Building a tri-color light.

Andrzej Kotlicki
kotlicki@physics.ubc.ca

Teachers Workshop October 24th 2008,
Michael Smith Laboratory
UBC, Department of Physics and Astronomy Outreach Program
LEDs

• What are they
• Efficiency up to 115 lm/W compared to 15 lm/W for incandescent bulb and 100 lm/W for fluorescent lights. Notice the importance of directionality in comparison.
• Examples
• Future of illumination?
RGB elements in every day life

• Why we can make any color from RGB (red, green, blue)
• Examples of RGB elements emitters and filters
  – TV
  – Monitor
  – Projector
  – LCD screen
• RGB sensors
• Potentiometers (2 kilo-ohm potentiometers Model: VTP-2K, 2K VERTICAL TRIMPOT from http://www.allelectronics.com/)

• One can convert a potentiometer into variable resistor by making one connection
• SOLDERLESS BREADBOARD
• Model: PB-400 from http://www.allelectronics.com/
• Breadboard (design board)
  – connections between the holes are shown in red
  – Use only the specified wire
• Light Emitting Diodes LEDs
  – voltage – current characteristics,
Voltage – current characteristics

Blue

Green

Red

Forward Voltage 3.5

Forward Voltage 3.5

Forward Voltage 2.5

Red arrows show maximum continues current
• Light Emitting Diodes LEDs
  – example circuit
• Light Emitting Diodes LEDs

Example circuit. What if we want to control the light intensity?

![电路图](image)
• Tri-color LEDs (RGB)

• If we want to mix color we have to control the brightness of each color component of the RGB diode individually:
• Tri-color Light Emitting Diodes LEDs
  – Pin assignment 4 pins
Other parts

• 1. Triple dip switch
• 2. 275 ohm resistors
• 3. 350 ohm resistors
• 4. 9V battery
• 5. 9V battery snap