

# Scratch Programming

 [dexterindustries.com/GoPiGo/programming\\_\\_trashed/scratch-programming-with-the-raspberry-pi/](https://dexterindustries.com/GoPiGo/programming__trashed/scratch-programming-with-the-raspberry-pi/)

## Scratch Programming With the Raspberry Pi and the GoPiGo

We've optimized Scratch and the GoPiGo for our operating system, Raspbian for Robots. This is a free operating system you run on your Raspberry Pi. You can [purchase an SD Card for the Pi with Raspbian for Robots already installed here](#). You can also [download the latest version and install it with these directions](#). The below instructions assume you are using Raspbian for Robots.

### Connect To Your GoPiGo

The first step to programming in Scratch with the GoPiGo and Raspberry Pi is to connect over wifi or ethernet. You may find our tutorial on setting up the GoPiGo and connecting over wifi helpful. You can watch the Youtube playlist below.

### Start Scratch

To start on the Scratch, just double click the **Scratch** Icon on the Desktop

After clicking the Scratch icon on the Desktop, the Scratch for Robots window will open. The Scratch Controller terminal program (the black window with white text) will open as well, do not close it! In the Scratch Controller window you can select your robot (the GoPiGo should appear in the picture as shown below).



You can start programming directly by clicking on "Start Programming." You can also select an example program by clicking "Open Examples". This will open the example program directory.

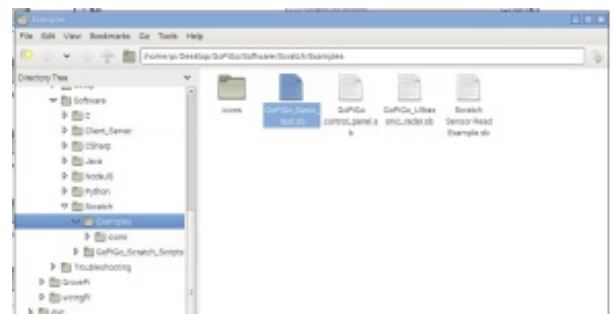
If you double click a Scratch program in the directory, or double click any Scratch program you have saved, a Scratch dialog box will pop up.

The Scratch for Robots robot selector will appear. Select the GoPiGo in the dropdown menu, and press “Start Programming”.

You will get a warning that all the Scratch programs running will be closed. You can only run one Scratch program at a time.

After clicking “OK” the example program will appear. You will see an alert that communications have started. Click “Ok” and begin!

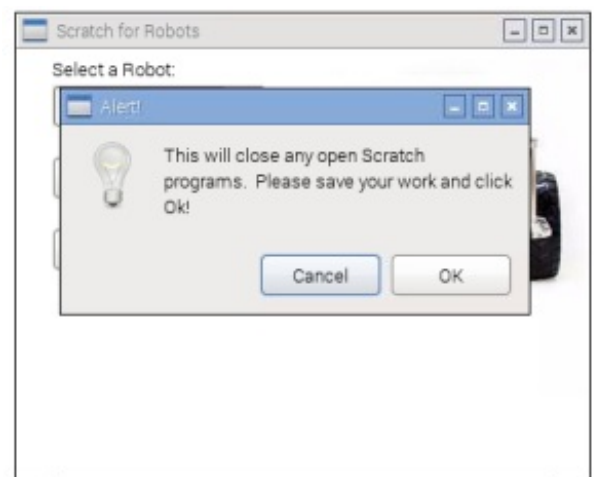
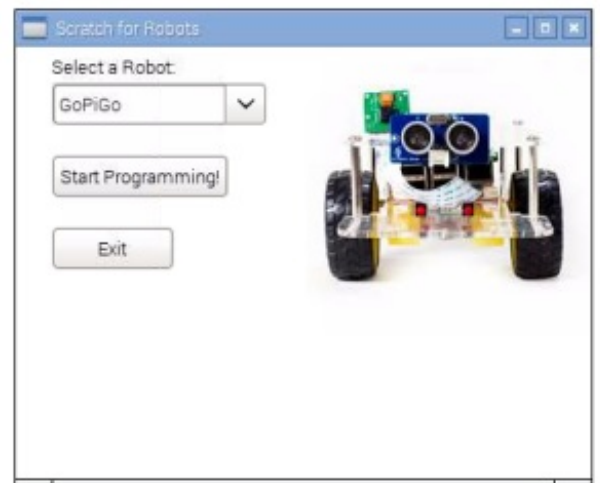
Beginning programming, in the below example you’ll see the example car.



## Sensors and Ports

For more information on which sensors go on the different ports of the GoPiGo in Scratch, [please see our description and software here](#).

Have a question? [Ask us on the forums!](#)





### GoPiGo Commands

#### Move the GoPiGo Forward

```
when space key pressed
broadcast FORWARD
```

#### Move the GoPiGo Back

```
when space key pressed
broadcast BACKWARD
```

#### Set GoPiGo Speed

```
when space key pressed
broadcast join SPEED 200
```

#### Turn GoPiGo to the Right

```
when space key pressed
broadcast RIGHT
```

#### Turn Left LED on

```
when space key pressed
broadcast join LEDL 255
```

#### Move Forward by 20 ticks

```
when space key pressed
broadcast join FORWARD 20
```

#### Move Back by 20 ticks

```
when space key pressed
broadcast join BACKWARD 20
```

#### Increase GoPiGo Speed

```
when space key pressed
broadcast INCREASE SPEED
```

#### Turn Right 90 degrees

```
when space key pressed
broadcast join RIGHT 90
```

#### Turn Left LED off

```
when space key pressed
broadcast join LEDL 0
```

#### Stop the GoPiGo

```
when space key pressed
broadcast STOP
```

#### Set Wheel Rotation

```
when space key pressed
broadcast join WHEEL ROT 18
broadcast FORWARD
```

#### Decrease GoPiGo Speed

```
when space key pressed
broadcast DECREASE SPEED
```

#### Turn GoPiGo to the Left

```
when space key pressed
broadcast LEFT
```

#### Turn Right LED on

```
when space key pressed
broadcast join LEDR 255
```

#### Turn Left 90 degrees

```
when space key pressed
broadcast join LEFT 90
```

#### Turn Right LED on

```
when space key pressed
broadcast join LEDR 0
```

### GoPiGo Sensors

#### Distance Sensor (A1)

```
when space key pressed
broadcast GET DISTANCE
say distance sensor value
```

#### Light Sensor (A1)

```
when space key pressed
broadcast light
say light sensor value
```

#### Motion Sensor (D11)

```
when space key pressed
broadcast MOTION
say motion sensor value
```

#### LED Sensor (D11)

```
when space key pressed
broadcast join LED 150
```

#### Set Photo Folder

```
when space key pressed
broadcast join FOLDER monday
say folder sensor value
```

#### Sound Sensor (A1)

```
when space key pressed
broadcast SOUND
say sound sensor value
```

#### Servo (servo)

```
when space key pressed
broadcast join SER 150
```

#### Buzzer (D11)

```
when space key pressed
broadcast join BUZZER 200
```

#### Infrared Sensor (Serial)

```
when space key pressed
broadcast IR
say ir sensor value
```

#### Take a Picture

```
when space key pressed
broadcast TAKE_PICTURE
say camera sensor value
```

#### Touch Sensor (A1)

```
when space key pressed
broadcast join BUTTON 15
say button sensor value
```

#### Line Follower (I2C)

```
when space key pressed
broadcast LINE
say line sensor value
```

#### Touch Sensor (D11)

```
when space key pressed
broadcast join BUTTON 11
say button sensor value
```

#### DHT (Serial)

```
when space key pressed
broadcast DHT
say humidity sensor value
say temperature sensor value
```

#### Speak out loud

```
when clicked
broadcast join SPEAK Hello
```

## Making Custom Broadcast Messages for Scratch

You can easily make Custom Broadcast Messages with Scratch for the GoPiGo.

To interact with the Scratch program, there is a Python program running in the background ([GoPiGoScratch.py](http://GoPiGoScratch.py)). This program catches the commands from the Scratch interface and runs a command on the GoPiGo. This program is automatically launched by the Scratch icon in Raspbian for Robots.

To make a custom command, just add a condition for the new broadcast message in the Python example.

### Example:

For the run **forward** block in Scratch:

Here is the Python code handling it:



```
if msg=="FORWARD":  
    if en_gpg:  
        fwd()  
    if en_debug:  
        print msg
```

Similarly, you can make your own block and easily make them work with the GoPiGo.

**Have a question or a suggestion? Go check out our support page [here](#) or post it on the forums [here](#).**