

# RG50xQ&RM5xxQ Series FILE Application Note

**5G Module Series**

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# About the Document

## Revision History

Version	Date	Author	Description
-	2022-02-10	Monan TIAN	Creation of the document
1.0	2022-06-13	Monan TIAN	First official release

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# 1 Introduction

Quectel RG50xQ series and RM5xxQ series modules support AT commands to manipulate files on different physical storage mediums. This document is a reference guide to these commands.

The modules support the following storage mediums:

- **UFS:** User File Storage directory. It is a special directory on the flash file system.
- **SD:** SD card directory (only supported by RG50xQ series modules).

## NOTES

The file name indicates the storage location. When the file name begins with "UFS:" or with no prefix, it means that the file is stored in UFS. When the file name begins with "SD:", it means that the file is stored in SD card.

## 1.1. Applicable Modules

**Table 1: Applicable Modules**

Module Series	Module
RG50xQ	RG500Q Series
	RG501Q-EU
	RG502Q Series
RM5xxQ	RM500Q Series
	RM502Q-AE
	RM510Q-GL
	RM505Q-AE

## 1.2. Process of Using FILE AT Commands

The general procedure for uploading/downloading, opening/creating, reading and writing to a file in the storage:

1. Upload a file to the storage with **AT+QFUPL**, and output/download it through the serial interface with **AT+QFDWL**.
2. Open the file with **AT+QFOPEN**. Once the file is opened, you can write to it or read from it any time and from any location until the file is closed with **AT+QFCLOSE**.
  - When opening a file with **AT+QFOPEN**, you can set the file to overwrite mode, read-only mode or other mode with **<mode>** (For more information about **<mode>**, see **Chapter 2.3.6**). After opening the file, **<filehandle>** is assigned to it so that various file operations can be carried out.
  - After opening the file, write the data to the file with **AT+QFWRITE** and read the data with **AT+QFREAD** from the current file pointer position.
  - Set the file pointer position with **AT+QFSEEK** and query the current file pointer position with **AT+QFPOSITION**.
  - Close the file with **AT+QFCLOSE**, after which the **<filehandle>** turns invalid.

Use the following commands to manage files on the storage medium:

1. **AT+QFLDS** Get the space information of the storage medium.
2. **AT+QFLST** List the file information in the storage medium.
3. **AT+QFDEL** Delete the file(s) in the storage medium.

### NOTE

The file handle obtained after executing **AT+QFOPEN** must be closed with **AT+QFCLOSE** after the operation is completed, otherwise the file handle will be leaked.

## 1.3. Description of Data Mode

The COM port of RG50xQ series and RM5xxQ series modules has two working modes: AT command mode and data mode. In AT command mode, the data inputted via COM port will be treated as AT commands; while in data mode, they will be treated as data.

- **Enter Data Mode**

Execute **AT+QFUPL**, **AT+QFDWL**, **AT+QFREAD** or **AT+QFWRITE** to enter the data mode. If you input **+++** to make the port exit the data mode, the execution of these commands will be interrupted before the response is returned. In such a case, the COM port cannot re-enter the data mode if you execute **ATO**.



- **Exit Data Mode**

Input **+++** to make the COM port exit the data mode. To prevent the **+++** from being misinterpreted as data, the following sequence should be followed:

- 1) Do not input any character for at least 1 second before inputting **+++**.
- 2) Finish inputting **+++** within 1 second, during which no other character shall be inputted. Wait until **OK** is returned, and once **OK** is returned, the COM port exits the data mode and switches to AT command mode.

# 2 Description of FILE AT Commands

## 2.1. AT Command Introduction

### 2.1.1. Definitions

- **<CR>** Carriage return character.
- **<LF>** Line feed character.
- **<...>** Parameter name. Angle brackets do not appear on command line.
- **[...]** Optional parameter of a command or an optional part of TA information response. Square brackets do not appear on command line. When an optional parameter is omitted, the new value equals its previous value or its default setting, unless otherwise specified.
- **Underline** Default setting of a parameter.

### 2.1.2. AT Command Syntax

All command lines must start with **AT** or **at** and end with **<CR>**. Information responses and result codes always start and end with a carriage return character and a line feed character: **<CR><LF><response><CR><LF>**. In tables presenting commands and responses throughout this document, only the commands and responses are presented, and **<CR>** and **<LF>** are deliberately omitted.

**Table 2: Type of AT Commands**

Command Type	Syntax	Description
Test Command	<b>AT+&lt;cmd&gt;=?</b>	Test the existence of the corresponding command and return information about the type, value, or range of its parameter.
Read Command	<b>AT+&lt;cmd&gt;?</b>	Check the current parameter value of the corresponding command.
Write Command	<b>AT+&lt;cmd&gt;=&lt;p1&gt;[,&lt;p2&gt;[,&lt;p3&gt;[...]]]</b>	Set user-definable parameter value.
Execution Command	<b>AT+&lt;cmd&gt;</b>	Return a specific information parameter or perform a specific action.

## 2.2. Declaration of AT Command Examples

The AT command examples in this document are provided to help you learn about the use of the AT commands introduced herein. The examples, however, should not be taken as Quectel's recommendations or suggestions about how to design a program flow or what status to set the module into. Sometimes multiple examples may be provided for one AT command. However, this does not mean that there is a correlation among these examples, or that they should be executed in a given sequence.

## 2.3. AT Command Description

### 2.3.1. AT+QFLDS Get Space Information of Storage Medium

This command gets the space information of the specified storage medium.

<b>AT+QFLDS Get Space Information of Storage Medium</b>	
Test Command <b>AT+QFLDS=?</b>	Response <b>OK</b>
Write Command <b>AT+QFLDS=&lt;name_pattern&gt;</b>	Response <b>+QFLDS: &lt;free_size&gt;,&lt;total_size&gt;</b>  <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>
Execution Command <b>AT+QFLDS</b>	Response Return the UFS information: <b>+QFLDS: &lt;UFS_file_size&gt;,&lt;UFS_file_number&gt;</b>  <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately; The configurations will not be saved.

#### Parameter

<b>&lt;name_pattern&gt;</b>	String type. Storage medium type. "UFS" UFS
-----------------------------	--

	"SD" SD card
<free_size>	Integer type. Free space size of <name_pattern>. Unit: byte.
<total_size>	Integer type. Total space size of <name_pattern>. Unit: byte.
<UFS_file_size>	Integer type. Size of all files in UFS. Unit: byte.
<UFS_file_number>	Integer type. Number of files in UFS.
<err>	Integer type. Error code. See <b>Chapter 4</b> for details.

**Example**

```

AT+QFLDS="UFS" //Query the space information of UFS.
+QFLDS: 578847,917503

OK
AT+QFLDS="SD" //Query the space information of SD card.
+QFLDS: 251920384,253132800

OK
    
```

**2.3.2. AT+QFLST List File Information on Storage Medium**

This command lists the information of a single file or all files on the specified storage medium.

AT+QFLST List File Information on Storage Medium	
Test Command <b>AT+QFLST=?</b>	Response <b>OK</b>
Write Command <b>AT+QFLST=&lt;name_pattern&gt;</b>	Response <b>+QFLST: &lt;filename&gt;,&lt;file_size&gt;</b> <b>[+QFLST: &lt;filename&gt;,&lt;file_size&gt;</b> <b>[...]]</b>  <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>
Execution Command <b>AT+QFLST</b>	Response Return the information of the UFS files: <b>+QFLST: &lt;filename&gt;,&lt;file_size&gt;</b> <b>[+QFLST: &lt;filename&gt;,&lt;file_size&gt;</b> <b>[...]]</b>  <b>OK</b>  If there is an error related to ME functionality:

	<b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately; The configurations will not be saved.

**Parameter**

<b>&lt;name_pattern&gt;</b>	String type. File(s) to be listed. "*" All files in UFS "<filename>" Specified file <filename> in UFS "UFS:*" All files in UFS "UFS:<filename>" Specified file <filename> in UFS "SD:*" All files on SD card "SD:<filename>" Specified file <filename> in SD card
<b>&lt;filename&gt;</b>	String type. File name. Max. length: 80 bytes.
<b>&lt;file_size&gt;</b>	Integer type. File size. Unit: byte.
<b>&lt;err&gt;</b>	Integer type. Error code. See <b>Chapter 4</b> for details.

**Example**

```

AT+QFLST="" //List all files in UFS.
+QFLST: "UFS:1k.txt",1024
+QFLST: "UFS:2k.txt",2048
+QFLST: "UFS:3k.txt",3072

OK
AT+QFLST="SD:*" //List all files on SD card.
+QFLST: "SD:1k.txt",1024
+QFLST: "SD:10k.txt",10240
+QFLST: "SD:100k.txt",102400

OK
    
```

**NOTE**

**AT+QFLST** queries the actual size of the file currently stored in flash. After the data is written in with **AT+QFWRITE**, if you fail to query the file size by executing **AT+QFLST**, please close the file with **AT+QFCLOSE** before another query.

### 2.3.3. AT+QFDEL Delete File(s) on Storage Medium

This command deletes a single file or all the files on the specified storage medium.

AT+QFDEL Delete File(s) on Storage Medium	
Test Command <b>AT+QFDEL=?</b>	Response <b>+QFDEL: &lt;filename&gt;</b>  <b>OK</b>
Write Command <b>AT+QFDEL=&lt;filename&gt;</b>	Response <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately; The configurations will not be saved.

#### Parameter

<b>&lt;filename&gt;</b>	String type. Name of file to be deleted. Max. length: 80 bytes. "*" Delete all files in UFS (do not delete the directory) "<filename>" Delete the specified file <filename> in UFS "UFS:*" Delete all files in UFS (do not delete the directory) "UFS:<filename>" Delete the specified file <filename> in UFS "SD:*" Delete all files on SD card (do not delete the directory) "SD:<filename>" Delete the specified file <filename> in SD card
<b>&lt;err&gt;</b>	Integer type. Error code. See <b>Chapter 4</b> for details.

#### Example

```

AT+QFDEL="*" //Delete all files in UFS (do not delete the directory).
OK
AT+QFDEL="UFS:1.txt" //Delete the file 1.txt in UFS.
OK
AT+QFDEL="SD:*" //Delete all files on SD card (do not delete the directory).
OK
    
```

### 2.3.4. AT+QFUPL Upload File to Storage Medium

This command uploads a file to a storage medium. If any file on the storage medium has the same name as the file to be uploaded, an error will be reported.

After the Write Command is executed and **CONNECT** returned, the module will switch to data mode. When the uploaded data reach **<file\_size>**, or if no data are inputted when **<timeout>** is reached, the module will exit data mode automatically. During data transmission, you can send "+++" to make the module exit data mode. For more details, see **Chapter 1.3**.

<b>AT+QFUPL Upload File to Storage Medium</b>	
Test Command <b>AT+QFUPL=?</b>	Response <b>+QFUPL: &lt;filename&gt;,(1-&lt;free_size&gt;),(range of supported &lt;timeout&gt;s),(list of supported &lt;ackmode&gt;s)</b>  <b>OK</b>
Write Command <b>AT+QFUPL=&lt;filename&gt;[,&lt;file_size&gt;[,&lt;timeout&gt;[,&lt;ackmode&gt;]]]</b>	Response <b>CONNECT</b> TA switches to the data mode (transparent transmission mode), so the binary data of the file can be inputted. When the total size of the inputted data reaches <b>&lt;file_size&gt;</b> or TA receives <b>+++</b> , TA will return to command mode and report the following code: <b>+QFUPL: &lt;upload_size&gt;,&lt;checksum&gt;</b>  <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately; The configurations will not be saved.

**Parameter**

<b>&lt;free_size&gt;</b>	Integer type. Free space size of <b>&lt;name_pattern&gt;</b> . See <b>Chapter 2.3.1</b> for more details.
<b>&lt;filename&gt;</b>	String type. Name of file to be uploaded. Max. length: 80 bytes. <b>"&lt;filename&gt;"</b> Name of file to be uploaded to UFS <b>"UFS:&lt;filename&gt;"</b> Name of file to be uploaded to UFS <b>"SD:&lt;filename&gt;"</b> Name of file to be uploaded to SD card
<b>&lt;file_size&gt;</b>	Integer type. File size expected to be uploaded. Default: 10240. Unit: byte. Maximum length is not greater than <b>&lt;freesize&gt;</b> .
<b>&lt;upload_size&gt;</b>	Integer type. Actual size of uploaded data. Unit: byte.
<b>&lt;timeout&gt;</b>	Integer type. Waiting time for inputting data to USB/UART. Range: 1–65535. Default: 5. Unit: s.
<b>&lt;ackmode&gt;</b>	Integer type. Indicates whether to use ACK mode. <b>0</b> Turn off the ACK mode by default

	1	Turn on the ACK mode
<checksum>		Integer type. Checksum of uploaded data.
<err>		Integer type. Error code. See <b>Chapter 4</b> for details.

**NOTE**

1. It is strongly recommended to use DOS 8.3 file name format for <filename>.
2. <checksum> is a 16-bit checksum based on bitwise Exclusive-OR (XOR). When the inputted data is odd byte size, the XOR operator sets the last inputted byte as the upper 8 bits, and sets the lower 8 bits as 0. The checksum verifies if the data have been uploaded correctly. Inputting +++ will make the TA end the data transmission and switch to command mode. However, the previously uploaded data will be preserved in the file.
3. When executing the command, the data must be inputted after **CONNECT** is returned.
4. The ACK mode is a safeguard against data loss when uploading large files, if hardware flow control does not work. The ACK mode works as follows:
  - 1) Run **AT+QFUPL=<filename>,<file\_size>,<timeout>,1** to enable the ACK mode.
  - 2) The module outputs **CONNECT**.
  - 3) MCU sends 1 KB of data, to which the module responds with an **A**.
  - 4) MCU receives the **A** and then sends the next 1 KB of data.
  - 5) Steps 3) and 4) are repeated until the transfer is completed.
 For an example of ACK mode use, see **Chapter 3.1.1.2**.

**2.3.5. AT+QFDWL Download File from Storage Medium**

This command downloads a specified file from the storage medium.

AT+QFDWL Download File from Storage Medium	
Test Command <b>AT+QFDWL=?</b>	Response <b>+QFDWL: &lt;filename&gt;</b>  <b>OK</b>
Write Command <b>AT+QFDWL=&lt;filename&gt;</b>	Response <b>CONNECT</b> TA switches to data mode, so the binary data of the file can be outputted. When the content of the file is read or the TA receives +++, the TA will return to command mode and report the following code: <b>+QFDWL: &lt;download_size&gt;,&lt;checksum&gt;</b>  <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>



Maximum Response Time	300 ms
Characteristics	The command takes effect immediately; The configurations will not be saved.

**Parameter**

<b>&lt;filename&gt;</b>	String type. Name of file to be downloaded. Max. length: 80 bytes. "<filename>" Name of UFS file to be downloaded "UFS:<filename>" Name of UFS file to be downloaded "SD: <filename>" Name of SD file to be downloaded
<b>&lt;download_size&gt;</b>	Integer type. Size of downloaded data.
<b>&lt;checksum&gt;</b>	Integer type. Checksum of downloaded data.
<b>&lt;err&gt;</b>	Integer type. Error code. See <b>Chapter 4</b> for details.

**NOTE**

1. Inputting +++ will cause the TA to end the data transmission and switch to command mode.
2. <checksum> is a 16-bit checksum based on bitwise XOR.

**2.3.6. AT+QFOPEN Open a File**

This command opens a file and gets the file handle to be used in commands such as **AT+QFREAD**, **AT+QFWRITE**, **AT+QFSEEK**, **AT+QFPOSITION** and **AT+QFCLOSE**.

<b>AT+QFOPEN Open a File</b>	
Test Command <b>AT+QFOPEN=?</b>	Response <b>+QFOPEN: &lt;filename&gt;,(range of supported &lt;mode&gt;s)</b>  <b>OK</b>
Read Command <b>AT+QFOPEN?</b>	Response <b>+QFOPEN: &lt;filename&gt;,&lt;filehandle&gt;,&lt;mode&gt;</b> <b>[+QFOPEN: &lt;filename&gt;,&lt;filehandle&gt;,&lt;mode&gt;</b> <b>[...]]</b>  <b>OK</b>
Write Command <b>AT+QFOPEN=&lt;filename&gt;[,&lt;mode&gt;]</b>	Response <b>+QFOPEN: &lt;filehandle&gt;</b>  <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>

Maximum Response Time	300 ms
Characteristics	The command takes effect immediately; The configurations will not be saved.

**Parameter**

<b>&lt;filename&gt;</b>	String type. Name of file to be opened. Max. length: 80 bytes. "<filename>" Name of file to be opened "UFS:<filename>" Name of UFS file to be opened "SD: <filename>" Name of SD file to be opened
<b>&lt;filehandle&gt;</b>	Integer type. Handle of the file to be used.
<b>&lt;mode&gt;</b>	Integer type. File opening mode. 0 If the file does not exist, it will be created. If the file exists, it will be opened directly. In both cases, the file can be read and written to. 1 If the file does not exist, it will be created. If the file exists, it will be cleared and overwritten. In both cases, the file can be read and written to. 2 If the file exists, it is opened directly as a read-only file. Otherwise, an error is returned.
<b>&lt;err&gt;</b>	Integer type. Error code. See <b>Chapter 4</b> for details.

**2.3.7. AT+QFREAD Read a File**

This command reads the data of a file specified by the file handle. The data start from the current position of the file pointer that belongs to the file handle.

<b>AT+QFREAD Read a File</b>	
Test Command <b>AT+QFREAD=?</b>	Response <b>+QFREAD: &lt;filehandle&gt;,&lt;length&gt;</b>  <b>OK</b>
Write Command <b>AT+QFREAD=&lt;filehandle&gt;[,&lt;length&gt;]</b>	Response <b>CONNECT &lt;read_length&gt;</b> TA switches to data mode. When the total size of the data reaches <length> or TA receives <b>+++</b> , TA will return to command mode, display the result, and then report the following code: <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms

Characteristics	The command takes effect immediately; The configurations will not be saved.
-----------------	--

**Parameter**

<filehandle>	Integer type. Handle of file to be read.
<length>	Integer type. Expected length of file to be read. Default length: 10 KB. If file length is less than 10 KB, the actual length of the file will be read. Unit: byte.
<read_length>	Integer type. Actual read length. Unit: byte.
<err>	Integer type. Error code. See <b>Chapter 4</b> for details.

**2.3.8. AT+QFWRITE Write into a File**

This command writes data into a file. The data starts from the current position of the file pointer that belongs to the file handle.

AT+QFWRITE Write into a File	
Test Command <b>AT+QFWRITE=?</b>	Response <b>+QFWRITE: &lt;filehandle&gt;,&lt;length&gt;,&lt;timeout&gt;</b>  <b>OK</b>
Write Command <b>AT+QFWRITE=&lt;filehandle&gt;[,&lt;length&gt;[,&lt;timeout&gt;]]</b>	Response <b>CONNECT</b> TA switches to data mode. When the total size of the written data reaches <b>&lt;length&gt;</b> , TA receives <b>+++</b> or the time reaches <b>&lt;timeout&gt;</b> , TA will return to command mode and report the following code: <b>+QFWRITE: &lt;written_length&gt;,&lt;total_length&gt;</b>  <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately; The configurations will not be saved.

**Parameter**

<filehandle>	Integer type. Handle of file which data are written into.
<length>	Integer type. Length of the file which data are written into. Default length:10 KB. Maximum value of this parameter is determined by <b>&lt;free_size&gt;</b> of <b>AT+QFUPL</b> .

	Unit: byte.
<timeout>	Integer type. Waiting time for inputting data to USB/UART. Default: 5. Unit: s.
<written_length>	Integer type. Actual written length. Unit: byte.
<total_length>	Integer type. Total length of the file. Unit: byte.
<err>	Integer type. Error code. See <b>Chapter 4</b> for details.

### 2.3.9. AT+QFSEEK Set File Pointer to Specified Position

This command sets a file pointer to the specified position. This will decide the starting position of commands such as **AT+QFREAD**, **AT+QFWRITE** and **AT+QFPOSITION**.

<b>AT+QFSEEK Set File Pointer to Specified Position</b>	
Test Command <b>AT+QFSEEK=?</b>	Response <b>+QFSEEK: &lt;filehandle&gt;,&lt;offset&gt;,&lt;position&gt;</b>  <b>OK</b>
Write Command <b>AT+QFSEEK=&lt;filehandle&gt;,&lt;offset&gt;[,&lt;position&gt;]</b>	Response <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately; The configurations will not be saved.

#### Parameter

<filehandle>	Integer type. Handle of file to be utilized.
<offset>	Integer type. Number of bytes of file pointer movement.
<position>	Integer type. Pointer movement mode. <ul style="list-style-type: none"> <li><u>0</u> Move backward from the beginning of the file</li> <li>1 Move backward from the current position of the pointer</li> <li>2 Move forward from the end of the file</li> </ul>
<err>	Integer type. Error code. See <b>Chapter 4</b> for details.

**NOTE**

If the final position of the pointer set exceeds the file size, executing this command will return **ERROR**.

### 2.3.10. AT+QFPOSITION Get Offset of File Pointer

This command gets the offset of a file pointer from the beginning of the file.

<b>AT+QFPOSITION Get Offset of File Pointer</b>	
Test Command <b>AT+QFPOSITION=?</b>	Response <b>+QFPOSITION: &lt;filehandle&gt;</b>  <b>OK</b>
Write Command <b>AT+QFPOSITION=&lt;filehandle&gt;</b>	Response <b>+QFPOSITION: &lt;offset&gt;</b>  <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately; The configurations will not be saved.

#### Parameter

<b>&lt;filehandle&gt;</b>	Integer type. Handle of the file to be utilized.
<b>&lt;offset&gt;</b>	Integer type. Offset from the beginning of file.
<b>&lt;err&gt;</b>	Integer type. Error code. See <b>Chapter 4</b> for details.

### 2.3.11. AT+QFCLOSE Close a File

This command closes a file and ends all file operations. After that, the file handle is released and should not be used again, unless the file is re-opened with **AT+QFOPEN**.

<b>AT+QFCLOSE Close a File</b>	
Test Command <b>AT+QFCLOSE=?</b>	Response <b>+QFCLOSE: &lt;filehandle&gt;</b>  <b>OK</b>
Write Command <b>AT+QFCLOSE=&lt;filehandle&gt;</b>	Response <b>OK</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms

**Characteristics**

The command takes effect immediately;  
The configurations will not be saved.

---

**Parameter**

---

<b>&lt;filehandle&gt;</b>	Integer type. Handle of file to be utilized.
<b>&lt;err&gt;</b>	Integer type. Error code. See <b>Chapter 4</b> for details.

---

# 3 Examples

## 3.1. Upload and Download Files

### 3.1.1. Upload a File

#### 3.1.1.1. Non-ACK Mode

```

AT+QFUPL="test1.txt",10 //Upload the text file test1.txt to UFS.
CONNECT
<Input file bin data>
+QFUPL: 10,3938

OK
    
```

#### 3.1.1.2. ACK Mode

The ACK mode can make the data transmission more reliable. When transmitting a large file without hardware flow control, the ACK mode is recommended to prevent data loss. For more details about ACK mode, see **AT+QFUPL**.

```

AT+QFUPL="test.txt",3000,5,1 //Upload the text file test.txt to UFS.
CONNECT
<input file bin data of 1024bytes>
A //After MCU sends 1024 bytes of data, the module will
respond return an A. Then the next 1024 bytes of data can
be inputted.
<input file bin data of 1024bytes>
A
<input the rest file bin data>
+QFUPL: 3000,B34A

OK
    
```

### 3.1.2. Download a File

```

AT+QFDWL="test.txt" //Download the text file test.txt from UFS.
CONNECT
<Output Data>
+QFDWL: 10,613e //Size and checksum value of the downloaded data are returned.
OK
    
```

## 3.2. Write to and Read Files

### 3.2.1. Write to and Read a UFS File

```

AT+QFOPEN="test.txt",1 //Open the file to get the file handle.
+QFOPEN: 3023

OK
AT+QFWRITE=3023,10 //Write 10 bytes to the file.
CONNECT
<Write Data>
+QFWRITE: 10,10 //The actual written bytes and the size of the file are returned.

OK
AT+QFSEEK=3023,0,0 //Set the file pointer to the beginning of the file.
OK
AT+QFREAD=3023,10 //Read 10 bytes from the file.
CONNECT 10
<Read Data>

OK
AT+QFCLOSE=3023 //Close the file.
OK
    
```

### 3.2.2. Write to and Read an SD File

```

AT+QFOPEN="SD:1.txt",1 //Open the file to get the file handle.
+QFOPEN: 3024

OK
AT+QFWRITE=3024,1024 //Write 1024 bytes to the file.
CONNECT
<Write Data>
    
```



```
+QFWRITE: 1024,1024 //The actual written bytes and the size of the file are returned.  
  
OK  
AT+QFSEEK=3024,0,0 //Set the file pointer to the beginning of the file.  
OK  
AT+QFREAD=3024,1024 //Read data from the file.  
CONNECT 1024  
<Read Data>  
OK  
AT+QFCLOSE=3024 //Close the file.  
OK
```

# 4 Summary of Error Codes

The error code **<err>** indicates an error related to mobile equipment or network. The details about **<err>** are presented in the following table.

**Table 3: Summary of Error Codes**

<b>&lt;err&gt;</b>	<b>Meaning</b>
400	Invalid input value
401	Larger than the size of the file
402	Zero-byte read
403	Drive full
405	File not found
406	Invalid file name
407	File already exists
409	Failed to write to the file
410	Failed to open the file
411	Failed to read the file
413	Reached the max. number of files allowed to be opened
414	Read-only file
416	Invalid file descriptor
417	Failed to list the file
418	Failed to delete the file
419	Failed to get disk info
420	No space

---

421	Time out
423	File too large
425	Invalid parameter
426	File already opened

---

# 5 Appendix References

**Table 4: Terms and Abbreviations**

Abbreviation	Description
ACK	Acknowledgement
COM	Communication Port
DOS	Disk Operating System
ME	Mobile Equipment
SD	Secure Digital
TA	Terminal Adapter
UART	Universal Asynchronous Receiver-Transmitter
UFS	User File Storage
USB	Universal Serial Bus
XOR	Exclusive OR