Sensor Bus Mobile Processing Unit
SB-MPU

The **Sensor Bus Mobile Processor Unit, SB-MPU,** is a multi-purpose processing platform designed to work with the **Inertial Labs™ OS3D** family of orientation sensors.
The **SB-MPU** provides power to and receives data from up to 30 simultaneously connected sensors via TIA/EIA 485A serial protocol. The data is logged locally and can be transmitted in real-time to the PC via a standard mini-USB cable or wirelessly.

Applications

- Biomechanics research
- Motion capture systems
- Virtual reality simulation and training systems
- Orientation data logging
- Rehabilitation and monitoring systems

The **SB-MPU** is equipped with hot-pluggable connector able to support a combined total of up to 30 orientation sensors (**OS3D family**) and sensor bus extenders (**SB-Extender**) simultaneously. Input supply power is able to be provided by the Inertial Labs Battery Module or an equivalent DC supply. Power is then provided out to all of the connected sensor bus chains.

In addition to the currently supported feature set, the SB-MPU system is equipped with its own internal GPS receiver allowing for future support of GPS on board.

KEY FEATURES AND FUNCTIONALITY

- Supports up to 30 orientation sensors (OS3D type) per system
- Can be accessed via Bluetooth and WiFi
- Linux operating platform provides limitless customization capabilities
- Apache web server with PHP support provides ability to add user-defined web interface and controls
- Sensor bus extenders with GPIO, Analog, or RS232 interfaces can add buttons, switches, joysticks, RFID, or biometric devices to the wireless system
- Sensor algorithms allow for modification of the filter parameters for greater control over system performance
- Technical capability to integrate Full Body Training Motion Capture System with Smart Weapon Orientation System

3D Orientation Sensors, supported by **SB-MPU Sensor Bus Mobile Processor Unit:**

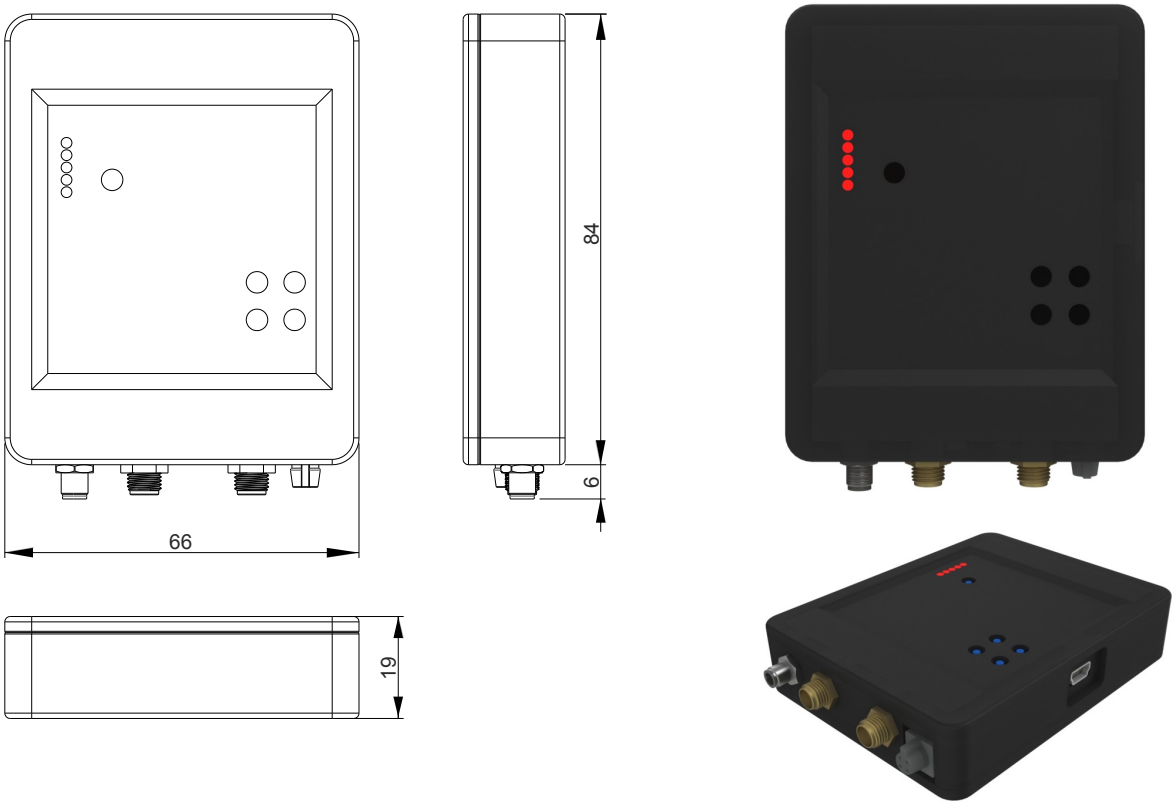
OS3D key specifications		
Heading accuracy, RMS	deg	1
Pitch and Roll accuracy, RMS	deg	0.2
Gyroscopes measurement range	deg/sec	up to ±1,200
Accelerometers measurement range	g	±2, ±6 and ±16
Gyroscopes in-run Bias stability	deg/hr	360
Accelerometers Bias stability	mg	3
Size (OS3D)	mm	50.7×14.5×9.2
Weight	gram	12

OS3DM key specifications		
Heading accuracy, RMS	deg	1
Pitch and Roll accuracy, RMS	deg	0.2
Gyroscopes measurement range	deg/sec	up to ±1,200
Accelerometers measurement range	g	±2, ±6 and ±16
Gyroscopes in-run Bias stability	deg/hr	360
Accelerometers Bias stability	mg	3
Size (OS3DM)	mm	16×10×3.5
Weight	gram	2

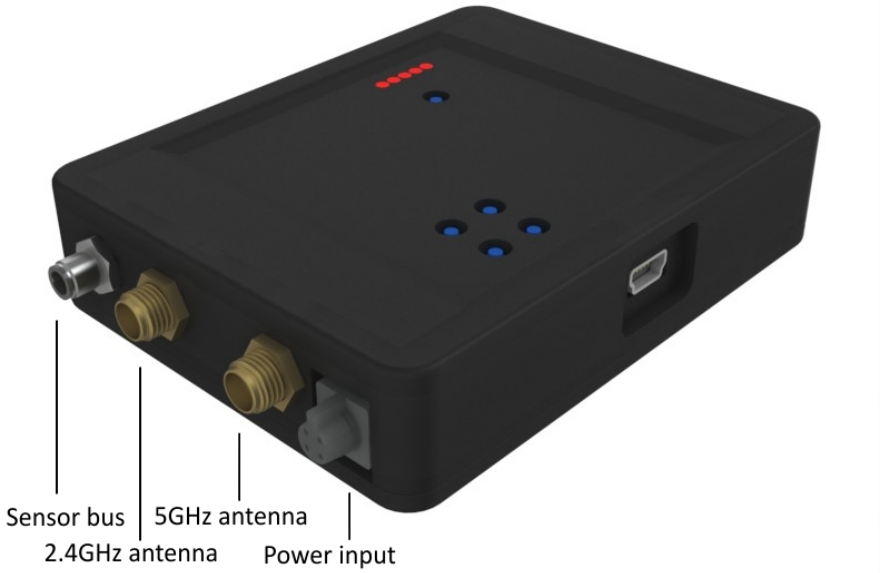
SB-MPU Specifications

Parameter	Value	Units
MPU to PC wireless interface	802.11a/b/g/n or Bluetooth	-
MPU to PC for debug console	Virtual Serial Port over miniUSB, 115200/8/noPar/1/noFC	
MPU to sensor bus interface	TIA/EIA-485A	-
Performance		
Internal Processor	Up to 1GHz (TI DM3730)	-
DDR Memory	512MB, 200MHz Mobile DDR SDRAM	-
Flash Memory	512MB, NAND flash memory +uSD card slot, up to 64GB	-
Environment		
Operating temperature	0 to +85	ºC
Storage temperature	-40 to +85	ºC
Electrical		
Input supply voltage	6.0 to 15.0	V
Output supply voltage	5±2%	V
Maximum output current	3000	mA
Power consumption (no sensors, WiFi off)	500	mW
Power consumption (no sensors, WiFi on)	1500	mW
Power consumption (18 sensors, WiFi on)	7000	mW
Sensor Bus Interface		
Standard	TIA/EIA-485A (half-duplex)	-
Baud Rate	1000000	bps
Byte Size	8	bits
Stop Bites	1	bits
Parity	No	-

SB-MPU mechanical interface drawing (mm)



SB-MPU electrical interface description



Power Connector Pinout (Binder 09 9766 30 04)

Num	Name	Function	Parameters
1	PWR	supply voltage	6.0V to 15.0V
2	GND	supply ground	