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LUCKFOX Core3566 Development Board

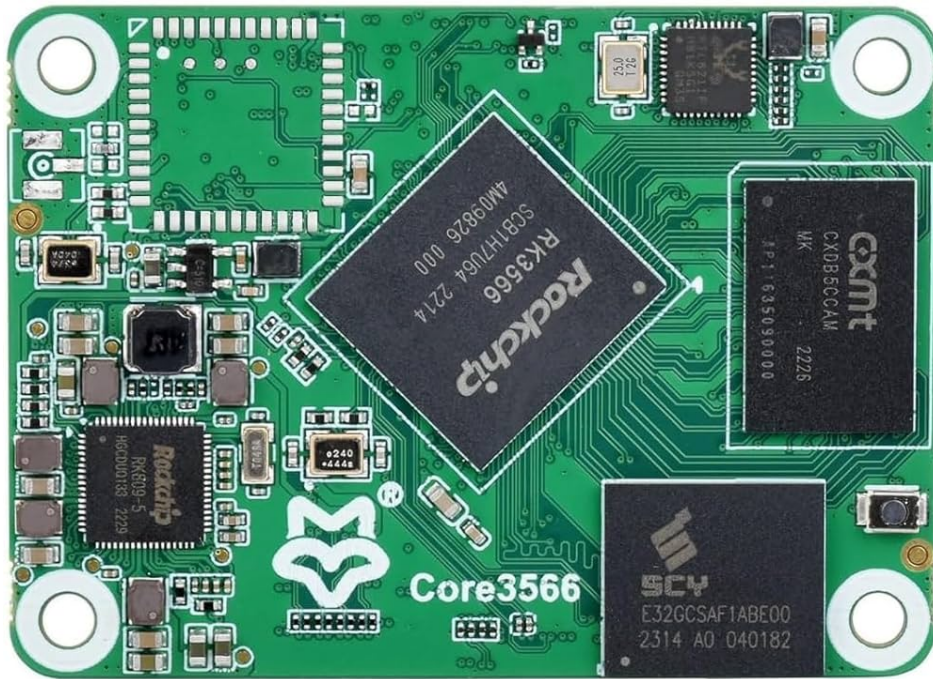# LUCKFOX Core3566 Development Board User Manual

Contents

LUCKFOX Core3566 Development Board

Product Information

Specifications

- **Model:** Luckfox Core3566
- **Supported Displays:** HDMI and DSI displays
- **Operating System:** Linux
- **SDK:** Included

Product Usage Instructions

Equipment Preparation
Ensure you have the Core-3566 development board and CM4-IO-BASE-B baseboard ready.

EMMC Image Burning

Follow the steps below to burn the EMMC image:

1. Download the RK Driver Assistant and RKDevTool.
2. Install the USB driver using the RK Driver Assistant.
3. Enter Upgrade Mode (Loader or MaskRom mode) based on your requirements.
4. Use RKDevTool to flash the system image to the device.

Image Burning Process

Loader Mode

1. Install the Core-3566 development board on the CM4-IO-BASE-B baseboard.
2. Switch the BOOT switch on the baseboard from OFF to ON.
3. Connect the Type-C cable between the computer and the CM4-IOBASE-B baseboard.

4. Use RKDevTool to burn the image onto the device.

MaskRom Mode

1. Disconnect power and hold down the MaskRom button on the development board.
2. Connect the data cable and use RKDevTool to flash the image.

Image Burning for Windows

1. Open RKDevTool, select Firmware, choose the system image, and click Upgrade.
2. Wait for the burning process to complete.

Image Burning for Linux

1. Download and install upgrade_tool on Linux.
2. Use upgrade_tool to flash raw firmware, RK firmware, and partition images to eMMC.

Frequently Asked Questions (FAQ)

- **Q: How can I switch between Loader Mode and MaskRom Mode?**
  A: Follow the instructions provided in the user manual to enter the desired mode based on your requirements.
- **Q: What should I do if the device does not boot up after flashing?**
  A: Ensure that you switch the BOOT switch back to OFF on the baseboard after successful flashing to enable proper booting of the device.

Introduction

The Core3566 development board is equipped with the Rockchip RK3566 quad-core processor, integrated with a dual-core architecture GPU and a high-performance NPU, supporting up to 0.8T computing power. It supports various video input and output interfaces and has powerful computing and graphics processing capabilities. The board supports 8GB of RAM, 2.4/5G WIFI, and 4G wireless network communication. It also has abundant interface extensions, making it suitable for a wide range of applications, including IoT devices, smart audio, smart displays, industrial control, and educational devices.

Equipment Preparation

- Core3566 development board
- waveshare's CM4-IO-BASE-B baseboard
- USB Type-A to Type-C data cable
- 5V/3A Type-C power adapter(Core3566 must be powered on using the power adapter to prevent insufficient power supply)
- Display or TV with HDMI interface, and HDMI cable
- 100M/1000M Ethernet cable and router
- USB wireless/wired mouse and keyboard
- USB to Serial Module
- USB card reader and TF card (minimum capacity of 8GB)

Note:

The default baud rate for Core3566 is 1500000. Some USB to serial chips may not support this baud rate, and there may be differences among different series of the same chip. Therefore, it is important to confirm the compatibility before purchasing. We recommend using CH343, FT232, and CP2102 serial modules and do not recommend using PL2303 and CH340 serial modules.

EMMC Image Burning

Core3566 provides images compatible with HDMI displays and DSI displays. Users can download the image file according to their needs.

Version	Description	Download
Debian10	Includes core3566 DSI image and HDMI image	**Download**

Preparation

1. Download the RK Driver Assistant DriverAssitant-RKDriver Assistant and the flashing tool RKDevTool.
2. Install the USB driver using the RK Driver Assistant. No need to connect the device during this process. After installation, restart your computer.
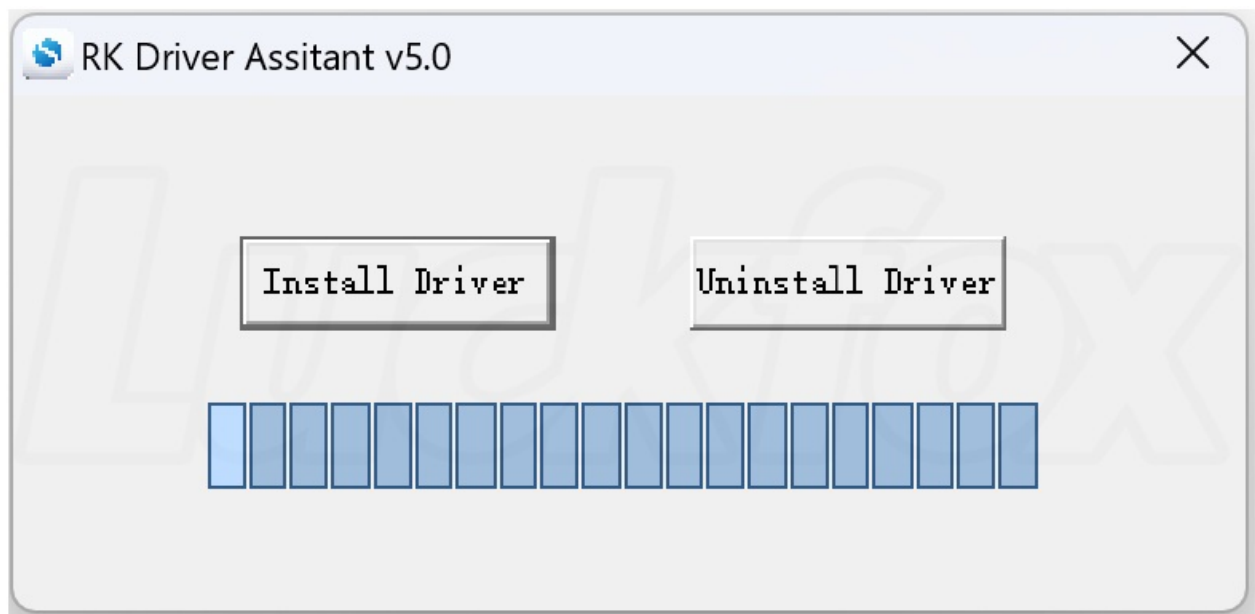

Entering Upgrade Mode

Loader mode and MaskRom mode are two common device upgrade modes used for loading firmware or bootloaders.

- Loader mode is loaded through a software-level bootloader and is typically used for firmware upgrades and similar operations.
- MaskRom mode is a hardware-level boot mode that directly loads firmware for operations and is usually used for factory flashing or device repair.

Loader Mode

After the initial factory flashing and successful Flash erase, the device will be in MaskRom mode. Once an image is flashed onto the device, it will enter Loader mode.

1. Install the Core-3566 development board on the CM4-IO-BASE-B baseboard and switch the BOOT switch on the baseboard from OFF to ON. (Note: After successfully flashing the image, make sure to switch it back to OFF, or the device won't boot up)
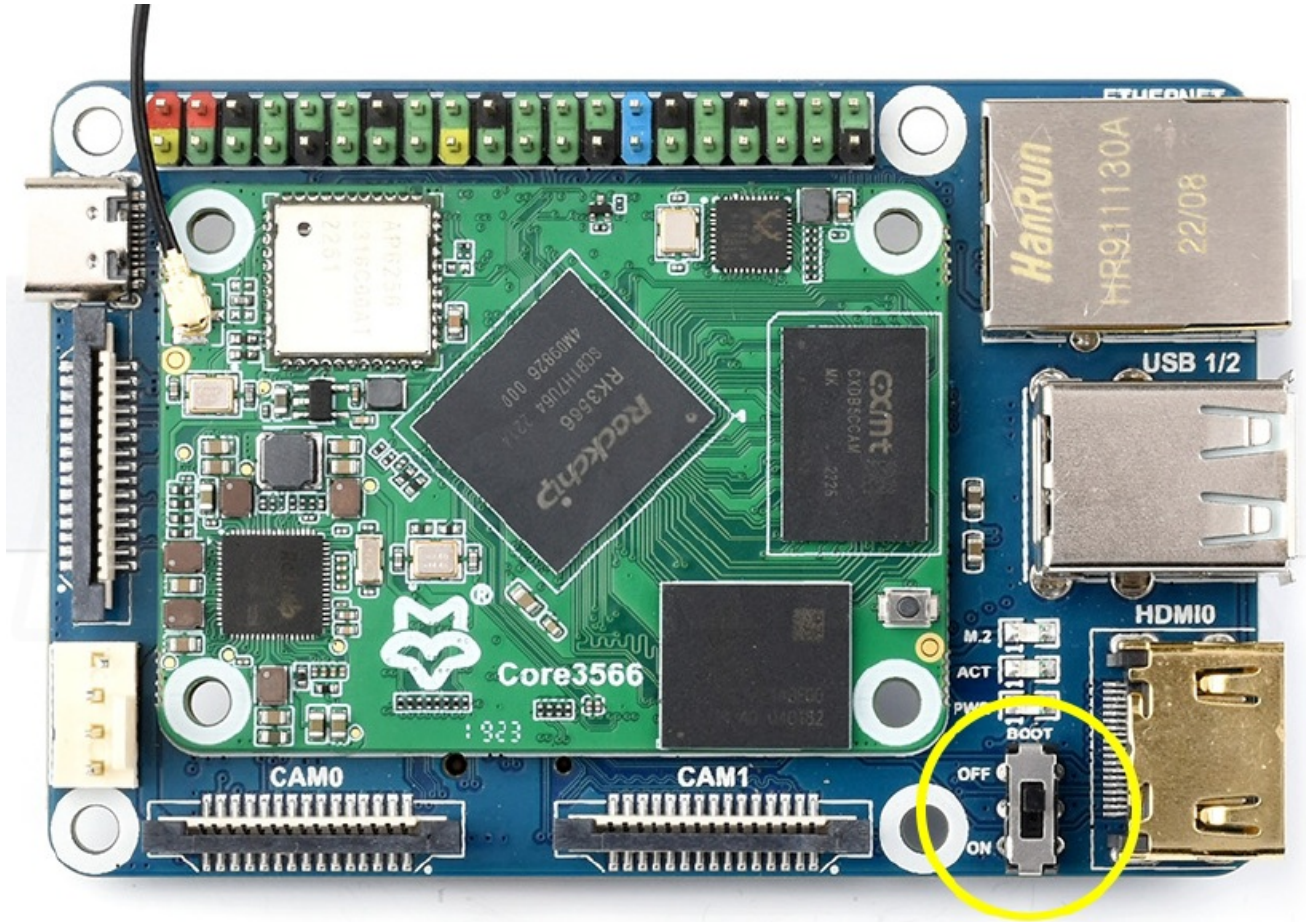

2. Connect one end of the Type-C cable to the USB port of the computer and the other end to the Type-C interface of the CM4-IOBASE- B baseboard.
3. Open the RKDevTool flashing tool provided by Rockchip. Once you see the prompt "Found One LOADER Device" at the bottom, you can proceed with image burning.

MaskRom Mode
If the device cannot enter Loader mode, you can try to force it into MaskRom mode.

1. Disconnect the power of Core3566 and hold down the MaskRom button on the development board.
2. Connect the data cable and open the RKDevTool flashing tool. Release the button when you see the prompt "Found One MASKROM Device" at the bottom.
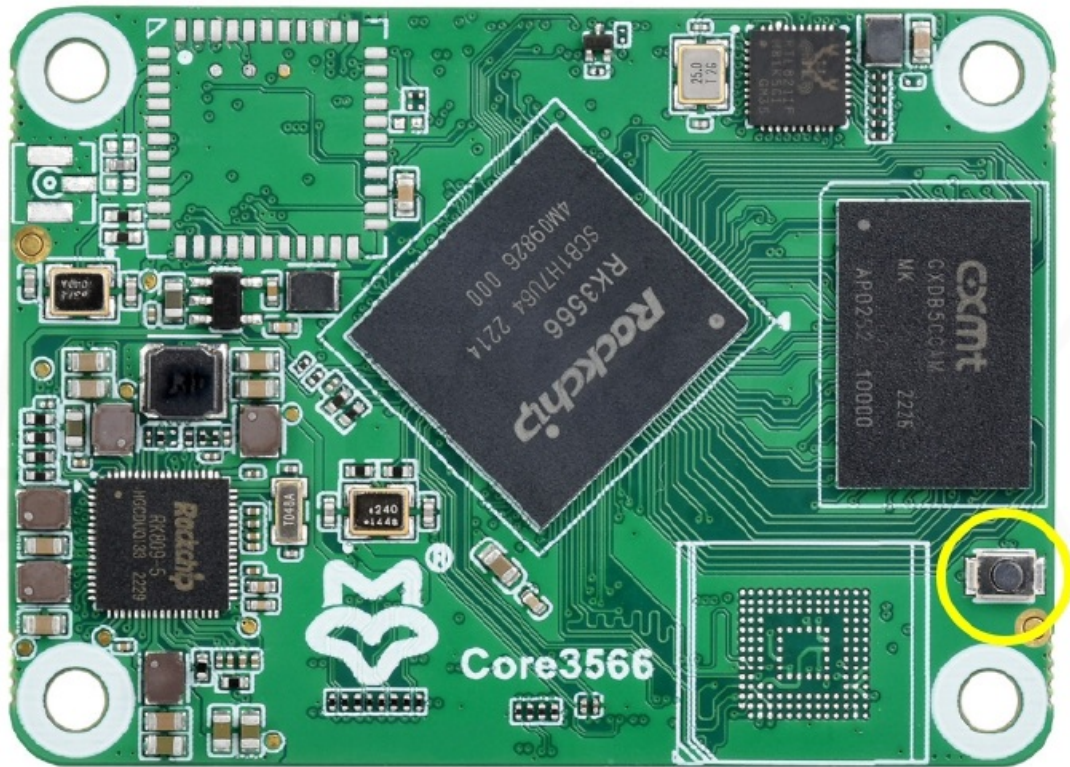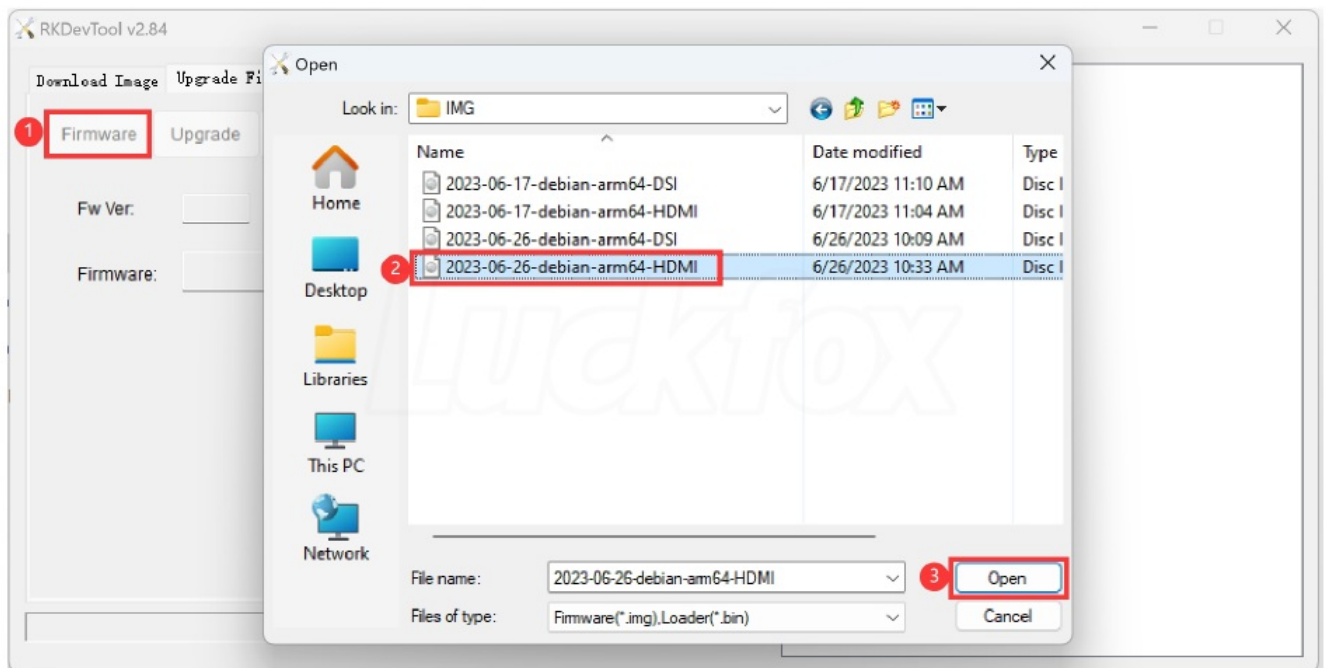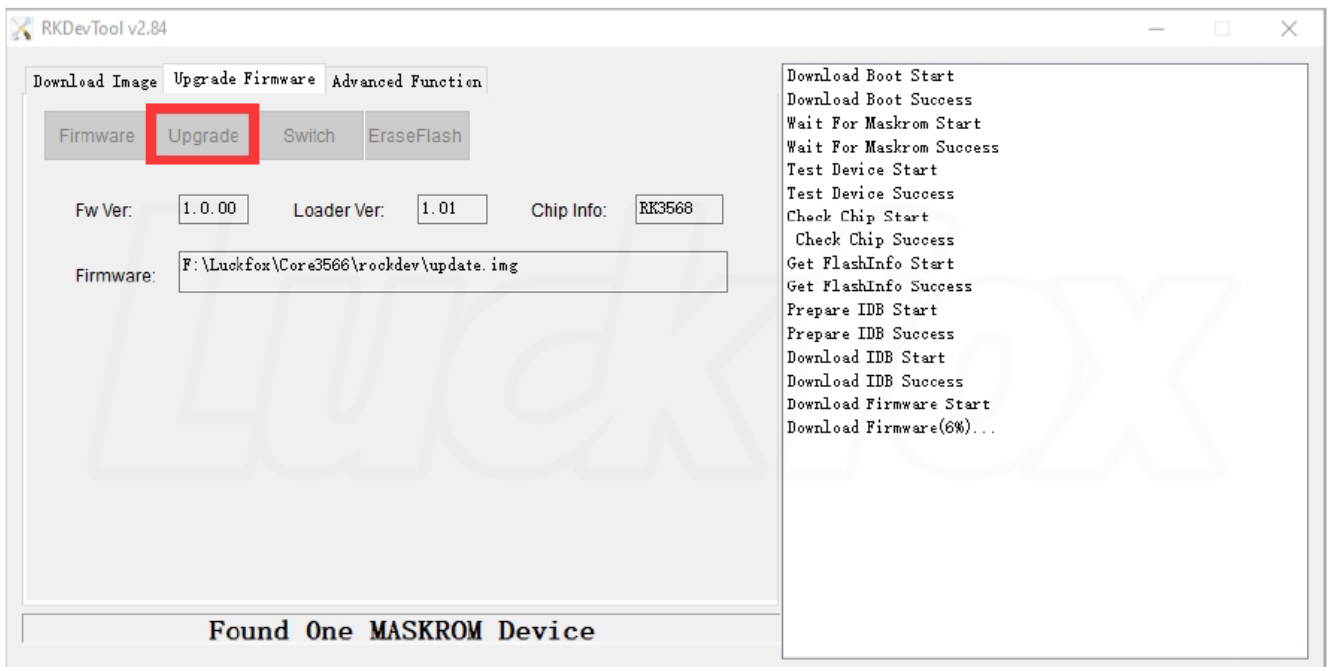
Image Burning

Windows

1. Open the RKDevTool, the flashing tool provided by Rockchip. At this point, you will see that the device is in "MASKROM mode." Click on "Firmware" and choose the path to the system image. Open the Open DSI image (or HDMI image) file.

2. Open it and wait for the image to load successfully. Click on "Upgrade".

3. After the burning process is complete, you will see the device in "LOADER mode".
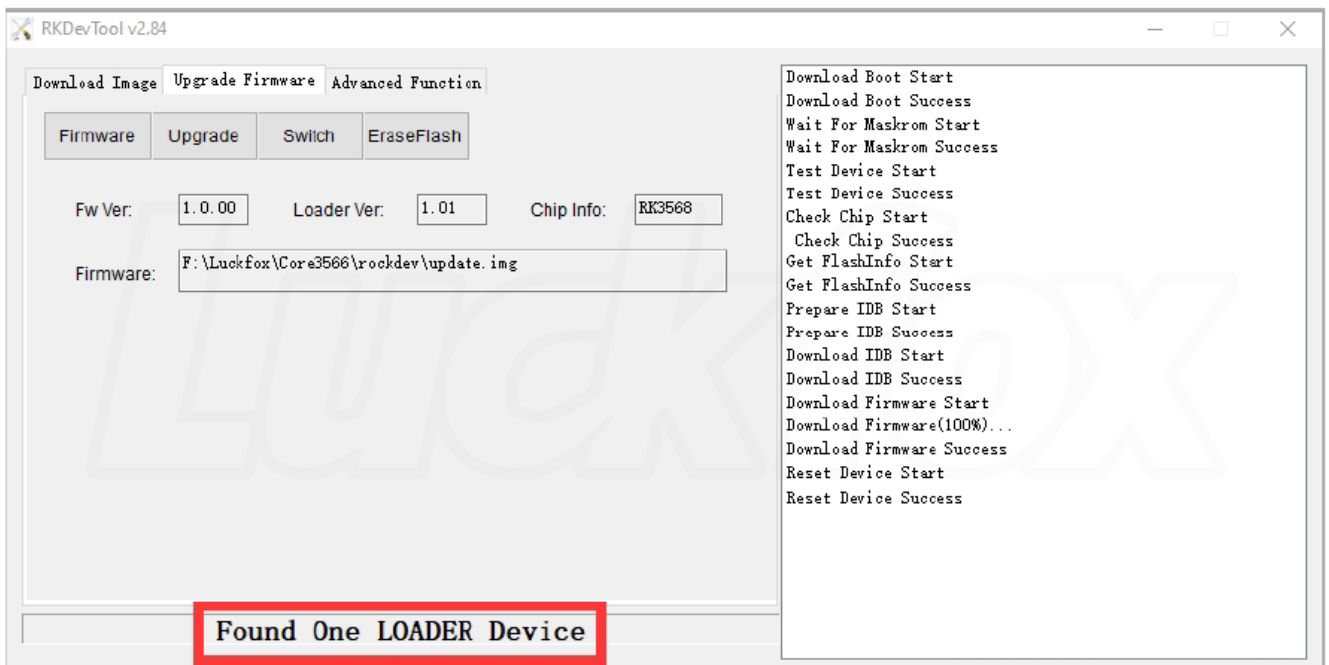
Linux

upgrade_tool is a tool used in Linux to flash raw firmware, RK firmware, and partition images to eMMC. It is a closed-source command line tool provided by Rockchip.

1. Download, extract, and install upgrade_tool:

```
sudo unzip upgrade_tool_v2.17.zip
cd upgrade_tool_v2.17_for_linux/
sudo cp upgrade_tool /usr/local/bin
sudo chmod +x /usr//local/bin/upgrade_tool
```

2. Test if the installation was successful:

- ubuntu@ubuntu:~$ sudo upgrade_tool -v

- Upgrade Tool v2.17

3. Run the program to flash the firmware:

```
ubuntu@ubuntu:~$ sudo upgrade_tool uf 2023-06-17-debian-arm64-HDMI.img
Loading firmware...
Support Type:3568    FW Ver:1.0.00    FW Time:2023-06-17 11:04:17
Loader ver:1.01 Loader Time:2023-06-17 10:55:48
Start to upgrade firmware...
Download Boot Start
Download Boot Success
Wait For Maskrom Start
Wait For Maskrom Success
Test Device Start
Test Device Success
Check Chip Start
Check Chip Success
Get FlashInfo Start
Get FlashInfo Success
Prepare IDB Start
Prepare IDB Success
Download IDB Start
Download IDB Success
Download Firmware Start
Download Image... (100%)
Download Firmware Success
Upgrade firmware ok.
```

4. **The result is as follows:**

Mac OS

1. Download and extract upgrade_tool:

   sudo ditto -xk upgrade_tool_v2.3_mac.zip.

2. Run the program to flash the firmware (please modify the path according to the actual location of the image):

   - cd upgrade_tool_v2.3_mac

     sudo./upgradetool uf ../2023-06-26-debian-arm64-HDMI.img

3. **The result is as follows:**

```
cjwdeMac-mini:core3566 cjw$ sudo ditto -xk upgrade_tool_v2.3_mac.zip .
cjwdeMac-mini:core3566 cjw$ ls
2023-06-26-debian-arm64-HDMI.img        upgrade_tool_v2.3_mac        upgrade_tool_v2.3_mac.zip
cjwdeMac-mini:core3566 cjw$ cd upgrade_tool_v2.3_mac
cjwdeMac-mini:upgrade_tool_v2.3_mac cjw$ ls
revision.txt                            upgrade_tool                命令行开发工具使用文档.pdf
cjwdeMac-mini:upgrade_tool_v2.3_mac cjw$ sudo ./upgrade_tool uf ../2023-06-26-debian-arm64-HDMI.img
Program Log will save in the /Users/cjw/upgrade_tool/log/
ftruncate: Invalid argument
Loading firmware...
Support Type:RK3568    FW Ver:1.0.00   FW Time:2023-06-26 10:33:27
Loader ver:1.01 Loader Time:2023-06-26 10:25:07
Upgrade firmware ok.
cjwdeMac-mini:upgrade_tool_v2.3_mac cjw$ ▊
```
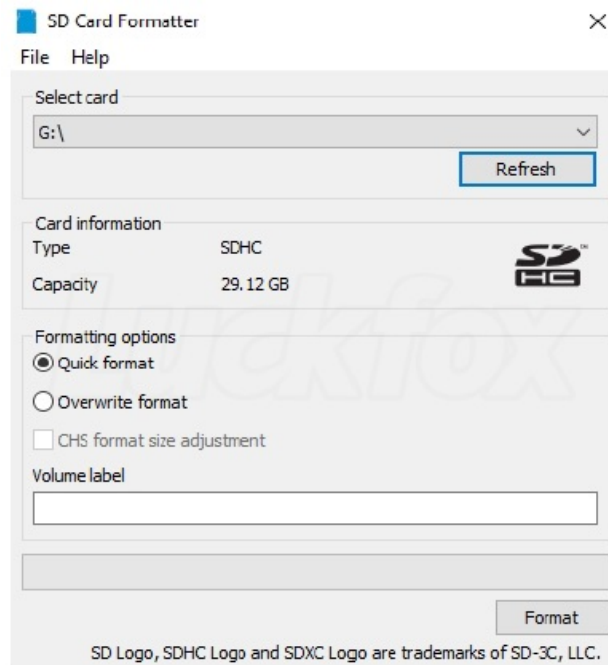
Image Erasure

- To erase the data in the EMMC, select the update.img firmware and click "Erase Flash".
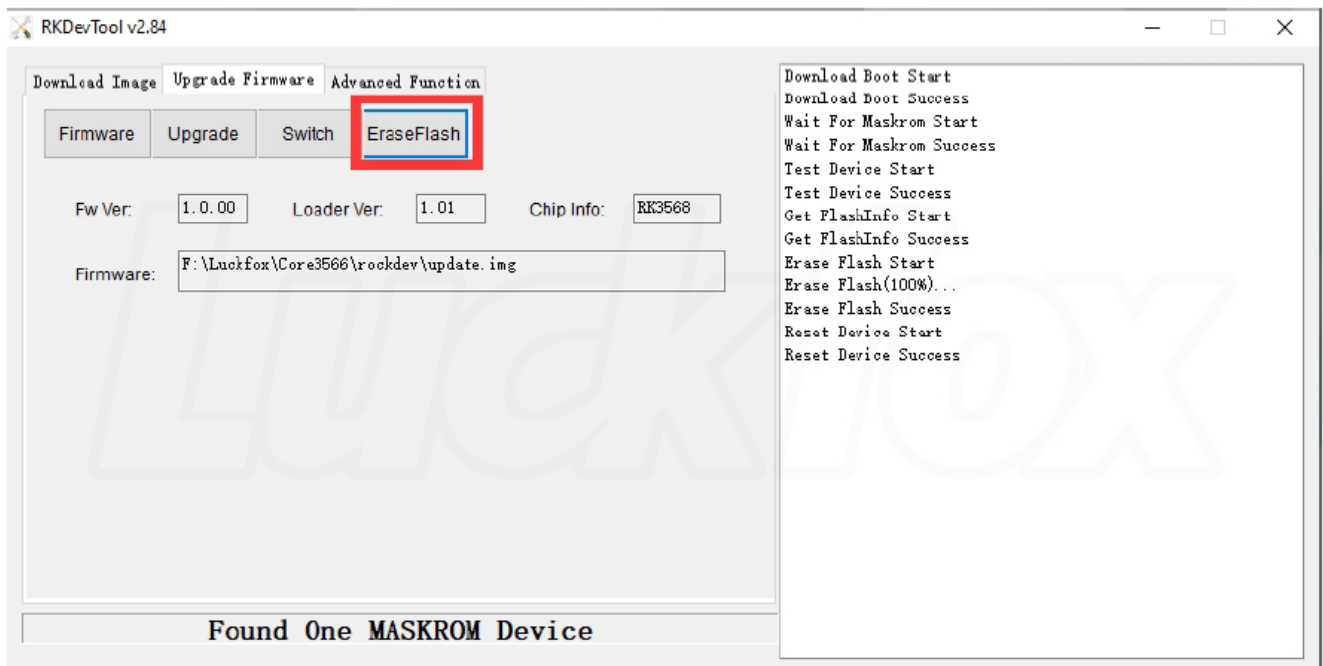
TF Card Image Burning

1. Download the TF card formatting tool **SD Card Formatter** and extract it. Install it with a single click.
2. Select the TF card drive letter and click "Format" (Make sure to remove other TF cards to prevent data loss).

3. Download the TF card burning tool **SDDiskTool** and extract it. It can be used without installation.
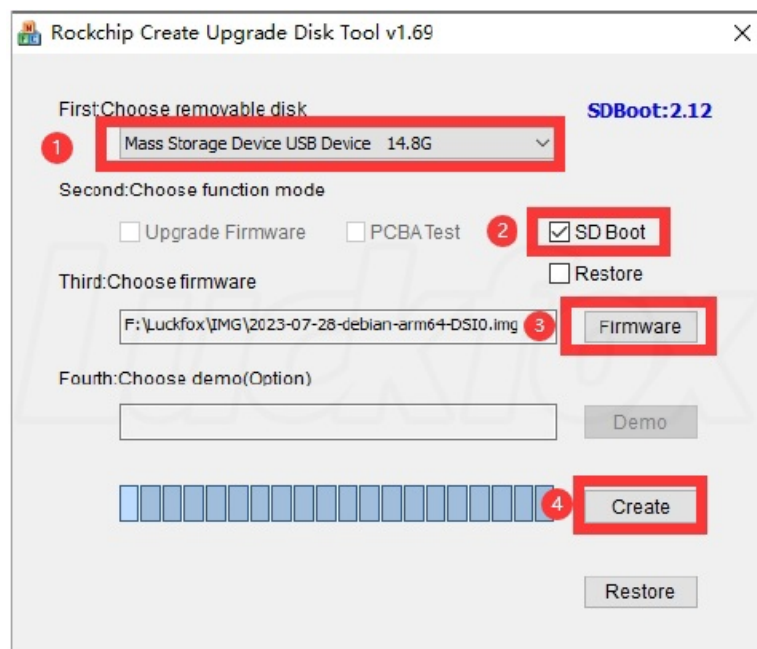
Login

- Default user account for Debian (non-root user)
 - linaro-alip login:linaro
  - Password:linaro

Local Login

1. **Hardware connection:** Connect a USB keyboard and USB mouse to the USB ports of the CM4-IO-BASE-B board.
2. **Power on Core3566:** Connect a monitor and power adapter to the CM4-IO-BASE-B board. (Please wait patiently until the desktop is loaded during the first boot. Do not unplug the power during this period).
3. **Open the terminal:** Click on the bottom left corner of the desktop, and select "System Tools" -> "LXTerminal".
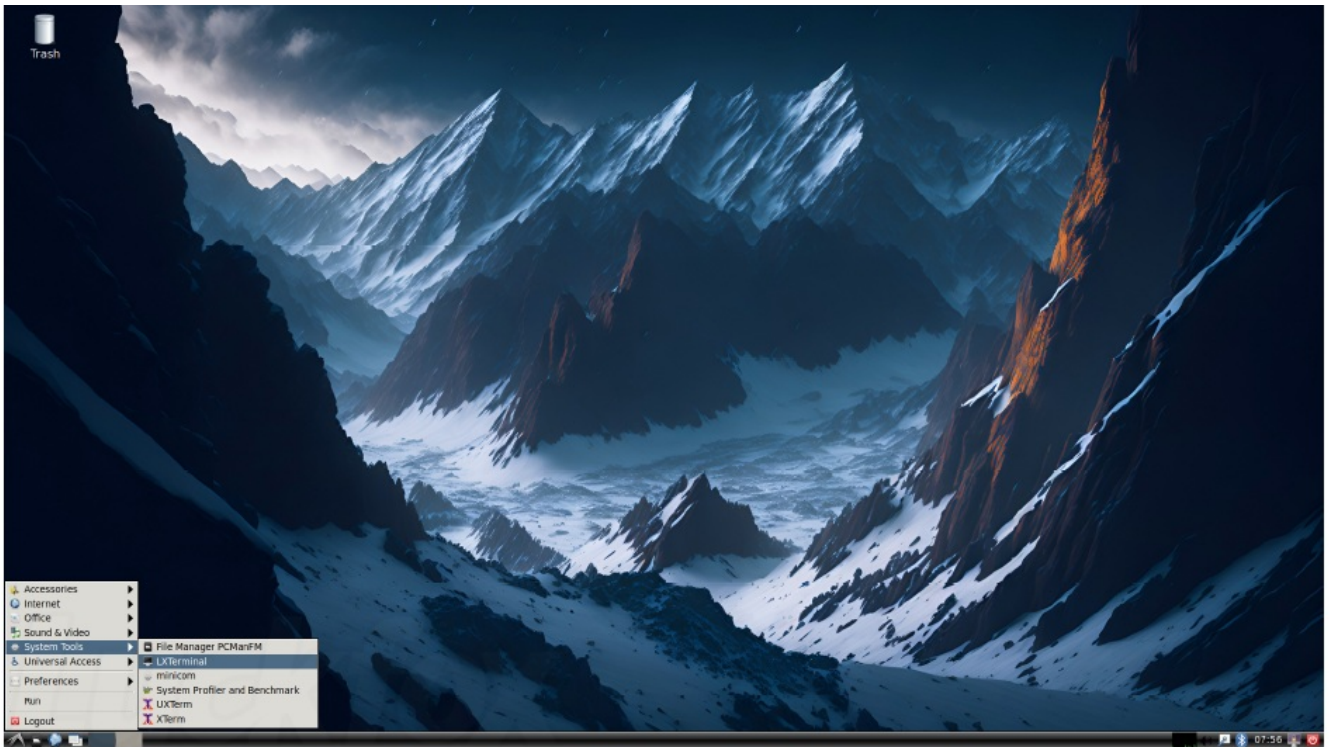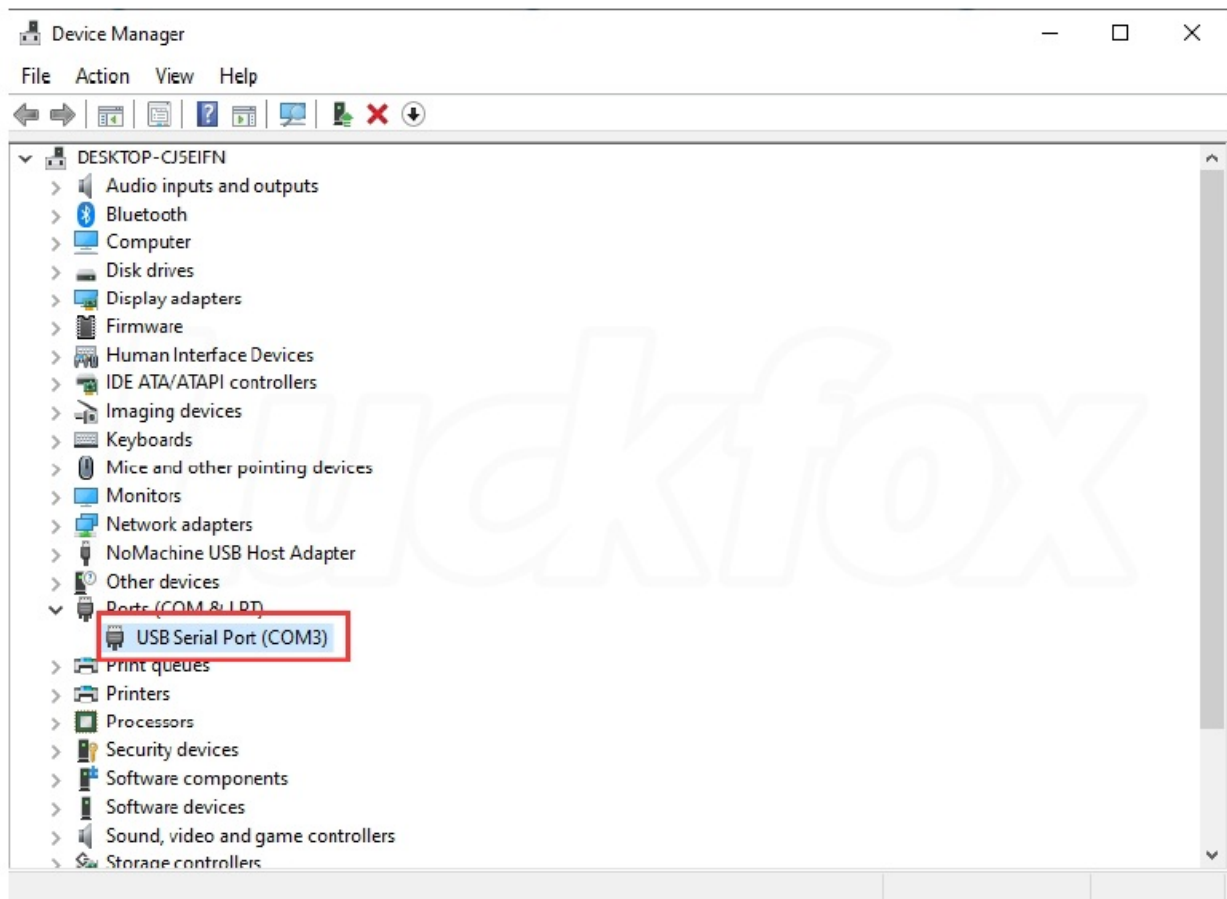
Serial Login

1. Connect one end of the serial module to the computer and the other end to pins 6 (GND), 8 (TX), and 10 (RX) on the CM4-IOBASE- B board, as shown in the following diagram:

| Core3566	USB to UART
6 (GND)	GND
8 (TX)	RX
10 (RX)	TX
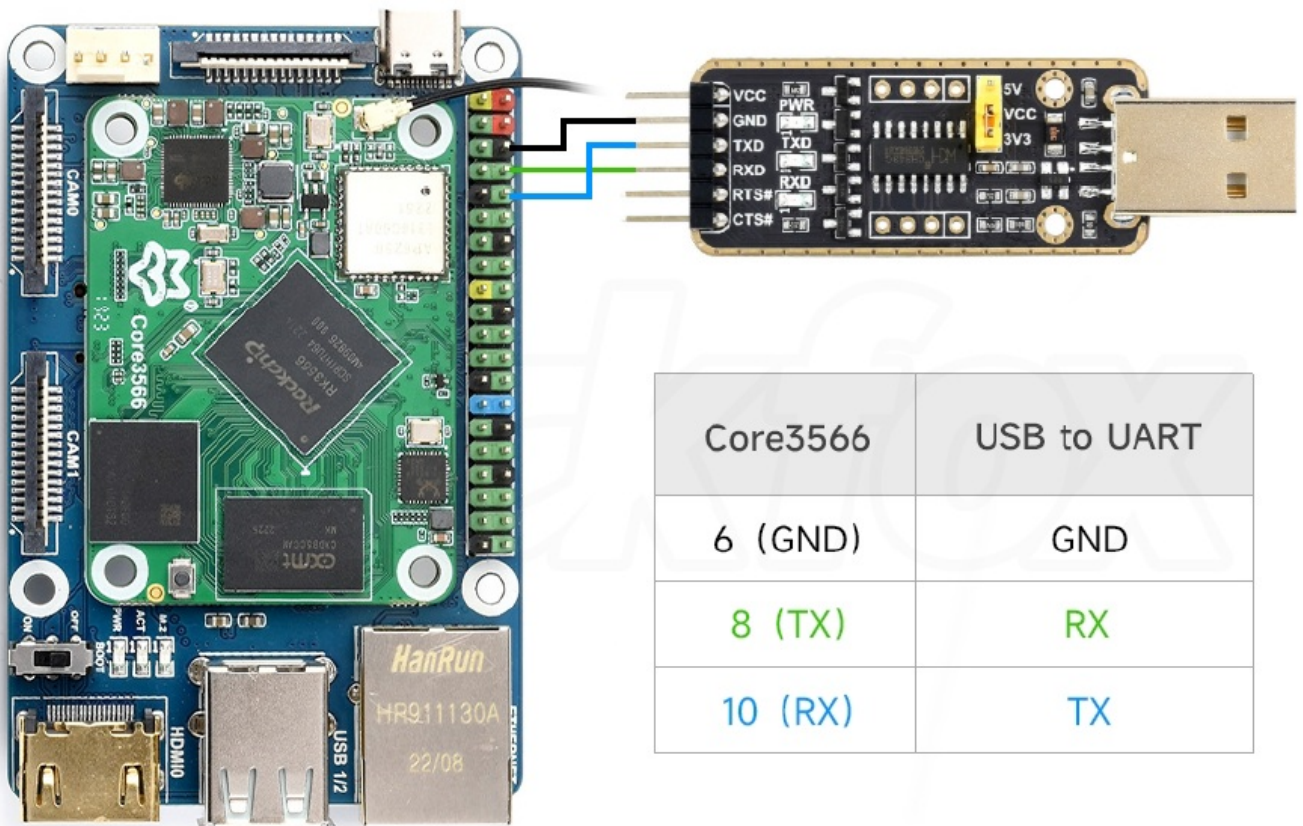
2. Open the computer settings, search for Device Manager, and check the COM port corresponding to the Device Manager.
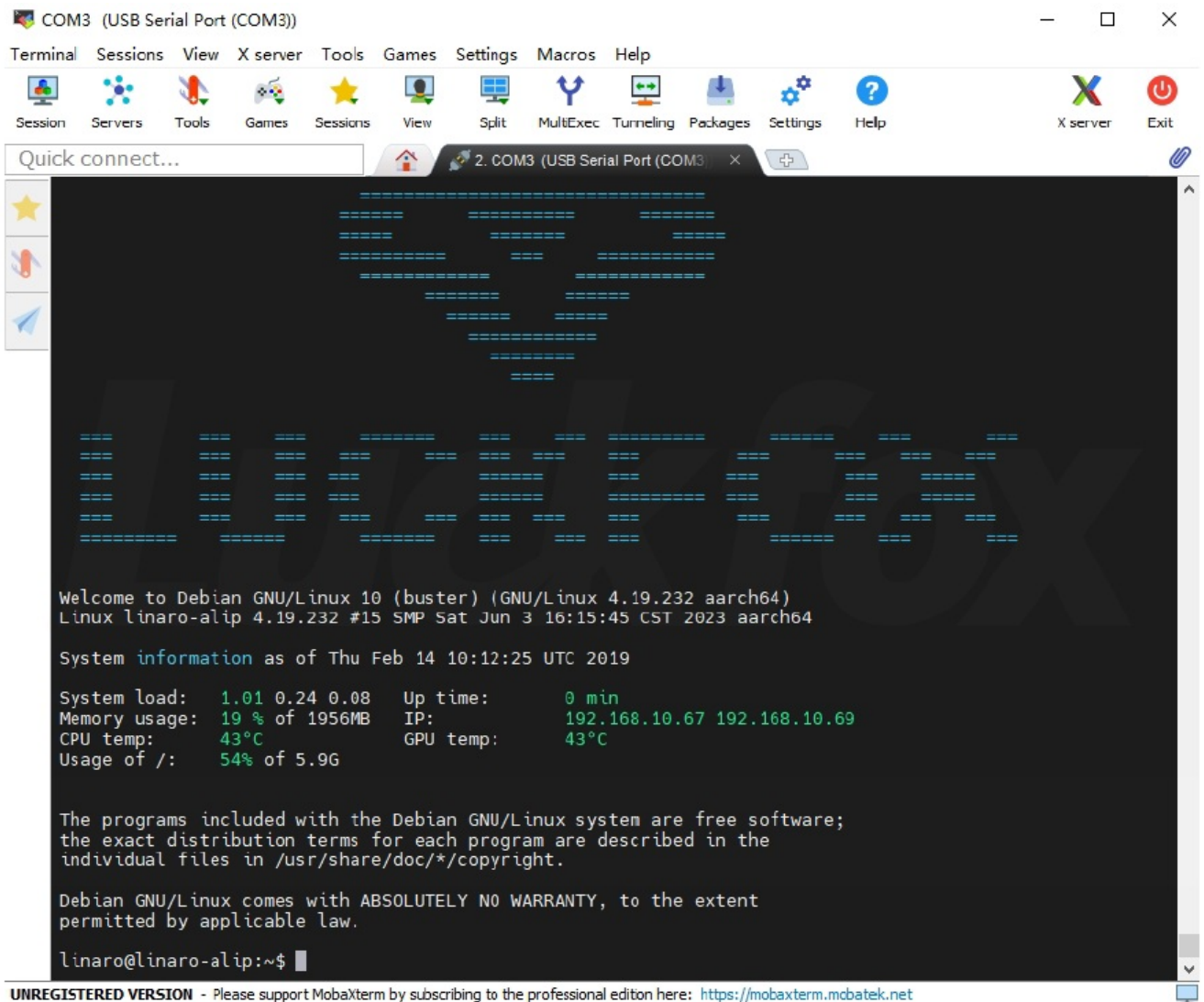
3. Download the remote login softwareMobaXterm and extract it. It can be used directly.

4. Open the MobaXterm remote login software, select "Session," then select "Serial",Set the baud rate of the serial port to 1500000 (1.5Mbps).

5.
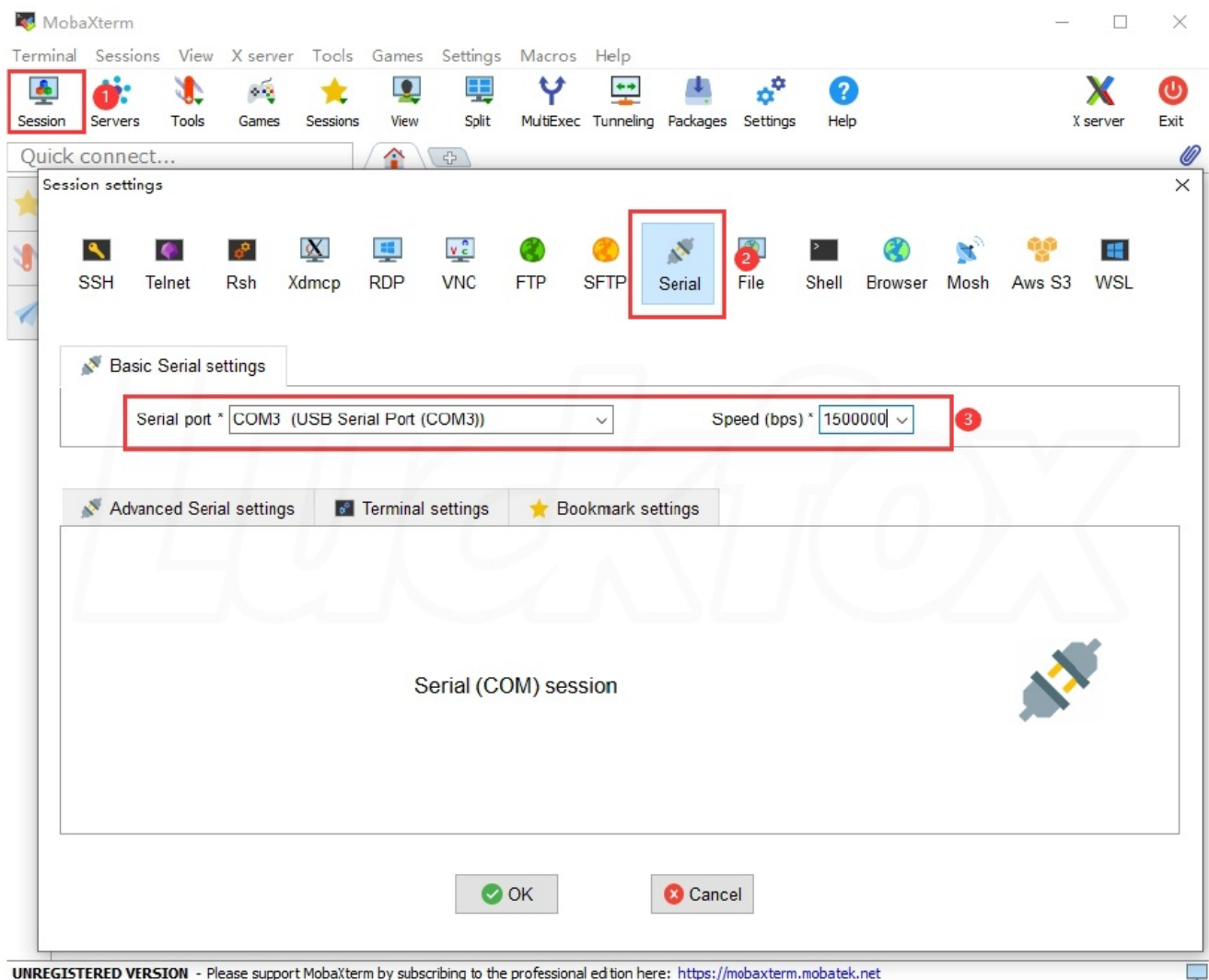
After clicking "OK," press Enter, and enter the login name and password to log in.

Remote Login

Preparation

1. Connect one end of an Ethernet cable to the network port of the CM4-IO-BASE-B baseboard and the other end to the LAN port of the router.

Obtain the IP Address of Core3566

- Log in to the router to find the IP address of Core3566.

- You can also use some local network IP scanning tools. Here, we take the Advanced IP Scanner as an example.
    1. Run Advanced IP Scanner, and click the Scan button to scan the IP addresses within the current local network.
    2. Find all IP addresses with the name containing "Core3566" and record them.
    3. Power on the device and ensure that it is connected to the network.
    4. Click the Scan button again to scan the IP addresses within the current local network:
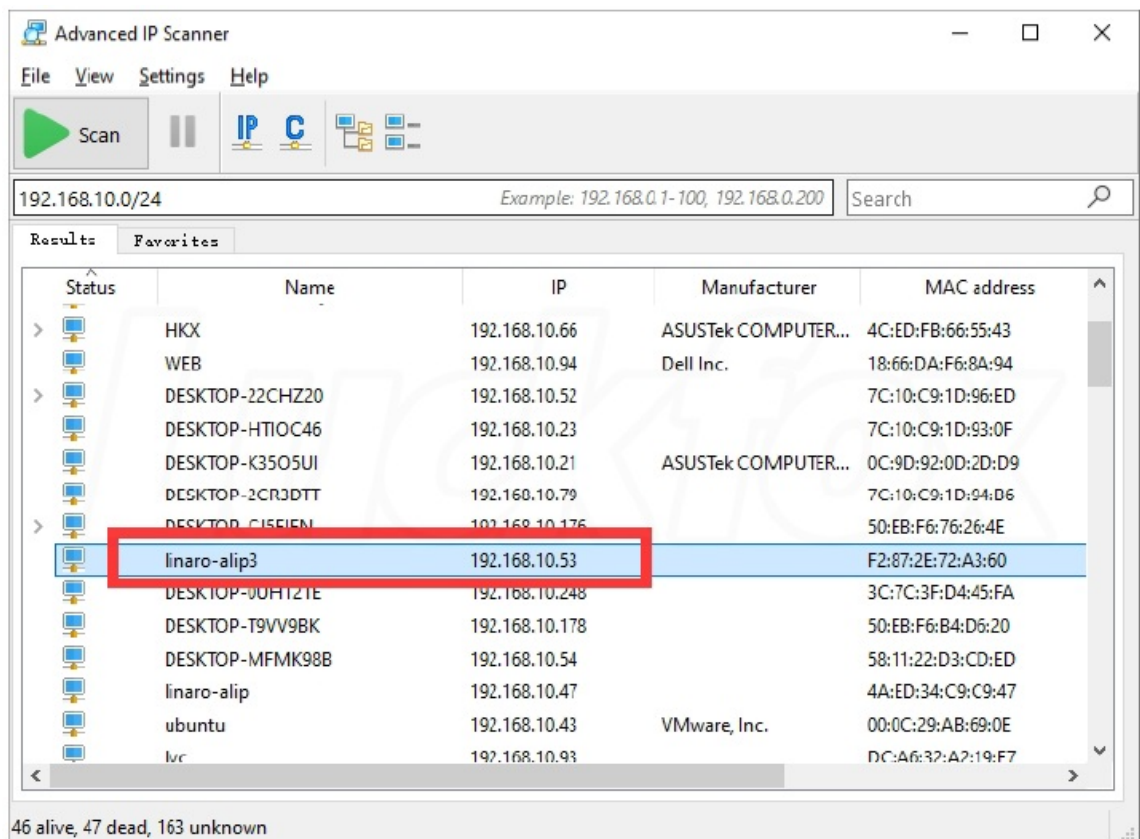
5. Exclude IP addresses previously recorded with the name containing "linaro-alip". The remaining IP address is your Core3566's IP address.

Using MobaXterm for Login

1. Download MobaXterm remote login software, and unzip it for immediate use.
2. Open MobaXterm remote login software and select Session -> SSH. In the "Remote host" field, enter the IP address we obtained earlier, which is 192.168.10.67 (Please fill in your actual IP address).
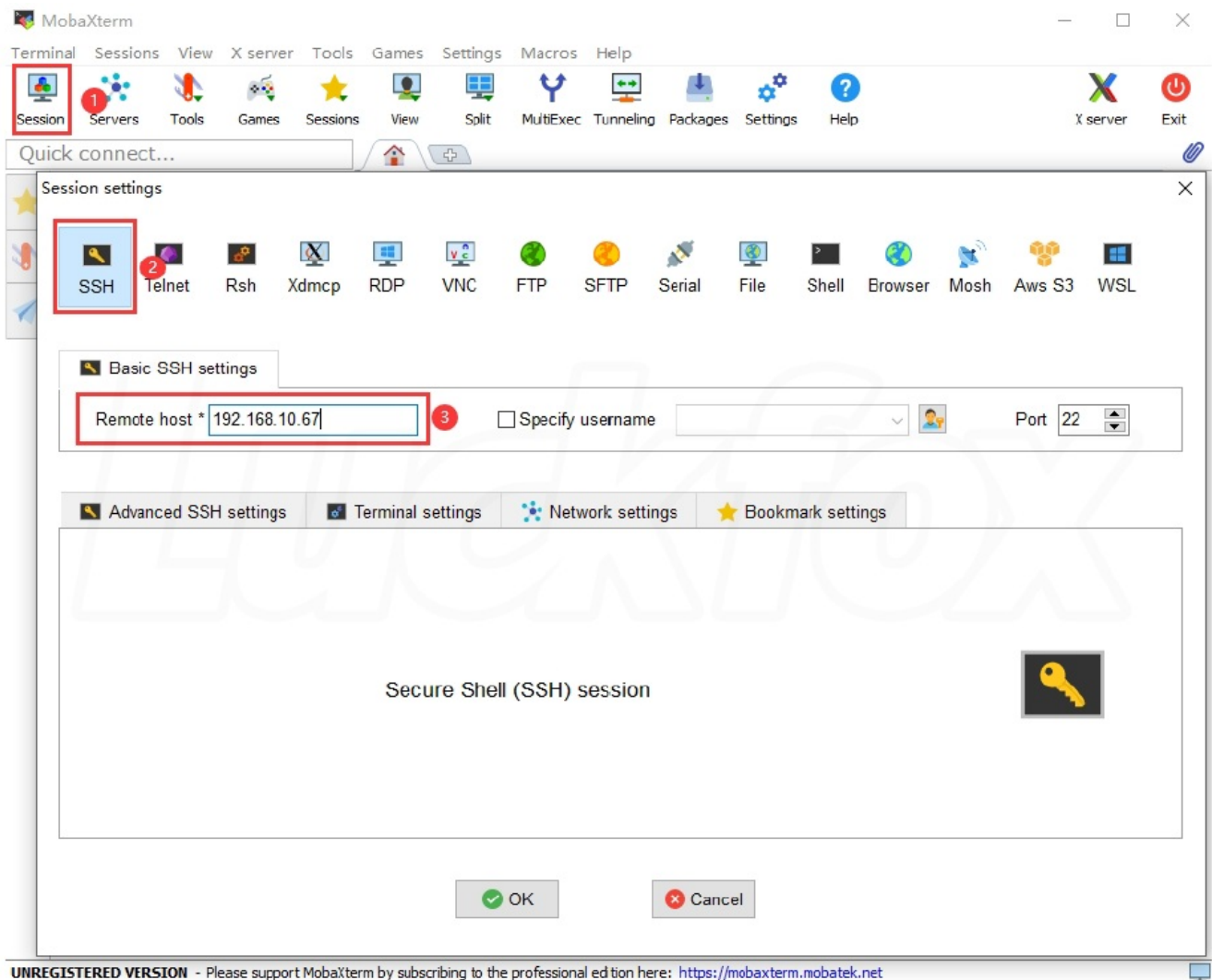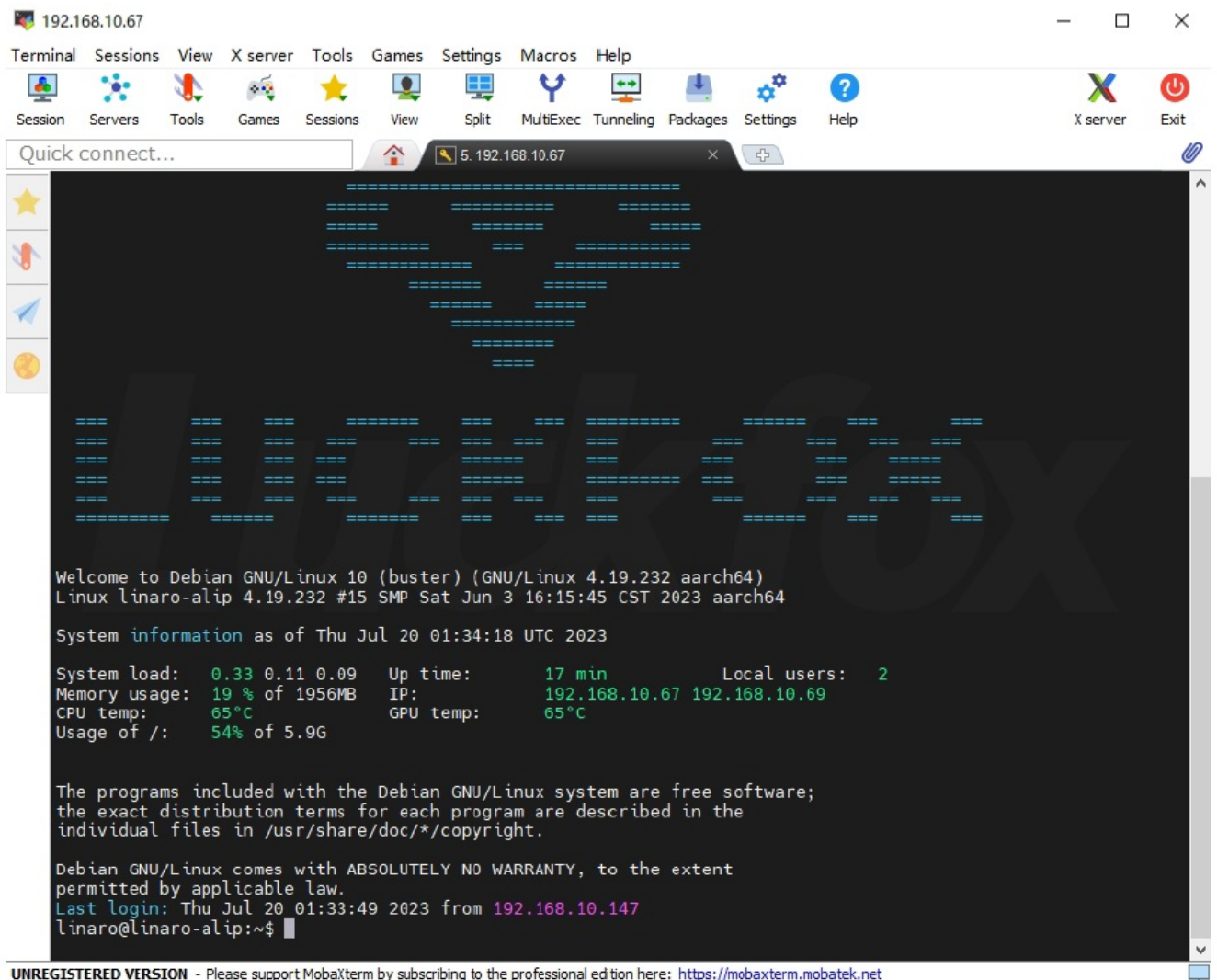
3. After filling in the information, click OK, and then enter the Core3566 login name and password: "linaro"(Note: When entering the password, you won't see any characters on the screen, which is normal. After typing the password, press the Enter key to proceed).
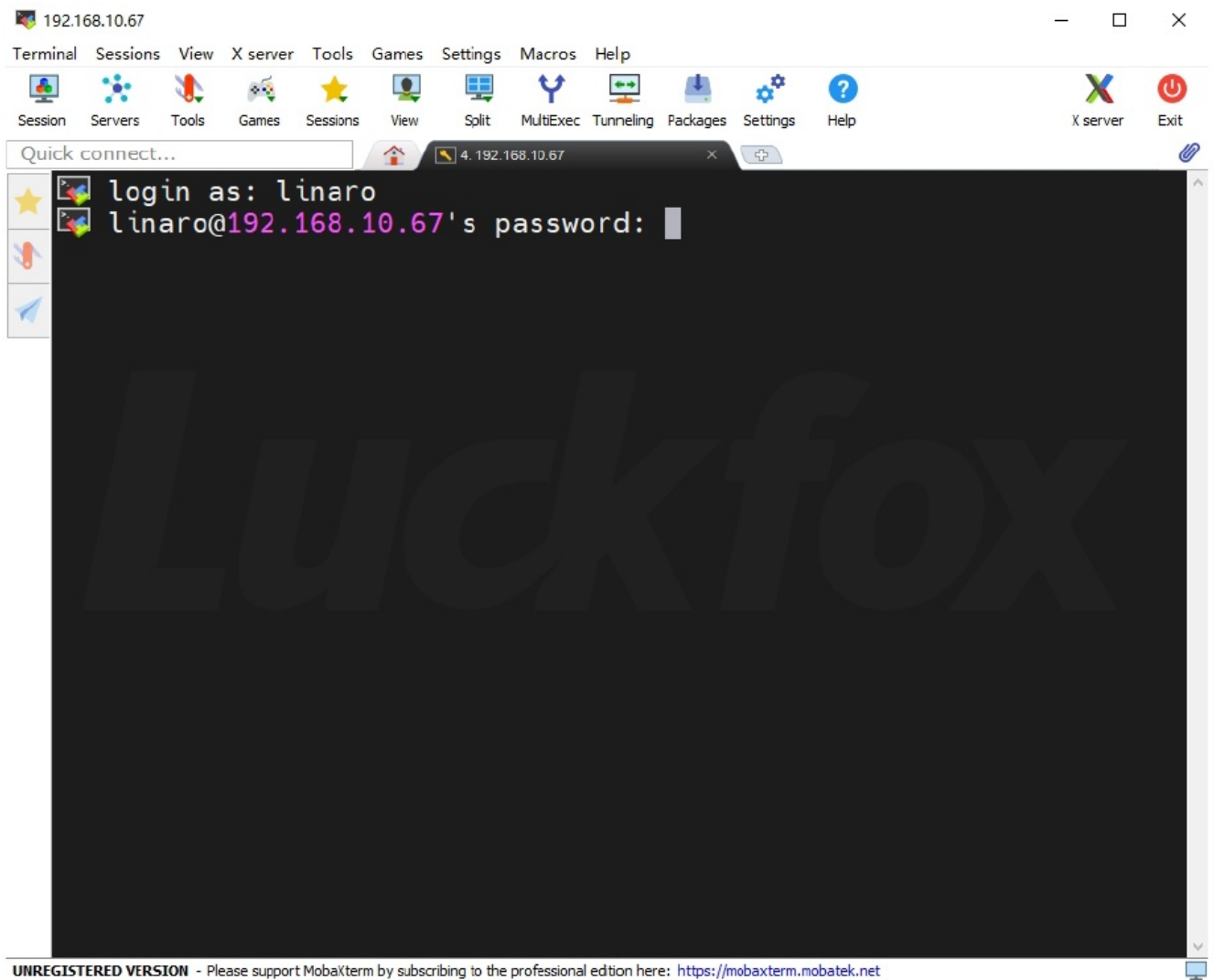
4. **Congratulations!** You have successfully logged into Core3566.

Use VNC for Login

1. Install and enable the VNC Server on Core3566.
   - Download and install:
     - sudo apt-get update
     - sudo apt-get install tightvncserver
     - sudo apt-get install xfonts-base
   - Set up the VNC password:
     - vncpasswd
   - For example, if the password is set to "luck fox", after entering the password twice, choose "y", and enter the password again twice:

     ```
     root@linaro-alip:/home/linaro# vncpasswd
     Using password file /root/.vnc/passwd
     Password:
     Verify:
     Would you like to enter a view-only password (y/n)? y
     Password:
     Verify:
     root@linaro-alip:/home/linaro#
     ```

   - Start the VNC server with the following command:

```
tightvncserver
```

```
root@linaro-alip:/home/linaro# tightvncserver

New 'X' desktop is linaro-alip:1

Starting applications specified in /root/.vnc/xstartup
Log file is /root/.vnc/linaro-alip:1.log

root@linaro-alip:/home/linaro#
```
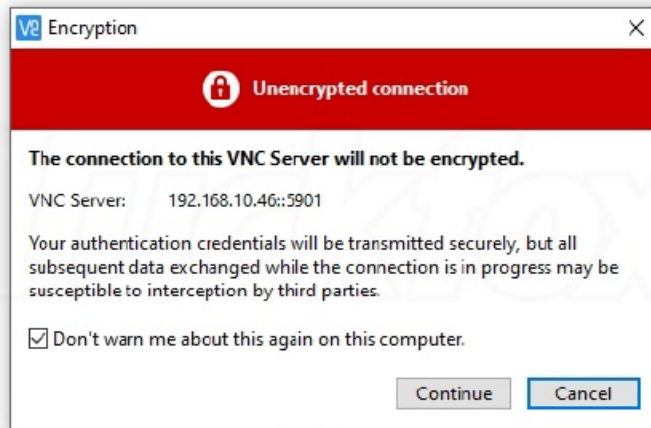
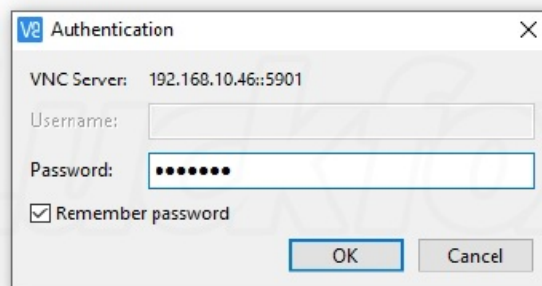2. Download and install **VNC Viewer** on your Windows computer.

- Open the VNC Viewer tool, select File->New Connection->General.
- Enter the IP address of Core3566 and the port number, which is 5901, for example:
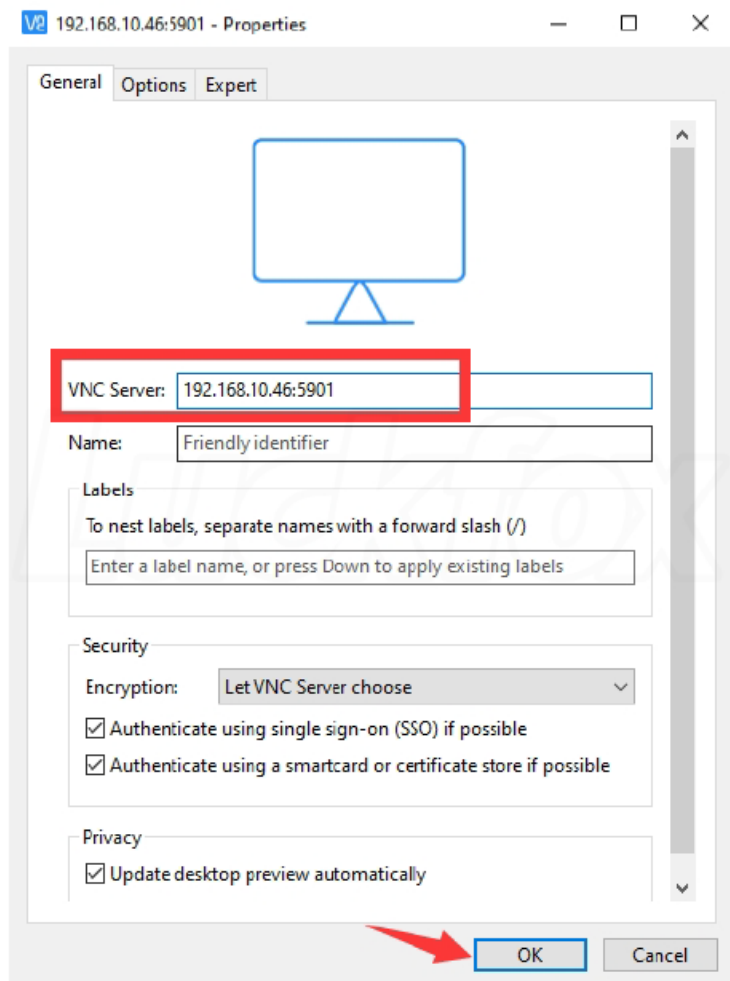
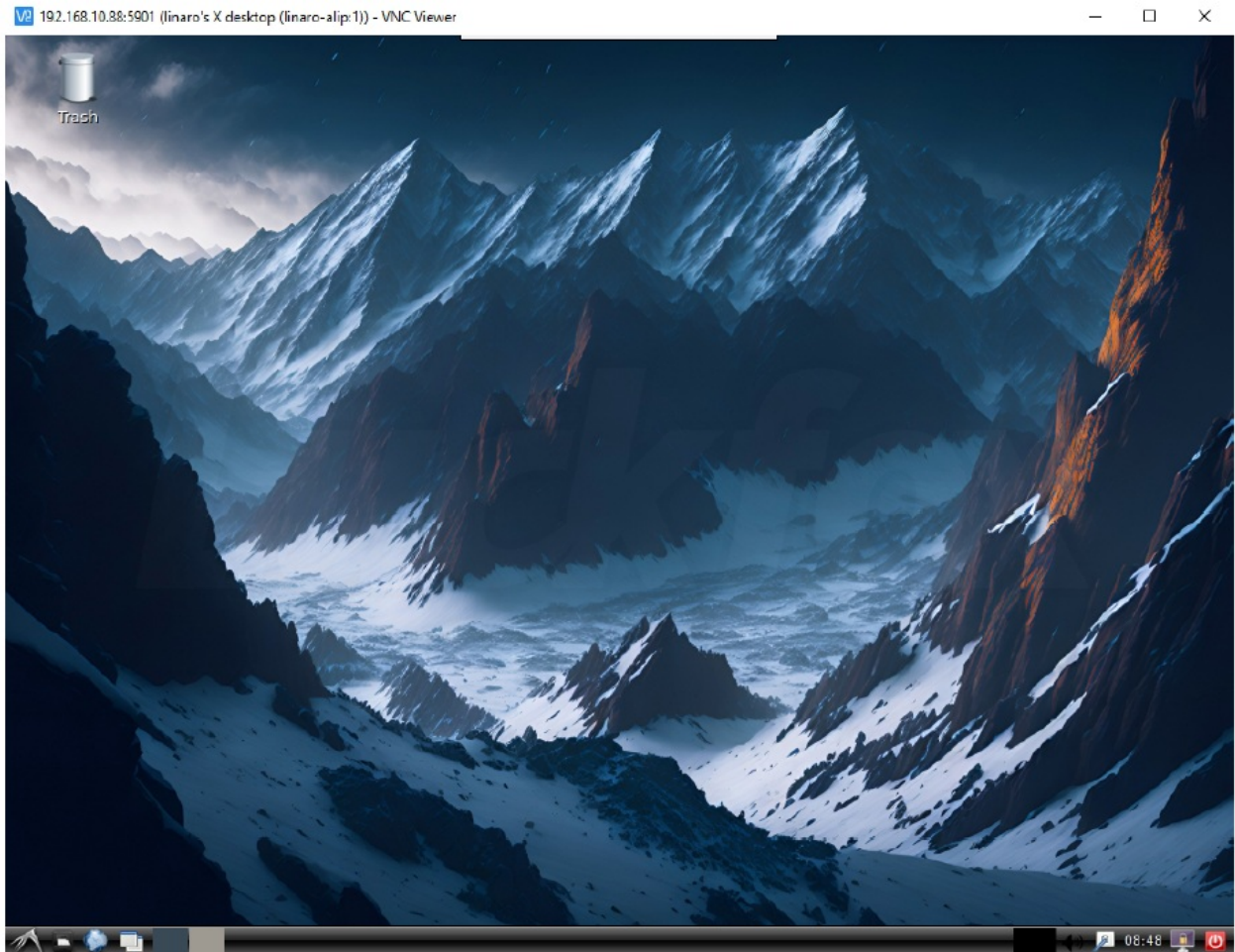- Click "Continue" and enter the VNC password set earlier.

- Successfully logged into VNC:

3. Create a startup script:

- Before setting up the startup service, make sure tightvncserver is not running in the terminal. If it is running, restart the device.
- Run the following command to create a startup script:
  - sudo nano /etc/systemd/system/tightvncserver.service
- In the file, enter the following content:

```
[Unit]
Description=TightVNC Server
After=network.target

[Service]
ExecStart=/usr/bin/tightvncserver :1
User=linaro
Type=forking

[Install]
WantedBy=multi-user.target
```

- Use the shortcut Ctrl + X to save the file and exit the editor. Run the following commands to enable the tightvncserver service:
  - sudo systemctl enable tightvncserver
  - sudo systemctl status tightvncserver
  - sudo systemctl start tightvncserver

Connect to Wi-Fi

1. Switch to superuser mode:
   - sudo su
2. Scan for available Wi-Fi networks:
   - nmcli dev wifi
3. Connect to a Wi-Fi network (replace "wifi_name" and "wifi_password" with your actual Wi-Fi SSID and password):
   - nmcli dev wifi connect "wifi_name" password "wifi_password"
4. If you see "successfully," it means the wireless network is connected successfully. The board will automatically connect to your specified Wi-Fi network on the next boot.

```
root@linaro-alip:/home/linaro# nmcli dev wifi connect test password 123456789
Device 'wlan0' successfully activated with 'bd88cdf5-2c04-406a-b4b6-1caaa0b1bf6c'.
root@linaro-alip:/home/linaro#
```

Connecting to Bluetooth

1. Switch to superuser mode and follow these steps to connect and use Bluetooth:

```
root@linaro-alip:/home/linaro# bluetoothctl
[bluetooth]# default-agent
[bluetooth]# power on                    # Turn on Bluetooth
[bluetooth]# scan on                     # Scan for Bluetooth devices
[bluetooth]# trust 12:11:32:DE:A3:03     # Trust the Bluetooth device with the specified device number
[bluetooth]# pair 12:11:32:DE:A3:03
[bluetooth]# connect 12:11:32:DE:A3:03   # Connect to the Bluetooth device
[M1]# exit                               # Exit Bluetooth
```
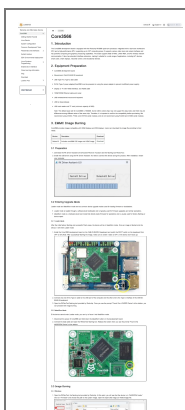
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Documents / Resources

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Core3566 Development Board, Core3566, Development Board, Board

References

- **User Manual**