

Signal Chain Power LT3461 Boost Converter

DESCRIPTION

Demonstration circuit SCP-LT3461-EVALZ features the LT3461 in a 12V output boost converter which operates from an input voltage of 3V to 6V. The maximum output current is 70mA when powered from a 5.0V input and 40mA when powered from a 3.3V input.

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-1X2BKOUT-EVALZ
SCP-OUTPUT-EVALZ	SCP-1X5BKOUT-EVALZ
SCP-FILTER-EVALZ	SCP-5X1-EVALZ
SCP-THRUBRD-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 [LT3461](#). Please refer to the [LT3461 datasheet](#) for a complete description of the part.

Design files for this circuit board are available.

All registered trademarks and trademarks are property of their respective owner.

Table 1. Performance Summary

SYMBOL	PARAMETER	NOTES	MIN	TYP	MAX	UNITS
$V_{IN(MAX)}$	Max Input Voltage				16	V
$V_{OUT(MAX)}$	Max Output Voltage				38	V
$I_{SW(LIM)}$	Switch Current Limit		300	420	600	mA

BOARD IMAGE

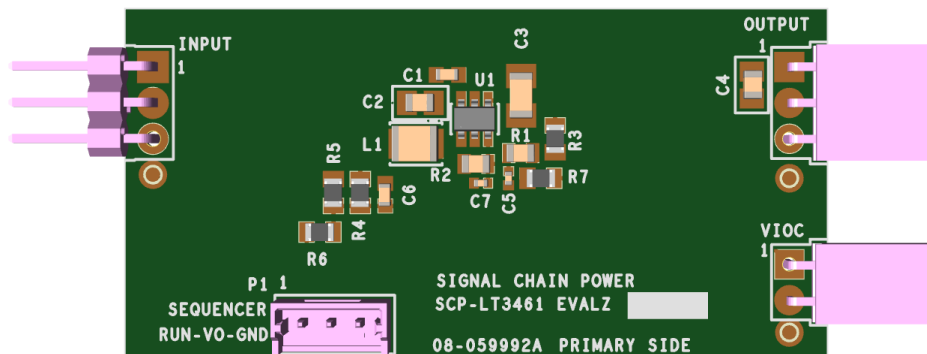


Figure 1. SCP-LT3461-EVALZ Board

DEMO MANUAL SCP-LT3461-EVALZ

QUICK START PROCEDURE

Demonstration circuit SCP-LT3461-EVALZ is easy to set up to evaluate the performance of any SCP hardware configuration.

1. The SCP-LT3461-EVALZ ships with a default output voltage of 12V. 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-LT3461-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-LT3461-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 specification. 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.

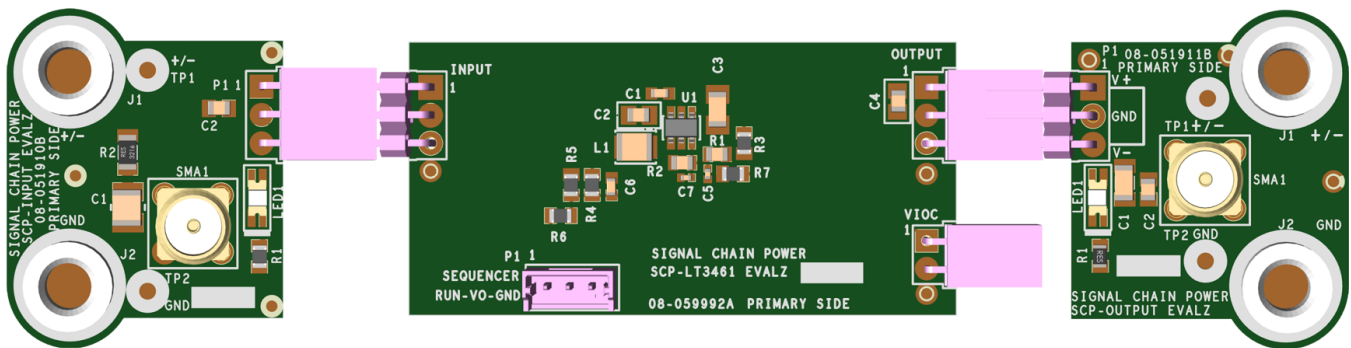


Figure 2. Proper Measurement Equipment Setup (Use SMA connectors for Measuring Input or Output Ripple)

CONFIGURATION SETTINGS

Demonstration circuit SCP-LT3461-EVALZ features the LT3461 in a 12V output boost converter which operates from an input voltage of 3V to 6V. The maximum output current is 70mA when powered from a 5.0V input and 40mA when powered from a 3.3V input.

The output of the SCP-LT3461-EVALZ is resistor-programmable from 5V to 38V. The board can be also configured to drive VIOC-capable linear regulators.

OUTPUT VOLTAGE PROGRAMMING

$$V_{OUT} = 1.255V \left(1 + \frac{R1}{R2} \right)$$

Table 2. Resistor Selection Guide for Common Output Voltages

V _{OUT} (V)	R1 (Ω)	R2 (Ω)
5.0	45.3k	15.0k
6.0	61.9k	16.5k
7.0	84.5k	18.7k
8.0	102k	19.1k
9.0	140k	22.6k
10.0	191k	27.4k
11.0	221k	28.7k
12.0	261k	30.1k
13.0	274k	29.4k
14.0	287k	28.0k
15.0	301k	27.4k
16.0	316k	26.7k
17.0	332k	26.7k
18.0	348k	26.1k
19.0	365k	26.1k
20.0	383k	25.5k
21.0	402k	25.5k
22.0	422k	25.5k
23.0	442k	25.5k
24.0	464k	25.5k
25.0	487k	25.5k
30.0	536k	23.2k
35.0	634k	23.7k
38.0	681k	23.2k

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 1.00M resistor for either pull-up or pull-down resistors R4 and R5, short R6 with 0Ω, and use the drive signal from connector P1.

VOLTAGE INPUT-TO-OUTPUT CONTROL (VIOC) IMPLEMENTATION

To implement the VIOC function for this regulator, set R7 to 0Ω. Refer to the “Configuration Settings” section in the Demo Manual for the low-dropout (LDO) linear regulator board and use the following configuration for this board.

Table 3. VIOC Cross-Reference Designators

VIOC SETTING REFERENCES	R _{BOT}	R _{TOP}	R _{MAX}
V _{OUT} Reference Designators	R2	R1	R3

$$V_{LD0IN} - V_{LD0OUT} = V_{VIOC} = 1.255V \left(\frac{R_{BOT} + R_{TOP}}{R_{BOT}} \right)$$

$$V_{(MAX)LD0IN} = 1.255V \left(\frac{R_{BOT} + R_{TOP} + R_{MAX}}{R_{BOT}} \right) + I_{SINK} R_{MAX}$$

I_{SINK} is the current through R_{MAX} which is typically 15μA. Since the divider current is fixed due to the internal low side gain setting feedback resistor and is less than the recommended divider current of 100μA, the effect of the sink current on the maximum linear regulator input voltage cannot not be mitigated and should be taken into consideration.

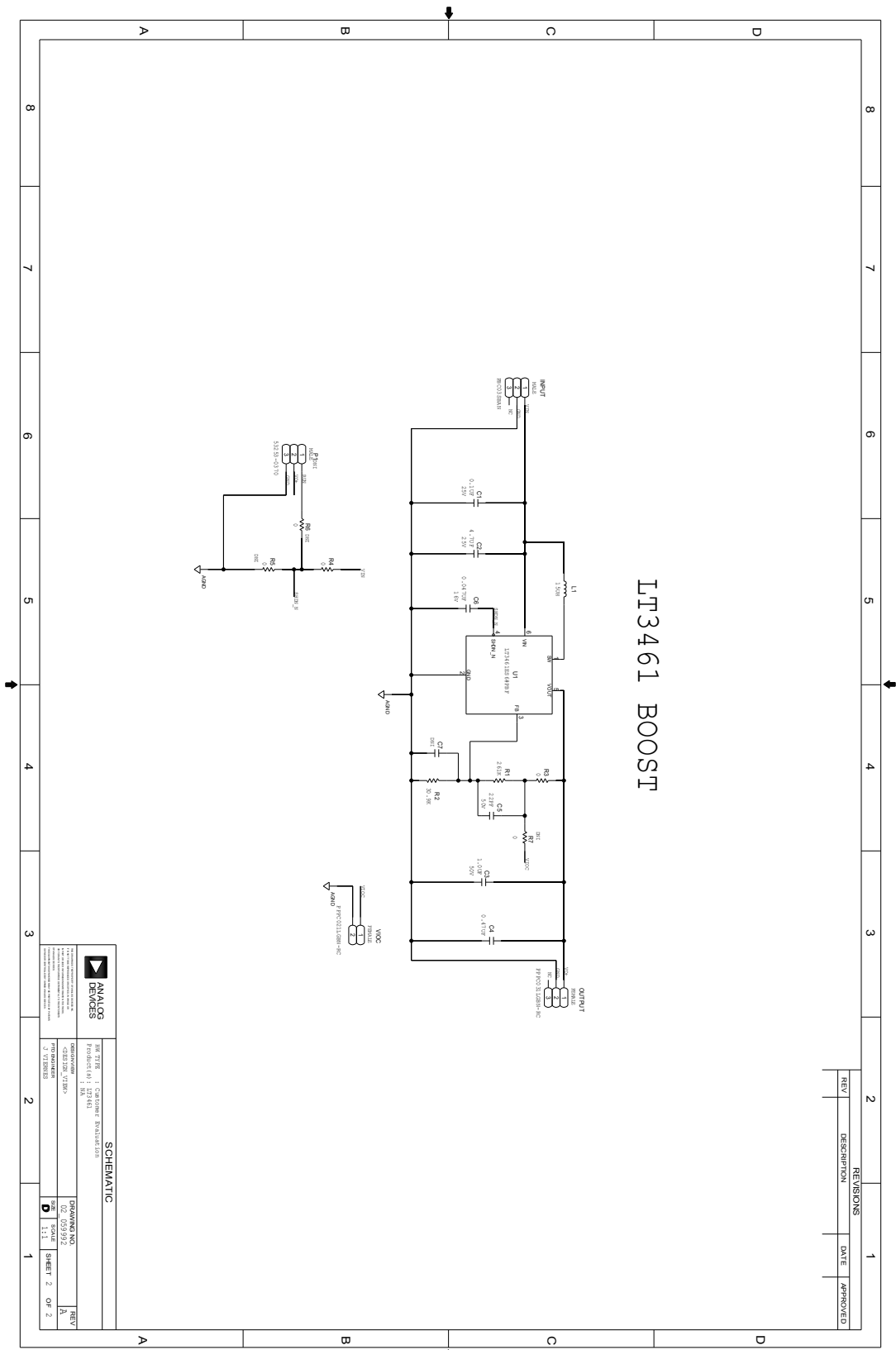
DEMO MANUAL SCP-LT3461-EVALZ

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
1	1	PCB	PRINTED CIRCUIT BOARD	ANALOG DEVICES 08_059992a
2	1	C1	CAP CER 0.1uF 25V 10% X7R 0603	SAMSUNG CL10B104KA8NNNC
3	1	C2	CAP CER 4.7uF 25V 10% X5R 0805	SAMSUNG CL21A475KAQNNNG
4	1	C3	CAP CER 1uF 50V 10% X7R 1206	YAGEO CC1206KKX7R9BB105
5	1	C4	CAP CER 0.47uF 50V 10% X7R 0805	SAMSUNG CL21B474KBFNNNG
6	1	C5	CAP CER 22pF 50V 5% C0G 0402 AEC-Q200 LOW ESR	TDK CGA2B2C0G1H220J050BA
7	1	C6	CAP CER 0.047uF 16V 10% X7R 0603	AVX CORPORATION 0603YC473KAT2A
8	1	C7	CAP MLCC 0402 (Note 1)	N/A
9	1	INPUT	CONN-PCB MALE HEADER 3POS 2.54MM PITCH R/A GOLD	SULLINS PBC03SBAN
10	1	L1	IND POWER COIL, 0.3A, 0.580HM DCR	MURATA LQH32CN150K53L
11	1	OUTPUT	CONN FEMALE 3POS 2.54MM PITCH R/A GOLD	SULLINS PPPC031LGBN-RC
12	1	P1	CONN-PCB 3POS HEADER WIRE TO BRD WAFER ASSY STRAIGHT 2MM PITCH (Note 1)	MOLEX 53253-0370
13	1	R1	RES SMD 261K Ohm 1% 1/8W 0805	YAGEO RC0805FR-07261KL
14	1	R2	RES SMD 30.1K Ohm 1% 1/8W 0805 AEC-Q200	PANASONIC ERJ-6ENF3012V
15	2	R3, R4	RES SMD 0 Ohm JUMPER 1/8W 0805 AEC-Q200	VISHAY CRCW08050000Z0EA
16	3	R5, R6, R7	RES SMD 0 Ohm JUMPER 1/8W 0805 AEC-Q200 (Note 1)	VISHAY CRCW08050000Z0EA
17	1	U1	IC-ADI 1.3MEGHZ STEP-UP DC/DC CONVERTERS WITH INTEGRATED SCHOTTKY	ANALOG DEVICES LT3461ES6#PBF
18	1	VIOC	CONN FEMALE 2POS 2.54MM PITCH R/A GOLD	SULLINS PPPC021LGBN-RC

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

SCHEMATIC DIAGRAM



DEMO MANUAL SCP-LT3461-EVALZ



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.

Legal Terms and Conditions

By using the evaluation board discussed herein (together with any tools, components documentation or support materials, the "Evaluation Board"), you are agreeing to be bound by the terms and conditions set forth below ("Agreement") unless you have purchased the Evaluation Board, in which case the Analog Devices Standard Terms and Conditions of Sale shall govern. Do not use the Evaluation Board until you have read and agreed to the Agreement. Your use of the Evaluation Board shall signify your acceptance of the Agreement. This Agreement is made by and between you ("Customer") and Analog Devices, Inc. ("ADI"), with its principal place of business at One Technology Way, Norwood, MA 02062, USA. Subject to the terms and conditions of the Agreement, ADI hereby grants to Customer a free, limited, personal, temporary, non-exclusive, non-sublicensable, non-transferable license to use the Evaluation Board FOR EVALUATION PURPOSES ONLY. Customer understands and agrees that the Evaluation Board is provided for the sole and exclusive purpose referenced above, and agrees not to use the Evaluation Board for any other purpose. Furthermore, the license granted is expressly made subject to the following additional limitations: Customer shall not (i) rent, lease, display, sell, transfer, assign, sublicense, or distribute the Evaluation Board; and (ii) permit any Third Party to access the Evaluation Board. As used herein, the term "Third Party" includes any entity other than ADI, Customer, their employees, affiliates and in-house consultants. The Evaluation Board is NOT sold to Customer; all rights not expressly granted herein, including ownership of the Evaluation Board, are reserved by ADI. CONFIDENTIALITY. This Agreement and the Evaluation Board shall all be considered the confidential and proprietary information of ADI. Customer may not disclose or transfer any portion of the Evaluation Board to any other party for any reason. Upon discontinuation of use of the Evaluation Board or termination of this Agreement, Customer agrees to promptly return the Evaluation Board to ADI. ADDITIONAL RESTRICTIONS. Customer may not disassemble, decompile or reverse engineer chips on the Evaluation Board. Customer shall inform ADI of any occurred damages or any modifications or alterations it makes to the Evaluation Board, including but not limited to soldering or any other activity that affects the material content of the Evaluation Board. Modifications to the Evaluation Board must comply with applicable law, including but not limited to the RoHS Directive. TERMINATION. ADI may terminate this Agreement at any time upon giving written notice to Customer. Customer agrees to return to ADI the Evaluation Board at that time. LIMITATION OF LIABILITY. THE EVALUATION BOARD PROVIDED HEREUNDER IS PROVIDED "AS IS" AND ADI MAKES NO WARRANTIES OR REPRESENTATIONS OF ANY KIND WITH RESPECT TO IT. ADI SPECIFICALLY DISCLAIMS ANY REPRESENTATIONS, ENDORSEMENTS, GUARANTEES, OR WARRANTIES, EXPRESS OR IMPLIED, RELATED TO THE EVALUATION BOARD INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF MERCHANTABILITY, TITLE, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. IN NO EVENT WILL ADI AND ITS LICENSORS BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM CUSTOMER'S POSSESSION OR USE OF THE EVALUATION BOARD, INCLUDING BUT NOT LIMITED TO LOST PROFITS, DELAY COSTS, LABOR COSTS OR LOSS OF GOODWILL. ADI'S TOTAL LIABILITY FROM ANY AND ALL CAUSES SHALL BE LIMITED TO THE AMOUNT OF ONE HUNDRED US DOLLARS (\$100.00). EXPORT. Customer agrees that it will not directly or indirectly export the Evaluation Board to another country, and that it will comply with all applicable United States federal laws and regulations relating to exports. GOVERNING LAW. This Agreement shall be governed by and construed in accordance with the substantive laws of the Commonwealth of Massachusetts (excluding conflict of law rules). Any legal action regarding this Agreement will be heard in the state or federal courts having jurisdiction in Suffolk County, Massachusetts, and Customer hereby submits to the personal jurisdiction and venue of such courts. The United Nations Convention on Contracts for the International Sale of Goods shall not apply to this Agreement and is expressly disclaimed.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Analog Devices Inc.:](#)

[SCP-LT3461-EVALZ](#)