LTC2754-16
Quad 16-Bit SoftSpan
I_{OUT} DAC

DESCRIPTION

Demonstration circuit 1546A features the LTC2754-16 dual 16-bit SoftSpan™ I_{OUT} DAC. This device features six output ranges: 0V to 5V, 0V to 10V, ±5V, ±10V, ±2.5V, and –2.5V to 7.5V. The DAC has offset adjustment and gain-adjustment pins to allow optimization of transient response.

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

BOARD PHOTO

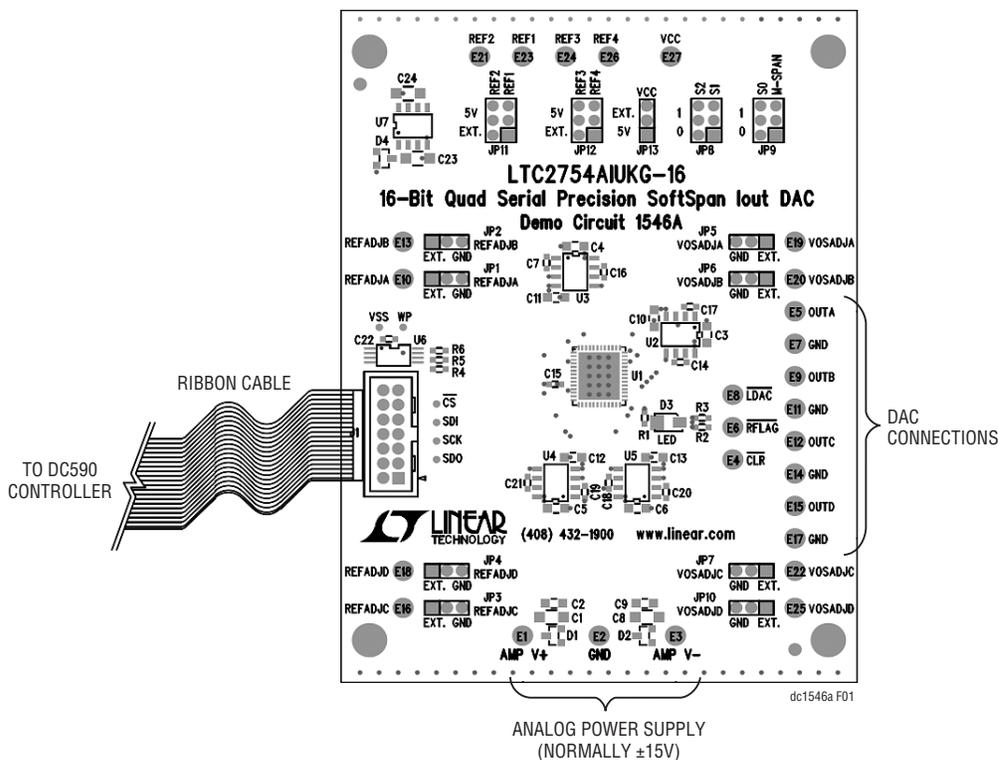
Figure 1. DC1546A Connection Diagram

QUICK START PROCEDURE

1. Connect a clean ±15V power supply to the AMPV⁺ and AMPV⁻ turret posts at the bottom of the DC1546A board.

2. Connect J1 to a DC590 USB serial controller using the supplied 14-conductor ribbon cable.

3. Connect the DC590 to a host PC with a standard USB A/B cable.

4. Run the QuikEval™ evaluation software supplied with the DC590 or download it from www.linear.com/software. The correct control panel will be loaded automatically.

The software automatically sets the LTC2754-16 outputs according to the entries in the control panel. A square wave option is available to test settling time. The MSPAN jumper should be low if software span control is desired.

Additional software documentation may be available from the Help menu item, as features may be added periodically.
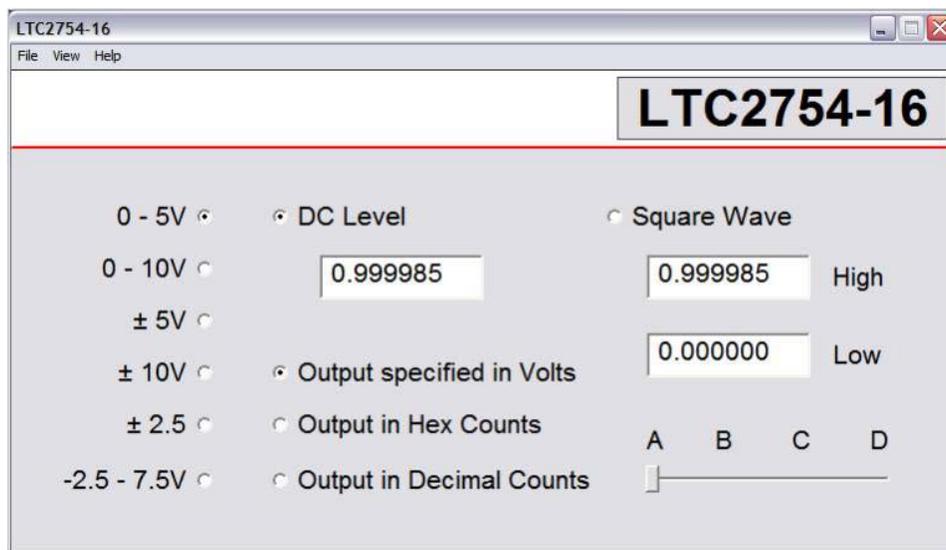

Figure 2. QuikEval Software Screenshot

HARDWARE SETUP

JUMPERS

MSPAN: Manual Span Control Pin. MSPAN is used to configure the LTC2754-16 for operation in a single, fixed output range. If MSPAN is high it will be configured for single span use. If MSPAN is low it will be set through the QuikEval software. The default position is 0 (low).

S0, S1, S2: Used to set the fixed output range if MSPAN is high. Default is all jumpers removed, allowing software span control.

S2	S1	S0	SPAN
0	0	0	Unipolar 0V to 5V
0	0	1	Unipolar 0V to 10V
0	1	0	Bipolar –5V to 5V
0	1	1	Bipolar –10V to 10V
1	0	0	Bipolar –2.5V to 2.5V
1	0	1	Bipolar –2.5V to 7.5V

Codes not shown are reserved and should not be used.

VREF: Voltage reference selection for the DAC, either 5V for the onboard LT1236 reference or EXT if an external reference source is connected to the VREF turret post.

VOSA, VOSB, VOSC,VOSD: Offset adjustment selection for DACA, DACB, DACC, DACD. If no offset adjustment is required, select GND. Selecting EXT connects the offset pin to the turret allowing external adjustment of offset.

REFADJA, REFADJB, REFADJC, REFADJD: Gain-adjustment selection for each associated DAC. If no gain-adjustment is required, select GND. Selecting EXT connects the gain pin to the turret allowing external adjustment of gain.

VCC: Select source for 5V V_{CC} supply. Set to 5V for supply by onboard LT1236 reference (recommended). Set to REG to be supplied by regulated supply from the DC590 controller and remove the jumper to supply externally.

ANALOG CONNECTIONS

OUTA, OUTB, OUTC, OUTD: DAC Voltage Outputs.

VREF: DAC Reference Voltage. If the onboard LT1236 references are selected, the voltage may be measured at these points. If a remote reference is selected, then an external reference must be applied to these points.

VOSA, VOSB, VOSC, VOSD: DAC Offset Adjust Input. Use only if the VOSA/VOSB/VOSC/VOSD jumper is set to EXT. Nominal input range is ±5V.

REFADJA, REFADJB, REFADJC, REFADJD: Gain-adjust input for each associated DAC. This control input can be used to null gain error or to compensate for reference errors. Only used if the associated REFADJ jumper is set to EXT.

DIGITAL CONNECTIONS (TURRET POSTS)

CLR: Asynchronous Clear Pin. Pulled high through a 10k on the board but can be driven low to clear all DAC registers.

RFLAG: Reset Flag Pin. Active low output.

LDAC: Asynchronous DAC Load Input. Pulled high through a 10k on the board, but can be driven low to update all DAC registers

GROUNDING AND POWER CONNECTIONS

Analog Power: The 15V, –15V and GND turret posts are the analog supplies for the internal DAC amplifiers. These should be connected to a well regulated, low noise power supply.

VCC: Connection to V_{CC}. See the schematic and description for the VCC jumper.

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
DC1546A Required Circuit Components				
1	4	C7, C14, C20, C21	CAP., X7R, 150pF, 50V, 10%, 0603	AVX, 06035C151KAT2A
2	4	C16, C17, C18, C19	CAP., COG, 27pF, 50V, 10%, 0603	AVX, 06035A270KAT2A
3	2	C15, C22	CAP., X7R, 0.1µF, 25V, 20%, 0603	TDK, C1608X7R1E104M
4	10	C1-C6, C8, C9-C13	CAP., X5R, 0.1µF, 50V, 20%, 0805	TDK, C2012X7R1H104M
5	4	C1, C8, C23, C24	CAP., X5R, 10µF, 16V, 20%, 1206	TDK, C3216X5R1C106M
6	0	C7, C14, C16-C21	OPT.	
7	3	D1, D2, D4	DIODE, SCHOTTKY, SOT23	DIODES INC., BAT54C-7-F
8	1	D3	LED, SMT GREEN	PANASONIC, LN1351C-(TR)
9	27	E1-E27	TESTPOINT, TURRET, 0.064"	MILL-MAX, 2308-2
10	0	TP1-TP6	OPT.	
11	9	JP1-JP7, JP10, JP13	JMP, 3-PIN, 1 ROW, 0.079"	SAMTEC, TMM-103-02-L-S
12	4	JP8, JP9, JP11, JP12	JMP, 2×3, 0.079"	SAMTEC, TMM-103-02-L-D
13	17	JP1-JP7, JP10, JP13,	SHUNT, 0.079" CENTER	SAMTEC, 2SN-BK-G
		(JP8, JP9, JP11, JP12 = 2 EA.)		
14	1	J1	HEADER, 2×7PIN, 0.079"	MOLEX, 87831-1420 (PBF)
15	3	R4-R6	RES., CHIP, 4.99k, 1/16W, 1%, 0603	VISHAY, CRCW06034K99FKED
16	3	R1-R3	RES., CHIP ,10k, 1/16W, 5%, 0603	VISHAY, CRCW060310K0FKED
17	1	U1	I.C., LTC2754AIUKG-16, QFN52UKG	LINEAR TECHNOLOGY, LTC2754AIUKG-16
18	4	U2-U5	I.C., LT1469CS8, SO8	LINEAR TECHNOLOGY, LT1469CS8
19	1	U7	I.C., LT1236ACS8-5, SO8	LINEAR TECHNOLOGY, LT1236ACS8-5
20	1	U6	I.C., SERIAL EEPROM, TSSOP8	MICROCHIP, 24LC025-I /ST
21	4	FOR 4 CORNERS	STAND-OFF, NYLON (SNAP-ON), 0.625" TALL	KEYSTONE, 8834

SCHEMATIC DIAGRAM

Figure 3. LTC2754-16 Schematic Diagram

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