

Apollo Agilex SoM Board

Linux Booting Start Guide



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Chapter 1

Linux Booting on the Apollo Agilex

1.1 Introduction

This guide describes how to boot the HPS on the Apollo Agilex 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 Apollo Agilex board.

1.2 Required Hardware

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

- Apollo Agilex board
- Mini USB Cable
- Micro SD Card (At least 4GB capacity)

1.3 Install the MicroSD Card

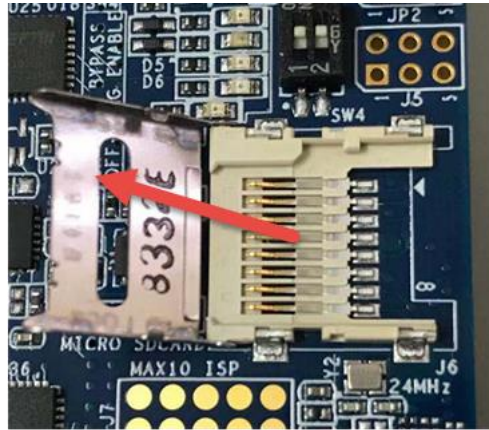
This section will show you how to install it into the Apollo Agilex board. In addition, if user want to recover the factory image file to the MicroSD Card. It will show how to download the Linux image file for the Apollo Agilex board and how to write it into the MicroSD Card.

■ Install the MicroSD Card to the Apollo Agilex board

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



- 1** Toggle left the cover to unlock the Micro SD card socket



- 2** Pull up the cover



- 3** Insert the Micro SD card



- 4** Pull down the cover



- 5** Toggle right the cover to lock the Micro SD card socket

Figure 1-1 Steps for 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:

<https://www.terasic.com.tw/cgi-bin/page/archive.pl?Language=English&CategoryNo=166&No=1278&PartNo=4#contents>

■ Download the programming tool

To program a MicroSD card Linux image you can use a free tool called Win32DiskImager.exe from <http://url.terasic.com/win32diskimager> on a Windows machine.

■ 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 Win32DiskImager.exe.

1. Connect the MicroSD card to a Windows PC
2. Execute Win32DiskImager.exe
3. Select the image file for MicroSD card
4. Select the MicroSD card device
5. Click “Write” to start writing the image file to the MicroSD card. Wait until the image is successfully written.

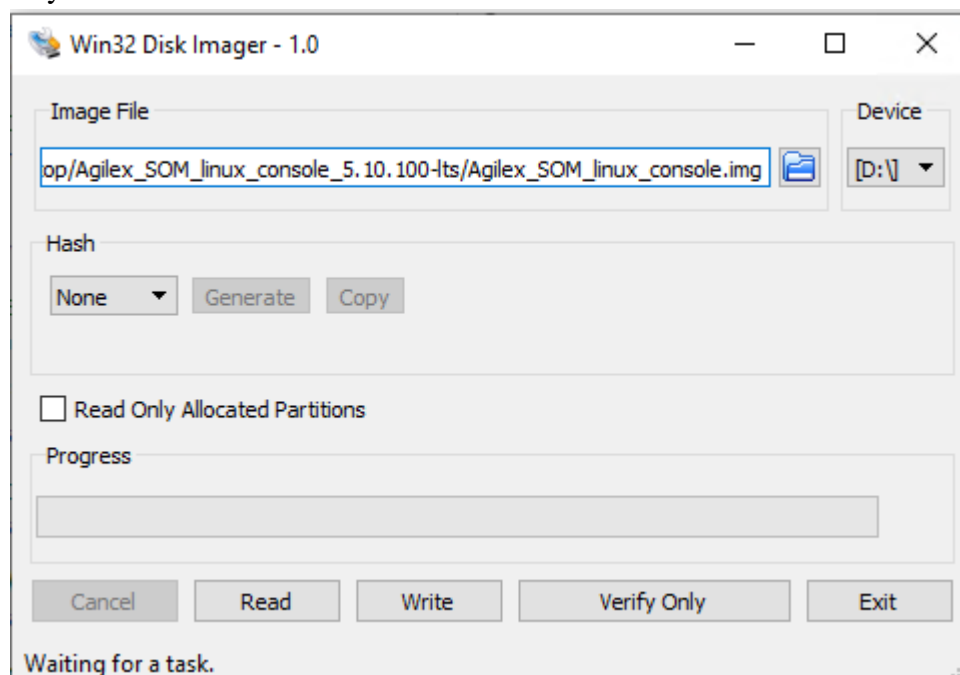


Figure 1-2 Win32 Disk Imager

1.4 Power On the Apollo Agilex board

To power up the Apollo Agilex board in stand-alone mode, user need to connect a 2x4 PCIe power connector on the Apollo Agilex board to the external 12V DC power supply, then turn on the power switch SW1 on the board to power on the Apollo Agilex (See **Figure 1-3**).

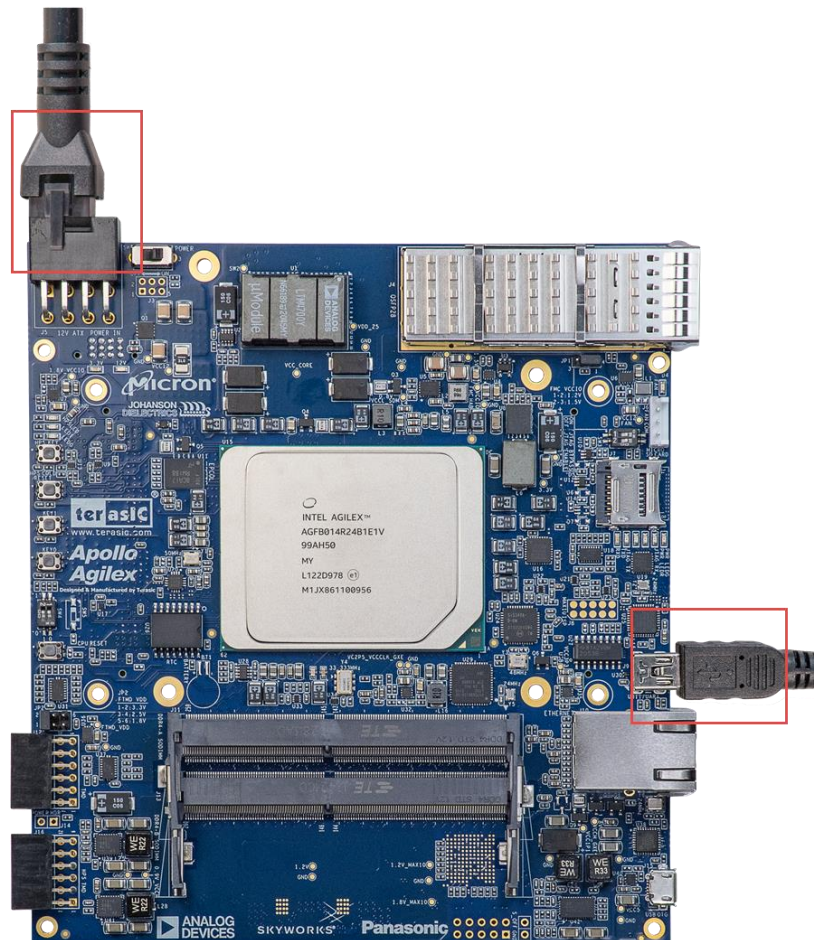


Figure 1-3 Power on the Apollo Agilex form external Power

1.5 Setting Up UART Terminal

This section presents how to install the drivers for the USB to UART chip on the Apollo Agilex board and how to set up the UART terminal on your Host PC. The Apollo Agilex board communicates with the PC through the Mini USB connector. You should install the USB to UART driver and configure the UART terminal before you run Linux on the board.

■ Installing the Driver

1. Connect your computer to the development board by plugging the USB cable into the mini USB connector of Apollo Agilex. (Connection setup is shown in **Figure 1-3**)
2. Please refer to the section 5.2 (Install driver for FT232R) of the *Apollo_Agilex_SoM_User_Manual.pdf* 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 putty.exe, click Serial go to a serial configure interface.
2. 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 “COM5” on the Serial Line column needs to be modified according to the actual com port on the user's computer.*

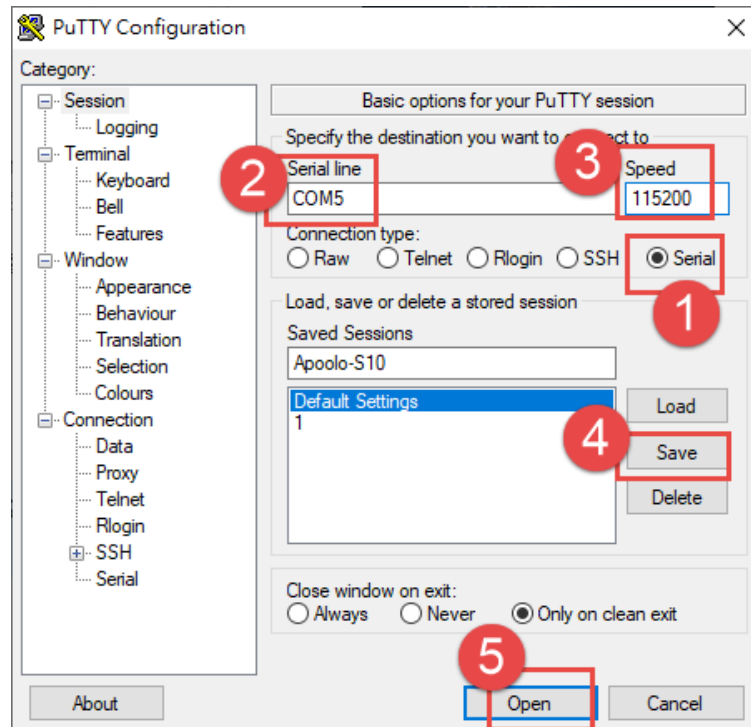


Figure 1-4 Putty Window

- After the board is successfully booted, the Linux will ask for the login name. Type "terasic" for account name and type "123" for the password (See Figure 1-5).

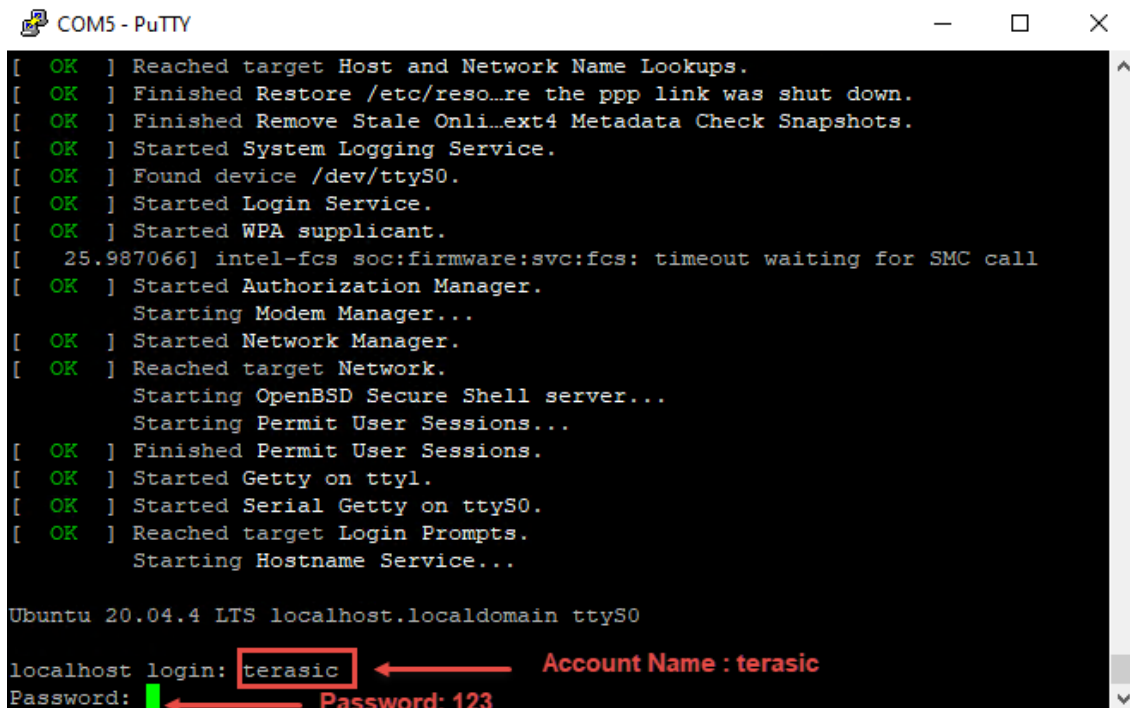


Figure 1-5 Putty Window

1.6 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.

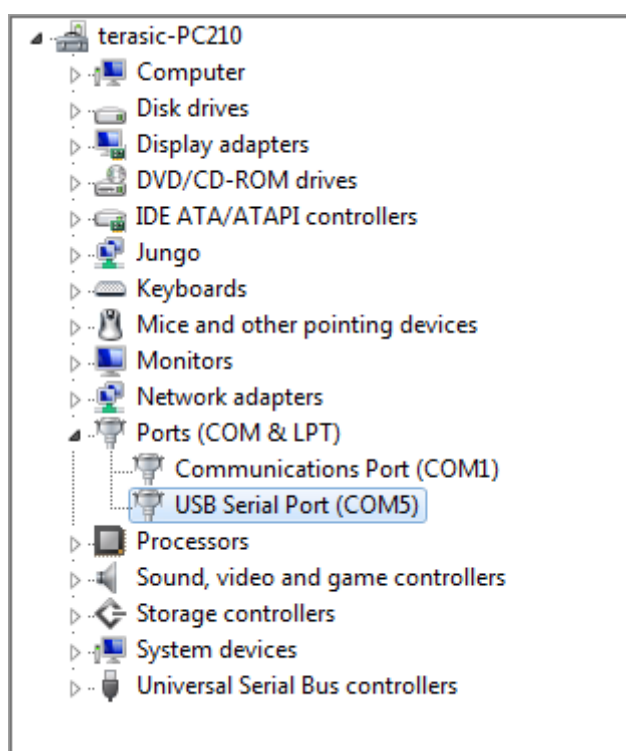


Figure 1-6 Hardware Setup for UART Terminal

2. The QSPI flash on the Apollo Agilex board had programmed the boot file when shipped. After power on, user can check if the user LED is flashing, and after 10 seconds of booting, the HPS LED has light on. If not, please refer to following steps to re-program the QSPI flash with the factory code.
 - Connect the MiniUSB cable to USB blaster II connector of the Apollo Agilex 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

Apollo Agilex Web: agilex-som.terasic.com

■ Revision History

Date	Version	Changes
2022.07	First publication	