Introduction

The ES9038PRO SABRE DAC - Bringing Music to Life

The ES9038PRO SABRE DAC is the flagship of the ESS PRO series. It sets a new benchmark for audio excellence with the industry's highest dynamic range (DNR), up to 140dB, in a 32-bit, 8-channel DAC. The ES9038PRO was designed for premium home theater equipment including Blu-ray players, preamplifiers, all-in-one A/V receivers, and more. For serious audiophiles it provides the most immersive listening experience — bringing music to life.

The ES9038PRO SABRE DAC also features ESS' patented 32-bit HyperStreamDAC technology with-122dB total harmonic distortion plus noise (THD+N). The HyperStream architecture is responsible for both the outstanding sound quality of the ES9038 and the extremely low THD+N. A typical competitive, 32-Bit 8-Channel DAC using a delta-sigma architecture features-107dB THD+N (0.0004%), which when subjected to listening tests does not equal the clarity and sound stage of the ES9038PRO.

Es9038 PRO DAC - *Design by Andrea Ciuffoli-Quang Hao*
- *Based on the ESS Sabre32 Reference (ES9038PRO) DAC chip*
- Support 44,88,96,192,352,384KHz PCM and DSD to play SACD ISO.
- Full ground isolation from USB module
- On board reference 100MHz Crystek oscillator with a jitter of 0.5psecUltra fast oscillator buffer

Output: *Stereo balanced output impedance: 202 / 4 = 50 ohm*
- DC-ouput: +1.65VDC.
- Output impedance: 100 Ohm.
- Output: *2-Channel (stereo) outputs can be used in current-output or voltage-output mode (depends on output stage used)*

Input: *4 inputs:*
- 1. USB -match with Amanero USB (not included). Have pin I2C for other USB
- 2. Spdif
- 3. AES/EBU.
- 4. Optical

Digiltal supply:
- 1.2V core: LT3042
- 3.3V oscillator: LT3042
- 3.3V digital: LT3042
- 3.3V Top-botton chip
- 3.3V USB: LT3042 (If you not like us 3.3v from Computer for USB)

Analog supply:
- 1.2V analog (left and right separated): LT3042
- 3.3V analog (left and right separated): LT3042
- 5V for LCD: LT1117
- 5V Analog supply: LT1117
- 5V Digiltal supply Digiltal supply: LT1117

On-board DAC ESD9038PRO includes:

1. ES9038PRO chip.

2. Clock 100MHz CCHD-575, Ultra-Low Phase Noise Crystal Oscillator.

3. All Input connecters, Amanero USB (not included)

4. All low noise Lt3042

5. Lm1117

Use: it is simple and need:

1. Transformer 15VA to 25VA: 2 x 6 - 8VAC: Talema 70050 or Talema 70060 Or equivalent

2. Use LCD Control board off Andrea-quanghao for ES9038PRO, ES9028PRO

ES9038PRO Board
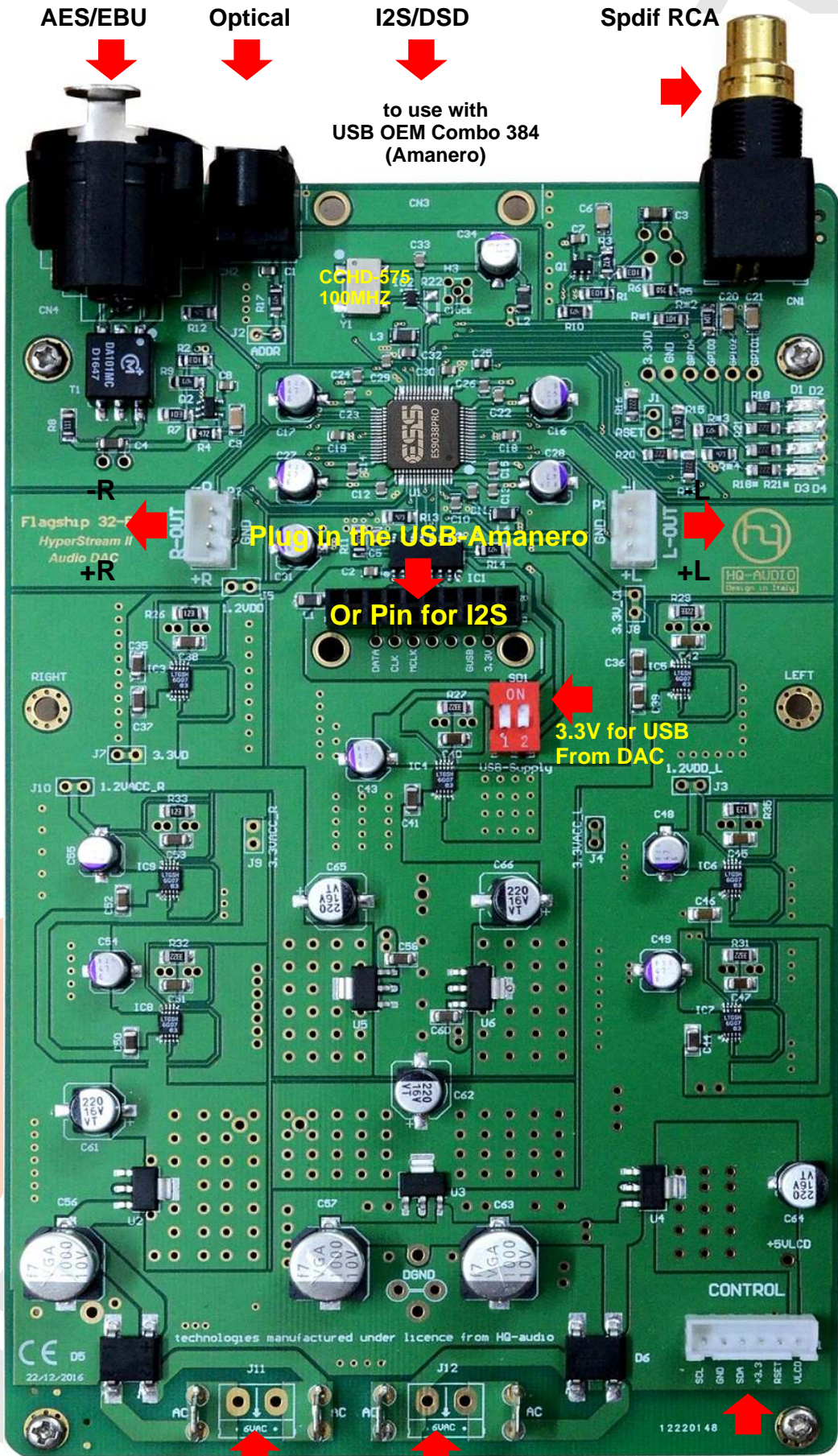
AES/EBU **Optical** **I2S/DSD** **Spdif RCA**

to use with
**USB OEM Combo 384
(Amanero)**

CCHD-575
100MHZ

**Channel R
Output**

DC= +1.65V

Plug in the USB Amanero

Or Pin for I2S

**3.3V for USB
From DAC**

**Channel L
Output**

DC= +1.65V

AC input

6-7.5V/1A x 2

Connect to LCD board
wire 6 pin

Design

Structural design

the flagship of the ESS PRO series

ES9038PRO
ES9028PRO
ES9018S

INPUTS

AES/EBU   AMANERO   OPTICAL   SPDIF

USB

Digital Isolators

RIGHT OUTPUT

50 Ohm Z-out

4 dac outputs in parallel

voltage output

⊕
⊖

balanced output

ES9038PRO

LEFT OUTPUT

50 Ohm Z-out

4 dac outputs in parallel

voltage output

⊕
⊖

balanced output

CRYSTEK CCHD-575

220 to 230VAC

Tranfomer stanby power supply

controller module

USB input   ᴴ Vol -dB
DSD 64
R-L Band 70K   3C
Brickwall

on/off
Selector

Mute
Volume

remote control

ES9038PRO
POWER SUPPLY

Supply Analog right

1.2V   3.3V

LT3042 low noise regulator 0.8uV
LT3042 low noise regulator 0.8uV

Supply Digital

1.2V core   3.3V Clock   3.3V USB   5V LCD   3.3V D

LT3042 low noise regulator 0.8uV
LT3042 low noise regulator 0.8uV
LT3042 low noise regulator 0.8uV
LT1117 - 5V
LT1117 - 3V

Supply Analog left

3.3V   1.2V

LT3042 low noise regulator 0.8uV
LT3042 low noise regulator 0.8uV

LT1117

LT3042 Low noise 0.8uV$_{RMS}$

LT1117

470uF   470uF

Transformer 15VA to 25VA:
2 x 6 -8VAC:
Talema 70050 or Talema 70060

470uF   470uF
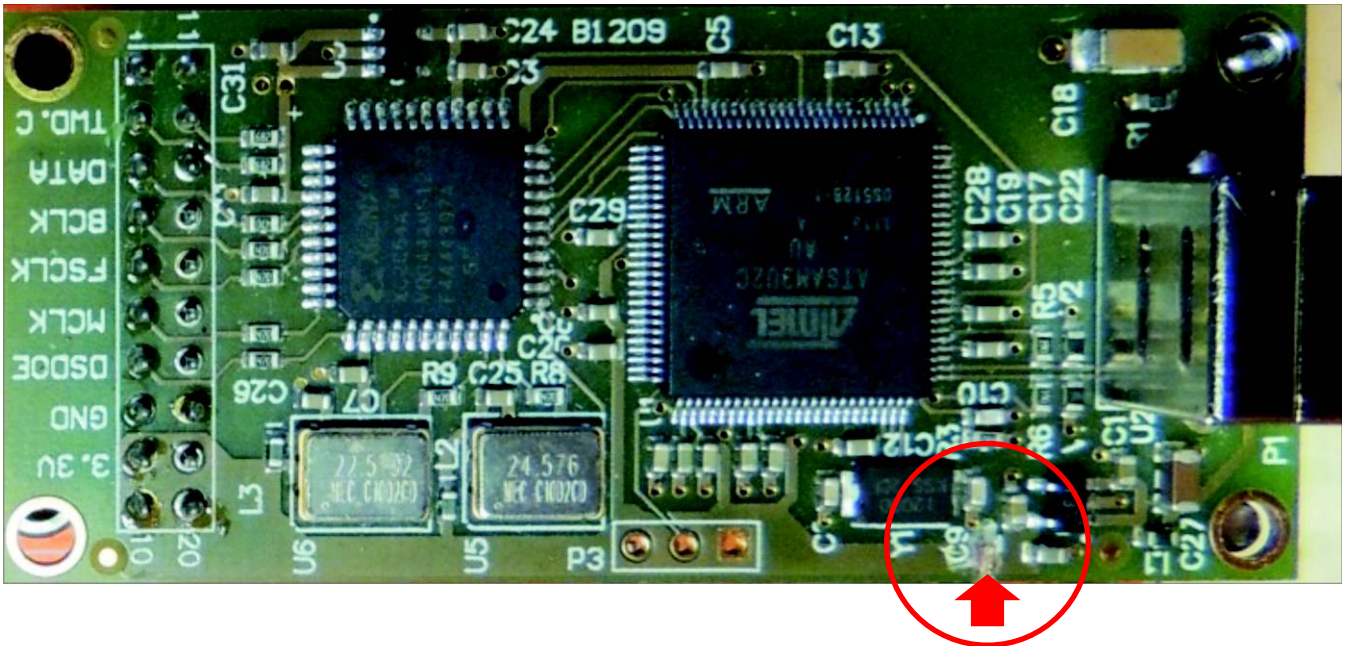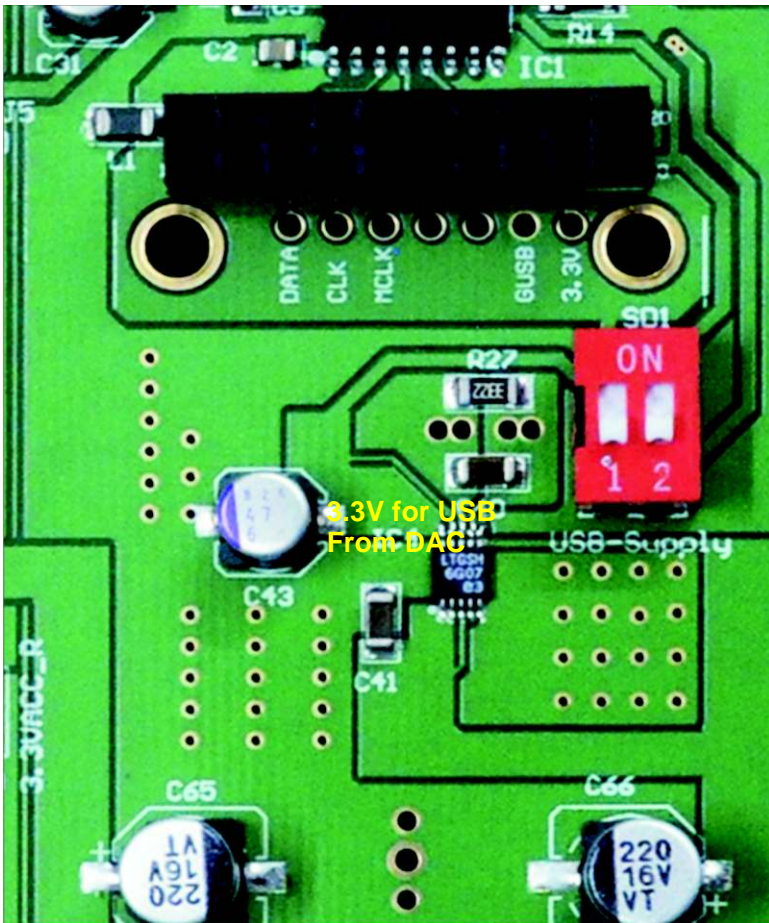
AC1   0 6V
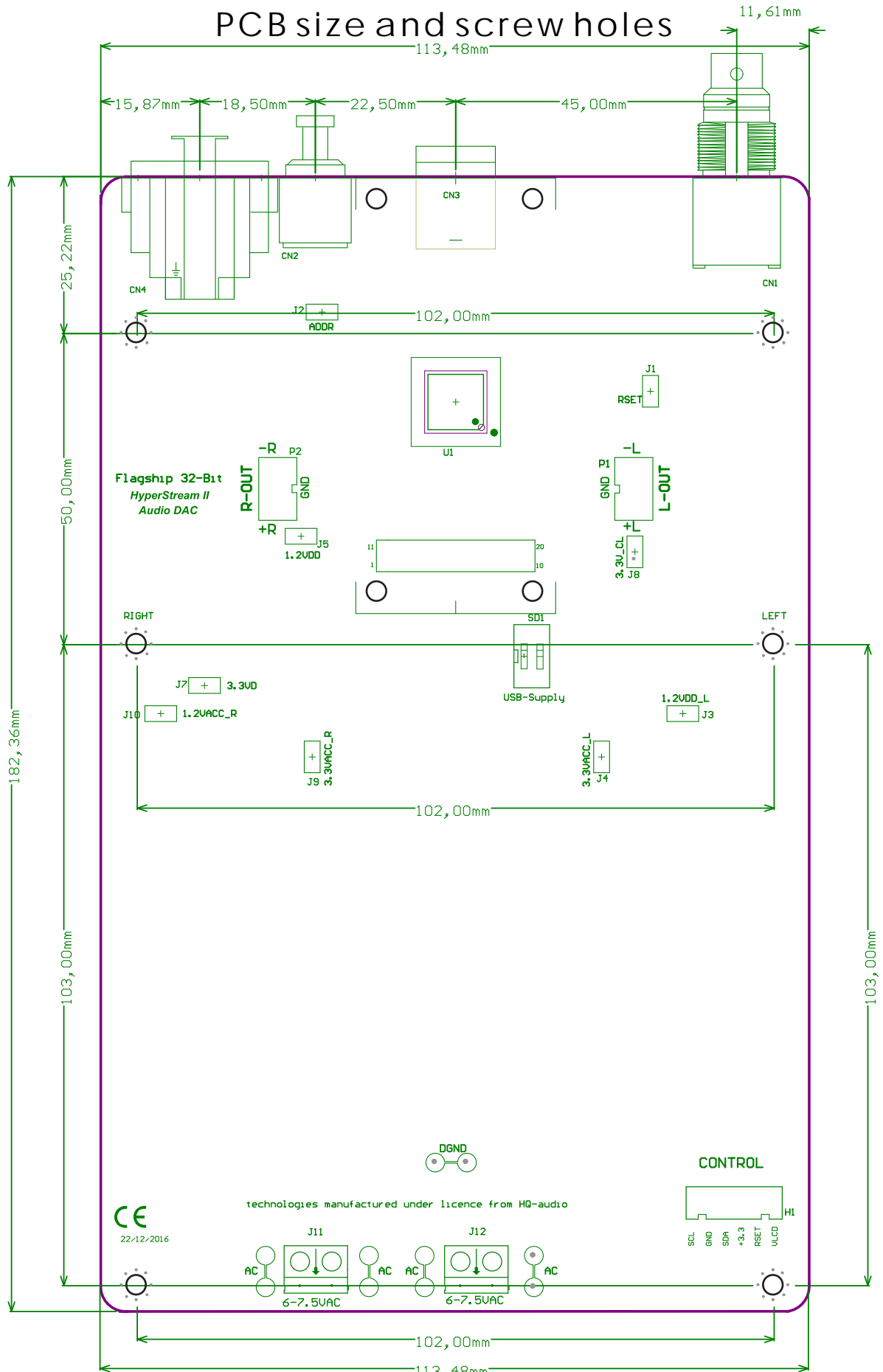
Earth

AC2   0 6V

Use 3.3v on DAC for USB Amanero:

Cut off the circuit at position C9
(remove 5 VDC from the computer)

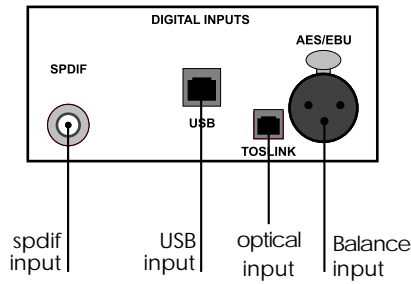Turn on switch Sd1
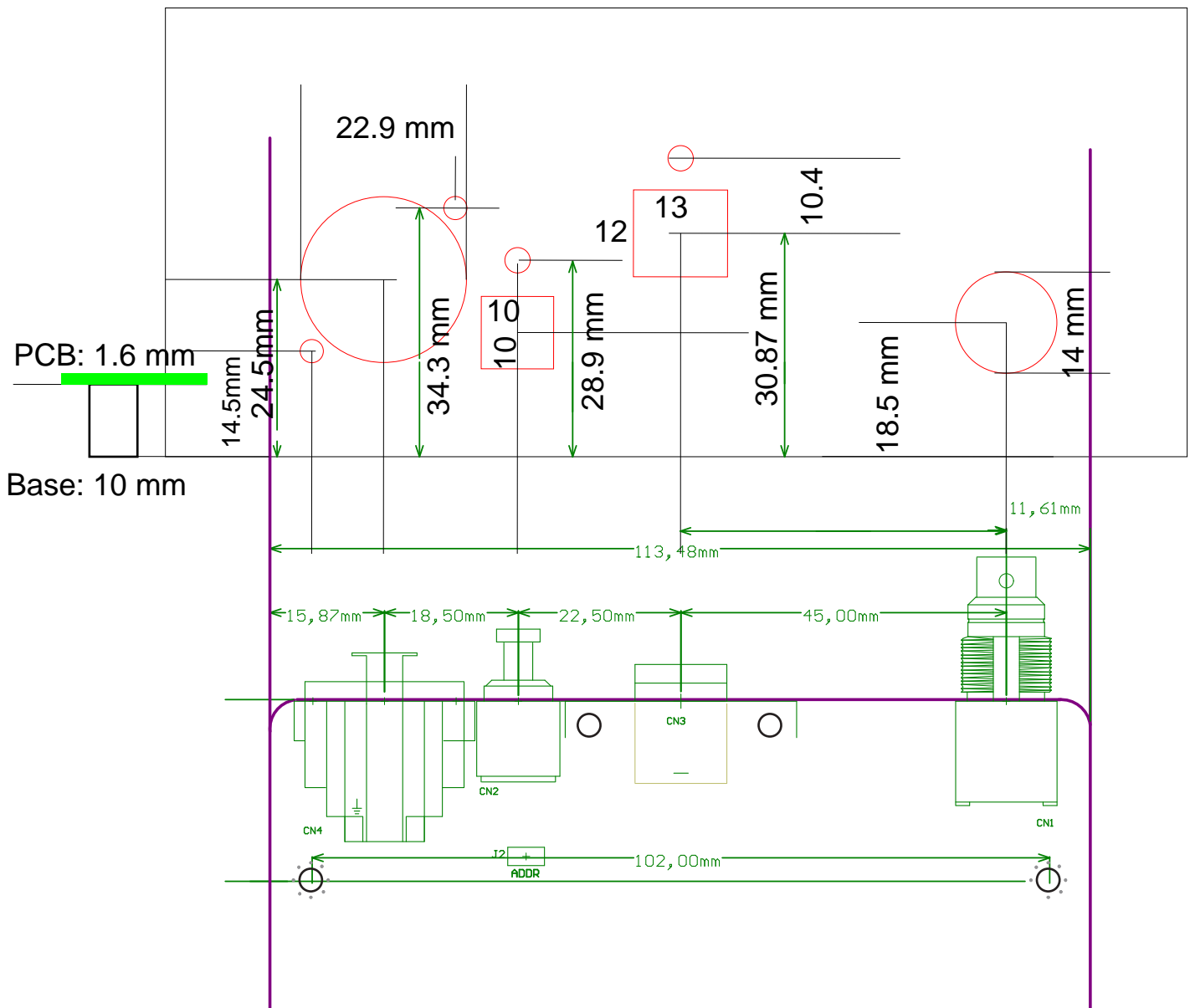to position On

USB use 3.3V from DAC

Board size

PCB size and screw holes

113,48mm
11,61mm

15,87mm 18,50mm 22,50mm 45,00mm

25,22mm

CN3

CN2

CN4

CN1

J2 ADDR 102,00mm

J1 RSET

50,00mm

Flagship 32-Bit
*HyperStream II
Audio DAC*

-R P2
R-OUT
GND

-L
P1
GND
L-OUT

U1

+R J5
1.2VDD

+L
3.3V_CL J8

11 20
1 10

RIGHT LEFT
SD1

182,36mm

J7 3.3VD
J10 1.2VACC_R

USB-Supply

1.2VDD_L
J3

3.3VACC_R
J9

3.3VACC_L
J4

102,00mm

103,00mm 103,00mm

DGND

CONTROL

CE
22/12/2016

technologies manufactured under licence from HQ-audio

J11 J12

H1

AC AC AC AC

SCL GND SDA +3,3 RSET VLCD

6-7.5VAC 6-7.5VAC

102,00mm

113,48mm

Board size

DIGITAL INPUTS

SPDIF

AES/EBU

USB

TOSLINK

spdif input

USB input

optical input

Balance input

Hole in the back

22.9 mm

13

12

10.4

10

10

PCB: 1.6 mm

14.5mm

24.5mm

34.3 mm

28.9 mm

30.87 mm

18.5 mm

14 mm

Base: 10 mm

11,61mm

113,48mm

15,87mm   18,50mm   22,50mm   45,00mm

CN3

CN2

CN4

CN1

J2
ADDR

102,00mm

Siz PCD DAC

Controls and features

1. Standby mode.

2. High volume display.

3. 20 x 4 LCD display.

4. Select the 4-way input and display the frequency on the LCD screen

5. Fuse protection - 220 VAC power supply / 5W

6.Turn on, off with remote control or buttons.

7. Simple and appropriate use for DAC chips: ES9038PRO, ES9028PRO.

8. Set up customizable protocols such as: volume, input as you like.

9. Select modes such as filter, frequency, left channel right.

10. Special and unique - Store settings according to your preferences:

* *A, Keep the big picture to the desired: lowest -100dB, largest 0dB.*
* *B, Select and store left or right channel output - No need to reverse the output.*
* *C, Selectable filter modes: (Pass band): 47kHz, 50kHz, 60kHz, 70kHz.*
* *D, Option: PCM Filter Characteristics*
* *E, Selectable filter modes: (Pass band): 47kHz, 50kHz, 60kHz, 70kHz.*
* *F, Option: PCM Filter Characteristics: Fast, Slow Roll-Off, Apodizing, Hybrid, Brickwall.*
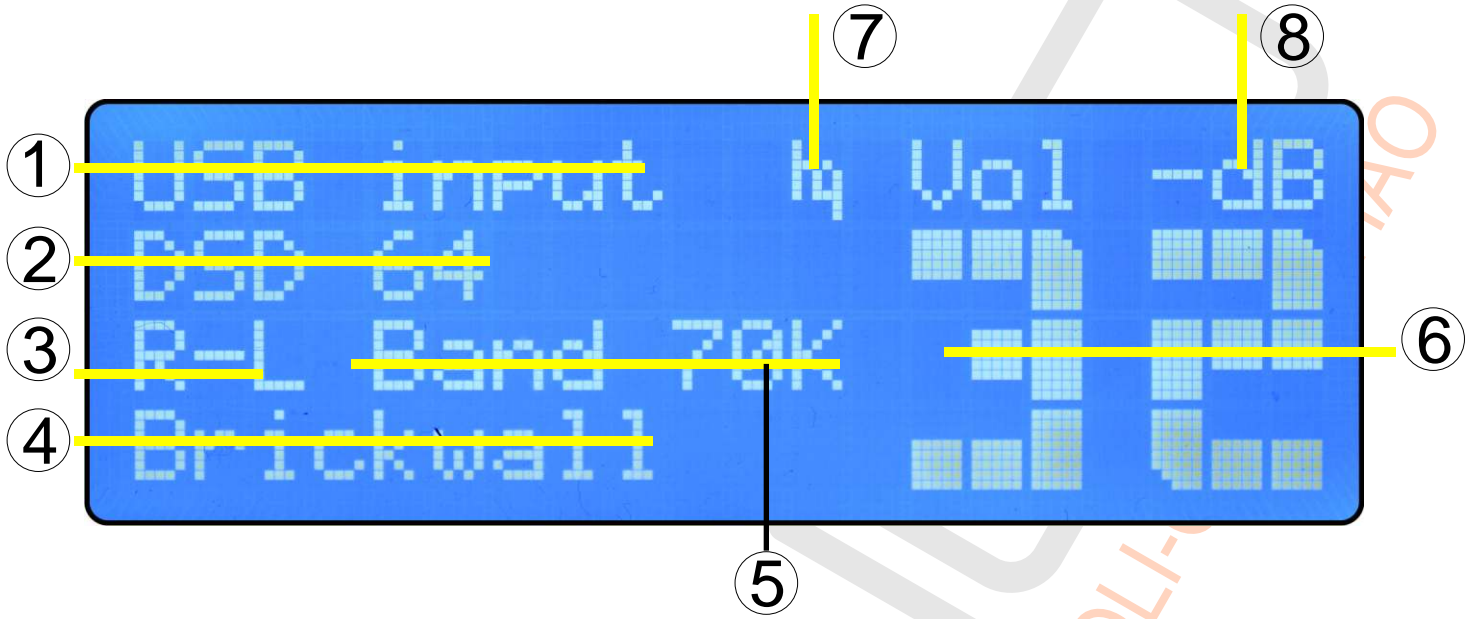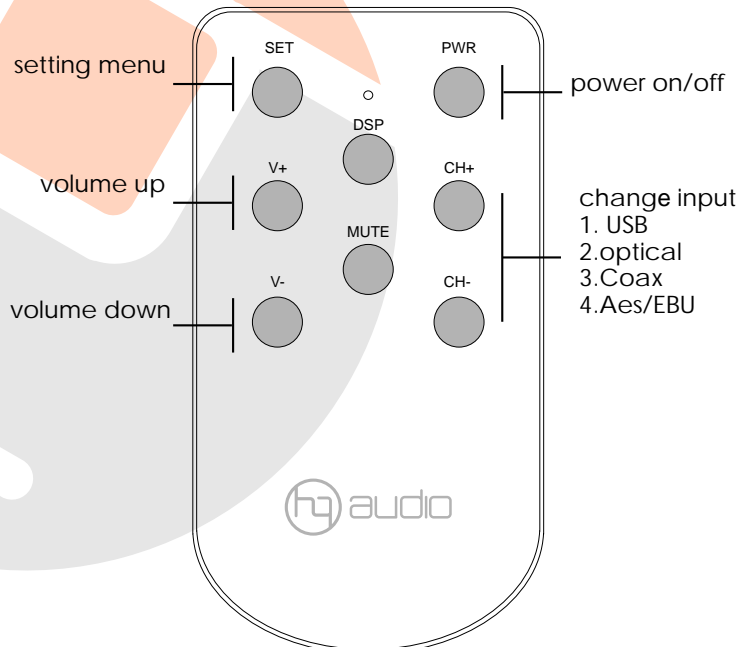
Board Controle
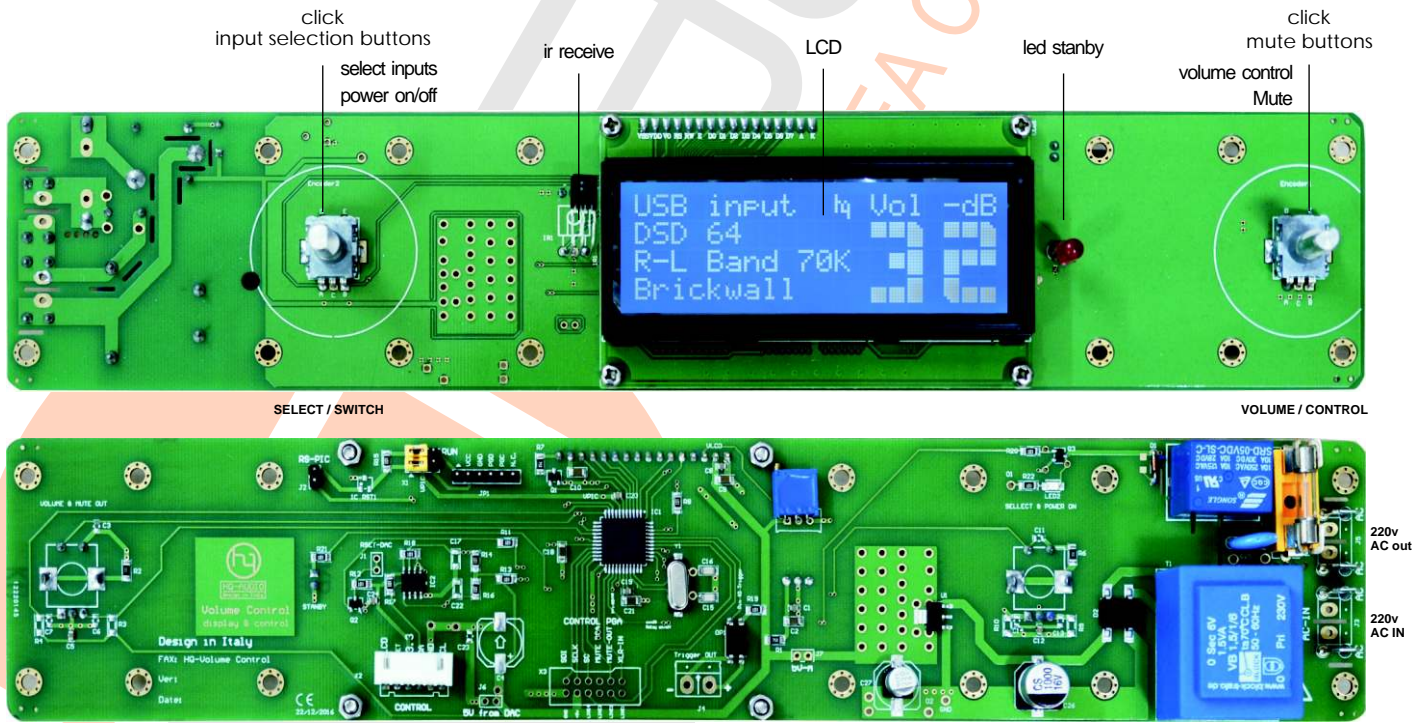
DAC connection and control   Remote

Information on LCD

LCD display showing:
- USB input
- DSD 64
- R-L Band 70K
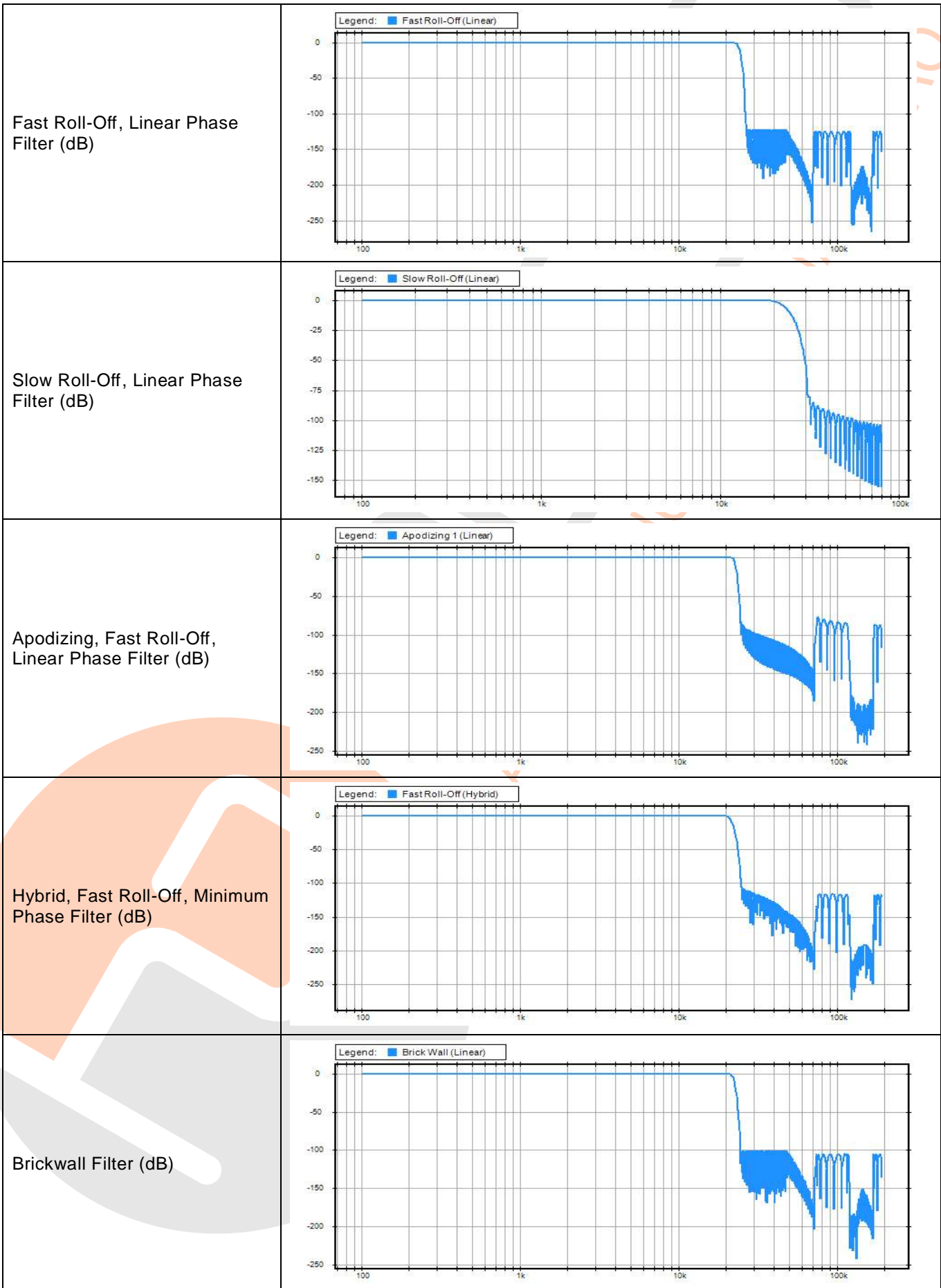- Brickwall
- Vol -dB
- Value: 99

1. Digital input: USB, AES/EBU, Spdif-RCA, Optical
2. Input frequency
3. Select Left Channel Right Channel
4. Filter
5. Band Filter: 47kHz, 50kHz, 60kHz, 70kHz
6. Volume: maximum is 0 dB, minimum is -99dB
7. Logo HQ
8. Volume dB

Remote control

- setting menu — SET
- power on/off — PWR
- DSP
- volume up — V+
- CH+
- MUTE
- volume down — V-
- CH-
- change input
  1. USB
  2. optical
  3. Coax
  4. Aes/EBU

hq audio

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PCM Filter Freqency Response

Fast Roll-Off, Linear Phase Filter (dB)	Legend: ■ Fast Roll-Off (Linear)
Slow Roll-Off, Linear Phase Filter (dB)	Legend: ■ Slow Roll-Off (Linear)
Apodizing, Fast Roll-Off, Linear Phase Filter (dB)	Legend: ■ Apodizing 1 (Linear)
Hybrid, Fast Roll-Off, Minimum Phase Filter (dB)	Legend: ■ Fast Roll-Off (Hybrid)
Brickwall Filter (dB)	Legend: ■ Brick Wall (Linear)

Control guide

Use the remote control to set and remember settings such as:

Volume,

input,

left-channel right channel,

filter modes,

filter frequencies.

Using:

1. On the remote control, press: SET, LCD display text: settings.

```
USB input  hq      Setting
DSD 64
R-L Band 70K       30
Brickwall
```
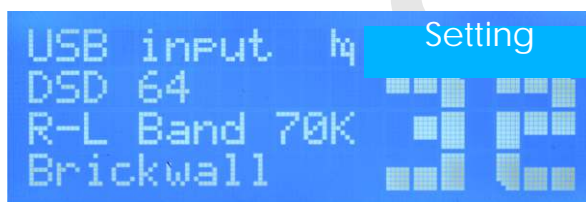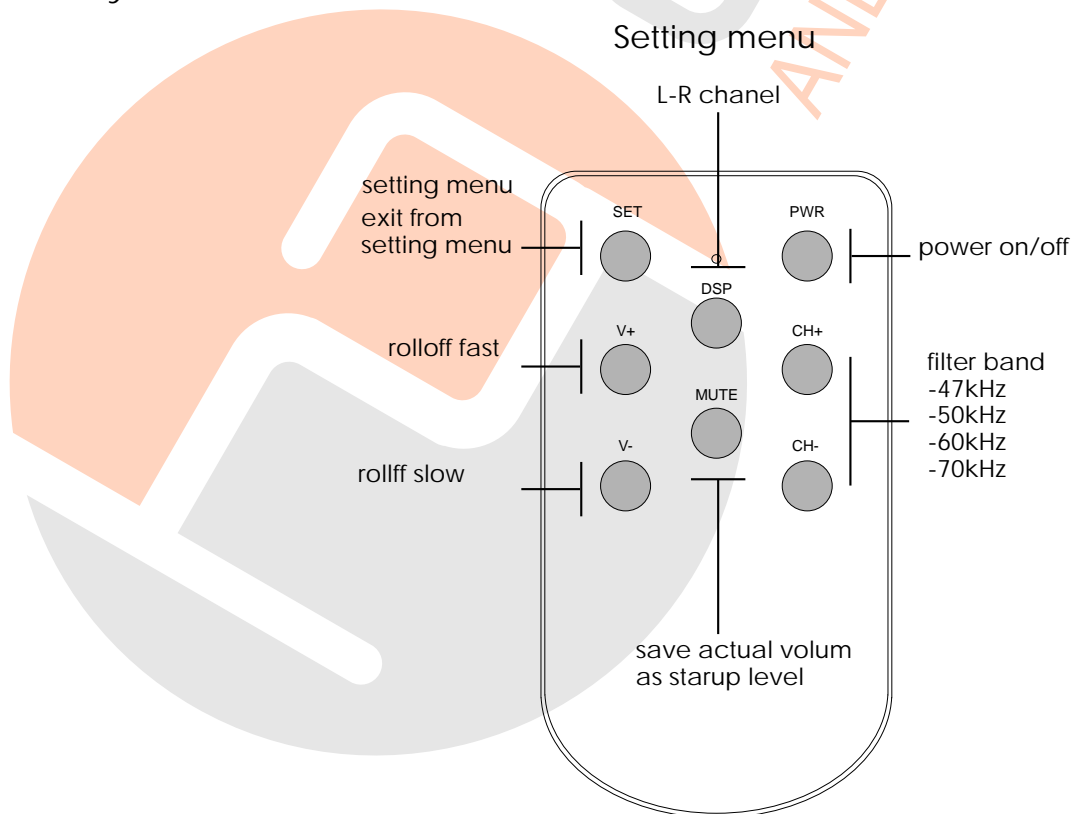
2. Press the install options button:

a, V +, V-: filter selection.

b, DSP: island left channel and right channel output (L-R)

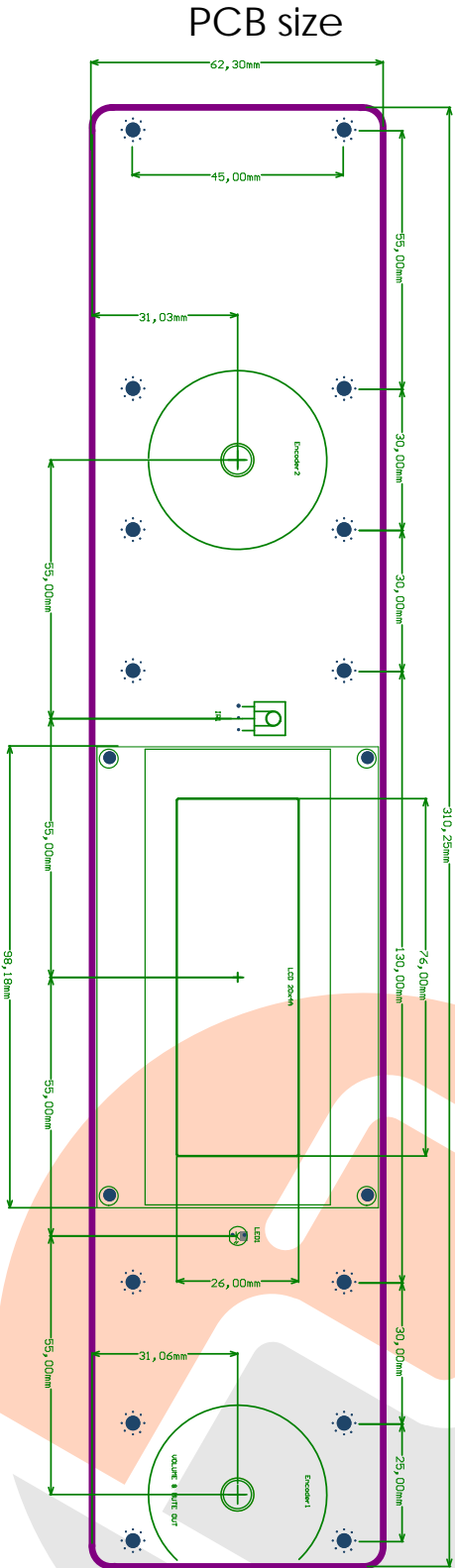*c, CH +, Ch-: select the filter frequency.*

When the installation is complete, press the button: Mute to save all the settings, and press the SET button to exit the program.

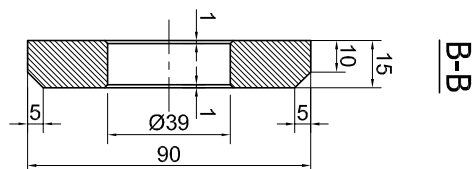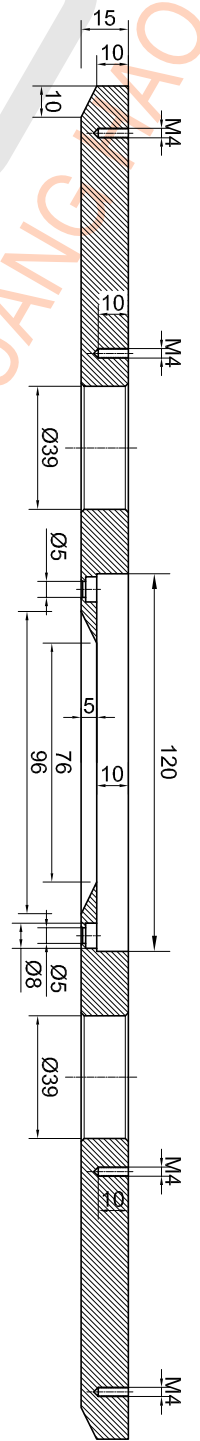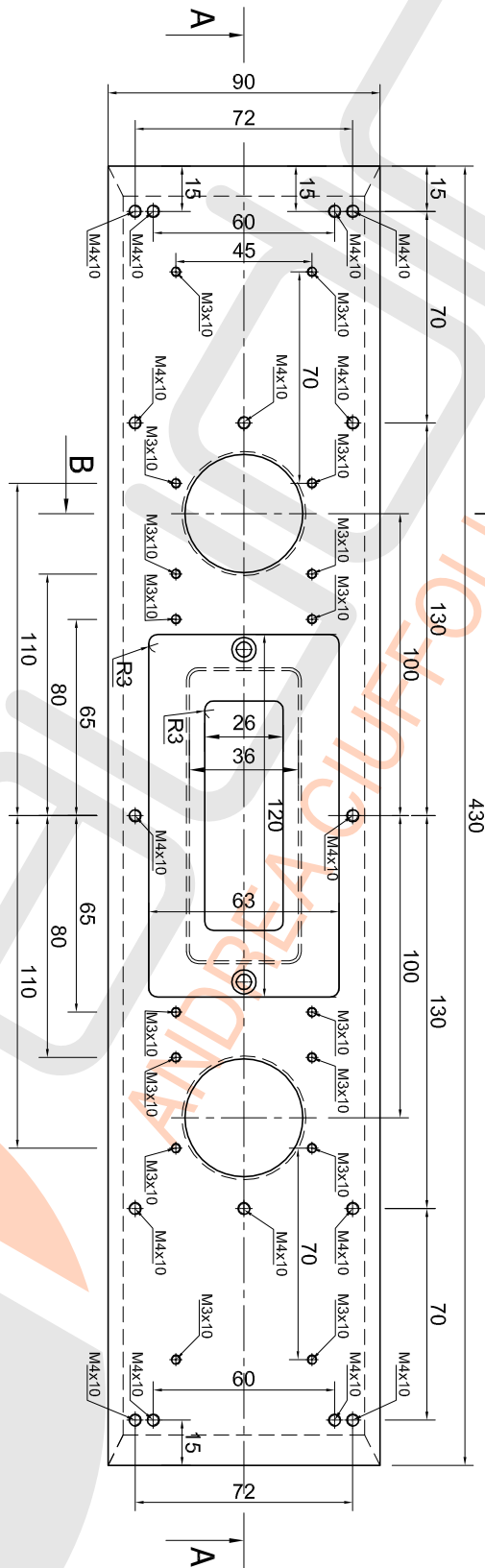*Then, restart the DAC, and play the music!*

Thank you!

Setting menu

L-R chanel

setting menu
exit from
setting menu — SET   PWR — power on/off

                DSP

rolloff fast — V+   CH+   filter band
                                        -47kHz
                MUTE   -50kHz
rollff slow — V-   CH-   -60kHz
                                        -70kHz

save actual volum
as starup level

Control drawing

PCB size

view from the back

A-A

B-B

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Music player setup.

The Music player

To use Hq- Reference DAC and DSD-DAC with all the PCM sampling frequency and DSD sample rates, it is necessary configure the Music player (Foobar2000, Jriver or similar) to use: Windows Audio Session API (WASAPI), Kernel streaming (KS) or Audio Streaming Input Output (ASIO).

Using the default Windows driver called Direct Sound (DS) the DAC unit will work only at a specific frequency set in the Windows Audio control panel.

To work with the Kernel streaming (KS) and the Audio Streaming Input Output (ASIO) it is necessary set as predefined a different sound device on Windows Audio control panel to keep the Amanero free for the application control.

The Kernel streaming (KS) is the lower level mode to operate on Audio device so there are lower stratification in the software stack. The Windows Audio Session API (WASAPI) give less problems and it work very good with PCM and DSD tracks. Set the Windows with no sound to avoid that the system messages interference during the reproduction.

To use Foobar2000

To use Foobar2000 is much more complex

 You can follows the guide on: http://hifiduino.wordpress.com or this following images.

download the last player SACD support   (foo_input_sacd-0.6.1.zip to get foo_input_sacd.dll and ASIOProxyInstall-0.6.0.zip)

ASIO4ALL (ASIO4ALL 2.11 Beta1 to get foo_dsd_asio.dll)

Kernel Streaming support necessary to play 384KHz tracks (foo_out_ks.dll)

copy foo_input_sacd.dll, foo_dsd_asio.dll and foo_out_ks.dll in the directory C:\Program\foobar2000\components

If you select as output device the ASIO4ALL when you start to play any tracks an little icon will be insert in the Appl. Bar.
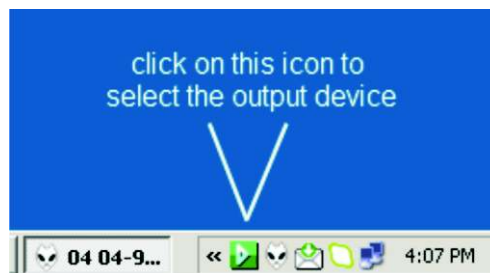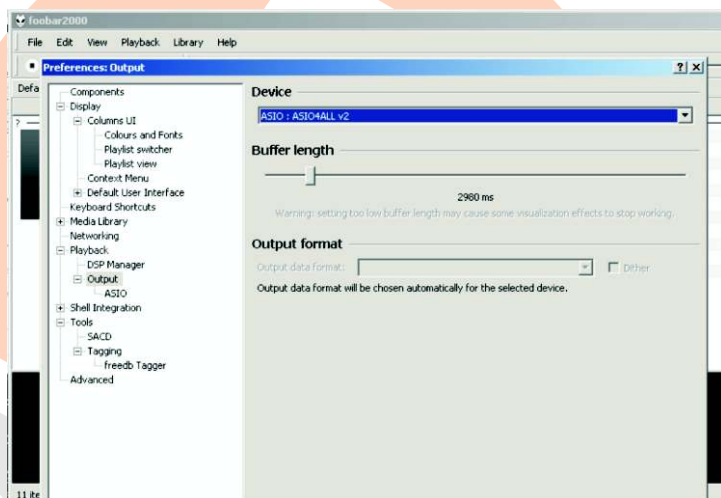
Music player setup.

JRiver DSD setting screenshots

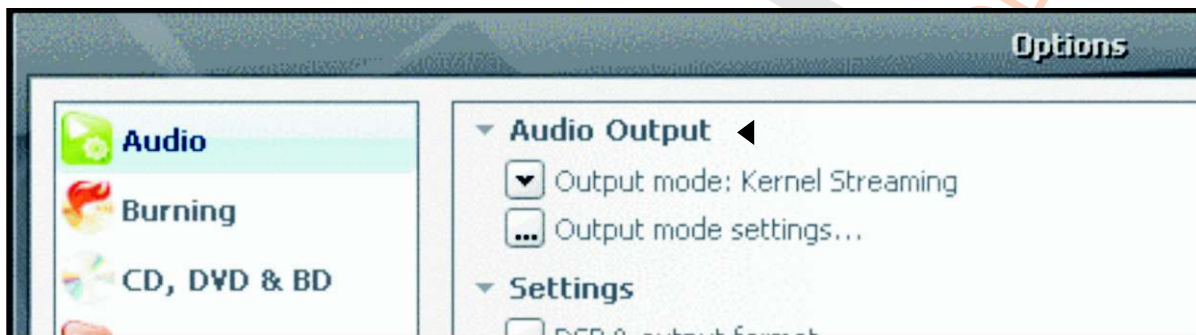The JRiver is more simple and with this configuration you can play 44,88,96,192,384KHz, DSD files and SACD ISO.

download the last player: http://www.jriver.com.

it's best to buy a license for Jriver

Direct Stream Digital, also known as DSD format - this format is not new as many people think, it is as old as digital but it wasn't used for consumer audio or home audio - before. It became very popular after 2010 and continues to make its way into our homes.

It encodes the music in the data stream differently, looks differently and sounds differently. It is the format in which the SACD discs were recorded and a format in which the analog master tapes were backed up by record companies. It is currently the format in which the master recordings are made in record industry.

1. Open Jriver and Tool/Options

2. Tool/Options/Audio

2. Audio Output /Output mode/
   kernel Streaming

4. DSD over PCM(DoP)
   DoP Format: DoP 1.0 (0XFA / 0x05)

3. Audio Output /Output mode/
   Bitstreming: Yes over PCM(DoP)

5. Ok and save
   Now playing

Music player setup.

Audirvana on MAC OS configuration:

The **Audirvana** is more simple and with this configuration you can play DSD files and SACD ISO.

download the last player: https://audirvana.com/

it's best to buy a license for **Audirvana**

General Optimization

☑ Deactivate completely iTunes own playback
Note: this option should be enabled for playing proxy files

Sound Quality optimizations at the expense of convenience functions

☑ Deactivate volume control by iTunes
☑ Deactivate play position control by iTunes

Native DSD Capability [DSD over PCM standard 1.0 ◊]

Max sample rate limit [No Limit ◊] Spl rate switch
☑ Limit max bitdepth to 24bit instead of 32bit

☑ Optimize System for Audio Playback

Audirvana Plus priority [Very High ◊]
☑ Disable Spotlight
☑ Disable Time Machine
☑ Disable detection of iDevices on USB

Converter: [iZotope 64-bit SRC ◊]

Quality ———————●———
Fastest   Best
Advanced parameters
Steepness: ———————●——— 97 dB
Filter max length: ——●——————— 500,000 Samples

AudioUnits

☐ Use AudioUnits effects
[No Effect ◊]
[No Effect ◊]
[No Effect ◊]
[No Effect ◊]