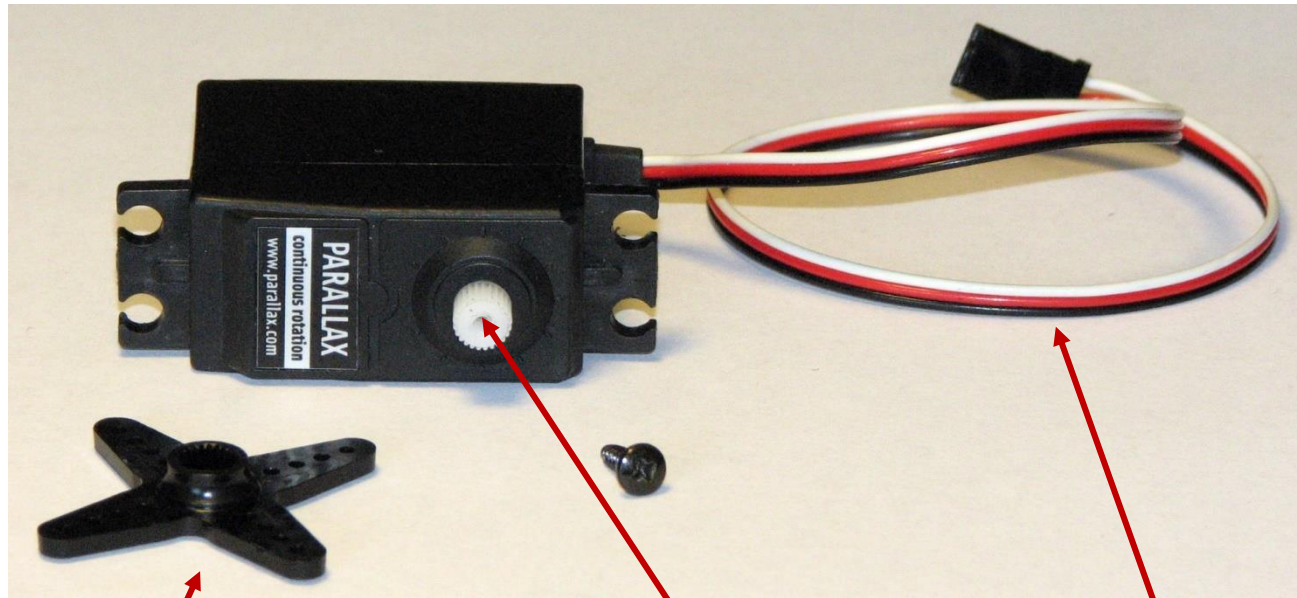


standard servo

# limited rotation servo basics



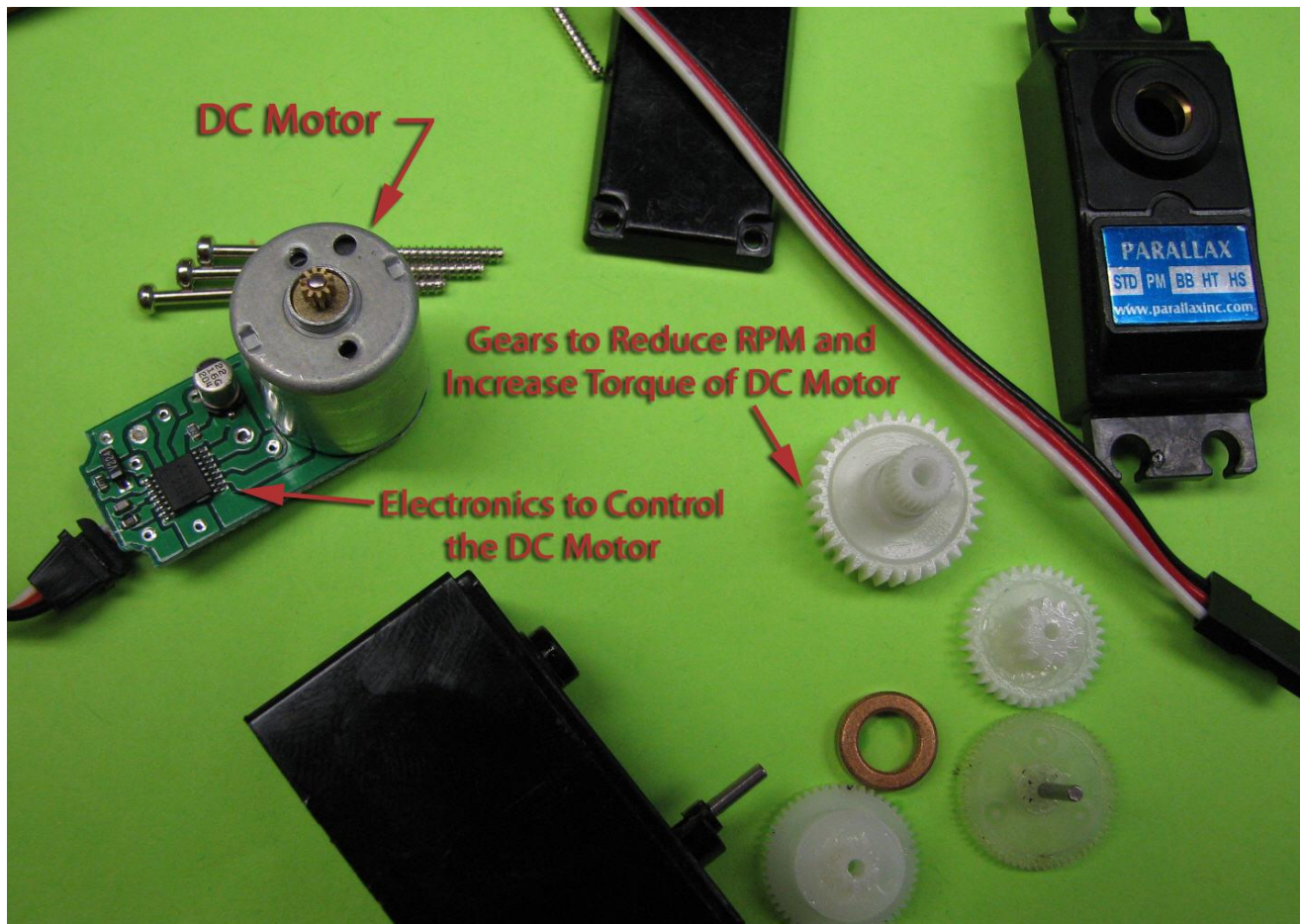
servo horn

output shaft

red wire = 5V +  
black wire = Gnd -  
white wire = control signal

# servo components

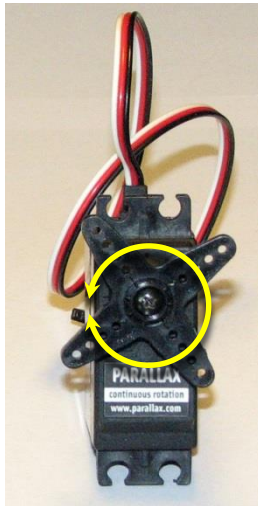
1. small **DC motor**
2. **gearbox** with small plastic gears to reduce the RPM and increase output torque
3. special **electronics** to interpret a pulse signal and deliver power to the motor



# types of servos

continuous rotation

can rotate all the way around in either direction

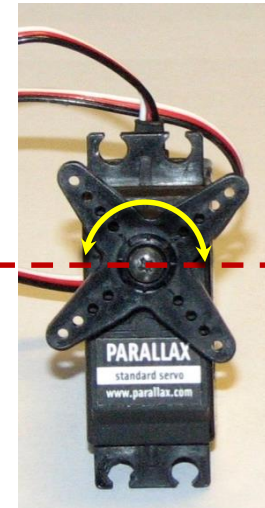


**white wire tells servo**

which way to spin & how fast to spin

standard (limited rotation)

can only rotate 180 degrees

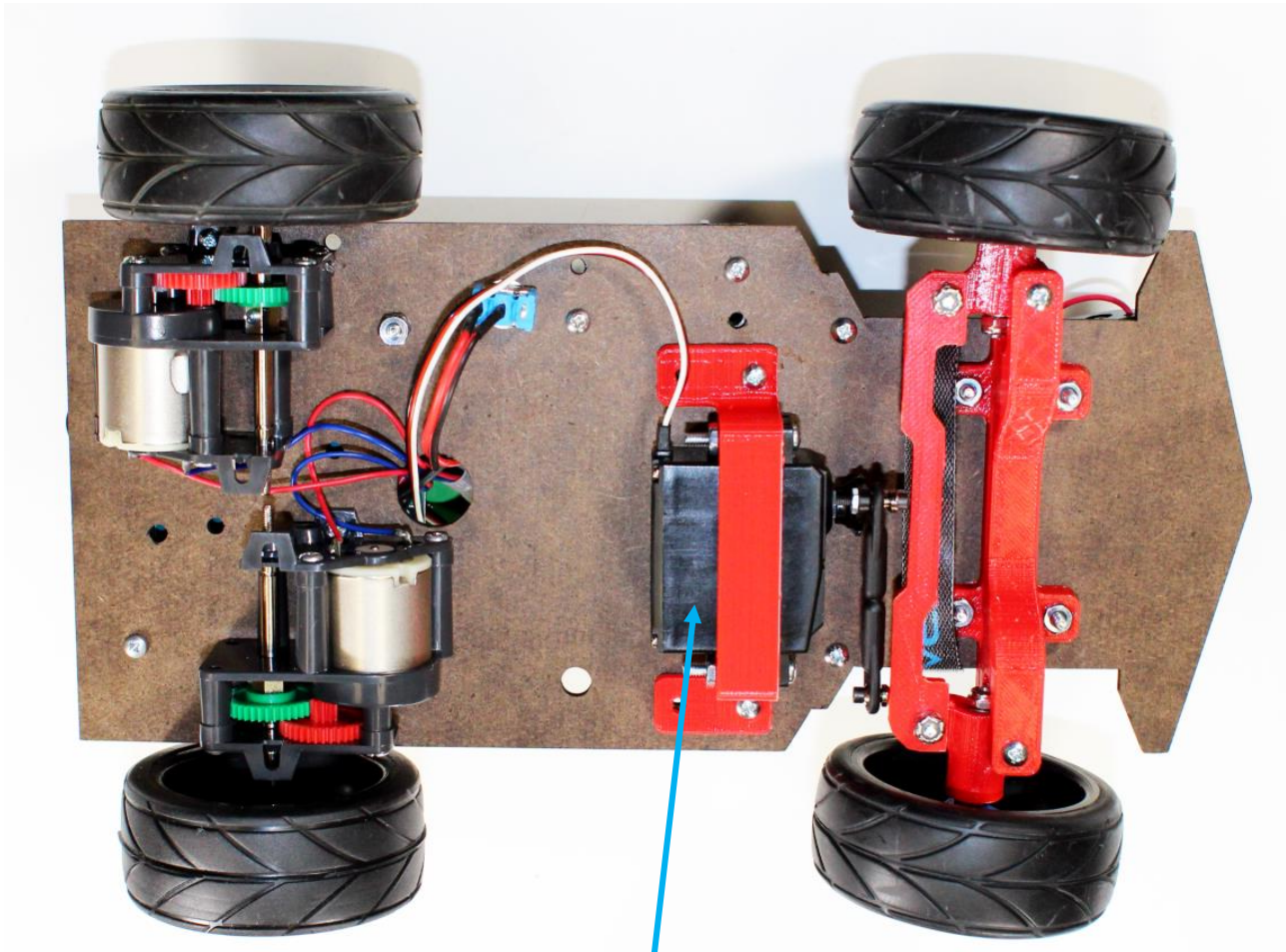


**white wire tells servo**

which steering position to hold



# servo for steering

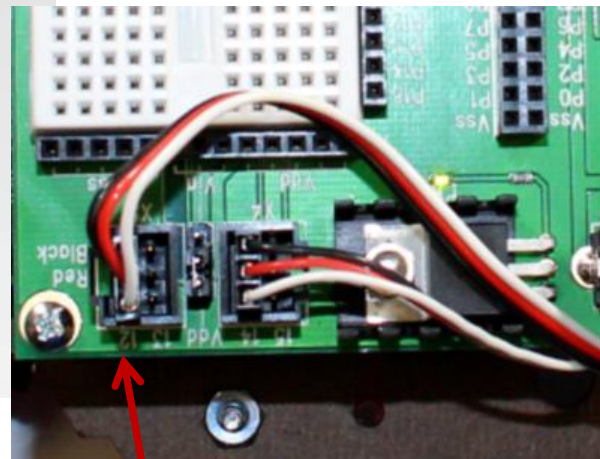
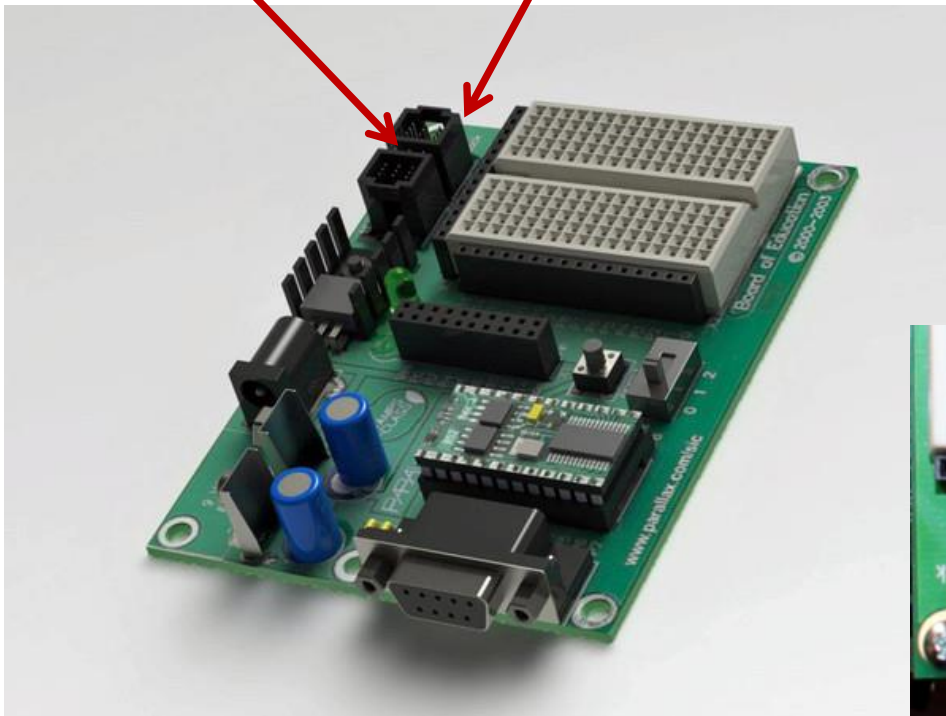


standard servo makes car turn left or right

# hooking up servo motors

servo ports

red & black color labels



servo controlling steering is plugged to 12

# controlling standard servos

```
' {$STAMP BS2}
' {$PBASIC 2.5}

DO
  PULSOUT 12, 750
  PAUSE 20
LOOP
```

steering servo is plugged into channel 12

make this number larger or smaller to control servo position

Experiment to determine the numbers that makes the servo turn all the way left and all the way right. Write down these numbers!

straight	=	<u>750</u>	}	start with these numbers, then trial & error
left	=	<u>850</u>		
right	=	<u>650</u>		

# how the control works

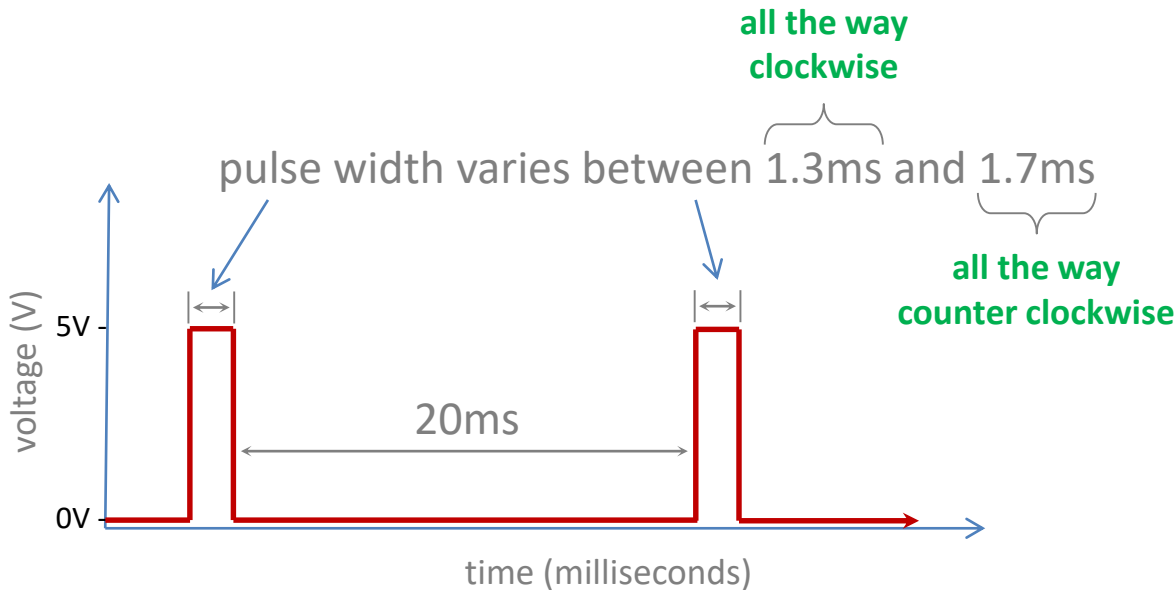
```
' {$STAMP BS2}
' {$PBASIC 2.5}

DO
  PULSOUT 12, 650
  PAUSE 20
LOOP
```

$$\text{pulse} = 650 \cdot 2\mu\text{s} = 1300\mu\text{s} = 1.3\text{ms}$$

$$\text{pulse} = 750 \cdot 2\mu\text{s} = 1500\mu\text{s} = 1.5\text{ms}$$

$$\text{pulse} = 850 \cdot 2\mu\text{s} = 1700\mu\text{s} = 1.7\text{ms}$$

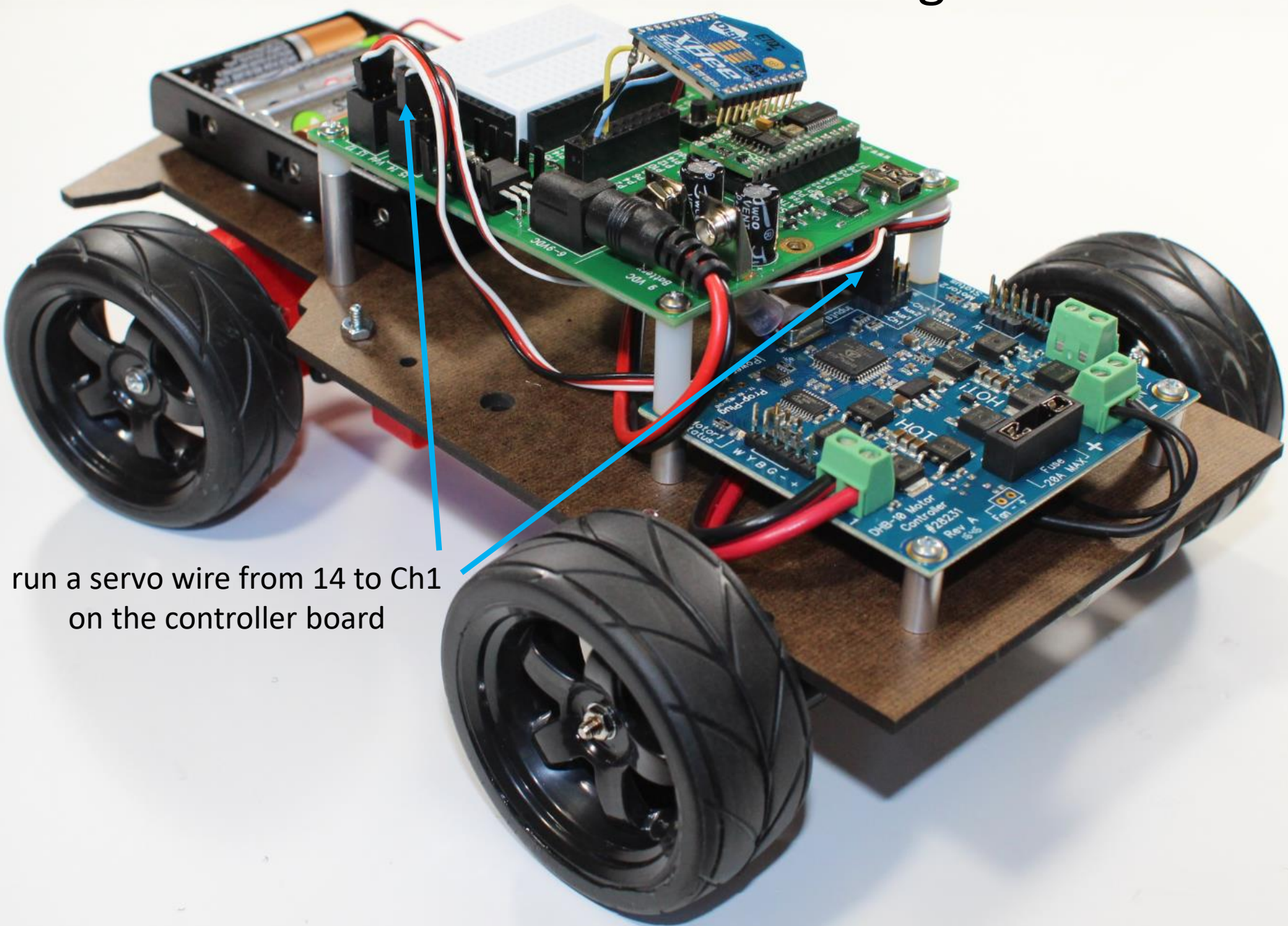


pulse width ( $\mu\text{s}$ )	servo action
1300	limit position CW
1400	$\frac{1}{2}$ way to CW
1500	middle
1600	$\frac{1}{2}$ way to CCW
1700	limit position CCW

position not linear with pulse duration



controlling back wheels



run a servo wire from 14 to Ch1 on the controller board



send pulses out pin 14 to control the speed and direction of the motors driving the back wheels

```
' {$STAMP BS2}  
' {$PBASIC 2.5}
```

```
DO
```

```
  PULSOUT 14, 750  
  PAUSE 20
```

```
LOOP
```

change this number and see what happens with the back wheels

center	CON 650
right	CON 750
left	CON 540
fullstop	CON 750
slowforward	CON 680
slowback	CON 820