

Assembly_C_Code_1 for KIT_AURIX_TC334_LK

Assembly language in C code

AURIX™ TC3xx Microcontroller Training
V1.0.0



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Scope of work

Inline assembler and assembler files are used in combination in a C project.

Two LEDs are switched on then switched off using assembly code functions.

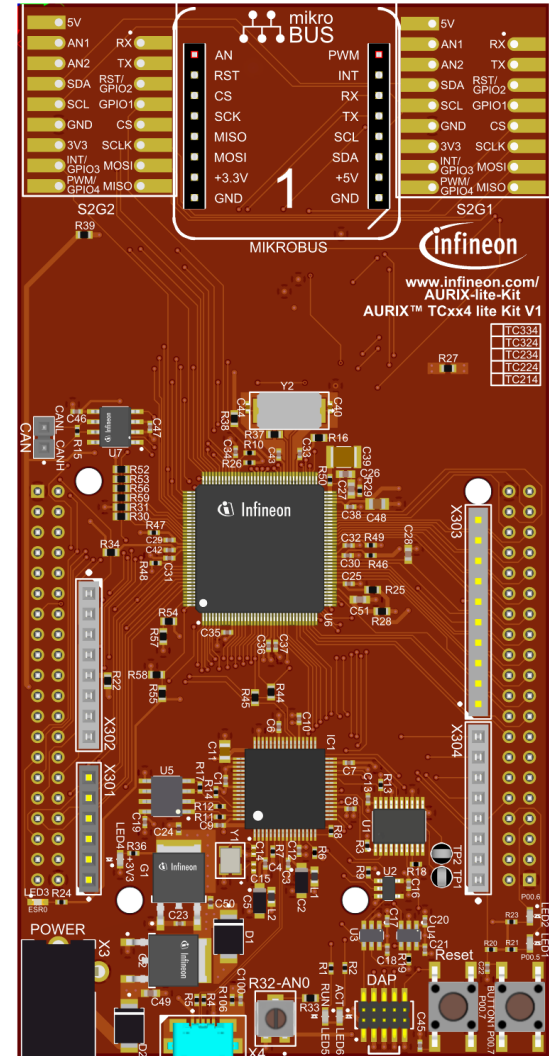
Introduction

- › The TASKING compiler within the AURIX™ Development Studio offers the possibility to use the assembly language inside the project code
- › The assembly language is based on implementing code with the CPU instruction set, TriCore™ in this case
- › This hardware oriented method allows the application to be memory efficient and faster in terms of execution time comparing to higher level programming languages (C, C++, ...)
- › Assembly code can be implemented both inside dedicated source files “*.src” and in C source files using the `__asm()` keyword

- › Useful Documentation:
 - TriCore™ instruction set:
 - “TriCore_TC162P_core_architecture_vol2of2_Instruction_set.pdf”
 - Tasking Compiler Assembly language:
 - “ctc_user_guide.pdf”

Hardware setup

This code example has been developed for the board KIT_A2G_TC334_LITE.



Implementation

LED1 state control

LED1 driven by port 00 pin 5 can be switched ON/OFF by calling the assembly function ***set_LED1_State_Assembly()***, implemented in the assembly source file ***Assembly_Code.src***.

This functionality is ensured by the following steps:

- › Check the value passed to the function:
 - If 0 (LED_OFF): write 0x20 to D0 data register
 - Else 1 (LED_ON): write 0x200000 to D0 data register
- › Load the Port 00 Output Modification Register (OMR) into A0 address register
- › Store D0 value into A0 address register (Port 00 OMR register)
- › Return from function, needed to restore the context of the caller function

Note: To set the port n pin x, the corresponding PCLx bit is set on the Pn_OMR register; while to reset it, the corresponding PSx bit is set on the Pn_OMR register.

Note: The LED1 and LED2 on the board KIT_AURIX_TC334_LITE are low-level active, therefore to turn off an LED the corresponding port pin must be set.

Implementation

LED2 state control

LED2 driven by port 00 pin 6 can be switched ON/OFF by calling the assembly function ***set_LED2_State_Assembly()***, implemented in the C source ***Assembly_C_Code.c*** file using the ***__asm()*** keyword.

This functionality is ensured by the following steps:

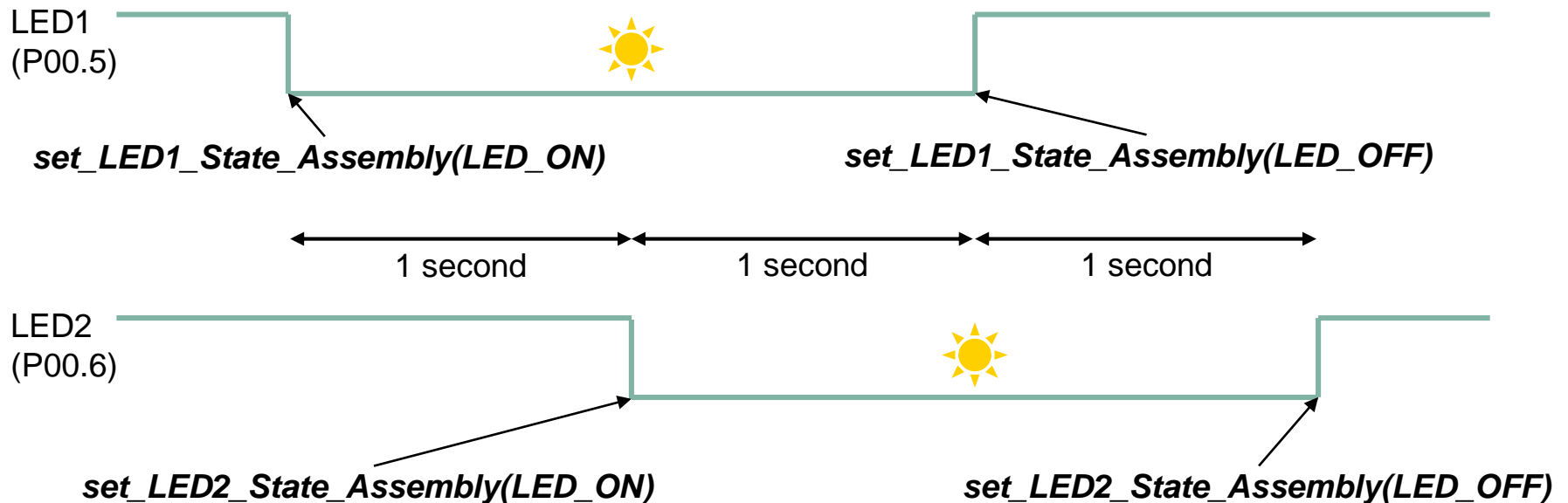
- › Check the value passed to the function:
 - If 0 (LED_OFF): write 0x40 to D0 data register
 - Else 1 (LED_ON): write 0x400000 to D0 data register
- › Load the Port 00 OMR register into A0 address register
- › Store D0 value into A0 address register (Port 00 OMR register)

Note: the return instruction is not needed in this case, because the assembly code is called inside a C code, this means the C compiler is handling the context restore.

Implementation

Scenario:

- › P00.5 and P00.6 are configured to control respectively LED1 and LED2 using the *lfxPort_setPinMode()* iLLD function
- › Then both LED1 and LED2 are switched off using the *lfxPort_setPinHigh()* iLLD function, please note that the LEDs are low-level active
- › Afterwards the following is implemented:

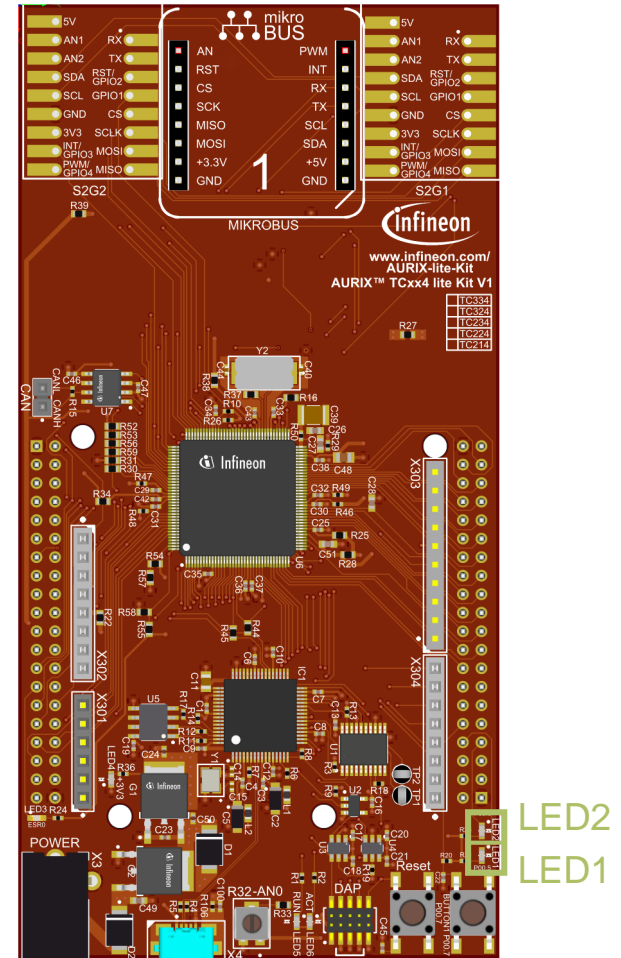


Run and Test

After code compilation and flashing the device, check the following behavior

- › Firstly, LED1 is switched **on**
- › One second after, LED2 is switched **on**
- › One second after, LED1 is switched **off**
- › One second after, LED2 is switched **off**

For more details, please refer to the [previous slide](#).



References



- › AURIX™ Development Studio is available online:
- › <https://www.infineon.com/aurixdevelopmentstudio>
- › Use the „*Import...*“ function to get access to more code examples.



- › More code examples can be found on the GIT repository:
- › https://github.com/Infineon/AURIX_code_examples



- › For additional trainings, visit our webpage:
- › <https://www.infineon.com/aurix-expert-training>



- › For questions and support, use the AURIX™ Forum:
- › <https://www.infineonforums.com/forums/13-Aurix-Forum>

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