Installing Raspbian

NOTE: To control the AStarBox power sockets, you must download and install the AStarBox control software, even if you are using the Indi or TheSky plugins. Do this after installing Raspbian.

Installing the Raspberry Pi OS is simple. Download the Raspberry Pi Imager from

https://www.raspberrypi.com/software/

Use this to install the Raspberry Pi OS on microSD card. If you don't have an SD card reader on your computer, there are USB card readers available.

You can pre-configure the installation or configure the installation at first boot. You may wish to enable SSH during the pre-configuration stage – doing this means you don't have to connect your AStarBox to a monitor, keyboard and mouse (see comments on setting up VNC access below). Full instructions can be found on the Raspberry Pi website:

https://www.raspberrypi.com/documentation/computers/getting-started.html#setting-up-your-raspberry-pi

When controlling your telescope, you will likely use VNC to connect to the Pi in your AStarBox. This will allow you to remotely display your screen on a tablet, phone or computer and is likely the best way to control your imaging. The most straightforward way to do this is to log on to the Raspberry Pi after first boot and turn on the VNC server using the user interface – see:

https://www.raspberrypi.com/documentation/computers/remote-access.html#screen-share-with-vnc

However, to do this you will need to connect your Pi to a monitor, a keyboard and a mouse. For this you will need a micro-HDMI cable to connect your Pi to a display.

An alternative is to use SSH. This allows you to log on remotely to a computer via a terminal and issue command line instructions. This is a little more complicated, but does mean you don't need to connect to a monitor etc. You can enable SSH and specify the WiFi network when you download the OS onto an SD card. See

https://www.raspberrypi.com/documentation/computers/getting-started.html#install-using-imager

Once the SD card is set up, put the card in the SD card socket – this can be accessed by turning your AStarBox over. In this configuration, the card should be inserted so that the contacts are face down – the little lip on the card should face up. You will be able to

remove the card by using your thumbnail on the lip and pulling outward. See image below.

Figure 1. Location of the SD card slot. The electrical connectors should face downwards and be inserted into the slot. The lip on the SD card will allow you to remove the card if necessary.

WARNING: Do NOT connect your AStarBox directly to the mains. This is dangerous, will destroy your AStarBox and Raspberry Pi 5 and will invalidate your warranty.

You can now power up the Raspberry Pi. You can either do this by connecting 12v to power input XT60 connector, or 5v through the USB-C connector on the Pi. The second method will work fine to control the PI but will not power the external power ports on the AStarBox.

Figure 2. Location of input power. Provide 12 input via the male XT60 connector circled in blue, or 5v through the USB-C port circled in purple.

If you have pre-configured the Pi and enabled SSH, you can connect to the AStarBox remotely provided that the computer you are using is on the same network as the AStarBox is connected to. Assume you have named your AStarBox as box1 and the user

account as astro. Start a terminal on your computer and type ssh astro@box1.local. Your computer may issue warnings, but if so, ignore these and ask to connect. You will be prompted to enter the password (the one you set up during the OS configuration step). Once entered, you will see the command line:

```
astro@box1:~ $
```

At this point follow the instructions on the raspberry pi site to enable VNC via the command line (just below the user interface section):

https://www.raspberrypi.com/documentation/computers/remote-access.html#enable-the-vnc-server

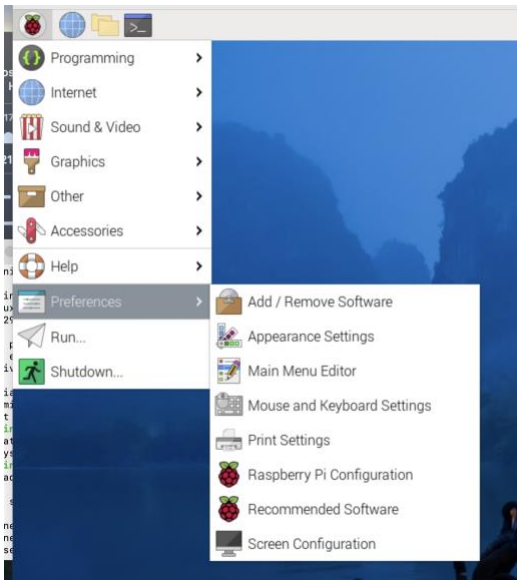
If you did not enable SSH during the configuration step, instead connect the Pi to a monitor, keyboard and mouse. Follow the instructions on the Pi site to enable VNC via the user interface:

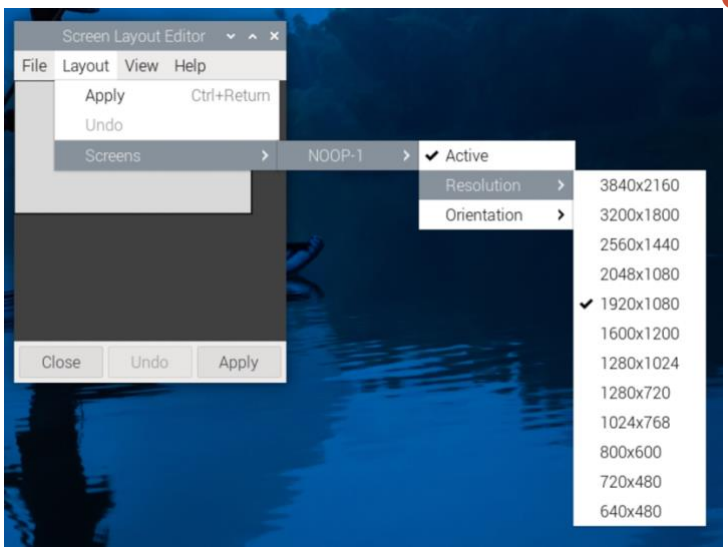
https://www.raspberrypi.com/documentation/computers/remote-access.html#enable-the-vnc-server

Once VNC has been enabled, you can connect using your favourite VNC viewer (e.g. RealVNC Viewer) using the address *machinename*.local (for our example, box1.local) and the username and password you set up during the OS configuration step. You will no longer need to connect your AStarBox to a monitor.

Optional Configuration Steps

Setting the screen size and resolution. Select **Preferences** > **Screen Configuration** from the menu:



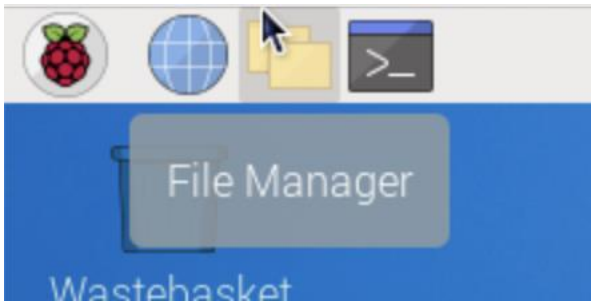


Select **Layout** > **Screens > NOOP-1> Resolution** and the resolution you require. 1920x1080 is a good starting choice.

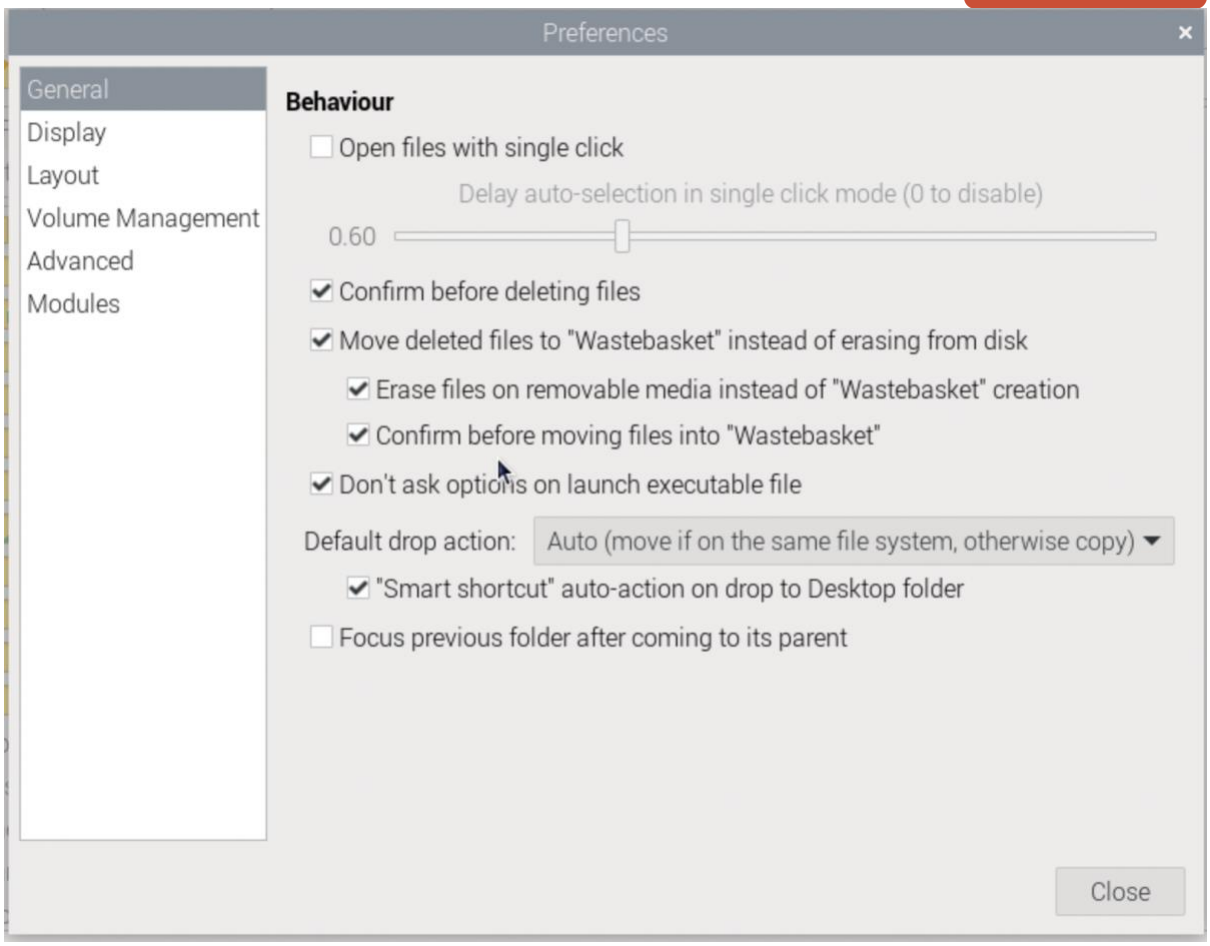
Accessing files remotely. While VNC will allow you to log on and control your imaging sessions, it will not allow you to download your images. The easiest way to access these is to install smb. This will allow you to access the images directly from your computer (as well as move files to your AStarBox if required). To do this, follow the steps at:

https://www.raspberrypi.com/documentation/computers/remote-access.html#samba

Preventing Dialogue on Launching an Executable. When you double click on an executable, the default behaviour of the file manager is to ask if you want to run this in a terminal. To change this, click on the **File Manager** icon on the task bar:

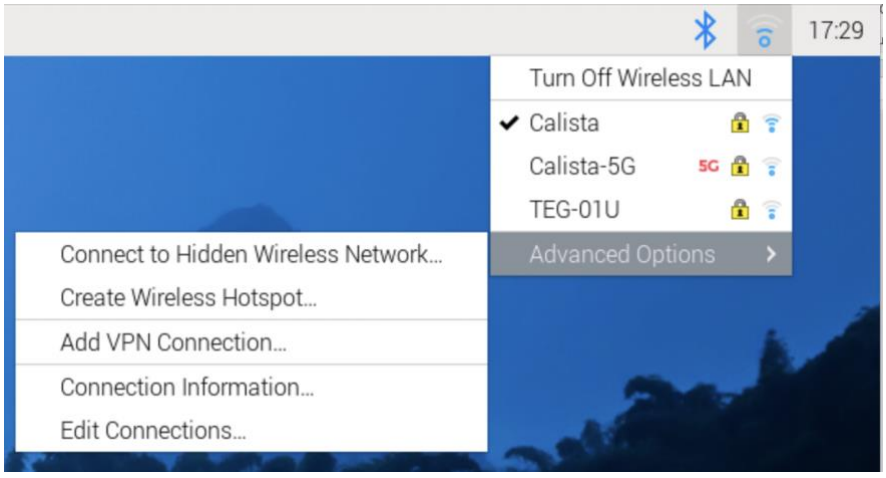


Select **Edit > Preferences** from the File Manager window:



Tick "**Don't ask options on launch executable file**", then close the window and File Manager.

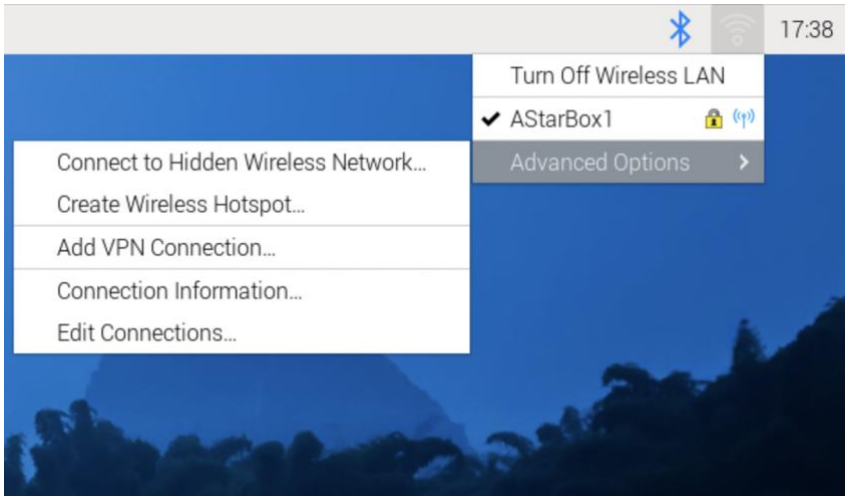
Providing Optional Hot Spot. By default, Raspbian connects to the WiFi network you specified on your initial set up. This is likely convenient if you are imaging at home. However, to image away from home it is will be convenient to create a hot-spot that will allow you to connect using a phone or tablet. To do this, click on the network icon at the upper right of the task bar and select **Advanced Options > Create Wireless Hotspot**



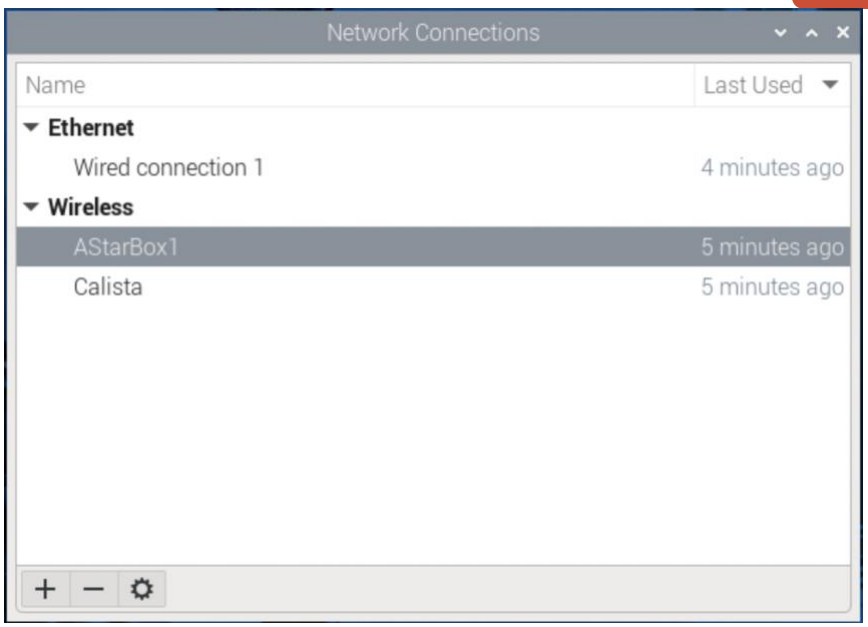
This will open a dialogue panel. Enter the desired name for the hotspot, select a security level, enter a password and press **Create.**

At this point, the box will disconnect from your WiFi network and create its own network, in this case called AStarBox1. Your VNC connection will drop out unless you are connected via ethernet. On your computer, join this network and reopen the VNC connection.

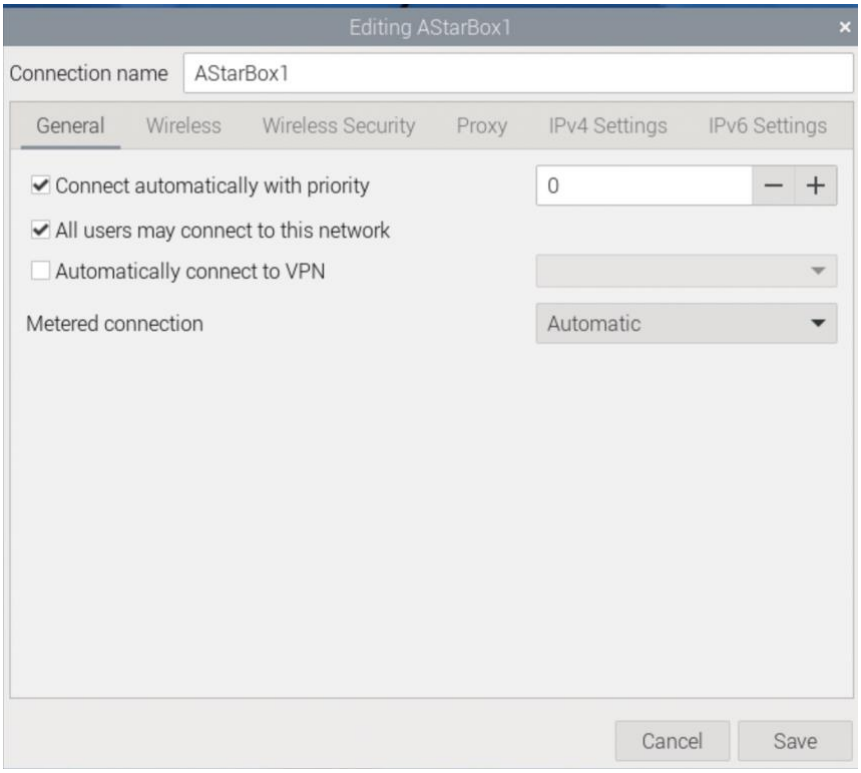
Again, click on the network icon and select **Advanced Options > Edit Connections...**



This will open the network connections dialogue. Double click the name of your hotspot.



Select the **General** tab and click **Connect Automatically with priority**. Generally, you want to connect to your home WiFi network if its available, and if not, then start the hotspot. To do this, you need to make sure that the hotspot has a lower priority than you' your home network. Set the priority to **-200** and click **Save**.



Now double click on the name of your home WiFi network, navigate to the **General** tab and make sure that the **Connect automatically with priority** is ticked. Make sure the priority is set to **0**, or some number higher than the hot spot priority. Click **Save.** When

you next start the Pi, you should find that the Pi connects to your home WiFi if it is available and if not, will start the hot spot.