

## Charger for Elecraft K2 – Battery (Sealed Lead Acid)

### Important:

It is assumed, that your K2 is in the original state as designed by Elecraft, especially the protective Schottky-diode D10 must be soldered in.

### Function:

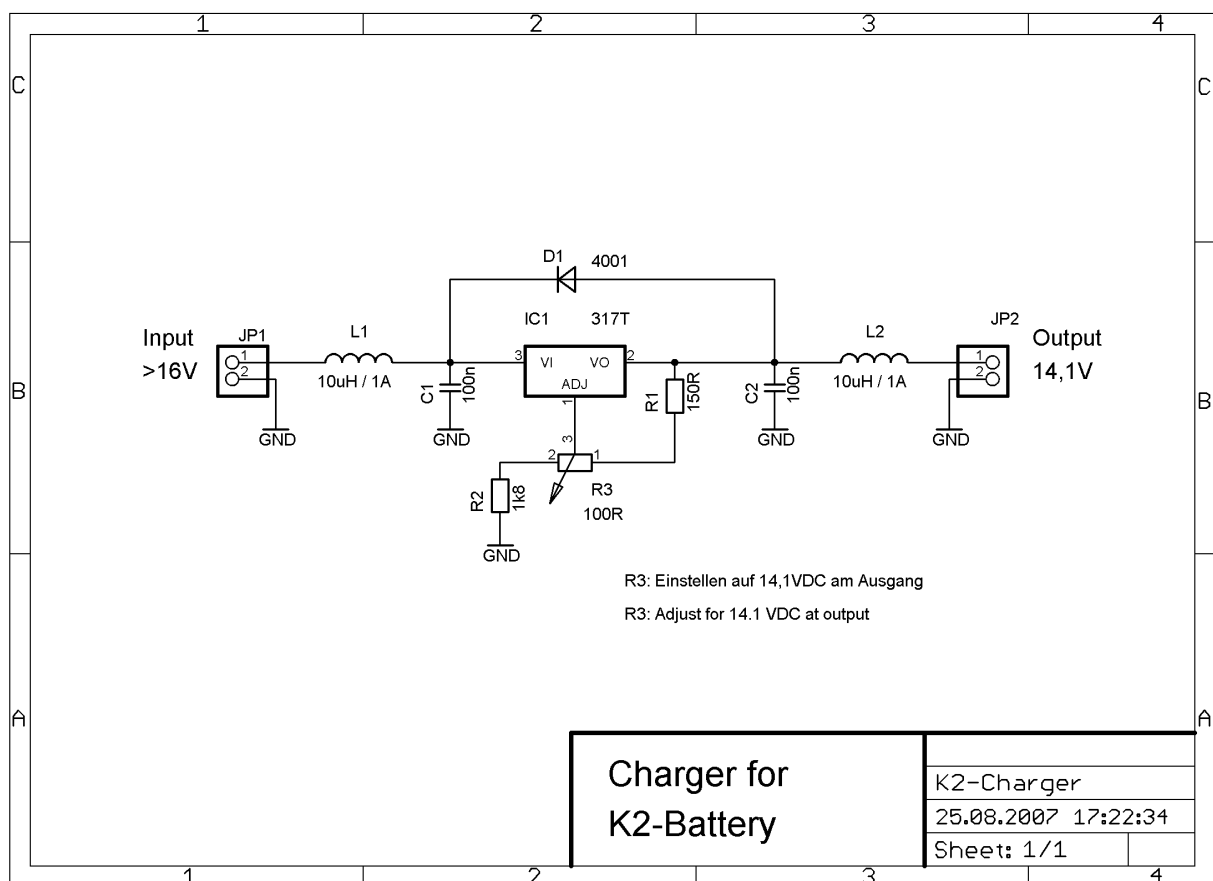
The internal battery of the K2 can be charged via the power-connector J3 (12VDC) at the rear of the K2, if the battery is switched „ON“. Different sources may be used for charging, e.g. power supplies (regulated / not regulated) or solar cells during field operation.

A sealed lead acid battery („gel-cell“) requires a constant voltage of 13.8VDC for charging. The serial diode D10 in the K2 causes a voltage drop of app. 0.3 VDC, therefore charging should be done with  $13.8\text{VDC} + 0.3\text{VDC} = 14.1\text{VDC}$ .

A good description can be found on Elecraft's homepage (see Reference).

### The circuit:

The charger regulates the output voltage at 14.1VDC (picture 1).



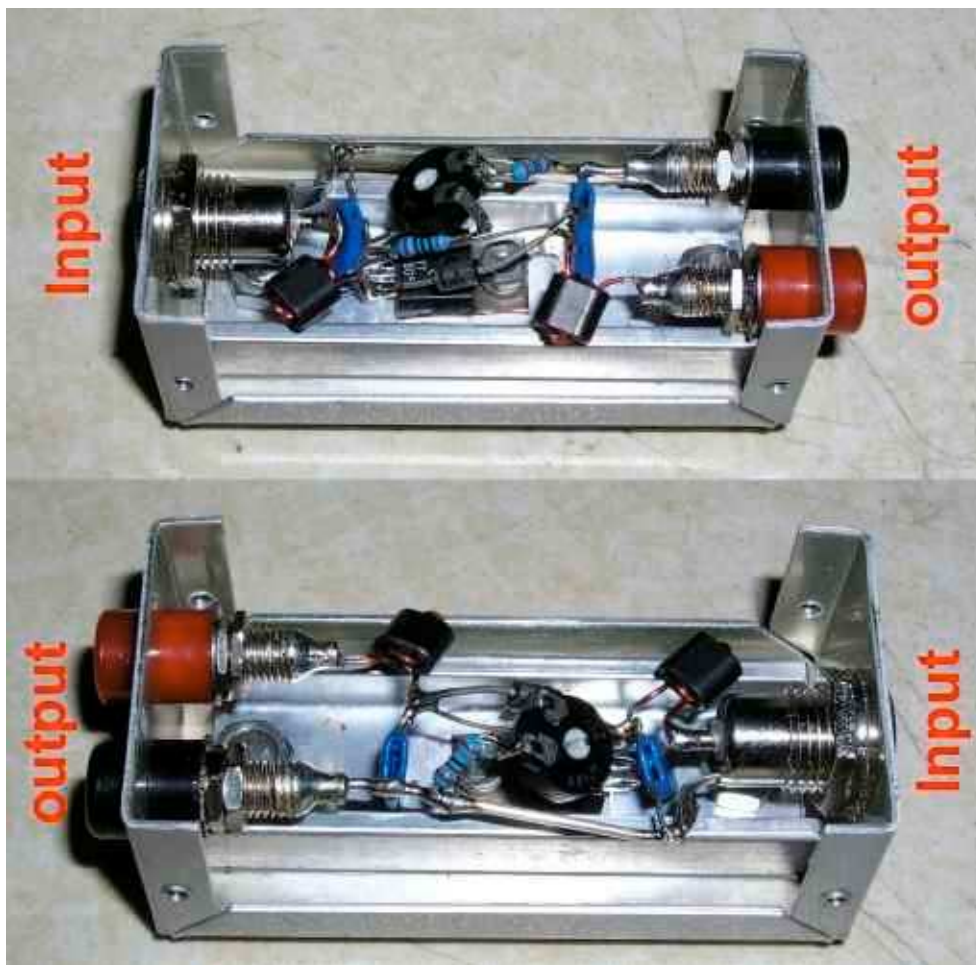
Picture 1: Schematic of the K2 – Charger

Based on the well known voltage regulator type 317T (package TO-220), a simple circuit provides following functions:

- voltage regulation, 14.1VDC adjustable with R3
- protection against reverse feeding (D1), when confusing in- and output
- blocking against HF (L1, L2, C1, C2)

The minimum input voltage is about 16.0VDC.

The circuit is mounted into a small box and a heat sink is provided for the 317T (picture 2). The type of connectors is at your choice.



Picture 2: Insight view of the K2-Charger

**Note:**

Please note, that no protection against discharging the battery is provided in this circuit. If the power supply fails, 2mA are flowing in reverse direction from the battery through R1, R2 and R3 at 12VDC. It is necessary that D10 is installed in the K2 to avoid reverse current flowing and discharging the K2-battery in this case!

**Important:**

The K2-battery requires a current limitation of app. 560mA, but the 317T limits the current to 1.5A(!). So it is necessary, that the power source limits the current to app. 560mA. This can easily be achieved by selecting an appropriate source:

- Power adapter, not regulated, e.g. 13VDC, 1A nominal (picture 3)
- Solar cell/s with not more than 20V/0,5A (picture 4)



Picture 3: K2-Charger with power adapter and K2

The power adapter (picture 3) shall not be regulated. A power adapter with nominal 13VDC and 1,5A makes app. 18 VDC at currents less than 0.5A. An output voltage of more than 16VDC is required, the current is limited by the adapter.



Picture 4: K2-Charger with solar cell, multimeter (Ammeter) and K2

The solar cells (picture 4) have following nominal data:

Nominal power Pmax:	10W
Nominal current:	0.58A
Nominal voltage:	17.2V
Short circuit current:	0.64A
Voltage unloaded:	20.8V
Dimensions:	434mm x 234mm x 20mm
Weight:	1.3kg
Type:	Silicium, monocrystal

The Ammeter is a good demonstration in the field (as long as the sun shines...)  
The flashlight of my camera was too weak.

You can use self-adhesive laser-transparencies to create a professional design, see picture 5.



Picture 5: Professional Layout

Reference:

Care and Feeding of Batteries\_aa4pb.pdf (download at [www.elecraft.com](http://www.elecraft.com))  
Data sheet LM317 (download from [www.national.com](http://www.national.com))

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