

**WARNING: BATTERIES ARE TO BE INSERTED WITH THE CORRECT POLARITY (+ AND -). DO NOT MIX DIFFERENT TYPES OF BATTERIES OR NEW AND USED BATTERIES. NON-RECHARGEABLE BATTERIES ARE NOT TO BE RECHARGED. RECHARGEABLE BATTERIES ARE ONLY TO BE CHARGED BY AN ADULT. RECHARGEABLE BATTERIES ARE TO BE REMOVED FROM THE TOY BEFORE BEING CHARGED. THE SUPPLY TERMINALS ARE NOT TO BE SHORT-CIRCUITED. REMOVE BATTERIES FROM THE TOY WHEN NOT IN USE FOR EXTENDED TIME OR WHEN BATTERIES BECOME EXHAUSTED. BATTERY INSTALLATION BY AN ADULT IS REQUIRED. DISPOSE OF BATTERIES RESPONSIBLY. DO NOT DISPOSE OF IN FIRE.**

**WARNING: CHOKING HAZARD**  
SMALL PARTS. NOT FOR CHILDREN UNDER 3 YEARS.

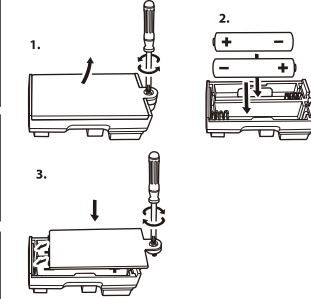
**WARNING: HAIR ENTANGLEMENT MAY RESULT IF THE CHILD'S HEAD IS TOO CLOSE TO THE MOTORISED UNIT OF THIS TOY ADULT SUPERVISION AND ASSISTANCE IS REQUIRED.**

**WARNING: FOR SAFETY REASONS, REMOVE ALL TAGS, LABELS AND PLASTIC FASTENERS BEFORE GIVING THIS TOY TO YOUR CHILD.**

**WARNING: CONTAINS FUNCTIONAL SHARP POINT ON THE LEADS.**

PRODUCT MAY VARY SLIGHTLY FROM IMAGE SHOWN. PLEASE KEEP THE PACKAGING FOR FUTURE REFERENCE.

To insert batteries please unscrew battery cover with a screw driver. Insert the required batteries in accordance with battery polarity with + and - ends in the right position and then fix screw on the battery door to close the battery compartment case.



2 X AA BATTERIES  
REQUIRES 2 X 1.5V AA BATTERIES (NOT INCLUDED).

- EXPERIMENTS**
- Rotor (Flying Fan)
  - Simple LED circuit
  - Rotor (Flying Fan) and LED
  - Red and green LED
  - Basic circuit operation of LED
  - Diode and capacitor discharge
  - LED "AND Gate" circuit
  - LED "NOT Gate" circuit (with flying fan for extra excitement)
  - LED "OR Gate" circuit (with flying fan for extra excitement)
  - Time controller
  - Morse code training kit
  - Delay type fan
  - Slow down type fan
  - Microphone triggered fan
  - Adjustable LED
  - Speed adjustable fan

**COMPONENTS IN THIS KIT**

Description	Quantity
Circuit Board Unit	1 piece
Connecting Wire	10cm x 10 pieces, 20cm x 6 pieces
Instruction Manual	1 piece

**WIRING SEQUENCE AND CONNECTION**

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

Bend the spring terminal over and insert the exposed shiny conductor part of the wire into the spring terminal. Make sure the wire is securely connected to the 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 connections to see whether they are properly connected or the insulated plastic part of the wire is inserted into the spring terminal.

**EXPERIMENT 10 LED "NAND Gate" circuit (with flying fan for extra excitement)**  
Wiring Sequence: 4-14, 13-7-30, 3-1, 2-19-24, 20-15, 13-23

- Complete all wiring connections as indicated in the sequence.
- The LED will automatically light up.
- The LED will be turned off only when both the push switch and main switch are switched on. This is called "NAND gate".
- "NAND gate" is the exact opposite of "AND gate".
- As an extra fun element, the fan will spin when the LED is off! After a few seconds, when you have the LED switched on again, the fan will fly up from the motor!

A	B	C
0	0	1
0	1	0
1	0	0
1	1	1

**EXPERIMENT 11 LED "NOR Gate" circuit (with flying fan for extra excitement)**  
Wiring Sequence: 4-16-24-14, 3-1, 2-19-23-13, 20-15

- Complete all wiring connections as indicated in the sequence.
- The LED will automatically light up.
- When both the main switch and push switch are off, then the LED will light up. When the main switch or push switch is on, the LED will be off. This is known as "NOR Gate".
- "NOR Gate" is the exact opposite of "OR Gate".
- As an extra fun element, the fan will spin when the LED is off! After a few seconds, when you have the LED switched on again, the fan will fly up from the motor!

A	B	C
0	0	1
0	1	0
1	0	0
1	1	0

**EXPERIMENT 12 Time controller**  
Wiring Sequence: 4-14, 13-7-30-24, 23-25-22, 3-5-10-21, 6-9, 8-29-12, 11-26

- Complete all wiring connections as indicated in the sequence.
- Switch on the main switch.
- By pressing the push switch, the LED will light up.
- After you have released the push switch, just wait for some time and see. The LED light will gradually extinguish.

**EXPERIMENT 13 Morse code training Kit**  
Wiring Sequence: 4-24, 23-19, 16-20, 3-15

- Complete all wiring connections as indicated in the sequence.
- By tapping the push switch, the LED will flash. This is equivalent to Morse code.
- By hearing the Morse-Code table, it is possible to send messages.

**Objective :**

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

**Note :** Remember to untie the string which ties the flying disc/capacitor filter (if available) to the motor before starting the experiment. When the motor is rotating, do not use any object to touch the motor. Do not aim the fan at eyes or face. Do not aim the fan at people or animals.

**EXPERIMENT 1 Rotor (Flying Fan)**  
Wiring Sequence: 4-14, 13-2, 1-3

- Complete all wiring connections as indicated in the sequence.
- Switch on the main switch.
- You can see the fan spinning. After a few seconds, when you switch off the main switch, the fan will fly up from the motor.

**EXPERIMENT 2 Simple LED circuit**  
Wiring Sequence: 4-14, 13-6, 5-3

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

**EXPERIMENT 3 Rotor (Flying Fan) and LED**  
Wiring Sequence: 4-14, 3-1-5, 13-2-6

- Complete all wiring connections as indicated in the sequence.
- Switch on the main switch. The fan will spin and the LED will light up dimly.
- When you switch off the main switch, the LED will extinguish and the fan will fly up from the motor.
- If you take away the fan first and repeat the experiment again, this time the LED will light up more brightly!

**EXPERIMENT 4 Red and green LED**  
Wiring Sequence: 4-14, 13-18-16, 19-17-15, 3-20

- Complete all wiring connections as indicated in the sequence.
- Switch on the main switch.
- When you switch off the main switch, both LEDs will be turned off.

**EXPERIMENT 5 Basic circuit operation of LED**  
Wiring Sequence: 4-14, 3-5-20, 6-19-24-15, 13-16-23

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

**EXPERIMENT 6 Diode and capacitor discharge**  
Wiring Sequence: 4-14, 3-17-27-5, 13-32-20, 18-19, 31-28-23, 6-24

- Complete all wiring connections as indicated in the sequence.
- Switch on the main switch. The small red LED will light up. Current flowing from the diode will charge the capacitor at the same time.
- When you press the push switch, the large red LED will light up. Release the push switch so that the large red LED will be turned off.
- Now switch off the main switch. The small red LED will extinguish. However if you press the push switch at this time, due to the release of stored electrical charge of the capacitor, the large red LED will light up for a brief moment!

**EXPERIMENT 7 LED "AND Gate" circuit**  
Wiring Sequence: 4-24, 14-23, 13-16, 15-19, 20-2, 3-1

- Complete all wiring connections as indicated in the sequence.
- If you only switch on the main switch, or only press the push switch alone, the LED will not light up.
- If you switch on the main switch AND press the push switch together, then LED will light up.
- This is known as "AND Gate". Both switches have to be switched on in order to activate the LED.

A	B	C
0	0	0
0	1	0
1	0	0
1	1	1

**EXPERIMENT 8 LED "NOT Gate" circuit (with flying fan for extra excitement)**  
Wiring Sequence: 4-16-14, 3-1, 2-13-19, 20-15

- Complete all wiring connections as indicated in the sequence.
- LED will automatically light up even though the main switch is off.
- When you switch on the main switch, the LED will turn off.
- For the LED, this is known as "NOT Gate" - the LED lights up when the switch is off. The LED is off when the switch is on.
- As an extra fun element, the fan will spin when the LED is off! After a few seconds, when you have the LED switched on again, the fan will fly up from the motor!

A	B
0	1
1	0

**EXPERIMENT 9 LED "OR Gate" circuit**  
Wiring Sequence: 4-24-14, 3-1, 2-20, 19-15, 16-13-23

- Complete all wiring connections as indicated in the sequence.
- To light up the LED, you can either press the push switch OR switch on the main switch.
- This is known as "OR Gate". Switching on either switch OR switching on both switches will activate the LED.

A	B	C
0	0	0
0	1	1
1	0	1
1	1	1

**EXPERIMENT 14 Delay type fan**  
Wiring Sequence: 4-14, 13-7-30, 8-12, 29-37, 11-36, 35-22, 2-10-21-9, 1-3

- Complete all wiring connections as indicated in the sequence.
- Switch on the main switch. Because of the capacitor, the fan will not spin immediately. The fan will start to spin after a few seconds.
- NOTE: If the experiment does not work, you may need to "discharge" the capacitor first. To "discharge", connect any wire to 21-22 for a second. This way the electricity stored in the capacitor will be "discharged" and then the experiment can work again.

**EXPERIMENT 15 Slow down type fan**  
Wiring Sequence: 4-14, 13-7-24, 23-25, 11-22-26, 1-3-10-21, 2-9, 8-12

- Complete all wiring connections as indicated in the sequence.
- Switch on the main switch. When you press the push switch, the fan will start spinning.
- When you release the push switch, the fan will not stop immediately, but will gradually slow down and come to a stop.

**EXPERIMENT 16 Microphone triggered fan**  
Wiring Sequence: 4-14, 13-7-20, 19-37, 8-12, 11-36-34, 2-9, 3-1-10-33-35

- Complete all wiring connections as indicated in the sequence.
- Switch on the main switch and adjust the variable resistor to a position that will not trigger the fan to spin. If it is already spinning, switch off the main switch and adjust the variable resistor slightly, then switch on the main switch again to see. You will need to try a few times to figure out the correct position.
- Once you have correctly figured out the right position, blow air towards the microphone or tap the microphone to trigger the fan!

**EXPERIMENT 17 Alternating LED and fan**  
Wiring Sequence: 4-14, 13-6-7-20, 5-2-9-21, 8-12, 11-36-22, 1-3-35-10, 19-37

- Complete all wiring connections as indicated in the sequence.
- Switch on the main switch and try to adjust the variable resistor slowly.
- Both the LED and fan will be activated alternately.
- The alternate frequency for both devices depends on the set value of the variable resistor.

**EXPERIMENT 18 Adjustable LED**  
Wiring Sequence: 4-14, 13-20, 19-37, 16-36, 3-15

- Complete all wiring connections as indicated in the sequence.
- Switch on the main switch.
- By adjusting the variable resistor, you can adjust the brightness of the LED.

**EXPERIMENT 19 Speed adjustable fan**  
Wiring Sequence: 4-14, 13-7-20, 8-12, 19-37, 11-36, 35-3-1, 2-10-9

- Complete all wiring connections as indicated in the sequence.
- Switch on the main switch.
- By adjusting the variable resistor, you can adjust the spinning speed of the fan.

**GLOSSARY**

**Amplifier** - An electronic circuit that amplifies the signal that is sent to it. The amplifying component can be a transistor, vacuum tube or appropriate magnetic device.

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

**Capacitance** - A measurement of the capacity of a capacitor for storing electric charge.

**Capacitor** - A device which consists of two conductors that are separated by an insulator. It is designed for storing electrical charge or as a filter in the circuit.

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

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

**Diode** - A device used in electric circuitry to allow an electric current to flow in a single direction and block it in the reverse direction.

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

**Microphone** - A device converts sound into an electrical signal.

**Motor** - A device converts electrical energy to mechanical motion.

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

**Resistor** - A device designed for possessing resistance.

**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.

**Truth Table** - A mathematical table used to logically compute the values of logical explication and as a decision procedure.

**Variable Resistor** - A resistor with a device of adjustable resistance in the electronic / electrical circuit.

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

If at any time in the future you should need to dispose of this product please note that waste electrical products should not be disposed of with household waste. Please check where facilities exist. Check with your local authority or retailer for recycling advice. (Waste Electrical and Electronic Equipment Directive)

**KEYCODE: 43-264-346**

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