KITS EDUCATIONAL ELECTRONIC

AVT 3172

Practical workshop power supply

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Presented workshop power supply is an adapter to the typical power supply. The regulator based on a well-known stabilizer LM317. Multi-turn potentiometer allows precise setting of the output voltage, which is indicated by a digital voltmeter.

Specifications

- supply voltage within range 5-18V AC or 5-24V DC
- output voltage 1.25-20V DC
- maximum output current 0.5A

Functional description

The schematic diagram of the workshop power supply is shown in Figure 1. The output voltage is stabilized by well-known integrated circuit LM317. It is protected against shortcut and overheating. The output voltage can be precise set in the wide range by multi-turn potentiometer used instead of two – one for course and one for fine adjustment.
The workshop power supply can be used at input voltages up to 24V and output current up to 0.5A. To obtain the maximum parameters for the stabilizer, in example output current of 1.5A, it is necessary to use a power supply of several tens of watts and a large heat sink. By using a rectifier bridge, the device can be powered by a non-polarized or alternating current.
For the measurement of the output voltage, a universal voltmeter module is used. It measures voltage up to 99.9V. The voltmeter is powered by a DC voltage from 3V to 30V. Three output connectors – banana socket, goldpin 2x5 strip and double spring connectors allow easy connection of the powered device.

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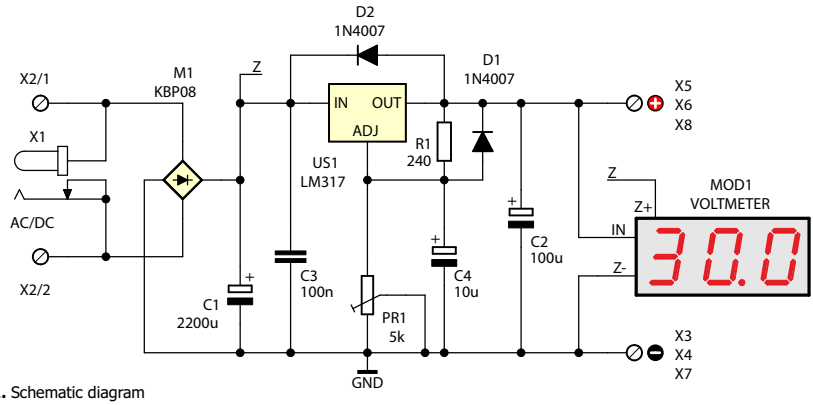

Figure 1. Schematic diagram

Assembly and test

Practical workshop power supply should be assembled on PCB shown in Figure 2. The assembly is typical and should not cause the problems. It runs in standard way starting from the smallest components and ending with the largest ones.

There are two power supply connectors on the PCB that are connected together. Therefore it does not matter which connectors supply power, which makes it possible to connect using a DC 2.1/5.5 or 2.5/5.5 plug or power supply cables. To fix the plate use four screws.

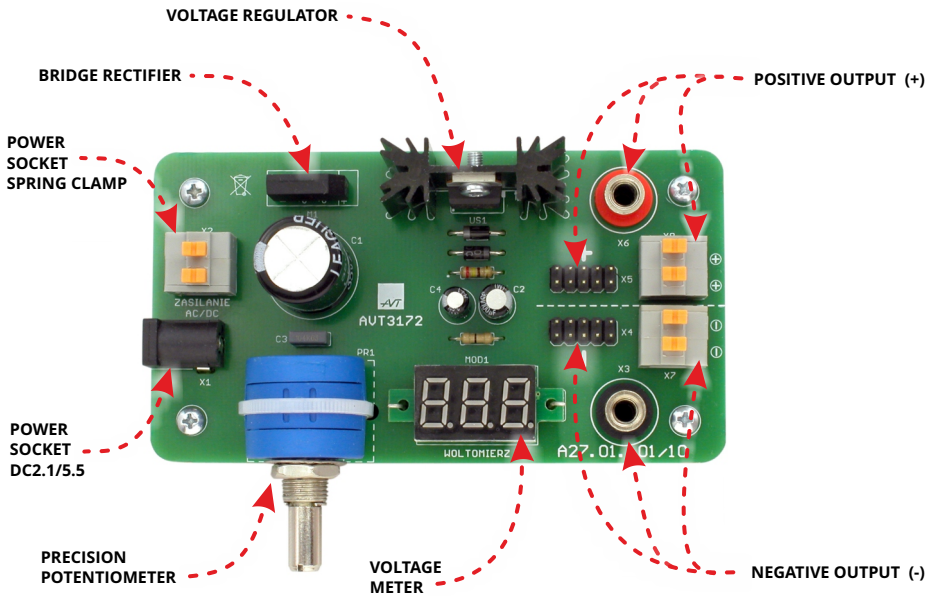

Figure 2. Components layout

Start off by soldering the printed circuit elements in order from smallest to largest. The unit assembled flawlessly, using the supplied components will operate immediately after switching on the power supply.

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Component list

Resistors:

R1:.....240Ω (red-yellow-brown-gold)
Z: .....0Ω (black)
PR1: .....precision potentiometer 5kΩ

Capacitors:

C1:.....2200µF !
C2:.....100µF !
C3:.....100nF (also marked as 104)
C4:.....10µF !

Semiconductors:

D1, D2:.....1N4007 or similar !
M1: KBP08
US1:.....LM317 !

Others:

X1:.....DC 2.1/5.5
X2,7,8:.....TLZ24V-2P
X3:.....red banana socket
X4,5: .....goldpin connector 2x5pin
X6:.....black banana socket
MOD1:.....voltmeter module
heatsink + fixing elements
case

While assembling the components marked with an exclamation mark attention should be paid to their polarity. Symbols of the components on the PCB as well as photos of assembled sets may come in useful. To access high-resolution images, download the PDF file.

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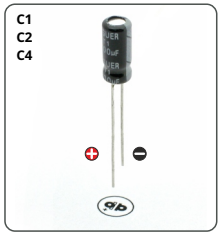
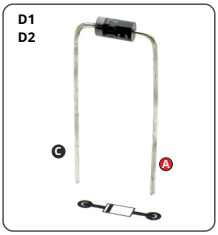
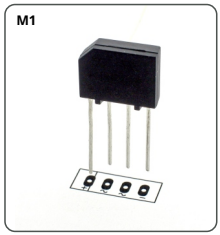
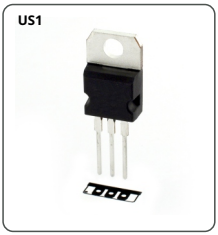


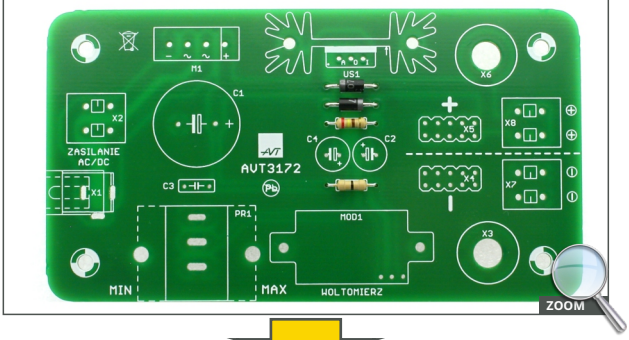




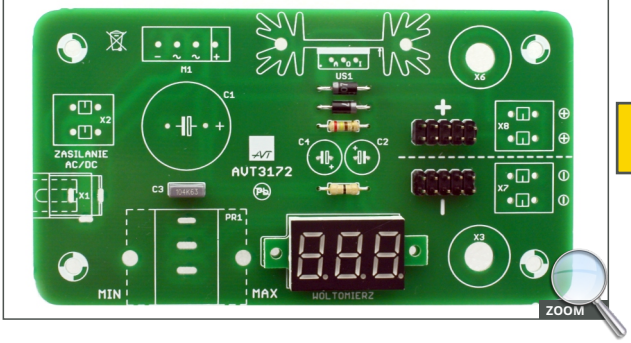


Assembly in 5 steps

1 Solder resistors Z and R1 and diodes D1, D2



2 Solder capacitor C3 and goldpin Connectors and Voltmeter Module



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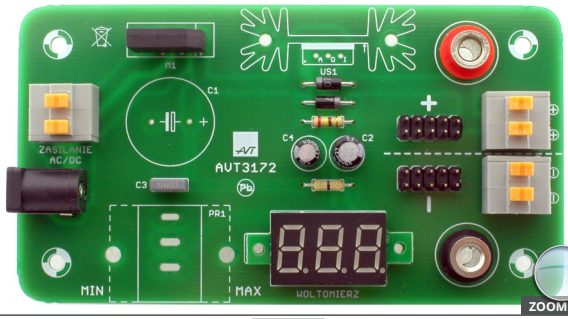
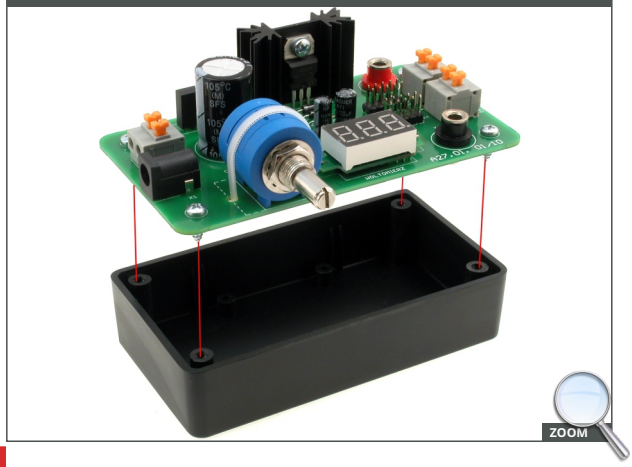
3 Solder capacitors C2, C4, connectors X1-X3, X6-X8 and rectifier M1



4 Solder capacitor C1, potentiometer PR1 and US1

5 Screw the plate to the case



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This symbol means do not dispose of your product with your other household waste. Instead, you should protect human health and the environment by handing over your waste equipment to a designated collection point for the recycling of waste electrical and electronic equipment.

Notes

Thank you for purchasing AVT product. Please take your time to read carefully the important information below concering use of this product.

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• Battery or wall-adaptor are safe devices. They do not require special attention unless main voltage is connected to an output e.g. a relay.
• If the kit is used to switch currents greater than 24V it is necessary to have the installation and performed by a trained professional authorized for such work. The kit may only be used in such application if it was installed in a safe to touch enclosure.
• Never exceed the limits or ratings listed in the 'Specifications' section at the this user guide.
• If the kit is used in schools or educational facilities or similar institutions the operation must be supervised by trained and authorized staff.
• The product itself and all parts thereof (including packing material) are not suitable toys for childern! (choking hazard, risk of electric shock, ...)

Failures in modern electronic component are very rare as 95% of non-working kits are due to poor soldering or components placed in the wrong location or orientation so please check your work carefully.