

TLE9893_2QKW62S_T20_RELOAD_INTTRG

About this document

Scope and purpose

The aim of this guide is to present the scope, the implementation, the algorithm and a demonstration of the **TLE9893_2QKW62D_T20_RELOAD_INTTRG** 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 code blocks 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, the signal is captured at the GPIO pin P0.1.

An interrupt is triggered every 100ms, which toggles the LED on the pin P0.1. This means the LED toggles exactly 10 times in a second.

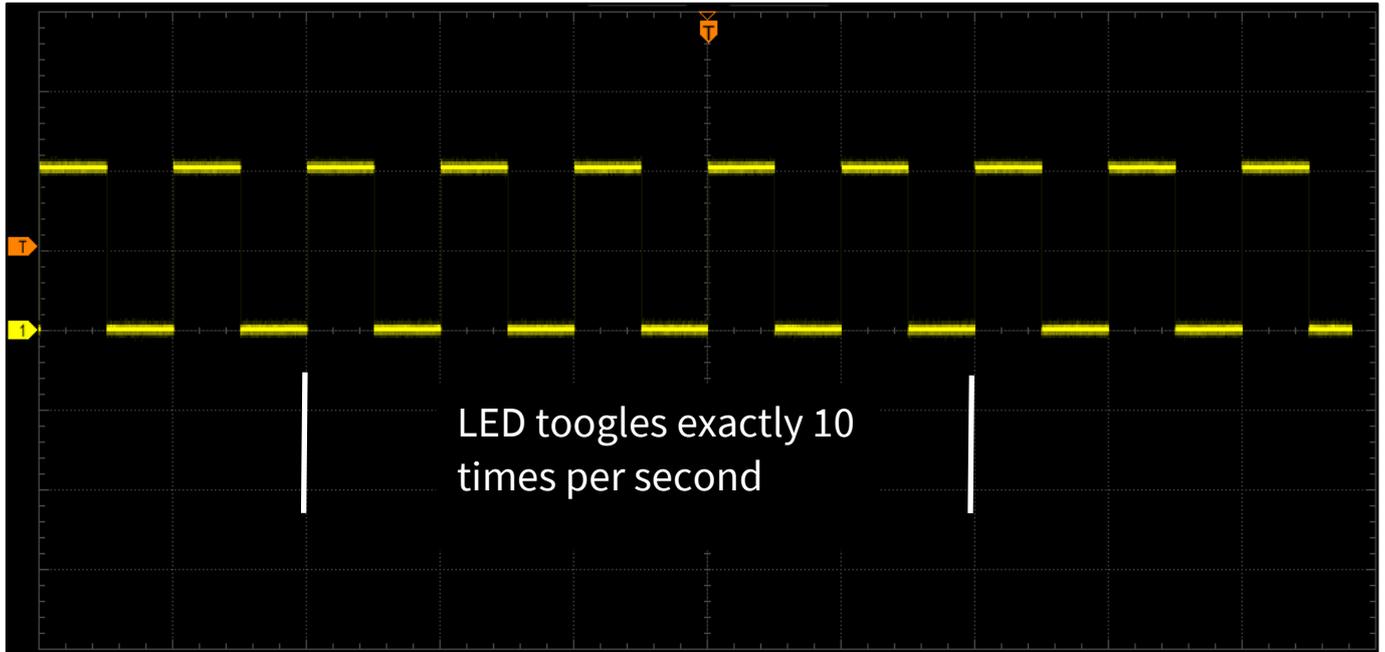


Figure 1 Capture of GPIO P0.1 signal

2 Hardware

This chapter shows how to run the TLE9893_2QKW62S_T20_RELOAD_INTTRG example with the TLE988X/TLE989X evaluation board. For this the project must be opened and compiled.

Figure 2 shows the TLE988X/TLE989X evaluation board. The application code must be loaded via a debugger (e.g. ULINK or J-Link) to the board. The board must be powered with 12V (red and black connections). Then the LED at P0.1 is flashing (second LED from the left-hand side).

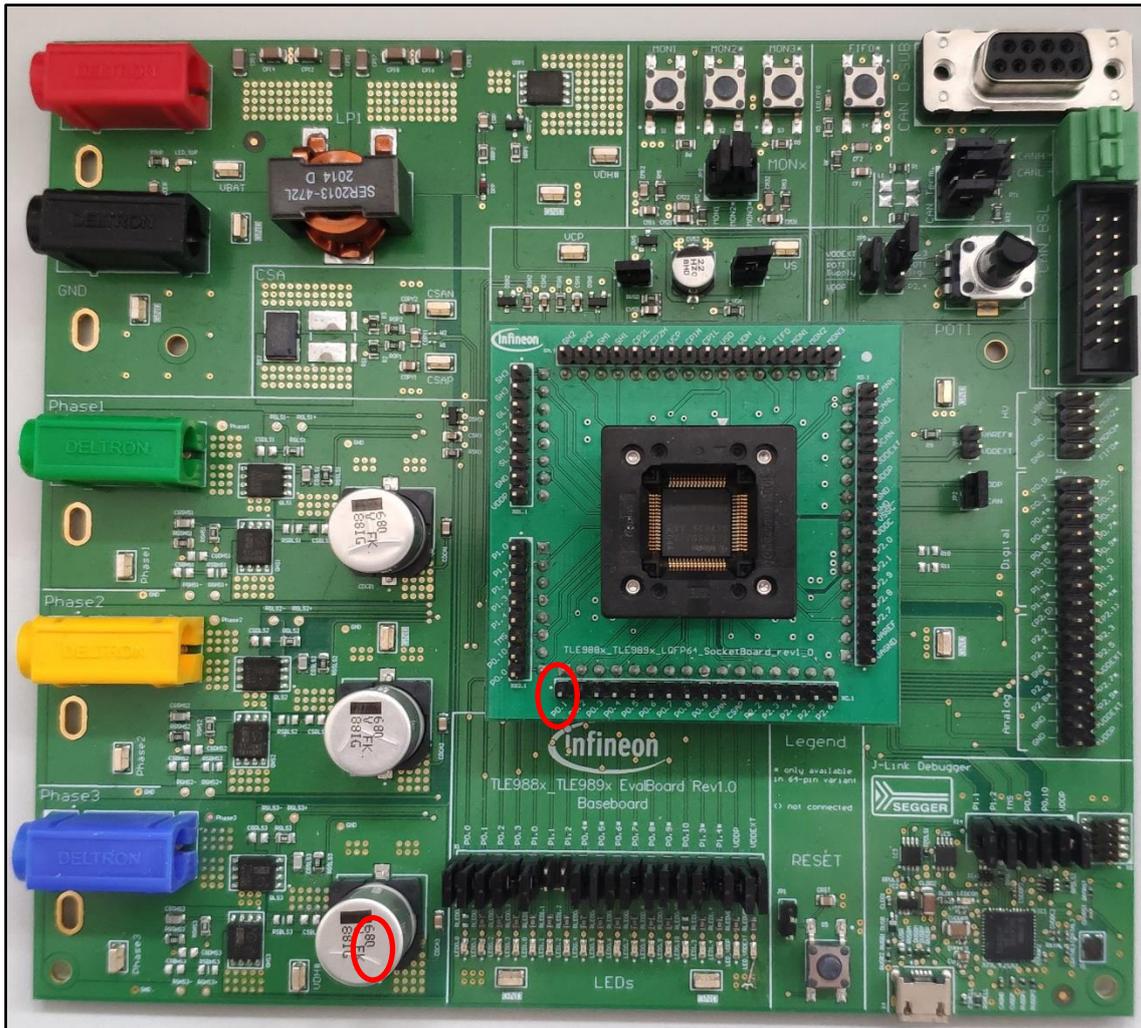


Figure 2 TLE988X/TLE989X evaluation board

The LED connected on GPIO pin P0.1 toggles exactly 10 times a second.

3 Implementation

This chapter shows the process to follow to get a working TLE9893_2QKW62_T20_RELOAD_INTTRG example.

3.1 Get the example via the Pack Installer for Keil

Open the Pack Installer within the Keil IDE. See Figure 3 below.

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 example TLE9893_2QKW62S_T20_RELOAD_INTTRG.

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

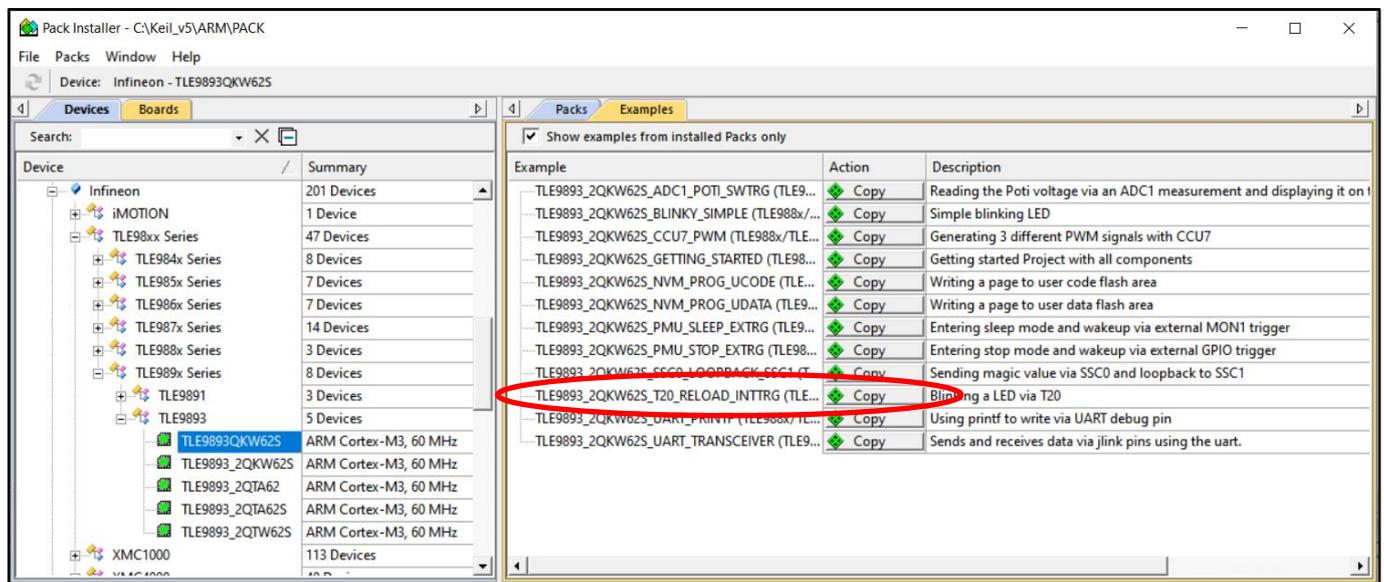


Figure 3 Keil Pack Installer

3.2 Configuration

In order to see the configured pins, start the tool Config Wizard. It is available within the Keil IDE through a shortcut in the Tools menu.

The Config Wizard opens and shows an overall status of the current pin configuration. In Figure 4 the GPIO P0.1 is used as output signal to toggle the LED.

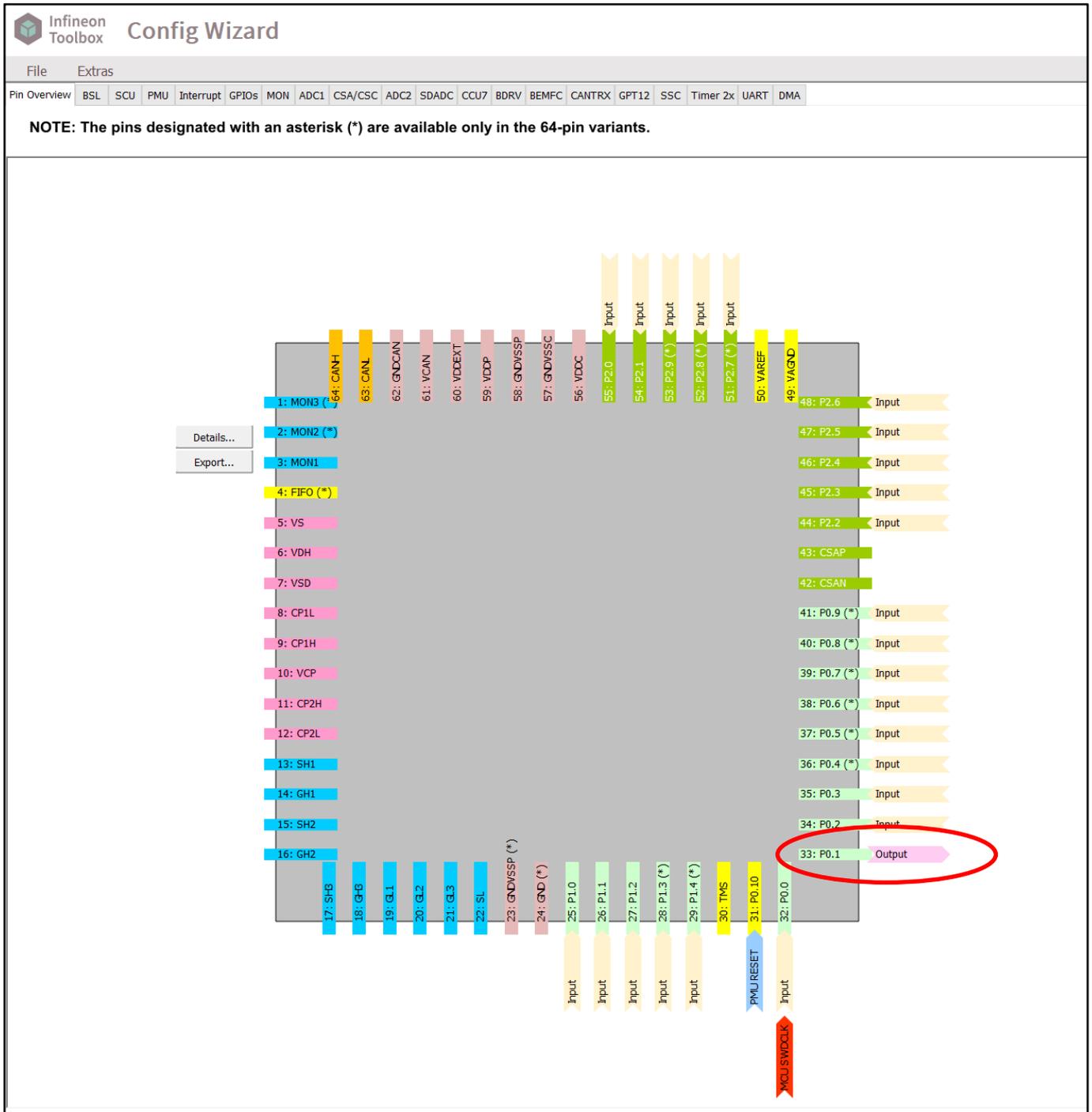


Figure 4 Config Wizard pin overview

In order to change the timer configuration, click on the Timer2x tab, where you can see all available Timer2x settings.

Figure 5 shows the available components for the Timer2x module. In this example the timer T20 is enabled.

In the Clock Settings box (blue), the clock prescaler is set to a divisor of 128. Since the core clock is set to 60MHz, the effective clock output is 468.750kHz (60MHz / 128).

Within the Interrupt box (pink), the underflow/overflow interrupt is set and enabled. Additionally, a function callback name for the interrupt is defined (here t20_reload_inttrg).

Next, the reload register is set to 100000µs. This means that the interrupt callback is triggered exactly 10 times each second.

The screenshot shows the Infineon Config Wizard interface for module T20. The 'Enable T20' checkbox is checked. The Mode Selection is set to 'Auto-Reload without Up/Down Count'. The T20 Configuration section includes: Clock Settings (Timer, fPER / 128), External Event (disabled), Interrupt (Overflow/Underflow Interrupt enabled, callback t20_reload_inttrg), and Timer Register (Timer Register 1 ticks, Reload/Capture Register 100000 us). The T20 Diagram shows a 60 MHz clock divided by 128 to 468.75 kHz, which feeds into the Timer T20 CNT Register. The CNT Register is connected to the RC Register, and an overflow signal is sent back to the CNT Register. The CNT Register outputs a TF2 signal to the T20 IRQ pin.

Figure 5 Config wizard, module T20

Additionally, within the GPIO module tab, the pin P0.1 is configured as output to switch the appropriate LED on and off continuously.

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

3.3 Sample code

Figure 6 shows the application code of the TLE9893_2QKW62S_T20_RELOAD_INTTRG application.

Within the main function, the Timer module T20 is started (line 85). Then the system runs within the endless loop serving the watchdog periodically.

The configured callback function name is implemented from line 95 to 99. Within this callback, the GPIO P0.1 pin is toggled (line 98). The interrupt service callback is triggered continuously from the timer module and is exactly called 10 times a second.

```
81      /* Clear bridge driver status flags */
82      BDRV->STSCCLR.reg = 0xFFFFFFFFU;
83
84      /* Start timer T20 */
85      T20_start();
86
87      for (;;)
88      {
89          /* Main watchdog service */
90          (void) PMU_serviceFailSafeWatchdog();
91      }
92
93
94      /* Callback of timer T20 */
95      void t20_reload_intrg()
96      {
97          /* Toogle GPIO pin P0.1 */
98          GPIO_setP01State(GPIO_STATE_TOGGLE);
99      }
100
```

Figure 6 TLE9893_2QKW62S_T20_RELOAD_INTTRG application code

References

See the code examples at www.infineon.com

Revision history

Document version	Date of release	Description of changes
1.0	2021-06-21	Initial version
1.1	2022-10-13	Editorial changes

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Edition 2022-10-13

Published by

Infineon Technologies AG

81726 Munich, Germany

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