

# Signal Chain Power LT1964 Negative Linear Regulator

## DESCRIPTION

Demonstration circuit SCP-LT1964-EVALZ is a -20V, 200mA Low Dropout (LDO) regulator designed to allow low noise operation in noise sensitive circuits. It is easily configured for a wide output range and can provide extremely quiet operation with its high PSRR.

Like all boards in the Signal Chain Power series, this board is designed to be easily plugged into other SCP boards to form a complete signal chain power system, enabling fast evaluation of low power signal chains. To evaluate this board, some universal SCP hardware is required, namely:

- SCP-INPUT-EVALZ
- SCP-OUTPUT-EVALZ
- SCP-1X5BKOUT-EVALZ
- SCP-THRUBRD-EVALZ
- SCP-FILTER-EVALZ
- SCP-1X2BKOUT-EVALZ
- SCP-5X1-EVALZ

To properly evaluate SCP series demo boards, you will need the SCP Configurator companion software. SCP Configurator can help you choose the right board and topology for your design.

Note that this Demo Manual does not cover details important to the operation and configuration regarding the [LT1964](#). Please refer to the [LT1964 datasheet](#) for a complete description of the part.

**Design files for this circuit board are available.**

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**Table 1. Performance Summary**

SYMBOL	PARAMETER	NOTES	MIN	TYP	MAX	UNITS
V <sub>IN(MAX)</sub>	Max Input Voltage				-20	V
V <sub>OUT(MAX)</sub>	Max Output Voltage				-19.57	V
I <sub>OUT(MAX)</sub>	Max Output Current				200	mA

## BOARD IMAGE

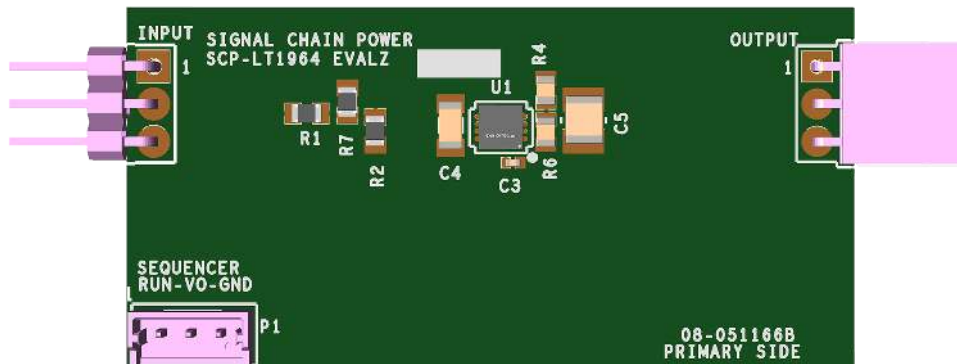


Figure 1. SCP-LT1964-EVALZ Board

## QUICK START PROCEDURE

Demonstration circuit SCP-LT1964-EVALZ is easy to set up to evaluate the performance of any SCP hardware configuration.

1. The SCP-LT1964-EVALZ ships with a default output voltage of  $-5V$ . To change the output voltage, see “Configuration Settings” section, and modify the board accordingly. Be sure to check for open connections or solder shorts after making any modifications.
2. Connect the SCP-INPUT-EVALZ and SCP-OUTPUT-EVALZ boards to the SCP-LT1964-EVALZ (refer to Figure 2) and connect the input board to a voltage source,  $V_{SOURCE}$ . Connect the output board to a voltmeter or dynamic load. Slowly raise the input voltage until the SCP-LT1964-EVALZ powers up into regulation and sweep  $V_{SOURCE}$  through the desired range of operation.

NOTE: Make sure that the input voltage is always within spec. If using a dynamic load to measure output voltage, make sure the load is initially set to zero.

3. Check for proper output voltage. The output should be regulated at the programmed value ( $\pm 5\%$ ).
4. Once the proper output voltage is established, power off  $V_{SOURCE}$  and similarly test other boards in the SCP system until all elements have been individually verified prior to assembling into the final circuit configuration.

NOTE: When measuring the input or output voltage ripple, use the optional SMA connector locations available on the input, output,  $1 \times 5$ ,  $1 \times 2$ , and  $5 \times 1$  breakout boards. Avoid using the test point connections with long scope leads.

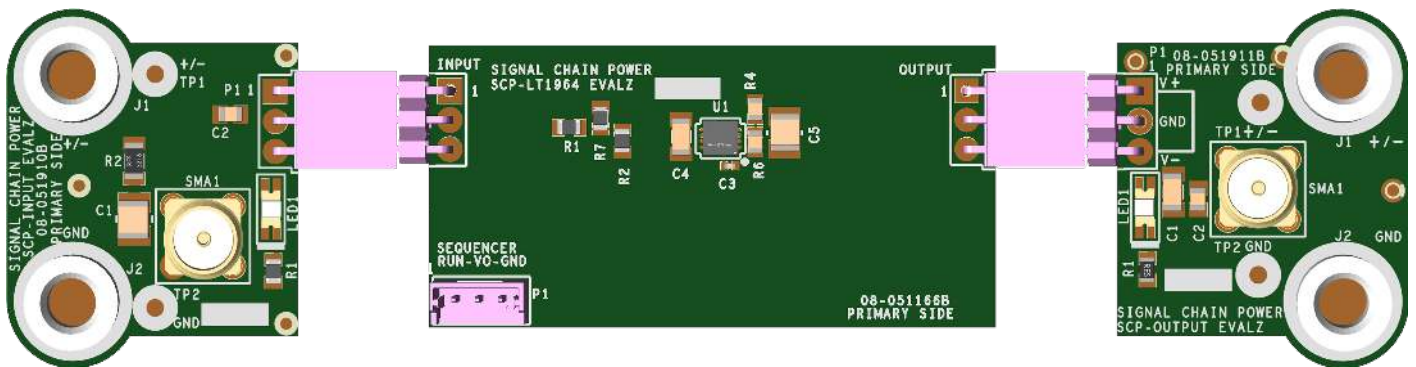


Figure 2. Proper Measurement Equipment Setup (Use SMA connectors for Measuring Input or Output Ripple)

# DEMO MANUAL LT1964 LOW NOISE, NEGATIVE MICROPOWER LDO REGULATOR

## CONFIGURATION SETTINGS

Demonstration circuit SCP-LT1964-EVALZ is a –20V, 200mA Low Dropout (LDO) regulator designed to allow low noise operation in noise sensitive circuits. It is easily configured for a wide output range and can provide extremely quiet operation with its high PSRR.

The output of the SCP-LT1964-EVALZ is resistor-programmable from –1.22V to –19.5V.

## OUTPUT VOLTAGE PROGRAMMING

$$-V_{\text{OUT}} = 1.22\text{V} \left( 1 + \frac{R6}{R4} \right)$$

Table 2. Resistor Selection Guide for Common Output Voltages

V <sub>OUT</sub>   (V)	R6 (Ω)	R4 (Ω)
1.22	0	Open
1.25	1.02k	41.2k
1.5	11.5k	49.9k
1.8	26.1k	54.9k
2.0	13.7k	21.5k
2.5	57.6k	54.9k
3.0	20.0k	13.7k
3.5	49.9k	26.7k
4.0	23.2k	10.2k
4.5	30.9k	11.5k
5.0	31.6k	10.2k
5.5	25.7k	10.2k
6.0	90.9k	23.2k
6.5	174k	40.2k
7.0	64.9k	13.7k
7.5	137k	26.7k
8.0	59.0k	10.7k
8.5	63.4k	10.7k
9.0	137k	21.5k
9.5	169k	24.9k
10	76.8k	10.7k
11	150k	18.7k
12	205k	23.2k
13	133k	13.7k
14	110k	10.5k
15	340k	30.1k
16	464k	38.3k
17	102k	7.87k
18	158k	11.5k
19	200k	13.7k
19.5	102k	6.81k

## SHDN PIN CONFIGURATION

The SHDN pin is tied to the optional SCP Run/Sequence header P1. To create a harness for this function, use Molex part 0510650300 with crimp pin 50212-8000.

To use an active run signal, use a 100k resistor for either pull-up or pull-down resistors R2 and R7, short R1 with 0Ω, and use the drive signal from connector P1.

The SHDN pin has fixed 1.6V and –1.9V guaranteed threshold levels with built-in hysteresis to prevent oscillations. Holding the said pin to within ±0.8V of ground disables operation. Choose resistors that can source or sink at least –3μA or 6μA when active.

## BYPASS PIN CONFIGURATION

The addition of a bypass capacitor lowers output noise considerably, while also increasing startup time. It also allows a lower capacitance to stabilize the loop response for a given output capacitor ESR. The default 0.01μF capacitor is recommended for most applications.



# DEMO MANUAL LT1964 LOW NOISE, NEGATIVE MICROPOWER LDO REGULATOR

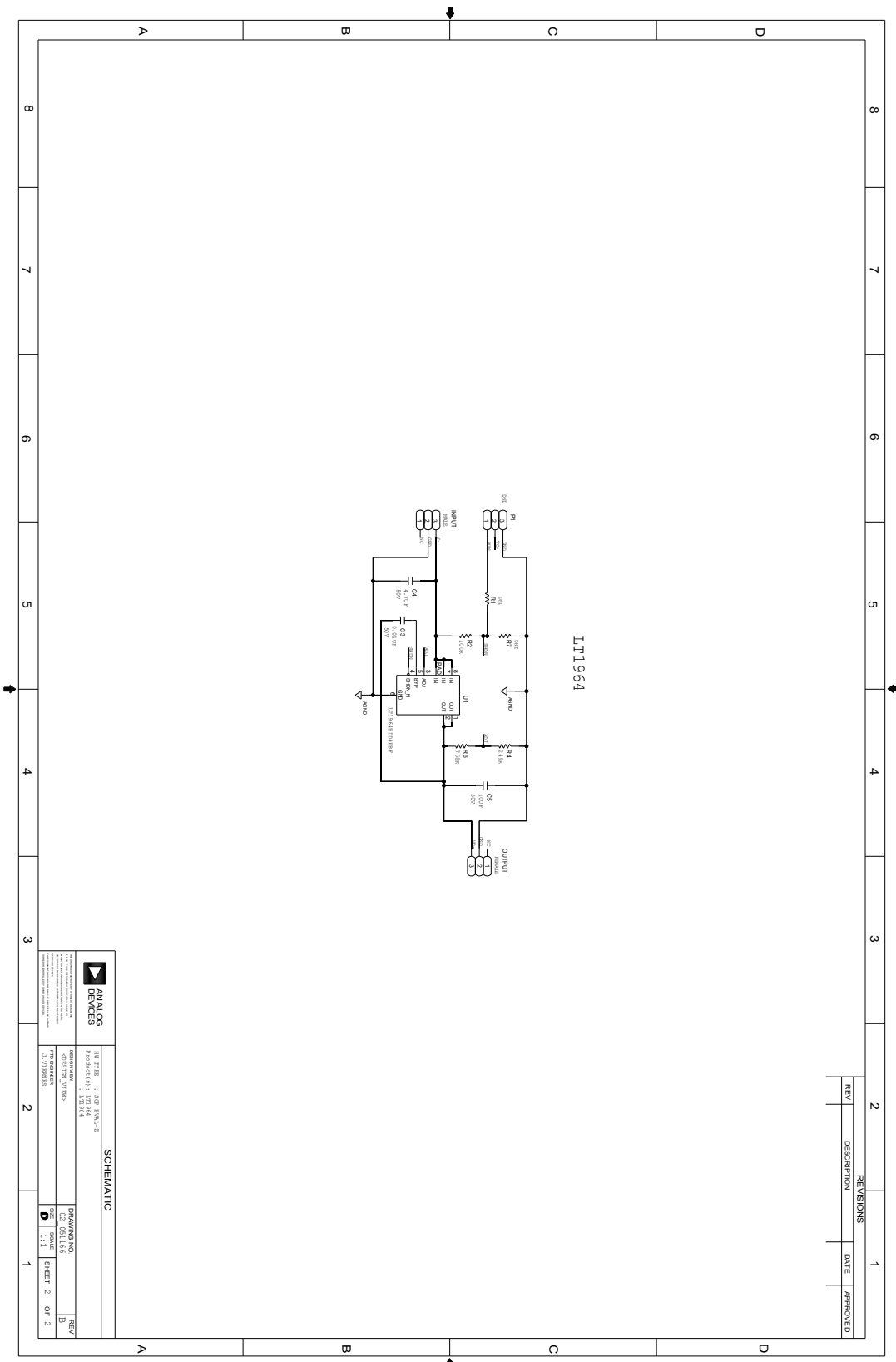
## PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
1	1	PCB	PCB	ANALOG DEVICES 08_051166b
2	1	C3	CAP 10nF 50V CER X7R 0402	MURATA GCM155R71H103KA55D
3	1	C4	CAP 4.7UF 50V CER X7R 1206	SAMSUNG CL31B475KBHNNNE
4	1	C5	CAP 10UF 50V CER X5R 1206	SAMSUNG CL31A106MBHNNNE
5	1	INPUT	CONN MALE 3POS 2.54MM PITCH R/A	SULLINS PBC03SBAN
6	1	OUTPUT	CONN FEMALE 3POS 2.54MM PITCH R/A	SULLINS PPPC031LGBN-RC
7	1	P1	CONN-PCB 3POS HEADER WIRE TO BRD WAFER ASSY STRAIGHT 2MM PITCH (Note 1)	MOLEX 53253-0370
8	2	R1, R7	RES THICK FILM 0805 (Note 1)	N/A
9	1	R2	RES 100k 1% THICK FILM 0805	PANASONIC ERJ-6ENF1003V
10	1	R4	RES 249k 1% THICK FILM 0805	VISHAY CRCW0805249KFKECC
11	1	R6	RES 768k 1% THICK FILM 0805	PANASONIC ERJ-6ENF7683V
12	1	U1	IC LOW NOISE LDO NEGATIVE MICPROWER REGULATOR	ANALOG DEVICES LT1964EDD#PBF

**Note 1.** These items are not stuffed (DNI).

# DEMO MANUAL SCP-LT1964-EVALZ

## SCHEMATIC DIAGRAM





# DEMO MANUAL SCP-LT1964-EVALZ

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## ESD Caution

**ESD (electrostatic discharge) sensitive device.** Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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