

## Chelonia Base

### Overview

#### 1.1 Notices



Image of Chelonia

##### ***What is Chelonia !!***

The Chelonia Bot User Manual – Base Version is an extensive guide designed to unlock the full potential of your versatile robotic companion. Featuring 30 diverse experiments, each tailored to enhance specific capabilities, this manual offers a gateway to exploration and innovation. The Chelonia Bot is equipped with an array of innovative hardware, including motors, infrared sensors, ultrasonic sensors, IMUs, sound sensors, Bluetooth modules, and more. This comprehensive set of sensors enables accurate proximity detection, distance measurement, environmental monitoring, orientation tracking, identification, and audio interaction. The robot's robust motor control system allows for precise programming of movements, with clearly defined motor pins for easy experimentation. Bluetooth connectivity provides wireless flexibility, enabling remote control of the Chelonia Robot through a Bluetooth module. Designed as an educational platform, the Chelonia Base Version is an ideal tool for students and enthusiasts, offering hands-on learning opportunities that foster a deeper understanding of robotic systems and programming.

#### 1.2 Events

Videos of Chelonia completing the tasks

## Features

### **1. Budget-friendly!**

Chelonia, the budget-friendly robot, was created to suit the needs of schools, labs, and businesses on a tight budget. Chelonia is the most affordable robot in its class, It's small!

It's small too! Chelonia measures just 138mm x 178mm x 192mm (L x W x H), making it about a quarter of the size of its predecessor. Imagine carrying Chelonia in your backpack, developing and testing your programs wherever you go.

### **2. Diverse Sensor Integration:**

The Chelonia Base Version includes a comprehensive set of sensors, such as infrared (IR) sensors for proximity detection, ultrasonic sensors for accurate distance measurement, gas sensors for environmental monitoring, inertial measurement units (IMUs) for orientation tracking, RFID tags for identification, and sound sensors for audio interaction.

### **3. Versatile Motor Control:**

The robot is equipped with a robust motor control system, allowing users to program precise movements. Motor pins are clearly defined, making it easy to understand and experiment with forward, backward, left, and right movements.

### **5. Bluetooth Connectivity:**

Utilize Bluetooth communication to control the Chelonia Robot remotely. Commands can be sent through a Bluetooth module, providing wireless flexibility and enabling users to experiment with different control mechanisms.

### **6. Educational Platform:**

Tailored for educational purposes, the Chelonia Base Version is an ideal tool for students and enthusiasts to delve into the world of robotics. The robot facilitates hands-on learning, fostering a deeper understanding of robotic systems and programming.

## 1. Hardware Specifications

Features	Chelonia Base version	Advanced version
Size		
Weight		
Base platform		
Wheels diameter	6 cm	7 cm
Microcontroller Development Board	Arduino UNO	Raspberry pi, Teensy
Operation time		
Charging time		
Bluetooth Transceiver Module	HC05 Speed: Asynchronous: 2.1Mbps (Max) / 160 kbps, Synchronous: 1Mbps/1Mbps. Security: Authentication and encryption. Profiles: Bluetooth serial port.	HC05 Speed: Asynchronous: 2.1Mbps (Max) / 160 kbps, Synchronous: 1Mbps/1Mbps. Security: Authentication and encryption. Profiles: Bluetooth serial port.
HC-SR-04 Ultrasonic sensor	Power Supply +5V DC Working Current 15mA Output Signal Electrical frequency signal. Ranging Distance 2cms – 400 cms Resolution 0.3 cm	Power Supply +5V DC Working Current 15mA Output Signal Electrical frequency signal. Ranging Distance 2cms – 400 cms Resolution 0.3 cm
MPU 6050 IMU	Features three-axis gyroscope and three-axis accelerometer. Communication modes: Standard iic communications protocol Chip built-in 16bit ad converter with 16-bit data output. Gyroscope range: 250 500 1000 2000°/s	Features three-axis gyroscope and three-axis accelerometer. Communication modes: Standard iic communications protocol Chip built-in 16bit ad converter with 16-bit data output. Gyroscope range: 250 500 1000 2000°/s
BO Motor Wheels(2pcs)	Color Yellow Diameter 65 mm Width 26 mm Material Rubber Weight 39 g	
Switch and buttons	Single Pole Double Throw switch and pushbuttons	Single Pole Double Throw switch and pushbuttons
12V 2200mAh Rechargeable Lithium Battery	Brand Witty Fox Voltage 11.1V Battery Capacity 5200 mAh Battery Type Lithium-Ion Dimensions 110 x 19 x 70mm Weight 600 grams	Brand Witty Fox Voltage 11.1V Battery Capacity 5200 mAh Battery Type Lithium-Ion Dimensions 110 x 19 x 70mm Weight 600 grams

## 2. Sensors

### 1. MPU 6050



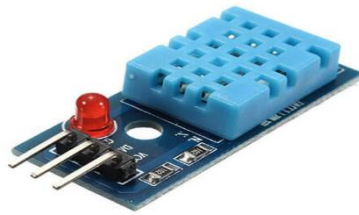
The MPU 6050 is a versatile motion tracking device that combines a gyroscope and accelerometer in a single integrated circuit. With its compact size and low power consumption, the MPU 6050 is an ideal choice for a wide range of applications, from wearable devices to motion-controlled gaming controllers. Its advanced motion sensing capabilities allow for precise measurement of acceleration and angular velocity in three dimensions, enabling accurate motion tracking and gesture recognition. Additionally, the MPU 6050 features onboard digital motion processing, reducing the workload on the host microcontroller and simplifying integration into existing systems. Whether you're designing a fitness tracker, stabilizing a camera, or developing a virtual reality headset, the MPU 6050 provides the performance and flexibility you need to bring your project to life. Trust in the reliability and versatility of the MPU 6050 to meet your motion sensing needs with ease and efficiency.

### 2. Hc-SR04 Ultrasonic Sensor



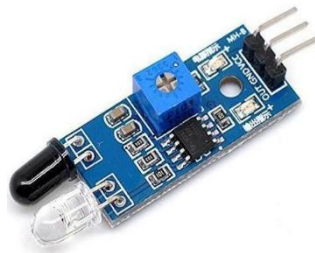
The HC-SR04 Ultrasonic Sensor is a widely used distance-measuring device that utilizes ultrasonic waves to determine the distance between the sensor and an object. This compact and affordable sensor consists of a transmitter and receiver pair, which work together to emit ultrasonic pulses and detect their reflections. By measuring the time it takes for the ultrasonic waves to travel to the object and back, the HC-SR04 can accurately calculate the distance with high precision.

### 3. DHT11- Temperature & Hummidity Sensor



The DHT11 is a popular digital sensor used for measuring temperature and humidity. It features a capacitive humidity sensor and a thermistor to measure the surrounding air, providing accurate and reliable data. The DHT11 sensor operates within a temperature range of 0-50°C and a humidity range of 20-90% RH. It is widely used in environmental monitoring and control applications due to its simplicity, low cost, and ease of integration with microcontrollers like Arduino and Raspberry Pi. The sensor communicates using a single-wire protocol, making it straightforward to connect and program in various DIY projects and educational platforms.

#### 4. IR Sensor



An Infrared (IR) sensor is an electronic device that detects and measures infrared radiation in its environment. IR sensors are commonly used for proximity detection, object detection, and distance measurement. They operate by emitting an infrared light and detecting the reflection from nearby objects. This technology is widely employed in applications such as obstacle avoidance in robotics, motion detectors in security systems, and remote-control systems. IR sensors are valued for their simplicity, low power consumption, and ability to function effectively in various lighting conditions, making them a versatile component in many electronic projects.

#### 5. Gas Sensor



The MQ135 gas sensor is a versatile device used to detect a variety of harmful gases in the environment, including ammonia, nitrogen oxide, alcohol, benzene, smoke, and carbon dioxide. It operates by sensing changes in the conductivity of the material inside the sensor when exposed to different gas concentrations. The MQ135 is widely used in