

[**https://docs.nvidia.com/jetson/archives/r34.1/DeveloperGuide/text/SD/Communications/EnablingBluetoothAudio.html#sd-communications-enablingbluetoothaudio**](https://docs.nvidia.com/jetson/archives/r34.1/DeveloperGuide/text/SD/Communications/EnablingBluetoothAudio.html#sd-communications-enablingbluetoothaudio)

<https://docs.nvidia.com/jetson/archives/r34.1/DeveloperGuide/text/SD/Communications/AudioSetupAndDevelopment.html>  
<https://docs.nvidia.com/jetson/archives/r34.1/DeveloperGuide/text/SD/Communications/AudioSetupAndDevelopment.html#audio-hub-hardware-architecture>  
<https://docs.nvidia.com/jetson/archives/r34.1/DeveloperGuide/text/SD/Communications/AudioSetupAndDevelopment.html#asoc-driver-software-architecture>  
<https://docs.nvidia.com/jetson/archives/r34.1/DeveloperGuide/text/SD/Communications/AudioSetupAndDevelopment.html#high-definition-audio>  
<https://docs.nvidia.com/jetson/archives/r34.1/DeveloperGuide/text/SD/Communications/AudioSetupAndDevelopment.html#hd-audio-header>  
<https://docs.nvidia.com/jetson/archives/r34.1/DeveloperGuide/text/SD/Communications/AudioSetupAndDevelopment.html#usage-and-examples>  
<https://docs.nvidia.com/jetson/archives/r34.1/DeveloperGuide/text/SD/Communications/AudioSetupAndDevelopment.html#troubleshooting>

Here's a structured summary of the key information from the provided NVIDIA Jetson documentation links:

**Enabling Bluetooth Audio on Jetson Devices**

**Hardware Support Overview**

|  |  |  |
| --- | --- | --- |
| Jetson Module | SoC | Bluetooth Support |
| AGX Orin | T234 | TBD |
| Xavier NX Series | T194 | Supported (X) |
| AGX Xavier Series | T194 | Supported (X) |

> **Note**: Bluetooth audio is disabled by default to maintain product conformance.

**Enabling Bluetooth Audio**

1. **Modify Bluetooth Service Configuration**  
   Edit the systemd service file:

sudo nano /lib/systemd/system/bluetooth.service.d/nv-bluetooth-service.conf

Change:

ExecStart=/usr/lib/bluetooth/bluetoothd -d --noplugin=audio,a2dp,avrcp

To:

ExecStart=/usr/lib/bluetooth/bluetoothd -d

1. **Install PulseAudio Bluetooth Module**

sudo apt-get update  
sudo apt-get install pulseaudio-module-bluetooth

1. **Reboot the Device**

sudo reboot

1. **Pair and Connect Bluetooth Headset**  
   Use bluetoothctl or GUI tools after reboot.

**Audio Setup and Development**

**Key Components**

* **ASoC Driver**: Manages audio routing between hardware blocks (I2S, DMIC, DSPK, etc.).
* **Audio Hub (AHUB)**: Hardware block handling audio processing with modules:
  + **I2S**: Bidirectional audio interface (6 instances)
  + **DMIC**: Digital microphone controller (4 instances)
  + **DSPK**: Digital speaker interface (2 instances)
  + **Mixer/AMX/ADX**: Audio multiplexing/demultiplexing

**Configuration Workflow**

1. **Device Tree Setup**  
   Example I2S node configuration:

tegra\_i2s1: i2s@2901000 {  
 compatible = "nvidia,tegra210-i2s";  
 reg = &lt;0x0 0x2901000 0x0 0x100&gt;;  
 clocks = &lt;&amp;bpmp\_clks TEGRA194\_CLK\_I2S1&gt;;  
 status = "okay";  
};

1. **Dynamic Audio Routing**  
   Use amixer to configure paths:

amixer -c APE cset name='I2S1 Mux' 'ADMAIF1'

1. **Runtime Parameters**  
   Set sample rate/format:

aplay -D hw:0,0 -r 48000 -f S16\_LE audio.wav

**Troubleshooting Tips**

* **Verify ALSA Configuration**:

aplay -l # List playback devices  
arecord -l # List capture devices

* **Check Kernel Messages**:

dmesg | grep -i audio

* **Test Audio Hardware**:

speaker-test -c 2 -t wav # Test stereo output

**High-Definition Audio (HDA) Support**

* **HD Audio Header**: Exposes Intel HDA-compatible interface for codecs.
* **Typical Use Case**: Connect to external audio codecs via hda-analog or hda-digital nodes.

**Summary**:  
This guide provides steps to enable Bluetooth audio and configure advanced audio pipelines on Jetson platforms. For custom implementations, refer to the /etc/asound.conf file for ALSA settings and the official NVIDIA Audio Hub documentation.

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