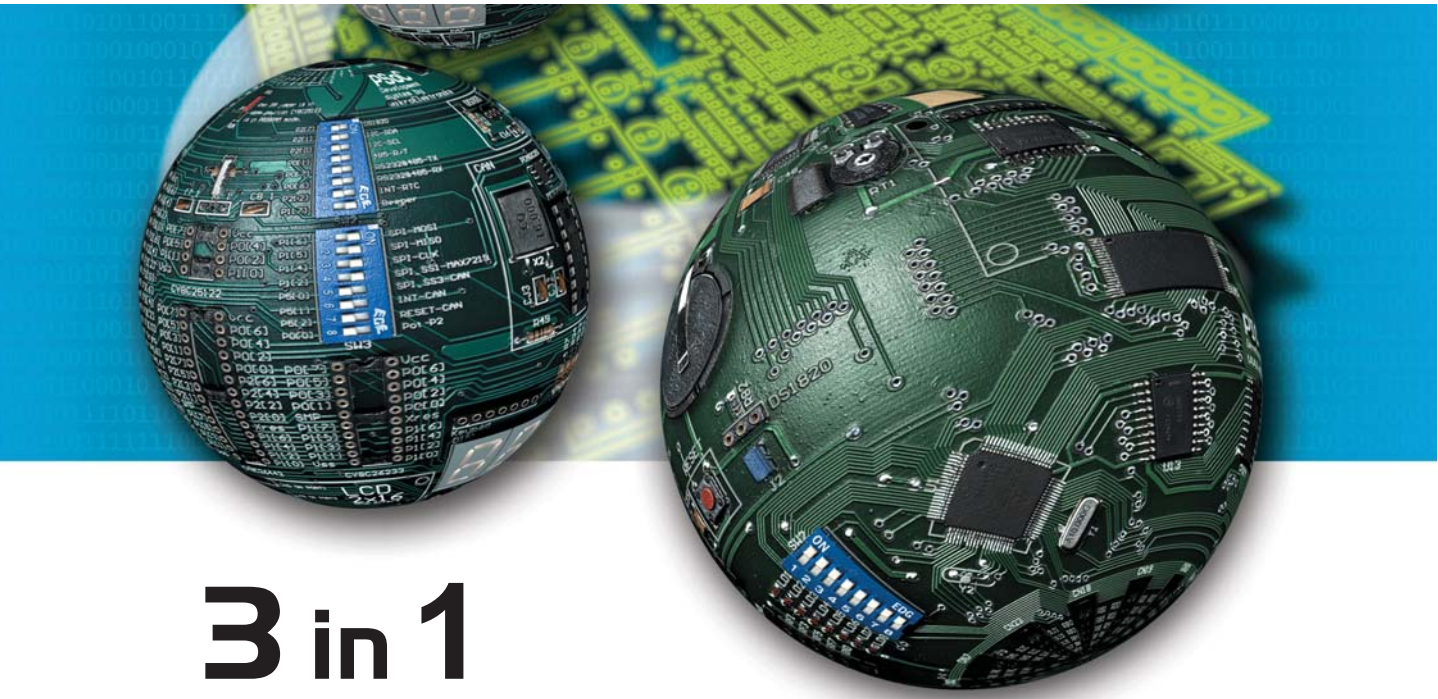
SOFTWARE AND HARDWARE SOLUTIONS FOR THE EMBEDDED WORLD

MikroElektronika
Development tools - Books - Compilers

UNI-DS3
User's Manual

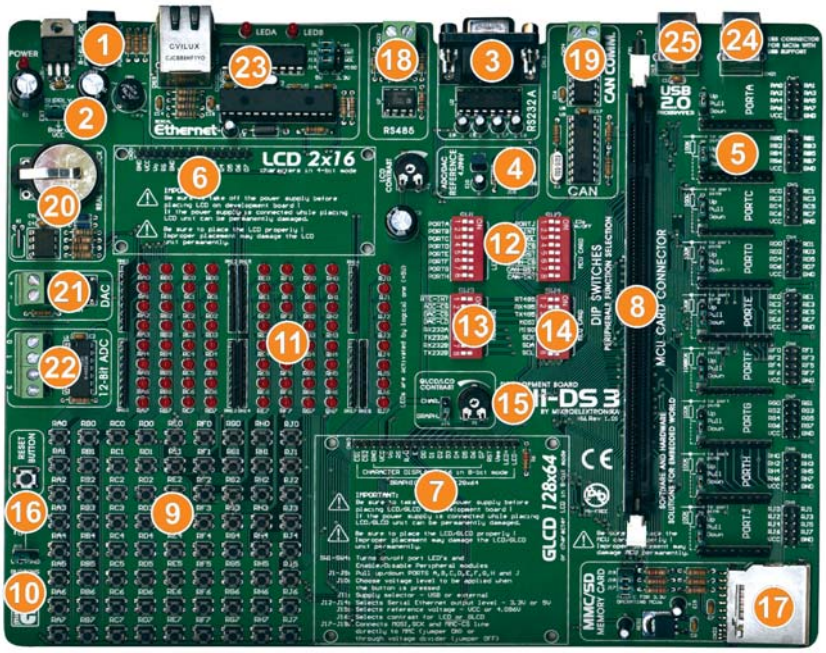


3 in 1

With useful implemented peripherals, many practical code examples and a broad set of add-on boards (Serial Ethernet, Compact Flash, MMC/SD, ADC, DAC, CAN, RTC, RS-485, etc.), MikroElektronika development boards make fast and reliable tool which can satisfy needs of experienced engineers and beginners alike.

Software and Hardware solutions for Embedded World

UNI-DS3
KEY FEATURES



1. External power supply from 8 to 16 V AC/DC;
2. Choose between external and USB power supply. You don't need an external supply if you choose powering from PC's USB port ;
3. RS232 communication port ;
4. 4.096V voltage reference is used for working with A/D converter ;
5. If you set jumper to the upper position the pins of appropriate port are set to logical one (pull-up). If you set jumper to the lower position, the pins are set to logical zero (pull-down). It is very important to select pull-up for the port if you expect logical zero on it's inputs and vice versa ;
6. You can connect LCD if you need it for your application in 4-bit mode ;
7. You can connect Graphic LCD if you need it for your application or LCD in 8-bit mode ;
8. MCU Card socket ;
9. 72 buttons enable you to control every pin on your microcontroller ;
10. You can choose how to affect a pin by pressing button, high state or low state ;
11. See all the signals - each pin has an LED ;
12. All switches on SW1 and switch 1 on SW2 are used to turn LEDs on all MCU ports ON or OFF. Switches 2, 3, 4 and 5 on SW2 are used to enable Serial Ethernet and switches 6, 7 and 8 are used to enable CAN communication ;
13. Switch 1 on SW3 enables Real Time Clock Interrupt. Switches 2, 3 and 4 on SW2 are used to enable A\D and D\A modules. Switches 5, 6, 7, and 8 on SW3 are used to enable RS232 com munication ;
14. Switches 1, 2 and 3 on SW2 are used to enable RS485 communication, switches 4, 5 and 6 to enable SPI communication lines and switches 7 and 8 to enable Real Time Clock ;
15. Set LCD contrast according to your display characteristics ;
16. Reset circuit - if the reset button is pressed a hardware reset will happen (MCU will start executing from the beginning) ;
17. MMC/SD slot for multimedia cards with storage space up to 2GB;
18. RS485 communication port ;
19. CAN communication port ;
20. Real Time Clock ;
21. D\A converter output ;
22. A\D converter input ;
23. Serial Ethernet on board ;
24. USB connector for MCUs with USB support ;
25. USB connector for USB 2.0 programmer ;

CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONNECTING THE SYSTEM

The development system box contains: development system, product CD, USB cable, RS232 cable and this manual.

Step no.1 The first thing you should do is to take your development board and MCU Card out of the box. Place carefully the MCU Card into the MCU Socket. Unpack USB cable and connect it to the PC. Please use the USB ports at the back of the PC with direct connection to the motherboard.

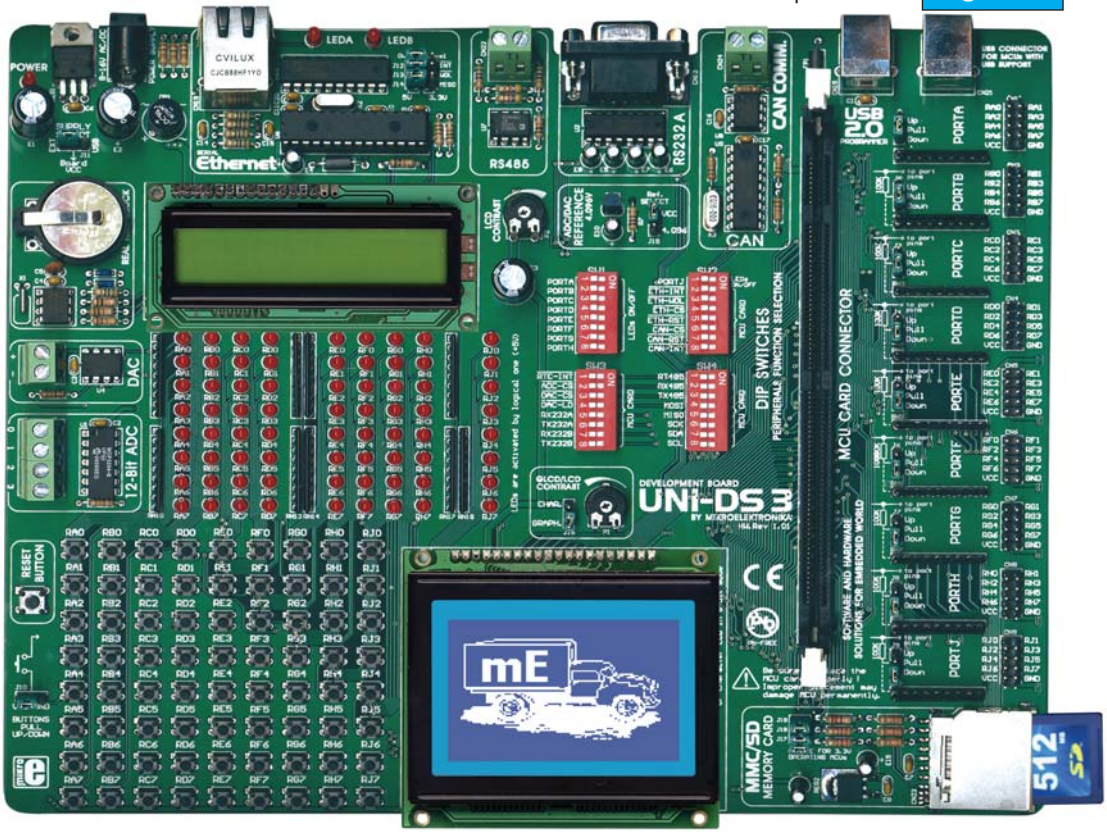
Step no.1 is common for all MCU cards. After you have done this, please refer to the corresponding pages of this manual which describes the MCU Card you picked. In order to finish installation follow instructions for installation of the MCU Card.

INTRODUCTION

UNI-DS3 development system is a full-featured development board for a broad range of microcontrollers. The development system supports Philips ARM microcontrollers, Atmel 8051 and 64pin AVR microcontrollers, Microchip DIP40 PIC, 80pin PIC and dsPIC, as well as Cypress PSoC microcontrollers. It enables microcontrollers to be interfaced with a wide range of peripheral devices, enabling user to concentrate just on the software.

Figure 1. illustrates the development board.On a silkscreen, there are identification marks beside each component. These marks describe connections to microcontroller, operation modes and provide other useful notes. Need for additional schematics is minimized as all relevant information is on the board.

UNI-DS3 development board **Figure 1.**



MCU CARD CONNECTOR

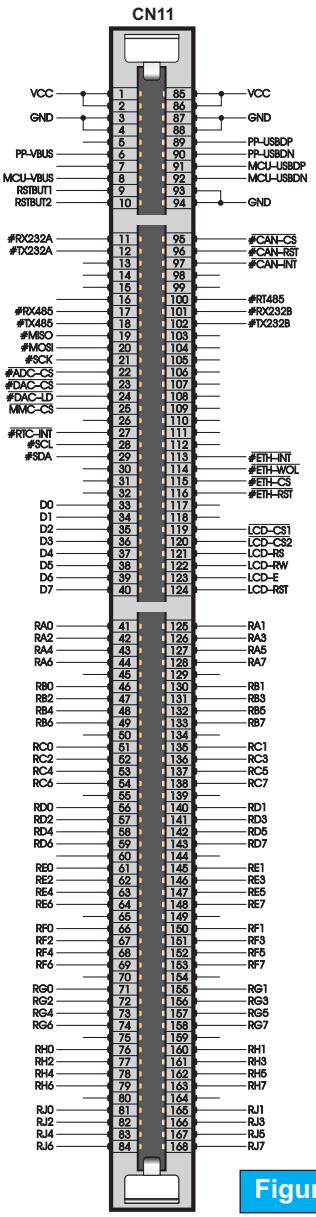
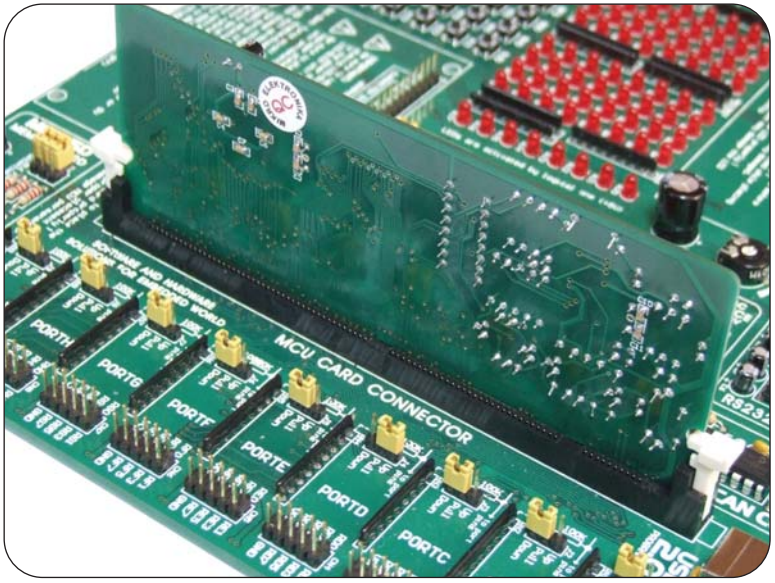


Figure 3. MCU Card Connector schematically

The UNI-DS3 development board is designed to enable students and engeneers to exercise and explore capabilities of various microcontrollers. For each supported microcontroller a different MCU Card is designed.
Development board goes together with standard DIMM-168P MCU Card Connector which enable you easy switch between MCU Cards.



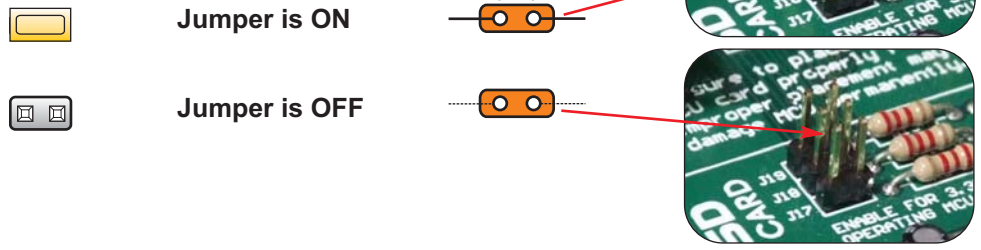
MCU Card Connector **Figure 2.**

JUMPERS

Jumpers can break or establish a connection between two points. Under a plastic cover of jumper is a metal contact that makes connection if the jumper is placed between two pins which are not connected.

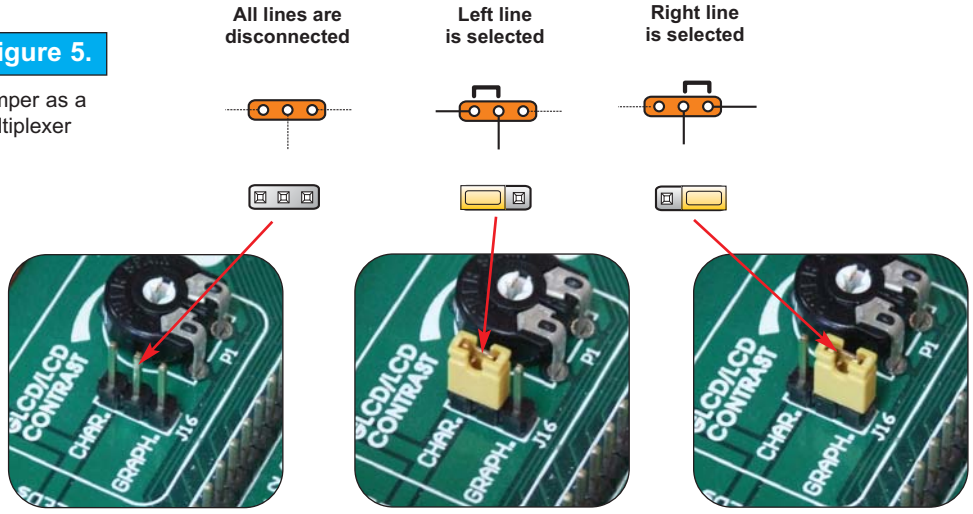
For instance, jumpers J17, J18 and J19 are used to enable Multimedia Memory Card (MMC) to work with microcontrollers with 3.3V power supply voltage level. A connection is made by placing jumper between two contacts.

Figure 4. Jumper as a switch



Jumpers are more often used as a selectors between two possible connections using three pin connector. As illustrated in Fig. 5, the pin in the middle can be connected to the left or to the right pin, depending on the jumper position.

Figure 5.
Jumper as a multiplexer



SWITCHES

UNI-DS3 development board features peripheral devices. In order to enable these devices before programming, you need to check if appropriate jumpers or switches have been properly set. Switches are devices that have two positions - ON and OFF , which have a role to establish or break a connection between two contacts.

UNI-DS3 development board has four groups of switches.The first group, **SW1,** and switch 1 on **SW2** are used to enable LEDs connected to PORTA, PORTB, PORTC, PORTD, PORTE, PORTF, PORTG, PORTH and PORTJ. For instance, if the switch PORTA is ON, all LEDs from RA0 to RA7 will be turned on. Rest of the switches on **SW2** are used to enable a connection between microcontrollers and Serial Ethernet, and also between microcontrolers and Controller Area Network (CAN) communication devices.
The third group, **SW3,** is used to enable communication between microcontrollers and RS232 communication device by putting the last four switches in ON position.The first switch is used toconnect microcontroller to Real Time Clock. Switches 2, 3, and 4 are used to connect A/D and D/A converters to the microcontroller's pins.
The first three switches on **SW4** are used to enable a connection between microcontroller's pins and RS485 communication devices. Switches 4, 5 and 6 are used to enable SPI comunication, and switches 7 and 8 are used to connect Real Time Clock to the microcotroller's pins.

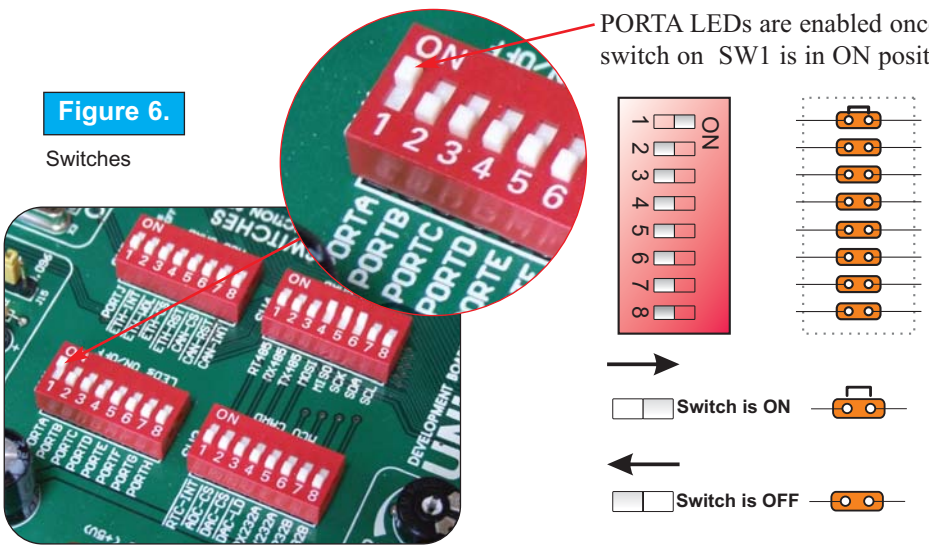


Figure 6.
Switches

POWER SUPPLY

As a power supply source, user can select either a regulated supply from USB cable (default) or an external non-regulated power supply.
In case of USB power supply, system should be connected to the PC using the USB cable and jumper J11 should be set in the right-hand position.
In case of external power supply, UNI-DS3 development board produces +5V using an LM7805 voltage regulator. The external power supply can be AC or DC, with voltage between 8V and 16 V and jumper J11 should be set in the left-hand position.

Note: USB connector CN15 should be used for USB programmer and USB power supply.

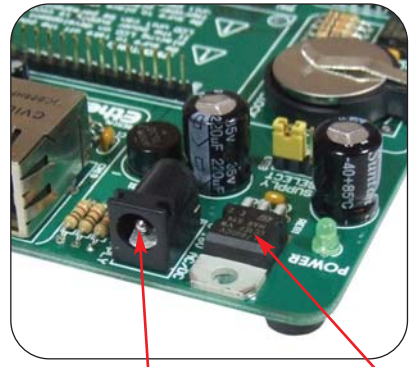
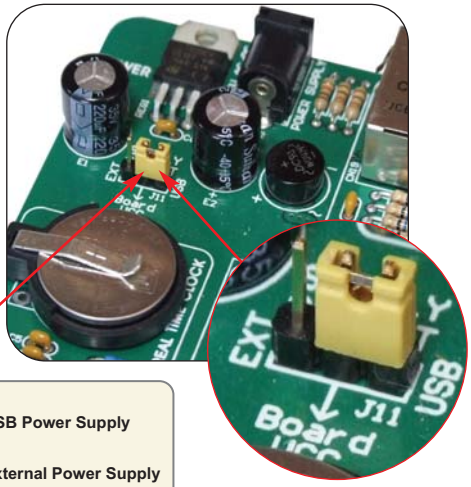


Figure 7.
Power supply connectors

J11 in left-hand: system will take power from external AC/DA power adapter.

J11 in right -hand position: system will take power from USBcable.

Figure 8. Power supply selection jumper



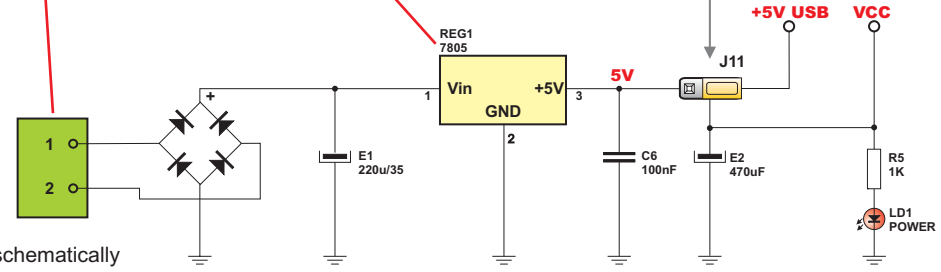


Figure 9.
Power supply schematically

USB CONNECTORS

UNI-DS3 development board goes together with two USB connectors. USB connector CN21 is used for MCUs with USB support.
Since all the MCU cards has their own USB programmer, there is no need to use any external equipment during programming. All you need to do is to connect the board to the PC using the USB cable, then load your program into microcontroller via programming software that is supplied with every MCU Card.

Note: There is no need to resetart MCU manually after programming. The programmer will reset the MCU automatically.

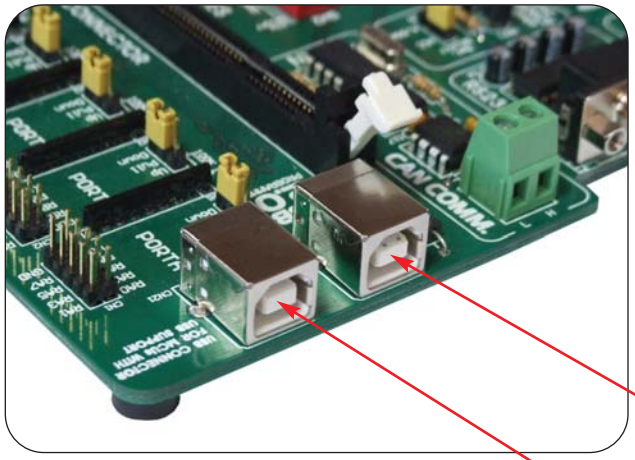


Figure 10.
USB connectors

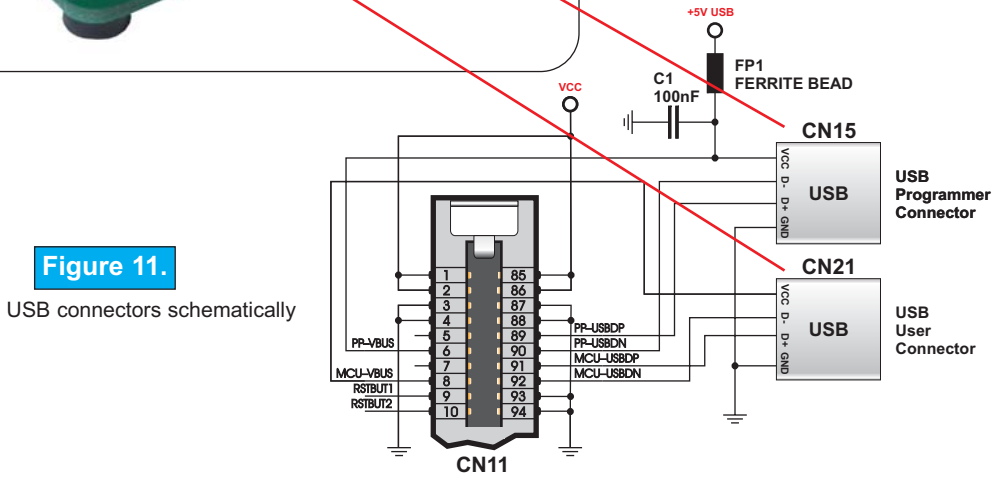
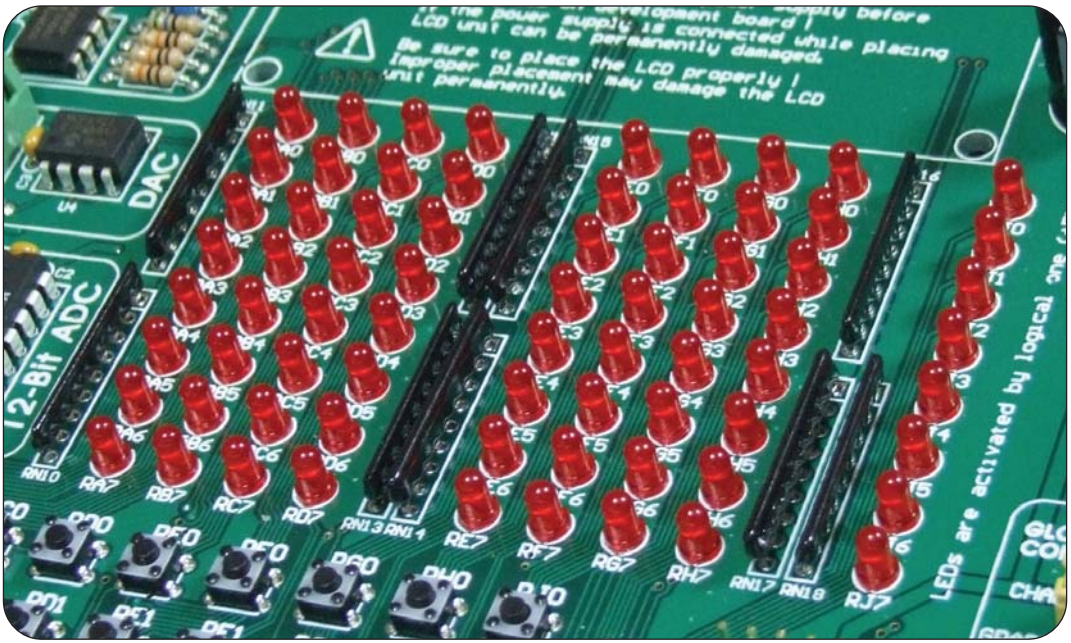


Figure 11.
USB connectors schematically

LEDs

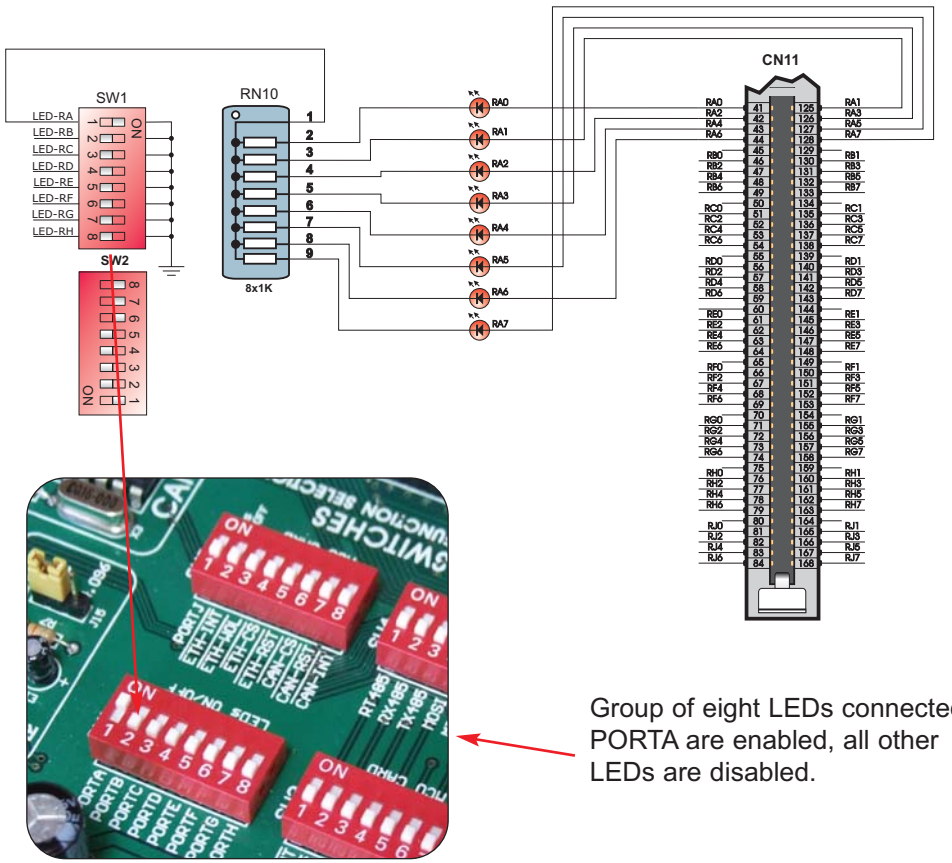
Light Emitting Diodes (LEDs) are the most commonly used components, usually for displaying pin's digital state. UNI-DS3 has 72 LEDs connected to the MCU Card Socket. Each LED, if enabled, will display the state of the corresponding microcontoller pin.

Figure 12. LEDs



Each gruop of eight LEDs can be enabled or disabled using SW1 and SW2, as shown in Figure 13. Once enabled, LEDs will display the state of the corresponding microcontroller pin, otherwise the LEDs will always be off, no matter what the port state is as no current can flow through it.

Figure 13. LEDs schematically

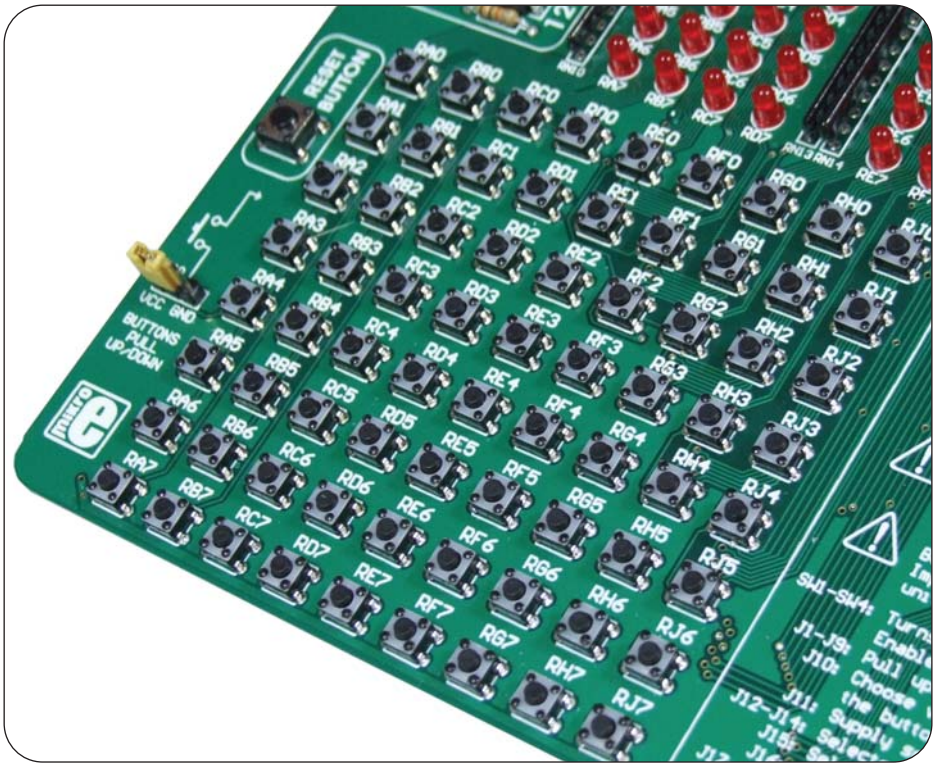


Group of eight LEDs connected to PORTA are enabled, all other LEDs are disabled.

PUSHBUTTON SWITCHES

UNI-DS3 development board has 72 push buttons which can be used to change states of digital inputs on microcontroller pins.

Figure 14. Pushbutton switches



Button- connection example is shown in Figure 15. The figure shows how buttons are connected to the PORTA.

Jumper J10 determines whether a button press will bring logical zero or logical one to the appropriate pin.

When the button is not pressed, the pin state is determined by pull-up or pull-down port jumpers.

In the example below, J10 is connected to +5V, therefore a button press will bring logical one to the appropriate pins.

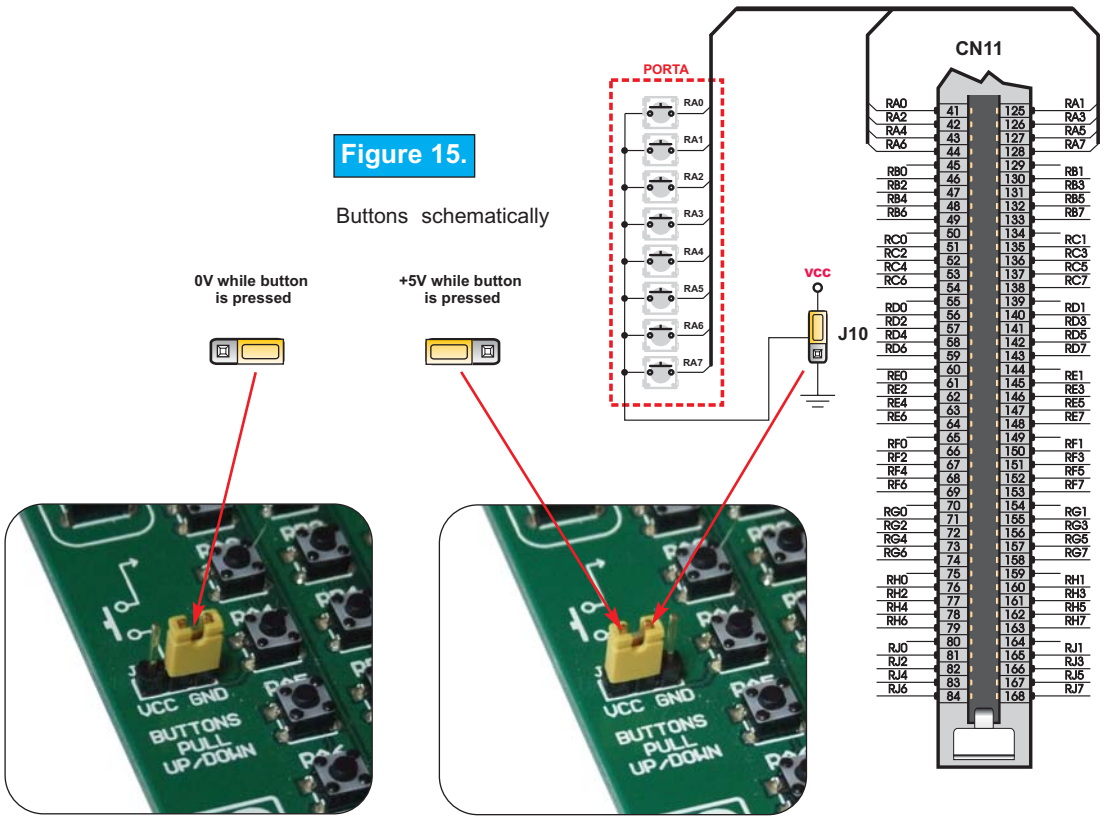


Figure 15.

Buttons schematically

UNI-DS3 development board has one pushbutton placed on it's left side acting as a RESET button.

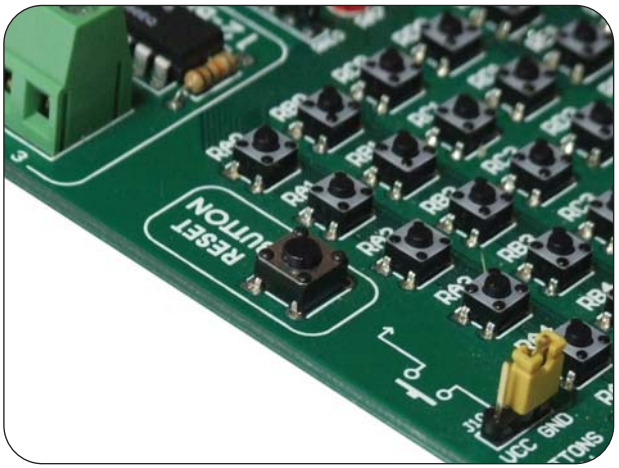


Figure 16. Reset button

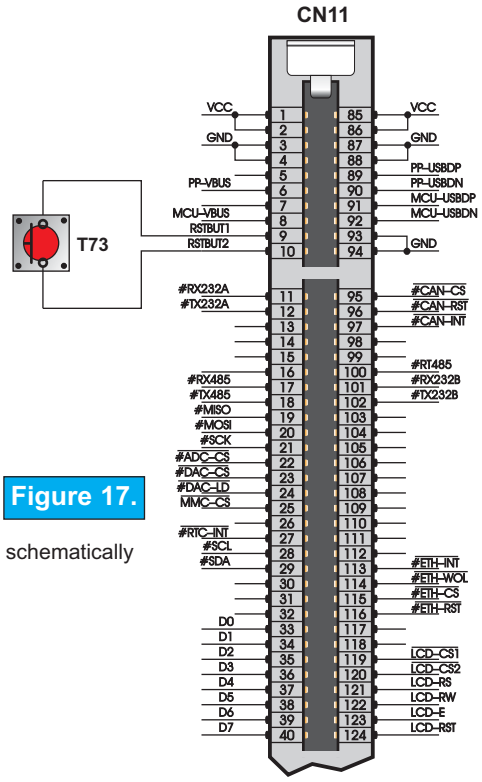


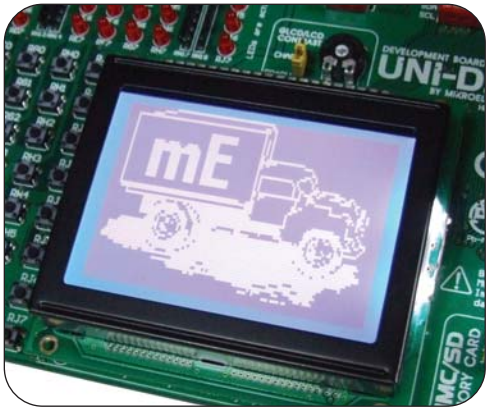
Figure 17. Reset button schematically

Note: There is no need to reset MCU manually after programming. The programmer will reset the MCU automatically.

GRAPHIC LCD CONNECTOR ON-BOARD

GRAPHIC LCD

Graphic LCD (GLCD) enables advanced visual messages to be displayed. While character LCD can display only alphanumeric characters, GLCD is used to display messages as drawings and bitmaps. The most commonly used graphic LCD has a screen resolution of 128x64 pixels.Before GLCD is connected, user needs to set jumper J16 to the GRAPH position. GLCD contrast can be adjusted using potentiometer P1.



GLCD **Figure 19.**

In order to enable GLCD, jumper J16 should be set to the right-hand position.

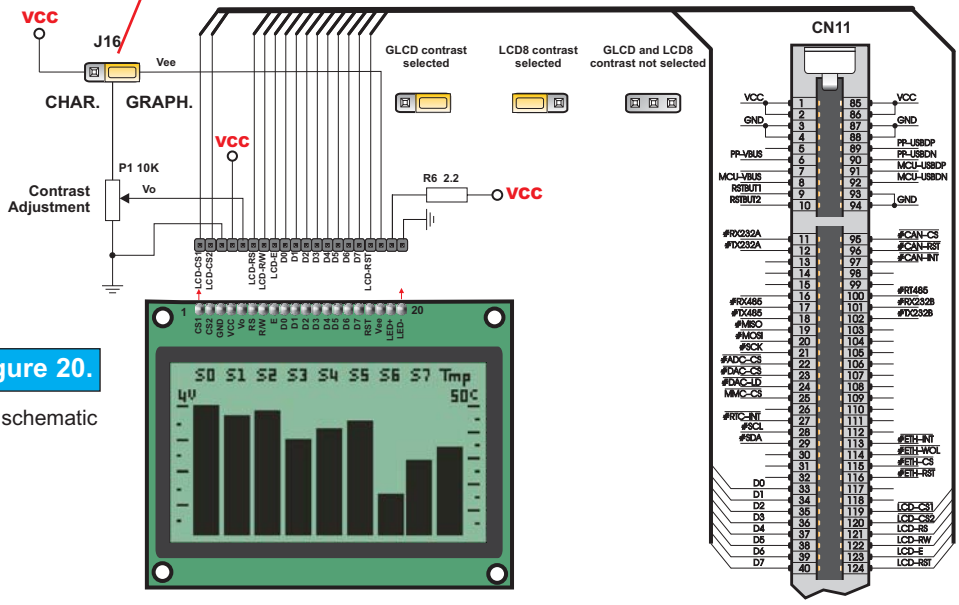


Figure 20.

GLCD schematic

2x16 LCD CONNECTOR
2x16 LCD
ON-BOARD

LCD 2x16 IN 4-bit MODE

Standard character LCD is probably the most widely used data visualization component. Normally, it can display two lines of 16 alphanumeric characters, each made of 5x8 pixels. Character LCD communicates with microcontroller via 4-bit or 8-bit data bus, each requiring the use of different connector on UNI-DS3 development board. In order to use 4-bit data bus, LCD should be placed in the upper left part of the board, just above the LEDs. It is important that LCD is placed or removed from UNI-DS3 when the power is turned off..

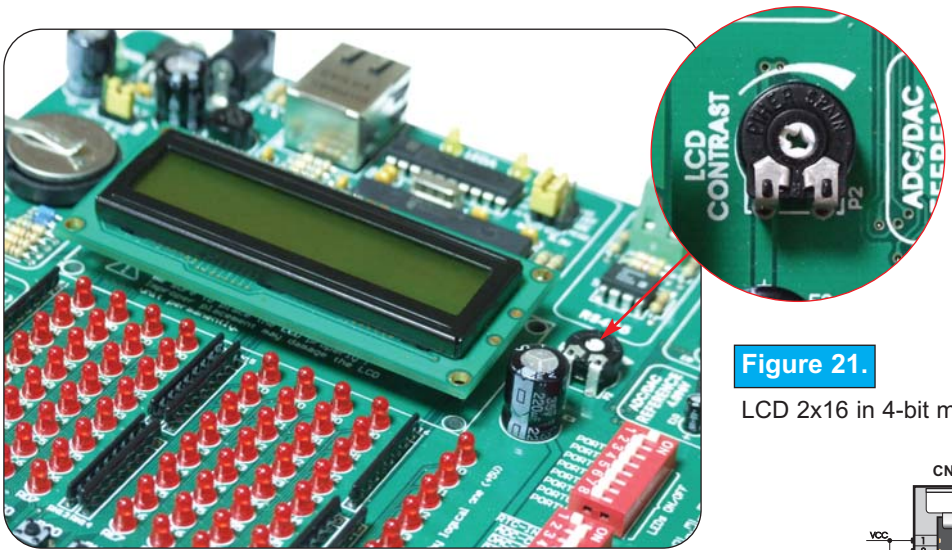


Figure 21.

LCD 2x16 in 4-bit mode

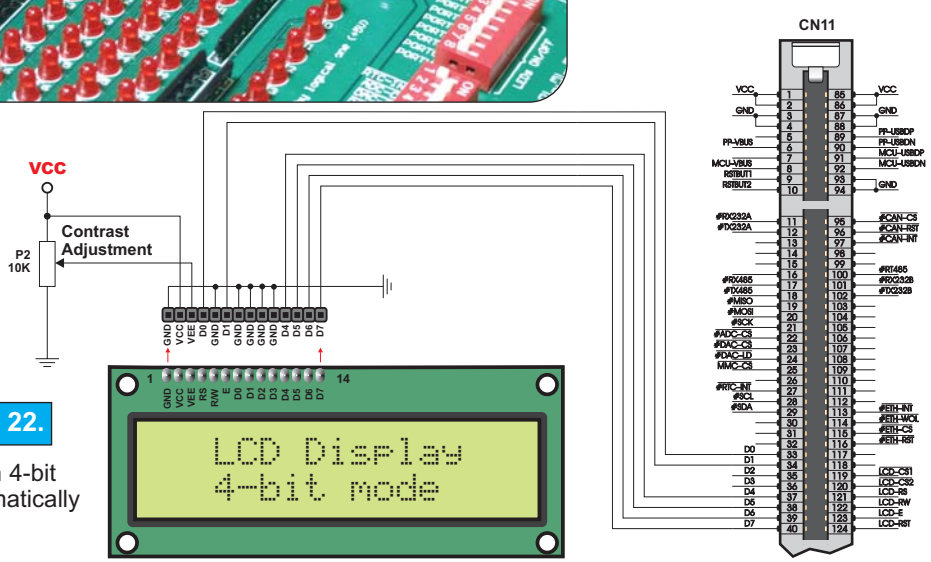


Figure 22.

LCD 2x16 in 4-bit mode schematically

LCD 2x16 IN 8-bit MODE

When you use character LCD in 8-bit mode, it should be placed on the GLCD connector. Special attention is required for placing the LCD because this GLCD connector has 20 pins and the character LCD has only 14 pins. Otherwise the LCD can be permanently damaged. The LCD must be placed in the marked position with two free pins to the left and four free pins to the right.Be sure that the power supply is off when you place or remove LCD.

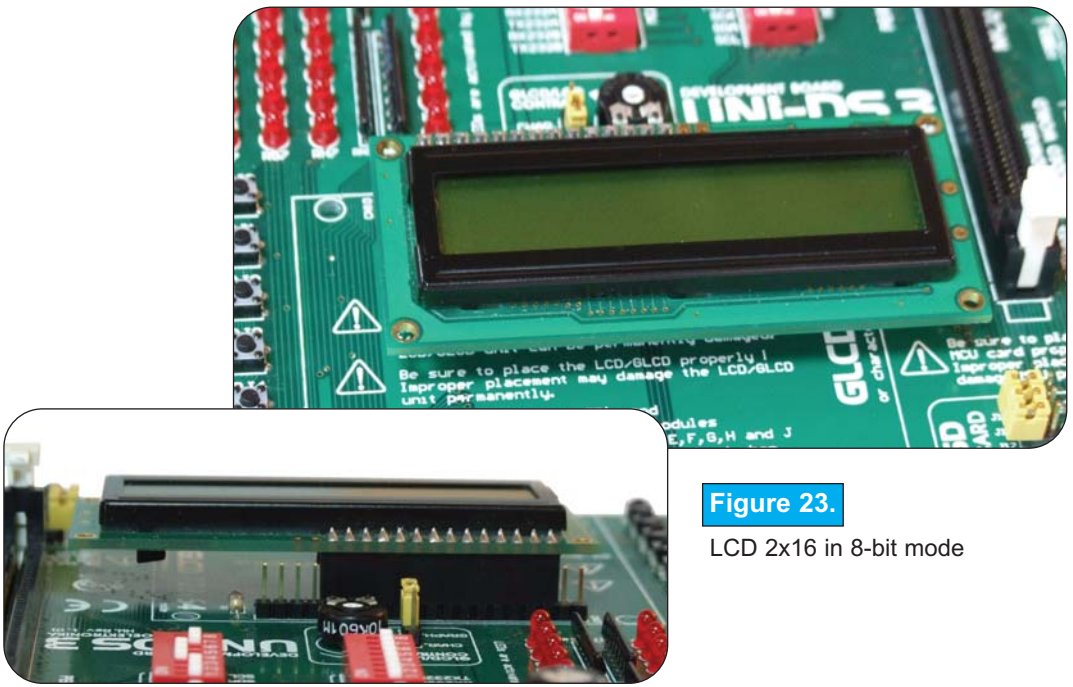
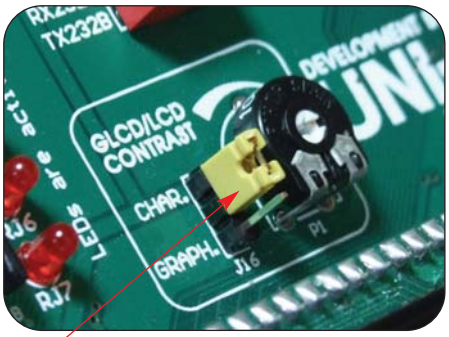


Figure 23.
LCD 2x16 in 8-bit mode

NOTE: Special attention is required for placing LCD. Otherwise the LCD can be permanently damaged.



In order to enable LCD, jumper J9 should be set to the position labelled as CHAR.

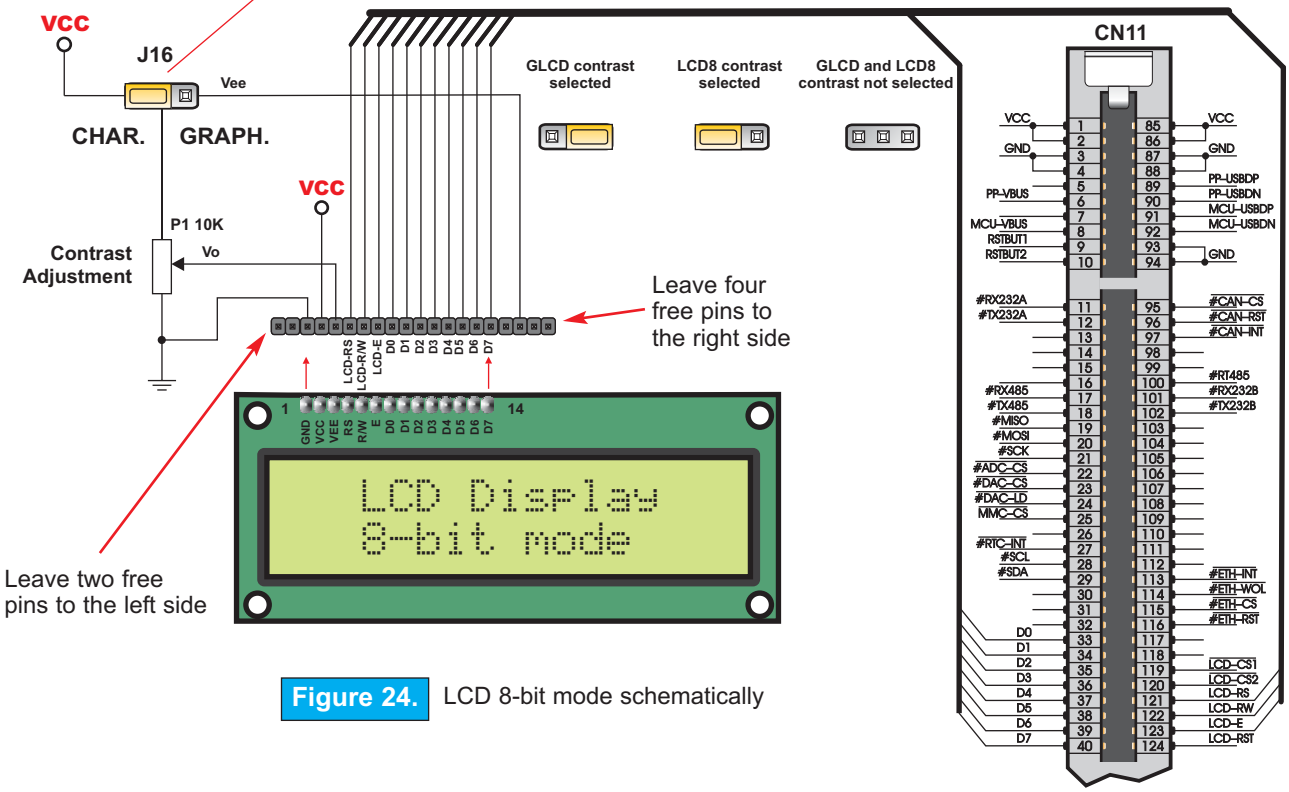
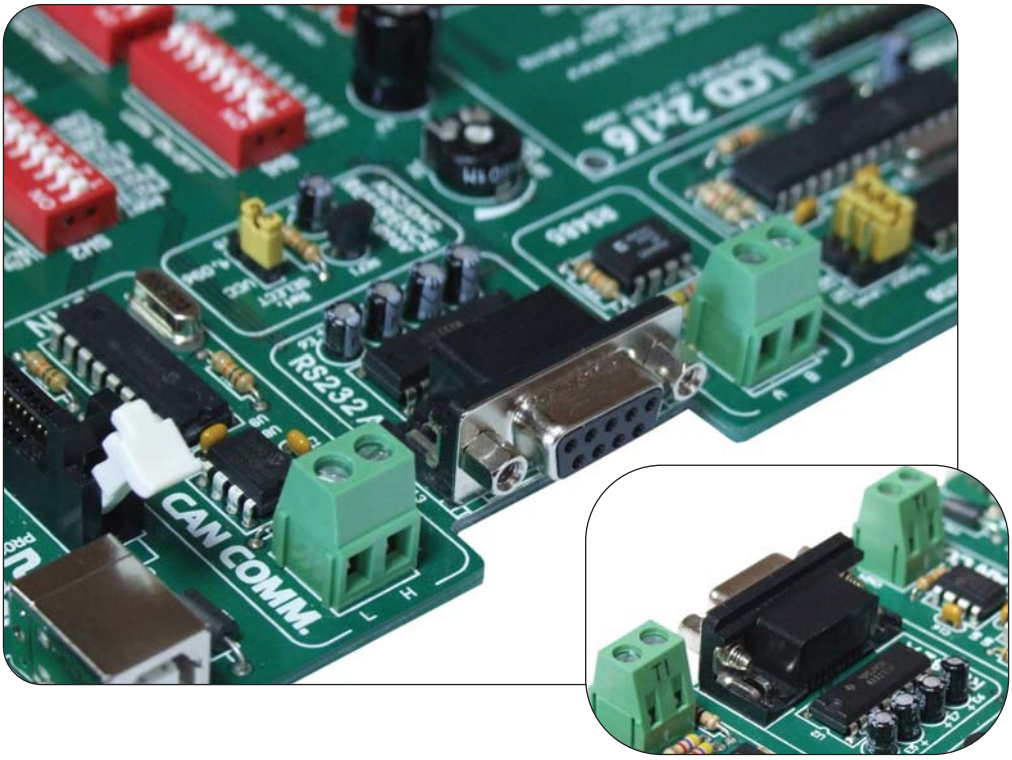


Figure 24. LCD 8-bit mode schematically

RS-232 COMMUNICATION

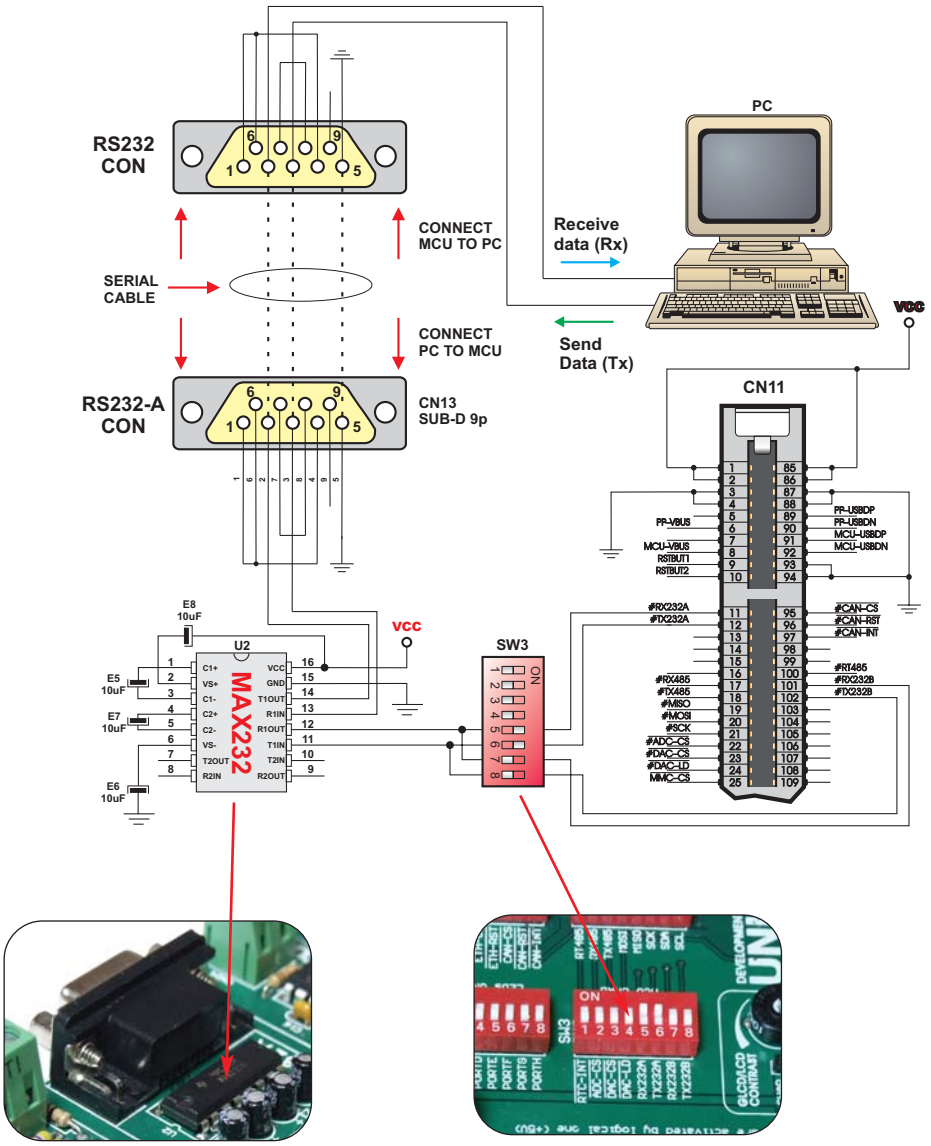
RS-232 communication enables point-to-point data transfer. It is commonly used in data acquisition applications for data transfer between microcontroller and PC. Since the voltage levels of microcontroller and PC are not directly compatible with each other, a level transition buffer such as MAX232 must be used.

Figure 25. RS232 Connector



UNI-DS3 development board has one RS232 communication device. This RS232 communication device can be connected to both RS232 communication ports of MCU through DIP-switch SW3. Only one RS232 communication port can be connected to RS232 communication device at the time. In order to connect the RS232-A communication port, switches 5 and 6 on SW3 have to be turned on, and switches 7 and 8 have to be turned off (Fig. 26). In order to connect the RS232-B communication port, switches 5 and 6 on SW3 have to be turned off, and switches 7 and 8 have to be turned on.

Figure 26. RS232 Connector schematically



RS-485 COMMUNICATION

RS-485 communication enables point-to-point and point-to-multipoint data transfer. It is commonly used for data transfer between several microcontrollers. LTC485 interface tranciever is used to transform signal from microcontroler's Rx and Tx lines to differential signal on A and B output lines.

UNI-DS3 development board has one RS485 communication device. In order to provide more flexible system, microcontroller is connected to the LTS485 through three switches on **SW4**. These switches are used to connect Rt, Rx and Tx lines from microcontroller to the RS485 port.

Figure 27. RS232 Connector

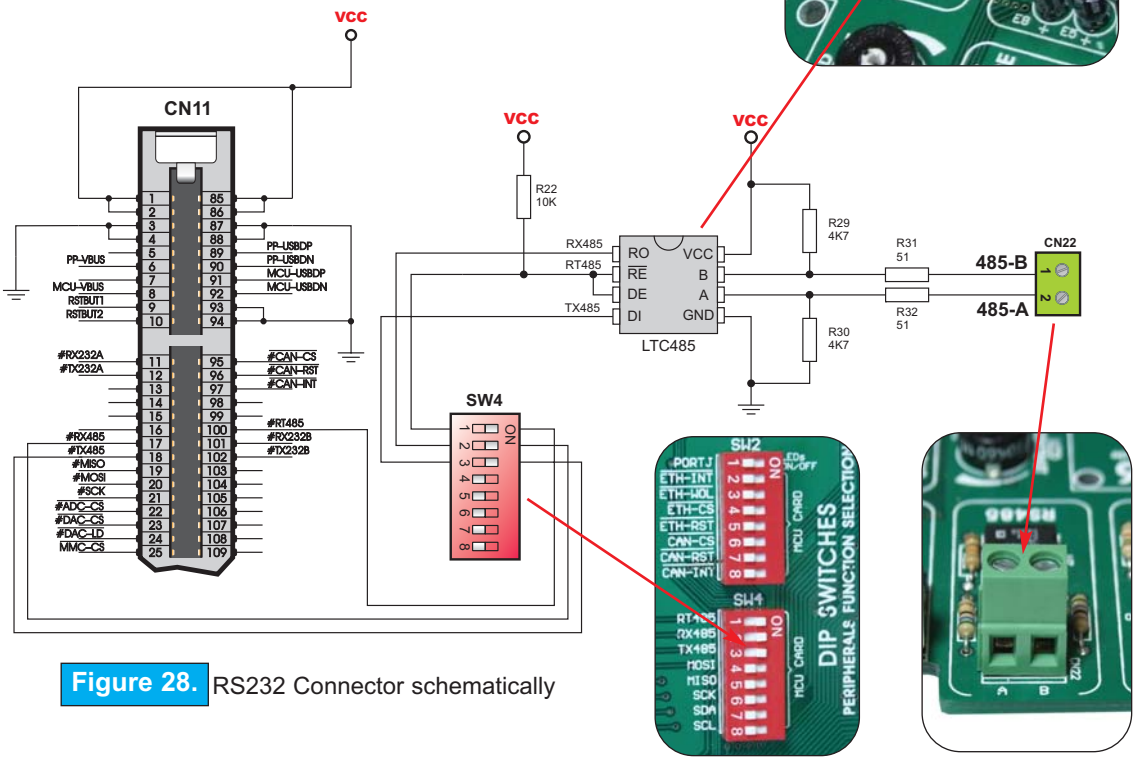
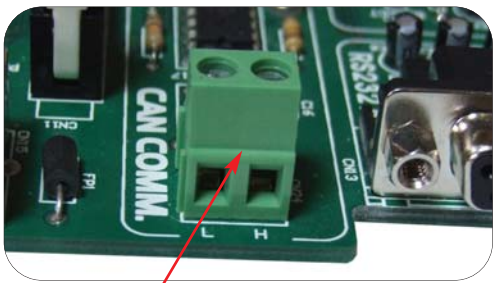


Figure 28. RS232 Connector schematically

CAN COMMUNICATION

Controller Area Network (CAN) is a serial network that was originally designed for automotive industry, but has also become a popular bus in industrial automation as well as in other applications. CAN is a network etablished among microcontrollers. It is two-wire, half-duplex, high-speed network system. Half-duplex means that microcontrollers can send and recieve data, but only in one direction at the time.

UNI-DS3 development board has one CAN communication device. Microcontroller is connected to the CAN Controller through SPI communication. In order to provide more flexible system, CAN's Chip Select, Interrupt and Reset are connected through switches 6, 7 and 8 on **SW2**.



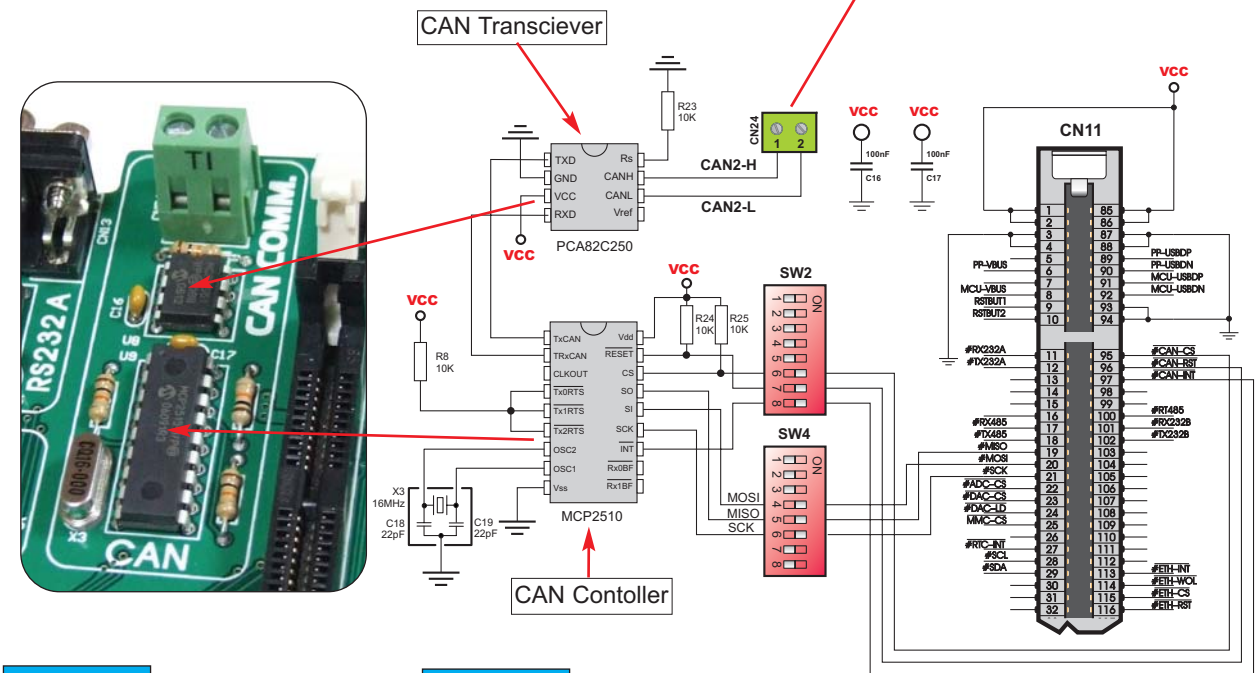


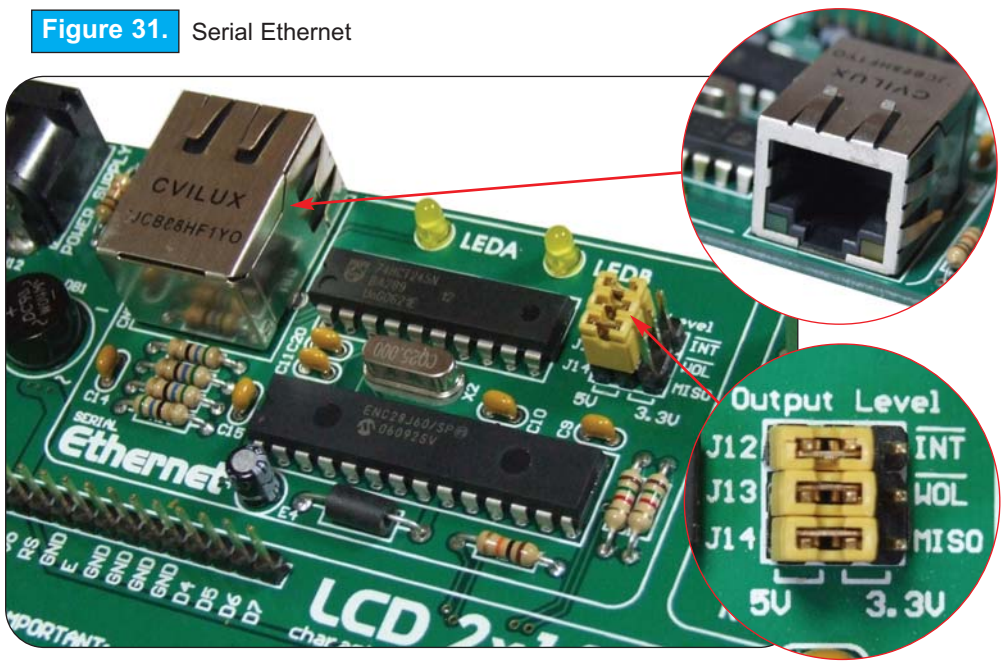
Figure 29. CAN Connector

Figure 30. CAN Connector schematically

SERIAL ETHERNET ON BOARD

Ethernet is the most common Local Area Network (LAN) technology in use today. On the top of the physical layer Ethernet stations communicate to each other by sending data packets to each other. Each Ethernet station is given a single 48-bit MAC address which is used to specify both the destination and the source of each data packet.
Serial Ethernet has 28-pin ENC28J60 10BASE-T Ethernet Controller with on-board Media Access Control and Physical Layer (MAC &PHY), 8 Kbytes of Buffer RAM and Serial Peripheral Interface (SPI) communication.

Figure 31. Serial Ethernet



Note: Make sure to select proper voltage level depending on the MCU Card attached to your UNI-DS3 development board.
Improper VOLTAGE LEVEL can damage development system or Serial Ethernet chip!

Note: All three jumpers (J12, J13 and J14) must be in the same position (left or right).

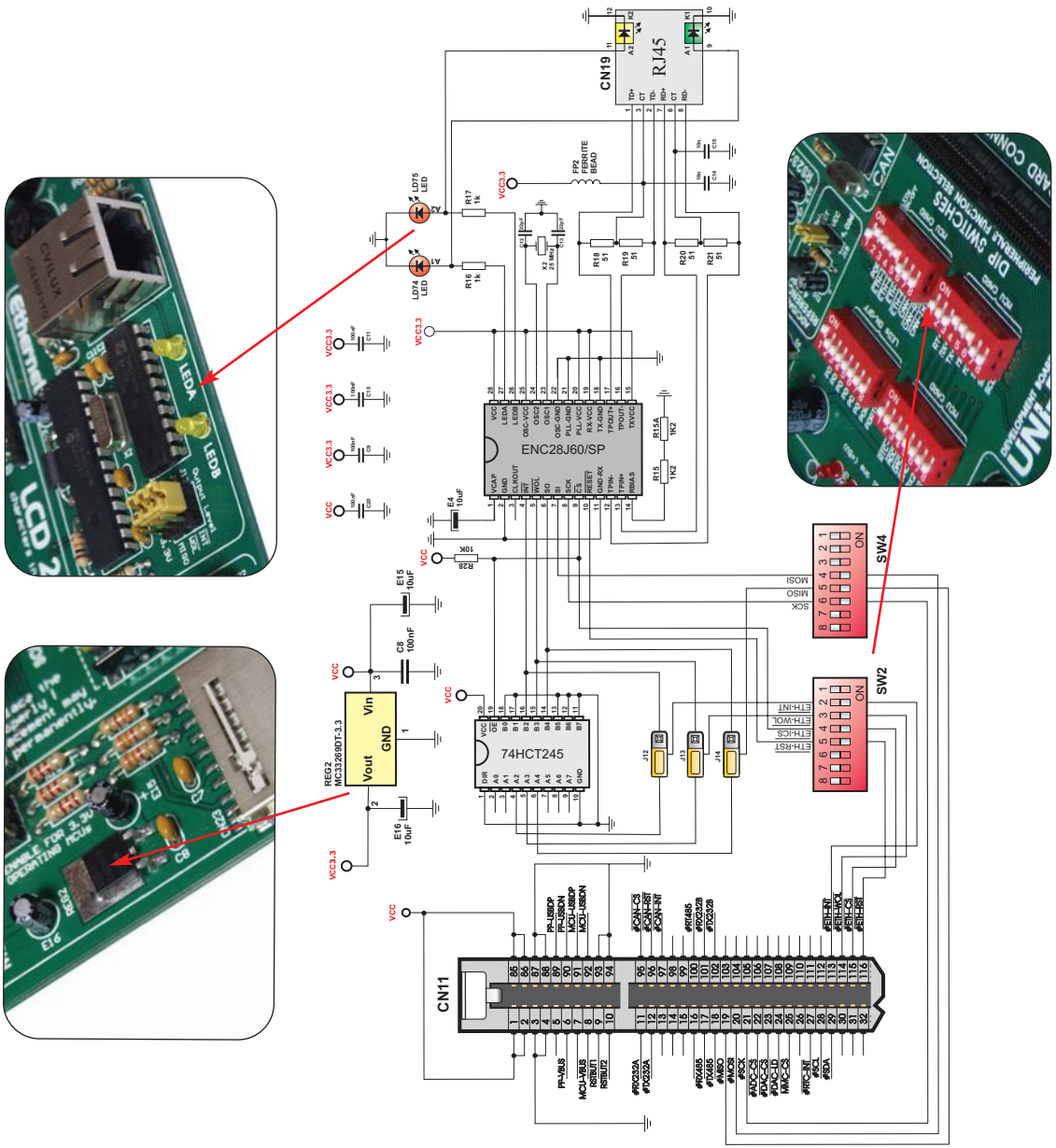


Figure 31. Serial Ethernet schematically

DIRECT PORT ACCESS

All microcontroller input/ouput pins can be accessed via connectors placed along the right-hand side of the board. For each of the ports PORTA, PORTB, PORTC, PORTD, PORTE, PORTF, PORTG, PORTH and PORTJ, there is one 10-pin connector providing VCC, GND and up to eight port pins.

These connectors can be used for system expansion with external boards such as serial GLCD, IrDA, CompactFlash, etc.

Ensure that on-board peripherals are not connected with the microcontroller by setting appropriate jumpers while external peripherals use the same pins.The connectors can also be used for attaching logic probes or other test equipment.

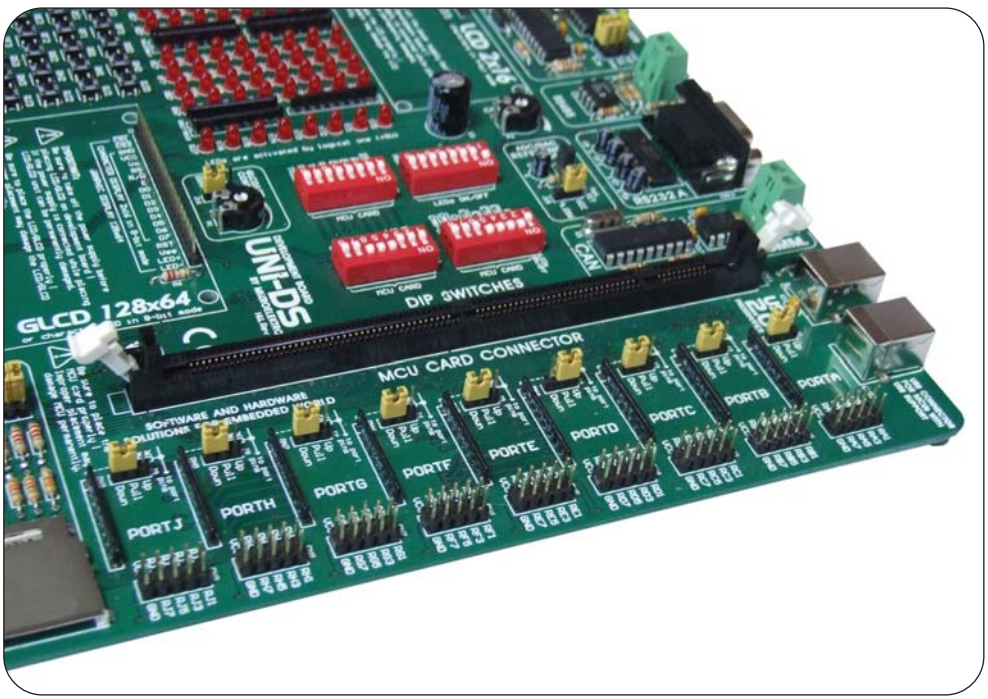


Figure 32. Direct port access connectors

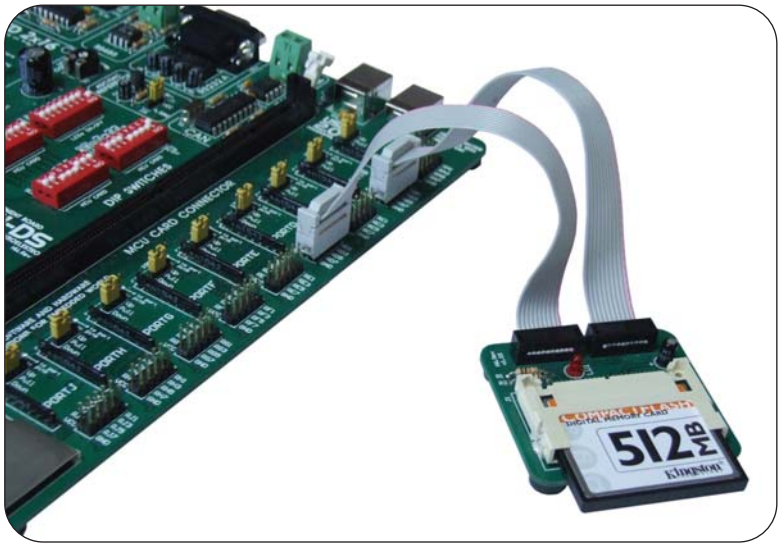
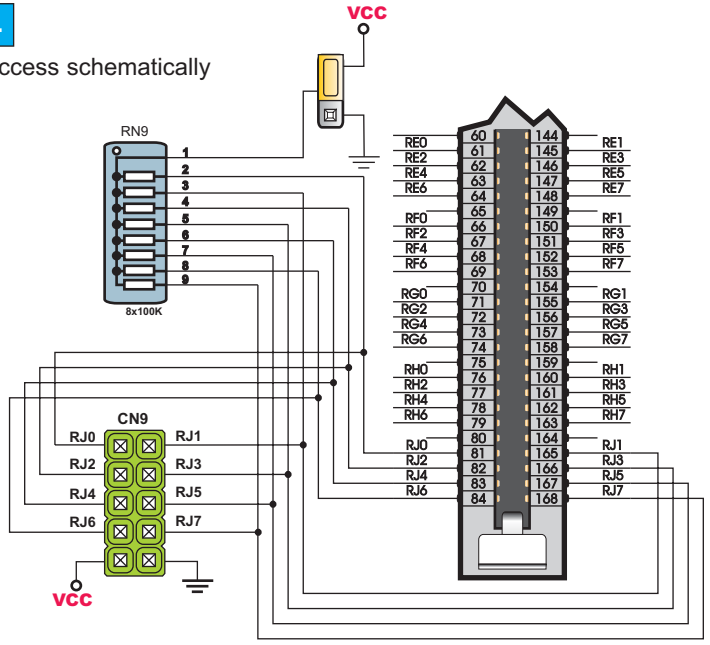


Figure 33. Example of Compact Flash Card connected

Figure 34.
Direct port access schematically



MMC/SD (Multimedia Card)

MMC card is used as a storage media for a portable device, in the form that can be easily removed for access by PC. For example, a digital camera uses MMC card to store image files. With MMC reader (a small box connected to USB or some other serial connection, although some types can be found integrated into the computer itself), user could copy to the computer the pictures taken with the digital camera.Microcontroller on UNI-DS3 development board comunicates with Multimedia Card via SPI communication.

Figure 35. MMC Card

To enable MMC card you have to turn on switches 4, 5 and 6 on **SW4**, as shown in Figure36. By doing that SPI communication lines (SCK, MISO and MOSI) are connected to microcontroller.

Working voltage of the MMC Card is 3.3V DC. If voltage level of the MCU attached to your UNI-DS3 development board is 5V, then jumpers J17, J18 and J19 should be disconnected. In that way, resistor voltage dividers are used for adjusting voltage from 5V to 3.3V DC.

UNI-DS3 development board voltage level is 5V.

3.3V power supply voltage regulator (MC33269DT-3.3) is used for the MMC Card.

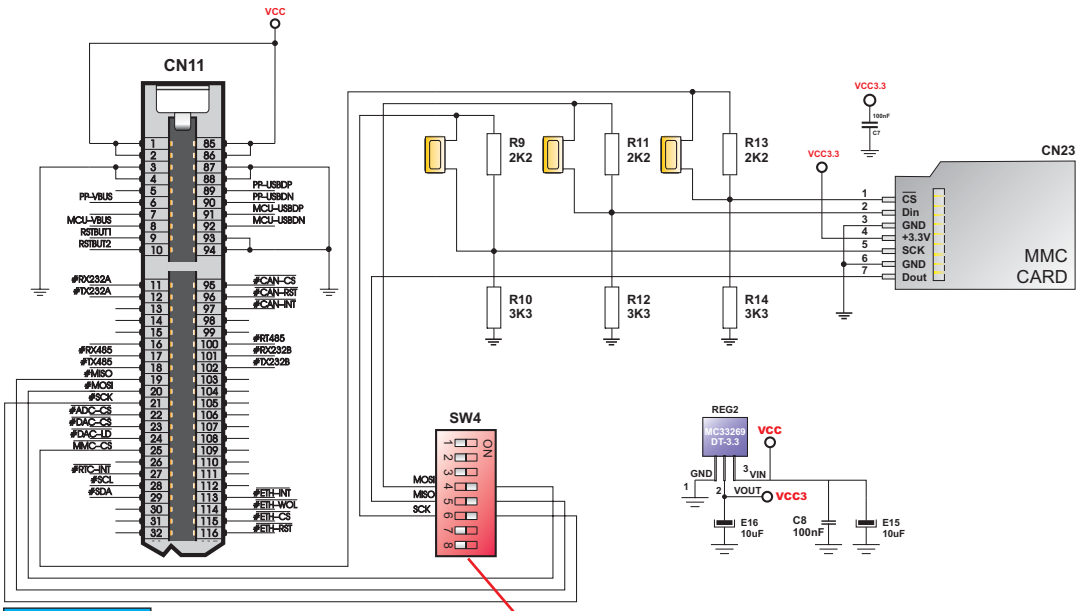
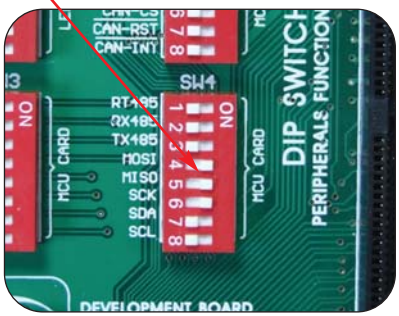
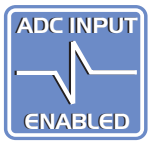


Figure 36. MMC Card schematically





A/D CONVERTER INPUT

Analog-to-digital converter is a semiconductor device used to convert an analog signal into a digital code. In the real world, most of the signals sensed and processed by humans are analog signals. Analog-to-digital conversion is a primary means by which analog signals are converted into digital data which can be processed by computers for various purposes.
Analog signal is a signal that may assume any value within a continuous range. Device used to convert an analog signal into an analog voltage or current is known as a transducer. The analog-to-digital converter is used to translate further this analog voltage or current into digital codes that consist of 1's and 0's.

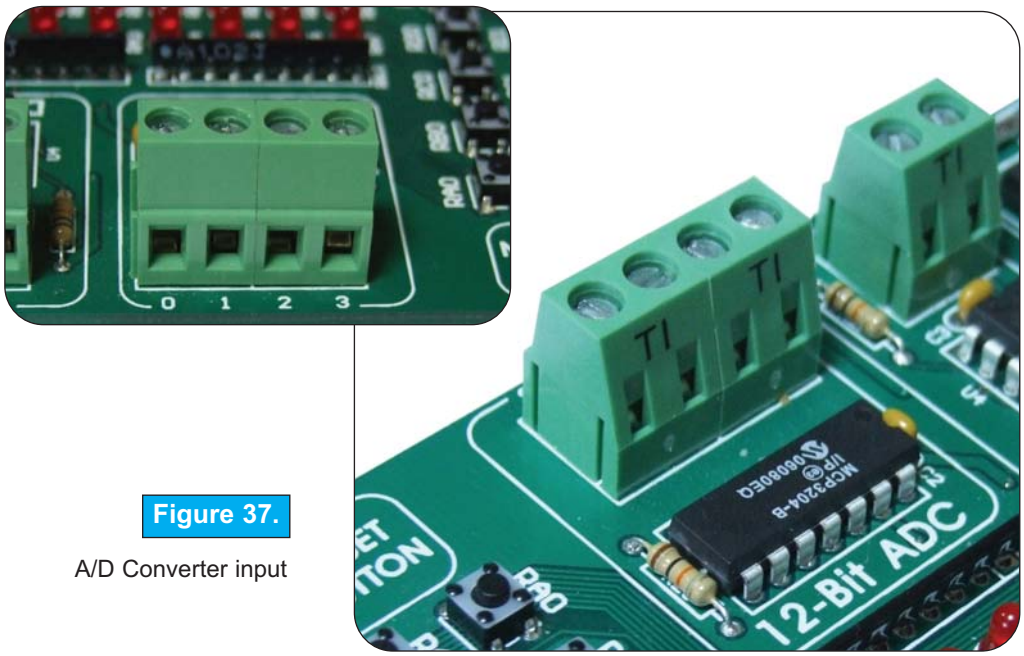


Figure 37.

A/D Converter input

UNI-DS2 development board has 12-bit, 4 input A/D converter MCP3204 with serial interface. As shown in Figure 39, switches on **SW3** and **SW4** are used to enable communication between microcontroller and AD converter device. Switch 2 on **SW3** is used for AD Chip Select (AD-CS), and switches 4, 5 and 6 on **SW3** have to be turned on in order to enable SPI communication between ADC device and microcontroller.

VREF 4.096V ON-BOARD

D/A CONVERTER

Digital-to-analog converter is a semiconductor device used to convert a digital code into an analog signal. The typical digital-to-analog converter outputs an analog signal, usually voltage or current which is proportional to the value of the digital code provided to it's inputs.

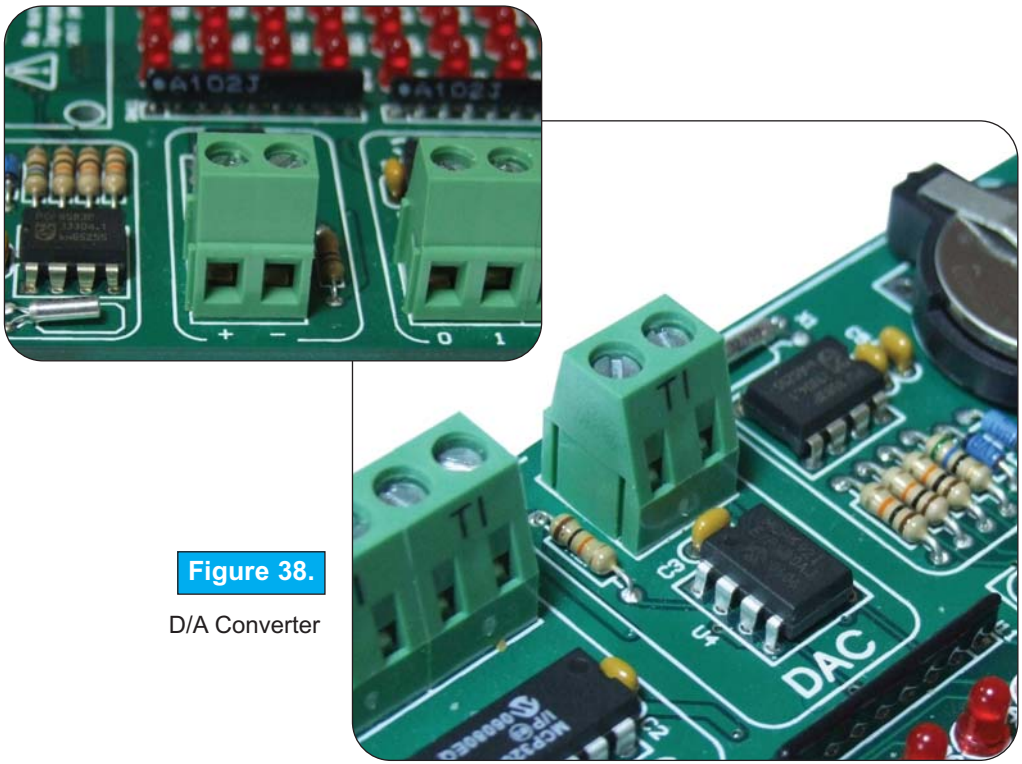
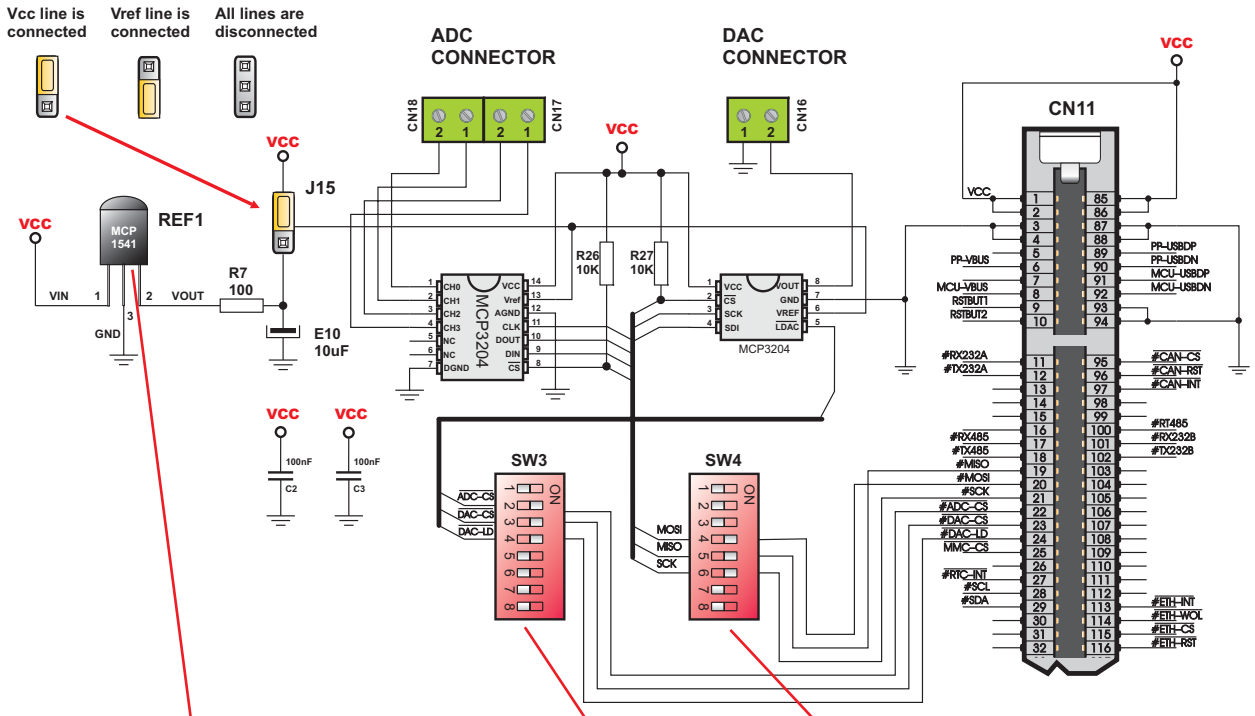


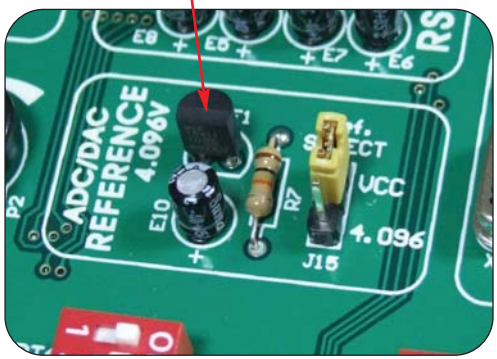
Figure 38.

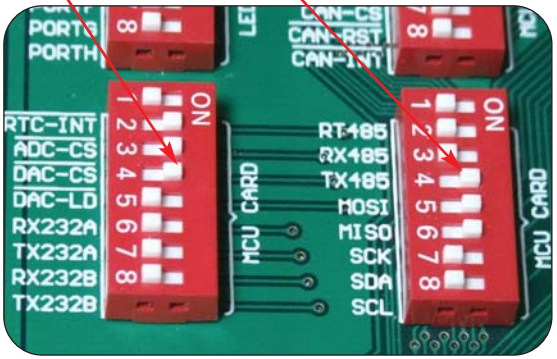
D/A Converter

UNI-DS3 has 12-bit D/A converter MCP4921 with serial interface. In order to enable D/A converter, switches 3 and 4 on **SW3** have to be turned on, as well as switches 4, 5 and 6 on **SW4**, which role is to enable SPI communication between microcontroller and D/A converter. D/A converter is schematically shown in Figure 39.

Figure 39. Converters schematically







REAL TIME CLOCK

Real-Time Clock (RTC) is an integrated circuit chip that keeps track of the current time even when the microcontroller is turned off. Real-time clock runs using a special battery which is not connected to normal power supply.

In order to enable Real-Time Clock, switch groups **SW3** and **SW4** are used. You have to turn on switch 1 on **SW3**, and switches 7 and 8 on **SW4** in order to connect the Real-Time Clock to the microcontroller's pins.

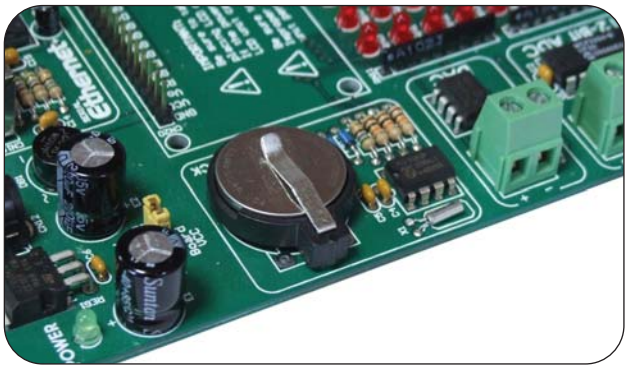


Figure 40.
Real-Time Clock

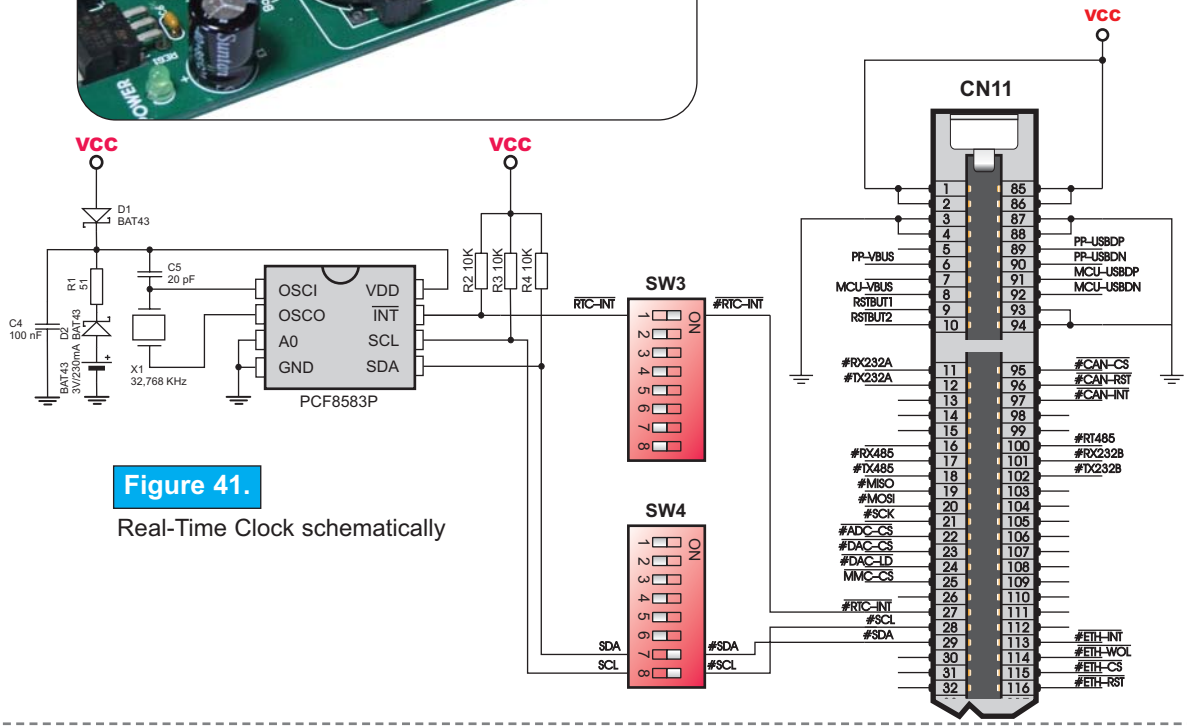


Figure 41.
Real-Time Clock schematically

mikroICD (Real-Time Hardware In-Circuit Debugger)

mikroICD is a highly effective tool for Real-Time debugging on hardware level. mikroICD debugger enables you to execute a program on microcontroller and see variables' values, Special Function Registers (SFR) and EEPROM while the program is running.

You can use the mikroICD within any of MikroElektronika's compilers for PIC and dsPIC (mikroC, mikroBasic or mikroPascal). All you have to do is to select appropriate build type (Release or ICD Debug), build the project, program the MCU and select appropriate debugger (mikroICD Debugger), then you are ready to go.

Note: For more information on how to use mikroICD debugger please refer to the mikroICD documentation: *"mikroICD User's Manual"*. You can also find it within the Help documentation inside any of mentioned compilers.

mikroICD debugger uses on-board programmer to communicate with compiler and it supports common debugger commands:

Start Debugger	[F9]
Run/ Pause Debugger	[F6]
Toggle Breakpoints	[F5]
Run to cursor	[F4]
Step Into	[F7]
Step Over	[F8]
Flush RAM	[F2]
Stop Debugger	[Ctrl+F2]

microICD is supported by the following MCU Cards:

- PIC DIP40 MCU Card
- PIC 80-pin MCU Card
- dsPIC MCU Card

PLACING MCU CARDS

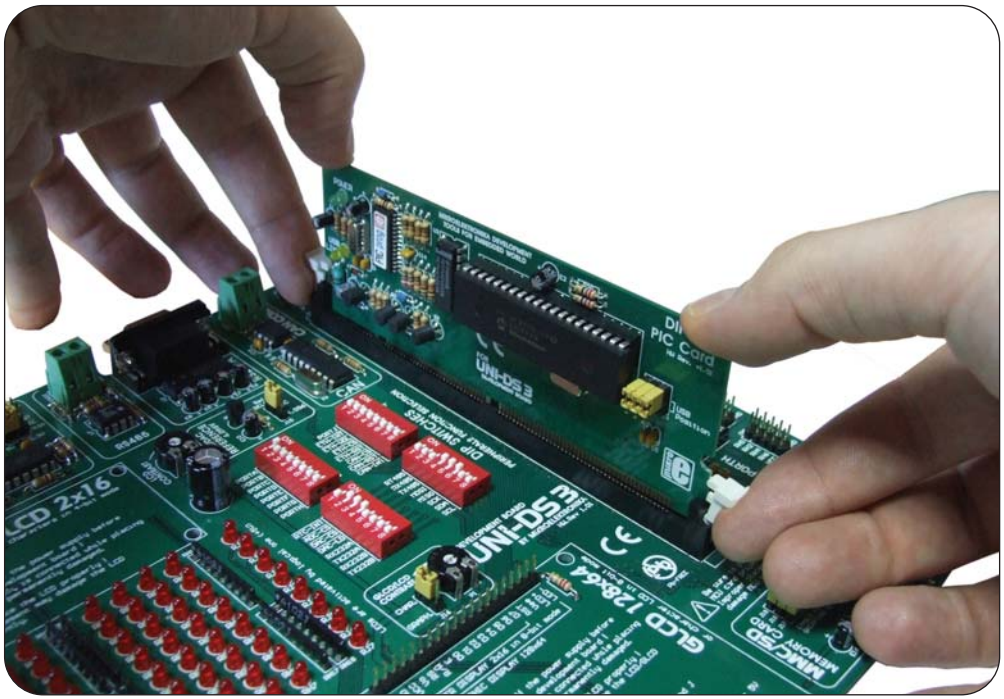


Figure 42. Placing MCU Card

UNI-DS3 development board supports a broad range of MCU families. Each MCU family has it's own MCU Card which can be connected to UNI-DS3 development board via 168-pin connector.
All you have to do in order to switch between different MCU Cards is to remove the existing MCU Card from the MCU socket and place a new one.

Note: Make sure to place MCU Card properly. Improper placement may damage MCU Card or development board permanently!

8051 MCU CARD

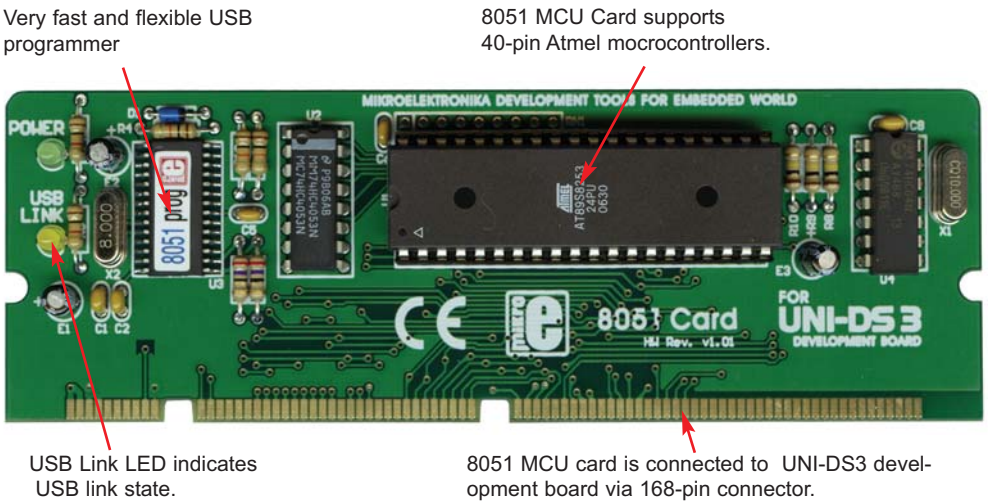


Figure 43. 8051 MCU Card

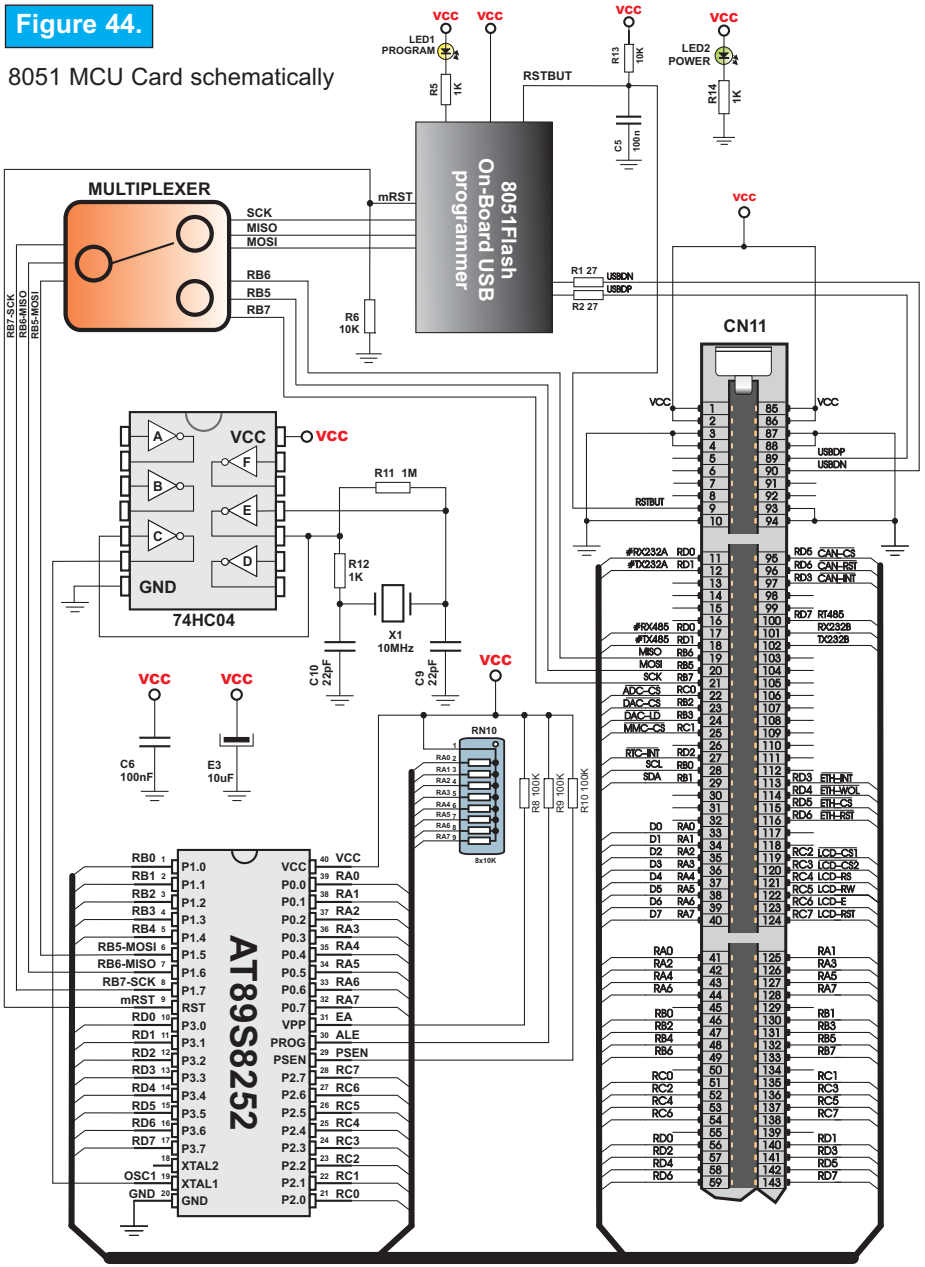
8051 MCU Card is delivered with AT89S52 40-pin microcontroller. Users can remove this one and fit different microcontroller supported.
The 8051 MCU Card supports AT89S51, AT89S52, AT89S53, AT89S8252 and AT89S8253 microcontrollers.

There is no need to use external equipment during programming because 8051 MCU Card has its own on-board USB2.0 programmer. All you need to do is to connect the UNI-DS3 development system to PC using USB cable. Then, load your program into the microcontroller via the *8051Flash* programming software which is supplied with the product CD.

Microcontroller pins are routed to various peripherals connected to the UNI-DS3 development board MCU socket (Fig. 3). Every pin on the 8051 MCU Card (schematically shown in Fig. 44) is labelled with a pin number which corresponds with the same pin number on the UNI-DS3 development board. Each pin used on the 8051 MCU Card has also a logical label which describes pin function.

Figure 44.

8051 MCU Card schematically



CONNECTING 8051 MCU CARD

Before you move to the next step of instalation make sure that you have placed your 8051 MCU Card properly into MCU Socket on your UNI-DS3 development board and that USB cable is connected to your PC.

Step no.2 Install the 8051FLASH programmer and drivers for the 8051 MCU Card.
Start installation from the product CD:
CD_Drive:\product\zip\8051Flash_setup.exe.

Step no.3 After this installation connect USB cable to the UNI-DS3 board. You'll be asked for 8051FLASH drivers. Select drivers in order to finish installation. The drivers are placed in the folder:
System_Drive:\Program Files\MikroElektronika\8051FLASH\Driver.NT.

Step no.4 Run and use 8051FLASH as explained in the document '*8051flash programmer*'. The document is placed in the following folder on the product CD:
CD_Drive:\product\pdf\8051prog_manual.pdf.

After these 4 steps, your 8051 MCU Card is installed and ready for use. You can try to read a program from the chip or to load an example from the examples folder of mikroElektronika's compilers for 8051 or from the product CD:
CD_Drive:\product\zip\UNI_DS3_8051_examples.zip.

AVR MCU CARD

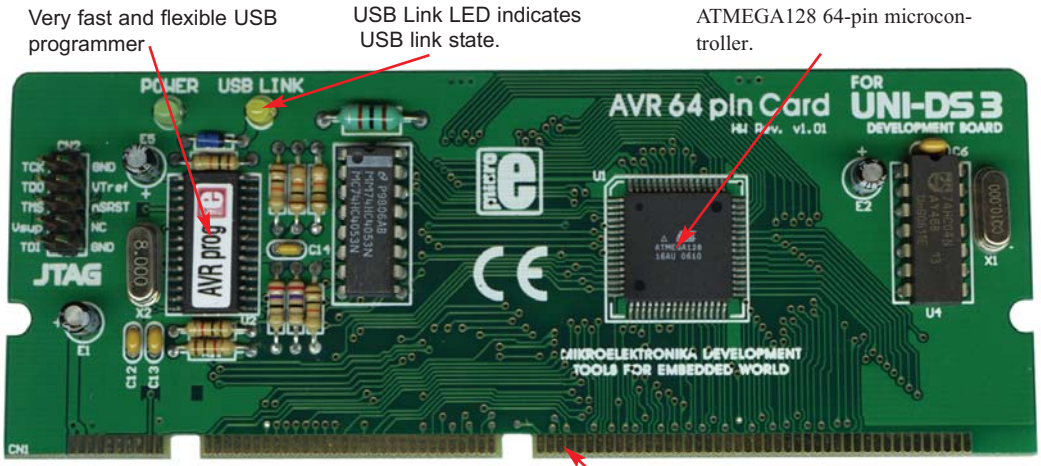


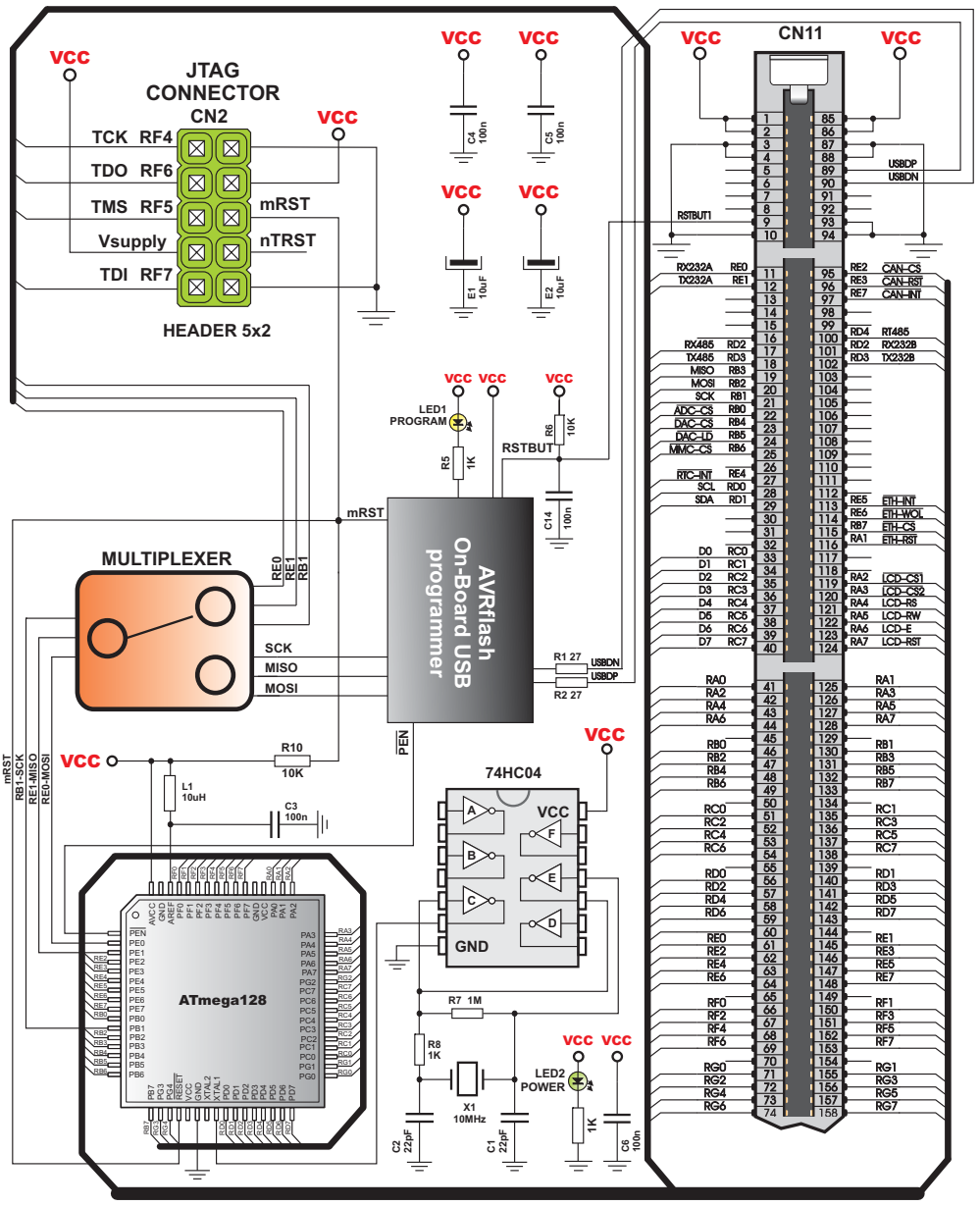
Figure 45. AVR MCU Card

AVR MCU Card is delivered with an Amtel ATMEGA128 64-pin microcontroller.

There is no need to use external equipment during programming because AVR MCU Card has it's own on-board USB2.0 programmer. All you need to do is to connect UNI-DS3 development system to PC using USB cable. Then, load your program into the microcontroller via the *AVRFlash* programming software which is supplied with the product CD.

Microcontroller pins are routed to various peripherals connected to the UNI-DS3 development board MCU socket (Fig. 3). Every pin on the AVR MCU Card (schematically shown in Fig. 46) is labelled with a pin number which corresponds with the same pin number on the UNI-DS3 development board. Each pin used on the AVR MCU Card has also a logical label which describes pin function.

Figure 46. AVR MCU Card schematic



CONNECTING AVR MCU CARD

Before you move to the next step of installation make sure that you have placed your AVR MCU Card properly into MCU Socket on your UNI-DS3 development board and that USB cable is connected to your PC.

Step no.2 Install AVRProg programmer and drivers for the AVR MCU Card.
Start installation from the product CD:
CD_Drive:\product\zip\AVRFlash_setup.exe.

Step no.3 After this installation connect USB cable to the UNI-DS3 board. You'll be asked for AVRProg drivers. Select drivers in order to finish installation. The drivers are placed in the folder:
System_Drive:\Program Files\MikroElektronika\AVRFLASH\Driver.NT.

Step no.4 Run and use AVRProg as explained in the document '*AVRflash programmer*'. The document is placed in the following folder on the product CD:
CD_Drive:\product\pdf\AVRprog_manual.pdf.

After these 4 steps, your AVR MCU Card is installed and ready for use. You can try to read a program from the chip or to load an example from the examples folder of mikroElektronika's compilers for AVR or from the product CD:
CD_Drive:\product\zip\UNI_DS3_AVR_examples.zip.

ARM MCU CARD

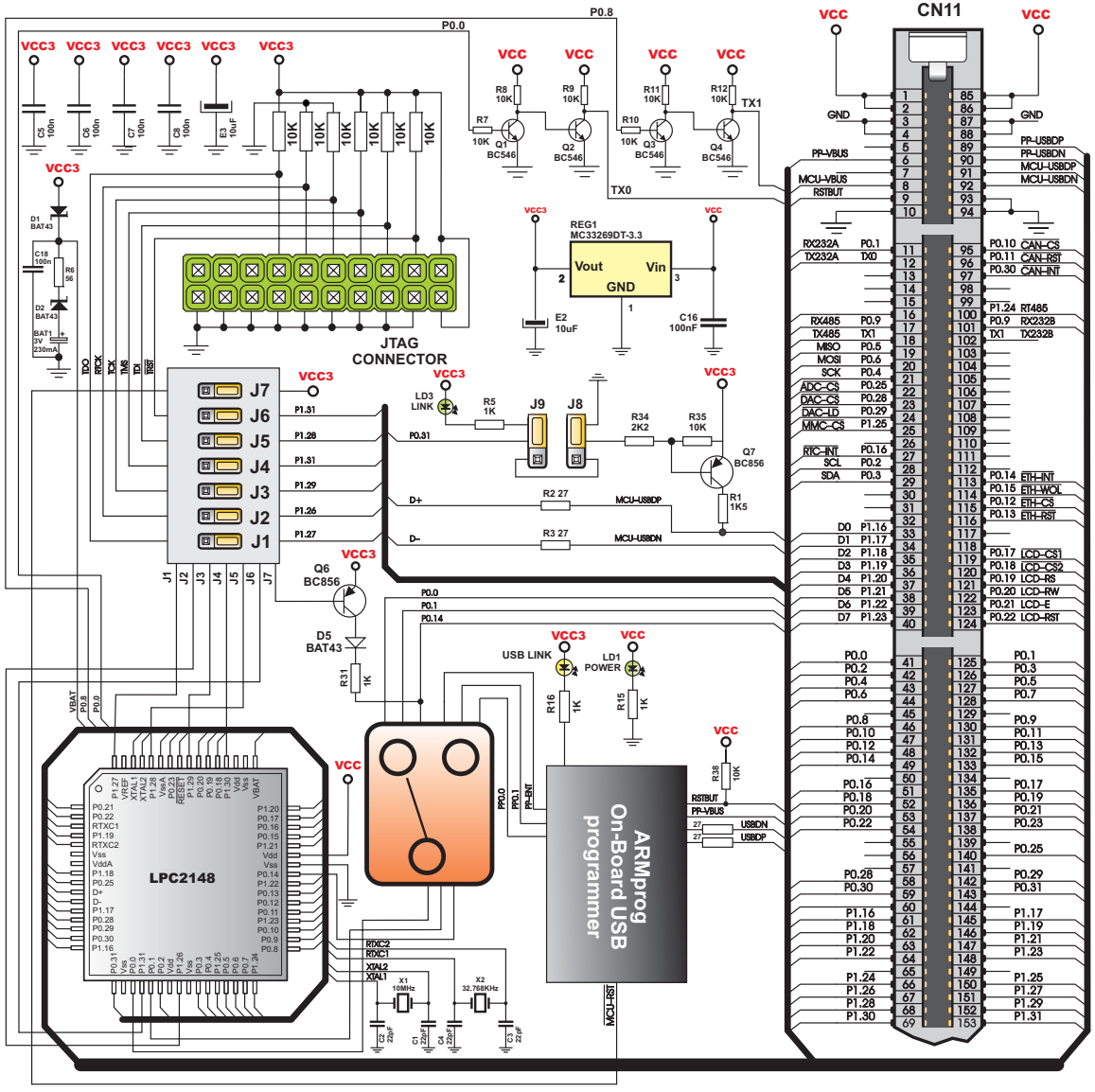
Figure 47.
ARM Card

ARM MCU Card is delivered with LPC2148 64-pin microcontroller.

There is no need to use external equipment during programming because ARM MCU Card has it's own on-board USB2.0 programmer. All you need to do is to connect UNI-DS3 development system to PC using USB cable. Then, load your program into the microcontroller via the *ARMFlash* programming software which is supplied with the product CD.

Microcontroller pins are routed to various peripherals connected to the UNI-DS3 development board MCU socket (Fig. 3). Every pin on the ARM MCU Card (schematically shown in Fig. 48) is labelled with a pin number which corresponds with the same pin number on the UNI-DS3 development board. Each pin used on the ARM MCU Card has also a logical label which describes pin function.

Figure 48. ARM MCU Card schematically



CONNECTING ARM MCU CARD

Before you move to the next step of installation make sure that you have placed your ARM MCU Card properly into MCU Socket on your UNI-DS3 development board and that USB cable is connected to your PC.

Step no.2 Install ARMFLASH programmer and drivers for the ARM MCU Card.
Start instalation from the product CD:
CD_Drive:\product\zip\ARMFlash_setup.exe.

Step no.3 After this installation connect USB cable to the UNI-DS3 board. You'll be asked for ARMFLASH drivers. Select drivers in order to finish installation. The drivers are placed in the folder:
System_Drive:\Program Files\MikroElektronika\ARMFLASH\Driver.NT.

Step no.4 Run and useARMFLASH as explained in the document '*ARMflash programmer*'. The document is placed in the following folder on the product CD:
CD_Drive:\product\pdf\ARMflash_manual.pdf.

After these 4 steps, your ARM MCU Card is installed and ready for use. You can try to read a program from the chip or to load an example from the examples folder of mikroElektronika's compilers for ARM or from the product CD:
CD_Drive:\product\zip\UNI_DS3_ARM_examples.zip.

PSoC MCU CARD

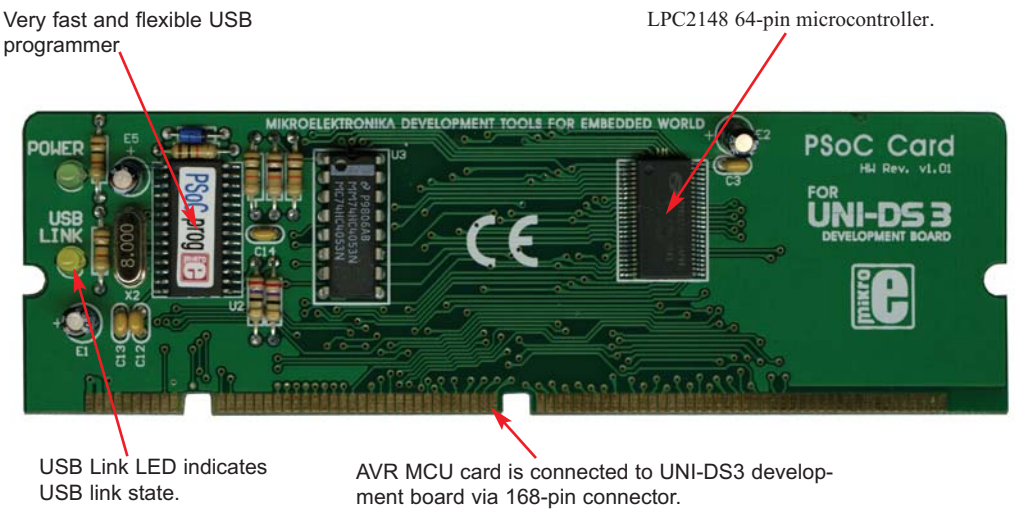


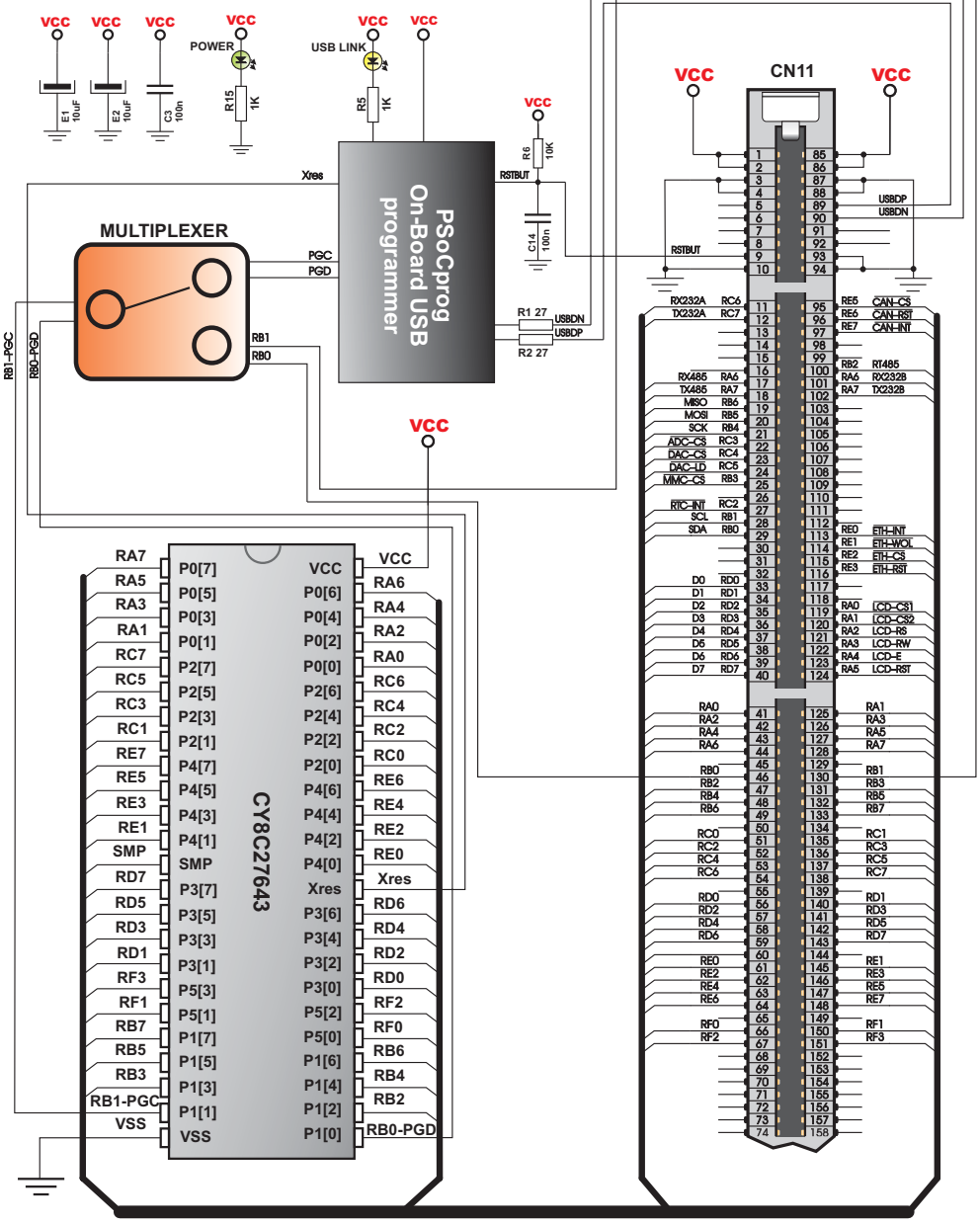
Figure 49. PSoC MCU Card

PSoC MCU Card is delivered with Cypress Semiconductor's CY8C27643 48-pin microcontroller.

There is no need to use external equipment during programming because PSoC MCU Card has it's own on-board USB2.0 programmer. All you need to do is to connect UNI-DS3 development system to PC using USB cable. Then, load your program into the microcontroller via the *PSoCFlash* programming software which is supplied with the product CD.

Microcontroller pins are routed to various peripherals connected to the UNI-DS3 development board MCU socket (Fig. 3). Every pin on the PSoC MCU Card (schematically shown in Fig. 50) is labelled with a pin number which corresponds with the same pin number on the UNI-DS3 development board. Each pin used on the PSoC MCU Card has also a logical label which describes pin function.

Figure 50. PSoC MCU Card schematically



CONNECTING PSoC MCU CARD

Before you move to the next step of installation make sure that you have placed your PSoC MCU Card properly into MCU Socket on your UNI-DS3 development board and that USB cable is connected to your PC.

Step no.2 Install PSoCFLASH programmer and drivers for the PSoC MCU Card.
Start installation from the product CD:
CD_Drive:\product\zip\PSoCFlash_setup.exe.

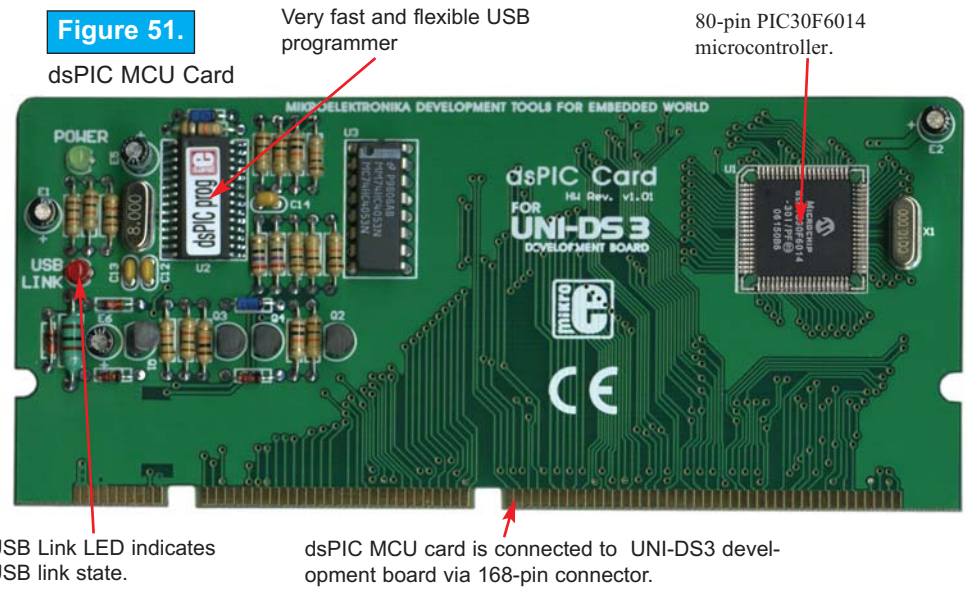
Step no.3 After this installation connect USB cable to the UNI-DS3 board. You'll be asked for PSoCFLASH drivers. Select drivers in order to finish installation. The drivers are placed in the folder:
System_Drive:\Program Files\MikroElektronika\PSoCFLASH\Driver.NT.

Step no.4 Run and usePSoCFLASH as explained in the document '*PSoCflash programmer*'. The document is placed in the following folder on the product CD:
CD_Drive:\product\pdf\PSoCprog_manual.pdf.

After these 4 steps, your PSoC MCU Card is installed and ready for use. You can try to read a program from the chip or to load an example from the examples folder of mikroElektronika's compilers for PSoC or from the product CD:
CD_Drive:\product\zip\UNI_DS3_PSoC_examples.zip.

dsPIC MCU CARD

Figure 51.
dsPIC MCU Card

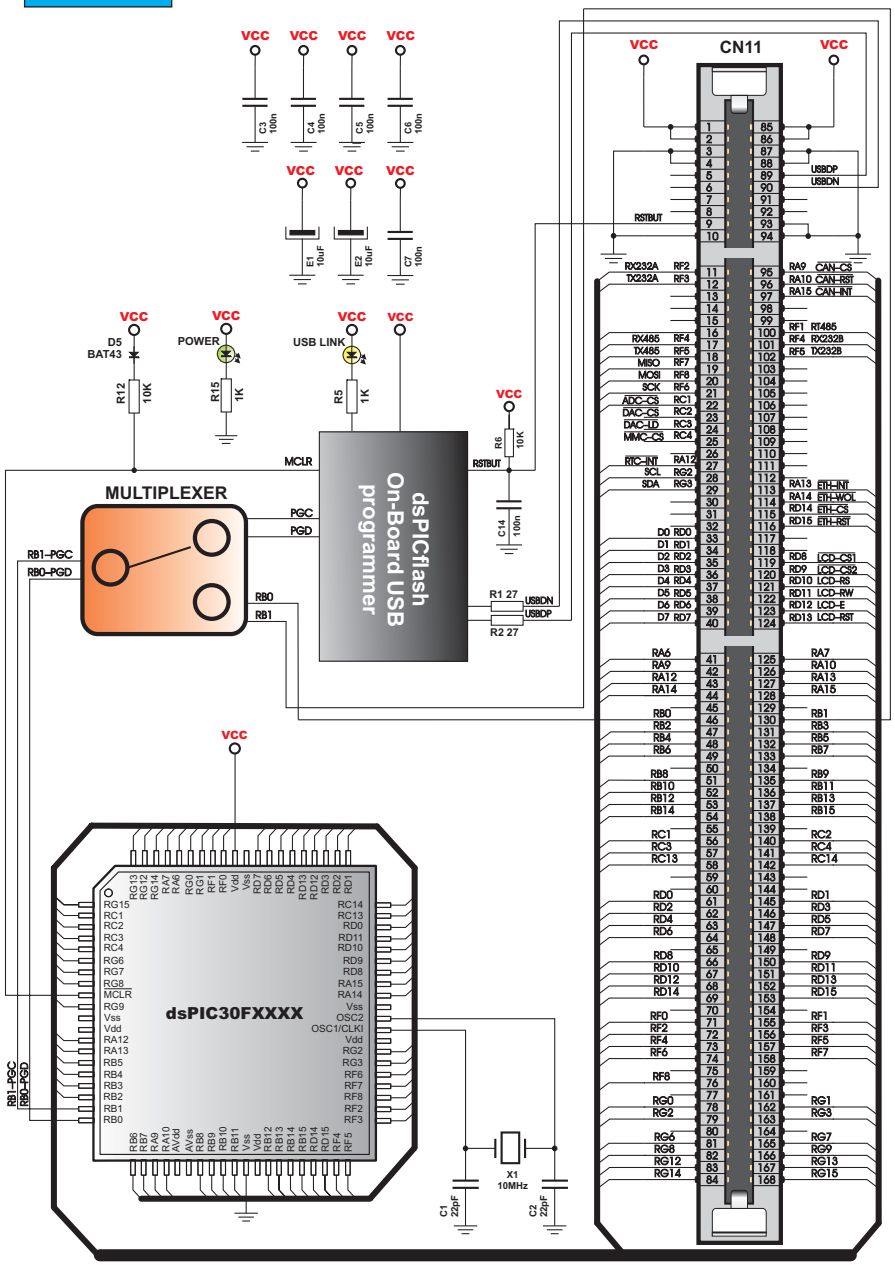


dsPIC MCU Card is delivered with Microchip's PIC30F6014A 80-pin microcontroller.

There is no need to use external equipment during programming because dsPIC MCU Card has it's own on-board USB2.0 programmer. All you need to do is to connect UNI-DS3 development system to PC using USB cable. Then, load your program into the microcontroller via the dsPIC*Flash* programming software which is supplied with the product CD.

Microcontroller pins are routed to various peripherals connected to the UNI-DS3 development board MCU socket (Fig. 3). Every pin on the dsPIC MCU Card (schematically shown in Fig. 52) is labelled with a pin number which corresponds with the same pin number on the UNI-DS3 development board. Each pin used on the dsPIC MCU Card has also a logical label which describes pin function.

Figure 52. dsPIC MCU Card connector schematically



CONNECTING dsPIC MCU CARD

Before you move to the next step of installation make sure that you have placed your dsPIC MCU Card properly into MCU Socket on your UNI-DS3 development board and that USB cable is connected to your PC.

Step no.2 Install dsPICFLASH programmer and drivers for the dsPIC MCU Card.
Start installation from the product CD:
CD_Drive:\product\zip\dsPICFlash_setup.exe.

Step no.3 After this installation connect USB cable to the UNI-DS3 board. You'll be asked for dsPICFLASH drivers. Select drivers in order to finish installation. The drivers are placed in the folder:
System_Drive:\Program Files\MikroElektronika\dsPICCFLASH\Driver.NT.

Step no.4 Run and use dsPICFLASH as explained in the document '*dsPICflash programmer*'. The document is placed in the following folder on the product CD:
CD_Drive:\product\pdf\dsPICprog_manual.pdf.

After these 4 steps, your dsPIC MCU Card is installed and ready for use. You can try to read a program from the chip or to load an example from the examples folder of mikroElektronika's compilers for dsPIC or from the product CD:
CD_Drive:\product\zip\UNI_DS3_dsPIC_examples.zip.

PIC DIP40 MCU CARD

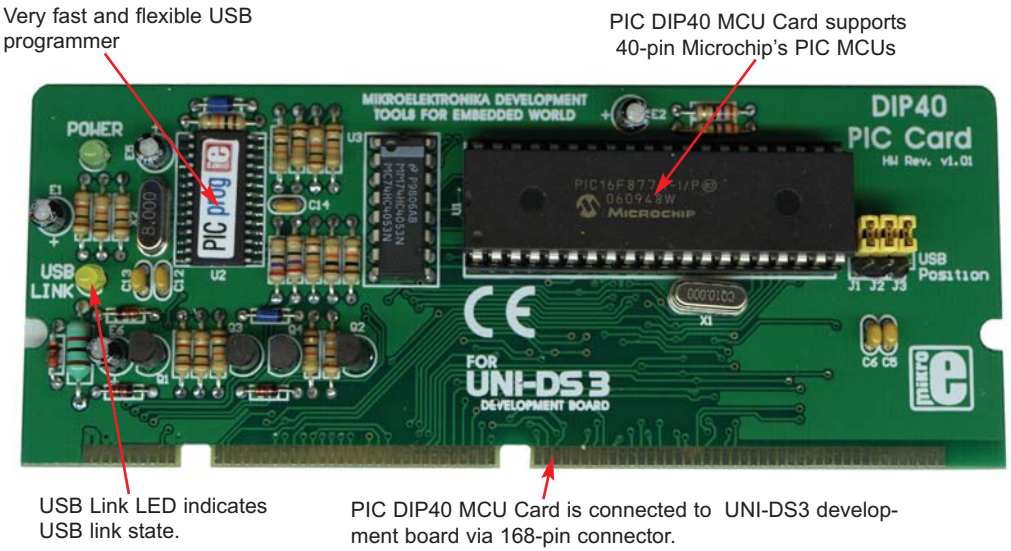


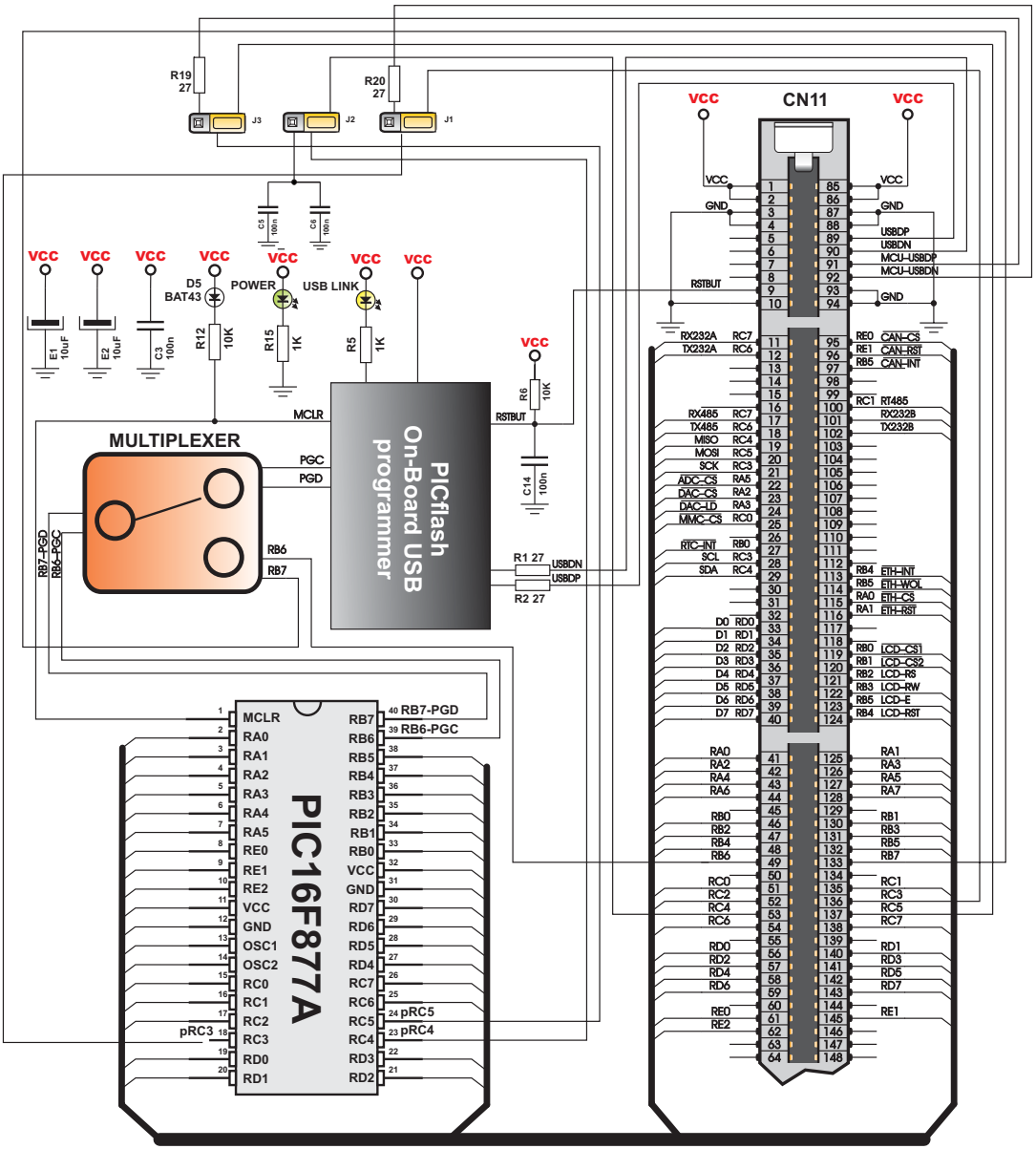
Figure 53. PIC DIP40 MCU Card

PIC DIP40 MCU Card is delivered with Microchip's PIC16F877A 40-pin microcontroller. Users can remove this one and fit a different microcontroller supported.
PIC DIP40 MCU Card supports all 40-pin Microchip's PIC microcontrollers. For example, PIC18F4520, PIC18F4550 etc.

There is no need to use external equipment during programming because PIC DIP40 MCU Card has it's own on-board USB2.0 programmer. All you need to do is to connect UNI-DS3 development system to PC using USB cable. Then, load your program into the microcontroller via the PIC*Flash* programming software which is supplied with the product CD.

Microcontroller pins are routed to various peripherals connected to the UNI-DS3 development board MCU socket (Fig. 3). Every pin on the PIC DIP40 MCU Card (schematically shown in Fig. 54) is labelled with a pin number which corresponds with the same pin number on the UNI-DS3 development board. Each pin used on the PIC DIP40 MCU Card has also a logical label which describes pin function.

Figure 54. PIC DIP40 MCU Card schematically



CONNECTING PIC DIP40 MCU CARD

Before you move to the next step of installation make sure that you have placed your PIC DIP40 MCU Card properly into MCU Socket on your UNI-DS3 development board and that USB cable is connected to your PC.

Step no.2 Install PICFLASH programmer and drivers for the PIC DIP40 MCU Card.
Start installation from the product CD:
CD_Drive:\product\zip\PICFlash_setup.exe.

Step no.3 After this installation connect USB cable to the UNI-DS3 board. You'll be asked for PICFLASH drivers. Select drivers in order to finish installation. The drivers are placed in the folder:
System_Drive:\Program Files\MikroElektronika\PICCFLASH\Driver.NT.

Step no.4 Run and use PICFLASH as explained in the document '*PICflash programmer*'. The document is placed in the following folder on the product CD:
CD_Drive:\product\pdf\PICflash_manual_v4.pdf.

After these 4 steps, your PIC DIP40 MCU Card is installed and ready for use. You can try to read a program from the chip or to load an example from the examples folder of mikroElektronika's compilers for PIC or from the product CD:
CD_Drive:\product\zip\UNI_DS3_PICDIP40_examples.zip.

PIC 80pin MCU CARD

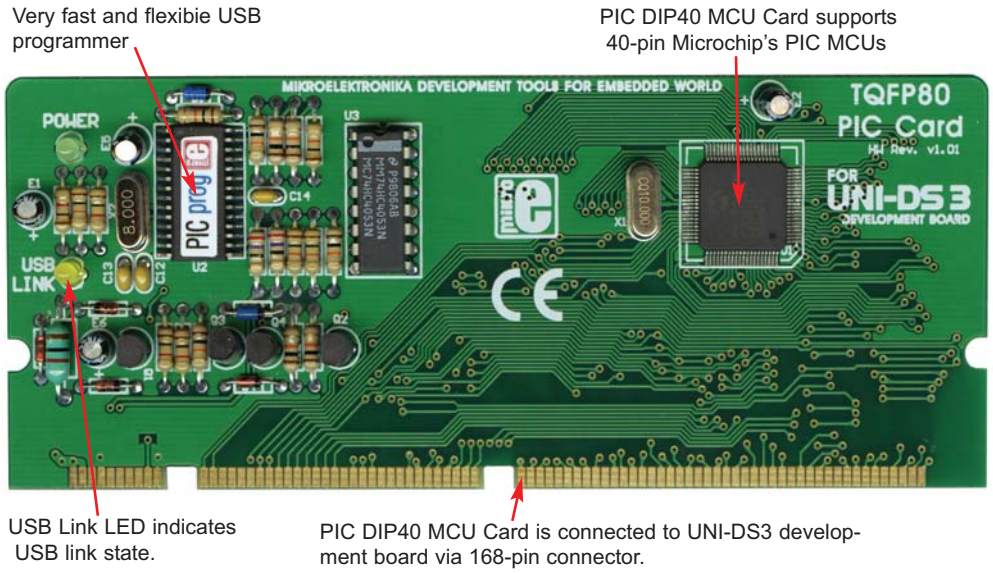


Figure 55. PIC 80-pin MCU Card

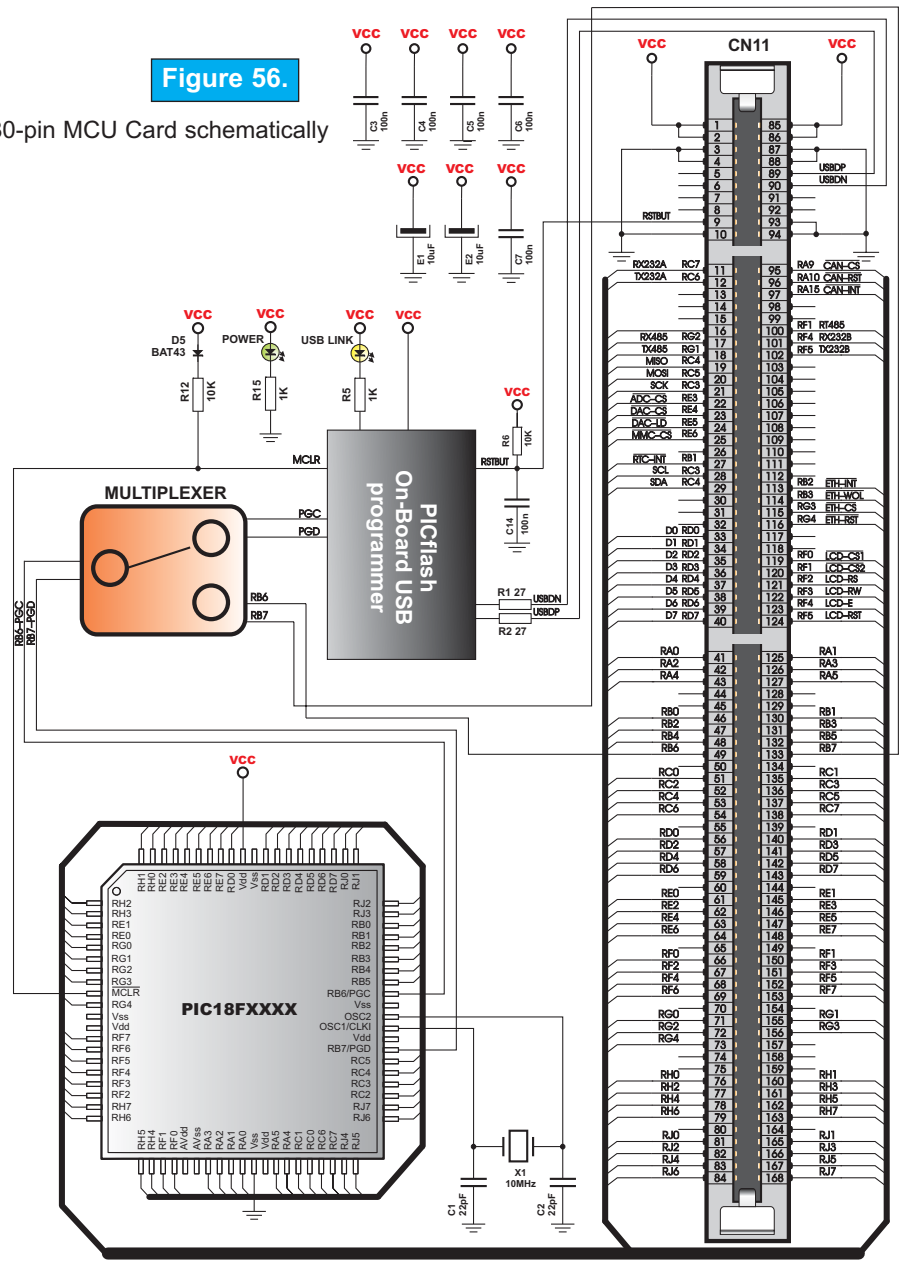
PIC 80-pin MCU Card is delivered with Microchip's PIC18F8520 80-pin microcontroller.

There is no need to use external equipment during programming because PIC 80-pin MCU Card has it's own on-board USB2.0 programmer. All you need to do is to connect UNI-DS3 development system to PC using USB cable. Then, load your program into the microcontroller via the PIC*Flash* programming software which is supplied with the product CD.

Microcontroller pins are routed to various peripherals connected to the UNI-DS3 development board MCU socket (Fig. 3). Every pin on the PIC 80-pin MCU Card (schematically shown in Fig. 56) is labelled with a pin number which corresponds with the same pin number on the UNI-DS3 development board. Each pin used on the PIC 80-pin MCU Card has also a logical label which describes pin function.

Figure 56.

PIC 80-pin MCU Card schematically



CONNECTING PIC 80pin MCU CARD

Before you move to the next step of installation make sure that you have placed your PIC 80pin MCU Card properly into MCU Socket on your UNI-DS3 development board and that USB cable is connected to your PC.

Step no.2 Install PICFLASH programmer and drivers for the PIC 80pin MCU Card.
Start installation from the product CD:
CD_Drive:\product\zip\PICFlash_setup.exe.

Step no.3 After this installation connect USB cable to the UNI-DS3 board. You'll be asked for PICFLASH drivers. Select drivers in order to finish installation. The drivers are placed in the folder:
System_Drive:\Program Files\MikroElektronika\PICCFLASH\Driver.NT.

Step no.4 Run and use PICFLASH as explained in the document '*PICflash programmer*'. The document is placed in the following folder on the product CD:
CD_Drive:\product\pdf\PICflash_manual_v4.pdf.

After these 4 steps, your PIC 80pin MCU Card is installed and ready for use. You can try to read a program from the chip or to load an example from the examples folder of mikroElektronika's compilers for PIC or from the product CD:
CD_Drive:\product\zip\UNI_DS3_PIC80pin_examples.zip.

Second edition
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UNI-DS3

MikroElektronika
Tools-Compilers-Books
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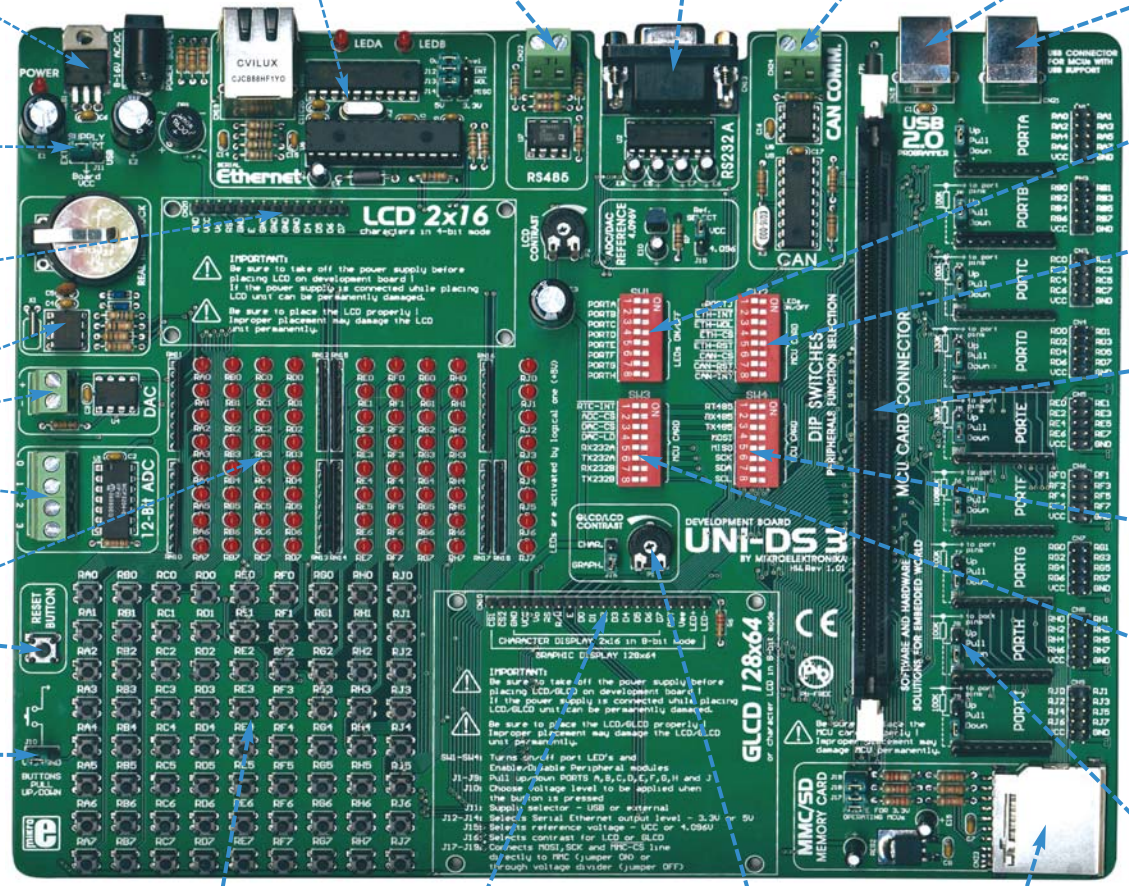
Universal Development tool



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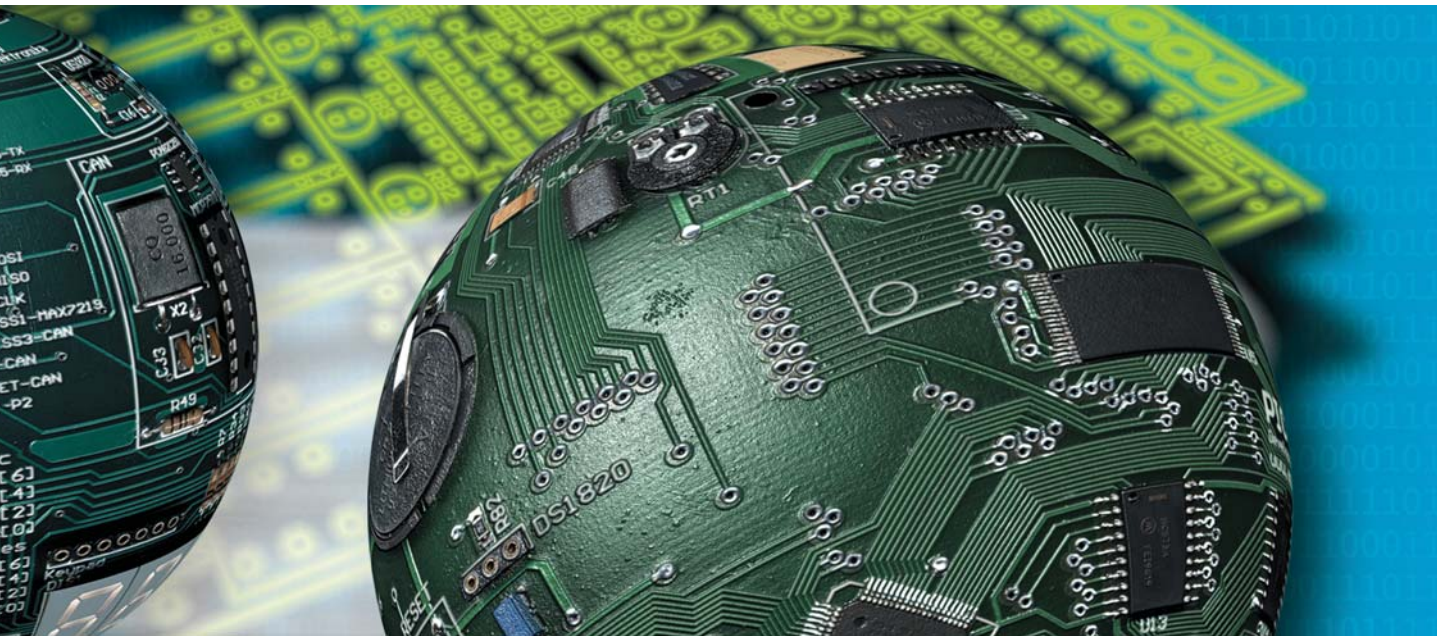

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