8051Flash[™]

User manual

Flash program is used to transfer a .hex file from a PC to the microcontroller memory by means of the appropriate hardware. Every flash program includes numerous options used for setting the microcontroller's configuration bits.

Programmer

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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1.0. Introduction to 8051prog Programmer

The 8051prog[™] programmer is a great tool used for programming 8051 microcontrollers from Atmel®. As a low-consumption device, it is ideal to be used with notebooks. It's unique design and simplicity make it a very popular tool among beginners and professional users alike. The 8051prog programmer communicates to the microcontroller through a USB cable which is also used for powering the programmer. In order to use this programmer, it is necessary to have the 8051*Plash* program and the appropriate driver, provided on the product CD, installed on your PC. After that, you can use the 8051prog programmer and a hex code generated in any 8051 compiler to load the program into an 8051 microcontroller.

The *8051prog* programmer is built into all Mikroelektronika's 8051 development systems. The same programmer is also available as a stand-alone device used for programming 8051 microcontrollers built into (soldered on) the target device.

The *8051prog* programmer is built into all Mikroelektronika's development systems designed for working with 8051 microcontrollers.



Figure 1-1: On-board 8051prog programmer

The *8051prog* programmer is also available as a standalone device used for programming 8051 microcontrollers built into (soldered on) the target device.



Figure 1-2: Stand-alone 8051prog programmer

The *8051Flash* program contains an option for selecting the microcontroller to be programmed. The latest version of this software with updated list of supported microcontrollers can be downloaded free of charge from our website at <u>www.mikroe.com</u>

| ile <u>D</u> evice Buffer Windows USB About History | |
|---|------------------------|
| | Device |
| LOCK Bits: | AT8958253 |
| Mode 1 | Device frequency [MHz] |
| | Read Write |
| No internal memory lock feature | Verify Erase |
| FUSE Bits | CODE DATA (EE) |
| V SPI Enable | Load Load |
| □ ≥2 Clock ▼ User Row Program | Reload |
| Clock Select: | Save |
| | CODE DATA |
| | Options |
| FLASH Size: 12 K Type: Unknown EEPROM Size: 2048 Bytes Device Status: Idle | Progress: |
| El Kon biel 2010 bytes Dence states, fait | 0% |
| ASH HEX File: C:\PROJECT\CANSPI.HEX | 4 |
| PROM HEX File: | |
| Device: AT8958253 | |

Figure 1-3: 8051Flash program's window

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2.0. Programming Microcontrollers

The process of programming microcontrollers starts by writing a program in one of 8051 compilers (*mikroC PRO for 8051*, *mikroBASIC PRO for 8051*, *mikroPASCAL PRO for 8051* etc.). When the program is correctly written, it should be compiled into a format that can be loaded into the microcontroller. The program to be loaded into the microcontroller has the .hex extension. As soon as the .hex file is generated, the program can be loaded into the microcontroller.

| Eile Edit | PRO for 8051 - C:\Program Files\Mikroelektronik View Project Run Tools Help I II II II II P & I A A I A II II II II II II II II A A II A II II A II II | Compiling program 1110001001 0110100011 0111 [2FC23AA7 1011 F43E0021A | MCU |
|-----------|---|---|--|
| Lcd.c | | Hex. DA67F0541 | |
| • | <pre>// LCD module connections sbit LCD_RS at P2_0_bit;</pre> | Loading hex code | 3 |
| • | <pre>sbit LCD_EN at P2_1_bit; (1)</pre> | mikroElektronika - 8051Elash Programmer [v2.'9] File Device Buffer Windows USB About History | |
| 30 | <pre>sbit LCD_D4 at P2_2_bit; sbit LCD_D5 at P2_3_bit; sbit LCD_D6 at P2_4_bit; sbit LCD_D6 at P2_4_bit; sbit LCD_D7 at P2_5_bit;</pre> | Lock Bits: Mode 1 No internal memory lock feature | Device AT8958253 Device frequency [MHz] Read Write Verify Erase |
| - | // End LCD module connections | FUSE Bits | CODE DATA (EE) Load Load |
| · · | <pre>char txt1[] = "mikroElektronika"; char txt2[] = "Easy8051 v6";</pre> | V Lar Row Program Clock Select: Crystal oscillator | Reload Reload Save Save DATA |
| • 40 | <pre>char txt3[] = "Lcd4bit"; char txt4[] = "example";</pre> | FLASH Size: 12 K Type: Unknown EERKOM Size: 2048 Bytes Device Status: I die | Options Progress: |
| 1 Write | a code in one of 8051 compilers and generate | FLASH HEX File: C:\PROJECT\CANSPILHEX EEPROM HEX File: | |

Device: AT8958253

 Write a code in one of 8051 compilers and generate a .hex file;

(2) In the *8051Flash* program's main window select the microcontroller and load the hex code into the programmer's buffer;

3 Click the Write button to program the microcontroller.

On the right side of the *8051Flash* program's window there are several options which make the programming process easier, whereas, on the left side of the window there are a number of options for microcontroller settings. Positioned in the bottom right corner of the window, the *Progress* bar enables you to monitor the programming process.

3.0. 8051Flash Program

The 8051Flash program is easy to use as all the options necessary for its operation are provided in a simple window which will appear either by clicking on the 8051FLASH icon or automatically by starting the programming process (*Build And Program* option) in one of 8051 compilers.

The options used for setting configuration bits are provided on the left side of the window, whereas the options for loading .hex file into the programmer and microcontroller are provided on the right side of the window.

The left side of the window can be different depending on the type of the microcontroller in use and its configuration bits.

| 💽 mikroElektronika - 8051Flash Programmer 🛛 [v2.10] | | To load the program into the microcontroller, do the following: |
|---|---|---|
| <u>File D</u> evice <u>B</u> uffer <u>W</u> indows <u>U</u> SB <u>A</u> bout <u>H</u> istory | | do the following. |
| LOCK Bits: | Device AT8958253 ① - Device frequency [MHz] Read 3 Write | Select the microcontroller to be programmed and the <i>8051Flash</i> will automatically set default parameters for working with the respective microcontroller |
| No internal memory lock feature | Verify Erase | Click the Load option to open the window to select the hex code to be loaded into the |
| FUSE Bits | CODE DATA (EE) | microcontroller |
| ☑ <u>S</u> PI Enable | 2 Load Load | |
| □ <u>×</u> 2 Clock | Reload Reload | |
| V User Row Program | Save Save | Click the Write option to start programming the microcontroller |
| Clock Select: | Jave Jave | |
| Crystal oscillator | CODE | |
| | Options | |
| FLASH Size: 12 K Type: Unknown EEPROM Size: 2048 Bytes Device Status: Idle | Progress: | The <i>Progress</i> bar shows the programming progress expressed in a percentage |
| FLASH HEX File: C:\PROJECT\CANSPI.HEX | (令) | |
| EEPROM HEX File: | | |
| Device: AT8958253 | | |

Figure 3-1: 8051Flash program's main window

The 8051Flash program enables a hex code, generated in some of 8051 compilers, to be loaded into the microcontroller. The hex code should be loaded first into the programmer's buffer by clicking the *Load* option, then into the microcontroller by clicking the *Write* option within the programmer's main window. The programming progress will be shown in the *Progress* bar positioned in the bottom right corner of the same window.

4.0. Software Installation

Before you use the 8051Flash program, it is necessary to install the appropriate driver. For more information refer to quick guide for installing USB drivers.

Step 1: Start installation

Insert the product CD into a CD drive. After a few seconds, a list with all Mikroelektronika's products will appear on the screen. To start the process of installing the *8051Flash* software, click on the setup icon provided in the *8051prog* section on the product CD:

CD Drive:/zip/8051flash_programmer.zip

You can also download the *8051Flash* free of charge from our website. In this case the installation starts from your hard drive. A welcome window appears. Click *Next* to proceed.

| Welcome to the 8051FLASH Programmer v2.10 Setup Wizard |
|--|
| This wizard will guide you through the installation of 8051FLASH Programmer v2.10. |
| It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer. |
| Click Next to continue. |
| |
| |

Step 2: License Agreement

Before you start the installation process, please review the license agreement terms. To accept them, select the option *I accept the terms in the License Agreement* and click *Next*.

| 8051FLASH Programmer v2.10 Setup 📃 🗖 🔀 |
|--|
| License Agreement Please review the license terms before installing 8051FLASH Programmer v2.10. |
| Press Page Down to see the rest of the agreement. |
| mikroElektronika Associates License Statement and Limited Warranty |
| IMPORTANT - READ CAREFULLY |
| This license statement and limited warranty constitute a legal agreement ('License Agreement') between you (either as an individual or a single entity) and mikroElektronika ('mikroElektronika Asociates') for software product ('Software') identified above, including any software, media, and accompanying on-line or printed documentation. |
| If you accept the terms of the agreement, select the first option below. You must accept the agreement to install 8051FLASH Programmer v2.10. Click Next to continue. |
| ● I accept the terms in the License Agreement |
| I do not accept the terms in the License Agreement |
| 051FLASH Programmer |
| < Back Next > Cancel |

8051FLASH Programmer v2.10 Setup Choose Components Choose which features of 8051FLASH Programmer v2.10 you want to install. Check the components you want to install and uncheck the components you don't want to install. Click Next to continue. Select components to install: Image: Select component to install:

Step 3: Choose Components

To make your choice simple, this installation step offers you only one component to choose. Click *Next*.

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Step 4: Choose Installation Location

Now, you should specify the folder to install the *8051Flash* program into. If you want to install it in a folder different from default, click *Browse* and select another folder on your hard disc. Then click *Next*. If you choose the default folder, the program will be installed on the following location:

C:\Program Files\Mikroelektronika\8051FLASH\



Step 5: Installation Details

The installation of the *8051Flash* program starts immediately. The installation progress will be shown on the screen. If you are interested in details about the installation, click the *Show details* button.

| 🕏 8051FLASH Programmer v2.10 Setup |
|--|
| Installing Please wait while 8051FLASH Programmer v2.10 is being installed. |
| Create shortcut: C:\Documents and Settings\Rade\Start Menu\Programs\Mikroelektronika\805 |
| Show details |
| |
| |
| |
| |
| 6051FLASH Programmer |

Step 6: Completing Installation

Windows will inform you in the window, as shown in figure on the right, that the *8051Flash* program has been successfully installed. Click *Finish* to complete the installation.



5.0. Practical Example of Using 8051Flash Program

After the software installation is complete, connect the programmer to your development system using a USB cable. The USB connection will be automatically established, which is indicated by the USB LINK LED's illumination.

Step 1: Start up the 8051Flash program

Start up the *8051Flash* program installed on your PC. Click the *Device* option in order to select the microcontroller to be programmed. The *8051Flash* program will automatically set default parameters for working with the respective microcontroller.



Step 2: Load a hex code into programmer's buffer

Click the *Load* option to open the *Open* window, as shown in figure on the right. Select the relevant file with the *.hex* extension and click the *Open* button. The file will be automatically loaded into the programmer's buffer.

| Open | | | | | ? 🔀 |
|-----------------------------------|------------------------------|---------------------|---|----------|----------------|
| Look in: | Project | | - | ⇔ 🗈 💣 💷• | |
| My Recent Documents Desktop | CANSPI.hex | | | | |
| My Documents | | | | | |
| My Computer | | | | | |
| My Network Places | File name: Files of type: | CANSPI HEX Files | | • | Open Cancel |

Step 3: Write the hex code into the microcontroller

Click the *Write* option in the upper right corner of the main window to start programming the microcontroller. The programming progress will be shown in the bottom right corner of the same window.



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6.0. Keyboard Shortcuts and Command Line Parameters

| Keyboard Shortcuts: | Alt-EErase the content of microcontroller's memoryAlt-WWrite a hex code into an 8051 microcontrollerAlt-VVerify the loaded hex codeAlt-RProgram memory readingAlt-DChange microcontroller typeCtrl-SSave hex codeCtrl-OOpen (Load) file with hex codeCtrl-RReload hex code |
|---------------------|---|
| Command Line: | The <i>8051Flash</i> program may also be activated from the command line, thus enabling you to use it from some other software, compiler etc. Here is a list of the command line parameters: |
| | -w Write to 8051 microcontroller -v Verify -e Erase program from 8051 microcontroller -r Read program from 8051 microcontroller -p Type of microcontroller (for example AT89S8253) -f .hex file name "[<name be="" enclosed="" in="" marks="" must="" quotation="">]" -fc .hex file name to be loaded into FLASH memory "[<name be="" enclosed="" in="" marks="" must="" quotation="">]" -fd .hex file name to be loaded into EEPROM memory "[<name be="" enclosed="" in="" marks="" must="" quotation="">]" -g Close the 8051Flash program after programming</name></name></name> |
| Example 1: | 8051Flash.exe -w -pAT89S8253 -v -f"C:\somefile.hex" |
| | This command is used for loading <i>C</i> :\somefile.hex into the AT89S8253 microcontroller. This file will be verified immediately after being loaded into the microcontroller. |
| Example 2: | 8051Flash.exe -r -pAT89S8253 |
| | This command is used for reading the content of the AT89S8253 microcontroller's program memory. |
| Example 3: | 8051Flash.exe -e -pAT89S8253 |
| | This command is used to erase program from the AT89S8253 microcontroller. |

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