PCM2706 USB DAC

User Manual

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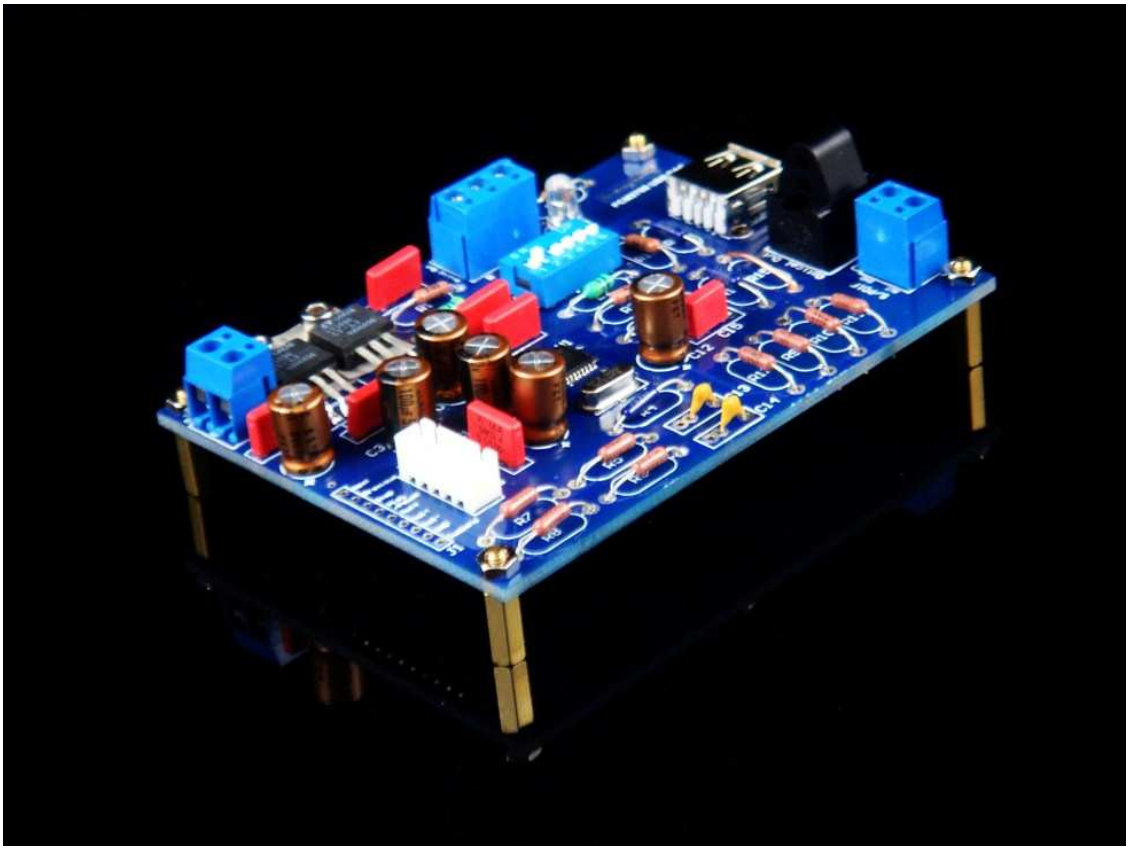


INTRODUCTION

As in a general computer sound card, you can often hear some weird noise via a normal headphone, so you may want to make a USB DAC to get a better sound by DIY. There are common USB DAC chip, for examples, the PCM2702, PCM2704, and PCM2706, etc.

	PCM2704	PCM2705	PCM2706	PCM2707
SNR(Typ)(dB)	98	98	98	98
# DACs	2	2	2	2
# Inputs / # Outputs	0 / 2	0 / 2	0 / 2	0 / 2
Sampling Rate(Max)(kHz)	48	48	48	48
Resolution(Bits)	16	16	16	16
Digital Audio Interface	USB	USB	USB, I2S	USB, I2S

Control Interface	HID	HID, SPI	HID, SPI	HID, SPI
Supply Voltage(s)(V)	3.3, 5	3.3, 5	3.3, 5	3.3, 5
Pd(Typ)(mW)	175	175	175	175
Additional Features	S/PDIF Output, Ext. ROM I/F, Headphone Output	S/PDIF Output, Headphone Output	S/PDIF Output, Ext. ROM I/F, Headphone Output	S/PDIF Output, Headphone Output
Operating Temp Range(Celsius)	-25 to 85	-25 to 85	-25 to 85	-25 to 85
Pin/Package	28SSOP	28SSOP	32TQFP	32TQFP

The PCM2704/5/6/7 is TI's single-chip USB stereo audio DAC with USB-compliant full-speed protocol controller and S/PDIF. The USB-protocolcontroller works with no software code, but USB descriptors can be modified in some parts (for example, vendor ID/product ID) through the use of an external ROM (PCM2704/6), SPI (PCM2705/7), or on request. The modification of the USB descriptor through external ROM or SPI must comply with USB-IF guidelines, and the vendor ID must be your own ID as assigned by the USB-IF. The descriptor also can be modified by changing a mask; contact your representative for details. The PCM2704/5/6/7 employs SpAct architecture, TI's unique system that recovers the audio clock from USB packet data. On-chip analog PLLs with SpAct enable playback with low clock jitter.

The PCM 2706 is selected to develop USB DAC sound card which can provide both analog (stereo single-end audio signal) and digital (S/PDIF and I2S). Because this PCM2706 is more flexible than the same series of PCM270x, that is PCM2702; which is ready to output both SPDIF and I2S. Obtained some samples from the TI, the PCM2706 can provide its own version of analog output signal, however if its quality is not perfect which may not meet the high requirements of DIYers. One might consider feed the S/PDIF digital output from the BNC connector or via optical fiber to the classical the best TDA1541A DAC.

It supports digital output (S/PDIF and I2S) with coaxial BNC output and optical fiber. Also can be used as USB sound card, direct-drive 16-64ohm headphones, sound quality for comparison with similar products .

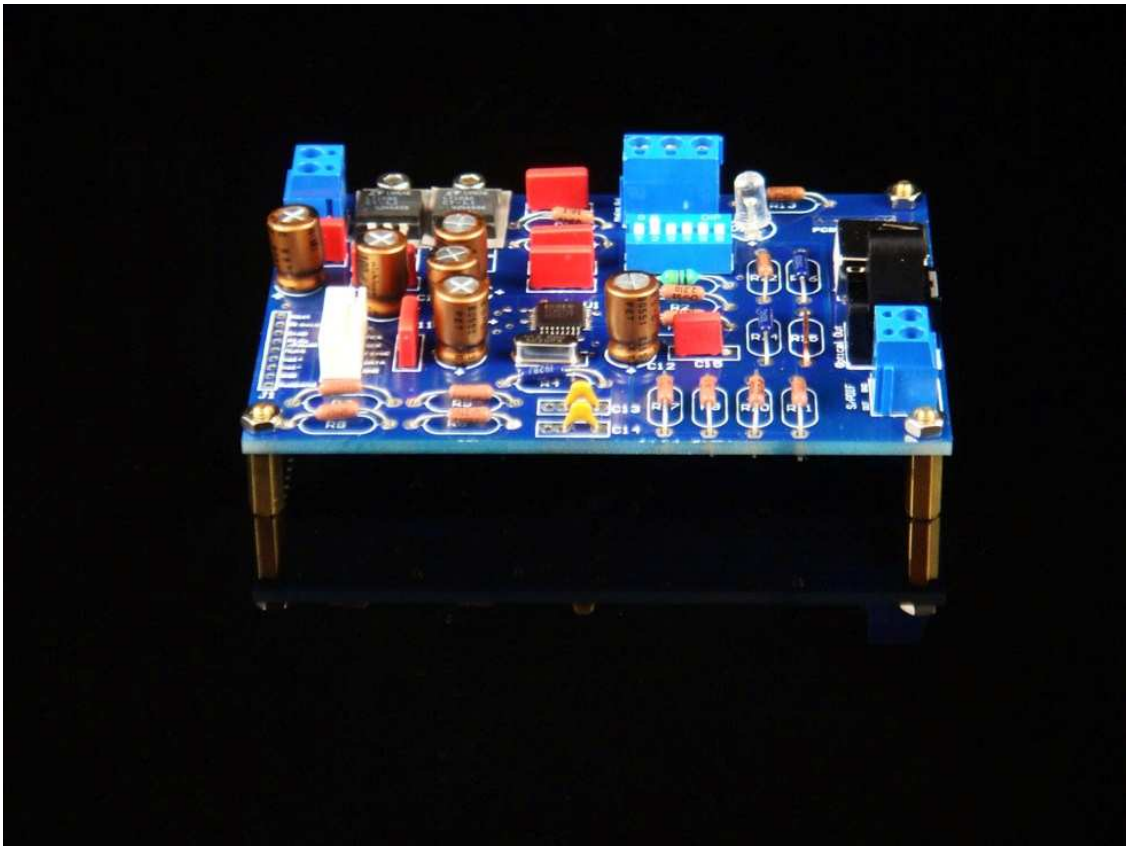
Also, it provides the external power supply options; usually the USB DAC is a direct use of 5V USB power, from which taking from the peripherial of computer power. However, there may be cause some serious noise problem from computer to the audio equipment that cannot always be avoid, so I do its external power supply, 3.3 for the two groups -V regulated power supply, a group of power supply for analog circuits, a group of power supply for digital circuits. In the LAYOUT and PC BOARD deliberately separated, and there provides options for using either external power or USB power.

As a lot of User asked why we did not sound the most high-end PCM2702, for three reasons, First, the 2702 circuit complexity, debugging difficult, and if unreasonable or debug circuit design is not good, is easy to sharp deterioration in sound quality, and the second, 2702 finished bulky , its 3, 2702 only the analog line audio output

WINDOWS XP or VISTA itself been built PCM2706 driver, so you do not have to install driver, a plug in the USB connector, the computer will be instantly more a USB sound card.

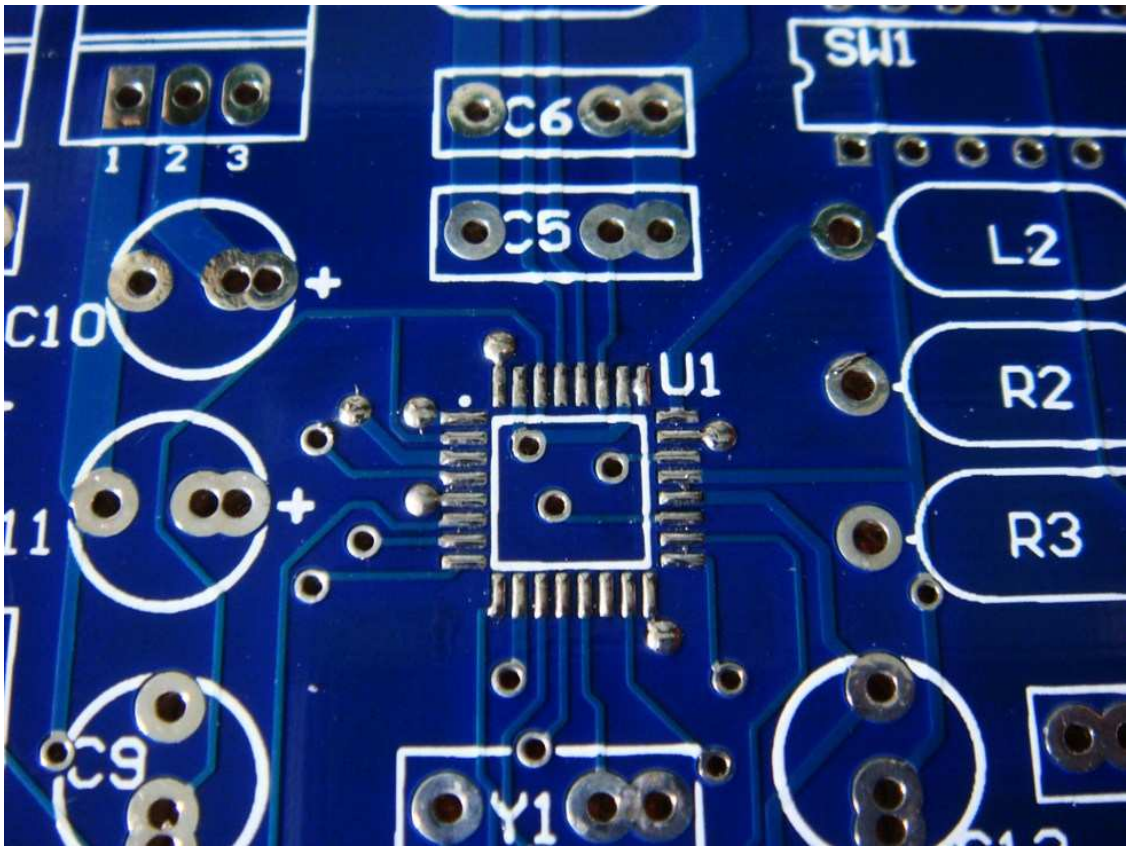
FEATURES

- Stereo USB DAC PCM2706
- Input: USB1.1/2.0
- Output: stereo single-end analog signal, digital SP/DIF, and I2C
- Operation system: Windows 98/2000/XP/Vista/7
- No need driver installation. Plug and play in windows OS.
- Support either USB bus power or external power supply.
- Built-in regulator circuit by using LM1086-3.3 to provide 3.3V voltages to the core.
- Dedicate power and ground railings of layout design.
- Power requirement: USB bus power or 8-18V DC for external power supply.
- PCB dimension: 104mm x 75mm, 2.4mm thickness and 2oz copper.

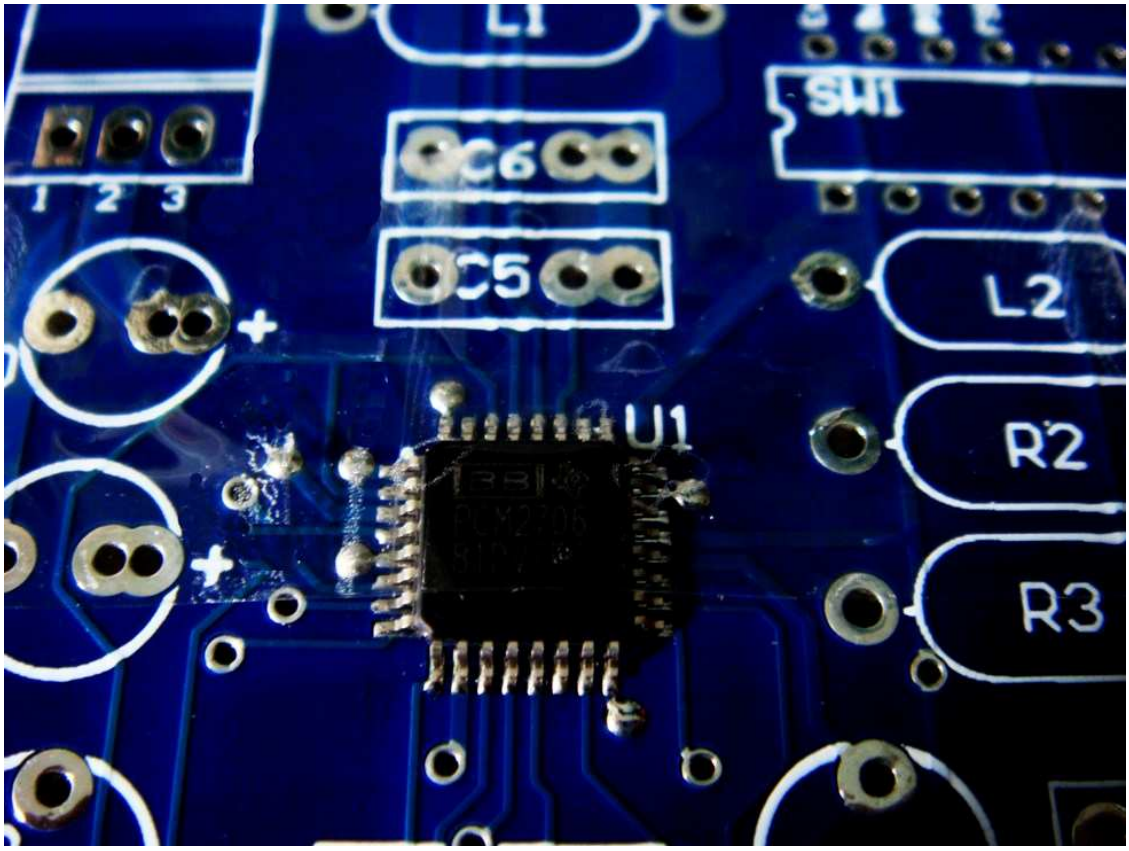


PROCEDURES

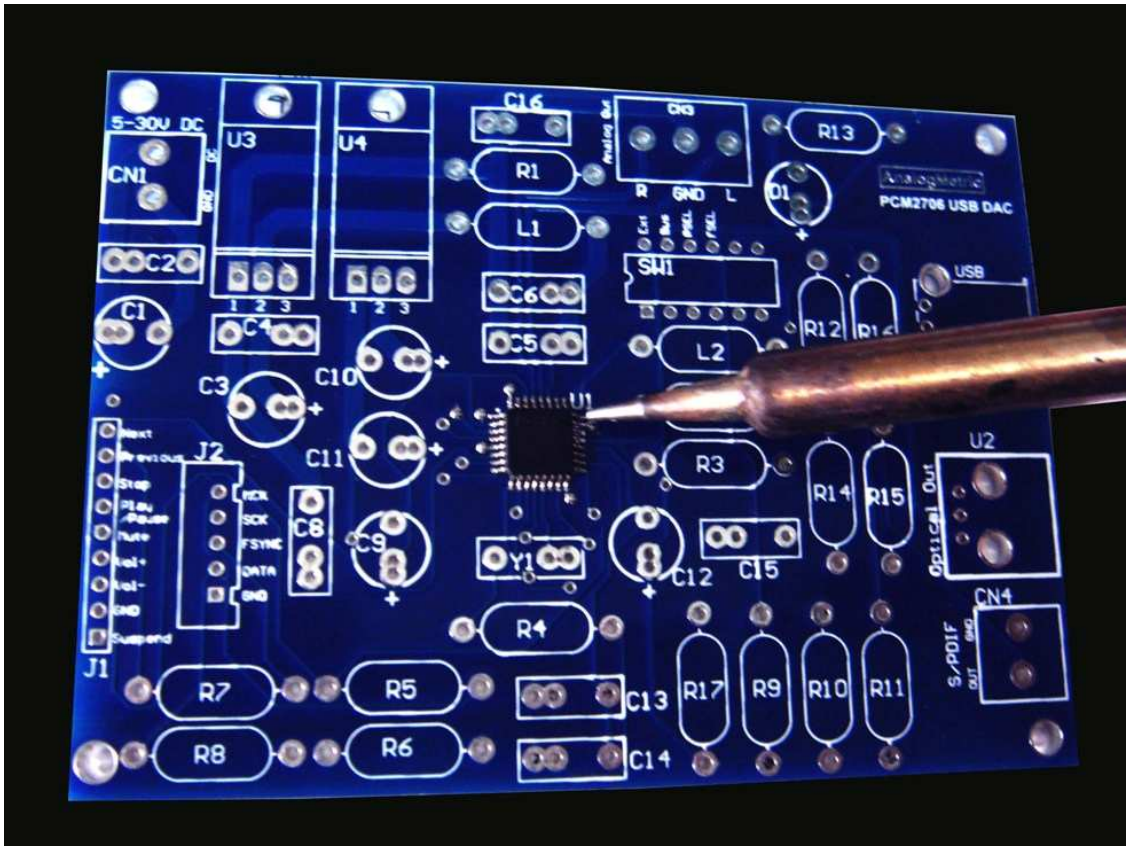
1. Solder the PCM2706 IC (this is the most difficult part, so we have more elaborations in it): Make some solder to the pins of U1 as the following photo. Uses some soldering paste to prevent short of adjacent pins.



2. Use a plastic tape to mount the PCM2706 IC to the right position. The dot of the IC indicates the direction of the PIN #1. There is a corresponding white dot on the board.



3. Use a soldering iron to heat and then push downward the pin one by one. Avoid heating the pin more than 2-3 seconds which may damage the IC.



4. Use a multimeter to check all the pins so that they are correctly mounted onto the board.

5. Solder all the remaining components according to the schematic, BOM list, and the photo. Notice to the polarity of the capacitors (C1-C12). There is no polarity of the thin film capacitors, so it can place in any directions.

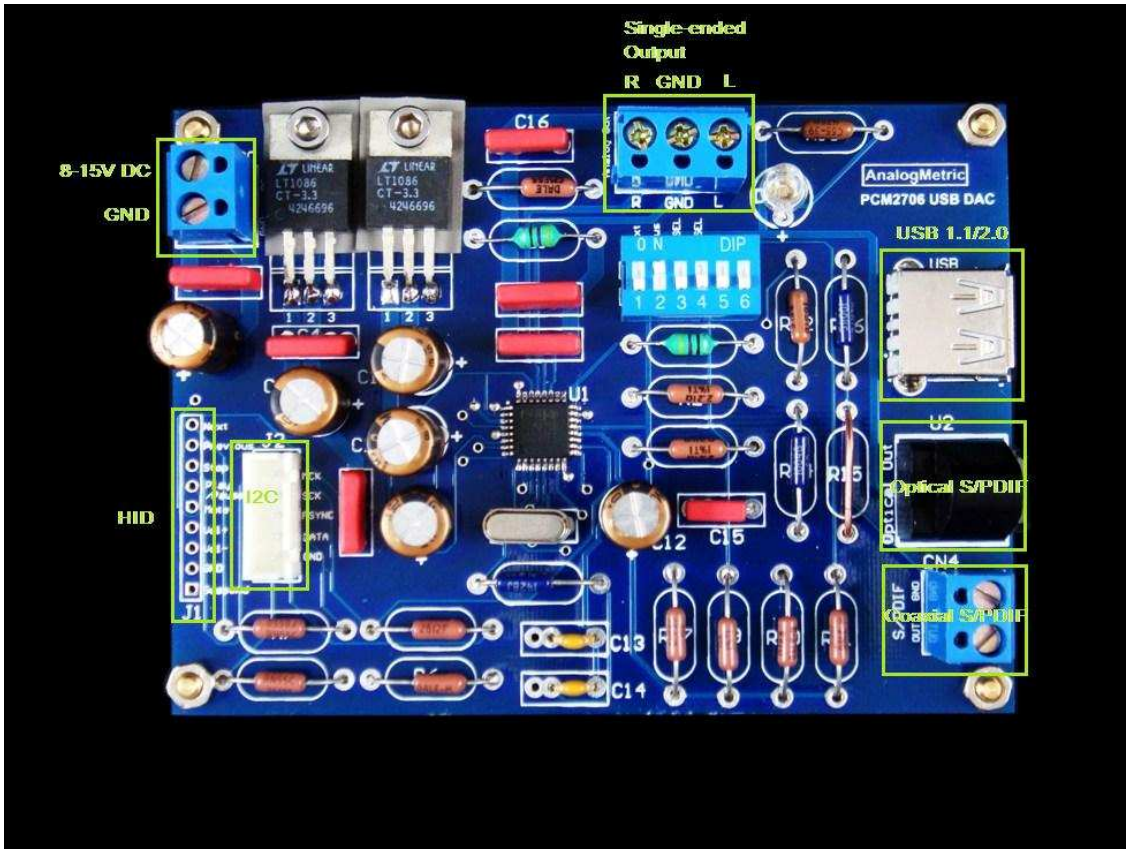
6. Set up the DIP switch (SW1): for S1 and S3 are On, and S2 is Off for external power supply; whereas S1 and S3 are Off, and S2 is On for USB bus power supply.

7. For bus power supply, connect the USB cable to the board, the LED will be led up.

8. For external power supply, connect 8-15V DC to the CN1 connector.

9. Windows OS will automatically detect it and install the required driver, so user do not need to install the driver themselves.

10. Play the musics in Windows OS and enjoy it.



If you have any problem in assembly, please contact us by email to tech@analogmetric.com