

Pisemi Shanghai Office

# Instrument Driver Structure

V1.0

Ran Shuai  
2025-4-25

## Table of Contents

1	Instrument driver structure .....	1
2	Python File Analysis .....	2
2.1	Device Class.....	2
2.2	Multimeter Class.....	3
2.3	Power .....	3
2.4	SMU .....	4
2.5	Other classes.....	5
3	Instrument_Info.txt.....	6
4	Instrument Name Rules .....	6

## 1 Instrument driver structure

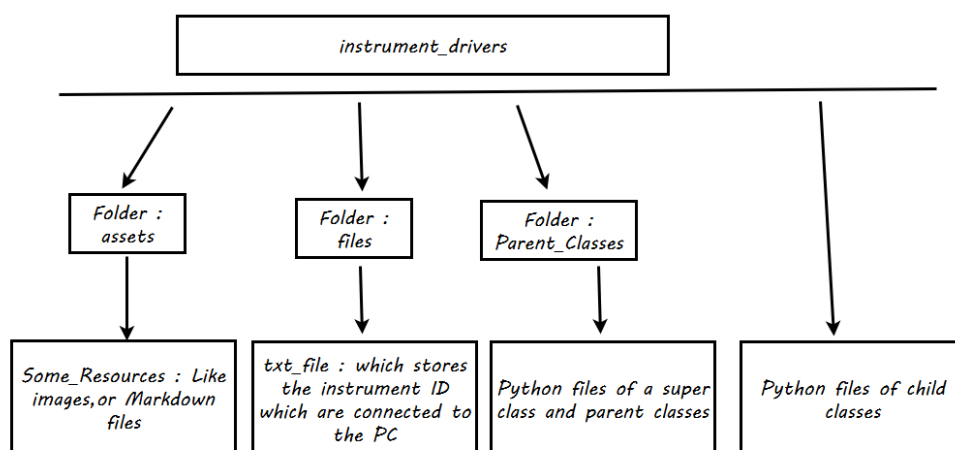


Figure 1 File Structure of Instrument Driver Code

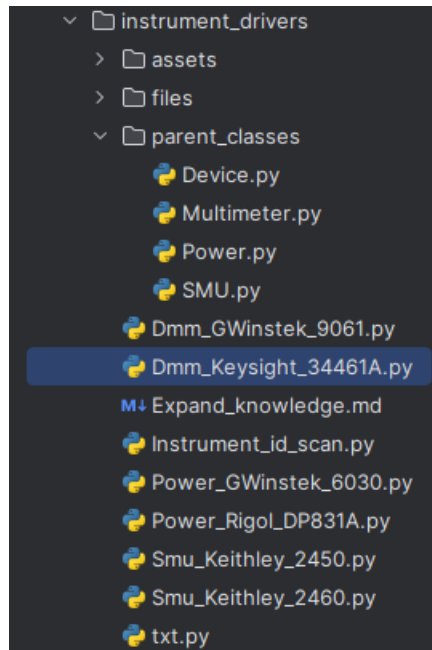


Figure 2 File Structure

All the files are put in the root directory called instrument\_drivers.

## 2 Python File Analysis

This paragraph mainly implies the main features of each python files.

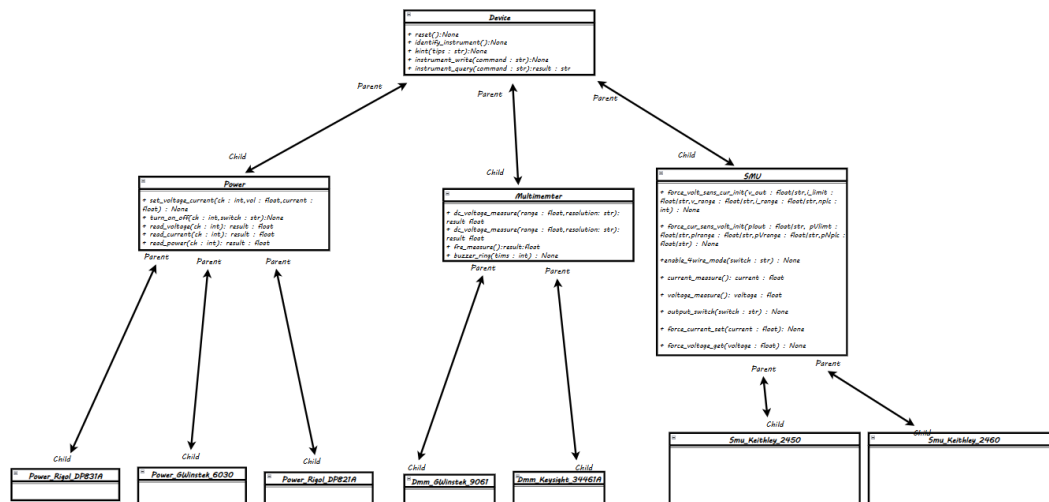


Figure 3 Python Instrument Control Class Inheritance Hierarchy

### 2.1 Device Class

This is a super class which contains the general SCPI commands for all instruments.

All other instruments classes inherit this class.

Also in the future, any general SCPI commands should be added to this file.

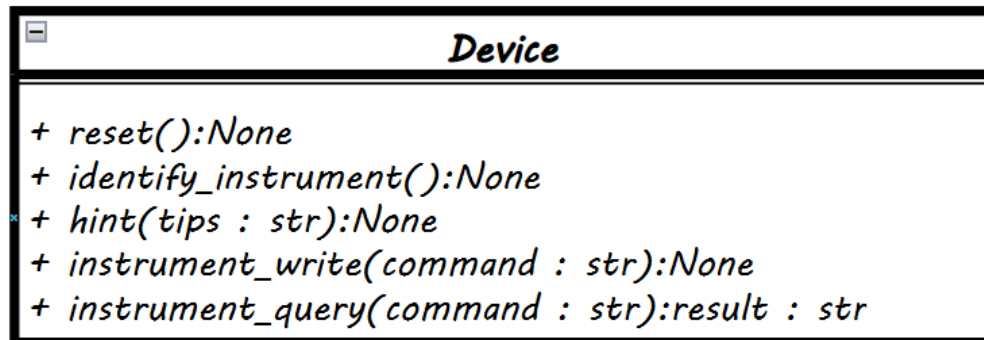


Figure 4 Device Class

## 2.2 Multimeter Class

This class contains basic multimeter operation functions, such as voltage/current measurement.

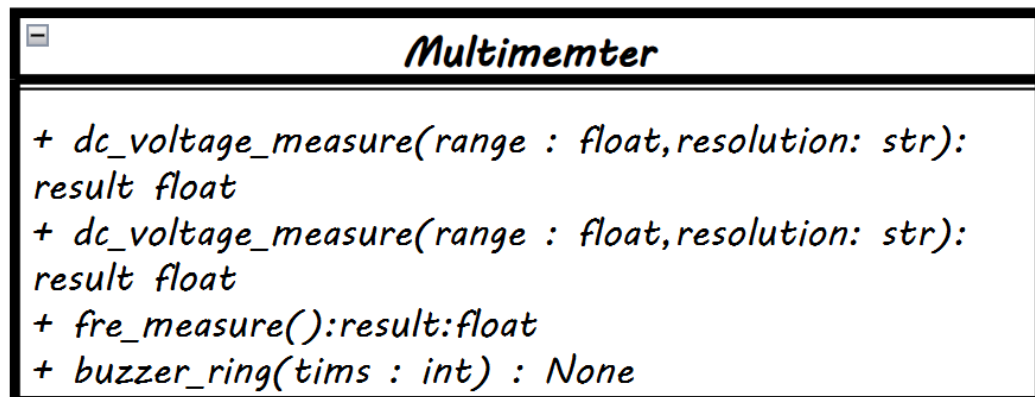


Figure 5 Multimeter Class

## 2.3 Power

This class implements basic power supply operations, such as channel enable/disable, voltage/current limit setting.

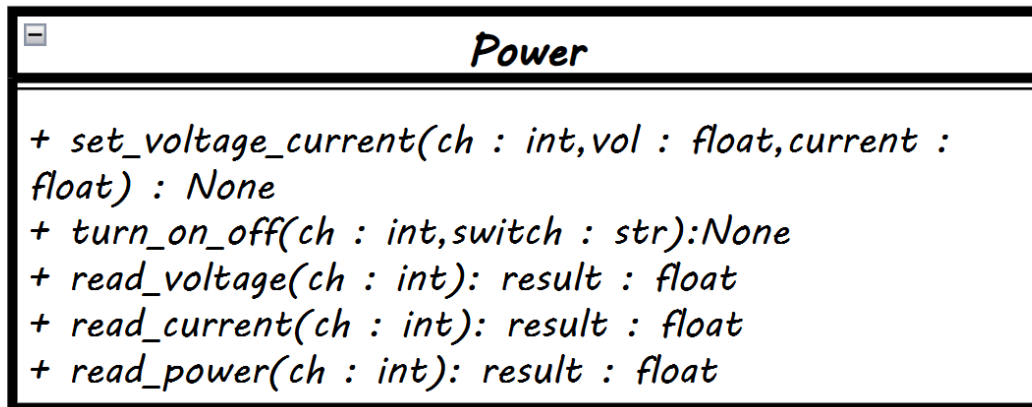


Figure 6 Power Class

## 2.4 SMU

This class implements core SMU (Source Measure Unit) operations, including:

- 2-wire/4-wire measurement modes
- Voltage sourcing with current measurement
- Current sourcing with voltage measurement
- Range/Compliance auto-configuration
- .etc

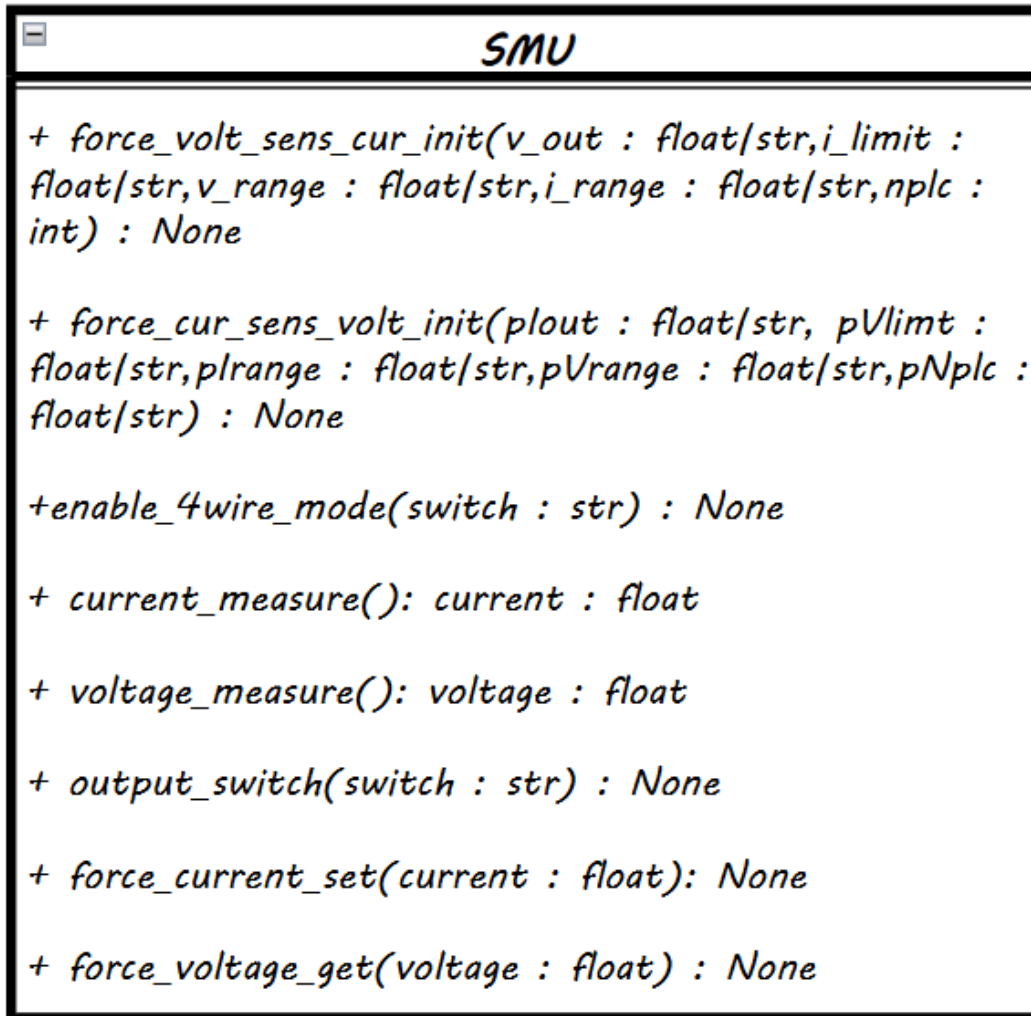


Figure 7 SMU Class

## 2.5 Other classes

Other classes are mainly focused on the specific function of one instrument, which is not the general function of all instruments.

Such as : For 9060 dmm, the digital filter should be closed, but for 34461A dmm, it is not necessary.

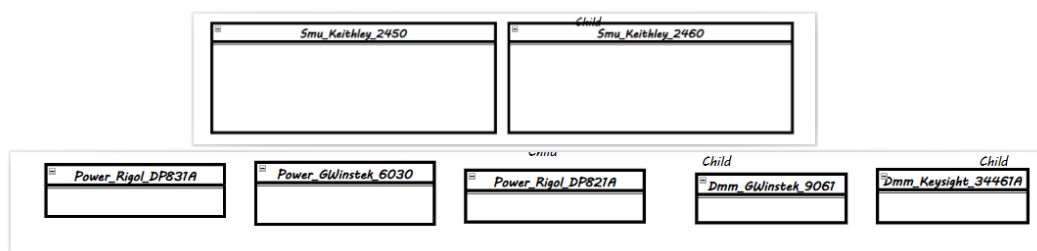


Figure 8 The child classed

### 3 Instrument\_Info.txt

After you run the file below :

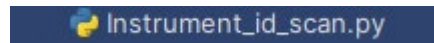


Figure 9 Python file for scan instruments IDs

```
1  USB0::0x05E6::0x2450::04576516::INSTR      KEITHLEY INSTRUMENTS,MODEL 2450,04576516,1.7.12b
2  -----
3  USB0::0x05E6::0x2460::04624797::INSTR      KEITHLEY INSTRUMENTS,MODEL 2460,04624797,1.7.12b
4  USB0::0x05E6::0x2450::04576516::INSTR      KEITHLEY INSTRUMENTS,MODEL 2450,04576516,1.7.12b
5  2025_04_24_15_57_18
6  USB0::0x05E6::0x2460::04624797::INSTR      KEITHLEY INSTRUMENTS,MODEL 2460,04624797,1.7.12b
7  USB0::0x05E6::0x2450::04576516::INSTR      KEITHLEY INSTRUMENTS,MODEL 2450,04576516,1.7.12b
8  -----2025_04_24_15_57_59-----
9  USB0::0x05E6::0x2460::04624797::INSTR      KEITHLEY INSTRUMENTS,MODEL 2460,04624797,1.7.12b
10 USB0::0x05E6::0x2450::04576516::INSTR      KEITHLEY INSTRUMENTS,MODEL 2450,04576516,1.7.12b
11 -----
12 -----2025_04_24_15_58_24-----
13 USB0::0x05E6::0x2460::04624797::INSTR      KEITHLEY INSTRUMENTS,MODEL 2460,04624797,1.7.12b
14 USB0::0x05E6::0x2450::04576516::INSTR      KEITHLEY INSTRUMENTS,MODEL 2450,04576516,1.7.12b
15 -----
16 -----2025_04_24_17_58_40-----
17 USB0::0x2A80::0x1301::MY60099169::INSTR      Keysight Technologies,34461A,MY60099169,A.03.03-03.15-03.03-00.52-04-03
18 USB0::0x05E6::0x2460::04624797::INSTR      KEITHLEY INSTRUMENTS,MODEL 2460,04624797,1.7.12b
19 USB0::0x1AB1::0x0E11::DP8A261200218::INSTR  RIGOL TECHNOLOGIES,DP831A,DP8A261200218,00.01.19
20 -----
```

Figure 10 instruments IDs and their model

The IDs of the instrument which are connected to your PC will shown in the txt file.

### 4 Instrument Name Rules

When working with instruments in code, use a clear naming convention like:

Brand\_InstrumentMode\_Function1\_Function2\_Num.

For example :

Gwinstek\_Dmm9061\_VoltMeasure\_CurMeasure\_1

Keysight\_Dmm34461A\_VoltMeasure\_1

Keithley\_SMU2450\_ForceCurMeaVolt\_1