Errata for What’s a Microcontroller? Text v3.0 (#28123)

If you find what may be additional errata items not listed here, please email editor@parallax.com. We appreciate your sharp eyes!

Text errors are noted with red strikethrough text, and corrections with blue text, in the sections below. Formatted PDF replacement pages for each correction are appended to this document.

How the Potentiometer Circuit Works

The total resistance in your test circuit is 220 Ω plus the resistance between the A and W terminals of the potentiometer. The resistance between the A and W terminals increases as the knob is adjusted further clockwise counterclockwise, which in turn reduces the current through the LED, making it dimmer.

Pages 166-167

' What's a Microcontroller - Ch5Prj01_ControlServoWithPot.bs2
' Read potentiometer in RC-time circuit using RCTIME command.
' The time var ranges from 126 to 713, and an offset of 330 is needed.
' Use RCTIME result in time variable to control servo position.
' Bicolor LED on P12, P13 tells direction of servo rotation:
' green for CW, red for CCW, off when servo is holding position.
' {$STAMP BS2}
' {$PBASIC 2.5}

PAUSE 1000
DEBUG "Program Running!"

<table>
<thead>
<tr>
<th>time</th>
<th>VAR</th>
<th>Word</th>
<th>' time reading from pot</th>
</tr>
</thead>
<tbody>
<tr>
<td>prevTime</td>
<td>VAR</td>
<td>Word</td>
<td>' previous reading</td>
</tr>
</tbody>
</table>

DO

prevTime = time
' Store previous time reading
HIGH 7
' Read pot using RCTIME
PAUSE 10
RCTIME 7, 1, time
' Scale pot, match servo range

- time = time + 350
- time = time */ 185
- time = time + 500

' Scale by 0.124 (X 256 for */).
' Offset by 500.
The memory map does not match the one for the program in Activity #1. This is the correct memory map display.

Figure 0-1a
Memory Map

To view this window, click Run, and select Memory Map.

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In the printed program listing for StoreLightMeasurementsInEeprom.bs2, a comma is missing from the end of one line of code. The corrected listing is shown below, with a comment pointing out the changed line.

```
' What's a Microcontroller - StoreLightMeasurementsInEeprom.bs2
' Write light measurements to EEPROM.
' {$STAMP BS2}
' {$PBASIC 2.5}

    time            VAR     Word
    eepromAddress   VAR     Byte

    PAUSE 1000
    DEBUG "Starting measurements...", CR, CR, "<<< SECOND CR SHOULD BE FOLLOWED BY A COMMA"
        "Measurement Value", CR,
        "------------ ----", CR
    FOR eepromAddress = 0 TO 58 STEP 2
        HIGH 2
        PAUSE 5000
        RCTIME 2, 1, time
        DEBUG DEC2 eepromAddress,
            "", DEC time, CR
        WRITE eepromAddress, Word time
    NEXT
    DEBUG "All done. Now, run:", CR,
        "ReadLightMeasurementsFromEeprom.bs2"
END
```
If your What’s a Microcontroller v3.0 kit did not contain a 4.7 kΩ resistor, you can instead use two 10 kΩ resistors in parallel as shown in Figure 7-20a. The equivalent resistance of two 10 kΩ resistors in parallel is 5 kΩ. You can also use this approach with two 100 kΩ resistors in parallel for an equivalent resistance of 50 kΩ. (Since this is not a book error specifically, no replacement PDF page is provided.)

**Figure 0-2a:** Schematic and Wiring Diagram that Utilize two 10 kΩ Resistors in Parallel for an Equivalent Resistance of 5 kΩ.

![Schematic and Wiring Diagram](image)

**Equivalent Resistance for Series and Parallel Values.**

When two or more resistors are connected in series, the equivalent resistance is:

\[
R_{eq} = R_1 + R_2 + R_3 \ldots
\]

(Equivalent resistance for resistors in series)

When two or more resistors are connected in parallel, their equivalent resistance is:

\[
R_{eq} = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \ldots}
\]

(Equivalent resistance for resistors in parallel)

For two 10 kΩ resistors in parallel, that's \(1 + \frac{1}{1/10k + 1/10k} = 1 + \frac{2}{10k} = 10k/2 = 5\ kΩ\).

Two equal value resistors in parallel allow twice as much current through as one of them in its own would let through. So it stands to reason that the equivalent resistance for two equal value resistors in parallel would be one half of the value.

**Equivalent Capacitance for Series and Parallel Values.**

It’s easiest to remember how to calculate equivalent capacitance if you think about it as the reverse of series and parallel resistor calculations. So, the equivalent capacitance for parallel capacitors adds up, and equivalent capacitance for series capacitors uses inverses.

\[
C_{eq} = C_1 + C_2 + C_3 \ldots
\]

(Equivalent capacitance for capacitors in parallel)

In the previous activity, two capacitors were placed in parallel to double the capacitance. For two 0.01 μF capacitors, that’s \(C_{eq} = 0.01 \text{ μF} + 0.01 \text{ μF} = 0.02 \text{ μF}\).

When two or more capacitors are placed in series, their equivalent capacitance is:

\[
C_{eq} = \frac{1}{\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} \ldots}
\]

(Equivalent capacitance for capacitors in series)