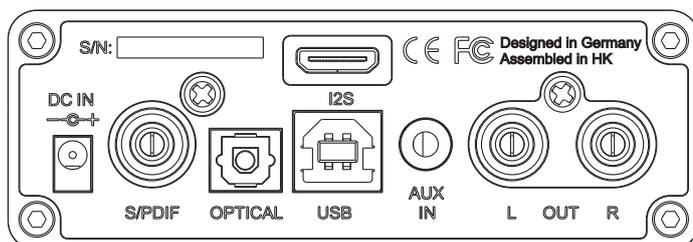
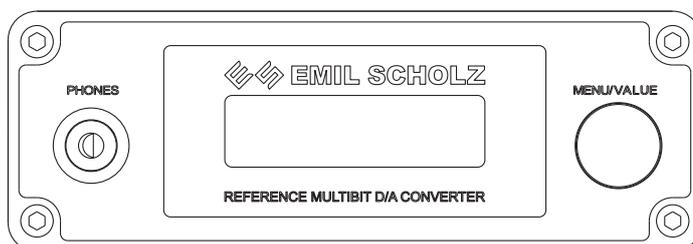




20/24-bit 96 kHz USB multibit D/A convertor

USER'S MANUAL



ESD-6300
ESD-1862
ESD-1704



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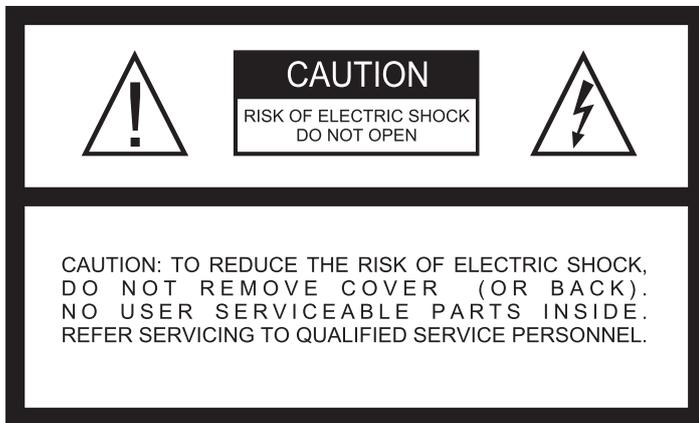
Warnings

FCC warning

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to take whatever measures necessary to correct the interference at his own expense.

Copyright Notice

The Emil Scholz ESD DACs is a computer-based devices, and as such contains and uses software. This software, and all related documentation, including this User's Manual contain proprietary information which is protected by copyright laws. No part of the software and its related documentation may be copied, transferred, or modified. You may not modify, adapt, translate, lease, distribute, resell for profit or create derivative works based on the software and its related documentation or any part thereof without prior written consent from Emil Scholz GmbH. All rights are reserved.



CAUTION:

TO PREVENT ELECTRIC SHOCK, MATCH WIDE BLADE OF PLUG TO WIDE SLOT, FULLY INSERT.

ATTENTION:

POUR ÉVITER LES CHOCS ÉLECTRIQUES, INTRODUIRE LA LAME LA PLUS LARGE DE LA FICHE DANS LA BORNE CORRESPONDANTE DE LA PRISE ET POUSSER JUSQU' AU FOND.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance(servicing) instructions in the literature accompanying the appliance.



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

“WARNING”

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

Servicing

The appliance should be serviced by qualified service personnel when:

- The power supply cord or the plug has been damaged or
- Objects have fallen, or liquid has been spilled into the appliance or
- The appliance has been exposed to rain or
- The appliance does not appear to operate normally or exhibits a marked changed in performance or
- The appliance has been dropped, or the enclosure damaged

The user should not attempt to service the appliance beyond that described in the operating instructions.

All other servicing should be referred to qualified service personnel only.

Thank you for purchasing Emil Scholz multibit DAC. Please read this manual before operating Emil Scholz multibit DAC. Store the manual in a safe, easily accessible place for future reference.

Overview

Emil Scholz ESD series digital-to-analog converters are based on legendary classical multi-bit converters produced by Burr Brown Analog Devices. These are widely known and recognized as reference of DA audio converter chips PCM63P-K, AD1862N-J and PCM1704U-K.

Emil Scholz ESD digital to analog converter series includes three basic devices: ESD-6300, ESD-1862 and ESD-1704. All the devices are functionally same and have same main board and software.

Two additional module boards can be installed on the main board to modify the device type. The first module allows adding ADAT Type I/II interface support option and can be installed either during assembling of the device or during its upgrade by the customer or with our assistance.

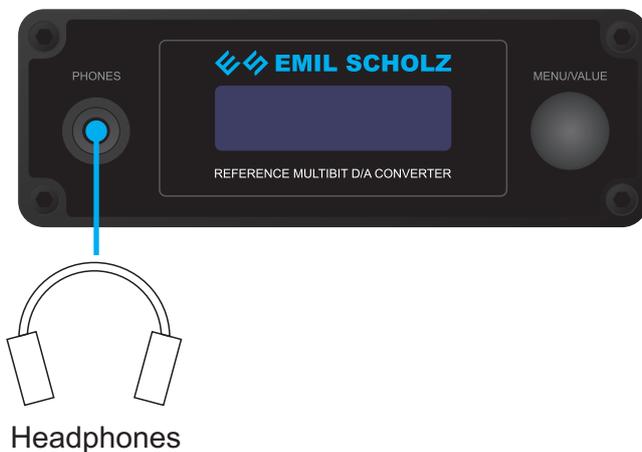
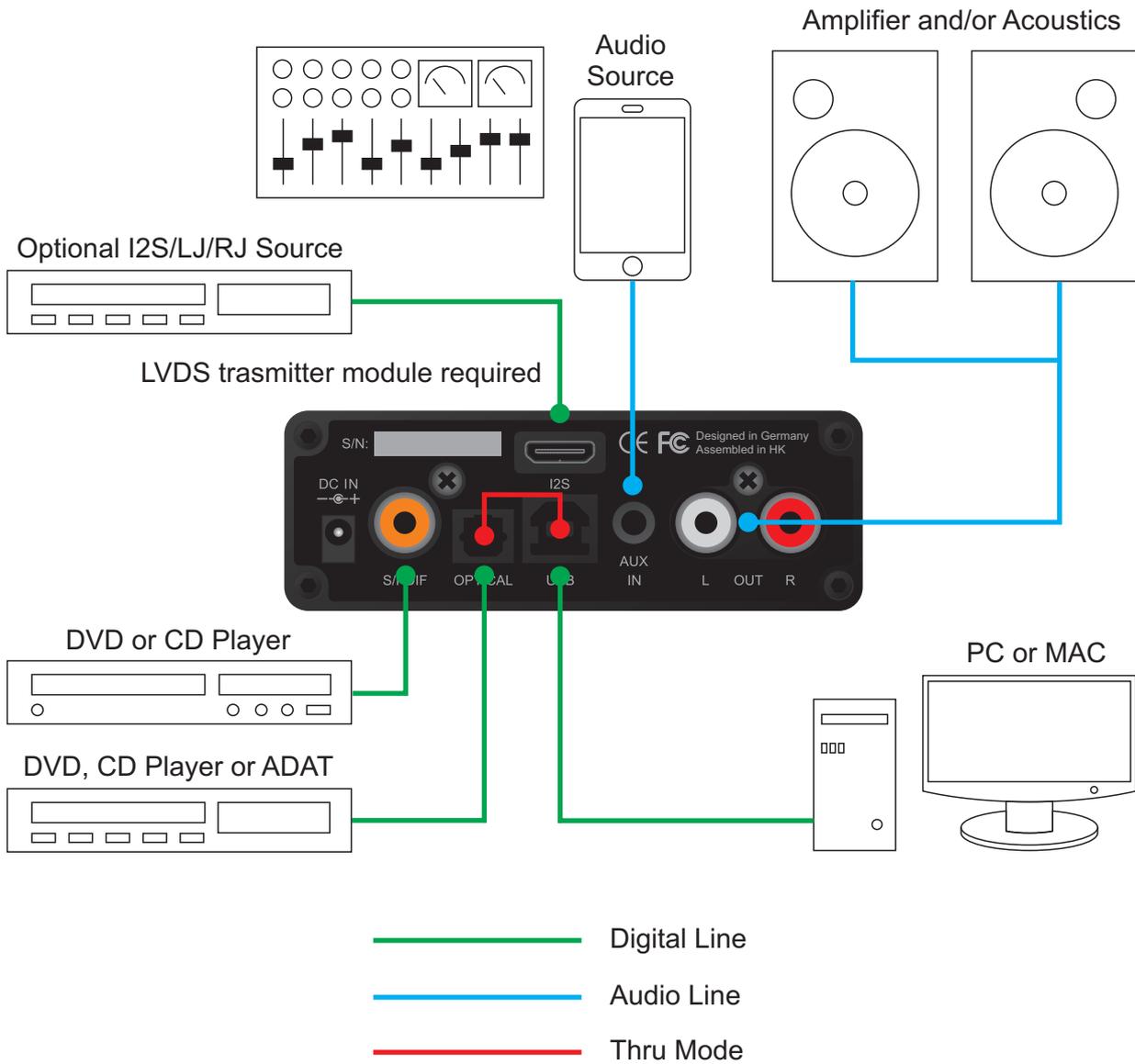
The second module is a daughter board with DA converters and necessary components. When a definite type of DA daughter board is installed software automatically defines its type and makes all necessary modifications in the device performance.

Now three versions of the daughter boards are available, and there are three models of the converters accordingly - based on Burr Brown PCM63P-K (20-bit), Analog Devices AD1862N-J (20-bit) and Burr Brown PCM1704U-K (24-bit). As the DAC modules are replaceable, you can upgrade your 20-bit version into an advanced 24-bit model on the basis of PCM1704 any time at your discretion.

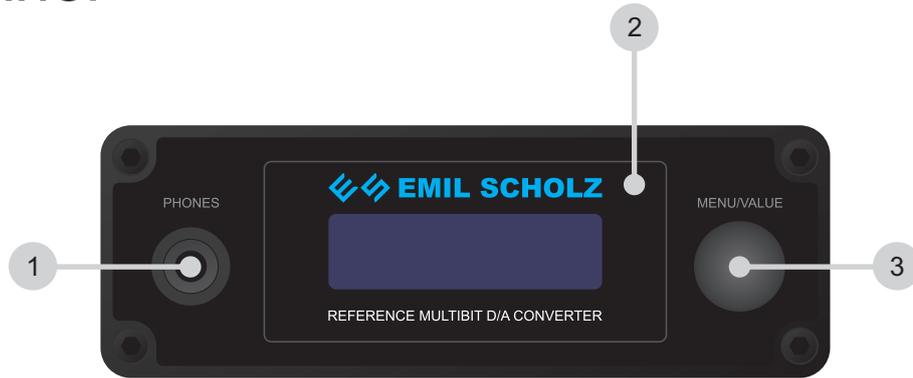
Features

- Home and studio usage
- Highest grade matched DACs
- Classic multibit reference sound
- Low jitter recovery technology
- Miniature design
- Easy control and input select - one touch push & turn
- Quick view of settings and parameters
- ADAT support (optional or preinstalled board)
- High performance low ripple DC/DC
- Galvanic isolation between digital and analog parts
- External 6-lines mini HDMI LVDS input including emphasis and error information
- Stereo, mono, left, right channel mode control
- Normal, inverted both, inverted left or inverted right channel phase mode
- Sharp and slow roll-off DF mode control
- Automatic LCD backlit off
- Auxiliary 3.5mm input for additional audio source
- Optical and coaxial S/PDIF inputs
- USB 2.0 24-bit/96kHz support
- Ultra-low noise headphone and output stage
- Power failure protection
- No capacitors in analog path
- Optional 24-bit PCM1704U-K upgrade board for basic models
- Optional ADAT interface upgrade board for basic models
- Thru mode from optical input to USB

Connections

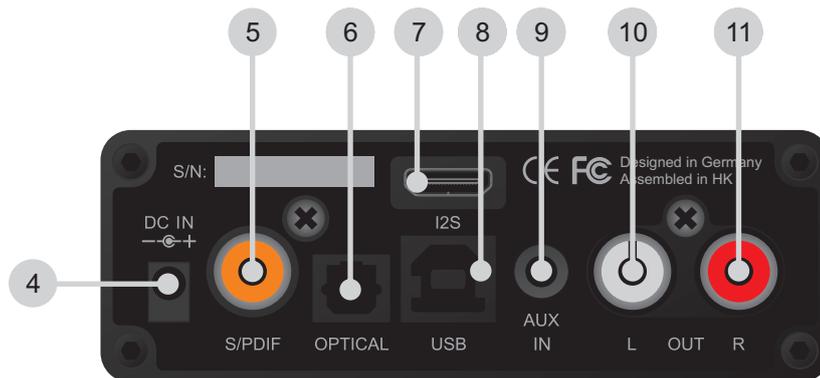


Front Panel



1. HEADPHONES OUTPUT. Low noise output for 16-32 Ohms studio or consumer headphones.
2. LCD DISPLAY. Displays all necessary information such as selected input, settings and control.
2. CONTROL KNOB. Multifunctional turn and push encoder for input select and settings access.

Rear Panel



4. DC INPUT. For connection of an external power supply. Use only Emil Scholz recommended power supply unit.
5. S/PDIF INPUT. RCA 75 Ohms S/PDIF coaxial input.
6. OPTICAL INPUT. Toslink S/PDIF input. Also can be used for ADAT 8-channel sources.
7. I2S INPUT. Multimode LVDS I2S input. Accepts all formats such as 16-24 bit I2S, 16-24 bit left and right justified sources.
8. USB 2.0 input/output.
9. AUX INPUT. Provides -10dBV unbalanced input signal. Maximum level is +6dBV.
10. LEFT OUTPUT. -10dBV left audio output. The maximum level is +6dBV.
11. RIGHT OUTPUT. -10dBV right audio output. The maximum level is +6dBV.

Quick Start

1. Connect the power supply.
2. Connect S/PDIF coaxial or optical output of digital source to the appropriate S/PDIF or TOSLINK connector.
3. Connect a pair of headphones to the front panel HEADPHONES output.
4. Connect a power amplifier or acoustic systems to LEFT and RIGHT RCA outputs.
5. Press the multifunctional knob to power on (see page 7 for details).
6. Turn the knob and select COAXIAL or TOSLINK input.
7. Press the knob to enter settings and adjust the headphones level.

Power On/Off

Press the multifunctional encoder knob. The model number ESD-6300, ESD-1862 or ESD-1704 will be displayed.

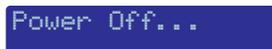


```
Emil Scholz
ESD-6300
```

If your DAC is equipped with an ADAT module the following message will be displayed. Press and hold knob to power off.



```
Emil Scholz
ESD-6300 ADAT
```

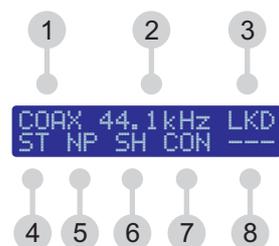


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Power Off...
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Input Menu

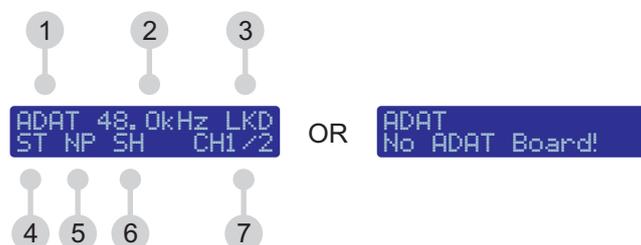
After power on the DAC will indicate last used input, channel, phase, filter mode and other settings. Turn the multifunctional encoder knob left or right and select a required input.

COAXIAL and OPTICAL (1, 2) Inputs only



1. Selected input: coaxial (COAX), optical (OPT).
2. Incoming sample rate: 8.00kHz, 16.0kHz, 32.0kHz, 44.1kHz, 48.0kHz, 88.2kHz, 96kHz.
3. Error/lock indication: error occurred (ERR), locked (LKD).
4. Channel mode: stereo (ST), mono (MN), left only (LO), right only (RO), channel swap (SW).
5. Phase mode: normal (NP), inverted both (IB), inverted left (IL), inverted right (IR).
6. Digital filter Roll-Off mode: slow (SL), sharp (SH).
7. Input format: consumer (CON), professional (PRO).
9. Emphasis: no emphasis (---), emphasis on (EMP).

ADAT (3) Input

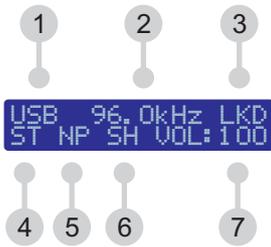


1. Selected input: ADAT (ADAT).
2. Incoming sample rate: 44.1kHz, 48.0kHz.
3. Error/lock indication: error occurred (ERR), locked (LKD).
4. Channel mode: stereo (ST), mono (MN), left only (LO), right only (RO), channel swap (SW).
5. Phase mode: normal (NP), inverted both (IB), inverted left (IL), inverted right (IR).
6. Digital filter Roll-Off mode: slow (SL), sharp (SH).
7. ADAT channel: 1/2, 3/4, 5/6, 7/8.

If ADAT board is not installed "No ADAT Board" message will be displayed. Settings menu of this input will not be available. Contact Emil Scholz for optional ADAT module purchase.

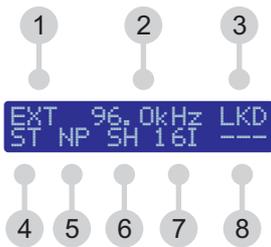
Input Menu

USB (4) Input



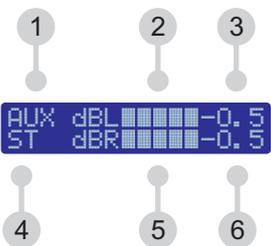
1. Selected input: USB (USB).
2. Incoming sample rate: 8.00kHz, 16.0kHz, 32.0kHz, 44.1kHz, 48.0kHz, 88.2kHz, 96kHz.
3. Error/lock indication: error occurred (ERR), locked (LKD).
4. Channel mode: stereo (ST), mono (MN), left only (LO), right only (RO), channel swap (SW).
5. Phase mode: normal (NP), inverted both (IB), inverted left (IL), inverted right (IR).
6. Digital filter Roll-Off mode: slow (SL), sharp (SH).
7. Output volume level.

EXTERNAL (I2S, 5) Input



1. Selected input: I2S (EXT).
2. Incoming sample rate: 8.00kHz, 16.0kHz, 32.0kHz, 44.1kHz, 48.0kHz, 88.2kHz, 96kHz.
3. Error/lock indication: error occurred (ERR), locked (LKD).
4. Channel mode: stereo (ST), mono (MN), left only (LO), right only (RO), channel swap (SW).
5. Phase mode: normal (NP), inverted both (IB), inverted left (IL), inverted right (IR).
6. Digital filter Roll-Off mode: slow (SL), sharp (SH).
7. Input format: 16-bit RJ (16R), 20-bit RJ (20R), 24-bit RJ (24R), 24-bit LJ (24L), 16-bit I2S (16I), 24-bit I2S (24I), auto mode (AUT).
8. Emphasis: no emphasis (---), emphasis on (EMP).

AUX (6) Input



1. Selected input: AUX (AUX).
2. Left channel level.
3. Left channel level in dB.
4. Channel mode: stereo (ST), mono (MN). Other channel functions are unavailable in this mode.
5. Right channel level.
6. Right channel level in dB.

Out Monitor (8)

Output level monitor of selected source. Press the knob to return to input select menu. The function is not available if AUX is selected. There is no automatic return from this window to the Input Menu.

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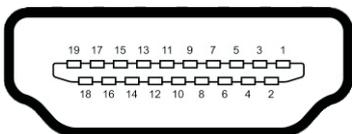
OUT dBL ██████-0.5
MON dBR ██████-0.5
  
```

Settings Table

INPUT	VOLUME	CHANNEL MODE	PHASE MODE	DF ROLL-OFF	BACKLIT	OUT MONITOR
COAX	000-100	STEREO MONO LEFT ONLY RIGHT ONLY SWAP	NORMAL INV. BOTH INV. LEFT INV. RIGHT	SHARP SLOW	ON AUTO OFF	YES
OPT	000-100	STEREO MONO LEFT ONLY RIGHT ONLY SWAP	NORMAL INV. BOTH INV. LEFT INV. RIGHT	SHARP SLOW	ON AUTO OFF	YES
ADAT	000-100	STEREO MONO LEFT ONLY RIGHT ONLY SWAP	NORMAL INV. BOTH INV. LEFT INV. RIGHT	SHARP SLOW	ON AUTO OFF	YES
USB	000-100	STEREO MONO LEFT ONLY RIGHT ONLY SWAP	NORMAL INV. BOTH INV. LEFT INV. RIGHT	SHARP SLOW	ON AUTO OFF	YES
EXT	000-100	STEREO MONO LEFT ONLY RIGHT ONLY SWAP	NORMAL INV. BOTH INV. LEFT INV. RIGHT	SHARP SLOW	ON AUTO OFF	YES
AUX	000-100	STEREO MONO	UNAVAILABLE	UNAVAILABLE	ON AUTO OFF	NO

EXT Input Pinout

The DAC uses an LVDS interface for external audio sources connection. Supported formats: 16-bit RJ, 20-bit RJ, 24-bit RJ, 24-bit LJ, 16-bit I2S, 24-bit I2S. Automatic select can also be supported.



- | | | | |
|-------------|---------------|----------------------|-----------------------|
| 1. SCLK IN+ | 6. MCK IN- | 11. SDATA GND | 16. ERROR IN (AH) |
| 2. SCLK GND | 7. LRCK IN+ | 12. SDATA IN- | 17. GND |
| 3. SCLK IN- | 8. LRCK GND | 13. NC | 18. +5VD |
| 4. MCK IN+ | 9. LRCK IN- | 14. NC | 19. AUTO DETECT |
| 5. MCK GND | 10. SDATA IN+ | 15. EMPHASIS IN (AH) | SHIELD DC COUPLED GND |

AH=Active High. Internal tie to GND. Can be unconnected.

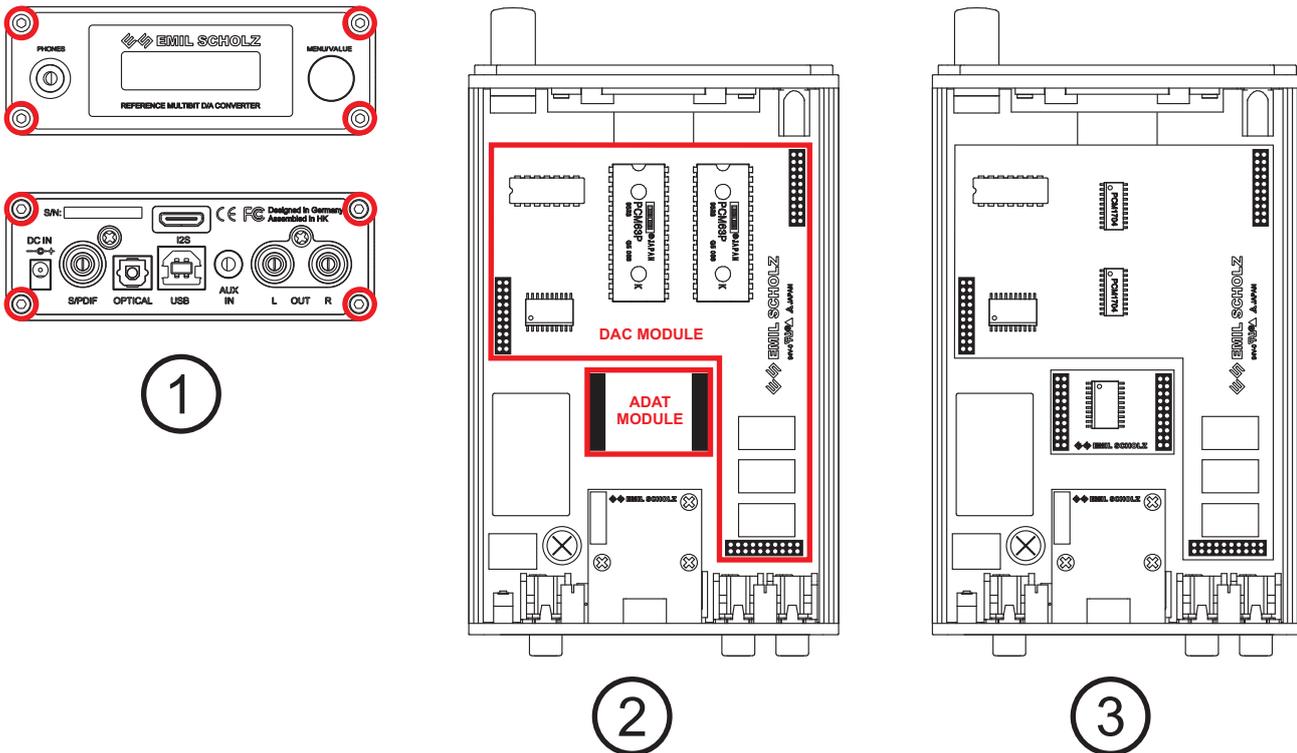
Please see DGO-I2S LVDS optional transmitter board manual for more detailed information and reference.

Upgrade

There are two ways to upgrade your DAC - changing the DAC PCB to a higher 24-bit version and adding an optional ADAT board. To upgrade your DAC or add an optional ADAT board remove the screws indicated on the picture 1 and 2 with a screw driver.

Carefully pull the top part of the case. Use a flat object to carefully pull up the DAC PCB that is located on the picture 3. Install the new PCB and softly push it down on the main board.

To add an ADAT PCB just install it as per picture 3. Put the top part of the case back and assemble it with the screws. Turn on the DAC. The display will show its current model and presence of ADAT board inside. Note that opening the case will cancel your 90 days warranty period.



Factory Reset

To return your DAC to factory settings push and hold the knob and plug in the power supply. The display will show the current hardware and software version and the device will return to the factory settings as per the table below.

VOLUME	085
CHANNEL MODE	STEREO
PHASE MODE	NORMAL PHASE
DF ROLL-OFF	SHARP
BACKLIT	ON
AUX IN	0dB

Specification

Inputs

- S/PDIF coaxial RCA @ 75 Ohms 8-96kHz, S/PDIF Toslink 8-96kHz
- ADAT optical 16/20/24-bit 44.1/48kHz Type I/II
- EXT: 8-96kHz, 16/20/24-bit I2S/LJ/RJ/AUTO, x256/384Fs, mini HDMI 6-line LVDS
- USB: 2.0 8/16/32/44.1/48/88.2/96kHz $\pm 5\%$
- AUX: ± 10 dB adjusted unbalanced stereo, 1dB step, 3.5mm jack

Outputs

- RCA: -10dBV, +6dBV max, ultra low impedance
- Headphones, 3.5mm jack: 250mW @ 30 Ohms

Control

- Multifunctional pushbutton encoder
- Highcontrast 2x16 LCD with backlit

Technical characteristics

- DACs: Burr Brown PCM63P-K/PCM1704U-K, Analog Devices AD1862N-J
- DAC word length: 20-bit (ESD-6300, ESD-1862), 24-bit (ESD-1704)
- DAC quantity: 2, left/right channel
- Frequency response: 5-22kHz ± 0.1 dB
- Sample rates: 8/16/32/44.1/48/88.2/96kHz $\pm 10\%$
- Digital Filter word length: 24-bit
- Input word length: 16/18/20/24-bit, all inputs
- THD+N: -92dB (ESD-6300), -118dB (ESD-1704), -96dB (ESD-1862)
- Dynamic range: 105dB (ESD-6300), 112dB (ESD-1704), 100dB (ESD-1862)
- Interchannel separation: -120dB
- Power supply: 5VDC @ 650mA
- Dimensions (W x H x D): 96 x 34 x 140
- Weight: 450g

Warranty

All Emil Scholz products are covered by warranty for a minimum of 90 days. Emil Scholz, GmbH warrants products manufactured and sold by Emil Scholz to be free from defects in materials and workmanship for the shown above.

To maintain this limited warranty, the product must be operated, calibrated, and maintained in accordance with the Operation and Maintenance Manual supplied with the product. Abuse, mechanical damage, alteration, or repairs not made in accordance with the Operation and Maintenance Manual void the Emil Scholz Warranty.

The obligation of Emil Scholz under this limited warranty is limited to the repair or replacement of components deemed by the Emil Scholz Technical Support Center to have been defective under the scope of this Warranty.

To receive consideration for warranty repair or replacement, the product must be returned to a Emil Scholz Authorized Service Partner with transportation and shipping charges prepaid.

If the product is being returned to Emil Scholz, it is necessary to obtain a return authorization number from Emil Scholz prior to shipment.

This limited warranty is expressly in lieu of any and all representations, express or implied, including but not limited to the warranty of fitness for a particular purpose. Emil Scholz will not be liable for loss or damage of any kind connected to the use of its products or failure of its products to function or operate properly.

For more information on our Warranty, please contact your appropriate Emil Scholz distributor or representative.