

MEMSENSE

**nIMU and μ IMU
Inertial Data Latency**

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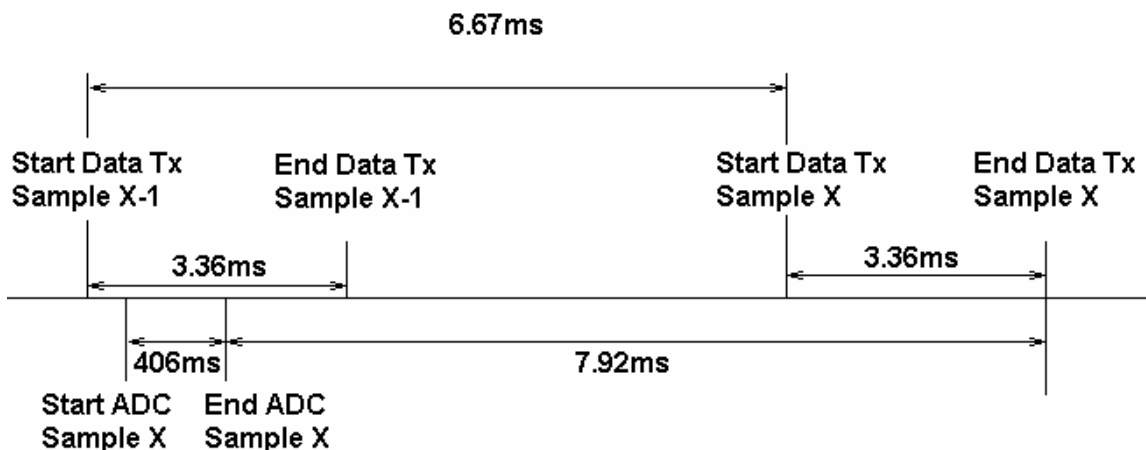
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MEMSense nIMU and μ IMU Inertial Data Latency by Protocol

Introduction

The process of characterizing inertial motion for use in a control system requires an understanding of the inertial data's timeliness. This allows the control system designer to model the latency in the system and compensate it through predictive algorithms or other such mechanisms. This document details the latency associated with MEMSense nIMUs and μ IMUs by protocol used in the serial output. Figure 1 below depicts the inertial data's latency when using a nIMU or μ IMU with the RS422 serial output protocol. Figure 2, on the following page, details the inertial data's latency when utilizing the I²C protocol with the nIMU.



RS422 (UART)

Sample Frequency = 150Hz

Sample Period = 6.67ms

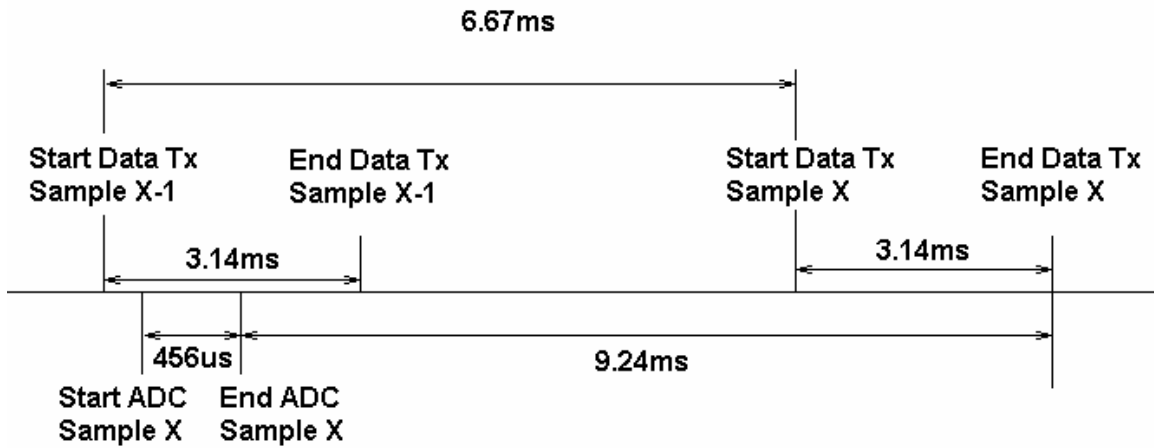
Data Tx Freq = 115.2 KHz

Data Latency = 7.92 ms (min) to 8.33 ms (max)

Figure 1 - RS422 inertial data latency in the nIMU and μ IMU



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I2C (SMBus)

Sample Frequency = 150Hz

Sample Period = 6.67ms

Data Tx Frequency = 135KHz (approx)

Data Latency = 9.24ms (min) to 9.70ms(max)

Figure 2 – I²C inertial data latency in the nIMU



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