

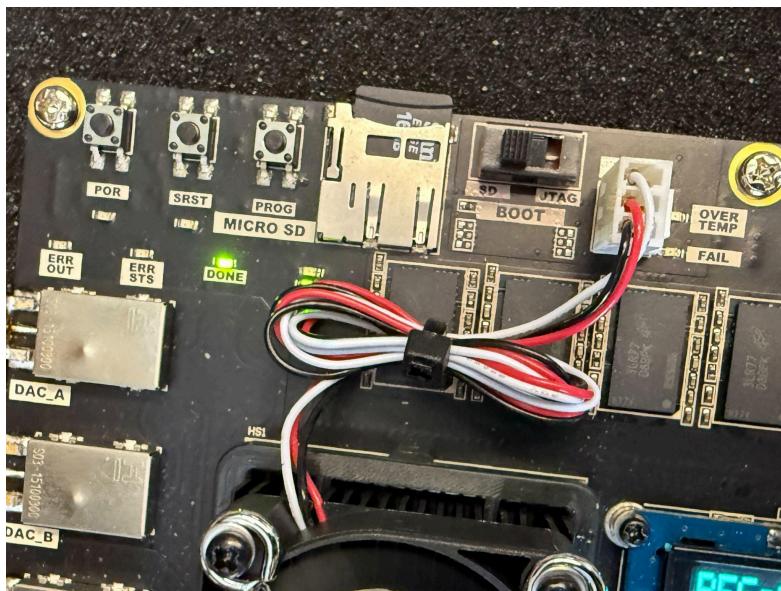
RfSoc 4x2 Pynq setup

Reference tutorial: <https://github.com/realdigitalorg/rfsoc4x2-bsp>

After acquiring the RfSoC 4x2 board, the MicroSD card that is supplied has the majority of the necessary files which will be used for its setup.

First insert the MicroSD card into the Micro SD card slot on the board, and make sure the Boot switch is set to SD.

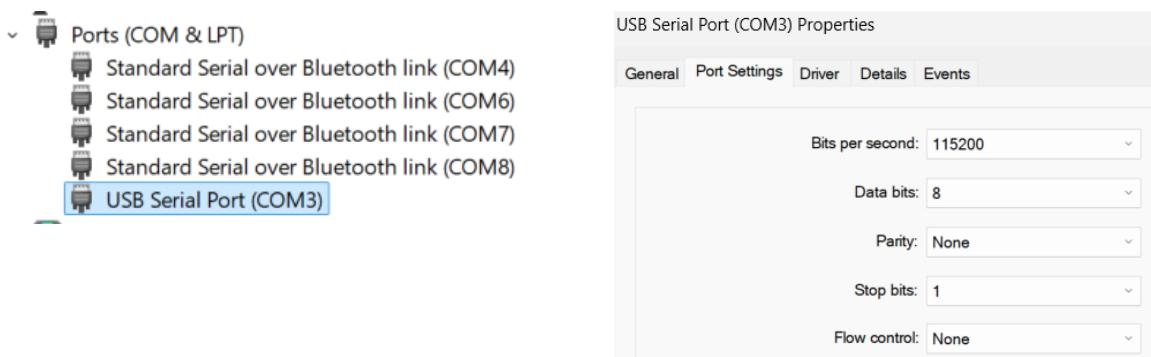
If you have problems with the SD card please refer to the referenced RFSoC4x2-BSP Github.



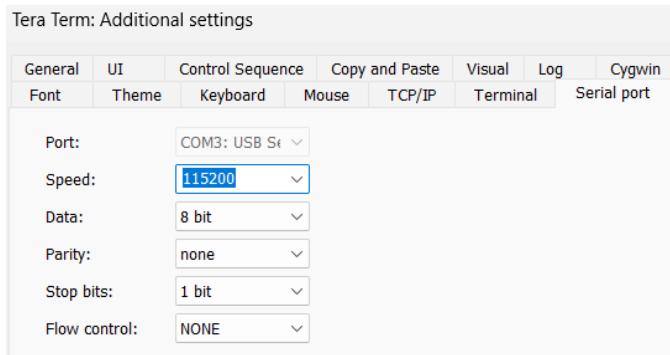
After the MicroSD boot configuration is setup, you will need to connect the Micro-USB cable supplied into the PROG-UART port located on the board and into your computer. The next steps will depend on your operating system.

FOR WINDOWS:

You will need to bring up a terminal emulator such as Tera Term or Putty. For this example we used Tera Term. First, open Device manager, and locate the new COM port which appears when you plug in your board. Note: This COM value may change if you switch USB ports on your machine. For this COM port, (COM3 in our instance), open properties and change the Baud rate to 115200, Data Bits to 8, Parity to None, Stop Bits to 1, and Flow control to None.



From here, in your terminal emulator, set the connection to your COM port, and the same settings as described above.



Now, Power on your board. if you configured it correctly, you should see the board boot up on the terminal as the default user xilinx.

```
PYNQ Linux, based on Ubuntu 22.04 pynq ttyPS0
pynq login: xilinx (automatic login)
Welcome to PYNQ Linux, based on Ubuntu 22.04 (GNU/Linux 5.15.19-xilinx-v2022.1 aarch64)
Last login: Sat Sep 13 12:47:25 UTC 2025 on ttyPS0
xilinx@pynq:~$
```

FOR LINUX:

Configure the Linux terminal with the exact same COM settings as the Windows version

To make visualization of the graphs possible, we decided to use xfce4 as our desktop environment, connected remotely through XRDP but any lightweight Linux desktop environment should work just fine.

To install xfce4 & XRDP:

First you will need an ethernet connection to the board, from here use the following series of commands:

sudo apt update

sudo apt upgrade

sudo apt install xfce4-goodies xfce4

<https://linuxconfig.org/guide-to-installing-xfce-desktop-on-ubuntu-linux>

```
aspell-autobuildhash: processing: en [en-variant_0].  
aspell-autobuildhash: processing: en [en-variant_1].  
aspell-autobuildhash: processing: en [en-variant_2].  
aspell-autobuildhash: processing: en [en-w_accents-only].  
aspell-autobuildhash: processing: en [en-wo_accents-only].  
aspell-autobuildhash: processing: en [en_AU-variant_0].  
aspell-autobuildhash: processing: en [en_AU-variant_1].  
aspell-autobuildhash: processing: en [en_AU-w_accents-only].  
aspell-autobuildhash: processing: en [en_AU-wo_accents-only].  
aspell-autobuildhash: processing: en [en_CA-variant_0].  
aspell-autobuildhash: processing: en [en_CA-variant_1].  
aspell-autobuildhash: processing: en [en_CA-w_accents-only].  
aspell-autobuildhash: processing: en [en_CA-wo_accents-only].  
aspell-autobuildhash: processing: en [en_GB-ise-w_accents-only].  
aspell-autobuildhash: processing: en [en_GB-ise-wo_accents-only].  
aspell-autobuildhash: processing: en [en_GB-ize-w_accents-only].  
aspell-autobuildhash: processing: en [en_GB-ize-wo_accents-only].  
aspell-autobuildhash: processing: en [en_GB-variant_0].  
aspell-autobuildhash: processing: en [en_GB-variant_1].  
aspell-autobuildhash: processing: en [en_US-w_accents-only].  
aspell-autobuildhash: processing: en [en_US-wo_accents-only].  
xilinx@pynq:~$
```

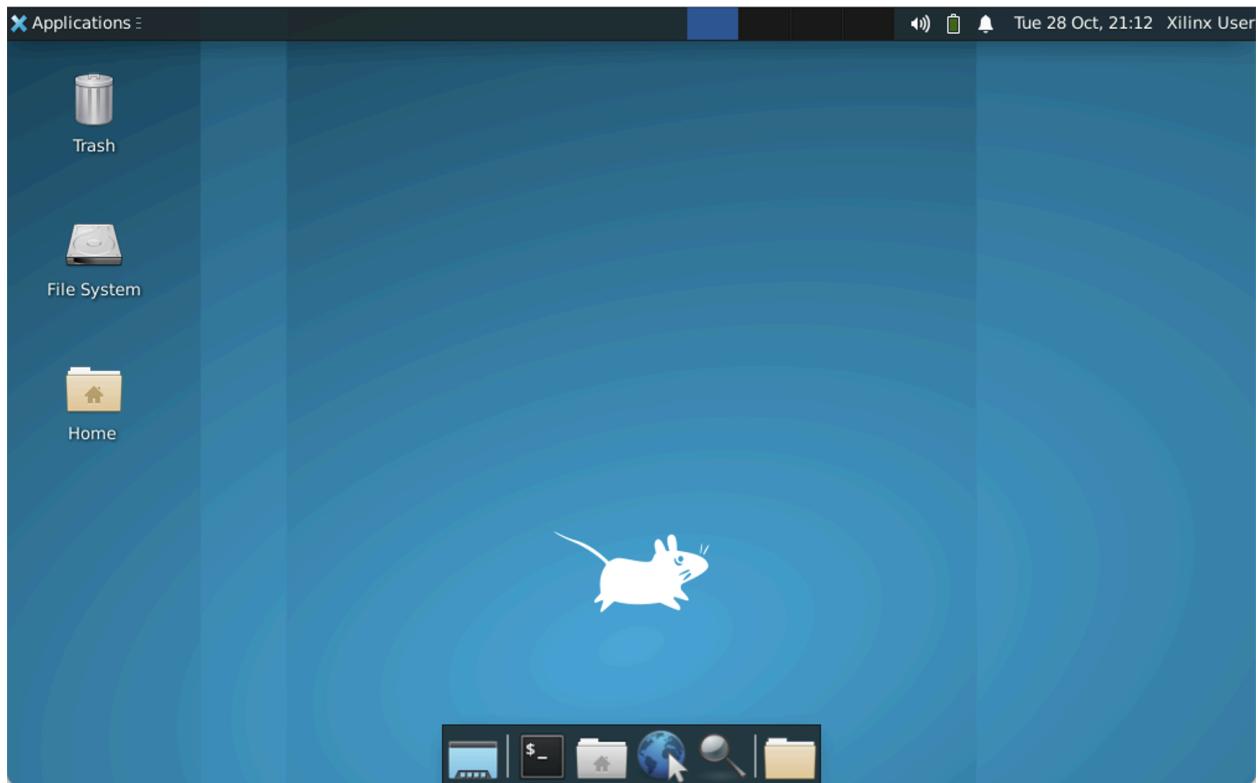
sudo apt install xrdp

```
[xilinx@pynq:~$ sudo systemctl status xrdp  
● xrdp.service - xrdp daemon  
    Loaded: loaded (/lib/systemd/system/xrdp.service; enabled; vendor preset: ▶  
      Active: active (running) since Tue 2025-10-28 21:01:09 UTC; 1min 34s ago  
        Docs: man:xrdp(8)  
              man:xrdp.ini(5)  
    Process: 1610 ExecStartPre=/bin/sh /usr/share/xrdp/socksetup (code=exited, ▶  
    Process: 1618 ExecStart=/usr/sbin/xrdp $XRDP_OPTIONS (code=exited, status=0)  
      Main PID: 1619 (xrdp)  
        Tasks: 1 (limit: 4561)  
       Memory: 852.0K  
         CPU: 38ms  
        CGroup: /system.slice/xrdp.service  
                  └─1619 /usr/sbin/xrdp
```

Verify the status

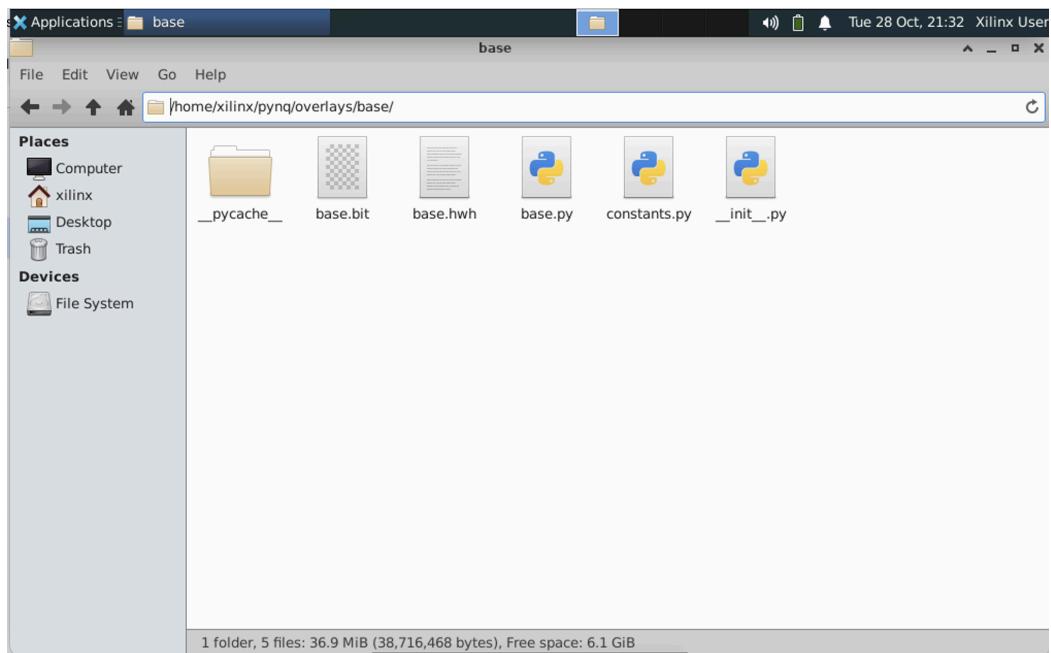
sudo systemctl status xrdp

Connect to it using Windows Remote Desktop or (Windows App in MAC)



/home/xilinx/pynq/overlays/base/base.bit

You can access the hardware bit file.



Now you are in the system with a UI, download the repository to test out the application.

- Git clone should be the fastest way to get all the files in the system.
- git clone <https://github.com/RealDigitalOrg/RFSoC4x2-App.git>

Originally, libraries we use in python such as Qt and Pyside6 is not include in the system, therefore we need to run an executable that downloads these files inside the system.

```
Chmod +x install_packages.sh  
./install_packages.sh
```

NOTE : When running the program, it might throw an error about numpy version.

To Fix just downgrade the numpy version using the command below.

- Python3 -m pip install “numpy<2”

Now we have finished up setting up the board, we can run the board now.



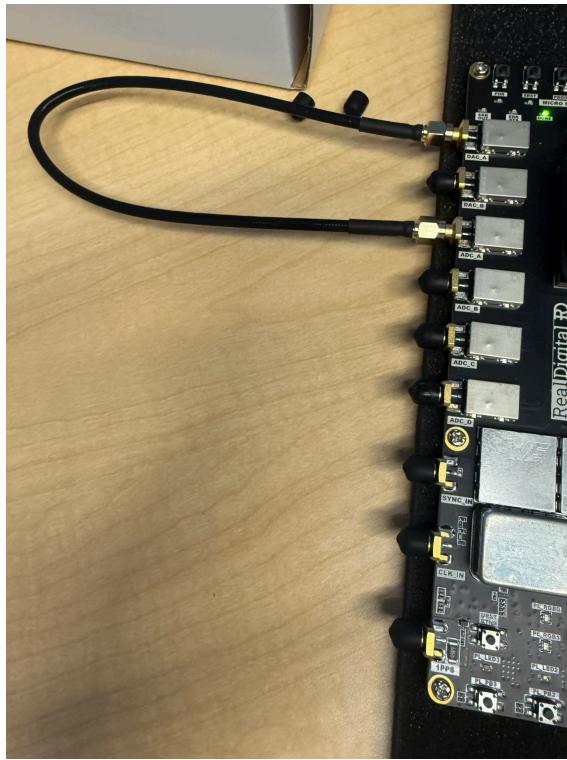
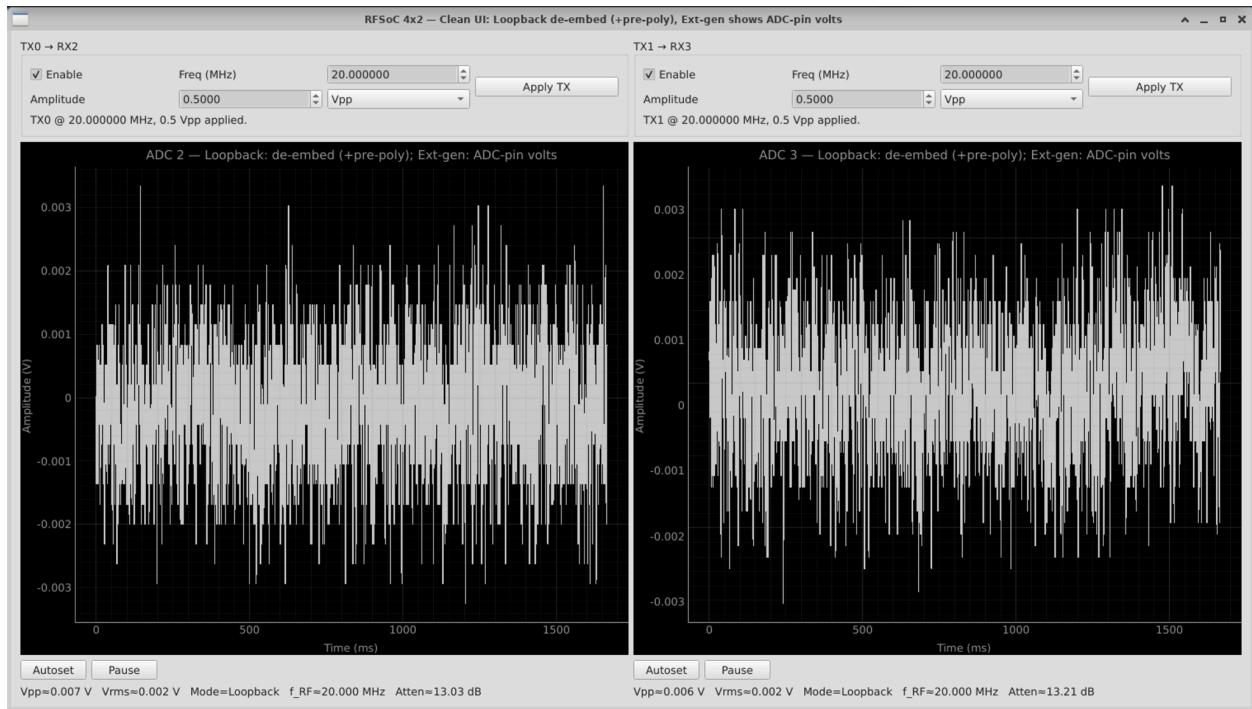
If you open the “ ScopeApp.desktop” file with mousepad, then you will see the Exec= section, this section sets the directory and how its going to start the program.

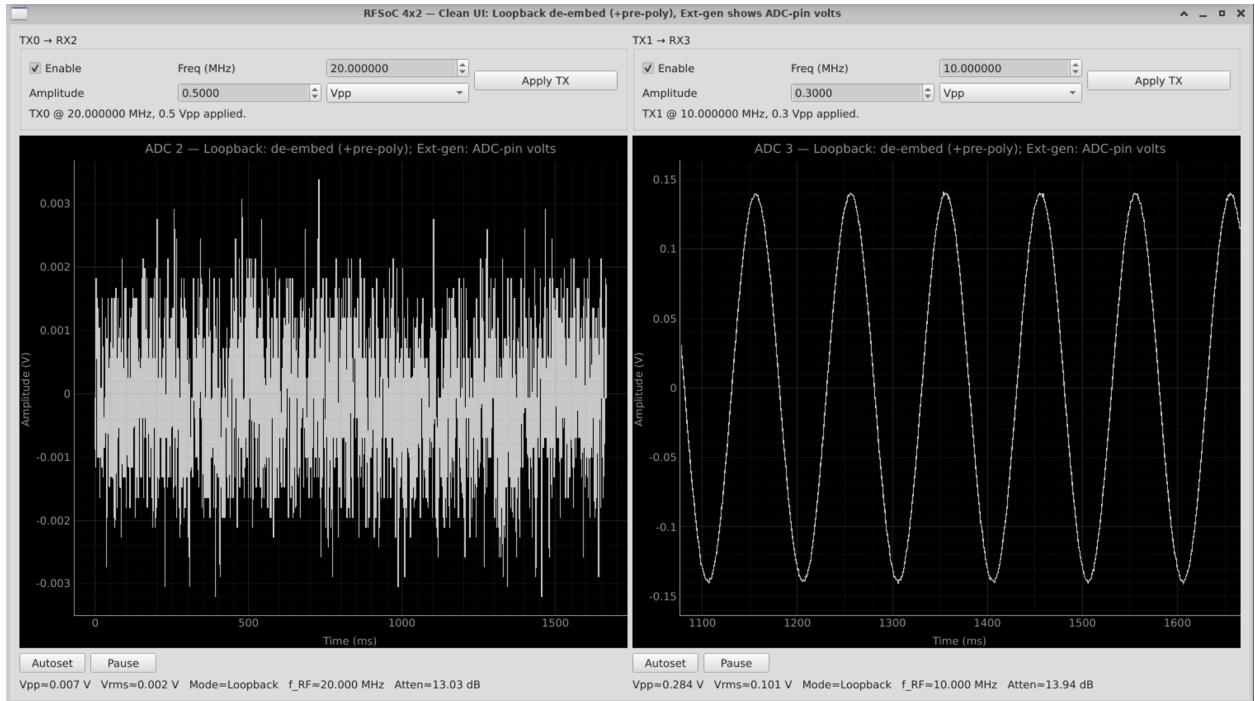
1. You can either change your file directory to the file directory above
2. Or you can change the directory above to your own saved directory.

Also, chmod +x filename might be necessary in order to make the file executable.

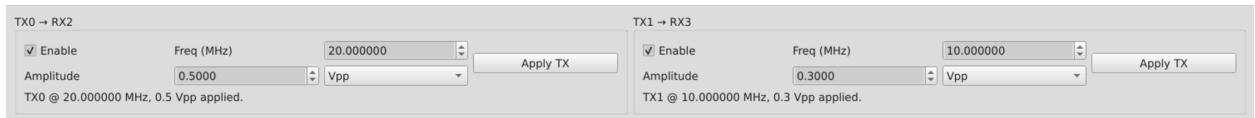
Click on the ScopeApp.desktop and the application should run.

Now the program is running, try running loop back mode and see the results.





By changing the DAC settings, you can change the Frequency and Amplitude of the DAC and see the input changes using the ADC.



Also, using the Autoset and Pause options below, you can see more clear graph is one click and pause the wave for measuring or observing purposes.