Developing Communication between the Leg and the Body of EduBot

Advisors:
Daniel E. Koditschek
Jonathan Clark
Kevin Galloway
Bill Mather

By
Mulutsga Bereketab

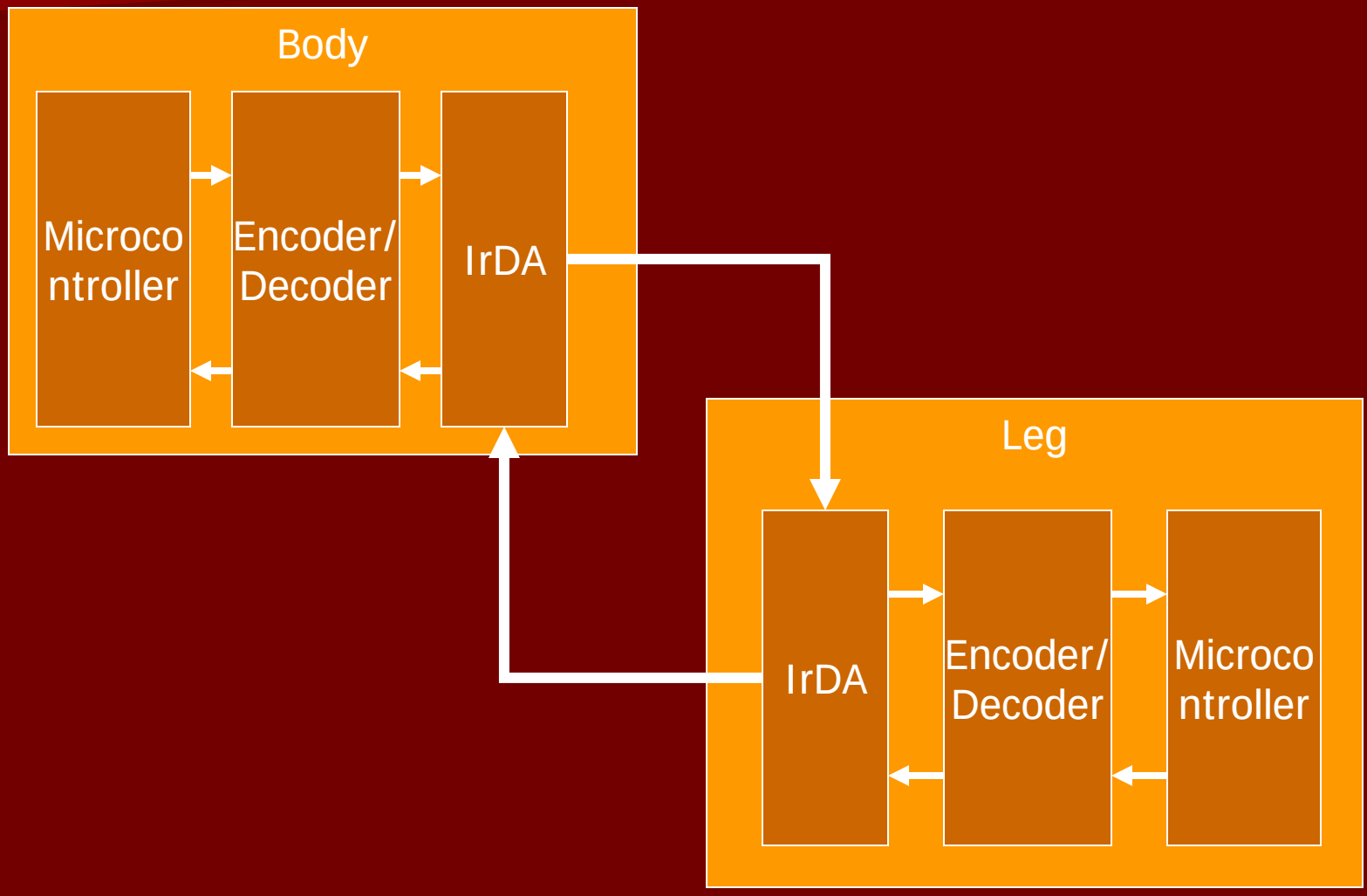
Motivation and Goal

- Motivation:
  - Add flexibility and efficiency to EduBot
- Goal
  - Enable Edubot to change the stiffness of its leg while on the move

The Approach

- Develop communication between the robot and the leg for data acquisition and relaying commands
- Control the movement of the slider, which controls the stiffness of the leg

Communication Schematic

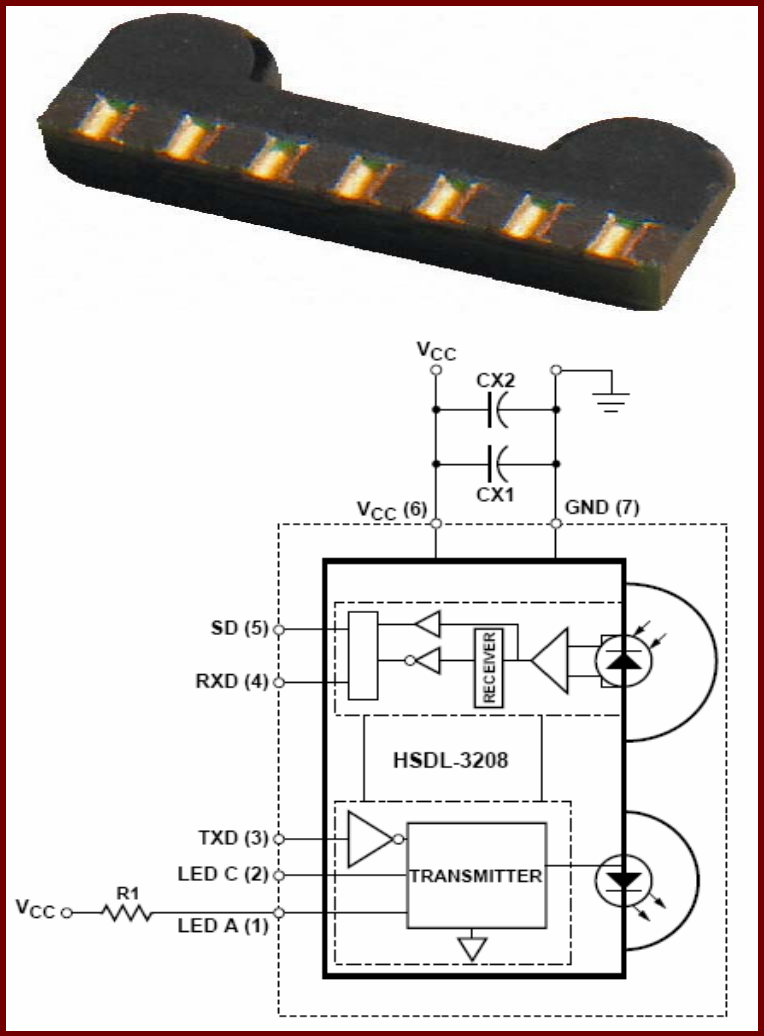


Microcontroller (PIC18F2680)

- Controls what kind of data is sent and how fast
- Can be programmed in C Language
- Generates a Pulse Width Modulation (PWM) to control the speed of the motor

Infrared Data Association (IrDA)

- A form of wireless communication
- Built in receiver and transmitter
- Small Dimensions (1.6mm H, 7mm W, 2.8mm D)

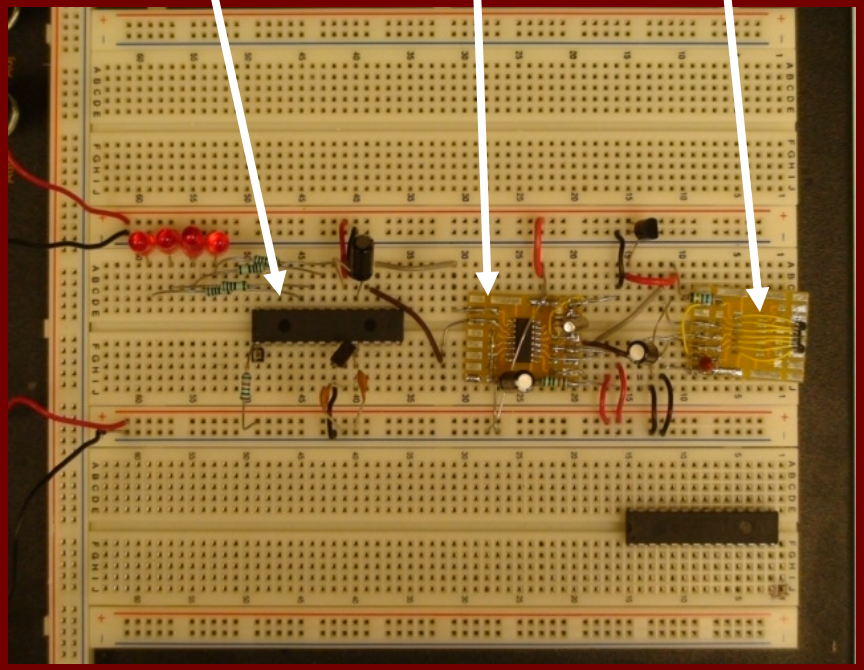


Communication Prototype

Microcontroller

Encoder/ Decoder

IrDA

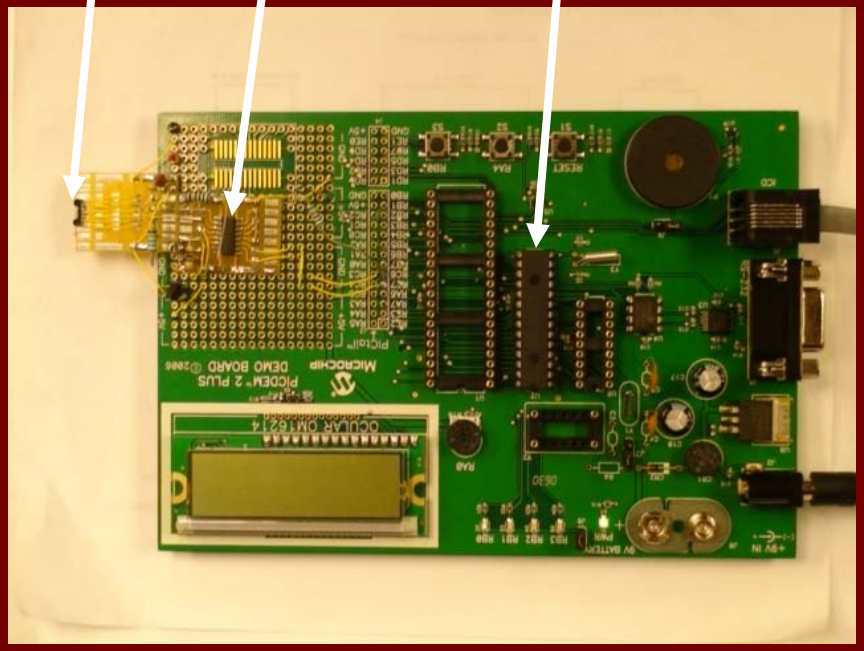


LEG

IrDA

Encoder/ Decoder

Microcontroller



BODY

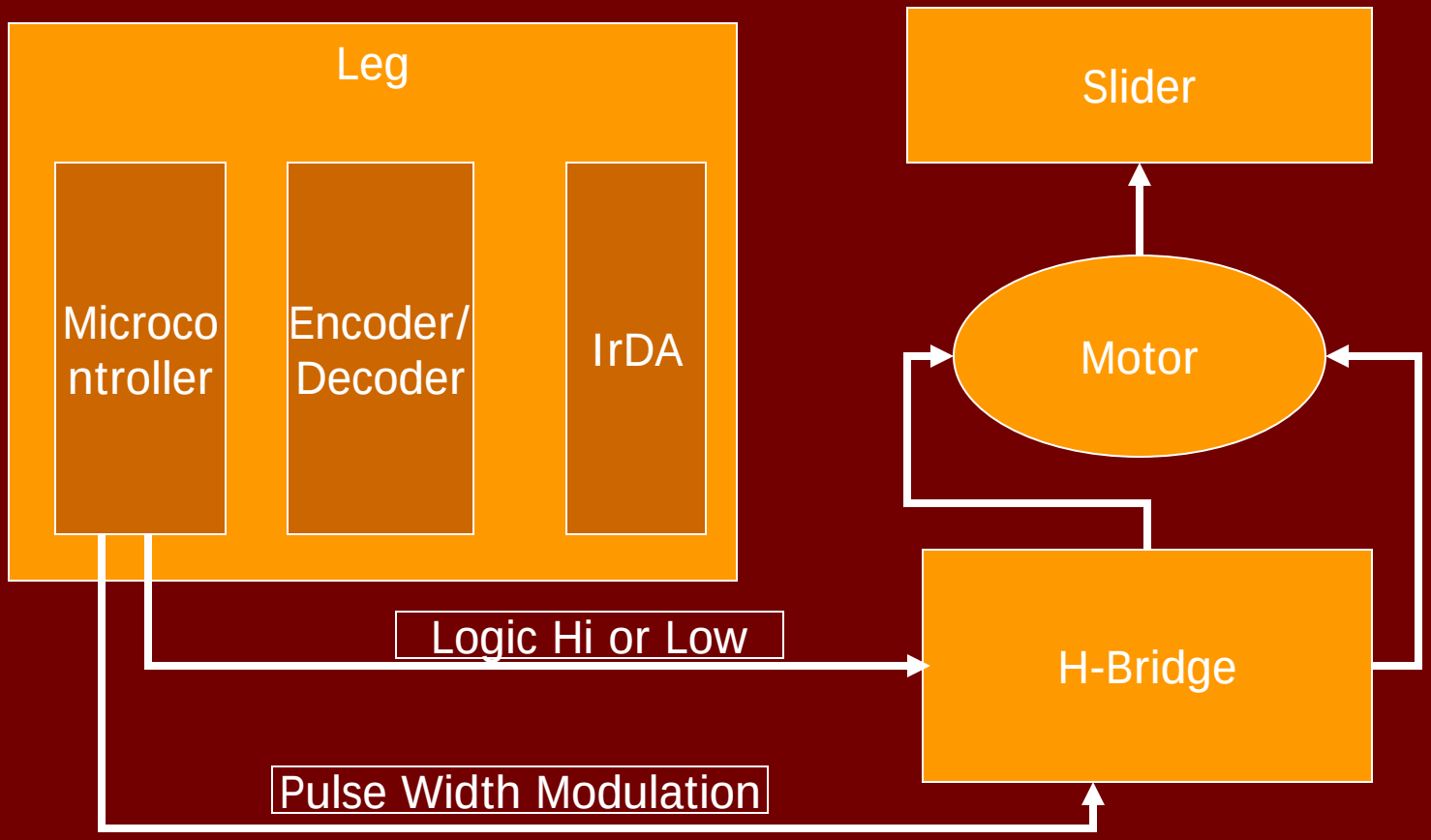
Two Communication Protocols

- The body of the EduBot initiates the communication
- First Protocol:
  - The body asks the leg for data
    - Slider Position (1 Byte)
    - Stress on the Leg (1 Byte)
    - The time the leg touches the ground (1 Byte)
    - The time the leg leaves the ground (1 Byte)
  - The body gets 4 bytes of information back from the leg

Two Communication Protocols Cont.

- Second Protocol
  - The body commands the leg to change the slider position
  - The leg in return positions the slider as specified by the body

Slider Control Schematic



Thanks

- Daniel E. Koditschek
- Jonathan Clark
- Kevin Galloway
- Bill Mather
- Haldun Komsuoglu

- Kod*lab Colleagues

- Jan Van der Spiegel
- Sunfest Program