



## mikroPascal PRO for FT90x

PID: MIKROE-1736

**mikroPascal PRO for FT90x** is a full-featured Pascal compiler for FT90x devices. The feature rich environment you can experience today is the result of 15 years of dedicated work and steady progress. The ever-increasing number of hardware and software libraries, intuitive IDE, integrated Visual TFT software, detailed documentation, a full box of additional tools.

### Choose your license

mikroPascal PRO for FT90x has two licensing options available: the License Code and the USB Dongle License. Just choose the license type in the top right part of the page.

We also offer the Site License, if you run a two-person team, a whole R&D department, or teach a class, the Site License is the best choice. It allows you to own, manage and deploy multiple single licenses.

Learn more about our licensing options.

# Your Strong Ally.

mikroPascal PRO for FT90x is a full-featured Pascal compiler for FT90x devices.

The feature rich environment you can experience today is the result of 15 years of dedicated work and steady progress. The ever-increasing number of hardware and software libraries, intuitive IDE, integrated Visual TFT software, detailed documentation, a full box of additional tools.

**DOWNLOAD**

<https://download.mikroe.com/setups/compilers/mikropascal/ft90x/mikropascal-ft90x-setup-v221.zip>

**ROADMAP**

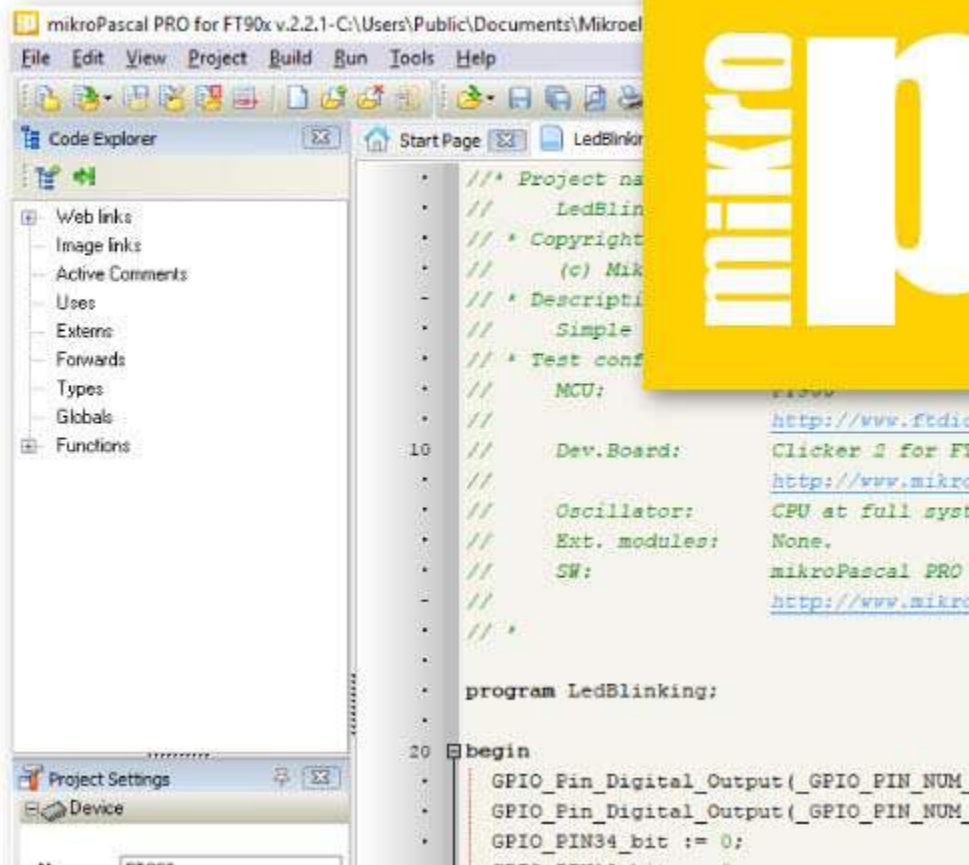
**QUICK START GUIDE**

**1200** LIBRARY FUNCTIONS

**100+** CODE EXAMPLES

**8** SUPPORTED MCUs

**∞** LIFETIME LICENSE



# You will love mikroPascal!

## 1-TIME PAYMENT, LIFETIME LICENSE

Pay once and never worry about it again. Once you buy the compiler you are entitled to lifetime free upgrades. Upgrading the compiler takes only a few minutes and a few clicks. We are constantly adding new features to the compiler, you can keep track of what is happening on the Software Roadmap page.

Our support team is always available – you can rely on our help while you are developing. The compiler license guarantees free product lifetime technical support.

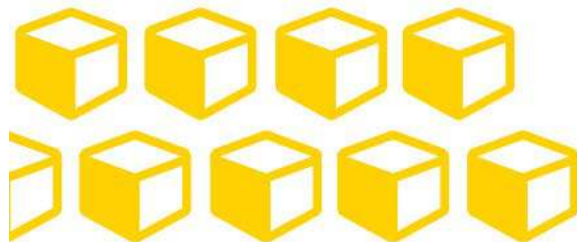
## 1200 LIBRARY FUNCTIONS

mikroPascal offers a unique mechanism to easily use libraries in your project, just select the libraries you need and they will be instantly available in your code. No need for dozens of #include directives. You can also install and manage third-party libraries using our package manager and library manager.

Simply select the libraries you need for your project, by checking the box. Or press the "Check All" button to include them all. With more than 500 library functions you'll save time, effort and you'll write better code.

Visit LibStock and download fully functional and working projects, and install them with a single click.

The screenshot displays the MikroElektronika LibStock website. At the top, there is a navigation menu with 'PRODUCTS', 'SHOP', 'LEARN', 'LIBSTOCK', and 'FORUM'. Below this is a green banner for 'LIBSTOCK' with options to 'Browse Code', 'Share Code', 'Request Code', and 'About Lib'. The main content area is divided into several sections: a 'LOGIN' form with fields for 'Username:' and 'Password:', a 'CODE CATEGORIES' section listing 1800 total codes across various fields like Audio & Speech (52), Communication (398), Graphics & LCD (244), GSM / GPRS (25), GPS (23), Measurement (410), Power supply (24), Storage (36), Timers (Real time clock) (103), Other Codes (212), Internal MCU modules (54), Gaming and Fun (54), and Rfid (12); and a list of code categories. Two code listings are shown: 'ATA6563 click' (1.80MB) and 'dac 3 click' (28.55KB), each with a rating, author, version, and description.



## 100+ EXAMPLES

Every single library that is in our compiler is covered by a working example. More than 100 ready-made working examples, to help you understand how the library works or give you useful code snippets for your project.

## 8 SUPPORTED MCUs

The mikroPascal PRO for FT90x currently supports 8 FT90x MCUs and we are constantly adding new ones.

You can be part of the process by letting us know what microcontroller you wish to see supported next, by using our helpdesk and submitting a ticket.



Toolchain	Vendor	Device	Pins	Flash (KB)	RAM (bytes)	Clock (MHz)	mikroICD	Datasheet
FT90x	FTDI	FT900	100	256	65536	100	Yes	
FT90x	FTDI	FT901	100	256	65536	100	Yes	
FT90x	FTDI	FT902	100	256	65536	100	Yes	
FT90x	FTDI	FT903	100	256	65536	100	Yes	
FT90x	FTDI	FT905	76	256	65536	100	Yes	
FT90x	FTDI	FT906	76	256	65536	100	Yes	
FT90x	FTDI	FT907	76	256	65536	100	Yes	
FT90x	FTDI	FT908	76	256	65536	100	Yes	

Showing 1 to 8 of 8 entries

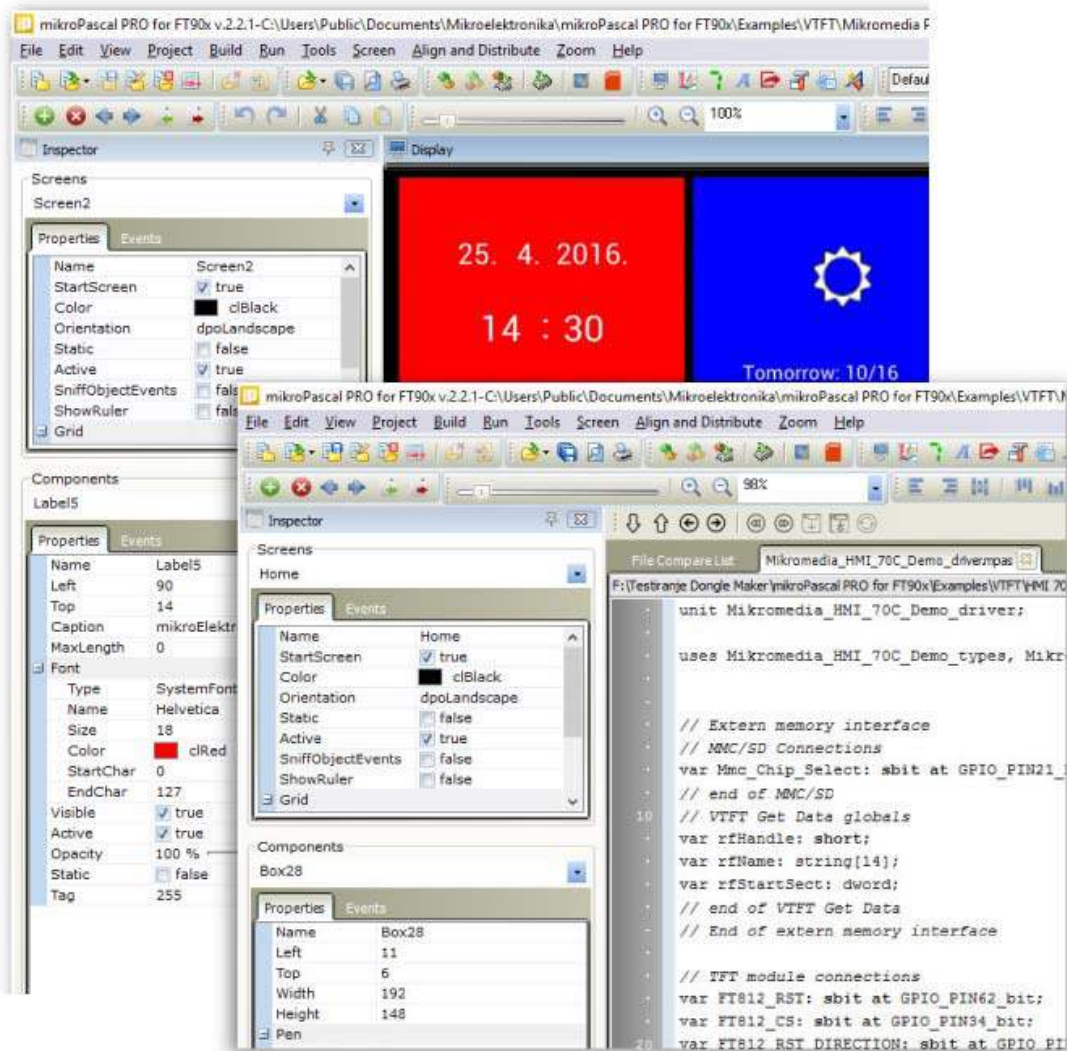
## Create amazing user interfaces thanks to the integrated Visual TFT

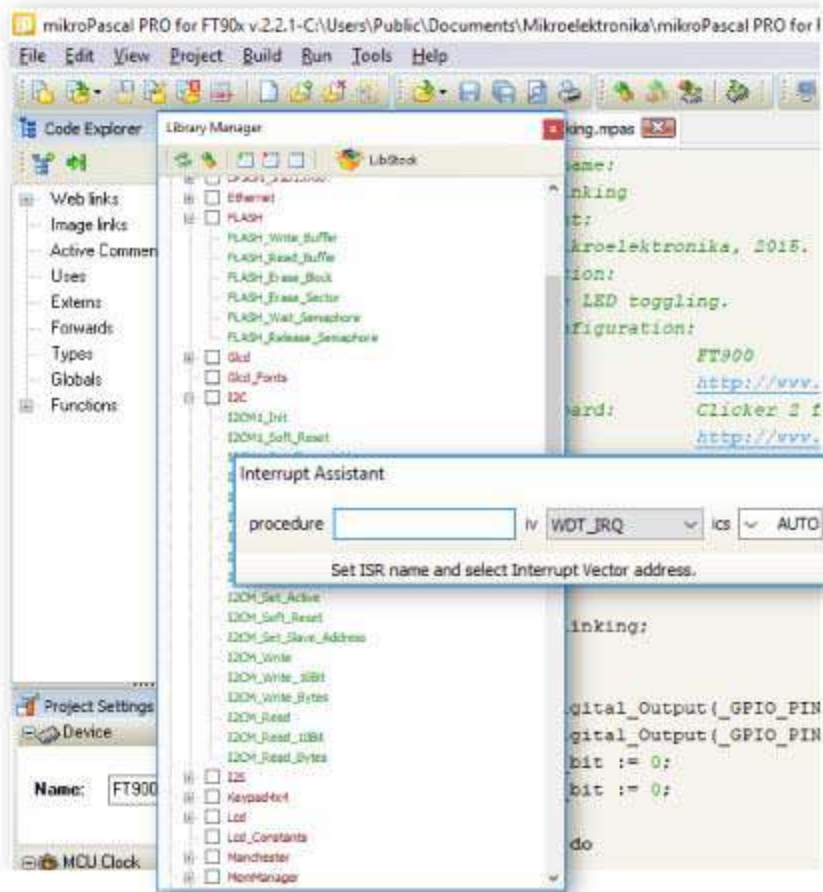
The integrated solution allows for a streamlined workflow. Drag and drop graphic elements while the compiler generates the code automatically in the background. Modify the generated code in the compiler and create event functions. Seamlessly switch between designing and coding using keyboard shortcut F12.

Try it out for yourself and create fully functional GUIs with just a few clicks. And don't worry about the code, the compiler will take care of that.

To enable Visual TFT, you need to acquire the Visual TFT license separately. That is why we prepared a **30% discount** on the Visual TFT software if you purchase it with the compiler.

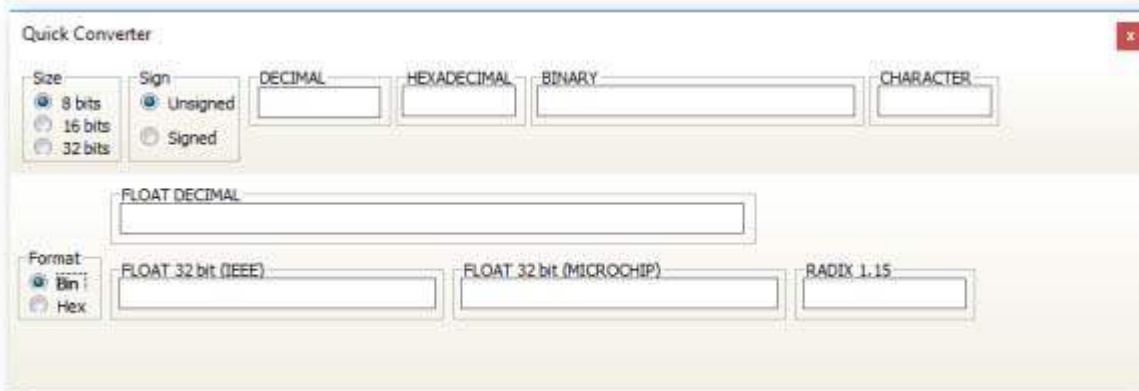
Visual TFT supports 17 TFT controllers and multiple different display resolutions. So, we even have the hardware prepared for your next graphic project.





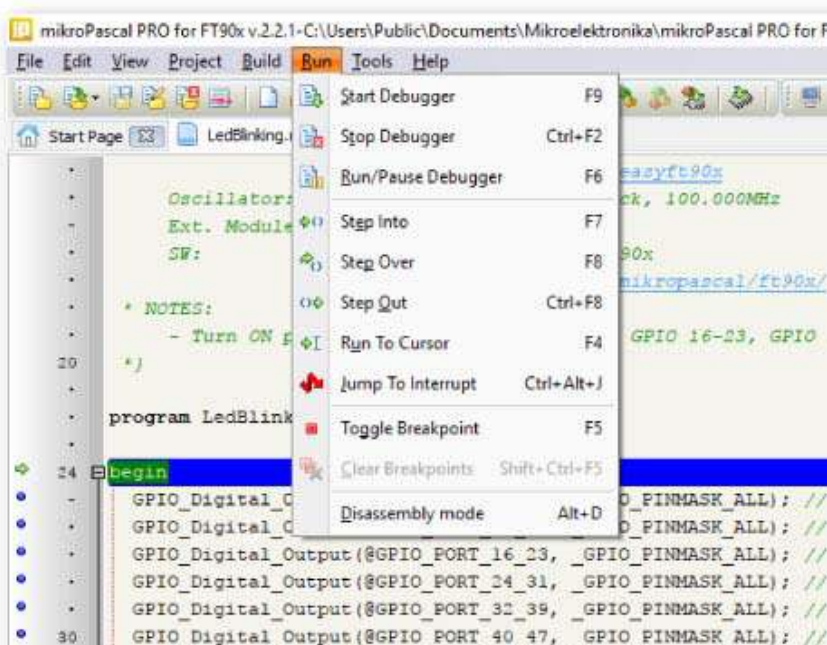
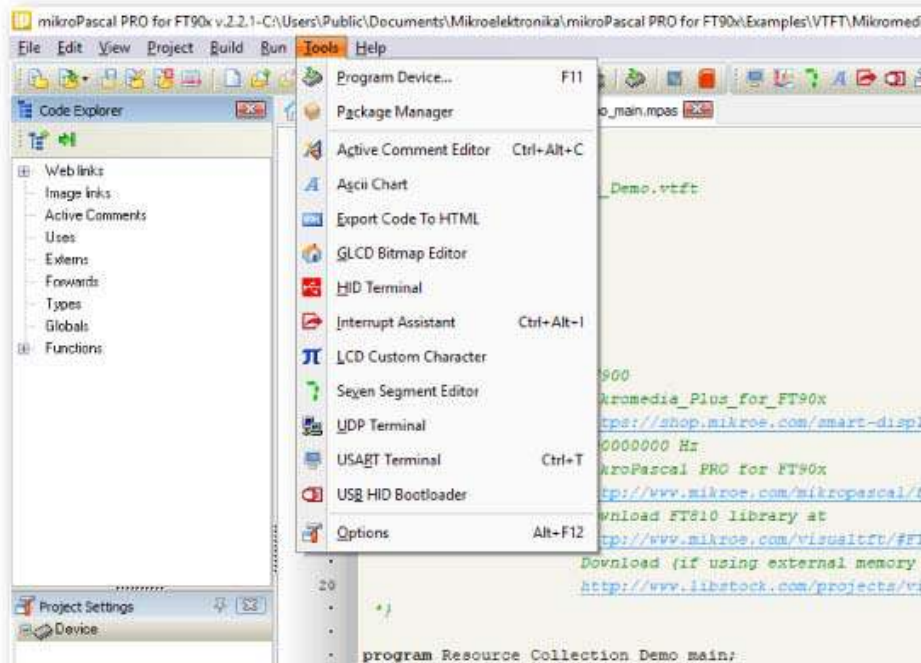
## IDE

The ideal environment for you to write, compile, execute, and debug your code. All the tools you could think of, and more, are there. The Library Manager, Interrupt Assistant, Project Explorer, Quick Converter and more. [Click here to get an in-depth explanation of each part of the IDE.](#)



## The perfect toolbox

mikroPascal comes equipped with fully-functional software tools that can boost your efficiency and do the job for you, so you can be more productive in your work: LCD Custom Character Tool, GLCD Bitmap Editor, Seven Segment Editor, UART Terminal, UDP Terminal, HID Terminal, ASCII Chart, Active Comments Editor, Interrupt Assistant, Advanced Statistics and much, much more.



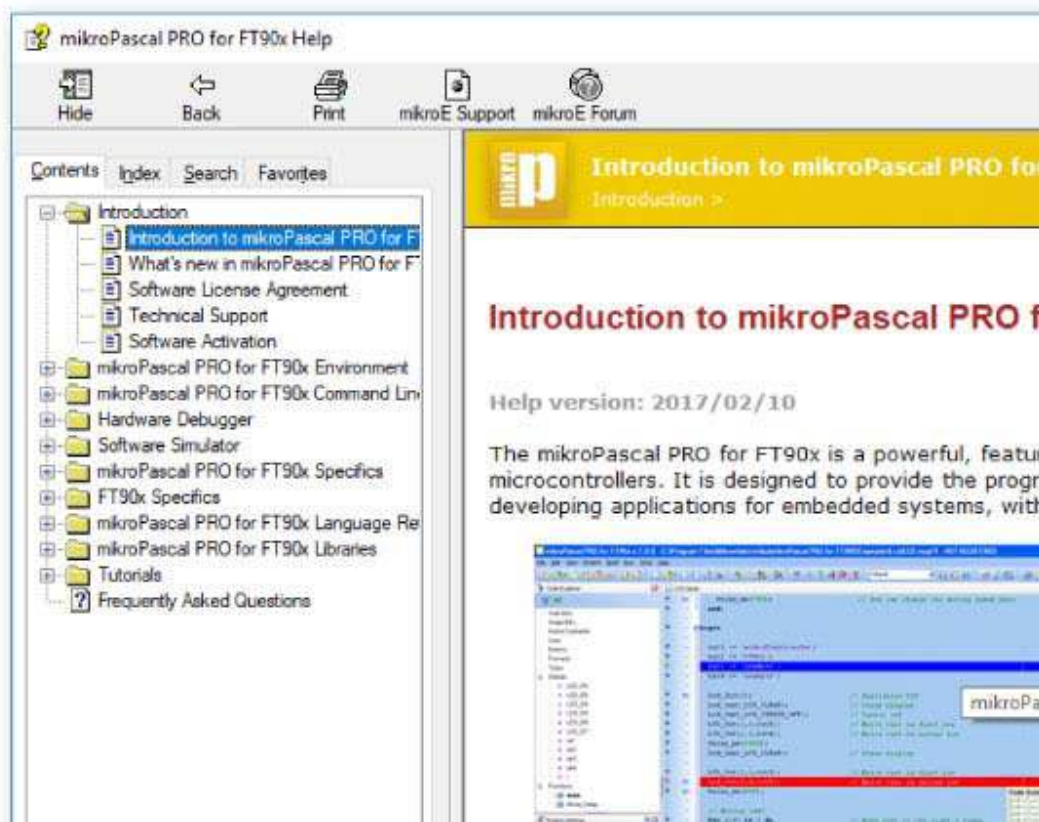


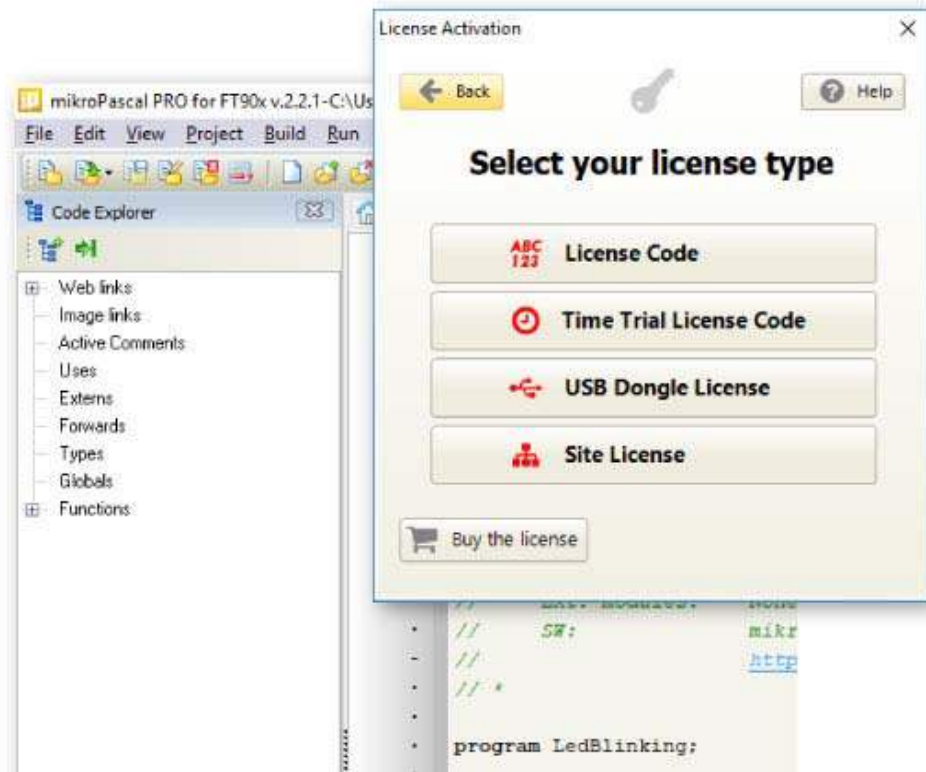
## Hardware debugging

Detect and correct all the code errors in seconds. mikroPascal has native support for hardware debugging when used with the mikroProg in-circuit programmer and debugger. It supports Step-over, Step-into, Step-out, Run, and Run To Cursor debugging operations. Also, the debugger supports standard breakpoints, which enable you to exploit the full potential of hardware debugging.

## Comprehensive documentation

The help file is the best place to start if you want to get to know the compiler. The easy-to-read format and detailed explanations of every functionality and feature will make you an expert in no time.





## Flexible licensing options

### **LICENSE CODE**

Buy the compiler and the License Code will be sent to your inbox instantly. Once you activate the license you can use it on up to two computers.

### **USB DONGLE**

Do you need a portable license, that can be used on multiple computers? USB Dongle license is the perfect solution.

### **SITE LICENSE**

Own, manage, and deploy multiple software licenses. Instead of buying several licenses at a regular price, use the Site License option and get licenses for your whole team or class at a special price. Learn more.

### **TIME TRIAL LICENSE CODE**

Time Trial license was created by our developers, especially and only for the FT90x compilers. It includes 45-day free trial period in which you can use the compiler to its full potential. Once the time trial period expires, you can either purchase one of our licenses or get back to the demo version of the compiler. Keep in mind that you can always switch from the demo version to the licensed version.

# Start developing out of the box!

## mikroLab - essential tools for the efficient developer

Code, compile, program, and debug – all in one environment. Choose the development board, and you'll soon see that the rest of the tools are perfectly arranged around it.

mikroLab contains everything a developer needs to explore the possibilities of the microcontroller architectures we offer: a development board (with integrated programmer and debugger), the compiler license, an assortment of accessories, and as a bonus, a free license for one of our GUI design tools (either Visual TFT or Visual GLCD).

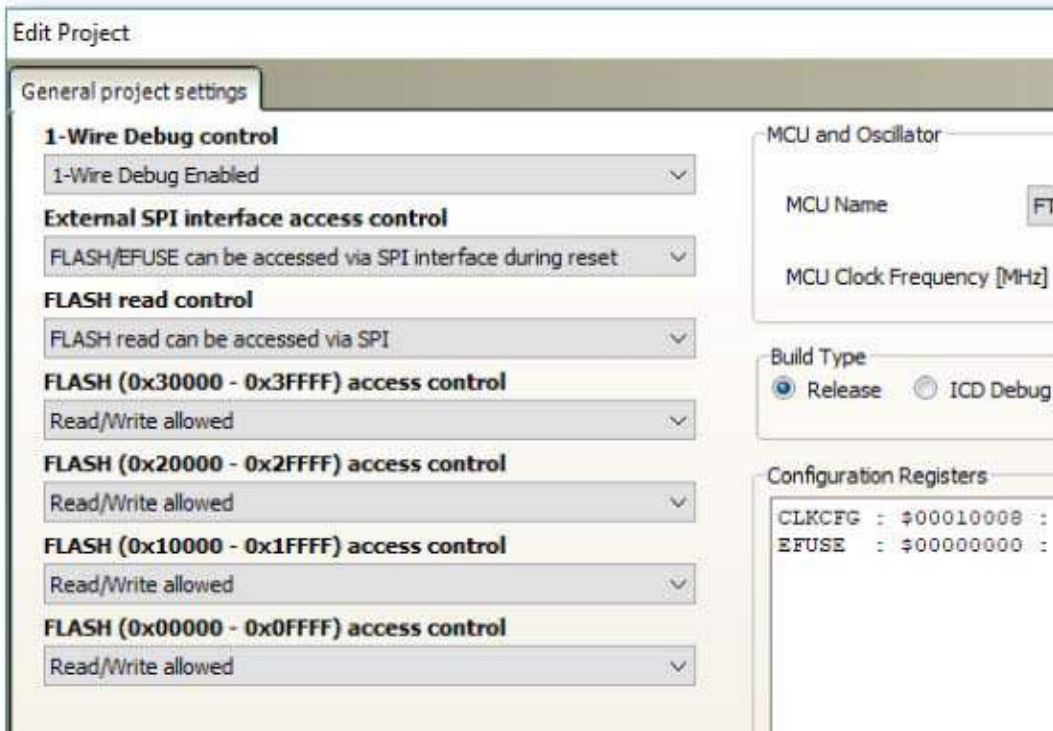
## IDE

### Single solution for designing GUIs, coding the backend, compiling and debugging

With the integrated **Visual TFT** you can create amazing user interfaces, simply drag and drop visual elements and the compiler will generate the code for you. Save time and focus on making your graphic design the best possible. Seamlessly switch between designing and coding using keyboard shortcut F12.



Manage all your data quickly and easily. Make the workspace comfortable and suited to your need. Use the default layout of the IDE, or arrange the windows manually. Navigate through all the projects you are working seamlessly and save time with the intuitive IDE of the mikroPascal compiler.



## Advanced Project Management

Edit Project gives you a full overview of the entire set of configuration bits in each chip. Select only among listed options, described in simple terms. Edit project includes predefined schemes of oscillator settings for most widely used microcontrollers. Simply load your desired scheme, and you are ready to go.

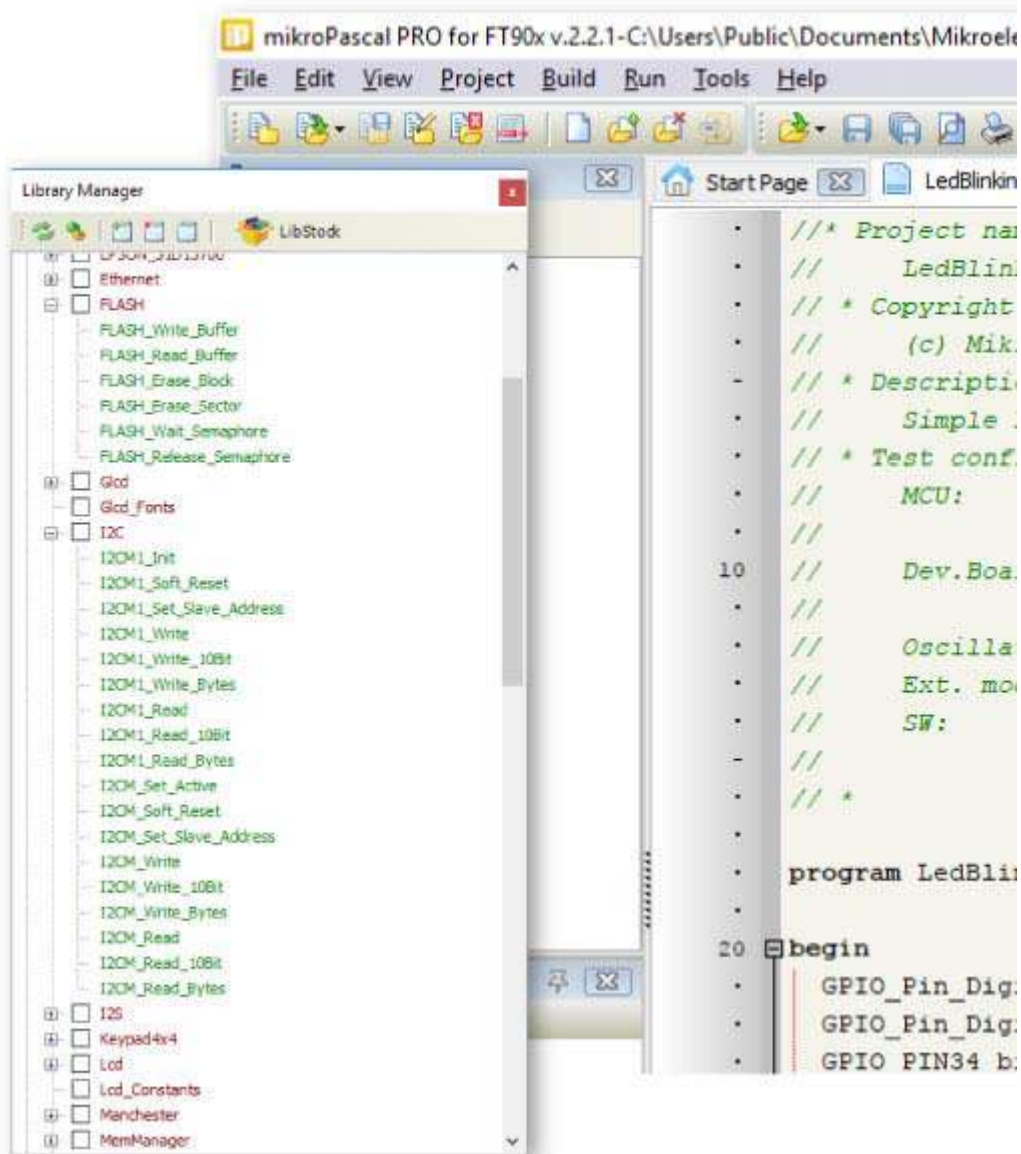
Don't waste your time browsing for examples. Let them come to you. **New Project Explorer** window leads you to your projects. It displays all of compiler's many included examples by default. But simply point the path to any other folder and fast recursion-search algorithm will extract all of projects inside and will display a tree view of your project files up to any depth. Double click opens the project and sets it as active. Easily switch between the projects as often as you want.

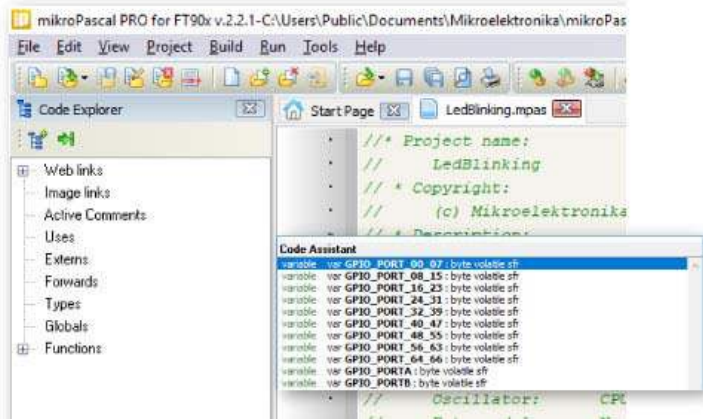
## Library manager

Only mikroPascal offers the unique mechanism to easily use any available library in your project. Special OneClick technology allows you to speed up your development.

Just click on the checkboxes of the libraries you need and they will be instantly available in your code. As we always think one step ahead, we programmed Library manager to allow easy usage of third party libraries installed with Package Manager software.

**Notice:** Visit LibStock and download fully functional and working projects, and install them with a single click.





## Code Assistant

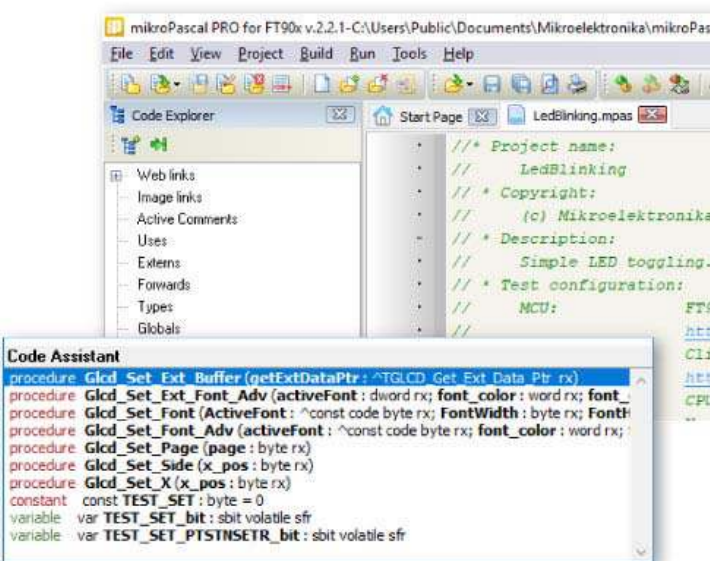
Control-space is probably the most widely used shortcut among programmers. Why? Because it initiates Code Assistant - programmer's first aid kit. No one needs to memorize function names.

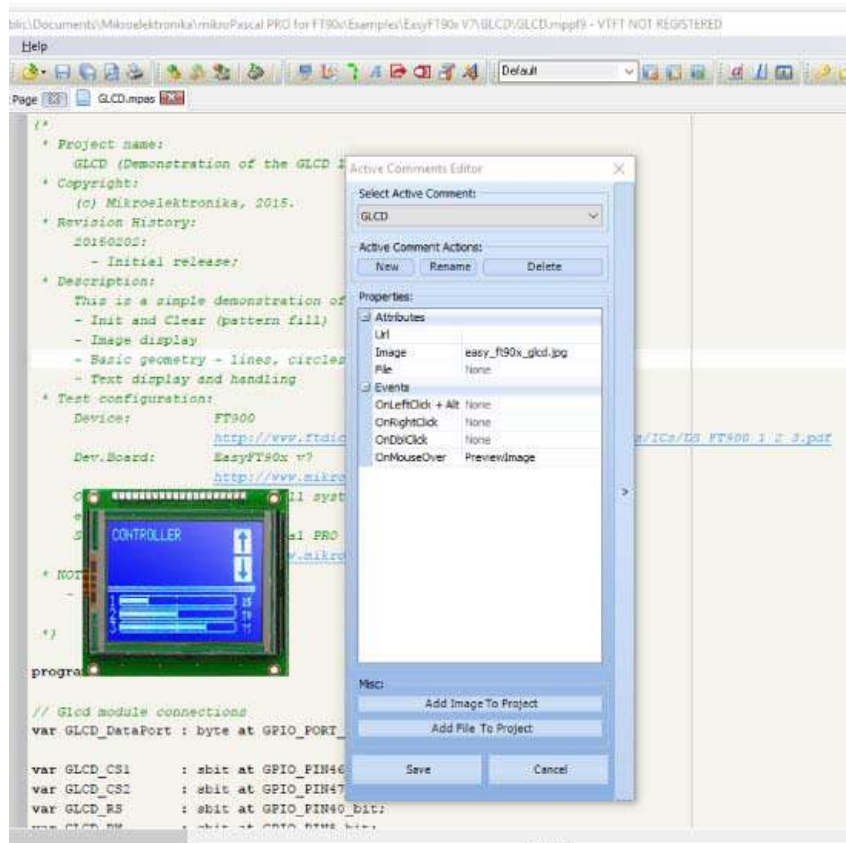
Focus on your code, and let the syntax write itself correctly. Write function calls with one click of your keyboard. **Code assistant in mikroPascal PRO for ft90x** also suggests correct names of functions, constants and variables, so you have it all covered. You don't ever have to get another Syntax error message.

## Wild Card Code Completion

Use Code Completion for all those times when you need to list identifier names that contain a certain word, or when you only know a part of the identifier name.

Simply type \\* in the Code Editor, followed by the phrase, and presses Ctrl+Space - a list of identifiers containing this phrase will be shown.





## Active Comments

We have developed Active Comments - a unique feature of mikroPascal PRO for ft90x. Any comment can become your multimedia event hook.

Add images, files and URLs to any active comment and assign events as you like.

Right Mouse Click can open browser with URL, Mouse Over can display the image, and Double Click can open a specified file.

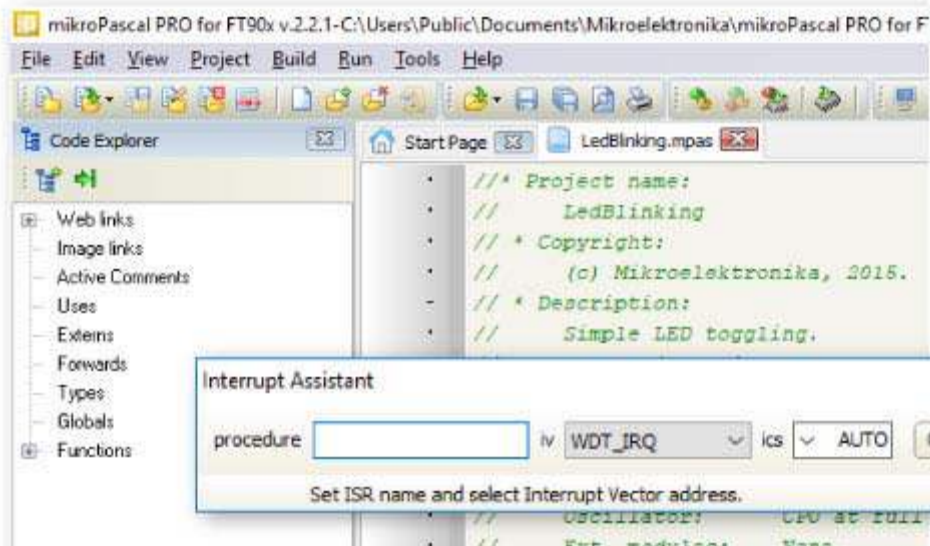
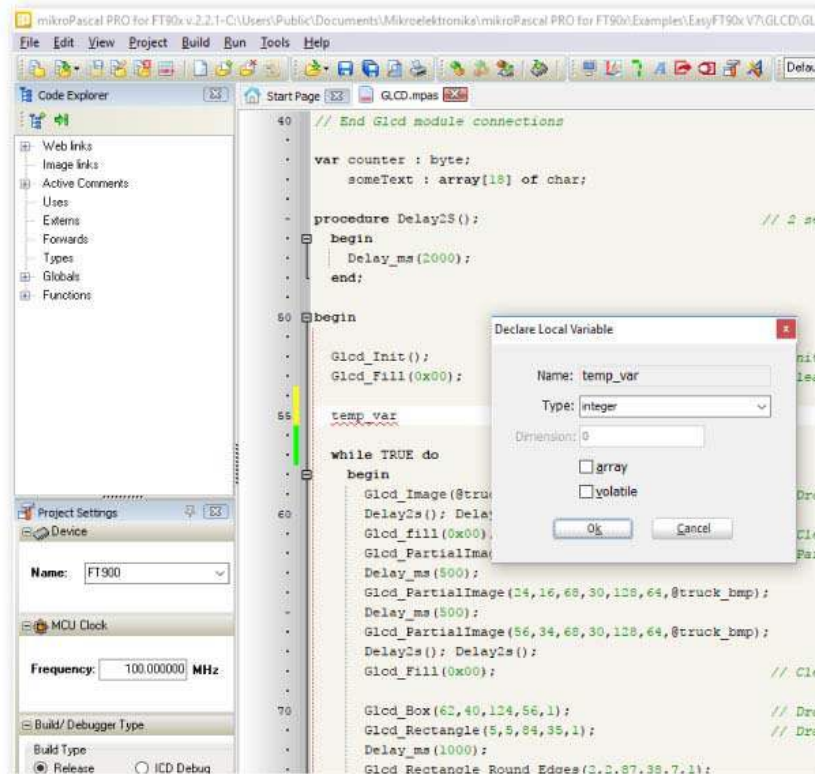
You can add:

- Images
- Files
- URLs

## Add local variable declaration option

Easily declare a local variable.

- First, enter the desired variable's name in the Code Editor.
- Then select this option from Edit menu (Shift+Ctrl+V). Here you can the select variable type, dimension, and add a volatile qualifier if needed.
- After pressing the OK button, a variable declaration will be placed.



## Interrupt Assistant

The compiler also includes the Interrupt Assistant, that can help you in configuring interrupts.

You can launch it from the drop-down menu Tools > Interrupt Assistant.



## Parameter Assistant

Many functions. Even more parameters. Was it word, or byte? You don't have to scroll through Help file.

Just hit CTRL+SHIFT+SPACE and function parameters will be listed for you.

```
• procedure DrawLine(Aline : ^TLine);
• begin
•   if (Aline^.Visible = 1) then
•     begin
•       x1 : integer rx, y1 : integer rx, x2 : integer rx, y2 : integer rx
710   IFT_Set_Pen(Aline^.Color, Aline^.Pen_Width);
711   IFT_Line(Aline^.First_Point_X, Aline^.First_Point_Y, Aline^.Second_Point_X, A
•     end;
•   end;
•
• procedure DrawLines();
• var i : integer;
•   local_line : ^TLine;
• begin
•   for i := 0 to CurrentScreen^.LinesCount - 1 do
720   begin
•     local_line := GetLine(i);
```

```
92 begin
•
• begin
•   IFT_Set_Active(@Set_Index, @Write_Command, @Write_Data);
•   IFT_Init_ILI9341_8bit(320,240);
110 IFT_Fill_Screen(CL_WHITE);
•   IFT_Set_Pen(CL_Black, 1);
•   IFT_Line(20, 220, 300, 220);
•   IFT_LLine(20, 46, 300, 46);
•   IFT_Set_Font(@HandelGothic_BT21x22_Regular, CL_RED, FO_HORIZONTAL);
•   IFT_Write_Text('SERIAL_FLASH', 95, 14);
•   IFT_Set_Font(@Verdana12x13_Regular, CL_BLACK, FO_HORIZONTAL);
•   IFT_Write_Text('EasyMxv7s', 19, 223);
•   IFT_Set_Font(@Verdana12x13_Regular, CL_RED, FO_HORIZONTAL);
•   IFT_Write_Text('www.mikroe.com', 200, 223);
•   IFT_Set_Font(@IFT_defaultFont, CL_BLACK, FO_HORIZONTAL);
120 IFT_Set_Pen(CL_WHITE, 1);
```

## Code Folding

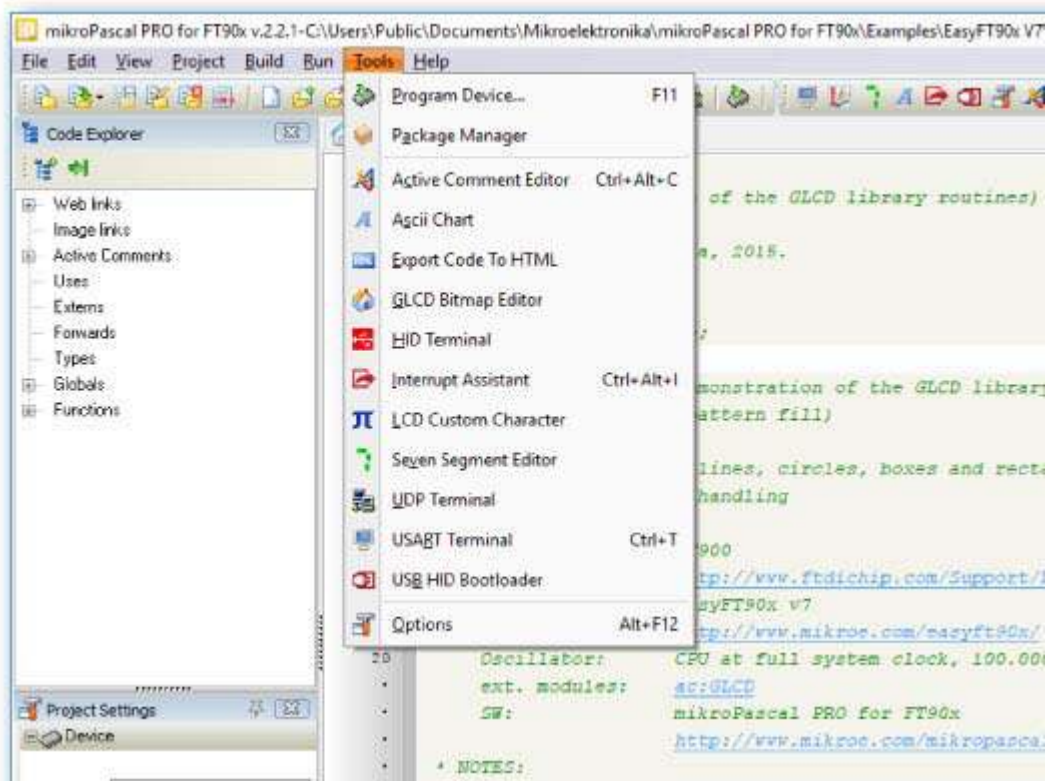
When your code overgrows the size of your screen, it's always better to fold those completed blocks, and work in a clearer surrounding.

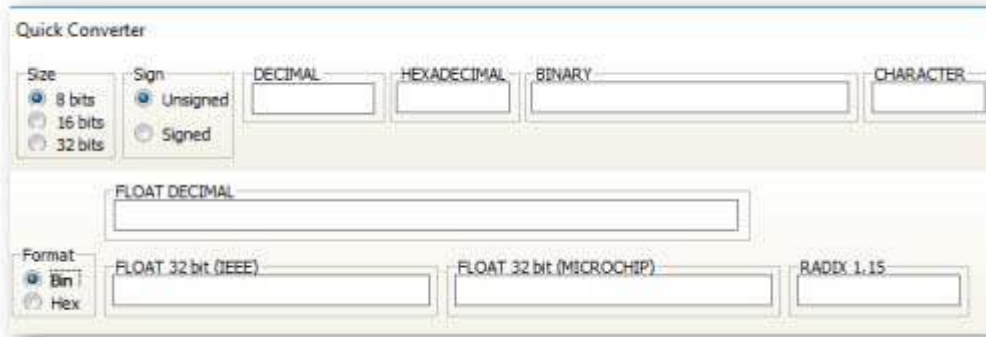
This way you can always see the big picture.

## Built-in tools

What's the point of a compiler if you have to do all the hard work yourself. mikroPascal PRO for ft90x offers you several most useful integrated tools that will help you get the job done with minimum effort.

- Active Comment Editor
- ASCII chart
- Export Code To HTML Tool
- GLCD Bitmap Editor
- HID Terminal
- Interrupt Assistant
- LCD Custom Character
- Seven Segment Editor
- UDP Terminal
- USART Terminal
- USB HID Bootloader





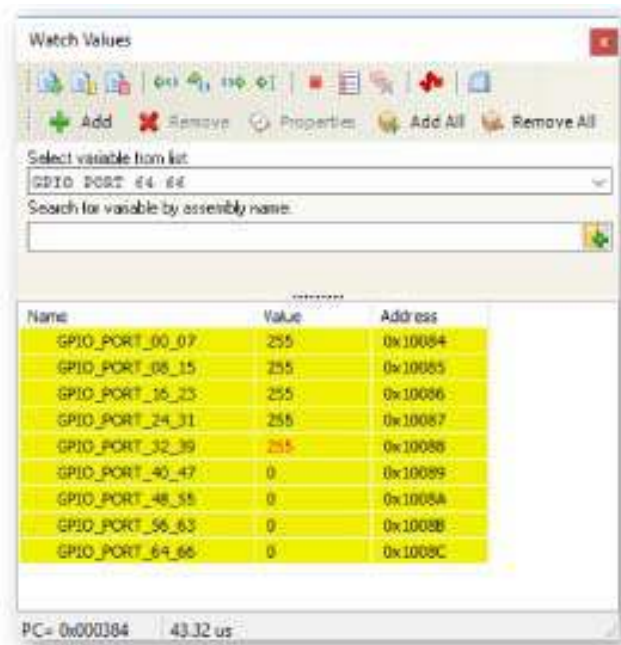
## Quick Converter

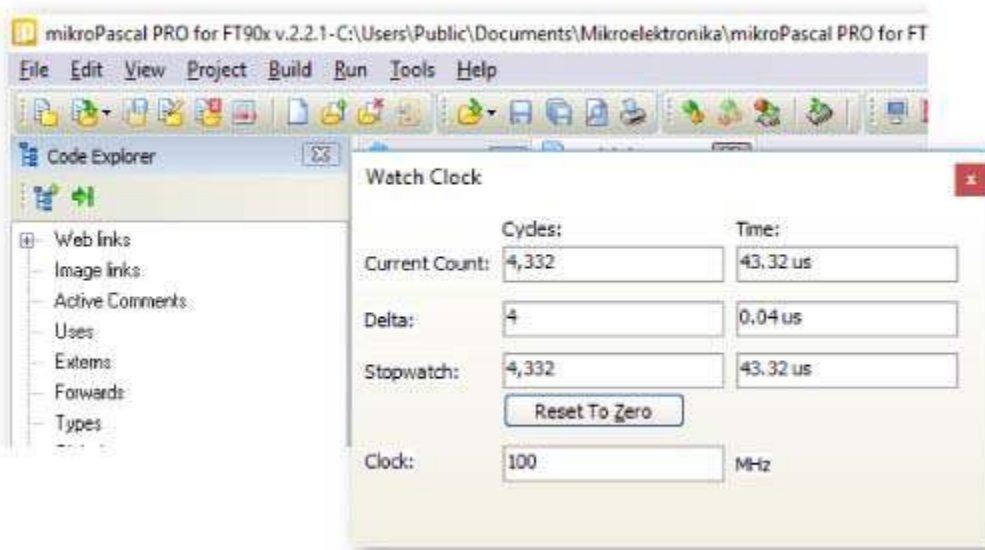
Your fast pocket converter of binary, float, HEX and Radix 1.15 formats into formats you need in your code.

It even displays ASCII values of your bytes.

## In-Circuit Debugging

mikroPascal PRO for ft90x has native support for hardware step-by-step In-Circuit Debugger when used with fast USB 2.0 mikroProg™ programmer (in both on-board and standalone version). Debugger is a separate DLL module which supports Step-over [F8], Step-into[F7], Step-out[Ctrl+F8], Run[F6], Run To Cursor[F4] debugging operations. Also, debugger supports standard breakpoints, which enable you to exploit the full potential of fast debugging.





## Software Simulator

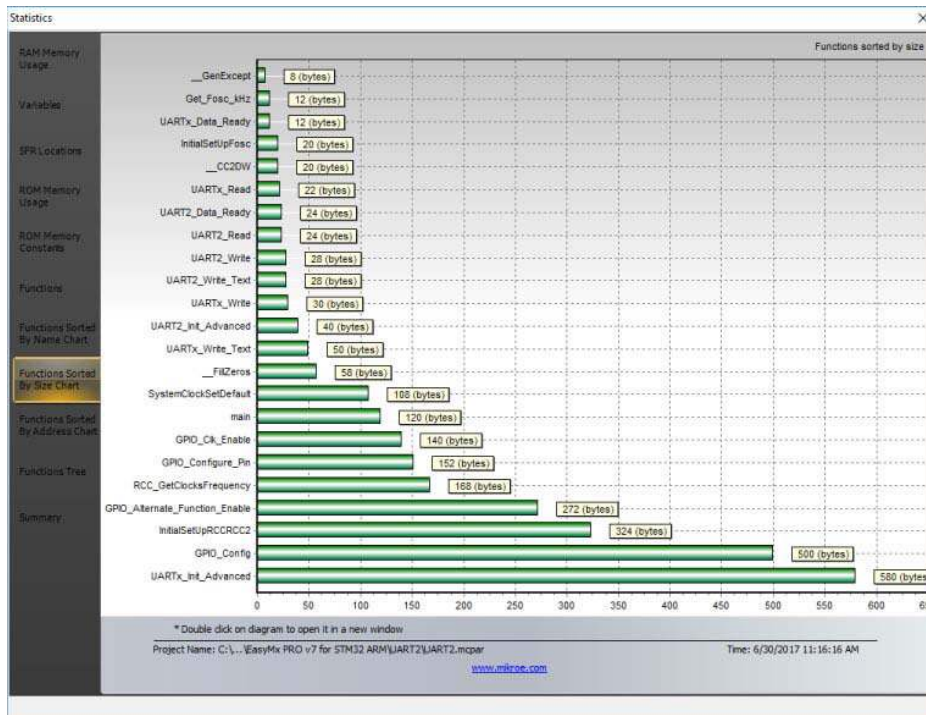
If you want to go through your code and monitor the values of your variables searching for bugs and errors, Software Simulator is the best way to do so.

Software simulator supports all debugging modes as hardware debugger, but instead of executing the code on real hardware, it simulates code flow on your PC. Using Watch Clock you can precisely measure the code execution time in microseconds or in clock cycles.

## Advanced Statistics

After you build your project, you can always look under the hood with mikroPascal's Advanced Statistics. It is a powerful tool that visually describes most important information about your project.

Take a look at your variables, arrays and constants and know how much memory your program consumes. See which function calls which in the functions tree window. See how big are your functions and how are they linked in memory, which is especially important if you want to write your own bootloader applications.



# mikroC, mikroBasic, mikroPascal for FT90x v2.21

- Release date: December 29, 2016.
- Ide build 2.21
- cmd line build 2.21

List of features applies to all three languages unless specified otherwise.

License owners are entitled to a lifetime of free upgrades.

## Compiler Changelog

### Version 2.2.1

The TFT library has been updated to include support for ST7789V TFT controller. The library now includes automatic detection whether the connected display is ILI9341 or ST7789V. To install the update, launch the compiler, go to Help >>> Check for Updates. Development of the new version is proceeding regularly.

### [DOWNLOAD](#)

<https://download.mikroe.com/setups/compilers/mikropascal/ft90x/mikropascal-ft90x-setup-v221.zip>

# IDE

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## **New:**

- Added board definition for mikromedia PLUS for FT90x (VTFT part)
- Key file license is now obsolete

## **Added Options**

- Generate Code for all VTFT projects
- Generate and Build for all projects

## **Improved:**

- MaxLength property (if set >0) now automatically detects if caption length is greater and updates.
- Software licensing window facelift.
- Radius property for circle/rounded objects now limited to a maximum of half screen.
- Progress bar font Start/End char reduced from 32-127 to 37-58 (code size reduced)

## **Fixed:**

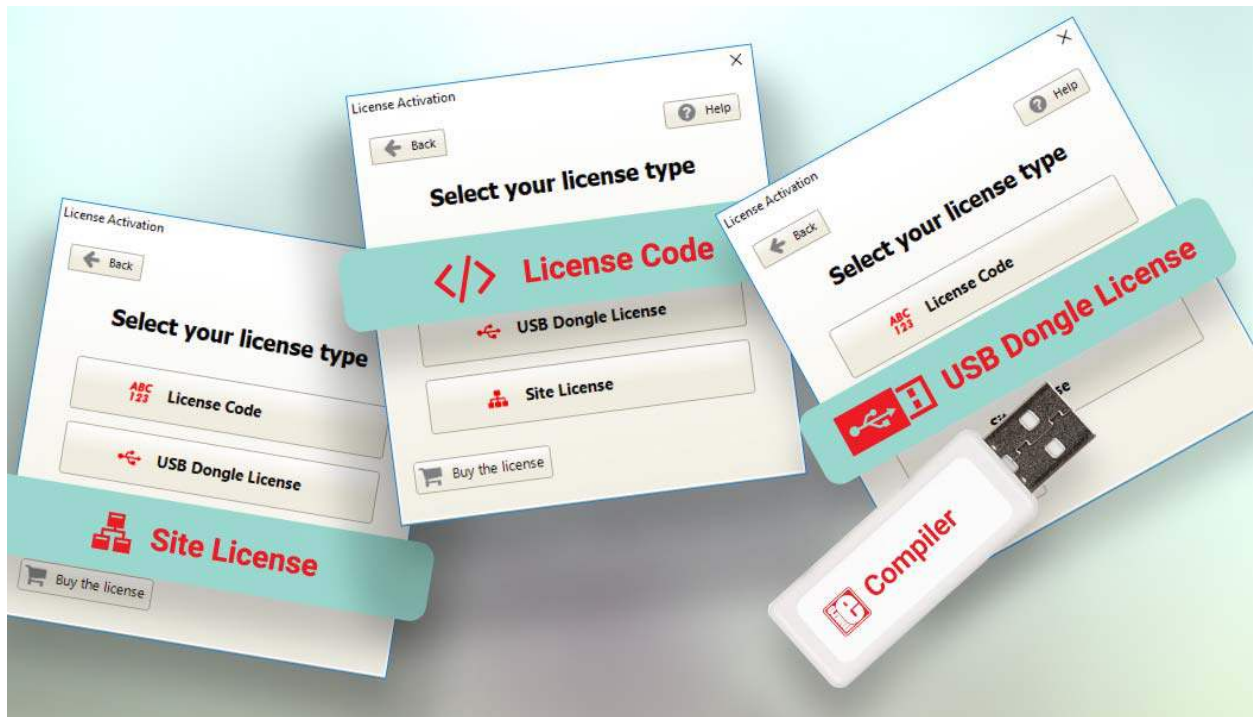
- Changing board definitions sometimes doesn't set calibration method properly.
- Sound action related code (FT8xx controller) doesn't get generated every time.
- Some rounded objects can be resized down past corner radius limitations.
- IDE raises unnecessary warnings when switching from one FT8xx controller to another FT8xx controller.
- Code merge window is raised undocked.
- Adding events to screen adds the same events if any object is selected.
- Touch panel controllers mechanisms improved.
- Aborting create new pattern wizard takes 2 clicks on the cancel button.
- Locate projects resource file button remains disabled after code generation.
- Image objects load images without setting picture ration to 1 resulting in stretched image.
- Image objects (non FT8xx controllers) missing Picture Ratio property.
- Design screen responsive to keyboard inputs even though code view is active.
- Compiler and Visual TFT projects can be easily distinguished by color (Start Page).

## *Examples*

- Added Examples for mikromedia PLUS for FT90x

## **Version 2.0.0**

## **Version 1.2.0**



## License Code

Choose this licensing option if you want to **activate your compiler license in seconds**. You can use it on up to two computers. We will send you the Registration code as soon as you purchase the compiler, which you will use to request the Activation code. That is the whole process - your compiler license is activated. It's the quick and straightforward licensing option for this fast-paced world.

Learn more.

## USB Dongle License

Plug the **USB Dongle** into your computer and activate the license. Use your compiler license anywhere. If you are looking for a portable license that can be used on different computers the USB Dongle license is what you need. The USB Dongle contains a single license, it registers the compiler while it's connected. So, carry it anywhere with you. You will not be tied to one computer or one office.

Learn more.

**HOW TO ACTIVATE YOUR COMPILER**

# Site License



## Site Licenses for MikroElektronika Compilers

The regular licensing model for MikroElektronika software works best for individual users. If you run a two-person team, a whole R&D department, or teach a class, the Site License is a better solution. It allows you to own, manage and deploy multiple single licenses, with some major benefits:

**Affordable:** Instead of buying multiple licenses at regular price, we will quote a special discounted price. **Schools and universities will get the best deals.**

**Flexible:** With the Site license, individual licenses are not tied to individual computers/users. In other words, you don't have to buy a compiler license for each person who will use it. The number of licenses you own only defines how many compiler copies can be in active use at the same time. You control who has access.



# Here's How It Works

1. Once you purchase a given number of compilers, we will send you the installation for the Site License Manager (available for Windows and Linux). It's an application that runs a server from your computer.
2. Enter the Site License activation key in the License Manager application
3. To give members of your team/class access, simply share IP address and/or PORT number of the Site License server (visible from within the application)
4. To activate their compiler, members of your class/team connect to the server by entering the IP address and PORT number you gave them.
5. Once an individual user finishes his work session, the user slot becomes available again

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## Site License Inquiry

Name

Email

Message

Clicking on Submit will open a Support Ticket which will be assigned to the person who can best deal with the issue in question. You will immediately receive an automated response message and will be able to monitor communication thread through our Support Center.