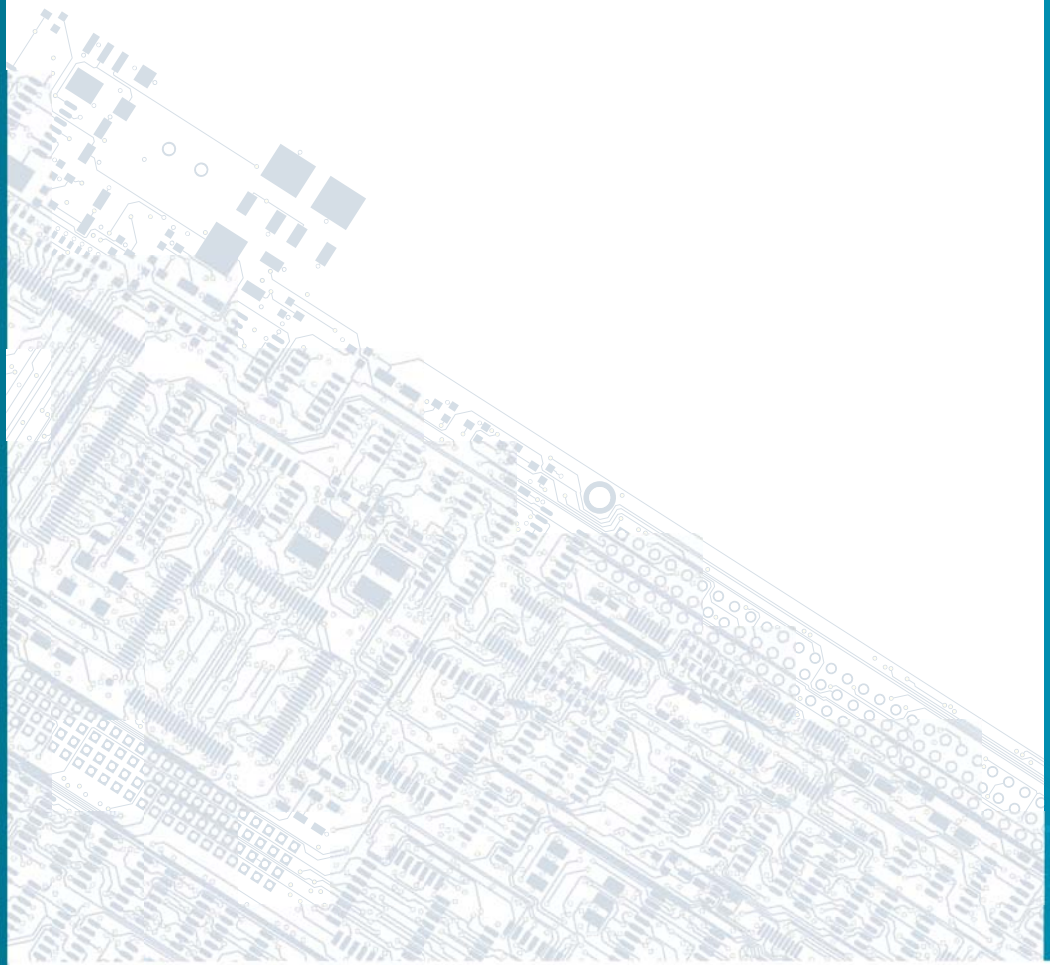
PICflash®

User manual

PICflash® programmer with mikroICD® support is a high performance tool used for programming PIC16F and PIC18F microcontroller families from MICROCHIP®. The PICflash programmer communicates to the microcontroller through a USB cable which is also used for powering the programmer.

Programmer



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.

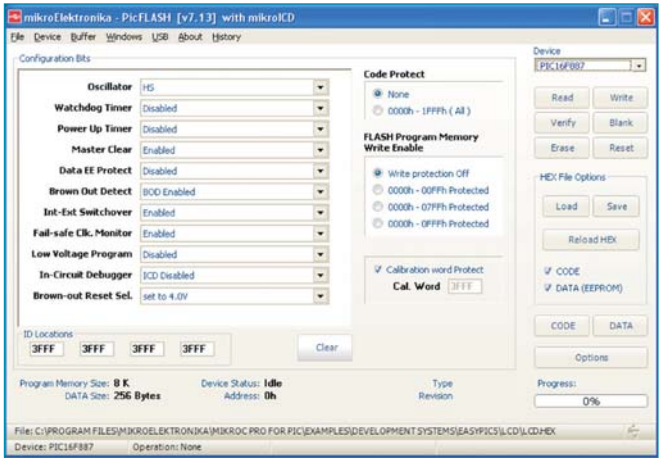
Nebojsa Matic
General Manager

TABLE OF CONTENTS

Introduction to PICflash® with mikroICD® Programmer

The PICflash programmer with mikroICD support is a great tool used for programming PIC16F and PIC18F microcontrollers from MICROCHIP®. It is of unique design and easy to use which makes it a very popular tool among beginners and professional users alike. The PICflash programmer communicates to the microcontroller through a USB cable which is also used for powering the programmer. In addition, it is a low power consumption device, which makes it ideal for working with portable PCs. In order to use this programmer, it is necessary to have the appropriate software, provided on the product CD, installed on your PC.

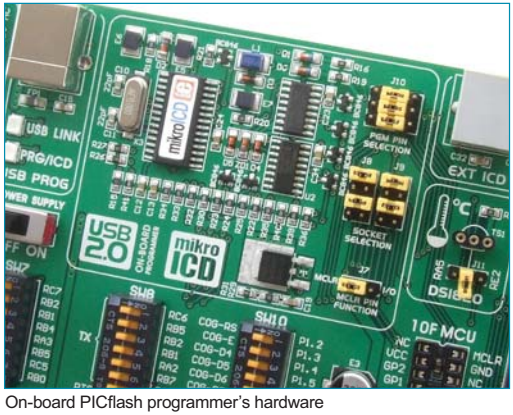
The mikroICD debugger is an integral part of the PICflash programmer that enables you to run a program step by step while monitoring the state of all registers within the microcontroller. If you simply want to load the program in some PIC® microcontroller, you may use the PICflash programmer and the HEX code generated in any PIC compiler. If you also want to debug/simulate the program in real environment using the mikroICD debugger, you have to use some of our PIC compilers for program writing as they provide mikroICD support. The mikroICD debugger may be used with all MikroElektronika's compilers for PIC16, PIC18, PIC24, PIC30 and PIC33 families.



PICflash with mikroICD software is used for programming PIC microcontrollers from MICROCHIP

The PICflash 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 www.mikroe.com

The PICflash programmer's hardware is built in all MikroElektronika's development systems designed for working with PIC microcontrollers....



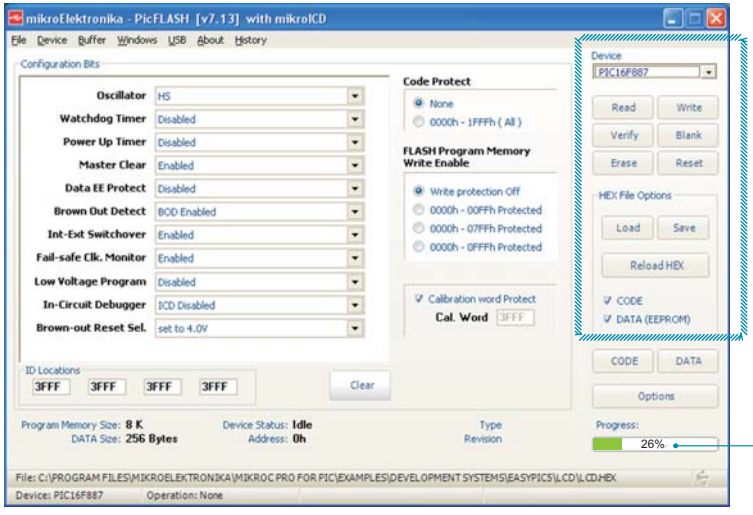
On-board PICflash programmer's hardware

... It is also available as a stand-alone device used for programming PIC microcontrollers built into (soldered on) the taget device

Stand-alone PICflash programmer's hardware

1.0. PICflash Programmer's Operation

The PICflash programmer 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 PICFLASH icon or automatically by starting the compiling process (*Build And Program* option).
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 the microcontroller are provided on the right side of the window.

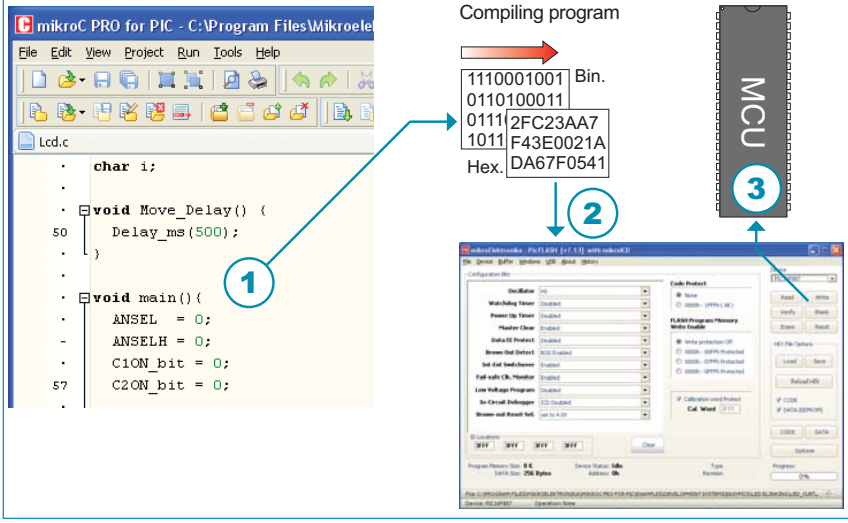


To load the program into the microcontroller, do the following:

1. Select the microcontroller to be programmed and the PICflash will automatically set default parameters for working with the respective microcontroller
2. Click the *Load* option to open the window to select the HEX code to be loaded into the microcontroller
3. Click the *Write* option to start programming the microcontroller

The *Progress* bar shows the programming progress expressed as a percentage

The PICflash program enables a HEX code, generated in some of PIC compilers, to be loaded into the microcontroller. The HEX code should be first loaded 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 in the bottom right corner of the same window.

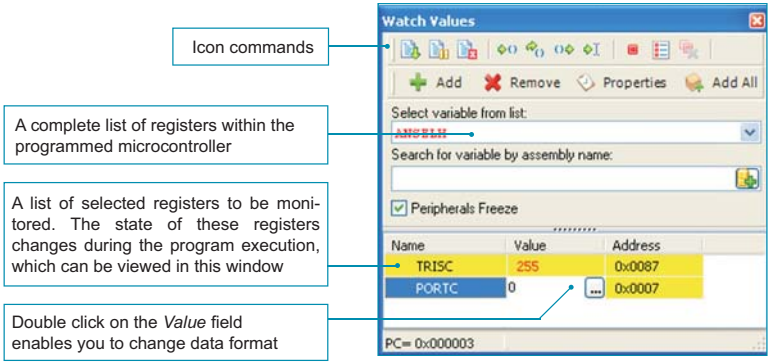


1. Write a program in a compiler and generate a HEX code;
2. In the *PICflash* programmer's main window select the appropriate microcontroller and load the HEX code into the programmer's buffer;
3. Click the *Write* button to program the microcontroller.

On the left side of The *PICflash* programmer's main window there are several options for microcontroller settings.
A number of options which will make the programming process easier are provided on the right side of the window.

2.0. mikroICD (In-Circuit Debugger)

The mikroICD (In-Circuit Debugger) is an integral part of the PICflash programmer. It is used for testing and debugging programs. The process of testing and debugging is performed by monitoring the state of all registers within the microcontroller which operates in real environment. The mikroICD software is integrated in all compilers designed by mikroElektronika such as *mikroBASIC PRO® for PIC*, *mikroC PRO® for PIC* and *mikroPASCAL PRO® for PIC*. In order to enable the process of debugging within the compiler, it is necessary to select options *Build Type - ICD Debug* and *Debugger - mikroICD* before the program is loaded into the microcontroller.
As soon as the mikroICD debugger starts up, the window, as shown in figure below, appears. The *mikroICD* debugger communicates with the PC through the microcontroller pins used for programming. Therefore, these pins cannot be used as I/O pins while the process of debugging is in progress.



mikroICD *Watch Values* window

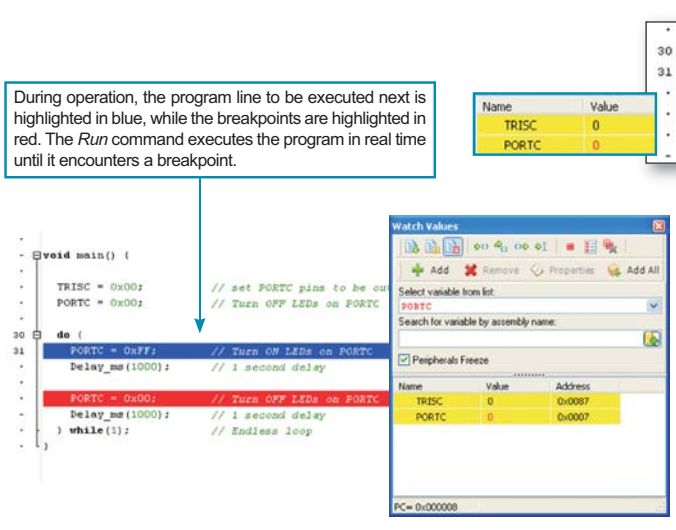
mikroICD debugger options:

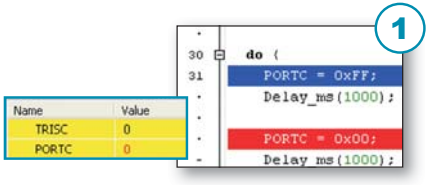
Start Debugger	[F9]
Run/Pause Debugger	[F6]
Stop Debugger	[Ctrl+F2]
Step Into	[F7]
Step Over	[F8]
Step Out	[Ctrl+F8]
Toggle Breakpoint	[F5]
Show/Hide Breakpoints	[Shift+F4]
Clear Breakpoints	[Ctrl+Shift+F4]

Each of these commands is activated via keyboard shortcuts or by clicking appropriate icon within the *Watch Values* window.

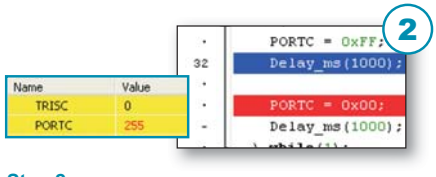
The mikroICD debugger also offers functions such as running a program step by step (single stepping), pausing the program execution to examine the state of currently active registers using breakpoints, tracking the values of some variables etc. Here is an example of program execution using the *Step Over* command.

During operation, the program line to be executed next is highlighted in blue, while the breakpoints are highlighted in red. The *Run* command executes the program in real time until it encounters a breakpoint.





Step 1:
In this example the 31st program line is highlighted in blue, which means that it will be executed next. The current state of all registers within the microontroller can be viewed in the mikroICD *Watch Values* window.



Step 2:
After the *Step Over* command [F8] is executed, the microcontroller will execute the 31st program line. The next line (32nd) to be executed is highlighted in blue. The state of registers being changed during the execution of this instruction, may be viewed now in the *Watch Values* window.

NOTE: For more information on the mikroICD debugger refer to the *mikroICD Debugger* manual.

3.0. Software Installation

Before you start software installation, make sure that the *PICflash* programmer is not connected to the PC.

Step 1: Start installation

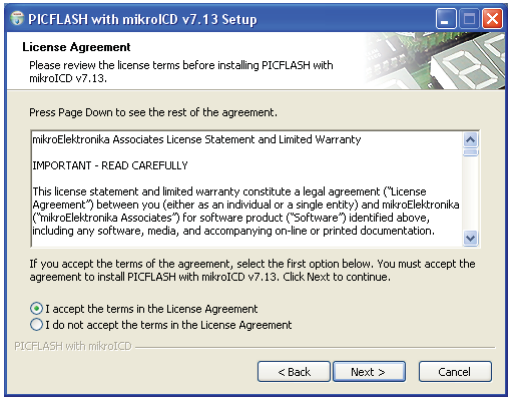
Insert the product CD into your PC drive. After a few seconds, a list with all MikroElektronika's products will appear on the screen. To start the process of installing the *PICflash* software, click on the setup icon provided in the PICflash section on the product CD:

CD Drive:\\zip\PICFlash_setup.exe

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

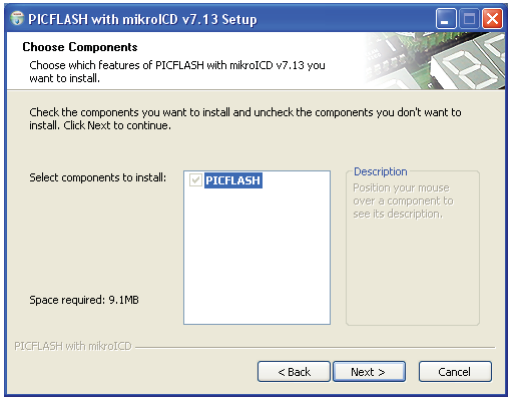
Step 2: Licence Agreement

Before you start the installation procedure, please review the licence agreement terms. To accept them, select the option *I accept the terms in the Licence Agreement* and click *Next*.



Step 3: Choose Components

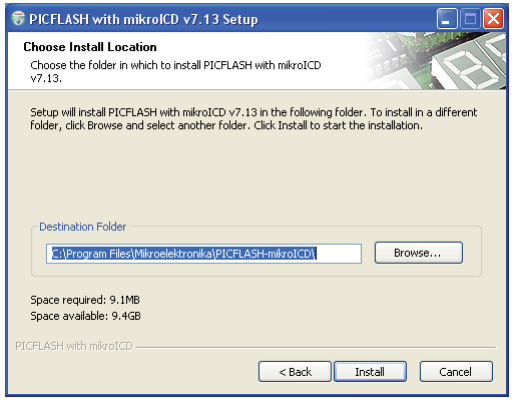
To make your choice simple, this installation step offers you only one component to choose. Click *Next*.



Step 4: Choose Installation Location

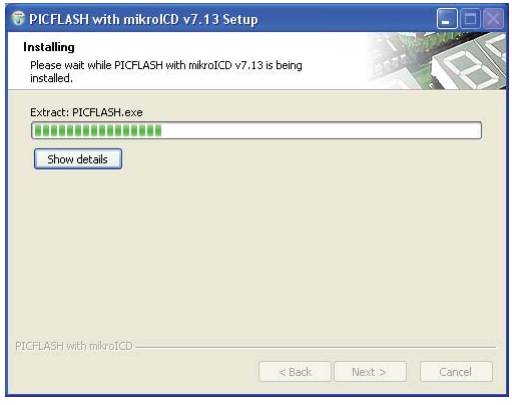
Now, you should specify the folder to install the *PICflash* program in. If you want to install it in a folder different from default, click *'Browse'* and select another folder on your hard disc. Then click *'Next'*. If you choose the default folder, the program will be installed on the following location:

C:\Program Files\Mikroelektronika\PICFLASH-mikroICD



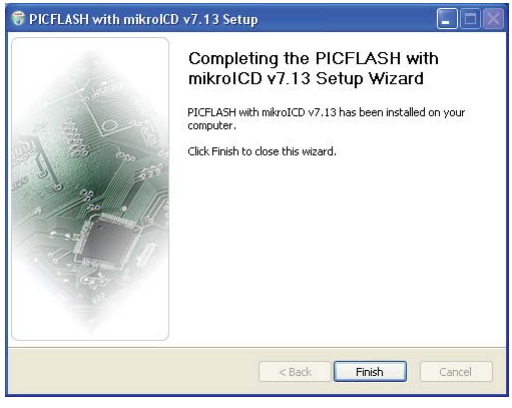
Step 5: Installation Details

The *PICflash* programmer installation 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.



Step 6: Completing Installation

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



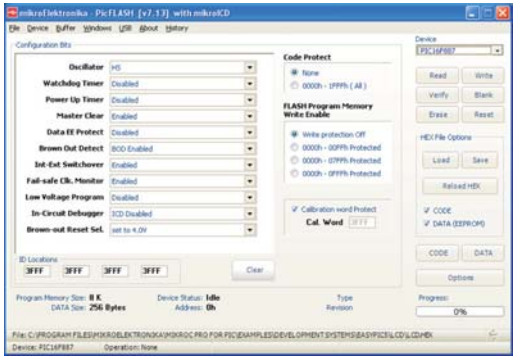
NOTE: Before you use the *PICflash* programmer, it is necessary to install the appropriate drivers. For more information refer to the *Installing USB Drivers* manual.

4.0. Practical Example of Using PICflash Programmer

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

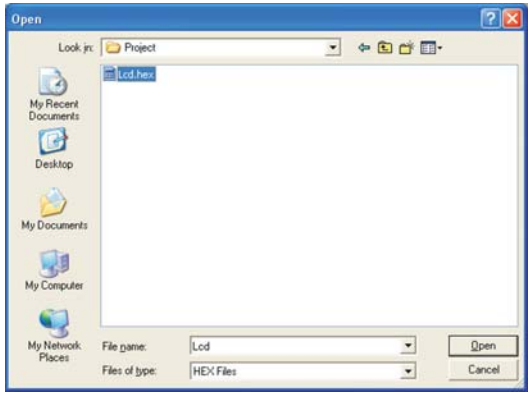
Step 1: Start up the *PICflash* programmer

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



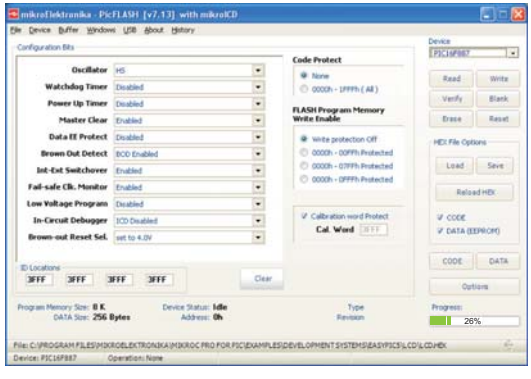
Step 2: Load a HEX file into the programmer

Click the *'Load HEX'* 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.



Step 3: Load 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.



5.0. Keyboard Shortcuts and Command Line Parameters

Keyboard Shortcuts:

Alt-E	Erase microcontroller's memory
Alt-B	Program memory blank check
Alt-W	Write HEX code into PIC
Alt-V	Verify loaded HEX code
Alt-R	Read program memory
Alt-D	Change microcontroller type
Ctrl-S	Save HEX code
Ctrl-O	Open (Load) file with HEX code
Ctrl-R	Reload HEX code

Command Line:

The *PICflash* programmer 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 PIC
-v	Verify
-e	Erase PIC
-r	Read from PIC
-p	Microcontroller type (for example, P16F877A, P18F452 etc.)
-f	File name (must be enclosed in quotation marks)
-b	Blank check
-q	Close the PICflash program after programming

Example 1:

PICflash.exe -w -pPIC16F877A -v -f"C:\somefile.hex"

This command is used for loading *C:\somefile.hex* into the PIC16F877A microcontroller. This file is verified immediately after being loaded.

Example 2:

PICflash.exe -r -pPIC16F877A

This command is used for reading the PIC16F877A program memory.

Example 3:

PICflash.exe -e -pPIC16F877A

This command is used for erasing program from the PIC16F877A microcontroller.

DISCLAIMER

All the products owned by MikroElektronika are protected by copyright law and international copyright treaty. Therefore, this manual is to be treated as any other copyright material. No part of this manual, including product and software described herein, may be reproduced, stored in a retrieval system, translated or transmitted in any form or by any means, without the prior written permission of MikroElektronika. The manual PDF edition can be printed for private or local use, but not for distribution. Any modification of this manual is prohibited.

MikroElektronika provides this manual 'as is' without warranty of any kind, either expressed or implied, including, but not limited to, the implied warranties or conditions of merchantability or fitness for a particular purpose.

MikroElektronika shall assume no responsibility or liability for any errors, omissions and inaccuracies that may appear in this manual. In no event shall MikroElektronika, its directors, officers, employees or distributors be liable for any indirect, specific, incidental or consequential damages (including damages for loss of business profits and business information, business interruption or any other pecuniary loss) arising out of the use of this manual or product, even if MikroElektronika has been advised of the possibility of such damages. MikroElektronika reserves the right to change information contained in this manual at any time without prior notice, if necessary.

HIGH RISK ACTIVITIES

The products of MikroElektronika are not fault–tolerant nor designed, manufactured or intended for use or resale as on–line control equipment in hazardous environments requiring fail–safe performance, such as in the operation of nuclear facilities, aircraft navigation or communication systems, air traffic control, direct life support machines or weapon systems in which the failure of Software could lead directly to death, personal injury or severe physical or environmental damage ("High Risk Activities"). MikroElektronika and its suppliers specifically disclaim any expressed or implied warranty of fitness for High Risk Activities.

If you want to learn more about our products, please visit our website at www.mikroe.com

If you are experiencing some problems with any of our products or just need additional information, please place your ticket at www.mikroe.com/en/support

If you have any questions, comments or business proposals, do not hesitate to contact us at office@mikroe.com