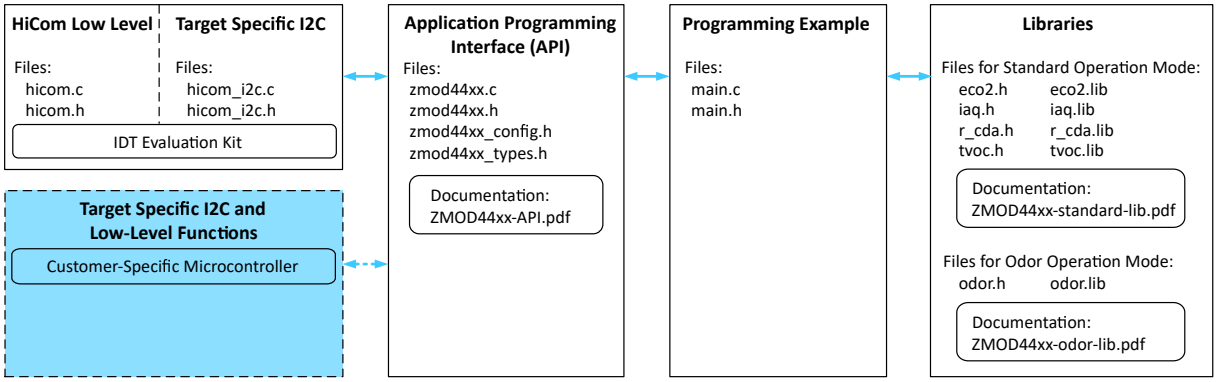
ZMOD44xx-API Documentation

Contents

Chapter 1

ZMOD44xx Application Programming Interface Overview

This document refers to the IDT document *ZMOD4410 Programming Manual - Read Me*. The figure below shows an overview of the ZMOD44xx API, programming example and libraries. Custom microcontrollers can be used to establish I2C communication. Using the user's own microcontroller requires implementing the user's own target-specific I2C and low-level functions (highlighted in light blue). The following describes in detail the Application Programming Interface (API) of the ZMOD44xx.



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5.1 Gas sensor IDs

Macros

- #define **ZMOD4410_PID** (0x2310)

5.1.1 Detailed Description

The gas sensor product IDs.

5.2 Error codes

Macros

- #define ERROR_INIT_OUT_OF_RANGE (1)
- #define ERROR_GAS_TIMEOUT (2)
- #define ERROR_I2C (3)
- #define ERROR_SENSOR_UNSUPPORTED (4)
- #define ERROR_CONFIG_MISSING (5)
- #define ERROR_SENSOR (6)

5.2.1 Detailed Description

The gas sensor and API error codes.

5.2.2 Macro Definition Documentation

5.2.2.1 #define ERROR_CONFIG_MISSING (5)

There is no pointer to a valid configuration.

5.2.2.2 #define ERROR_GAS_TIMEOUT (2)

The operation took too long.

5.2.2.3 #define ERROR_I2C (3)

Failure in i2c communication.

5.2.2.4 #define ERROR_INIT_OUT_OF_RANGE (1)

The initialize value is out of range.

5.2.2.5 #define ERROR_SENSOR (6)

Sensor malfunction.

5.2.2.6 #define ERROR_SENSOR_UNSUPPORTED (4)

Sensor is not supported with this firmware.

Chapter 6

Data Structure Documentation

6.1 zmod44xx_conf Struct Reference

Structure to hold the gas sensor module configuration.

`#include <zmod44xx_types.h>`

Data Fields

- char **name** [ZMOD44XX_NAME_LEN]
- uint8_t **start**
- zmod44xx_conf_str **h**
- zmod44xx_conf_str **d**
- zmod44xx_conf_str **m**
- zmod44xx_conf_str **s**
- zmod44xx_conf_str **r**

6.1.1 Detailed Description

Structure to hold the gas sensor module configuration.

The documentation for this struct was generated from the following file:

- zmod44xx_types.h

6.2 zmod44xx_conf_str Struct Reference

A single data set for the configuration.

`#include <zmod44xx_types.h>`

Data Fields

- uint8_t **addr**
- uint8_t **len**
- uint8_t * **data**

6.2.1 Detailed Description

A single data set for the configuration.

The documentation for this struct was generated from the following file:

- zmod44xx_types.h

6.3 zmod44xx_dev_t Struct Reference

Device structure ZMOD44xx.

```
#include <zmod44xx_types.h>
```

Data Fields

- uint8_t i2c_addr
- uint16_t pid
- uint8_t config [6]
- uint16_t mox_lr
- uint16_t mox_er
- zmod44xx_i2c_ptr_t read
- zmod44xx_i2c_ptr_t write
- zmod44xx_delay_ptr_p delay_ms

6.3.1 Detailed Description

Device structure ZMOD44xx.

6.3.2 Field Documentation

6.3.2.1 uint8_t config[6]

configuration parameter set

6.3.2.2 zmod44xx_delay_ptr_p delay_ms

function pointer to delay function

6.3.2.3 uint8_t i2c_addr

i2c address of the sensor

6.3.2.4 uint16_t mox_er

sensor specific parameter

6.3.2.5 uint16_t mox_lr

sensor specific parameter

6.3.2.6 uint16_t pid

product id of the sensor

6.3.2.7 zmod44xx_i2c_ptr_t read

function pointer to i2c read

6.3.2.8 zmod44xx_i2c_ptr_t write

function pointer to i2c write

The documentation for this struct was generated from the following file:

- zmod44xx_types.h

Chapter 7

File Documentation

7.1 zmod44xx.c File Reference

ZMOD44xx functions.

```
#include "zmod44xx.h"
```

Functions

- int8_t zmod44xx_read_sensor_info (zmod44xx_dev_t *dev)
  Read sensor parameter.
- int8_t zmod44xx_init_sensor (zmod44xx_dev_t *dev)
  Initialize the sensor after power on.
- int8_t zmod44xx_init_measurement (zmod44xx_dev_t *dev)
  Initialize the sensor for IAQ, TVOC, eCO2 and Odor measurement.
- int8_t zmod44xx_start_measurement (zmod44xx_dev_t *dev)
  Start the measurement.
- int8_t zmod44xx_read_status (zmod44xx_dev_t *dev, uint8_t *status)
  Read the status of the device.
- int8_t zmod44xx_read_rmox (zmod44xx_dev_t *dev, float *rmox)
  Read adc values from sensor and calculate RMOX.

7.1.1 Detailed Description

ZMOD44xx functions.

Version

1.0.2

Date

2018-05-17

Author

IDT

7.1.2 Function Documentation

7.1.2.1 int8_t zmod44xx_init_measurement (zmod44xx_dev_t * *dev*)

Initialize the sensor for IAQ, TVOC, eCO2 and Odor measurement.

Parameters

in	*dev*	pointer to the device

Returns

error code

Return values

0	success
!= 0	error

7.1.2.2 int8_t zmod44xx_init_sensor (zmod44xx_dev_t * *dev*)

Initialize the sensor after power on.

Parameters

in	*dev*	pointer to the device

Returns

error code

Return values

0	success
!= 0	error

7.1.2.3 int8_t zmod44xx_read_rmox (zmod44xx_dev_t * *dev,* float * *rmox*)

Read adc values from sensor and calculate RMOX.

Parameters

in	*dev*	pointer to the device
in,out	*rmox*	pointer to the resulting Rmox value

Returns

error code

Return values

0	success
!= 0	error

7.1.2.4 int8_t zmod44xx_read_sensor_info (zmod44xx_dev_t * *dev*)

Read sensor parameter.

Parameters

in	*dev*	pointer to the device

Returns

error code

Return values

0	success
!= 0	error

Note

This function must be called once before running other sensor functions.

7.1.2.5 int8_t zmod44xx_read_status (zmod44xx_dev_t * *dev,* uint8_t * *status*)

Read the status of the device.

Parameters

in	*dev*	pointer to the device
in,out	*status*	pointer to the status variable

Returns

error code

Return values

0	success
!= 0	error

7.1.2.6 int8_t zmod44xx_start_measurement (zmod44xx_dev_t * *dev*)

Start the measurement.

Parameters

in	*dev*	pointer to the device

Returns

error code

Return values

0	success
!= 0	error

7.2 zmod44xx.h File Reference

ZMOD44xx functions.

```
#include "zmod44xx_config.h"
#include "zmod44xx_types.h"
```

Macros

- #define **ZMOD4410_I2C_ADDRESS** (0x32)
- #define **ZMOD44XX_ADDR_PID** (0x00)
- #define **ZMOD44XX_ADDR_CONF** (0x20)
- #define **ZMOD44XX_ADDR_CMD** (0x93)
- #define **ZMOD44XX_ADDR_STATUS** (0x94)
- #define **ZMOD44XX_LEN_PID** (2)
- #define **ZMOD44XX_LEN_CONF** (6)

Functions

- int8_t zmod44xx_read_sensor_info (zmod44xx_dev_t *dev)

  Read sensor parameter.
- int8_t zmod44xx_init_sensor (zmod44xx_dev_t *dev)

  Initialize the sensor after power on.
- int8_t zmod44xx_init_measurement (zmod44xx_dev_t *dev)

  Initialize the sensor for IAQ, TVOC, eCO2 and Odor measurement.
- int8_t zmod44xx_start_measurement (zmod44xx_dev_t *dev)

  Start the measurement.
- int8_t zmod44xx_read_status (zmod44xx_dev_t *dev, uint8_t *status)

  Read the status of the device.
- int8_t zmod44xx_read_rmox (zmod44xx_dev_t *dev, float *rmox)

  Read adc values from sensor and calculate RMOX.

7.2.1 Detailed Description

ZMOD44xx functions.

Version

1.0.2

Date

2018-05-17

Author

IDT

7.2.2 Function Documentation

7.2.2.1 int8_t zmod44xx_init_measurement (zmod44xx_dev_t * *dev*)

Initialize the sensor for IAQ, TVOC, eCO2 and Odor measurement.

Parameters

in	*dev*	pointer to the device

Returns

error code

Return values

0	success
!= 0	error

7.2.2.2 int8_t zmod44xx_init_sensor (zmod44xx_dev_t * *dev*)

Initialize the sensor after power on.

Parameters

in	*dev*	pointer to the device

Returns

error code

Return values

0	success
!= 0	error

7.2.2.3 int8_t zmod44xx_read_rmox (zmod44xx_dev_t * *dev*, float * *rmox*)

Read adc values from sensor and calculate RMOX.

Parameters

in	*dev*	pointer to the device
in,out	*rmox*	pointer to the resulting Rmox value

Returns

error code

Return values

0	success
!= 0	error

7.2.2.4 int8_t zmod44xx_read_sensor_info (zmod44xx_dev_t * *dev*)

Read sensor parameter.

Parameters

in	*dev*	pointer to the device

Returns

error code

Return values

0	success
!= 0	error

Note

This function must be called once before running other sensor functions.

7.2.2.5 int8_t zmod44xx_read_status (zmod44xx_dev_t * *dev*, uint8_t * *status*)

Read the status of the device.

Parameters

in	*dev*	pointer to the device
in, out	*status*	pointer to the status variable

Returns

error code

Return values

0	success
!= 0	error

7.2.2.6 int8_t zmod44xx_start_measurement (zmod44xx_dev_t * *dev*)

Start the measurement.

Parameters

in	*dev*	pointer to the device

Returns

error code

Return values

0	success
!= 0	error

7.3 zmod44xx_config.h File Reference

ZMOD44xx configuration.

```
#include <stdint.h>
#include "zmod44xx_types.h"
```

7.3.1 Detailed Description

ZMOD44xx configuration.

Version

1.0.2

Date

2018-05-25

Author

IDT

7.4 zmod44xx_types.h File Reference

ZMOD44xx types.

```
#include <stdint.h>
```

Data Structures

- struct zmod44xx_dev_t

  Device structure ZMOD44xx.
- struct zmod44xx_conf_str

  A single data set for the configuration.
- struct zmod44xx_conf

  Structure to hold the gas sensor module configuration.

Macros

- #define **ZMOD4410_PID** (0x2310)
- #define ZMOD44XX_OK (0)
- #define ERROR_INIT_OUT_OF_RANGE (1)
- #define ERROR_GAS_TIMEOUT (2)
- #define ERROR_I2C (3)
- #define ERROR_SENSOR_UNSUPPORTED (4)
- #define ERROR_CONFIG_MISSING (5)
- #define ERROR_SENSOR (6)
- #define **ZMOD44XX_NAME_LEN** (5)

Typedefs

- typedef int8_t(∗ zmod44xx_i2c_ptr_t) (uint8_t addr, uint8_t reg_addr, uint8_t ∗data, uint8_t len)

  function pointer type for i2c access
- typedef void(∗ zmod44xx_delay_ptr_p) (uint32_t ms)

  function pointer to hardware dependent delay function

7.4.1 Detailed Description

ZMOD44xx types.

Version

1.0.2

Date

2018-05-17

Author

IDT

7.4.2 Macro Definition Documentation

7.4.2.1 #define ZMOD44XX_OK (0)

Return value if no fault has been found.