**8bit & 32bit**

**ABOV I2C API**

**User Guide**

Application Note

Version 1.00

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# Overview

This document describes the firmware for the ABOV\_I2C\_Driver.

It has the goal of helping the developer to understand how this firmware works, and how to tailor the application.

# Function block diagram

## I2C Master Mode

|  |
| --- |
| main.c    I2C IRQ |

## I2C Slave Mode

|  |
| --- |
| main.c    I2C IRQ |

# How to use in main application

## Public Macro

The macros on the left side are user specific.

Modification is required for the user application.

|  |  |
| --- | --- |
| #define I2C\_DEVICE\_ADDRESS 0xA0  #define I2C\_SLAVE\_OWN\_ADDR 0xA0  #define I2C\_SPEED 10000  #define I2C\_MAX\_BUFFER\_SIZE 20  #define I2C\_MAX\_CHANNEL 2  #define I2C\_CH0 0  #define I2C\_CH1 1 | #define I2C\_ACK\_DISABLE 0  #define I2C\_ACK\_ENABLE 1  #define I2C\_WRITE\_MODE 0  #define I2C\_READ\_MODE 1  #define I2C\_IDLE 0  #define I2C\_BUSY 1  #define I2C\_FALSE 0  #define I2C\_TRUE 1 |

## I2C Initialization

‘USI\_I2C\_Initial()’ function is required to use I2C functionality.

This function includes the following.

- Peri. Clock Enable / I2C Block Reset / I2C Interrupt Enable

- I2C Enable / I2C Ack Enable / Set Slave Own Address / Set I2C Speed / Set I2C Data Hold Time

|  |
| --- |
| [example of use]  USI\_I2C\_Initial(I2C\_CH0, I2C\_SPEED, I2C\_SLAVE\_OWN\_ADDR, I2C\_ACK\_ENABLE); |

## I2C Master – Write / Read

Using ‘USI\_I2C\_MasterTransferData()’ function, you can use both I2C Write and I2C Read functions.

This function includes the following parameter.

- I2C channel number / slave device address

- write data buffer / write data length / read data buffer / read data length

|  |
| --- |
| [example of use]  (case1) I2C Write 4-byte  🡪 USI\_I2C\_MasterTransferData(I2C\_CH0, I2C\_DEVICE\_ADDRESS, \*u8TxDat, 4, \*u8RxDat, 0);  (case2) I2C Read 4-byte  🡪 USI\_I2C\_MasterTransferData(I2C\_CH0, I2C\_DEVICE\_ADDRESS, \*u8TxDat, 0, \*u8RxDat, 4);  (case3) I2C Write 1-byte , Read 3-byte  🡪 USI\_I2C\_MasterTransferData(I2C\_CH0, I2C\_DEVICE\_ADDRESS, \*u8TxDat, 1, \*u8RxDat, 3);  (case4) I2C Write 3-byte , Read 1-byte  🡪 USI\_I2C\_MasterTransferData(I2C\_CH0, I2C\_DEVICE\_ADDRESS, \*u8TxDat, 3, \*u8RxDat, 1); |

## I2C Slave – Set Transmit Buffer

Using ‘USI\_I2C\_SetSlaveData()’ function, you can set transmit buffer data.

The buffer data can be modified by the user.

|  |
| --- |
| [example of use]  USI\_I2C\_SetSlaveData(I2C\_CH0); |

## Example of use in main application

This is example of use in main application.

|  |
| --- |
|  |

# How to port to other device

## Main (main.c)

1) Include header file 🡪 #include "ABOV\_USI\_I2C.h"

2) Call ‘USI\_I2C\_InterruptHandler()’ function at the I2C IRQ.

🡪 Example) void I2C0\_Handler(void){ USI\_I2C\_InterruptHandler(I2C\_CH0); }  
 void I2C1\_Handler(void){ USI\_I2C\_InterruptHandler(I2C\_CH1); }

3) Use functions as below in user application.

🡪 Example) USI\_I2C\_Initial(I2C\_CH0, I2C\_SPEED, I2C\_SLAVE\_OWN\_ADDR, I2C\_ACK\_ENABLE);  
 USI\_I2C\_MasterTransferData(I2C\_CH0, I2C\_DEVICE\_ADDRESS, \*u8TxDat, 4, \*u8RxDat, 0);  
 USI\_I2C\_SetSlaveData(I2C\_CH1);

## Header file (ABOV\_USI\_I2C.h)

It needs to change public typedef as below.

I2C Control Register and I2C Status Register may differ from product to product,

So the corresponding bits must be checked.

|  |
| --- |
|  |

## Source file (ABOV\_USI\_I2C.c)

1) Exchange device header file 🡪 #include "user\_device\_name.h"

2) Exchange name of register as below

- SCUCG relevant registers and their sub bits

- I2C relevant registers and their sub bits

- Interrupt relevant registers and their sub bits

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