



The +5V line powers Arduino Nano, DS3231 RTC Module, and the Si5351 VFO Module. The +6V line powers the 74ACT00 driver IC. The maximum current consumption is less than 150 mA.

<https://electronics.stackexchange.com/questions/52355/inductor-purpose>

Note: We don't use AVCC, ADC, and the analog circuitry of the Arduino Nano. Hence, there is no 100uH inductor in our power supply module (as compared to the uSDX one). Also, on an Arduino Nano AVCC is connected to VCC ;)

We avoid AMS1117 and similar chips due to their horrible "I-O short circuit" failure mode (see QCX-mini's failure reports and the subsequent power design fixes). If size reduction over the LM7805's TO-220 footprint is desired, 78M05 (DPAK) is a decent option. TI say that LM7805 is 'essentially indestructible' in their datasheet ;)

A note from the "QCX assembly Rev 1.08.pdf" document:
To keep noise (power line or radiated noise from the microcontroller/LCD back into the sensitive receiver) out of the supply, the 5V supply to the microcontroller and LCD module is filtered by 100uH inductor L6 and 220uF capacitor C47 (may be supplied as 470uF, even better!).

We don't have a sensitive receiver or audio component in our TX circuit.

Note: Heatsinking of the regulator chips is not required at <= 100mA consumption (per chip).

R_{sens} (R1) fixes the maximum current to a value given by $(0.65/R_{sens})$.

For example, if $R_{sens} = 0.33 \Omega$, the current is limited to about 2 A even if the output is shorted.

References:

- <https://www.g0k1a.com/scpa/SimpleCheapPA.php>
- https://www.g0k1a.com/scpa/current_sense_circuit_v1.png
- https://en.wikipedia.org/wiki/Current_limiting#In_electronic_power_circuits

Note: The current limiting circuit was simulated in LTspice. For 24v input, change R2 and R3 to 10k. Take care of heatsinking at such higher voltages.

Note: Keep BD140 at <= 300 mA continuous current flow.

Test the power section with a dummy load at 250ma on 5v and 6v rail (with 15 / 20 ohms load) and 1A on the 12v rail (with 10 ohms 10 watts load).

Triple ('12v+6v+5v) Power Module for 4S LiFePO4 or 12v SLA battery with current limiting
Dhiru Kholia (VU3CER), Chris Thompson (AC2CZ)

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