# Raspberry Pi Laptop Connection

For "laptop" Raspberry Pi 3 image (http://csinparallel.stolaf.edu/CSiP_rpi3_base_2.0.img.zip)

**Your kit should contain:**

1. Raspberry Pi 3 motherboard contained in a box;
2. MicroUSB to USB cable;
3. Ethernet cable;
4. USB to Ethernet dongle;
5. MicroSD card within an SD adapter within a snack-sized Ziplock bag; and
6. Gallon Ziplock bag container.

Items 1-4 should be labelled with the same number.

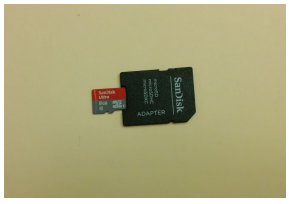
**Note: Return all these items in their gallon Ziplock container at the end!**

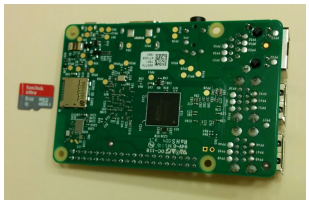
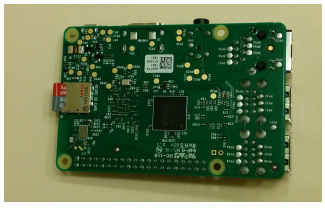

1. Install software on your laptop.

- Install a VNC viewer client such as RealVNC Viewer
  https://www.realvnc.com/download/viewer/
  **Note:** We do not need VNC Connect (the Pi already has a server installed)
- Linux only: Make VNC viewer an executable: `chmod -x VNC-Viewer-6.1.1-Linux-x64`
- Windows only: Install an SSH client such as putty http://www.putty.org/

2. Insert the MicroSD card.

Remove the MicroSD from its SD-sized adapter, and insert into the MicroSD slot on the bottom side of the of the motherboard.



3. Connect the Raspberry Pi 3 to power.

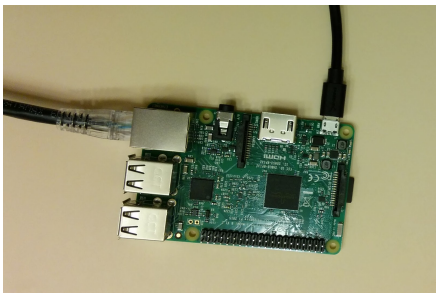
- Attach the microUSB end of the power cable to the microUSB socket on the Pi.
- If the other end of the power cable is a USB connector (e.g., for the kit), attach to a USB socket (e.g., on your laptop).
  If the other end of the power cable is a power block, attach to a power socket.

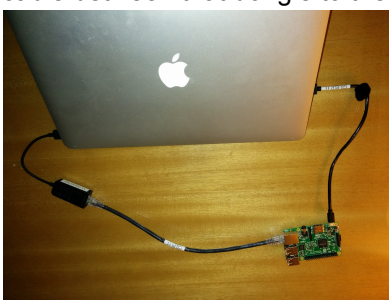
**Look for this:**

- ❏ A red light should appear, indicating that power is connected to the Pi.
- ❏ A green light should flash, indicating that the Pi operating system is booting.

4. Attach your laptop to the Pi.

- If your laptop has an ethernet port, attach the ethernet cable between that laptop ethernet port and the Pi's ethernet port.
- If your laptop doesn't have an ethernet port, connect the USB-to-ethernet dongle to a USB port on your laptop, then attach the ethernet cable between that dongle to the Pi's ethernet port

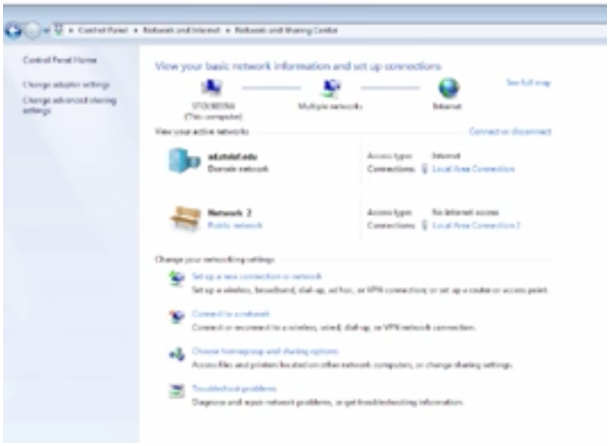




5. Verify an Ethernet network connection to the Pi.

Windows:

- From the Start menu, select Control Panel, then Network and Internet
- Once your laptop connects to the Pi (this may take a minute or so), you may see a popup window about selecting a network location. You can select Home Network or choose the red X at the top right of the window to exit that popup.



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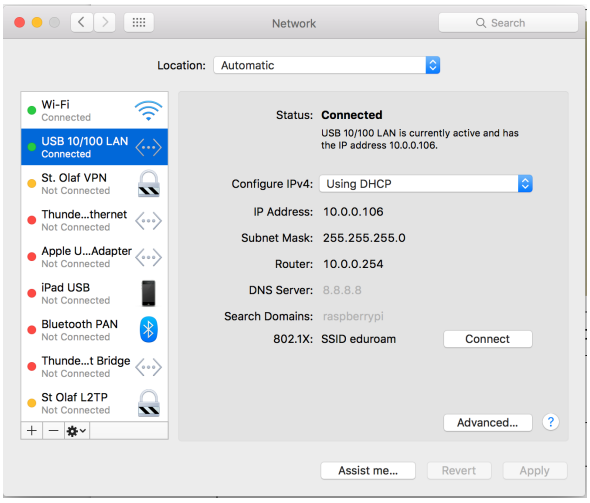
Linux:

- After a moment, a two-arrow icon should show in the upper right toolbar:


This indicates a wired connection to the Pi.

Macintosh:

- Start up to System Preferences, then choose Network.
- If using an ethernet port on your Mac, the Ethernet port should move to the top and show that it is connected.
- If using the kit's USB-Ethernet dongle, "USB 10/100 LAN" should move near the top of list and show a green connection status (image below). The connection may take a minute or so to complete.
  **Note for dongle only:** If "USB 10/100 LAN" doesn't appear in the list, download the driver for "**SKU 202023**" from http://www.cablematters.com/cs-Downloads.aspx



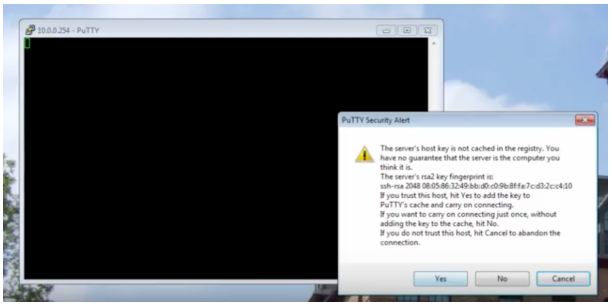
6. Log into the Pi using SSH.

**Note: If this is a workshop-provided MicroSD card, please do not change the password!**
**If this is your own MicroSD card, do change the password** for security.

Windows:

- Open the Putty application (or another SSH client) and enter the IP address `10.0.0.254` , then login with
  User: `pi`
  Password: `raspberry`

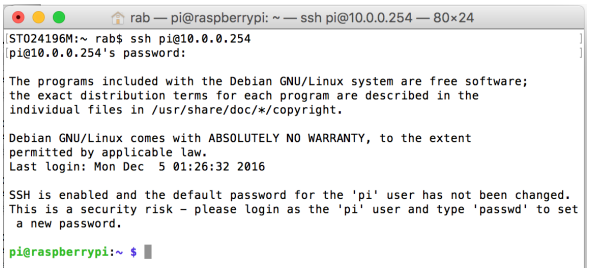
**Note:** If this is your first SSH session to this Pi, a popup will appear. Click on Yes to indicate that you trust the Pi.




Macintosh, Linux:

- Open the Terminal application
- Enter the command
  `ssh pi@10.0.0.254`
  Password: `raspberry`

**Note:** If this is your first SSH session to this Pi, respond Yes to indicate that you trust the Pi.

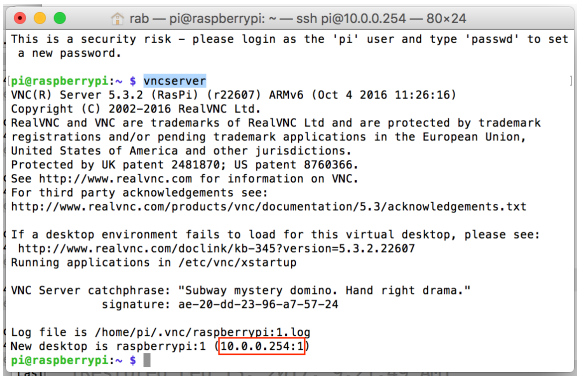



7. Start a VNC virtual desktop (VNC server) on the Pi.

In an SSH session from your laptop to the Pi:

- Enter the command
  **`vncserver`**

The new desktop's identifier is `10.0.0.254:1` as shown in the last line of the vncserver output. (If you enter vncserver more than once, the final component of the identifier will change.)

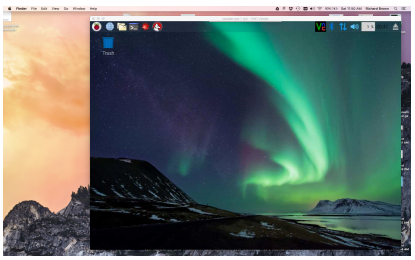



8. Connect a VNC viewer on your laptop to the VNC virtual desktop.

- Open VNC Viewer, and create a new connection to the virtual desktop `10.0.0.254:1`
  **Note:** On your first connection to this VNC server, click Continue to indicate you trust the Pi.

  Linux only: Command to start VNCViewer:
  `./VNC-Viewer-6.1.1-Linux-x64`

- Enter username `pi` and password `raspberry` .
  You should see a Raspberry Pi desktop.



9. To open a terminal window in VNCViewer, click on the  icon near the top of the Pi VNC viewer window. (You can also compile and run programs in an SSH session from your laptop to the Pi.)

# To quit

To close the VNC viewer:

| | |
|---|---|
| Windows: Click on the red X in the upper right corner of the VNC viewer window.<br>• You can reconnect to your virtual desktop using VNC viewer later, until that virtual desktop exits on the pi. | Macintosh, Linux: Click on the red dot in the upper left corner of the VNC viewer window.<br>• You can reconnect to your virtual desktop using VNC viewer later, until that virtual desktop exits on the pi. |

To exit a VNC virtual desktop on the Pi:

In an SSH session from your laptop to the pi, enter the command

**`vncserver -kill :1`**

for the desktop number :n in your desktop identifier (e.g., 10.0.0.254:1)

```
pi@raspberrypi:~ $ vncserver -kill :1
pi@raspberrypi:~ $
```

- You can use an SSH connection to the Pi to start another virtual desktop later if desired.

To close an SSH session (not necessary when you shut down the Pi operating system, below):

In that SSH session from your laptop to the Pi, enter the command

**`exit`**

- You can start another SSH session to the Pi later, and have multiple SSH sessions at once.

To shut down the Pi operating system:

In an SSH session from your laptop to the pi, enter the command

**`sudo shutdown -h now`**

Allow a few seconds for the Pi's operating system to shut down.

- The -h flag halts the Pi hardware (you could restart by substituting -r instead).

**Note: Return all the kit items in their gallon Ziplock container!**

See first page for list of all kit items.