AK-147
Regulated Power Supply (0-30V/2mA-1.5A)

Parts Included:

- **Diodes:** 1N914(4), 5.6V Zener (2), 1N4004 (1).
- **Transistors:** 2N4124(2), 2N4126(1)
- **Capacitors:** 47pf (1), 0.1uf (2), 330pf (1), 2200uf 35V (1), 100uf 35V (2).
- **IC:** 8 pin Socket (2), LM741(1), MC4558(1).
- **Resistors:** 2.2kΩ/2W (1), 100Ω(1), 1.1kΩ(2), 220Ω(1), 4.7Ω(1), 1.5kΩ(1), 10kΩ(5), 56kΩ(1), 4.7kΩ(2), 2.2kΩ(2), 27kΩ(1) , 33kΩ(1), 39kΩ(1), 0.25/3W(1).

- **Potentiometers:** 2kΩ trim pot, 10kΩ.
- 1 x 5mm red LED
- 2KBP02M H-Bridge Rectifier
- 1 x 3 Pin Terminal Block
- 1 x 2 Pin Terminal Block
- TIP121 Transistor
- Heat Sink for TIP121.

Let's Begin Soldering!

We Require Solder Iron, Flux and Solder Wire.

This Manual does not talk more about soldering, you need to know basics of how to use solder.

#The PCB Side with names and symbols is "TOP" and opposite side is "BOTTOM". We need to place the components on the TOP and solder to the BOTTOM.

Step1: Start with Diodes. Solder all 1N914 and 5.6V Zener Didoes at there respective places on the PCB. The diode is labelled with its name on PCB top.
* Black mark on the diode indicates the N side (Cathode).

The direction of the Diode is important. Place as shown in the figure. The Black band on the diode should go to the same direction of white band on the PCB TOP.

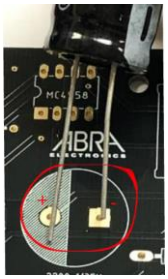
Step2: Now, Solder 1N4004 Diode. White mark on the diode should go in the same direction of white band on the PCB.

Step3: Solder all the Resistors at their respective places. Use marking on PCB TOP.
*For resistors, direction does not matter.

Step4: Solder the 8Pin IC base near LM741P and MC4558.

Step5: Solder 2k and 10k potentiometers. The 2k is trim pot and its blue in color.

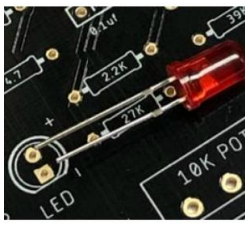
Step6: Solder the Capacitors. Capacitors: In the Kit there are two types, Polarized and ceramic. The polarized should be soldered carefully. * The marking on the polarized capacitors indicates for +Ve and -Ve. Match the +Ve and -Ve to the marking on the PCB. For 2200uf/35V, the white lining indicates +Ve side and other is -Ve.
Polarized Capacitors in the Kit:
2200uf/35V and 100uf/35V. Solder the ceramic capacitors in any direction.

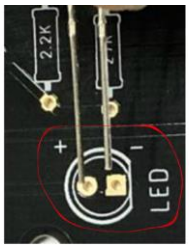


Step7: Solder Transistors 2N4124 and 2N4126. Directions as per symbol on PCB TOP.

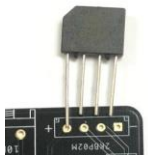
Step8: Now, solder the Terminal blocks with the screw holes facing outward.

Step9: Solder the 5mm Red LED, attach heatsink on TIP121, and 2KBP02M H Bridge Rectifier.



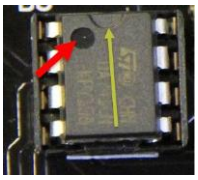


* For 2KBP02M check for the -Ve, +Ve sign on the component and match with the label on the PCB TOP. For LED, the +Ve side the long lead and the short lead denotes -Ve. Place accordingly on the PCB as per the label.



Step 10: Install and solder the Heatsink pins attached to the TIP121 as well as TIP121 (facing inwards).

Step11: Now its time to place the ICs on the sockets previously soldered, LM741 and MC4558. The notch on the IC goes to the notch on the PCB IC label.



Step12: Verify components soldering, for safety

Precautions: Before Powering on, ensure that the excess lead lengths are cut off on the bottom side of the PCB and there are no shorts or components leads touching each other.

After checking for any possible issues, connect a 24VAC Center Tap transformer with the max. voltage being 24 to AC Terminal block(3-pin). Place a Multimeter to DC OUT (2-pin Terminal Block) and connect the transformer to a wall socket plug cord. Monitor for any irregularities such as smoke, abnormally hot components or voltage output. If the output is constantly at 28volts, the transistors at Q1 & Q2 are not soldered in the correct orientation. The LED will only turn on to indicate if there is an overload on your power supply. The current over protection system will work when the current limit is set to a low value and a circuit requires more current. This will trigger the protection system and illuminate the LED. You can test this by adjusting the current potentiometer knob. Increase the voltage to around 12volts. Connect a series circuit of a 5ohm/40W with an ammeter to the output causing the system to enter current protection.

Note: This Kit is not for beginners and be careful before connecting transformer. Any fault soldering will cause damage to the board and components.