Bugatronics Kit Directions

The Bugatronics kit comes with everything you need to make a picture that teaches circuitry. The circuit pattern suggestion included in the kit is a parallel circuit but you can get creative. For more on circuits, see the circuit tutorial.

Time to complete: 40 minutes

Kit Contents

- One 5x7 inch (12.7x17.8 cm) card
- One paper with copper tape schematic
- One piece of blue cardstock perforated to create a picture stand and battery holder
- Two 3v batteries
- Six feet (1.8 m) of 1/8 inch (.32 cm) copper tape
- Two feet (61 cm) of 1/4 inch (.64 cm)
- Six Chibitronic lights (2 each red, blue, and yellow)
- Paper cutouts
  - One monarch butterfly
  - One monarch caterpillar
  - One honeybee
  - One June beetle
  - Nine plum flowers
  - Three plum leaves
- One large paperclip
- Glue dots
- Circuit tutorial schematic

Tools you will need (not included)

- Scissors
- Tape measure or ruler
- Pen or pencil
- A tool with a smooth, flat edge (i.e. a letter opener, a butter knife, or your scissors handle if it is not rubberized)

IMPORTANT: Please do the circuit tutorial first if you have never built a circuit!!

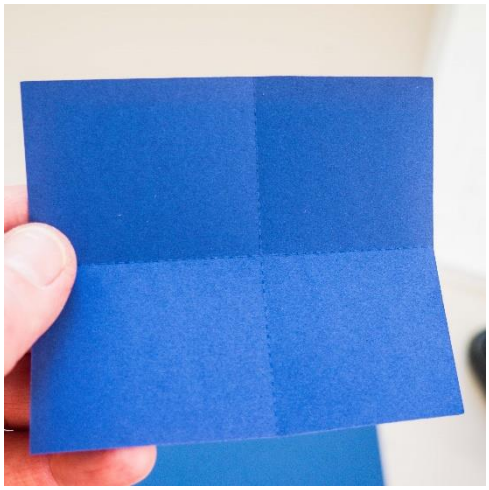
Directions

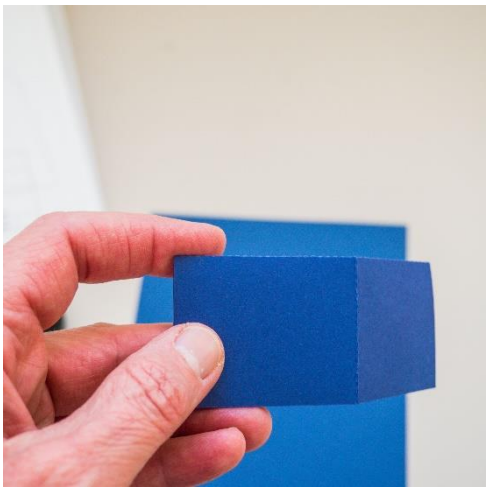
Step 1: Trace the pattern or draw your own design

- Lay the pattern for the stems over the blue 5x7 inch card.
- Take a pencil or pen and trace it, pressing firmly to make an impression of the drawing.
- After removing the paper, you may want to lightly draw over the impression you made from pressing firmly so it is easier to see.

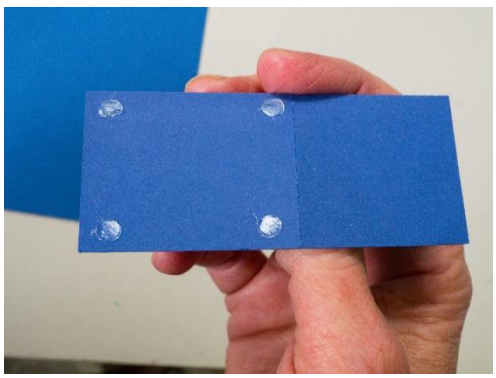
Step 2: Build the picture stand/battery holder

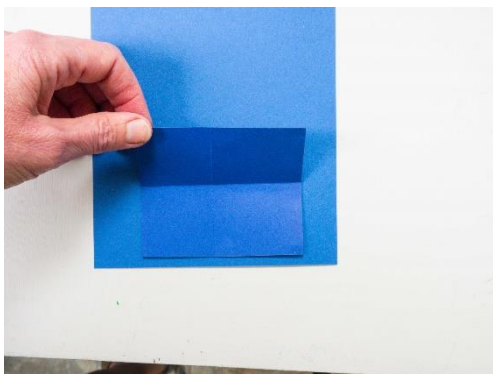
- The picture stand/battery holder is the smaller piece of blue cardstock. Note that one side is longer than the other. The shorter side functions as the stand and the longer side attaches to the back of the card to form the battery holder.
- Hold it with the longer side to the left. Refold the holder along the horizontal fold so the open side is at the bottom.





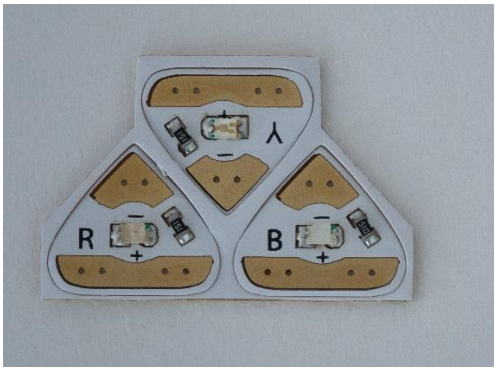
- Place glue dots on the four corners of the *longer* side, which should be facing you.
- Stick the stand to the card, about 1/4 inch (.6 cm) up from the bottom and 3/4 inch (1.9 cm) in from the right, the open end pointing down and the short side on the left.





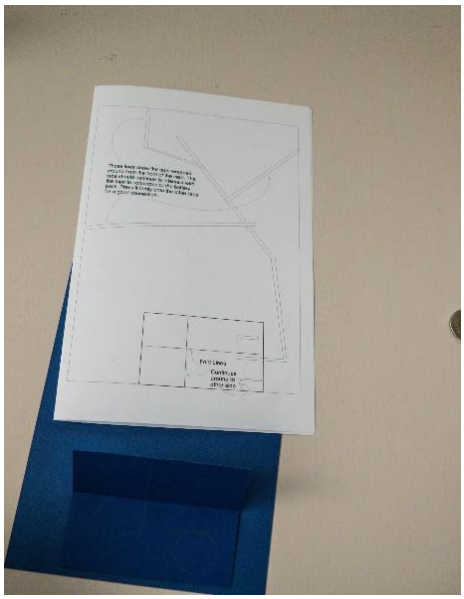
Step 3: Get familiar with the Chibitronic Circuit Stickers

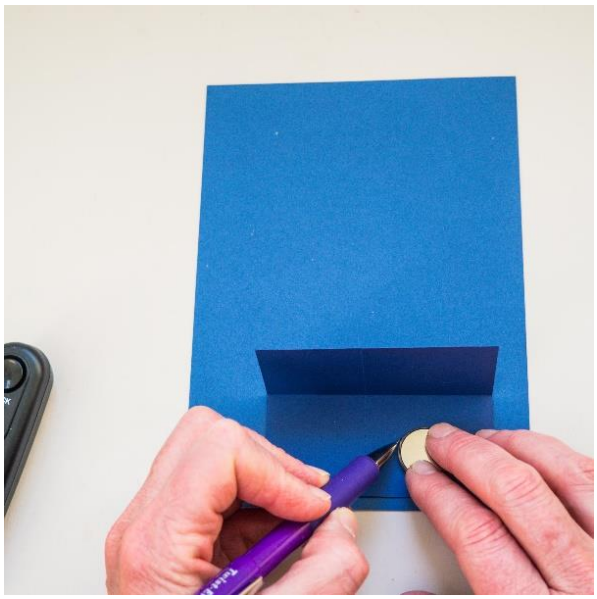
- The Chibitronic stickers are polarized so one side needs a positive connection and the other side needs a negative connection.
- The Chibitronic stickers have the positive charge on the broad side of the sticker.
- Note the gold strips on the lights. The undersides of the lights have the same strips. When you build your circuit, these are the conductive surfaces that you need to ensure are in contact with the copper tape.
- The adhesive on the stickers is conductive so it helps to make sure you have a consistent connection.
- When you complete the design, it is still important to make sure that the stickers are in firm contact with the copper tape.



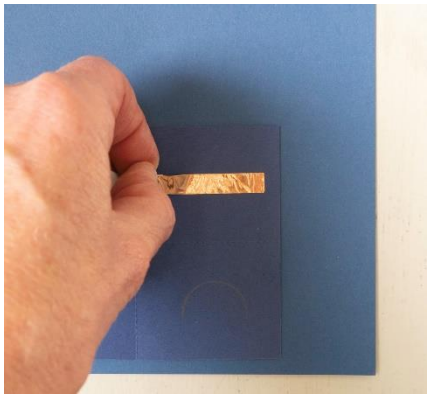
Step 4: Adhere the copper tape on the card back

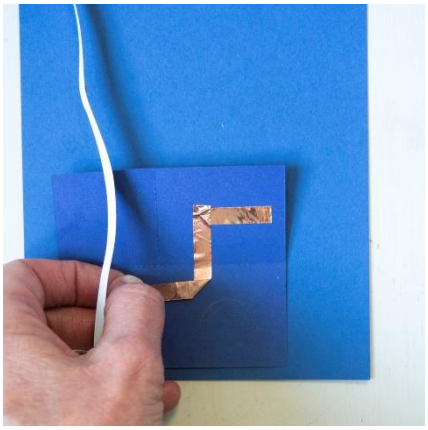
- Use the schematic to the place the copper tape on the card.
- To make sure the tape is placed so that a good connection is made with the battery, start by marking the approximate battery location for reference.



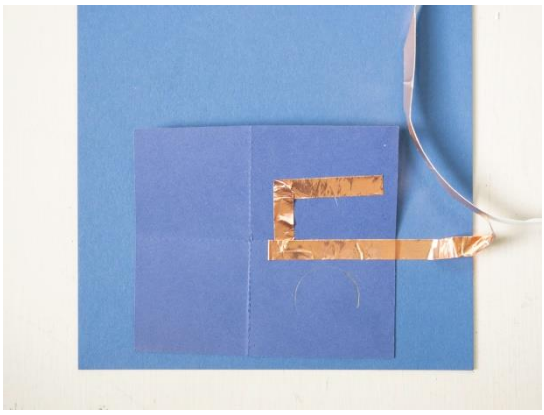


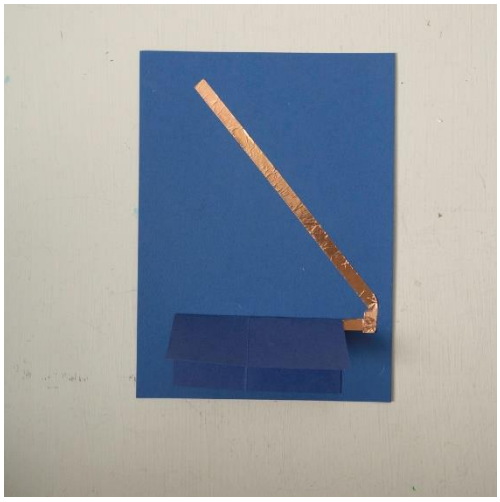
- Next, build the negative connection to the battery. The negative connection will run from the inside top of the battery holder, down to the inside bottom, to the right and onto the card itself, then up toward the top left corner.
- To start, cut a piece of the ¼ inch tape (the wider tape) about 8 inches (20 cm) long.
- Start to remove the backing on one end and lay it horizontally, starting along right edge of the upper right quadrant following the diagram, adhesive side down.
- When it is about even with the midpoint of the circle you made for the battery, fold the tape up, then back down on itself to form a corner.
- Continue the tape over the fold line then form another corner to head back right.





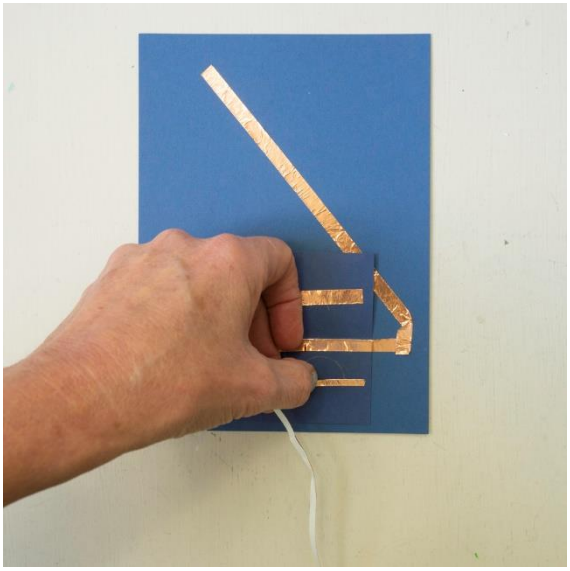
- Lay the tape all the way across the holder and secure it on the card itself.
- Fold the tape again and continue to adhere the tape to the card, heading toward the top left corner.

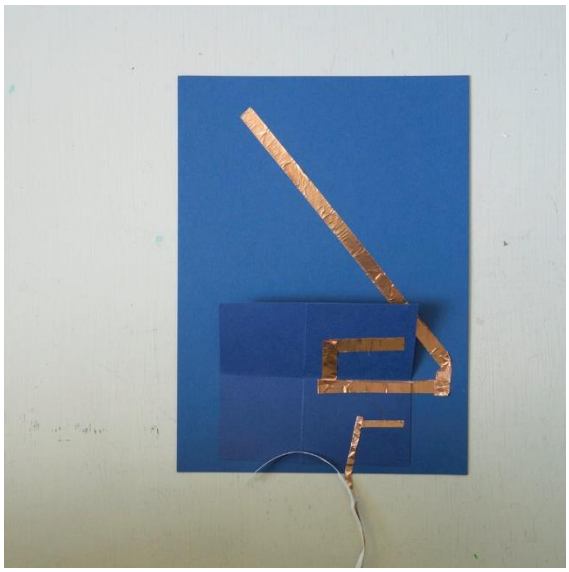




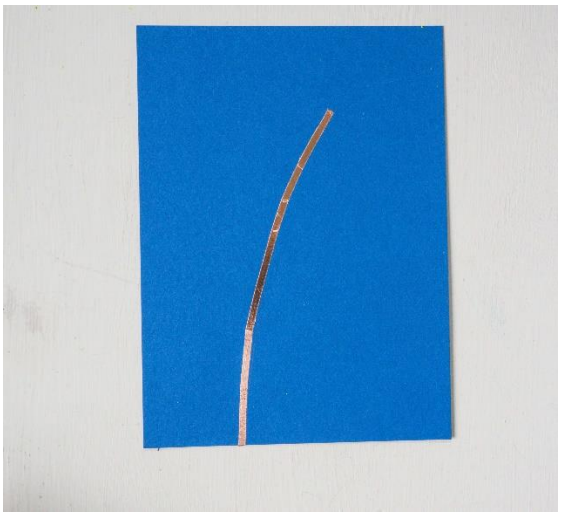
Step 5: Adhere tape to connect the positive circuit

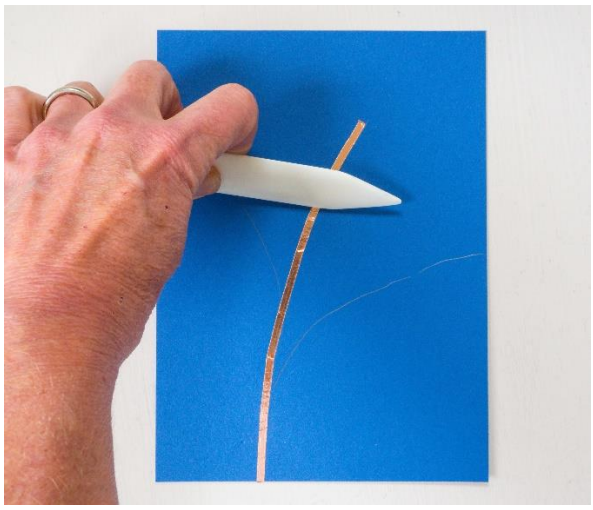
- *Note that the narrow 1/8 inch tape is used for the rest of the directions.*
- Cut a piece of 1/8 inch tape about 8 inches (20 cm) long to run from the battery holder on the back of the card, around to the front of the card, and up the main branch to start the positive circuit.
- Begin to peel the backing off the tape at one end, and stick it to the battery case going horizontally across the circle you drew to mark the battery placement.
- Fold the tape down toward the bottom of the card, lining the tape up at the bottom of the card so that it aligns with the bottom of the branch on the front of the card.



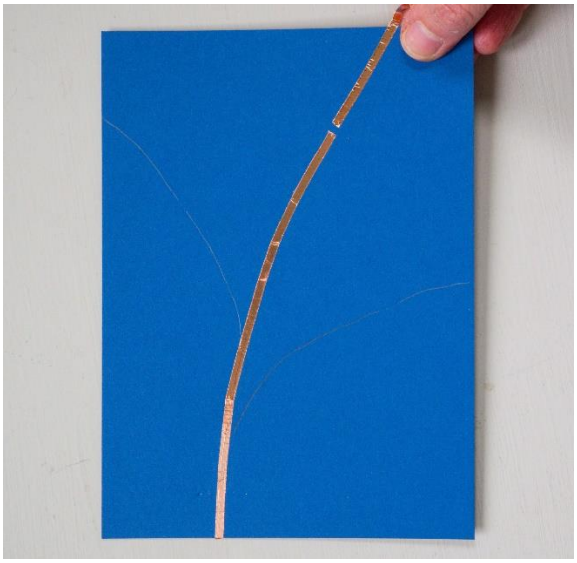


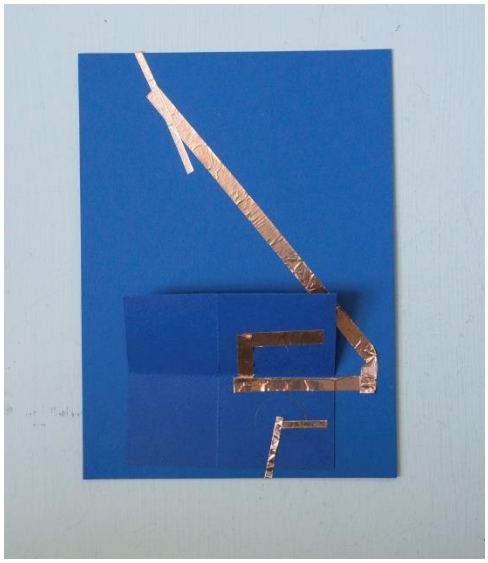
- Fold the tape over the bottom of the card and adhere the tape along the main branch, ending about at the break in the line shown on the schematic.
- Press any wrinkles out of the tape using a tool with a smooth flat edge.





- Now take another piece of tape about 3 1/2 inches (9 cm) long, and place it starting slightly above the tape you just placed, close enough so the Chibitronic sticker will make a connection with both pieces of tape.
- Run the tape over the top of the card and over the top of the negative connection.
- Press the tape firmly where it overlaps to ensure a solid connection.

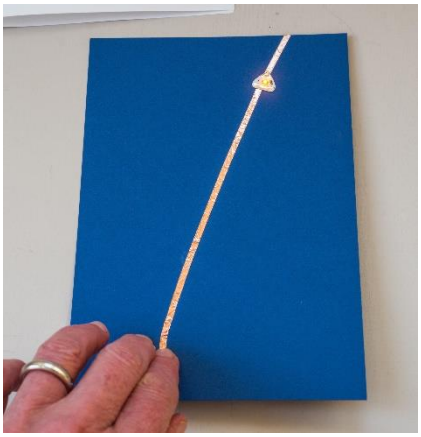




Step 6: Test the Connection

- Take a Chibitronic sticker and press it firmly over the gap in the copper tape. The positive, wide side of the triangle should be toward the bottom of the card -- the direction of the source of the positive connection.
- Turn the card over and place the battery on the battery holder, positive side down.
- Close the battery holder, turn the card over, and see if the light is lit.

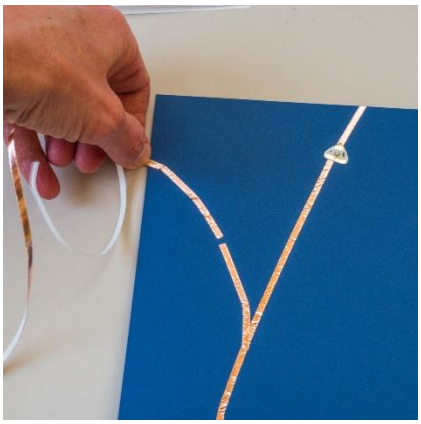
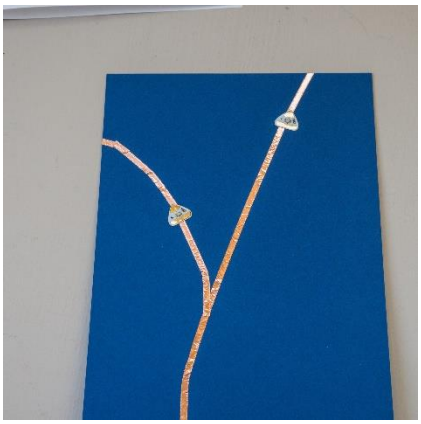
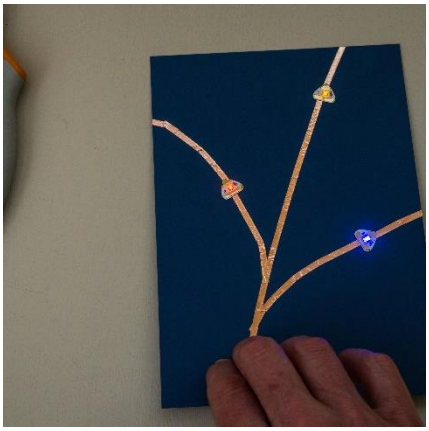




Troubles with the connection? Check the troubleshooting guide at the end of this document.

Step 7: Finish building the circuit

- Place the other pieces of copper tape according to the diagram
- Place the remaining two stickers over the gaps to complete the circuits.
- Test the circuits.

Step 7: Decorate

- Use the glue dots to attach the cut outs to the picture

Having trouble with getting your LED circuit to work?

Try the following:

- Make sure the positive side of the light is connected to the copper tape or wire that is touching the positive side of the battery.
- Make sure the battery is in firm contact with the copper tape.

- Is the positive side of the battery touching the negative copper tape or vice versa?
- Does the copper tape have any rips that are breaking the connection?
- Are there any places where the positive side of the tape or wire touches the negative side without going through a light? This would be a short circuit.
- Make sure the conductive edges of the lights are overlapping the copper tape enough to make a good connection.
- Firmly press around the edges of the lights and anywhere the copper tape overlaps to make sure the connection is good.
- Try a different battery.