Configurable 4-Channel Switch

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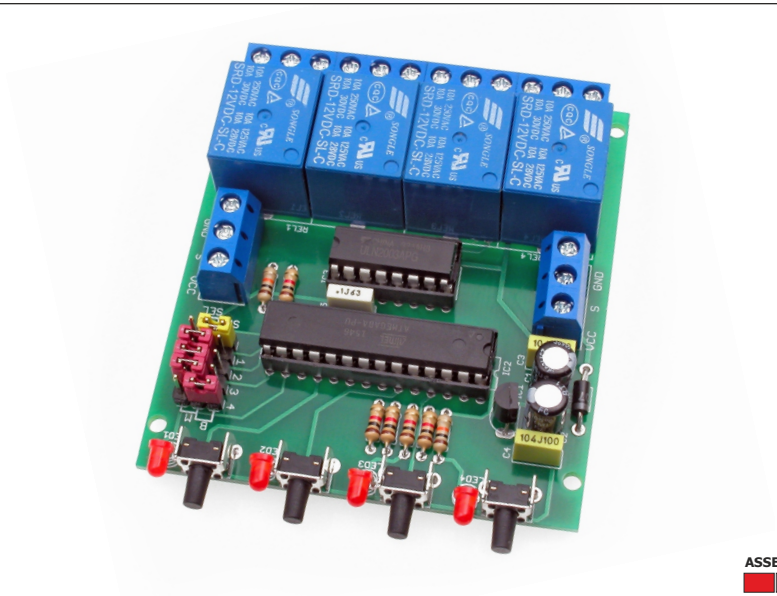
AVT 1916



ASSEMBLY DIFFICULTY

A configurable 4-channel switch circuit, allowing the attached devices to be controlled in any way. Each output can operate in monostable, bistable and dependent modes, and due to the synchronisation output and input, it is possible to link multiple such switches together.

Specifications

- 3 operating modes: monostable, bistable and dependent
- multiple such switches can be connected together
- independent configuration of each of the four outputs
- output circuit: 4 relays 230 VAC / 10 A (NC/NO)
- supply: 12 VDC
- board size: 68×75 mm

Circuit description

Schematic diagram of the switch is shown in Figure 1. It must be supplied with 12VDC. Operation of the switch is controlled by an Atmega8 microcontroller. The ULN2003A circuit is used to power relays. LED1...LED4 indicate which relay is energised. Relays are switched using the S1...S4 buttons.

The "MODE" jumper is used to select the operation mode, while the way of switching on a particular relay is made using jumpers 1...4, switching them to the "B" position - bistable operation or "M" - monostable operation.

The "MODE" jumper set in "SW" mode configures the device to operate in the switch mode with the possibility of setting any channel as a monostable switch (jumper in "M" position - relay is switched on as long as the button is held down) or bistable (jumper in "B" position - each time the button is pressed, the relay changes to the opposite state). In the next mode, the switch can operate as a dependent. To activate this function, switch the "MODE" jumper to the "SEL" position. In this mode, the 'S' sync input is activated and there is a low level on this line every time a button is pressed. This causes all relays to switch off and only the currently selected relay to switch on. In addition, it is possible to deactivate dependent operation for a channel in this mode. It is then necessary to move the selected jumper to the "B" position - from then on, each press of the button will change the state of the assigned relay to the opposite without affecting the other channels, which will continue to operate in a dependent manner.

Schematic diagram of the switch is shown in Figure 2. Start by soldering resistors and other small components onto the board and finish by fitting electrolytic capacitors, screw connectors and relays. A properly assembled circuit, once the configuration jumpers have been properly set, is immediately ready for operation. Changing the operating configuration of a particular relay is possible at any time during system operation and takes place independently for each of the 4 channels.

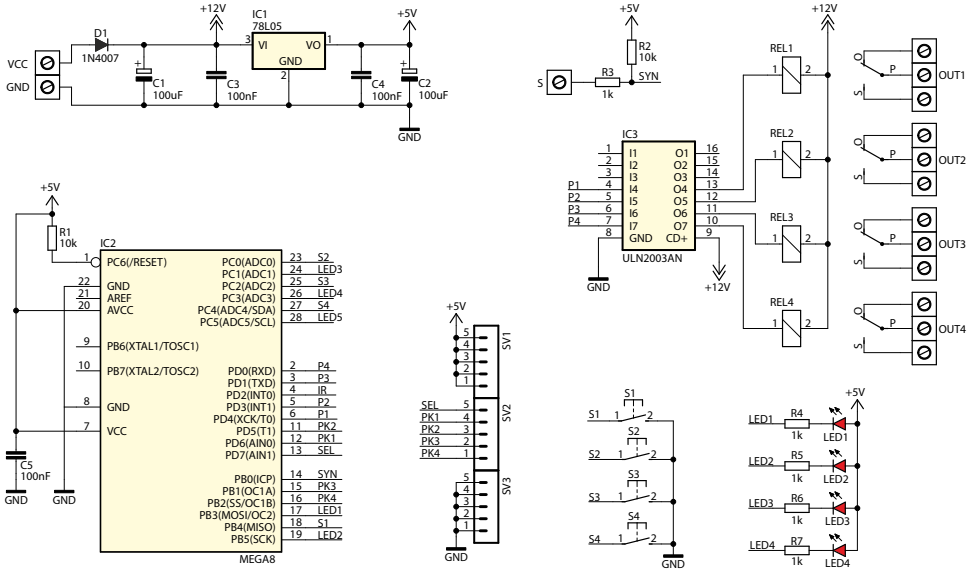


Fig. 1 Schematic diagram

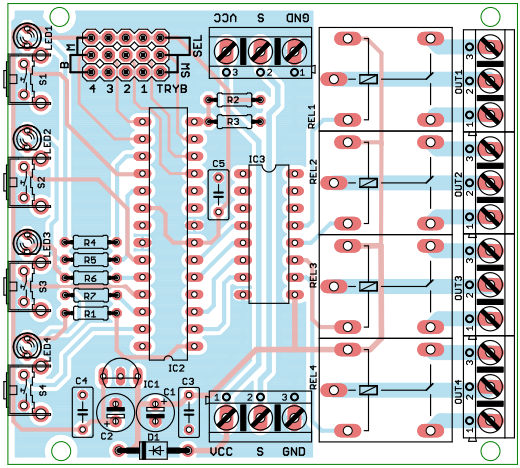


Fig. 2 Arrangement of components on the PCB

List of elements

Resistors:
R1, R2:.....10 kΩ
R3-R7:..... 1kΩ
Capacitors:
C1, C2: .....100 µF
C3-C5: .....100 nF
Semiconductors:
D1:.....1N4007
IC1:.....78L05
IC2:.....ATmega8
IC3:.....ULN2003
LED1-LED4: .....LED 3 mm

Other:
S1-S4: .....button
SV1-SV3:.....goldpin 1×5 + jumper
REL1-REL4:.....JQC3FF/012-1ZS
VCC, VCC2, OUT1-OUT4: ARK3/500

Begin assembly by soldering the components onto the board in order of size from smallest to largest. When mounting components marked with an exclamation mark, pay attention to their polarity. Photographs of the assembled kit may be helpful. To access high-resolution images, download the PDF file.

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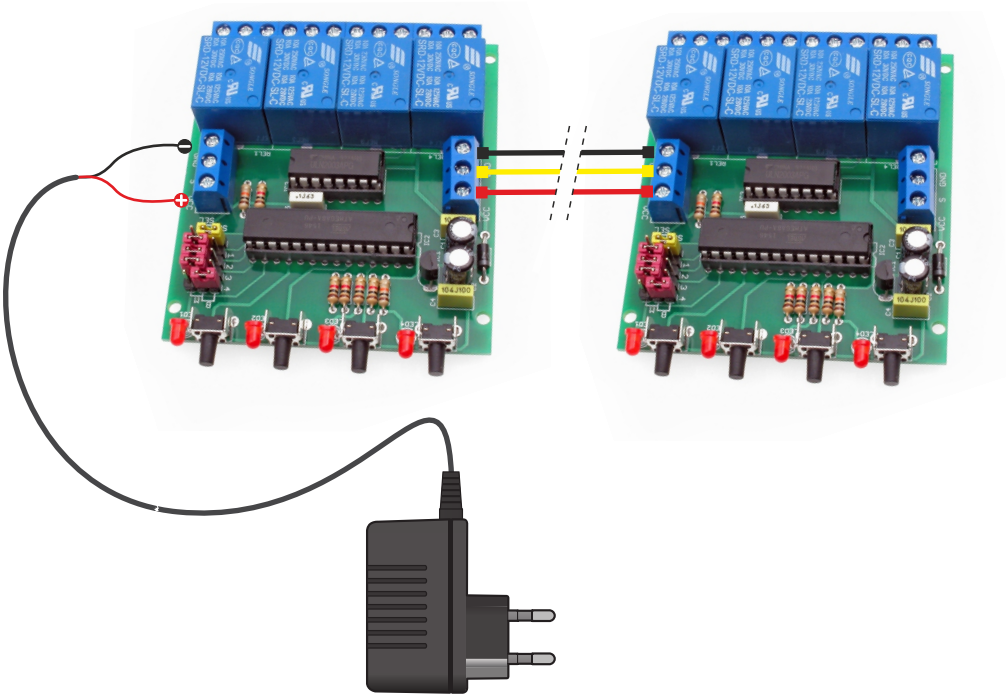

Notes

AVT SPV Sp. z o.o.

Leszczynowa 11 Street,
03-197 Warsaw, Poland
https://sklep.avt.pl/

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