AVT 724

Universal timer controlled by a button or touch sensor

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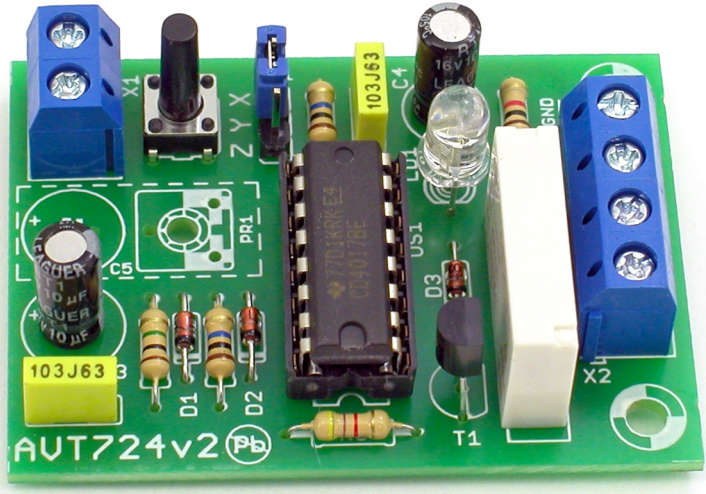

Timer can work in two modes: typical Timer or Staircase switch. In the first mode, after pressing the button, the timer changes the state of its output for a certain time and then returns to the standby mode. In the stair switch mode, each pressing of the button changes the output state to the opposite. After the set time has elapsed, the state changes again.

Specifications

- status signaling by two-color LED
- touch button or push button control.
- 2 working modes: Timer or Staircase switch
- relay output
- power supply: 9-12V DC

Functional description

The schematic diagram is shown in Figure 1. The US1 (4017) operates a counter to 2. Each time the S1 button is pressed, the pulse occurs on the CLK input. The state of the input is determined by the state of the input ENA (pin 13 U1). If the points X and Y are shorted, the input is permanently set to low and each pulse on the CLK input changes the counter state. The first pulse will result in a setting of the output Q1 and the red LED will be on. Next will set the output Q2 and reset the counter - logic "1" will occur at output Q0 and the green LED will light on. When the Y and Z points are shorted, the output Q1 is directly connected to the ENA input. In standby mode, when output Q0 is set and output Q1 and input ENA are reset, counter can count. After the first impulse on the CLK input, the Q1 output and the ENA input will be set, and this will block the counting ability – subsequent pulses at the CLK input will not cause any counter response.

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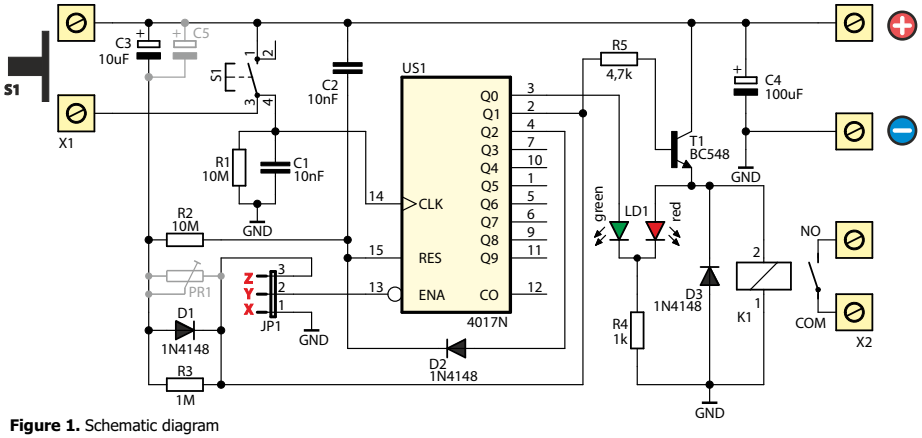

Figure 1. Schematic diagram

Assembly and test

The assembly diagram is shown in Figure 2. The assembly must be carried out in accordance with generally accepted principles. Particular attention should be paid to the orientation of electrolytic capacitors, transistors and diodes. After checking the correct installation, power supply can be connected: 9V battery or (better) stabilized power supply (9-12V).

The mode of operation of the timer can be selected with two points X, Y, Z:

- X-Y shorted – intelligent timer with switch on / off.
- Y-Z shorted – a typical timer, which measures the time after pressing the button.

Timer operation can be arbitrarily adjusted by changing the values of resistance R3 and capacitance C3 in a very wide range. On the PCB there is space for optional mounting of additional C5 capacitor, and potentiometer PR1. At first, a resistor R3 = 1MΩ and a capacitor C3 = 10uF is proposed, which allows for a delay time of up to 10 seconds.

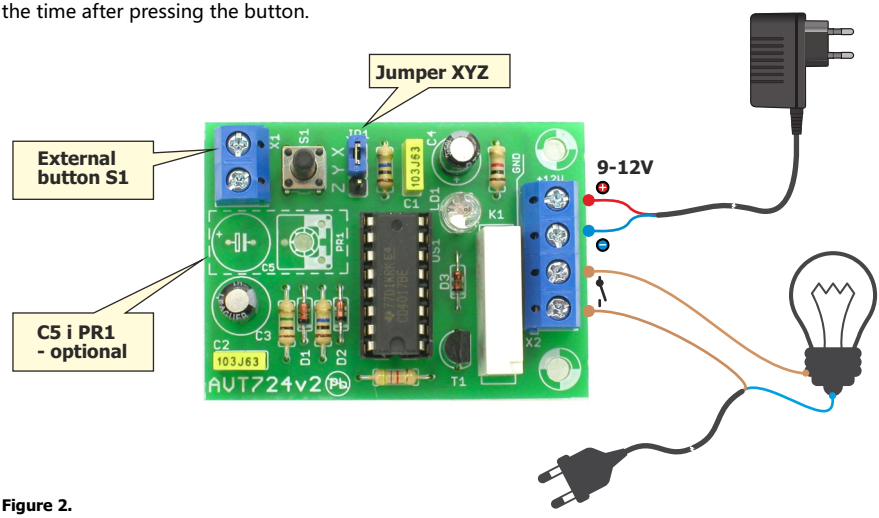

Figure 2.

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, R2: .....10MΩ (brown-black-blue-gold)
R3:.....1MΩ (brown-black-green-gold)
R4:.....1kΩ (brown-black-red-gold)
R5:.....4,7kΩ (yellow-purple-red-gold)

Capacitors:

C1, C2: .....10nF (also marked as 103)
C3:.....10uF !
C4:.....100uF !

Semiconductors:

D1-D3:.....1N4148 !
LD1: .....LED diode R/G !
T1: .....BC548 !
US1:.....CMOS 4017 IC with 16-pin IC socket

Others:

JP1: .....goldpin connector 1×3pin + jumper
S1: .....switch
K1:.....relay
X1, X2: .....2-pin terminal block connector - 3pcs.

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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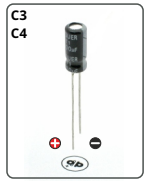
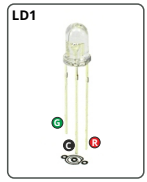
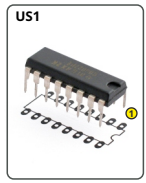


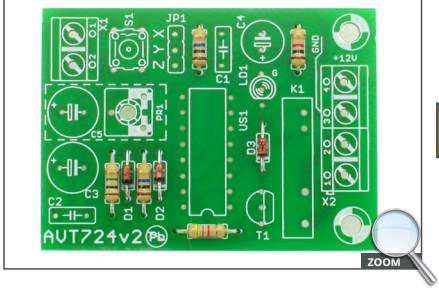




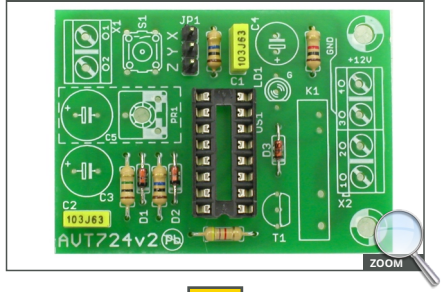
The proposed values for R3 and C3 are 10uF and 1MΩ, which gives an operating time of about 6-10 sec. After checking the correct operation, the values C3 and R3 can be adjusted accordingly according to the instructions. For this purpose, the AVT724 also has a 100uF capacitor and a 1MΩ potentiometer (the R3 resistor must be removed by mounting the PR1 potentiometer).

Assembly in 4 steps

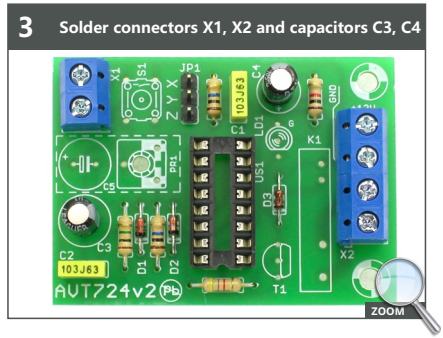
1 Solder resistors R1-R5 and diodes D1-D3



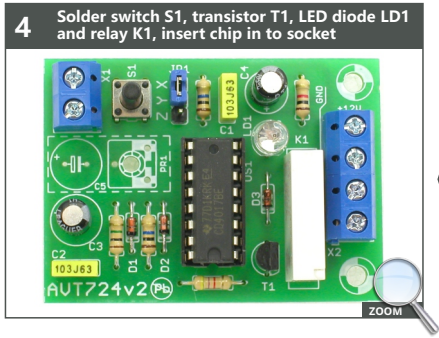
2 Solder IS socket, capacitors C1, C2 and goldpin connector JP1



3 Solder connectors X1, X2 and capacitors C3, C4



4 Solder switch S1, transistor T1, LED diode LD1 and relay K1, insert chip in to socket



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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.
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