

# **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 <u>www.putty.org</u>.

### **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

📇 Device Manager Х File Action View Help 🗭 | 📰 | 📝 🗊 | 晃 Disk drives > -> I Display adapters > Firmware Human Interface Devices > 🚠 Imaging devices Keyboards > Mice and other pointing devices > Monitors > I Network adapters > Volter devices Ports (COM & LPT) Standard Serial over Bluetooth link (COM11) Standard Serial over Bluetooth link (COM12) USB Serial Port (COM54) > Print queues > Printers > Processors > Security devices



- 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.

🔀 PuTTY Configuration		? ×
Category:		
Session	Basic options for your PuTTY se	ssion
	Specify the destination you want to conne	ct to
	Serial line	Speed
Bell	COM54	9600
Features	Connection type:	$\smile$
⊡. Window	○SSH	t ~
Appearance		
Translation	Load, save or delete a stored session	
	Saved Sessions	
Colours		
	Default Settings	Load
Data		Save
		0010
Serial		Delete
···· Telnet		
Riogin	Class window on suit:	
SUPDUP	Always Never Only on cl	ean exit
About Help	Open	Cancel

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.

🕵 PuTTY Configuration	? ×
Category:	
	Options controlling the terminal emulation
<ul> <li>□ Terminal</li> <li>□ Reyboard</li> <li>□ Bell</li> <li>□ Features</li> <li>□ Window</li> <li>□ Appearance</li> <li>□ Behaviour</li> <li>□ Translation</li> <li>① Selection</li> <li>□ Colours</li> <li>□ Connection</li> <li>□ Data</li> <li>□ Proxy</li> <li>① SSH</li> <li>□ Serial</li> <li>□ Telnet</li> <li>□ Rlogin</li> <li>□ SUPDUP</li> </ul>	Set various terminal options         Auto wrap mode initially on         DEC Origin Mode initially on         Implicit CR in every LF         Implicit LF in every CR         Use background colour to erase screen         Enable blinking text         Answerback to ^E:         PuTTY         Line discipline options         Local echo:         Auto         Force on         Force off         Remote-controlled printing         Printer to send ANSI printer output to:
About Help	Open Cancel



## **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.

🕵 PuTTY Configuration		?	×
Category:			
Session     Logging     Terminal         Gell         Features         Features         Window         Gell         Features         Features         Selection         Colours         Connection         Colours         SSH         SSH         Serial         Telnet         Rlogin         SUPDUP	Options controlling session loggi Session logging: None Printable o SSH packets and raw data Log file name: putty.log (Log file name can contain &Y, &M, &D for of time, &H for host name, and &P for port num What to do if the log file already exists: Always overwrite it Always overwrite it Always append to the end of it Always append to the end of it Always append to the end of it Sk the user every time Flush log file frequently Include header Options specific to SSH packet logging Omit known password fields Omit session data	ing utput ets Browse date, &T f nber)	۶ for
About Help	Open	Cance	el



## **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)				
<b>Command:</b> @254U!TORR\ (changes unit of measurement to Torr) <b>Response:</b> @254ACKTORR\ (acknowledges unit of measurement is now Torr)				
<ul> <li>@254BAUD?\(queries the current baud rate)</li> <li>@254BAUD!XXXXX\(changes baud rate to a user-specified value)</li> </ul>				
Currently supported baud rates are 4800, 9600, 19200, 38400, 57600, and 115200.				
Ex: @254BAUD!115200 will change the baud rate to 115200.				
<pre>@254P?\(queries combined pressure) @254P?MP\(queries pressure from MEMS Pirani specifically) @254P?PZ\(queries pressure from Piezo specifically)</pre>				
<pre>@254GT?\(queries gas type) @254GT!XXXXX\(changes gas type to a user-specified type)</pre>				
Currently supported gas types are NITROGEN, HELIUM, ARGON, and AIR.				



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

@254MD?\ @254PN?\ @254T?\	(queries model name) (queries part number) (queries sensor temperature)
@254U?\ @254U!XXXX\(c	
Currently supported units of me	asurement are TORR, MBAR and PASCAL.
Ex: @254U!PASCAL\ will chang	ge 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

📇 Device Manager	_	×
File Action View Help		
V 📇 LT-HP-Hilary		^
> I Audio inputs and outputs		
> 🎲 Batteries		
> 👼 Biometric devices		
> 🚯 Bluetooth		
> 💿 Cameras		
> 🛄 Computer		
> 👝 Disk drives		
> 🔙 Display adapters		
> 📔 Firmware		
> 🐺 Human Interface Devices		
> 👔 Imaging devices		
> 🥅 Keyboards		
> II Mice and other pointing devices		
> 🛄 Monitors		
> 🚽 Network adapters		
> 😰 Other devices		
🗸 🛱 Ports (COM & LPT)		
Standard Serial over Bluetooth link (COM11)		
Standard Serial over Bluetooth link (COM12)		
C USB Serial Port (COM9)		
> 🚍 Print queuer		
> 🚍 Printers		
>  Processors		
> 🛐 Security devices		
🔨 🏴 Software components		~



- 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.

. SmartPirani™ Comm	unicator v1.2			- 🗆 X
SmartPirani <sup>TM</sup> co COM Port <sup>1</sup> / <sub>2</sub> COM11 COM12 COM9 Refresh	mmunication configuration Baud rate 115200	SmartPirani™ Pressure Reading 0E+0 mbar	Command or query (exclude "(	@254" and "\") Send
	No SmartPirani™ T Please select a COM Port tha connected to it from the "COM "SmartPirani™ Communication	Transducer found! It has a SmartPirani™ transducer I Port" drop-down menu in the on Configuration" tile.		
# of s 100	amples to display on graph Sampling f	requency [Hz] Y-axis mapping mode	Zero adjust Create new k Log file path EXIT	ng file Start logging



5. 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**.



	А	В	С	D	E
1	Date;Time	Pressure	reading		
2	Thu, Nov 7	, 2024;12:0	2:49 PM;7.	6092E+02	
3	Thu, Nov 7	, 2024;12:0	2:49 PM;7.	6093E+02	
4	Thu, Nov 7	, 2024;12:0	2:50 PM;7.	6093E+02	
5	Thu, Nov 7	, 2024;12:0	2:51 PM;7.	6093E+02	
6	Thu, Nov 7	, 2024;12:0	2:51 PM;7.	6093E+02	
7	Thu, Nov 7	, 2024;12:0	2:52 PM;7.	6093E+02	
8	Thu, Nov 7	, 2024;12:0	2:53 PM;7.	6093E+02	
9	Thu, Nov 7	, 2024;12:0	2:53 PM;7.	6093E+02	
10	Thu, Nov 7	, 2024;12:0	2:54 PM;7.	6093E+02	
11	Thu, Nov 7	, 2024;12:0	2:55 PM;7.	6094E+02	
12	Thu, Nov 7	, 2024;12:0	2:55 PM;7.	6093E+02	
13	Thu, Nov 7	, 2024;12:0	2:56 PM;7.	6094E+02	
14	Thu, Nov 7	, 2024;12:0	2:57 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.



