

EE322: Analog and Mixed Signal Circuits

Project Report

Team: Waveform Wizards

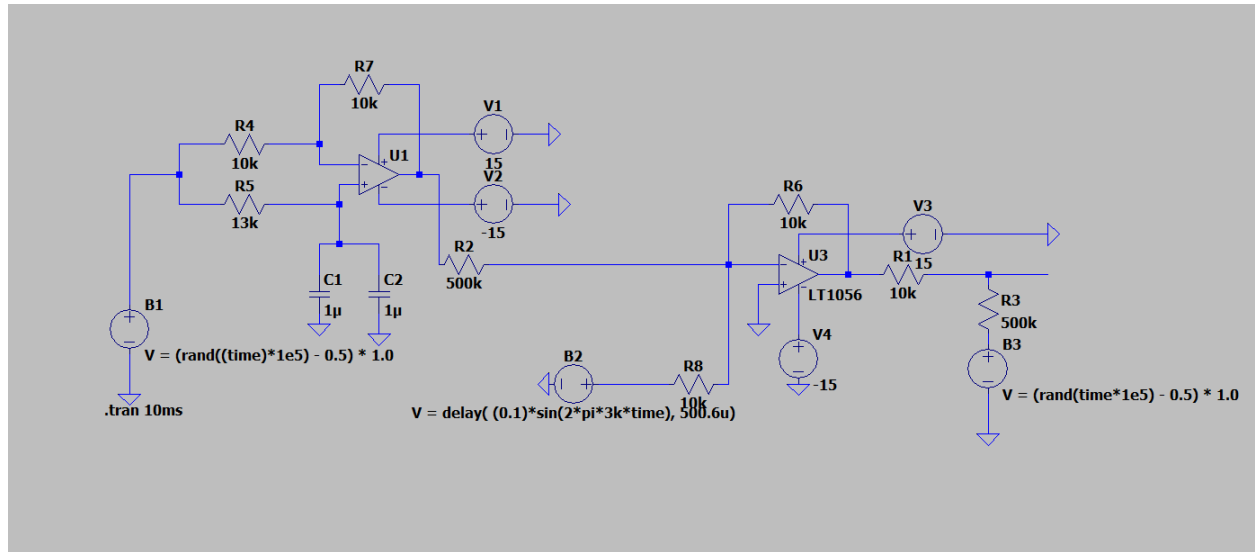
Member 1: Swayam Borate(23110066)

Member 2: Parth Dembla(23110234)

Member 3: Shriniket Behera(23110306)

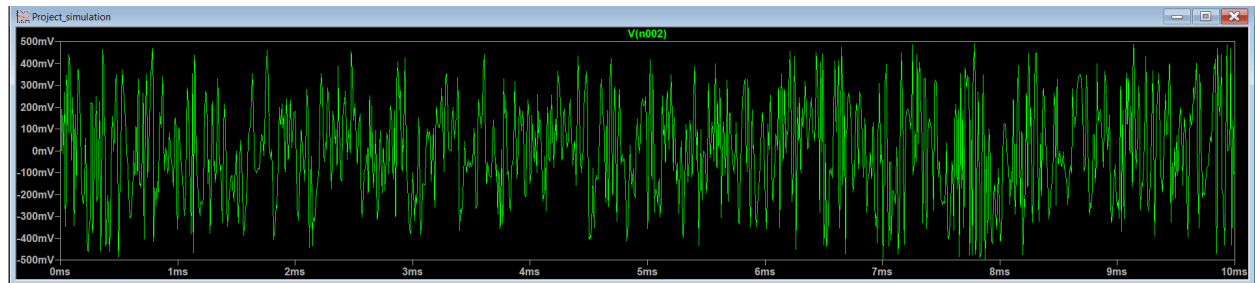
Project Title: Analog Noise Cancellation

LT Spice Schematic:-

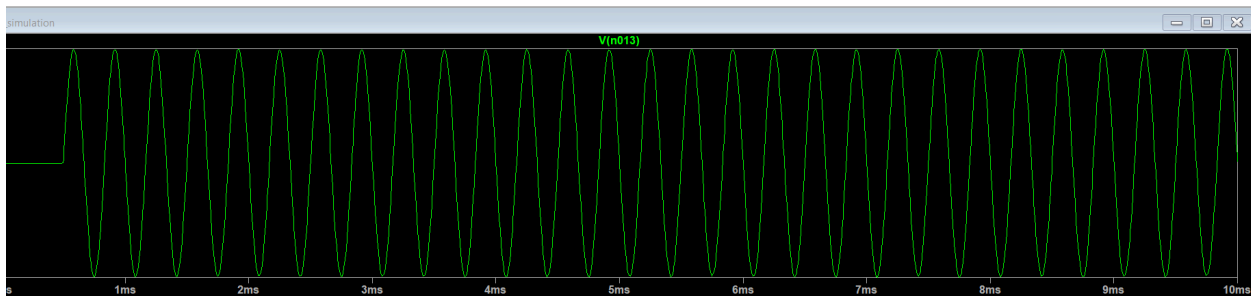


LTSPICE Simulation Results

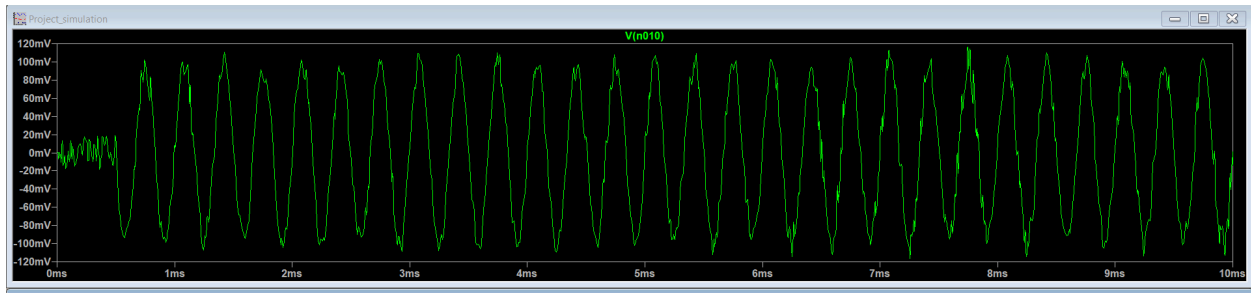
Ambient Noise -



Music Signal -

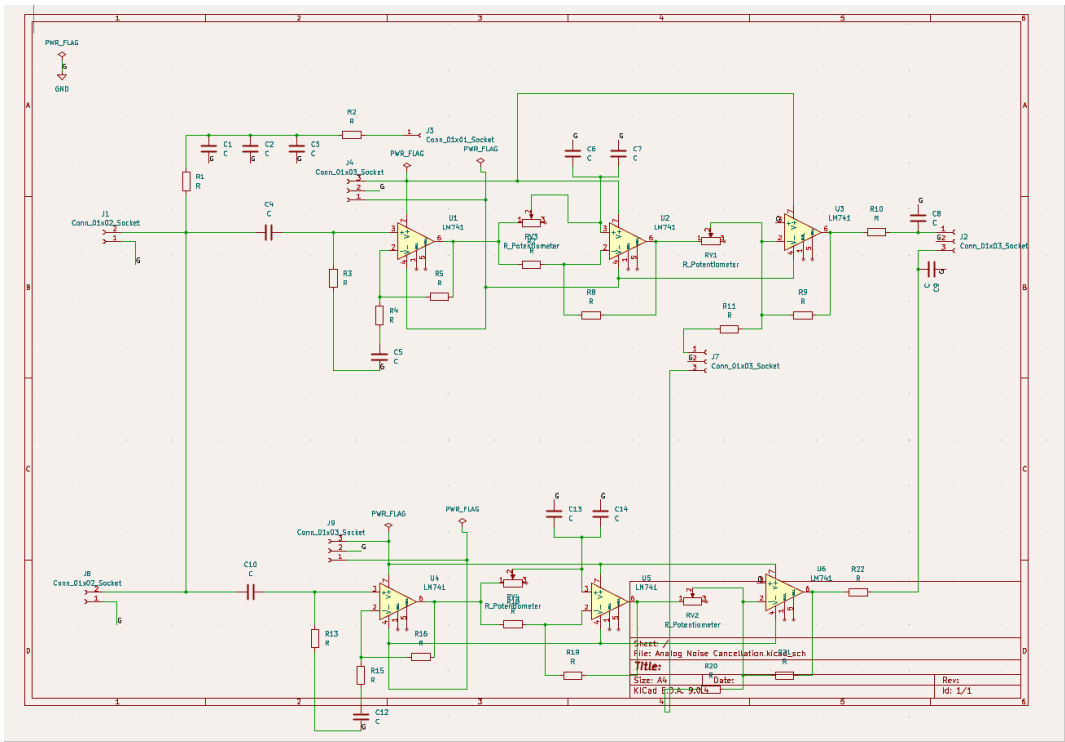


Music after Analog Active Noise Cancellation(Some Noise is Still There)

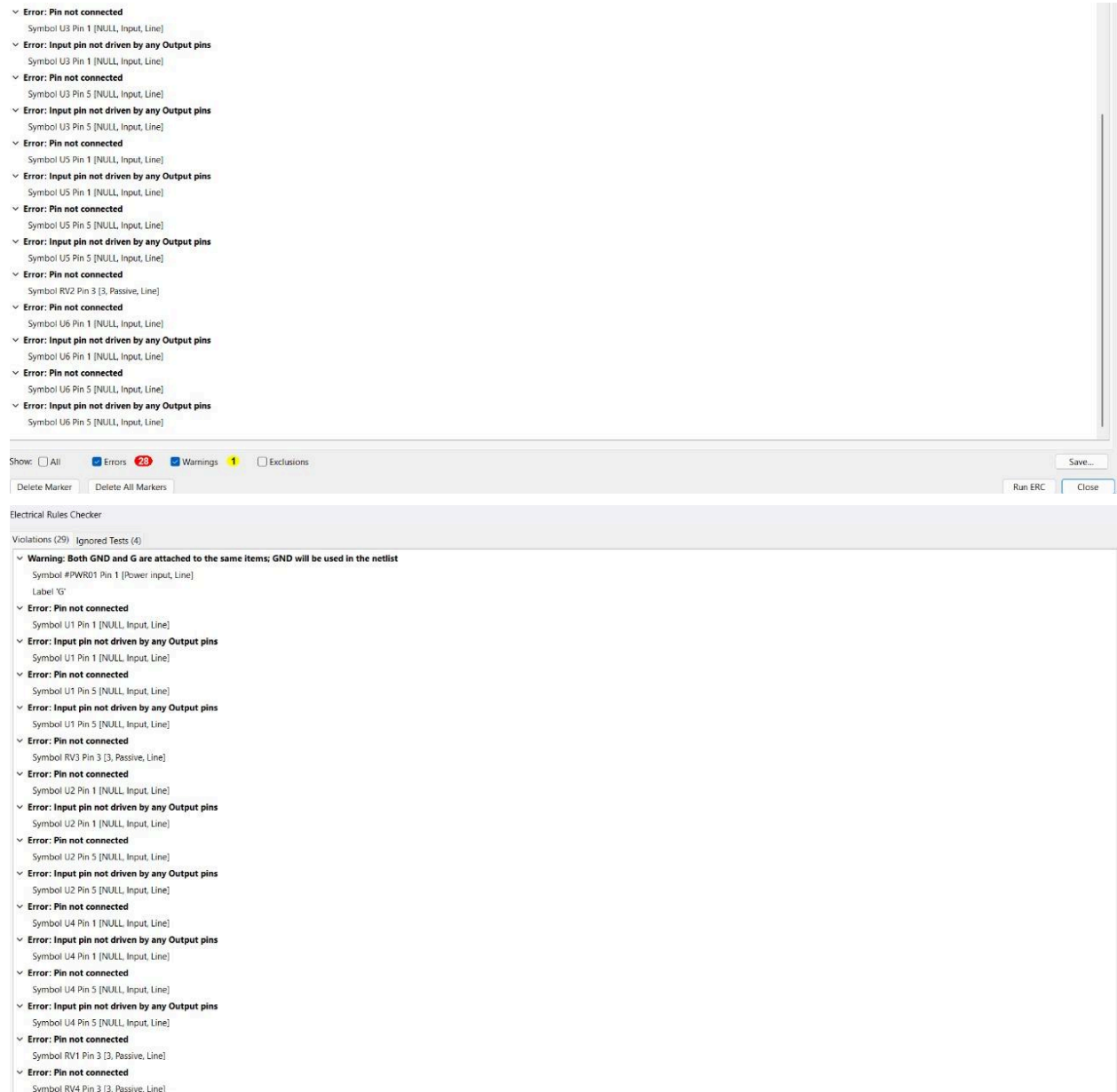


PCB Design:-

Following Image shows the Schematic(contains both stereo channels):-



ERC Error screenshot(Some Unconnected Pins Error like NULL pin in LM741 can be ignored)



Footprints Assignments

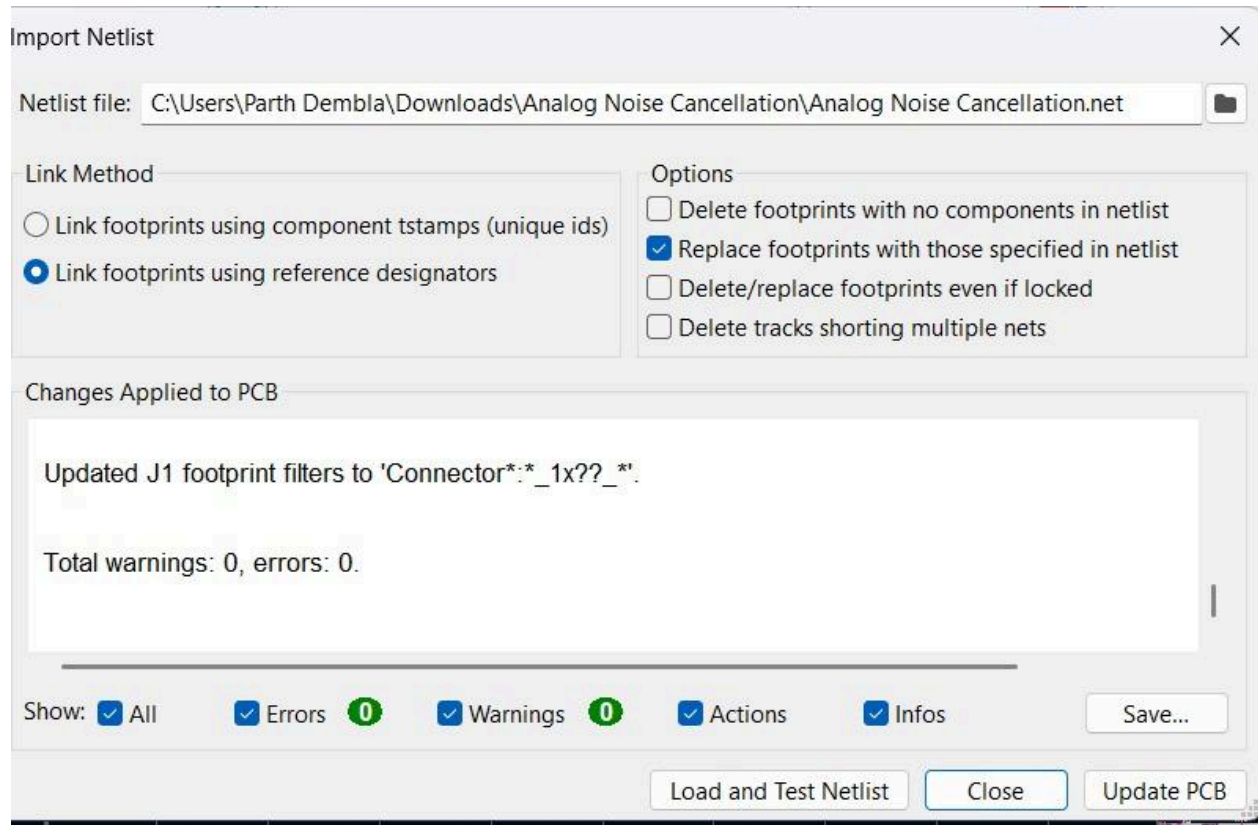
Below Screenshot shows the footprint assignments , all the components used are THT components(to be soldered separately)

Symbol : Footprint Assignments

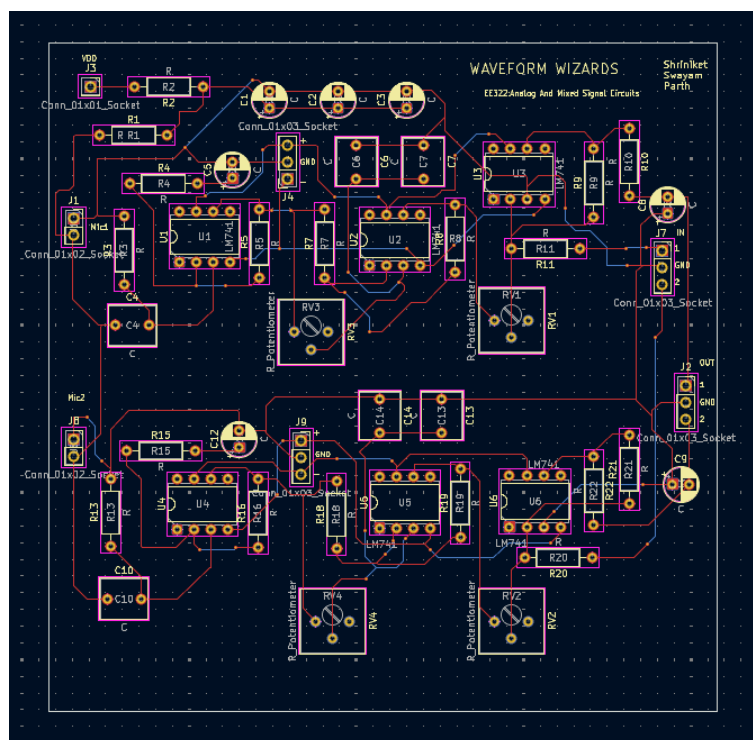
1	C1 -	C : Capacitor_THT:CP_Radial_D5.0mm_P2.50mm
2	C2 -	C : Capacitor_THT:CP_Radial_D5.0mm_P2.50mm
3	C3 -	C : Capacitor_THT:CP_Radial_D5.0mm_P2.50mm
4	C4 -	C : Capacitor_THT:C_Rect_L7.0mm_W6.0mm_P5.00mm
5	C5 -	C : Capacitor_THT:CP_Radial_D5.0mm_P2.50mm
6	C6 -	C : Capacitor_THT:C_Rect_L7.0mm_W6.0mm_P5.00mm
7	C7 -	C : Capacitor_THT:C_Rect_L7.0mm_W6.0mm_P5.00mm
8	C8 -	C : Capacitor_THT:CP_Radial_D5.0mm_P2.50mm
9	C9 -	C : Capacitor_THT:CP_Radial_D5.0mm_P2.50mm
10	C10 -	C : Capacitor_THT:C_Rect_L7.0mm_W6.0mm_P5.00mm
11	C12 -	C : Capacitor_THT:CP_Radial_D5.0mm_P2.50mm
12	C13 -	C : Capacitor_THT:C_Rect_L7.0mm_W6.0mm_P5.00mm
13	C14 -	C : Capacitor_THT:C_Rect_L7.0mm_W6.0mm_P5.00mm
14	J1 - Conn_01x02_Socket	: Connector_PinSocket_2.54mm:PinSocket_1x02_P2.54mm_Vertical
15	J2 - Conn_01x03_Socket	: Connector_PinSocket_2.54mm:PinSocket_1x03_P2.54mm_Vertical
16	J3 - Conn_01x01_Socket	: Connector_PinSocket_2.54mm:PinSocket_1x01_P2.54mm_Vertical
17	J4 - Conn_01x03_Socket	: Connector_PinSocket_2.54mm:PinSocket_1x03_P2.54mm_Vertical
18	J7 - Conn_01x03_Socket	: Connector_PinSocket_2.54mm:PinSocket_1x03_P2.54mm_Vertical
19	J8 - Conn_01x02_Socket	: Connector_PinSocket_2.54mm:PinSocket_1x02_P2.54mm_Vertical
20	J9 - Conn_01x03_Socket	: Connector_PinSocket_2.54mm:PinSocket_1x03_P2.54mm_Vertical
21	R1 -	R : Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
22	R2 -	R : Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
23	R3 -	R : Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
24	R4 -	R : Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
25	R5 -	R : Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
26	R7 -	R : Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
27	R8 -	R : Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
28	R9 -	R : Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
29	R10 -	R : Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
30	R11 -	R : Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
31	R13 -	R : Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
32	R15 -	R : Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
33	R16 -	R : Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
34	R18 -	R : Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
35	R19 -	R : Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
36	R20 -	R : Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
37	R21 -	R : Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
38	R22 -	R : Resistor_THT:R_Axial_DIN0207_L6.3mm_D2.5mm_P10.16mm_Horizontal
39	RV1 - R_Potentiometer	: Potentiometer_THT:Potentiometer_Bourns_3386P_Vertical
40	RV2 - R_Potentiometer	: Potentiometer_THT:Potentiometer_Bourns_3386P_Vertical
41	RV3 - R_Potentiometer	: Potentiometer_THT:Potentiometer_Bourns_3386P_Vertical
42	RV4 - R_Potentiometer	: Potentiometer_THT:Potentiometer_Bourns_3386P_Vertical

43	U1 -	LM741 : Package_DIP:DIP-8_W7.62mm
44	U2 -	LM741 : Package_DIP:DIP-8_W7.62mm
45	U3 -	LM741 : Package_DIP:DIP-8_W7.62mm
46	U4 -	LM741 : Package_DIP:DIP-8_W7.62mm
47	U5 -	LM741 : Package_DIP:DIP-8_W7.62mm
48	U6 -	LM741 : Package_DIP:DIP-8_W7.62mm

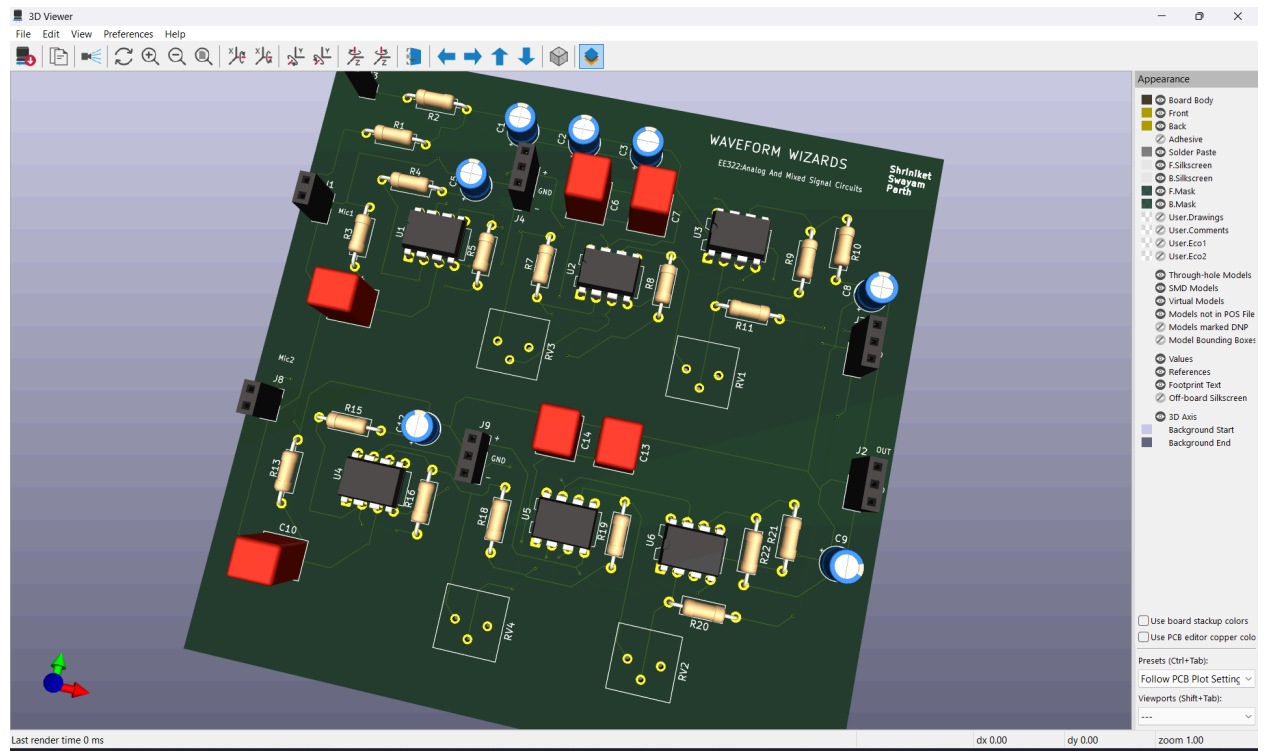
The Netlist is exported



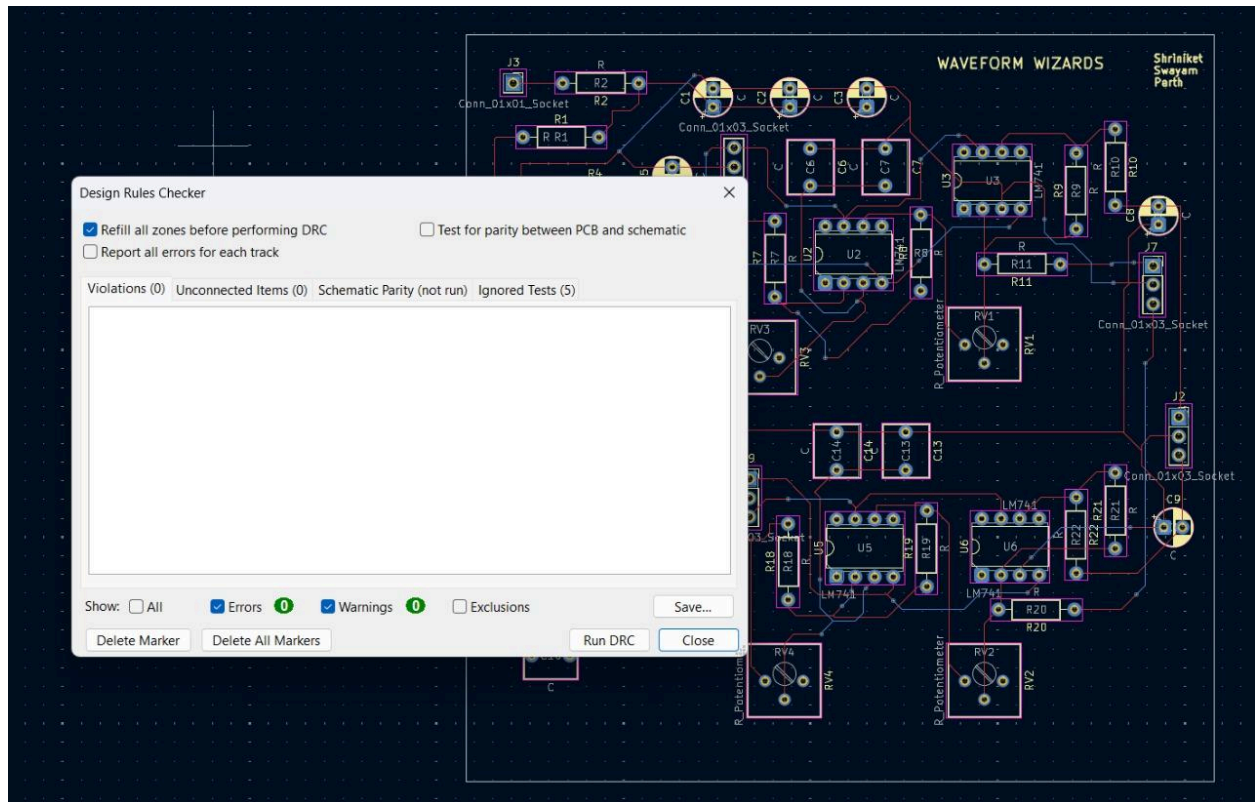
Using the OSHPark board settings in the PCB Editor, the PCB was designed



3D Schematic of PCB



Design Rules Checker was also run and below image shows that there were no errors in the designs



GERBER Files were generated and converted to ZIP

Today				
Analog Noise Cancellation-NPTH-drl.gbr	01-11-2025 06:33	GBR File	1 KB	
Analog Noise Cancellation-NPTH-drl_ma...	01-11-2025 06:33	GBR File	4 KB	
Analog Noise Cancellation-PTH-drl.gbr	01-11-2025 06:33	GBR File	7 KB	
Analog Noise Cancellation-PTH-drl_map....	01-11-2025 06:33	GBR File	68 KB	
Analog Noise Cancellation-Edge_Cuts.gbr	01-11-2025 06:30	GBR File	1 KB	
Analog Noise Cancellation-job.gbrjob	01-11-2025 06:30	GBRJOB File	3 KB	
Analog Noise Cancellation-B_Mask.gbr	01-11-2025 06:30	GBR File	7 KB	
Analog Noise Cancellation-B_Paste.gbr	01-11-2025 06:30	GBR File	1 KB	
Analog Noise Cancellation-B_Silks.gbr	01-11-2025 06:30	GBR File	1 KB	
Analog Noise Cancellation-Back.gbr	01-11-2025 06:30	GBR File	17 KB	
Analog Noise Cancellation-F_Mask.gbr	01-11-2025 06:30	GBR File	7 KB	
Analog Noise Cancellation-F_Paste.gbr	01-11-2025 06:30	GBR File	1 KB	
Analog Noise Cancellation-F_Silks.gbr	01-11-2025 06:30	GBR File	148 KB	
Analog Noise Cancellation-Front.gbr	01-11-2025 06:30	GBR File	32 KB	

The ZIP File was uploaded on LION CIRCUITS to see the quotation

The screenshot displays the LION CIRCUITS website interface for a quotation. The top navigation bar includes the LION CIRCUITS logo, a search bar, and links for Services, Capabilities, Resources, Instant Quote, Shop Components, Login, and Sign Up. The main content area is divided into three sections: a file upload section, a configuration section, and a charge details section.

File Upload Section:

- File Name: WaveformWizards_EE322Analog
- File Format: Zip
- Size Limit: 50MB or less
- Sample File Download
- Your File Is Secure And Confidential.
- Reset button

Configuration Section:

- Base Material: FR4
- Layers: 2, 4, 6, 8, 10, 12, 14, 18, 20, 22
- Dimensions: 100 x 100 mm
- Quantity: 5
- Discrete Design: 1, 2, 3, 4, 5
- Delivery Format: Single PCB, Panel By Customer, Panel By LionCircuits
- PCB Thickness (mm): 0.4, 0.8, 1.2, 1.6, 2.0, 2.4
- Mask Color: Green, White, Red, Blue, Black
- PCB Finish: HASL Finish, Lead Free HASL, ENIG

Charge Details Section:

- Make In India
- Price Estimate:
 - Per Unit Cost: ₹322.20 × 5
 - NRE Cost: ₹0
 - Sub Total: ₹1611
- Build Time:
 - 5-6 Days (selected)
 - 4-5 Days
- Shipping Method:
 - DTDC Standard 2-3 Working Days (selected)
 - DTDC Plus 1-2 Working Days
- New Sub Total: ₹1611
- GST: ₹290
- Shipping Cost: ₹0
- Total Cost: ₹1901
- Save to Cart button

One unit costs Rs. 322

(Our PCB contains both stereo right and left)