

Soirée Pratique

Build your own robot

Motor control

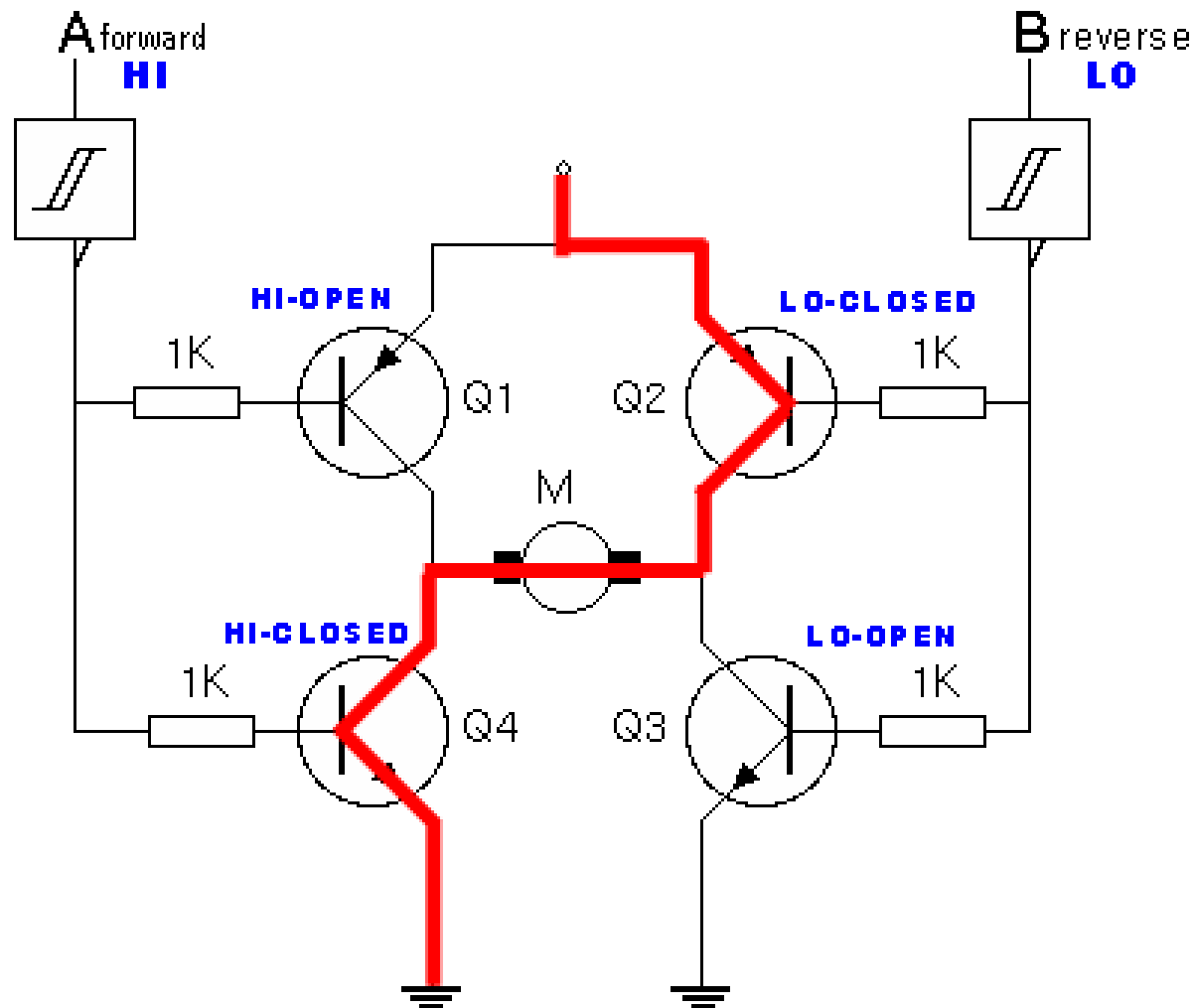
Roadmap SP 2013-2014 (sem 1)

1. The brains: Arduino
2. The muscles: motor and power (today)
3. The eyes: sensors (next week)
4. More brains: programming (4/11)
5. Training session (18/11)
6. Sumo Competition (2/12)

All info online!

- <http://www.ieee-sb-leuven.be>
- Motor spec:
 - <http://powerfunctions.lego.com/en-us/ElementSpecs/8882.aspx>
 - <http://www.philohome.com/motors/motorcomp.htm>
 - <http://www.philohome.com/pf/pf.htm>
- Controller spec:
<http://www.pololu.com/catalog/product/2135>

H-bridge

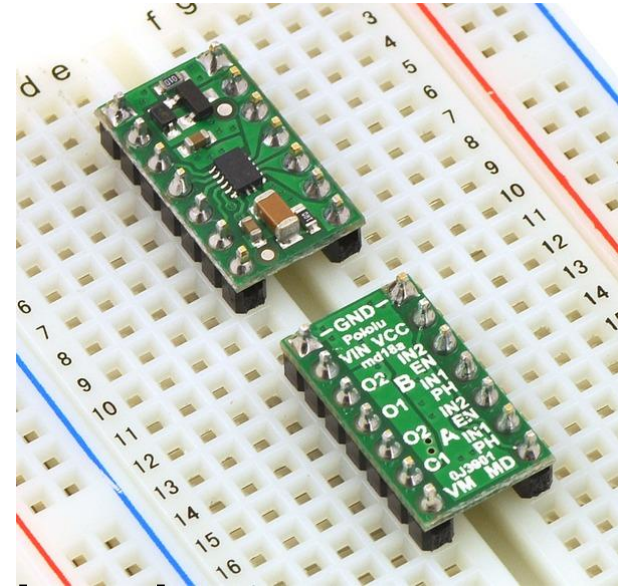


The motor controller

- Dual-H-bridge motor driver
- Motor supply voltage: 2–11 V
- Logic supply voltage: 2–7 V
- Output current: 1.2 A continuous (1.5 A peak) per motor
- Two possible interface modes: IN/IN (outputs mostly mirror inputs) or PHASE/ENABLE (one pin for direction and another for speed)

The motor controller

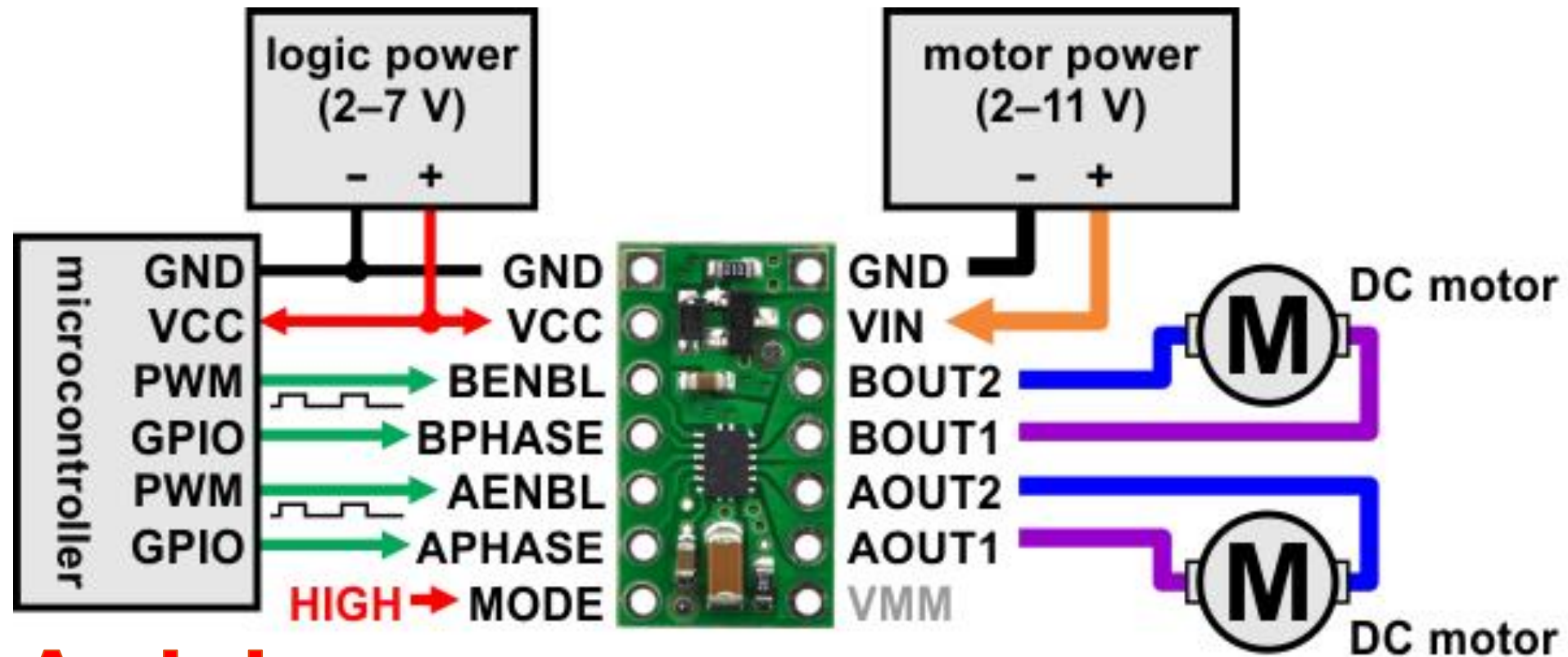
- Undervoltage, overcurrent, and thermal shutdown
- Reverse-voltage protection circuit
- Compact size with the form factor of a 14-pin DIP package => it can fit on your breadboard
- You'll have to solder the leads yourself (ask help i.s.o. burning your controller!)



The motor controller

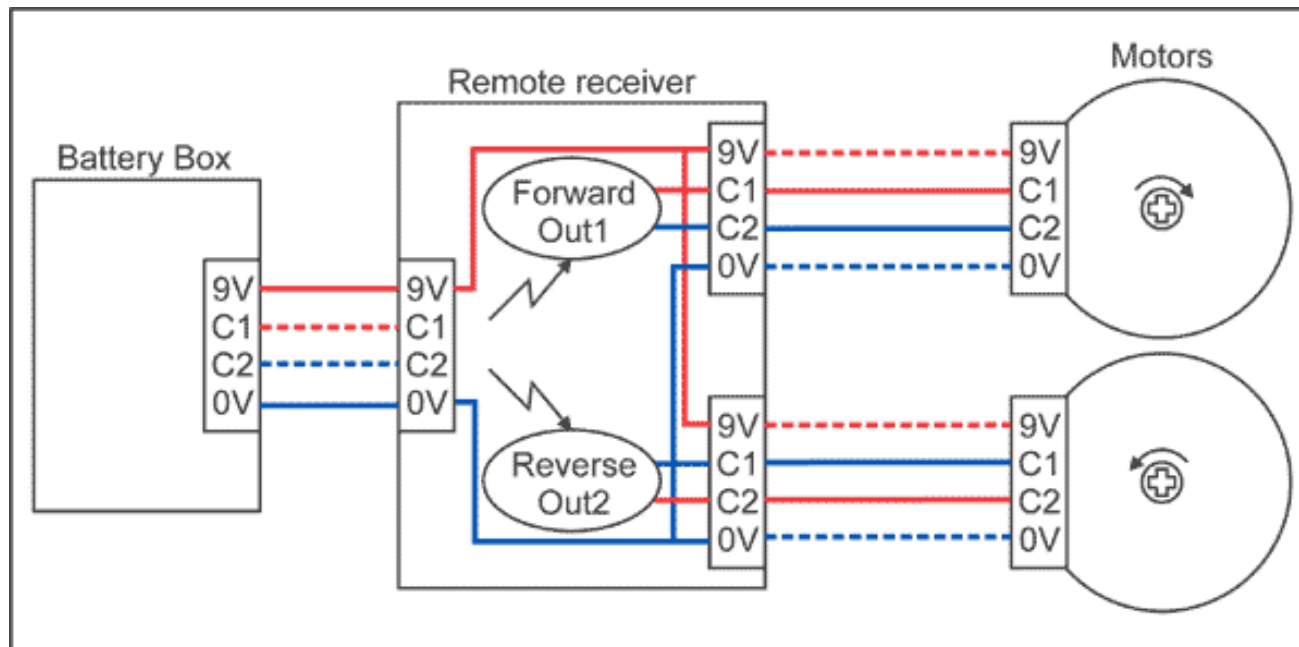
Arduino

Batteries



Arduino

The lego PF XL motor



Connection with 4 wire lego cables. Dotted: not connected/used

=>C1 with A/B out1 from controller
and C2 with A/B out2 from controller

Turn 1 wheel back and forward setup

```
int enablePin = 5; // enable of motor controller connected to digital pin 5
int phasePin = 4; // phase of motor controller connected to digital pin 4
int modePin = 7; // mode of motor controller connected to digital pin 7
int turn_direction = LOW;

void setup() {
  pinMode(modePin, OUTPUT);
  pinMode(phasePin, OUTPUT);
}
```

Turn 1 wheel back and forward loop

```
void loop() {  
    digitalWrite(modePin, HIGH); // put motor controller in phase/enable mode  
    digitalWrite(phasePin, turn_direction); // switch turn direction  
    // turn harder from min to max in increments of 5 points:  
    for(int fadeValue = 0 ; fadeValue <= 255; fadeValue +=5) {  
        analogWrite(enablePin, fadeValue); // sets the value (range from 0 to 255)  
        delay(30); // wait for 30 milliseconds to see the effect  
    }  
    // turn slower from max to min in increments of 5 points:  
    for(int fadeValue = 255 ; fadeValue >= 0; fadeValue -=5) {  
        analogWrite(enablePin, fadeValue); // sets the value (range from 0 to 255)  
        delay(30); // wait for 30 milliseconds to see the effect  
    }  
    if(turn_direction == LOW)  
        turn_direction = HIGH;  
    else  
        turn_direction = LOW;  
}
```

Next session (next week)

Sensors

- Bring sensors or order them with us
- Order as soon as possible! (This week)
- See you all next session!