Lecture 11
Robots
Definition of Robot

• First introduced by Karel Capek in a 1920

• Definition of robot
  • Reprogrammable
  • Multifunctional manipulator
  • Designed to move material, parts, tools or specialized devices
  • Through variable programmed motions for the performance of a variety of tasks
  • Robot Institute of America, 1979
Sensors

In-Sight vision sensors

Force Sensors

Tilt Sensor

UltraSonic Ranger

Devantech SRF04

Funded by The National Science Foundation
Actuators

- Actuators used in robotics is almost always combinations of different electro-mechanical devices
  - Stepper motor
  - AC servo motor
  - Brushless DC servo motor
  - Brushed DC servo motor
Hydraulic Motor

Stepper Motor

Pneumatic Motor

Servo Motor
Controller

RoboBoard Robotics Controller

BASIC Stamp 2 Module
The Interface Units

Interfacing with the external world (sensors and actuators)

Analog to Digital Converter

Operational Amplifier
What Can a Robot Do?

- Industrial Robots
  1. Material Handling
  2. Material Transfer
  3. Machine Loading and/or Unloading
  4. Spot Welding
  5. Continuous Arc Welding
  6. Spray Coating
  7. Assembly
  8. Inspection
How to Modify Servo Motor
Prepare All the Tools
Open Cover
Take All Gears Out
Take Pot Drive Plate Out

Don’t forget to remove it.
Cut Tab off the Surface of the Gear
Servo Calibration

low 12

loop:
  pulsout 12, 750
  pause 20
  goto loop
Fully Assembled Boe-Bot
# Robot Experiments

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Lecture 12
InfraRed

- Light that has lower frequency than red light
- Application
  - Night-vision goggles
  - IR temperature sensor
  - Object detection
  - Distance determination
IR Transmitter

IR LED

Heat Shrink Tube
IR Detector
IR Sensor on the BoeBot

- Detects obstacles
- Detects distance
- Freqout pin#, period, 38500
  - Freqout 7, 1, 38500
  - IR_Detect = in8
# IR Sensor Experiments

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