DESCRIPTION

Demonstration Circuit 698 is an I2C controlled high efficiency synchronous current mode buck regulator featuring the LTC®3445. The board also contains two resistor programmable LDO regulators and backup/main battery power path selection. The circuit design is ideally suited for single Li-Ion battery powered applications and specifically Intel Bulverde µP based applications. The buck regulator uses either a constant or spread spectrum switching frequency selected by the I2C User Interface. The two input voltages to the demonstration board are Vcc1 and Vcc2. The Vcc1 and Vcc2 input voltage ranges are both 2.5V to 5.5V. The buck regulator has a programmable output range of 0.85V to 1.55V with a 1A switch (V_{BUCK_OUT} refers to the "0.85V-1.55V at 600mA" output turret). Switching regulator noise can be reduced by setting the slew rate anywhere from 0.9mV/usec to 11mV/usec using an I2C command. Automatic Burst Mode at light loads and 100% duty cycle extend battery life in portable systems. The 0.3V dropout LDOs are both capable of delivering up to 50mA.

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

LTC is a trademark of Linear Technology Corporation

Table 1. Performance Summary (T_A = 25°C)

PARAMETER	CONDITION	VALUE
Vcc1 Input Voltage Range		2.5V - 5.5V
Vcc2 Input Voltage Range		2.5V - 5.5V
V_{BUCK_OUT} Buck Output Voltage		0.85V - 1.55V
Maximum Output Current	Vcc1 = 3V, V_{BUCK_OUT} = 1.3V	600mA
LDO1 Output Voltage		1.3V
LDO2 Output Voltage		1.1V
V_{BACK_UP} Input Voltage		Li-Ion Cell (~ 3.6V)
V_{TRACK} Input Voltage		3.0V - 3.3V
$V_{CC_BATT_OUT}$ Output Voltage		3.0V - (V_{TRACK} - 0.2v)
Switching Frequency		1.5MHz Const. Or Spread Spectrum dithered around 1.5MHz
On\Off Control		I2C Controlled Enable Bits for V_{BUCK_OUT}, LDO1, and LDO2

QUICK START PROCEDURE

DC698 is easy to set up to evaluate the performance of the LTC3445. Refer to Figure 2. For proper measurement equipment setup and follow the procedure below:

1. Connect a 100mA load, LOAD1, between the V_{BUCK_OUT} and Gnd_SW terminals on the right hand side of the board.

2. Connect a 25mA load, LOAD2, between the $1.3V_{OUT}$ and Gnd_out terminals on the top side of the board.
3. Connect a 25mA load, LOAD3, between the $1.1V_{OUT}$ and Gnd_out terminals on the top side of the board.
4. Apply 3.3V between the Vcc1\Vcc2\Vcc_Track and Gnd terminals on the left hand side of the board.
5. Connect the DC410B to the Computer's serial port via a 9-pin RS232 cable.
6. Connect 8V – 10V to the VinExt and Gnd terminals on the DC410B (ensure the JP2 jumper on the DC410B is in the VinExt position and the JP1\JP3 jumpers are in their RES positions).
7. Connect the DC698 to the DC410B via their 5 pin connectors.
8. Run the LVDC698.exe User Interface program provided to issue the relevant I2C commands (note: the serpdrv file must be stored in the same directory as the LVDC698.exe file).
9. To change the Buck voltage, set the Buck Voltage slider to whatever voltage you want the output to be, click on the Voltage Slider's Write button, then set the Buck Update (Go bit) in Reg2 to "0", click on the Reg2 Write button, then set the Buck Update (Go bit) in Reg2 to "1", click on the Reg2 Write button again.

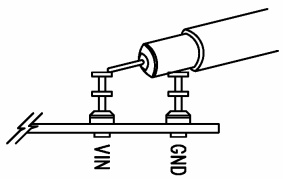


Figure 1. Scope Probe Placement for Measuring Input or Output Ripple

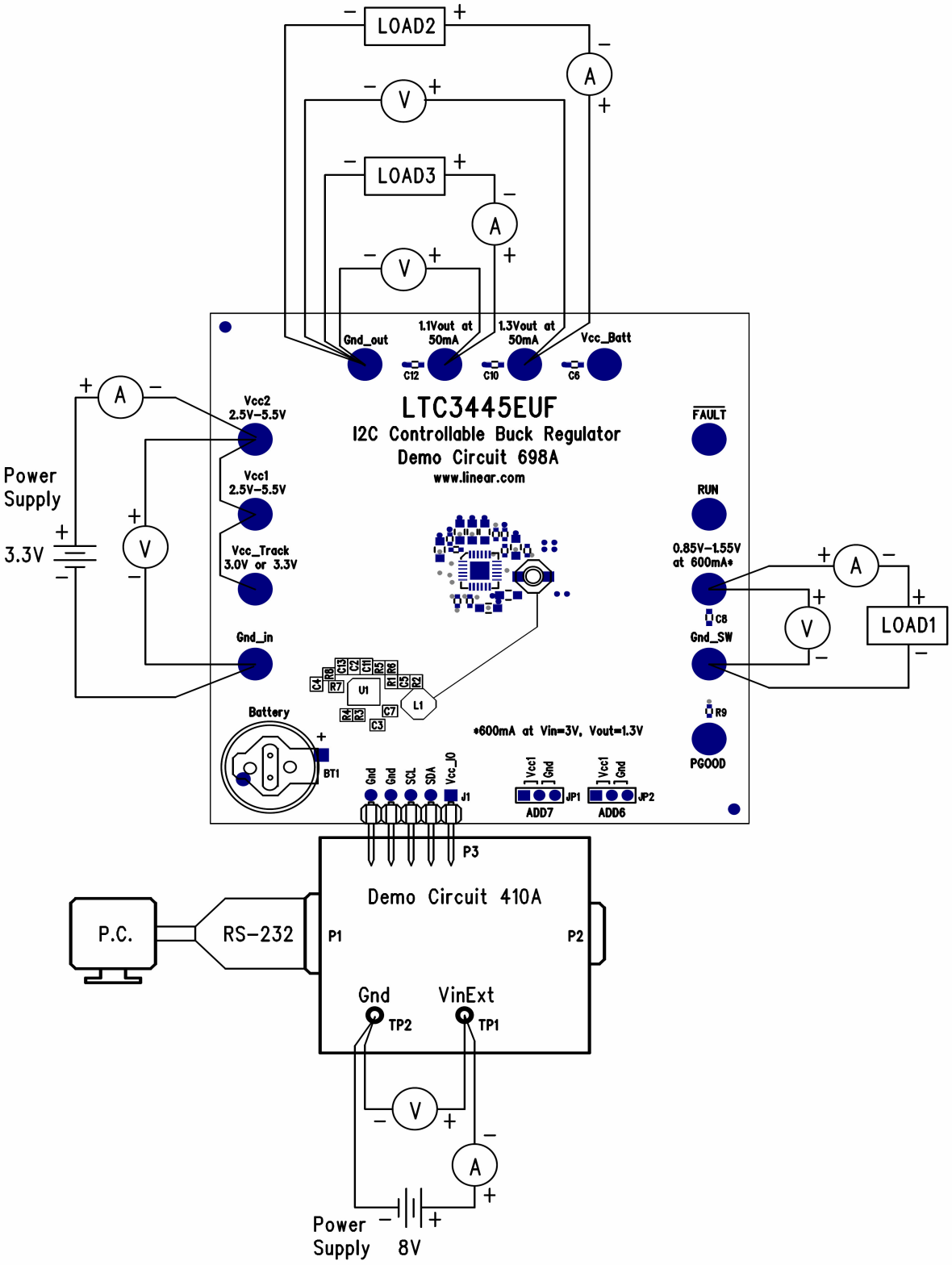
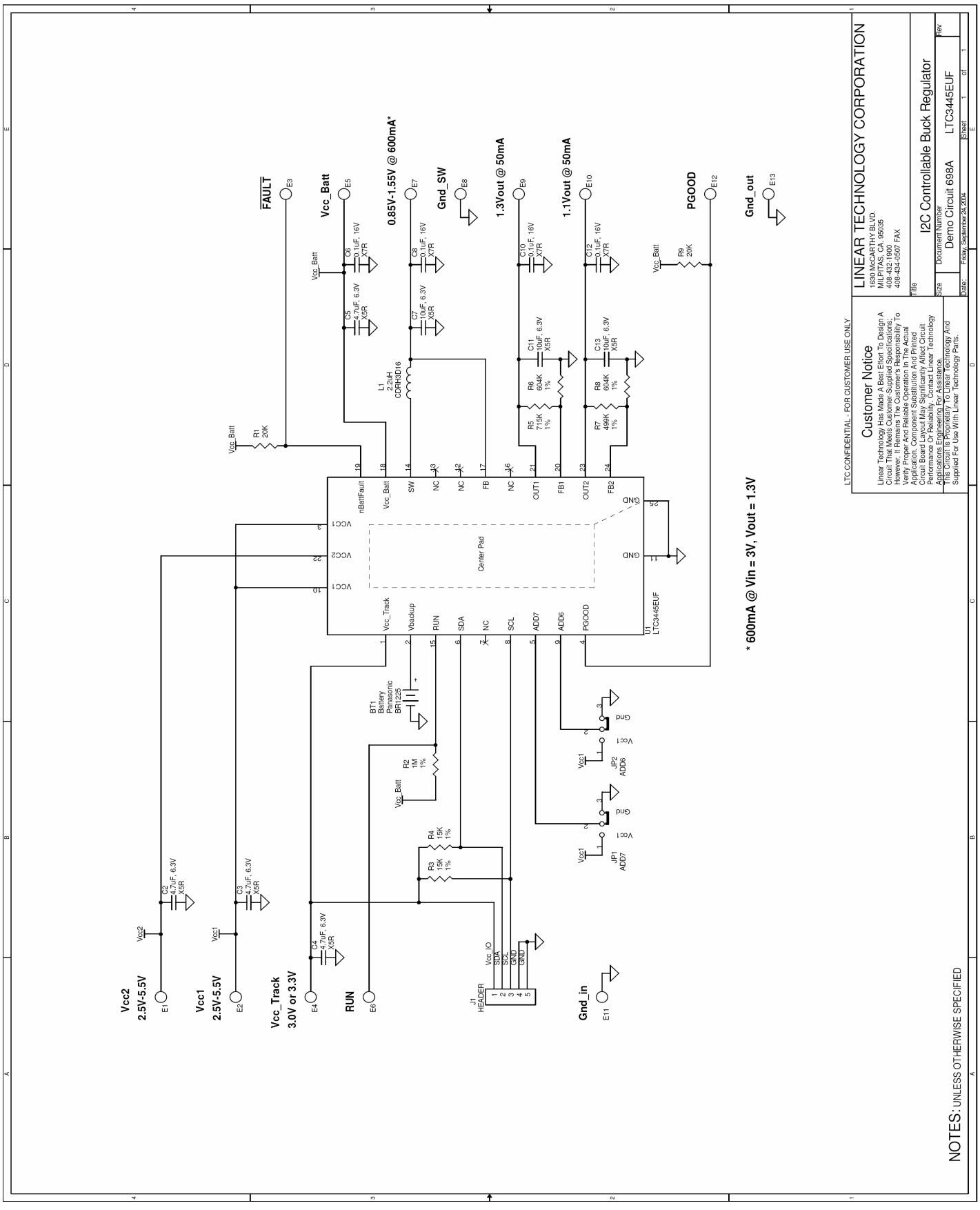


Figure 2. Proper Measurement Equipment Setup


FAULT
Vcc_Batt
0.85V-1.55V @ 600mA*
Gnd_SW
1.3Vout @ 50mA
1.1Vout @ 50mA
PGOOD
Gnd_out
Vcc2
2.5V-5.5V
Vcc1
2.5V-5.5V
Vcc_Track
3.0V or 3.3V
RUN
Gnd_in
* 600mA @ Vin = 3V, Vout = 1.3V
LTC3445EUF
Center Pad
BT1
Battery
Panasonic
BR1225
J1
HEADER
JP1
ADD7
JP2
ADD6
LINEAR TECHNOLOGY CORPORATION
1630 McCARTHY BLVD.
MILPITAS, CA. 95035
408-432-1900
408-434-0507 FAX
I2C Controllable Buck Regulator
Demo Circuit 698A
LTC3445EUF
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NOTES: UNLESS OTHERWISE SPECIFIED