

# 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.

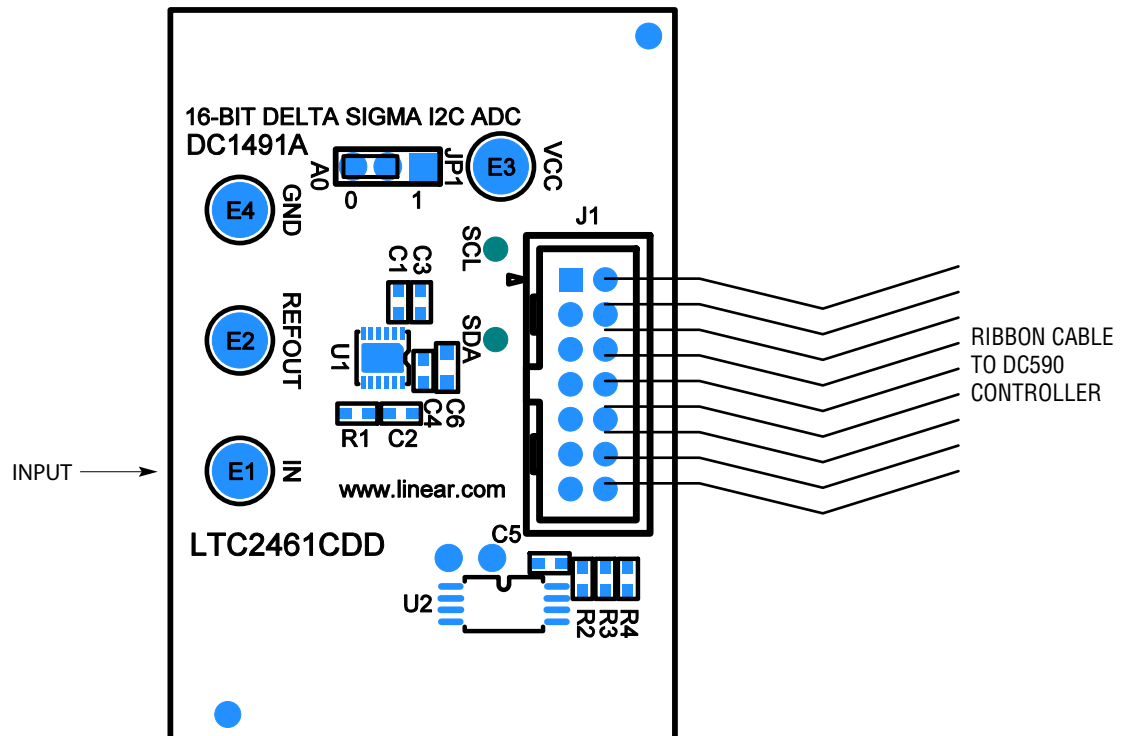
DC1491A is a member of Linear Technology's QuikEval family of demonstration boards. It is designed to allow easy evaluation of the LTC2461 and may be connected directly to the target application's analog signals while using the

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



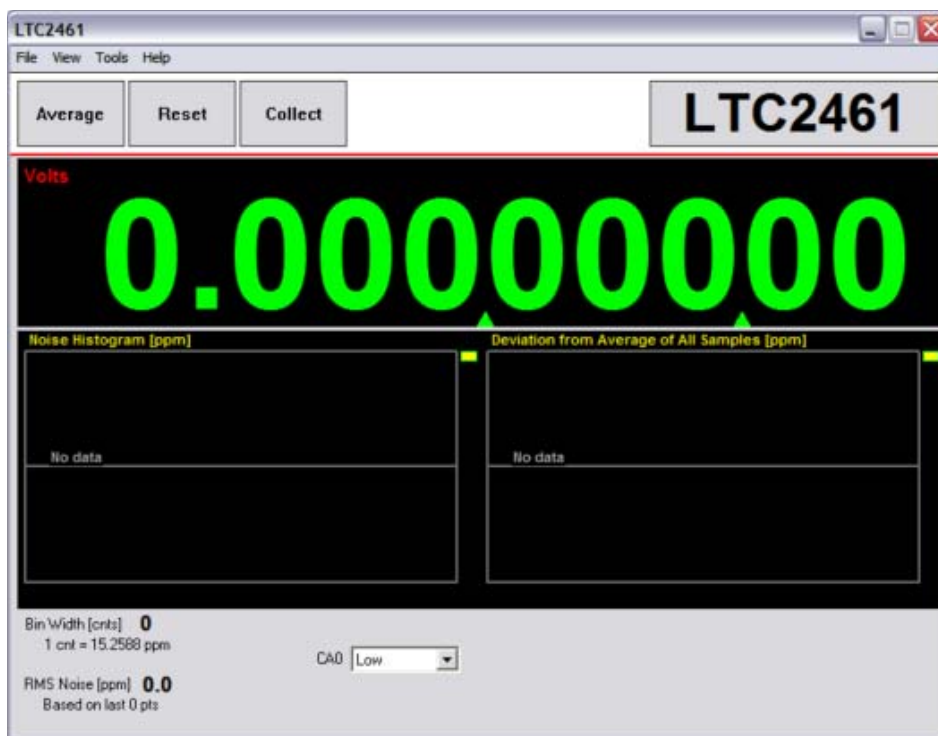
## QUICK START PROCEDURE

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.

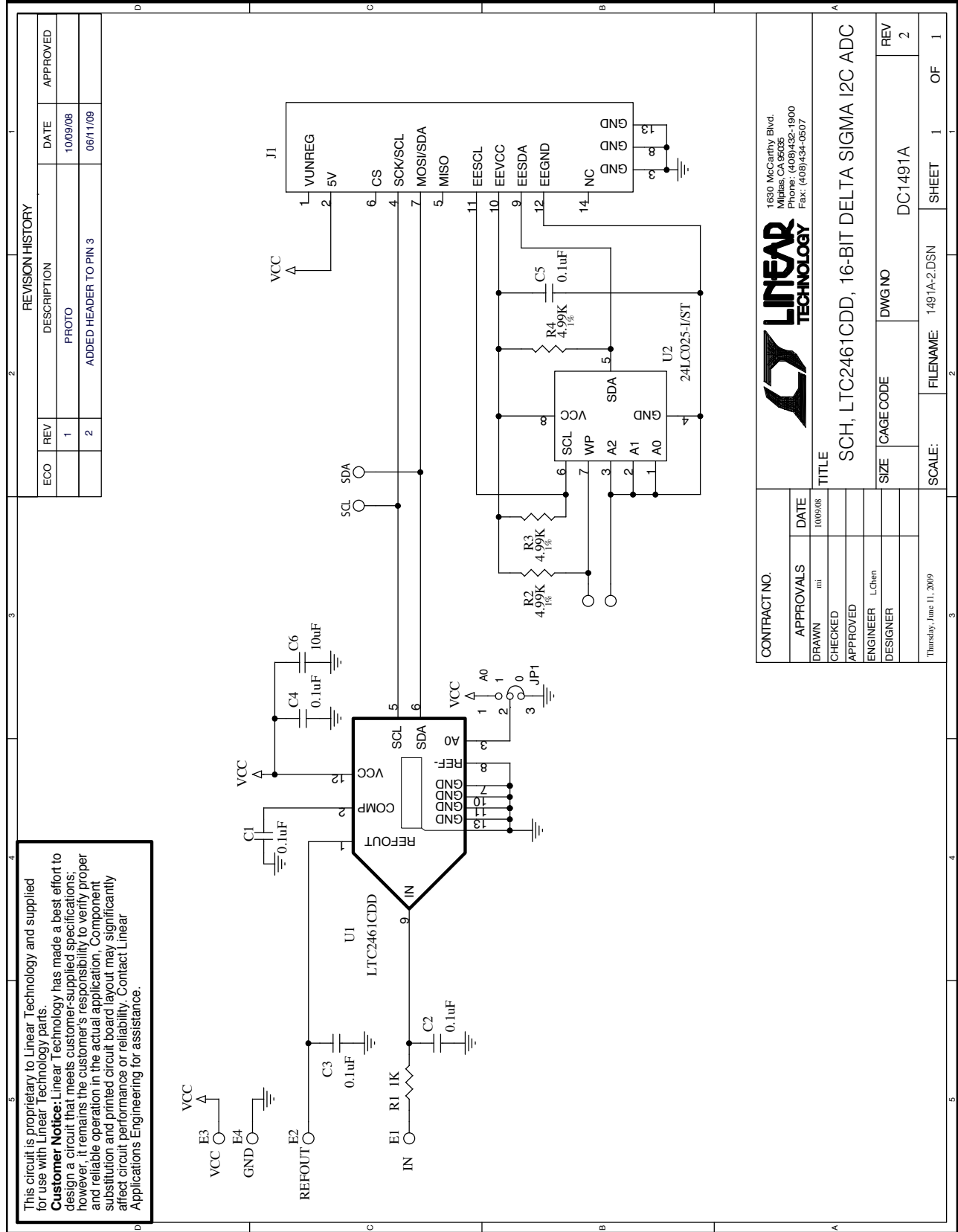
**IN:** This is the positive input to the ADC.

**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 0.1µF 20% 16V X7R	TDK C1005X7R1C104M
2	1	C6	CAP, 0603 10µF 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 × 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



CONTRACT NO.		1650 McCarthy Blvd. Milpitas, CA 95035 Phone: (408) 255-1000 Fax: (408) 434-6507	
APPROVALS	DATE	TITLE	
DRAWN mi	10/09/08	SCH, LTC2461CDD, 16-BIT DELTA SIGMA I2C ADC	
CHECKED		SIZE	DWG NO
APPROVED		SCALE	DC1491A
ENGINEER L.Chen		FILENAME	1491A-2.DSN
DESIGNER		SHEET	1 OF 1
Thursday, June 11, 2009			

# SCHEMATIC DIAGRAM

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

**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.  
 0.00" ARE PRIMARY DATUMS.
- SIZE: CUT TO DIMENSIONS AND TOLERANCES SHOWN.
- 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

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 .XXX ± 0.127

**LAYER CONSTRUCTION**

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**

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

1650 MCCARTHY BLVD  
 WILMINGTON, MA 01898  
 TEL: (508) 334-1000  
 FAX: (508) 334-1001  
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**LINEAR**  
 TECHNOLOGY

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

SIZE: DEMO  
 DC1491A

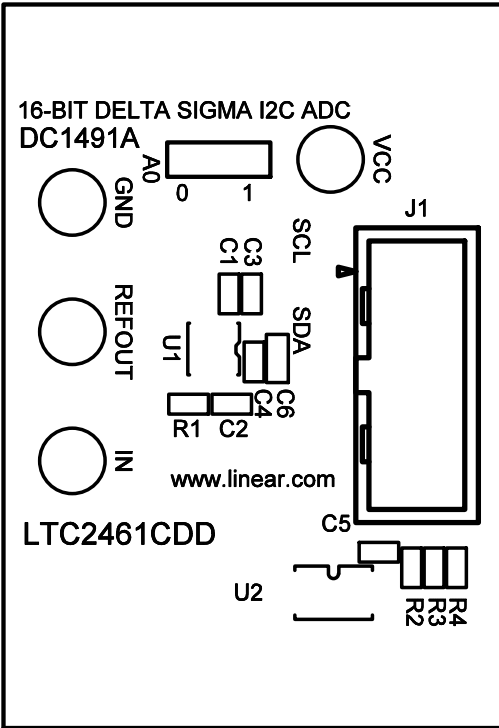
REV: 2

SCALE = NONE

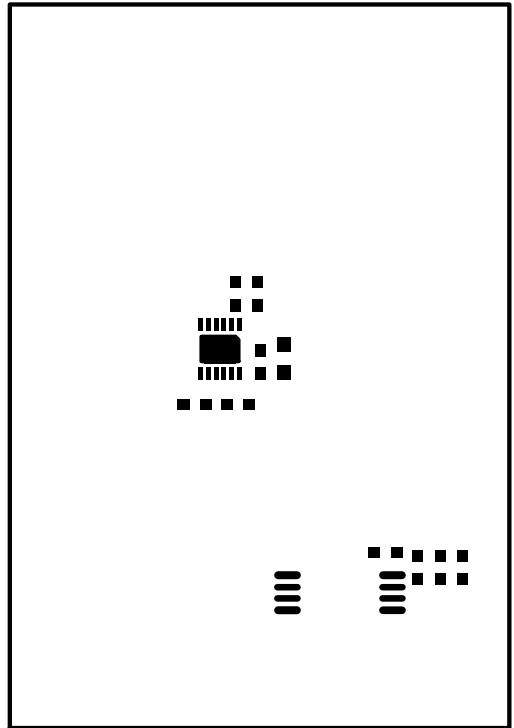
SHT 1 of 1

## PCB LAYOUT AND FILM

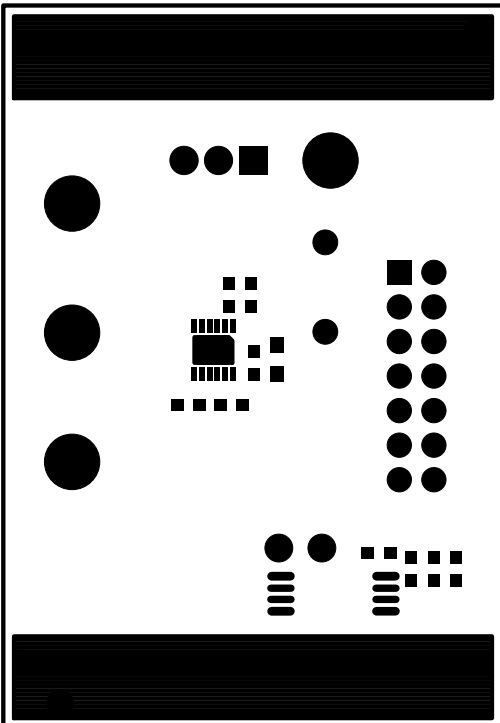
Top Silkscreen



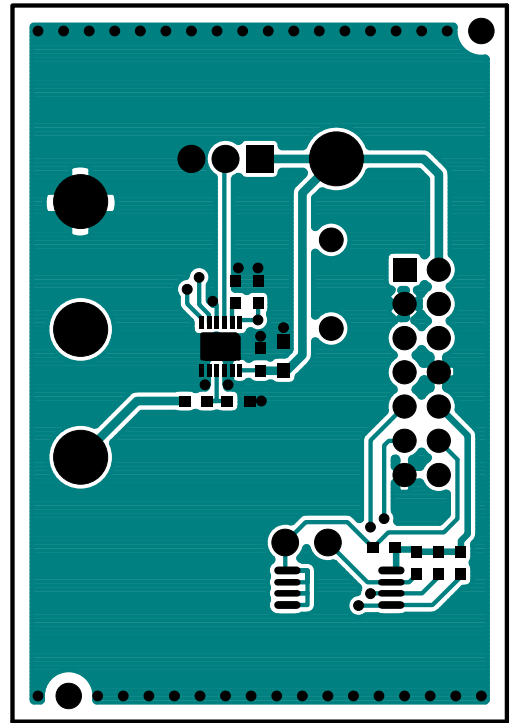
Top Paste



Top Soldermask

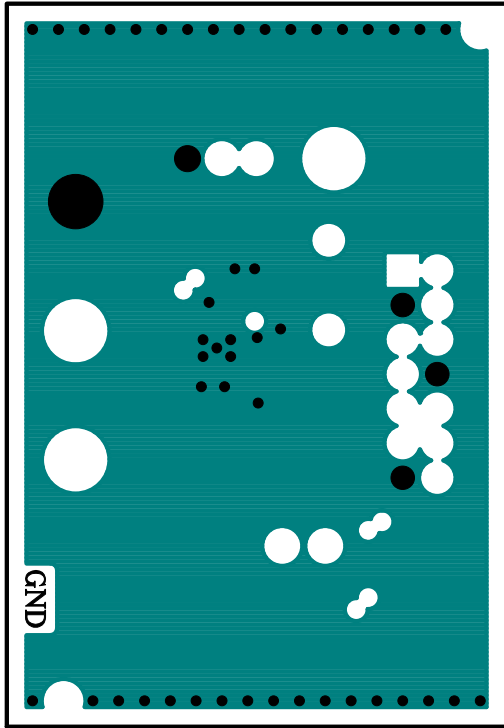


L1 Component Side

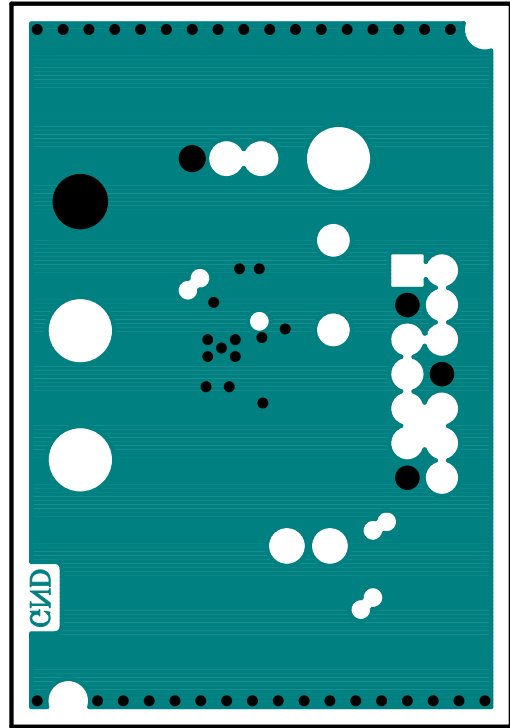


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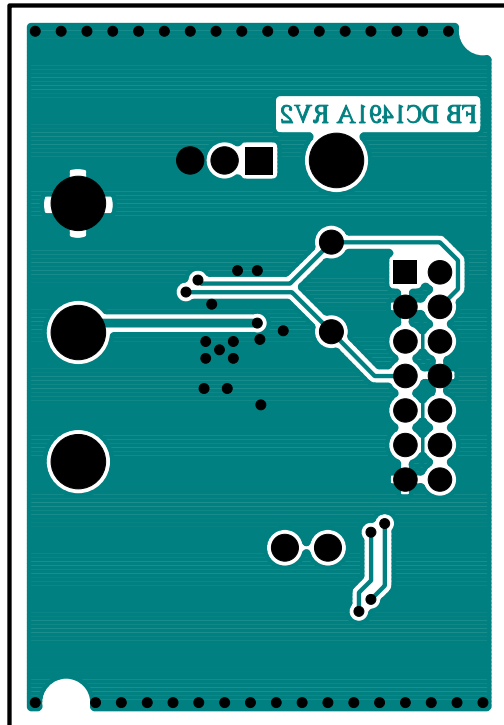
Top Silkscreen



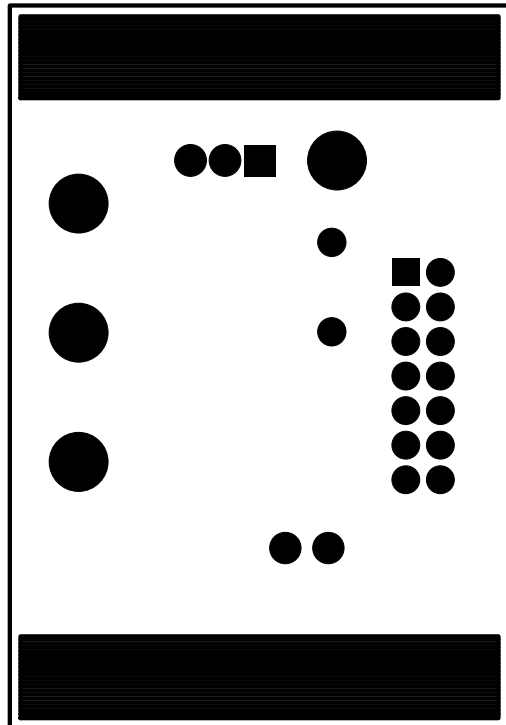
Top Paste



Top Soldermask



L1 Component Side



# DEMO MANUAL DC1491A

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1630 McCarthy Blvd.  
Milpitas, CA 95035

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