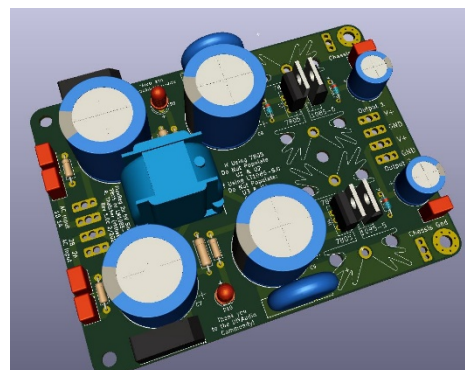


FlexReg 2x5V Single Rail Power Supply Build Notes

The idea for this PCB is to provide a flexible 2x5V Single Rail regulated power supply to power the Jsounds I2S board for DAC Builds. The design goals for the board and power supply included:

- 2x Single Rail Regulated DC power supply to provide 5V at 400ma & 5V at 100mA to I2S/USB PCB
- Connectors for AC Inputs from R-Core or other transformer
- Flexibility for using standard 7805 fixed regulators OR 1085 -5.0 fixed regulators
- Mounting holes to fit the 10x10 grid of a Modushop / DIYAudio chassis
- Robust CLC pre filtering before regulators
- Include ground break on the PCB
- Optional items for users to populate or not:
 - o LEDs on PCB – optional to populate
 - o Rectifier Snubber circuitry



Thank you to Miro1360, Kokanee, and Vunce!

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 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 for this project are offered without any warranty, guarantee provided, or liability taken.

Version / Date

V1.0a 11 February 2024

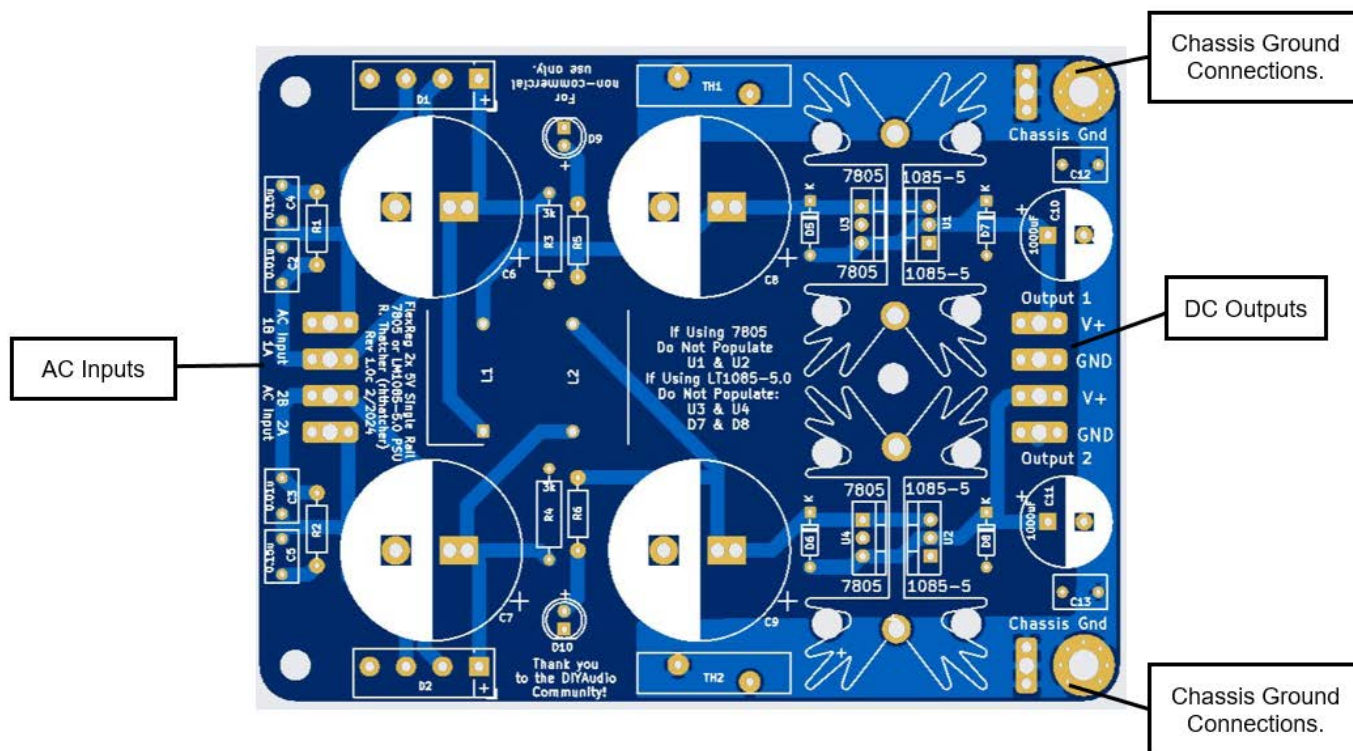
Revision History

Original Release

Getting to know the PCB

The PCB size is 120x90mm.

The mounting holes are compatible with the DIYAudio / Modushop 10x10mm grid.



PCB Revisions

PCB	Version / Date	Revision History
FlexReg i2s PSU	V1.0a- 2/2024	DRAFT with on-board Transformer (not produced)
FlexReg i2s PSU	V1.0b- 2/2024	DRAFT without transformer, bridge ground break (not produced)
FlexReg i2s PSU	V1.0a- 2/2024	Initial Release – TH/Cap ground break, increased heatsink size Gerbers posted builders to fab their own PCBs.

Regulators

The board will accommodate two fixed regulator pinout variations. This is why the PCB is a “FlexReg”. The key factor for which position you populate on the PCB is based on the pinouts. You can also try a discrete regulator like a Sparkos Labs unit.

Reg Type	Pin 1	Pin 2	Pin 3	Mfr	DK Part Number	Max Current (A)	PSRR dB (120Hz)
7805	Vin	GND	Vout	TI	296-14324-5-ND 296-21602-5-ND	1.5	85
				OnSemi	MC7805ACTGOS-ND NCV7805BTGOS-ND	1	83
				TI	296-47192-ND	1	80
				Nisshinbo	2129-NJM7805FA-ND	1.5	78
				ST Micro	497-2947-5-ND	1.5	68
1085-5.0	GND	Vout	Vin	ST Micro	497-17906-ND	0.8	75
				ST Micro	497-3436-5-ND	3	72
				TI	LM1085IT-5.0/NOPB-ND	3	68
				Analog Devices	LT1085CT-5#PBF-ND	3	68

- You can use one or the other type per rail. Use only 1 regulator per rail/heatsink.

You can read the datasheets for various regulators and choose which one you like.

The regulators must be FIXED voltage type (not adjustable).

Look at the PSRR specifications, pricing, current limit, availability, and any other specs you like, and then make your selection.

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.

Fuse

You MUST use a fuse in your build. This PCB does not include a fuse. Ensure there is a fuse upstream of the transformer.

Grounding

Always ground IEC earth ground pin to Chassis!

Connect one of the “Chassis Ground” points on the PCB to chassis. This PCB has 4 chassis ground connection points.

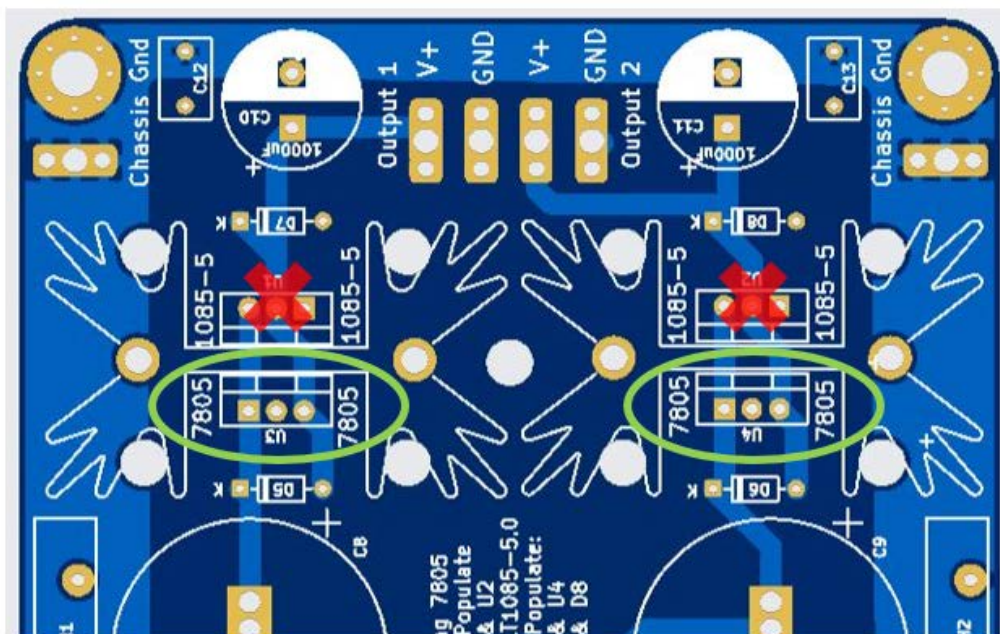
- Option 1 - solder: connect a ground wire from one of the “Chassis Ground” PCB connection points to the Chassis
- Option 2 - screw: connect via metal screw between chassis and PCB at one of the “Chassis Ground” corner mounting holes.. Use Lock / Star Washers.

Snubbers (Optional)

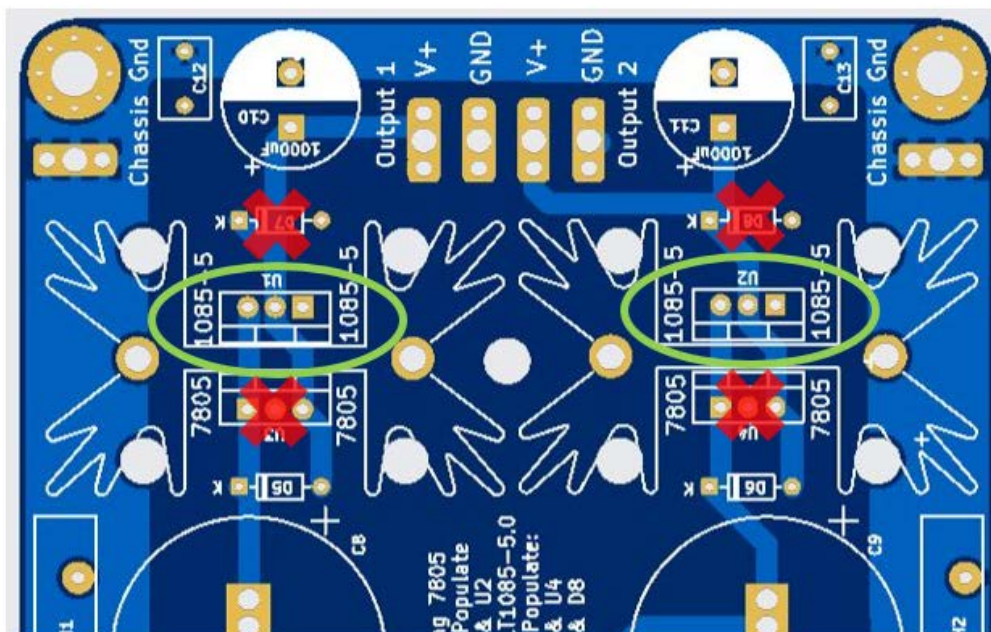
The snubber circuit is used to damp ringing between the transformer and the rectifiers. The theory and application is well described by Mark Johnson in his paper including on post #1 of the DIYAudio thread entitled “Simple, no-math transformer snubber using Quasimodo test-jig”. Using a Quasimodo test jig one can determine the Snubber Resistor value required.

Regulators – Fixed 7805 vs. 1085-5.0

Note which positions will be populated based on selection of 7805 vs. 1085-5.0 regulators. Refer to Schematic and BOM for additional details.

FlexReg 2x5V I2S using 7805 Regulators

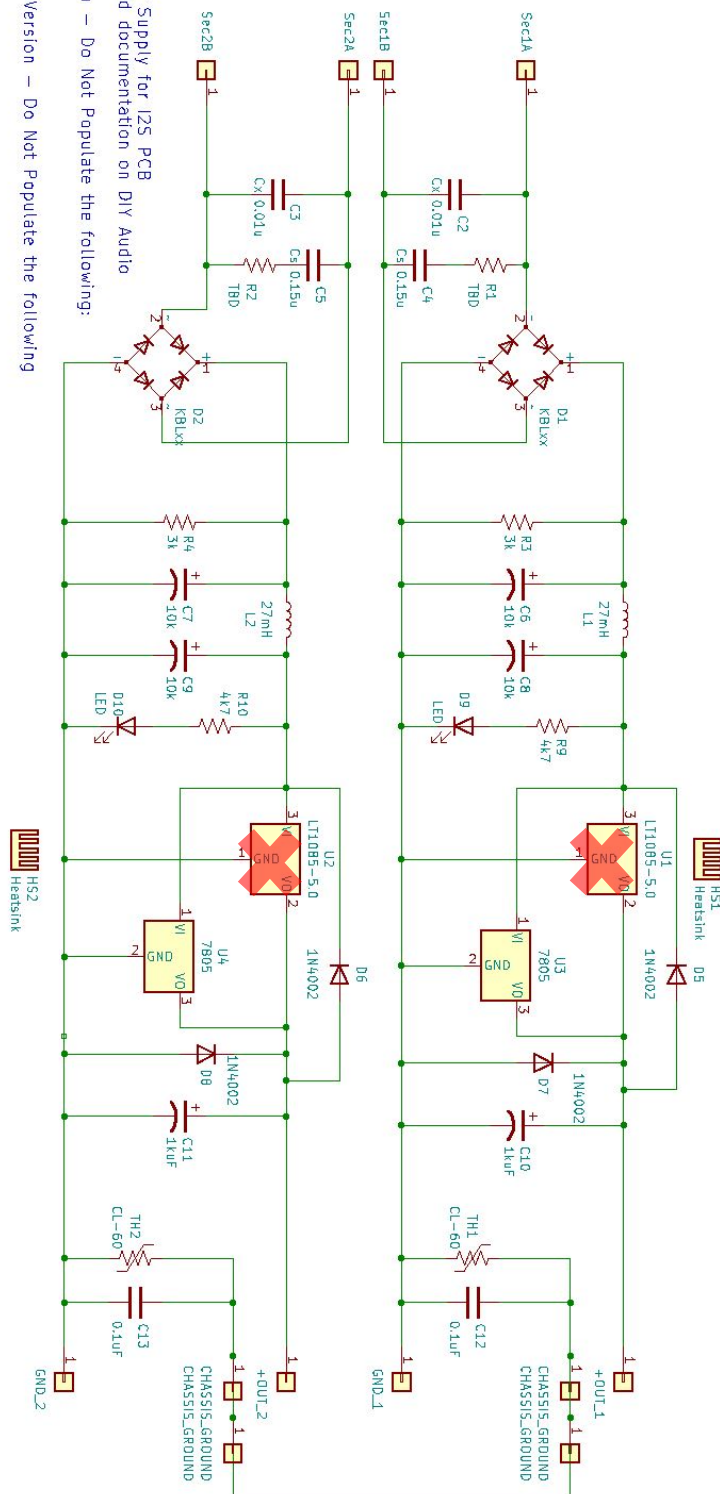
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FlexReg 2x5V I2S using 1085-5.0 Regulators

PCB Schematic – for use with 7805 RegulatorsDo not populate items with **Red X** (these are related to 1085-5.0 regulators)

7805 Version
Do Not Populate the
following
U1 & U2

2x 5V Power Supply for I2S PCB
Refer to build documentation on DIY Audio
7805 Version – Do Not Populate the following:
U1 & U2
LT1085-5.0 Version – Do Not Populate the following:
U3 & U4
D7 & D8



Do not populate items with **Red X** (these are related to 7805 regulators)

D7 & D8

Supply for 12S PCB and documentation on DIY Audio

— Do Not Populate the following:

FlexReg 2X5V Single Rail BOM

BOM Version: v1.0a

This table contains example part numbers and part recommendations. Any good quality similar parts will work with no detriment to the sound. Pay attention to notes on component sizing when making substitutions.

The values below are assume a max of 10VAC transformer secondaries. Capacitor C6-9 voltage ratings and heatsinks will need to be adjusted if higher voltages are used.

Qty	Reference	Value	Example Digikey Part Number	7805	1085	Notes
2	C2, C3	FILM 10000pF / 10nF / .01uF	495-4975-1-ND	OPT	OPT	OPTIONAL: Snubber Cap
2	C4, C5	FILM 150nF / .15uF	495-77011-1-ND	OPT	OPT	OPTIONAL: Snubber Cap
4	C6-9	10000uF 16V	1189-1125-ND	Yes	Yes	3 possible options, there are many more.
		10000uF 16V	495-6140-ND	Yes	Yes	
		10000uF 16V	LLS1C103MELZ-ND	Yes	Yes	
		Electrolytic Cap up to 25mm Diameter & 10mm Lead Spacing OR 18mm Diameter, 7.5mm Lead Spacing,				
2	C10, C11	1k uF, 16V	P19633CT-ND	Yes	Yes	Up to 12.5mm diameter, 5mm Lead Spacing
2	C12, C13	Film 0.1uF	399-5444-1-ND	OPT	OPT	OPTIONAL: Ground Break
2	D1, D2	Diode Bridge - KBL Package	641-1845-ND	Yes	Yes	KBL404, KBL406 or similar
2	D9, D10	LEDs	Get an assortment pack on Amazon	Yes	Yes	3 or 5MM LED. All blue/cyan, or blue/cyan for "Power On" LED, red/green for rails.
2	D5 – D6	1N4002	4786-1N4002CT-ND	Yes	Yes	Get a 100 pack on Amazon
2	D7 – D8	1N4002	4786-1N4002CT-ND	Yes	NO	
2	Heatsinks	Heatsink – 1" Tall	HS404-ND	Yes	Yes	5.50°C/W 1" tall
		Heatsink – 1.5" Tall	HS350-ND	Yes	Yes	3.7°C/W 1.5" Tall
1	L1	27mH 750mOhm 1A 2x Inductor	495-5730-ND	Yes	Yes	2 Inductors in one package
2	TH1, TH2	CL-60	KC006L-ND	Yes	Yes	Ground Break
2	R1, R2	TBD Quasi	TBD	OPT	OPT	OPTIONAL: Snubber Resistor. Use Quasimodo
2	R3, R4	3k / 1W	PPC3.0KW-1CT-ND	Yes	Yes	Bleeder Resistors 2k-4k will do. Value is not critical.
2	R9, R10	4k7 1/4W - LED Drop Resistors	13-MFR25SFTF52-4K7CT-ND	Yes	Yes	LED Dropping Resistor. "Rule of Thumb" - 1k Ohm per PSU volt. 4k7-10k will do.
2	U1, U2	1085-5.0 Regulator	497-17906-ND 497-3436-5-ND LM1085IT-5.0/NOPB-ND LT1085CT-5#PBF-ND	NO	Yes	5V Fixed Output Positive
2	U3, U4	7805 Regulator	296-14324-5-ND 296-21602-5-ND MC7805ACTGOS-ND NCV7805BTGOS-ND 296-47192-ND 2129-NJM7805FA-ND 497-2947-5-ND	Yes	NO	5V Fixed Output Positive
2	Terminal Blocks	4 Position Terminal Block	277-1579-ND	OPT	OPT	