

## Overview

The Host Audio example supports the audio microphone and speaker (unified) device.

The application prints the audio microphone and speaker information when the USB audio unified device is attached. For an audio device that only support microphone or speaker, this example does not support.

## System Requirement

### Hardware requirements

- Mini/micro USB cable
- USB A to micro AB cable
- Hardware (Tower module/base board, and so on) for a specific device
- Personal Computer

### Software requirements

- The project files are in:  
`<MCUXpresso_SDK_Install>/boards/<board>/usb_examples/usb_host_audio_unified/<rtos>/<toolchain>.`

Note

The `<rtos>` is Bare Metal or FreeRTOS OS. The host can't totally guarantee getting all of stream data of audio device on some platforms because some SOC's performance may not meet this case's requirement. If the ISO out endpoint interval of device is 125us, host may not have enough performance to handle transfer so that noise may occurs.

## Getting Started

### Hardware Settings

For detailed instructions, see the appropriate board User's Guide.

Note

Set the hardware jumpers (Tower system/base module) to default settings.

### Prepare the example

1. Download the program to the target board.
2. Power off the target board, and then power on again or press the reset button on your board.
3. Connect the USB audio speaker devices to the board.

Note

For detailed instructions, see the appropriate board User's Guide.

## Run the example

1. Connect the board UART to the PC, you can see the Serial port number from "Device Manager", then open the COM port in a terminal tool such as PuTTY as the following picture, the baud rate is 115200.

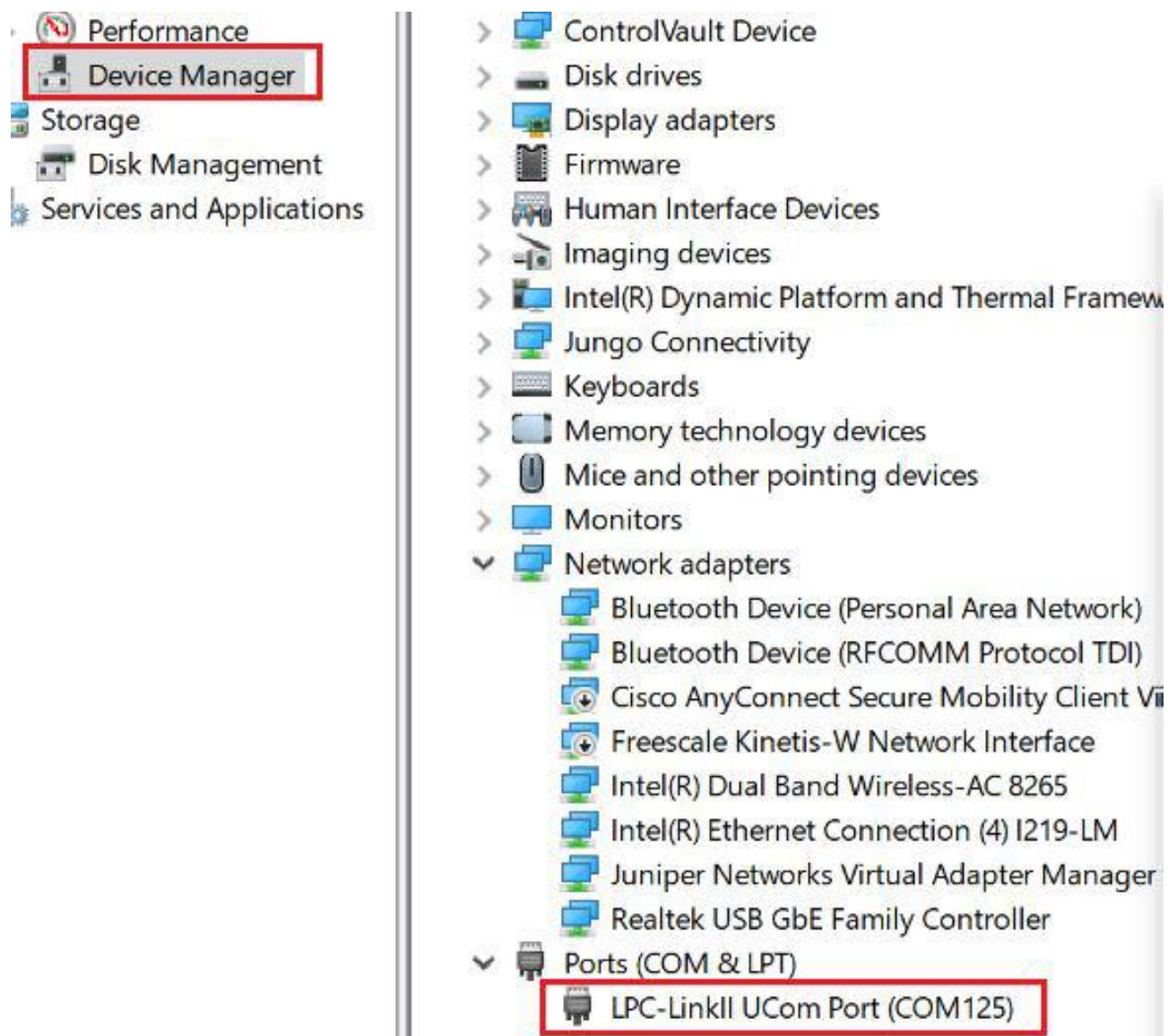


Figure 1: UART port number



Figure 2: Open UART

2. Plug in the USB audio unified (microphone and speaker) device to the board and the related information is printed in the terminal.
3. After the USB audio unified device is plugged into the host, the USB application automatically gets the audio data from the USB audio microphone of this device then transfers the recorded audio data to the USB audio speaker of this device. At this time, the sound can be heard from the audio speaker of this device. The following image shows how to attach a USB audio unified device.

```

host init done
hid keypad attached:pid=0x14vid=0xd8c address=1
hid audio attached:pid=0x14vid=0xd8c address=1
keypad attached
USB audio unified device attached
AUDIO 1.0 device
AUDIO_GET_MIN_VOLUME
Audio recorder information:
- Frequency device support      : 48000 Hz
- Frequency device support      : 44100 Hz
- Bit resolution : 16 bits
- Number of channels : 1 channels
- Transfer type : Isochronous
- Sync type : Synchronous
- Usage type : Data endpoint
This audio recorder records audio with these properties:
- Sample rate      :
  : 48000 Hz
  : 44100 Hz
- Sample size      : 16 bits
- Number of channels : 1 channels

Audio speaker information:
- Frequency device support      : 48000 Hz
- Frequency device support      : 44100 Hz
- Bit resolution : 16 bits
- Number of channels : 2 channels
- Transfer type : Isochronous
- Sync type : Adaptive
- Usage type : Data endpoint
This audio speaker plays audio with these properties:
- Sample rate      :
  : 48000 Hz
  : 44100 Hz
- Sample size      : 16 bits
- Number of channels : 2 channels
USB host unified example is recording 48k_16bit_1ch format audio, then loop playback 48k_16bit_2ch
format recorded audio.

```

Figure 3: Attach audio 1.0 unified (microphone + speaker) device

```

host init done
hid keypad attached:pid=0xa4vid=0x1fc9 address=1
hid audio attached:pid=0xa4vid=0x1fc9 address=1
keypad attached
USB audio unified device attached
AUDIO 2.0 device
AUDIO_GET_VOLUME_RANGE
Audio recorder information:
- Frequency device support frequency rang is :MIN 48000 Hz, MAX 48000 Hz, RES attributes 0Hz,
- Bit resolution : 16 bits
- Number of channels : 2 channels
- Transfer type : Isochronous
- Sync type : Synchronous
- Usage type : Data endpoint

Audio speaker information:
- Frequency device support frequency rang is :MIN 48000 Hz, MAX 48000 Hz, RES attributes 0Hz,
- Bit resolution : 16 bits
- Number of channels : 2 channels
- Transfer type : Isochronous
- Sync type : Asynchronous
- Usage type : Data endpoint
USB host unified example is recording 48k_16bit_2ch format audio, then loop playback 48k_16bit_2ch
format recorded audio.

```

Figure 4: Attach audio 2.0 unified (microphone + speaker) device

#### Note

1. If audio device is a microphone-only or speaker-only device, host doesn't support. It means that device must be a microphone + speaker (unified) device.
2. If the sample rate of audio device is different for microphone and speaker, host doesn't support.
3. Even though the sample rate is same, if both the bit width and channel count are different, host doesn't support.
4. If the bit width or channel count is different, host does some adjustment for recording audio data of microphone to make speaker plays audio normally.

the following are the USB audio devices tested.

- (1) UGREEN type:US205
- (2) BOYA BY-EA2S
- (3) Jabra Evolve2 40
- (4) evkmimxrt1170 which is running dev\_composite\_hid\_audio\_unified\_bm demo in our SDK.
- (5) Texas Instruments Japan, PCM2902 Audio codec.