

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

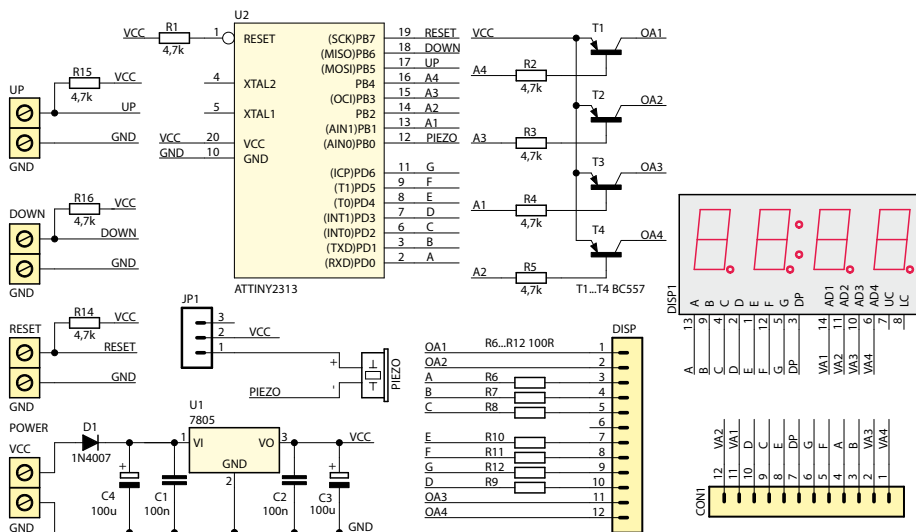
- up/down counter with maximum capacity 9999
- the calculated value is stored in the nonvolatile memory and restored in the case of power failure
- maximum counting frequency is 10 per second
- 4 digits LED display with 14 mm height
- power supply: 7-15V DC, 0.2A

### 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.



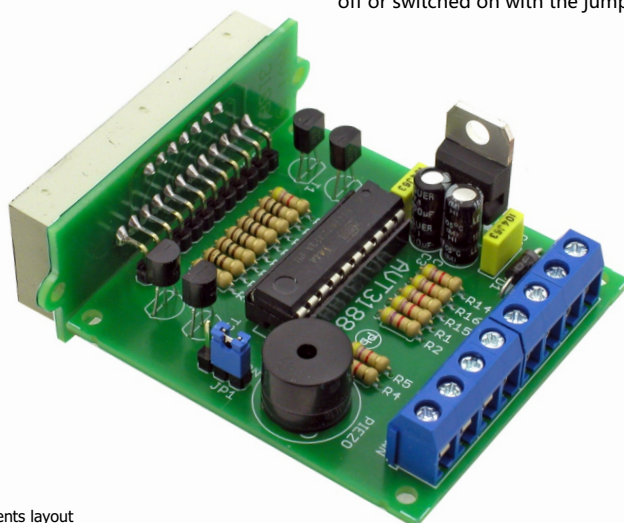


**Figure 1.** Schematic diagram

## 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 the value. 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.



**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.

# Component list

## Resistors:

R1-R5, R14-R16: ...4,7kΩ (yellow-violet-red-gold)  
R6-R12: .....100Ω (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

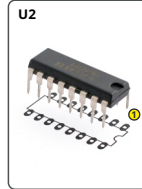
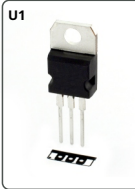
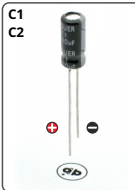


While assembling the components marked with an exclamation mark attention should be paid to their polarity. Symbols of the components on the PCB as well as photos of assembled sets may come in useful. To access high-resolution images, download the PDF file.

<http://bit.ly/2y1t0qC>

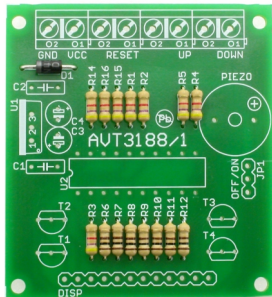


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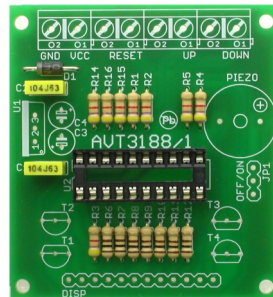


## Assembly in 4 steps

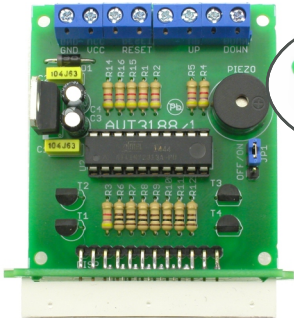
### 1 Solder resistors R1-R16 and diode D1



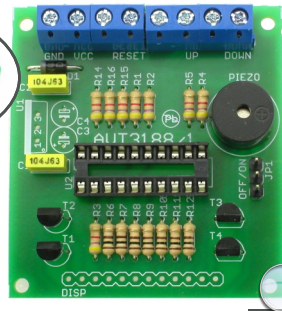
### 2 Solder capacitors C1, C2 and IC socket



### 4 Solder capacitors C3, C4, U1, and LED display with PCB, insert chip into socket



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



AVT 3188

Up/down counter with 4 digits LED display

DIFFICULTY  
LEVEL





EDUCATIONAL  
ELECTRONIC  
**KITS**







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Assembly and connection of the device not in accordance with the instructions, unauthorized modification of components and any structural modifications may cause damage to the device and endanger the person using it. In this case, the manufacturer and its authorized representatives shall not be liable for any damages arising directly or indirectly from the use or malfunction of the product.