

ZAP 2 & 2+

User Manual – v4.1



14390 Carlson Circle
Tampa, FL 33626
+1 (813) 855-8687

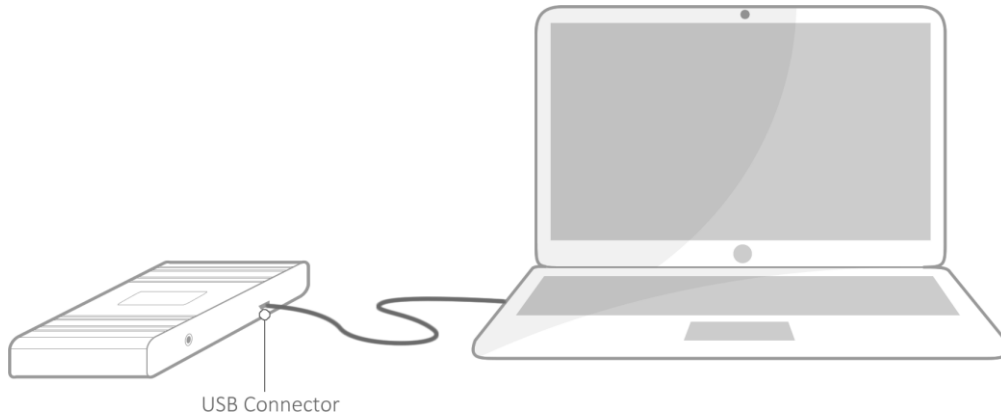
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1. Spectrometer modes

1.1. Normal Mode: Connected to USB

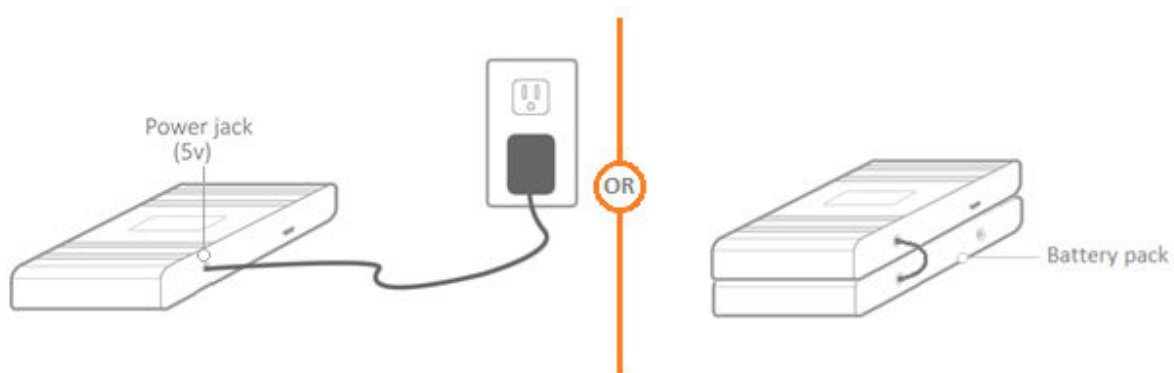
To use the spectrometer in normal mode (connected to the USB port of a computer) just plug the USB cable to the spectrometer and to the computer.



IMPORTANT: Remember to unplug the external power from the spectrometer before connecting the USB.

1.2. Wireless Mode: Connected to external power

To use the spectrometer in remote mode unplug the USB cable from the spectrometer and plug the 5V external power to the jack. After 1 minute the spectrometer and access point should be up and running.

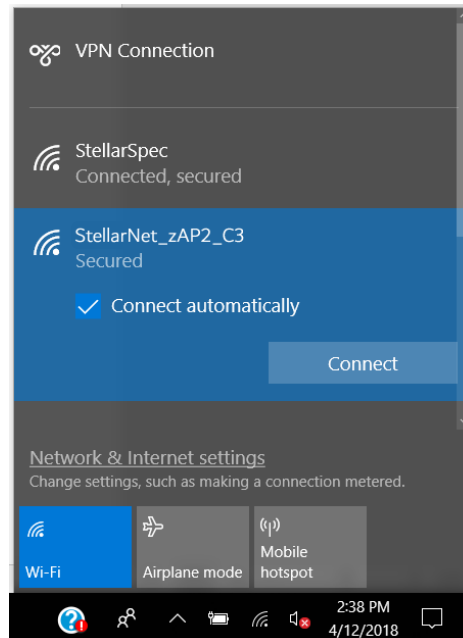


IMPORTANT: Remember to unplug the USB cable from the spectrometer before connecting the external power, otherwise it will not work.

NOTE: The green light of the spectrometer won't come up until the first communication with the spectrometer (ex. LabView)

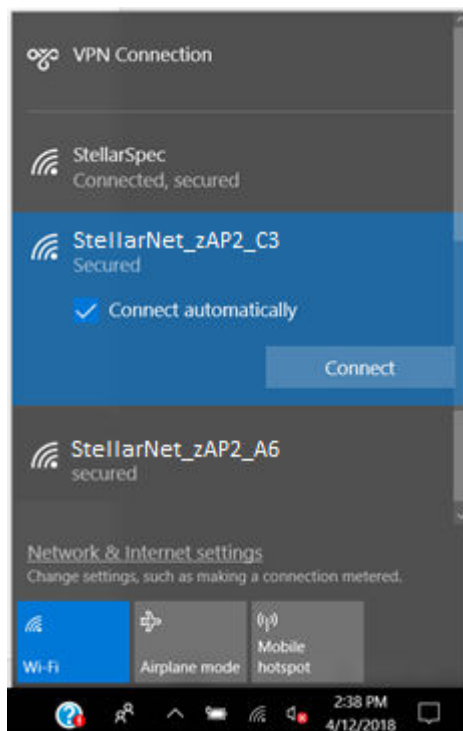
2. Remote mode: Connect to zAP2 access point

Once you power up the spectrometer, after about 60 seconds, you should see the Access Point WIFI like “StellarNet_zAP2_##” as shown in the figure:



Use “**stellarnet**” password to connect to the Access Point.

If you have multiple zAP2 connected you will see multiple Access Point networks:



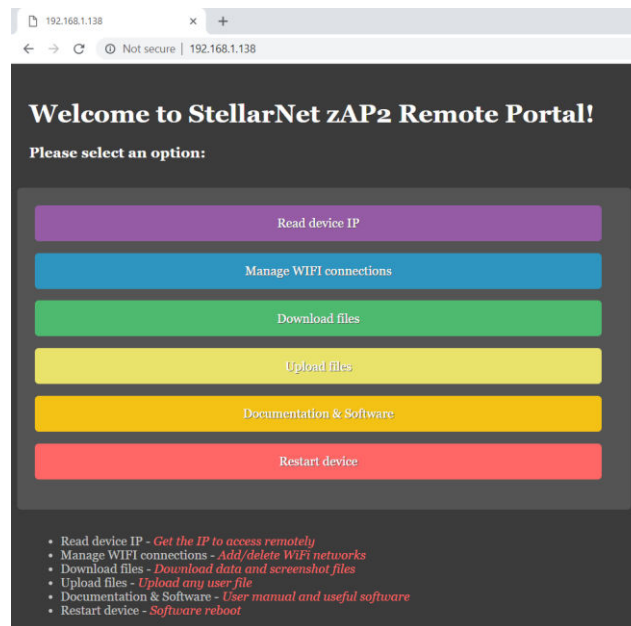
3. Remote portal

Now that you are connected to the Access Point you can open your web browser and type any page to display the remote portal (i.e: stellarnet.us, google.com, etc.)

NOTE: Some web browsers might not redirect you to the remote portal, if that is the case type:

192.168.4.1

The “StellarNet zAP2 Remote Portal” will come up as shown in the following picture:



3.1. Read device IP

This option is used to read the device IP. The IP is useful to remotely access the spectrometer using VirtualHere (USB-over-IP), LabView (TCP/IP), VNC (Desktop), SSH (Command console), among others.

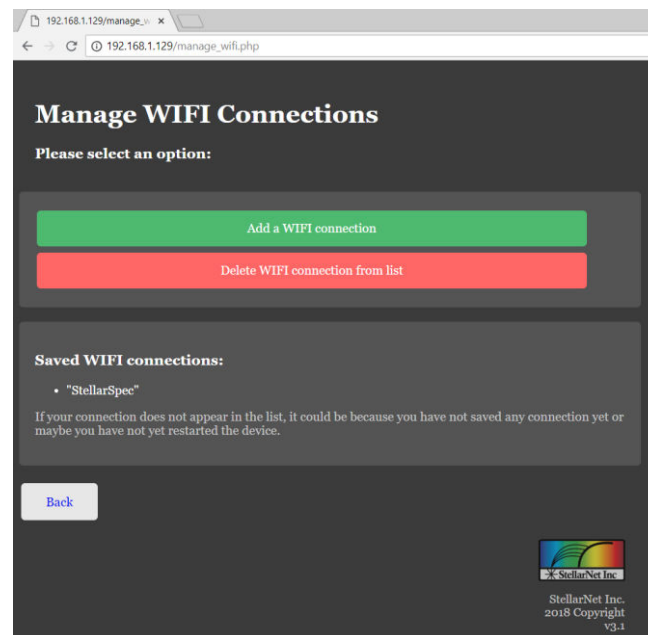


IMPORTANT: If the IP of the device is **192.168.4.1** (Access Point IP) means that the device is not yet connected to any WIFI.

3.2. Manage WIFI connections

This option is used to manage (add/remove) WIFI connections.

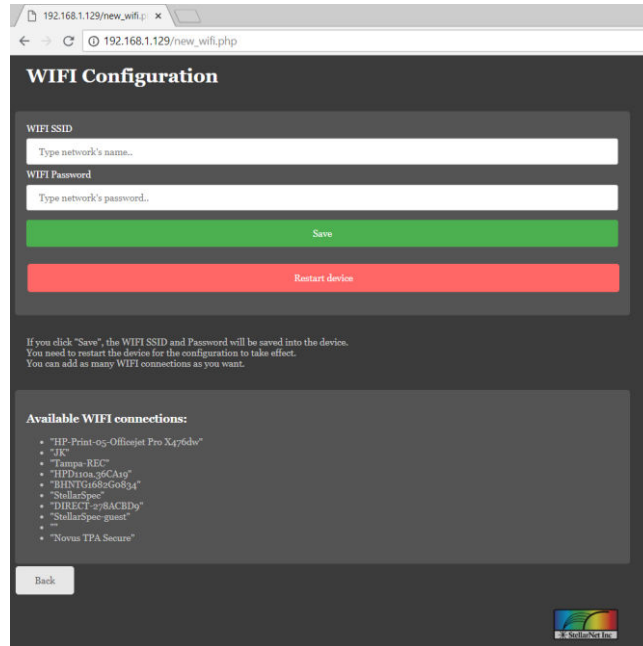
The following page will be displayed, where you can Add/Remove WIFI connections and also see the networks already saved on the device.



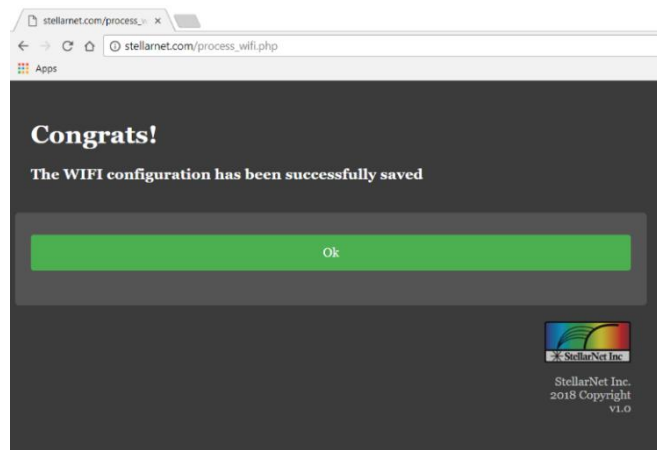
3.2.1. Add a WIFI connection

Use this option to add a new WIFI connection to the network list. You can add as many networks as you want.

A list of available WIFI connections is displayed at the bottom.



Once you type in your WIFI name and password and hit **save**, you will see the confirmation page:

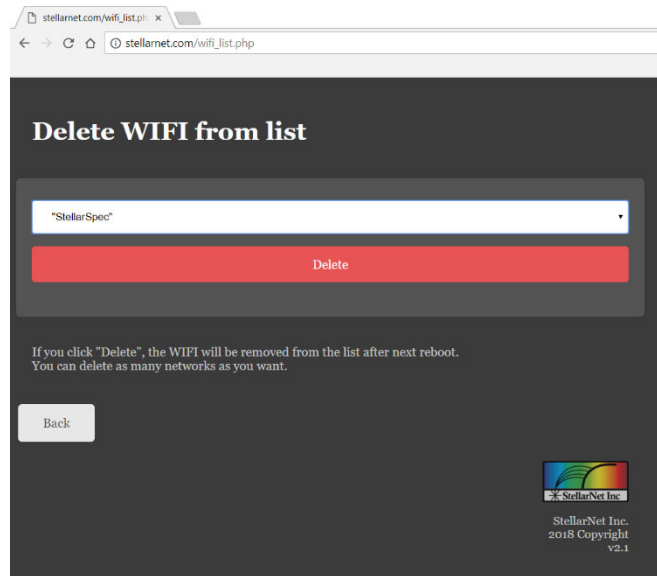


NOTE: Now the spectrometer has added the WIFI configuration to its network list. Next reboot it will try to connect to the first network in the list and if it fails, then it will try with the next one and so on.

3.2.2. Delete WIFI connection from the list

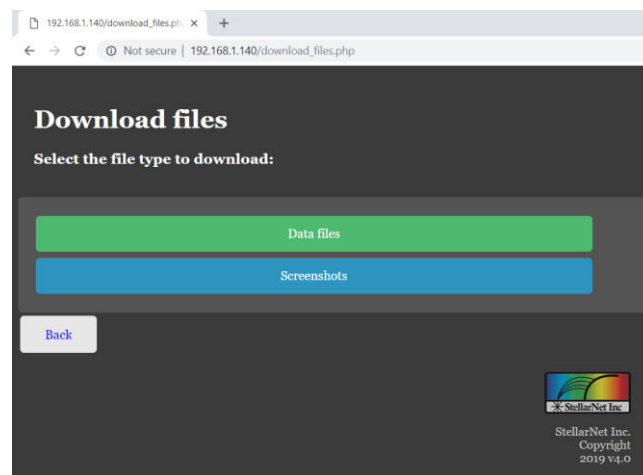
Use this option to delete a current WIFI connection from the network list.

Select a network from the drop-down list and hit "Delete". The WIFI configuration will be removed on next reboot.



3.3. Download files

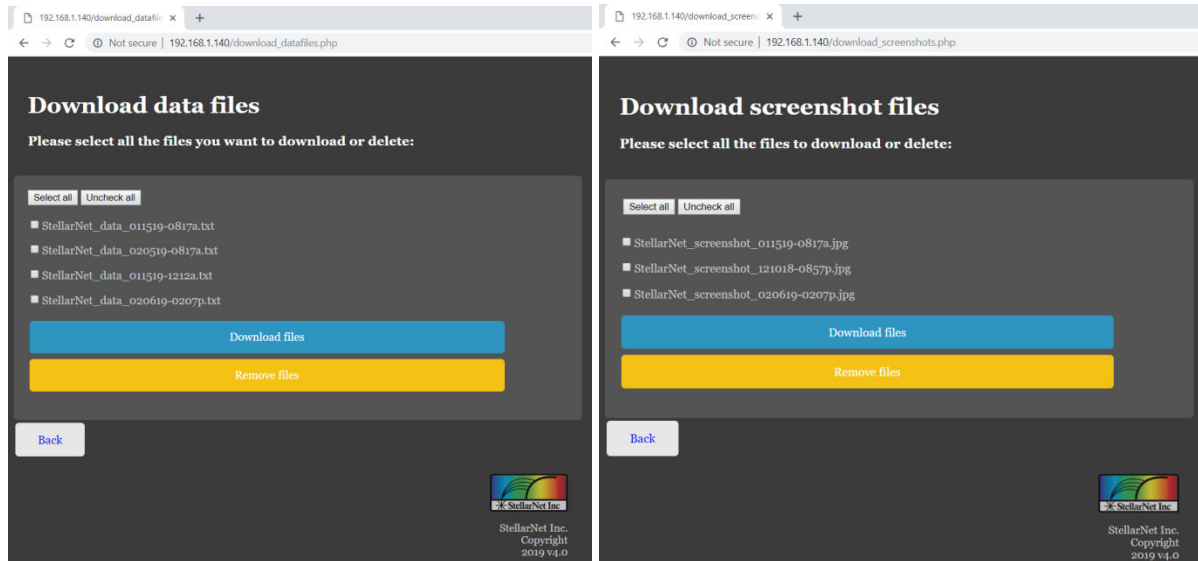
This option is used to download files from the user folders



3.3.1. Data files and Screenshots

Data files will list all the files inside `/home/zAP2/StellarNet/user_files/data_files`

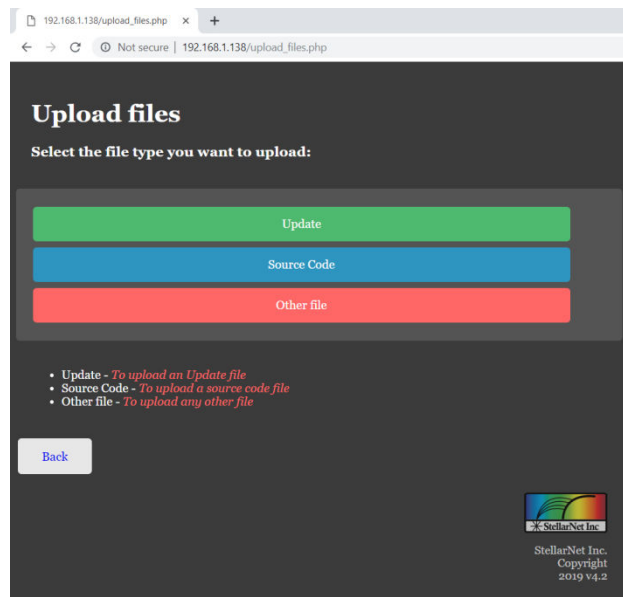
Screenshots will list all the files inside `/home/zAP2/StellarNet/user_files/screenshots`



The user can now check all the files and either chose “Download files” or “Remove files” to download all of them as a .zip file or remove them from the folder respectively.

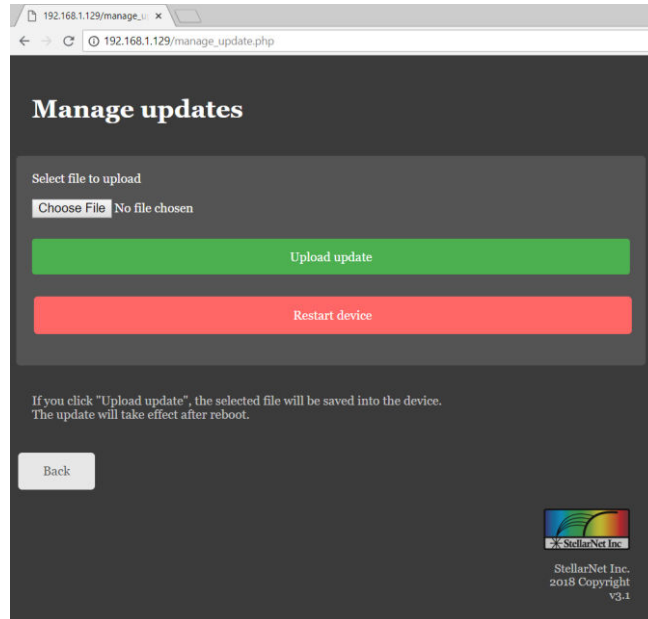
3.4. Upload files

This option is used to upload any kind of files (including Updates)

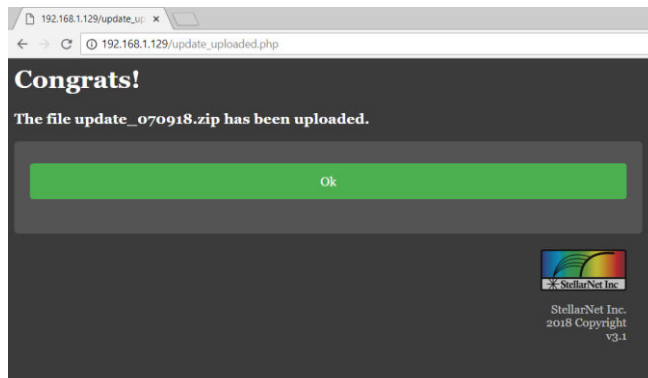
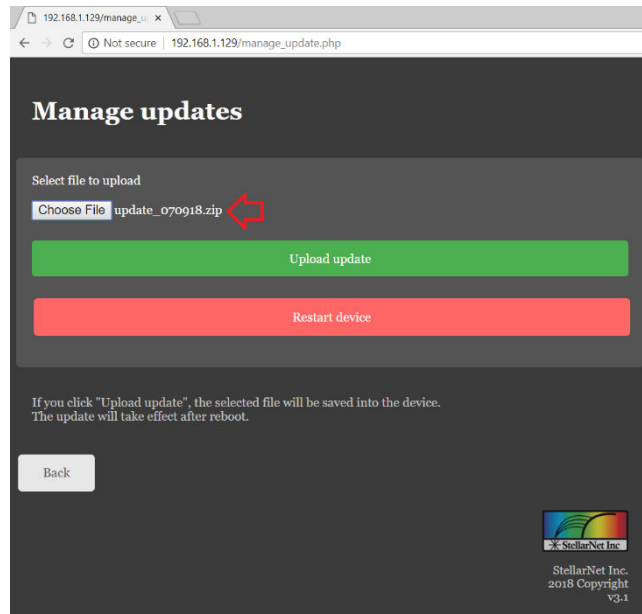


3.4.1. Updates

This option is used to upload an “Update file” so the device will upgrade on the next reboot. The update files are provided by StellarNet so the user only has to upload the update file and restart the device.

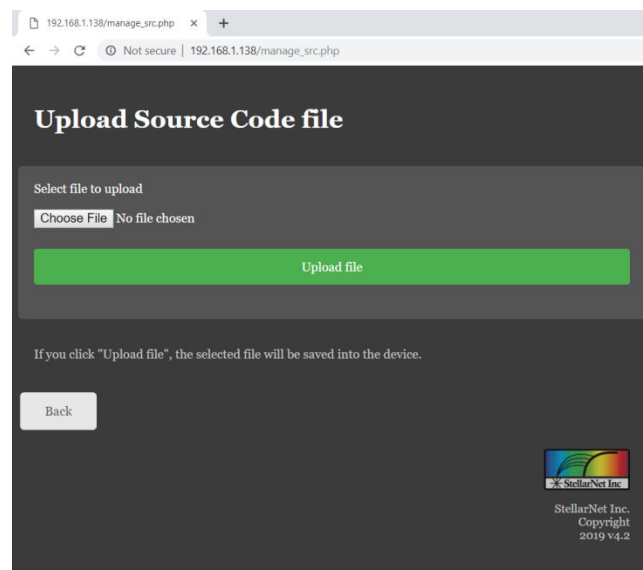


Once you selected an update file (“update_#####.zip”), click the “Upload update” button and the confirmation message will show up.



3.4.2. Source Code

This option allows the user to upload any purchased source code file (.py or .so) to the src folder.

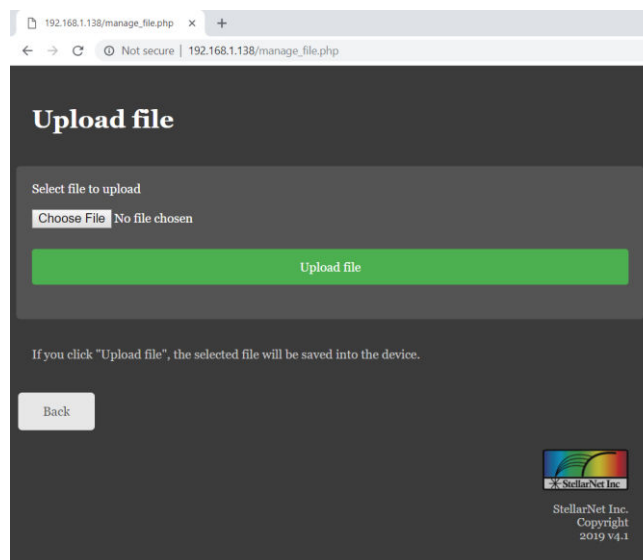


Simply click “Choose File” to select the file in your drive and then “Upload file” to save it into zAP2.

User folder: </home/zAP2/StellarNet/drivers/src>

3.4.3. Other file

With this option the user can upload any kind of file to the dedicated user folder into zAP2.

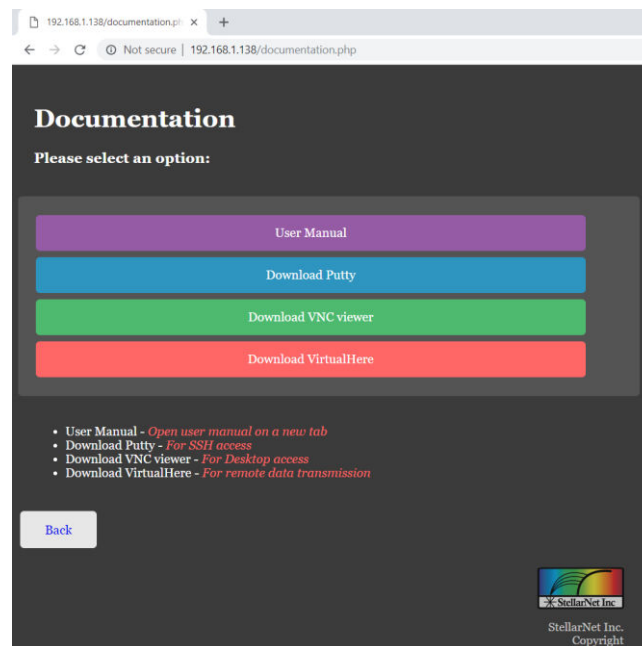


Simply click “Choose File” to select the file in your drive and then “Upload file” to save it into zAP2.

User folder: /home/zAP2/StellarNet/user_files/

3.5. Documentation & Software

In this section you can open this User Manual and download the required software to remotely access the Spectrometer.



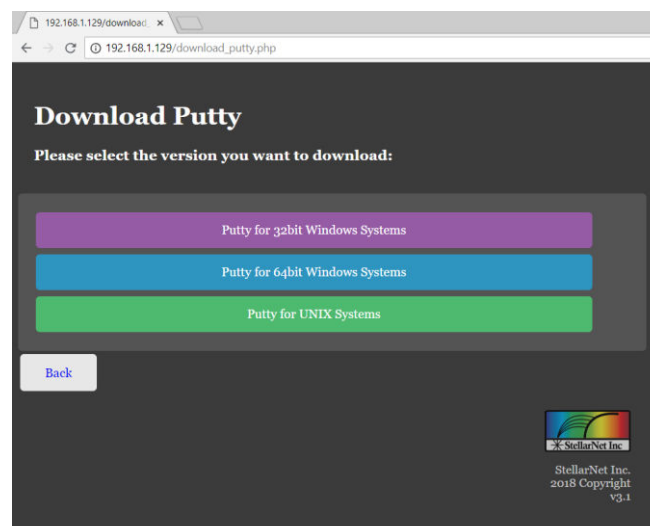
3.5.1. User Manual

This option will open this user manual in a new tab.

3.5.2. Download Putty

You can download the version of Putty (SSH access) you need for your system:

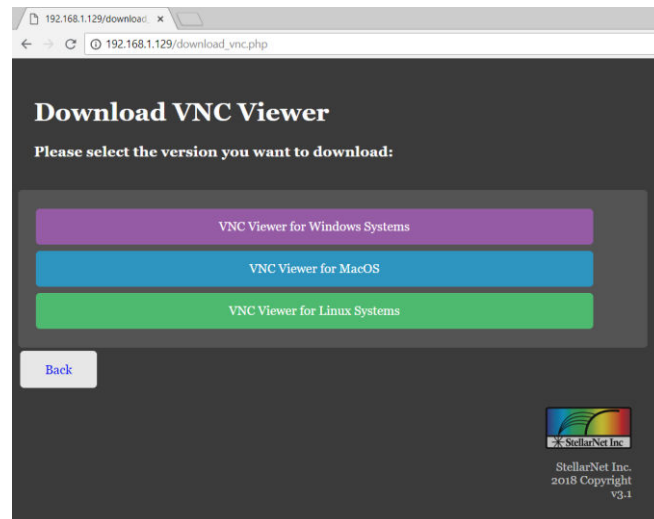
- Windows 32bit
- Windows 64bit
- UNIX



3.5.3. Download VNC Viewer

You can download the version of VNC Viewer (Desktop access) you need for your system:

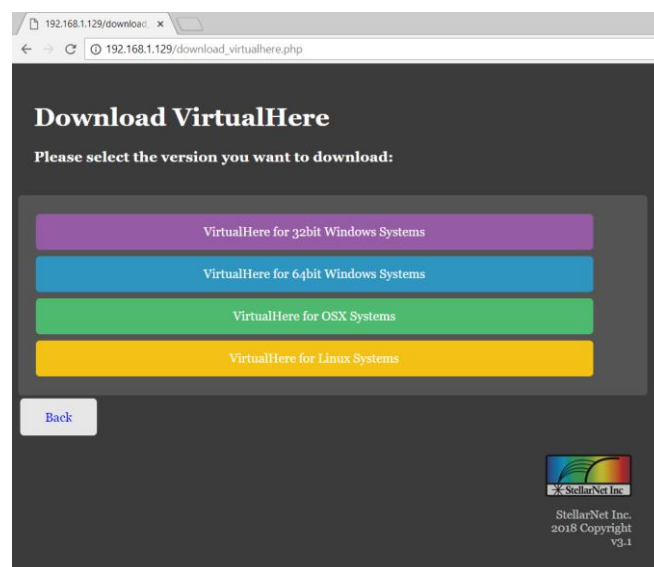
- Windows
- MacOS
- Linux



3.5.4. Download VirtualHere

You can download the version of VirtualHere (USB-over-IP) you need for your system:

- Windows 32bit
- Windows 64bit
- OSX
- Linux





3.6. Restart device

You can use this option to reboot the device without the need to unplug and re-plug the device.

Restart is required for these changes to take effect:

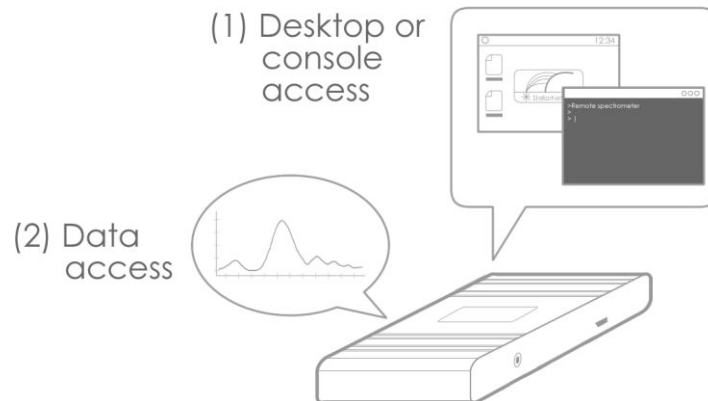
- ✓ Apply the update package (if available)
- ✓ Add new WIFI connections
- ✓ Remove selected WIFI connections
- ✓ Will try to connect to one of the WIFI connections on the list
- ✓ Will try to run the selected startup App (user app or default)

4. Remote access

There are different options to remotely access the Spectrometer, which can be divided in two categories:

- 1- Remote login to the onboard desktop/console
- 2- Remote data requests

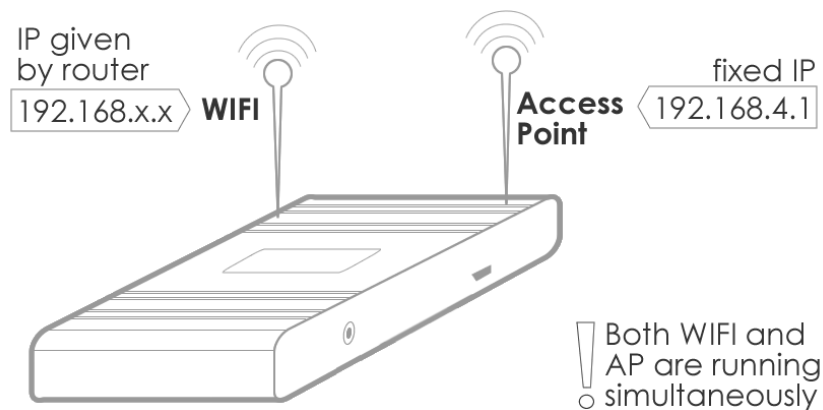
The first one is to access the Spectrometer desktop (graphic user interface – GUI) or console (command line console) and the second category is to receive spectrum data from the spectrometer.



4.1. Connection pathways

For any of the two options listed above you have two ways to connect to the Spectrometer:

- Through WIFI using the IP given by the router
- Through Access Point using the fixed IP



In both cases the user and password to access are:

User: [zAP2](#)

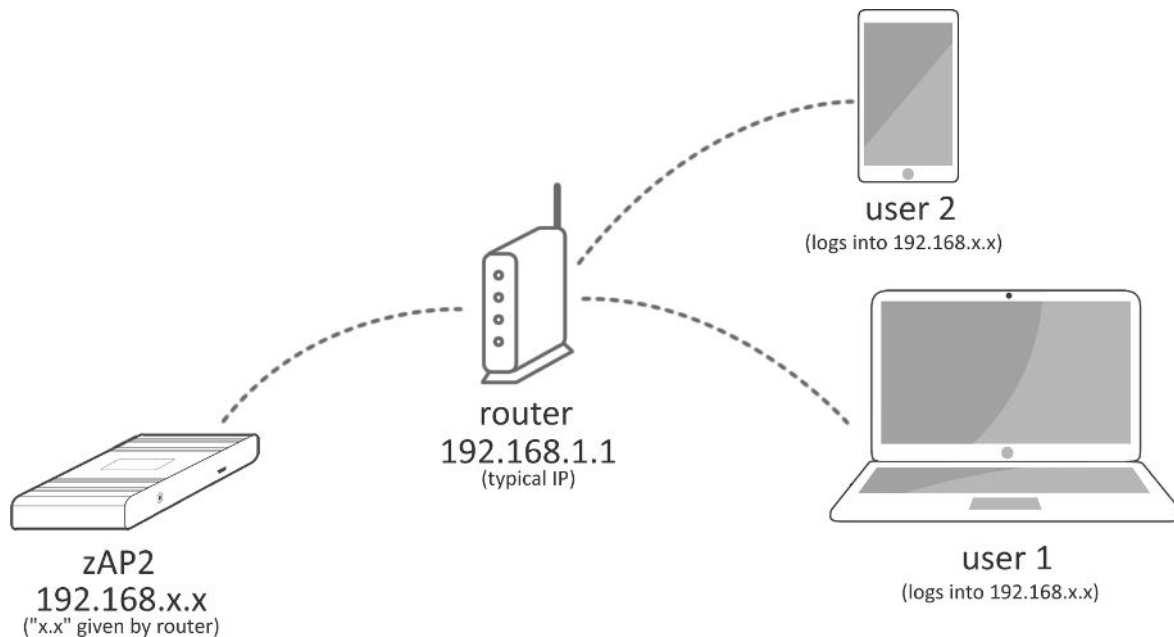
Password: [stellarnet](#)

4.1.1. Using WIFI with IP given by router

If the Spectrometer is connected to any WIFI, you can remotely access using the IP address displayed in the “Show IP” section of the remote portal ([3.1.Read device IP](#)), different than 192.168.4.1 (fixed Access Point IP)

IMPORTANT: You need to be connected to the same WIFI connection than the spectrometer to access using this IP given by the router.

Using this IP means that you are connecting to the zAP2 through your router (multiple users can be connected to the same zAP2 simultaneously):



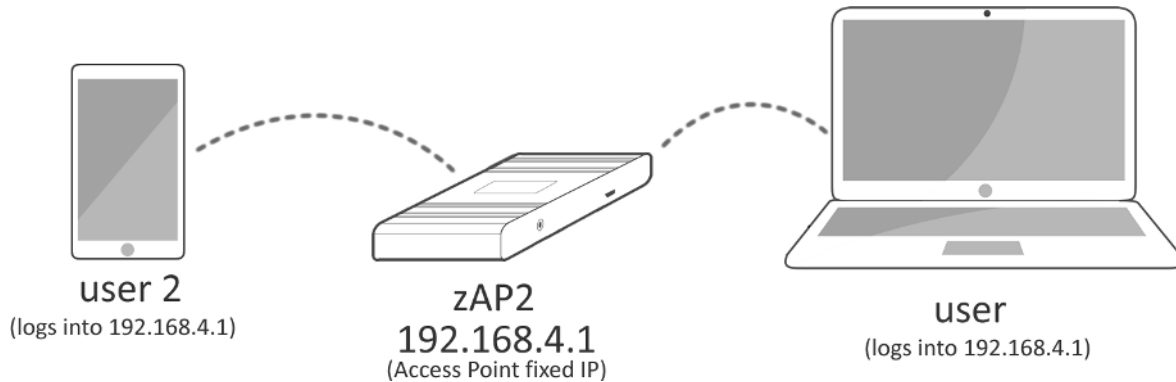
4.1.2. Using Access Point with fixed IP

Even if the device is connected or not to a WIFI, you can always remotely access using the Access Point connection.

You need to connect to the Access Point first ([2.Remote mode: Connect to zAP2 access point](#)) and then use the fixed IP **192.168.4.1**.

IMPORTANT: You need to be connected to the Access Point (Stellarnet_zAP2_##) of the device to access using the fixed IP 192.168.4.1. Keep in mind that the connection through the access point is not as stable as using the WIFI, so the device could disconnect more frequently.

Connecting to the AP means that you are directly connecting to zAP2, not through a router (multiple users can be connected to the same zAP2 simultaneously):



4.2. Data access

With the new zAP2 upgrade you can stream your full spectrum over Wi-Fi and still using your regular *SpectraWiz* (using VirtualHere – USB-over-IP solution) and any *customizable Windows program* as if you had the device directly connected to your USB.

Each zAP2 also comes preprogramed with our latest *SpectraWiz Mobile App* set which allows streaming of pre-processed data.

In addition you can read JSON-formatted data over TCP using our LabView demo code or any web browser!

4.2.1. USB-over-IP: VirtualHere

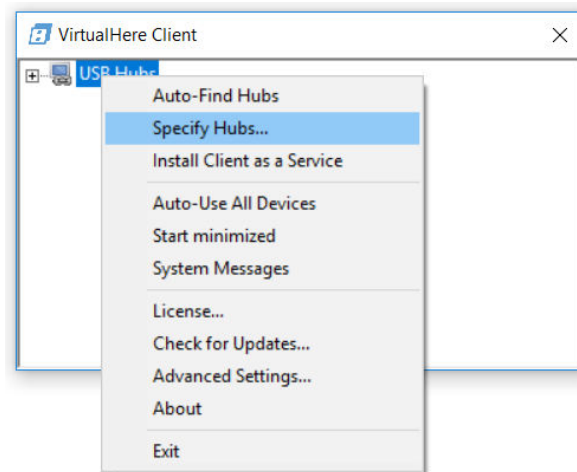
VirtualHere (<https://virtualhere.com>) is a utility to access USB devices shared into an internet connection. This utility is supported by our remote Spectrometer

You will be able to run *SpectraWiz* and any *customizable Windows program* as if you had the device connected directly to your USB ports!

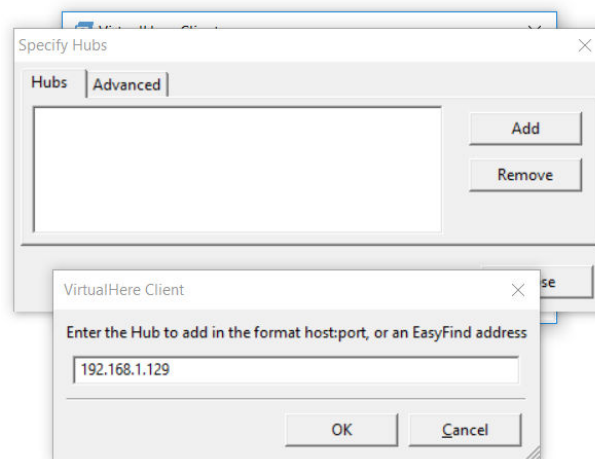
IMPORTANT: The spectrometer and the computer running *SpectraWiz* need to be connected to the same Wi-Fi.

To do that you just need to follow these steps:

- 1- Download VirtualHere Client for you Operating System from zAP2 portal or from the official webpage: https://virtualhere.com/usb_client_software
- 2- Run the downloaded software (no installation required):
- 3- Right click on “USB hubs” and select “Specify Hubs...”

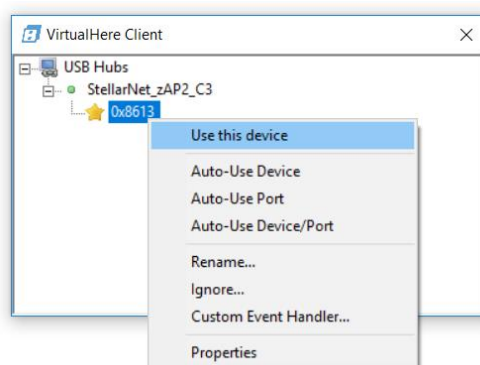


- 4- “Add” a new hub and use the IP of your spectrometer (3.1Read device IP). Press “OK” and then close the window.

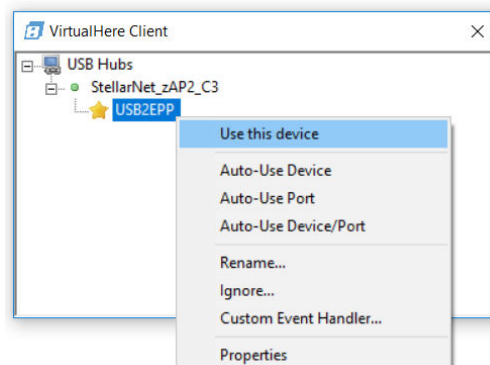


- 5- Wait a few seconds and you should now see the USB device as shown in the following picture. To use the device just double-click on it or right-click and “Use this device”.

You will have to do this step twice due to the USB driver operation:

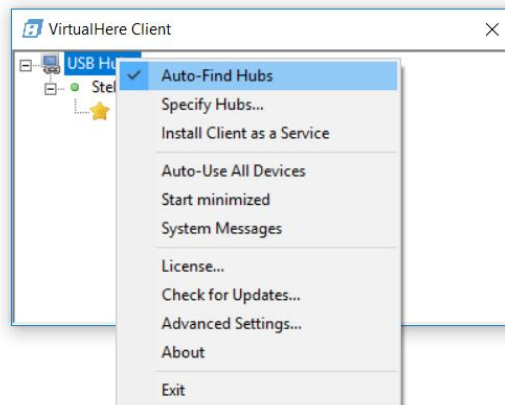


1st will show device name as 0x8613

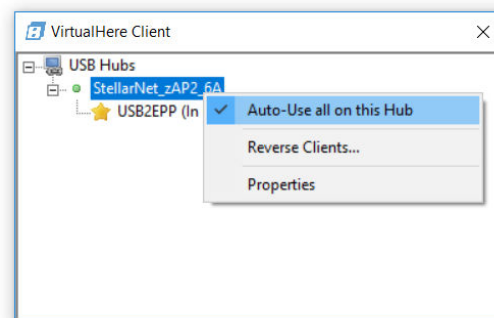


2nd will show device name as USB2EPP

- 6- You will have to “uncheck” the “Auto-Find Hub” option to avoid device disconnections:



- 7- If you want to always use the device when available, then you can check the “Auto-Use all on this Hub” option. Now that your device is virtually connected to your USB, you can open SpectraWiz as you normally would.



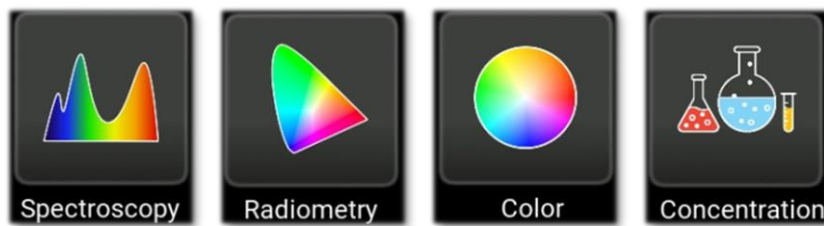
- 8- Now that your device is virtually connected to your USB port you can click on your SpectraWiz icon and run it as usual, as well as any other customizable Windows program.

4.2.2. SpectraWiz Mobile Apps (zAP2+)

The zAP2+ upgrade includes our latest **SpectraWiz Mobile App** set written in the form of .bin files (Linux executable) and dynamic library for USB drivers as *stellarnet_driver.so* and *stellarnet.hex* files.

We also provide with simple data acquisition script written in python (***data.py***) that can communicate with *stellarnet_driver.so* and perform simple operation to set device parameter and acquire spectrum data.

Using the local access point and your own mobile device, you can easily run applications for **General Spectroscopy, Radiometry, Colorimetry, and Concentration** analysis.



Check out our [SpectraWiz Mobile Apps user manual](#) for detailed information.

4.2.2.1. Source code purchase

In-app purchases allow users to download source codes, which can be further customized to suite each user's requirements.

Using the powerful Python language you can create your own onboard applications to stream only the data you need.

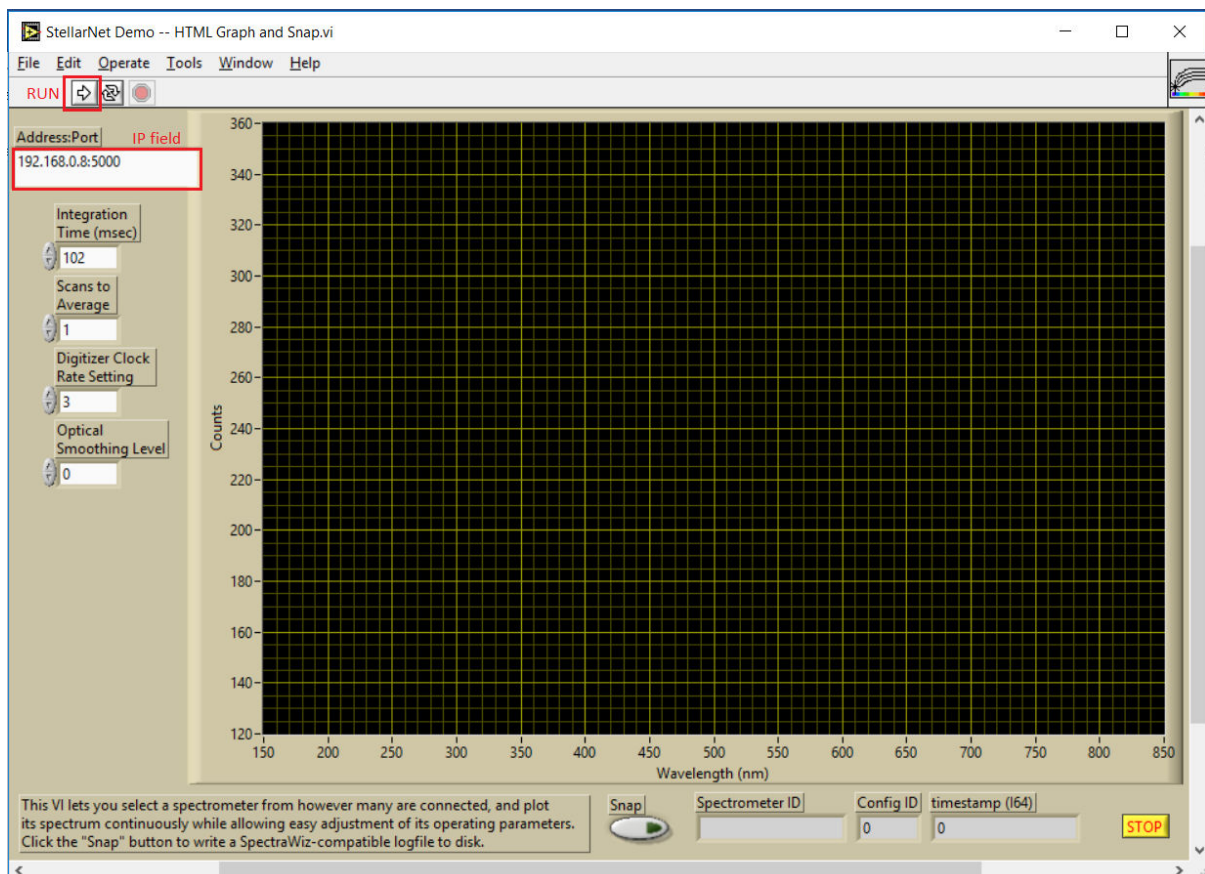
ContactUs@StellarNet.us today to discuss your zAP2 application!

4.2.3. StellarNet LabView

For this option you need to install “StellarNet Demo -- HTML Graph and Snap”.

Once you open it, type the Spectrometer IP depending on the pathway you use (see [4.1.Connection pathways](#)) and then press “Run” to start receiving data.

IMPORTANT: Always use port “:5000” after IP as shown in figure.



4.3. Desktop access: VNC viewer

You can use “Real VNC” (Virtual Network Computing) to remotely access the Spectrometer desktop.

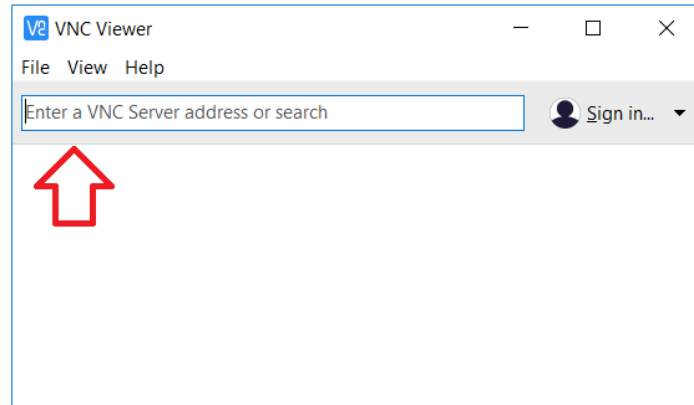
VNC Viewer is a freeware you can download from the zAP2 portal or from the official webpage:

<https://www.realvnc.com/es/connect/download/viewer/>

Once you install and open VNC Viewer you can enter the IP ([4.1.Connection pathways](#)) of the Spectrometer to remotely access its desktop using:

User: **zAP2**

Password: **stellarnet**



4.4. Console access: SSH

You can use any SSH client to remotely access the Spectrometer console. In this case we use PuTTYSSH, which you can download from the zAP2 portal or from the official webpage:

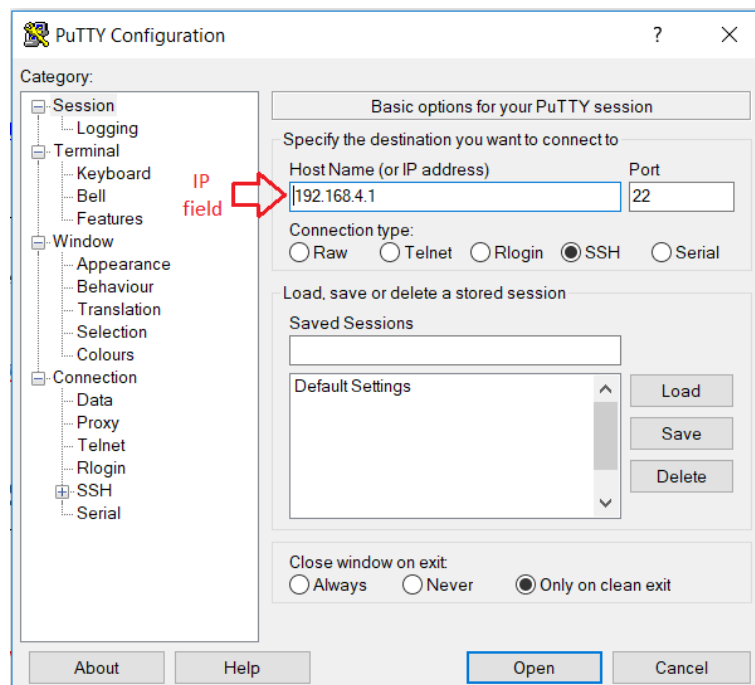
<https://www.putty.org/>.

You can access the spectrometer by using the access point – fixed IP – or the WIFI connection – dynamic IP – ([4.1.Connection pathways](#))

In both cases the user and password to access are:

User: [zAP2](#)

Password: [stellarnet](#)





5. Folders structure

Either if you access via SSH or VNC you will have access to all the folders into the remote spectrometer.

Once you log in you can see the zAP2 home folder with the following structure:

[-] [Home icon] zAP2	
[+] [Desktop icon] Desktop	<i>zAP2 Desktop</i>
[-] [Folder icon] StellarNet	
[+] [Folder icon] backgrounds	<i>StellarNet backgrounds</i>
[-] [Folder icon] documentation	<i>Documentation files (such as this user manual)</i>
[+] [Folder icon] software	<i>Installer files for the software required for remote access</i>
[+] [Folder icon] drivers	<i>Spectrometer drivers</i>
[-] [Folder icon] scripts	<i>Startup scripts</i>
[+] [Folder icon] logs	<i>Scripts logs</i>
[+] [Folder icon] startup_app	<i>Applications to run on startup</i>
[+] [Folder icon] update	<i>Location of update files</i>
[-] [Folder icon] user_files	
[+] [Folder icon] data_files	<i>Data files stored by the user</i>
[+] [Folder icon] screenshots	<i>Screenshots stored by the user</i>