SCU_Reset_Detection_1 for KIT_AURIX_TC375_LK

Detection of reset type

AURIX™ TC3xx Microcontroller Training
V1.0.0

Scope of work

This example shows how to detect the source of the last reset (power-on reset, watchdog reset, etc.)

The AURIX™ TC3xx devices can be reset by various reset sources. The application software is able to determine the source of the last reset based on a routine that evaluates the related reset special function registers. According to the type of reset, one or two LEDs are switched on.

Introduction

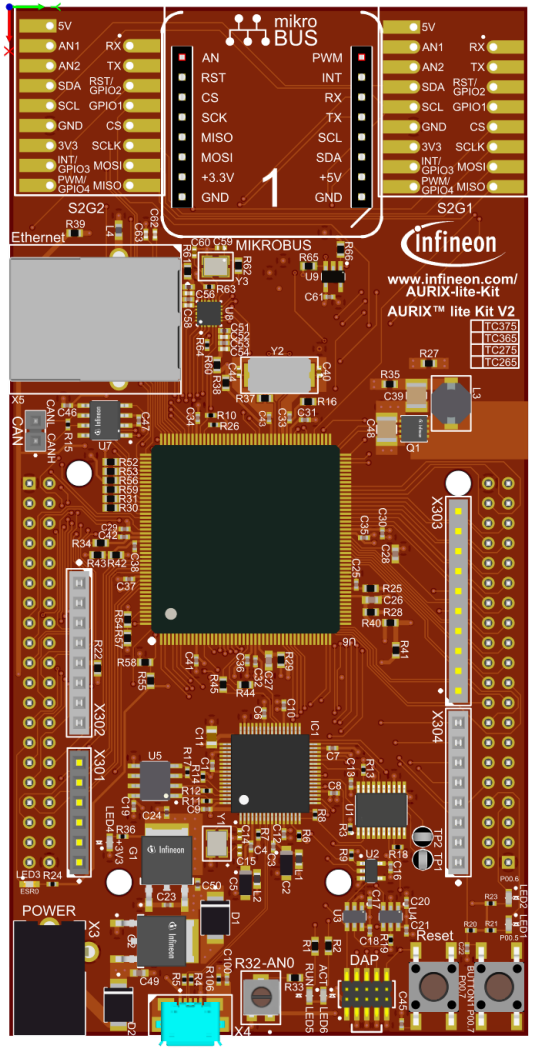
- Resets can be configured and determined in the Reset Control Unit (RCU), belonging to the System Control Unit (SCU)

- Various reset triggers are available, such as:
  - Supply Monitor
  - Embedded Voltage Regulators (EVRs)
  - Power-On Reset (PORST)
  - External Service Request (ESRx)
  - Debug interface

- Consequently, different reset types can be derived, such as:
  - Cold-/Warm-Power-On Reset
  - System Reset
  - Application Reset
  - Debug Reset
  - Module Reset

Hardware setup

This code example has been developed for the board KIT_A2G_TC375_LITE.



Implementation

Reset Detection

To get information about the last occurred reset, the function ***IfxScuRcu_evaluateReset()*** is called inside ***detectResetSource()***. The returned value is a data structure comprising elements such as ***resetType*** and ***resetTrigger***.

- The ***resetType*** specifies the type of the last reset (e.g. Cold Power-On Reset, System Reset, Application Reset or Warm Power-On Reset)

- The ***resetTrigger*** specifies the source of the last reset. For instance, the source can be a Power-On Reset (pressing the PORST-Button), a SW triggered reset or a reset triggered by the debugger or any voltage supervision monitor

The function ***IfxScuRcu_evaluateReset()*** evaluates both the ***RSTSTAT*** and ***RSTCON*** registers

- The ***RSTSTAT*** register is evaluated with regard to which reset bits are set, respectively, cleared. Firstly, the warm reset status bits comprising ***ESRx***, ***SMU***, ***SW***, ***STMx*** and ***CBx*** are evaluated. Secondly, the cold reset status bits comprising ***EVRC***, ***EVR33***, ***SWD*** and ***STBYR*** are evaluated if none of the warm reset status bits are set. Finally, the ***PORST*** bit is evaluated

- The ***RSTCON*** register is evaluated to determine the type of reset based on the trigger configuration

Implementation

Reset Detection (cont.)

Based on the ***resetType*** of the ***lastReset***, LED1, LED2 or both are switched on.

Furthermore, the function ***detectResetSource()*** clears the Cold Power-On sticky bits using the function ***IfxScuRcu_clearColdResetStatus()***. Those bits are not cleared automatically and must be explicitly cleared by the application.

The functions ***IfxScuRcu_evaluateReset()*** and ***IfxScuRcu_clearColdResetStatus()*** can be found in the iLLD header ***IfxScuRcu.h***.

Implementation

Reset Trigger

The function ***triggerSwReset()*** triggers either a software Application Reset or a software System Reset, depending on the macro ***RESET_SRC*** given as parameter.

To trigger a software reset, the request trigger in the Reset Configuration Register must be configured first. This is done through the function ***IfxScuRcu_configureResetRequestTrigger()***.

Then, the CPU EndInit protection is cleared with the function ***IfxScuWdt_clearCpuEndinit()*** and the software reset is triggered calling ***IfxCpu_triggerSwReset()***.

Finally, the CPU EndInit protection should be set again, but this instruction cannot be reached since a software reset is triggered right before.

The function ***IfxScuRcu_configureResetRequestTrigger()*** can be found in the iLLD header ***IfxScuRcu.h***.
The function ***IfxScuWdt_clearCpuEndinit()*** can be found in the iLLD header ***IfxScuWdt.h***.
The function ***IfxCpu_triggerSwReset()*** can be found in the iLLD header ***IfxCpu.h***.

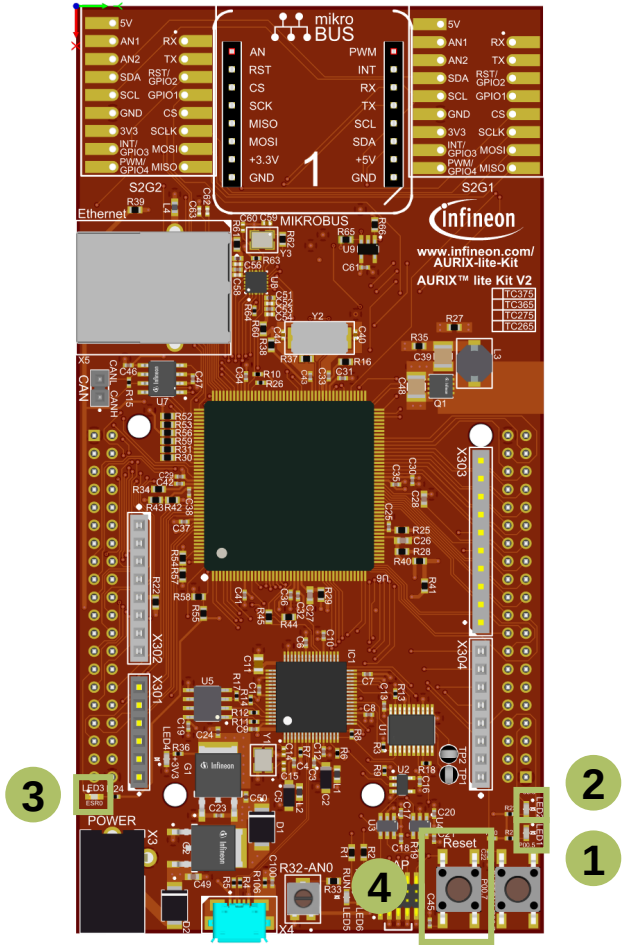
Run and Test

After code compilation and flashing the device, press the PORST button (4) and observe the following behavior:

- Both LED1 (1) and LED2 (2) are turned on for 500 ms because a Warm Power-On reset is detected
- Then, the board is reset by software, therefore the LED3 (3) is blinked once
- Finally, depending on the last occurred reset (given by the ***RESET_SRC*** macro) the LED1 (1) or the LED2 (2) is turned on

The ***RESET_SRC*** macro is firstly set to ***APPLICATION_RESET***. To trigger a system reset, change it to ***SYSTEM_RESET***, re-flash the code, press the PORST button (4) and check that LED2 (2) is switched on after both LED1 (1) and LED2 (2).

Note: To observe the correct behavior of this example, use the Flash button. This ensures that the project is flashed on the board without triggering the debugger.



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:
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