

Actiserver Setup

Pre-requisites

A computer with both Ethernet and WiFi interfaces

Linux installed and an administrator account set up with sudo permissions (Ubuntu or Debian, Debian Bookworm server works fine)

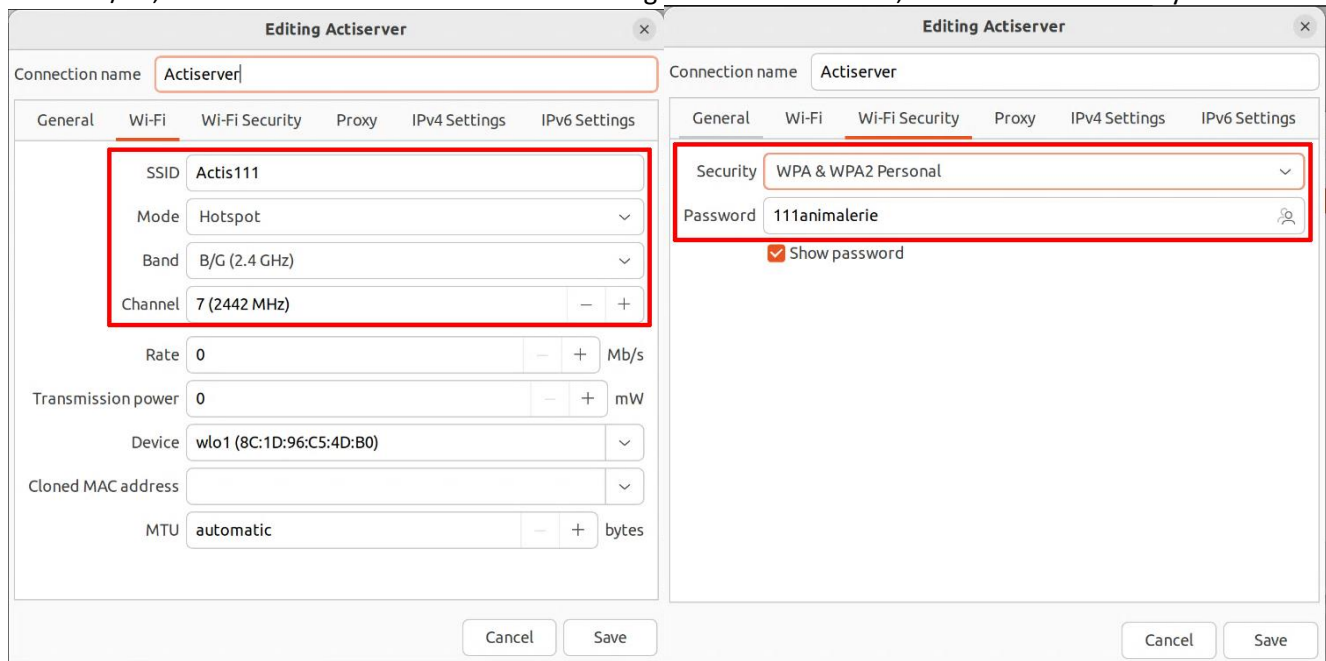
Software installation. Run the following commands:

```
sudo apt update
sudo apt -y upgrade
sudo apt -y install ntp ntpstat net-tools iw inxi git openjdk-17-jre apache2
sudo apt -y install autofs cifs-utils sysstat
sudo mkdir -p /media/actimetre
```

Choose a number between 100 and 899 for this Actiserver (we will call it **NNN**). Please ensure no two Actiservers have the same number.

For a PC (on Ubuntu)

Using the Advanced Network Configuration program (found in the “Utilities” folder), set up the WiFi AP with SSID in the form of “Actis**NNN**” and password “**NNN**animalerie” where **NNN** is the same. The “Band” must be set to “B/G”, and the channel can be chosen according to the environment, or left to 0 to let the system decide.



That's all. Jump to the section “Set up the shared server”

For a Raspberry

Install additional software

```
sudo apt install hostapd dnsmasq dhcpd5
```

For an Raspberry clone (our preference goes to OrangePi), ensure that NetworkManager is not running

```
sudo systemctl disable NetworkManager
```

Find the name of the WiFi device: run the following command

```
ifconfig
```

and note down the name of the WiFi device (**wlo1** in the example below)

```

enp89s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.1.200 netmask 255.255.255.0 broadcast 192.168.1.255
    inet6 fe80::b9ee:2b0c:38a5:efb0 prefixlen 64 scopeid 0x20<link>
    ether 1c:69:7a:af:d2:2a txqueuelen 1000 (Ethernet)
    RX packets 272033 bytes 346345738 (330.3 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 139924 bytes 17397499 (16.5 MiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device memory 0x6a200000-6a2fffff

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 24485 bytes 3043795 (2.9 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 24485 bytes 3043795 (2.9 MiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlo1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.200.1 netmask 255.255.255.0 broadcast 192.168.200.255
    ether 8c:1d:96:c5:4d:b0 txqueuelen 1000 (Ethernet)
    RX packets 816272 bytes 88336954 (84.2 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 817235 bytes 59169904 (56.4 MiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

```

WiFi AP setting

Run the following:

```

sudo systemctl unmask hostapd
sudo systemctl enable hostapd

```

In the file `/etc/hostapd/hostapd.conf` (create it if it doesn't exist), add the following, where `NNN` is a number between 002 and 250. The leading zeros are important, so there are exactly 3 digits. The name `wlo1` comes from the information gathered before.

```

country_code=FR
interface=wlo1
ssid=ActisNNN
hw_mode=g
channel=7
macaddr_acl=0
auth_algs=1
ignore_broadcast_ssid=0
wpa=2
wpa_passphrase=NNNanimalerie
wpa_key_mgmt=WPA-PSK
wpa_pairwise=TKIP
rsn_pairwise=CCMP

```

Note: it is recommended that each Actiserver use a different `channel` number (7 in the example above).

In the file `/etc/dhcpd.conf`, add the following:

```

interface wlo1
    static ip_address=192.168.4.1/24
    nohook wpa_supplicant

```

In `/etc/dnsmasq.conf`, add the following at the end of the file:

```
interface=wlo1
dhcp-range=192.168.4.2,192.168.4.250,255.255.255.0,24h
domain=wlan
address=/gw.wlan/192.168.4.1
```

Run the following to finalize the configuration and reboot:

```
sudo rfkill unblock wlan
sudo reboot
```

For other Linux systems (use with caution, this procedure might not work at all ! prefer the previous)

The procedure described above for Raspberry Pi should work on most systems. However, if the system has Network Manager enabled, try the following command, then reboot.

```
sudo nmcli d wifi hotspot ifname wlo1 ssid ActisNNN password NNNanimalerie
sudo reboot -f now
```

if after reboot the AP ActisNNN does not persist,

create a file `/etc/systemd/system/ActisNNN.service`, add the following content to the file

```
[Unit]
Description=AP-Activation
Wants=network-online.target multi-user.target

[Service]
Type=oneshot
User=root
ExecStart=/usr/bin/nmcli d wifi hotspot ifname wlo1 ssid ActisNNN password NNNanimalerie
Restart=no

[Install]
```

Set up the shared file server. Follow instructions to set up mounting fatadata

The mount point must be `/media/actimetre`

Set up the NTP server. In case the installation is behind a slow firewall, the NTP synchronization might be problematic. It is usefull in that case to point to a NTP time server that can be accessed locally

The config file is `/etc/ntp.conf`

Add the address of the local NTP server (here 172.20.163.1)

```
#Specify one or more NTP servers.
server 172.20.163.1
```

Comment the servers from the NTP Pool project

```
# Use servers from the NTP Pool Project. Approved by Ubuntu Technical Board
# on 2011-02-08 (LP: #104525). See http://www.pool.ntp.org/join.html for
# more information.
#pool 0.ubuntu.pool.ntp.org iburst
#pool 1.ubuntu.pool.ntp.org iburst
#pool 2.ubuntu.pool.ntp.org iburst
#pool 3.ubuntu.pool.ntp.org iburst
```

Set up Apache Web server

Open the file `/etc/apache2/sites-available/000-default.conf` and find the line

```
DocumentRoot /var/www
```

Change it to

```
DocumentRoot /media/actimetre/
```

In `/etc/apache2/apache2.conf`, find the line

```
<Directory /var/www/>
```

Replace it with

```
<Directory /media/actimetre/>
```

Restart Apache:

```
sudo systemctl restart apache2
```

Create an account for actiserver

You can use an existing account, or create an account specifically for running Actiserver.

```
sudo adduser actiserver
```

Make sure the `REPO_ROOT` directory belongs to actiserver

```
sudo chown actiserver /media/actimetre
```

Install Actiserver software

In a new directory:

```
git clone https://github.com/jay1han/V2-Actiserver-executables.git
```

This creates a directory named `V2-Actiserver-executables`.

If you use a different account for running Actiserver, make sure that the `User` directive in `actiserver.service` properly names that account:

```
[...]  
[Service]  
Type=simple  
User=actiserver  
ExecStart=/usr/bin/java -jar /etc/actimetre/Actiserver-2.0.jar  
[...]
```

Make the installation by running:

```
cd V2-Actiserver-executables  
sudo ./install.sh
```

Configure

Edit the file `/etc/actimetre/actiserver.conf` as needed:

```
VERBOSITY      = 10           Log verbosity
REPO_ROOT      = /media/actimetre the mount point of the file server
MAX_REPO_SIZE  = 1_000_000_000 maximum size of a data file before a new one is
created
MAX_REPO_TIME  = 24           maximum age (in hours) of a data file
INCLUDE_GZ     = false        (version >= 340) include Gz data in CSV
OUTPUT_RAW     = true         (version >= 340) output raw data in CSV
OUTPUT_VECTORS = false        (version >= 340) output vector sizes in CSV
CLEANUP_EXEC   =              (version >= 350) command to execute when disk space
gets low
SYNC_EXEC      =              (version >= 350) command to sync data file to server
SECRET_KEY     = SecretKeyOnlyAlphanumsAllowed
```

The `SECRET_KEY` is an alphanumeric string that is shared with Acticentral. Please see Acticentral's installation documentation on how to configure it on Acticentral.

`SYNC_EXEC` is a plain string that is invoked as if typed in a console. If present, the substring `$` will be replaced by the full path to the data file to sync. For example, the configuration string `"/usr/bin/mv $ /dev/null"` will result in the invocation of `"/usr/bin/mv /media/actimetre/Project01/Actim0011-1A_2020-01-01_000000.csv /dev/null"`. The file should be erased at the end of execution of this command before returning.

Note: please do not add any lines or comments. The parser is very simple and will be confused.

Run the Actiserver

The following command will install the program in the system and make it run automatically:

```
sudo ./run.sh
```

Actiserver is now running

To stop it, run the following command. But it will restart when the computer is rebooted.

```
sudo systemctl stop actiserver
```

To disable it, so it doesn't start automatically after a reboot:

```
sudo systemctl disable actiserver
```

Actimetre Dashboard

The Actimetre Dashboard is available at <https://actimetre.u-paris-sciences.fr/>. You need a login and a password to gain access; please contact boris.lamotte-incamps@u-paris.fr.

The graph chart shows the status of the Actimetre over the past 7 days (if available), in the form of its sampling frequency, from 100 to 4000Hz, over time. The date/time above shows the starting point of the graph. When the Actimetre is turned off, the graph drops at "0" and is shown in red color. The green bar shows the length of the latest uninterrupted operation of the Actimetre. The "scissors" button lets you cut the graph down to the latest green bar, i.e. forget previous runs.

"Signal" shows the WiFi signal strength as seen from the Actimetre. "Rating" is the percentage of missed sampling cycles during the latest up period. This is an indicator of the connectivity between the Actimetre and the Actiserver it's connected to.

You can click on the Project title to enter the project management screen. From there, you can reassign an Actimetre to a different project, and in general view the Project status.

In the Actiservers list, if that server uses local storage (see settings for Actiserver), you can click on the Data size information to retrieve the full list of files, and directly download them from the Actiserver. This will only work if the Actiserver has a valid, reachable IP address assigned to it.

Note that there is **NO ACCESS CONTROL**, so anyone can change any information. Please be careful.

Also note, **all date/times are in UTC**. This is to avoid dealing with DST.

Please keep in mind that Acticentral does NOT manage the repository. It is the user's responsibility to copy, process, and clean the repository of data. The files are all clearly labelled with "ActimXXXX", but please be careful when managing the repository, to avoid erasing or misplacing important data.

Since version 350, CSV files are stored in REPO_ROOT/Project##/Actim... Also, a new configuration option, SYNC_EXEC, designates a program or script that should take a file and move it to an appropriate storage server. The file must be erased once it is safely copied out. In case of straggling files (e.g. if Actimetre stops working inadvertently, and we still want to copy the remaining data), a "Sync" button is available on the Dashboard's Project page to force a sync. That button disappears once the sync is complete.

Actimetre and Project assignment protocol

Bringing up a new Actimetre:

- After the Actimetre has been flashed, connect at least one sensor and power it up near a running Actiserver
- It connects and gets assigned a unique Actim number and shows up on the Dashboard
- Initially, it goes in the pool of "Not assigned" Actimetres. It doesn't store any data, and its LED blinks rapidly.
- On the Dashboard, go into the "to assign" page, then click the "Move" button next to the Actimetre
- You can select an existing project, or create a new one

Moving an Actimetre to another project

- From the Dashboard, click the "Stop" button
- Make sure all data files have been processed and saved; "No data" shows on the Dashboard
- When there is no more outstanding data file for that Actimetre in its current Actiserver, the Dashboard shows the "Move" and "Remove" buttons

It is good practice to move an unused Actimetre to the "Not assigned" pool as soon as possible.

Actimetre

The display on the Actimetre is organized as below

v200>0004 123	Software version > Actimetre ID – Server ID
1AB2AB S2x@100	Sensors – Board type @ Frequency(Hz)
5h45 3.4	Time since boot – Average performance (lower is better)
M0 E0 Q0%	Missed cycles – I2C read errors – Queue occupation%

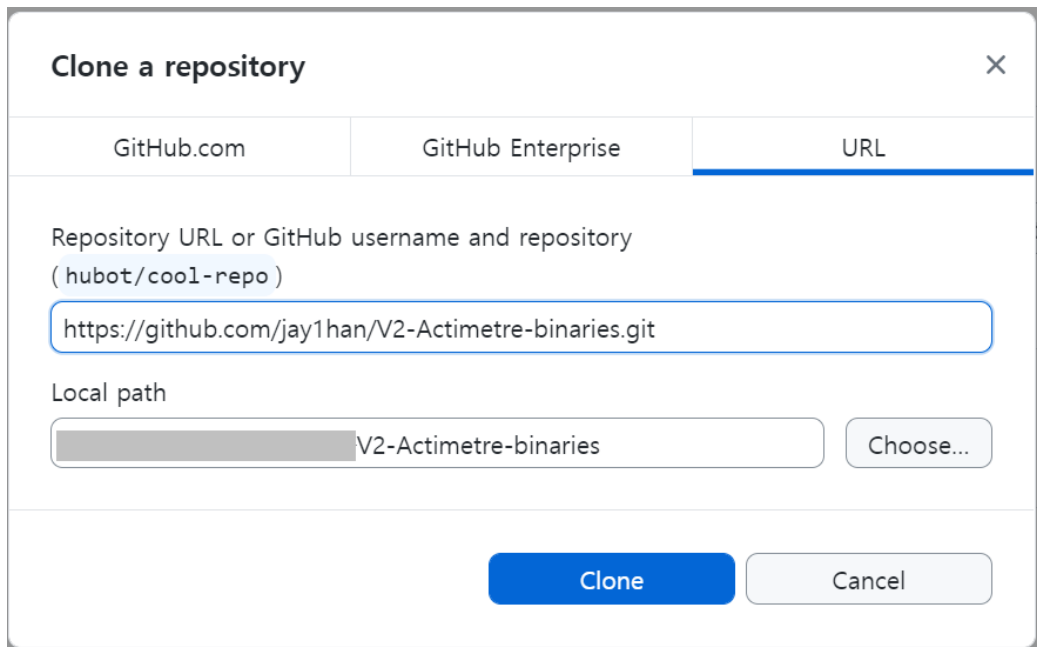
To use the latest version of the Actimetre firmware

Install Github desktop from <https://desktop.github.com/>

File > Clone Repository > URL tab

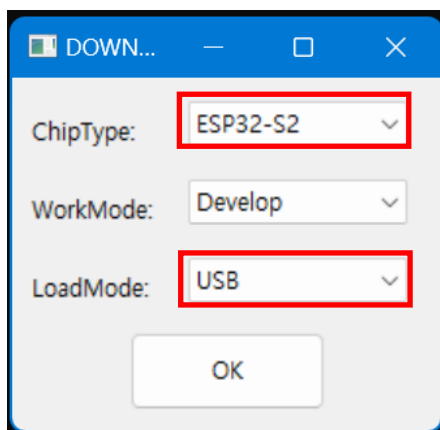
In the URL enter: <https://github.com/jay1han/V2-Actimetre-binaries.git>

Choose a convenient folder to put it. Please remember where, we'll need it later.

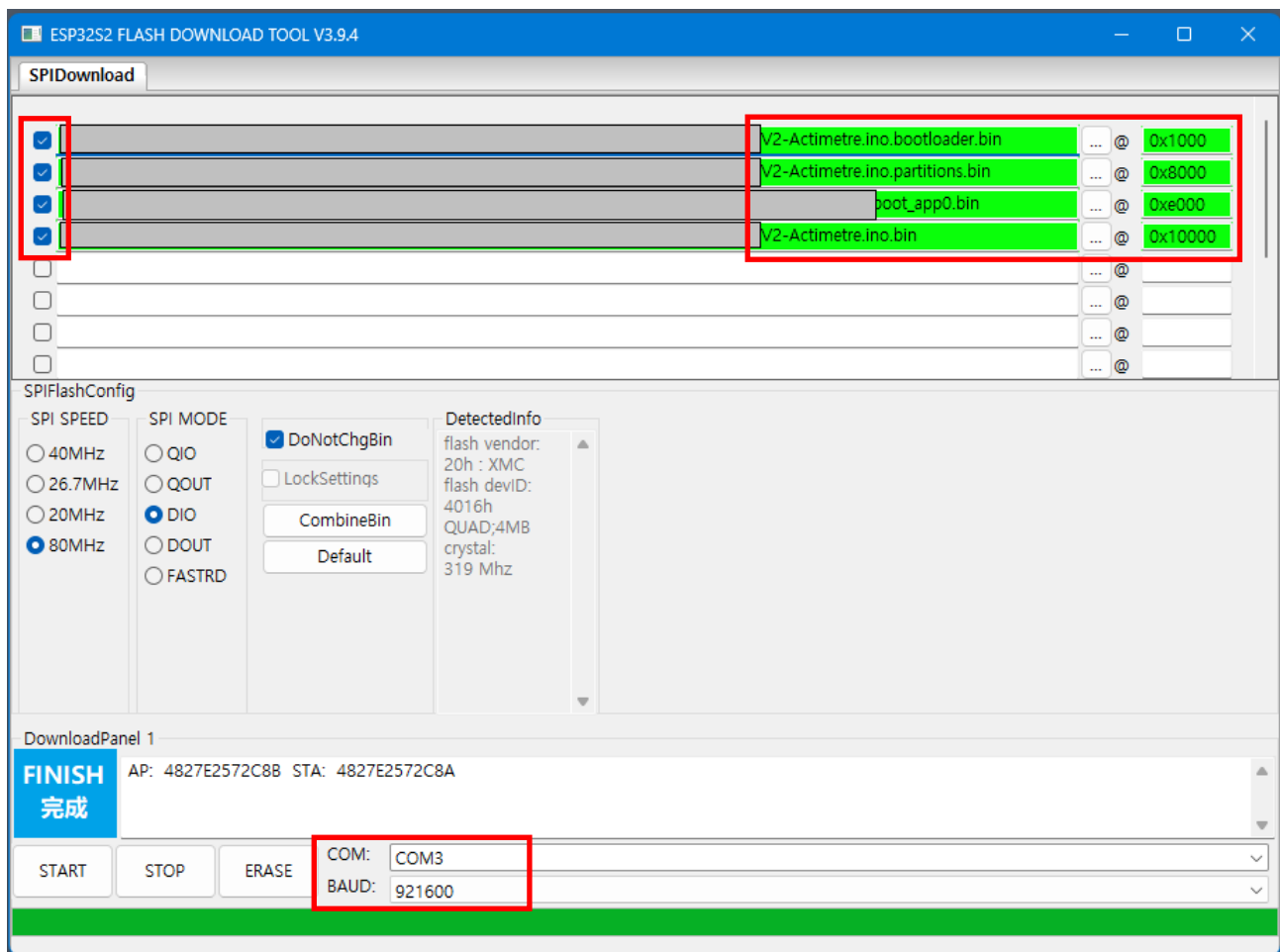


The download tool is included in the Run the Flash Download Tool. Select ESP32-S2 as the chip type and USB as the mode.

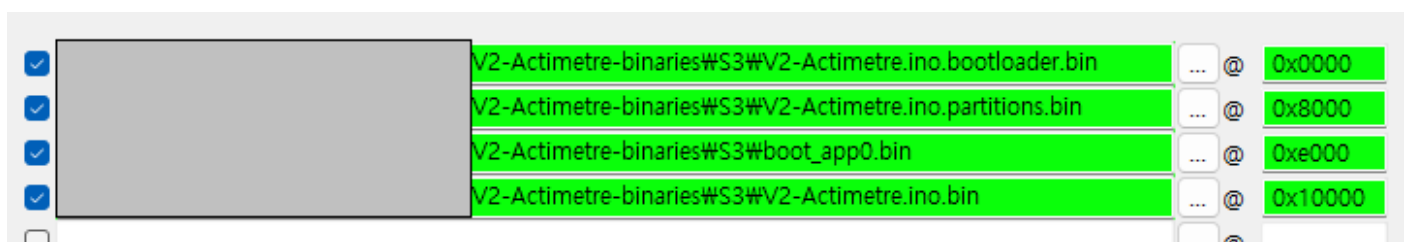
For the ESP32-S3 board, select ESP32-S3 in "ChipType".



Enter the fields as shown, replacing the file path with the correct directory you've cloned the Git into. Enter the right addresses on the right-hand side and check the checkboxes on the left-hand side. Make sure the COM number corresponds to the S2 mini board, and check the BAUD rate is set at 921600.



For the S3, the addresses are slightly different (bootloader goes at 0x0000).



Place the board in download mode: while the board is powered, press Reset and keep it pressed, then press Boot (marked "0"), then release Reset and release Boot. Click Start and wait.

When the display turns blue "FINISH", it's done.