

LTC2640

Single 12-Bit SPI V_{OUT} DAC with Internal Reference

DESCRIPTION

Demonstration circuit 1333A features the [LTC[®]2640](#), a 12-bit SPI DAC. This device establishes a new benchmark for size and integration of 12-bit DACs and onboard reference.

The DC1333A 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

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

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DEMO BOARD VARIATIONS

DEMO BOARD TYPE	LTC2640 VARIATION	RESOLUTION (BITS)	POWER-UP	FULL-SCALE
DC1333A-A	LTC2640-LM12	12	Mid-Scale	2.5V
DC1333A-B	LTC2640-LZ12	12	Zero	2.5V
DC1333A-C	LTC2640-HM12	12	Mid-Scale	4.096V
DC1333A-D	LTC2640-HZ12	12	Zero	4.096V

BOARD PHOTO

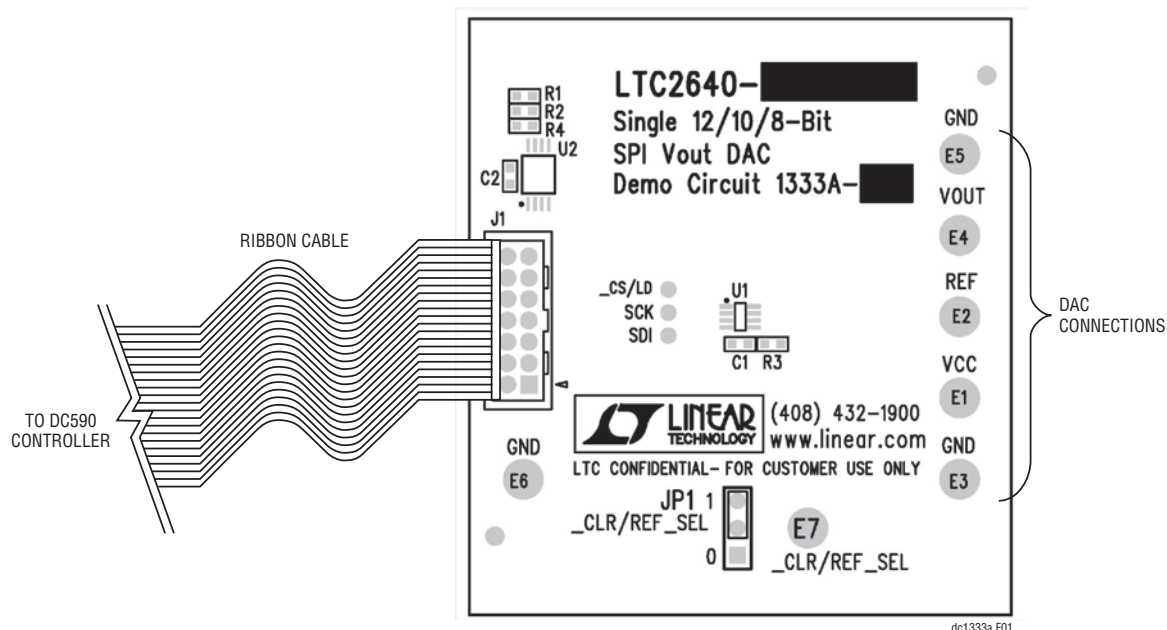


Figure 1. DC1333A Connection Diagram

QUICK START PROCEDURE

1. Connect the DC1333A 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.

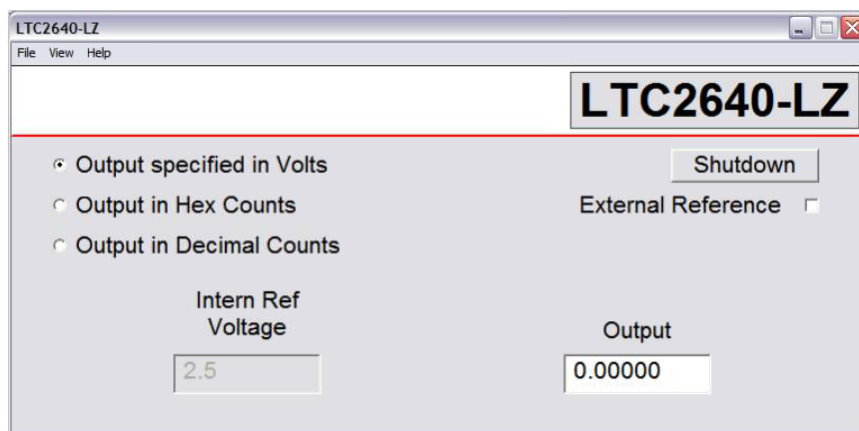


Figure 2. QuikEval Software

HARDWARE SETUP

JUMPERS

_CLR/REF_SEL: On the B and D versions of the demo board, this is not populated. 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 DC1334A 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.

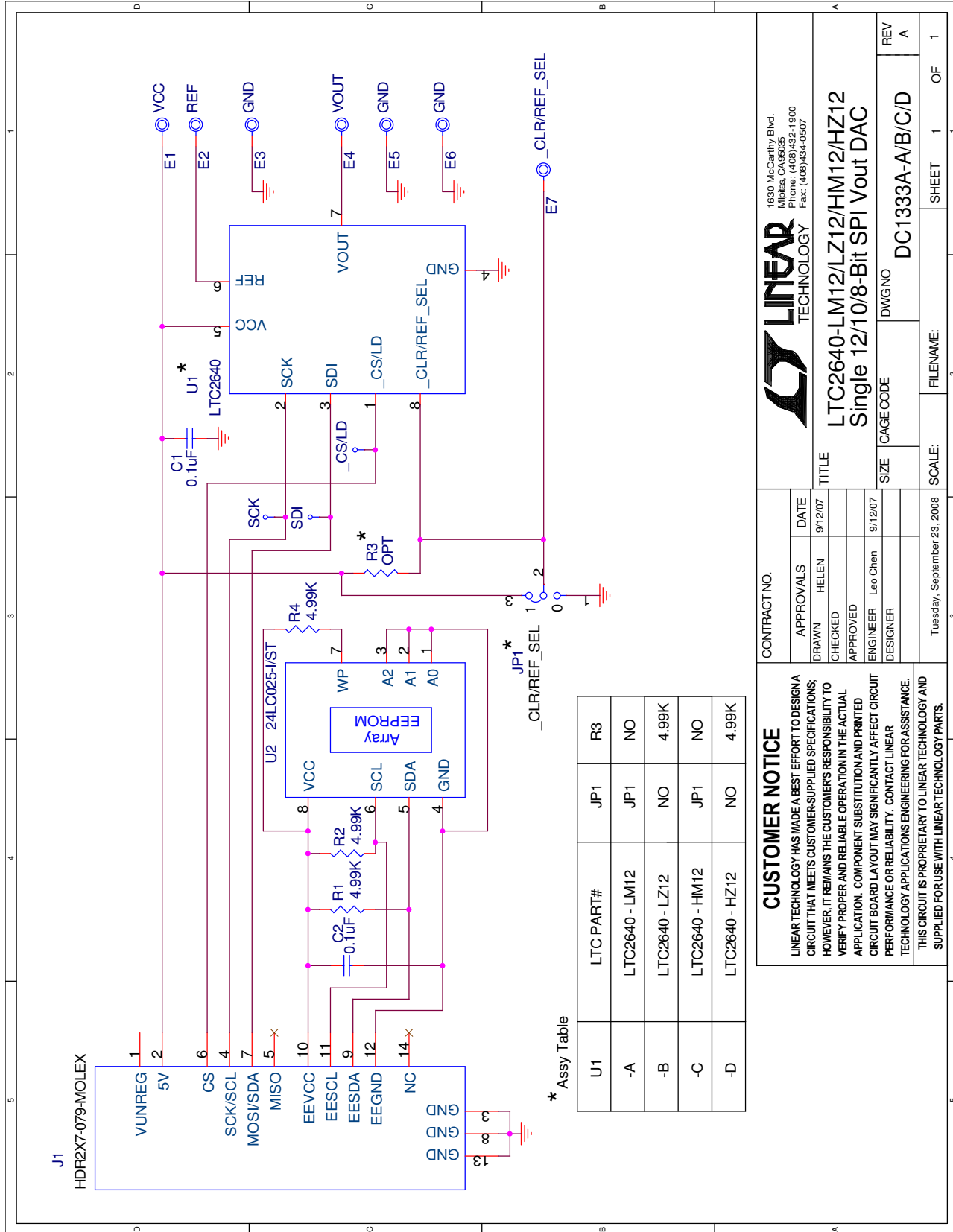
Grounding: Three ground posts are provided.

DEMO MANUAL DC1333A

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
DC1333A-A Required Circuit Components				
1	2	C1, C2	CAP., X7R, 0.1µF, 16V, 10%, 0603	AVX, 0603YC104KAT
2	1	J1	HEADER, 2×7 PIN, 0.079"	MOLEX, 87831-1420
3	3	R1, R2, R4	RES., CHIP, 4.99k, 1/16W, 1%, 0603	VISHAY, CRCW06034K99FKEA
4	1	U2	IC, 24LC025ST, TSSOP	MICROCHIP, 24LC025-I/ST
5	1	U1	IC, LTC2640-LM12#PBF, TSOT-23	LINEAR TECHNOLOGY, LTC2640-LM12#PBF
Hardware: For Demo Board Only				
1	7	E1-E7	TESTPOINT, TURRET, 0.095"	MILL-MAX, 2501-2-00-80-00-00-07-0
2	1	JP1	0.1" SINGLE ROW HEADER, 3-PIN	SAMTEC, TSW-103-07-L-S
3	1	JP1	SHUNT, 1" BLK	SAMTEC, SNT-100-BK-G
DC1333A-B Required Circuit Components				
1	2	C1, C2	CAP., X7R, 0.1µF, 16V, 10%, 0603	AVX, 0603YC104KAT
2	1	J1	HEADER, 2×7 PIN, 0.079"	MOLEX, 87831-1420
3	3	R1, R2, R4	RES., CHIP, 4.99k, 1/16W, 1%, 0603	VISHAY, CRCW06034K99FKEA
4	1	U2	IC, 24LC025ST, TSSOP	MICROCHIP, 24LC025-I/ST
5	1	U1	IC, LTC2640-LZ12#PBF, TSOT-23	LINEAR TECHNOLOGY, LTC2640-LZ12#PBF
Hardware: For Demo Board Only				
1	7	E1-E7	TESTPOINT, TURRET, 0.095"	MILL-MAX, 2501-2-00-80-00-00-07-0
2	1	R3	RES., CHIP, 4.99k, 1/16W, 1%, 0603	VISHAY, CRCW06034K99FKEA
DC1333A-C Required Circuit Components				
1	2	C1, C2	CAP., X7R, 0.1µF, 16V, 10%, 0603	AVX, 0603YC104KAT
2	1	J1	HEADER, 2×7 PIN, 0.079"	MOLEX, 87831-1420
3	3	R1, R2, R4	RES., CHIP, 4.99k, 1/16W, 1%, 0603	VISHAY, CRCW06034K99FKEA
4	1	U2	IC, 24LC025ST, TSSOP	MICROCHIP, 24LC025-I/ST
5	1	U1	IC, LTC2640-HM12#PBF, TSOT-23	LINEAR TECHNOLOGY, LTC2640-HM12#PBF
Hardware: For Demo Board Only				
1	7	E1-E7	TESTPOINT, TURRET, 0.095"	MILL-MAX, 2501-2-00-80-00-00-07-0
2	1	JP1	0.1" SINGLE ROW HEADER, 3-PIN	SAMTEC, TSW-103-07-L-S
3	1	JP1	SHUNT, 1" BLK	SAMTEC, SNT-100-BK-G
DC1333A-D Required Circuit Components				
1	2	C1, C2	CAP., X7R, 0.1µF, 16V, 10%, 0603	AVX, 0603YC104KAT
2	1	J1	HEADER, 2×7 PIN, 0.079"	MOLEX, 87831-1420
3	3	R1, R2, R4	RES., CHIP, 4.99k, 1/16W, 1%, 0603	VISHAY, CRCW06034K99FKEA
4	1	U2	IC, 24LC025ST, TSSOP	MICROCHIP, 24LC025-I/ST
5	1	U1	IC, LTC2640-HZ12#PBF, TSOT-23	LINEAR TECHNOLOGY, LTC2640-HZ12#PBF
Hardware: For Demo Board Only				
1	7	E1-E7	TESTPOINT, TURRET, 0.095"	MILL-MAX, 2501-2-00-80-00-00-07-0
2	1	R3	RES., CHIP, 4.99k, 1/16W, 1%, 0603	VISHAY, CRCW06034K99FKEA

SCHEMATIC DIAGRAM



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CONTRACT NO.		DATE	
DRAWN HELEN		9/12/07	
CHECKED		APPROVED	
ENGINEER Leo Chen		9/12/07	
DESIGNER		TITLE	
SIZE CAGE CODE		DWG NO	
DC1333A-A/B/C/D		REV	
SCALE:		FILENAME:	
Tuesday, September 23, 2008		SHEET 1 OF 1	

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.

Figure 3. LTC2640 Schematic Diagram

DEMO MANUAL DC1333A

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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