



# **XBStation User Guide**

**[xb-uav.com](http://xb-uav.com)**

21 December, 2018

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# **XBStation User Guide**

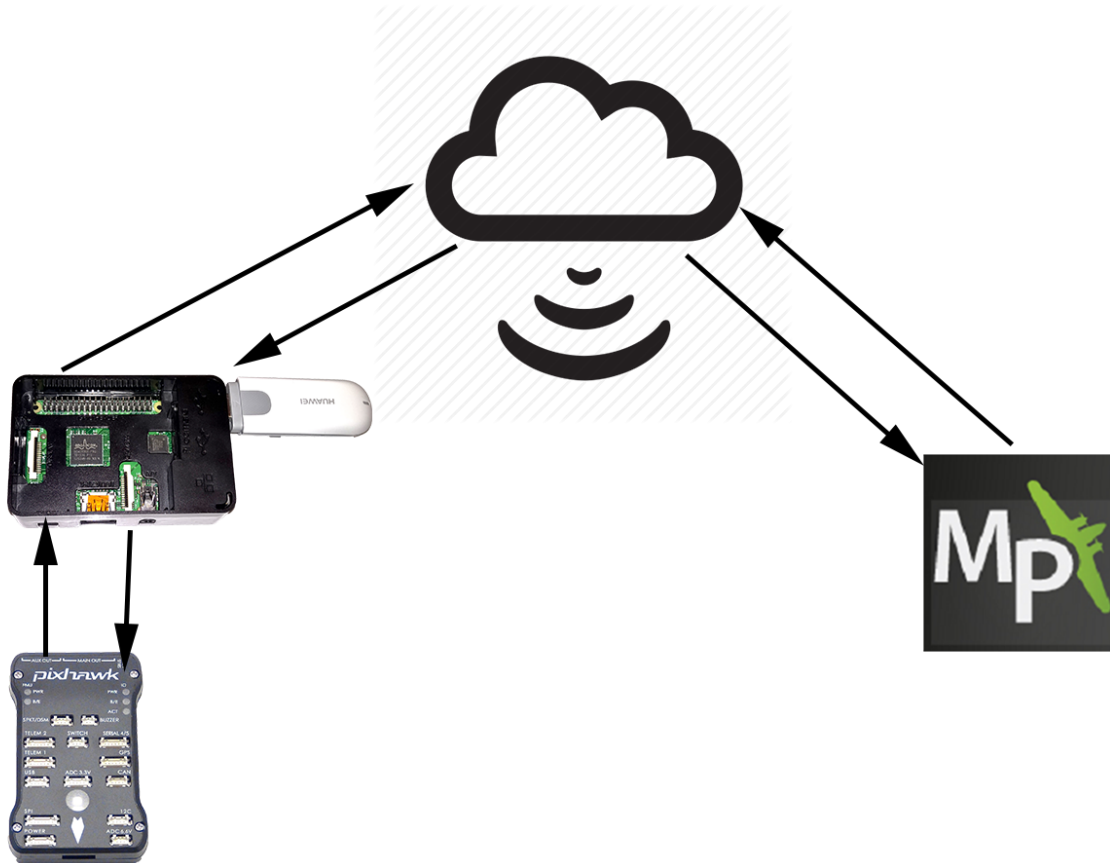
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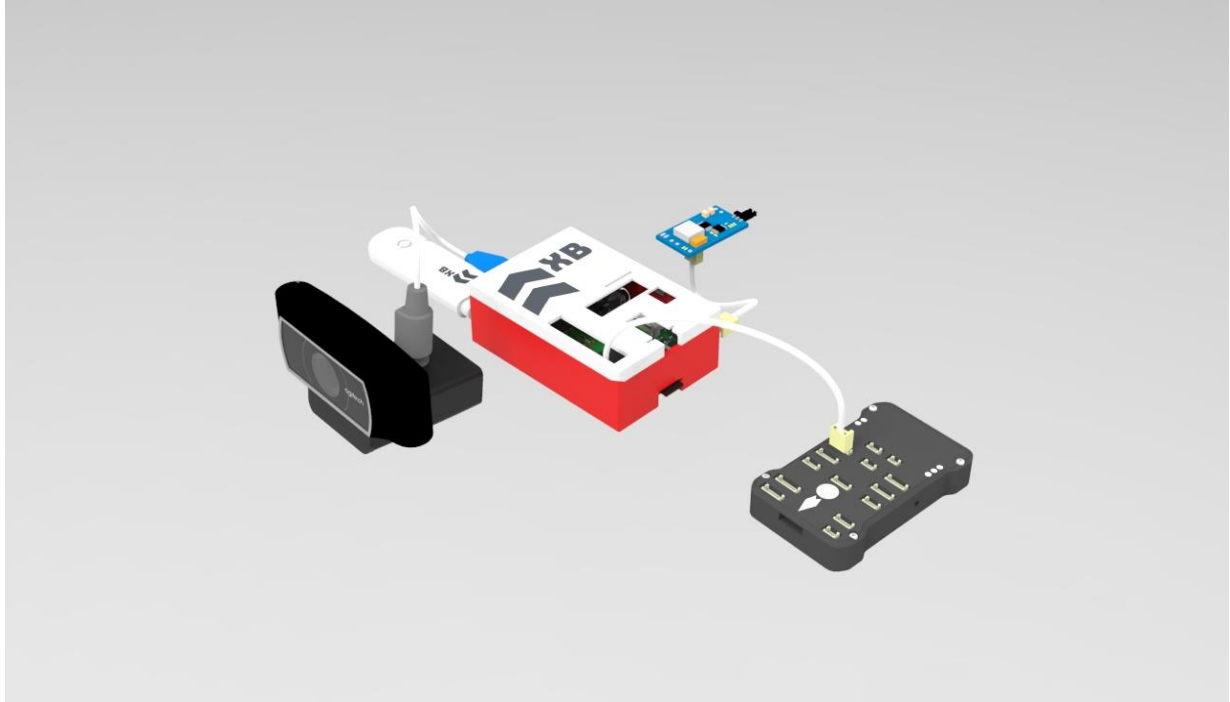
## **1.0 HOW IT WORKS**

## 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 release, you will register XBStation account via email.

\*\*\*\*\*

To: [creator@xb-uav.com](mailto: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.

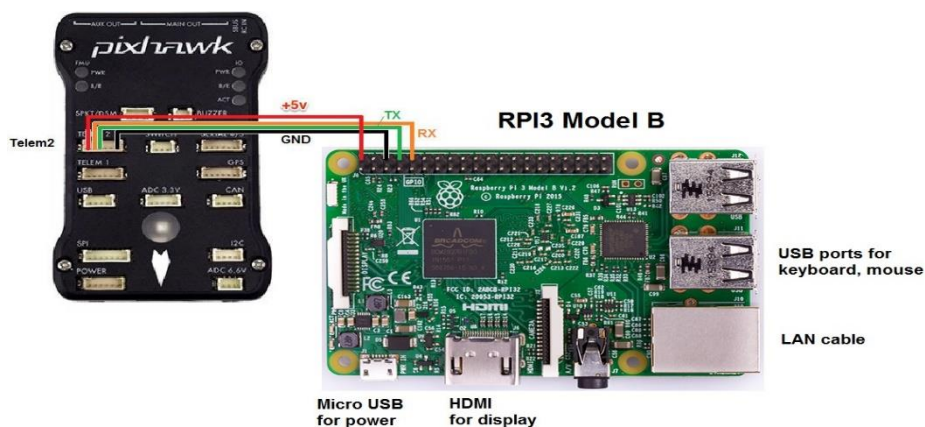


- **Logitech C310 camera:** (recommend). We support every camera which have output video via USB cable like C270, C310, C526, C616, C920...) but we just test C310 with under HD resolution (1280 x720), you maybe try

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):

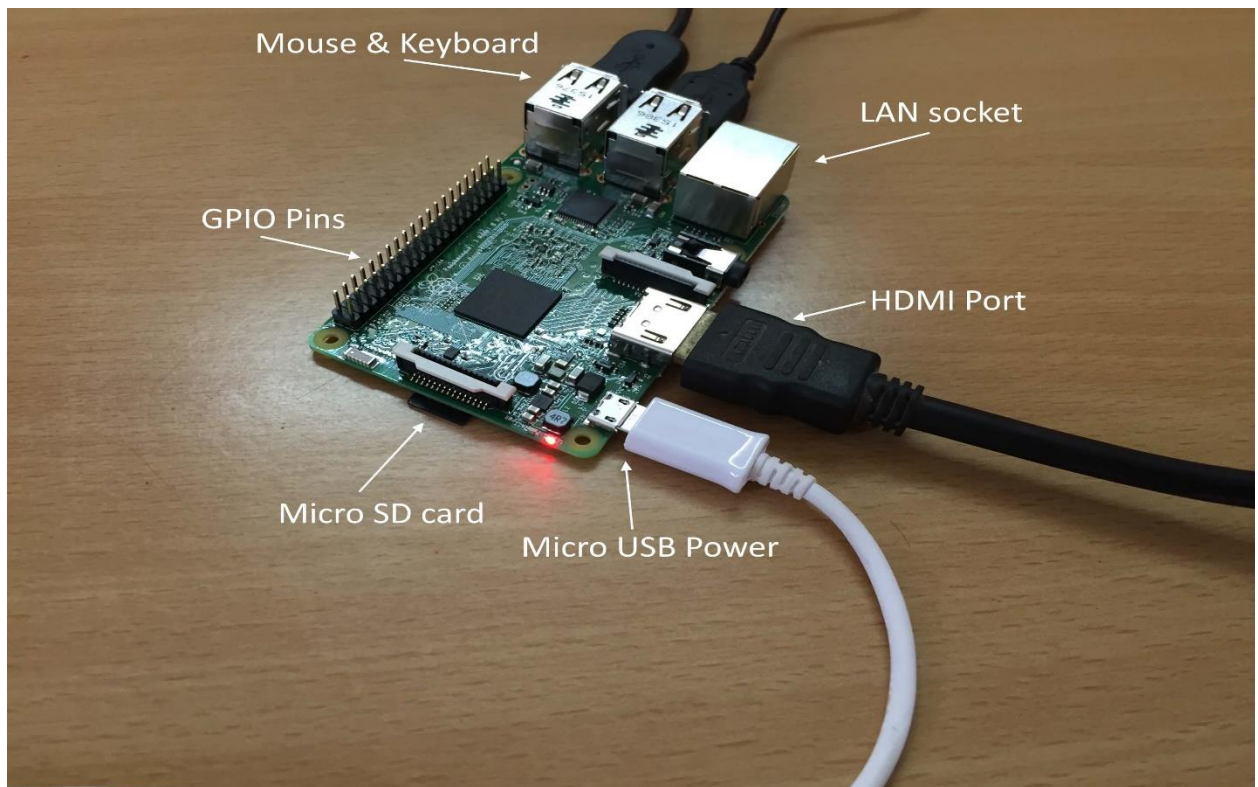
This step will install Debian OS on Rasp Pi, if you had Raspberry Pi which run on Debian OS, you can skip this step.

### 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:

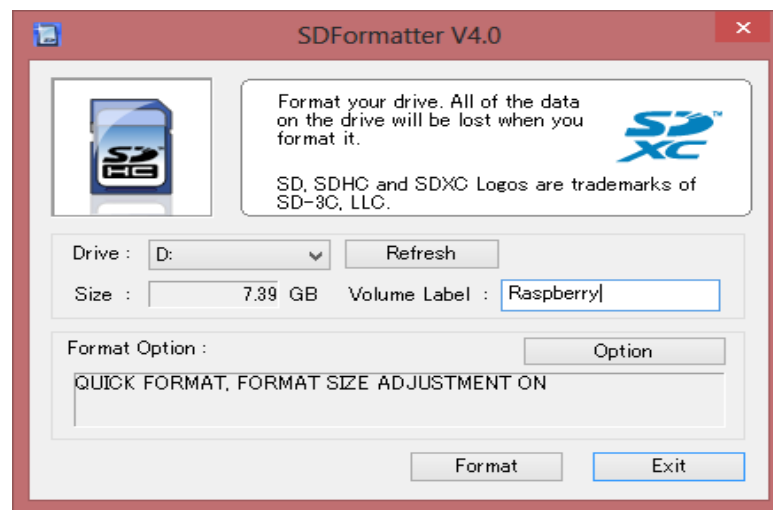
Connect the keyboard and mouse to your Pi USB ports. Connect the Pi to an HDMI supported TV using the HDMI



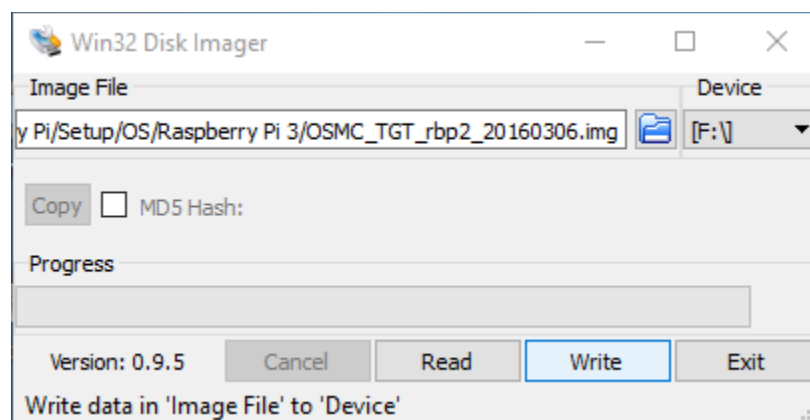
You must download 2 software and Debian img:

- SD Formatter 4.0  
[https://www.sdcard.org/downloads/formatter\\_4/eula\\_windows/](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



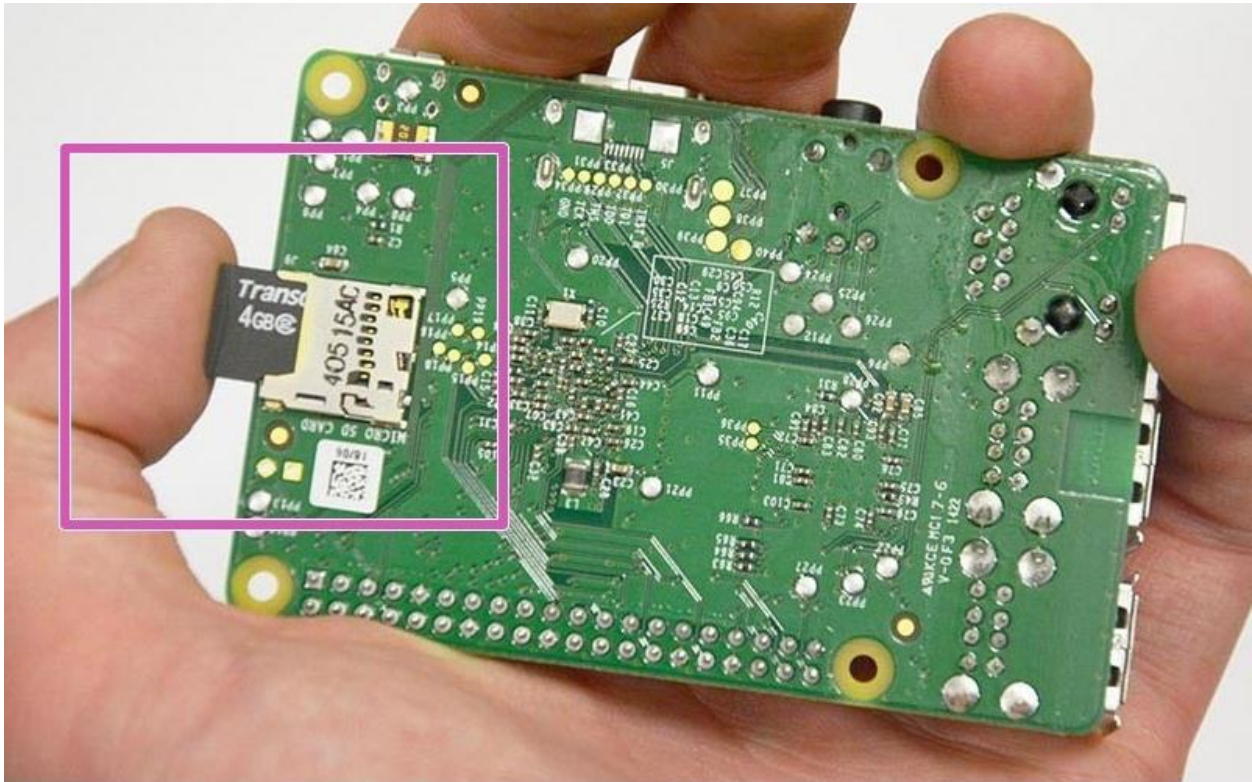
**Open Win32diskimager, chose Debian .img file and **Write:****



And waiting .... write successful


### 2.2.3 Run Debian OS on Pi

Insert micro SD card to raspberry



And turn on power



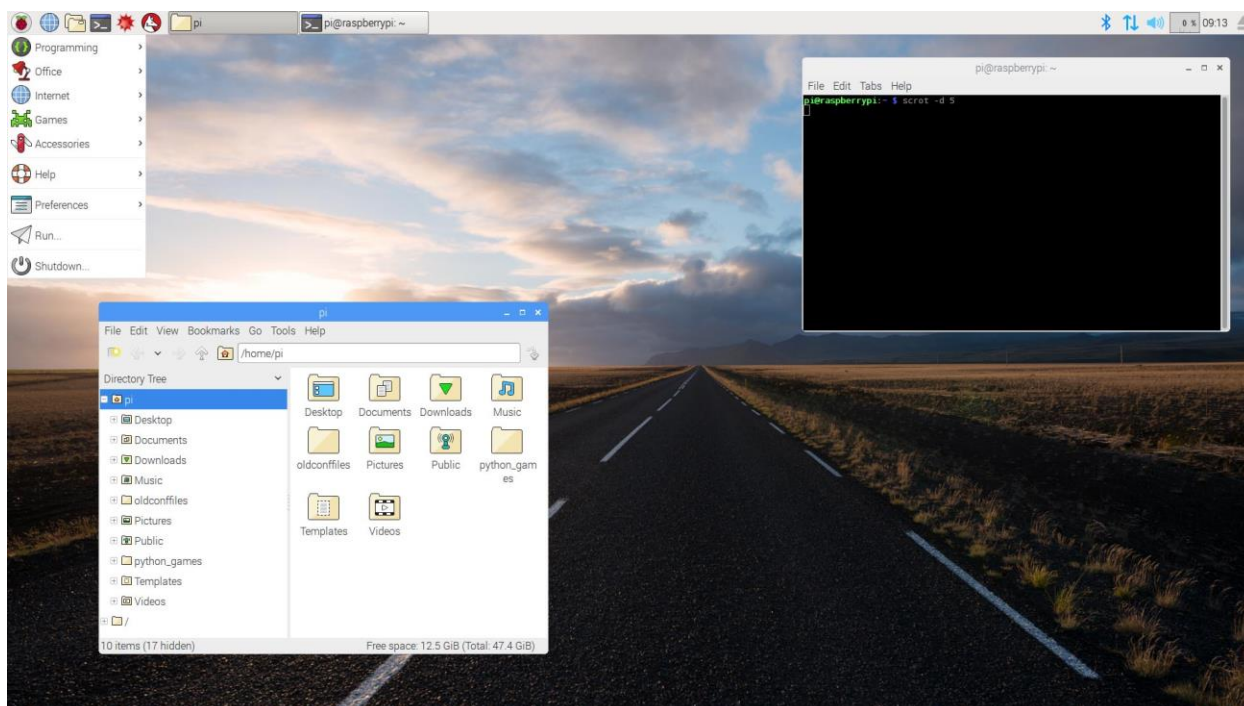


```

[ 3.286397] [c001cf498] (ext4_lookup) from [c0014c018] (lookup_real+0x30/0x5c)
[ 3.297203] [c0014c018] (lookup_real) from [c0014cbb8] (__lookup_hash+0x44/0x4c)
[ 3.308355] [c0014cbb8] (__lookup_hash) from [c0014ec38] (lookup_slow+0x48/0xb4)
[ 3.319425] [c0014ec38] (lookup_slow) from [c0014fb8c] (path_lookupat+0x6e8/0x738)
[ 3.330678] [c0014fb8c] (path_lookupat) from [c0014ff98] (filename_lookup.isra.46+0x30/0x70)
[ 3.342818] [c0014ff98] (filename_lookup.isra.46) from [c00152130] (user_path_at_empty+0x64/0x8c)
[ 3.355408] [c00152130] (user_path_at_empty) from [c0015217c] (user_path_at+0x24/0x2c)
[ 3.367063] [c0015217c] (user_path_at) from [c00141f18] (SyS_faccessat+0xa0/0x1d8)
[ 3.378378] [c00141f18] (SyS_faccessat) from [c00142078] (SyS_access+0x28/0x2c)
[ 3.389433] [c00142078] (SyS_access) from [c000ebc0] (ret_fast_syscall+0x0/0x48)
[ 3.400611] Code: e7934004 e3540000 0a00004c e5963014 (e794e003)
[ 3.410367] ---[ end trace de8385cb0d5102c5 ]---
[ 3.413518] usb 1-1: New USB device found, idVendor=0424, idProduct=9514
[ 3.413525] usb 1-1: New USB device strings: Mfr=0, Product=0, SerialNumber=0
[ 3.414105] hub 1-1:1.0: USB hub found
[ 3.414178] hub 1-1:1.0: 5 ports detected
[ 3.454547] Kernel panic - not syncing: Attempted to kill init! exitcode=0x0000000b
[ 3.454547]
[ 3.470682] CPU0: stopping
[ 3.476842] CPU: 0 PID: 0 Comm: swapper/0 Tainted: G      D      3.18.7-uv7+ #755
[ 3.487908] [c00016d14] (unwind_backtrace) from [c00012c40] (show_stack+0x20/0x24)
[ 3.499161] [c00012c40] (show_stack) from [c0052cfe8] (dump_stack+0x98/0xd8)
[ 3.509881] [c0052cfe8] (dump_stack) from [c0001509c] (handle_IPI+0x234/0x268)
[ 3.520759] [c0001509c] (handle_IPI) from [c00008618] (do_IPI+0x18/0x1c)
[ 3.531122] [c00008618] (do_IPI) from [c005349b4] (__irq_svc+0x34/0x14c)
[ 3.541471] Exception stack(0x807cbf08 to 0x807cbf50)
[ 3.550003] b000: 007e9ccc 00000000 ffffffff 00000000 007ca020 007c8dd4

```

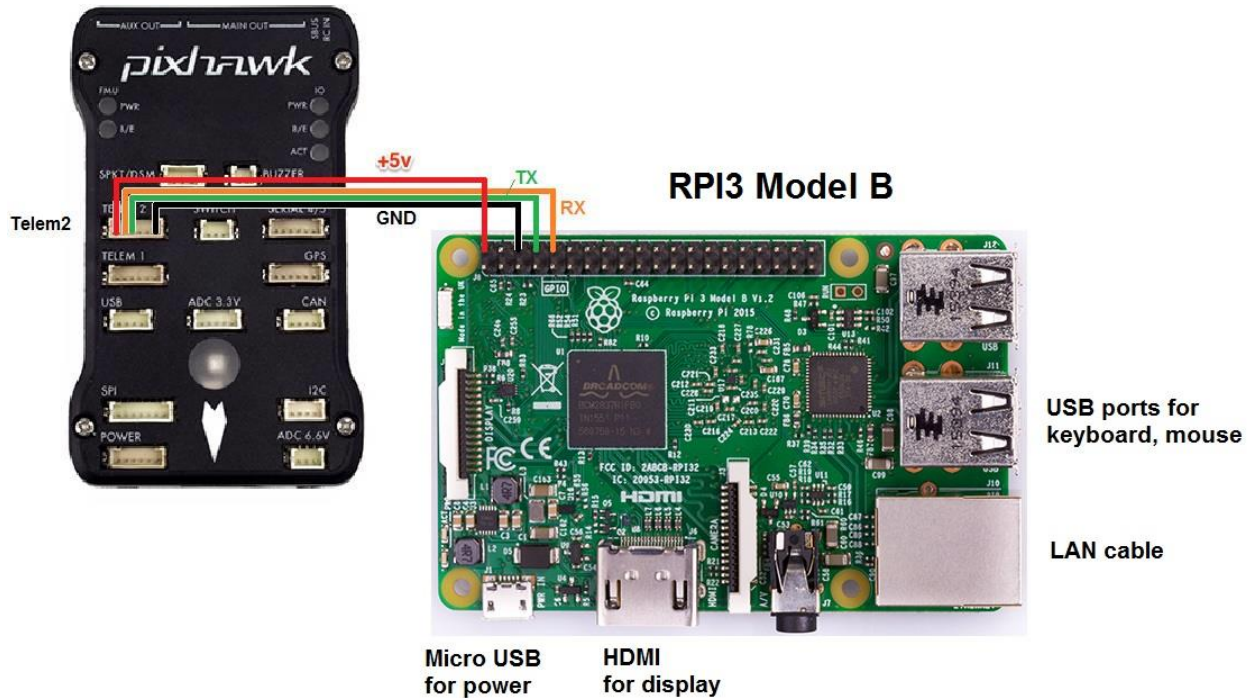
You have to add some installation steps but very easy. You just read and follow.



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:

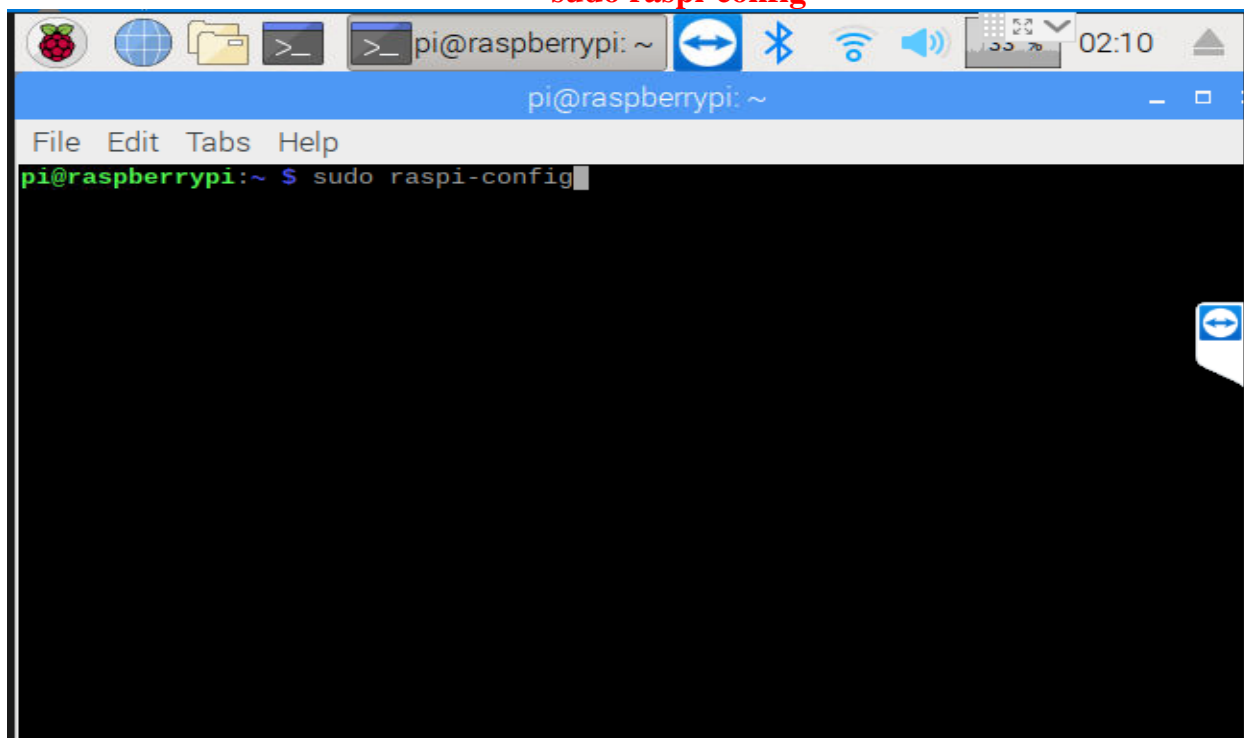
- SERIAL2\_PROTOCOL = 1 (the default) to enable MAVLink on the serial port.
- SERIAL2\_BAUD = 57 so the Pixhawk can communicate with the RPi at 57600 baud.  
(YOU MUST CHOOSE SERIAL2\_BAUD = 57, IF YOU CHOOSE OTHER NUMBER, SOFTWARE IS NOT OPERATION)
- LOG\_BACKEND\_TYPE = 3 if you are using APSync to stream the dataflash log files to the RPi

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

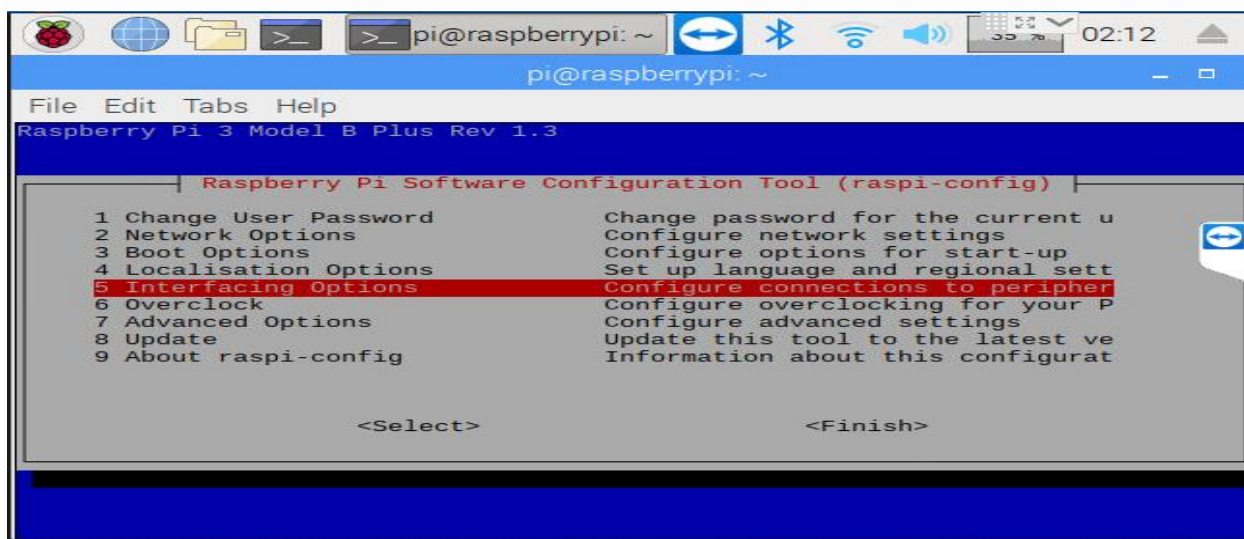
### 2.3.3 Setting up the Raspberry Pi

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

**sudo raspi-config**

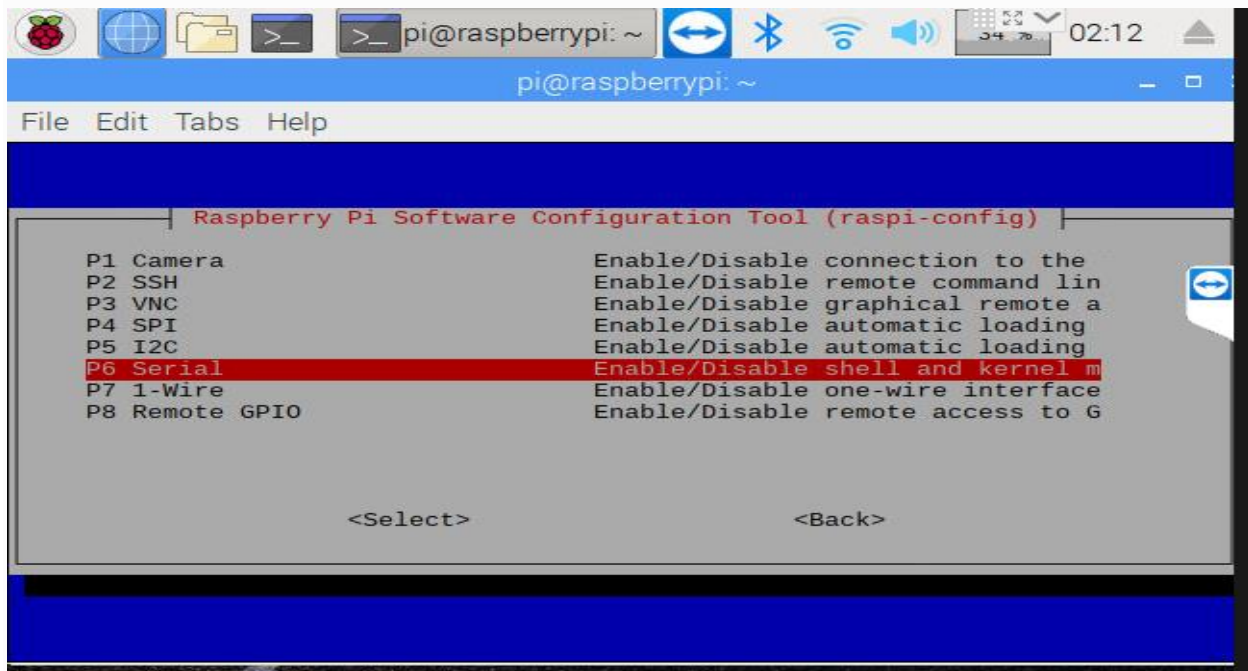


And in the utility, select “**interfacing Options**”:

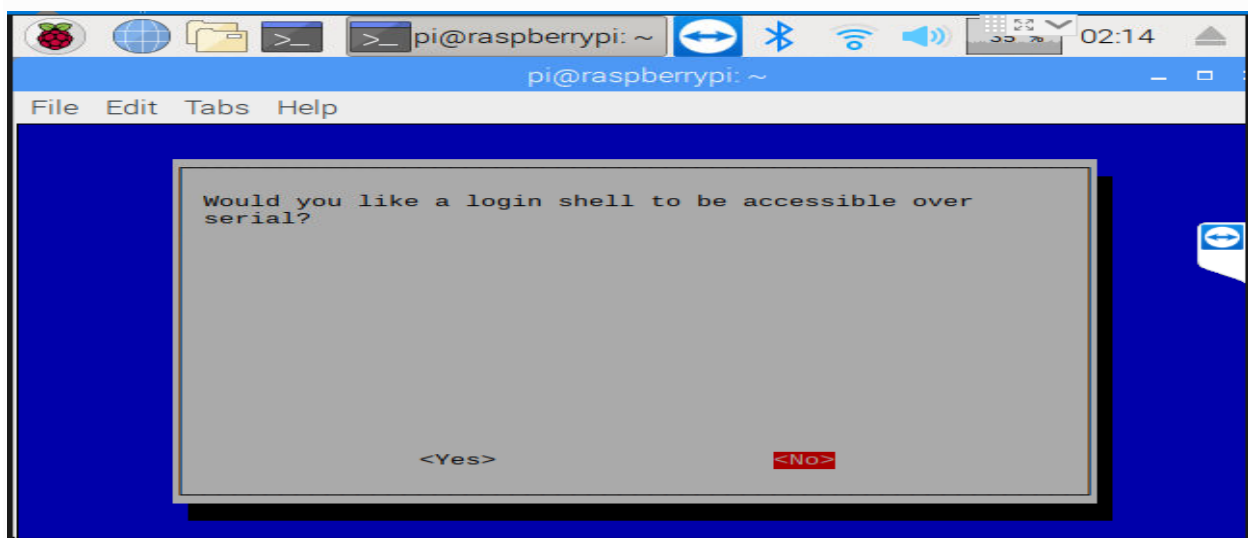




And “Serial”

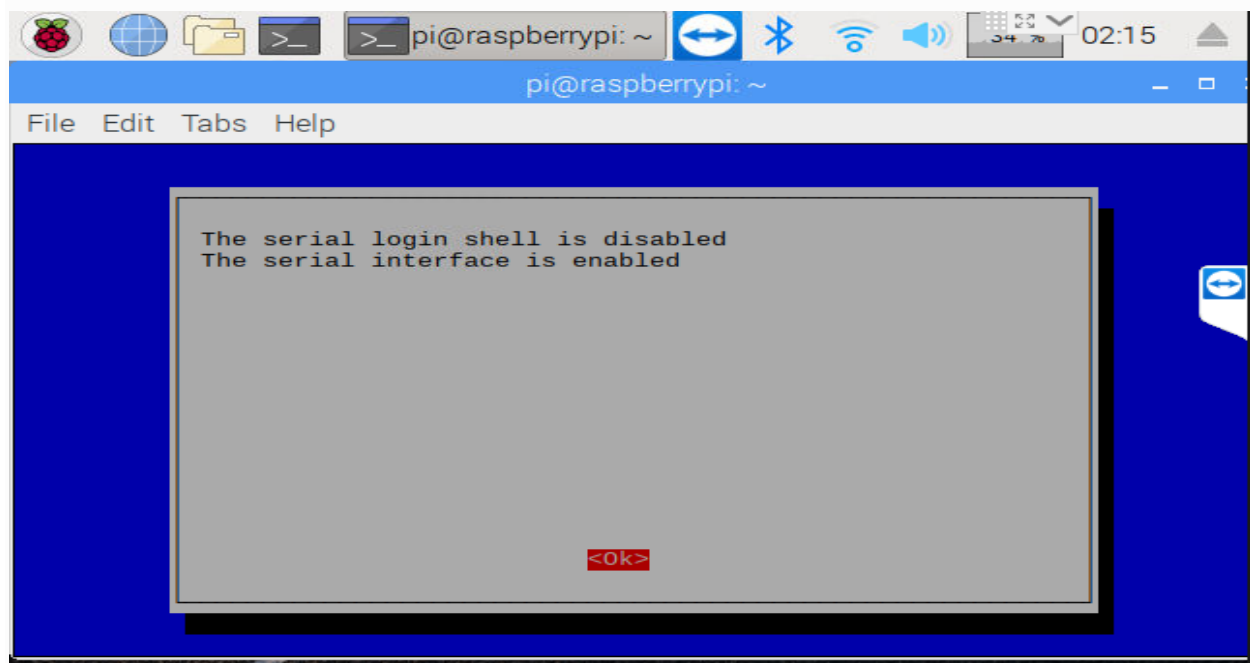
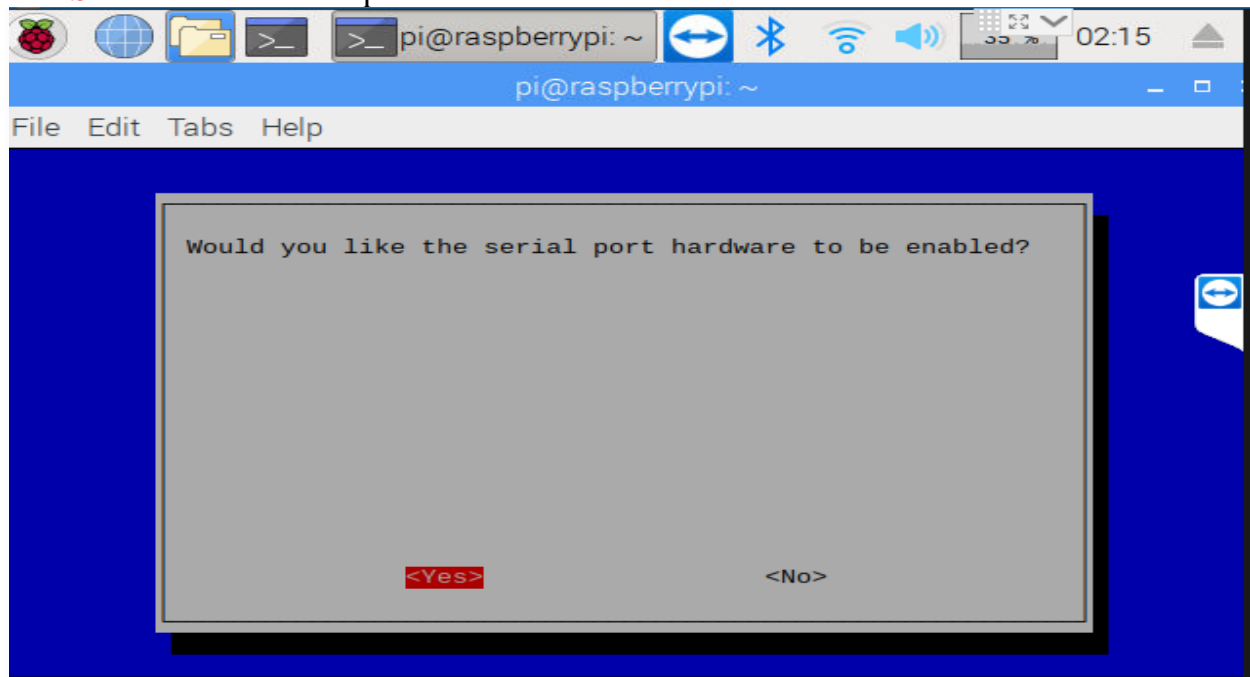


Choose “NO” (Disable OS use of the serial connection)





“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

```

setmefree@sprinter: ~
File Edit View Terminal Help
root@sprinter:/var/lib/apt# ls /dev/
MAKEDEV          input          nvidiactl      sdc1           tty14          tty33          tty52          usbmon0
autofs           kmsg          port           sdc5           tty15          tty34          tty53          vcs
block            kvm           ppp           sg0            tty16          tty35          tty54          vcs1
bsg              log           psaux          sg1            tty17          tty36          tty55          vcs2
cdrom            loop-control  ptmx           sg2            tty18          tty37          tty56          vcs3
cdrw             loop0         pts            sg3            tty19          tty38          tty57          vcs4
char             loop1         random          shm            tty2           tty39          tty58          vcs5
console          loop2         root           snapshot        tty20          tty4           tty59          vcs6
core             loop3         sdc0           snd             tty21          tty40          tty6           vcs7
cpu              loop4         sda            sndstat         tty22          tty41          tty60          vcsa
cpu_dma_latency loop5         sda1           sr0             tty23          tty42          tty61          vcsa1
disk             loop6         sda2           stderr          tty24          tty43          tty62          vcsa2
dmfm             loop7         sda5           stdin           tty25          tty44          tty63          vcsa3
dmmdi            mcelog        sda6           stdout          tty26          tty45          tty7           vcsa4
dvd              mem           sda7           tty             tty27          tty46          tty8           vcsa5
dvdrw            midi          sdb            tty0            tty28          tty47          tty9           vcsa6
fd               net           sdb1           tty1            tty29          tty48          ttyS0          vcsa7
full             network_latency sdb2           tty10           tty3           tty49          ttyS1          vga_arbiter
fuse             network_throughput sdb3           tty11           tty30          tty5           ttyS2          xconsole
hpet             null          sdb5           tty12           tty31          tty50          ttyS3          zero
initctl          nvidia0       sdc            tty13           tty32          tty51          urandom
root@sprinter:/var/lib/apt#

```

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:



```

pi@raspberrypi:~/development/release/XB-Firm $ sudo ./setup.sh
*****
*      ***          ***      *****
*      ***          ***      ***    **
*      ***          ***      ***    **
*      ***          ***      ***    **
*      ***          ***      ***    **
*      ***          ***      ***    **
*      ***          ***      *****
*****
*****
Hello my friend! Please Login...
Username:
your_user_name
Password:
your_pass_word

```

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

```

pi@raspberrypi:~/development/release/XB-Firm $ sudo ./setup.sh
*****
*****
*      ***      ***      *****
*      ***      ***      ***      **
*      ***      ***      ***      **
*      ***      ***      ***      **
*      ***      ***      ***      **
*      ***      ***      ***      **
*      ***      ***      *****
*****
*****
Hello my friend! Please Login...
Username:
Password:
Authenticating, please wait...
***Login: success
Installing....
***Setup: Completed
***Start at boot: Completed
***Completed
pi@raspberrypi:~/development/release/XB-Firm $

```

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**

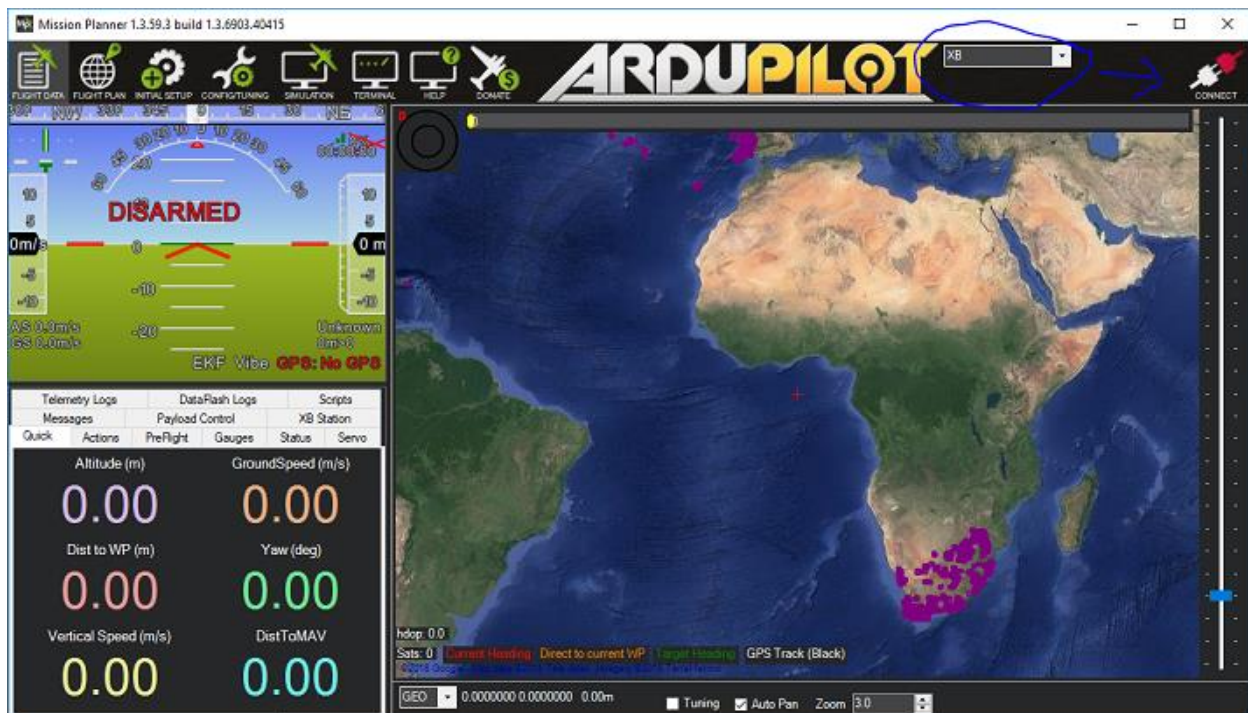
## C. GETTING STARTED

### 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

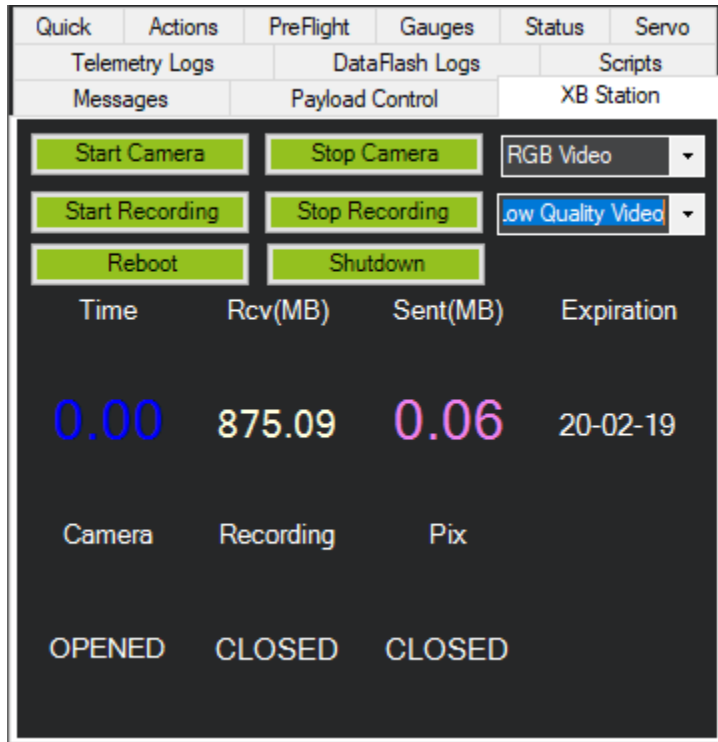


Login Dialog appear, type your username and password, then hit Enter button:



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

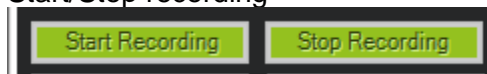


Start Camera button: Turn on Camera on Companion Computer

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:



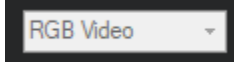
Reboot Button: Reboot Raspberry Pi

Shutdown button: Shutdown Raspberry Pi



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

#### 4. Video Type

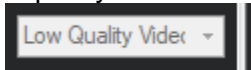


This function allow you to choose the type of streaming video.

- 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:

Time	Rcv(MB)	Sent(MB)	Expiration
0.00	948.56	0.06	20-02-19
Camera	Recording	Pix	
OPENED	CLOSED	CLOSED	

### 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 XBmission 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 <b>Open</b> 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, XBMission planner and hardware config). You can send me via email:

To: [creator@xb-uav.com](mailto: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](mailto: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/>