HMC5883L Driver

0.0.3

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Chapter 1

HMC5883L Driver Component

This is a driver component for HMC5883L magnetometer.

The sensor's datasheet can be found here.

1.1 Installation

No installation instructions available at the moment.

1.2 Getting Started

No instructions available at the moment

1.3 Next versions updates & fixes

- Single mode
- Status Register usage

Chapter 2

Todo List

Global hmc5883l_fs_t

rename

Global hmc5883l_measurement_mode_t

rename

Global hmc5883l_mode_t

rename

Chapter 3

Data Structure Index

3.1 Data Structures

Here are the data structures with brief descriptions:

hmc5883l_config_t
: Used to full configurate the sensor with an unique structure 9

hmc5883l_dev_t 10

mag_field_raw_t
: Rappresents the raw values read by the sensor 11

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: Rappresents the values read by the sensor adjusted with the configured gain 12

Chapter 4

File Index

4.1 File List

Here is a list of all files with brief descriptions:

hmc5883l.c 13
include/hmc5883l.h
Driver library of the sensor HMC5883L 18

Chapter 5

Data Structure Documentation

5.1 hmc5883l_config_t Struct Reference

Used to full configurate the sensor with an unique structure.

`#include <hmc5883l.h>`

Data Fields

- hmc5883l_sample_avg_t samples_avg
- hmc5883l_output_rate_t output_rate
- hmc5883l_measurement_mode_t m_mode
- hmc5883l_fs_t gain
- hmc5883l_highspeed_t hs
- hmc5883l_mode_t mode

5.1.1 Detailed Description

Used to full configurate the sensor with an unique structure.

5.1.2 Field Documentation

5.1.2.1 gain

`hmc5883l_fs_t hmc5883l_config_t::gain`

5.1.2.2 hs

```
hmc5883l_highspeed_t hmc5883l_config_t::hs
```

5.1.2.3 m_mode

```
hmc5883l_measurement_mode_t hmc5883l_config_t::m_mode
```

5.1.2.4 mode

```
hmc5883l_mode_t hmc5883l_config_t::mode
```

5.1.2.5 output_rate

```
hmc5883l_output_rate_t hmc5883l_config_t::output_rate
```

5.1.2.6 samples_avg

```
hmc5883l_sample_avg_t hmc5883l_config_t::samples_avg
```

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

- include/hmc5883l.h

5.2 hmc5883l_dev_t Struct Reference

Data Fields

- i2c_port_t bus
- uint16_t dev_addr

5.2.1 Field Documentation

5.2.1.1 bus

```
i2c_port_t hmc5883l_dev_t::bus
```

5.2.1.2 dev_addr

```
uint16_t hmc5883l_dev_t::dev_addr
```

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

- hmc5883l.c

5.3 mag_field_raw_t Struct Reference

Rappresents the raw values read by the sensor.

```
#include <hmc5883l.h>
```

Data Fields

- int16_t raw_x
- int16_t raw_y
- int16_t raw_z

5.3.1 Detailed Description

Rappresents the raw values read by the sensor.

5.3.2 Field Documentation

5.3.2.1 raw_x

```
int16_t mag_field_raw_t::raw_x
```

5.3.2.2 raw_y

```
int16_t mag_field_raw_t::raw_y
```

5.3.2.3 raw_z

```
int16_t mag_field_raw_t::raw_z
```

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

- include/hmc5883l.h

5.4 mag_field_t Struct Reference

Rappresents the values read by the sensor adjusted with the configured gain.

```
#include <hmc5883l.h>
```

Data Fields

- float x
- float y
- float z

5.4.1 Detailed Description

Rappresents the values read by the sensor adjusted with the configured gain.

5.4.2 Field Documentation

5.4.2.1 x

```
float mag_field_t::x
```

5.4.2.2 y

```
float mag_field_t::y
```

5.4.2.3 z

```
float mag_field_t::z
```

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

- include/hmc5883l.h

Chapter 6

File Documentation

6.1 hmc5883l.c File Reference

```
#include "esp_system.h"
#include "driver/i2c.h"
#include <esp_log.h>
#include "hmc5883l.h"
```

Data Structures

- struct hmc5883l_dev_t

Macros

- #define HMC5883L_CONFIG_A_REG 0x00
- #define HMC5883L_CONFIG_B_REG 0x01
- #define HMC5883L_MODE_REG 0x02
- #define HMC5883L_DATA_X_REG_0 0x03
- #define HMC5883L_DATA_X_REG_1 0x04
- #define HMC5883L_DATA_Z_REG_0 0x05
- #define HMC5883L_DATA_Z_REG_1 0x06
- #define HMC5883L_DATA_Y_REG_0 0x07
- #define HMC5883L_DATA_Y_REG_1 0x08
- #define HMC5883L_STATUS_REG 0x09
- #define HMC5883L_IDA_REG 0x0A
- #define HMC5883L_IDB_REG 0x0B
- #define HMC5883L_IDC_REG 0x0C

Functions

- hmc5883l_handle_t hmc5883l_create (i2c_port_t port, uint16_t addr)

  Create a sensor handler given the I2C port and sensor address.
- esp_err_t hmc5883l_delete (hmc5883l_handle_t sensor)

  Delete the given handler.
- esp_err_t hmc5883l_config (hmc5883l_handle_t sensor, const hmc5883l_config_t cfg)

  Apply to the given sensor a specific configuration.
- esp_err_t hmc5883l_get_gain (hmc5883l_handle_t sensor, uint16_t *gain)

  Retrieve the configured gain value.
- esp_err_t hmc5883l_get_raw_mag_field (hmc5883l_handle_t sensor, mag_field_raw_t *mag)

  Retrieve the raw readings of the sensor.
- esp_err_t hmc5883l_get_mag_field (hmc5883l_handle_t sensor, mag_field_t *mag)

  Retrieve the readings of the sensor adjusted according to current gain.

6.1.1 Macro Definition Documentation

6.1.1.1 HMC5883L_CONFIG_A_REG

```
#define HMC5883L_CONFIG_A_REG 0x00
```

6.1.1.2 HMC5883L_CONFIG_B_REG

```
#define HMC5883L_CONFIG_B_REG 0x01
```

6.1.1.3 HMC5883L_DATA_X_REG_0

```
#define HMC5883L_DATA_X_REG_0 0x03
```

6.1.1.4 HMC5883L_DATA_X_REG_1

```
#define HMC5883L_DATA_X_REG_1 0x04
```

6.1.1.5 HMC5883L_DATA_Y_REG_0

```
#define HMC5883L_DATA_Y_REG_0 0x07
```

6.1.1.6 HMC5883L_DATA_Y_REG_1

```
#define HMC5883L_DATA_Y_REG_1 0x08
```

6.1.1.7 HMC5883L_DATA_Z_REG_0

```
#define HMC5883L_DATA_Z_REG_0 0x05
```

6.1.1.8 HMC5883L_DATA_Z_REG_1

```
#define HMC5883L_DATA_Z_REG_1 0x06
```

6.1.1.9 HMC5883L_IDA_REG

```
#define HMC5883L_IDA_REG 0x0A
```

6.1.1.10 HMC5883L_IDB_REG

```
#define HMC5883L_IDB_REG 0x0B
```

6.1.1.11 HMC5883L_IDC_REG

```
#define HMC5883L_IDC_REG 0x0C
```

6.1.1.12 HMC5883L_MODE_REG

```
#define HMC5883L_MODE_REG 0x02
```

6.1.1.13 HMC5883L_STATUS_REG

```
#define HMC5883L_STATUS_REG 0x09
```

6.1.2 Function Documentation

6.1.2.1 hmc5883l_config()

```
esp_err_t hmc5883l_config (
            hmc5883l_handle_t sensor,
            const hmc5883l_config_t cfg )
```

Apply to the given sensor a specific configuration.

Parameters

sensor	Sensor handler
cfg	Configuration to apply

Returns

esp_err_t

6.1.2.2 hmc5883l_create()

```
hmc5883l_handle_t hmc5883l_create (
            i2c_port_t port,
            uint16_t addr )
```

Create a sensor handler given the I2C port and sensor address.

Parameters

port	I2C port
addr	I2C sensor address

Returns

hmc5883l_handle_t Sensor handler

6.1.2.3 hmc5883l_delete()

```
esp_err_t hmc5883l_delete (
            hmc5883l_handle_t sensor )
```

Delete the given handler.

Parameters

sensor	Sensor handler

Returns

esp_err_t

6.1.2.4 hmc5883l_get_gain()

```
esp_err_t hmc5883l_get_gain (
            hmc5883l_handle_t sensor,
            uint16_t * gain )
```

Retrieve the configured gain value.

Parameters

sensor	Sensor handler
gain	Pointer to store the configured gain value

Returns

esp_err_t

6.1.2.5 hmc5883l_get_mag_field()

```
esp_err_t hmc5883l_get_mag_field (
            hmc5883l_handle_t sensor,
            mag_field_t * mag )
```

Retrieve the readings of the sensor adjusted according to current gain.

Parameters

sensor	Sensor handler
mag	Pointer to store the reading

Returns

esp_err_t

6.1.2.6 hmc5883l_get_raw_mag_field()

```
esp_err_t hmc5883l_get_raw_mag_field (
            hmc5883l_handle_t sensor,
            mag_field_raw_t * mag )
```

Retrieve the raw readings of the sensor.

Parameters

sensor	Sensor handler
mag	Pointer to store the raw reading

Returns

esp_err_t

6.2 include/hmc5883l.h File Reference

Driver library of the sensor HMC5883L.

```
#include "driver/i2c.h"
#include "driver/gpio.h"
```

Data Structures

- struct hmc5883l_config_t

  Used to full configurate the sensor with an unique structure.
- struct mag_field_raw_t

  Rappresents the raw values read by the sensor.
- struct mag_field_t

  Rappresents the values read by the sensor adjusted with the configured gain.

Macros

- #define HMC5883L_ADDRESS 0x1E

Typedefs

- typedef void * hmc5883l_handle_t

Enumerations

- enum hmc5883l_fs_t { MAG_FS_0_88GA = 0 , MAG_FS_1_3GA = 1 , MAG_FS_1_9GA = 2 , MAG_FS_2_5GA = 3 , MAG_FS_4_0GA = 4 , MAG_FS_4_7GA = 5 , MAG_FS_5_6GA = 6 , MAG_FS_8_1GA = 7 }

  Used for configure the sensor gain (scale)
- enum hmc5883l_measurement_mode_t { MAG_MEASUREMENT_MODE_NORMAL = 0 , MAG_MEASUREMENT_MODE_PO = 1 , MAG_MEASUREMENT_MODE_NEG_BIAS = 2 }

  Used for configure the sensor measuremenet mode.
- enum hmc5883l_mode_t { MAG_CONTINUOUS = 0 , MAG_SINGLE = 1 , MAG_IDLE = 2 , MAG_IDLE_2 = 3 }

  Used for configure the sensor mode.
- enum hmc5883l_highspeed_t { HMC5883L_HIGHSPEED_DISABLED = 0 , HMC5883L_HIGHSPEED_ENABLED = 1 }

  Used for enabling I2C highspeed (3400kHz)
- enum hmc5883l_output_rate_t { HMC5883L_OUTPUT_RATE_0_75_HZ = 0 , HMC5883L_OUTPUT_RATE_1_5_HZ = 1 , HMC5883L_OUTPUT_RATE_3_HZ = 2 , HMC5883L_OUTPUT_RATE_7_5_HZ = 3 , HMC5883L_OUTPUT_RATE_15_HZ = 4 , HMC5883L_OUTPUT_RATE_30_HZ = 5 , HMC5883L_OUTPUT_RATE_75_HZ = 6 }

  Used for configure the sensor output rate.
- enum hmc5883l_sample_avg_t { HMC5883L_SAMPLE_AVG_1 = 0 , HMC5883L_SAMPLE_AVG_2 = 1 , HMC5883L_SAMPLE_AVG_4 = 2 , HMC5883L_SAMPLE_AVG_8 = 3 }

  Used for configure the sensor sample avarage.

Functions

- hmc5883l_handle_t hmc5883l_create (i2c_port_t port, uint16_t addr)

  Create a sensor handler given the I2C port and sensor address.
- esp_err_t hmc5883l_delete (hmc5883l_handle_t sensor)

  Delete the given handler.
- esp_err_t hmc5883l_config (hmc5883l_handle_t sensor, const hmc5883l_config_t cfg)

  Apply to the given sensor a specific configuration.
- esp_err_t hmc5883l_get_gain (hmc5883l_handle_t sensor, uint16_t *gain)

  Retrieve the configured gain value.
- esp_err_t hmc5883l_get_raw_mag_field (hmc5883l_handle_t sensor, mag_field_raw_t *mag)

  Retrieve the raw readings of the sensor.
- esp_err_t hmc5883l_get_mag_field (hmc5883l_handle_t sensor, mag_field_t *mag)

  Retrieve the readings of the sensor adjusted according to current gain.

6.2.1 Detailed Description

Driver library of the sensor HMC5883L.

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Version

0.0.3

Date

2023-05-10

Copyright

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6.2.2 Macro Definition Documentation

6.2.2.1 HMC5883L_ADDRESS

```
#define HMC5883L_ADDRESS 0x1E
```

6.2.3 Typedef Documentation

6.2.3.1 hmc5883l_handle_t

hmc5883l_handle_t

6.2.4 Enumeration Type Documentation

6.2.4.1 hmc5883l_fs_t

enum hmc5883l_fs_t

Used for configure the sensor gain (scale)

Todo rename

Enumerator

MAG_FS_0_88GA	
MAG_FS_1_3GA	
MAG_FS_1_9GA	
MAG_FS_2_5GA	
MAG_FS_4_0GA	
MAG_FS_4_7GA	
MAG_FS_5_6GA	
MAG_FS_8_1GA	

6.2.4.2 hmc5883l_highspeed_t

enum hmc5883l_highspeed_t

Used for enabling I2C highspeed (3400kHz)

Enumerator

HMC5883L_HIGHSPEED_DISABLED	
HMC5883L_HIGHSPEED_ENABLED	

6.2.4.3 hmc5883l_measurement_mode_t

enum hmc5883l_measurement_mode_t

Used for configure the sensor measuremenet mode.

Todo rename

Enumerator

MAG_MEASUREMENT_MODE_NORMAL	
MAG_MEASUREMENT_MODE_POS_BIAS	
MAG_MEASUREMENT_MODE_NEG_BIAS	

6.2.4.4 hmc5883l_mode_t

`enum hmc5883l_mode_t`

Used for configure the sensor mode.

Todo rename

Enumerator

MAG_CONTINUOUS	
MAG_SINGLE	
MAG_IDLE	
MAG_IDLE_2	

6.2.4.5 hmc5883l_output_rate_t

`enum hmc5883l_output_rate_t`

Used for configure the sensor output rate.

Enumerator

HMC5883L_OUTPUT_RATE_0_75_HZ	
HMC5883L_OUTPUT_RATE_1_5_HZ	
HMC5883L_OUTPUT_RATE_3_HZ	
HMC5883L_OUTPUT_RATE_7_5_HZ	
HMC5883L_OUTPUT_RATE_15_HZ	
HMC5883L_OUTPUT_RATE_30_HZ	
HMC5883L_OUTPUT_RATE_75_HZ	

6.2.4.6 hmc5883l_sample_avg_t

```
enum hmc5883l_sample_avg_t
```

Used for configure the sensor sample avarage.

Enumerator

HMC5883L_SAMPLE_AVG↩_1	
HMC5883L_SAMPLE_AVG↩_2	
HMC5883L_SAMPLE_AVG↩_4	
HMC5883L_SAMPLE_AVG↩_8	

6.2.5 Function Documentation

6.2.5.1 hmc5883l_config()

```
esp_err_t hmc5883l_config (
            hmc5883l_handle_t sensor,
            const hmc5883l_config_t cfg )
```

Apply to the given sensor a specific configuration.

Parameters

sensor	Sensor handler
cfg	Configuration to apply

Returns

esp_err_t

6.2.5.2 hmc5883l_create()

```
hmc5883l_handle_t hmc5883l_create (
            i2c_port_t port,
            uint16_t addr )
```

Create a sensor handler given the I2C port and sensor address.

Parameters

port	I2C port
addr	I2C sensor address

Returns

hmc5883l_handle_t Sensor handler

6.2.5.3 hmc5883l_delete()

```
esp_err_t hmc5883l_delete (
            hmc5883l_handle_t sensor )
```

Delete the given handler.

Parameters

sensor	Sensor handler

Returns

esp_err_t

6.2.5.4 hmc5883l_get_gain()

```
esp_err_t hmc5883l_get_gain (
            hmc5883l_handle_t sensor,
            uint16_t * gain )
```

Retrieve the configured gain value.

Parameters

sensor	Sensor handler
gain	Pointer to store the configured gain value

Returns

esp_err_t

6.2.5.5 hmc5883l_get_mag_field()

```
esp_err_t hmc5883l_get_mag_field (
            hmc5883l_handle_t sensor,
            mag_field_t * mag )
```

Retrieve the readings of the sensor adjusted according to current gain.

Parameters

sensor	Sensor handler
mag	Pointer to store the reading

Returns

esp_err_t

6.2.5.6 hmc5883l_get_raw_mag_field()

```
esp_err_t hmc5883l_get_raw_mag_field (
            hmc5883l_handle_t sensor,
            mag_field_raw_t * mag )
```

Retrieve the raw readings of the sensor.

Parameters

sensor	Sensor handler
mag	Pointer to store the raw reading

Returns

esp_err_t

6.3 hmc5883l.h

Go to the documentation of this file.

```
00001
00013 #ifndef HMC5883L_H
00014 #define HMC5883L_H
00015
00016 #include "driver/i2c.h"
00017 #include "driver/gpio.h"
00018
00019 #define HMC5883L_ADDRESS 0x1E
00020
00024 typedef void* hmc5883l_handle_t;
00025
00032 typedef enum {
00033     MAG_FS_0_88GA  = 0,
00034     MAG_FS_1_3GA    = 1,
00035     MAG_FS_1_9GA    = 2,
```

```
00036     MAG_FS_2_5GA    = 3,
00037     MAG_FS_4_0GA    = 4,
00038     MAG_FS_4_7GA    = 5,
00039     MAG_FS_5_6GA    = 6,
00040     MAG_FS_8_1GA    = 7
00041 } hmc5883l_fs_t;
00042
00049 typedef enum {
00050     MAG_MEASUREMENT_MODE_NORMAL      = 0,
00051     MAG_MEASUREMENT_MODE_POS_BIAS  = 1,
00052     MAG_MEASUREMENT_MODE_NEG_BIAS  = 2
00053 } hmc5883l_measurement_mode_t;
00054
00061 typedef enum {
00062     MAG_CONTINUOUS    = 0,
00063     MAG_SINGLE        = 1,
00064     MAG_IDLE        = 2,
00065     MAG_IDLE_2        = 3
00066 } hmc5883l_mode_t;
00067
00072 typedef enum {
00073     HMC5883L_HIGHSPEED_DISABLED = 0,
00074     HMC5883L_HIGHSPEED_ENABLED = 1
00075 } hmc5883l_highspeed_t;
00076
00081 typedef enum {
00082     HMC5883L_OUTPUT_RATE_0_75_HZ = 0,
00083     HMC5883L_OUTPUT_RATE_1_5_HZ = 1,
00084     HMC5883L_OUTPUT_RATE_3_HZ = 2,
00085     HMC5883L_OUTPUT_RATE_7_5_HZ = 3,
00086     HMC5883L_OUTPUT_RATE_15_HZ = 4,
00087     HMC5883L_OUTPUT_RATE_30_HZ = 5,
00088     HMC5883L_OUTPUT_RATE_75_HZ = 6
00089 } hmc5883l_output_rate_t;
00090
00095 typedef enum {
00096     HMC5883L_SAMPLE_AVG_1 = 0,
00097     HMC5883L_SAMPLE_AVG_2 = 1,
00098     HMC5883L_SAMPLE_AVG_4 = 2,
00099     HMC5883L_SAMPLE_AVG_8 = 3
00100 } hmc5883l_sample_avg_t;
00101
00106 typedef struct {
00107     hmc5883l_sample_avg_t samples_avg;
00108     hmc5883l_output_rate_t output_rate;
00109     hmc5883l_measurement_mode_t m_mode;
00110     hmc5883l_fs_t gain;
00111     hmc5883l_highspeed_t hs;
00112     hmc5883l_mode_t mode;
00113 } hmc5883l_config_t;
00114
00119 typedef struct {
00120     int16_t raw_x;
00121     int16_t raw_y;
00122     int16_t raw_z;
00123 } mag_field_raw_t;
00124
00129 typedef struct {
00130     float x;
00131     float y;
00132     float z;
00133 } mag_field_t;
00134
00135
00144 extern hmc5883l_handle_t hmc5883l_create(i2c_port_t port, uint16_t addr); // dev addresse are fixed
00152 extern esp_err_t hmc5883l_delete(hmc5883l_handle_t sensor);
00153
00162 extern esp_err_t hmc5883l_config(hmc5883l_handle_t sensor, const hmc5883l_config_t cfg);
00163
00172 extern esp_err_t hmc5883l_get_gain(hmc5883l_handle_t sensor, uint16_t* gain);
00181 extern esp_err_t hmc5883l_get_raw_mag_field(hmc5883l_handle_t sensor, mag_field_raw_t* mag);
00190 extern esp_err_t hmc5883l_get_mag_field(hmc5883l_handle_t sensor, mag_field_t* mag);
00191
00192 #endif
```

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