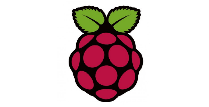
** Raspberry Pi Installation**

Now that you have your Raspberry Pi, it’s time to pick an operating system and create your SD card. NOOBS (New Out Of the Box Software) is an easy operating system install manager for the Raspberry Pi.

There are various places online where you can purchase an SD card with NOOBS installed, but it is very easy to create a NOOBS card yourself. All you need is access to the Internet and an SD card reader/writer on your PC or Mac. Below are the steps to follow to create your NOOBS SD card.

1. You will need a blank SD card (8GB recommended)
2. Using your computer, visit the web site <https://www.raspberrypi.org/downloads>. Here you can download a variety of operating system for the Raspberry Pi including NOOBS. Download the NOOBS zip file (not the NOOBS Lite). Once downloaded, extract the files from the zip.
3. Visit the web site <https://www.sdcard.org/downloads/formatter_4/index.html> and download the SD Formatter 4.0 for your computer. Follow the instructions to install the software. Insert your SD card in to your computer’s SD card reader. Using the SD Formatter, select your computer’s SD card drive letter and format it.
4. Once the SD card has been formatted, drag all of the files that you extracted in the NOOBS folder (step 2), and drop them onto your SD card. When the copy has finished, safely remove the SD card from your computer and insert it into your Raspberry Pi.
5. You are now ready to plug a keyboard, mouse, and power into your Raspberry Pi and start playing! But first there is some system configuration and housekeeping we have to do.

**First Boot**

1. Plug in your keyboard, mouse, monitor, and power cable.
2. You Raspberry Pi will now boot. For your first install, we recommend that you install Raspbian. This is a Raspberry Pi build of the popular Debian Wheezy Linux operating system. **Please make sure that you change your language and keyboard layout to English (US). The default is English (UK) which has a slightly different key placement on the keyboard.**
3. Raspbian will run through its installation process. Please note that this will take several minutes (less on Raspberry Pi model 2, longer on Raspberry Pi model 1).
4. Once the installation process has completed, the Raspberry Pi configuration menu (raspi-config) will load. Here you will be able to configure and personalize your Raspberry Pi. You can exit this menu using the Tab key on your keyboard to select [Finish].
5. By default, the login for Raspbian is username **pi** with the password **raspberry**.
6. To start the graphical user interface type **startx**.
7. Connect your Raspberry Pi to the Internet. You have the option of connecting an Ethernet cable or using an approved USB WiFi adapter.

**Updating and Upgrading**

Now that you have Rasbian installed it's time to update and upgrade our system. Both of these functions are done by the apt-get utility. To update and upgrade our system, we will need to use the sudo command along with apt-get. sudo tells the computer that we want to run the command not as a low privileged use, but as the super user. (super user do). We will use 3 different variations to update ad upgrade our Raspberry Pi.

**sudo apt-get update** This command to re-synchronize the package index files from their sources. The indexes of available packages are fetched from the location(s) specified in /etc/apt/sources.list. An update should always be performed before an upgrade or dist-upgrade.

**sudo apt-get upgrade** This command is used to install the newest versions of all packages currently installed on the system. Packages currently installed with new versions available are retrieved and upgraded; under no circumstances are currently installed packages removed, nor are packages that are not already installed retrieved and installed. New versions of currently installed packages that cannot be upgraded without changing the install status of another package will be left at their current version. An update must be performed first so that apt-get knows that new versions of packages are available.

**sudo apt-get dist-upgrade** In addition to performing the function of upgrade, this option also intelligently handles changing dependencies with new versions of packages; apt-get has a "smart" conflict resolution system, and it will attempt to upgrade the most important packages at the expense of less important ones, if necessary.

**Accessing your Raspberry Pi Remotely**

The Raspberry Pi is very portable, but carrying around a monitor and a keyboard is not very practical. Fortunately, there are some free programs that we can install on our Raspberry Pi's and laptops that can make it very easy to make our Pi's more mobile.

For a Windows PC, the first thing we want to install is **PuTTY**. PuTTY is a free SSH and telnet client for Windows. Visit the website:<http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html> to download PuTTY.

**WinSCP** is an open source free SFTP client, FTP client, WebDAV client and SCP client for Windows. Its main function is to transfer files between our Windows computer and our Raspberry Pi. Visit the website: <https://winscp.net/eng/download.php> for the latest version.

**VNC** is a graphical desktop sharing system that allows you to remotely control the desktop interface of one computer from another. You'll be able to control it as though you were working on the Raspberry Pi itself.

On your Pi (using a monitor or via SSH), install the TightVNC package:

**sudo apt-get install tightvncserver**

Next, run TightVNC Server which will prompt you to enter a password and an optional view-only password

Start a VNC server from the terminal. This example starts a session on VNC display zero (:0) with full HD resolution:

**vncserver :0 -geometry 1920x1080 -depth 24**

From your laptop computer, you can now use any VNC client applications such as **TightVNC**, **RealVNC**, or **UltraVNC**.

All of the above applications require you to know your IP address for your Raspberry Pi. **Advanced IP Scanner** is a free and fast network scanner allowing you to quickly retrieve information about network devices. Visit the website <http://www.advanced-ip-scanner.com> to download.