

# CyberAtom X-202

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## Main Features

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### Output Data

Reported output data provides orientation information as:

- Quaternion
- Euler Angles

as well as actual rotation rate over local body axes.

In addition, internal sensor data readings are available in the form of:

- Raw Measurements
- Uncalibrated Measurements
- Calibrated Measurements
- Operating Temperature

### Output Data Update Rate

The X-202 device produce orientation data with 100 Hz update rate.

The device can be queried for the estimated orientation data and provide them on demand, or can be commanded to start broadcasting them in an continuous mode.

### UART Communication Interface

The device can be controlled over UART interface with configurable baud rate.

The factory default transmissions parameters are 57600 8-N-1.

### I2C Communication Interface

The device can be controlled over I2C bus where it acts as a slave device. The clock speed can be up to high-speed rate of 400 kHz.

The factory default I2C slave address for the device is 0x30.

The I2C slave address is configurable and can be changed to any value.

### Sensor Calibration

It is possible to easily calibrate standalone as well as assembled device to get best possible performance in it's operational environment.

Calibration takes such things into account as:

- Inertial sensor bias and its temperature drift
- Soft- and hard-iron effect on magnetometer sensor
- Sensor axes missalignments

### Performance Tuning

The device has configurable set of parameters that tune internal algorithm and make the sensor data processing to be tailored for specific needs.

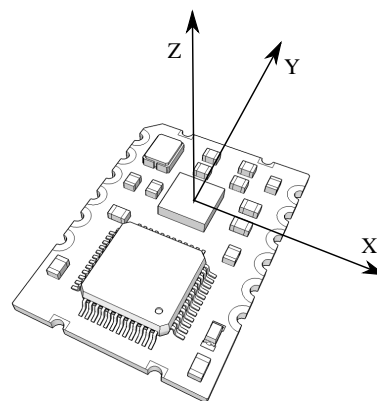
### Breadboard-friendly Pinout

X-202 comes with pins organized in two rows in a distance and 2.54 mm pitch that is friendly for prototyping with breadboards.

## Axes Conventions

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CyberAtom device reports its orientation with regards to a reference frame following ENU axes conventions.



**Figure 1: Axes Conventions for X-202 device.**

## Technical Parameters

**Table 1: Technical parameters of the device.**

Electrical	Value	Unit
Supply Voltage	+3.3	V
Current Consumption	55	mA
Output Logic Level	+3.3	V
Input Logic Level	+3.3 to +5.0	V
Environmental	Value	Unit
Operation temperature	-35 up to +80	°C
Storage temperature	-35 up to +80	°C
Temperature calibration range	+24	°C
Shock survivability	100	g
Accelerometer Sensor	Value	Unit
Data measuerment rate	100	Hz
Scale	4	g
Resolution	16	bits
Magnetometer Sensor	Value	Unit
Data measuerment rate	100	Hz
Scale	2	Gauss
Resolution	16	bits
Gyroscope Sensor	Value	Unit
Data measuerment rate	100	Hz
Scale	2000	deg/sec
Resolution	16	bits
AHRS Output Data	Value	Unit
Maximum output update rate	100	Hz
Quaternion output data format	float IEEE754	
Euler angles output data format	float IEEE754	
Maximum acceleration	±2	g
Maximum rotation rate	2000	deg/sec
Communication	Value	Unit
Communication interfaces	I2C, UART	
Max I2C clock speed	400	kHz
Factory default I2C slave address	0x30	
Max UART baud rate	230400	bauds
Factory default UART baud rate	57600	bauds
Firmware upgrade interface	UART	
Cable connector type	-	
Data Ready output	yes	
Hard reset input line	yes	
Mechanical	Value	Unit
Width	15.24	mm
Height	21.6	mm
Depth	2.5	mm
Weight	2.5	g
Mounting technology	SMT	

## Mechanical Drawings

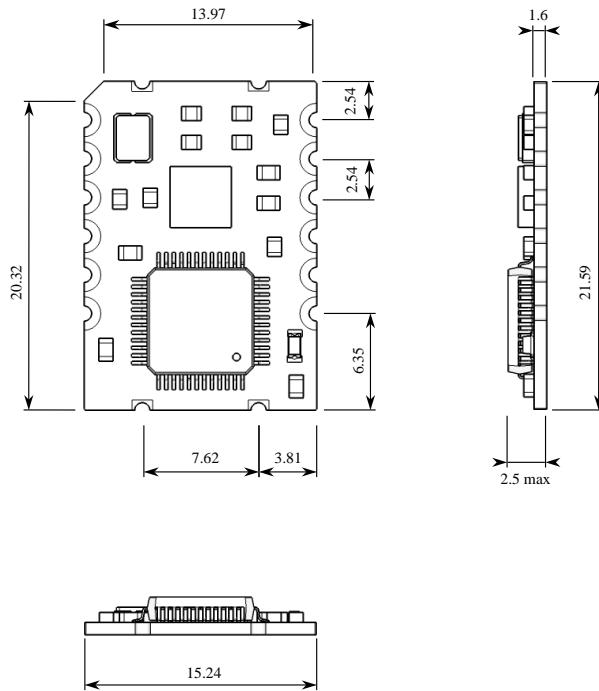


Figure 2: Outer dimensions. All values in millimeters.

## PCB Footprint

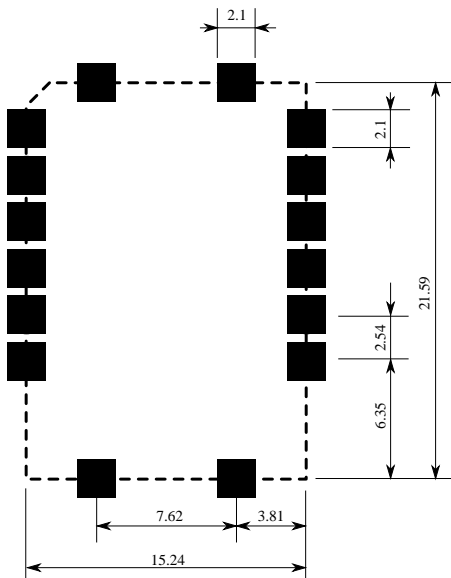
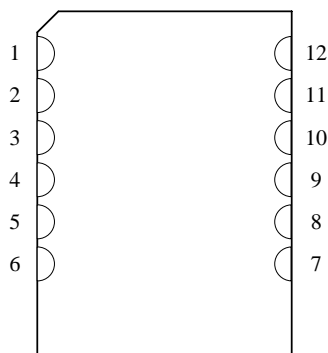


Figure 3: X-202 footprint for PCB design (view from top). All values are in millimeters.

## Pin Descriptions



**Figure 4: Pin numbering (view from top).**

**Table 2: Pins and signal names for X-202 device.**

Number	Name	Type	Remarks
1	GND	Power Input	Common ground signal.
2	RESET	Input	Resets the device (LOW) or normal operation (HIGH or unconnected).
3	TX	Output	UART (serial) port output line.
4	RX	Input	UART (serial) port input line.
5	DRDY	Output	Is set to LOW when new output data being ready for reading.
6	VDD	Power Input	+3.3V power supply input.
7	NC	n.a	Leave unconnected.
8	NC	n.a	Leave unconnected.
9	SDA	Input/Output	I2C bus data line.
10	SCL	Input	I2C bus clock input.
11	GND	Power Input	Common ground signal.
12	VDD	Power Input	+3.3V power supply input.

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