SCU_Reset_Detection_1 for KIT_AURIX_TC297_TFT

Detection of reset type

AURIX™ TC2xx Microcontroller Training
V1.1.0

Scope of work

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

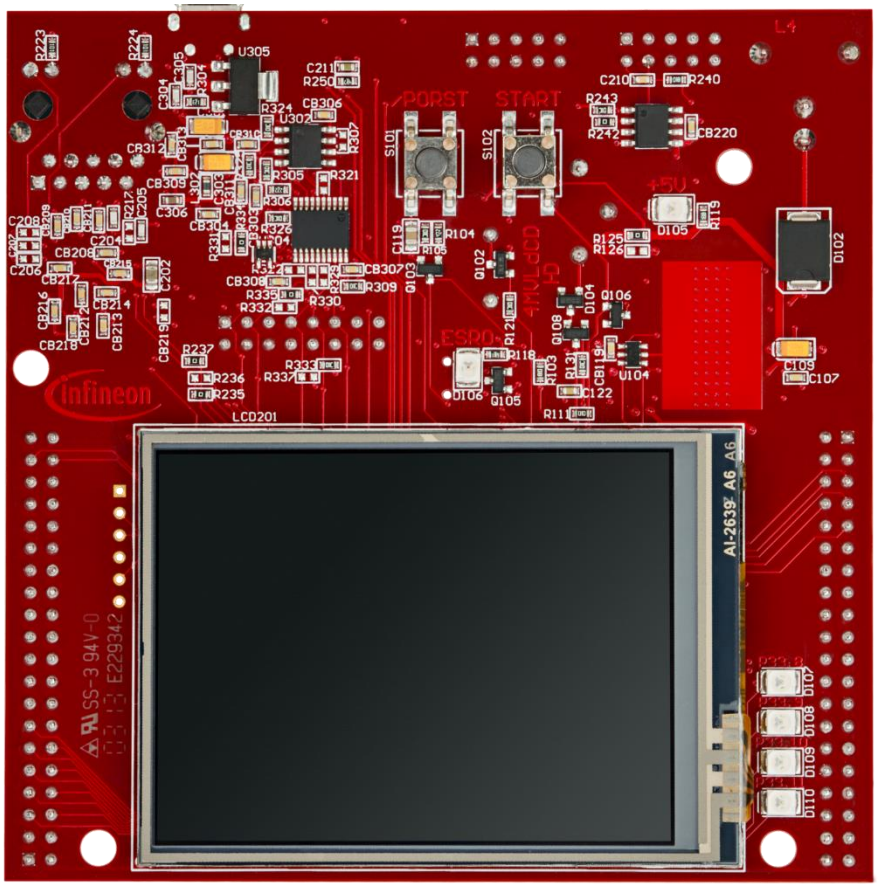
The AURIX™ TC2xx devices can be reset by various reset sources. The application software is able to determine the source of the last reset based on a routine that evaluates the related reset special function register. According to the type of reset, one of three LEDs is switched on.

Introduction

- Resets can be configured and determined in the Reset Control Unit (RCU), belonging to the System Control Unit (SCU)
- There are various reset triggers such as SupplyMonitor, EVRs, PORST, ESRx, JTAG
- 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_AURIX_TC297_TFT_BC-Step.



Implementation

Reset Detection

To get information about the last occurred reset, the function ***evaluateReset()*** is called inside ***detectResetSource()***. The returned value is a data structure defined in ***SCU_Reset_Detection.h*** comprising two elements: ***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 ***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 ***EVR13***, ***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***, LED D107, LED D108 or LED D109 is switched on.

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

The functions ***evaluateReset()*** and ***clearColdPowerOnResetBits()*** can be found in the ***SCU_Reset_Detection.h*** header file.

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 ***configureSwResetRequestTrigger()***, that sets the SW bitfield of the RSTCON register accordingly to the given parameter.

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

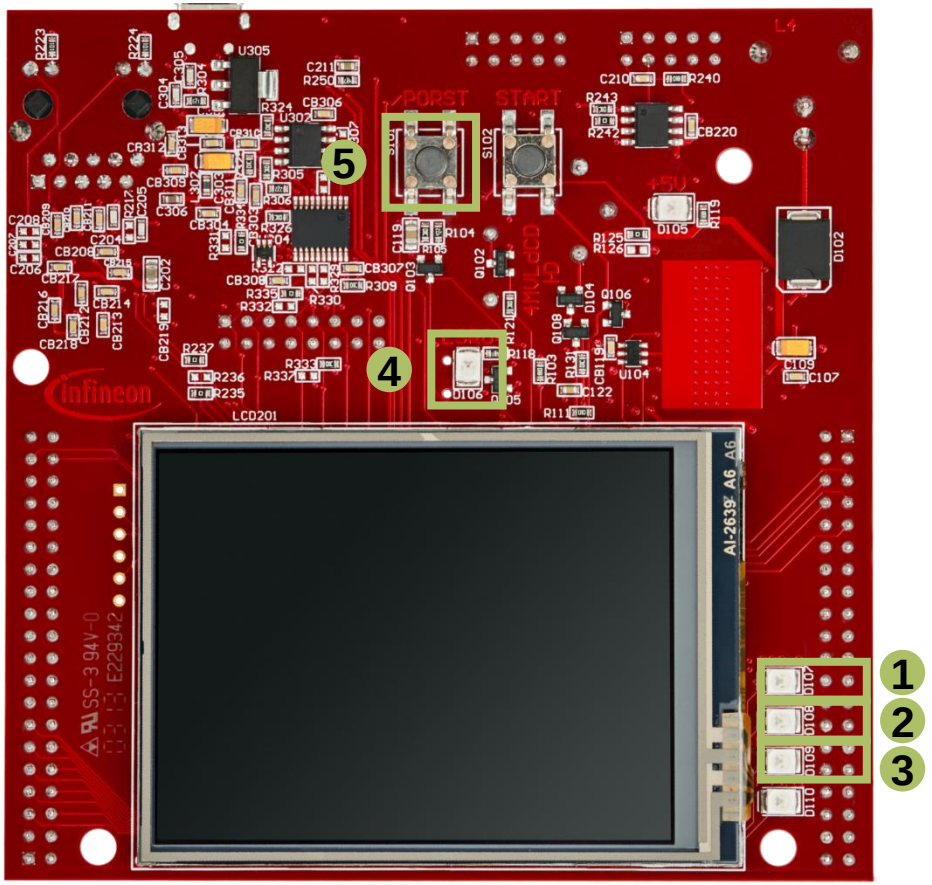
Finally, the Safety EndInit protection should be set again, but this instruction cannot be reached since a software reset is triggered right before.

The function ***configureSwResetRequestTrigger()*** can be found in the ***SCU_Reset_Detection.h*** header file.
The function ***IfxScuWdt_clearSafetyEndinit()*** 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 (5) and observe the following behavior:

- The LED D109 (3) is turned on for 500 ms because a Warm Power-On reset is detected
- Then, the board is reset by software, therefore the LED D106 (4) is blinked once
- Finally, depending on the last occurred reset (given by the ***RESET_SRC*** macro) the LED D107 (1) or the LED D108 (2) is turned on



The ***RESET_SRC*** is firstly set to ***APPLICATION_RESET***. To trigger a system reset, change the macro to ***SYSTEM_RESET***, re-flash the code, press the PORST button (5) and check that LED D108 (2) is switched on after LED D109 (3).

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:
- https://www.infineonforums.com/forums/13-Aurix-Forum

Revision history

Revision	Description of change
V1.1.0	Training reworked. Detection of resets is shown with LEDs
V1.0.1	Update of version to be in line with the code example’s version
V1.0.0	Initial version

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