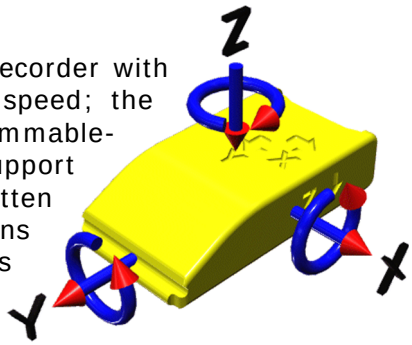
PraxSys Pty. Ltd.

Inertial Measurement Unit (IMU) v3.7 *Short Guide*



The PraxSys Inertial Measurement Unit (IMU) is a battery-powered data recorder with inertial sensors for measuring tri-axial linear acceleration and rotational speed; the illustration shows the inertial axis convention. IMU's also have a programmable-gain differential analog input, multiple digital input/output points, and support SPI, I²C and UART serial communications with external devices. Data is written to 1Gb flash memory at rates up to 2kHz. A real-time-clock (RTC) maintains an accurate clock/calendar. The IMU connects to a Windows® PC via its USB-C port for management and charging, and to external devices during recording. For detailed information refer to the *IMU v3.7 User Guide*.

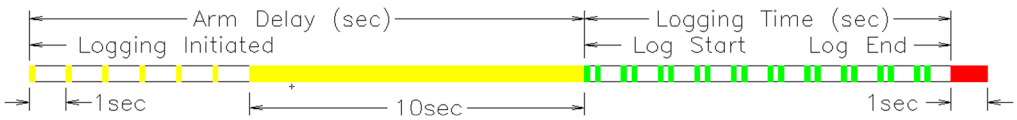
- Except for IMU-proprietary cables, any connection to the IMU must only use a **USB2.0** standard cable (power/data communications) to avoid damage to the IMU or connected device.
- When the IMU is used in dusty or damp environments, a Dust Cap should be fitted to its USB-C port to avoid contaminant ingress; the IMU must not be exposed to liquids.
- IMU batteries should be charged monthly when not in use.
  Up to 6 IMU's can be charged from a PC via the Hub without the Hub power pack.

The general process flow using the IMU software to conduct tests with IMU's is:

1. Start IMU software IMU(v3_7_#).
2. Connect IMU's to the PC where they are automatically detected by the IMU software.
3. Configure the IMU's for logging (if required).
4. Initiate logging whereby the IMU enters the logging armed state (IMU shows yellow).
5. Disconnect the IMU's from PC and mount for testing.
6. During logging (IMU flashing green) conduct test measurements.
   The IMU briefly shows red when logging has finished.
7. Re-connect IMU's to the PC.
8. Upload IMU's recorded data to a binary-format BIN (*.bin) file.
9. Process a BIN file in engineering units to a comma-separated-variable CSV (*.csv) text file.
10. Erase IMU's memory.
11. Repeat to step 3, or
12. Finish testing, command IMU's to sleep, exit IMU software, disconnect IMU's after charging.

IMU's have a colour LED visible through the IMU case for status annunciation, typically indicating:
IMU idle, sleep pending disconnection, error.
IMU logging armed.
IMU logging.
User *Manual Trigger* input (not IMU controlled)

By default, IMU's flash red every 5 seconds when idle or, after 30 minutes inactivity, show red as the IMU enters sleep mode pending disconnection from a PC or charger. When asleep and disconnected from a PC, re-connect an IMU to a PC to awaken it. IMU LED annunciation during the logging process is:

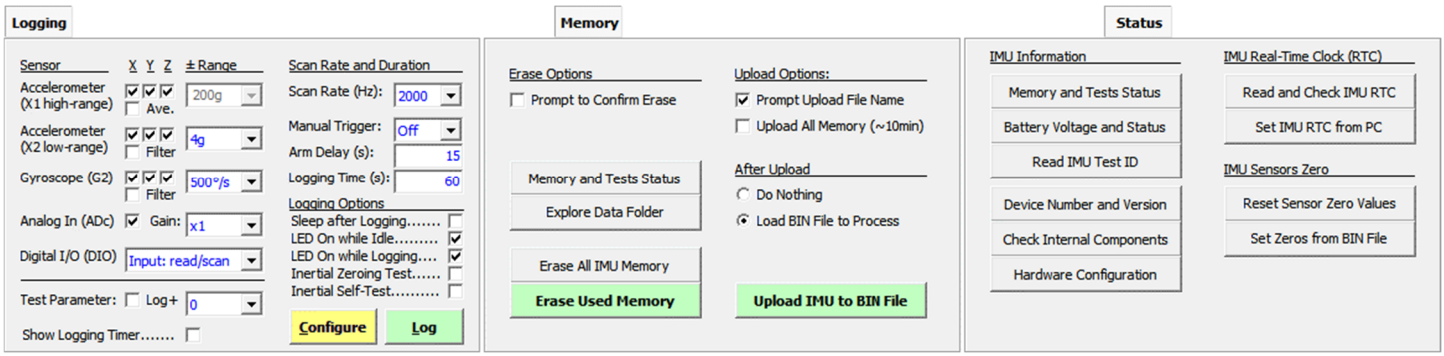


Windows® PC software IMU(v3_7_#) is used for IMU configuration, logging, data retrieval and processing.

Connected IMU's are automatically detected by the software and listed across the top of the main screen as a toolbar. When connecting IMU's allow a few seconds for the IMU's to be detected and identified by the software before they appear.

Selecting [ALL] in the IMU toolbar will broadcast commands to all listed IMU's. Selecting an individual IMU's button will issue commands to the selected IMU.

Principle software screen areas and controls for are:



The IMU logging configuration is sent to and saved in the IMU. If the configuration is changed the button colours indicating that the IMU configuration must be updated before its next use.

To initiate IMU logging click the [Log] button. Clicking [Log] with [ALL] IMU's will simultaneously initiate logging in all connected IMU's.

The IMU stores sensor measurements to its Flash memory. Data from successive tests will cumulate in memory until erased.

Tests data logged in the IMU memory is uploaded to a single binary-format BIN (*.bin) file from where it is processed to engineering units and saved in comma-separated-variable text-format CSV (*.csv) files; one CSV file per BIN file test.