

OSX MotionFX Software Library

[Main Page](#)

[Modules](#)

[Data Structures](#)

[Files](#)

Modules

Here is a list of all modules:

[detail level [1](#) [2](#) [3](#)]

▼ **MIDDLEWARES**

▼ **OSX_MOTION_FX**

[**OSX_MOTION_FX_Exported_Defines**](#)

[**OSX_MOTION_FX_Exported_Types**](#)

[**OSX_MOTION_FX_Exported_Functions**](#)

Generated on Tue Apr 5 2016 17:29:15 for OSX MotionFX Software Library by

 doxygen

1.8.8

OSX MotionFX Software Library

[Main Page](#)

[Modules](#)

[Data Structures](#)

[Files](#)

Modules

MIDDLEWARES

Modules

OSX_MOTION_FX

Detailed Description

Generated on Tue Apr 5 2016 17:29:15 for OSX MotionFX Software Library by  1.8.8

OSX MotionFX Software Library

Main Page

Modules

Data Structures

Files

Modules

OSX_MOTION_FX

MIDDLEWARES

Modules

[**OSX_MOTION_FX_Exported_Defines**](#)

[**OSX_MOTION_FX_Exported_Types**](#)

[**OSX_MOTION_FX_Exported_Functions**](#)

Detailed Description

Generated on Tue Apr 5 2016 17:29:15 for OSX MotionFX Software Library by  1.8.8

OSX MotionFX Software Library

[Main Page](#)

[Modules](#)

[Data Structures](#)

[Files](#)

Macros

OSX_MOTION_FX_Exported_Defines

[MIDDLEWARES](#) » [OSX_MOTION_FX](#)

Macros

```
#define NUM_AXES 3
```

```
#define QNUM_AXES 4
```

Detailed Description

Generated on Tue Apr 5 2016 17:29:15 for OSX MotionFX Software Library by  1.8.8

OSX MotionFX Software Library

[Main Page](#)

[Modules](#)

[Data Structures](#)

[Files](#)

[Data Structures](#) | [Enumerations](#)

OSX_MOTION_FX_Exported_Types

[MIDDLEWARES](#) » [OSX_MOTION_FX](#)

Data Structures

struct **osxFX_knobs**

struct **osxFX_input**

struct **osxFX_output**

struct **osxFX_calibFactor**

Enumerations

```
enum osxMFX_Engine_State { OSXMFX_ENGINE_DISABLE = 0,  
                            OSXMFX_ENGINE_ENABLE = 1 }
```

```
enum osxMFX_Engine_Output_Ref_Sys {  
    OSXMFX_ENGINE_OUTPUT_NED = 0,  
    OSXMFX_ENGINE_OUTPUT_ENU = 1 }
```

Detailed Description

Generated on Tue Apr 5 2016 17:29:15 for OSX MotionFX Software Library by  1.8.8

OSX MotionFX Software Library

Main Page	Modules	Data Structures	Files
Data Structures	Data Structure Index	Data Fields	
osxMFX_knobs Struct Reference			
MIDDLEWARES » OSX_MOTION_FX » OSX_MOTION_FX_Exported_Types			

Data Fields

float **ATime**

float **MTime**

float **FrTime**

unsigned char **LMode**

float **gbias_mag_th_sc_6X**

float **gbias_acc_th_sc_6X**

float **gbias_gyro_th_sc_6X**

float **gbias_mag_th_sc_9X**

float **gbias_acc_th_sc_9X**

float **gbias_gyro_th_sc_9X**

unsigned char **modx**

char **acc_orientation** [QNUM_AXES]

char **gyro_orientation** [QNUM_AXES]

char **mag_orientation** [QNUM_AXES]

osxFX_Engine_Output_Ref_Sys **output_type**

int **start_automatic_gbias_calculation**

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

- [**Inc/osx_motion_fx.h**](#)
-

Generated on Tue Apr 5 2016 17:29:15 for OSX MotionFX Software Library by  1.8.8

OSX MotionFX Software Library

Main Page	Modules	Data Structures	Files
Data Structures	Data Structure Index	Data Fields	
osxMFX_input Struct Reference			
MIDDLEWARES » OSX_MOTION_FX »			
OSX_MOTION_FX_Exported_Types			

Data Fields

float **mag** [NUM_AXES]

float **acc** [NUM_AXES]

float **gyro** [NUM_AXES]

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

- Inc/[osx_motion_fx.h](#)
-

Generated on Tue Apr 5 2016 17:29:15 for OSX MotionFX Software Library by

 doxygen

1.8.8

OSX MotionFX Software Library

Main Page	Modules	Data Structures	Files
Data Structures	Data Structure Index	Data Fields	
osxMFX_output Struct Reference			

[MIDDLEWARES](#) » [OSX_MOTION_FX](#) »

[OSX_MOTION_FX_Exported_Types](#)

Data Fields

float **rotation_9X** [NUM_AXES]

float **quaternion_9X** [QNUM_AXES]

float **gravity_9X** [NUM_AXES]

float **linear_acceleration_9X** [NUM_AXES]

float **heading_9X**

float **rotation_6X** [NUM_AXES]

float **quaternion_6X** [QNUM_AXES]

float **gravity_6X** [NUM_AXES]

float **linear_acceleration_6X** [NUM_AXES]

float **heading_6X**

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

- Inc/[osx_motion_fx.h](#)
-

OSX MotionFX Software Library

Main Page	Modules	Data Structures	Files
Data Structures	Data Structure Index	Data Fields	
osxMFX_calibFactor Struct Reference			
MIDDLEWARES » OSX_MOTION_FX »			
OSX_MOTION_FX_Exported_Types			

Data Fields

signed short **magOffX**

signed short **magOffY**

signed short **magOffZ**

float **magGainX**

float **magGainY**

float **magGainZ**

float **expMagVect**

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

- Inc/[osx_motion_fx.h](#)
-

Generated on Tue Apr 5 2016 17:29:15 for OSX MotionFX Software Library by


1.8.8

OSX MotionFX Software Library

[Main Page](#)

[Modules](#)

[Data Structures](#)

[Files](#)

[Functions](#)

OSX_MOTION_FX_Exported_Functions

[MIDDLEWARES](#) » [OSX_MOTION_FX](#)

Functions

uint8_t **osx_MotionFX_initialize** (void)
Initialize the MotionFX engine. [More...](#)

void **osx_MotionFX_setKnobs** (osxMFX_knobs *knobs)
Set the internal knobs. [More...](#)

void **osx_MotionFX_getKnobs** (osxMFX_knobs *knobs)
Get the current internal knobs. [More...](#)

osxMFX_Engine_State **osx_MotionFX_getStatus_6X** (void)
Get the status of the 6 axes library. [More...](#)

osxMFX_Engine_State **osx_MotionFX_getStatus_9X** (void)
Get the status of the 9 axes library. [More...](#)

void **osx_MotionFX_enable_6X**
(osxMFX_Engine_State enable)
Enable or disable the 6 axes function (ACC + GYRO) [More...](#)

void **osx_MotionFX_enable_9X**
(osxMFX_Engine_State enable)
Enable or disable the 9 axes function (ACC + GYRO + MAG) [More...](#)

void **osx_MotionFX_setGbias** (float *gbias)
Set the initial gbias. [More...](#)

void **osx_MotionFX_getGbias** (float *gbias)
Get the initial gbias. [More...](#)

void **osx_MotionFX_update** (osxMFX_output

*data_out, **osxMFX_input** *data_in, float
eml_deltatime, float *eml_q_update)
Run the Kalman filter update. [More...](#)

void **osx_MotionFX_propagate** (**osxMFX_output**
*data_out, **osxMFX_input** *data_in, float
eml_deltatime)
Run the Kalman filter propagate. [More...](#)

int **osx_MotionFX_getLibVersion** (char *version)
Get the library version. [More...](#)

void **osx_MotionFX_compass_init** (void)
Initialize the compass calibration library.
[More...](#)

void **osx_MotionFX_compass_saveAcc** (int acc_x,
int acc_y, int acc_z)
Save accelerometer data ENU systems
coordinate. [More...](#)

void **osx_MotionFX_compass_saveMag** (int
mag_x, int mag_y, int mag_z)
Save magnetometer data ENU systems
coordinate. [More...](#)

int **osx_MotionFX_compass_run** (void)
Run compass API at 25 Hz. [More...](#)

unsigned char **osx_MotionFX_compass_isCalibrated** (void)
Check if calibration is needed. [More...](#)

void **osx_MotionFX_compass_forceReCalibration**
(void)
Force new calibration. [More...](#)

void **osx_MotionFX_getCalibrationData**

(osxMFX_calibFactor *CalibrationData)
Get calibration data. [More...](#)

void **osx_MotionFX_setCalibrationData**
(osxMFX_calibFactor *CalibrationData)
Set calibration data. [More...](#)

Detailed Description

Function Documentation

void osx_MotionFX_compass_forceReCalibration (void)

Force new calibration.

Return values

None

void osx_MotionFX_compass_init (void)

Initialize the compass calibration library.

Return values

None

unsigned char osx_MotionFX_compass_isCalibrated (void)

Check if calibration is needed.

Return values

calibration status

int osx_MotionFX_compass_run (void)

Run compass API at 25 Hz.

Return values

None

```
void osx_MotionFX_compass_saveAcc ( int acc_x,  
                                     int acc_y,  
                                     int acc_z  
                                   )
```

Save accelerometer data ENU systems coordinate.

Parameters

acc_x accelerometer x coordinate in [mg]

acc_y accelerometer y coordinate in [mg]

acc_z accelerometer z coordinate in [mg]

Return values

None

```
void osx_MotionFX_compass_saveMag ( int mag_x,  
                                     int mag_y,  
                                     int mag_z  
                                   )
```

Save magnetometer data ENU systems coordinate.

Parameters

mag_x magnetometer x coordinate in [mG]

mag_y magnetometer y coordinate in [mG]

mag_z magnetometer z coordinate in [mG]

Return values

None

void osx_MotionFX_enable_6X (osxMFX_Engine_State enable)

Enable or disable the 6 axes function (ACC + GYRO)

Parameters

enable 1 to enable, 0 to disable

Return values

None

void osx_MotionFX_enable_9X (osxMFX_Engine_State enable)

Enable or disable the 9 axes function (ACC + GYRO + MAG)

Parameters

enable 1 to enable, 0 to disable

Return values

None

void osx_MotionFX_getCalibrationData (osxMFX_calibFactor * Calibrat

Get calibration data.

Parameters

CalibrationData pointer to calibration data structure

Return values

None

void osx_MotionFX_getGbias (float * gbias)

Get the initial gbias.

Parameters

pointer to a float array containing the 3 gbias values

Return values

None

void osx_MotionFX_getKnobs (osxMFX_knobs * knobs)

Get the current internal knobs.

Parameters

knobs knobs structure

Return values

None

int osx_MotionFX_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

osxMFX_Engine_State osx_MotionFX_getStatus_6X (void)

Get the status of the 6 axes library.

Return values

1 if enabled, 0 if disabled

```
osxMFX_Engine_State osx_MotionFX_getStatus_9X ( void )
```

Get the status of the 9 axes library.

Return values

1 if enabled, 0 if disabled

```
uint8_t osx_MotionFX_initialize ( void )
```

Initialize the MotionFX engine.

Return values

1 in case of success, 0 otherwise

```
void  
osx_MotionFX_propagate ( osxMFX_output * data_out,  
                           osxMFX_input * data_in,  
                           float           eml_deltatime  
                         )
```

Run the Kalman filter propagate.

Parameters

data_out pointer to the **osxMFX_output** structure
data_in pointer to the **osxMFX_input** structure
eml_deltatime delta time between two propagate calls [sec]

Return values

None

```
void  
osx_MotionFX_setCalibrationData ( osxMFX_calibFactor * Calibration )
```

Set calibration data.

Parameters

CalibrationData pointer to calibration data structure

Return values

None

void osx_MotionFX_setGbias (float * gbias)

Set the initial gbias.

Parameters

gbias pointer to a float array containing the 3 gbias values

Return values

None

void osx_MotionFX_setKnobs (osxMFX_knobs * knobs)

Set the internal knobs.

Parameters

knobs knobs structure

Return values

None

**void osx_MotionFX_update (osxMFX_output * data_out,
 osxMFX_input * data_in,
 float eml_deltatime,
 float * eml_q_update
)**

Run the Kalman filter update.

Parameters

- data_out** pointer to the `osxMFX_output` structure
- data_in** pointer to the `osxMFX_input` structure
- eml_deltatime** delta time between two propagate calls [sec]
- eml_q_update** set to NULL

Return values

- None**

OSX MotionFX Software Library

Main Page	Modules	Data Structures	Files
Data Structures	Data Structure Index		

Data Structures

Here are the data structures with brief descriptions:

- [!\[\]\(691a22fd4df0954da62778bfdf0894ff_img.jpg\) **osxMFX_calibFactor**](#)
- [!\[\]\(bdfd6da41192381cb02899825c2449bb_img.jpg\) **osxMFX_input**](#)
- [!\[\]\(b679dfc200baae3a97cbab800c27340b_img.jpg\) **osxMFX_knobs**](#)
- [!\[\]\(da696d392e0247534bb5692d33beadc5_img.jpg\) **osxMFX_output**](#)

Generated on Tue Apr 5 2016 17:29:15 for OSX MotionFX Software Library by


1.8.8

OSX MotionFX Software Library

[Main Page](#)

[Modules](#)

[Data Structures](#)

[Files](#)

[Data Structures](#)

[Data Structure Index](#)

Data Structure Index

O

o

[osxMFX_input](#)

[osxMFX_output](#)

[osxMFX_knobs](#)

[osxMFX_calibFactor](#)

O

Generated on Tue Apr 5 2016 17:29:15 for OSX MotionFX Software Library by

 doxygen
1.8.8

OSX MotionFX Software Library

Main Page

Modules

Data Structures

Files

File List

Globals

File List

Here is a list of all documented files with brief descriptions:

[detail level [1](#) [2](#)]

 Inc	
 osx_motion_fx.h	Header for OSX MotionFX module

Generated on Tue Apr 5 2016 17:29:15 for OSX MotionFX Software Library by



1.8.8

OSX MotionFX Software Library

[Main Page](#)

[Modules](#)

[Data Structures](#)

[Files](#)

Inc >

Inc Directory Reference

Files

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

Header for OSX MotionFX module.

Generated on Tue Apr 5 2016 17:29:15 for OSX MotionFX Software Library by

 doxygen

1.8.8

OSX MotionFX Software Library

Main Page	Modules	Data Structures	Files		
File List	Globals				
Inc					
osx_motion_fx.h File Reference					

[Data Structures](#) | [Macros](#) | [Enumerations](#) |
[Functions](#)

Header for OSX MotionFX module. [More...](#)

#include "stdint.h"

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

Data Structures

struct **osxFX_knobs**

struct **osxFX_input**

struct **osxFX_output**

struct **osxFX_calibFactor**

Macros

```
#define NUM_AXES 3
```

```
#define QNUM_AXES 4
```

Enumerations

```
enum osxMFX_Engine_State { OSXMFX_ENGINE_DISABLE = 0,  
    OSXMFX_ENGINE_ENABLE = 1 }
```

```
enum osxMFX_Engine_Output_Ref_Sys {  
    OSXMFX_ENGINE_OUTPUT_NED = 0,  
    OSXMFX_ENGINE_OUTPUT_ENU = 1 }
```

Functions

uint8_t **osx_MotionFX_initialize** (void)
Initialize the MotionFX engine. [More...](#)

void **osx_MotionFX_setKnobs** (osxMFX_knobs *knobs)
Set the internal knobs. [More...](#)

void **osx_MotionFX_getKnobs** (osxMFX_knobs *knobs)
Get the current internal knobs. [More...](#)

osxMFX_Engine_State **osx_MotionFX_getStatus_6X** (void)
Get the status of the 6 axes library. [More...](#)

osxMFX_Engine_State **osx_MotionFX_getStatus_9X** (void)
Get the status of the 9 axes library. [More...](#)

void **osx_MotionFX_enable_6X**
(osxMFX_Engine_State enable)
Enable or disable the 6 axes function (ACC + GYRO) [More...](#)

void **osx_MotionFX_enable_9X**
(osxMFX_Engine_State enable)
Enable or disable the 9 axes function (ACC + GYRO + MAG) [More...](#)

void **osx_MotionFX_setGbias** (float *gbias)
Set the initial gbias. [More...](#)

void **osx_MotionFX_getGbias** (float *gbias)
Get the initial gbias. [More...](#)

void **osx_MotionFX_update** (osxMFX_output

`*data_out, osxMFX_input *data_in, float
eml_deltatime, float *eml_q_update)`
Run the Kalman filter update. [More...](#)

`void osx_MotionFX_propagate (osxMFX_output
*data_out, osxMFX_input *data_in, float
eml_deltatime)`
Run the Kalman filter propagate. [More...](#)

`int osx_MotionFX_getLibVersion (char *version)`
Get the library version. [More...](#)

`void osx_MotionFX_compass_init (void)`
Initialize the compass calibration library.
[More...](#)

`void osx_MotionFX_compass_saveAcc (int acc_>
int acc_y, int acc_z)`
Save accelerometer data ENU systems
coordinate. [More...](#)

`void osx_MotionFX_compass_saveMag (int
mag_x, int mag_y, int mag_z)`
Save magnetometer data ENU systems
coordinate. [More...](#)

`int osx_MotionFX_compass_run (void)`
Run compass API at 25 Hz. [More...](#)

`unsigned char osx_MotionFX_compass_isCalibrated (void)`
Check if calibration is needed. [More...](#)

`void osx_MotionFX_compass_forceReCalibration
(void)`
Force new calibration. [More...](#)

`void osx_MotionFX_getCalibrationData`

(osxMFX_calibFactor *CalibrationData)
Get calibration data. [More...](#)

void **osx_MotionFX_setCalibrationData**
(osxMFX_calibFactor *CalibrationData)
Set calibration data. [More...](#)

Detailed Description

Header for OSX MotionFX module.

Author

VMA Application Team

Version

V1.0.7

Date

17-September-2015

Attention

© COPYRIGHT(c) 2016 STMicroelectronics

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. Neither the name of STMicroelectronics nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

OSX MotionFX Software Library

Main Page	Modules	Data Structures	Files
File List	Globals		
All	Functions		

Here is a list of all documented functions, variables, defines, enums, and typedefs with links to the documentation:

- `osx_MotionFX_compass_forceReCalibration()` : [osx_motion_fx.h](#)
- `osx_MotionFX_compass_init()` : [osx_motion_fx.h](#)
- `osx_MotionFX_compass_isCalibrated()` : [osx_motion_fx.h](#)
- `osx_MotionFX_compass_run()` : [osx_motion_fx.h](#)
- `osx_MotionFX_compass_saveAcc()` : [osx_motion_fx.h](#)
- `osx_MotionFX_compass_saveMag()` : [osx_motion_fx.h](#)
- `osx_MotionFX_enable_6X()` : [osx_motion_fx.h](#)
- `osx_MotionFX_enable_9X()` : [osx_motion_fx.h](#)
- `osx_MotionFX_getCalibrationData()` : [osx_motion_fx.h](#)
- `osx_MotionFX_getGbias()` : [osx_motion_fx.h](#)
- `osx_MotionFX_getKnobs()` : [osx_motion_fx.h](#)
- `osx_MotionFX_getLibVersion()` : [osx_motion_fx.h](#)
- `osx_MotionFX_getStatus_6X()` : [osx_motion_fx.h](#)
- `osx_MotionFX_getStatus_9X()` : [osx_motion_fx.h](#)
- `osx_MotionFX_initialize()` : [osx_motion_fx.h](#)
- `osx_MotionFX_propagate()` : [osx_motion_fx.h](#)
- `osx_MotionFX_setCalibrationData()` : [osx_motion_fx.h](#)
- `osx_MotionFX_setGbias()` : [osx_motion_fx.h](#)
- `osx_MotionFX_setKnobs()` : [osx_motion_fx.h](#)
- `osx_MotionFX_update()` : [osx_motion_fx.h](#)

OSX MotionFX Software Library

Main Page	Modules	Data Structures	Files
File List	Globals		
All	Functions		

- `osx_MotionFX_compass_forceReCalibration()` : [`osx_motion_fx.h`](#)
- `osx_MotionFX_compass_init()` : [`osx_motion_fx.h`](#)
- `osx_MotionFX_compass_isCalibrated()` : [`osx_motion_fx.h`](#)
- `osx_MotionFX_compass_run()` : [`osx_motion_fx.h`](#)
- `osx_MotionFX_compass_saveAcc()` : [`osx_motion_fx.h`](#)
- `osx_MotionFX_compass_saveMag()` : [`osx_motion_fx.h`](#)
- `osx_MotionFX_enable_6X()` : [`osx_motion_fx.h`](#)
- `osx_MotionFX_enable_9X()` : [`osx_motion_fx.h`](#)
- `osx_MotionFX_getCalibrationData()` : [`osx_motion_fx.h`](#)
- `osx_MotionFX_getGbias()` : [`osx_motion_fx.h`](#)
- `osx_MotionFX_getKnobs()` : [`osx_motion_fx.h`](#)
- `osx_MotionFX_getLibVersion()` : [`osx_motion_fx.h`](#)
- `osx_MotionFX_getStatus_6X()` : [`osx_motion_fx.h`](#)
- `osx_MotionFX_getStatus_9X()` : [`osx_motion_fx.h`](#)
- `osx_MotionFX_initialize()` : [`osx_motion_fx.h`](#)
- `osx_MotionFX_propagate()` : [`osx_motion_fx.h`](#)
- `osx_MotionFX_setCalibrationData()` : [`osx_motion_fx.h`](#)
- `osx_MotionFX_setGbias()` : [`osx_motion_fx.h`](#)
- `osx_MotionFX_setKnobs()` : [`osx_motion_fx.h`](#)
- `osx_MotionFX_update()` : [`osx_motion_fx.h`](#)

OSX MotionFX Software Library

Main Page	Modules	Data Structures	Files
File List	Globals		
Inc			

osx_motion_fx.h

Go to the documentation of this file.

```
1
38 /* Define to prevent recursive inclusion ---
-----*/
39 #ifndef _OSX_MOTION_FX_H_
40 #define _OSX_MOTION_FX_H_
41
42 #ifdef __cplusplus
43 extern "C" {
44 #endif
45
46 /* Includes -----
-----*/
47 #include "stdint.h"
48
60 /* Exported types -----
-----*/
61 #define NUM_AXES      3
62 #define QNUM_AXES    4
63
70 typedef enum
71 {
72     OSXMFX_ENGINE_DISABLE = 0,
73     OSXMFX_ENGINE_ENABLE = 1
74 } osxMFX_Engine_State;
75
76 typedef enum
```

```
77 {  
78     OSXMFx_ENGINE_OUTPUT_NED = 0,  
79     OSXMFx_ENGINE_OUTPUT_ENU = 1  
80 } osxMFx_Engine_Output_Ref_Sys;  
81  
82 typedef struct  
83 {  
84     float ATime;  
/* merge rate to the accel */  
85     float MTime;  
/* merge rate to the mag */  
86     float FrTime;  
/* merge rate to the accel when external  
accelerations occurs */  
87     unsigned char LMode;  
/* gyro bias learn mode: 1-static learning 2-  
dynamic learning */  
88     float gbias_mag_th_sc_6X;  
/* 6 axes scaler for the gyro bias mag  
threshold nominal */  
89     float gbias_acc_th_sc_6X;  
/* 6 axes scaler for the gyro bias acc  
threshold nominal */  
90     float gbias_gyro_th_sc_6X;  
/* 6 axes scaler for the gyro bias gyro  
threshold nominal */  
91     float gbias_mag_th_sc_9X;  
/* 9 axes scaler for the gyro bias mag  
threshold nominal */  
92     float gbias_acc_th_sc_9X;  
/* 9 axes scaler for the gyro bias acc  
threshold nominal */  
93     float gbias_gyro_th_sc_9X;  
/* 9 axes scaler for the gyro bias gyro  
threshold nominal */  
94     unsigned char modx;  
/* setting to indicate the decimation,
```

```
95     set to 1 in smartphone/tablet
96
97     set to >=1 in embedded solutions */
98     char acc_orientation[QNUM_AXES];
99     /* accelerometer data orientation */
100    char gyro_orientation[QNUM_AXES];
101    /* gyroscope data orientation */
102    char mag_orientation[QNUM_AXES];
103    /* magnetometer data orientation */
104    osxMFX_Engine_Output_Ref_Sys output_type;
105    /* 0: NED, 1: ENU */
106    int start_automatic_gbias_calculation;
107 } osxMFX_knobs;
108
109
110
111
112
113
114
115
116
117
118
```

typedef struct

{

float mag[NUM_AXES]; /* calibrated mag
[uT]/50 */

float acc[NUM_AXES]; /* acc [g] */

float gyro[NUM_AXES]; /* gyro [dps] */

} osxMFX_input;

typedef struct

{

float rotation_9X[NUM_AXES]; /*
9 axes yaw, pitch and roll */

float quaternion_9X[QNUM_AXES]; /*
9 axes quaternion */

float gravity_9X[NUM_AXES]; /*
9 axes device frame gravity */

float linear_acceleration_9X[NUM_AXES]; /*
9 axes device frame linear acceleration */

float heading_9X; /*
9 axes heading */

float rotation_6X[NUM_AXES]; /*
6 axes yaw, pitch and roll */

```

119     float quaternion_6X[QNUM_AXES];           /*  

   6 axes quaternion */  

120     float gravity_6X[NUM_AXES];                /*  

   6 axes device frame gravity */  

121     float linear_acceleration_6X[NUM_AXES]; /*  

   6 axes device frame linear acceleration */  

122     float heading_6X;                         /*  

   6 axes heading */  

123 } osxMFX_output;  

124  

125 typedef struct  

126 {  

127     signed short magoffX; /* X axis Offset */  

128     signed short magOffY; /* Y axis Offset */  

129     signed short magOffZ; /* Z axis Offset */  

130     float magGainX;      /* X axis Gain */  

131     float magGainY;      /* Y axis Gain */  

132     float magGainZ;      /* Z axis Gain */  

133     float expMagVect;    /* expected magnetic  

   field */  

134 } osxMFX_calibFactor;  

139 /* Exported constants -----  

----- */  

140 /* Exported variables -----  

----- */  

141 /* Exported macro -----  

----- */  

142 /* Exported functions -----  

----- */  

150 uint8_t osx_MotionFX_initialize(void);  

151  

157 void osx_MotionFX_setKnobs(osxMFX_knobs  

   *knobs);  

158  

164 void osx_MotionFX_getKnobs(osxMFX_knobs  

   *knobs);  

165

```

```
170 osxMFX_Engine_State  
    osx_MotionFX_getStatus_6X(void);  
171  
176 osxMFX_Engine_State  
    osx_MotionFX_getStatus_9X(void);  
177  
183 void  
    osx_MotionFX_enable_6X(osxMFX_Engine_State  
    enable);  
184  
190 void  
    osx_MotionFX_enable_9X(osxMFX_Engine_State  
    enable);  
191  
197 void osx_MotionFX_setGbias(float *gbias);  
198  
204 void osx_MotionFX_getGbias(float *gbias);  
205  
214 void osx_MotionFX_update(osxMFX_output  
    *data_out, osxMFX_input *data_in, float  
    eml_deltatime, float *eml_q_update);  
215  
223 void osx_MotionFX_propagate(osxMFX_output  
    *data_out, osxMFX_input *data_in, float  
    eml_deltatime);  
224  
230 int osx_MotionFX_getLibVersion(char  
    *version);  
231  
236 void osx_MotionFX_compass_init(void);  
237  
245 void osx_MotionFX_compass_saveAcc(int acc_x,  
    int acc_y, int acc_z);  
246  
254 void osx_MotionFX_compass_saveMag(int mag_x,  
    int mag_y, int mag_z);  
255
```

```
260 int osx_MotionFX_compass_run(void);
261
266 unsigned char
    osx_MotionFX_compass_isCalibrated(void);
267
272 void
    osx_MotionFX_compass_forceReCalibration(void);
273
279 void
    osx_MotionFX_getCalibrationData(osxMFX_calibFa
ctor* CalibrationData);
280
286 void
    osx_MotionFX_setCalibrationData(osxMFX_calibFa
ctor* CalibrationData);
287
300 #ifdef __cplusplus
301 }
302#endif
303
304#endif /* _OSX_MOTION_FX_H_ */
305
306 /***** (C) COPYRIGHT
    STMicroelectronics *****END OF FILE****/
```