



# Chapter 4

## City Defender-A Police Car

There are so many city defender heroes in movies, and have you ever considered being one of them? Now let's turn this Maqueen Plus into a city defender-a police car to make your dream come true!

## Goal



1. Learn how to use the buzzer module
2. Learn how to use the RGB light module

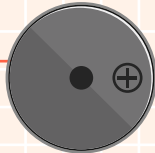
## Electronic Component



### Buzzer and RGB Brief

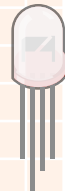
Buzzer

Work as an output module, can be used to play sounds.



RGB Light

Display various colorful lighting effects



## Command Learning



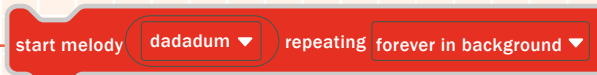
### Block Brief

Control RGB LED



Control the color of light

Play sound



Play MakeCode built-in music

## Hands-on Practice



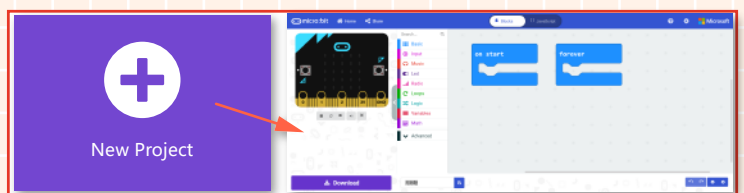
### Step 1 Create a New Project

1. Input <https://makecode.microbit.org/> into your browser to enter MakeCode editor.
2. Click "new project" to enter MakeCode programming interface.
3. Add the Maqueen Plus library: <https://github.com/DFRobot/pxt-DFRobot-Maqueenplus>

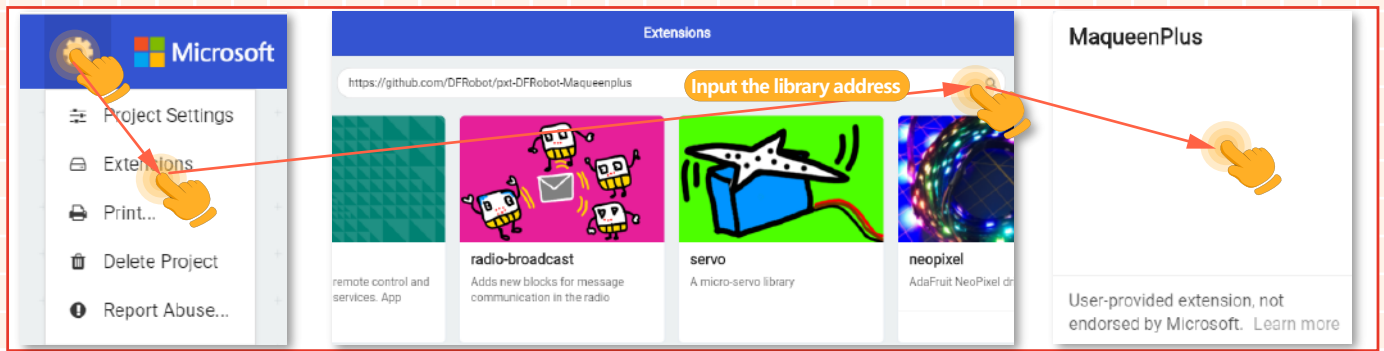
<https://makecode.microbit.org/>



1. Enter MakeCode editor



2. Enter programming interface



3.Add the extension library

## Step 2 Programming

1.Program the car to drive

Both motors move forward at the speed of 200.



2.Program the lighting effect

Since the lights on a police car emit red light and blue light alternatively, the next step here is to exchange the lighting color.



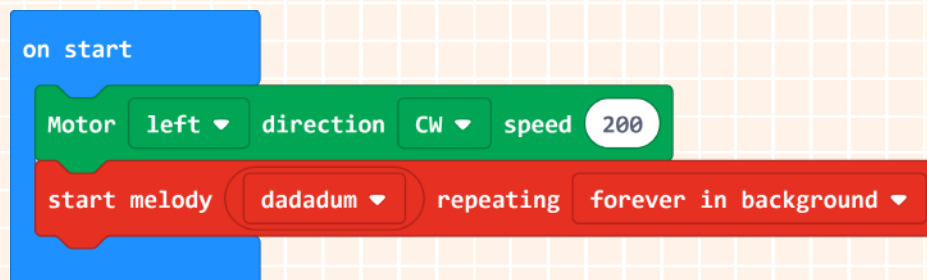
### Knowledge Expansion

**Why are the lights on police car red and blue?**

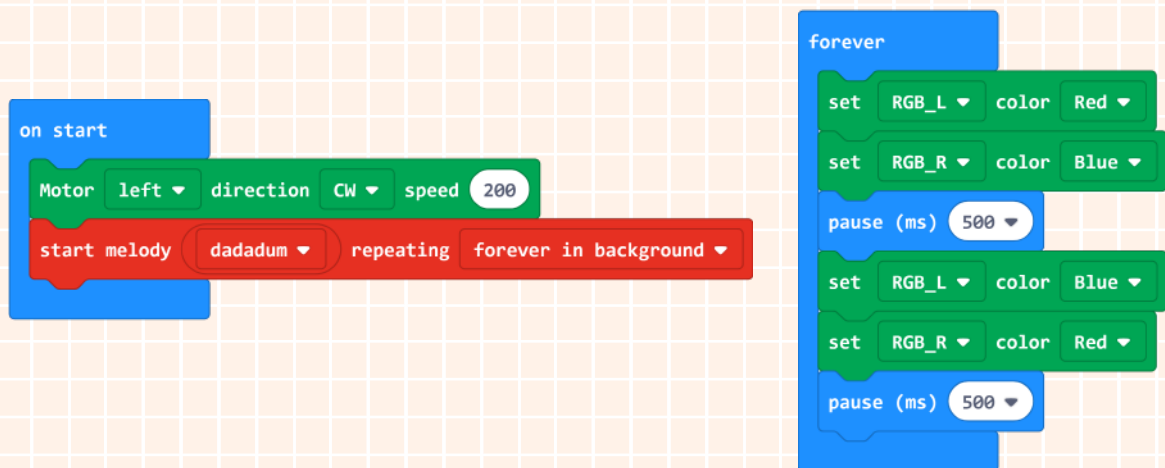
- 1.Alert other drivers of its presence, so that they can maneuver out the way.
- 2.The color red is associated with stop and warning, but most tail lights are also red, so blue lights really stand out and help to alert others in these situations.

3.Program the siren

Play the built-in sound "dadadum" repeatedly to simulate the sound of siren.



4.The whole program is shown below.



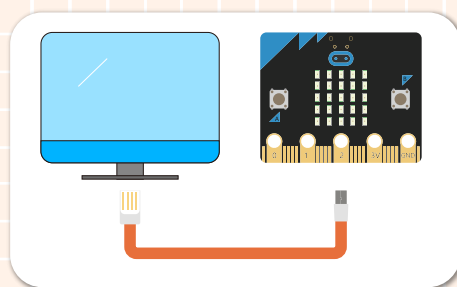
5.Name your project as "City defender-A police car" and save it.

### Step 3 Download Program

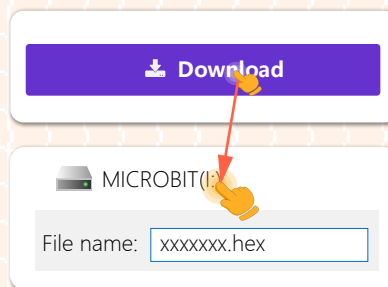
1.**Connect to a computer:** connect the micro:bit to your computer with a USB cable before downloading. There will be a hard-disk named micro:bit appearing in the computer when the connection is successful.

2.**Download the program:** download your project into the micro:bit hard-disk.

3.**Plug in the micro:bit board:** after downloading the program, plug the micro:bit board into Maqueen Plus.



1.Connect to computer



2.Download program



3.Plug in micro:bit

### Step 4 Effect Display

Turn on the power switch, then Maqueen Plus moves forward with siren wailing and lights flashing, just like a police car.



#### Note:

- 1.There is a buzzer switch on the left side of Maqueen Plus, and you need to turn it on when using the buzzer.
- 2.The buzzer and P0 are shared, so when you need to use P0 as input/output port, turn off the buzzer.

## Think & Explore



We have learned how to play the built-in music in MakeCode. Do you want to make a piece of your music? Try it with Maqueen Plus. The block shown below is used to play notes.

Click here to display keyboard, then select note.

Select beat for the note.



The letter "C" represents the note "do", so middle C is middle do. "1" is the beat of the note, the basic time unit, also specified by the time signature. The relation between note and notation is shown below:

C	D	E	F	G	A	B
1	2	3	4	5	6	7

Create a piece of music according to the numbered musical notation below!

