


# 110/220V FlexMC PCB

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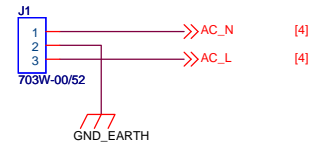
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### Revision History

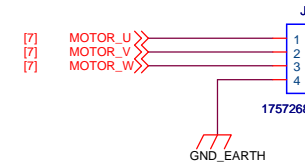
- Rev 1: Initial Draft
- Rev 2: Update refer to request on changes
- Rev 3: Change R33 R34 to 2.20K  
Change R184, R186, R187, R188 to 0 ohm  
Change C44, C45 to 100pF  
Change R193 R198 R203 to 5.60kohm
- Rev 4: Update refer to request of changes

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	IR DATE			
	LAST CHANGE			
	DRAWN BY	J. ROONEY		
	CHECKED BY			
APPROVED BY				COVER
	SIZE	CAGE CODE	DWG NO	REV
	C	1NST2	3022G01	4
BARE PCB P/N			Friday, August 22, 2014	SHEET 1 OF 8
ASSY PCB P/N				

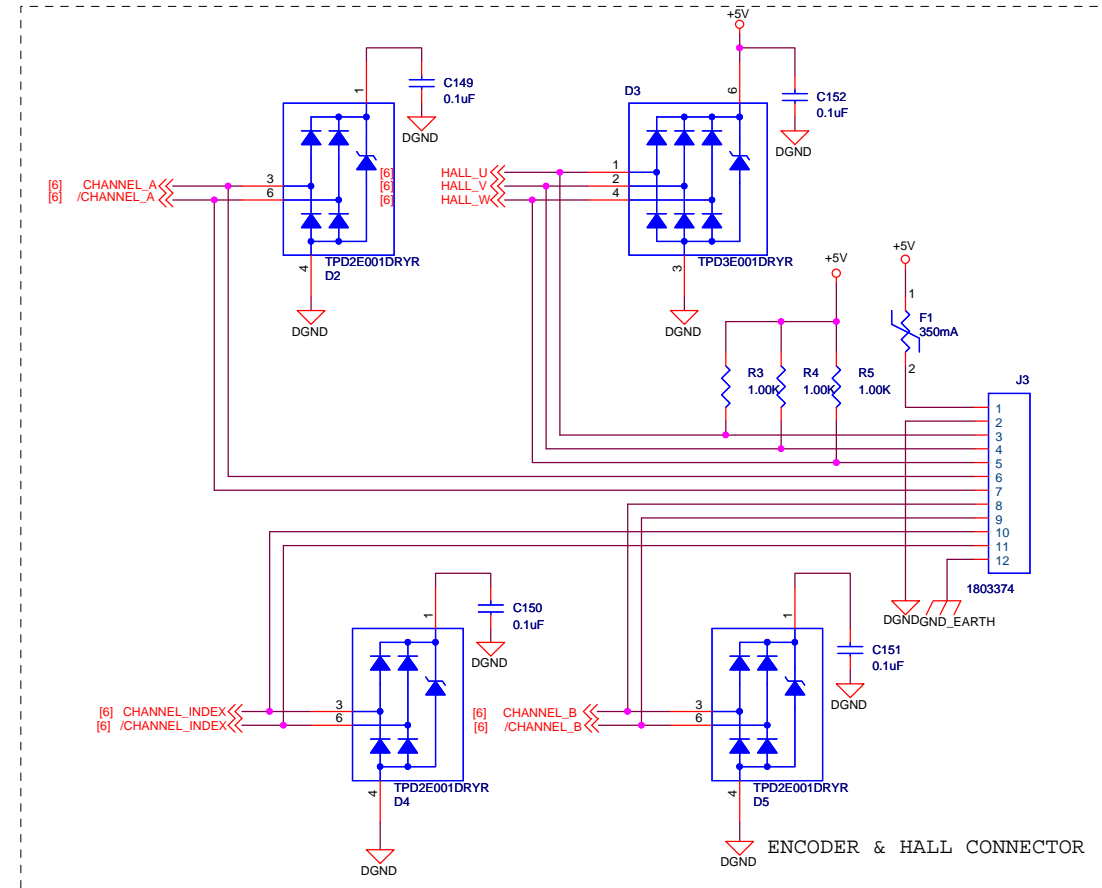
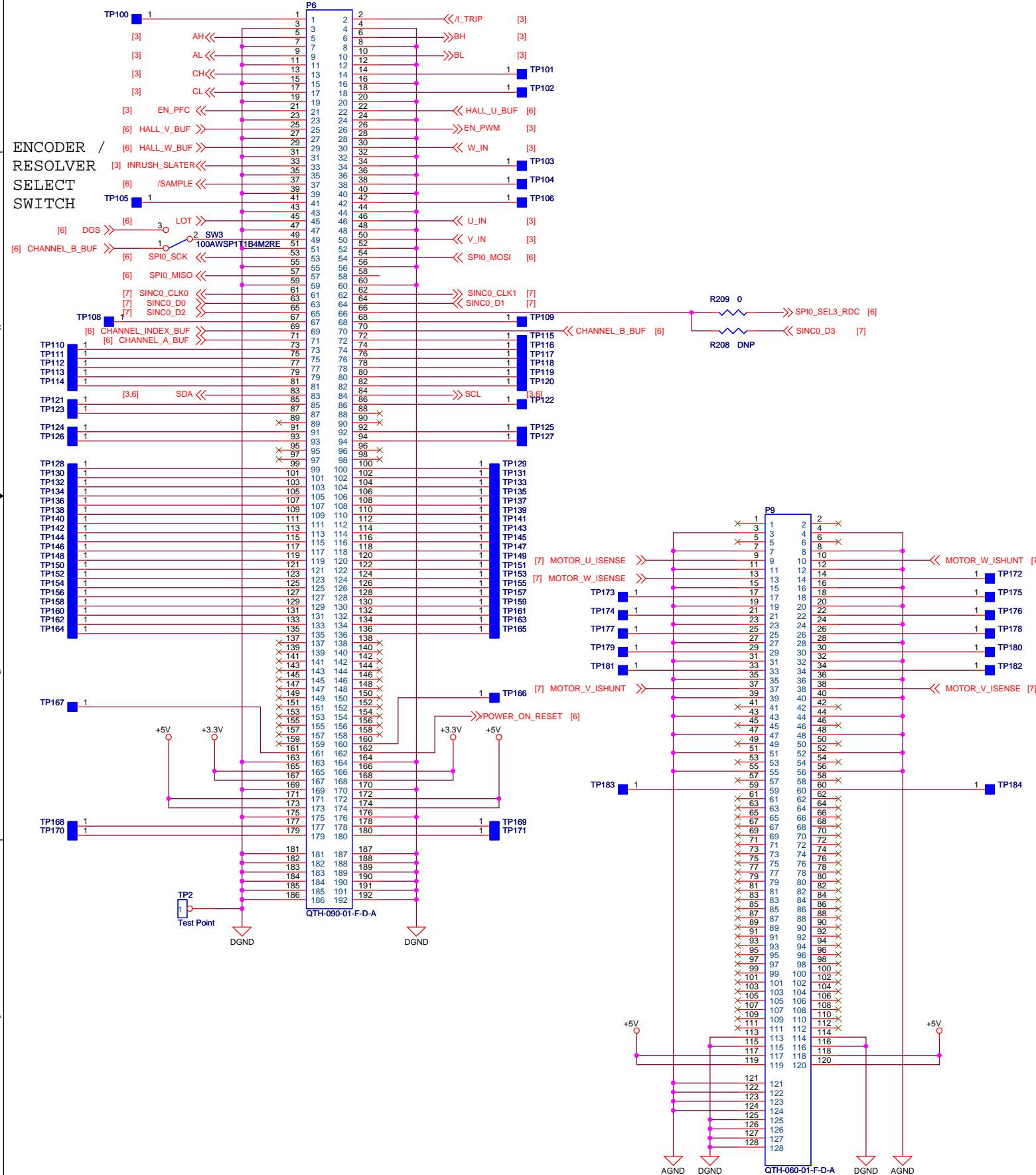
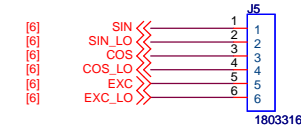
UNIVERSAL AC POWER INPUT



MOTOR CONNECTOR



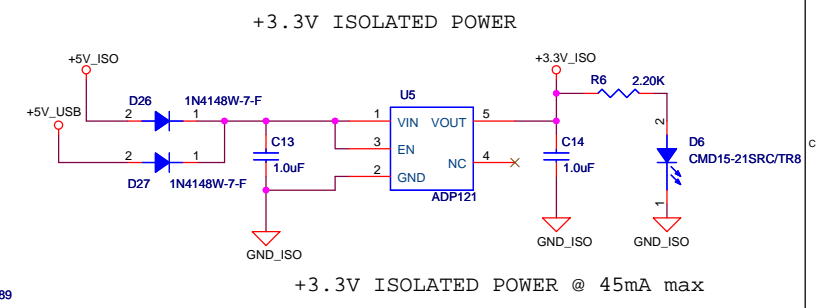
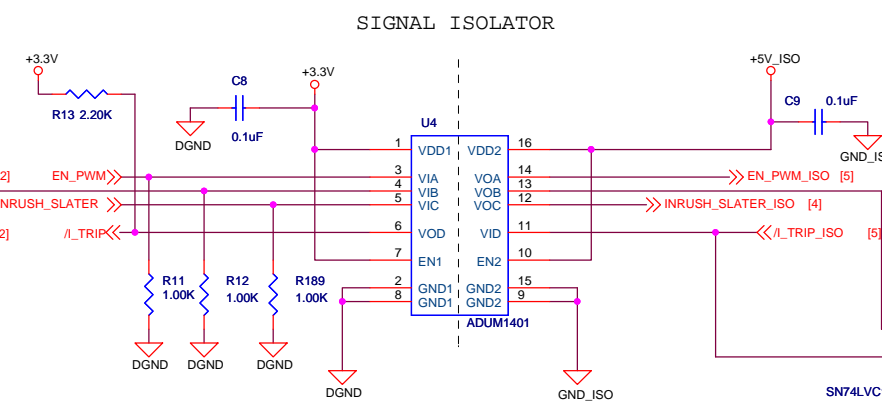
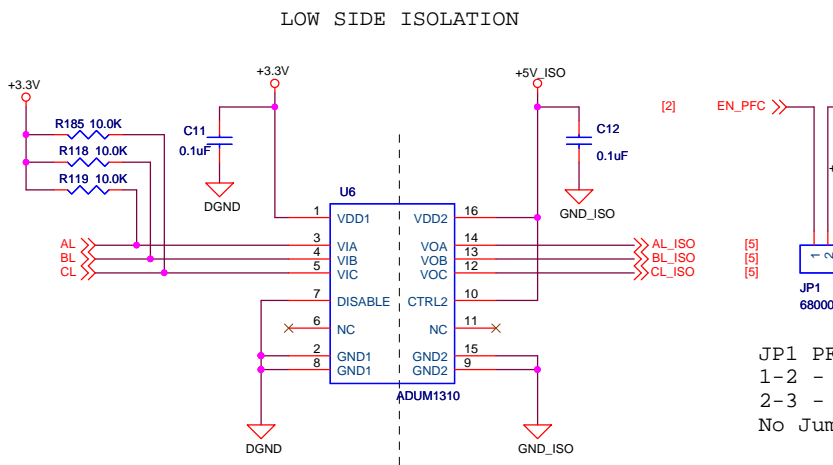
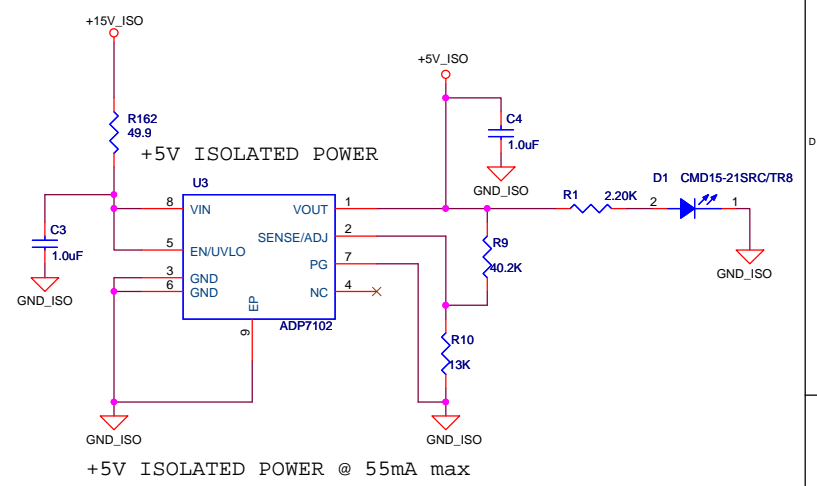
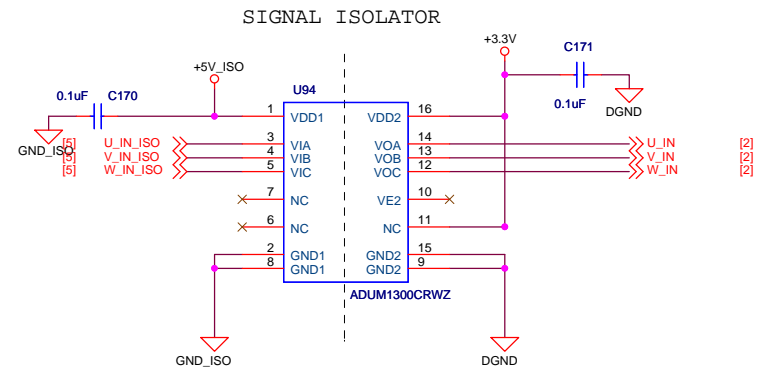
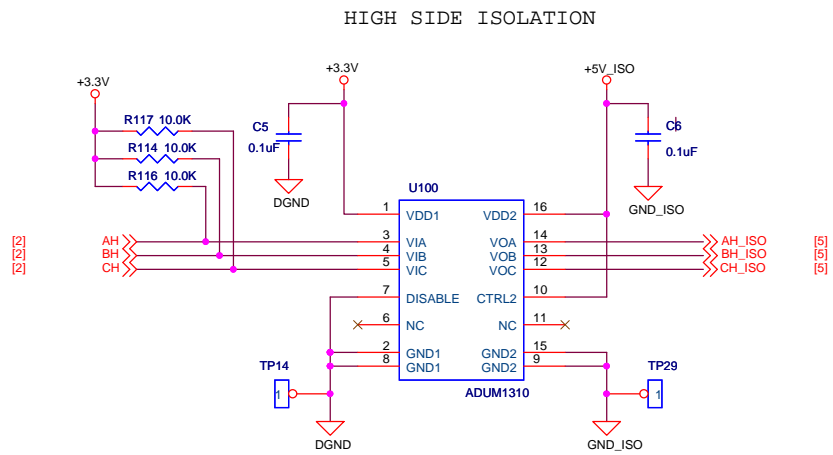
RESOLVER SENSOR CONNECTOR



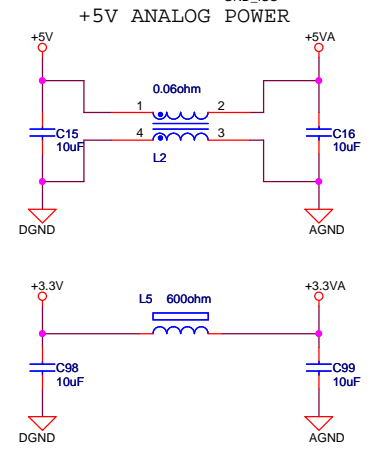
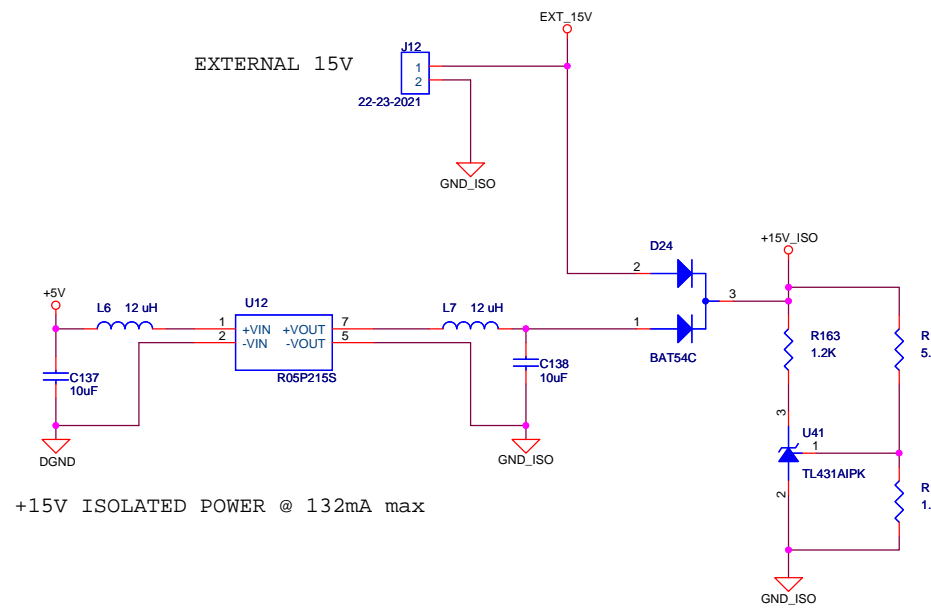
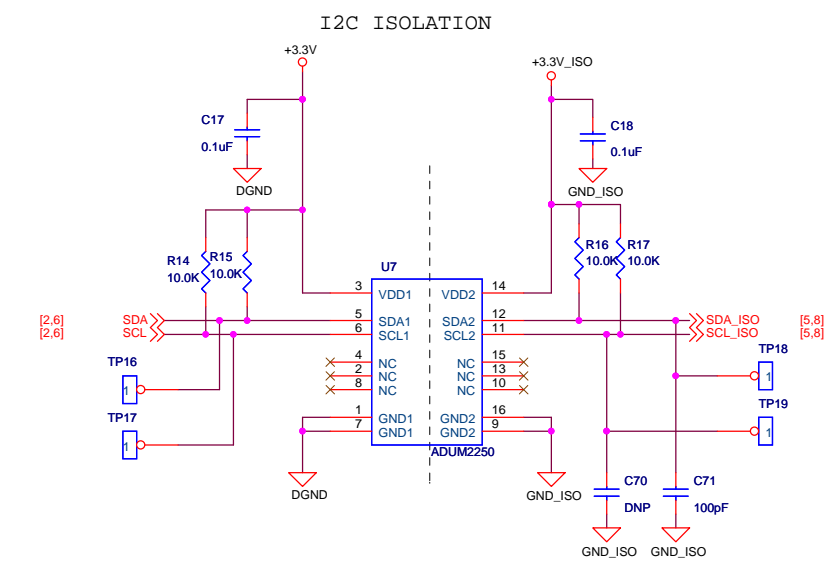
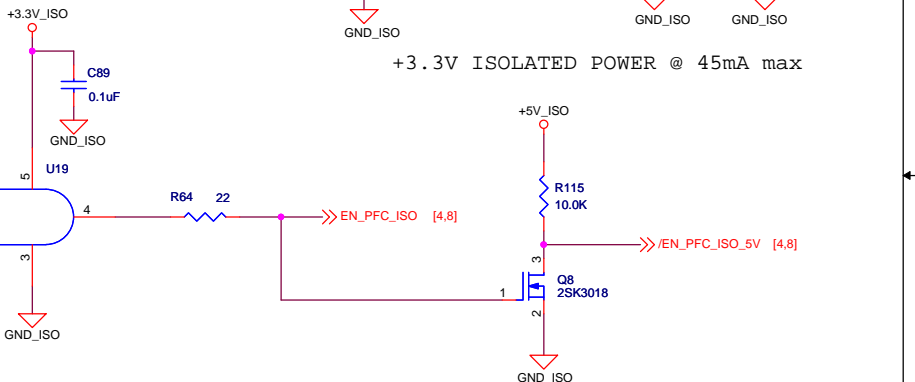
**BOSTON ENGINEERING**  
 300 BEAR HILL ROAD  
 WALTHAM, MA 02451  
 781-466-8010

**CONNECTOR INTERFACE**

SIZE	CAGE CODE	DWG NO	REV
C	1NST2	3022G01	4
Friday, August 22, 2014			SHEET 2 OF 8



JP1 PFC Bypass Setting  
 1-2 - Software Control (High Enable, Low Disable)  
 2-3 - Manual Control (Enable PFC)  
 No Jumper - Manual Control (Disable PFC)

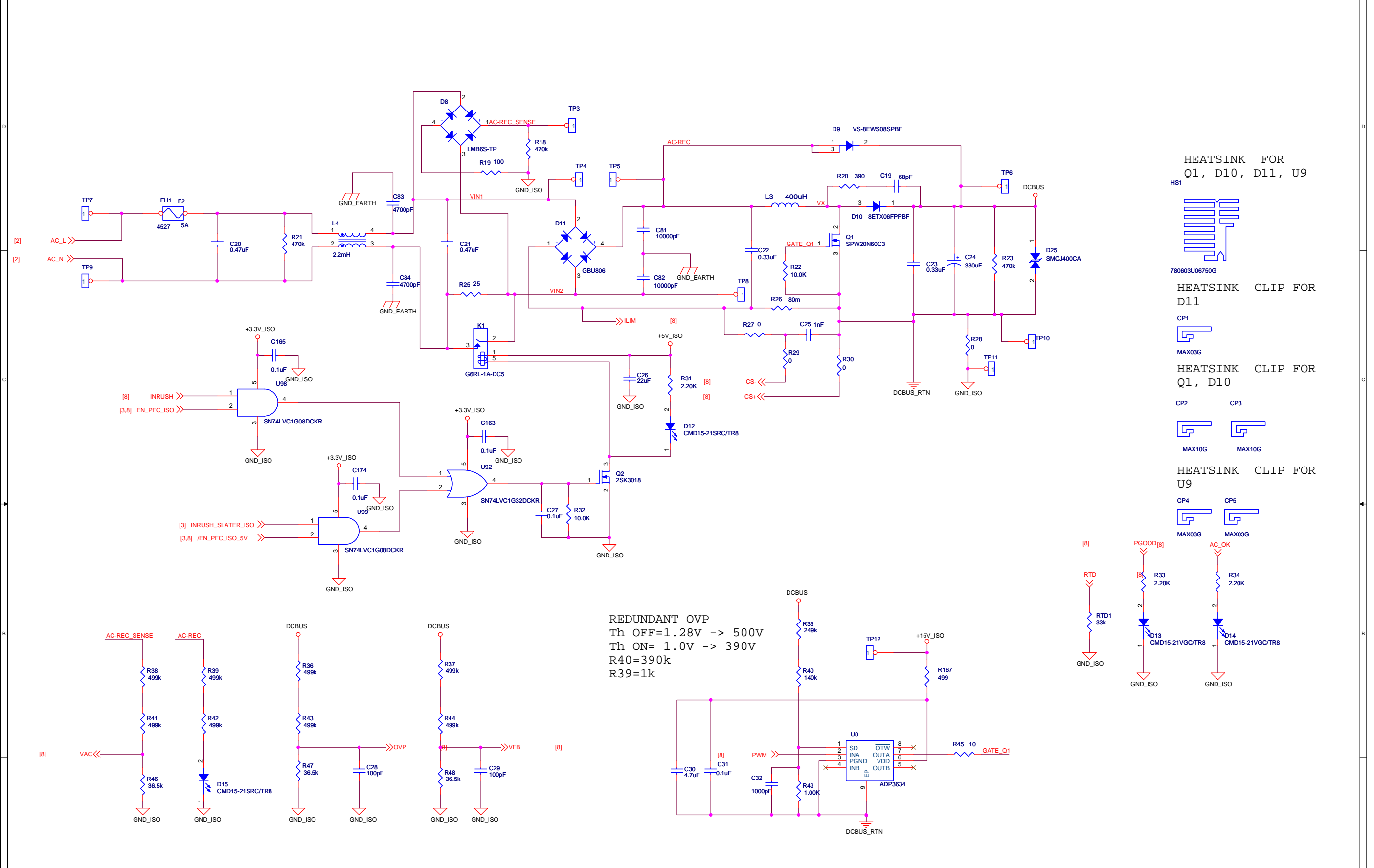


**BOSTON ENGINEERING**

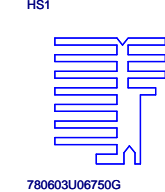
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 781-466-8010

**POWER SUPPLIES, ISOLATION**

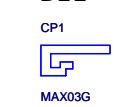
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C	1NST2	3022G01	4
		Friday, August 22, 2014	SHEET 3 OF 8



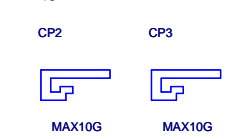
HEATSINK FOR Q1, D10, D11, U9



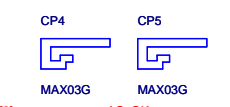
HEATSINK CLIP FOR D11



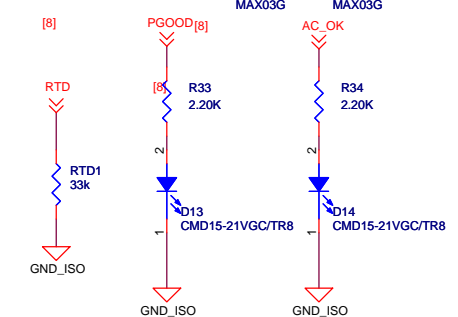
HEATSINK CLIP FOR Q1, D10



HEATSINK CLIP FOR U9



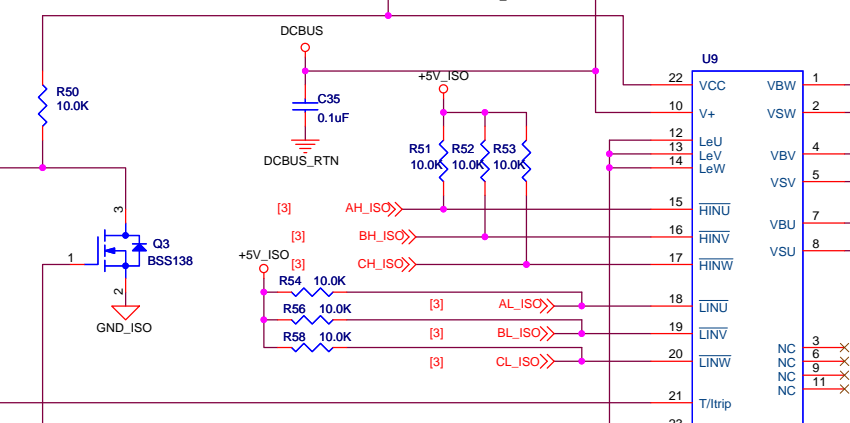
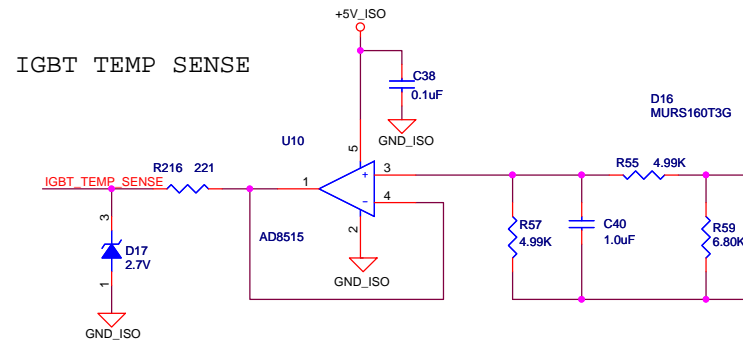
REDUNDANT OVP  
 Th OFF=1.28V -> 500V  
 Th ON= 1.0V -> 390V  
 R40=390k  
 R39=1k



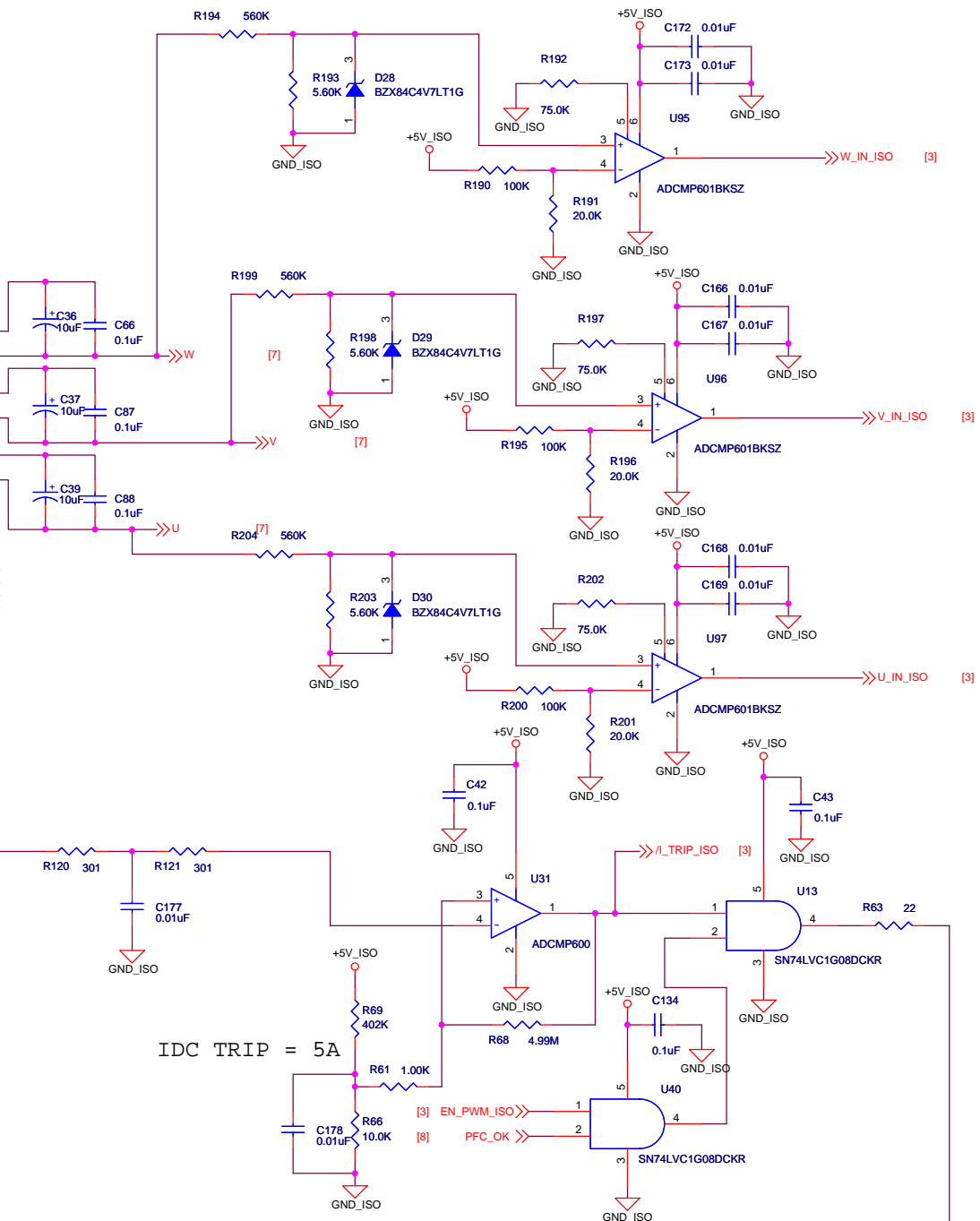
		300 Bear Hill Road Waltham, MA 02452 781-466-8010	
<b>POWER FACTOR CORRECTION</b>			
SIZE	CAGE CODE	DWG NO	REV
C	1NST2	3022G01	4
		Friday, August 22, 2014	SHEET 4 OF 8

IGBT MODULE

IGBT TEMP SENSE

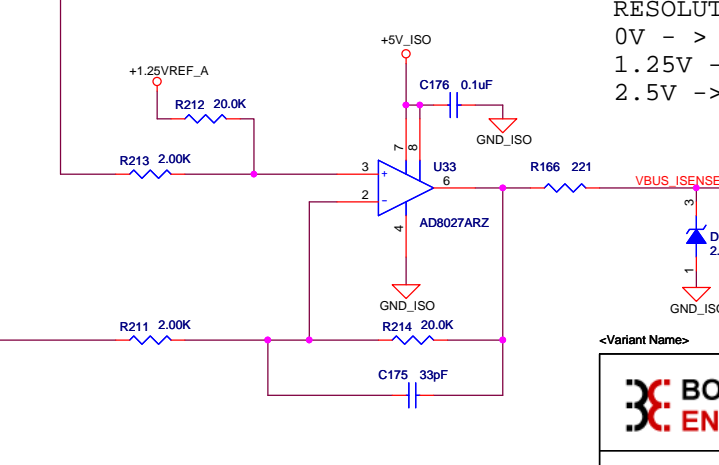
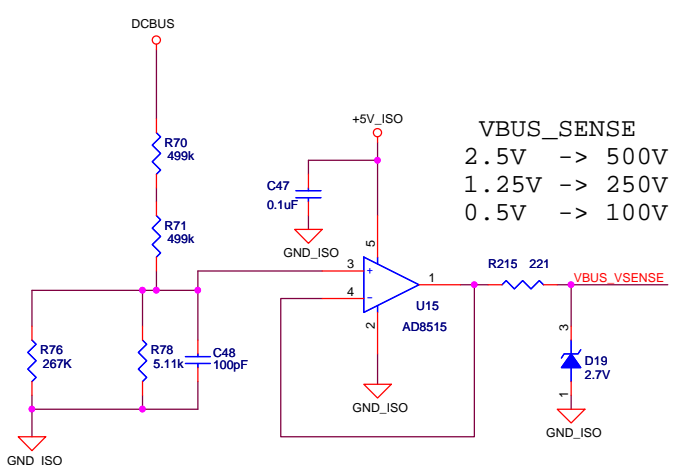
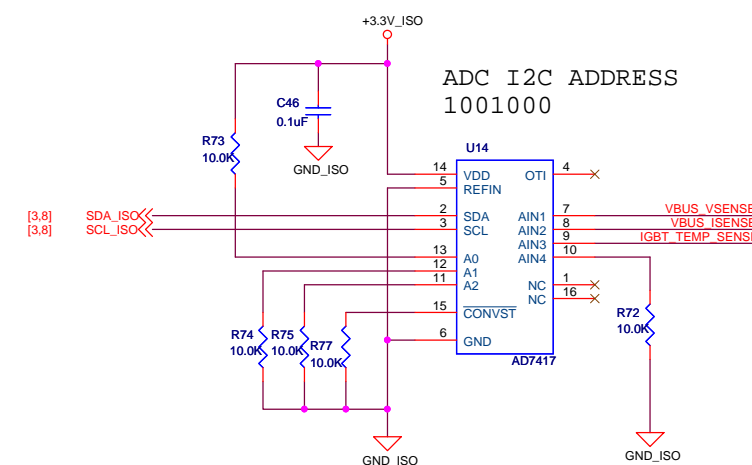


IDC TRIP = 5A



CURRENT SENSE  
 RESOLUTION: 4A/V, CENTER 1.25V  
 0V -> 5A  
 1.25V -> 0A  
 2.5V -> 5A

GAIN = 10  
 200kHz - Low Pass Filter



Variant Name:

**BOSTON ENGINEERING**

300 BEAR HILL ROAD  
 WALTHAM, MA 20451  
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**IGBT MOTOR DRIVER**

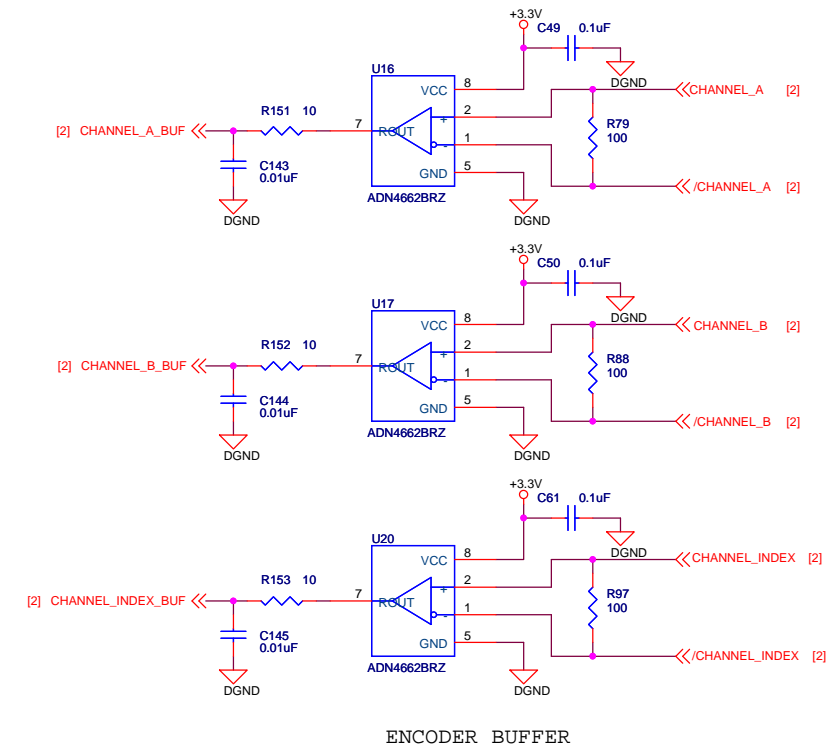
SIZE	CAGE CODE	DWG NO	REV
C	1NST2	3022G01	4

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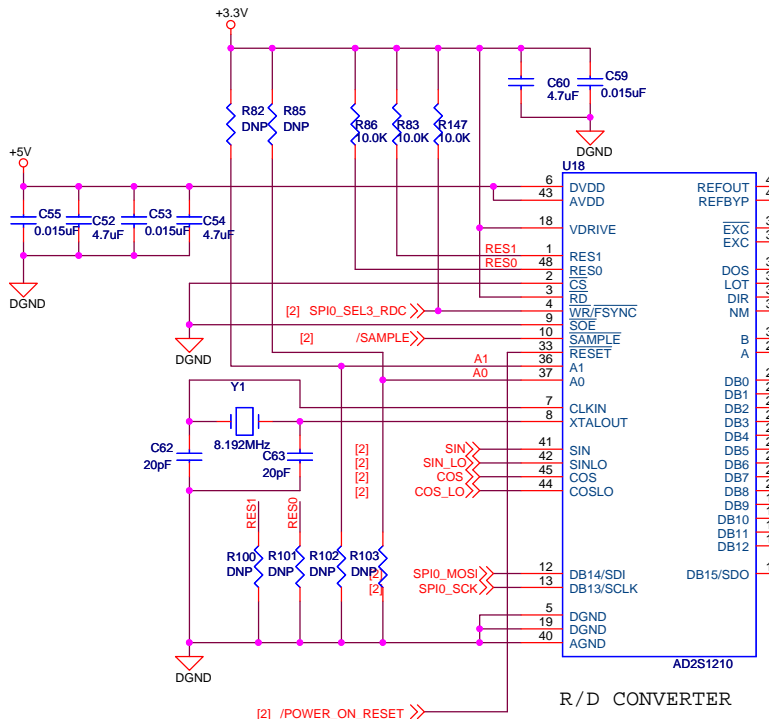
DEFAULT: USING 5V  
INSTALL R80, DNP R81

USING EXTERNAL 12V  
DNP R80, INSTALL R81

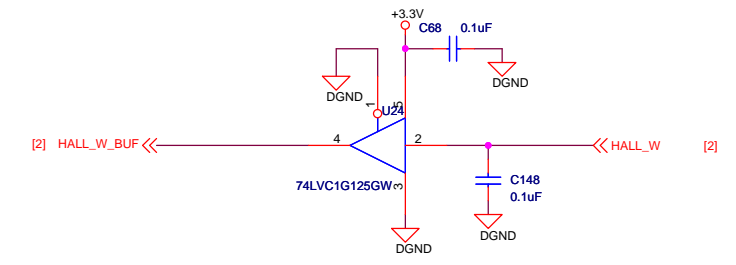
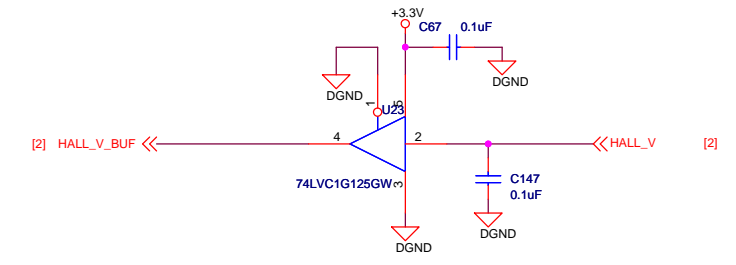
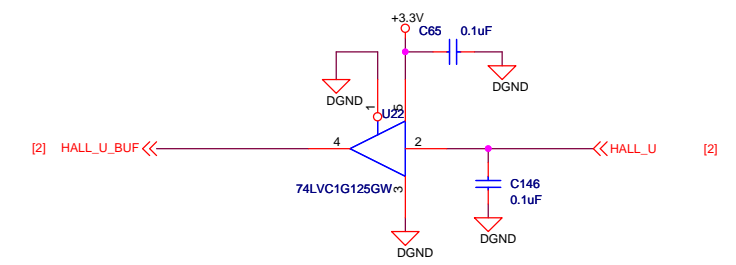
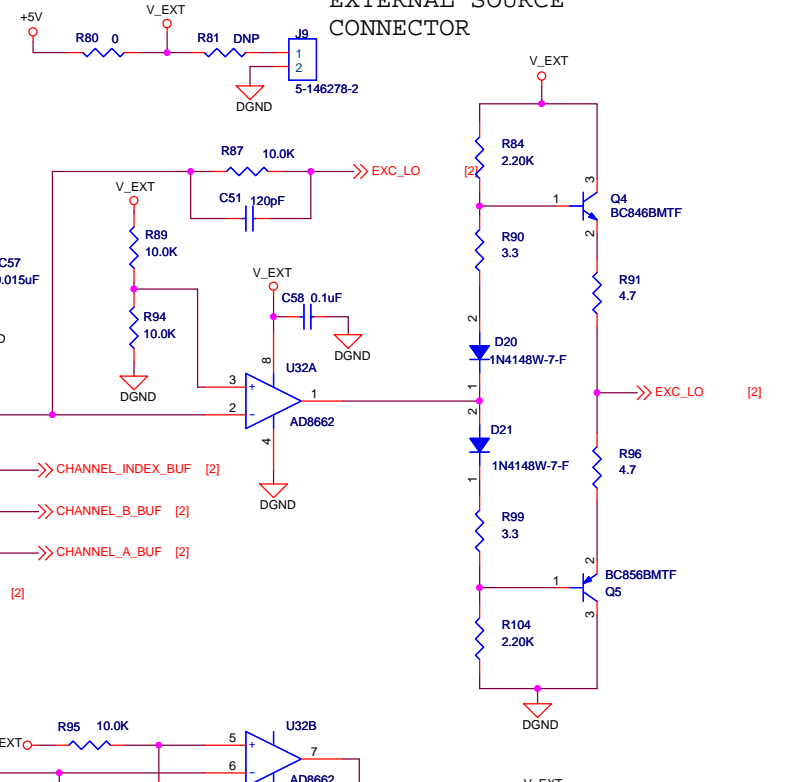
EXTERNAL SOURCE  
CONNECTOR



ENCODER BUFFER



R/D CONVERTER



HALL BUFFER

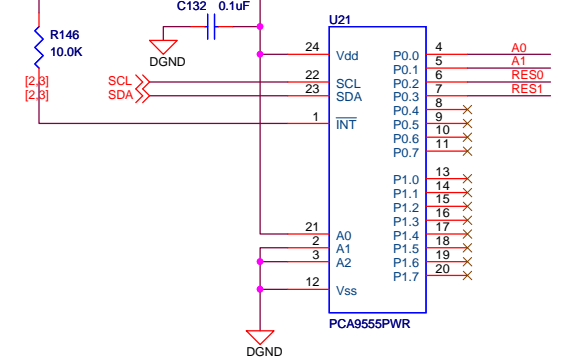
CONFIGURATION MODE SETTINGS

A0	A1	Mode
0	0	Normal mode - position output
0	1	Normal mode - velocity output
1	0	Reserved
1	1	Configuration mode

RESOLUTION SETTINGS

RES0	RES1	RESOLUTION (BITS)	POSITION LSB (Arc min)	VELOCITY LSB (rps)
0	0	10	21.1	4.88
0	1	12	5.3	0.488
1	0	14	1.3	0.06
1	1	16	0.3	0.004

I/O Expander I2C ADDRESS  
0100001



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300 BEAR HILL ROAD  
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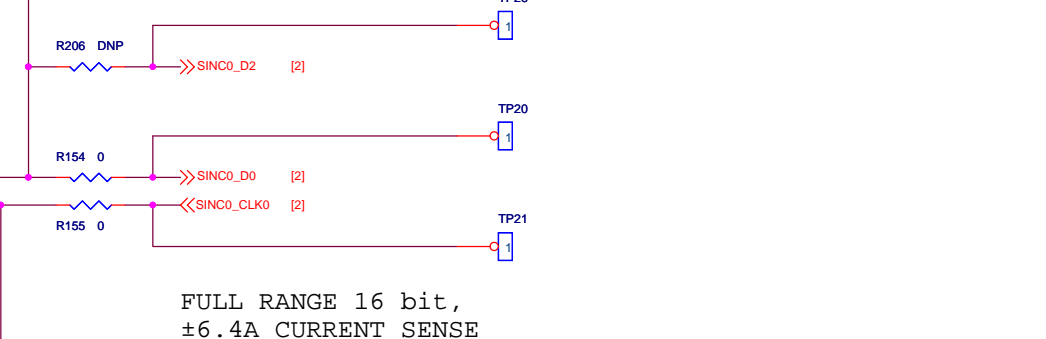
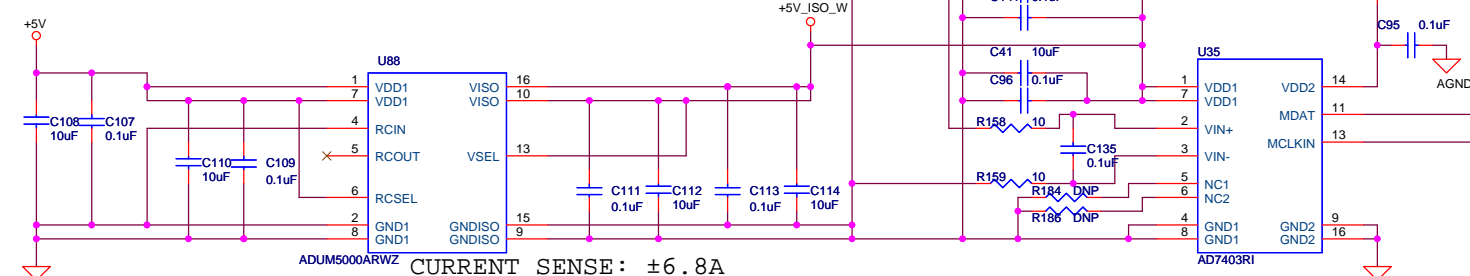
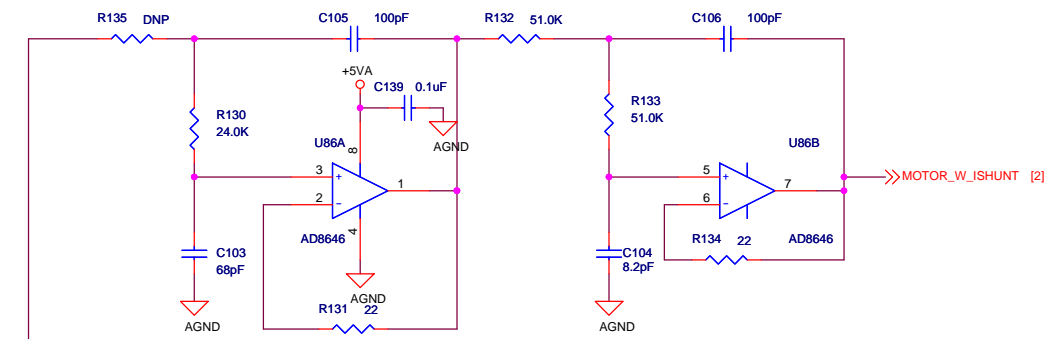
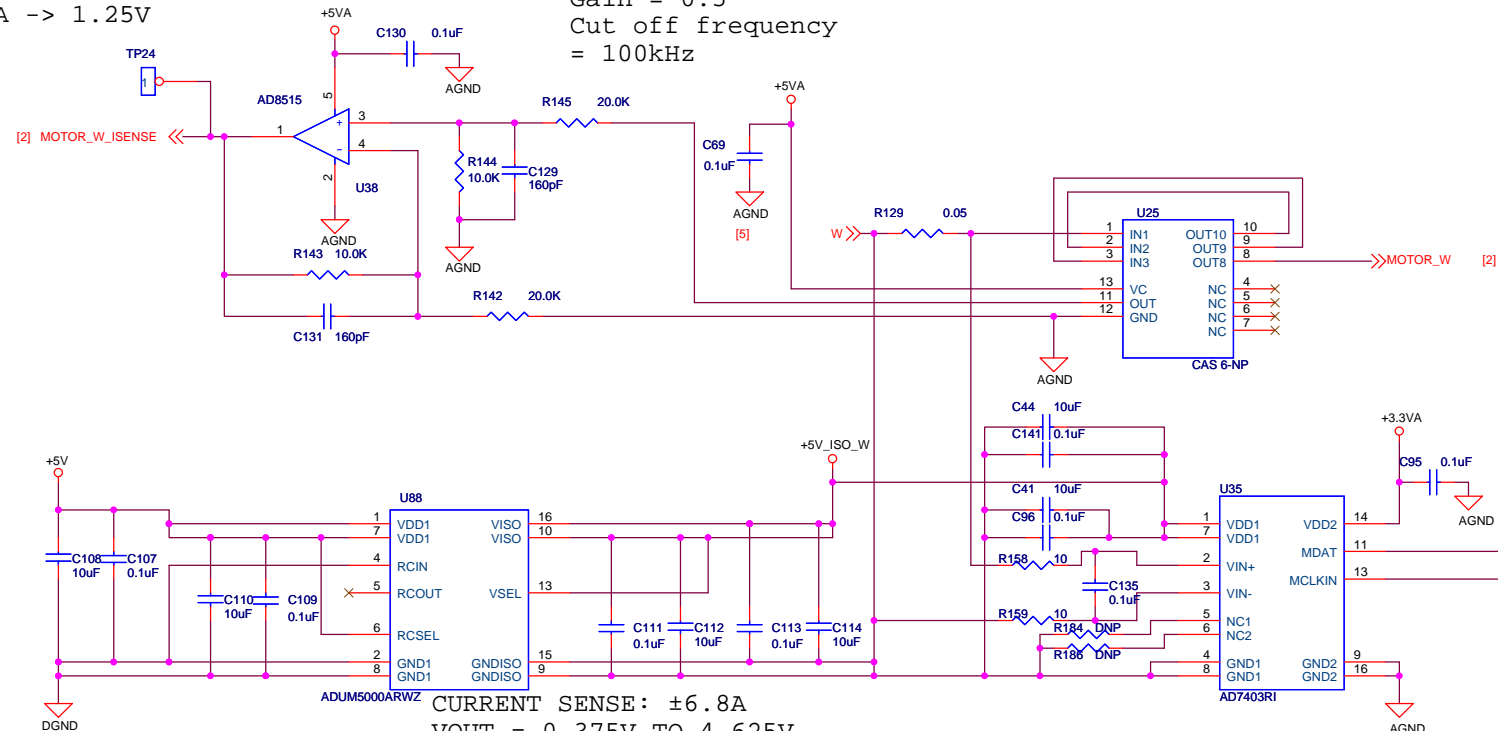
**BUFFER, RESOLVER TO DIGITAL CONVERTER**

SIZE	CAGE CODE	DWG NO	REV
C	1NST2	3022G01	4

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CURRENT SENSE:  $\pm 6.8A$   
 VOUT = 0.375V TO 4.625V  
 CENTER AT 1.25V  
 -6A -> 0.3125V  
 -4A -> 0.625V  
 -2A -> 0.9375V  
 0A -> 1.25V

6A -> 2.1875V  
 4A -> 1.875V  
 2A -> 1.5625V  
 Gain = 0.5  
 Cut off frequency = 100kHz

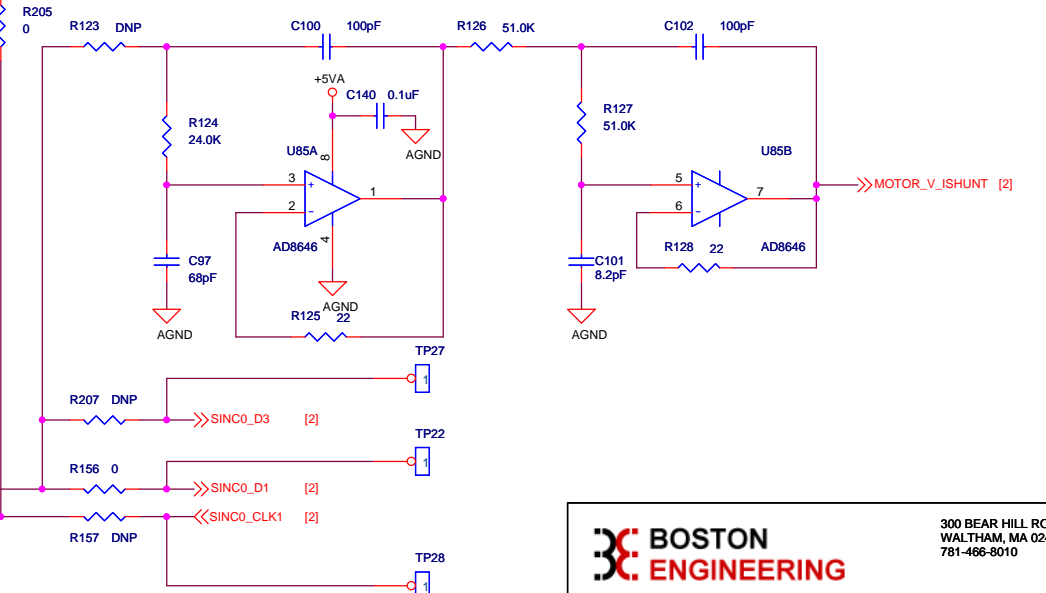
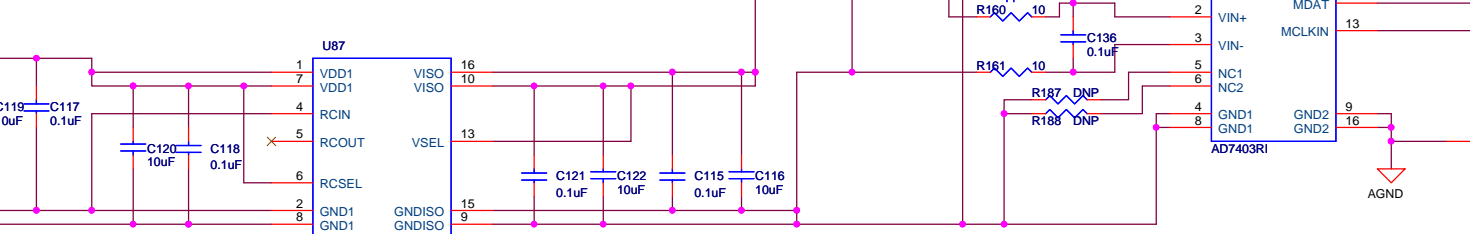
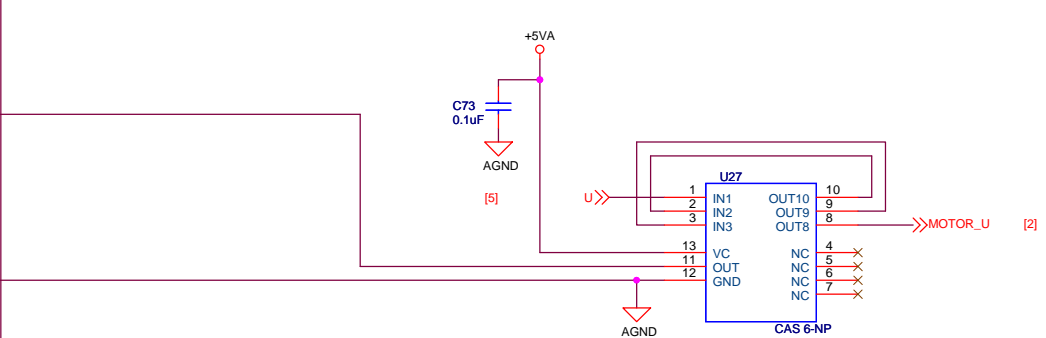
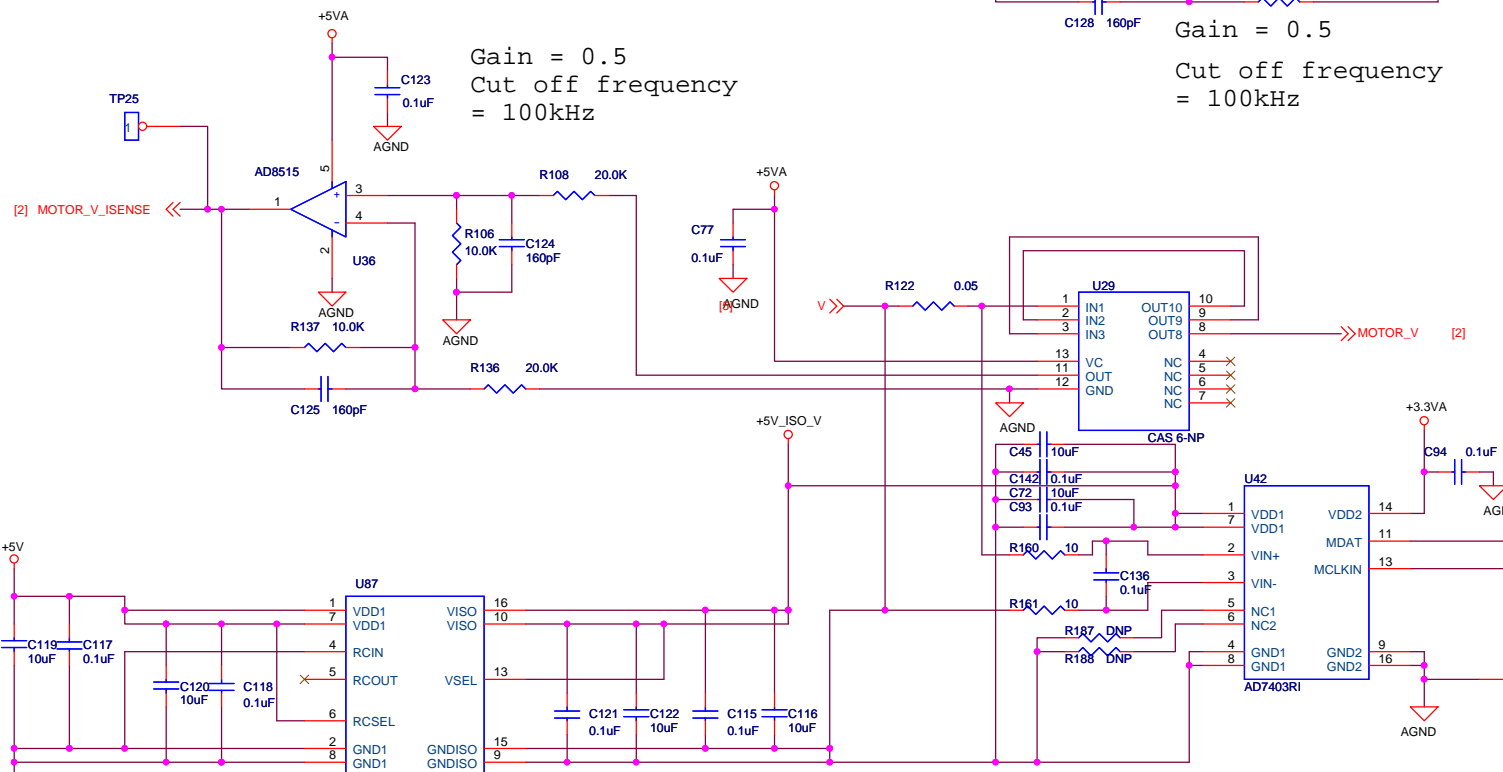


FULL RANGE 16 bit,  
 $\pm 6.4A$  CURRENT SENSE

CURRENT SENSE:  $\pm 6.8A$   
 VOUT = 0.375V TO 4.625V  
 CENTER AT 1.25V  
 -6A -> 0.3125V  
 -4A -> 0.625V  
 -2A -> 0.9375V  
 0A -> 1.25V

6A -> 2.1875V  
 4A -> 1.875V  
 2A -> 1.5625V

Gain = 0.5  
 Cut off frequency = 100kHz



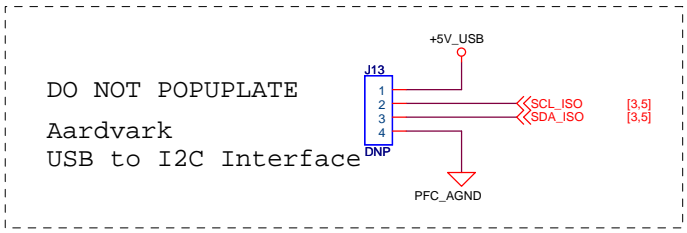
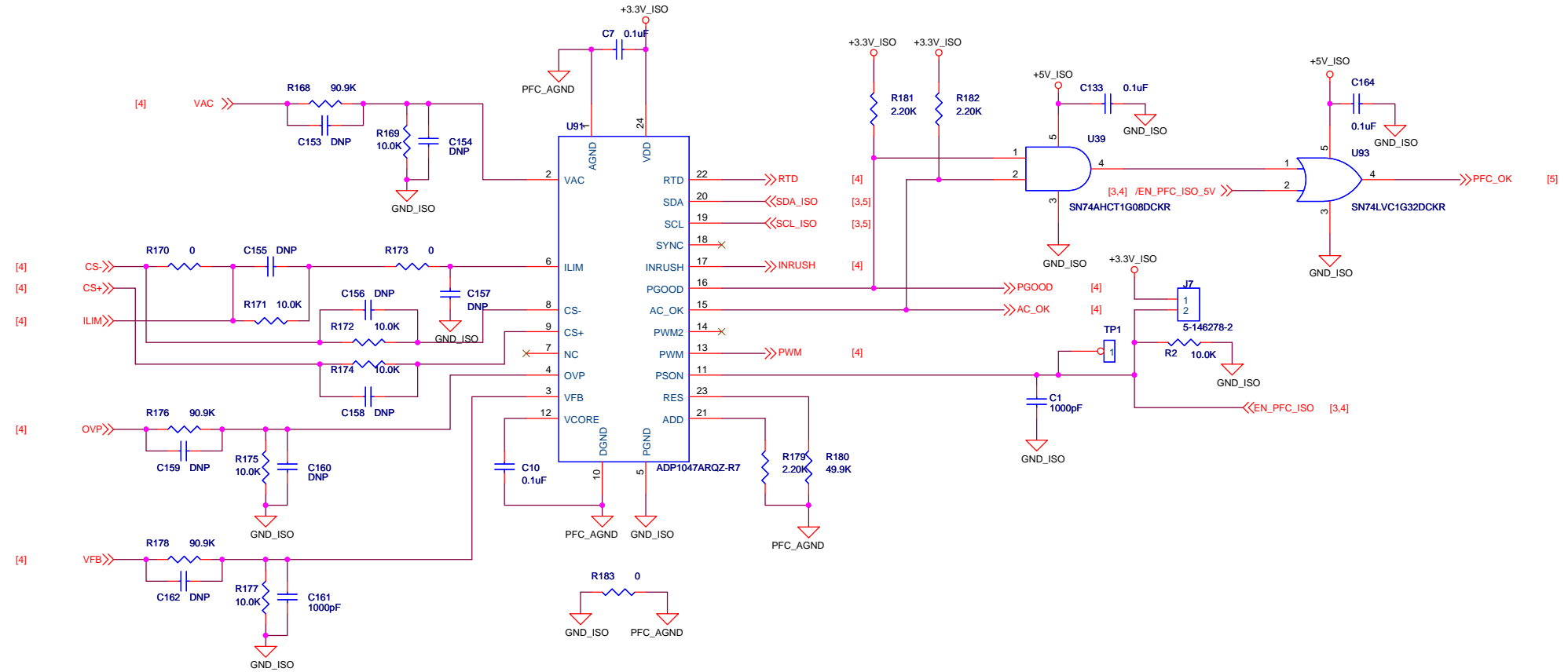
FULL RANGE 16 bit,  
 $\pm 6.4A$  CURRENT SENSE

**BOSTON ENGINEERING**  
 300 BEAR HILL ROAD  
 WALTHAM, MA 02451  
 781-466-8010

**CURRENT SENSING**

SIZE	CAGE CODE	DWG NO	REV
C	1NST2	3022G01	4
Friday, August 22, 2014		SHEET 7 OF 8	

PFC CONTROLLER I2C ADDRESS  
1011000



		300 Bear Hill Road Waltham, MA 02452 781-466-8010	
<b>PFC CONTROLLER</b>			
SIZE <b>C</b>	CAGE CODE <b>1NST2</b>	DWG NO <b>3022G01</b>	REV <b>4</b>
		Friday, August 22, 2014	SHEET 8 OF 8