

# FCE\_CRC\_1

## for KIT\_AURIX\_TC397\_TFT

### FCE CRC calculation

AURIX™ TC3xx Microcontroller Training  
V1.0.0



## Scope of work

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**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.

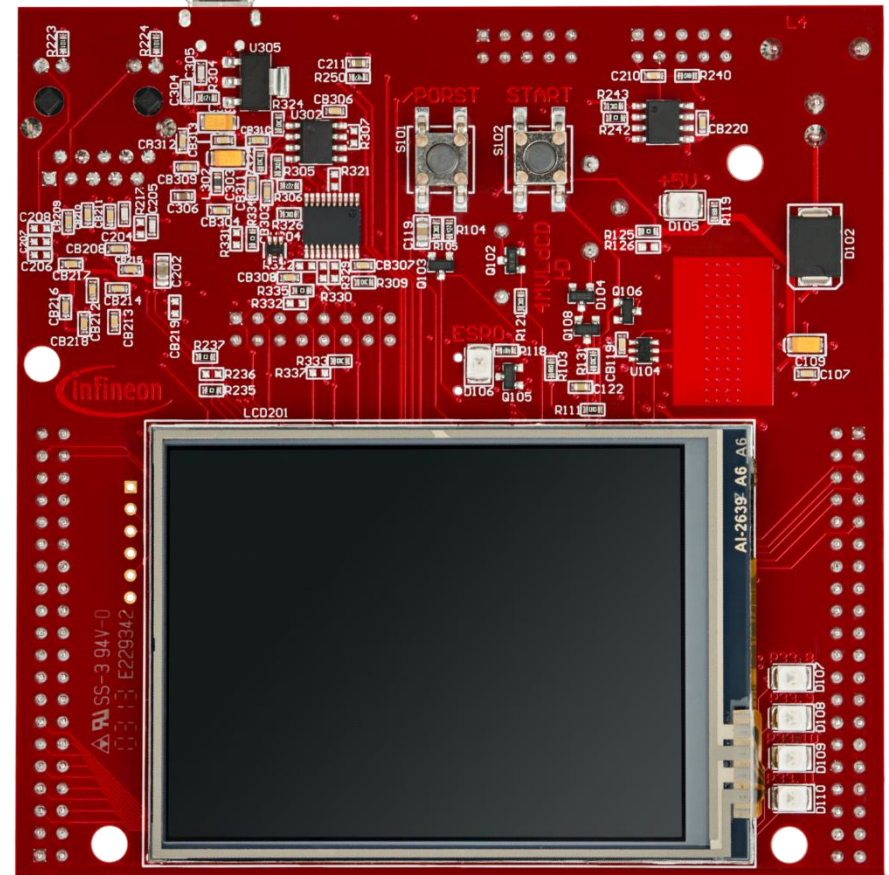
# Introduction

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- › 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\_TC397\_5V\_TFT.



# Implementation

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## Initialization

The initialization of the module is done via ***init\_FCE\_CRC()***, which contains:

- › the FCE module initialization, using the function ***lfxFce\_Crc\_initModule()***
- › the CRC algorithm initialization, using the function ***lfxFce\_Crc\_initCrc()***

## Execution

The execution is started with the function ***run\_FCE\_CRC()***, which calculates CRC32 algorithm using ***lfxFce\_Crc\_calculateCrc()*** function.

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

## FCE Error Interrupt Service Routine

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

# Implementation

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## Configure and control the LED

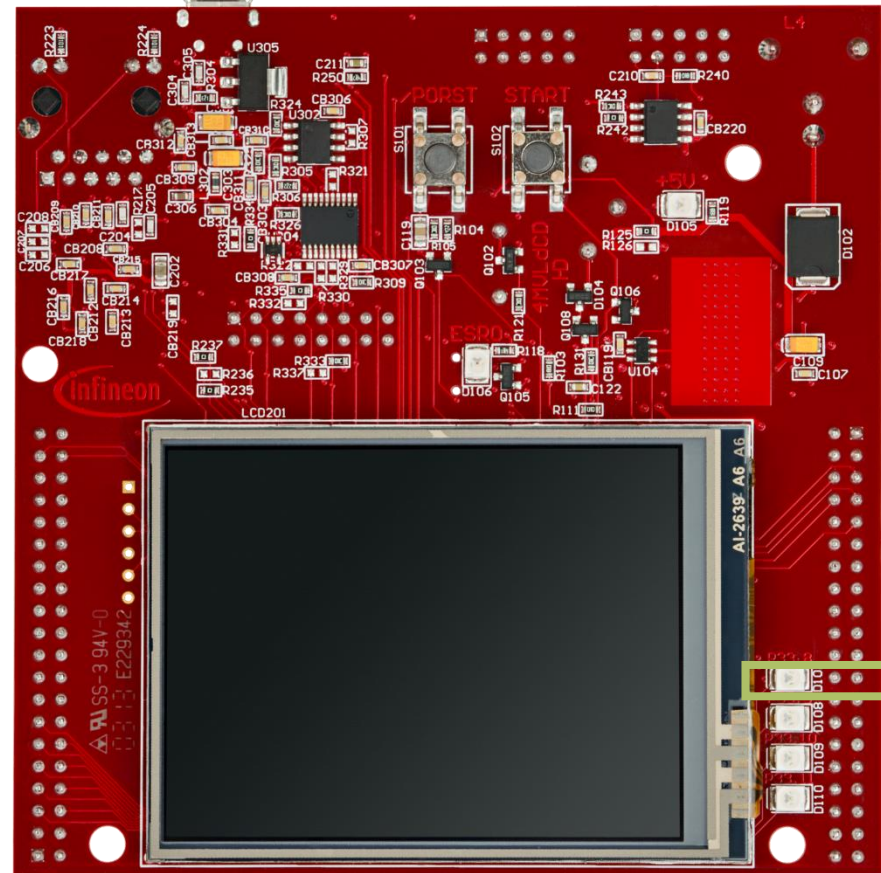
An LED is configured to be switched on/off by the **controlling port pin** to which it is connected using methods from the iLLD header ***IfxPort.h***.

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



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# Run and Test

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- › LED behavior in case of Error:
  - CRC32 calculation error: **D107** switches On
    - Could be tested by setting the macro ***CRC\_WRONG\_CHECK\_VAL*** to 1
  
- › 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](https://github.com/Infineon/AURIX_code_examples)



- > For additional trainings, visit our webpage:
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## Document reference

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