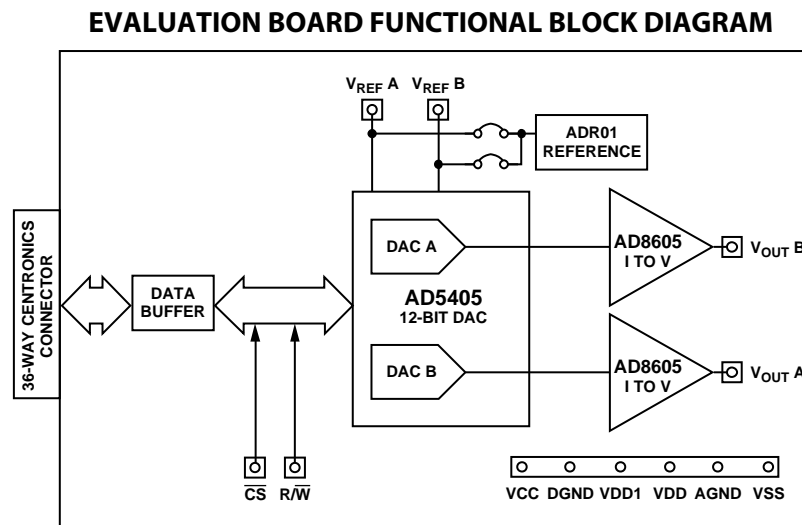


Figure 1.

### 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, and 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 a CD-ROM. The software is compatible with Windows® 95/97/2000/NT/XP.

If the setup file does not run automatically, you can 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 **AD5405** dialog box opens, as shown in Figure 2.
3. Click the appropriate button to select either **DAC A** or **DAC B**. The two DACs are configured differently. DAC A is configured to give an output voltage range of  $0\text{ V}$  to  $-10\text{ V}$ ; DAC B is configured to give an output voltage range of  $-10\text{ V}$  to  $+10\text{ V}$ . The difference in output voltage range is a result of the way in which the internal resistors are used.
4. In the **Enter DAC Word (Hex)** field, type a data-word to the DAC. You must enter the 12-bit word in hexadecimal.
5. Press **Enter** on the keyboard to load the DAC and update the selected output.
6. From the drop-down **Printer Port** menu, select the printer port address from the list of available addresses.

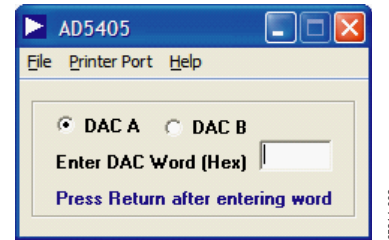


Figure 2. AD5405 Dialog Box

EVALUATION BOARD SCHEMATIC

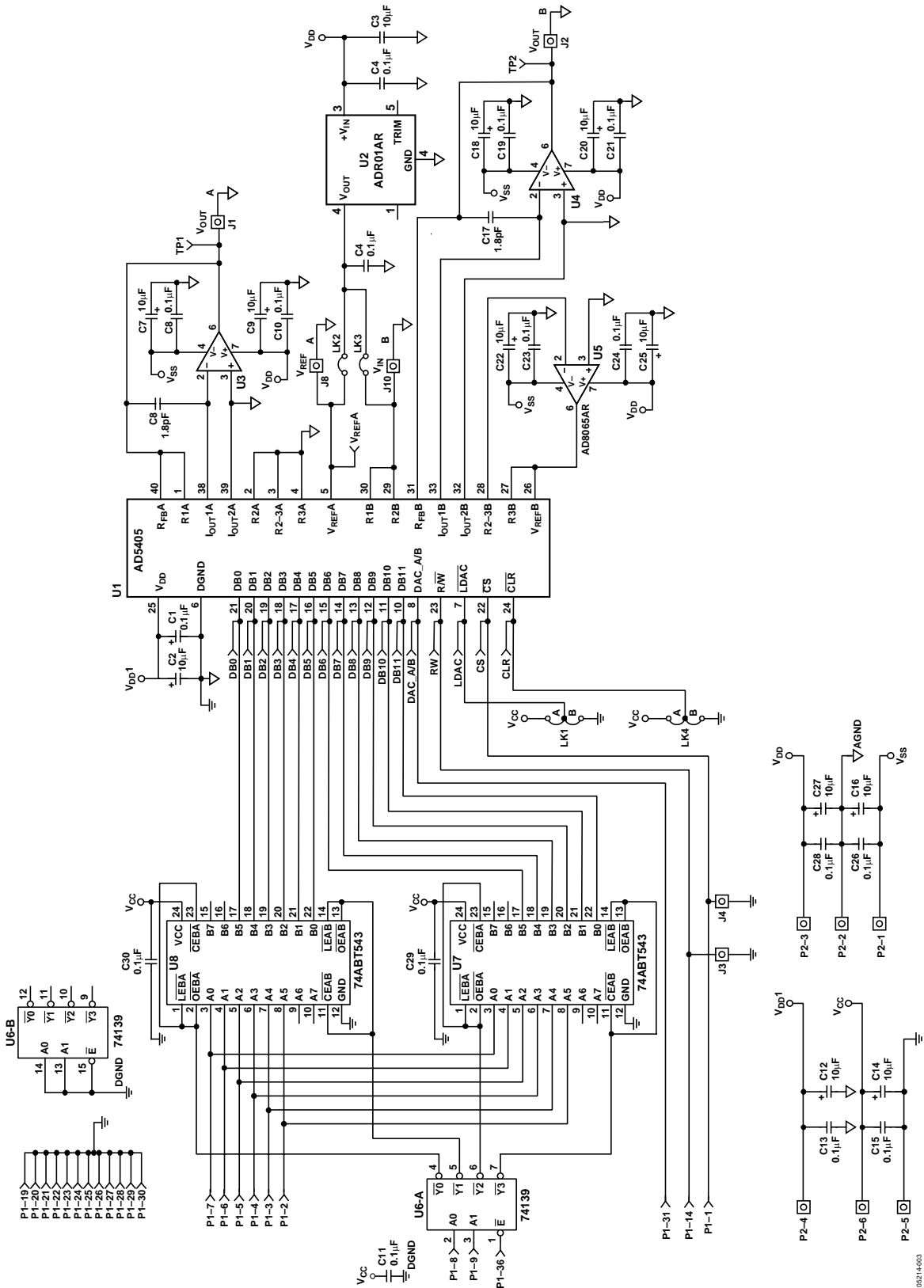
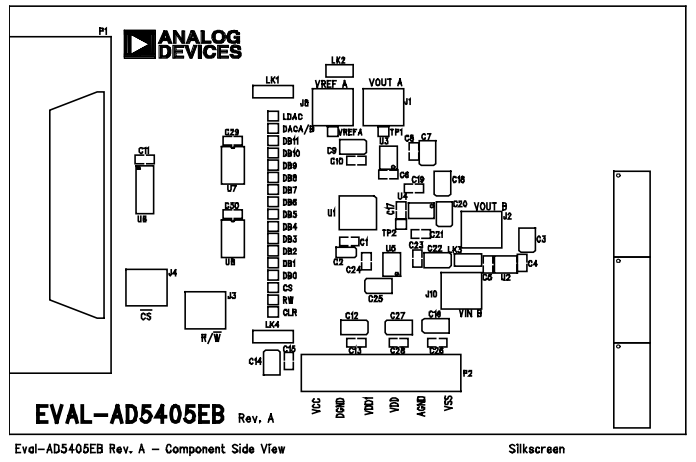


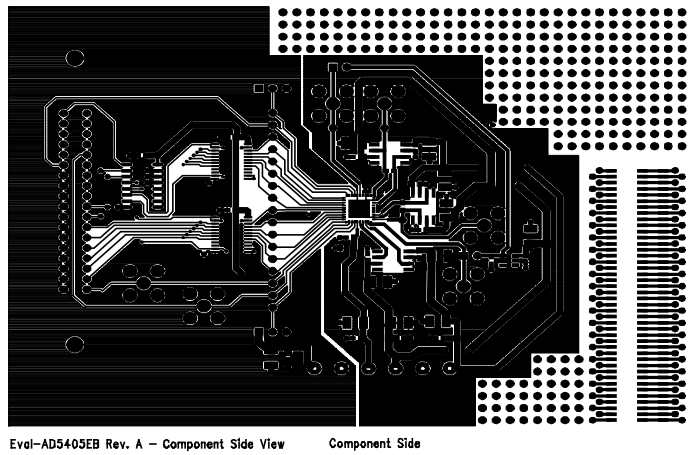
Figure 3. Evaluation Board Schematic

EVALUATION BOARD PCB LAYERS



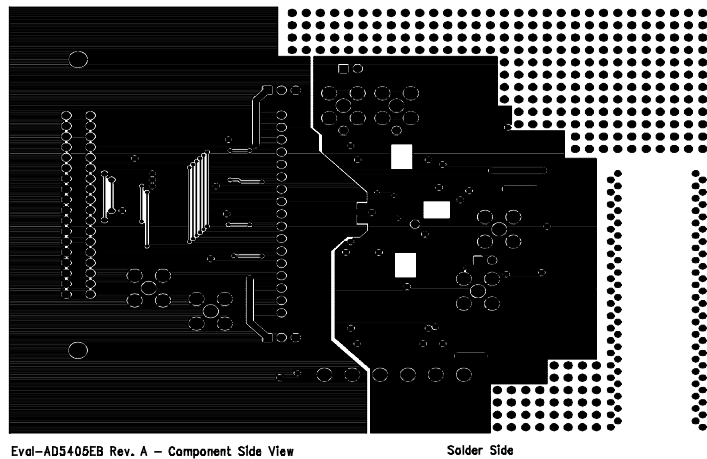
Eval-AD5405EB Rev. A – Component Side View Silkscreen

Figure 4. Component Placement Diagram



Eval-AD5405EB Rev. A – Component Side View Component Side

Figure 5. Component-Side PCB Layer



Eval-AD5405EB Rev. A – Component Side View Solder Side

Figure 6. Solder-Side PCB Layer

# EVAL-AD5405EB

## ORDERING INFORMATION

### BILL OF MATERIALS

Table 1.

Qty	Reference Designator	Description	Supplier/Number
1	U1	AD5405 DAC	Analog Devices/AD5405
1	U2	ADR01 10 V Reference	Analog Devices/ ADR01AUJ
3	U3, U4, U5	AD8065 Single Op Amp	Analog Devices/ AD8065AR
1	U6	74HCT139 Dual 2- to 4-Line Decoder	CD74HCT139M
2	U7, U8	74ABT543 Octal Transceiver	Fairchild/74ABT543CMTC
16	C1, C4, C5, C8, C10, C11, C13, C15, C19, C21, C23, C24, C26, C28, C29, C30	0.1 $\mu$ F, X7R Ceramic Capacitor, 0603 Package	FEC/499-675
12	C3, C7, C9, C12, C14, C16, C18, C20, C22, C25, C27	10 $\mu$ F, 20 V Tantalum Capacitor	FEC/197-427
1	C2	10 $\mu$ F, 10 V Tantalum Capacitor	FEC/197-130
2	C6, C17	1.8 pF Multilayer Ceramic Capacitor, 0603 Package	FEC/721-876
6	J1, J2, J3, J4, J8, J10	SMB Socket	FEC/310-682
2	LK1, LK4	3-Pin SIL Header with Shorting Block	FEC/511-717 and 150-411
2	LK2, LK3	2-Pin SIL Header with Shorting Block	FEC/511-705 and 150-411
1	P1	36-Pin 90° Centronics Connector	FEC/147-753
1	P2	6-Pin Terminal Block	FEC/151-792
20	VREFA, CLR, CS, DACA/B, DB0-DB11, RW, TP1, TP2, LDAC	Testpoint (Red)	FEC/240-435 (pack)
4		Rubber Stick-On Feet	FEC/148-922

### ORDERING GUIDE

Model	Description
EVAL-AD5405EB	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.



**NOTES**

**EVAL-AD5405EB**

**NOTES**