Application Note

Using Python code to communicate with the PRS-330 via GPIB

Summary

The IET Labs PRS-330 is designed for applications requiring automation of a decade resistor. The PRS-330 has Ethernet, USB and GPIB interfaces for communication to a PC or similar controller.

This application note gives a simplified example of using IDLE which is Python's Integrated Development and Learning Environment to communicate to the PRS-330.

This application note will deal mainly with GPIB however the code can easily be changed to use Ethernet or USB.

This example will use National Instrument NI VISA as the back-end for communication, pyvisa as the front-end and Python code within IDLE to send commands such as *IDN? or SOURCE:DATA to change the source resistance of the PRS-330.

More information on Python can be found at https://www.python.org/

Example

This example assumes you have not installed Python, or NI VISA. This example is on a PC with a Windows 10 operating system.

1.) Install the latest version of National Instrument NI VISA by going to the link below and selecting correct OS and latest version.

https://www.ni.com/en-us/support/downloads/drivers/download.ni-visa.html#442805

2.) Install the latest version of python for windows by going to the link below.

https://www.python.org/downloads/windows/

Python will be installed in

C:\Users\<user_name>\AppData\Local\Programs\Python\

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3.) Use Windows File Explorer to go to this directory.

C:\Users\<user_name>\AppData\Local\Programs\Python\Python39\Tools\scripts\

This is a screenshot of what File Explorer looks like on my PC. Note that my user name is bob.brown so this would be changed to your user name.
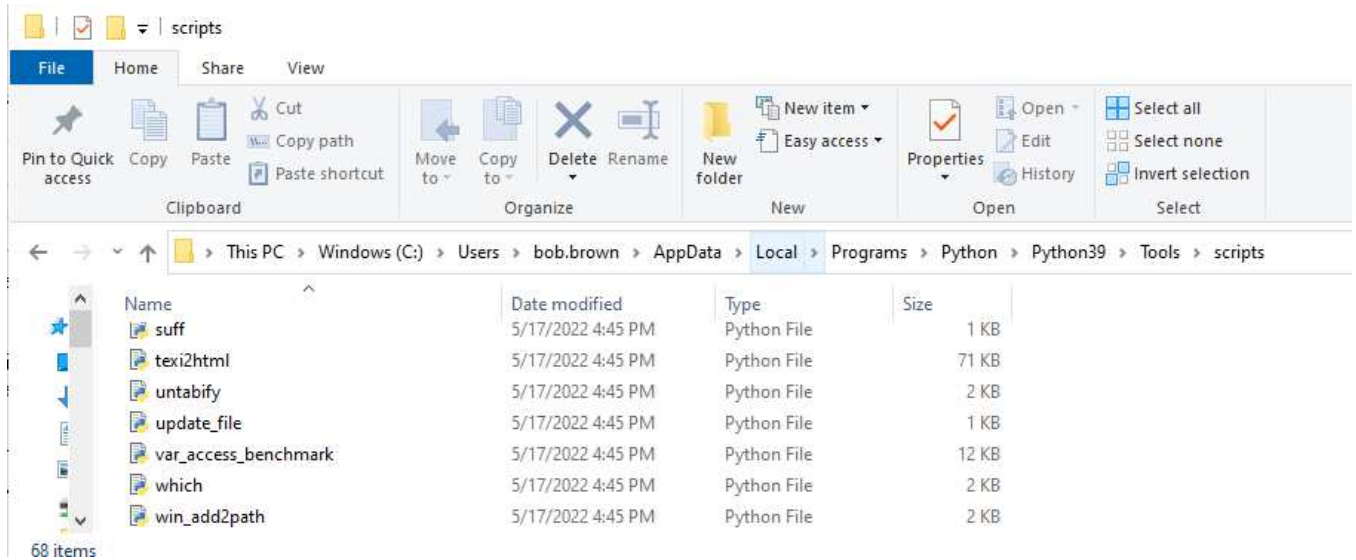
4.) You can then double click on win_add2path file. This will open a run-time window for a brief moment. This will make sure the directory where Python is installed is in your path.

5.) From Windows open the command prompt app. You can just type CMD into the search box to find the app.
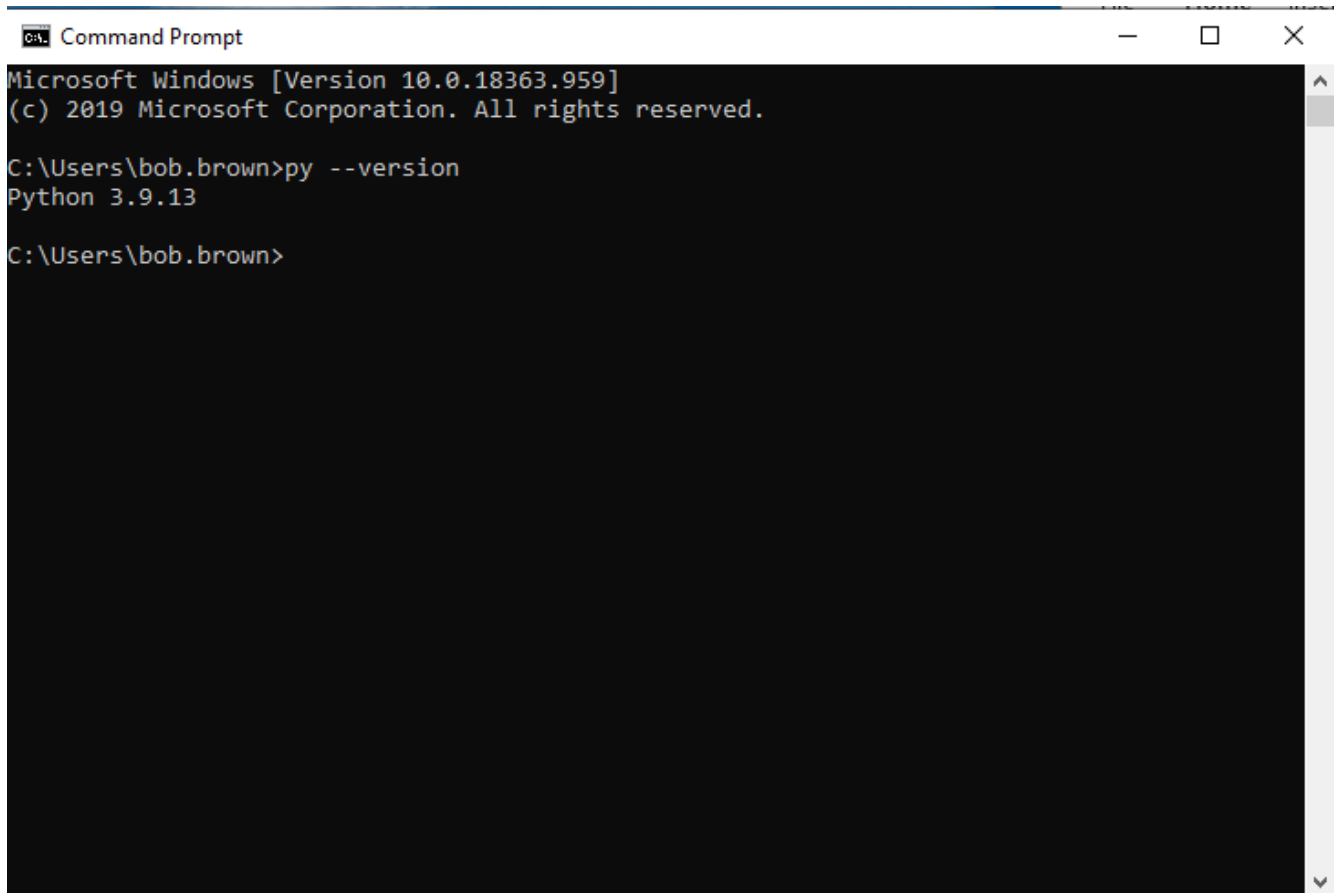
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6.) From command prompt type py –version

The command prompt window should look similar to the screenshot shown below.

Note that in this example Python 3.9.13 is installed

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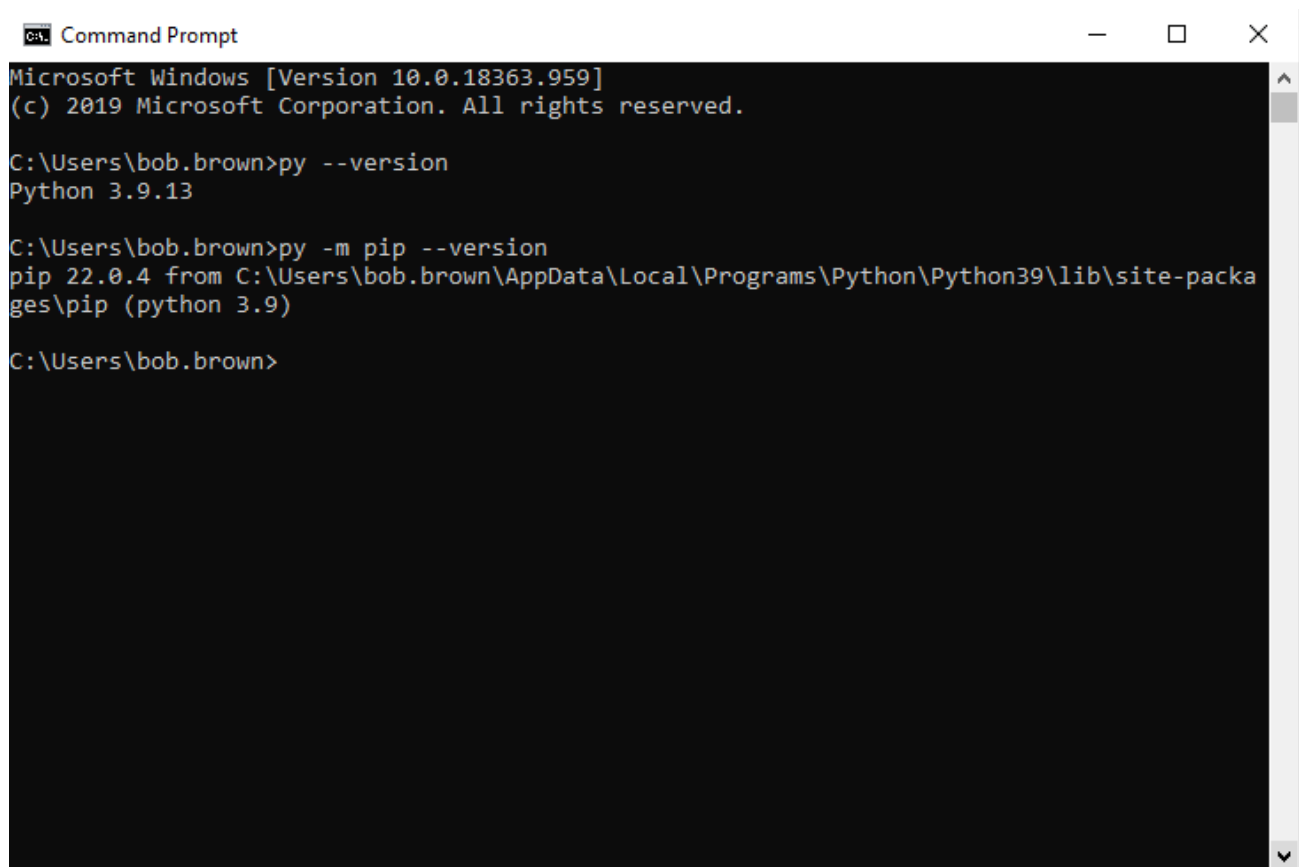
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7.) From the command prompt type py -m pip –version

This response from this command should be the version of pip which is an installed as shown in the screenshot below.

pip stands for Preferred Installer Program and we will use pip to install PyVISA in the next step.

The response from this command should be the version of pip and location of where it was installed from "pip 22.0.4 from C:\Users\<user_name>\AppData\Local\Programs\Python\Python39\lib\site-packages\pip (python 3.9)"

```
Command Prompt                                                    —    □    ×
Microsoft Windows [Version 10.0.18363.959]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\bob.brown>py --version
Python 3.9.13

C:\Users\bob.brown>py -m pip --version
pip 22.0.4 from C:\Users\bob.brown\AppData\Local\Programs\Python\Python39\lib\site-packa
ges\pip (python 3.9)

C:\Users\bob.brown>
```
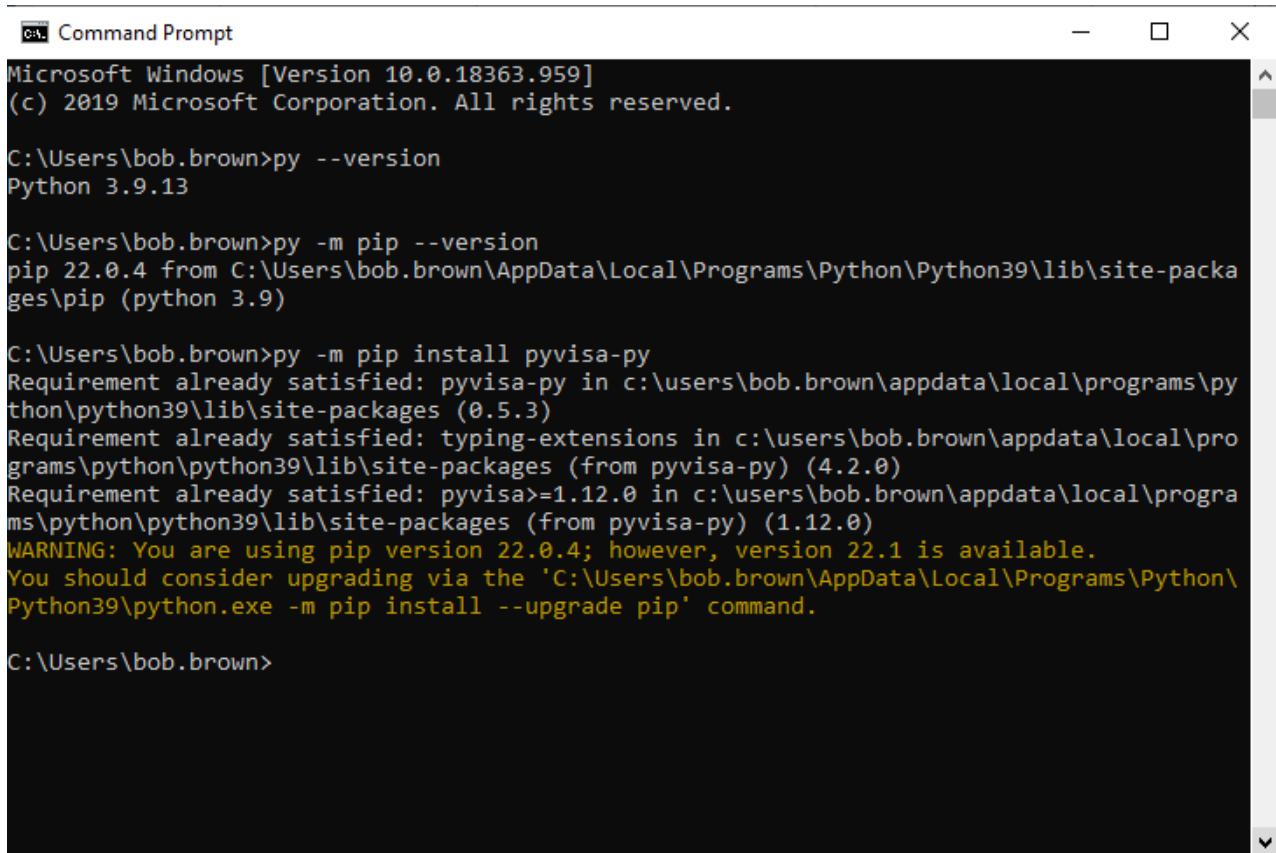
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8.) From command prompt type py -m pip install pyvisa-py

This will install PyVISA. PyVISA is a front-end to the NI VISA Library we installed earlier and simplifies communication to instruments when using Pyton.

The screenshot below shows that PyVISA was installed or in my case that it had already been installed.

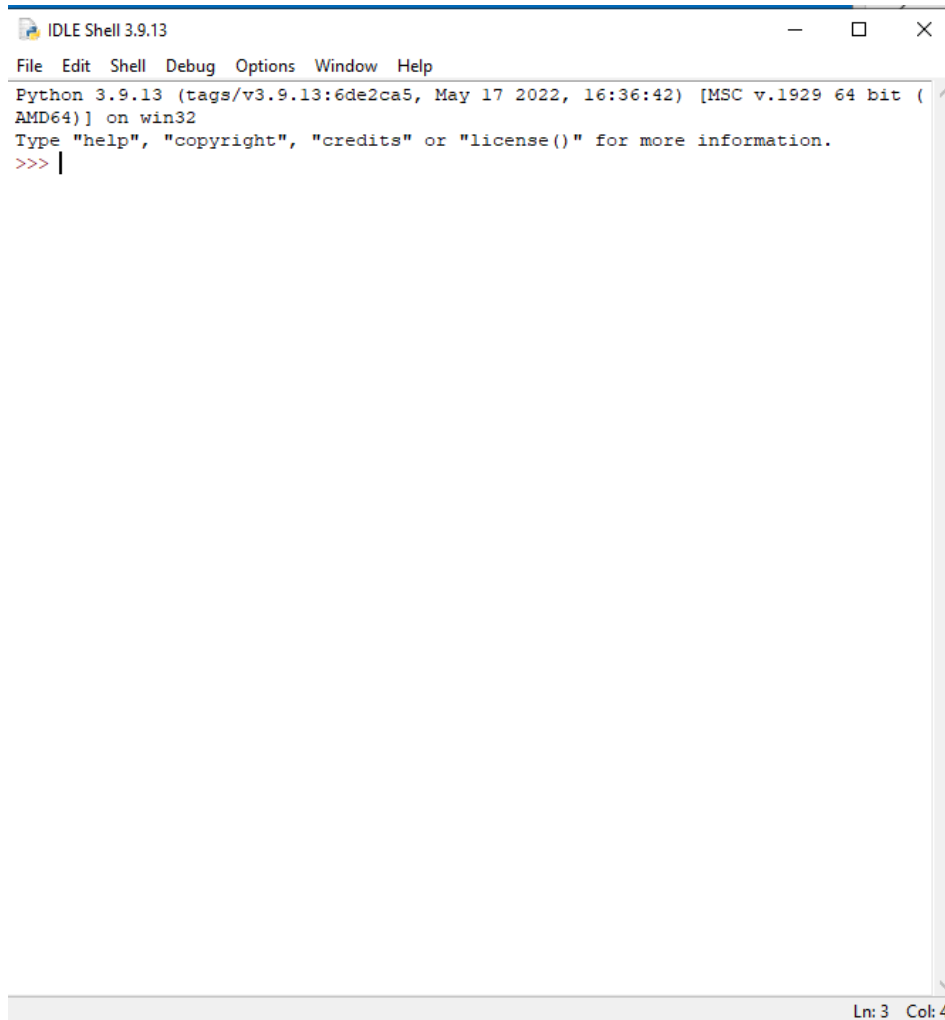9.) At this point you can close the Command Prompt window.

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10.) From the Windows Start menu open Pyton IDLE program

The IDLE screen will look like the screenshot below.

We can then type in Python code and see responses

Please also make sure that the GPIB adapter is installed in the PC, the adapter is connected to the PRS-330 and the PRS-330 is turned on.

```
IDLE Shell 3.9.13                                    —    □    ×
File  Edit  Shell  Debug  Options  Window  Help
Python 3.9.13 (tags/v3.9.13:6de2ca5, May 17 2022, 16:36:42) [MSC v.1929 64 bit (
AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> |
```
Ln: 3   Col: 4

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11.)We then type the following code into IDLE one at a time.

```
>>>import pyvisa
>>>rm = pyvisa.ResourceManager()
>>>rm.list_resources()
>>>('ASRL1::INSTR', 'ASRL2::INSTR', 'GPIB0::04::INSTR')
>>>inst = rm.open_resource('GPIB0::04::INSTR')
>>>print(inst.query("*IDN?"))
>>>print(inst.query("SOURCE:DATA?"))
>>> 10,000.00
>>>inst.write("SOURCE:DATA 125")
>>>print(inst.query("SOURCE:DATA?"))
```

The screenshot below shows the result of entering all of the code into IDLE.

The code rm.list_resources() will respond with the devices found on the PC including ASRL1 which is the serial port along with the PRS-330 which is at address 4 and indicated by 'GPIB::4::INSTR'.

More information on PyVISA code can be found at

https://pyvisa.readthedocs.io/en/latest/

The response to sending *IDN? should be the idn string for your specific PRS-330.

Sending the SOURCE:DATA? command will return the source resistance the PRS-330 is set to. In this case the PRS-330 was set to 10000 Ω.

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```
IDLE Shell 3.9.13                                                    —  □  ×

File  Edit  Shell  Debug  Options  Window  Help
Python 3.9.13 (tags/v3.9.13:6de2ca5, May 17 2022, 16:36:42) [MSC v.1929 64 bit (
AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> import pyvisa
>>> rm = pyvisa.ResourceManager()
>>> rm.list_resources()
('ASRL1::INSTR', 'ASRL10::INSTR', 'GPIB0::4::INSTR')
>>> inst = rm.open_resource('GPIB0::04::INSTR')
>>> print(inst.query("*IDN?"))
IET Labs Inc.,PRS-330,A8-22211274,A8

>>> print(inst.query("SOURCE:DATA?"))
10,000.00

>>> inst.write("SOURCE:DATA 125")
17
>>> print(inst.query("SOURCE:DATA?"))
125.0000

>>> |
                                                              Ln: 19  Col: 4
```

Conclusion

I hope this gives a simple introduction to communicating to the PRS-330 via Python code using PyVISA and National Instruments NI-VISA.

IET Labs is not an expert in Python but wanted to show how Python code could be used to control the PRS-330.

Hopefully with this information you can begin the process of creating your own Python code to control the PRS-330 or any instrument.

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