

RaspberryPi - Carputer

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• Raspberry Pi Image Creation for Carputer

Below outlines the steps needed to create the Raspberry Pi image for the main **Carputer** node.

1. [Download Image](#)

- From <https://www.raspberrypi.org/downloads/raspbian/>, download the 'Raspbian Stretch with desktop and recommended software' image dated 'November 2018'.

2. [Write to SD Card](#)

- Follow these instructions to install the operating system to an SD card: <https://www.raspberrypi.org/documentation/installation/installing-images/README.md>.

3. [Setup WiFi without keyboard or network access](#)

This step will allow you to connect your Raspberry Pi to your network then you can use a terminal emulator like 'PuTTY' to access the device.

- In the root of the SD card create a new file named **wpa_supplicant**.
- In the file add:

```
country=US
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1
network={
    ssid="YourNetworkSSID"
    psk="Your Network's Passphrase"
    key_mgmt=WPA-PSK
}
```

- Note:** Ensure you change the values for **ssid** and **psk**.
- Save the file using the Linux LF. In Notepad++ this is configured by going to Edit -> EOL Conversion - Unix (LF).

4. [Setup SSH Access](#)

This step will setup SSH access so that you can connect to the Raspberry Pi from other computers on the same network.

- All that is needed is to create a new empty file named **ssh** in the root of the SD card.
- Save the file using the Linux LF. In Notepad++ this is configured by going to Edit -> EOL Conversion - Unix (LF).

5. [Access the Raspberry Pi](#)

- Using an application connect to the device. You may need to use a program like **Advance Ip Scanner** to determine the IP of the Raspberry device.
 - The default Raspbian user/password is: **pi/raspberry**
- Once authenticated change the default password. Enter **passwd** command and enter the new password.
- I then run the command **sudo reboot**. Once back on-line validate the password change.

6. [Updates/Upgrades](#)

This step is to update and upgrade the packages.

- Enter the command: **sudo apt-get update**
- Enter the command: **sudo apt-get upgrade**

7. [Enable VNC](#)

This is an optional step, but useful nonetheless. You will need a desktop program like **VNC Viewer**. For detail instructions reference: <https://www.raspberrypi.org/documentation/remote-access/vnc/>.

- sudo apt-get install realvnc-vnc-server realvnc-vnc-viewer**
- sudo raspi-config**. This will launch an ASCII UI.

Now, enable VNC Server by doing the following:

- Navigate to Interfacing Options.

Scroll down and select **VNC -> Yes**

8. [raspi-config](#)

This step is to change the hostname of the device.

- Using a program like **VNC Viewer** connect to the Raspberry Pi. The first time the device is accessed the **raspi-config** program should launch automatically. If not, click on the **Raspberry Icon -> Preferences -> Raspberry Pi Configuration**.
 - Ignore changing password.
 - Change Hostname: **carputer**
 - Change resolution: 1280 x 1024
 - Change keyboard
 - Change localization
- Reboot

9. [USB Flash Drive](#)

Click the [link](#) for the steps to configure a USB flash drive that will be used for motionEye video archiving.

10. [phpSysInfo](#)

This step is completely optional. This will install the [phpSysInfo](#) monitoring tool on the Raspberry Pi. Reference: <http://phpsysinfo.github.io/phpsysinfo/>

- sudo apt-get install apache2 php5 libapache2-mod-php5** (if not already done) I get a bunch of errors.
- sudo apt-get install phpsysinfo**
- sudo apt-get install php-mbstring**
- sudo ln -s /usr/share/phpsysinfo /var/www/html**
- sudo reboot**

Then enter into your browser: <http://<your ip>/phpsysinfo>

11. [motionEye](#)
Click the [link](#) for the steps to install [motionEye](#).
12. [Pause - Create Image](#)
At this point I would recommend creating an image of the SD card. The next step involves setting the Raspberry Pi as an access point. If this fails you can easily write the saved image to the SD card rather than to manually redo the installation steps up to this point.
13. [Configure the Raspberry Pi as an Access Point](#)
Follow this [link](#) for the steps to configure the Raspberry Pi as an access point.

Note: The /etc/hostapd/hostapd.conf will have the following values:


```
interface=wlan0
#driver=nl80211
ssid=PINET
hw_mode=g
channel=7
wmm_enabled=0
macaddr_acl=0
auth_algs=1
ignore_broadcast_ssid=0
wpa=2
wpa_passphrase=scoobydoo
wpa_key_mgmt=WPA-PSK
wpa_pairwise=TKIP
rsn_pairwise=CCMP
```

<- Comment out this line
<- Set to PINET

<- Set to scoobydoo
14. [Validate you are now able to connect to PINET](#)
 - a. From another device with WIFI capabilities verify that the PINET access point is available.
 - b. Make a connection to the PINET access point using the passphrase supplied in the hostapd.conf. Note: There will not be any internet connectivity.
15. [motionEye Camera Configuration](#)
Click this [link](#) for the steps to configure the cameras that will be used for video streaming.
16. [Image Archive](#)
This step allows Apache to display directory index. Also creates a symbolic link to the motionEye video archives.
 - a. `cd /var/www/html`
 - b. `sudo mv index.html index.bak`
 - c. `ln -s /mnt/motioneye image_archive`
17. [Create Image](#)
Create an image of the SD card. This allows you to have a backup of the image used for the Carputer. This will allow you to have a development device that is exactly the same as deployed to your vehicle.