SmartGLCD 240x128™

User manual

All MikroElektronika´s development systems represent irreplaceable tools for programming and developing microcontroller-based devices. Carefully chosen components and the use of machines of the last generation for mounting and testing thereof are the best guarantee of high reliability of our devices. Due to simple design, a large number of add-on modules and ready to use examples, all our users, regardless of their experience, have the possibility to develop their project in a fast and efficient way.

Development system

MikroElektronika

SOFTWARE AND HARDWARE SOLUTIONS FOR EMBEDDED WORLD ...making it simple

TO OUR VALUED CUSTOMERS

I want to express my thanks to you for being interested in our products and for having confidence in Mikroelektronika.
The primary aim of our company is to design and produce high quality electronic products and to constantly improve the performance thereof in order to better suit your needs.

Nebojsa Matic
General Manager

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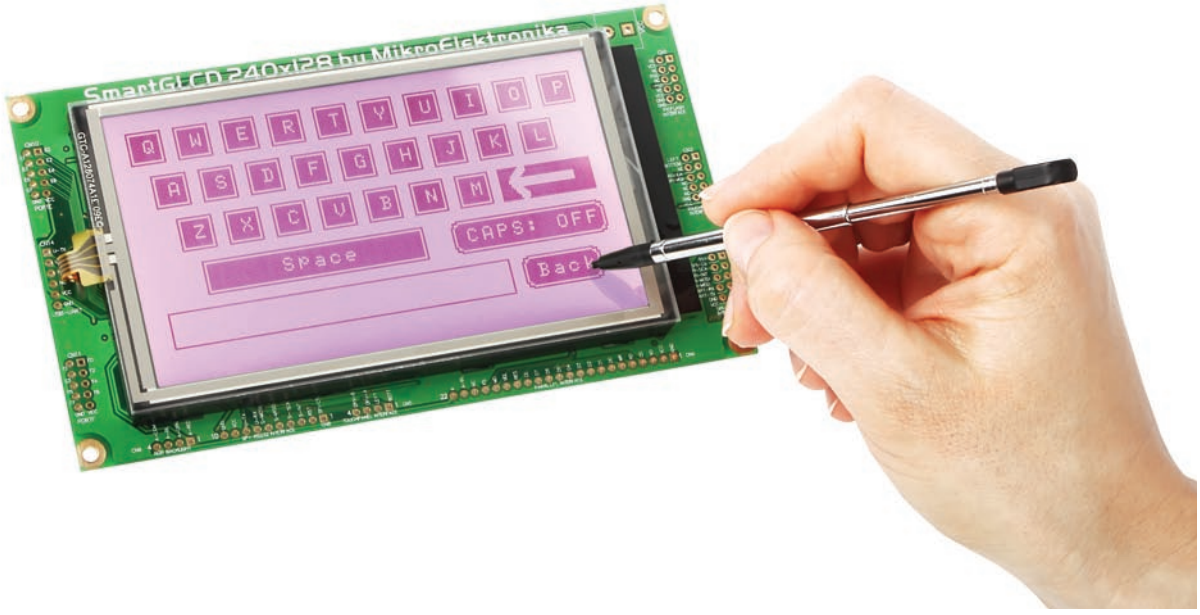
1. General information

The SmartGLCD 240x128 development system is a unique platform for designing and developing devices that use GLCD display with touch panel. This development system can also be used as a stand-alone device.



System specification:

Power supply: 5V DC via CN13 connector
Power consumption: ~60mA (~380mA, backlight ON)
Dimensions: 160 x 90cm (6,29 x 3,54inch)
Weight: ~200g (0.44lbs)

Connector specification:

CN1: PICFLASH programmer interface
CN2: Touch panel interface
CN3: SPI/RS-232 interface
CN4: Parallel interface to GLCD display's pins
CN5: Touch panel interface
CN8: SPI/RS-232 interface
CN9: Interface to backlight's RGB LED
CN10: I/O port PORTE
CN11: I/O port PORTF
CN13: Power supply
CN14: USB-UART Connector for external USB-UART board

A full-featured development system for PIC microcontroller based devices

microSD card reader

Graphic LCD display with LED RGB backlight

Integrated touch panel

2. PIC18F8527 microcontroller

The SmartGLCD 240x128 features the PIC18F8527 microcontroller in 80-pin TQFP package. Some of its key features are:

- CPU Speed (MIPS) 10;
- RAM Bytes 3,936;
- Data EEPROM (bytes) 1024;
- Program Memory Type Flash;
- Program Memory (KB) 48;

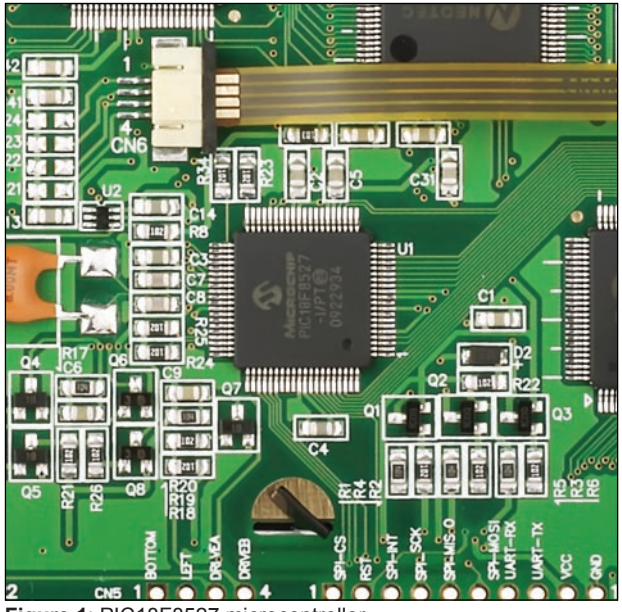


Figure 1: PIC18F8527 microcontroller

The PIC18F8527 microcontroller is connected via its I/O pins to GLCD display's controller. I/O pins of the ports PORTE and PORTF can be easily accessed by the user via connectors CN10 and CN11.

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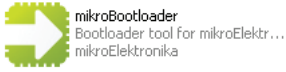
3. Programming the microcontroller

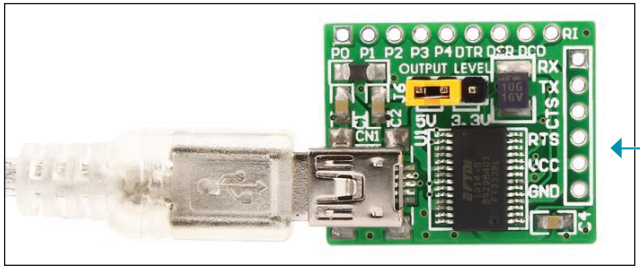
SmartGLCD 240x128 comes with a bootloader, which means that no external programmer is required. You just need an RS-232 interface (USB UART, MAX2322 etc.) between the development system and PC. The mikroBootloader application is used to transfer a .HEX code from the PC to the microcontroller.

Follow steps for programming procedure via mikroBootloader application:

Download the mikroElektronika Bootloader program from the following link:
http://www.mikroe.com/eng/downloads/get/1562/smartglcd_240x128_boot.zip

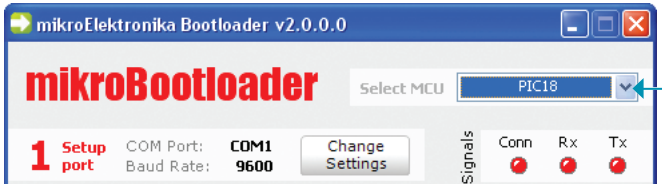
Unzip content to your desktop and start application with double click on 

STEP 1: Connect USB UART



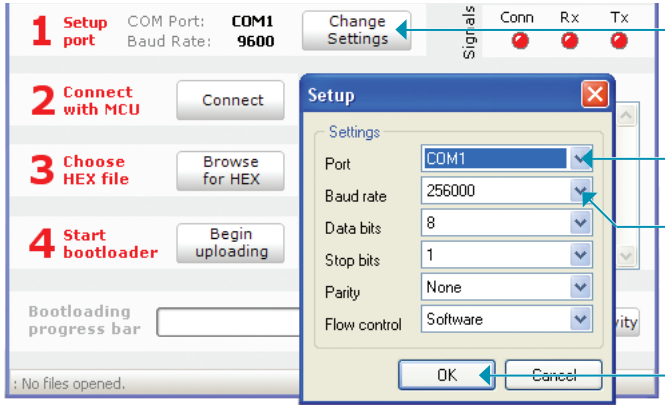
Connect USB UART to PC via USB cable

STEP 2: Chose MCU



From drop down list select PIC18

STEP 3: Change Settings



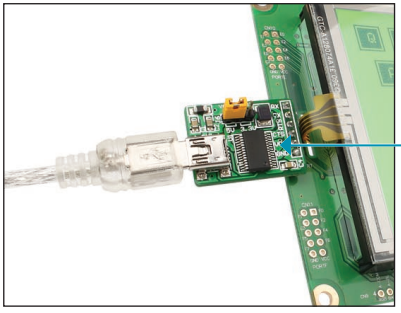
Click on Change Setting button

From drop down list select COM port which is connected with USB UART

From drop down list set baud rate to 256000

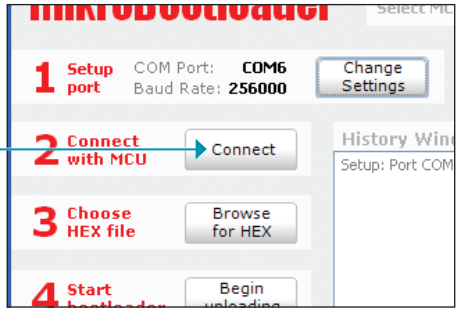
Click on OK button

STEP 4: Connect

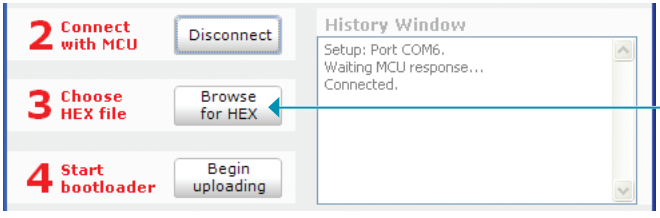


Connect USB UART to SmartGLCD 240x128 and within 5sec click on Connect in bootloader application

5sec connection

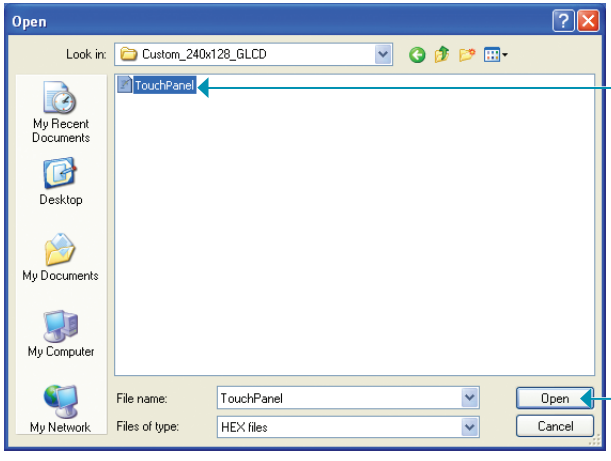


STEP 5: Browse for .hex file



Click on Browse for HEX button

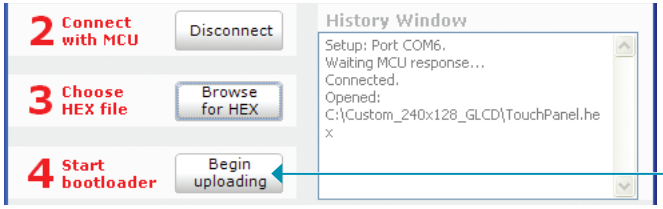
STEP 6: Open .hex file

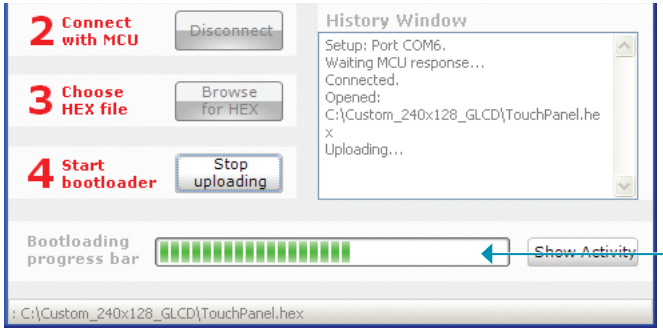


Chose .hex file from pop-up window

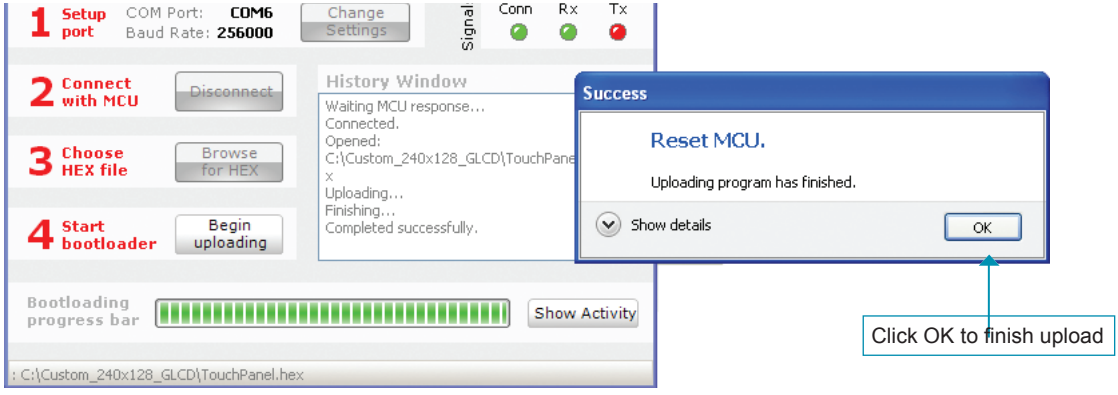
Click on Open

STEP 7: Start upload





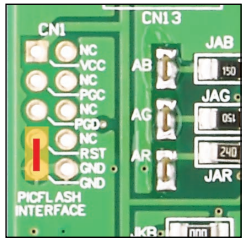
STEP 8: Finish uploading



After uploading program has finished **RESET** microcontroller.

In order to **RESET** the microcontroller, place a jumper between the RST and GND pins (7 and 9) on the CN1 connector. Keep the jumper in this position for a few seconds, then remove it.

As an alternative just unplug power supply and plug it in after a few seconds.



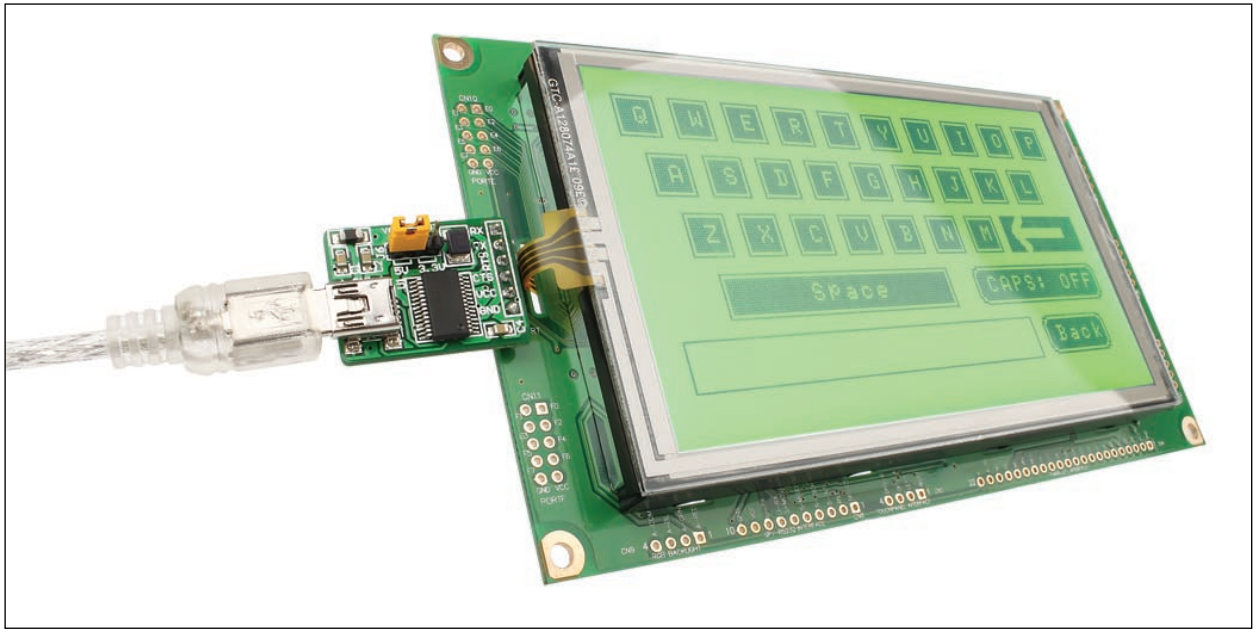


Figure 1: Programming via USB UART additional board

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In addition to the programming via bootloader, the microcontroller can also be programmed with the **PICFLASH** programmer. In this case it is necessary to solder a 2x5 mail header on the CN1 connector on the components side of the development board. After that, the IDC10 connector of the programmer should be connected to the 2x5 connector CN1, figure 2.

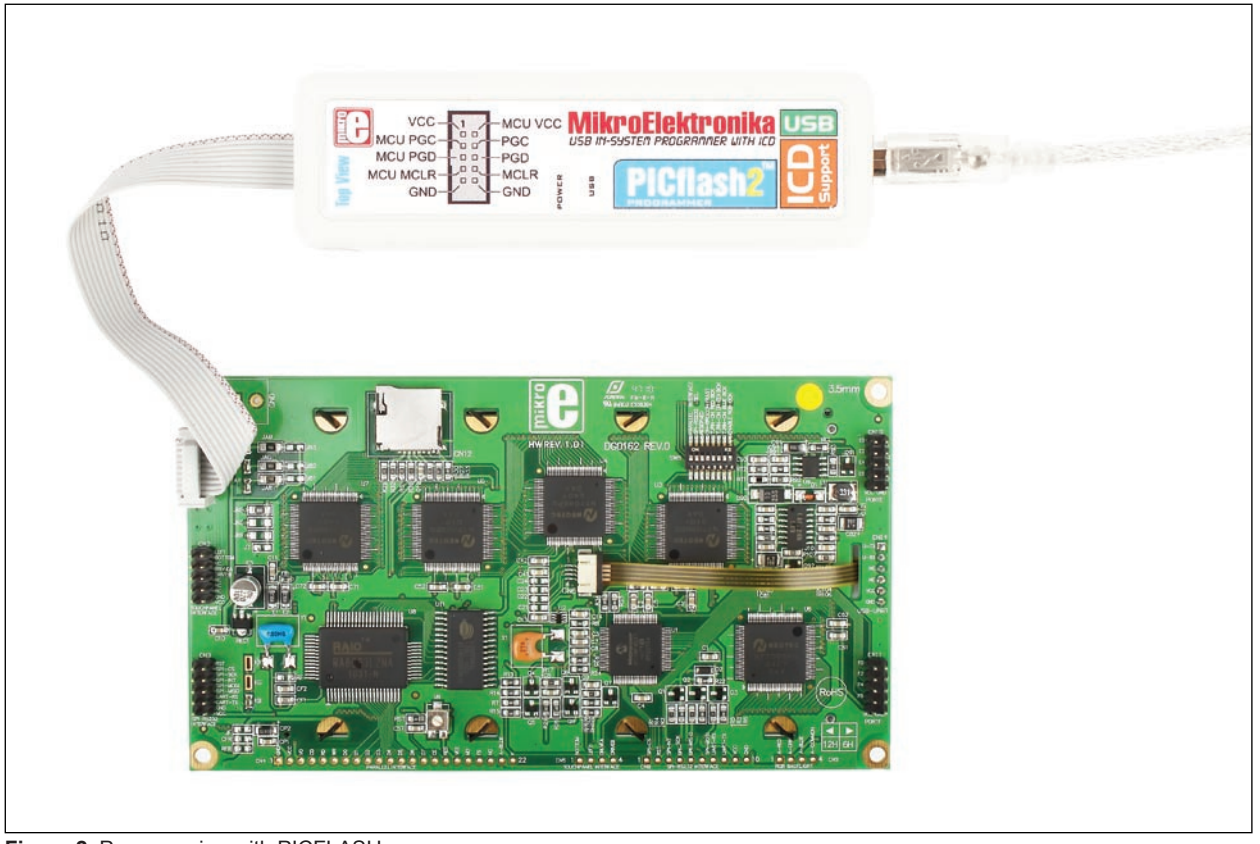

Figure 2: Programming with PICFLASH programmer

4. Connectors

The SmartGLCD 240x128 development system features connectors - pads used to access the microcontroller pins. These connectors also enable the development system to be connected to other devices.

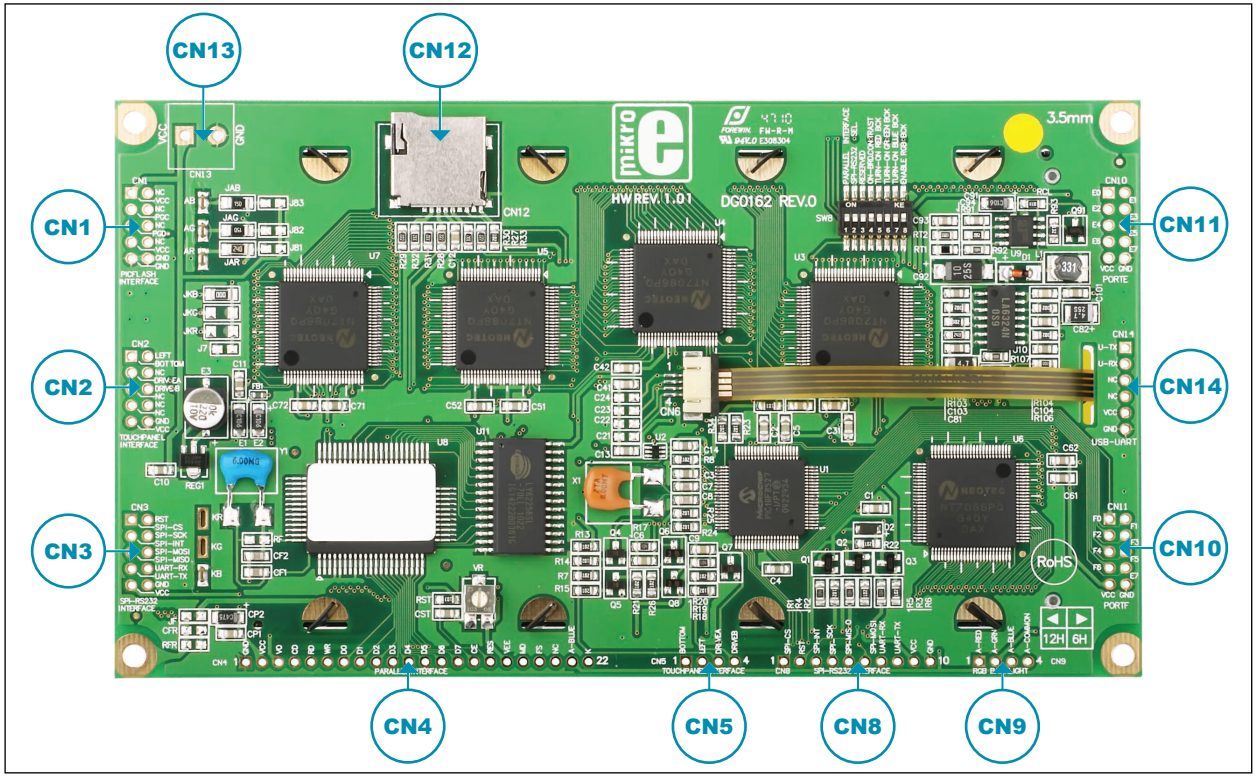

Figure 1: Each connector has its designation

The function of connectors:

CN1 - connector enables connection with the PICFLASH programmer. Pins PGC, PGD and RST are used for programming. The VCC pin is used for power supply, whereas the GND pin is connected to ground.

CN2 - connector enables an external controller to be connected to the touch panel.

CN3 - First six pins of this connector are used for SPI communication, whereas pins 7 and 8 are used for RS-232 communication via UART.

CN4 - connector enables an external controller to be connected to the GLCD display.

CN5 - connector enables an external controller to be connected to the touch panel.

CN8 - First six pins of this connector are used for SPI communication, whereas pins 7 and 8 are used for RS-232 communication via UART.

CN9 - connector is used to power the GLCD display backlight. Depending on the display color, the 5V positive voltage will be supplied on one of the following pins: A-RED, A-GREEN or A-BLUE pin. Ground (GND) is connected to the K-COMMON pin. The positive voltage may be supplied on two or three pins at the same time, thus providing the backlight with new colors such as yellow, purple, etc.

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CN10 - I/O port PORTE
CN14 - USB-UART is used for connection of USB UART borad for programming MCU via bootloader
CN11 - I/O port PORTF
CN12 - connector enables the use of mikroSD memory card. This card provides additional memory space that the microcontroller can use to store data. Communication between memory card and the microcontroller is performed via the Serial Peripheral Interface (SPI).
CN13 - connector is used to provide the system with the 5V power supply voltage. The VCC pin is supplied with the positive voltage, whereas the GND pin is connected to ground.

The parallel interface enables the GLCD display to be used without the microcontroller supplied on the development system. Due to this possibility, the SmartGLCD 240x128 development system can be built into a device that requires GLCD display only. The touch panel interface enables the touch panel's external controller to be connected.

5. Settings

All the necessary settings on the development system are performed by using DIP switch SW8 or potentiometer P1:

1. DIP Switch SW8 is used for SmartGLCD 240x128 configuration, serial communication, backlight and display contrast; and

2. Potentiometer P1 adjusts GLCD contrast.

In order to enable GLCD display, it is necessary to set switch 4 (ON-BRD.CONTRAST) on the DIP switch SW8 to the ON position. To enable backlight, it is necessary to set switch 8 (ENABLE RGB BCK) to the ON position. The color of the backlight can be set by switches or via user program through MOSFET transistors:

Red - switch 5 (TURN-ON RED BCK),
Green - switch 6 (TURN-ON GREEN BCK), or
Blue - switch 7 (TURN-ON BLUE BCK).

In order to enable parallel interface, it is necessary to set switch 1 (PARALLEL INTERFACE) on the DIP switch SW8 to the ON position. Switch 2 (SPI-RS232 SEL) can be used to select SPI or RS-232 communication. The user choose the type of communication when writing a program to be loaded into the microcontroller. Switch 3 is not used.

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