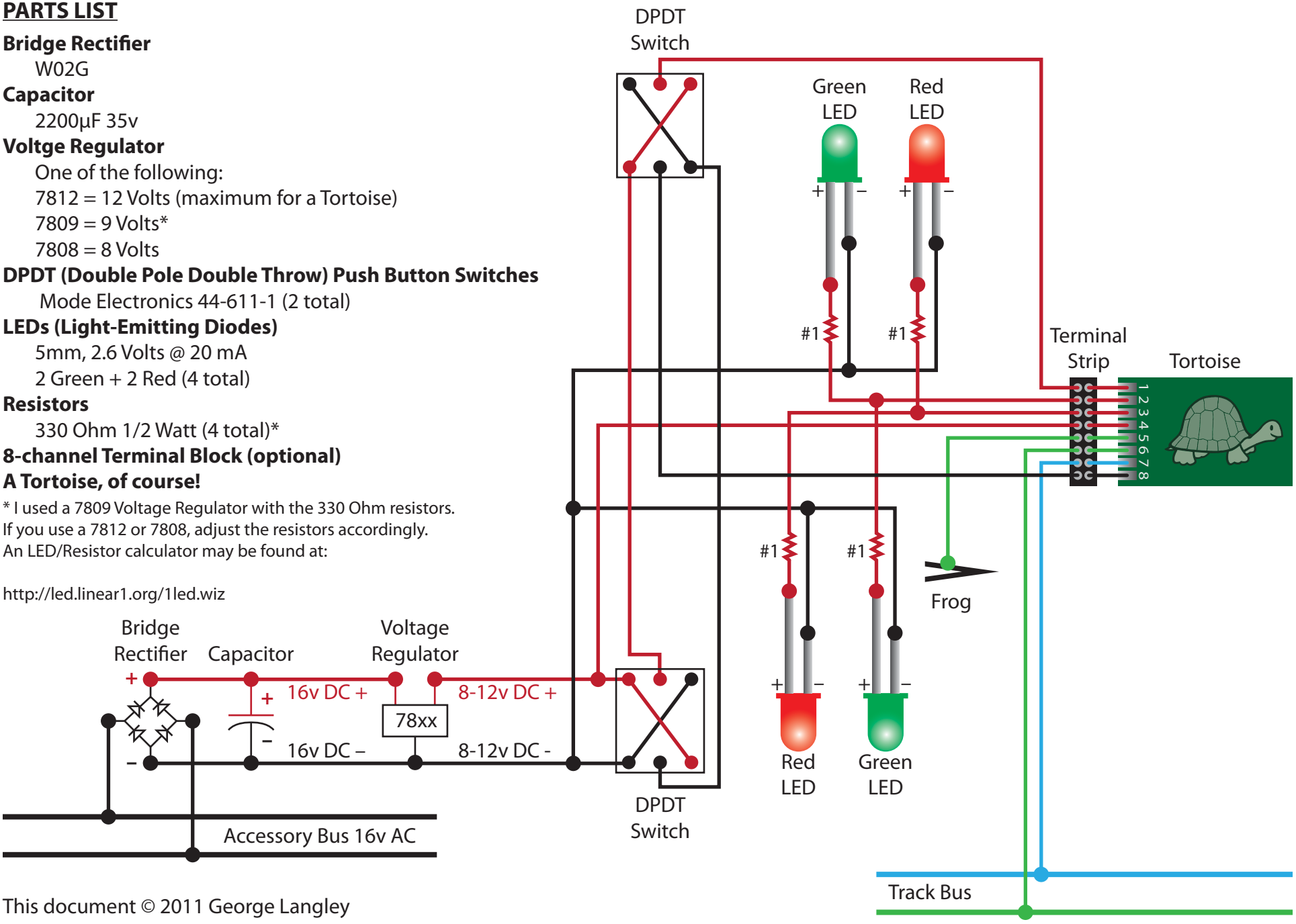
Tortoise Wiring Guide

PARTS LIST

Bridge Rectifier
W02G
Capacitor
2200µF 35v
Voltge Regulator
One of the following:
7812 = 12 Volts (maximum for a Tortoise)
7809 = 9 Volts*
7808 = 8 Volts
DPDT (Double Pole Double Throw) Push Button Switches
Mode Electronics 44-611-1 (2 total)
LEDs (Light-Emitting Diodes)
5mm, 2.6 Volts @ 20 mA
2 Green + 2 Red (4 total)
Resistors
330 Ohm 1/2 Watt (4 total)*
8-channel Terminal Block (optional)
A Tortoise, of course!

* I used a 7809 Voltage Regulator with the 330 Ohm resistors.
If you use a 7812 or 7808, adjust the resistors accordingly.
An LED/Resistor calculator may be found at:

http://led.linear1.org/1led.wiz



Tortoise Wiring Guide - Basic Wiring

This is the basic wiring for a Tortoise switch on a Free-mo module. It uses the 16 volt AC power supplied by the Accessory Bus and provides a Push Button Switch on both sides of the module.

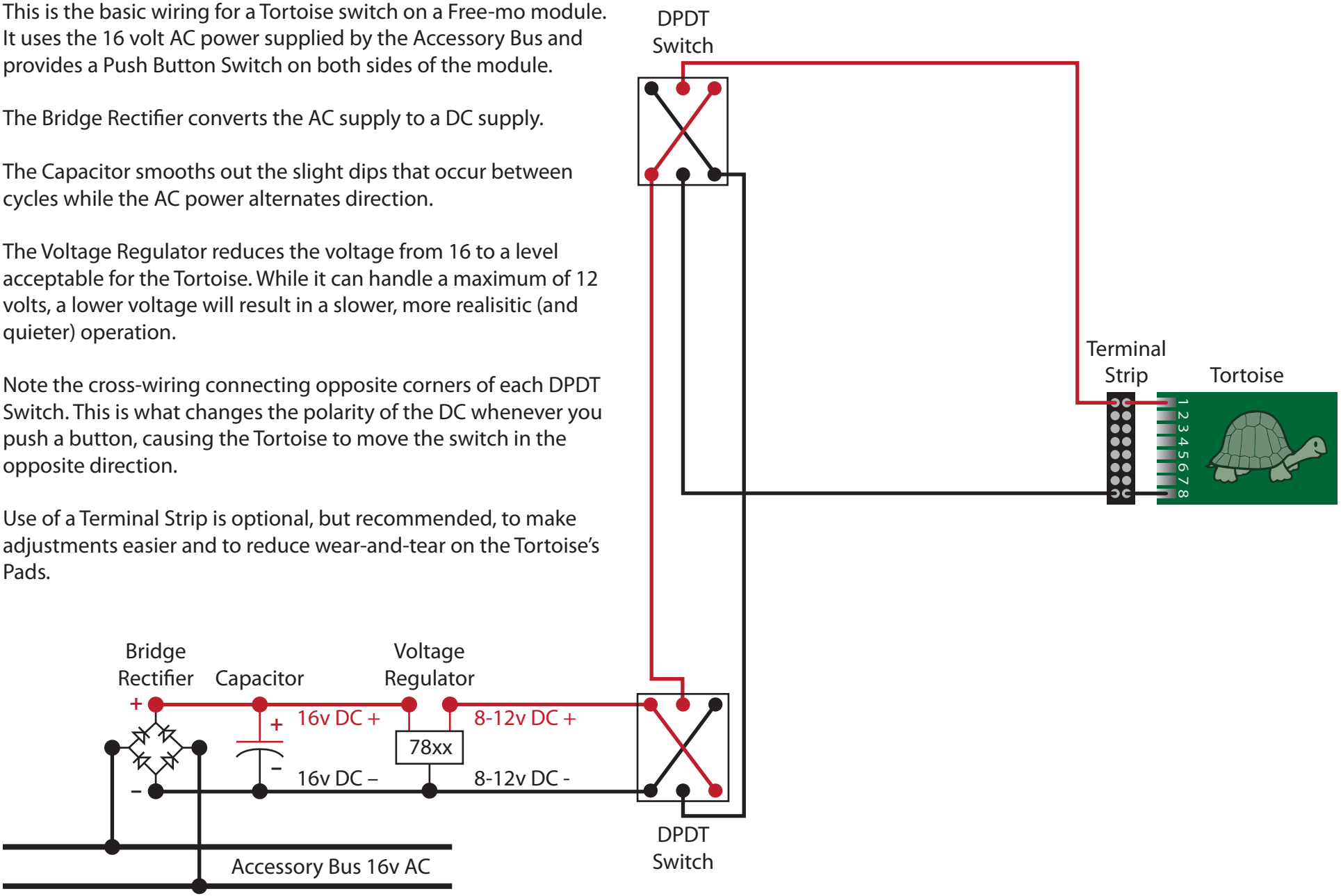
The Bridge Rectifier converts the AC supply to a DC supply.

The Capacitor smooths out the slight dips that occur between cycles while the AC power alternates direction.

The Voltage Regulator reduces the voltage from 16 to a level acceptable for the Tortoise. While it can handle a maximum of 12 volts, a lower voltage will result in a slower, more realisitic (and quieter) operation.

Note the cross-wiring connecting opposite corners of each DPDT Switch. This is what changes the polarity of the DC whenever you push a button, causing the Tortoise to move the switch in the opposite direction.

Use of a Terminal Strip is optional, but recommended, to make adjustments easier and to reduce wear-and-tear on the Tortoise's Pads.



Tortoise Wiring Guide - LED Wiring

This is the wiring for the LEDs. It uses one of the mechanical switches built into the Tortoise, to provide positive feedback that the switch has moved.

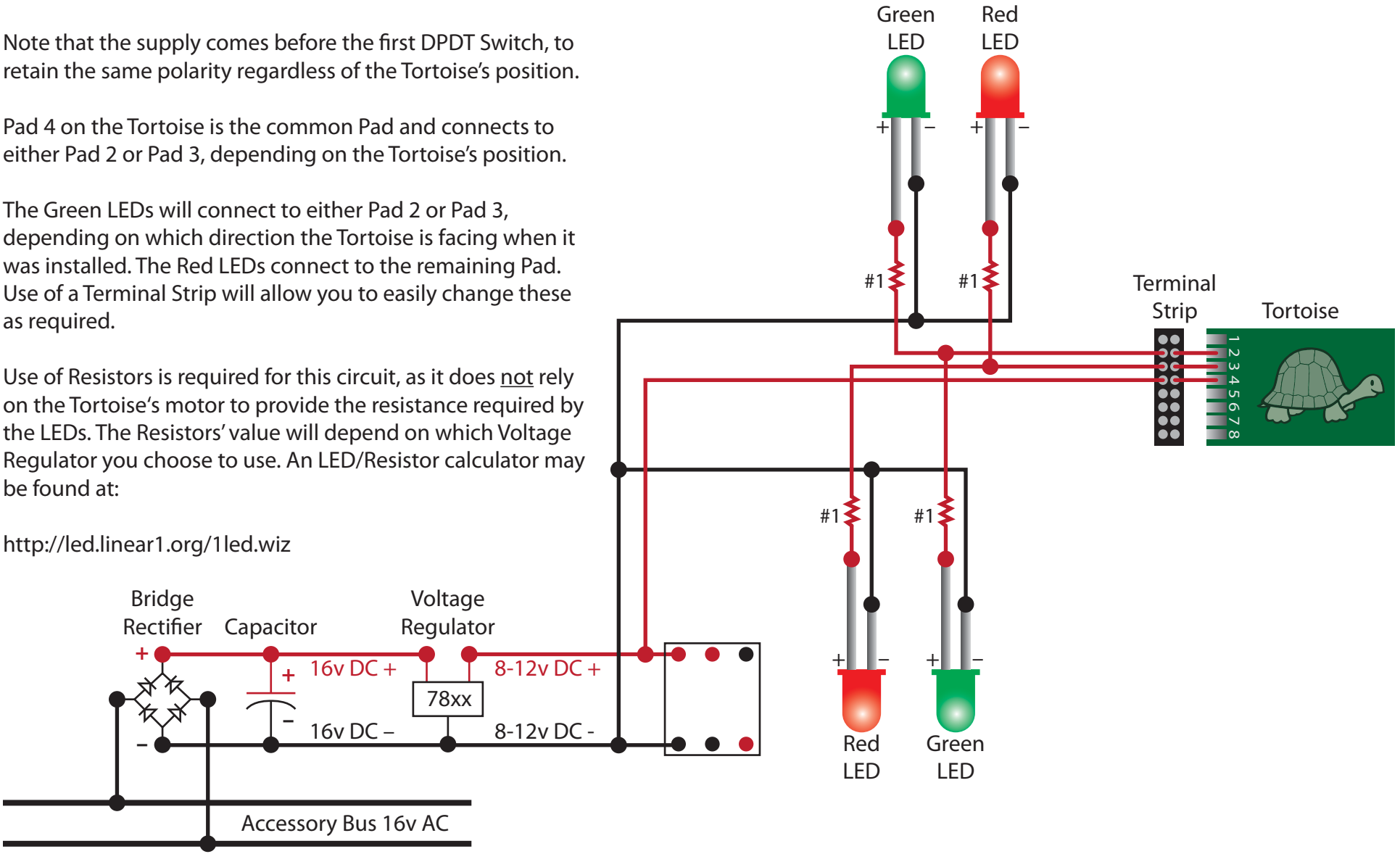
Note that the supply comes before the first DPDT Switch, to retain the same polarity regardless of the Tortoise's position.

Pad 4 on the Tortoise is the common Pad and connects to either Pad 2 or Pad 3, depending on the Tortoise's position.

The Green LEDs will connect to either Pad 2 or Pad 3, depending on which direction the Tortoise is facing when it was installed. The Red LEDs connect to the remaining Pad. Use of a Terminal Strip will allow you to easily change these as required.

Use of Resistors is required for this circuit, as it does not rely on the Tortoise's motor to provide the resistance required by the LEDs. The Resistors' value will depend on which Voltage Regulator you choose to use. An LED/Resistor calculator may be found at:

http://led.linear1.org/1led.wiz



Tortoise Wiring Guide - Frog Wiring

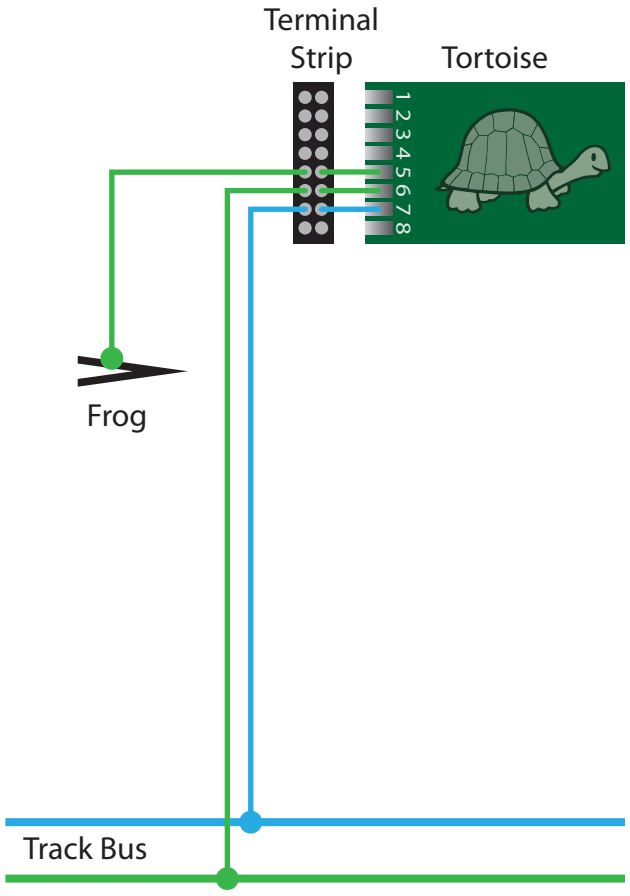
This is the wiring for the Frog. It uses the other mechanical switch built into the Tortoise to provide power to the Frog, with the correct polarity.

Note that the power comes from the Track Bus, and not the Accessory Bus, for this cicuit.

Pad 5 on the Tortoise is the common Pad and connects to either Pad 6 or Pad 7, depending on the Tortoise's position.

The Right Rail Bus will connect to either Pad 6 or Pad 7, depending on which direction the Tortoise is facing when it was installed. The Left Rail Bus connects to the remaining Pad. Use of a Terminal Strip will allow you to easily change these as required.

Be sure to test the polarity between the rails and the Frog, and swap Pads 6 and 7 if required.



Thanks to Jon Calon for the original Power Supply schematic, and to Doug Soeder for explaining the hows and whys to use the Tortoise's mechanical switches.

Visit the Calgary Free-mo website:
http://www.calgary-freemo.ca