

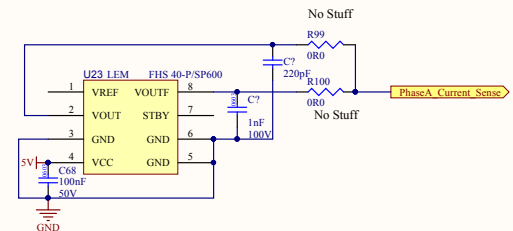
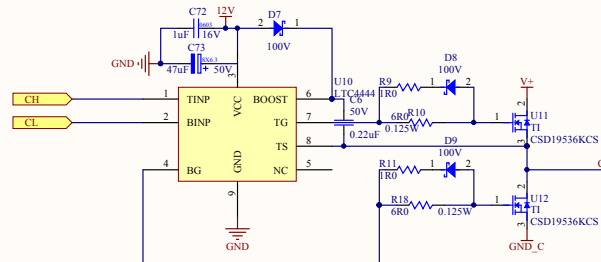
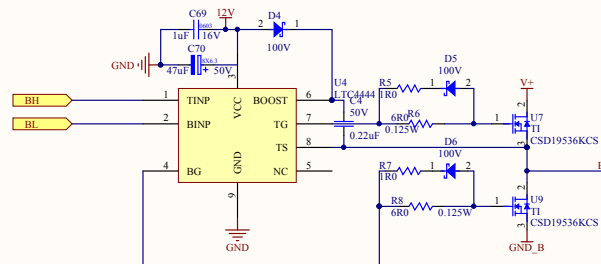
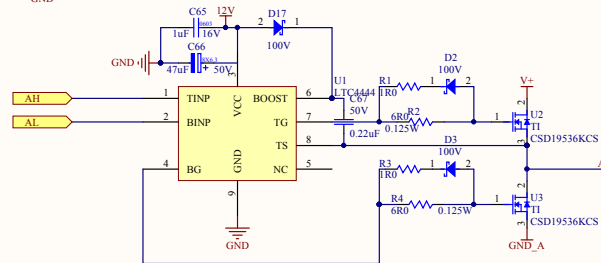
D

V+ volt sense
B- curr sense
phase voltage sense
phase curr sense
analog inputs: throttle, regen, mosfet heatsink thermistor
digital inputs: brake, regen, estop

55mA micro, 80 MHz, 85C, All peripherals on

12V (gate drive):
50 mA RMS at 50kHz (from sim)

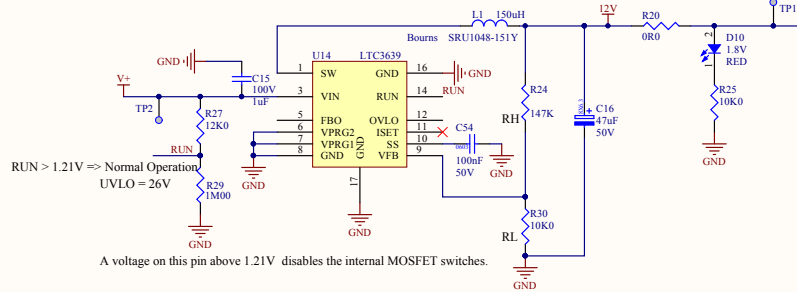
Note: test various DC Link caps (not all loaded at once).



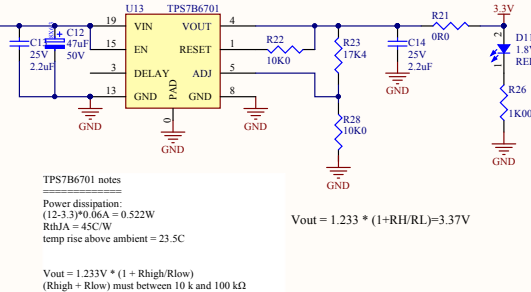
ITEM NAME		REVISION			
10kW Controller					
SHEET TITLE					
#					
Engineer J. Shanahan	DOCUMENT MotorDriver.SchDoc	SIZE B	MODIFIED 9/15/2014	SVN REV	
DATE 1	DO NOT SCALE DRAWING	SHEET	OF		

alts: LTC3703

100V => 12V DCDC



12V => 3.3V



Power Requirements

100V => 12V
12V => 5V (mostly for offboard sensors; eg Hall, throttle)
12V => 3.3V (micro)

Current Consumption Budget

3.3V:
55mA micro, 80 MHz, 85C, All peripherals on

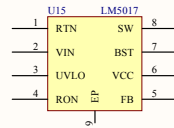
5V (sensors):

12V (gate drive):
50 mA RMS at 50kHz (from sim)

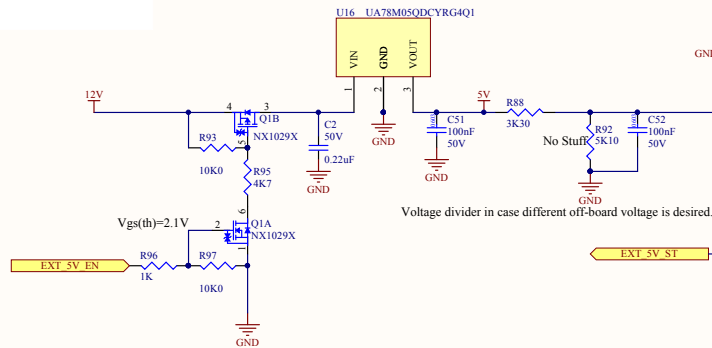
Sleep Current

1.75mA LM5017

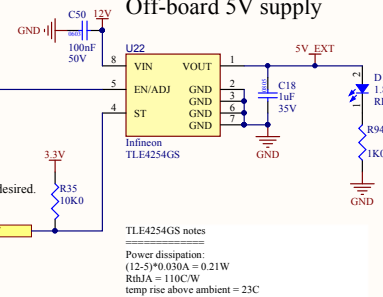
$$V_{out} = 0.8 * (1 + R_H/R_L) = 12.56V$$



On-board 5V supply



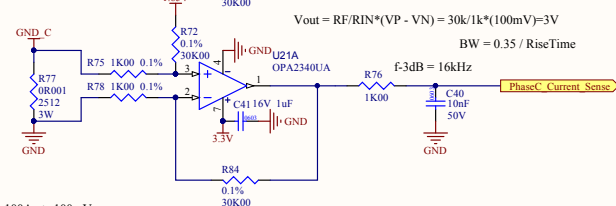
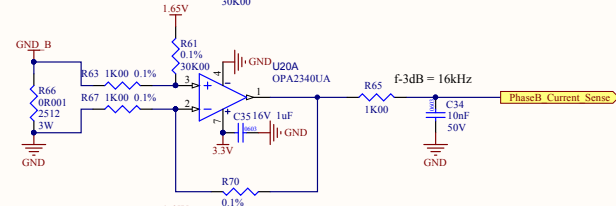
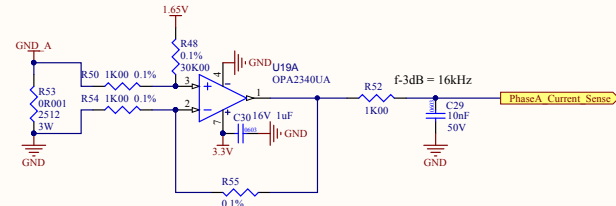
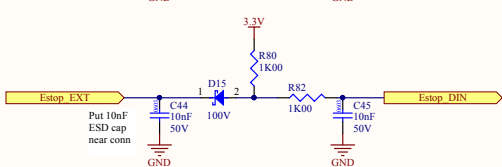
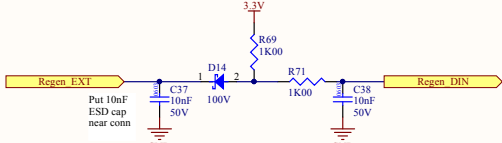
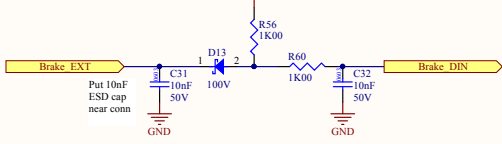
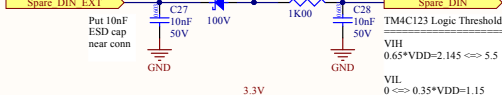
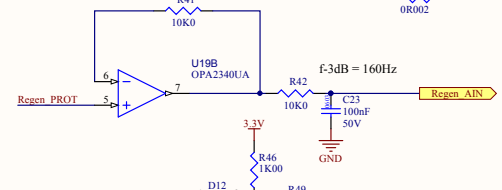
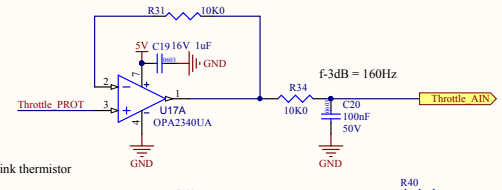
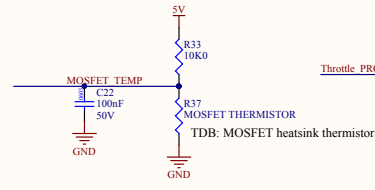
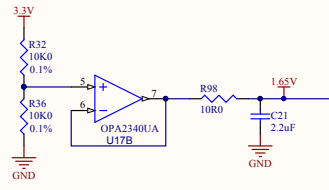
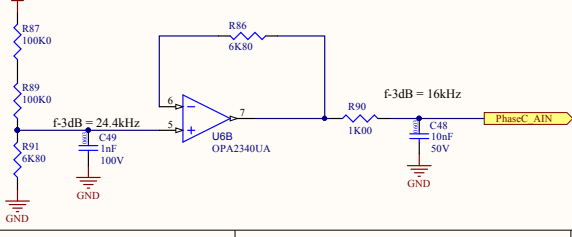
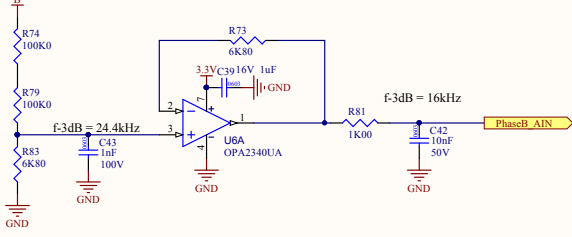
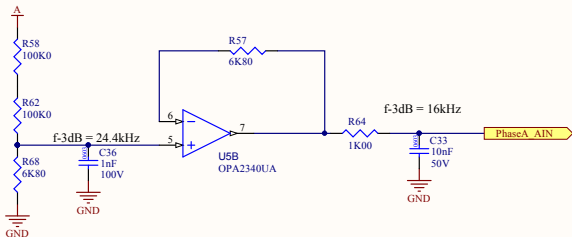
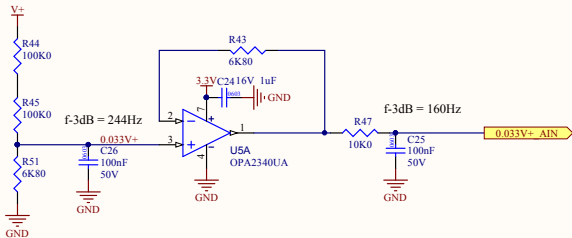
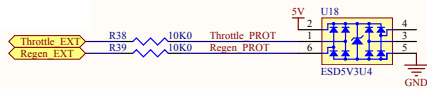
Off-board 5V supply



hall current sense: LEM HS 40-P/SP600

ITEM NAME		REVISION	
10kW Controller			
SHEET TITLE			
Power			
Engineer	DOCUMENT	SIZE	MODIFIED
J. Shanahan	power.SchDoc	B	9/15/2014
DATE	DO NOT SCALE DRAWING		SVN REV
1			SHEET * OF *

Sensors
 =====
 V+ = volt sense
 B- = curr sense
 phase voltage sense
 phase curr sense on ground leg
 analog inputs: throttle, regen, mosfet heatsink thermistor
 digital inputs: brake, regen, estop



$$V_{out} = R_F / R_{IN} * (V_P - V_N) = 30k / 1k * (100mV) = 3V$$

$$BW = 0.35 / RiseTime$$

100A => 100mV

ITEM NAME		REVISION	
10kW Controller			
SHEET TITLE			
Engineer		DOCUMENT	SIZE
J. Shanahan		sensors.SchDoc	B
DATE		MODIFIED	SWN REV
+		9/15/2014	
DO NOT SCALE DRAWING		SHEET * OF *	