Application Note

I2C_MASTER_SLAVE

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1. Preface

This application note describes the sample software of I2C_MASTER_SLAVE using Inter-Integrated Circuit (I2C). This document helps the user check operation of a product under development and develop its program.

2. Technical Term

Term/Abbreviation	Definition
I2C	Inter-Integrated Circuit
UART	Universal Asynchronous Receiver Transmitter

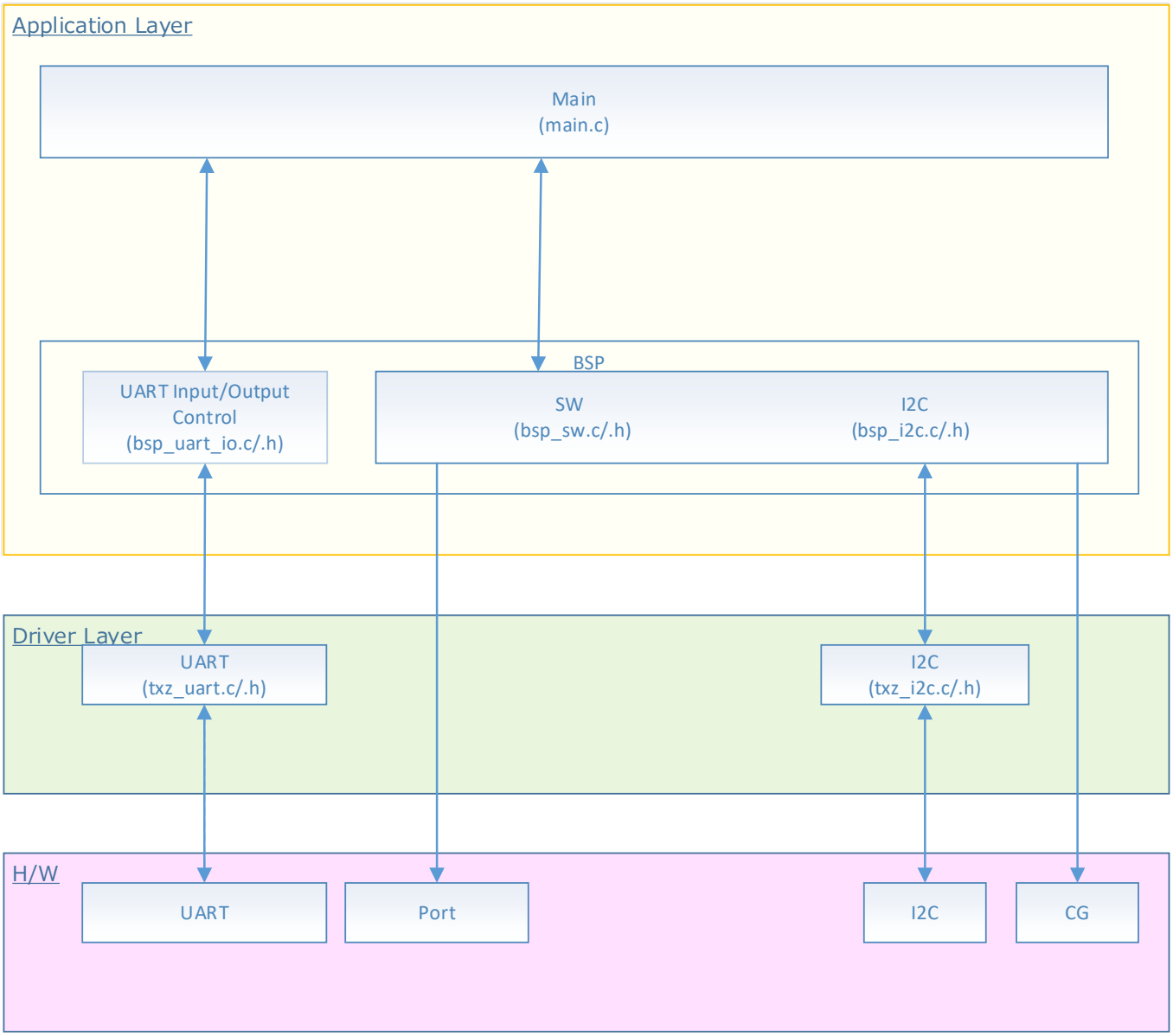
3. Reference Document

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
I2C_MASTER_SLAVE	Sample of I2C_MASTER_SLAVE

5. Configuration Diagram



6. Sample Program: I2C_MASTER_SLAVE

This sample program transmits data as Master and receives data as Slave using I2C function. And the received data is output on the terminal emulator.

6.1. Outlines of Operation

"command >" is displayed on the terminal emulator. MCU can execute I2C Master function or I2C Slave function using input characters according to the command format.
Switch from Master to Slave is done by a corresponding command. The command can be input when the I2C is in the Master mode.
* When a Master transmits more data than the data requested by a Slave, the Slave returns NACK.

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
I2C	BSP_I2C_0	Communication with I2C
UART	BSP_UART_0	Communication with the terminal emulator

6.3. Interrupt to Use

Interrupt	Outlines
I2C Interrupt	I2C interrupt
UART Interrupt	UART reception interrupt
	UART transmission interrupt
	UART ERROR interrupt

6.4. Configuration

Nothing.

6.5. Example of Terminal Emulator Output

6.5.1. Normal Operation

I2C Master operating side

```
I2C TEST - I2Cx
 ----------------
| I2C master mode |
 ----------------
command > write
master
sa      B0
tx[0] 00
tx[1] 01
tx[2] 02
tx[3] 03
command > read
master
sa      B0
tx[0] 00
tx[1] 01
rx[0] 80
rx[1] 81
command >
```

※x=CH number
Refer to MCU user guide for CH number.

I2C Slave operating side

```
I2C TEST - I2Cx
 ----------------
| I2C master mode |
 ----------------
command > slave
 ---------------
| I2C slave mode |
 ---------------
slave
sa      B0
rx[0] 00
rx[1] 01
rx[2] 02
rx[3] 03
slave
sa      B0
rx[0] 00
rx[1] 01
tx[0] 80
tx[1] 81
slave
sa      B0
```

※x=CH number
Refer to MCU user guide for CH number

6.5.2. Case of Error Occurrence

Nothing.

7. I2C Driver

7.1. List of Drivers

The I2C is controlled by using the following drivers.
For an example of use, refer to the source code.

Interface Name	Control Outlines
I2C_clear_int_status	Interrupt status is cleared.
I2C_disable_interrupt	Interrupt setting is invalidated
I2C_enable_interrupt	Interrupt setting is enabled
I2C_get_ack	Received ACK status is released.
I2C_get_clock_setting	I2C clock setting is released.
I2C_init	I2C register is initialized
I2C_int_status	Interrupt status.
I2C_master	Master status is released.
I2C_port_high	The high status of SDA or SCL is released.
I2C_read_data	Read form data buffer.
I2C_reset	I2C is reset.
I2C_restart	Restart condition is released.
I2C_set_ack	ACK condition is set.
I2C_set_address	Slave address is set.
I2C_slave_detected	Slave address is detected.
I2C_slave_init	Slave mode is set.
I2C_start_condition	Start condition is generated.
I2C_status_busy	Busy status is released.
I2C_stop_condition	Stop condition is generated.
I2C_transmitter	Whether Transmitter or not is released.
I2C_write_data	Write to data buffer.

8. Revision History

Revision	Date	Description
1.0	2021-10-29	First release

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