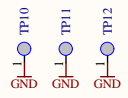
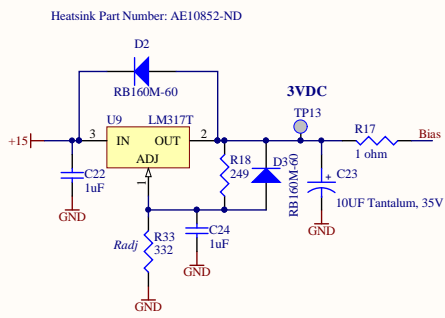
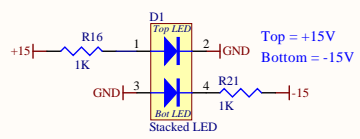
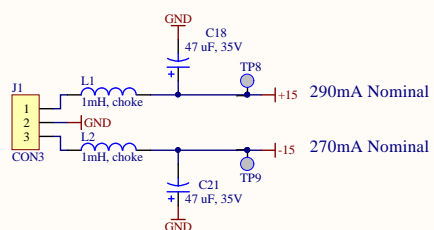
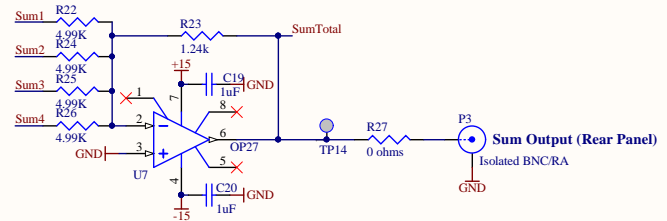


Single input gain = 0.2485
 All four input gain = 0.994
 1mA into a single anode input should produce 0.2485VDC at TP14



Change History
 Version. 1 - Initial Release
 Version. 2 notes:
 (1). R18 = 240, R17 = 336 for 3V DC on LM317. A formal decision on the bias output.
 (2). DS1, DS2 are dual type LED's for convenience and lower parts count
 (3). Add R15 = 0 ohms resistor in series with the noise cancellation output. This is a backup incase we don't like the noise amp any more
 (4). JP1 is added to the input of the Noise Cancellation Amp. This is for testing purposes
 (5). J2, J3 DB9 connectors shells are grounded to improve cable shielding
 Change History - V3 Schematic Only and the PCB Boards are in V2

Version. 3 notes:
 (1). Capacitor C15 is removed
 (2). Resistor R15 attributes have been changed correctly to 0 ohms.
 (3). PCB Board physical layout is the board generated in version 2 still

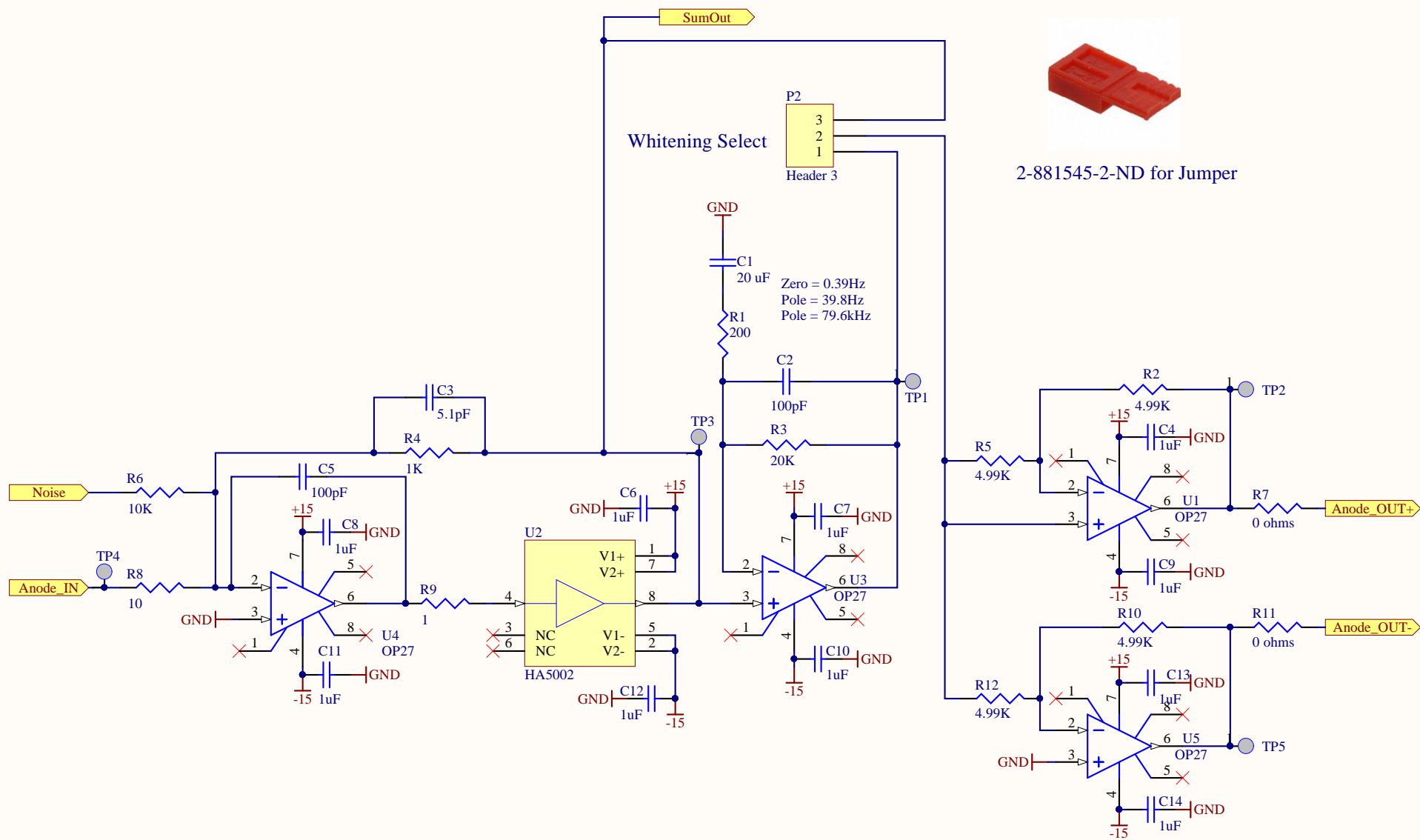
Version 4 (R. Abbott)
 1. Added jumper (P1) to board to disconnect the noise amp
 2. Added explanatory text to PCB in case future boards are ordered
 3. Changed all front end transimpedance amplifiers from AD8675 to OP-27 due to fragile input structure on AD8675

Version 5 (R. Abbott) PCB Revision is now Version 5 too
 1. Added sum output via BNC on rear of board
 2. Added jumpers to allow choice of whitened or unwhitened outputs for each channel
 3. Upgraded bias regulator due to part obsolescence
 4. Cleaned and groomed the BOM plus the PCB layout

Version 6 (R. Abbott)
 1. Changed value of R23 from 20k to 1.24k to avoid saturation if all four quadrants are at 10VDC. Version 5 PCB is still current

Version 7 (R. Abbott)
 1. Fixed a typo in the anticipated voltage at TP14. Text was 2.845VDC, and is now 0.2485VDC

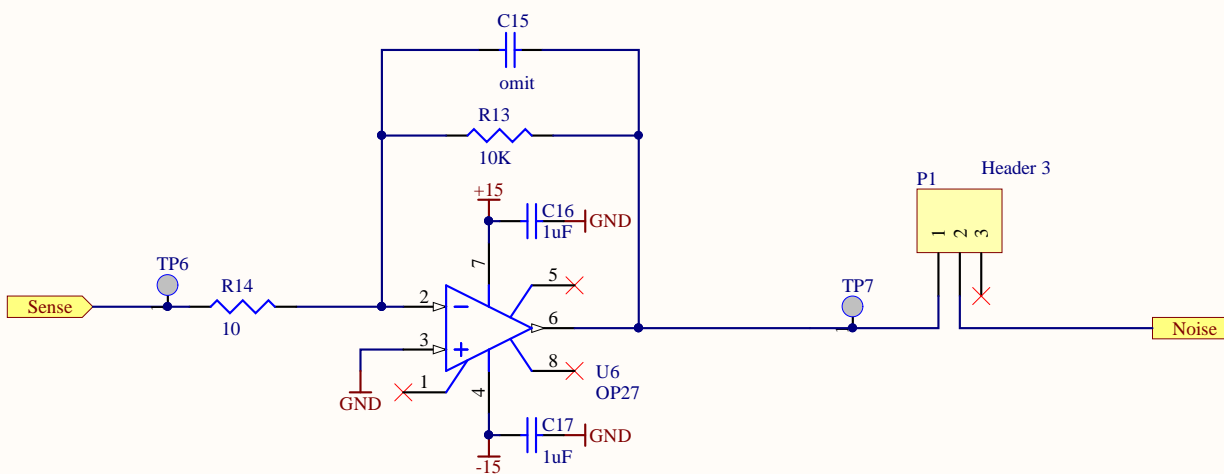
Title		Last Edited: 4/25/2018	
ISC QPD Transimpedance Amplifier		California Institute of Technology LIGO Project	
Size: B	DCC Number: D1001974	Revision: v7	Engineer: Mohana/R. Abbott
Date: 4/25/2018		Time: 2:25:02 PM	
Sheet 1 of 3			




2-881545-2-ND for Jumper

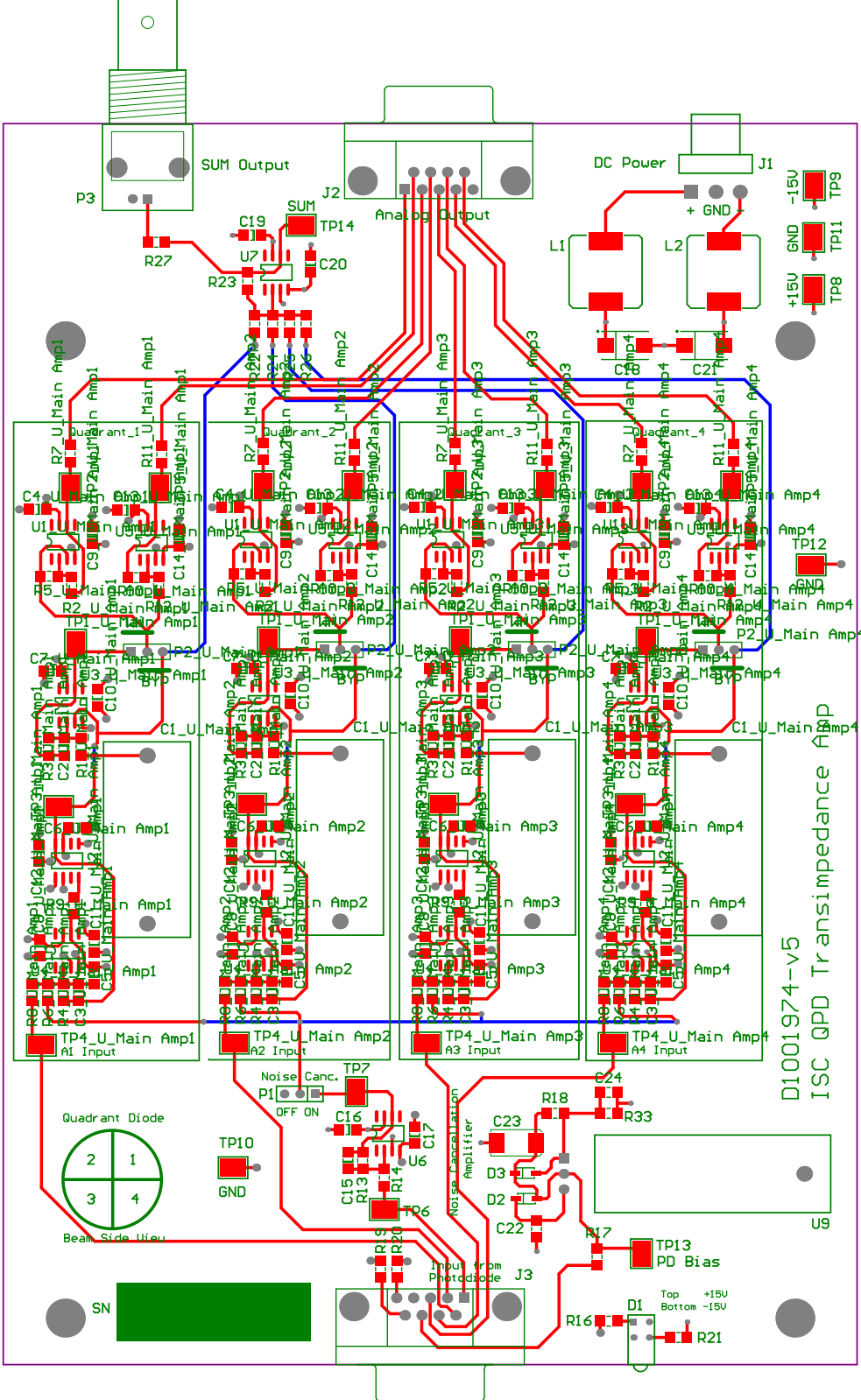
Last Edited: 17 July 2013

Title		* California Institute of Technology LIGO Project		LIGO	
Size: A	DCC Number: D1001974	Revision: v6	Engineer: Mohana/R. Abbott	Date: 4/25/2018	
File: C:\Rich's Files\Mycadfiles\ISC\alIGO Quadpd amp\D1001974-v5\Main Amp.SchDoc				Time: 2:25:02 PM	Sheet 2 of 3



Last Edited: 17 July 2013

Title		* California Institute of Technology LIGO Project		
Noise Cancellation Amplifier				
Size: A	DCC Number: D1001974	Revision: v6	Engineer: Mohana/R. Abbott	Date: 4/25/2018
File: C:\Rich's Files\Mycadfiles\ISC\aligo Quadpd amp\D1001974-v5\Noise Cancellation Amp.SchDoc				Time: 2:25:02 PM
				Sheet 3 of 3



Designator	Digkey Part Number	Heatsink Part Number	Jumper Part Number	Quantity
C1_U_Main1				
C1_U_Main Amp2				
C1_U_Main Amp3	478-2592-ND			4
C1_U_Main Amp4				
C2_U_Main Amp1				
C2_U_Main Amp2				
C2_U_Main Amp3				
C2_U_Main Amp4				
C3_U_Main Amp1				
C3_U_Main Amp2				
C3_U_Main Amp3	399-8127-1-ND			8
C3_U_Main Amp4				
C4_U_Main Amp1				
C4_U_Main Amp2	399-1186-1-ND			4
C4_U_Main Amp3				
C4_U_Main Amp4				
C5_U_Main Amp1				
C5_U_Main Amp2				
C5_U_Main Amp3				
C5_U_Main Amp4				
C6_U_Main Amp1				
C6_U_Main Amp2				
C6_U_Main Amp3				
C6_U_Main Amp4				
C7_U_Main Amp1				
C7_U_Main Amp2				
C7_U_Main Amp3				
C7_U_Main Amp4				
C8_U_Main Amp1				
C8_U_Main Amp2				
C8_U_Main Amp3				
C8_U_Main Amp4				
C9_U_Main Amp1				
C9_U_Main Amp2				
C9_U_Main Amp3				
C9_U_Main Amp4				
C10_U_Main Amp1				
C10_U_Main Amp2				
C10_U_Main Amp3				
C10_U_Main Amp4				
C11_U_Main Amp1				
C11_U_Main Amp2				
C11_U_Main Amp3				
C11_U_Main Amp4				
C12_U_Main Amp1				
C12_U_Main Amp2				
C12_U_Main Amp3				
C12_U_Main Amp4				
C13_U_Main Amp1				
C13_U_Main Amp2				
C13_U_Main Amp3				
C13_U_Main Amp4				
C14_U_Main Amp1				
C14_U_Main Amp2				
C14_U_Main Amp3	445-4044-1-ND			44
C15				1
C16				2
C16_C21	399-5164-1-ND			2
C23	478-1722-1-ND			1
D1	62-1321-ND			1
D2_D3	201084-00CT-ND			2
I1	W8M28-ND			1
I2_I3	A52117-ND			2
I1_L2	308-1321-1-ND			2
P1_P2_U_Main Amp1				
P2_U_Main Amp2				
P2_U_Main Amp3	609-3468-ND		NoParam; 2-481545-2-ND	3
P2_U_Main Amp4				
P3	A52244-ND			1
R1_U_Main Amp1				
R1_U_Main Amp2				
R1_U_Main Amp3	RG32P200BCT-ND			4
R1_U_Main Amp4				
R2_U_Main Amp1				
R2_U_Main Amp2				
R2_U_Main Amp3				
R2_U_Main Amp4				
R3_U_Main Amp1				
R3_U_Main Amp2				
R3_U_Main Amp3				
R3_U_Main Amp4				
R4_U_Main Amp1				
R4_U_Main Amp2				
R4_U_Main Amp3				
R4_U_Main Amp4				
R5_U_Main Amp1				
R5_U_Main Amp2				
R5_U_Main Amp3				
R5_U_Main Amp4				
R6_U_Main Amp1				
R6_U_Main Amp2				
R6_U_Main Amp3				
R6_U_Main Amp4				
R7_U_Main Amp1				
R7_U_Main Amp2				
R7_U_Main Amp3				
R7_U_Main Amp4				
R8_U_Main Amp1				
R8_U_Main Amp2				
R8_U_Main Amp3				
R8_U_Main Amp4				
R9_U_Main Amp1				
R9_U_Main Amp2				
R9_U_Main Amp3				
R9_U_Main Amp4				
R10_U_Main Amp1				
R10_U_Main Amp2				
R10_U_Main Amp3				
R10_U_Main Amp4				
R11_U_Main Amp1				
R11_U_Main Amp2				
R11_U_Main Amp3				
R11_U_Main Amp4				
R12_U_Main Amp1				
R12_U_Main Amp2				
R12_U_Main Amp3				
R12_U_Main Amp4				
R12_U_Main Amp4, R22, R24				
R25_R26	78P49KACCT-ND			20
R3_U_Main Amp1				
R3_U_Main Amp2				
R3_U_Main Amp3	RG32P200BCT-ND			4
R3_U_Main Amp4				
R4_U_Main Amp1				
R4_U_Main Amp2				
R4_U_Main Amp3				
R4_U_Main Amp4				
R4_U_Main Amp4, R16, R19, R20, R21	RG32P100BCT-ND			8
R6_U_Main Amp1				
R6_U_Main Amp2				
R6_U_Main Amp3				
R6_U_Main Amp4				
R6_U_Main Amp4, R13	RG32P100BCT-ND			5
R7_U_Main Amp1				
R7_U_Main Amp2				
R7_U_Main Amp3				
R7_U_Main Amp4				
R7_U_Main Amp4, R17				
R7_U_Main Amp4, R17, R18				
R7_U_Main Amp4, R17, R18, R19				
R7_U_Main Amp4, R17, R18, R19, R20				
R7_U_Main Amp4, R17, R18, R19, R20, R21				
R7_U_Main Amp4, R17, R18, R19, R20, R21, R22	PG08CT-ND			6
R8_U_Main Amp1				
R8_U_Main Amp2				
R8_U_Main Amp3				
R8_U_Main Amp4				
R8_U_Main Amp4, R14	CRT1206-BY-1080ELFCT-ND			5
R9_U_Main Amp1				
R9_U_Main Amp2				
R9_U_Main Amp3				
R9_U_Main Amp4				
R9_U_Main Amp4, R15	P108CT-ND			4
R17	P108CT-ND			1
R18	RNCP1206FD2498CT-ND			1
R22	P1248BCT-ND			1
R23	P1248BCT-ND			1
R33	P132PCT-ND			1
U1_U_Main Amp1				
U1_U_Main Amp2				
U1_U_Main Amp3				
U1_U_Main Amp4				
U2_U_Main Amp1				
U2_U_Main Amp2				
U2_U_Main Amp3				
U2_U_Main Amp4				
U3_U_Main Amp1				
U3_U_Main Amp2				
U3_U_Main Amp3				
U3_U_Main Amp4				
U4_U_Main Amp1				
U4_U_Main Amp2				
U4_U_Main Amp3				
U4_U_Main Amp4				
U5_U_Main Amp1				
U5_U_Main Amp2				
U5_U_Main Amp3				
U5_U_Main Amp4				
U5_U_Main Amp4, U6, U7	OP27G5Z-ND			18
U2_U_Main Amp1				
U2_U_Main Amp2				
U2_U_Main Amp3				
U2_U_Main Amp4	HAR9000-5Z-ND			4
U9	LM317TF5-ND	AE10852-ND		1