3DM-GX1®
Orientation Sensor

Fastest Data Output Rates

General

MicroStrain's 3DM-GX1® orientation sensor allows the user to optimize the data output rate of finished data quantities to suit varying applications. The **fastest data output rates** can be achieved by setting the *timer tick* intervals as shown below.

- This technical note assumes that:
    - the user has a working knowledge of the 3DM-GX1®;
    - the user is using MicroStrain's 3DM-GX1® Data Acquisition and Display software;
    - the user is familiar with the Read and Write EEPROM functions on the EEPROM map screen of the software.
- The table shows the various **Data Quantity** outputs available *in continuous mode* for the 3DM-GX1®, the fastest achievable sampling **Rate** per second (in Hz), and the values that must be written to the 4 controlling EEPROM addresses (**238, 240, 242 and 246**).
- As an example, the red row indicates that if the user wants the fastest data output for Gyro-Stabilized Orientation Matrix (111 samples per second), the user should set EEPROM 238 to 4, EEPROM 240 to 10, EEPROM 242 to 250 and EEPROM 246 to 9.

Data Quantity	Rate	238	240	242	246
Raw Sensor Bits	143 Hz	4	10	250	7
Gyro-Stabilized Vectors	125 Hz	4	10	250	8
Instantaneous Vectors	125 Hz	4	10	250	8
Instantaneous Quaternion	100 Hz	4	10	250	10
Gyro-Stabilized Quaternion	100 Hz	4	10	250	10
Instantaneous Orientation Matrix	111 Hz	4	10	250	9
Gyro-Stabilized Orientation Matrix	111 Hz	4	10	250	9
Gyro-Stabilized Quaternion & Vectors	100 Hz	4	10	250	10
Instantaneous Euler Angles	100 Hz	4	10	250	10
Gyro-Stabilized Euler Angles	100 Hz	4	10	250	10
Gyro-Stabilized Quaternion & Instantaneous Vectors	100 Hz	4	10	250	10
Gyro-Stabilized Euler Angles & Accel & Rate Vector	100 Hz	4	10	250	10

Fastest Data Output Rates

- **Notes:** The user should cycle the power on the 3DM-GX1® after setting the timer tick intervals. **The baud rate setting must be 38,400 or 115,200; 19,200 will not support all these rates.**

Operating without Compensation Algorithm

- Even faster data output rates can be achieved with certain data quantities by turning off the 3DM-GX1®'s Compensation Algorithm.
- These data quantities include a) Raw Sensor Bits, b) Instantaneous Vectors, c) Instantaneous Quaternion, d) Instantaneous Orientation Matrix and e) Instantaneous Euler Angles.
- Please note that when the Compensation Algorithm is turned off, all stabilized data quantities are invalid.
- Using the EEPROM map screen described above, the user can switch the Compensation Algorithm off by writing a 0 value to EEPROM 122. The Compensation Algorithm can be turned on by writing a 1.
- The table shows the various **Data Quantity** outputs available *in continuous mode* for the 3DM-GX1®, the fastest achievable sampling **Rate** per second (in Hz), and the values that must be written to the 4 controlling EEPROM addresses (**238, 240, 242 and 246**).
- As an example, the red row indicates that if the user wants the fastest data output for Instantaneous Vectors (333 samples per second), the user should set EEPROM 238 to 4, EEPROM 240 to 10, EEPROM 242 to 250 and EEPROM 246 to 3.

Data Quantity	Rate	238	240	242	246
Raw Sensor Bits	333 Hz	4	10	250	3
Instantaneous Vectors	333 Hz	4	10	250	3
Instantaneous Quaternion	200 Hz	4	10	250	5
Instantaneous Orientation Matrix	200 Hz	4	10	250	5
Instantaneous Euler Angles	166 Hz	4	10	250	6

- **Notes:** The user should cycle the power on the 3DM-GX1® after setting the timer tick intervals. **The baud rate setting must be 115,200; 38,400 and 19,200 will not support all these rates.**