

Weiss OEM products



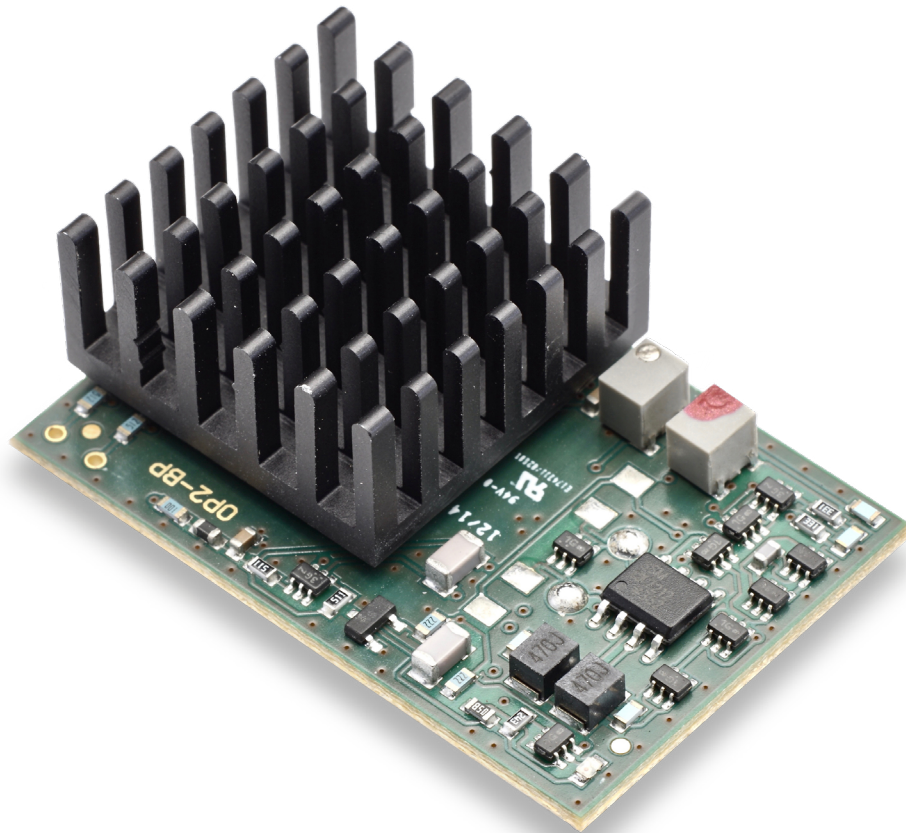
WEISS PRODUCTS FOR ORIGINAL EQUIPMENT MANUFACTURERS (OEMs)

Weiss Engineering Ltd. offers various products for audio applications to OEMs:

- The OP2-BP, a discrete bipolar operational amplifier
- The DAC301, a Stereo D/A Converter
- The USB204, an USB to AES/EBU and S/PDIF Interface
- Various building blocks for active speaker systems and all in one audio systems

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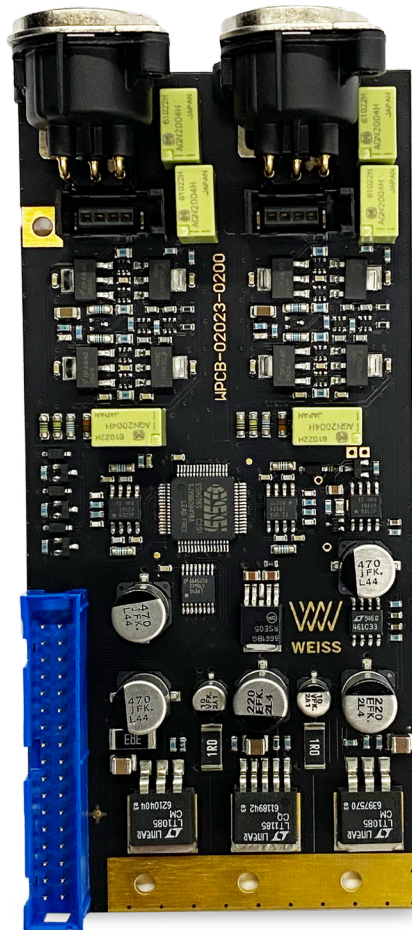
THE OP2-BP DISCRETE OPERATIONAL AMPLIFIER MODULE

Our OP2-BP discrete, State of the Art operational amplifier is used by many OEMs in cutting edge applications. At Weiss Engineering we use it as I/V converter, line driver, phono preamp stage, line receiver etc.

Initially called the OP1-BP we later built the OP2-BP with some differences in terms of component housings for better manufacturability. The OP1-BP we do not manufacture anymore. That means that the datasheet for the OP1-BP is also valid for the OP2-BP and can be downloaded from here:

<https://weiss.ch/wp-content/uploads/2022/07/OP1-BP-Datasheet-R1.pdf>

The OP2-BP is perfectly suited for low noise / low distortion audio applications. It is capable to drive low impedances at high voltage levels. It can replace standard op-amps typically with some changes to the compensation network.



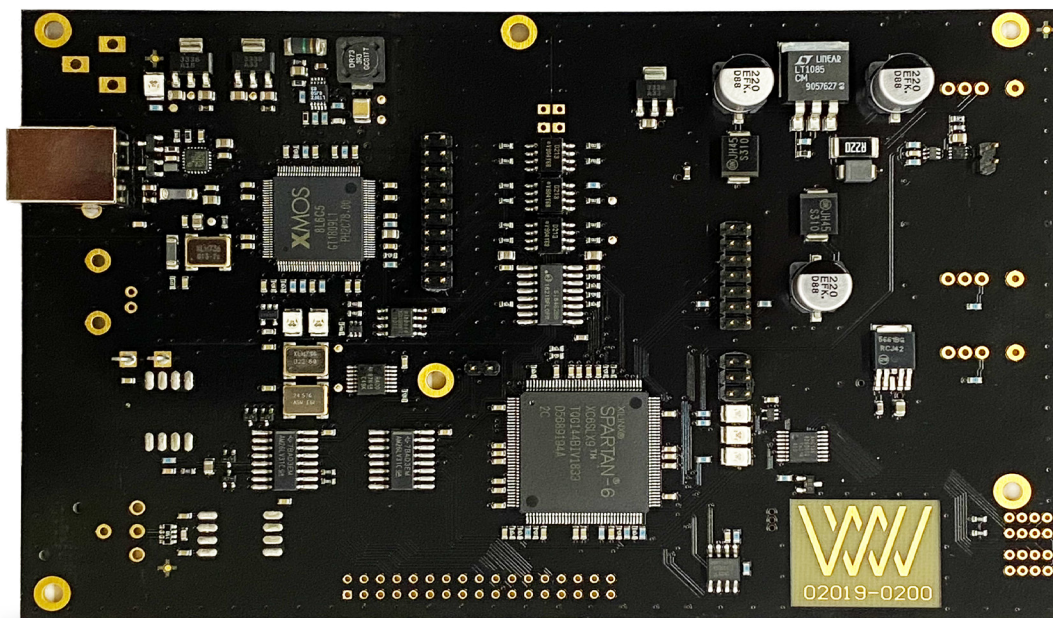
THE DAC301 STEREO D/A CONVERTER

A compact 2 channel high performance D/A converter board with I2S and AES/EBU interfacing and balanced / unbalanced outputs. Analog output levels selectable with 4 level steps. High resolution digital level control. Powerful de-jittering mechanism. Locally regulated power supplies.

The DAC301 is based on the ES9018 eight channel D/A Converter chip from the ESS company. We use four DAC channels per audio channel in parallel to enhance the signal to noise figure. The output level can be set to four levels in the analog domain via relays. In addition the output level can be finely tuned via the digital level control available in the ES9018. There are balanced and unbalanced outputs which can be used simultaneously.

The digital audio input signals, power supplies, relay controls, ES9018 controls and a master clock are on a 34 pin header connector. The input signals are fed in a balanced I2S format with LVDS type voltage levels, The ES9018 can be controlled via an I2C signal which has to be applied externally, typically via a small microprocessor. In place of the I2S audio signals it is also possible to feed an S/PDIF or AES/EBU formatted signal.

The ES family of D/A Converters is known to be a family of very well sounding DACs and sees a widespread acceptance by the pro audio as well as high-end HiFi clientele.



THE USB204 USB TO AES/EBU INTERFACE

An USB to AES/EBU and S/PDIF converter with DSD64 and DSD128 to PCM conversion as well as downsampling of 384 or 352.8 kHz to 192 or 176.4 kHz respectively. Single power supply operation. Additional I2S output. An IR controlled digital level control is also supported.

It sports a USB 2 input for stereo signals up to 384kHz sampling frequency as well as DSD64 and DSD128 streams. The DSD streams are converted to PCM with selectable sampling frequency of 88.2 kHz or 176.4 kHz and selectable word-length of 16 or 24 Bit. The 44.1 kHz up to 192 kHz sampling frequency signals are conveyed untouched. 352.8 kHz are converted to 176.4 kHz and 384 kHz are converted to 192 kHz.

An optional IR remote control can be activated. It allows to control the volume of the audio signal and also supports a mute / unmute key.



MODULES FOR ACTIVE SPEAKERS

Currently the following modules are available. The modules can be used as is or can be modified according to the OEM requirements.

Modules typically mounted in a Control Box common to the speakers connected:

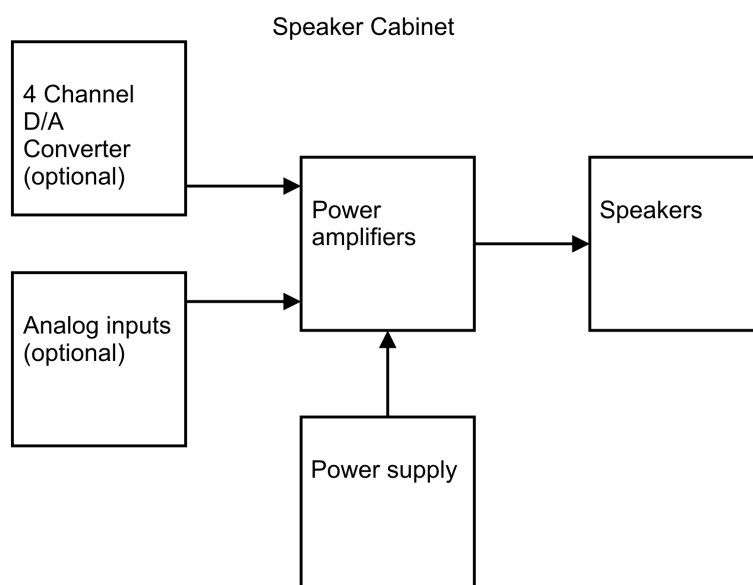
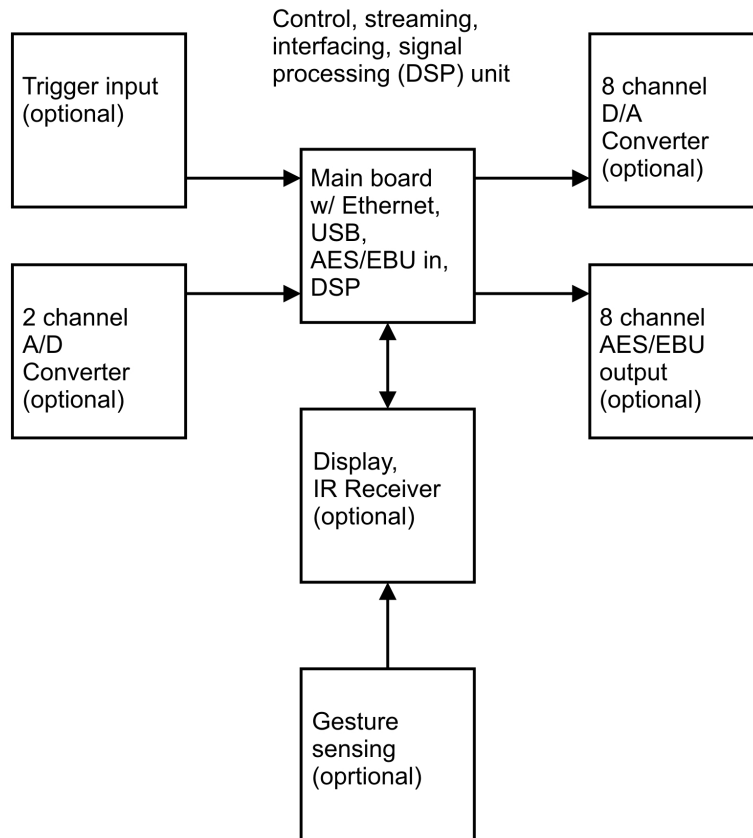
- A) Main Board with power supply, DSP, USB, Ethernet, AES/EBU and S/PDIF inputs and outputs
- B) 8 channel D/A Converter
- C) 8 channel AES/EBU output interface
- D) 2 channel A/D Converter
- E) Display / IR receiver board
- F) Gesture sensing board
- G) Trigger input board

Modules typically mounted in the speakers:

- H) 4 channel D/A Converter
- I) Power amplifier
- J) Power supply

TYPICAL CONFIGURATIONS

Here is a typical block diagram of an active speaker system based on the modules mentioned above. All the modules we can adapt to the requirements of the customer. The system consists of a central control box for interfacing and signal processing (the first block diagram) and the speaker cabinets connected to the control box (the second block diagram).



MORE DETAILED DESCRIPTION OF THE MODULES IN THE CONTROL BOX

A)



MAIN BOARD

The main board connects to all the other boards in the control box. It has the following on-board inputs / outputs:

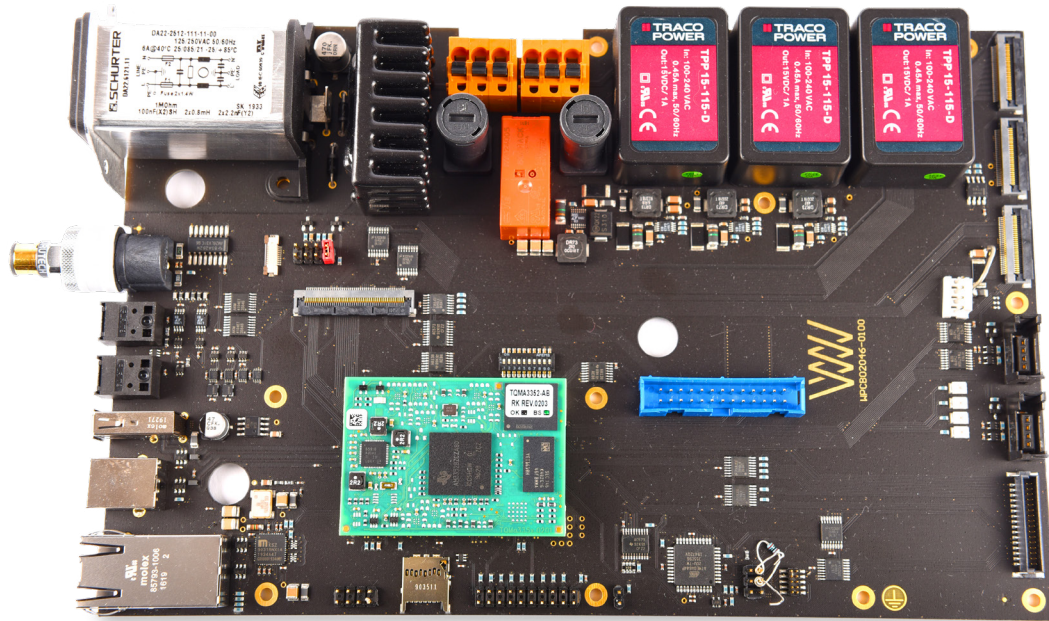
- Ethernet connector for streaming, web based remote control, software updates
- USB A type connector which is not yet supported
- USB B type connector for audio playback via USB
- 1 x S/PDIF input on an RCA connector
- 2 x S/PDIF input on Toslink (optical) connectors
- 1 x AES/EBU input on XLR connector (via an adapter board)
- 2 x AES/EBU output on XLR connectors (via an adapter board)
- IEC type mains voltage connector with automatic mains voltage switching
- Mains sockets for connecting other devices
- Multipin connectors to connect peripheral boards as described below

The main board sports an ARM type processor and two SHARC type signal processors (DSP) for interfacing and signal processing. The software for all processors is built according to the OEM's needs. The ARM takes care of USB, AES/EBU, S/PDIF, Ethernet interfacing for audio and control purposes. UPnP playback and Roon are supported if required. This allows for an "all in one" system. A web interface allows to control the whole system. In addition an IR remote control can be used. A gesture sensing board is also supported. This for instance allows to switch the system on / off and to control the volume.

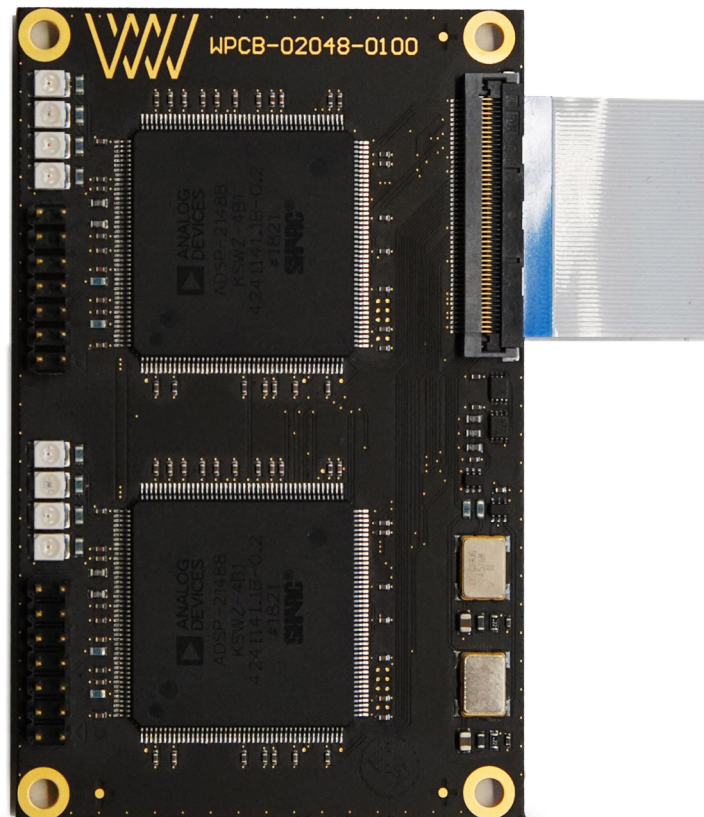
The DSP chips are on a piggy-back board and thus can be changed if required. The two SHARC processors typically are used for these tasks:

- arbitrary phase and/or minimum phase crossover for multiple speakers
- delays to align speaker impulse responses
- volume control
- various optional DSP tasks like: Room Equalizer, Creative Equalizer, De-Essing, Constant Volume, Crosstalk Cancelling, Vinyl Simulation, Loudness Equalizer or other custom-specific algorithms.

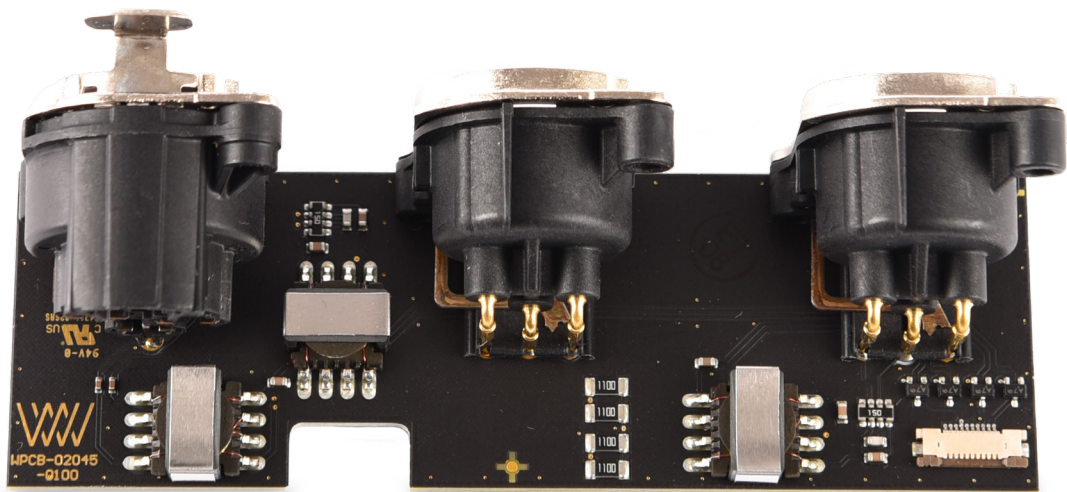
The on-board power supply is managed by a dedicated processor. Power on / off and power voltage selection is handled by that processor. The mains power is switched via a solid-state relay.



The Main Board



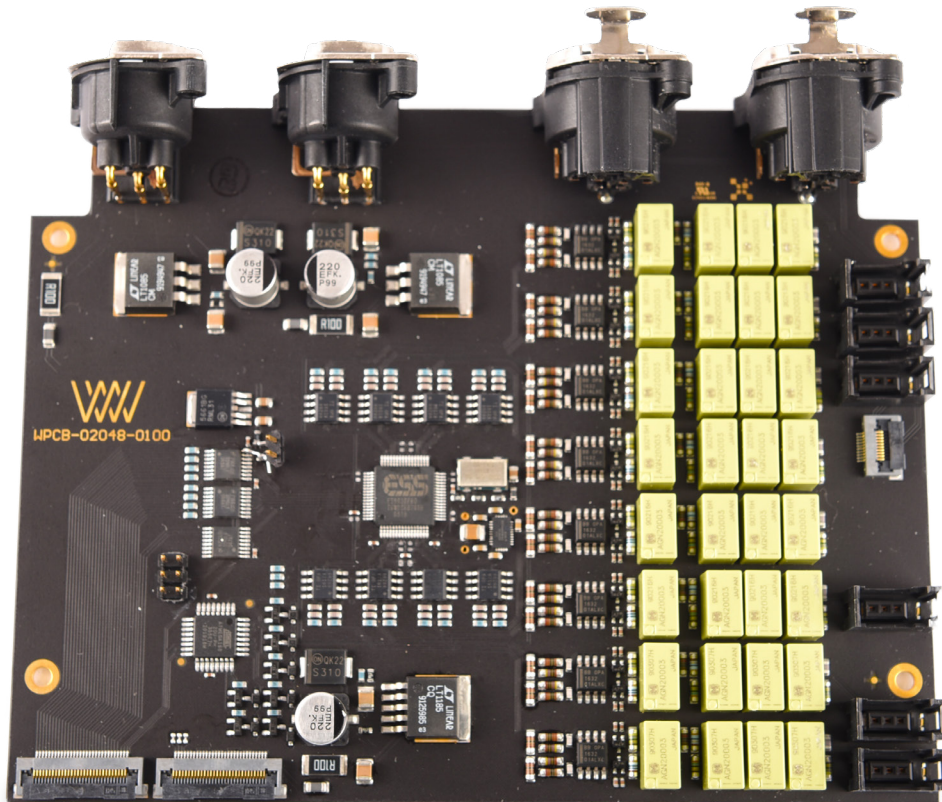
DSP piggy back board plugged into the Main Board
above the green ARM board shown above



AES/EBU I/O adapter board

B) 8 CHANNEL D/A CONVERTER

The 8 channel D/A Converter connects to the Main Board. It can be used to feed up to two times 4-way speakers for example. The number of channels can be reduced for smaller speaker setups. The output levels of the eight channels can be set in the analog domain to four different levels in order to accommodate for the power amplifiers used. The levels of the individual channels can be fine-tuned in the DSP.

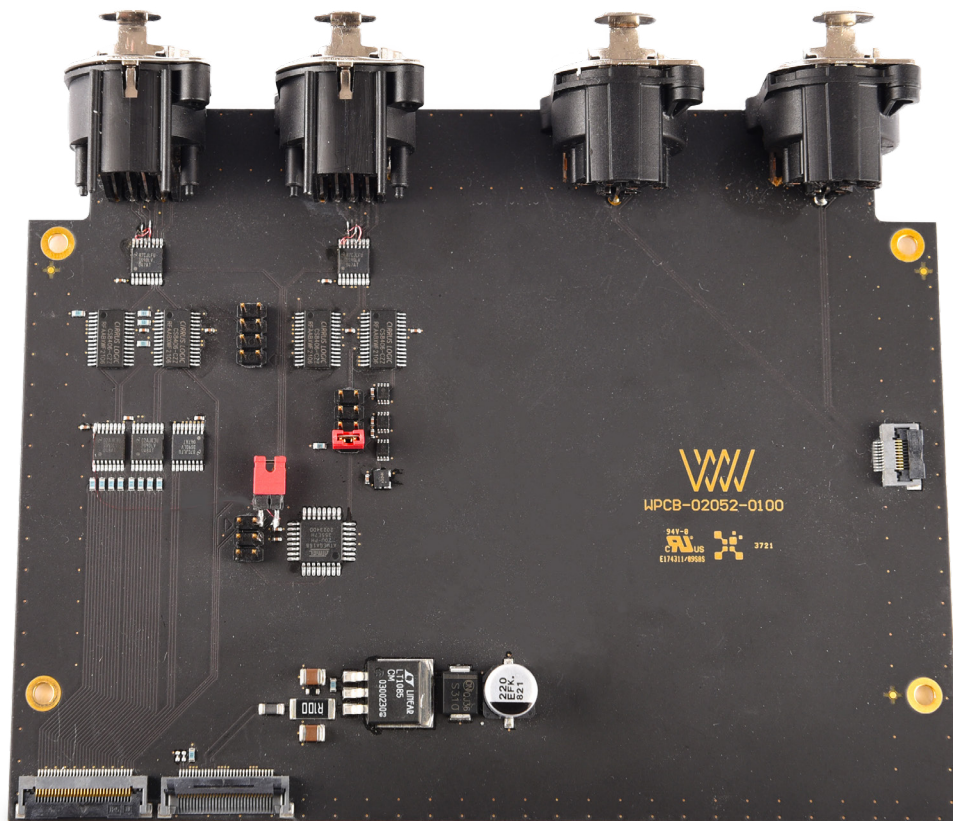


c)



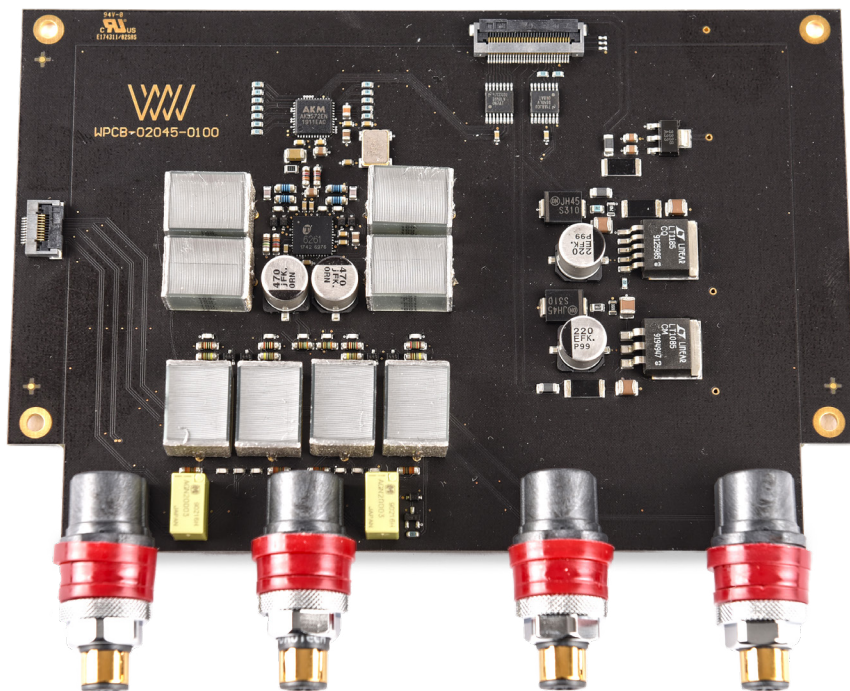
8 CHANNEL AES/EBU OUTPUT INTERFACE

The 8 channel AES/EBU output interface connects to the Main Board as an alternative to the 8 channel D/A Converter. This is used if the D/A Converters are located in the speakers. The D/A Converter described in H) is such a D/A Converter which connects to the AES/EBU output. The sampling frequency of the AES/EBU output can be selected between 44.1 kHz and 192 kHz.



D) 2 CHANNEL A/D CONVERTER

The 2 channel A/D Converter connects to the Main Board. It is used if an analog input to the speakers is required. The input sensitivity can be remotely controlled via a dedicated input amplifier.

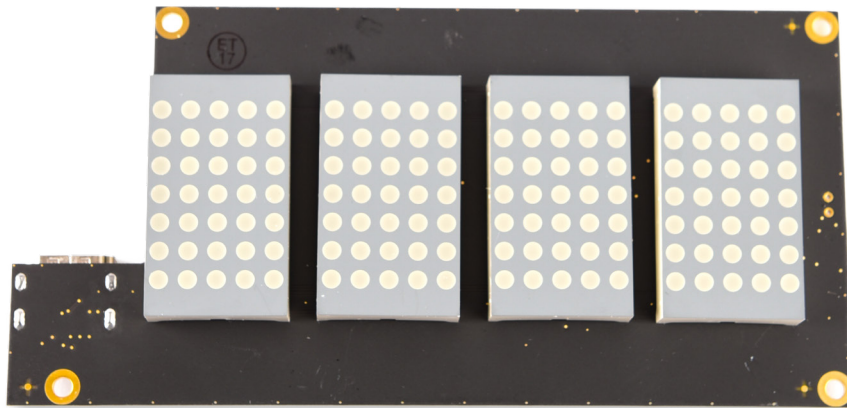


E)

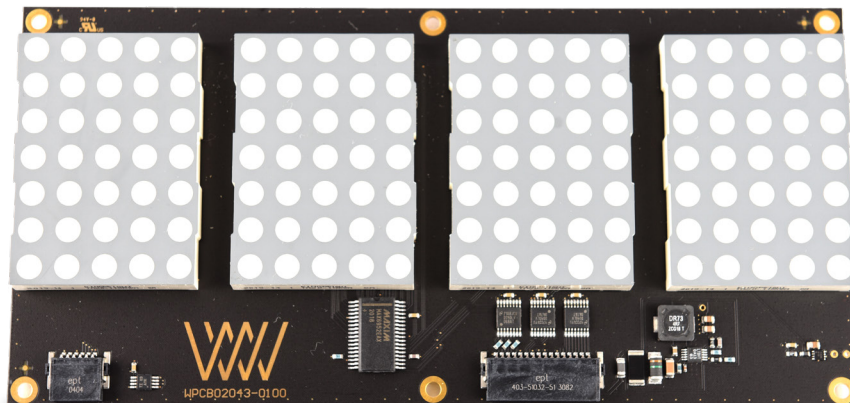


DISPLAY and IR RECEIVER

The display and IR receiver connects to the Main Board. In the current version the display consists of 4 dot matrix LED characters which can be used to display basic settings such as the input selected, the volume setting and more. The display can be put into a remotely located housing such that it can be positioned by the user for best readability. The IR receiver for the Infrared Remote Control is also located in that housing.



small version



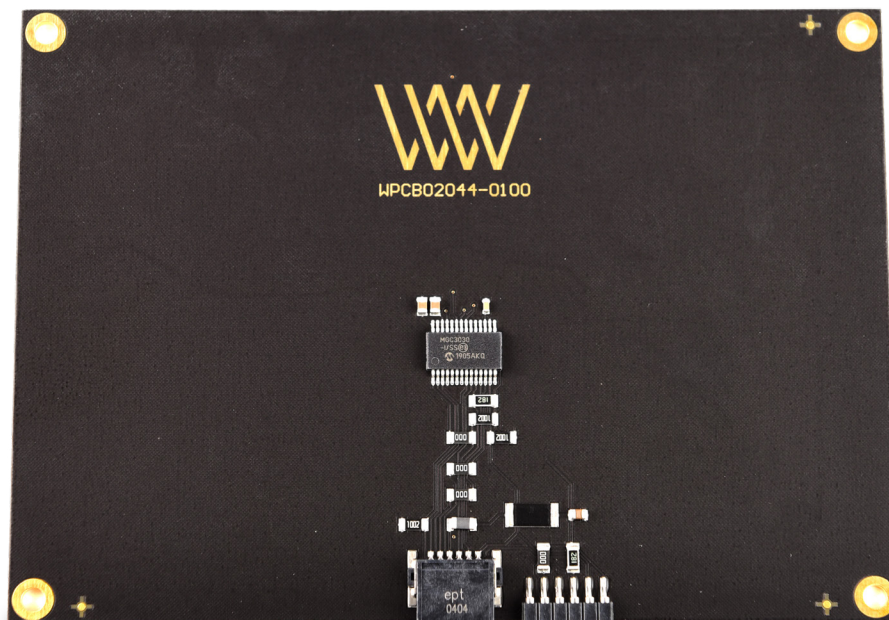
large version

F)



GESTURE SENSING

The gesture sensing board connects to the Display and IR receiver, large version. It can be used to control basic functions like mute / unmute, power on / off, volume. This can be very useful in the case the operation of the unit is done only via the IR remote control or the web interface. Of course it is also possible to connect switches etc. for controlling the system.

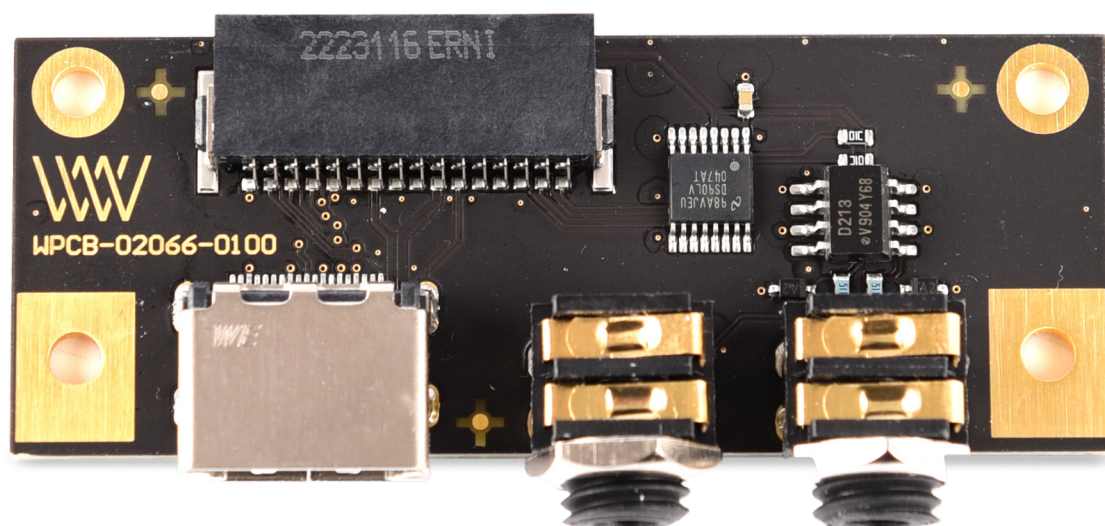


G)



TRIGGER INPUT BOARD

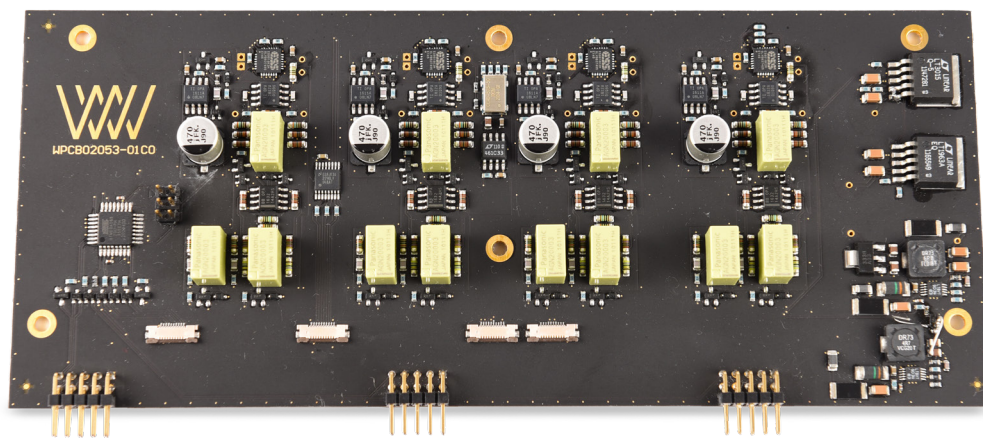
The trigger inputs allow to remotely switch on / off the system with a standard trigger signal. There are two inputs available in the standard version.



MORE DETAILED DESCRIPTION OF THE MODULES IN THE SPEAKER CABINET

H) 4 CHANNEL D/A CONVERTER

Mounted in the speaker cabinet for up to 4 way speaker designs. The number of D/A Converter channels can be reduced as required. The output levels of the four channels can be set in the analog domain to four different levels in order to accommodate for the power amplifiers used. The levels of the individual channels can be fine-tuned in the DSP.



I) **POWER AMPLIFIER**

We do not offer power amplifier modules of our own. If it comes to Class D amplifiers we recommend the amplifier modules made by Purifi Audio.

<https://purifi-audio.com>

J) **POWER SUPPLY**

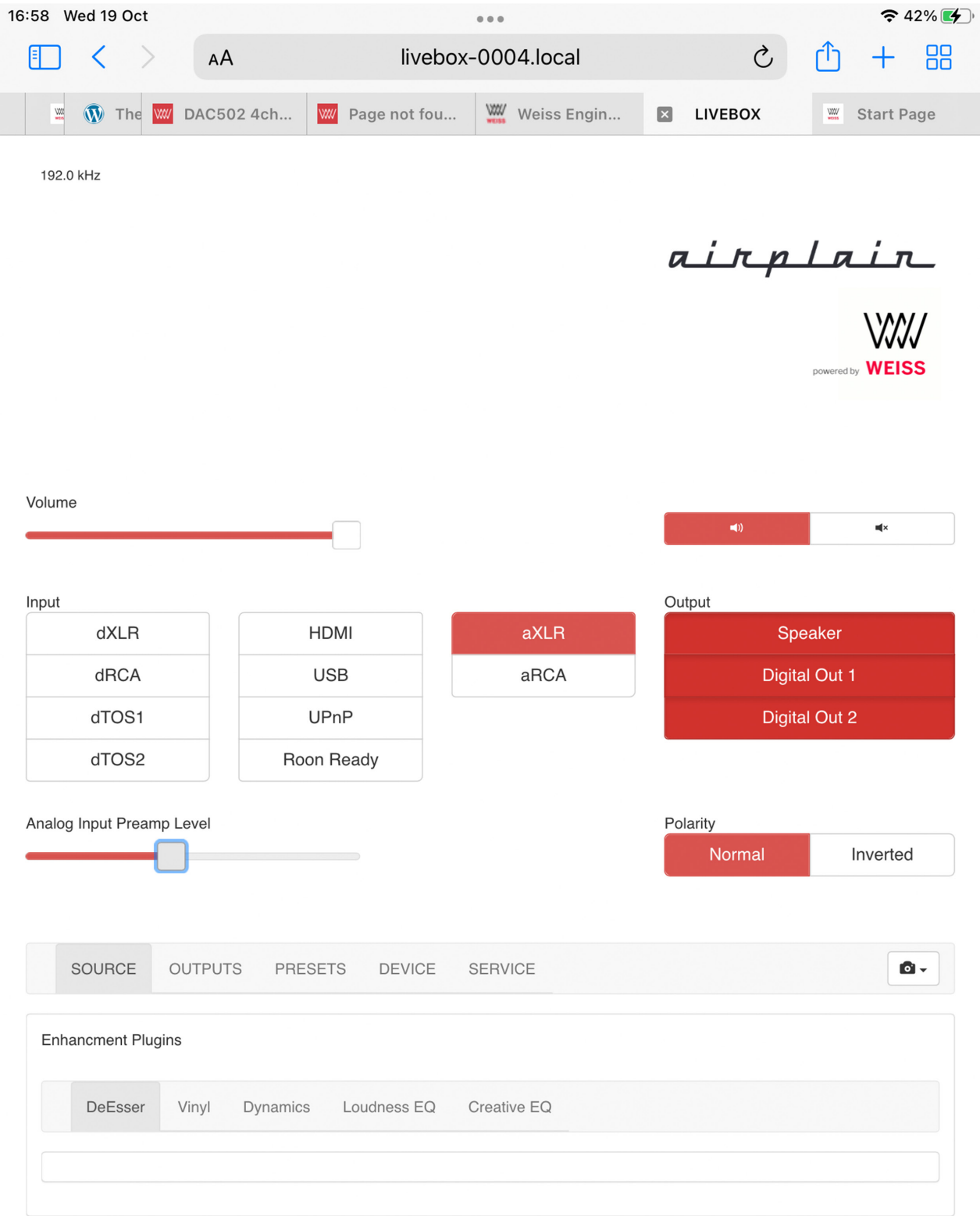
For the power amplifiers we do not offer power supplies of our own. For the Purifi Audio modules mentioned above there are specific Hypex brand power supplies available.

<https://www.hypex.nl>

EXAMPLE OF A WEB INTERFACE

Here are some web interface examples. The web interface can be designed according to the OEM customer’s requirements.

Input selection, output selection, volume control. The enhancement plug-ins are optional signal processing algorithms:



The output controls with volume trim, balance control:

16:59 Wed 19 Oct

AA livebox-0004.local

43%

The DAC502 4ch... Page not fou... Weiss Engin...

LIVEBOX

Start Page

Volume

Input

dXLR

dRCA

dTOS1

dTOS2

HDMI

USB

UPnP

Room Ready

aXLR

aRCA

Output

Speaker

Digital Out 1

Digital Out 2

Analog Input Preamp Level

Polarity

Normal

Inverted

SOURCE

OUTPUTS

PRESETS

DEVICE

SERVICE

Define your desired Settings for each Output Zone

Airplain Speaker

Digital Out

Volume Trim

Balance

Output Optimization EQ

Multi-Band Parametric EQ

Enable

Bypass

The basic settings of the control unit like display brightness, software update via the web interface:

16:59 Wed 19 Oct

AA livebox-0004.local

43%

WP The DAC502 4ch... Page not fou... Weiss Engin... LIVEBOX Start Page

dXLR

dRCA

dTOS1

dTOS2

HDMI

USB

UPnP

Roon Ready

aXLR

aRCA

Speaker

Digital Out 1

Digital Out 2

Analog Input Preamp Level

Polarity

Normal

Inverted

SOURCE

OUTPUTS

PRESETS

DEVICE

SERVICE

General Device Settings

Display Brightness

Screensaver Brightness

Display

On

Off

Choose Your Screensaver Display

Mute State

Your Device

Model	Livebox
Serial #	0004
Hostname	Livebox-0004
IP address	192.168.0.56
MAC address	f0:45:da:84:89:e7
HW IDs	0:4:0

Firmware

[Release Notes](#)

	Version	Revision	Date	Status	
Current	v0.0.1	r887	2022-10-18 12:24:34+0200		<div>Check for Update</div> <div>Abort</div>
New					<div>0 %</div>

The service page (not accessible by the end-user) for individual speaker chassis tunings in terms of volume and delay:

17:00 Wed 19 Oct

livebox-0004.local

43%

Volume

Input

dXLR

dRCA

dTOS1

dTOS2

HDMI

USB

UPnP

Room Ready

aXLR

aRCA

Output

Speaker

Digital Out 1

Digital Out 2

Analog Input Preamp Level

Polarity

Normal

Inverted

SOURCE

OUTPUTS

PRESETS

DEVICE

SERVICE

Privileged Service Settings

Mute single Speaker Channels

DAC1 Muted

DAC2 Muted

DAC3 Muted

DAC4 Muted

DAC5 Muted

DAC6 Muted

DAC7 Muted

DAC8 Muted

Bypass CX Filtering

BYPASSED

Gain Settings Speaker Channels in dB

DAC1

DAC2

DAC3

DAC4

DAC5

DAC6

DAC7

DAC8

Delay per Speaker Channels in Number of Samples

DAC1

DAC2

DAC3

DAC4

DAC5

DAC6

DAC7

DAC8

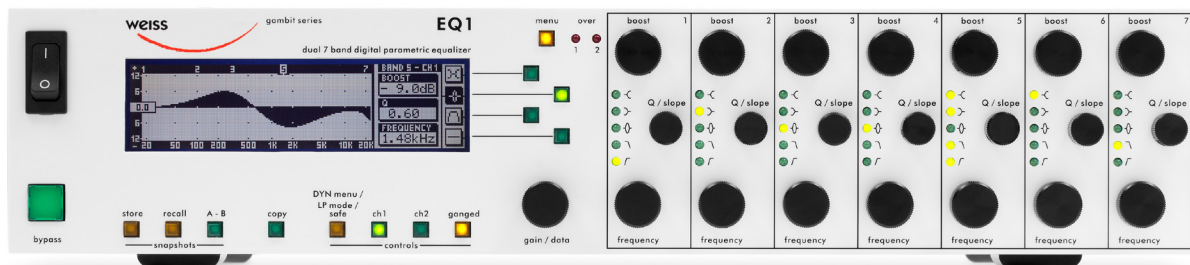
THE CROSSOVER FILTER DESIGN PROCEDURE

Currently the design procedure for the crossover filters works like this, typically:

- The OEM customer supplies amplitude and phase response data of all the speaker chassis when mounted in the speaker cabinet.
- The OEM customer specifies the tolerance scheme for amplitude response and phase response of the speaker cabinet.
- We design the digital filters according to the specifications. Filters can be made in IIR and/or FIR technique. The FIR allows to implement arbitrary amplitude and phase responses in order to accommodate for the speaker design at hand.
- The OEM customer uploads the filter data into his system and tests the speaker response.



SHORT HISTORY OF WEISS ENGINEERING LTD.



Daniel Weiss joined the Willi Studer AG in Switzerland as electronics engineer in 1979.

In 1985 he founded the company **Weiss Engineering Ltd.** From the outset the company concentrated on the design and manufacture of digital audio equipment for Mastering Studios.

The **modular 102 Series system** was the first product line and was sold worldwide via the Harmonia Mundi Acustica Company in Germany. One of the largest setups of a 102 Series system was used at Sony Music in New York in the form of the IBIS digital mixing console for mixing of classical music recordings.

In the early nineties the **Weiss Gambit Series** was launched. It consists of stand-alone units like Equalizer, Dynamics Processor, De-Noise/De-Clicker, A/D converter, D/A converter, Sampling Frequency Converter etc. Weiss Engineering is recognized as the leading company when it comes to signal processing for Mastering.

Starting in the year 2000 we entered the **High-End Hi-Fi market** with a new product line. With our expertise in the design of top quality audio equipment for the most discerning clientele, the **Mastering Engineers**, it seemed like a logical step to design equipment for the demanding audiophile.



A few years ago we started to serve **OEMs** with various products from our lab.

In 2021 Daniel Weiss received the **Technical Grammy award**.