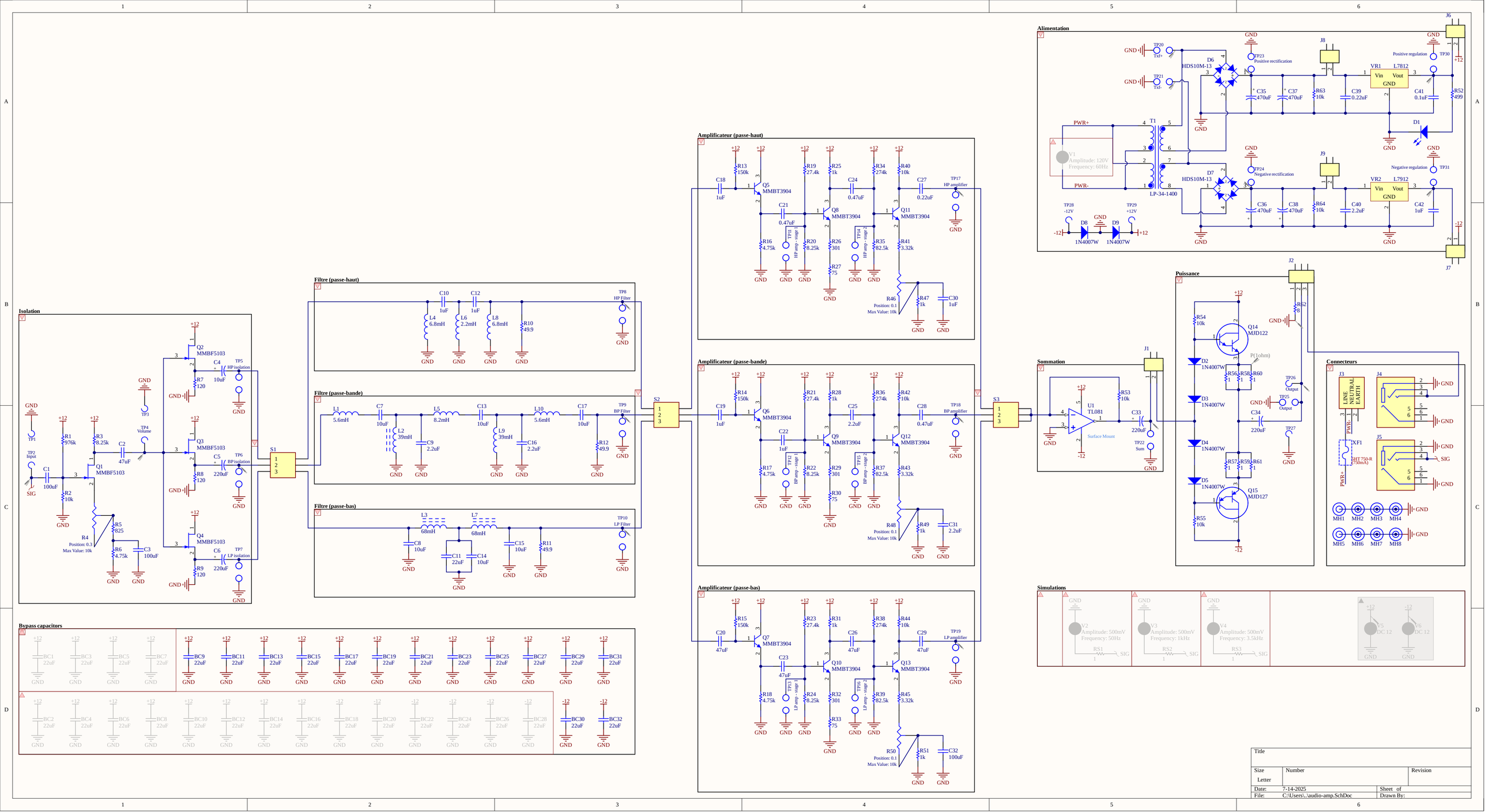

Isolation
Filtre (passe-haut)
Filtre (passe-bande)
Filtre (passe-bas)
Amplificateur (passe-haut)
Amplificateur (passe-bande)
Amplificateur (passe-bas)
Alimentation
Puissance
Sommation
Connecteurs
Simulations
Bypass capacitors
Title
Size
Letter
Number
Revision
Date: 7-14-2025
Sheet of
File: C:\Users\..\audio-amp.SchDoc
Drawn By:

Analog audio amp FIP 2025 Sebastien Cabana

CAUTION - HIGH VOLTAGE

ISO FILTER AMP

1-HP 2-BP 3-LP

Treble

Mids

Bass

HP amp

BP amp

LP amp

Stage 1

Stage 2

HP Filter

BP Filter

LP Filter

Speaker Load

Volume

Signal

Output

Input

Sum

GND

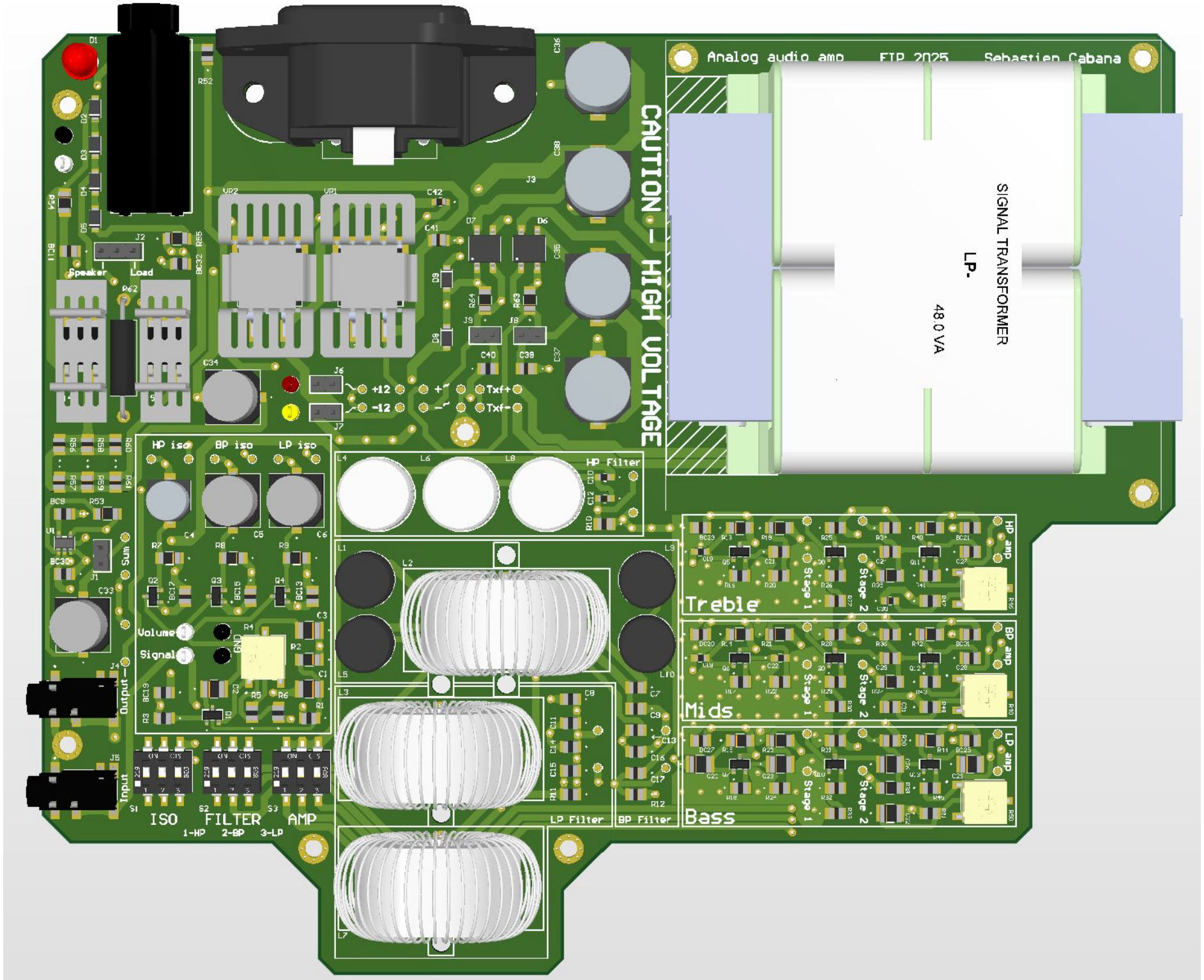
+12

-12

Txf+

Txf-

PCB EDGE


Analog audio amp FIP 2025 Sebastien Cabana
CAUTION - HIGH VOLTAGE
SIGNAL TRANSFORMER
LP-
48.0 VA
HP iso
BP iso
LP iso
HP Filter
LP Filter
BP Filter
Treble
Mids
Bass
HP amp
BP amp
LP amp
Stage 1
Stage 2
Volume
Signal
Speaker
Load
Output
Input
Sum
GND
+12
-12
Txf+
Txf-
ISO FILTER AMP
1-HP 2-BP 3-LP

DigiKey Part Number	Comment	Description	Designator	Footprint	Quantity	MountingType	Value
	Cap-SM-M	Capacitor - Surface Mount larger pads	BC9, BC11, BC13, BC15, BC17, BC19, BC21, BC23, BC25, BC27, BC29, BC30, BC31, BC32, C11	SMD-0805-M	15	Surface Mount	22uF
	Cap-SM-M	Capacitor - Surface Mount larger pads	C1, C3, C32	SMD-1210-M	3	Surface Mount	100uF
	Cap-SM-M	Capacitor - Surface Mount larger pads	C2, C20, C23, C26, C29	SMD-1210-M	5	Surface Mount	47uF
	Cap2-10uF-SM	10µF 50V Aluminum - Polymer Capacitors Radial, Can - SMD 60mOhm 5000Hrs @ 105°C	C4	CAP-APA0606	1	Surface Mount	10uF
	Cap2-220uF-SM	220µF 35V Aluminum - Polymer Capacitors Radial, Can - SMD 24mOhm 2000Hrs @ 125°C	C5, C6, C33, C34	CAP-A768KS-M	4	Surface Mount	220uF
	Cap-SM-M	Capacitor - Surface Mount larger pads	C7, C8, C13, C14, C15, C17	SMD-0805-M	6	Surface Mount	10uF
	Cap-SM-M	Capacitor - Surface Mount larger pads	C9, C16, C25, C31, C40	SMD-0805-M	5	Surface Mount	2.2uF
	Cap-SM-M	Capacitor - Surface Mount larger pads	C10, C12, C18, C19, C22, C30, C42	SMD-0603-M	7	Surface Mount	1uF
	Cap-SM-M	Capacitor - Surface Mount larger pads	C21, C24, C28	SMD-0805-M	3	Surface Mount	0.47uF
	Cap-SM-M	Capacitor - Surface Mount larger pads	C27, C39	SMD-0805-M	2	Surface Mount	0.22uF
	Cap2-470uF-SM	470µF 35V Aluminum - Polymer Capacitors Radial, Can - SMD 27mOhm 2000Hrs @ 105°C	C35, C36, C37, C38	CAP-APD1012	4	Surface Mount	470uF
	Cap-SM-M	Capacitor - Surface Mount larger pads	C41	SMD-0805-M	1	Surface Mount	0.1uF
	LED	Typical LED	D1	LED_RED	1	Through Hole	
5272-1N4007WTR-ND	1N4007W	Diode 1000V 1A Surface Mount SOD-123FL	D2, D3, D4, D5, D8, D9	SOD-123FL	6	Surface Mount	
HDS10M-13DITR-ND	HDS10M-13	Bridge Rectifier Single Phase Standard 1 kV Surface Mount HDS	D6, D7	HDS10M13	2	Surface Mount	
	HDR2x1	Connector Header Through Hole 2 position 0.100" (2.54mm)	J1, J6, J7, J8, J9	HDR_1X2	5	Through Hole	
	HDR3x1	Connector Header Through Hole 3 position 0.100" (2.54mm)	J2	HDR_1X3	1	Through Hole	
Q219-ND	703W-00/53	Power Entry Connector Receptacle, Male Blades IEC 320-C14 Panel Mount, Flange; Through Hole, Right Angle	J3	QUALTEK_703W-00/53	1	Through Hole	
839-54-00178TR-ND	Audio-Jack-Input	Connector, 3C audio jack, 3.5xL14 mm, SMT mount, silver plated	J4, J5	Audio-Jack-Input	2	Surface Mount	

DigiKey Part Number	Comment	Description	Designator	Footprint	Quantity	MountingType	Value
	Inductor	Unshielded Drum Core, Wirewound Inductor Radial, Vertical Cylinder	L1, L10	IND-9MM	2	Through Hole	5.6mH
	Ind-Ferrite	Inductance Made With Epoxy Ferrite Core Toroid	L2	TX-1779-1567-ND	1	Through Hole	39mH
	Ind-Ferrite	Inductance Made With Epoxy Ferrite Core Toroid	L3, L7	TX-1779-1567-ND	2	Through Hole	68mH
	Inductor	Unshielded Drum Core, Wirewound Inductor Radial, Vertical Cylinder	L4, L8	IND-12MM	2	Through Hole	6.8mH
	Inductor	Unshielded Drum Core, Wirewound Inductor Radial, Vertical Cylinder	L5	IND-9MM	1	Through Hole	8.2mH
	Inductor	Unshielded Drum Core, Wirewound Inductor Radial, Vertical Cylinder	L6	IND-12MM	1	Through Hole	2.2mH
	Inductor	Unshielded Drum Core, Wirewound Inductor Radial, Vertical Cylinder	L9	IND-9MM	1	Through Hole	39mH
	Mounting-Hole	2.8mm mounting hole with 4.5mm pads	MH1, MH2, MH3, MH4, MH5, MH6, MH7, MH8	MH	8		
MMBF5103TR-ND	MMBF5103	N-Channel JFET 40V SOT23-3	Q1, Q2, Q3, Q4	SOT-23-3	4	Surface Mount	
MMBT3904LT3GOSTR-ND	MMBT3904	BJT NPN 40V 200mA 300MHz 300mW Surface Mount SOT-23-3 (TO-236)	Q5, Q6, Q7, Q8, Q9, Q10, Q11, Q12, Q13	SOT-23-3	9	Surface Mount	
5272-MJD122TR-ND	MJD122	Bipolar (BJT) Transistor NPN - Darlington 100V 8A 1.5W Surface Mount TO-252-2L	Q14	TO-252-2L+HSS-C52	1	Surface Mount	
5272-MJD127TR-ND	MJD127	Bipolar (BJT) Transistor PNP - Darlington 100V 8A 1.5W Surface Mount TO-252-2L	Q15	TO-252-2L+HSS-C52	1	Surface Mount	
	Res-SM-M	Resistor - Surface Mount larger pads	R1	SMD-0805-M	1	Surface Mount	976k
	Res-SM-M	Resistor - Surface Mount larger pads	R2, R40, R42, R44, R53, R54, R55, R63, R64	SMD-1206-M	9	Surface Mount	10k
	Res-SM-M	Resistor - Surface Mount larger pads	R3, R20, R22, R24	SMD-0805-M	4	Surface Mount	8.25k
3361P-103GLFTR-ND	Potentiometer_SM	10kOhms 500mW Gull Wing Surface Mount Trimmer Potentiometer	R4, R46, R48, R50	TRIM_3361P	4	Surface Mount	
	Res-SM-M	Resistor - Surface Mount larger pads	R5	SMD-0805-M	1	Surface Mount	825
	Res-SM-M	Resistor - Surface Mount larger pads	R6, R16, R17, R18	SMD-0805-M	4	Surface Mount	4.75k
	Res-SM-M	Resistor - Surface Mount larger pads	R7, R8, R9	SMD-1206-M	3	Surface Mount	120
	Res-SM-M	Resistor - Surface Mount larger pads	R10, R11, R12	SMD-0805-M	3	Surface Mount	49.9
	Res-SM-M	Resistor - Surface Mount larger pads	R13, R14, R15	SMD-1206-M	3	Surface Mount	150k
	Res-SM-M	Resistor - Surface Mount larger pads	R19, R21, R23	SMD-1206-M	3	Surface Mount	27.4k
	Res-SM-M	Resistor - Surface Mount larger pads	R25, R28, R31, R47, R49, R51	SMD-0805-M	6	Surface Mount	1k
	Res-SM-M	Resistor - Surface Mount larger pads	R26, R29, R32	SMD-0805-M	3	Surface Mount	301

DigiKey Part Number	Comment	Description	Designator	Footprint	Quantity	MountingType	Value
	Res-SM-M	Resistor - Surface Mount larger pads	R27, R30, R33	SMD-0805-M	3	Surface Mount	75
	Res-SM-M	Resistor - Surface Mount larger pads	R34, R36, R38	SMD-0805-M	3	Surface Mount	274k
	Res-SM-M	Resistor - Surface Mount larger pads	R35, R37, R39	SMD-1206-M	3	Surface Mount	82.5k
	Res-SM-M	Resistor - Surface Mount larger pads	R41, R43, R45	SMD-0805-M	3	Surface Mount	3.32k
	Res-SM-M	Resistor - Surface Mount larger pads	R52	SMD-0805-M	1	Surface Mount	499
	Res-SM-M	Resistor - Surface Mount larger pads	R56, R57, R58, R59, R60, R61	SMD-0805-M	6	Surface Mount	1
	Res	Resistor	R62	RES-2W	1	Through Hole	8
119-219-3MSTR-ND	219-3MSTR	Dip Switch SPST 3 Position Surface Mount Slide (Standard) Actuator 100mA 20VDC	S1, S2, S3	2193MSTR	3	Surface Mount	
595-1341-ND	LP-34-1400	PWR XFMR SEMI-TORO 48VA TH (Parallel 17V@2.8A, Series 34V@1.4A)	T1	LP341400	1	Through Hole	
36-5002-ND	Comment	PC Test Point, Miniature Phosphor Bronze Silver Plating Through Hole Mounting Type	TP1, TP3, TP27	KEYSTONE_5002_Black	3	Through Hole	
36-5002-ND	Input	PC Test Point, Miniature Phosphor Bronze Silver Plating Through Hole Mounting Type	TP2	KEYSTONE_5002_White	1	Through Hole	
36-5002-ND	Volume	PC Test Point, Miniature Phosphor Bronze Silver Plating Through Hole Mounting Type	TP4	KEYSTONE_5002_White	1	Through Hole	
36-5002-ND	Output	PC Test Point, Miniature Phosphor Bronze Silver Plating Through Hole Mounting Type	TP26	KEYSTONE_5002_White	1	Through Hole	
36-5002-ND	-12V	PC Test Point, Miniature Phosphor Bronze Silver Plating Through Hole Mounting Type	TP28	KEYSTONE_5002_Yellow	1	Through Hole	
36-5002-ND	+12V	PC Test Point, Miniature Phosphor Bronze Silver Plating Through Hole Mounting Type	TP29	KEYSTONE_5002_Red	1	Through Hole	
296-TL081HIDBVRTR-ND	TL081	General-Purpose J-FET Single Operational Amplifier	U1	SOT-23-5	1	Surface Mount	
497-1178-2-ND	L7812	Linear Voltage Regulator IC Positive Fixed +12V Output 1.5A D2PAK	VR1	TO-263AB+HSS-C2591	1	Surface Mount	
497-1215-2-ND	L7912	Linear Voltage Regulator IC Negative Fixed -12V Output 1.5A D2PAK	VR2	TO-263AB+HSS-C2591	1	Surface Mount	
732-11384-ND	696310001002	WR-FSH Shocksafe Fuse Holder Turn and Lock Cover for PCB	XF1	696310001002	1	Through Hole	

Design Rules Verification Report

Filename : C:\Users\sebas\OneDrive - Université du Québec à Trois-Rivières\Stages\É2025\H2025 - FIP\Altium\Audio-amp\audio-amp-4layers.PcbDoc

Warnings 14
Rule Violations 0
Waived Violations 2

Warnings	
Unplated multi-layer pad(s) detected	14
Total	14

Rule Violations	
Clearance Constraint (Gap=4mil) (All),(All)	0
Clearance Constraint (Gap=5mil) (OnLayer('Top Overlay')),(All)	0
Clearance Constraint (Gap=60mil) (InNetClass('PWR')),(All)	0
Short-Circuit Constraint (Allowed=No) (All),(All)	0
Un-Routed Net Constraint ((All))	0
Modified Polygon (Allow modified: No), (Allow shelved: No)	0
Creepage Distance Constraint =(47.244mil) (InNetClass('PWR')),(All)	0
Width Constraint (Min=12mil) (Max=1000mil) (Preferred=12mil) (All)	0
Width Constraint (Min=10mil) (Max=1000mil) (Preferred=10mil) (All)	0
Width Constraint (Min=4mil) (Max=1000mil) (Preferred=4mil) (All)	0
Width Constraint (Min=20mil) (Max=150mil) (Preferred=45mil) (All)	0
Width Constraint (Min=20mil) (Max=1000mil) (Preferred=20mil) (All)	0
Width Constraint (Min=6mil) (Max=1000mil) (Preferred=6mil) (All)	0
Routing Layers(All)	0
Routing Via (MinHoleWidth=7.874mil) (MaxHoleWidth=248.031mil) (PreferredHoleWidth=7.874mil)	0
Differential Pairs Uncoupled Length using the Gap Constraints (Min=4mil) (Max=4mil) (Prefered=4mil) and Width	0
Power Plane Connect Rule(Direct Connect)(Expansion=20mil) (Conductor Width=10mil) (Air Gap=10mil) (Entries=4)	0
Power Plane Connect Rule(Relief Connect)(Expansion=11.811mil) (Conductor Width=4mil) (Air Gap=4mil) (Entries=4)	0
Power Plane Connect Rule(Direct Connect)(Expansion=20mil) (Conductor Width=10mil) (Air Gap=10mil) (Entries=4)	0
Minimum Annular Ring (Minimum=6mil) (All)	0
Hole Size Constraint (Min=7.874mil) (Max=248.031mil) (All)	0
Hole To Hole Clearance (Gap=10mil) (All),(All)	0
Minimum Solder Mask Sliver (Gap=6mil) (All),(All)	0
Net Antennae (Tolerance=0mil) (All)	0
Board Clearance Constraint (Gap=0mil) (All)	0
Board Clearance Constraint (Gap=0mil) (InComponentClass('Outside'))	0
Component Clearance Constraint (Horizontal Gap = 4mil, Vertical Gap = 4mil) (All),(All)	0
Height Constraint (Min=0mil) (Max=71497.938mil) (Prefered=500mil) (All)	0
Total	0

Waived Violations	
Short-Circuit Constraint (Allowed=No) (All),(All)	1
Hole To Hole Clearance (Gap=10mil) (All),(All)	1
Total	2

Unplated multi-layer pad(s) detected
Pad T1-2(4951.496mil,7700.866mil) on Multi-Layer on Net PWR+
Pad T1-6(7569.606mil,7700.866mil) on Multi-Layer on Net NetD6_2
Pad T1-1(5170mil,6771.732mil) on Multi-Layer on Net PWR-
Pad T1-2(5170mil,7370.158mil) on Multi-Layer on Net PWR+
Pad T1-4(5170mil,8031.575mil) on Multi-Layer on Net PWR+
Pad T1-3(5170mil,8630mil) on Multi-Layer on Net PWR-
Pad T1-5(7351.102mil,6771.732mil) on Multi-Layer on Net NetD6_4
Pad T1-6(7351.102mil,7370.158mil) on Multi-Layer on Net NetD6_2
Pad T1-8(7351.102mil,8031.575mil) on Multi-Layer on Net NetD7_4
Pad T1-7(7351.102mil,8630mil) on Multi-Layer on Net NetD7_2
Pad XF1-2(1465mil,8536.181mil) on Multi-Layer on Net NetJ3_3
Pad XF1-1(1465mil,8142.48mil) on Multi-Layer on Net PWR+
Pad J3-3(3178.032mil,8558.528mil) on Multi-Layer on Net NetJ3_3
Pad J3-1(2626.85mil,8558.528mil) on Multi-Layer on Net PWR-

Short-Circuit Constraint (Allowed=No) (All),(All)
Short-Circuit Constraint: Between Pad L3-MH(3290mil,4302.165mil) on Multi-Layer And Pad L7-MH(3290mil,4302.165mil) on Multi-Layer Location : [X =

Hole To Hole Clearance (Gap=10mil) (All),(All)
Hole To Hole Clearance Constraint: (Collision < 10mil) Between Pad L3-MH(3290mil,4302.165mil) on Multi-Layer And Pad L7-MH(3290mil,4302.165mil) on