Serial 7-Seg Display™

Manual

Additional Board

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.

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Serial 7-Seg Display Additional Board

The *Serial 7-Seg Display* additional board is used to display digits on seven-segment displays. Communication between the additional board and a microcontroller is performed via a Serial Peripheral Interface (SPI), whereas four 7-segment displays on the additional board are used to display digits.

How to connect the board?

The additional board is connected to a development system via an IDC10 connector on the board and a 2x5 connector on one of the developmet system's ports. It is necessary to define in the program, to be loaded into the microcontroller, which port will be used for SPI communication.

The position of SMD jumpers depends on the development system in use, Figure 3. These jumpers are placed in the position marked PIC by default. It means that the board is ready to be used with PIC development systems. If you want to use it with AVR/8051 development systems, it is necessary to unsolder jumpers from the PIC position and resolder them in the AVR/8051 position.

The Serial 7-Seg Display additional board is powered with the 5V power supply from the development system it is connected to.
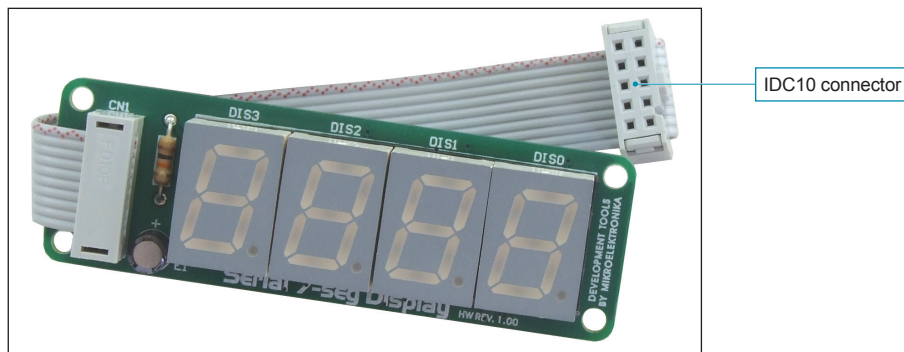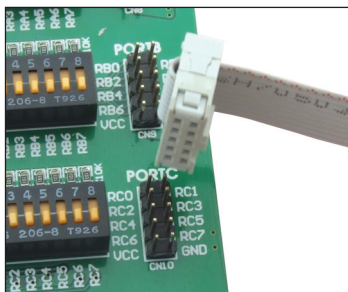

Figure 1: *Serial 7-Seg Display* additional board

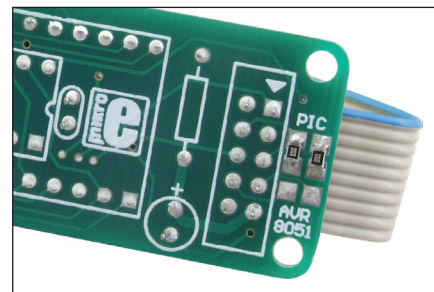**Figure 2:** Connecting IDC10 connector

Figure 3: Development system selection

How does the board operate?

In order to use this additional board, it is necessary to load a .hex code into the microcontroller on the devlopment system. Find examples of .hex code that may be loaded into the microcontroller on our web site:

http://www.mikroe.com/eng/products/view/162/serial-7-seg-display-board/

As a result of the .hex code loading, the development system starts communication with the additional board via a Serial Peripheral Interface (SPI).

Displaying digits is enabled by the time-division multiplexing. All the operations related to multiplexing and displaying digits are performed by using the MAX7219 circuit provided on the additional board. The time-division multiplexing of a 7-segment display is based on fast turning the display segments on/off in such a manner that one gets impression that all eight digits are active at the same time. The MAX7219 circuit feeds digit segments with a signal via pins marked SEGxx, whereas pins marked DIGx are used to select one of four displays to show the appropriate number.
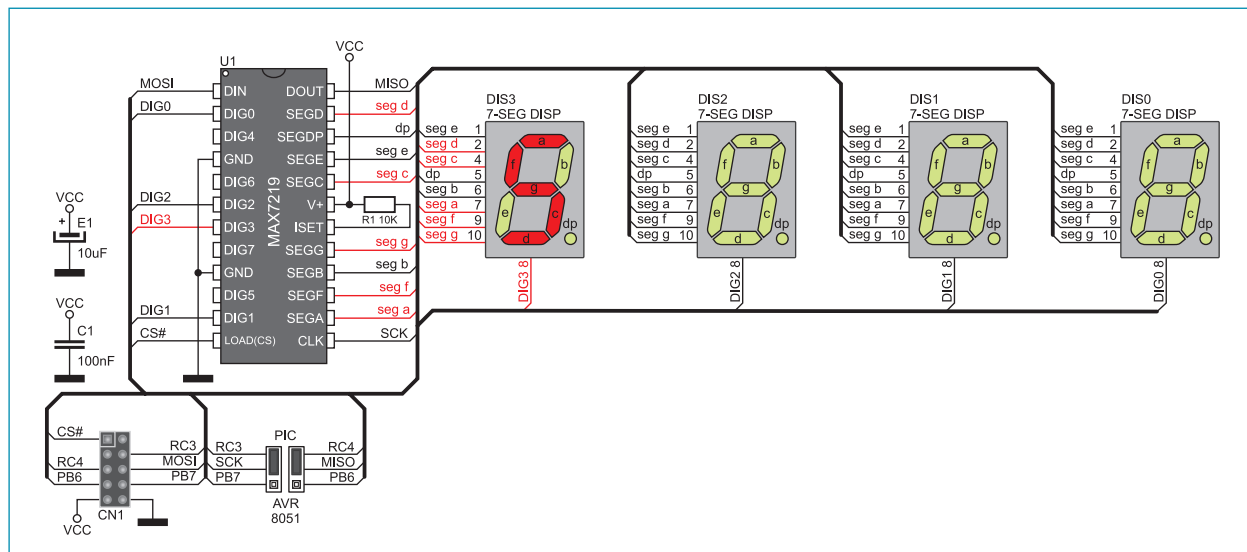

Figure 4: Time-division multiplexing performed on the DIS3 display

In Figure 4, signals provided by the MAX7219 circuit causes segments of the DIS3 display to show number 5. When this display turns off, the MAX7219 circuit sends a signal to the next display (DIS2), via the DIG2 pin, to show number 6. The same applies to digits DIS1 and DIS0. When one cycle is complete, another one automatically starts, which results in successive changing of display digits DIS3, DIS2, DIS1 and DIS0.
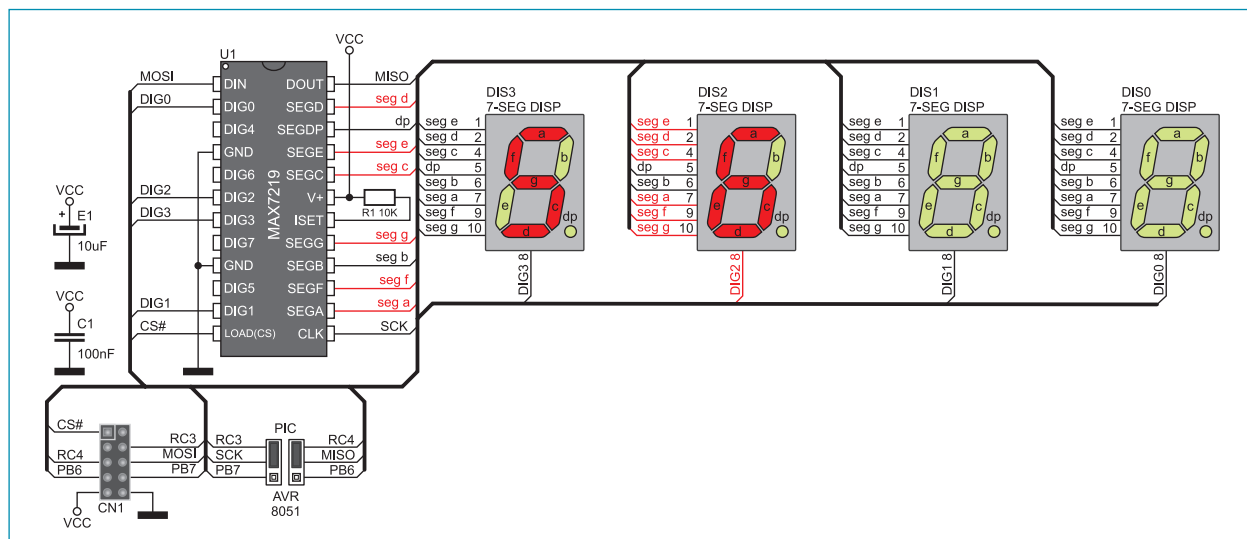

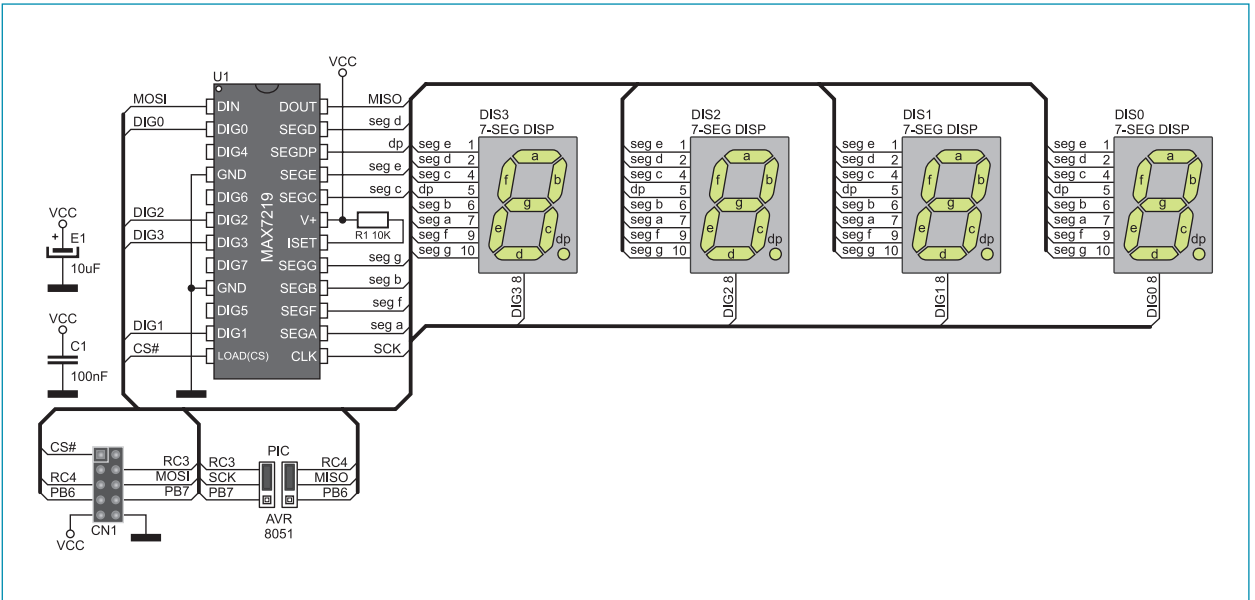**Figure 5**: Principle of time-multiplexing performed on the DIS2 display

Figure 6: *Serial 7-Seg Display* additional board connection schematic
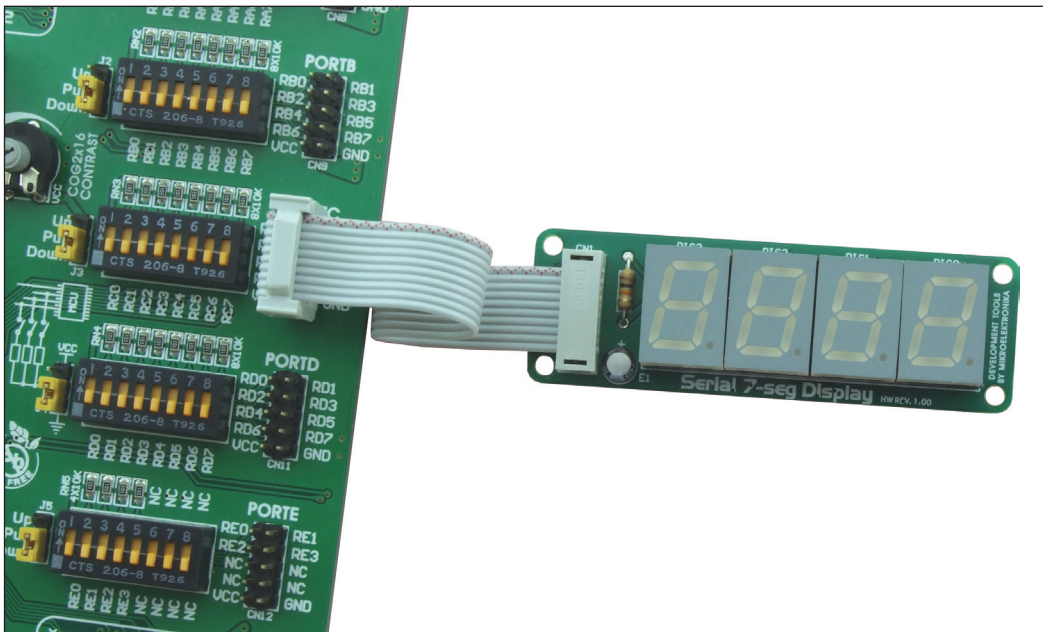

Figure 7: *Serial 7-Seg Display* additional board connected to a development system

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- Техническая поддержка проекта;
- Защита от снятия компонента с производства.

Как с нами связаться

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