

The module generates waveforms: rectangular, sawtooth, triangular and sinusoidal. The limitation is the ability to work only with one pre-selected frequency. The advantage is the ease of making the device. The basic application of the presented device is to work in the electronics workshop as a stationary or portable generator.

Specifications

- frequency 1 kHz
- output waveforms: rectangular, sawtooth, triangular and sinusoidal
- duty cycle of the rectangular waveform: 50%
- output voltage: adjusted within range 0...supply voltage
- power supply: 9 VDC / 10mA (6-10 VDC)

Functional description

The schematic diagram of the generator is shown in Figure 1. The US1 chip generates a square wave with a duty factor of about 50%. The frequency of the waveform generated depends on the capacitance C1 and the resistance R1, and R2. Using elements with the values given in the diagram, a rectangular signal with a frequency close to 1 kHz will appear on the pin 3 of the US1 chip. Then, the rectangular waveform is converted by several RC filters into signals of other shapes. At the connection point of the resistor R6 and the capacitor C3 a sawtooth waveform is obtained. Then, after passing through a filter composed of R7 and C4, the shape of the waveform is close to that of the triangular one. Further, the signal is fed to the integrator circuit with transistor T1. The signal has a sinusoidal shape on the T1 collector. Then, the rectangular waveform is shaped by several RC filters for signals of other shapes. At

the connection point of the resistor R6 and the capacitor C3 a sawtooth waveform is obtained. Then, after passing through a filter composed of R7 and C4, the shape of the waveform is close to triangular one. Further, the signal is fed to the integrator circuit with transistor T1. The signal has a sinusoidal shape on the T1 collector.

All these signals are fed to the inputs of the analogue multiplexer US2. With its help, one of the four input signals is available on pin 3 connected to the base of transistor T2, which acts as an emitter follower.

The amplitude of the output signal can be adjusted using the potentiometer P1. The voltage of the output signal depends on the type of signal shape and the supply voltage. Generator works properly powered with voltage from the range of 5 V to 10 V. Due to low power consumption (approx. 10 mA at 9V), the generator can be powered by battery.



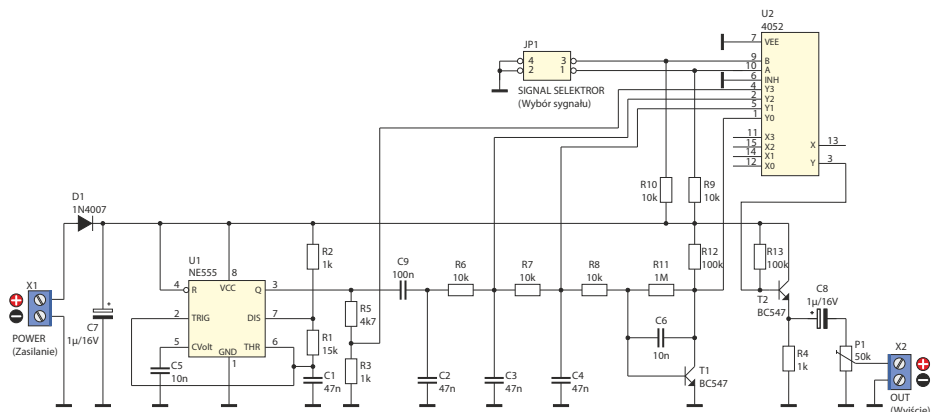


Figure 1. Schematic diagram

Assembly and test

The generator assembly diagram is shown in Figure 2. It is assembled on a single-sided printed circuit board. The assembly should start with soldering resistors and a rectifying diode. Then, it is necessary to solder elements of larger dimensions and finish them on the block

terminals. After completing the assembly, the polarity of the elements should be carefully checked. The generator should work immediately after switching on the power supply. Figure 3 presents the configuration of the signal selector jumpers.

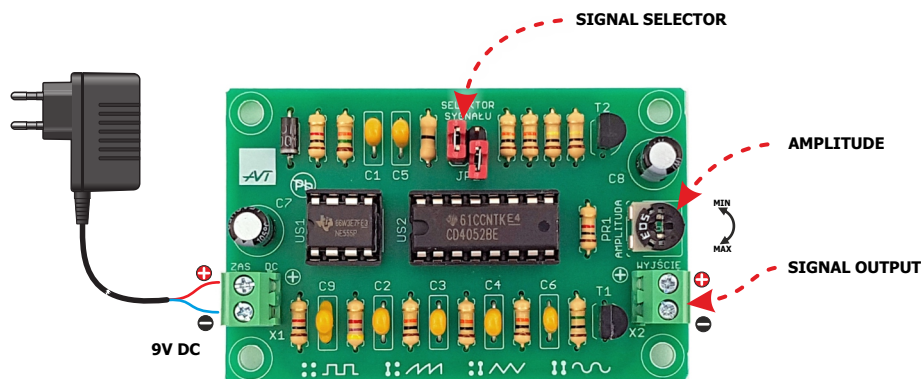


Figure 2. Components layout

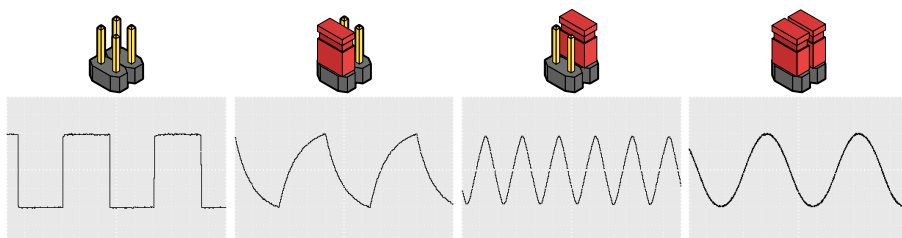


Figure 3. Signal switch jumper

Component list

Resistors:

R1:15k Ω (brown-green-orange-gold)
 R2-R4:1k Ω (brown, black-red-gold)
 R5:4,7k Ω (yellow-violet-orange-gold)
 R6-R10:10k Ω (brown-black-orange-gold)
 R11:1M Ω (brown-black-green-gold)
 R12, R13:100k Ω (brown-black-yellow-gold)
 Z:0 Ω (black)
 PR1:trimmer potentiometer 50k Ω

Capacitors:

C1-C4:47nF (also marked as 473)
 C5, C6:10nF (also marked as 103)
 C7, C8:1 μ F !
 C9:100nF (also marked as 104)

Semiconductors:

D1:1N4007 !
 US1:NE555 !
 US2:4052 !
 T1, T2:BC547 (BC548) !

Others:

JP1:goldpin connector 2 \times 2pin + jumper
 X1, X2:2-pin terminal block connector

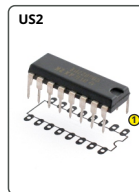
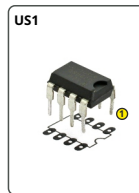
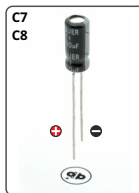


While assembling the components marked with an exclamation mark attention should be paid to their polarity. Symbols of the components on the PCB as well as photos of assembled sets may come in useful. To access high-resolution images, download the PDF file.

<http://bit.ly/2lo2TyZ>



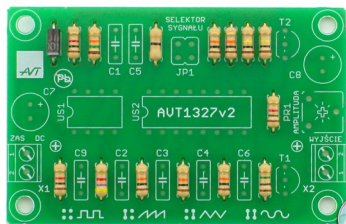
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Start off by soldering the printed circuit elements in order from smallest to largest. The unit assembled flawlessly, using the supplied components will operate immediately after switching on the power supply.

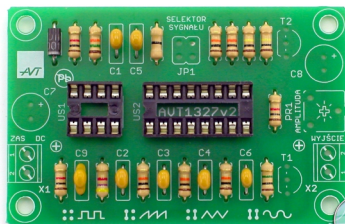
Assembly in 4 steps

1 Solder resistors R1-R13 and diode D1



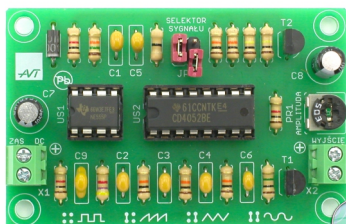
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2 Solder IC sockets, capacitors C1-C6 and C9



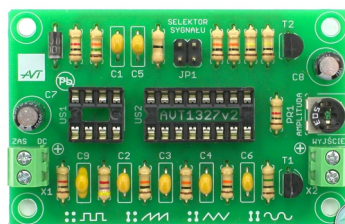
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4 Insert chips into sockets



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3 Solder connectors X1, X2, transistors T1, T2, goldpin JP1, PR1 and capacitors C7, C8



ZOOM

AVT 1327

Miniature function generator

DIFFICULTY LEVEL





- 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, ...)

**DIFFICULTY
LEVEL**



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<http://avtkits.com/>



This symbol means do not dispose of your product with your other household waste. Instead, you should protect human health and the environment by handing over your waste equipment to a designated collection point for the recycling of waste electrical and electronic equipment.

AVT SPV reserves the right to make changes without prior notice.

AV1 SPV reserves the right to make changes without prior notice.

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.