H-Bridges

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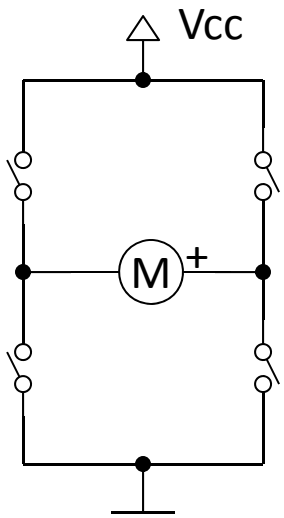
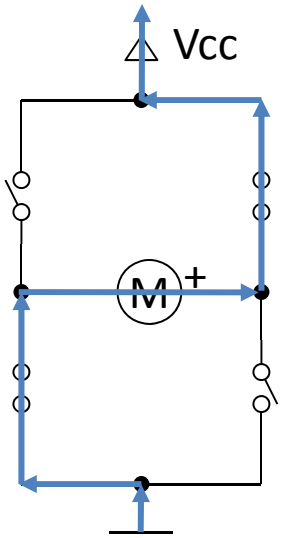
H-Bridges

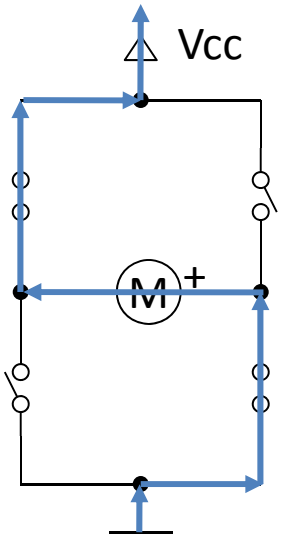
- Circuits that uses switches to reverse the direction of the current



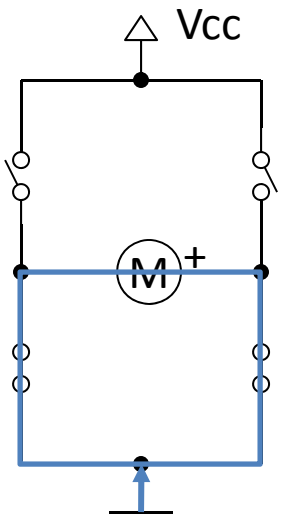
Circuit is open; motor is free to rotate in either direction



Diagonal switches (top right, bottom left) are closed; motor spins in positive (CCW) direction



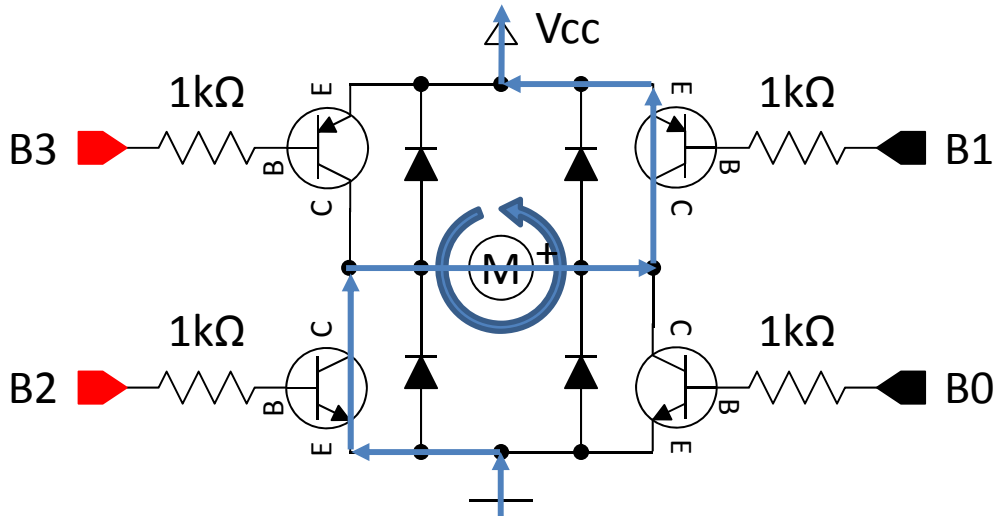
Diagonal switches (top left, bottom right) are closed; motor spins in negative (CW) direction

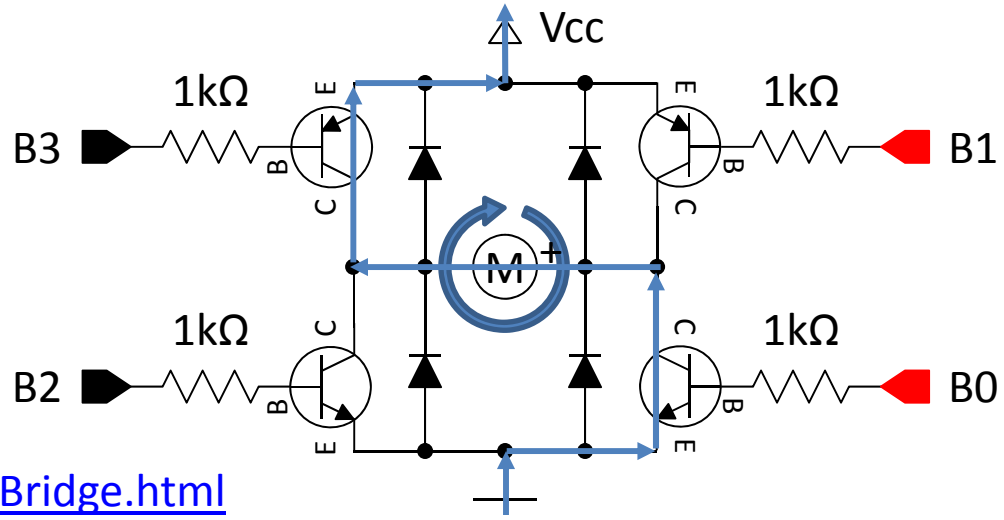


Bottom switches are closed; motor terminals are grounded, which stops motor

Direction Control (Transistor H-Bridges)

Action	B3	B2	B1	B0
Free rotation	1	0	1	0
Forward	1	1	0	0
Backward	0	0	1	1
Brake	1	1	1	1





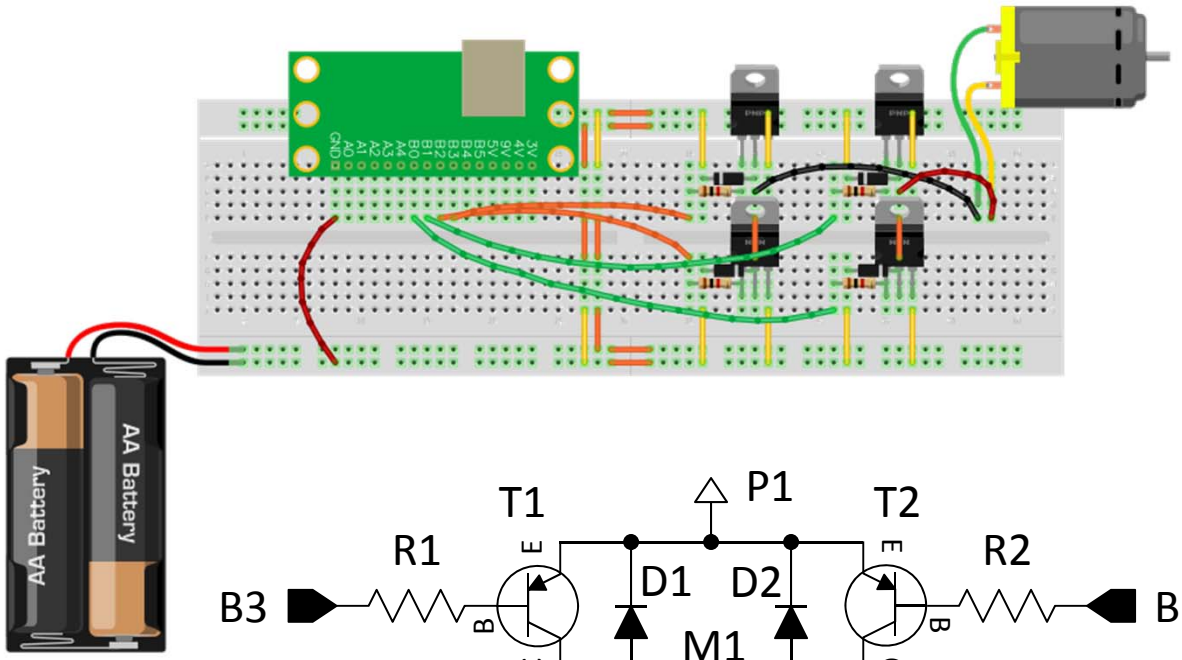
Transistors act as electronic switches which can be controlled by the digital output of a microcontroller and can direct the flow of current in the circuit with little current applied to the base of each transistor

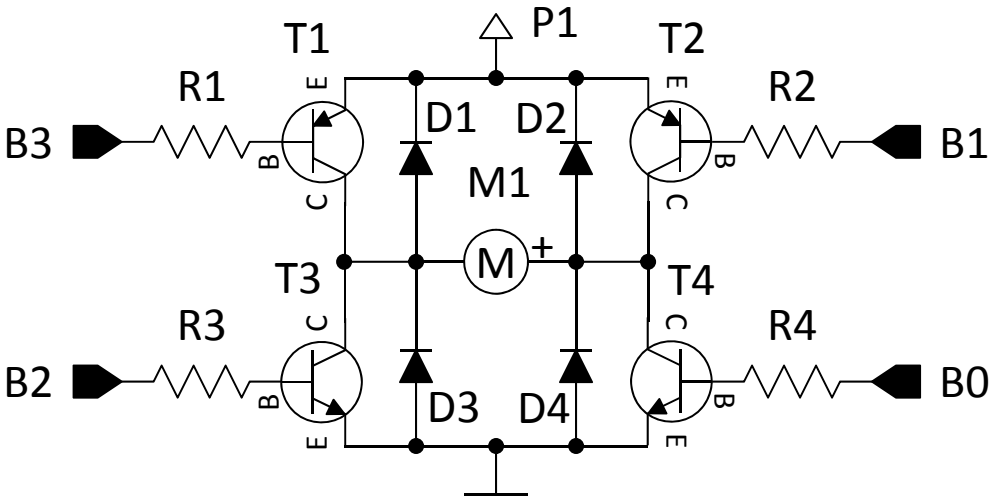
http://www.robotroom.com/BipolarHBridge.html

Lab

- Brushed DC Motor Control
  - Building and controlling a brushed DC motor using an H-bridge circuit and the NXT Sensor Expansion Kit

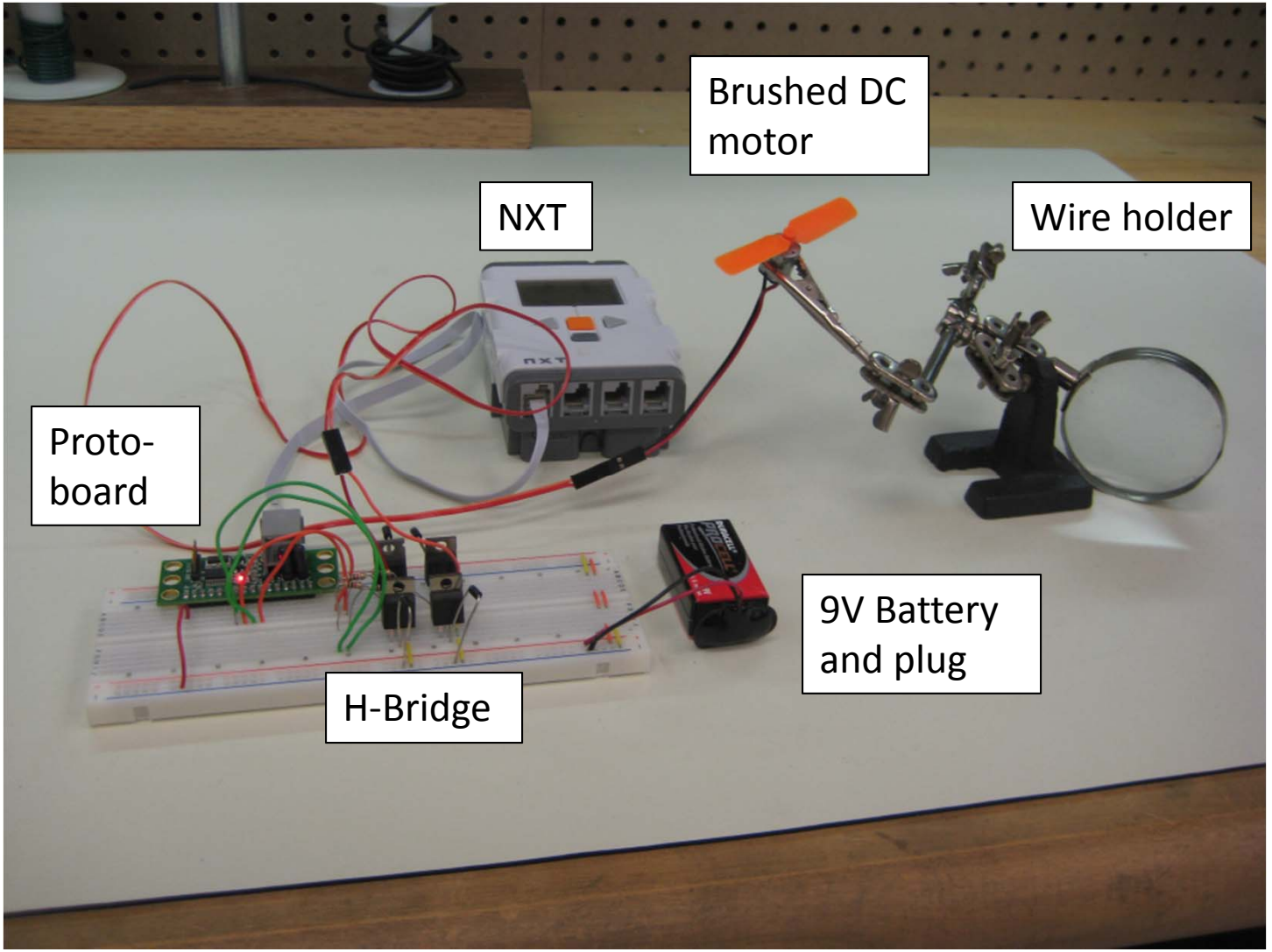
Transistor H-Bridge



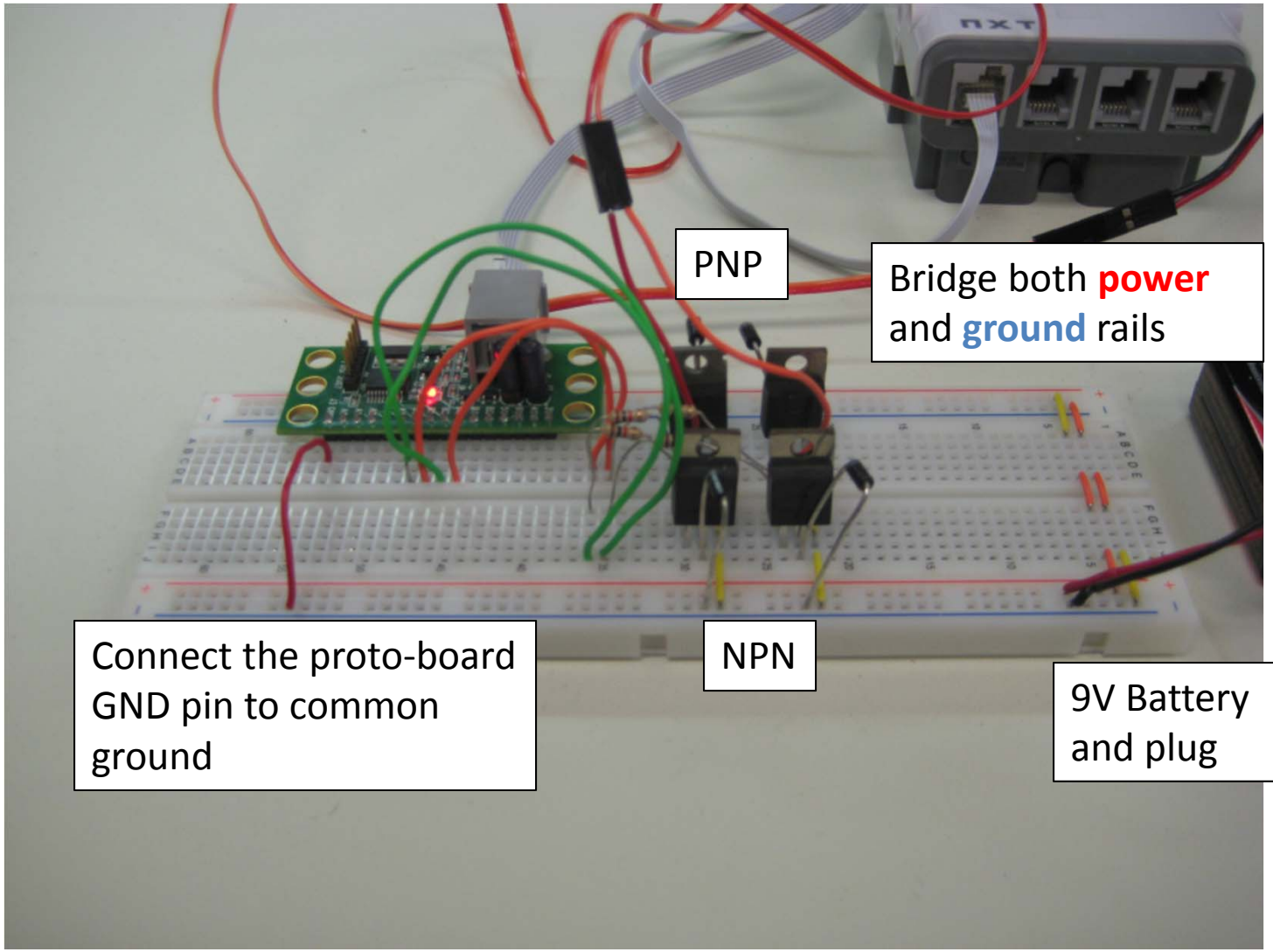


Part	Name	Value
Resistor	R1	1kΩ
	R2	1kΩ
	R3	1kΩ
	R4	1kΩ
Transistor	T1	PNP
	T2	PNP
	T3	NPN
	T4	NPN
Diode	D1	Power
	D2	Power
	D3	Power
	D4	Power
Motor	M1	Brushed
Battery	P1	9V

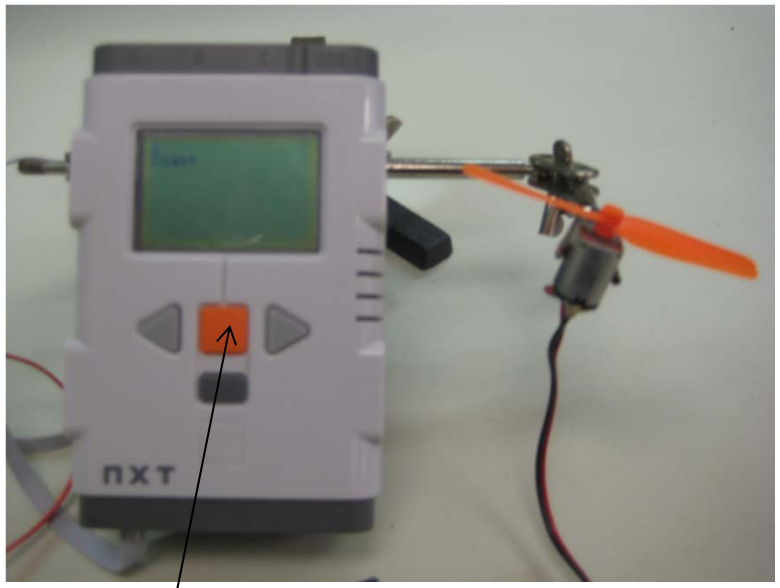
Lab Setup


Brushed DC motor
NXT
Wire holder
Proto-board
9V Battery and plug
H-Bridge

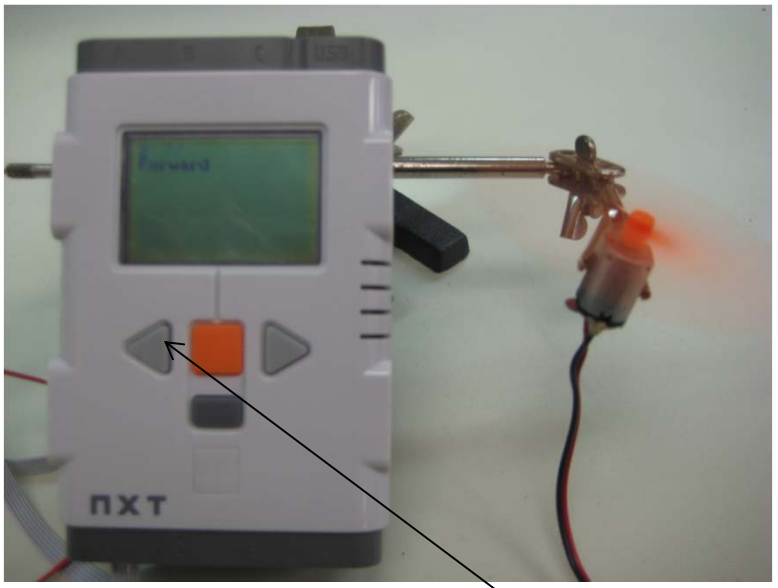
Circuit


PNP
Bridge both power and ground rails
Connect the proto-board GND pin to common ground
NPN
9V Battery and plug

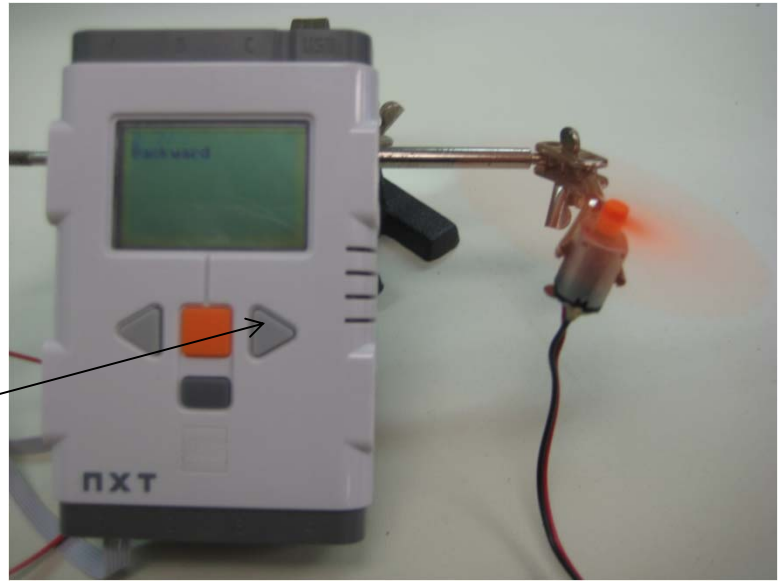
Output



Press the **center button** □ to let the motor spin freely



Press the **left button** < to drive the motor forward



Press the **right button** > to drive the motor backward