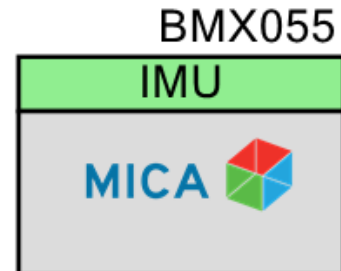


Features

- 12 Bit Accelerometer
- 16 Bit Gyroscope
- Geo-Magnetic sensor



General Description

The BMX055 component provides an API implementation for dealing with the Bosch Sensortec BMX055 IMU. The current implementation is for I2C only, although SPI is also supported by the chip. Additionally, the I2C address are not dynamic at this point.

Input/Output Connections

The BMX055 component is a software only API and contains no I/O connections

Component Parameters

Double click on the BMX055 component to open the Configure dialog.

Basic

I2C Include File

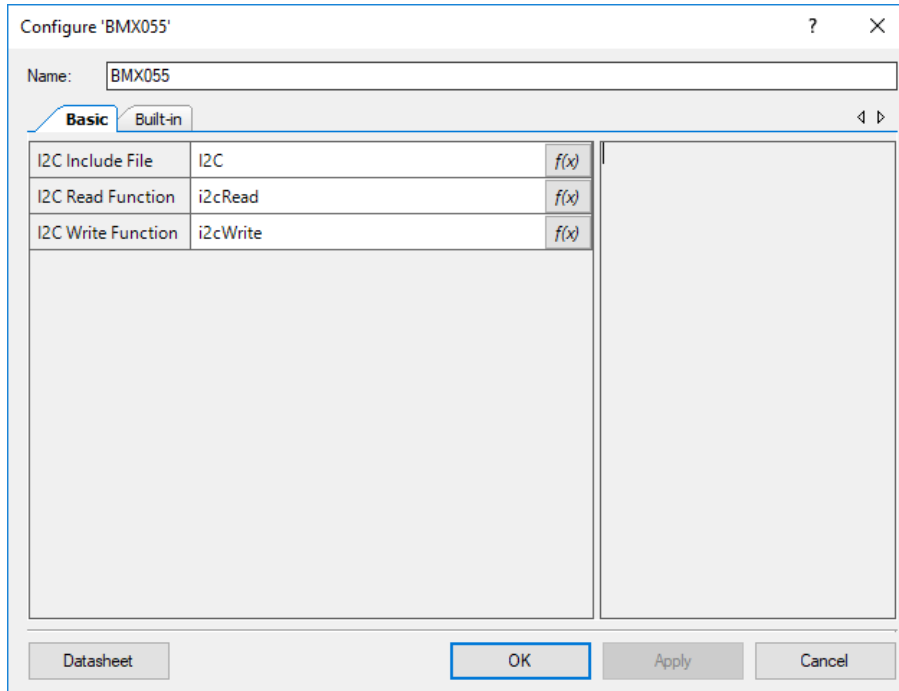
Name of the header file (excluding ".h") that contains the declaration for the I2C Transport function

I2C Read Function

Name of the function that reads data from the device. Must have a signature `uint32 `i2cReadFunction`(uint8 deviceAddr, uint8 regAddr, uint8 * readVal)`.

I2C Write Function

Name of the function that writes data to the device. Must have a signature `uint32 `i2cWriteFunction`(uint8 deviceAddr, uint8 regAddr, uint8 val)`.



Application Programming Interface (API)

API routines allows users to control the BMX055 from software. The default name for the component is "BMX055", which can be changed in the configure dialogue. All functions and constants are generated based on this name.

Functions

Function	Description
BMX055_Start()	Start the IMU (Acc, Gyr, Mag)
BMX055_Stop()	Disable the IMU (Acc, Gyr, Mag)
BMX055_Sleep()	Put the IMU (Acc, Gyr, Mag) to sleep
BMX055_Wakeup()	Wakeup all of the IMU (Acc, Gyr, Mag)
BMX055_SetParameters()	Writes the parameters out to the device specified
BMX055_GetDeviceState()	Get the value of the power state for a device



BMX055_Acc_Start()	Start the Accelerometer
BMX055_Acc_Stop()	Stop the Accelerometer
BMX055_Acc_Sleep()	Put the Accelerometer into the specified sleep mode
BMX055_Acc_Wakeup()	Wakeup the Accelerometer
BMX055_Acc_Read()	Read the value of the Accelerometer
BMX055_Gyr_Start()	Start the Gyroscope
BMX055_Gyr_Stop()	Stop the Gyroscope
BMX055_Gyr_Sleep()	Put the Gyroscope to sleep
BMX055_Gyr_Wakeup()	Wakeup the Gyroscope
BMX055_Gyr_Read()	Read the value of the Gyroscope
BMX055_Mag_Start()	Start the Magnetometer
BMX055_Mag_Stop()	Stop the Magnetometer
BMX055_Mag_Sleep()	Put the Magnetometer into the specified sleep mode
BMX055_Mag_Wakeup()	Wakeup the Magnetometer
BMX055_Mag_Read()	Read the value of Magnetometer

uint32 BMX055_Start(void)

Description: Starts all three devices (Acc, GYR, and MAG). **Currently not implemented.**

Return Value: An error code with the result of the start procedure. Possible errors:
BMX055_ERR_OK



uint32 BMX055_Stop(void)

Description: Stops all three devices (Acc, GYR, and MAG). **Currently not implemented.**

Return Value: An error code with the result of the stop procedure. Possible errors:
BMX055_ERR_OK

uint32 BMX055_Sleep(void)

Description: Sets all three devices (Acc, GYR, and MAG) into sleep mode. **Currently not implemented.**

Return Value: An error code with the result of the Sleep procedure. Possible errors:
BMX055_ERR_OK

uint32 BMX055_Wakeup(void)

Description: Wakes up all three devices (Acc, GYR, and MAG) into from mode. **Currently not implemented.**

Return Value: An error code with the result of the wakeup procedure. Possible errors:
BMX055_ERR_OK

uint32 BMX055_SetParameters(uint8 deviceAddr, uint8 numParams, uint8* sensorParams)

Description: Writes the parameters out to the device specified

Parameter

deviceAddr: Address of the device in question, values are BMX055_ACC_ADDR, BMX055_GYR_ADDR, BMX055_MAG_ADDR

numParams: Number of parameters to be written to the device. The array sensor params should be double this length as each parameter is in the format (address, value)

sensorParams: An array containing the parameters. (address, value)



Return Value: An error code with the result of the write procedure. Possible errors:
BMX055_ERR_OK, BMX055_ERR_DEVICE_UNKNOWN, or an error from the I2C write function.

uint32 BMX055_GetDeviceState(uint8 deviceAddr, uint8 * returnState)

Description: Allows the user to get the power state for any of the three devices

Parameter **deviceAddr:** Address of the device to query
returnState: Pointer to place result into.

Return Value: An error code with the result of the get State procedure. Possible errors:
BMX055_ERR_OK, BMX055_ERR_DEVICE_UNKNOWN

uint32 BMX055_Acc_Start (void)

Description: Initializes the Accelerometer. Meant to be a one time initialization / reset. Use BMX055_Acc_Wakeup if the sensor needs to be woken up from sleep. *CURRENTLY NOT IMPLEMENTED*

Return Value: An error code with the result of the Start procedure. Possible errors:
BMX055_ERR_OK

uint32 BMX055_Acc_Stop(void)

Description: Shuts down the Accelerometer completely. Disables all interrupts. Use BMX055_Acc_Sleep if interrupts should be maintained. *CURRENTLY NOT IMPLEMENTED*

Return Value: An error code with the result of the Stop procedure. Possible errors:
BMX055_ERR_OK

uint32 BMX055_Acc_Sleep(uint8 powerMode)

Description: Puts the Accelerometer into the low power mode specified. *Limit implementation*



Parameter	powerMode: The next power mode the device will enter
Return Value:	An error code with the result of the Sleep procedure. Possible errors: BMX055_ERR_OK, BMX055_ERR_MODE_INVALID, BMX055_ERR_MODE_UNKNOWN

uint32 BMX055_Acc_Wakeup(void)

Description:	Wakes the Accelerometer up from sleep. *CURRENTLY NOT IMPLEMENTED*
Return Value:	An error code with the result of the Wakeup procedure. BMX055_ERR_OK

uint32 BMX055_Acc_Read(uint16* dataArray, uint8 sensorChannels)

Description:	Reads the specified channels of the Accelerometer. Places result into the dataArray
Parameter	dataArray: Pointer to array to place the data into. sensorChannels: A bit mask of the channels to sample
Return Value:	An error code with the result of the get Read procedure. Possible errors: BMX055_ERR_OK, BMX055_ERR_CHANNELS_NONE

uint32 BMX055_Gyr_Start (void)

Description:	Initializes the Gyroscope. Meant to be a one time initialization / reset. Use BMX055_Gyr_Wakeup if the sensor needs to be woken up from sleep. *CURRENTLY NOT IMPLEMENTED*
Return Value:	An error code with the result of the Start procedure. Possible errors: BMX055_ERR_OK



uint32 BMX055_Gyr_Stop(void)

- Description:** Shuts down the Accelerometer completely. Disables are interrupts. Use BMX055_Gyr_Sleep if interrupts should be maintained.
CURRENTLY NOT IMPLEMENTED
- Return Value:** An error code with the result of the Stop procedure. Possible errors:
BMX055_ERR_OK

uint32 BMX055_Gyr_Sleep(uint8 powerMode)

- Description:** Puts the Gyroscope into the low power mode specified. *Limit implementation*
- Parameter** **powerMode:** The next power mode the device will enter
- Return Value:** An error code with the result of the Sleep procedure. Possible errors:
BMX055_ERR_OK, BMX055_ERR_MODE_INVALID,
BMX055_ERR_MODE_UNKNOWN

uint32 BMX055_Gyr_Wakeup(void)

- Description:** Wakes the Gyroscope up from sleep. *CURRENTLY NOT IMPLEMENTED*
- Return Value:** An error code with the result of the Wakeup procedure.
BMX055_ERR_OK

uint32 BMX055_Gyr_Read(uint16* dataArray, uint8 sensorChannels)

- Description:** Reads the specified channels of the Gyroscope. Places result into the dataArray
- Parameter** **dataArray:** Pointer to array to place the data into.
sensorChannels: A bit mask of the channels to sample
- Return Value:** An error code with the result of the get Read procedure. Possible errors:
BMX055_ERR_OK, BMX055_ERR_CHANNELS_NONE



uint32 BMX055_Mag_Start (void)

- Description:** Initializes the Magnetometer. Meant to be a one time initialization / reset. Use BMX055_Mag_Wakeup if the sensor needs to be woken up from sleep. *CURRENTLY NOT IMPLEMENTED*
- Return Value:** An error code with the result of the Start procedure. Possible errors:
BMX055_ERR_OK

uint32 BMX055_Mag_Stop(void)

- Description:** Shuts down the Accelerometer completely. Disables all interrupts. Use BMX055_Mag_Sleep if interrupts should be maintained. *CURRENTLY NOT IMPLEMENTED*
- Return Value:** An error code with the result of the Stop procedure. Possible errors:
BMX055_ERR_OK

uint32 BMX055_Mag_Sleep(uint8 powerMode)

- Description:** Puts the Magnetometer into the low power mode specified. *Limit implementation*
- Parameter** **powerMode:** The next power mode the device will enter
- Return Value:** An error code with the result of the Sleep procedure. Possible errors:
BMX055_ERR_OK, BMX055_ERR_MODE_INVALID,
BMX055_ERR_MODE_UNKNOWN

uint32 BMX055_Mag_Wakeup(void)

- Description:** Wakes the Magnetometer up from sleep. *CURRENTLY NOT IMPLEMENTED*
- Return Value:** An error code with the result of the Wakeup procedure.
BMX055_ERR_OK



uint32 BMX055_Mag_Read(uint16* dataArray, uint8 sensorChannels)

Description:	Reads the specified channels of the Magnetometer. Places result into the dataArray
Parameter	dataArray: Pointer to array to place the data into. sensorChannels: A bit mask of the channels to sample
Return Value:	An error code with the result of the get Read procedure. Possible errors: BMX055_ERR_OK, BMX055_ERR_CHANNELS_NONE

Component Macros

The following is a list of macros/constants that a user may find useful for interacting with the component. A component may contain macros not listed here.

Macro Name	Description
BMX055_PARAM_BYTE_LEN	Number of bytes contained in a dynamic param for a sensor (address & value)
BMX055_CHANNEL_INDEX_X	Index of the X Channel
BMX055_CHANNEL_INDEX_Y	Index of the Y Channel
BMX055_CHANNEL_INDEX_Z	Index of the Z Channel
BMX055_CHANNEL_INDEX_NUM_CHAN	Index of the number of channels that data was collected from
BMX055_CHANNEL_INDEX_DATA	Index of the start of data when reported by a sensor
BMX055_CHANNEL_MASK_X	Mask of the X channel
BMX055_CHANNEL_MASK_Y	Mask of the Y channel
BMX055_CHANNEL_MASK_Z	Mask of the Z channel
BMX055_ACC_PM_NORMAL	Accelerometer Power Mode - Normal



BMX055_ACC_PM_STANDBY	Accelerometer Power Mode - Standby
BMX055_ACC_PM_LP1	Accelerometer Power Mode – Low Power 1
BMX055_ACC_PM_LP2	Accelerometer Power Mode – Low Power 2
BMX055_ACC_PM_SUSPEND	Accelerometer Power Mode - Suspend
BMX055_ACC_PM_DEEP_SUSPEND	Accelerometer Power Mode – Deep Suspend
BMX055_GYR_PM_NORMAL	Gyroscope Power Mode - Normal
BMX055_GYR_PM_FAST_POWERUP	Gyroscope Power Mode – Fast powerup
BMX055_GYR_PM_SUSPEND	Gyroscope Power Mode - Suspend
BMX055_GYR_PM_DEEP_SUSPEND	Gyroscope Power Mode – Deep Suspend
BMX055_MAG_PM_SUSPEND	Magnetometer Power Mode - Suspend
BMX055_MAG_PM_SLEEP	Magnetometer Power Mode - Sleep
BMX055_MAG_PM_NORMAL	Magnetometer Power Mode - Normal
BMX055_MAG_PM_FORCED	Magnetometer Power Mode - Forced



Change Log

This sections lists changes to the component from previous versions

Version	Revision	Description of Changes	Reason for Changes / Impact
v1.0	ro	Initial implementation of the component and datasheet	

