



# VIRTUAL LAB

## User Manual

REVISION 1.0

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## Installation

### 1. National Instruments Drivers

Download and install the latest version of the National Instruments VISA drivers.

WIN: (NI-488.2 17.6.0 latest at time of release <http://www.ni.com/download/ni-488.2-17.6/7272/en/>)

MAC: NI-488.2 18.0 latest at time of release <http://www.ni.com/download/ni-488.2-for-mac-os-18.0/7749/en/>)

### 2. (OPTIONAL) Install and Configure VirtualHere

If remote operation of the devices over network is required, download and install the VirtualHere Client from: [https://virtualhere.com/usb\\_client\\_software](https://virtualhere.com/usb_client_software)

'Auto-Find Hubs' should be enabled (Figure 1) and the client can also be installed as a service (otherwise it will have to be manually started by the user before running VirtualLab with networked devices).

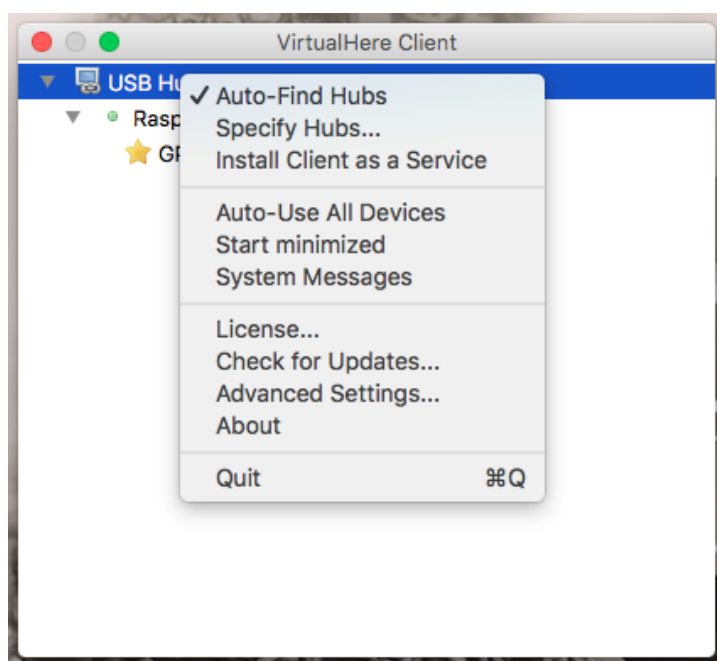


Figure 1 - Virtual Here Client

'Auto-Use all on this hub' can also be enabled (Figure 2) on user-specified hubs to have the client auto-connect to any device that is connected to the hub. This is recommended. Otherwise the user can manually enable/disable the use of selected devices that will then be detected by VirtualLab (Figure 3). VirtualHere can also be configured with EasyFind to enable access from anywhere. See <https://virtualhere.com/easyfind> . Raspberry Pi text address: 4naTRoZm7e13MMC5C1VmAT-Btmkr

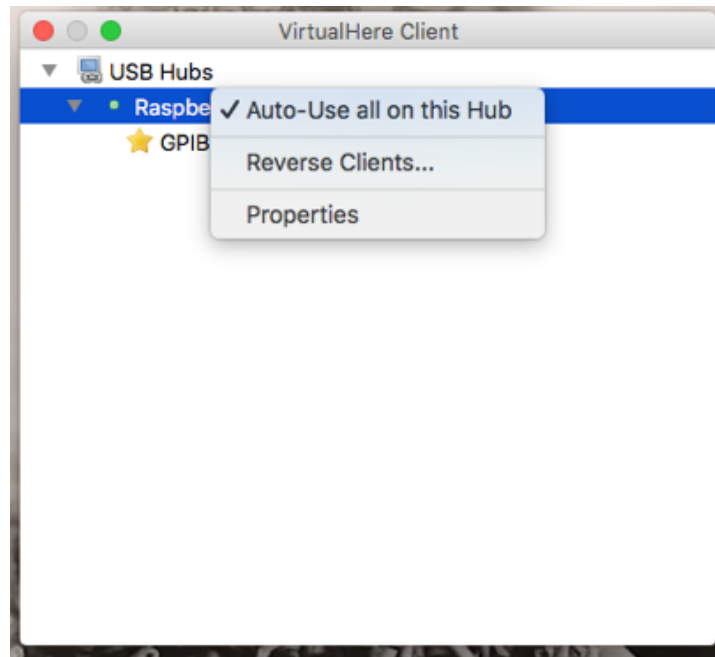


Figure 2 - Auto-Use all on this Hub

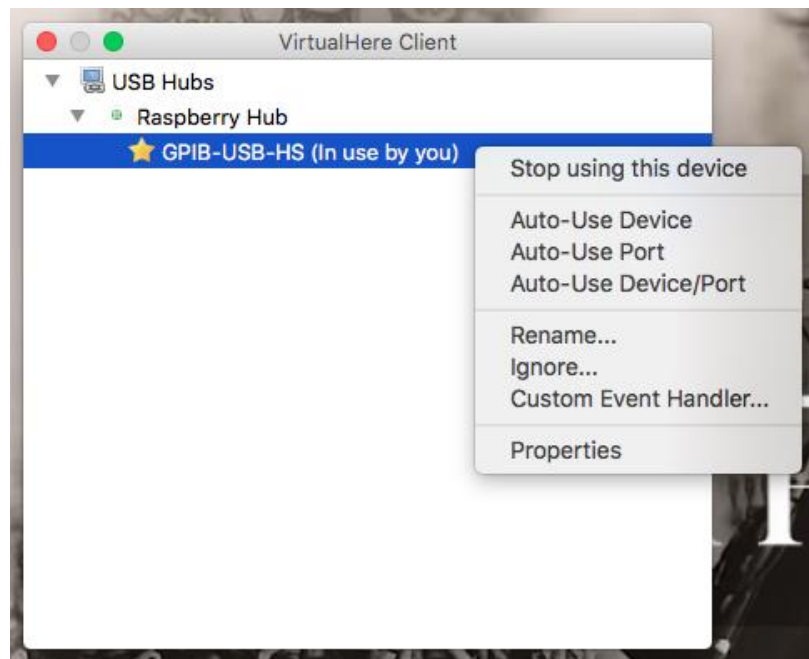


Figure 3 - Manual device enable

### 3. VirtualLab

Download and install the latest version of VirtualLab from: <https://github.com/mjbla6/FYP>

## Running Virtual Lab

Starting up VirtualLab and selecting *'New Instrument'* from the *'File'* menu will bring up the New Instrument window (Figure 4) where any detected connected devices (local and network) will appear. Selecting one will open it in a new tab. Current instruments supported are the Agilent 86142B, HP8157A and the ANDO AQ4303B. If instruments are not initially detected or a device is connected after program start, the *'Refresh'* button will rescan for connected devices.

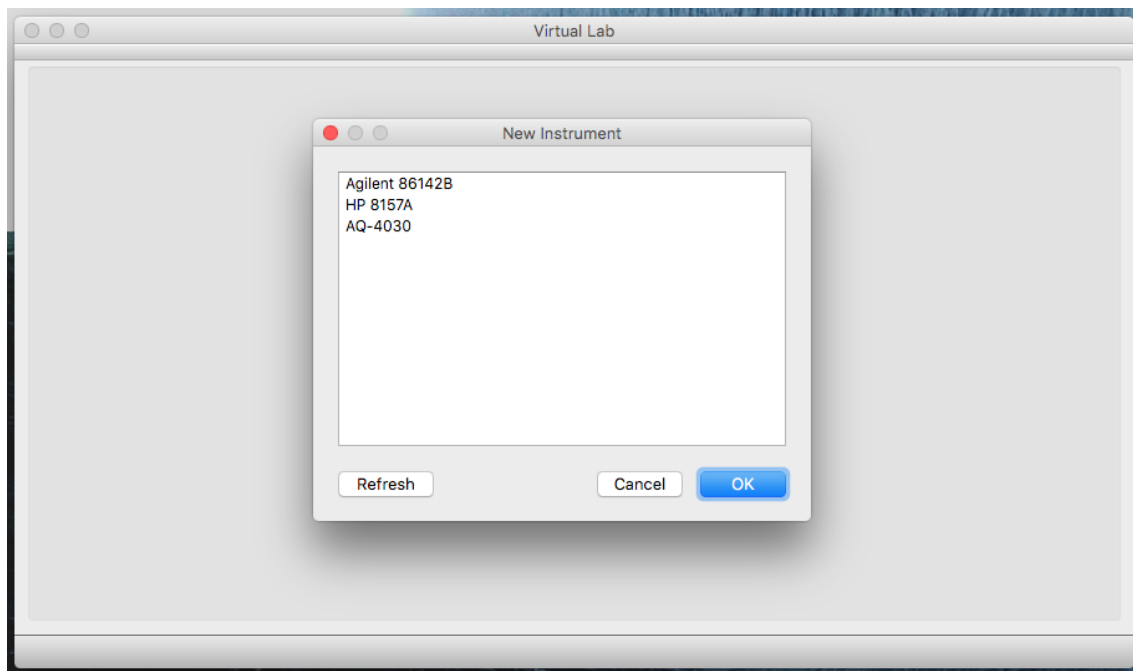


Figure 4 - New Instrument window

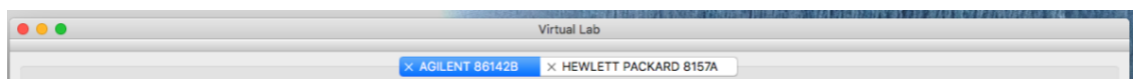


Figure 5 - Instrument Tabs

Instruments can be switched between or closed with the tabs across the top of the main window and tabs can be re-arranged by dragging the tab to the desired position.

## Agilent 86124B Operation

Loading up the Agilent 86142B will present the following window (depending on the state of the machine, traces, markers and settings will vary).

NOTE: It is recommended that the machine display be turned OFF using the menu in the bottom right hand corner if 'Repeat Sweep' is ON as this will speed up the interface and improve user experience considerably.

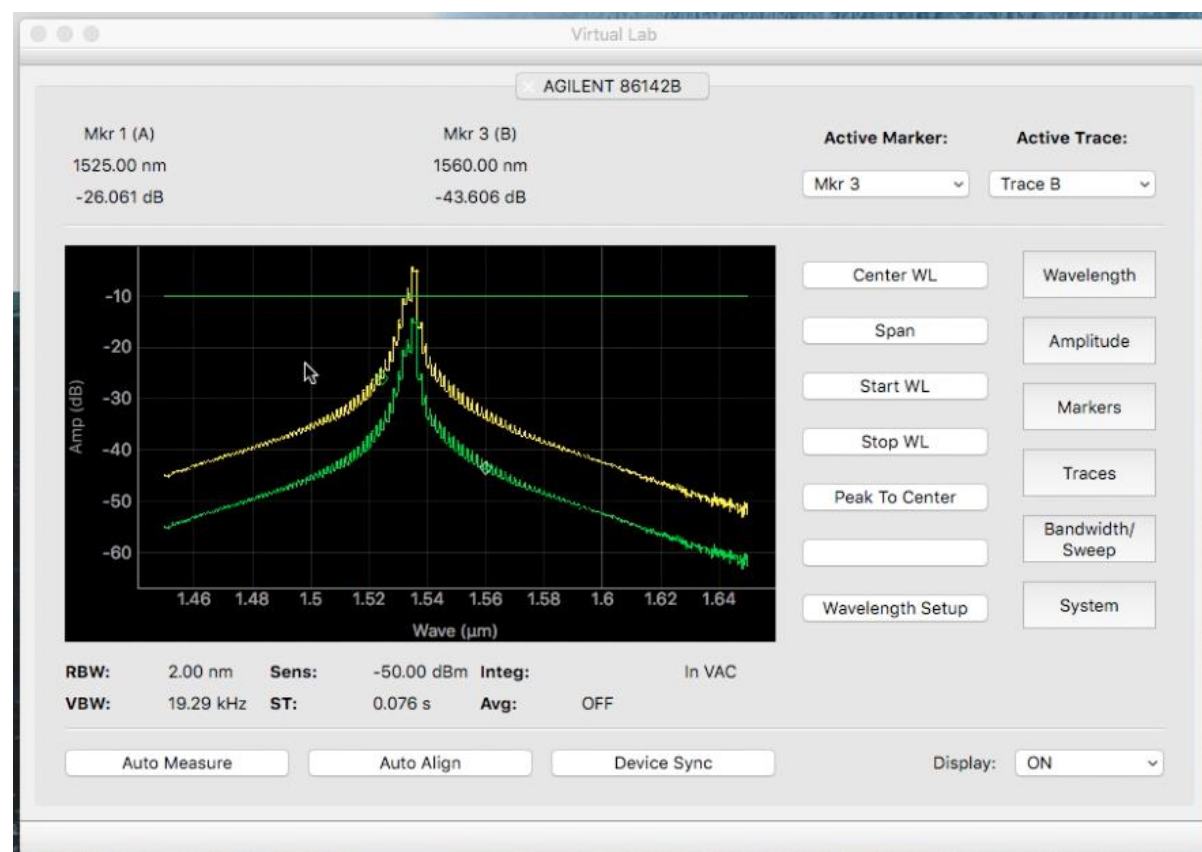


Figure 6 - Agilent 86142B

## Graph Interaction and Exporting

The graph features full interaction, with zooming and scrolling performed using the mouse. Markers can be placed and moved by clicking on the desired location on a trace and a drop down menu will allow for selection. The active marker can be moved on its trace with the left and right arrow keys. The increment (number of trace points) a marker moves with each keypress can be adjusted in the System window (default is 5). These features exist in both static mode and repeat sweep mode. The entire plot data can be exported as an image file or CSV by right clicking the plot and selecting export (Figure 7).



Figure 7 - Export Plot

NOTE: When exporting, be sure to select the entire plot (Figure 8) as selecting the 'View Box' sub selection and exporting will result in errors and potential crashes.

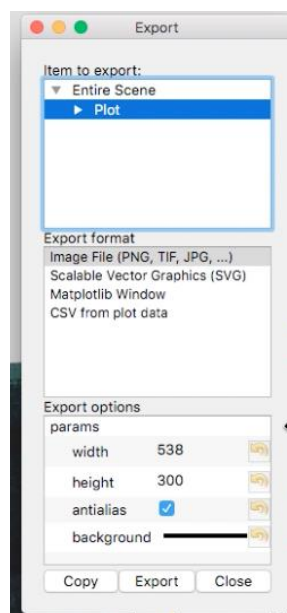


Figure 8 - Export Options

Some features of the plot interaction have not been enabled in the current version. Exporting as a Matplotlib window will cause errors. Some of the plot options in right click will cause an error as well. These are the down sampling and averaging options.

### Exception Messages

Some features can trigger an exception message if the OSNR values are out of range, plot data is out of range or the machine is still fetching data when a function is selected with repeat sweep enabled. In these cases, an exception window such as the one in Figure 9 will appear.



Figure 9 - Exception Window

### Repeat Sweep Limitations

Unfortunately not all functions are available with repeat sweep enabled. *'Auto Measure'* *'Auto Align'* *'Device Sync'* and *'Trigger Mode'* are not available and an exception window will appear if selected. The software also does not support more than one non-standard marker with repeat sweep enabled (though up to 4 normal markers or 1 non-standard and 3 standard are supported). If more than one is enabled when repeat sweep is enabled, only the active marker's non-standard functions will persist.

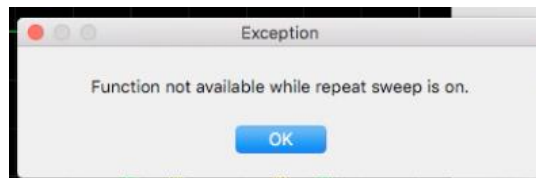


Figure 10 - Function not available window