SU-1 DIGITAL INTERFACE USER MANUAL

Description

SU-1 digital interface is our team develop a high-performance USB digital audio interface, using the XMOS latest xCORE-200 series chip. SU-1 is the independent development low jitter clock digital system interface (CRYSTEK CCHD-575). SU-1 digital interface using standard USB2.0 input interface, while SU-1 has many output interfaces, including XLR Balanced Output AES, coaxial RCA and BNC, using HDMI socket output I2S port, WCLK /MCLK clock output.

Technical features

- 1. The SU-1 is the first domestic and the XMOS latest xCORE - 200 series of USB digital interface. A new generation of XMOS chip, using the more advanced process technology, the performance was doubled the old one U8 chip, the processing capacity of up to 1000 MIPS.
- 2.Used the high-speed whole isolation design, can be isolation between PC and interface of noise interference cleanly. SU-1 adopted a preeminent circuit design, using the high-speed CPLD/FPGA digital audio signal for separate after restructuring, so as to make the signal after reforming completely unaffected by isolation chip itself shaking.
- 3.SU-1 internal main board adopts the technology of the uniform source synchronous clock, CPLD/FPGA internal using special algorithm of clock signal and digital audio signal phase control strictly, can ensure that the digital audio signal after isolation chip will not appear extra distortion because of the time delay and phase difference.
- 4.SU-1 internal was use of an expensive audio level low jitter clock (Femtosecond clock), two CCHD - 575 are from the Crystek.
- 5.It is well known that the weight of the core of the digital audio is algorithm. Singxer team are occupied in the field of digital audio for many years, at the same time we get strong support from the XMOS FAE team, we are on the basis of the original firmware had done many of the technical improvement and optimization algorithm.

Technical indicators

- Each output interface support the sampling rate of:
- **PCM:** 44.1 KHz, 48 KHz, 88.2 KHz, 96 KHz,

  176.4 KHz, 192 KHz, 352.8 KHz, 384 KHz

[the I2S out and WCLK out support all sampling rate, S/PDIF and AES/ EBU highest support 192 KHZ]

- **DSD:** 2.8 MHz (DSD64) - DoP, native

  5.6 MHz (DSD128) - DoP, native

  11.2 MHz (DSD256) - DoP, native

[the I2S out support all DSD format, S/PDIF and AES/EBU support DSD64 DOP mode]

bit wide: top to 32 bit over I2S output

top to 24 bit over S/PDIF and AES/EBU output

Each interface electrical standards

- 1. it is a standard USB input socket USB - type B mother, USB power supply range is 4.5 V to 5.2 V;
- 2.the AC POWER input socket adopts three oneness of IEC 320, support for AC 110 v (90 v to 120 v or 220 v, 180 v to 240v) input, 50 to 60 hz, chassis internal AC voltage switching development.
- 3.BNC output interface and RCA interface standard, S/PDIF signal level is 550 mv (standard load), the output impedance of 75 ohms.
- 4.XLR output interface standard AES/EBU signal, level of 3.3 V (standard load), the output impedance of 110 ohms.
- 5.the word clock (WCLK) use BNC output interface, for TTL level (no load), the output impedance of 75 ohms.
- 6.I2S output signal through the HDMI socket, four road signal output, including MCLK, BCLK, LRCLK, SDATA signal, using standard an LVDS difference level, impedance control in 100 ohms. One of the HDMI socket PIN13-15 DSD_ON signals, high electricity at ordinary times is I2S work in DSD mode, for LVTTL level; Weak PIN18 for 5 v power supply output (output current is less than 20 ma), can be used as an interface plug.

Design details

- 1.power is the mother of the sound implementation of the design concept, attaches great importance to the power circuit design, uses the high performance, low noise and has fast response as the main power supply. Whole board adopted up to five independent of the road power supply, digital audio main parts for the secondary power supply,the clock part they even adopted the ADI ultra low noise, in order to ensure the output performance has laid a solid foundation to the extreme.
- 2.in order to ensure good electrical transmission performance, we choose Neutriks' products XLR plugs, USB - B socket chosen Molex,BNC and RCA concentric socket for Taiwan's giant products, even the fuse is chose America Littelfuse model, adopt imported sealing ring transformer TALEMA export.
- 3.audio motherboard used 4 layer PCB design, make sure it had complete ground plane and the power supply layer, adopting high speed digital design method, ensure the whole signal integrity and power integrity. The clock signal for special processing, using the impedance of the package design and precise control, so as to ensure the quality of the clock signal and improve its anti-interference ability.
- 4. input and output signals are all follow the standard design, especially USB high-speed signal with 90 ohm impedance control, has built-in ESD protection circuit for TVS; I2S signal using an LVDS level standard, the impedance control in 100 ohms, MCLK output in one of the interface in even adopted independent an LVDS driver.

System compatibility:

1:windows7,windows8;32/64bit,need install dirver.

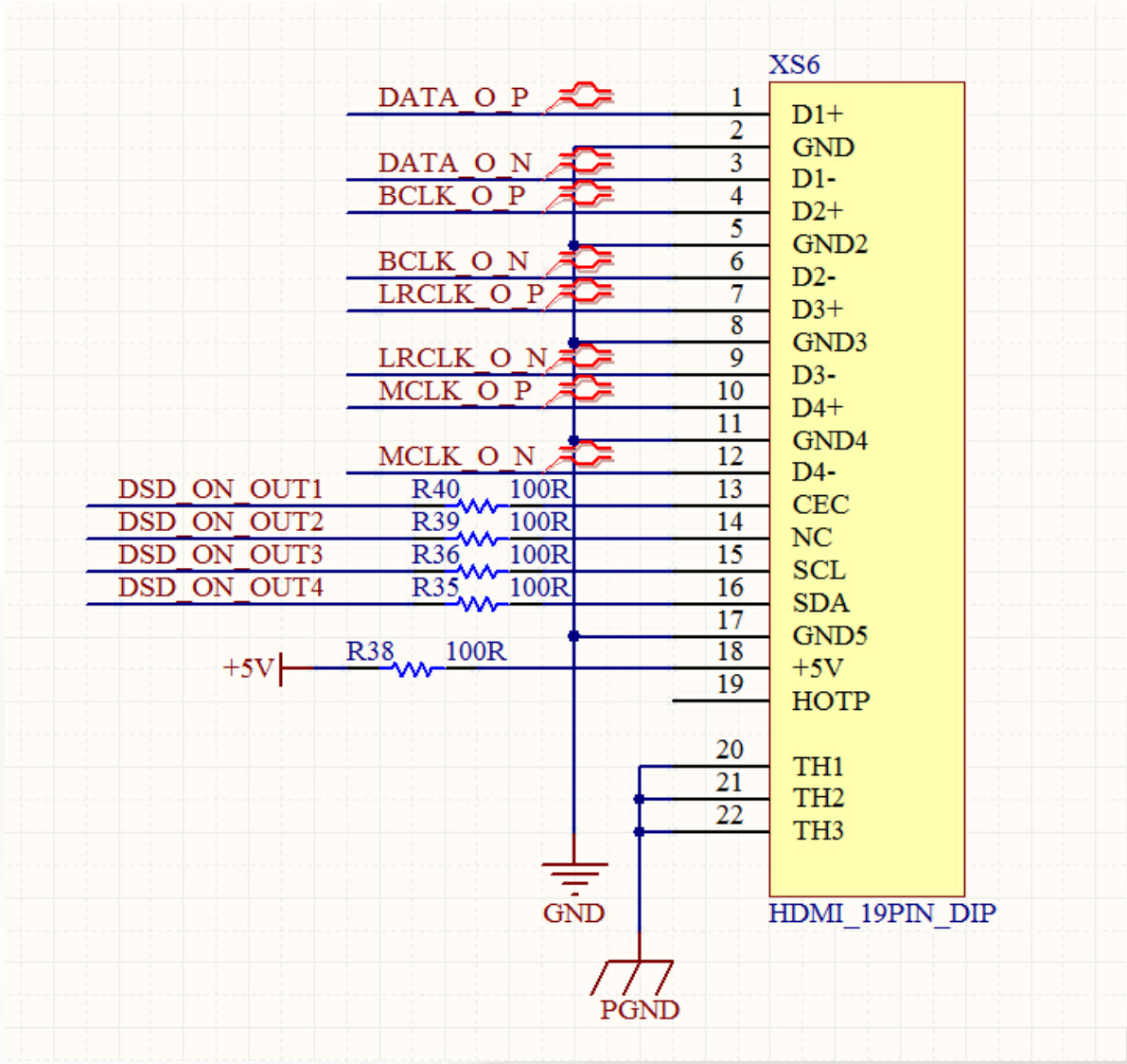
2:Native Mac os 10.6 and later,without driver.

3:Native Linux with NAC2 compliant Kernel, without driver.

4:Android OS 4.2 and above, need support OTG function.

I2S port use HDMI socket output

1. Electrical level is LVDS differential signal.
2. DSD ON singnal,5V power supply, CPLD has processed the MUTE signal, so do not need to output it again.
3. DSD ON signal can be user-defined, DSD ON signal can be connected to PIN 13,14,15,16 on the socket..
4. You can adjust the phase of PIN 1-3 and PIN 7-9 with a switch .


XS6
DATA_O_P
DATA_O_N
BCLK_O_P
BCLK_O_N
LRCLK_O_P
LRCLK_O_N
MCLK_O_P
MCLK_O_N
DSD_ON_OUT1
DSD_ON_OUT2
DSD_ON_OUT3
DSD_ON_OUT4
R40 100R
R39 100R
R36 100R
R35 100R
+5V
R38 100R
GND
PGND
1 D1+
2 GND
3 D1-
4 D2+
5 GND2
6 D2-
7 D3+
8 GND3
9 D3-
10 D4+
11 GND4
12 D4-
13 CEC
14 NC
15 SCL
16 SDA
17 GND5
18 +5V
19 HOTP
20 TH1
21 TH2
22 TH3
HDMI_19PIN_DIP

The flexible HDMI - I2S output configuration:

- It can pull code switch to configure the SU - 1 HDMI - I2S, corresponding configuration switch 1-4 HDMI socket PIN13-16 feet. To pull ON the position, it means that HDMI PIN DSD_ON function.
- Switch 5 is to configure the clock output mode, OFF the clock output MCLK, ON the clock output WCK. Switch 6 is configuration HDMI PIN1-3 and PIN7-9 phase, ON time is the positive phase, OFF is the reverse. (Remark: ON time, and song poetry, the decoder matching; OFF can match and PS AUDIO).
- If your decoder is song poem's (GUSTARD), switch 3 and switch 6 to the ON position and pull the other OFF. If your decoder is PS - AUDIO, please to pull OFF the switch 1-4, switch 6 is OFF.
- Switch 7 and 8 as backup, there is no effect. Below is the production version of the chassis, the switch on the back of the case, you don’t need to open the chassis but you can be configured. The factory all switch is OFF by default.


HDMI-I2S的配置开关：
出厂默认都是OFF的
HDMI-I2S configuration switch:
Factory default is OFF
Warranty void if Damaged
16 1 2 3 4 5 6
17 7 8 9 10 11 12
ON
1 2 3 4 5 6 7 8
MODE3
MODE2
MODE1
MCLK
HP16
HP15
HP14
HP13

Case size and packing

- The dimensions of the case: 46 mm * 238 mm * 170 mm, not including the machine feet and chassis of the out standing part of the connector.
- Single machine weighs about: 1.8 KG.
- The dimensions of the carton packing: 350 mm * 230 mm * 110 mm.
- Packing weight: about 2 kg