

MotionGC Software Library

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Modules

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▼ **MIDDLEWARES**

 ▼ **MOTION_GC**

[MOTION_GC_Exported_Types](#)

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MOTION_GC

Detailed Description

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Detailed Description

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Data Structures

MOTION_GC_Exported_Types

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Data Structures

```
struct MGC_input_t
```

```
struct MGC_output_t
```

```
struct MGC_knobs_t
```

Detailed Description

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MGC_input_t Struct Reference				

MIDDLEWARES » **MOTION_GC** » **MOTION_GC_Exported_Types**

```
#include <motion_gc.h>
```

Data Fields

float **Acc** [3]

float **Gyro** [3]

Detailed Description

Definition at line **64** of file **[motion_gc.h](#)**.

Field Documentation

float Acc[3]

Definition at line [66](#) of file [motion_gc.h](#).

float Gyro[3]

Definition at line [67](#) of file [motion_gc.h](#).

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- [algorithms/Middlewares/ST/STM32_MotionGC_Library/Inc/motion_](#)
-

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MGC_output_t Struct Reference				
MIDDLEWARES » MOTION_GC »		MOTION_GC_Exported_Types		

```
#include <motion_gc.h>
```

Data Fields

float **GyroBiasX**

float **GyroBiasY**

float **GyroBiasZ**

Detailed Description

Definition at line **70** of file **[motion_gc.h](#)**.

Field Documentation

float GyroBiasX

Definition at line [72](#) of file [motion_gc.h](#).

float GyroBiasY

Definition at line [73](#) of file [motion_gc.h](#).

float GyroBiasZ

Definition at line [74](#) of file [motion_gc.h](#).

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MGC_knobs_t Struct Reference				
MIDDLEWARES » MOTION_GC »		MOTION_GC_Exported_Types		

```
#include <motion_gc.h>
```

Data Fields

float **AccThr**

float **GyroThr**

float **FilterConst**

int **FastStart**

float **MaxGyro**

float **MaxAcc**

Detailed Description

Definition at line **78** of file **[motion_gc.h](#)**.

Field Documentation

float AccThr

Definition at line [80](#) of file [motion_gc.h](#).

int FastStart

Definition at line [83](#) of file [motion_gc.h](#).

float FilterConst

Definition at line [82](#) of file [motion_gc.h](#).

float GyroThr

Definition at line [81](#) of file [motion_gc.h](#).

float MaxAcc

Definition at line [85](#) of file [motion_gc.h](#).

float MaxGyro

Definition at line [84](#) of file [motion_gc.h](#).

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MOTION_GC_Exported_Functions

[MIDDLEWARES](#) » [MOTION_GC](#)

Functions

void **MotionGC_Initialize** (float freq)

Initialize the MotionGC engine. [More...](#)

void **MotionGC_GetKnobs** (**MGC_knobs_t** *knobs)

Get the knobs setting of the library. [More...](#)

void **MotionGC_SetKnobs** (**MGC_knobs_t** *knobs)

Set the knobs setting of the library. [More...](#)

void **MotionGC_Update** (**MGC_input_t** *data_in, **MGC_output_t**

*gyro_bias, int *bias_update)

Run gyroscope calibration algorithm and return
compensation parameters. [More...](#)

void **MotionGC_GetCalParams** (**MGC_output_t** *gyro_bias)

Get the gyroscope compensation parameters. [More...](#)

void **MotionGC_SetCalParams** (**MGC_output_t** *gyro_bias)

Set the initial gyroscope compensation parameters. [More...](#)

void **MotionGC_SetFrequency** (float freq)

Set new sample frequency. [More...](#)

uint8_t **MotionGC_GetLibVersion** (char *version)

Get the library version. [More...](#)

Detailed Description

Function Documentation

void MotionGC_GetCalParams (MGC_output_t * gyro_bias)

Get the gyroscope compensation parameters.

Parameters

gyro_bias pointer to actual gyroscope offset value in [dps]

Return values

none

void MotionGC_GetKnobs (MGC_knobs_t * knobs)

Get the knobs setting of the library.

Parameters

knobs pointer to knobs setting structure

Return values

none

uint8_t MotionGC_GetLibVersion (char * version)

Get the library version.

Parameters

version pointer to an array of 35 char

Return values

Number of characters in the version string

void MotionGC_Initialize (float freq)

Initialize the MotionGC engine.

Parameters

freq sampling frequency

Return values

none

void MotionGC_SetCalParams (MGC_output_t * gyro_bias)

Set the initial gyroscope compensation parameters.

Parameters

gyro_bias pointer to actual gyroscope offset value in [dps]

Return values

none

void MotionGC_SetFrequency (float freq)

Set new sample frequency.

Parameters

freq new sample frequency in Herz [Hz]

Return values

none

```
void MotionGC_SetKnobs ( MGC_knobs_t * knobs )
```

Set the knobs setting of the library.

Parameters

knobs pointer to knobs setting structure

Return values

none

```
void MotionGC_Update ( MGC_input_t * data_in,
                      MGC_output_t * gyro_bias,
                      int *           bias_update
)
```

Run gyroscope calibration algorithm and return compensation parameters.

Parameters

data_in pointer to acceleration [g] and angular rate values [dps]

gyro_bias pointer to actual gyroscope offset value in [dps]

bias_update pointer to an integer that is set to 1 if the gyroscope bias was updated, 0 otherwise

Return values

none

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Data Structures

Here are the data structures with brief descriptions:

- [!\[\]\(6c3219972f067da85e8b06c9c543b9de_img.jpg\) MGC_input_t](#)
- [!\[\]\(396bde1ab81c7ed0acd4ef6c3b580162_img.jpg\) MGC_knobs_t](#)
- [!\[\]\(d8f94c53910768abb7c17f22ba0b1121_img.jpg\) MGC_output_t](#)

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All	Variables		

Here is a list of all struct and union fields with links to the structures/unions they belong to:

- Acc : [MGC_input_t](#)
- AccThr : [MGC_knobs_t](#)
- FastStart : [MGC_knobs_t](#)
- FilterConst : [MGC_knobs_t](#)
- Gyro : [MGC_input_t](#)
- GyroBiasX : [MGC_output_t](#)
- GyroBiasY : [MGC_output_t](#)
- GyroBiasZ : [MGC_output_t](#)
- GyroThr : [MGC_knobs_t](#)
- MaxAcc : [MGC_knobs_t](#)
- MaxGyro : [MGC_knobs_t](#)

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- Acc : [MGC_input_t](#)
- AccThr : [MGC_knobs_t](#)
- FastStart : [MGC_knobs_t](#)
- FilterConst : [MGC_knobs_t](#)
- Gyro : [MGC_input_t](#)
- GyroBiasX : [MGC_output_t](#)
- GyroBiasY : [MGC_output_t](#)
- GyroBiasZ : [MGC_output_t](#)
- GyroThr : [MGC_knobs_t](#)
- MaxAcc : [MGC_knobs_t](#)
- MaxGyro : [MGC_knobs_t](#)

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File List

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 algorithms	
 Middlewares	
 ST	
 STM32_MotionGC_Library	
 Inc	
 motion_gc.h	Header for motion_gc module

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directory **Middlewares**

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directory **ST**

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ST Directory Reference

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directory **STM32_MotionGC_Library**

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STM32_MotionGC_Library

STM32_MotionGC_Library Directory Reference

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directory **Inc**

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[Inc](#)

Inc Directory Reference

Files

file [**motion_gc.h \[code\]**](#)

Header for motion_gc module.

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algorithms	Middlewares	ST	STM32_MotionGC_Library
Inc			
			Data Structures Functions
<h2>motion_gc.h File Reference</h2>			

Header for motion_gc module. [More...](#)

#include <stdint.h>

[Go to the source code of this file.](#)

Data Structures

```
struct MGC_input_t
```

```
struct MGC_output_t
```

```
struct MGC_knobs_t
```

Functions

void **MotionGC_Initialize** (float freq)

Initialize the MotionGC engine. [More...](#)

void **MotionGC_GetKnobs** (**MGC_knobs_t** *knobs)

Get the knobs setting of the library. [More...](#)

void **MotionGC_SetKnobs** (**MGC_knobs_t** *knobs)

Set the knobs setting of the library. [More...](#)

void **MotionGC_Update** (**MGC_input_t** *data_in, **MGC_output_t**

*gyro_bias, int *bias_update)

Run gyroscope calibration algorithm and return
compensation parameters. [More...](#)

void **MotionGC_GetCalParams** (**MGC_output_t** *gyro_bias)

Get the gyroscope compensation parameters. [More...](#)

void **MotionGC_SetCalParams** (**MGC_output_t** *gyro_bias)

Set the initial gyroscope compensation parameters. [More...](#)

void **MotionGC_SetFrequency** (float freq)

Set new sample frequency. [More...](#)

uint8_t **MotionGC_GetLibVersion** (char *version)

Get the library version. [More...](#)

Detailed Description

Header for motion_gc module.

Author

MEMS Application Team

Version

V2.0.0

Date

01-May-2017

Attention

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Definition in file [motion_gc.h](#).

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Here is a list of all functions, variables, defines, enums, and typedefs with links to the files they belong to:

- MotionGC_GetCalParams() : [motion_gc.h](#)
- MotionGC_GetKnobs() : [motion_gc.h](#)
- MotionGC_GetLibVersion() : [motion_gc.h](#)
- MotionGC_Initialize() : [motion_gc.h](#)
- MotionGC_SetCalParams() : [motion_gc.h](#)
- MotionGC_SetFrequency() : [motion_gc.h](#)
- MotionGC_SetKnobs() : [motion_gc.h](#)
- MotionGC_Update() : [motion_gc.h](#)

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- MotionGC_GetCalParams() : `motion_gc.h`
- MotionGC_GetKnobs() : `motion_gc.h`
- MotionGC_GetLibVersion() : `motion_gc.h`
- MotionGC_Initialize() : `motion_gc.h`
- MotionGC_SetCalParams() : `motion_gc.h`
- MotionGC_SetFrequency() : `motion_gc.h`
- MotionGC_SetKnobs() : `motion_gc.h`
- MotionGC_Update() : `motion_gc.h`

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motion_gc.h

Go to the documentation of this file.

```
1
38 /* Define to prevent recursive inclusion ---
   *-----*/
39 #ifndef _MOTION_GC_H_
40 #define _MOTION_GC_H_
41
42 #ifdef __cplusplus
43 extern "C"
44 {
45 #endif
46
47 /* Includes -----
   *-----*/
48 #include <stdint.h>
49
58 /* Exported types -----
   *-----*/
59
64 typedef struct
65 {
66     float Acc[3];          /* Acceleration in
      X, Y, Z axis in [g] */
67     float Gyro[3];         /* Angular rate
      along X, Y, Z axis in [dps] */
68 } MGC_input_t;
```

```
69
70 | typedef struct
71 | {
72 |     float GyroBiasX;          /* Gyroscope offset
   |      value in X axis in [dps] */
73 |     float GyroBiasY;          /* Gyroscope offset
   |      value in Y axis in [dps] */
74 |     float GyroBiasZ;          /* Gyroscope offset
   |      value in Z axis in [dps] */
75 | } MGC_output_t;
76
77
78 | typedef struct
79 | {
80 |     float AccThr;            /* Accelerometer
   |      threshold to detect steady state in [g] in
   |      range 0.003-0.05 g, defualt value 0.01 g */
81 |     float GyroThr;           /* Gyroscope
   |      threshold to detect steady state in [dps] in
   |      range 0.008-0.4 dps , default value 0.2 dps */
82 |     float FilterConst;       /* Constant for
   |      internal filter [0..1], default value 0.002 */
83 |     int FastStart;           /* Set to 1 for fast
   |      convergence at the initialization, default
   |      value 1 */
84 |     float MaxGyro;           /* Maximum expected
   |      angular rate offset when still in [dps],
   |      default value 15 dps */
85 |     float MaxAcc;            /* Maximum
   |      acceleration module when still in [g], default
   |      value 1.3g */
86 | } MGC_knobs_t;
87
88
89 | /* Exported constants -----*/
90
91 | /* Exported variables -----*/
```

```
94  /* Exported macro -----*/
-----*/
95
100 /* Exported functions -----*/
-----*/
101
107 void MotionGC_Initialize(float freq);
108
114 void MotionGC_GetKnobs(MGC_knobs_t *knobs);
115
121 void MotionGC_SetKnobs(MGC_knobs_t *knobs);
122
130 void MotionGC_Update(MGC_input_t *data_in,
    MGC_output_t *gyro_bias, int *bias_update);
131
137 void MotionGC_GetCalParams(MGC_output_t
    *gyro_bias);
138
144 void MotionGC_SetCalParams(MGC_output_t
    *gyro_bias);
145
151 void MotionGC_SetFrequency(float freq);
152
153
159 uint8_t MotionGC_GetLibVersion(char
    *version);
160
173 #ifdef __cplusplus
174 }
175#endif
176
177#endif /* _MOTION_GC_H_ */
178
179 /***** (C) COPYRIGHT
    STMicroelectronics *****END OF FILE****/
```

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