

# **EC200A Series UAC**

# **Application Note**

**LTE Standard Module Series**

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# About the Document

## Revision History

Version	Date	Author	Description
-	2022-03-30	August YANG	Creation of the document
1.0	2022-04-24	August YANG	First official release

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# 1 Introduction

This document describes how to use the UAC function of Quectel LTE Standard EC200A series module.

UAC (USB Audio Class) is an audio protocol class in the USB specification. In UAC mode, the module is identified as a USB sound card in the host device, and an "UAC Interface" device appears in the host device manager. Standard third-party audio library such as *alsa-lib* can be used to run the audio application on Linux device (the host), and some third-party tools can also be used to play/record the application on Windows devices.

**NOTE**

The UAC function of EC200A series module is optional. Please contact Quectel Technical Support to obtain whether the current model supports UAC.

# 2 Description of 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 the command line.
- **[...]** Optional parameter of a command or an optional part of TA information response. Square brackets do not appear on the command line. When an optional parameter is not given in a command, the new value equals its previous value or the default settings, 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 1: Type of AT Commands and Responses**

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 a 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. AT+QAUDCFG="uacmode" Enable/Disable UAC Function

This command enables or disables the UAC function.

<b>AT+QAUDCFG="uacmode" Enable/Disable UAC Function</b>	
Test Command <b>AT+QAUDCFG=?</b>	Response ... <b>+QAUDCFG: "uacmode",(list of supported &lt;on_off&gt;s)</b> ... <b>OK</b>
Write Command <b>AT+QAUDCFG="uacmode"[,&lt;on_off&gt;]</b>	Response If the optional parameter is omitted, query the current setting: <b>+QAUDCFG: "uacmode",&lt;on_off&gt;</b>  <b>OK</b>  If the optional parameter is specified, enable or disable the UAC function: <b>OK</b> Or <b>ERROR</b>  If there is any error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved automatically.

### Parameter

<b>&lt;on_off&gt;</b>	Integer type. Enable or disable UAC function. <u>0</u> Disable 1      Enable
<b>&lt;err&gt;</b>	Error code. 902      Invalid audio parameters

**NOTE**

After the Write Command is sent to enable or disable the UAC function, the configured value is returned by sending the Read Command, but the command takes effect after the module is rebooted.

### 2.3. AT+QAUDCFG="uactype" Set UAC Function Mode

This command sets the UAC function mode.

AT+QAUDCFG="uactype" Set UAC Function Mode	
Test Command <b>AT+QAUDCFG=?</b>	Response ... <b>+QAUDCFG: "uactype",(range of supported &lt;type&gt;s)</b> ... <b>OK</b>
Write Command <b>AT+QAUDCFG="uactype"[,&lt;type&gt;]</b>	Response If the optional parameter is omitted, query the current setting: <b>+QAUDCFG: "uactype",&lt;type&gt;</b>  <b>OK</b>  If the optional parameter is specified, set the UAC function mode: <b>OK</b> Or <b>ERROR</b>  If there is any error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module or UAC link is rebooted. The configuration is saved automatically.

#### Parameter

<b>&lt;on_off&gt;</b>	Integer type. UAC function mode. <u>0</u> Near-end mode (The module performs UAC communication with the host)
-----------------------	--

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	1	Far-end mode (The peer end of the call performs UAC communication with the host)
	2	Near-end/far-end (Currently only supported by EC200N-CN and EC600N-CN modules)
<b>&lt;err&gt;</b>		Error code.
	902	Invalid audio parameters

---

**NOTE**

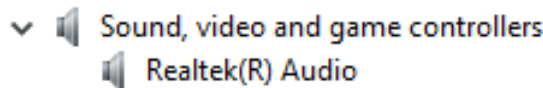
The way to reboot the UAC link is to disconnect the UAC connection between the host and the module and reconnect.

# 3 UAC Function Test

This chapter introduces the testing steps of the UAC function.

## 3.1. On Windows

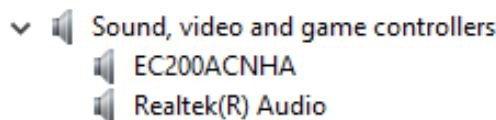
**Step 1:** Power on the module with UAC disabled, open the device manager of the host (Take PC as an example), check the "Sound, video and game controllers" option, and then it can be seen that there is only an audio device coming with the PC.



**Figure 1: Device Manager**

**Step 2:** Execute `AT+QAUDMOD="uacmode",1` to enable the UAC function, then execute `AT+QAUDMOD="uacmode"` to query the setting, and reboot the module after `+QAUDCFG: "uacmode",1` is returned.

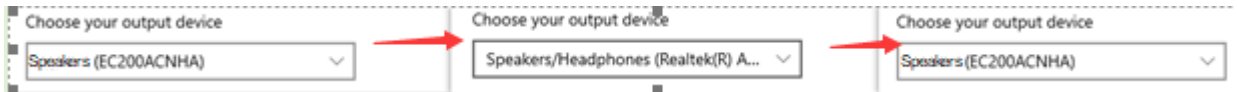
**Step 3:** After the module is rebooted, check the "Sound, video and game controllers" option in the device manager of PC again, you can see a new set of audio input and output device (namely the UAC device), as shown in the figure below, which indicates the UAC function is successfully enabled.



**Figure 2: Sound, Video and Game Controllers**

**Step 4:** Modify the default audio device used on the PC to the newly added UAC device. Then play audio on the PC. If `<type>` is set to 0 (near-end mode), the module can play the audio file played on the PC; If `<type>` is set to 1 (far-end mode), the audio played on the PC is played on the peer end of the call (if the module is not on a call, the audio cannot be played). The same is true for recording.

**Step 5:** If you set `<type>=0` (near-end mode) in **Step 4**, you need to execute `AT+QAUDCFG="uactype",1` to switch UAC to far-end mode and check whether the setting is successful. After the setting is successful, switch the output device on the PC, that is, switch the UAC device to another device (take PC audio device as an example), and then update it to the UAC device again to reboot the UAC link to make the command take effect (Or reboot the module after switching UAC to far-end mode to make the command take effect). The operation is as shown below:



**Figure 3: Steps of Rebooting the UAC Link**

**Step 6:** After the above operations, use the module to call with other devices, the audio played on the PC is played on the peer end of the call. And this is also applicable for recording.

### 3.2. In Linux

**Step 1:** Power on the module and execute `AT+QAUDMOD="uacmode",1` to enable the UAC function. The following steps take `AT+QAUDCFG="uactype",1` as an example to set the UAC to far-end mode (The procedure for setting UAC to near-end mode is the same as that of setting to far-end mode).

**Step 2:** Execute `aplay` to play a WAV audio file, and confirm that the PC can play the audio file normally (that is, there is a sound coming from the speaker on the PC). If it cannot be played normally, the subsequent steps cannot be performed.

```

augustlinux@ubuntu:~/UAC_test$ ll
total 148
drwxrwxr-x  2 augustlinux augustlinux  4096 Feb 21 20:16 ./
drwxr-xr-x 32 augustlinux augustlinux  4096 Feb 21 20:16 ../
-rw-----  1 augustlinux augustlinux 18550 Sep  3 11:44 2.wav
-rw-----  1 augustlinux augustlinux 23158 Sep  3 11:44 3.wav
-rw-----  1 augustlinux augustlinux 96044 Jan 24  2021 test1.wav
augustlinux@ubuntu:~/UAC_test$ aplay test1.wav
Playing WAVE 'test1.wav' : Signed 16 bit Little Endian, Rate 8000 Hz, Mono
augustlinux@ubuntu:~/UAC_test$
    
```

**Step 3:** Check if there is a device with the word "Andriod" in its name in Ubuntu's sound devices. For testing the UAC function of the module, select "Analog xxx-Android" for both "Output Device" and "Input Device", which is the UAC device.

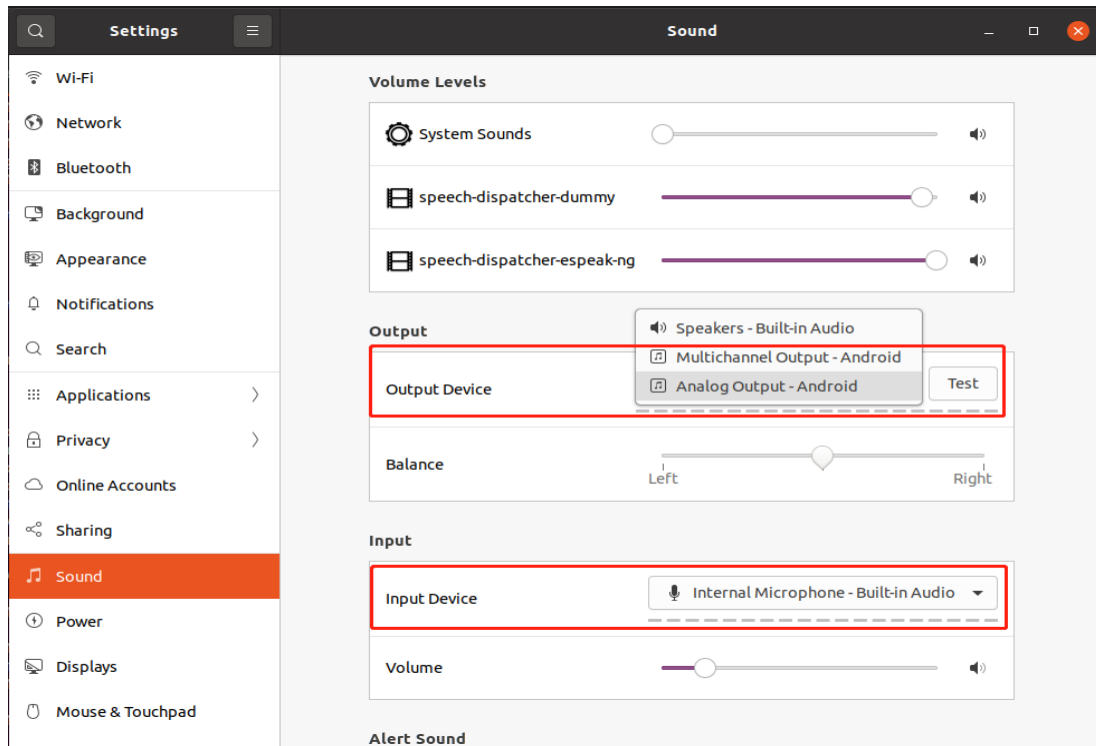


Figure 4: Sound Device

Step 4: Execute `aplay -l` or `arecord -l` to view the UAC device information of the module.

```

augustlinux@ubuntu:~/UAC_test$ aplay -l
**** List of PLAYBACK Hardware Devices ****
card 0: AudioPCI [Ensoniq AudioPCI], device 0: ES1371/1 [ES1371 DAC2/ADC]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
card 0: AudioPCI [Ensoniq AudioPCI], device 1: ES1371/2 [ES1371 DAC1]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
card 1: Android [Android], device 0: USB Audio [USB Audio]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
augustlinux@ubuntu:~/UAC_test$
    
```

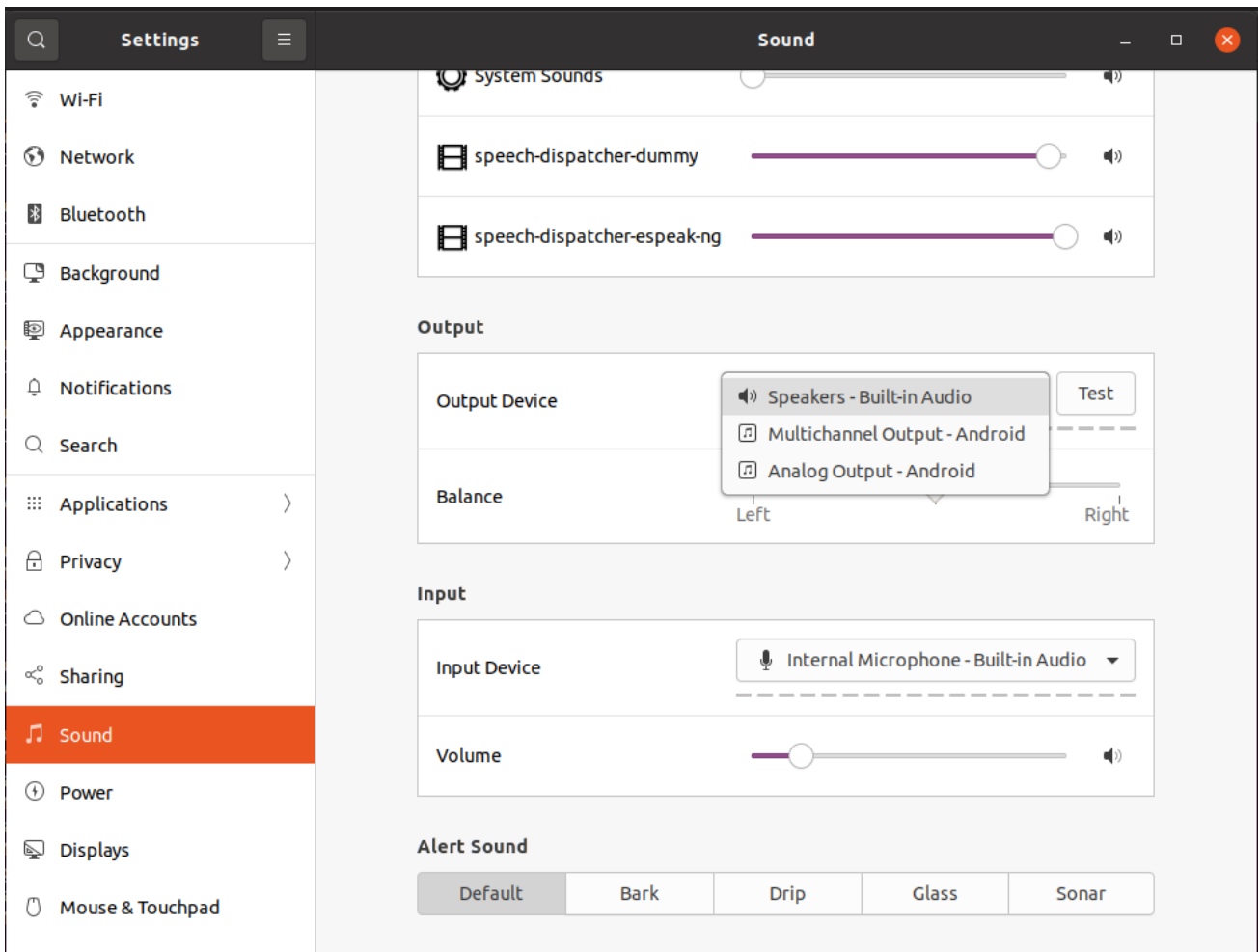
```

augustlinux@ubuntu:~/UAC_test$ arecord -l
**** List of CAPTURE Hardware Devices ****
card 0: AudioPCI [Ensoniq AudioPCI], device 0: ES1371/1 [ES1371 DAC2/ADC]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
card 1: Android [Android], device 0: USB Audio [USB Audio]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
augustlinux@ubuntu:~/UAC_test$
    
```

**Step 5:** After executing **aplay** or **arecord**, execute **ATD** to make a call to test the UAC function. See *document [1]* for details about **ATD**.

If the prompt "audio open error" appears when executing **aplay**, you need to switch the Ubuntu sound device and select "Built-in Audio" for both "Output Device" and "Input Device", do not use the UAC device.

```
augustlinux@ubuntu:~/UAC_test$ aplay 3.wav -D hw:1,0 -r 16000 -f S16_LE
aplay : main:722: audio open error: Device or resource busy
```



**Figure 5: Switch Sound Device**

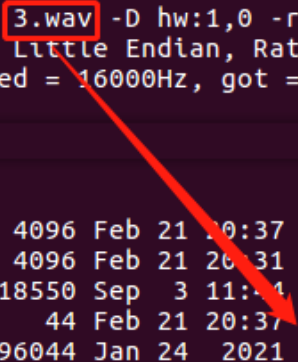
After executing **aplay** and **arecord** and return correctly, execute **ATD** to make a call, as shown in the following figure.

```
[15:00:28:425] atd18926094384; 📞 📞 📞
[15:00:28:830] OK 📞 📞
[15:01:16:717] 📞 📞
[15:01:16:717] NO CARRIER 📞 📞
```

The peer end of the call can hear the sound of the WAV file played on PC, and the PC records the sound from the peer end of the call and saves it as a 3.wav file. Play the 3.wav file on the local device to confirm whether the audio is correct (consistent with the audio of the peer end).

```
augustlinux@ubuntu:~/UAC_test$ arecord 3.wav -D hw:1,0 -r 16000 -f S16_LE
Recording WAVE '3.wav' : Signed 16 bit Little Endian, Rate 16000 Hz, Mono
Warning: rate is not accurate (requested = 16000Hz, got = 8000Hz)
please, try the plug plugin

augustlinux@ubuntu:~/UAC_test$ ll
total 128
drwxrwxr-x  2 augustlinux augustlinux  4096 Feb 21 20:37 ./
drwxr-xr-x 32 augustlinux augustlinux  4096 Feb 21 20:31 ../
-rw-----  1 augustlinux augustlinux 18550 Sep  3 11:44 2.wav
-rw-r--r--  1 augustlinux augustlinux   44 Feb 21 20:37 3.wav
-rw-----  1 augustlinux augustlinux 96044 Jan 24  2021 test1.wav
augustlinux@ubuntu:~/UAC_test$
```



# 4 Appendix References

**Table 2: Related Document**

Document Name
[1] Quectel_EC200x&EG912Y&EG915N_Series_AT_Commands_Manual

**Table 3: Terms and Abbreviations**

Abbreviation	Description
DSP	Digital Signal Processing
PC	Personal Computer
PCM	Pulse Code Modulation
TA	Terminal Adapter
UAC	USB Audio Class
USB	Universal Serial Bus