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# LTC2472: Selectable 250sps/1ksps 16-Bit, Differential, $\Delta\Sigma$ ADC with SPI Interface

## DESCRIPTION

Demonstration circuit 1629A features the LTC2472, a 16-bit high performance  $\Delta\Sigma$  analog-to-digital converter (ADC) with an SPI interface. The input is differential with a range of  $\pm V_{REF}$ . The modulator's proprietary sampling technique reduces the average input current to less than 50nA – orders of magnitude lower than typical delta sigma ADCs.

DC1629A is a member of Linear Technology's QuikEval™ family of demonstration boards. It is designed to allow easy evaluation of the LTC2472 and may be connected directly to the target application's analog signals while using the

DC590 USB Serial Controller board and supplied software to measure performance. The exposed ground planes allow proper grounding to prototype circuitry. After evaluating with Linear Technology's software, the digital signals can be connected to the end application's processor/controller for development of the serial interface.

**Design files for this circuit board are available at <http://www.linear.com/demo>**

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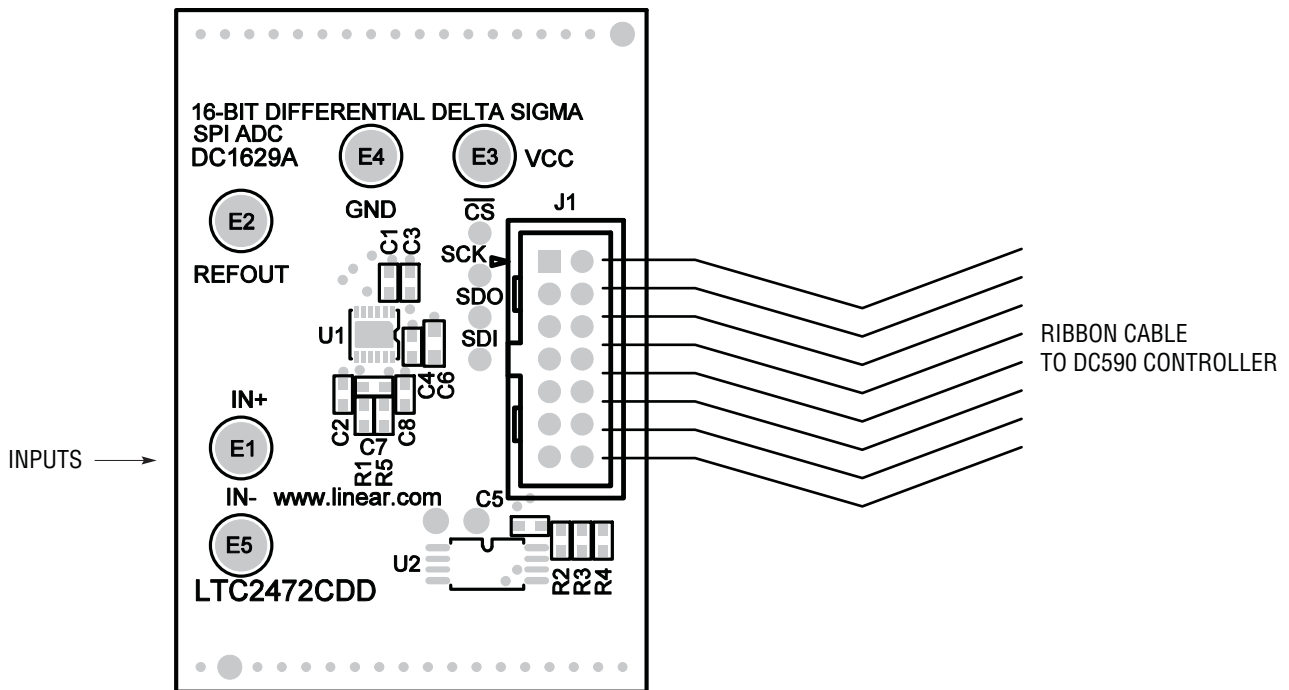


Figure 1. Proper Measurement Equipment Setup

## QUICK START PROCEDURE

Connect DC1629A to a DC590 USB Serial Controller using the supplied 14-conductor ribbon cable. Connect DC590 to host PC with a standard USB A/B cable. Run the evaluation software supplied with DC590 or downloaded from <http://www.linear.com/software>. The correct program will be loaded automatically. Click the COLLECT button to start

reading the input voltage. Details on software features are documented in the control panel's help menu.

Tools are available for logging data, changing reference voltage, changing the number of points in the strip chart and histogram, and changing the number of points averaged for the DVM display.

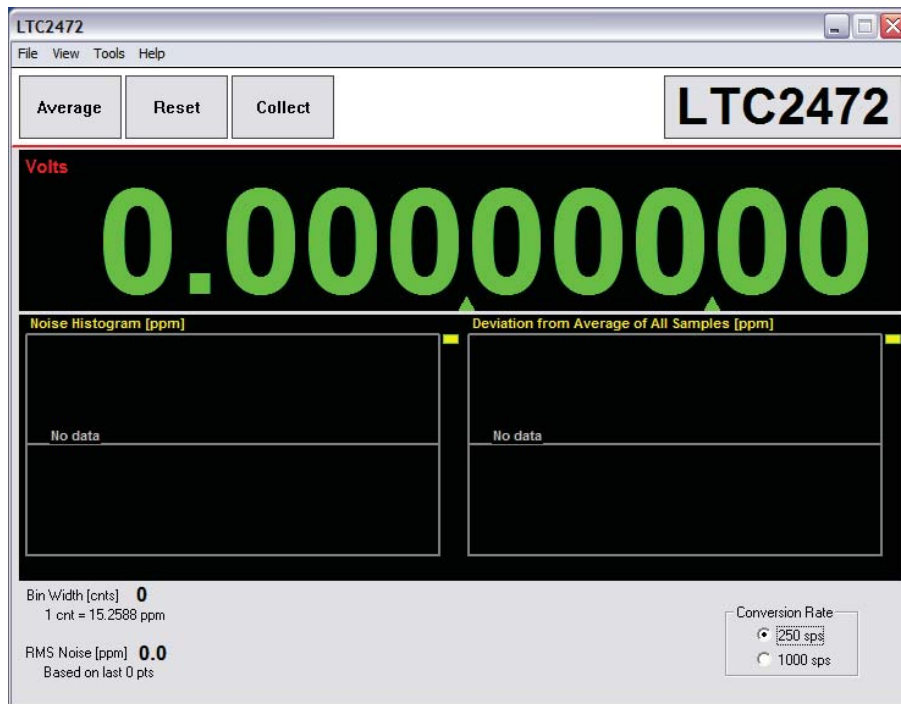


Figure 2. Software Screenshot

## HARDWARE SET-UP

### CONNECTION TO DC590 SERIAL CONTROLLER

J1 is the power and digital interface connector. Connect to DC590 serial controller with supplied 14-conductor ribbon cable.

### ANALOG CONNECTIONS

Analog signal connections are made via the row of turret posts along the edge of the board. Also, when connecting the board to an existing circuit the exposed ground planes along the edges of the board may be used to form a solid connection between grounds.

**GND:** This turret is connected directly to the internal ground planes.

**V<sub>CC</sub>:** This is the supply and reference voltage for the ADC. Do not draw any power from this point.

**IN<sup>+</sup>:** This is the positive input to the ADC. The maximum differential voltage between IN<sup>+</sup> and IN<sup>-</sup> is  $\pm 1.25V$ .

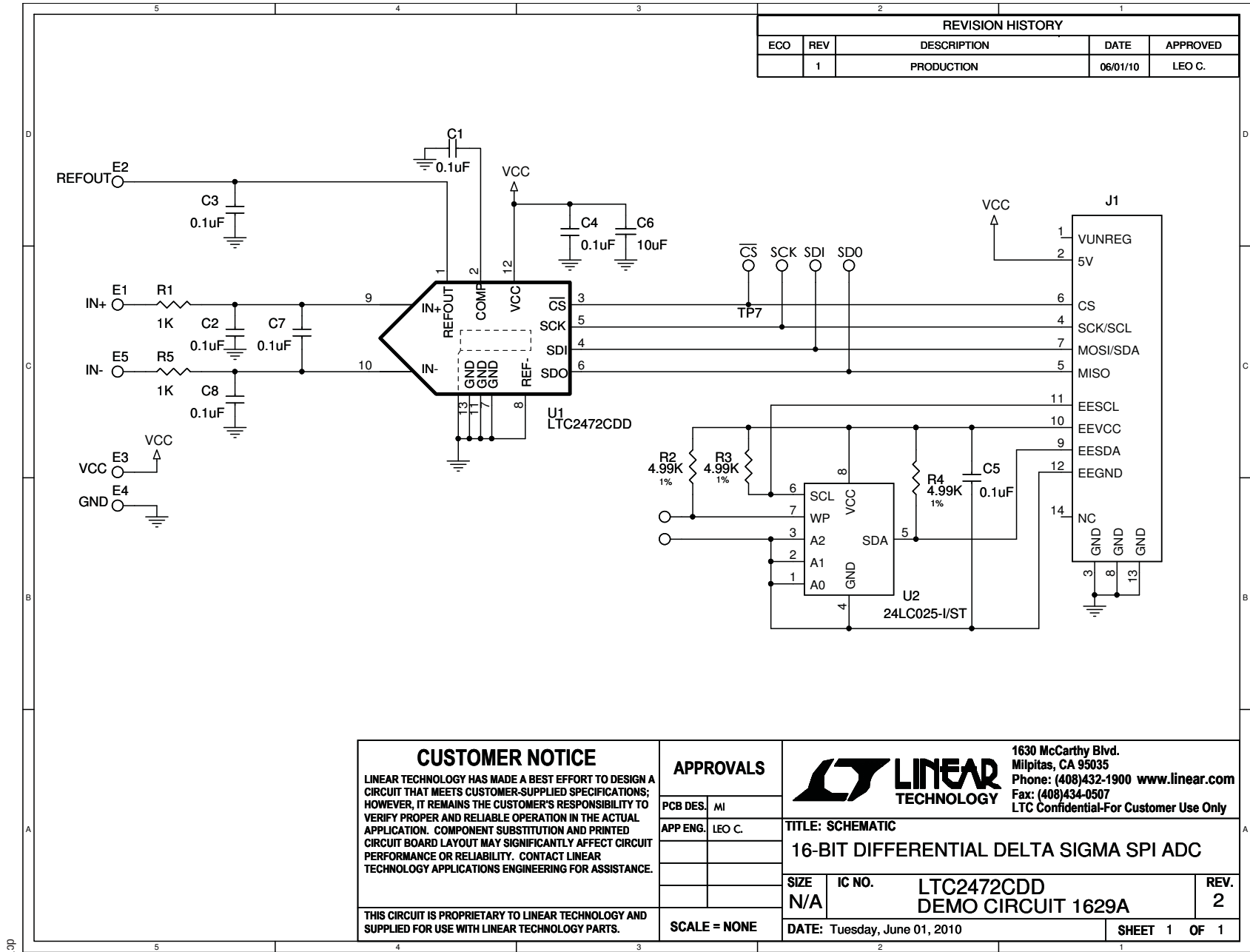
**IN<sup>-</sup>:** This is the negative input to the ADC

**REFOUT:** This turret is connected to the LTC2472 REFOUT pin. This pin may be used to provide a reference voltage to an external circuit and can source up to 100 $\mu$ A. Do NOT drive this pin. This pin is normally at 1.25V.

# DEMO MANUAL DC1629A

## PARTS LIST

ITEM	QUANTITY	REFERENCE-DESCRIPTION	PART DESCRIPTION	MANUFACTURER, PART NUMBER
<b>REQUIRED CIRCUIT COMPONENTS</b>				
1	7	C1, C2, C3, C4, C5, C7, C8	Capacitor, 0402, 0.1 $\mu$ F, 20%, 16V, X7R	TDK C1005X7R1C104M
2	1	C6	Capacitor, 0603, 10 $\mu$ F, 20%, 6.3V, X5R	TDK C1608X5R0J106M
		C6 - Alternate	Capacitor, 0603, 10 $\mu$ F, 20%, 6.3V, X5R	Murata GRM188R60J106ME47D
3	5	E1, E2, E3, E4, E5	Turret	Mill Max 2308-2
4	1	J1	Header, 2mm $\times$ 7mm 2mm	Molex 878311420
5	2	R1, R5	Resistor, 0402, 1k $\Omega$ , 5%, 1/16W	Vishay CRCW0402102JNED
6	3	R2, R3, R4	Resistor, 0402, 4.99k $\Omega$ , 1%, 1/16W	Vishay CRCW04024K99FKED
7	1	U1	IC, 16-Bit ADC w/Integrated Precision Reference	Linear Technology LTC2472CDD
8	1	U2	IC, IC Serial EEPROM 2k	Microchip Technology 24LC025-I/ST
9	1		Fab, Printed Circuit Board	Demo Circuit 1629A
10	1		Stencil	Stencil 1629A



REVISION HISTORY				
ECO	REV	DESCRIPTION	DATE	APPROVED
	1	PRODUCTION	06/01/10	LEO C.

<p><b>CUSTOMER NOTICE</b></p> <p>LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER-SUPPLIED SPECIFICATIONS; HOWEVER, IT REMAINS THE CUSTOMER'S RESPONSIBILITY TO VERIFY PROPER AND RELIABLE OPERATION IN THE ACTUAL APPLICATION. COMPONENT SUBSTITUTION AND PRINTED CIRCUIT BOARD LAYOUT MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.</p> <p>THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.</p>	<p><b>APPROVALS</b></p> <p>PCB DES. MI</p> <p>APP ENG. LEO C.</p>		<p>1630 McCarthy Blvd. Milpitas, CA 95035 Phone: (408)432-1900 <a href="http://www.linear.com">www.linear.com</a> Fax: (408)434-0507 LTC Confidential-For Customer Use Only</p>	
	<p>TITLE: SCHEMATIC</p> <p>16-BIT DIFFERENTIAL DELTA SIGMA SPI ADC</p>			
	<p>SIZE N/A</p>	<p>IC NO. LTC2472CDD DEMO CIRCUIT 1629A</p>	<p>REV. 2</p>	
	<p>SCALE = NONE</p> <p>DATE: Tuesday, June 01, 2010</p>			<p>SHEET 1 OF 1</p>

# DEMO MANUAL DC1629A

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