

MotionEC Software Library

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Modules

Here is a list of all modules:

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▼ **MIDDLEWARES**

 ▼ **MOTION_EC**

MOTION_EC_Exported_Types

MOTION_EC_Exported_Functions

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Modules

MIDDLEWARES

Modules

MOTION_EC

Detailed Description

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MOTION_EC

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Detailed Description

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MOTION_EC_Exported_Types

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Data Structures

```
struct MEC_input_t
```

```
struct MEC_output_t
```

Enumerations

```
enum MEC_state_t { MEC_DISABLE = 0, MEC_ENABLE = 1 }
```

Detailed Description

Enumeration Type Documentation

enum MEC_state_t

Enumerator
MEC_DISABLE
MEC_ENABLE

Definition at line **80** of file **motion_ec.h**.

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MEC_input_t Struct Reference	MIDDLEWARES » MOTION_EC » MOTION_EC_Exported_Types			

```
#include <motion_ec.h>
```

Data Fields

float **Acc** [3]

float **Mag** [3]

float **DTime**

Detailed Description

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

Field Documentation

float Acc[3]

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

float DTime

Definition at line [68](#) of file [motion_ec.h](#).

float Mag[3]

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

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- [algorithms/Middlewares/ST/STM32_MotionEC_Library/Inc/motion_](#)
-

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MEC_output_t Struct Reference				

MEC_output_t Struct Reference

MIDDLEWARES » MOTION_EC » MOTION_EC_Exported_Types

```
#include <motion_ec.h>
```

Data Fields

float **Quaternion** [4]

float **Euler** [3]

float **IGyro** [3]

float **Gravity** [3]

float **Linear** [3]

Detailed Description

Definition at line **71** of file **[motion_ec.h](#)**.

Field Documentation

float Euler[3]

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

float Gravity[3]

Definition at line [76](#) of file [motion_ec.h](#).

float IGyro[3]

Definition at line [75](#) of file [motion_ec.h](#).

float Linear[3]

Definition at line [77](#) of file [motion_ec.h](#).

float Quaternion[4]

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

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MOTION_EC_Exported_Functions

[MIDDLEWARES](#) » [MOTION_EC](#)

Functions

void **MotionEC_Initialize** (float freq)

Initialize and reset the MotionEC engine. [More...](#)

void **MotionEC_Run** (**MEC_input_t** *data_in, **MEC_output_t** *data_out)

Run E-Compass algorithm (accelerometer and magnetometer data fusion) [More...](#)

void **MotionEC_GetOrientationEnable** (**MEC_state_t** *state)

Get enable/disable state of the Euler angles calculation.

[More...](#)

void **MotionEC_SetOrientationEnable** (**MEC_state_t** state)

Set enable/disable state of the Euler angles calculation.

[More...](#)

void **MotionEC_GetVirtualGyroEnable** (**MEC_state_t** *state)

Get enable/disable state of the virtual gyroscope calculation.

[More...](#)

void **MotionEC_SetVirtualGyroEnable** (**MEC_state_t** state)

Set enable/disable state of the virtual gyroscope calculation.

[More...](#)

void **MotionEC_GetGravityEnable** (**MEC_state_t** *state)

Get enable/disable state of the gravity vector calculation.

[More...](#)

void **MotionEC_SetGravityEnable** (**MEC_state_t** state)

Set enable/disable state of the gravity vector calculation.

[More...](#)

void **MotionEC_GetLinearAccEnable** (**MEC_state_t** *state)

Get enable/disable state of the linear acceleration

calculation. More...

void **MotionEC_SetLinearAccEnable** (**MEC_state_t** state)

Set enable/disable state of the linear acceleration
calculation. More...

void **MotionEC_SetFrequency** (float freq)

Set sampling frequency (modify filtering parameters) More...

uint8_t **MotionEC_GetLibVersion** (char *version)

Get the library version. More...

Detailed Description

Function Documentation

void MotionEC_GetGravityEnable (MEC_state_t * state)

Get enable/disable state of the gravity vector calculation.

Parameters

state Current enable/disable state

Return values

none

uint8_t MotionEC_GetLibVersion (char * version)

Get the library version.

Parameters

version Pointer to an array of 35 char

Return values

Length of the version string

void MotionEC_GetLinearAccEnable (MEC_state_t * state)

Get enable/disable state of the linear acceleration calculation.

Parameters

state Current enable/disable state

Return values

none

void MotionEC_GetOrientationEnable (MEC_state_t * state)

Get enable/disable state of the Euler angles calculation.

Parameters

state Current enable/disable state

Return values

none

void MotionEC_GetVirtualGyroEnable (MEC_state_t * state)

Get enable/disable state of the virtual gyroscope calculation.

Parameters

state Current enable/disable state

Return values

none

void MotionEC_Initialize (float freq)

Initialize and reset the MotionEC engine.

Parameters

freq Sensors sampling frequency [Hz]

Return values

None

```
void MotionEC_Run ( MEC_input_t * data_in,
                    MEC_output_t * data_out
                )
```

Run E-Compass algorithm (accelerometer and magnetometer data fusion)

Parameters

data_in Structure containing input data
data_out Structure containing output data

Return values

None

```
void MotionEC_SetFrequency ( float freq )
```

Set sampling frequency (modify filtering parameters)

Parameters

freq New sensors sampling frequency [Hz]

Return values

none

```
void MotionEC_SetGravityEnable ( MEC_state_t state )
```

Set enable/disable state of the gravity vector calculation.

Parameters

state New enable/disable state to be set

Return values

none

void MotionEC_SetLinearAccEnable (MEC_state_t state)

Set enable/disable state of the linear acceleration calculation.

Parameters

state New enable/disable state to be set

Return values

none

void MotionEC_SetOrientationEnable (MEC_state_t state)

Set enable/disable state of the Euler angles calculation.

Parameters

state New enable/disable state to be set

Return values

none

void MotionEC_SetVirtualGyroEnable (MEC_state_t state)

Set enable/disable state of the virtual gyroscope calculation.

Parameters

state New enable/disable state to be set

Return values

none

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Data Structures

Here are the data structures with brief descriptions:

- [!\[\]\(21836c01843165e8dc035337f541a17f_img.jpg\) MEC_input_t](#)
- [!\[\]\(e411cb55f5ec6217252f076861c8cda1_img.jpg\) MEC_output_t](#)

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M

M

[MEC_output_t](#)

[MEC_input_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 : [MEC_input_t](#)
- DTime : [MEC_input_t](#)
- Euler : [MEC_output_t](#)
- Gravity : [MEC_output_t](#)
- IGyro : [MEC_output_t](#)
- Linear : [MEC_output_t](#)
- Mag : [MEC_input_t](#)
- Quaternion : [MEC_output_t](#)

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- Acc : [MEC_input_t](#)
- DTime : [MEC_input_t](#)
- Euler : [MEC_output_t](#)
- Gravity : [MEC_output_t](#)
- IGyro : [MEC_output_t](#)
- Linear : [MEC_output_t](#)
- Mag : [MEC_input_t](#)
- Quaternion : [MEC_output_t](#)

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File List

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[detail level [1](#) [2](#) [3](#) [4](#) [5](#) [6](#)]

 algorithms	
 Middlewares	
 ST	
 STM32_MotionEC_Library	
 Inc	
 motion_ec.h	Header for motion_ec module

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Directories

directory **Middlewares**

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Middlewares Directory Reference

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directory **ST**

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ST Directory Reference

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directory **STM32_MotionEC_Library**

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STM32_MotionEC_Library Directory Reference

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directory **Inc**

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[Middlewares](#)

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[STM32_MotionEC_Library](#)

[Inc](#)

Inc Directory Reference

Files

file [**motion_ec.h**](#) [code]

Header for motion_ec module.

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<h2>motion_ec.h File Reference</h2>			

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

#include <stdint.h>

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

Data Structures

```
struct MEC_input_t
```

```
struct MEC_output_t
```

Enumerations

```
enum MEC_state_t { MEC_DISABLE = 0, MEC_ENABLE = 1 }
```

Functions

void **MotionEC_Initialize** (float freq)

Initialize and reset the MotionEC engine. [More...](#)

void **MotionEC_Run** (**MEC_input_t** *data_in, **MEC_output_t** *data_out)

Run E-Compass algorithm (accelerometer and magnetometer data fusion) [More...](#)

void **MotionEC_GetOrientationEnable** (**MEC_state_t** *state)

Get enable/disable state of the Euler angles calculation.

[More...](#)

void **MotionEC_SetOrientationEnable** (**MEC_state_t** state)

Set enable/disable state of the Euler angles calculation.

[More...](#)

void **MotionEC_GetVirtualGyroEnable** (**MEC_state_t** *state)

Get enable/disable state of the virtual gyroscope calculation.

[More...](#)

void **MotionEC_SetVirtualGyroEnable** (**MEC_state_t** state)

Set enable/disable state of the virtual gyroscope calculation.

[More...](#)

void **MotionEC_GetGravityEnable** (**MEC_state_t** *state)

Get enable/disable state of the gravity vector calculation.

[More...](#)

void **MotionEC_SetGravityEnable** (**MEC_state_t** state)

Set enable/disable state of the gravity vector calculation.

[More...](#)

void **MotionEC_GetLinearAccEnable** (**MEC_state_t** *state)

Get enable/disable state of the linear acceleration

calculation. More...

void **MotionEC_SetLinearAccEnable** (**MEC_state_t** state)

Set enable/disable state of the linear acceleration
calculation. More...

void **MotionEC_SetFrequency** (float freq)

Set sampling frequency (modify filtering parameters) More...

uint8_t **MotionEC_GetLibVersion** (char *version)

Get the library version. More...

Detailed Description

Header for motion_ec module.

Author

MEMS Application Team

Version

V1.0.0

Date

01-May-2017

Attention

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Definition in file [motion_ec.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:

- MEC_DISABLE : [motion_ec.h](#)
- MEC_ENABLE : [motion_ec.h](#)
- MEC_state_t : [motion_ec.h](#)
- MotionEC_GetGravityEnable() : [motion_ec.h](#)
- MotionEC_GetLibVersion() : [motion_ec.h](#)
- MotionEC_GetLinearAccEnable() : [motion_ec.h](#)
- MotionEC_GetOrientationEnable() : [motion_ec.h](#)
- MotionEC_GetVirtualGyroEnable() : [motion_ec.h](#)
- MotionEC_Initialize() : [motion_ec.h](#)
- MotionEC_Run() : [motion_ec.h](#)
- MotionEC_SetFrequency() : [motion_ec.h](#)
- MotionEC_SetGravityEnable() : [motion_ec.h](#)
- MotionEC_SetLinearAccEnable() : [motion_ec.h](#)
- MotionEC_SetOrientationEnable() : [motion_ec.h](#)
- MotionEC_SetVirtualGyroEnable() : [motion_ec.h](#)

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- MotionEC_GetLibVersion() : [motion_ec.h](#)
- MotionEC_GetLinearAccEnable() : [motion_ec.h](#)
- MotionEC_GetOrientationEnable() : [motion_ec.h](#)
- MotionEC_SetVirtualGyroEnable() : [motion_ec.h](#)
- MotionEC_Initialize() : [motion_ec.h](#)
- MotionEC_Run() : [motion_ec.h](#)
- MotionEC_SetFrequency() : [motion_ec.h](#)
- MotionEC_SetGravityEnable() : [motion_ec.h](#)
- MotionEC_SetLinearAccEnable() : [motion_ec.h](#)
- MotionEC_SetOrientationEnable() : [motion_ec.h](#)
- MotionEC_SetVirtualGyroEnable() : [motion_ec.h](#)

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- MEC_state_t : [motion_ec.h](#)

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- MEC_DISABLE : [motion_ec.h](#)
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motion_ec.h

Go to the documentation of this file.

```
1
38 /* Define to prevent recursive inclusion ---
   *-----*/
39 #ifndef _MOTION_EC_H_
40 #define _MOTION_EC_H_
41
42 #ifdef __cplusplus
43 extern "C"
44 {
45 #endif
46
47 /* Includes -----
   *-----*/
48 #include <stdint.h>
49
62 /* Exported types -----
   *-----*/
63
64 typedef struct
65 {
66     float Acc[3];          /* Accelerometer Data
   [g] */
67     float Mag[3];          /* Magnetometer Data
   [uT / 50] */
68     float DTime;           /* Delta-time [s] */
```

```
69 } MEC_input_t;
70
71 typedef struct
72 {
73     float Quaternion[4]; /* Quaternion [x, y,
74     z, w] */
75     float Euler[3];      /* Yaw, Pitch, Roll
76     [deg] */
77     float IGyro[3];     /* Virtual Gyroscope
78     [dps] */
79     float Gravity[3];   /* Gravity [g] */
80     float Linear[3];    /* Linear
81     acceleration [g] */
82 } MEC_output_t;
83
84 typedef enum
85 {
86     MEC_DISABLE = 0,
87     MEC_ENABLE  = 1
88 } MEC_state_t;
89
90 /* Exported constants -----
91 *-----*/
92 /* Exported variables -----
93 *-----*/
94 /* Exported macro -----
95 *-----*/
96
97 /* Exported functions -----
98 *-----*/
99
100
101 void MotionEC_Initialize(float freq);
102
103 void MotionEC_Run(MEC_input_t *data_in,
104                     MEC_output_t *data_out);
105
106
107 void
```

```
    MotionEC_GetOrientationEnable(MEC_state_t
*state);
121
127 void
MotionEC_SetOrientationEnable(MEC_state_t
state);
128
134 void
MotionEC_GetVirtualGyroEnable(MEC_state_t
*state);
135
141 void
MotionEC_SetVirtualGyroEnable(MEC_state_t
state);
142
148 void MotionEC_GetGravityEnable(MEC_state_t
*state);
149
155 void MotionEC_SetGravityEnable(MEC_state_t
state);
156
162 void MotionEC_GetLinearAccEnable(MEC_state_t
*state);
163
169 void MotionEC_SetLinearAccEnable(MEC_state_t
state);
170
176 void MotionEC_SetFrequency(float freq);
177
183 uint8_t MotionEC_GetLibVersion(char
*version);
184
197 #ifdef __cplusplus
198 }
199#endif
200
201#endif /* _MOTION_EC_H_ */
```

```
202
203 /****** (C) COPYRIGHT
STMicroelectronics *****END OF FILE****/
```

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