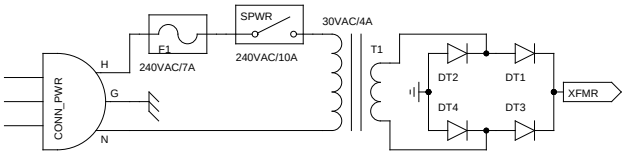
Direct Drive Lead Acid Battery Desulfator

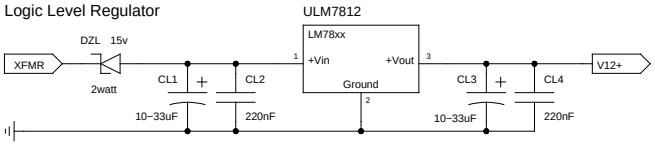
Original Design by Tusconshooter/Mark. Forum:
http://leadacidbatterydesulfation.yuku.com/topic/1162/Direct−Drive−Desulfator−Design?page=1

Wall Transformer



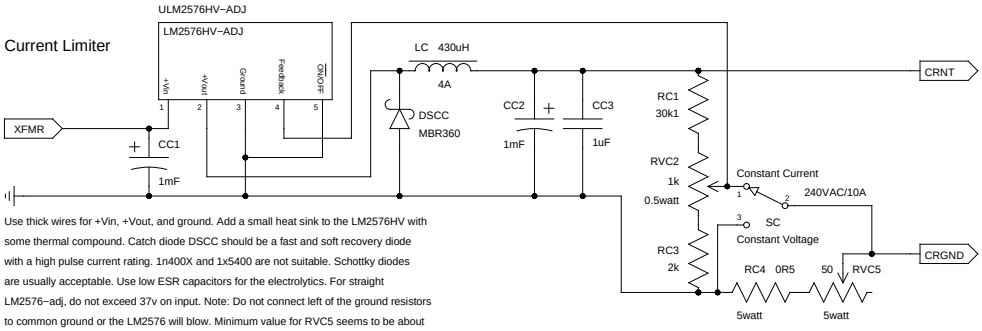
Use thick wires for the transformer and diode bridge. The fuse may be substituted with a circuit breaker.
Diodes should be 10amp rated or better. Use a 24V/4A transformer if using a straight LM2576−ADJ.

Logic Level Regulator



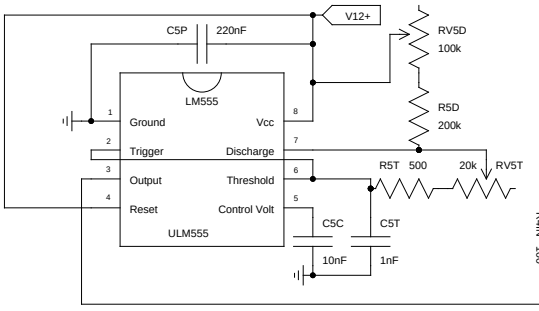
DZL drops the unregulated input voltage into a safe range for the LM7812. Adjust yours so it delivers 16−20v at the LM7812.

Current Limiter

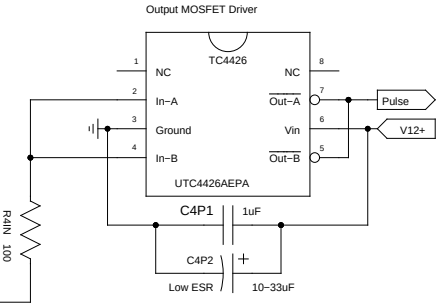


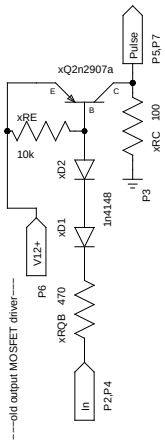
Use thick wires for +Vin, +Vout, and ground. Add a small heat sink to the LM2576HV with some thermal compound. Catch diode DSCC should be a fast and soft recovery diode with a high pulse current rating. 1n400X and 1x5400 are not suitable. Schottky diodes are usually acceptable. Use low ESR capacitors for the electrolytics. For straight LM2576−adj, do not exceed 37v on input. Note: Do not connect left of the ground resistors to common ground or the LM2576 will blow. Minimum value for RVC5 seems to be about 10 ohms to prevent the LM2576 from over heating.

Frequency Circuit



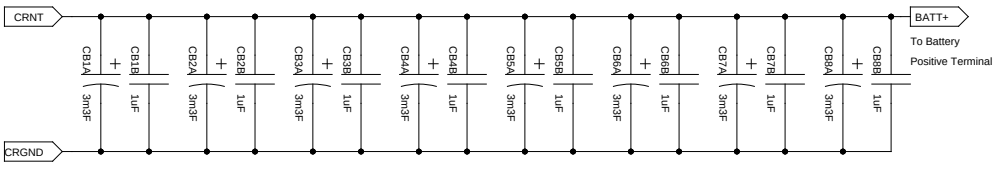
Output MOSFET Driver





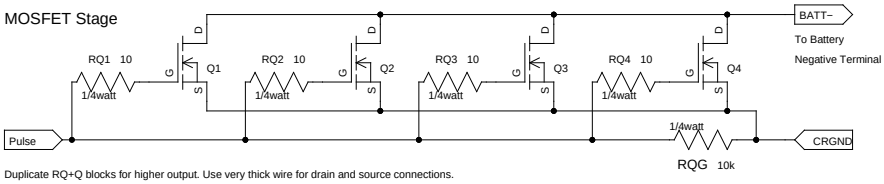
CLEAN OFF EXCESS FLUX!!! Resistors made by left over flux will cause the 555 to lock up.
All 3 brands of my 555's had a +3v spike on the top of the square wave and −3v spike below ground. This was somewhat minimized after the output was hooked to a load. Running the 555 unloaded is not recommended.
If the TC4426 inverting MOSFET driver cannot be found, use the discrete transistor circuit to the right.
Scope'd from the MOSFET gate, the 555 should be delivering a 1−3uS pulse and a 200−300uS space. When setting up the 555, try to keep the duty cycle below 1% or things will deliver too much current, over heat, and burn out. The low duty cycle also allows time for the capacitor bank to properly recharge. Mine runs with these settings at about 3kHz. RV5D will increase the space as resistance increases (pulse width doesn't change). RV5T will make the total pulse cycle longer as resistance is increased (both pulse and space are changed). R5D+RV5D should start around 300k. R5T+RV5T should be about 1k. Even with these minimal settings, the battery charge may float well above 14v. Keep an eye on it and be careful.

Capacitor Bank



Low ESR capacitors connected to very thick wire. Using larger and more capacitors is acceptable. Total capacitance should be around 27mF.
For safety and longevity, capacitor voltage rating should be at least 30% above the rectified transformer voltage.

MOSFET Stage



Duplicate RQ+Q blocks for higher output. Use very thick wire for drain and source connections.
Choose MOSFET's based on 70−100V, 80−150 amps, 300−500 peek amps, fast rise and fall times (less than 130nS, less than 50nS ideal), and low resistance (less than 0.005ohm).
Preferred choices: IRFB3307 or IRFB4710 (mine are NXP PSMN6R5−80PS). A low resistance MOSFET shouldn't get hot, but add a small heat sink to it anyways.