XBStation
User Guide

xb-uav.com

21 December, 2018

XBStation User Guide

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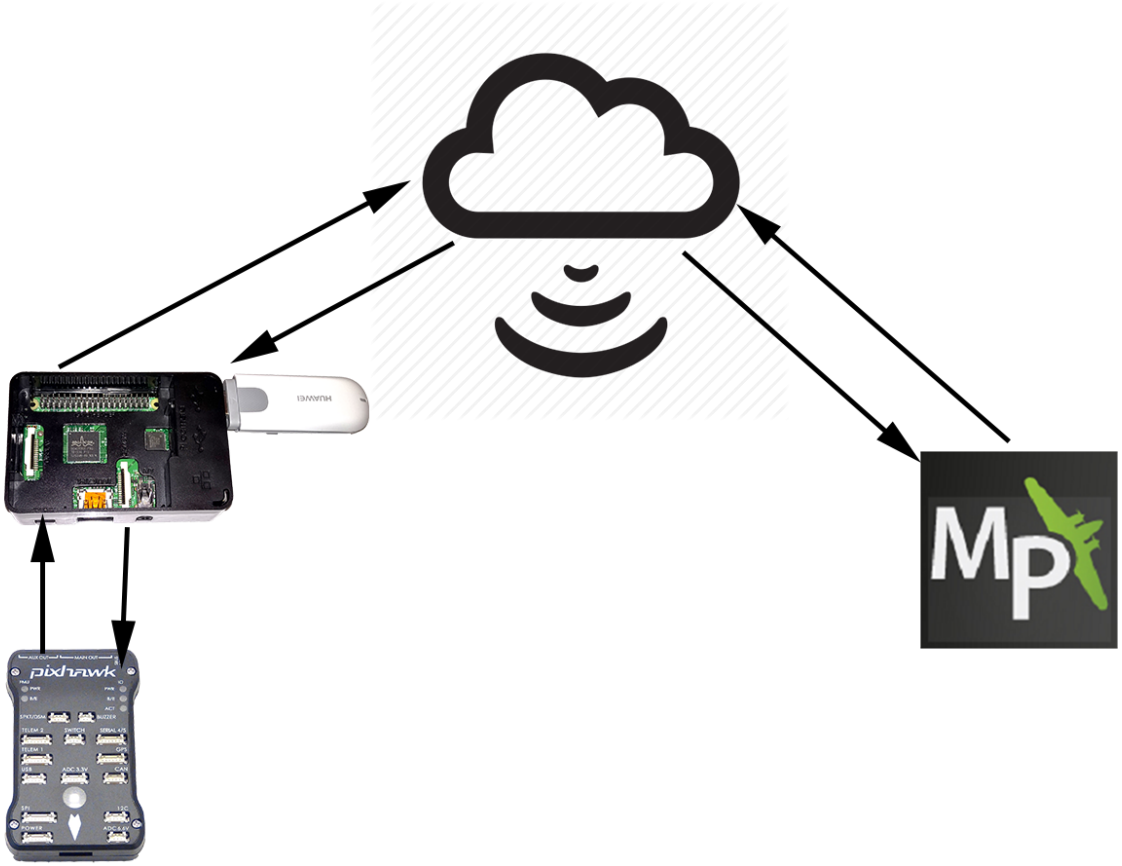
1.0 HOW IT WORKS

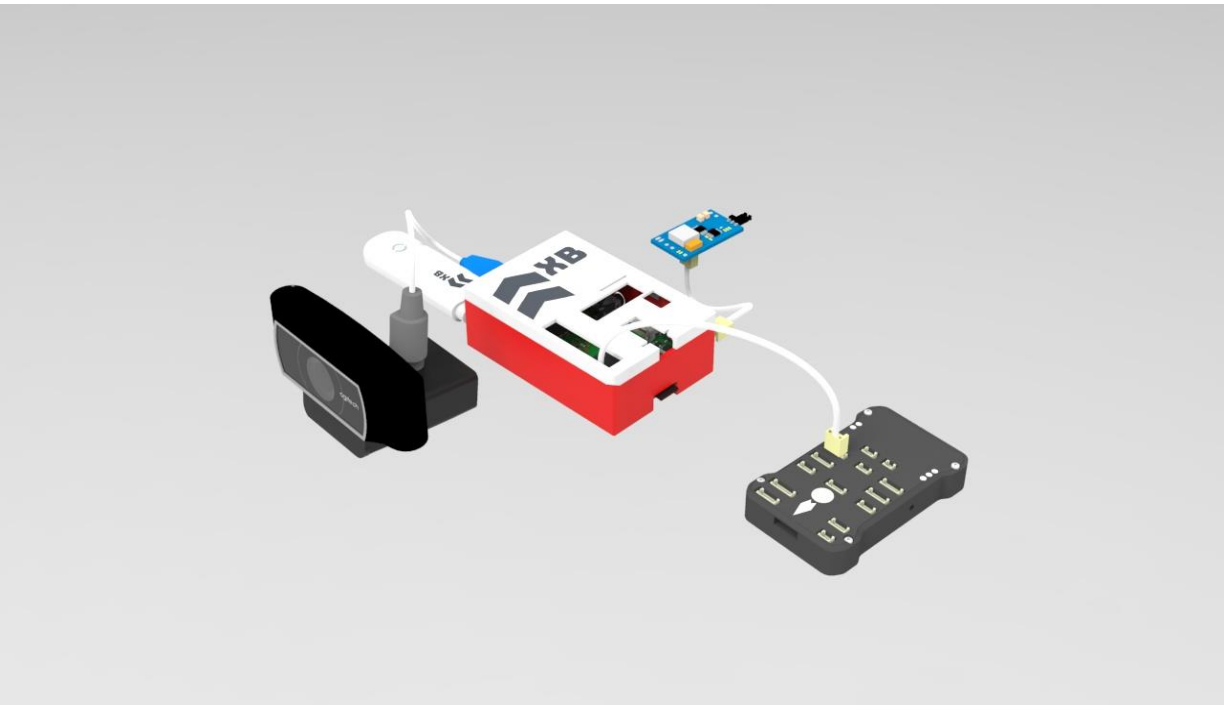
A. HOW IT WORKS

XBStation is a 4G LTE control system, which allows operators to control drones and live streaming via internet



1. XBFirm software run on Raspberry Pi to communicate with Pixhawk

2. XBMissionPlanner software run on your PC to send/receive MAVLink message, video streaming data to/from XBFirm via Internet



WHAT DO YOU NEED?

The XBStation is very simple, you can install and use very easy through few step . Don't need any more. (5 step):

1. Get XBStation ACCOUNT:
   For security reasons, in this relase, you will register XBStation account via email.
   ****
   To: creator@xb-uav.com
   Subject: Register XBStation account
   Name: your_name_account
   Pass: pass_account
   ****
2. Setup and config rasp pi and Pixhawk:

- ❖ Install Debian OS on Raspberry Pi (if you have Raspberry Pi with Debian OS, you can ignore this step)
- ❖ Config telemetry 2 on Pixhawk (very important)
- ❖ Config Usart communication on Raspberry Pi (very important)

3. Setup 4G, camera hardware:
   https://www.youtube.com/watch?v=pY0D0c7BCEg&feature=youtu.be
4. Install XBFirm on Raspberry Pi (just download, extract and login)
5. Install XBMissionPlanner (just download, extract and login)

2.0 SETUP

B. SETUP

2.1 Materials:

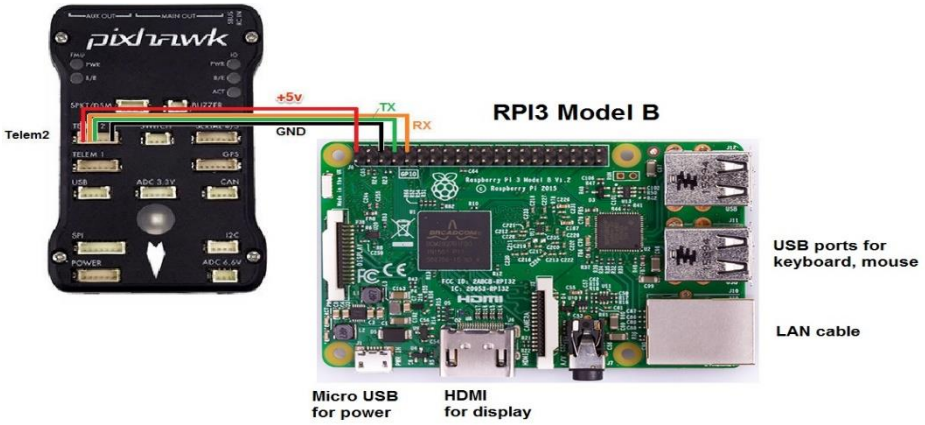
- Raspberry Pi 3 +(recommend). XBStation can run any version rasp pi (zero, pi 2, pi 3, 3 +) with Debian OS). But we just deploy and test on rasp pi 3 + with Debian OS.

- Micro SD card: Up to class 10 high speed and minimum 16GB (more memory is better) because, we have feature logging video on rasp pi.

- Logitech C310 camera: (recommend). We support every camera which have output video via USB cable like C270, C310, C526, C616, C920…) but we just test C310 with under HD resolution (1280 x720), you maybe try

another camera. We don't test with full HD Camera and 4k 3840 x 2160 pixels or 4096 x 2160 pixels**).** We think full HD and 4K maybe exceed rasp pi 3 GPU. We will improve GPU with XU4.

- Cable connect Pix and Pi: telemetry 2 (pixhawk) connect UASRT (rasp pi):
  RX pix → TX pi
  TX pix → RX pi
  Ground pix → Ground pi
  Vcc is not recommend. Power rasp pi and pix maybe different (Volt) and when we connect, it not good.



- 4G Dcom Huawei E3372: (recommend) we can chose it because it have auto connect hilink. You can try with another 4G Dcom which have auto connect. And you must test auto connect before fly.

- UBEC POWER 5V 5A (recommend up to 3A) for supply to rasp pi, camera and 4g Dcom, avoid over load

2.2 Setup Raspberry Pi (Optional):

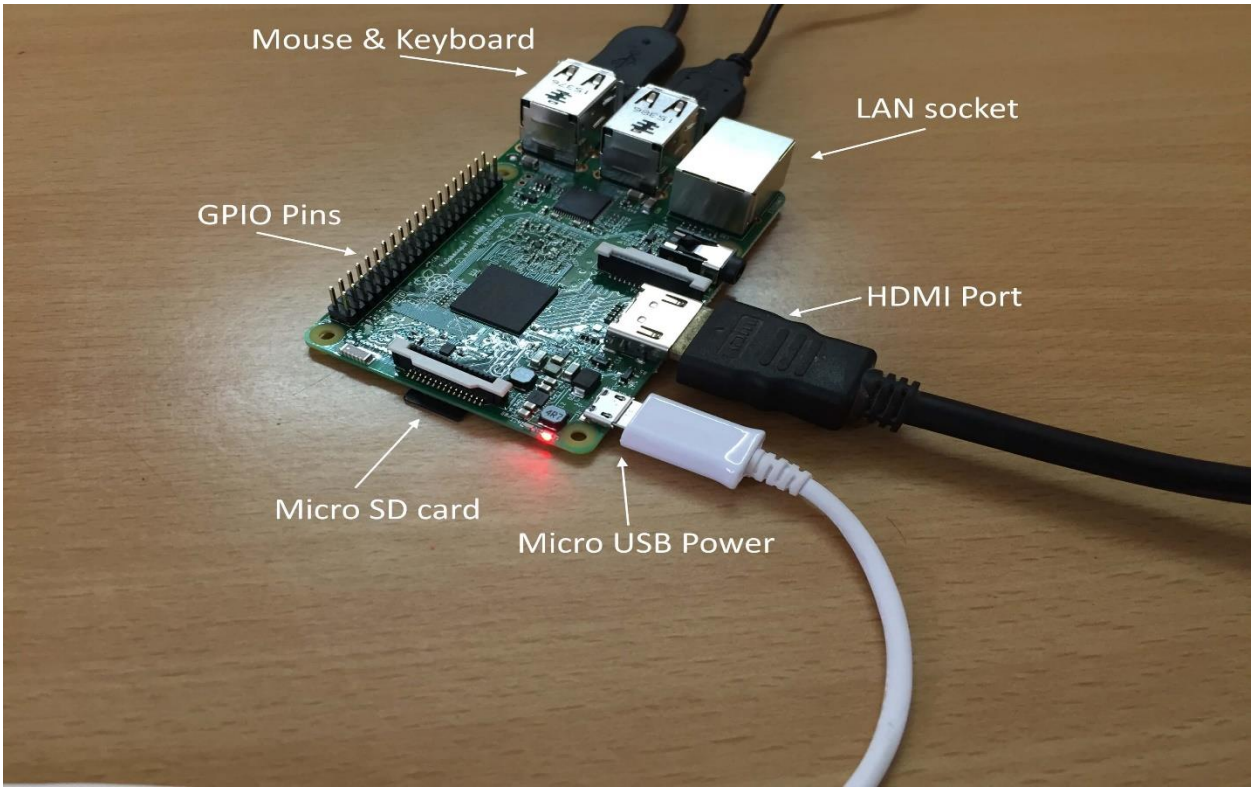
This step will install Debian OS on Rasp Pi, if you had Raspberry Pi which run on Debian OS, you can skip this step.

2.2.1 Components Needed:

1. Raspberry Pi
2. 5V, 2A adapter with mini USB cable
3. HDMI cable
4. USB keyboard and mouse
5. SD card minimum 8GB class 10 (recommended 16 or 32Gb)
6. Ethernet cable (optional)

2.2.2 Install Debian OS:

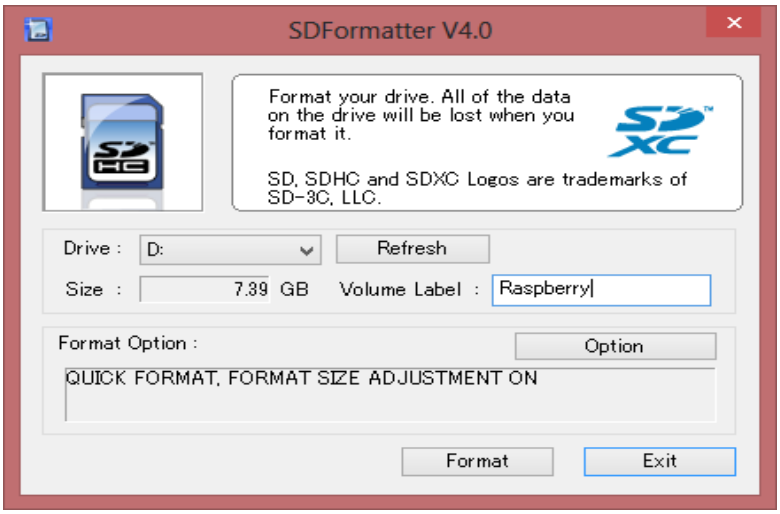
Connect the keyboard and mouse to your Pi USB ports. Connect the Pi to an HDMI supported TV using the HDMI



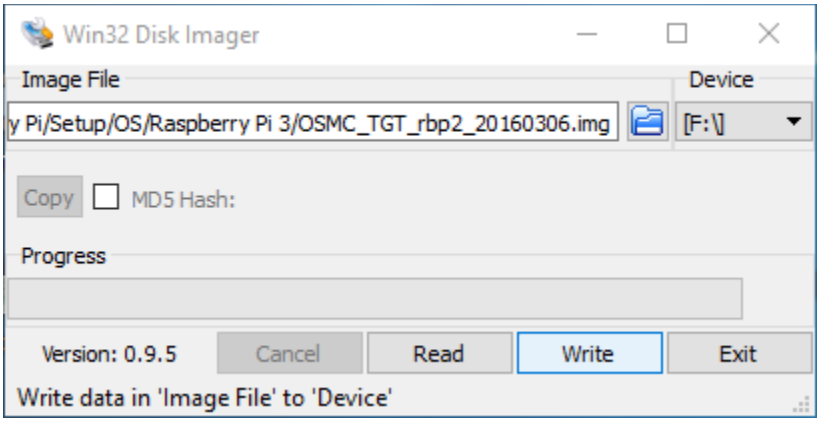
You must download 2 software and Debian img:

- SD Formatter 4.0
  https://www.sdcard.org/downloads/formatter_4/eula_windows/
- Win32diskimager
  https://sourceforge.net/projects/win32diskimager/
- Debian image

https://www.raspberrypi.org/downloads/raspberry-pi-desktop/
Input micro SD card to PC



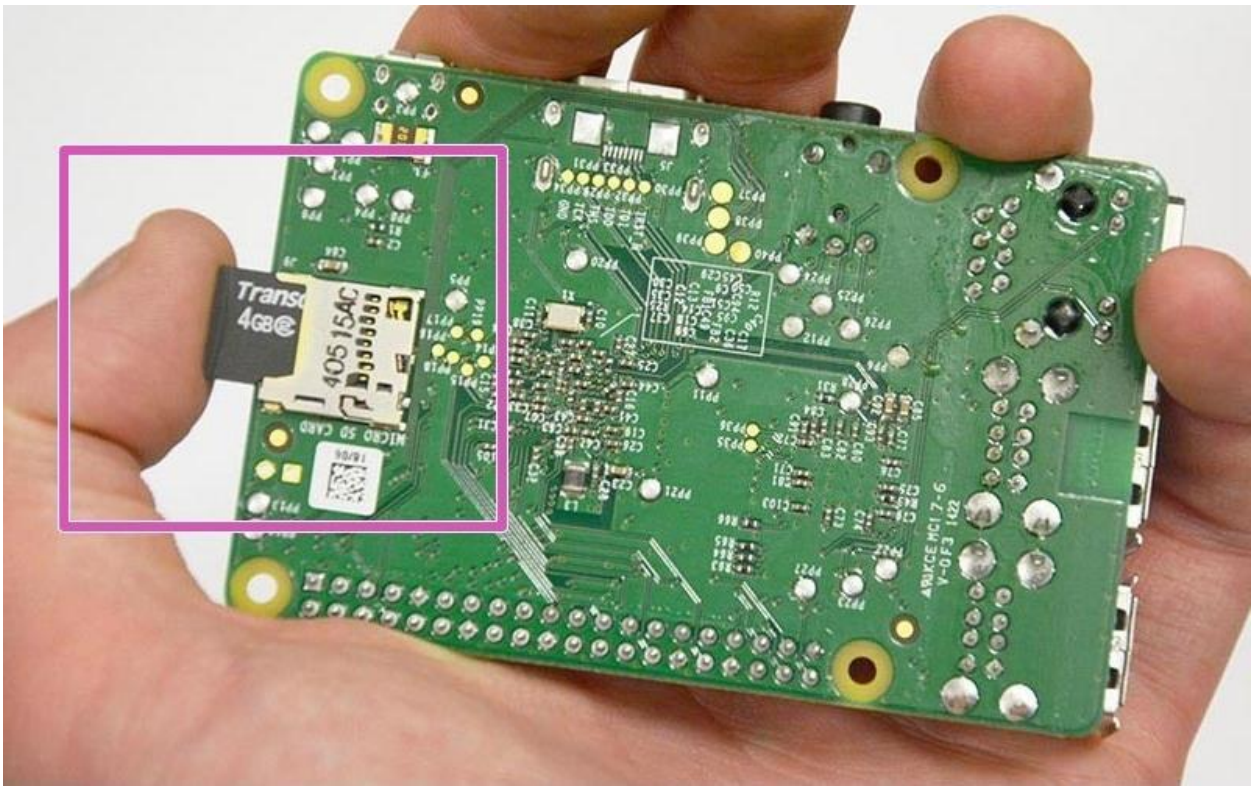
Open Win32diskimager, chose Debian .img file and **Write:**



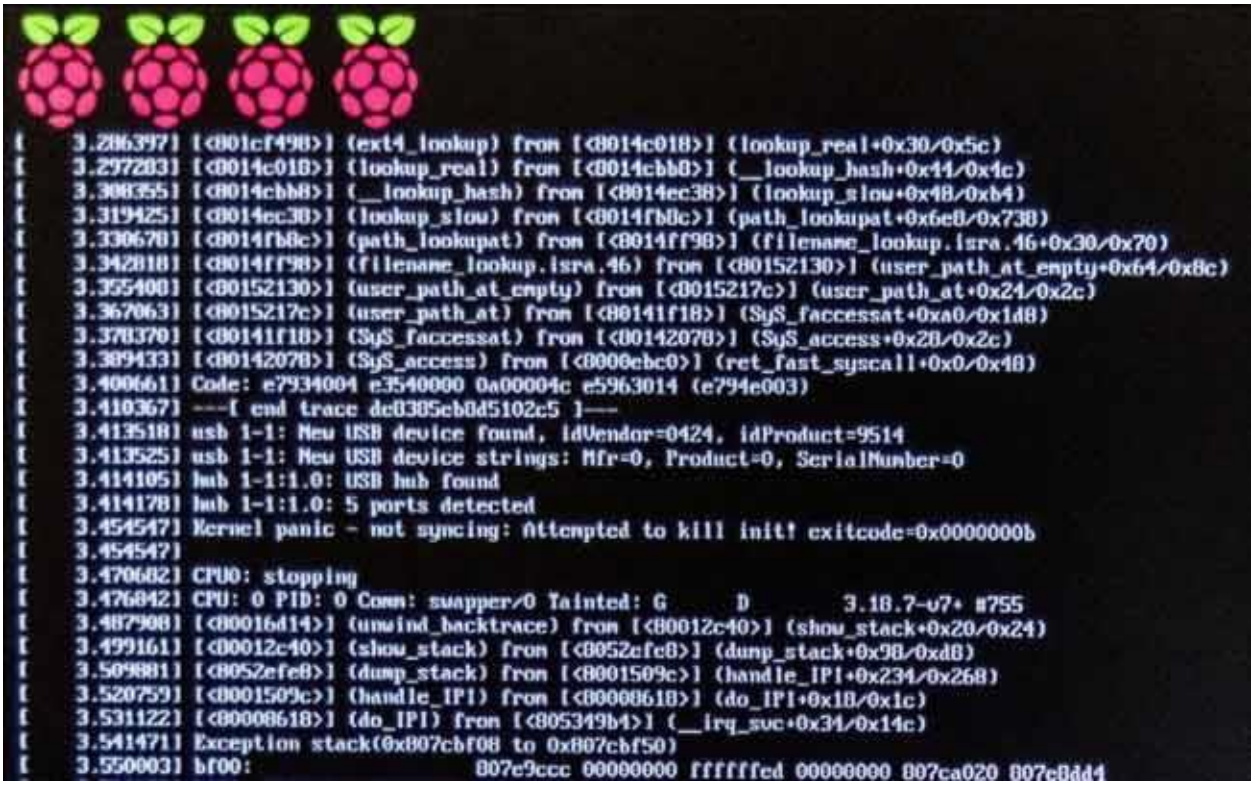
And waiting …. write successful

2.2.3 Run Debian OS on Pi

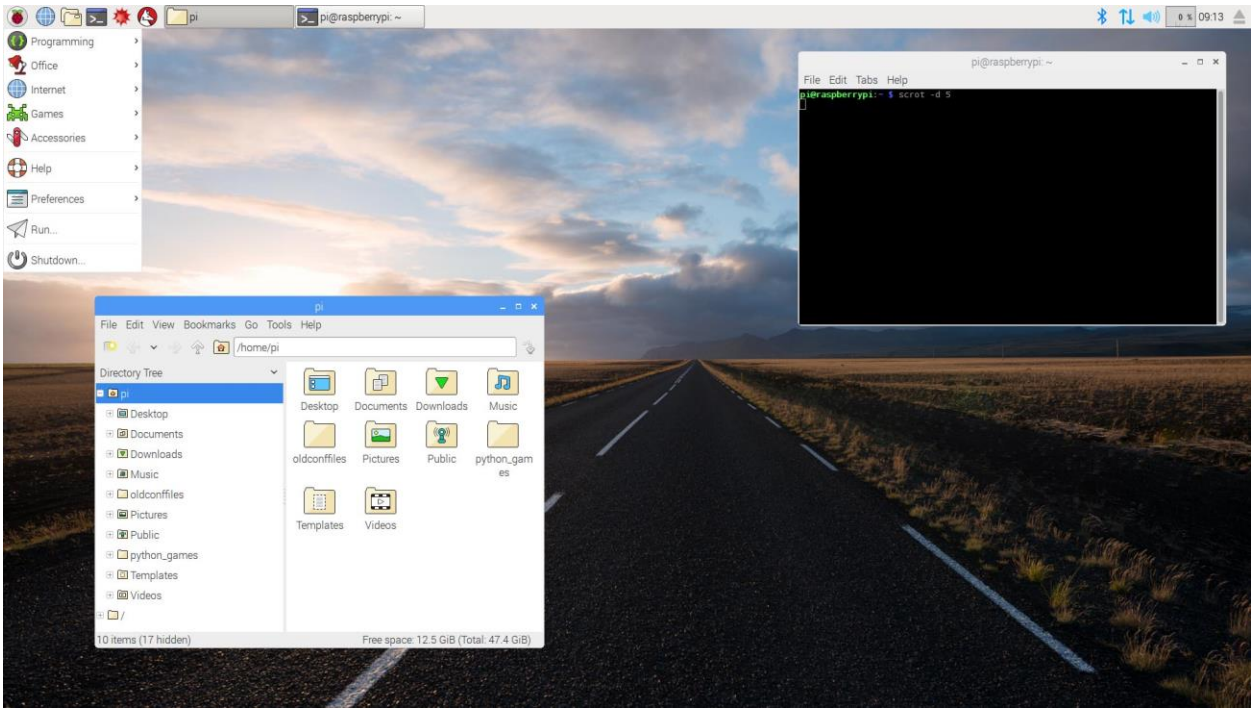
Insert micro SD card to raspberry



And turn on power



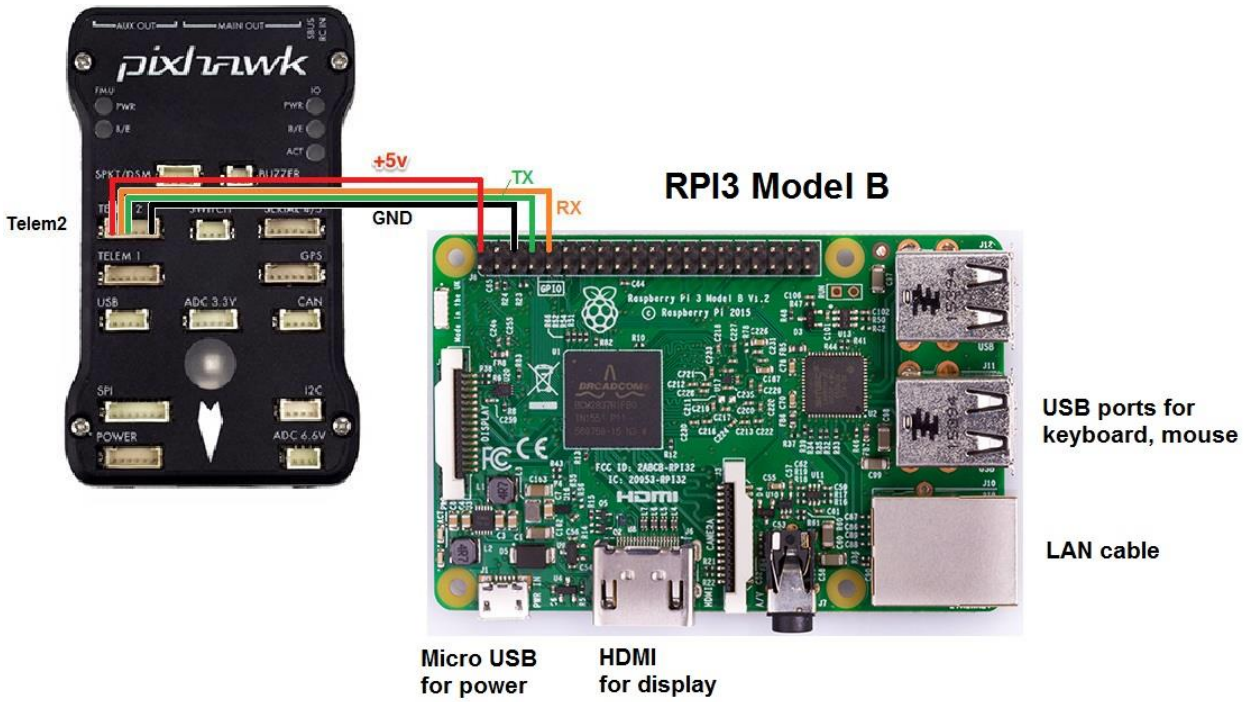
You have to add some installation steps but very easy. You just read and follow.



Finish.

2.3 Connect Pixhawk and Raspberry Pi: VERY IMPORTANT

2.3.1 Connect the Pixhawk's TELEM2 port to the RPi's Ground, TX and RX pins as shown in the image



2.3.2 Setting up the Pixhawk

Connect to the Pixhawk with a ground station (i.e. Mission Planner) and set the following parameters:

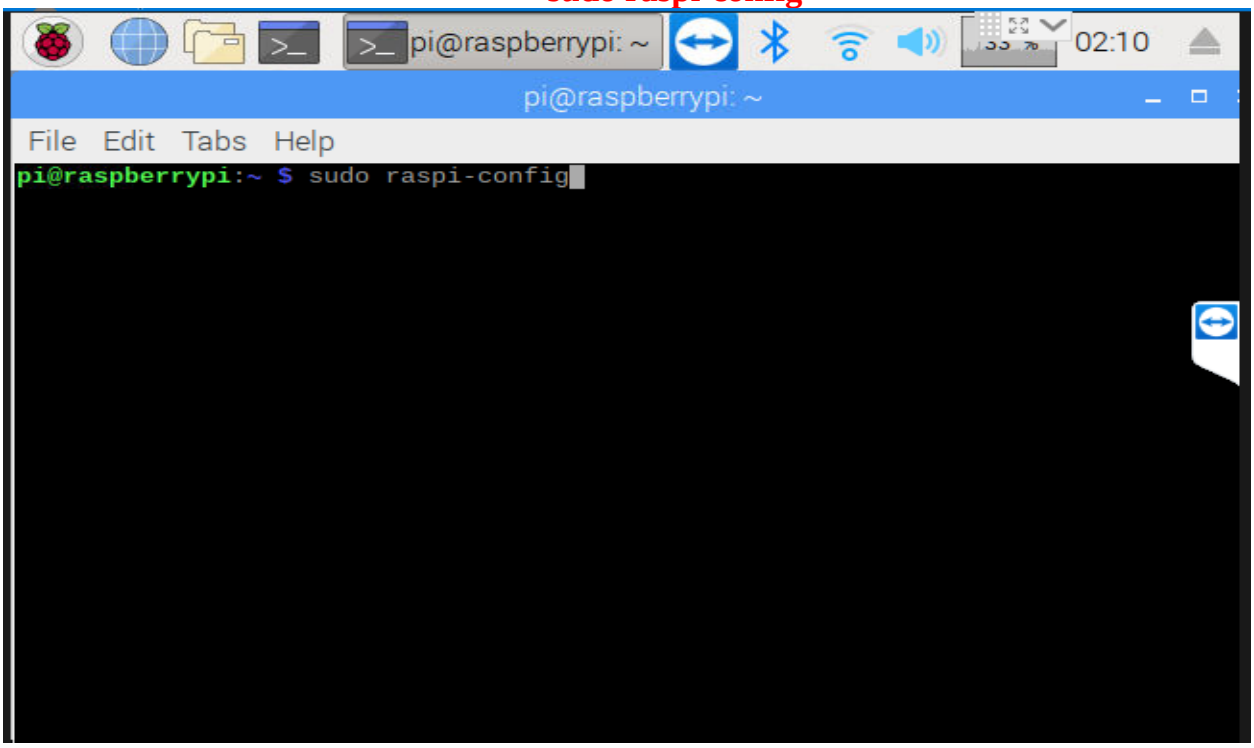
- SERIAL2_PROTOCOL = **1** (the default) to enable MAVLink on the serial port.
- SERIAL2_BAUD = **57** so the Pixhawk can communicate with the RPi at 57600 baud. (YOU MUST CHOOSE SERIAL2_BAUD = 57, IF YOU CHOOSE OTHER NUMBER, SOFTWARE IS NOT OPERATION)
- LOG_BACKEND_TYPE = **3** if you are using APSync to stream the dataflash log files to the RPi

  (NOTE: use telemetry or USB connect PC for config)

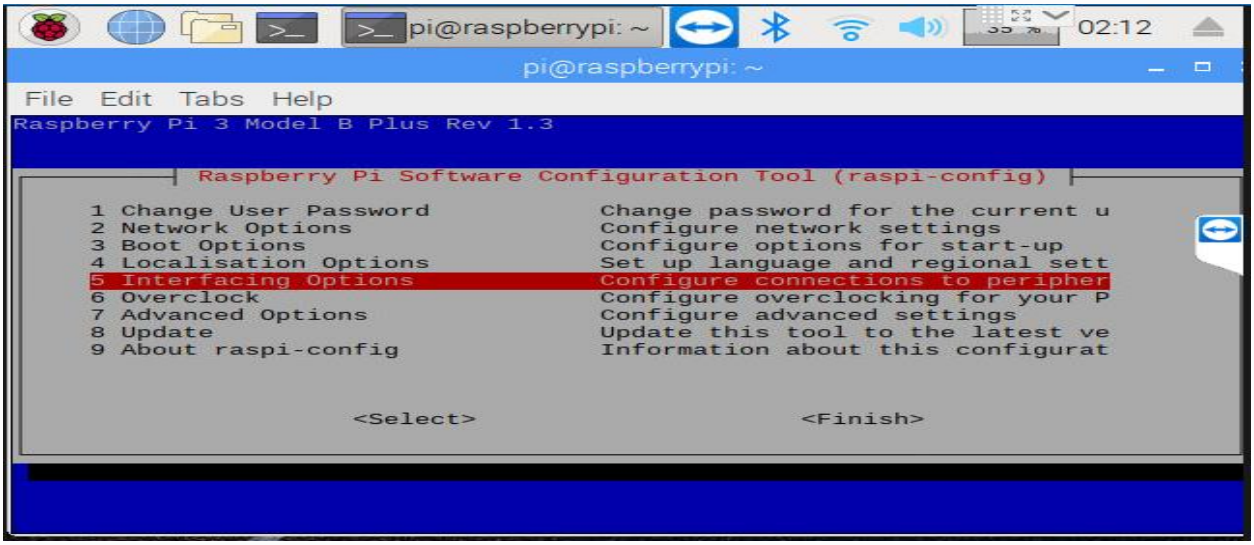
2.3.3 Setting up the Raspberry Pi

Open terminal on RASP PI (Ctrl+Alt+T) and type :

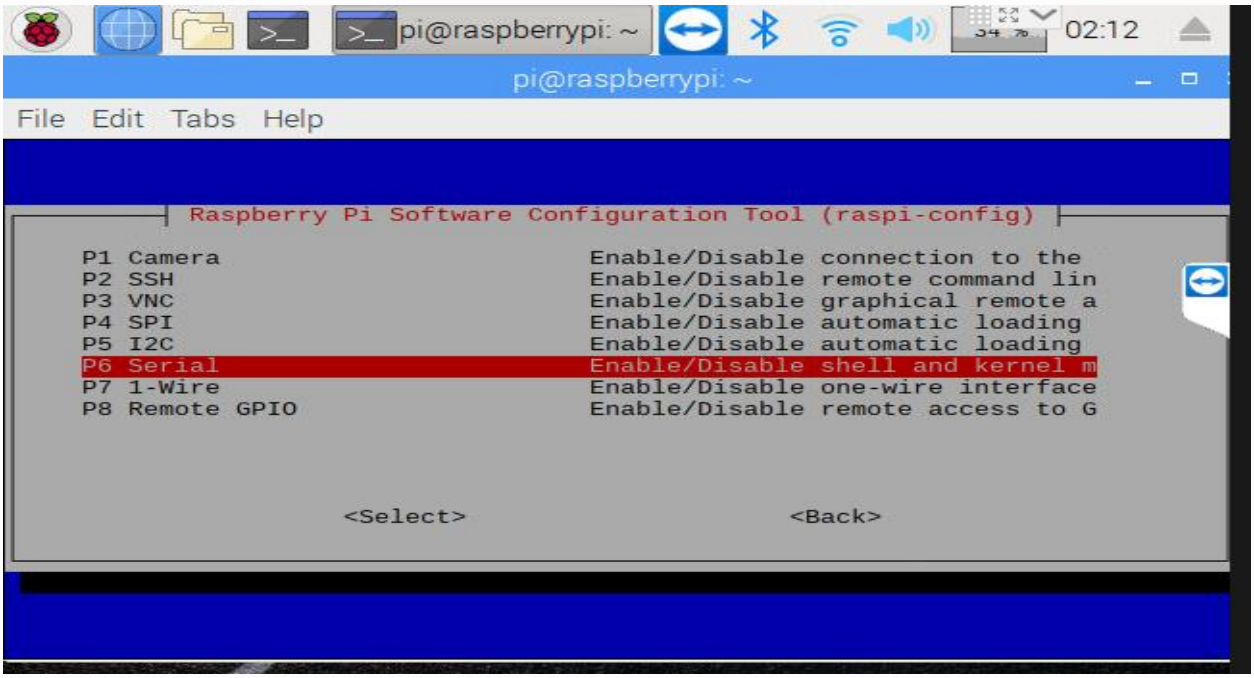
sudo raspi-config



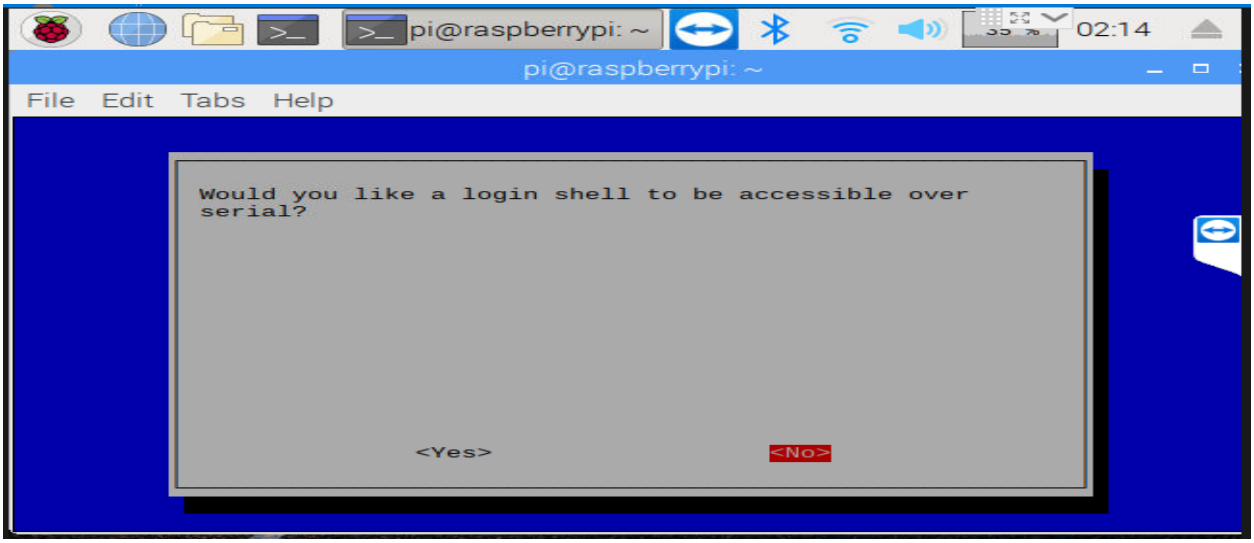
And in the utility, select "interfacing Options":



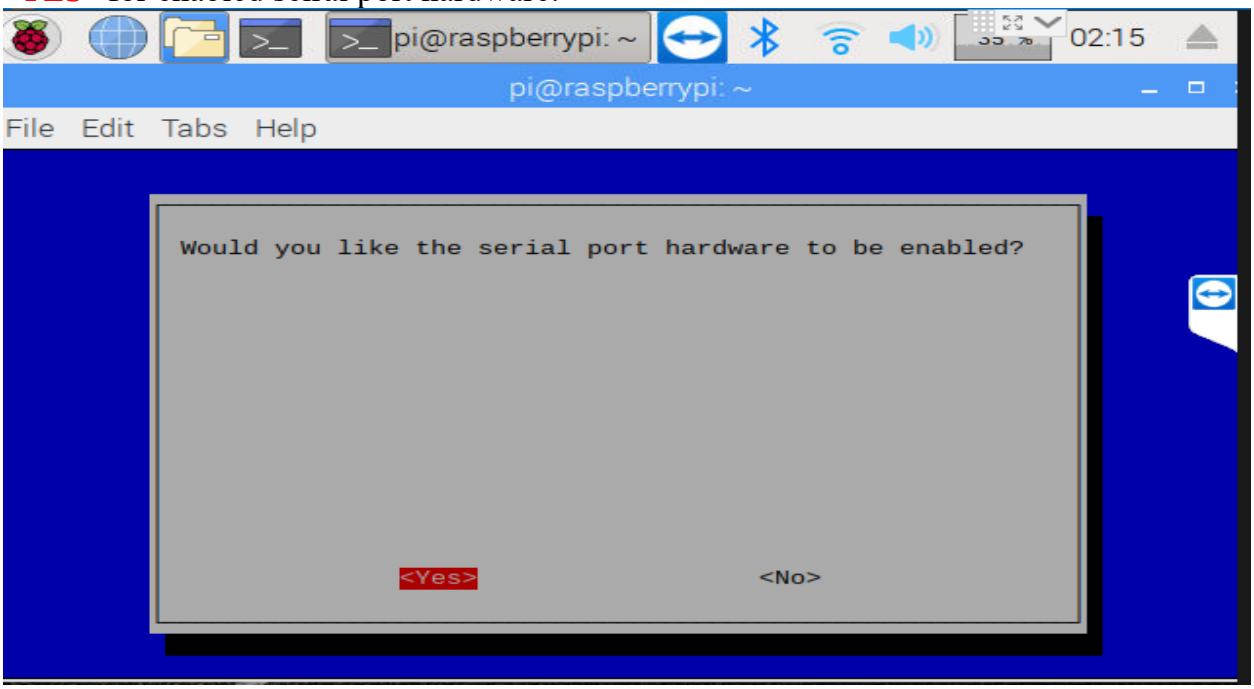
And “Serial”

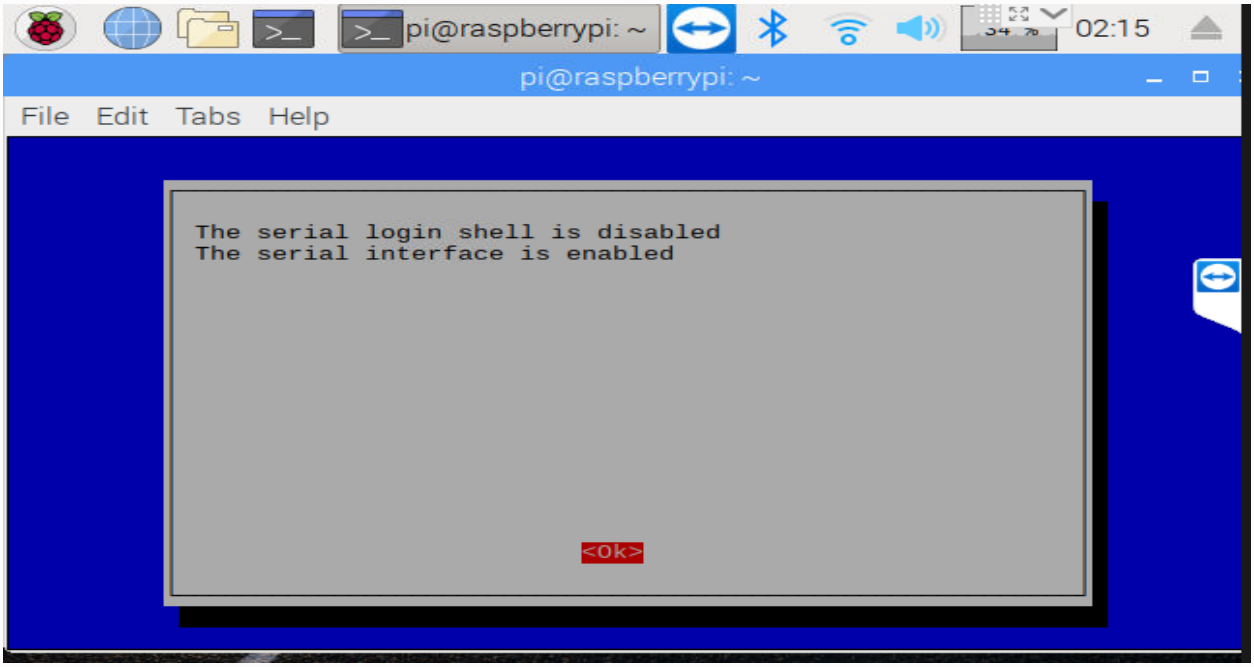


Choose “NO” (Disable OS use of the serial connection)



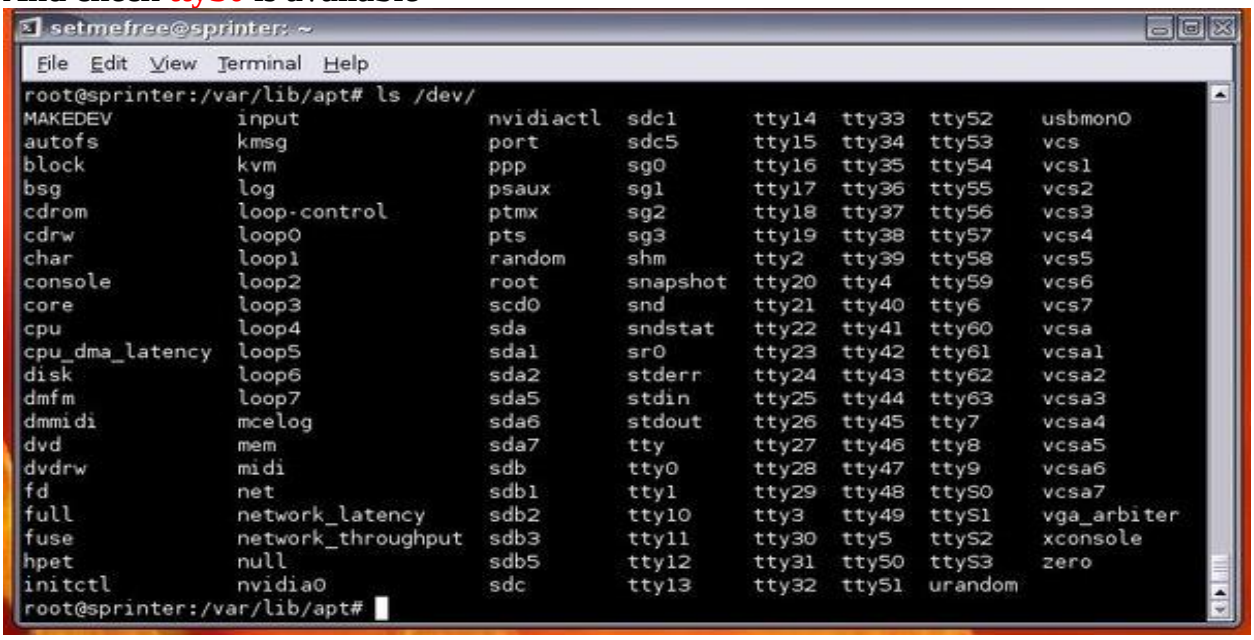
"YES" for enabled seiral port hardware:





Reboot the Raspberry Pi when you are done.

NOTE: after reboot, you need check Serial UART is enabled,
TYPE: ls /dev
And check ttyS0 is available



Finish setup rasp pi

2.4 XBFirm

XBFirm is a software run on Pi (currently support Debian OS) to read/write data from/to Pixhawk, capture Streaming Video from camera and send to Station software.

2.4.1 Download XBFirm software:

Open terminal and type command:

sudo wget -O - https://sourceforge.net/projects/xbinstall/files/XBFirm-1.0.1-install.txt **| bash**

2.4.2 Setup

Move to XBFirm folder:

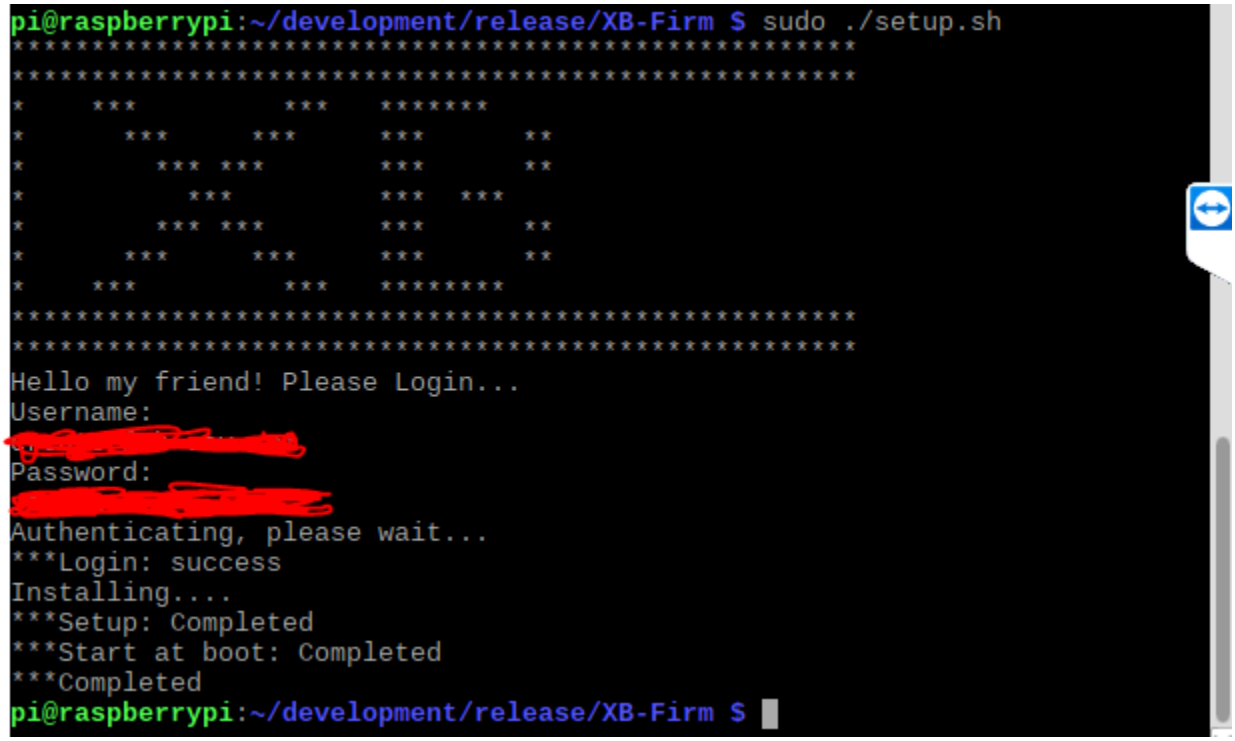
cd XBFirm

Run setup.sh file:

sudo ./setup.sh

Input username and password:

When you see the out put "***Completed", it's mean the setup process is done:



Reboot Rasp pi, and XBFirm will automitically.

sudo reboot

2.5 XBMissionPlanner

XBMissionPlanner is a ground control station for Plane, Copter and Rover. It is compatible with Windows only.

Download link:
https://sourceforge.net/projects/xbmissionplanner/files/XBMissionPlanner-1.2.7.rar/

3.0 GETTING STARTED

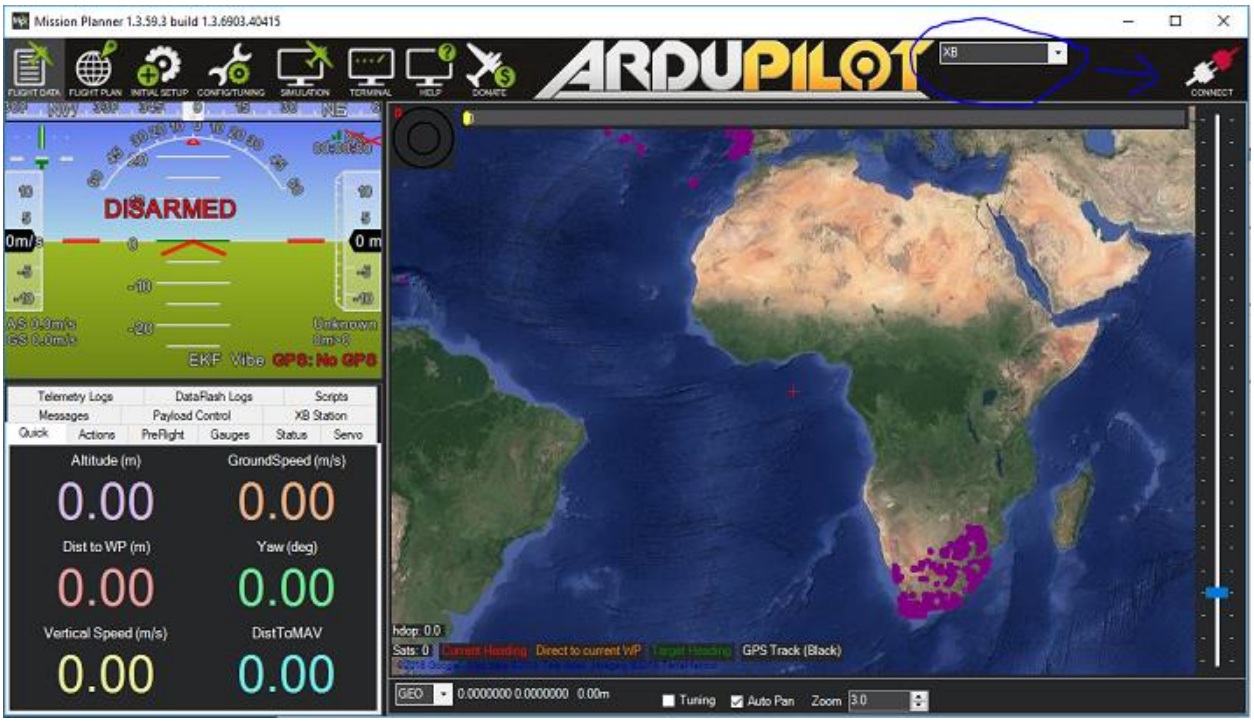
C. GETTING STARTED

3.1 Start XBMissionPlanner

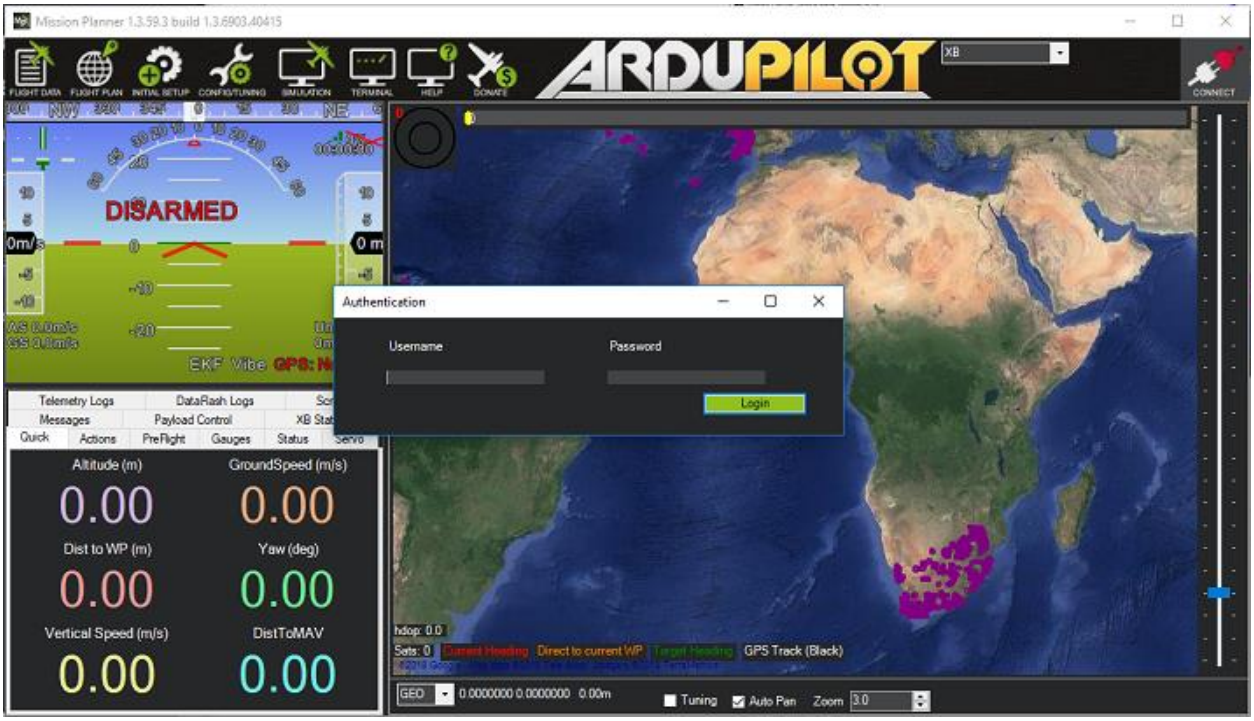
4.3.1 Extract rar file, and run MissionPlanner.exe

4.3.2 Login and Connect:

Choose "XB" connection in the top right and click button Connect

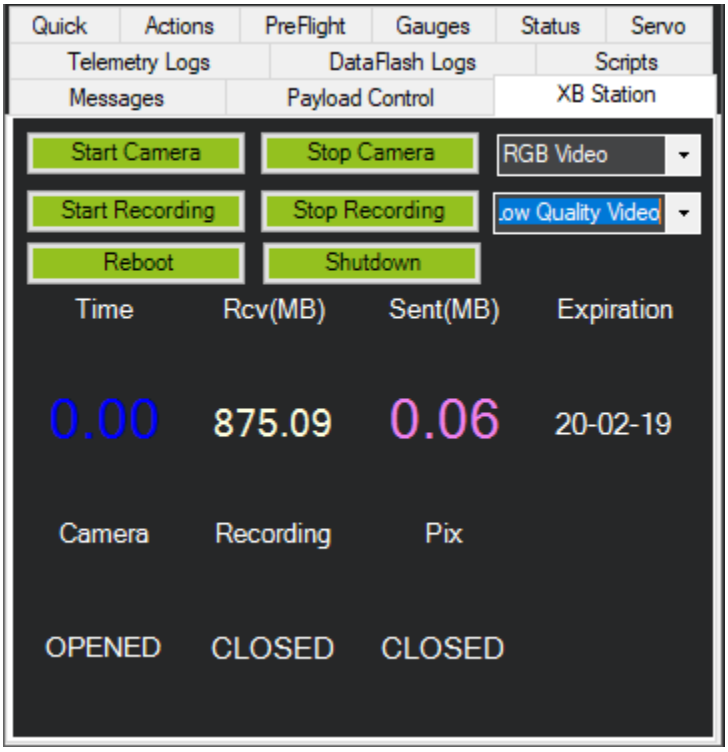


Login Dialog appear, type your username and password, then hit Enter button:



Please wait about 2 minutes for loading parameters from pix.

4.3.3 Feature:



The current XBStation version supports features for recording video, change quality and show information data.

1. Turn on/off camera

Start Camera button: Turn on Camera on Companion Computer
Stop Camera button: Turn off camera on companion computer

NOTE: camera is turned on automatic, when raspberry pi start up

2. Start/Stop recording

Start Recording: Start/Resume recording
Stop Recording: Pause recording

NOTE: Video recording is saved at **path-to-XBFirm/videos** in raspberry pi with the highest quality

3. Reboot/ Shutdown button:

Reboot Button: Reboot Raspberry Pi
Shutdown button: Shutdown Raspberry Pi

NOTE: DON'T CLICK THIS 2 BUTTON WHEN FLY, because shuting down Raspberry Pi cause disconnect to Station, and you lost control.

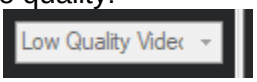
4. Video Type

This function allow you to choose the type of streaming video.

- RGB Video: Video in RGB format (3 channels)
- Grayscale Video: Video in Grayscale format (1 channel)

NOTE: If your network connection is unstable (weak),you should use grayscale video. Video will be smooth and low latency!

5. Video quality:

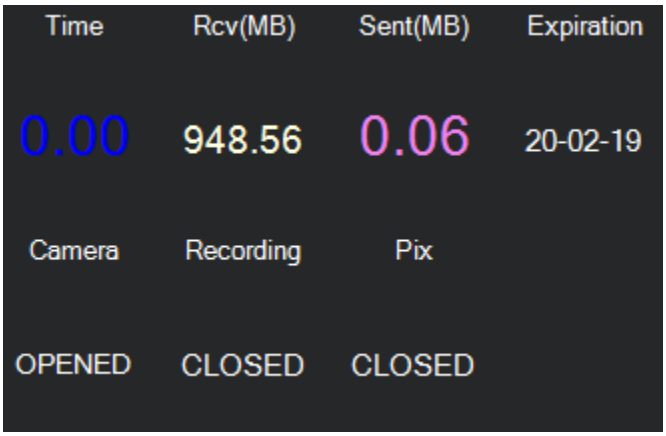


This function allow you to choose the quality of streaming video. with 4 option:

- Low Quality Video
- Normal quality Video
- High quality Video
- Highest quality Video

NOTE: the higher quality video, maybe increase latency!

6. Information Datas:



6.1 Receiving data:

Perform the amount of receiving data (Megabyte)

6.2 Sending data:

Perform the amount of sending data (Megabyte)

6. 3 Expiration

Perform the Expiration day of XBStation Account

6.4 Camera

Perform camera is on or off

6.5 Recording

Perform recording video function is on or off

6.5 Pix

Perform the pixhawk connect Raspberry Pi

4.0 VIDEO TUTORIALS

D. VIDEO TUTORIALS

4.1 Setup Hardware

https://www.youtube.com/watch?v=pY0D0c7BCEg&feature=youtu.be

4.2 Setup XBFirm

https://www.youtube.com/watch?v=Es3c3sGtwEU

5.0 Attention

5.1 Check list and error:

If you have problem when use XB Station, you must check:

Check list:
STATUS on XBmisson planer

	name	Success status	note
1	DCOM 4G ON RPI (you should chose the 4g dcom which have auto connect and check it with rpi, remember turn off wifi when test)	CONNECTED	You can see led stt on dcom 4g. if don't have internet signal. You try: 1:reset, 2: registration,3:check rpi power enough.
2	Internet on computer sation	CONNECTED	
3	Pi Connect Pix	OPEN	If Close, check cable
4	Pi Connect Camera	OPEN	If Close, check cable
5	XBStation Account	Unexpired --/--/--	You should renew before expiry date
6			
7			
8			

ERROR:

	NAME	RESOLVE
1	PI AUTO RESET	Check pi power and cable
2	4G AUTO RESET	Check pi power and cable
3	PI don't run	Check SD Full and SD Crash
4	Pix status Open but don't have singal	Check baurate config(should be 57)
5	Every thing ok and strong internet but stream video look like latency	Maybe your station computer not enough strong. You try test on strong computer. (recommend: core i7, ram 4gb)
6		
7		

NOTE: if you have problem with XBStation (XBFirm, XBMisson planner and hardware config). You can send me via email:
To: creator@xb-uav.com
Subject: Check list and error

5.2 Support:

If you need support or have any question , you can contact me via facebook, email.

TO: creator@xb-uav.com
Subject: Support

Facebook: https://www.facebook.com/XBLab/
Wed: http://xb-uav.com/

If you have problem when steup XBFirm or XBStation, I can support you via teamview.

Note:
For easy, you should install TeamViewer Host 14 on Rasp pi 3 befor contact me: https://www.teamviewer.com/en-us/download/linux/