

AvaRaman

785/532 nm Laser Module User Interface

Software Installation and Operation Instructions

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2 Introduction:

The 785 nm and 532 nm Laser modules are an integral part of the AvaRaman spectrometer and include safety and safety interlock features. It is not intended or implied in these instructions that the laser module should be used separately.

Only the 785 Raman Boxx Control Panel software enables control of laser power, laser operation, such as modulation, and readout of power level setting, laser bias[mA], temperature [deg C] and case temperature [deg C]. This software is a separate program from the main spectrometer software Avasoft Raman, or Panorama-Raman.

This document covers the software installation set up of the 785/532 Raman Boxx Control Panel and its use as a General User Interface [GUI]

The control of the laser and information about their operating condition is very helpful to applications where, photodegradation of delicate samples by over power of the laser is an issue. This has to be balanced by a suitable power level to obtain acceptable optical signal to noise level in photon collection by the spectrometer detector.

One example of this is in the Raman measurement of carbon nanotubes.

3 SAFETY PROCEDURES AND WARNINGS



FOR YOUR SAFETY, READ AND UNDERSTAND ALL SAFETY AND OPERATING INSTRUCTIONS BEFORE USING THIS PRODUCT.

3.1 Optical Safety

The laser beam emerging from the AvaRaman laser output port or from the fiber optic probe is a Class IV laser. This laser product produces visible and/or invisible laser radiation. It is capable of causing serious eye injury and blindness to anyone who looks directly into the beam *or* its specular reflections. Laser safety eyewear must be worn before applying power to the unit. Laser safety eyewear must be worn at all times while operating the AvaRaman. The laser will operate at full power within 2 seconds of applying power to the unit and it operates in continuous wave (cw) mode with a 50mW-output power for the 532nm system, and 500mW-output power for the 785nm system.

The backside power switch controls the power to the system. When the system is on, the *green* Spectrometer LED will be on. The key switch on the front panel of the AvaRaman labeled LASER ON | OFF controls the power to the laser. When the laser is on, the *red* Laser Power Indicator Lamp will be on.

Due to the dangers associated with operating lasers, the Safety Goggles are specified with every AvaRaman order. It is the customer's responsibility to supply the correct laser safety eyewear to anyone who could be exposed to the laser radiation. Reputable distributors of laser safety eyewear can recommend the best product for a user's specific needs.

Laser light presents special safety hazards not associated with other light sources. People present while a laser is in operation need to be aware of the special properties and dangers involved in laser radiation. Familiarity with the AvaRaman and the properties of intense laser radiation will aid in the safe operation of this product. AvaRaman users must read and understand all of the information presented in the Raman Systems AvaRaman Operating Instructions before operating the Raman System.

The AvaRaman System has following internal laser safety protection installed:

1. Key-switch, please remove the key, such that unauthorized operators cannot switch on the laser
2. Interlock, connect the interlock to a door switch, such that the laser is automatically switched off when the door is opened. This applies to room doors and sample compartment accessory doors.
3. SMA connector micro-switch, the laser is automatically switched off when no SMA coupled fiber probe is inserted into the laser exit.

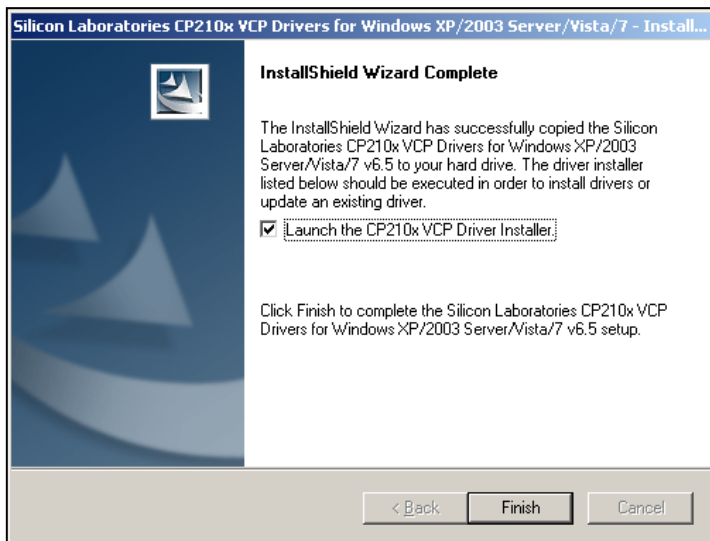
3.2 AvaRaman users must adhere to the following regulations:

1. Never look directly into the laser light source.
2. Never stare at the diffuse reflected beam.
3. Never sight down the beam into the source.
4. **ALWAYS** check the fiber optic ends of the Raman probe for contamination prior to use.
This can occur at the end of the probe itself or at the ends of the branch fibers ,which connect to the AvaRaman console.
Gently remove contamination using alcohol with a soft optical quality cloth.
Remove alcohol smears using a dry optical quality cloth.
Contamination on the fiber optic ends can be burnt into the optical surface by the high power laser beam. This can cause permanent damage to the fiber optic end surface and loss of light and performance can occur.
5. Do not turn the laser on unless the fiber-optic probe is connected to the AvaRaman.
Do not disconnect the fiber-optic probe from the AvaRaman unless the laser is turned off.
Both these instructions are good practice even though the laser will be turned off, via the interlock if the fiber optic is disconnected
6. Restrict the use of the AvaRaman to qualified and well-trained users knowledgeable in laser safety practices. In addition, inform all personnel working in the area of these regulations.
7. Before the laser is in operation, notify all personnel in the room or others who might be exposed to the laser beam that a laser is about to be used.
8. Illuminate warning lights and post warning signs in the area when the laser is in operation.
9. People requiring access to areas within the nominal hazard zone must wear protective eyewear designed for 785nm lasers with the 785 nm system and 532 nm with the 532 nm system. The eyewear designation should permit observation of the emission indicator.
10. Position the beam path and optical components used in the operation of the AvaRaman at an elevation low enough to prevent inadvertent beam-to-eye contact.
11. Reflections from shiny surfaces, such as watches, rings, window glass, polished surfaces, etc., can redirect light in dangerous directions. Whenever the laser light can possibly illuminate a shiny object, consider where the reflected light could go and make sure that a hazardous situation is not created.
Even a diffused reflection of a Class IV laser product is dangerous.
12. User should consult with their laser safety division, if applicable.
13. Use of a Class IV laser product requires power interlocks installed on every door leading to the lab.

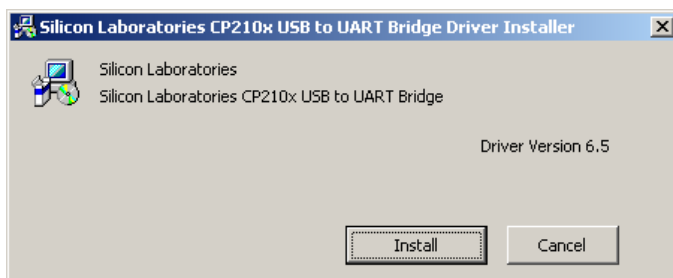
4 SOFTWARE INSTALLATION SET UP [USB DRIVERS]

4.1 Driver installation

1. Make sure the AvaRaman Raman system is disconnected from your PC/Laptop.
And insert the provided CD into your CD-ROM drive.
2. Remove, if any, old CP210x drivers that have been previously installed.
For Windows systems, open the *Add or Remove Programs* window from the Control Panel, and uninstall each CP210x entries from *Silicon Laboratories* and click on *Remove*.
3. Run the driver executable *CP210x_VCP_Win_XP_S2K3_Vista_7.exe* located in the *CP210x_driver* CD folder, to extract all of the device drivers included with this release.
The default installation directory for this release is “C:\Silabs\Mcu\CP210x”.
4. After extraction of the drivers the following screen shows up, and leave the *Launch the CP210x VCP Driver installer* box ticked and press “Finish”.



5. Press “Install” in the following window to install the drivers.



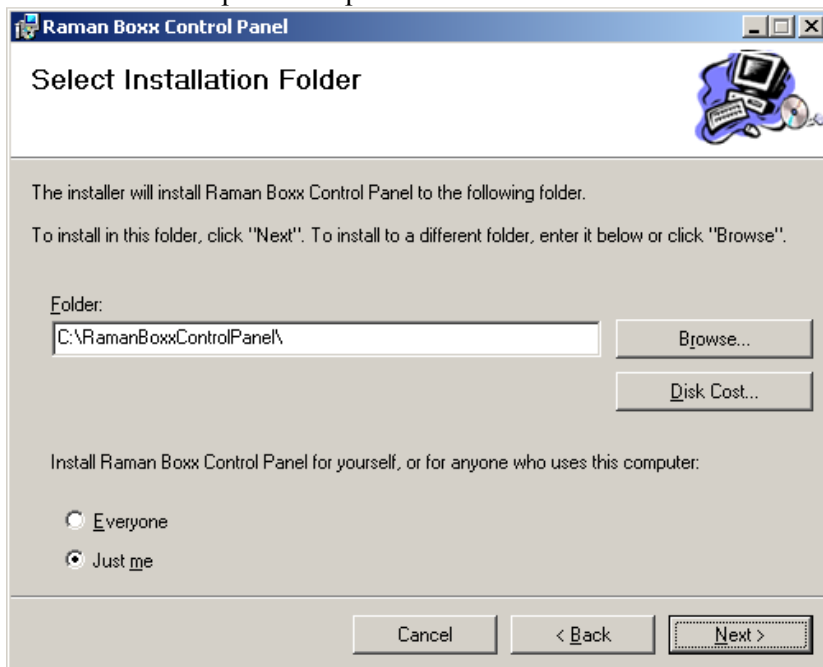
6. Connect the USB port of the AvaRaman Raman System with your PC/Laptop, and turn on the AvaRaman Raman system, if it is not already turned on.
This will power the laser unit, and the “found new hardware” prompt should come up.
7. If no drivers have been previously installed the “Add New Hardware” wizard should open when a new device is detected.
Use the wizard to install the drivers by directing it to the default installation directory.
Depending on the operating system you use you should navigate and select:
“C:\Silabs\Mcu\CP210x\WIN\Windows_XP_S2K3_Vista_7\86” for Windows 32bit operating systems”,
or “C:\Silabs\Mcu\CP210x\WIN\Windows_XP_S2K3_Vista_7\64” for Windows 64bit operating systems.
8. The setup will be completed after you click the “Finish” button.

4.2 Raman Boxx Control Panel software installation

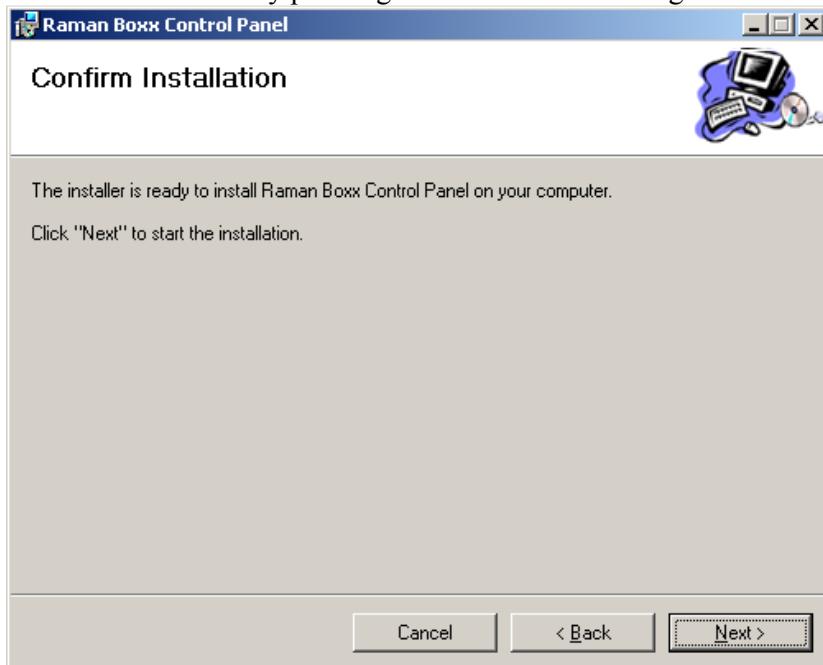
1. Run the installation executable *setup.exe* located in the *Raman Boxx Control Panel V1* CD folder.
2. Press the “Next” button in the opening window.



3. Select the installation directory, or leave it default, and choose for which user account you want to install the control panel and press “Next”



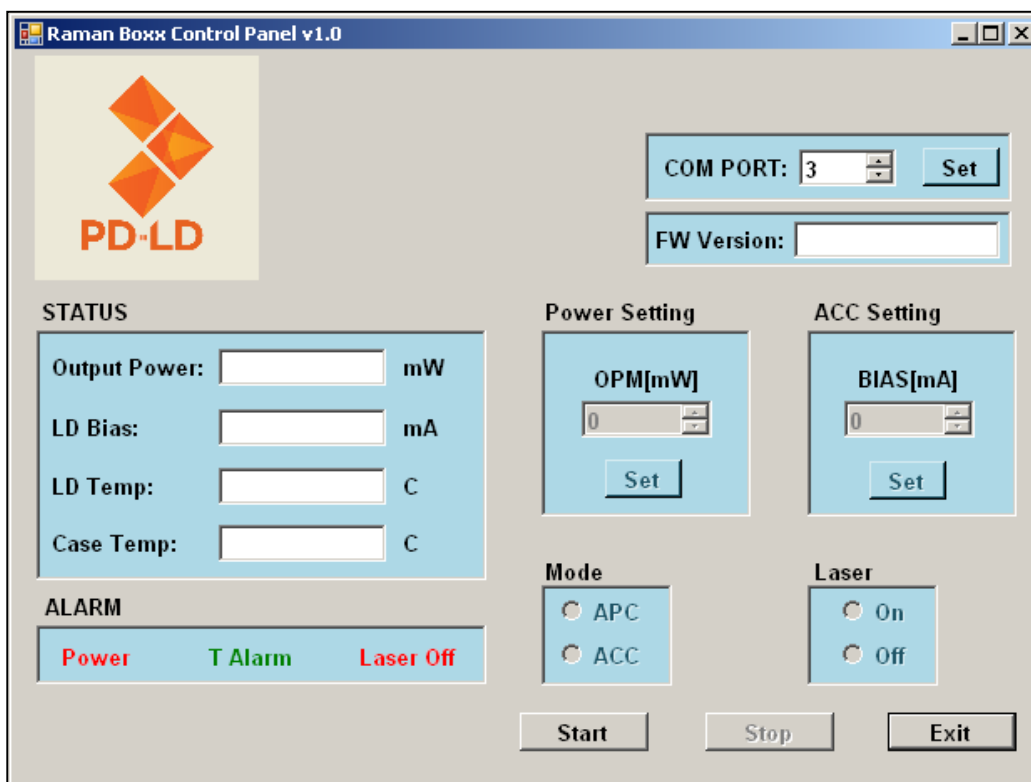
4. Start the installation by pressing “Next” in the following window.



5. After installation you can “Close” the installation setup.

5 SOFTWARE USE

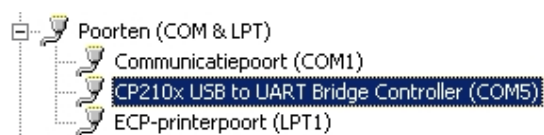
1. Connect the PC/Laptop to the AvaRaman Raman system with a USB cable.
2. Start *RamanBoxxControlPanel (Active).exe* from your start menu or desktop shortcut. The “Raman Boxx User’s GUI” will be opened.



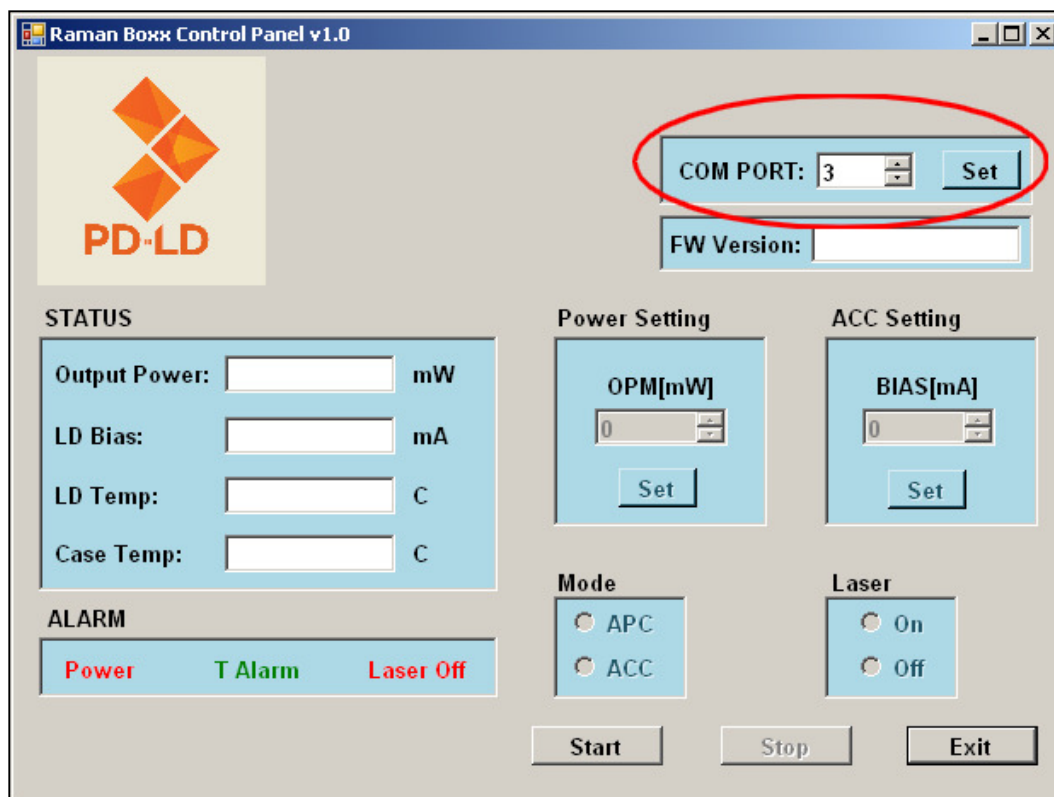
Raman Boxx User GUI

3. To enable connection between software and laser unit, you need to select the correct “COM PORT” in the software.
To determine which “COM PORT” is used, open *System* from the Windows Control Panel.
 - Select the *Hardware* tab.
 - Select System devices
 - Scroll down to *Ports (COM & LPT)* and unfold this by clicking [+]

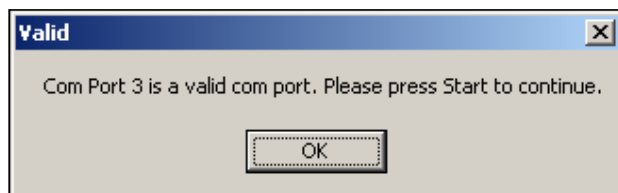
You should now see which “COM PORT” is used for the CP210x controller.



4. Select the correct “COM PORT” in the software, and click the “Set” button.



5. A pop-up window will inform you if the set Com Port is valid, and press the “OK” button to close the window.



6. Ignite the laser by pressing the “Start” button.



*Please be aware that the laser will lase after 2 seconds when clicking the “START” button in combination with the Laser “On” selection, and only when a fiber has been connected to the AvaRaman system.
The fiber connection functions as a laser interlock.*

The laser selection “On” is the default setting, this because a fiber connection will remove the laser *interlock*. When a fiber is not connected to the AvaRaman system the laser can not lase. When the laser selection is set to “Off” click the “On” selection to have the laser lase.



7. To be able to control the laser output power you need to select “APC” Mode which is also the default setting.

When in “APC” Mode you can change the output power setting ($OPM[mW]$) by changing this value to a desired output power and pressing the “SET” button.

The Power setting operates in steps of 10 mW.

The output power in The ”status” section will show approximately the setting value. If an exact power output reading is required; we recommend a separate calibrated laser power meter is used to measure the power at the target sample .

ACC mode means Auto Current Control

APC mode means Auto Power Control

*NOTE: 785nm laser systems output power can be set from **5mW** to **500mW***

6 Shutting down the software

1. You can leave the laser setting to “On” as the fiber disconnection from the AvaRaman Raman system will function as the laser interlock.
If you choose to leave the fiber connected, you can select the laser setting “Off” to turn the laser off.
2. Press the “STOP” button to stop the program.
3. You can now close the “Raman Boxx User’s GUI”, and shut down the AvaRaman Raman system as usual.

7 Upgrades

Customers sometimes find that they need Avantes to make a change to or to upgrade their system. In order for Avantes to make these changes, the customer must first contact us and obtain a Return Merchandise Authorization (RMA) number. Please contact the Avantes Technical Services for specific instructions when returning a product.

If you still have problems with your installation, do not hesitate to contact us:

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