ERU_Interrupt_1 for KIT_AURIX_TC397_TFT

External interrupt generation

AURIX™ TC3xx Microcontroller Training
V1.0.0

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Scope of work

The ERU is used to generate an interrupt on each rising and falling edge at an input pin.

The code example uses the External Request Unit (ERU) to generate an interrupt for each falling and rising edge at the input pin P02.0. The falling and rising edges are generated with pin P02.1. If an interrupt occurs, an LED will be toggled.

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Introduction

- The External Request Unit (ERU) is a versatile event and pattern detection unit.
- Its main task is the **generation of interrupts based on selectable trigger events at different inputs**, e.g. to generate external interrupt requests if an edge occurs at an input pin.
- The detected events can also be used by other modules to trigger or to gate module specific actions.

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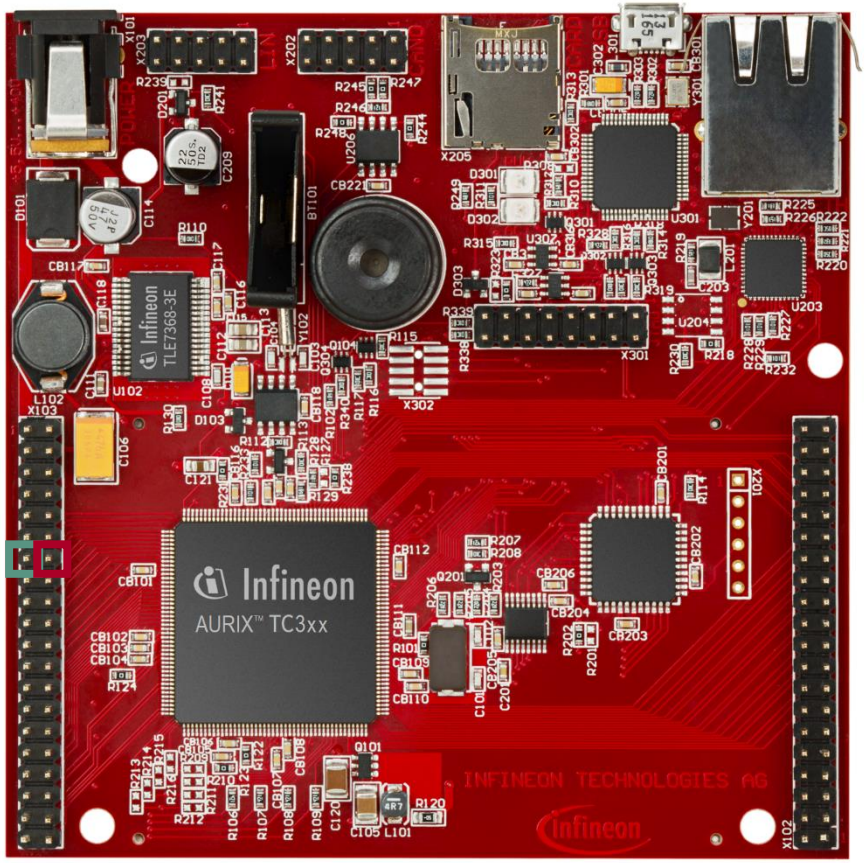
Hardware setup

This code example has been developed for the board KIT_A2G_TC397_5V_TFT.

The two pins P02.0 and P02.1 have to be connected to each other.

		X103		
	VCC_IN	1	2	V_UC
	GND	3	4	GND
	P21.2	5	6	P21.3
	P14.8	7	8	P14.7
	P14.6	9	10	P20.0
	P21.4	11	12	P21.5
Input	P02.0	13	14	P02.1 Output
	P02.2	15	16	P02.3
	P02.4	17	18	P02.5
	P02.6	19	20	P02.7
	P02.8	21	22	P00.0
	P00.1	23	24	P00.2
	P00.3	25	26	P00.4
	P00.5	27	28	P00.6
	P00.7	29	30	P00.8
	P00.9	31	32	P00.10
	P00.11	33	34	P00.12
	AN19	35	36	AN18
	AN17	37	38	AN16
	AN25	39	40	AN24



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Implementation

- To generate an interrupt via falling and rising edges on an input pin, a few configuration steps are required:
  - Initialize external request pin (***IfxScuEru_initReqPin()***)
  - Select which edge should trigger the interrupt (***IfxScuEru_enableRisingEdgeDetection()*** and/or ***IfxScuEru_enableFallingEdgeDetection()***)
  - Enable generation of trigger events with the function ***IfxScuEru_enableTriggerPulse()***
  - Choose the output channel by selecting the Output Gating Unit (OGUz) and the trigger pulse output (TRxz)
    - An event from the Event Trigger Logic (ETL0) triggers the OGU0 (signal TRx0). The function ***IfxScuEru_connectTrigger()*** determines the output channel for the trigger event
  - Select the condition to generate an interrupt with the function ***IfxScuEru_setInterruptGatingPattern()***
  - Configure and enable the service request with the functions ***IfxSrc_init()*** and ***IfxSrc_enable()***

- The functions above are provided by the iLLD headers ***IfxScuEru.h*** and ***IfxSrc.h***.

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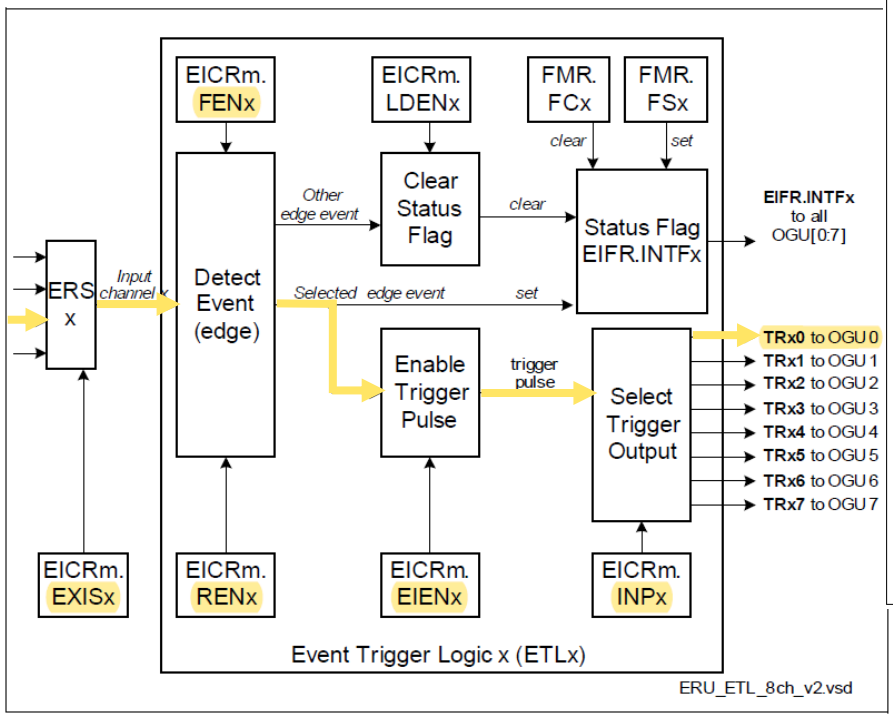
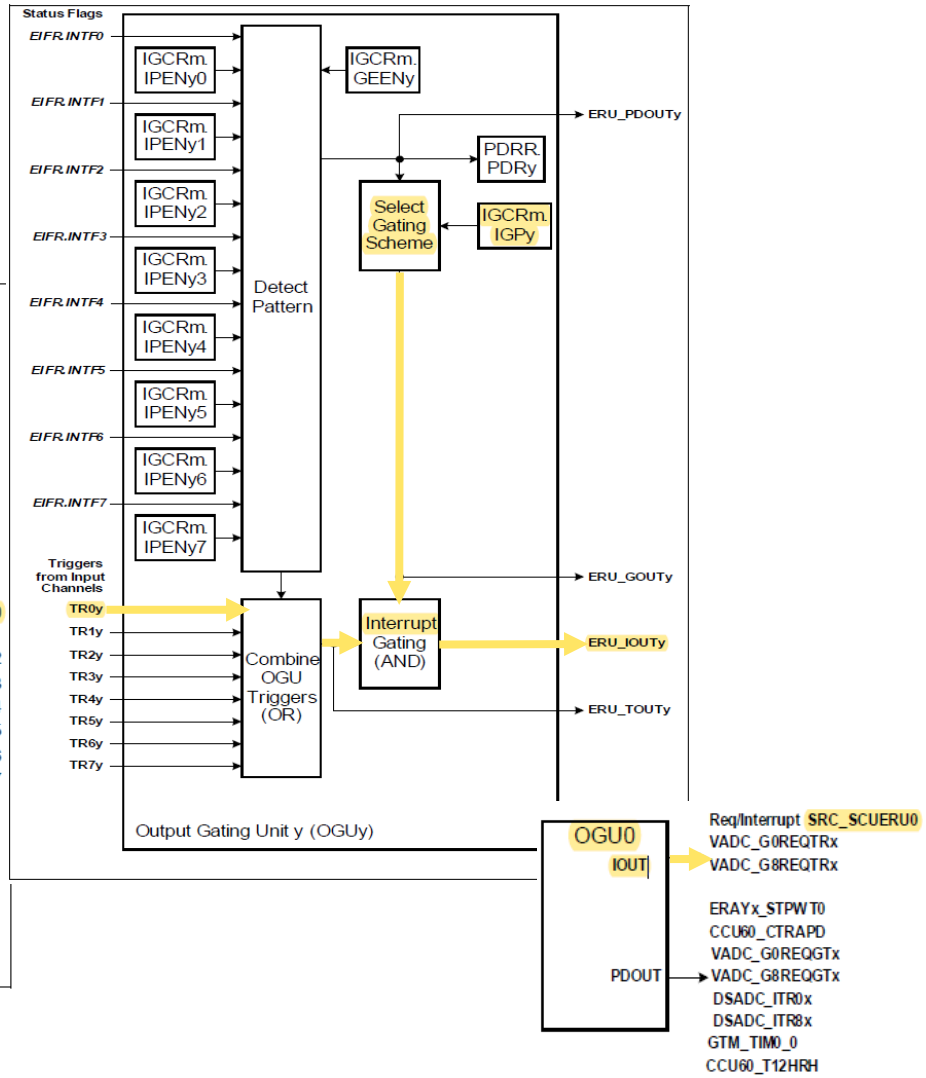
Implementation

- The below figures from the AURIX™ TC39x B-Step User's Manual illustrate the configuration steps that were followed in this example.





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Implementation

The Interrupt Service Routine (ISR)

Blinking an LED is implemented inside an **ISR** triggered by the ERU which generates **interrupt requests** according to its configuration.

The method implementing the ISR needs to be assigned a **priority** and a **CPU core** responsible for its execution. This is done with the macro ***IFX_INTERRUPT(isr, vectabNum, priority)***.

When triggered, the ISR **blinks** the LED by **toggling** the **state** of the connected pin using the function ***IfxPort_setPinState()***.

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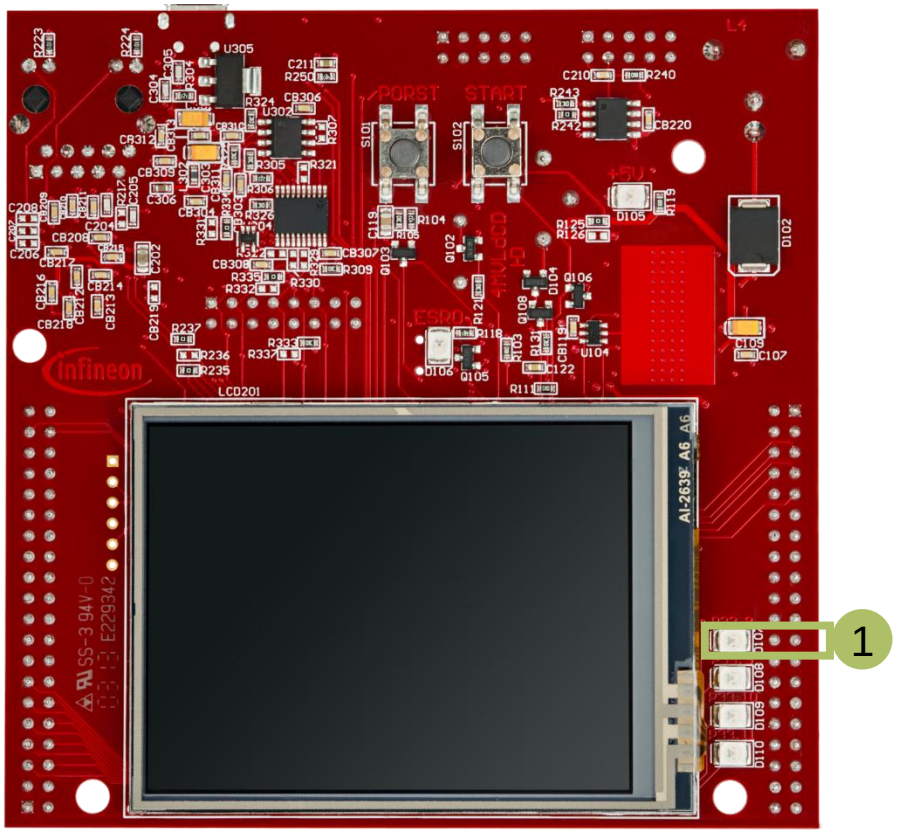
Run and Test

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

1. Connect the two pins P02.0 and P02.1 to each other.
   P02.1 is used to generate the falling and rising edges by toggling the state from high to low. P02.0 is the input of the ERU which generates the interrupts on falling and rising edges.
2. Toggle the P02.1 pin state via the value of the variable ***LEDstate*** of the structure ***g_ERUconfig*** with the debugger.
3. Check LED D107 (1) is changing state when the variable is modified.



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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

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