FCE_CRC_1
for KIT_AURIX_TC375_LK
FCE CRC calculation

AURIX™ TC3xx Microcontroller Training
V1.0.0

Scope of work

The FCE module is used to calculate the CRC of a message with a CRC32 algorithm.

This training shows how to configure the FCE to calculate CRC of a known message with a CRC32 algorithm. The FCE interrupt is enabled to report execution errors. Any CRC kernel calculation error is indicated by switching ON an LED.

Introduction

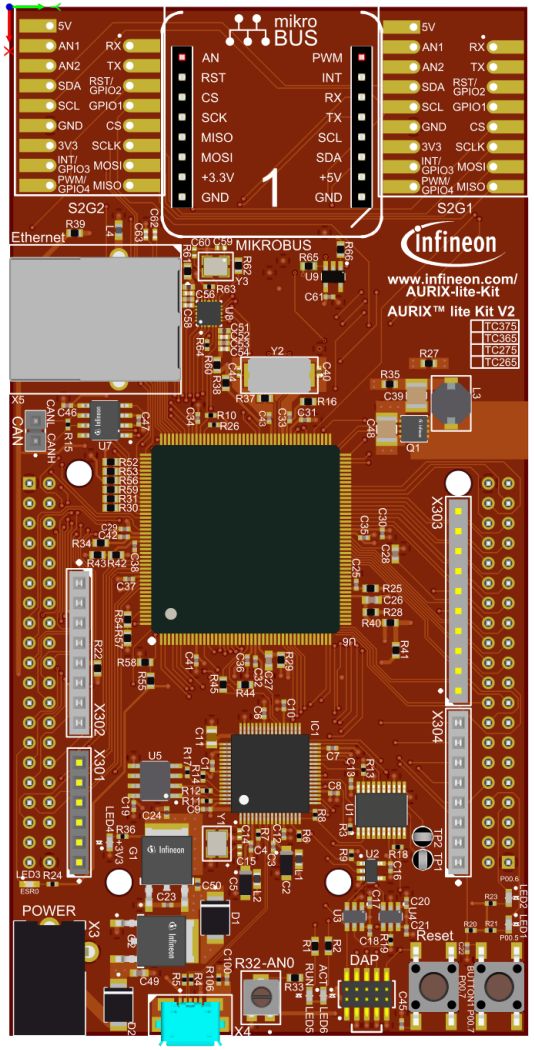
- The Flexible CRC Engine (FCE) provides a parallel implementation of Cyclic Redundancy Code (CRC) algorithms.

- FCE module supported algorithms:
  - IEEE 802.3 Ethernet CRC32 polynomial (used in this example)
  - AUTOSAR safety polynomial CRC32P4
  - CCITT CRC16 polynomial
  - SAE J1850 CRC8 polynomial

- CRC algorithms are used to calculate message signatures that can be used to check message integrity during transport over communication.

Hardware setup

This code example has been developed for the board KIT_A2G_TC375_LITE.



Implementation

Initialization

The initialization of the module is done via ***init_FCE_CRC()***, which contains:

- the FCE module initialization, using the function ***IfxFce_Crc_initModule()***
- the CRC algorithm initialization, using the function ***IfxFce_Crc_initCrc()***

Execution

The execution is started with the function ***run_FCE_CRC()***, which calculates CRC32 algorithm using ***IfxFce_Crc_calculateCrc()*** function.

All functions, needed for using the FCE CRC calculation, are provided by the iLLD header ***IfxFce_Crc.h***.

FCE Error Interrupt Service Routine

The ISR will be executed in case of a CRC calculation error. It scans the kernel status register and checks if the error flag is set.

Implementation

Configure and control the LED

An LED is configured to be switched on/off by the **controlling port pin** to which it is connected using methods from the iLLD header ***IfxPort.h***.

In the setup phase, the port pin of the LED has to be **configured as push-pull output** using the function ***IfxPort_setPinMode()***.

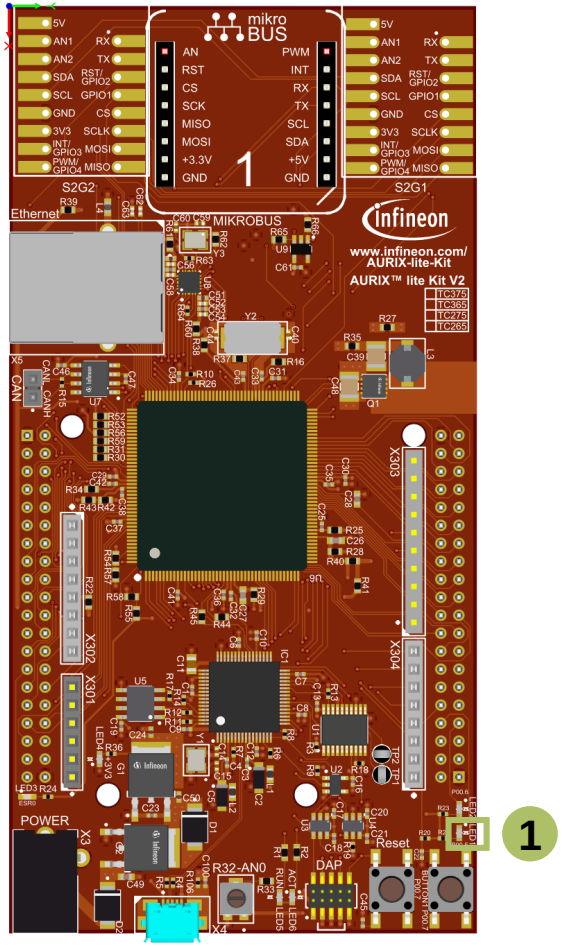
If CRC calculation errors occur, the LED is **switched on** using the function ***IfxPort_setPinLow()***.

Run and Test

After code compilation and flashing the device, observe the LED behavior.

The LED1 (1) should be switched **Off** if the CRC algorithm calculation is correct (Result = Expected).

- LED behavior in case of Error:
  - CRC32 calculation error: **LED1** switches On (can be tested by setting the macro ***CRC_WRONG_CHECK_VAL*** to 1)



Note: The macro mentioned above is provided only for test purpose. It allows to pass a wrong expected value to the FCE CRC kernel which leads to a mismatch with the calculated one, therefore the error flag will be set and the error interrupt will be triggered.

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

Trademarks
All referenced product or service names and trademarks are the property of their respective owners.

Edition 2021-03
Published by
Infineon Technologies AG
81726 Munich, Germany

Do you have a question about this document?
Email: erratum@infineon.com

Document reference
FCE_CRC_1_KIT_TC375_LK

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.