

LTC2460: 16-Bit, Differential, $\Delta\Sigma$ ADC with SPI Interface

DESCRIPTION

Demonstration circuit 1490B features the **LTC2460**, a 16-bit high performance $\Delta\Sigma$ analog-to-digital converter (ADC) with an SPI interface. The input is unipolar with a range of 0-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.

DC1490B is a member of Linear Technology's QuikEval™ family of demonstration boards. It is designed to allow easy evaluation of the LTC2460 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 www.linear.com/demo/1490

LT, LT, LTC, LTM, Linear Technology and the Linear logo are registered trademarks and QuikEval is a trademark of Linear Technology Corporation. All other trademarks are the property of their respective owners.

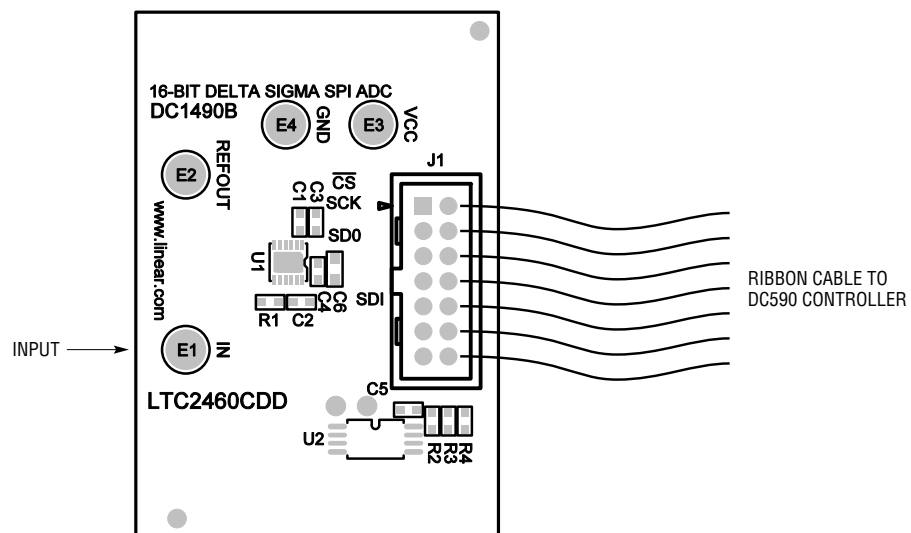


Figure 1. Proper Measurement Equipment Setup

DEMO MANUAL DC1490B

QUICK START PROCEDURE

Connect DC1490B 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.

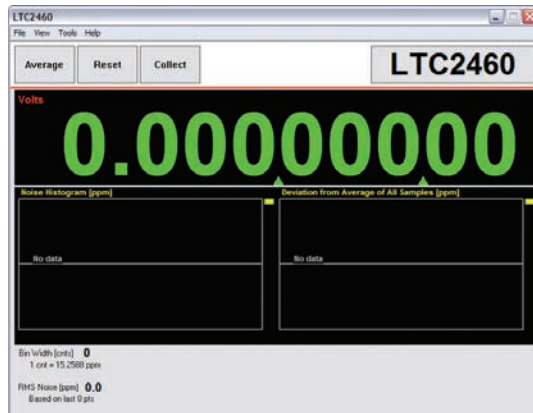


Figure 2. Software Screenshot

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_{CC}: This is the supply and reference voltage for the ADC. Do not draw any power from this point.

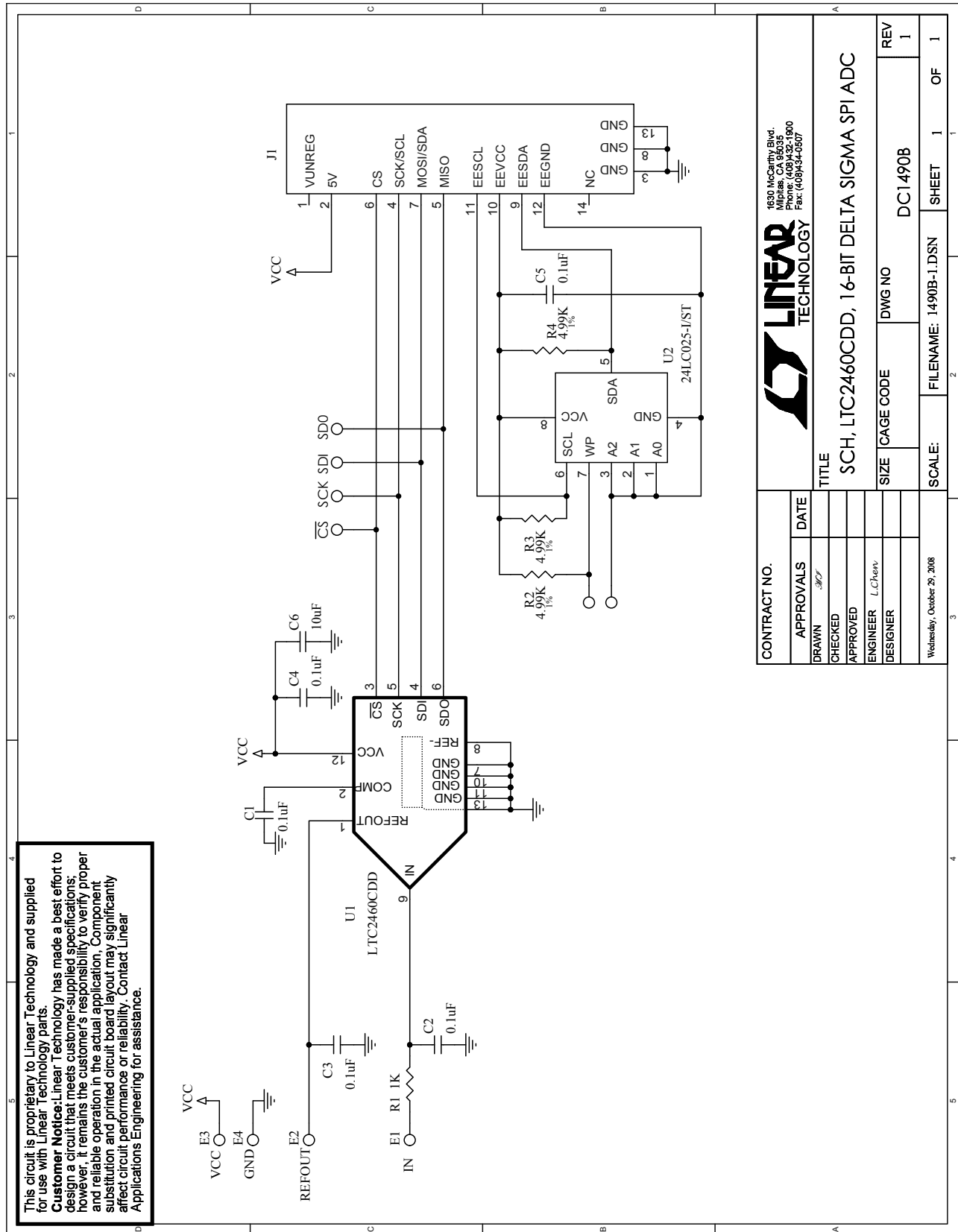
IN: This is the input to the ADC

REFOUT: This turret is connected to the LTC2460 REFOUT pin. This pin may be used to provide a reference voltage to an external circuit and can source up to 100 μ A. Do NOT drive this pin.

PARTS LIST

| ITEM | QTY | REFERENCE | PART DESCRIPTION | MANUFACTURER/PART NUMBER |
|------------------------------------|-----|--------------------|--|------------------------------|
| Required Circuit Components | | | | |
| 1 | 5 | C1, C2, C3, C4, C5 | Capacitor, 0402 0.1 μ F 20% 16V X7R | TDK C1005X7R1C104M |
| 2 | 1 | C6 | Capacitor, 0603 10 μ F 20% 6.3V X5R | Murata GRM188R60J106ME47D |
| 3 | 4 | E1, E2, E3, E4 | Turret | Mill Max 2308-2 |
| 4 | 1 | J1 | Header, 2X7 2mm | Molex 87331-1420 |
| 5 | 1 | R1 | Resistor, 0402 1k Ω 5% 1/16W | Vishay CRCW0402102JNED |
| 6 | 3 | R2, R3, R4 | Resistor, 0402 4.99k Ω 1% 1/16W | Vishay CRCW04024K99FKED |
| 7 | 1 | U1 | IC, 16-Bit ADC with Integrated Precision Reference | Linear Tech. LTC2460CDD |
| 8 | 1 | U2 | IC, IC Serial EEPROM 2k | Microchip Tech. 24LC025-I/ST |

SCHEMATIC DIAGRAM



This circuit is proprietary to Linear Technology and supplied for use with Linear Technology parts.
Customer Notice: 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 Applications Engineering for assistance.

| | | | | | |
|---|--|-------------|--|----------|--|
| CONTRACT NO. | | APPROVALS | | DATE | |
| DRAWN | | CHECKED | | APPROVED | |
| DESIGNER | | ENGINEER | | DATE | |
| TITLE | | SIZE | | DWG NO | |
| SCH, LTC2460CDD, 16-BIT DELTA SIGMA SPI ADC | | CAGE CODE | | DC1490B | |
| SCALE: | | FILENAME: | | SHEET | |
| Wednesday, October 29, 2008 | | 1490B-1.DSN | | 1 OF 1 | |



1600 McCarthy Blvd.
 Milpitas, CA 95035
 Phone: (408) 321-1900
 Fax: (408) 341-0507

DEMO MANUAL DC1490B

DEMONSTRATION BOARD IMPORTANT NOTICE

Linear Technology Corporation (LTC) provides the enclosed product(s) under the following **AS IS** conditions:

This demonstration board (DEMO BOARD) kit being sold or provided by Linear Technology is intended for use for **ENGINEERING DEVELOPMENT OR EVALUATION PURPOSES ONLY** and is not provided by LTC for commercial use. As such, the DEMO BOARD herein may not be complete in terms of required design-, marketing-, and/or manufacturing-related protective considerations, including but not limited to product safety measures typically found in finished commercial goods. As a prototype, this product does not fall within the scope of the European Union directive on electromagnetic compatibility and therefore may or may not meet the technical requirements of the directive, or other regulations.

If this evaluation kit does not meet the specifications recited in the DEMO BOARD manual the kit may be returned within 30 days from the date of delivery for a full refund. **THE FOREGOING WARRANTY IS THE EXCLUSIVE WARRANTY MADE BY THE SELLER TO BUYER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. EXCEPT TO THE EXTENT OF THIS INDEMNITY, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.**

The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user releases LTC from all claims arising from the handling or use of the goods. Due to the open construction of the product, it is the user's responsibility to take any and all appropriate precautions with regard to electrostatic discharge. Also be aware that the products herein may not be regulatory compliant or agency certified (FCC, UL, CE, etc.).

No License is granted under any patent right or other intellectual property whatsoever. **LTC assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or any other intellectual property rights of any kind.**

LTC currently services a variety of customers for products around the world, and therefore this transaction **is not exclusive**.

Please read the DEMO BOARD manual prior to handling the product. Persons handling this product must have electronics training and observe good laboratory practice standards. **Common sense is encouraged.**

This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact a LTC application engineer.

Mailing Address:

Linear Technology
1630 McCarthy Blvd.
Milpitas, CA 95035

Copyright © 2004, Linear Technology Corporation