# X-SPDIF 2

Manual

www.matrix-digi.com

Summary

- X-SPDIF 2 USB Audio Class 2.0 is a new designed asynchronous data transmission digital interface, which inherited the high quality of last generation to make it connect to the other devices through IIS directly. It crossed the quality lost of digital signal caused by protocol conversion, while integrated the high-quality femtosecond clock and FPGA processing unit, to realize a maximum of 32bit/768kHz for PCM signal and 1bit/DSD512 for signal output.

- The XMOS 8-core new generation X-CORE XU208 digital signal processing unit is the most advanced solution to USB Audio Class 2.0 digital audio with strong processing capacity for multi-core and multi-threading.

- The powerful XILINX SPARTAN FPGA assisting with XMOS to premium manage the clock and process IIS data, achieved the DoP code conversion and remove the jitter in IIS port.

- Two pieces ACCUSILICON high-quality femtosecond clock as basic clock source, and respectively work for 44.1kHz and 48kHz as well as several times sampling rate, which is controlled by FPGA to do the frequency division and switch automatically. Besides, femtosecond has an independent ultra-low noise LDO power supply circuit.

Summary

- The inner multi-level and multi-group LDO combined with solid-state capacitor, which can filter the superposed noise in the power supply. All the circuit units are supplied by the low or ultra-low noise LDO without DC/DC circuit to avoid high frequency switching noise. Even if using USB bus power supply, it can also maintain the high quality for the internal power supply.

- With the external power supply port, convenient to upgrade the external linear power supply. The device will auto-disconnect the USB bus power supply after connected the external power supply, and can be connected to the devices which do not support power output, such as mobile phone.
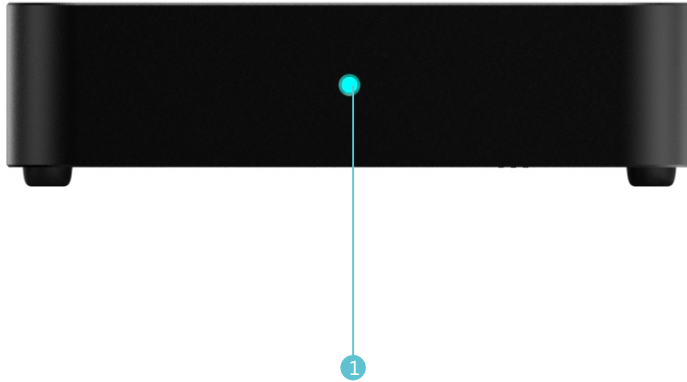
① LED Indicator status

❶ AES Output   ❹ IIS Output

❷ Coaxial Output   ❺ USB Input

❸ Optical Output   ❻ DC Power Input

- Optical/Coaxial/AES

  The Optical / Coaxial/AES Port can output a maximum 24bit/192kHz sampling rate of PCM signal and 1bit/DSD64 for DoP which are meet the SPDIF coding standard and DoP coding standard.

  Note: When the front-end devices transfer DSD through Native coding mode, the SPDIF output will turn off, because Native-coded DSD signal can only output from IIS port.

- IIS port

  IIS port can output a maximum 32bit/768kHz sampling rate of PCM signal.

  Native coding mode can output DSD64/128/256/512 of DSD signal;
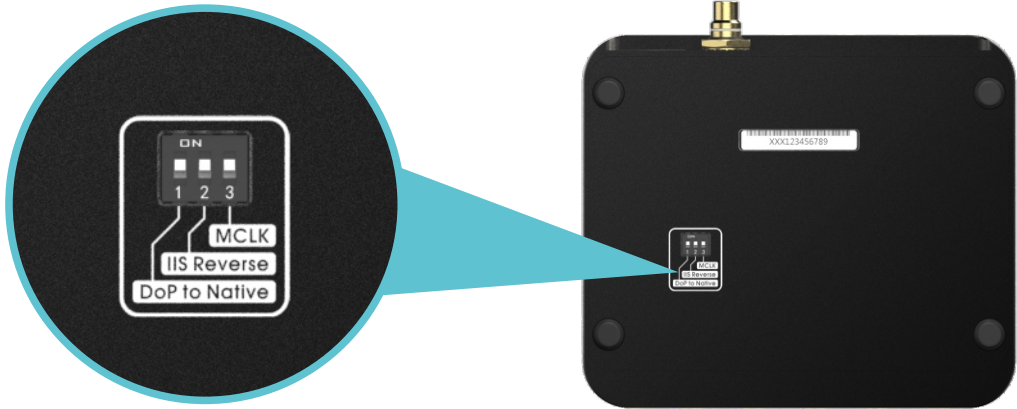
  DoP coding mode can output DSD64/128/256 of DSD signal.

Settings & Usage

- IIS port configuration

    The bottom dip switch is used for set up the function of IIS port.
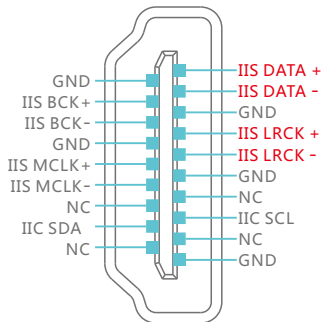
    The definition of dip switch as shown below:

1.DoP code conversion

When playing the DSD audio stream of DoP code, switching on can convert the DoP code into original DSD code output from IIS port; switching off will keep the DSD coding output mode of front-end device. (This function should setting when not playing DSD signal, which take effect when playing DSD signal, will not take effect immediately during DSD signal playback.)
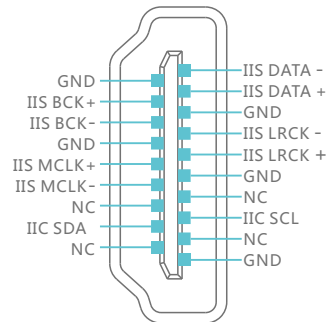
2.IIS port definition settings

You can set IIS port definition through the bottom dip switch; can reverse polarity of IIS deferential signal, in order to adapt different definition of IIS device.switch on for A definition; switch off for B definition (B definition for all Matrix Audio products.), as shown below:

GND
IIS BCK+
IIS BCK-
GND
IIS MCLK+
IIS MCLK-
NC
IIC SDA
NC

IIS DATA +
IIS DATA -
GND
IIS LRCK +
IIS LRCK -
GND
NC
IIC SCL
NC
GND

A definition
(the red words in the pictrure is the different definition)

GND
IIS BCK+
IIS BCK-
GND
IIS MCLK+
IIS MCLK-
NC
IIC SDA
NC

IIS DATA -
IIS DATA +
GND
IIS LRCK -
IIS LRCK +
GND
NC
IIC SCL
NC
GND

B definition

3. MCLK mode switch

X-SPDIF2 has two modes of MCLK output to suitable for connecting different devices, The MCLK output frequency when switch on and off as shown in the following table:

Switch Position	OFF		ON	
Sample Rate	MCLK	Frequency	MCLK	Frequency
44.1kHz	512fs	22.579MHz	128fs	5.6448MHz
48kHz	512fs	24.576MHz	128fs	6.144MHz
88.2kHz	256fs	22.579MHz	128fs	11.2896MHz
96kHz	256fs	24.576MHz	128fs	12.288MHz
176.4kHz	128fs	22.579MHz	128fs	22.579MHz
192kHz	128fs	24.576MHz	128fs	24.576MHz
352.8kHz	128fs	45.1584MHz	128fs	45.1584MHz
384kHz	128fs	49.152MHz	128fs	49.152MHz
705.6kHz	64fs	45.1584MHz	64fs	45.1584MHz
768kHz	64fs	49.152MHz	64fs	49.152MHz

Note: When using with synchronous mode X-sabre pro, please set the switch to ON.

- LED State

  When USB port doesn't connect to device or connect to the device without installing driver, the LED of X-SPDIF 2 will not light up, and will keep standby mode.

  ○ Stop Playing
  ● PCM
  ● DSD_DoP
  ○ DSD_Native

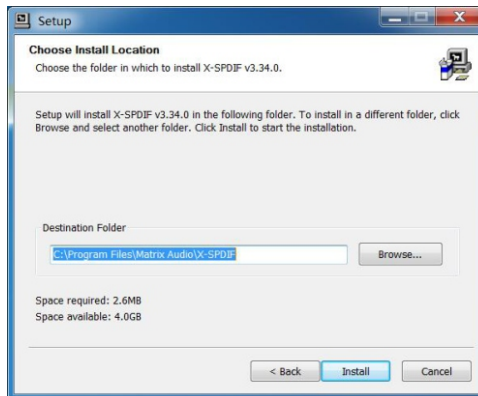 Note: The DSD LED state is for the input data stream in DSD code, not the output data mode from the IIS port.

1. Install X-SPDIF 2 drivers for windows

Double click the installation files, then choose "Next"
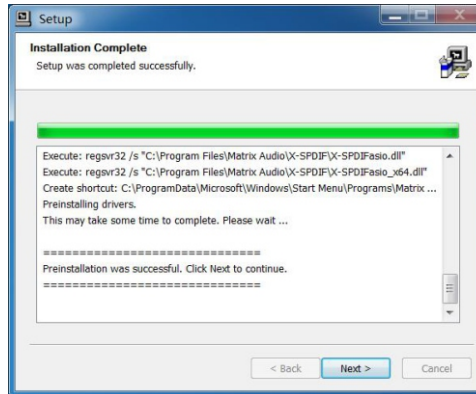

Select the installation path and click "Install"

Choose "Always trust the software from Xi'an Matrix Electronic Technology Co., Ltd" in the pop-up dialog box and select "installation".
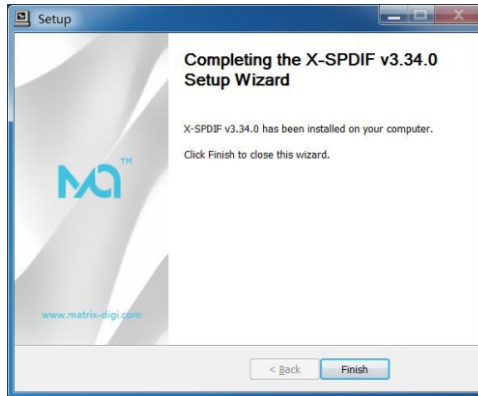

Click "Finish" to complete installation.

Click "Finish" to complete installation.

2.The drivers is not necessary for Mac OS X, please select the audio device directly to "MATRIX Audio X-SPDIF 2" in system preference.

Technical specifications

- Sampling rate for Optical/Coaxial/AES

  PCM 16-24Bit /44.1kHz、48kHz、88.2kHz、96kHz、176.4kHz、192kHz

  DSD 64(DoP)

- Sampling rate for IIS port

  PCM 16-32Bit /44.1kHz、48kHz、88.2kHz、96kHz、176.4kHz、192kHz、
  352.8kHz、384kHz、705.6kHz、768kHz

  DSD 64/128/256(DoP)

  DSD 64/128/256/512(Native)

- System support

  Windows7/8/8.1/10 system needs to install the supplied driver.

  Mac OS X10.6.4 or above without installing the driver.

  Most Android devices can be used via OTG cable.

  The iOS devices can be used via Lightning to USB Camera Kits.

Technical specifications

- Power supply specifications

  USB bus power supply: 5V/500mA

  External power supply: DC 6~9V , ≥800mA

  Power supply port: outer diameter 5.5mm; inner diameter 2.1mm (+ for inner, - for outer)

  Note: Don't connect to the power supply with a voltage above 9V, or will cause damage.It will auto disconnect USB bus supply after connected to the external power supply.It needs to connect to the external power supply when using mobile phone or pad which USB port with low current output.

- Boundary dimension: 133 x 142 x 38 mm (L×W×H, including protruding parts)

- Weight: 1.1kg

For purpose of improvement design and specifications are subject to change without notice.

Customer Service

From purchase date, we provide you one-year-limited warranty, warranty does not contain the accessories.

Free warranty is only for the faulty caused by the quality, not including the wrong operation, negligence or accident.

It is beyond our free warranty terms when you change the components or fix it by your own.

For more information, please visit www.matrix-digi.com.