# PMS_Power_Down_Standby_1 for KIT_AURIX_TC397_TFT

## Power Saving in Standby Mode

AURIX™ TC3xx Microcontroller Training
V1.0.0

# Scope of work

**Set the system to standby mode and use an external trigger signal on PinA to return to active mode.**

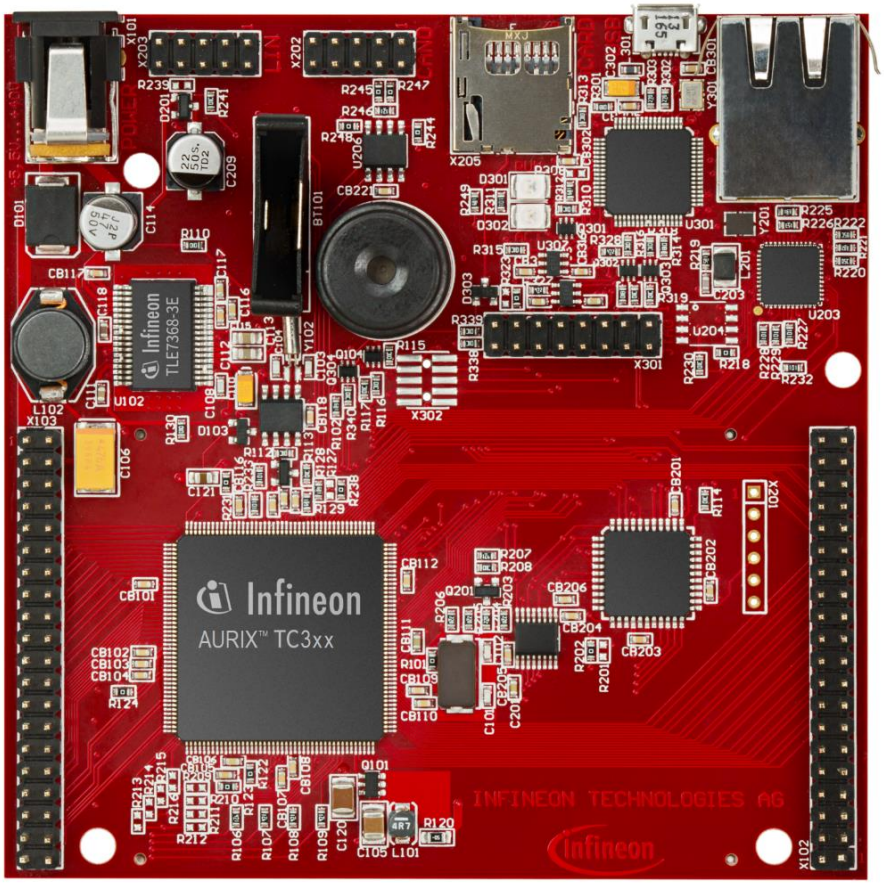
This example shows how to set the microcontroller in power saving mode standby. The standby mode is triggered via a SW request by writing into the Power Management Control and Status Register. The system is woken up from standby mode using PinA (port pin 14.1) and can be controlled by a terminal program.

# Introduction

- The Power Management System (PMS) allows the activation of power down modes so that the AURIX™ microcontroller system operates with the minimum required power for the corresponding application state
- The most significant power saving mode is the Standby mode. In this mode the entire microcontroller system is switched off besides some system blocks that constitute the Standby domain
- Waking-Up from standby mode re-powers the microcontroller core domain thus the application software restarts

# Hardware setup

This code example has been developed for the board KIT_AURIX_TC397_TFT_BC-Step.



# Implementation

**Standby mode implementation:**

› The routine ***runStandby()*** is used to put the microcontroller system in Standby mode

- Two configurations in terms of indication are done using **LED110** and **LED107**
  - The **LED110** connected to pin 13.3 is switched on and indicates the start of the example
  - The **LED107** connected to pin 13.0 is switched off
- The application waits for approximately four seconds
- Then **LED107** is switched on to signal that Standby mode is going to be entered in approximately one second

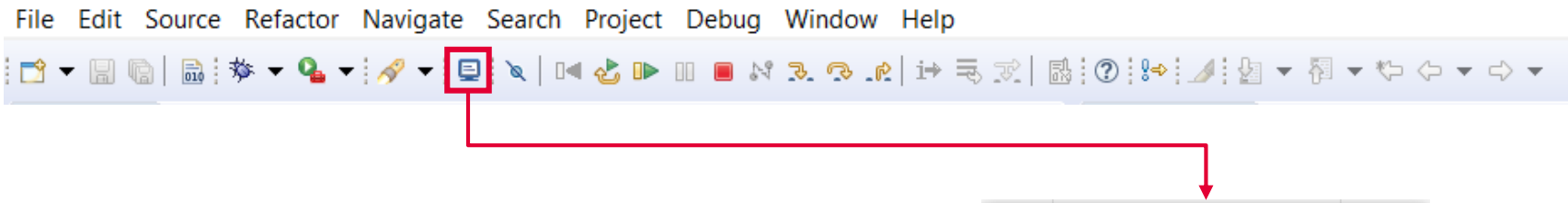
› The routine ***stepIntoStandbyMode()*** executes the following sequence to enter the Standby mode

1. Clear **Safety Endinit** and **CPU Endinit**
2. Clear all status flags within **PMSWSTAT** register
3. Write the Wake-Up configuration into control status register **PMSWCR0**
   - Configure PinA connected to port pin 14.1 as the desired Wake-Up trigger request
   - Enable to WakeUp on PORST
   - Configure PinA Wake-Up trigger to react on any edge
   - Disable ESR0 as a Wake-Up trigger
   - Disable Wake-Up on $V_{EXT}$ ramp-up
4. Request Standby mode by writing into the register **PMCSR0**
5. Set **Safety Endinit** and **CPU Endinit**

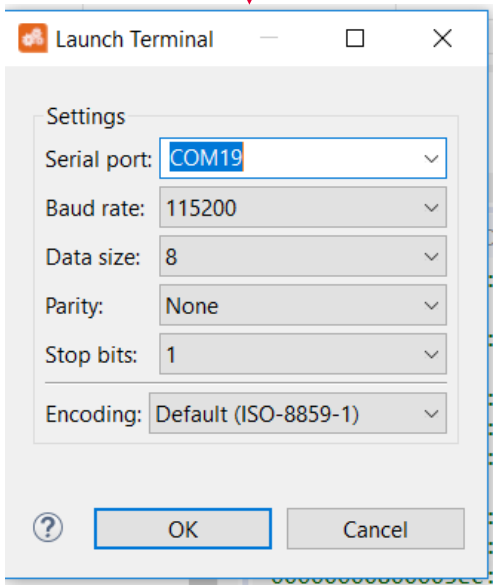
**Note**: The standby mode becomes active as soon as the CPU Endinit is set.

# Run and Test

- For this training, a serial monitor is required for bringing the microcontroller out of standby mode. The monitor can be opened inside the AURIX™ Development Studio using the following icon:




- The serial monitor must be configured with the following parameters to enable the communication between the board and the PC:
  - Speed (baud): 115200
  - Data bits: 8
  - Stop bit: 1



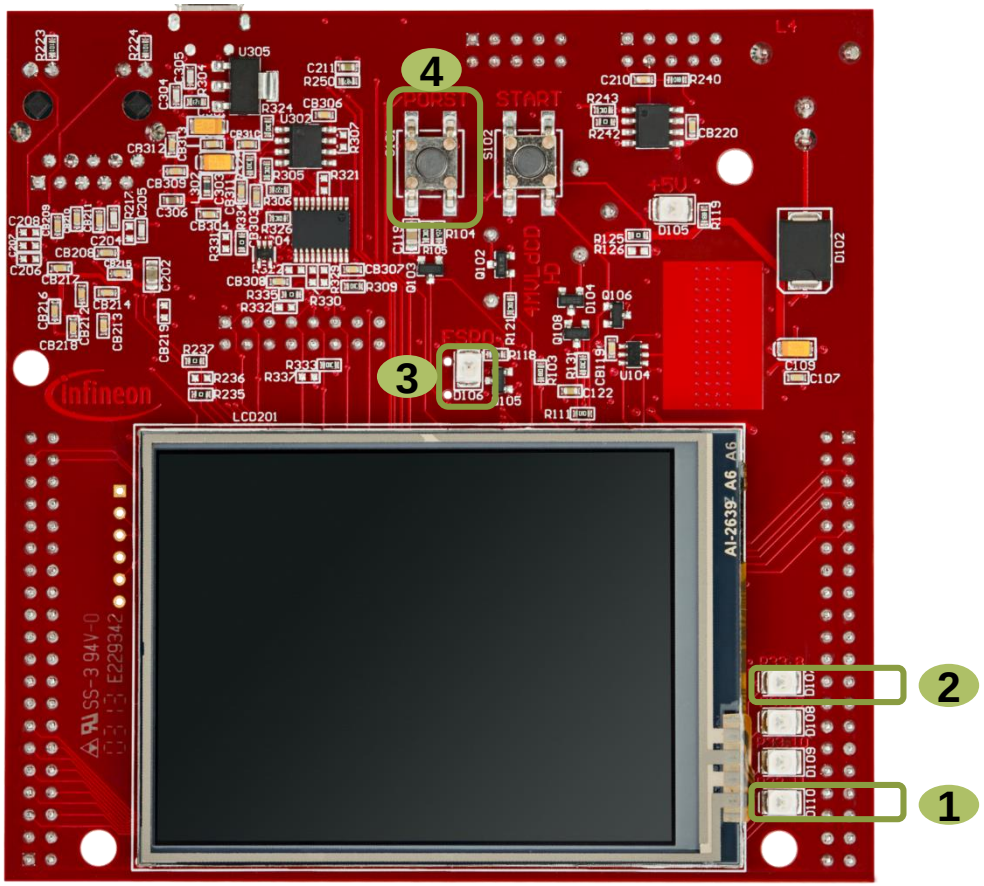
# Run and Test

After code compilation and flashing the device, observe the **LED D110**, **LED D107** and **LED D106** behavior.

**Stepping in Standby:**

- LED D110 (1) is ON immediately after reset
- Approximately after four seconds, LED D107 (2) turns on to signal that in one second Standby mode is going to be entered
- In Standby mode, all LEDs are off as all ports are set in their reset state. The LED D106 (3) turns on signaling Standby mode entered as the ESR0 is configured as reset output and held low during Standby mode

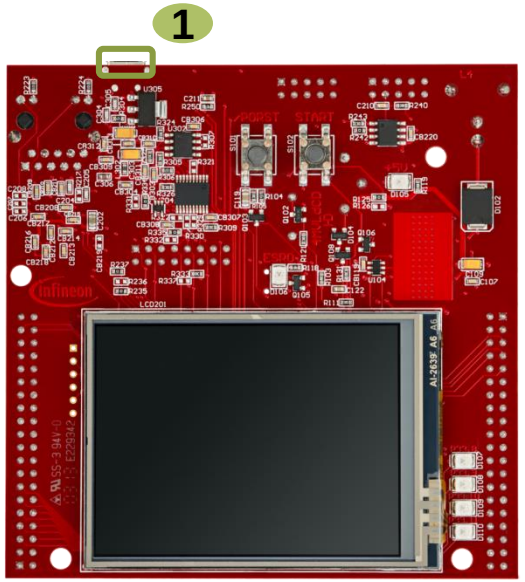
**Note:** 'Stepping in Standby' can be repeated by pressing PORST button (4) .



# Run and Test

**Returning from Standby:**

- The board must be connected to the PC through the USB port 1
- The configured Wake-Up trigger is PinA connected to port pin 14.1 and can be controlled using the terminal window
- Open the terminal window and send anything out 2
- Observe that the microcontroller returns from Standby mode similar as it would start from a reset and the application code is executed again. Then the application sends the microcontroller back into Standby mode

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