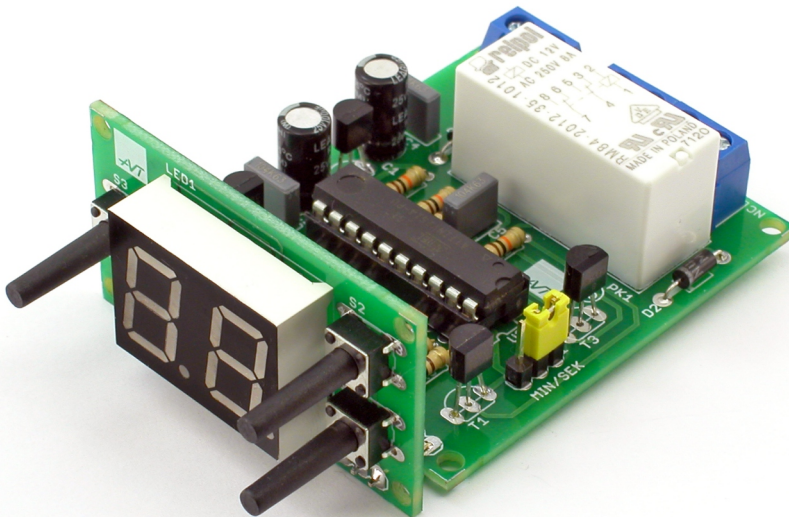


AVT 3200

Timer 0...99 minutes



A simple timer to count down in time ranges from 0 to 99 seconds or from 0 to 99 minutes. Thanks to the built-in high current relay contact and intuitive operation, the timer can be used to perform time functions in home automation and industrial automation.

Specifications

- 2 operating modes: seconds and minutes
- time setting in the range of 1-99 in steps of 1
- output relay with contacts 230V AC, 8A
- 2-digits LED display
- power supply: 12V DC

Functional description

Schematic of the timer is shown in Figure 1. Timer is supplied with DC voltage from 8...12 V. Rectifying diode D1 protects the circuit from reverse polarity. The supply voltage is stabilized by the integrated stabilizer U1. Timer is based on ATtiny261 microcontroller clocked with an internal RC generator. The operating status is displayed on a seven-segment display with a common anode. The 2-digit LED segments of the multiplexed LED display are connected via R5...R12 limit resistors to the PA0...PA7 pins of

the microcontroller. The T1 and T2 transistors are used to supply LED digits. Transistors are switch on/turned off by the signals from PB3 and PB4 pins of the microcontroller. Three buttons S1-S3 allow you to enter settings and enable timer functions. Buttons are connected to pins PB0, PB1 and PB6. Active level is low. The NO and NC contacts of the relay are connected to the pins of the output connector.

Timer 0...99 minutes

DIFFICULTY
LEVEL



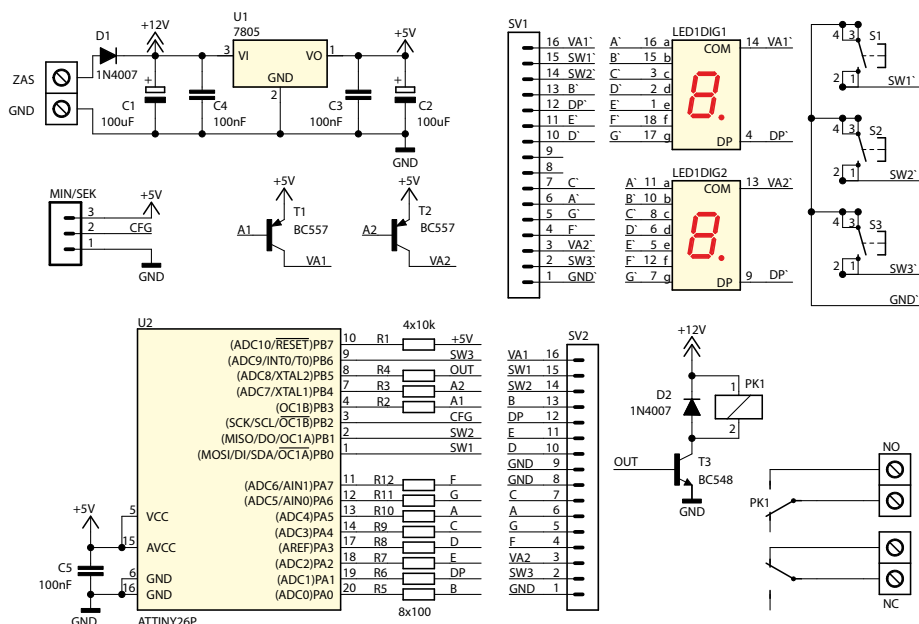


Figure 1. Schematic diagram

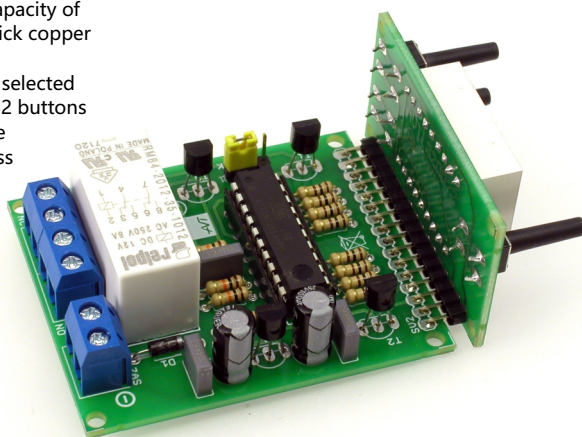
Assembly and test

The assembly is easy and typical. At the start, you must install the smallest components and finish on the largest ones. After assembling, both plates should be connected using an angular goldpin connector. The assembled system works flawlessly when the power is turned on. For heavy load control, pay attention to the load on the relay contacts and the PCB paths. In order to improve the load capacity of the tracks, they can be soldered to thick copper wire.

The time unit (seconds or minutes) is selected by the MIN/SEK jumper. The S1 and S2 buttons increase or decrease the time. Use the S3 button to start the timer. Each press of S2 button increases and S1 button decreases the time value. To make the change faster, press and hold the corresponding button.

The set value is stored in the non-volatile memory. If the dot is lit at the unity number, the timer counts down the minutes. If the dot is off, then the timer counts the seconds. Blinking a dot indicates time running.

When you use the timer, at any time by pressing S3 user can stop the timer. In this case the digits on the display will blink. The timer waits for a short press of the S3 key or its longer hold time, after which it will restart. Warning! Counting the time may be a little inaccurate, especially for minute work.



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 - R4:10kΩ (brown-black-orange-gold)

R5 - R12:100Ω (brown-black-brown-gold)

Capacitors:

C1, C2:100μF !

C3 - C5:100nF(also marked as 104)

Semiconductors:

D1, D2:1N4007 !

U1:78L05 !

U2:ATtiny261 with 20-pin IC socket

T1, T2:BC557 (BC558) !

T3:BC547 (BC557) !

DISP:LED-AF5624

Others:

PK1:relay

SV1:goldpin connector 1×16pin

MIN/SEK:goldpin connector 1×3pin+ jumper

ZAS, NO, NC:2-pin terminal block connector

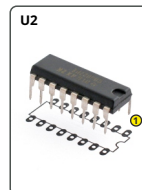
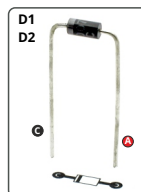
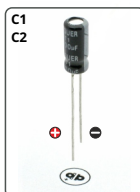


While assembling the components marked with an exclamation mark attention should be paid to their polarity. Symbols of the components on the PCB as well as photos of assembled sets may come in useful. To access high-resolution images, download the PDF file.

<http://bit.ly/2I3HcH>

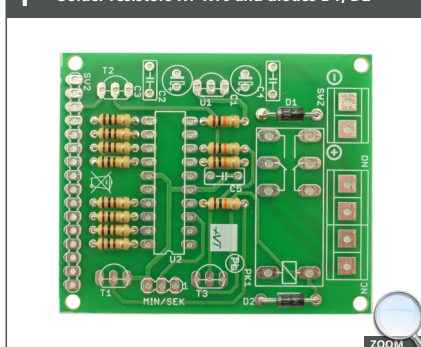


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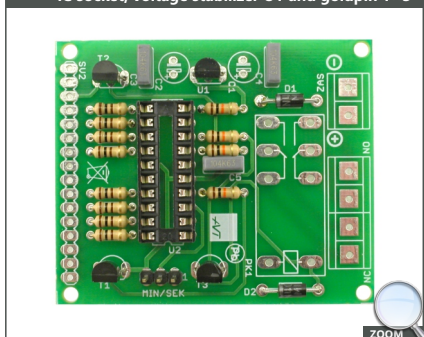


Assembly in 4 steps

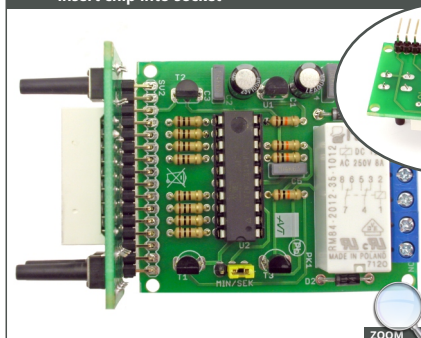
1 Solder resistors R1-R16 and diodes D1, D2



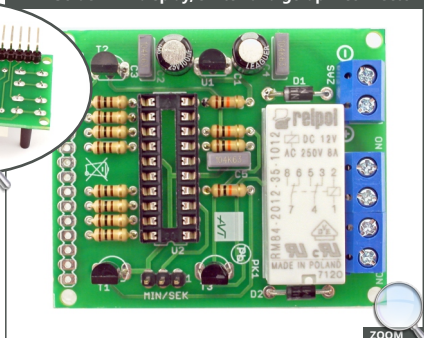
2 Solder capacitors C2, C4, C5, transistors T1-T3, IC socket, voltage stabilizer U1 and goldpin 1×3



4 Solder LED display with PCB, insert jumper and insert chip into socket



3 Solder capacitors C1, C2, connector and relay Solder LED display, switch and goldpin connector



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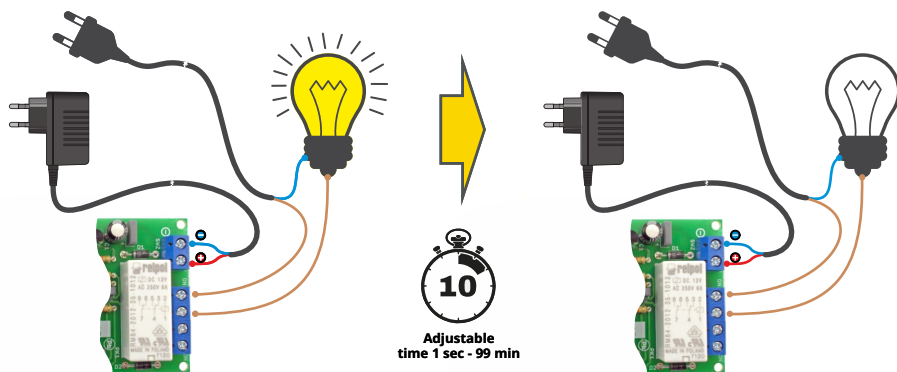


Figure 2. Relay on countdown timer

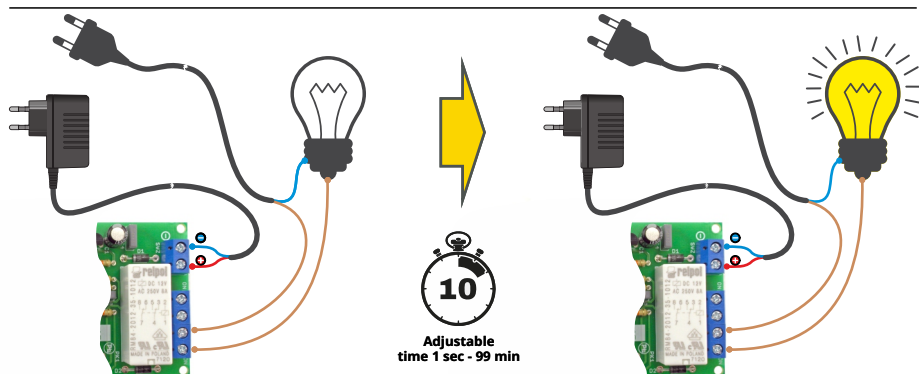


Figure 3. Relay off countdown time

Thank you for purchasing AVT product. Please take your time to read carefully the important information below concerning 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 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 children! (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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