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Nebojša Matic
General Manager

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# mikroBoard for ARM 64-pin

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1. General information

MikroBoard for ARM 64-pin is primarily intended to be connected to the EasyARM v6 development system but can also be used as a stand-alone device. The board features the LPC2148 microcontroller, flash module, USB connectors, microSD connector, JTAG connector, USB UART, voltage regulator and connectors that enable connection with a development system.

![MikroBoard for ARM 64-pin](Figure 1-1: mikroBoard for ARM 64-pin)
2. LPC2148 microcontroller

The LPC2148 microcontroller in 64-pin LQFP package is soldered on the mikroBoard for ARM 64-pin. Some of its key features are:

- 16-bit/32-bit ARM7TDMI-S microcontroller in a tiny LQFP64 package
- 40 kB of on-chip static RAM and 512 kB of on-chip flash memory. 128-bit wide interface/ accelerator enables high-speed 60 MHz operation
- In-System Programming/In-Application Programming (ISP/IAP) via on-chip boot loader software. Single flash sector or full chip erase in 400 ms and programming of 256 B in 1 ms
- USB 2.0 full-speed compliant device controller with 2 kB of endpoint RAM
- Low power Real-Time Clock (RTC) with independent power and 32 kHz clock input

![Figure 2-1: LPC2148 microcontroller](image)

The LPC2148 is connected to on-board modules via pins which are also connected to the CN1 and CN2 connectors. These two connectors enable the board to be connected to the EasyARM v6 development system or some other device.
The LPC2148 microcontroller is connected to the X1 and X2 oscillators. The X1 oscillator generates a clock used for the operation of the microcontroller, whereas the X2 oscillator is used for the operation of the RTC module built into the microcontroller. The microcontroller can be cleared by feeding the reset pin with a logic 0, i.e. by pressing the RESET button.
Figure 2-3: LPC2148 microcontroller with connectors connection schematic
3. Programming the microcontroller

The microcontroller can be programmed with a bootloader or the JTAG programmer. The use of bootloader is enabled due to the bootloader code that is loaded into the microcontroller. In order to program the microcontroller with the bootloader, it is necessary to connect the board to a PC via the CN3 connector and USB cable, figure 3-1. A .hex code is transferred from the PC to the microcontroller by using some of the bootloader programs, such as Flash Magic.

The CN3 USB connector is connected to the UART module built into the microcontroller via FTDI module (FT232RL).

When the mikroBoard for ARM 64-pin operates as a stand-alone device, it is necessary to place jumper J3 on the board. If the board is connected to the EasyARM v6 development system, jumper J3 should be removed.
The following steps explain how to program the microcontroller with bootloader via the Flash Magic application.

**STEP 1: Connect the system to a PC**

Connect the mikroBoard for ARM 64-pin to available USB port on your PC.

**STEP 2: Start Flash Magic**

Download the Flash Magic application from http://www.flashmagictool.com/download.html\&d=FlashMagic.exe and install it on your PC.

When the installation is finished, double click on the Flash Magic icon.

**STEP 3: Select MCU**

Click on the Select Device button, select MCU from the list, and click OK.
STEP 4: Settings

From the drop-down menu select COM port on your PC

Set Baud Rate to 19200

Enter 12 in the Oscillator field (if you use different oscillator enter its value in MHz instead)

Device Manager on your PC contains information on which COM port is used for USB communication with the mikroBoard for ARM 64-pin. In this case the COM4 port is used.

Right click on USB port, then on properties in the drop-down list

Select the Port Settings tab from pop-up window

Click on the Advanced... button

In pop-up window uncheck the Serial Enumeration option and click OK
**STEP 5: Browse for .hex file**

Click on the Browse button.

In pop-up window select the appropriate .hex file.

Click on the Open button.

**STEP 6: Upload .hex file**

Click Start to begin .hex file upload.

After progress bar becomes green programming is finished.
The microcontroller can also be programmed with the JTAG programmer, Figure 3-3. In addition, this programmer can also be used to test the operation of the microcontroller.

![Figure 3-3: JTAG connector](image)

In order to enable the JTAG programmer to be used, it is necessary to place jumper J4 in the ENABLE position, Figure 3-5. If the JTAG programmer is not used for programming, jumper J4 should be removed from the board, Figure 3-6.

![Figure 3-4: JTAG module connection schematic](image)

![Figure 3-5: JTAG is enabled](image)

![Figure 3-6: JTAG is disabled](image)
4. Voltage regulator

The on-board microcontroller operates at 3.3V power supply voltage. The board is powered with the 5V power supply voltage via the CN3 USB connector.

![Figure 4-1: Voltage regulator]

If the board is powered by a development system (EasyARM v6), the function of the voltage regulator remains the same. In this case, it is necessary to remove jumper J3 (STANDALONE), Figure 4-3.

![Figure 4-2: Voltage regulator connection schematic]

![Figure 4-3: Standalone mode disabled (development system connection)]

![Figure 4-4: Standalone mode enabled]
5. MicroSD connector

There is a connector CN5 provided on the development system that enables the use of microSD card. When inserted, the microSD card provides additional memory space that the microcontroller can use to store data. Communication between the microSD card and the microcontroller is performed via the Serial Peripheral Interface (SPI).

The pins' designations have the following meaning:

- **CS** - Chip Select
- **Din** - Master Out/Slave In (MOSI)
- **SCK** - Clock
- **Dout** - Master In/Slave Out (MISO)
6. Flash module

Flash module provides additional 8Mbit of flash memory that the microcontroller can use via the Serial Peripheral Interface (SPI).

Figure 6-1: Flash memory

Figure 6-2: Flash module connection schematic
7. USB communication

The USB connector CN7 enables USB devices to access the microcontroller. When connecting USB devices, jumpers J1 and J2 are used to determine whether the UP_LED or soft connect function will be active. When jumpers J1 and J2 are placed in the UP_LED position, a LED marked UP_LED (LD1) will illuminate if the connected USB device is configured. If the connected USB device is not configured, this LED will not illuminate. If jumpers J1 and J2 are placed in the CONNECT position, an external resistor of 1.5K will be automatically controlled by the software, thus enabling the soft connect function.

Figure 7-1: USB connector

Figure 7-2: UP_LED function

Figure 7-3: Soft connect function

Figure 7-4: USB connector connection schematic
Figure 7-5: Dimensions of the mikroBoard for ARM 64-pin
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