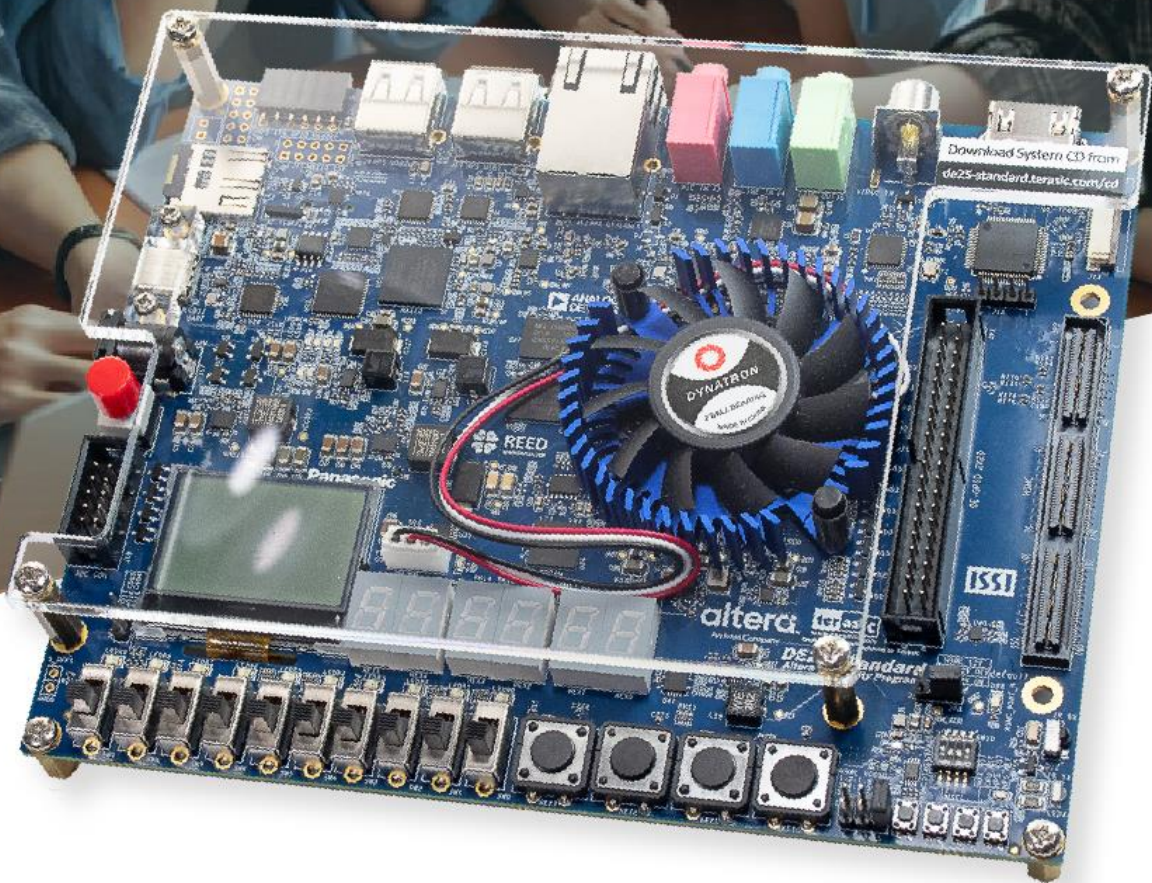


DE25-Standard Development Kit



**Powering next-level performance for
digital logic and embedded applications !**

Linux Booting Started Guide

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Chapter 1

Linux Booting on the board

1.1 Introduction

This guide describes how to boot the HPS on the board using the Micro SD Card with Linux image, and use the UART interface to allow the Host PC to communicate with the HPS of the board.

1.2 Required Hardware

To boot Linux on the board, the following hardware is required:

- DE25-Standard board
- USB Type A to Type-C Cable
- Micro SD Card (At least 4GB capacity)

1.3 Install the MicroSD Card

This section will show you how to install the MicroSD card into the board. In addition, if user want to recover the factory image file to the MicroSD Card. It will show how to download the Linux image file for the board and how to write it into the MicroSD Card.

■ Install the MicroSD Card to the Board

The Board will be shipped with a MicroSD card that has been written with Linux image. Users can install the Micro SD Card on the board by referring to **Figure 1-1**.

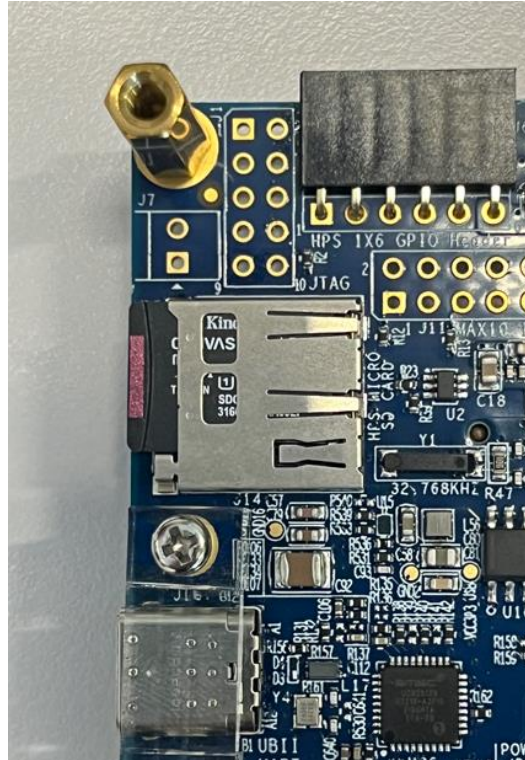


Figure 1-1 Installing MicroSD card

■ Download Linux image file

If the user wants to copy or re-program the MicroSD card, you can download the Linux image file (Find “*Linux BSP (Board Support Package): MicroSD Card Image*”) by referring to the link below:

<http://de25-standard.terasic.com/cd>

Linux BSP (Board Support Package): MicroSD Card Image

Title	Version	Size	Date	Download
Linux Console (Kernel 6.1.68-lts; rev. A Hardware)	1.0.0		2024-06-12	 

Figure 1-2 BSP Download site

■ Download the programming tool

To program a MicroSD card Linux image you can use a free tool such as [Rufus](#).

■ Program the MicroSD Card

The SD card image file needs to be programmed to a MicroSD card before it can be used.

The steps below present how to create MicroSD card on a windows machine using Rufus.

1. Connect the MicroSD card to a Windows PC
2. Execute **Rufus**
3. Select the image file for MicroSD card
4. Select the MicroSD card device
5. Click “**START**” to start writing the image file to the MicroSD card. Wait until the image is successfully written.

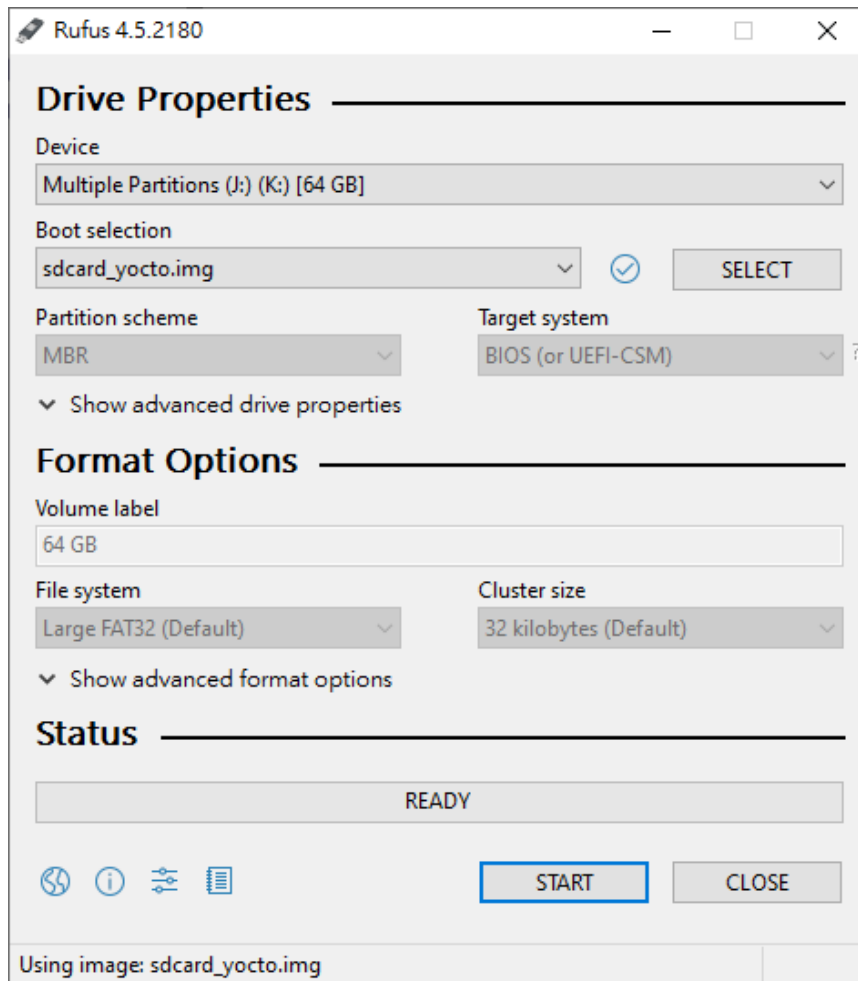


Figure 1-3 Rufus tool

1.4 Set the MSEL

Make sure the Configure mode switch is set to AS Fast mode. please set MSEL[2:0] to “001”.

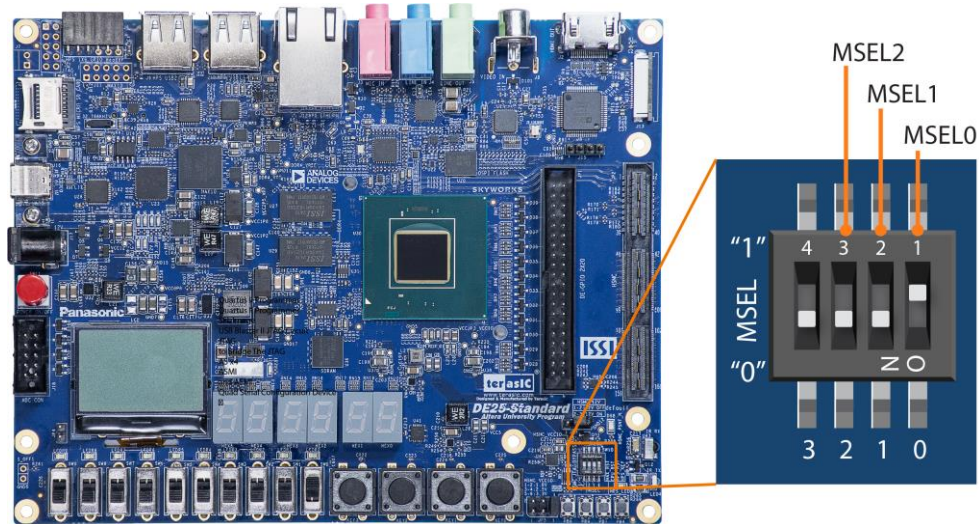


Figure 1-4 Position of slide switches SW10 for Configuration Mode

1.5 Power On the Board

To power up the board, user need to connect a 12V DC power supply to the board, then turn on the power switch SW5 on the board to power on the board (See **Figure 1-5**).

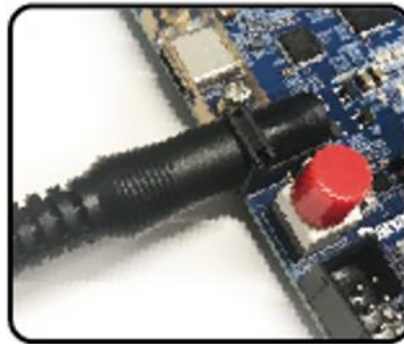


Figure 1-5 Power on the board form external Power

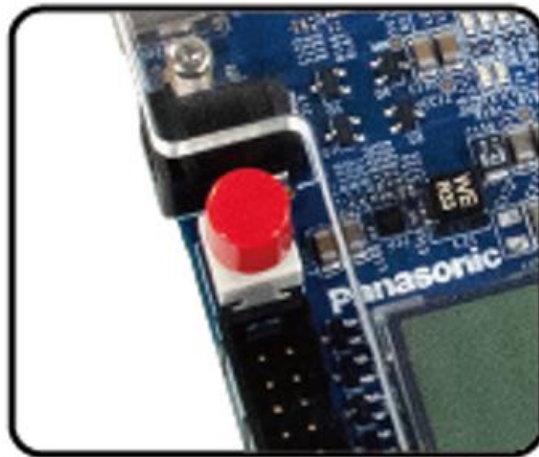


Figure 1-6 Power on the board form external Power

1.6 Setting Up UART Terminal

This section presents how to install the drivers for the USB to UART chip on the board and how to set up the UART terminal on your Host PC. The board communicates with the PC through the Micro USB connector. You should install the USB to UART driver and configure the UART terminal before you run Linux on the board (see [The CP2105 \(USB to UART\) Driver Installation Instructions](#)).

■ Installing the Driver

1. Connect your computer to the development board by plugging the USB cable into the USB Type-C connector of the board. (Connection setup is shown in **Figure 1-7**)

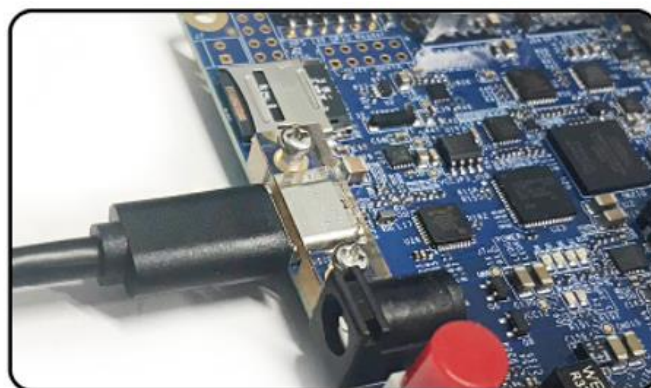


Figure 1-7 Connect the Micro USB cable to the board

2. Please refer to the [The CP2105 \(USB to UART\) Driver Installation Instructions](#) to install the USB to UART driver for HPS fabric.

■ Configure UART terminal UART terminal spec

- 115200 baud rate
- no parity
- 1 stop bit
- no flow control settings

The following steps show how to configure a PuTTY terminal window (can be downloaded from the link: <http://the.earth.li/~sgtatham/putty/latest/x86/putty.exe>)

1. Open the “Device Manager” on your windows and check the “Port(COM&LPT)” tab. User may find the Silcon UART device CP2105 on the list. Find the COM number of “**Enhanced COM port**”. It represents the HPS UART Port. See **Figure 1-8**, the COM number of this Host is COM9. *Note that the “**COM9**” on the Serial Line column needs to be modified according to the actual com port on the user's computer.*

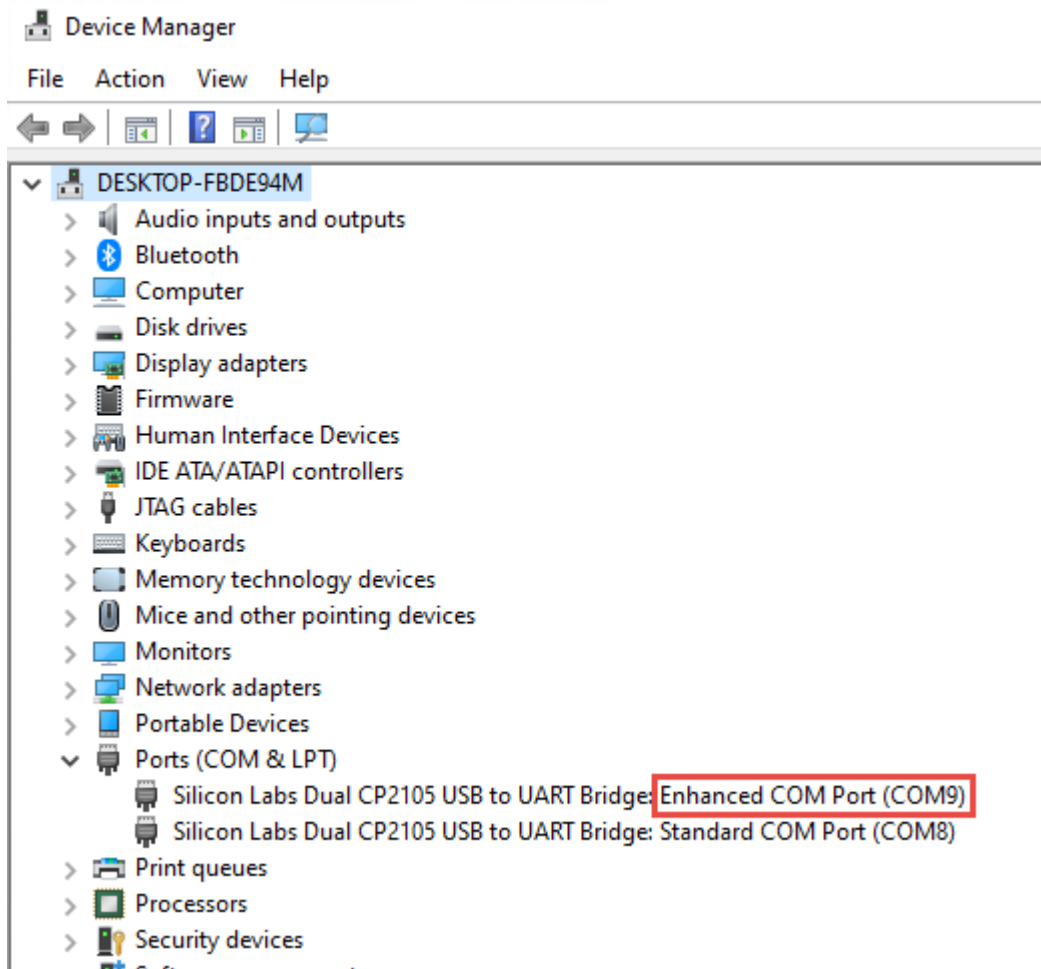


Figure 1-8 Device Manager

2. Open putty.exe, click Serial go to a serial configure interface.
3. Configure the window like the flowing picture and click “save” button to save the setting and click “Open” to open the terminal window. *Note that the “COM9” on the Serial Line column needs to be modified according to the actual com port on the user's computer.*

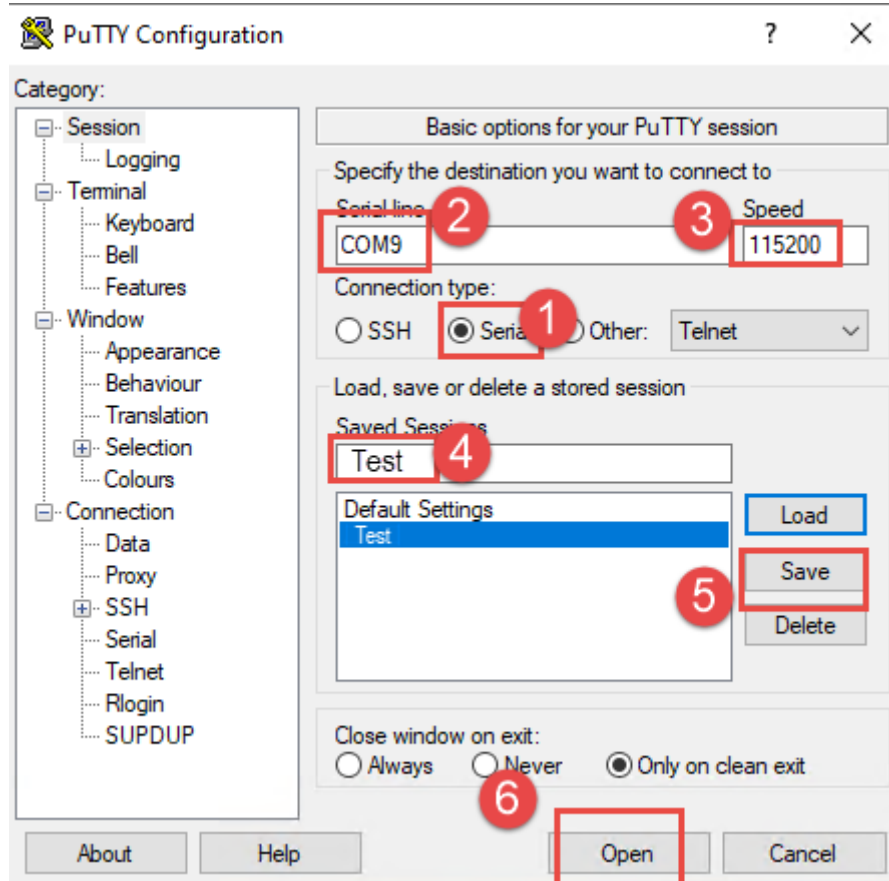
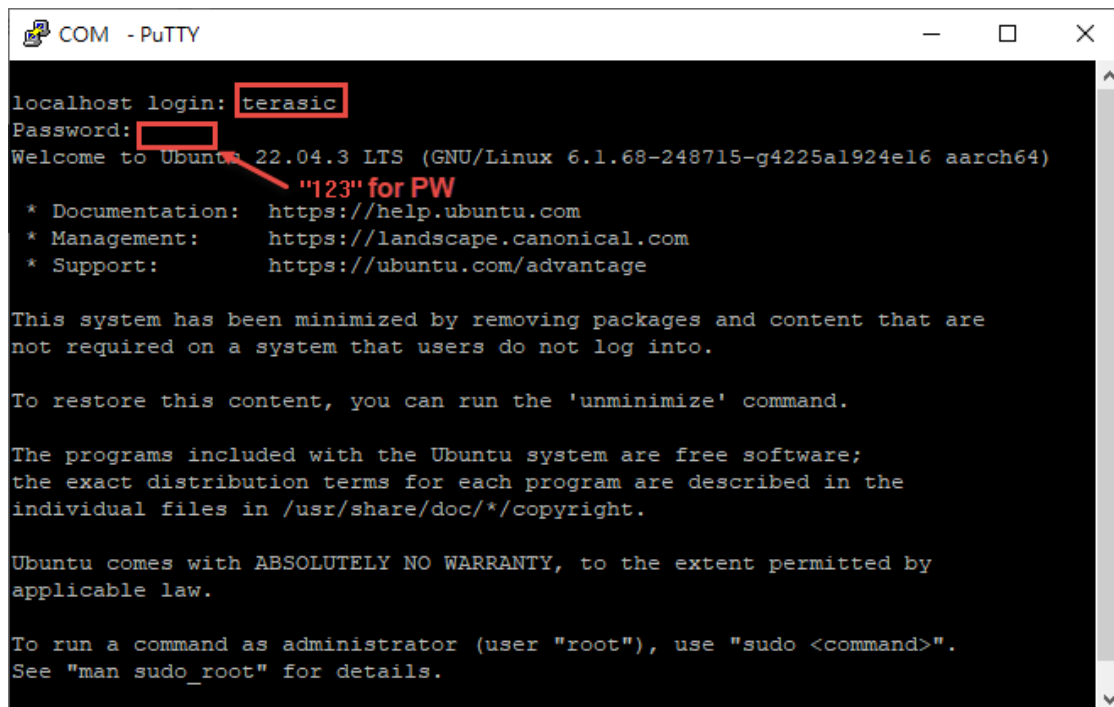


Figure 1-9 Putty Window

4. If user use the image “Linux BSP 1.1.0 (Ubuntu + Kernel 6.1.68-lts; revB Board)” or later version, please type “terasic” for account name and “123” for the password to login Ubuntu(See **Figure 1-10**).

Note : If the UART terminal does not respond, please refer to Appendix 1.7 to troubleshoot the issue.



```
COM - PuTTY

localhost login: terasic
Password:
Welcome to Ubuntu 22.04.3 LTS (GNU/Linux 6.1.68-248715-g4225a1924e16 aarch64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

This system has been minimized by removing packages and content that are
not required on a system that users do not log into.

To restore this content, you can run the 'unminimize' command.

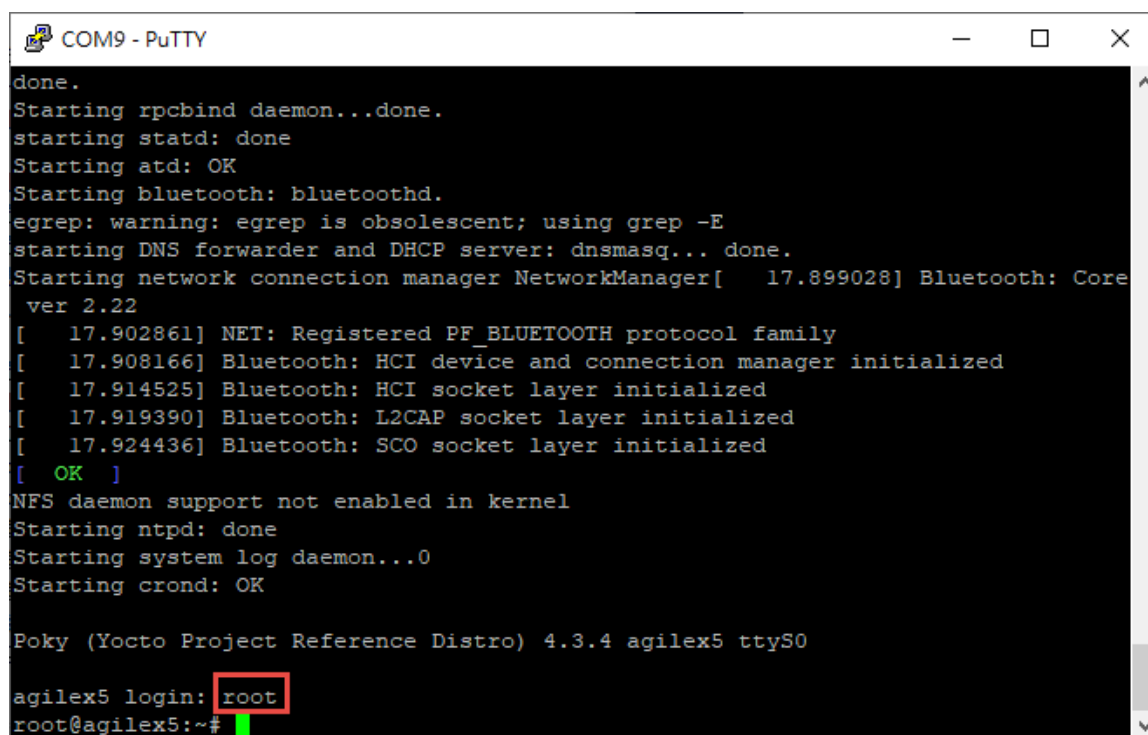
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
```

Figure 1-10 Putty Window

- For the image “Linux BSP 1.0.0 (Poky + Kernel 6.1.68-lts; rev. B Hardware)”, type “root” for account name and **NO Need** for the password (See **Figure 1-11**)



```
COM9 - PuTTY

done.
Starting rpcbind daemon...done.
starting statd: done
Starting atd: OK
Starting bluetooth: bluetoothd.
egrep: warning: egrep is obsolescent; using grep -E
starting DNS forwarder and DHCP server: dnsmasq... done.
Starting network connection manager NetworkManager[ 17.899028] Bluetooth: Core
ver 2.22
[ 17.902861] NET: Registered PF_BLUETOOTH protocol family
[ 17.908166] Bluetooth: HCI device and connection manager initialized
[ 17.914525] Bluetooth: HCI socket layer initialized
[ 17.919390] Bluetooth: L2CAP socket layer initialized
[ 17.924436] Bluetooth: SCO socket layer initialized
[ OK ]
NFS daemon support not enabled in kernel
Starting ntpd: done
Starting system log daemon...0
Starting crond: OK

Poky (Yocto Project Reference Distro) 4.3.4 agilex5 ttyS0

agilex5 login: root
root@agilex5:~#
```

Figure 1-11 Putty Window

1.7 Appendix

This section will introduce what check items can be done if Linux cannot be boot and the putty window does not print any messages.

1. Check if the USB Serial Port shows on the device manager on the computer.

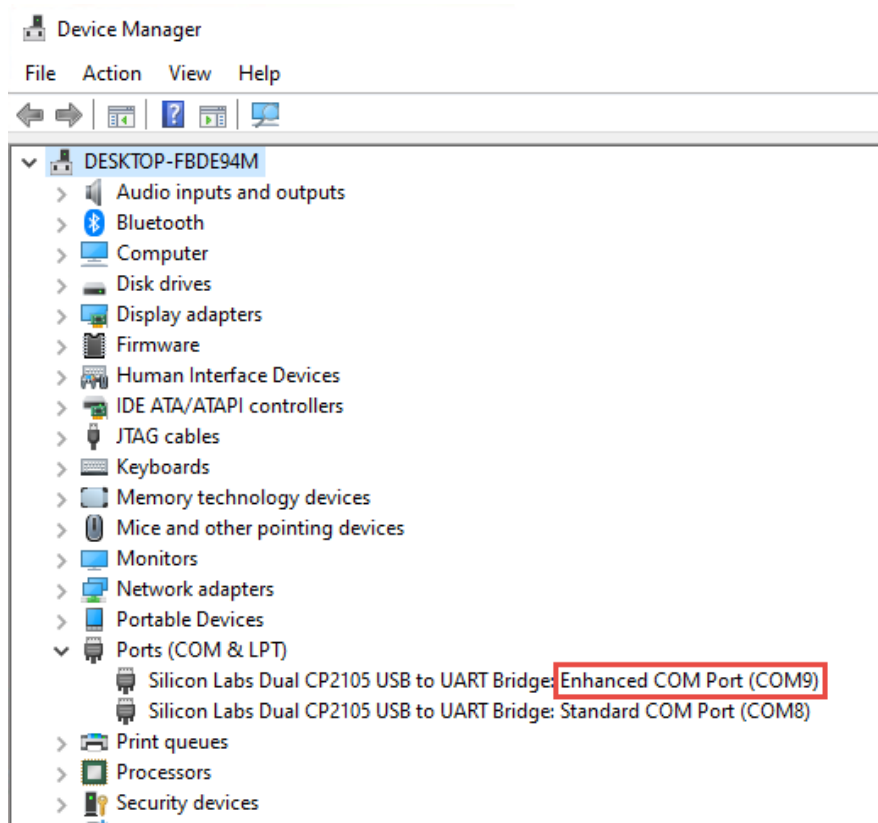


Figure 1-12 Hardware Setup for UART Terminal

2. Make sure the Configure mode switch is set to AS mode.

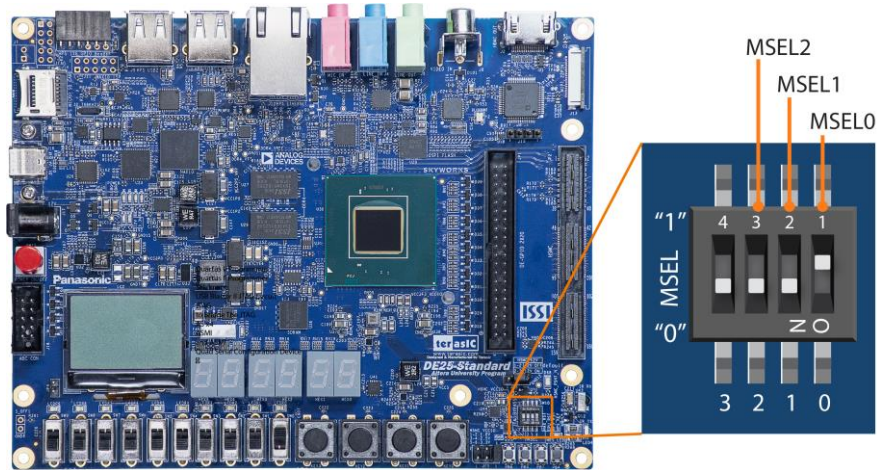


Figure 1-13 Position of slide switches SW10 for Configuration Mode

3. The QSPI flash on the Board had programmed the boot file when shipped. After power on, user can check if the user LEDR[9] is flashing, and after 10 seconds of booting. If not, please refer to following steps to re-program the QSPI flash with the factory code.
 - Connect the USB cable to USB blaster II connector of the Board.
 - Copy the factory code from the path :
System CD\ Demonstration\SoC_FPGA\GHRD\output_files\program_qspi_flash\
 - Execute “flash_program.bat” to erase and program the QSPI flash.

Additional Information

Contact Terasic

Here are the addresses where you can get help if you encounter problems:

■ Terasic Technologies

No.80, Fenggong Rd., Hukou Township, Hsinchu County 303035. Taiwan

Email: support@terasic.com

Web: www.terasic.com

Agilex 7 FPGA Starter Kit Web: DE25-STANDARD.terasic.com

■ Revision History

Date	Version	Changes
2024.07	First publication	
2025.02	V1.1	Modify section 1.6 for add Ubuntu image