TLE9893_2QKW62S_T20_PWM_CAPTURE

About this document

Scope and purpose

The aim of this guide is to present the scope, the implementation, and a demonstration of the **TLE9893_2QKW62S_T20_PWM_CAPTURE** example code for the TLE989x Infineon Embedded Power ICs based on Arm® Cortex® M3. This example code can be found in the Keil µVision Pack Installer.

The full functionalities and characteristics of the embedded power devices are described in the datasheets and user's manual. Please refer to these documents for more detailed information. Furthermore, a low level (line-by-line) description of the code is not the aim of this document, although occasionally some codeblocks might be reported if necessary to the comprehension.

Note: The following information is given as a hint for the implementation of the system only and shall not be regarded as a description or warranty of a certain functionality, condition or quality of the referred devices or presented software example.

Intended audience

Design engineers, system engineers, embedded power designers

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1 Introduction

In this example project PWM signal received on GPIO is captures and its duty cycle and period are measured using Timer(T20). T20 captures number of ticks when external event (falling or rising edge) is detected on configured input pin.

2 Hardware

This chapter shows how to run the **TLE9893_2QKW62S_T20_PWM_CAPTURE** example with the TLE988x/TLE989x evaluation board. For this the project must be opened and compiled.

Figure 3 shows the TLE988x/TLE989x evaluation board. The application code must be loaded via a debugger (e.g. J-Link) to the board. The board must be powered with 12V (red and black connections).
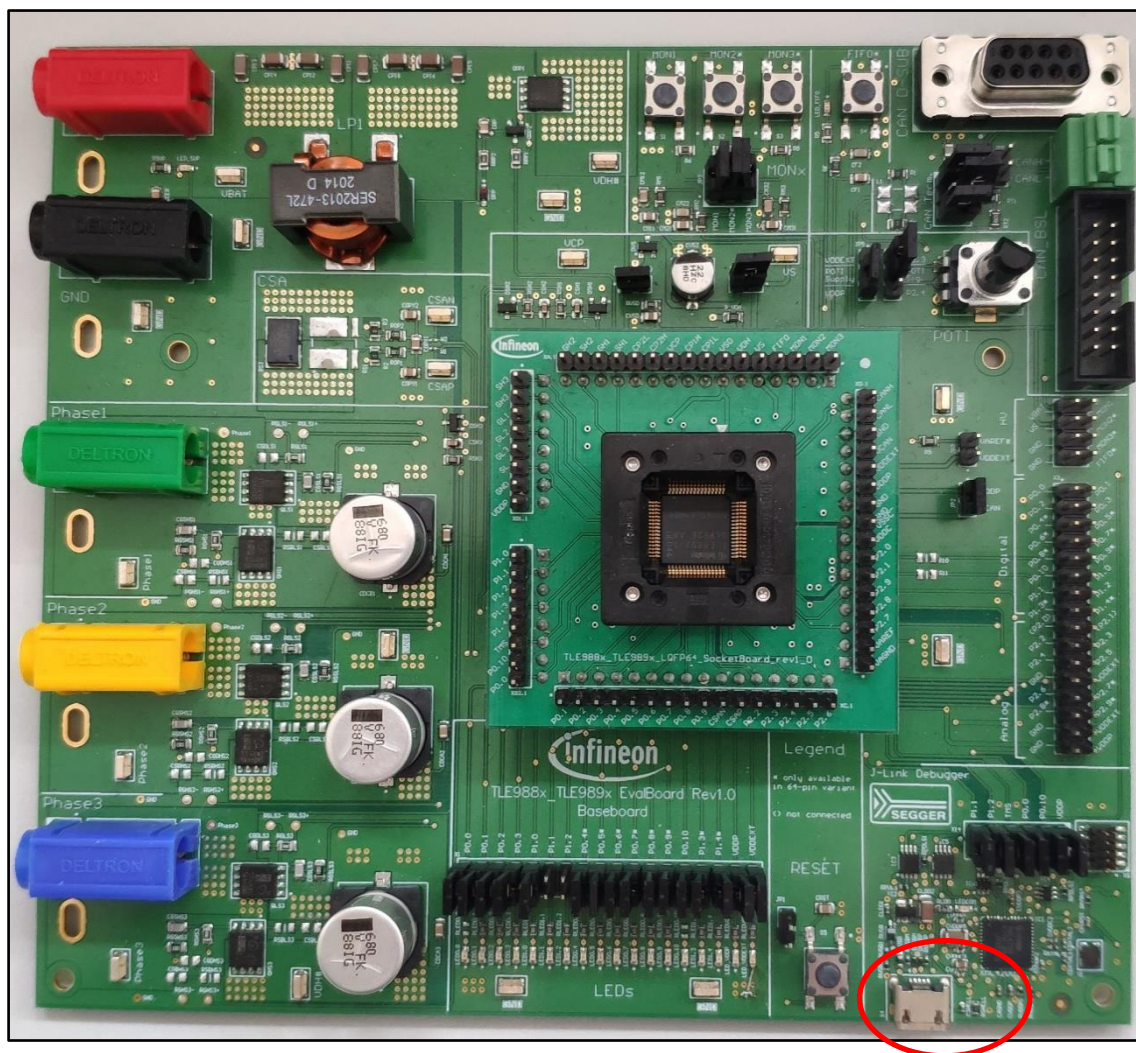

Figure 1 TLE988x/TLE989X evaluation board

2.1 Connections

Two boards are required for this example.
1st board: Flash this example – master board
2nd board for generating the PWM signal – slave board

Connect P0.3 of the master board to one of the PWM output pins of the slave board.

3 Implementation

This chapter shows the process to follow to get a working secure access simple example.

3.1 Get the example via the Pack Installer for Keil

Open the Pack Installer within the Keil IDE.

Choose the appropriate device (here TLE9893_2QKW62S) on the left-hand side. On the right-hand side, select the tab Examples, where you can access the **TLE9893_2QKW62S_T20_PWM_CAPTURE** example.

Clicking on "Copy" will copy the example on your computer and open it.

3.2 Configuration

In order to configure the Timer2x module to detect the external event for
TLE9893_2QKW62S_T20_PWM_CAPTURE example, select the Timer2x tab. Enable the Timer20 module. Next, select mode selection as capture mode. Select Clock selection as Timer with f/16 as pre-scalar.
Next, enable external event, choose P0.3 for input. Select the initial setting for event detection as on the rising edge of T2EX. Enable External timer start and select on the falling edge as external start trigger. In the next step, enable interrupt and external interrupt, provide PWM_Capture as callback function.
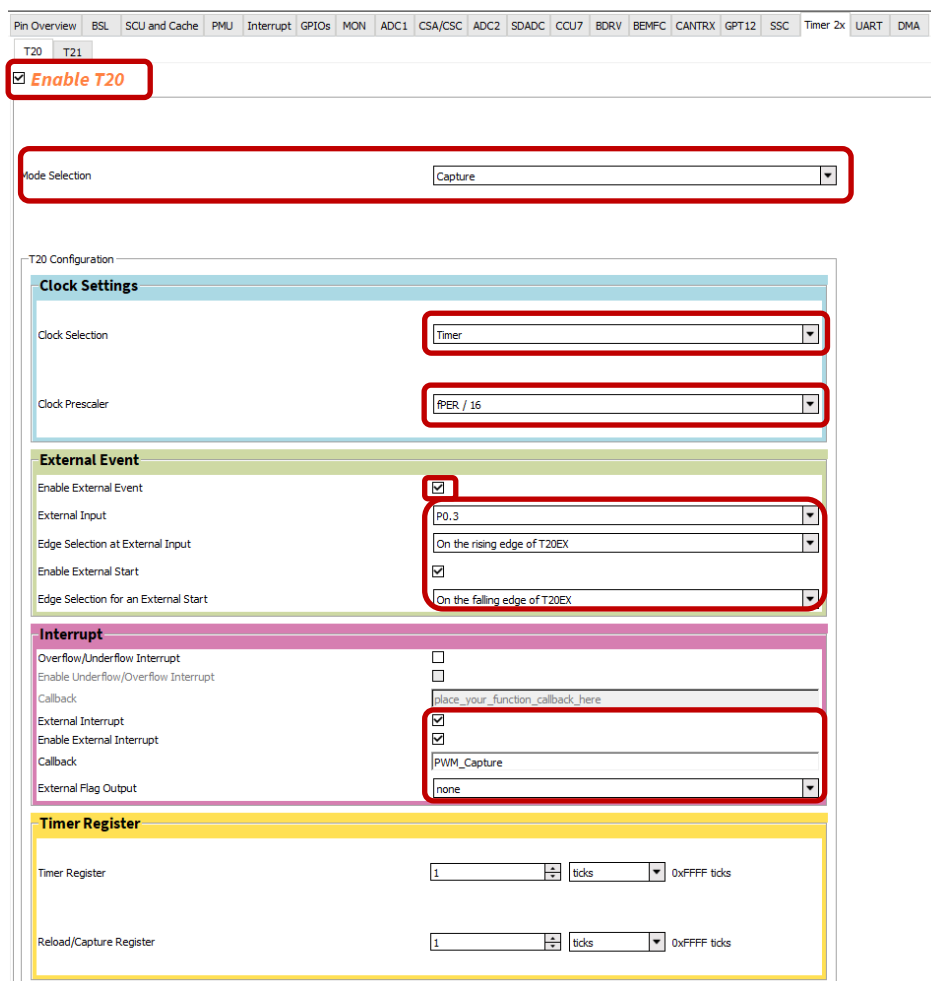

Figure 2 Config Wizard T20 configuration

Finally, save your configuration to take these changes into account (File -> Save).

3.3 Measuring low phase and period of PWM signal

Measuring low time of PWM signal:
T20 starts at the falling edge on the P0.3 and starts counting. At rising edge on P0.3, T20 detects the external event and captures the number of timer ticks (PWM low phase, stored in variable CapDC).

Measuring period of PWM signal:
While T20 is still running on detecting the next falling edge on P0.3, it captures the timer ticks and stores in variable capPer.

Figure below depicts the concept for measuring the low phase and period of input PWM signal.
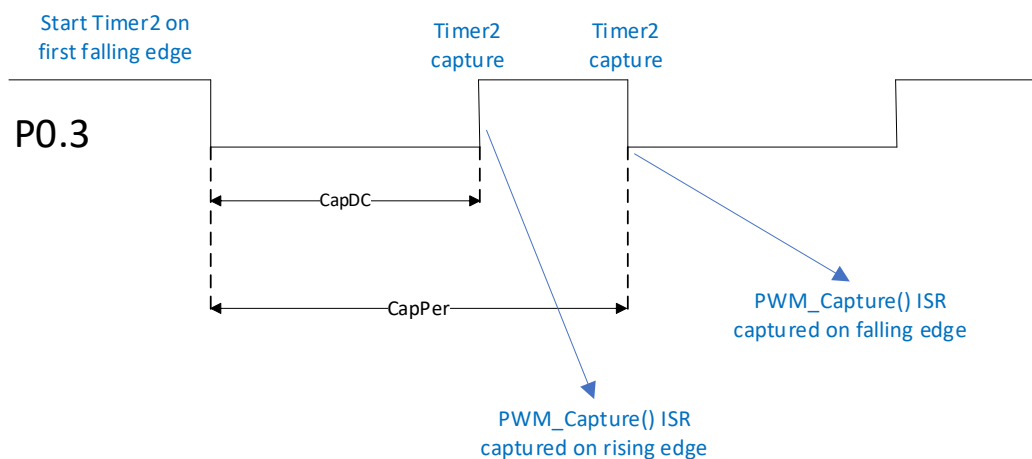
Figure 3 TLE9893_2QKW62S_T20_PWM_CAPTURE example concept

3.4 Flowchart for low phase and period measurement

Eternal Event (edge on P0.3)

Falling edge?

Yes

Rising edge
No

Timer20 already running?

Yes

No

Capture low phase time in var CapDC
Set EDGE.SEL to falling edge

Capture PWM period value in var CapPer
Stop Timer

HW starts Timer20
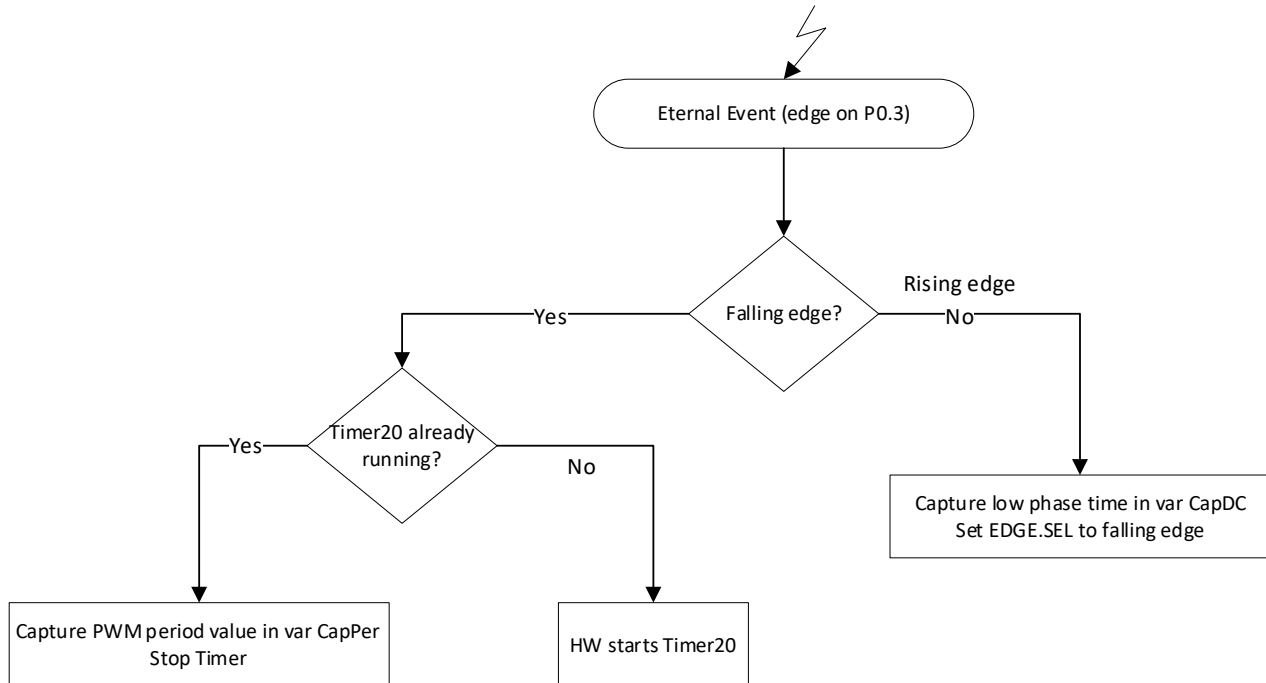
Figure 4 TLE9893_2QKW62S_T20_PWM_CAPTURE code flow chart

Note: In this example, period/ low phase time is measurement in done in every alternate period.

References

See the code examples at **www.infineon.com**

Revision history

Document version	Date of release	Description of changes
1.0	2022-22-08	Initial version
1.1	2022-10-13	Editorial changes

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