Here is a list of all modules:

- **MIDDLEWARES**
  - **MOTION_GC**
    - MOTION_GC_Exported_Types
    - MOTION_GC_Exported_Functions

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## MIDDLEWARES

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## Modules

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<td></td>
<td></td>
<td>Data Structures</td>
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</table>

## MOTION_GC_Exported_Types

MIDDLEWARES » MOTION_GC
## Data Structures

<table>
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<tr>
<th>Structure</th>
<th>Type</th>
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<tr>
<td>struct MGC_input_t</td>
<td></td>
</tr>
<tr>
<td>struct MGC_output_t</td>
<td></td>
</tr>
<tr>
<td>struct MGC_knobs_t</td>
<td></td>
</tr>
</tbody>
</table>
### MGC_input_t Struct

#### Reference

[MIDDLEWARES](#) » MOTION_GC » MOTION_GC_Exported_Types

```c
#include <motion_gc.h>
```
## Data Fields

<table>
<thead>
<tr>
<th>Type</th>
<th>Field</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>float</td>
<td>Acc</td>
<td>[3]</td>
</tr>
<tr>
<td>float</td>
<td>Gyro</td>
<td>[3]</td>
</tr>
</tbody>
</table>
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`.

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

- `algorithms/Middlewares/ST/STM32_MotionGC_Library/Inc/motion_gc.h`

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**MGC_output_t Struct Reference**

MIDDLEWARES » MOTION_GC » MOTION_GC_Exported_Types

```c
#include <motion_gc.h>
```
Data Fields

<table>
<thead>
<tr>
<th>Type</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>float</td>
<td>GyroBiasX</td>
</tr>
<tr>
<td>float</td>
<td>GyroBiasY</td>
</tr>
<tr>
<td>float</td>
<td>GyroBiasZ</td>
</tr>
</tbody>
</table>
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.

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

- algorithms/Middlewares/ST/STM32_MotionGC_Library/Inc/motion_
# MGC_knobs_t Struct

**Reference**

[MIDDLEWARES » MOTION_GC » MOTION_GC_Exported_Types](#)

```c
#include <motion_gc.h>
```
## Data Fields

<table>
<thead>
<tr>
<th>Type</th>
<th>Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>float</td>
<td>AccThr</td>
</tr>
<tr>
<td>float</td>
<td>GyroThr</td>
</tr>
<tr>
<td>float</td>
<td>FilterConst</td>
</tr>
<tr>
<td>int</td>
<td>FastStart</td>
</tr>
<tr>
<td>float</td>
<td>MaxGyro</td>
</tr>
<tr>
<td>float</td>
<td>MaxAcc</td>
</tr>
</tbody>
</table>
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.

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

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<thead>
<tr>
<th>Function</th>
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<tbody>
<tr>
<td>void MotionGC_Initialize (float freq)</td>
<td>Initialize the MotionGC engine.</td>
</tr>
<tr>
<td>void MotionGC_GetKnobs (MGC_knobs_t *knobs)</td>
<td>Get the knobs setting of the library.</td>
</tr>
<tr>
<td>void MotionGC_SetKnobs (MGC_knobs_t *knobs)</td>
<td>Set the knobs setting of the library.</td>
</tr>
<tr>
<td>void MotionGC_Update (MGC_input_t *data_in, MGC_output_t *gyro_bias, int *bias_update)</td>
<td>Run gyroscope calibration algorithm and return compensation parameters.</td>
</tr>
<tr>
<td>void MotionGC_GetCalParams (MGC_output_t *gyro_bias)</td>
<td>Get the gyroscope compensation parameters.</td>
</tr>
<tr>
<td>void MotionGC_SetCalParams (MGC_output_t *gyro_bias)</td>
<td>Set the initial gyroscope compensation parameters.</td>
</tr>
<tr>
<td>void MotionGC_SetFrequency (float freq)</td>
<td>Set new sample frequency.</td>
</tr>
<tr>
<td>uint8_t MotionGC_GetLibVersion (char *version)</td>
<td>Get the library version.</td>
</tr>
</tbody>
</table>
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
Here are the data structures with brief descriptions:

- MGC_input_t
- MGC_knobs_t
- MGC_output_t
Data Structure Index

M

MGC_knobs_t        MGC_output_t

MGC_input_t

M

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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`
- 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`
# MotionGC Software Library

MotionGC Software Library Documentation

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Here is a list of all files with brief descriptions:

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<td>Inc</td>
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<td>6</td>
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<td>Header for motion_gc module</td>
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## algorithms Directory Reference
### Directories

| directory | Middlewares |

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## Middlewares Directory Reference
# MotionGC Software Library

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Inc Directory Reference
Files

file  motion_gc.h [code]
     Header for motion_gc module.

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# motion_gc.h File

Header for motion_gc module. More...

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

Go to the source code of this file.
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<td>struct</td>
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</thead>
<tbody>
<tr>
<td><code>void MotionGC_Initialize(float freq)</code></td>
<td>Initialize the MotionGC engine.</td>
<td>More...</td>
</tr>
<tr>
<td><code>void MotionGC_GetKnobs(MGC_knobs_t *knobs)</code></td>
<td>Get the knobs setting of the library.</td>
<td>More...</td>
</tr>
<tr>
<td><code>void MotionGC_SetKnobs(MGC_knobs_t *knobs)</code></td>
<td>Set the knobs setting of the library.</td>
<td>More...</td>
</tr>
<tr>
<td><code>void MotionGC_Update(MGC_input_t *data_in, MGC_output_t *gyro_bias, int *bias_update)</code></td>
<td>Run gyroscope calibration algorithm and return compensation parameters.</td>
<td>More...</td>
</tr>
<tr>
<td><code>void MotionGC_GetCalParams(MGC_output_t *gyro_bias)</code></td>
<td>Get the gyroscope compensation parameters.</td>
<td>More...</td>
</tr>
<tr>
<td><code>void MotionGC_SetCalParams(MGC_output_t *gyro_bias)</code></td>
<td>Set the initial gyroscope compensation parameters.</td>
<td>More...</td>
</tr>
<tr>
<td><code>void MotionGC_SetFrequency(float freq)</code></td>
<td>Set new sample frequency.</td>
<td>More...</td>
</tr>
<tr>
<td><code>uint8_t MotionGC_GetLibVersion(char *version)</code></td>
<td>Get the library version.</td>
<td>More...</td>
</tr>
</tbody>
</table>
Detailed Description

Header for motion_gc module.

Author
MEMS Application Team

Version
V2.0.0

Date
01-May-2017

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Definition in file motion_gc.h.
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`
- 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
motion_gc.h

Go to the documentation of this file.

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

typedef struct {
    float AccThr;        /* Accelerometer threshold to detect steady state in [g] in range 0.003-0.05 g, default value 0.01 g */
    float GyroThr;       /* Gyroscope threshold to detect steady state in [dps] in range 0.008-0.4 dps, default value 0.2 dps */
    float FilterConst;   /* Constant for internal filter [0..1], default value 0.002 */
    int FastStart;       /* Set to 1 for fast convergence at the initialization, default value 1 */
    float MaxGyro;       /* Maximum expected angular rate offset when still in [dps], default value 15 dps */
    float MaxAcc;        /* Maximum acceleration module when still in [g], default value 1.3g */
} MGC_knobs_t;

/* Exported constants ------------------------------
   ---------------------------------------------*/

/* Exported variables ------------------------------
   ---------------------------------------------*/
/* Exported macro  --------------------------*/

/* Exported functions  ----------------------*/

void MotionGC_Initialize(float freq);
void MotionGC_GetKnobs(MGC_knobs_t *knobs);
void MotionGC_SetKnobs(MGC_knobs_t *knobs);
void MotionGC_Update(MGC_input_t *data_in, MGC_output_t *gyro_bias, int *bias_update);
void MotionGC_GetCalParams(MGC_output_t *gyro_bias);
void MotionGC_SetCalParams(MGC_output_t *gyro_bias);
void MotionGC_SetFrequency(float freq);
uint8_t MotionGC_GetLibVersion(char *version);

#endif /*_cplusplus*/
#endif /*_MOTION_GC_H_*/

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