

Assembly_C_Code_1 for KIT_AURIX_TC297_TFT

Assembly language in C code

AURIX™ TC2xx Microcontroller Training
V1.0.0



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.

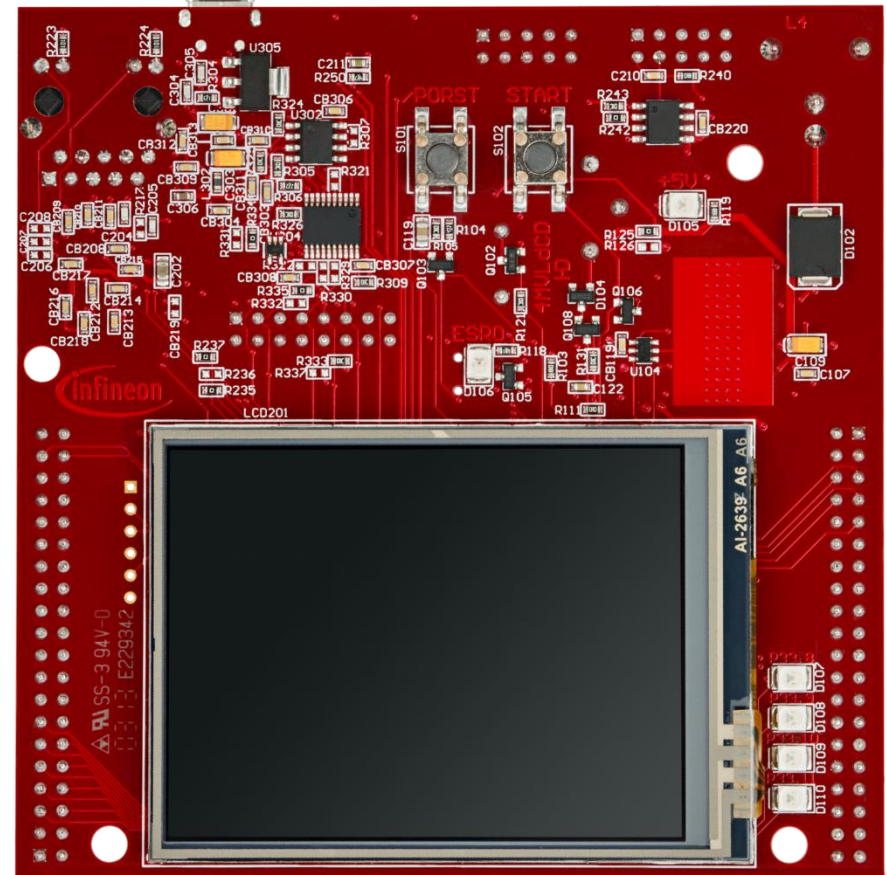
Introduction

- › 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 term 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:
 - “TC_Architecture_vol2_TC161_TCS_TC16P_TC16E.pdf”
 - Tasking Compiler Assembly language:
 - “ctc_user_guide.pdf”

Hardware setup

This code example has been developed for the board
KIT_AURIX_TC297_TFT_BC-Step.



Implementation

LED1 state control

LED1 driven by port 13 pin 0 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 0x1 to D0 data register
 - Else 1 (LED_ON): write 0x10000 to D0 data register
- › Load the Port 13 Output Modification Register (OMR) into A0 address register
- › Store D0 value into A0 address register (Port 13 OMR register)
- › Return from function, needed to restore the context of the caller function

Implementation

LED2 state control

LED2 driven by port 13 pin 1 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:

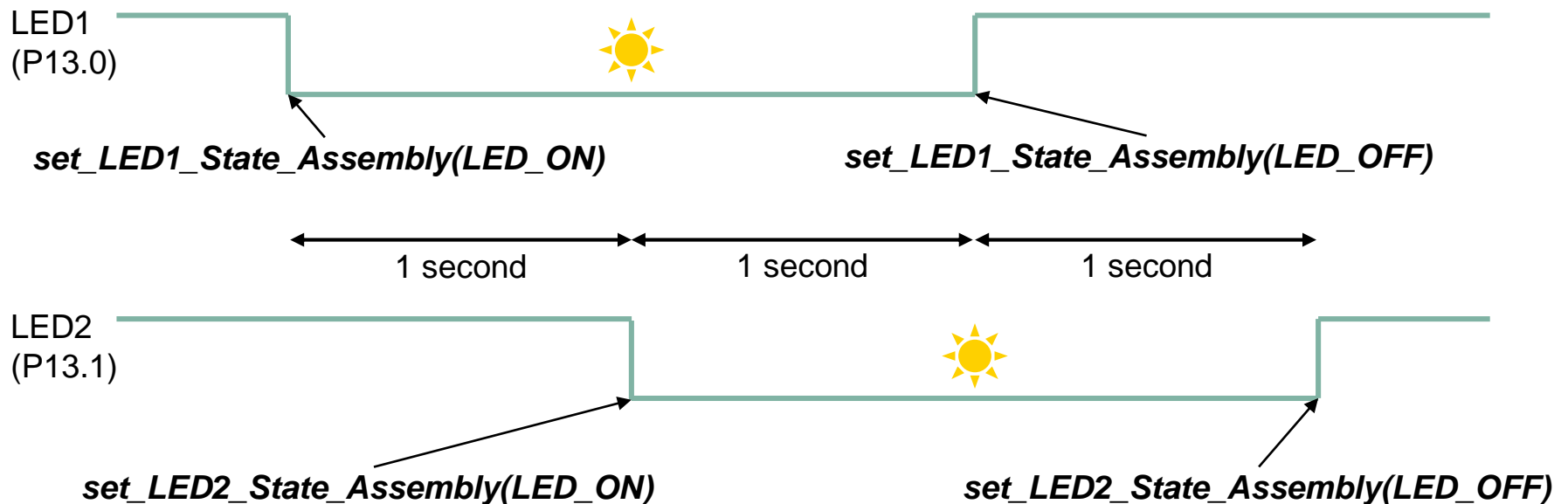
- › Check the value passed to the function:
 - If 0 (LED_OFF): write 0x2 to D0 data register
 - Else 1 (LED_ON): write 0x20000 to D0 data register
- › Load the Port 13 OMR register into A0 address register
- › Store D0 value into A0 address register (Port 13 OMR register)

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 restoring the context.

Implementation

Scenario:

- › P13.0 and P13.1 are configured to control respectively LED1 (D107) and LED2 (D108) 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:

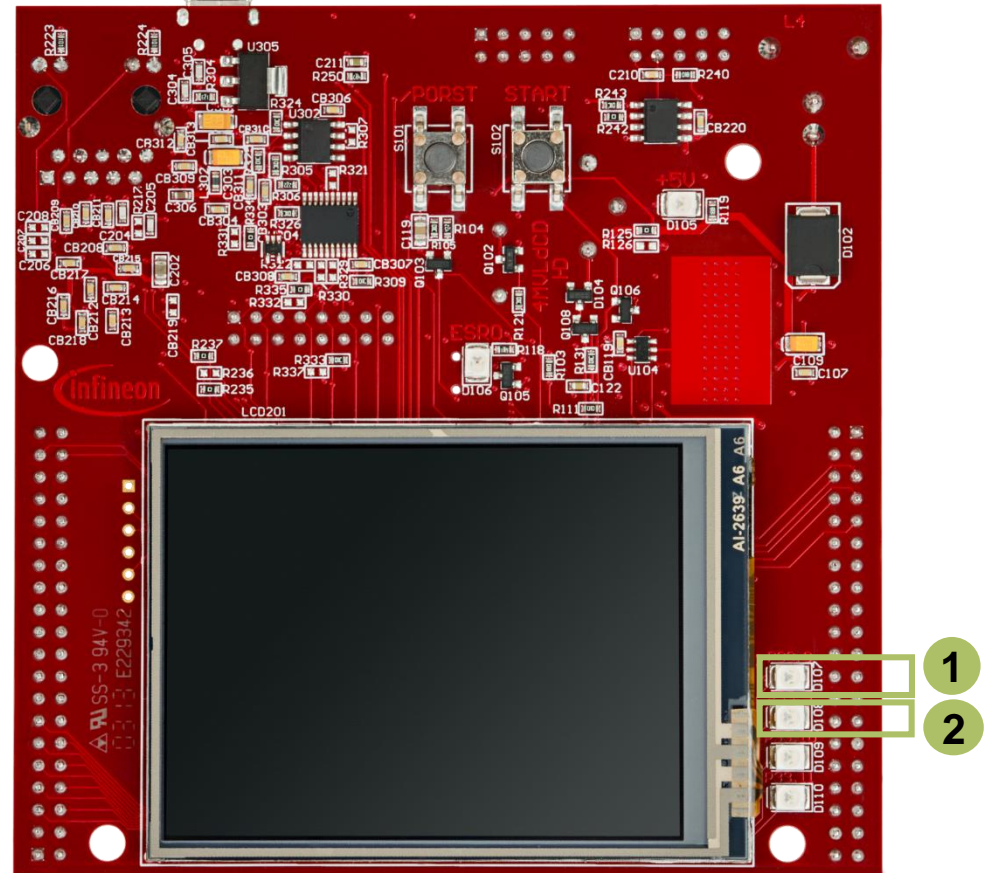


Run and Test

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

- › Firstly, LED1 (D107) is switched **on**
- › One second after, LED2 (D108) is switched **on**
- › One second after, LED1 (D107) is switched **off**
- › One second after, LED2 (D108) 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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Edition 2020-06

Published by

Infineon Technologies AG

81726 Munich, Germany

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Email: erratum@infineon.com

Document reference

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