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10. DS1820 temperature sensor

DS1820 is a temperature sensor that uses 1-wire communication for its operation. It is used to measure temperature in a range between -55 and 125°C and provides ±0.5°C accuracy for temperatures in a range between -10 and 85°C. The power supply voltage of 3.3V to 5V is used for the operation of this sensor. It takes maximum 750ms for the DS1820 to convert temperature with 9-bit resolution. There is a socket for this temperature sensor provided on the development system. Communication between this module and the microcontroller is enabled via the microcontroller pins RC1 and RA4. To use pin RC1 place jumper J15 in the RC1 position and for the RA4 pin place jumper J15 in the RA4 position.

1-wire® serial communication enables data to be transferred over one single communication line, while the process itself is under control of the *master* microcontroller. The advantage of this communication is that only one microcontroller pin is used. All slave devices have a unique ID code, which enables the master device to easily identify all devices sharing the same communication bus.

Figure 10-1: DS1820 connector (DS1820 is not connected)

Figure 10-2: Temperature sensor DS1820 is connected via pin RA4

Figure 10-3: Temperature sensor DS1820 is connected via pin RC1

NOTE:
Make sure that the rounded side of the DS1820 matches half-circle on the board

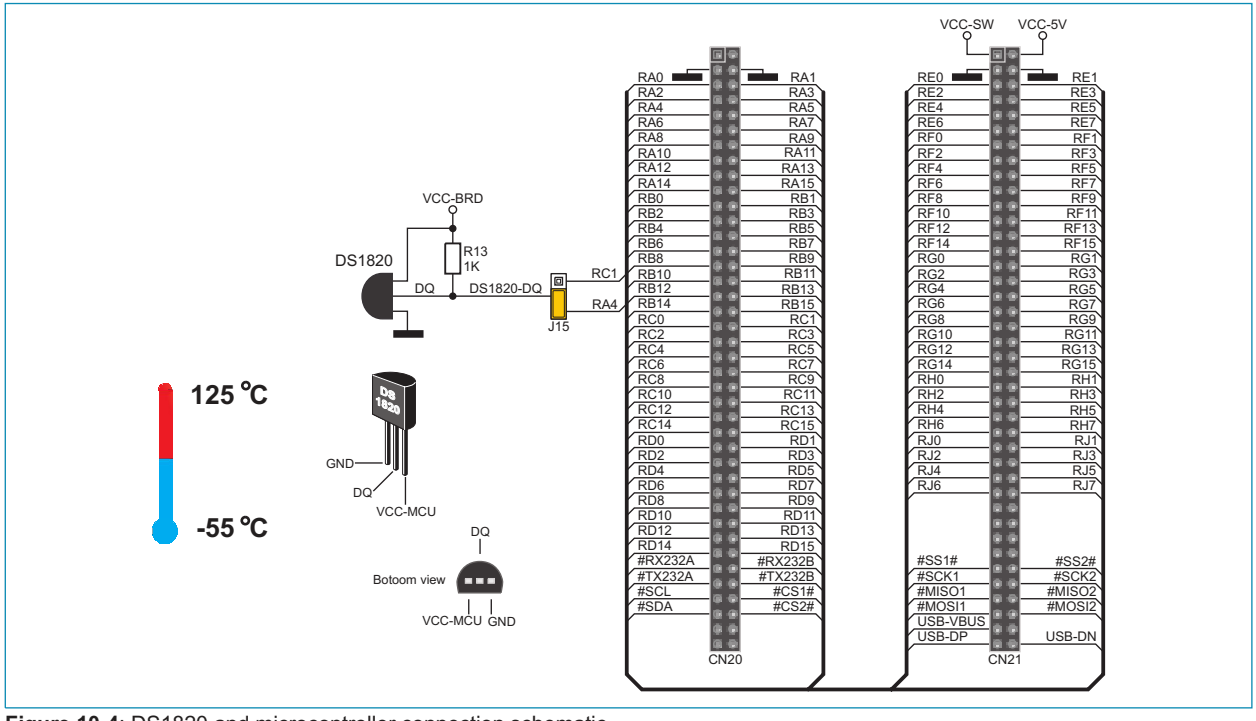

Figure 10-4: DS1820 and microcontroller connection schematic

11. MMC/SD connector

The UNI-DS6 development system is capable of reading memory cards due to the on-board MMC/SD connector. Memory card communicates with the microcontroller through the microcontroller pins used for serial communication. In order to establish connection between MMC/SD cards and the microcontroller, it is necessary to set switches 1, 2 and 3 (optionally 4, 5 and 6) on the DIP switch SW14, as well as switch 8 on the DIP switch SW13 to the ON position.

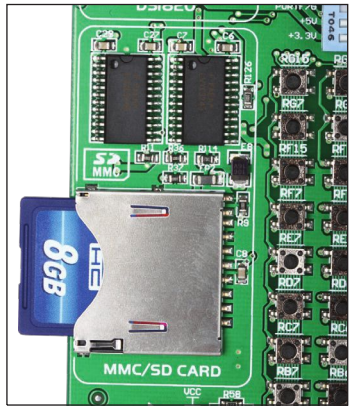

Figure 11-1: MMC/SD memory card

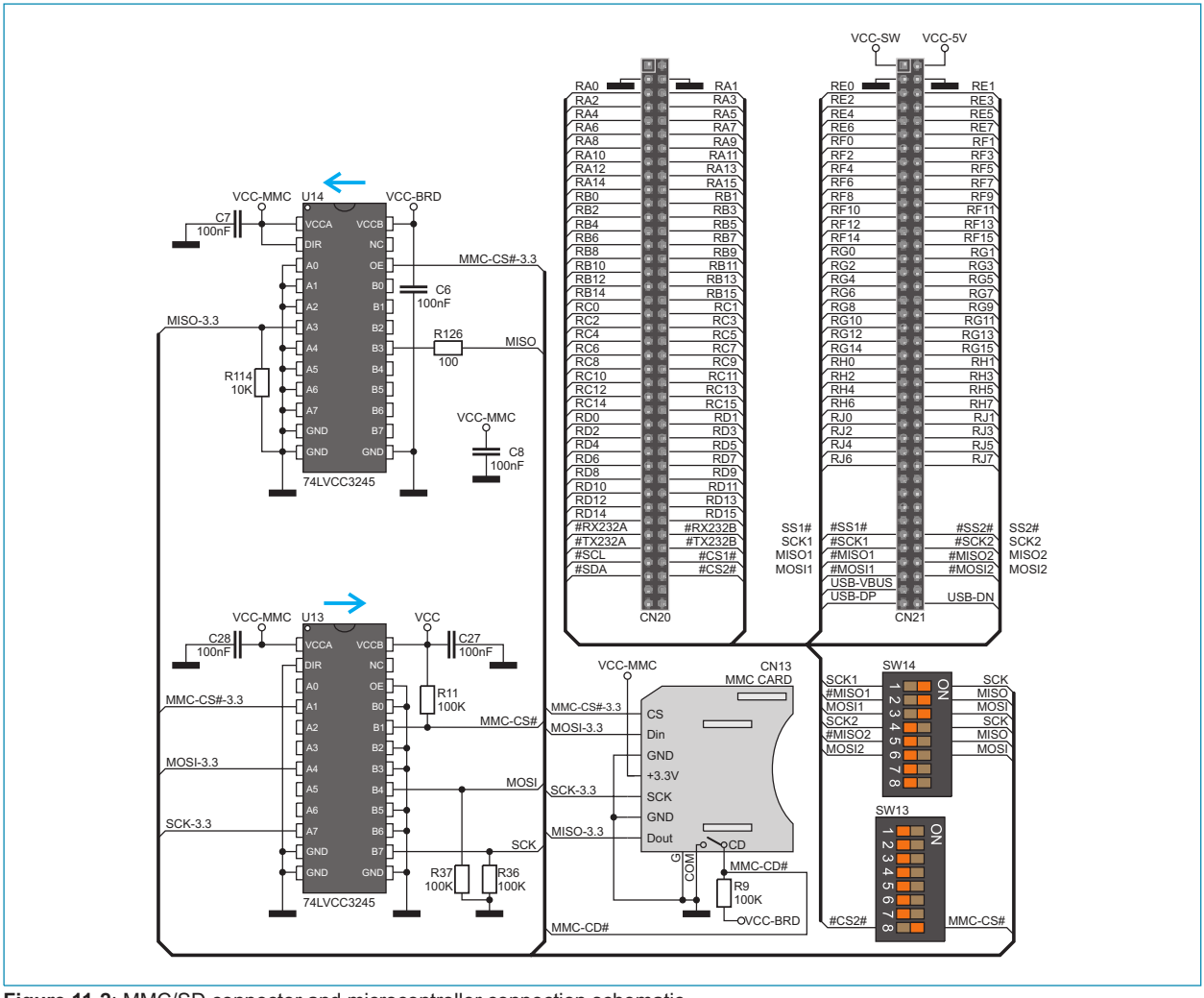

Figure 11-2: MMC/SD connector and microcontroller connection schematic

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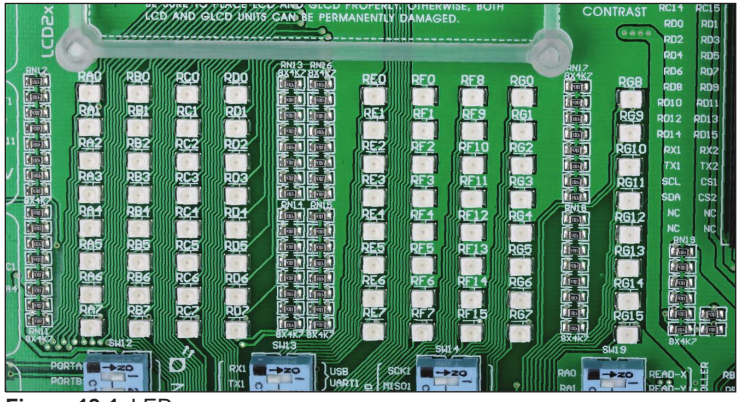
12. LEDs

There are 72 LEDs on the UNI-DS6 development system used to visually indicate the state of each microcontroller I/O pin. An active LED indicates that a logic one (1) is present on the pin. In order to enable LEDs to illuminate, it is necessary to select the appropriate port (PORTA, PORTB, PORTC, PORTD, PORTE or PORTF/G) by using DIP switch SW12. Ports PORTH and PORTJ are not connected to LEDs.



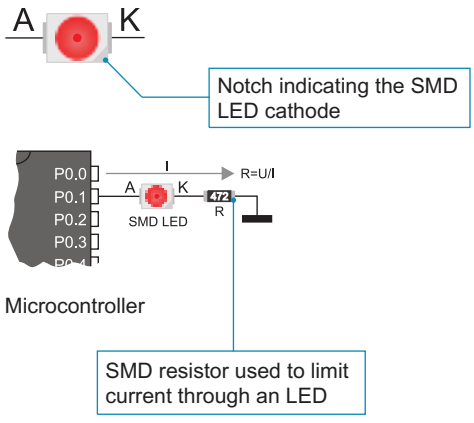


Figure 12-1: LEDs

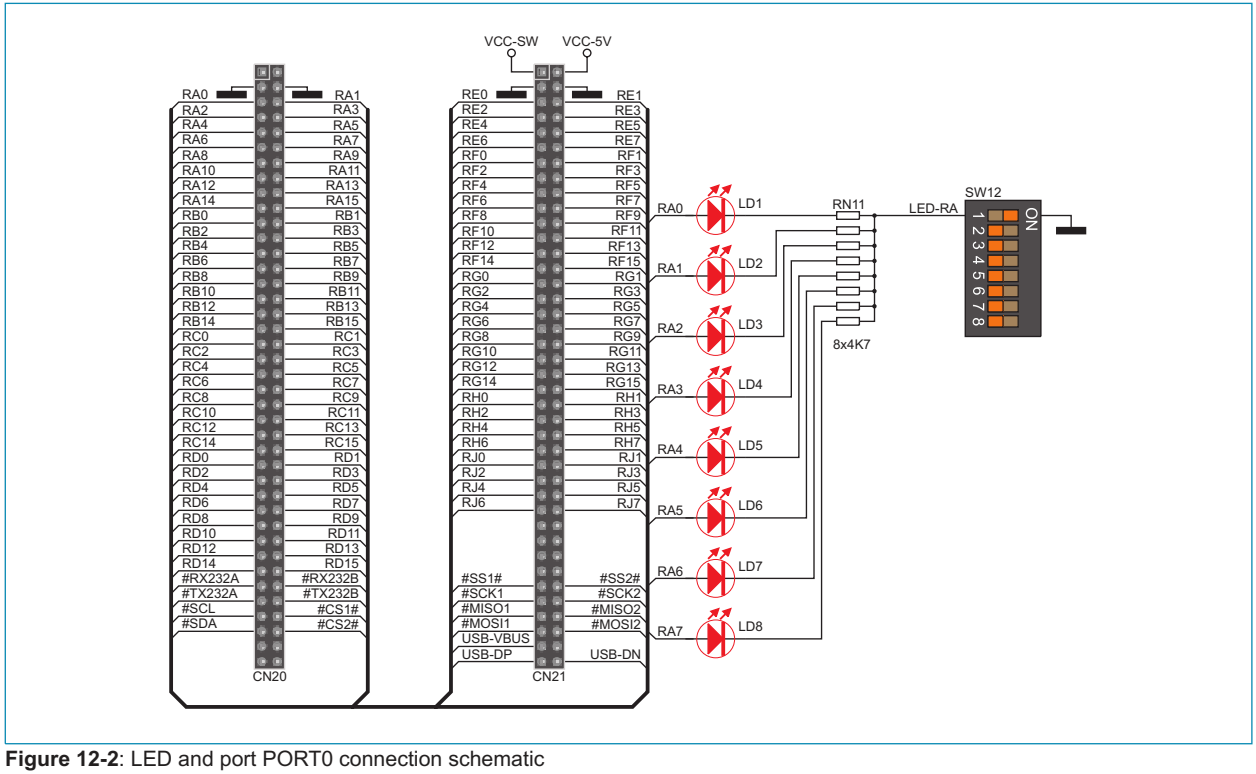


Figure 12-2: LED and port PORT0 connection schematic

13. Push buttons

The logic level of all microcontroller input pins may be changed by using push buttons. Jumper J13 is used to determine the logic level to be supplied on the appropriate microcontroller pin by pressing a push button. The function of the protective resistor is to limit the maximum current, thus preventing the development system and peripheral modules from being damaged in case a short circuit occurs. If needed, advanced users may shorten this resistor by using jumper J12.

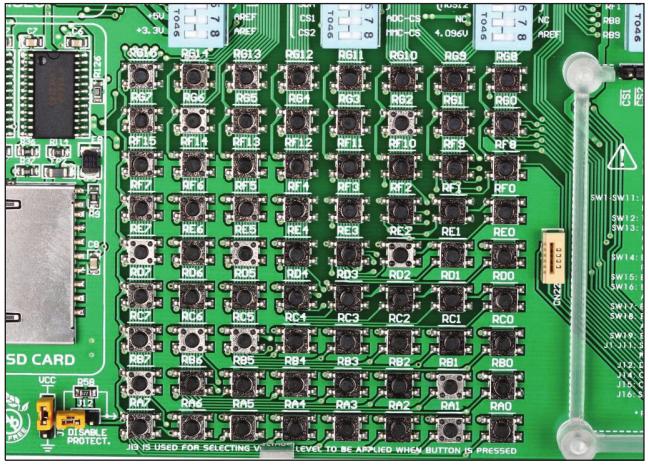


Figure 13-1: Push buttons

By pressing any push button when jumper J13 is in the VCC-BRD position, a logic one (3.3V or 5V) will be applied to the appropriate microcontroller pin, as shown in Figure 13-2.

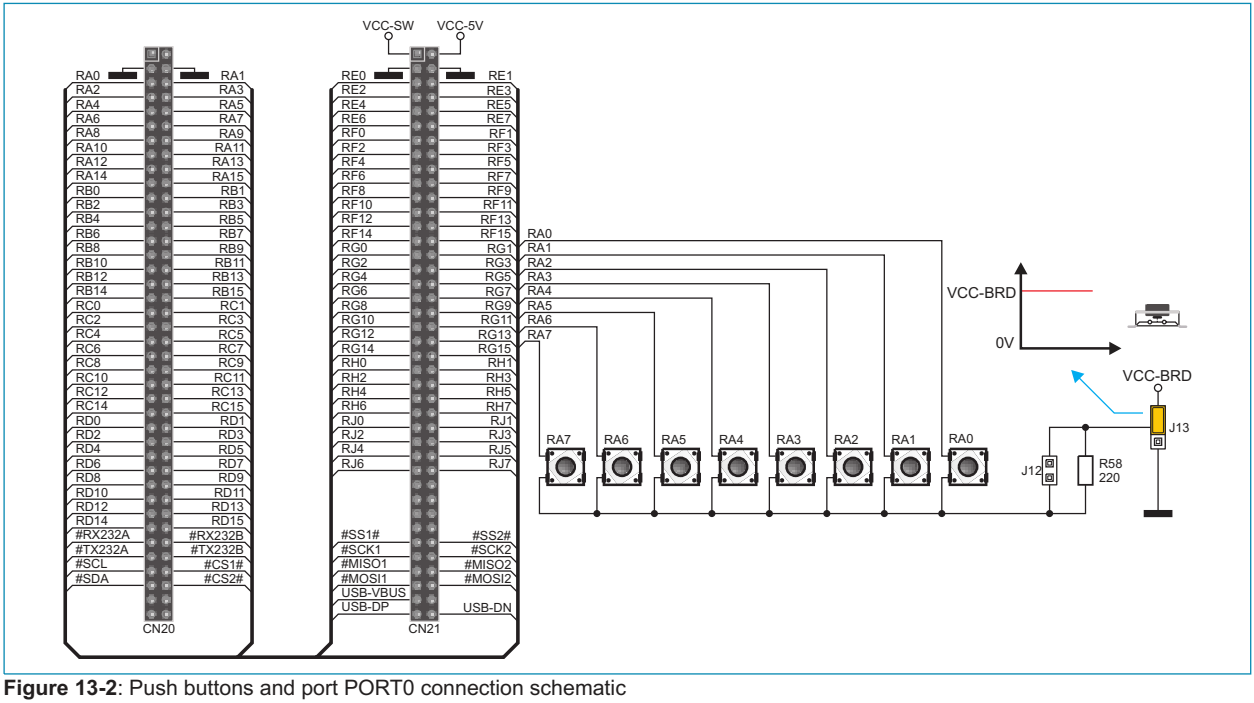


Figure 13-2: Push buttons and port PORT0 connection schematic

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14. 2x16 LCD display

The UNI-DS6 development system features an on-board connector for the alphanumeric 2x16 LCD display. This connector is linked to the microcontroller via DIP switches (SW18 (PORTA) or SW15 (PORTB)) and (SW16 (PORTD) or SW17 (PORTC)) . Potentiometer P1 is used to adjust display contrast. The LCD-BCK switch on the DIP switch SW18 is used to turn the display backlight on/off.

To enable the 2x16 LCD display it is necessary to write a program which defines which MCU pins will be used for communication between the 2x16 LCD display and the MCU. For data transfer you can use PORTD or PORTC pins on MCU via DIP switch SW16 or SW17. For display control you can use PORTA and PORTB or PORTC via DIP switches SW15 and SW18.

Communication between this LCD and the microcontroller is performed in a 4-bit mode. Alphanumeric characters are displayed in two lines each containing up to 16 characters of 7x5 pixels.

Figure 14-1: Connector for alphanumeric LCD display

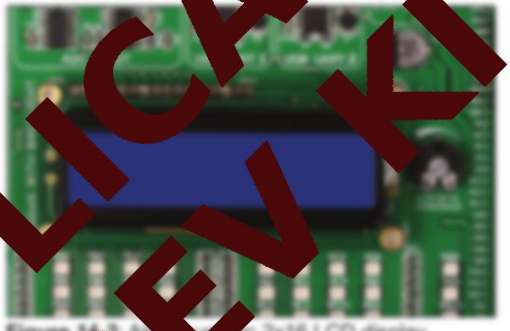

Figure 14-2: Alphanumeric 2x16 LCD display

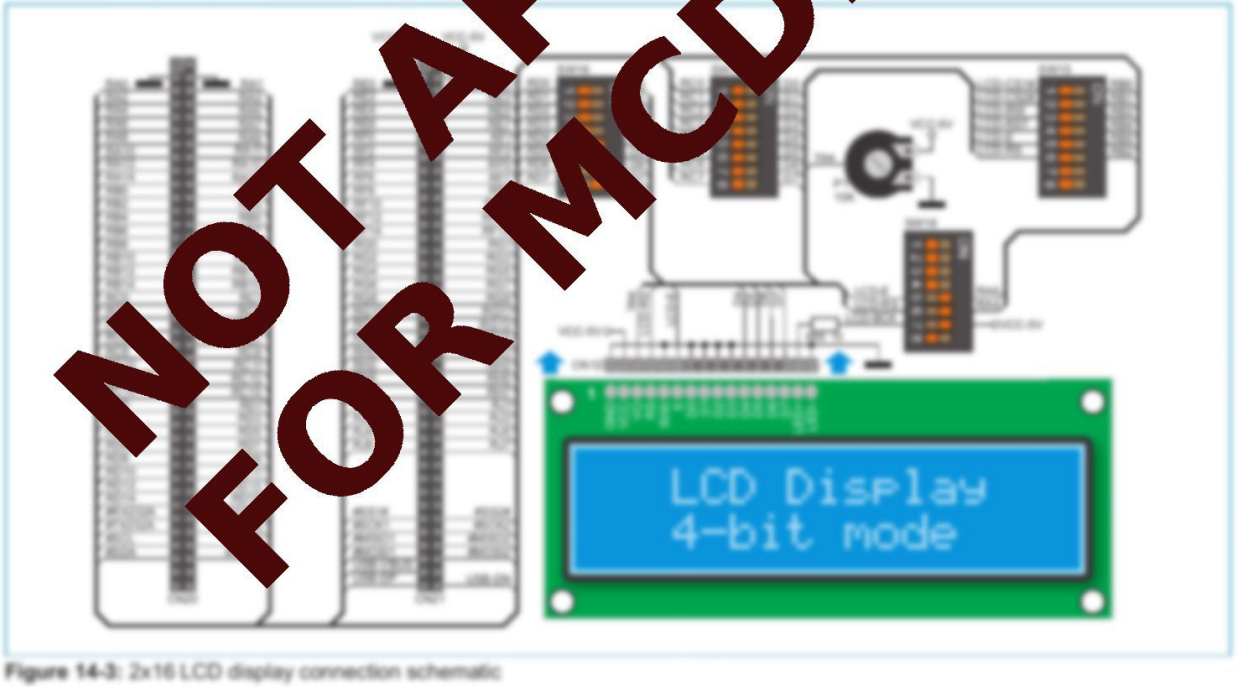

Figure 14-3: 2x16 LCD display connection schematic

14. 2x16 LCD display

The UNI-DS6 development system features an on-board connector for the alphanumeric 2x16 LCD display. This connector is linked to the microcontroller via DIP switches (SW18 (PORTA) or SW15 (PORTB)) and (SW16 (PORTD) or SW17 (PORTC)) . Potentiometer P1 is used to adjust display contrast. The LCD-BCK switch on the DIP switch SW18 is used to turn the display backlight on/off.

To enable the 2x16 LCD display it is necessary to write a program which defines which MCU pins will be used for communication between the 2x16 LCD display and the MCU. For data transfer you can use PORTD or PORTC pins on MCU via DIP switch SW16 or SW17. For display control you should use only PORTB on MCU via DIP switch SW15, since RA6 pin of the microcontroller is not connected to the UNI-DS6 main board.

Communication between this LCD and the microcontroller is performed in a 4-bit mode. Alphanumeric digits are displayed in two lines each containing up to 16 characters of 7x5 pixels.

Figure 14-1: Connector for alphanumeric LCD display

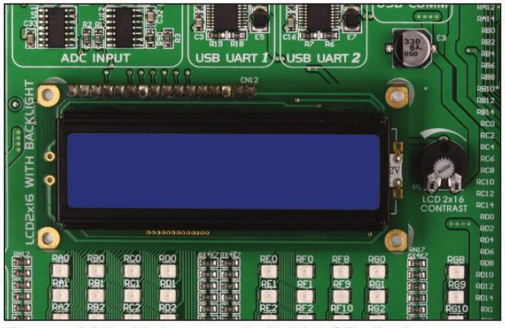

Figure 14-2: Alphanumeric 2x16 LCD display

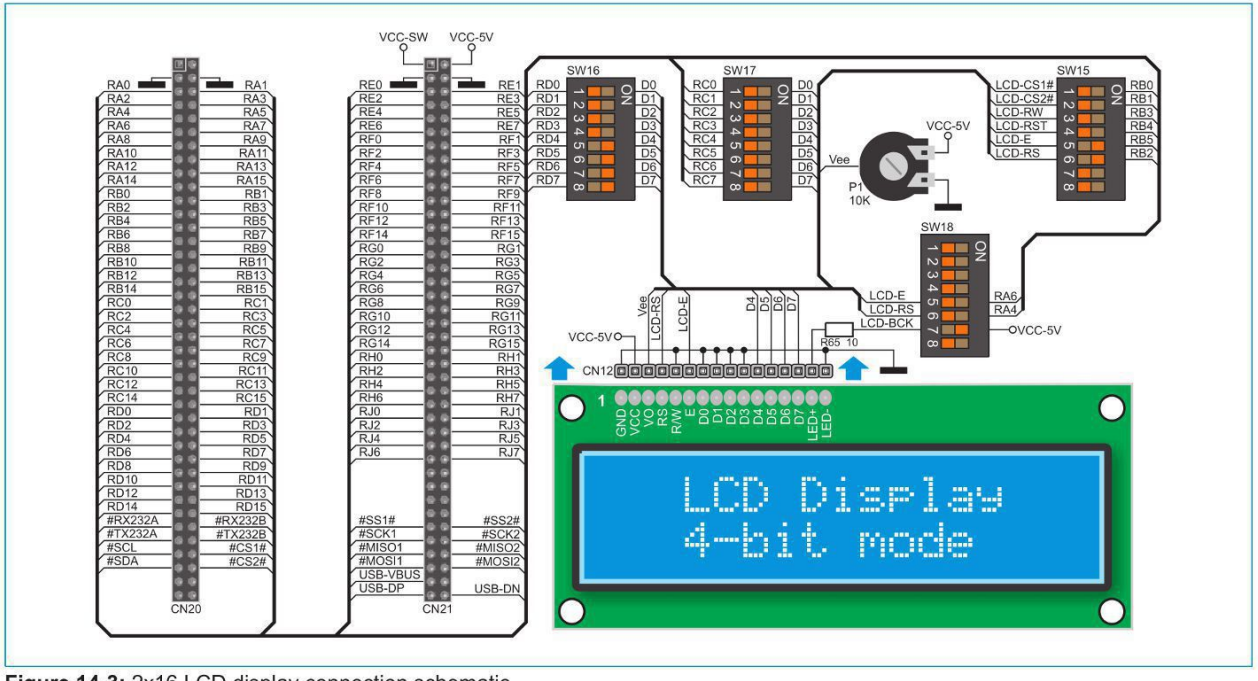

Figure 14-3: 2x16 LCD display connection schematic

15. 128x64 graphic LCD display

128x64 graphic LCD (GLCD) is connected to the microcontroller via DIP switches (SW18 (PORTA) or SW15 (PORTB)) and (SW16 (PORTD) or SW17 (PORTC)). It has a screen resolution of 128x64 pixels, which allows diagrams, tables and other graphic contents to be displayed. Potentiometer P2 is used for the GLCD display contrast adjustment. Switch 8 (GLCD-BCK) on the DIP switch SW18 is used to turn the display backlight on/off.

To enable the GLCD display it is necessary to write a program which defines which MCU pins are used for communication between the GLCD display and the MCU. For data transfer you can use PORTD or PORTC pins on MCU via DIP switch SW16 or SW17. For display control you can use PORTA and PORTB of MCU via DIP switches SW15 and SW18.

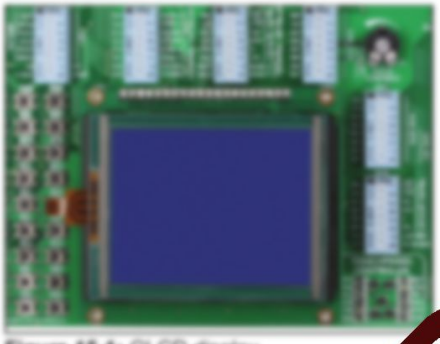

Figure 15-1: GLCD display

Figure 15-2: GLCD connector

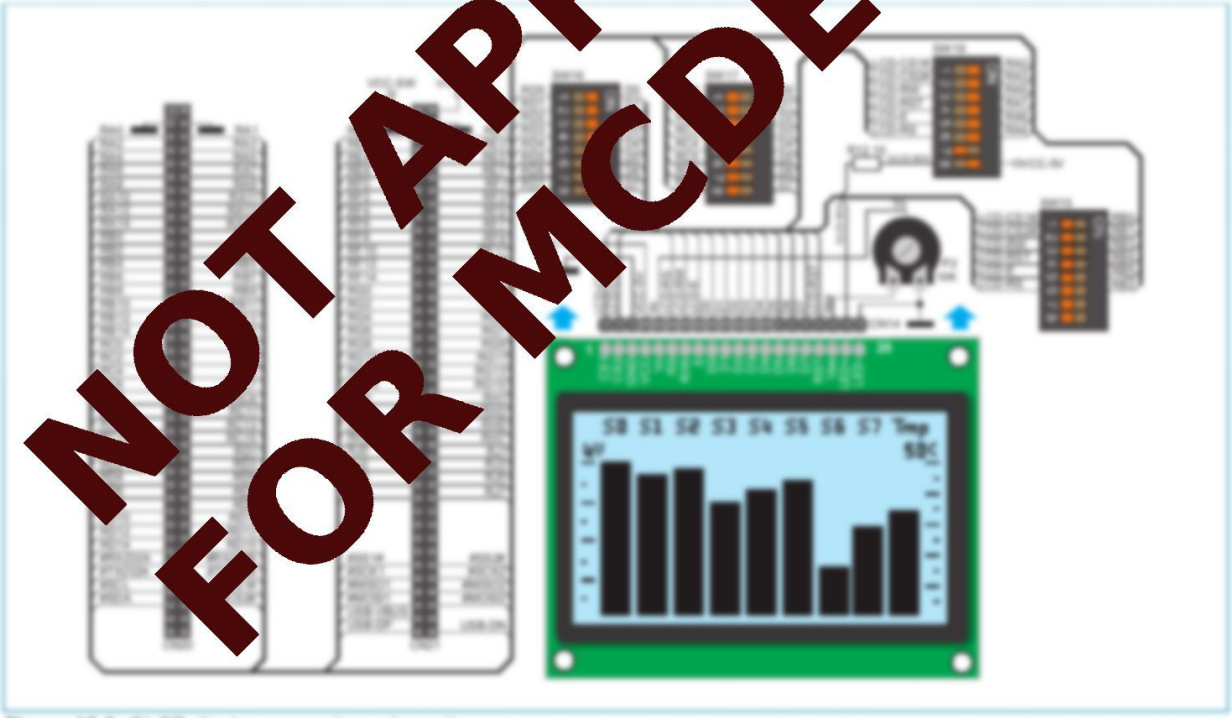

Figure 15-3: GLCD display connection schematic

15. 128x64 graphic LCD display

128x64 graphic LCD (GLCD) is connected to the microcontroller via DIP switches (SW18 (PORTA) or SW15 (PORTB)) and (SW16 (PORTD) or SW17 (PORTC)). It has a screen resolution of 128x64 pixels, which allows diagrams, tables and other graphic contents to be displayed. Potentiometer P2 is used for the GLCD display contrast adjustment. Switch 8 (GLCD-BCK) on the DIP switch SW18 is used to turn the display backlight on/off.

To enable the GLCD display it is necessary to write a program which defines which MCU pins will be used for communication between the GLCD display and the MCU. For data transfer you can use PORTD or PORTC pins on MCU via DIP switch SW16 or SW17. For display control you should use only PORTB on MCU via DIP switch SW15, since RA6 and RA7 pins of the microcontroller are not connected to the main board.

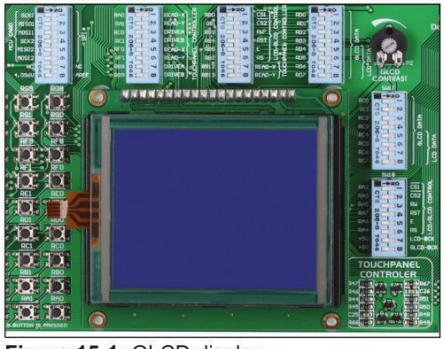

Figure 15-1: GLCD display

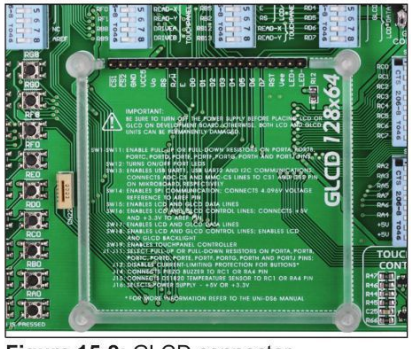

Figure 15-2: GLCD connector

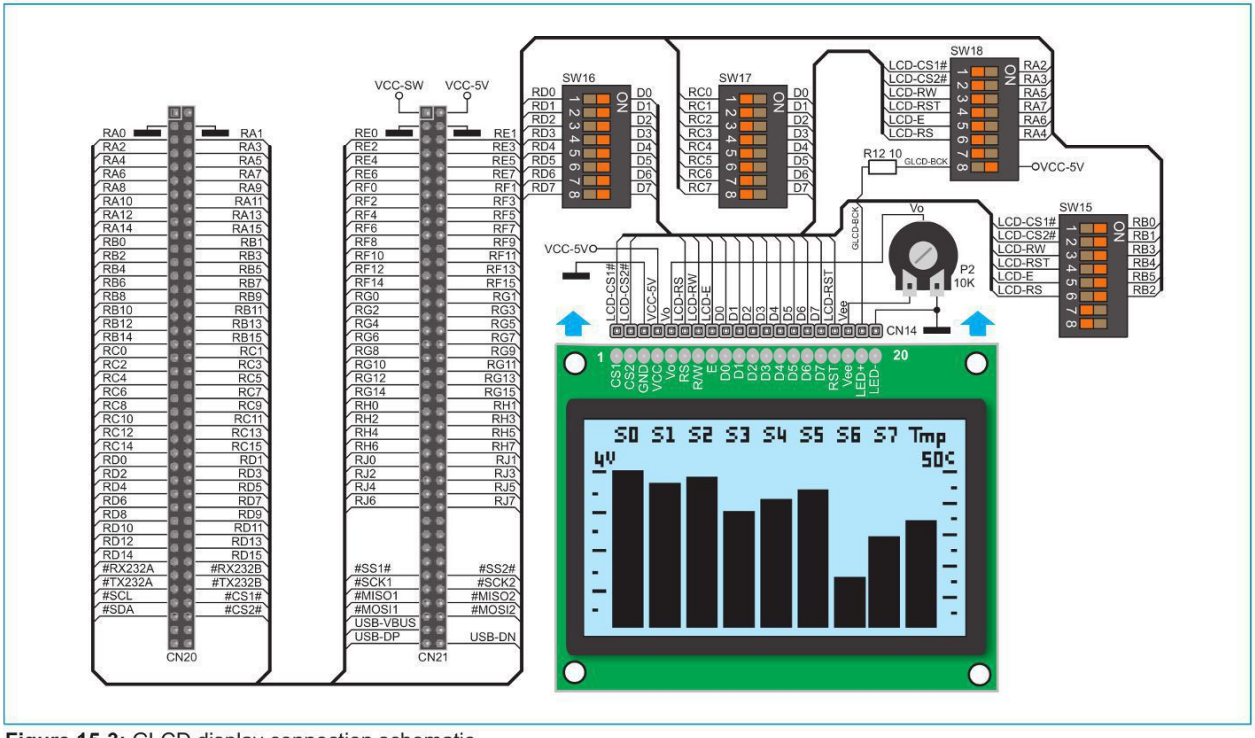

Figure 15-3: GLCD display connection schematic

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16. Touch panel

A touch panel is a thin, self-adhesive, transparent, touch-sensitive panel. It is placed over a GLCD display. Its main function is to register pressure at some specific display point and to forward its coordinates in the form of analog voltage to the microcontroller. Switches 5, 6, 7 and 8 on the DIP switch SW19 are used to connect the microcontroller and touch panel.

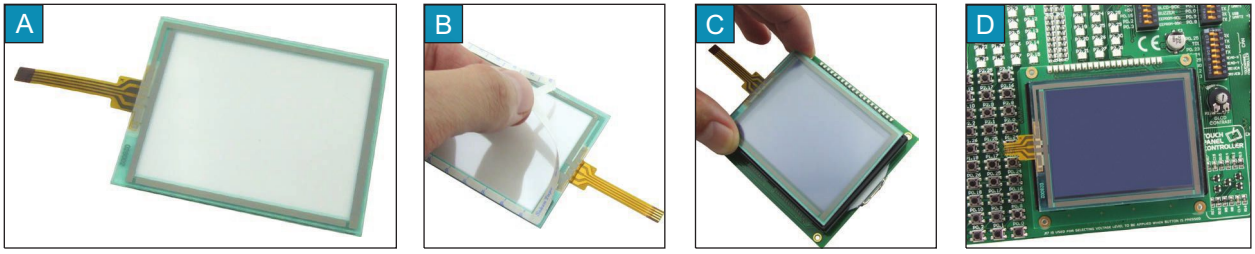

Figure 16-1: Placing touch panel over a GLCD

Figure 16-1 shows how to place a touch panel over a GLCD display. Make sure that the flat cable is to the left of the GLCD, as shown in Figure 1D.

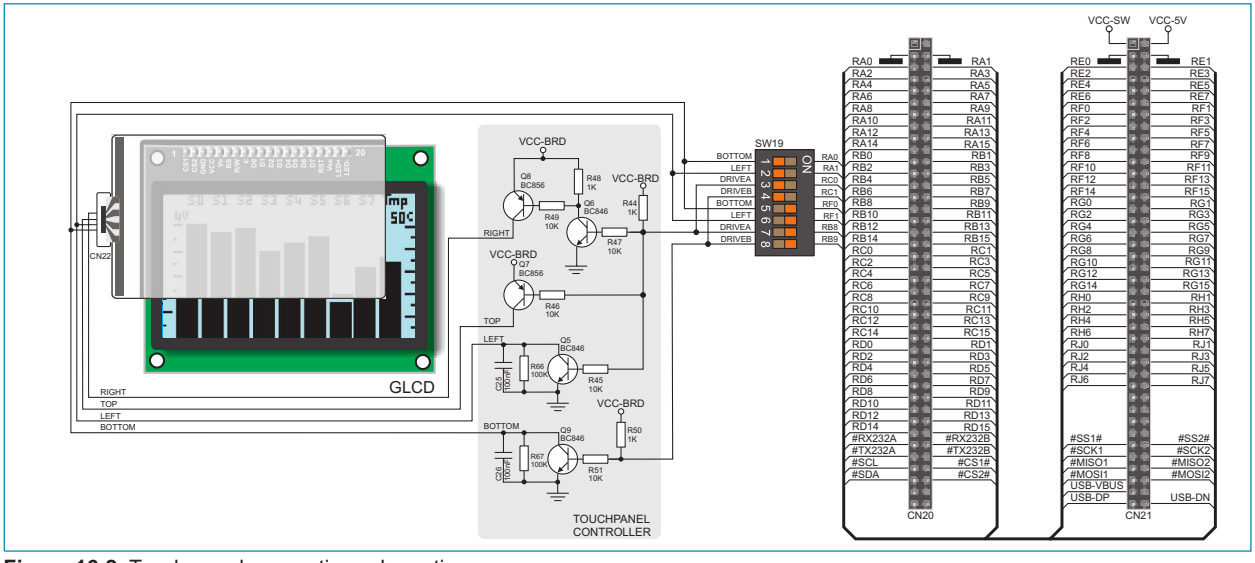

Figure 16-2: Touch panel connection schematic

Figure 16-3: Connecting touch panel

Figure 16-3 shows in detail how to connect a touch panel to the microcontroller. Bring the end of the flat cable close to the CN22 connector (Figure 3A). Plug the cable into the connector (Figure 3B) and press it easily so as to fully fit the connector (Figure 3C). Now, a GLCD can be plugged into the appropriate connector (Figure 3D).

NOTE: LEDs and pull-up/pull-down resistors on ports which are in use should be off when the touch panel is in use.

17. Input/output ports

Along the right side of the development system, there are eleven 10-pin connectors linked to the microcontroller I/O ports. Pull-up or pull-down resistors can be connected to I/O ports via jumpers J1-J11 and DIP switches SW1-SW11.

Figure 17-1: I/O ports

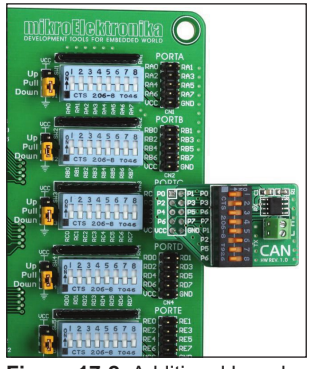

Figure 17-2: Additional board connected to I/O port

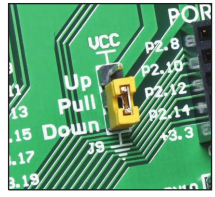

Figure 17-3: J9 in pull-down position

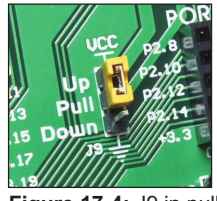

Figure 17-4: J9 in pull-up position

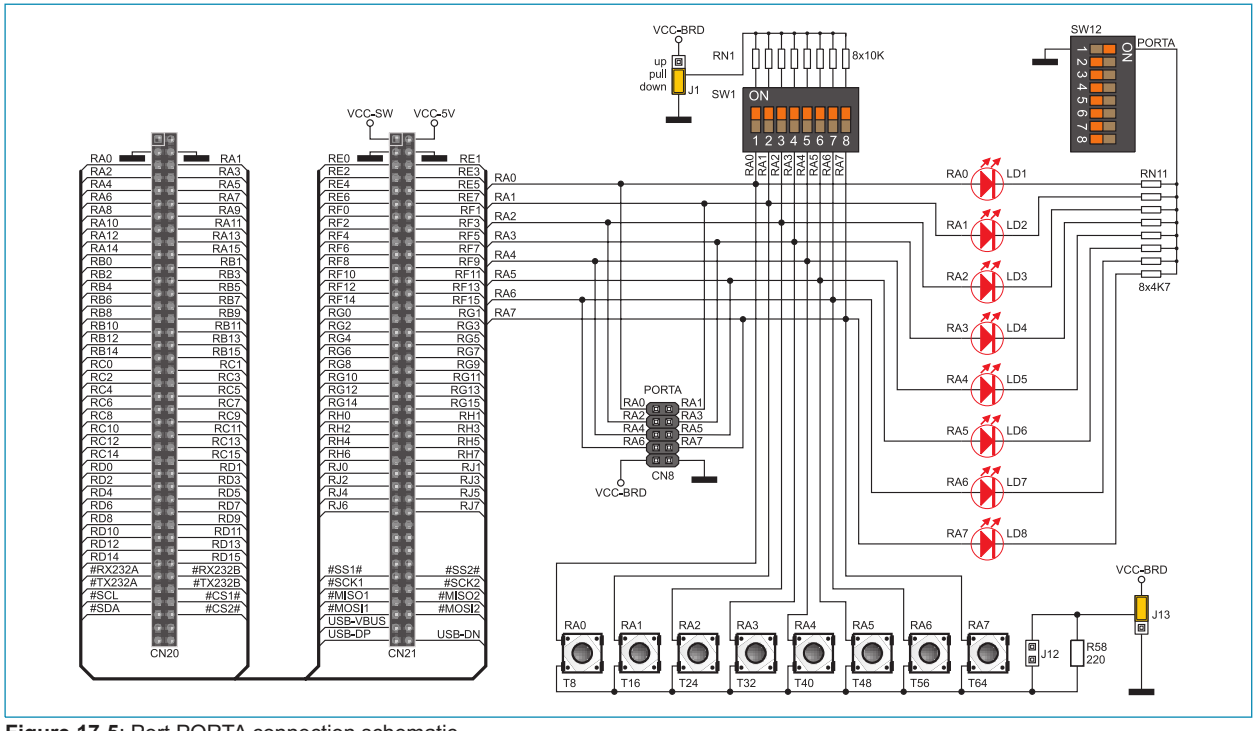

Figure 17-5: Port PORTA connection schematic

Pull-up/pull-down resistors enable you to feed all microcontroller's input pins with logic level when they are in idle state. This level depends on the position of the pull-up/pull-down jumper (J1-J11). The RA0 pin with the relevant jumper J1 and RA0 push button with jumper J13 are used here for the purpose of explaining the performance of pull-up/pull-down resistors. The principle of their operation is the same for all other microcontroller pins.

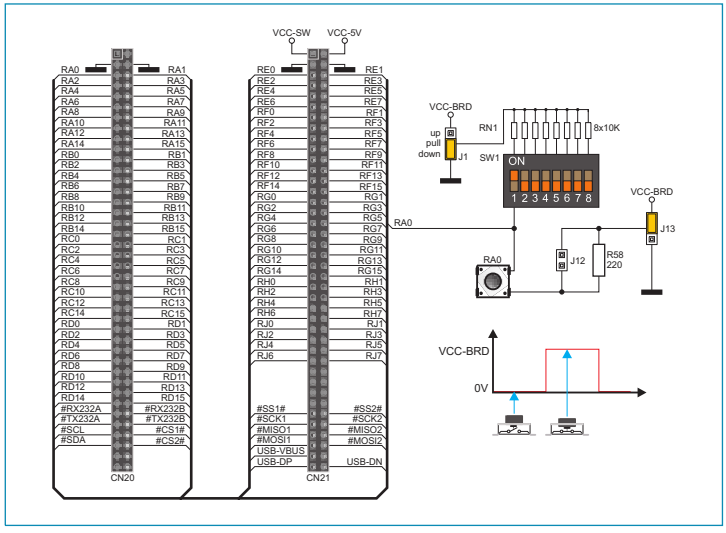

Figure 17-6: Jumper J1 in pull-down and jumper J13 in pull-up position

In order to enable the PORTA pins to be connected to pull-down resistors, it is necessary to place jumper J1 in the *Down* position first. This enables any PORTA port pin to be supplied with a logic zero (0V) in idle state over jumper J1 and 8x10k resistor network. To provide the RA0 pin with this signal, it is necessary to set switch 1 on the DIP switch SW1 to the ON position.

As a result, every time you press the RA0 push button, the RA0 pin will be fed with a logic one (VCC-BRD voltage), provided that jumper J13 is placed in the VCC-BRD position.

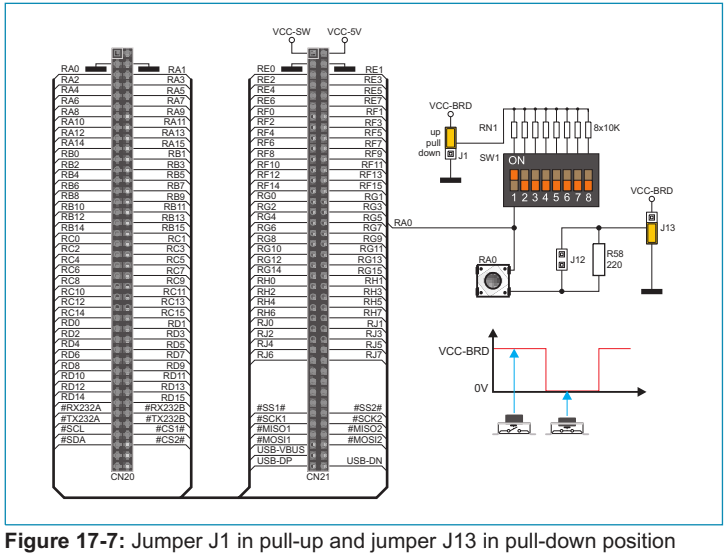

Figure 17-7: Jumper J1 in pull-up and jumper J13 in pull-down position

In order to enable the PORTA pins to be connected to pull-up resistors and the port input pins to be supplied with a logic one (1), it is necessary to place jumper J1 in the *Up* position and jumper J13 in the GND position. This enables any port PORTA input pin, when it is in idle state, to be driven high (VCC-BRD) over the 10k resistor.

As a result, every time you press the RA0 push button, the RA0 pin will be fed with a logic zero (0V), provided that switch 1 on the DIP switch SW1 is set to the ON position.

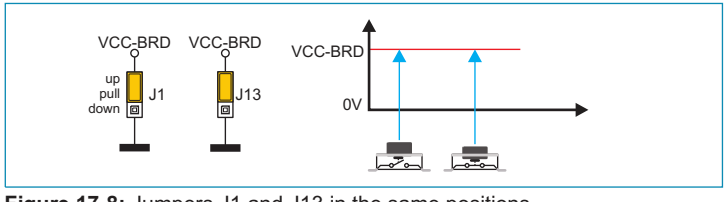

Figure 17-8: Jumpers J1 and J13 in the same positions

In case that jumpers J1 and J13 are in the same positions, pressure on any button will not cause input pins to change their logic state.

DISCLAIMER

HIGH RISK ACTIVITIES

TRADEMARKS

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