

DistanceMeter 2 PROTO™

Manual

All Mikroelektronika's development systems feature a large number of peripheral modules expanding microcontroller's range of application and making the process of program testing easier. In addition to these modules, it is also possible to use numerous additional modules linked to the development system through the I/O port connectors. Some of these additional modules can operate as stand-alone devices without being connected to the microcontroller.

Additional board

 **MikroElektronika**

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DistanceMeter 2 PROTO

The DistanceMeter 2 PROTO additional board is used to measure distance between the board and an obstacle by means of ultrasonic signals.

Key features:

- Sound pressure level (SPL): 117dB (0dB=0.2n bar);
- Sensitivity (SEN): -60dB (0dB 1V/u bar);
- Operating frequency: 38KHz to 42KHz;
- Power supply 3.3 or 5V.



Figure 1: DistanceMeter 2 PROTO additional board

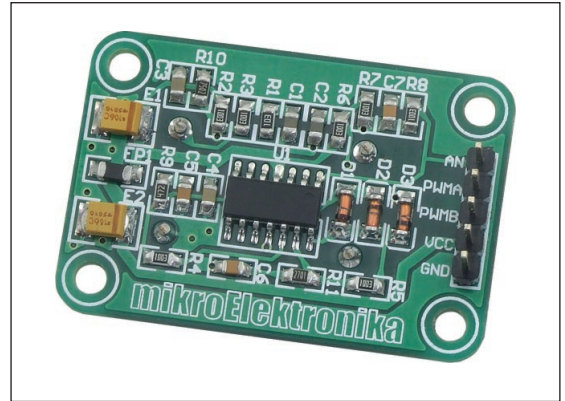


Figure 2: Back side of the additional board

How to connect the board?

The DistanceMeter 2 PROTO board is connected to a microcontroller or some other device via a 1x5 connector CN1.

How to use the board?

The operation of the DistanceMeter 2 PROTO board is based on sending and receiving ultrasonic waves. Ultrasonic waves are sent by using transducer UT1 and received by using transducer UT2. Time between sending an ultrasonic wave and receiving reflected one determines the distance of an object.

UT1 transmits ultrasonic waves when appropriate signals are brought to PWMA and PWMB lines. The frequency of these signals should range between 38 and 42KHz and they may be generated via PWM module's pins or I/O pins of a microcontroller. When an ultrasonic wave is sent, time measurement should start.

UT2 receives transmitted ultrasonic waves after they are reflected by an obstacle, wall for example. Received wave is converted by UT2 into an electrical signal which is then amplified and sent to an analog pin of A/D converter built into the microcontroller. When microcontroller receives a signal via this pin, time measurement is done and if voltage is higher than some predefined voltage threshold, measurement is valid (signal is not caused by some noise). Measured time can now be used to calculate the distance. When doing calculation, it should be taken into consideration that the wave passes two distances (to the obstacle and back), so the time needs to be divided by two and then multiplied by the speed of sound.

Concrete examples on how to measure distance using DistanceMeter 2 PROTO, can be found on our website at <http://www.mikroe.com/eng/products/view/439/distance-meter-2-proto-board/>

Designations associated to the 1x5 connector CN1 indicate that it is used for:

- AN - connection with the pins of A/D converter built into the microcontroller
- PWMA - connection with PWM pins or I/O pins of the microcontroller, the first pin
- PWMB - connection with PWM pins or I/O pins of the microcontroller, the second pin

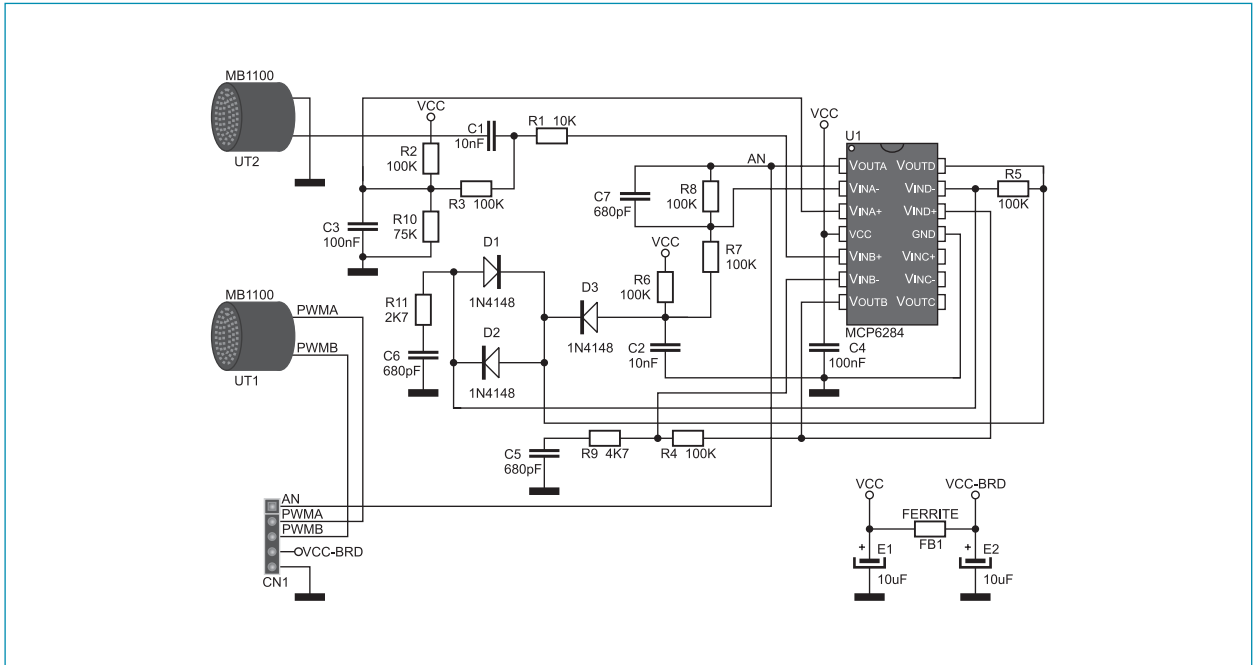


Figure 3: DistanceMeter 2 PROTO additional board connection schematic

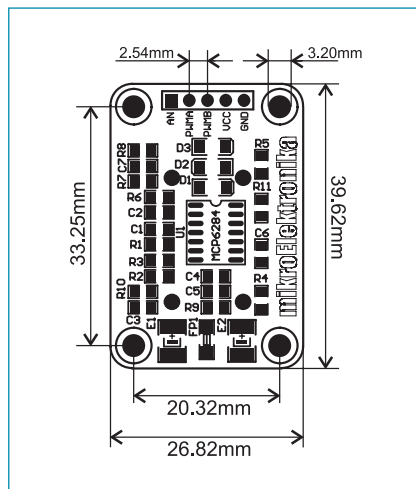


Figure 4: Dimensions of the additional board



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