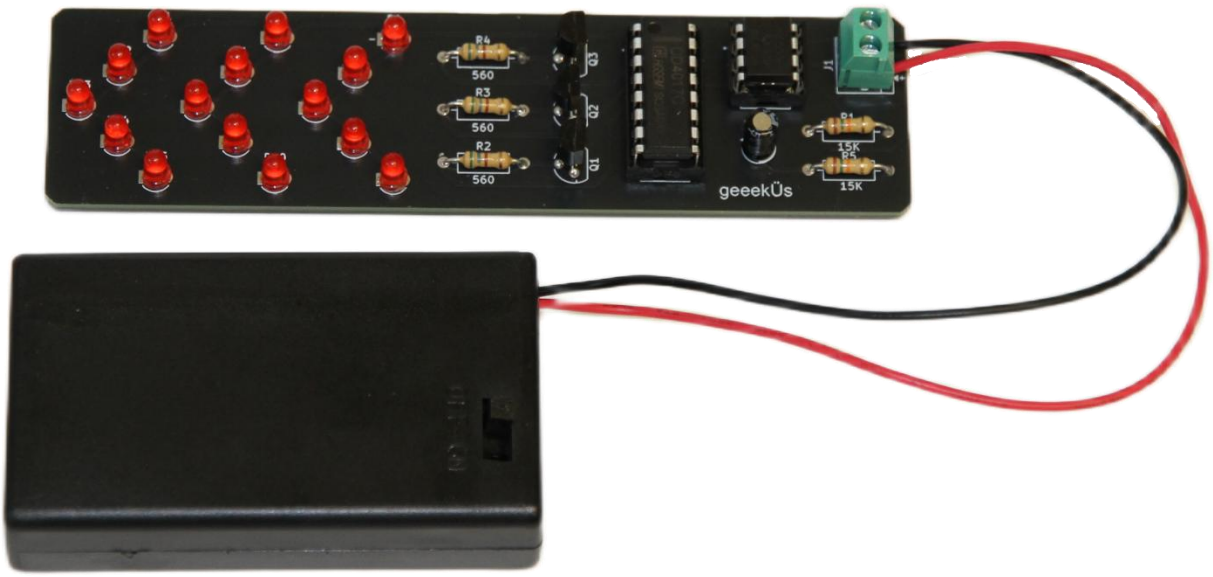
GK-EK-ARROW DIY LED KIT



geeekÜs

Parts List

x1 NE555 IC Timer_____ 

x1 CD4017 Counter_____ 

x1 8LP Low Profile Socket_____ 

x1 16LP Low Profile Socket_____ 

x3 BC547_____ 

x2 15kΩ Resistor_____ 

x3 560Ω Resistor_____ 

x1 10uf 16v Electrolytic Radial Capacitor_____ 

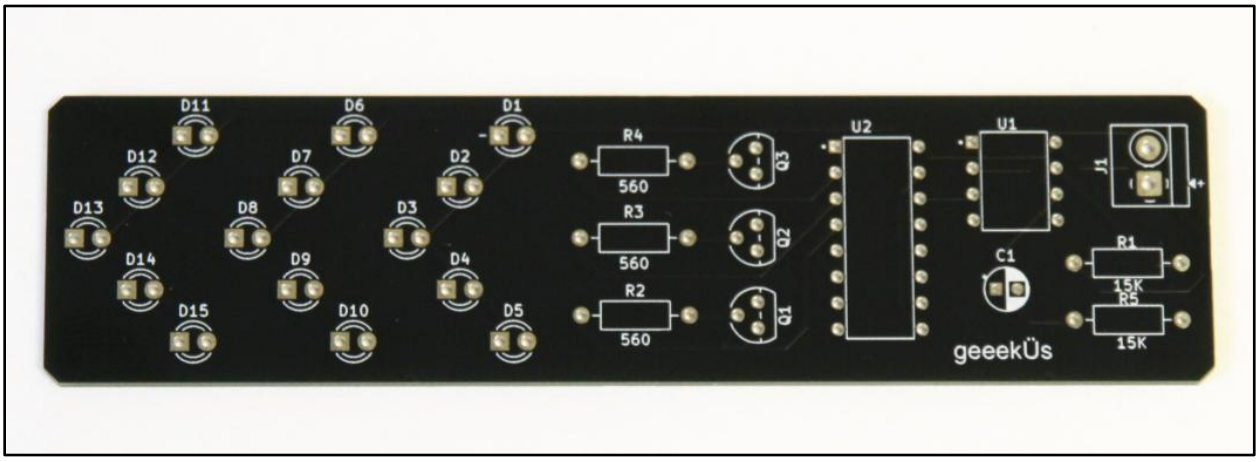
x15 Red LEDs_____ 

x1 Terminal Block_____ 

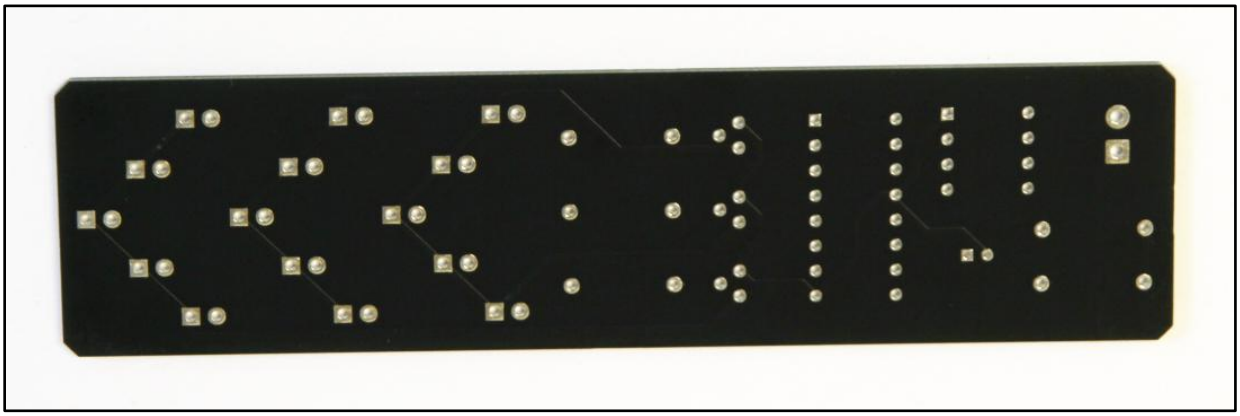
x1 3-Slot AAA Battery Holder_____ 

PCB Views

Top View



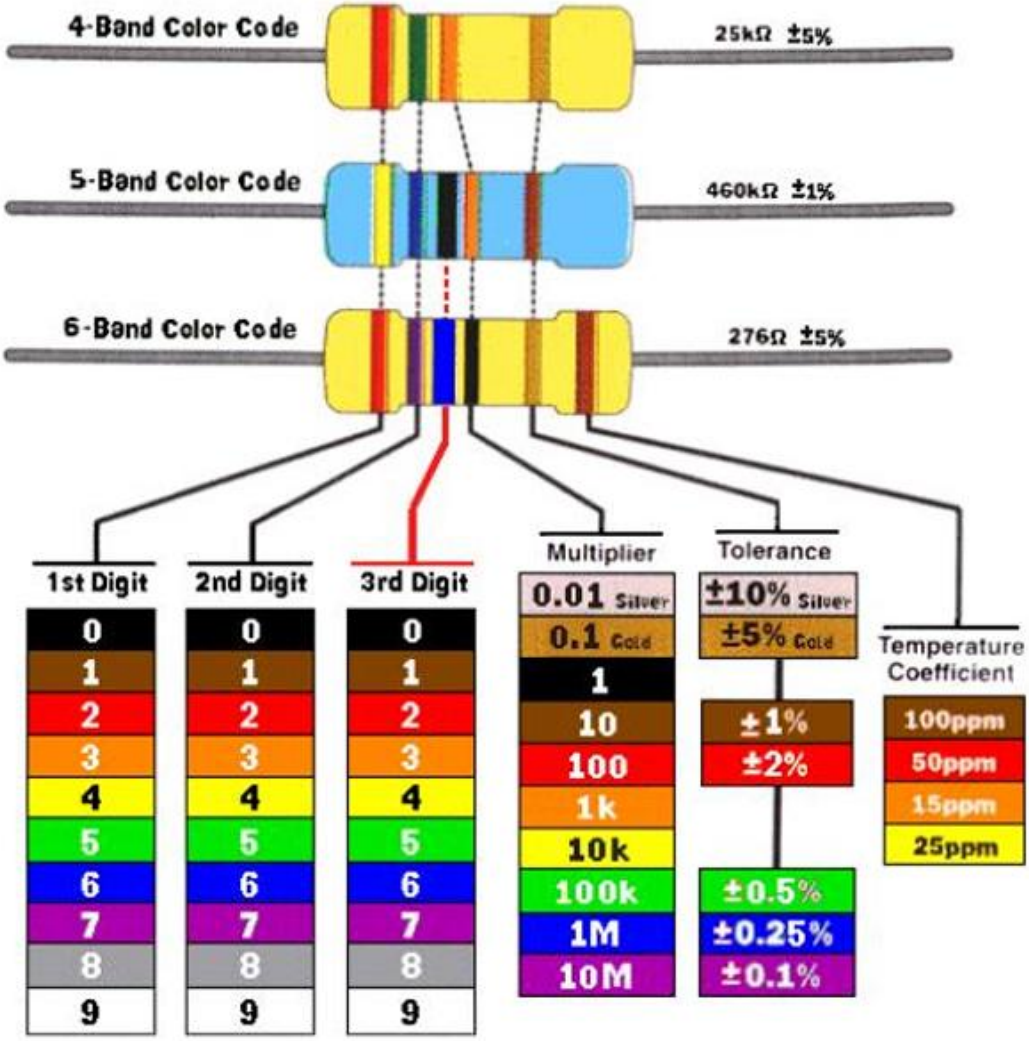
Bottom View



Introduction

GK-EK-ARROW is a straightforward soldering practice kit consisting of a single PCB. With the use of an NE555 timer and a CD4017 counter, each group of 5 LEDs take turns lighting up in a sequence according to its assigned BC547 transistor. It's advised to solder the IC sockets first as placing them into the board later with surrounding components could pose a nuisance.

Resistor Color Coding



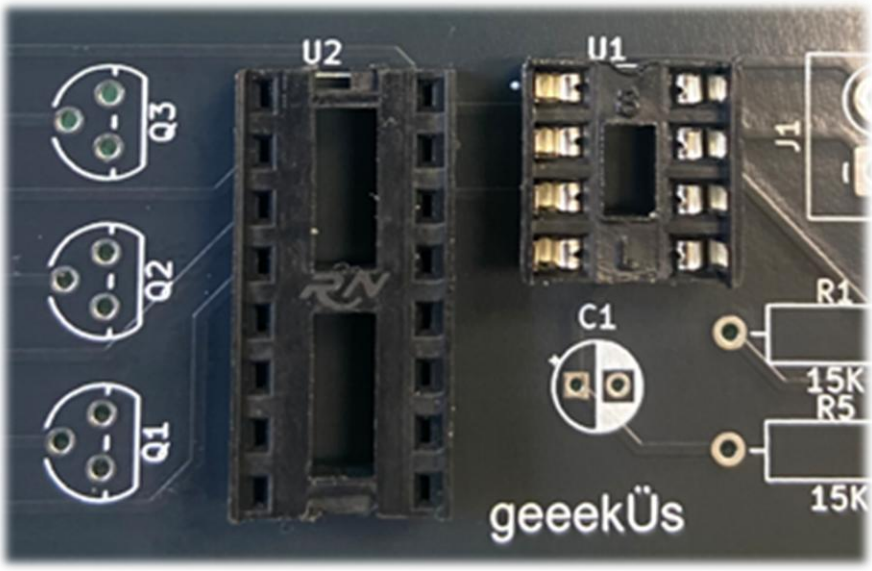
Resistors can have a different number of bands. Refer to the chart above to identify the value of your resistor. For example, [brown – black – black – red – brown] sequence of colors gives values [1 – 0 – 0 – 100 – 1%], which represents a 10kΩ resistor with 1% tolerance.

Soldering/Assembly Guide

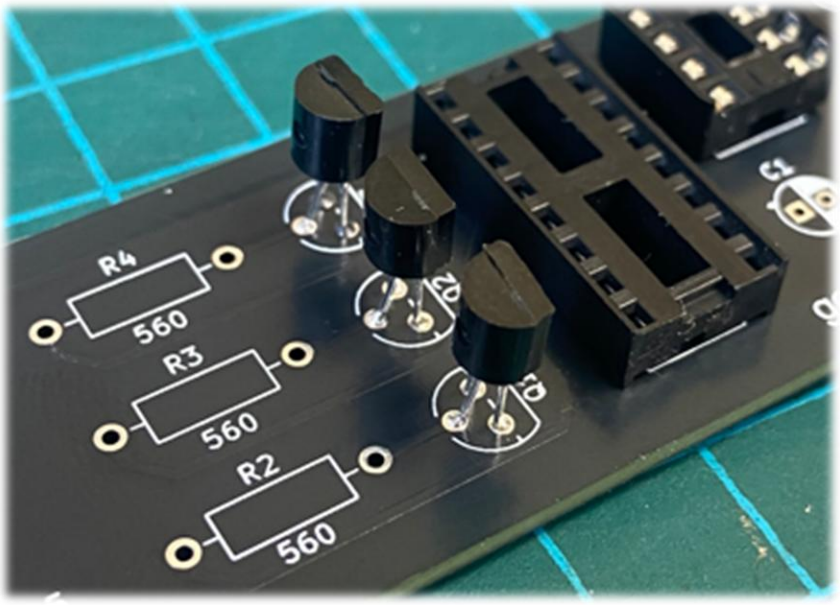
The recommended temperature when soldering with lead-free solder is 370-400 degrees Celsius (700-750 degrees Fahrenheit). For leaded solder, the recommended temperature is 330-370 degrees Celsius (626-698 degrees Fahrenheit). The range of these temperatures may wary depending on solder wire diameter, thermal aspects of soldering equipment, as well as the thickness of iron tip. Be very careful when handling the soldering iron because the tip can get very hot when powered on, and for a period after powered off.

Cleaning the tip prior to soldering results in smoother solder flow. Cleaning the PCB in areas where you intend to solder with flux paste also provides smoother solder flow, which can be done with a sponge soaked in water.

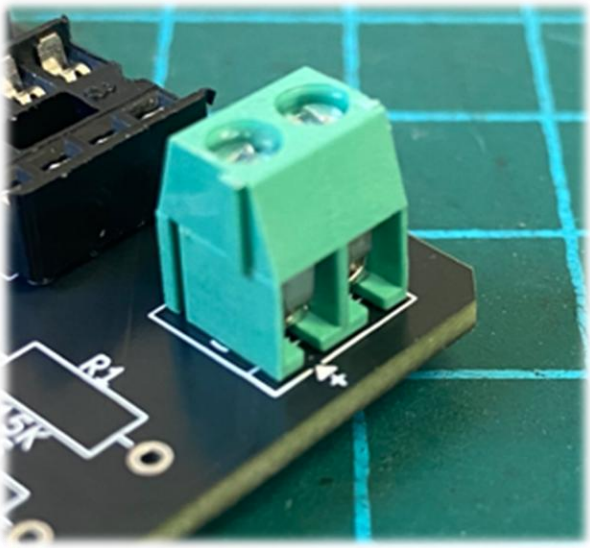
Begin with soldering the IC sockets first. The way they're placed into the board matters because they have spots that indicate the direction the IC will be facing. If you have sockets that appear different from the image below, do not worry. You will be shown the ICs in their sockets later. Tape them to the board if you must before soldering.



Place the transistors next. They must be placed on the board as shown in the picture below – the flat side of each in respect with the flat side of their silkscreens. Transistors are identified with Q#.

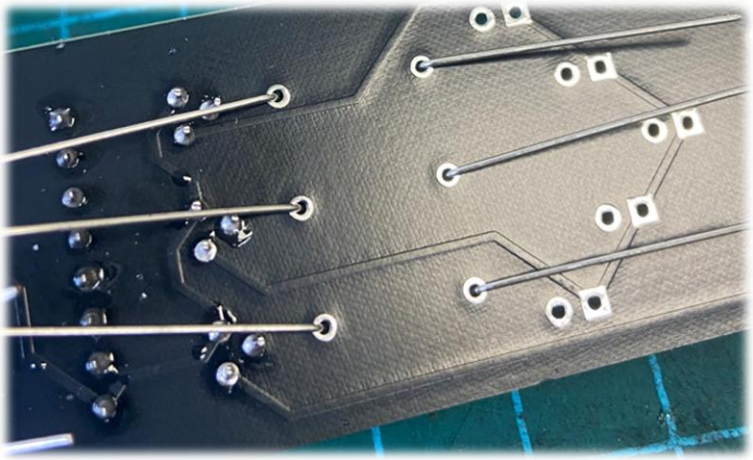


The screw terminal allows the battery pack to not be soldered permanently to the board by having the wires be clamped into it instead, then removed whenever. The plus sign indicates the hole for the VCC (red) wire.

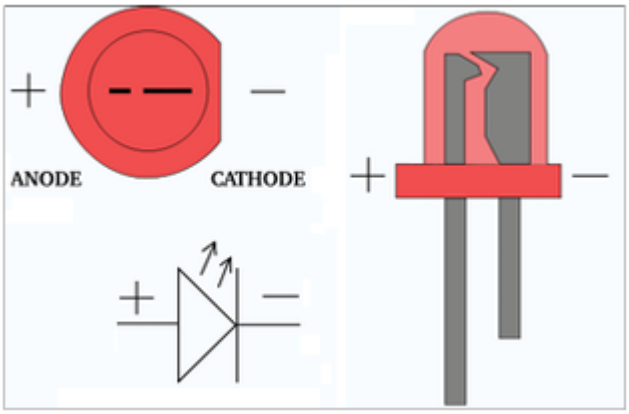


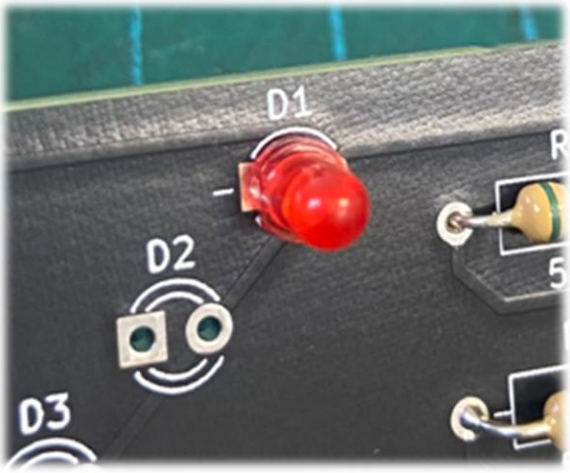
The capacitor has polarities, which are identified via the length of its pins and/or silver stripe on either side to indicate its negative side. It's identified with C#. On the silkscreen, you will see the tiny + to indicate the positive side insertion and a white, colored half to indicate the negative side.

Resistors do not have a polarity, meaning they can be placed on the board facing any direction, and are marked with R#. When placing them in the board, bend the leads in opposite directions to secure them before soldering.

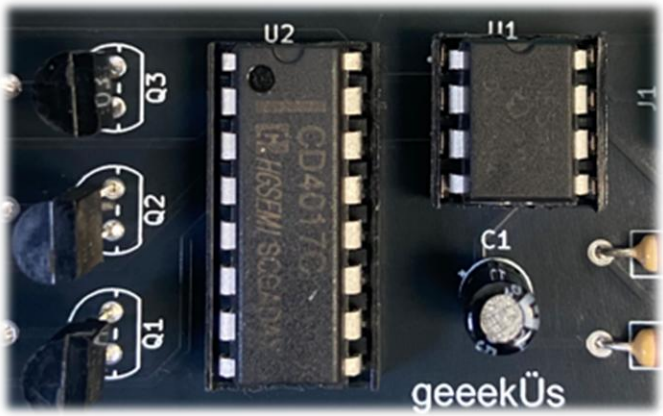


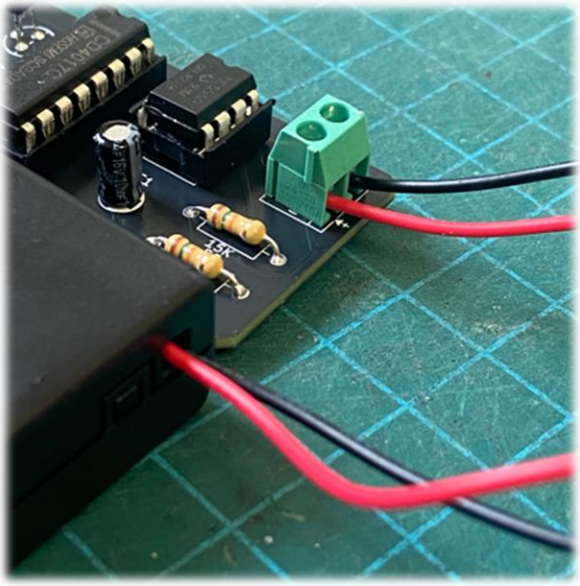
LEDs have polarities. They're identified with D#. Polarity is important because of the unidirectional flow of current through it. The diagram below provides ways to differentiate an anode from a cathode. The – mark on the board indicates the cathode placement.



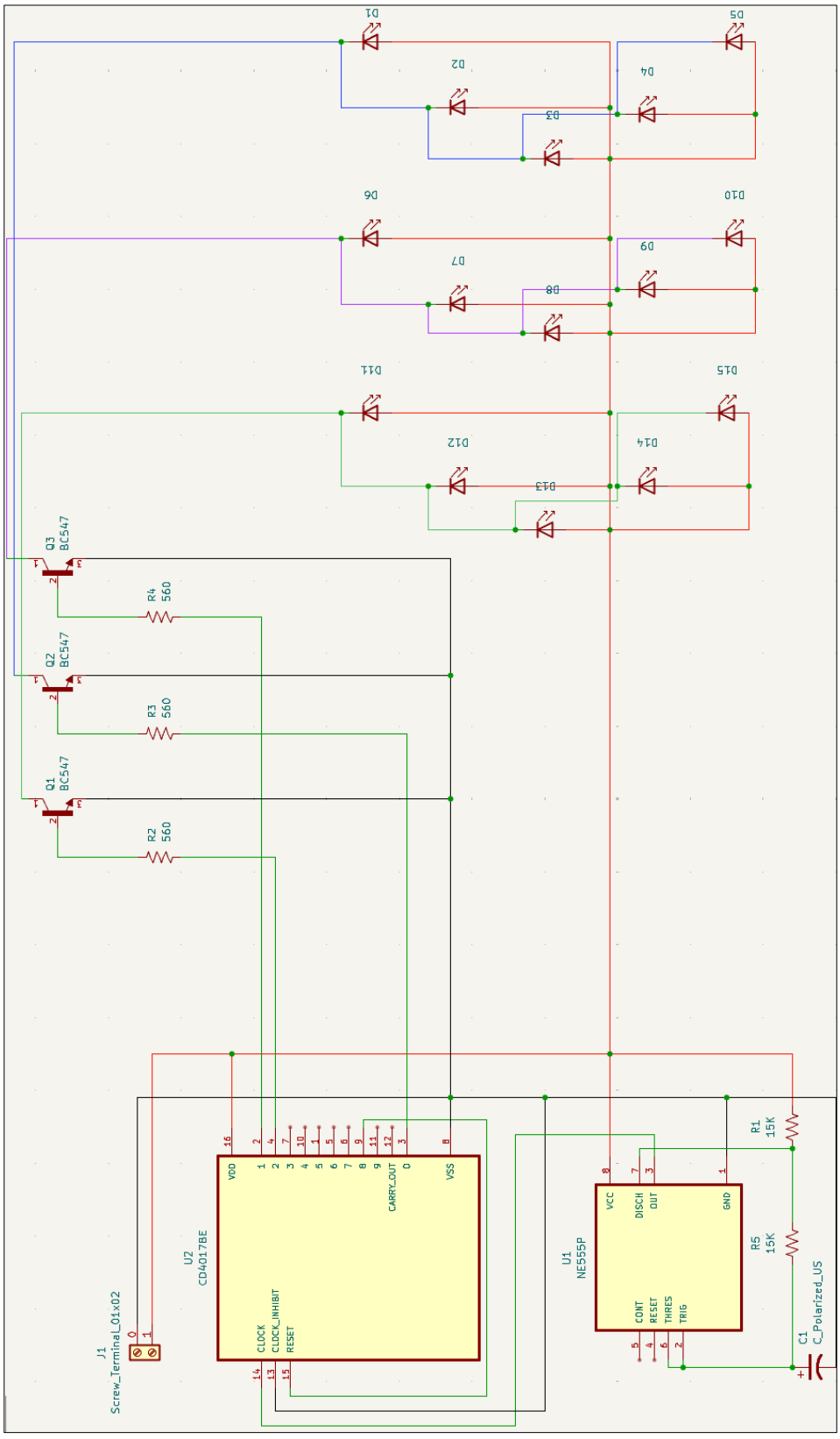


Now that you've soldered the remaining 14 LEDs, you may insert the ICs onto the board and plug the wires in from the case. The board will power up and flash the arrows subsequently when the AAA batteries are in the case and it's switched on.





Schematic


D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
D15
Q3
BC547
Q2
BC547
Q1
BC547
R4
560
R3
560
R2
560
R1
15K
R5
15K
C1
C_Polarized_US
J1
Screw_Terminal_01x02
U2
CD4017BE
U1
NE555P
VDD
VSS
CARRY_OUT
CLOCK
CLOCK_INHIBIT
RESET
VCC
DISCH
OUT
GND
CONT
RESET
THRES
TRIG