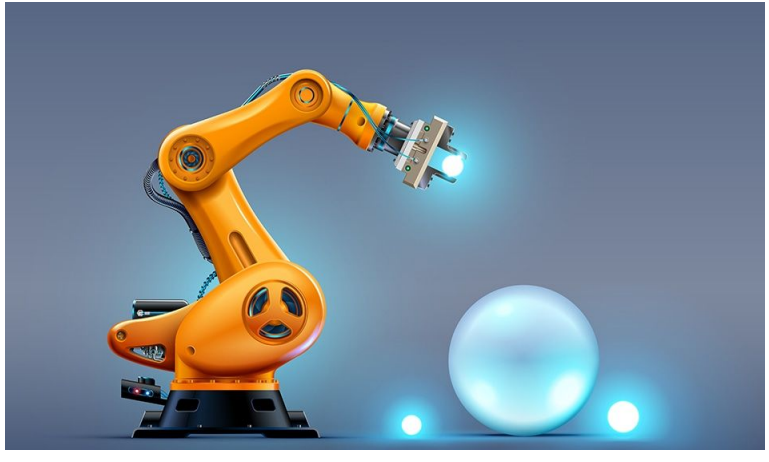
CIHAN UNIVERSITY-ERBIL

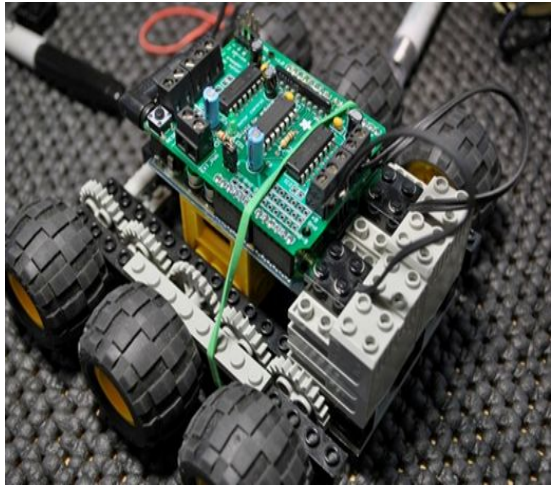
COLLEGE OF ENGINEERING

COMMUNICATION AND COMPUTER ENGINEERING DEPARTMENT

Arduino in Robot

Present by : Adil Hussain Mohammed





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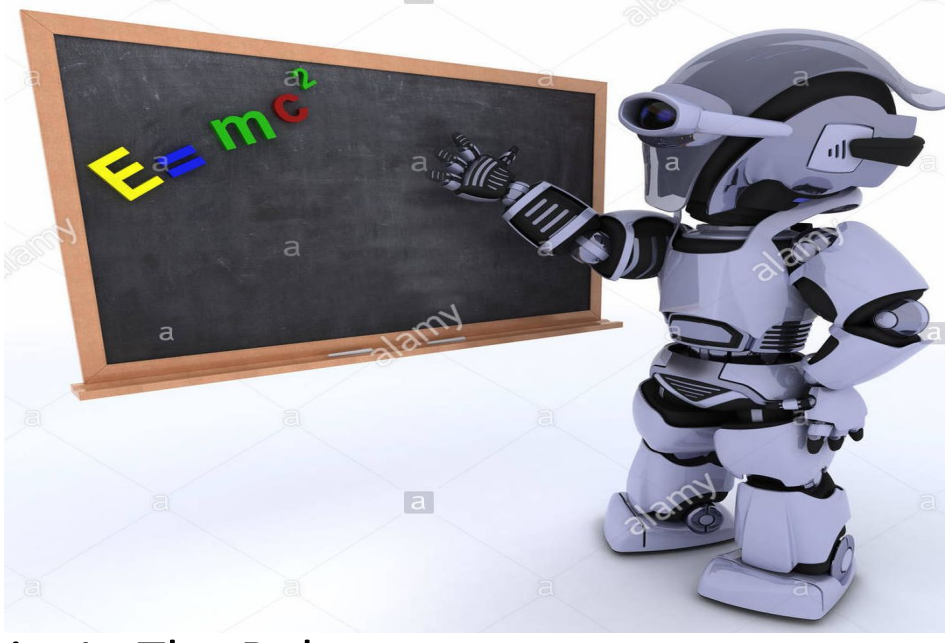


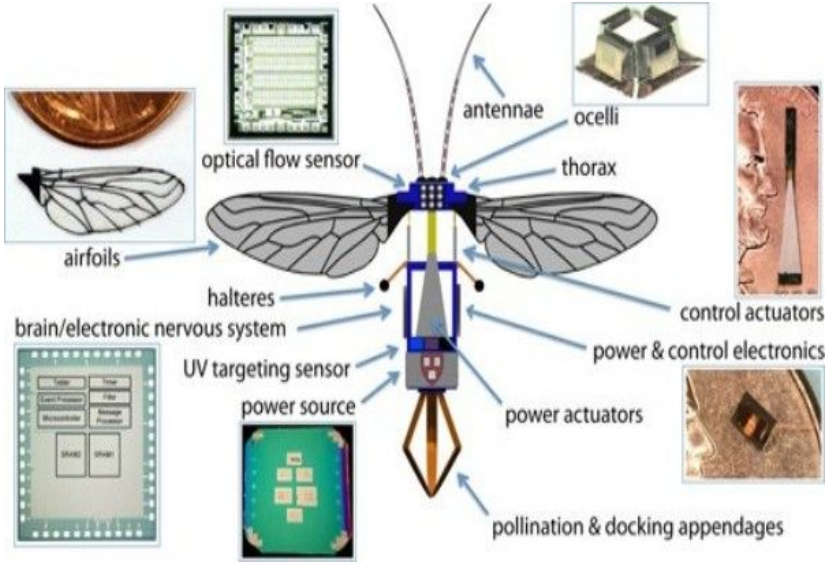
- 1- What Is A Robot .
- 2- Types Of Robots.
- 3-laws Of Robots
- 4- Main Parts And Main Units In The Robots
- 5- The Rules Arduino In Robot

What is a ROBOT

1. **A machine that is controlled by a computer (programmable device) and does jobs automatically .**
2. **A robot is a reprogrammable , multifunctional manipulator designed to move material , parts , tools or specialized devices through variable programmed motions for the performance of a variety of tasks .**

Types of robots

Mechanical bots come in all shapes and sizes to efficiently carry out the task for which they are designed. From the few millimeter-long “RoboBee” to the 200 meter-long robotic shipping vessel “Vindskip,” robots are emerging to carry out tasks that humans simply can’t. Generally, there are five types of robots:

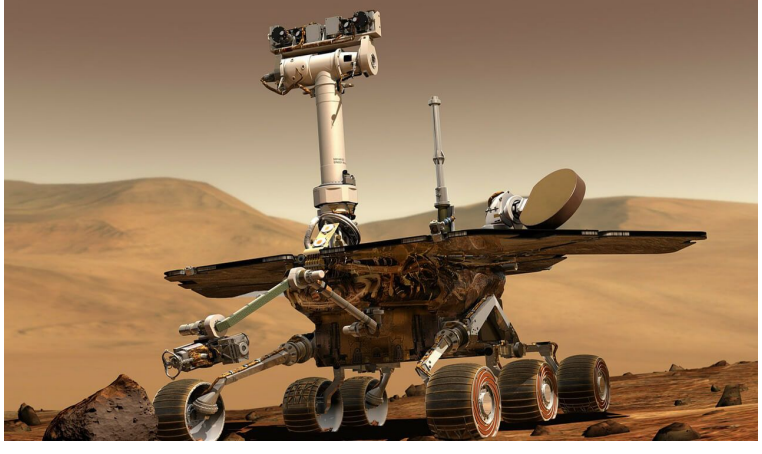


Humanoid Robots

Humanoid robots are robots that look like and/or mimic human behavior. These robots usually perform human-like activities (like running, jumping and carrying objects), and are sometimes designed to look like us, even having human faces and expressions.

Autonomous Robots

Autonomous robots operate independently of human operators. These robots are usually designed to carry out tasks in open environments that do not require human supervision. An example of an autonomous robot would be the Roomba vacuum cleaner, which uses sensors to roam throughout a home freely.



Teleoperated Robots

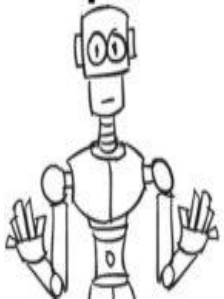
Teleoperated robots are mechanical bots controlled by humans. These robots usually work in extreme geographical conditions, weather, circumstances, etc. Examples of teleoperated robots are the human-controlled submarines used to fix underwater pipe leaks during the BP oil spill or drones used to detect landmines on a battlefield.

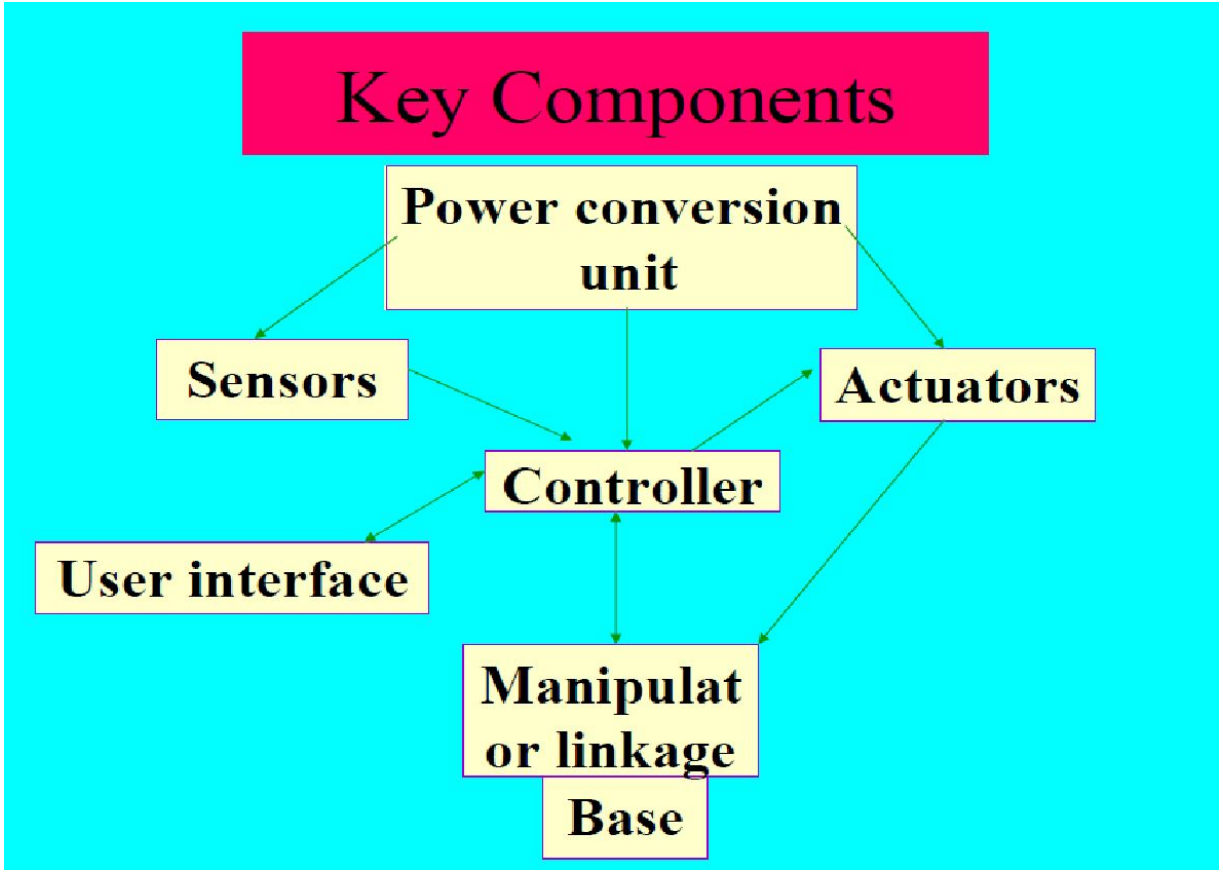
THREE LAWS OF ROBOTICS

1. A robot must not injure a human being or, through inaction, allow a human being to come to harm.

2. A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.

3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.



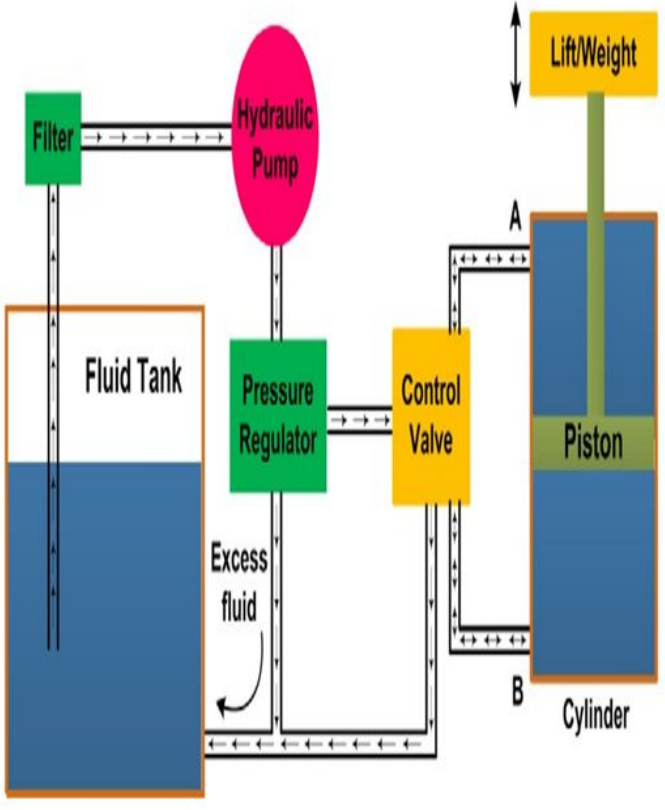

Key Components
Power conversion unit
Sensors
Actuators
Controller
User interface
Manipulator linkage
Base

Actuation Systems

• Actuation systems are the elements of control systems which are responsible for transforming the output of a microprocessor or control system into a controlling action on a machine or device.

• For example, we may have an electrical output from the controller which has to be transformed into a linear motion to move a load.

• Or, we might have an electrical output from the controller which has to be transformed into an action to control the flow of liquid into a vessel



Mechanical Actuation Systems

Mechanical Aspects of Motor Selection: Moment of Inertia and Torque

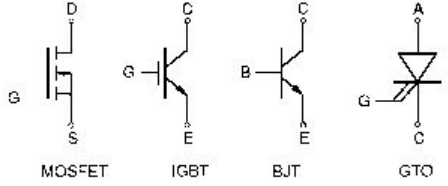
- Mechanical devices are motion converters: they transform motion from one form into another form. For example they transform linear motion into rotational motion.

- Mechanical elements may include the usage of linkages, cams, gears, rack and pinion, chains, belt drives.

- Examples: Force amplification given by levers; change of speed given by gears; transfer of rotation about one axis to rotation about another using timing belts.

Electrical Actuation Systems

- **Switching devices** such as mechanical switches, e.g., relays, or solid-state switches, e.g., diodes, thyristors, and transistors.



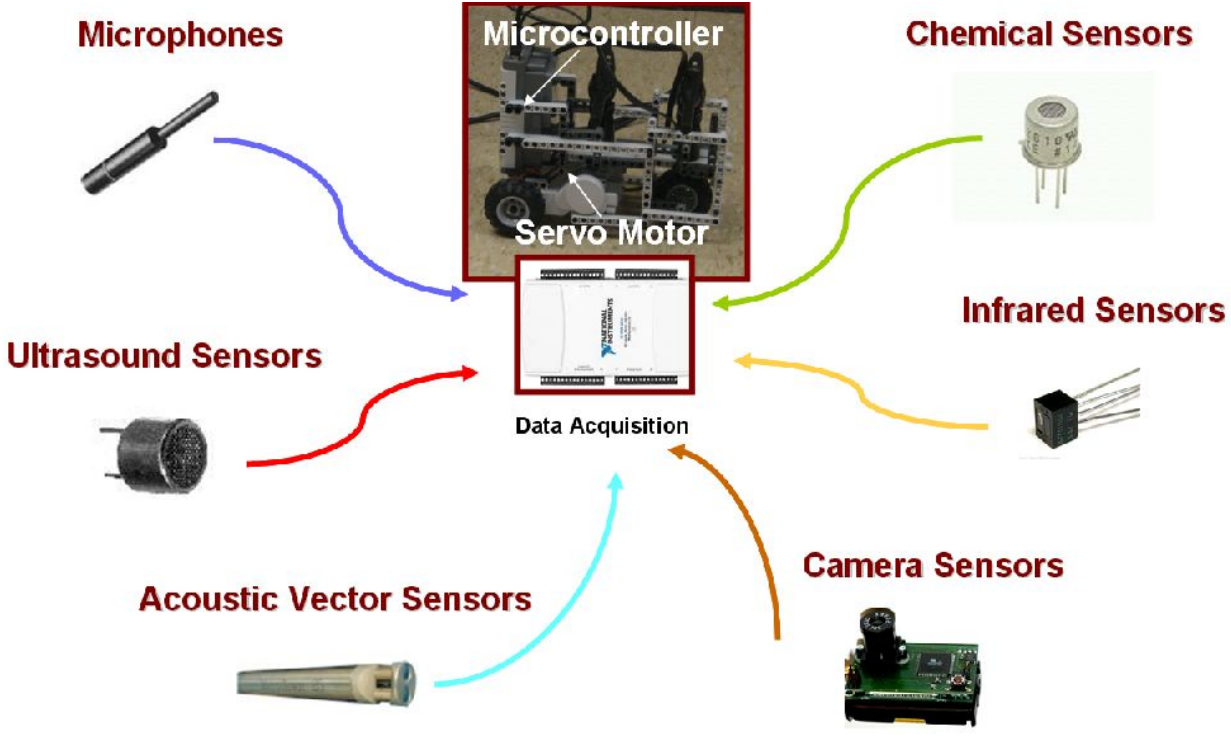
- **Solenoid type devices** where a current through a solenoid is used to actuate a soft iron core. For example a solenoid operating hydraulic/pneumatic valve.

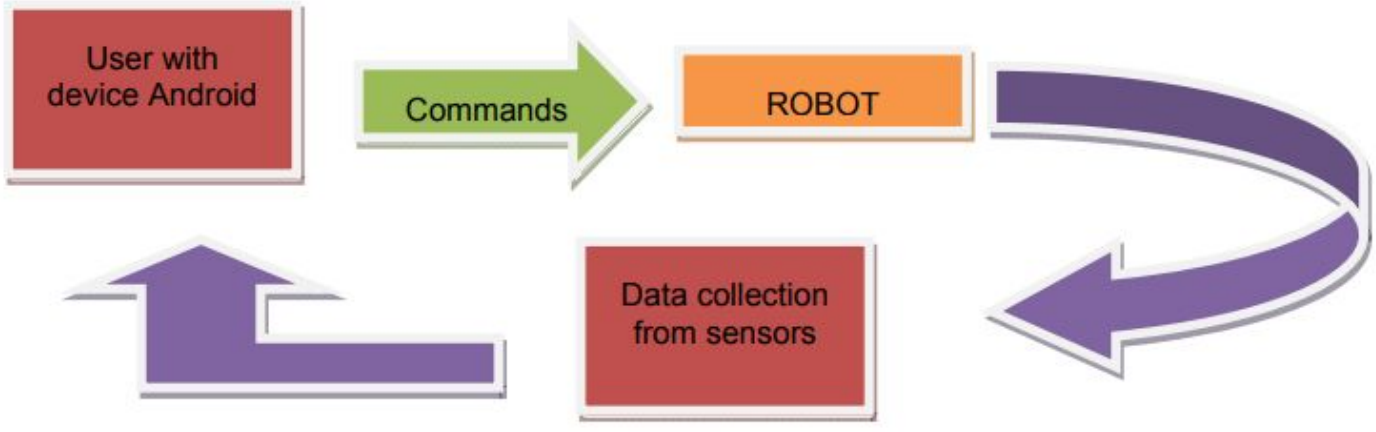
- **Drive systems** such as DC and AC motors where a current through a motor is used to produce rotation.

Sensors

a **sensor** is a device, module, machine, or subsystem whose purpose is to detect events or changes in its environment and send the information to other electronics, frequently a computer processor. A sensor is always used with other electronics.

Example of one system can used many sensors types



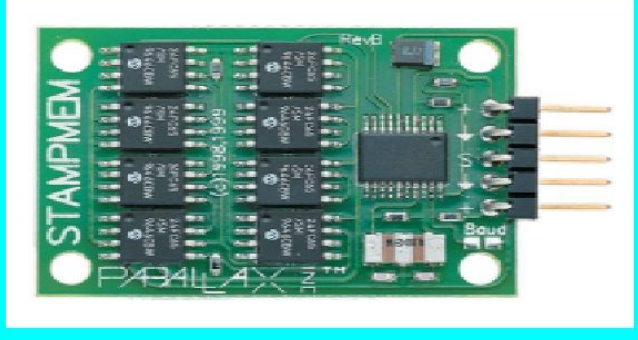

User with device Android
Commands
ROBOT
Data collection from sensors

Controller

- Provide necessary intelligence to control the manipulator/mobile robot
- Process the sensory information and compute the control commands for the actuators to carry out specified tasks

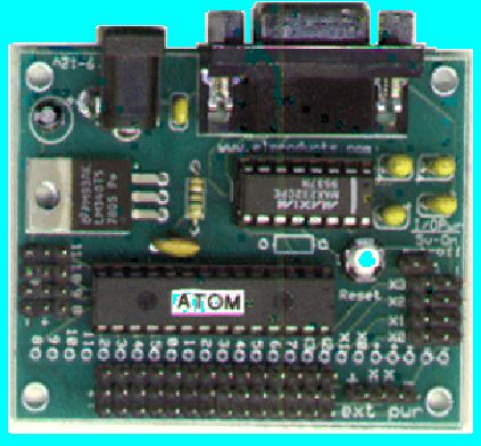
Storage Hardware

Storage devices: e.g., memory to store the control program and the state of the robot system obtained from the sensors

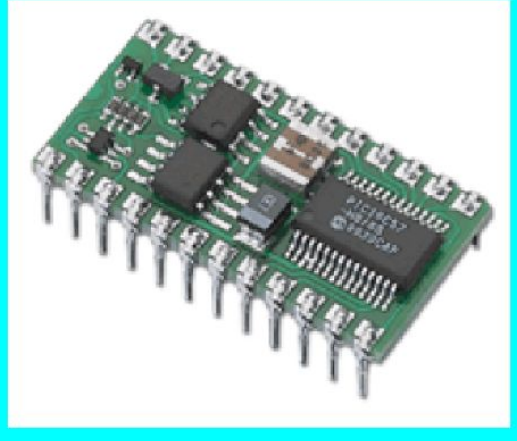


Computation Hardware

Computational engine that computes the control commands



RoboBoard Robotics Controller



BASIC Stamp 2 Module

Interface Hardware

Interface units: Hardware to interface digital controller with the external world (sensors and actuators)

Analog to Digital Converter

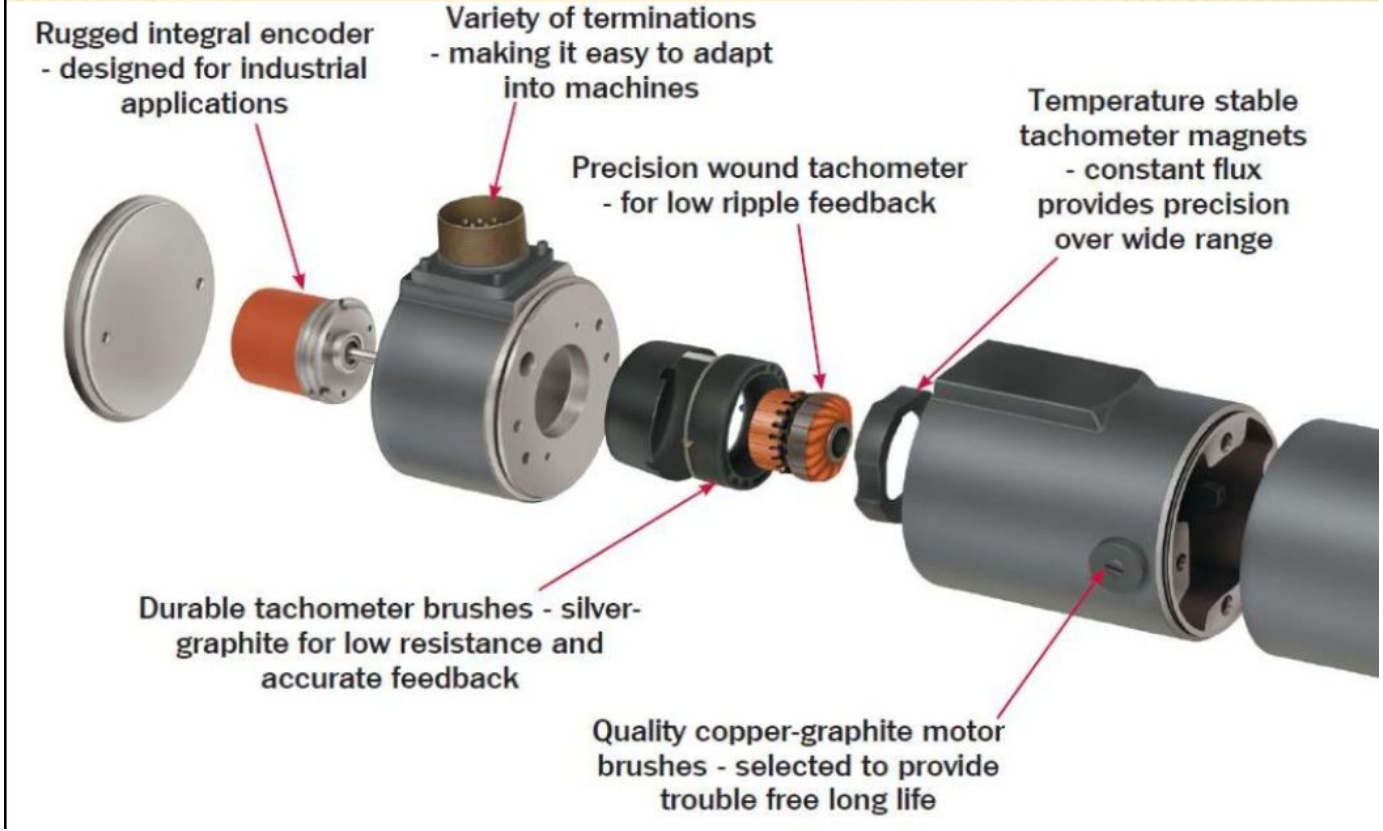
Operational Amplifiers

LM358

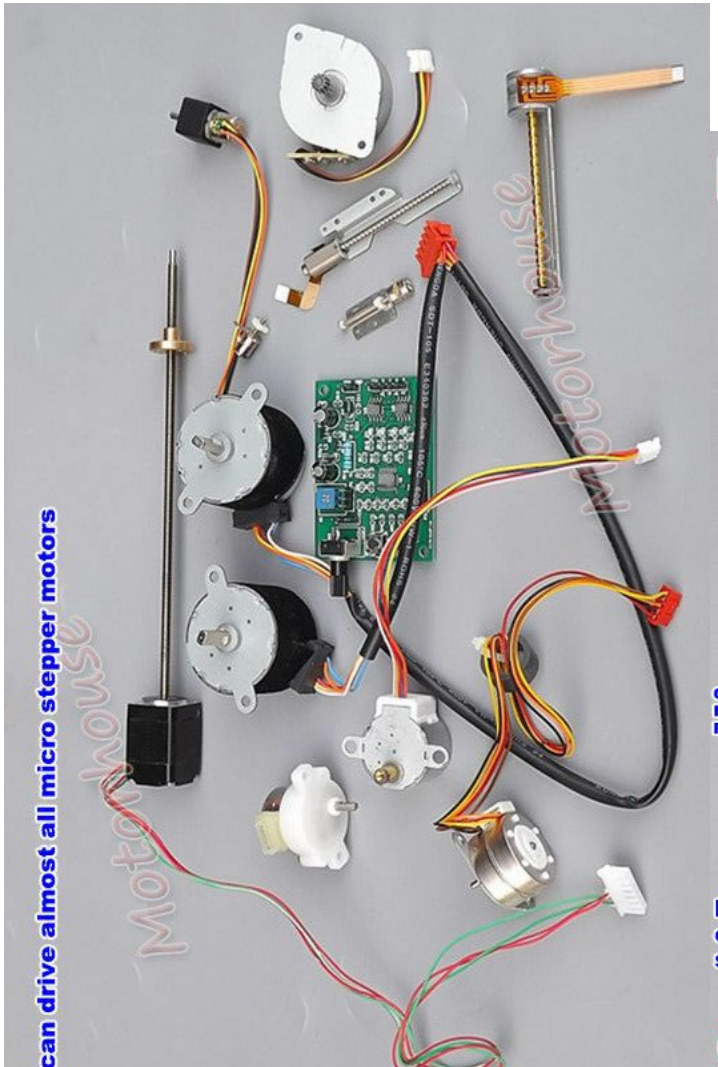
LM358

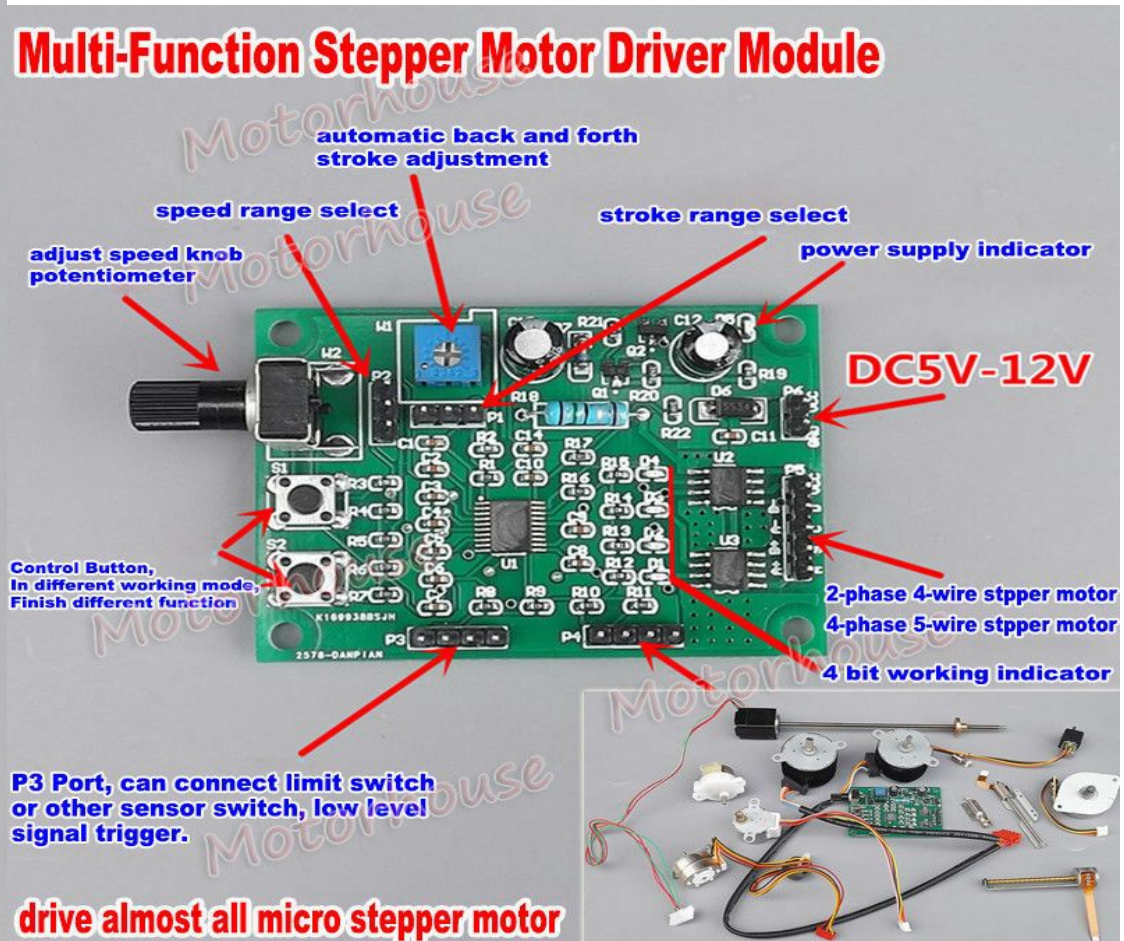
LM1458 dual operational amplifier

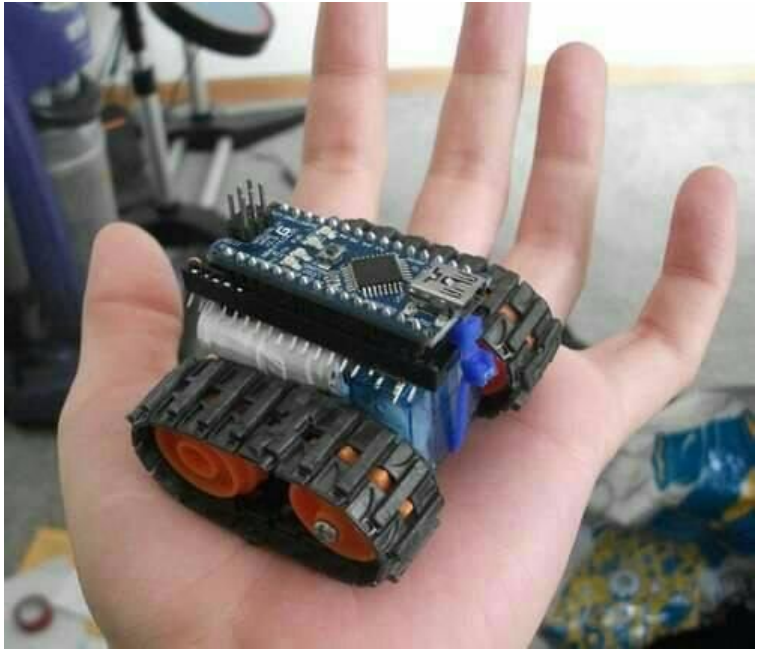
INTERNAL VIEW OF DC SERVO MOTOR

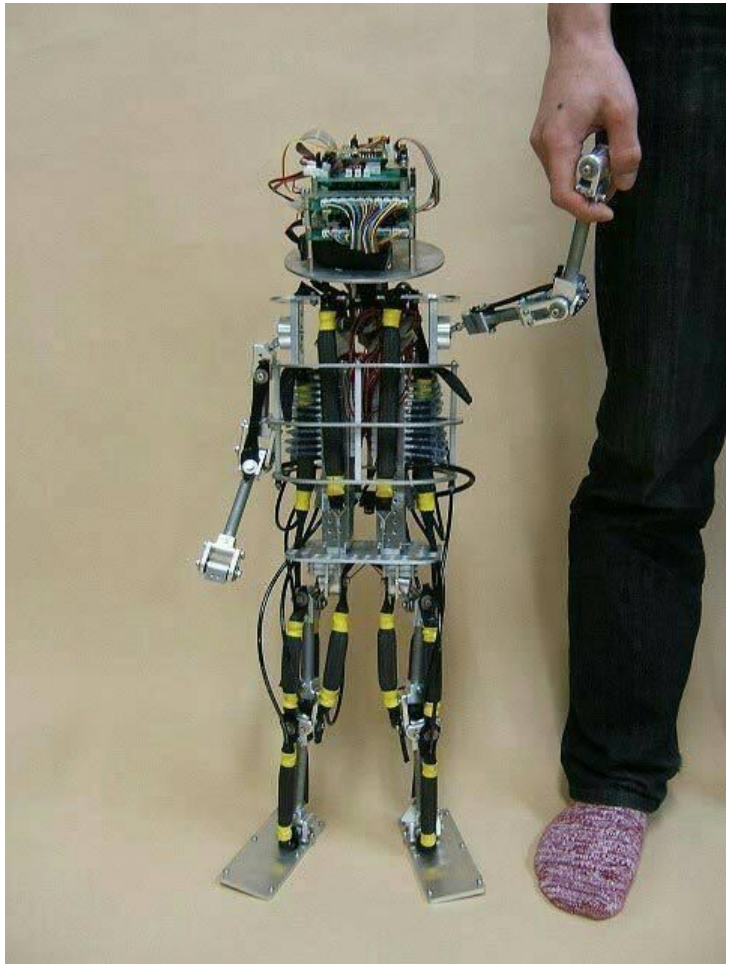


DC steppers motor







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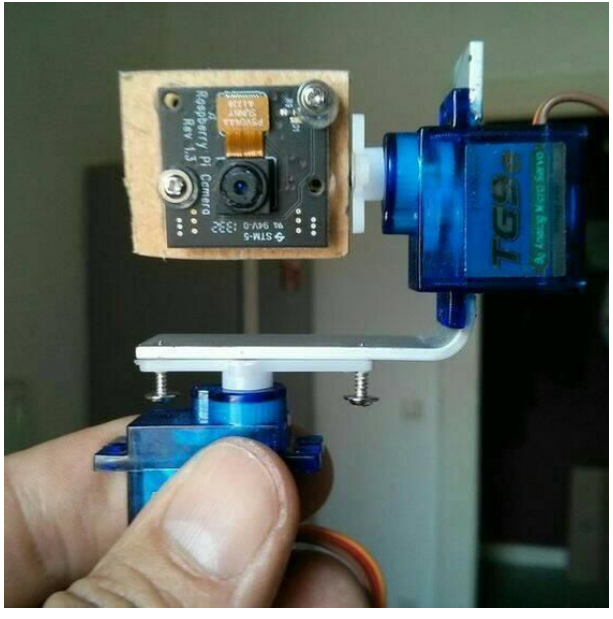
Raspberry Pi Camera
Rev 1.3
TG9e

Thank you!