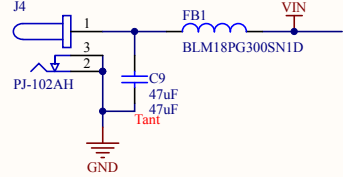
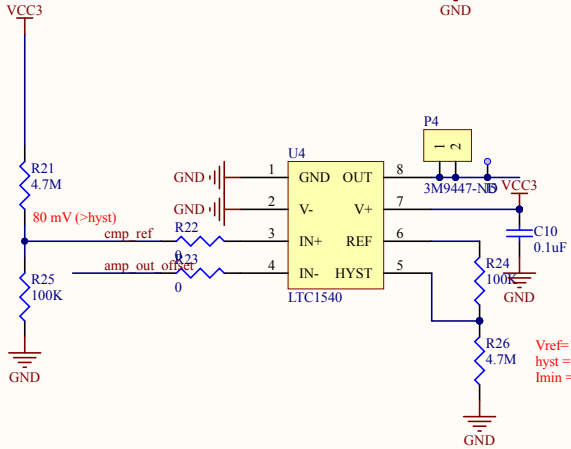
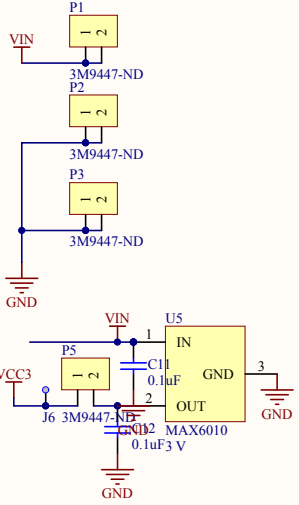
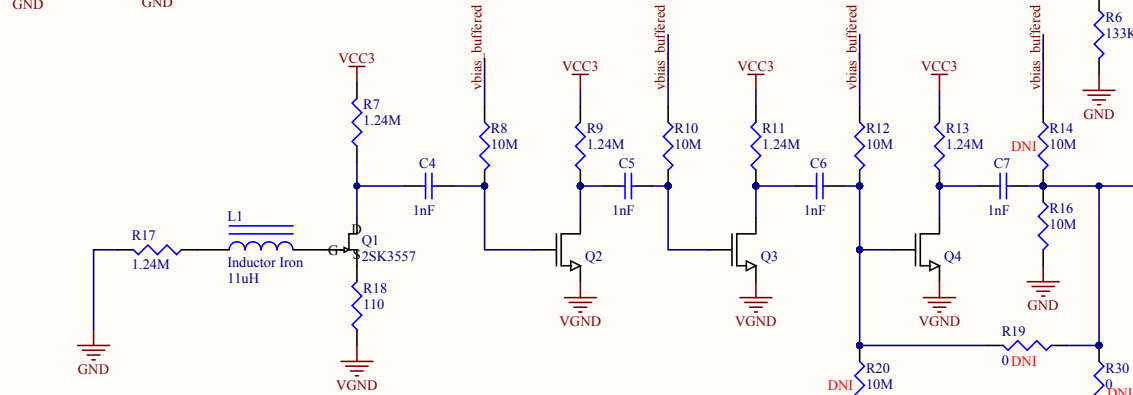
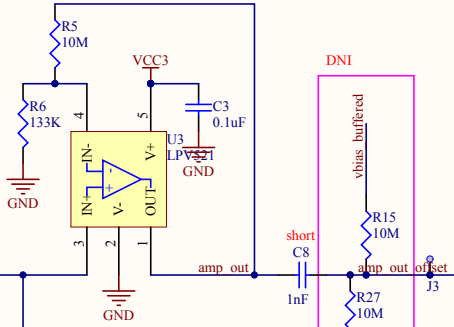
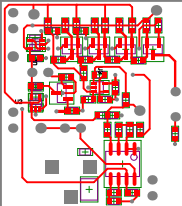


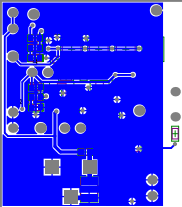
$A(rc) = 1/\sqrt{1 + 1/(rcw)^2}$

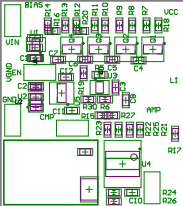


$Vref = 1.182 V$
 $hyst = 2 * (Vref - Vhyst) = 49 mV$
 $Imin = 0.1 uA$

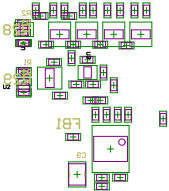
Title *		Cannot open file C:\Users\samk ... University of Michigan
Author *	Revision:*	
Date: 6/16/2014	Sheet* of *	
File: 60hz receiver v3.SchDoc		

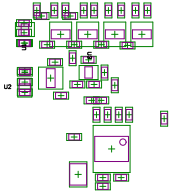






M
 60 Hz phase extractor
 Kuo, 10 '13





Designator	Description	Value	Quantity	Footprint	Supplier part#
C1, C2, C3, C10, C11, C12	Capacitor (Semiconductor SIM Model)	0.1uF	6	1608[0603]	
C4, C5, C6, C7, C8	Capacitor (Semiconductor SIM Model)	1nF	5	1608[0603]	
C9	Capacitor (Semiconductor SIM Model)	47uF	1	C1210	
FB1	FERRITE CHIP 30 OHM 1000MA 0603		1	1608[0603]	
J1, J2, J3, J5, J6	TEST POINT PC MINI .040"D YELLOW		5	TestPoint	
J4	CONN PWR JACK 2.1X5.5MM HIGH CUR		1	PJ-102AH	
L1	Magnetic-Core Inductor	11uH	1	charging coil	445-9309-ND
P1, P2, P3, P4, P5	100 mils standard header		5	1x2 header	
Q1	N-Channel JFET		1	SOT23-3N	869-1106-1-ND
Q2, Q3, Q4	N-Channel 20 V (D-S) MOSFET		3	SOT23-3N	SI2312CDS-T1-GE3CT-ND
R1, R21, R26	Resistor	4.7M	3	J1-0603	
R2	Resistor	6.98M	1	J1-0603	
R3, R4	Resistor	3M	2	J1-0603	
R5, R8, R10, R12, R14, R15, R16, R20, R27	Resistor	10M	9	J1-0603	
R6	Resistor	133K	1	J1-0603	
R7, R9, R11, R13, R17	Resistor	1.24M	5	J1-0603	
R18	Resistor	110	1	J1-0603	
R19, R22, R23, R28, R30	Resistor	0	5	J1-0603	
R24, R25	Resistor	100K	2	J1-0603	
R29	Resistor	357K	1	J1-0603	
U1, U2, U3	Nanopower, 1.8V, RRIO, CMOS Input, Operational Amplifier		3	SC70-5	LPV521MGE/NOPBCT-ND
U4	Nanopower Comparator with Reference		1	SOIC-8	LTC1540IS8#PBF-ND
U5	Precision Micropower Shunt Voltage Reference	3 V	1	SOT23-3N	MAX6010AEUR+TCT-ND