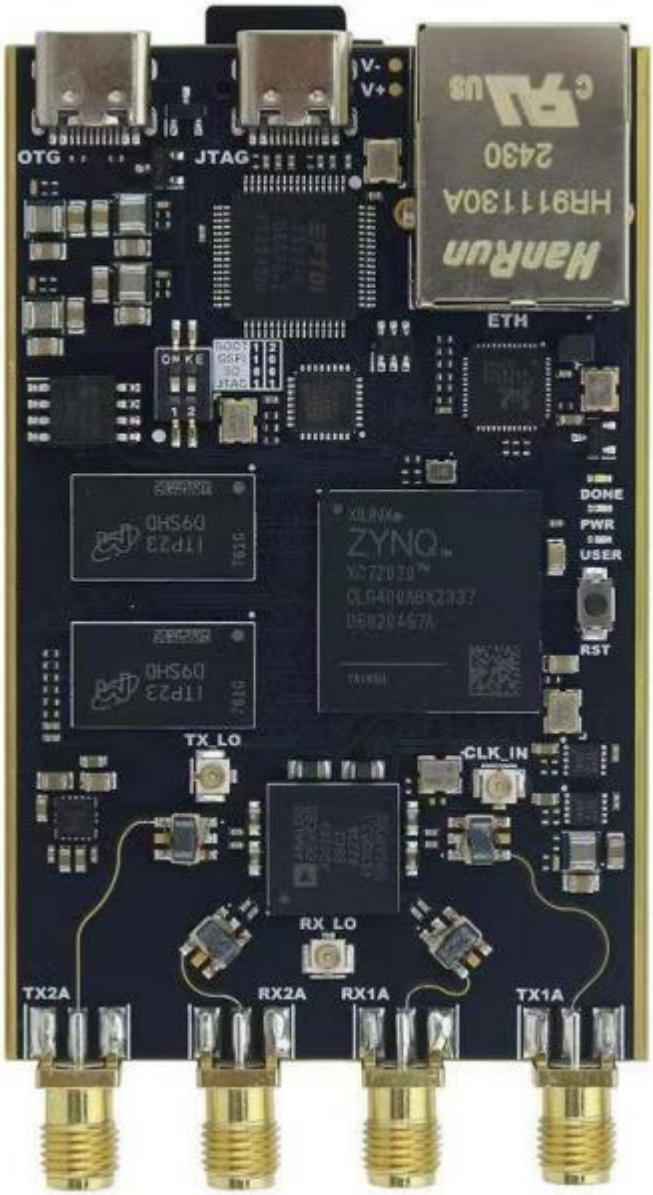
Fish Ball SDR Testing



2. Packaging List and Unboxing Preparation

Thank you for purchasing SDR products from our store. Our product focuses on cost-effectiveness, so the accessory package does not include some common accessories. The package you received should include the following information. If there are any abnormal situations such as damage, collision, or water immersion on the SDR motherboard, please contact us promptly:

Packaging list:

- SDR board *1 (v0.38 firmware has been loaded into the SD card and inserted into the board)
- ZYNQ7010/20 heat sink *1
- AD936X heat sink *1
- FM antenna *1

Please prepare the following items by yourself for the test:

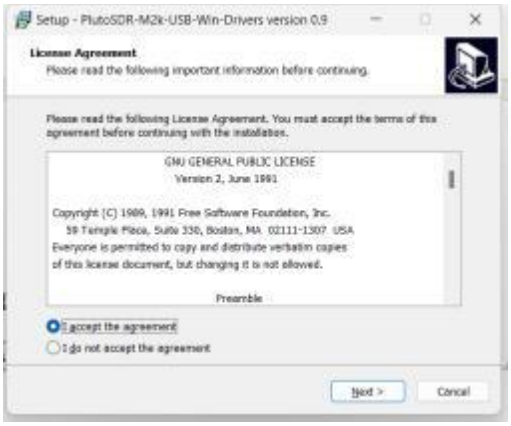
- Windows Computer *1
- Type-C Cable *1
- Network Cable *1
- SMA Loop Cable (SMA-J) *2

Note: Both ZYNQ and AD936X have high power consumption and small board size, so the board may generate heat, which is a normal phenomenon. If the board needs to work continuously for a long time (more than 2 hours), it is necessary to prepare a fan or CNC heat dissipation shell!

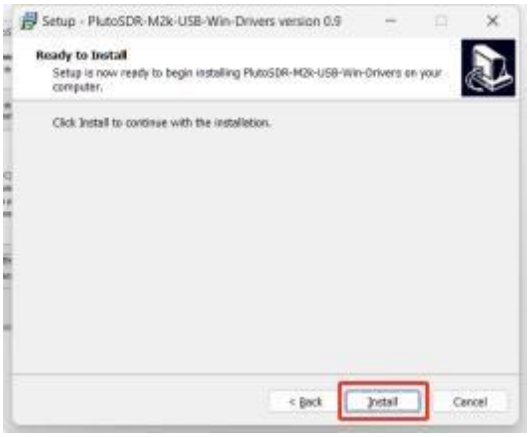
3. Drive Installation

Open the data package: software and drivers -> USB virtual network port driver, and install the driver in it:

Double-click to install:

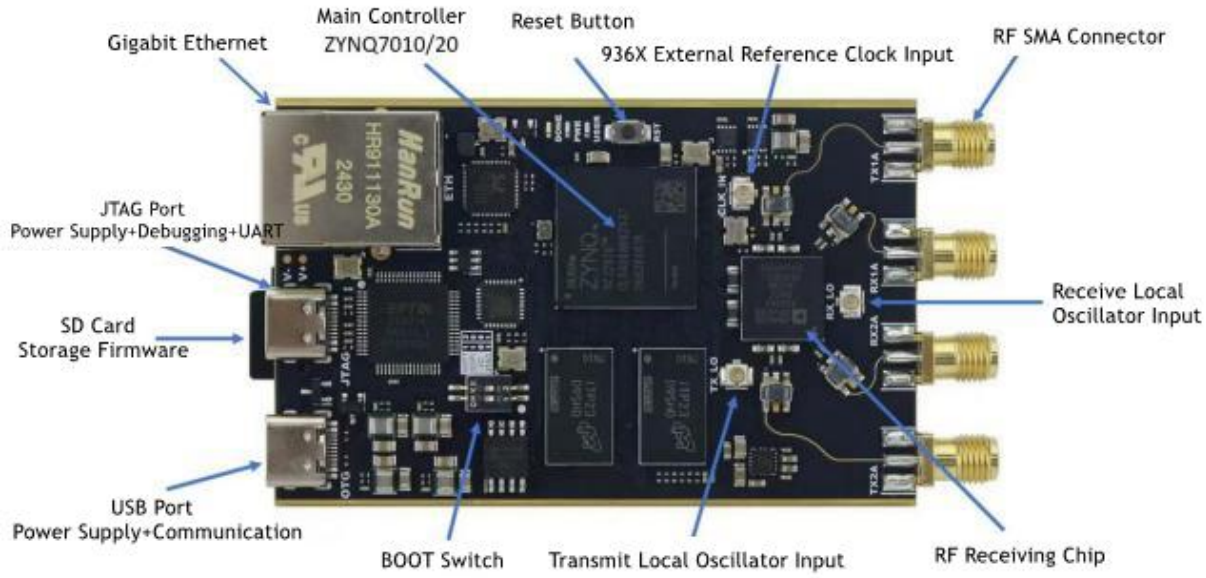


Next:



Waiting for installation to complete:

4. SDR function and interface block diagram



This SDR development board is improved from the official version, and the main functional differences are as follows:

- Adding a Gigabit Ethernet port, which can support some functions of ZEDBOARD + FMCOMMS2-3, and the corresponding firmware is also provided in the information, but it does not support USB ports.
- Adding a JTAG port, which supports power supply, FPGA debugging, and serial port functions simultaneously, making it convenient for customers to develop bare machine drivers. In the field firmware, this JTAG port serves as the boot information output interface, and is also used for configuring IP and other interactive functions.

➢ Replacing the main control chip, the original Pluto main control chip is XC7Z010-CLG225, changed to XC7Z020-CLG400/XC7Z010-CLG400.

➢ Increasing DDR capacity to 1GB.

➢ Dual transmitter and dual receiver on the RF interface, and crack it into 9361 using the original firmware.

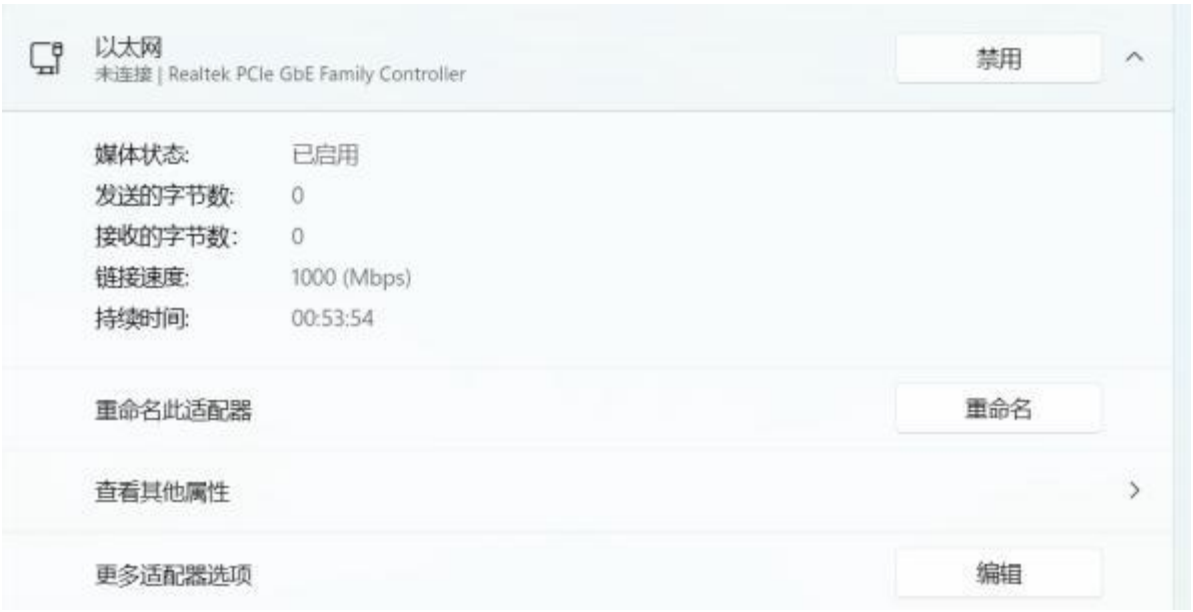
➢ Lead to the local oscillator input interface and the reference clock input interface.

5. SDR # Software Testing

1) Set computer IP

Open Network and Internet Options:

Enter advanced network settings and select the Ethernet you want to use:



Click the edit button after 'More Adapter Options':

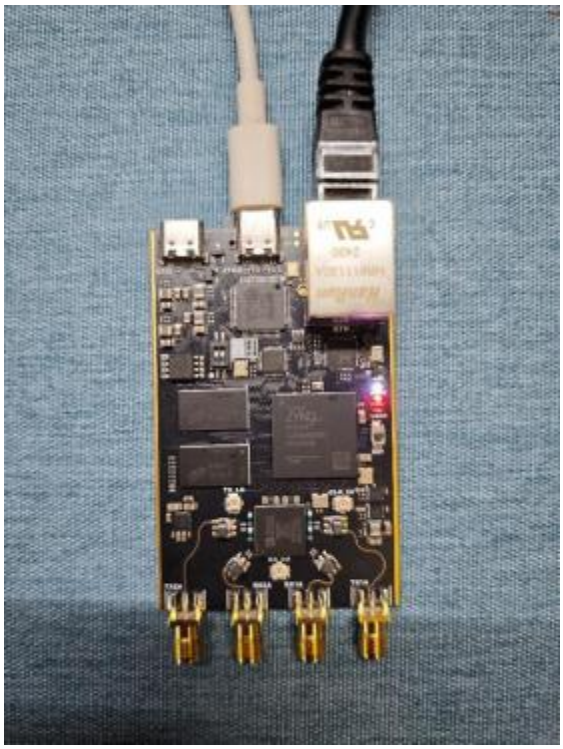
Double click the selected item and set the local IP as follows:

Click OK to complete the computer IP settings.

2) Power on SDR development board

Please perform the following steps in sequence:

- Check if the SD card is correctly inserted into the board (default for shipment).
- Check if the status of the dip switch is "00" (default for shipping).
- Check if the board is in contact with other metal conductors. If there is contact, it may cause a short circuit.
- Connect the computer to the board using Ethernet cables.
- Insert the Type-C cable into the JTAG port and connect it to the computer.

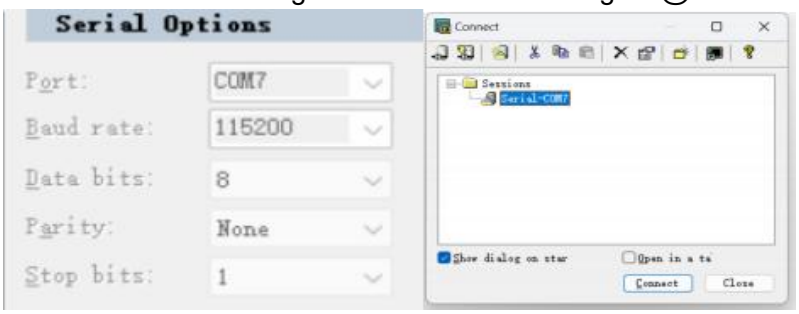


Wait for about half a minute to complete the startup process. As shown above, the normal phenomenon is that the white and red LEDs are always on, the blue LED flashes, and the Ethernet port light flashes. If the phenomenon is abnormal, please check if the previous steps were correct. The most common problems are as follows:

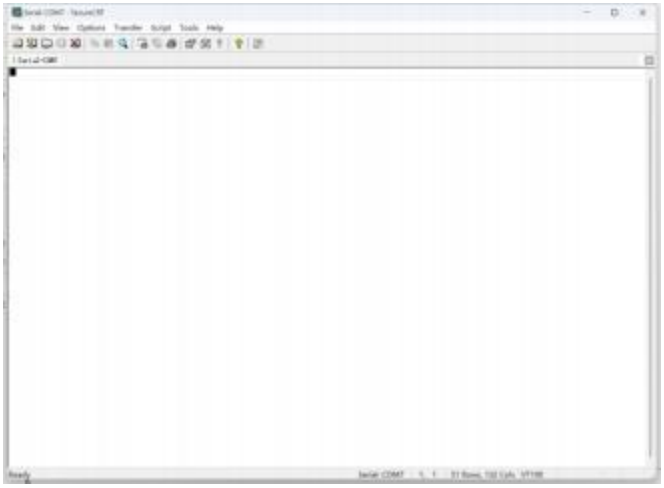
- The SD card is not securely inserted.
- The dip switch is not turned to "00" (all facing down).
- The USB cable is too thin and does not provide enough current.
- .....

Next, you need to use a serial port to set the IP of the SDR board, or you can use the existing serial port software on your computer to install the software and the serial port software in the driver:

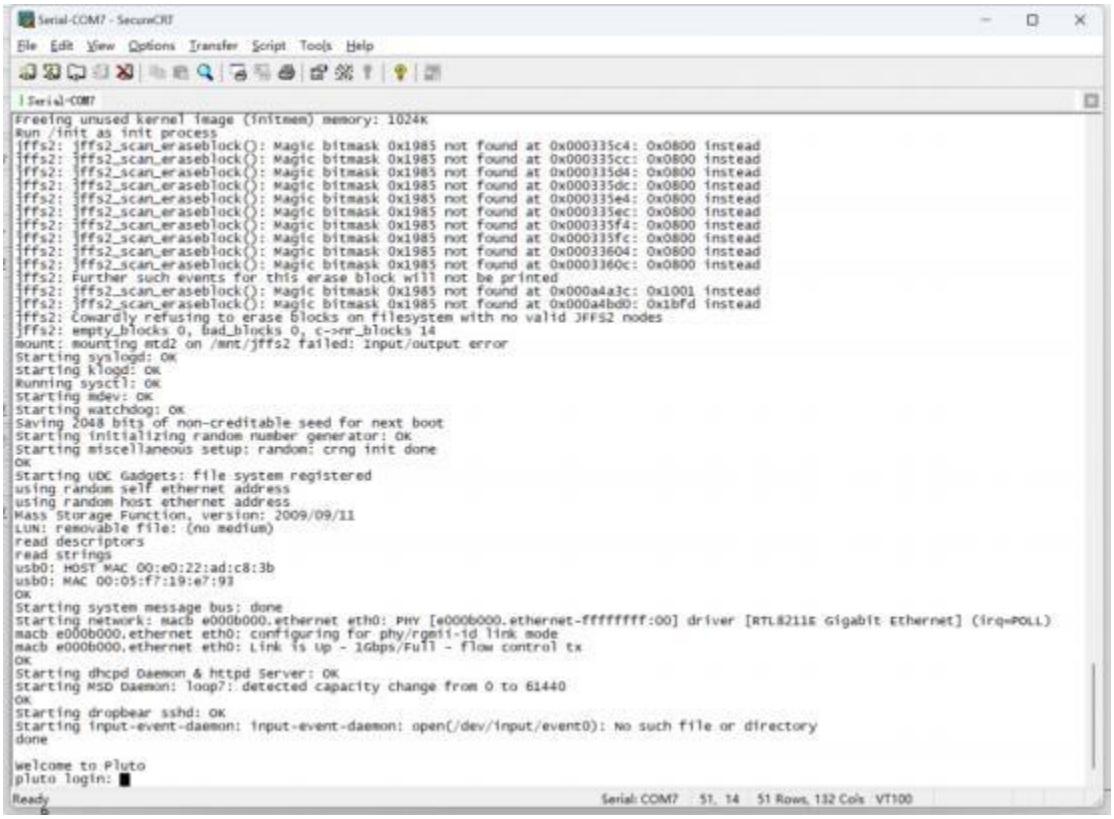
The serial port connected to the SDR motherboard (which can be viewed in the device manager), baud rate, and other information are as follows:



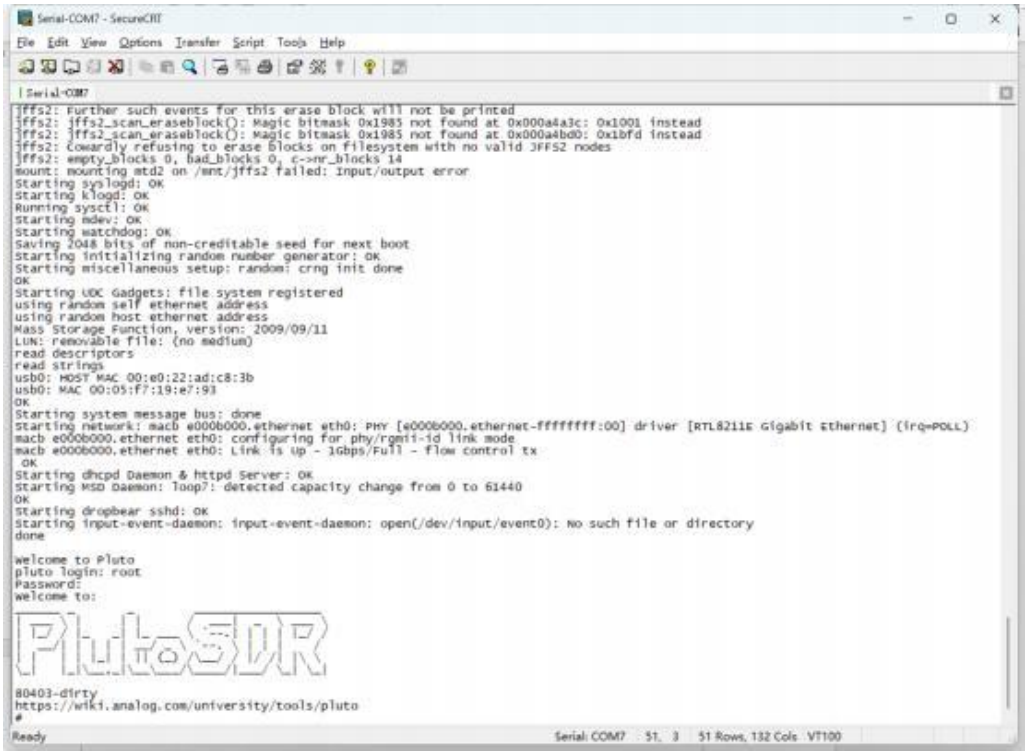
Click connect to complete the connection:



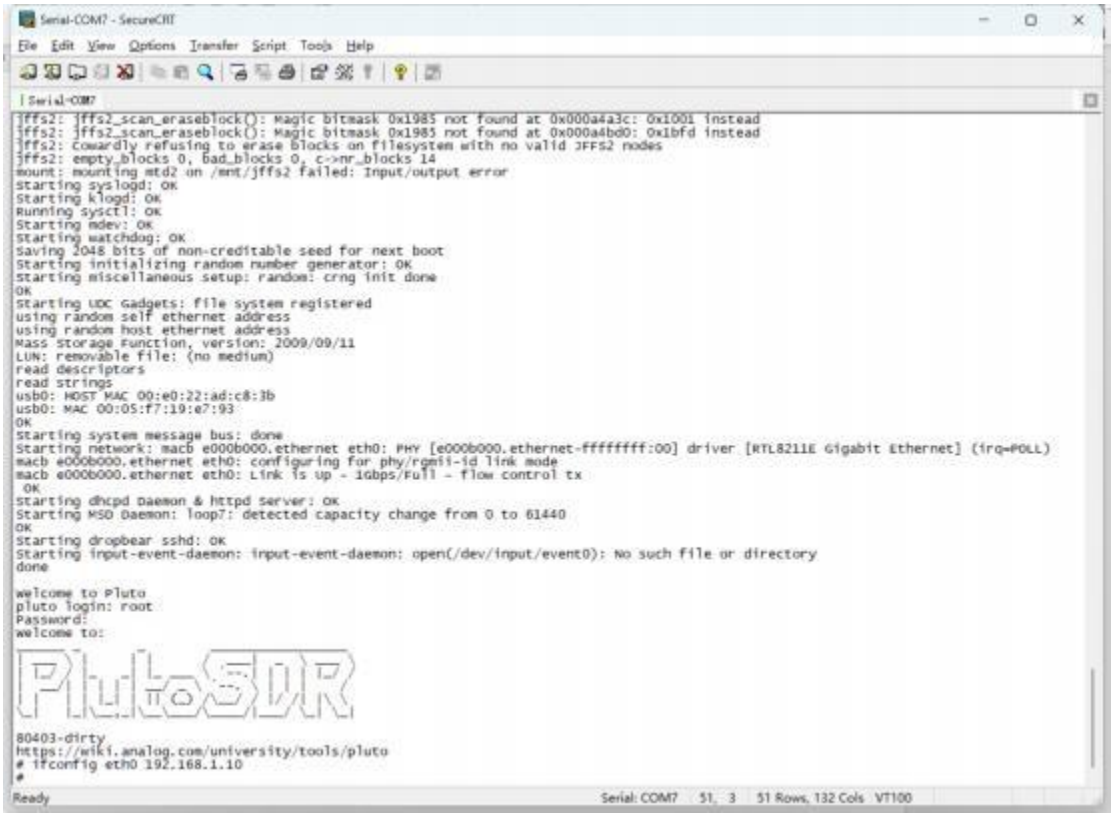
Next, restart the board and the user can check if the relevant startup information is correct. Press and release the reset button on the SDR motherboard to complete the board restart, and wait for the board startup information to be output:



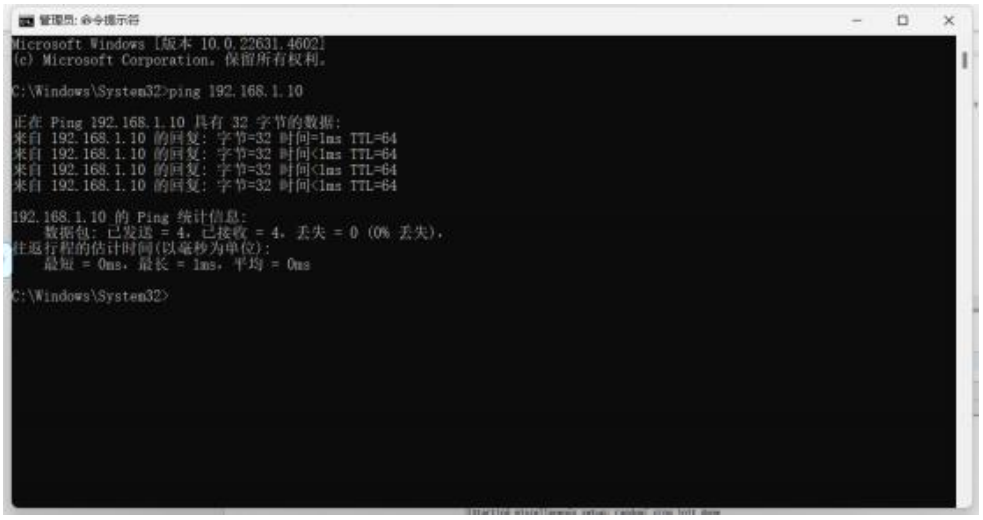
Next, log in the board; account: root; password: analog



Enter command: ifconfig eth0 192.168.1.10, set the card IP to 192.168.1.10



Ping test within cmd:



At this point, the board IP setting is completed, and users can also use other serial port software to complete IP configuration.

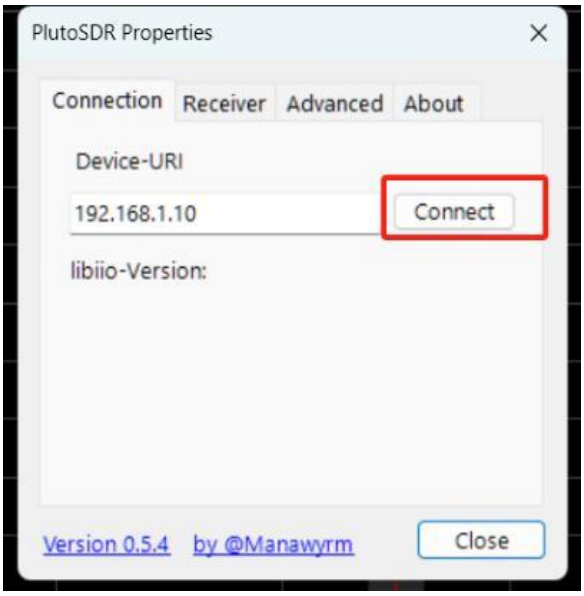
3) SDR # Software Testing

Firstly, connect the FM antenna that comes with the shipment to the RX1A RF interface, and unzip the SDR# software in the software and driver folder:

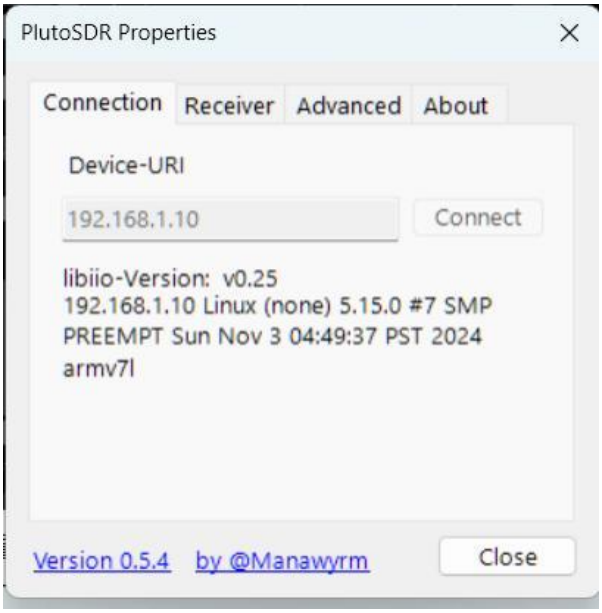
Double click to run:

Click on Settings:

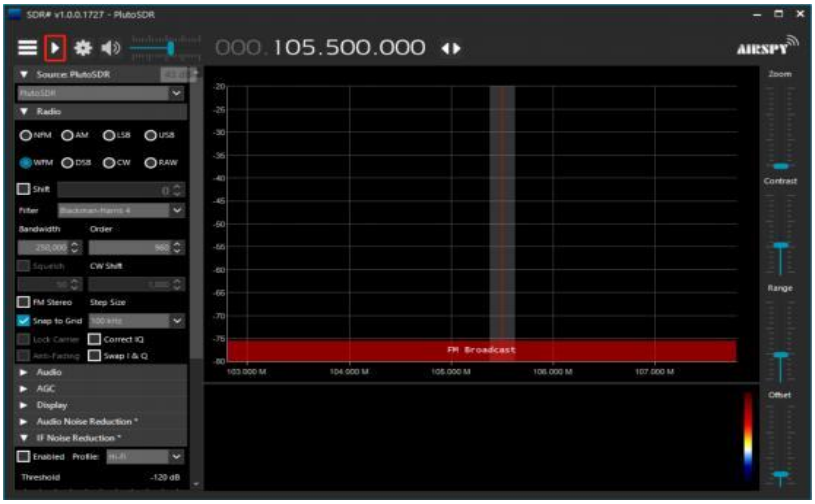
Fill in the IP address set in the previous step and click connect:



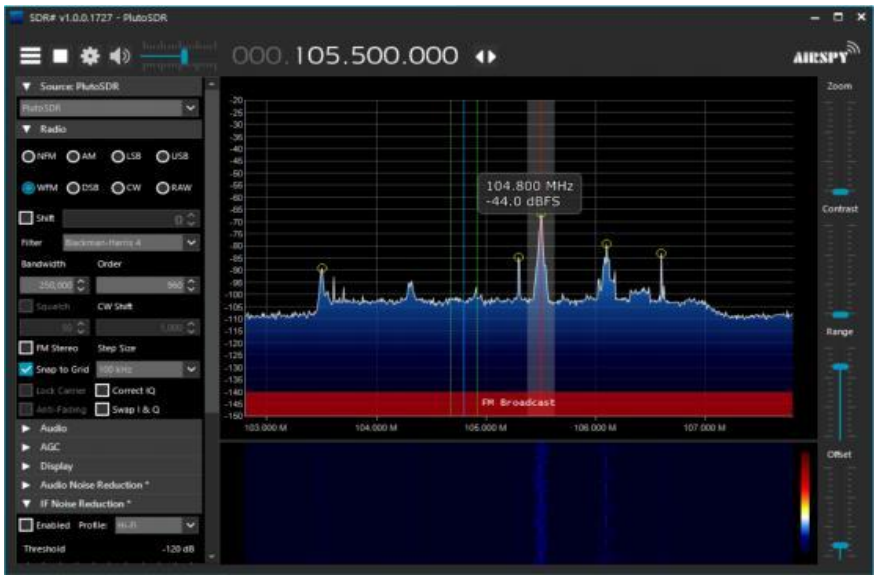
Complete the connection, close this window:



Set the interface parameters as follows and click the start button:



Move the red line to a peak position to hear the broadcast sound:

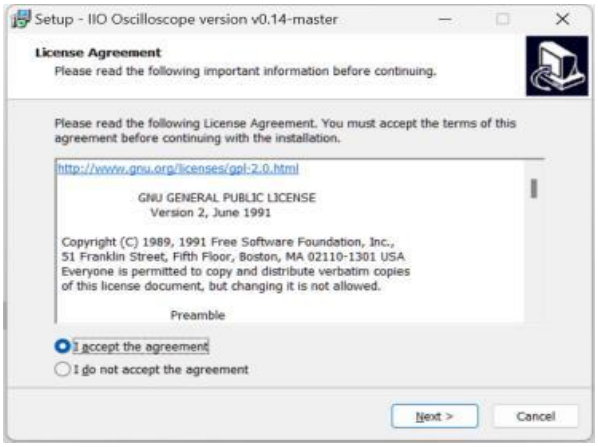


6. IIO Oscilloscope Testing

Next, use the IIO Oscilloscope software to test the USB port on the hardware. Insert a Type-C cable into the USB port and wait for about half a minute to complete the startup. The same phenomenon occurs when the white and red lights remain on and the blue LED flashes. At the same time, the computer will prompt for the insertion of storage devices.

Next, extract the IIO oscilloscope software from the software and driver folder:

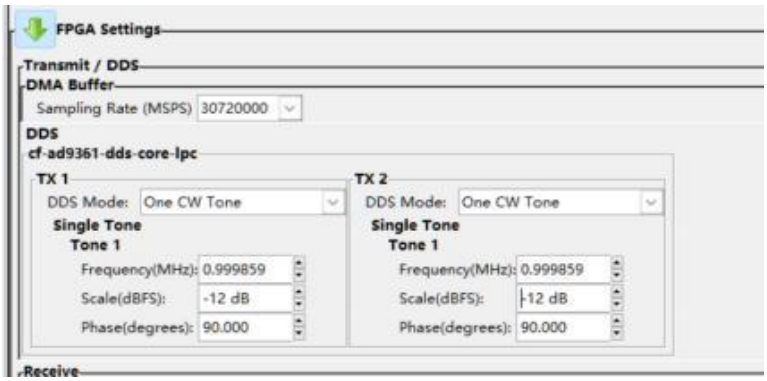
Double click to install:



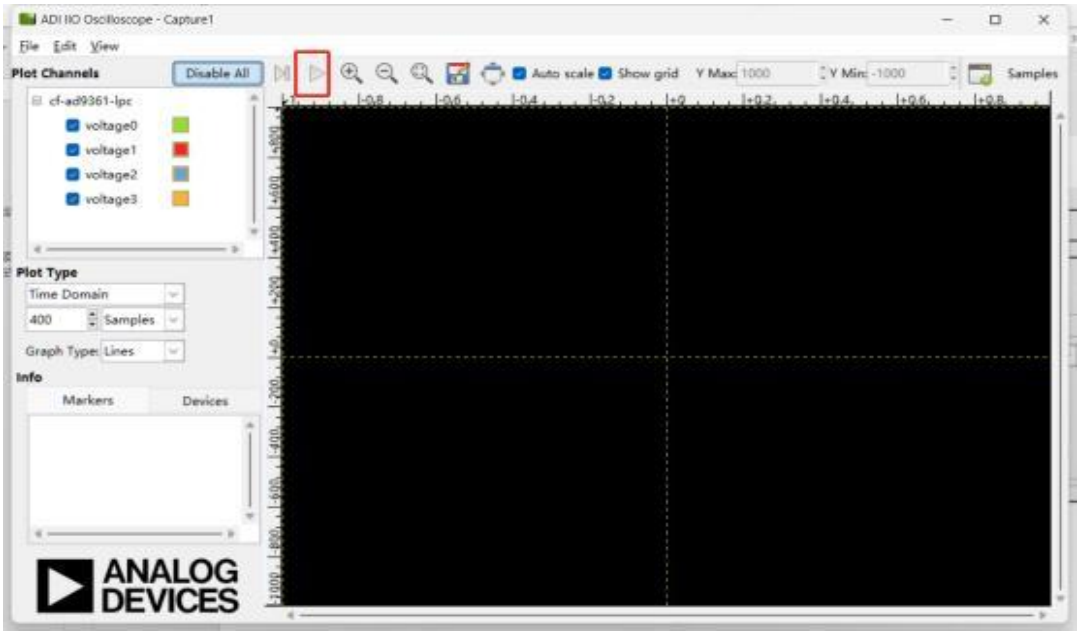
Click "Next" for porting, wait for installation to complete, and then open the software. The software will automatically find the current Pluto device:

Click on the connection and set the transmission and reception frequencies to be the same:

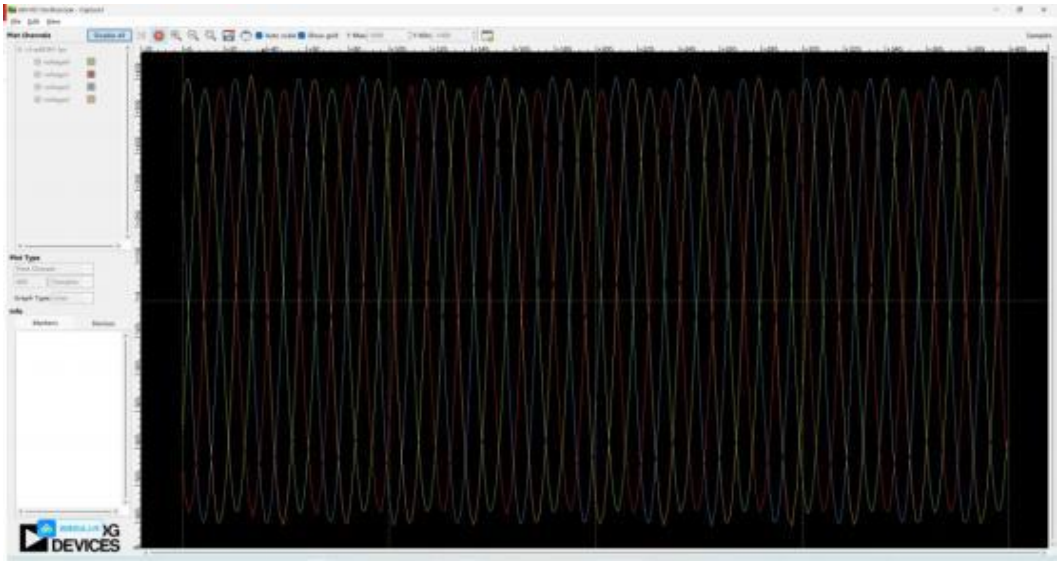
Set up signal transmission:



Connect TX1A to RX1A and TX2A to RX2A using SMA loopback cable, enable the four channels in the software, and click the start button:



You can see the received waveform, which is consistent with the set transmission waveform frequency:



At this point, the IIO oscilloscope has completed the transmission and reception loop test. Please enjoy it!