

## Application Note

# TSPI ACCELEROMETER

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### 1. Preface

This application note describes sample software for the function to acquire accelerometer information (X, Y, Z axis) using the TSPI driver.

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
UART	Universal Asynchronous Receiver Transmitter
Timer	T32A : 32-bit Timer Event Counter
TSPI	Toshiba Serial Peripheral Interface

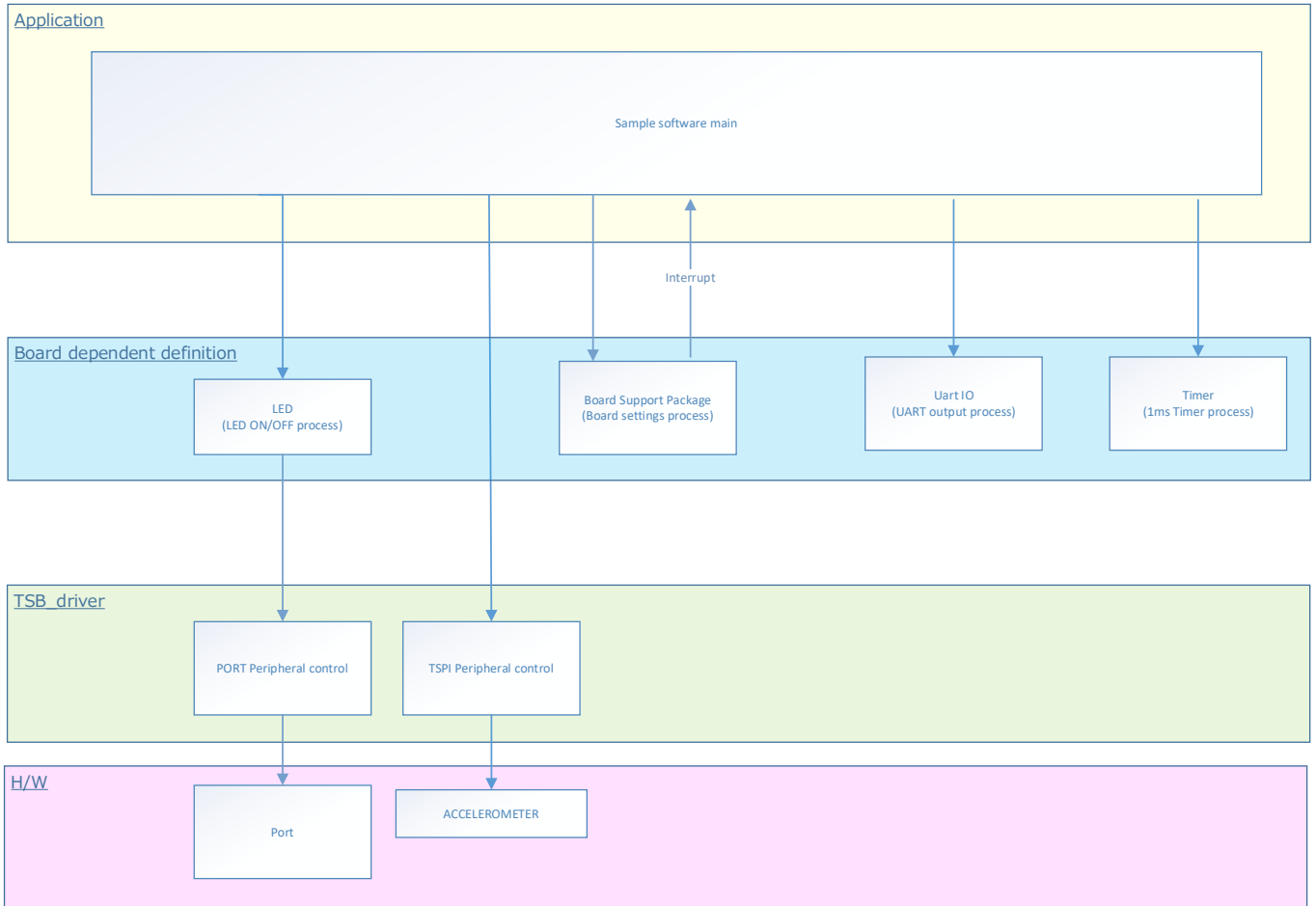
### 3. Reference Document

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 guide to be used.

## 4. Target Sample Program

Sample Program	Outline
TSPI_ACCELEROMETER	Sample program of TSPI_ACCELEROMETER function

## 5. Configuration Diagram



## 6. Sample Program : TSPI\_ACCELEROMETER

This sample software is software to acquire accelerometer information (X, Y, Z axis).

### 6.1. Outlines of Operation

Detects the strength of the shaking of the evaluation board every time Timer\_A elapses.  
The detection result is output to the terminal emulator.

### 6.2. Function to Use

The functions to use are as follows.

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

IP	Channel	Objective
TSPI	BSP_TSPI_IC	For accelerometer interface
PORT(LED)	BSP_LED_1	For operation check. Shows the seismic intensity of the shaking detected by the accelerometer
	BSP_LED_2	For operation check. Shows the seismic intensity of the shaking detected by the accelerometer
	BSP_LED_3	For operation check. Shows the seismic intensity of the shaking detected by the accelerometer
	BSP_LED_4	For operation check. Shows the seismic intensity of the shaking detected by the accelerometer
UART	BSP_UART_1	For terminal emulator communication (Outputs log)

### 6.3. Interrupt to Use

Interrupt	Outlines
INTT0RX	TSPI ch0 Receive interrupt
INTT0TX	TSPI ch0 Transmission interrupt
INTT0ERR	TSPI ch0 Error interrupt
INTUART0RX	UART ch0 Receive interrupt for terminal emulator
INTUART0TX	UART ch0 Transmission interrupt for terminal emulator
INTUART0ERR	UART ch0 Error interrupt for terminal emulator

### 6.4. Configuration

“main.c” configuration setting.

Configuration	Current Value	Description
Timer_A	1s	-
Threshold_A	36	-
Threshold_B	72	-
Threshold_C	108	-
Threshold_D	144	-
Threshold_E	180	-

## 6.5. Example of Terminal Emulator Output

### 6.5.1. Normal Operation

```
X:xx Y:yy Z:zz  
X:xx Y:yy Z:zz  
X:xx Y:yy Z:zz  
X:xx Y:yy Z:zz  
X:xx Y:yy Z:zz  
X:xx Y:yy Z:zz  
X:xx Y:yy Z:zz  
X:xx Y:yy Z:zz  
X:xx Y:yy Z:zz  
X:xx Y:yy Z:zz  
X:xx Y:yy Z:zz  
X:xx Y:yy Z:zz  
X:xx Y:yy Z:zz
```

### 6.5.2. Case of Error Occurrence

```
X:xx Y:yy Z:zz  
X:xx Y:yy Z:zz  
X:xx Y:yy Z:zz  
X:xx Y:yy Z:zz  
Detection angle over!!  
Detection angle over!!  
Detection angle over!!  
Detection angle over!!  
Detection angle over!!  
Detection angle over!!  
X:xx Y:yy Z:zz  
X:xx Y:yy Z:zz  
X:xx Y:yy Z:zz
```

### 7. TSPI Driver

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

Driver	Control Outlines
tspi_dma_init	TSPI DMA Initialize the object
tspi_dma_deinit	TSPI DMA Release the object
tspi_dma_discard_transmit	Discard transmission
tspi_dma_discard_receive	Discard reception
tspi_dma_transmitt	Send data. Non-blocking communication
tspi_dma_receive	Receive data. Non-blocking communication
tspi_init	TSPI Object initialization
tspi_deinit	TSPI Object release
tspi_master_write	Data writing
tspi_master_read	Data read
tspi_master_transfer	Send data. Non-blocking communication
tspi_master_receive	Receive data. Non-blocking communication
tspi_irq_handler_transmit	IRQ handler for sending
tspi_irq_handler_receive	IRQ handler for receiving
tspi_error_irq_handler	IRQ handler for errors
tspi_format	Data format settings
tspi_get_status	Get status
tspi_get_error	Get error information
tspi_error_clear	Clear error information
tspi_discard_transmit	Discard transmission
tspi_discard_receive	Discard reception

## 8. Revision History

Revision	Date	Description
1.0	2023-06-28	First release



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