

BIOX AAL-Band 2.0 Data Sheet

The BIOX AAL-Band is an advanced, patented sensing technology to detect human limb motion. The technology, based on knowledge of biomechanics, robotics, and machine learning, is able to detect arm motion, strength, and gestures accurately and conveniently.

The AAL-Band combines data from an array of Force Sensing Resistors (FSRs) with data from an inertia measurement unit (IMU) to continuously estimate the current hand gesture as well as the hand location. All data can be transmitted via embedded bluetooth unit to receiving devices such as computers or mobile devices for processing and analyzing.

The AAL-Band can be used for many applications, for example, exoskeleton control, general human-machine/robot interface as well as research & education platform, etc.



BIOX ALL-Band key features

Robust design with bi-modality	BIOX AAL-Band is capable of functioning reliably in offices, labs, homes and industrial environments. By using bi-modality of FMG technology and IMU sensors, the BIOX AAL-Band achieves detection accuracy of over 90%.
Ultra-Low Power Consumption	BIOX AAL-Band achieves ultra-low power consumption with state-of-the-art features, such as multiple power modes and dynamic power scaling.
High Level of Integration	BIOX AAL-Band is highly-integrated with FMG sensors, IMU, Blue tooth, low-noise receiver amplifier and power management modules.
Comfortable use	The band is constructed using a soft material, which is comfortable to wear, also for a long time

BIOX AAL-Band overview

Model	Mounting place	Output	Applications	Interface ports
BIOX AAL-Band 2.0	Forearm	<ul style="list-style-type: none"> • 10 Hand gestures • Euler angles, angular velocity, linear acceleration and gravitational forces 	<ul style="list-style-type: none"> • Motion analysis • Human-machine interfacing • Exoskeleton and robot control 	Micro-USB and Bluetooth

Hardware

Sensors	<ul style="list-style-type: none"> • Array of eight FSR sensor to measure the muscle contraction intensity. • Highly sensitive IMU to measure angular velocity, linear acceleration and orientation of the limb. Tri-axis gravity forces can also be measured.
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Battery	<ul style="list-style-type: none"> • Rechargeable lithium battery. • Approximately 4 hours of use in a full single charge.
Charging	<ul style="list-style-type: none"> • Micro-USB charging. • Input voltage - 5V
Weight and Dimensions	<ul style="list-style-type: none"> • 90 grams • 36cm x 5.5cm (L x W)
Processor	Xtensa® single-/dual-core 32-bit LX6 microprocessor
Communication	Classic Bluetooth SPP

Operation

Forearm circumference	<ul style="list-style-type: none"> • To be used for the forearm with circumference between 22cm and 25cm.
Turn on	<ul style="list-style-type: none"> • Wear the AAL-Band on the forearm near elbow joint. • Press 'ON' button, shown in Figure 1, to turn on or restart the AAL-Band. • Green and Red led will blink twice with two seconds gap. After that RED led remain on. This indicates that the device has started successfully and is ready to connect.
Shut down	<ul style="list-style-type: none"> • When the AAL-Band is taken off shut down is initiated automatically after 20 seconds. • Shut down can also be initiated by pressing 'OFF' button, shown in Figure 1. • During shut down the RED led will blink five times with one second gap.
Data transmission	<ul style="list-style-type: none"> • Green LED will blink with 2 second gap during data transmission.
Battery charging	<ul style="list-style-type: none"> • RED led will blink with 2 second gap while charging.

Cleaning	<ul style="list-style-type: none"> • Cleaning can be done only to the outer part of the fabric, excluding electronics case, by using a light moist fabric only.
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Cautions

Electronics Unit	<ul style="list-style-type: none"> • Both FSR sensors and embedded electronics are prone to chemical contamination and mechanical impact. So do not disassemble it to prevent any possible damages. • Do not keep it in moist or high temperature (>50°) places.
Power terminal	<ul style="list-style-type: none"> • Do not attach the AAL-Band with any power supply higher than 5 volts. • Do not reverse the polarity.
Charging	<ul style="list-style-type: none"> • Do not recharge battery while AAL-Band is operational. • While charging, the equipment will slightly heat up. This is not malfunction.
AAL-Band	<ul style="list-style-type: none"> • Avoid water contact. • Do not disassemble any layer of the AAL-Band. • Keep the AAL-Band in round shape, as shown in Figure 2. Any of the sides pinched for some time can damage the FSR sensors strip.



Figure 1. Power Buttons



Figure 2. AAL-Band when taken off