**Quick Start Guide**

# i.MX Audio Board

## ABOUT THE i.MX AUDIO BOARD

i.MX Audio Board (or MCIMX8M-AUD) is an excellent, configurable and functional audio processing platform. It supports multiple i.MX 8M series processors and HDMI card. A variety of audio input and output interfaces are integrated into the system, it supports HDMI input, HDMI eARC, S/PDIF I/O, 2-ch ADC line-in, 24-ch DAC line-out and so on. Based on these features, rich audio application cases can be realized.

### Features

- 24-ch line out
- 2-ch line in
- S/PDIF I/O
  - TOSLINK up to 192kHz for optical fiber cable
  - RCA for coaxial cable
- Audio in/out on HDMI card
- eARC on HDMI card
- eARC on i.MX 8M Plus processor

- Micro-SD card connector
- USB with Type-C connector
- Ethernet
- M.2 connector
  - PCIE for i.MX 8M Plus and i.MX 8M Mini
  - SDIO for i.MX 8M Plus
- DSI mini-SAS connector
- USB to serial converter for debug
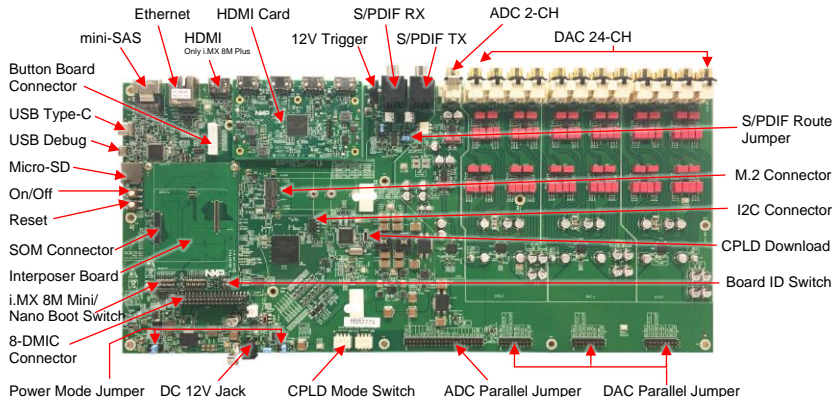
# GET TO KNOW THE i.MX AUDIO BOARD



**Figure 1: i.MX Audio Board Top View**

Labels (clockwise from top):
Ethernet · HDMI Card · S/PDIF RX · ADC 2-CH · mini-SAS · HDMI (Only i.MX 8M Plus) · 12V Trigger · S/PDIF TX · DAC 24-CH · Button Board Connector · USB Type-C · USB Debug · Micro-SD · On/Off · Reset · SOM Connector · Interposer Board · i.MX 8M Mini/Nano Boot Switch · 8-DMIC Connector · S/PDIF Route Jumper · M.2 Connector · I2C Connector · CPLD Download · Board ID Switch · Power Mode Jumper · DC 12V Jack · CPLD Mode Switch · ADC Parallel Jumper · DAC Parallel Jumper

## GETTING STARTED

### Unpack the Kit

The i.MX Audio Board is shipped with the items listed in Table 1. Ensure the items are included in the box.

### Table 1 Kit Contents

| ITEM | DESCRIPTION |
|------|-------------|
| EVB Board | i.MX Audio board |
| Additional Daughter Cards | - Interposer board<br>- EP HDMI card<br>- Button board |
| Power Supply | 12V 5A with DC jack |
| Accessories | - SCREW-TY PE3 M3X5-5-S  x1<br>- Antenna                          x3 |
| Documentation | Quick Start Guide |

### Prepare Accessories

The following items in Table 2 are recommended to run the i.MX 8M Audio Board.

### Table 2 Customer Supplied Accessories

| ITEM | DESCRIPTION |
|------|-------------|
| SOM Boards* | - i.MX 8M Nano SOM Board<br>- i.MX 8M Mini SOM Board<br>- i.MX 8M Plus SOM Board |
| HDMI Display | HDMI display that supports a minimum resolution of 1080P60 |
| HDMI Cable | HDMI 2.0 cable to connect the HDMI card to HDMI display |
| USB Micro-B Cable | USB Type-A Male to Micro-B Male |
| Coaxial Cable | RCA cable for line-in and line-out |
| Fiber Cable | Optical fiber cable for TOSLINK |

*Note: SOM Boards from their EVK Boards. For example, i.MX 8M Nano SOM Board from i.MX 8M Nano DDR4 EVK.

GETTING STARTED CONTINUED

## Download Software and Tools

Installation software and documentation are available at
**http://www.nxp.com/imxaudioboard**. The following are available on the website:

## Table 3 Software and Tools

| ITEM | DESCRIPTION |
|---|---|
| Documentation | • Schematics, layout and Gerber files<br>• i.MX Audio Board Hardware User's Guide<br>• Quick Start Guide |
| Software Development | Linux BSPs, CPLD code |
| Demo Images | Copy of the latest Linux and Android BSP images that are available to program on to the micro-SD Card on i.MX Audio Board |

## SETTING UP THE SYSTEM

Contact Sales to get Image from assigned link, then burn image in Micro SD card for testing use.
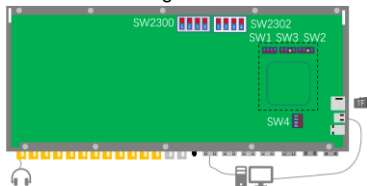


# 1 Confirm Power Supply

There are several power supply modes. Use J2521 and J2522 set system power, GPIO mode and 3V3 mode are recommended.

| MODE | J2521 | J2522 |
|------|-------|-------|
| GPIO mode | 3-4 | 7-8 |
| 3V3 mode | 5-6 | 3-4 |
| Self-mode | 1-2 | 1-2 |
| CPLD mode | - | 5-6 |

# 2 Confirm SOM ID Switches

If target using i.MX 8M Mini or i.MX 8M Nano SOM board, the interposer board should be used. If target using i.MX 8M Plus SOM board, the interposer board should be removed and plug SOM board on the i.MX Audio Board directly.

If the SOM interposer board is used, set the ID SW1[4:1] according to the SOM used. if interposer board not used, all pins are pulled up by on board resistors.

| SOM | SW1 [4:1] |
|-----|-----------|
| i.MX 8M Nano DDR4 | 0001 |
| i.MX 8M Nano LPDDR4 | 0010 |
| i.MX 8M Mini DDR4 | 0011 |
| i.MX 8M Mini LPDRR4 | 0100 |
| … | Reserved |
| i.MX 8M Plus DDR4/LPDDR4 | 1111 |

Note: 0 is on, 1 is off, x means don't care

## SETTING UP THE SYSTEM CONTINUED

# 3 Confirm MPU Boot Switches

The boot switches should be set to boot from the micro-SD card. SW4[4:1] on the i.MX Audio Board are used for i.MX 8M Plus SOM. SW2[10:1] and SW3[10:1] on the interposer board are used for i.MX 8M Mini SOM and i.MX 8M Nano SOM board. Different SOM boards have different settings. See the table below for more details.

i.MX 8M Plus SOM

| BOOT Device | SW4 [4:1] |
|---|---|
| micro-SD Card | 1100 |

i.MX 8M Mini SOM

| BOOT Device | SW2 [10:1] | SW3 [10:1] |
|---|---|---|
| micro-SD Card | 01001_10110 | 00010_11000 |

i.MX 8M Nano SOM

| BOOT Device | SW2 [10:1] | SW3 [10:1] |
|---|---|---|
| micro-SD Card | xxxxx_x0011 | xxxxx_xxxxx |

Note: 0 is off, 1 is on, x means don't care for 3 tables

# 4 Confirm CPLD Mode

CPLD supports many modes, The default mode is shown in the table below.

| SOM | SW2302 [4:1] | SW2300 [4:1] |
|---|---|---|
| i.MX 8M Nano | 0000 | 0000 |
| i.MX 8M Mini | 0000 | 0001 |
| i.MX 8M Plus | 0000 | 0000 |

Note: 0 is on, 1 is off, x means don't care

# 5 Connect USB Debug Cable

Connect the micro-B end of a USB cable into debug port J23. Connect the other end of the cable to a PC acting as a host terminal. UART connections will appear on the PC, then select the right COM port. The console print will output on "Enhanced COM port," which can be found in "Device Manager" of the PC.

## SETTING UP THE SYSTEM CONTINUED

If the serial port is not recognized, download and install updated drivers as listed in the section Debug Serial Console below.

Open the terminal window (i.e., Hyper Terminal or Tera Term), choose the right COM port number and apply the following configuration.

- Baud rate: 115200
- Data bits: 8
- Parity: None
- Stop bits: 1

# 6 Connect HDMI Cable

Connect an HDMI cable to the HDMI connector Jack J2 on HDMI card. Connect the other end of the cable to PC with a HDMI interface, or connect to a Blu-ray player if don't require the terminal tool and only playback. both sides are HDMI type A interface. This cable is for audio source in this configuration.

# 7 Connect Power Supply

Connect the 12V 5A power brick to J2000, power up the board using rock switch on the rear panel or SW2000 on the i.MX Audio Board.

# 8 Board Boot Up

As the board boots up, you will see logs on the terminal tool on the PC. Select the right HDMI sound card and play a sound, the sound will output on the earphone. if there is no sound, please try below commands one by one.

```
> jinit.sh
> jstart.sh --rpc -- pp_sample
> afrun.sh /dev/stdin
> PUT pipeline0/pipeline.elt/0/state=NULL
> PUT pipeline0/pipeline.elt/0/src_device=hdmi-input
> PUT pipeline0/pipeline.elt/0/state=PLAYING
```

## ADDITIONAL INFORMATION

### Boot Switches

SW4 on the i.MX Audio Board is the i.MX 8M Plus boot configuration switch. SW2 and SW3 on the interposer board are the i.MX 8M Mini and i.MX 8M Nano boot configuration switches. If other device want to be selected for boot, please see below tables. the more detailed information, please see SOM evaluation board kit.

i.MX 8M Plus Boot Device Settings

| BOOT DEVICE | SW4 | | | |
|---|---|---|---|---|
| | 4 | 3 | 2 | 1 |
| eMMC/USDHC3 | 0 | 1 | 0 | 0 |
| Micro-SD/USDHC2 | 1 | 1 | 0 | 0 |
| NAND 8-bit single device 256 page | 0 | 0 | 1 | 0 |
| NAND 8-bit single device 512 page | 1 | 0 | 1 | 0 |
| USB Download Mode | 1 | 0 | 0 | 0 |

Note: 0 is off, 1 is on, x means don't care

i.MX 8M Mini Boot Device Settings

| Device | SW2 | | | | | | | | | | SW3 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| eMMC/USDHC3 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Micro-SD/USDHC2 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| NAND Flash | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 |
| USB Download Mode | x | x | x | x | x | x | 0 | 1 | 0 | 1 | 0 | x | x | x | x | x | x | x | x | x |

Note: 0 is off, 1 is on, x means don't care

## ADDITIONAL INFORMATION CONTINUED

i.MX 8M Nano Boot Device Settings

| Device | SW2 | | | | | | | | | | SW3 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| eMMC/USDHC3 | x | x | x | x | x | x | 0 | 0 | 1 | 0 | x | x | x | x | x | x | x | x | x | x |
| Micro-SD/USDHC2 | x | x | x | x | x | x | 0 | 0 | 1 | 1 | x | x | x | x | x | x | x | x | x | x |
| NAND Flash | x | x | x | x | x | x | 0 | 1 | 0 | 0 | x | x | x | x | x | x | x | x | x | x |
| USB Download Mode | x | x | x | x | x | x | 0 | 0 | 0 | 1 | x | x | x | x | x | x | x | x | x | x |

Note: 0 is off, 1 is on, x means don't care

## Debug Serial Console

Windows users may need to update the serial drivers on your computer. The drivers can be found at **https://www.ftdichip.com/Drivers/VCP.htm**

## ADDITIONAL INFORMATION CONTINUED

### Do more with Accessory boards

| IMX-MIPI-HDMI | 8MIC-RPI-MX8 |
|---|---|
| Use this module for MIPI-DSI to HDMI transformation, the monitor can be tied to this interface for video display. find it from https://www.nxp.com/part/IMX-MIPI-HDMI#/. | This is a digital mic phone board, there are 8 mics on the board, use this module for voice development and so on. find it from https://www.nxp.com/part/8MIC-RPI-MX8#/. |
|  |  |

## SUPPORT

Visit **www.nxp.com/support** for a list of phone numbers within your region.

## WARRANTY

Visit **www.nxp.com/warranty** for complete warranty information.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

Attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This product has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this product does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

This equipment should be installed and operated with a minimum distance 20cm between the radiator and your body.

The full EU Declaration of Conformity for this apparatus can be found at this location: **http://www.nxp.com/imxaudioboard**

## www.nxp.com/imxaudioboard

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