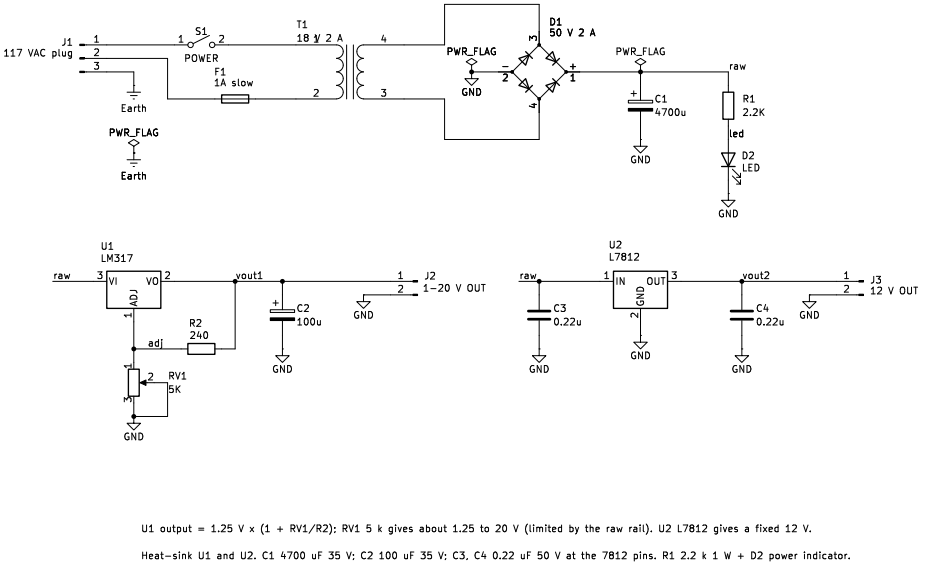
LM317 Dual-Output Bench Supply

dc · 20 V · sim-pass
EMRFD p. 1.15

A mains bench supply with two regulated outputs from LM317s, one adjustable, for powering QRP projects.



BUILD LIST: TICK AS YOU GO

	Ref	Value	Qty	Part / notes
☐	C1	4700 µF	1	
☐	C2	100 µF	1	
☐	C3, C4	0.22 µF	2	
☐	D1	50 V 2 A	1	
☐	D2	LED	1	
☐	F1	1A slow	1	
☐	J1	117 VAC plug	1	
☐	J2	1-20 V OUT	1	
☐	J3	12 V OUT	1	
☐	R1	2.2 kΩ	1	
☐	R2	240 Ω	1	
☐	RV1	5 kΩ	1	
☐	S1	POWER	1	
☐	T1	18 V 2 A	1	
☐	U1	LM317	1	LM317 adjustable regulator
☐	U2	L7812	1	LM317 adjustable regulator

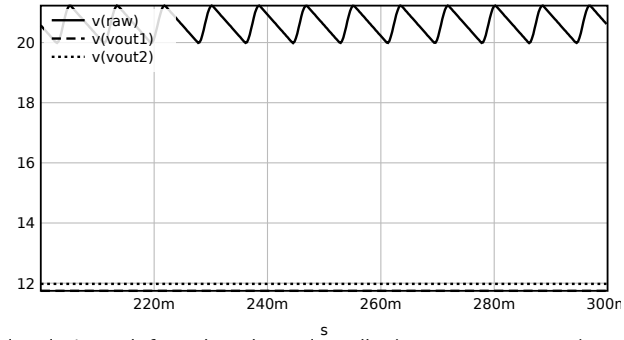
BUILD NOTES

- Mains wiring is dangerous. Fuse the primary, insulate everything, and bond the chassis to the earth pin (J1's ground goes to Earth, not to the DC ground).
- Heat-sink both regulators.

Test: Bring it up first with no load and check both outputs. Then load each output to 0.5 A and check for ripple and heat.

CHECK AGAINST

Check	Expect	Basis
Output voltage	11.7 V ± 0.15 · sim 12 V ± 0.15	simulated
Raw DC voltage	20 V ± 0.5	simulated



ngspice sim/tran.cir from the schematic netlist (not a measurement)

Full page:
https://qrpedia.com/circuits/power/lm317-dual-output-supply/
Interactive sim, KiCad project, netlist and errata.

SPECIFICATIONS (FULL)

Spec	Value	Basis	Reference
Output voltage	11.7 V ± 0.15	simulated	sim/tran.cir, output 1, RV1 = 2.04k, 0.5 A
Output voltage	12 V ± 0.15	simulated	sim/tran.cir, output 2, 0.5 A
Raw DC voltage	20 V ± 0.5	simulated	sim/tran.cir, min raw rail at full load, 18 V rms secondary assumed

Simulated values are this build's ngspice results (± the build's check tolerance); book and measured values are as published.

HOW IT WORKS

A transformer, bridge rectifier and filter capacitor make a raw DC rail. Each LM317 holds 1.25 V between its output and adjust pins, so the divider resistors set the output. Output 1 uses a pot (RV1) for adjustment. The simulation, with an assumed 18 V rms secondary, shows the raw rail at 20.0–21.2 V at 1 A total load, so the top of the adjustment range (20 V) isn't reachable at full load (**simulated**).

WHERE IT COMES FROM

The beginner's bench supply in Experimental Methods in RF Design, Chapter 1.

SOURCES

- EMRFD Fig 1.24, p. 1.15 (errata: text-only: p. 1.15: "Farads" should be lowercase "farads". Text only.)