# The Raspberry Pi

The Raspberry Pi is a credit card-sized single-board computer developed in the UK by the Raspberry Pi Foundation with the intention of promoting the teaching of basic computer science in schools.

The Raspberry Pi has a Broadcom BCM2835 system on a chip (SoC), which includes an ARM1176JZF-S 700 MHz processor, VideoCore IV GPU, and was originally shipped with 256 megabytes of RAM, later upgraded (Model B & Model B+) to 512 MB. It does not include a built-in hard disk or solid-state drive, but it uses an SD card for booting and persistent storage, with the Model B+ using a MicroSD.

# The Operating System

The Raspberry Pi foundation provides several ready to use operating system images for the Pi. At the moment this writing the following are available:

* RASPBIAN - Debian Wheezy
* PIDORA - Fedora Remix
* OPENELEC - An XBMC Media Centre
* RASPBMC - An XBMC Media Centre
* RISC OS - A non-Linux distribution
* ARCH LINUX - A lightweight Linux distribution

For the start of this course we will be using the Raspbian image. Later we will create our own distribution.

## Installing Raspbian

You can download the latest image from the Raspberry Pi website (<http://www.raspberrypi.org/downloads/>). Make sure to pick the “Download ZIP” option. Extract the zip file on your local disk. You should get an image file (.img extension).

The current version at the moment of this writing is of June 2014 with a Linux kernel version of 3.12. You can always check out the release notes on <http://downloads.raspberrypi.org/raspbian/release_notes.txt>.

To boot this Linux distribution we will need to write the image file to an SD card of at least 4GB. A popular tool to write the image to an SD card is “Win32 Disk Imager”[[1]](#footnote-1) which can be downloaded on <http://sourceforge.net/projects/win32diskimager/>

Select the correct device letter and load the Raspbian image from your local drive as shown in Figure 1. If you’re ready hit the write button and grab a cup of coffee. You can also create a backup of your current SD card by reading from the SD card to an image file. Just make sure to select a new image file name.

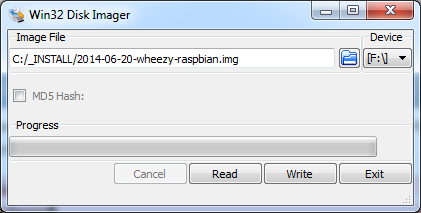
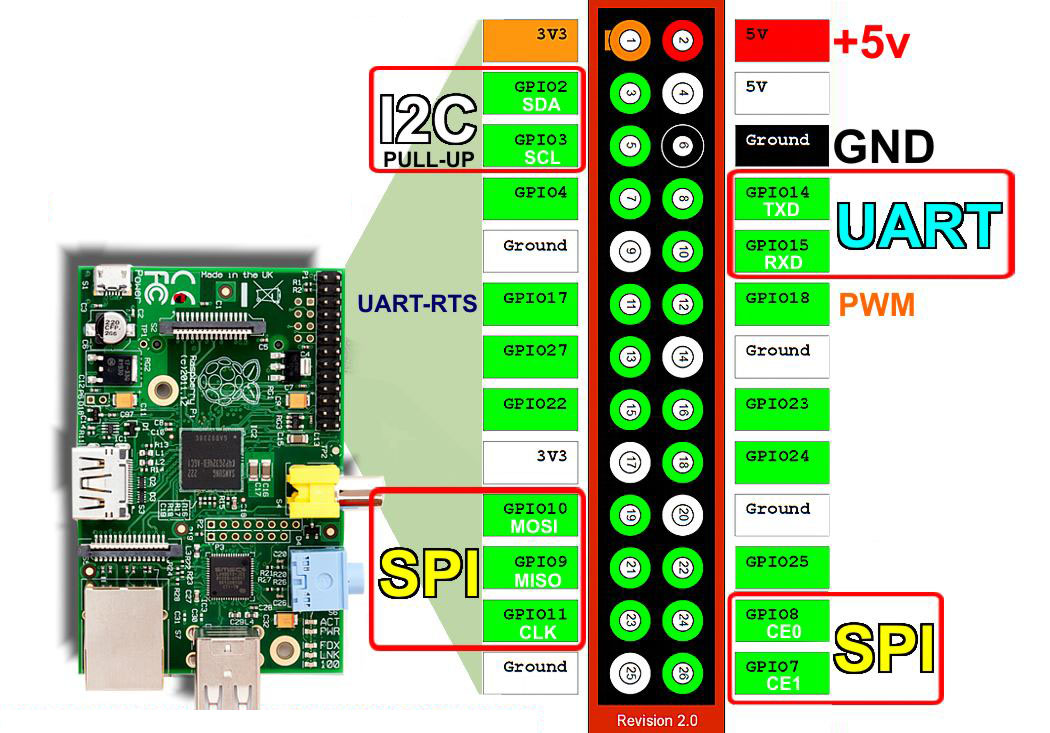


Figure Win32 Disk Imager

Once the write process is finished you can remove the SD card and plug it in the Raspberry Pi. Just make sure to disconnect the power first.



# Buildroot: Making Embedded Linux easy

## Introduction

Buildroot is a tool that simplifies and automates the process of building a complete Linux system for an embedded system, using cross-compilation.

In order to achieve this, Buildroot is able to generate a cross-compilation toolchain, a root filesystem, a Linux kernel image and a bootloader for your target. Buildroot can be used for any combination of these options, independently (you can for example use an existing cross-compilation toolchain, and build only your root filesystem with Buildroot).

Buildroot is useful mainly for people working with embedded systems. Embedded systems often use processors that are not the regular x86 processors everyone is used to having in his PC. They can be PowerPC processors, MIPS processors, ARM processors, etc.

Buildroot supports numerous processors and their variants; it also comes with default configurations for several boards available off-the-shelf. Besides this, a number of third-party projects are based on, or develop their BSP 1 or SDK 2 on top of Buildroot.

Buildroot is designed to run on Linux systems.

## Getting Buildroot

## Requirements

While Buildroot itself will build most host packages it needs for the compilation process, certain standard Linux utilities are expected to be already installed on the host system. Below you will find an overview of the mandatory packages and how to install them on a Debian based Linux system.

1. Check out <http://www.raspberrypi.org/documentation/installation/installing-images/README.md> for instructions for different host operating systems such as Linux or Mac. [↑](#footnote-ref-1)