# Micriμm

Empowering Embedded Systems

# μC/OS-II

# μC/Probe

and the

**STMicroelectronics STM32 Processor**

(Using the ST STM3210B-EVAL Evaluation Board,
ST STM3210E-EVAL Evaluation Board or the
IAR STM32-SK Evaluation Board)

## Read Me

www.Micrium.com

## About Micriμm

Micriμm provides high-quality embedded software components in the industry by way of engineer-friendly source code, unsurpassed documentation, and customer support. The company's world-renowned real-time operating system, the Micriμm **μC/OS-II**, features the highest-quality source code available for today's embedded market. Micriμm delivers to the embedded marketplace a full portfolio of embedded software components that complement **μC/OS-II**. A TCP/IP stack, USB stack, CAN stack, File System (FS), Graphical User Interface (GUI), as well as many other high quality embedded components. Micriμm's products consistently shorten time-to-market throughout all product development cycles. For additional information on Micriμm, please visit www.micrium.com.

## About μC/OS-II

Thank you for your interest in **μC/OS-II**. **μC/OS-II** is a preemptive, real-time, multitasking kernel. **μC/OS-II** has been ported to over 45 different CPU architectures and now, has been ported to the STM32 CPU available from STMicroelectronics.

**μC/OS-II** is small yet provides all the services you'd expect from an RTOS: task management, time and timer management, semaphore and mutex, message mailboxes and queues, event flags an much more.

You will find that **μC/OS-II** delivers on all your expectations and you will be pleased by its ease of use.

## Licensing

**μC/OS-II** is provided in source form for **FREE** evaluation, for educational use or for peaceful research. If you plan on using **μC/OS-II** in a commercial product you need to contact Micriμm to properly license its use in your product. We provide **ALL** the source code with this application note for your convenience and to help you experience **μC/OS-II**. The fact that the source is provided **DOES NOT** mean that you can use it without paying a licensing fee. Please help us continue to provide the Embedded community with the finest software available. Your honesty is greatly appreciated.

# About μC/Probe

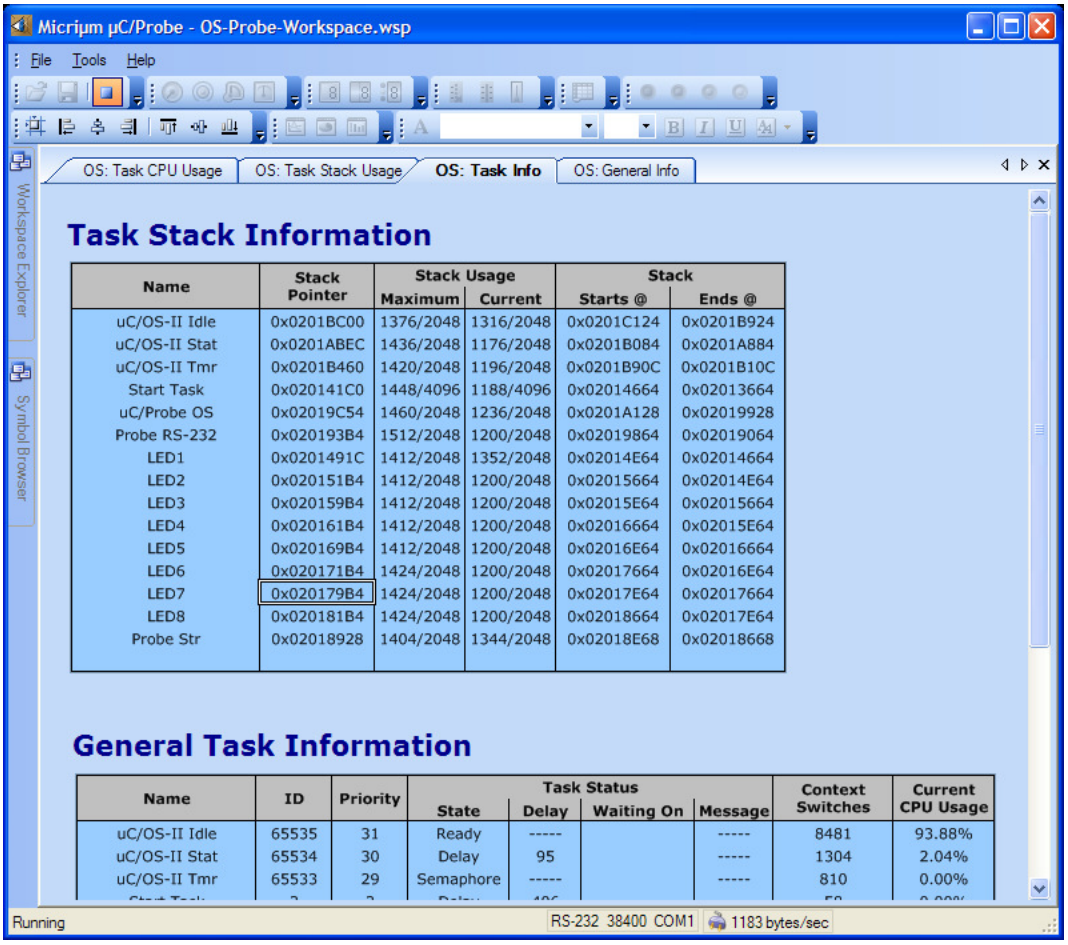
**uC/Probe** is a Windows application that allows a user to display the value (at run-time) of virtually any variable or memory location on a connected embedded target. The user simply populates **μC/Probe**'s graphical environment with gauges, tables, graphs, and other components, and associates each of these with a variable or memory location. Once the application is loaded onto the target, the user can begin **μC/Probe**'s data collection, which will update the screen with variable values fetched from the target.

**uC/Probe** retrieves the values of global variables from a connected embedded target and displays the values in a engineer-friendly format. The supported data-types are: booleans, integers, floats, and ASCII strings.

**uC/Probe** can have any number of 'data screens' where these variables are displayed. This allows to logically group different 'views' into a product.

A 30-day trial version of **uC/Probe** is available on the Micriμm website:

http://www.micrium.com/products/probe/probe.html

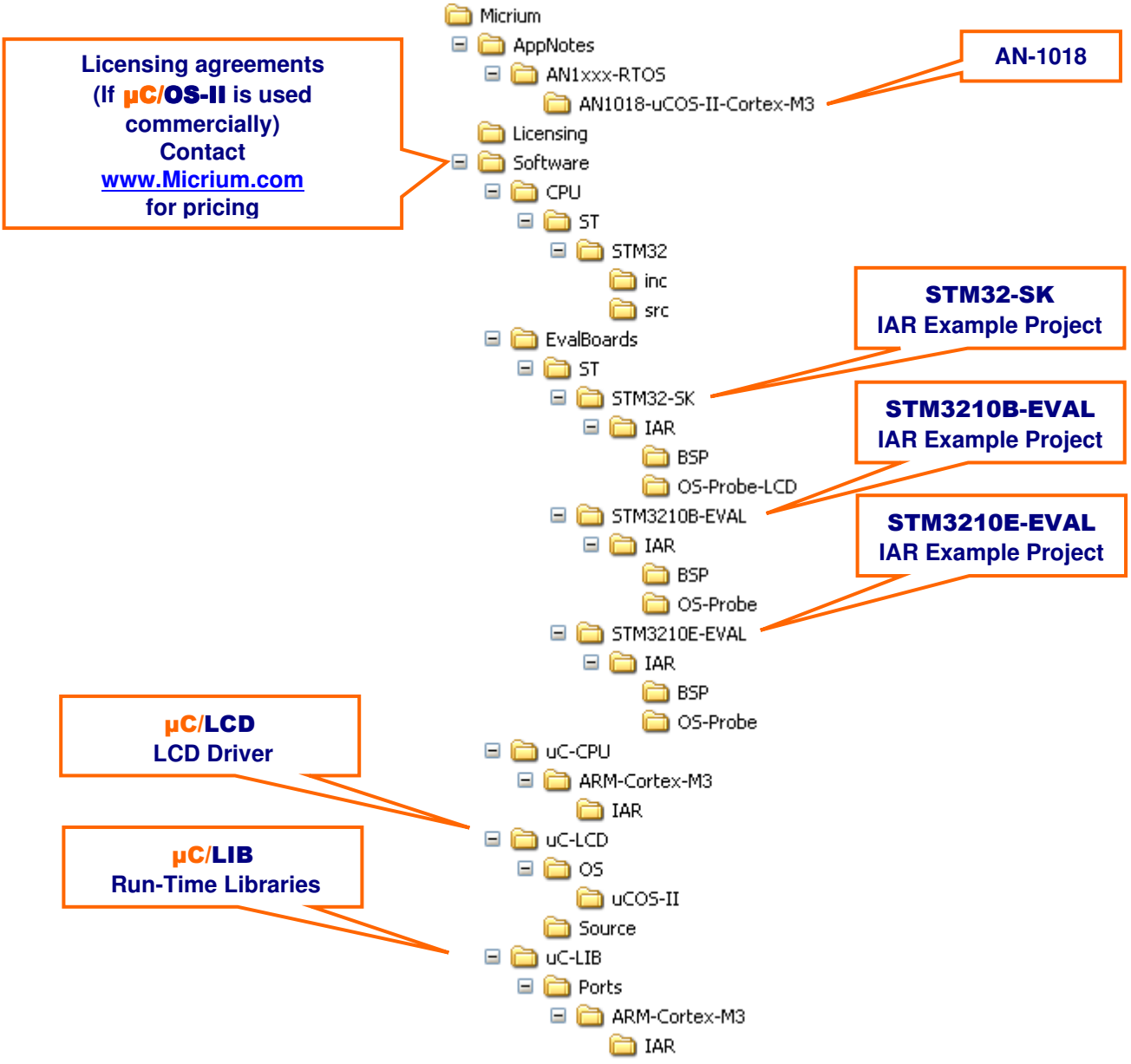


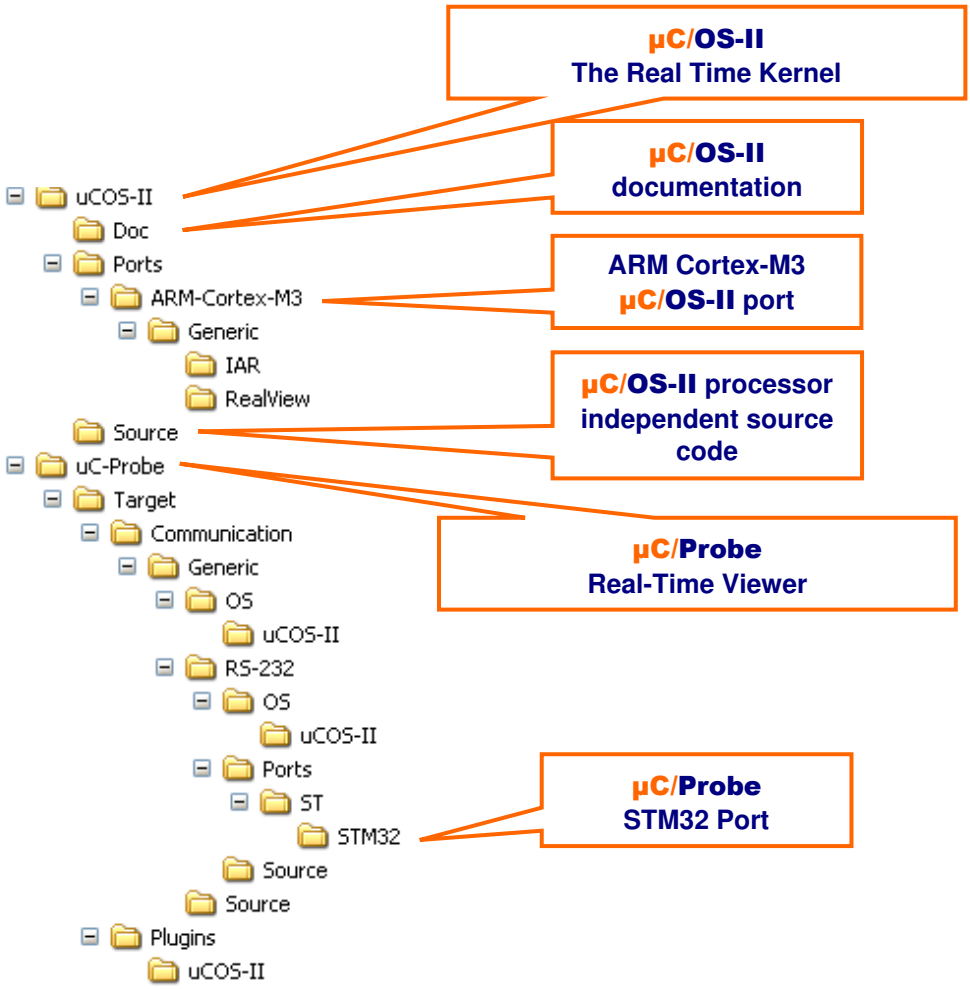
# Installing the Micriμm Software

The source code for **μC/OS-II** is provided in source form along with IAR EW) project files that allows you to run **μC/OS-II** on the IAR STM32-SK, ST STM3210B-EVAL and ST STM3210E-EVAL evaluation boards. To install the software, simply run the self-extracting executable.

The self-extracting executable is called *Micrium-ST-uCOS-II-LCD-STM32.exe*.

You will be prompted to accept the simple terms of the licensing agreement. If you answer 'Yes', the software will be installed on your PC under the *\Micrium* directory from the root:




μC/OS-II
The Real Time Kernel
μC/OS-II
documentation
ARM Cortex-M3
μC/OS-II port
μC/OS-II processor
independent source
code
μC/Probe
Real-Time Viewer
μC/Probe
STM32 Port
uCOS-II
Doc
Ports
ARM-Cortex-M3
Generic
IAR
RealView
Source
uC-Probe
Target
Communication
Generic
OS
uCOS-II
RS-232
OS
uCOS-II
Ports
ST
STM32
Source
Source
Plugins
uCOS-II

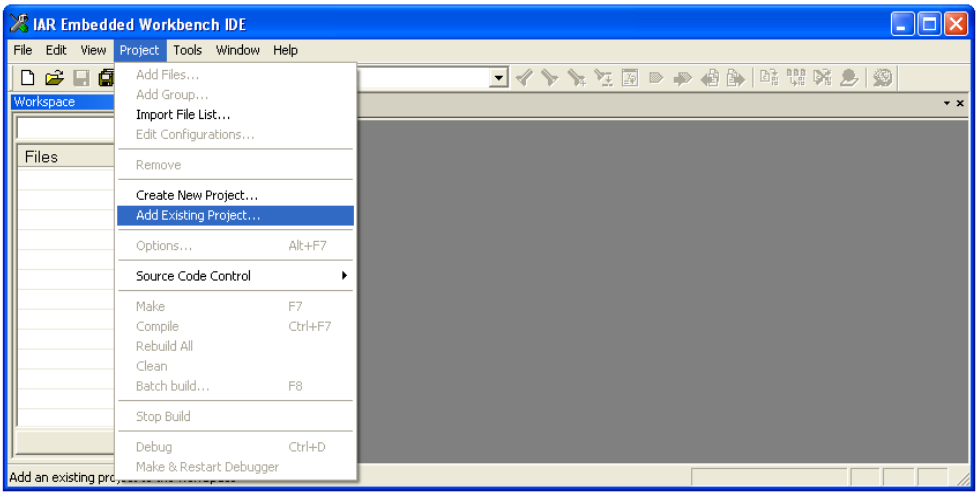
# Using the Micriμm IAR Example Project

You should read AN-1018 if you are interested in further information about the port for ARM Cortex-M3 processors.

To view the example project, start an instance of IAR Embedded Workbench, and open either the

- For the IAR STM32-SK evaluation boad, ***STM32-SK-OS-Probe-LCD-5.ewp***, located in the directory marked "STM32-SK IAR Example Project" in the tree above.
- For the ST STM3210B-EVAL evaluation board, ***STM3210B-EVAL-OS-Probe-5.ewp***, located in the directory marked "STM32102B-EVAL IAR Example Project" in the tree above.
- For the ST STM3210E-EVAL evaluation board, ***STM3210E-EVAL-OS-Probe-5.ewp***, located in the directory marked "STM32102E-EVAL IAR Example Project" in the tree above.

To do this, use the *Add Existing Project...* menu command under the *Project* menu:




The **μC/OS-II** Kernel Awareness plugin will allow you to examine information about system objects while using the C-Spy debugger. To gain access to this feature, enable the plug-in by right-clicking on the project name in the work space browser and choosing *Options…* Then, select the "Debugger" entry in the list box, and the "Plugins" tab pane. Find the **μC/OS-II** entry in the list and, finally, select the check box beside the entry.

**IAR EWARM Versions**

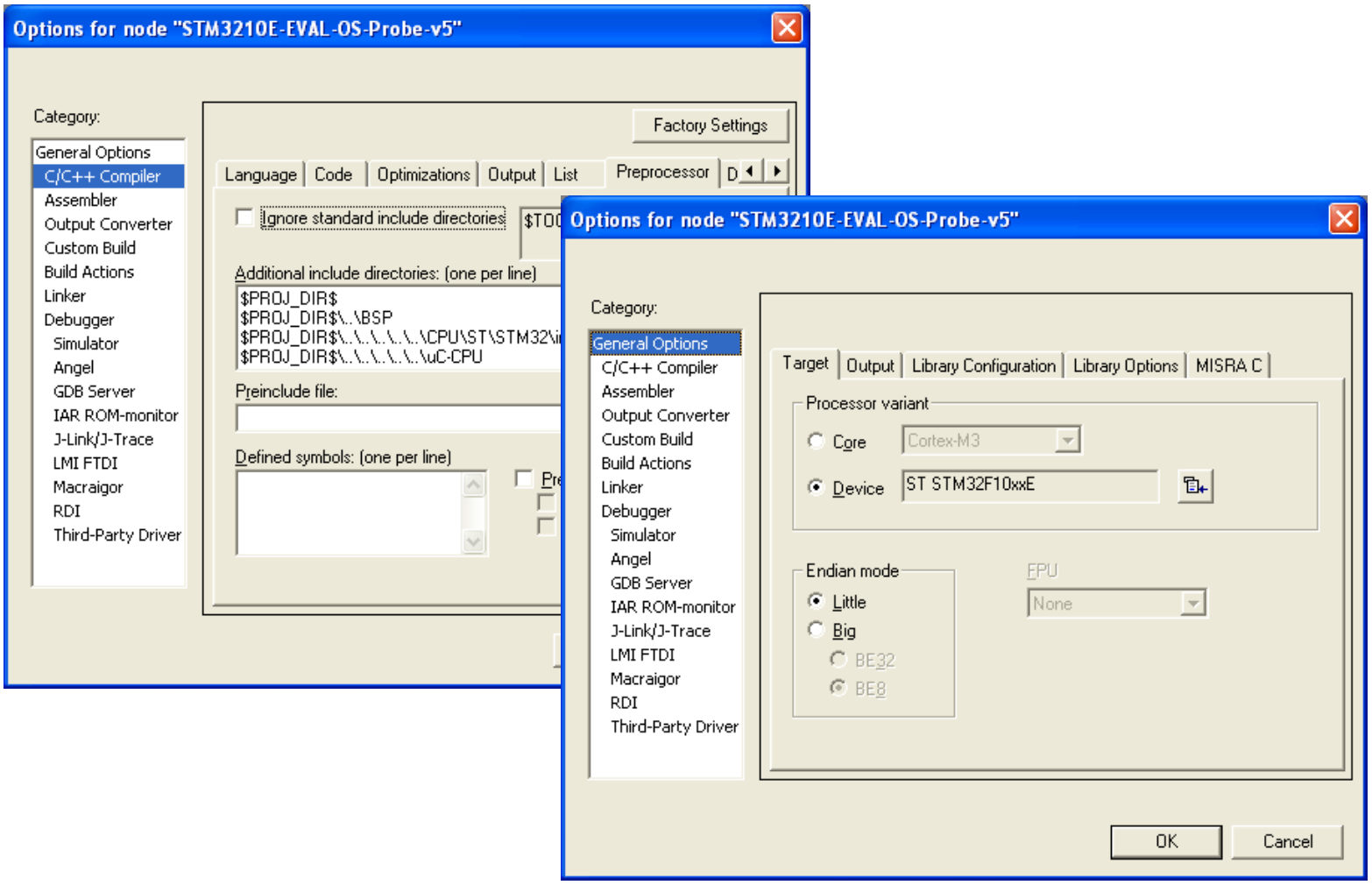
Be certain the project with a proper version of EWARM. IAR EWARM v4.4x will NOT open a v5.1x project. You will need to have IAR EWARM v5.1x or later to use these projects.

If you have opened the correct project file, but IAR gives errors because of project file compatibility problems, verify that the following project settings (or equivalent) are in place:

1. For the STM3210E-EVAL, the device “ST STM32F10xxE” is selected; for the STM32-SK or STM3210B-EVAL, the device “ST STM32F10xxB” is selected. In either case, the device radio button should be selected.

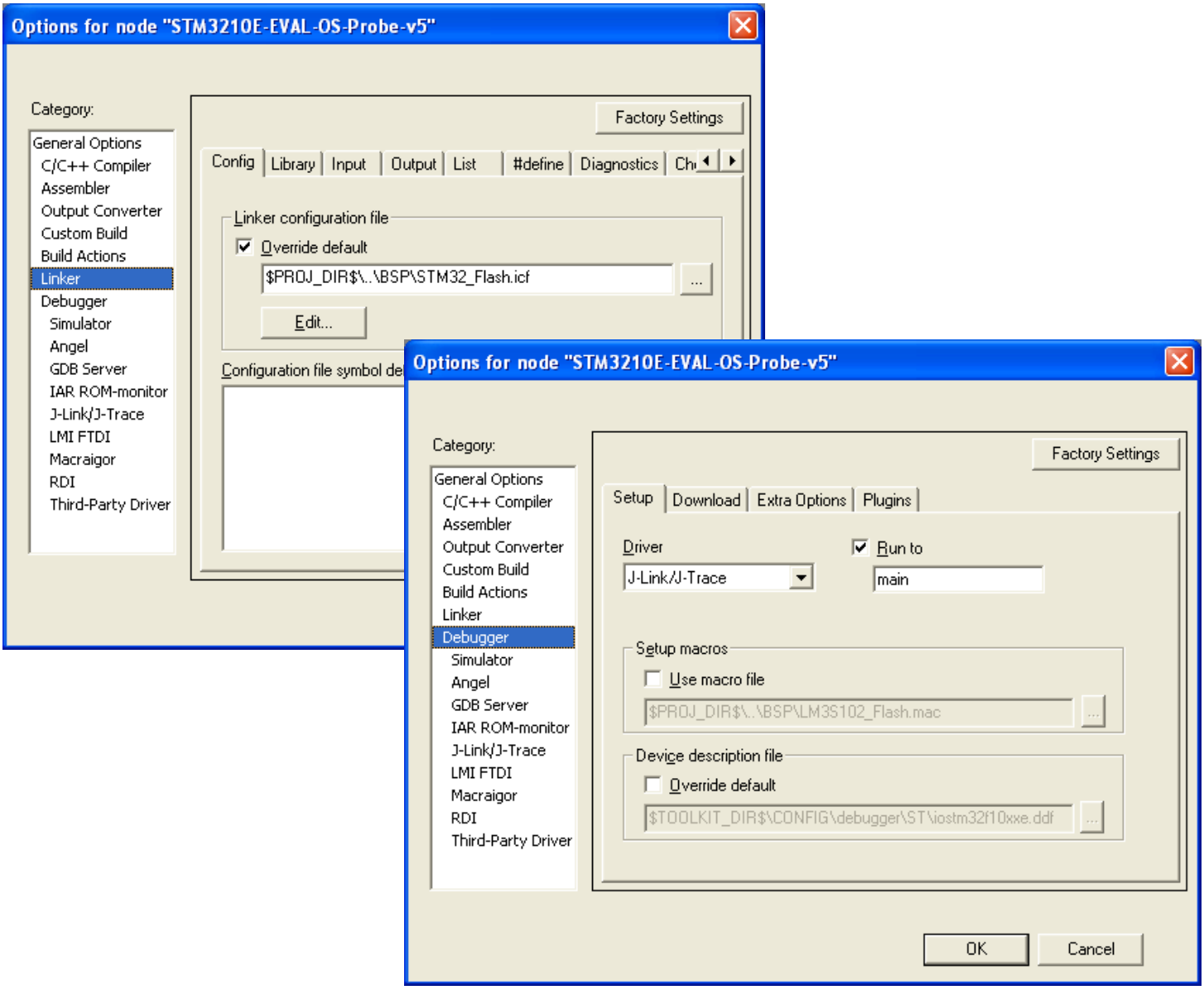
2. The following “C/C++ Compiler” → “Preprocessor” → “Additional Include Directories” are present:

```
$PROJ_DIR$
$PROJ_DIR$\..\BSP
$PROJ_DIR$\..\..\..\..\..\CPU\ST\STM32\inc
$PROJ_DIR$\..\..\..\..\..\uC-CPU
$PROJ_DIR$\..\..\..\..\..\uC-CPU\ARM-Cortex-M3\IAR
$PROJ_DIR$\..\..\..\..\..\uC-LCD\Source
$PROJ_DIR$\..\..\..\..\..\uC-LIB
$PROJ_DIR$\..\..\..\..\..\uCOS-II\Ports\ARM-Cortex-M3\Generic\IAR
$PROJ_DIR$\..\..\..\..\..\uCOS-II\Source
$PROJ_DIR$\..\..\..\..\..\uC-Probe\Target\Communication\Generic\RS-232\Source
$PROJ_DIR$\..\..\..\..\..\uC-Probe\Target\Communication\Generic
                                        \RS-232\Ports\ST\STM32
$PROJ_DIR$\..\..\..\..\..\uC-Probe\Target\Communication\Generic\Source
$PROJ_DIR$\..\..\..\..\..\uC-Probe\Target\Plugins\uCOS-II
```



3. The appropriate “Linker” → “Config” → “Linker configuration file” is chosen. This should be ***$PROJ_DIR$\..\BSP\STM32_Flash.icf***.

4. The “Debugger” → “Setup” → “Setup macros”, “Use macro file” checkbox should be unchecked.



# Using μC/Probe with the Example Project

The STM3210B-EVAL and STM3210E-EVAL projects are configured to use the STM32's UART1; the STM32-SK project uses the STM32's UART3. To use **μC/Probe** with the example project, perform the following steps:

1. Compile the project, load the code onto the board and begin running. The LEDs on the evaluation board should begin to blink.

2. Start **μC/Probe** and open the example workspace (*.wsp) located in the directory

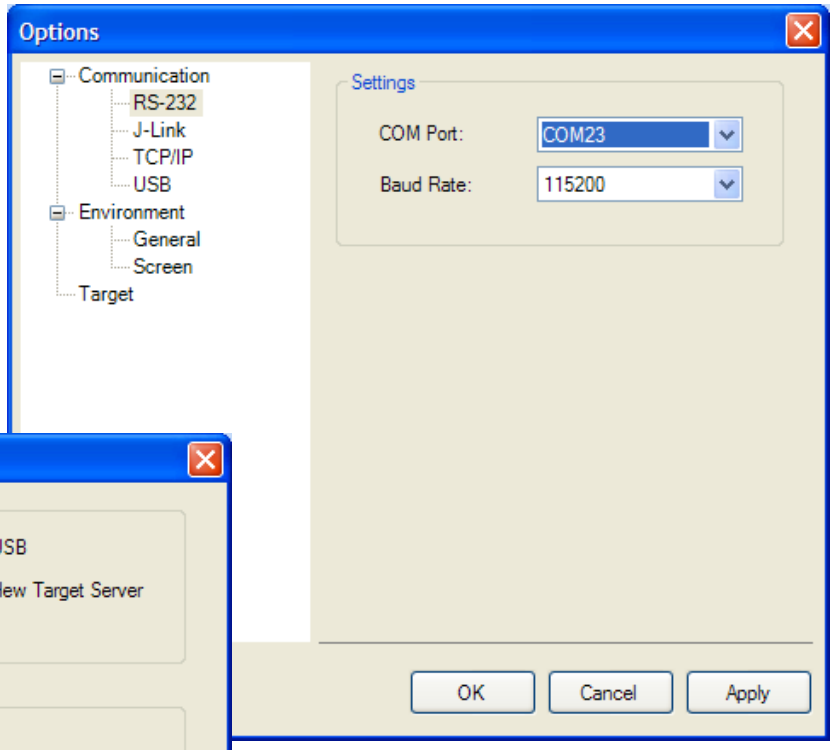
   *\Micrium\Software\uC-Probe\Target\Plugins\uCOS-II\Workspace*

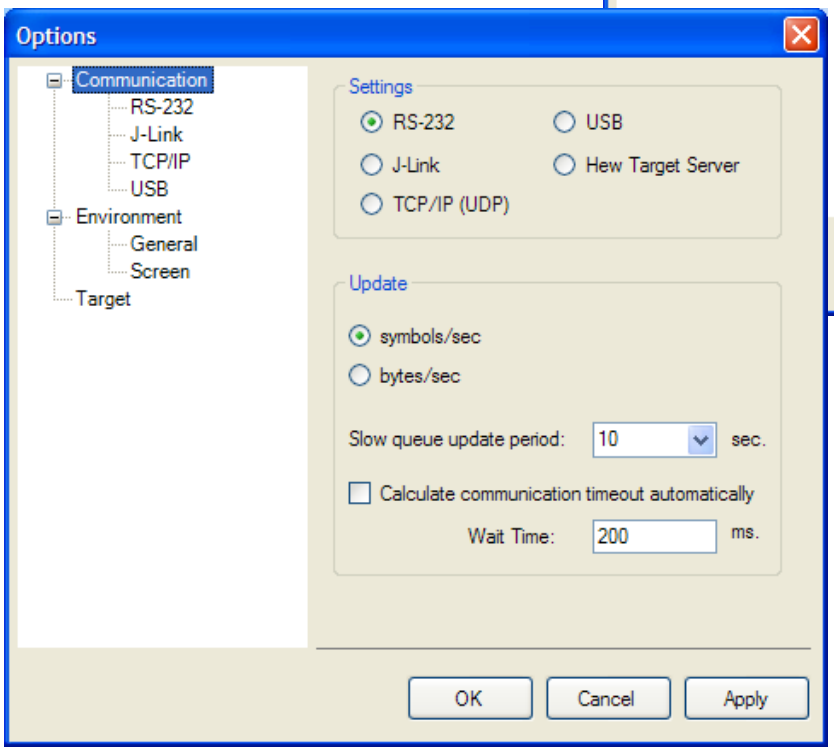
3. Check the options (choose "Options" from the "Tools" menu) and confirm that

   a. The RS-232 communication method is selected;

   b. A baud rate of 115200 has been selected;

   c. The appropriate COM port (on your computer) is selected.



4. Load the ELF file into the Symbol Browser. For the STM32-SK project, this should be located in the directory:

   ***\Micrium\Software\Evalboards\ST\STM32-SK\IAR\OS-Probe-LCD\Flash \Exe***

   For the STM3210B-EVAL, the ELF file will be in the directory:

   ***\Micrium\Software\Evalboards\ST\STM3210B-EVAL\IAR\OS-Probe\Flash \Exe***

   For the STM3210E-EVAL, the ELF file will be in the directory:

   ***\Micrium\Software\Evalboards\ST\STM3210E-EVAL\IAR\OS-Probe\Flash \Exe***

   The file will have a *.out extension.

5. Press the “Run” button on the toolbar (a green triangle).

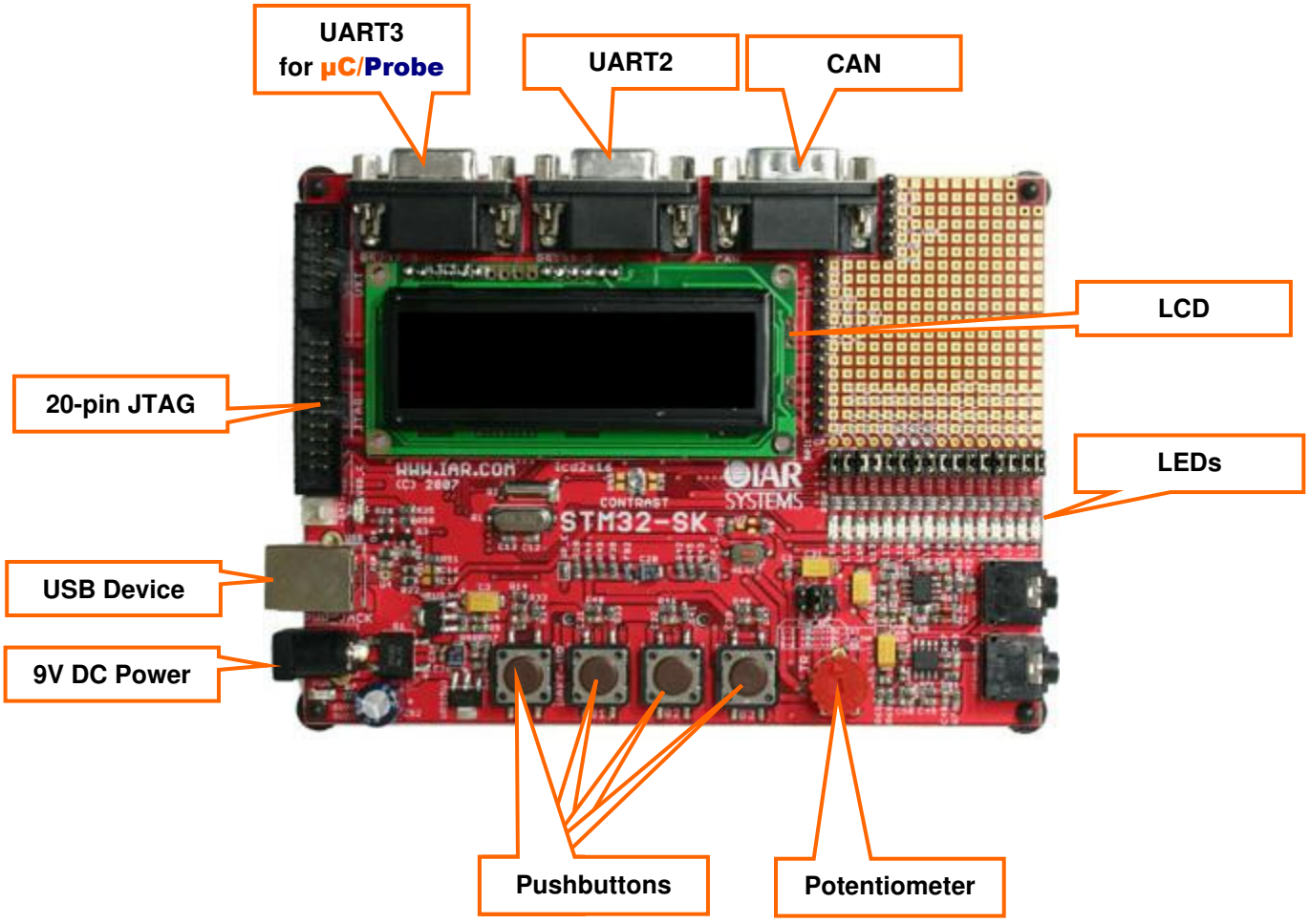
# About the Example Application: IAR STM32-SK

The example project includes a basic demonstration of **μC/OS-II**, **μC/Probe** and **μC/LCD**. The evaluation board components are labeled in the figure below. After you load the evaluation board with the sample project, the LEDs will start to blink, and the LCD will be populated with system information. Moving the potentiometer will change the speed at which the LEDs blink. The left-most push button (PB1) will change the information displayed on the LCD; PB2 will toggle the LCD backlight. UART1 is used for **μC/Probe**, which allows you to view (in real-time) the value of static / global variables in the target system. A 30-day trial version of this program can be downloaded from the Micriμm website.

Micriμm has also ported the following products to this platform:

- **μC/FS** (file system), including support for the following devices:
  - SD/MMC cards
- **μC/USB-Device**

See the other ST projects on the Micriμm website for additional information.



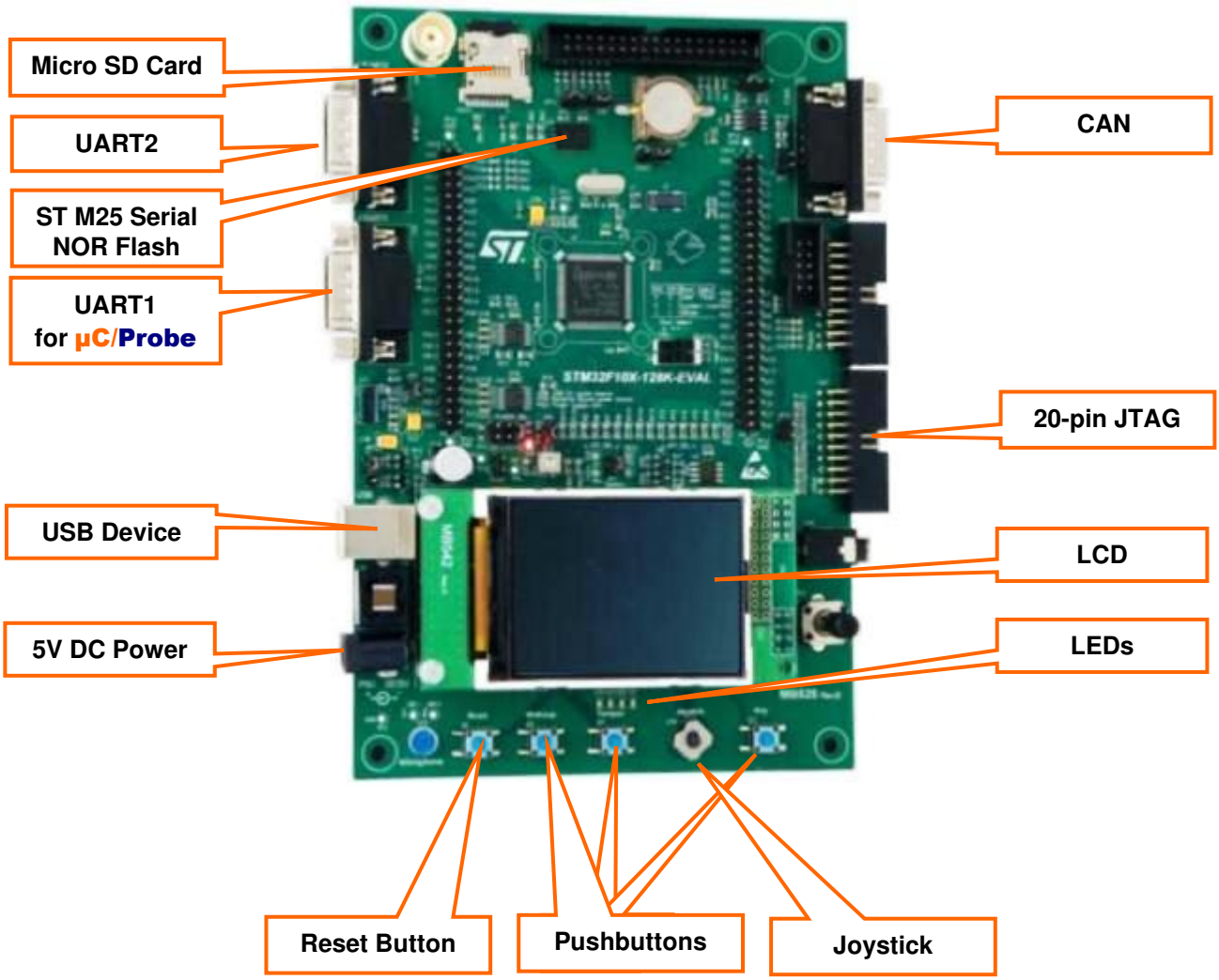
# About the Example Application: ST STM3210B-EVAL

The example project includes a basic demonstration of **μC/OS-II** and **μC/Probe**. The evaluation board components are labeled in the figure below. After you load the evaluation board with the sample project, the LEDs will start to blink, and the LCD will be populated with system information. Moving the potentiometer will change the speed at which the LEDs blink. The right-most push button (KEY) will change the information displayed on the LCD. UART1 is used for **μC/Probe**, which allows you to view (in real-time) the value of static / global variables in the target system. A 30-day trial version of this program can be downloaded from the Micriμm website.

Micriμm has also ported the following products to this platform:

- **μC/FS** (file system), including support for the following devices:
  - SD/MMC cards
  - ST M25 serial NOR flash
- **μC/USB-Device**

See the other ST projects on the Micriμm website for additional information.



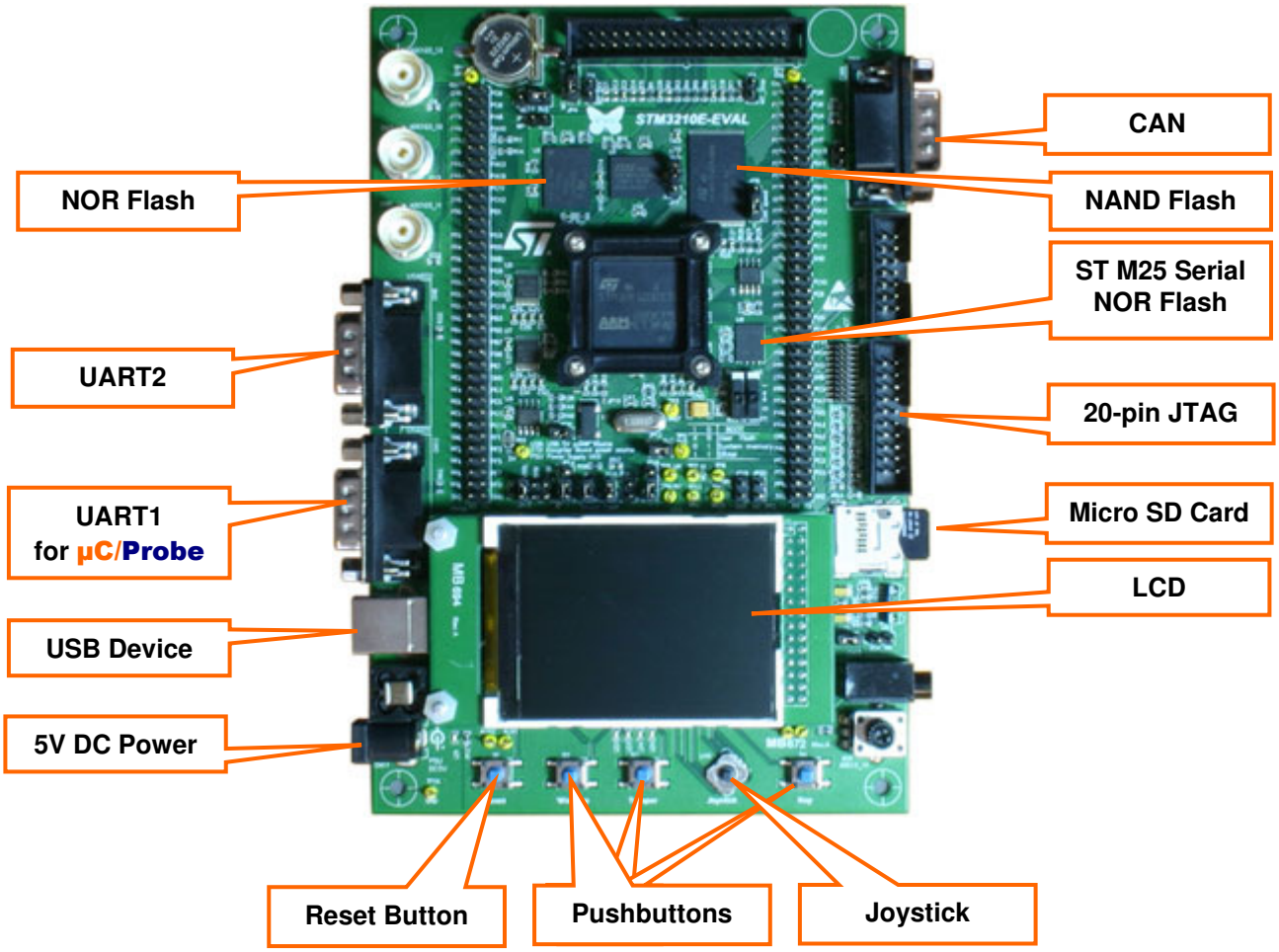
# About the Example Application: ST STM3210E-EVAL

The example project includes a basic demonstration of **μC/OS-II** and **μC/Probe**. The evaluation board components are labeled in the figure below. After you load the evaluation board with the sample project, the LEDs will start to blink, and the LCD will be populated with system information. Moving the potentiometer will change the speed at which the LEDs blink. The right-most push button (KEY) will change the information displayed on the LCD. UART1 is used for **μC/Probe**, which allows you to view (in real-time) the value of static / global variables in the target system. A 30-day trial version of this program can be downloaded from the Micriμm website.

Micriμm has also ported the following products to this platform:

- **μC/FS** (file system), including support for the following devices:
  - SD/MMC cards
  - NAND flash
  - NOR flash
  - ST M25 serial NOR flash
- **μC/USB-Device**

See the other ST projects on the Micriμm website for additional information.



# Erratas

If you find any errors in the documentation or code provided, please send those corrections to Support@Micrium.com. Be sure to specify the processor, version of **μC/OS-II** and any other pertinent information about the error being reported.

# Contacts

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