Controlling a Raspberry Pi RC Car With a Keyboard

by ChrisMason (/member/ChrisMason/)

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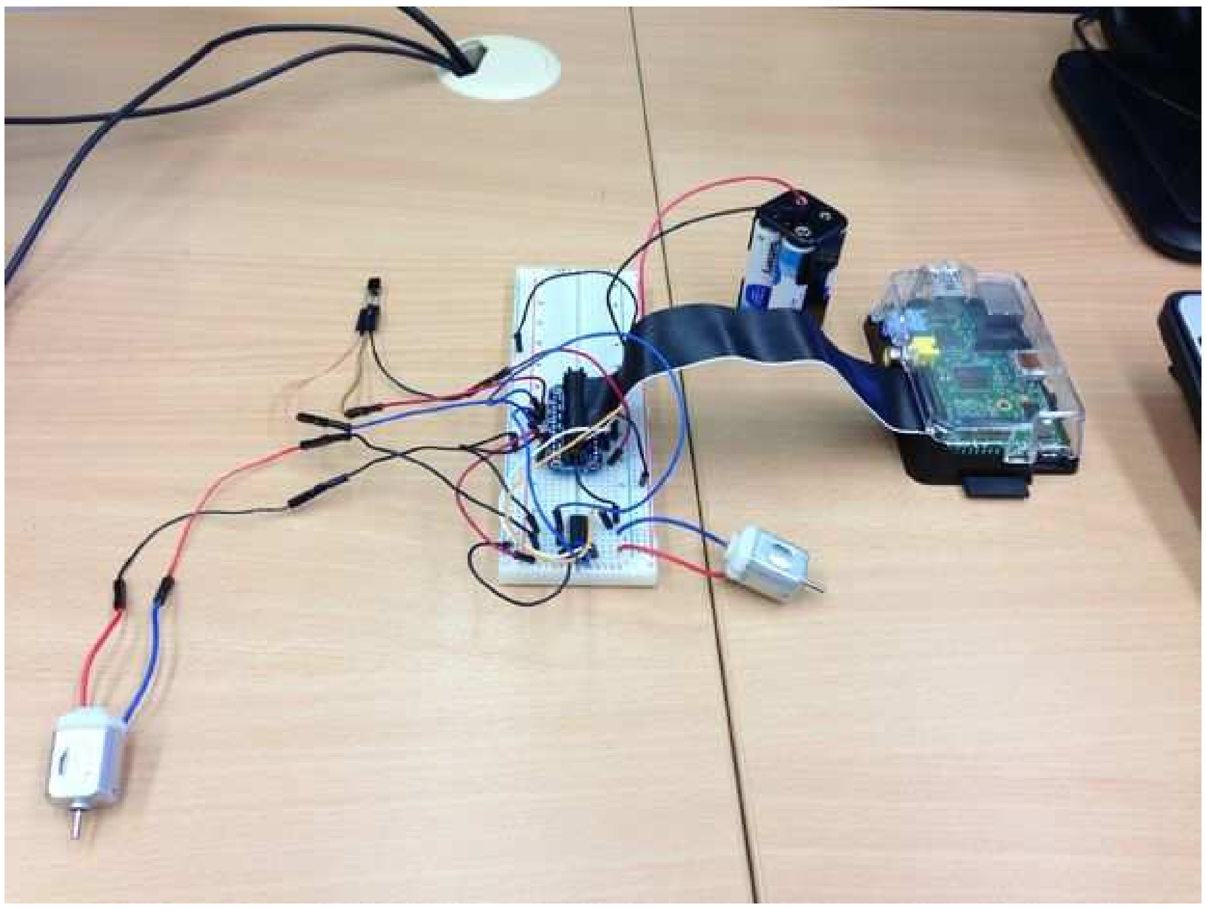

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In this intermediate tutorial you will learn how to operate a hacked RC car with a keyboard using a model B Raspberry Pi device using Python. The key points in this tutorial include:

• Configuring the virtual Pulse Width Modulation (PWM) for the GPIO pins so two DC motors can run independently
• Wiring the Raspberry Pi to the RC car

I had originally planned to have the car operated through the use of an IR remote control and receiver but due to compatibility issues between the Raspberry Pi and the required libraries I had to revise my project.

Step 1: Components

(http://cdn.instructables.com/F0F/8CNC/HO23AJI7/F0F8CNCHO23AJI7.LARGE.jpg)

Please ensure you have the following components before continuing with the tutorial:

• Raspberry Pi Model B (http://www.adafruit.com/products/998 (http://www.adafruit.com/products/998))
• MicroSD Card (http://www.adafruit.com/products/102 (http://www.adafruit.com/products/102))
• Pi Cobbler Breakout and Cable (http://www.adafruit.com/products/914 (http://www.adafruit.com/products/914))
• Any sized Breadboard (http://www.adafruit.com/products/239 (http://www.adafruit.com/products/239))
• M/M Wires (http://www.adafruit.com/products/153 (http://www.adafruit.com/products/153))
• F/F Wires (http://www.adafruit.com/products/266 (http://www.adafruit.com/products/266))
• Prototyping Pi Plate (http://www.adafruit.com/products/801 (http://www.adafruit.com/products/801))
• L293D Chip (http://www.adafruit.com/products/807 (http://www.adafruit.com/products/807))
• Medium sized RC Car with DC Motors
• Bluetooth Keyboard
• Soldering Iron and Wire

Step 2: Prerequisites

Please ensure you meet the following prerequisites before continuing with the tutorial:

• An assembled Cobbler with GPIO Cable and Breadboard

• Soldering iron experience

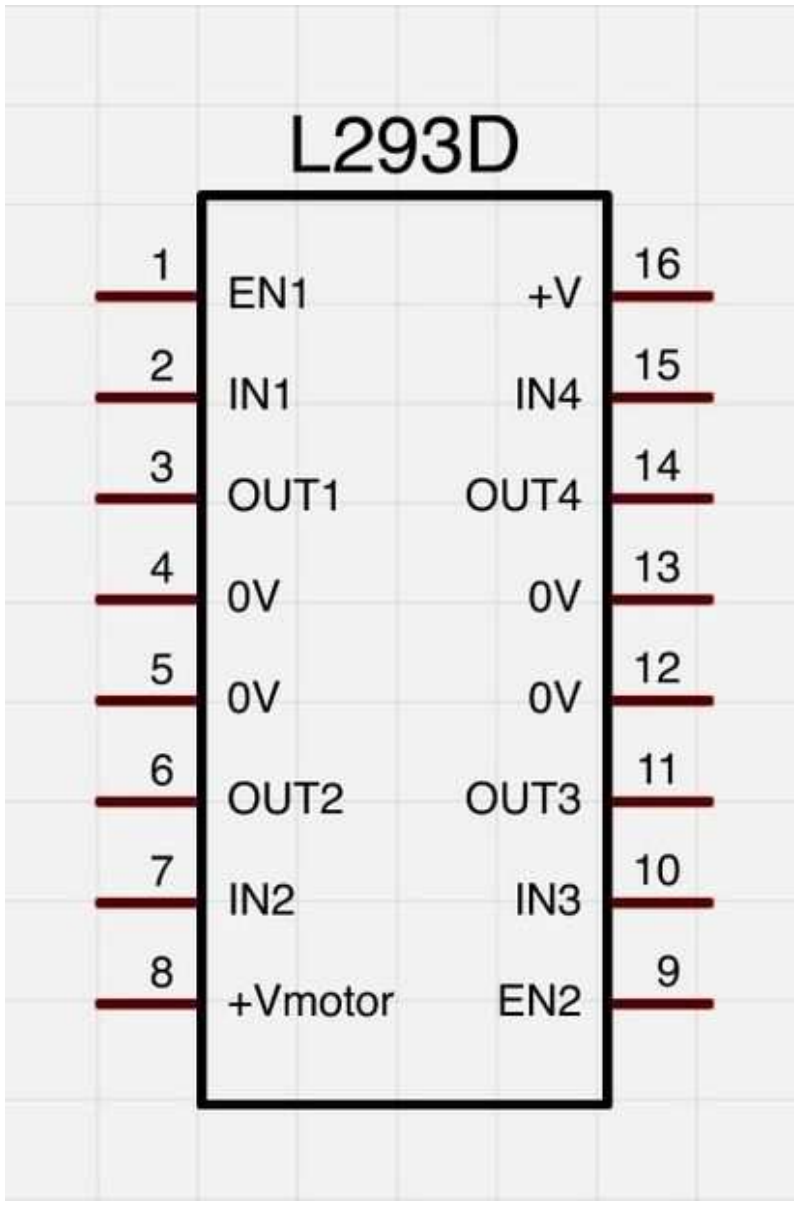
• An upgraded operating system. You can achieve this by entering into the terminal:

```
sudo apt-get upgrade
```

• Up-to-date GPIO library. You can achieve this by entering into the terminal:

```
sudo apt-get update
sudo apt-get install python-dev
sudo apt-get install python-rpi.gpio
```

Step 3: The L293D Chip



(http://cdn.instructables.com/FUV/UUGF/HO0Q2THX/FUVUUGFHO0Q2THX.LARGE.jpg)

The most important part of your hardware setup is the L293D chip. With the appropriate code, this chip allows you to control the speed and direction of two independent DC motors. It is crucial for you to understand how this chip works and the function of each of its pins. The '+Vmotor' pin (8) provides the power for the motors while the '+V' pin (16) provides the power for the chip's logic. The 'IN' pins (2, 7, 10, 15) each require a connection to a GPIO pin and the 'OUT' pins (3, 6, 11, 14) provide the output for the two DC motors.

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AdamGalbraith (/member/AdamGalbraith/)

(removed by author or community request)

9 months ago Reply (C4U6PJBHRWNBOKY)

(/member/AdamGalbraith/)

Scruffybiggems (/member/Scruffybiggems/) AdamGalbraith

9 months ago Reply (CVPAZKBHS18B1VF)

(/member/Scruffybiggems/)

Your problem is the programs reading the crap at the top how to fix this is open up the file u get the error in in python at the top there like the time and date u want to delete that stuff so that the code starts with import RPi.GPIO as io

io.setmode(io.BCM)
import sys, tty, termios, time

if you have more troubles message me i can help

also heres my code its based off this one so it will work with this set up

http://pastebin.com/b0sKWEpu

Josh_the_DIYer (/member/Josh_the_DIYer/) Scruffybiggems

1 month ago Reply (CU68HPAI1941Y7W)

(/member/Josh_the_DIYer/)

Hey awesome project just what I was looking for. unfortunately its not working for me... I have raspi B+ and when I run your code I get this error.

(http://cdn.instructables.com/F4B/335P/I1941Y7Q/F4B335PI1941Y7Q.LARGE.jpg)

Scruffybiggems (/member/Scruffybiggems/) Josh_the_DIYer

1 month ago Reply (CCPZZS8I194610C)

(/member/Scruffybiggems/)

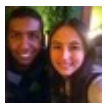
It will not work with the b+ sorry

Josh_the_DIYer (/member/Josh_the_DIYer/) Scruffybiggems

1 month ago Reply (CTTEI9VI1KJMET9)

(/member/Josh_the_DIYer/)

ah poo thanks anyway...



jfelipeara (/member/jfelipeara/) 2 months ago Reply (CMCARD9I0C95NPO)

(/member/jfelipeara/)

what means the parameters in the PWM() function?

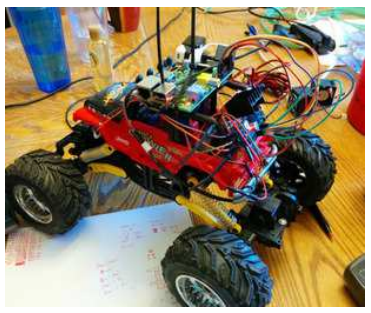
---

ahachenberg (/member/ahachenberg/) made it!

(/member/ahachenberg/) 5 months ago Reply (CEE2O6AHX7P8HUX)

Thanks for the write-up on this. I'm just getting started with my Raspberry Pi and this was exactly what I was looking for in a first project. I'm having trouble with the setup. When I press W or S for forward or reverse motion the action does not stop when I release the key press. So, if I press the W key the car begins forward motion and will not stop. If I press the S key the car goes in reverse and will not stop until I end the script or hit the

W key to change direction. Steering behaves the same way. Thanks for any help. If I find the answer I'll post it here.



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(/member/Scruffybiggems/)

Scruffybiggems (/member/Scruffybiggems/) ahachenberg
4 months ago Reply (CJWWEYUHXSSKIOU)

I believe its because the driver you using is it the L293D?? this code will only work with that driver chip, also i have modded the code to work better and fix a few things you can check it out here : http://pastebin.com/m2pBWtKM

(/member/perrycannon/)

perrycannon (/member/perrycannon/) 6 months ago Reply (CXKA28WHVDU662G)

Will this code work with the below components? I bought a kit on ebay. I would like to control the movement with a keyboard.

1 x Quality Feetech Servo

1 x L298N Motor Drive

1 x IWM Electronics Ultrasonic / Servo Breakout Board

1 X Adjustable Step Down Voltage Controller

One Battery Case Holding 6 x AA With PP3 Style Connector to allow easy removal of battery pack without disturbing wiring use 6 X AA Rechargeable (7.2vdc)

1 x PP3 Connectors

One HC-SR04 dIstance sensor

this is the code that i am using

```
import RPi.GPIO as GPIO
from time import sleep
from time import time
import os
GPIO.setmode(GPIO.BCM)
GPIO.setup(9,GPIO.OUT)
GPIO.setup(10,GPIO.OUT)
GPIO.setup(11,GPIO.OUT)
Motor1 = GPIO.PWM(11, 50)
Motor1.start(0)
Echo = 17
Steer = 4
def forward(speed):
GPIO.output(9,GPIO.HIGH)
GPIO.output(10,GPIO.LOW)
Motor1.ChangeDutyCycle(speed)
def backward(speed):
GPIO.output(9,GPIO.LOW)
GPIO.output(10,GPIO.HIGH)
Motor1.ChangeDutyCycle(speed)
def left(speed):
```

```
string = "echo 0=110 > /dev/servoblaster"
os.system(string)
sleep(1)
GPIO.output(9,GPIO.LOW)
GPIO.output(10,GPIO.HIGH)
Motor1.ChangeDutyCycle(speed)
def right(speed):
string = "echo 0=190 > /dev/servoblaster"
os.system(string)
sleep(1)
GPIO.output(9,GPIO.LOW)
GPIO.output(10,GPIO.HIGH)
Motor1.ChangeDutyCycle(speed)
def stop():
Motor1.ChangeDutyCycle(0)
def get_range():
GPIO.setup(Echo,GPIO.OUT)
GPIO.output(Echo, 0)
sleep(0.1)
GPIO.output(Echo,1)
sleep(0.00001)
GPIO.output(Echo,0)
GPIO.setup(Echo,GPIO.IN)
while GPIO.input(Echo) == 0:
pass
start = time()
while GPIO.input(Echo) == 1:
pass
stop = time()
elapsed = stop - start
distance = elapsed * 17000
return distance
while True:
distance = get_range()
if distance < 30:
print "Distance %.1f " % distance
stop()
string = "echo 0=110 > /dev/servoblaster"
os.system(string)
sleep(1)
disleft = get_range()
print "Left %.1f " % disleft
string = "echo 0=190 > /dev/servoblaster"
os.system(string)
sleep(1)
disright = get_range()
print "Right %.1f " % disright
if disleft < disright:
print "Turn right"
left(100)
sleep(2)
else:
```

print "Turn left"

right(100)

sleep(2)

os.system("echo 0=150 > /dev/servoblaster")

else:

forward(80)

print "Distance %.1f " % distance

sleep(0.5)

GPIO.cleanup()

perrycannon (/member/perrycannon/) 6 months ago Reply (CQ9YPG1HVDU6498)

(/member/perrycannon/)

Will this code work with the below parts. This is a kit that I bought on ebay. I want to control the car with a keyboard. Thank you.

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1 x PP3 Connectors

One HC-SR04 dIstance sensor

NahuelMata (/member/NahuelMata/) 7 months ago Reply (C40B9IVHUU1H5OP)

(/member/NahuelMata/)

And what would i need the prototyping plate for? sorry if it is too obvious im new to the raspberry pi community

---

NahuelMata (/member/NahuelMata/) 7 months ago Reply (C62A5GBHUU1H5CW)

(/member/NahuelMata/)

HIgh i had a doubt how is that the keyboard connects to the raspberry pi? wouldn't i need a bluetooth receiver conncted to the raspberry pi. Im doing a bridge for a scince fair combining hydraulics and robotics but i dont know how you did to connect the keybord.

julianp3000 (/member/julianp3000/) 10 months ago Reply (CGNBSCPHQEA1UCH)

(/member/julianp3000/)

If the Raspberry Pi and DC motors are powered by separate supplies, will the L293D wiring change? Do you still connect pin 16 on the L293D chip to the 5V on the Pi?

Scruffybiggems (/member/Scruffybiggems/) julianp3000 9 months ago Reply (CN4VIDDHS18B1VL)

(/member/Scruffybiggems/)

no its says the same u can use 6 volts like he has done and it will work fine

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