LTC2642A-16
16-Bit Unbuffered V_{OUT} DAC

DESCRIPTION

Demonstration circuit 1096B features the LTC®2642A-16, a 16-bit voltage output DAC. The LTC2642A-16 output is unbuffered, allowing it to swing all the way to the supply rails.

DC1096B is a member of Linear Technology's QuikEval™ family of demonstration boards. It is designed to allow easy evaluation of the LTC2642A-16 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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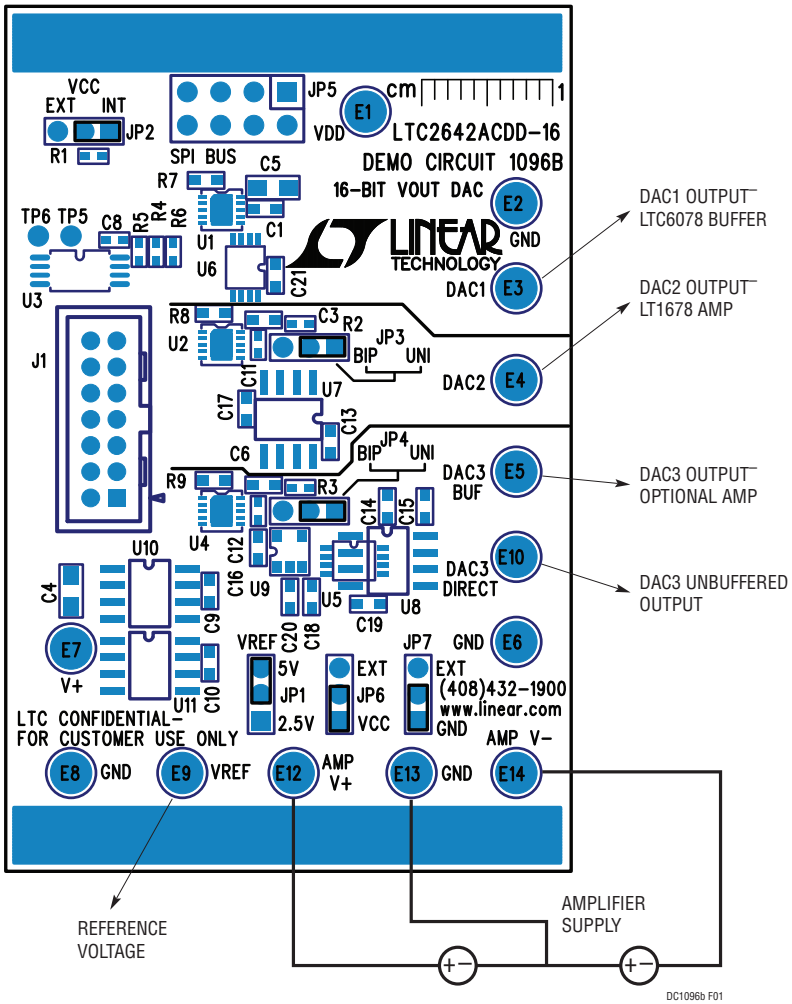


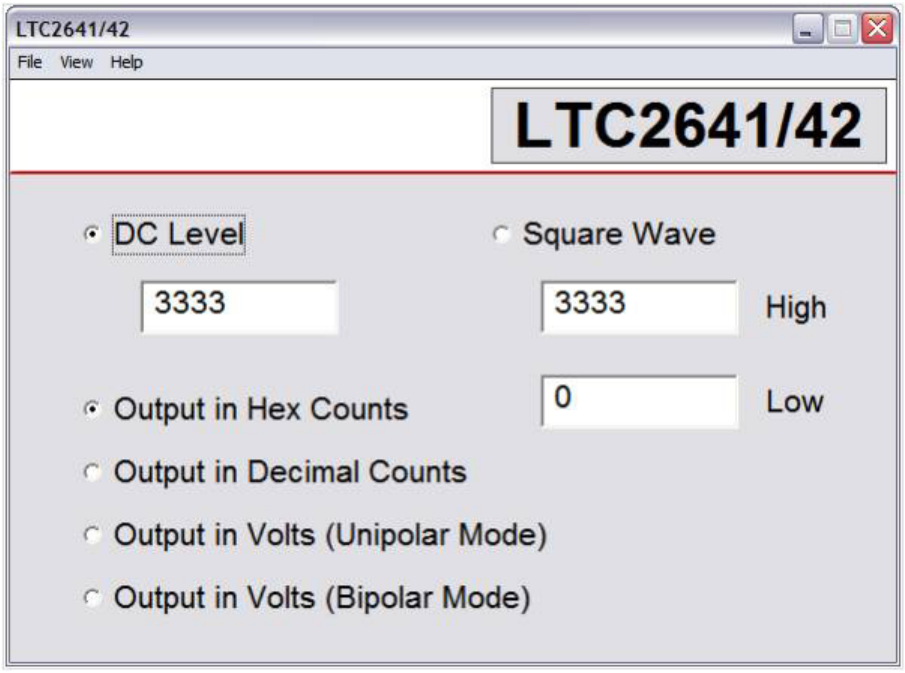
Figure 1. Connection Diagram

QUICK START PROCEDURE

Connect DC1096B 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 www.linear.com/software. The correct program will be loaded automatically. By default, the control program will load a DC value into the LTC2642A-16. The value may be changed by typing hexadecimal counts (0000 - FFFF), or decimal counts (0 – 65535), or the voltage desired depending on the option selected. Setting the software to unipolar or bipolar will not set the hardware to bipolar mode. The jumpers need to be placed in their proper positions in order to accomplish this.

The other option is a square wave output. The frequency of the square wave is not tightly controlled; it is intended to allow measurement of settling time and glitch impulse.

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



HARDWARE SETUP

POWER CONNECTIONS

A low noise, bipolar power supply can be connected to the AMPV$^+$, AMPV$^-$, and GND turret posts.

If an external supply is connected, the respective jumpers must be placed in the EXT position.

This provides power to the LT1678 amplifier and optional amplifiers U5, U8, or U9. The LT1678 will work with supplies as high as ±15V, consult the data sheet for supply limitations on any optional amplifiers that are installed.

JUMPERS

JP1: Select the source for REF$^+$, either 2.5V or 5V from the onboard LT1019 or LT1236 reference (default – 5V)

JP2: Select the V_{CC} source, either provided by a connected DC590 or an external source.

JP3: Sets DAC2 to either unipolar or bipolar mode. JP7 may also need to be modified in order to provide the proper behavior.

JP4: Sets DAC3 to either unipolar or bipolar mode. JP7 may also need to be modified in order to provide the proper behavior.

JP6: Sets V$^+$ for the amplifiers to either external (AMP V$^+$) or V_{CC}.

JP7: Sets V$^-$ for the amplifiers to either external (AMP V$^-$) or ground.

CONNECTION TO DC590 SERIAL CONTROLLER

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

OUTPUT CONNECTIONS

E3 is the output from U1, which is buffered by an LTC6078 op amp.

E4 is the output from U2, which is buffered by an LT1678 op amp. JP3 allows this DAC to be configured for either unipolar or bipolar operation.

E5 is the buffered output of U4, if an optional amplifier is installed. There are three standard op amp footprints that allow other amplifiers to be evaluated.

E10 is directly connected to U4's output.

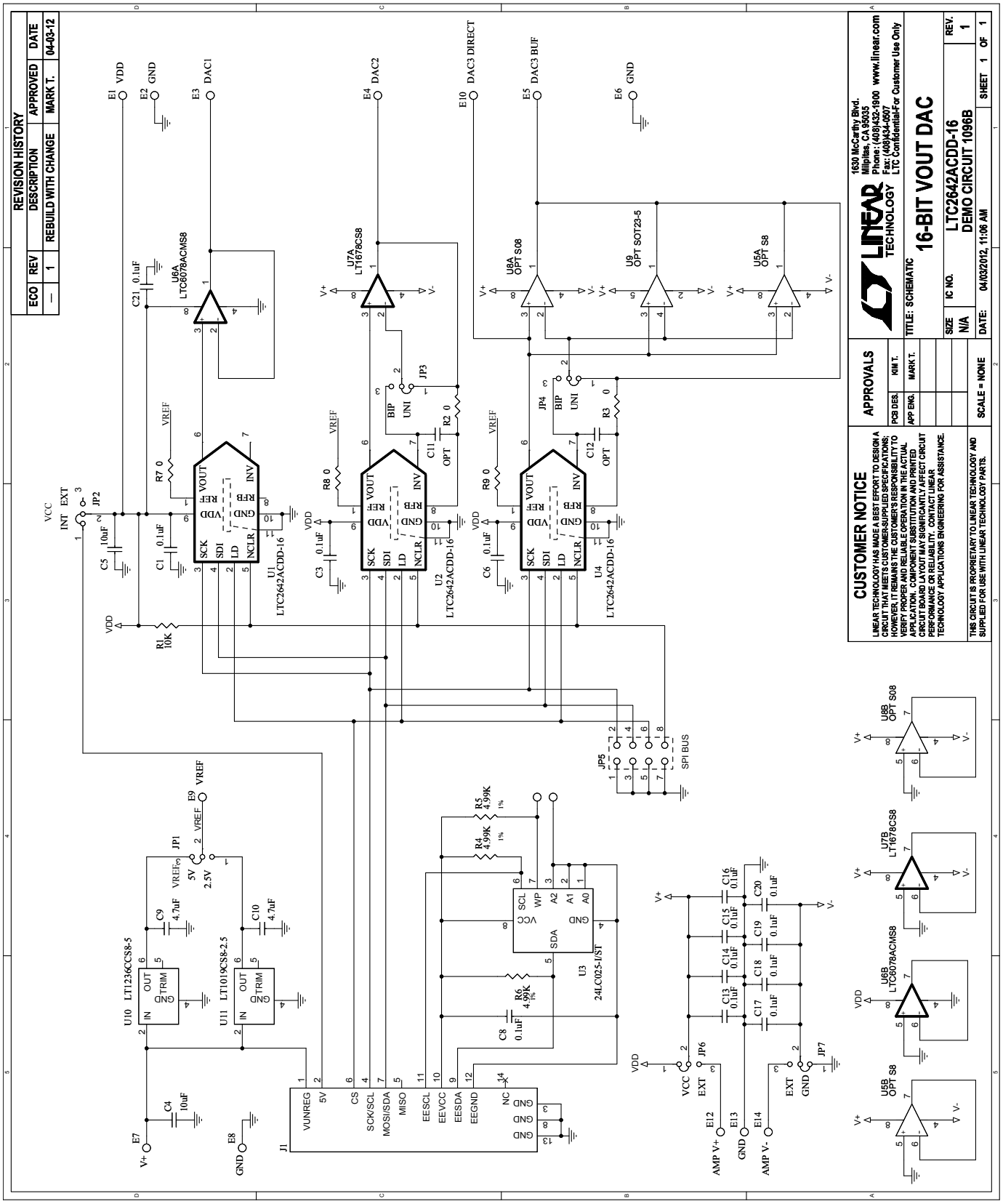
REFERENCE CONNECTIONS

JP1 selects between the onboard 5V reference and the onboard 2.5V reference. The reference voltage can be monitored on E9, or an external reference may be applied to E9 if JP1 is removed.

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
1	12	C1, C3, C6, C13 TO C21	CAP, 0603 0.1µF 10% 25V X7R	AVX 06033C104KAT
2	2	C4, C5	CAP, 0805 10µF 20% 10V X5R	TAIYO YUDEN LMK212BJ106MG-T
3	1	C8	CAP, 0402 0.1µF 20% 16V X7R	TDK C1005X7R1C104M
4	2	C10, C9	CAP, 0603 4.7µF 20% 6.3V X5R	TDK C1608X5R0J475MT
5	0	C11, C12	CAP, 0402 OPTION	TDK C1005X7R1E103K
6	13	E1 TO E10, E12 TO E14	TURRET	MILL-MAX 2308-2-00-80-00-00-07-0
7	6	JP1 TO JP4, JP6, JP7	HEADER, 3PIN 2mm	SAMTEC TMM-103-02-L-S
8	1	JP5	HEADER, 2X4 0.100 CENTERS	SAMTEC TSW-104-07-L-D
9	1	J1	HEADER, 2X7 2mm	MOLEX 87831-1420
10	1	R1	RES, 0402 10k 5% 1/16W	VISHAY CRCW0402103JNED
11	2	R3, R2	RES, 0402 0Ω JUMPER	VISHAY CRCW04020000Z0ED
12	3	R4, R5, R6	RES, 0402 4.99k 1% 1/16W	VISHAY CRCW04024K99FKED
13	3	R7, R8, R9	RES, 0603 0Ω JUMPER	VISHAY CRCW0603000Z0EA
14	3	U1, U2, U4	IC, LTC2642ACDD-16	LINEAR TECHNOLOGY LTC2642ACDD-16
15	1	U3	IC, 24LC025-I/ST	MICROCHIP TECH 24LC025-I/ST
16	0	U5, U8, U9	IC, OPTION	OPTION
17	1	U6	IC, LTC6078ACMS8	LINEAR TECHNOLOGY LTC6078ACMS8
18	1	U7	IC, LT1678CS8#PBF	LINEAR TECHNOLOGY LT1678CS8#PBF
19	1	U10	IC, VOLTAGE REG 5V	LINEAR TECHNOLOGY LT1236CCS8-5#PBF
20	1	U11	IC, VOLTAGE REG 2.5V	LINEAR TECHNOLOGY LT1019CS8-2.5#PBF
21	6	JP1 TO JP4, JP6, JP7	SHUNT	SAMTEC 2SN-BK-G
22	1	JP5	SHUNT, 0.100	SAMTEC SNT-100-BK-G

SCHEMATIC DIAGRAM



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