GTM_TOM_PWM_1
for KIT_AURIX_TC237_TFT
GTM TOM PWM generation
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 0 of the port 13. The state of the pin is controlled by the PWM signal generated by the TOM timer of GTM.
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_TC237_TFT_AC-Step.

LED D107 (1) is used for this example.
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 `IfxGtm_enable()`
- Enable the FXU clocks by calling the function `IfxGtm_Cmu_enableClocks()`

The function `IfxGtm_Tom_Pwm_initConfig()` initializes an instance of the structure `IfxGtm_Tom_Pwm_Config` with its default values.

The `IfxGtm_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 0 in this example)
- `tomChannel` – Selection of the channel which is driving the LED (Channel 5 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 iLLLD 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: \( Period = \frac{100 \ MHz}{2 \ kHz} = 50000 \ ticks \)
Run and Test

After code compilation and flashing the device, observe the **LED D107 (1)**, which should be fading.
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## Revision history

<table>
<thead>
<tr>
<th>Revision</th>
<th>Description of change</th>
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<tbody>
<tr>
<td>V1.0.1</td>
<td>Update of version to be in line with the code example’s version</td>
</tr>
<tr>
<td>V1.0.0</td>
<td>Initial version</td>
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