## Anatomy of LocoXtreme

LocoXtreme "Head"

- LocoXtreme "Eyes" using an Ultrasonic Sensor

- LocoXtreme "Brain" that lets LocoXtreme communicate to the outside world wirelessly through "BLE" or Bluetooth Low Energy.

- LocoXtreme's "Head" also contains a ring of 8 LEDs or Light Emitting Diodes. Each LED has three tiny separate colored lights that when combined can appear as varying colors across the visible light spectrum.

LocoXtreme "Vocal Chords”

LocoXtreme's main board also contains a device called a piezo buzzer. This disc shaped object can be made to vibrate when provided electrical signals. These vibrations can create acoustical sound waves that the human ear can detect.

LocoXtreme "Body"

The main board of LocoXtreme contains many of the sensors of LocoXtreme such as the 3D Accelerometer (for sensing acceleration in three dimensions) and the 3D Gyroscope (for sensing angular velocity, or rotation around an axis, for three dimensions), and the microcontroller that interfaces with both the sensors, the motors, and the "head" of LocoXtreme.

LocoXtreme "Legs"

LocoXtreme achieves mobility through the use of two driving motors, four wheels and two treads. The motors are used to drive two of the motors, in the front of LocoXtreme, which connected to the treads, cause the other set of wheels to rotate. The use of four wheels and treads helps to improve the stability of LocoXtreme as it travels.

LocoXtreme "Eyes"

The Ultrasonic sensor, used to detect distance, uses two circular devices to emit and receive ultrasonic acoustical waves. Ultrasound refers to sound waves with frequencies above the upper limit of human hearing. The upper limit of human hearing is typically around 20kHz or 20,000 Hz, where a Hz is a unit of frequency and means times per second.

As the audio waves travel, if they encounter an object, they are typically reflected back allowing for the receiver of the ultrasonic sensor to detect them. The differences in time it takes for a wave to be bounced back and received after being emitted allows for objects at varying distances allows for wave travel-time to be mapped to distance.

LocoXtreme "Skeleton"

Base structure to house batteries, motors, tires and treads. Provides a solid structure to prevent the motors from being pulled out of position.

LocoXtreme "Heart”

Located underneath LocoXtreme, the battery connector houses 4 double A batteries. This is what provides energy for LocoXtreme to function.

These batteries are connected "in series" providing a total of 6V to LocoXtreme. As the batteries' energy is used up, the voltage they can provide decreases.

Power Switch: The LocoXtreme's battery power can be turned on an off with a switch at the back of the robot.

Locoxtreme Maintenance and Safety

- Batteries: Many batteries are polarized, meaning that they have intended orientation for use. Make sure when connecting the batteries to connect the polarized double A batteries in the proper orientation.

- Ultrasonic sensor: The "Eyes" of LocoXtreme can be damaged if too much pressure is put on the protective screen. If either of the screens is pushed into the cylinder it can distort the distance readings.

- Motors: After prolonged use, hair and other objects can potentially wrap around the motor shafts on the inner sides of the wheels. The wheels can be taken off allowing for the obstructions to be removed.

- LEDs: The tops of the LEDs are a thin plastic. Avoid using sharp or heated objects near the LEDs.

- Hydrophobic: LocoXtreme does not like to be washed. Exposing LocoXtreme to water can potentially cause short circuits and permanently damage the robot. A short circuit is when electricity is able to flow through a path with less resistance than the normal circuit.