

## SLA 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 approx~250 mA during the 'Bulk' mode ; transition to constant-voltage at ~14.5 volts during the 'Adsorb' mode and when current drain in that mode falls to less than 50-80mA approx, then 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 4-8 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 my amateur radio applications. 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 29 March 2003-Rev B. 22 July 2016 Rev C.

Rev C: Deleted Radio Shack 15 VAC Transformer (not available).

Replaced with AC Adapters 18-20VDC ~65W. Modified Circuitry and Text Accordingly.

Figure 1: Inside View: Note Heatsink on U1

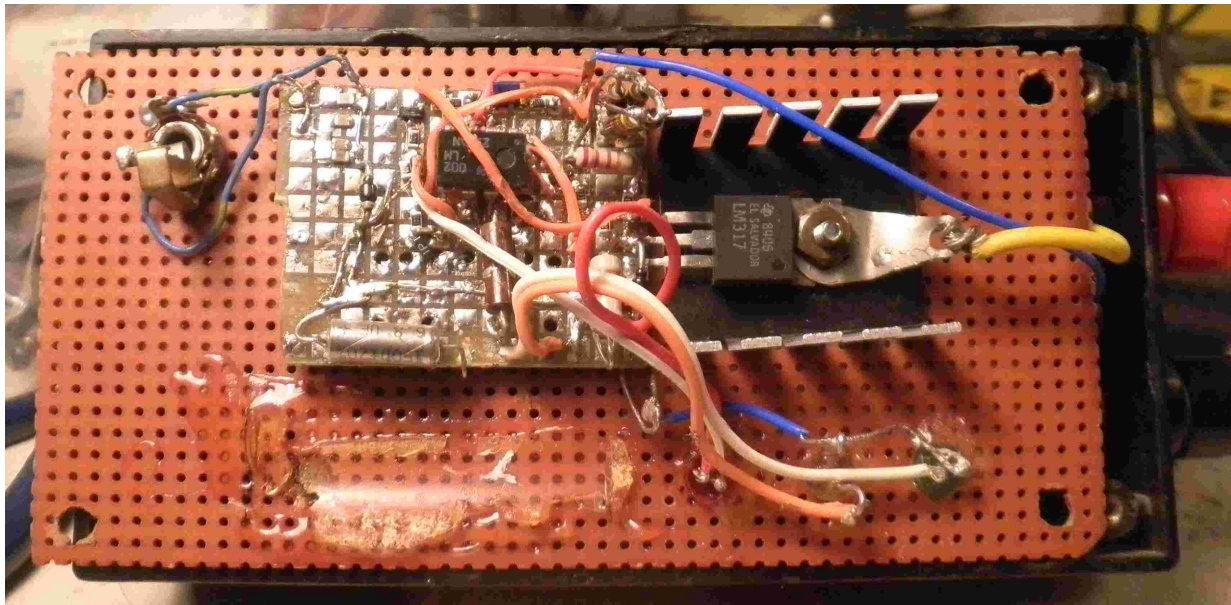


Figure 2: SLA Charger in use.  
Charging of an old SLA battery. Over 15 years old, but still takes a charge..



### 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 for now.
- 3) Insert AC Adapter (see text) into the coaxial or phone power connector in your SLA Charger.
- 4) Insert AC Adapter 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 ~250~300 mA when only the Yellow Led lights. It can take some time before this happens, depending again on battery condition. The battery terminal voltage at this point at where only the "Adsorb" LED is lit, should be increasing toward 14.5 volts. This process also could take time depending on battery condition.
- 6) At approx 14.5 volts battery terminal voltage, and a good battery, the charging current drops below ~50 to ~80 mA, the Yellow "Adsorb" LED goes dark and only the Green ('Float') Led is lit. Battery voltage should be ~13.8 volts.
- 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 AC Adapter and/or battery. See Disclaimer.*



<b>Ref Designator</b>	<b>Part Number/Description</b>	<b>Notes</b>
C1,C3	0.1 uF X7R,X5R ,50V Chip Capacitor	
C2	6.8 uF, 35 Volt Tantalum	
CR1,CR2	1N5804 or 1N4001	
CR3,CR4	1N914 or IN914	
J1	3.5 mm Phono Jack or Coaxial DC Power connector	Use whatever is compatible with your AC Adapter
J2	Banana Jack, Red	Similar to Pomona 1581-2
J3	Banana Jack, Blk	Similar to Pomona 1581-0
LED1	Red LED, 20mA	“Bulk”
LED2	Yellow LED, 20mA	“Adsorb”
LED3	Green LED, 20mA	“Float”
Q1	2N2222A,MMBT2222A	Or equiv
U1	LM317T	
U2	LM2904, LM258,LM358	Dual Op Amp,Gen Purpose

**Disclaimer:**

This disclaimer of liability applies, regardless of the cause or duration, to any damages or injury caused by any failure of performance, error, inaccuracies, omission, alteration of, the information presented in this paper or anything else related to the author. The Author bears no responsibility for any damage and or liability occurred to builder, user or anyone else.

**Software Used:**

1. Qucs Electronic Simulator
2. Inkscape
3. LibreOffice

All done on PuppyLinux 6.3.0 “Slacko” OS