

# GTM\_TOM\_PWM\_1 for KIT\_AURIX\_TC275\_LK GTM TOM PWM generation

AURIX™ TC2xx Microcontroller Training  
V1.0.2



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## Scope of work

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**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

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- › 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

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## 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

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## 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.

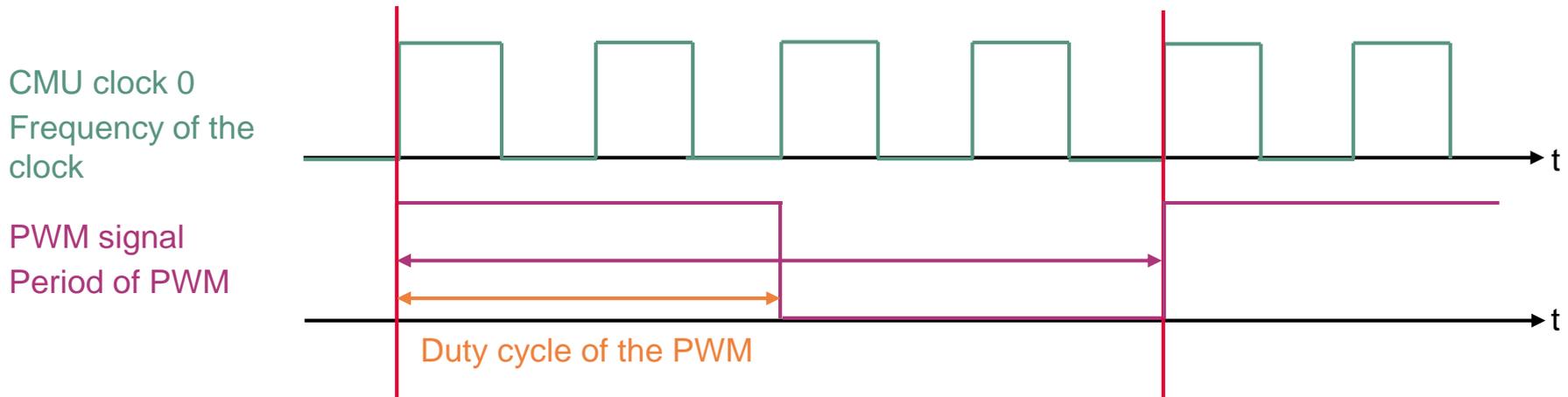
# Implementation

## 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:

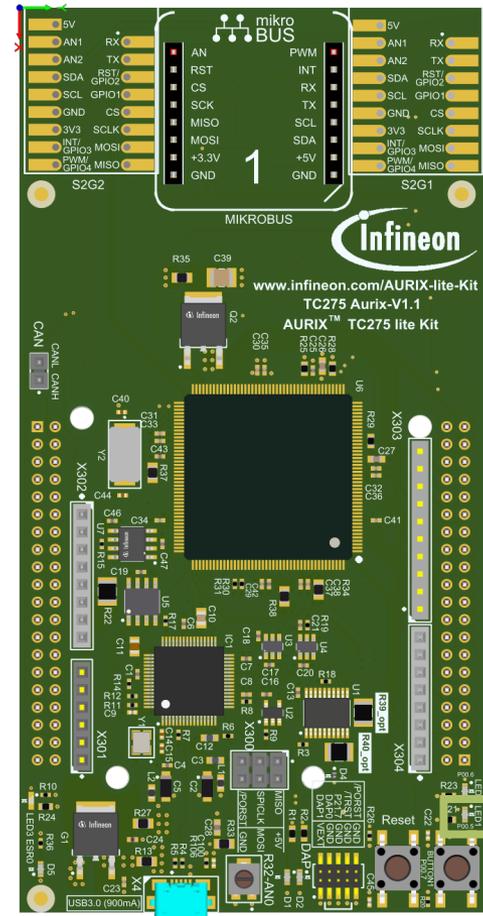
$$Period = \frac{f_{fxclk0}}{f_{PWM}}$$

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](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>

# Revision history

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<b>Revision</b>	<b>Description of change</b>
V1.0.2	Updated board's image
V1.0.1	Update of version to be in line with the code example's version
V1.0.0	Initial version

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**Document reference**

**GTM\_TOM\_PWM\_1\_KIT\_TC275\_LK**

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