

Running a mains mixer from batteries

I have two battery powered mixers which work well. One is a **home made mixer** and the other is a **modified Behringer MX400**. Neither have any tone control, so I wondered if I could run my mains mixer from batteries.

The mixer in question is a wharfdale connect 802B.



The power supply is a transformer with a stated output of 19.5V x2 at 200mA.



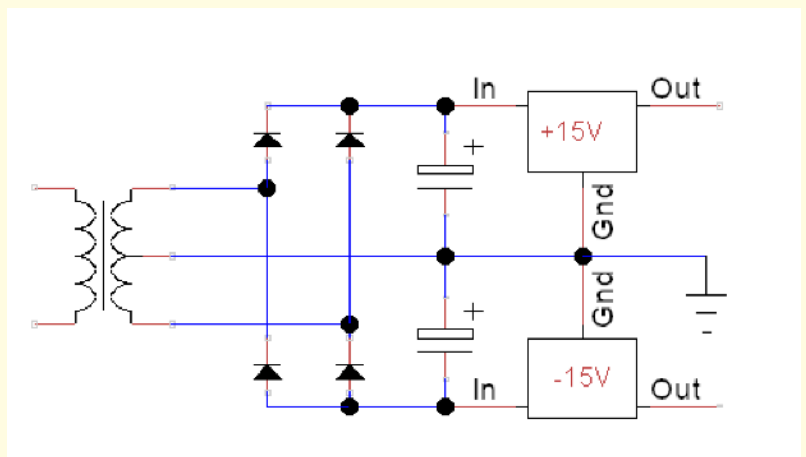
It is a split supply so probably looks like this.

19.5V rms from the transformer is 27.5V peak, and with 0.7 diode drop, the regulator wills peaks of around 26.8V.

If the capacitors are at their minimum value, the voltage will drop to 17.5 (a typical regulator has a 2.5V drop out voltage).

So the average voltage will be $(26.8 - 17.5) / 3$ or around 5V. Which results in 7.5V across the regulators. It will be higher if bigger capacitors are used.

Current take is around 90mA (see below). So the regulators dissipate **a minimum** of around 700mW each. Under normal operation it can get quite warm beside the air vent on the bottom.



CONNECT 802USB

Main 1/4" Jack Balanced out +21dBu
+/-1dBu

Headphones output 150mw +/-5mw @
32ohms

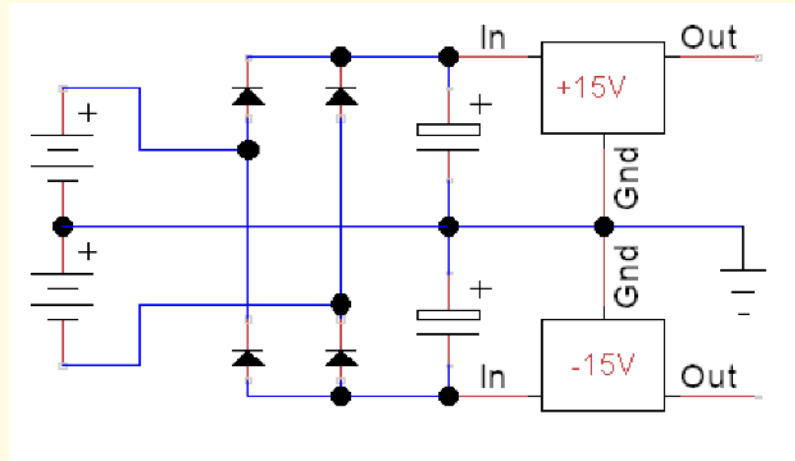
The mixer has a stated maximum output of +21dBu which is 8.7Vrms or 12.3V peak. So it looks like the output can drive to 2.7V from the supply rails.

The green level leds are designated at 0dBu or 0.775Vrms

Batteries can replace the transformer and we get this.

With a 9V battery, we lose 0.7V through the diodes, then around 2.5V (drop out voltage) across the regulators, so the circuitry will see a $\pm 5.8\text{V}$ supply. If it can drive within 2.7V, maximum output will be 3.1 Vpeak.

The opamps used in the mixer are RC4580s which operate from $\pm 2\text{V}$ up to $\pm 18\text{V}$.



I tried this out, and the results seem to match the theory. I measured around 90mA being taken from each battery. The LEDs on the output level seem to be based on voltages derived from the supply voltage. So the green led will come on at $0.775 \times 5.8 / 15$ or 0.3V rms. The yellow (+6dB) led will come on at 0.6V and clipping will occur at 3.1V.

So this particular mixer could be driven from batteries. Alternatives are $\pm 9\text{V}$ from two PP3s, $\pm 18\text{V}$ using four PP3s, $\pm 12\text{V}$ from either two 12V batteries, or one 12V and an isolated 1:1 converter.

I don't need to do this just yet, and mounting the batteries will be a challenge, but it's good to know it can be done.