

# Motion Sensor User Guide

## Introduction

This motion sensor code is meant to be a Matlab demonstration of how to extract motion sensor data from the memory card. It is not intended to be used as a standalone app and therefore has the following requirements:

1. It works on a single, 16MB file
2. The file it works on must be completely filled

It must be modified in order to work with multiple files or a file that was not completely filled during a recording.

It uses the values in Constants.m, which were assigned based on values contained in the document MotionDataFormatDefinition\_v4.pdf.

## User Instructions

To run this example, the user must fill in the relevant information in the Initialize section of the MotionSensorExample.m script, i.e.

1. filename: the file name including the path
2. numChannels: the number of channels in recording
3. motionSensorIndex: the zero indexed channel containing the motion sensor data (e.g. if the motion sensor is in the first column, this value would be zero)
4. acclMax: the maximum value of the selected accelerometer range. This should always be an integer value multiplied by the acceleration due to gravity (consts.G)
5. gyroMax: the selected range of the gyroscope in degrees/second
6. magMax: the maximum value of the selected magnetometer range in teslas

After entering these initial values, running the script will generate time stamps, as well as structs for each type of data (accelerometer, gyroscope, and magnetometer) in each direction (x, y, and z). It also plots the responses of each.

## Note

The timestamp is only recorded at the beginning of each block, thus the timestamp of each data point must be obtained through interpolation. In actual fact, we interpolate the timestamps across chunks of several data blocks (in the example code, 10 blocks) to reduce the effects of jitter. For the final block in a file, we extrapolate timestamps based on the frequencies of each data type (i.e. accelerometer, gyroscope, or magnetometer) found in Constants.m.