Run_Function_RAM_1
Function running from RAM

AURIX™ TC2xx Microcontroller Training
V1.0.0

Scope of work

A function is stored and executed from SRAM.

This example implements twice the same function which toggles an LED with a wait loop. One function is implemented to be executed from SRAM and the other one from Flash memory.
The SRAM function is toggling LED1 (P13.0), while the flash function is toggling LED2 (P13.1).

Introduction

› The Local Memory Unit (LMU) SRAM can be used for **code execution**, data storage or overlay memory

› The LMU can be accessed via cached (segment 9_H) or via non-cached (segment B_H) memory addresses

› If a code is programmed to be executed from SRAM memory, it is copied from Flash to SRAM by the Start-up Software (SSW) code

Hardware setup

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

SRAM code section creation

The linker file "***Lcf_Tasking_Tricore_Tc.lsl***" is updated by adding a memory section (called ***code_lmuram_nc***) for code execution from LMURAM memory. The memory section should be assigned to the **non-cached** memory addresses (segment B_H) to avoid any data inconsistency.

Locating function code in a specific memory section

The ***pragma*** compiler keyword with the attribute ***section code "<section_identifier>"*** is used to specify the memory section from which the implemented function code will be fetched and executed.

The ***section code restore*** attribute is used after the function implementation to ensure that next implemented functions will be located in the default code memory section (Flash memory).

Implementation

LED Toggling

Two functions are implemented, *toggleLedSram()* and *toggleLedFlash()*, to toggle two LEDs from different memory regions.
Using the previously mentioned *pragma* compiler keyword, the *toggleLedSram()* can be executed from LMURAM memory not-cached addresses segment.

Both functions are implemented as following:
 – Switch On the LED by calling *IfxPort_setPinLow()*
 – Wait for a one second delay
 – Switch Off the LED by calling *IfxPort_setPinHigh()*
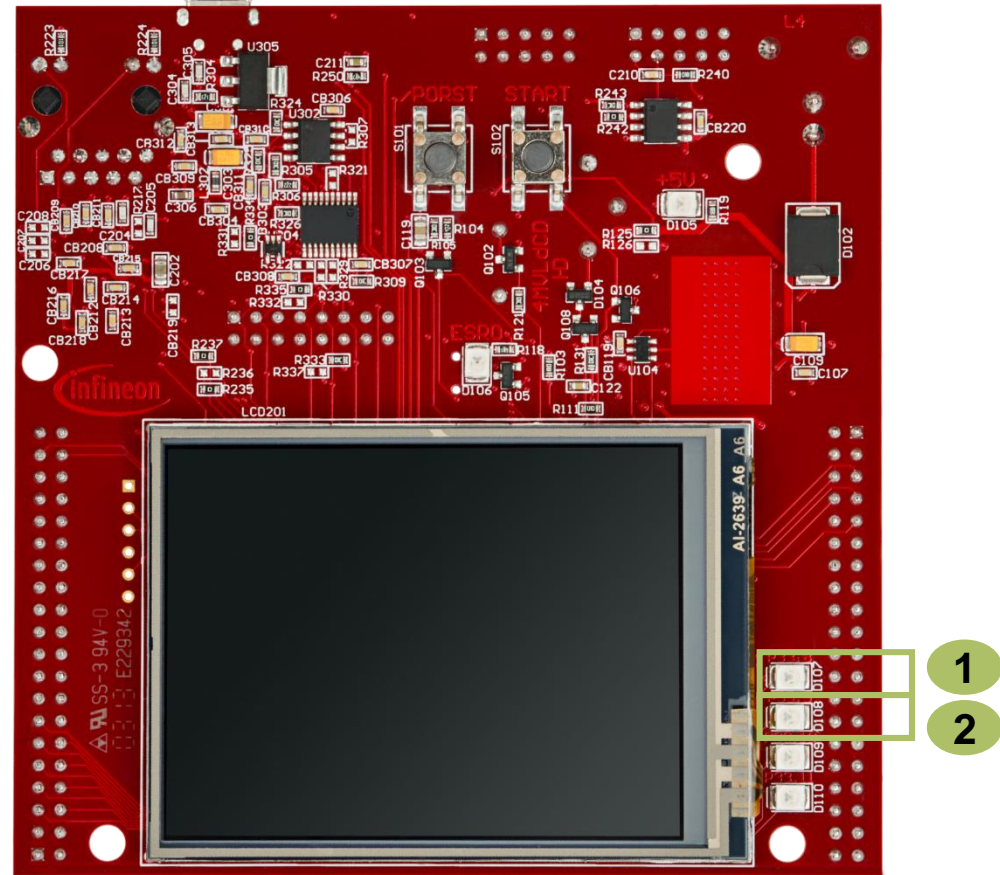 – Wait for a one second delay

The above Port functions can be found in the iLLD header *IfxPort.h*.

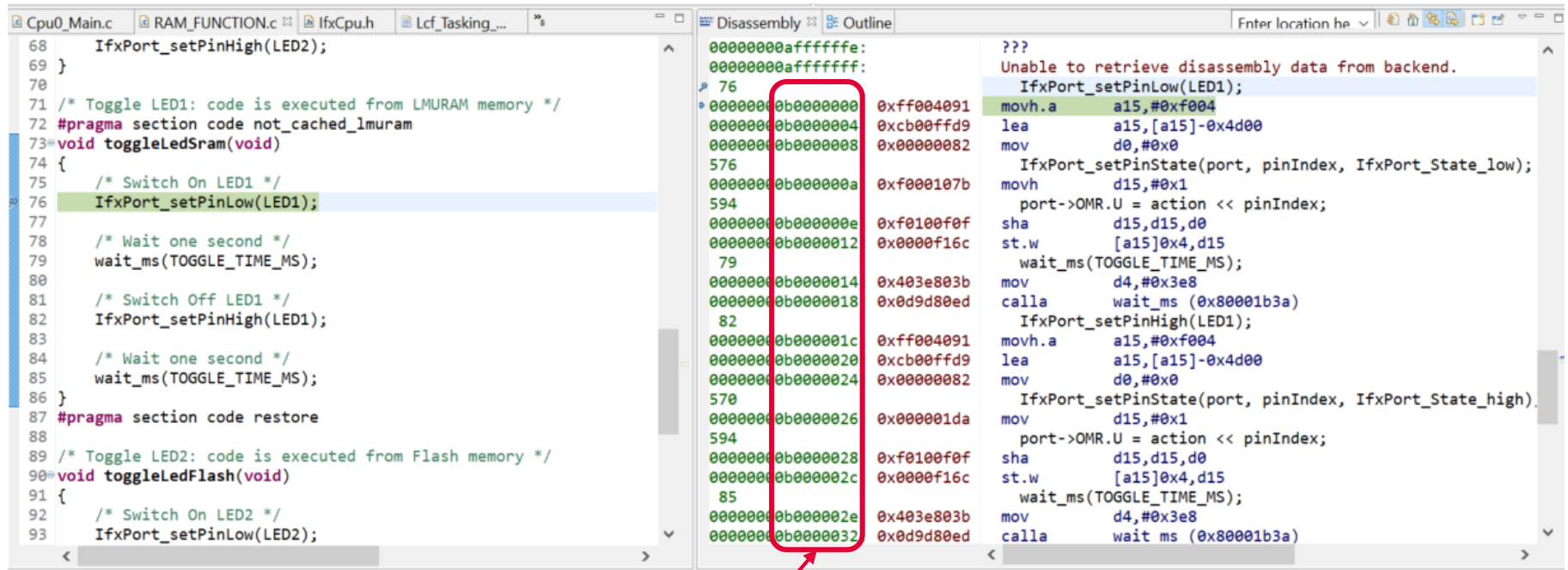**Note:** The LEDs on the used board are low-level active.

Run and Test

After code compilation and flashing the device:

› Check that LED1 (D107) and LED2 (D108) are toggling

Run and Test

Additionally, the execution from RAM can be checked by adding a breakpoint inside the ***toggleLedSram()*** function and verify in the disassembly window of the debugger that the CPU is executing it from LMURAM (Addresses segment B$_H$).

› Addresses from where the ***toggleLedSram()*** function is executed

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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