

Aleph 30 Clone Build Notes

Thank you for participating the Classic Aleph Group Buy!

The idea for this PCB is to bring back the classic Aleph circuit for DIY builders in a flexible and expandible format. This document focuses on building the Aleph 30 Clone circuit in a stereo / 2 channel chassis.

NOTE: The Aleph 60 circuit and use of the Expansion Connections is covered in a separate document.

Project Difficulty: **NOVICE** **INTERMEDIATE** **EXPERT**



Questions?

You're probably not alone!

Post your question(s) on the DIYAudio forums.

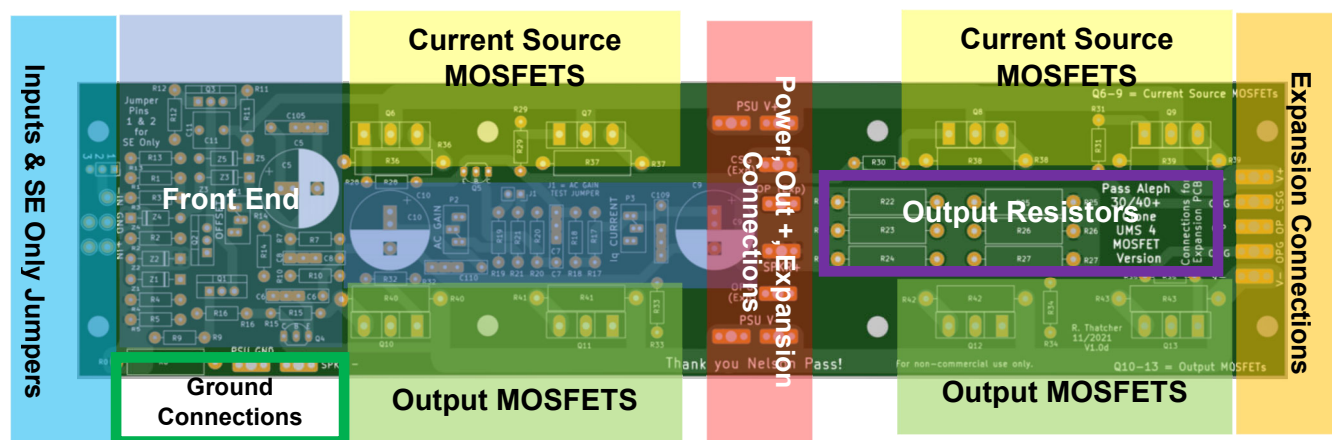


This project uses line/mains voltages and has a power supply with large capacitors. The voltages in this amplifier can kill – even at miniscule current. If you are not competent / confident with working with these voltages, please seek advice from either a qualified electrician, or an audio DIYer who is competent and experienced in this area. Always work safe and work smart!

The original schematic has been updated and a new PCB layout devised. The PCBs for this project are offered without any warranty, guarantee provided, or liability taken.

Version / Date	Revision History
V1.0a 10 Dec 2021	Original Release
V1.0b 26 Jan 2022	Updated V8 CRCRC PSU Schematic and BOM to reflect D2 and R12
V1.0c – 22 Feb 2022	<ul style="list-style-type: none">Noted error on PCB Silkscreen (PCB rev V1.0d) – Q4 & Q5 CBE / EBC are backwards on PCB. Details in “Semiconductors” section.Updated AC Gain Setting Procedure.
V1.0d– 15 Mar 2022	<ul style="list-style-type: none">Added Alternate for Q1/2: FQP3P20Added Group Buy #2 details<ul style="list-style-type: none">PCB ChangesBOM UpdateAdded Fuse & Thermal switch to PSU BOM
V1.0e – 16 Mar 2022	<ul style="list-style-type: none">Updated R16 in BOM
V1.0f – 12 Apr 2023	<ul style="list-style-type: none">Added pinout diagrams for ZTX450 & 2N4401Updated PSU BOM based on current stock levels
V1.0f –17 Mar 2025	<ul style="list-style-type: none">Updated Wiring Diagrams

Getting to know the Amp PCB



PCB Revisions

PCB	Version / Date	Revision History
Main Aleph PCB	V1.0d – 11/2021	Group Buy #1 Version <ul style="list-style-type: none"> Q4 & Q5 CBE / EBC markings are backwards on PCB.
Main Aleph PCB	V1.0f – 3/2022	Group Buy #2 Version <ul style="list-style-type: none"> Q4 & Q5 corrected CBE / EBC markings on PCB Added C20 & C21

Resistors

Resistors are either 1/4W or 3W rated.

- For 1/4W resistors use your favorite brand metal film resistors. Yaego, etc.
 - Higher wattage is OK. Less is not OK
 - Hole spacing on PCB is 10mm for 1/4 W resistors.
- For 3W MOSFET Source Resistors and Output resistors use 3W metal oxide, and avoid wire wounds unless non-inductive.
- Solder all 3W resistors on amp PCBs and Power supply PCBs so they are elevated from the PCB. Put a spacer underneath them (like a piece of cardboard) to create an air gap of a few mm, and remove it after soldering them in place.
- For Ground / Hum Breaker resistor (R0), any brand 3W Metal Oxide resistor will work. Value is not critical, 2R7 to 4R will be fine.

Trimpots & Adjustments

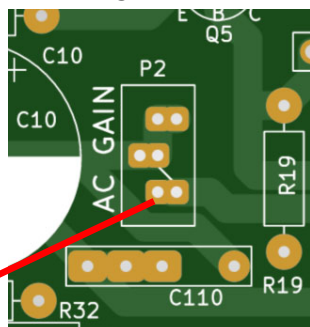
Trimpot positions are included for adjusting output DC Offset, AC Gain, and bias current. In the original circuit these were fixed resistors. It is recommended to install the trimpots to make easy adjustments to your build. The values below are chosen so that midrange of the trimpot value (factory default) + associated resistor equals approximately the original Aleph 30 resistor value. This allows for range for adjustment.

BUILD NOTE: Set trimpot prior to installation

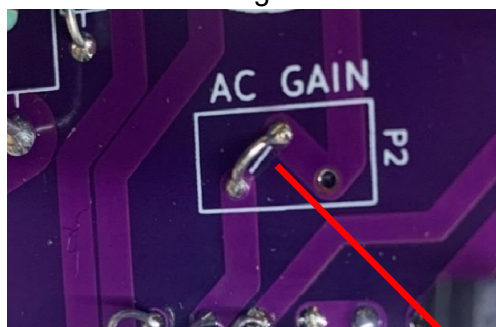
Parameter	Original Aleph 30 Value	Trimpot + Resistor	Initial Trimpot value Set before Installing
DC Offset	R14 = 392R	P1 @ 242R + R14 @ 150R = 392R	P1 = 242R
AC Gain	R21 = 820R	P2 @ 428R + R21 @ 392R = 820R	P2 = 428R
Iq Current	R19 = 47k5	P3 @ 17k5 + R19 @ 30k = 47k5	P3 = 17k5

Optional – Build with fixed resistors and no trimpots

You can use the original base Aleph 30 resistor values in R14, R19, and R21. You will need to jumper the trimpots by soldering in a clipped resistor lead from your discard pile as a jumper wire between the trimpot pads on the PCB. You must use the correct base resistor value (R14 = 392R, R21 = 820R, R19 = 47k5), not the values in the BOM. The PCB is marked with a white line showing where to install the jumper.



Install Jumper here.
See the white mark on the
PCB for guidance.



Example hardwired jumper
on a prototype build

Bias Current Measurement

Option 1 – Measure voltage of each source resistor (R36-39 & R40-43), divide by source resistor values. Add them up. Example: R36: 330mV / 0R47 = 0.7A Measure the rest and add up the values.

Option 2 – use a clamp ammeter on positive and negative voltage rail wires from power supply.

Initial target value is 2.1 - 2.2A

Use Option 1 to verify the current is spread evenly on the MOSFETS. Once verified, Option 2 is good for overall bias adjustments.

AC Gain Setting Procedure

See Posts 2 & 3 here for guidance

<https://www.diyaudio.com/forums/pass-labs/38033-proper-current-source-adjustment.html>

Post 3 - From Nelson:

If you set the amplifier driving a sine wave into a load (let's say 16 Vrms into 8 ohms at 100 Hz), you can measure the current variation of the gain N channel Mosfets (whose Sources attach through power resistors to the - supply rail) with a cheap AC voltmeter placed across one of these Source resistors.

With R21 taken out of the circuit, you will get one AC value across the Source resistor (say 470 mV, for example). As you put a value for R21 in the circuit, this will decline, and when it measures ½ the value without R21, you have reached 50%.

If it measures 1/4 the value, the current gain of the Aleph source is 75%, and this figure is too high for a standard Aleph. Most listeners like the Alephs at 50% or lower, so I recommend between 50% and 100% of the AC voltage value compared with no R21.

NOTE: The PCB has an AC Gain Setting jumper that allows for pulling R21 out of circuit temporarily by removing the jumper.

Step	Procedure	Measurements	
		Left Channel	Right Channel
1	Remove AC Gain Jumper		
2	Set the amplifier driving a sine wave into a dummy load (let's say 16 Vrms into 8 ohms at 100 Hz).	V = _____ into 8R Freq = _____ Hz	V = _____ into 8R Freq = _____ Hz
3	Measure voltage on source resistors on Amp / V- Side (R40-43) Set meter to read AC Volts. Confirm it's AC, not DC.	R40 = _____ mV R41 = _____ mV R42 = _____ mV R43 = _____ mV	R40 = _____ mV R41 = _____ mV R42 = _____ mV R43 = _____ mV
4	Calculate 50% of voltages in Step 3	R40 = _____ mV R41 = _____ mV R42 = _____ mV R43 = _____ mV	R40 = _____ mV R41 = _____ mV R42 = _____ mV R43 = _____ mV
5	Install AC Gain Jumper		
6	Set the amplifier driving a sine wave into a load (let's say 16 Vrms into 8 ohms at 100 Hz)	V = _____ into 8R Freq = _____ Hz	V = _____ into 8R Freq = _____ Hz
7	Measure Source resistors on Amp / V- Side. Adjust P2 to match Step 4 values Set meter to read AC Volts. Is it set for AC, not DC?	R40 = _____ mV R41 = _____ mV R42 = _____ mV R43 = _____ mV	R40 = _____ mV R41 = _____ mV R42 = _____ mV R43 = _____ mV

Capacitors

Positions	Value	Size & Notes
C5, C9, C10	220uF 20+V	5.0 or 7.5mm Lead Spacing, up to 16mm Diameter Use your favorite brand here
C105, C109, C110	0.1uF Film Cap	OPTIONAL - Bypass for each of the above Electrolytic Caps 5.0, 7.5, or 10.0 mm Lead Spacing
C8	10pF Mica	5.0, 7.5, or 10.0 mm Lead Spacing
C6, C7	1nF / 1000pf / 0.001uF	5.0, 7.5, or 10.0 mm Lead Spacing
C11	1.0uF to 4.7uF will do, value is not critical	5mm LS 7.2x7.2 Film
C20, C21	1,000 uF or greater	5.0 or 7.5mm Lead Spacing, up to 16mm Diameter Use your favorite brand here

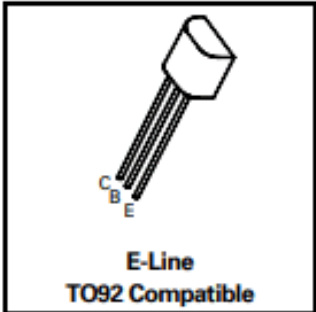
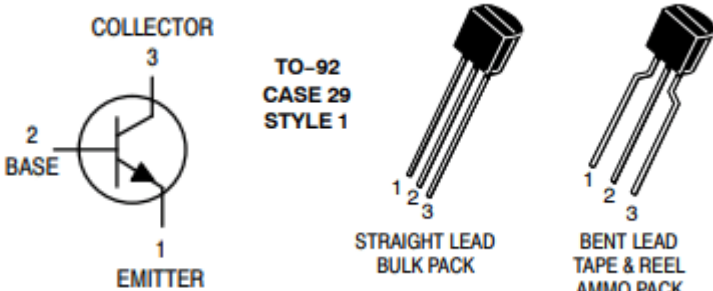
Minimum DC Voltage rating for capacitors should at minimum be rail voltage. Greater is OK, lower is NOT OK.

The exception is C5/105, C9/109, C10/110. For these caps the minimum Voltage rating = $\frac{1}{2}$ rail voltage + 4V. Therefore >16.5V for Aleph 30. 20V is the next larger standard size. 20V or higher voltage rating is OK. Lower is not OK.

Semiconductors

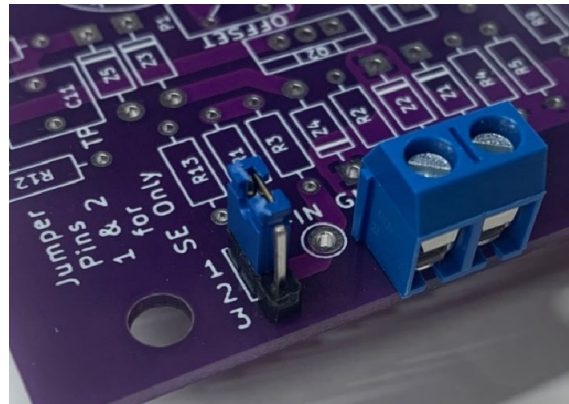
The Aleph 30 clone will use 3 of the 4 MOSFET positions on the top and bottom of the PCB.

Positions	Semiconductors	Matching & Notes
Q1 & Q2	IRF9610 / SFP9610 Alternate: 2SJ313 Alternate: FQP3P20	Must be matched
Q3	IRF9610 / SFP9610	No need to match
Q4 & Q5	ZTX450 Alternate: 2N4401	No need to match NOTE for PCB version 1.0d: Q4 shows "C B E" on PCB rev V1.0d. This is backwards, it should read "E B C". Q5 shows "E B C" on PCB rev V1.0d. This is backwards, it should read "C B E". Markings have been corrected on PCB version 1.0f
Q6-Q9	IRFP240	Qty 3. Must be matched Must populate Q6 position. Populate 2 of the 3 remaining positions on PCB and populate associated gate and source resistors.
Q10-Q13	IRFP240	Qty 3. Must be matched Must populate Q10 position. Populate 2 of the 3 remaining positions on PCB and populate associated gate and source resistors.

ZTX450 Pinout	2N4401 Pinout
 <p>E-Line TO92 Compatible</p>	 <p>COLLECTOR 3 2 BASE 1 EMITTER TO-92 CASE 29 STYLE 1 STRAIGHT LEAD BULK PACK BENT LEAD TAPE & REEL AMMO PACK</p>

Connections to PCB

You have several options for wire connections to the board including Quick Disconnect Spades, bare wire, or Euroblock type 5mm / 5.08 mm connectors.



Grounding

Input Signal Ground(s) attach here.

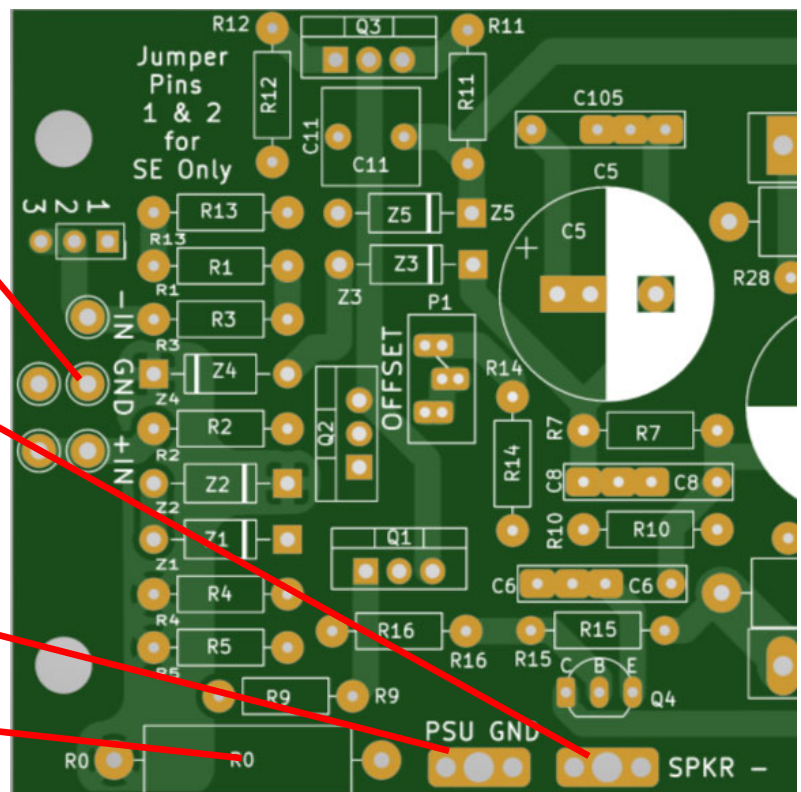
Option 1 – Connect Power supply / star ground to Negative Speaker Terminal.

Option 2 – Connect from here to Negative Speaker Terminal.

See which option sounds better in your setup

Power Supply Ground attaches here.

R0 = hum breaker resistor



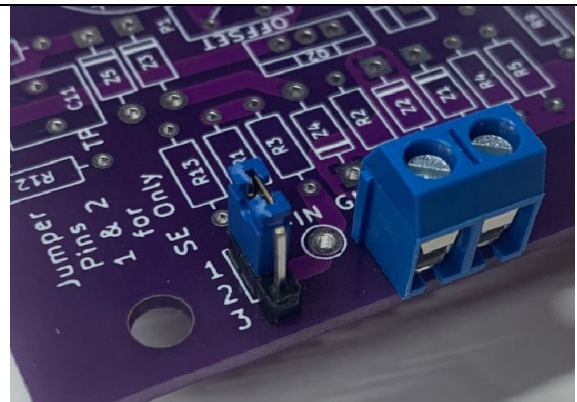
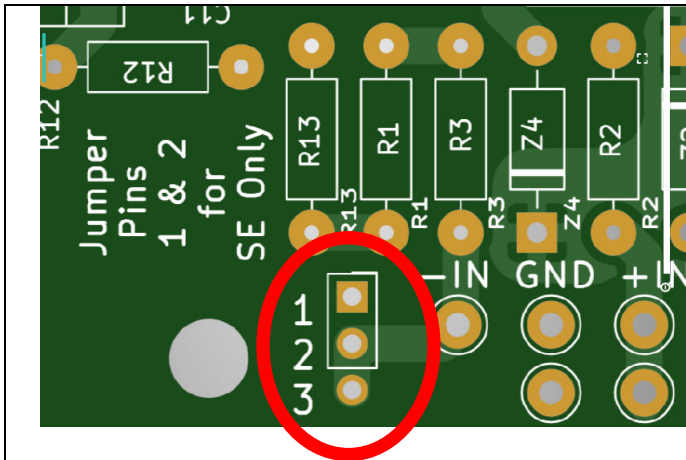
Single Ended vs. Balanced & SE Only Jumper

The Aleph 30 can be operated in balanced or single ended mode. When operating in Singled ended mode, XLR- must be connected to ground.

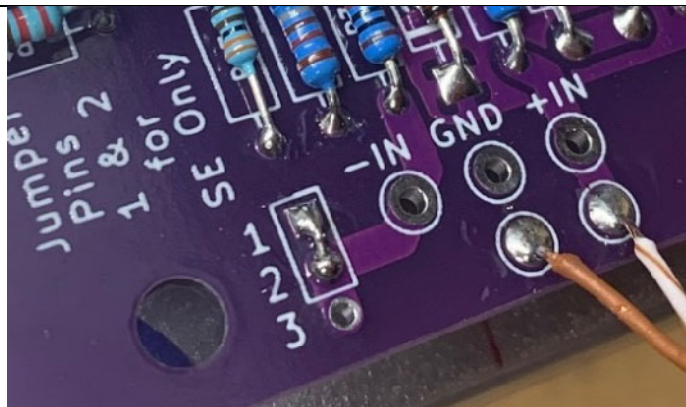
Option 1: Install a shorting plug/wire in the XLR jack that connects XLR Pin 1 (Ground) to XLR Pin 3 (negative)

Option 2: install a jumper header pins and use a jumper on the PCB between Pins 1 & 2 as marked on the PCB. You can store the jumper on Pins 2 & 3 when operating in Balanced mode.

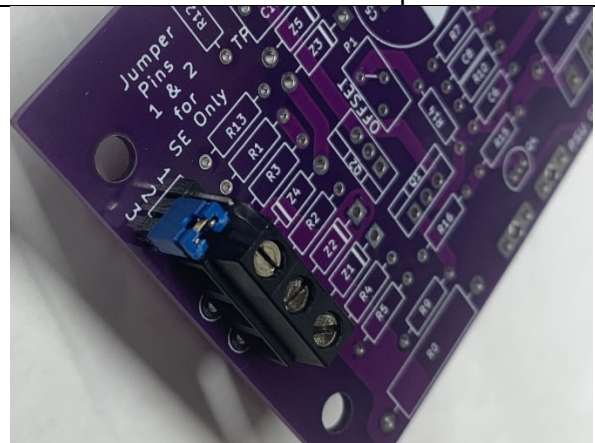
Option 3: SE only mode ONLY - Solder in a clipped resistor lead from your discard pile as a jumper wire between the point 1 & 2.



Example: Jumper installed for SE Only Operation
Euroblock for SE inputs

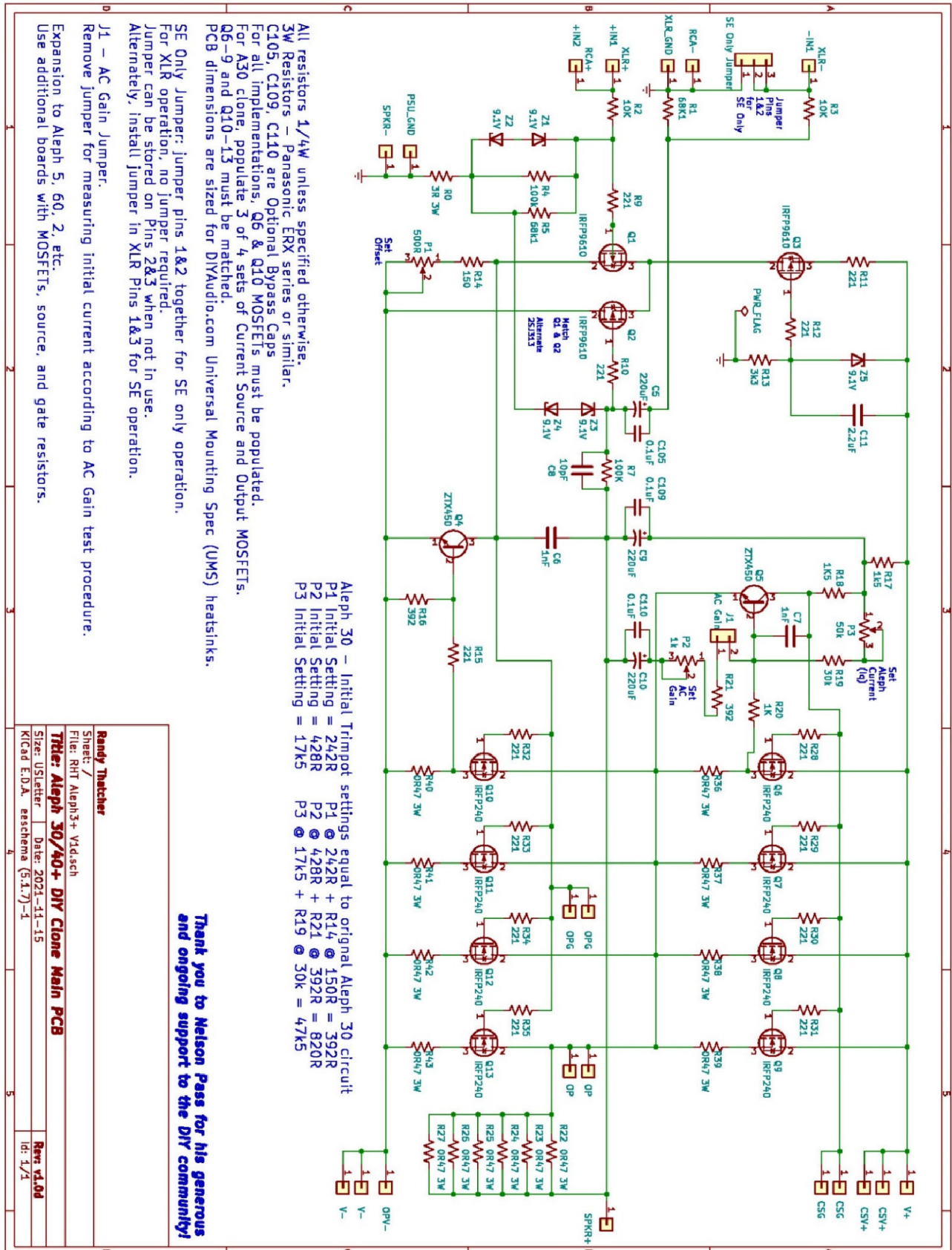


Example: Hardwire jumper installed for SE Only
Hardwired SE Input

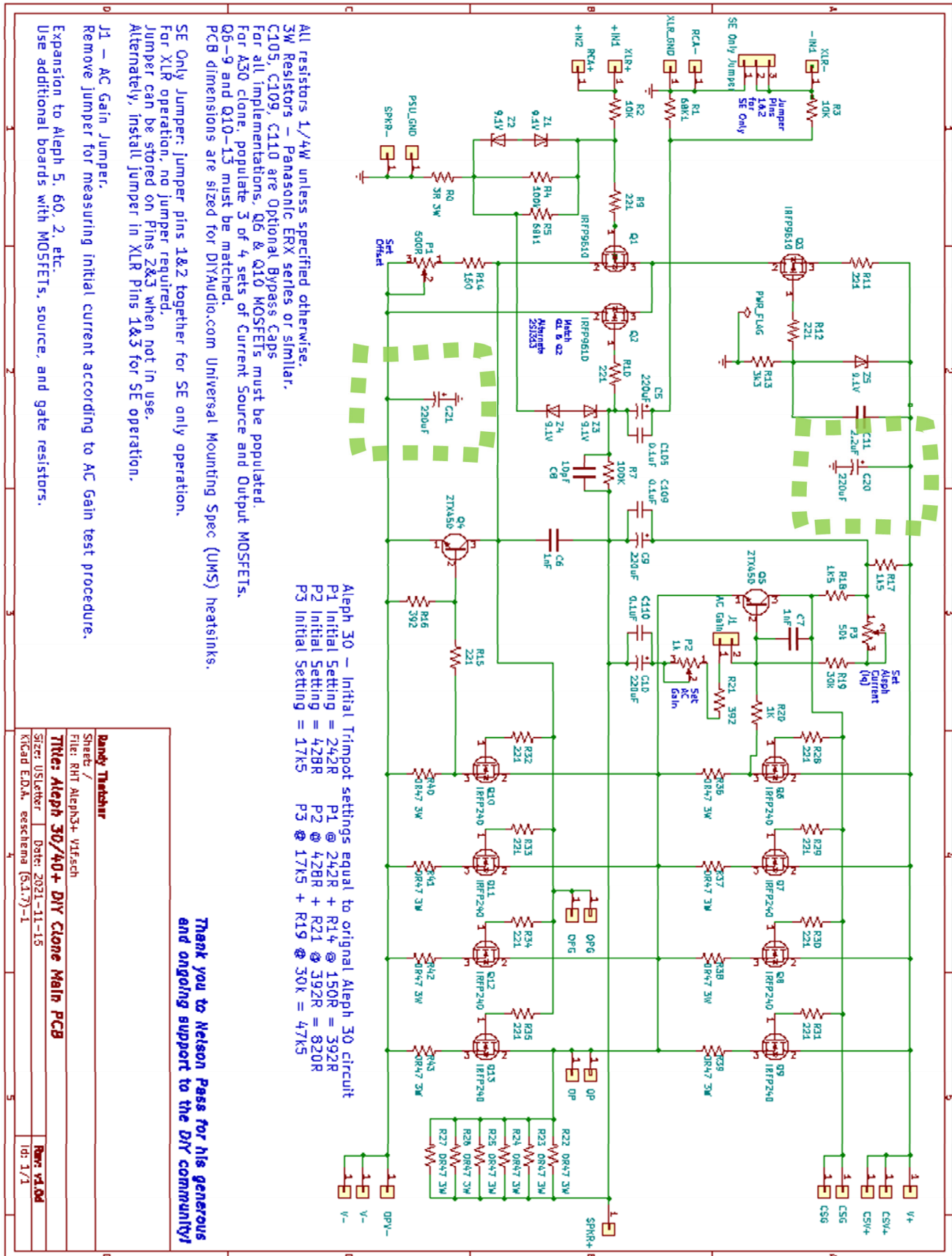


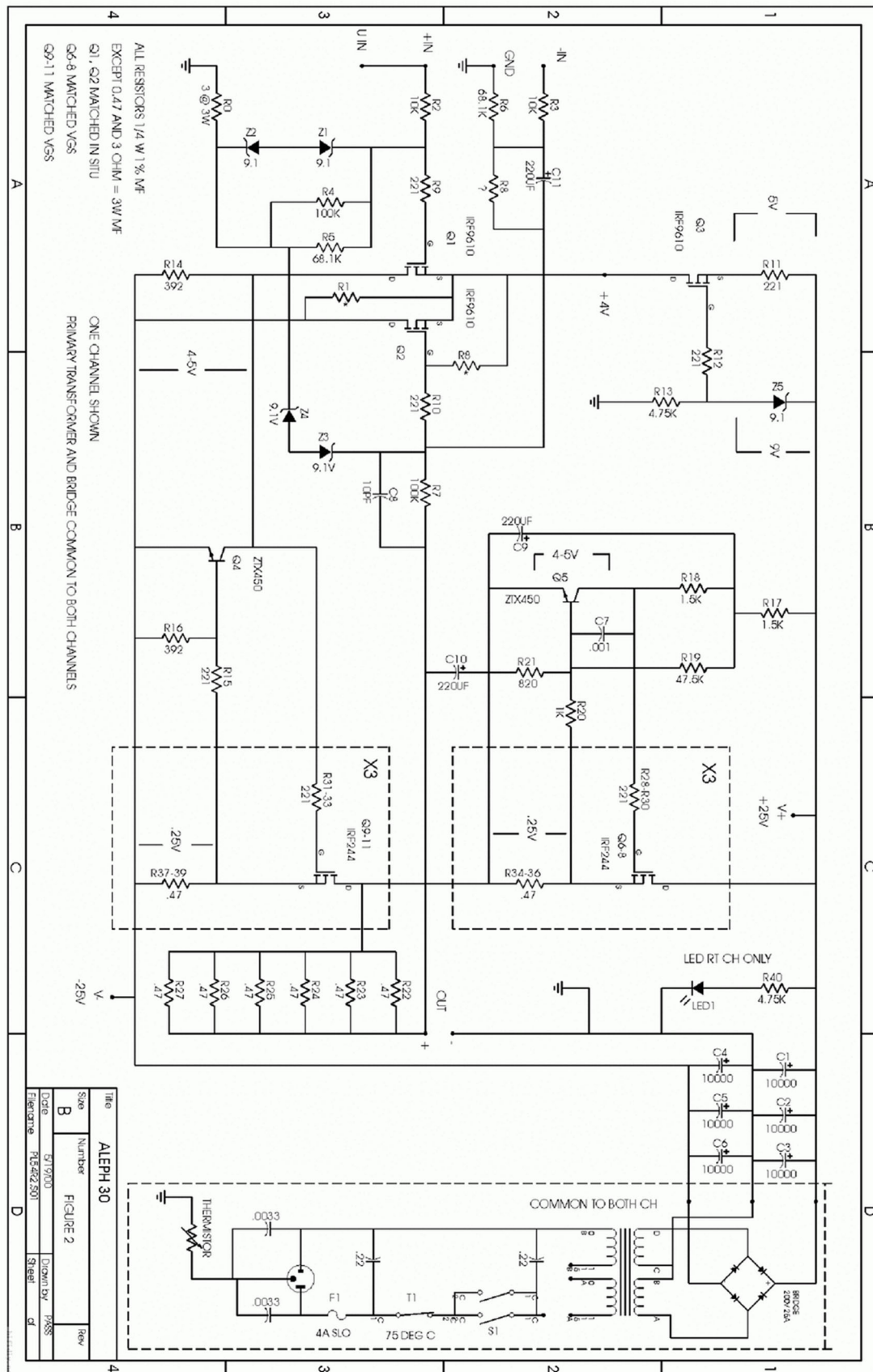
Example: Jumper installed for Balanced Operation
Euroblock for Balanced inputs

PCB Schematic – Main PCB – Version 1.0d



PCB Schematic – Main PCB – Version 1.0f





Aleph 30 BOM

BOM for Aleph 30+ Front End PCBs - The quantities below are for 3 MOSFET output (Aleph 30)

BOM Version: v1.0e

NOTE: Assumes 2 channels in stereo amp chassis configuration

This table contains example part numbers and part recommendations. Any good quality similar parts will work with no detriment to the sound.

Per Chan	2 Chan	Designation	Description	Add'l Detail / Comment	Digikey
1	2	R0	2R7-4R 3W		A131577CT-ND
2	4	R1, R5	68k1 1/4W		68.1KXBK-ND
2	4	R2, R3	10k 1/4W		10.0KXBK-ND
2	4	R4, R7	100k 1/4W		100KXBK-ND
11	22	R9-12, R15, R28-35	221R 1/4W		221XBK-ND
1	2	R13	3k3 1/4W		MFR-25F52-3K3-ND
1	2	R14	150R 1/4W		150XBK-ND
2	4	R16, R21	392R 1/4W		392XBK-ND
2	4	R17, 18	1k5 1/4W		RNF14FTD1K50CT-ND
1	2	R19	30k 1/4W		MFR-25F52-30K-ND
1	2	R20	1k 1/4W		1.00KXBK-ND
12	24	R22-27, R36-43	0R47 3W	Panasonic ERX or similar Metal Oxide	A138094CT-ND
5	10	Z1-5	9.1V Zener		1N5239B-ND
3	6	Q1-3	IRF9610 / SFP9610	Q1&2 Matched	IRF9610PBF-ND
2	4	Q1-2 Alternate Option	2SJ313 or FQP3P20	Q1&2 Matched	
2	4	Q4-5	ZTX450	Alternate: 2N4401	ZTX450-ND
6	12	Q6-13	IRFP240	Q6-9 Matched, Q10-13 Matched	IRFP240PBF-ND
3	6	C5, C9, C10	220uF 25V	5.0 or 7.5mm Lead Spacing, up to 16mm Diameter	604-1056-ND
3	6	C105, C109, C110 (Optional)	0.1uF Film Cap	5.0, 7.5, or 10.0 mm Lead Spacing	1928-1538-ND
1	2	C8	10pF Mica	5.0, 7.5, or 10.0 mm Lead Spacing	338-1061-ND
2	4	C6, C7	1nF / 1000pf / 0.001uF	5.0, 7.5, or 10.0 mm Lead Spacing	1928-1384-ND
1	2	C11	1.0uF to 4.7uF will do, value is not critical	5mm LS 7.2x7.2 Film	399-12660-ND 495-1127-ND
2	4	C20, C21	1,000uF or more, 35V	5.0 or 7.5mm Lead Spacing, up to 16mm Diameter (PCB V1.0f only)	493-3181-ND 493-10881-1-ND 399-6572-ND 493-6966-ND
1	2	P1	500R Multi-turn pot	Initial Setting = 242R	3296Y-501LF-ND or 3296W-501LF-ND
1	2	P2	1k Multi-turn pot	Initial Setting = 428R	3296Y-102LF-ND or 3296W-102LF-ND
1	2	P3	50k Multi-turn pot	Initial Setting = 17k5	3296Y-503LF-ND or 3296W-503LF-ND
2	4	Jumpers	2.54mm jumper		1849-09200-71-BBGB00-ND
1	1	Jumper Header	2.54mm jumper header pins	Buy a long strip and cut for J1 and SE Only Jumpers	2057-PH1-15-UA-ND
6	12	Heatsink pads	Pads for MOSFETS		Keratherm (DIYAudio Store)
1	2	PCB			Group Buy
		OPTIONAL: QD Connectors	Quick Disconnect Spades		36-1287-ST-ND
		OPTIONAL: QD Connectors	3 Position Terminal Block	Screw disconnect for inputs	A98077-ND
		OPTIONAL: QD Connectors	5 Position Terminal Block	Screw disconnect for Expansion connectors For use in Aleph 60 Builds	23-0305443005-ND

Chassis

The DIY Audio 4U Deluxe Chassis is a perfect candidate for the Aleph 30 Stereo Amplifier.

Power Supply

Transformer

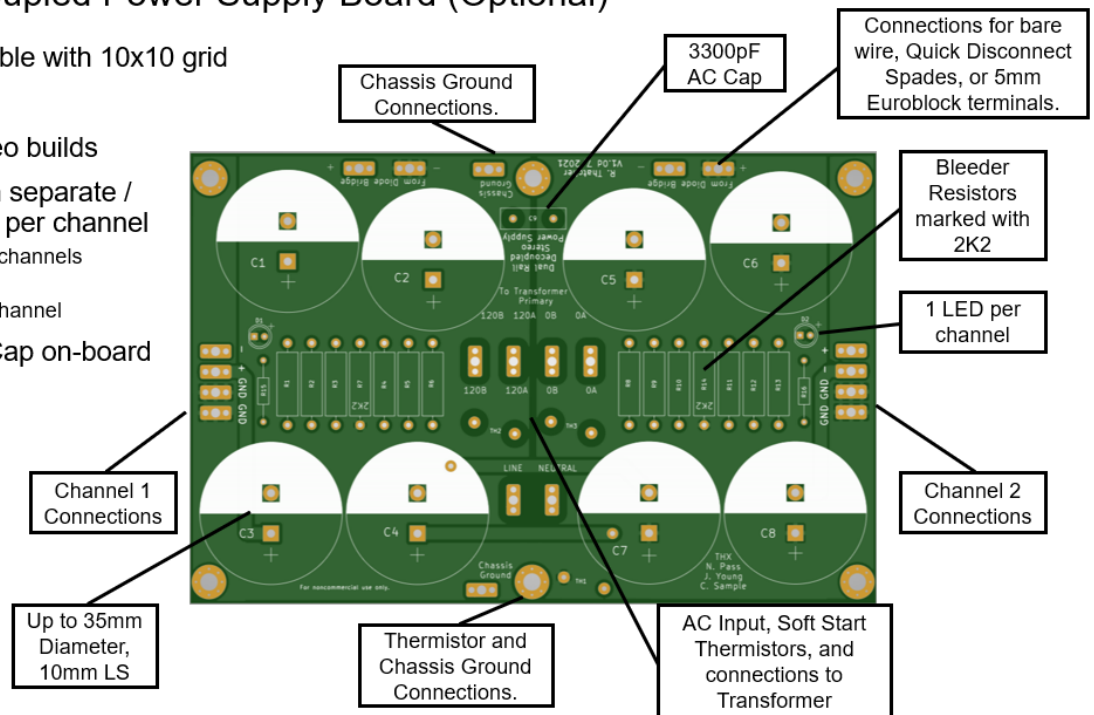
Recommend 300VA 18+18 Transformer (example: Antek AS-3218)

Alternate 300VA 20+20V Transformer (example: Antek AS-3220)

“New Original” F5 Power Supply – Recommended for Stereo builds

Classic Aleph for UMS Chassis Group Buy Dual Rail Decoupled Power Supply Board (Optional)

- Mounting holes compatible with 10x10 grid
- 112 x 170mm
- Recommended for stereo builds
- CRC Power Supply with separate / decoupled 2nd cap bank per channel
 - 1st bank of caps for both channels
 - Last bank of caps:
1 cap per rail for each channel
- CL-60 Soft Start & AC Cap on-board



Power Supply BOM for “New Original” F5 Dual Rail Decoupled Power Supply PCB

NOTE: Assumes 2 channels in stereo amp chassis configuration

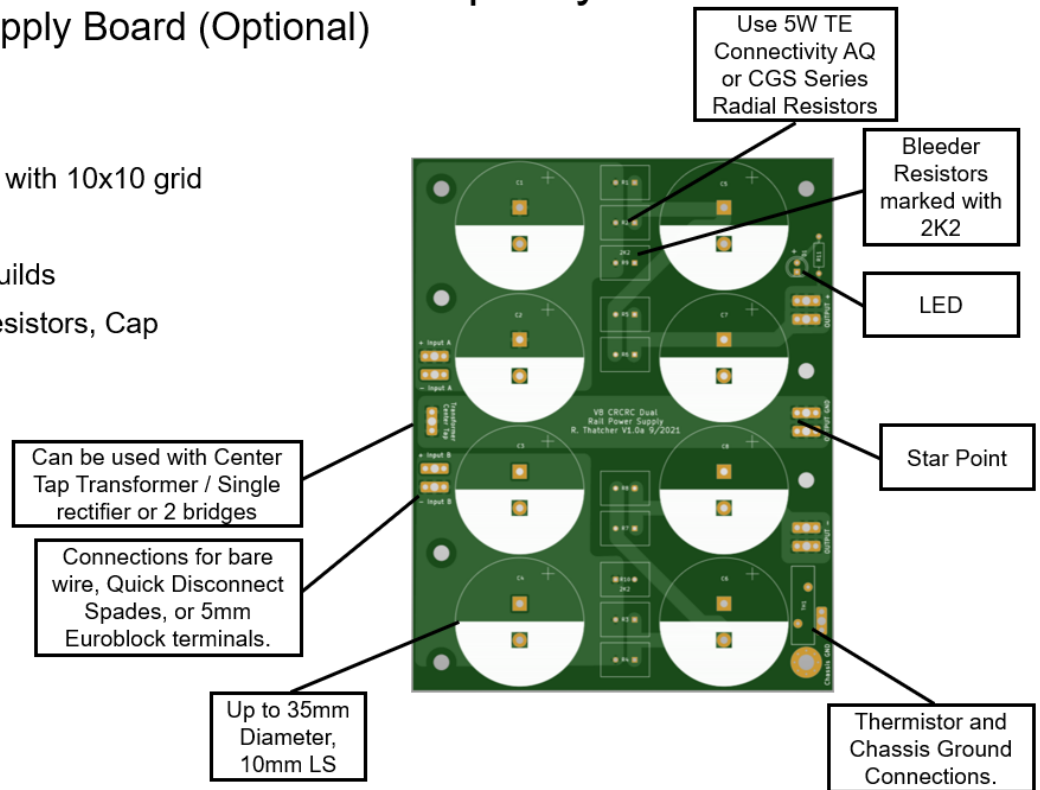
This table contains example part numbers and part recommendations. Any good quality similar parts will work with no detriment to the sound.

ID	Qty	Value	Digikey Part Number	Comment
Power Supply Board				
R1-6, R8-13	12	0R33 - 1R 3W	P0.47W-3BK-ND WHDR50FETCT-ND 0.33AECT-ND A131659CT-ND	Panasonic EGR/ERX or similar Alternate: use inductive wirewound resistors in this position. Inductive resistors add filtration in powers supply CRC filter.
R7, R14	3	2k2 3W	ERG-3SJ222	Panasonic EGR/ERX or similar
R15-16	2	25k 1/4W	24.9KXBK-ND	"Rule of Thumb" - 1k Ohm per PSU volt Increase R for dimmer LED.
C1-8	8	22k uF or greater, 25V or greater	338-2431-ND	10mm Lead Spacing, up to 35mm Diameter. Voltage rating must be greater than rail voltage!
C1-8 (alternate)		27k uF, 25V	338-2255-ND	
C1-8 (alternate)		33k uF, 25V	338-1613-ND	
C1-8 (alternate)		47k uF, 25V	1189-3900-ND	
C1-8 (alternate)		22k uF, 35V	338-1485-ND	If using 20+20 Transformer, increase voltage rating to next size up: 35V
C1-8 (alternate)		27k uF, 35V	1189-3914-ND	
C1-8 (alternate)		33k uF, 35V	338-2260-ND	
C9	1	3300pF, X1 Safety Rated	399-9513-1-ND	
TH1-3	3	CL-60	KC006L-ND	
D1,2	2	Blue LED	732-5019-ND	This is a Pass clone – blue is required!
Other	2	Screw Terminal Blocks 4 position	277-1579-ND	OPTIONAL - For connection to amp PCBs
Other	3	Screw Terminal Blocks 2 Position 35 Degree	277-5941-ND	OPTIONAL - for AC Connections (Mains + Transformer)
Other	6-16	Quick Disconnect Blades	WM14275CT-ND 36-1287-ST-ND	OPTIONAL - 6 if AC only, up to 16 total if not using screw terminal blocks
Rectifiers / Snubber PCBs				
Rectifier Bridges	2		GBPC3510-E4/51GI-ND 641-1380-ND	
Snubber C	2	FILM 10000PF / 10nF / .01uF	495-4975-1-ND	
Snubber C	2	FILM 150nF / .15uF	495-77011-1-ND	
Snubber R	2	Metal Film 1/4W - Value TBD		Use Quasimodo test jig to determine value
MISC				
Fuses	TBD	TBD Amp Slow Blow	Calculate Fuse size based on Transformer VA / Mains voltage, then go to next standard size. Example: 300VA / 120V = 2.5A Fuse	
Thermal Switch	1	THERMOSTAT 70DEG C SPST-NC	1862-1126-ND	

V8 CRCRC Power Supply – Recommended for Mono builds

Classic Aleph for UMS Chassis Group Buy V8 CRCRC Power Supply Board (Optional)

- Mounting holes compatible with 10x10 grid
- 115 x 146mm
- Recommended for mono builds
- 2 Caps, Resistors, Cap, Resistors, Cap





Power Supply BOM for V8 CRCRC Power Supply PCB

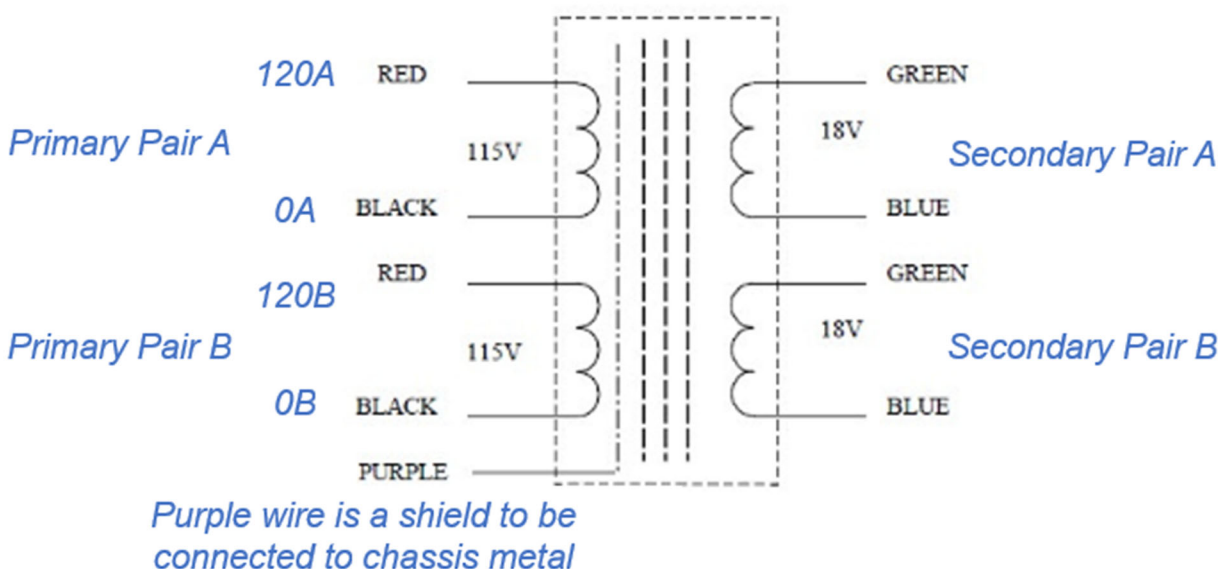
NOTE: BOM is for SINGLE CHANNEL. Multiply Quantity x 2 for 2 channels!

This table contains example part numbers and part recommendations. Any good quality similar parts will work with no detriment to the sound.

ID	Qty	Value	Digikey Part Number	Comment
Power Supply Board				
R1-8	8	0R22 – 0R33 5W	A103689-ND A137379-ND A102472-ND	Use TE Connectivity 5W Radial Resistors for this PCB 13.00mm x 9.00mm 5mm Lead Spacing
R9-10	2	2k2 5W (3k3 is also OK)	A102461-ND A131251-ND	Use TE Connectivity 5W Radial Resistors for this PCB 13.00mm x 9.00mm 5mm Lead Spacing
R11, 12	2	25k 1/4W	24.9KXBK-ND	"Rule of Thumb" - 1k Ohm per PSU volt Increase R for dimmer LED.
C1-8	8	22k uF or greater, 25V or greater	338-2431-ND	10mm Lead Spacing, up to 35mm Diameter. Voltage rating must be greater than rail voltage!
C1-8 (alternate)		27k uF, 25V	338-2255-ND	
C1-8 (alternate)		33k uF, 25V	338-1613-ND	
C1-8 (alternate)		47k uF, 25V	1189-3900-ND	
C1-8 (alternate)		22k uF, 35V	338-1485-ND	If using 20+20 Transformer, increase voltage rating to next size up: 35V
C1-8 (alternate)		27k uF, 35V	1189-3914-ND	
C1-8 (alternate)		33k uF, 35V	338-2260-ND	
TH1	1	CL-60	KC006L-ND	
D1-2	2	Blue LED	732-5019-ND	This is a Pass clone – blue is required! LEDs are both on positive rail. Use one for on-board and another for front panel
Other	5	Screw Terminal Blocks 2 position	277-1667-ND	OPTIONAL - For connection to amp PCB and/or Bridges
Other	10	Quick Disconnect Blades	WM14275CT-ND 36-1287-ST-ND	
CL-60 / AC Cap PCB				
C1	1	3300pF, X1 Safety Rated	399-9513-1-ND	
TH1-2	2	CL-60	KC006L-ND	
Other	3	Screw Terminal Blocks 2 position	277-1667-ND	
Other	6	Quick Disconnect Blades	WM14275CT-ND 36-1287-ST-ND	
Rectifiers / Snubber PCBs				
Rectifier Bridges	2		GBPC3510-E4/51GI-ND 641-1380-ND	
Snubber C	2	FILM 10000PF / 10nF / .01uF	495-4975-1-ND	
Snubber C	2	FILM 150nF / .15uF	495-77011-1-ND	
Snubber R	2	Metal Film 1/4W - Value TBD		Use Quasimodo test jig to determine value
MISC				
Thermal Switch	1	THERMOSTAT 70DEG C SPST-NC	1862-1126-ND	

Transformers – Preparing for Wiring the Amplifier

It is critical to identify transformer wire pairs for your build. Below is an example diagram for a shielded toroidal Antek Transformer (example: AS-3218) with added notes in blue text.



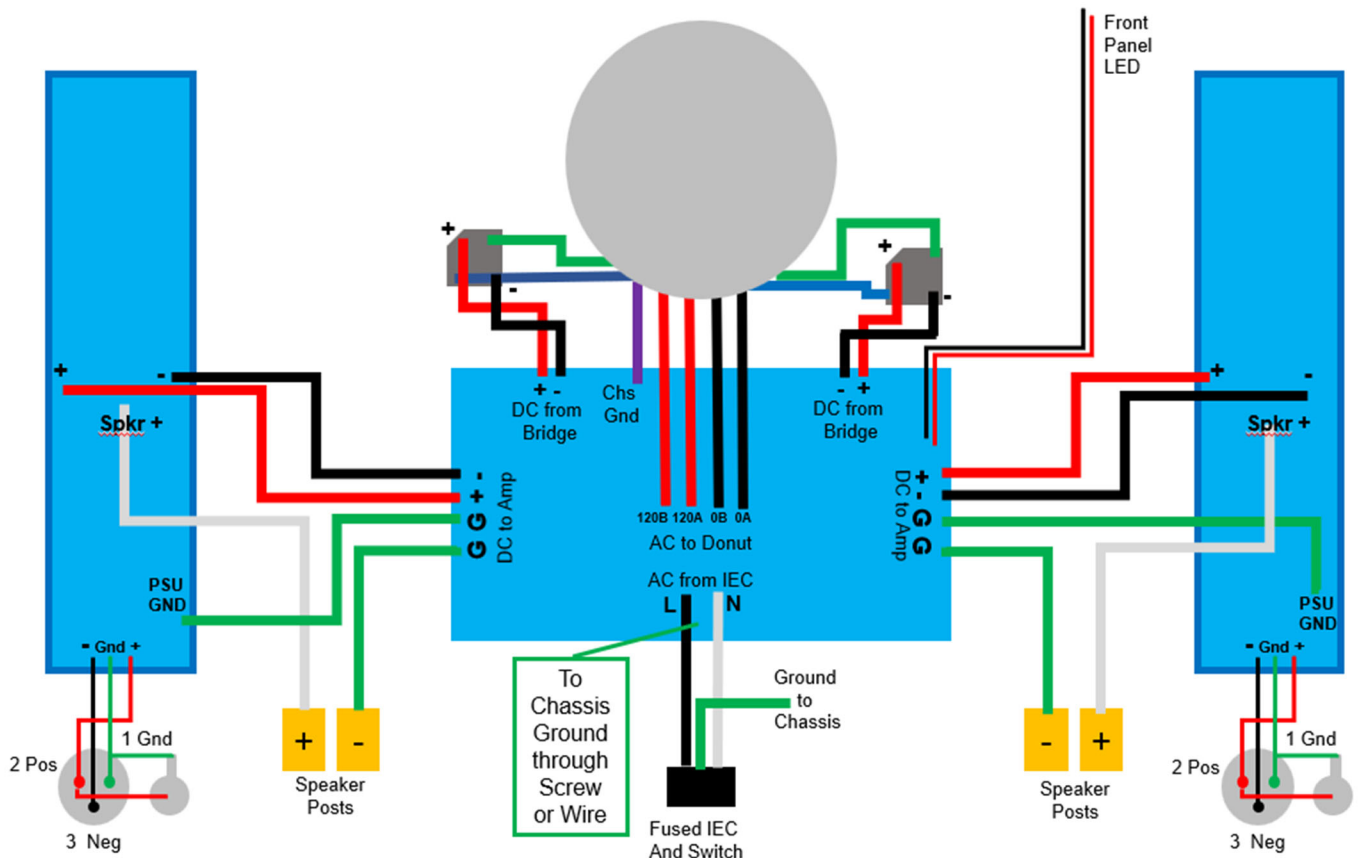
Identifying Wire Pairs

- Confirm transformer wiring pairs (120A / 0 A, 120B / 0B, secondary pairs)
 - How to identify which wires are pairs
 - Use DMM set to Ohms or Continuity “buzzer”.
 - Pairs will “buzz” or read as a few Ohms.
 - For Antek Transformers:
 - Find red / black pairs, twist each pair, and tape or heatshrink to hold together as a pair.
 - Find blue / green pairs, twist each pair, and tape or heatshrink to hold together as a pair.
 - Other transformers – refer to transformer datasheet and/or label on transformer for wire colors.
 - Verify pairs with DMM, twist each pair, and tape or heatshrink to hold together as a pair.

Amplifier Wiring – Aleph 30 Stereo Configuration with “New Original” F5 Power Supply PCB Wiring Concept for 120VAC Mains and transformer with Dual 120V primary pairs

- Twist wires!!!
- If using Antek shielded transformer, attach purple wire to Chassis.
 - Option 1: Direct to Chassis
 - Option 2: Connect to “Chassis Ground” termination point on PSU PCB
- Confirm transformer wiring pairs (120A / 0 A, 120B / 0B, secondary pairs)
 - Use DMM set to Ohms or Continuity “buzzer”. Pairs will “buzz” or read as a few Ohms.
 - For Antek Transformers:
 - Find red / black pairs, twist each pair, and tape or heatshrink to hold together as a pair.
 - Find blue / green pairs, twist each pair, and tape or heatshrink to hold together as a pair.
 - Other transformers – refer to transformer datasheet and/or label on transformer for wire colors.
 - Verify pairs with DMM, twist each pair, and tape or heatshrink to hold together as a pair.
- 120VAC wiring application using an Antek transformer (2 secondary pairs) is shown below.

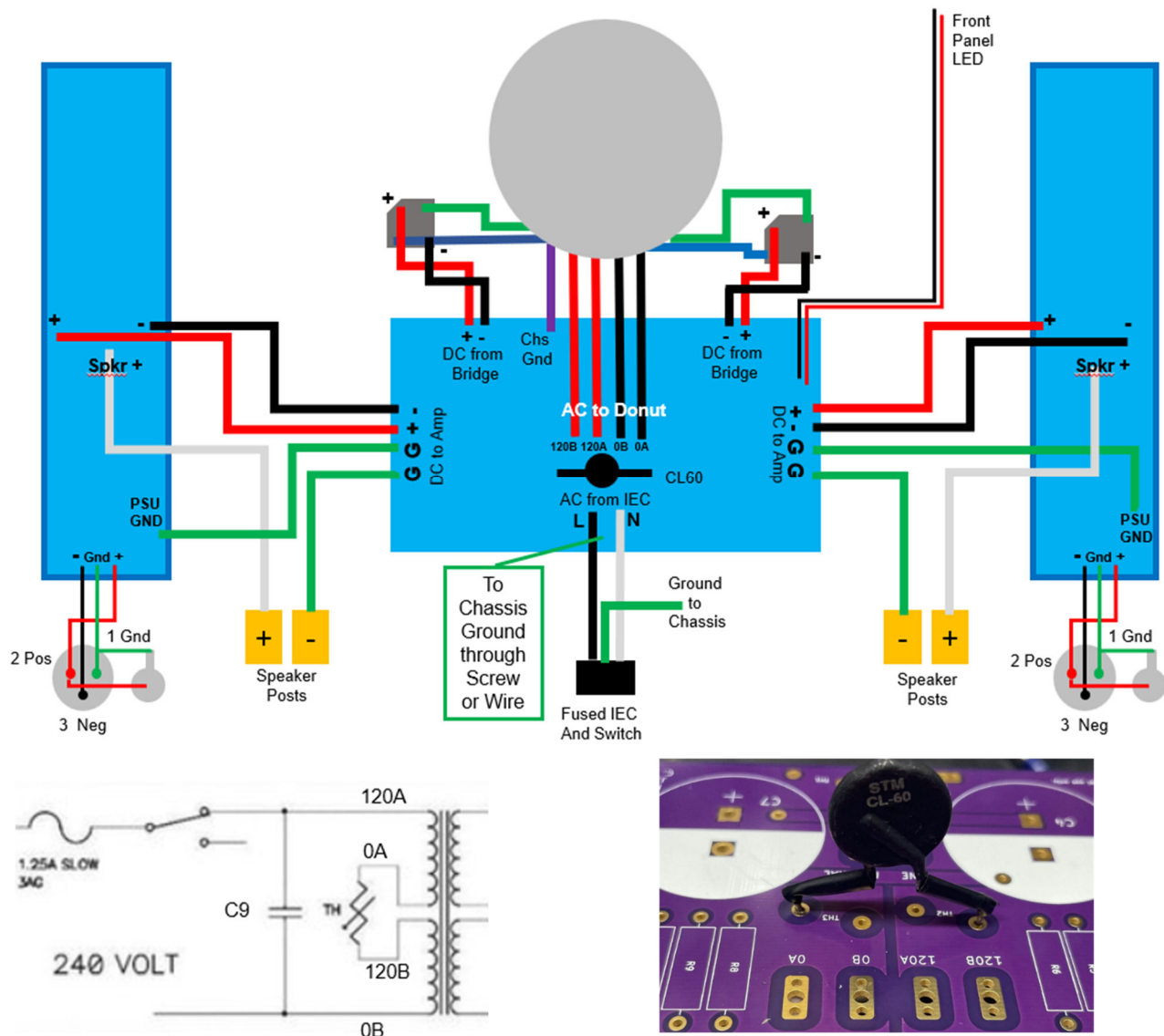
Wiring for 120VAC Mains – Transformer with **Dual 120V Primary Pairs**



Amplifier Wiring – Aleph 30 Stereo Configuration with “New Original” F5 Power Supply PCB Wiring Concept for 240VAC Mains and transformer with Dual 120V primary pairs

- Twist wires!!!
- This is for transformers with two pairs of primary wires for 240VAC mains applications.
- Confirm transformer wiring pairs (120A / 0 A, 120B / 0B, secondary pairs)
 - Use DMM set to Ohms or Continuity “buzzer”. Pairs will “buzz” or read as a few Ohms.
 - For Antek Transformers:
 - Find red / black pairs, twist each pair, and tape or heatshrink to hold together as a pair.
 - Find blue / green pairs, twist each pair, and tape or heatshrink to hold together as a pair.
 - Other transformers – refer to transformer datasheet and/or label on transformer for wire colors.
 - Verify pairs with DMM, twist each pair, and tape or heatshrink to hold together as a pair.
- Install a single CL60 from the **outer holes of TH2 and TH3**. Use heatshrink on the legs. See Picture.

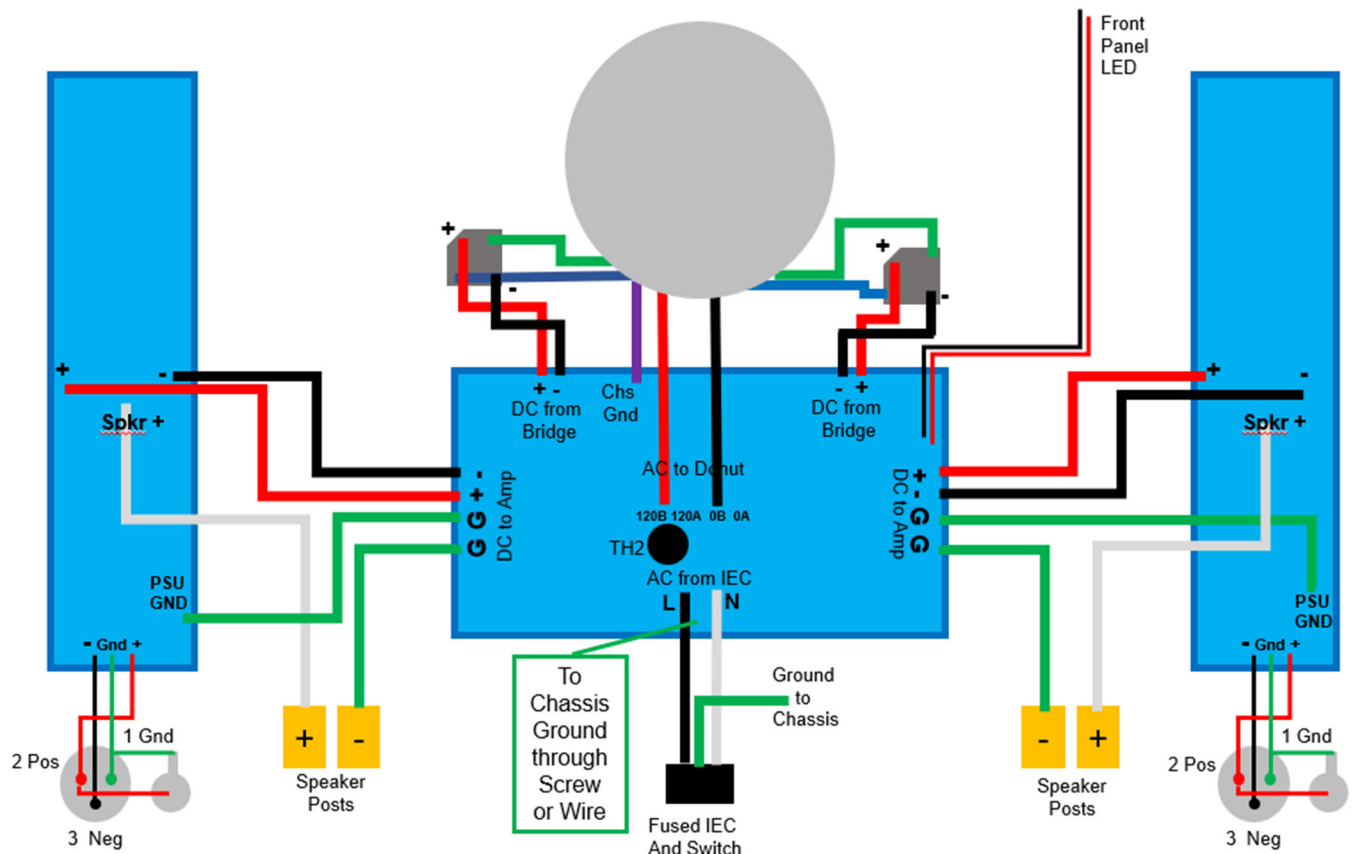
Wiring for **240VAC Mains** – Transformer with **Dual 120V Primary Pairs**



Amplifier Wiring – Aleph 30 Stereo Configuration with “New Original” F5 Power Supply PCB
Wiring Concept for 120 or 240VAC Mains and transformer with a Single primary pair

- Twist wires!!!
- This is for transformers with one pair of primary wires.
- Confirm transformer wiring pairs (primary pair, secondary pairs)
 - Use DMM set to Ohms or Continuity “buzzer”. Pairs will “buzz” or read as a few Ohms.
 - Refer to transformer datasheet and/or label on transformer for wire colors.
 - Verify pairs with DMM, twist each pair, and tape or heatshrink to hold together as a pair.
- CL-60 Thermistors
 - Install TH2 (soft start)
 - **DO NOT INSTALL TH3**
 - Install TH1 (Ground Loop Breaker)
- Connect Transformer Primary wires to “120B” and “0B” only.

Wiring for 120V or 240V Mains – Transformer with **Single Primary Pair**

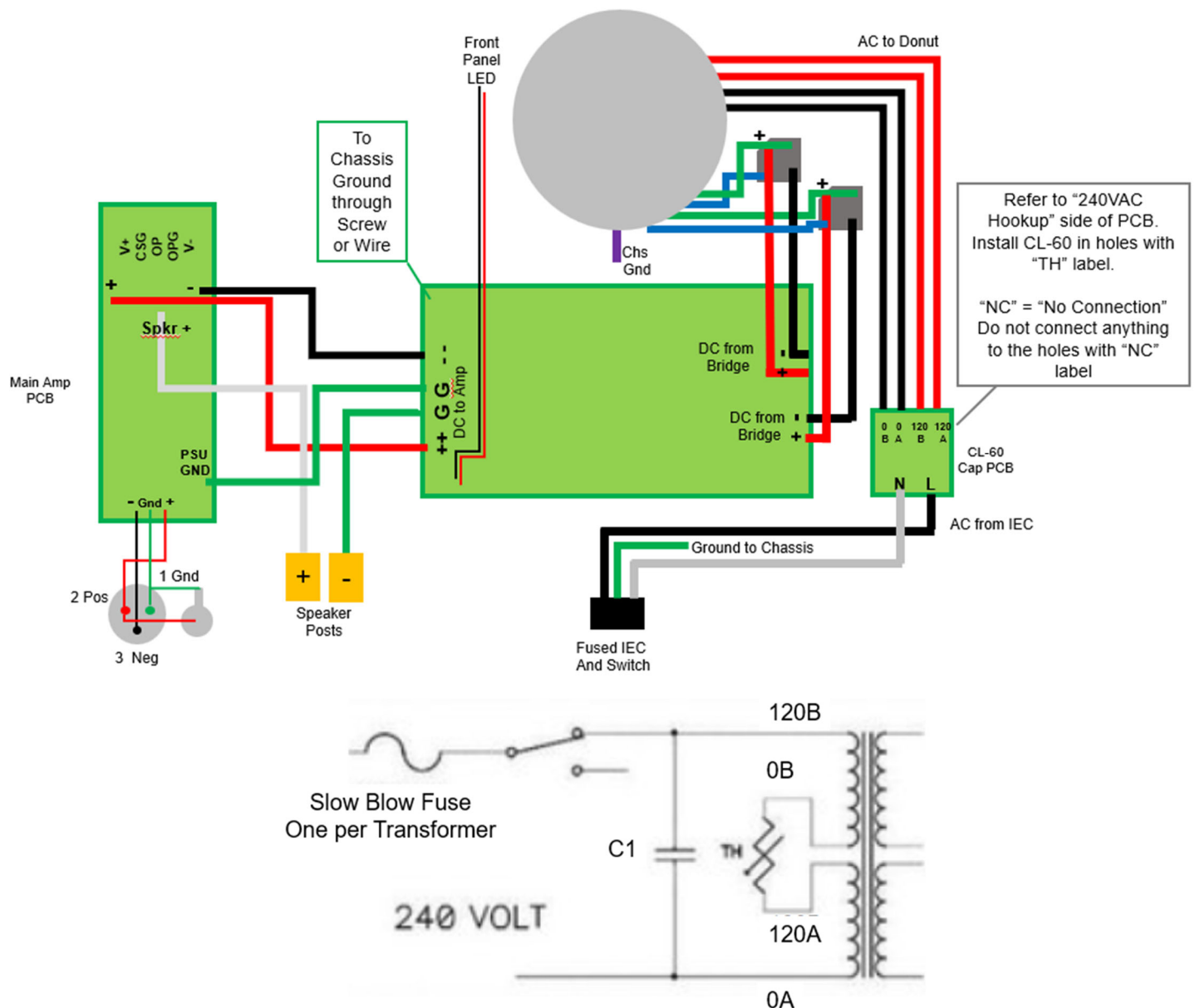


- Twist wires!!!
- If using Antek shielded transformer, attach purple wire to Chassis.
 - Option 1: Direct to Chassis
 - Option 2: Connect to “Chassis Ground” termination point on PSU PCB
- Confirm transformer wiring pairs (120A / 0 A, 120B / 0B, secondary pairs)
 - Use DMM set to Ohms or Continuity “buzzer”. Pairs will “buzz” or read as a few Ohms.
 - For Antek Transformers:
 - Find red / black pairs, twist each pair, and tape or heatshrink to hold together as a pair.
 - Find blue / green pairs, twist each pair, and tape or heatshrink to hold together as a pair.
 - Other transformers – refer to transformer datasheet and/or label on transformer for wire colors.
- 120VAC wiring application using an Antek transformer (2 secondary pairs) is shown below.



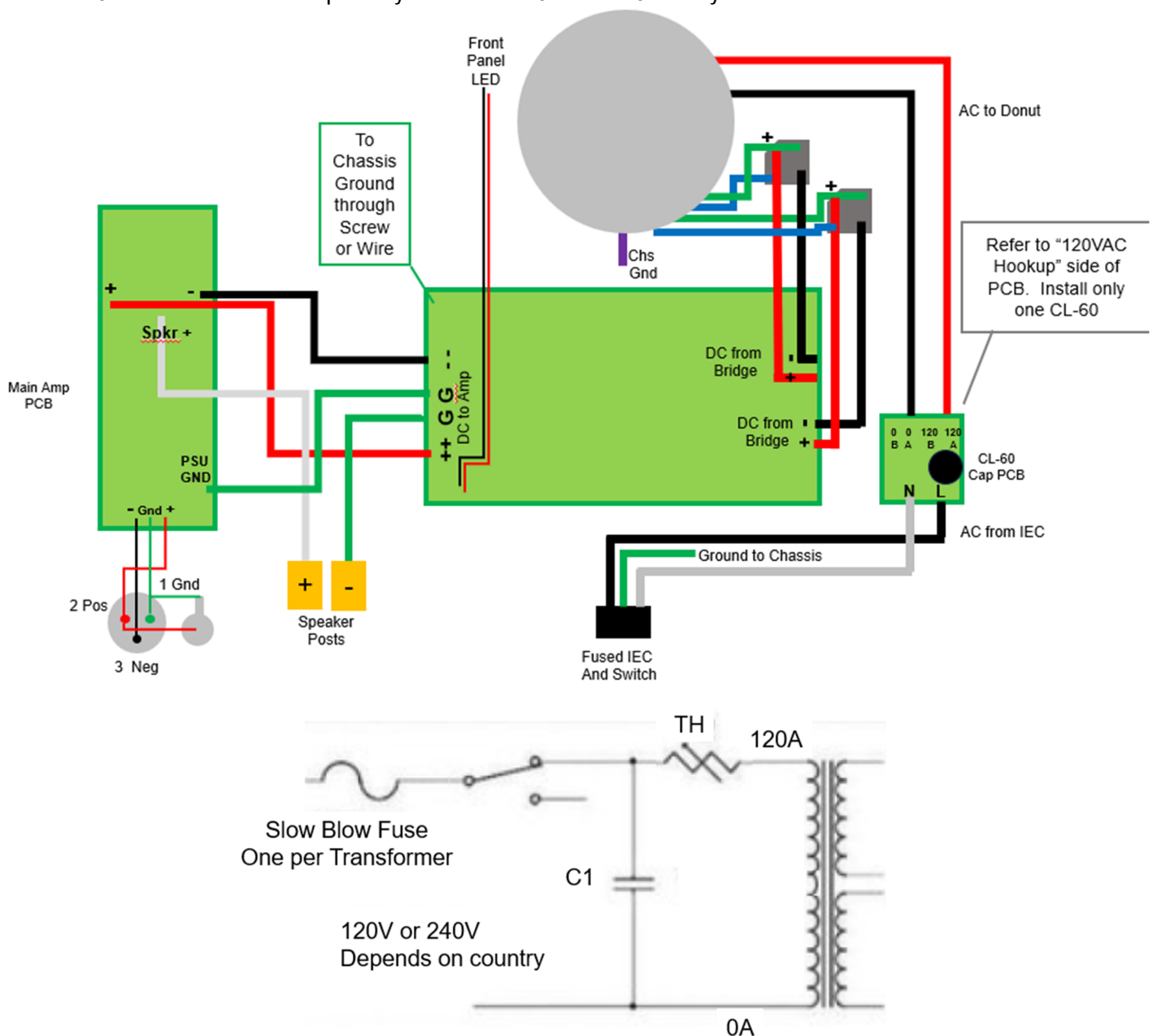
Amplifier Wiring Concept – Monoblock Configuration with W12 Power Supply PCB 240V Mains – Transformer with Two Pairs of Primary Wires

- Twist wires!!!
- If using Antek shielded transformers, attach purple wire to Chassis.
- Confirm transformer wiring pairs (120A / 0 A, 120B / 0B, secondary pairs)
 - Use DMM set to Ohms or Continuity “buzzer”. Pairs will “buzz” or read as a few Ohms.
 - For Antek Transformers:
 - Find red / black pairs, twist each pair, and tape or heatshrink to hold together as a pair.
 - Find blue / green pairs, twist each pair, and tape or heatshrink to hold together as a pair.
 - Other transformers – refer to transformer datasheet and/or label on transformer for wire colors.
- 240VAC wiring application using Antek transformers (2 secondary pairs each) is shown below.



Amplifier Wiring Concept – Monoblock Configuration with V8 Power Supply PCB 120 or 240V Mains – Transformer with One Pair of Primary Wires per transformer

- Twist wires!!!
- 240VAC wiring application with one pair of primary wires per transformer is shown below.
- For each CL-60/AC-Cap PCB
 - Install Line wire from dedicated fuse to CL-60 PCB
 - Install Neutral wire from IEC to CL-60 PCB
- CL-60 PCB Wiring – use “120VAC” hookup side of PCB
 - Install C1
 - Install CL-60 between “Line” and “120A” only.
 - Wire Transformer primary wires to “120A” and “0A” only.



Power Supply - Test / Checkout Sheet

Test	Result	Target	
BEFORE POWER UP, amp board(s) <u>not</u> connected			
Measure Resistance from IEC Ground Pin to output GND connector		10-15 Ohms	
Did you verify transformer wiring pairs with DMM then twist and tape/heatshrink them in pairs?		YES	
Did you wire up the transformer wires as shown?		YES	
Confirm rating of installed fuse. Some fuse holders ship without fuses by default. Some ship with HIGH values.		TBD – based on transformer and mains voltage	
DO NOT PROCEED UNTIL ALL OF THE ABOVE TESTS HAVE PASSED			
POWER UP, amp boards <u>not</u> connected			
Set DMM to DC Volts (VDC)		~1.4x transformer secondary voltage Example: 18V Transformer = ~+/- 25V rails	
<ul style="list-style-type: none"> Positive Rail: Measure + to GND for each set of outputs Negative Rail: Measure - to GND for each set of outputs 			
Unloaded voltage – Channel 1	+ Rail: - Rail:		
Unloaded voltage – Channel 2	+ Rail: - Rail:		
DO NOT PROCEED UNTIL ALL OF THE ABOVE TESTS HAVE PASSED			
POWER UP, amp boards connected			
Loaded voltage – Channel 1	+ Rail: - Rail:	~1.2-1.3x transformer secondary voltage Example: 18V Transformer = +/- 22-23V Rails	
Loaded voltage – Channel 2	+ Rail: - Rail:		
Proceed to next page to set up amp boards			

Amp - Final Test / Checkout Sheet

	Initial / Cold		Warm (After ~1 Hour)		After Adjustment	
	Left	Right	Left	Right	Left	Right
DC Offset (mV) Target < 100 mV						
Current Source MOSFET 1 current						
Current Source MOSFET 2 current						
Current Source MOSFET 3 current						
Total Current Source Current (Amps) Target = 2.1 – 2.2A						
Output MOSFET 1 current						
Output MOSFET 2 current						
Output MOSFET 3 current						
Total Output Current (Amps) Target = 2.1 – 2.2A						

See AC Gain setting section for testing / recording AC Gain.