



# **RGx00U&RM500U Series**

## **Partition Backup User Guide**

**5G Module Series**

Version: 1.0

Date: 2024-01-19

Status: Released



At Quectel, our aim is to provide timely and comprehensive services to our customers. If you require any assistance, please contact our headquarters:

**Quectel Wireless Solutions Co., Ltd.**

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China

Tel: +86 21 5108 6236

Email: [info@quectel.com](mailto:info@quectel.com)

**Or our local offices. For more information, please visit:**

<http://www.quectel.com/support/sales.htm>.

**For technical support, or to report documentation errors, please visit:**

<http://www.quectel.com/support/technical.htm>.

Or email us at: [support@quectel.com](mailto:support@quectel.com).

## Legal Notices

We offer information as a service to you. The provided information is based on your requirements and we make every effort to ensure its quality. You agree that you are responsible for using independent analysis and evaluation in designing intended products, and we provide reference designs for illustrative purposes only. Before using any hardware, software or service guided by this document, please read this notice carefully. Even though we employ commercially reasonable efforts to provide the best possible experience, you hereby acknowledge and agree that this document and related services hereunder are provided to you on an "as available" basis. We may revise or restate this document from time to time at our sole discretion without any prior notice to you.

## Use and Disclosure Restrictions

### License Agreements

Documents and information provided by us shall be kept confidential, unless specific permission is granted. They shall not be accessed or used for any purpose except as expressly provided herein.

### Copyright

Our and third-party products hereunder may contain copyrighted material. Such copyrighted material shall not be copied, reproduced, distributed, merged, published, translated, or modified without prior written consent. We and the third party have exclusive rights over copyrighted material. No license shall be granted or conveyed under any patents, copyrights, trademarks, or service mark rights. To avoid ambiguities, purchasing in any form cannot be deemed as granting a license other than the normal non-exclusive, royalty-free license to use the material. We reserve the right to take legal action for noncompliance with abovementioned requirements, unauthorized use, or other illegal or malicious use of the material.

## Trademarks

Except as otherwise set forth herein, nothing in this document shall be construed as conferring any rights to use any trademark, trade name or name, abbreviation, or counterfeit product thereof owned by Quectel or any third party in advertising, publicity, or other aspects.

## Third-Party Rights

This document may refer to hardware, software and/or documentation owned by one or more third parties ("third-party materials"). Use of such third-party materials shall be governed by all restrictions and obligations applicable thereto.

We make no warranty or representation, either express or implied, regarding the third-party materials, including but not limited to any implied or statutory, warranties of merchantability or fitness for a particular purpose, quiet enjoyment, system integration, information accuracy, and non-infringement of any third-party intellectual property rights with regard to the licensed technology or use thereof. Nothing herein constitutes a representation or warranty by us to either develop, enhance, modify, distribute, market, sell, offer for sale, or otherwise maintain production of any our products or any other hardware, software, device, tool, information, or product. We moreover disclaim any and all warranties arising from the course of dealing or usage of trade.

## Privacy Policy

To implement module functionality, certain device data are uploaded to Quectel's or third-party's servers, including carriers, chipset suppliers or customer-designated servers. Quectel, strictly abiding by the relevant laws and regulations, shall retain, use, disclose or otherwise process relevant data for the purpose of performing the service only or as permitted by applicable laws. Before data interaction with third parties, please be informed of their privacy and data security policy.

## Disclaimer

- a) We acknowledge no liability for any injury or damage arising from the reliance upon the information.
- b) We shall bear no liability resulting from any inaccuracies or omissions, or from the use of the information contained herein.
- c) While we have made every effort to ensure that the functions and features under development are free from errors, it is possible that they could contain errors, inaccuracies, and omissions. Unless otherwise provided by valid agreement, we make no warranties of any kind, either implied or express, and exclude all liability for any loss or damage suffered in connection with the use of features and functions under development, to the maximum extent permitted by law, regardless of whether such loss or damage may have been foreseeable.
- d) We are not responsible for the accessibility, safety, accuracy, availability, legality, or completeness of information, advertising, commercial offers, products, services, and materials on third-party websites and third-party resources.

**Copyright © Quectel Wireless Solutions Co., Ltd. 2024. All rights reserved.**

# About the Document

## Revision History

Version	Date	Author	Description
-	2023-12-29	Achang ZHANG/ Jeffery JIANG	Creation of the document
1.0	2024-01-19	Achang ZHANG/ Jeffery JIANG	First official release

## Contents

<b>About the Document</b> .....	3
<b>Contents</b> .....	4
<b>Table Index</b> .....	5
<b>Figure Index</b> .....	6
<b>1</b> <b>Introduction</b> .....	7
<b>2</b> <b>ResearchDownload Tool Introduction</b> .....	8
<b>3</b> <b>Partition Backup</b> .....	10
3.1    Backup Procedures.....	10
3.2    Reference for Partition Sizes .....	14
<b>4</b> <b>Backup Partition Download</b> .....	15
<b>5</b> <b>Appendix References</b> .....	19

## Table Index

Table 1: Toolbar Icons .....	9
Table 2: Reference for Partition Sizes.....	14
Table 3: Terms and Abbreviations .....	19

## Figure Index

Figure 1: Main Interface .....	8
Figure 2: Original File in the.pac File .....	10
Figure 3: Cancel Partition Download .....	11
Figure 4: Select the Partition to Be Read.....	12
Figure 5: Partition Backup in Progress .....	13
Figure 6: Partition Backup Completed .....	13
Figure 7: Generate <i>userdata</i> Image File.....	13
Figure 8: Image File in the .pac File.....	15
Figure 9: Add the <i>userdata</i> Partition Image to the Download List .....	16
Figure 10: Enter Download Mode .....	17
Figure 11: Downloading.....	17
Figure 12: Successful Download .....	17
Figure 13: Failed Download .....	18

# 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.

## 2 ResearchDownload Tool Introduction

This chapter introduces the functions of each icon in ResearchDownload tool. After opening *ResearchDownload.exe*, the main interface of the program is shown in the following figure.

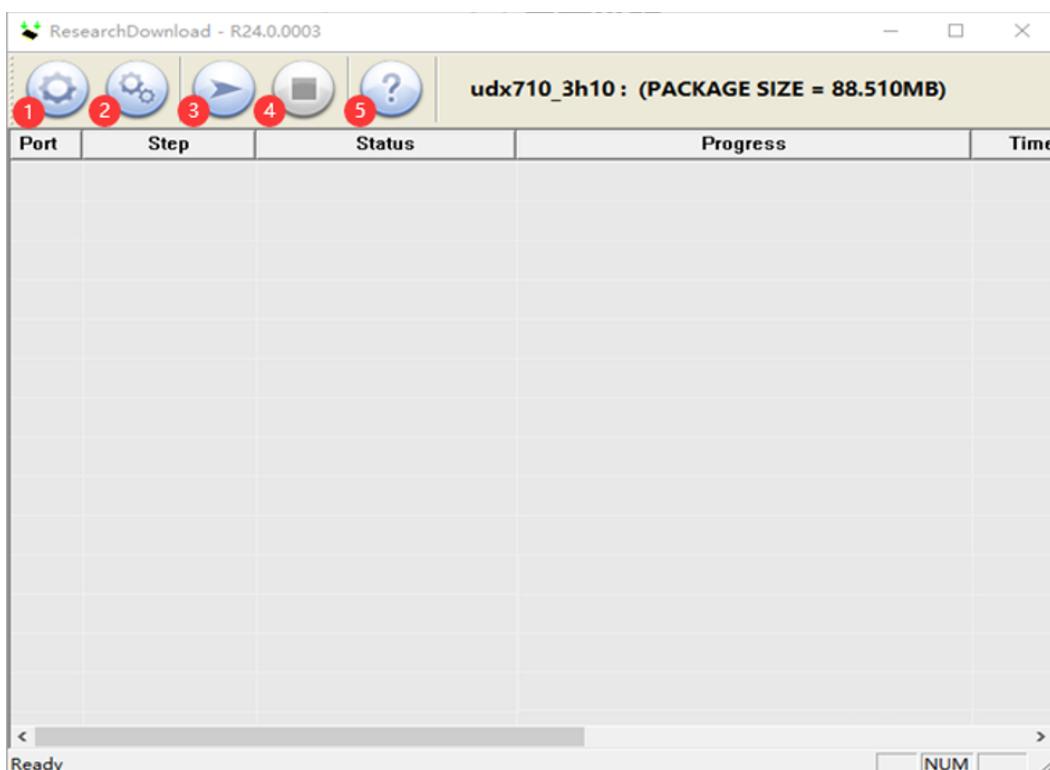


Figure 1: Main Interface

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.

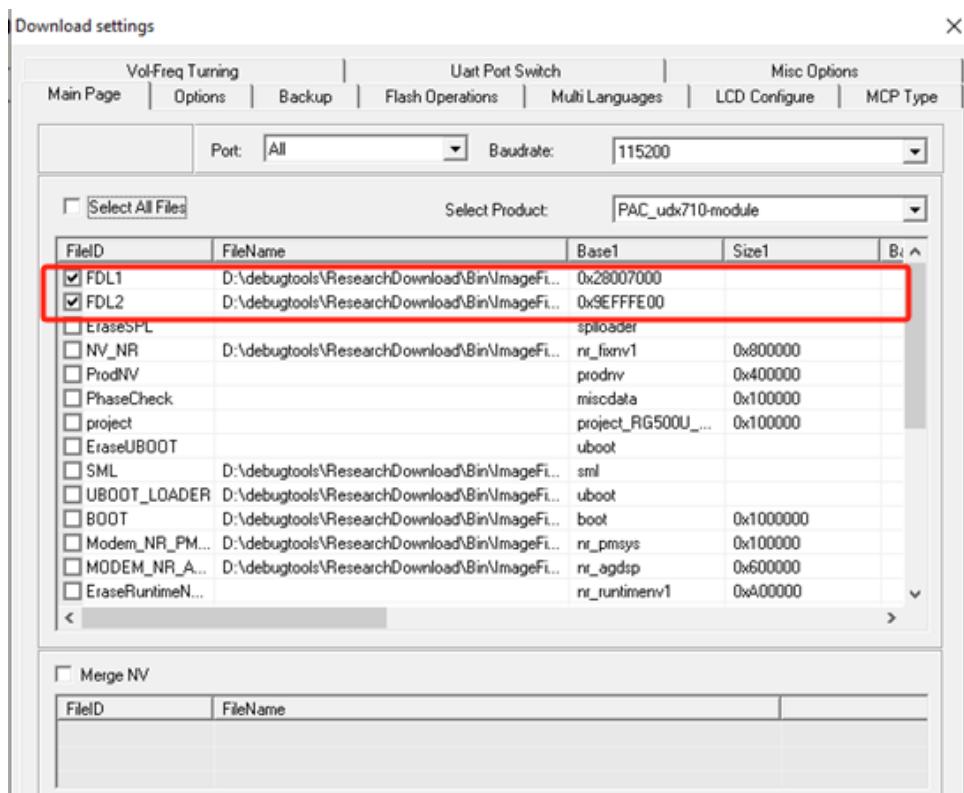


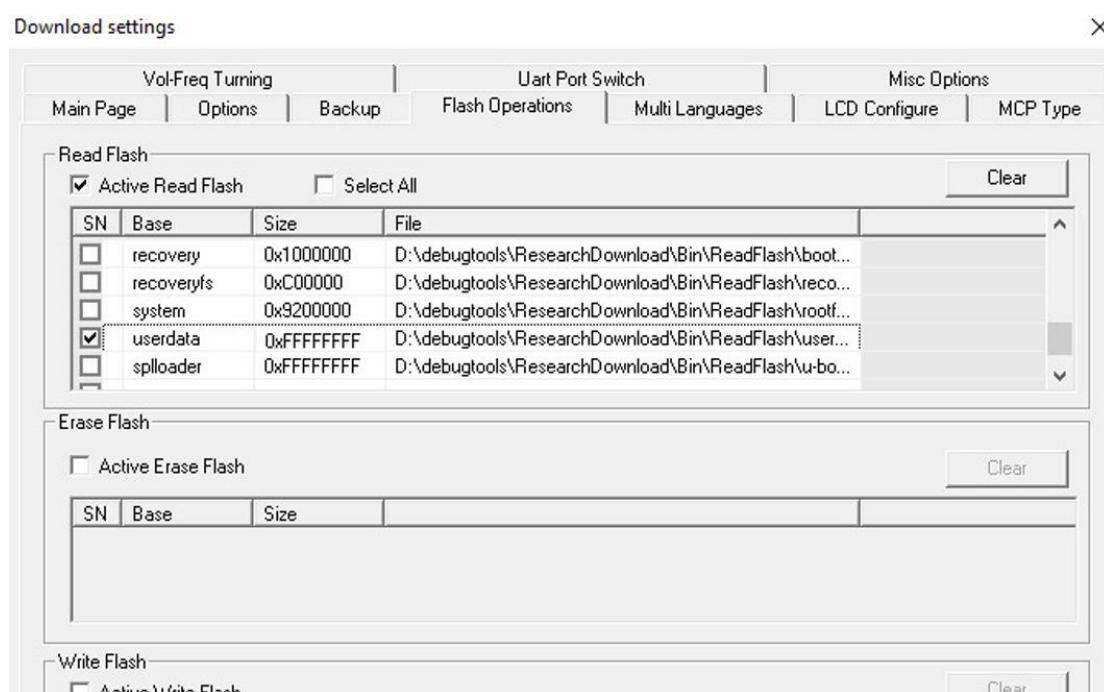
Figure 3: Cancel Partition Download

**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.

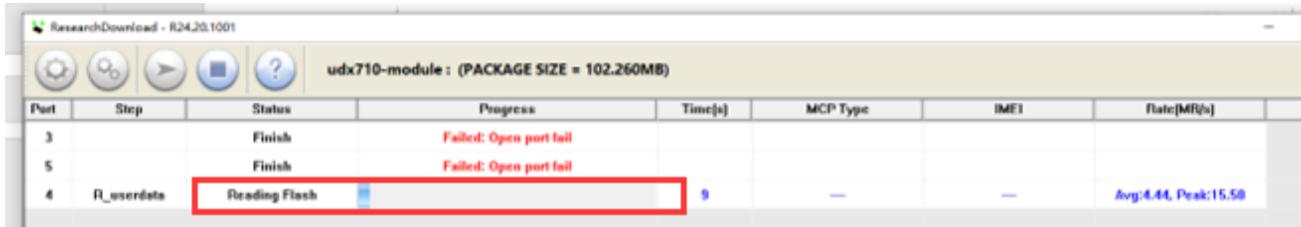
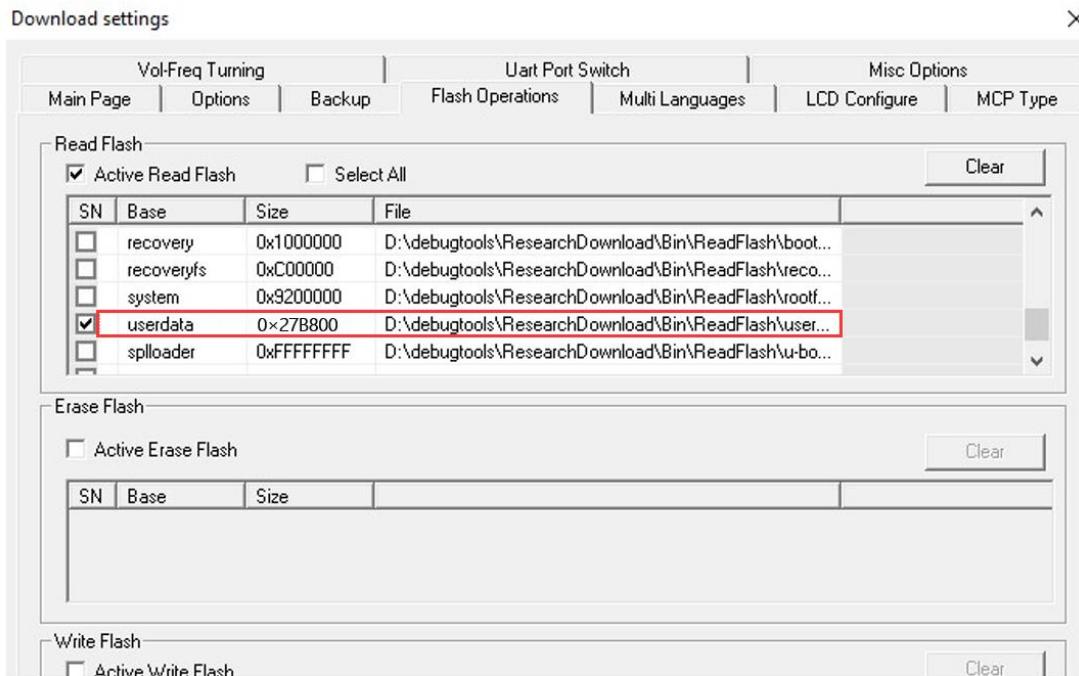


Figure 5: Partition Backup in Progress



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.

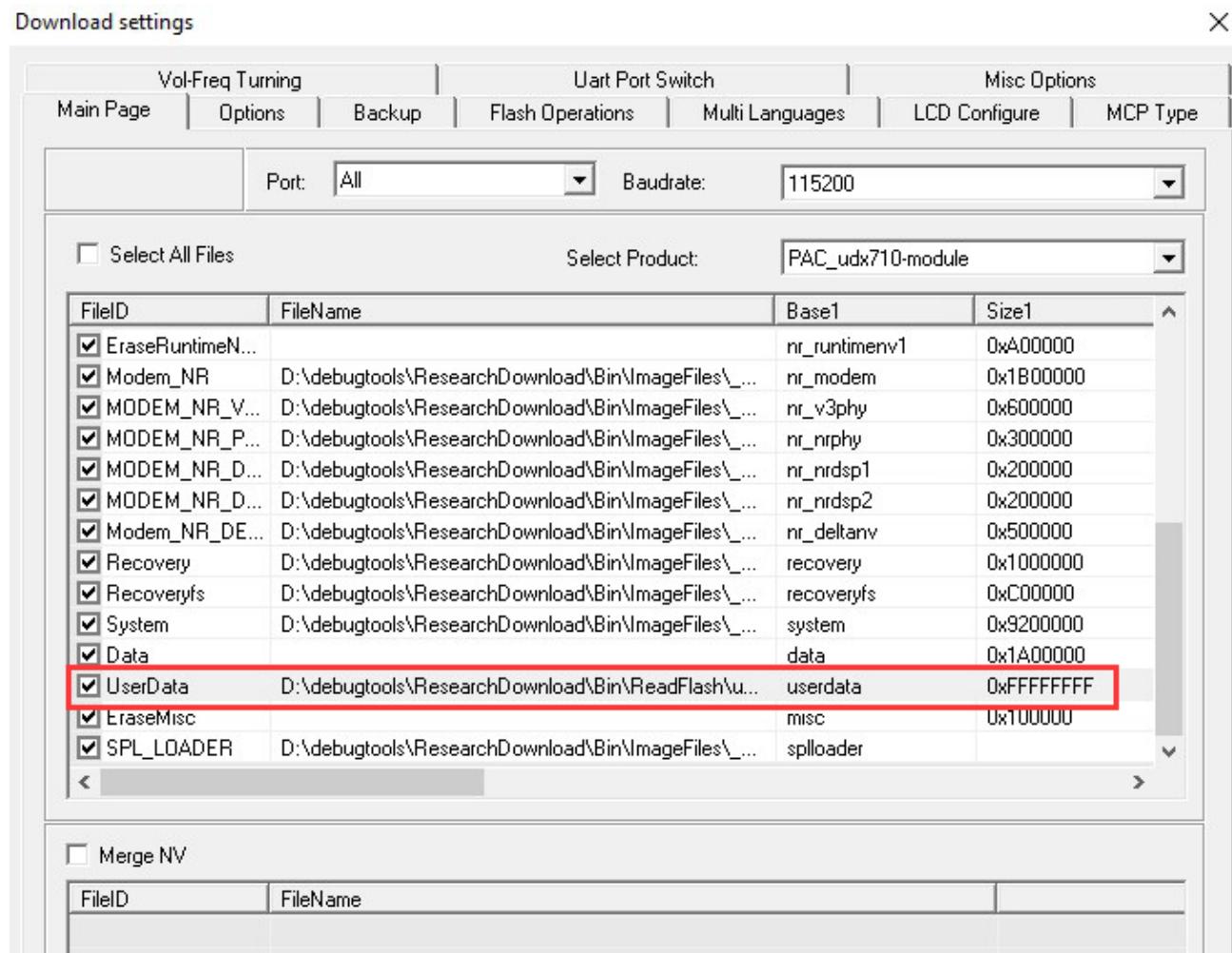
ResearchDownload > Bin > ImageFiles > _DownloadFiles64E0_9E7B9B0_0				
Name	Date modified	Type	Size	
boot-sign.img	12/22/2023 11:22 AM	Disc Image File	13,278 KB	
boot-sign.img(1)	12/22/2023 11:22 AM	IMG(1) File	13,278 KB	
fdl1-sign.bin	12/22/2023 11:22 AM	BIN File	48 KB	
fdl2-sign.bin	12/22/2023 11:22 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.

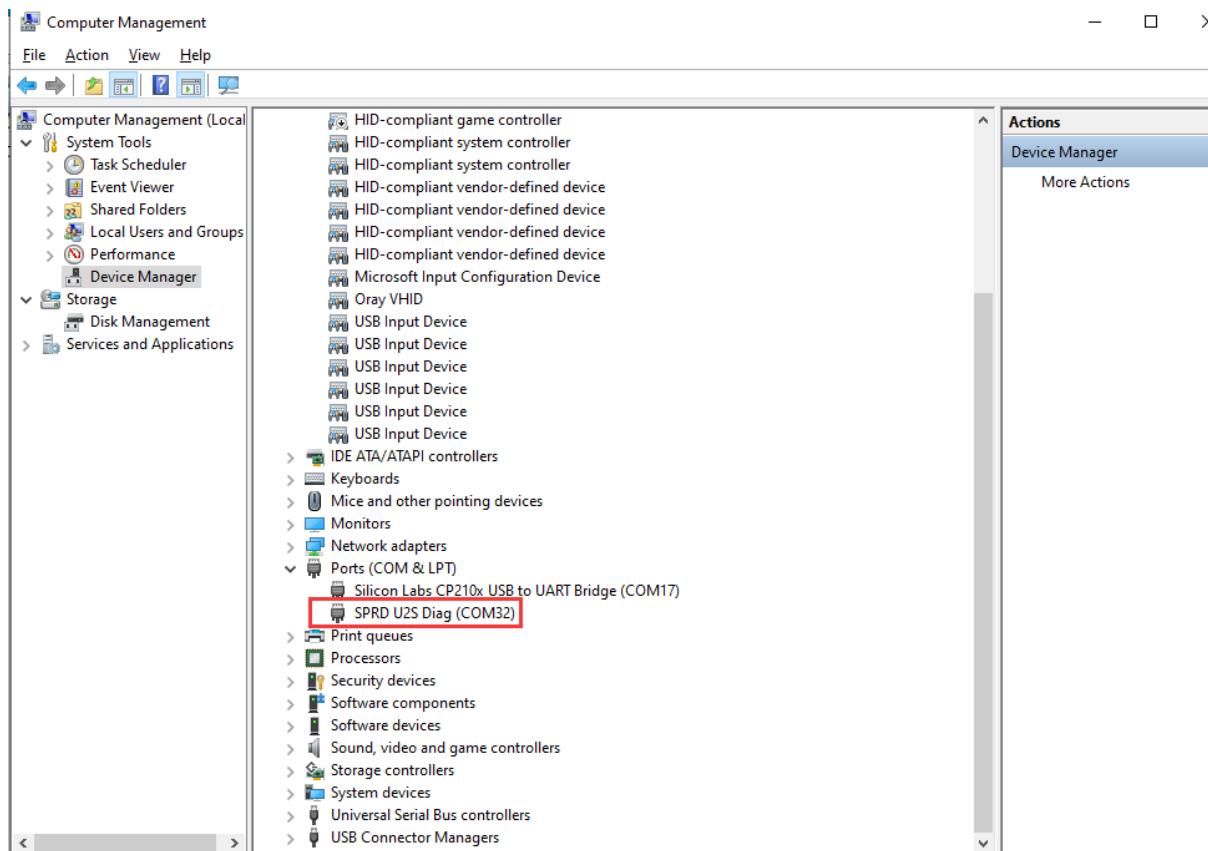


Figure 10: Enter Download Mode

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