LED Adjustable Speed Flasher
Model GSK-109

This is an excellent kit for introducing basic electronic principles. Two LED's will alternatively blink and the blinking speed is adjustable. Kit is easy to assemble with minimal components.

Technical Specifications
■ Power Source: 9-12 VDC
■ Consumption: 16-22 mA max.
■ Adjust flashing speed with potentiometer
■ PCB dimensions: 1.39 x 1.22 inches

Operating Principles
This is a two LED circuit that works alternatively through transistor 1 and transistor 2 in the form of a multi-vibrator frequency circuit. When TR1 is powered, LED1 will light and LED2 is off. When TR2 is powered, LED2 will light and LED1 is off. Blinking speed is controlled by potentiometer VR1.

Circuit Assembly
Please refer to Figures 1, 2, and 3 for aid in component placement. It is recommended to start with lower components i.e. diodes, resisters, electrolyte capacitors, and transistors. Be careful to check polarity with Figure 3 before soldering. If a problem is detected it is best too use a desoldering pump or desoldering braids to remove component. This will minimize potential damage to the printed circuit board.

Testing
Connect circuit to 9-12 VDC power source. LED1 and LED2 will work alternatively. Adjust blinking speed with VR1. If LED's do not light or blinking speed will not vary please review Troubleshooting.

Troubleshooting
This circuit has only a few components. The main cause of problems come from misplaced components or faulty soldering. Utilize Figure 3 to ensure proper placement/polarity and then check solder points for connectivity.

Accessories
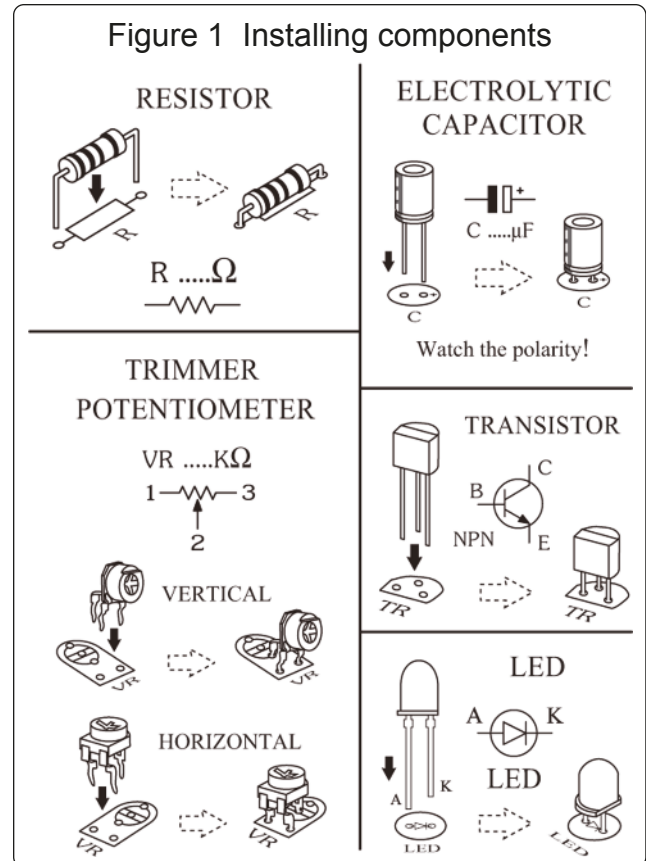Use GSB-17 (sold separately) to house the PCB and batteries.

Figure 1 Installing components

Figure 2 LED flasher 2 dot circuit

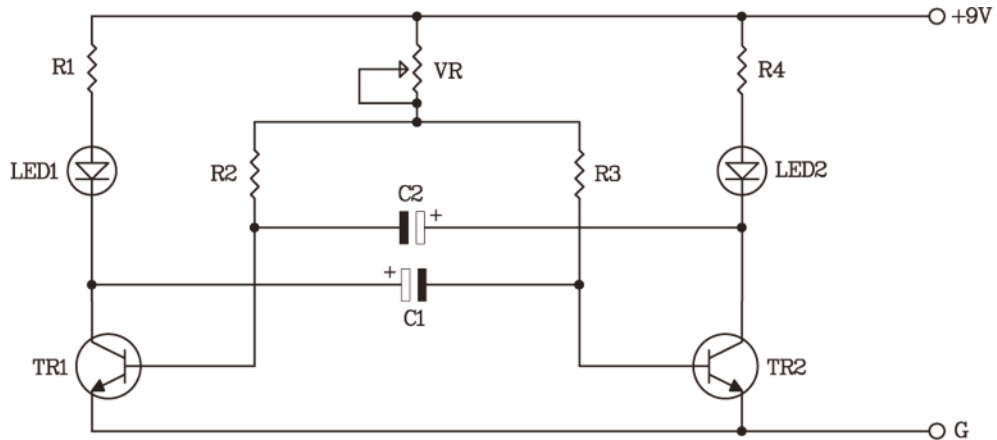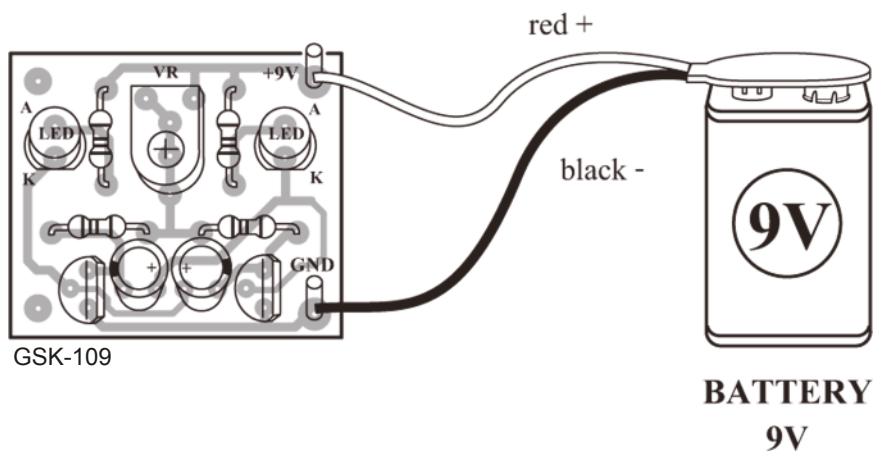## Figure 3 Connecting circuits

GSK-109

Resistors
R1, R4   470 Ω   yellow – violet – brown – gold
R2, R3   3 kΩ   orange – orange – red – gold

Potentiometer
VR1   10 kΩ or 103

Electrolytic Capacitors
C1, C2   33 µF

Transistors
TR1, TR2   C458, C828, C945, C1815