

MT793X IoT SDK for I2C Master User Guide

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Version History

Version	Date	Description
1.0	2021-08-02	Official release





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1 I2C Master

1.1 Introduction

There are two I2C master channels in the MT793X with the same hardware architecture. I2C (Inter-Integrated Circuit) is a two-wire serial interface with two signals, SCL and SDA. SCL (Serial Clock Line) is a clock signal driven by the master, and SDA (Serial Data Line) is a bi-directional data signal that can be driven either by the master or by the slave. This generic controller supports the master role and conforms to the I2C specification.

1.2 Features

The main supported features of I2C master are as follows:

- I2C compliant master mode operation
- Adjustable clock speed for Fast-mode Plus
- 7-bit address
- Clock stretching feature
- START/STOP/repeated START conditions
- I2C_FIFO mode
- DMA transfer mode
- Multi-write per transfer
- Multi-read per transfer
- Multi-transfer per transaction
- Combined format transfer with length change capability
- Multi-transfer with repeated START condition



2 Driver Introduction

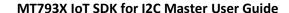
2.1 Driver API Reference

```
hal_i2c_status_t hal_i2c_master_init (hal_i2c_port_ti2c_port, hal_i2c_config_t*i2c_config)
                  This function initializes the I2C master before starting a transaction.
hal i2c status t hal i2c master deinit (hal i2c port t i2c port)
                  This function releases the I2C master after the transaction is over.
hal_i2c_status_t hal_i2c_master_set_frequency (hal_i2c_port_ti2c_port, hal_i2c_frequency_t frequency)
                  This function sets the transaction speed
hal_i2c_status_t hal_i2c_master_register_callback (hal_i2c_port_t i2c_port, hal_i2c_callback_t i2c_callback, void *user_data)
                  This function registers a callback function while using DMA mode
hal_i2c_status_t hal_i2c_master_send_polling (hal_i2c_port_t i2c_port, uint8_t slave_address, const uint8_t *data, uint32_t size)
                  This function sends data to I2C slave in polling mode
hal i2c status t hal i2c master send dma (hal i2c port ti2c port, uint8 t slave address, const uint8 t *data, uint32 t size)
                  This function sends data to I2C slave in DMA mode
hal_i2c_status_t hal_i2c_master_receive_polling (hal_i2c_port_ti2c_port, uint8_t slave_address, uint8_t *buffer, uint32_t size)
                  This function receives data from I2C slave in a polling mode
hal_i2c_status_t hal_i2c_master_receive_dma (hal_i2c_port_ti2c_port, uint8_t slave_address, uint8_t *buffer, uint32_t size)
                  This function receives data from I2C slave in a DMA mode
hal_i2c_status_t_hal_i2c_master_send_to_receive_polling (hal_i2c_port_ti2c_port_ti2c_port_ti2c_send_to_receive_config_t*i2c_send_to_receive_config)
                  This function sends data to and then receives data from I2C slave in a polling mode.
hal_i2c_status_t hal_i2c_master_send_to_receive_dma (hal_i2c_port_ti2c_port, hal_i2c_send_to_receive_config_t*i2c_send_to_receive_config)
                  This function sends data to and then receives data from I2C slave in a DMA mode.
hal_i2c_status_t hal_i2c_master_get_running_status (hal_i2c_port_t i2c_port, hal_i2c_running_status_t *running_status)
                  This function gets running status of the I2C master.
```

1.1. Sample Code

2.1.1 Using I2C Master Polling Mode

- . Step1: Call hal gpio init() to initialize the pin. For mode details about hal gpio init please refer to GPIO module in HAL.
- . Step2: Call hal pinmux set function() to set the GPIO pinmux or use the EPT tool to apply the pinmux settings
- Step3: Call hal_i2c_master_init() to initialize the I2C master.
- Step4: Call hal_i2c_master_send_polling() to send data in a polling mode.
- Step5: Call hal_i2c_master_receive_polling() to receive data in a polling mode
- Step6: Call hal_i2c_master_deinit() to de-allocate the I2C master if it is no longer in use.





2.1.2 Using I2C Master DMA Mode

- Step1: Call hal_gpio_init() to initialize the pin. For mode details about hal_gpio_init please refer to GPIO module in HAL.
- . Step2: Call hal_pinmux_set_function() to set the GPIO pinmux or use the EPT tool to apply the pinmux settings.
- · Step3: Call hal i2c master init() to initialize the I2C master.
- Step4: Call hal_i2c_master_register_callback() to register a user callback.
- Step5: Call hal_i2c_master_send_dma() to send data within a DMA mode.
- Step6: Call hal_i2c_master_receive_dma() to receive data in a DMA mode.
- Step7: Call hal_i2c_master_deinit() to de-initialize the I2C master if it is no longer in use.

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