CrowPi All-in-One Kit
Quick Start Guide

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

* Product pictures are for reference only
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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

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

Note: The CHIP name (module) of each sensor is inside the parenthesis
<table>
<thead>
<tr>
<th>Pin#</th>
<th>NAME</th>
<th>NAME</th>
<th>Pin#</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>3.3v DC Power</td>
<td>DC Power 5v</td>
<td>02</td>
</tr>
<tr>
<td>03</td>
<td>GPIO02 (SDA1, I2C)</td>
<td>DC Power 5v</td>
<td>04</td>
</tr>
<tr>
<td>05</td>
<td>GPIO03 (SCL1, I2C)</td>
<td>Ground</td>
<td>06</td>
</tr>
<tr>
<td>07</td>
<td>GPIO04 (GPIO_GCLK)</td>
<td>(TXD0) GPIO14</td>
<td>08</td>
</tr>
<tr>
<td>09</td>
<td>Ground</td>
<td>(RXD0) GPIO15</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>GPIO17 (GPIO_GEN0)</td>
<td>(GPIO_GEN1)</td>
<td>12</td>
</tr>
<tr>
<td>13</td>
<td>GPIO27 (GPIO_GEN2)</td>
<td>Ground</td>
<td>14</td>
</tr>
<tr>
<td>15</td>
<td>GPIO22 (GPIO_GEN3)</td>
<td>(GPIO_GEN4)</td>
<td>16</td>
</tr>
<tr>
<td>17</td>
<td>3.3v DC Power</td>
<td>(GPIO_GEN5)</td>
<td>18</td>
</tr>
<tr>
<td>19</td>
<td>GPIO10 (SPI_MOSI)</td>
<td>Ground</td>
<td>20</td>
</tr>
<tr>
<td>21</td>
<td>GPIO09 (SPI_MISO)</td>
<td>(GPIO_GEN6)</td>
<td>22</td>
</tr>
<tr>
<td>23</td>
<td>GPIO11 (SPI_CLK)</td>
<td>(SPI_CE0_N)</td>
<td>24</td>
</tr>
<tr>
<td>25</td>
<td>Ground</td>
<td>(SPI_CE1_N)</td>
<td>26</td>
</tr>
<tr>
<td>27</td>
<td>ID_SD (I²C ID EEPROM)</td>
<td>(I²C ID EEPROM)</td>
<td>28</td>
</tr>
<tr>
<td>29</td>
<td>GPIO05</td>
<td>Ground</td>
<td>30</td>
</tr>
<tr>
<td>31</td>
<td>GPIO06</td>
<td>GPIO12</td>
<td>32</td>
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<td>33</td>
<td>GPIO13</td>
<td>Ground</td>
<td>34</td>
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<tr>
<td>35</td>
<td>GPIO19</td>
<td>GPIO16</td>
<td>36</td>
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<td>37</td>
<td>GPIO26</td>
<td>GPIO20</td>
<td>38</td>
</tr>
<tr>
<td>39</td>
<td>Ground</td>
<td>GPIO21</td>
<td>40</td>
</tr>
</tbody>
</table>
## Sensor Control Description

<table>
<thead>
<tr>
<th>Sensor Name</th>
<th>Control Pin</th>
<th>Control Method</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUZZER</td>
<td>pin12/GPIO18</td>
<td>GPIO OUTPUT</td>
<td></td>
</tr>
<tr>
<td>RELAY</td>
<td>pin40/GPIO21</td>
<td>GPIO OUTPUT</td>
<td></td>
</tr>
<tr>
<td>SOUND SENSOR</td>
<td>pin18/GPIO24</td>
<td>GPIO INPUT</td>
<td></td>
</tr>
<tr>
<td>TILT SWITCH</td>
<td>pin15/GPIO22</td>
<td>GPIO INPUT</td>
<td>UX5-2 ON</td>
</tr>
<tr>
<td>VIBRATION MOTOR</td>
<td>pin13/GPIO27</td>
<td>GPIO OUTPUT</td>
<td>UX5-1 ON</td>
</tr>
<tr>
<td>MOTION SENSOR</td>
<td>pin16/GPIO23</td>
<td>GPIO OUTPUT</td>
<td></td>
</tr>
<tr>
<td>TOUCH SENSOR</td>
<td>pin11/GPIO17</td>
<td>GPIO INPUT</td>
<td></td>
</tr>
<tr>
<td>STEPPER MOTOR</td>
<td>pin29/GPIO5, pin31/GPIO6, pin33/GPIO13, pin35/GPIO19</td>
<td>GPIO OUTPUT</td>
<td>UX5-3 ON, UX5-4 ON, UX5-5 ON, UX5-6 ON</td>
</tr>
<tr>
<td>SERVO</td>
<td>pin22/GPIO25</td>
<td>GPIO OUTPUT</td>
<td>UX5-8 ON</td>
</tr>
<tr>
<td>IR RECEIVER</td>
<td>pin38/GPIO20</td>
<td>GPIO BOTH</td>
<td></td>
</tr>
<tr>
<td>TEMPERATURE&amp;HUMIDITY</td>
<td>pin7/GPIO4</td>
<td>GPIO INPUT</td>
<td></td>
</tr>
<tr>
<td>ULTRASONIC SENSOR</td>
<td>ECHO:Pin32/GPIO12, TRIG:Pin36/GPIO16</td>
<td>GPIO INPUT</td>
<td></td>
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<tr>
<td>LIGHT SENSOR</td>
<td>I2C</td>
<td>I2C</td>
<td>Address:0x5c</td>
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<tr>
<td>I2C LCD</td>
<td>I2C</td>
<td>I2C</td>
<td>Address:0x21</td>
</tr>
<tr>
<td>4 BITE SEGMENT</td>
<td>I2C</td>
<td>I2C</td>
<td>Address:0x70</td>
</tr>
<tr>
<td>LED MATRIX</td>
<td>SPI</td>
<td>SPI</td>
<td>CS: pin26/GPIO8</td>
</tr>
<tr>
<td>NFC MOUDLE</td>
<td>SPI</td>
<td>SPI</td>
<td>CS: pin24/GPIO7</td>
</tr>
<tr>
<td>INDEPENDENT BUTTON</td>
<td>UP: pin37/GPIO26</td>
<td>DOWN: pin33/GPIO13</td>
<td>RIGHT: pin35/GPIO19</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------------</td>
<td>---------------------</td>
<td>----------------------</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GPIO INPUT</th>
<th>UX1-5 ON</th>
<th>UX1-6 ON</th>
<th>UX1-7 ON</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>BUTTON ARRAY</th>
<th>Row1: pin13/GPIO27</th>
<th>Row2: pin15/GPIO22</th>
<th>Row3: pin29/GPIO5</th>
<th>Row4: pin31/GPIO6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Col1: pin22/GPIO25</td>
<td>Col2: pin37/GPIO26</td>
<td>Col3: pin35/GPIO19</td>
<td>Col4: pin33/GPIO13</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GPIO INPUT</th>
<th>UX1-1 ON</th>
<th>UX1-2 ON</th>
<th>UX1-3 ON</th>
<th>UX1-4 ON</th>
<th>UX1-5 ON</th>
<th>UX1-6 ON</th>
<th>UX1-7 ON</th>
<th>UX1-8 ON</th>
</tr>
</thead>
</table>

**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.
* The device was designed to be portable. It's possible to take it anywhere including out-doors, school, train etc … The device should not be left out-doors without supervision and / or in bad weather conditions such as rain and snow. The device is neither water or dust proof.

**Initial Installation**

**Pre-installation requirements**

Before diving right into the CrowPi Initial installation guide we’d like to confirm you have everything that is required in order to make the installation process as smooth as possible. Please go through the following checklist and make sure you have it all

**Note:** These are not optional. They are all necessary for the installation process.

- Official Elecrow CrowPi Board
- CrowPi Power Adapter
- Raspberry Pi 3
- Micro SD Card (Highly recommended Class 10, With high Read/Write speed)
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**

![Raspberry Pi + Raspbian OS]

The Raspberry Pi uses a 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/crowpiV1.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:
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 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 Operation System here: https://etcher.io/
After downloading and opening Etcher you should see something like this:

![Etcher Interface]

Follow the following steps:

1) Click the “Select Image” button and select your .img file which you downloaded from either Elecrow Website or Raspbian 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.

![Raspberry Pi Connection]

**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 its location on top of the CrowPi board.

**Note:** First of all, we should have to plug the cable first, then mount screw. You can put the unused cable under the board.

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.

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 CrowPi board into power supply, 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.
First time booting into the Operating System

After We've prepared everything and plugged the power on, if the Raspberry Pi doesn't turn on by itself - it means the power button isn't pressed.

After powering on the board by clicking on the power button, 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.
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 circuit using the breadboard.

Download the lessons PDF Here:

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 RFID 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 Matrix.
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
* CrowPi is a new brand by Elecrow