

Application Note

Timer PPG

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1. Preface

This application note describes the sample software of Timer_PPG using Programmable Pulse Generator (PPG) in 32-bit Timer Event counter (T32A). This document helps the user check operation of a product under development and develop its program.

2. Technical Term

Term/Abbreviation	Definition
BSP	Board Support Package
PPG	Programmable Pulse Generator
UART	Universal Asynchronous Receiver Transmitter
T32A	32-bit Timer Event counter

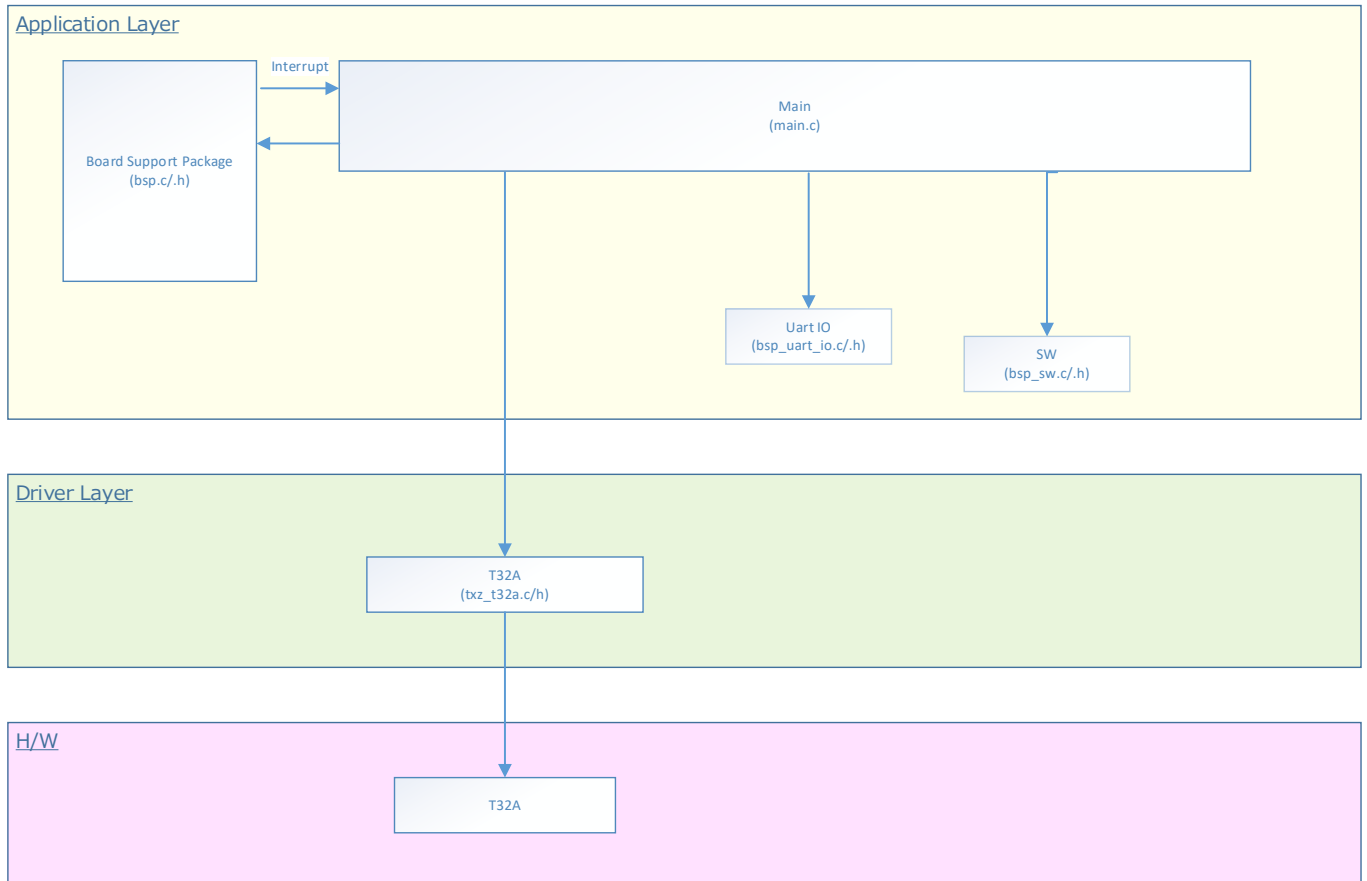
3. Reference Document

Document	Notes
Data sheet	Refer to the data sheet of MCU to be used.
Reference manual	Refer to the reference manual of each IP to be used.
Application note MCU User Guide	Refer to the MCU user manual to be used.

4. Target Sample Program

Sample Program	Outlines
Timer_PPG	Sample of PPG function in T32A

5. Configuration Diagram



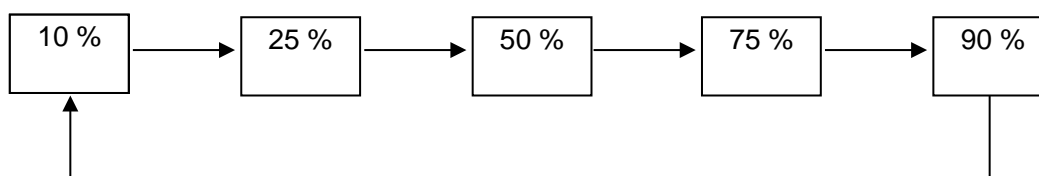
6. Sample Program: Timer_PPG

This sample software changes step by step the duty ratio of the output signal from T32A PPG circuit.

6.1. Outlines of Operation

When BSP_PSW_0 is pushed down, the PPG starts to output a signal. When BSP_PSW_1 is pushed down, the PPG stops and the duty ratio of the output signal is changed.

If the BSP_PSW_0 is pushed down twice continuously, Time error occurs. The BSP_PSW_0 should be pushed down to output the PPG signal after the BSP_PSW_1 is pushed down to stop the PPG and to change the duty ratio.



6.2. Function to Use

The functions to use are as follows.

For the Port assignment of each channel, refer to the MCU user manual.

IP	Channel	Objective
UART	BSP_UART_0	Communication with the terminal software
PORT	BSP_PSW_0	PSW control
	BSP_PSW_1	PSW control
T32A	BSP_OUT_PULSE_SAMPLE_A	PPG output

6.3. Interrupt to Use

Interrupt	Outlines
Timer Interrupt	Interval timer interrupt
UART Interrupt	UART reception interrupt
	UART transmission interrupt
	UART ERROR interrupt

6.4. Configuration

Nothing.

6.5. Example of Terminal Software Output

6.5.1. Normal Operation

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Change to Duty: 50%
PPG Output
Duty: 50%
  
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6.5.2. Case of Error Occurrence

Nothing.

7. T32A Driver

7.1. List of Drivers

The T32A is controlled by using the following drivers.
For an example of use, refer to the source code.

Interface Name	Control Outlines
t32a_Calculator	Timer value is calculated, then the timer register is set.
t32a_deinit	T32A object is released.
t32a_get_status	Status is acquired.
t32a_mode_init	T32A object mode is initialized.
t32a_reg_set	Timer register setting
t32a_SWcounter_start	When the Timer is enabled, the counter is started.
t32a_SWcounter_stop	When the Timer operates, the counter is stopped.
t32a_timer_init	T32A object is initialized.
t32a_timer_startIT	The timer operation is enabled.
t32a_timer_stopIT	The timer operation is disabled.
t32a_tmr_read	Timer register is read.

8. Revision History

Revision	Date	Description
1.0	2021-11-04	First release

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