

GTM_TOM_PWM_1 for KIT_AURIX_TC275_LK GTM TOM PWM generation

AURIX™ TC2xx Microcontroller Training
V1.0.0



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Scope of work

GTM TOM is used to generate a PWM signal, which is driving the intensity of an LED.

The LED is driven by pin 5 of the port 00. The state of the pin is controlled by the PWM signal generated by the TOM timer of GTM.

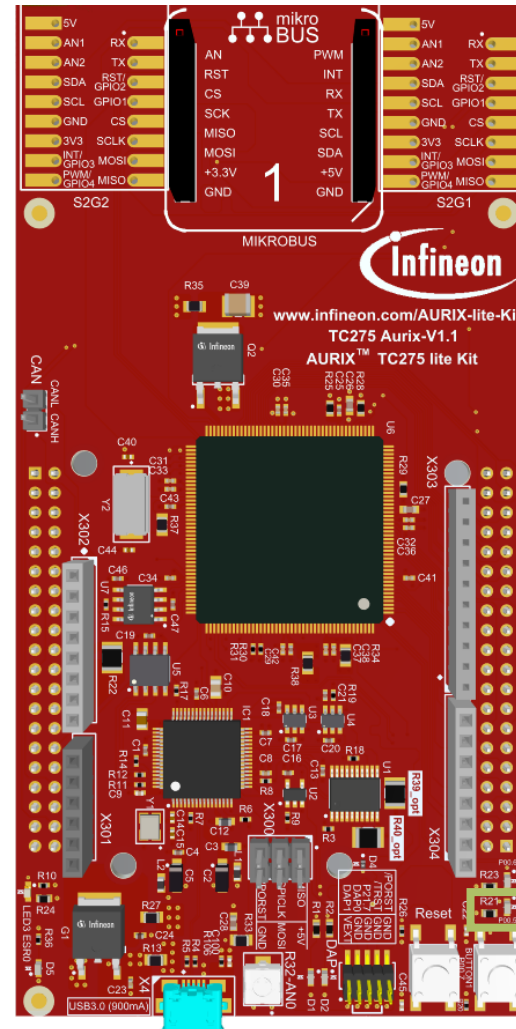
Introduction

- › The Generic Timer Module (GTM) is a modular timer unit designed to accommodate many timer applications.
- › It has an in-built Timer Output Module (TOM) that can offer up to 16 independent channels to generate output signals.
- › The Clock Management Unit (CMU) is responsible for clock generation of the GTM. The Fixed Clock Generation (FXU) is one of its subunits and it provides five predefined non-configurable clocks for GTM modules, including the TOM.

Hardware setup

This code example has been developed for the board `KIT_AURIX_TC275_LITE`.

LED1 (1) is used for this example.



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Implementation

Configuring the TOM

The configuration of the TOM is done by calling the initialization function ***initGtmTomPwm()*** containing the following steps:

- › Enable the GTM by calling the function ***lfxGtm_enable()***
- › Enable the FXU clocks by calling the function ***lfxGtm_Cmu_enableClocks()***

The function ***lfxGtm_Tom_Pwm_initConfig()*** initializes an instance of the structure ***lfxGtm_Tom_Pwm_Config*** with its default values.

The ***lfxGtm_Tom_Pwm_Config*** structure can be modified to set the following parameters to initialize the module:

- › ***tom*** – Selection of the TOM which is counting (TOM 1 in this example)
- › ***tomChannel*** – Selection of the channel which is driving the LED (Channel 4 in this example)
- › ***period*** – Setting of the period for the PWM signal to the desired value
- › ***pin.outputPin*** – Selection of the LED as output pin
- › ***synchronousUpdateEnable*** – Enabling of synchronous update of the timer

Implementation

Configuring the TOM

After configuration, the function ***IfxGtm_Tom_Pwm_init()*** initializes and activates the TOM with the user configuration.

Start the PWM with the function ***IfxGtm_Tom_Pwm_start()***.

Setting the duty cycle

The setting of the duty cycle is done by calling the function ***setDutyCycle()***, which contains the following steps:

- › Set the ***dutyCycle*** parameters of the configuration structure to set the duty cycle of the PWM signal to the desired value
- › Call the function ***IfxGtm_Tom_Pwm_init()*** to reconfigure the TOM with the new value of the duty cycle

All the functions used for the configuration of the TOM are provided by the iLLD header ***IfxGtm_Tom_Pwm.h***.

Fading the LED

The fading of the LED is done in the function ***fadeLED()*** by repeatedly adding or removing a step value to the duty cycle of the PWM.

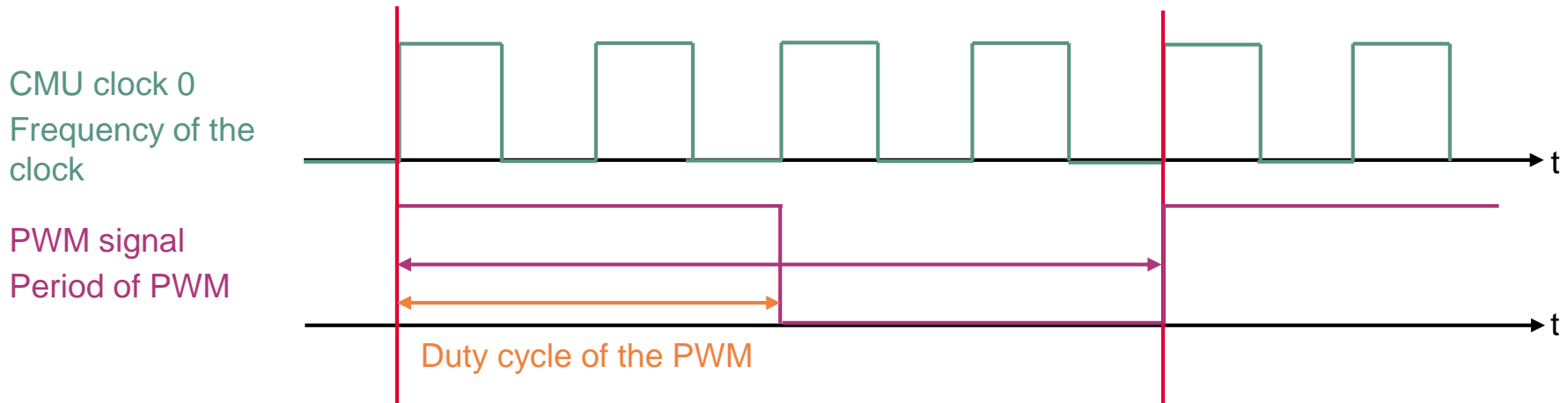
Implementation

Calculation example

The FXU clock 0 frequency (f_{fxclk0}) is 100 MHz. The period value to have the desired PWM frequency (f_{PWM}) is calculated with the following formula:

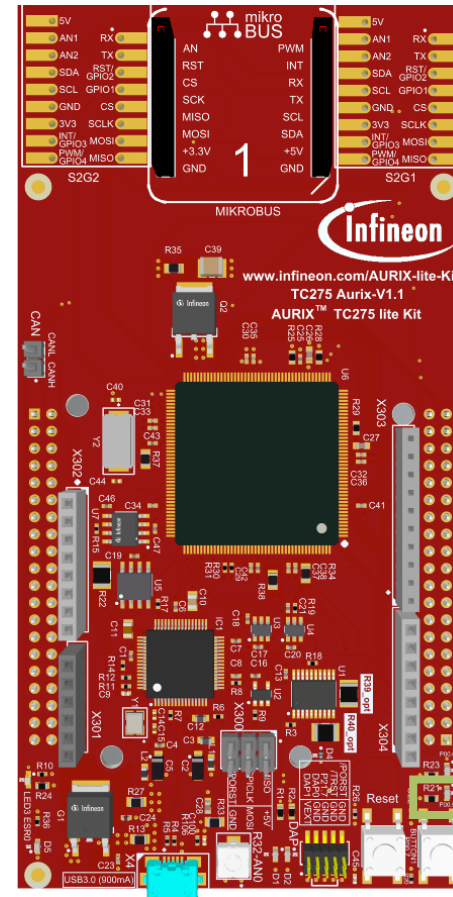
$$Period = \frac{f_{fxclk0}}{f_{PWM}}$$

In this example: $Period = \frac{100 \text{ MHz}}{2 \text{ kHz}} = 50000 \text{ ticks}$



Run and Test

After code compilation and flashing the device, observe the **LED1** (1), which should be fading.



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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:
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