EduScience Lab

8+

28 Pieces


V37326

2 Ways to Interact

1 DIGITAL Programming

2 MANUAL Programming

Bluetooth®

Light & sound effects

SCIENCE + TECHNOLOGY + ENGINEERING + MATH
STEM
TOYSRUS.COM/STEM

# Programmable Cyber Robot

**Read and keep these instructions for future reference.**
**Read the information about compatibility and connection on page 12 carefully.**
WARNING! Only for use by children aged 8 years and older.
Instructions for parents are included and have to be observed.

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

AA x4 NOT INCLUDED

⚠ WARNING: Adult assembly required.

## BATTERY INSTALLATION AND REMOVAL

1) Ensure the electrical device is turned off.
2) Only adults should install and replace the batteries.
3) Open the battery compartment. You will need to unscrew it (using a screwdriver).
4) Remove old batteries.
5) Insert the 4 x 1.5 Volt AA/LR6 alkaline batteries by following the polarity indicated on the compartment.
6) Close the battery compartment by tightening the screw.
7) Ensure the electrical device now works.

## INSTALLATION FOR SUPERVISING ADULTS

This toy is suitable for children of 8 years and upwards.
We recommend the presence of an adult during assembly, handling and installation of the electrical parts.

## OTHER RECOMMENDATIONS:

- Batteries are dangerous if swallowed; keep away from children.
- Always remove batteries prior to long-term storage.
- Do not try to open the batteries.
- Do not throw batteries into a fire.

## HOW TO INSTALL BATTERIES

ASK AN ADULT TO HELP YOU

POWER SUPPLY: D.C. 6V ⎓
BATTERIES: 4 x 1.5V AA/LR6
*(batteries are not included)*

## INSTRUCTIONS FOR BATTERY DISPOSAL

The symbol  indicates that dead batteries must be disposed of in accordance with current regulations for waste disposal. Chemical symbols for mercury (Hg), cadmium (Cd) and/or lead (Pb) which appear below the crossed out wheelie bin symbol indicate that there is a significant percentage of the relative substance in the battery. These substances are highly damaging to the environment and human health. The correct disposal of batteries allows their isolation and the targeted treatment of harmful substances, and allows recycling of precious primary materials, reducing negative effects on people and the environment.
The disposal of worn-out batteries in landfills or the environment significantly increases the risk of water pollution.
Pursuant to European Directive 2013/56/EU, it is prohibited to dispose of batteries and accumulators as urban waste and consumers are obliged to participate in separated waste collection so as to facilitate the treatment and recycling of the same.

## INSTALLATION FOR CORRECT USE OF PRODUCTS WITH REPLACEABLE BATTERIES

**WARNING!**

- Batteries must be installed by an adult.
- The + and – symbols on the batteries must be lined up correctly.
- Old batteries must be removed from the product.
- The power terminal block are not to be short-circuited.
- Never touch the contacts inside the battery case, as this could cause a short circuit.
- The rechargeable batteries must be removed prior to being charged. Only recharge under adult supervision.
- Never attempt to recharge non-rechargeable batteries.
- Different types of batteries or new and used batteries should not be used at the same time.
- Do not mix old and new batteries.
- Do not mix alkaline, standard (carbon-zinc), or rechargeable batteries.
- The wires are not to be inserted into socket-outlets.

**CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.**

**INFORMATION TO THE USER:**

This equipment has been tested and found to comply wit or a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

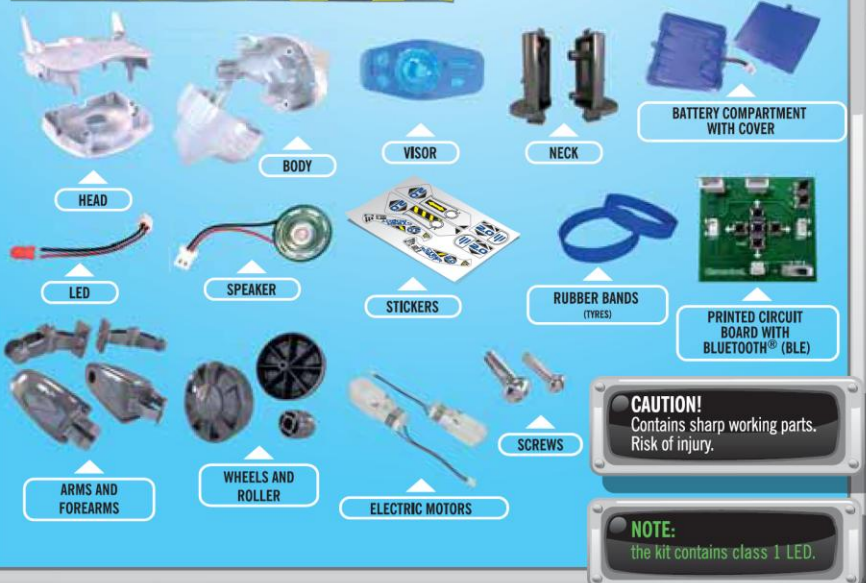
**This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.**

# INTRODUCTION

Before you embark on this **exciting adventure** to find out all about **robotics**, try and think about the different ways **robots** are used in our everyday lives today. Industry, medicine, domestic cleaning and space travel are just a few examples of situations where they play an indispensable role. You've probably already seen a few of them in real life, but have you ever asked yourself **how they work**?

This **unique scientific kit** has been created to show you **how to build** and **control a robot**, so it *obeys your commands*. Furthermore, thanks to **Bluetooth® technology** and the **free APP**, you can have fun **programming** your robot, so you can control it in **real-time** and teach it to **understand** your **commands**. With **Cyber Robot** you can do lots of **fun activities**, as well as discover the basic principles of **programming**!

# KIT CONTENTS




**CAUTION!**
Contains sharp working parts.
Risk of injury.

**NOTE:**
the kit contains class 1 LED.

## BLE (BLUETOOTH® LOW ENERGY) COMPATIBLE

The Cyber Robot comes with energy-saving Bluetooth® technology (BLE = Bluetooth® Low Energy), which is only compatible with certain devices. This means the APP will only work on the smartphones or tablets on the following list:

**Apple®**
- iPhone® 4S and later
- iPad® 3 and later
- iPad Air® and later
- iPad mini™ 1 and later
- iPod touch® 5th Generation and later

**Android™**
- All devices with BLE and Android™ 4.3 software (and later)

***Not compatible with Windows® operating systems***

**WARNING**
In order to ensure correct function of the electric motor, a small quantity of grease is added during the manufacturing process. As grease can melt at high temperatures, it may dirty the motor. However, it can simply be wiped off with a piece of towel or a napkin. The grease used is neither toxic nor hazardous.

## TABLE OF CONTENTS

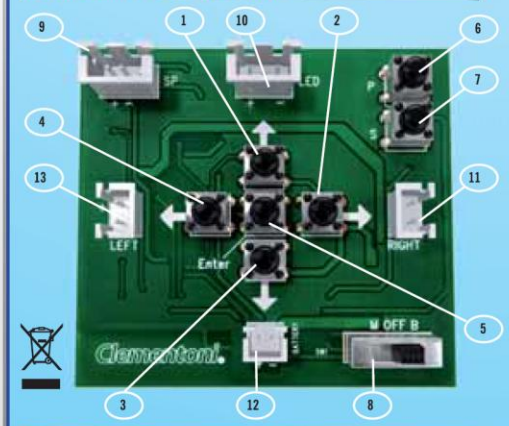


**PLEASE NOTE!**
THE ROBOT'S SPEED AND ACCURACY OF MOVEMENT TEND TO DECREASE WITH THE GRADUAL REDUCTION OF THE BATTERY CHARGE. WHEN THE TOTAL VOLTAGE OF THE BATTERIES FALLS BELOW A CERTAIN THRESHOLD, ROBOT OPERATION MAY BE COMPROMISED AND THE BATTERIES MUST THEREFORE BE REPLACED.

# YOUR ROBOT'S ELECTRONIC COMPONETS

To understand how the Cyber Robot is made and works more clearly, the following pages include a description and analysis of the principal electronic components: circuit board, motor, battery compartment, LED and speaker.

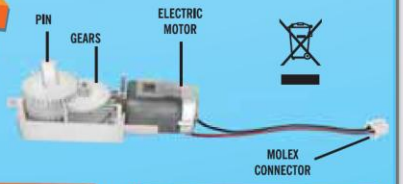
## 1-THE PRINTED CIRCUIT BOARD



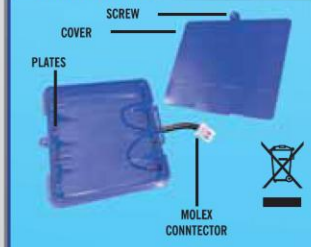

| N. | COMPONENTS |
|---|---|
| 1 | Forward button |
| 2 | Right button |
| 3 | Back button |
| 4 | Left button |
| 5 | Enter button |
| 6 | Programming button |
| 7 | Sound button |
| 8 | Switch (Manual-OFF-Bluetooth®) |
| 9 | Speaker Molex connector |
| 10 | LED Molex connector |
| 11 | Right engine Molex connector |
| 12 | Molex battery compartment |
| 13 | Left engine Molex connector |

## 2-THE MOTORS AND GEARS

The two motors which make your robot move each have two completely separate parts. As you can see in the picture, there's the actual **electric motor** on one side, connected to a box with a set of **gears**. The gears reduce the speed of rotation of the motor, which would otherwise make the wheels turn too quickly.

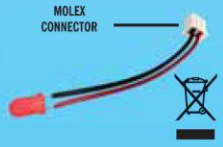



## 3-THE BATTERY COMPARTMENT



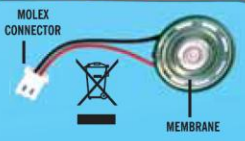

The battery compartment is simply a container for the batteries, through which the robot **absorbs energy**. Inside the compartment there are metal plates that allow electric current to flow.

## 4-The LED




A LED (Light Emitting Diode) is a special type of diode which **emits light**. When it receives an electric pulse, it produces the light as a response. The first LED was developed in **1962 by Nick Holonyak Jr.**, an American inventor.

## 5-THE SPEAKER

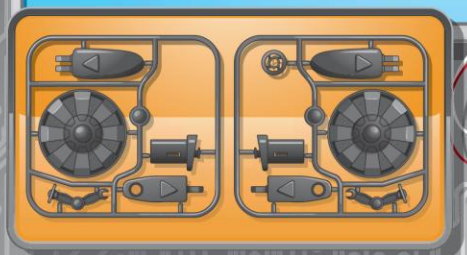



The speaker is the electronic component that enables the robot to make the sounds that are recorded in its internal memory. The main parts consist of a magnet, a plastic membrane and a copper coil (voice coil). The magnetic field generated by the magnets and the electrical current transmitted to the voice coil make the membrane vibrate, which moves the air and produces sound.

# ASSEMBLY

**NOTE**: some of the components of the robot are attached to two plastic frames. Once you've removed the components from the frame, ask an adult to remove any sharp surfaces with a file or sandpaper.
**In order to ensure smooth movement of the robot, it is very important to make sure this is carefully done on the wheels.**

**CAUTION!**
Ask an adult to help you!



**1**

Insert the LED into the visor, making sure the **red wire is on the left** (look at the figure carefully to see the right position).

**2**

Insert the visor with the LED into the lower half of the head, making sure the cables are pushed through the appropriate hole on the back.

**3**

Assemble the two forearms by slotting the inner and outer pieces together, as shown in the figure.

**4**

Push the rounded end of the arm into the hole on the forearms until it clicks into place (the ball joint in the center **must be facing upwards).**

**5**

Now attach the two assembled arms to the lower half of the head, by inserting the rectangular ends into the appropriate slot.

## 6

After attaching the arms and the visor with the LED to the lower half of the head correctly, assemble the neck by joining the two matching halves together **(A)**, then insert it into the hole until it clicks into place **(B)**.

**NOTE:** The end of the neck **must be facing forwards.**


## 7

Attach the top of the head to the lower half of the head, making sure they slot together securely. The LED wires must come out of the hole on the back.
Due to the special design of the neck, the robot's head can turn 25° to the right and left.

## 8

Put the blue elastic bands (treads) onto the wheels, making sure they are inserted between the appropriate guides correctly. (**NOTE:** the **rough side** of the elastic bands must be **facing outwards**). If the treads get dirty during use, simply **take them off and wash them** in soapy water).

## 9

Insert the speaker into the appropriate hub inside the left half of the body, being careful **not to damage the welded joints.**

## 10

Insert the motor into both halves of the body, until the pins come out of the round holes. Push until you hear a click, but be careful not to damage the plastic wings, which are needed to hold the motor in place.


## 11

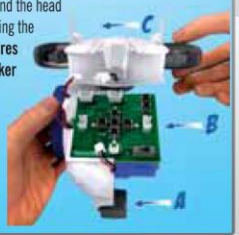
Once the motors have been installed, you will need to mount the wheels with the elastic tread onto the wheel housing. When you insert them, make sure you keep the motors firmly in their place, to stop them from coming out of their hubs.


## 12

When you have finished the previous operation, you must insert the **battery compartment** (with the batteries inserted and the cover closed) into the left side of the body, making sure it is aligned correctly with the guides. To insert the batteries into the compartment, please refer to **p. 2.**

## 13

Look at the figure carefully. On the left side of the robot (the one where you have assembled the motor, battery compartment and the wheel with the elastic tread), insert the following components in the following order: **wheel (A)**, **circuit board (B)** and the head with the **neck (C)**. When inserting the circuit board, make sure the **wires** of the **left motor** and the **speaker** have been passed through the appropriate holes correctly.




## 14

Now, attach the other half of the robot to the side with the wheel, motor and elastic tread and secure well, making sure all the joints slot together correctly. Also, check to make sure that the wires of the **motor on the right** come out of the hole on the right and that the wires for the **battery compartment** come out of the hole under the circuit board.

## 15

After assembling all of the components, connect the **5 Molex connectors** to the circuit board. To make this easier, the name of the component that needs to be connected is written on the printed circuit board (PCB): e.g. **LED**, **SP** (speaker), **Right** (right motor), **Left** (left motor), **Battery** (battery component). Furthermore, to avoid confusion, each component has a connector of a different shape and size.

## 16

Finally, to make the structure more stable, insert the 2 screws into the holes and tighten with a screwdriver.

## 17

When you have finished assembling the robot, you can apply the stickers to the mudguards, the side of the body and the head. To make sure you're putting them in the right place, use the pictures as a guide. Apply the stickers firmly to the plastic, making sure there are no creases.

**YOUR ROBOT IS NOW READY TO USE!**

**NOTE**: the arms have an elbow joint that allows the forearms to move **360°**. The robot's hands have **grasping fingers**, which have the ability to hold **small objects**.

**WARNING!**
BE CAREFUL NOT TO KNOCK OR DROP THE ROBOT TOO HARD. AS THE ROBOT IS MADE OF PLASTIC AND ELECTRONIC COMPONENTS, IMPROPER USE OR HANDLING COULD DAMAGE OR PREVENT THE TOY FROM WORKING.

## GENERAL CHARACTERISTICS OF THE APP

The Cyber Robot APP has been developed for **Android™** and **iOS** (by Apple®) operating systems, so it can be used by most of the smartphone and tablets on the market. Once the APP has been downloaded and installed (to do this, please follow the instructions in the next chapter), the APP will allow you to use the **Bluetooth® BLE** module and have fun with Cyber Robot in **three different play modes** (a complete description can be found on **p. 12**)

## DOWNLOADING THE APP

GET IT ON Google play

If your device has an Android™ operating system, you must log in to the Google Play™ store and search for the Cyber Robot APP, then download it to your device.

Download on the App Store

If your device has an iOS operating system, you need to access the App Store℠ and search for the Cyber Robot APP, then download it to your device.

## BLUETOOTH® CONNECTION BETWEEN DEVICE AND ROBOT

To use the APP, you must connect the device and the robot to Bluetooth®.

Follow these simple steps to activate the connection (instructions apply to both Android™ and iOS):

1 – Search for the APP in the App Store℠ (iOS devices) or Google Play™ store (Android™ devices) and download it to your device;

2 – Switch the Cyber Robot on, by flicking the switch to Bluetooth® mode **(B)**;
3 – Make sure your tablet or smartphone is switched on;
4 – Go the settings menu of your device and activate Bluetooth®;
5 – Launch the Cyber Robot APP and associate the robot by pressing the button with the Bluetooth® symbol, which you will find to the upper right of the user interface of the APP.

**NOTE: SOME ANDROID™ DEVICES MAY TAKE LONGER TO CONNECT THAN OTHERS. AS THESE PROBLEMS ARE RELATED TO THE HARDWARE AND SOFTWARE OF THE INDIVIDUAL DEVICES, UNFORTUNATELY, WE ARE UNABLE TO INTERVENE TO IMPROVE THE SITUATION. SHOULD YOU HAVE PROBLEMS DURING CONNECTION, PLEASE KEEP TRYING UNTIL YOU GET A CONNECTION.**

**WARNING!**
1- Once you have set the switch to B, connect your device within 30 seconds, otherwise you may lose the signal. The frequency of the Bluetooth® BLE signal tends to fade after 30 seconds.
2- If you lose the signal, turn off the APP (don't leave it in standby mode, but make sure that you don't have it running in the background) and carry out the connection procedure again, starting from point 2.
3- Each time you exit the APP, you will need to switch the robot back on and carry out the connection procedure again.

# THE APP PLAY MODES

THE APP COMES WITH 4 PLAY MODES:

PROGRAMMING MODE | REAL TIME | GYRO MODE | SELF-LEARNING

## 1 PROGRAMMING MODE_

This play mode allows you to program the robot, to create a sequence of commands with movements (which can be carried out at different speeds), sound and light effects. Before confirming the sequence, you can also have fun watching a virtual simulation of the different actions. Once you have sent the command via Bluetooth®, you can then photograph and video the robot as it carries out your commands.

## 2 REAL TIME_

By using the APP in Real Time mode, you can control the robot as if you were using a remote control or a joypad. Cyber Robot will carry out all of your commands in real time, without any delay in response times. Furthermore, you can focus in on the robot with the camera, so you can follow all of its movements on your smartphone or tablet screen.

## 3 GYRO MODE

NEW

This play mode uses the **gyroscope** or the **accelerometer** of your tablet or smartphone to control the Robot in real-time. **Tilt** your device and the Robot will move accordingly.
**Warning:** if your device does not have a gyroscope or an accelerometer, you will not be able to use this play mode.

## 4 SELF-LEARNING_

This play mode has the same user interface as the programming mode, with the addition of a **REC** button, which you can use to **record** all of the selected commands and send them in real time to the robot. In this way, you can teach your robot to **memorize routes**, so it will be able **to understand and follow** your commands at a later date. This mode also allows you to access the **camera**.

NOTE: for further information on 3 of these play modes (programming, real time and self -learning), please read the following pages, which will provide an in-depth explanation of all the APP's settings for tablets and smartphones.

# THE TABLET VERSION OF THE APP

## HOME APP

You can access one of the three play modes from the Home Page, by simply tapping your finger on one of the three options.

When the Bluetooth® symbol is lit up this means the connection has been activated.


To the top right of the screen there is a Bluetooth® symbol, which you can use to connect the device and check to see if the connection between the robot and the device is on or off.

- If you have followed the connection procedure on page 11 correctly the symbol should be lit up, which means the connection is active. If this doesn't happen, repeat the instructions on page 11 again, starting from point 2.
- Bluetooth® has a range of 30 feet. If you go out of this range the connection may be lost. In this case, the light of the Bluetooth® symbol will go off and you will need to connect again.
- To close the connection at any time, simply tap the Bluetooth® symbol.

# TABLET - PROGRAMMING MODE

As described on p. 12, the Programming mode allows you to create a command sequence that can be sent to the robot via Bluetooth®. This and the following pages describe all of the functions and characteristics of the user interface for this play mode.

## MAIN CHARACTERISTICS

The ACTIONS menu is used for programming the robot. Here you can create, save, change, delete, simulate and send the command sequence to the robot (please refer to the following chapters).

Camera option (for further information, please see p. 16).

Home button to return to the Home Page

Sound effect commands

Light effect commands


Movement commands

Commands for changing the speed (the movements window automatically updates itself to the selected speed).

# TABLET - PROGRAMMING MODE

## CREATING A COMMAND SEQUENCE

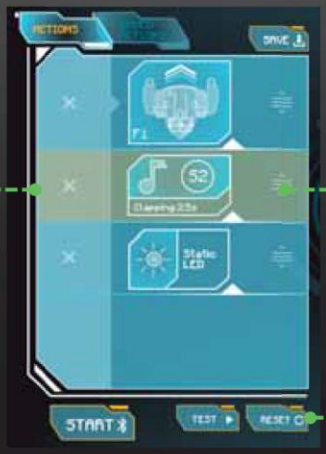

To create a command sequence, simply tap on the movement, sound and light effect commands. The selected commands will automatically make up the chosen sequence, which can be saved, simulated, changed, deleted or sent to the robot. In particular, the speed commands allow you to change the speed of the movements. **To view a key of the commands, please see p. 31.**

The Cyber Robot and the APP can manage up to **200 commands.** If you go over this limit, the sequence screen will turn red and a warning will appear.

## CHANGING AND SENDING A SEQUENCE

To insert a new command between two actions that are already in a sequence, simply select one (which will become highlighted), then tap on the desired command.

If you tap the X sign of a given option, the action will automatically be deleted from the sequence.




To change the order of the commands in a given sequence, simply 'Drag & Drop' them to the desired position.

Use the RESET button to cancel the entire sequence.

Use the START button at any time to send the programmed commands to the robot

If you want to stop the robot while it is carrying out the commands, simply press STOP

# TABLET - PROGRAMMING MODE

## SIMULATING A SEQUENCE

Press the TEST button in the Programming area to open the simulation page, where you will see a 2D model of your Cyber Robot simulating the commands in the sequence.

Tap on the X button to exit the simulation page and return to the Programming area.

Movement simulation area


In this area, the commands in the sequence take place at the same time as the simulation. This will allow you to see which commands have already been simulated and which commands have yet to be carried out.

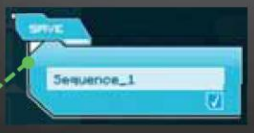
Simulation of the light and sound effects

When the simulation has been completed, you can press the TEST button to start it from the beginning.

In this case also, tapping the START button will send the commands to the robot.

## SAVING A SEQUENCE

When you press SAVE in the programming area, a pop-up window will appear, where you can name the sequence and save it by selecting the confirm button on the right. The sequence will automatically be saved in the SAVED ACTIONS menu.





You can cancel any of the sequences by tapping on the X symbol.

If you select one of the saved sequences, it will automatically appear in the ACTIONS area, and you will be able to change, simulate or carry out the chosen actions.

# TABLET - PROGRAMMING MODE

## CAMERA OPTION

Tapping on the Camera button, will allow you to access the camera on your device, so you can take pictures and record videos of the robot as it carries out your commands.

**NOTE**: the camera can only be activated after pressing START and after the command sequence has been sent to the robot via Bluetooth®.


To exit camera mode and return to the previous APP screen, please follow the instructions for your specific device:

Android™ ⟶ tap on the back button on your device

iOS ⟶ tap on Cancel

# TABLET - REAL TIME MODE

As described on p. 12, the Real time mode allows you to send commands to the robot in real time. This page describes all of the options and characteristics of the user interface for this play mode.

## MAIN CHARACTERISTICS


## CAMERA SETTINGS

When you tap on the Camera button, the static background of the APP will be replaced by what the camera on your device can see. In this way, as well as the commands on the screen (which will be superimposed), you will also have a real time visual of what your robot is doing.

To exit Camera mode, simply tap the Camera button again.