

Application Note

TSPI SPI

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1. Preface

This application note describes sample software for the SPI Master control and Slave control functions 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
TSPI	Toshiba Serial Peripheral Interface
CRC	Cyclic Redundancy Check

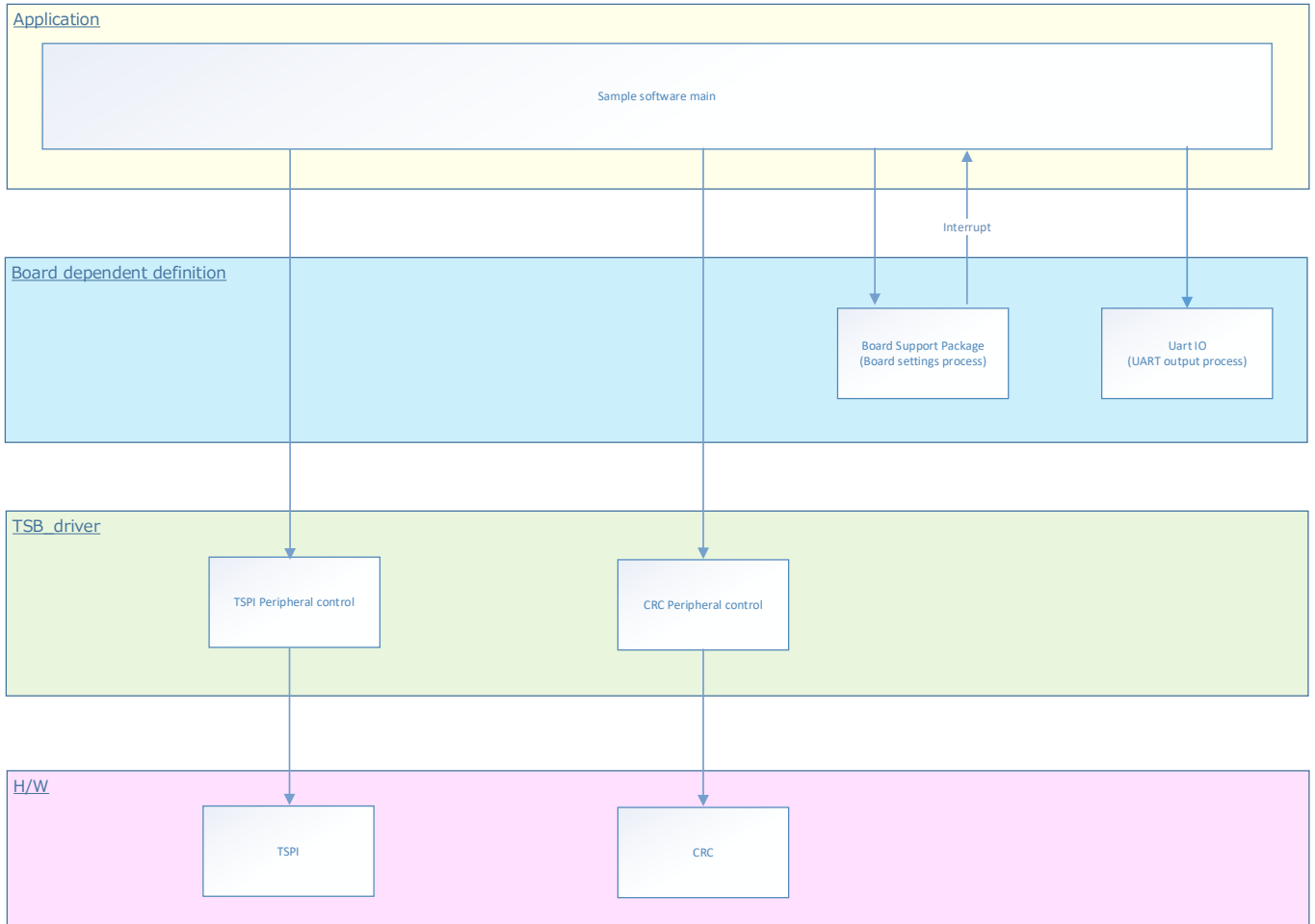
3. Reference Document

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_SPI	Sample program of TSPI_SPI function

5. Configuration Diagram



6. Sample Program : TSPI_SPI

This sample software is designed for data transfer by TSPI.

6.1. Outlines of Operation

Enter the valid command "send" from the terminal emulator and send the transfer data from BSP_TSPI_2. Receives the transfer data from BSP_TSPI_1 and outputs it 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_1	For Slave control. Used to receive transfer data
	BSP_TSPI_2	For Master control. Used for sending transfer data
UART	BSP_UART_1	For terminal emulator communication. Used for operation log output and command input

6.3. Interrupt to Use

Interrupt	Outlines
INTTORX	TSPI ch0 Receive interrupt
INTTOTX	TSPI ch0 Transmission interrupt
INTTOERR	TSPI ch0 Error interrupt
INTUARTORX	UART ch0 Receive interrupt for terminal emulator
INTUARTOTX	UART ch0 Transmission interrupt for terminal emulator
INTUARTOERR	UART ch0 Error interrupt for terminal emulator

6.4. Configuration

"main.c" configuration setting.

Configuration	Current Value	Description
Transfer data	"TOSHIBA"	TSPI transmission data. (Format): ASCII Code column
Max size of transfer data	255	Byte
Confirmation code	CRC16	-
Verification code error message	"Check Error"	Verification code error message. (Format): ASCII Code column

6.5. Example of Terminal Emulator Output

6.6. Normal Operation

```
command > send
CRC Code > 0xdfd8
CRC Check: OK
read data > TOSHIBA
```

6.6.1. Case of Error Occurrence

```
command > 12345
Command Error !!
command >
```

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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