HAMlab

Release 1.0

User Manual

Sep 18, 2017

Contents

CHAPTER 1

WARNING! IMPORTANT NOTICE - Read before operating this unit

Warning: This radio has been configured to operate in your country according to your nation's regulations when required. It may operate on frequencies which are not allowed for public use. You are required to have a valid amateur radio license of an appropriate class from your government to have the privileges to operate on amateur radio frequencies. Except those actions which have been described in this HAMlab documentation, no other manipulations to the radio are allowed. The unit must only be opened and/or serviced by a qualified technician. These documents contain important information for safe operation, please study it!

Radio frequency energy (RF) from transmitters can interact with some electronic devices, such as cardiac pacemakers and defibrillators. Please refer to the implanted pacemaker or defibrillator manufacturer's instructions with respect to precautions to be taken in the vicinity of an amateur radio transmitter. If any interaction or interference with a pacemaker or implanted defibrillator is suspected, STOP transmitting immediately!

Warning: This product shall only be powered by an external power supply providing 13.8 VDC power supply that can provide at least 4A of constant power. The power supply used with Red Pitaya HAMlab must comply with relevant regulations and standards applicable in the country of use.

Danger: NEVER CONNECT THE +13.8V POWER CONNECTOR DIRECTLY TO AN AC OUTLET. This may cause a fire, injury or electrical shock.

Danger: This product is intended for use with low voltage energy sources and signals. NEVER MEASURE OR CONNECT TO VOLTAGE SOURCES THAT ARE ABOVE 30V!

Caution: Avoid operation this unit in direct sunlight or other areas of extrem heat, excessive vibrations or mechanical force. This product should be operated at normal conditions with ambient temperatures not exceeding 40oC (86oF) and should not be covered.

Caution: When using earphones, use caution when adjusting the volume prevent any harm to your hearing.

Caution: The connection of unapproved external devices to the unit may damage the unit and/or affect compliance with manufacturer's instructions or applicable standards and shall invalidate the warranty. Please follow the instuctions in user manual in order to undrestand how to properly and safely connect external devices and what are voltage/current limitations of HAMlab inputs/outputs.

Caution: This product should be placed on a stable, flat, nonconductive surface and should not be contacted by conductive items.

Danger: This product is not a toy. Keep the product and all of its parts out of reach of children.

Caution: This product should not be overclocked and should not be or modified in the hardware components as this may result in excess heating of certain components or may damage the product.

Caution: If any defects, abnormal result, or other observations occur not covered in user manual, immediately disconnect device from it's power and contact manufacturer or local distibutor for operationa advice or repair of the unit.

INSTRUCTIONS FOR SAFE HANDLING

This product should only be handled (operated, maintained, cleaned, and otherwise dealt with) in accordance with good engineering practices and only by persons with the adequate knowledge and skills. To avoid malfunction or damage to your Red Pitaya product please observe the following:

Do not expose the product to any liquid, moisture, flammable materials or chemicals.

Do not expose the product to heat from any source. The Red Pitaya product is designed for reliable operation only at normal ambient room temperatures.

Handle the product with care to avoid mechanical or electrical damage to the printed circuit board and connectors.

Avoid handling the Red Pitaya HAMlab product while it is powered.

All peripherals used with the Red Pitaya HAMlab product should comply with relevant standards for the country of use and be marked accordingly to ensure that safety and performance requirements are met. Such peripherals include, but are not limited to, USB (Universal Serial Bus) wireless adapters, USB storage media and measurement probes used in conjunction with the Red Pitaya HAMlab product.

The Red Pitaya HAMlab product is not designed to be powered from a USB port on other connected equipment. If such connection is attempted, the product may malfunction and the USB port on the device may be damaged.

Factory design of this device only allows booting from an SD card. Only cards in accordance with the Red Pitaya HAMlab specifications may be used for the purpose.

Do not disassemble the product in any way!

CHAPTER 2

Quick start

HAMlab models that are covered by this user manual:

HAMlab model	release date	what has changed to previous model
HAMlab 80-10 10W	Dec. 2016	
HAMlab 160-6 10W	Apr. 2017	• all amateur transmit bands are now supported, • USB audio card was replaced with audio codec, • other improvements

Note: If you have proposal what to improve in next generation please contact us: hamlab@redpitaya.com

What is in the box

The following accessories and materials are included with your HAMlab kit. Carefully remove the HAMlab device and accessories from its shipping package and identify the items listed below.

- HAMlab
- DC power cord with Anderson Power Pole™ connector
- Ethernet cable
- USB 2.0 Cable - A-Male to Mini-B (only for HAMlab 80-10 10W)
- Rx fliters bypass BNC cable

Other additional requirements

In addition to the supplied accessories, software and cables supplied with the HAMlab, you will need to provide the following:

- An **HF-Antenna** or dummy load with BNC or SO-239 connector
- powered **stereo speakers** (computer type) or stereo headphones
- **router** with enabled **DHCP** and connection to the internet
- good RF **ground**
- HAMlab compatible Microphone available in HAMlab shop .
- A stabilized DC 13.8 VDC, 4A **Power Supply**
- Oscilloscope and logic analyzer probes available in HAMlab shop .
- DJControl Instinct S Series available from Hercules or other midi controller.

SDR application requirements:

- Personal computer (PC) running Windows 7 or later. Either 32 or 64-bit operating systems are supported.

Instrumentation applications requirements:

- All instrumentation applications are WEB based and don't require the installation of any native software. Users can access them via a browser using their smartphone, tablet or a PC running any popular operating systems (macOS, Linux, Windows, Android or iOS).

Start using HAMlab measurement instruments

Connecting the cables

Back panel connections

HAMlab should be powered by DC 13.8 V Power Supply that can provide at least 4A of constant power. Make sure that is turned off and then use DC power cord with Anderson Power Pole™ connector to connect it with HAMlab. RED wire is positive (+) while BLACK wire is negative (-), double check to not mix the colours or polarity! Don't turn on the power supply yet.

Anderson Power Pole™ power connector **(1)** Ethernet connection **(2)** - connect the HAMlab to your local network using ethernet cable.

Note: Other connections are at the moment not important, you can read more about them later in the *Back panel controls and connections* section.

Front panel connections

Logic analyzer probes **(1)**, Oscilloscope probes **(2)**, Signal generator connections **(3)**

Turning it on and start using measuring instruments

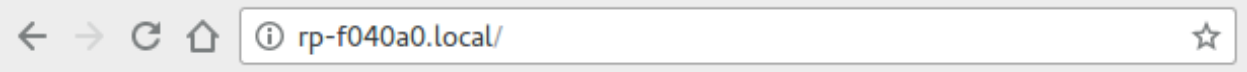
1.) Turn on power supply, and press momentary power button on the HAMlab to turn it ON. Blue led on power button will turn on and after 30s HAMlab will be ready to use.

2.) Make sure your computer is connected to same local area network as HAMlab.

3.) On your computer start a WEB browser (Chrome recommended).

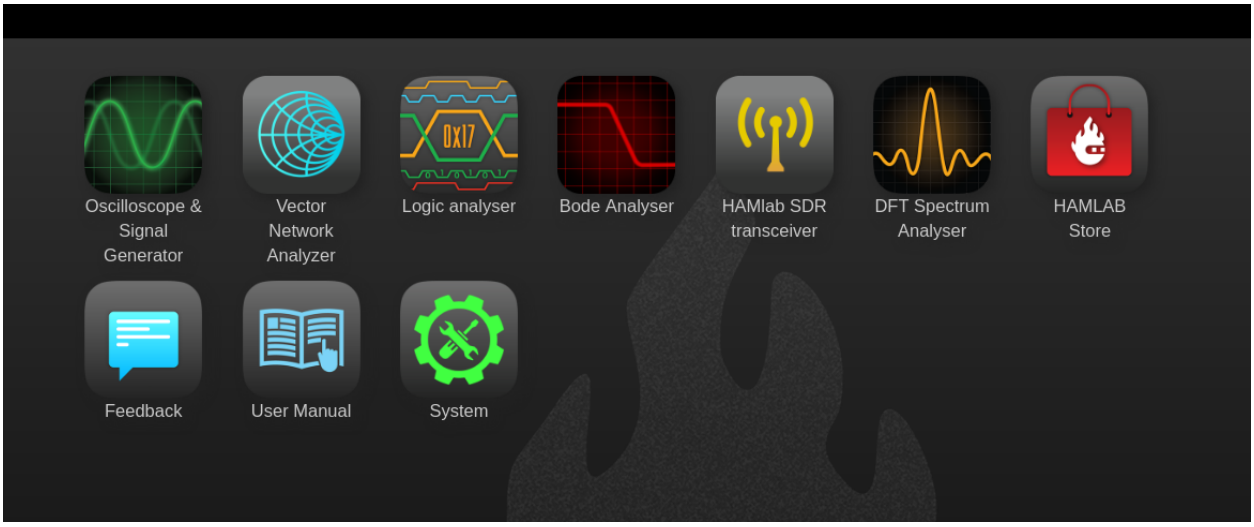
4.) Type in the HAMlab URL.

Example:



Note: URL can be found on the back panel of the HAMlab. See image below.

HAMlab application page should appear where measurement applications are listed.



Click on application to run it.

Note: More details about HAMlab instruments can be found in the Applications & features section.

Instruments applications documentation:

- *Oscilloscope with Signal Generator*
- *Logic Analizer*

- *Spectrum Analyzer*

Start using HAMlab as Radio Station - SDR

Connecting the cables

Back panel connections

Antenna - Connect an HF antenna with nominal 50 Ohm impedance to the SO-239 connector.

Note: If you prefer BNC connector you can remove HAMlab top cover and reconnect it from SO-239 to BNC.

Ground - Remove the thumb screw marked GND. Connect your central station ground to the thumb screw and screw it back into the radio.

Speakers - connect powered stereo speakers to the jack

Tip: You can instead of speakers connect headphones on the front panel.

USB cable **(3)** - connect the HAMlab with the PC using USB 2.0 Cable - A-Male to Mini-B. USB cable will provide a way for PowerSDR software to use HAMlabs audio outputs. USB cable for audio is only required for HAMlab 80-10 10W model.

Ethernet Connection **(4)** - connect the HAMlab to your local network using ethernet cable

HAMlab should be powered by DC 13.8V Power Supply that can provide at least 4 A of constant power. Make sure that is turned off and then use DC power cord with Anderson Power Pole™ connector **(1)** to connect it with HAMlab. RED wire is positive (+) while BLACK wire is negative (-), double check to not mix the colours or polarity! Don't turn on the power supply yet.

Mount Rx filters bypass BNC loopback cable from RX1 IN to RX1 OUT **(2)**.

Note: Other connections are at the moment not important, you can read more about them later in the *Back panel controls and connections* section.

Front panel connections

Microphone **(1)**

Note: More information about compatibility of microphone, key and headphones and front panel connections in general can be found in the *Front panel controls and connections* section.

Iambic Morse Code Paddle Keyer **(2)**

Note: Keyer is supported only with software 0.97-93 or later. Please check for software update.

Phones **(3)** (optional if speakers are not connected)

Turn it on & put HAMlab in SDR mode

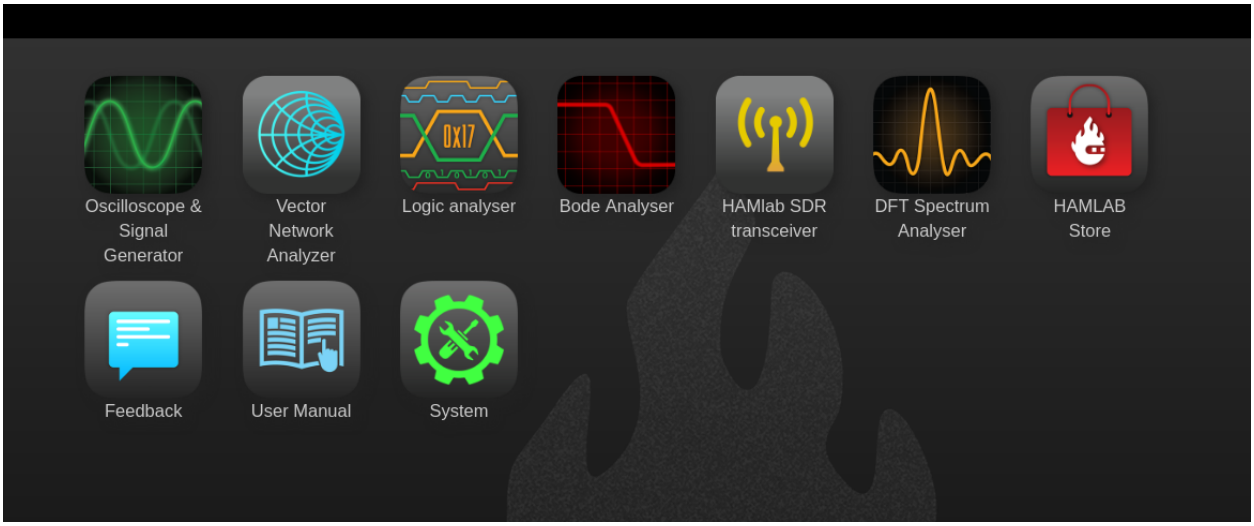
1.) Turn on power supply, HAMlab will start automatically. Next time you can momentary press on the power button to turn it on/off.

2.) Make sure your computer is connected to same local area network as HAMlab.

3.) On your computer start a WEB browser (Chrome recommended).

4.) Type in the HAMlab URL that can be found on the back panel of the HAMlab

HAMlab application page should appear



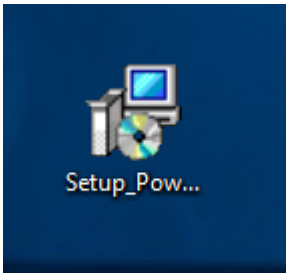
Congratulations, HAMlab is now ready for use, now let's install Power SDR.

Note: Exiting this SDR WEB application will close the connection to Power SDR.

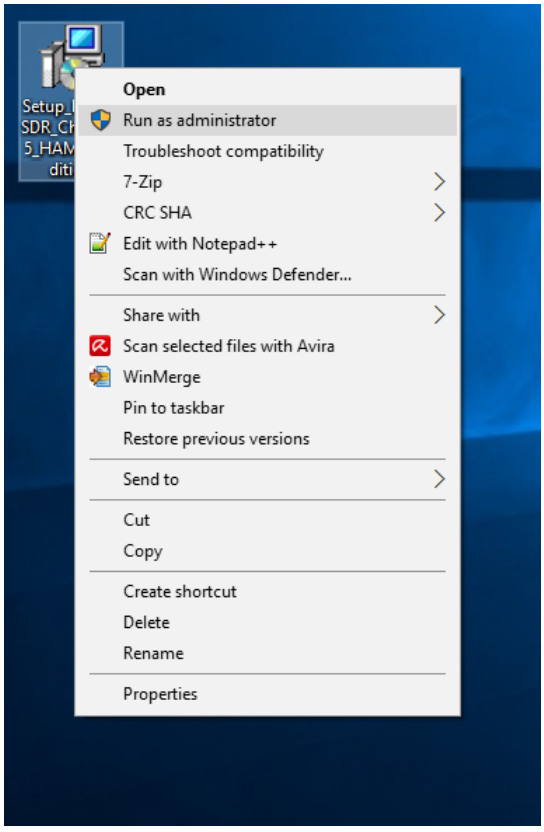
Power SDR installation and SDR configuration

Click here to download Power SDR installation package.

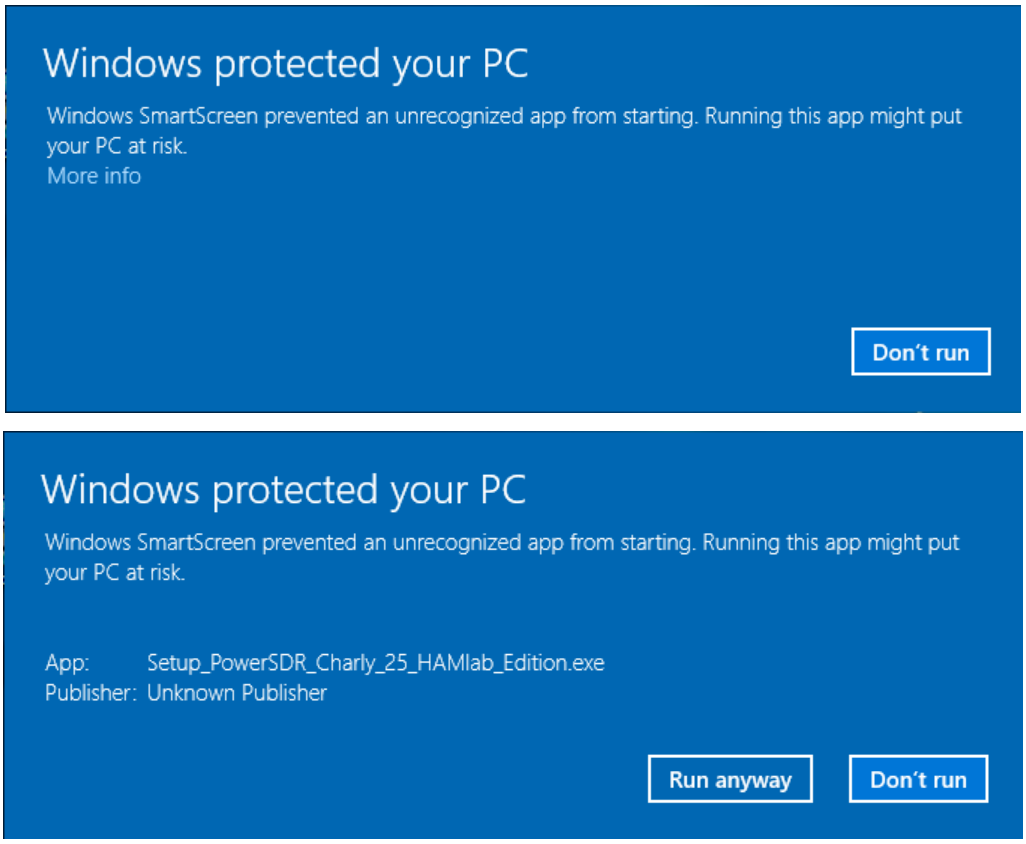
1. Start the installation by double clicking on the Setup_PowerSDR_STEMlab_HAMlab_Edition.exe file.



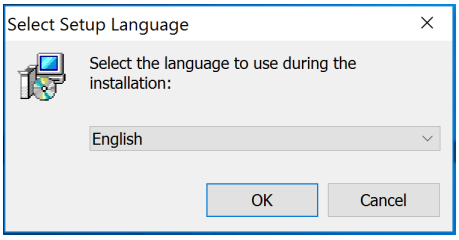
2. If you are asked for extended user access rights during the installation click Yes! Running installer with administration rights will work as well.

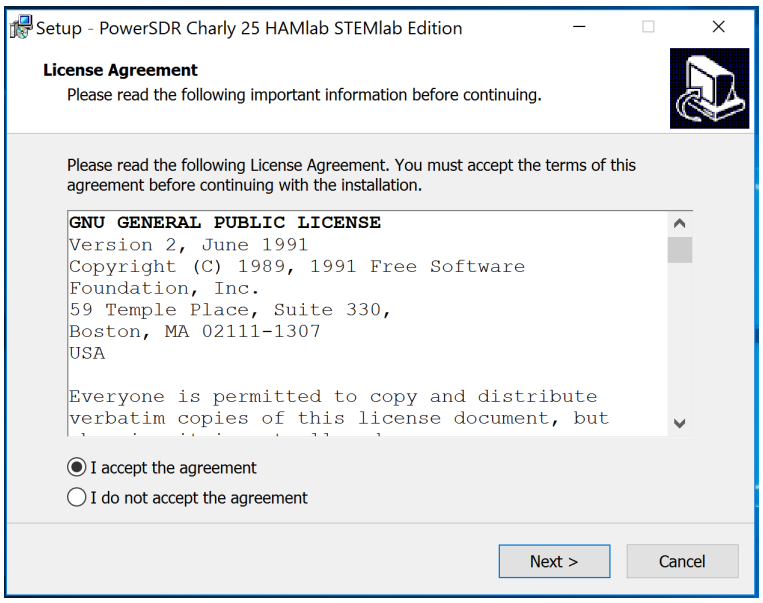


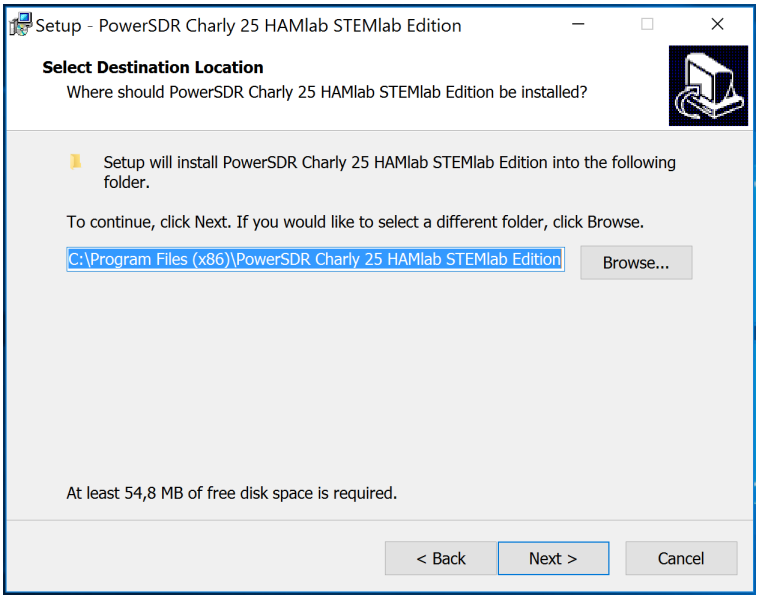
On Windows 10 you might get warning of Unknown Publisher you can procede with installation by clicking on "more info" and then "Run anyway".

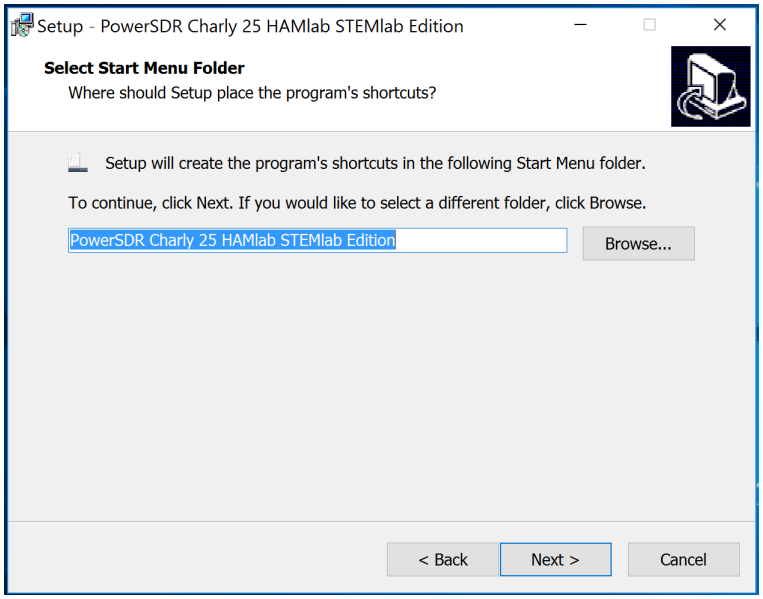


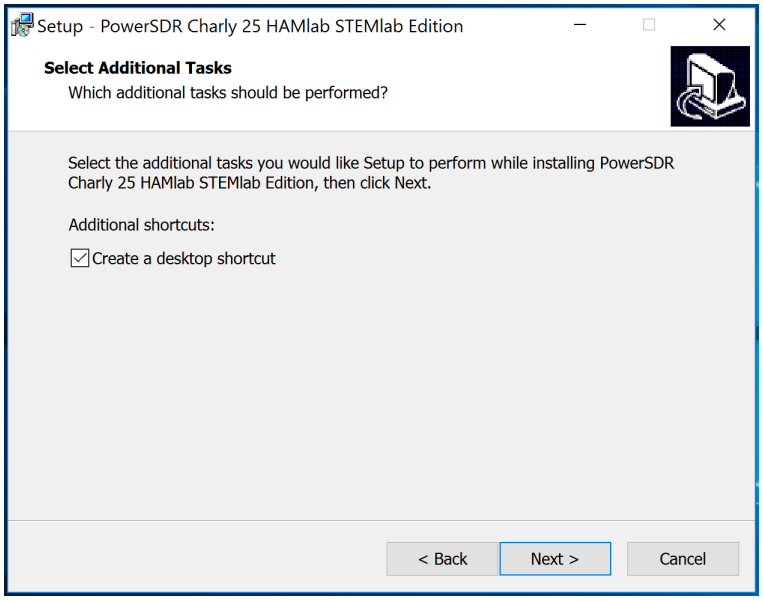
3. Follow the instructions of the setup routine and accept the license agreements if asked for.

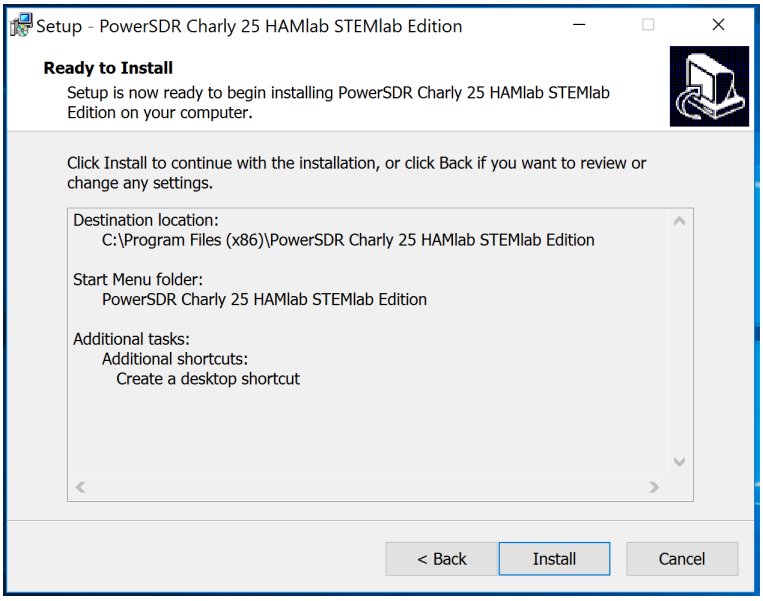



Setup - PowerSDR Charly 25 HAMlab STEMlab Edition
License Agreement
Please read the following important information before continuing.
Please read the following License Agreement. You must accept the terms of this agreement before continuing with the installation.
GNU GENERAL PUBLIC LICENSE
Version 2, June 1991
Copyright (C) 1989, 1991 Free Software
Foundation, Inc.
59 Temple Place, Suite 330,
Boston, MA 02111-1307
USA
Everyone is permitted to copy and distribute
verbatim copies of this license document, but
I accept the agreement
I do not accept the agreement
Next >
Cancel

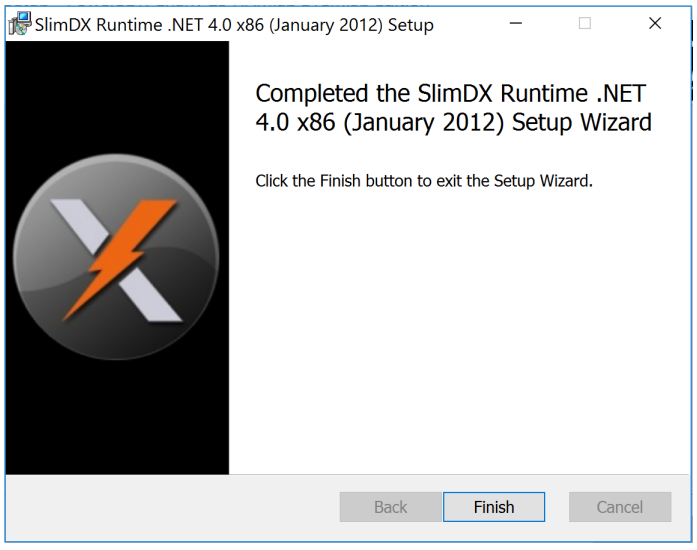

Setup - PowerSDR Charly 25 HAMlab STEMlab Edition
Select Destination Location
Where should PowerSDR Charly 25 HAMlab STEMlab Edition be installed?
Setup will install PowerSDR Charly 25 HAMlab STEMlab Edition into the following folder.
To continue, click Next. If you would like to select a different folder, click Browse.
C:\Program Files (x86)\PowerSDR Charly 25 HAMlab STEMlab Edition
Browse...
At least 54,8 MB of free disk space is required.
< Back
Next >
Cancel


Setup - PowerSDR Charly 25 HAMlab STEMlab Edition
Select Start Menu Folder
Where should Setup place the program's shortcuts?
Setup will create the program's shortcuts in the following Start Menu folder.
To continue, click Next. If you would like to select a different folder, click Browse.
PowerSDR Charly 25 HAMlab STEMlab Edition
Browse...
< Back
Next >
Cancel

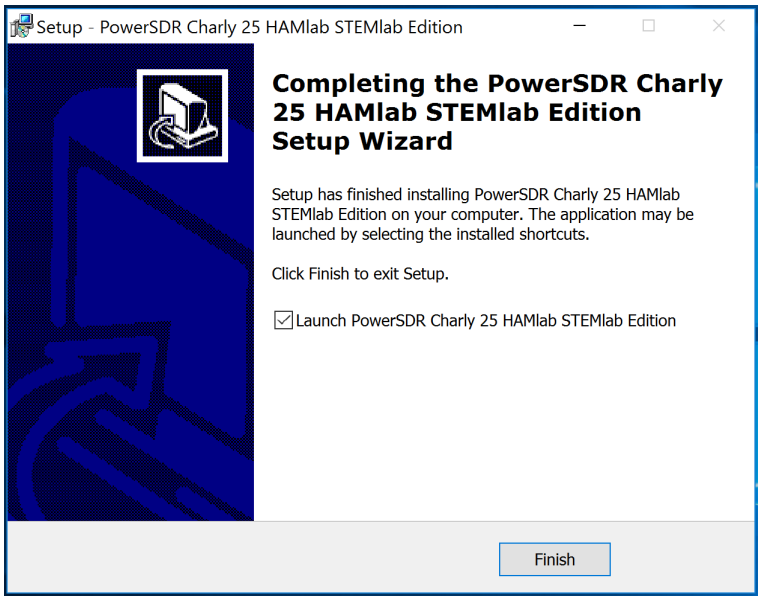

Setup - PowerSDR Charly 25 HAMlab STEMlab Edition
Select Additional Tasks
Which additional tasks should be performed?
Select the additional tasks you would like Setup to perform while installing PowerSDR Charly 25 HAMlab STEMlab Edition, then click Next.
Additional shortcuts:
Create a desktop shortcut
< Back
Next >
Cancel


Setup - PowerSDR Charly 25 HAMlab STEMlab Edition
Ready to Install
Setup is now ready to begin installing PowerSDR Charly 25 HAMlab STEMlab Edition on your computer.
Click Install to continue with the installation, or click Back if you want to review or change any settings.
Destination location:
C:\Program Files (x86)\PowerSDR Charly 25 HAMlab STEMlab Edition
Start Menu folder:
PowerSDR Charly 25 HAMlab STEMlab Edition
Additional tasks:
Additional shortcuts:
Create a desktop shortcut
< Back
Install
Cancel

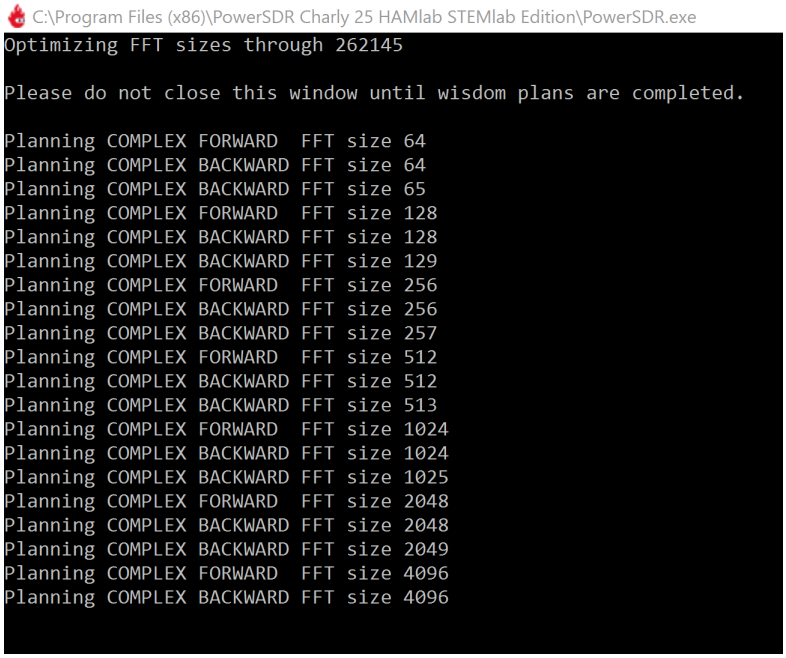

SlimDX Runtime .NET 4.0 x86 (January 2012) Setup
Please read the SlimDX Runtime .NET 4.0 x86 (January 2012) License Agreement
I accept the terms in the License Agreement
Print
Back
Install
Cancel


SlimDX Runtime .NET 4.0 x86 (January 2012) Setup
Completed the SlimDX Runtime .NET 4.0 x86 (January 2012) Setup Wizard
Click the Finish button to exit the Setup Wizard.
Back
Finish
Cancel

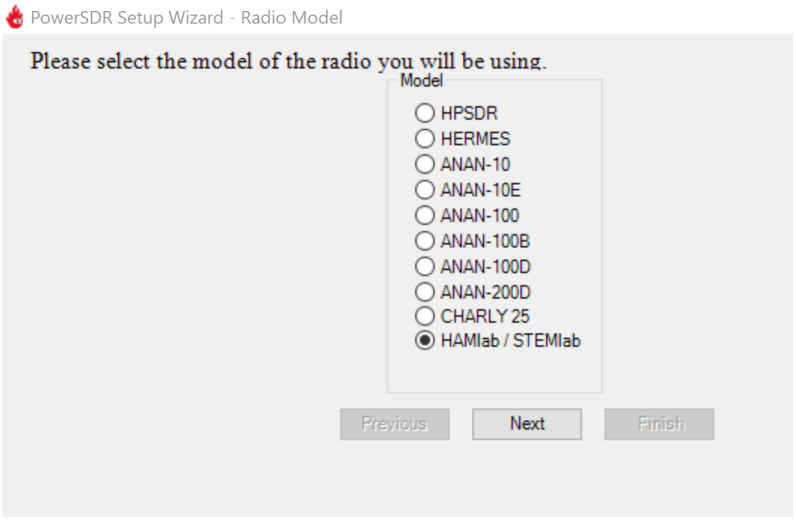
4. At the end of the installation you are asked if you want to run PowerSDR software immediately, feel free to do so.



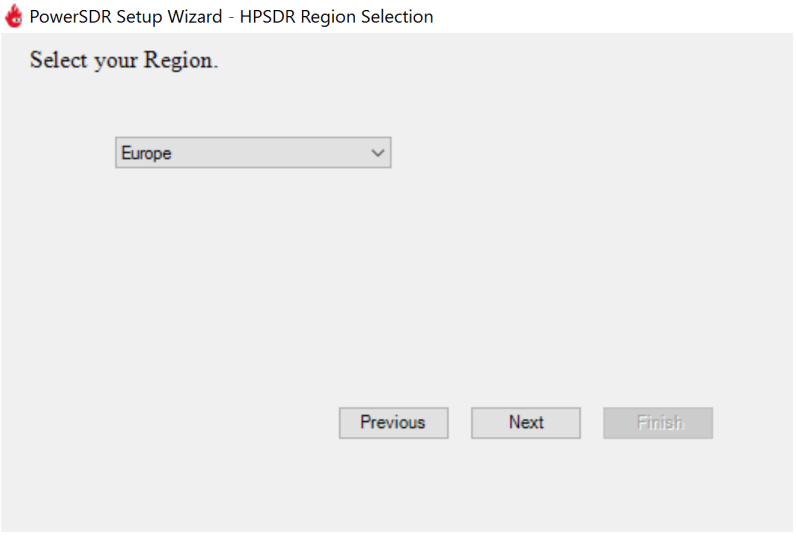
5. PowerSDR software will start with the calculation of the FFT wisdom file, **which will take a while** depending on the CPU power of your computer. This is only done once, even after updating the software to a new version in the future:



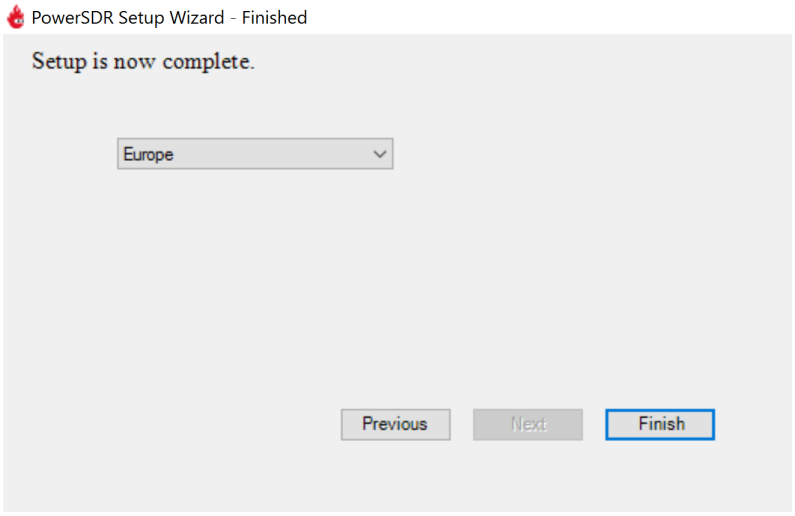
6. After starting the PowerSDR software you will be led through the PowerSDR software specific setup wizard which lets you configure the software to use it with your STEMlab. Pick the HAMlab/STEMlab radio model.



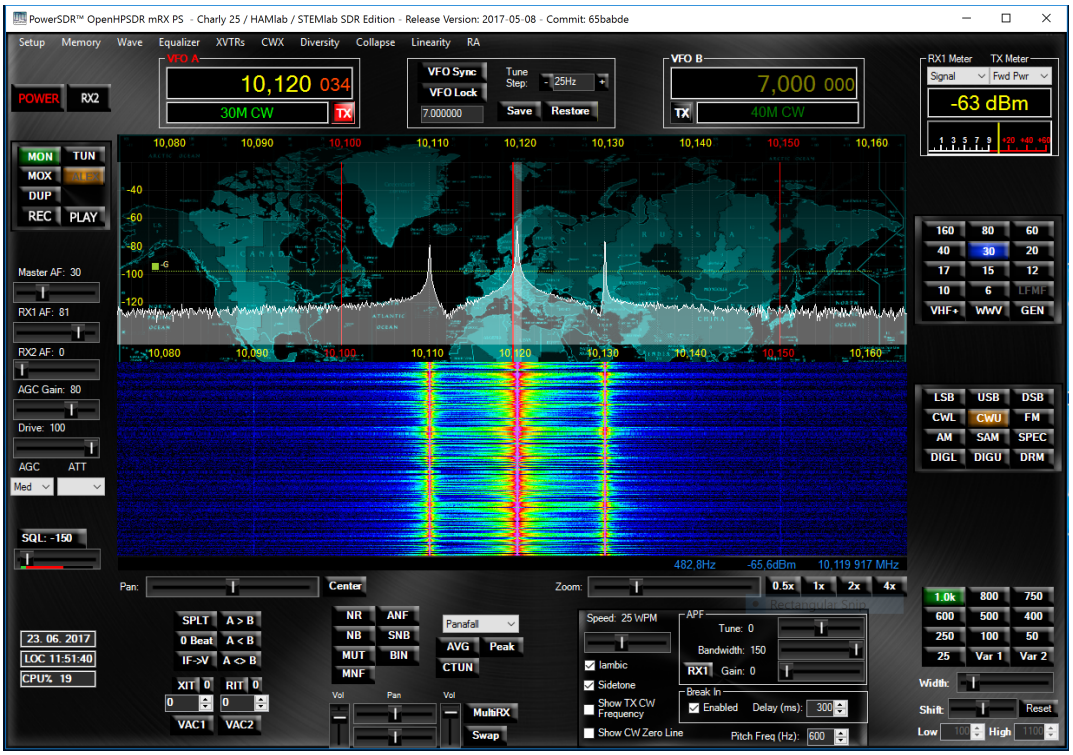
7. Select the region where you are using your STEMlab, this is important due to the different frequency ranges your are allowed to transmit in the different countries all over the world:



8. Your initial setup is completed click finish.



9. Click Power to connect Power SDR with STEMlab. On the screen the input singnal should appear.



Note: Power SDR software is described in *Power SDR* section.

Tip: Optionaly you can connect MIDI controller to your PC. MIDI controller can be used to control radio software parameters like frequency with physical knobs.

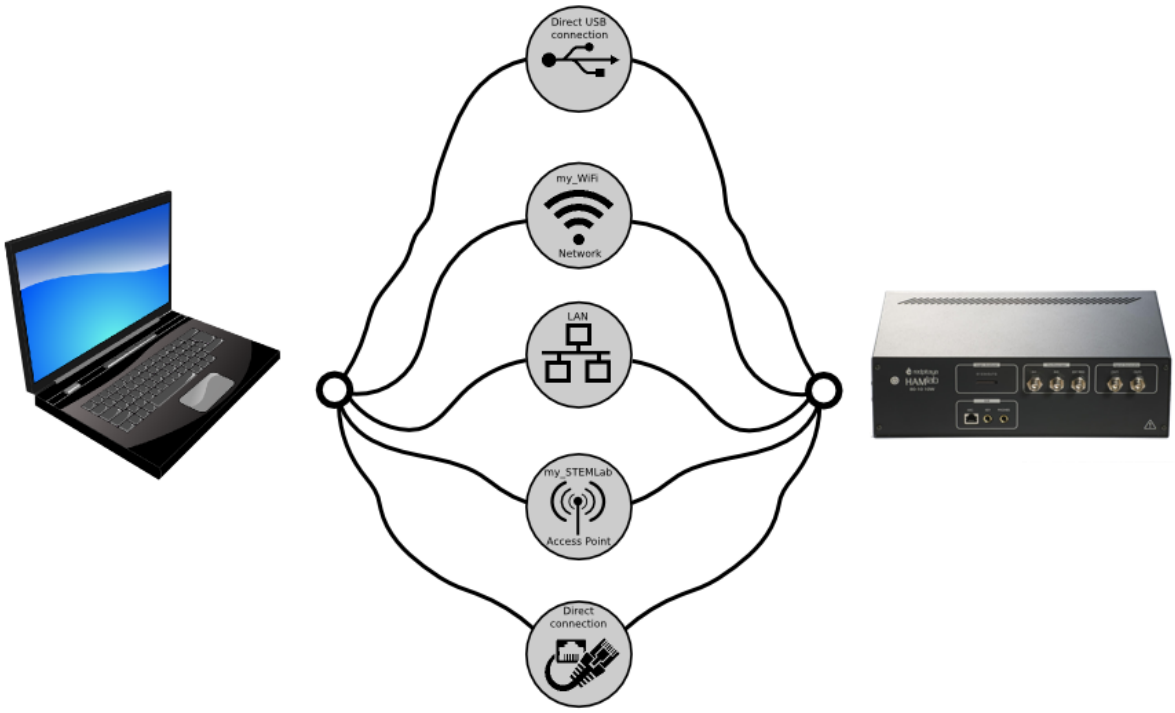
Alternative networking for HAMlab

Network connectivity user guide

HAMlab is network attached device focused on simple connectivity and quick accessibility.

HAMlab can be connected over:

1. Local Area Network (LAN) - Requires DHCP settings on your local network router
2. Direct Ethernet cable connection - Requires additional setting on users PC and HAMlab
3. Wireless Network - Requires an additional WiFi dongle available at store
4. Access Point Mode - HAMlab creates its own WiFi network



Wired

Local Area Network (LAN)

This is the most common and recommended way of connecting and using your HAMlab. Your LAN network needs to have DHCP settings enabled which is the case in majority of the local networks, whit this, simple "plug and play" approach is enabled. Having HAMlab connected the local network will enable quick access to all applications using only your web browser. Simply follow this 3 simple steps:

1. Connect power supply to the HAMlab
2. Connect HAMlab to the router or directly to the PC ethernet socket
3. Open your web browser and in the URL filed type: `rp-xxxxxx.local/`

Note: `xxxxxx` are the last 6 characters from MAC address of your HAMlab. MAC address is written on the back hamlab panel.

Fig. 2.1: Figure 1: Connecting your HAMlab to the LAN network.

After the **third step** you will get a HAMlab main page as shown below.

Direct Ethernet cable connection

It is possibe to establish direct connection between your pc and HAMlab. For Windows 10 just connect HAMlab to your computer and access it using `rp-xxxxxx.local/` method.

Note: **Windows 7/8** users should install Bonjour Print Services, otherwise access to `*.local` addresses will not work.

If there are some restrictions for the user to have HAMlab on the DHCP LAN network **permanently** there is a possibility to directly connect to your HAMlab. This type of connection requires additional settings on your PC and HAMlab.

Note: This connection is also arranged via Network manager application so users should first have access to the LAN (DHCP) network in order to arrange static IP on the HAMlab.

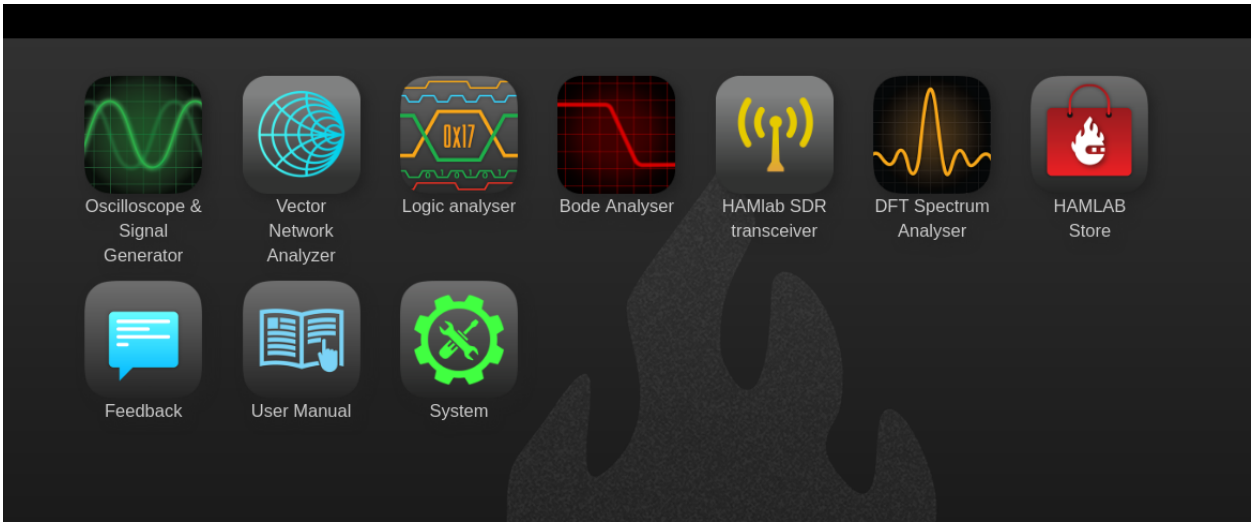
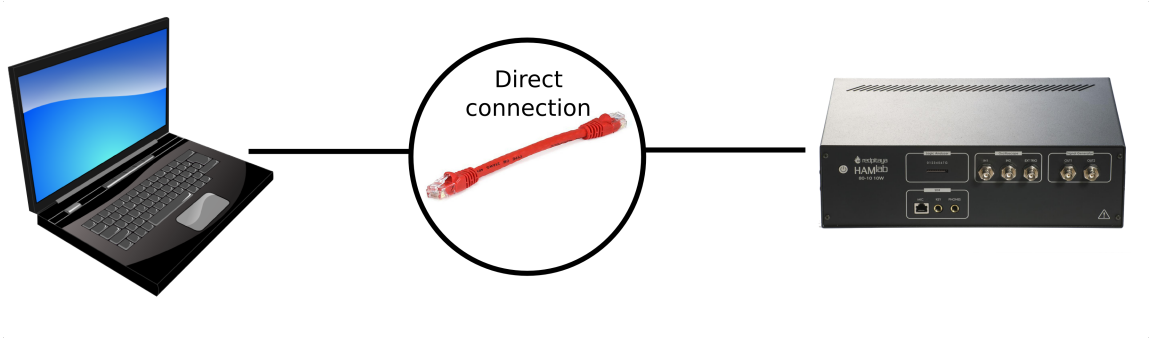


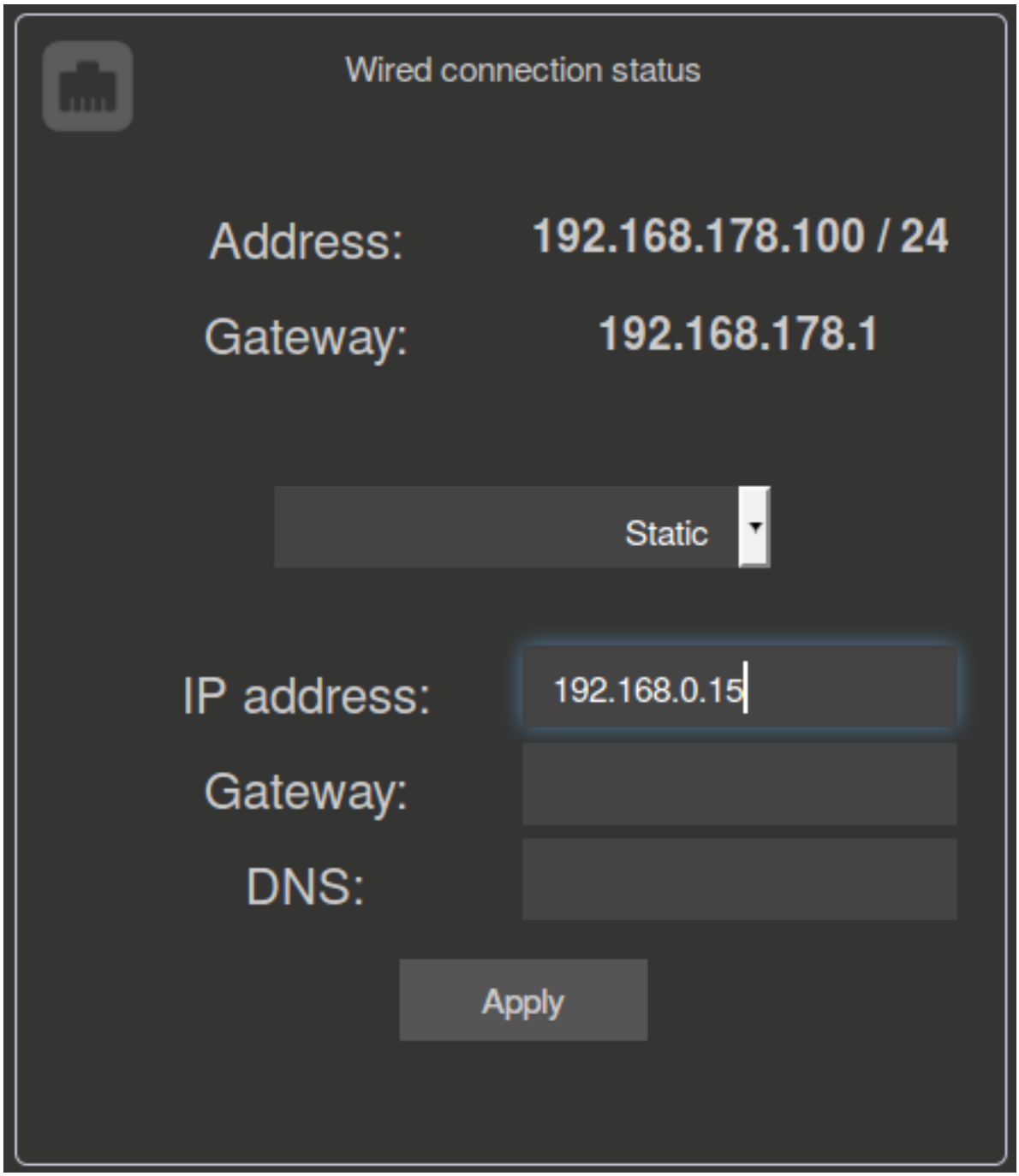
Fig. 2.2: Figure 2: HAMlab main page user interface.

How to set direct Ethernet connection is described bellow.

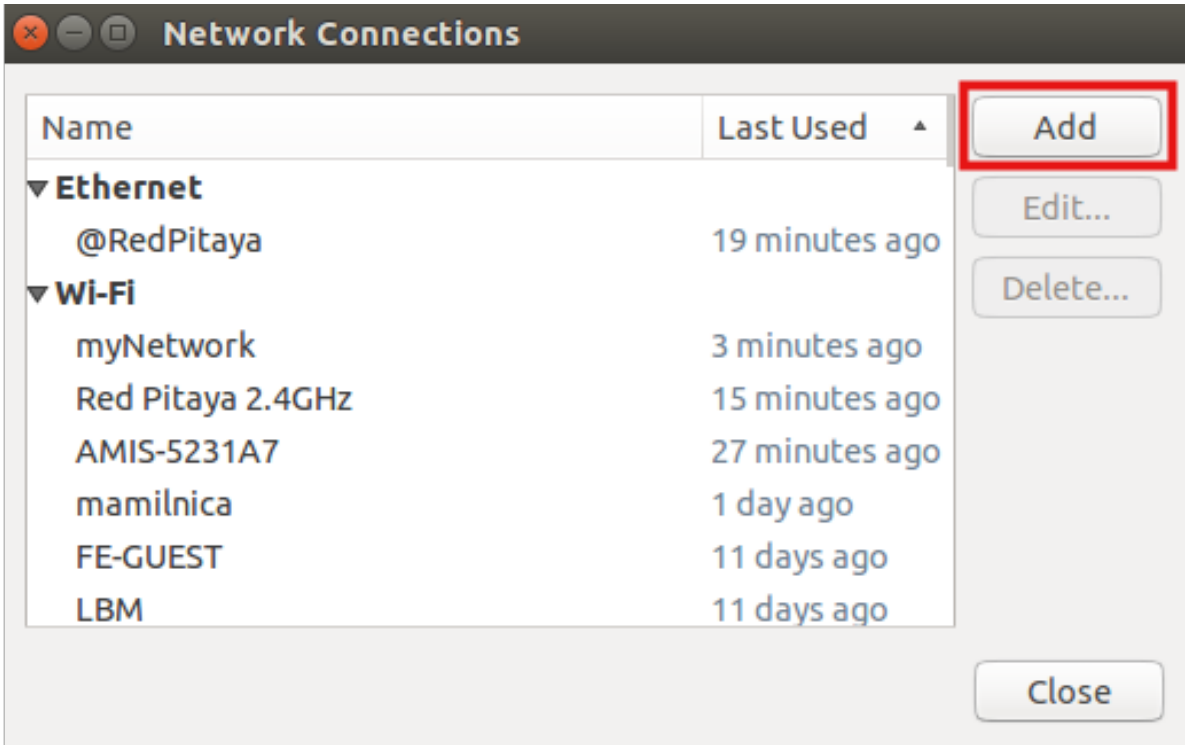


First step in connecting HAMlab directly to LAN network and setting a static IP on it.

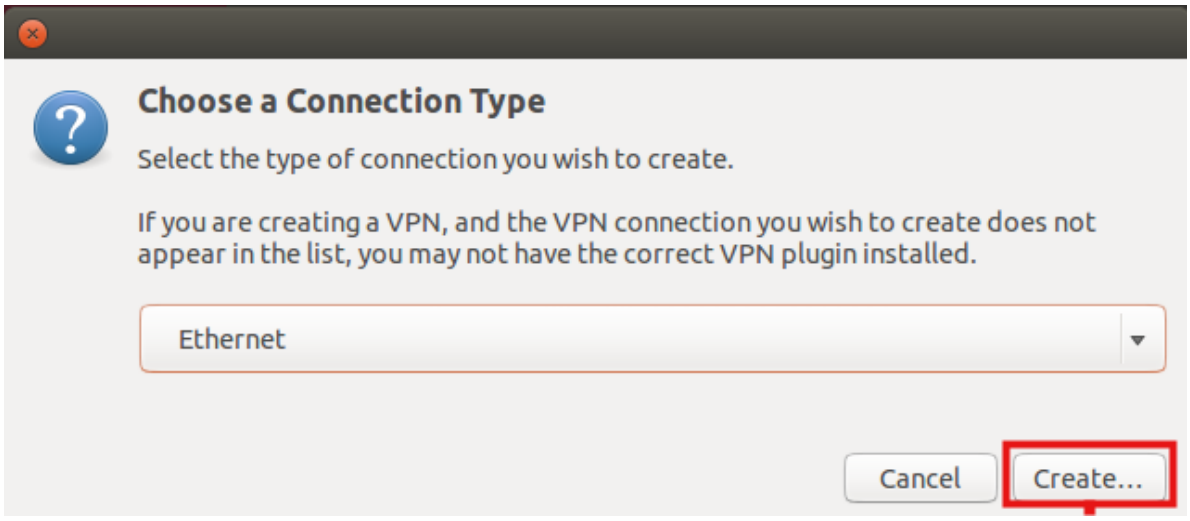
1. Use recommended connection described in **Local Area Network (LAN)** section. Once you are successfully connected to your HAMlab, open Network Manager and chose "Static" option. Input the static IP, default getaway and DNS. Click "Apply". **Fields Gateway and DNS can be left empty.**



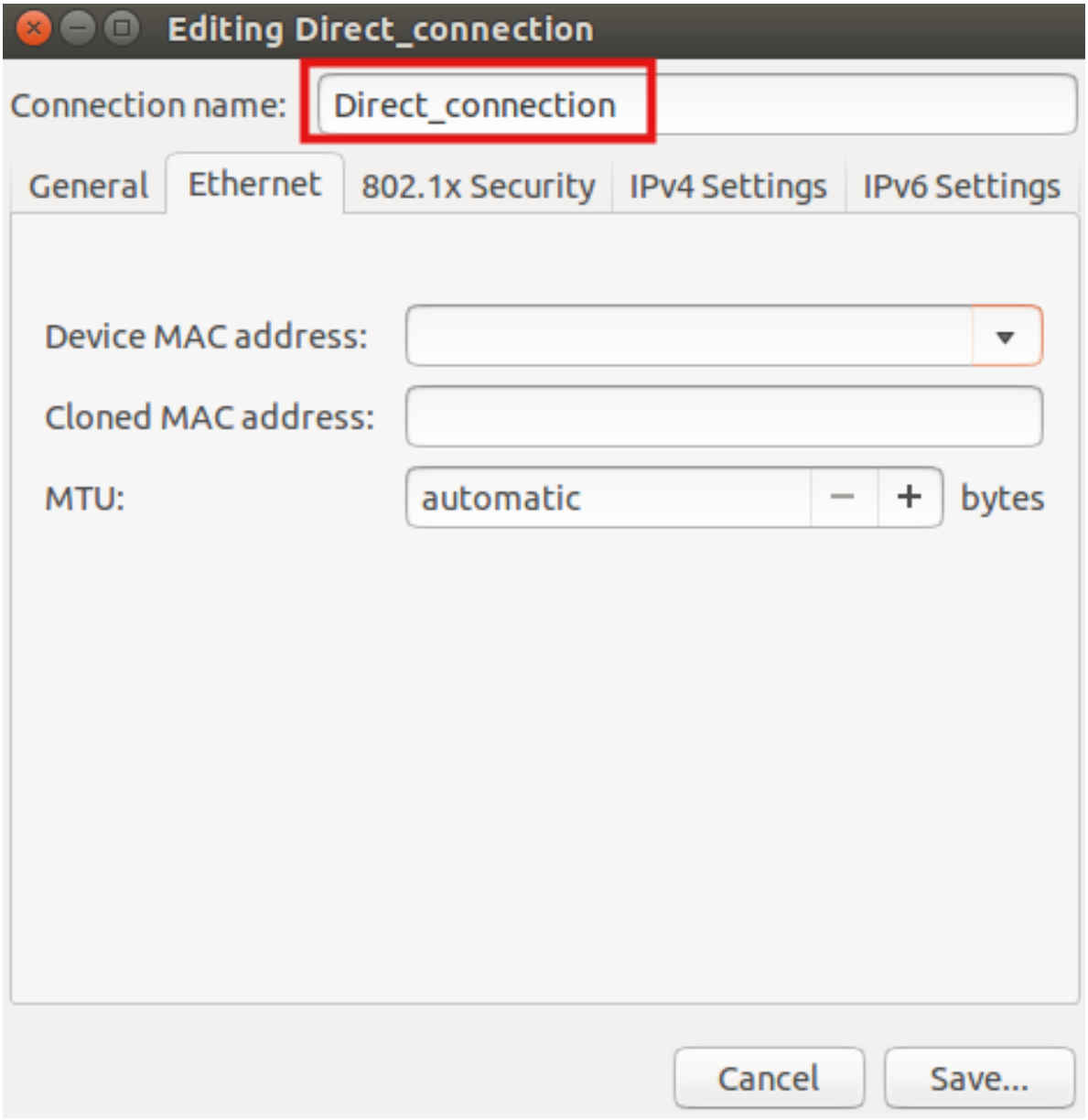
2. Second step is to set a network setting on the PC Here we give an example on the Ubuntu 14.04 but it is very similar on the other OS also. To set a direct connection with your PC follow next steps:
   (a) Open network manager on your PC
   (b) Add new Ethernet connection (**There is no need to create new network since you can set static IP settings on the existing network and skip all steps up to step 5.)**



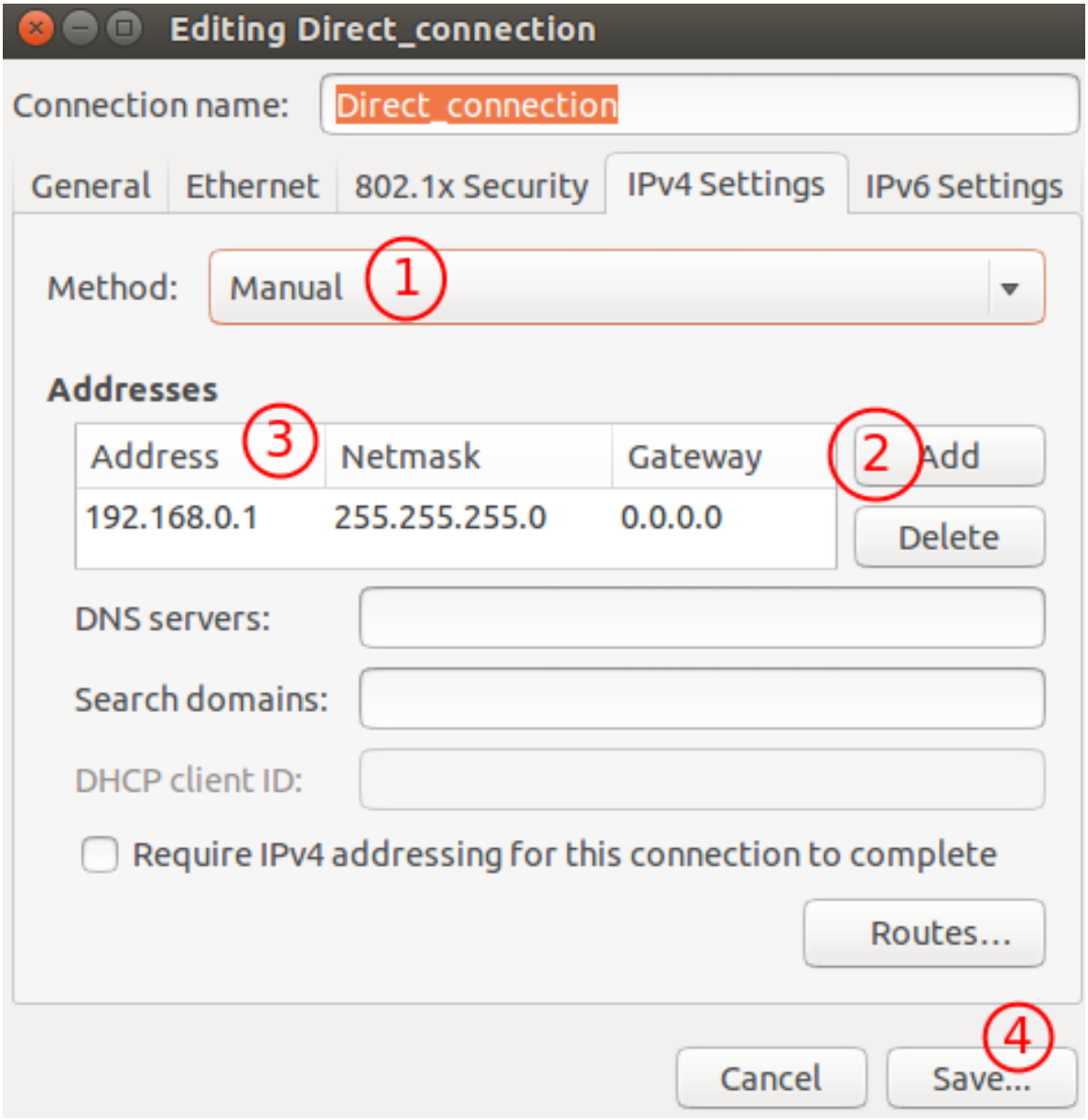
3. Select “Ethernet” connection and press “Create” button



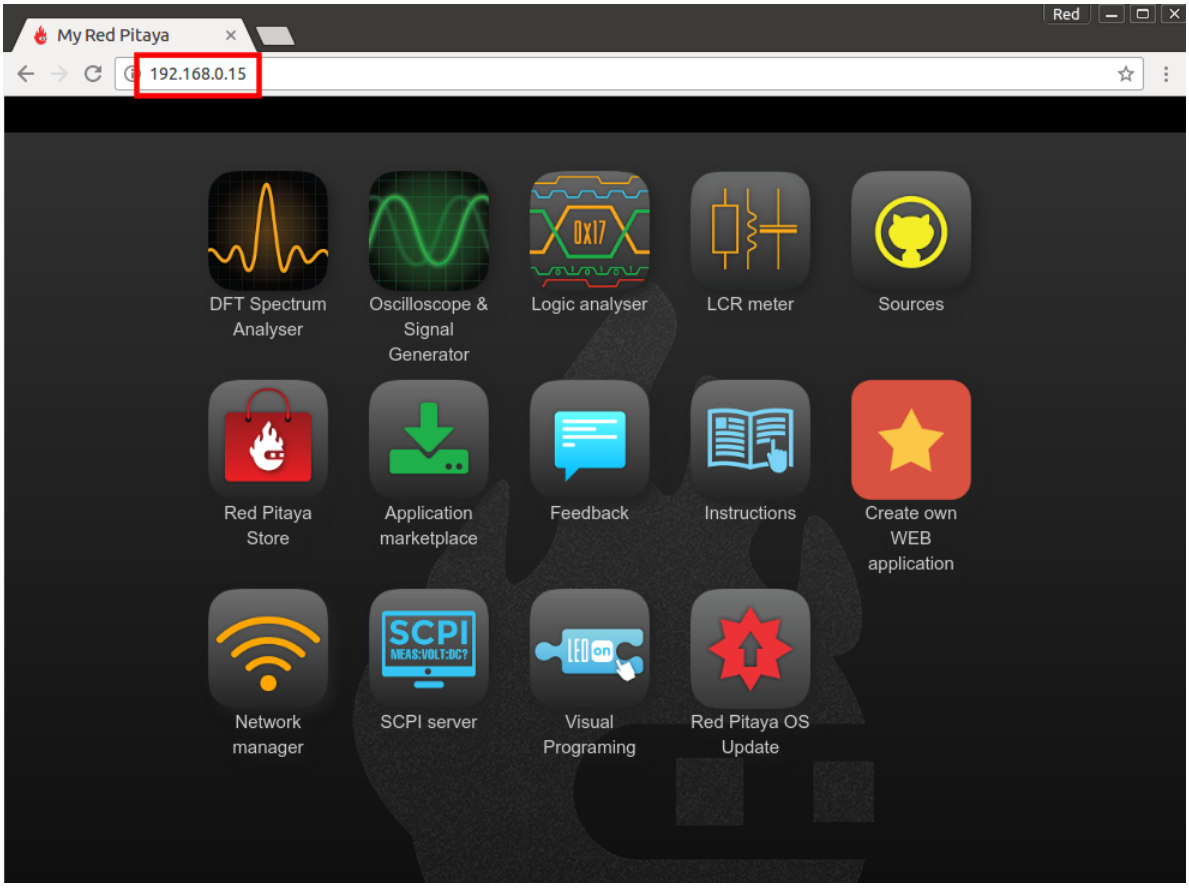
4. Select the name of the new Ethernet connections



5. Select “Method – Manual”, Press “Add” button and insert:
    - static IP address of your PC (must be different from the IP address of the HAMlab),
    - Netmask (input: 255.255.255.0)
    - Getaway (can be left empty)
    - DNS servers (can be left empty) and click “Save” button.



Note: Once you have this settings arranged, connect Ethernet cable between your HAMlab and PC, open web browser, in the web browser URL field input chosen HAMlab static IP (in our example it is 192.168.0.15) and press enter.

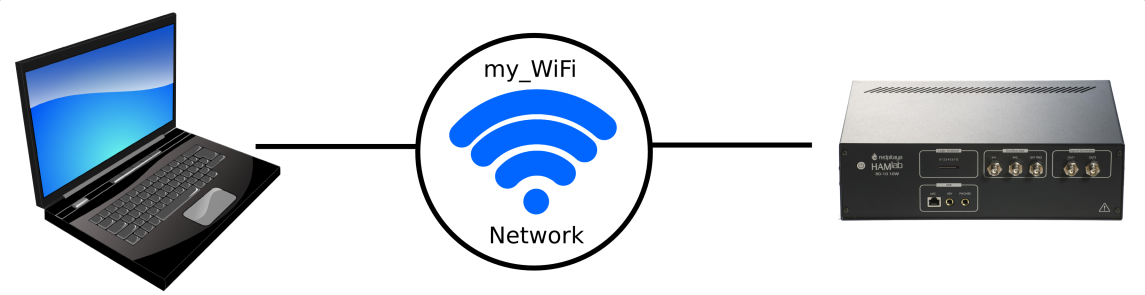


Wireless

Wireless Network Connection

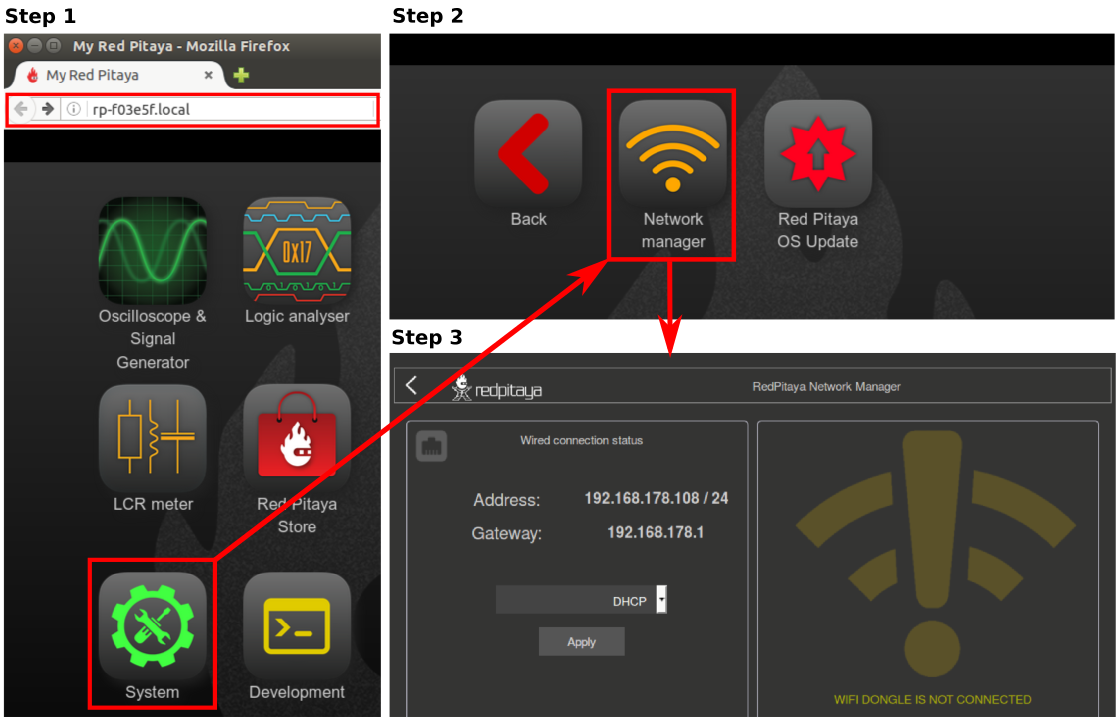
This type of the connection will enable wireless connection to the HAMlab via your local WiFi network. In order to connect your HAMlab to the same WiFi network on which you have connected your PC/Laptop first you need to use LAN connection. Access your HAMlab via web browser and start Network Manager application. Trough this application all network settings of the HAMlab are manageable. Simply select the desired WiFi network, input password and select connect. Once you have arranged WiFi network you don't need LAN connection anymore and after the restart of the HAMlab it will connect to the preset WiFi network automatically.

Note: Connecting the HAMlab via WiFi network the additional WiFi dongle is needed. WiFi dongle is available here [Link to RS or similar].



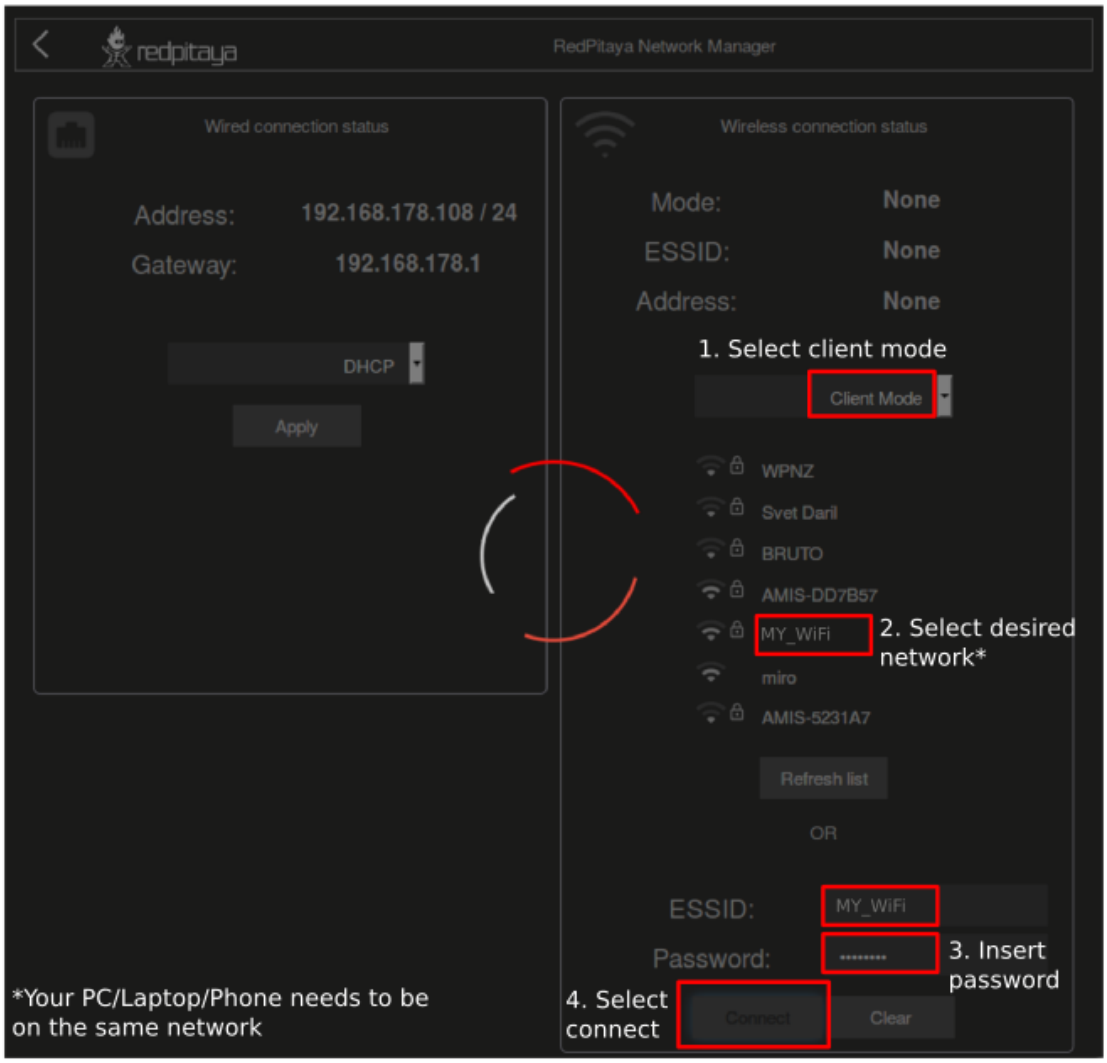
Steps on how to connect your HAMlab over WiFi network are described bellow:

1. Start your HAMlab web user interface (Use connection described **Local Area Network (LAN) connection**)
2. Open Network Manager application
3. Insert WiFi dongle in the USB plug on the HAMlab. Supported WiFi dongles are described here [FAQ]



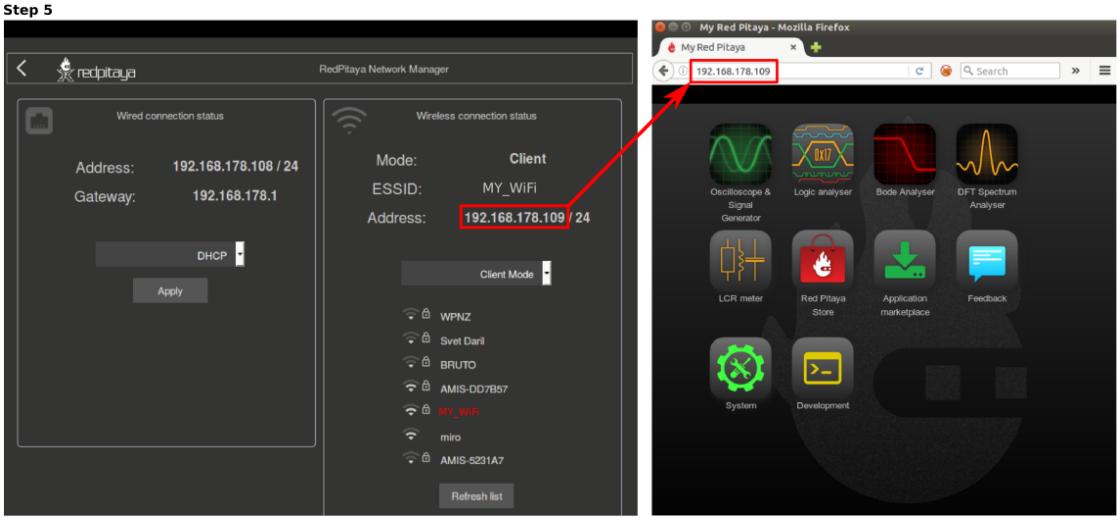
4. When the USB WiFi dongle is plugged in, the system will recognize it and enabled additional settings.
5. Select Client Mode, Desired WiFi network, Insert password and click Connect.

Step 4



6. When your HAMlab is connected the IP address will be shown on the user interface. This IP address is only for WiFi connection. You can check the connection by inputing a WiFi IP address in the web browser URL field (press enter after inputing).

Step 5



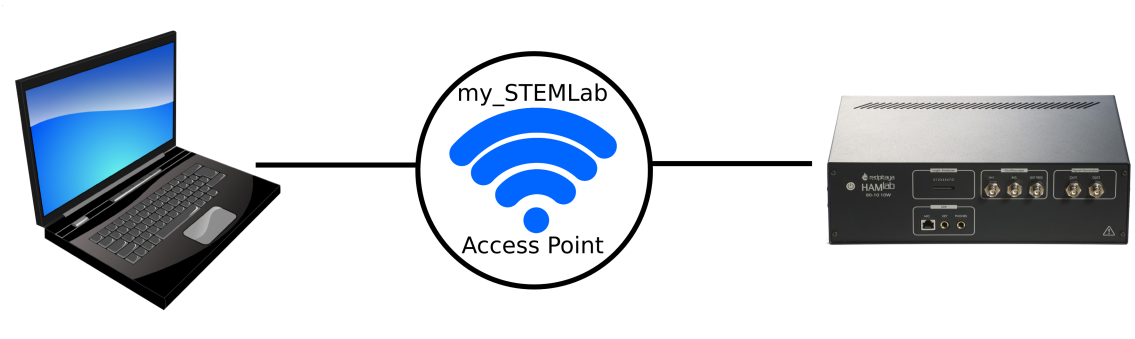
Now you have WiFi connection established. If you restart HAMlab it will connect to selected network automatically (if selected network is available). Also you can disconnect LAN connection and your HAMlab will be still available over the WiFi network i.e WiFi IP address.

Note: WiFi networks are generally not robust and the full performances of the HAMlab applications can be affected.

Access Point mode

This type of the connection is ideal if there is no LAN or WiFi network. HAMlab will simply create its own WiFi network on which users PC/Laptop or Tablet can be connected. Access Point mode is arranged via Network Manager application where you give the name to your HAMlab network and enable it. Since Access Point mode is enabled via Network Manager application this means that first you need to use LAN network, access your HAMlab and arrange the Access Point mode. After this there is no need for LAN network and after restarting the HAMlab the settings are saved.

Note: Connecting the HAMlab via Access Point mode the additional WiFi dongle is needed. WiFi dongle is available [Link to RS or similar].

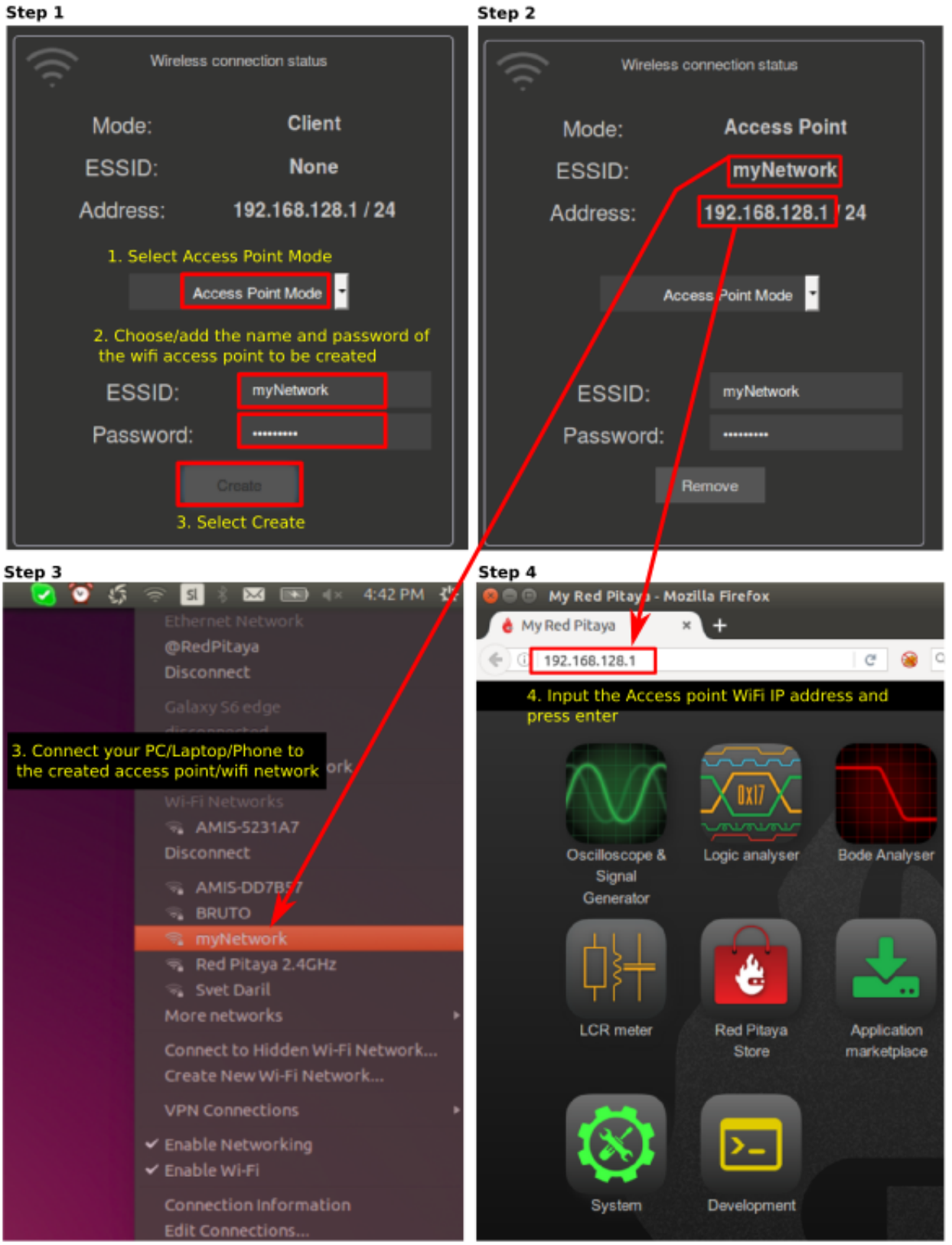


How to create Access Point network and connect to it is describe below.

1. Start your HAMlab web user interface (Use connection described **Local Area Network (LAN) connection**)

2. Open Network Manager application
3. Input the name and password of the Access Point network to be created (Password name should be at least 8 characters long. Do not use special signs.)
4. Connect your PC/Laptop/Tablet/Phone to the network created by HAMlab
5. Input Access Point network IP address to the web browser URL field and press enter.

Note: IP address in Access Point mode is always the same: 192.168.128.1


Step 1
Wireless connection status
Mode: Client
ESSID: None
Address: 192.168.128.1 / 24
1. Select Access Point Mode
Access Point Mode
2. Choose/add the name and password of the wifi access point to be created
ESSID: myNetwork
Password:
Create
3. Select Create
Step 2
Wireless connection status
Mode: Access Point
ESSID: myNetwork
Address: 192.168.128.1 / 24
Access Point Mode
ESSID: myNetwork
Password:
Remove
Step 3
4:42 PM
Ethernet Network
@RedPitaya
Disconnect
Galaxy S6 edge
3. Connect your PC/Laptop/Phone to the created access point/wifi network
Wi-Fi Networks
AMIS-5231A7
Disconnect
AMIS-DD7B57
BRUTO
myNetwork
Red Pitaya 2.4GHz
Svet Daril
More networks
Connect to Hidden Wi-Fi Network...
Create New Wi-Fi Network...
VPN Connections
Enable Networking
Enable Wi-Fi
Connection Information
Edit Connections...
Step 4
My Red Pitaya - Mozilla Firefox
My Red Pitaya
192.168.128.1
4. Input the Access point WiFi IP address and press enter
Oscilloscope & Signal Generator
Logic analyser
Bode Analyser
LCR meter
Red Pitaya Store
Application marketplace
System
Development

Unlocking Logic Analizer app

1. Click here and log in with your account. If you are not registered yet, please do so!
2. Click on MY RP in the right upper corner.
3. If redpitaya inside your HAMlab is not listed yet, click “Add new board” and follow the instructions.
4. To unlock application: Click the UNLOCK APP button and enter Logic Analizer unlock key and click OK.
5. Connect to your HAMlab and start Logic Analizer app.

Prepare SD card

1. Download latest HAMlab OS Image File

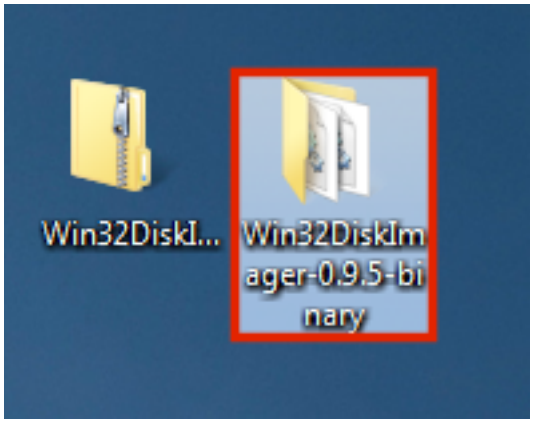
   

   Download
2. Unzip
3. Select your operating system and follow the instructions:

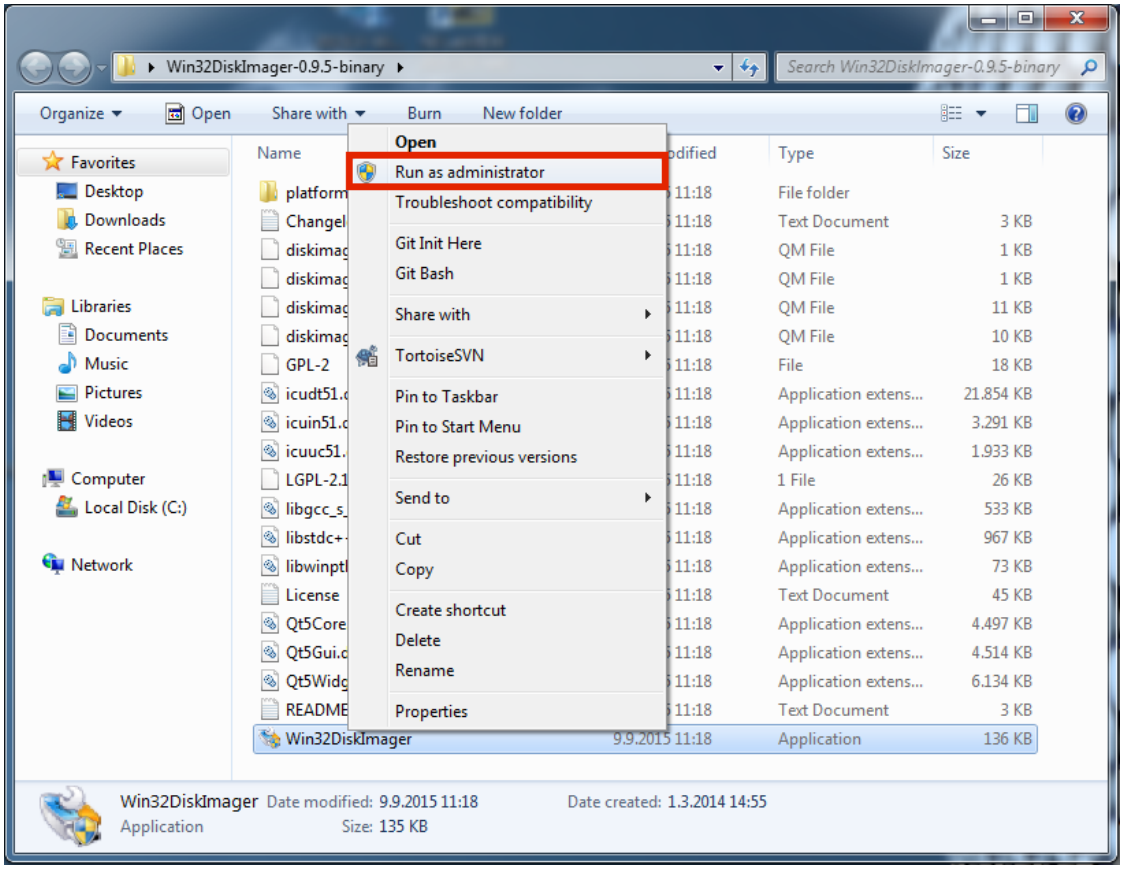
Windows

1. Insert SD card into your PC or SD card reader.

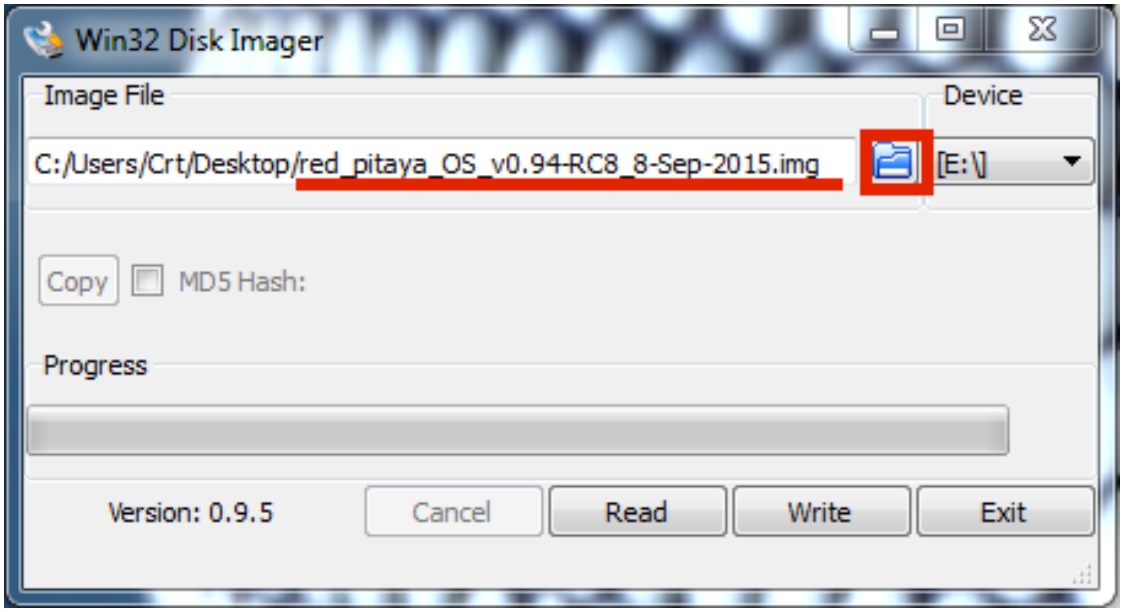
2. Download Win32 Disk Imager to your Desktop and unzip it.



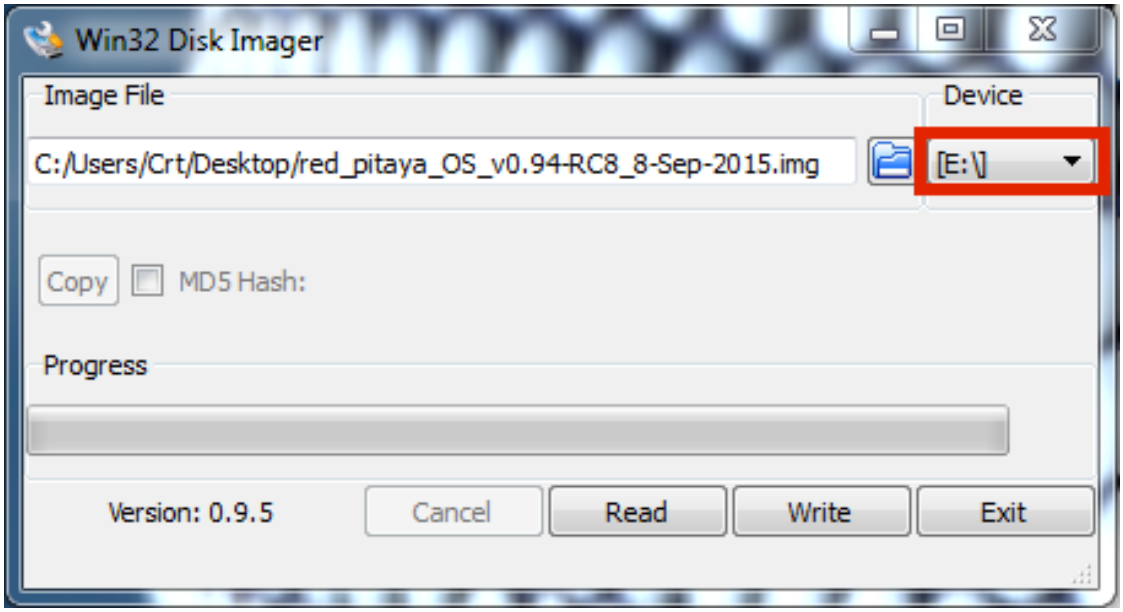
3. Open unzipped folder, right-click on the WinDisk32Imager, and select 'Run as Administrator'.



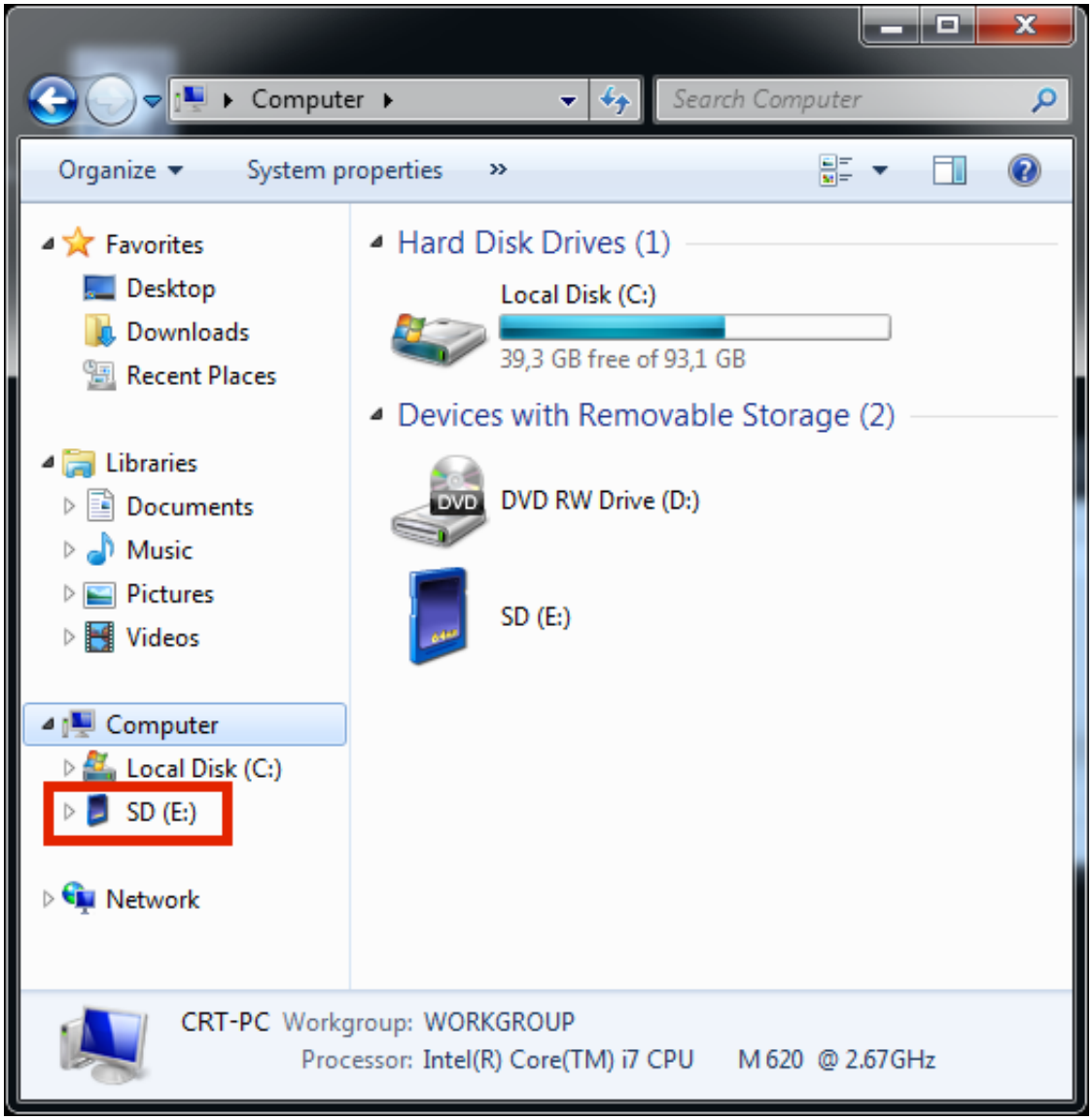
4. Under image file box select unzipped HAMlab OS image file.



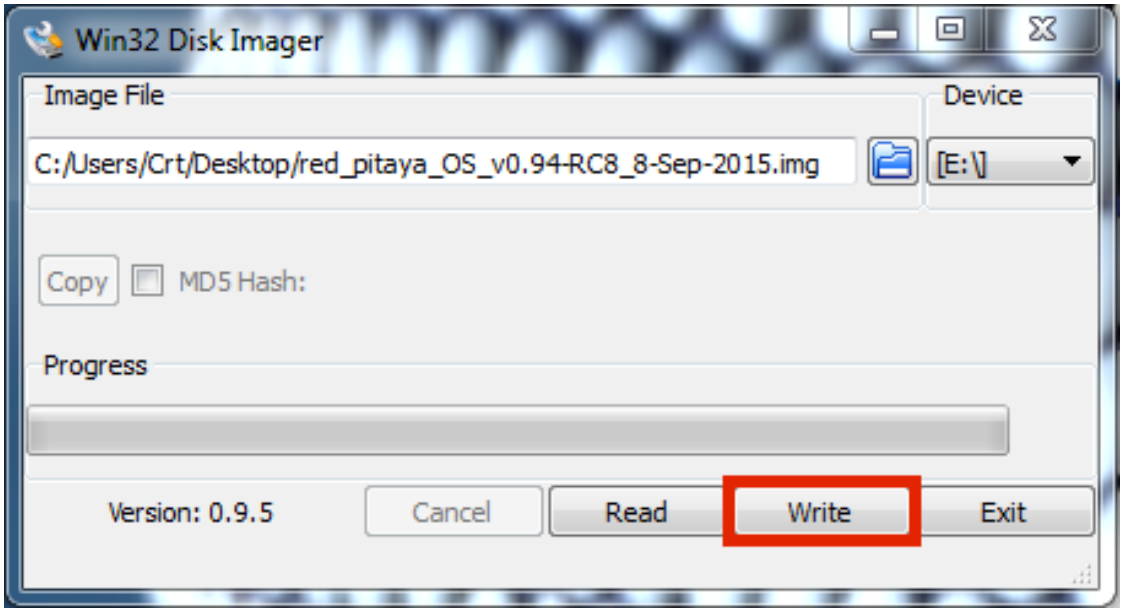
5. Under device box select the drive letter of the SD card.



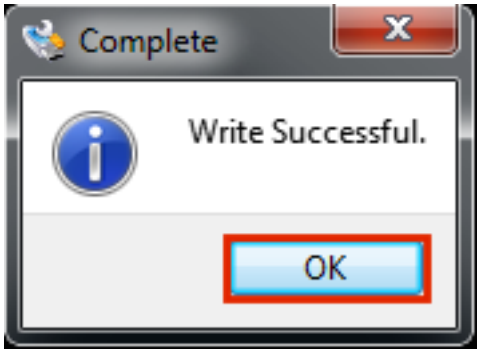
Note: Be careful to select the correct drive; if you choose the wrong one you risk erasing data from the computer's hard disk! You can easily see the drive letter (for example E:) by looking in the left column of Windows Explorer.



6. Click Write and wait for the write to complete.



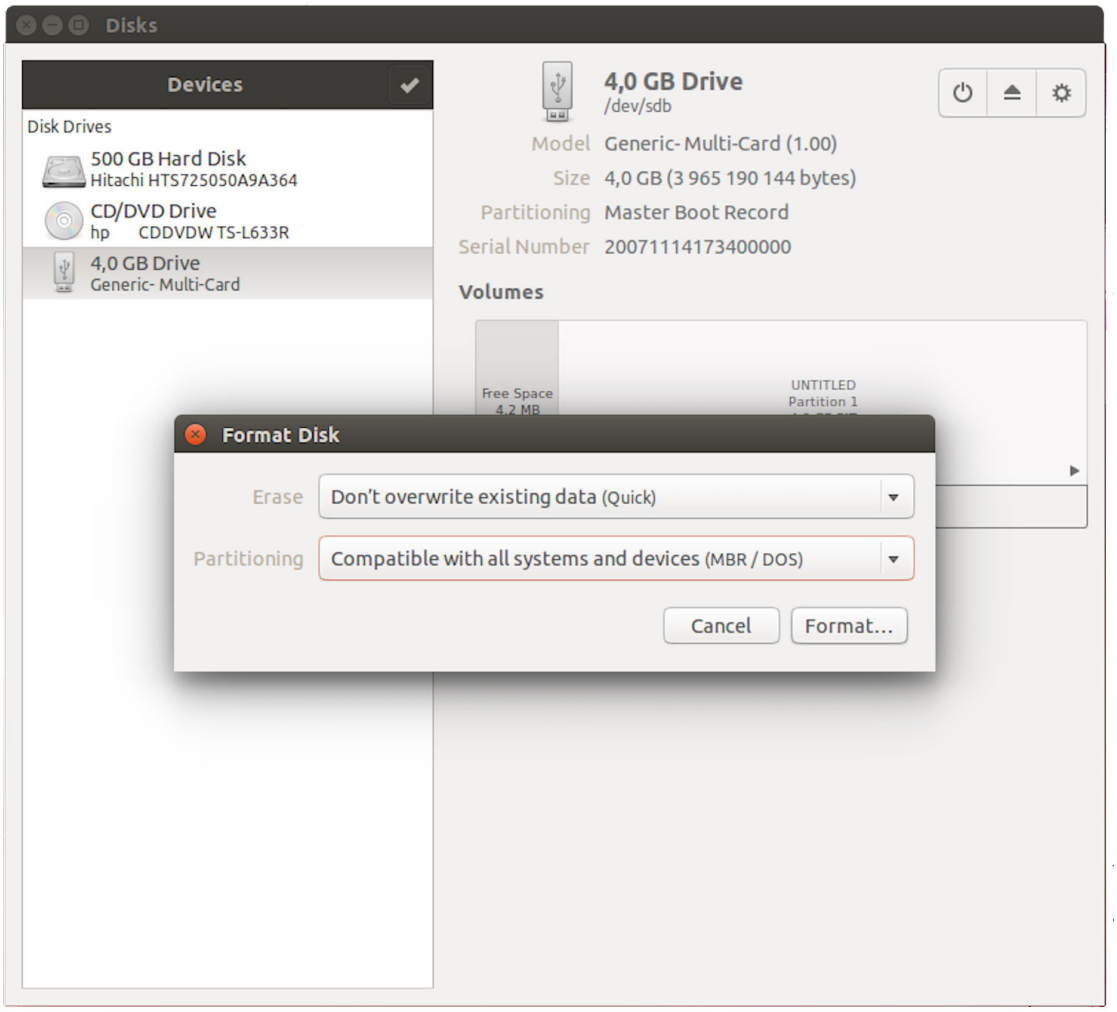
7. Exit the Imager.



Linux

1. Insert SD card into your PC or SD card reader.

2. Run Disks application to format the SD card.



3. Open the Terminal and check the available disks with "df -h". Our SD card is 4GB and mounted to /dev/sdb

```
a7@a7-HP-ProBook-4421s:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda1       151G   37G  106G  26% /
none            4,0K     0  4,0K   0% /sys/fs/cgroup
udev            2,9G  4,0K  2,9G   1% /dev
tmpfs           583M  1,3M  582M   1% /run
none            5,0M     0  5,0M   0% /run/lock
none            2,9G  152K  2,9G   1% /run/shm
none            100M   76K  100M   1% /run/user
/dev/sda3       151G   60M  143G   1% /media/a7/625bd16f-4905-42ff-b9f5-6a91bf9e
2700
/dev/sda4       152G   60M  144G   1% /media/a7/081e3477-a0be-4da6-8d38-010842c4
0002
/dev/sdb1       3,7G  4,0K  3,7G   1% /media/a7/test
```

4. Unmount the SD card with "umount /dev/sdbN" (make sure you replace N with the right number).

```
a7@a7-HP-ProBook-4421s:~$ umount /dev/sdb1
```

5. Write the image to the SD card with the following command : dd if=image_file of=/dev/sdb bs=1M

Note: Replace the red_pitaya_image_file with the name of the unzipped Red Pitaya SD Card Image and /dev/device_name is replaced with the path to the SD Card, usually it will be /dev/sdb.

```
a7@a7-HP-ProBook-4421s:~$ sudo dd if=Desktop/debian_armhf_21-16-00_05-avg-2015_w
yliodrin.img of=/dev/sdb bs=1M
[sudo] password for a7:
```

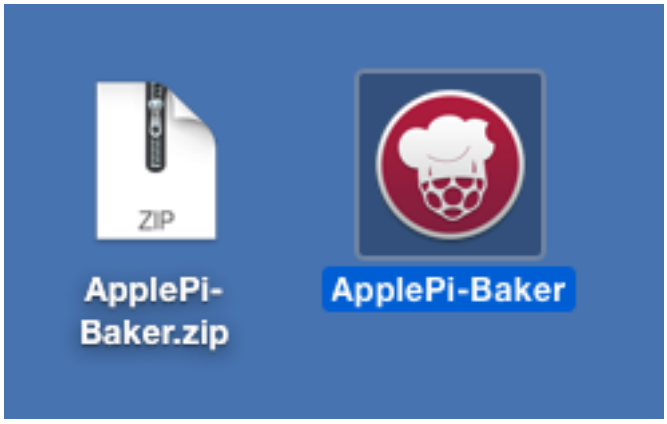
6. Wait until the process has finished.

```
3791+0 records in
3791+0 records out
3975151616 bytes (4,0 GB) copied, 507,089 s, 7,8 MB/s
a7@a7-HP-ProBook-4421s:~$
```

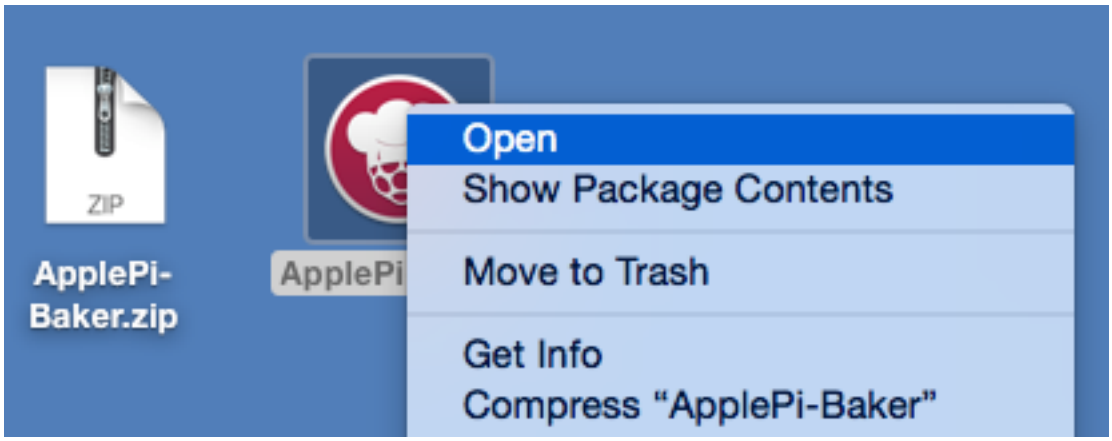
MacOS

1. Insert SD card into your PC or SD card reader.

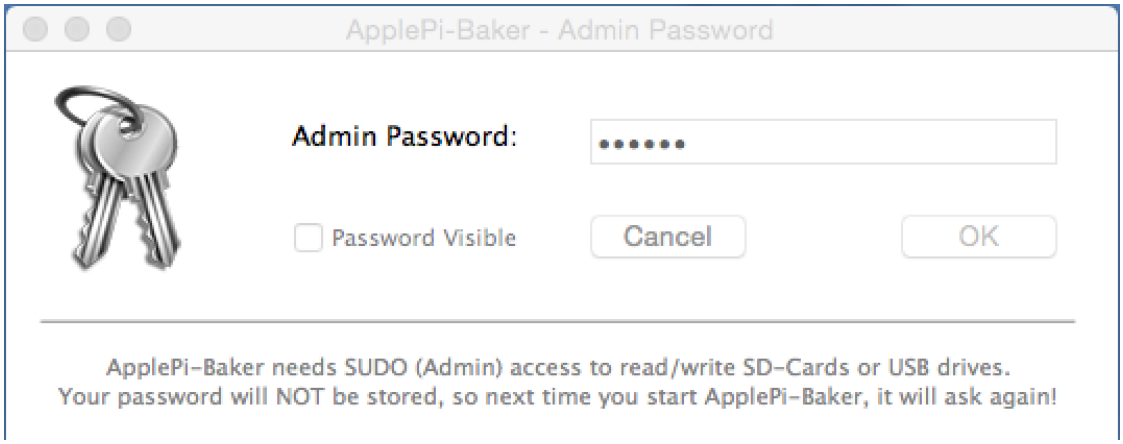
2. Download Apple Pi Baker and unzip it.



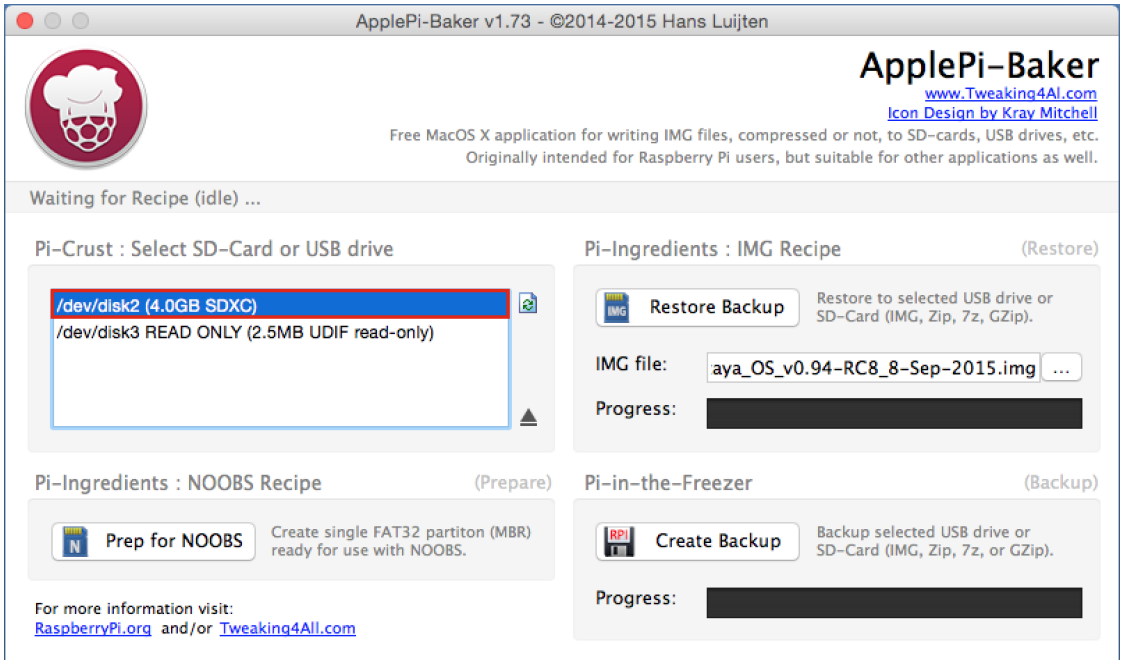
3. Press “crtl” key and click on ApplePi-Baker icon, then click Open in order to run it.



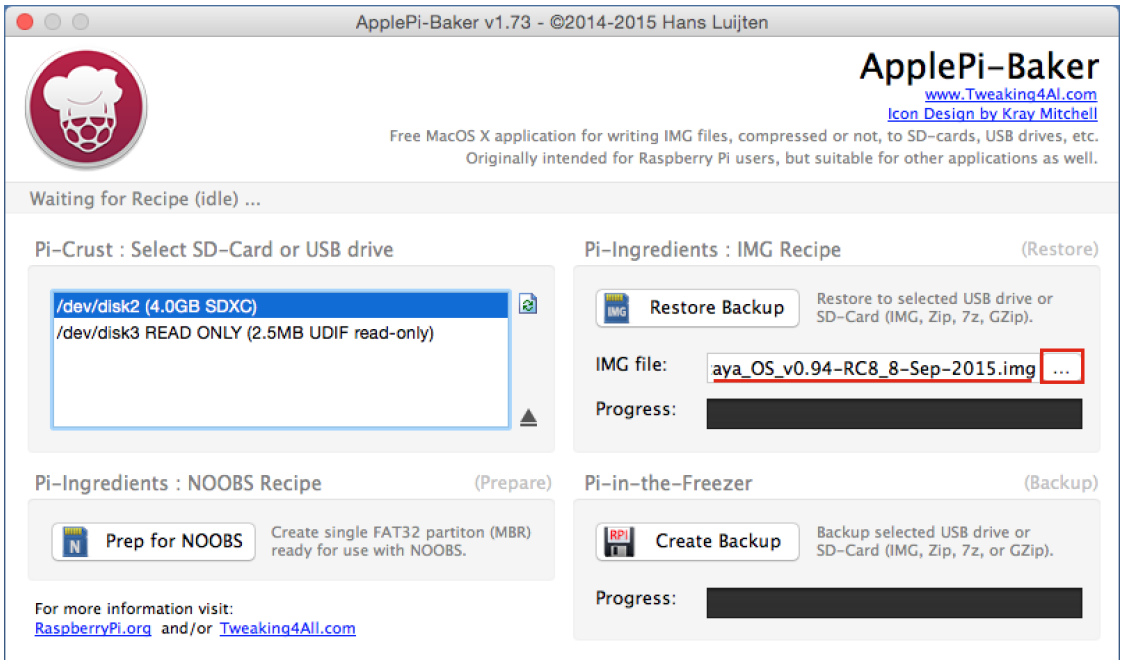
4. Enter your admin password and click OK.



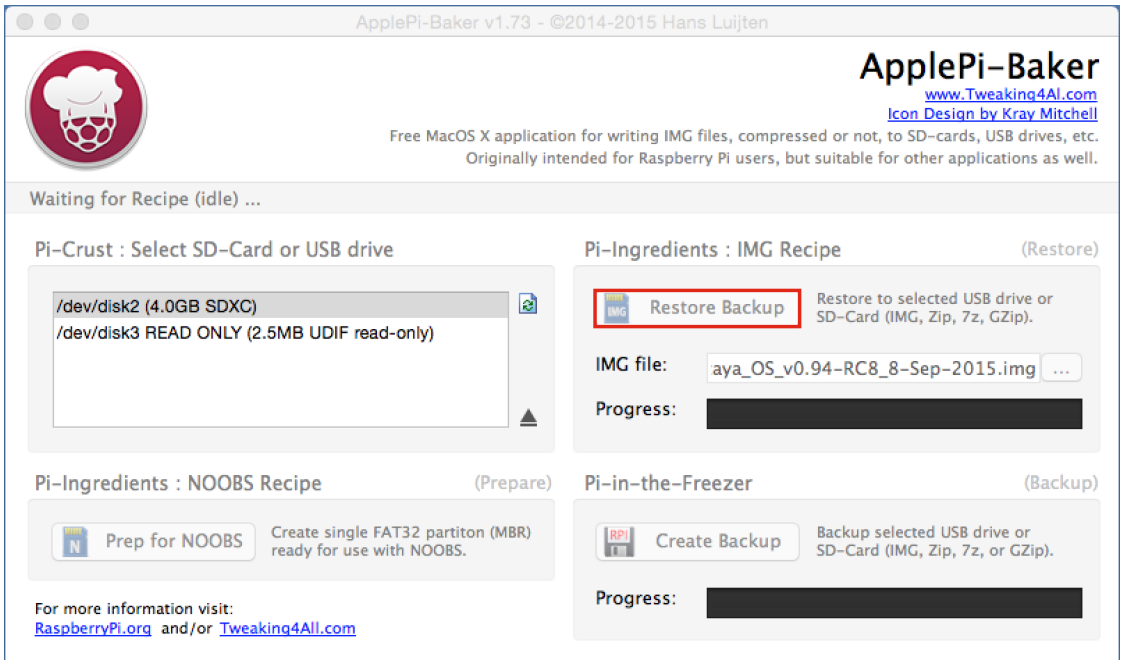
5. Select SD card drive. This can be recognized by the size of the card that is 4GB.



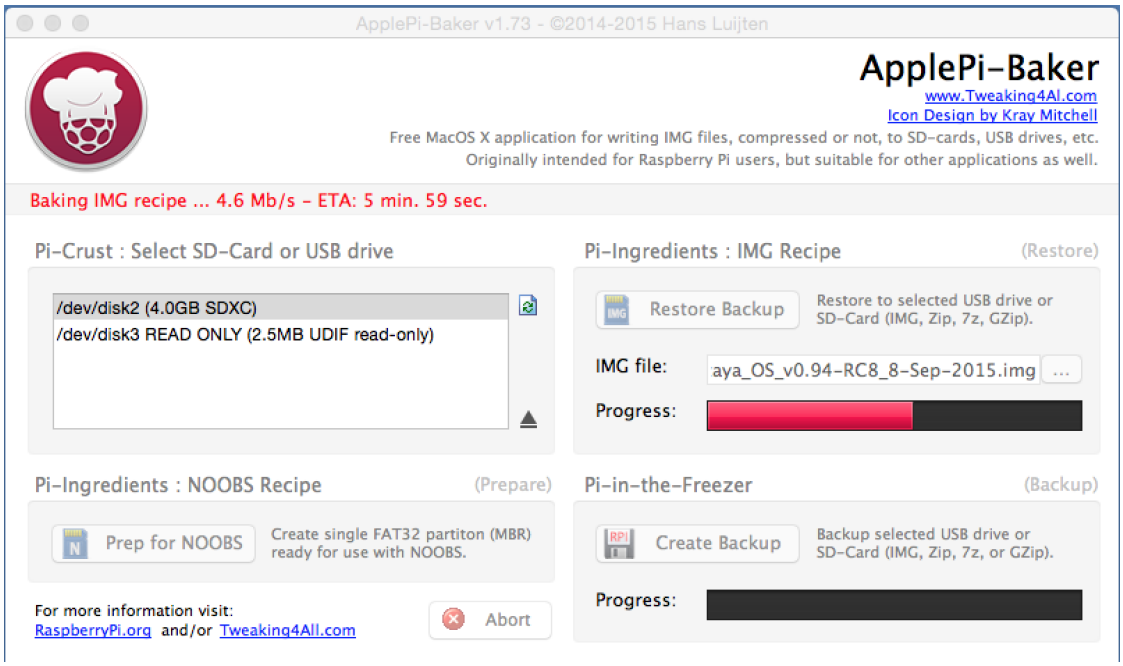
6. Select HAMlab OS image file.



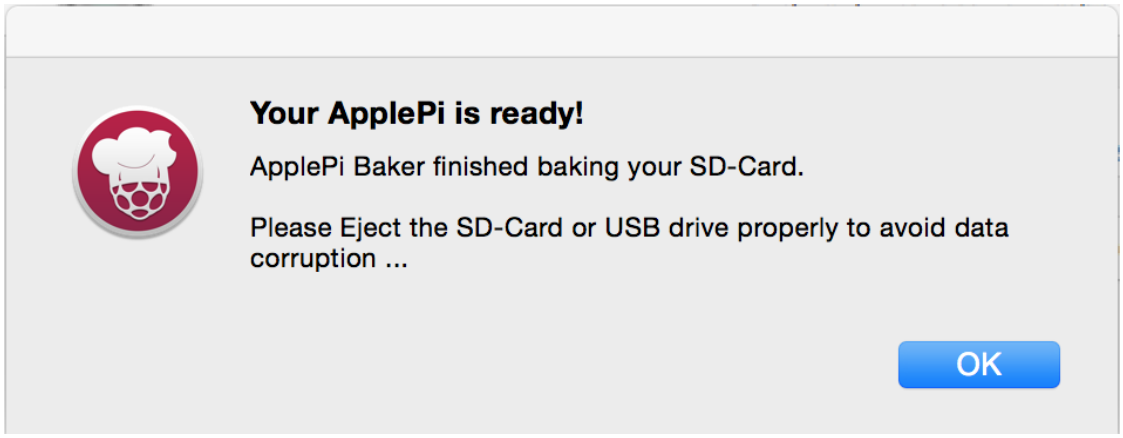
7. Click “Restore Backup” button in order to write image to SD card.



8. It’s coffee time, application will show you Estimated Time for Accomplishment.

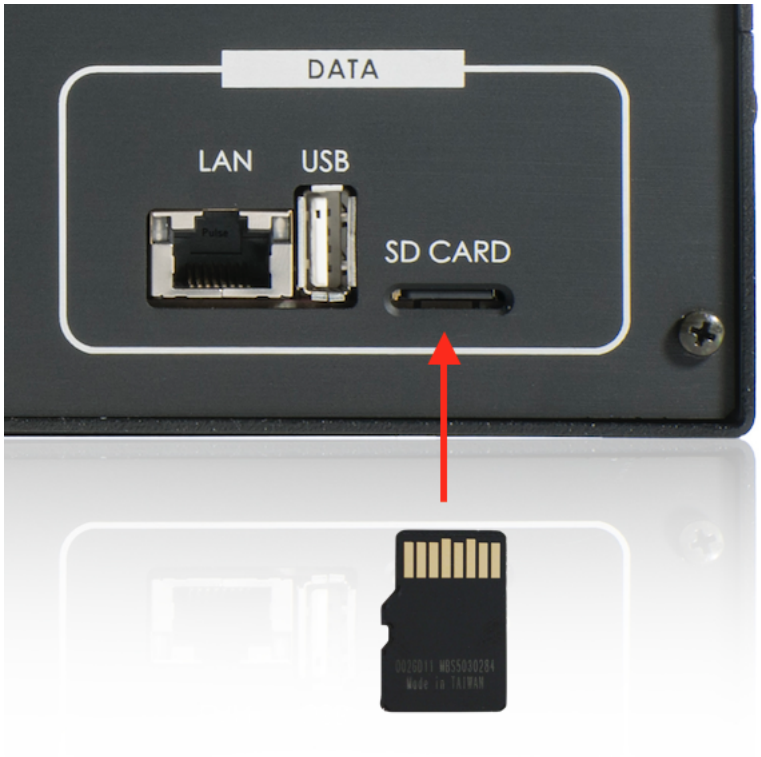


9. When operation is completed click “OK” and quit ApplePi-Baker.



FAQ: How to install HAMlab OS on MAC not using ApplePiBaker?

4. Now you have a brand new Micro SD card with latest HAMlab OS. Insert it into HAMlab with contacts facing up.



5. Power on Power Supply
6. Turn HAMlab ON by shortly pressing Power Button

Note: You can also use cross platform Etcher for burning your SD Card.

Update HAMlab software

Instead of writing the whole SD card image, it is possible to update only the ecosystem.

Web interface update

At boot HAMlab checks for software updates, and alerts the user if a new release is available. Users can also check for updates manually.

1. Open HAMlab desktop using your WEB browser.
2. Click on the system icon.

   quickStart/system.png

3. Then click onto update icon.

4. Select ecosystem version and start OS updater
5. Follow the steps in the OS updater app in order to install new OS.

Note: OS update might cause your HAMlab desktop to freeze for a few minutes.

Manual upgrade

A manual upgrade allows you to fix a corrupted SD card image (if only the FAT partition is corrupted) or to install older, newer or custom ecosystem zip files.

1. Download a zip file from our download server.
2. Insert SD card into card reader.
3. Delete all files from the FAT partition. Use `Shift + Delete` to avoid placing files into a trash bin on the same partition.
4. Extract the ecosystem zip file contents onto the now empty partition.

If you wish too keep wireless settings skip deleting the next files:

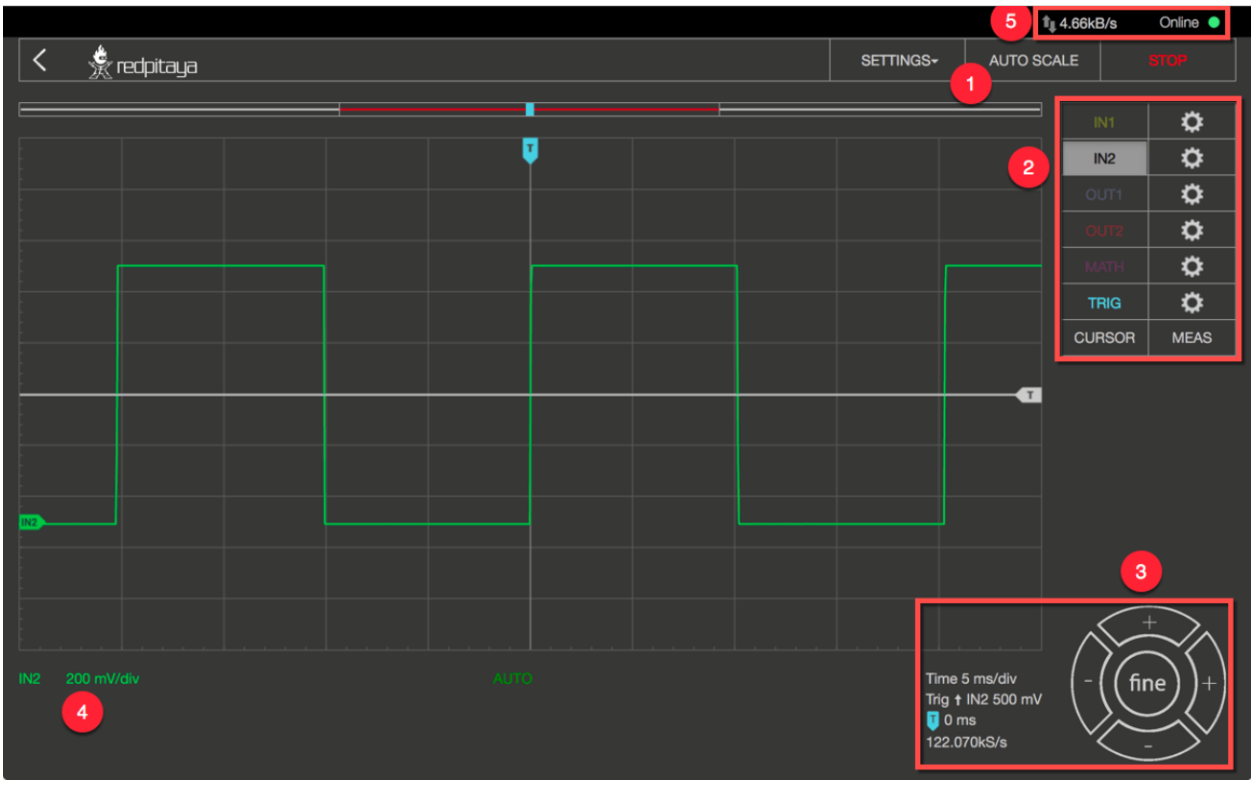
- `wpa_supplicant.conf`
- `hostapd.conf`

CHAPTER 3

Applications and Features

Oscilloscope with Signal Generator

This application will turn your HAMlab into a 2-channel Oscilloscope and 2-channel Signal generator. It is the perfect tool for educators, students, makers, hobbyists and professionals seeking affordable, highly functional test and measurement equipment. It enables generating and measuring electrical signals up to 50MHz. The simple and intuitive user interface provides all the necessary tools for signal analysis and measurements. High end specifications will satisfy more demanding users looking for powerful tools for their working benches. The application is web-based and doesn't require installation of any native software. Users can access them via any web browser (Google Chrome is recommended) using their smartphone, tablet or a PC running any popular operating system (MAC, Linux, Windows, Android and iOS). The elements on the Oscilloscope&Sig. Generator application are arranged logically and offer a familiar user interface.



Apart from the graph there are five areas in which the surface is divided:

1. Autoscale: Automatically sets up the Oscilloscope settings for the optimal display of the input signals. By pressing the button the voltage axis and time axis are set so that at least one full period of the signal will fill the screen.
2. Channels / Trigger / Measuring Tools: This menu provides controls for inputs / outputs, Trigger, guides, and measurements.
3. Axis control panel:
   - By pressing the horizontal **+/-** buttons the scaling of the X axis is changed and thus the selected time range which is displayed in the graph.
   - The vertical **+/-** buttons change the Y axis, and thus the displayed voltage range of the signal.
   - In addition, the setting for the time frame, trigger, zero point of the X axis and the sampling rate are displayed.
4. Channel Setting display: Indicates the scale of the Y axis for all channels that are switched.
5. Osciloscope application network data usage.

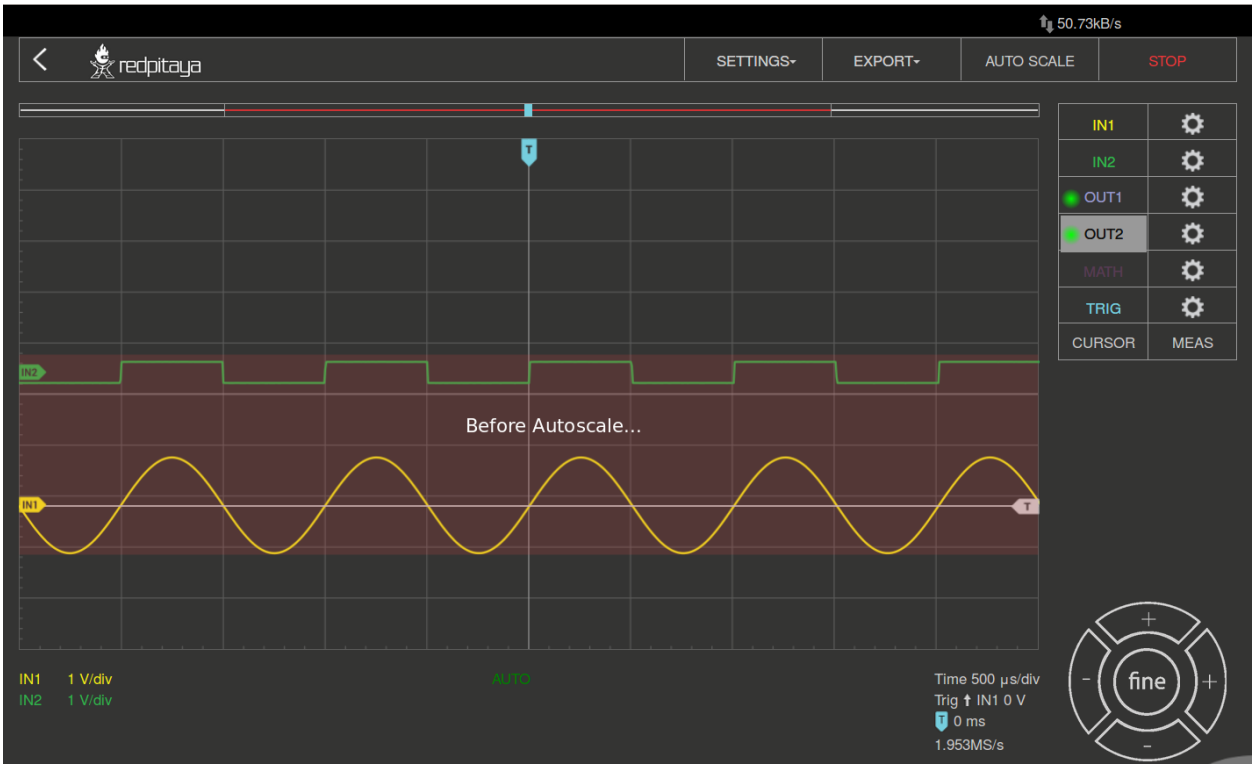
Features

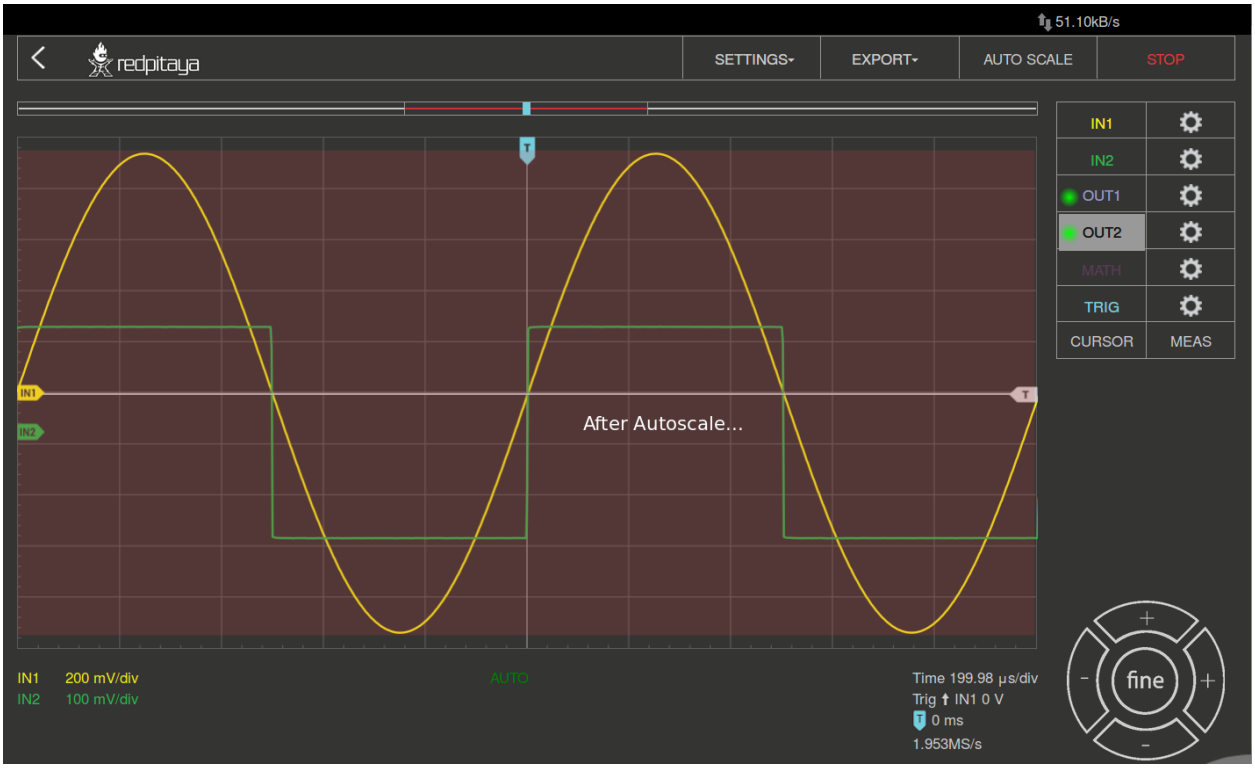
Oscilloscope & signal generator main features are listed below:

- Run/stop and auto set functionality
- Signals position and scale controls
- Trigger controls:
  - source,

  - level,
  - slope
- Trigger modes:
  - auto,
  - normal and
  - single triggering
- Input calibration wizard
- Cursors
- Measurements
- Math operations
- Signal generator controls:
  - waveform,
  - amplitude,
  - frequency,
  - phase

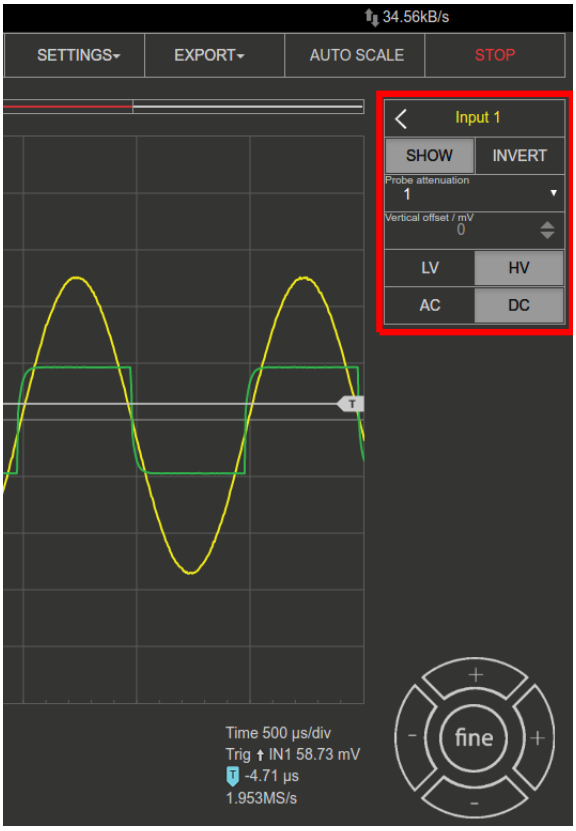
AUTO SCALE: Automatically sets up the Oscilloscope to best display the input signal. By pressing this button, the voltage axis and the time axis are set so that at least one full period of the signal will fill the screen.





INPUTS: On the right side of the Oscilloscope&Sig. Generator application interface the IN1 and IN2 channels are listed. By a simple click on the name of a channel (not the gear) the channel gets highlighted and you can simply control all the settings of the respective channel.

The available settings are the following:



SHOW: Shows or hides the curve associated with the channel.

INVERT*: Reflects the graph on the X axis.

Probe attenuation: The division that was set on the probe. (must be selected manually)

Vertical offset: Moves the curve up or down.

LV and **HV**: Are osciloscope input range options of your HAMlab implemented via attenuator.

- **HV** represent **higher voltage range** from **-20** to **+20** V.
- **LV** represent **low voltage range** from **-1** to **1** V.

AC and **DC** coupling: HAMlab enables you to mesure signals in two coupling modes **AC** and **DC**.

- **AC** Osciloscope will show **only AC** component of a signal.
- **DC** Osciloscope will show **both AC and DC** components of a signal.

Output

On the right side of the Oscilloscope & Sig. Generator application interface the **OUT1** and **OUT2** channels are listed.

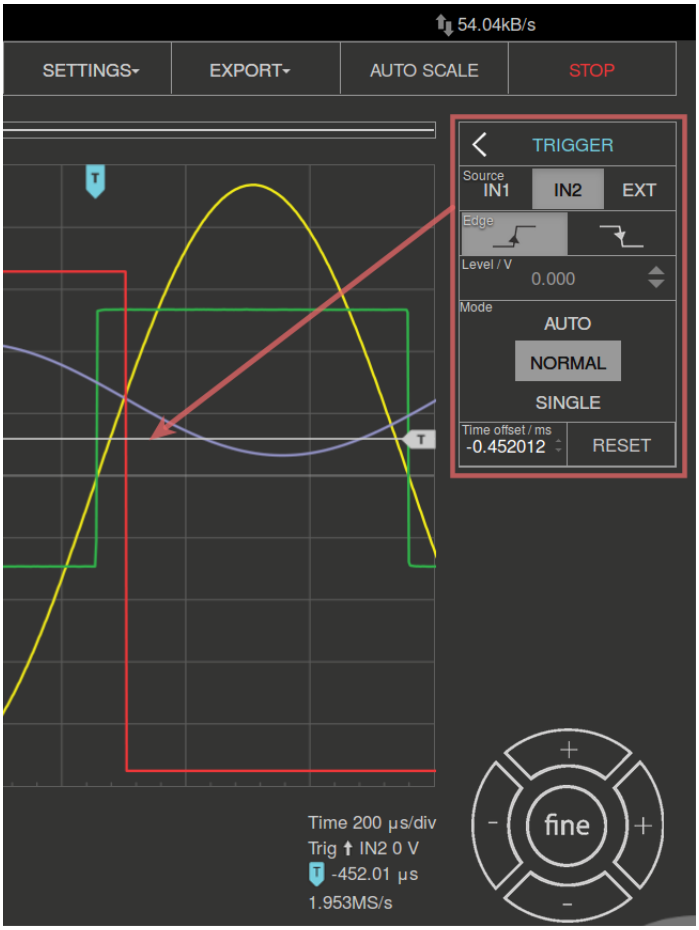
By a simple click on the name of a channel (not the gear) the channel gets highlighted and you can simply control all the settings of the respective channel.

The available settings are the following:

- **ON**,
- **SHOW**,
- **Type**,
- **Trigger**,
- **Frequency**,
- **Amplitude**,
- **Offset**,
- **Phase** and
- **Duty cycle**.

Various waveforms are available for output: **SINE** (sinus), **SQUARE** (rectangle) **TRIANGLE** (triangle), **SAWU** (rising sawtooth), **SAWD** (falling sawtooth), **DC** and **PWM** (Pulse Width Modulation).

TRIGGER:



The Trigger is used to enable the scope to display changing waveforms to be displayed on the screen of the scope in a steady fashion. The parameter Source defines the trigger source used for this. The trigger source can be input channel 1 (IN1) or input channel 2 (IN2) or an external source. The available settings are the following:

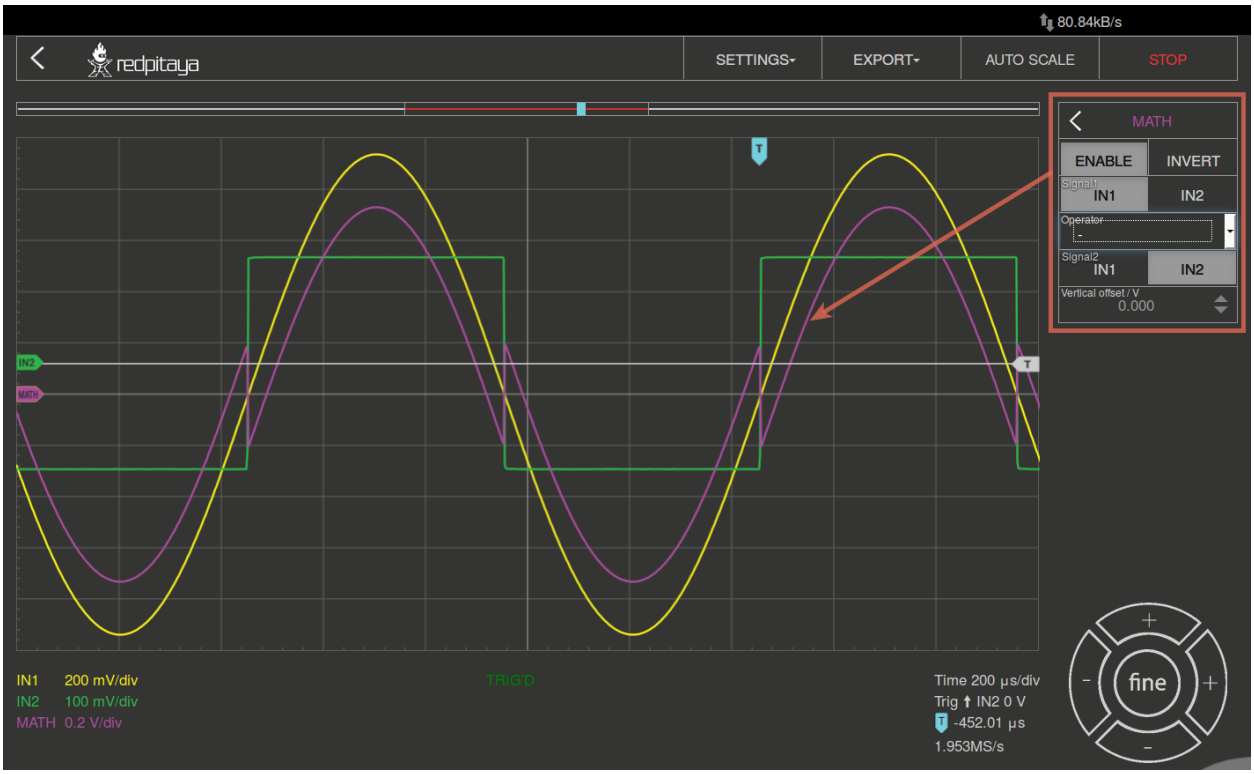
- **LEVEL** Trigger level value is used to determinate at which value of signal amplitude the trigger condition will be satisfied(true). When signal amplitude achieves/cross this value the trigger state is set to "true". Following "true" trigger condition the acquisition and signal plotting will be executed.
- **EGDE** Since during the time sweep(acquisition) signal amplitude can cross trigger level from higher value to the lowest one or vice versa. The edge setting will determinate at which case the trigger condition will be set to "true".
- **NORMAL** The acquisition(trace (re)plotting) is executed only if the trigger state is "true". In other words; signal needs to satisfy trigger condition in order to be acquired and (re)plotted by the Oscilloscope.
- **SINGLE** After trigger conditions are satisfied by the observed signal the acquisition is executed only once and trace re-plotting is stopped regardless of the repetitive "true" trigger states.
- **AUTO** Trigger state and conditions are disregarded. Signal acquisition and signal trace re-plotting are executed in repetitive(continuous) manner. This setting is default one.
- **STOP** Pause triggers.
- **RUN** Starts/continues triggering.

The Source parameter defines the source used for this purpose. With the **IN1** or the **IN2** the signal at the respective input is selected; with the **EXT** you can invoke the trigger from outside through external BNC input connector located on front pannel indicated with **EXT TRIG**.

MATH:

Among the more interesting features of a digital oscilloscope is the "math" channel. The available settings are the following:

- **+** Adds the selected channels.
- **-** Subtract the selected channels.
- ***** Multiply selected channels.
- **ABS** Gives an absolute value of the selected signal.
- **dy/dt** Gives an time derivation of the selected signal.
- **ydt** Gives an time integration of the selected signal.
- **INVERT** Inverts the signal.



CURSOR: This feature enables the user to easily get the data of relevant basic measurements such is: signal period, amplitude, time delay, amplitude difference between two points, time difference between two points and etc.

NAVIGATE: When you have a lot of data to analyze, it is very important to get through them easily. Navigate left and right by dragging the data where you want and effortlessly zoom in and out by using your mouse scroll wheel.

MEASUREMENTS: The menu can be found under the **MEAS** button. Here you can select up to 4 measured values in total, then provide the corresponding values.

In the Operator field select the desired measurement and then set the Signal from which channel the value should be taken. One click on **DONE** shows the value in the bottom of the channel settings. You may choose among the following:

- **P2P**: The difference between the lowest and the highest measured voltage value.
- **MEAN**: The calculated average of the signal.
- **MAX**: The highest measured voltage value.
- **MIN**: The lowest measured voltage value.
- **RMS**: The calculated RMS (root mean square) of the signal.
- **DUTY CYCLE**: The Signal's duty cycle (ratio of the pulse duration and period length).
- **PERIOD**: Displays the period length, the time length of a vibration.
- **FREQ**: The frequency of the signal.

NAVIGATE:

Spectrum Analyzer

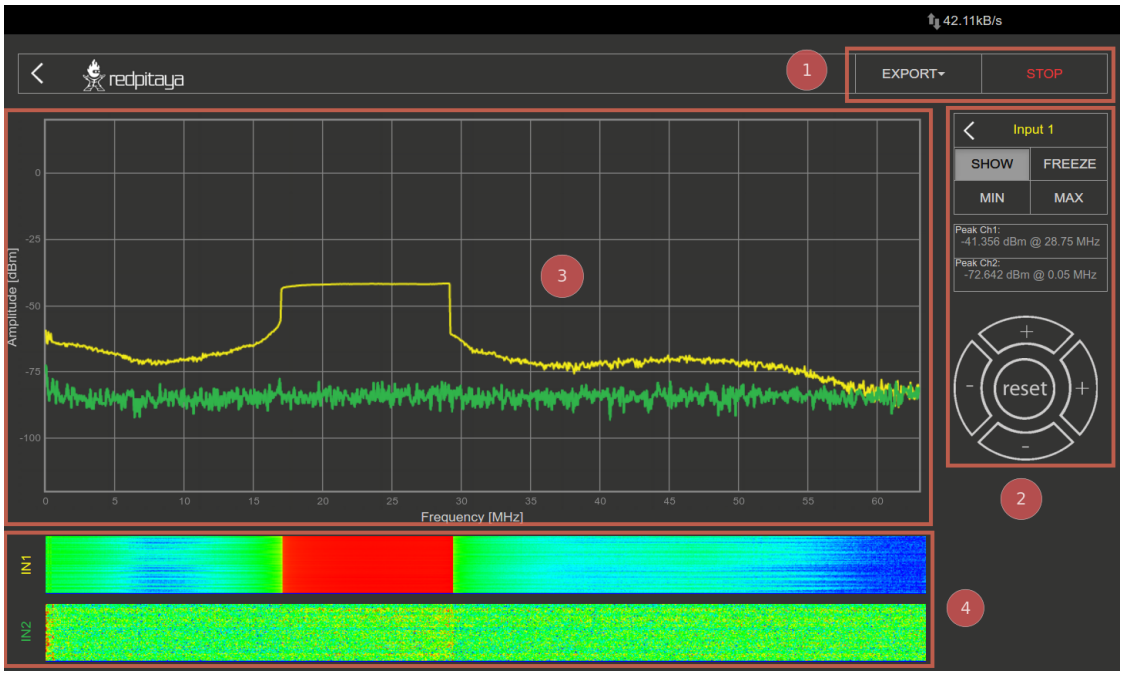
This application will turn your HAMlab board into a 2-channel DFT Spectrum Analyzer. It is the perfect tool for educators, students, makers, hobbyists and professionals seeking affordable, highly functional test and measurement equipment.

The DFT Spectrum analyzer application enables a quick and powerful spectrum analysis using a DFT algorithm. Frequency span is form DC up to 62.5MHz where the frequency range can be arbitrarily selected. You can easily measure the quality of your signals, signal harmonics, spurious and power. Instrument HAMlab applications are web-based and do not require the installation of any native software. Users can access them via a web browser using their

smartphone, tablet or a PC running any popular operating system (MAC, Linux, Windows, Android, and iOS). The elements on the DFT Spectrum analyzer application are arranged logically and offer a familiar user interface.

The graphical interface is divided into 4 main areas:

- **Run/Stop** and **Export** button: The "Run/Stop" button is used to start and stop measurements. With the "Export" button you can select in which format you want to download the measured data (plotted spectrum). Two formats are available: .png and .csv.
- **Inputs / Cursors / Range / Axis** control panel: This menu provides controls for inputs, cursors, and frequency range settings. Horizontal +/- buttons are used to select the span of the X (frequency) axis (zooming in/out). The vertical +/- buttons change the Y (amplitude)-axis range.
- **Graph area**: Here, the currently calculated signal spectrum is plotted in the selected frequency range.
- **Waterfall plots**: Waterfall plots are a different way of the signal spectrum representation where the color on the plot defines the signal amplitude for a certain frequency. The waterfall plot is also useful to enable the representation of a signal spectrum in a time dependency.

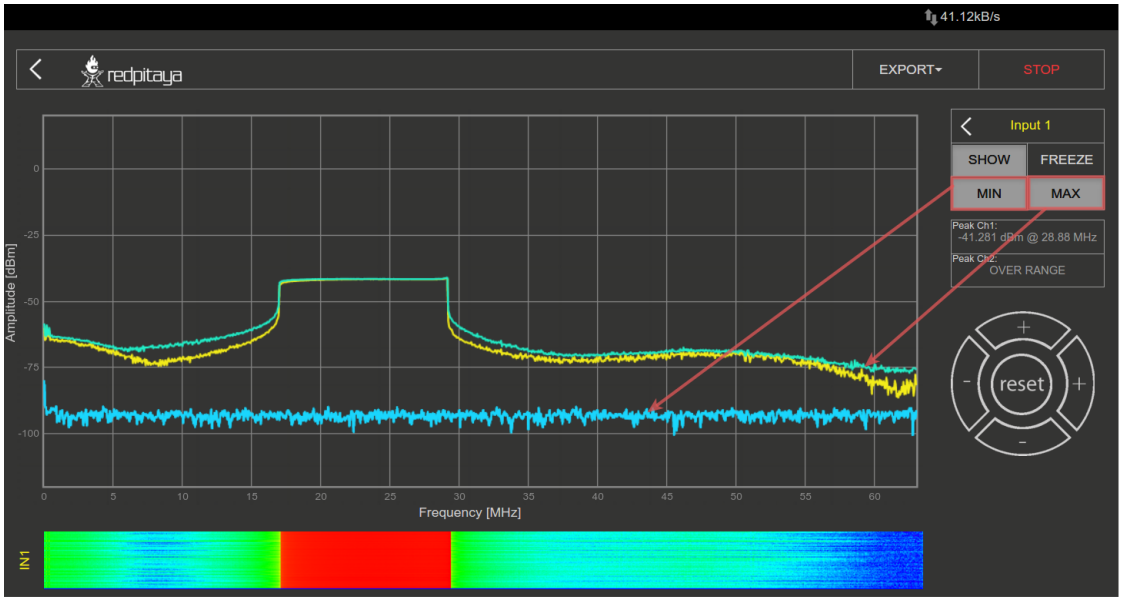


Features

The main features of the DFT Spectrum analyzer are described below:

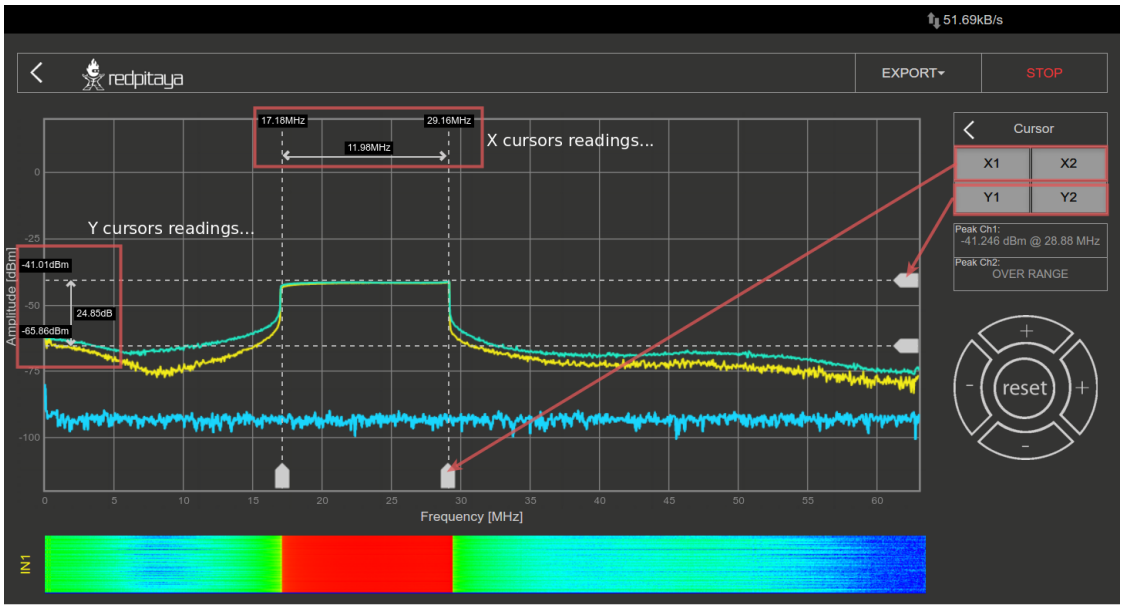
INPUTS

Inputs controls are shown in the picture below. With the "SHOW" select button displaying the spectrum of the selected input can be enabled or disabled. The "FREEZE" button is used for stopping the measurements of the selected input. The "MIN" and "MAX" select buttons are used to enable/disable the persist mode for the spectrum plot. The "MIN" signal spectrum plot will show the lowest values of the signal spectrum taken after enabling the "MIN" button. The same logic is used for the "MAX" signal where the MAX values of the signal spectrum are shown. This feature is mostly used for detecting signal glitches and the max/min spectrum amplitude values during the measurement.



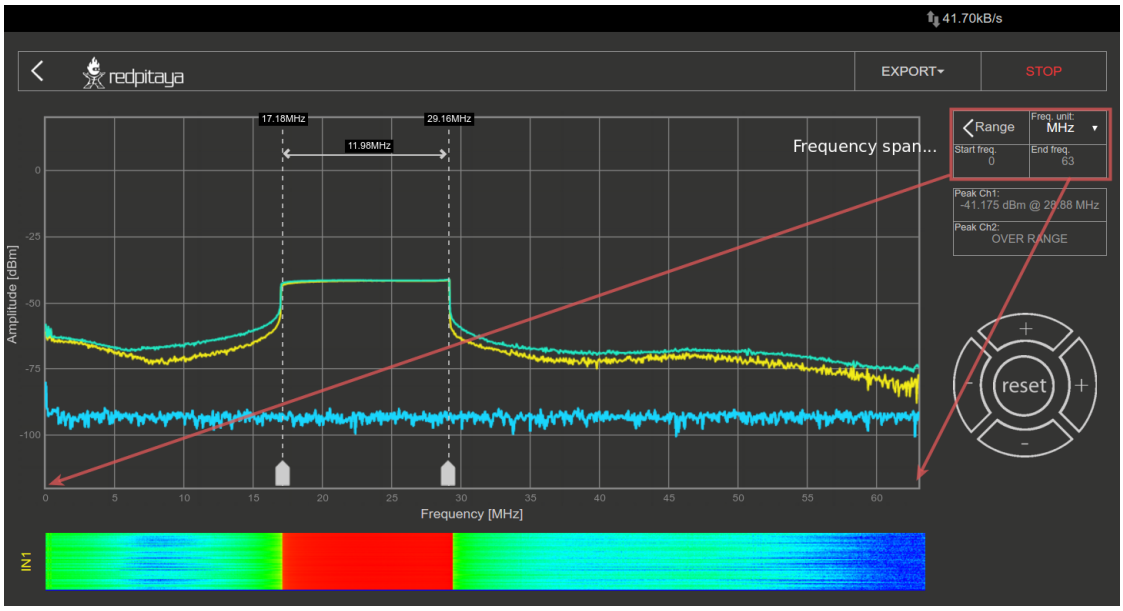
CURSORS

The cursors are an additional vertical and horizontal pair of lines useful for extracting the values of the spectrum plots. The cursors are interactive and they can be set on any part of the graph while the frequency value is shown corresponding to the place where the X cursors are set, and the amplitude value where the Y cursors are set. Cursor delta values are useful for measuring signal harmonics and relative ratios between amplitudes and frequencies.



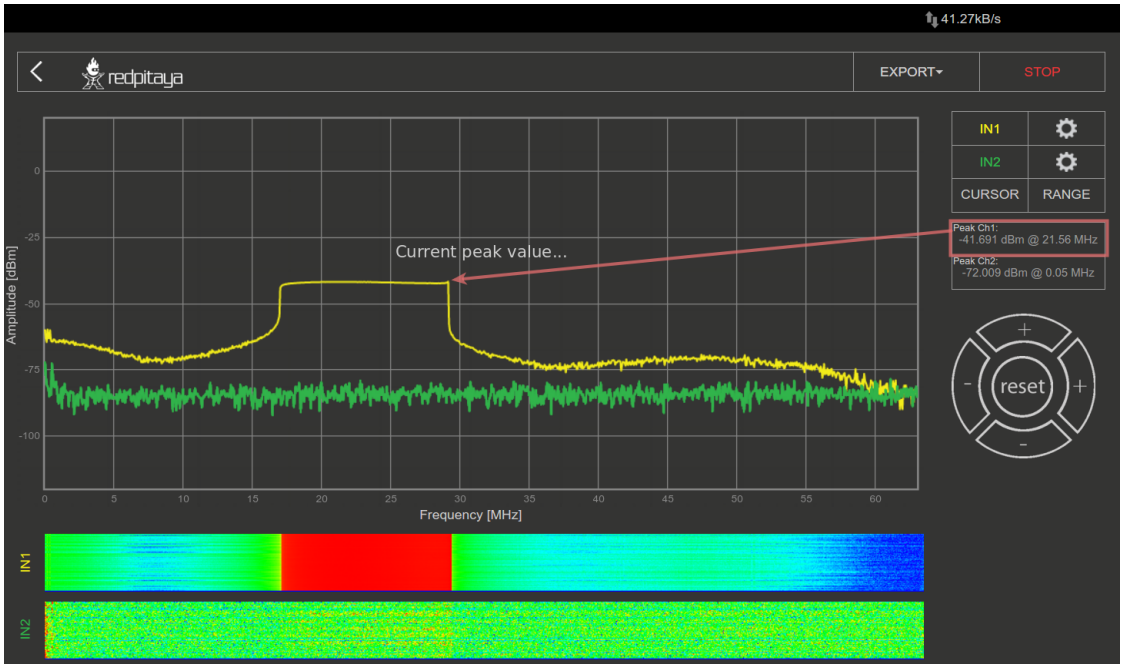
RANGE

The range settings are used to set a frequency span. This feature is useful when the frequency range of interest is smaller than the full frequency range of the Spectrum analyzer application.



PEAK DETECTION

During the measurement, peak values of the signal spectrum are measured and shown on the "Peak Values" field. Peak values are max values of the signals spectrum regardless of the selected frequency range. This peak finding prevents not seeing peak values which are outside the selected frequency span.

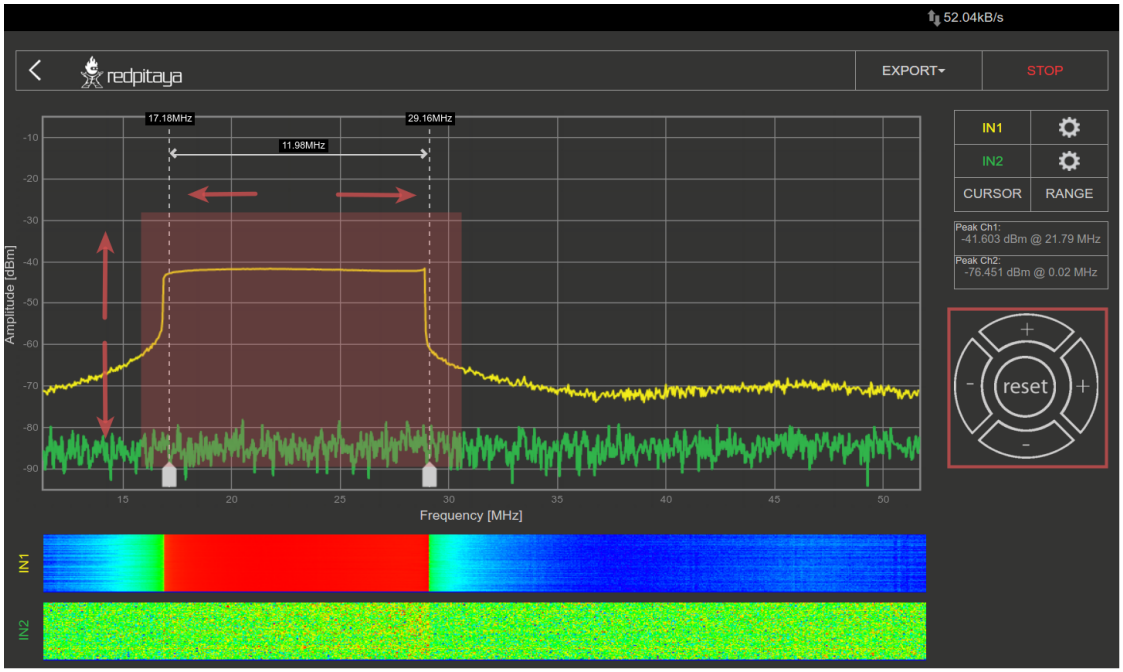


WATERFALL PLOTS

Waterfall plots are a different way of the signal spectrum representation where the color on the plot defines the signal amplitude for a certain frequency. The waterfall plot is also useful when enabling the representation of the signal spectrum in a time dependency.

AXIS CONTROLS

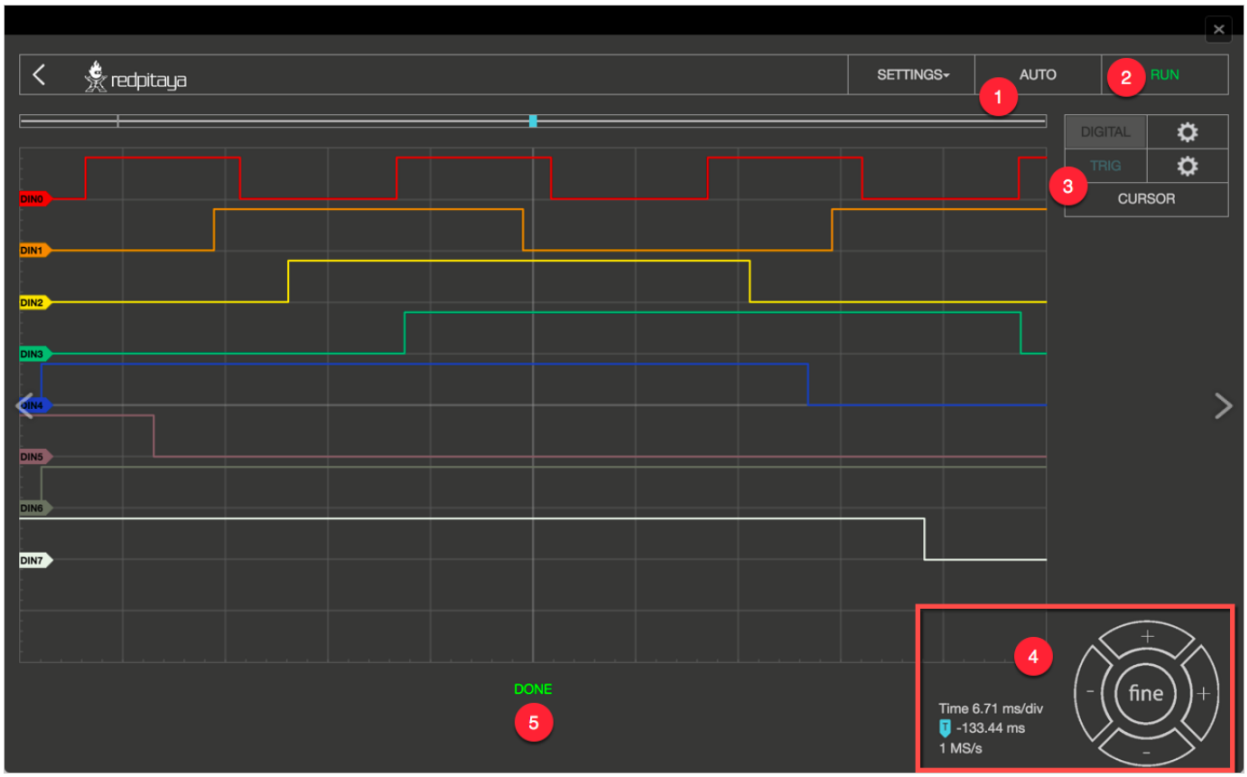
Horizontal +/- buttons are used to select the span of the X (frequency) axis (zooming in/out). The vertical +/- buttons change the Y (amplitude)-axis range. Reset button when selected reset frequency and amplitude span do default values.



Logic Analizer

The Logic Analyzer application enables the representation of the binary states of digital signals. The Logic Analyzer can both deal with purely binary signals, such as GPIO outputs of the Raspberry Pi or Arduino board, as well as analyze different bus (I2C, SPI, and UART) and decode the transmitted data. Instrument applications are web-based and do not require the installation of any native software. Users can access them via a web browser using their smartphone, tablet or a PC running any popular operating system (MAC, Linux, Windows, Android, and iOS).

HAMlabs Logic Analyzer enables capturing of different logic levels. The graphical user interface of the Logic Analyzer fits well into the overall design of the HAMlab applications providing the same operating concept. The Logic Analyzer user interface is shown below.

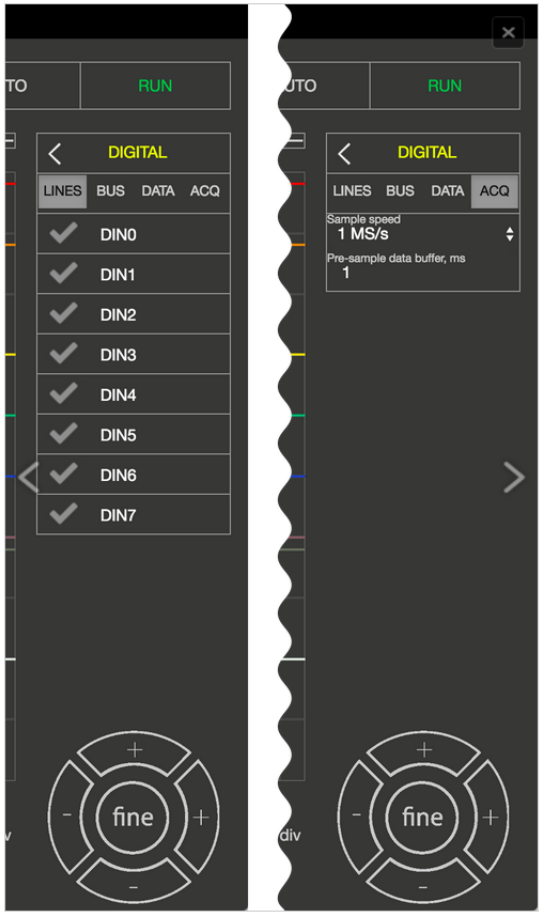


Apart from the actual graph, there are again 5 key areas/elements, in which the surface is divided:

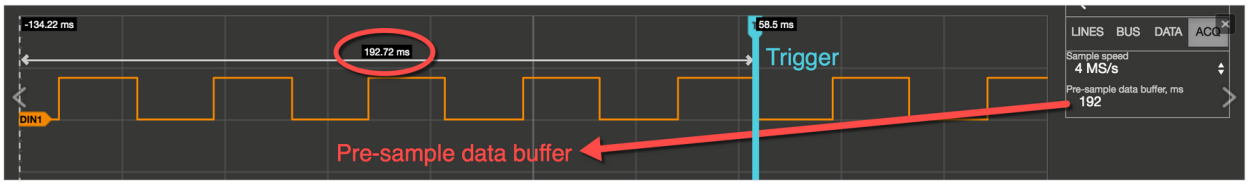
- **Auto**: Resets the zoom and brings the trigger event in the middle of the graph.
- **Run / Stop**: Starts recording the input signals, and interrupts it when the recording is active.
- **Channels / trigger / Measuring Tools**: This menu provides controls for inputs, triggers, and guides.
- **Axis control panel**: The horizontal +/- buttons enable you to select the scaling of the X axis and to change it, and to select the time range displayed in the graph. The vertical +/- buttons change the Y axis, and thus the height of the graph display. In addition, the setting for the time frame, trigger and sampling rate are displayed.
- **Status Display**: Displays information about the current state of the recording (stop, wait, ready).

Features

Analyzing binary signals

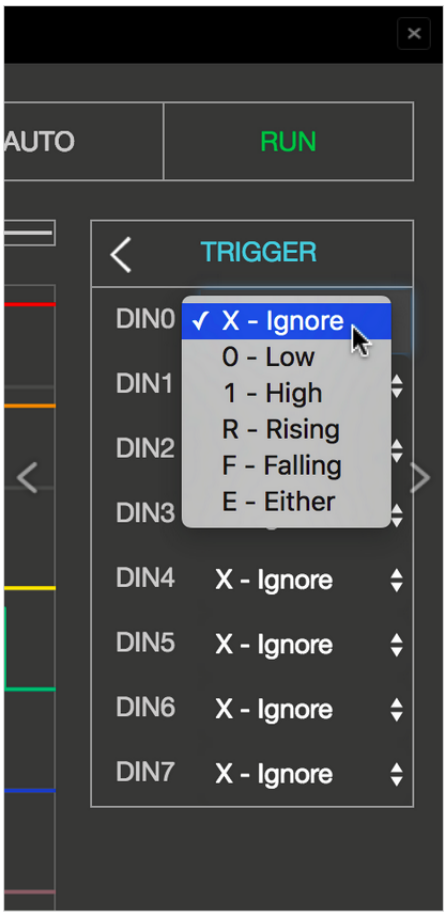


By selecting the gear button behind the DIGITAL selection field you enter the menu for the channel configuration. In the LINES register, the channels can be activated or deactivated by simply clicking the check mark. As long as no bus systems have been configured, the channels operate as purely digital inputs and correspondingly show the progress. The tab ACQ opens the selection field for the Sample rate settings. When selecting the values there is one thing to note: the sample rate has a significant influence on the time section, which can be represented. The memory depth of the Logic Analyzer applications is 1 MS, so it can store and display 1,000,000 binary values. From this it is clear that the sampling rate determines how many values are recorded per second. If we choose the highest sampling rate (125MS/s), 125,000,000 values would be recorded per second. Since 1,000,000 values can be stored is the time memory, we get a 0.008 second time window. With a sampling rate of 1MS/s, the time window of the recorded signal will be one full second. When the Pre-sample data buffer value is set, at which point of the recording the trigger event is located. This makes particular sense if you want to find out what happened before the defined trigger event. To illustrate with an example: the sample rate is set to 4MS / s, the stored time segment thus amounts to approximately 0.25s = 250ms. If the Pre-sample data buffer is set to 10ms, then the recorded signal shows what has happened 10ms before the event, and 240ms after the event.



TRIGGER

By clicking the gear behind TRIG settings, the trigger menu is opened. Each channel can be set as a trigger source with the desired condition. For acquisition to start, the Trigger source and Rising Edge needs to be defined.



The possible criteria for Trigger event are next:

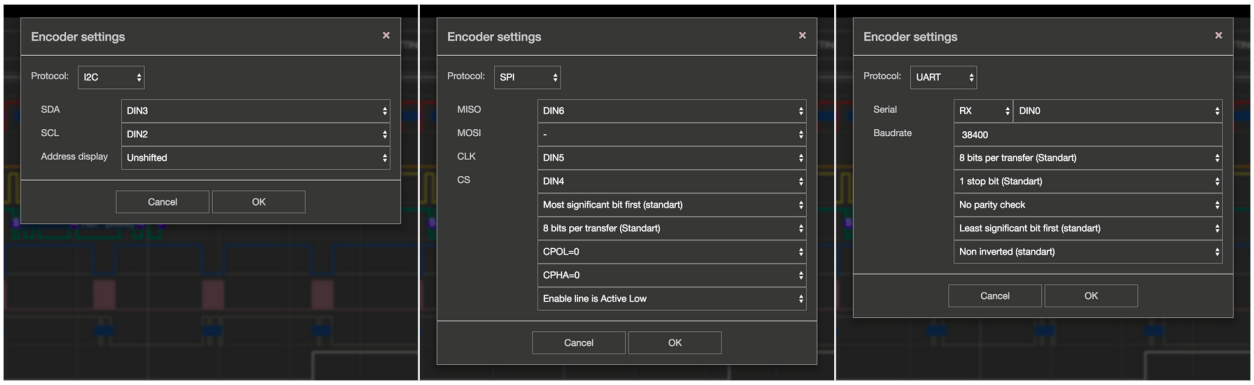
- X - Ignore no event
- R - Rising rising edge
- F - Falling Falling edge
- E - Either Edge change (rising or falling edge)

By clicking the RUN button the recording is started. The status display informs you whether the process is still running (WAITING) or has already been completed (DONE). After finishing the acquisition, the results are displayed in a graph. Additional trigger options LOW and HIGH are used for the so called Patterned triggering. For example: If you set the trigger source to be DIN0 – Rising edge (to have one channel defined as a trigger source with a rising or falling edge is a mandatory condition for the acquisition to start), DIN1 to HIGH and DIN2 to LOW this will cause such a behavior that the application logic will wait for the state where DIN0 goes from 0 to 1, DIN1 is 1 and DIN2 is 0 to start the acquisition.

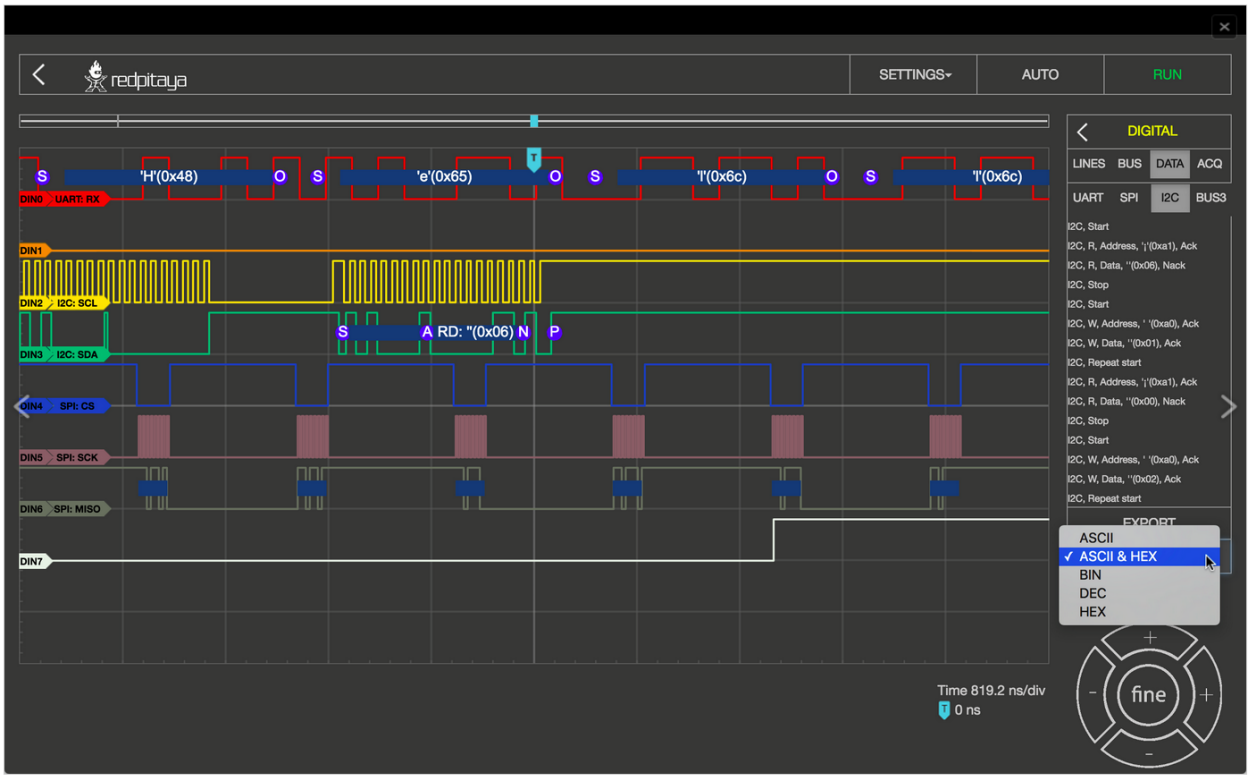
DECODE BUS DATA

In the **DIGITAL** → **BUS** menu the decoding of the desired lines can be selected. Up to 4 buses can be defined. The available decoding protocols are **I2C**, **UART**, and **SPI**. By selecting the desired protocol, the setting menu for the

selected protocol is opened.

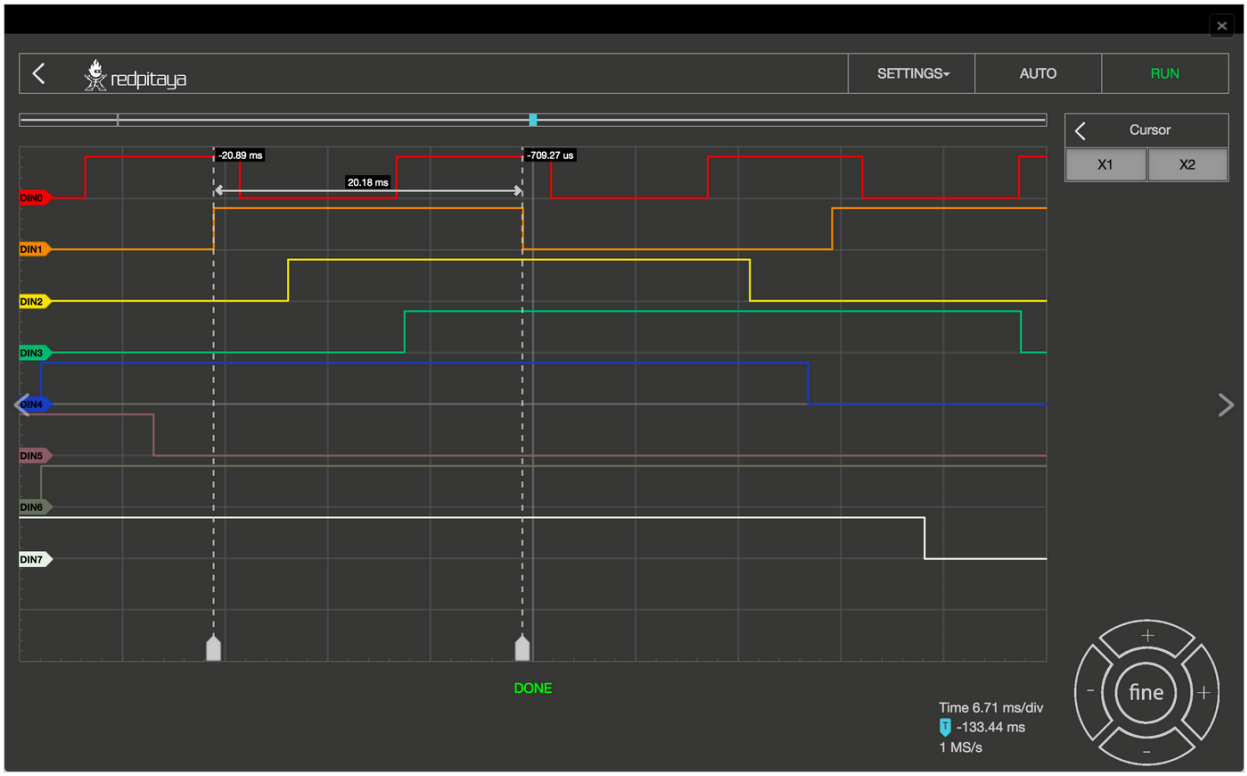


Two options are possible for the display of the decoded data: firstly, the data is placed as a separate layer in the graph directly on the signal. Secondly, using the DIGITAL → DATA menu where the decoded data are represented in a table format. You can select **ASCII**, **DEC**, **BIN** and **HEX** data formatting. With the **EXPORT** button the decoded data can be packed into a CSV file. This then ends up directly in the download folder and can be used for further analysis.



CURSORS

As with the Oscilloscope the Logic Analyzer App also provides **CURSORS** for quick measurements. Because there are no variable amplitude readings but only discrete signal levels, the cursors are available exclusively for the X axis. When enabled, the cursors will show the relative time respectively to zero point (trigger event) and the difference between the two.



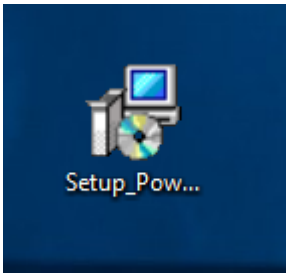
Note: On HAMlab OS releses before 0.97.100 Logic Analizer application will be require to enter unlock code into our licencing system. Procedure can be access at *Unlocking Logic Analizer app* section.

Power SDR

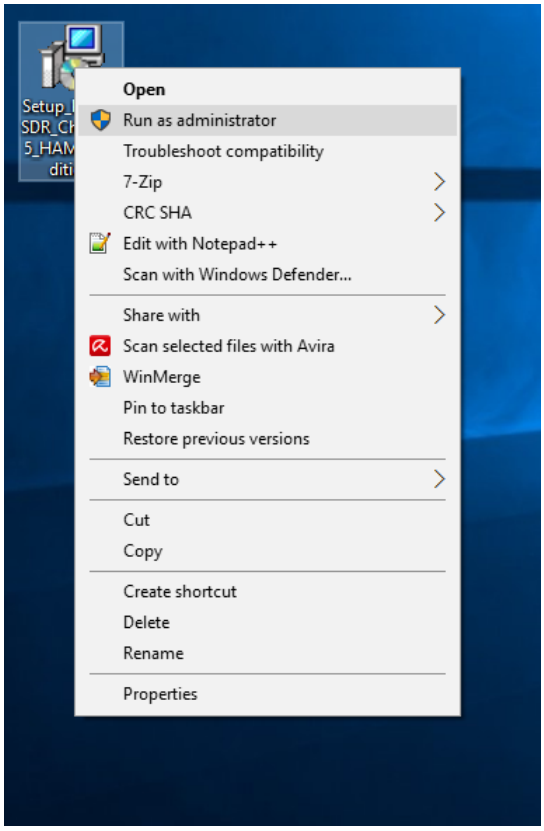
Power SDR installation and SDR configuration

Click here to download Power SDR installation package.

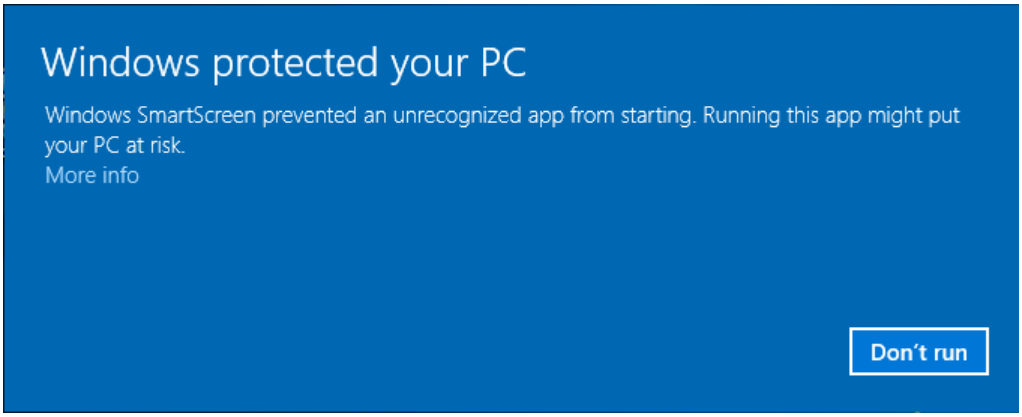
1. Start the installation by double clicking on the Setup_PowerSDR_STEMlab_HAMlab_Edition.exe file.

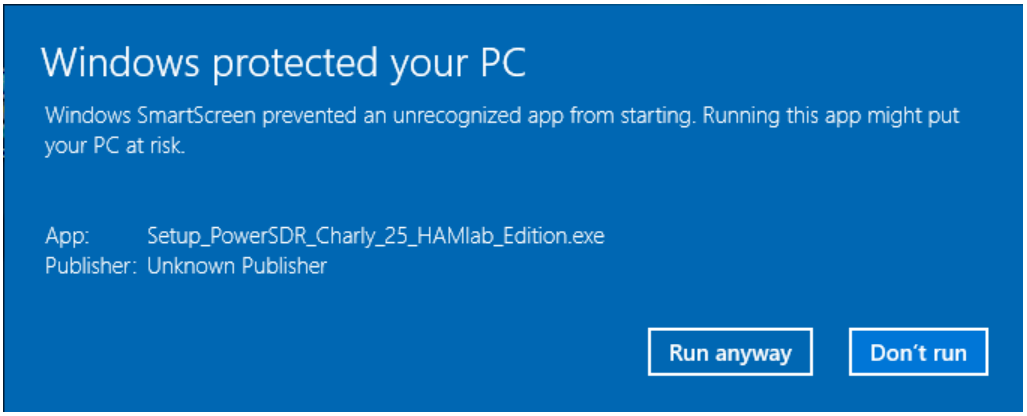


2. If you are asked for extended user access rights during the installation click Yes! Running installer with administration rights will work as well.

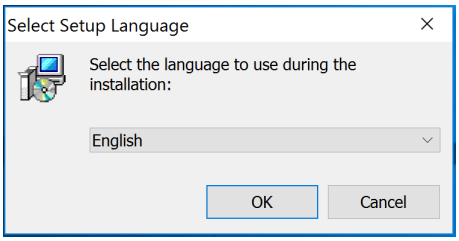


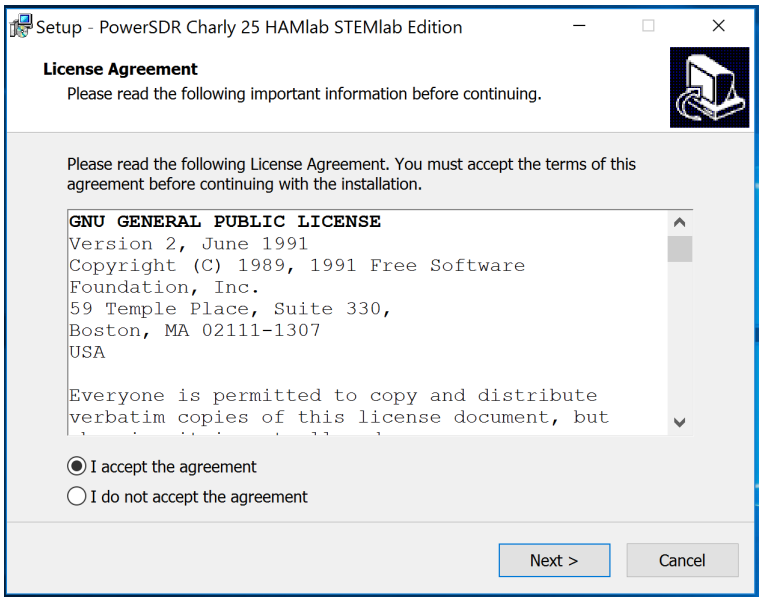
On Windows 10 you might get warning of Unknown Publisher you can procede with installation by clicking on “more info” and then “Run anyway”.

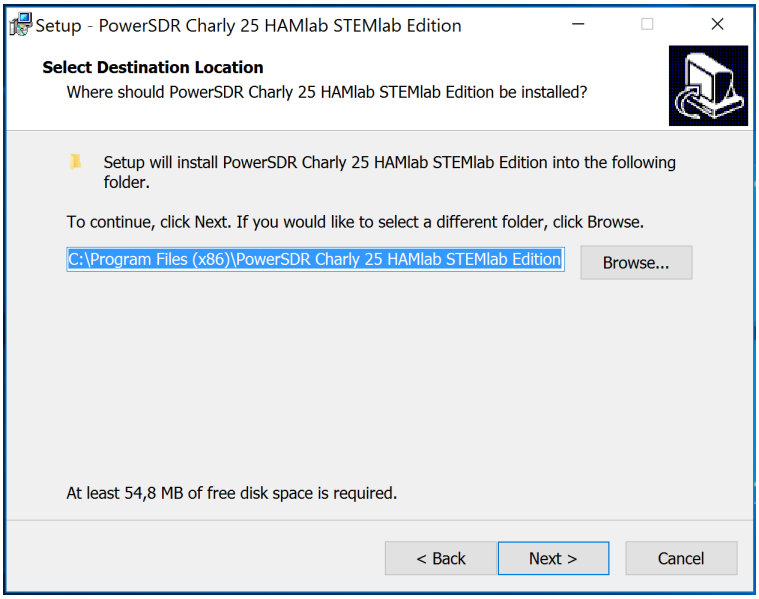


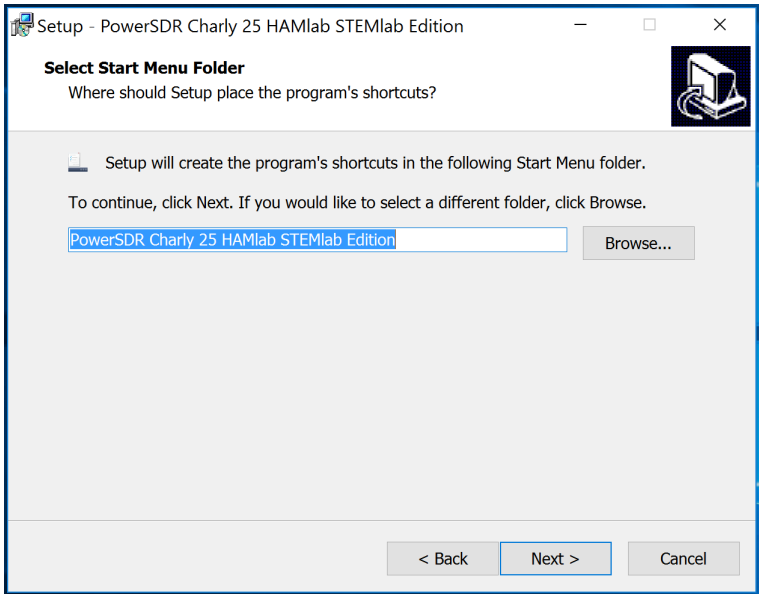


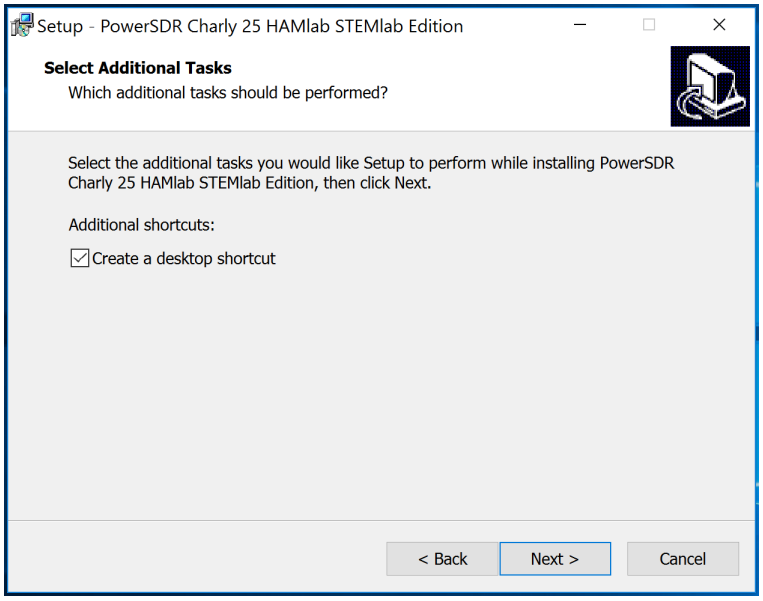
3. Follow the instructions of the setup routine and accept the license agreements if asked for.

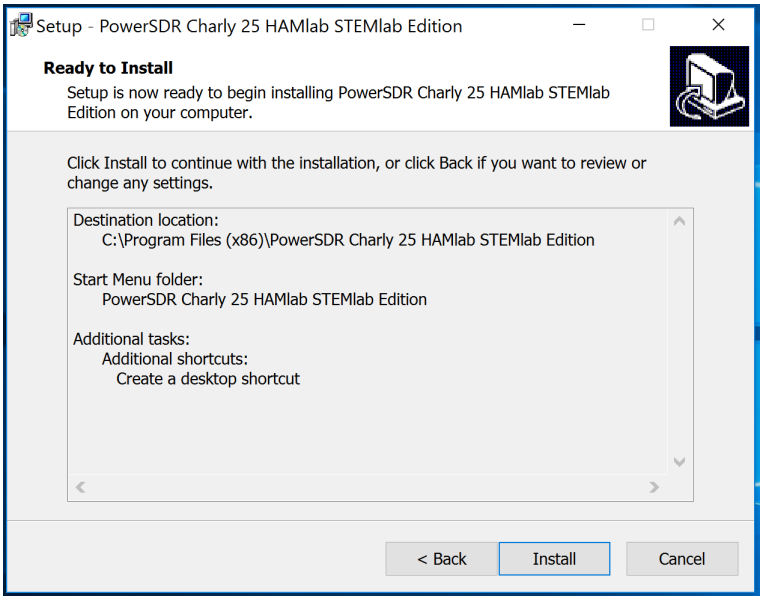


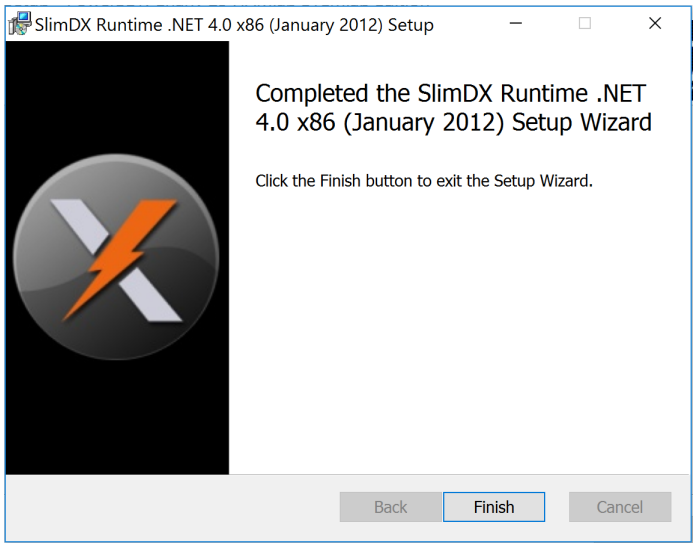



Setup - PowerSDR Charly 25 HAMlab STEMlab Edition
Select Destination Location
Where should PowerSDR Charly 25 HAMlab STEMlab Edition be installed?
Setup will install PowerSDR Charly 25 HAMlab STEMlab Edition into the following folder.
To continue, click Next. If you would like to select a different folder, click Browse.
C:\Program Files (x86)\PowerSDR Charly 25 HAMlab STEMlab Edition
Browse...
At least 54,8 MB of free disk space is required.
< Back
Next >
Cancel

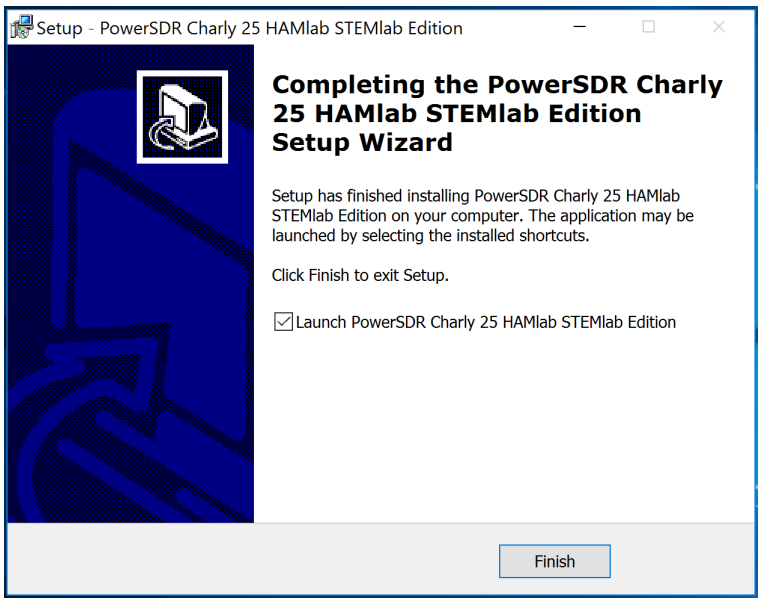

Setup - PowerSDR Charly 25 HAMlab STEMlab Edition
Select Start Menu Folder
Where should Setup place the program's shortcuts?
Setup will create the program's shortcuts in the following Start Menu folder.
To continue, click Next. If you would like to select a different folder, click Browse.
PowerSDR Charly 25 HAMlab STEMlab Edition
Browse...
< Back
Next >
Cancel


Setup - PowerSDR Charly 25 HAMlab STEMlab Edition
Select Additional Tasks
Which additional tasks should be performed?
Select the additional tasks you would like Setup to perform while installing PowerSDR Charly 25 HAMlab STEMlab Edition, then click Next.
Additional shortcuts:
Create a desktop shortcut
< Back
Next >
Cancel

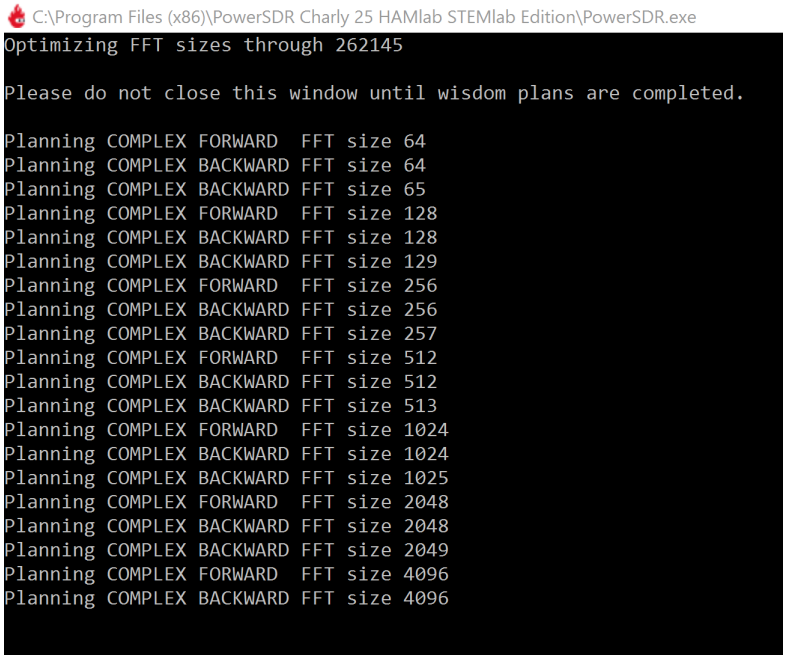

Setup - PowerSDR Charly 25 HAMlab STEMlab Edition
Ready to Install
Setup is now ready to begin installing PowerSDR Charly 25 HAMlab STEMlab Edition on your computer.
Click Install to continue with the installation, or click Back if you want to review or change any settings.
Destination location:
C:\Program Files (x86)\PowerSDR Charly 25 HAMlab STEMlab Edition
Start Menu folder:
PowerSDR Charly 25 HAMlab STEMlab Edition
Additional tasks:
Additional shortcuts:
Create a desktop shortcut
< Back
Install
Cancel



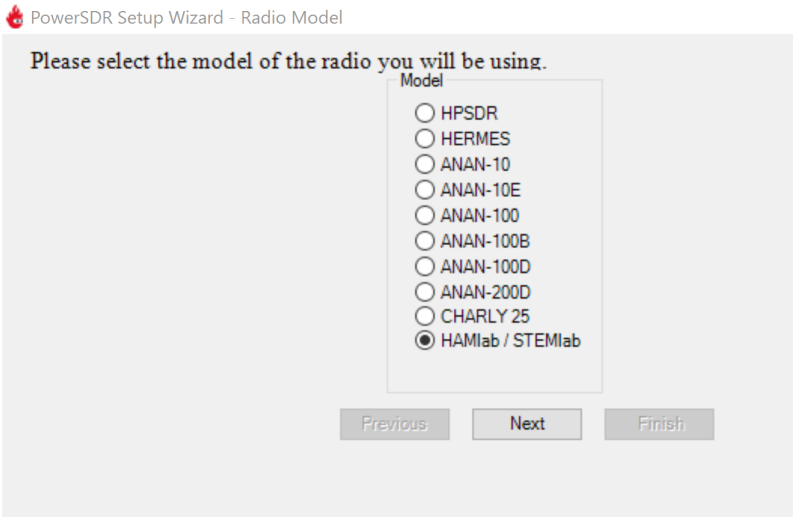
4. At the end of the installation you are asked if you want to run PowerSDR software immediately, feel free to do so.



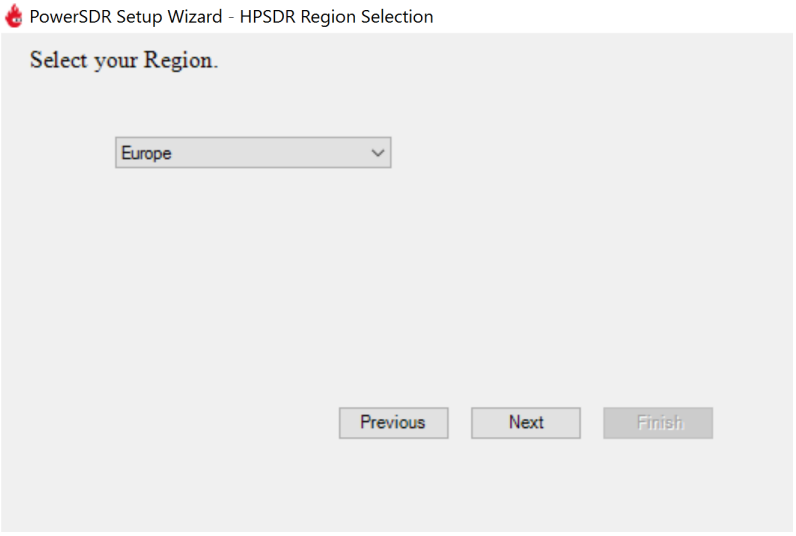
5. PowerSDR software will start with the calculation of the FFT wisdom file, **which will take a while** depending on the CPU power of your computer. This is only done once, even after updating the software to a new version in the future:



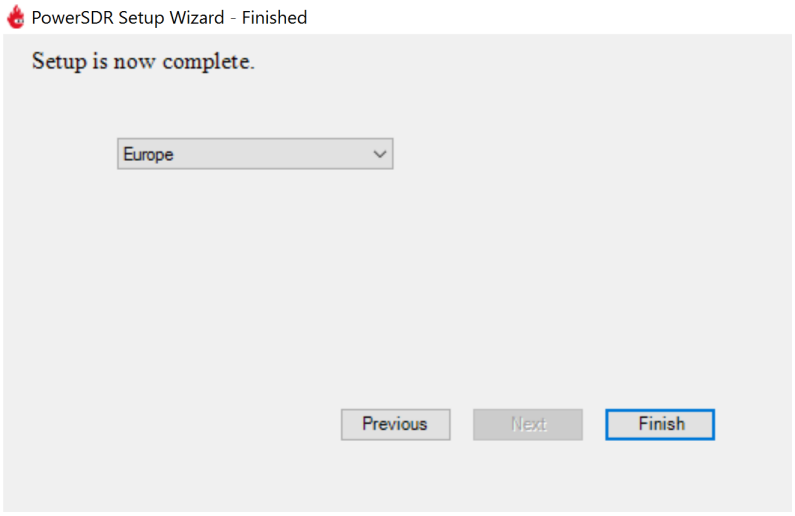
6. After starting the PowerSDR software you will be led through the PowerSDR software specific setup wizard which lets you configure the software to use it with your STEMlab. Pick the HAMlab/STEMlab radio model.



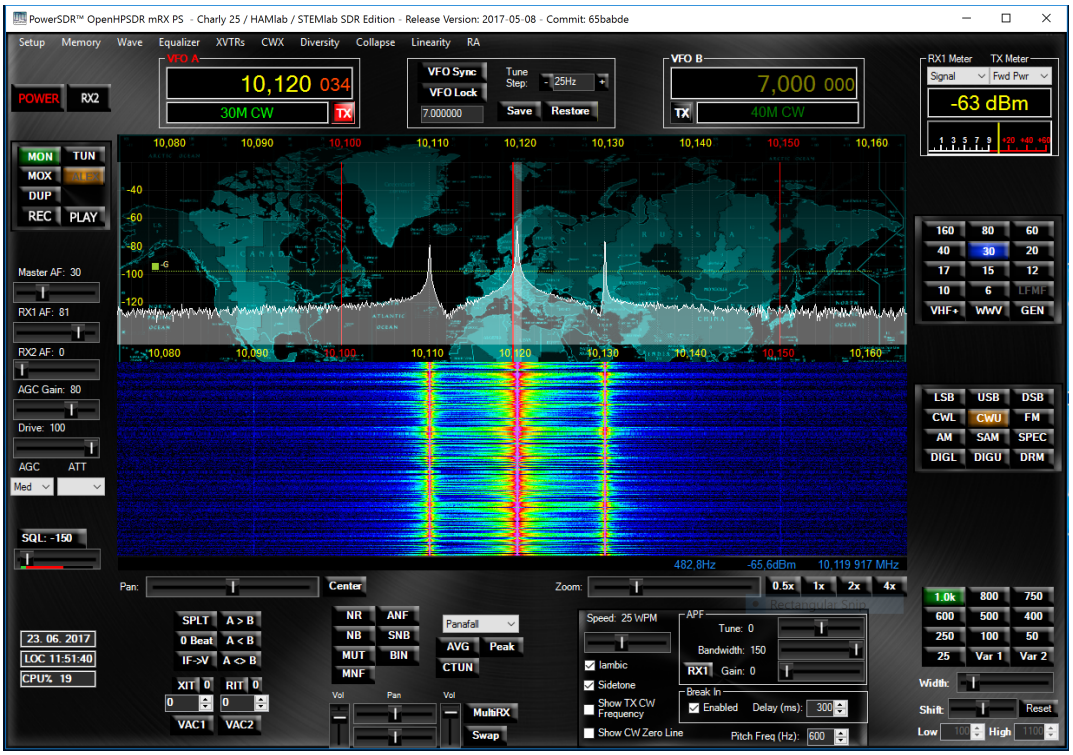
7. Select the region where you are using your STEMlab, this is important due to the different frequency ranges your are allowed to transmit in the different countries all over the world:



8. Your initial setup is completed click finish.

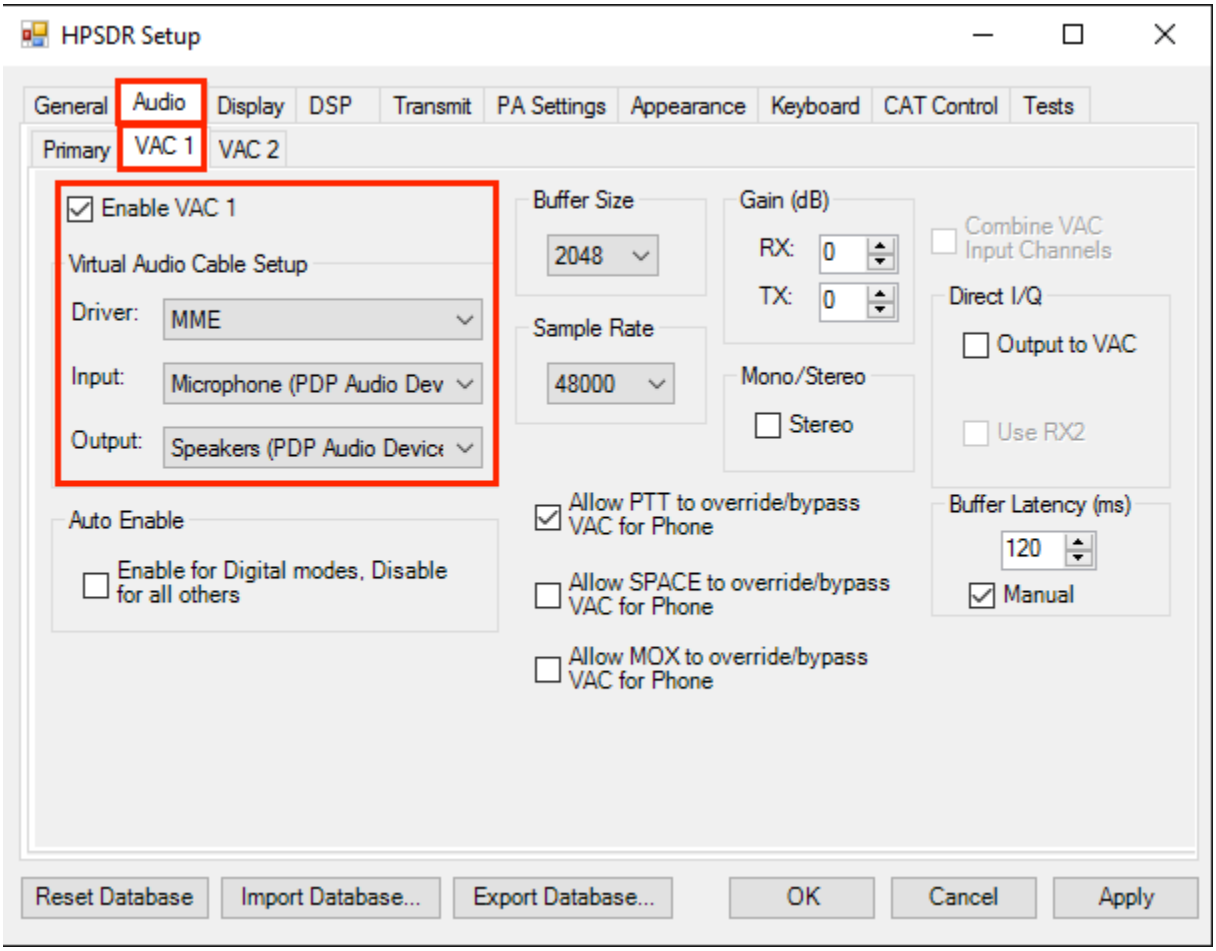


9. Click Power to connect Power SDR with STEMlab. On the screen the input singnal should appear.



Power SDR configuration

Audio configuration (only required for HAMlab 80-10 10W model)

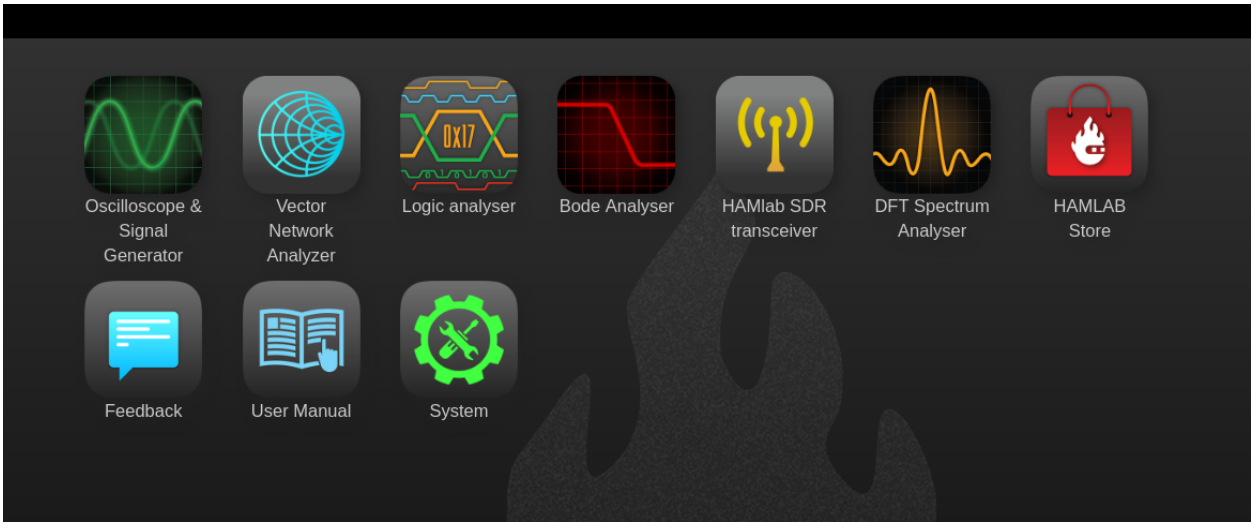


Power SDR basic usage

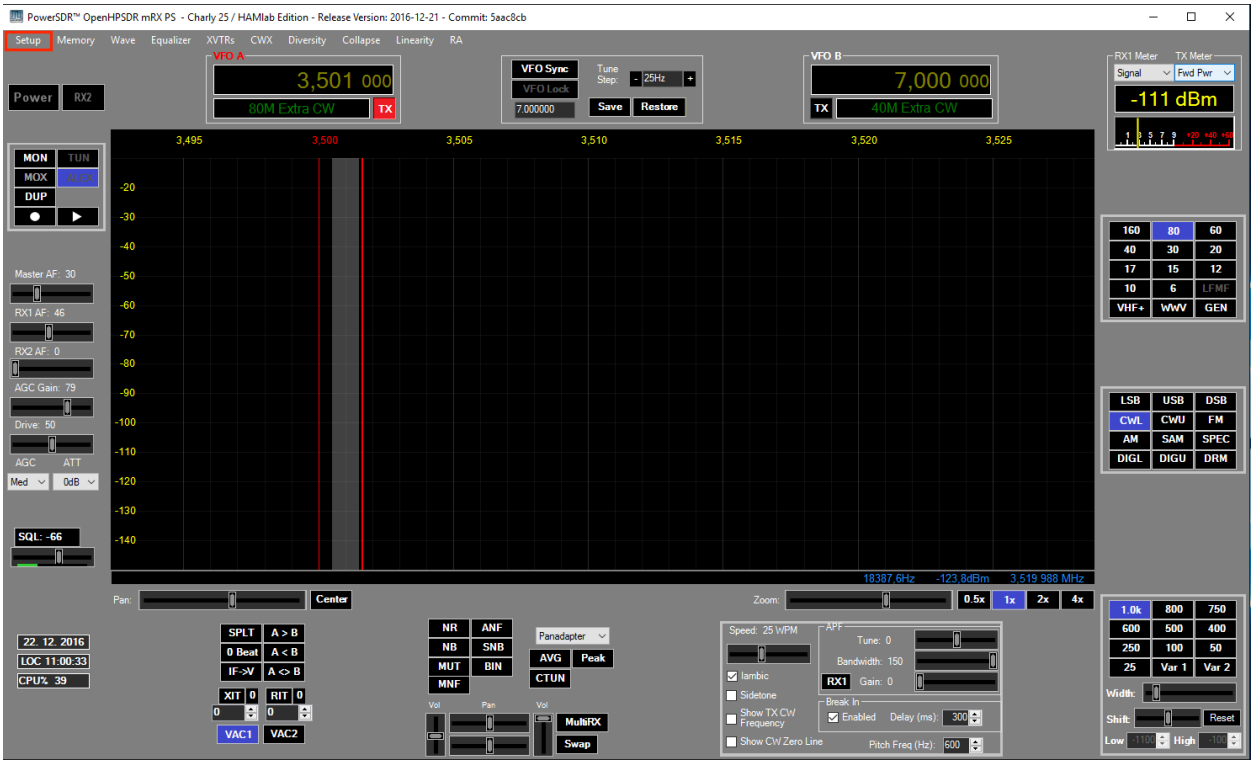
Putting HAMlab into SDR mode

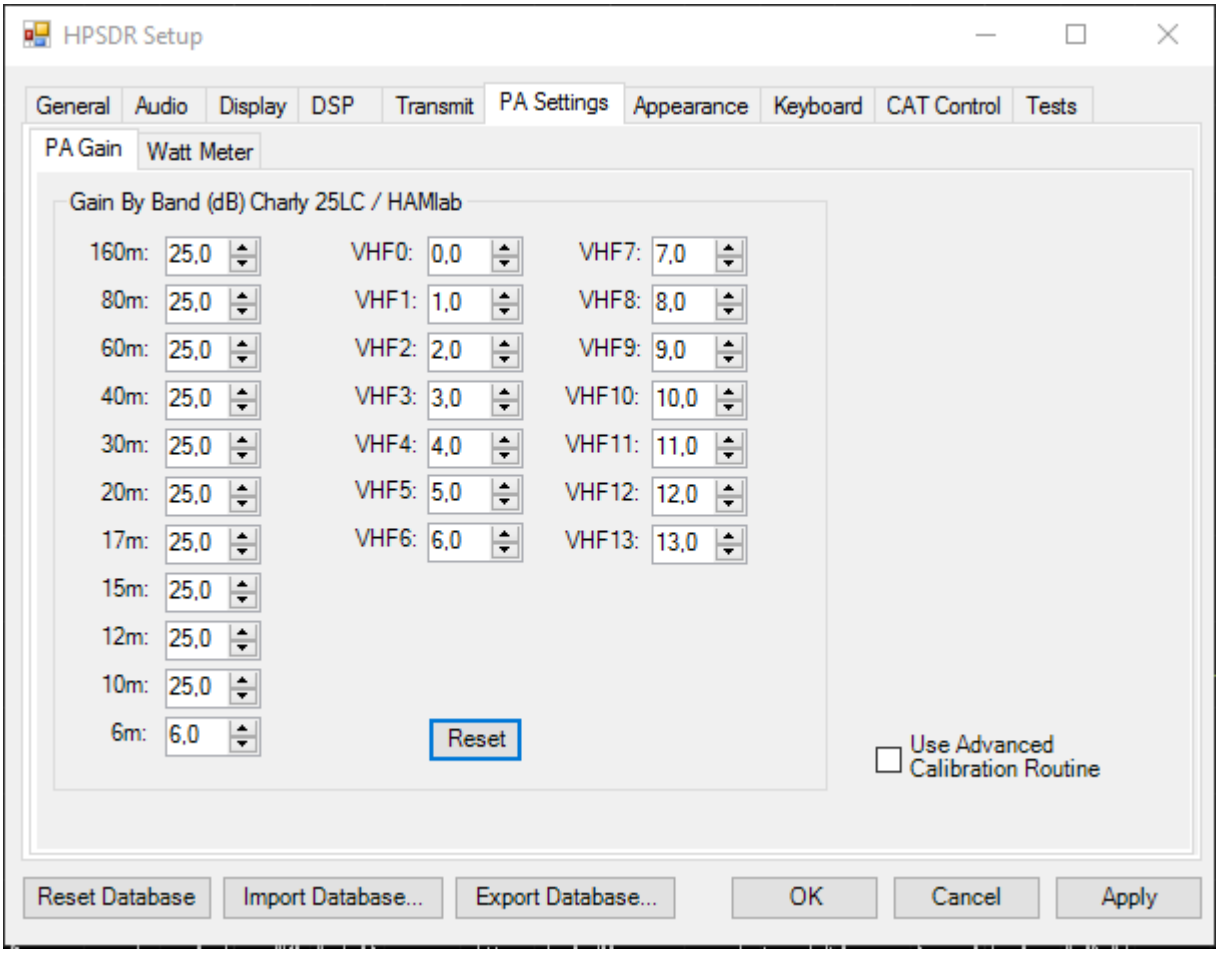
1. Turn on power supply, HAMlab will start automatically. Next time you can momentary press on the power button to turn it on/off.
2. Make sure your computer is connected to same local area network as HAMlab.
3. On your computer start a WEB browser (Chrome recommended).
4. Type in the HAMlab URL that can be found on the back panel of the HAMlab

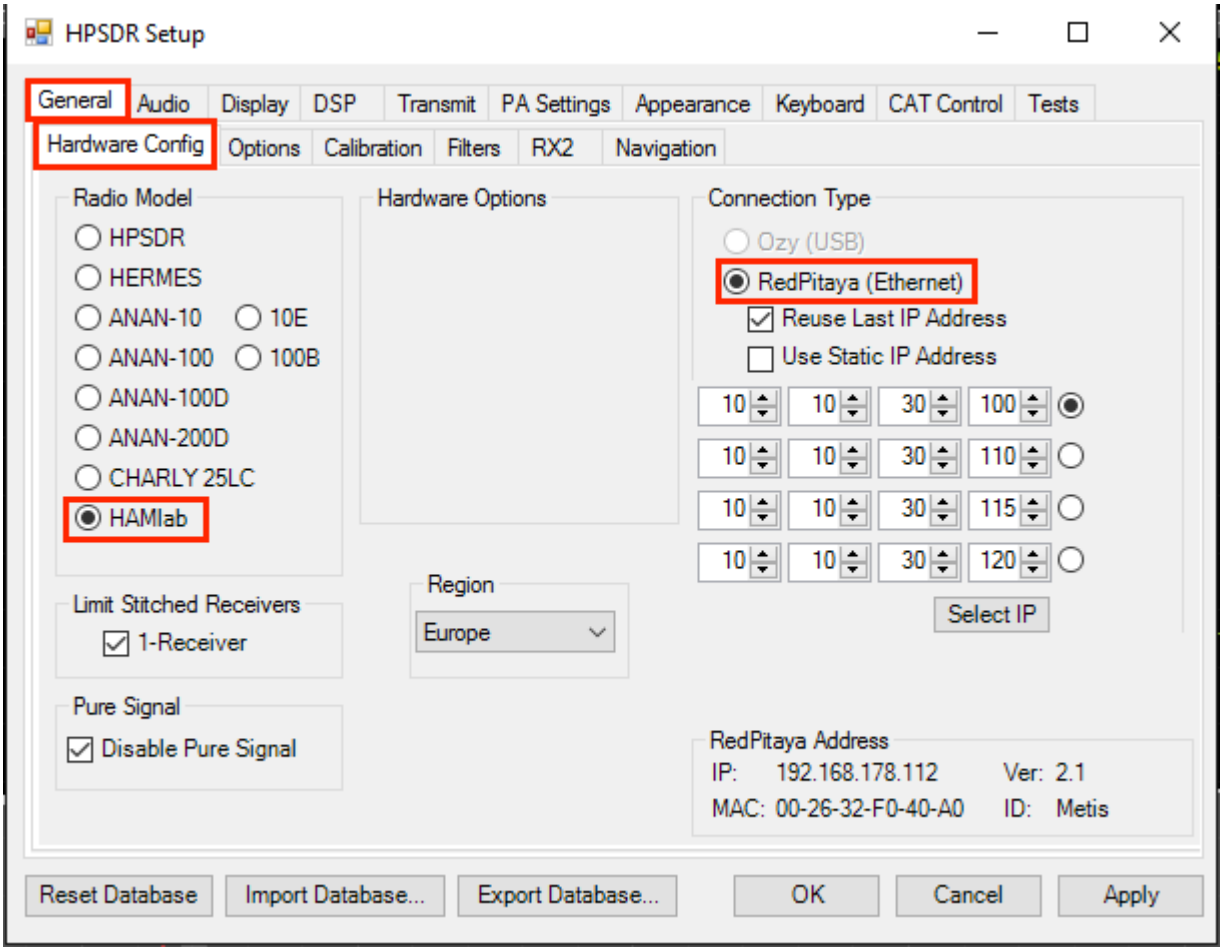
HAMlab application page should appear



Connecting Power SDR with HAMlab




HPSDR Setup
General
Audio
Display
DSP
Transmit
PA Settings
Appearance
Keyboard
CAT Control
Tests
PA Gain
Watt Meter
Gain By Band (dB) Charly 25LC / HAMlab
160m: 25,0
80m: 25,0
60m: 25,0
40m: 25,0
30m: 25,0
20m: 25,0
17m: 25,0
15m: 25,0
12m: 25,0
10m: 25,0
6m: 6,0
VHF0: 0,0
VHF1: 1,0
VHF2: 2,0
VHF3: 3,0
VHF4: 4,0
VHF5: 5,0
VHF6: 6,0
VHF7: 7,0
VHF8: 8,0
VHF9: 9,0
VHF10: 10,0
VHF11: 11,0
VHF12: 12,0
VHF13: 13,0
Reset
Use Advanced Calibration Routine
Reset Database
Import Database...
Export Database...
OK
Cancel
Apply



Receiving

Transmitting

Credits

Original developer of sdr-transceiver-hpsdr web application is Pavel Demin. Original developer of PowerSDR is FlexRadio Systems.

Repositories used for our builds:

- https://github.com/RedPitaya/PowerSDR_HPSDR_mRX_PS
- https://github.com/RedPitaya/red-pitaya-notes

CHAPTER 4

HAMlab 80-10 10W Specifications

SDR specifications

Highlights

Architecture:	direct sampling / internal high performance 14-bit A/D and D/A 125 Msps converters (no sound card required)
Band coverage:	All band receiver with 5 bands transmitter (80, 40, 20, 10 m)
Transmit power:	up to 10 W
Wideband Frequency Coverage:	25 kHz - 62.25 MHz
Connection to PC:	1 Gbit ethernet or WIFI connection
Software:	Power SDR, HDSPR, Gqrx, GNU Radio, GNU Radio Companion and Pothos
Phones and MIC connection:	available on the front panel
Secondary Rx and Tx channel:	available through back panel BNC connectors (RX2 IN, XVTX)
CW key and paddle input:	available through front panel jack connector

Receiver Specifications

Architecture:	Direct Digital Sampling
ADC Sampling Rate:	125Msps
ADC Resolution:	14 bits
Wideband Frequency Coverage:	25 kHz - 62.25 MHz
MDS (min. detectable signal):	MDS (typ)@ 500Hz BW
Preamp OFF at 14MHz	-113dBm
Preamp +15dB at 14MHz	-130dBm
Preamp +30dB at 50MHz	-135dBm
	More MDS measurements.
Preselectors:	Available as add-on module (comming soon)
	User can also connect own preselectors/filters to back panel BNC connectors (RX1 IN, RX1 OUT)

Transmitter Specifications

Architecture:	Direct Digital Up-conversion
TX DAC Sampling Rate:	125 Msps
TX DAC Resolution:	14 bits
RF Output Power:	up to 10 W CW and SSB at @ 13.8 V input voltage (max. 15 V)
Transmitter Frequency Range:	80 - 10 m (amateur bands only)
Low Pass PA Filter Bands:	80 m / 40 m / 20 m / 10 m (possibility to changed it to any range 1.8 - 50 MHz)
Emission Modes Types:	not limited by HAMlab hw, depending on 3rd party SDR software used
Harmonic Radiation:	better than -45 dB
3rd-Order IMD:	better than -35 dB below PEP @ 14.2 MHz 10 Watts PEP
Cooling:	copper heat spreader
Microphone connector:	RJ45
Microphone impedance:	600 ohm unbalanced

General Specifications

Antenna Connector:	SO-239 UHF or BNC back panel connector (ANT1, ANT2)
Antenna Impedance:	50 Ohm Unbalanced
RF Output Power:	up to 10 W CW and SSB at 13.8 V input voltage (max. 15 V)
Maximum Interconnect Cable Length Ethernet:	100 meters (328 feet), Category 5 cable
Power connector:	PowerPole

Measurement instruments specifications

Oscilloscope

Input channels	2
Input channels connector	BNC
Bandwidth	50 MHz
Resolution	14 bit
Memory depth	16384 Samples Max.
Sampling Rate	125 MS/s
Input range	+/- 1 V or +/- 20 V
Input coupling	AC/DC
Minimal Voltage Sensitivity	$\pm$0.244 mV / $\pm$2.44 mV
External Trigger connector	BNC
Input coupling	AC/DC

Signal generator

Output channels	2
Output channels connector	BNC
Bandwidth	50 MHz
Resolution	14 bit
Signal buffer	16384 Samples Max.
Sampling Rate	125 MS/s
Output range	+/- 1V
Frequency Range	0 - 50 MHz
Output impedance	50 ohm
External Trigger connector	BNC

Spectrum analyzer

Input channels	2
Input channels connector	BNC
Bandwidth	0 - 62 MHz
Dynamic Range	-80dBm
Input noise level	< -119 dBm/Hz
Input range	+/- 1V
Frequency Range	0 - 50 MHz
Input impedance	1 MΩ / 10 pF
Spurious frequency components	-90 dBFS Typically

Logic analyzer

Input channels	8
Max. sample rate	125 MS/s
Fastest input signal	50 MHz
Supported protocols:	I2C, SPI, UART
Input voltage levels	2.5 V - 5.5 V
Threshold:	0.8 V for logic low
	2.0 V for logic high
Input impedance	100 kohm 3 pF
Sample depth	1 MS (typical*)
Trigger resolution	8 ns
Min. detectable pulse length	10 ns

Note: Acquired data is compressed therefore the size of data than can be captured depends on activity of signal on LA inputs. For I2C, SPI & UART signals 1MS is typical sample depth. All instrumentation applications are WEB based and don't require the installation of any native software. Users can access them via a browser using their smartphone, tablet or a PC running any popular operating systems (MAC, Linux, Windows, Android and iOS).

General Electrical specifications

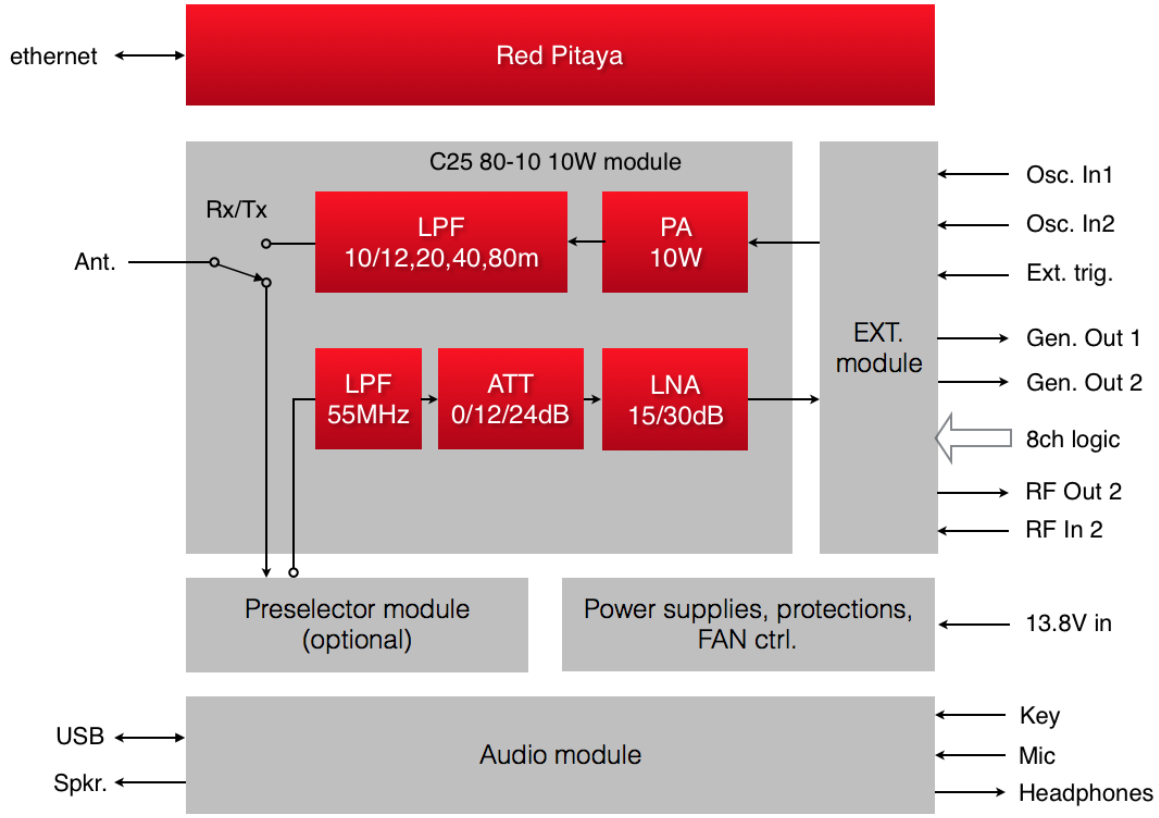
Power Requirements:	+13.8 V DC nominal $\pm$ 15 % (Transmitter output specified at 13.8 V DC)
Power Consumption:	4 A

Mechanical specifications

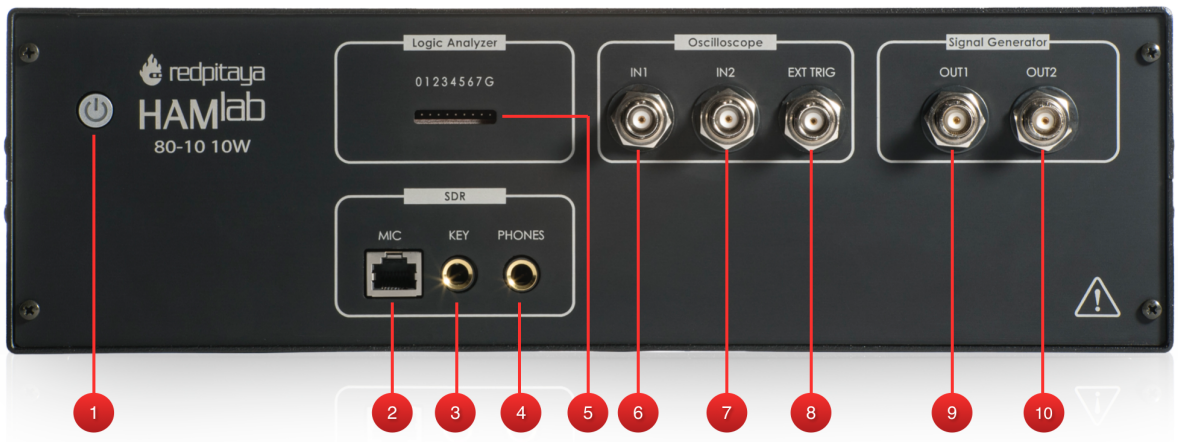
Height:	100 mm
Width:	340 mm
Depth:	215 mm
Weight:	5 kg
Operating temperature:	-10*C to +50*C

HAMlab system architecture

SDR block diagram r2



Front panel controls and connections



Power button

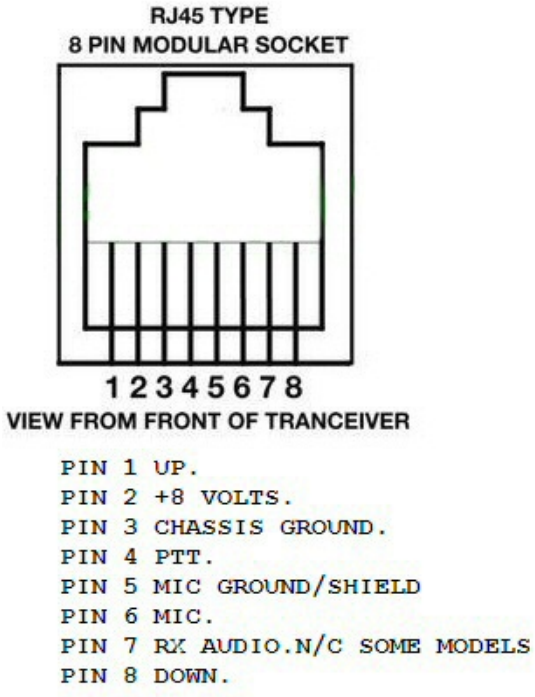
Momentarily pressing power button **(1)** will turn the HAMlab ON. It normally takes 30s from the button press until the HAMlab is ready to be used. Once HAMlab is ON, holding the power button pressed will cause the proper shut down of the device. Blue LED indication on the power button indicates that device is turned on.

Note: In case that system halts and becomes unresponsive, device can be turned off by holding power button for a few seconds / until the blue LED is turned off.

SDR

Microphone connector (RJ45)

The HAMlab 80-10 10W front microphone connector **(2)** can support Kenwood KMC 30 electret microphone or compatible types.



Front panel view microphone pinout

Pin	Function
1	NC
2	8V DC
3	Ground
4	PTT
5	Ground
6	MIC
7	NC
8	NC

CW Key / paddle jack

The CW key/paddle jack **(3)** is a ¼ inch TRS phone plug. Tip - DOT Ring - DASH The common is connected to the sleeve.

Note: 3.3V Max input.

For an iambic paddle, the tip is connected to the dot paddle, the ring is connected to the dash paddle and the sleeve is connected to the common. For a straight key or a keyer output, connect to the tip and leave the ring floating. The common is connected to the sleeve.

Note: Currently keyer is not supported by software. Software support for it will be availabe in one of incomming software updates.

Phones

The HAMlab 80-10 10W supports a stereo headset with headphone ¼ inch TRS phone plug **(4)** . Mono or TS connector that grounds the "ring" portion of the connector should not be used!

Logic analyzer

0-7 are logic analyzer inputs. G - common ground.

Note: Logic analyzer inputs **(5)** can only be used when running Logic analyzer WEB app.

Oscilloscope

(6) - IN1 **(7)** - IN2 **(8)** - EXT. TRIG.

IN1, IN2 and EXT. TRIG. are oscilloscope inputs.

Note: These inputs are active and can be used only when Oscilloscope+Signal generator WEB application is running.

Signal generator

(9) - OUT1 **(10)** - OUT2

OUT1 and OUT2 are signal generator outputs.

Note: These two outputs are active and can be controlled only when Oscilloscope+Signal generator WEB application is running.

Note: To get expected signals from the signal generator, outputs must be 50ohm terminated.

Back panel controls and connections

ANT - TRANSCEIVER ANTENNA PORTS [1,2]

ANT1 **(1)** is SO-239 50 ohm connector, while ANT2 **(2)** is BNC 50 ohm connector.

User can connect transmitter output to ANT1 or ANT2 by properly connecting SMA cable inside the chassis to one of ANT connectors. Software switching between ANT1 and ANT2 is not available in HAMlab 80-10 10W version.

Danger: THIS UNIT GENERATES RADIO FREQUENCY (RF) ENERGY. USE CAUTION AND OBSERVE PROPER SAFETY PRACTICES REGARDING YOUR SYSTEM CONFIGURATION. WHEN ATTACHED TO AN ANTENNA, THIS RADIO IS CAPABLE OF GENERATING RF ELECTROMAGNETIC FIELDS WHICH REQUIRE EVALUATION ACCORDING TO YOUR NATIONAL LAW TO PROVIDE ANY NECESSARY ISOLATION OR PROTECTION REQUIRED, WITH RESPECT TO HUMAN EXPOSURE!

Danger: NEVER CONNECT OR DISCONNECT ANTENNAS WHILE IN TRANSMIT MODE. THIS MAY CAUSE ELECTRICAL SHOCK OR RF BURNS TO YOUR SKIN AND DAMAGE TO THE UNIT.

AUX1

RX1 IN - direct feed to the first receiver pre-amp and attenuators.

RX1 OUT - an output from the antenna feeding

By default HAMlab 80-10 10W comes with loopback cable connected from RX1 IN to RX1 OUT. User can also use this two connectors to insert external filters or preamplifier.

Note: This input is not protected by any ESD circuitry, therefore device connected to the RX1 OUT Output is susceptible to possible damage by ESD from an EMP event if the connected device does not have adequate ESD protection circuitry.

Warning: Be aware that Preamp1 and Preamp 2 are both wide band amplifiers covering the whole bandwidth of 55MHz. It is not recommended to use the Preamps on a large Antenna without a Preselector connected (this would cause overload and intermodulation from strong broadcast signals outside the Amateur Radio Bands)!

AUX2

RX2 IN - secondary 50ohm receiver input that can be used as a second panadapter in Power SDR software or to as feedback signal for pre-distortions (Pure Signal tool).

XVTR (TX2 OUT) - secondary transmitter can be used to drive external PA Max. output power is around 10 dBm @ 50ohm.

However, currently there is no support in HPSDR for a second TX output.

Power and Fuses

The HAMlab 80-10 10W is designed to operate from a 13.8 volt nominal DC supply and required at least 4A.

Danger: This unit must only be operated with the electrical power described in this manual. NEVER CONNECT THE +13.8VDC POWER CONNECTOR DIRECTLY TO AN AC OUTLET. This may cause a fire, injury, or electrical shock.

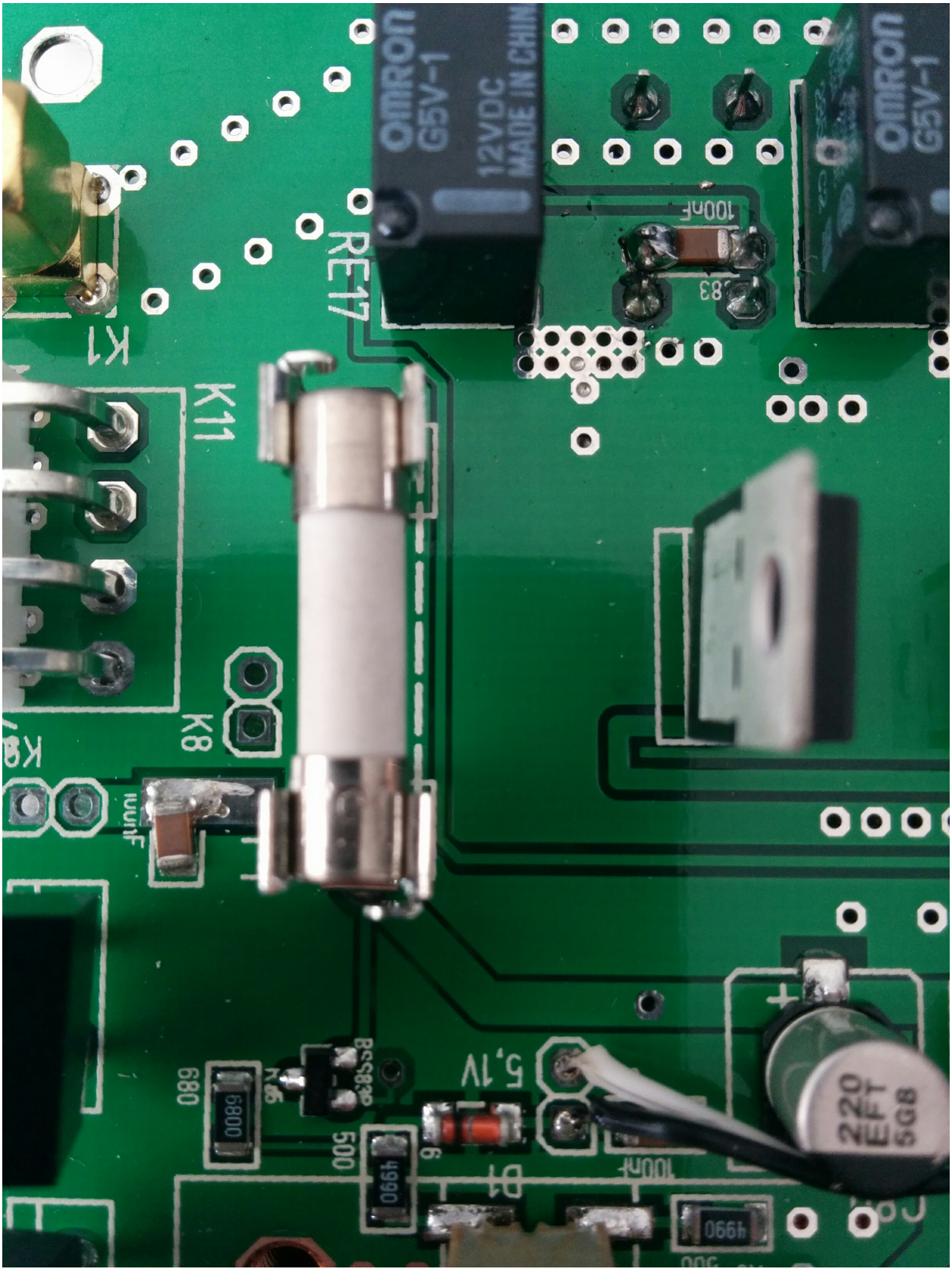
The HAMlab 80-10 10W requires 13.8 VDC @ 4 A measured at the radio in order to transmit maximum wattage. Multiple power cable connections between the power supply and the HAMlab 80-10 10W, a poorly regulated power supply, undersized power cable and very long power cable lengths will result in a voltage drop, especially under load. Any voltage deviation from 13.8 VDC will result in lower power output that the 10W nominal specification.

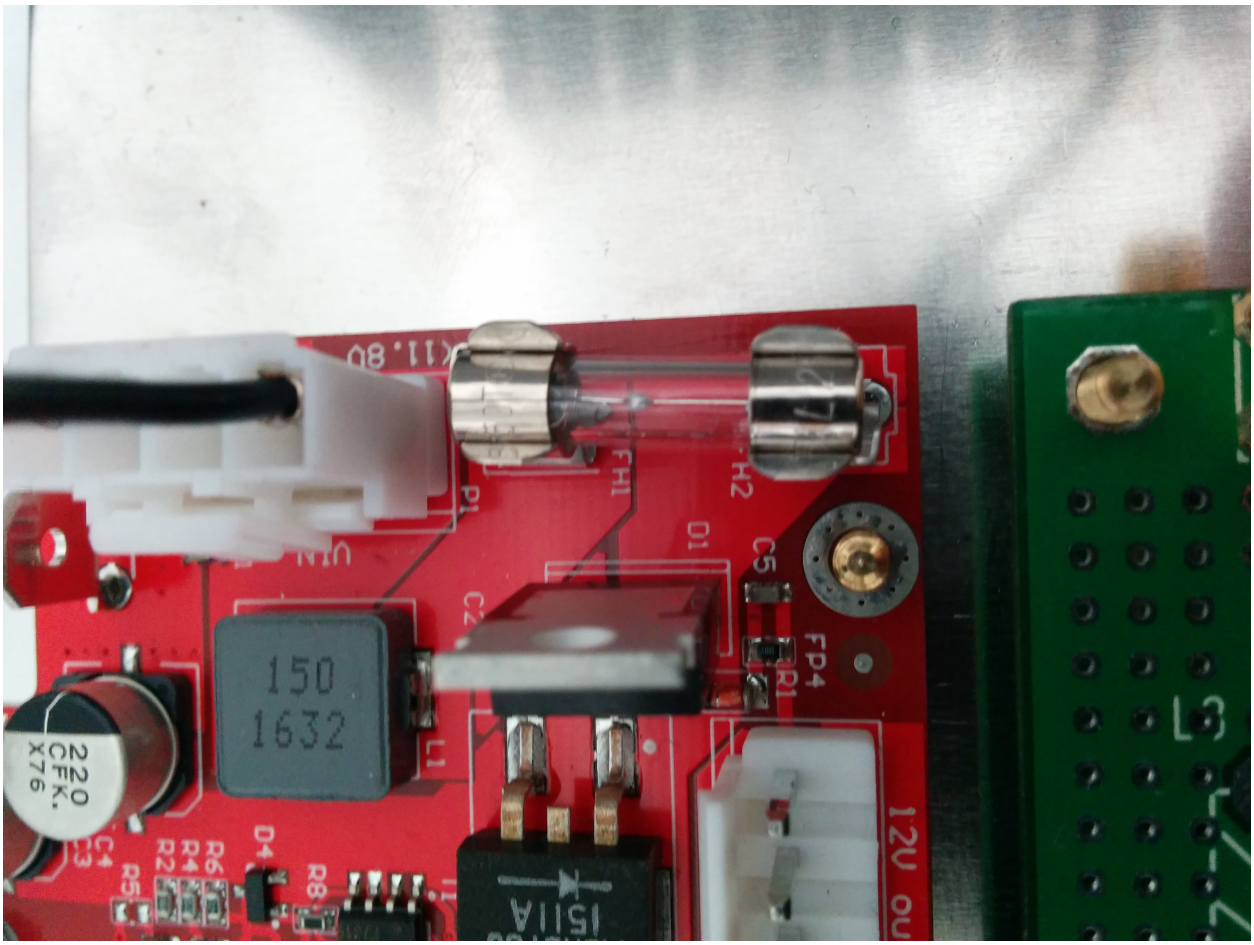
For best results, select a linear or switching power supply that is well regulated and free of internally generated radio frequency noise. “Birdies” generated by a poorly filtered supply can often appear as signals in the Power SDR Panadapter display.

The Anderson Powerpole™ connector contains 45 Amp pins to minimize voltage drop during transmit. The RED connection should be connected to the positive (+) lead of the power source. The BLACK connection should be connected to the negative (-) lead of the power source.

I - If you choose to use your own Powerpole cabling, be sure to properly size the wire and the Powerpole connector to minimize voltage drop during transmit. Excessive voltage drop can cause lower transmit power output levels.

There are two internal fuses in the HAMlab. One is protecting whole system while the other one is just for the transceiver. If you ever need to replace the internal fuse, remove the top cover and the shield of the power board.


OMRON
G5V-1
12VDC
MADE IN CHIN
OMRON
G5V-1
RE17
K1
K11
K8
100nF
680
5,1V
500
220
EFT
5G8



Danger: FUSE CURRENT RATING SHOULD NOT BE HIGHER THAN 3.15A AMPS! FAILURE TO PROPERLY USE THIS SAFETY DEVICE COULD RESULT IN DAMAGE TO YOUR RADIO, POWER SUPPLY, OR CREATE A FIRE RISK.

Chassis ground

This is a thumbscrew for attaching an earth ground to the chassis of the radio. Grounding is the most important safety enhancement you can make to your shack. Always ground the HAMlab to your station RF ground using high quality wiring with the length being as short as possible. Braided wire is considered the best for ground applications. Your station ground should be a common point where all grounds come together. You will likely be using a PC and a DC power source so be sure to ground these devices together as well.

AUDIO

Audio USB connector USB 2.0 Cable - A-Male to Mini-B must be used to connect HAMlab audio sound card with the PC in order to be able to use Phone, MIC and speaker connector for voice communication.

Speaker connector 1/8” TRS stereo connector can be used to connect stereo powered computer speakers.

Note: Do not use a mono or TS connector that grounds the "ring" portion of the connector.

CTRL

DB9 connector is used to control external equipment. PTT OUT relay is connected between pins 6 and 7.

Note: Other pins are at the moment not in use and should be left unconnected.

DATA

LAN This is network connection to the HAMlab. It is an auto-sensing 100 megabit or 1 gigabit Ethernet port that enables you to connect HAMlab to your local network or directly to PC.

USB This USB port is used to connect WIFI dongle when user would like to connect to HAMlab wirelessly.

Note: Recommended WIFI USB dongle is Edimax EW7811Un. In general all WIFI USB dongles that use RTL8188CUS chipset should work.

SD card HAMlab software is running from SD card.

Note: HAMlab comes with pre installed SD card HAMlab OS. Upgrade can be done using OS upgrade application from the HAMlab application menu and there is no need to remove the SD card. Therefore user should remove the SD card and reinstall SD card software only if system gets corrupted or stops working due to SD card failure reason. In this case only official HAMlab OS should be installed on the SD card for proper operation.

CHAPTER 5

HAMlab 160-6 10W 10W Specifications

SDR specifications

Highlights

Architecture:	direct sampling / internal high performance 14-bit A/D and D/A 125 Msps converters (no sound card required)
Band coverage:	All band receiver and 160-6m transmitter
Transmit power:	up to 10 W
Wideband Frequency Coverage:	25 kHz - 62.25 MHz
Connection to PC:	1 Gbit ethernet or WIFI connection
Software:	Power SDR HAMlab edition
Phones and MIC connection:	available on the front panel
Secondary Rx and Tx channel:	available through back panel BNC connectors (RX2 IN, XVTX)
CW key and paddle input:	available through front panel jack connector

Receiver Specifications

Architecture:	Direct Digital Sampling
ADC Sampling Rate:	125Msps
ADC Resolution:	14 bits
Wideband Frequency Coverage:	25 kHz - 62.25 MHz
MDS (min. detectable signal):	MDS (typ)@ 500Hz BW
Preamp OFF at 14MHz	-113dBm
Preamp +15dB at 14MHz	-130dBm
Preamp +30dB at 50MHz	-135dBm
	More MDS measurements.
Preselectors:	Available as add-on module (comming soon)
	User can also connect own preselectors/filters

Transmitter Specifications

Architecture:	Direct Digital Up-conversion
TX DAC Sampling Rate:	125 Msps
TX DAC Resolution:	14 bits
RF Output Power:	up to 10 W CW and SSB at @ 13.8 V input voltage (max. 15 V)
Transmitter Frequency Range:	160 - 10 m (amateur bands only)*
Low Pass PA Filter Bands:	160m / 80 m / 40 m / 30m / 20 m / 17m / 15m / 12m / 10m / 6 m
	(possibility to changed it to any range 1.8 - 50 MHz)
Emission Modes Types:	A1A (CWU, CWL), J3E (USB, LSB), A3E (AM), F3E (FM), DIGITAL (DIGU, DIGL)
	DIGITAL (DIGU, DIGL)
Harmonic Radiation:	better than -45 dB
3rd-Order IMD:	better than -35 dB below PEP @ 14.2 MHz 10 Watts PEP
Cooling:	copper heat spreader

Note: C25 also supports 6m operation and has all necessary output filters for 6m, anyhow STEMlab 125-14 ouput signal is not pure enough to comply harmonic regulations for 6m

General Specifications

Antenna Connector:	ANT1 and ANT2 available on SMA connectors Included one cable with SMA to SO-239 UHF
Antenna Impedance:	50 Ohm Unbalanced
RF Output Power:	up to 10 W CW and SSB at 13.8 V input voltage (max. 15 V)
Maximum Interconnect Cable Length Ethernet:	100 meters (328 feet), Category 5 cable
Power connector:	PowerPole

Measurement instruments specifications

Oscilloscope

Input channels	2
Input channels connector	BNC
Bandwidth	50 MHz
Resolution	14 bit
Memory depth	16384 Samples Max.
Sampling Rate	125 MS/s
Input range	+/- 1 V or +/- 20 V
Input coupling	AC/DC
Minimal Voltage Sensitivity	$\pm$0.244 mV / $\pm$2.44 mV
External Trigger connector	BNC
Input coupling	AC/DC

Signal generator

Output channels	2
Output channels connector	BNC
Bandwidth	50 MHz
Resolution	14 bit
Signal buffer	16384 Samples Max.
Sampling Rate	125 MS/s
Output range	+/- 1V
Frequency Range	0 - 50 MHz
Output impedance	50 ohm
External Trigger connector	BNC

Spectrum analyzer

Input channels	2
Input channels connector	BNC
Bandwidth	0 - 62 MHz
Dynamic Range	-80dBm
Input noise level	< -119 dBm/Hz
Input range	+/- 1V
Frequency Range	0 - 50 MHz
Input impedance	1 MΩ / 10 pF
Spurious frequency components	-90 dBFS Typically

Logic analyzer

Input channels	8
Max. sample rate	125 MS/s
Fastest input signal	50 MHz
Supported protocols:	I2C, SPI, UART
Input voltage levels	2.5 V - 5.5 V
Threshold:	0.8 V for logic low
	2.0 V for logic high
Input impedance	100 kohm 3 pF
Sample depth	1 MS (typical*)
Trigger resolution	8 ns
Min. detectable pulse length	10 ns

Note: Acquired data is compressed therefore the size of data than can be captured depends on activity of signal on LA inputs. For I2C, SPI & UART signals 1MS is typical sample depth. All instrumentation applications are WEB based and don't require the installation of any native software. Users can access them via a browser using their smartphone, tablet or a PC running any popular operating systems (MAC, Linux, Windows, Android and iOS).

General Electrical specifications

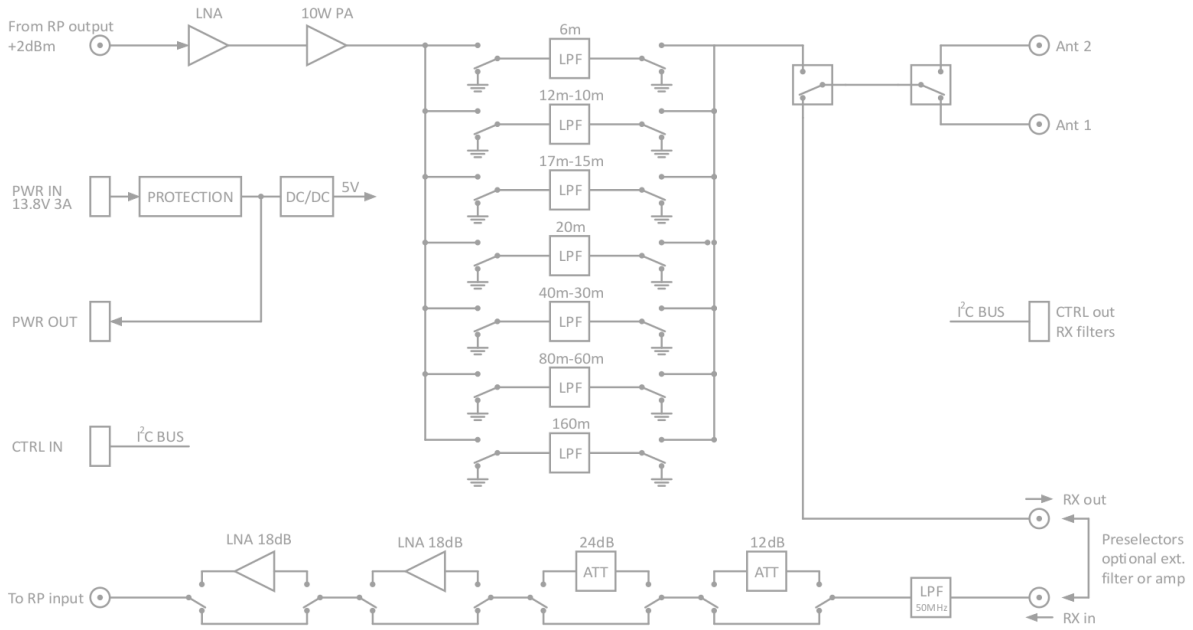
Power Requirements:	+13.8 V DC nominal $\pm$ 15 % (Transmitter output specified at 13.8 V DC)
Power Consumption:	2 A

Mechanical specifications

Height:	100 mm
Width:	340 mm
Depth:	215 mm
Weight:	5 kg
Operating temperature:	-10*C to +50*C

HAMlab system architecture

SDR block diagram



Front panel controls and connections

Power button

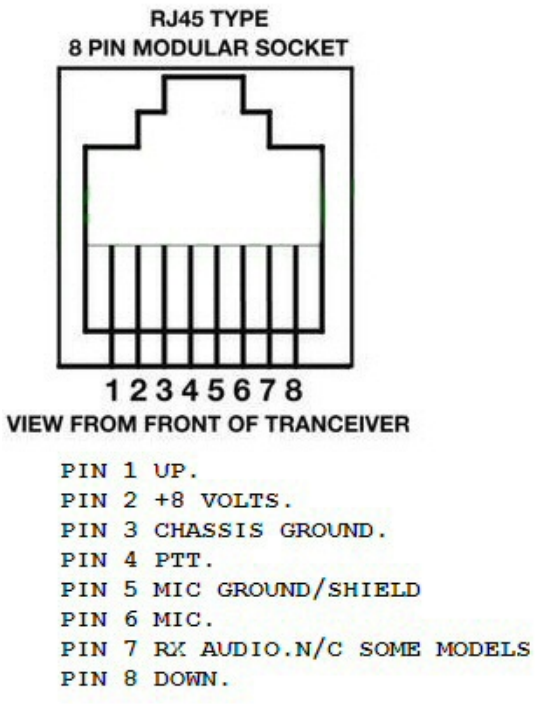
Momentarily pressing power button **(1)** will turn the HAMlab ON. It normally takes 30s from the button press until the HAMlab is ready to be used. Once HAMlab is ON, holding the power button pressed will cause the proper shut down of the device. Blue LED indication on the power button indicates that device is turned on.

Note: In case that system halts and becomes unresponsive, device can be turned off by holding power button for a few seconds / until the blue LED is turned off.

SDR

Microphone connector (RJ45)

The HAMlab 80-10 10W front microphone connector **(2)** can support Kenwood KMC 30 electret microphone or compatible types.



Front panel view microphone pinout

Pin	Function
1	NC
2	8V DC
3	Ground
4	PTT
5	Ground
6	MIC
7	NC
8	NC

CW Key / paddle jack

The CW key/paddle jack **(3)** is a ¼ inch TRS phone plug. Tip - DOT Ring - DASH The common is connected to the sleeve.

Note: 3.3V Max input.

For an iambic paddle, the tip is connected to the dot paddle, the ring is connected to the dash paddle and the sleeve is connected to the common. For a straight key or a keyer output, connect to the tip and leave the ring floating. The common is connected to the sleeve.

Note: Currently keyer is not supported by software. Software support for it will be availabe in one of incomming software updates.

Phones

The HAMlab 80-10 10W supports a stereo headset with headphone ¼ inch TRS phone plug **(4)** . Mono or TS connector that grounds the "ring" portion of the connector should not be used!

Logic analyzer

0-7 are logic analyzer inputs. G - common ground.

Note: Logic analyzer inputs **(5)** can only be used when running Logic analyzer WEB app.

Oscilloscope

(6) - IN1 **(7)** - IN2 **(8)** - EXT. TRIG.

IN1, IN2 and EXT. TRIG. are oscilloscope inputs.

Note: These inputs are active and can be used only when Oscilloscope+Signal generator WEB application is running.

Signal generator

(9) - OUT1 **(10)** - OUT2

OUT1 and OUT2 are signal generator outputs.

Note: These two outputs are active and can be controlled only when Oscilloscope+Signal generator WEB application is running.

Note: To get expected signals from the signal generator, outputs must be 50ohm terminated.

Back panel controls and connections

ANT - TRANSCEIVER ANTENNA PORTS [1,2]

ANT1 **(1)** is SO-239 50 ohm connector, while ANT2 **(2)** is BNC 50 ohm connector.

User can connect transmitter output to ANT1 or ANT2 by properly connecting SMA cable inside the chassis to one of ANT connectors. Software switching between ANT1 and ANT2 is not available in HAMlab 80-10 10W version.

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Danger: NEVER CONNECT OR DISCONNECT ANTENNAS WHILE IN TRANSMIT MODE. THIS MAY CAUSE ELECTRICAL SHOCK OR RF BURNS TO YOUR SKIN AND DAMAGE TO THE UNIT.

AUX1

RX1 IN - direct feed to the first receiver pre-amp and attenuators.

RX1 OUT - an output from the antenna feeding

By default HAMlab 80-10 10W comes with loopback cable connected from RX1 IN to RX1 OUT. User can also use this two connectors to insert external filters or preamplifier.

Note: This input is not protected by any ESD circuitry, therefore device connected to the RX1 OUT Output is susceptible to possible damage by ESD from an EMP event if the connected device does not have adequate ESD protection circuitry.

Warning: Be aware that Preamp1 and Preamp 2 are both wide band amplifiers covering the whole bandwidth of 55MHz. It is not recommended to use the Preamps on a large Antenna without a Preselector connected (this would cause overload and intermodulation from strong broadcast signals outside the Amateur Radio Bands)!

AUX2

RX2 IN - secondary 50ohm receiver input that can be used as a second panadapter in Power SDR software or to as feedback signal for pre-distortions (Pure Signal tool).

XVTR (TX2 OUT) - secondary transmitter can be used to drive external PA Max. output power is around 10 dBm @ 50ohm.

However, currently there is no support in HPSDR for a second TX output.

Power and Fuses

The HAMlab 80-10 10W is designed to operate from a 13.8 volt nominal DC supply and required at least 4A.

Danger: This unit must only be operated with the electrical power described in this manual. NEVER CONNECT THE +13.8VDC POWER CONNECTOR DIRECTLY TO AN AC OUTLET. This may cause a fire, injury, or electrical shock.

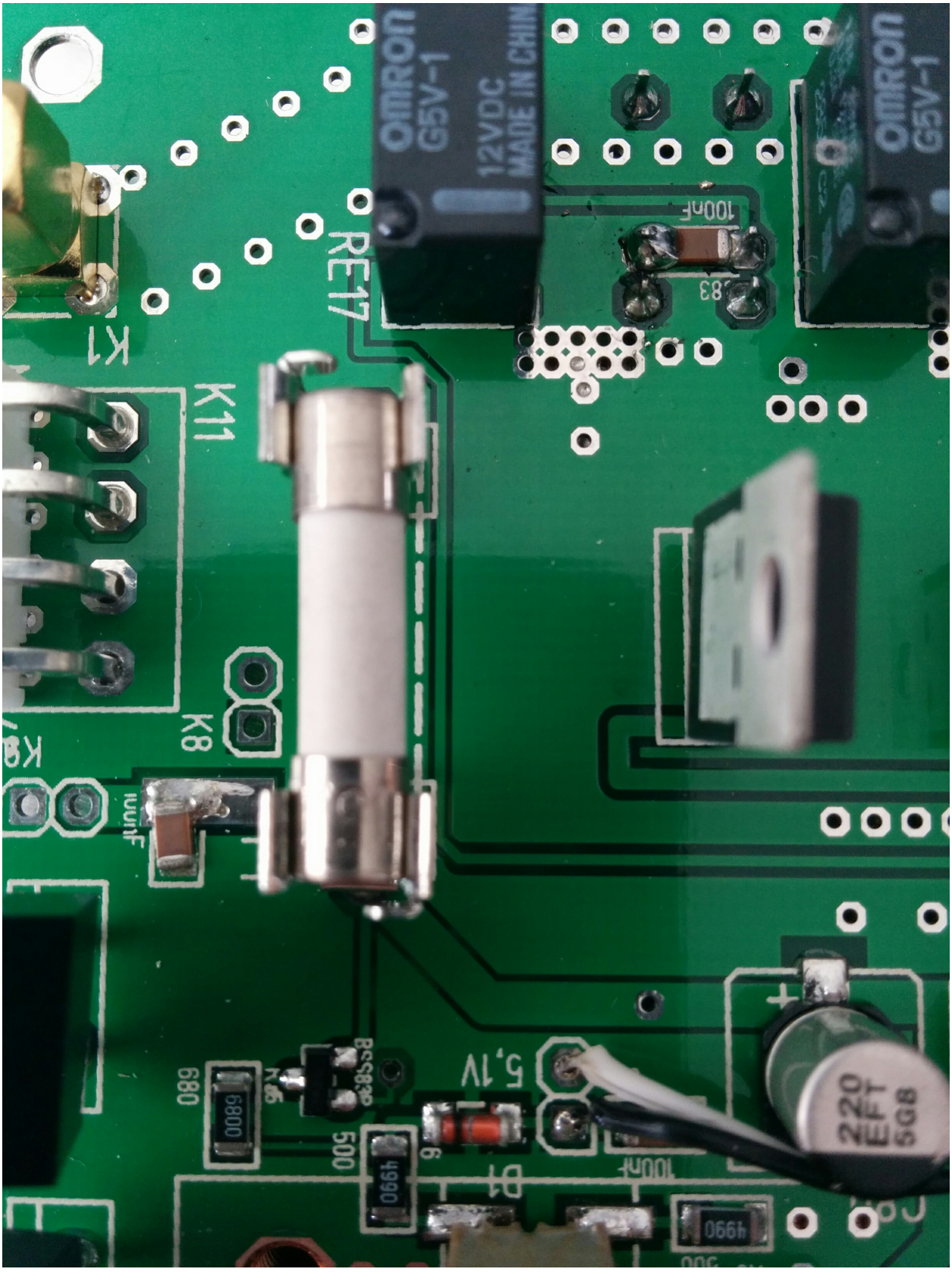
The HAMlab 80-10 10W requires 13.8 VDC @ 4 A measured at the radio in order to transmit maximum wattage. Multiple power cable connections between the power supply and the HAMlab 80-10 10W, a poorly regulated power supply, undersized power cable and very long power cable lengths will result in a voltage drop, especially under load. Any voltage deviation from 13.8 VDC will result in lower power output that the 10W nominal specification.

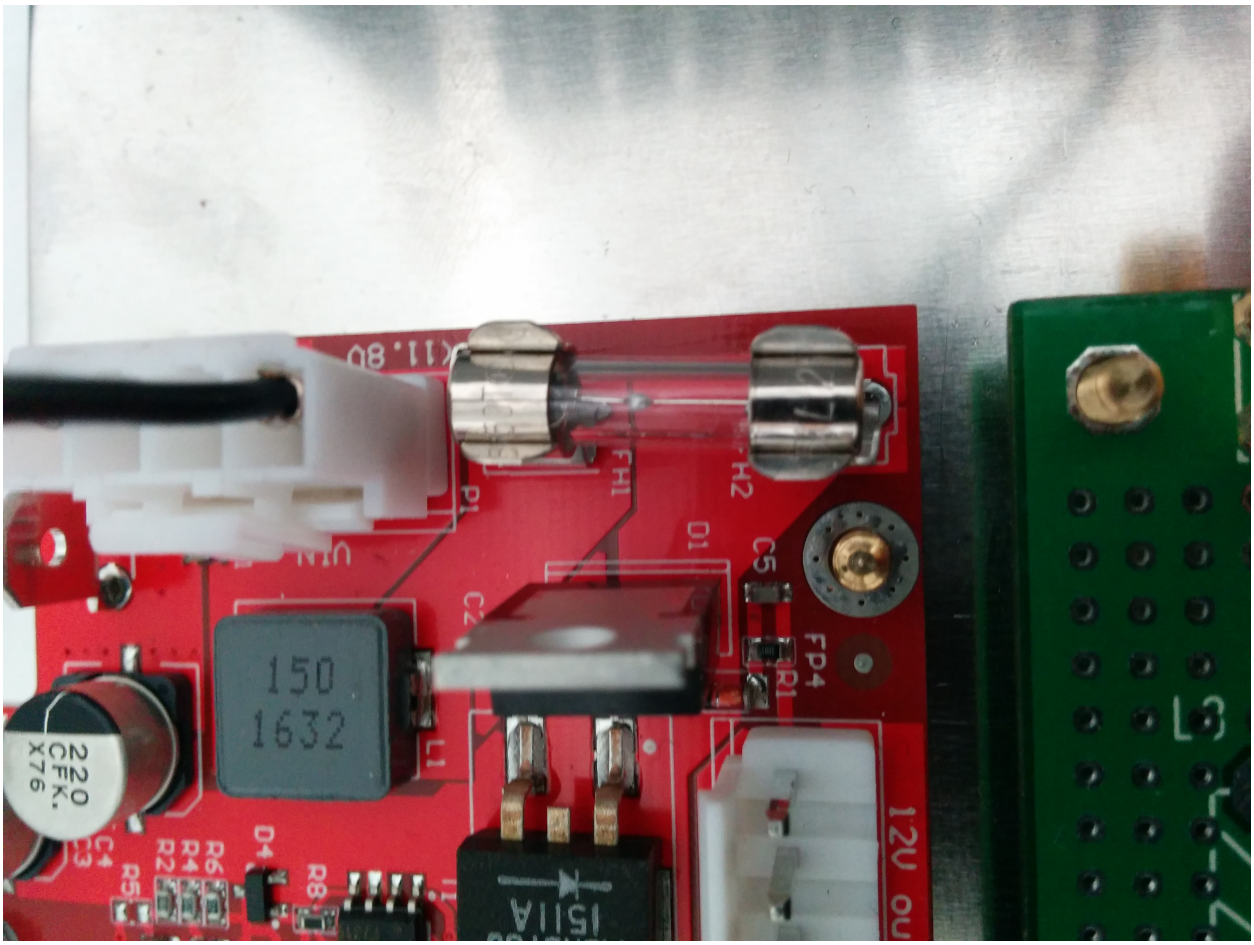
For best results, select a linear or switching power supply that is well regulated and free of internally generated radio frequency noise. “Birdies” generated by a poorly filtered supply can often appear as signals in the Power SDR Panadapter display.

The Anderson Powerpole™ connector contains 45 Amp pins to minimize voltage drop during transmit. The RED connection should be connected to the positive (+) lead of the power source. The BLACK connection should be connected to the negative (-) lead of the power source.

I - If you choose to use your own Powerpole cabling, be sure to properly size the wire and the Powerpole connector to minimize voltage drop during transmit. Excessive voltage drop can cause lower transmit power output levels.

There are two internal fuses in the HAMlab. One is protecting whole system while the other one is just for the transceiver. If you ever need to replace the internal fuse, remove the top cover and the shield of the power board.


OMRON
G5V-1
12VDC
MADE IN CHIN
OMRON
G5V-1
RE17
K1
K11
K8
100nF
5,1V
680
500
220
EFT
5G8



Danger: FUSE CURRENT RATING SHOULD NOT BE HIGHER THAN 3.15A AMPS! FAILURE TO PROPERLY USE THIS SAFETY DEVICE COULD RESULT IN DAMAGE TO YOUR RADIO, POWER SUPPLY, OR CREATE A FIRE RISK.

Chassis ground

This is a thumbscrew for attaching an earth ground to the chassis of the radio. Grounding is the most important safety enhancement you can make to your shack. Always ground the HAMlab to your station RF ground using high quality wiring with the length being as short as possible. Braided wire is considered the best for ground applications. Your station ground should be a common point where all grounds come together. You will likely be using a PC and a DC power source so be sure to ground these devices together as well.

AUDIO

Audio USB connector USB 2.0 Cable - A-Male to Mini-B must be used to connect HAMlab audio sound card with the PC in order to be able to use Phone, MIC and speaker connector for voice communication.

Note: USB connector is only available on HAMlab 80-10 10W model. For new models audio codec is used / audio is transferred over ethernet.

Speaker connector 1/8” TRS stereo connector can be used to connect stereo powered computer speakers.

Note: Do not use a mono or TS connector that grounds the “ring” portion of the connector.

CTRL

DB9 connector is used to control external equipment. PTT OUT relay is connected between pins 6 and 7.

Note: Other pins are at the moment not in use and should be left unconnected.

DATA

LAN This is network connection to the HAMlab. It is an auto-sensing 100 megabit or 1 gigabit Ethernet port that enables you to connect HAMlab to your local network or directly to PC.

USB This USB port is used to connect WIFI dongle when user would like to connect to HAMlab wirelessly.

Note: Recommended WIFI USB dongle is Edimax EW7811Un. In general all WIFI USB dongles that use RTL8188CUS chipset should work.

SD card HAMlab software is running from SD card.

Note: HAMlab comes with pre installed SD card HAMlab OS. Upgrade can be done using OS upgrade application from the HAMlab application menu and there is no need to remove the SD card. Therefore user should remove the SD card and reinstall SD card software only if system gets corrupted or stops working due to SD card failure reason. In this case only official HAMlab OS should be installed on the SD card for proper operation.

CHAPTER 6

Troubleshoot

Damaged or corrupted SD card

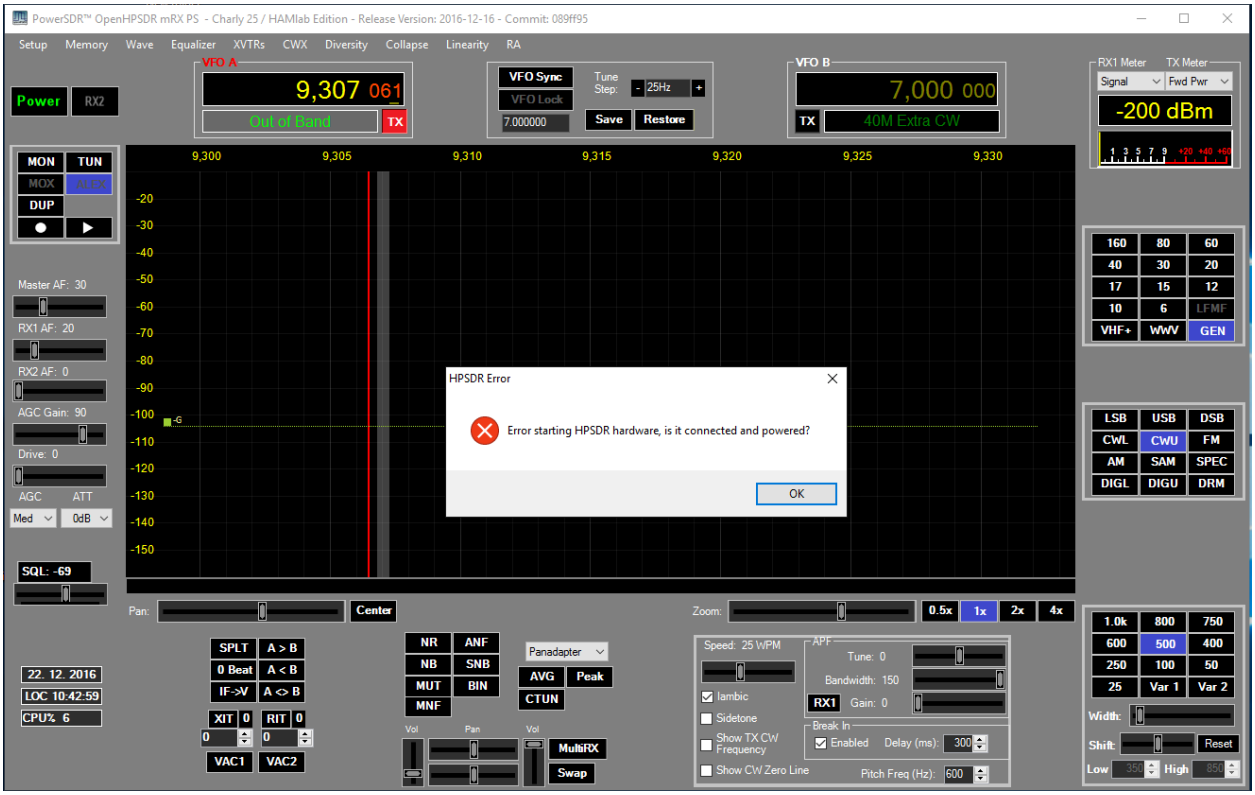
HAMlabs equivalent for geting your sistem back into factory setings is preparing new sd card. This should be done in case of sd card failiure. In that situation new HAMlab OS memory card will have to be prepaired. Please folow this steps to achieve this:

1. Power off HAMlab
2. Remove sd card from HAMlab
3. Insert sd cart into computer
4. Folow *Prepare SD card* guide to create new sd card with HAMlab OS

In case that written sd card does not behave as expected please use new sd card, size should be at least 4 Gb and it should be specified as class 10.

Power SDR cannot connect to HAMlab

After clicking Power button the Power SDR application should automatically connect to HAMlab and receiving signal should appear in the panadapter. If the following msg. appears on screen after clicking the Power button this means that:



HAMlab might not be connected to same network as computer that is running Power SDR application

SDR transceiver application was not started or is not running on HAMlab

When trying to run PowerSDR please run SDR HPSDR web application before starting Power SDR.

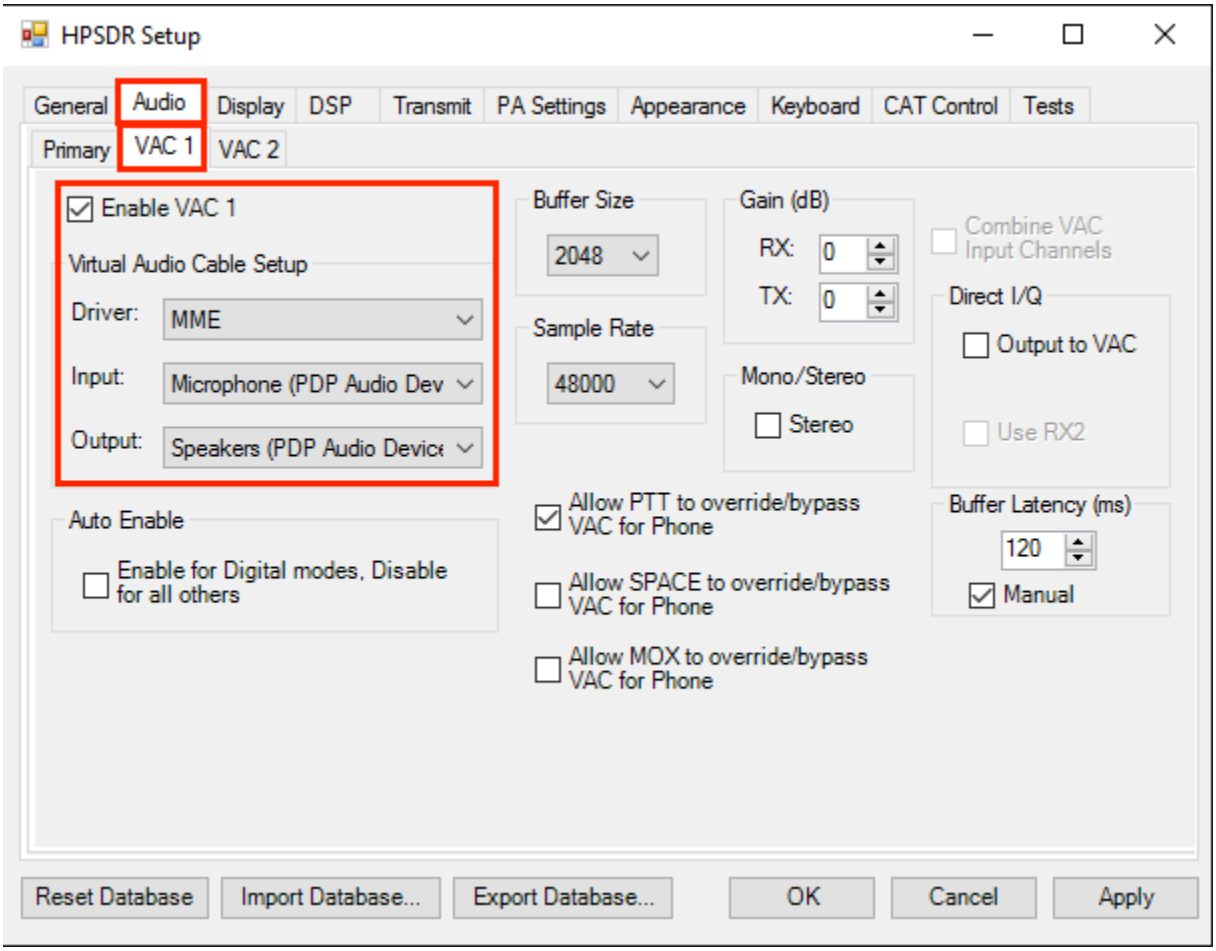
Audio board not working

(This troubleshoot is only for HAMlab 80-10 10W model)

If audio there is no sound coming from your headphones or speaker connected to HAMlab while running Power SDR application please make sure that: HAMlab is connected to PC that is running Power SDR with USB cable

Check audio setings on your computer

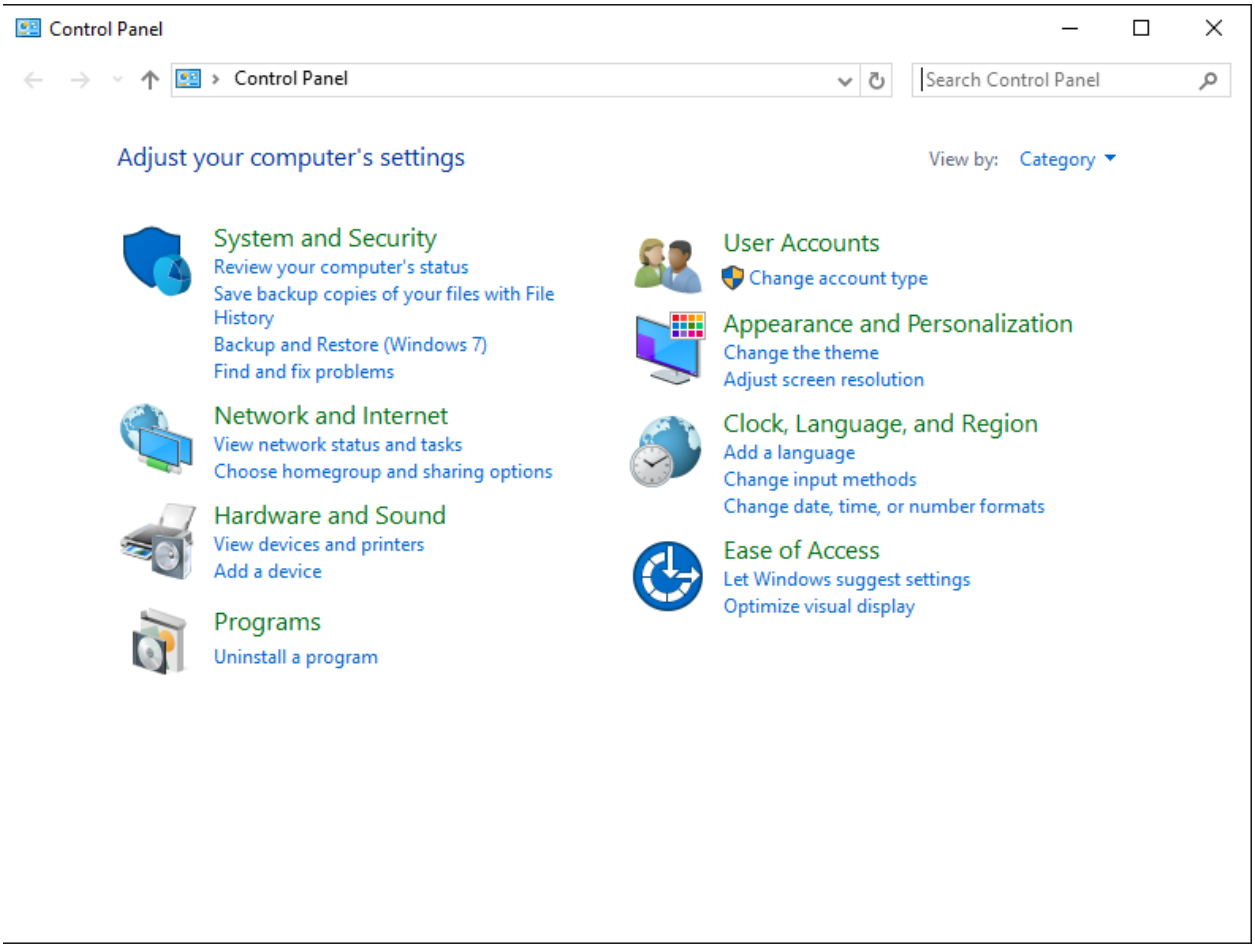
Set correnct Power SDR avdio settings



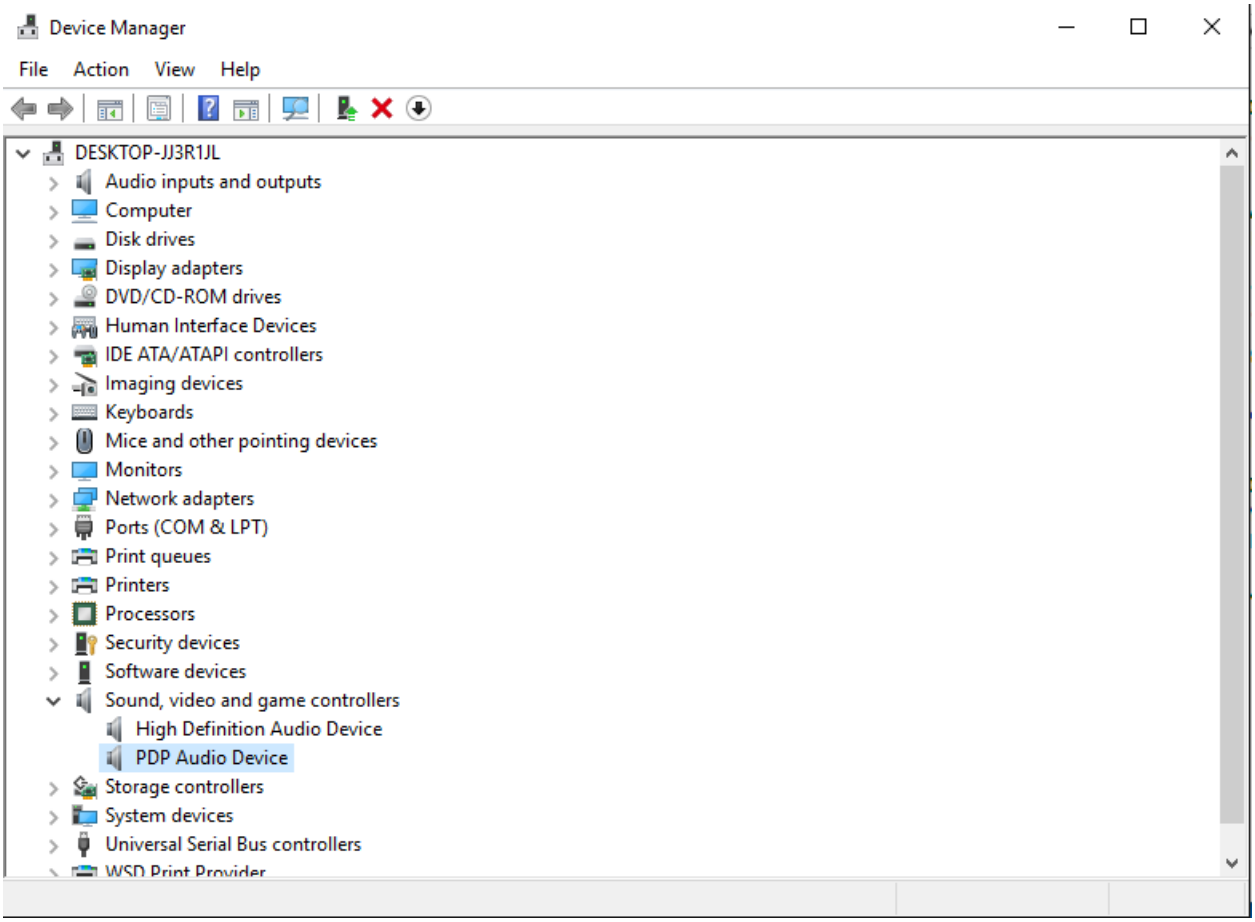
Make sure that HAMlab audio card was recognized by your Windows OS and driver is properly installed.

Open control panel.

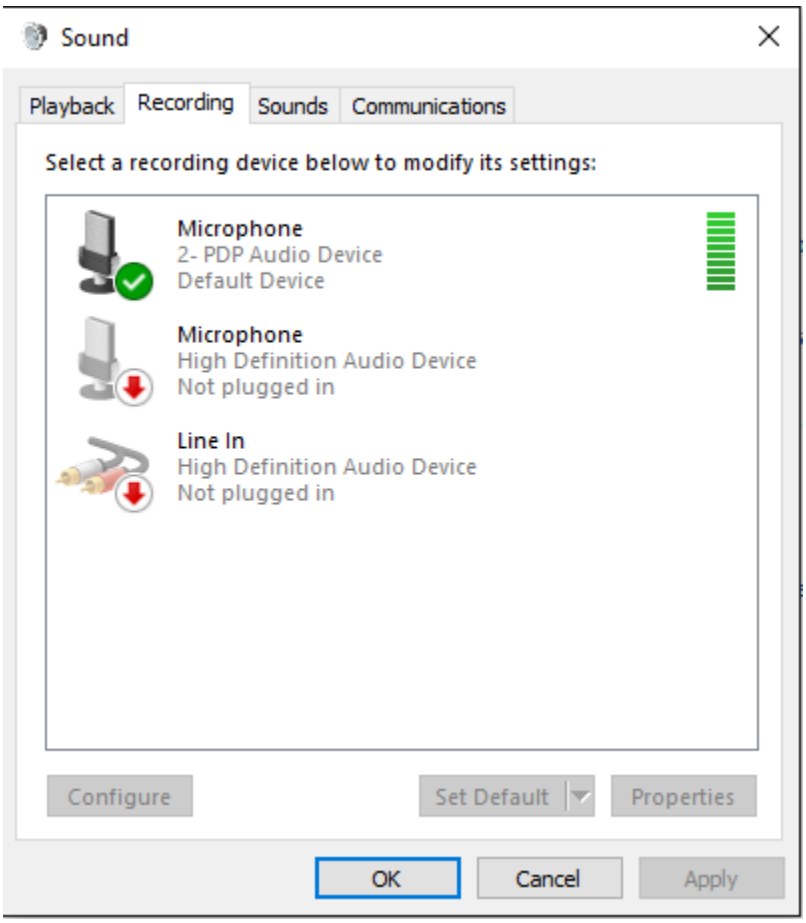
Click on Hardware and Sound

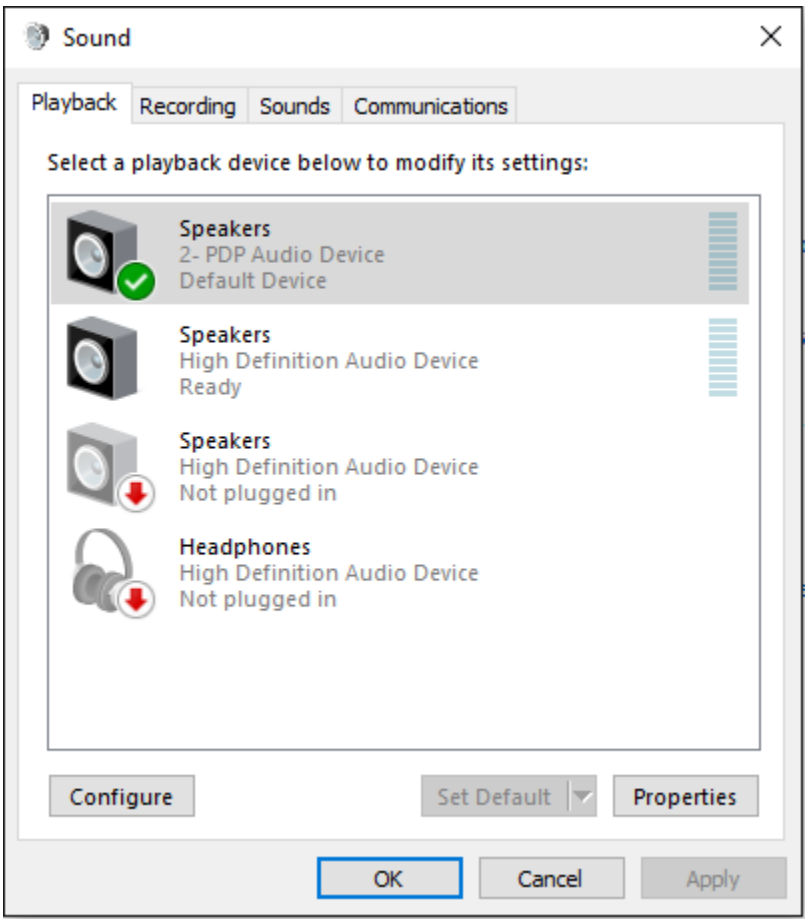


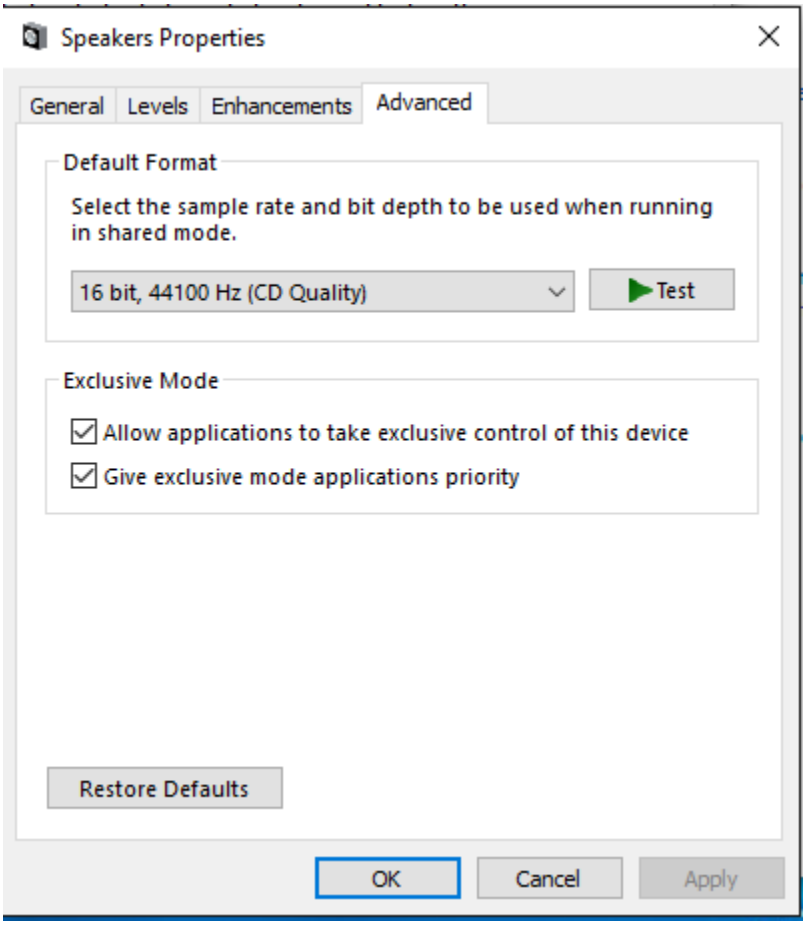
Check that audio card was recognized



You can also make a simple test by playing some music with media player.


Sound
Playback
Recording
Sounds
Communications
Select a recording device below to modify its settings:
Microphone
2- PDP Audio Device
Default Device
Microphone
High Definition Audio Device
Not plugged in
Line In
High Definition Audio Device
Not plugged in
Configure
Set Default
Properties
OK
Cancel
Apply


Sound
Playback
Recording
Sounds
Communications
Select a playback device below to modify its settings:
Speakers
2- PDP Audio Device
Default Device
Speakers
High Definition Audio Device
Ready
Speakers
High Definition Audio Device
Not plugged in
Headphones
High Definition Audio Device
Not plugged in
Configure
Set Default
Properties
OK
Cancel
Apply



HAMlab doesn't turn ON anymore

Make sure your power supply is on and properly connected. Try to remove HAMlab cover and check the main fuse - if broken, try to replace it.

Cannot connect to HAMlab anymore

Try to turn your HAMlab off and follow quick start procedure first. If you hear that the fan doesn't lower it's power (revolutions) after 1 min after turning the HAMlab on this might suggest that SD card image (HAMlab software) is corrupted. In this case it is recommended to remove SD card and try to reinstall it.

There is no transmit power from the HAMlab

If there is no transmit power from the device please check your Power SDR settings first. In case that settings are not the case, please try to remove the cover of HAMlab and Transceiver module to replace the fuse.