

3DM-GX5-45™

Using a 3DM-GX5-45™ with Bluetooth® RS-232 Adapters

Overview

The LORD SENSING MicroStrain® [3DM-GX5-45™](#) GNSS Aided Inertial Navigation System combines MEMS inertial sensors, a GNSS receiver, and an Auto-Adaptive Extended Kalman Filter to generate position, velocity, and attitude (PVA) estimates. It is available with RS-232 and USB communication interfaces. A wireless communication interface can easily be integrated by employing off-the-shelf Bluetooth® RS-232 adapters.

The Sena Technologies, Inc. Parani™ [SD1000](#) is a Class 1 Bluetooth® Serial Adapter that transmits 100 meters and up to 1000 meters with optional antenna. The SD1000 measures just 99mm long x 20mm wide x 16mm high, and when coupled with the 3DM-GX5-45™, provides a wireless inertial sensor package with a very small footprint.

This technical note briefly describes how to connect the 3DM-GX5-45™ to the Parani™ serial adapter and establish communication using LORD SENSING MicroStrain® MIP™ Monitor software. The reader will understand that many other approaches may be taken using different Bluetooth® devices, computer hosts (including PCs, microprocessors, SBCs, etc.), communication software and coding languages. This technical note demonstrates the basic principle. Familiarity with the 3DM-GX5-45™ and MIP™ Monitor software is assumed.



Connecting the 3DM-GX5-45™ and the SD1000

Two SD1000 Bluetooth® serial adapters are employed. Following the Quick Start Guide provided with the adapters:

- the two adapters were powered with their AC power supplies;
- the baud rates were set on the adapters to 115200 (the default 3DM-GX5-45™ baud rate) by setting the dip switches;
- the adapters were 'paired' using the 7 step Quick Pairing method;
- one adapter was connected to a standard 9 pin serial port on a Windows® PC;
- the 3DM-GX5-45™ was connected to its standard RS-232 communication/power cable (model 6212-1000);
- the AC power supply was connected to the RS-232 communication/power cable, powering the 3DM-GX5-45™;
- the RS-232 communication/power cable and the second adapter were connected using the 9 pin gender changer available with the SD1000.

Using with MIP™ Monitor

- Launch MIP™ Monitor software and establish communication with the 3DM-GX5-45™ as normal.
- Click Settings.
- Click Load Default Settings and a confirming message box appears.
- Click OK and the message box disappears.
- Click Settings.
- Click Save Current Settings and a confirming message box appears.
- Click OK and the message box disappears.
- Click Settings.
- Click Device and the Device Setup screen will appear.
- Click the Estimation Filter tab.
- Click the Message Format sub-tab.
- Select Attitude (Euler RPY) in the drop-down.
- Select 100 Hz.

- Click the EF Aiding sub-tab.
- Select Magnetometer in the Heading Aiding drop-down.
- Click the EF Options sub-tab.
- Check the Enable Auto EF initialization checkbox.
- Click OK and the Device Setup window disappears.
- Click View.
- Click 3D Attitude and the 3D Attitude window appears.
- Click the blue arrow icon to start sampling.
- Rotate the 3DM-GX5-45™ and the 3D model will follow.

Bluetooth® Throughput

Testing indicates that MIP™ Monitor software will support 100 Hz sampling of the 3DM-GX4-45™ via the Bluetooth® RS-232 connection, as shown above. Faster sampling rates and/or larger data packet sizes will likely cause data drop-outs due to Bluetooth® bandwidth issues, operating system interrupts, timeouts, etc. Performance may potentially be improved by programming techniques for those users writing their own applications, or by the use of other Bluetooth® equipment.

Wider Use

This technical note uses the 3DM-GX5-45™ as an example inertial sensor to explain the integration. This same integration can be applied to all LORD SENSING MicroStrain® GX5 inertial sensors including the 3DM-GX5-10 IMU, 3DM-GX5-15 VRU, 3DM-GX5-25 AHRS, and 3DM-GX5-35 AHRS + GNSS.

Support

LORD SENSING MicroStrain® support engineers are always available to expand on this subject and support you in any way we can.