

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 974 HIGH VOLTAGE PROGRAMMABLE FREQUENCY STEP-DOWN CONVERTER

LT3844

DESCRIPTION

Demonstration Circuit 974 is a 100kHz – 500kHz programmable frequency, high voltage, current-mode DC/DC step-down converter featuring the LT3844. The operating frequency can be synchronized up to 600kHz.

The board operates from a V_{in} range of 15V – 60V and outputs 12Vout @ 4.2A (50W). A soft-start feature controls the output voltage slew rate at start-up, reducing current surges and voltage overshoots. The Burst Mode of operation that improves the efficiency at light loads can be enabled with a jumper.

An Optional Boost Bias circuit is provided on the bottom side of the board for back-driving the LT3844 internal regulator from the output voltage. Customers might want to use this optional circuit with modified applications that have relatively high input voltages and low (~5V) output voltages. In such applications, the optional

circuit can increase the overall efficiency by reducing the power lost in the LT3844. The demonstration board has also been laid out with the option for a second switching MOSFET to facilitate higher output currents. The circuit design can be modified for a Boost converter configuration.

This board is suitable for a wide range of Industrial control and automotive applications.

Note: It's best to Ground the SYNC pin if the SYNC function is not being used.

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

Table 1. Performance Summary ($T_A = 25^\circ\text{C}$)

PARAMETER	CONDITION	VALUE
Vin Input Voltage Range		15V → 60Vin
Efficiency	48Vin, 0.1Aout	76.5%
	48Vin, 1.0Aout	79.5%
	48Vin, 4.2Aout	87.5%
Switching Frequency		100kHz – 600kHz..
Output Voltage	0 – 4.2Aout	12V
Vout_ripple_pp		~ 75mV

QUICK START PROCEDURE

DC974 is easy to set up to evaluate the performance of the LT3844. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

1. Apply a 0 – 4.2A Load across the Vout/Gnd turrets.
2. Connect Voltmeters and Ammeters as shown in Figure 1.
3. Connect a 0 - 60V Power Supply (or better) across the Vin/Gnd turrets. Typically it's best to set the Current Limit of this Power Supply to its maximum setting. The power supply must be capable of providing the required start-up power. If using a bench power supply, a 60V/15A rated (or better) supply is recommended. Set Vin to 15V – 60Vin for start-up. Make sure the SHDN/RUN jumper is in the RUN position.

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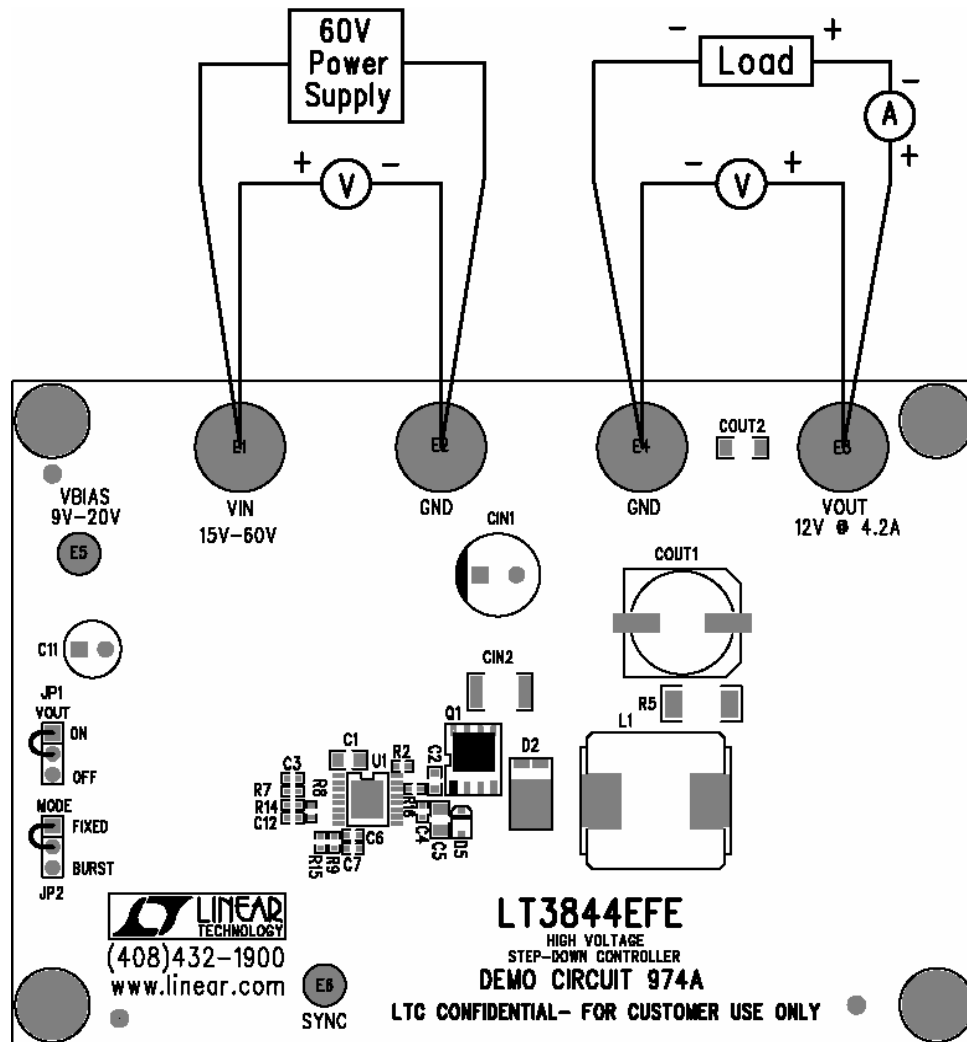
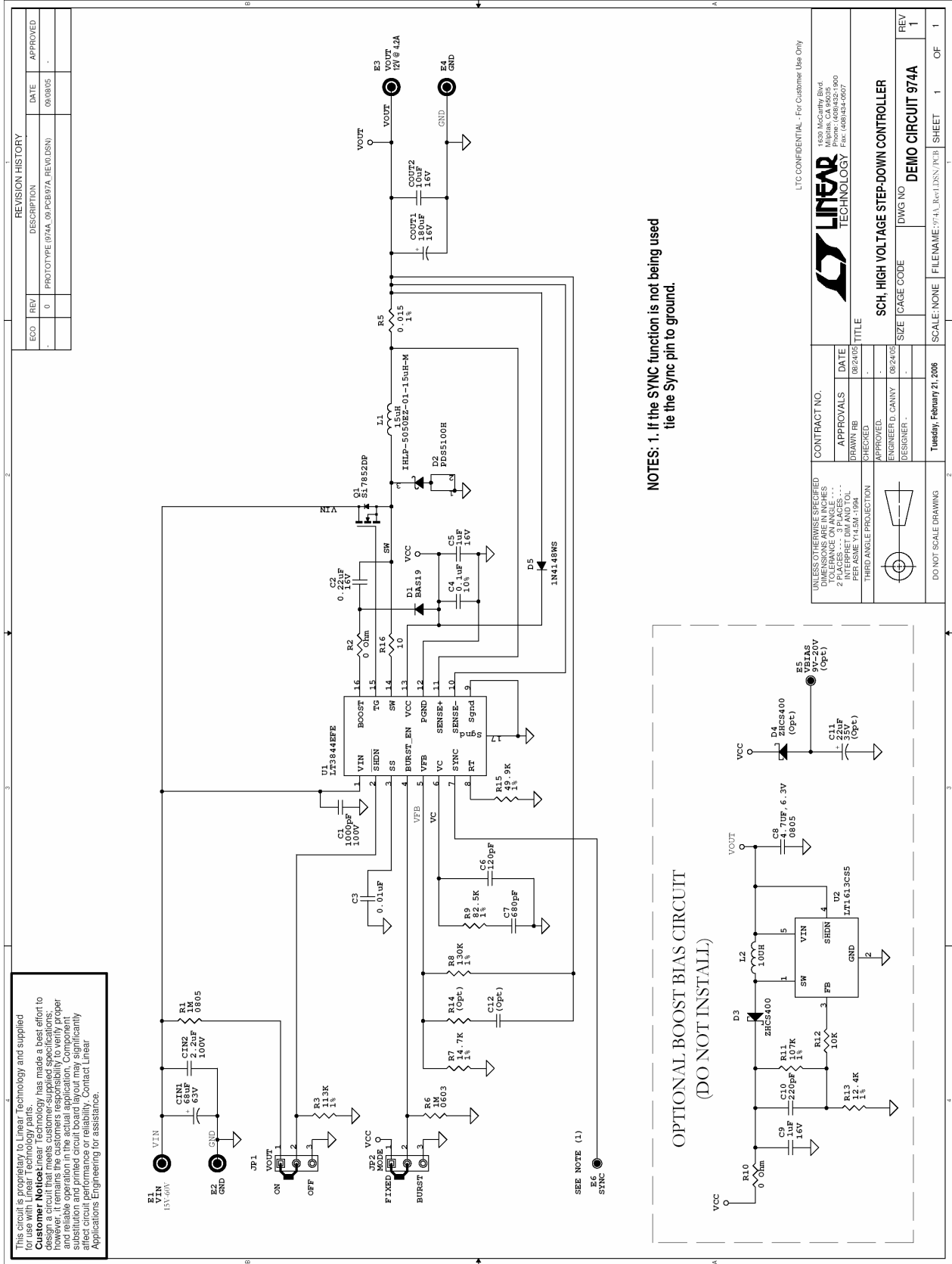


Figure1. Proper Measurement Equipment Setup

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<i>Item</i>	<i>Qty</i>	<i>Reference</i>	<i>Part Description</i>	<i>Manufacturer / Part #</i>
12	0	R13	Res., Chip 12.4K 1/16W 1%	AAC CR05-1242FM
13	0	R14	Res., 0402 TBD	
14	0	U2	I.C., Volt. Reg.	Linear Tech. Corp. LT1613CS5
HARDWARE-FOR DEMO BOARD ONLY:				
1	4	E1,E2,E3,E4	Conn. Banana Jack	keystone 575-4
2	1	E6	Testpoint, Turret	Mill Max 2501-2
3	2	JP1,JP2	Headers, 3 Pins 2mm Ctrs.	CommConn Con Inc. 2802S-03G2
4	2	XJP2,XJP1	Shunt, 2mm Ctrs.	CommConn Con Inc. CCIJ2MM-138G
5	4	X1,X2,X3,X4	STAND-OFF 4-40 x1/2"	MICRO PLASTICS 14HTSP003
6	4		HWD, SCREW #4-40x1/4"	ANY
7	1		FAB, PRINTED CIRCUIT BOARD	DEMO CIRCUIT #974A
8	2		STENCIL	STENCIL 974A