Manuals+ — User Manuals Simplified.

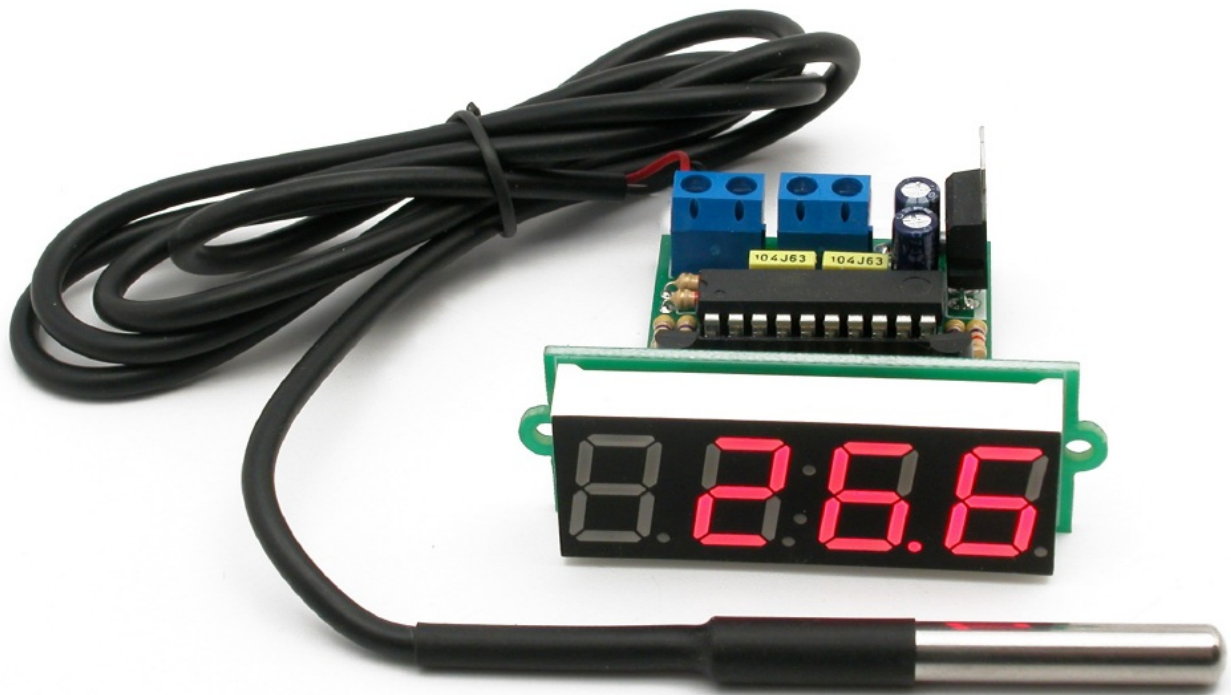# AVT 3122 Digital LED Display Thermometer Instruction Manual

Contents

AVT 3122 Digital LED Display Thermometer

The thermometer measures the temperature between -55°C and +125°C. It was built exclusively with THT components and a readymade waterproof temperature sensor.

Specifications

- temperature range -55…+125°C
- LED display update every 2 seconds
- waterproof sensor based on DS18B20
- does not require adjustment or calibration
- power supply 7…15V DC/0.3A

Functional description

Schematic of the thermometer with LED display is shown in Figure 1. The device should be supplied with DC voltage within range from 7 to 15V connected to the POWER connector. It can be any DC power supply unit with 0.2A load current or more. Diode D1 protects device from faulty input polarity. Input voltage is applied to voltage stabilizer U1. Microcontroller U2 (ATtiny2313) is responsible for all functionality of the thermometer DS1820, DS18B20 or DS18S20 is used as temperature sensor. Individual sensors differ in their resolution and software driver The microcontroller software automatically detects the type of connected sensor after switching power on. The result of temperature measurement is displayed on the 4 digit LED display. Bipolar transistors T1…T4 are supplying anodes of the LED digits while cathodes are directly driven from microcontrollers outputs via limit resistors R6…R13. The first position of the LED display shows a minus sign, if the measured temperature is less than 0. The maximum resolution of the temperature measurement is 0.1°C. The measurement result is updated every 2 seconds.
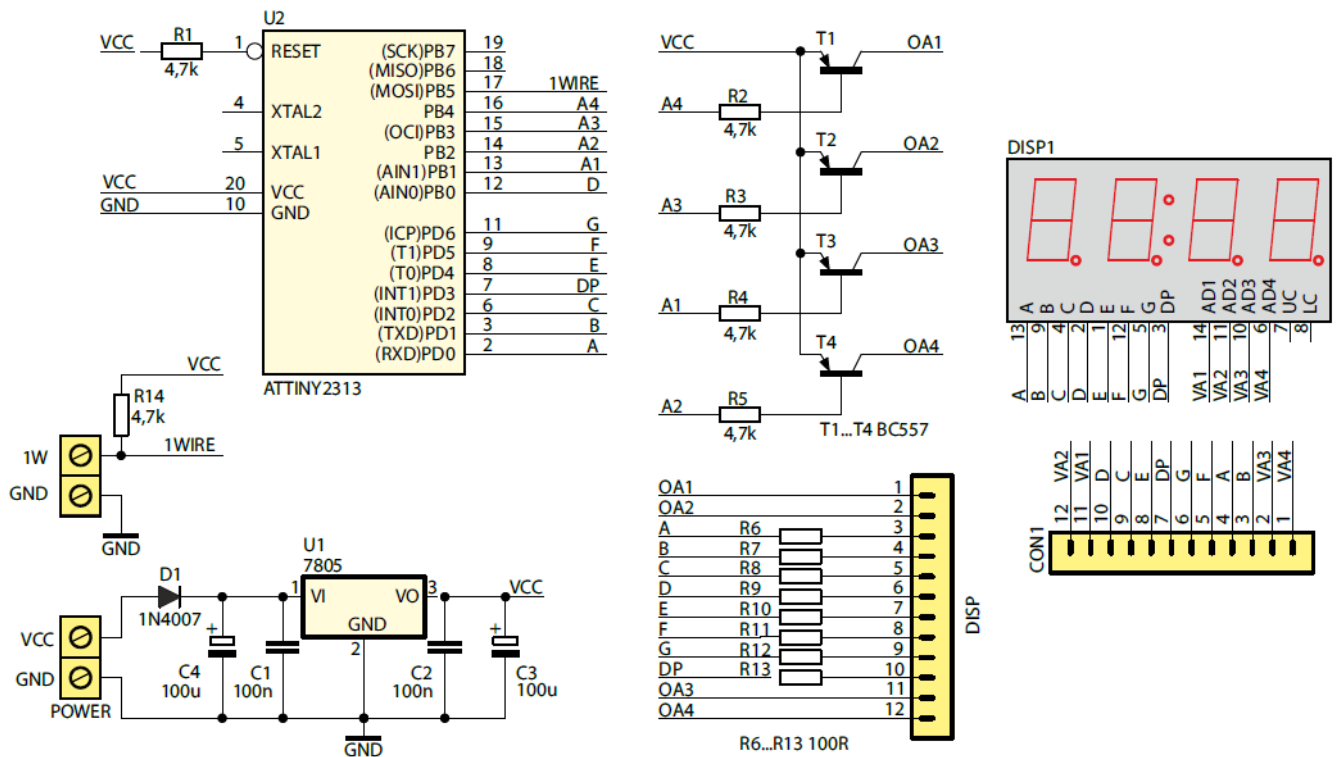
Figure 1. Schematic diagram

Assembly and test

- 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 next step is to attach the temperature sensor. For this purpose use a screw connector mounted on the PCB: the yellow sensor cable is connected to the 1W pin the black and red cables are shorted and connected to the pin marked GND. The way of attaching a temperature sensor is shown in Figure 2.
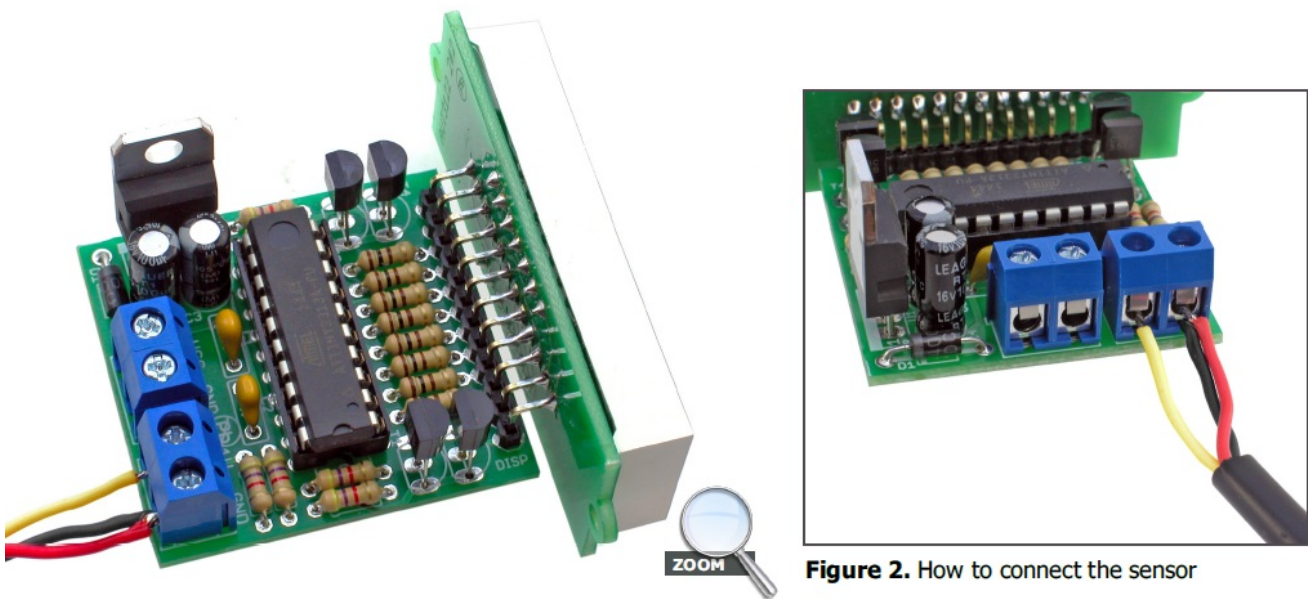
Figure 2. How to connect the sensor

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:**…….4,7kΩ (yellow-violet-red-gold)
- **R6–R13:** …………..100Ω (brown-black-brown-gold)

Capacitors

- **C1, C2:** …………….100nF (also marked as 104)
- **C3, C4:** …………….100µF

Semiconductors

- **D1:** …………………..1N4007 or similar
- **T1-T4:**………………BC557 (BC558)
- **U1:**……………………7805
- **U2:**……………………ATtiny2313A with 20-pin IC socket
- **U3:**……………………DS18B20
- **DISP:**………………..LED-AF5643

Others

goldpin connector 14pin

- **VCC:**…………………2-pin terminal block connector
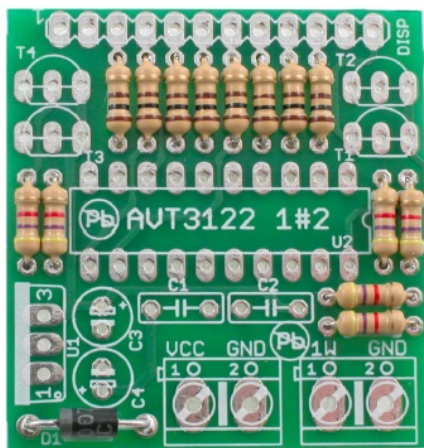- **1W:** …………………2-pin terminal block connector

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.
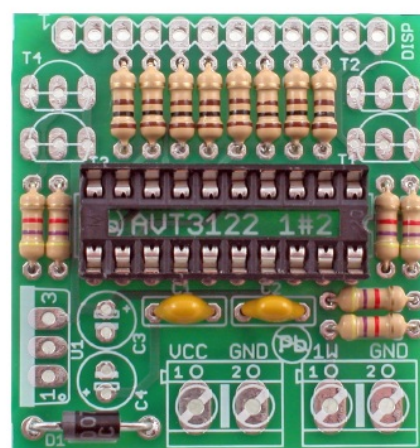
C3 C4	D1	T1 T2 T3 T4
⊕ ⊖	ⓒ ⒶA	
U1	U2	
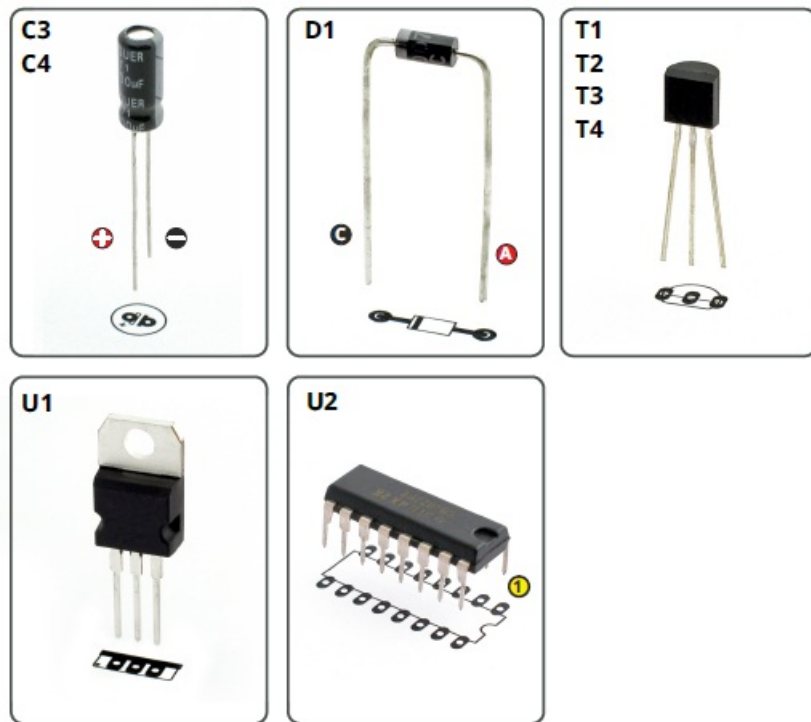
Assembly in 4 steps

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

ZOOM

ZOOM

ZOOM
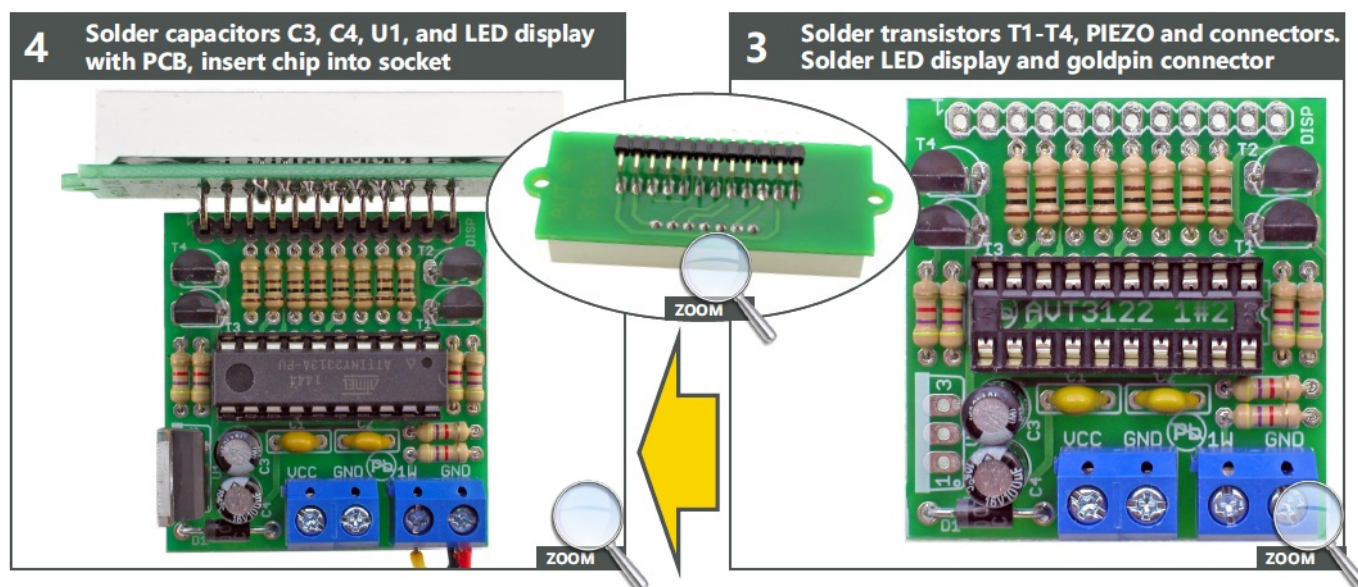
Notes

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

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 Sp. z o.0. Leszczynowa 11 Street, 03-197 Warsaw, Poland **http://avtkits.com/**

Documents / Resources

AVT 3122 Digital LED Display Thermometer [pdf] Instruction Manual
3122, Digital LED Display Thermometer, LED Display Thermometer, Digital Thermometer, Thermometer, 3122 Thermometer

References

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