

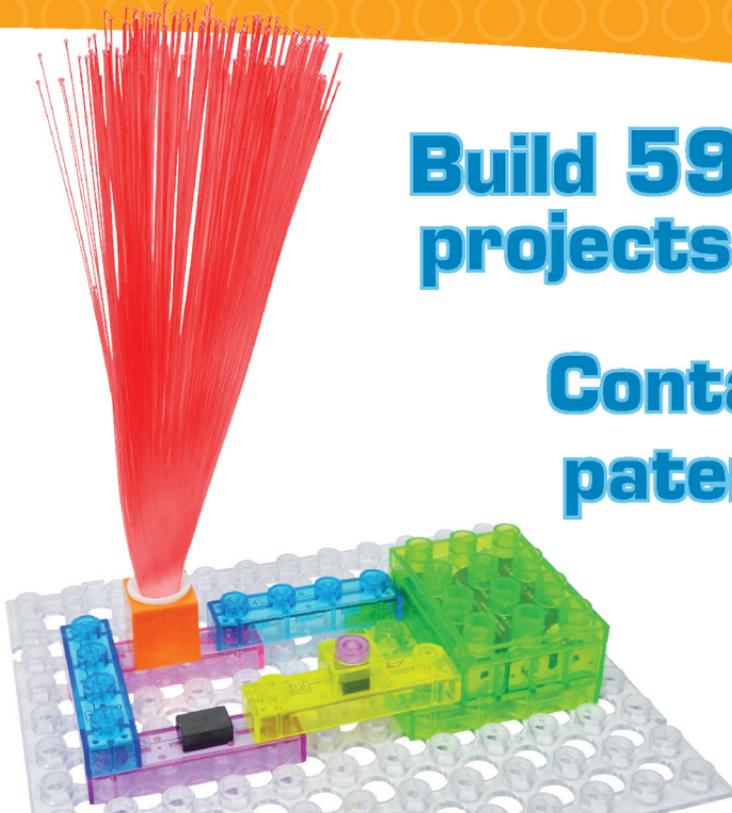
# 59

**Build 59  
projects**

**Contains unique  
patented parts**

**Ages  
8+**

**Instruction Manual**





# CIRCUIT BUILDER™ 59



## **WARNING: SHOCK HAZARD**

Never connect E-Blox® Circuit Builder to the electrical outlets in your home in any way!



## **WARNING:**

Only use the battery holder with the cover securely in place.



## **WARNING: CHOKING HAZARD**

Small parts. Not for children under 3 years.



## **WARNING: MOVING PARTS**

Do not touch the fan while it is spinning.

**WARNING:** Always check your wiring before turning on a circuit. Never leave a circuit unattended while the batteries are installed. Never connect additional batteries or any other power sources to your circuits. Discard any cracked or broken parts.

### **Adult Supervision:**

Because children's abilities vary so much, even with age groups, adults should exercise discretion as to which experiments are suitable and safe (the instructions should enable supervising adults to establish the experiment's suitability for the child). Make sure your child reads and follows all of the relevant instructions and safety procedures, and keeps them at hand for reference.

This product is intended for use by adults and children who have attained sufficient maturity to read and follow directions and warnings.

Never modify your parts, as doing so may disable important safety features in them, and could put your child at risk of injury.

**FCC Notice:** Please note that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



## Batteries:

- Use only 1.5V “AA” type, alkaline batteries (not included).
- Insert batteries with correct polarity.
- Non-rechargeable batteries should not be recharged.
- Rechargeable batteries should only be charged under adult supervision, and should not be recharged while in the product.
- Do not connect batteries or battery holders in parallel.
- Do not mix old and new batteries.
- Do not mix alkaline, standard (carbon-zinc), or rechargeable (nickel-cadmium) batteries.
- Remove batteries when they are used up.
- Do not short circuit the battery terminals.
- Never throw batteries in a fire or attempt to open its outer casing.
- Batteries are harmful if swallowed, so keep away from small children.

## Basic Troubleshooting

1. Most circuit problems are due to incorrect assembly, always double-check that your circuit exactly matches the drawing for it.
2. Be sure that parts with positive/negative markings are positioned as per the drawing.
3. Be sure that all connections are securely made.
4. Try replacing the batteries. **Note:** Rechargeable batteries do not work as well as alkaline batteries.

**E-Blox® is not responsible for parts damaged due to incorrect wiring.**

**Note:** If you suspect you have damaged parts, you can follow the Advanced Troubleshooting procedure on page 13 to help determine which ones need replacing.

# About Electricity

## 1. What is Electricity?

 Q: So many things are connected to electricity, such as lamps, TVs, and air conditioners. Can you tell me what electricity is?

 A: It can be defined as the movement of sub-atomic particles (with their electrical charges) through a material due to an electrical charge outside the material. There are some examples in our daily life, such as lightning and static electricity.



## 2. Who Discovered Electricity?

 Q: Who discovered electricity?

 A: I am going to tell you a story that can be traced back to at least 600 BCE. In ancient Greece, it was found that rubbing fur on amber cause an attraction between the two. This discovery is credited to the philosopher Thales of Miletus. One day, when he was polishing his amber at home, he found that a piece of fur was attracted by the amber after he put it on the desk. Then he split them, but it happened again. So he made record about the phenomenon. It was to be many centuries before anyone was able to connect this phenomenon with electricity and a century more before electrical current was put to practical use.



## 3. How to Categorize Electricity?

 Q: Are we using the same electricity to power the air conditioner and the remote control?

 A: Good question! Actually they are totally different. What we use in the air conditioner is called alternating current, because the flow of electric charge periodically reverses direction. All home appliances use alternating current; whereas, we use direct current in the remote control, in which the flow of electric charge is only in one direction.



## 4. Wireless

 Q: My parents tell me that the weather report is transferred by the satellite, but I know it is impossible for us to connect a wire to outer space. How do we deliver these messages?

 A: Wireless communication is the transfer of information between two or more points that are not connected by an electrical conductor. So scientists upload the information by wireless waves, so it can transfer to wherever they want.



# About Electricity

## 5. What did people do in electricity research?



Q: What did people do in electricity research after Milletus' discovery?



A: Dating back to the 18th century, Benjamin Franklin, a famous American scientist, proved that lightning was caused by electricity by describing an experiment in which an electrical conductor would be used to extract power from a thundercloud. In the experiment, he flew a kite with a metal key attached to it into a suitable cloud. The precise historical details are unclear; but he may have then retrieved the key and discharged electricity from it. By using the principles, he successfully invented the lightning rod. In 1799, the Italian scientist Alessandro Volta went on to create a "voltaic pile" consisting of alternating layers of copper and zinc separated by paper soaked in salt water. This generated a larger current and is credited as the first battery. In 1821, the English scientist Michael Faraday created the world's first electric motor, even though it was very simple. All the motors that we use today are based on that design. Ten years later, Faraday made another contribution to the world with his second crucial invention, the dynamo. In 1866, the first industrial dynamo was invented by a German named Siemens.



## 6. Unit of Electricity



Q: What is the unit for electricity?



A: Electricity has various related units of measure. Electrical current flow is measured in Amperes (Amps), which is named in honor of the famous French physician André-Marie Ampère and the contribution that he made. Electrical resistance is measured in Ohms, which is named after the German physicist George Ohm for his contributions. Electrical force, or the electrical difference of potential that would drive one ampere of current against one ohm of resistance, is measured in Volts, which is named after the Italian physicist Alessandro Volta for his contributions. Electrical power is measured in Watts, which is named after the famous Scottish inventor James Watt for his contributions.



## 7. Application of Electricity



Q: All the home appliances don't work when a blackout happens. It is very inconvenient without electricity in life.



A: Absolutely! We need electricity a lot because it can either be used for cooking, watching TV, or transportation.



## 8. What is Triboelectrification?



Q: I found it very interesting that a plastic ruler cannot attract any bits of paper, but when it is rubbed against hair several times it does.



A: Yes, that's it! This is the phenomenon of Triboelectrification. Rubbing glass with fur, or a comb through your hair, can build up triboelectricity. Most everyday static electricity is triboelectric. The polarity and strength of the charges produced differ according to the materials, surface roughness, temperature, strain, and other properties.

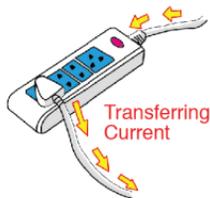


# About Electricity

## 9. What is Current?

 Q: What is current? Is that like water flow? Can it flow too?

 A: Yeah, good question. Electric current can flow too, but it is totally different from water flow. Electric current is a flow of electric charge.



## 10. What is Voltage?

 Q: What is voltage?

 A: Voltage is equal to the work done per unit of charge against a static electric field to move the charge between two points. A voltage may represent either a source of energy (electromotive force), or lost, used, or stored energy (potential drop).



## 11. Electricity Generation

 Q: How do they make electricity for daily use?

 A: There are seven fundamental methods of directly transforming other forms of energy into electrical energy: fossil-fuel, biomass, hydro/tidal, wind, nuclear, mechanical power generation, and solar thermal energy. Certainly there will be more methods for electricity generation to be found, since the scientists are always researching.



## 12. Battery Recycling

 Q: How do we recycle used batteries?

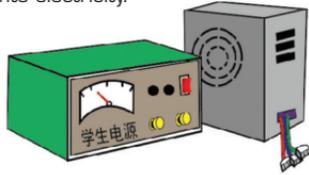
 A: Battery recycling aims to reduce the number of batteries being disposed as municipal solid waste. Batteries contain a number of heavy metals and toxic chemicals and their dumping has raised concerns over soil contamination and water pollution. Most typical kinds of batteries can be recycled. However, some batteries are recycled more readily than others, such as lead-acid automotive batteries (nearly 90% are recycled) and Press Switch cells (because of the value and toxicity of their chemicals). Other types, such as alkaline and rechargeable, e.g., nickel-cadmium (Ni-Cd), nickel metal hydride (Ni-MH), lithium-ion (Li-ion) and nickel zinc (Ni-Zn), can also be recycled. So kids, please do something for battery recycling in our daily life from now on.



# About Electricity

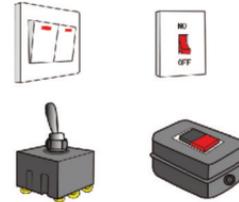
## 13. Power Supply

A power supply is an electronic device that supplies electric energy to an electrical load. The primary function of a power supply is to convert one form of electrical energy to another. There are both DC (direct current) and AC (alternating current) power supplies. Batteries are a type of power supply in which chemical energy is converted into electricity.



## 14. Switch

A switch is a device that controls all the other components in the circuit. It is used for power connection and disconnection. A switch should be connected in series with the other functional components, otherwise, it will cause a short circuit.



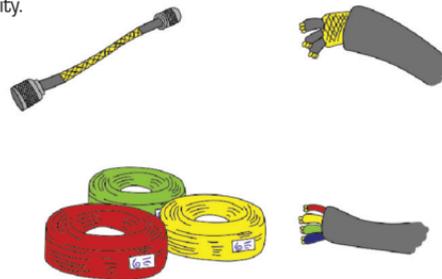
## 15. Home Appliances

Home appliances are electrical / mechanical machines which accomplish some home functions such as cooking or cleaning.



## 16. Wire

Wire is mainly used for connecting circuits and transferring electricity.

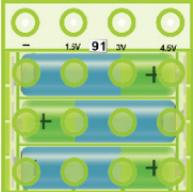
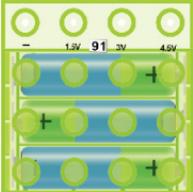


## Parts List (colors and styles may vary) Symbols and Numbers

**Important:** If any parts are missing or damaged, **DO NOT RETURN TO RETAILER.** Call toll-free (855) MY EBLOX (693-2569) or e-mail us at: [help@myeblox.com](mailto:help@myeblox.com). Customer Service: 880 Asbury Dr., Buffalo Grove, IL 60089 U.S.A.

Qty.	Name	Symbol	Part #
3	4-wire Block		6EB2X04
1	Press Switch		6EB2X61
1	Switch		6EB2X62
1	LED		6EB2X69
1	Bi-directional LED		6EB2X71
1	Colorful LED		6EB2X72
1	Lamp		6EB2X76

## Parts List (colors and styles may vary) Symbols and Numbers

Qty.	Name	Symbol	Part #
1	Alarm		6EB2X78
1	Reed Switch		6EB2X83
1	Magnet		6EB2X07
1	Fiber Optic Tree		6EB2X40
1	Motor		6EB2X95
1	Battery Holder		6EB2X91
1	Battery Cover		6EB2X91C

Qty.	Name	Symbol	Part #
1	Motor Top		6EB2X64
1	Motor Shaft Cap		6EB2X59
1	Fan Blade		6EB2X60
1	Base Grid		6EB2X39
2	Plated Block		6EB2X101

## How to Use Your E-Blox® Circuit Builder™ Set

E-Blox® Circuit Builder™ parts contain a PC board with connectors so you can build the different electrical and electronic circuits in the projects. Each block has a function: there are switch blocks, a light block, battery block, wire blocks, etc. These blocks are different colors and have numbers on them so that you can easily identify them.

### **For Example:**

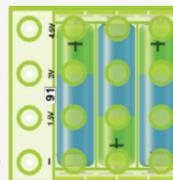
This is the press switch, it is green and has the marking 61 on it. The part symbols in this booklet may not exactly match the appearance of the actual parts, but will clearly identify them.



This is a wire block which comes in a single length. The part has the number 4 on it.



You need a power source to build each circuit. The part is marked 91 and requires three (3) 1.5V "AA" batteries (not included). The four connections are marked -, 1.5V, 3V, and 4.5V.



A short circuit indicator LED lights if any of the outputs are shorted or under a high current draw.

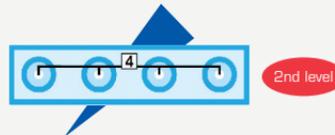
Only use the battery holder when the cover is securely in place.

Included is a special plated wire 1 block which allows you to connect to other E-Blox® series (see last page).



A large clear plastic base grid is included with this kit to help keep the circuit blocks properly spaced. You will see evenly spaced posts that the different blocks plug into.

Next to the assemble drawing may be a part with an arrow and red circle as shown below. This indicates that the part is installed below other parts and which level it is on.



## About Your E-Blox® Circuit Builder™ Parts

(Part designs are subject to change without notice).

The **base grid** functions like the printed circuit boards found in most electronic products. It is a platform for mounting parts and wire blocks (though the wires are usually “printed” on the board).

The blue **wire blocks** are just wires used to connect other components, they are used to transport electricity and do not affect circuit performance.

The **batteries (91)** produce an electrical voltage using a chemical reaction. This “voltage” can be thought of as electrical pressure, pushing electrical “current” through a circuit. This voltage is much lower and much safer than that used in your house wiring. Using more batteries increases the “pressure” and so more electricity flows.

The **switch (62)** connects (ON) or disconnects (OFF) the wires in a circuit.

The **press switch (61)** connects (pressed) or disconnects (not pressed) the wires in a circuit, just like the slide switch does.

The **LED (69)** is a light emitting diode inside the heart, and may be thought of as a special one-way light bulb. In the “forward” direction (indicated by the “arrow” in the symbol) electricity flows if the voltage exceeds a turn-on threshold (about 1.5V); brightness then increases. LEDs block electricity in the “reverse” direction.

The **bi-directional LED (71)** is like the others but has red and blue LEDs connected in opposite directions.

The **colorful LED (72)** slowly changes colors (red-green-blue) when connected to a power source.

The **4.5V lamp (76)** contains a special wire (filament) that glows bright when a large electric current passes through it. Voltages above the bulb’s rating can burn out the wire.

The **alarm (78)** converts electricity into sound by making mechanical vibrations. These vibrations create variations in air pressure which travel across the room. You “hear” sound when your ears feel these air pressure variations.

A **reed switch (83)** is an electrical switch operated by an applied magnetic field. When exposed to a magnetic field, the switch closes (ON). When the magnetic field is removed the switch opens (OFF).

A **fiber optic tree (40)** is used with the LED to enhance the light effects.

The **motor (95)** converts electricity into mechanical motion. Electricity is closely related to magnetism, and an electric current flowing in a wire has a magnetic field similar to that of a very, very tiny magnet. Inside the motor are three coils of wire with many loops. If a large electric current flows through the loops, the magnetic effects become concentrated enough to move the coils. The motor has a magnet inside, so as the electricity moves the coils to align them with the permanent magnet, the shaft spins.

## DOs and DON'Ts of Building Circuits

After building the circuits given in this booklet, you may wish to experiment on your own. Use the projects in this booklet as a guide, as many important design concepts are introduced throughout them. Every circuit will include a power source (the batteries), a resistance (which might be a lamp, motor, integrated circuit, etc.), and wiring paths between them and back. **You must be careful not to create "short circuits" (very low-resistance paths across the batteries, see examples below) as this will damage components and/or quickly drain your batteries.** Only connect the parts using configurations given in the projects, incorrectly doing so may damage them. **E-Blox® is not responsible for parts damaged due to incorrect wiring.**

### *Here are some important guidelines:*

**DO USE EYE PROTECTION WHEN EXPERIMENTING ON YOUR OWN.**

**DO** include at least one component that will limit the current through a circuit, such as the speaker, lamp, alarm, integrated circuits (ICs, which must be connected properly), or motor.

**DO** disconnect your batteries immediately and check your wiring if something appears to be getting hot.

**DO** check your wiring before turning on a circuit.

**DO** connect ICs using configurations given in the projects or as per the connection descriptions for the parts.

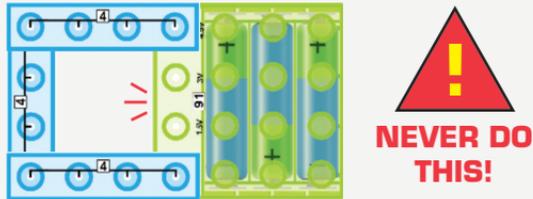
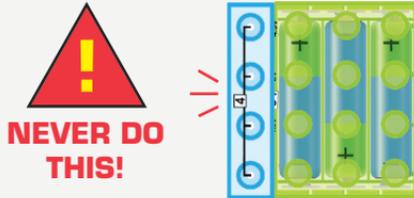
**DON'T** connect to an electrical outlet in your home in any way.

**DON'T** leave a circuit unattended when it is turned on.

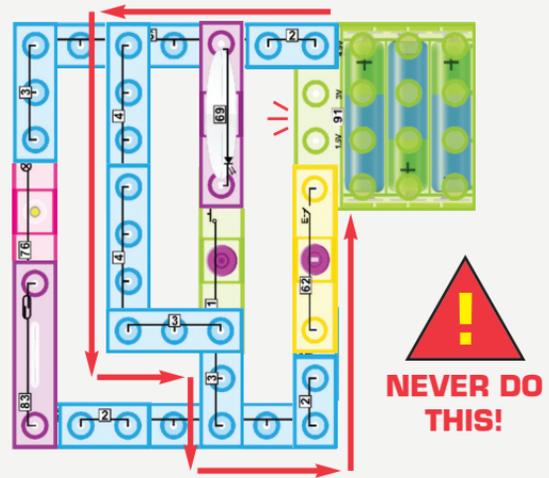
**DON'T** touch the motor when it is spinning at high speed.

## Examples of SHORT CIRCUITS – NEVER DO THIS!

Placing a wire block directly across the battery holder is a **SHORT CIRCUIT**, indicated by a flashing LED in the battery holder.



When the switch (S1) is turned on, this large circuit has a **SHORT CIRCUIT** path (as shown by the arrows). The short circuit prevents any other portions of the circuit from ever working.



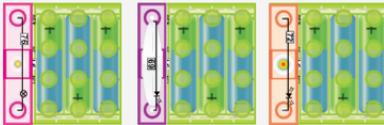
**WARNING: SHOCK HAZARD!** Never connect E-Blox® Circuit Builder™ to the electrical outlets in your home in any way!

## Advanced Troubleshooting (adult supervision recommended)

**E-Blox® is not responsible for parts damaged due to incorrect wiring.**

**If you suspect you have damaged parts, you can follow this procedure to systematically determine which ones need replacing:**

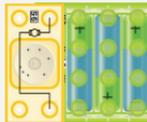
- 1. Lamp (76), LED (69), Colorful LED (72):** Place part directly across the battery holder as shown; it should light. Make sure the LEDs are installed in the correct direction. If they do not light, then replace your batteries and repeat. If they still fail to light, then the battery holder is damaged.



- 2. Bi-directional LED (71):** Place the LED across the battery holder; it should light in both directions.



- 3. Motor (95):** Place the motor across the battery holder (95 at top) as shown; it should spin clockwise.



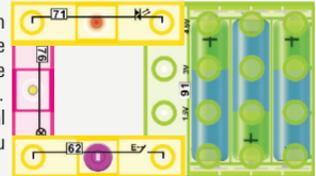
- 4. Switch (62), Press switch (61), Reed Switch (83), 4-Wire Block (4):** Use this circuit to test each switch and the wire blocks. The lamp (76) and bi-directional LED (71) should light. If they don't light, then the switch or wire block is bad. Follow the steps below:

With the switch (62) in the circuit - Up position, the lamp (76) and bi-directional (71) should be off, Down position, the lamp and bi-directional LED should be lit.

Replace the Switch (62) with the Press Switch (61) - the lamp and bi-directional LED should light when the switch is pressed.

Replace the Press Switch (61) with the Reed Switch (83) - When you place the magnet on the switch the lamp and bi-directional LED should light.

Replace the Reed Switch (83) with each of the three Wire blocks (4) - Test the wire blocks one at a time. The lamp and bi-directional LED should light when you connect the wire blocks.



**E-Blox®**

880 Asbury Dr., Buffalo Grove, IL 60089 U.S.A.

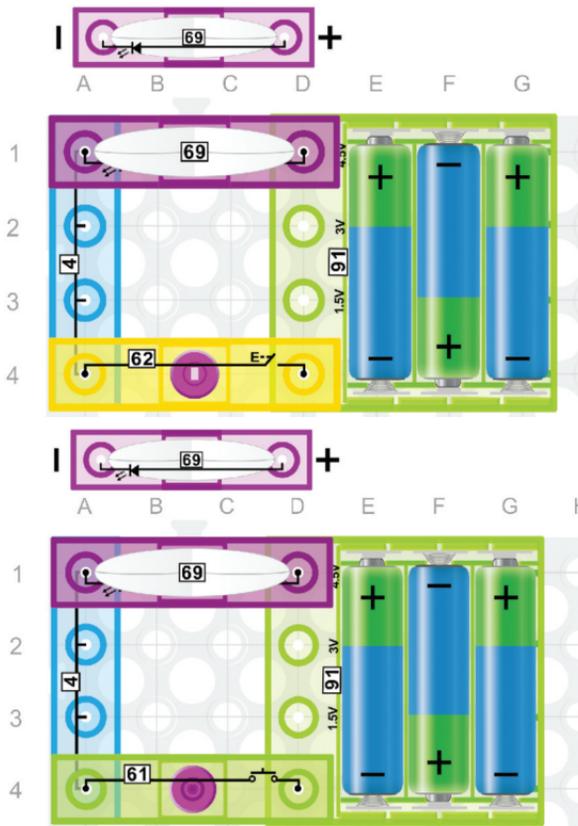
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e-mail: [help@myeblox.com](mailto:help@myeblox.com) • Website: [www.myeblox.com](http://www.myeblox.com)

**You may order additional / replacement parts at:  
[www.pickabrick.com](http://www.pickabrick.com)**

# Project Listings

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## 1. LED Switch

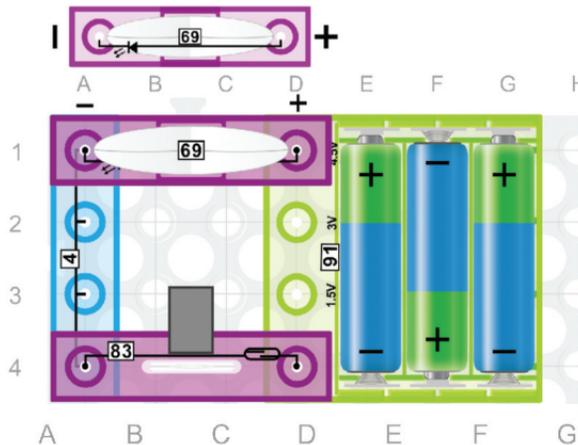
E-Blox® Circuit Builder™ uses electronic blocks that plug onto a clear plastic grid to build different circuits. These blocks have different colors and numbers on them so that you can easily identify them.

Build the circuit shown on the left by placing all the parts that plug onto the first layer base. Then, assemble the parts that connect to the secondary layer. Install three (3) “AA” batteries (not included) into the battery holder (91). **Secure the cover onto the battery holder before using it.**

Build the circuit, press the switch (62), the LED (69) will turn on.

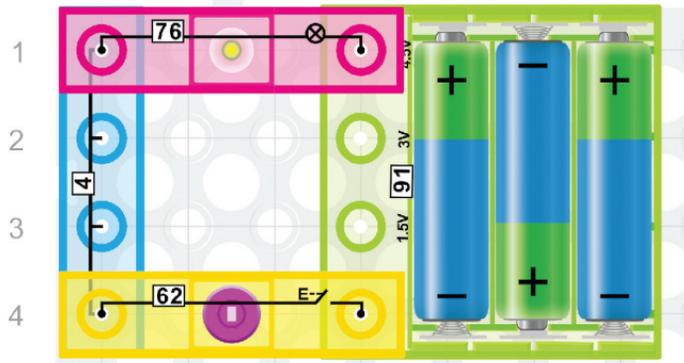
## 2. LED Press Switch

Build the circuit, press the press switch (61), the LED (69) will flash. If you hold the press switch (61), the LED (69) will stay on.



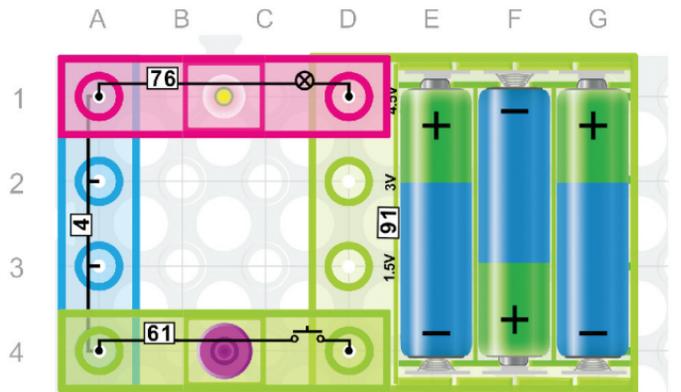
### 3. Magnet-controlled LED

Build the circuit, move the magnet (7) towards the reed switch (83), the LED (69) will turn on, move the magnet (7) away, and the LED (69) will turn off.



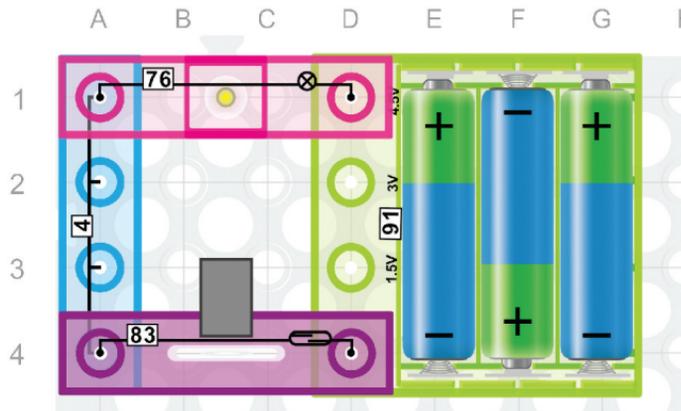
### 4. Lamp Switch

Build the circuit, press the switch (62), the lamp (76) will turn on.



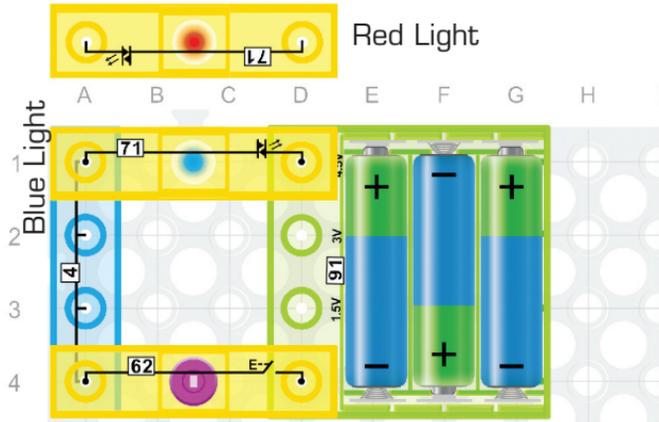
## 5. Press Switch-controlled Lamp

Build the circuit, press the press switch (61), the lamp (76) will flash. Hold the press switch (61), the lamp (76) will stay on.



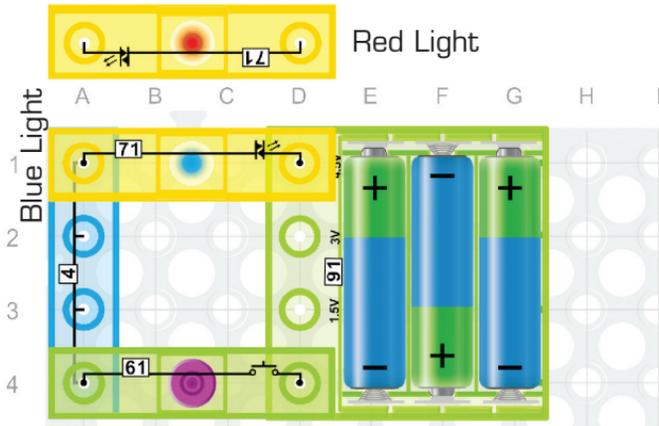
## 6. Magnet-controlled Lamp

Build the circuit, move the magnet (7) towards the reed switch (83), the lamp (76) will turn on. Move the magnet (7) away, the lamp (76) will turn off.



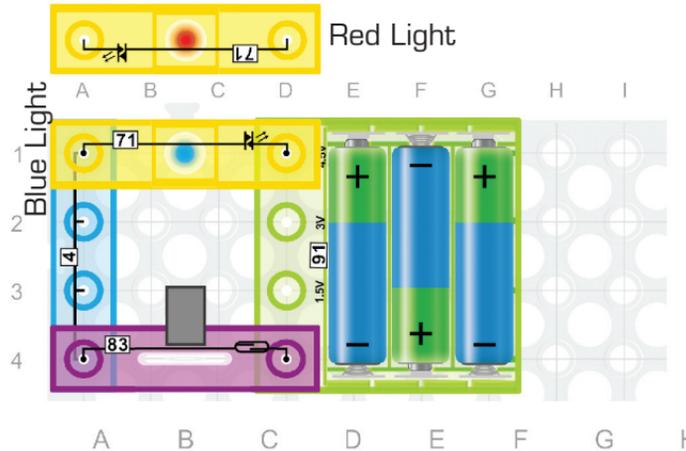
## 7. Bi-directional LED Switch

Build the circuit, press the switch (62), you will see the bi-directional LED (71) turn on blue. Install the bi-directional LED (71) in the reverse direction. When you press the switch (62) the bi-directional LED (71) will turn on red.



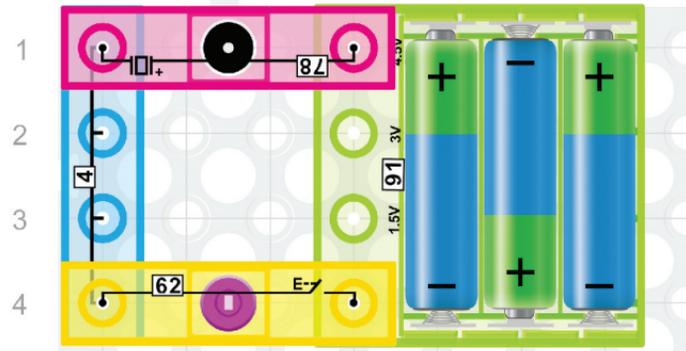
## 8. Press Switch-controlled Bi-directional LED

Build the circuit, press the press switch (61), the bi-directional LED (71) will flash. If you hold press switch (61), the bi-directional LED (71) will turn on blue. Install the bi-directional LED (71) in the reverse direction, then hold the press switch (61), you will see the bi-directional LED (71) turn on red.



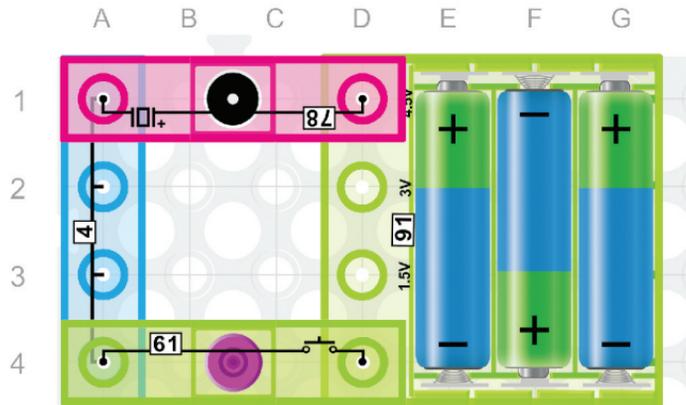
## 9. Magnet-controlled Bi-directional LED

Build the circuit, move the magnet (7) towards the red switch (83), the bi-directional LED (71) will turn on blue. Move the magnet (7) away, the light will turn off. Install the bi-directional LED (71) in the reverse direction, then move the magnet (7) towards the reed switch (83), the bi-directional LED (71) will turn on red.



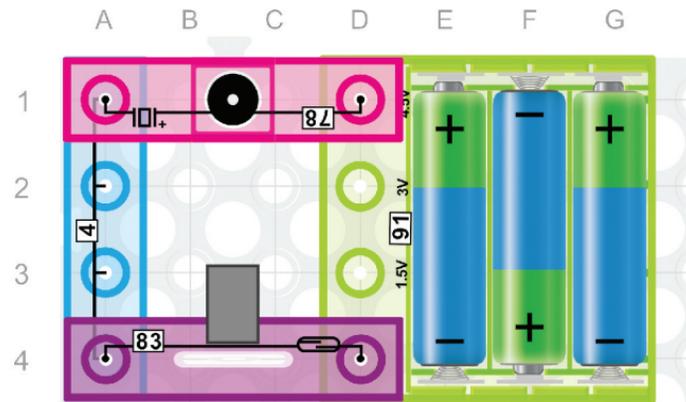
## 10. Alarm Switch

Build the circuit, press the switch (62), you will hear the alarm (78).



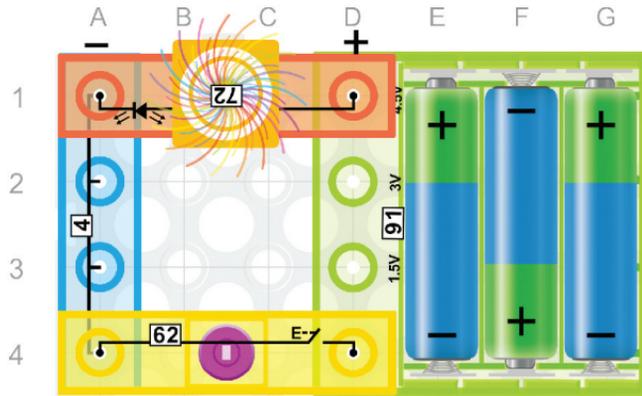
## 11. Press Switch-controlled Alarm

Build the circuit, press the press switch (61), you will hear the alarm (78) sound. Hold the press switch (61), the alarm (78) will stay on.



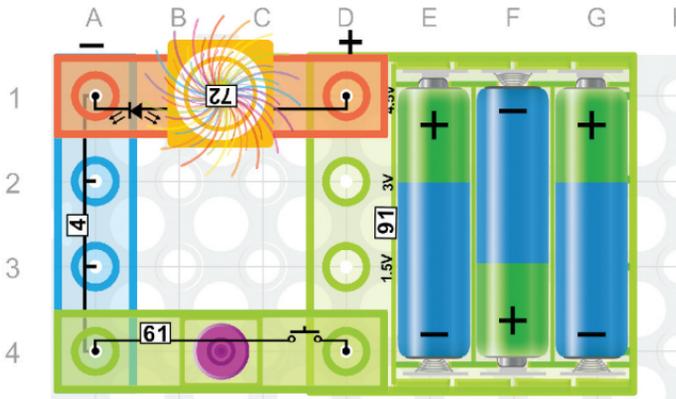
## 12. Magnetic-controlled Alarm

Build the circuit, move the magnet (7) towards the reed switch (83), the alarm (78) will sound. Move the magnet (7) away, the alarm (78) will turn off.



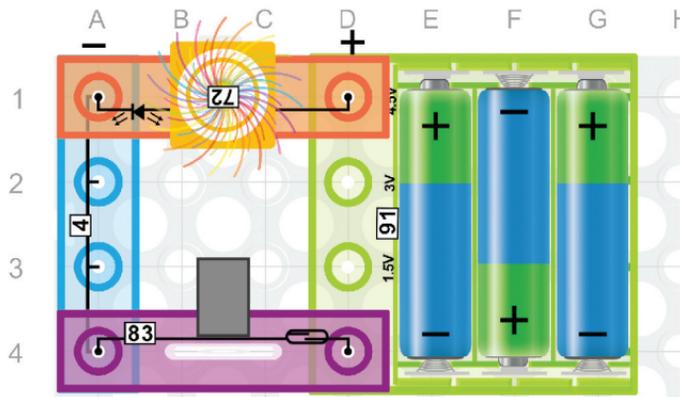
### 13. Switch-controlled Fiber Optic Tree

Build the circuit and place the fiber optic tree on the colorful LED (72), press the switch (62), the colorful LED (72) will turn on, you will see the fiber optic tree (40) change colors with the LED's colors.



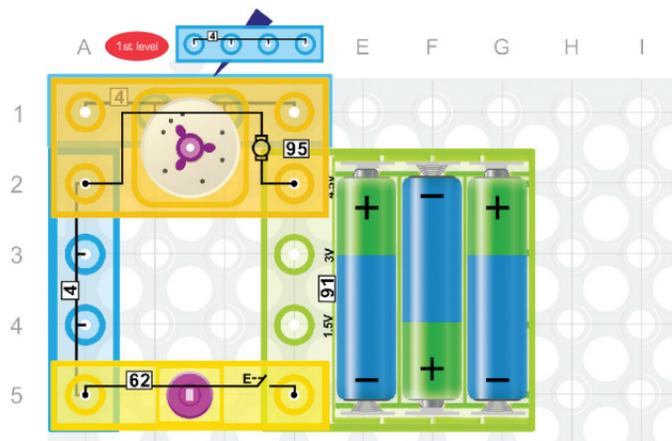
### 14. Press Switch-controlled Fiber Optic Tree

Build the circuit, press the press switch (61), the colorful LED (72) will flash. Hold the press switch (61), the colorful LED (72) will stay on while the fiber optic tree (40) changes colors with the colorful LED (72).



## 15. Magnet-controlled Optical Fiber Tree

Build the circuit, move the magnet (7) towards the reed switch (83), the colorful LED (72) will turn on, the fiber optic tree (40) is changing colors with the colorful LED (72).

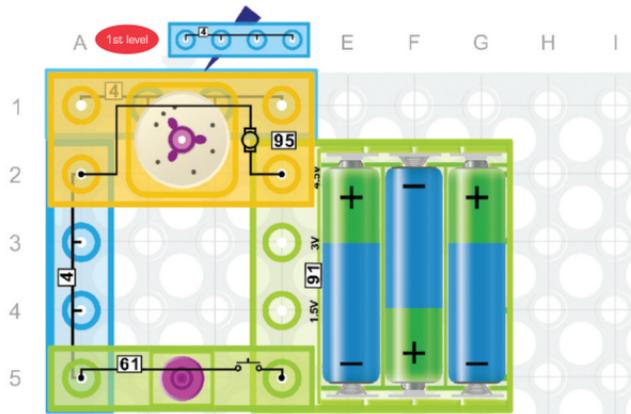


## 16. Motor Switch

Build the circuit, press the switch (62), the motor (95) will turn on.



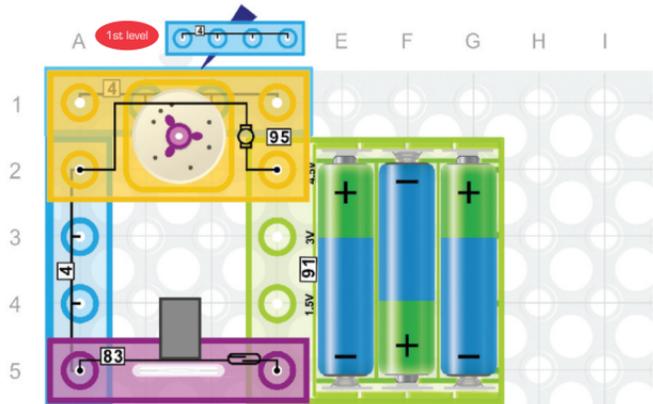
**WARNING:** Moving parts. Do not touch the fan or motor during operation. Do not lean over the motor.



## 17. Press Switch-controlled Motor

Build the circuit, press the press switch (61), the motor (95) will turn on for a short time. Hold the press switch (61), the motor (95) will stay on.

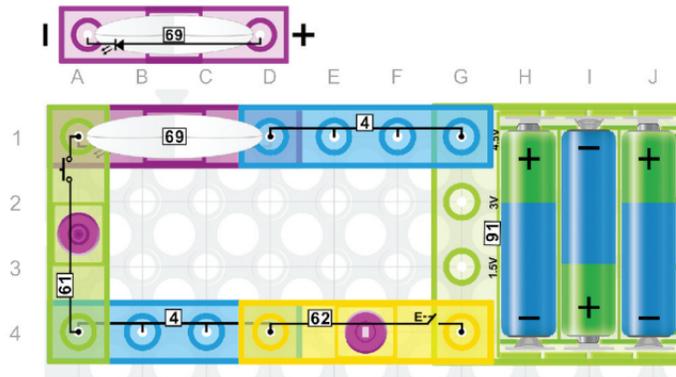
**WARNING:** Moving parts. Do not touch the fan or motor during operation. Do not lean over the motor.



## 18. Magnet-controlled Motor

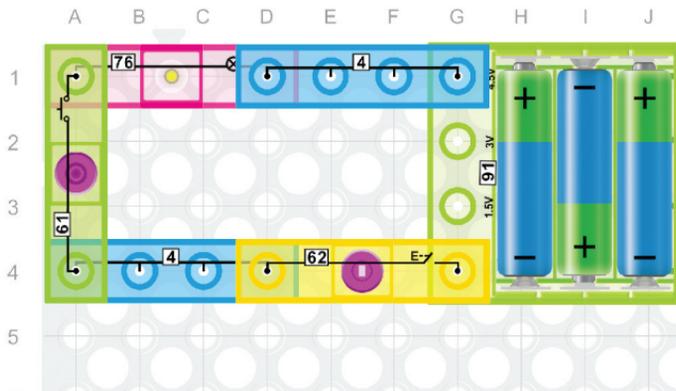
Build the circuit, move the magnet (7) towards the reed switch (83), motor (95) will turn on. Move the magnet (7) away, the motor (95) will turn off.

**WARNING:** Moving parts. Do not touch the fan or motor during operation. Do not lean over the motor.



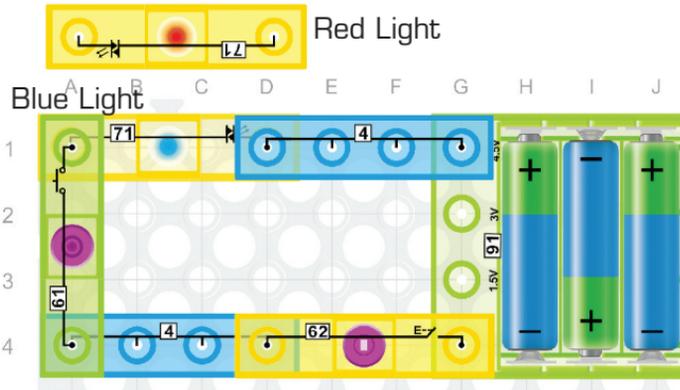
## 19. Switch & Press Switch-controlled LED Series Connection

Build the circuit, press the switch (62), then hold the press switch (61). The LED (69) will turn on. Release the press switch (61), then the light will turn off.



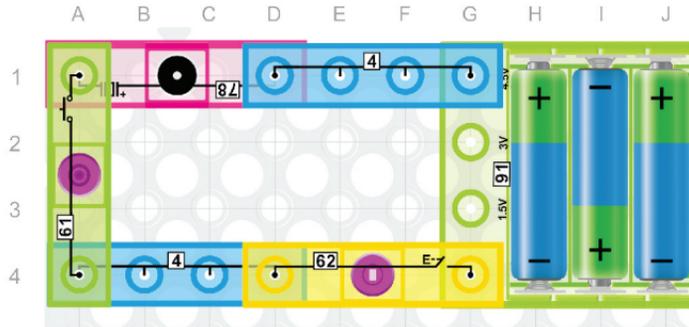
## 20. Switch & Press Switch-controlled Lamp Series Connection

Build the circuit, press the switch (62), then press the press switch (61), you will see the lamp (76) turn on. Release the press switch (61), the lamp (76) will turn off.



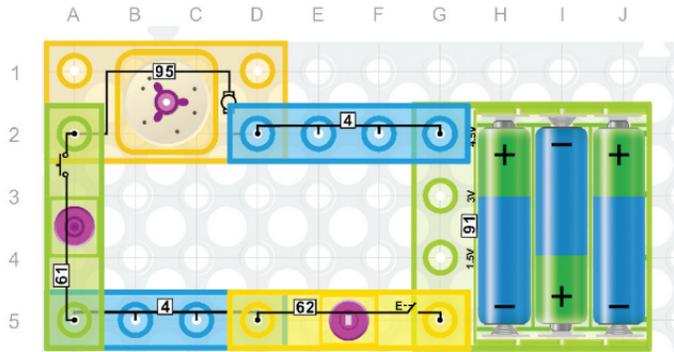
## 21. Switch & Press Switch-controlled Bi-directional LED Series Connection

Build the circuit, press the switch (62), then hold the press switch (61), the bi-directional LED (71) will turn on blue. Release the press switch (61), then install the bi-directional LED (71) in the reverse direction, hold the press switch (61) the bi-directional LED (71) will turn on red.



## 22. Switch & Press Switch-controlled Alarm Series Connection

Build the circuit, press the switch (62), then hold the press switch (61), you will hear the alarm (78). Release the press switch (61), the alarm (78) will stop.

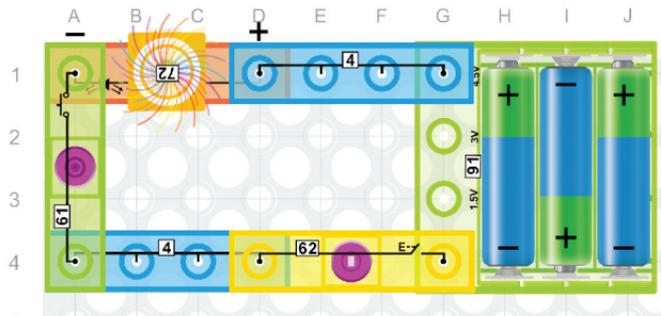


## 23. Switch & Press Switch-controlled Motor Series Connection

Build the circuit, press the switch (62), then hold the press switch (61). The motor (95) will turn on. Release the press switch (61), then the motor (95) will turn off.

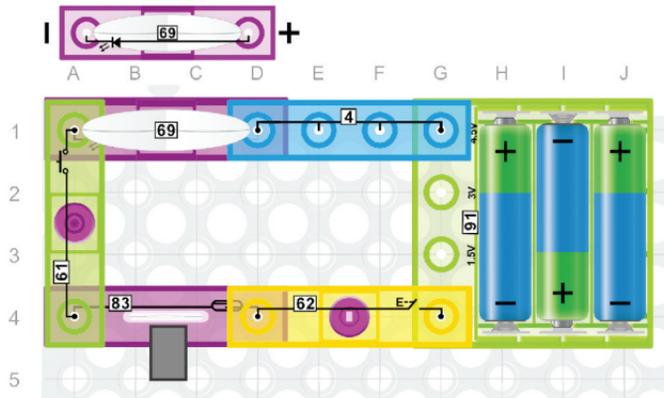


**WARNING:** Moving parts. Do not touch the fan or motor during operation. Do not lean over the motor.



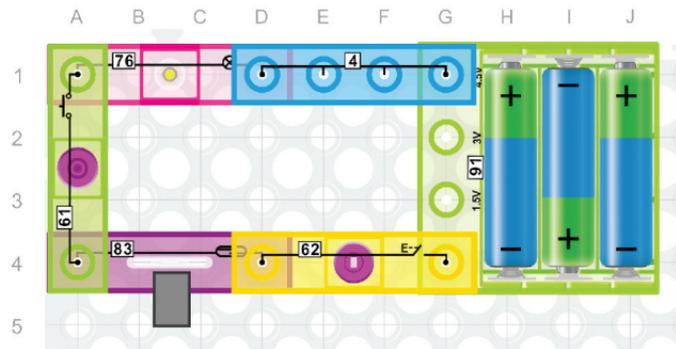
## 24. Switch & Press Switch-controlled Fiber Optic Tree Series Connection

Build the circuit, press the switch (62), then hold the press switch (61). The colorful LED (72) will turn on and the fiber optic tree (40) will light up with the colors of the colorful LED (72). Release the press switch (61); the colorful LED (72) will turn off.



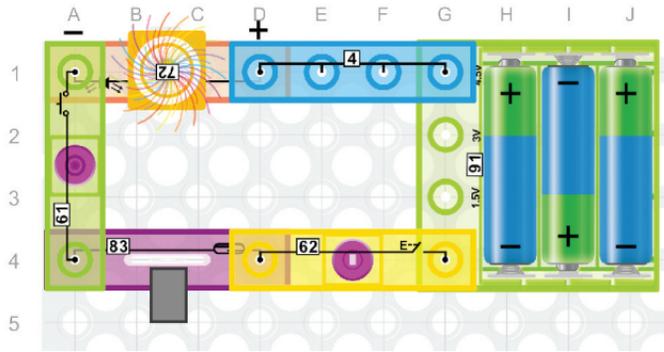
## 25. Magnet, Switch & Press Switch-controlled LED Series Connection

Build the circuit, press the switch (62), then hold the press switch (61). Then move the magnet (7) towards the reed switch (83), you will see the LED (69) turn on. If you move the magnet (7) away, the LED (69) will turn off.



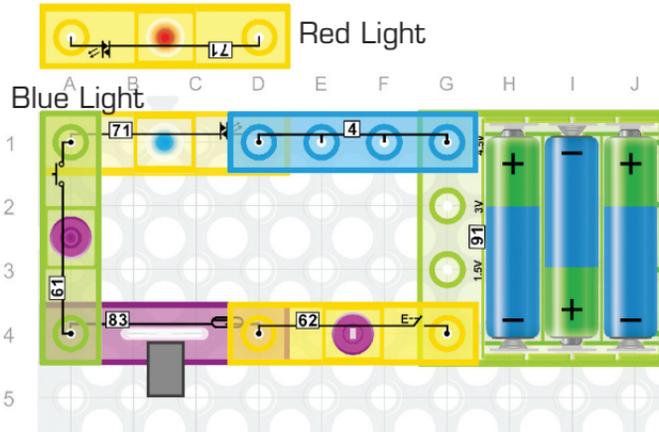
## 26. Magnet, Switch & Press Switch-controlled Lamp Series Connection

Build the circuit, press the switch (62), then hold the press switch (61). Then move the magnet (7) towards the reed switch (83). The lamp (76) will turn on. If you move the magnet (7) away, the lamp (76) will turn off.



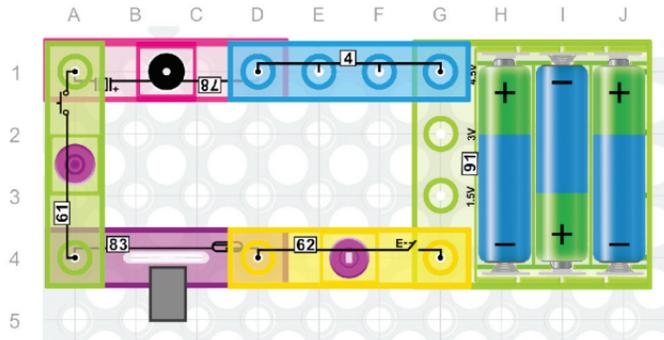
## 27. Magnet, Switch & Press Switch-controlled Fiber Optic Tree Series Connection

Build the circuit, press the switch (62), then hold the press switch (61). Move the magnet (7) towards the reed switch (83). The colorful LED (72) will turn on. The fiber optic tree (40) will light up with the colors of the LED. If you move the magnet (7) away, the light will turn off.



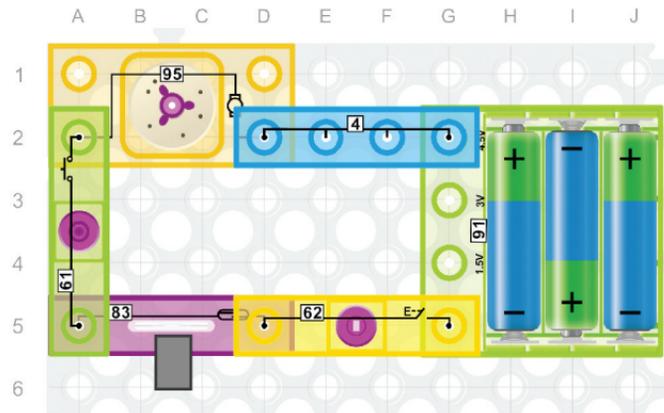
## 28. Magnet, Switch & Press Switch-controlled Bi-directional LED Series Connection

Build the circuit, press the switch (62), then press the press switch (61). Move the magnet (7) towards the reed switch (83); you will see the bi-directional LED (71) turn on with the blue light. If you move the magnet (7) away, the bi-directional LED (71) will turn off. Install the bi-directional LED (71) in the reverse direction and move the magnet (7) towards the reed switch (83). The bi-directional LED (71) will turn red.



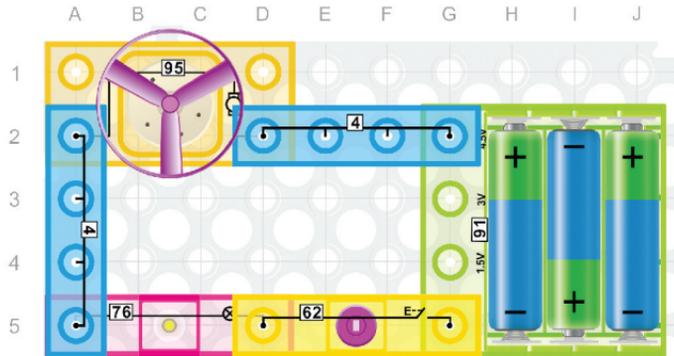
## 29. Magnet, Switch & Press Switch-controlled Alarm Series Connection

Build the circuit, press the switch (62), then hold the press switch (61). When you move the magnet (7) towards the reed switch (83), you will hear the alarm (78). If you move the magnet (7) away, the alarm (78) will turn off.

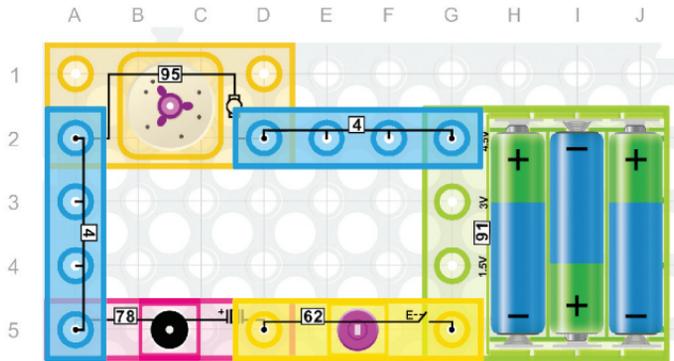


## 30. Magnet, Switch & Press Switch-controlled Motor Series Connection

Build the circuit, press the switch (62), then hold the press switch (61). When you move the magnet (7) towards the reed switch (83), you will see the motor (95) turn on. If you move the magnet (7) away, the motor (95) will turn off.



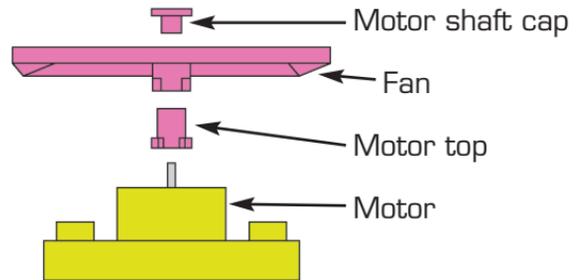
**WARNING:** Moving parts. Do not touch the fan or motor during operation. Do not lean over the motor.



## 31. Switch-controlled Fan & Lamp Series Connection

Build the circuit, press the switch (62), the fan blade (60) of the motor (95) will start running while the lamp (76) is on.

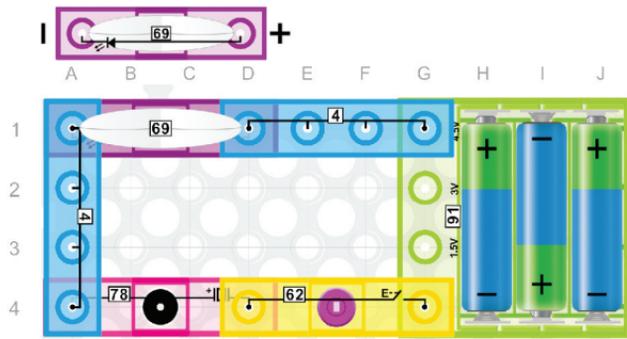
### Fan Assembly



## 32. Switch-controlled Motor & Alarm Series Connection

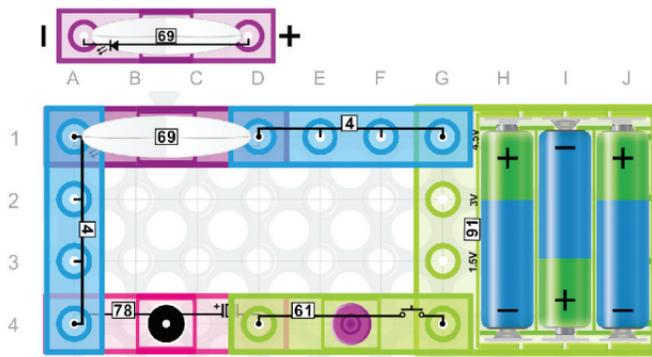
Build the circuit, press the switch (62), you will hear the alarm (78) faintly. The motor (95) will be off.

**WARNING:** Moving parts. Do not touch the fan or motor during operation. Do not lean over the motor.



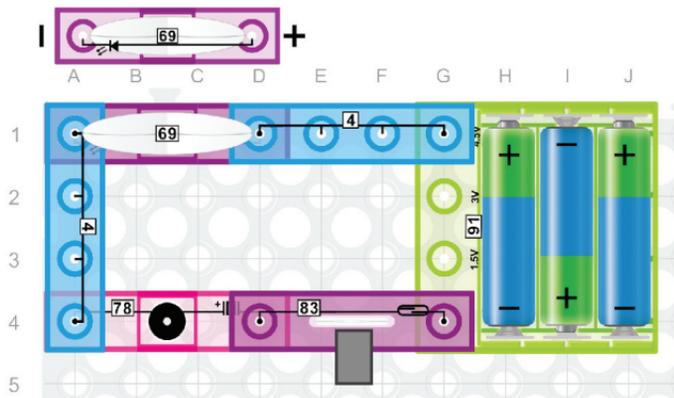
### 33. Switch-controlled Alarm & LED Series Connection

Build the circuit, press the switch (62), you will hear the alarm (78), while the LED (69) turns on at the same time.



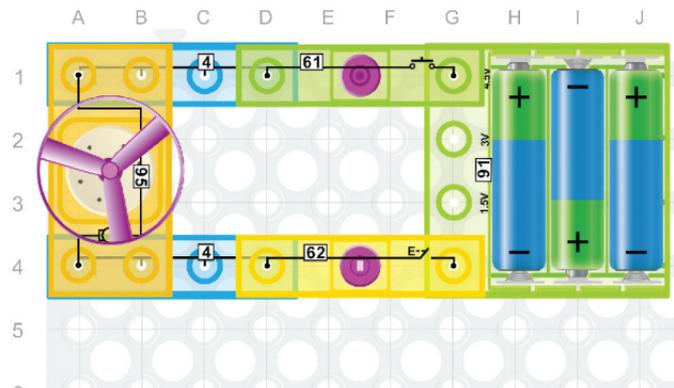
### 34. Press Switch-controlled Alarm & LED Series Connection

Build the circuit, press the press switch (61) several times, the alarm (78) will sound for short intervals. If you hold the press switch (61), the alarm (78) will start while the LED (69) is on.



### 35. Magnet-controlled Alarm & LED Series Connection

Build the circuit, move the magnet (7) towards the reed switch (83), the alarm (78) will sound while the LED (69) is on. Move the magnet (7) away, the alarm (78) and LED (69) will turn off.



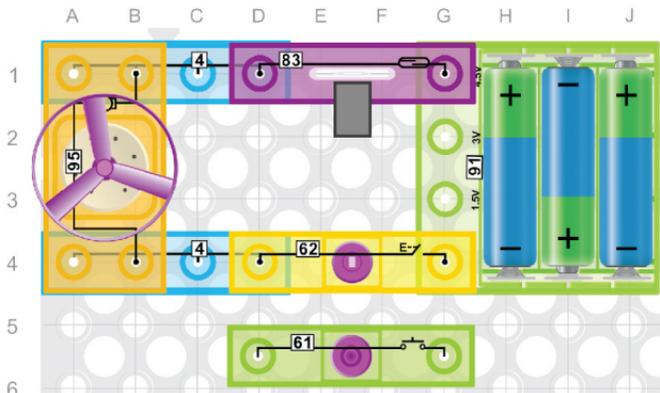
### 36. Switch & Press Switch-controlled Flying Saucer

Build the circuit, press the switch (62), then hold the press switch (61). The fan blade (60) of the motor (95) will spin. Release the press switch (61), the fan blade (60) will launch into the air. **(Caution!** Never let it fly near your face!)



Reminder: Remove the shaft cap before using the flying saucer.

**WARNING:** Moving parts. Do not touch the fan or motor during operation. Do not lean over the motor.

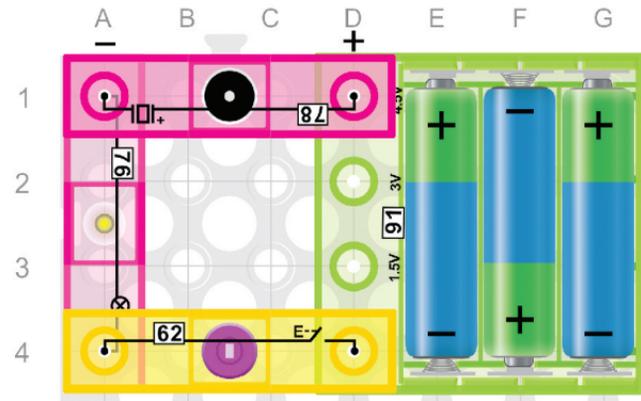


### 37. Magnet & Switch-controlled Fan

Build the circuit, press the switch (62), when you move the magnet (7) towards the reed switch (83), you will see the fan blade (60) of the motor (95) start spinning. When you move the magnet (7) away, the fan blade (60) will stop spinning.

### 38. Magnet & Press Switch-controlled Fan

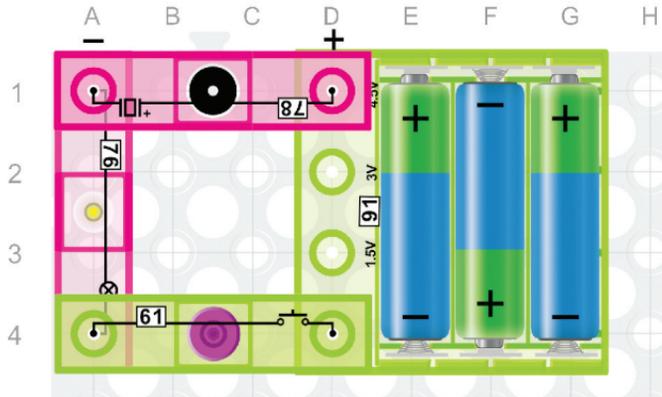
Build the circuit by replacing the switch (62) with the press switch (61). Press and hold the press switch (61). When you move the magnet (7) towards the reed switch (83), you will see the fan blade (60) of the motor (95) start spinning. When you move the magnet (7) away, the fan blade (60) will stop spinning.



**WARNING:** Moving parts. Do not touch the fan or motor during operation. Do not lean over the motor.

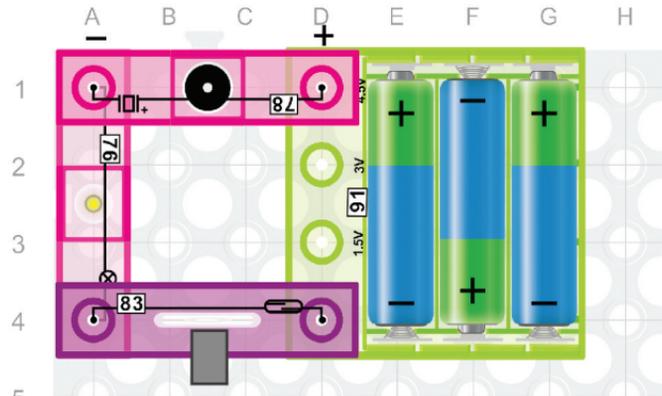
### 39. Switch-controlled Alarm & Lamp Series Connection

Build the circuit, press the switch (62), you will hear the alarm (78) start wailing while the lamp (76) will light dimly.



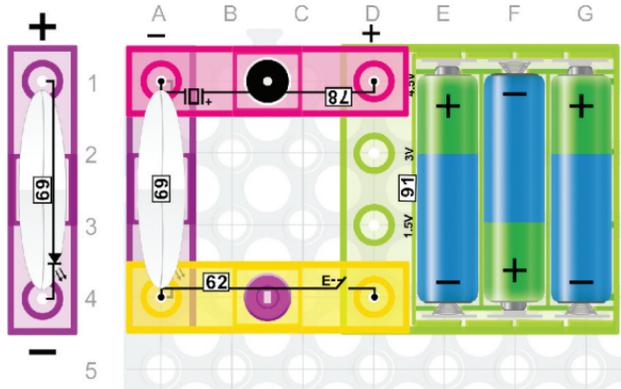
## 40. Press Switch-controlled Lamp Alarm

Build the circuit, press and hold the press switch (61), you will hear the alarm (78) sound, while the lamp (76) will light dimly. When you release the press switch (61), the alarm (78) will stop. The lamp is used as a wire block in this circuit and will light dimly.



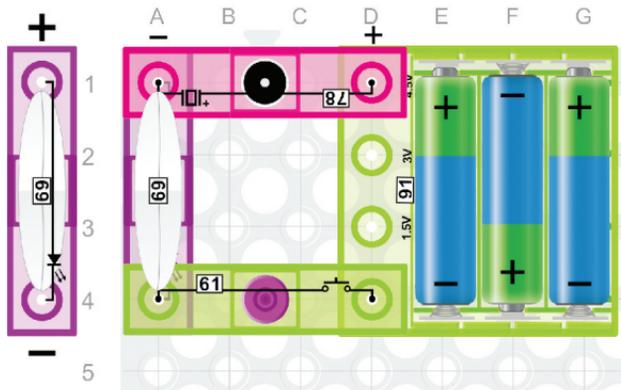
## 41. Magnet-controlled Lamp Alarm

Build the circuit, move the magnet (7) towards the reed switch (83), the alarm (78) will start while the lamp (76) will light dimly. When you move the magnet (7) away the alarm (78) will stop. The lamp is used as a wire block in this circuit and will light dimly.



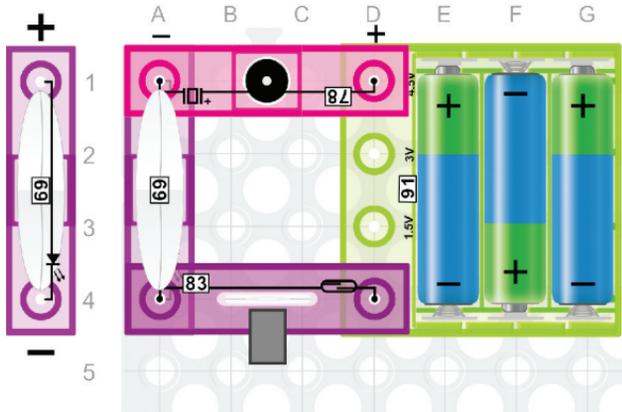
## 42. Switch-controlled Alarm & LED Series Connection

Build the circuit, press the switch (62), the alarm (78) will start in a low volume, while the LED (69) turns on.



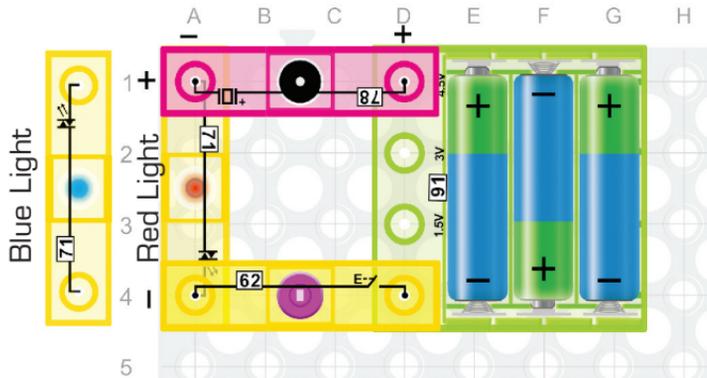
## 43. Press Switch-controlled Alarm & LED

Build the circuit, hold the press switch (61), the alarm (78) will start in a low volume, while the LED (69) turns on. Release the press switch (61), then the alarm (78) and the LED (69) will turn off at the same time.



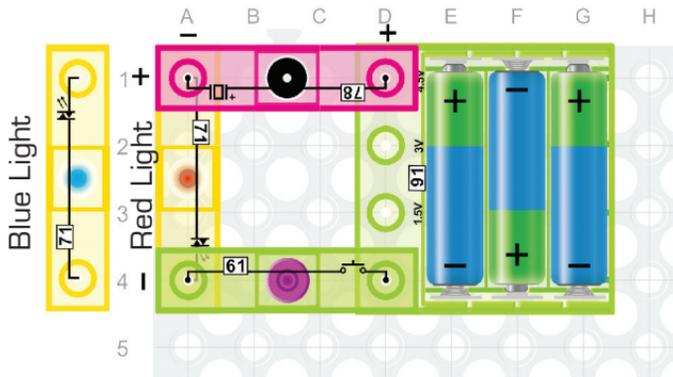
#### 44. Magnet-controlled Alarm and LED

Build the circuit, move the magnet (7) towards the reed switch (83), the alarm (78) will start in a low volume while the LED (69) turns on. If you move the magnet (7) away, the alarm (78) and LED (69) will turn off.



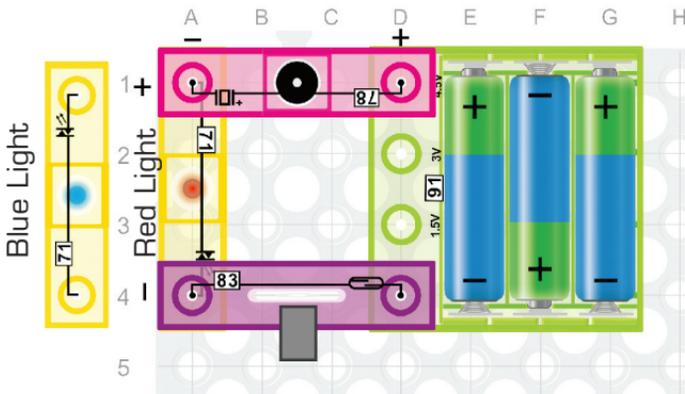
#### 45. Switch-controlled Bi-directional LED & Alarm Series Connection

Build the circuit, press the switch (62), the alarm (78) will sound, the bi-directional LED (71) turns on red. Install the bi-directional LED (71) in the reverse direction, then press the switch (62), the bi-directional LED (71) will turn on blue and the alarm will sound very faintly.



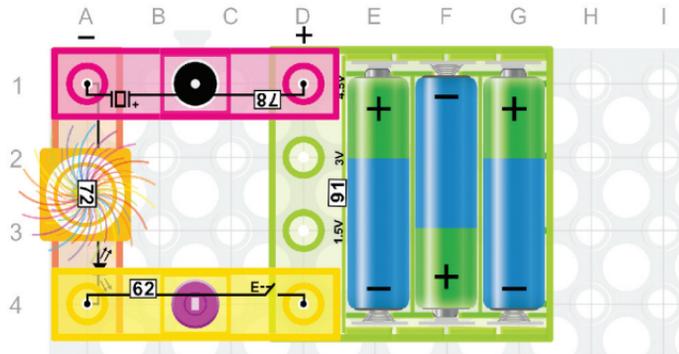
## 46. Press Switch-controlled Bi-directional LED & Alarm

Build the circuit, hold the press switch (61), you will hear the alarm (78) sound, while the bi-directional LED (71) turns on red. Release the press switch (61), then install the bi-directional LED (71) in the reverse direction. Hold the press switch (61), you will see the bi-directional LED (71) will turn on blue and the alarm will sound very faintly. If you release the press switch (61), the alarm (78) and the bi-directional LED (71) will turn off.



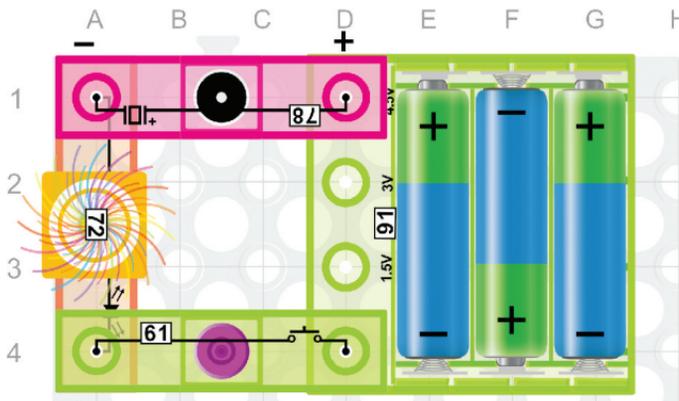
## 47. Magnet-controlled Bi-directional LED and Alarm

Build the circuit, move the magnet (7) towards the reed switch (83), the alarm (78) will sound while the bi-directional LED (71) turns on red. Move the magnet (7), then install the bi-directional LED (71) in the reverse direction. Now if you move the magnet (7) towards the reed switch (83), the bi-directional LED (71) will turn on blue and the alarm will sound very faintly. If you move the magnet (7) away, you will see the alarm (78) and bi-directional LED (71) turn off.



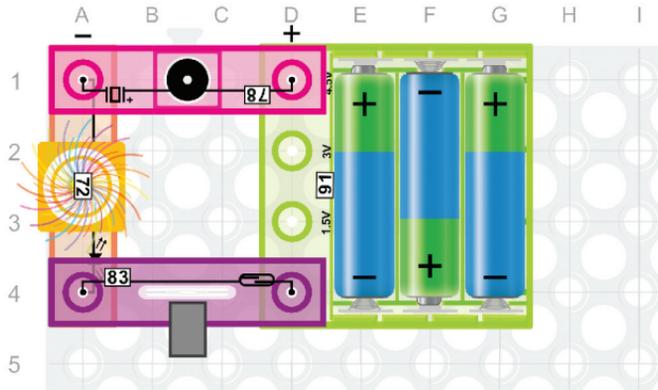
## 48. Switch-controlled Fiber Optic Tree & Alarm Series Connection

Build the circuit, press the switch (62), the alarm (78) will sound very faintly. Then you will see the colorful LED (72) turn on. The fiber optic tree (40) will be lit up with the colors of the LED.



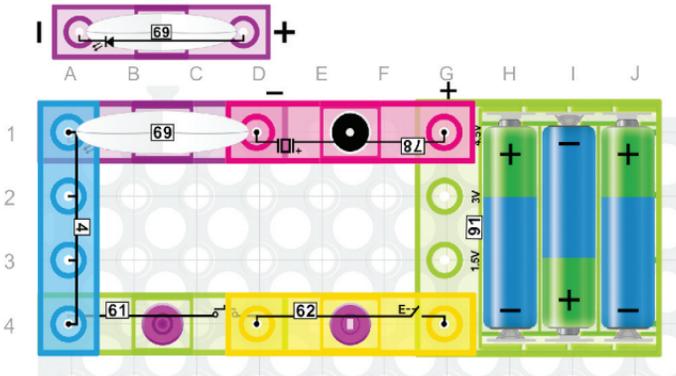
## 49. Press Switch-controlled Fiber Optic Tree & Alarm Series Connection

Build the circuit, press and hold the press switch (61), the alarm (78) will sound very faintly. Then you will see the colorful LED (72) turn on with the light of the fiber optic tree (40) on with the colors of the LED.



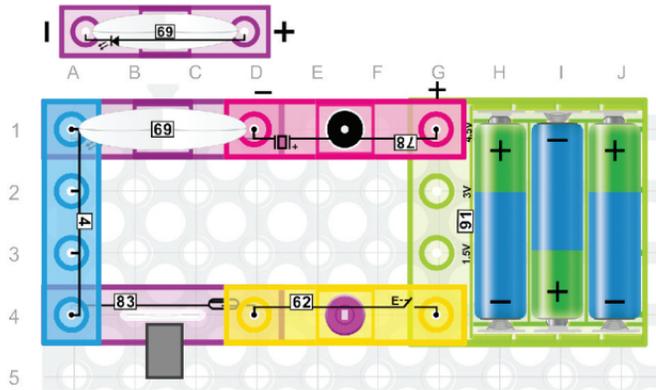
## 50. Magnet-controlled Fiber Optic Tree & Alarm Series Connection

Build the circuit, move the magnet [7] towards the reed switch [83], the alarm [78] will sound very faintly. Then you will see the fiber optic tree [40] turn on with the light of the colorful LED [72]. If you move the magnet [7] away the alarm [78] and colorful LED [72] will turn off.



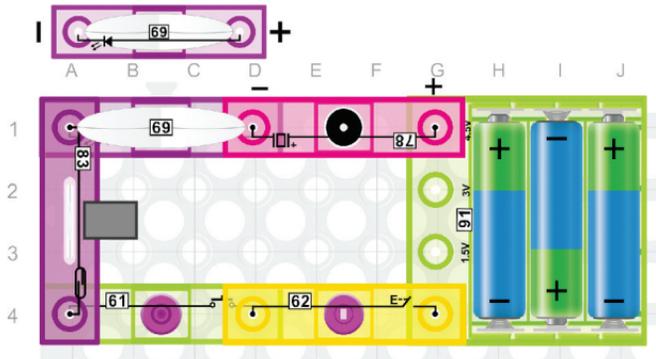
## 51. Switch and Press Switch-controlled Alarm and LED Series Connection

Build the circuit, press the switch [62], then hold the press switch [61], you will hear the alarm [78] start with its pitch varying from low to high, also the LED [69] will turn on. Release the press switch [61], the alarm [78] and LED [69] will turn off.



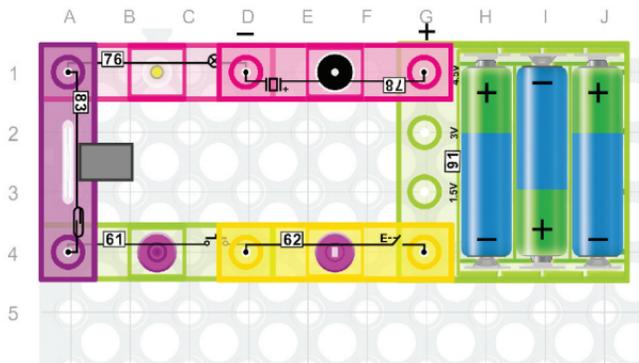
## 52. Magnet & Switch-controlled Alarm & LED Series Connection

Build the circuit, first press the switch (62), then move the magnet (7) towards the reed switch (83), you will hear the alarm (78) sound very faintly. The LED (69) will turn on at the same time. If you move the magnet (7) away the alarm (78) and LED (69) will turn off.



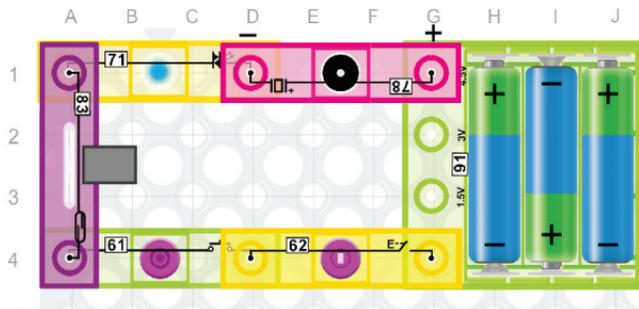
## 53. Magnet, Switch & Press Switch-controlled Alarm & LED Series Connection

Build the circuit, press the switch (62), then hold the press switch (61). Now move the magnet (7) towards the reed switch (83), the alarm (78) will sound very faintly, while the LED (69) turns on. If you release the press switch (61) or move the magnet (7) away, both the alarm (78) and LED (69) turn off.



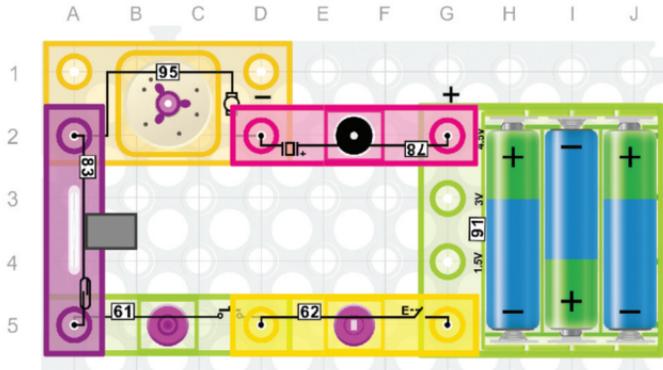
## 54. Magnet, Switch & Press Switch-controlled Alarm & Lamp Series Connection

Build the circuit, press the switch (62), then hold the press switch (61). Move the magnet (7) towards the reed switch (83), you will hear the alarm (78) sound while the lamp (76) is still off. If you release the press switch (61) or move the magnet (7), the alarm (78) will turn off.



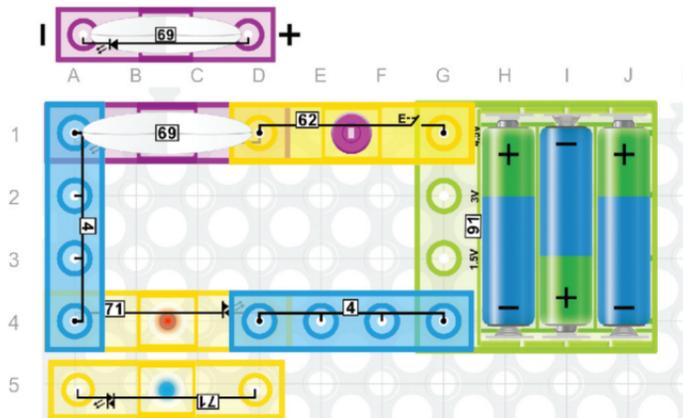
## 55. Magnet, Switch & Press Switch-controlled Alarm & Bi-directional LED Series Connection

Build the circuit, press the switch (62), then hold the press switch (61). Move the magnet (7) towards the reed switch (83), you will hear the alarm (78) sound very faintly while the bi-directional LED (71) turns on blue. If you release the press switch (61), or move the magnet (7) away, the alarm (78) and bi-directional LED (71) will turn off.



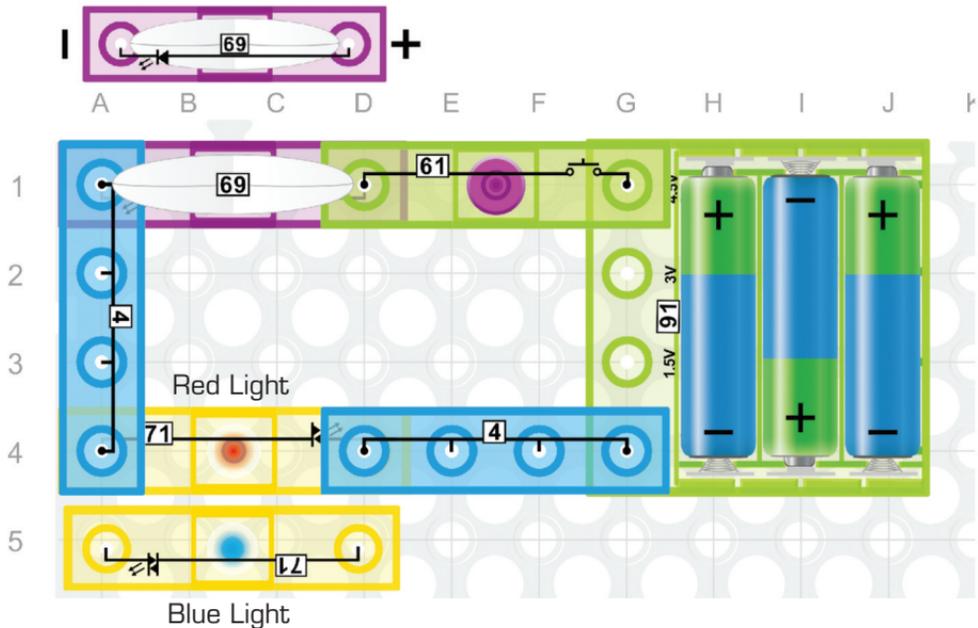
## 56. Magnet, Switch & Press Switch-controlled Alarm & Motor Series Connection

Build the circuit, press the switch (62), then hold the press switch (61). Move the magnet (7) towards the reed switch (83), you will hear the alarm (78) sound very faintly while the motor (95) is off. If you release the press switch (61), or move the magnet (7) away, the alarm (78) and motor (95) will turn off.



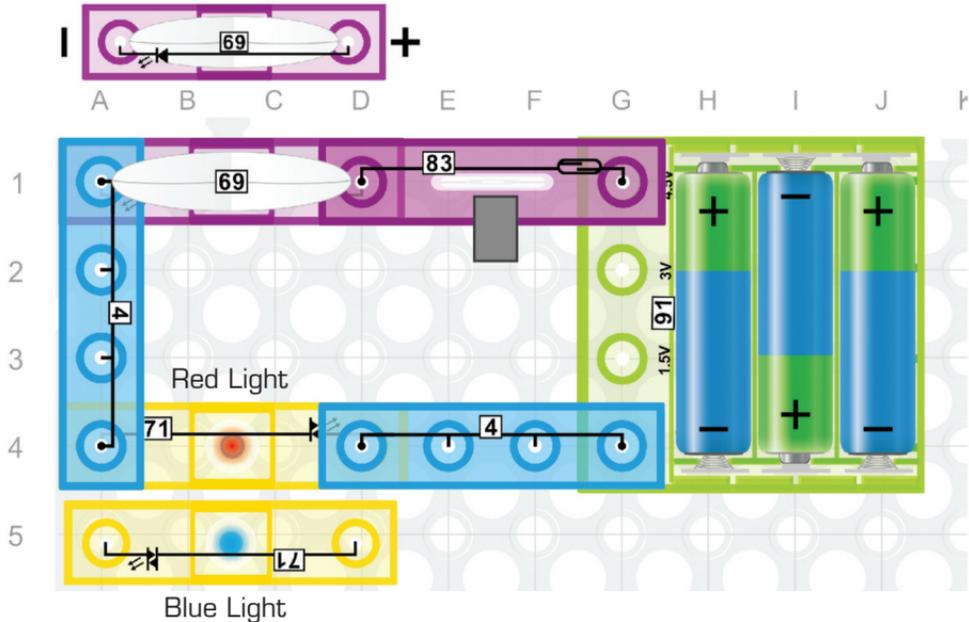
## 57. Switch-controlled LED and Bi-directional LED Series Connection

Build the circuit, press the switch (62), you will see the LED (69) and the bi-directional LED (71) turn on at the same time. If you install the bi-directional LED (71) in the reverse direction, then press the switch (62), the LED (69) will turn on red while the bi-directional LED (71) will turn on blue.



## 58. Press Switch-controlled LED & Bi-directional LED Series Connection

Build the circuit, press and hold the press switch (61), you will see the LED (69) and the bi-directional LED (71) turn on red at the same time. Install the bi-directional LED (71) in the reverse direction, then press the press switch (61), the LED (69) will turn on red, while the bi-directional LED (71) will turn on blue.



## 59. Magnet-controlled LED and Bi-directional LED Series Connection

Build the circuit, move the magnet (7) towards the reed switch (83), you will see the LED (69) and the bi-directional LED (71) turn on red. Move the magnet (7) away and install the bi-directional LED (71) in the reverse direction. Move the magnet (7) towards the reed switch (83), you will see the LED (69) turn on red and the bi-directional LED (71) turn on blue.

## Your E-Blox® Circuit Builder™ is compatible with other E-Blox® products!

Your E-Blox® Circuit Builder™ kit includes two tin plated blocks (part # 6EB2X101) which allow you to connect to other E-Blox® sets. A simple demo circuit is shown on the right and the parts needed to build it are shown below.

LED Block (6EB2X69)



Plated blocks  
(6EB2X101)

Battery block (6EB3795)  
(from E-Blox® pARTS™  
Starter/Plus/Deluxe set)



Plated 1x3 blocks (6EB3622Tin)  
(from E-Blox® pARTS™ Starter/Plus/Deluxe set)

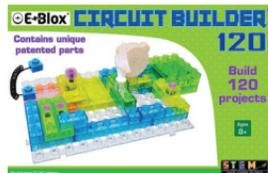


## Other E-Blox® Products

### CIRCUIT BUILDER™



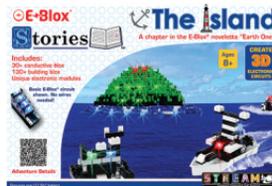
Build 115 projects with component parts such as a speaker and three-in-one integrated circuit (IC).



Build 120 projects with component parts such as a power amplifier, FM radio IC, and volume controller.



Follow the adventures of Seymour and his robot Robyn as they investigate a mysterious light in the distant ocean horizon. The storybook includes QR codes that create an interactive learning environment using online resources. Models are built in several parts of the story, further enhancing the learning experience.



The **E-Blox® pARTS™** series utilizes our patented technology that allows you to build electrical circuits in three dimensions. Our tin plated blocks are safe to use thanks to a low current power supply (9V battery), our patented battery holder which will sound an alarm and shut down if a short circuit exists, and tin (just like the cans your food comes in). Let your imagination run wild as you create your own circuits integrated into whatever you are inspired to build. Perfect for budding scientists, technicians, engineers, artists, or mathematicians!



#### STARTER

Contains six (6) LEDs.



#### PLUS

Contains six (6) LEDs.



#### DELUXE

Contains eight (8) LEDs.



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Visit us at: [www.myeblox.com](http://www.myeblox.com)

**U.S. Patents:** 8,221,182; 6,805,605; 62/328,692; PCT/US2010/060613; and other patents pending.

**International Patents:** 10842574.5 (EU); 2780580 (Canada); 326,340 (Mexico);  
ZL 201080056936.6 (China); HK1171711 (Hong Kong)

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