

# LTC2461: 16-BIT, Single-Ended, $\Delta\Sigma$ ADC WITH I<sup>2</sup>C INTERFACE

## DESCRIPTION

Demonstration circuit 1491A features the LTC2461, a 16 bit high performance  $\Delta\Sigma$  analog-to-digital converter (ADC) with an I<sup>2</sup>C interface. The input is single-ended with a range of 0 to REF. The modulator's proprietary sampling technique reduces the average input current to less than 50nA—orders of magnitude lower than typical delta sigma ADCs.

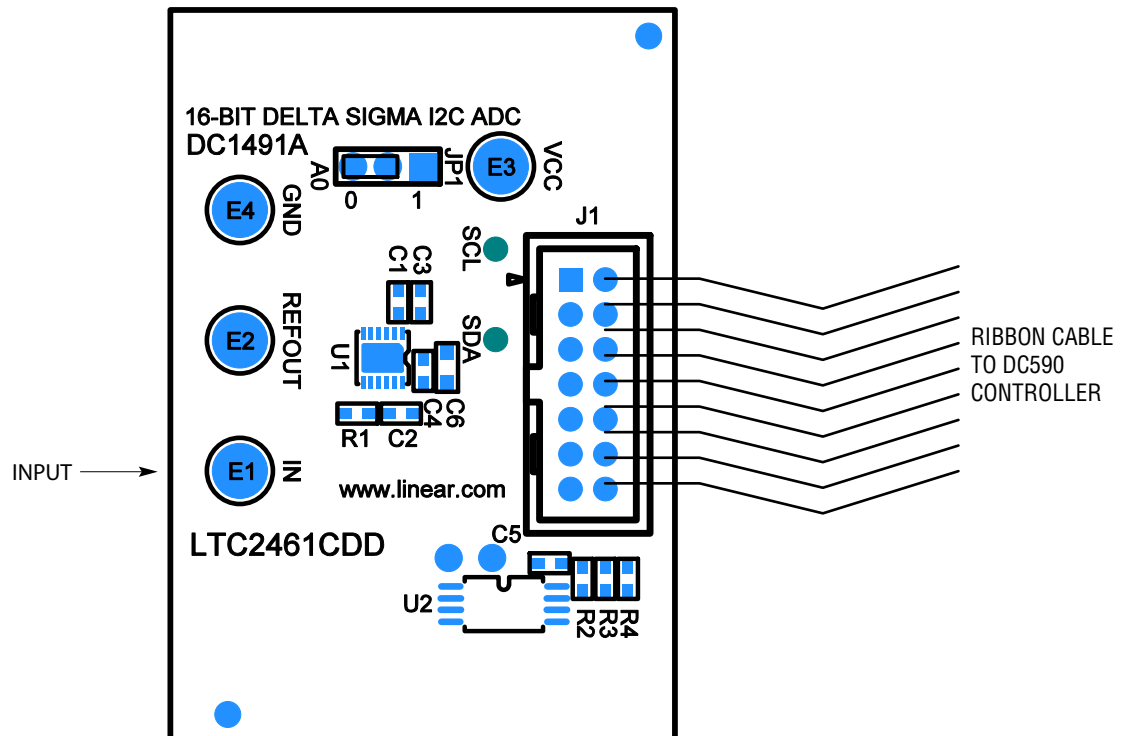
DC1491A is a member of Linear Technology's QuikEval family of demonstration boards. It is designed to allow easy evaluation of the LTC2461 and may be connected directly to the target application's analog signals while using the

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 [www.linear.com/demo](http://www.linear.com/demo).**

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Figure 1. Proper Measurement Equipment Setup



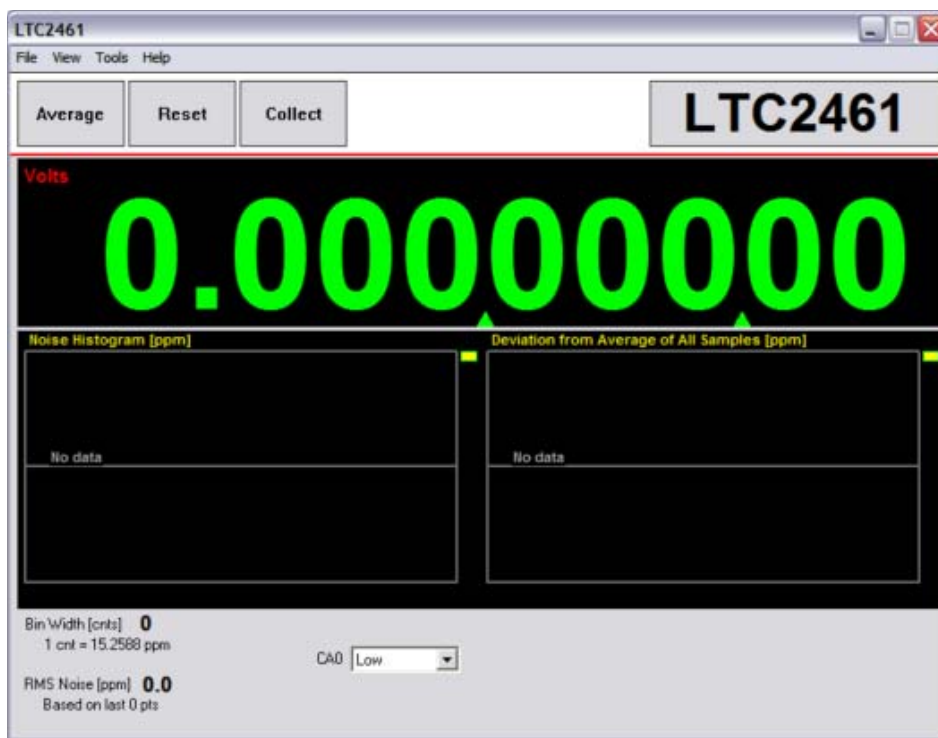
## QUICK START PROCEDURE

Connect DC1491A 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 <http://www.linear.com/software>. The correct program will be loaded automatically. Click the COLLECT button to start

reading the input voltage. Details on software features are documented in the control panel's help menu.

Tools are available for logging data, changing reference voltage, changing the number of points in the strip chart and histogram, and changing the number of points averaged for the DVM display.

Figure 2. Software Screenshot



## HARDWARE SET-UP

### CONNECTION TO DC590 SERIAL CONTROLLER

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

### ANALOG CONNECTIONS

Analog signal connections are made via the row of turret posts along the edge of the board. Also, when connecting the board to an existing circuit the exposed ground planes along the edges of the board may be used to form a solid connection between grounds.

**GND:** This turret is connected directly to the internal ground planes.

**V<sub>CC</sub>:** This is the supply and reference voltage for the ADC. Do not draw any power from this point.

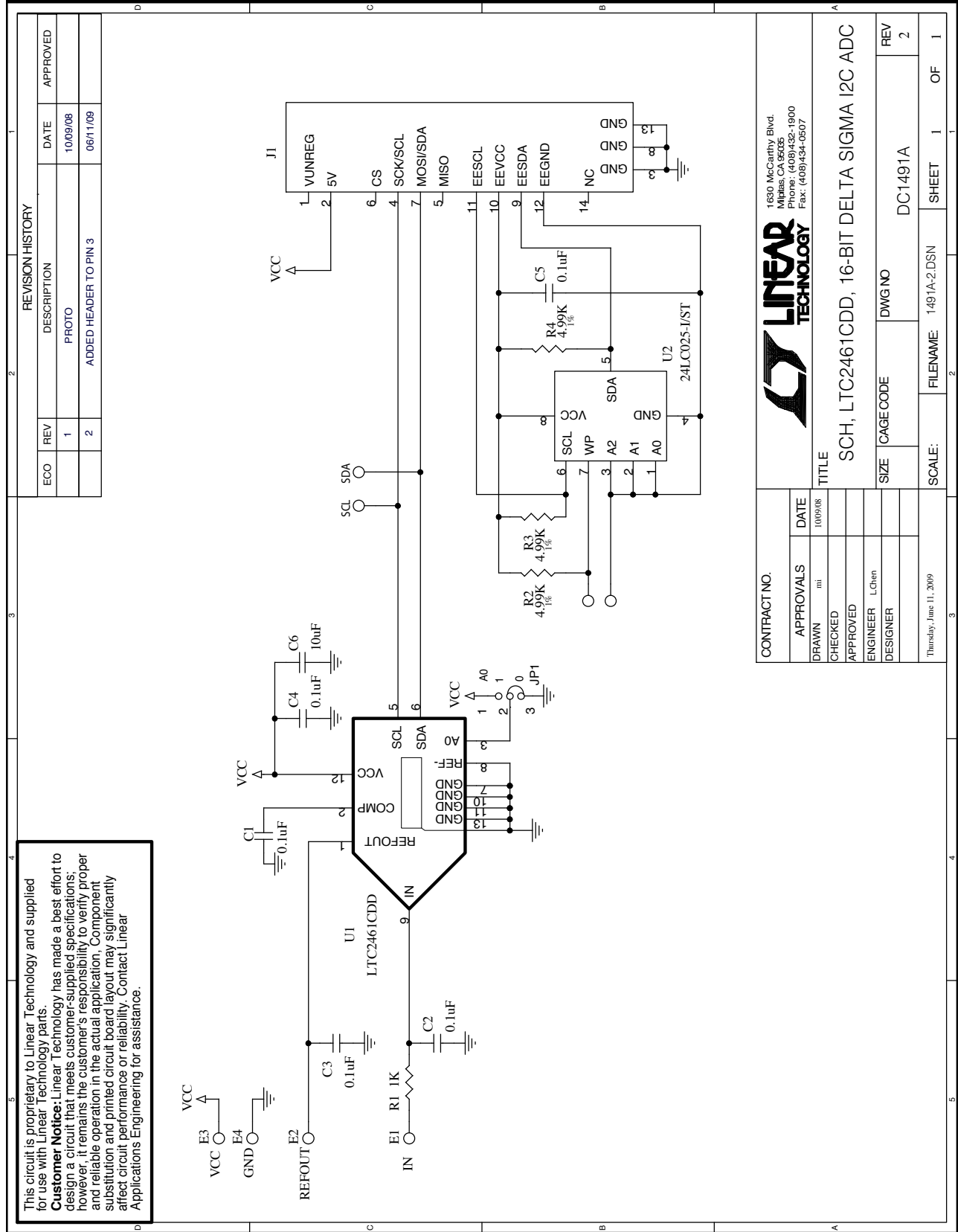
**IN:** This is the positive input to the ADC.

**REFOUT:** This turret is used as the reference voltage for the LTC2461.

## PARTS LIST

ITEM	QUANTITY	REFERENCE-DESCRIPTION	DESCRIPTION	MANUFACTURER'S PART NUMBER
1	5	C1, C2, C3, C4,C5	CAP, 0402 0.1 $\mu$ F 20% 16V X7R	TDK C1005X7R1C104M
2	1	C6	CAP, 0603 10 $\mu$ F 10% 6.3V X5R	MURATA GRM188R60J106ME47D
3	4	E1, E2, E3, E4	TURRET	MILL MAX 2308-2
4	1	JP1	HEADER,3-PIN, 2mm	SAMTEC TMM-103-02-L-S
5	1	J1	HEADER, 2 $\times$ 7 2mm	MOLEX 87331-1420
6	1	R1	RES, 0402 1k OHMS 5% 1/16W	VISHAY CRCW0402102JNED
7	3	R2, R3, R4	RES, 0402 4.99k OHMS 1% 1/16W	VISHAY CRCW04024K99FKED
8	1	U1	IC, 16-BIT DELTA SIGMA I <sup>2</sup> C ADC WITH INTEGRATED PRECISION REFERENCE	LINEAR TECH. LTC2461CDD
9	1	U2	IC, IC SERIAL EEPROM 2k	MICROCHIP TECH. 24LC025-I/ST
10	1	JP1	SHUNT, 2mm	SAMTEC 2SN-BK-G

## SCHEMATIC DIAGRAM



# SCHEMATIC DIAGRAM

REVISIONS			
REV	DESCRIPTION	APPR	DATE
2	ADDED HEADER TO PIN 3, MOVED E2 AND JP1	LC	08/12/09

L1 - COMPONENT SIDE  
L2 - GND  
L3 - GND  
L4 - BOTTOM

TOP  
BOTTOM

LAYER CONSTRUCTION

**NOTES: UNLESS OTHERWISE SPECIFIED**

- FAB PER IPC-A-600
- MATERIAL: EPOXY FIBERGLASS, NEMA GRADE FR-4  
-FINISHED THICKNESS SHALL BE 1.6 +/- 0.1mm  
-TOTAL OF 4 LAYERS WITH 2 OZ. CU ON THE OUTER LAYERS AND 1 OZ. CU ON THE INNER LAYERS.  
-FLAMMABILITY RATING: 94 V-0 MINIMUM.
- SIZE: CUT TO DIMENSIONS AND TOLERANCES SHOWN.  
0.00" ARE PRIMARY DATUMS.
- DRILLING: DRILL HOLES PER SCHEDULE PLATE THROUGH HOLES WITH COPPER, 0.001" THICK MIN.  
ALL HOLE SIZES ARE SPECIFIED AFTER PLATING.  
HOLE LOCATION TOLERANCES ARE +/-0.08mm IN RELATION TO CENTER  
-GOLD IMMERSION BOTH SIDES.
- FINISH: -SMORC USING LPI BOTH SIDES, COLOR GREEN.  
-FOR SILKSCREEN: BOTH SIDES USE WHITE NON-CONDUCTIVE INK  
-DO NOT ALTER ARTWORK e.g. TO ADD LOGO OR DATE CODE.  
PAD SIZE CAN BE MODIFIED TO MEET END FINISH.
- PCBS SHALL BE RoHS COMPLIANT.
- SCORING FOR PANELIZED PCB:

9. DIMENSIONS ARE IN MILLIMETERS  
TOLERANCES ON ANGLE ±1°  
.XX ± 0.25  
.XXX ± 0.127

SIZE	QTY	SYM	PLATED	TOL
0.25	54	+	YES	+/-0.08
0.9	21	X	YES	+/-0.08
1.6	4	□	YES	+/-0.13
1.8	2	⊗	NO	+/-0.13

APPROVALS		INITIAL	DATE
DRAWN			
CHECK			
DESIGN	MI	10/09/08	
ENGR	LC	08/12/09	

SCALE = NONE

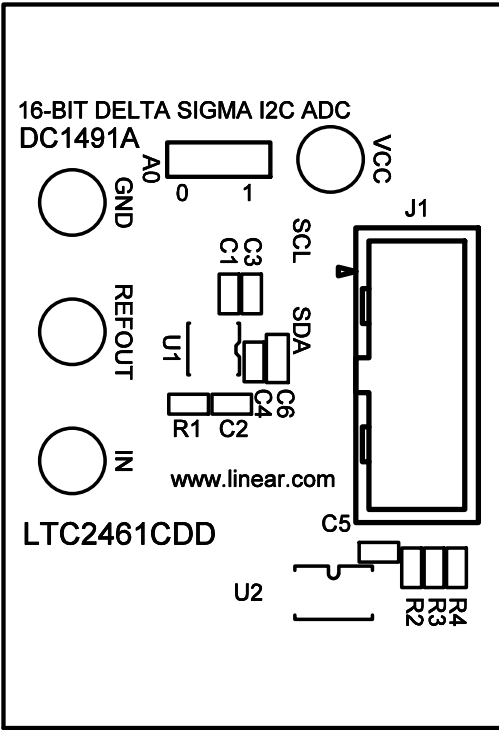
165 MCCARTHY BLVD  
MILWAUKEE, WI 53219  
TEL: (414)334-1000  
LTC CONFIDENTIAL - FOR CUSTOMER USE ONLY

TITLE: FABRICATION DRAWING: LTC2461CDD,  
16-BIT DELTA SIGMA I2C ADC

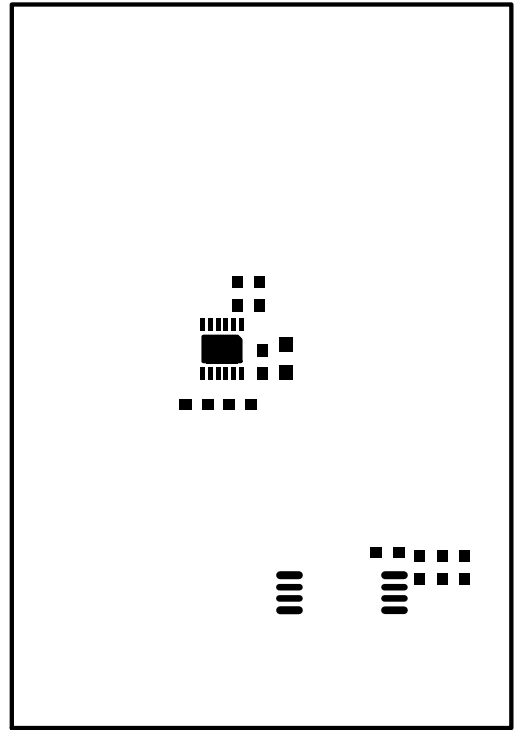
SIZE	DEMO DC1491A	REV	2
SCALE = NONE		SHT 1 of 1	

## PCB LAYOUT AND FILM

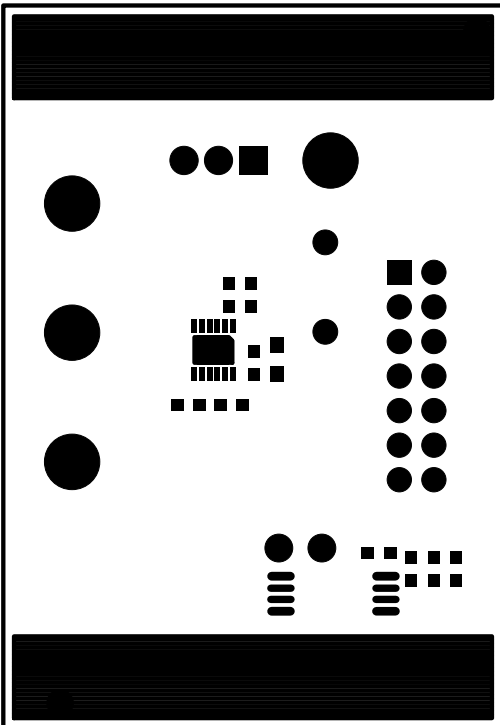
Top Silkscreen



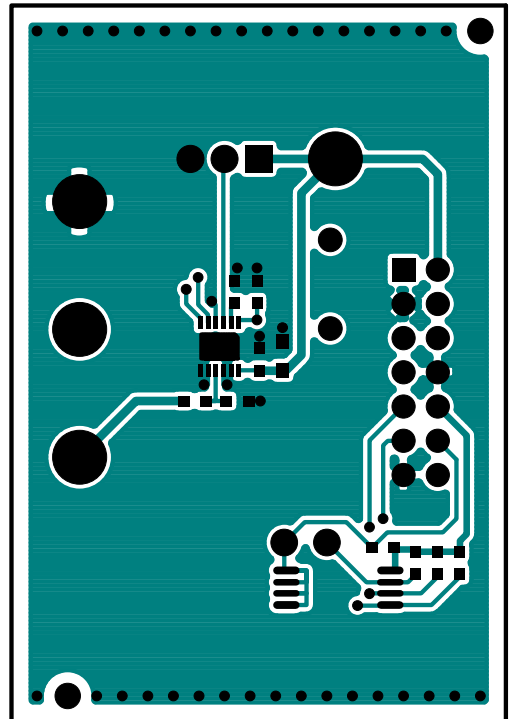
Top Paste



Top Soldermask

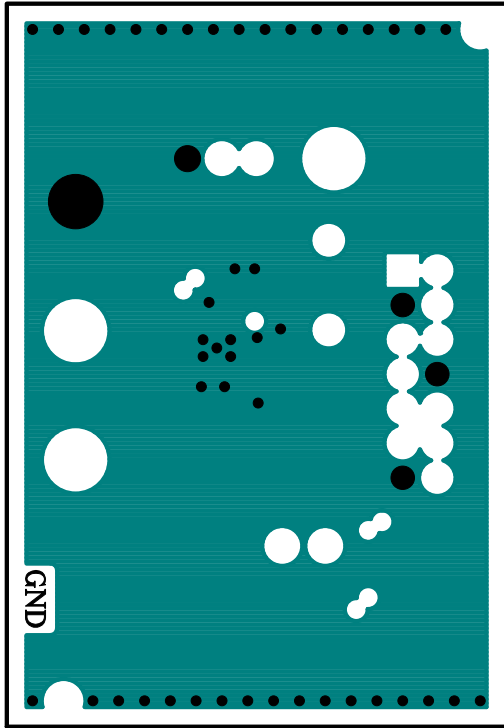


L1 Component Side

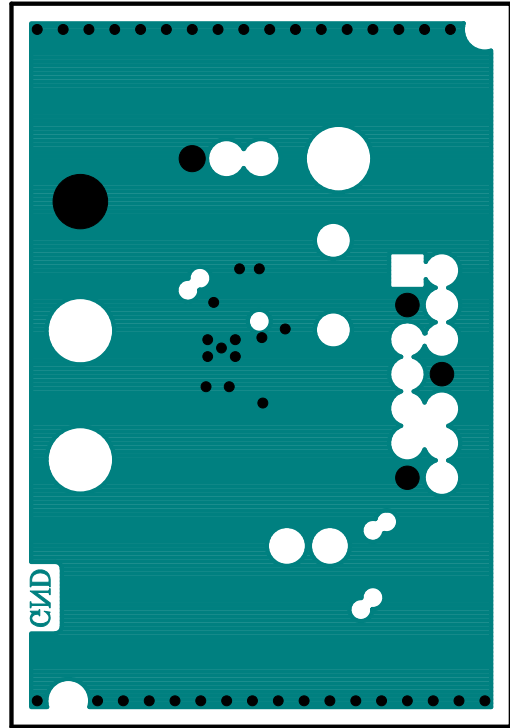


# PCB LAYOUT AND FILM

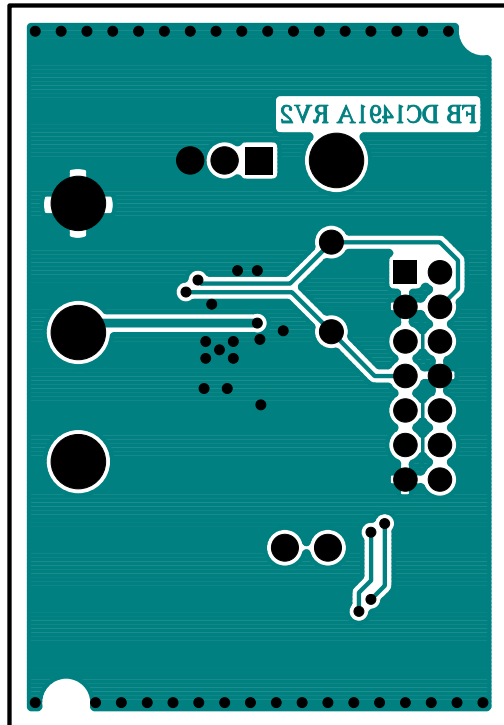
Top Silkscreen



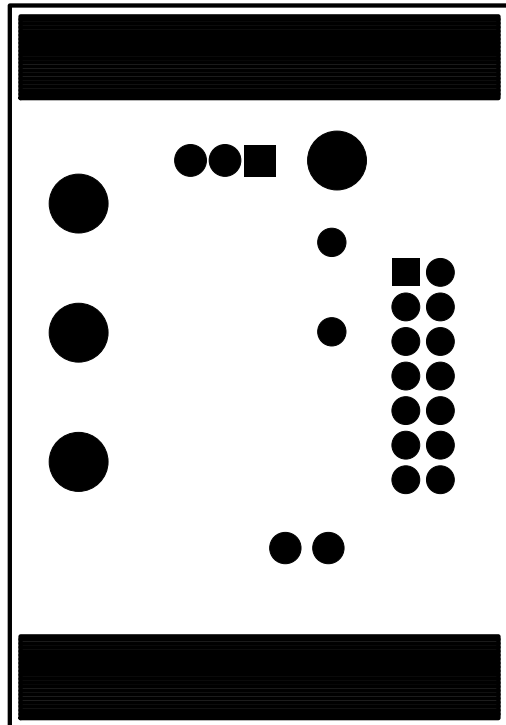
Top Paste



Top Soldermask



L1 Component Side



# DEMO MANUAL DC1491A

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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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