DESCRIPTION

Demonstration circuit 1397 features the LTC2656 Octal 16 bit DAC. This device establishes a new board-density benchmark for 16 bit DACs and advances performance standards for output drive, crosstalk and load regulation in single supply, voltage-output multiple DACs.

DC1397 has many features for evaluating the performance of the LTC2656. Onboard 2.5 volt and 1.25 volt precision references are provided.

Another feature of this board is the onboard LTC2428 20 bit ADC for monitoring DAC output voltage. The 16ppm total error of this device is adequate for taking meaningful measurements of various LTC2656 parameters.

Design files for this circuit board are available. Call the LTC factory.

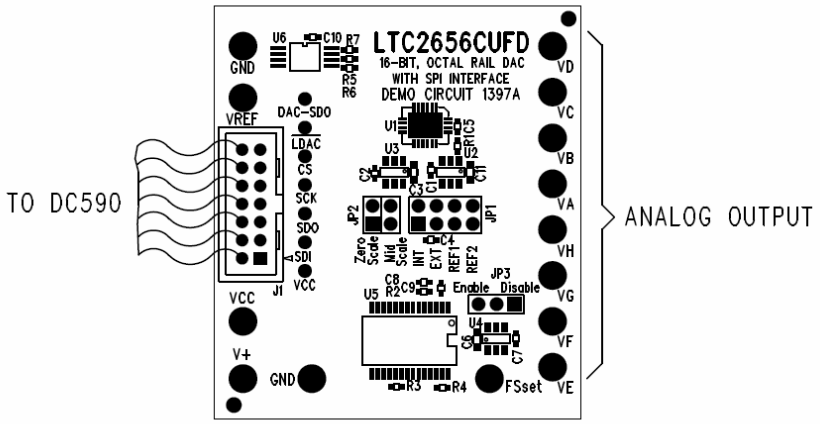


Table 1.LTC2656 Performance Summary

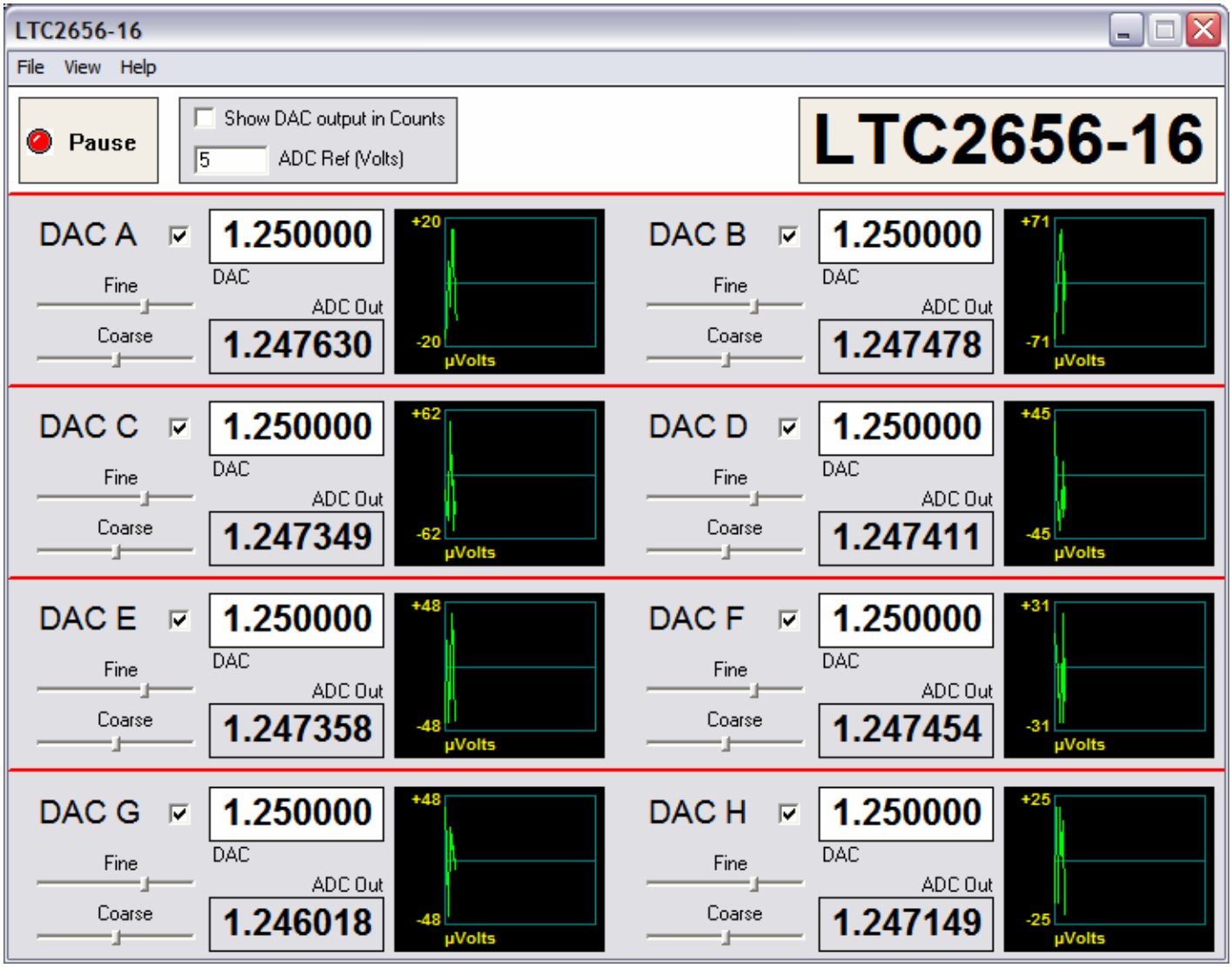
PARAMETER	CONDITION	VALUE
Resolution		16 BITS
Monotonicity	Vcc = 5V, Vref = 4.096V	16 BITS
Differential Nonlinearity	Vcc = 5V, Vref = 4.096V	+/-1 LSB
Integral Nonlinearity	Vcc = 5V, Vref = 4.096V	+/-12 LSB Typical
Load Regulation	Vcc = Vref = 5V, Midscale Iout = +/- 15 mA	2 LSB/mA Max
DC Crosstalk	Due to load current change on any other channel	3.5 µV/mA

Demoboard Type	LTC2656 Variation	Full Scale
A	L	2.5V
B	H	4.096V

QUICK START PROCEDURE

Connect DC1397 to a DC590 USB serial controller using the supplied 14 conductor ribbon cable. Connect DC590 to a host PC with a standard USB A/B cable. Run the evaluation software supplied with DC590 or download it from www.linear.com. The correct control panel will be loaded automatically. Click the COLLECT button to begin outputting codes to the DACs and reading back the resulting output voltage for each DAC.

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



HARDWARE SET-UP

JUMPERS

JP1 – Vref Select. Either a 2.5 volt internal or 1.25 volt on-board reference can be selected. To apply an external reference through the Vref Turret, set jumper to EXT.

JP2 – Power Up Mode. The LTC2656 can be set to either power up in Mid Scale or Zero Scale.

JP3 – ADC Disable. Set to ON for normal operation, with the onboard ADC enabled. For very sensitive noise measurements, the ADC may be disabled. The software will then display a positive full-scale reading.

ANALOG CONNECTIONS

DAC outputs – The eight DAC outputs from the LTC2656 are brought out to turrets labeled DAC A through DAC H. These may be connected to external instruments or other circuitry.

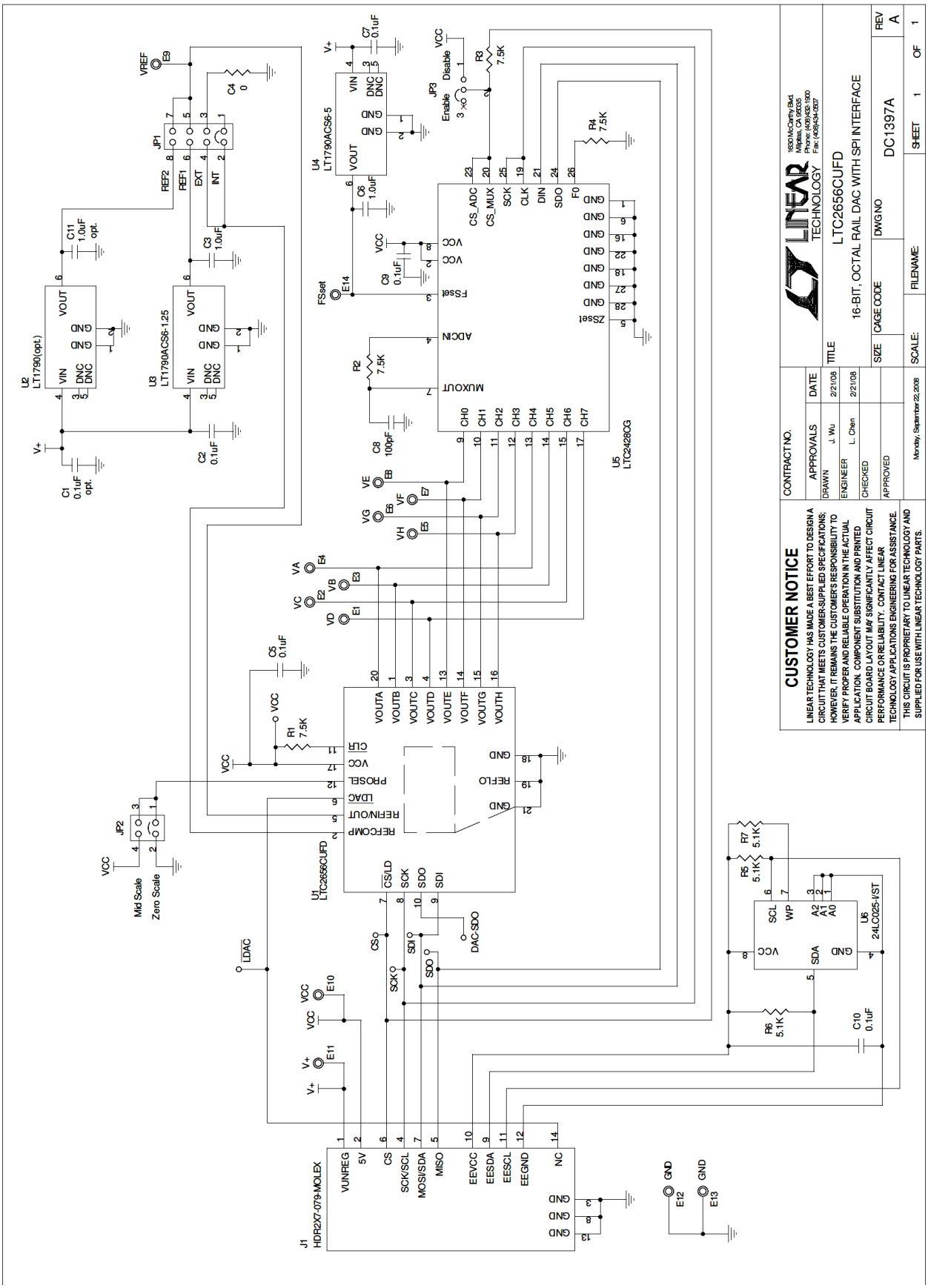
NOTE: DAC outputs are not in alphabetical order on the circuit board.

Vref – The Vref turret is connected directly to the reference terminals of the LTC2656 and LTC2428 ADC. When one of the onboard reference is being used, the reference voltage may be monitored at this point. An external reference may also be applied to this turret after removing JP2.

GROUNDING AND POWER CONNECTIONS

Power (Vcc) – Normally DC1397 is powered by the DC590 controller. Vcc can be supplied to this turret, however the power supply on DC590 must be disabled! Refer to DC590 Quick Start Guide for more details on this mode of operation.

Grounding – Separate power and signal grounds are provided. Any large currents drawn from the DAC outputs should be returned to power ground. Also, if an external power supply is connected, power ground should be used. Signal ground is connected to the exposed ground planes at the top and bottom edges of the board, and to the two turrets labeled “Gnd.” Use signal ground as the reference point for measurements and connections to external circuits.


LINEAR TECHNOLOGY
LTC2656CUFD
16-BIT, OCTAL RAIL DAC WITH SPI INTERFACE
DC1397A
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