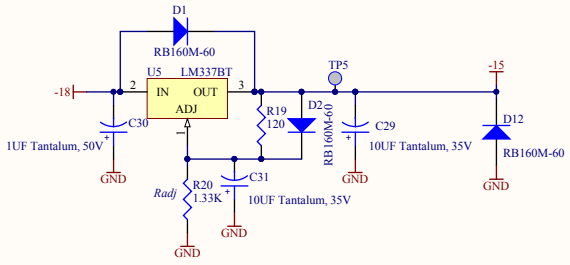
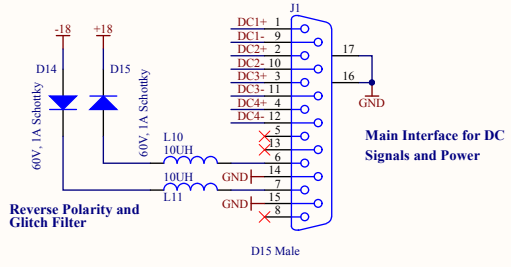
Revision History:
Rev1 - Initial release

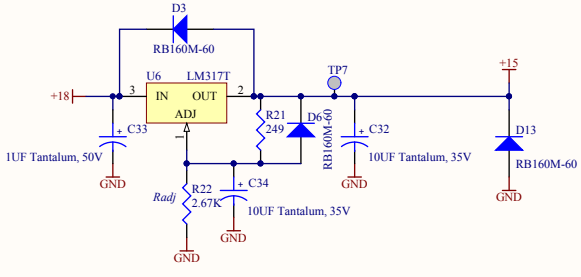
Rev2 - In response to single supply sensitivity, changed U2 from AD8597 to LT1128, changed U1 from AD8599 to AD8672, removed C28 to stabilize LT1128. Bypassed C29 and C32 with reverse biased 1N4001 diode to clamp the +/-15V regulated supplies.

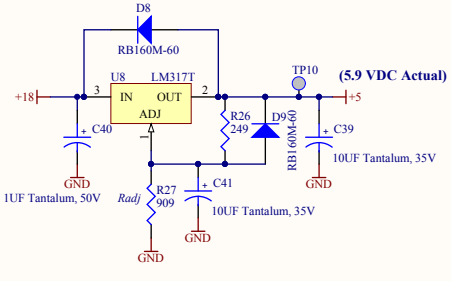
Rev3 - PCB updated to include single supply sensitivity fixes. All new orders of this board should use revision 3 schematic and PCB

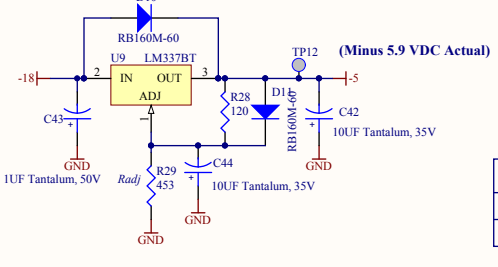
Rev4 - Fixed typo in RF component values to reflect actual 9/45MHz RF values. Updated BOM to reflect this change. Resubmitted all files to DCC. V3 PCB still current



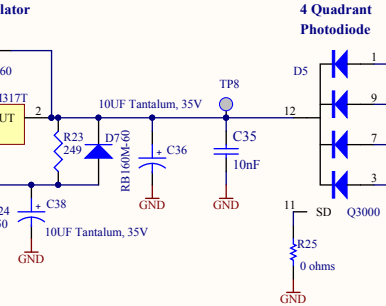


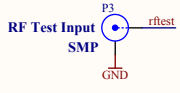


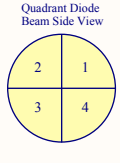


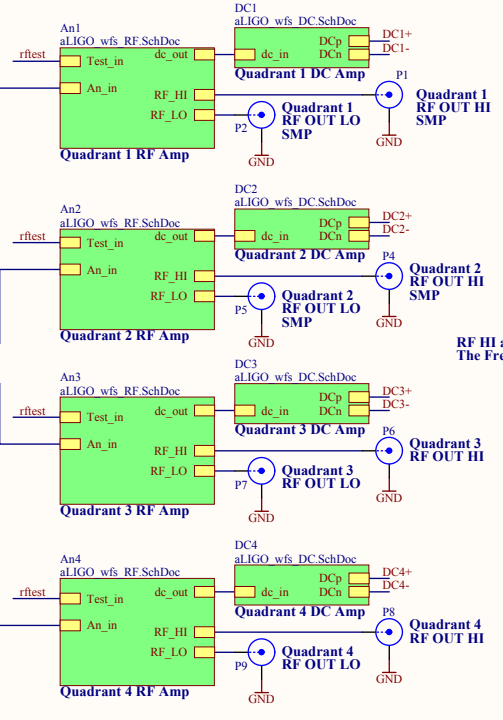


Voltage Regulator Equations
LM337 Vo= - 1.25(1+Radj/120)+(50uA*Radj)
LM317 Vo=1.25(1+Radj/249)+(100uA*Radj)







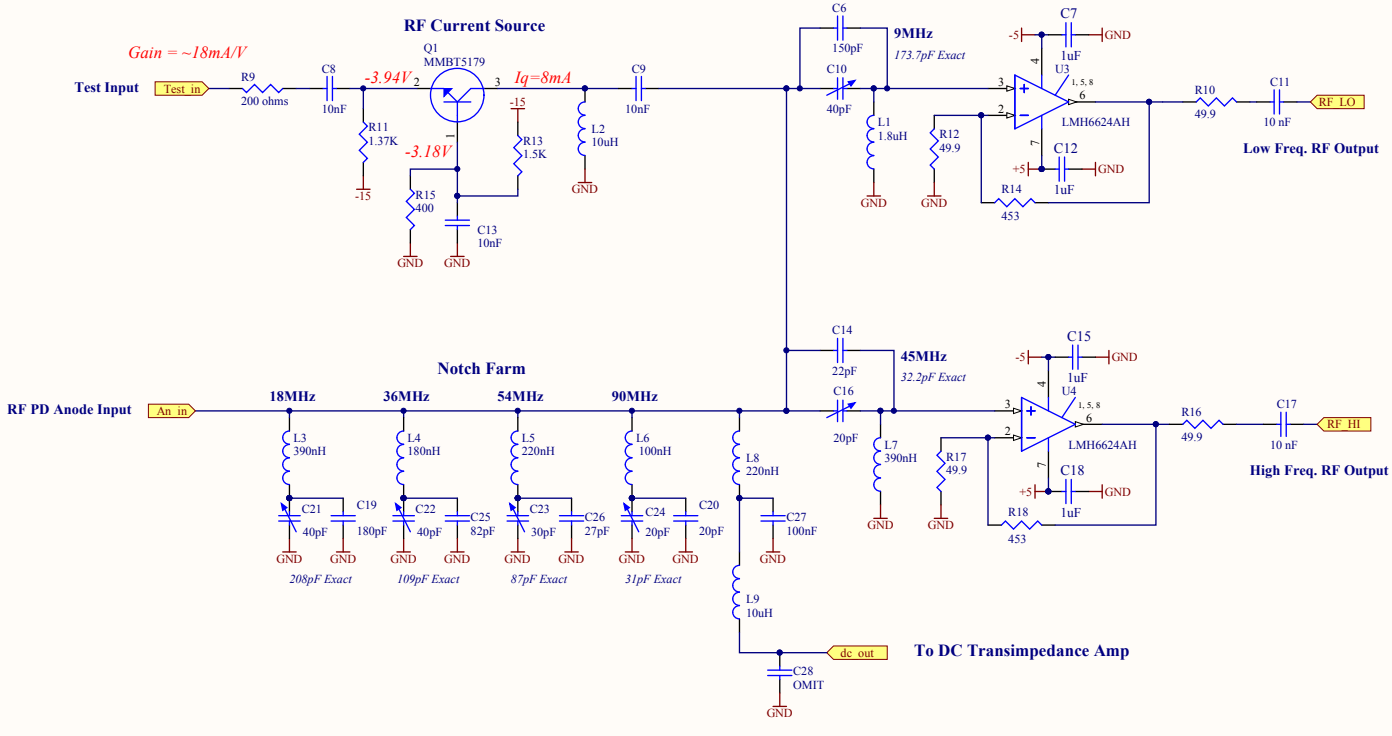


RF HI and LO Refer To The Frequency of Operation

TP11 -18 TP6 +18 TP4 GND TP13 GND TP14 GND

Title: aLIGO ASC RF Photodetector			LIGO Laboratory, California Institute of Technology, Massachusetts Institute of Technology	LIGO
Size: B	DCC Number: D1101614	Revision: v4	Engineer: R. Abbott	Last Edited: 29 August 2013
File: C:\Rich's Files\Mycadfiles\ISC\AdL RFPD\2011 aLIGO_WFS\aLIGO WFS v4\aLIGO_wfs_top.SchDoc				Date: 8/29/2013 Time: 12:25:26 PM Sheet 1 of 3

Values shown for 9/45 MHz. For component variations at different operating frequencies, see T1300199

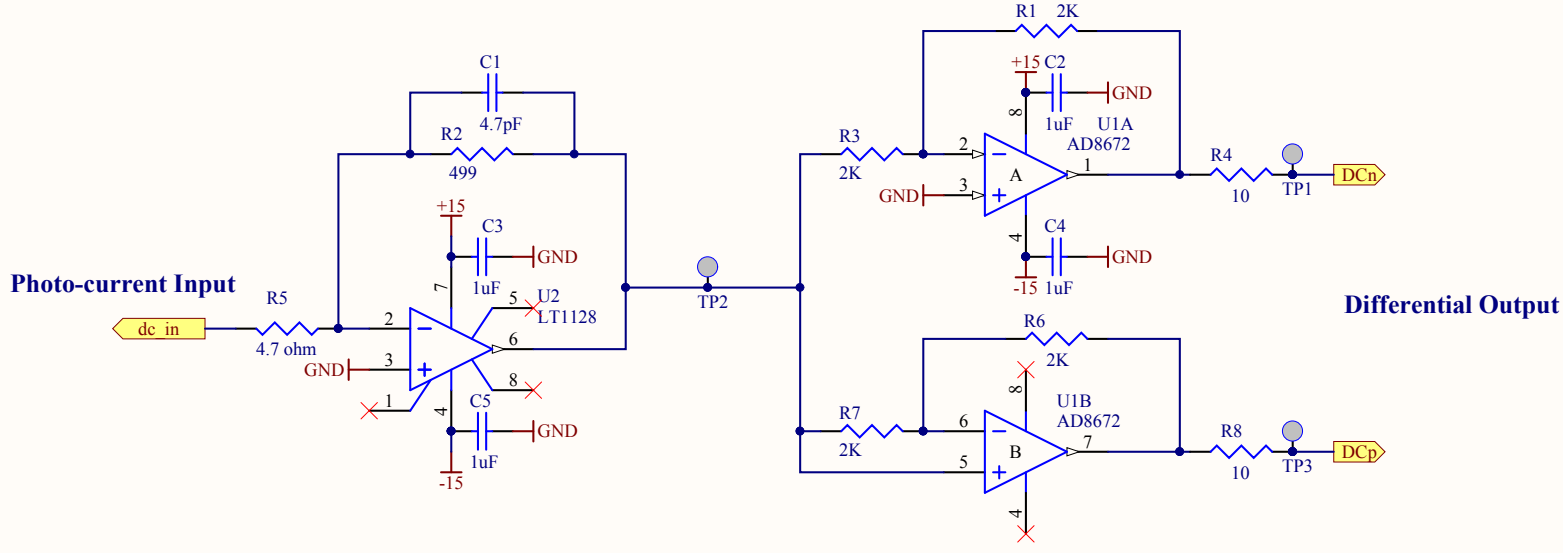


9/45 Design Corresponds to: C:\Rich's Files\LT Spice\PhotodiodeAnalysis\lsc_rfpds\aLIGO_ASC_2011\9_45_ASC_v3.asc

Last Edited: *29 August 2013*

Title: ***RF Section***			*LIGO Laboratory* *California Institute of Technology* *Massachusetts Institute of Technology*	LIGO
Size: B	DCC Number: D1101614	Revision: v4	Engineer: *R. Abbott*	Date: 8/29/2013 Time: 12:25:26 PM
File: C:\Rich's Files\Mycadfiles\ISC\AdL RFPD\2011 aLIGO WFS\aLIGO WFS v4\aLIGO wfs RF.SchDoc				Sheet 2 of 3

DC Transimpedance Amp
(15mA Maximum Photo-current)



Last Edited: *29 August 2013*

Title: ***DC Section***			*LIGO Laboratory* *California Institute of Technology* *Massachusetts Institute of Technology*	LIGO
Size: A	DCC Number: D1101614	Revision: v4	Engineer: *R. Abbott*	Date: 8/29/2013 Time: 12:25:26 PM
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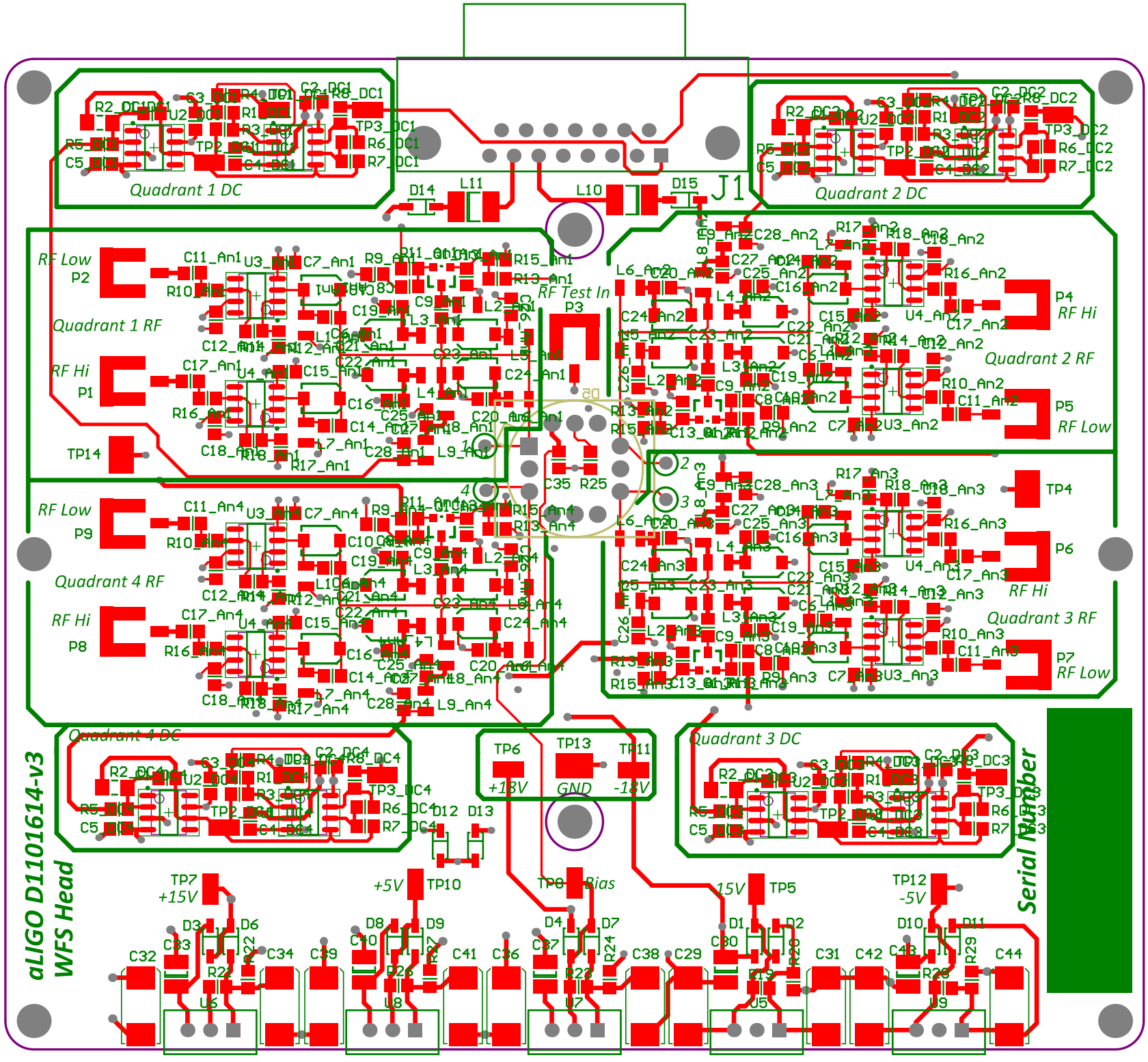
aLIGO D1101614-v3
WFS Head
Serial Number
Quadrant 1 DC
Quadrant 2 DC
Quadrant 3 DC
Quadrant 4 DC
Quadrant 1 RF
Quadrant 2 RF
Quadrant 3 RF
Quadrant 4 RF
RF Low
RF Hi
RF Test In
J1
P1
P2
P3
P4
P5
P6
P7
P8
P9
TP14
TP6
TP13
TP11
+18V
GND
-18V
TP7
+15V
TP10
+5V
TP8
Bias
TP5
-15V
TP12
-5V

Designator	Comment	Digikey Part Number	Manufacturer Part Number	Quantity
C1_DC1, C1_DC2, C1_DC3, C1_DC4	4.7pF	478-1300-1-ND		4
C2_DC1, C2_DC2, C2_DC3, C2_DC4, C3_DC1, C3_DC2, C3_DC3, C3_DC4, C4_DC1, C4_DC2, C4_DC3, C4_DC4, C5_DC1, C5_DC2, C5_DC3, C5_DC4, C7_An1, C7_An2, C7_An3, C7_An4, C12_An1, C12_An2, C12_An3, C12_An4, C15_An1, C15_An2, C15_An3, C15_An4, C18_An1, C18_An2, C18_An3, C18_An4	1uF	478-1580-1-ND		32
C6_An1, C6_An2, C6_An3, C6_An4	150pF	399-1125-1-ND		4
C8_An1, C8_An2, C8_An3, C8_An4, C9_An1, C9_An2, C9_An3, C9_An4, C11_An1, C11_An2, C11_An3, C11_An4, C13_An1, C13_An2, C13_An3, C13_An4, C17_An1, C17_An2, C17_An3, C17_An4, C35	10 nF, 10nF	399-1158-1-ND		21
C10_An1, C10_An2, C10_An3, C10_An4, C21_An1, C21_An2, C21_An3, C21_An4, C22_An1, C22_An2, C22_An3, C22_An4	40 pF		Voltronics JZ400	12
C14_An1, C14_An2, C14_An3, C14_An4	22pF	490-3608-1-ND		4
C16_An1, C16_An2, C16_An3, C16_An4, C24_An1, C24_An2, C24_An3, C24_An4	20 pF, 20pF		Voltronics JZ200	8
C19_An1, C19_An2, C19_An3, C19_An4	180pF	445-13354-1-ND		4
C20_An1, C20_An2, C20_An3, C20_An4	20pF	490-3607-1-ND		4
C23_An1, C23_An2, C23_An3, C23_An4	30pF		Voltronics JZ300	4
C25_An1, C25_An2, C25_An3, C25_An4	82pF	490-3615-1-ND		4
C26_An1, C26_An2, C26_An3, C26_An4	27pF	490-3609-1-ND		4
C27_An1, C27_An2, C27_An3, C27_An4	100nF	478-1316-1-ND		4
C28_An1, C28_An2, C28_An3, C28_An4	OMIT	OMIT		4
C29, C31, C32, C34, C36, C38, C39, C41, C42, C44	10UF Tantalum, 35V	478-1701-1-ND		10
C30, C33, C37, C40, C43	1UF Tantalum, 50V	478-3075-1-ND		5
D1, D2, D3, D4, D6, D7, D8, D9, D10, D11, D12, D13, D14, D15	60V, 1A Schottky, RB160M-60	RB160M-60CT-ND		14
D5	Q3000	Q3000		1
J1	D15 Male	6E17C-015P-AJ-121-ND		1
L1_An1, L1_An2, L1_An3, L1_An4	1.8uH		Coilcraft 1008CS-182XJLB	4
L2_An1, L2_An2, L2_An3, L2_An4, L9_An1, L9_An2, L9_An3, L9_An4	10uH		Coilcraft 1008LS-103XJLB	8
L3_An1, L3_An2, L3_An3, L3_An4, L7_An1, L7_An2, L7_An3, L7_An4	390nH		Coilcraft 1008CS-391XGLB	8
L4_An1, L4_An2, L4_An3, L4_An4	180nH		Coilcraft 1008CS-181XGLB	4
L5_An1, L5_An2, L5_An3, L5_An4, L8_An1, L8_An2, L8_An3, L8_An4	220nH		Coilcraft 1008CS-221XGLB	8
L6_An1, L6_An2, L6_An3, L6_An4	100nH		Coilcraft 1008CS-101XGLB	4
L10, L11	10UH	495-1754-1-ND		2
P1, P2, P3, P4, P5, P6, P7, P8, P9	SMP Surface Mount RF Connector	ARF1594-ND		9
Q1_An1, Q1_An2, Q1_An3, Q1_An4	MMBT5179	MMBT5179CT-ND		4
R1_DC1, R1_DC2, R1_DC3, R1_DC4, R3_DC1, R3_DC2, R3_DC3, R3_DC4, R6_DC1, R6_DC2, R6_DC3, R6_DC4, R7_DC1, R7_DC2, R7_DC3, R7_DC4	2K	P2.00KFCT-ND		16
R2_DC1, R2_DC2, R2_DC3, R2_DC4	499	RNCP0805FTD499RCT-ND		4
R4_DC1, R4_DC2, R4_DC3, R4_DC4, R8_DC1, R8_DC2, R8_DC3, R8_DC4	10	RNCP0805FTD10R0CT-ND		8
R5_DC1, R5_DC2, R5_DC3, R5_DC4	4.7 ohm	RNCP0805FTD4R70CT-ND		4
R9_An1, R9_An2, R9_An3, R9_An4, R12_An1, R12_An2, R12_An3, R12_An4, R17_An1, R17_An2, R17_An3, R17_An4	49.9 ohms	RNCP0805FTD49R9CT-ND		12
R10_An1, R10_An2, R10_An3, R10_An4, R16_An1, R16_An2, R16_An3, R16_An4	30 ohms	311-30BCT-ND		8
R11_An1, R11_An2, R11_An3, R11_An4	1.37K	P1.37KDACT-ND		4
R13_An1, R13_An2, R13_An3, R13_An4	1.5K	RNCP0805FTD1K50CT-ND		4
R14_An1, R14_An2, R14_An3, R14_An4, R18_An1, R18_An2, R18_An3, R18_An4, R29	453, 453 ohms	RG20P453BCT-ND		9
R15_An1, R15_An2, R15_An3, R15_An4	402 ohms	985-1294-1-ND		4
R19, R28	120	P120DACT-ND		2
R20	1.33K	RG20P1.33KBCT-ND		1
R21, R23, R26	249	RNCP0805FTD249RCT-ND		3
R22	2.67K	P2.67KDACT-ND		1
R24	750	RNCP0805FTD750RCT-ND		1
R25	0 ohms	P0.0ACT-ND		1
R27	909	RNCP0805FTD909RCT-ND		1
TP1_DC1, TP1_DC2, TP1_DC3, TP1_DC4, TP2_DC1, TP2_DC2, TP2_DC3, TP2_DC4, TP3_DC1, TP3_DC2, TP3_DC3, TP3_DC4, TP4, TP5, TP6, TP7, TP8, TP10, TP11, TP12, TP13, TP14	TESTPT	5016KCT-ND		22
U1_DC1, U1_DC2, U1_DC3, U1_DC4	AD8672	AD8672ARZ-REEL7CT-ND		4
U2_DC1, U2_DC2, U2_DC3, U2_DC4	LT1128	LT1128CS8#PBF-ND		4
U3_An1, U3_An2, U3_An3, U3_An4, U4_An1, U4_An2, U4_An3, U4_An4	LMH6624AH	296-35334-1-ND		8
U5, U9	LM337BT	LM337BTGOS-ND		2
U6, U7, U8	LM317T	LM317BTGOS-ND		3