

## Preliminary Technical Document

**Evaluation Board for AD5629, Octal, 16-Bit, Serial Voltage-Output DAC**
**FEATURES**

- Full-featured evaluation board for the [AD5629](#)
- On-board reference
- Various link options
- PC control in conjunction with Analog Devices
- System development platform (SDP)
- PC software for control of DACs
- On-board ADC for voltage readback

**PACKAGE CONTENTS**

- AD566x evaluation board
- AD5629 device
- CD that includes
  - Self-installing software that allows users to control the board and exercise all functions of the device
  - Electronic version of the AD5629 data sheet
  - Electronic version of AN-XXX

**GENERAL DESCRIPTION**

The Analog Devices, Inc., AD5629 evaluation board (EVAL-AD5629REB1Z and AD5629REB2Z) is designed to help customers quickly prototype new AD5629 circuits and reduce design time. The AD5629 operates from a single 2.7 V to 5.5 V supply. The part incorporates an internal 1.25 V or 2.5 V on-board reference to give an output voltage span of 2.5 V or 5 V, respectively. The on-board reference is off at power-up allowing for the use of an external reference—the REF195 is used on this evaluation board. The part must be written to after power-up to turn on the internal reference.

Full data on the AD5629 may be found in the data sheet available from Analog Devices and should be consulted in conjunction with this data sheet when using the evaluation board.

The evaluation board interfaces to the USB port of an IBM compatible PC via the SDP board. Software is available with the evaluation board which allows the user to easily program the AD5629.

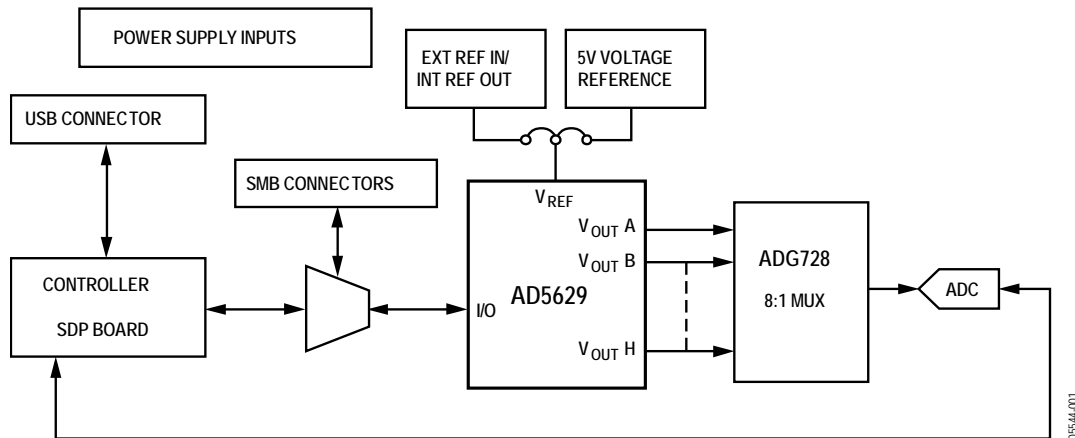


Figure 1. Universal Evaluation Board

05544-001

## EVALUATION BOARD HARDWARE

### POWER SUPPLIES

To power the AD5629 evaluation board supply 5V between the  $AV_{DD}$  and AGND inputs for the analog supply.

All supplies are decoupled to ground with 10  $\mu$ F tantalum and 0.1  $\mu$ F ceramic capacitors.

**Table 1. Power Supply Connectors**

Connector No.	Voltage
J2	Analog positive power supply, VDD. For single-supply operation, supply 5 V.

### LINK OPTIONS

A number of link and switch options are incorporated in the evaluation board and should be set for the required operating setup before using the board. The functions of these link options are described in detail in Table 3. Table 2 describes the positions of the different links to control the evaluation board by PC, via the USB port, using the AD5629 is single-supply mode.

**Table 2. Link Options Setup for SDP Control (Default)**

Link No.	Options
LK1	B
LK2 – LK3	INSERTED
LK4	INSERTED
LK5	B
LK7	B
LK8	B
LK9 – LK14	INSERTED

**Table 3. Link Functions**

Link No.	Option
LK1	This link selects source of the A0 pin: <ul style="list-style-type: none"> <li>Position A selects <math>AV_{DD}</math>.</li> <li>Position B selects GND(default).Software designed with link in this position.</li> </ul>
LK2	This link connects the $V_{outA}$ to $V_{outF}$ pins of the AD5629 to the i/p pins of the demultiplexer so that the DAC output value can be monitored using the on-board ADC.
LK3	This link connects the $V_{outA}$ to $V_{outF}$ pins of the AD5629 to the i/p pins of the demultiplexer so that the DAC output value can be monitored using the on-board ADC.
LK4	This link connects a 0.1 $\mu$ F capacitor to AGND on the $V_{REF}$ pin. It is recommended to connect this when using the internal reference.
LK5	This link selects the reference source: <ul style="list-style-type: none"> <li>Position A selects the internal reference as the reference source. The part must be written to via software to turn on the internal reference.</li> <li>Position B selects the on-board 5 V reference as the reference source.</li> </ul>
LK7	This link selects the DAC voltage source: <ul style="list-style-type: none"> <li>Position A selects the <math>AV_{DD}</math> analog circuitry power supply source.</li> <li>Position B selects the on-board 5 V reference as the power supply source.</li> </ul>
LK8	This link sets the RESET pin on the demultiplexer; <ul style="list-style-type: none"> <li>Position A allows normal operation of the switch.</li> <li>Position B resets the switch.</li> </ul>
LK9 to LK14	This link connects the $V_{outA}$ to $V_{outF}$ pins of the AD5629 to the i/p pins of ADG728 demultiplexer so that the DAC output value can be monitored using the on-board ADC.

# EVALUATION BOARD SOFTWARE

## INSTALLING THE SOFTWARE

The EVAL-AD5629EBZ evaluation kit includes self-installing software on CD. The software is compatible with Windows® XP, Windows Vista (32-bits) and Windows 7 (32-bits).

Install the software before connecting the SDP board to the USB port of the PC. This ensures that the SDP board is recognized when it connects to the PC.

1. Start the Windows® operating system and insert CD.
2. The installation software must open automatically. If it does not, run the **setup.exe** file from the CD.
3. After installation is completed, power-up the evaluation board as described in the Power Supplies section
4. -. Plug the EVAL-AD5629EBZ into the SDP board and the SDP board into the PC using the USB cable included in the box.
5. When the software detects the evaluation board, proceed through any dialog boxes that appear to finalize the installation.

## RUNNING THE SOFTWARE

To run the program, do the following:

1. Click **Start > All Programs > Analog Devices > AD5629 > AD5629 Evaluation Software**. To uninstall the program, click **Start > Control Panel > Add or Remove Programs > AD5629 Evaluation Software**.
2. If the SDP board is not connected to the USB port when the software is launched, a connectivity error is displayed (see Figure 2). Simply connect the evaluation board to the USB port of the PC, wait a few seconds, click **Rescan**, and follow the instructions.

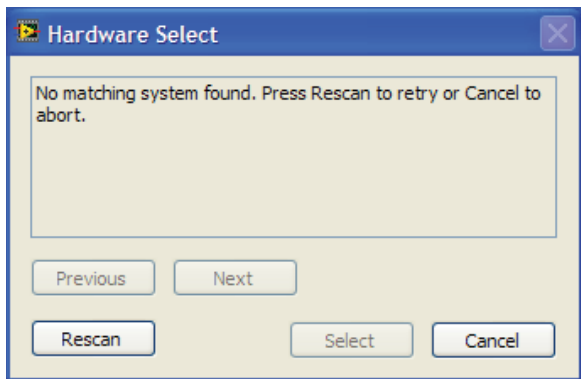


Figure 2. Pop-Up Window Error

3. If the SDP board is not connected to the evaluation boards a message box appears as shown in Figure 3. Check the connection between the SDP and EVAL-AD5629EBZ boards and run the program again.

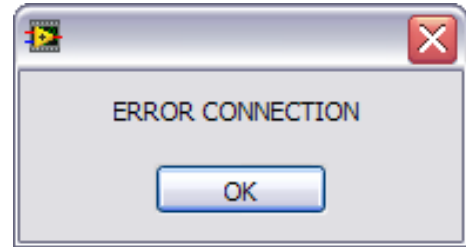


Figure 3. Error Message

4. If the SDP board is connect the System Development Platform will connect for a brief period.

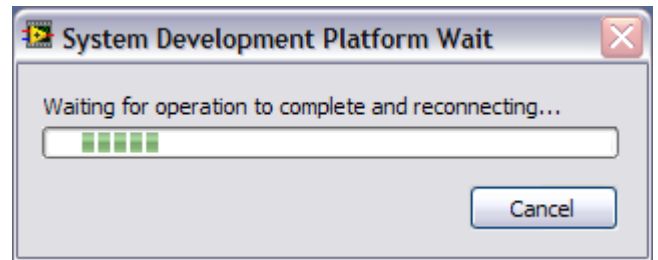


Figure 4. System Develop Platform Wait Window

5. The main window of the AD5629 evaluation software then opens, as shown in Figure 5.

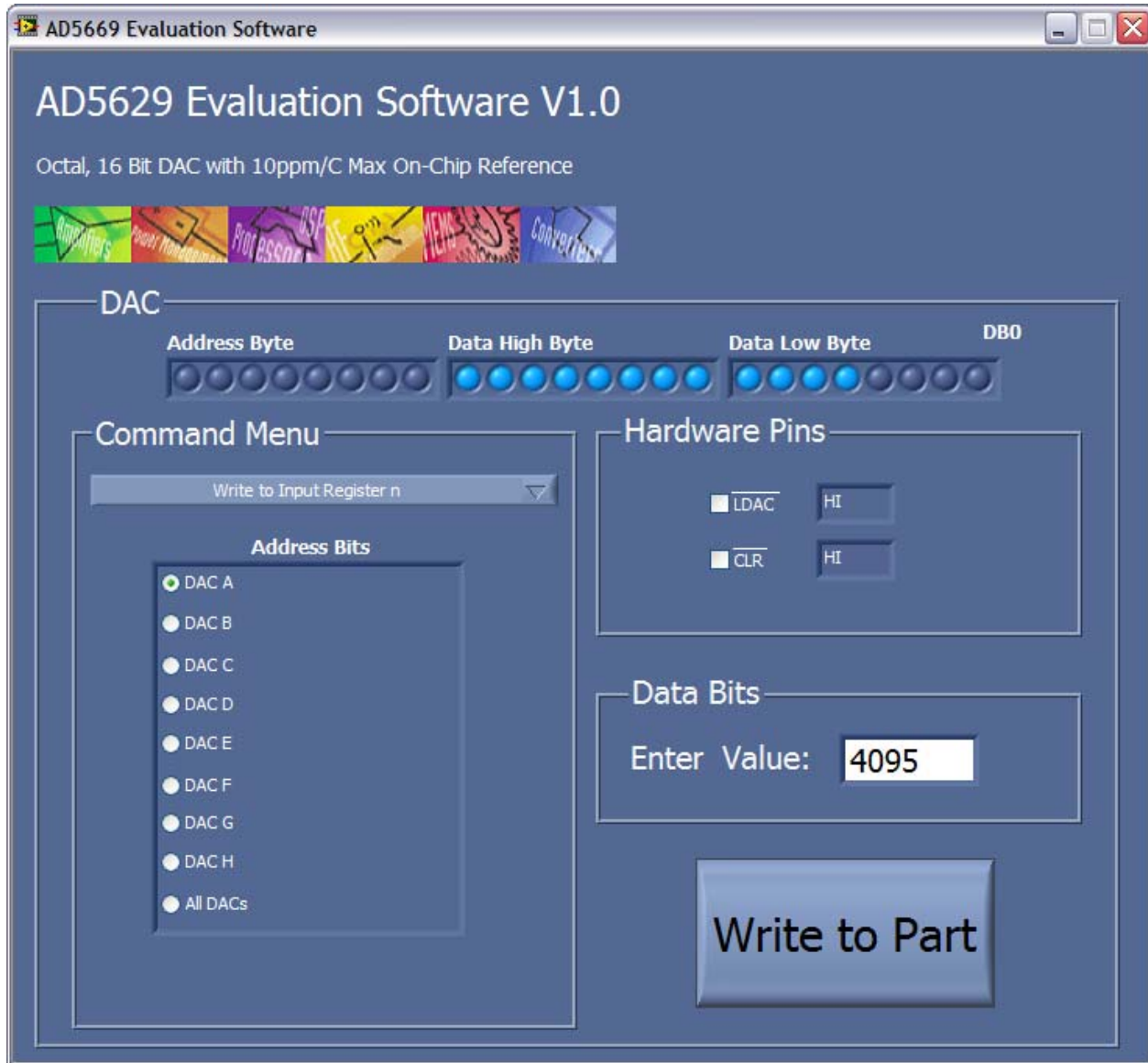


Figure 5. AD5629 Evaluation Board Main Window

## SOFTWARE OPERATION

From the **Analog Devices** menu, click **Start > All Programs > Analog Devices > AD5629 > AD5629 SDP Evaluation Software**.

For older PCs, click **Start > Programs > Analog Devices > AD5629 > AD5629 SDP Evaluation Software**.

The AD5629 main window opens, as shown in Figure 5. The data programmed into the 24 bit input shift register is displayed. You can select the command bits, the address bits and the data bits by clicking the appropriate button under each area.

To select a command with which to program the part, select the appropriate option from the drop down menu under **Command Menu**. For example, to program all DAC outputs

with fullscale click “Write to and Update DAC channel n”.

Click “All DACs” under **Address Bits**.

Under **Data Bits**, type the data in decimal format. To execute click **Write to Part**. You must click **Write to Part** to execute all writes to the part.

The AD5629 evaluation board lets you set up the power down DAC bits, the clear code register bits and the LDAC register bits, by selecting the appropriate option from the drop down menu under **Command Menu** and clicking **Write to Part**. You can also set the register bits for the required mode of operation. Consult the AD5629 datasheet for details.

Set /LDAC and /CLR to High or Low by clicking the corresponding checkbox under **Hardware Pins**. This command is executed immediately so there is no need to click **Write to**

**Part**.

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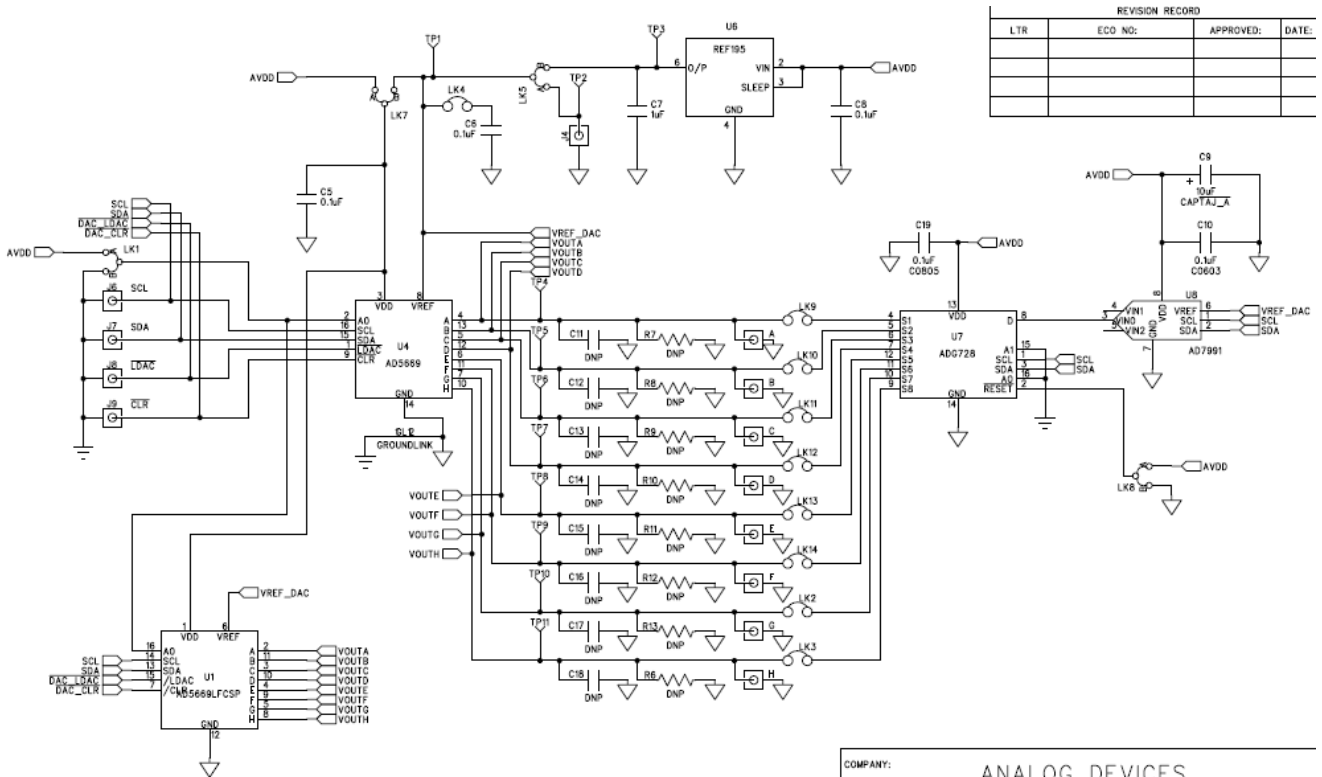
**Evaluation Board for AD5629, Octal, 16-Bit, Serial Voltage-Output DAC**
**EVALUATION BOARD SCHEMATICS AND ARTWORK**


Figure 6. Schematic of AD5629 Evaluation Circuitry

COMPANY: ANALOG DEVICES

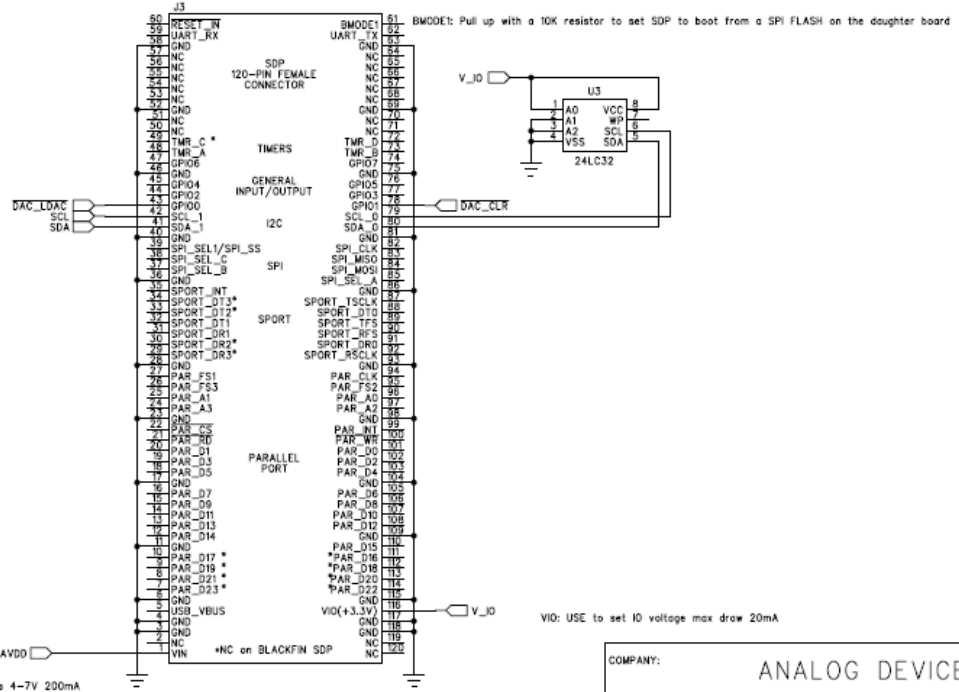
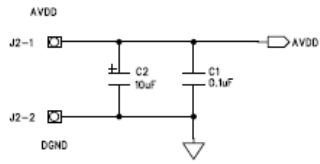



Figure 7. Schematic of SDP Connector

COMPANY: ANALOG DEVICES

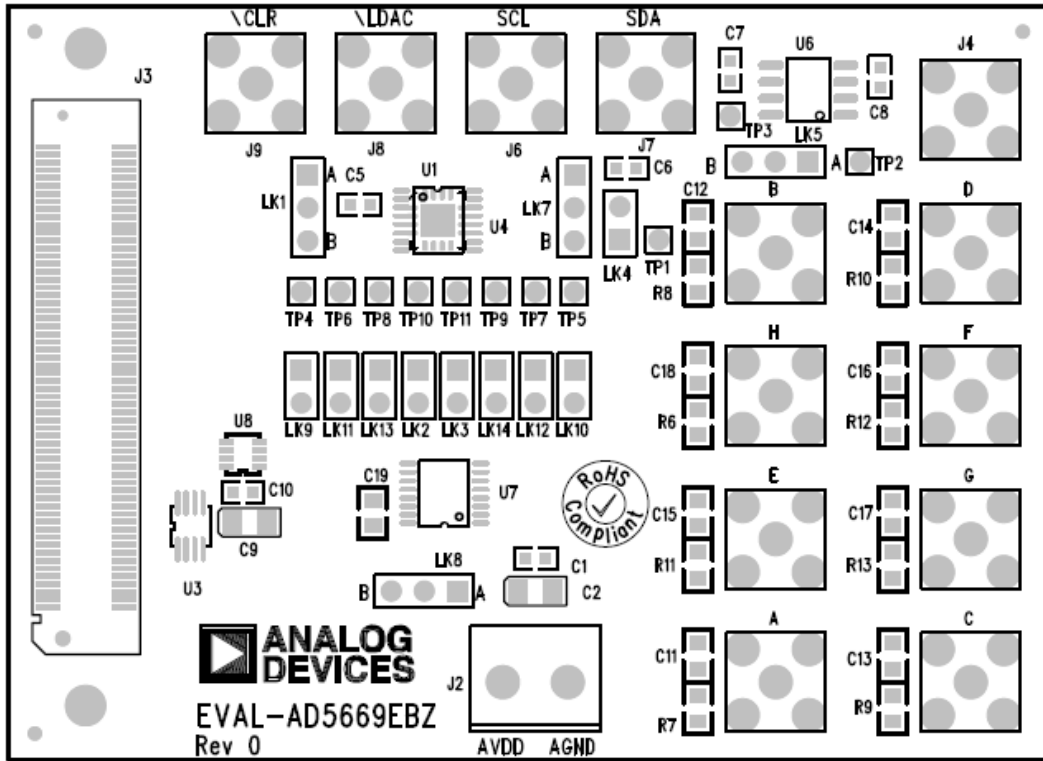


Figure 8. Component Placement Drawing

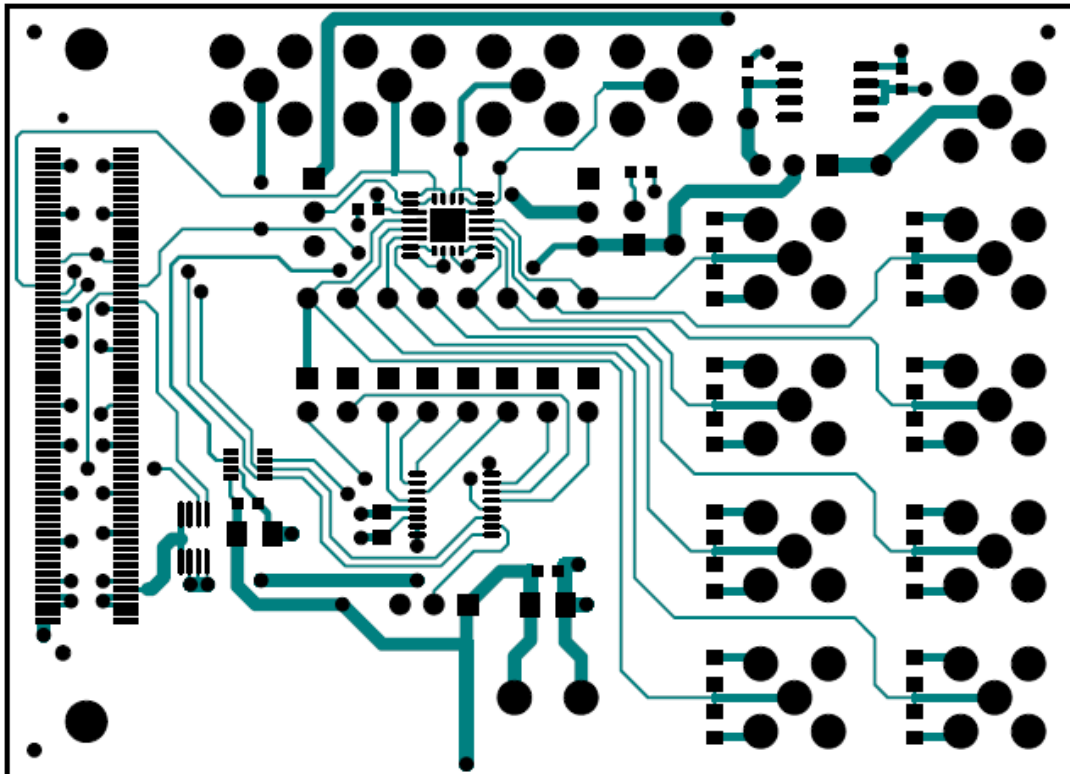


Figure 9. Component Side PCB Drawing

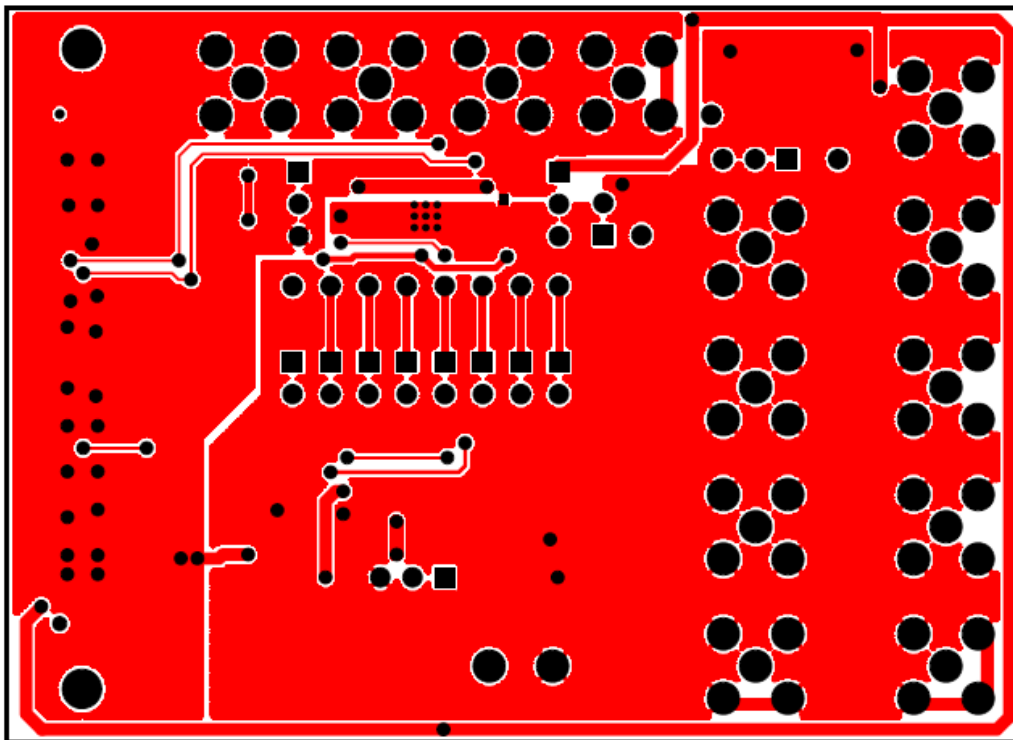


Figure 10. Solder Side PCB Drawing



# ORDERING INFORMATION

## COMPONENTS LIST

Table 4.

Qty	Reference Designator	Description	Supplier/Part Number
1	U8	12-bit ADC	Analog Devices AD7991
1	U7	Matrix Switch/Multiplexer	Analog Devices ADG728
1	L1	Ferrite Bead	Digi-Key 490-1024-1-ND
9	LK2,LK3,LK4,LK9,LK10,LK11, LK12,LK, LK13, LK14	Jumper Block, 2 pins 0.1" spacing	FEC 1022247 & 150-411
3	LK5, LK7 ,LK8	Jumper Block using 3 pin SIP header	FEC 1022248 & 150-410
6	J4, J5, J6, J7, J8, J9	SMB Jack 50 Ohm	FEC1206013
1	J3	120-Way Female Connector	FEC 1324660
1	U3	32k I2C Serial EEPROM	FEC 1331330
2	J1, J2	2 Pin Terminal Block	FEC 151789
3	C2, C3, C9	Case A 10uF Capacitor	FEC 197-130
1	C7	0603 10uF Capacitor	FEC 318-8840
2	LK1, LK6	3 Pin SIL Header	FEC 512-047 & 150-411
13	TP1-TP13	Red Testpoint	FEC 8731144 (Pack)
9	C1, C4, C5, C6, C8, C10, C19, C20, C21	0603 100nF Capacitor	FEC 8820023
4	R1, R2, R3, R4	SMD Resistor	FEC 933-0399
1	R5	Resistor, 1R5, 5%, 0.063W, 0603	FEC 9331832
2	U4, U5	Octal Buffer/Line Driver	FEC 9591915
1	U1	Octal 16-Bit DAC with on-chip reference in LFCSP(-CP only)	Analog Devices AD5629(CP)
1	U2	Octal 16-Bit DAC with on-chip reference in TSSOP(-RU only)	Analog Devices AD5629(RU)
1	U6	Low dropout Voltage Reference	Analog Devices REF195

**NOTES**

# NOTES

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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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