MSPM0 I2C module introduction
—— MSPM0 peripheral training series

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MCU level overview

--- MSPM0Lxx series

**MSPM0L13x3/4/5/6**

- **CPU**
  - ARM Cortex-M0+
  - 32 MHz
  - NVIC / 3-ch DMA

- **On-chip Memory**
  - 8, 16, 32 or 64 kB flash
  - 2 or 4 kB SRAM

- **Data Integrity & Security**
  - CRC accelerator (16 and 32 bit)

- **Programming & Debug**
  - ARM SWD interface
  - ROM UART & I2C BSL

- **Power & Clocking**
  - POR / BOR / SVS
  - Internal LF 32kHz (5%)
  - Internal HF 4-32MHz (1%)

- **Communication**
  - UART w/ LIN (1)
  - UART (1)
  - SPI (1)
  - I2C (2) w/ FastMode+

- **IO**
  - Up to 28 GPIO
  - Up to 2 low I/O inputs

- **Timers**
  - General purpose 16-bit 2 CC (4)
  - Windowed watchdog

- **Precision Analog**
  - 12-bit SAR ADC 1Mips (1)
  - ULP/HS Comparator (1)
  - 8-bit reference DAC (1)
  - Zero-drift chopper op-amps (2)
  - General purpose amp (1)
  - Internal ADC reference (2.5%)
  - Temperature sensor

--- MSPM0Gxx series

**MSPM0G350x/310x/150x/110x**

- **CPU**
  - Arm Cortex-M0+
  - 80 MHz
  - NVIC / MPU / 7-ch DMA

- **Power & Clocking**
  - POR / BOR / SVS
  - External LF 32kHz XTAL
  - External HF 4-48MHz XTAL
  - Internal HF 32kHz (3%)
  - Internal HF 4-32MHz (1%)
  - PLL (up to 80 MHz)

- **Communication**
  - UART w/ LIN (1)
  - UART (3)
  - SPI (2)

- **IO**
  - Up to 60 GPIO

- **Accelerators**
  - Math (DIV, SQRT, TRIG, MAC)

- **Memory**
  - 32, 64, or 128 kB flash [ECC]
  - 16 or 32 kB SRAM [ECC]

- **Timers**
  - Advanced control 16-bit 4 CC (1)
  - Advanced control 16-bit 2 CC (1)

- **Data Integrity & Security**
  - CRC accelerator (16 and 32 bit)
  - AES256 accelerator + TRNG
  - CAN-FD (1)

- **Precision Analog**
  - 12-bit ADC 4Mips (9-ch)
  - 12-bit ADC 4Mips (8-ch)
  - Comparators w/ 8-bit DACs (3)
  - 12-bit 1Mips buffered DAC (1)
  - Zero-drift chopper op-amps (2)
  - Internal reference (1.5%)

- **Special Features**
  - General purpose amp (1)
  - Temperature sensor

**32 MHz MCU with up to 64kB flash, 32 pins, 12-bit ADC, dual zero-drift OPA/PGA, COMP**

**80 MHz MCU with up to 128kB flash, 64 pins, advanced analog, AES/TRNG, CAN-FD**
MSPM0 I2C module introduction

Key features

- Fast-mode Plus (Fm+) with a bit rate up to 1 Mbps
- Independent 8-byte FIFOs for reception and transmission
- Dual target address capability
- Controller operation with arbitration, clock synchronization, multiple controller support
- Hardware support for SMBus and PMBus
- Hardware support for DMA with separate channels for transmitting and receiving

Application note

The following minimum functional clock frequencies are required when running certain I2C clock speeds:

<table>
<thead>
<tr>
<th>Running mode</th>
<th>SCL Speed</th>
<th>I2C_CLK requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard mode</td>
<td>&lt;=100kHz</td>
<td>&gt;=2MHz</td>
</tr>
<tr>
<td>Fast mode</td>
<td>&lt;=400kHz</td>
<td>&gt;=8MHz</td>
</tr>
<tr>
<td>Fast mode plus</td>
<td>&lt;=1MHz</td>
<td>&gt;=20MHz</td>
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</tbody>
</table>

Fig1: I2C Typical Application

Fig2: MSPM0 I2C Block Diagram
I2C module quick start

**Academy**
- I2C introduction lab

**Driverlib Examples**
- i2c_controller_rw_multibyte_fifo_interrufts
- i2c_controller_rw_multibyte_fifo_poll
- i2c_controller_target_dynamic_switching
- i2c_multiconroller_arbitration
- i2c_target_rw_multibyte_fifo_interrufts
- i2c_target_rw_multibyte_fifo_interrufts_stop
- i2c_target_rw_multibyte_fifo_poll

**Related links**
- MSPM0 online resource
- MSPM0 quick start guide
- MSPM0 Sysconfig user’s guide
- MSPM0G350x datasheet
- MSPM0L13xx datasheet
- MSPM0Gxx technical reference manual
- MSPM0Lxx technical reference manual

**Launchpad**
- LP-MSPM0G3507
- LP-MSPM0L1306

**Sysconfig entrance for I2C setting**

**Step1:**
- COMUNICATIONS
  - I2C

**Step2:**
- Quick Profiles
  - Basic Configuration
  - Advanced Configuration
  - Interrupt Configuration
  - DMA Configuration
  - PinMax Peripheral and Pin Configuration
  - Other Dependencies
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