



AVT 3085

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ASSEMBLY DIFFICULTY

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The circuit can be used wherever you need to continuously monitor the temperature in several points at the same time, over a wide temperature range. It can detect the absence or failure of a sensor.

Characteristics

- 4 measurement channels
- temperature measuring range: -55°C to $+125^{\circ}\text{C}$
- accuracy of measurement: $\pm 0.5^{\circ}\text{C}$ (from -10°C to $+85^{\circ}\text{C}$), $\pm 2^{\circ}\text{C}$ (from -55°C to $+125^{\circ}\text{C}$)
- reading resolution: 0.1°C over full range
- no calibration required
- reading box: 2×16 LCD display
- power supply: $7 \dots 16$ VDC / 200 mA

Circuit description

The circuit can be used wherever you need to continuously monitor the temperature in several points at the same time, over a wide temperature range. Due to the DS18B20 digital sensor with a resolution of up to 12 bits, the system can measure temperature from -55 to 125°C with a resolution of 0.1°C . The device reads temperature from the sensors in a single cycle, which significantly increases the measurement rate. The device can detect absence or failure of the sensor, as indicated on the display. Figure 1 shows a schematic diagram of the circuit. IC U1 is an ATmega8 microcontroller clocked by an internal RC oscillator at 1 MHz. Resistor R1 of 10 k Ω

pulls up the Reset pin to Vcc for the microcontroller was not reset by any interference during operation. Input voltage is fed to voltage stabiliser U2 type 7805. Capacitors C1, C2 and C3 filter the voltage for the microcontroller. The LCD display is connected to the microcontroller in 4-bit mode. Potentiometer PR1 adjusts the contrast of the display. The R/W signal is permanently connected to earth as it is not used. To measure temperature it uses DS18B20 digital sensors with high resolution and accuracy of measurement.

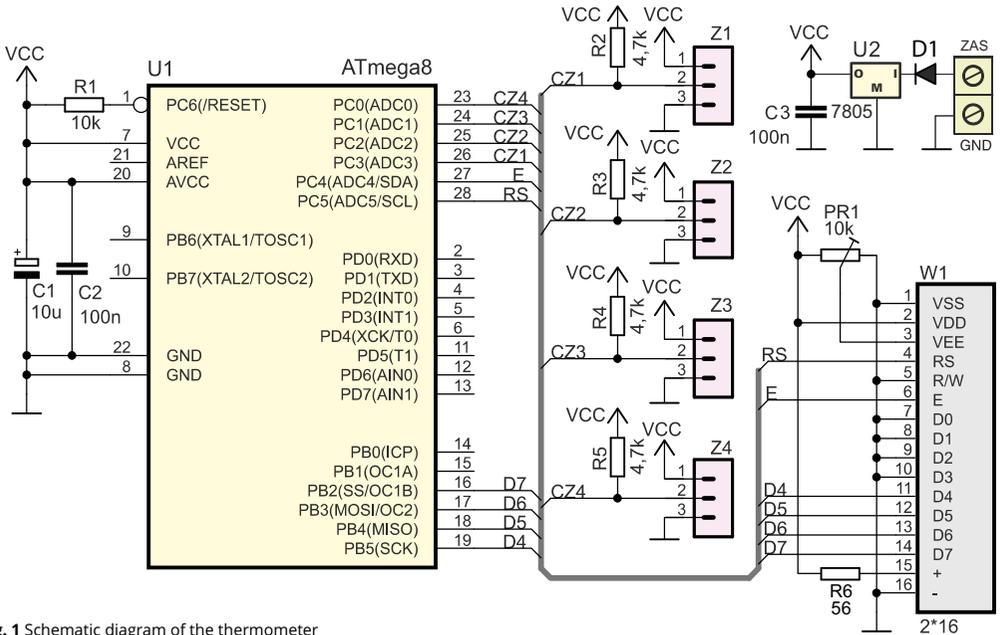


Fig. 1 Schematic diagram of the thermometer

Mounting and start-up

Figure 2 shows a mounting diagram, and the photo shows a view of the assembled board. Solder the components in order from the smallest to the largest. During mounting, it is important to remember to solder all jumpers at the sensor sockets. Capacitor C1 needs to be soldered "lying down", as it is quite high and must fit between the display and the board. Under the microcontroller use the DIP28 socket. The device will not require any calibration or adjustment, after energizing it is ready for operation. It must be

supplied with a DC voltage in the range 7...15 V. Dashes are displayed for any not connected or defective sensors. Measurements from subsequent sensors are displayed from top to bottom from left to right.

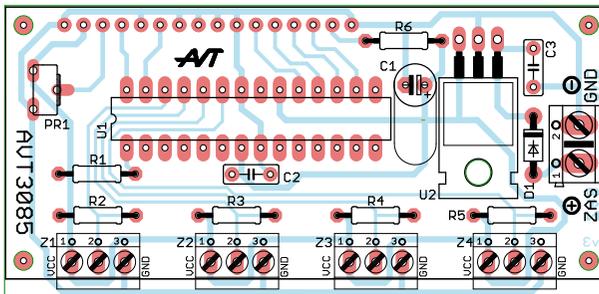
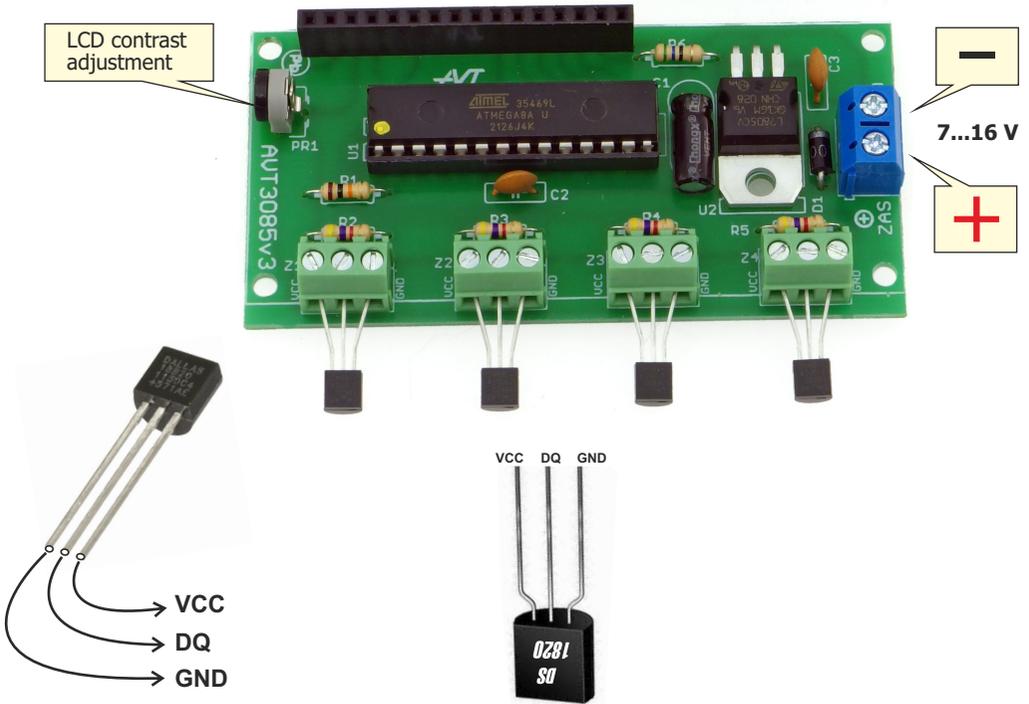


Fig. 2 Mounting diagram of the thermometer



Example of sensor protection

List of components

Resistors:

- R1:.....10 kΩ
- R2-R5:.....4.7 kΩ
- R6:.....56 Ω
- PR1:.....mounting potentiometer 5-10 kΩ

Capacitors:

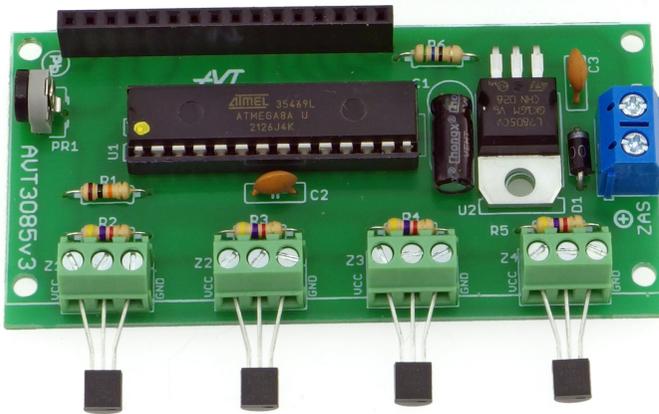
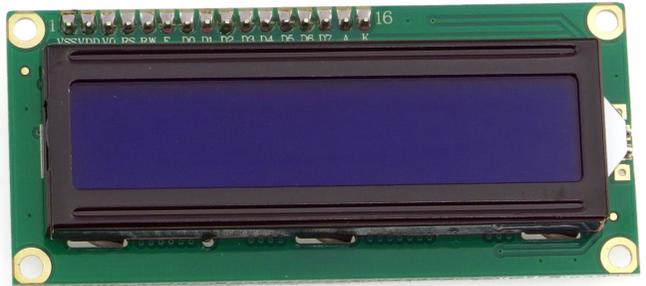
- C1:.....100 uF / 16 V
- C2, C3:.....100 nF

Semiconductors:

- U1:.....Atmega8
- U2:.....7805
- W1:.....display LCD 2×16

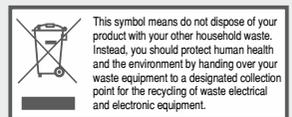
Other:

- Z:JUMPER - 4 pcs
- Z1-Z4:angle goldpin 3pin
- CON1:screw connection ARK2/500
- Sensors DS18B20 4pcs



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