

Using the Pi as a Computer: The Very Basics

Overview

- Hooking up Pi to use as a computer
- Learn a few basic commands for your Pi
- Change the wireless network name of your Pi
- How to expand a newly imaged SD card so you Pi has access to the free space on the card for storage
- Properly shutdown your Pi

BE AWARE: ESD Sensitive Components!

- ESD – Electrostatic discharge

Electrostatic discharge (ESD) is the sudden flow of electricity between two electrically charged objects caused by contact, an electrical short, or dielectric breakdown. A buildup of static electricity can be caused by tribocharging or by electrostatic induction. The ESD occurs when differently-charged objects are brought close together or when the dielectric between them breaks down, often creating a visible spark.

ESD can cause a range of harmful effects of importance in industry, including gas, fuel vapour and coal dust explosions, as well as failure of solid state electronics components such as integrated circuits. These can suffer permanent damage when subjected to high voltages. Electronics manufacturers therefore establish electrostatic protective areas free of static, using measures to prevent charging, such as avoiding highly charging materials and measures to remove static such as grounding human workers, providing antistatic devices, and controlling humidity.

- Use grounding straps when handling/touching components such as the Pi, RFD 900+ modems, iridium modem, power boards, OCCAMS, etc. and place them on the ESD rubber mat when not in use.

Using the Pi as a Computer: What you will need



Monitor

USB Keyboard

Pi

**Powered
Micro USB
cable**

**HDMI to
HDMI/DVI/VGA
video cable
(monitor
dependent)**

Plugging components into Pi

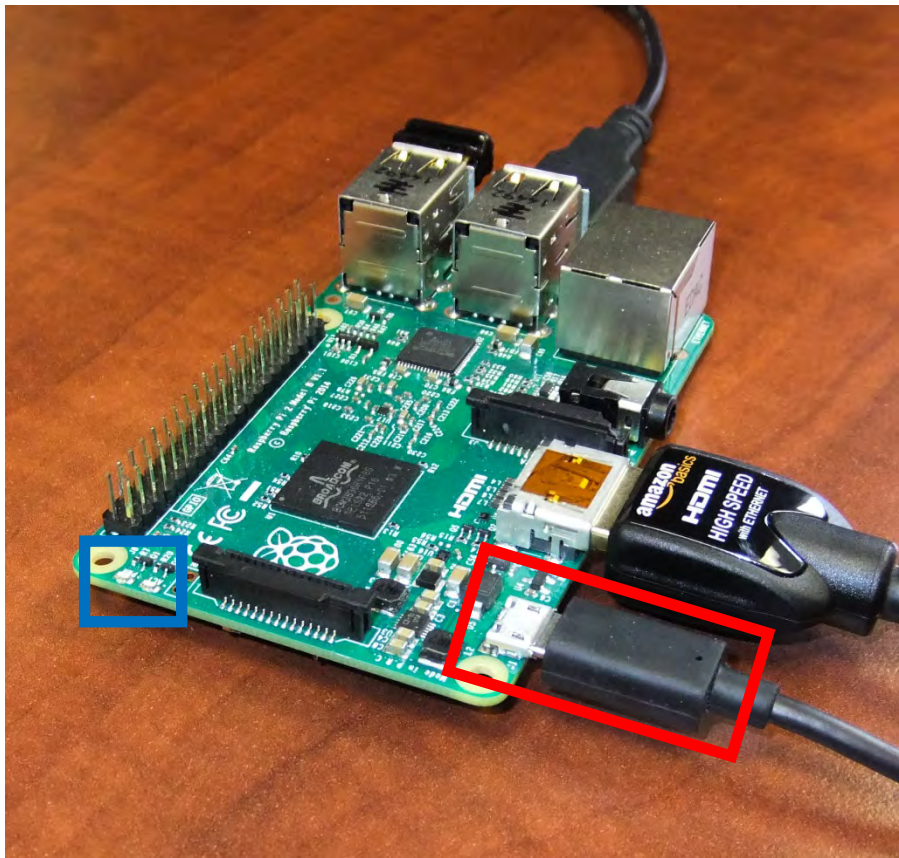
Plug the USB keyboard into one of the USB ports on the Pi



Plug the HDMI end of the video cable into the Pi. Plug the other end (HDMI, DVI, VGA) into your monitor. Turn the monitor on.

Powering up the Pi

- Make sure you have the RFD or UBIQITY OS SD card inserted in the Pi (on bottom of Pi)



Plug in the Micro USB into power and plug the **Micro USB end** into the Pi. The Pi will then begin to boot up on the screen. A red and green LED will flash **here** showing power (red) and SD card access (green).

Pi Login

```
[info] Using makefile-style concurrent boot in runlevel.
[ ok ] Network Interface Plugging Daemon...skip eth0...
[info] Initializing cgroups.
[warn] Kernel lacks cgroups or memory controller not available.
[ ok ] Starting enhanced syslogd: rsyslogd.
Starting dphys-swapfile swapfile setup ...
want /var/swap=100MByte, checking existing: keeping it
done.
[ ok ] Starting periodic command scheduler: cron.
[ ok ] Starting NTP server: ntpd.
[ ok ] Starting system message bus: dbus.
[ ok ] Starting OpenBSD Secure Shell server: sshd.
[hwclock: Cannot access the Hardware Clock via any known method.
[hwclock: Use the --debug option to see the details of our fault.

Raspbian GNU/Linux 7 Raspberry tty1

Raspberry login:
Password: _____
```

Pi Login

Raspberry login: **pi**

Password: **raspberry**

```
| [ ok ] Starting periodic command scheduler: cron.  
| [ ok ] Starting NTP server: ntpd.  
| [ ok ] Starting system message bus: dbus.  
| [ ok ] Starting OpenBSD Secure Shell server: sshd.  
[hwclock: Cannot access the Hardware Clock via any known m  
[hwclock: Use the --debug option to see the details of our  
  
| Raspbian GNU/Linux 7 Raspberry tty1  
  
| Raspberry login: pi  
| Password: _
```


Pi Command Prompt

```
2 Starting dphys-swapfile swapfile setup ...
3 want /var/swap=100MByte, checking existing: keeping it
4 done.
5 [ ok ] Starting periodic command scheduler: cron.
6 [ ok ] Starting NTP server: ntpd.
7 [ ok ] Starting system message bus: dbus.
8 [ ok ] Starting OpenBSD Secure Shell server: sshd.
9 hwclock: Cannot access the Hardware Clock via any known method.
10 hwclock: Use the --debug option to see the details of our search for an access
11
12 Raspbian GNU/Linux 7 Raspberry tty1
13
14 Raspberry login: pi
15 Password:
16 Last login: Thu May 5 01:40:03 UTC 2016 on tty1
17 Linux Raspberry 3.18.7-v7+ #755 SMP PREEMPT Thu Feb 12 17:20:48 GMT 2015 armv7l
18
19 The programs included with the Debian GNU/Linux system are free software;
20 the exact distribution terms for each program are described in the
21 individual files in /usr/share/doc/*/copyright.
22
23 Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
24 permitted by applicable law.
25 pi@Raspberrypi ~ $
```

Pi Command Prompt

```
2 Starting dphys-swapfile swapfile setup ...
3 want /var/swap=100MByte, checking existing: keeping it
4 done.
5 [ ok ] Starting periodic command scheduler: cron.
6 [ ok ] Starting NTP server: ntpd.
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8 [ ok ] Starting OpenBSD Secure Shell server: sshd.
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23 Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
24 permitted by applicable law.
25 pi@Raspberr ~ $
```

- ~ \$ - Home Directory

Shutting Down Pi

- It is important that you shutdown the Pi to avoid corrupting the SD card. To shutdown the Pi, type in the command line **sudo shutdown -h now**
- sudo allows you to be a “superuser” to have permission to execute certain commands.

```
Raspberry login: pi
Password:
Last login: Thu May 5 01:40:03 UTC 2016 on tty1
Linux Raspberry 3.18.7-v7+ #755 SMP PREEMPT Thu Feb 12 17:20:48 GMT 2015 armv7l

The programs included with the Debian GNU/Linux system are free software;
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permitted by applicable law.
pi@Raspberry ~$ sudo shutdown -h now_
```

Changing Directories

- **cd** is the “change directory” command.
- In this example, we will change some network settings on the pi to see how the cd command works (and a few others)
- Let’s begin at the screen right after logging into the Pi...

Changing Directories

```
Starting dnsmasq-swapsrv: dnsmasq setup ...
want /var/swap=100MByte, checking existing: keeping it
done.
[ ok ] Starting periodic command scheduler: cron.
[ ok ] Starting NTP server: ntpd.
[ ok ] Starting system message bus: dbus.
[ ok ] Starting OpenBSD Secure Shell server: sshd.
My IP address is 192.168.1.1
hwclock: Cannot access the Hardware Clock via any known method.
hwclock: Use the --debug option to see the details of our search for an access method.

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Raspberry login: pi
Password:
Last login: Thu May 5 02:11:32 UTC 2016 on tty1
Linux Raspberry 3.18.7-07+ #755 SMP PREEMPT Thu Feb 12 17:20:48 GMT 2015 armv7l

The programs included with the Debian GNU/Linux system are free software:
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permitted by applicable law.
pi@Raspberry ~ $
```

In order to view or change network work settings, we need to be in the network directory

Changing Directories

```
Starting dnsmasq-swapsrv: dnsmasq setup ...
want /var/swap=100MByte, checking existing: keeping it
done.
[ ok ] Starting periodic command scheduler: cron.
[ ok ] Starting NTP server: ntpd.
[ ok ] Starting system message bus: dbus.
[ ok ] Starting OpenBSD Secure Shell server: sshd.
My IP address is 192.168.1.1
hwclock: Cannot access the Hardware Clock via any known method.
hwclock: Use the --debug option to see the details of our search for an access method.

Raspbian GNU/Linux 7 Raspberry tty1

Raspberry login: pi
Password:
Last login: Thu May  5 02:11:32 UTC 2016 on tty1
Linux Raspberry 3.18.7-07+ #755 SMP PREEMPT Thu Feb 12 17:20:48 GMT 2015 armv7l

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permitted by applicable law.
pi@Raspberry ~ $ cd /etc/network
```

The network directory is within the etc directory. There are two ways to get there:

cd /etc [ENTER] then **cd /network** [ENTER] •or• **cd /etc/network** [ENTER]

Listing Contents in Directory

```
Starting dnsmasq-swapsite swapsite setup ...
want /var/swap=100MByte, checking existing: keeping it
done.
[ ok ] Starting periodic command scheduler: cron.
[ ok ] Starting NTP server: ntpd.
[ ok ] Starting system message bus: dbus.
[ ok ] Starting OpenBSD Secure Shell server: sshd.
My IP address is 192.168.1.1
hwclock: Cannot access the Hardware Clock via any known method.
hwclock: Use the --debug option to see the details of our search for an access method.

Raspbian GNU/Linux 7 Raspberry tty1

Raspberry login: pi
Password:
Last login: Thu May 5 02:11:32 UTC 2016 on tty1
Linux Raspberry 3.18.7-v7+ #755 SMP PREEMPT Thu Feb 12 17:20:48 GMT 2015 armv7l

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the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
pi@Raspberry ~$ cd /etc/network
pi@Raspberry /etc/network$ ls
if-down.d if-post-down.d if-pre-up.d if-up.d interfaces interfaces.rfd interfaces.ubiquiti run
pi@Raspberry /etc/network$
```

To get a list of what is inside the network directory, type `ls` and hit [ENTER]

Items in blue are other directories and items in gray are files.

(NOTE: if at any time you get “lost” in the command prompt, typ `pwd` and hit [ENTER] to see the path where you are)

Making Changes to network

```
Starting dhcpcd-wpa supplicant setup ...
want /var/swap=100MByte, checking existing: keeping it
done.
[ ok ] Starting periodic command scheduler: cron.
[ ok ] Starting NTP server: ntpd.
[ ok ] Starting system message bus: dbus.
[ ok ] Starting OpenBSD Secure Shell server: sshd.
My IP address is 192.168.1.1
hwclock: Cannot access the Hardware Clock via any known method.
hwclock: Use the --debug option to see the details of our search for an access method.

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Raspberry login: pi
Password:
Last login: Thu May 5 02:11:32 UTC 2016 on tty1
Linux Raspberry 3.18.7-v7+ #755 SMP PREEMPT Thu Feb 12 17:20:48 GMT 2015 arwu71

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

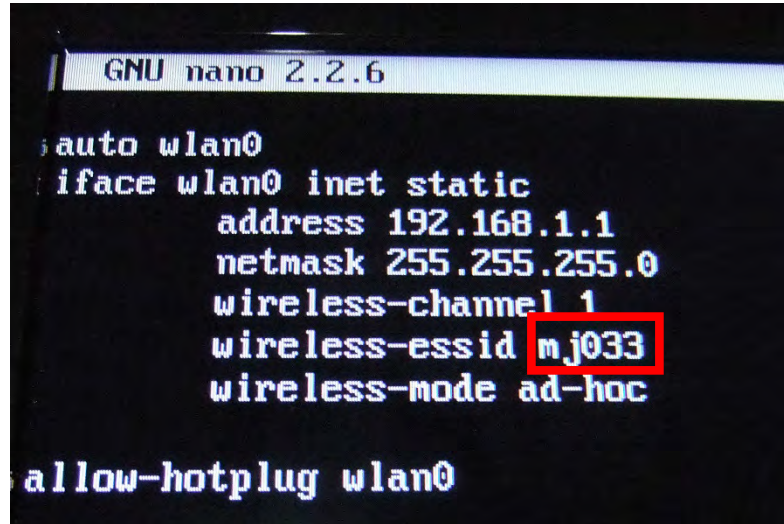
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
pi@Raspberry ~$ cd /etc/network
pi@Raspberry /etc/network$ ls
if-down.d if-post-down.d if-pre-up.d if-up.d interfaces interfaces.rfd interfaces.ubiquiti run
pi@Raspberry /etc/network$
```

We want to get into interfaces to look at our network settings:

- To look at setting but NOT be able to make changes, type **nano interfaces** and hit **[ENTER]**
- To make changes (BE CAREFUL WHEN MAKING CHANGES!) type **sudo nano interfaces** and hit **[ENTER]**

Changing the wireless network name of your Pi

Upon typing `sudo nano interfaces` and hitting **[ENTER]** you will see the following:



```
GNU nano 2.2.6
auto wlan0
iface wlan0 inet static
    address 192.168.1.1
    netmask 255.255.255.0
    wireless-channel 1
    wireless-essid mj033
    wireless-mode ad-hoc

allow-hotplug wlan0
```

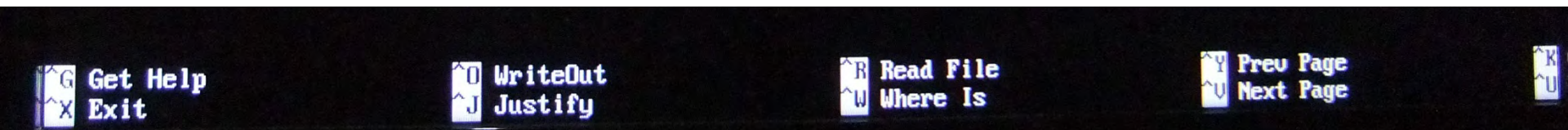
We are changing the wireless-essid (this is what you will see in your wireless networks from your laptop). This will allow you make your own name so you can easily find your Pi wirelessly. The red box is what you can change to your preference. By default this will be your team registration number. If you so choose, change the name.

Changing the wireless network name of your Pi

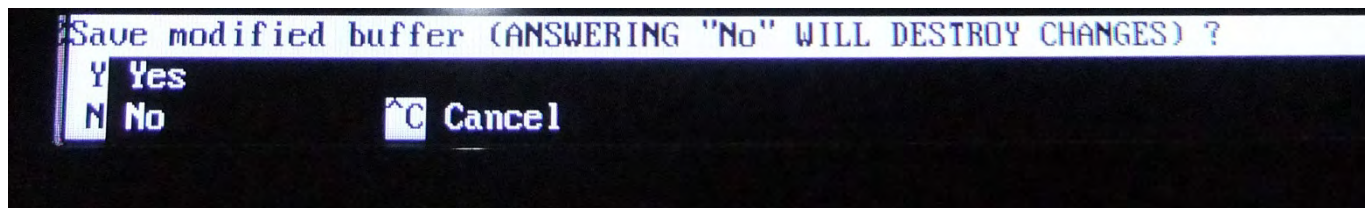
```
GNU nano 2.2.6
auto wlan0
iface wlan0 inet static
    address 192.168.1.1
    netmask 255.255.255.0
    wireless-channel 1
    wireless-essid mj033
    wireless-mode ad-hoc

allow-hotplug wlan0
```

On the bottom of the screen will be shown the following:



To exit and save your changes hit [CTRL] + X and you will see the following on the bottom:



Changing the wireless network name of your Pi

```
GNU nano 2.2.6
auto wlan0
iface wlan0 inet static
    address 192.168.1.1
    netmask 255.255.255.0
    wireless-channel 1
    wireless-ssid mj033
    wireless-mode ad-hoc

allow-hotplug wlan0
```

```
Save modified buffer (ANSWERING "No" WILL DESTROY CHANGES) ?
Y Yes
N No          ^C Cancel
```

Hit the y key to save changes. The following will then be displayed:

```
File Name to Write: interfaces
^G Get Help
^C Cancel
^D-D DOS Format
^M-M Mac Format
```

Changing the wireless network name of your Pi

```
GNU nano 2.2.6  
auto wlan0  
iface wlan0 inet static  
    address 192.168.1.1  
    netmask 255.255.255.0  
    wireless-channel 1  
    wireless-essid mj033  
    wireless-mode ad-hoc  
  
allow-hotplug wlan0
```

```
File Name to Write: interfaces  
G Get Help  
C Cancel  
1-D DOS Format  
1-M Mac Format
```

Hit **[ENTER]** (DO NOT CHANGE THE FILE NAME!) Upon hitting **[ENTER]** you will see the following on the bottom of the screen:

```
pi@Raspberry /etc/network $
```

Returning to Home Directory

```
pi@Raspberry /etc/network $
```

Typing **cd** and hitting **[ENTER]** will take you back to the home directory:

```
pi@Raspberry /etc/network $ cd  
pi@Raspberry ~ $
```

Expanding a Newly Imaged SD Card

- If you put an image of the RFD or UBIQUITI OS on a new SD card, you must expand the card to allow the Pi full access to the “free space” on the card for storage, etc.
- To see how to make a new image, see the “Making new SD card with RFD or UBIQUITI OS” instructions
- Begin by inserting the card into a UNPOWERED pi SD card slot and powering up the pi.
- Login to the pi

Expanding your SD Card: Login to your Pi

```
[ OK ] Starting system message bus: dbus.
[ ok ] Starting OpenBSD Secure Shell server: sshd.
hwclock: Cannot access the Hardware Clock via any known method.
hwclock: Use the --debug option to see the details of our search for an access

Raspbian GNU/Linux 7 Raspberry tty1

Raspberry login: pi
Password:
Login timed out after 60 seconds.

Raspbian GNU/Linux 7 Raspberry tty1

Raspberry login: pi
Password:
Last login: Thu May 5 01:36:08 UTC 2016 on tty1
Linux Raspberry 3.18.7-v7+ #755 SMP PREEMPT Thu Feb 12 17:20:48 GMT 2015 armv7l

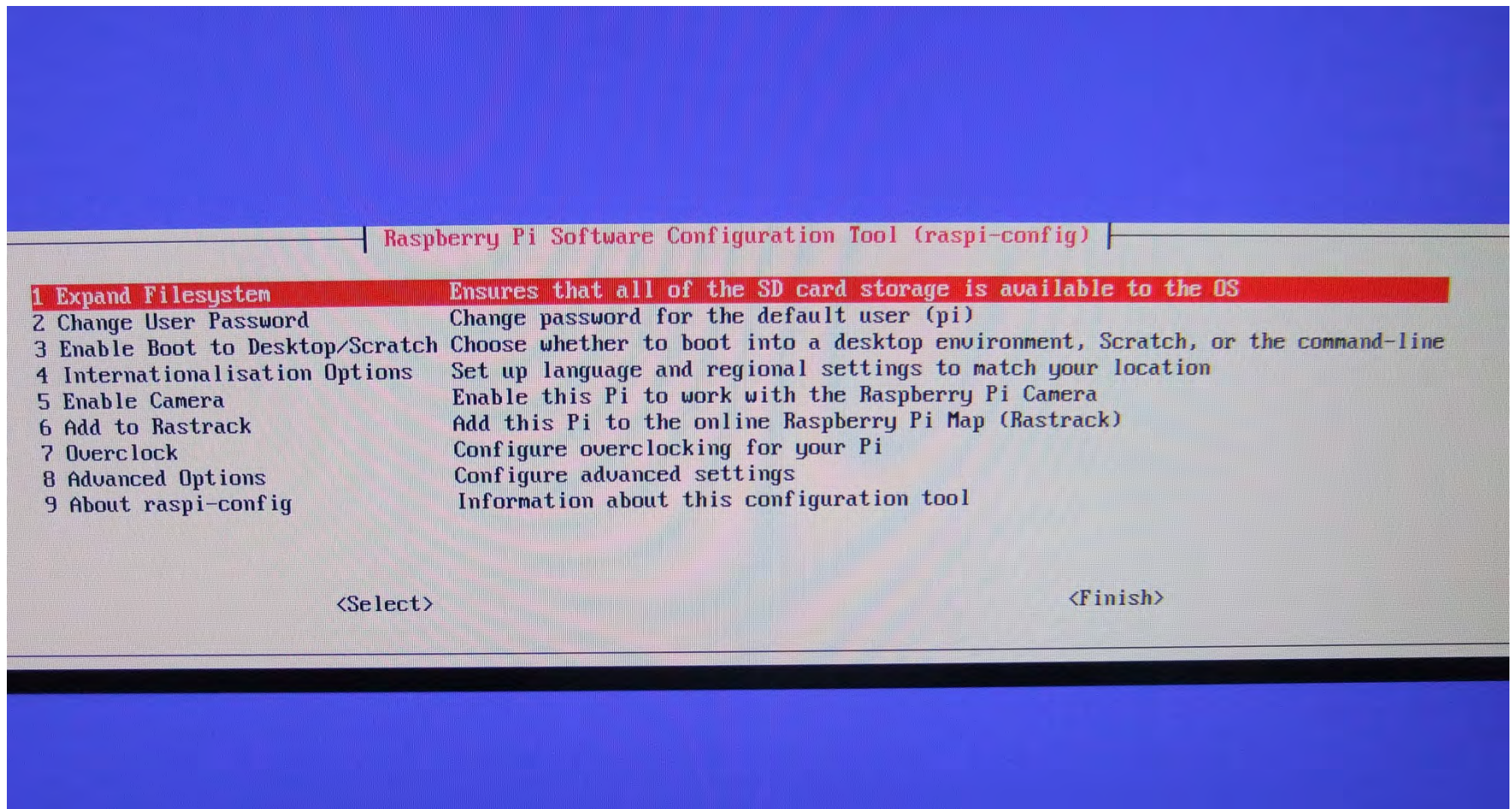
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permitted by applicable law.
pi@Raspberry ~ $ sudo raspi-config
```

Once logged into the Pi type **sudo raspi-config** and hit [ENTER]

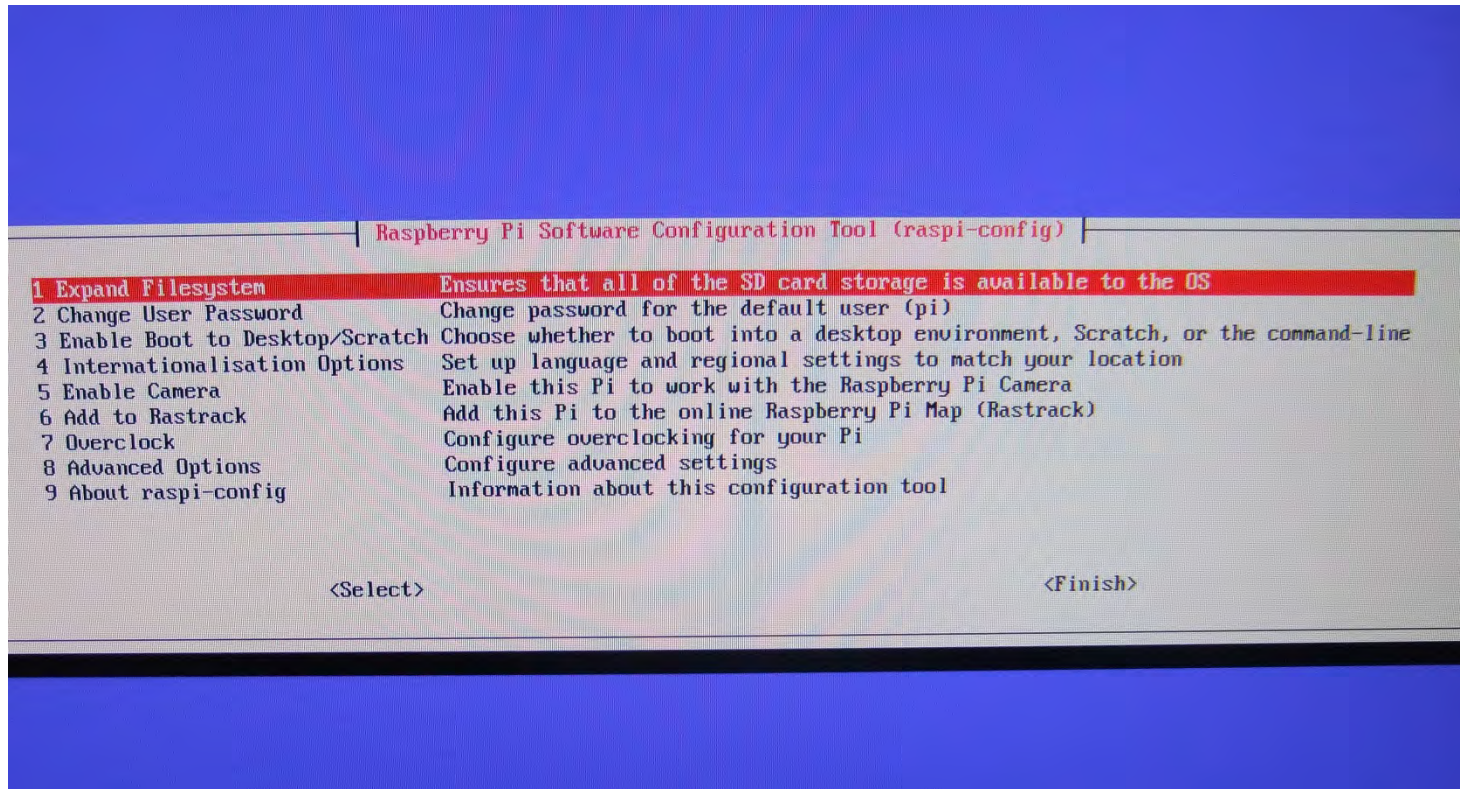
Expanding your SD Card: Login to your Pi

The following screen will be displayed. Highlight **1 Expand Filesystem** and hit **[ENTER]**



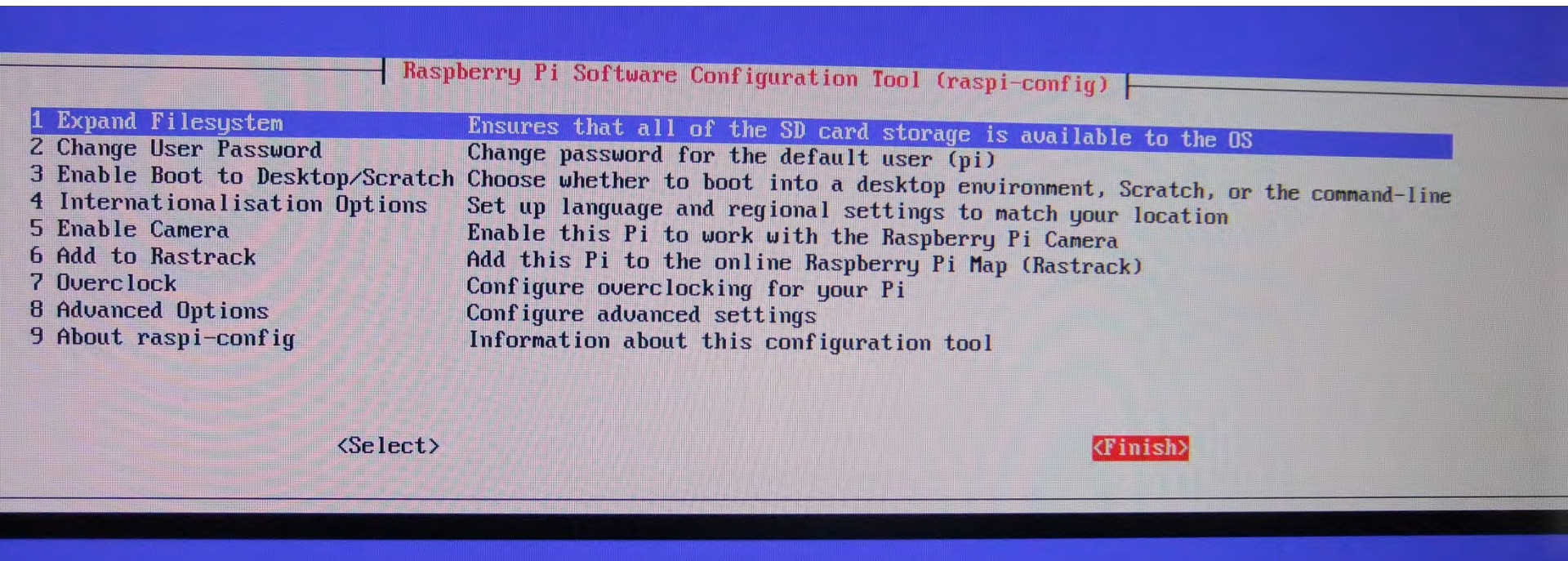
Expanding your SD Card: Login to your Pi

The screen will flash black and you will see some text scroll by in the command prompt screen. Once completed you will once again be returned to the following screen:



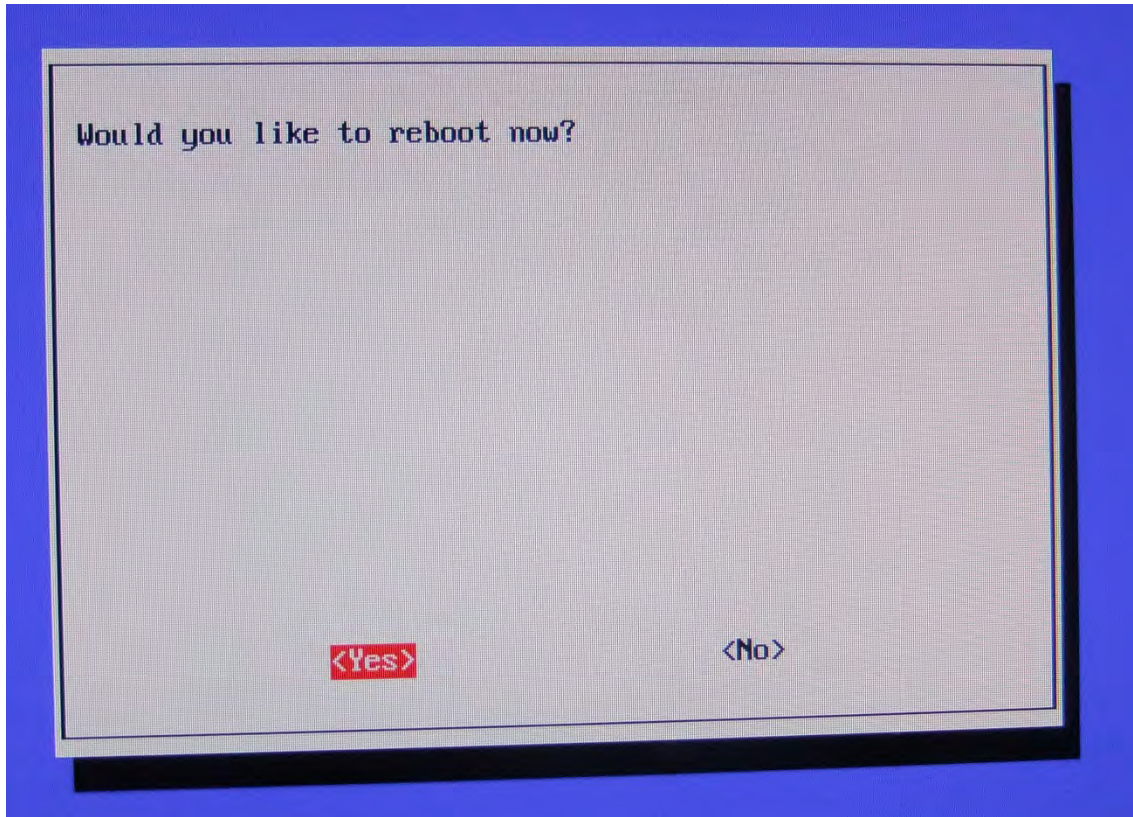
Expanding your SD Card: Login to your Pi

Use the **[Right Arrow Key]** or **[TAB]** to highlight **Finish** on the bottom and hit **[ENTER]**



Expanding your SD Card: Login to your Pi

You will then be asked if you want to reboot, highlight **Yes** and hit **[ENTER]**



Your Pi will now reboot and bring you back to the “Login” screen. You have successfully expanded the filesystem. If you are done accessing the Pi, don’t forget to log back in and shutdown the Pi! (**sudo shutdown -h now**)