

SCU_Emergency_Stop_1

Emergency Stop via SCU

AURIX™ TC2xx Microcontroller Training
V1.0.0



[Please read the Important Notice and Warnings at the end of this document](#)

Scope of work

This example shows how to trigger an emergency stop via an external signal and how port pins can be set to a defined state in this case.

The LED D107, which is driven by the port pin P13.0, is blinking until an external signal triggers an emergency stop and sets the pin to emergency stop mode.

Introduction

- › The System Control Unit (SCU) contains miscellaneous control registers associated with other functions such as controlling Application Test Mode and chip identification.

- › The Emergency Stop (EMS) is one of these functions. It provides a fast reaction to an emergency without the intervention of the software.

- › An emergency stop can be triggered by a transition on the port pin state which is configured as the EMS input or by an alarm event.

- › The Emergency Stop control logic for the port pins can operate in two modes:
 - Synchronous Mode: emergency case is activated by hardware and released by software (default and used in this training)
 - Asynchronous Mode: emergency case is activated and released by hardware

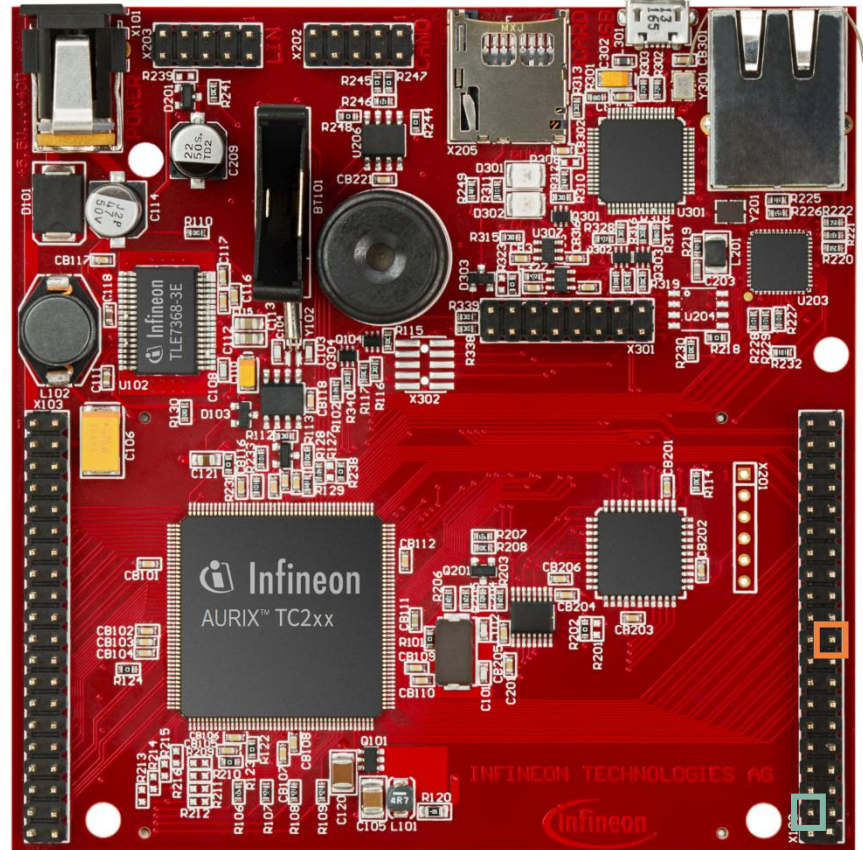
Hardware setup

This code example has been developed for the board KIT_AURIX_TC297_TFT_BC-Step.

Connect the emergency stop port pin P33.8 to the ground via a jumper.

	X102		
P14.5	40	39	P14.4
P20.10	38	37	P20.9
P15.7	36	35	P15.6
P15.5	34	33	P15.4
P15.3	32	31	P15.2
P22.3	30	29	P22.2
P22.1	28	27	P22.0
P33.11	26	25	P23.4
P23.3	24	23	P23.2
P23.1	22	21	P23.0
P33.6	20	19	P33.8
P33.12	18	17	P33.1
P33.2	16	15	P33.3
P33.4	14	13	P33.5
AN0	12	11	AN8
AN2	10	9	AN3
AN32	8	7	AN33
AN20	6	5	AN21
GND	4	3	GND
V_UC(+5V)	2	1	VCC_IN

Emergency stop



Implementation

Configuring System Control Unit

Configuration of the System Control Unit (SCU) is done once in the setup phase by calling the initialization function ***initScuEmergency()***, which contains the following steps:

- › Call the iLLD function ***IfxScuWdt_clearSafetyEndinitInline()*** to disable the Safety Endinit protection in order to modify the SCU register.
- › Set ***SCU_EMSR.B.POL*** to 0x0 to set input state as active high.
- › Set ***SCU_EMSR.B.MODE*** to 0x0 to select the synchronous mode.
- › Set ***SCU_EMSR.B.PSEL*** to 0x0 to select port A (pin P33.8) as emergency stop input.
- › Set ***SCU_EMSR.B.ENON*** to 0x1 to enable emergency stop flag.
- › Call the iLLD function ***IfxScuWdt_setSafetyEndinitInline()*** to re-enable the Safety Endinit protection.

The functions ***IfxScuWdt_clearSafetyEndinitInline()*** and ***IfxScuWdt_setSafetyEndinitInline()*** are contained in the iLLD header ***IfxScuWdt.h***, while ***initScuEmergency()*** function is contained in ***SCU_Emergency_Stop.h***.

Implementation

Configuring port pin

Configuration of the port pins for emergency stop input and for the LED are also done in the function ***initScuEmergency()*** with the following steps:

- › Call the iLLD function ***IfxPort_setPinMode()*** with ***IfxPort_Mode_inputPullDown*** as parameter for the input to configure the pin as input.
- › Call the iLLD function ***IfxPort_setPinMode()*** with ***IfxPort_Mode_outputPushPullGeneral*** as parameter for the input to configure the LED as output.
- › Enable the emergency stop for the LED with the function ***IfxPort_setESR()***.

Toggling the LED

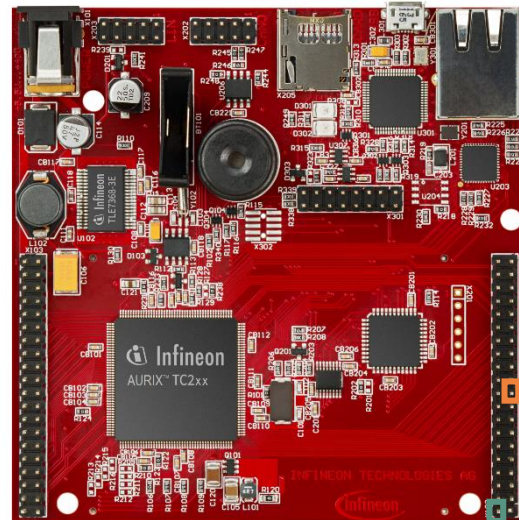
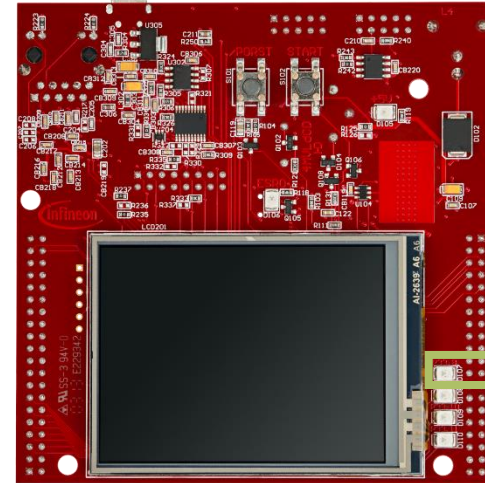
The LED is toggled in the function ***toggleLED()***, which contains a call of the iLLD function ***IfxPort_togglePin()***.

All of the above functions, called inside ***initSCUEmergency()*** and ***toggleLED()***, are contained in the iLLD header ***IfxPort.h***.

Run and Test

After code compilation and flashing the device, perform the following steps:

- > Observe the LED D107 (1) which should be blinking.
- > Switch the emergency pin state P33.8 from low to high by connecting it to V_UC(+5V) via the jumper in order to trigger the emergency stop.
- > Observe the LED D107 (1), which should be off.



X102		
P14.5	40 39	P14.4
P20.10	38 37	P20.9
P15.7	36 35	P15.6
P15.5	34 33	P15.4
P15.3	32 31	P15.2
P22.3	30 29	P22.2
P22.1	28 27	P22.0
P33.11	26 25	P23.4
P23.3	24 23	P23.2
P23.1	22 21	P23.0
P33.6	20 19	P33.8
P33.12	18 17	P33.1
P33.2	16 15	P33.3
P33.4	14 13	P33.5
AN0	12 11	AN8
AN2	10 9	AN3
AN32	8 7	AN33
AN20	6 5	AN21
GND	4 3	GND
V_UC(+5V)	2 1	VCC_IN

Emergency stop

V_UC(+5V)

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 2019-10

Published by

Infineon Technologies AG
81726 Munich, Germany

© 2019 Infineon Technologies AG.
All Rights Reserved.

Do you have a question about this document?

Email: erratum@infineon.com

Document reference

SCU_Emergency_Stop_1

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.