

SLA Battery Charger- By WN2A

This simple charger was designed for charging 12 Volt sealed lead acid (SLA) batteries, specifically of the 4 to 7 Amp-Hr Class used by radio amateurs for portable/emergency operation. The charger is of the triple-mode type. It will current-limit to ~260 mA during the 'Bulk' mode ; constant-voltage at ~14.5 volts during the 'Adsorbtion' mode and when current drain falls to less than 50-80mA switch into the 'Float' mode. The 'Float' mode can (in theory) run indefinitely at a potential of ~13.8 volts, but I generally give an SLA battery about 4-5 hours in this mode. There has been much discussion as to what the best method is for charging SLA batteries. Whether this is the “best” method or not, it has proven itself adequate in an amateur radio application. The builder is advised that this is not a construction article, but just an informal paper documenting one such charger.

It is recommended that if one wants to build an SLA charger like this , make every attempt to use the same parts called for in the Parts List. Read the directions for use as well as the disclaimer at the end of this paper. Enjoy and see you on the air- 73's de WN2A

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Figure1: In Use: Green LED=Float Mode

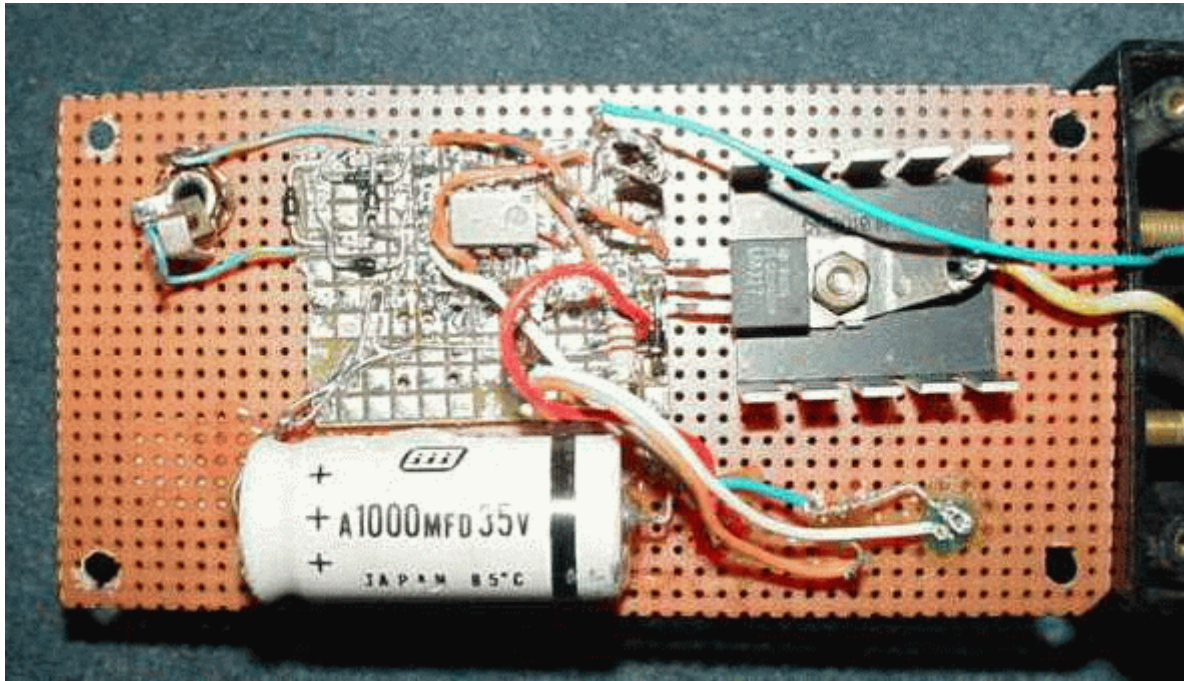
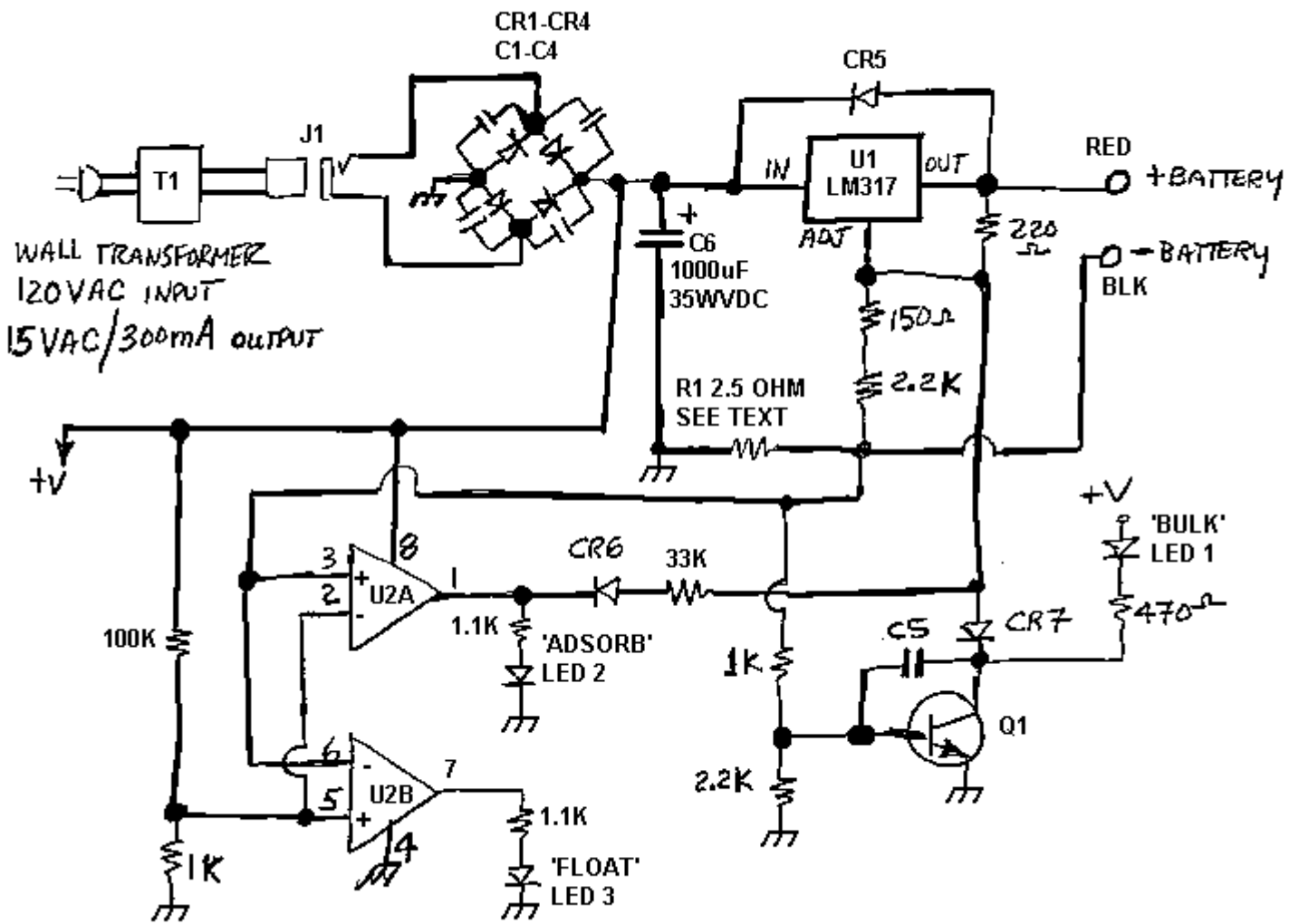


Figure 2: Inside View: Note Heatsink on U1

Directions for Use (see Disclaimer). Remember: Safety First! Following is a suggested procedure.

- To Use:
- 1) You must start with a functional battery. Use of battery with shorted cells and/or a battery that has been out of service for an extended time could result in abnormal operation or a danger to the operator! Do all your charging in a very well-ventilated space, preferably outdoors, since hydrogen gas can be produced !!
 - 2) Connect negative lead from battery to BLK binding post. Leave the positive lead from battery open.
 - 3) Insert wall transformer plug (15VAC) into the coaxial or phone power connector.
 - 4) Insert wall transformer into AC outlet (120VAC). Green Led ('Float') should light.
 - 5) Connect the positive lead from battery to RED binding post. Normally, if battery charge is low, both Red ('Bulk') and Yellow('Adsorb') lights will light. This will continue until the current drops below ~280 mA when only the Yellow Led lights. It can take some time before this happens, depending again on battery condition. The battery voltage at this point will be ~14.5 volts.
 - 6) After battery charging current drops below ~50 to ~80 mA, the Yellow Led goes dark and the Green ('Float') Led is lit. Battery voltage should be ~13.8 volts. As noted above, I generally charge the SLA battery 4-5 hours in this mode.
 - 7) If any abnormal condition should occur and/or any of the above conditions not be observed, then disconnect the apparatus and troubleshoot. Do not leave apparatus unmonitored or unattended when charger is connected to wall transformer and/or battery.

SCHEMATIC -SLA CHARGER



Parts List:

Ref. Designator	Part Number/Description	Notes
C1-C5	.01 uF chip capacitors	ceramic leaded capacitors are OK
C6	1000uF; 35 WVDC Electrolytic	Observe Polarity!
CR1-CR5	1N5804 (available from author)	1N4001 should be OK
CR6-CR7	MMBD914 or 1N914 or 1N4148	or equal, leaded or SMD
J1	Coaxial or phone power connector.	Compatible with wall transformer 15VAC connector.
LED 1	Red LED 20mA type	'BULK'
LED 2	Yellow LED 20mA type	'ADSORB'
LED 3	Green LED 20mA type	'FLOAT'
Q1	MMBT2222A or 2N2222A	2N3904 ,2N4124, etc
R1	2.5 OHMS TOTAL; 1/4 Watt	(4pcs) 10 ohm 1/4 watt in parallel
R2, R11	2.2K; 1/4 watt	leaded or SMD
R3	150 ohm, 0.1 watt	leaded or SMD
R4	220 ohm, 0.1 watt	leaded or SMD
R5	100 K, 0.1 watt	leaded or SMD
R6, R10	1K,0.1 watt	leaded or SMD
R7, R8	1.1K, 1/2 watt	leaded or SMD
R9	27K, 0.1 watt	leaded or SMD
R12	470 ohm, 1/2 watt	leaded or SMD
T1	Wall Transformer Radio Shack #8790026. see note.	120VAC input,15VAC output @ 300mA . Replacement must be as similiar as possible. Do not vary from above ratings.
U1	LM317T (with Heatsink)	LM317T Available from author
U2	LM2904	LM258 or LM358 OK

Disclaimer:

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