

LTC2309

8-Channel, 12-Bit SAR ADC with I²C Interface

DESCRIPTION

Demonstration circuit 1337A features the [LTC[®]2309](#), a low noise, low power, 8-channel, 12-bit, successive approximation ADC with an I²C compatible serial interface. The LTC2309 is available in a 24-pin 4mm × 4mm QFN package. DC1337A demonstrates the DC performance of the LTC2309 in conjunction with the DC590 or DC2026 data collection boards (QuikEval™ controller). Alternatively, by connecting the DC1337 into a customer application the

performance of the LTC2309 can be evaluated directly in that circuit.

Design files for this circuit board are available at <http://www.linear.com/demo/DC1337A>

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BOARD PHOTO

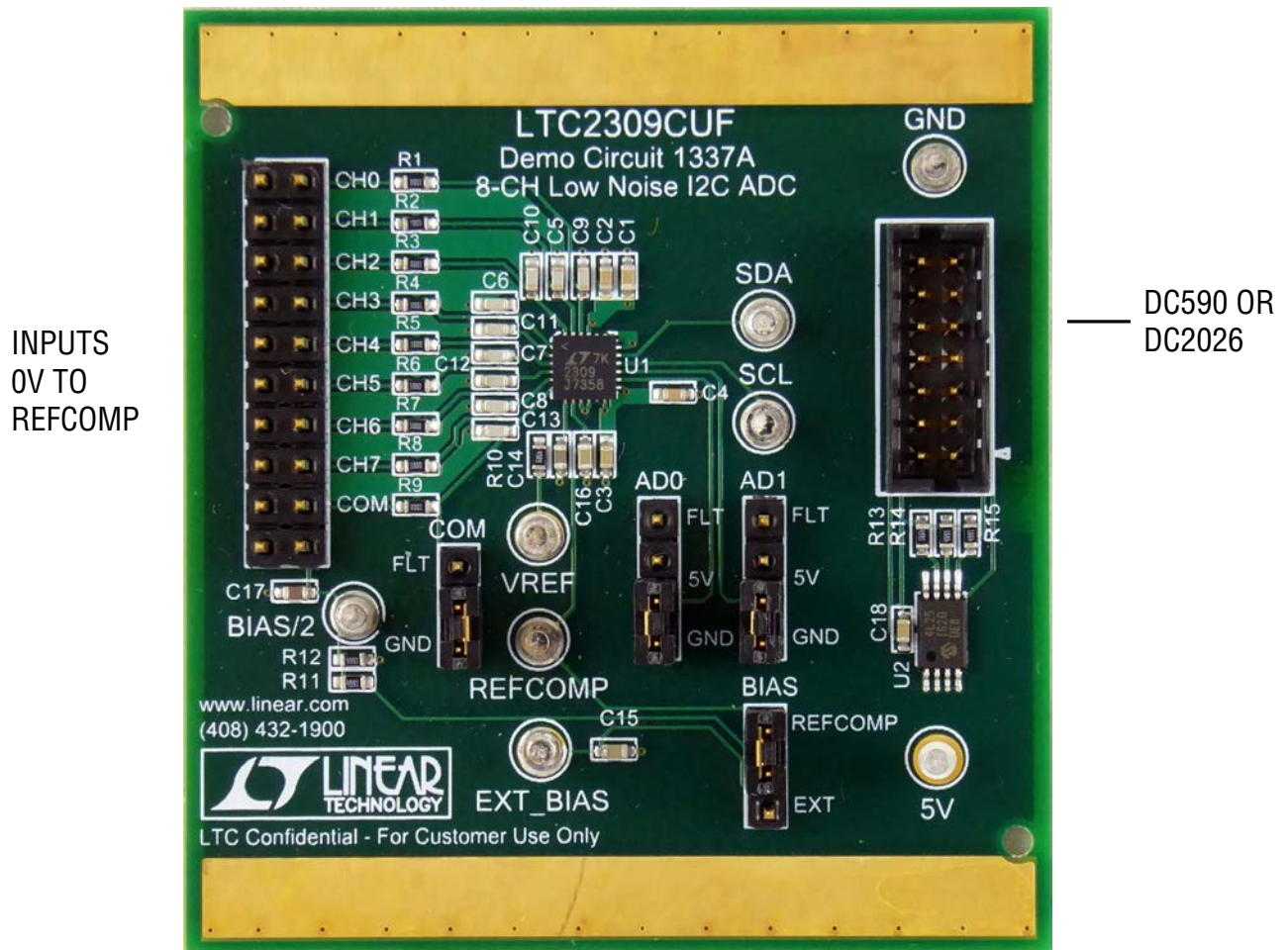


Figure 1. DC1337A Connection Diagram

QUICK START PROCEDURE

Connect the DC1337 to a QuikEval controller using the supplied 14-conductor ribbon cable. **Make sure the VCCIO jumper of the QuikEval controller is in the 5V position.** Connect the QuikEval controller to a host PC with a standard USB A/B cable. Apply an analog input voltage to CH0-CH7 on connector J1. Run the evaluation software supplied with the QuikEval controller or download it from www.linear.com/software. The correct control panel will be loaded automatically. Click the Collect (Figure 2) button to begin reading CH0-CH3. Press the Page 1 Button to toggle to Page 2. This displays CH4-CH7. This button toggles between the two displays.

The Help menu contains information on data logging the ADC results. The Tools menu has the data logging option as well as options for changing the number of points displayed, the number of points in an average and whether the data is displayed in LSBs or Volts. The View menu can be used to access the LTC2309 product page.

If the QuikEval program is started without the demo board attached to the QuikEval controller, the Tools menu can be used to check for updates and automatically install them. DC1337 requires at least version K71 of the QuikEval software.

HARDWARE SETUP

Signal Connections

J1 Connector for CH0-CH7, COM and BIAS/2. Limit input voltage swings to GND-VDD. For optimum performance, the input should be bandlimited to the frequencies of interest.

Jumper J2 AD0 I²C address line. Set to GND for operation with supplied software. For operation without QuikEval, configure as desired: Low (GND), High (5V) or Float (FLT)

Jumper J3 AD1 I²C address line. Set to GND for operation with supplied software. For operation without QuikEval, configure as desired: Low (GND), High (5V) or Float (FLT)

Jumper J4 COM Common pin for single ended ADC conversions. Can be set to GND or left floating (FLT) so that COM can be driven by J1.

J5 QuikEval interface connector. Provides power and I²C interface to the DC1337.

Jumper J6 BIAS Selects between REFCOMP and an external bias voltage to drive the Bias/2 line. Bias/2 is designed to set a center point for the minus input during bipolar operation.

Turrets

EXT_BIAS External Bias connection. This can be used to drive the BIAS/2 line through a 2:1 divider. To use this pin put jumper J6 in the EXT position and apply desired bias voltage.

5V 5V supply line for the DC1337. Use this line only if the QuikEval controller is not used

GND Ground line for the DC1337

SDA I²C bidirectional data line. Controlled by the QuikEval controller if connected.

SCL I²C clock line. Controlled by the QuikEval controller if connected.

VREF Connected to ADC V_{REF} pin.

REFCOMP Connected to ADC REFCOMP pin.

BIAS/2 Bias Voltage/2 (REFCOMP or EXT)

HARDWARE SETUP

Using the DC1337 without the QuikEval Controller

Interface signals SDA and SCL and power are normally provided to the DC1337 by the QuikEval controller. If you use this board without the QuikEval controller, it is the user's responsibility to connect a 5V power supply and

ground as well as generating SDA and SCL. These signals can be provided through the 14-pin ribbon cable connector. See schematic for pinout. See the LTC2309 data sheet for information on driving SDA and SCL.

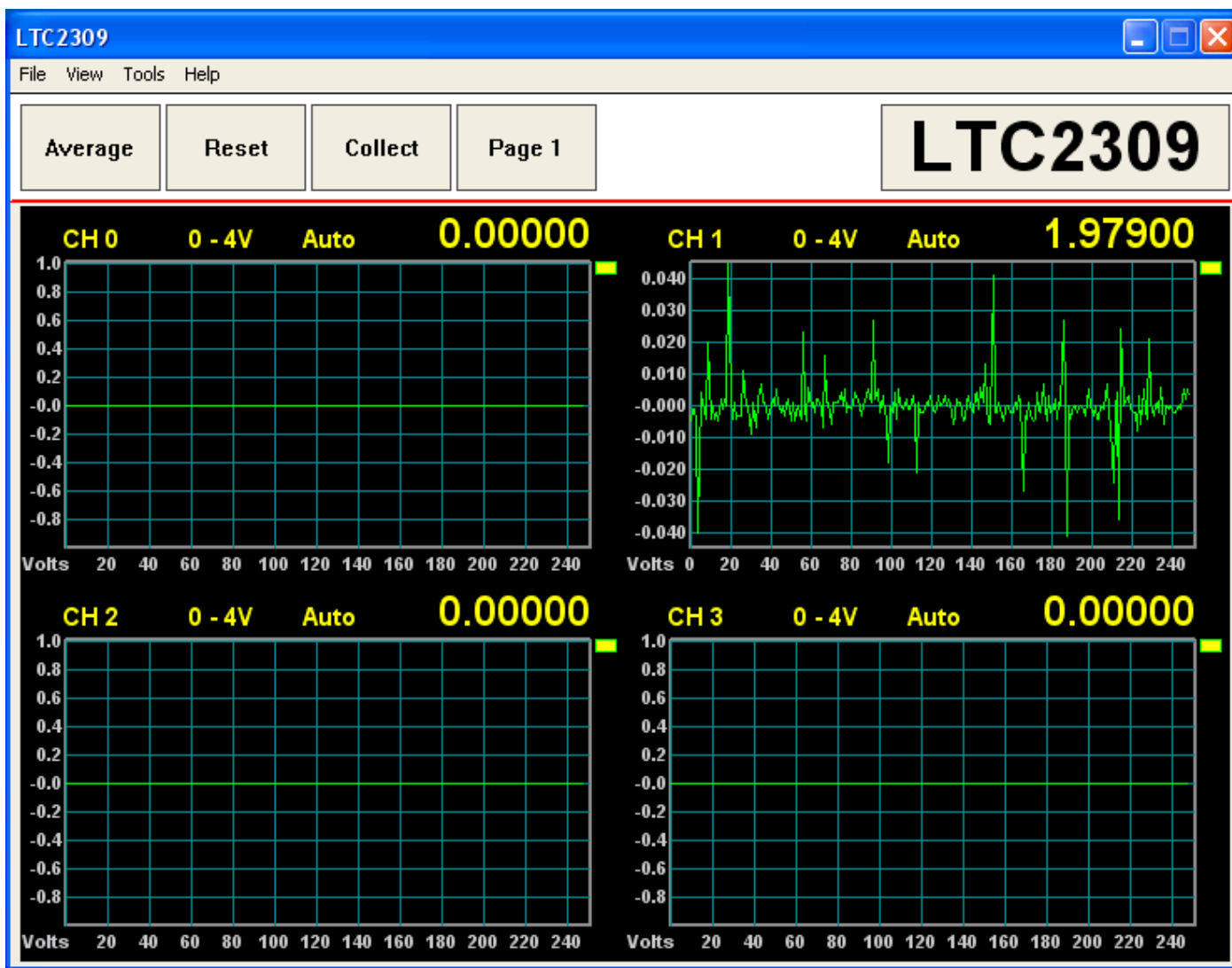


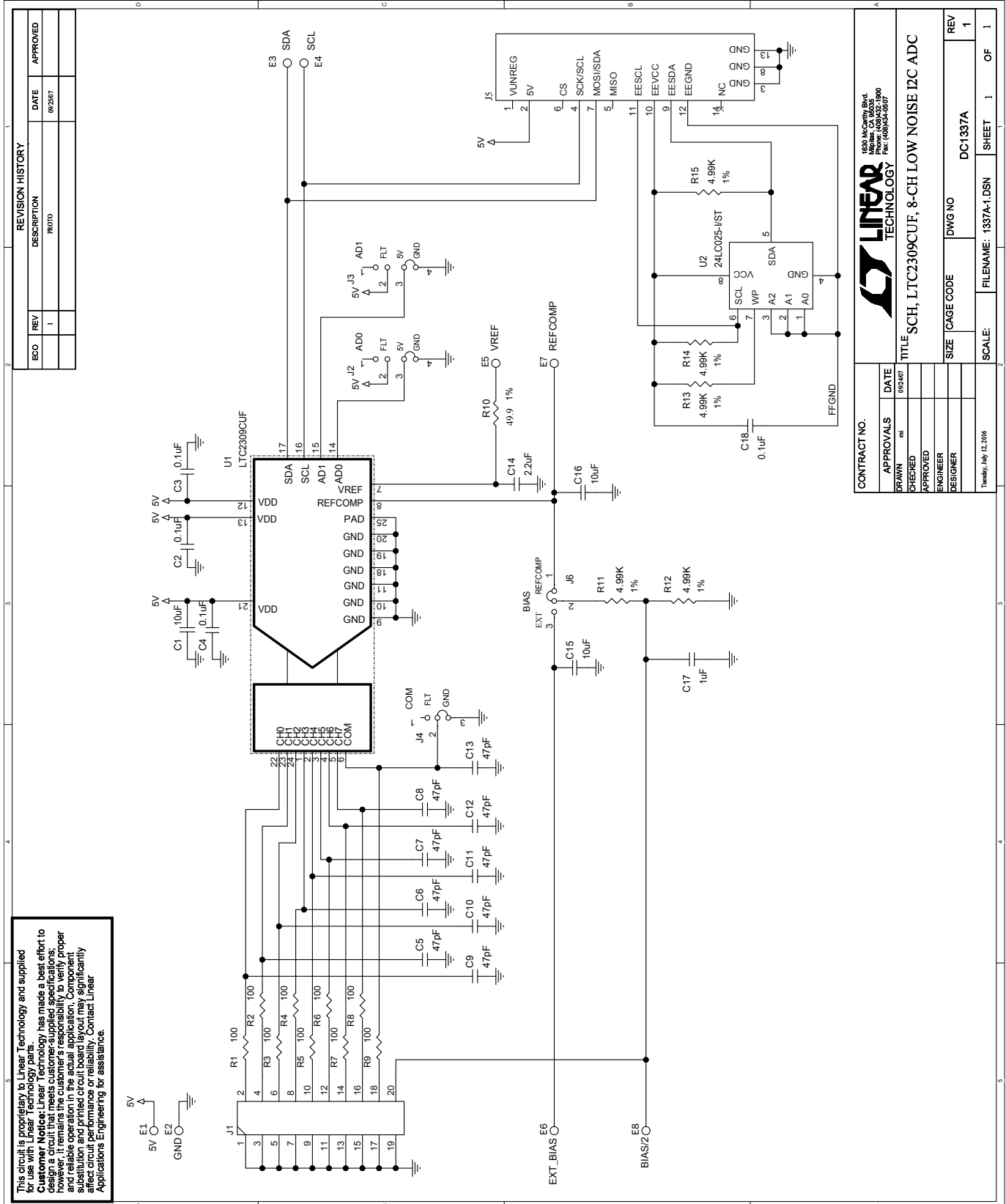
Figure 2. DC1337A QuikEval Screenshot

DEMO MANUAL DC1337A

PARTS LIST

| ITEM | QTY | REFERENCE | PART DESCRIPTION | MANUFACTURER/PART NUMBER |
|------|-----|--|---|--|
| 1 | 3 | C1, C15, C16 | CAP., 10 μ F, X5R, 6.3V, 20%, 0603 | MURATA, GRM188R60J106ME47D AVX, 06036D106MAT2A NIC, NMC0603X5R106M6.3TRPF TDK, C1608X5R0J106M080AB |
| 2 | 4 | C2, C3, C4, C18 | CAP., 0.1 μ F, X7R, 25V, 10%, 0603 | AVX, 06033C104KAT2A TDK, C1608X7R1E104K080AA |
| 3 | 9 | C5, C6, C7, C8, C9, C10, C11, C12, C13 | CAP., 47pF, C0G, 25V, 10%, 0603 | AVX, 06033A470KAT2A |
| 4 | 1 | C14 | CAP., 2.2 μ F, X5R, 6.3V, 10%, 0603 | TAIYO YUDEN, JMK107BJ225KA-T AVX, 06036D225KAT2A MURATA, GRM188R60J225KE19D |
| 5 | 1 | C17 | CAP., 1 μ F, X7R, 16V, 10%, 0603 | TDK, C1608X7R1C105K080AC AVX, 0603YC105KAT2A NIC, NMC0603X7R105K16TRPF |
| 6 | 8 | E1, E2, E3, E4, E5, E6, E7, E8 | TEST POINT, TURRET, 0.064", MTG. HOLE | MILL-MAX, 2308-2-00-80-00-00-07-0 |
| 7 | 1 | J1 | CONN., HDR., MALE, 2x10, 2.54mm, THT, STRT | SAMTEC, TSW-110-07-L-D |
| 8 | 2 | J2, J3 | CONN., HDR., MALE, 1x4, 2.54mm, THT, STRT | SAMTEC, TSW-104-07-L-S |
| 9 | 2 | J6, J4 | CONN., HDR., MALE, 1x3, 2.54mm, THT, STRT | SAMTEC, TSW-103-07-L-S |
| 10 | 1 | J5 | CONN., HDR., MALE, 2x7, 2mm, THT, VERT, SHROUDED | MOLEX, 87831-1420 |
| 11 | 9 | R1, R2, R3, R4, R5, R6, R7, R8, R9 | RES., 100 Ω , 1%, 1/10W, 0603 | VISHAY, CRCW0603100RFKEA NIC, NRC06F1000TRF |
| 12 | 1 | R10 | RES., 49.9 Ω , 1%, 1/10W, 0603 | VISHAY, CRCW060349R9FKEA PANASONIC, ERJ3EKF49R9V |
| 13 | 5 | R11, R12, R13, R14, R15 | RES., 4.99k Ω , 1%, 1/10W, 0603 | VISHAY, CRCW06034K99FKEA NIC, NRC06F4991TRF |
| 14 | 1 | U1 | IC, 5V, 8-CH, 12-Bit I ² C SAR ADC, QFN-24UF | LINEAR TECH., LTC2309CUF#PBF |
| 15 | 1 | U2 | IC, MEMORY, EEPROM, 2K-Bit, 400kHz, TSSOP-8 | MICROCHIP, 24LC025-I/ST |
| 16 | 4 | JP2, JP3, JP4, JP6 | CONN., SHUNT, FEMALE, 2 POS, 2.54mm | SAMTEC, SNT-100-BK-G |
| 17 | 1 | | PCB, DC1337A | DEMO CIRCUIT 1337A |
| 18 | 1 | | STENCIL | STENCIL 1337A |

SCHEMATIC DIAGRAM



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DEMO MANUAL DC1337A

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

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