

Data Logging to a PC

For Quantum Sensors



Via RS232 Commands or SmartPirani Software & Sens4 Custom Cable

November 7th, 2024

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OVERVIEW

This document describes the two different methods that data from quantum vacuum sensors can be logged to PC. Below is a table comparing the two.

Feature Comparison Chart:

	RS232	S4 Connect
Vacuum Interface	Any	Any
Electrical Interfact	DB9, HD15	FCC68
Special Software Required?	No	Yes
Access to Analog Output?	Yes	No
External Power Required?	Yes	No
Ability to Log Vacuum Data to PC?	Yes	Yes

OPTION 1: Using RS232 Commands

This option will demonstrate how to use simple RS232 commands to read the DigiVac Quantum series of sensors through Putty.

What is Putty?

Putty is a popular, free terminal emulator software. You can download it at www.putty.org.

SECTION 1: Setup

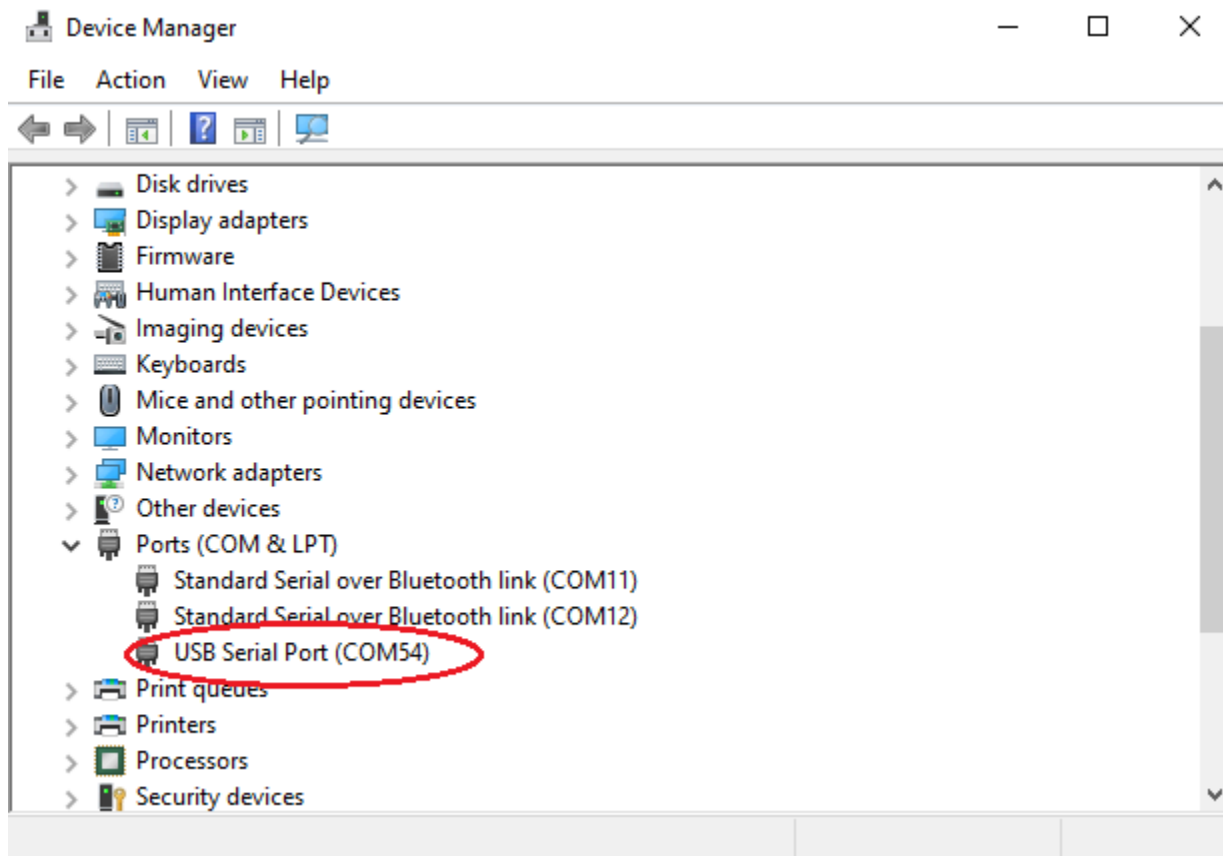
1. Plug the black USB-to-DB9 cable into your computer.
2. Connect the male DB9 end to the female DB9 on the gray cable marked "PC".
3. Connect the female DB9 end on the gray cable marked "SENSOR" to the sensor.
4. Plug in the power supply.
5. The LED on the sensor will flash a few times, then stay solid green.



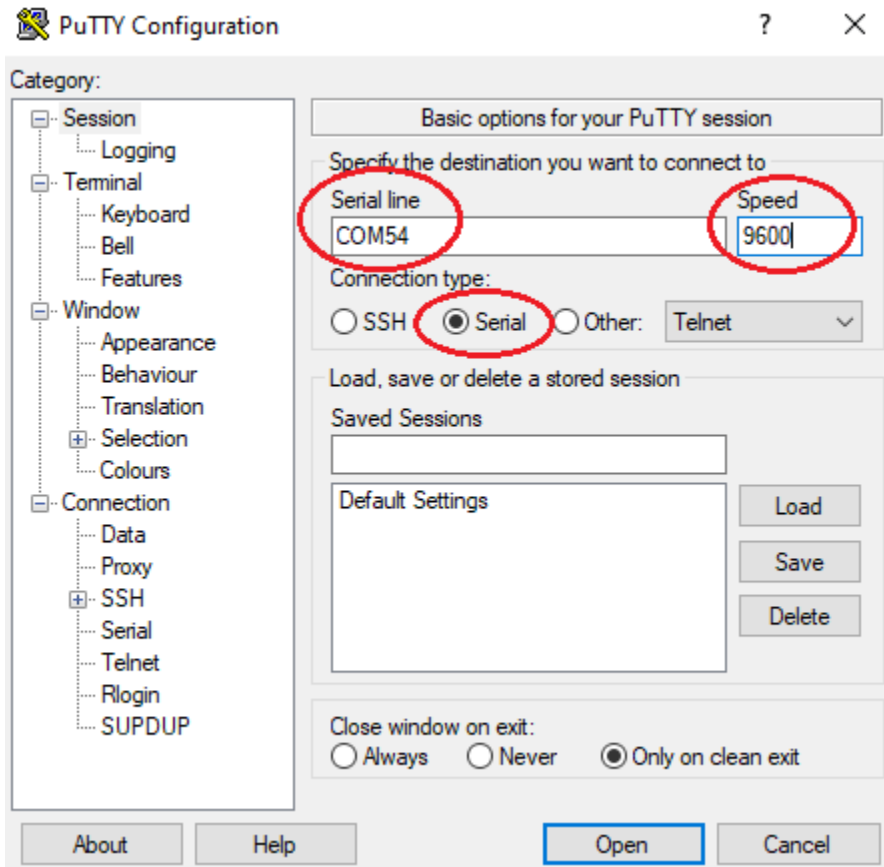
6. Open **Device Manager** and determine what **COM port** the device is connected to.

Note: If you do not see the Ports (COM & LPT) in the menu, there are several ways you can troubleshoot:

- Go to View > Show Hidden Devices
- Action > Add Legacy Hardware
- Try a different USB port on your machine
- Download an FTDI driver

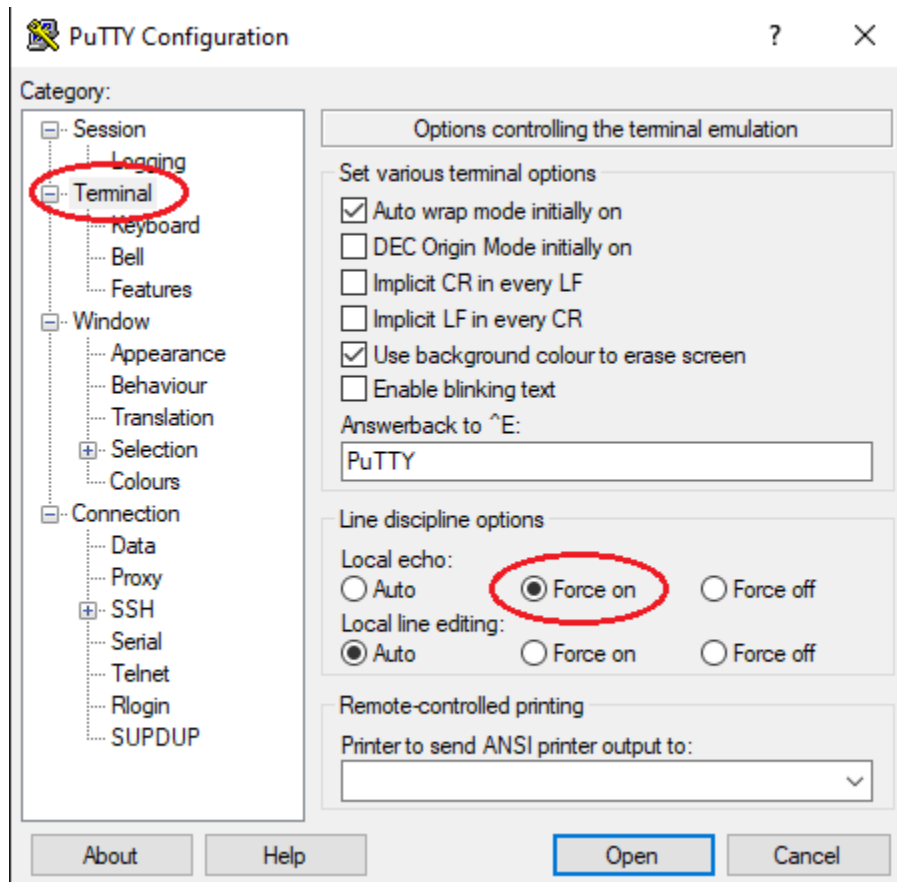


7. Launch Putty. You will see the window pictured below.
 - a. Change Connection Type to *Serial*.
 - b. Change the text in *Serial Line* to match the *COM port* your device is connected to.
 - c. Change the baud rate to 9600.



If you would like to **log** the data from the sensor, follow the instructions below. Otherwise, skip to [Reading the Sensor Through Putty](#).

Note: Putty will not echo the commands given. It will only display the sensor's response. If you would like Putty to echo the commands given, go to [Terminal](#) and select [Local Echo: Force On](#) as shown.

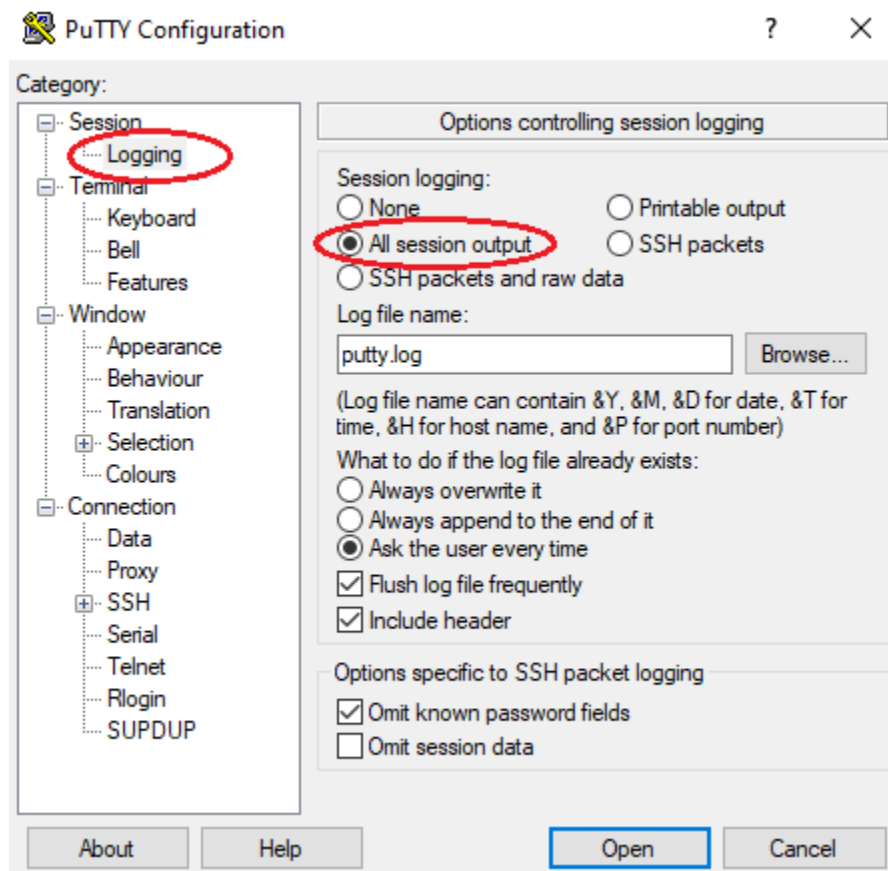


SECTION 2: Logging

1. On the left side of the menu, click **Logging**.
2. Click All Session Output.

You can change the log file name as you wish and click [Browse](#) to select the save location. You may want to *assign date codes to the file*.

If you use the name of a previous log file, Putty will try to append to or overwrite that file.



SECTION 3: Reading the Sensor Through Putty

When you have configured the Putty session, click **Open**. The Putty screen will launch blank. You can then send commands through Putty to the sensor to query the vacuum reading, baud rate, change setpoints, etc.

The sensor will not put out an automatic stream of vacuum data. It must be queried.

To Enter a Command:

1. Copy it and right-click in the Putty window.
2. Putty will echo the command *if you have forced on the Local Echo* as shown above.
3. It will always display a response acknowledging the query or change.

Example:

Command: @254BAUD?\ (queries the baud rate)

Response: @254ACK115200\ (acknowledges current baud rate is 115200)

Command: @254U!TORR\ (changes unit of measurement to Torr)

Response: @254ACKTORR\ (acknowledges unit of measurement is now Torr)

@254BAUD?\(queries the current baud rate)

@254BAUD!XXXXX\(changes baud rate to a user-specified value)

Currently supported baud rates are 4800, 9600, 19200, 38400, 57600, and 115200.

Ex: @254BAUD!115200 will change the baud rate to 115200.

@254P?\(queries combined pressure)

@254P?MP\(queries pressure from MEMS Pirani specifically)

@254P?PZ\(queries pressure from Piezo specifically)

@254GT?\(queries gas type)

@254GT!XXXXX\(changes gas type to a user-specified type)

Currently supported gas types are NITROGEN, HELIUM, ARGON, and AIR.

Ex: @254GT!ARGON\ will change the gas type to Argon.

@254MD?(queries model name)

@254PN?(queries part number)

@254T?(queries sensor temperature)

@254U? (queries pressure unit of measurement)

@254U!XXXX(changes unit of measurement to a user-specified unit)

Currently supported units of measurement are TORR, MBAR and PASCAL.

Ex: @254U!PASCAL\ will change the unit of measurement to Pascal.

@254FD! (restores factory settings)

When you are finished logging, close Putty. The log file will automatically save where you assigned it. The native file form is a **Notepad (.txt) file**.

To Export File into Excel:

1. Right click on the file.
2. Go to Open With.
3. Follow the prompts to open with Excel via Program Files.

OPTION 2: SmartPirani Software & Sens4 Cable

This option will demonstrate how to set up, read, and log vacuum data through the SmartPirani software using the Sens4 custom cable.

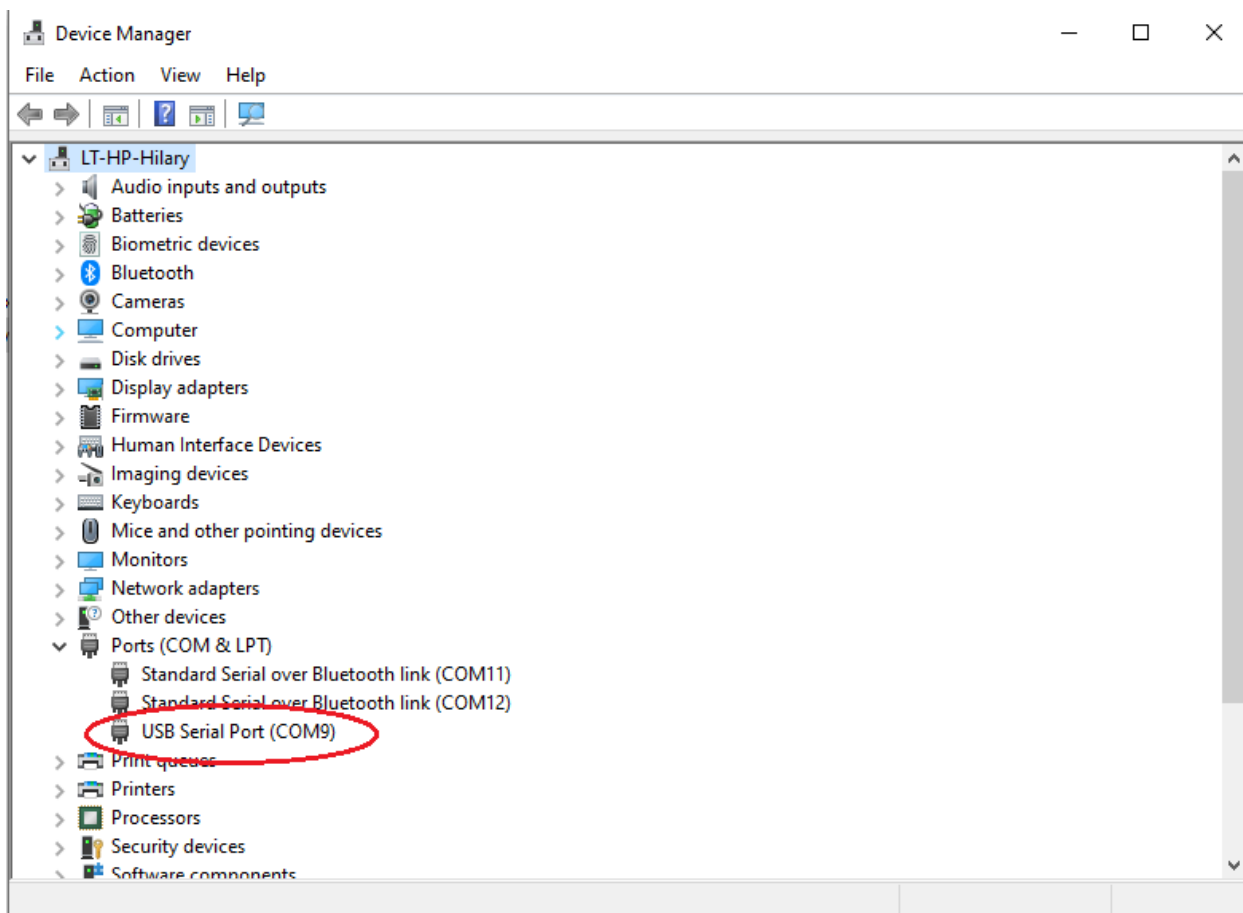
This method of reading the sensor relies on converting the voltage from the analog output pins on the sensor. You will not be able to get analog voltage data independently of the software.

SECTION 1: Setup

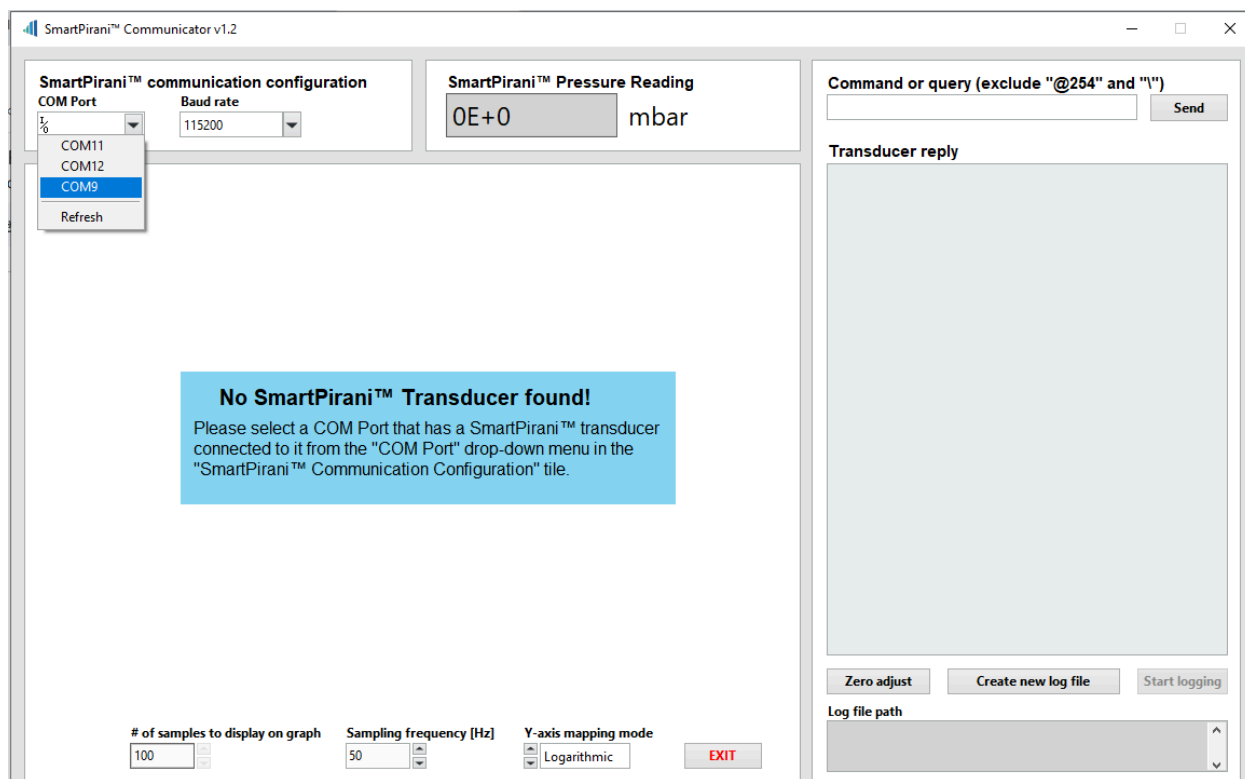
1. Plug the cable into your laptop or PC and connect the other end to the sensor. There is *no need* to use an additional power supply as the sensor is powered through the cable. The LEDs on the sensor and the USB portion of the cable will light up.
2. Open **Device Manager** and determine what **COM port** the device is connected to.

Note: If you do not see the Ports (COM & LPT) in the menu, there are several ways you can troubleshoot:

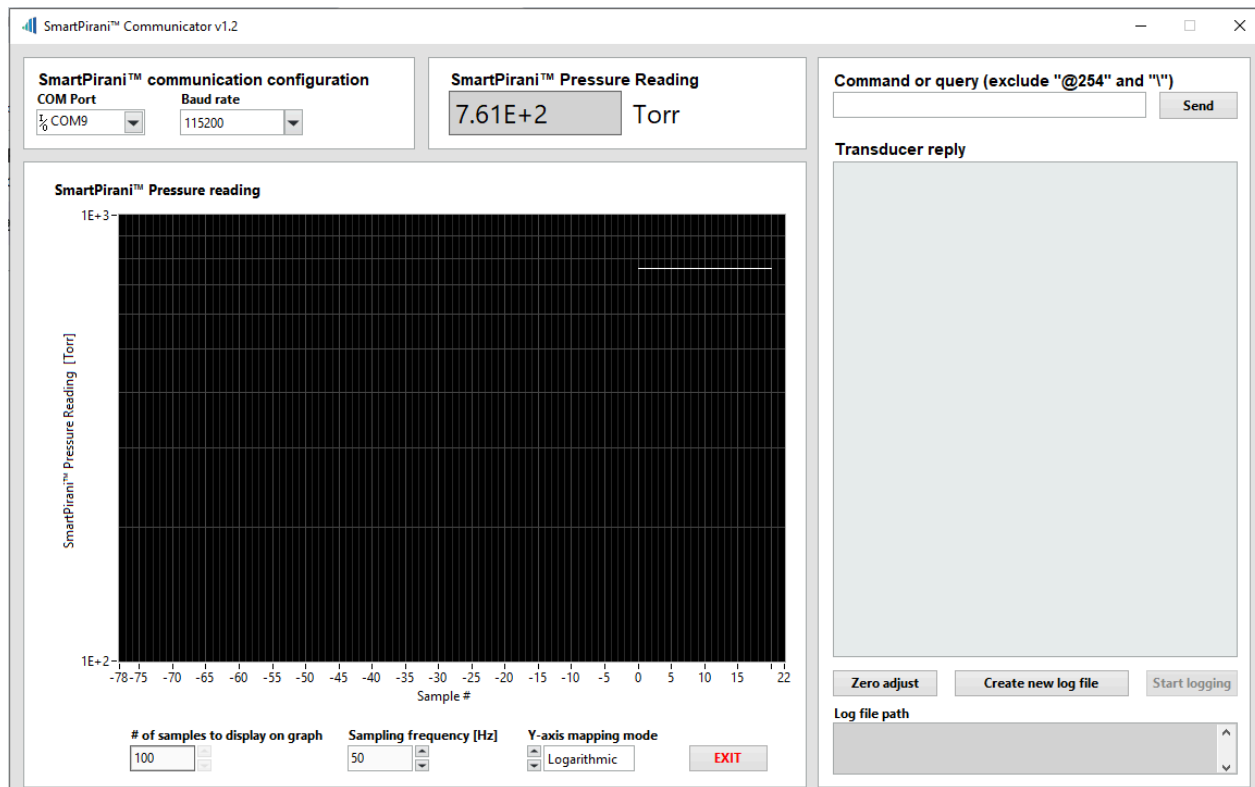
- Go to View > Show Hidden Devices
- Action > Add Legacy Hardware
- Try a different USB port on your machine
- Download an FTDI driver



3. Launch the [SmartPirani software](#).
4. Select the correct COM port from the dropdown menu. The baud rate for the sensor is *always* 115200 unless it has been configured otherwise.



- After selecting the correct **COM port** and baud rate, the program will begin reading vacuum. This example shows the sensor properly connected and reading atmospheric pressure.



SECTION 2: Logging

In order to log vacuum data, click “*Create new log file*” in the bottom right portion of the window.

You can select a save site and a file name for the logged data. The path for the file will appear in the window under “*Log file path*” to ensure you’re saving in the correct location.

Once the log file has been created, click *Start Logging*. The vacuum data will then be logged to the file. When you’re ready to generate the file, click *Stop Logging*. The file will export as a **.csv file** that can be read with **Excel** or **Notepad**.

	A	B	C	D	E
1	Date;Time;	Pressure reading			
2	Thu, Nov 7, 2024;	12:02:49 PM;	7.6092E+02		
3	Thu, Nov 7, 2024;	12:02:49 PM;	7.6093E+02		
4	Thu, Nov 7, 2024;	12:02:50 PM;	7.6093E+02		
5	Thu, Nov 7, 2024;	12:02:51 PM;	7.6093E+02		
6	Thu, Nov 7, 2024;	12:02:51 PM;	7.6093E+02		
7	Thu, Nov 7, 2024;	12:02:52 PM;	7.6093E+02		
8	Thu, Nov 7, 2024;	12:02:53 PM;	7.6093E+02		
9	Thu, Nov 7, 2024;	12:02:53 PM;	7.6093E+02		
10	Thu, Nov 7, 2024;	12:02:54 PM;	7.6093E+02		
11	Thu, Nov 7, 2024;	12:02:55 PM;	7.6094E+02		
12	Thu, Nov 7, 2024;	12:02:55 PM;	7.6093E+02		
13	Thu, Nov 7, 2024;	12:02:56 PM;	7.6094E+02		
14	Thu, Nov 7, 2024;	12:02:57 PM;	7.6094E+02		

The SmartPirani software will sample the data about *twice per second*. If this is too much data, you can experiment with adjusting the sampling rate in the bottom of the SmartPirani screen.

SmartPirani™ Communicator v1.2

SmartPirani™ communication configuration
COM Port: COM9 Baud rate: 115200

SmartPirani™ Pressure Reading
7.6089E+2 Torr

Command or query (exclude "@"254" and "\")
Send

Transducer reply

SmartPirani™ Pressure reading
1E+3
SmartPirani™ Pressure Reading [Torr]
1E+2
Sample #
553 560 565 570 575 580 585 590 595 600 605 610 615 620 625 630 635 640 645 653

of samples to display on graph: 100
Sampling frequency [Hz]: 50
Y-axis mapping mode: Logarithmic
EXIT

Zero adjust Create new log file Start logging
Log file path: C:\Users\Hilary\Downloads\Logging1