



CrowPi All-in-One Kit

Quick Start Guide

V2.1 2019.11

Please read this instruction carefully before using this Kit and keep it for future reference.

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The CrowPi

About the CrowPi development board



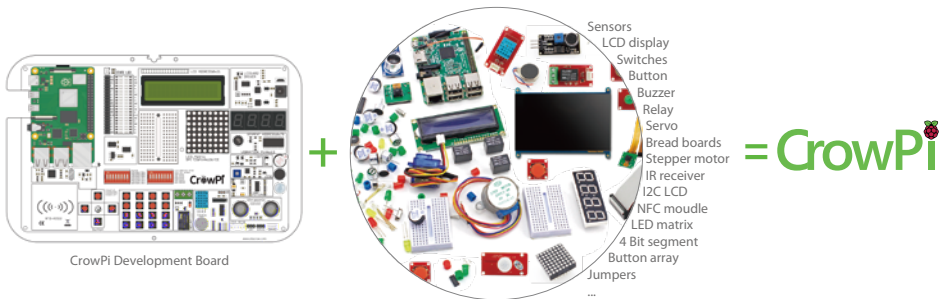
Thank you for supporting and purchasing our Elecrow **CrowPi Board**!

After months of dedicated working with our top R&D engineers and teams at Elecrow, We are proudly presenting the “**CrowPi**”, a one of a kind Raspberry Pi Development board, Which we truly believe you'll like just as we do.

The CrowPi Board was specially crafted for those who are passionate about STEM education, Making, Computer Science, Robotics, teaching others or just learning out of curiosity!

We've been working hard to make the CrowPi board as easy as possible so anyone (literally) will be able to learn how to code and make incredible projects using the Raspberry Pi Single Board Computer.

All-in-One Kit, CrowPi embeds regular materials for doing RPI projects



With our board we are solving issues that have been in the wild for quite a while .. issues like:

- Being in an unproductive, messy environment - full of sensors, jumpers, bread boards and cables. Our CrowPi solves it by offering an all-in-one board with on-board necessary sensors for learning and rapid development.
- Being unable to start using Raspberry Pi or Python Coding due to the complex, old fashionable learning methods. We offer 21 lessons to get started with hands-on, detailed examples that anyone can make.



The Raspberry CrowPi Kit can be used as laptop, gaming console, IOT project, studying, making, prototyping and more! The imagination is the limit.

You can fit Raspberry Pi 3 into the CrowPi and extend support of sensors and modules using the on-board breadboard.

We'd like to thank you again for supporting us and purchasing your first CrowPi Development board. We can't wait to see what you'll make with it!

Enclosure & Materials

Beautifully Designed for Everyday Life



● Black

● Blue

CrowPi case is made of ABS plastic. The case edge is made of Aluminium alloy. The monitor frame is made of acrylic. The fastener and hinge is made of iron. The handle is made of plastic with metal coating. The development board is made of hasl lead free FR-4. All the materials we use are non-toxic.

Hardware, Sensors & GPIO Usage



Module List:

- | | | |
|----------------------------|---|-------------------------|
| 1. ABS Plastic Case | 11. Sound Sensor | 21. Relay |
| 2. Camera | 12. PIR Motion Sensor(LH1778) | 22. Button Array |
| 3. 7inch HDMI Touch Screen | 13. Ultrasonic Sensor | 23. Independent Buttons |
| 4. Power Circuit | 14. Servo Interface | 24. NFC Module(MFRC522) |
| 5. LCD Module(MCP23008) | 15. UART | 25. Switches |
| 6. Segment LED (HT16K33) | 16. Stepper Motor Interface | 26. Bread board |
| 7. Vibration Motor | 17. Tilt Sensor(SW-200D) | 27. Raspberry Pi |
| 8. Matrix LED(MAX7219) | 18. IR Sensor | 28. GPIO LED Indicators |
| 9. Light sensor(BH1750) | 19. Touch Sensor(TTP223) | 29. Acrylic board |
| 10. Buzzer | 20. Temperature and Humidity
Sensor (DH11) | 30. Microphone |

Note: The CHIP name (module) of each sensor is inside the parenthesis

Raspberry Pi GPIO Header

Pin#	NAME	NAME	Pin#
01	3.3v DC Power	DC Power 5v	02
03	02 (SDA1, PC)	Ground	04
05	05 (GPIO3 (SCL1, PC))	(T0000) 05 NO14	
06	06 (GPIO4 (GPIO_SCLK))	(H0000) 06 NO15	
09	09 (GPIO17 (GPIO_GEN0))	(GPIO_GEN1) 09 NO16	
10	10 (GPIO18 (GPIO_GEN1))	Ground	
12	12 (GPIO27 (GPIO_GEN2))	(GPIO_GEN4) 12 NO20	
13	13 (GPIO28 (GPIO_GEN3))	(GPIO_GEN5) 13 NO21	
14	14 (GPIO29 (GPIO_GEN4))	Ground	
16	16 (GPIO10 (GPIO_GEN0))	(GPIO_GEN6) 16 NO22	
18	18 (GPIO11 (GPIO_GEN1))	(SPL_CE0_N) 18 NO23	
20	20 (GPIO12 (SPI_MOSI))	(SPL_CE1_N) 20 NO24	
22	22 (GPIO13 (SPI_MISO))	(PC-ID EEPROM) ID_00	
24	24 (GPIO15 (SPI_CLK))	Ground	
26	26 (GPIO16 (SPI_CS))	GPIO02	
27	27 (ID_00 (PC ID EEPROM))	Ground	
28	28 (GPIO05)	GPIO12	
30	30 (GPIO06)	Ground	
32	32 (GPIO07)	GPIO20	
34	34 (GPIO08)	GPIO24	
36	36 (GPIO09)		
38	38 (GPIO10)		
40	40 (Ground)		



Sensor Control Description

Sensor Name	Control Pin	Control Method	Remarks
BUZZER	pin12/GPIO18	GPIO OUTPUT	
RELAY	pin40/GPIO21	GPIO OUTPUT	
SOUND SENSOR	pin18/GPIO24	GPIO INPUT	
TILT SWITCH	pin15/GPIO22	GPIO INPUT	UX5-2 ON
VIBRATION MOTOR	pin13/GPIO27	GPIO OUTPUT	UX5-1 ON
PIR MOTION SENSOR	pin16/GPIO23	GPIO OUTPUT	
TOUCH SENSOR	pin11/GPIO17	GPIO INPUT	
STEPPER MOTOR	pin29/GPIO5 pin31/GPIO6 pin33/GPIO13 pin35/GPIO19	GPIO OUTPUT	UX5-3 ON UX5-4 ON UX5-5 ON UX5-6 ON
SERVO	pin22/GPIO25	GPIO OUTPUT	UX5-8 ON
IR RECEIVER	pin38/GPIO20	GPIO BOTH	
TEMPERATURE&HUMIDITY	pin7/GPIO4	GPIO INPUT	
ULTRASONIC SENSOR	ECHO:Pin32/GPIO12 TRIG:Pin36/GPIO16	GPIO INPUT	
LIGHT SENSOR	I2C	I2C	Address:0x5c
I2C LCD	I2C	I2C	Address:0x21
4 BIT SEGMENT	I2C	I2C	Address:0x70
LED MATRIX	SPI	SPI	CS: pin26/GPIO8
NFC MOUDLE	SPI	SPI	CS: pin24/GPIO7

INDEPENDENT BUTTON	UP: pin37/GPIO26 DOWN: pin33/GPIO13 RIGHT: pin35/GPIO19 LEFT:pin22/GPIO25	GPIO INPUT	UX1-5 ON UX1-6 ON UX1-7 ON
BUTTON ARRAY	Row1: pin13/GPIO27 Row2: pin15/GPIO22 Row3: pin29/GPIO5 Row4: pin31/GPIO6 Col1: pin22/GPIO25 Col2: pin37/GPIO26 Col3: pin35/GPIO19 Col4: pin33/GPIO13	GPIO INPUT	UX1-1 ON UX1-2 ON UX1-3 ON UX1-4 ON UX1-5 ON UX1-6 ON UX1-7 ON UX1-8 ON

Note : UX1 and UX5 are dialing switches, some sensors use the same GPIO, so if you want to use those sensors, you have to turn on the right switch, for example: button-LEFT using the same GPIO with the SERVO 2, if you want to use the SERVO, You can open UX5-8, if you want to use button-LEFT , you can open UX1-8.

The CrowPi Safety Notes and warnings

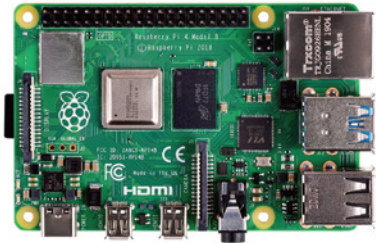
Elecrow puts their customer's safety and security at the first priority, for the same reason Elecrow doesn't use dangerous materials while manufacturing, and we follow extremely strict QA tests to make sure the highest quality product will be shipped to our customers. The CrowPi is a safe-to-use product with 5V input by power supply. Even though it's completely safe to use it under normal circumstances there are a few rules that parents should be aware of when buying this product for their children.

* Children should be under parent's supervision while using such a product, the product contains small parts which might cause choking to small children if swallowed.

* The relay module supplied inside our CrowPi board should **ONLY** be used within the breadboard circuit designing, standing with 3v/5v power supply and **SHOULD NOT** under any circumstances be used / connected or wired to a 220v/110v power plug like light bulb, air conditioner etc ...

* We care about your children's eyes and health just as you do, we do not recommend using the device in dark room with no light for safety reasons and to protect the eyes from the light of the LED' s and LCD display.

Pre-installation requirements





Micro SD Adapter (To be able to connect to your PC / Laptop)



Mouse + Keyboard (Can be bluetooth as well as USB)

If you've confirmed you have the above items, You're ready to go!

Downloading the CrowPi Image



The Raspberry Pi uses an Linux-based operating system in order to function properly, it uses a Micro-SD card to boot the operating system into a use-friendly environment to enable customers like you to code and make amazing things.

In the following steps we'll go through downloading the Raspberry Pi Image that we're going to use.

In order to make the whole process much easier and user-friendly, we've created an image based on the stock Raspberry Pi Raspbian Image with all the necessary drivers and installation that will help you get you started right away without hassle .

You can either use this method and burn our Image or use a stock Raspbian Image from the Raspberry Pi website and then install all the drivers manually.

We highly recommend the first method. To clarify, We didn't modify or add any thing unnecessary to the image, all the modifications are for the pure purpose of

making our CrowPi working perfectly with the Raspbian OS. If you don't have any advanced knowledge with compiling packages from source / getting around Linux OS - We strongly recommend downloading our Image.

To download our Image, go to the following link on your favourite web browser:

<https://www.elecrow.com/download/crowpi/Crowpi-image-RPI-4B-Version.zip>

And download the “.img” (image) file that contains the CrowPi Raspbian OS.

To download the stock Raspbian image, go to the following link on your favourite web browser:

<https://www.raspberrypi.org/downloads/>

And download the official Raspberry pi Raspbian OS or any other Raspberry compatible image that works for you .

Burning the image into an Micro SD Card

After you've successfully downloaded the image, you should have a file called “<file_name>.img” while “<file_name>” can depend on where you downloaded from, either Elecrow website or the Raspberry Pi Official website.

The file extension should be “.img” or “.zip” if it' s an “.zip” you should extract it to have a file extension “.img” .

In order to extract it,download the software “7zip” for Windows or “the unarchiver” for Mac OSX:

Windows: <http://www.7-zip.org/download.html>

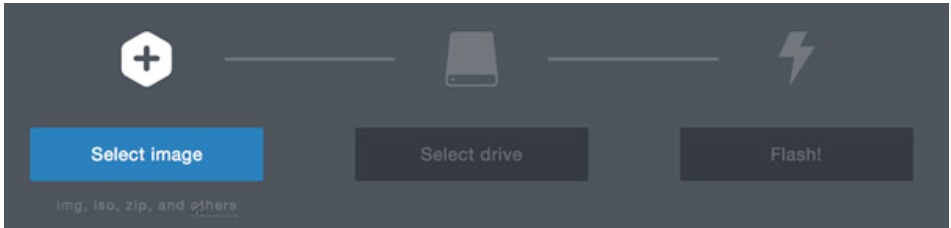
Mac OSX: <http://wakaba.c3.cx/s/apps/unarchiver.html>

After you successfully confirmed you have the file, the next step will be burning the image into your Micro SD card.

In order to burn the image, we'll need a tool called “Etcher” , **Etcher** is a graphical Micro SD card writing tool that works on Mac OS, Linux and Windows.

You can download Etcher for your Operating System here: <https://etcher.io/>

After downloading and opening Etcher you should see something like this:

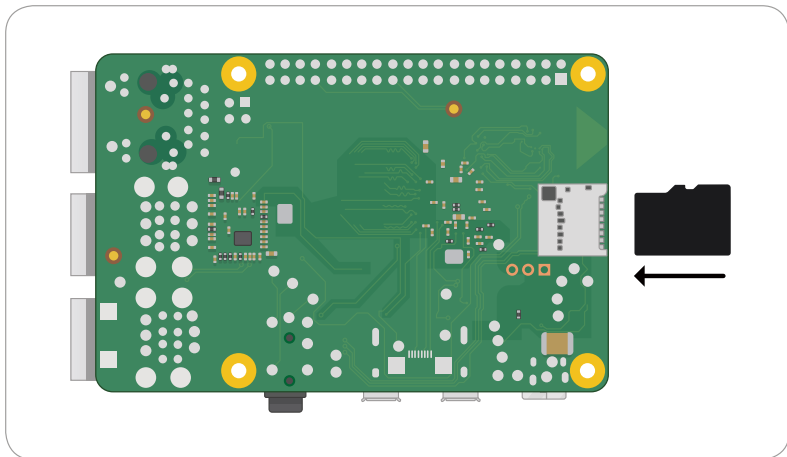


Follow the following steps:

- 1) Click the “Select Image” button and select your .img file which you downloaded from either Elecrow Website or Raspberry Pi official website
- 2) Click “Select Drive” button to select your Micro SD Card that you would like to burn the image on (if Micro SD Card inserted, Etcher will do this step for you automatically)
- 3) Click Flash Button to flash the image, wait for it to finish and we're done!

Attaching the Raspberry Pi to the CrowPi Board

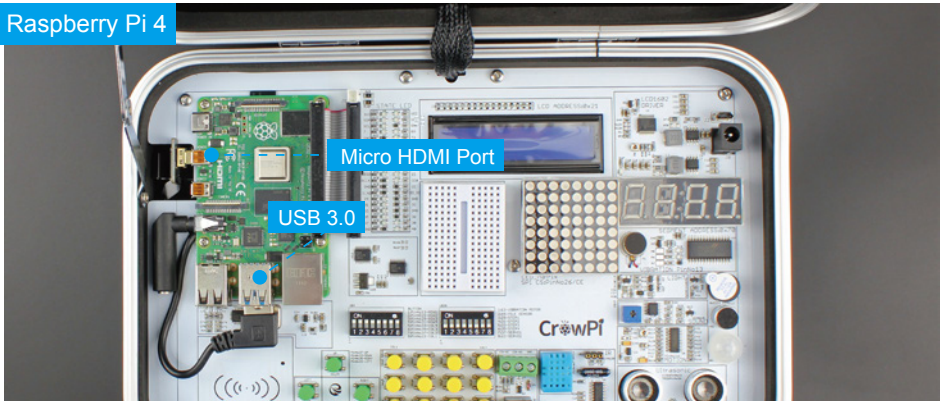
After finishing the burning process it's time to disconnect the micro SD card from the PC / laptop and plug it into the Raspberry Pi.



Note: Make sure to follow the following steps carefully, don't apply extra pressure or strong force over the cable as you might damage the pins.

After successfully plugging back in the Micro SD card, we'll need to lay the Raspberry Pi over it's location on top of the CrowPi board.

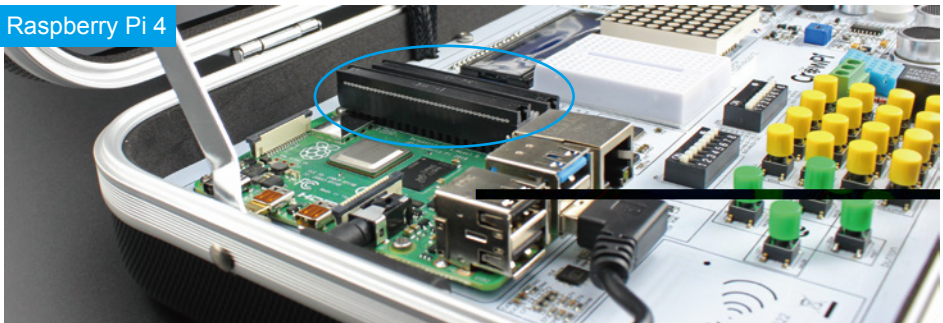
Raspberry Pi 4



Note: First of all, we should have to plug the cable first, then mount screw .

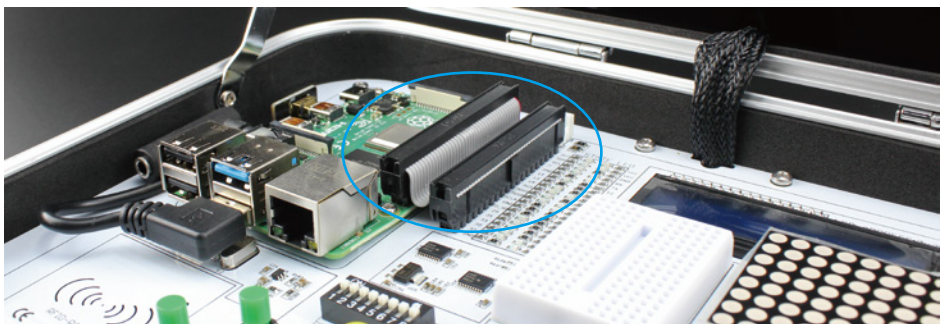
Afterwards, we'll need to plug it in by using “rainbow” (flat) cable. We'll first carefully plug it into the Raspberry pi making sure it covers the exact pins of the raspberry pi and very importantly doing it carefully not to damage the Raspberry Pi pins.

Raspberry Pi 4



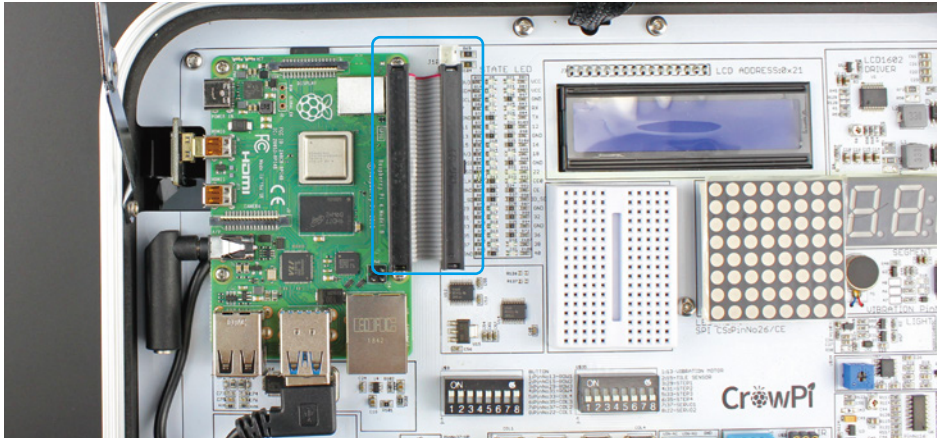
The second step will be plugging the “rainbow” cable into the CrowPi board.

We'll take the other end of the “rainbow” cable and carefully plug it directly into the board making sure it covers all the pins and placed at the right spots.



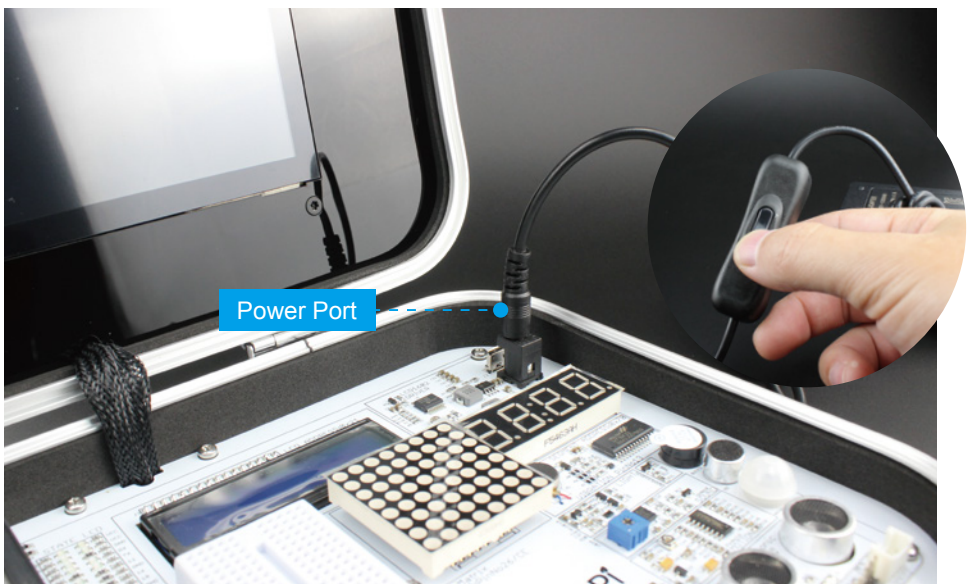
And ... We are done! Well ... almost!

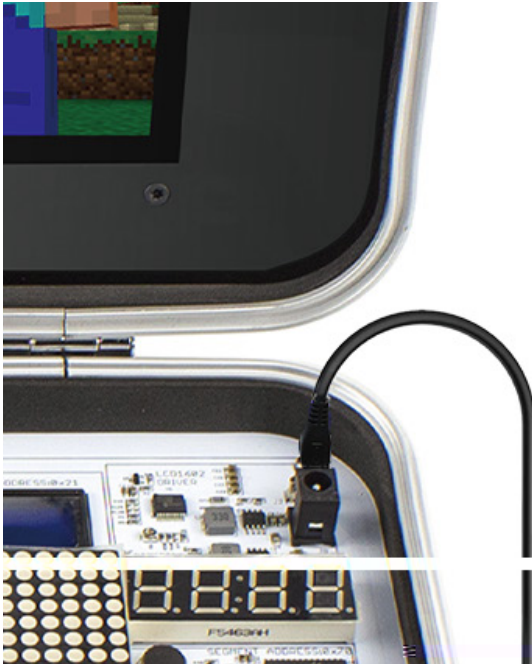
To make sure that the Raspberry Pi won't move during your rapid development we will need to attach it using screws, the Raspberry Pi contains screws to be attached to the CrowPi board, take a look at the following picture for reference:



Make sure to attach them tightly for your Raspberry Pi safety.

Last thing will be to plug the power adapter into the CrowPi board , it's highly recommended to use the power supply we supply with the board, but also any other power supply like micro-USB / Battery will work as well.





USB Powered-Easy and Convenient



First time booting into the Operating System

After We've prepared everything and plugged the power on.

After powering on the board by clicking on the power button of cable, the Raspberry Pi should load the operating system automatically. Give it few seconds up to one minute to load until you'll see the desktop environment and you'll be ready to go.

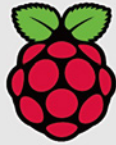
```

      [Raspberry Pi Logo]
Starting /etc/rc.local Compatibility...
Starting getty on tty2-tty6 if dbus and login are not available...
Starting LSB: Start NTP daemon...
Starting System Logging Service...
Starting Permit User Sessions...
[ OK ] Started Permit User Sessions.
My IP address is 192.168.2.41
[ OK ] Started getty on tty2-tty6 if dbus and login are not available.
[ OK ] Started /etc/rc.local Compatibility.
Starting Getty on tty6...
[ OK ] Started Getty on tty6...
Starting Getty on tty5...
[ OK ] Started Getty on tty5...
Starting Getty on tty4...
[ OK ] Started Getty on tty4...
Starting Getty on tty3...
[ OK ] Started Getty on tty3...
Starting Getty on tty2...
[ OK ] Started Getty on tty2...
Starting Getty on tty1...
[ OK ] Started Getty on tty1...
Starting Serial Getty on ttyAMA0...
[ OK ] Started Serial Getty on ttyAMA0...
[ OK ] Reached target Login Prompts.
[ OK ] Started LSB: Start NTP daemon.
[ OK ] Started System Logging Service.
[ OK ] Reached target Multi-User System.
[ OK ] Reached target Graphical Interface.
Starting Update UTMP about System Runlevel Changes...
[ OK ] Started Update UTMP about System Runlevel Changes.

Raspbian GNU/Linux 0 minbian tty1
minbian login: _

```

Welcome to the Raspberry Pi Desktop



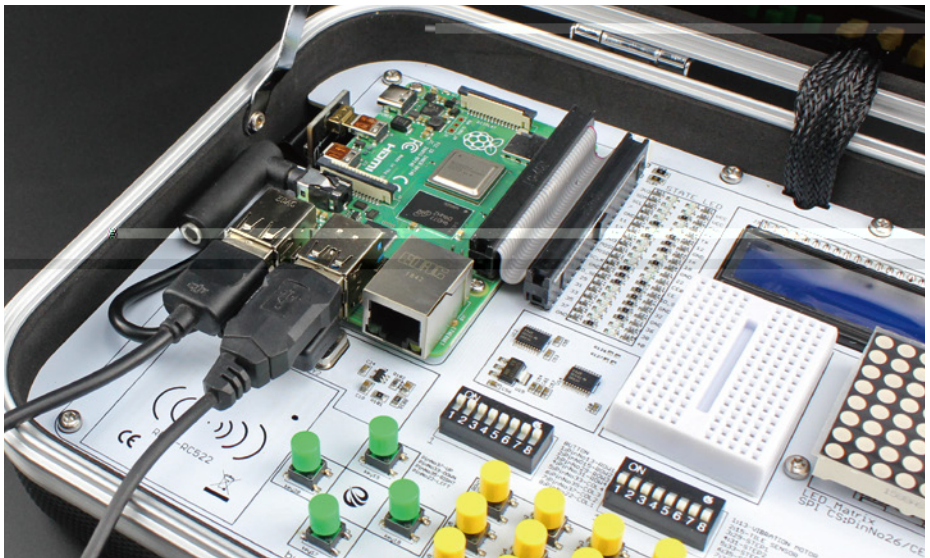
Powered by Debian

Congratulations!

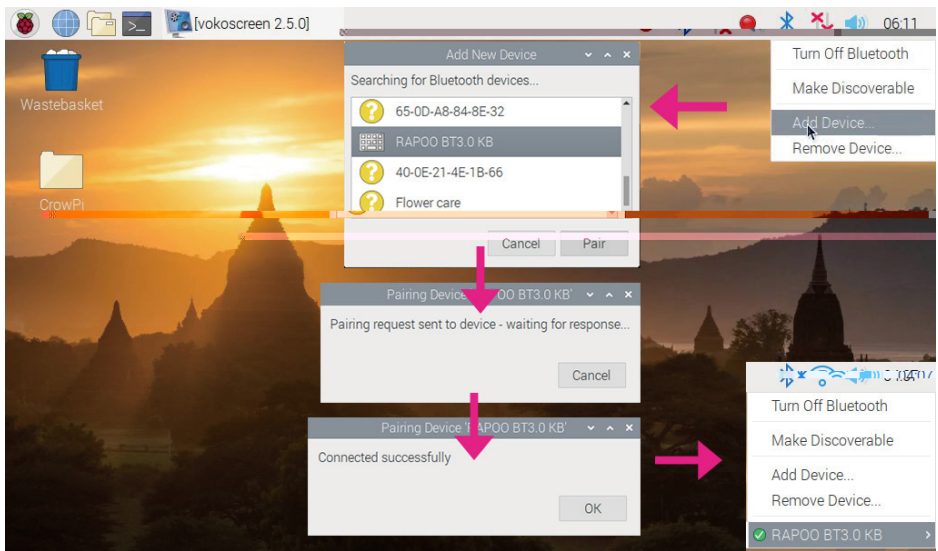
You've officially got your CrowPi up and running.

You might have realized that you have no way to control the desktop environment except for the 7 inch touch screen ... let's get it solved by plugging in a keyboard and external mouse.

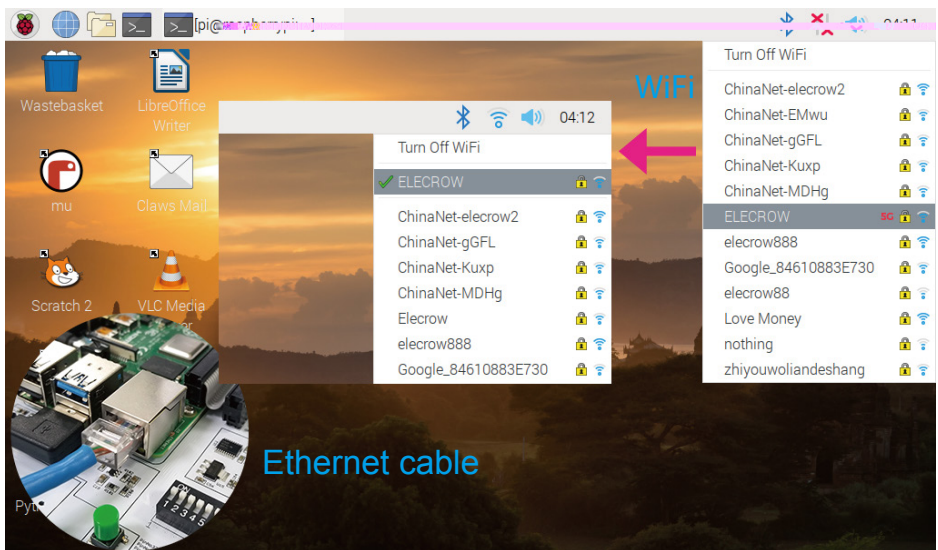
We can do it by simply plugging in a USB keyboard and USB mouse



Or connect Bluetooth keyboard and mouse using the touch screen with the bluetooth configuration



Last thing will be connecting to a local wifi access point or using Ethernet cable if that works better for you (both are optional)



After this, you should have fully functional CrowPi laptop that you can do everything you want to with it!

Summary

What should you do next?

Now, when the initial installation is complete - you're ready to go!

We've prepared 21 lessons for you to get started with the CrowPi.

The lessons will get you started using Python 2.7 and modules usages including all on-board sensors and creating your own first project using the breadboard.

Download the lessons PDF Here:

<https://www.elecrow.com/download/CrowPi-lessons.pdf>

- Lesson 1 - Using the Buzzer for alert sound or notification.
- Lesson 2 - Get input from button to control the Buzzer.
- Lesson 3 - How Relay works and how to control it.
- Lesson 4 - Send vibration signal to the vibration sensor.
- Lesson 5 - Detect sound using the sound sensor.
- Lesson 6 - Detect low or bright light using the Light sensor.
- Lesson 7 - Detect room temperature and humidity using the DHT11 sensor.
- Lesson 8 - Detect motion using the motion sensor.
- Lesson 9 - Getting distance information using the Ultrasonic sensor.
- Lesson 10 - Controlling the LCD Display.
- Lesson 11 - Read / Write RFID card using the NFC module.
- Lesson 12 - Using the step motor and making step movements.
- Lesson 13 - Controlling servos motors using the servo interfaces.
- Lesson 14 - Controlling the 8x8 Matrix LED.
- Lesson 15 - Controlling the 7 Segment Display.
- Lesson 16 - Detecting touch using the Touch Sensor.
- Lesson 17 - Detecting tilt using the Tilt Sensor.
- Lesson 18 - Using and controlling the Button Array.
- Lesson 19 - Using and controlling the IR sensor
- Lesson 20 - Making your own circuit board using the Bread Board
- Lesson 21 - Using the CrowPi Camera

If you encounter any issues or have any question regarding the CrowPi, don't hesitate to ask, we are always here for you. info@elecrow.com



MAKE YOUR MAKING EASIER



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* CrowPi is a new brand by Elecrow