



8+

88-90153



50 ELECTRONIC EXPERIMENTS SET

INSTRUCTIONS

We take pleasure to welcome you to try out this ready-to-use electronic circuit kit suitable for children of 8 years old and up. "You'll be amazed" to find what you can learn as the experiment is a realistic concept of electronics and electricity. It will definitely enable you to learn about the necessary electronic components, circuits, and theories as well as the basic electronics principles – electricity, voltage, current, resistance, magnetism, other electrical circuit and theory.

It is alright if you have no knowledge about electronics and do not fully understand how all the experiments work. Once you get started you will be able to build your understanding through experimenting and maybe trying out some interesting experiments on your own.

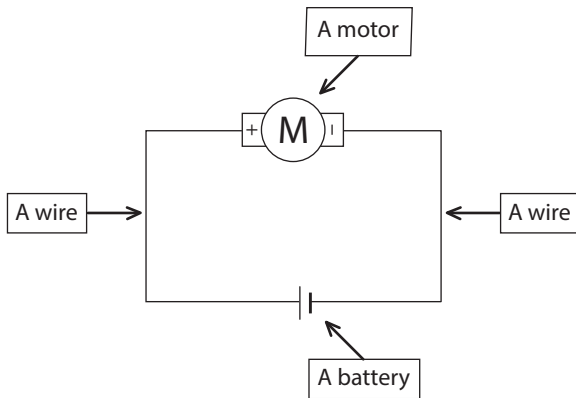
This electronic circuit kit contains more than 50 experiments, and it is smartly designed that the main circuit board unit has all the relevant electronic components included. All you have to do is simply connect the wires according to the wiring sequence of each experiment and follow the steps one by one. Once connected the circuit will activate and function.

Have a great electrifying experience !!!

WARNING : Only for use by children aged 8 years and older. May over heat.

BASIC CONCEPTS

How to read a circuit diagram?



The **battery** is a source of electricity. It contains chemicals which will undergo chemical reaction to produce electricity when a circuit is connected.

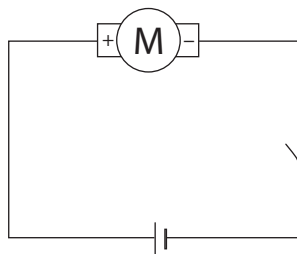
The **wire** is a conductor that conducts electricity. Connecting a wire is like providing a path that allows electricity to flow through.

The **motor** is a device that produces rotary motion when electricity is provided.

As an analogy, the battery is like a pump that pumps water through the pipes (wires). When a circuit is connected, electricity can flow through it. The electricity flowing is called a **current**. A current is the flow of electric charges. The amount of a current is the amount of electric charge flowing in the wire in a second.

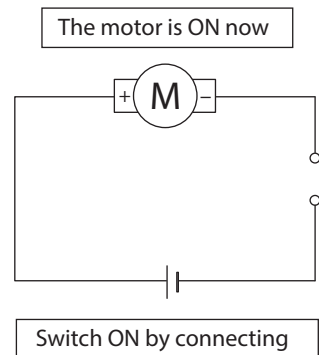
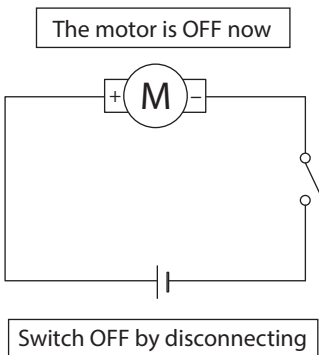
Another common term we often heard about electricity is the **voltage**. Voltage is referring to the electric energy per unit charge. It is the electric energy of each unit amount of electric charge carries.

Open circuit and close circuit


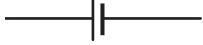
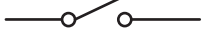







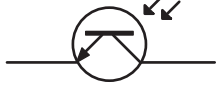







This is an open circuit. The wires are not connected and electricity cannot flow through the circuit. When it is connected, then it is completed and is called a closed circuit. Electricity can flow through it.

A **switch** is a simple mechanism that makes the circuit open or close.



BASIC CIRCUIT SYMBOLS

Component	Circuit symbol	Explanation
Wire		A wire is like a path that allows electric current to flow through. It has very low resistance which is close to zero.
Battery		Each symbol represents a battery.
On/off switch		The main switch.
Push switch		Press it to make the metal plates come into contact. And then current can transfer through them and thus the path is connected.
Reed switch		This is a magnetic switch which contains metal reeds inside. When a magnet is close to it, the attractive force will cause the reeds to come together. Thus they will be in contact and the path is connected.
Resistor		Resistor is a unit that process resistance. It is like an obstacle that reduces the flow of current in a circuit.
Diode		Allows current to flows in one direction only. Current in the reverse direction cannot pass through it. The symbol is like the direction of an arrow that indicates the direction of the current allowed.
LED		Light Emitting Diode. It is like a diode that allows current to flows in one direction only. Additionally it will emit light when current passes through it.
Motor		A device that produce rotational motion when electricity is applied.
Touch plate		It is a plate with two parts of conducting surfaces. The two surfaces are not connected but with a little gap between them. Electricity cannot flow through because of the little gap. When touched by a finger, or dripped with a water droplet, then the little gap is filled and electricity can flow through it (though the resistance is quite large because the resistance of water is quite large)
Light Sensor		There are different types of light sensor. The one used here is a phototransistor. When light falls on it, it is like a switch connected and so current is allowed to pass through it.
Buzzer		A device that can produce simple sound.
Microphone		A device that converts sound to electrical signal.
Speaker		A device that converts electrical signal to sound.
Transistor (PNP)		The transistor is a device made of semiconductor material that has three terminals. It can act as a switch or signal amplifier. The transistor is the key active component in practically all modern electronics. Besides being an individual component, they can be found integrated in logic gates, IC and Center Processing Unit (CPU) of a computer. CPUs nowadays contain billions of transistors integrated inside!
Transistor (NPN)		

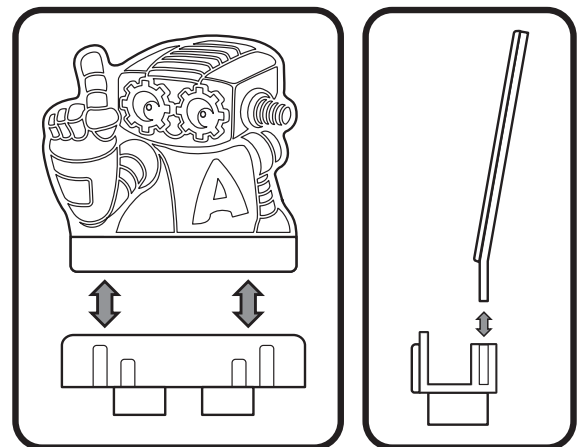
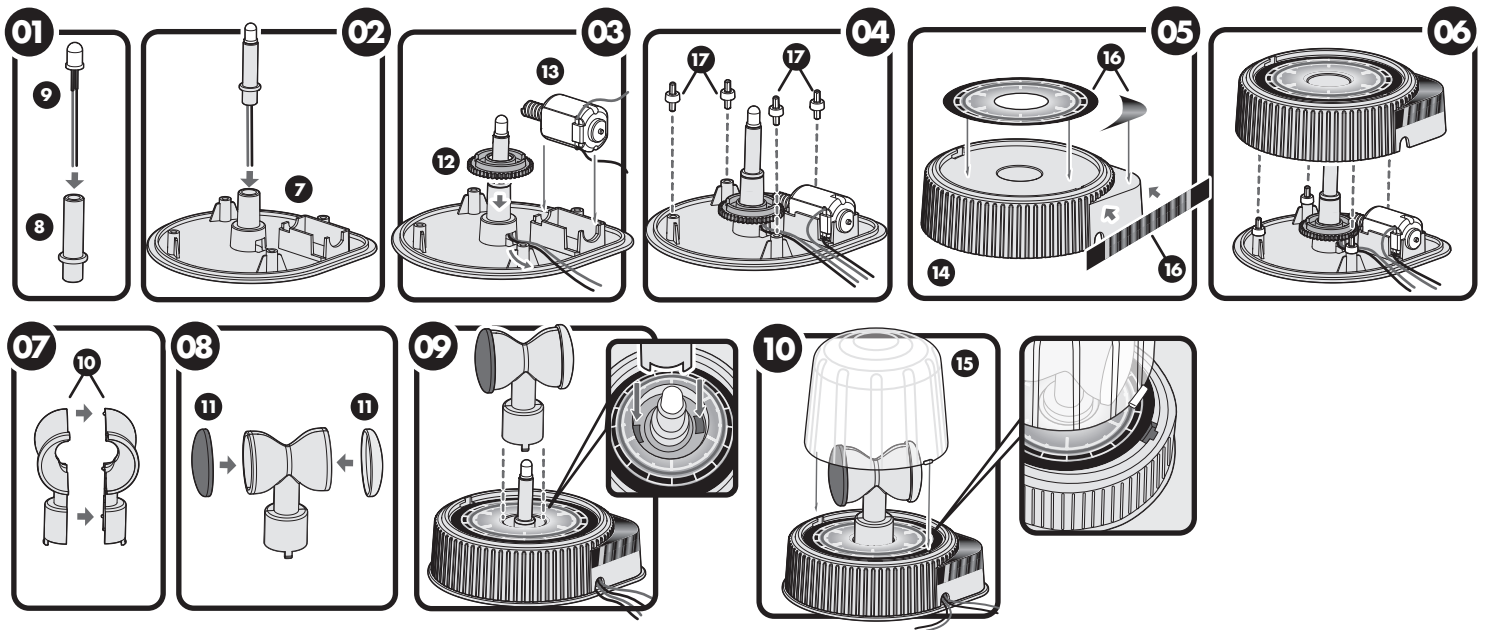
COMPONENTS IN THIS KIT

	Description	Quantity
1.	Circuit Board Unit	1pc
2.	Magnetic pole	1pc
3.	Connecting wire	10cm x 8pcs, 20cm x 5pcs, 30cm x 5pcs
4.	Instruction Manual	1pc
5.	Memo holder base	1pc
6.	Memo holder board	1pc
7.	Alarm base	1pc
8.	Axis	1pc
9.	LED Light	1pc

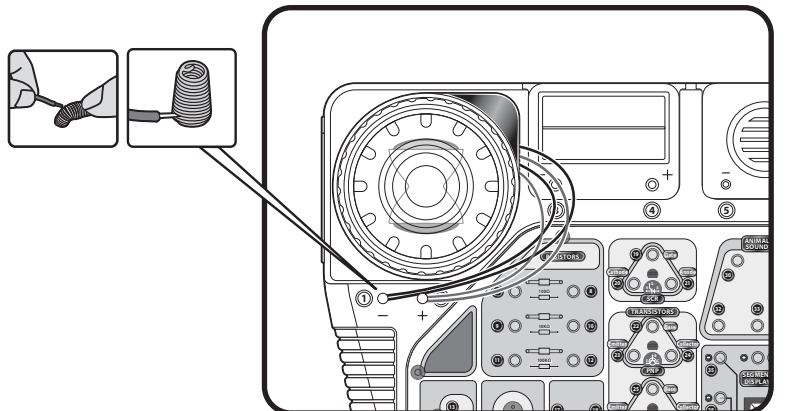
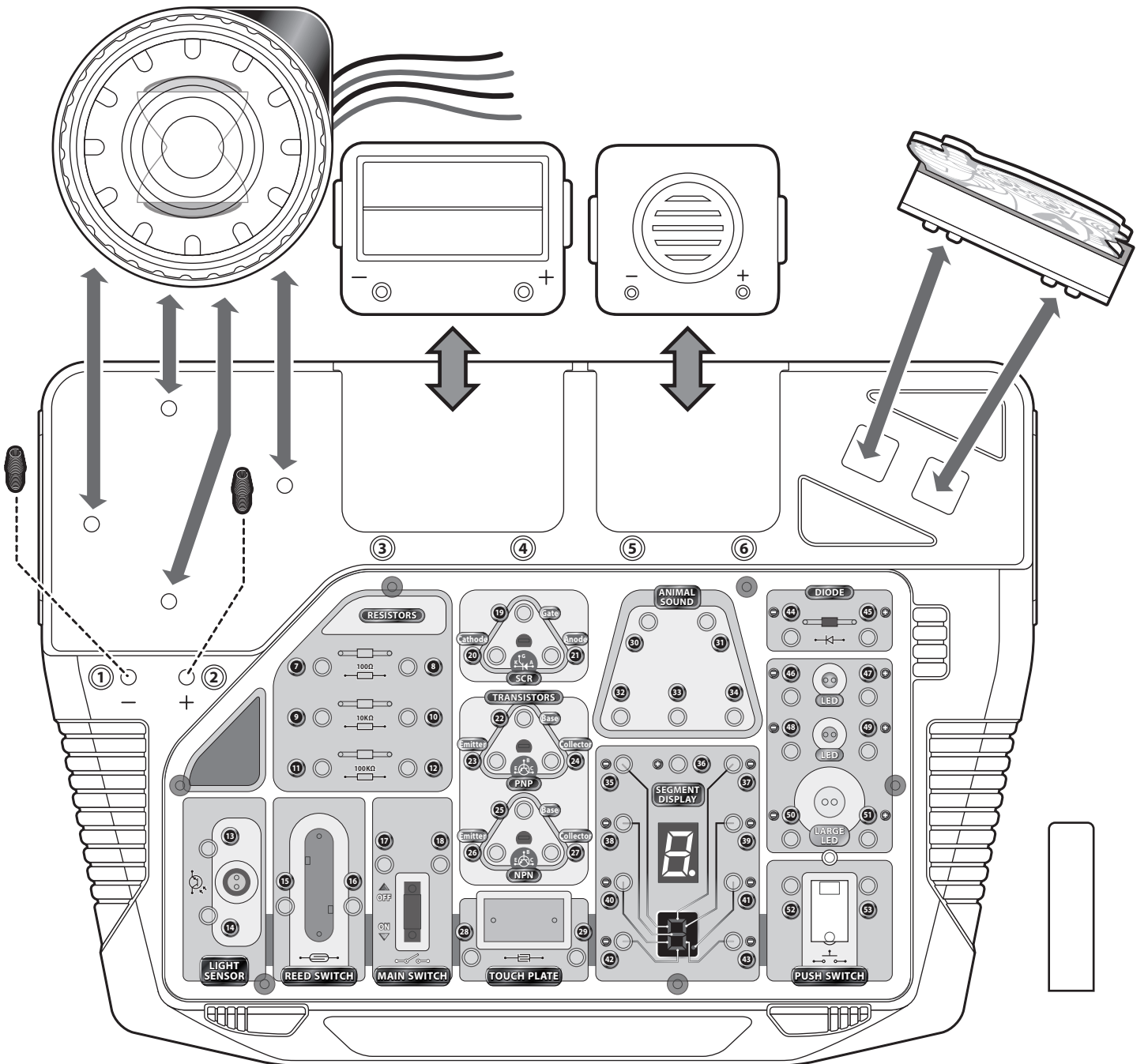
	Description	Quantity
10.	Alarm body (halved)	2pcs
11.	Red & Blue cover	2pcs
12.	Gear	1pc
13.	Motor with a worm	1pc
14.	Alarm base cover	1pc
15.	Transparent cover	1pc
16.	Sticker	1pc
17.	5pcs(1 spare)	
18.	Spring	2pcs

Assembling

Spinning LED light



Memo pad



1. Simple LED circuit
2. Spinning LED light
3. Function of the reed switch
4. Demonstration of resistance and current
5. Resistors in series connection
6. Resistors in parallel connection
7. Function of the touch plate
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22. A practical example of SCR
23. Digital segment LED displaying "1"
24. Digital segment LED displaying "2"
25. Digital segment LED displaying "8"
26. Digital segment LED displaying "F"

27. Digital segment LED switching between "1" and "8"
28. Digital segment LED switching between "I", "L", "F" and "E"
29. Light control seven-segment LED display – C (Dark Type)
30. Light control seven-segment LED display – E (Light Type)
31. Flashing LEDs
32. Dog barking sound with flashing LED
33. Dog barking sound and flashing digit "1"
34. Rooster crowing sound and flashing digit "2"
35. Cat meowing sound and flashing digit "3"
36. Horse neighing sound and flashing digit "4"
37. Bird chirping sound and flashing digit "5"
38. Duck quacking sound and flashing digit "6"
39. Sheep baaing sound and flashing digit "7"
40. Cuckoo calling sound and flashing digit "8"
41. Frog croaking sound and flashing digit "9"
42. Manual control horse neighing sound with push switch control flashing digit "0"
43. Magnet control sheep baaing sound with flashing LED
44. Touch control rooster crowing sound with flashing LED
45. Light control cat meowing sound with flashing LED
46. Darkness activated dog barking sound
47. Security alarm based on wiring disconnection
48. Water level LED alarm
49. Light intensity indicator
50. Darkness activated spinning LED light
51. Light control spinning LED light

WARNING

Adult supervision and assistance is required.

This unit is only for use by children aged 8 years and older.

Not suitable for children under age 3 years old due to small part(s) and component(s) – CHOKING HAZARD.

Read and follow all instructions in the manual before use.

This toy contains small parts and functional sharp points on components. Keep away from children under age 3 years.

2 x AA size batteries are required (not included)

Please retain the information and this manual for future reference.

Instructions for parents are included and have to be observed.

WARNING! Not intended for children under 8 years. This product contains (a) small magnet(s). Swallowed magnets can stick together across intestines causing serious injuries and death. Seek immediate medical attention if magnet(s) are swallowed or inhaled.

This toy contains functional sharp points on component leads and wires, requiring care when handling.

Warning. Do not use close to the ear! Misuse may cause damage to hearing.

CAUTION !

Before setting up any experiment, please double check and make sure all wiring connections you have made are correct before inserting the batteries and switching on the unit, as failure may result in damage to components or circuit board unit.

When experiment is finished, make sure the batteries are disconnected and switch off the unit before you clear away the wires.

Do not apply any components or parts to the experiment other than those provided with this kit.

If this product malfunctions or "locks up", try switching off and back on again or removing and re-inserting batteries.

Do not lock the motor or other moving parts. Otherwise it may cause overheating.

The toy is not to be connected to more than recommended number of power supplies.

BATTERY INFORMATION

Use 2 x AA size batteries (not included)

For best performance, always use fresh batteries and remove batteries when not in use

Batteries must be inserted with the correct polarity

Non-rechargeable batteries are not to be recharged

Re-chargeable batteries are only to be charged under adult supervision

Re-chargeable batteries are to be removed from the toy before being charged

Different types of batteries or new and used batteries are not to be mixed.

Exhausted batteries are to be removed from the toy

The supply terminals are not to be short-circuited

Only batteries of the same or equivalent types are to be used

Do not dispose of the batteries in fire

Do not mix old and new batteries

Do not mix alkaline, carbon zinc and re-chargeable batteries

WIRING SEQUENCE AND CONNECTION

Ensure all wires are correctly connected to the numbered spring terminals of the main circuit board unit as stated wiring sequence of each experiment

Bend the spring terminal over and insert the exposed shiny conductor part of wire into spring terminal. Make sure the wire is securely connected to spring terminal.

For example if the wiring sequence is 4-33, 1-10-32-35, 2-12, then first connect a wire between spring terminal 4 and 33; next connect a wire between spring terminal 1 and 10, and then a wire between spring terminal 10 and 32, a wire between spring terminal 32 and 35, and finally connect a wire between spring terminal 2 and 12. This is an example to demonstrate wiring connections only, not an exact circuit connection in the experiment.

If the circuit does not work, check the wire and spring terminal connection to see whether it is probably not well connected or the insulated plastic part of a wire is inserted to spring terminal.

Objective :

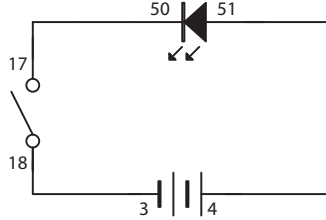
The overall aim for this electronic circuit kit is for you to get a better understanding of how connecting different wiring sequence will make different science experiments. Each experiment is targeted at different basic concept of electronics & electricity. Please make sure to read carefully and all wires are correctly connected in the indicated diagram in order to have each experiment work.

EXPERIMENT 1

Simple LED circuit

Wiring Sequence 4-51, 50-17, 18-3

- Complete all wiring connections as indicated in the sequence. By switching ON, the LED will light up. By switching OFF, the LED will extinguish. You can change to use another LED yourself. Simply look at the circuit diagram, and connect to another LED in the same way. Just don't mix up the +ve and -ve pole. Otherwise the LED will not light up.

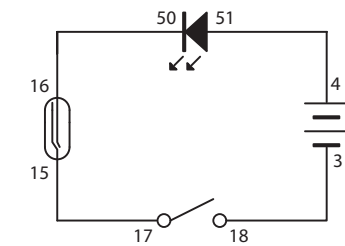


EXPERIMENT 3

Function of the reed switch

Wiring Sequence 4-51, 50-16, 15-17, 18-3

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. Access the reed switch with the magnetic pole. The LED will light up as the circuit is connected. Move away the magnetic pole, and the circuit will be disconnected, and the LED will be off.

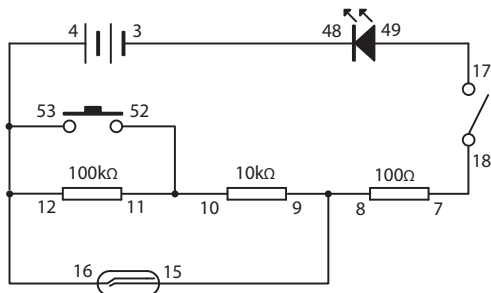


EXPERIMENT 5

Resistors in series connection

Wiring Sequence 4-12-16-53, 52-11-10, 9-15-8, 7-18, 17-49, 48-3

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. The electric current from the batteries will have to pass through 3 resistors, and therefore the LED will light up very dimly, or apparently not light up at all. Press the push switch. This time, the current will have to pass through 2 resistors only, so the LED will light up brighter than before. Access the reed switch with the magnetic pole. This time, the current will have to pass through 1 resistor only, so the LED will light up even more brightly. As an analogy, a resistor is like an obstacle. The fewer obstacles are there in the circuit, the more current can flow through.

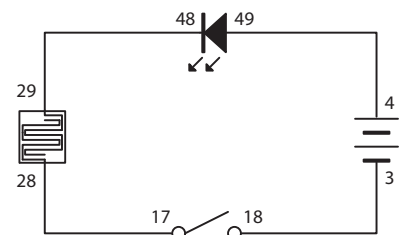


EXPERIMENT 7

Function of the touch plate

Wiring Sequence 4-49, 48-29, 28-17, 18-3

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. Dampen your finger with water and touch the touch plate. The LED will light up very dimly. This indicates water has a large resistance and so only a small amount of electric current is able to pass through. If you put a drop of salt water onto the touch plate, the LED will light up more brightly! This is because salt water is a better conductor than plain water, and thus more current can pass through.

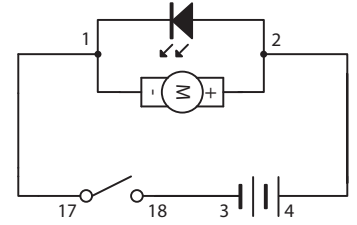


EXPERIMENT 2

Spinning LED light

Wiring Sequence 4-2, 1-17, 18-3

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. The spinning LED will light up and spin!

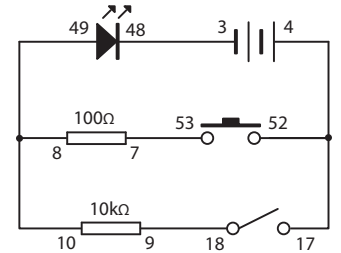


EXPERIMENT 4

Demonstration of resistance and current

Wiring Sequence 4-52-17, 18-9, 7-53, 10-8-49, 48-3

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. The LED will light up dimly. Switch off the main switch to turn it off. Now press the push switch. The LED will light up more brightly. This is because the path of the main switch has a resistor of larger resistance. So the current through this path will be less, and as a result the LED will be less bright. On the other hand, the path of the push switch has a resistor of smaller resistance. So the current through this path will be more, and the LED will be brighter.

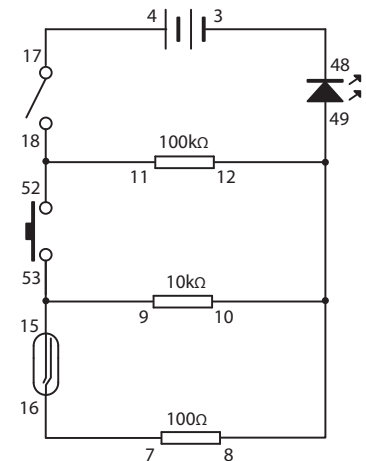


EXPERIMENT 6

Resistors in parallel connection

Wiring Sequence 4-17, 18-11-52, 53-9-15, 16-7, 8-10-12-49, 48-3

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. The electric current from the batteries will pass through the 100KΩ resistor to light up the LED. The LED will light up very dimly, or apparently not light up at all. Press the push switch. Now one more path is available. Though there is a 10KΩ resistor in this path, this is still an extra path for the current to flow through. Therefore more current will flow through the LED and make it light up more brightly! Do not release the push switch. Access the reed switch with the magnetic pole. Now one more extra path is also available! There are total 3 paths for the current to flow through now and so the LED will light up brightly! Though this time there are also 3 resistors in the circuit, the LED lights up brightly. The resistors are in parallel connection so this causes a different result.

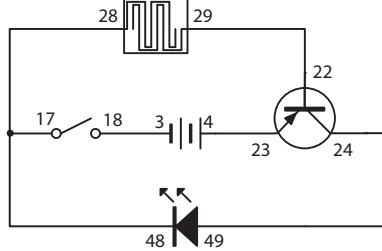


EXPERIMENT 8

A simple demonstration of a function of the PNP transistor

Wiring Sequence 4-23, 24-49, 22-29, 28-48-17, 18-3

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. Dampen your finger with water and touch the touch plate. Through only very little amount of electric current flows through the touch plate (as shown in the last experiment), the LED is switched on brightly! It is because in this circuit, the PNP transistor is the real gateway to the LED, and the touch plate is only acting as a switch for opening the gateway! When the upper part of the circuit is not connected, no current is flowing through the "Emitter" to the "Base" of the transistor. So the gateway of the "Emitter" to the "Collector" is shut. When you touch the touch plate, the upper circuit is connected; a very small amount of current passes through the "Emitter" to the "Base", and then the gateway of the "Emitter" to the "Collector" is opened! Electric current from the battery can then flow through the transistor to the LED, and therefore the LED will light up brightly!

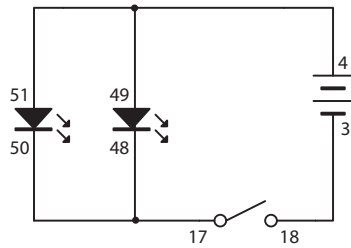


EXPERIMENT 10

Two LEDs in parallel connection

Wiring Sequence 4-49-51, 50-48-17, 18-3

- Complete all wiring connections as indicated in the sequence. By switching ON, both LEDs will light up. By switching OFF, both LEDs will extinguish.

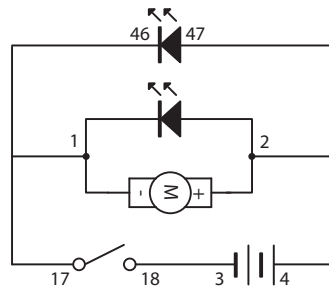


EXPERIMENT 12

LED and spinning LED with a single switch

Wiring Sequence 4-2-47, 46-1-17, 18-3

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. The LED will light up and the spinning LED light will be on. When you switch off the main switch, both devices will be off at the same time.

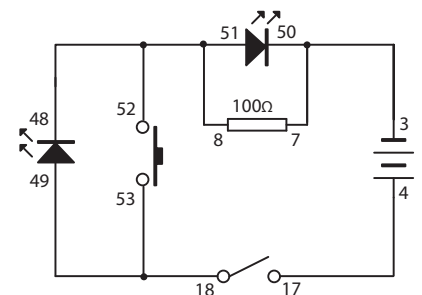


EXPERIMENT 14

Basic circuit operation of LED

Wiring Sequence 4-17, 18-49-53, 52-48-51-8, 7-50-3

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. You will see that the small LED will light up but the large LED will not. When you press the push switch, you will see the large LED will light up but the small LED will be turned off.

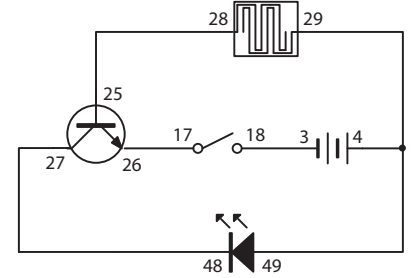


EXPERIMENT 9

A simple demonstration of the function of the NPN transistor

Wiring Sequence 4-49-29, 28-25, 27-48, 26-17, 18-3

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. Touch the touch plate. Through only very little amount of electric current flows through the touch plate (as shown in the last experiment), the LED is switched on brightly! This is pretty much the same as the case of the PNP transistor. It is just the polarities of the transistor that are reversed.

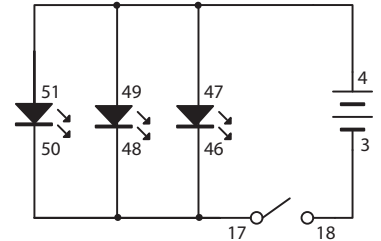


EXPERIMENT 11

Three LEDs in parallel connection

Wiring Sequence 4-47-49-51, 50-48-46-17, 18-3

- Complete all wiring connections as indicated in the sequence. By switching ON, three LEDs will light up. By switching OFF, All three LEDs will extinguish.

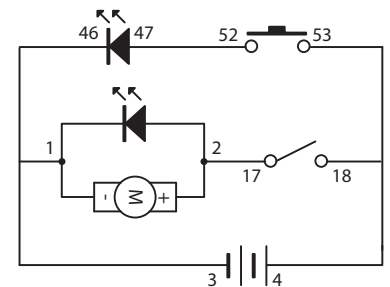


EXPERIMENT 13

LED and spinning LED with separate switches

Wiring Sequence 4-18-53, 17-2, 52-47, 46-1-3

- Complete all wiring connections as indicated in the sequence. If you switch on the main switch, the spinning LED light will be on. If you press the push switch, the LED will light up. They are controlled by separate switches so you can turn them on and off individually.

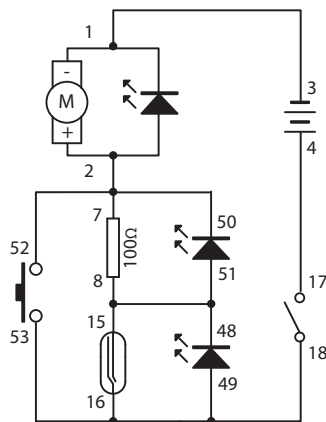


EXPERIMENT 15

Spinning LED light in advance circuit operation of LEDs

Wiring Sequence 4-17, 18-49-53-16, 15-48-51-8, 7-50-52-2, 1-3

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. You will see that the blue LED will light up but the other LEDs will not light up. When you access the reed switch with the magnetic pole, the blue LED will be off and now only the yellow LED will light up. Press the push switch. This time only the spinning LED will be on!

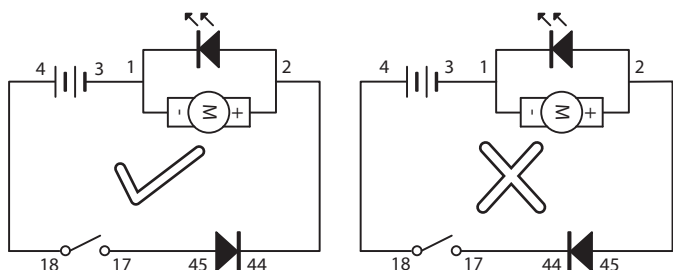


EXPERIMENT 17

Function of a diode

Wiring Sequence 4-18, 17-45, 44-2, 1-3

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. The motor will spin. If you reverse the connection polarity of the diode by changing the wiring connection a bit, 17 connect to 44 and 2 connect to 45, then this time you will find that the circuit does not work. This is because the diode does not allow current to follow through it in a reverse direction. Therefore the circuit does not work this time.

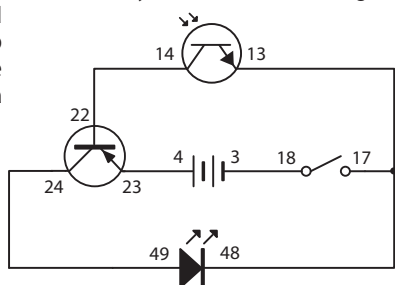


EXPERIMENT 19

A practical example: Light triggered LED

Wiring Sequence 4-23, 22-14, 24-49, 48-13-17, 18-3

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. This time, even with a small amount of light, the LED will light up brightly! It is because in this circuit, the PNP transistor is the real gateway to the LED, and the light sensor is only acting as a switch for opening the gateway! When the upper part of the circuit is not connected, no current is flowing through the "Emitter" to the "Base" of the transistor. So the gateway of the "Emitter" to the "Collector" is shut. When light falls on the light sensor, the upper circuit is connected; a very small amount of current passes through the "Emitter" to the "Base", and then the gateway of the "Emitter" to the "Collector" is opened! Electric current from the battery can then flow through the transistor to the LED, and therefore the LED will light up brightly! This circuit makes the light sensor to become a sensitive switch to detect light.

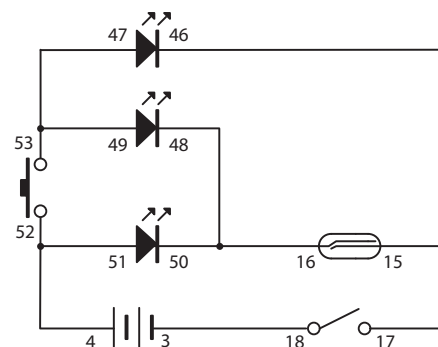


EXPERIMENT 16

LEDs Combination

Wiring Sequence 4-52-51, 50-16-48, 49-53-47, 46-15-17, 18-3

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. Pressing the push switch, or accessing the reed switch with the magnetic pole, or doing both at the same time will lead to different LED performances!

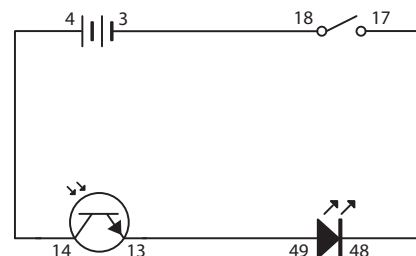


EXPERIMENT 18

A simple demonstration of the light sensor

Wiring Sequence 4-14, 13-49, 48-17, 18-3

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. You may notice that the LED lights up very dimly. This indicates only a very small amount of current is flowing through it. It depends on the intensity of light falling onto the light sensor. If you perform this experiment in a darker place, the LED may not light up at all. If you use a torch to shine on the light sensor, you can see that the LED light up brightly. This is because when there is more light, more current will be able to pass through the light sensor and light up the LED.

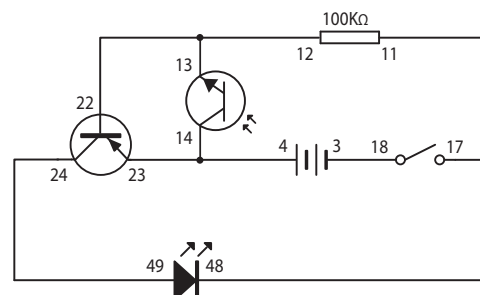


EXPERIMENT 20

A practical example: Darkness triggered LED

Wiring Sequence 4-14-23, 22-13-12, 24-49, 48-11-17, 18-3

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. If you are in a room with bright light, then the LED will not be on. When you cover the light sensor, the LED will light up. This means the LED is switch on by darkness instead of light!

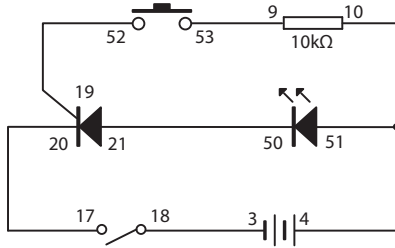


EXPERIMENT 21

Demonstration of a simple function of SCR

Wiring Sequence 21-50, 51-4-10, 9-53, 52-19, 20-17, 18-3

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. Nothing happens. And then press the push switch without releasing it. The upper part of the circuit is connected and thus current can flow through the gate (G) and cathode (K) of the SCR as it is a complete circuit. This is like opening the gate of the SCR. And the main current can flow through the anode (A) and the cathode (K), which lights up the LED. Release the push switch. The LED will still continue to glow! This is because the "gate" is already opened by the initial current from the upper circuit and therefore the main current will continue to flow through the SCR. Therefore if you want to switch off the LED, you will have to switch off the main switch.

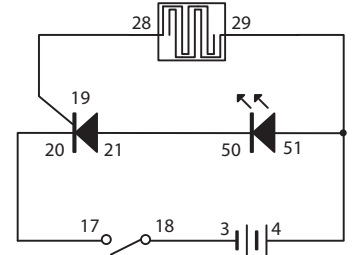


EXPERIMENT 22

A practical example of SCR

Wiring Sequence 21-50, 51-4-29, 28-19, 20-17, 18-3

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. Nothing happens. When there is a drop of water on the touch plate, the LED will light up. Even the touch plate is dried after that, the LED will still continue to glow, as the gate of the SCR has been opened. Base on this principle, you can set up a monitor to indicate that if the tide has ever reached a certain height, or if there is any rain during the period that you are out of home for a trip, or if something has ever got wet..... etc.

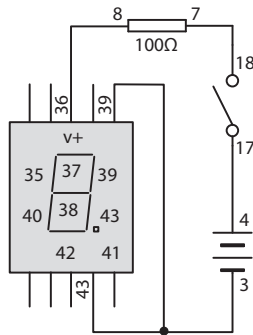


EXPERIMENT 23

Digital segment LED displaying "1"

Wiring Sequence 4-17, 18-7, 8-36, 3-39-43

- Complete all wiring connections as indicated in the sequence. By switching ON, the digital segment LED will display "1".

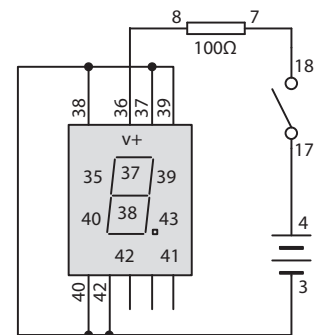


EXPERIMENT 24

Digital segment LED displaying "2"

Wiring Sequence 4-17, 18-7, 8-36, 3-37-38-39-40-42

- Complete all wiring connections as indicated in the sequence. By switching ON, the digital segment LED will display "2".

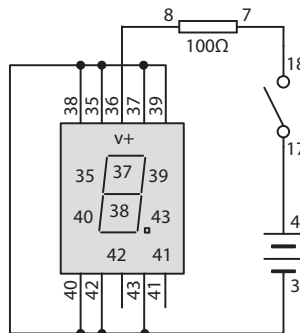


EXPERIMENT 25

Digital segment LED displaying "8"

Wiring Sequence 4-17, 18-7, 8-36, 3-35-37-38-39-40-42-43

- Complete all wiring connections as indicated in the sequence. By switching ON, the digital segment LED will display "8".

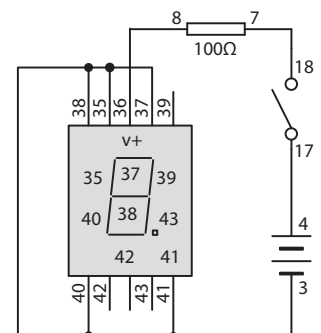


EXPERIMENT 26

Digital segment LED displaying "F."

Wiring Sequence 4-17, 18-7, 8-36, 3-35-37-38-40-41

- Complete all wiring connections as indicated in the sequence. By switching ON, the digital segment LED will display "F."

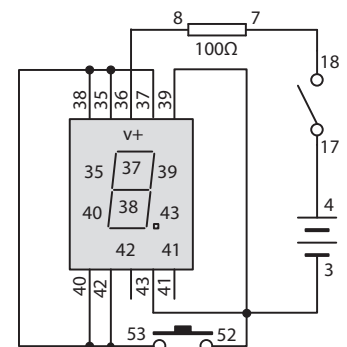


EXPERIMENT 27

Digital segment LED switching between "1" and "8"

Wiring Sequence 4-17, 18-7, 8-36, 3-39-43-52, 53-35-37-38-40-42

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. The digital segment LED will display "1". By pressing the push switch, the digital segment LED will display "8".

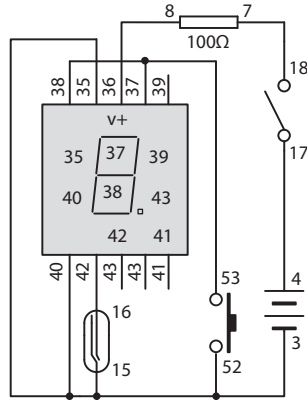


EXPERIMENT 28

Digital segment LED switching among "I", "L", "F" and "E"

Wiring Sequence 4-17, 18-7, 8-36, 35-40-15-3-52, 53-37-38, 42-16

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. The digital segment LED will display "I". If you access the reed switch with the magnetic pole, the digital segment LED will display "L"; or if you press the push switch, the digital segment LED will display "F". And if you activate both switches at the same time, it will display "E".

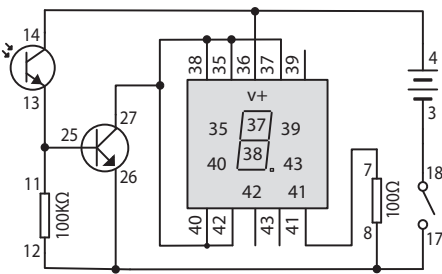


EXPERIMENT 30

Light control seven-segment LED display - E (Light Type)

Wiring Sequence 3-18, 41-7, 17-26-12-8, 11-13-25, 4-36-14, 27-35-38-37-40-42

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. Then power indicator will light up and letter E will show on display. When you cover the light sensor, only the power indicator will light up on display. If you uncover the light sensor, then letter E will light up again.

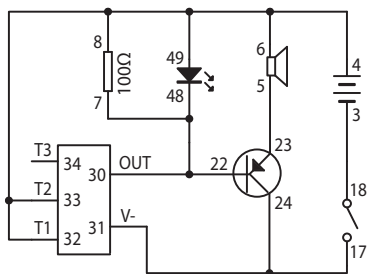


EXPERIMENT 32

Dog barking sound with flashing LED

Wiring Sequence 3-18, 4-6-8-32-33-49, 5-23, 7-22-30-48, 17-24-31

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. The speaker will produce dog barking sound and the LED will flash to the rhythm of it.

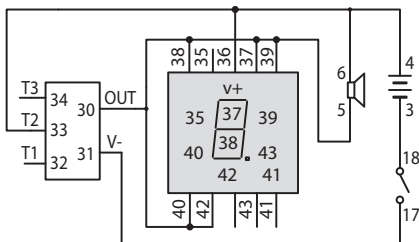


EXPERIMENT 34

Rooster crowing sound and flashing digit "2"

Wiring Sequence 3-18, 4-6-36-33, 17-31, 5-30-37-38-39-40-42

- Complete all wiring connections as indicated in the sequence. By switching ON, the speaker will produce rooster crowing sound. The display screen will also display digit "2" and flash to the rhythm of it.

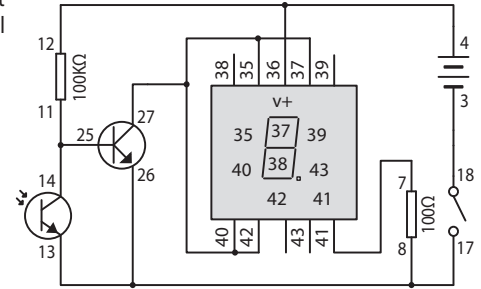


EXPERIMENT 29

Light control seven-segment LED display - C (Dark Type)

Wiring Sequence 3-18, 11-25-14, 4-36-12, 13-17-26-8, 7-41, 27-35-37-40-42

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. If there is enough light in the room, then only the power indicator on display lights up. Cover the light sensor and the display will show letter C. If you uncover the light sensor, the letter C will disappear.

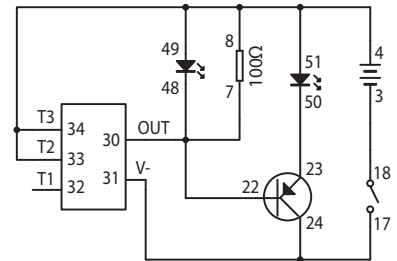


EXPERIMENT 31

Flashing LEDs

Wiring Sequence 3-18, 8-4-51-49-33-34, 50-23, 7-22-30-48, 17-24-31

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. Then the LEDs will flash.

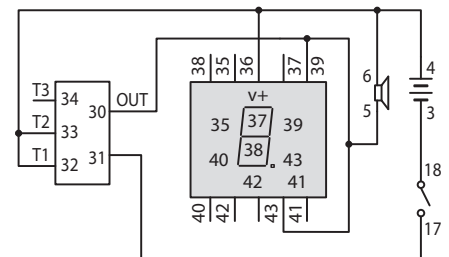


EXPERIMENT 33

Dog barking sound and flashing digit "1"

Wiring Sequence 3-18, 4-6-36-32-33, 17-31, 30-39-43-5

- Complete all wiring connections as indicated in the sequence. By switching ON, the speaker will produce dog barking sound. The display screen will also display digit "1" and flash to the rhythm of it.

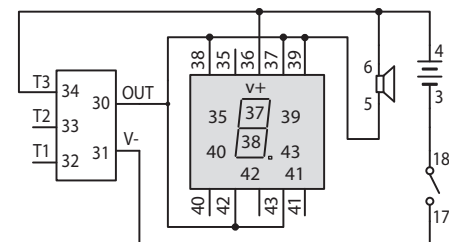


EXPERIMENT 35

Cat meowing sound and flashing digit "3"

Wiring Sequence 3-18, 4-6-36-34, 17-31, 30-37-39-38-42-43-5

- Complete all wiring connections as indicated in the sequence. By switching ON, the speaker will produce cat meowing sound. The display screen will also display digit "3" and flash to the rhythm of it.

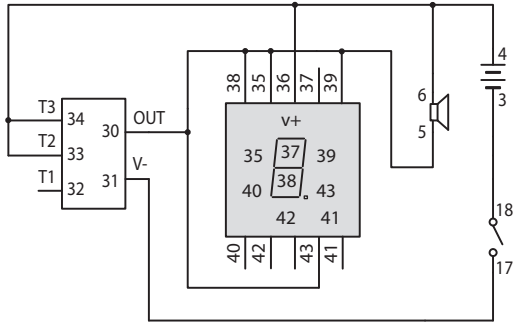


EXPERIMENT 36

Horse neighing sound and flashing digit "4"

Wiring Sequence **3-18, 4-36-33-34-6, 17-31, 30-35-38-39-43-5**

- Complete all wiring connections as indicated in the sequence. By switching ON, the speaker will produce horse neighing sound. The display screen will also display digit "4" and flash to the rhythm of it.

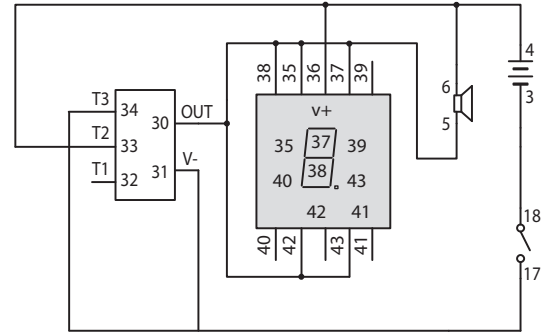


EXPERIMENT 37

Bird chirping sound and flashing digit "5"

Wiring Sequence **3-18, 4-6-36-33, 17-31-34, 5-30-35-37-38-42-43**

- Complete all wiring connections as indicated in the sequence. By switching ON, the speaker will produce bird chirping sound. The display screen will also display digit "5" and flash to the rhythm of it.

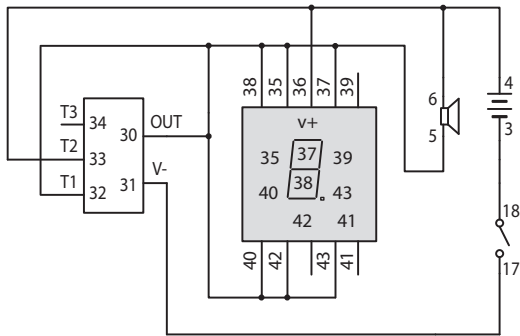


EXPERIMENT 38

Duck quacking sound and flashing digit "6"

Wiring Sequence **3-18, 4-6-36-33, 17-31, 5-30-32-35-37-38-40-42-43**

- Complete all wiring connections as indicated in the sequence. By switching ON, the speaker will produce duck quacking sound. The display screen will also display digit "6" and flash to the rhythm of it.

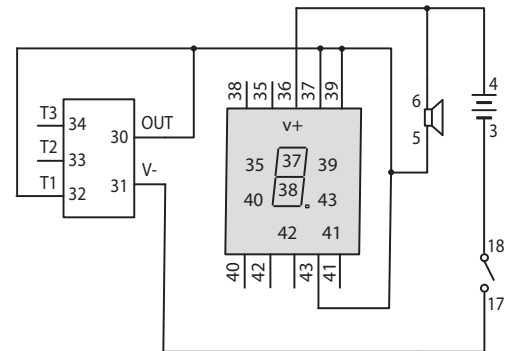


EXPERIMENT 39

Sheep baaing sound and flashing digit "7"

Wiring Sequence **3-18, 4-6-36, 17-31, 5-30-32-37-39-43**

- Complete all wiring connections as indicated in the sequence. By switching ON, the speaker will produce sheep baaing sound. The display screen will also display digit "7" and flash to the rhythm of it.

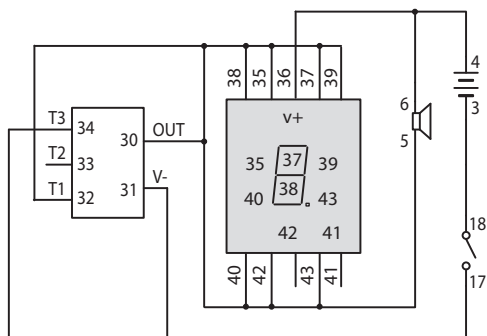


EXPERIMENT 40

Cuckoo calling sound and flashing digit "8"

Wiring Sequence **3-18, 4-6-36, 17-31-34, 5-30-32-35-37-38-39-40-42-43**

- Complete all wiring connections as indicated in the sequence. By switching ON, the speaker will produce cuckoo calling sound. The display screen will also display digit "8" and flash to the rhythm of it.

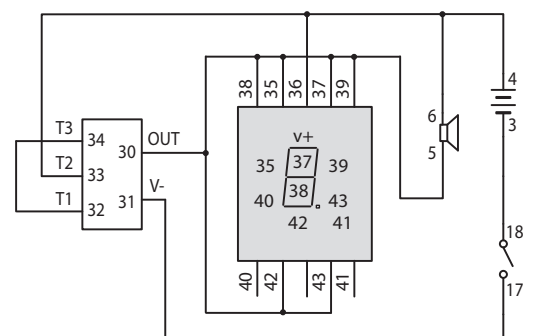


EXPERIMENT 41

Frog croaking sound and flashing digit "9"

Wiring Sequence **3-18, 4-6-36-33, 32-34, 5-30-35-37-38-39-42-43, 17-31**

- Complete all wiring connections as indicated in the sequence. By switching ON, the speaker will produce frog croaking sound. The display screen will also display digit "9" and flash to the rhythm of it.

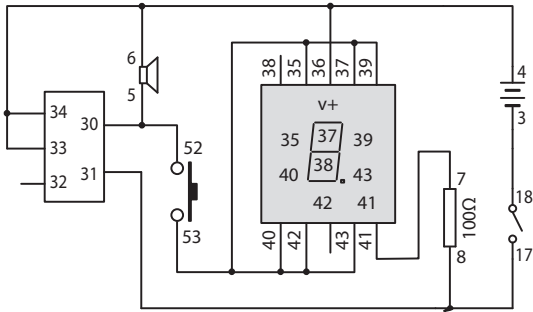


EXPERIMENT 42

Manual control horse neighing sound with push switch control flashing digit "0"

Wiring Sequence **3-18, 4-6-36-34-33, 5-30-52, 53-40-42-43-35-37-39, 41-7, 8-31-17**

- Complete all wiring connections as indicated in the sequence. By switching ON, the speaker will produce horse neighing sound, and the dot at the bottom right corner of the display screen will light up. And then by pressing the push switch without releasing it, digit 0 will light up and flash to the rhythm of the horse neighing sound.

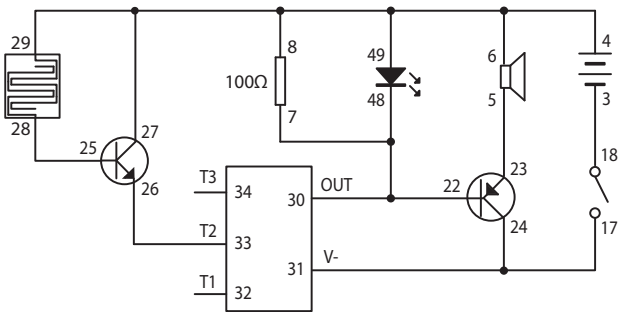


EXPERIMENT 44

Touch control rooster crowing sound with flashing LED

Wiring Sequence **3-18, 17-24-31, 30-7-22-48, 33-26, 28-25, 23-5, 29-27-8-49-6-4**

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. Use your finger to touch the touch plate. The speaker will produce rooster crowing sound and the LED will flash to the rhythm of it. Note that if there is no response, you may have to dampen your finger and try again.

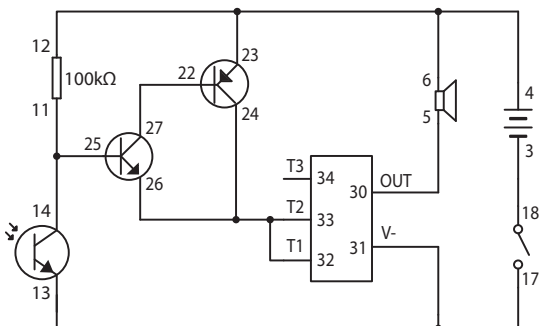


EXPERIMENT 46

Darkness activated dog barking sound

Wiring Sequence **3-18, 4-6-23-12, 5-30, 17-31-13, 24-26-33-32, 22-27, 11-14-25**

- Complete all wiring connections as indicated in the sequence. Switch on the main switch and cover the light sensor completely. Then you can hear dog barking sound coming from the speaker. Once you uncover the light sensor, the dog barking sound will stop.

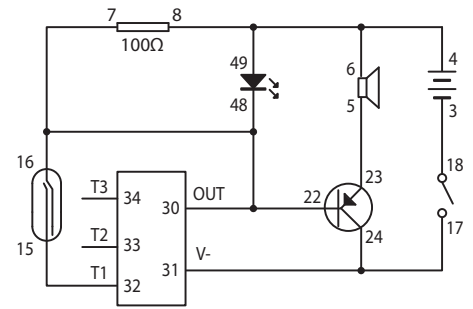


EXPERIMENT 43

Magnet control sheep baaing sound with flashing LED

Wiring Sequence **3-18, 17-24-31, 32-15, 16-7-30-22-48, 49-8-6-4, 5-23**

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. Access the reed switch with the magnetic pole. The speaker will produce sheep baaing sound and the LED will flash to the rhythm of the sheep baaing sound.

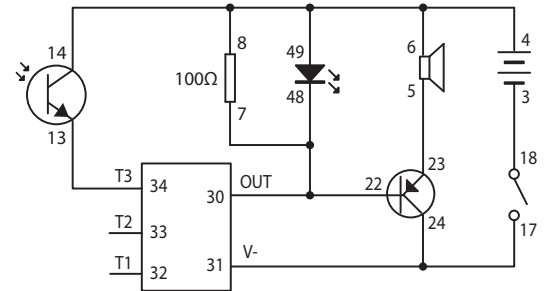


EXPERIMENT 45

Light control cat meowing sound with flashing LED

Wiring Sequence **5-23, 22-48-7-30, 31-24-17, 18-3, 4-6-8-49-14, 13-34**

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. When there is light shone on the light sensor, the speaker will produce cat meowing sound and the LED will flash to the rhythm of it.

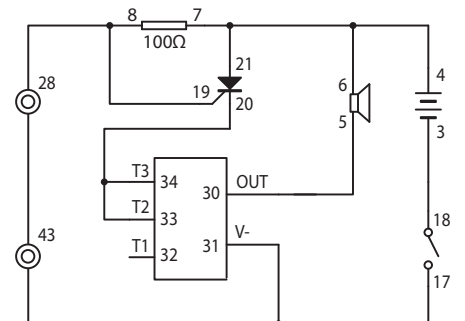


EXPERIMENT 47

Security alarm based on wiring disconnection

Wiring Sequence **3-18, 17-43-31, 30-5, 4-6-21-7, 8-28-19, 20-33-34, 28-43**

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. Nothing happens. Then when you disconnect the wire connecting spring 28 to 43, the speaker will produce horse neighing sound! This circuit can be used as an alarm system. For example, when somebody trips on the alarm string, horse neighing sound will warn you of a trespasser!

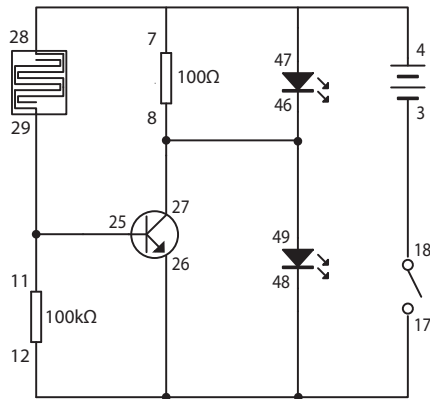


EXPERIMENT 48

Water level LED alarm

Wiring Sequence 3-18, 4-7-28-47, 17-48-12-26, 8-27-49-46, 11-29-25

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. Drop a drop of water on the touch-plate. Then the multi-color LED will light up and the blue LED will extinguish. Wipe the water off the touch-plate. Then the blue LED will light up and the multi-color LED will extinguish. This principle can be used for water-level warning. Have a similar circuit at the place where the water level is needed to be supervised. When the water-level is beyond warning level, the multi-color LED will light up, and the blue LED will extinguish. When the water level is below warning level, the multi-color LED will extinguish and the blue LED will light up.

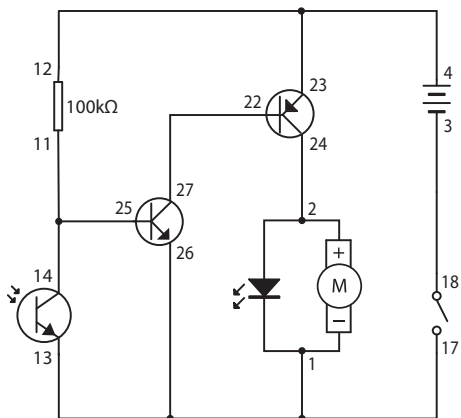


EXPERIMENT 50

Darkness activated spinning LED light

Wiring Sequence 3-18, 4-23-12, 26-17-1-13, 24-2, 22-27, 11-14-25

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. Cover the light sensor, and the spinning LED will be on. Uncover the light sensor, and then the spinning LED will turn off.

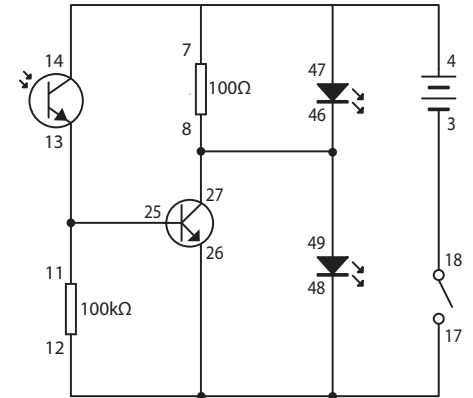


EXPERIMENT 49

Light intensity indicator

Wiring Sequence 3-18, 4-7-14-47, 17-12-26-48, 8-27-46-49, 11-13-25

- Complete all wiring connections as indicated in the sequence. Switch on the main switch. When there is light shining on the light sensor, the multi-color LED will light up, but the blue LED will not. Cover the light sensor completely. Since no light is shining on it, the multi-color LED will extinguish and the blue LED will light up. When there is nothing covering the light sensor, the multi-color LED will light up and the blue LED will extinguish again. This can be used as a light intensity indicator.

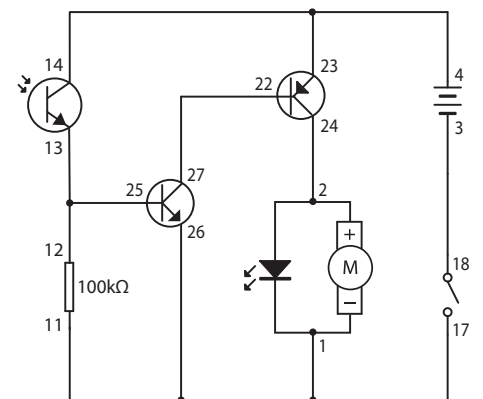


EXPERIMENT 51

Light control spinning LED light

Wiring Sequence 3-18, 4-23-14, 26-17-1-11, 24-2, 22-27, 12-13-25

- Complete all wiring connections as indicated in the sequence. Switch on the main switch, and then the spinning LED will be on. When the light sensor is covered, the spinning LED will be off. Light is the switch of the spinning LED in this circuit.



GLOSSARY

Battery – A source of energy. It contains chemicals which will undergo chemical reaction to produce electricity when a circuit is connected.

Circuit – A system of interconnected components / devices such as power source, resistors, capacitors and transistors...etc.

Diode – A device which is used in electric circuitry to allow an electric current to flow in single direction and block it in the reverse direction.

IC (Integrated Circuit) – A small electronic device made of a semiconductor material and is used for a variety of devices, including microprocessors, electronic equipment and automobiles.

LED (Light Emitting Diode) – A diode emits light when current is passing through it.

Light Sensor – There are different types of light sensor. The one used here is a phototransistor. When light falls on it, it is like a switch connected and so current is allowed to pass through it.

Motor – A device that produce rotational motion when electricity is applied.

Reed Switch – A magnetically controlled switch made to open and close a circuit.

Resistance – A measurement of the degree to which an object opposes an electrical current through it.

Resistor – A device designed for possessing resistance.

Seven-Segment LED Display – A display device which is commonly used in electronic circuits or equipment as decimal numeric display or indicator.

Speaker – A device that changes electrical signals to sound.

Switch – A device for opening and closing power source to a circuit

Transistor – A semi-conductor material device that amplifies a signal and opens or closes a circuit.

Wire – A conductor that conducts electricity. Connecting a wire is like providing a path that allows electricity to flow through.



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