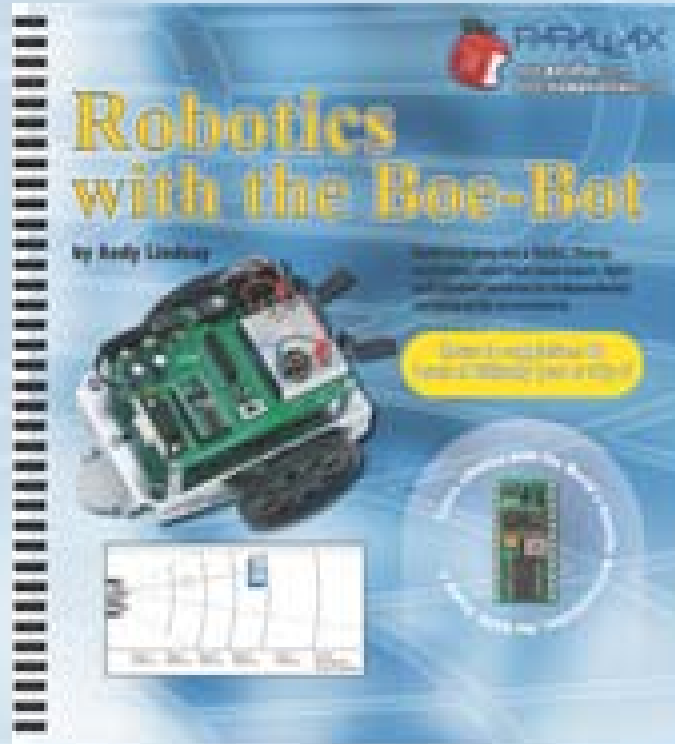




Robotics: with the Boe-Bot



Presentation based on:

“Robotics: with the Boe-Bot”

by Andy Lindsay

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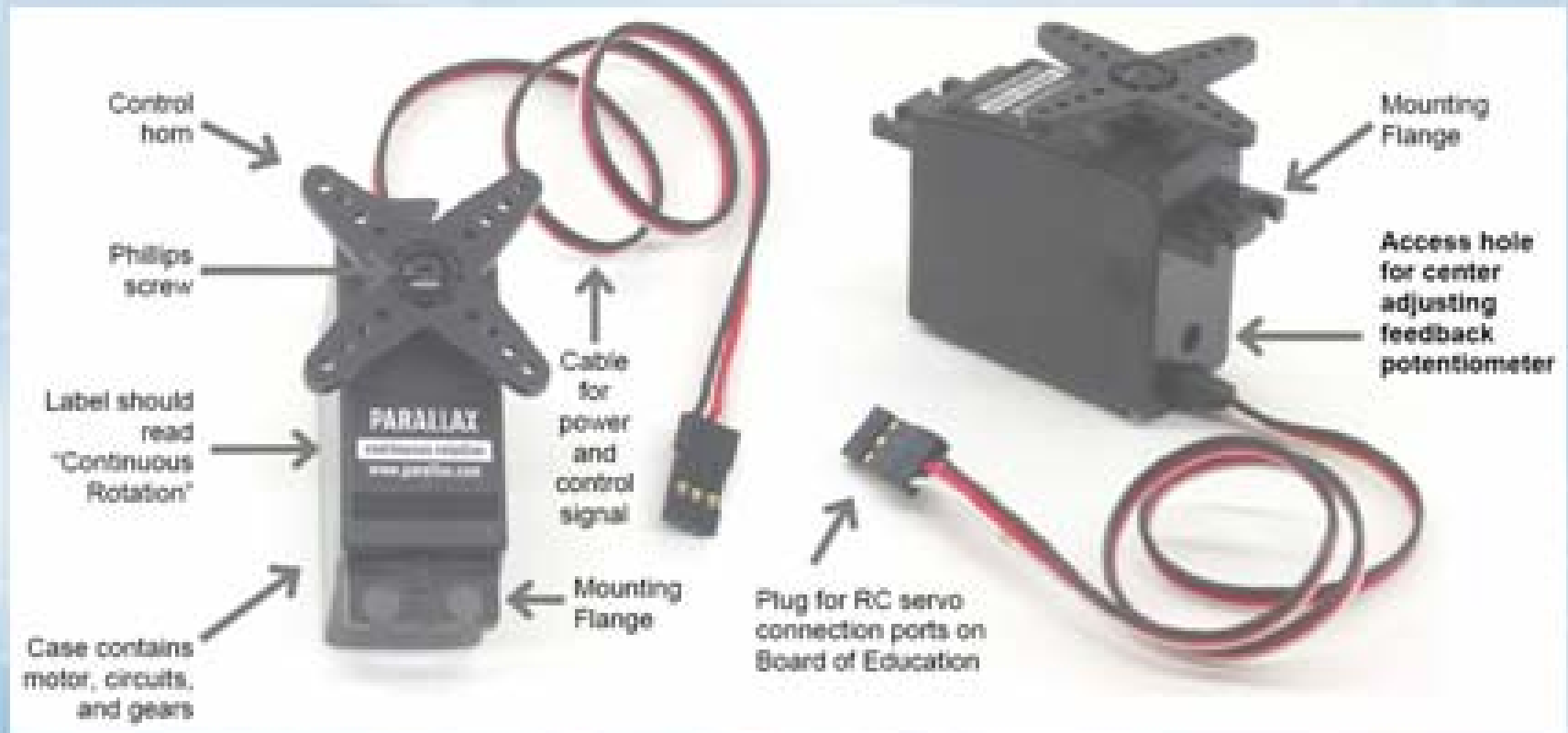
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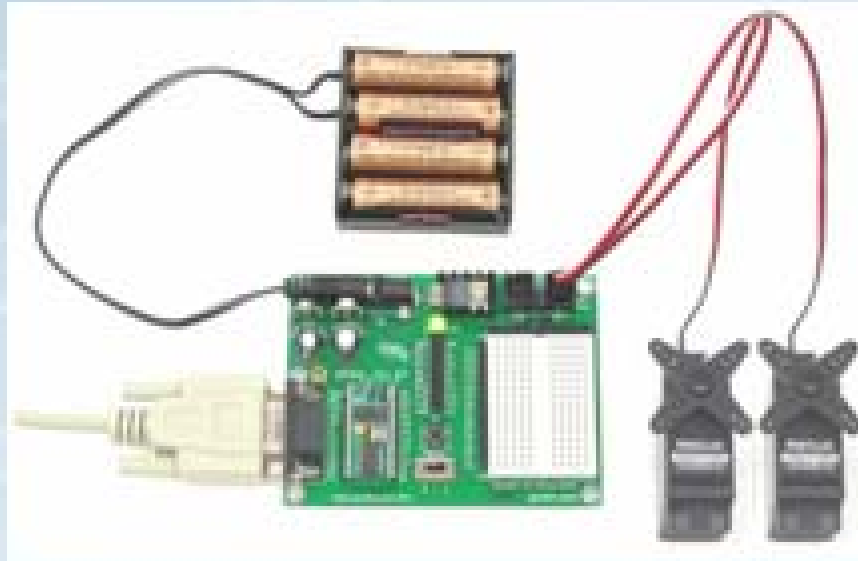


Introducing the Continuous Rotation Servo





Connecting Servos to the Board of Education Rev C

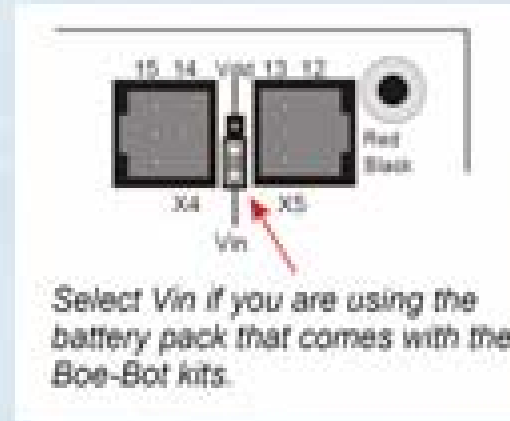




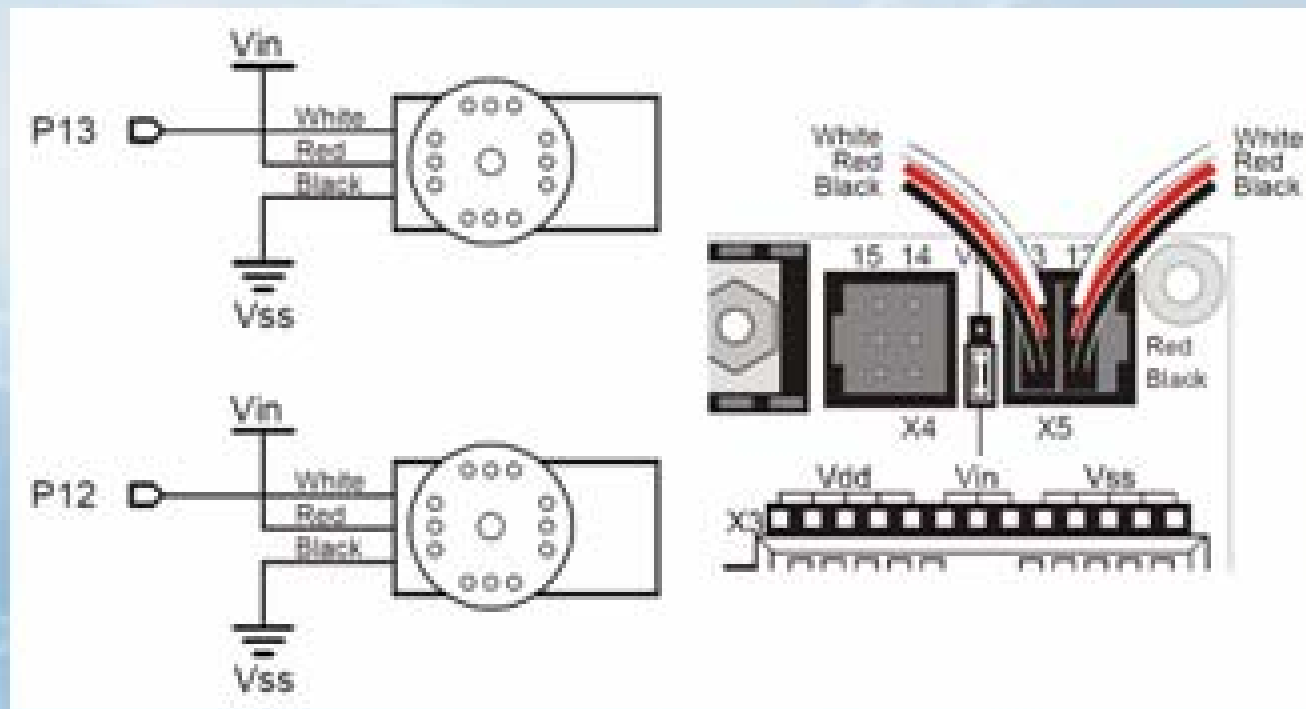
Connecting Servos to the Board of Education Rev C



Page 60



Page 61



Page 61



Centering the Servos

Example Program: CenterServoP12.bs2

```
* Robotics with the Boe-Bot - CenterServoP12.bs2
* This program sends 1.5 ms pulses to the servo connected to
* P12 for manual centering.

* ($STAMP BS2)
* ($PBASIC 2.5)

DEBUG "Program Running!"

DO
  PULSOUT 12, 750
  PAUSE 20
LOOP
```

Page 69

Example Program: CenterServoP13.bs2

```
* Robotics with the Boe-Bot - CenterServoP13.bs2
* This program sends 1.5 ms pulses to the servo connected to
* P13 for manual centering.

* ($STAMP BS2)
* ($PBASIC 2.5)

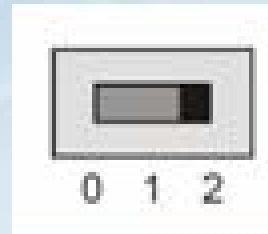
DEBUG "Program Running!"

DO
  PULSOUT 13, 750
  PAUSE 20
LOOP
```

Page 70

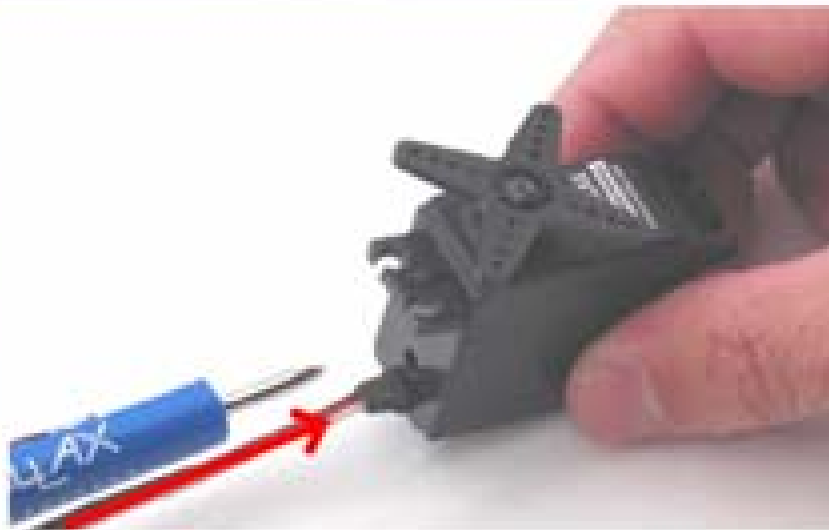


Centering the Servos



Page 68

Make the servo stop turning – use the screwdriver.



Insert tip of Phillips screwdriver into potentiometer access hole.



Gently turn screwdriver to adjust potentiometer

Page 69

Slide 7



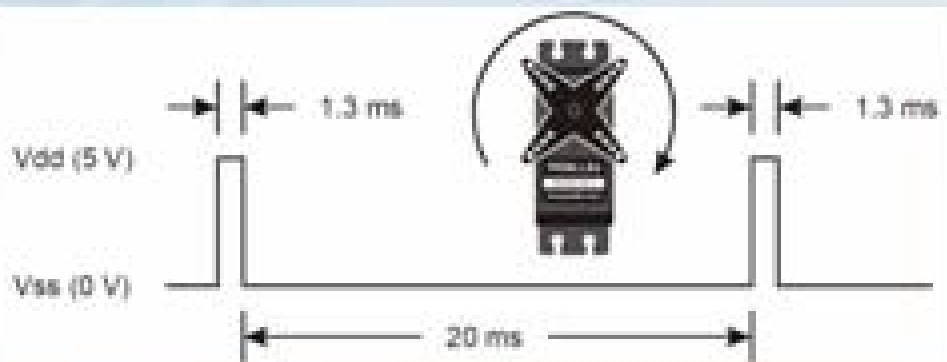
Testing the Servos



Page 67

```
DO
  PULSOUT 12, 750
  PAUSE 20
LOOP
```

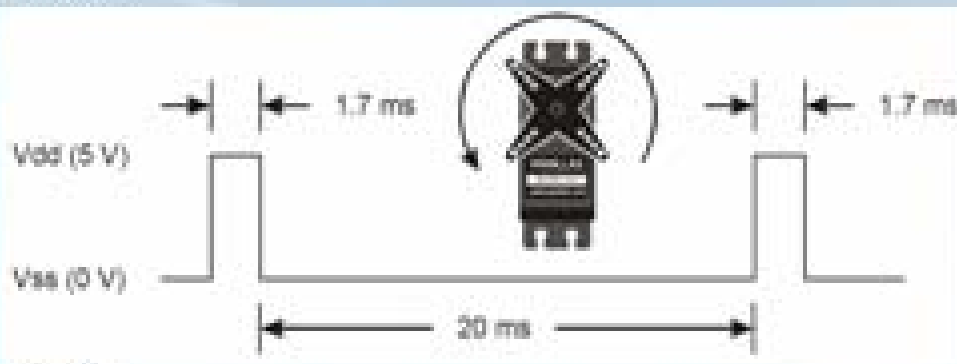
Page 69



Page 76

```
DO
  PULSOUT 12, 650
  PAUSE 20
LOOP
```

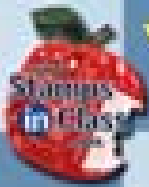
Page 77



Page 78

```
DO
  PULSOUT 12, 850
  PAUSE 20
LOOP
```

Page 79



Your Turn – Adjusting the Speed and Direction

```
DO
  PULSOUT 13, 850
  PULSOUT 12, 650
  PAUSE 20
LOOP
```



Page 79

Page 81

Table 2-1: PULSOUT Duration Combinations

| Durations | | Description | Behavior |
|-----------|-----|---|----------|
| P13 | P12 | | |
| 850 | 650 | Full speed, P13 servo counterclockwise, P12 servo clockwise | |
| 650 | 850 | | |
| 850 | 850 | | |
| 650 | 650 | | |
| 750 | 850 | | |
| 650 | 750 | | |
| 750 | 750 | Both servos should stay still because of the centering adjustments you made in Activity #4. | |
| 760 | 740 | | |
| 770 | 730 | | |



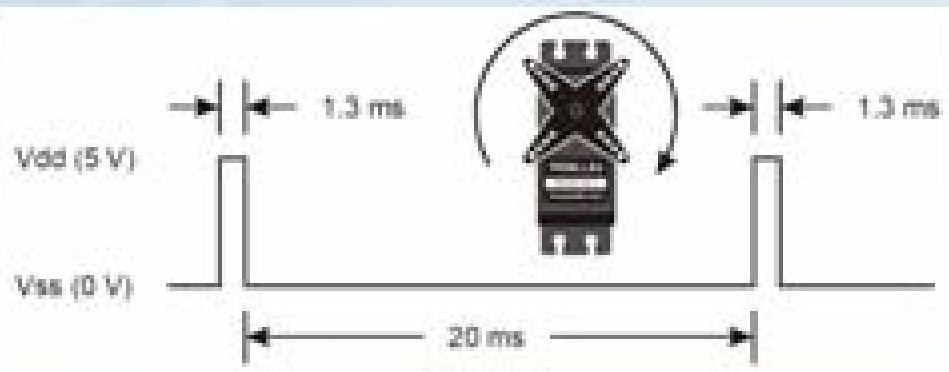
Testing the Servos



Page 67

```
DO
  PULSOUT 12, 750
  PAUSE 20
LOOP
```

Page 69



Page 76

```
DO
  PULSOUT 12, 650
  PAUSE 20
LOOP
```

Page 77



Page 78

```
DO
  PULSOUT 12, 850
  PAUSE 20
LOOP
```

Page 79



How the Assembly Instructions Work



Mounting the Topside Hardware

- ✓ Start by gathering this list of parts.
- ✓ Then, follow the accompanying instructions.

Parts List:

See Figure 3-2.

- (1) Boe-Bot chassis
- (4) 1" Standoffs
- (4) Pan head screws, 1/4" 4-40
- (1) Rubber grommet, 13/32"

Instructions:

- ✓ Insert the 13/32" rubber grommet into the hole in the center of the Boe-Bot chassis.
- ✓ Make sure the groove in the outer edge of the rubber grommet is seated on the edge of the hole in the chassis.
- ✓ Use the four 1/4" 4-40 screws to attach the four standoffs to the chassis as shown.



Figure 3-2
Chassis and
Topside
Hardware

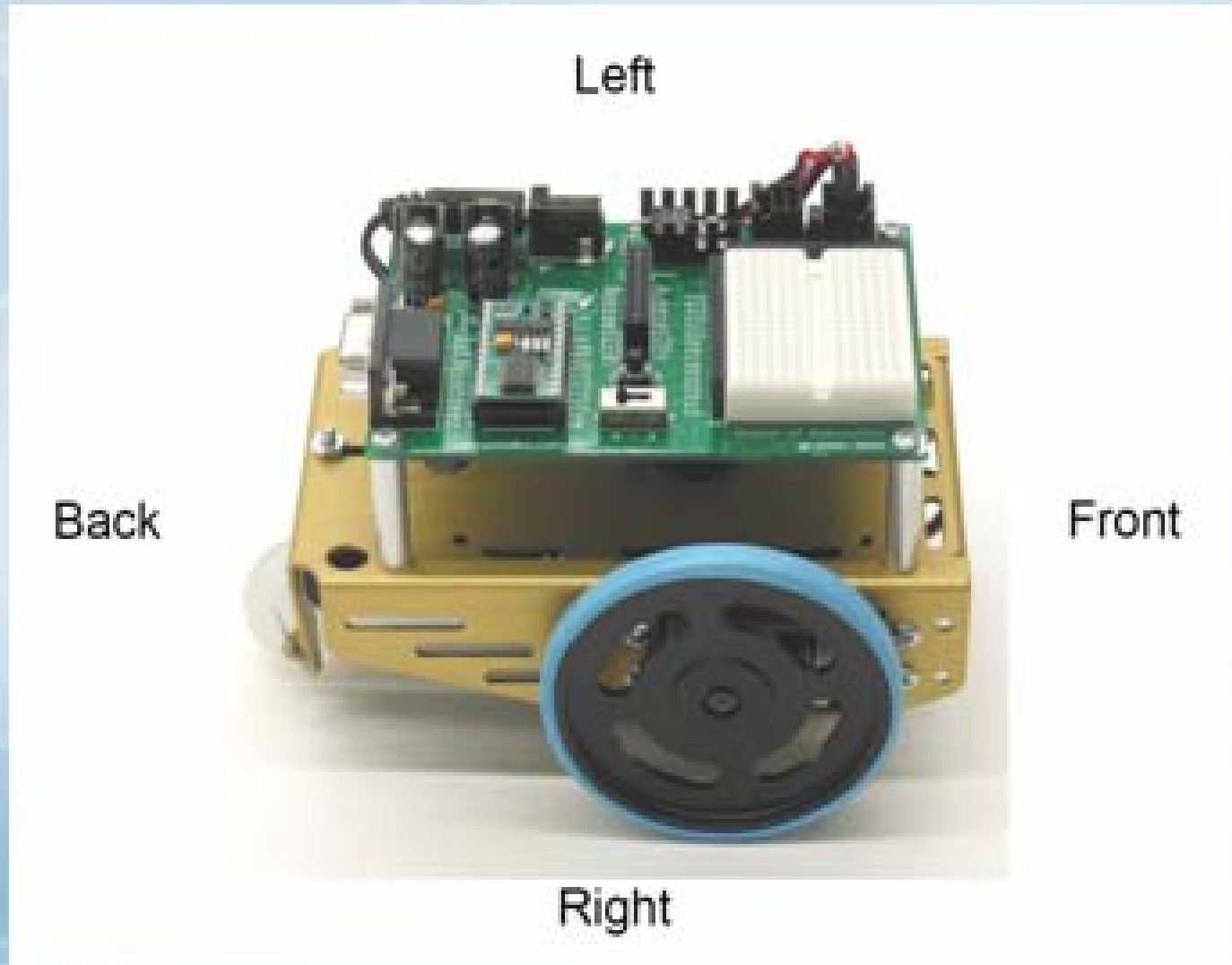
Parts (left):
assembled
(right).

Page 92 – 93

Before → After



Assembling the Boe-Bot...Finished





Retest the Servos

```
' ($STAMP BS2)
' ($PBASIC 2.5)

DEBUG "Program Running!"

counter          VAR          Word

FOR counter = 1 TO 122
  PULSOUT 12, 650
  PAUSE 20
NEXT

FOR counter = 1 TO 40
  PULSOUT 12, 750
  PAUSE 20
NEXT

FOR counter = 1 TO 122
  PULSOUT 12, 850
  PAUSE 20
NEXT

END
```

Page 103



Build the Start/Reset Indicator

✓ Brownout

- Batteries drop below 5.2 V
- Brownout detector circuit resets the BASIC Stamp
- Program starts over from beginning

✓ Low Battery Indicator

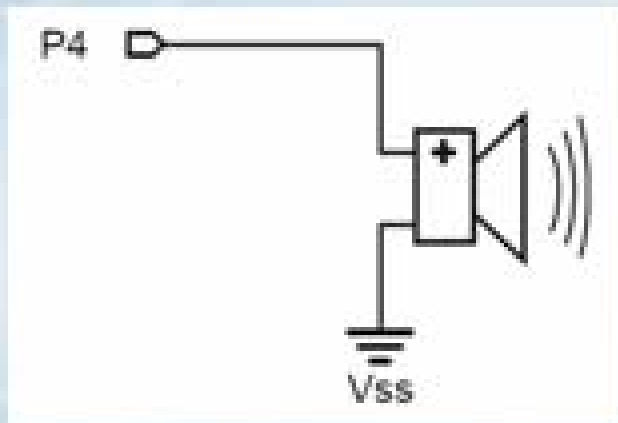
- Add speaker to Boe-Bot
- "Beep" first thing in program
 - ✓ If Boe-Bot beeps during navigation, must have reset
 - ✓ Thus batteries are low



Start Reset Indicator Circuit and Program



Page 107

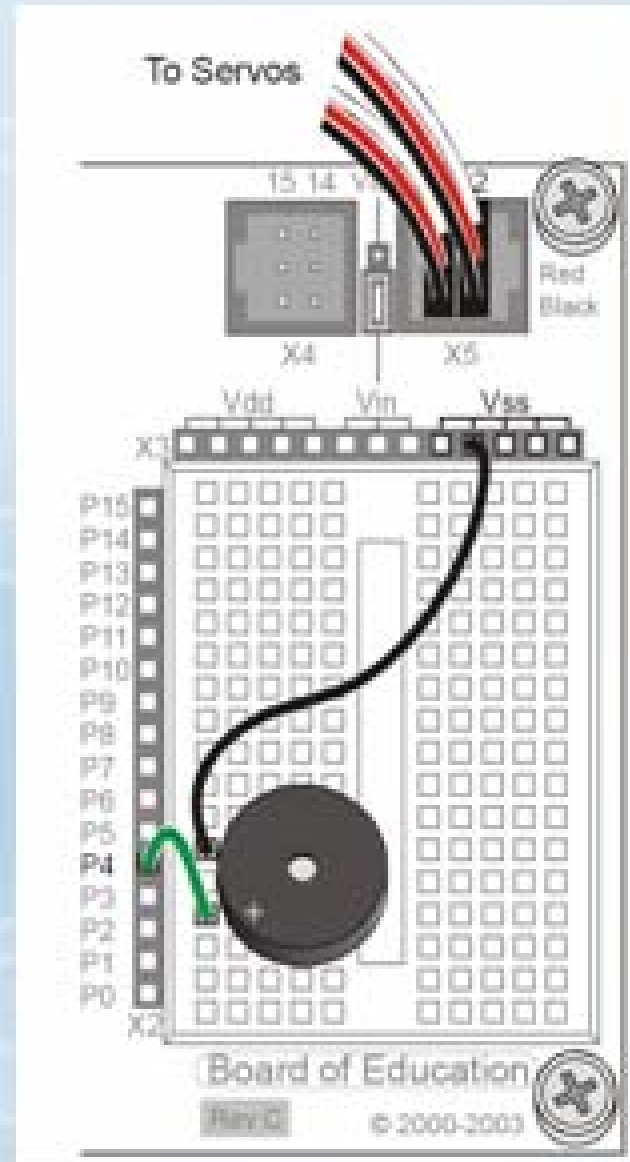


Page 108

FREQOUT *Pin, Duration, Freq1 {,Freq2}*

FREQOUT 4, 2000, 3000

Page 109



Page 108