

# SCU\_Power\_Down\_Standby\_1 for KIT\_AURIX\_TC297\_TFT

## Power Saving in Standby Mode

AURIX™ TC2xx Microcontroller Training  
V1.0.0



[Please read the Important Notice and Warnings at the end of this document](#)

## Scope of work

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**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.

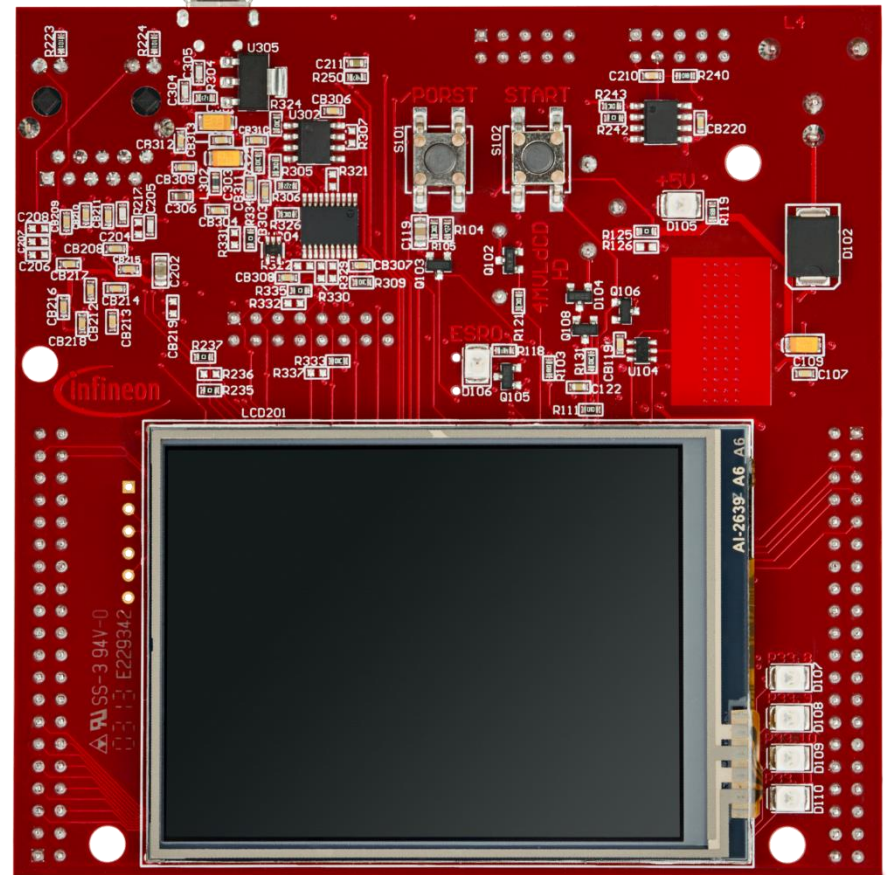
# Introduction

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- › The Power Management scheme allows 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\_TC297\_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 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.
    - 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.

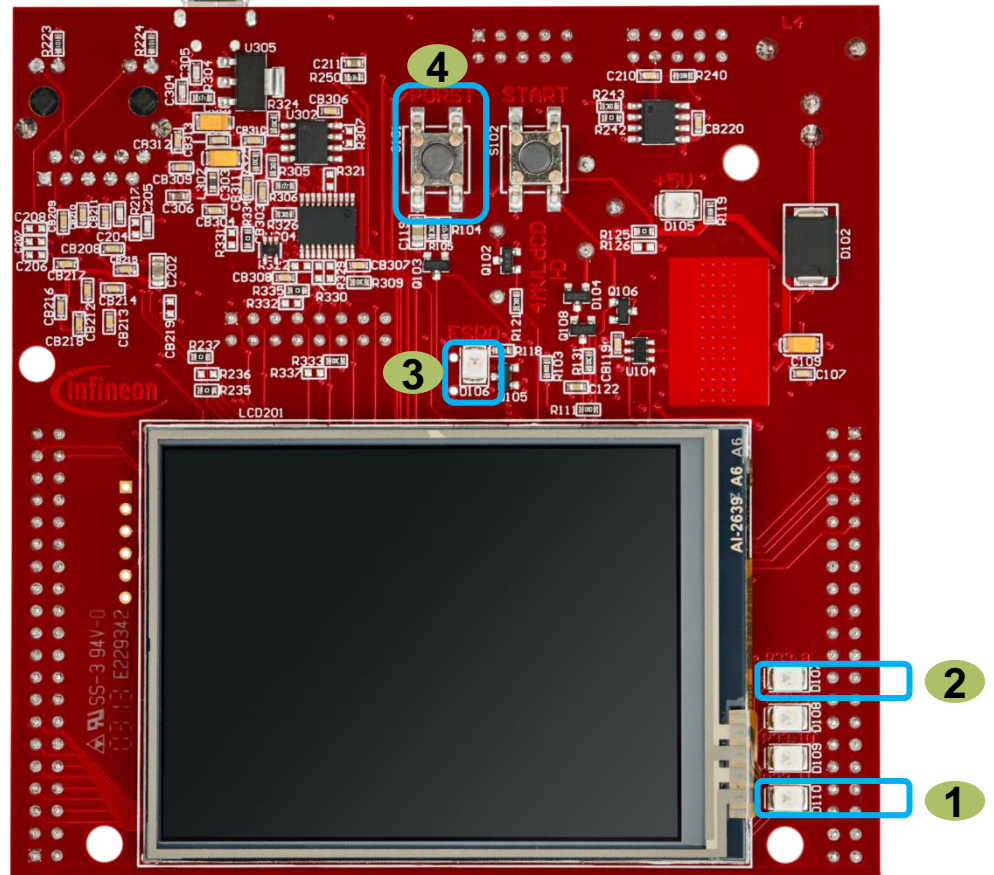
# Run and Test

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.

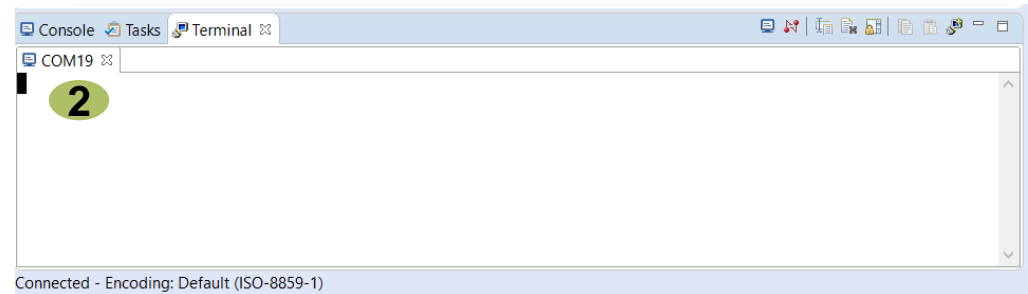
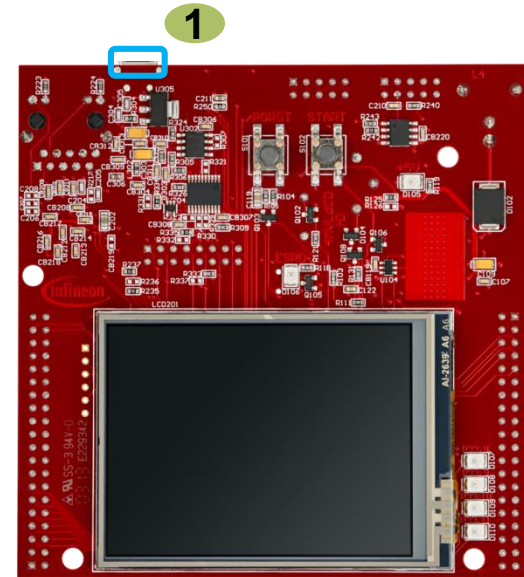
**Note:** 'Stepping in Standby' can be repeated by pressing PORST button **4**.



# Run and Test

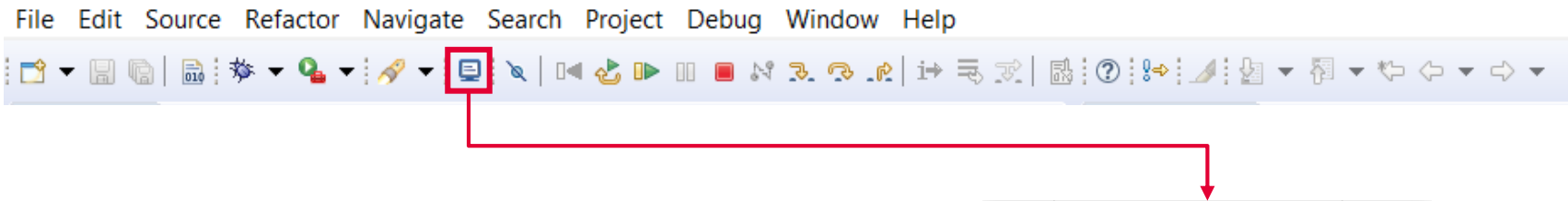
## Returning from Standby:

- › 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. Thus the application sends the microcontroller back into Standby mode.



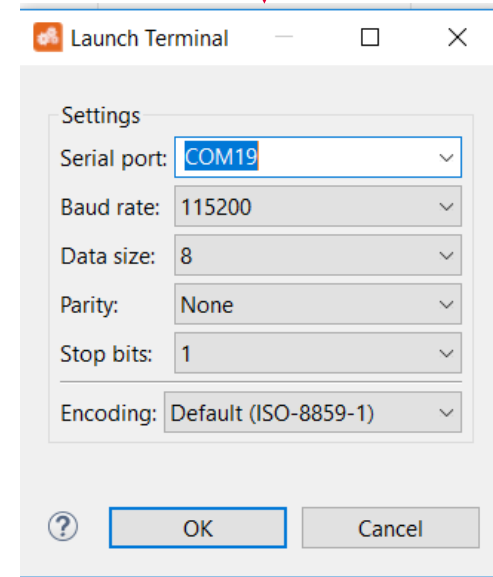
# Run and Test

- > 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





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**Document reference**

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**\_KIT\_TC297\_TFT**

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