mikroProg Suite^{m for PIC®}

programming software



mikroProg SuiteTM for PIC[®] is a free software used for programming of all of Microchip[®] microcontroller families, including PIC10[®], PIC12[®], PIC16[®], PIC18[®], dsPIC30/33[®], PIC24[®] and PIC32[®]. It features user friendly interface with simple to use options and menus.



Que Suite for PIC LVEL)] by make a		-	Code Protect	
kroProg Suite for PIC (v2.21 USB Info Minimize	Configuration Bits		TÎ	T Data EEPROM	
The provided and the pr	Configuration vision oscillator 4 x PLL Enable bit Primary Clock Enable bit Fail-safe CLK Monitor BIT- JRZ Switch over Brown Out Detect Power Up Timer Watchdog Postcale Watchdog Timer HCLR Enable bit CCP2 B Output HUX bit TSCNX WE Tehose fact Enable bit D Locations FF FF FF FF FF	EC cossilator (high power, > 15 MHz) 4 x PL is under software control, PLEN Primary Clocks always enabled Disabled 2.05 V HW Enabled Disabled 1.32768 WOT enabled in bardware; SWDTEN bit it MCLR Enabled, RE3 Disabled P2B is on RO2 TSOCI is on RC0 UNITARY Control is not defaulted FF FF FF FF Device Status: Idle Address: Oh DECEMBERTION		Code 0000-007FF Code 0000-007FF Code 0000-03FFF Code 04000-03FFF Code 04000-03FFF Code 05000-07FFF Code 05000-07FFF Code 05000-007FF Code 05000-03FFF Code 05000-03FFF	m ·

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

The PIC®, dsPIC®, PIC24®, PIC32® and Windows® logos and product names are trademarks of Microchip Technology® and Microsoft® in the U.S.A. and other countries

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х mikroProg Suite File USB Info Minimize MCU Family PIC18F-K -CONFIG MCU PIC18F45K22 -Read Write MCU INFO Verify Blank Erase Reset -HEX File Options Load Save Reload HFX Load/Save CODE Load/Save DATA CODE DATA UNIT ID Options Progress: 0% ÷ HEX File:

Introduction to

mikroProg Suite[™] for PIC[®]

Program **mikroProg SuiteTM for PIC**[®] is intended for programming **PIC**[®], **dsPIC**[®] and **PIC32**[®] microcontrollers from Microchip[®]. The graphic interface of this program is clear and easy-to-use, which makes the use of this program faster. The program main window includes basic options for programming microcontrollers. In addition, there are advanced programming options that enable experienced users to set configuration bits on their own. The program includes views providing basic information about the selected MCU, voltage monitoring, etc.

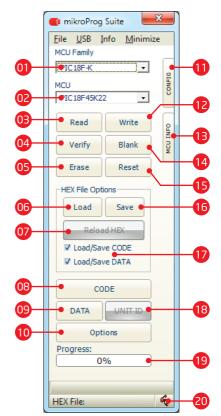
Main Window

mikroProg Suite[™] for PIC[®] window contains all the programming options. These options are graphically presented in the form of buttons, drop-down lists and check boxes.

MCU family selection list MCU type selection list

- Read program from MCU
- Verify the loaded program
- Erase MCU memory contents
- Browse for a .hex file on your PC
- Reload previously loaded .hex file
- Preview program which is in buffer and ready for uploading in MCU FLASH memory
- Preview program which is in buffer and ready for uploading in MCU EEPROM memory

- Various settings of visual, advanced and programming options.
- Expand configuration bits menu
- 2 Upload .hex file in to MCU memory
- 3 Expand MCU info menu
- Check whether the MCU is empty
- 5 Reset the microcontroller
- Save buffer to a .HEX file
- Load/Save CODE/DATA in buffer
- 18 Used for some MCU-s ID
- 19 Progress bar
- 20 Shows that programer is connected to USB port on a PC (red if connected)



1. Installation

mikroProg Suite[™] for PIC[®] setup executable is located on the **Product DVD.** You can also download it it from the website.



DVD://download/eng/software/ development-tools/universal/ mikroprog/mikroprog_suite_for_ pic_v220.zip

when you locate and download the setup, please extract files from the ZIP archive. Folder with extracted files contains setup executable. Double click it to start the setup wizard.



mikroprog_suite_for_pic_v220.zip WinRAR ZIP archive 4.70 MB



mikroprog_suite_for_pic_v220 File folder



mikroProg_Suite_For_PIC_v220_set up.exe Installer for mikroProg Suite For P...

step 1 - Start installation





Welcome screen. Click the **Next** button to proceede.

step 2 - Licence Agreement

😚 mikroProg Suite for PIC v2.20 Setup	X
License Agreement Please review the license terms before installing mikroProg Suite for PIC v2.20.	
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 mikroElektron ("mikroElektronika Associates") for software product ("Software") identified above, including any software, media, and accompanying on-line or printed documentation.	nika T
01 ou accept the terms of the agreement, select the first option below. You must accept element to install mikroProg Suite for PIC v2.20. Click Next to continue.	ept the
I accept the terms of the License Agreement I	
mikroProg Suite For PIC	Cancel

step 3 - Select user





If you agree with it, click **Next** to procede.



It's recommended to select Install For All Users option.

02 Click Next.

step 4 - Choose destination

🗑 mikroProg Suite for PIC v2.20 Setup
Choose Install Location Choose the folder in which to install mikroProg Suite for PIC v2.20.
Setup will install mikroProg Suite for PIC v2.20 in the following folder. To install in a different folder, click Browse and select another folder. Click Install to start the installation.
Destination Folder lers/Public'/Documents/Mikroelektronika/mikroProg Suite For PIC BrowsE
Space required: 35.0MB Space available: 5.9GB

step 5 - Progress bar

mikroProg Suite for PIC v2.20	Setup	
Installing		
Please wait while mikroProg Suite	e for PIC v2.20 is being installed.	
Create folder: C:\ProgramData≬	Microsoft\Windows\Start Menu\Progra	ams <mark>(</mark> Mikroelektronika \mik
	•	
Showdetails	0	
02	•	
-		
kroProg Suite For PIC		
	< Back Ne	xt > Cancel

Use suggested destination folder, or select a different installation path by clicking the **Browse** button.

02 Click the Install button.

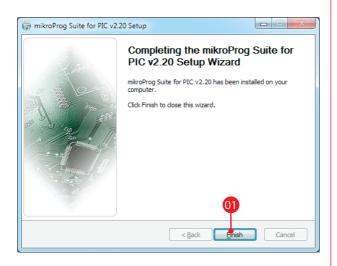


Installation progress bar.

Click the Show details button to monitor installation

process more closely.

step 6 - Finish installation



01 Click the **Finish** button to close Setup Wizard.

After installation process is finished mikroProg Suite^{TTI}</sup> for PIC[®] shortcut will appear on your desktop.



Double click it to start mikroProg Suite[™] for PIC[®] software.

2. Quick start

To program your microcontroller with a desired .HEX file just follow these few steps:

Before you begin, connect your device (programmer) with a PC via USB cable. In bottom right corner of **mikroProg SuiteTM for PIC**[®] main window notice USB icon which will turn red when device is connected.

DATA UNIT ID	
Options	
Progress:	_
0%	
HEX File:	

Figure 2-1: USB icon in bottom right corner

step 1 - MCU family

<u>F</u> ile <u>U</u> SB <u>I</u> r	nfo <u>M</u> inir	nize
MCU Family		-
PIC18F-K		-01
PIC10F		CONFIG
PIC12F PIC16F		0
PIC18F		
PIC18F-K		
PIC18F-J		P. P.
Verify	Blank	MCU INFO
Erase	Reset	
HEX File Opti	ons	_
Load	Save	
Reloa	dHEX	
✓ Load/Save CODE		
🛛 Load/Sav	e DATA	
со	DE	

01 From drop down list select MCU family of your device (in this case PIC18F-K)

step 2 - MCU type

<u>F</u> ile	<u>U</u> SB	Info	Mir	nimiz	e
MCU F	amily				
PIC	L8F-K			-	
,					METO
MCU				_	
PIC:	18F45k	(22		-	-01
PIC1	8F26K	20			
PIC1	8F26K	22			
PIC1	8LF26	K22			5
	8F43K				T.A.
	8F43K				VOIL TNEY
	8LF43				
	8F44K				
	8F44K 8LF44				
	8F45K				
	8F45K			-	
	8LF45			-	
PIC1	8F46K	20			
PIC1	8F46K	22			
	8LF46				
	8F25K				
	8F26K				
	8F45K				
	8F46K 8F65K			-	
PICI		LODE			

From drop down list select MCU type

(in this case PIC18F-K)

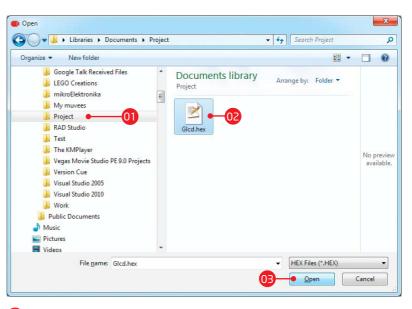
Page 10

step 3 - Load .HEX



.HFX file

step 4 - Browse for .HEX file



1 Locate the folder that contains target HEX file

2 Select .HEX file

Click the **Open** button

* Note that you can also load HEX file by dragging and dropping it onto the mikroProg Suite[™] for PIC[®] window.



step 5 - Write HEX

🛑 mikroProg	Suite 🔀			
<u>F</u> ile <u>U</u> SB <u>I</u>	nfo <u>M</u> inimize			
MCU Family	_			
PIC18F-K	•			
MCU	CONFIG			
PIC18F45K2	2 • •			
Read	Write • 01			
Verify	Blank			
Erase	Reset			
HEX File Opti	ons			
Load	Save			
Reload HEX				
Load/Save CODE				
✓ Load/Save DATA				
CODE				

Click the **Write** button to start programming the microcontroller.

01

step 6 - Progress bar

Verify Blank			
Verify Blank Q			
Erase Reset			
HEX File Options			
Load Save			
Reload HEX			
Load/Save CODE			
✓ Load/Save DATA			
CODE			
DATA UNIT ID			
Options			
Progress:			
28% • 01			
Programming CODE Memory			
Operation: Programming			
HEX File: Loaded 🛛 👻			

01 Progress bar displays programming progress.

step 7 - Finish upload

Kedu	White Of N					
Verify	Blank					
Erase	Reset					
HEX File Option	ons					
Load	Save					
Reloa	d HEX					
✓ Load/Sav						
✓ Load/Sav	✓ Load/Save DATA					
СО	CODE					
DATA	DATA UNIT ID					
Opti	Options					
Progress:						
09	0%					
Operation: No	Operation: None -01					
HEX File: Load	HEX File: Loaded					

01 When uploading is finished your MCU is programed and ready for use

3. Menus

mikroProg Suite[™] for PIC[®] comes in form of graphical user interface which consists of button's, check box's, and menus.

File menu

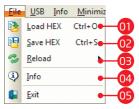


Figure 3-1: File menu



Display information about .HEX file

Close mikroProg Suite[™] for PIC[®]

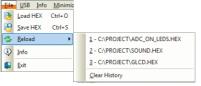


Figure 3-2: Reload

Reload menu shows previously loaded .HEX files which can be reloaded with a single click. Click the Clear History option any time to erase the list.



Figure 3-2: File information

USB menu



Figure 3-3: USB menu

Select USB Programmer Device
WDM Internal Version: 6.00. 16386
mikroProg Firmware v2.11 - EasyPICv7
When you select your development tool PRG/ICD LED will blink so you can determine which one is selected.
ОК

Figure 3-4: USB menu

Under USB menu click the Show Devices option. A new window will appear containing information about connected USB device and firmware version

It is also possible to connect two devices at the same time, Figure 3-5.

Select USB Programmer Device
WDM Internal Version: 6.00.16386
mikroProg Firmware v2.11 - EasyPICv7 mikroProg Firmware v2.11 - mikroProg Device
When you select your development tool PRG/ICD LED will blink so you can determine which one is selected.
ОК

Figure 3-5: USB menu

When two devices are connected at the same time it is necessary to choose which one is used for programming of your target device. Note that it is not possible to use multiple programmers at the same time.

Info menu



Figure 3-6: Info menu

Info menu contains History and About options. Click the **History** option to get information about program changes throughout releases. **About** option contains information about the development team.



Figure 3-7: History window

Minimize



Figure 3-8: Minimize option

Minimize option minimizes program to tray. Program stays active until explicitely closed.



Along the right side of the main window, you may notice a **CONFIG** button. Click it to expand the main window with additional panel containing MCU configuration options. It's contents will be adjusted depending on the selected microcontrollers.

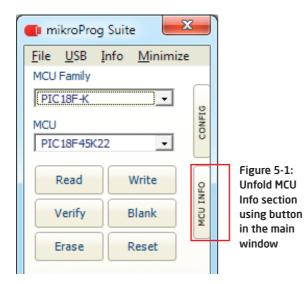
Common options for all MCU's are:

- CONFIG button opens config window
 Configuration Bits section is used to set specific options for chosen MCU.
- Protect parts of MCU memory from unauthorized reading and writing.
- 04 ID Location in MCU memory.
 - Basic information about selected MCU.

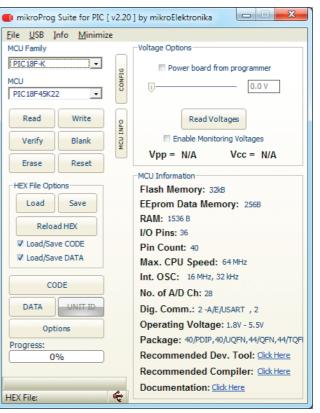
mikroProg Suite for PIC [v2	0] by mikroElektronika			-
File USB Info Minimize	02		03	
MCU Family	Configuration Bits			
РІС18F-К 01		*	Code Protect	
MCU	Oscillator EC oscillator (high power, >16 MHz)	-	Data EEPROM	
PIC18F45K22 •	4 x PLL Enable bit 4 x PLL is under software control, PLLEN (-	Code 00000-007FF	
THE ISINGLE	Primary Clock Enable Bit Primary Clock is always enabled	-		
Read Write	Fail-safe CLK Monitor Disabled	-	Code 00800-01FFF	
Verify Blank	INT. / EXT. Switch over Disabled	• E	Code 04000-05FFF	
Verify Blank	Brown Out Voltage 2.05 V		Code 06000-07FFF	
Erase Reset			E	
Lidse Reset		•	Table Write Protect	
HEX File Options			Configuration Bits	
Load Save	Watchdog Postscale 1:32768	-	Data EEPROM	
Loud Save	Watchdog Timer WDT enabled in hardware; SWDTEN bit is	•	Code 00000-007FF	
Reload HEX	MCLR Enable Bit MCLR Enabled, RE3 Disabled	-	Code 00800-01FFF	
✓ Load/Save CODE		-	Code 02000-03FFF	
✓ Load/Save DATA		-	Code 04000-05FFF	
in constance prime	HE Intose fast			
CODE	ID Locations		Table Read Protect	
	FF FF FF FF FF FF FF FF C	ear	Code 00000-007EE -	
DATA UNIT ID				
0-11-01	Program Memory Size: 32 KB Device Status: Idle		Type	
Options	DATA Size: 256 Bytes Address: Oh		Revision	
Progress:	MikroElektron	ika		
0%	05 DEVELOPMENT TOOLS I COMPILERS	BOOKS		
	making it	simple		
HEX File:				
inex mer				

Figure 4-1: Config window

5. MCU Info window

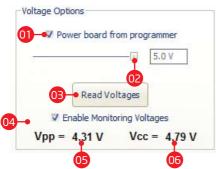


A click on the **MCU INFO** button opens a window containing basic data about the selected microcontroller as well as voltage monitoring options.



Voltage Options Section

The programming voltage (Vpp) is provided by the programmer during programming procedure. Depending on the type of the microcontroller, the Vpp programming voltage can be up to 13V.





Check box for enabling supply voltage from programmer Setting supply voltage value from 1.8 to 5V (max 250mA) Manually read voltages on Vpp and Vcc MCU pins Check box for enabling automatic voltage monitoring Current Vpp value (programming voltage)

Current Vcc value (power supply voltage)



After programming is finished it is possible to power up target device via mikroProg[™] programmer. While device is connected to the programmer set desired voltage using slider. Max supply voltage is determined by MCU power supply voltage while minimum voltage is 1.8V (max 250mA). When voltage is set just check **"Power board from programmer"** check box.



A warning window will appear. If electrical characteristics of target device are correct click the **Yes** button. Otherwise click **No** button and set appropriate electrical characteristics of connected device.



Move slider to set required voltage level

- Tick "Power board from programmer" box
- Click Yes button after electrical characteristics of connected device are met.

MCU Information Flash Memory: 32kB EEprom Data Memory: 2568 RAM: 1536 B 1/O Pins: 36 Pin Count: 40 Max. CPU Speed: 64 MHz Int. OSC: 16 MHz, 32 kHz No. of A/D Ch: 28 Dig. Comm.: 2 -A/E/USART, 2 Operating Voltage: 1.8V - 5.5V Package: 40/PDIP,40/UQFN,44/QFN,44/TQF Recommended Dev. Tool: Click Here Recommended Compiler: Click Here Documentation: Click Here

Figure 5-2: MCU information section

MCU Information Section

Example in Figure 5-2 shows information on the PIC18F45K22 microcontroller such as: microcontroller memory size, number of integrated modules and I/O pins, operating speed, package etc. In addition, there are links to web pages where you can find the recommended development system and compiler for the selected microcontroller. There is also a link to the MCU manufacturer website where you can find a complete documentation for the selected microcontroller.

6. Advanced options

Click the **Options** button, and a window containing Program/Verify Options, Advanced Options and Visual Settings will appear.

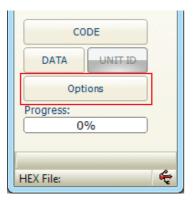


Figure 6-1: Options button

Program/Verify Options:	Advanced Options:		
CODE	Verify Chip Writes		
Executive	🔲 Disable Vpp-First mode entry		
V DATA	Preserve DATA		
ID Locations	Clear Buffers Before Load		
Configuration Word(s)			
BOOT			
Visual Settings	Theme:		
✓ Hints Disabled	Hints Disabled		

Figure 6-2: Options window

-Program/Verify Options:

CODE

Executive

DATA

ID Locations

Configuration Word(s)

BOOT

Within the **Program/Verify Options** section it is possible to disable programming /verification of the microcontroller memory: CODE, Executive, DATA, ID Locations, Configuration Words) and BOOT. Verification is performed by clicking on the Verify button in Main window, page 5. Advanced Options: Verify Chip Writes Disable Vpp-First mode entry Preserve DATA Clear Buffers Before Load

The Advanced Options section includes:

Verify Chip Writes: After programing is finished .hex code verification is performed automatically. By verifying .hex code it is eliminated possibility for error in program execution.

Disable Vpp-First mode entry : prevent the device from entering program mode via VPP Preserve DATA: EEPROM memory is not erased during MCU programming Clear Buffers Before Load: Clears DATA and CODE buffers



The **Visual Settings option** is used to select visual program settings as well as to disable hints.

7. Keyboard shortcuts

and command line parameters

Keyboard shortcuts

- **Alt+E** Erase the contents of the microcontroller memory
- Alt+B Program memory blank check (whether it is empty)
- Alt+W Write a hex code into microcontroller(F11 key may be optionally used)
- Alt+V Verify the loaded hex code
- Alt+R Read program memory
- Alt+D Change microcontroller type
- Alt+F Open File menu
- Alt+U Open USB menu
- Alt+I Open Info menu
- Alt+M Minimize man window
- Ctrl+S Save hex code
- Ctrl+O Open (load) file with hex code
- Ctrl+R Reload hex code

Command line

The mikroProg Suite[™] for PIC[®] programmer may also be set up from the command line, which enables you to use it from some other software, compiler, etc. Here is a list of the command line parameters:

- -w Write to MCU
- -v Verify
- -e Erase program from MCU
- -r Read program from MCU
- -p Microcontroller type
- -f .hex file name (FLASH) "[<name should be enclosed within quotation marks>]"
- -b Memory blank check (whether it is empty)
 - the mikroProg Suite™ for PIC® program after programming

-q

Example 01

mikroProg Suite for PIC.exe -w -pPIC18F45K22 -v -f"C:\somefile.hex"

This command is used for loading C:\somefile.hex into the PIC18F45K22 microcontroller. This file will be verified immediately after being loaded into the microcontroller.

Example 02

mikroProg Suite for PIC.exe -r -pPIC18F45K22

This command is used for reading the contents of the PIC18F45K22 microcontroller program memory.

Example 03

mikroProg Suite for PIC.exe -e -pPIC18F45K22

This command is used to erase program from the PIC18F45K22 microcontroller.

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