
How to install and run the osxMotionFX Sensor Data Fusion library

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Main components	
osxMotionFX	Real-time motion-sensor data fusion software expansion for STM32Cube
X-NUCLEO-IKS01A1	Motion MEMS and environmental sensor expansion board for STM32 Nucleo
STEVAL-MKI160V1	LSM6DS3 adapter board for a standard DIL24 socket
NUCLEO-F401RE	STM32 Nucleo-64 development board with STM32F401RET6 MCU, supports Arduino and ST morpho connectivity

How to install the osxMotionFX Sensor Data Fusion SW library

The osxMotionFX is an add-on software package for the X-CUBE-MEMS1. The software runs on the STM32 and includes drivers that recognize the sensors and provide real-time motion-sensor data fusion.

The following are the necessary steps to correctly install the osxMotionFX sensor data fusion library on the NUCLEO-F401RE evaluation board:

1. Plug the X-NUCLEO-IKS01A1 expansion board into the Nucleo-F401 board (if the STEVAL-MKI160V1 board is available, plug it into the X-NUCLEO-IKS01A1 expansion board).
2. Connect The Nucleo-F401 board to the PC through a mini-USB cable. Drivers will be automatically installed.
3. If the X-CUBE-MEMS1 package is already installed on the PC to go step 4, if not
 - a. Download the X-CUBE-MEMS1 package found on st.com
 - b. Unzip the file (suggested location: "C:\Program Files (x86)\STMicroelectronics\OpenSoftwareX").
4. Download and install the package osxMotionFX found on st.com. Note: the default installation will create a folder named "Workspace" in the folder "C:\Program Files (x86)\STMicroelectronics\OpenSoftwareX"
 - a. This will also install the OSX LicenseWizard. Note: the default installation will create a folder named "OSX LicenseWizard" in

the folder "C:\Program Files
(x86)\STMicroelectronics\OpenSoftwareX"

5. From the Workspace folder in the osxMotionFX package, copy the folder STM32_OSX_MotionFX_Library (in "\Middlewares\ST") into the X-CUBE-MEMS1 package in the folder "\Middlewares\ST". Note: if the path "\Middlewares\ST" is not present in the X-CUBE-MEMS1, create it.
6. From the osxMotionFX package, copy the folder DataLogFusion (in "Projects\Multi\Applications") into the X-CUBE-MEMS1 package in the folder "Projects\Multi\Examples".
7. Open the OSX LicenseWizard:
 - a. Select "MotionFX" library in the "Select the library to be activated..." button.
 - b. Click on "Identify STM32 Nucleo board".
 - c. Generate a license request.
 - d. Send the license request. An automatic mail will be sent from open.mems@st.com with a node-locked license number.
8. To compile the application example there are available three different IDEs: IAR Embedded Workbench, KEIL, and System Workbench for STM32. Taking as a reference IAR, open the project DataLogFusion in the folder "Projects\Multi\Examples\DataLogFusion\EWARM"
 - a. Copy and paste the license number obtained in step 7 into the file *osx_license.h* in the folder "\Middlewares\ST\STM32_OSX_MotionFX_Library"
 - b. Compile the project and download into the target Nucleo-F401RE board.

How to run the Sensor Data Fusion demo

The steps below quickly summarize how to run the reference example demo embedding the osxMotionFX library. For more details refer to the UM1866.

The X-CUBE-MEMS1 expansion for STM32Cube contains a utility for Windows PCs named "Sensors_DataLog.exe ". This utility is located in the X-CUBE-MEMS1 package in the folder "\Utilities\PC_software\Sensors_DataLog".

1. Launch Sensors_DataLog.exe and check if the COM device number for the current expansion board is correct (check in the Windows "Device Manager" the "STMicroelectronics STLink Virtual COM port").
2. Set the appropriate delay/interval in milliseconds between consecutive data points; the default is 500 ms
3. Press "Start Sensor Fusion" and a 3D cube is displayed. The cube animation is generated using sensor fusion quaternions.
4. Press "Switch to 6x Fusion" button to switch dynamically from 9x fusion to 6x fusion

Support material

Related design support material
Product Evaluation boards: X-NUCLEO-IKS01A1 STEVAl-MK1160V1 NUCLEO-F401RE
Development kits: osxMotionFX: Real-time motion-sensor data fusion software expansion for STM32Cube X-CUBE-MEMS1
Documentation
Data brief: DB2531: Real-time motion-sensor data fusion software expansion for STM32Cube
User manual: UM1866: Getting started with the osxMotionFx fusion and compass library for X-CUBE-MEMS1 expansion for STM32Cube

Revision history

Date	Version	Changes
04-Dec-2015	1	Initial release

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