SNAP CIRCUITS®
ELENCO®

ARCADE

GAMES OF LEARNING AND FUN

Simply Snap Together!

OVER **200** EXCITING PROJECTS

INCLUDING **20+** BUILD-AND-PLAY GAMES

CONTAINS OVER **35** PARTS

LEARN THE FUNDAMENTALS OF ELECTRICITY

MECHANICS

FUN SOUNDS

Project 4

Go to https://shop.elenco.com/consumers/snap-circuits-arcade.html to download projects 62-203

AWARD WINNING SNAP CIRCUITS GENUINE BRAND

ELENCO®
Learn by doing®

Ages 8-108

Requires three (3) "AA" batteries

MADE WITH CIRCUITSAFE® fuse technology

STEM.ORG AUTHENTICATED™ EDUCATIONAL PRODUCT

SOURCE CODE:SCA-200V1 | REV-B | 753077

Table of Contents

Go to https://shop.elenco.com/consumers/snap-circuits-arcade.html to download projects 62-203

WARNING: SHOCK HAZARD - Never connect Snap Circuits® to the electrical outlets in your home in any way!

WARNING: CHOKING HAZARD - Small parts. Not for children under 3 years.

WARNING: Moving parts. Do not touch the fan while it is spinning.

Conforms to all applicable government requirements

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.

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 snapped.
4. Try replacing the batteries.
5. If the programmable fan (M8) does not display any messages, then it could be because you erased them without programming in new ones. See project 15 for instructions on how to program it.

Elenco® is not responsible for parts damaged due to incorrect wiring.

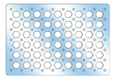
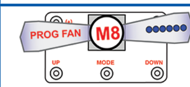
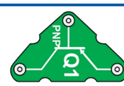
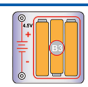
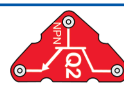
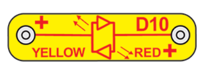
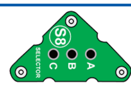
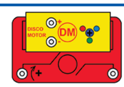
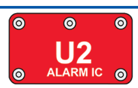
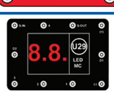
Note: If you suspect you have damaged parts, you can follow the Advanced Troubleshooting procedure on page 10 to determine which ones need replacing.

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.

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 (800) 533-2441 or e-mail us at: help@elenco.com. Customer Service • 150 Carpenter Ave. • Wheeling, IL 60090 U.S.A.

Qty.	ID	Name	Symbol	Part #	Qty.	ID	Name	Symbol	Part #
❒ 1		Base Grid (11.0” x 7.7”)		6SCBG	❒ 1		Jumper Wire (Black, 18”)		6SCJ1
❒ 2	1	1-Snap Wire		6SC01	❒ 1		Jumper Wire (Red, 18”)		6SCJ2
❒ 6	2	2-Snap Wire		6SC02	❒ 1		Jumper Wire (Orange, 8”)		6SCJ3A
❒ 3	3	3-Snap Wire		6SC03	❒ 2		Jumper Wire (Blue, 4”)		6SCJ4
❒ 1	4	4-Snap Wire		6SC04	❒ 1	M8	Programmable Fan		6SCM8
❒ 1	5	5-Snap Wire		6SC05	❒ 1	Q1	PNP Transistor		6SCQ1
❒ 1	B3	Battery Holder - uses three (3) 1.5V type “AA” (not Included)		6SCB3	❒ 1	Q2	NPN Transistor		6SCQ2
❒ 1	D1	Red Light Emitting Diode (LED)		6SCD1	❒ 1	S1	Slide Switch		6SCS1
❒ 1	D2	Green Light Emitting Diode (LED)		6SCD2	❒ 1	S2	Press Switch		6SCS2
❒ 1	D10	Red/Yellow Bicolor Light Emitting Diode (LED)		6SCD10	❒ 1	S8	Selector		6SCS8
❒ 1	DM	Disco Motor		6SCDM	❒ 1	SP2	Speaker		6SCSP2
❒ 1		Support Bar for Disco Covers		6SCDMSB	❒ 1	U2	Alarm IC		6SCU2
❒ 1		Disco Cover, Triangle		6SCDMCT	❒ 1	U29	LED Display and Microcontroller		6SCU29
❒ 1		Disco Cover, Hexagon		6SCDMCH					

You may order additional / replacement parts at our website: https://www.elenco.com/replacement-parts/

How to Use Snap Circuits®

Snap Circuits® uses building blocks with snaps to build the different electrical and electronic circuits in the projects. Each block has a function: there are switch blocks, light blocks, battery blocks, different length wire blocks, etc. These blocks are different colors and have numbers on them so that you can easily identify them. The blocks you will be using are shown as color symbols with level numbers next to them, allowing you to easily snap them together to form a circuit.

For Example:

This is the slide switch, it is green and has the marking (S1) 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 is blue and comes in different wire lengths.
This one has the number (2), (3), (4), or (5) on it depending on the length of the wire connection required.

There is also a 1-snap wire that is used as a spacer or for interconnection between different layers.

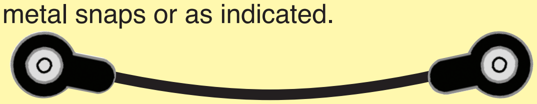
You need a power source to build each circuit. This is labeled (B3) and requires three (3) 1.5V “AA” batteries (not included).

When installing a battery, be sure the spring is compressed straight back, and not bent up, down, or to one side.

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 snap into. The base has rows labeled A-G and columns labeled 1-10.

Next to each part in every circuit drawing is a small number in black. This tells you which level the component is placed at. Place all parts on level 1 first, then all of the parts on level 2, then all of the parts on level 3, etc.

Some circuits use the jumper wires to make unusual connections. Just clip them to the metal snaps or as indicated.

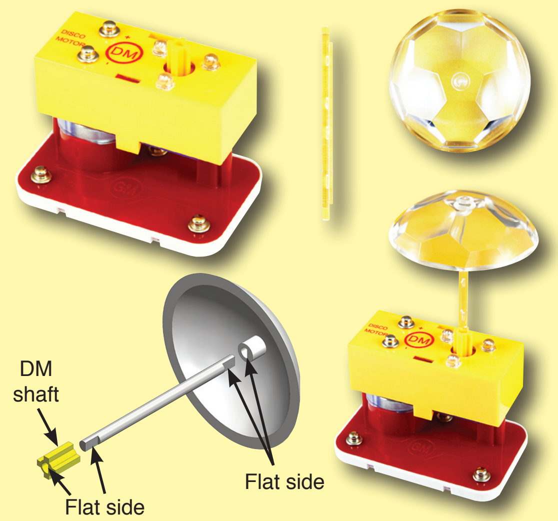


The programmable fan (M8) displays messages. You can change the messages displayed using project 15.

Most projects that use the LED MC (U29) require that you select a game using the selector (S8). This is explained in the projects, but here are a few notes:

- There are 21 games available.
- If you try to select a game number higher than 21 then the display will be reset to “00”.
- When the player wins, loses or finishes a game, the display will say “Go” again and the player can play the game again.
- The only way to select a different game is by turning off the circuit and then turning it back on so that “00” appears on the display again.

Some projects have you mount one of the disco covers on the disco motor (DM):



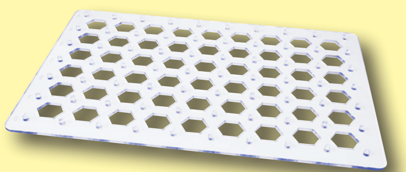
Note: While building the projects, be careful not to accidentally make a direct connection across the battery holder (a “short circuit”), as this may damage and/or quickly drain the batteries.

About Your Snap Circuits® Parts

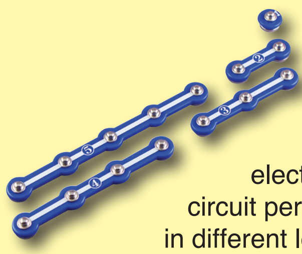
(Part designs are subject to change without notice).

BASE GRID

The **base grid** is a platform for mounting parts and wires. It functions like the printed circuit boards used in most electronic products, or like how the walls are used for mounting the electrical wiring in your home.



SNAP WIRES & JUMPER WIRES



The blue **snap wires** are wires used to connect components. They are used to transport electricity and do not affect circuit performance. They come in different lengths to allow orderly arrangement of connections on the base grid.

The **jumper wires** (red, black, orange, & blue) make flexible connections for times when using the snap wires would be difficult. They also are used to make connections off the base grid.

Wires transport electricity just like pipes are used to transport water. The colorful plastic coating protects them and prevents electricity from getting in or out.

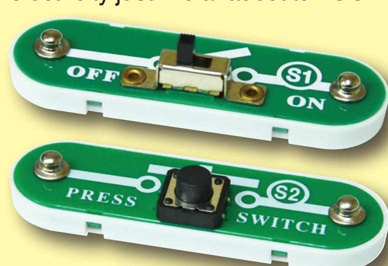
BATTERY HOLDER

The **batteries (B3)** produce an electrical voltage using a chemical reaction. This "voltage" can be thought of as electrical pressure, pushing electricity through a circuit just like a pump pushes water through pipes. This voltage is much lower and much safer than that used in your house wiring. Using more batteries increases the "pressure", therefore, more electricity flows.

Battery Holder (B3)

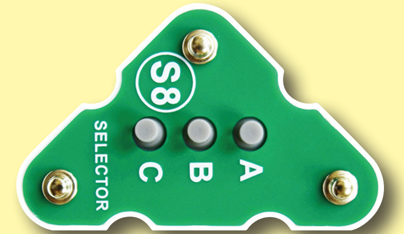
SLIDE & PRESS SWITCHES

The **slide & press switches (S1 & S2)** connect (pressed or "ON") or disconnect (not pressed or "OFF") the wires in a circuit. When ON they have no effect on circuit performance. Switches turn on electricity just like a faucet turns on water from a pipe.



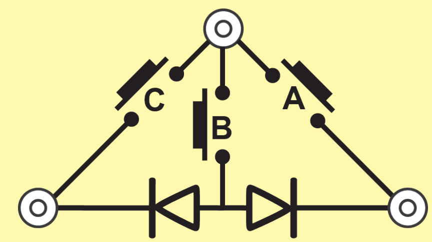
Slide & Press Switches (S1 & S2)

The **selector (S8)** is a more complex switch that will often be used with the LED MC (U29).



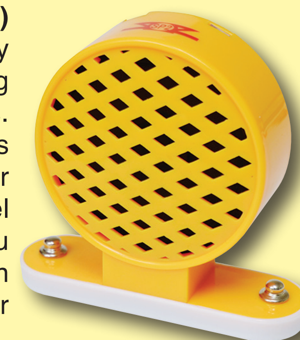
Selector (S8)

For people familiar with schematic diagrams, the schematic for the selector looks like this:



SPEAKER

The **speaker (SP2)** 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.



Speaker (SP2)

About Your Snap Circuits® Parts

TRANSISTORS

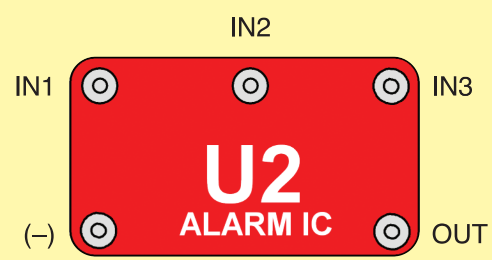
The **PNP & NPN transistors (Q1 & Q2)** are components that use a small electric current to control a large current, and are used in switching, amplifier, and buffering applications. They are easy to miniaturize, and are the main building blocks of integrated circuits including the microprocessor and memory circuits in computers.

PNP & NPN Transistors (Q1 & Q2)

ALARM IC

The **alarm IC (U2)** contains a specialized sound-generation integrated circuit (IC) and other supporting components (resistors, capacitors, and transistors) that are always needed with it. A schematic for it is available at https://www.elenco.com/faqs/.

Alarm IC (U2)



Connections:
IN1, IN2, IN3 - control inputs
(–) - power return to batteries
OUT - output connection

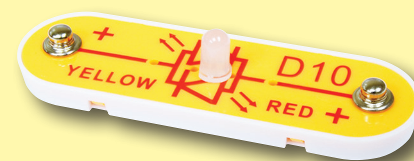
Connect control inputs to (+) power to make five alarm sounds, see project 59 for an example of proper connections.

LEDs

The **red & green LEDs (D1 & D2)** are light emitting diodes, 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 for red and yellow, about 2.0V for green, and about 3.0V for blue; brightness then increases. A high current will burn out an LED, so your Snap Circuits® LEDs have internal resistors to protect them. LEDs block electricity in the "reverse" direction.

Red & Green LEDs (D1 & D2)

The **red/yellow LED (D10)** is like the others but has red and yellow LEDs connected in opposite directions.



Red/Yellow LED (D10)

About Your Snap Circuits® Parts

MOTOR MODULES

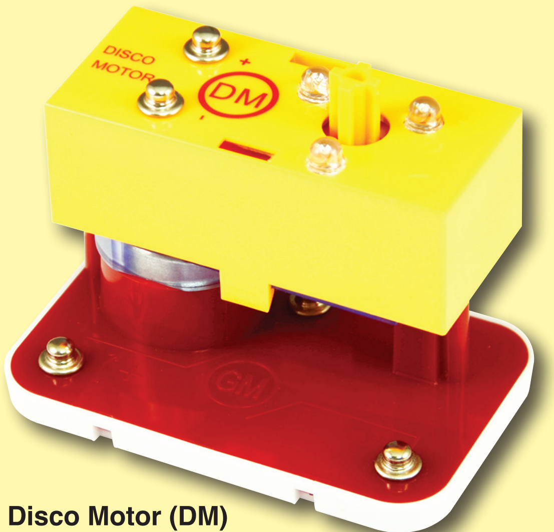
The **programmable fan (M8)** is a motor with an LED circuit. A motor converts electricity into mechanical motion, in the form of a spinning shaft. In the light motor electricity is transported through the motor shaft to power an LED circuit, with LEDs mounted on the fan blade. The motor spins in both directions, but the light circuit only works in one direction.

How does electricity turn the shaft in the motor? 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.

The LEDs in the fan blade are flashed in a pattern based on the programmed phrase, and synchronized with the motor speed. The flashes are precisely timed and are very brief, but your eyes can't react fast enough and the flashed pattern gives the illusion of words floating in space. You can change the messages displayed; see project 15. UP, MODE, and DOWN are controlled by connecting those snaps to (-) using switches or the selector (S8).

Programmable Fan (M8)

The **disco motor (DM)** is a motor with a gearbox attached to the shaft, and an LED module mounted on it. The gearbox makes its shaft spin slower but with more force than the shaft that is directly attached to the motor, so it can spin the disco covers. The LED module has red, green, and blue LEDs, connected in parallel.



Disco Motor (DM)

LED DISPLAY & MICROCONTROLLER

The LED MC module (U29) has a dual 7-segment LED display, a microcontroller, and supporting parts. The microcontroller is a mini computer which can be programmed to perform different tasks, including monitoring things and making things happen. It is pre-programmed for use with the games projects. See project 17 for how to select games on it.

LED MC outputs cannot control the motors in the disco motor (DM) or programmable fan (M8) directly, so an interface transistor must be used. LED MC outputs can control your speaker (SP2) and LEDs (D1, D2, D10, and the LEDs in the disco motor) directly.

The Snap Circuits® Arcade page on our website (https://shop.elenco.com/consumers/snap-circuits-arcade.html) has additional information about the LED MC, including a schematic diagram, the program it is running, links to software that will allow you to modify the program or write your own programs for it, and how to purchase a programming cable for it (which is only needed if you want to reprogram it). The microcontroller used is the PICAXE® 08M2, which has a special programming interface that makes it easy to use. You can also find information about the PICAXE® 08M2 from its manufacturer at www.picaxe.co.uk.

LED MC (U29)

LED MC (U29):

(+) - Power from batteries
(—) - Power return to batteries
S-IN - Takes input from the selector (S8)
S-OUT - An output, often connected to an LED
1 - An output, often connected to an LED
2 - An output, usually connected to the speaker
3 - Takes input from the selector (S8)
4 - An output, often connected to an LED
D1 - Used to shut off the right LED display
D2 - Used to shut off the left LED display

Summary of Games in the LED MC (U29)

Projects 62-69 can be found online

#	Name	Sample Project	Description	#	Name	Sample Project	Description
1	Arcade	4	Every few seconds it randomly turns on snaps 1, 4, & S-OUT, or plays a tune, or changes the LED display. Used in many projects.	12	Home Run Derby Game	26	A baseball "pitch" occurs where the red, yellow and then green LEDs light up in sequence but at different speeds. You try to press a button at the right moment to "hit" the pitch.
2	Fast Arcade	5	Same as Game 1 but changes faster.				
3	Faster Arcade	5	Same as Game 2 but changes even faster.	13	Baseball Game	27	Same as game 12, but has "outs".
4	Lucky Doubles	18	Rolls dice on the display, doubles plays a winning tune.	14	Memory Game (very easy)	64	A sequence of lights flash, and you try to repeat the order by pressing buttons.
5	Lucky Sixes, Unlucky Ones	62	Rolls dice on the display, 66 plays a winning tune and 11 plays a losing tune.	15	Memory Game (easy)	65	Same as game 14, but the sequence is faster.
6	Risk & Reward	63	Game based on rolling dice on the display.	16	Memory Game (medium)	66	Same as game 14, but the sequence is faster.
7	3 Second Hold	19	Timing game based on holding a button down for 3 seconds.	17	Memory Game (hard)	67	Same as game 14, but the sequence is faster.
8	5 Second Hold	20	Same as Game 7 but for 5 seconds.	18	Memory Game (progressive)	68	Same as game 14, but the sequence gets faster as you play it.
9	10 Second Hold	21	Same as Game 7 but for 10 seconds.	19	Twenty-One	28	A game based on the card game Blackjack.
10	20 Second Hold	22	Same as Game 7 but for 20 seconds.	20	Binary Coded Decimal	69	Uses LEDs to show how numbers 1-7 can be displayed in binary, which has only 2 states.
11	Numbers & Letters	24	Cycles through letters & numbers that can be shown on the display.	21	Changing Speed	25	Turns snaps 1 & 4 on/off at varying speed. Snaps 1 & 4 are always in opposite states. Used in many projects.

Introduction to Electricity

What is electricity? Nobody really knows. We only know how to produce it, understand its properties, and how to control it. Electricity is the movement of sub-atomic charged particles (called **electrons**) through a material due to electrical pressure across the material, such as from a battery.

Power sources, such as batteries, push electricity through a circuit, like a pump pushes water through pipes. Wires carry electricity, like pipes carry water. Devices like LEDs, motors, and speakers use the energy in electricity to do things. Switches and transistors control the flow of electricity like valves and faucets control water. Resistors limit the flow of electricity.

The electrical pressure exerted by a battery or other power source is called **voltage** and is measured in **volts** (V). Notice the "+" and "–" signs on the battery; these indicate which direction the battery will "pump" the electricity.

The **electric current** is a measure of how fast electricity is flowing in a wire, just as the water current describes how fast water is flowing in a pipe. It is expressed in **amperes** (A) or **milliamps** (mA, 1/1000 of an ampere).

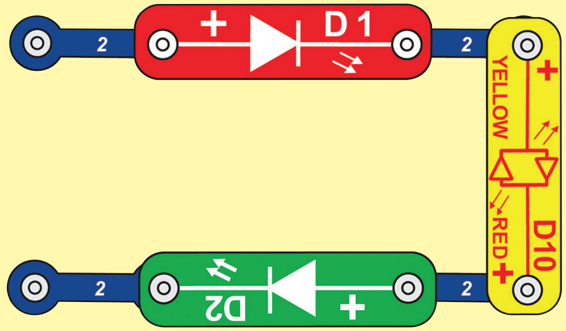
The "**power**" of electricity is a measure of how fast energy is moving through a wire. It is a combination of the voltage and current (Power = Voltage x Current). It is expressed in **watts** (W).

The **resistance** of a component or circuit represents how much it resists the electrical pressure (voltage) and limits the flow of electric current. The relationship is Voltage = Current x Resistance. When the resistance increases, less current flows. Resistance is measured in **ohms** (Ω), or **kilo ohms** (kΩ, 1000 ohms).

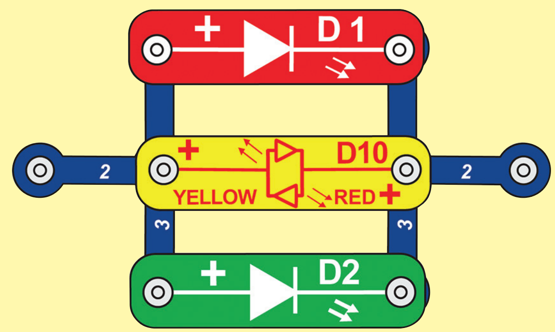
Nearly all of the electricity used in our world is produced at enormous generators driven by steam or water pressure. Wires are used to efficiently transport this energy to homes and businesses where it is used. Motors convert the electricity back into mechanical form to drive machinery and appliances. The most important aspect of electricity in our society is that it allows energy to be easily transported over distances.

Note that "distances" includes not just large distances but also tiny distances. Try to imagine a plumbing structure of the same complexity as the circuitry inside a portable radio - it would have to be large because we can't make water pipes so small. Electricity allows complex designs to be made very small.

There are two ways of arranging parts in a circuit, in series or in parallel. Here are examples:



Series Circuit



Parallel Circuit

Placing components in series increases the resistance; highest value dominates. Placing components in parallel decreases the resistance; lowest value dominates.

The parts within these series and parallel sub-circuits may be arranged in different ways without changing what the circuit does. Large circuits are made of combinations of smaller series and parallel circuits.

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 speaker, LED (which has an internal protection resistor), 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 ICs using configurations given in the projects, incorrectly doing so may damage them. Only connect the programmable fan (M8) using the configurations shown in the projects, otherwise you may damage it or unintentionally erase all messages. **Elenco® is not responsible for parts damaged due to incorrect wiring.**

Here are some important guidelines:

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

ALWAYS include at least one component that will limit the current through a circuit, such as the speaker, an LED (which has an internal protection resistor), ICs (which must be connected properly), or motor (disco motor or programmable fan).

ALWAYS use switches in conjunction with other components that will limit the current through them. Failure to do so will create a short circuit and/or damage those parts.

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

ALWAYS check your wiring before turning on a circuit.

ALWAYS connect ICs and the programmable fan (M8) using configurations given in the projects or as per the connection descriptions for the parts.

NEVER connect to an electrical outlet in your home in any way.

NEVER leave a circuit unattended when it is turned on.

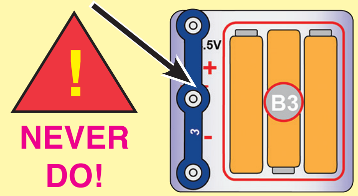
NEVER touch the programmable fan when it is spinning at high speed.

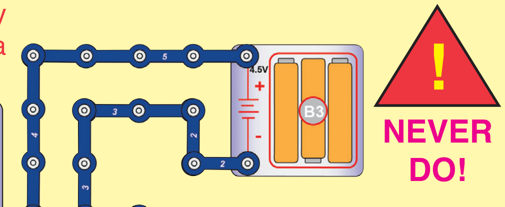
For all of the projects given in this book, the parts may be arranged in different ways without changing the circuit. For example, the order of parts connected in series or in parallel does not matter — what matters is how combinations of these sub-circuits are arranged together.

Warning to Snap Circuits® owners: Do not connect additional voltage sources from other sets, or you may damage your parts. Contact ELENCO® if you have questions or need guidance.

Examples of SHORT CIRCUITS - NEVER DO THESE!!!

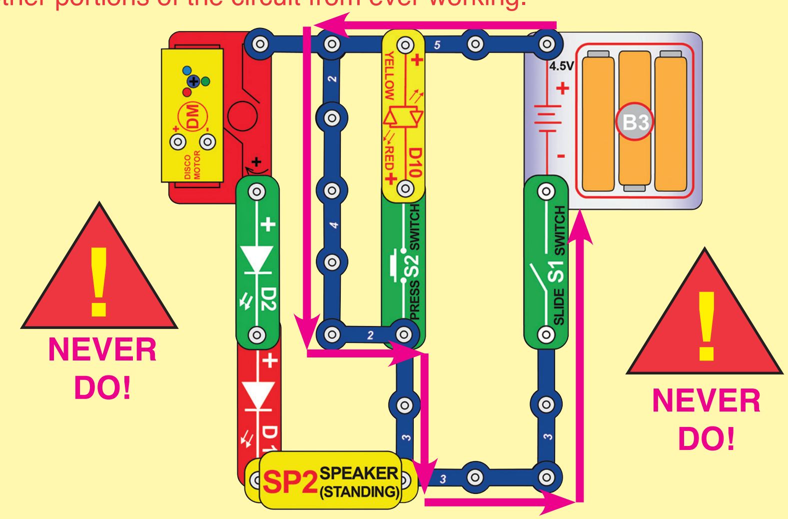
Placing a 3-snap wire directly across the batteries is a SHORT CIRCUIT.





This is also a SHORT CIRCUIT.

When the slide 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.



You are encouraged to tell us about new circuits you create. If they are unique, we will post them with your name and state on our website at **www.elenco.com/showcase**.
Send your suggestions (with photos) to **info@elenco.com**.

Elenco® provides a circuit designer so that you can make your own Snap Circuits® drawings. This Microsoft® Word document can be downloaded from **www.elenco.com/for-makers.**

WARNING: SHOCK HAZARD - Never connect Snap Circuits® to the electrical outlets in your home in any way!

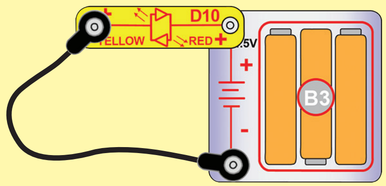
Advanced Troubleshooting (Adult supervision recommended)

Elenco® is not responsible for parts damaged due to incorrect wiring.

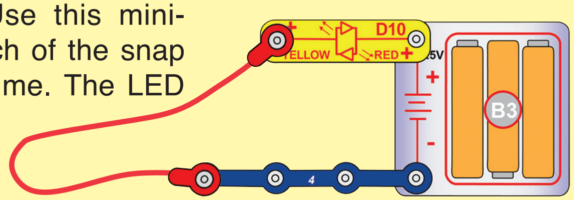
If you suspect you have damaged parts, you can follow this procedure to systematically determine which ones need replacing:

1. **Red LED (D1), green LED (D2), red/yellow LED (D10), speaker (SP2), and battery holder (B3):** Place batteries in holder. Place the red/yellow LED directly across the battery holder in both directions, it should light red or yellow depending on which side was positioned towards the battery "+" side. Do the same for the red and green LEDs, but be sure to position their "+" side towards the battery "+" side. "Tap" the speaker across the battery holder contacts, you should hear static as it touches. If none work, then replace your batteries and repeat, if still bad then the battery holder is damaged.

2. **Jumper wires:** Use this mini-circuit to test each jumper wire, the LED should light.



3. **Snap wires:** Use this mini-circuit to test each of the snap wires, one at a time. The LED should light.



4. **Slide switch (S1) and press switch (S2):** Build project 1; if the red LED (D1) doesn't light then the slide switch is bad. Replace the slide switch with the press switch to test it.

6. **Alarm IC (U2):** Build project 59; you should hear a siren. Variants 1, 2, 3, and 4 should change the sound, but the sound for variant 4 may be the same as one of the others.

7. **PNP transistor (Q1):** Use project 57 to test it.

8. **NPN transistor (Q2):** Use project 58 to test it.

9. **Selector (S8):** Use project 49 to test it.

10. **Disco motor (DM):** Build project 10. The shaft should spin, and red, green, and blue LEDs should light.

11. **Programmable fan (M8):** Connect it as shown in project 15. It should slowly cycle through 6 phrases (unless you erased all messages without programming in new ones). You should be able to change the messages displayed using the instructions in project 15.

    Warning: If you erased all messages, then the part will not display any messages until you program in new ones, as per the instructions in project 15.

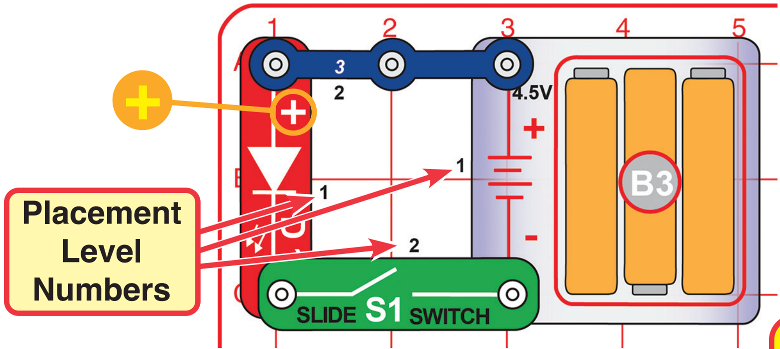
    Note: After several hours of continuous use, the fan message may be erratic, not clear, or even have no display. Turn off for 5 minutes, and it will be back to normal again.

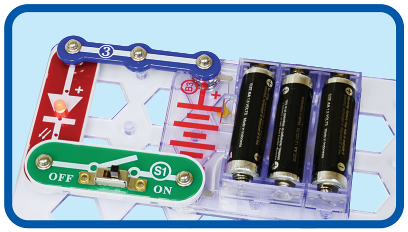
12. **LED-MC (U29, the LED display & microcontroller):** Use project 52 to test it.

ELENCO®
150 Carpenter Avenue
Wheeling, IL 60090 U.S.A.
Phone: (847) 541-3800
Fax: (847) 520-0085
e-mail: help@elenco.com
Website: www.elenco.com

**You may order additional / replacement parts at:
https://www.elenco.com/replacement-parts/**

☐ Project 1 Red Light



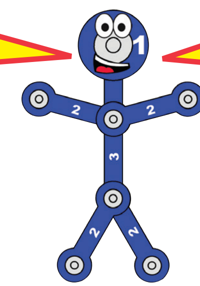


Snap Circuits® uses electronic blocks that snap onto a clear plastic grid to build different circuits. These blocks have different colors and numbers on them so you can easily identify them.

Build the circuit shown on the left by placing all the parts with a black **1** next to them on the board first. Then, assemble parts marked with a **2**. Install three (3) "AA" batteries (not included) into the battery holder (B3) if you have not done so already.

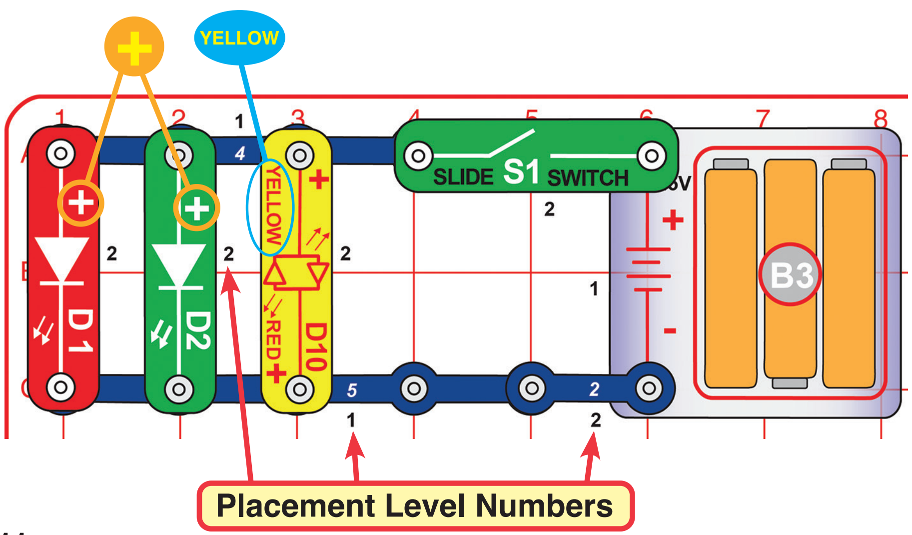
Turn on the slide switch (S1), and the red LED (D1) lights.

Snappy says when you turn on the slide switch, electricity flows from the batteries, through the red LED and back to the battery through the switch. If the switch is off, the flow of electricity is blocked, and the red LED won't light.



NOTE: this circuit (and many others in this book) have an LED being used without a resistor or other component to limit the electric current through it. Normally this could damage an LED but your Snap Circuits® LEDs include internal protection resistors, and will not be damaged. Be careful if you later use other electrical sets with unprotected LEDs.

☐ Project 2 Lights

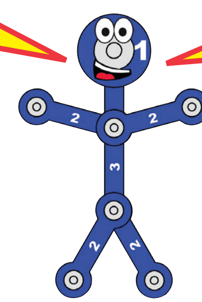


Build the circuit shown here and turn on the slide switch (S1). The red, green, and yellow LEDs (D1, D2, & D10) light.

☐ Project 3 Reverse Lights

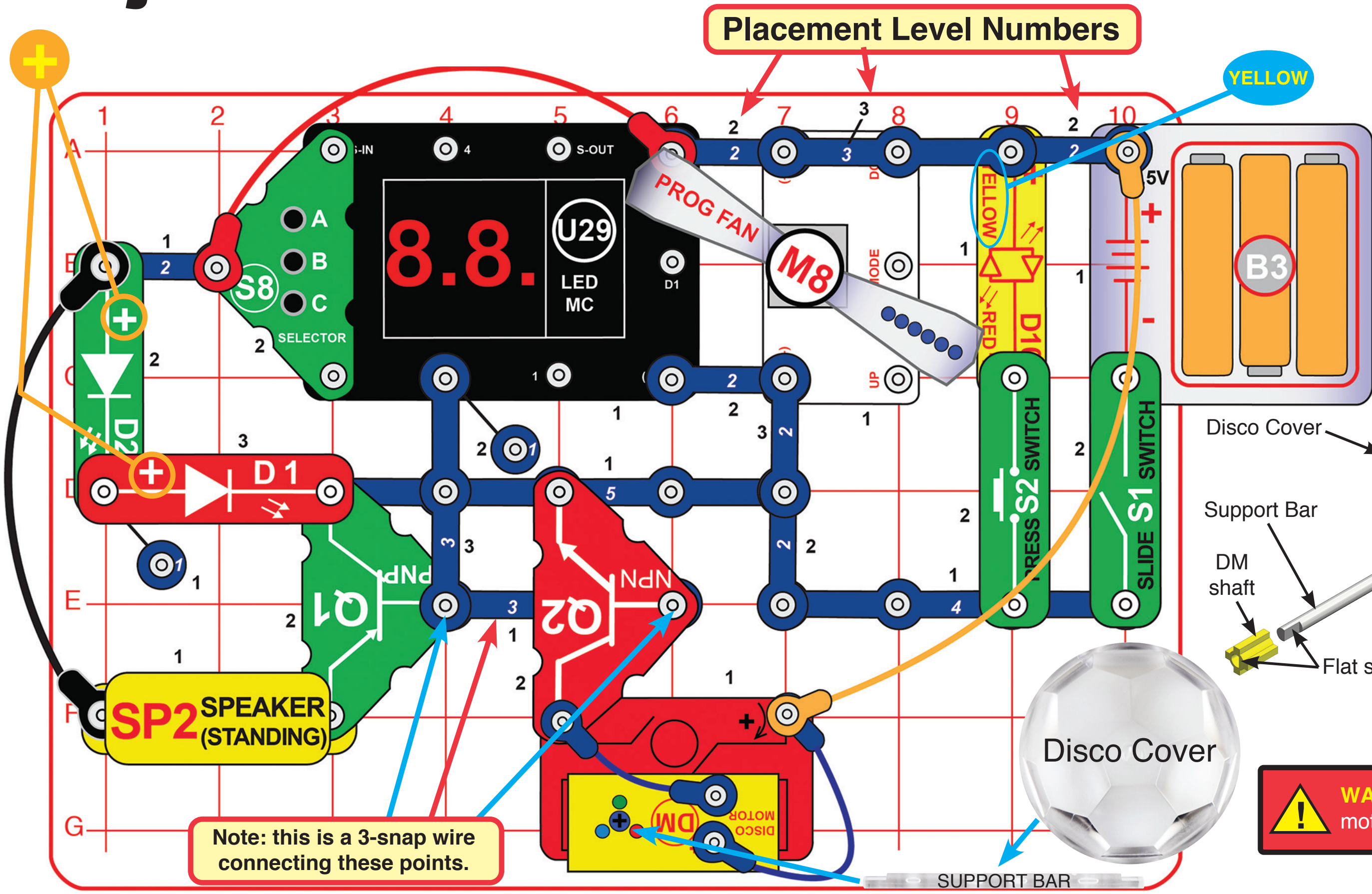
Try reversing the position of the slide switch (S1), 2-snap wire, and each of the LEDs (D1, D2, & D10), separately.

LEDs are light emitting diodes, which convert electrical energy into light. The color of the light depends on the characteristics of the material used in them.

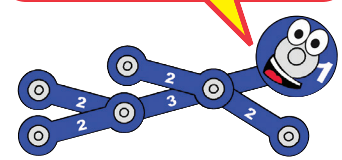


Reversing the slide switch and 2-snap wire has no effect. LEDs only work in one direction, so the red & green LEDs do not work in reverse, but the yellow LED (D10) is a bi-color LED, with separate red & yellow LEDs in opposite directions, as shown in its symbol.

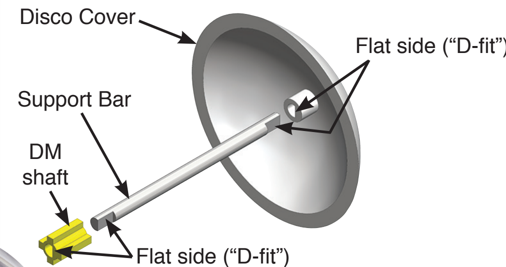
☐ Project 4 Arcade



This circuit is shown on the front of the Snap Circuits® Arcade box. Use that picture to help in building it.



Disco Cover Assembly



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

Build the circuit shown above by placing all the parts with a black **1** next to them on the board first. Then, place parts marked with a **2**, and then parts with a **3**. Connect the jumper wires (red, black, orange, and blue) as shown in the drawing. Install three (3) “AA” batteries (not included) into the battery holder (B3) if you have not done so already. Place the disco cover support bar on the disco motor (DM) shaft, and place one of the disco covers on it; note that both sides of the support bar are “D-fit”.

Turn on the slide switch (S1). The programmable fan (M8) spins, the red & green LEDs (D1 & D2) light, and the display on the LED-MC (U29) displays “00”. Push the press switch (S2) to light the yellow LED (D10).

Make the display on the LED-MC show “01” by pressing the A button on the selector (S8) to increase the ones digit on the display. Press the B button on the selector to select the game (now game 1), and a mini arcade show begins.

Every few seconds the speaker plays a tune while the disco motor spins & lights, and/or the U29 LED display shows a random pattern.

If you want to change games then turn off S1 to reset the circuit. You can make the sound louder by removing the disco motor and NPN transistor (Q2).

☐ Project 5 Fast Arcade

Use the project 4 circuit but select game 2 or 3 (instead of game 1). Some parts of the arcade show happen faster now, such as the changing random pattern on the U29 LED display.

☐ Project 6 New Pattern Arcade

Use the project 4 circuit (with game 1, 2, or 3), but replace the disco cover with the other one that is included. Place the circuit in a dark room for best effects.

Project 7

Arcade Dice

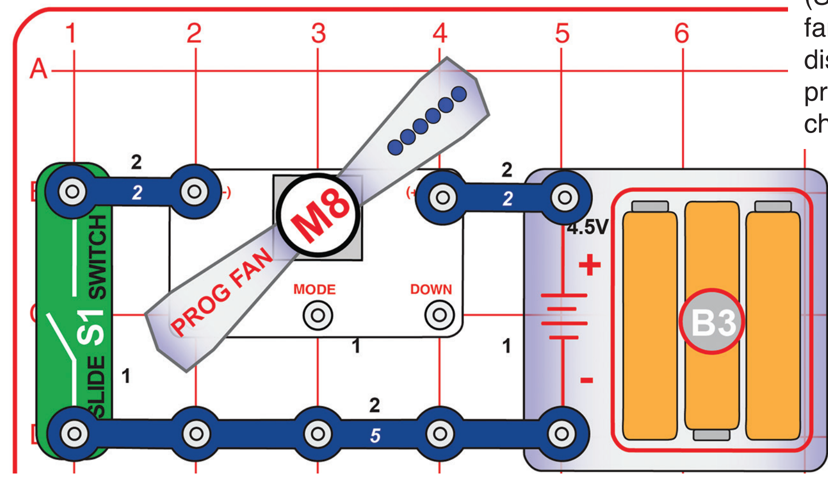
Use the project 4 circuit but select game 4 (instead of game 1), then press button B. When the display shows "Go" press button B to start the game.

- Hold down button C for a few seconds and then release it.
- Two random digits from 1 to 6 will be shown on the display (like rolling 2 dice).
- If the player rolls "doubles" (i.e. the two digits are the same), a winning song will be played, the disco motor (DM) spins & lights, and the game starts over ("Go" is shown on the display again).
- If the player does not roll "doubles", then they can keep trying by pressing button C again.

Project 8

Word Fan

Turn on the slide switch (S1). The programmable fan (M8) spins and slowly displays messages. See project 15 if you want to change the messages.

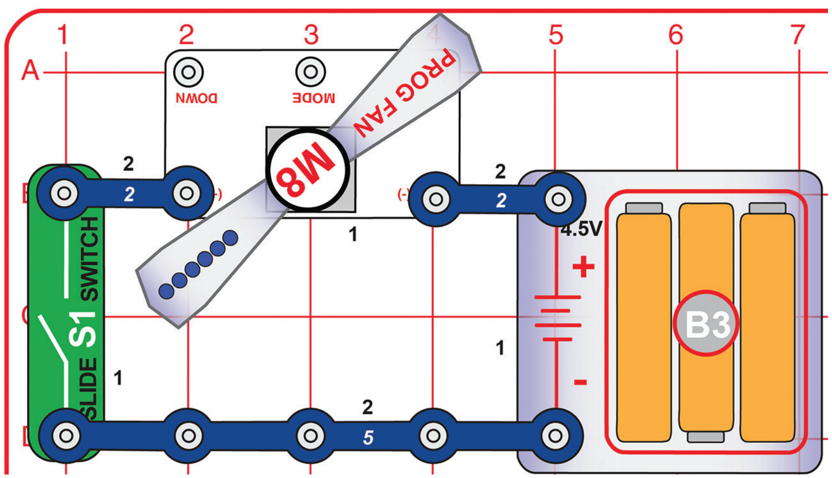


WARNING: Moving parts. Do not touch the fan or motor during operation. Do not lean over the motor.

Project 9

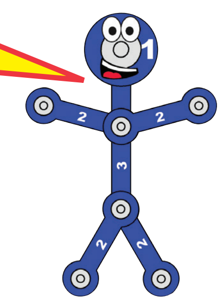
Just the Fan

Turn on the slide switch (S1). The programmable fan (M8) just spins, without displaying any messages.



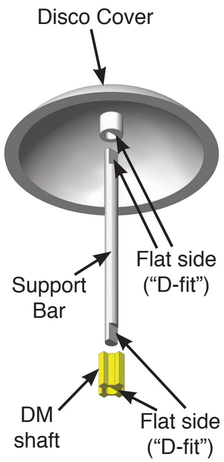
WARNING: Moving parts. Do not touch the fan or motor during operation. Do not lean over the motor.

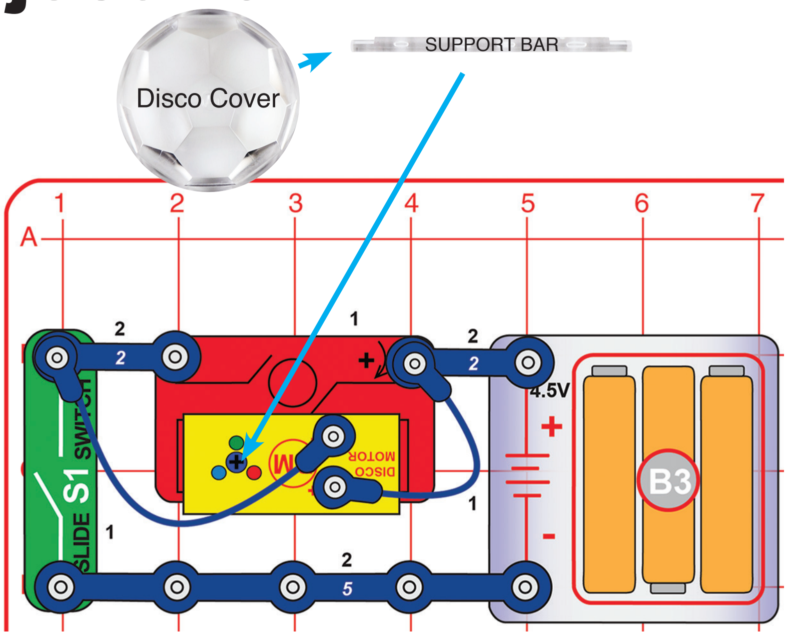
This circuit is like the Word Fan circuit except the voltage to the programmable fan is reversed. The motor works but spins the fan in the opposite direction. The lights on the fan are off, because the microcircuit controlling them doesn't function when the voltage to it is reversed.



☐ Project 10 Disco Ball

Disco Cover Assembly





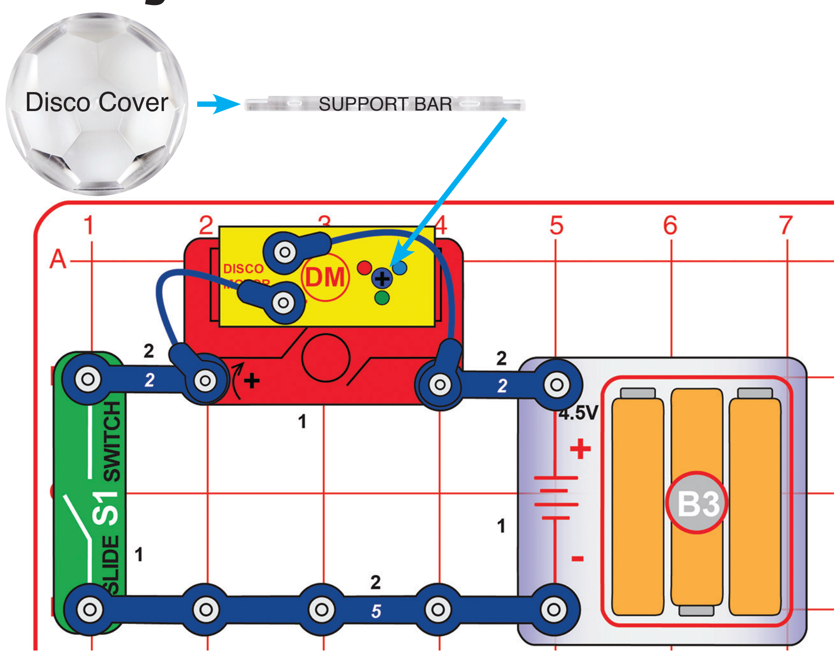
Build the circuit shown. Connect the two blue jumper wires to the snaps on top of the disco motor (DM). Install three (3) "AA" batteries (not included) into the battery holder (B3) if you have not done so already. Place one of the disco covers on the disco motor shaft. Note that both sides of the support bar are "D-fit".

Turn on the slide switch (S1) and watch the show. Place in a dark room for best effects.

☐ Project 11 Disco Pattern

Use the preceding circuit, but remove the 2-snap wire between the slide switch (S1) and disco motor (DM); connect the end of the blue jumper wire directly to S1. Place in a dark room and look at the pattern on the ceiling. The disco cover does not spin.

☐ Project 12 Reverse Disco Ball



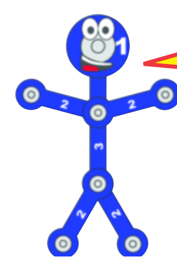
This circuit is like project 10, but the disco cover spins in the opposite direction.

☐ Project 13 Disco Ball with New Pattern

Use any of the three preceding circuits, but replace the disco cover with the other one included in this set. Compare the patterns on the ceiling. Place in a dark room for best effects.

☐ Project 14 Just the Ball

Use any of the project 10, 12, or 13 circuits, but remove the two blue jumper wires. Now the lights do not work, so you just have a spinning disco cover.



In this circuit we reversed the battery connections to the disco motor (DM), so its shaft spins in the opposite direction now. The connections to the LEDs in the disco motor were not changed.

☐ Project 15 Programmable Light Fan

Note that there is a 3-snap wire under the selector (S8) that is partially hidden. Turn on the slide switch (S1). The programmable fan (M8) spins and slowly displays messages.

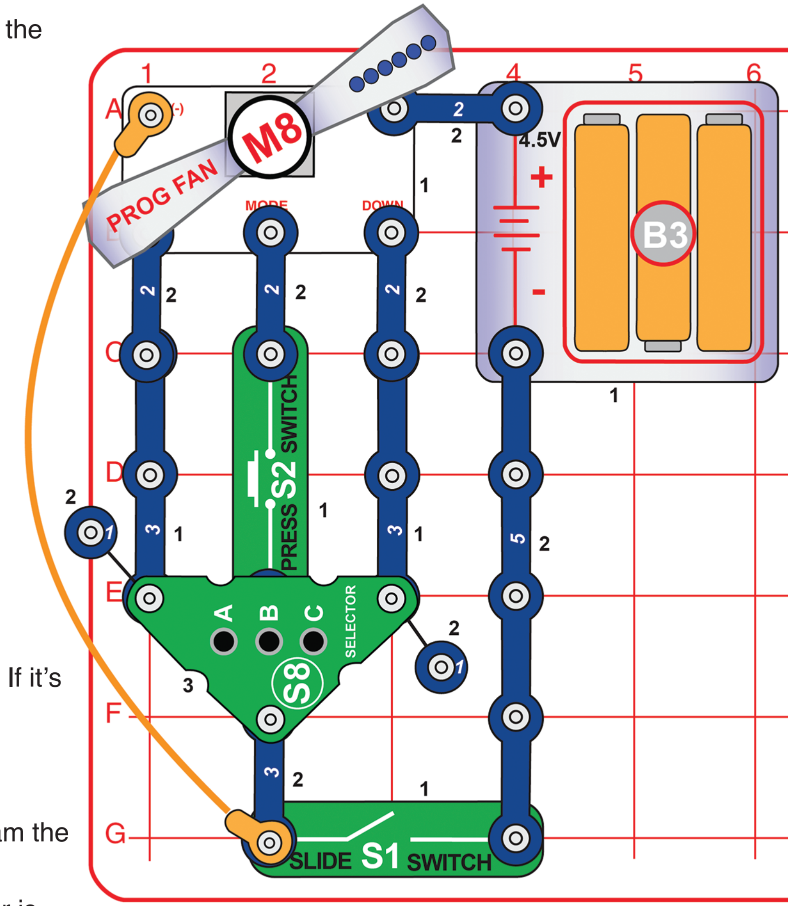
Button	Controls	Description
A (on S8)	UP	Press & hold to **ERASE ALL MESSAGES**.
S2	MODE	Press & hold to enter PROGRAM MODE.
C (on S8)	DOWN	Press to move to the next message.

Button Functions in NORMAL MODE:
Button B (on S8) does nothing.
Erased messages can only be restored by re-entering them.

Button Functions in PROGRAM MODE:

Button	Controls	Description
A (on S8)	UP	Press to find the letter you want upwards. Press & hold to find quickly.
S2	MODE	Press to move to the next space. Press & hold to save ready letters or exit.
C (on S8)	DOWN	Press to find the letter you want downward. Press & hold to find quickly.

Button B (on S8) does nothing.



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

Operation:

1. Use the slide switch (S1) to turn it on. The fan will display the message set last time. If it's the first time, the fan will display the initial set (these are subject to change):

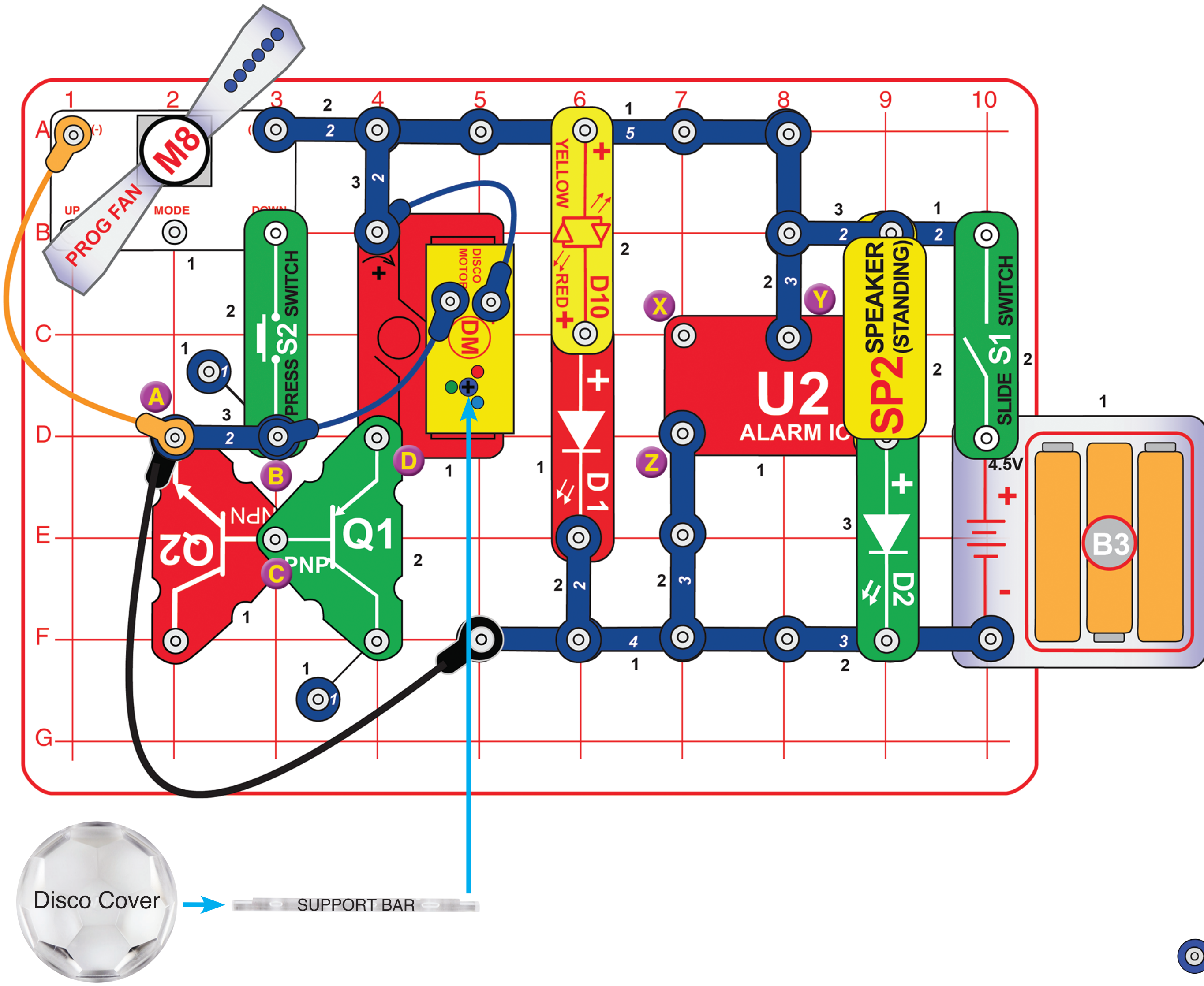
1 SNAP CIRCUITS	2 ARCADE	3 BY ELENCO
4 LEARN BY DOING	5 FUN ELECTRONICS	6 YOUR PHRASE

2. To program the messages, press the "DOWN" button to select the phase and program the message as per the following steps:
   - Press & hold the "MODE" button to enter the "PROGRAM MODE". When the cursor is blinking, you can edit the first letter.
   - Press the "UP" or "DOWN" button to find the letter you want. Hold the button down to change letters faster.
   - Each phase can contain 15 letters. Press the "MODE" button to edit the next space.
   - Press & hold the "MODE" button to save the message and exit from editing mode.
3. If you want to edit another message, press the "DOWN" button and select the phase and repeat the above steps.
4. In NORMAL MODE, press & hold the "UP" button to ERASE ALL MESSAGES. Turn off and on, it will not display any message until you program one.
5. Letters and marks available:
   A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
   ♥ ★ , : !? . () @ ○ # + — × ÷ = ≠ $ ¥ € ₵ ₤ £ & 1 2 3 4 5 6 7 8 9 0 ■   Remark: "■" means space.

Note: After several hours of continuous use, the fan message may be erratic, not clear, or even have no display. Turn off for 5 minutes, and it will be back to normal.

☐ Project 16

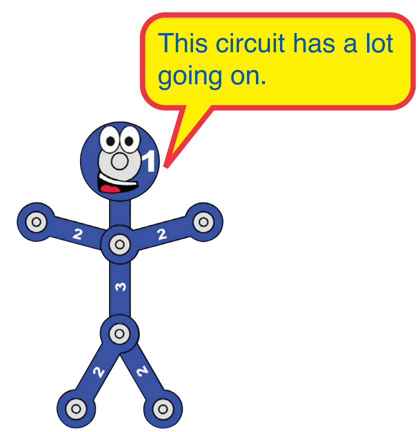
Busy Circuit



Place one of the disco covers on the disco motor (DM) shaft. Note that both sides of the support bar are "D-fit". Turn on the slide switch (S1). An alarm sounds, the disco motor spins & lights, the LEDs (D1, D2, & D10) light, and the programmable fan spins and displays a message. Push the press switch (S2) several times to display different messages. Place the circuit in a dimly lit room for best effects.

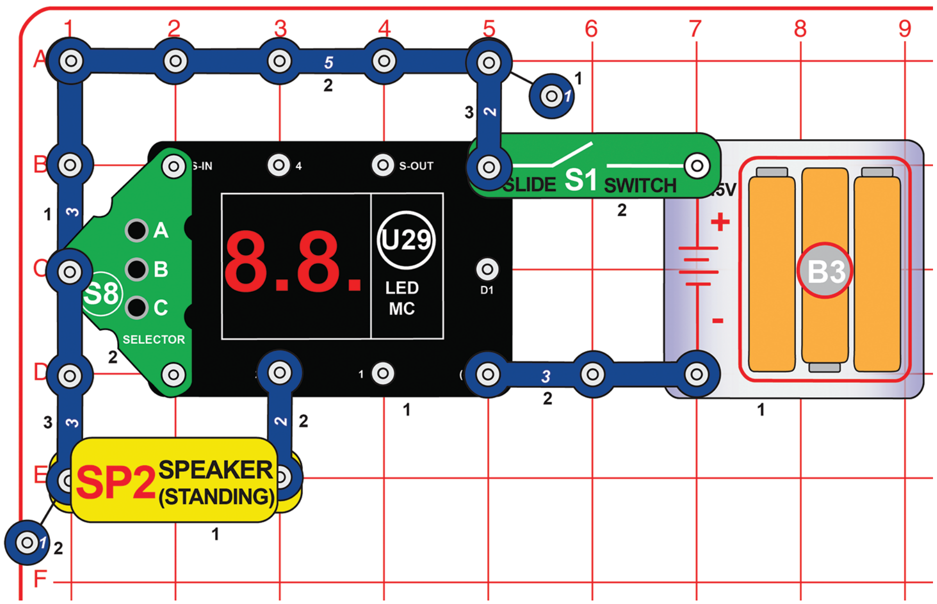
Variants:

1. Change the alarm sound by connecting the red jumper wire across points X & Y, or X & Z.
2. Make the disco cover spin faster by shifting the 2-snap wire across points A & B to points B & C or points B & D. The blue, orange, & black jumper wires must stay connected to the 2-snap wire.



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

☐ Project 17



Games Selector

This simple circuit is intended as an introduction for how to select games on the LED-MC (U29).

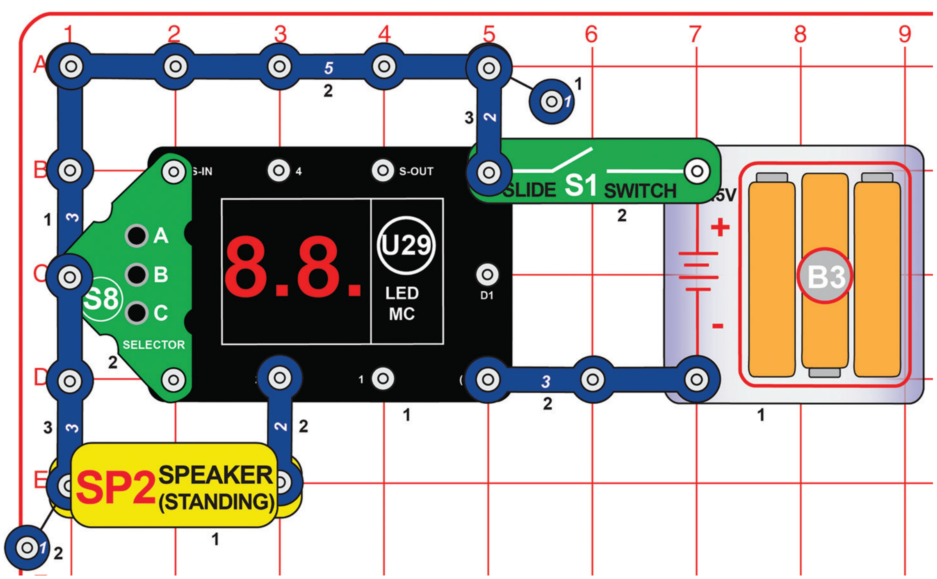
Turn on the slide switch (S1); the display on the LED-MC shows "00". Press the A button on the selector (S8) to increase the ones digit on the display, and press the C button on the selector to increase the tens digit on the display. When the display shows the game number you want, press the B button on the selector to select it; you hear a beep and the display shows "Go" for most games.

Notes:

- There are 21 games available, but most cannot be played with this simple circuit, or would only have limited features.
- If you try to select a game number higher than 21, then the display will be reset to "00".
- When the player wins, loses, or finishes a game, the display will say "Go" again and the player can play the game again.
- The only way to select a different game is by turning off the circuit and then turning it back on so that "00" appears on the display again.

Now you are ready to play games!

☐ Project 18



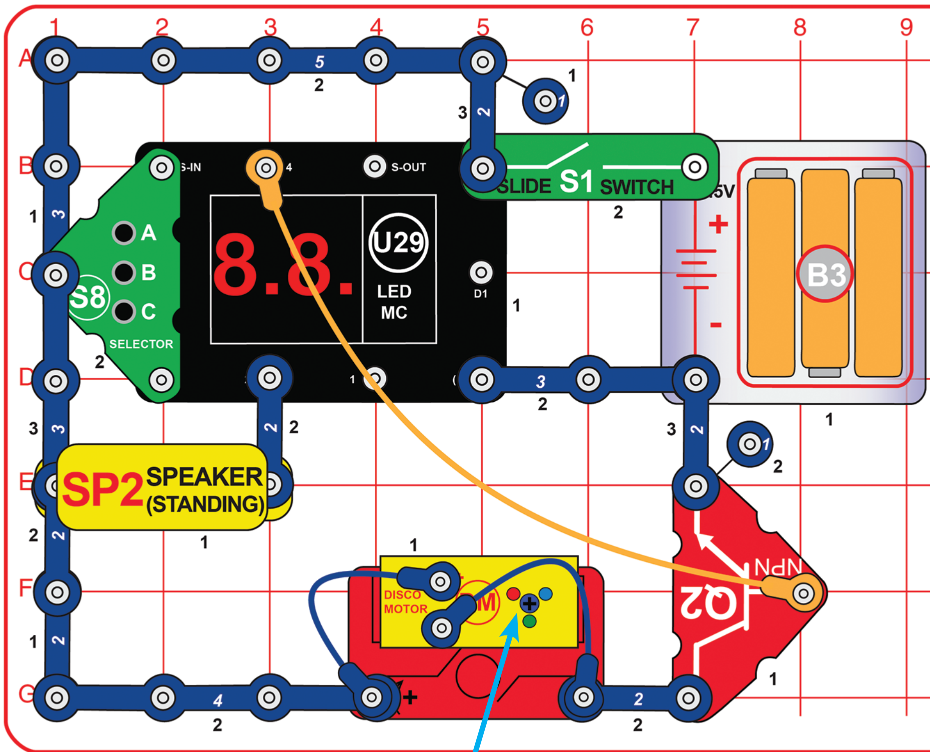
Lucky Doubles

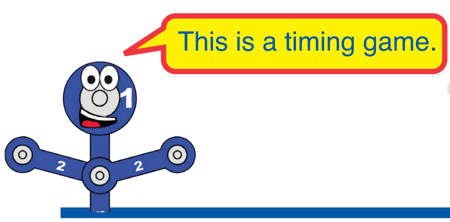
Use this circuit but select Game 4 using the game selection procedure in project 17.

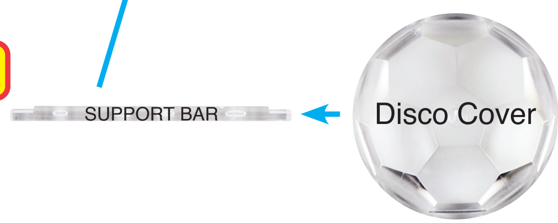
Once the player selects Game 4 and sees "Go" on the display, then:

- Hold down button C for a few seconds and then release it.
- Two random digits from 1 to 6 will be shown on the display (like rolling 2 dice).
- If the player rolls "doubles" (i.e. the two digits are the same), a winning song will be played and the game starts over ("Go" is shown on the display again).
- If the player does not roll "doubles", then they can keep trying by pressing button C again.
- Have multiple people play to see who is the first to roll "doubles", or who can roll the most "doubles" in 10 tries.

☐ Project 19 — 3 Second Hold







Use this circuit but select Game 7 using the game selection procedure in project 17.

Once the player selects Game 7 and sees “Go” on the display, then:

- Try to hold down button C for exactly 3 seconds, then release button C.
- The display will show the number of seconds the player held button C down.
- If the player held button C down for 3 seconds, a winning song will play while the disco cover spins, and the game starts over (“Go” is displayed to play the game again). The disco cover will stop spinning when you press C again.
- If the player held button C down for less than 3 seconds or more than 3 seconds, a losing song will play and the game starts over (“Go” is displayed to play the game again).
- Play with multiple people to see who is the first to hold the button for exactly 3 seconds.

☐ Project 20 5 Second Hold

Use the same circuit and instructions, but select game 8, and try to hold down button C for 5 seconds.

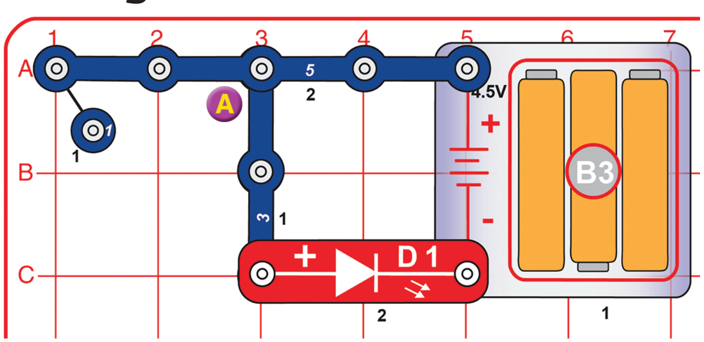
☐ Project 21 10 Second Hold

Use the same circuit and instructions, but select game 9, and try to hold down button C for 10 seconds.

☐ Project 22 20 Second Hold

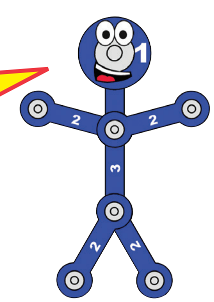
Use the same circuit and instructions, but select game 10, and try to hold down button C for 20 seconds.

☐ Project 23 — Pressure Circuit



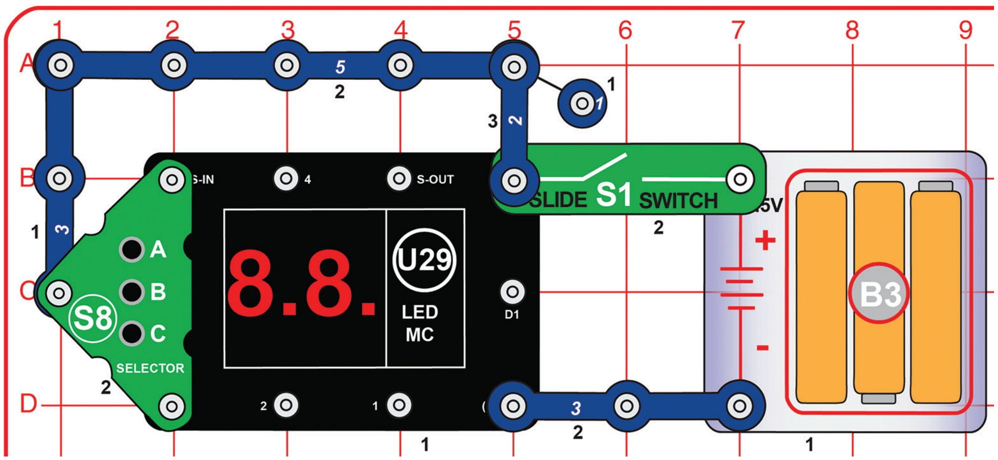
Build the circuit as shown, then push on point A with your finger to complete the circuit.

It may appear that the 3-snap and 5-snap wires are touching, but they do not actually touch unless you push them together.



☐ Project 24

Numbers & Letters



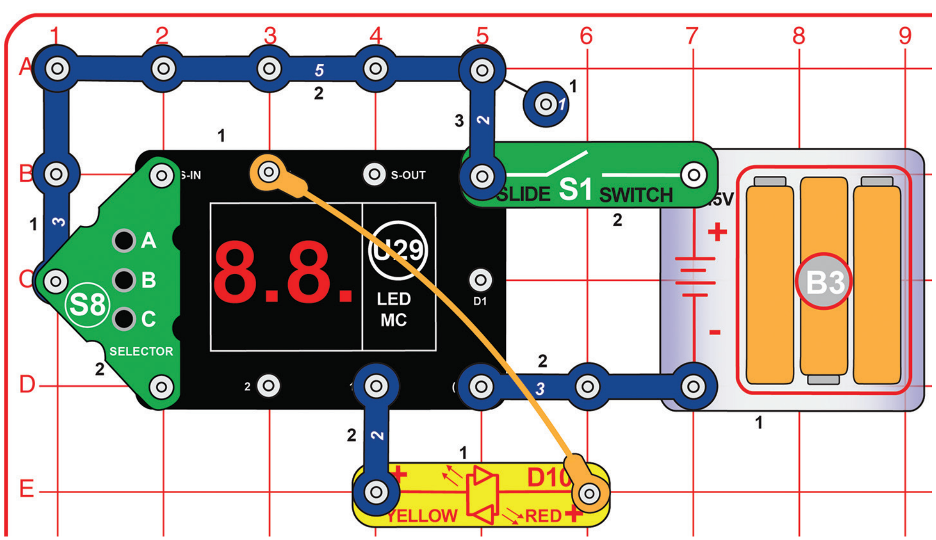
Use this circuit but select Game 11 using the game selection procedure in project 17.

Once the player selects Game 11 and sees "Go" on the display, then:

- Press button C, and a 0 is shown on the display.
- Press button C again, and a 1 is shown on the display.
- Continuing to press button C will cycle through the typical numbers and letters that can be shown on the display.
- Not all the letters in the alphabet can be easily created on the display since they are only 7-segment displays…can you identify which letters are missing? One letter is skipped because a certain number looks the same…can you identify what letter/number this is?

☐ Project 25

Bi-Color Light

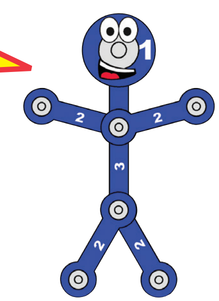


Turn on the slide switch (S1); the display on the LED-MC (U29) shows "00". Press the A button on the selector (S8) to increase the ones digit on the display, and press the C button on the selector to increase the tens digit on the display. When the display shows "21", press the B button on the selector to start.

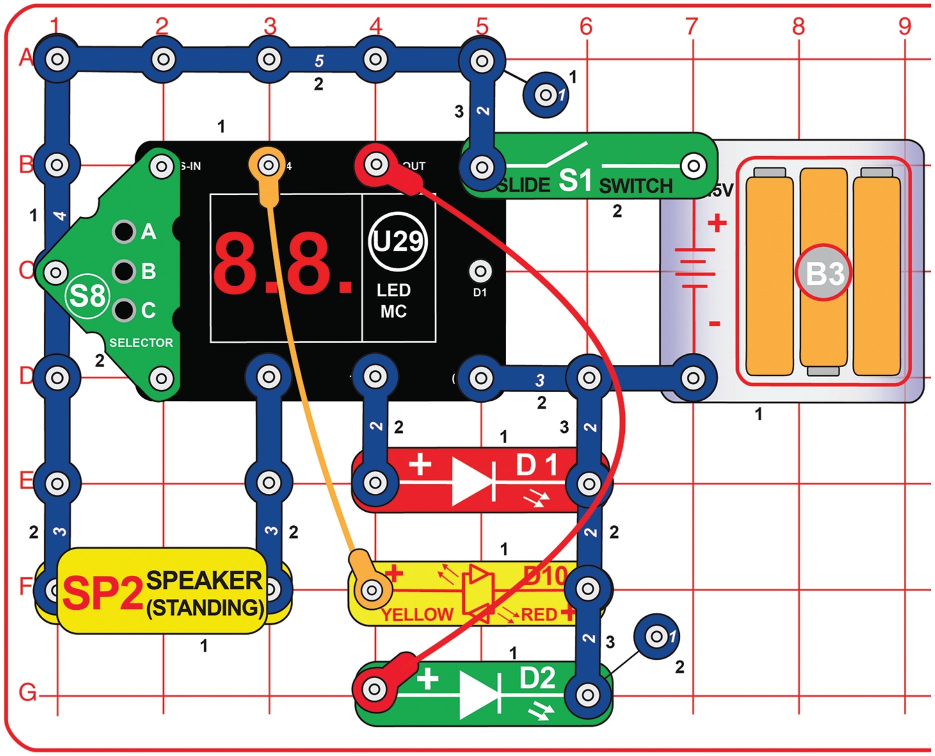
The red/yellow LED (D10) will be on continuously, but changing colors at varying speed.

The red/yellow LED (D10) is a bi-color LED, which means it has two LEDs (red & yellow) inside, connected in opposite directions.

Notice that when D10 is changing colors quickly, its red and yellow colors tend to blend into orange.



Project 26 — Home Run Derby Game

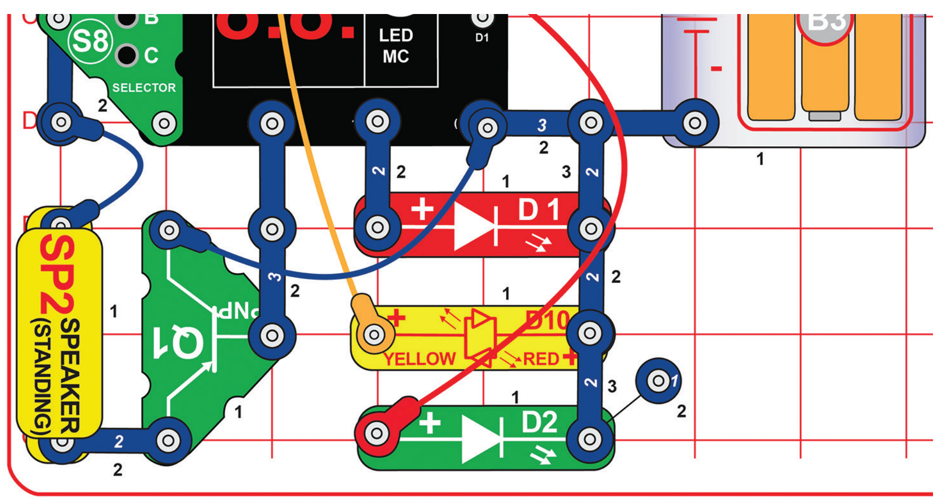


Use this circuit but select Game 12 using the game selection procedure in project 17.

Once the player selects Game 12 and sees "Go" on the display, then:

- Press & release button B, and the derby will begin.
- A baseball pitch occurs where the red, yellow, and then green LEDs light up in sequence but at different speeds.
- The player needs to press button B at just the right time (after the green LED is displayed) to hit a home run.
- If the player presses button B at just the right time, a winning song will play, the crowd will cheer, and the display will increase to indicate the number of home runs the player has. The next pitch will come automatically.
- If the player presses button B at the wrong time (either too late or too early), then a losing song will play and the display will flash the number of outs (or misses) the player has for a few seconds, and then go back to displaying the number of home runs the player has so far. The next pitch will come automatically.
- Once the player gets 10 outs, a losing song will play, the total number of home runs the player got is displayed for a few seconds, then the game starts over ("Go" is displayed until the next player presses button B).
- See who can get the most home runs before getting 10 outs!

Alternate connections for speaker (a little louder):

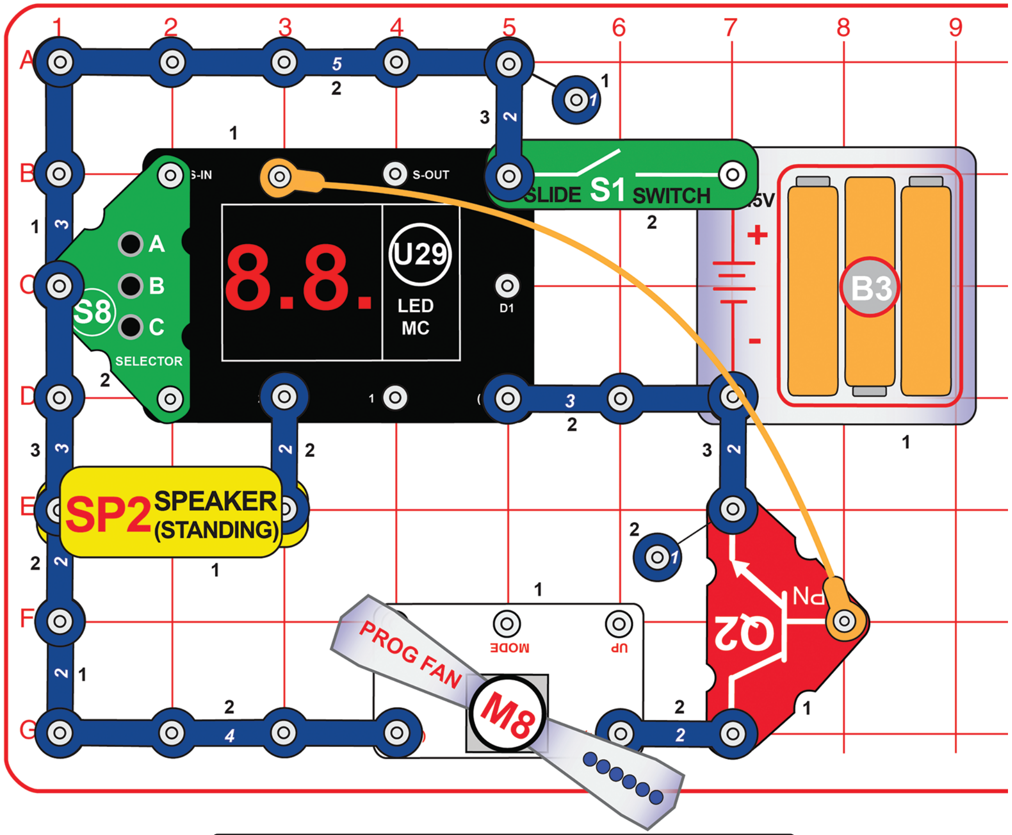


Project 27 Baseball Game

Use the same circuit and instructions, but select game 13, and try to hold down button C for 5 seconds. The game plays the same way except that each player gets 3 outs and then the game goes to the next inning.

- Once the player gets 3 outs, a losing song will play, the total number of home runs the player got in the inning is displayed for a few seconds, then the game starts over to go to the next inning ("Go" is displayed until the next player presses button B).
- Write down your scores after each inning and play a 9 inning game to see who scores the most runs!

☐ Project 28 Twenty-One



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

Use this circuit and select Game 19 using the game selection procedure in project 17.

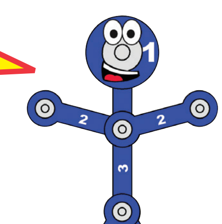
Once the player selects Game 19 and sees “Go” on the display, then:

- Press button C to get a first playing card (all jacks, queens, and kings are displayed as a 10). An Ace is displayed as an 11.
- The player then has the option to either:
  - Press A to Stand – a winning or losing song will then play depending on what the computer player gets:
    - If the computer player “busts” (i.e. goes over 21), then a winning song will play and the display will flash “Co” and then 22 indicating that the computer player went over 21. Then the game starts over by displaying a new card.
    - If the computer player has more points than the player, but not greater than 21, then a losing song will be played and the display will flash “Co” and the total points the computer player had. Then the game starts over by displaying a new card.
    - If the computer player has equal or less points than the player, then a winning song will be played and the display will flash “Co” and the total points the computer player had. Then the game starts over by displaying a new card.

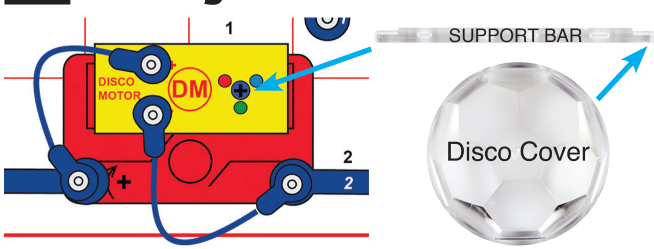
  OR

  - Press C to Hit – Another card will be drawn and the value will be added to the previous card(s) value, and then:
    - If the player “busts” (i.e. goes over 21), then a losing song will play and the display will show the total value of all cards for a few seconds. Then the game starts over by displaying a new card.
    - If the total value of all player cards is still 21 or less, then the player must decide whether to Stand (press A) or take another Hit (press C again).
    - Note that Aces are treated as 11 points, unless the total value of the cards exceeds 21, in which case Aces are treated as 1 point. Sometimes you may see that your total reduced after you take a Hit, which means you had an Ace that was being treated as 11, but now is treated as a 1.

This game is based on the card game “Blackjack”. You can use project 15 to program a Blackjack-related phrase into the programable fan (M8).



☐ Project 29 Disco Twenty-One

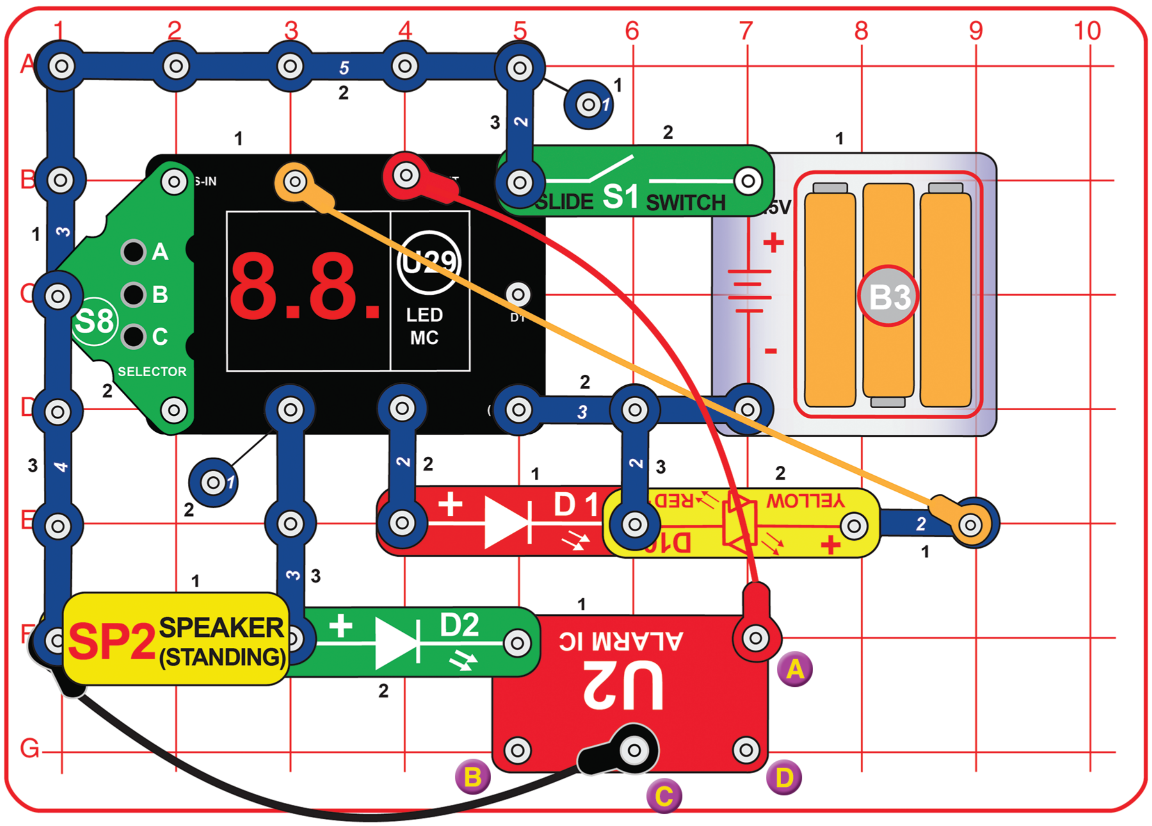


In the preceding circuit you can replace the programmable fan (M8) with the disco motor (DM), as shown here.

☐ Project 30 Siren Arcade

Turn on the slide switch (S1); the display on the LED-MC (U29) shows “00” and you hear a siren. Press the A button on the selector (S8) once to make the display show “01”, then press the B button on the selector to start.

Every few seconds one or more of the following will happen, randomly changing: the red LED (D1) lights, the yellow LED (D10) lights, the speaker plays a tune, the speaker plays a siren, the green LED (D2) lights, and the U29 LED display shows a random pattern.



☐ Project 31 Siren Arcade (II)

Use the preceding circuit (no need to reset the LED-MC), but add a connection between the points marked B & C using a blue jumper wire. The sound is different now.

☐ Project 32 Siren Arcade (III)

Use the preceding circuit, but remove the connection between B & C, and add a connection between C & D. The sound is different now.

☐ Project 33 Siren Arcade (IV)

Use the preceding circuit, but remove the connection between C & D, and add a connection between A & D. The sound is different now.

☐ Project 34 Siren Arcade (V)

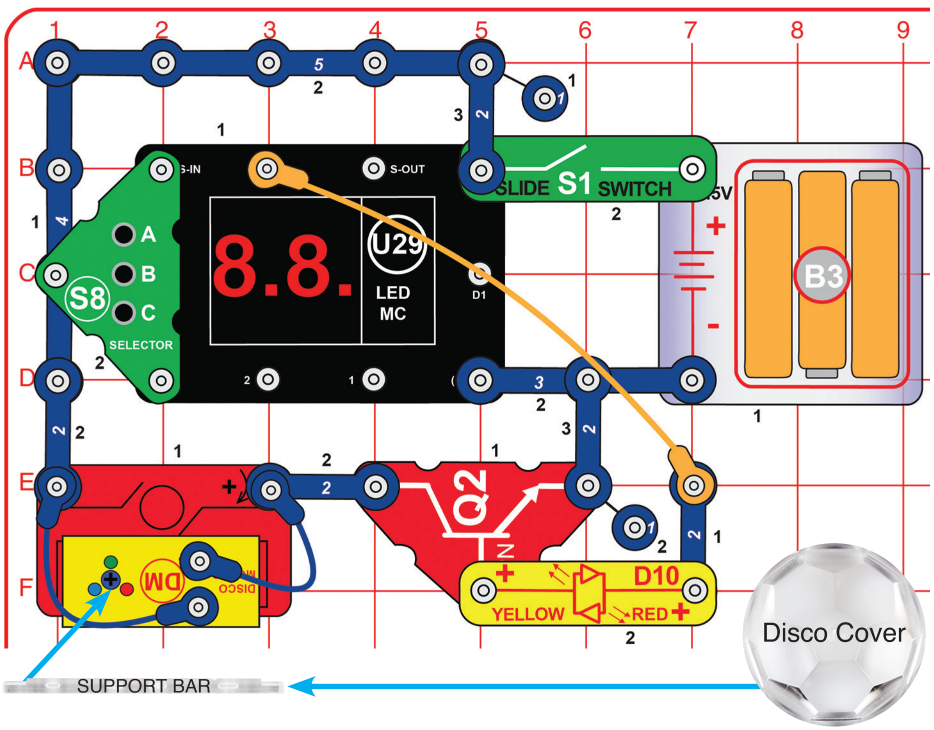
Use the project 30 circuit, but connect the end of the black jumper wire to point D instead of point C. The sound is different now.

☐ Project 35 Fast Siren Arcade

Use any of the five preceding circuits, but turn off the slide switch (S1) to reset the LED-MC (U29). Turn on the slide switch; the display on the LED-MC shows “00”. Press the A button on the selector (S8) two or three times to increase the ones digit on the display. When the display shows “02” or “03”, press the B button on the selector to start.

The circuit works the same, except that it changes faster (“03” is faster than “02”).

Project 36 Variable Disco Speed



Turn on the slide switch (S1); the display on the LED-MC (U29) shows “00”. Press the A button on the selector (S8) to increase the ones digit on the display, and press the C button on the selector to increase the tens digit on the display. When the display shows “21”, press the B button on the selector to start.

The red/yellow LED (D10) will be blinking at varying speed, and the disco motor (DM) will be spinning at varying speed. For best effects, view in a dark room.

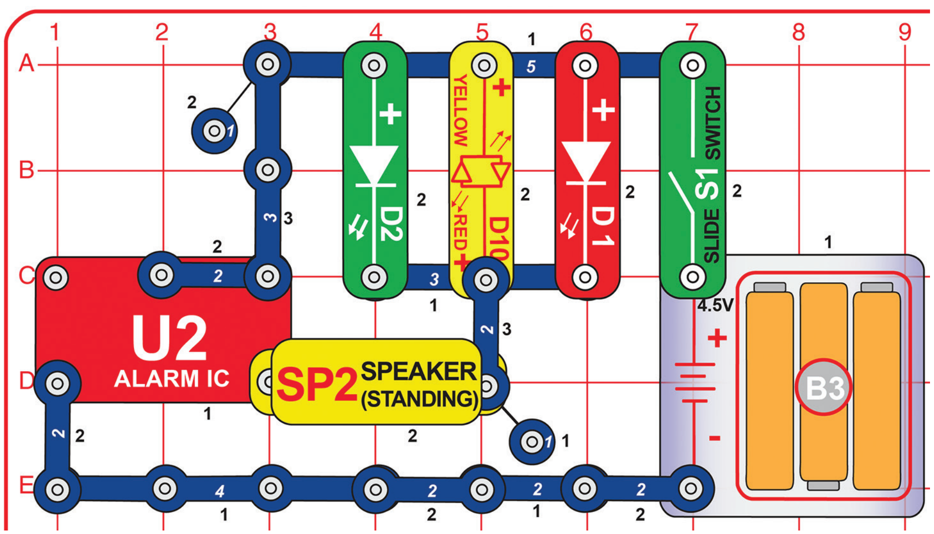
Project 37 Variable Disco Speed Variants

Use the preceding circuit, but reverse the red/yellow LED (D10), or replace it with the red LED (D1, “+” on right), green LED (D2, “+” on right), or the speaker (SP2).The circuit works the same way but now it sounds like a machine gun.

Project 38 Loud Click Rate Changer

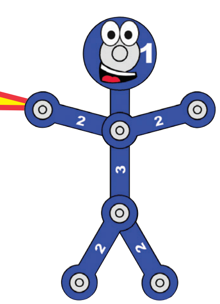
Use the project 36 circuit, but replace the disco motor (DM), including the blue jumper wires to it, with the speaker (SP2).

Project 39 Tri-Light Machine Gun



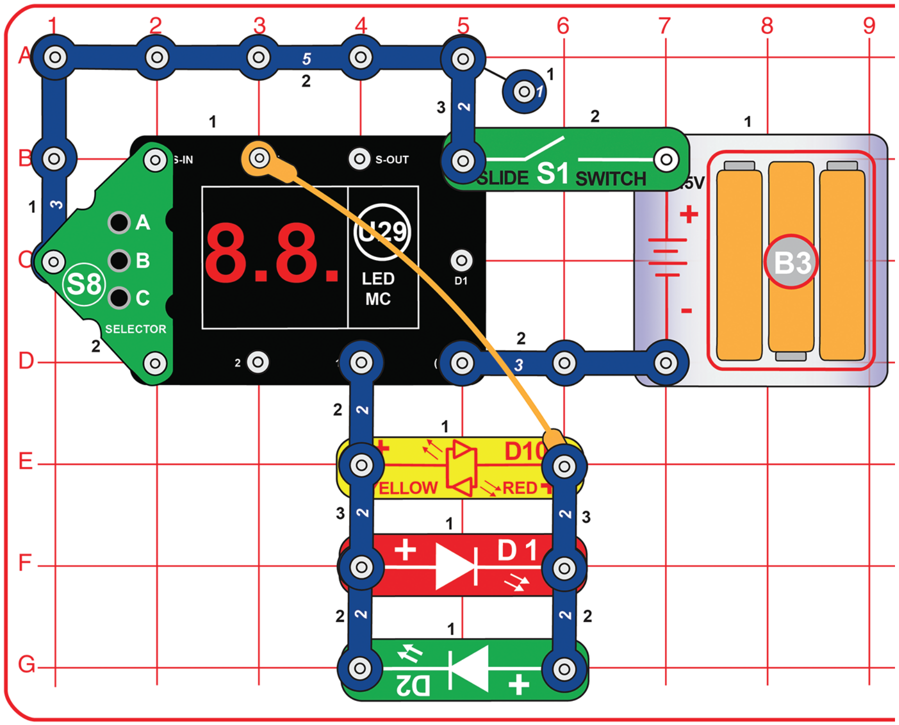
Turn on the slide switch (S1). Three LEDs are flashing and you hear a machine gun sound.

The lower-right snap of the alarm IC is like an electrical gate, opening and closing quickly to let small bursts of electric current flow in. The bursts of electric current also flow through the green, yellow, & red LEDs (lighting them) and the speaker (which produces sound). The alarm IC produces the different siren sounds by adjusting the pattern of current bursts through the speaker.



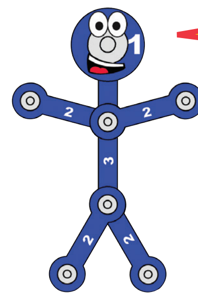
☐ Project 40

Dual Bi-Color Lights



Turn on the slide switch (S1); the display on the LED-MC (U29) shows "00". Press the A button on the selector (S8) to increase the ones digit on the display, and press the C button on the selector to increase the tens digit on the display. When the display shows "21", press the B button on the selector to start.

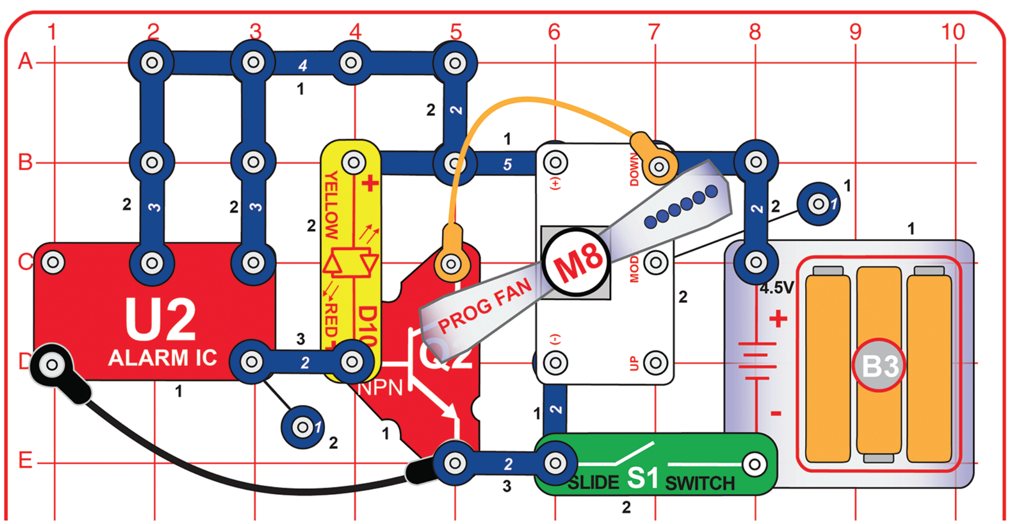
The red/yellow LED (D10) will be on continuously, but changing colors at varying speed. The red & green LEDs (D1 & D2) will be alternately between on and off, opposite each other, and synchronized with D10.



The red & green LEDs together act as a bi-color LED. Compare them to the red/yellow LED, which is a true bi-color LED.

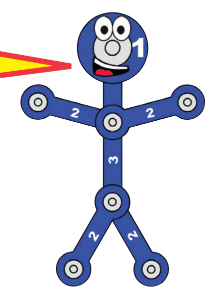
☐ Project 41

Fast Phrase Changer



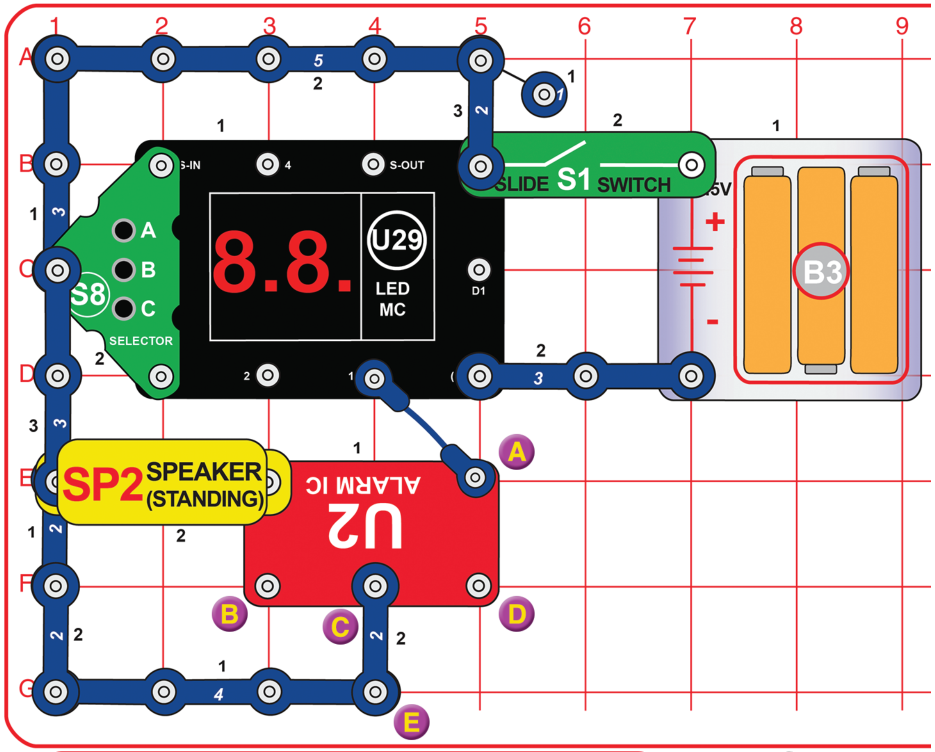
Turn on the slide switch (S1). The programmable fan (M8) spins, and changes the phrase displayed about once a second. See project 15 to change the phrases displayed.

This circuit uses the alarm IC (U2) to control the programmable fan (M8), cycling through the six phrases stored in it faster than normal.

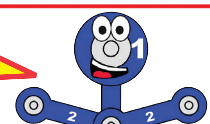


WARNING: Moving parts. Do not touch the fan or motor during operation. Do not lean over the motor.

Project 42 Funky Siren



The LED MC (U29) is turning on the alarm IC (U2) in short bursts, and varying their duration.



Turn on the slide switch (S1); the display on the LED-MC (U29) shows "00". Press the A button on the selector (S8) to increase the ones digit on the display, and press the C button on the selector to increase the tens digit on the display. When the display shows "21", press the B button on the selector to start.

Strange sounds will be heard on the speaker (SP2).

Project 43 Funky Siren (II)

Use the preceding circuit, but add a connection between the points marked B & C using a 1-snap and a 2-snap. The sound is different now.

Project 44 Funky Siren (III)

Use the preceding circuit, but remove the connection between B & C, and add a connection between C & D. The sound is different now.

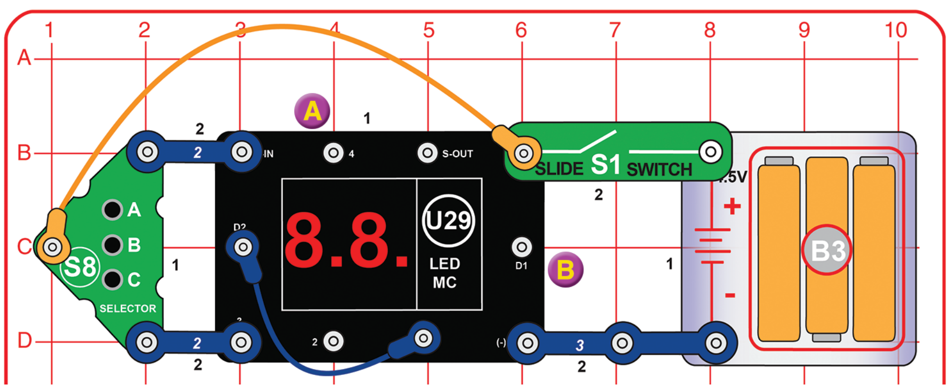
Project 45 Funky Siren (IV)

Use the preceding circuit, but remove the connection between C & D, and add a connection between A & D. The sound is different now.

Project 46 Funky Siren (V)

Use the project 42 circuit, but remove the connection between C & E, and add a connection between D & E using a blue jumper wire. The sound is different now.

Project 47 Vibrato 2



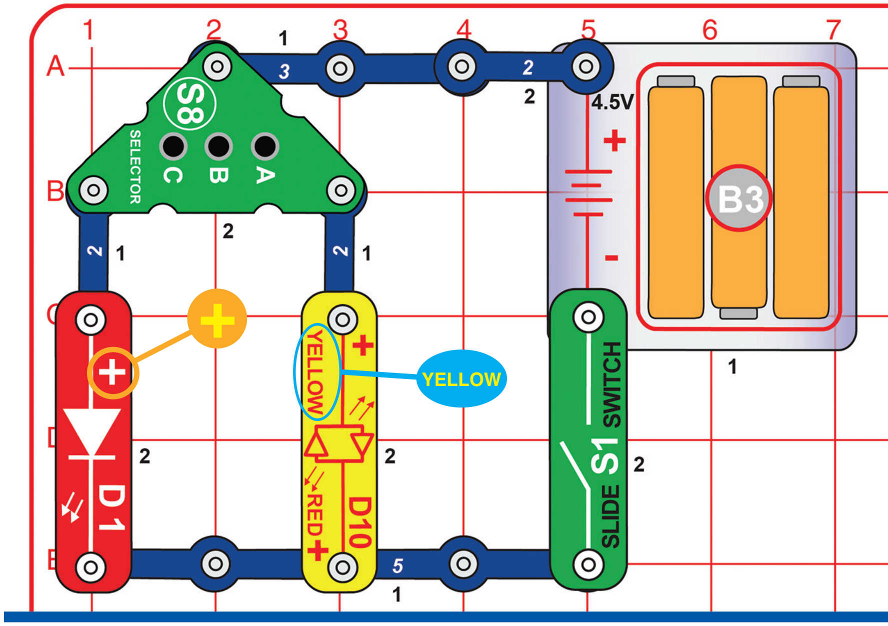
Turn on the slide switch (S1); the display on the LED-MC (U29) shows "00". Press the A button on the selector (S8) to increase the ones digit on the display, and press the C button on the selector to increase the tens digit on the display. When the display shows "21", press the B button on the selector to start.

The "2" in the display will be toggling on/off at a varying rate.

Project 48 Vibrato 21

Use the preceding circuit, but add a second blue jumper between points A & B. Now both digits on the display are toggling, but opposite to each other.

Project 49



Selector

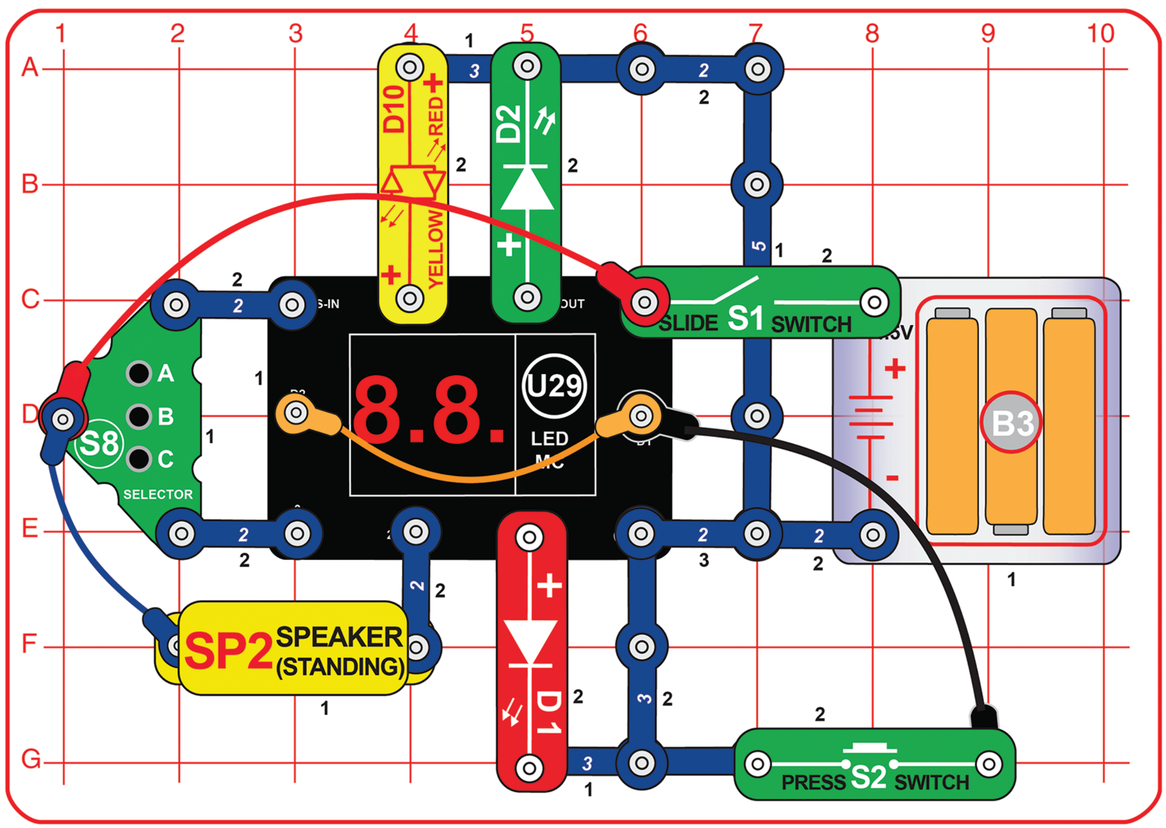
Turn on the slide switch (S1). Press button C on the selector (S8) to light the red LED (D1), press button A on the selector to light the yellow LED (D10), or press button B on the selector to light both LEDs.

Project 50 Red Selector

Use the preceding circuit, but reverse the orientation of the yellow bi-color LED (D10), to make it red.

Project 51 Green Selector

Use the project 49 circuit, but replace either of the LEDs (D1 or D10) with the green LED (D2).



Project 52

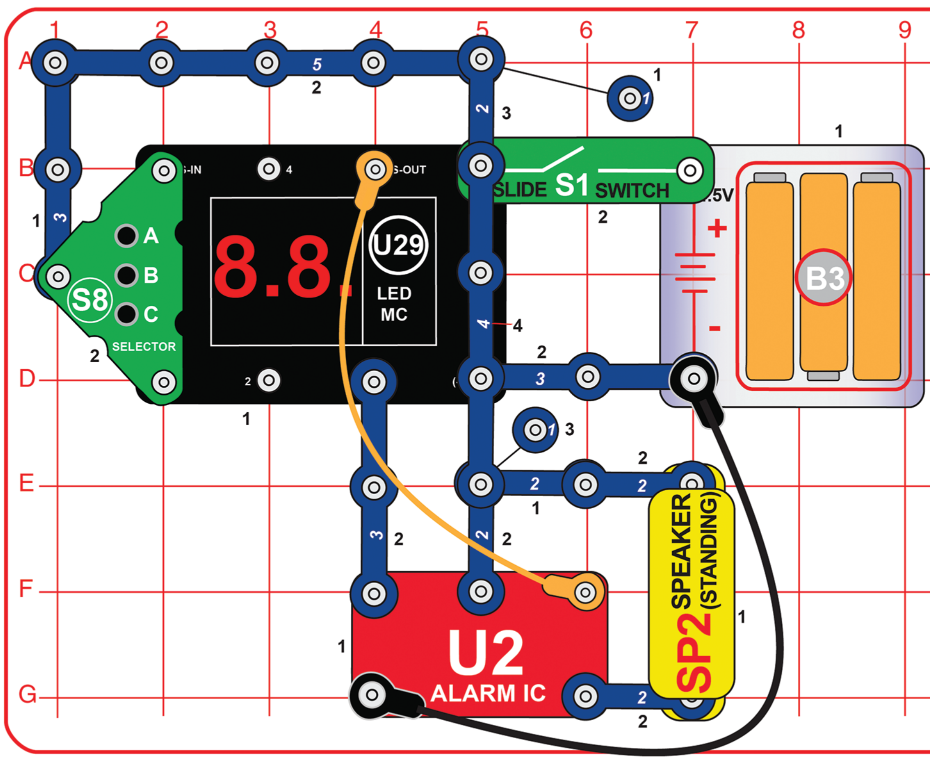
LED-MC Test

Turn on the slide switch (S1); the display on the LED MC (U29) should show "00". Select game 1 by pressing the A button on the selector (S8), then the B button.

Every 2 seconds one or more of the following will happen, randomly changing: D1 lights, D2 lights, D10 lights, SP2 plays a tune, the U29 LEDs display a random pattern. Make sure that eventually all these parts are being controlled. If not, something is wrong. Also, pushing the press switch (S2) should turn off the LED display on U29 until you release S2.

If desired, you can speed things up by turning S1 off and on (to reset the circuit), then selecting game 2 or game 3 by pressing the A button on S8, then the B button. The tunes played on the speaker (SP2) will play at the same speed as before.

☐ Project 53 Random Siren Selector



Turn on the slide switch (S1); the display on the LED-MC (U29) shows "00" and a siren sound plays. Press the A button on the selector (S8) once to make the display show "01", then press the B button on the selector to start.

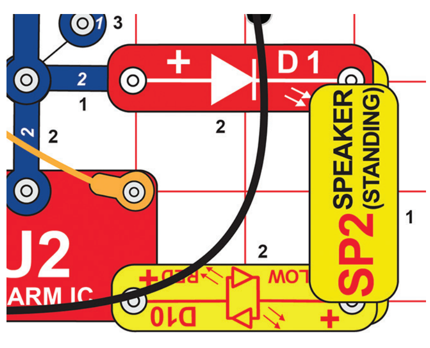
Every few seconds the speaker (SP2) randomly plays one of three siren sounds, and the U29 LED display shows a random pattern.

☐ Project 54 Fast Random Siren Selector

Use the preceding circuit. Turn on the slide switch (S1); the display on the LED-MC (U29) shows "00". Press the A button on the selector (S8) two or three times to increase the ones digit on the display. When the display shows "02" or "03", press the B button on the selector to start.

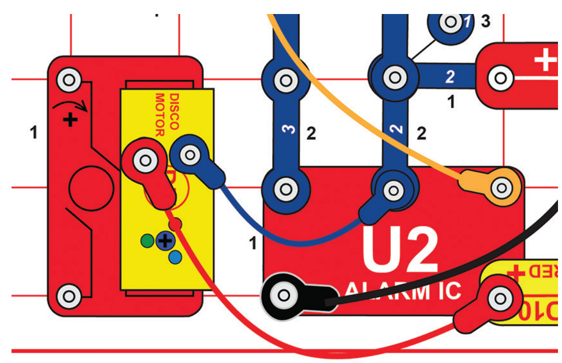
The circuit works the same, except that it changes faster. "03" is faster than "02".

☐ Project 55 LED Random Siren Selector



Modify the project 53 circuit by adding the red & red/yellow LEDs (D1 & D10) as shown. It works the same way, but has more lights and the sound is not as loud.

☐ Project 56 5-LED Random Siren Selector

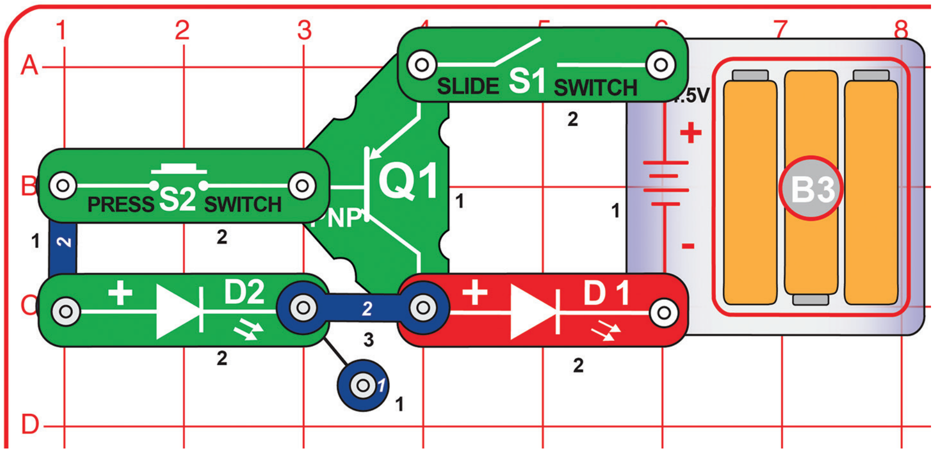


Modify the preceding circuit by adding the LEDs in the disco motor (DM) using blue & red jumper wires as shown. It works the same way, but has more lights.

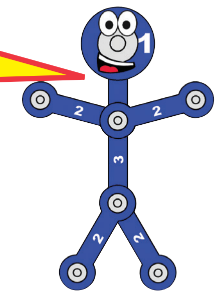
☐ Project 57

PNP Transistor

Turn on the slide switch (S1) - nothing happens. Now push the press switch (S2) and the red LED (D1) lights, but the green LED (D2) stays off.



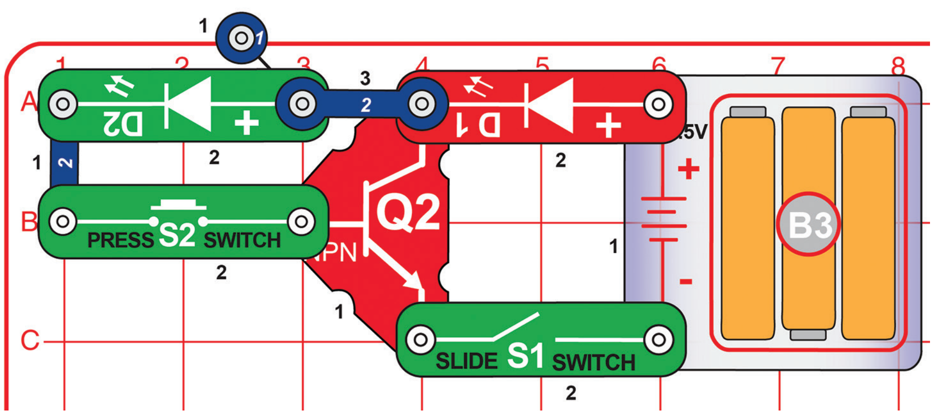
A transistor uses a small electric current to control a large electric current. Here pressing S2 makes a small current flow out of the PNP transistor (Q1) through the green LED, which triggers a large current out of the transistor through the red LED. The green LED is actually turned on, but is so dim you may not be able to see it even in a dark room.



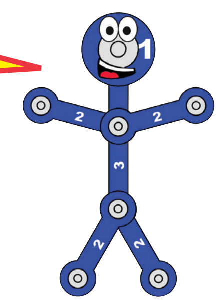
☐ Project 58

NPN Transistor

Turn on the slide switch (S1) - nothing happens. Now push the press switch (S2) and the red LED (D1) lights but the green LED (D2) stays off.

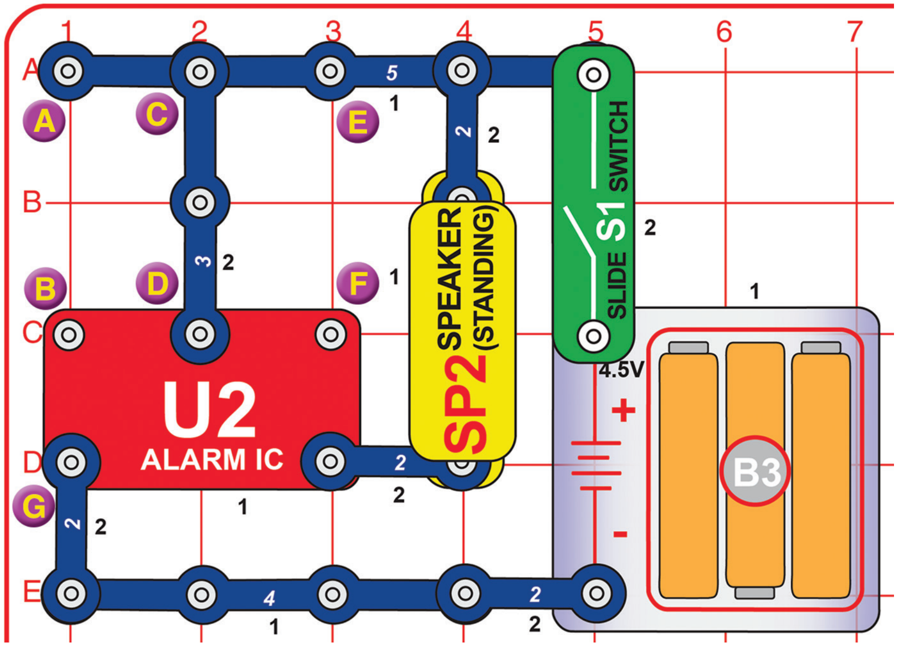


The NPN transistor (Q2) is just like the PNP transistor (Q1) in preceding circuit, except that the electric currents flow in the opposite direction. Here pressing S2 makes a small current flow into the transistor through the green LED, which triggers a large current into the transistor through the red LED. The green LED is actually turned on, but is so dim you may not be able to see it even in a dark room.



☐ Project 59

Sirens



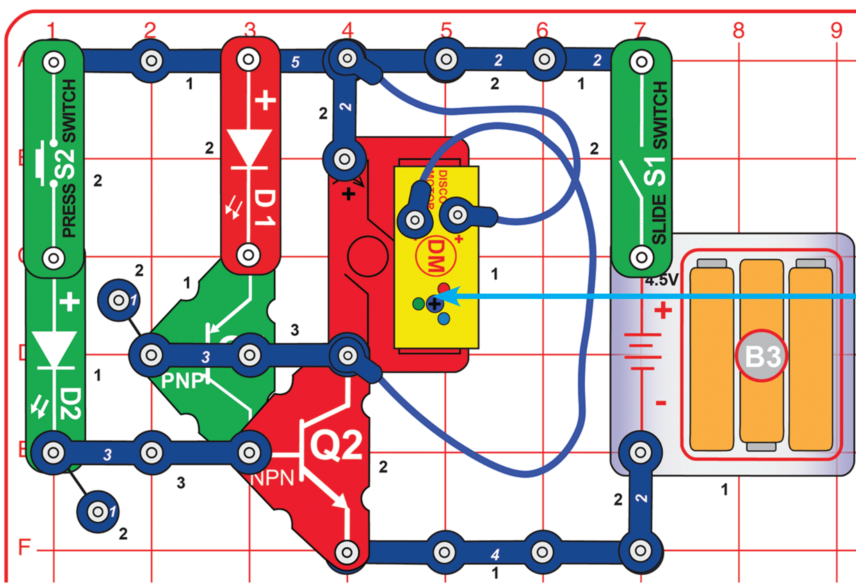
Turn on the slide switch (S1) to hear an alarm.

Variants:

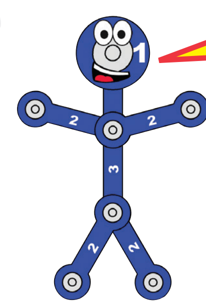
1. Connect a blue jumper wire between points A & B.
2. Move the blue jumper wire to points E & F.
3. Move the blue jumper wire to points B & G.
4. Remove the blue jumper wire. Remove the 3-snap wire between points C & D, and connect it between points A & B.

☐ Project 60

Thyristor Start Disco Ball

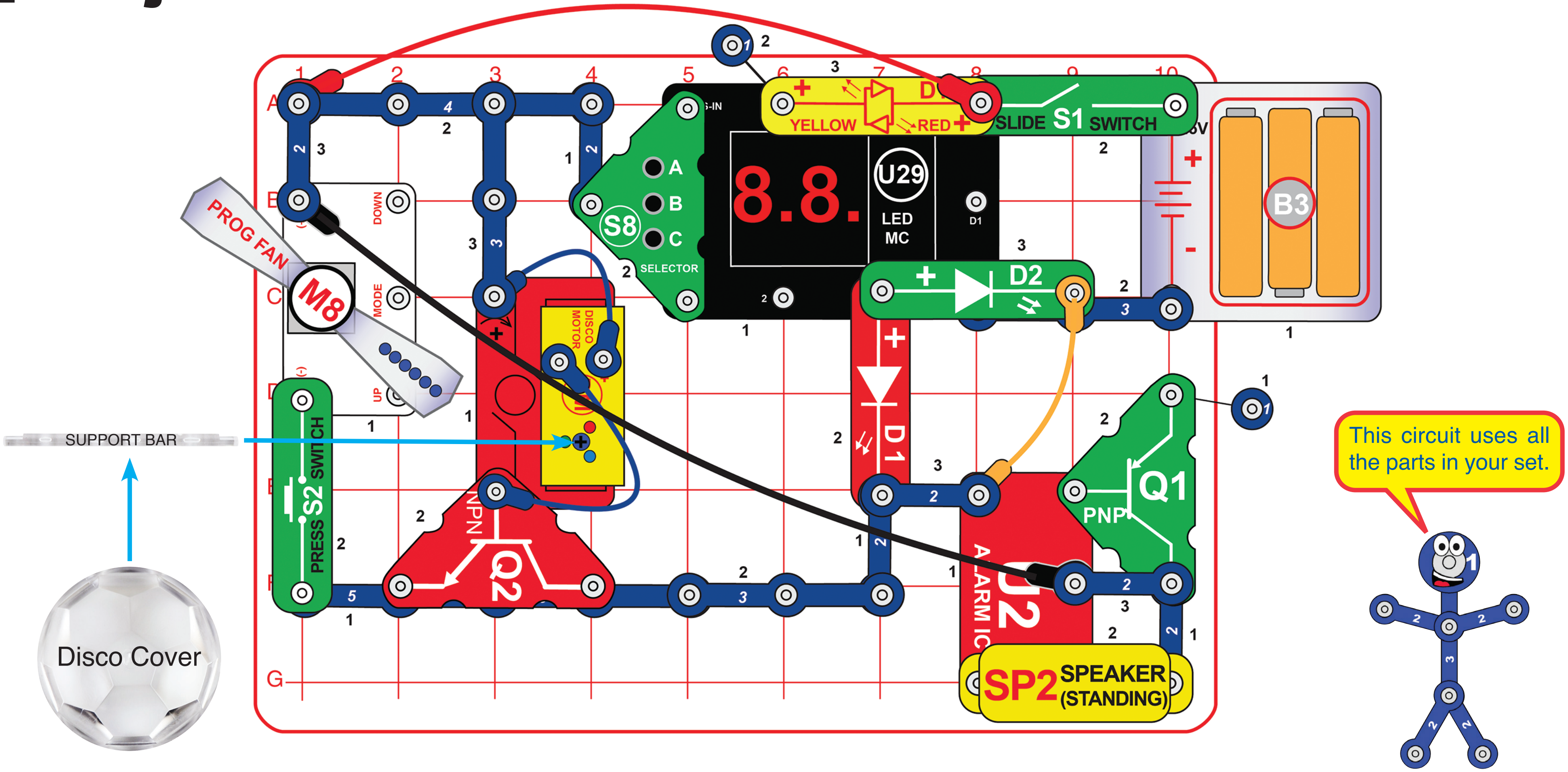


Build the circuit as shown, place one of the disco covers on the disco motor (DM), and turn on the slide switch (S1). Nothing happens. Push & release the press switch (S2); the green LED (D2) flashes once, turning on PNP & NPN transistors (Q1 and Q2), so now the disco motor and the LEDs on it turn on. The circuit will continue to run until switch S1 is turned off.



Transistors Q1 and Q2 act as a thyristor bistable switch, conducting electricity when their gate (the left side of Q2) is triggered (by pressing S2), and continuing to conduct until the circuit is turned off.

☐ Project 61 Finale



Build the circuit as shown; note that the 5-snap wire is partialy covered by the NPN transistor (Q2), and a 3-snap wire is partially covered by the green LED (D2). Place one of the disco covers on the disco motor (DM).

Turn on the slide switch (S1). A siren sounds, the disco motor spins & lights, and the display on the LED-MC (U29) displays “00”. Push and hold down the press switch (S2) to spin the programmable fan (M8); if you hold it down long enough then it cycles through 6 messages.

Make the display on the LED-MC show “02” or “03” by pressing the A button on the selector (S8) to increase the ones digit on the display. Press the B button on the selector. The LEDs (D1, D2, & D10) will flash while the display on U29 displays a random pattern; sometimes they will be rapidly changing, and sometimes they will stop for a few seconds.

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

Go to https://shop.elenco.com/consumers/snap-circuits-arcade.html to download projects 62-203

ELENCO®
Learn by doing®
From the makers of SNAP CIRCUITS

Important: If any parts are missing or damaged, **DO NOT RETURN TO RETAILER**. Call toll-free at: (800) 533-2441 **or** e-mail us at: help@elenco.com.

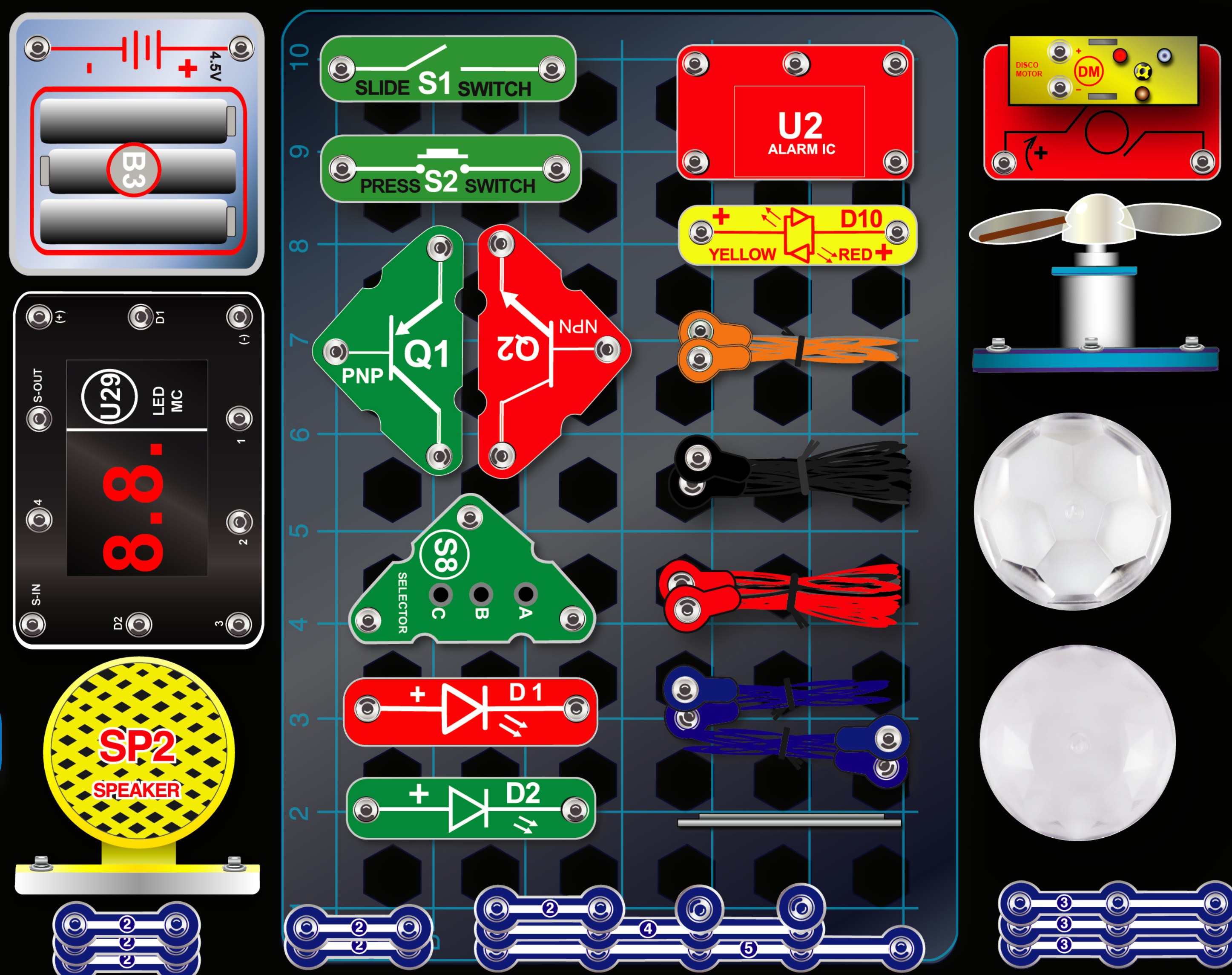
Customer Service:
150 Carpenter Ave.
Wheeling, IL 60090 U.S.A.

Note: A complete parts list is on pages 2 in this manual.

Go to https://shop.elenco.com/consumers/snap-circuits-arcade.html to download projects 62-203

SCA-200 Snap Circuits® Arcade Parts Layout

Base Grid (11” x 7.7”) overlays some parts.



1 Base Grid (7.7” x 5.5”) overlays some parts, and 6 others are below.

www.elenco.com

Not responsible for typographical errors. Colors, styles and case quantities are subject to change without notice.