

## F5 “New Original” Dual Rail Decoupled CRC Power Supply Build Guide

This PCB is designed for stereo Class A power amplifiers that require a dual rail power supply. It is a dual rail decoupled configuration. There is a bank of capacitors for each rail that splits to filter resistors and a final cap bank for each channel. Bleeder resistors are included in the circuit. This PCB is designed to be used with dual secondary transformers.

There is a connection from Audio Ground to Chassis / Earth Ground via a CL-60 Thermistor. The Chassis Ground connection point may be made either through a screw or wire.

The board accommodates LEDs and their associated dropping resistors. Oftentimes one LED is used on-board to indicate power supply operation, and other LED is installed via wires to be a front-panel “power on” display.

CL-60 Soft-Start and AC-Cap are included on this PCB.

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 large power supply capacitors. The voltages in this board 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 PCBs are offered without any warranty, guarantee provided, or liability taken.

Version / Date

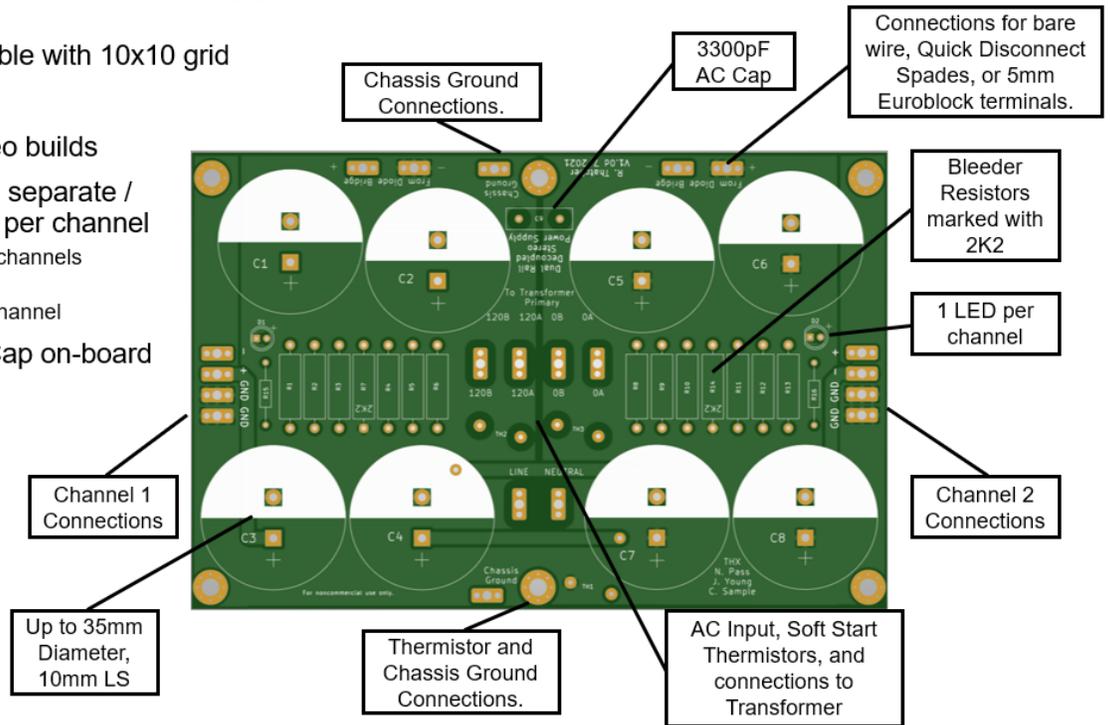
V1.0a 24 March 2023

Revision History

Original Release.

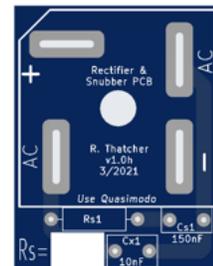
## Getting to know the Power Supply PCB

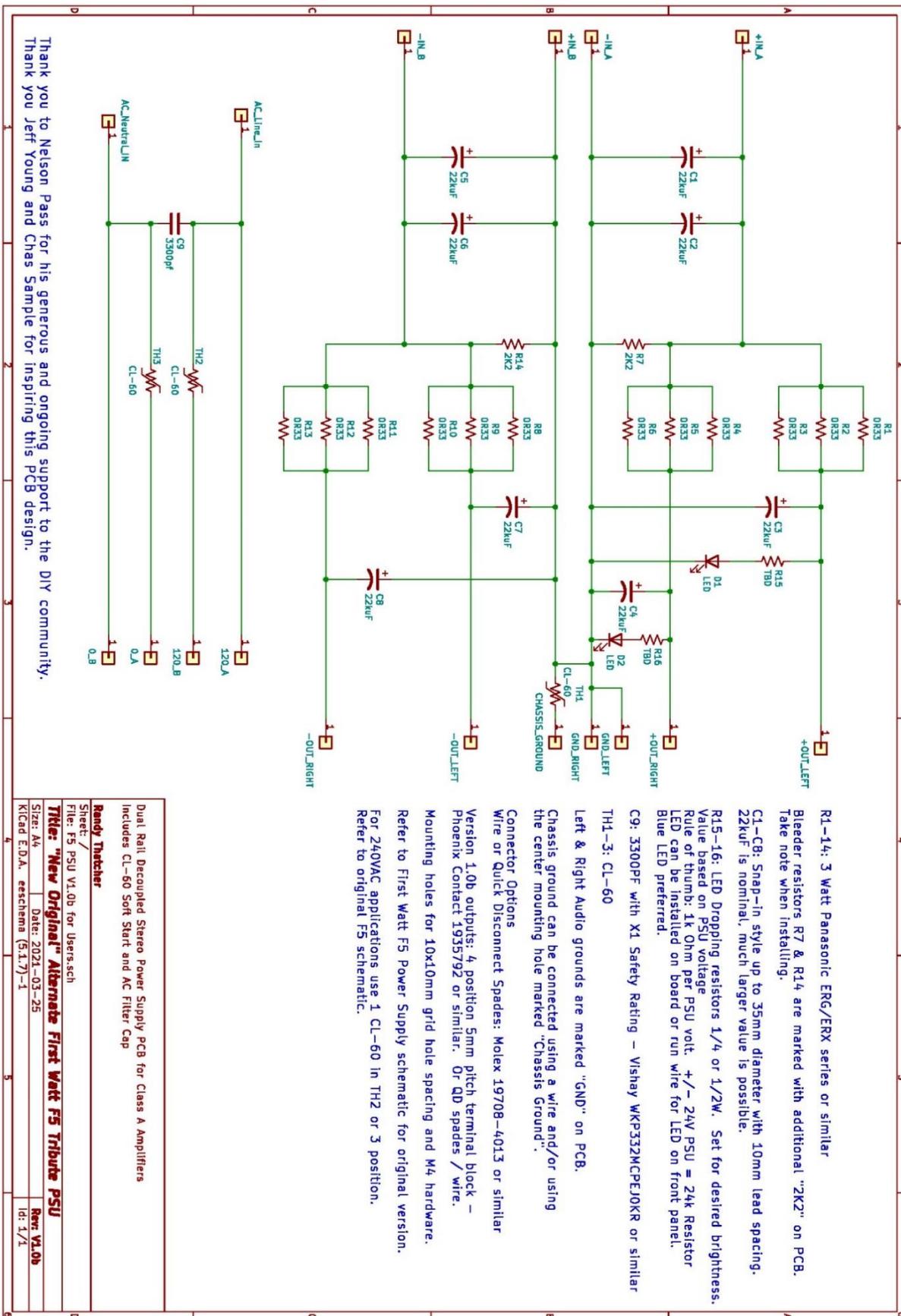
- Mounting holes compatible with 10x10 grid
- 112 x 170mm
- Recommended for stereo builds
- CRC Power Supply with separate / decoupled 2<sup>nd</sup> cap bank per channel
  - 1<sup>st</sup> bank of caps for both channels
  - Last bank of caps: 1 cap per rail for each channel
- CL-60 Soft Start & AC Cap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



### • Rectifier / Snubber Board

- Install on diode bridge with snubber resistor and caps
- Use your Quasimodo jig to calculate values based on transformer selection
- Convenient area to mark your Rs value





Thank you to Nelson Pass for his generous and ongoing support to the DIY community.  
Thank you Jeff Young and Chas Sample for inspiring this PCB design.

- R1-14: 3 Watt Panasonic ERG/ERX series or similar Bleeder resistors R7 & R14 are marked with additional "2K2" on PCB. Take note when installing.
- C1-C8: Snap-in style up to 35mm diameter with 10mm lead spacing. 22kuf is nominal, much larger value is possible.
- R15-16: LED Dropping resistors 1/4 or 1/2W. Set for desired brightness. Value based on PSU voltage Rule of thumb: 1k Ohm per PSU volt. +/- 24V PSU = 24k Resistor LED can be installed on board or run wire for LED on front panel. Blue LED preferred.
- C9: 3300PF with X1 Safety Rating - Vishay WKP332MCPJ0KR or similar
- TH1-3: CL-60
- Left & Right Audio grounds are marked "GND" on PCB.
- Chassis ground can be connected using a wire and/or using the center mounting hole marked "Chassis Ground".
- Connector Options
- Wire or Quick Disconnect Spades: Molex 19708-4013 or similar
- Version 1.0b outputs: 4 position 5mm pitch terminal block - Phoenix Contact 1935792 or similar. Or QD spades / wire.
- Mounting holes for 10x10mm grid hole spacing and M4 hardware.
- Refer to First Watt F5 Power Supply schematic for original version.
- For 240VAC applications use 1 CL-60 in TH2 or 3 position. Refer to original F5 schematic.

Dual Rail Decoupled Stereo Power Supply PCB for Class A Amplifiers	
Includes CL-60 Soft Start and AC Filter Cap	
Randy Thatcher	
File: F5 PSU V1.0b for Users.sch	
Title: "New Original" Alternates First Watt F5 Tribute PSU	
Size: A4	Date: 2021-03-25
Kicad E.D.A. eeschema (5.1.7)-1	Rev: V1.0b
	Id: 1/1

### 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
<b>Power Supply Board</b>				
R1-6, R8-13	12	0R33 – 0R47 3W	0.33AECT-ND A131659CT-ND A138507CT-ND	Metal Oxide or Wirewound
R7, R14	3	2k2 3W	A131567CT-ND	Metal Oxide or Wirewound
R15-16	2	25k 1/4W (<25V rails)	24.9KXBK-ND	"Rule of Thumb" - 1k Ohm per PSU volt Increase R for dimmer LED.
	2	36k 1/4W (25V-35V rails)	13-MFR-25FTE52- 36KCT-ND	
C1-8	8	10mm Lead Spacing, up to 35mm Diameter. <b>Voltage rating must be greater than rail voltage!</b>		
		22k uF, 25V	338-2431-ND	< 25V Rails
		27k uF, 25V	338-2255-ND	< 25V Rails
		33k uF, 25V	338-1613-ND	< 25V Rails
		47k uF, 25V	1189-3900-ND	< 25V Rails
		22k uF, 35V	338-1485-ND	< 35V Rails
		27k uF, 35V	1189-3914-ND	< 35V Rails
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	
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
<b>Rectifiers / Snubber PCBs</b>				
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	TBD if not using Antek	Use Quasimodo test jig to determine value
Snubber R for Antek	2	Metal Film 1/4W – 20-22R for Antek Transformers	RNF14FTD20R0CT-ND	Antek Transformers – use 20-22R

## Amplifier Wiring Concept

- 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.

