

GTM_ATOM_Interrupt_1

GTM ATOM interrupt

AURIX™ TC2xx Microcontroller Training
V1.0.0



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Scope of work

The GTM ATOM is configured to trigger an interrupt every 500 ms. The interrupt toggles an LED.

The Generic Timer Module triggers an interrupt every 500 ms. The state of the port pin, where the LED is connected, is toggled inside the Interrupt Service Routine (ISR).

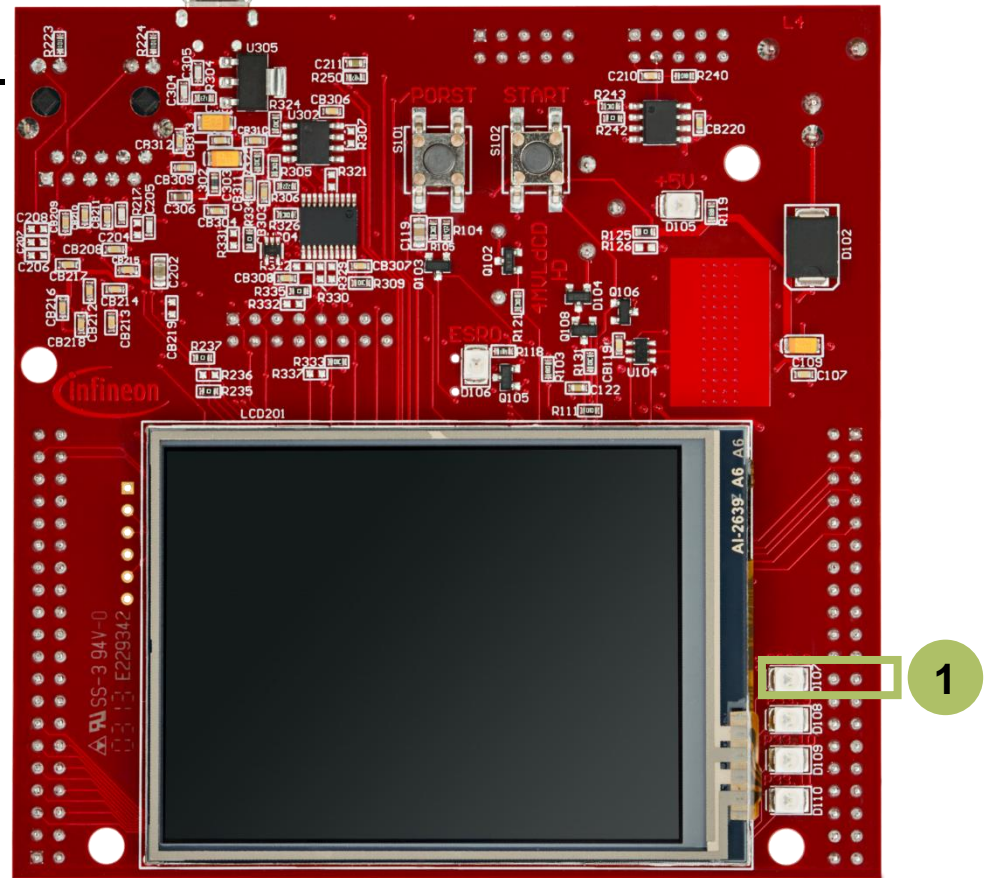
Introduction

- › The Generic Timer Module (GTM) is a modular timer unit designed to accommodate many timer applications.
- › It has an in-built Advanced Router Unit (ARU) that can be used to exchange specific data between sub-modules without CPU interactions.
- › The ARU-connected Timer Output Module (ATOM), which is part of the GTM, is able to generate complex output signals without CPU interactions.
- › The Clock Management Unit (CMU) is responsible for clock generation of the GTM. The Configurable Clock Generation Subunit (CFGU) provides eight clock sources for the GTM submodules TIM, TBU, MON and ATOM.

Hardware setup

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

LED D107 (1) is used for this
example.



Implementation

Configuring the ATOM

The configuration of the ATOM is done once in the setup phase by calling the initialization function ***initGtmAtom()*** containing the following steps:

- › Enable the GTM by calling the function ***lfxGtm_enable()***.
- › The function ***lfxGtm_Atom_Timer_initConfig()*** initializes an instance of the structure ***lfxGtm_Atom_Timer_Config*** with its default values.
- › The ***lfxGtm_Atom_Timer_Config*** structure allows to set the following parameters to initialize the module:
 - ***atom*** – Select ATOM 0
 - ***timerChannel*** – Select channel 0 of ATOM 0
 - ***clock*** – Select CMU clock 0
 - ***base.frequency*** – Set timer frequency to 2 Hz (interrupt every 500 ms)
 - ***base.isrPriority*** – Interrupt Service Routine priority
 - ***base.isrProvider*** – Interrupt Service Routine provider

Implementation

Configuring the ATOM

- › Set the CMU clock 0 frequency to 1 MHz with the function ***IfxGtm_Cmu_SetClkFrequency()***.
- › Enable the CMU clock 0 by calling the function ***IfxGtm_Cmu_enableClocks()***.
- › After clock configuration, the function ***IfxGtm_Atom_Timer_init()*** initializes and activates the ATOM with the user configuration.
- › Start the timer with the function ***IfxGtm_Atom_Timer_run()***.

All the functions used for the configuration of the ATOM are provided by the iLLD header ***IfxGtm_Atom_Timer.h***.

Configuring the LED

The LED configuration is also done in the function ***initGtmAtom()***:

- › Set the port pin mode to output and push-pull by calling the function ***IfxPort_setPinModeOutput()***, provided by iLLD header ***IfxPort.h***.

Implementation

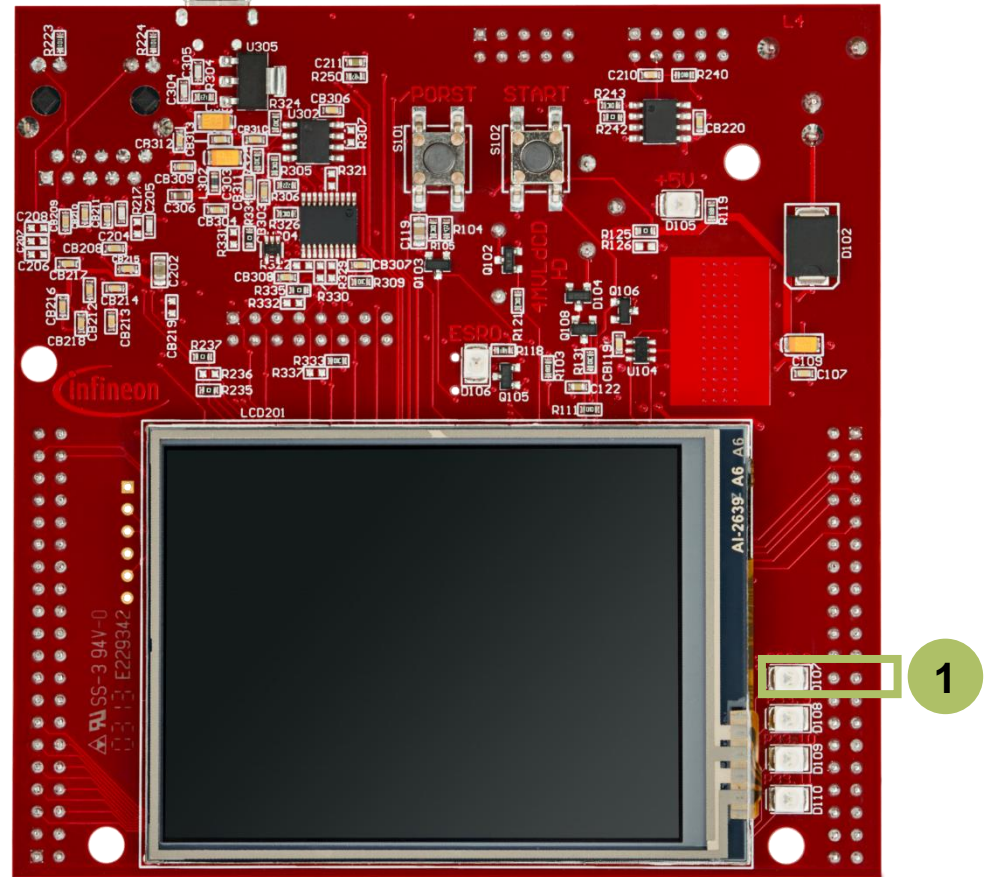
Interrupt Service Routine (ISR)

The ISR implemented in this example contains the following steps:

- › Clear the timer event with the function ***IfxGtm_Atom_Timer_acknowledgeTimerIrq()*** in the iLLD header ***IfxGtm_Atom_Timer.h***
- › Change the LED state by calling the function ***IfxPort_togglePin()*** in the iLLD header ***IfxPort.h***

Run and Test

After code compilation and flashing the device, observe the **LED D107** (1), which should be blinking.



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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