

# **RGx00U&RM500U Series**

## **Partition Backup User Guide**

**5G Module Series**

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# About the Document

## Revision History

Version	Date	Author	Description
-	2023-12-29	Achang ZHANG/ Jeffery JIANG	Creation of the document
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# 1 Introduction

This document introduces how to use ResearchDownload tool to back up partitions of Quectel 5G RG200U series, RG500U series, and RM500U series modules and download backup partitions by taking the *userdata* partition as an example.

## NOTE






Please contact Quectel Technical Support to obtain ResearchDownload tool.





The icons in the toolbar are described as follows.

**Table 1: Toolbar Icons**


Number	Icon	Description
①		Select .pac file.
②		Set ResearchDownload parameters. The setting will be automatically saved. This button is disabled when the download/backup starts. After the download/backup is stopped, this button will be enabled again.
③		Start download/backup.
④		Stop download/backup.
⑤		Query version information and help information.

# 3 Partition Backup

## 3.1 Backup Procedures

Follow the steps below to back up a specified partition.

**Step 1:** Import the firmware package in .pac format of the module.

Click  to open the firmware package in .pac format of the module. ResearchDownload tool will automatically uncompress the .pac file to the *ResearchDownload\Bin\ImageFiles\* directory to generate the original file. The PC will read the default configuration of the file by default. Theoretically, the partition configuration of the .pac file of the same version is consistent, as shown in the following figure.






















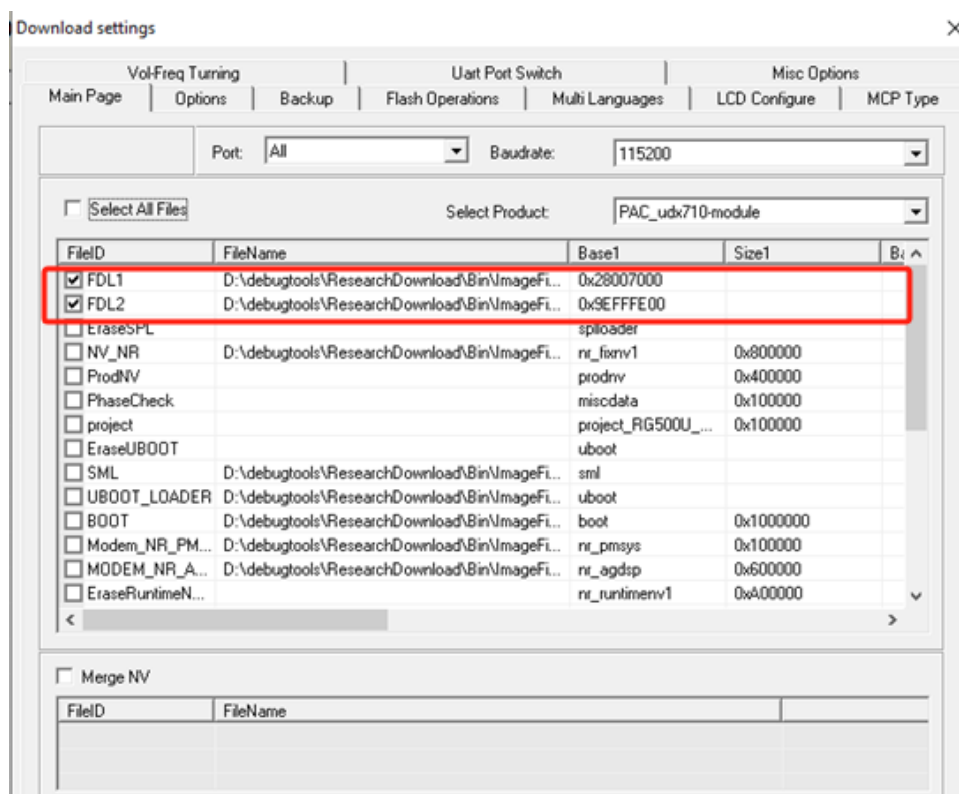
ResearchDownload > Bin > ImageFiles > _DownloadFiles64E0_9E7B9B0_0				
Name	Date modified	Type	Size	
 boot-sign.img	12/22/2023 11:22 AM	Disc Image File	13,278 KB	
 boot-sign.img(1)	12/22/2023 11:22 AM	IMG(1) File	13,278 KB	
 fdl1-sign.bin	12/22/2023 11:22 AM	BIN File	48 KB	
 fdl2-sign.bin	12/22/2023 11:22 AM	BIN File	523 KB	
 Orca_cm4_uart_as_ap_console.bin	12/22/2023 11:22 AM	BIN File	33 KB	
 Orca_NR_phy_NR_XC0_DSP-sign.bin	12/22/2023 11:22 AM	BIN File	511 KB	
 Orca_NR_phy_NR_XC1_DSP-sign.bin	12/22/2023 11:22 AM	BIN File	706 KB	
 Orca_PSCP_modem_CPE_lic_AGCP_DSP_...	12/22/2023 11:22 AM	BIN File	5,122 KB	
 Orca_PSCP_modem_CPE_lic_deltanv.bin	12/22/2023 11:22 AM	BIN File	64 KB	
 Orca_PSCP_modem_CPE_lic_nvitem.bin	12/22/2023 11:22 AM	BIN File	5,426 KB	
 recoveryfs.ubifs	12/22/2023 11:22 AM	UBIFS File	8,680 KB	
 rootfs.ubifs	12/22/2023 11:22 AM	UBIFS File	36,952 KB	
 SC9600_Orca_NR_phy_modem-sign.bin	12/22/2023 11:22 AM	BIN File	1,371 KB	
 SC9600_Orca_PSCP_modem_CPE_lic_mo...	12/22/2023 11:22 AM	DAT File	23,598 KB	
 SC9600_Orca_V3_phy_modem-sign.bin	12/22/2023 11:22 AM	BIN File	4,084 KB	
 sml-sign.bin	12/22/2023 11:22 AM	BIN File	53 KB	
 u-boot-sign.bin	12/22/2023 11:22 AM	BIN File	523 KB	
 u-boot-spl-16k-sign.bin	12/22/2023 11:22 AM	BIN File	50 KB	
 udx710-module.xml	12/22/2023 11:22 AM	XML File	38 KB	
 userdata_b128k_p2k.img	12/22/2023 11:22 AM	Disc Image File	3,720 KB	

Figure 2: Original File in the.pac File

**Step 2:** Read the partition only.

Click , select the **"Main Page"** tab on the "Download settings" pop-up window, and only check **"FDL1"** and **"FDL2"** on the "Main Page" page, as shown in the following figure.



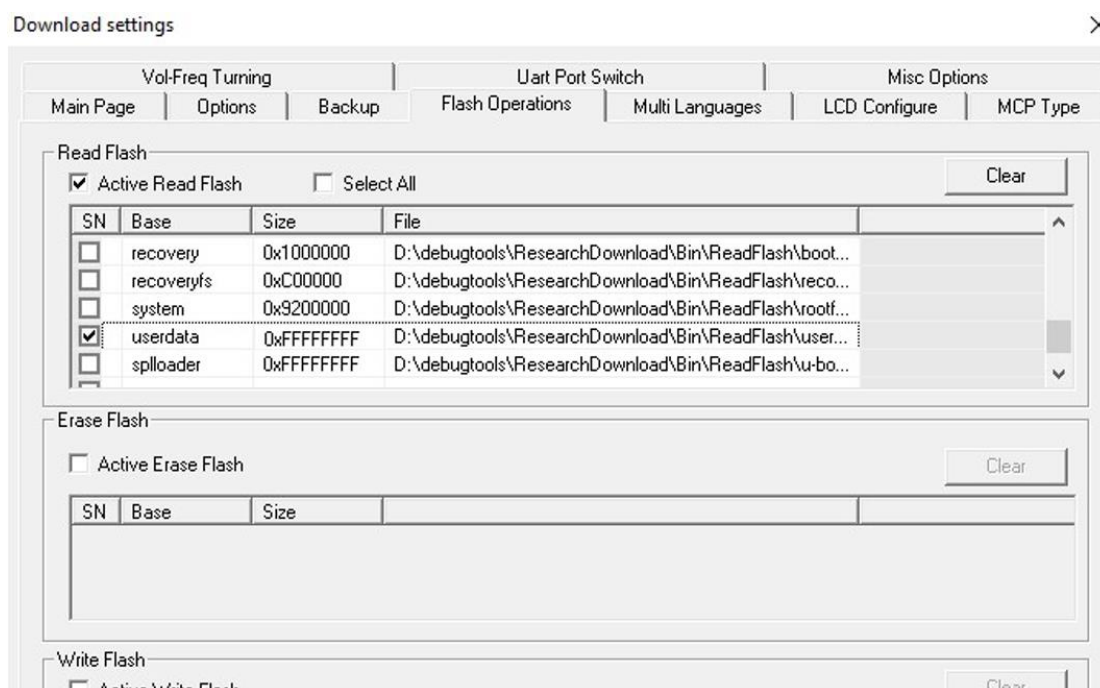
**Figure 3: Cancel Partition Download**

**NOTE**

The running rule of ResearchDownload tool is to download the partitions checked in the "Main Page" page first, and then process the configuration items under the functional columns in the "Flash Operations" page. So, if you only need to read partition data rather than download any partition, keep the default options **"FDL1"** and **"FDL2"** checked and do not check any other partitions, otherwise ResearchDownload tool will execute the task of downloading partitions first, thereby overwriting the data of the partition that needs to be read.

**Step 3:** Read the specified partition in the Flash and modify the partition size.

- 1) Select the **"Flash Operations"** tab on the "Download settings" pop-up window. In the "Flash Operations" page, the "Read Flash" column displays the data of each partition in the device Flash and the storage path on the PC.
- 2) Check **"Active Read Flash"** and the *userdata* partition.
- 3) Since the size of the *userdata* partition is displayed as "0xFFFFFFFF", you need to customize the size of this partition. Double-click **"0xFFFFFFFF"** in the "Size" column of the "userdata" row and replace the number with 0x27B8000, the actual size of the *userdata* partition. For other partition sizes, see **Chapter 3.2**.



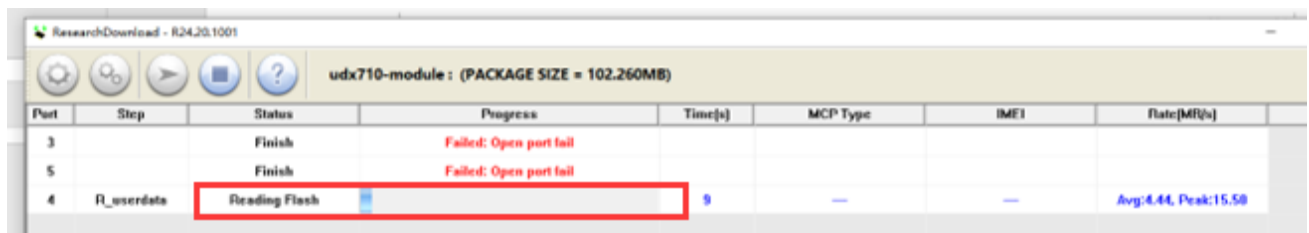
**Figure 4: Select the Partition to Be Read**

**NOTE**

Partitions with a size other than "0xFFFFFFFF" do not need to be modified and can be kept at the default value.

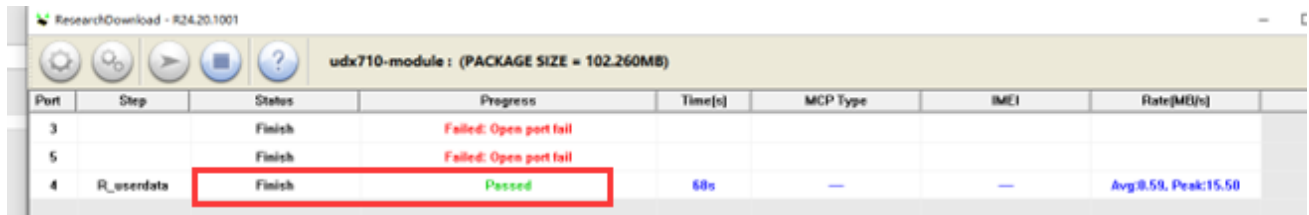
**Step 4:** Click **"OK"** to save the configuration.

**Step 5:** Click  to start reading the partition and backing the data up after configuration.



Port	Step	Status	Progress	Time[s]	MCP Type	IMEI	Rate[MB/s]
3		Finish	Failed: Open port fail				
5		Finish	Failed: Open port fail				
4	R_userdata	Reading Flash		9	—	—	Avg:4.44, Peak:15.50

Figure 5: Partition Backup in Progress



Port	Step	Status	Progress	Time[s]	MCP Type	IMEI	Rate[MB/s]
3		Finish	Failed: Open port fail				
5		Finish	Failed: Open port fail				
4	R_userdata	Finish	Passed	68s	—	—	Avg:8.59, Peak:15.50

Figure 6: Partition Backup Completed

**Step 6:** After the backup is completed, the generated image file is stored in the default path shown in the following figure. You can also modify the storage path by double-clicking the "File" column of the "userdata" row in **Step 3**.

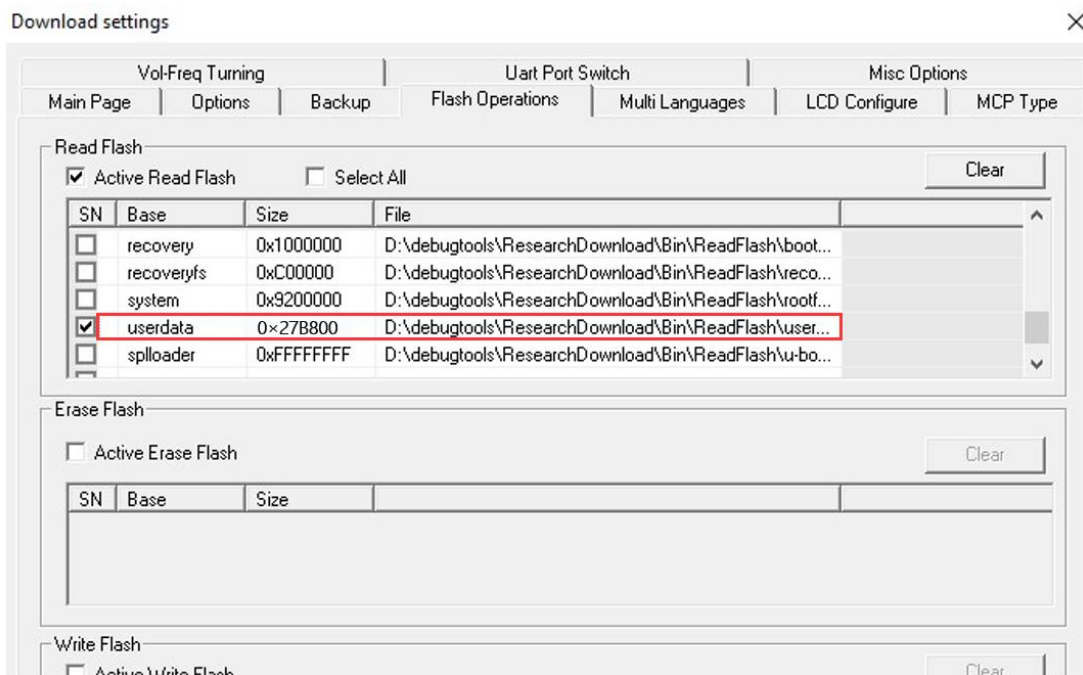


Figure 7: Generate *userdata* Image File

## 3.2 Reference for Partition Sizes

Table 2: Reference for Partition Sizes

Partition	Size	Size (Decimal)	Size (Hexadecimal)
<i>splloader</i>	256 KB	262144 bytes	0x40000 bytes
<i>sml</i>	768 KB	786432 bytes	0xC0000 bytes
<i>Uboot</i>	1.25 MB	1310720 bytes	0x140000 bytes
<i>userdata</i>	39.71875 MB	41648128 bytes	0x27B8000 bytes


### NOTE

1. Unlike other partitions, the size of the *userdata* partition is adjustable. You can execute **cat /sys/class/ubi/ubi0\_21/data\_bytes** to obtain the current size of the *userdata* partition.
2. The default size of the *userdata* partition is 41648128 bytes.

# 4 Backup Partition Download

You can download the image file of backup partition to another module as needed.

**Step 1:** Import the image firmware package in .pac format generated after backup.

Click  to open the image firmware package in .pac format generated after backup. ResearchDownload tool will automatically uncompress the .pac file to the *ResearchDownload\Bin\ImageFiles\* directory to generate the image file, as shown in the following figure.





















ResearchDownload > Bin > ImageFiles > _DownloadFiles64E0_9E7B9B0_0				
Name	Date modified	Type	Size	
 boot-sign.img	12/22/2023 11:22 AM	Disc Image File	13,278 KB	
 boot-sign.img(1)	12/22/2023 11:22 AM	IMG(1) File	13,278 KB	
 fdl1-sign.bin	12/22/2023 11:22 AM	BIN File	48 KB	
 fdl2-sign.bin	12/22/2023 11:22 AM	BIN File	523 KB	
 Orca_cm4_uart_as_ap_console.bin	12/22/2023 11:22 AM	BIN File	33 KB	
 Orca_NR_phy_NR_XC0_DSP-sign.bin	12/22/2023 11:22 AM	BIN File	511 KB	
 Orca_NR_phy_NR_XC1_DSP-sign.bin	12/22/2023 11:22 AM	BIN File	706 KB	
 Orca_PSCP_modem_CPE_lic_AGCP_DSP_...	12/22/2023 11:22 AM	BIN File	5,122 KB	
 Orca_PSCP_modem_CPE_lic_deltanv.bin	12/22/2023 11:22 AM	BIN File	64 KB	
 Orca_PSCP_modem_CPE_lic_nvitem.bin	12/22/2023 11:22 AM	BIN File	5,426 KB	
 recoveryfs.ubifs	12/22/2023 11:22 AM	UBIFS File	8,680 KB	
 rootfs.ubifs	12/22/2023 11:22 AM	UBIFS File	36,952 KB	
 SC9600_Orca_NR_phy_modem-sign.bin	12/22/2023 11:22 AM	BIN File	1,371 KB	
 SC9600_Orca_PSCP_modem_CPE_lic_mo...	12/22/2023 11:22 AM	DAT File	23,598 KB	
 SC9600_Orca_V3_phy_modem-sign.bin	12/22/2023 11:22 AM	BIN File	4,084 KB	
 sml-sign.bin	12/22/2023 11:22 AM	BIN File	53 KB	
 u-boot-sign.bin	12/22/2023 11:22 AM	BIN File	523 KB	
 u-boot-spl-16k-sign.bin	12/22/2023 11:22 AM	BIN File	50 KB	
 udx710-module.xml	12/22/2023 11:22 AM	XML File	38 KB	
 userdata_b128k_p2k.img	12/22/2023 11:22 AM	Disc Image File	3,720 KB	

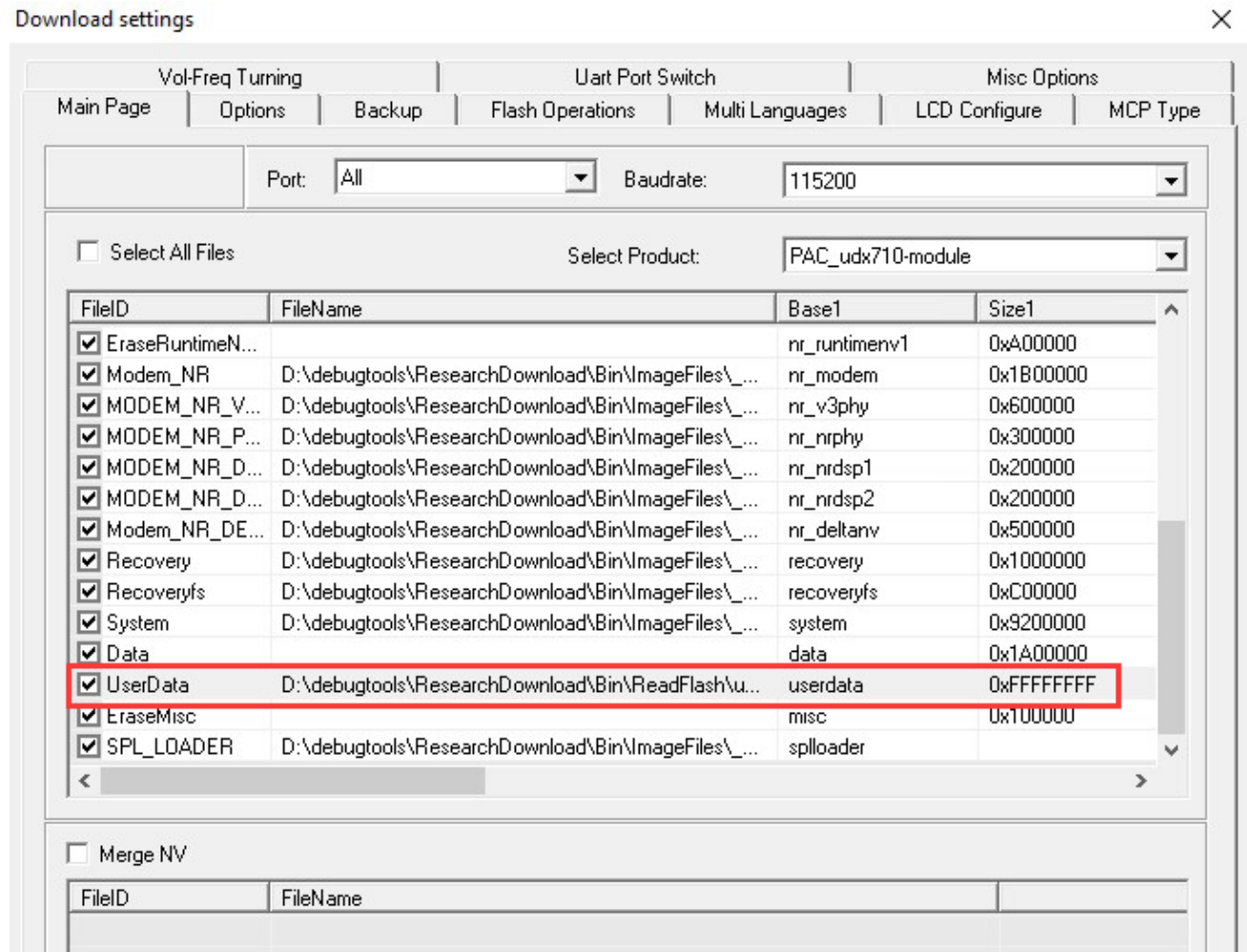
Figure 8: Image File in the .pac File

**Step 2:** Configure the image file to be downloaded.

Click  and select the "Main Page" tab in the "Download settings" pop-up window. On the "Main Page"



page, double-click the content in the "FileName" column of the "userdata" row and replace the content with the file path of the *userdata* partition image file that has been backed up in **Chapter 3.1, Step 6**, as shown in the following figure:



**Figure 9: Add the *userdata* Partition Image to the Download List**

**Step 3:** Start the download.

- 1) Before starting the download, you need to manually short the USB\_BOOT pin and press the "Reset" button on another specified module to make it enter the download mode. At this time, a USB download port will be displayed on the "Device Manager" page as shown below.

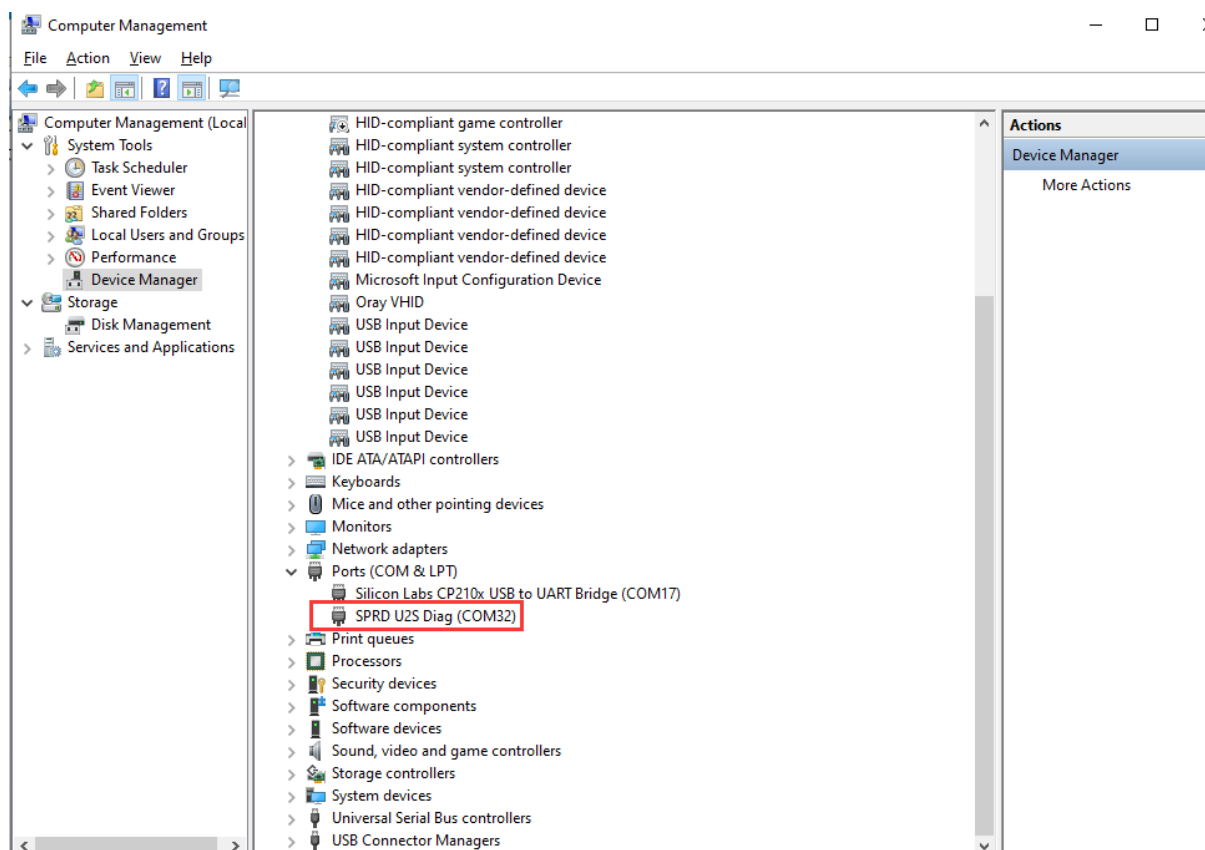



Figure 10: Enter Download Mode

- 2) Click , and the program will automatically detect and open the available port to start the download. The status window will display the progress of the download. "Downloading" indicates that the download is in progress.

15	Modem_NR_DSP1	Downloading...		39
----	---------------	----------------	--	----

Figure 11: Downloading

**Step 4:** Download completed.

After the download is completed, the "Progress" column displays the download result in different colors. "Passed" in green indicates a successful download, while "Failed" in red indicates a failed download, as shown below.

15	_Debug_	Finish	Passed	50
----	---------	--------	--------	----

Figure 12: Successful Download

15	FDL	Unplugged	Failed: User cancel	0s
----	-----	-----------	---------------------	----

**Figure 13: Failed Download**

**Step 5:** Stop the download

After the download is finished, click  before you exit the program.

# 5 Appendix References

**Table 3: Terms and Abbreviations**

Abbreviation	Description
LCD	Liquid Crystal Display
MCP	Multiple Chip Package
PC	Personal Computer
USB	Universal Serial Bus