SCU_Power_Down_Standby_1
for KIT_AURIX_TC275_LK
Power Saving in Standby Mode
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.
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_TC275_LITE.
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 LED2 and LED1
     - The LED2 connected to pin 00.6 is switched on and indicates the start of the example
     - The LED1 connected to pin 00.5 is switched off
   - The application waits for approximately four seconds
   - Then LED1 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

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 LED1, LED2 and LED3 behavior.

Stepping in Standby:

› LED1 1 is ON immediately after reset

› Approximately after four seconds, LED2 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 LED3 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
References

› AURIX™ Development Studio is available online:
  › [https://www.infineon.com/aurixdevelopmentstudio](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](https://github.com/Infineon/AURIX_code_examples)

› For additional trainings, visit our webpage:
  › [https://www.infineon.com/aurix-expert-training](https://www.infineon.com/aurix-expert-training)

› For questions and support, use the AURIX™ Forum:
IMPORTANT NOTICE
The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics (“Beschaffenheitsgarantie”).

With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer’s compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer’s products and any use of the product of Infineon Technologies in customer’s applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer’s technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

For further information on the product, technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies office (www.infineon.com).

WARNINGS
Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies’ products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.