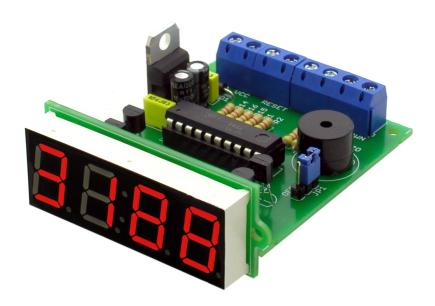


AVT 3188

Up/down counter with 4 digits LED display





The device is able to count pulses from different sources – sensors or buttons – in the direction up or down. Maximum counting frequency is 10 Hz (10 pulses per second). Each received pulse is signaled audibly. Maximum capacity of the counter is 9999. Calculated value is stored in the nonvolatile memory and it is restored in the case of power failure.

Specifications

- up/down counter with maximum capacity 9999
- the calculated value is stored in the nonvolatile memory and restored in the case of power failure
- maximum counting frequency is 10 per second
- 4 digits LED display with 14 mm height
- power supply: 7-15V DC, 0.2A

Functional description

The schematic diagram of the counter is shown in Figure 1. The device should be supplied with DC voltage within range from 7 to 15V connected to the POWER connector. Diode D1 protects device from faulty input polarity. Input voltage is applied to voltage stabilizer U1 type 7805, which supplies microcontroller responsible for all functionality of the counter. Bipolar transistors T1...T4 are supplying anodes

of the LED digits while cathodes are directly driven from microcontrollers outputs via limit resistors R6...R12. Resistors R14...R16 pull the counter's inputs to +5V. The piezo beeper acts as a pulse beacon. It can be turned off or switched on with the jumper JP1.



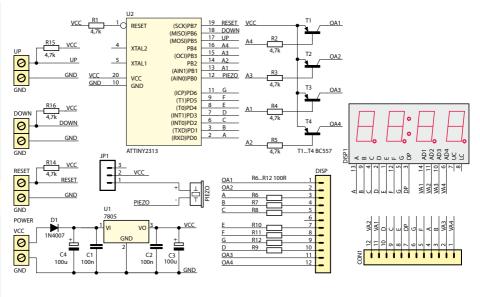
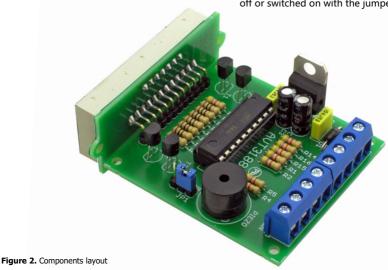


Figure 1. Schematic diagram

Assembly and test

The counter should be assembled on two PCBs 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. After assembling both PCBs should be connected together with the angled goldpins.

The counter operation is simple. Shorting the UP input increases the value, while shorting DOWN input decreases. To reset the counter hold down RESET button for about 3 seconds. Inputs UP, DOWN and RESET can be connected to the any momentary switches. The piezo beeper acts as a pulse beacon. It can be turned off or switched on with the jumper JP1.



DIFFICULTY LEVEL



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.

Component list

Resistors:

R1-R5, R14-R16:...4,7 $k\Omega$ (yellow-violet-red-gold) R6-R12:......100 Ω (brown-black-brown-gold)

Capacitors:

C1, C2:100nF (also marked as104)

C3, C4:100µF!

Semiconductors:

D1:.....1N4007 or similar!

T1-T4:....BC557 (BC558) !

U1:.....7805 !

U2:.....ATtiny2313 with 20-pin IC socket

DISP:....LED-AF5643

Others:

goldpin connector 12pin

POWER:.....2-pin terminal block connector

RESET:2-pin terminal block connector UP:....2-pin terminal block connector

DOWN:.....2-pin terminal block connector

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.





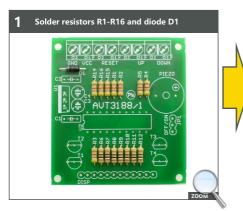


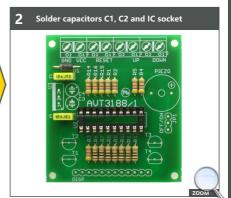


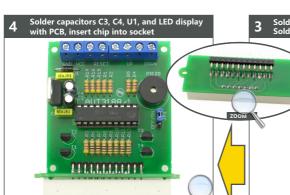




Assembly in 4 steps







3 Solder transistors T1-T4, PIEZO and connectors Solder LED display and goldpin connector



Notes



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



Educational Electronics Kits are intended for educational and demonstration purposes only. They are not intended for use in commercial applications. If they are used in such applications the purchaser assumes all responsibility for ensuring compliance with all local laws. In addition, they cannot be used as a part of life support systems, or systems that for use as or as a part of life support systems, or systems that might create a hazardous situation of any kind.

- 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.





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