

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 720

HIGH VOLTAGE SYNCHRONOUS STEP-DOWN CONTROLLER

LT3800

DESCRIPTION

Demonstration Circuit 720 is a 200kHz high voltage, synchronous current-mode DC/DC step-down converter featuring the LT3800.

The board operates from a V_{in} range of 20V – 55V and outputs 12V @ 6.25A (75W). A soft-start feature controls the output voltage slew rate at start-up, reducing current surges and voltage overshoots. The modes of operation, Burst Mode, Discontinuous Current Mode and Continuous Current Mode, are jumper selectable. Both Burst Mode and Discontinuous Current Mode increase the efficiency at light loads. Continuous Current Mode will maintain a constant switching frequency regardless of the load current required.

An Optional Boost Bias circuit is provided on the bottom side of the board for back-driving the LT3800 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 LT3800. The demonstration board has also been laid out with the option of doubling the switching MOSFETs 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 systems and particularly suitable for 12V/42V automotive applications and 48V Telecom power supplies.

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

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

PARAMETER	CONDITION	VALUE
Vin Input Voltage Range		20V → 55V
Efficiency	20Vin, 6.25Aout	95.6%
	48Vin, 6.25Aout	93.7%
	55Vin, 6.25Aout	93.2%
Switching Frequency		200kHz fixed.
Output Voltage	0 – 6.25Aout	12V
Vout_ripple_pp		~ 50mV

QUICK START PROCEDURE

DC720 is easy to set up to evaluate the performance of the LT3800. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

1. Apply a 0 – 6.25A Load across the Vout/Gnd turrets.
2. Connect Voltmeters and Ammeters as shown in Fig. 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 20V – 55Vin.
4. Make sure the SHDN/RUN jumper is in the RUN position.

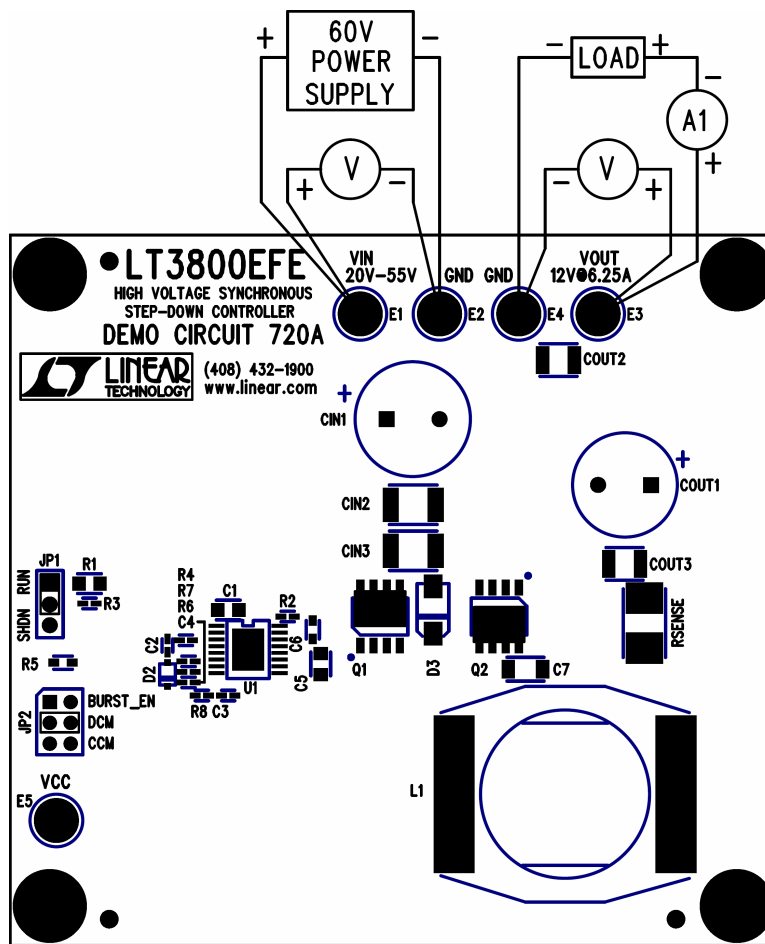
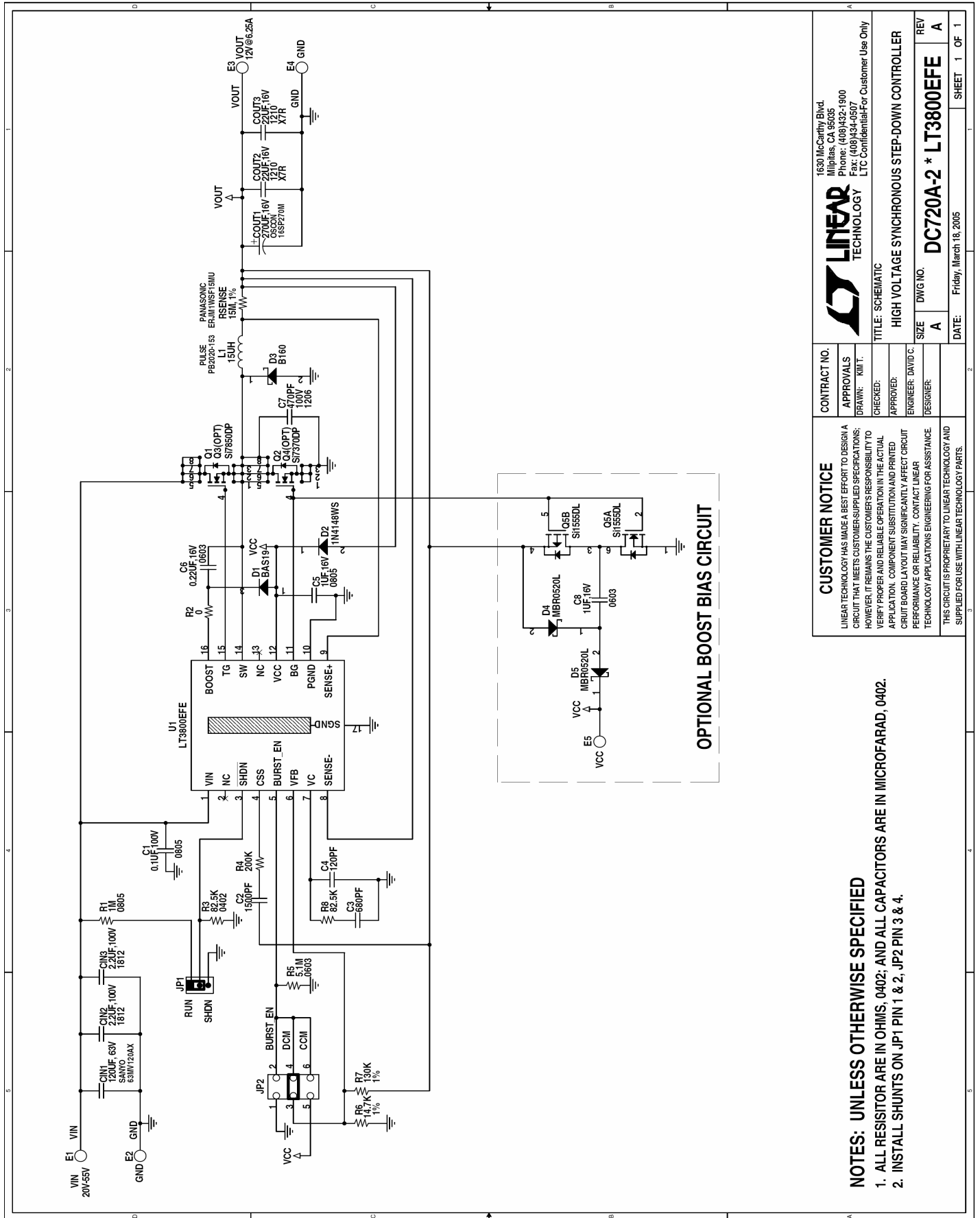


Figure 1. Proper Measurement Equipment Setup

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NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTOR ARE IN OHMS, 0402; AND ALL CAPACITORS ARE IN MICROFARAD, 0402.
2. INSTALL SHUNTS ON JP1 PIN 1 & 2, JP2 PIN 3 & 4.

CUSTOMER NOTICE
 LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER-SUPPLIED SPECIFICATIONS; HOWEVER, IT REMAINS THE CUSTOMER'S RESPONSIBILITY TO VERIFY PROPER AND RELIABLE OPERATION IN THE ACTUAL APPLICATION. COMPONENT SUBSTITUTION AND PRINTED CIRCUIT BOARD LAYOUT MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.
 THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.

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APPROVED:	ENGINEER: DAVID C. DESIGNER:	
TITLE: SCHEMATIC		REV: A
HIGH VOLTAGE SYNCHRONOUS STEP-DOWN CONTROLLER		DWG NO: DC720A-2 * LT3800EFE
SIZE: A	DATE: Friday, March 18, 2005	SHEET 1 OF 1