

# ***eMD-SmartMotion\_ICM20948***

## ***Software Release Notes***

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## OVERVIEW

This document details the relevant information regarding the eMD-SmartMotion\_ICM20948-1.1.0 software release.

## SUPPORTED SENSORS

- ICM20948

## SOFTWARE MODULES INCLUDED

The eMD-SmartMotion package includes all the necessary files to create a custom application for any of the supported ICM sensors (see above).

The package is organized as follow

- **doc:** Document(s) describing the use of this firmware development platform.
- **EMD-App:** contains sample firmware source and project files.
  - o **src:**
    - **At the top level:** Shared .c & .h files.
    - **ASF:** Shared Atmel system files.
    - **config:** Shared config files.
    - **ICM\*:** Sensor specific files, main.[c,h], sensor.[c,h] and system.[c,h].
  - o **\*.cproj:** AtmelStudio project file for the supported sensor.
- **EMD-Core:** Contains TDK driver files. These files are built into an archive libEMD-Core-ICM\*.a. Each supported sensor has it's own .a file.
  - o **config :** The Makefile(s) used to create the sensor driver archives.
  - o **sources/Invn:** TDK libraries source files.
  - o **\*.cproj:** AtmelStudio project files for each of the supported sensors.
- **scripts** – Batch files for building and flashing release versions of the firmware for each sensor.
- **tools** – The files required to run the host application sensor-cli.
- **EMD-G55-ICM\*.atsln** – Atmel Studio solution files for each of the supported sensors.
- **release** – Contains precompiled elf and binary files

## SUPPORTED FEATURES

Sensor features supported:

- Raw accelerometer
- Raw Gyroscope
- Calibrated accelerometer
- Calibrated gyroscope
- Uncalibrated gyroscope
- Game rotation vector
- Gravity
- Linear Acceleration

Optional sensor features supported:

- Calibrated magnetometer (AKM9916 only)
- Uncalibrated magnetometer
- Rotation vector
- Geomagnetic rotation vector
- Step Detector
- Step Counter
- Tilt Detector
- Pick-Up Gesture
- BAC (Activity Classifier)



- B2S
- SMD

## NEW FEATURES

- Addition of Accel and gyro offset driver API
- Support for non-default mag mounting matrix

## KNOWN ISSUES

- SPI clock interface speed should not be set higher than 2.5MHz to ensure sensor data consistency
  - SMD detection for running like motion has not been supported
  - Occasional Time-stamp jitter observed during stress-test
- Occasionally, accelerometer data in wrong rate and/or no magnetometer data have been seen after many iteration of command sequences like, set odr, enable-disable continuous and non-continuous sensors. This unexpected system behavior has been seen during stress-test, only for SPI configuration on SmartMotion platform (Atmel G55 based). The state can be recovered by restarting the sensor-cli application (resets the device in software) or resetting the device manually. The issue has not been seen for SmartMotion I2C interface or other MCU platforms using SPI interface.

## TEST PLATFORM

This section describes the software test platform used during the test

ICM20948:

Software Component	
Package	eMD-SmartMotion_ICM20948-1.1.0
Host	Windows 7

  

Hardware Component	
eMD Platform	SmartMotion board with onboard ICM20948

## NOTES

This release provides standalone example applications that run on the eMDSmartMotion platform only. A host application, sensor-cli, that runs on a Windows PC and communicates with the eMD-SmartMotion firmware through a TDK transport protocol is included within this release.



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