

LTC2631

Single 12-/10-/8-Bit I²C

V_{OUT} DACs with Integrated 10ppm/°C Reference

DESCRIPTION

Demonstration circuit 1332A features the **LTC[®]2631**, a 12-bit I²C DAC. This device establishes a new benchmark for size and integration of 12-bit DACs and onboard reference.

The DC1332A 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. 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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DEMO BOARD VARIATIONS

| DEMO BOARD TYPE | LTC2631 VARIATION | RESOLUTION (BITS) | POWER-UP | FULL-SCALE |
|-----------------|-------------------|-------------------|-----------|------------|
| DC1332A-A | LTC2631-LM12 | 12 | Mid-Scale | 2.5V |
| DC1332A-B | LTC2631-LZ12 | 12 | Zero | 2.5V |
| DC1332A-C | LTC2631-HM12 | 12 | Mid-Scale | 4.096V |
| DC1332A-D | LTC2631-HZ12 | 12 | Zero | 4.096V |

BOARD PHOTO

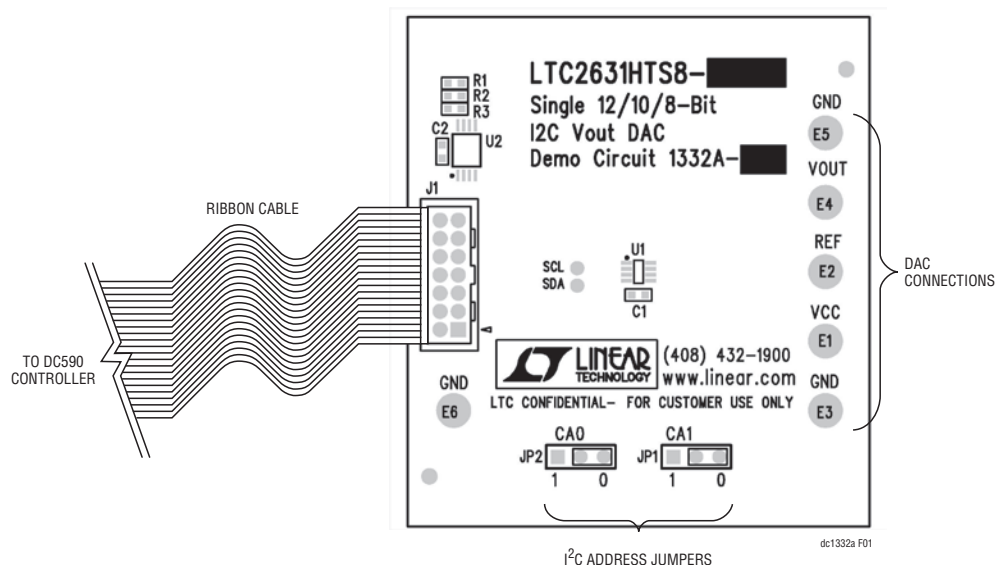


Figure 1. DC1332A Connection Diagram

QUICK START PROCEDURE

1. Connect the DC1332A to a DC590 USB serial controller using the supplied 14-conductor ribbon cable.
2. Connect the DC590 to the host PC with a standard USB A/B cable.
3. Run the QuikEval™ evaluation software supplied with the DC590 or download it from: www.linear.com/software. The correct program will be loaded automatically.

Options are available to display the DAC output in voltage, hex code, or decimal count. Additionally, the reference voltage may be changed to reflect an actual measured value, such that the output voltage matches the theoretical output voltage. The reference mode may be changed from internal reference to external reference.

Features may be periodically added to the software. See the software's help menu for the latest information.

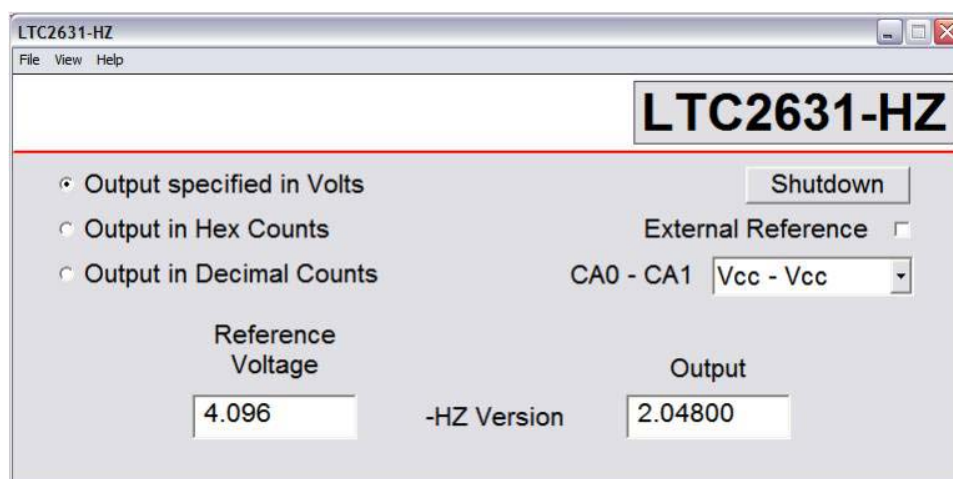


Figure 2. QuikEval Software

HARDWARE SETUP

JUMPERS

CA0: This sets the I²C address of the LTC2631. These should be set to 1 (V_{CC}) by default.

CA1/REF_SEL: On the B and D versions of the demo board, this is used to determine the I²C address of the LTC2631. On the A and C versions of the demo board, this is used to determine the reference input.

ANALOG CONNECTIONS

DAC outputs are provided on the row of turret posts at the edge of the board.

GROUNDING AND POWER CONNECTIONS

Power (V_{CC}): Normally, the DC1332A is powered by the DC590 controller. V_{CC} can be supplied to the 5V turret, however the power supply on the DC590 must be disabled! Refer to the DC590 Quick Start Guide for more details on this mode of operation.

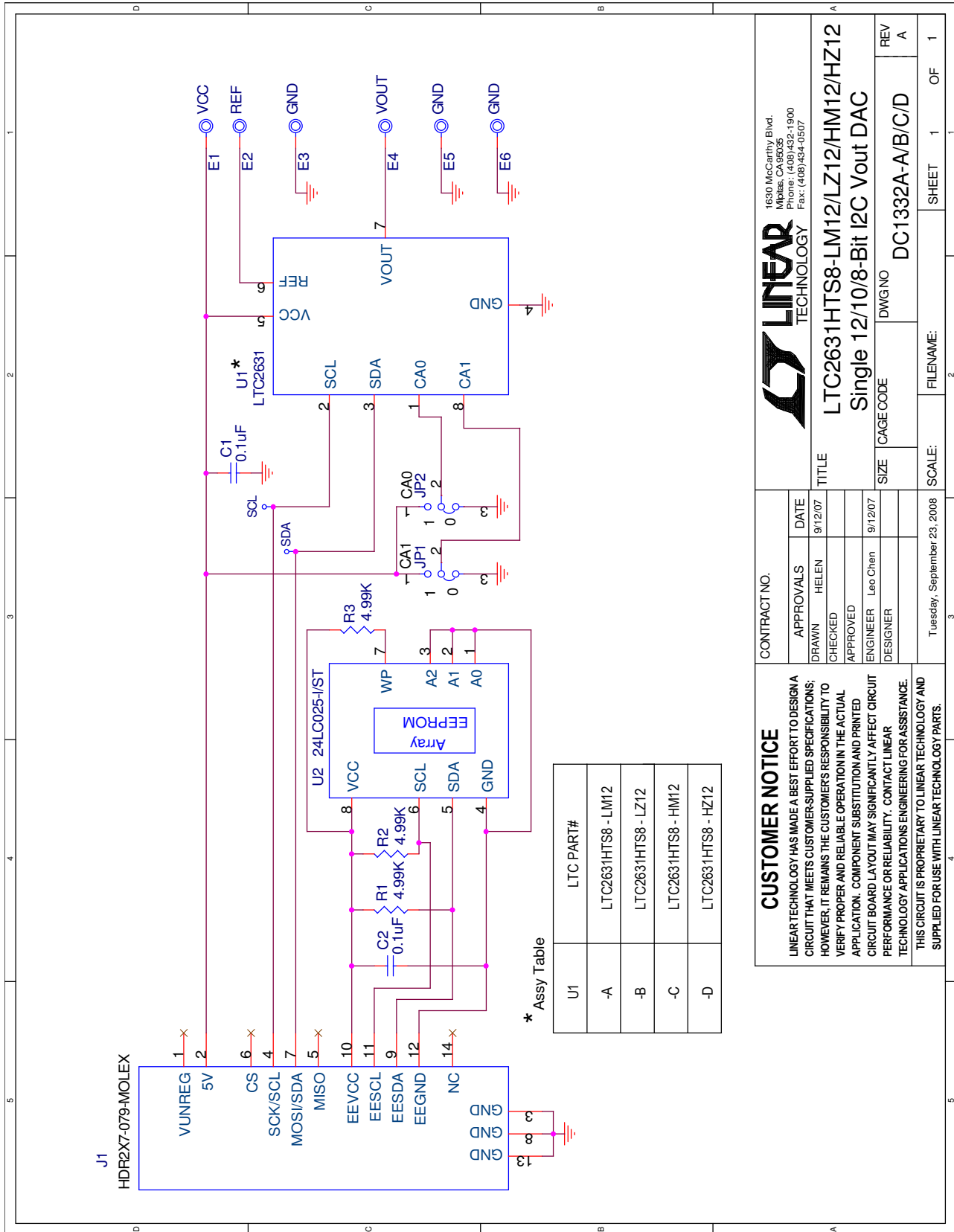
Grounding: Three ground posts are provided.

DEMO MANUAL DC1332A

PARTS LIST

| ITEM | QTY | REFERENCE | PART DESCRIPTION | MANUFACTURER/PART NUMBER |
|--|-----|------------|--|---|
| DC1332A Required Circuit Components | | | | |
| 1 | 2 | C1, C2 | CAP., X7R, 0.1 μ F, 16V, 10%, 0603 | AVX, 0603YC104KAT |
| 2 | 1 | J1 | HEADER, 2 \times 7 PIN, 0.079" | MOLEX, 87831-1420 |
| 3 | 3 | R1, R2, R3 | RES., CHIP, 4.99k, 1/16W, 1%, 0603 | VISHAY, CRCW06034K99FKEA |
| 4 | 1 | U2 | IC, 24LC025ST, TSSOP | MICROCHIP, 24LC025-I/ST |
| Hardware: For Demo Board Only | | | | |
| 1 | 6 | E1-E6 | TESTPOINT, TURRET, 0.095" | MILL-MAX, 2501-2-00-80-00-00-07-0 |
| 2 | 2 | JP1, JP2 | 0.1" SINGLE ROW HEADER, 3-PIN | SAMTEC, TSW-103-07-L-S |
| 3 | 2 | JP1, JP2 | SHUNT, 1" BLK | SAMTEC, SNT-100-BK-G |
| DC1332A-A | | | | |
| 5 | 1 | U1 | IC, LTC2631HTS8-LM12#PBF, TSOT-23 | LINEAR TECHNOLOGY, LTC2631HTS8-LM12#PBF |
| DC1332A-B | | | | |
| 5 | 1 | U1 | IC, LTC2631HTS8-LZ12#PBF, TSOT-23 | LINEAR TECHNOLOGY, LTC2631HTS8-LZ12#PBF |
| DC1332A-C | | | | |
| 5 | 1 | U1 | IC, LTC2631HTS8-HM12#PBF, TSOT-23 | LINEAR TECHNOLOGY, LTC2631HTS8-HM12#PBF |
| DC1332A-D | | | | |
| 5 | 1 | U1 | IC, LTC2631HTS8-HZ12#PBF, TSOT-23 | LINEAR TECHNOLOGY, LTC2631HTS8-HZ12#PBF |

SCHEMATIC DIAGRAM



| | | | |
|--|-----------------|---|--------------------|
| | | 1630 McCarthy Blvd. Milpitas, CA 95035 Phone: (408) 432-1900 Fax: (408) 434-0507 | |
| CONTRACT NO. | | TITLE | |
| APPROVALS DRAWN HELEN CHECKED APPROVED ENGINEER Leo Chen DESIGNER | DATE 9/12/07 | LTC2631HTS8-LM12/LZ12/HM12/HZ12 Single 12/10/8-Bit I2C Vout DAC | |
| 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 TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE. THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS. | | CAGE CODE DC1332A-A/B/C/D | DWG NO REV A |
| Tuesday, September 23, 2008 | | SCALE: | FILENAME: |
| SHEET 1 OF 1 | | 1 | |

Figure 3. LTC2631 Schematic Diagram

DEMO MANUAL DC1332A

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.

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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.

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