

# Weiss DAC502 Mk2 DAC

11-15-2022 | By [Wojciech Pacuła](#) | Issue 124

Weiss was founded in 1985 in Uster, Switzerland by Daniel Weiss, previously an employee at STUDER, where he specialized in designing frequency converters used in its digital recorders. Until 2000, he specialized in digital devices for mastering studios, and later he proposed D/A converters for audiophiles. We are testing its top D/A Converter designed for home use, the DAC502.

The owner of Weiss Engineering, the Weiss brand belongs to, is one of the most experienced audio engineers. What's more, he is one of several—maybe three—designers who are equally easily navigating the consumer audio and professional audio markets, where he started his career. Apart from him, only [MYTEK](#) with Michal Jurewicz, [EMM Labs](#) and [Bricasti and dCS](#) with teams of engineers were as successful on both.

## History

Daniel Weiss graduated from the Higher Technical School in Rapperswil, Switzerland (HSR Hochschule für Technik Rapperswil) in 1979. In the same year, he was recruited by Willi Studer AG, then based in Herisau, a town in northeastern Switzerland. The late 1970s was a period of intense research into digital reel to reel recorders, and Studer opted for the DASH (Digital Audio Stationary Head) standard, developed by Sony, which was introduced in 1982.

Weiss was hired by Studer to design analog anti-aliasing filters, test signal generators, sample rate converters and digital processing circuits for the new standard. In 1983, the company proposed the SFC-16, a studio sample rate converter by Weiss, and in 1986, the D820X stereo digital tape recorder featuring solutions developed by him.

However, it was two years after he already left Studer to found his own company, Weiss Engineering—it was founded in 1985. It was conceived as a company developing products for the "pro" market, offering analog-to-digital and digital-to-analog converters, and later also devices for digital sound processing for mastering studios. Initially, he dealt with everything himself, and only later did he hire new engineers. Today he is responsible for the development of electronics (digital and analog) as well as for marketing.

At that time, Daniel Weiss's company turned from a one-man micro-company into one of the most important and recognizable producers of digital studio components. It is best known for the 102 modular mastering system that was part of the IBIS Digital Console that Sony Music installed in its recording studio in New York. Countless recordings of classical, jazz and popular music have been created on it.

In recognition of Daniel Weiss' work, on March 14, 2021, at the 63rd Grammy Awards Ceremony, he received the Technical Grammy belonging to the Special Merit Awards category. This award is given by manufacturers and engineers who are members of the Academy and later approved by the general council; Jacek Gawlowski from the JG Mastering studio represents Poland in it (more [HERE](#)).

In justification of the award for Daniel Weiss it reads:

*Daniel Weiss is a true pioneer of digital technology. In 1985, in Zurich, he founded Weiss Engineering Ltd. The company designed and manufactured ground-breaking digital audio devices for mastering studios, including the IBIS digital mixing console and the Gambit range of ultra-high sound quality.*

### **Present day**

The IBIS mixing console sort of a passport for Weiss to the great world of music, but enclosed within Sony Music's labels. The Weiss Gambit Series devices developed by Weiss had an even greater impact on the audio world. It included separate devices such as the EQ, Dynamics Processor, De-Noiser/De-Clicker, A/D and D/A Converters, Sample Rate Converter, etc. Since their introduction in 1998, they have been the object of desire for more and less known studios.

Eric James, the owner of the British PHILOSOPHER'S BARN MASTERING studio wrote in *Sound on Sound* magazine:

On any list of classic digital mastering equipment, the name Weiss has to be very near the top. When the Weiss Gambit series of mastering processors first went into production in 1998, the EQ equalizer and DS compressor were regarded by many mastering engineers as the pinnacle of digital processing. Weiss developed them further over the next decade, and they are still made today. My mastering facility at Philosopher's Barn bought a Weiss EQ-MK2 15 years ago, upgraded it to the full Linear Phase/Dynamic EQ spec a little later, and it is still in regular use.



Eric James, *Softube Weiss DS1*, *Sound on Sound*, May 2019, [www.SOUNDONSOUND.com](http://www.SOUNDONSOUND.com), accessed: 29.09.2022.

At the same time, they were never cheap devices. Later in the same article, James adds that he did not buy the de-esser at the time because he couldn't afford it. Those who were more fortunate—usually large labels—immediately recognized the special value in these products and using them began remastering of the most important titles. This was the case, for example, with the RCA Red Seal High Performance series. Engineers used Weiss A/D converters and sample rate converters. The company emphasized his contribution to their sound, writing on

the album covers: "Digitally remastered in Weiss 24/96 technology;" more about this series [HERE](#).

I am bringing these events, products and technologies up because when the company decided to enter the consumer audio market in 2000, it was already well-known and highly acclaimed. The world of high-end has its own rules and rarely accepts "strangers." It looks at them suspiciously, which is caused by listening to all those albums massacred in professional studios using pro equipment.

However, I know from experience that most often the problem lies with the people, not with the equipment. And if the devices are of the same class as Weiss's, there are no excuses. Therefore, the first "consumer" products, the Medea digital-to-analog converter and the Jason CD transport, brought this Swiss company recognition also on *this* side of the glass. I confirmed this myself when I tested the Gambit Series DAC1 Mk2 DAC, the professional version of the Medea DAC, years ago; test [HERE](#).

The DAC502 Mk2 grows straight out of these experiences. It is a unique example of how professional studio solutions can be transferred directly to the high-end world. And I am talking not only about the sound as such, but also about the functionality of the devices. We are testing an audio files player, which is called by the manufacturer a "digital-to-analog converter," which was also emphasized in its symbol. But a player that features many tools known from professional Weiss products.



Traditionally, let me add that an audio files player and a DAC are two different devices. The audio SIGNAL is sent to the DAC, and the audio FILES to the transport. Transport can also be a separate device. It's best to think of them as a CD transport and DAC, together they make a CD player. And yet... It cannot be denied that the transport module is something additional in the tested device, like a phono preamplifier or a headphone amplifier in an integrated amplifier. So in this case I would like to repeal my principle of using the correct nomenclature and I will refer to the DAC502 Mk2 as a "D/A converter."

**A few simple words...**

**Daniel Weiss**

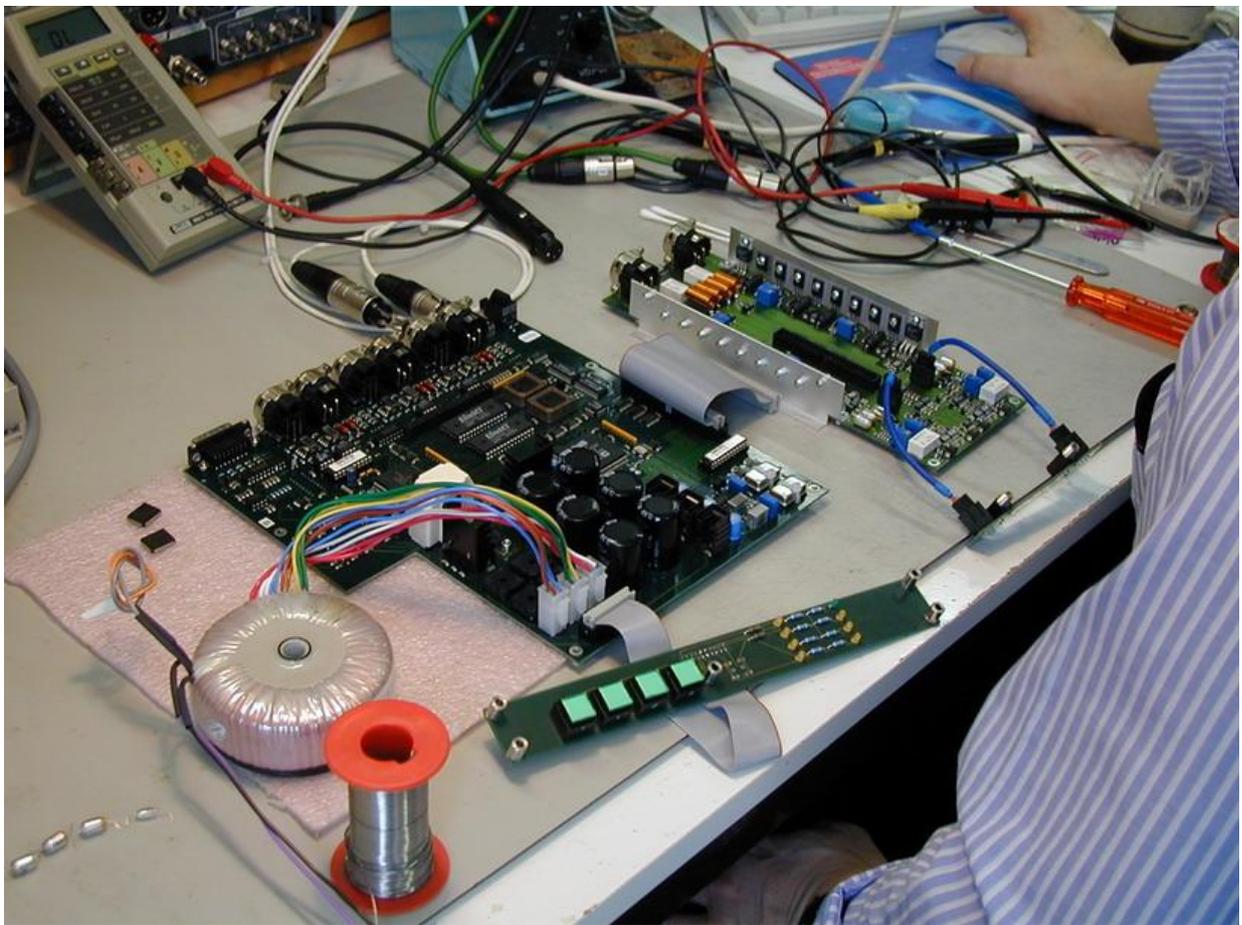
**Owner, designer**

**WOJCIECH PACUŁA** How do consumer product range differ from the pro one?

**DANIEL WEISS** The sonic quality of the two product ranges is the same, i.e. we try to have top notch quality with both ranges (all emphasis ed.). Some DSP algorithms we offer in both ranges, like e.g. the de-esser which is used to tame the sharp sibilance sound. In the pro range such a de-esser has many parameters to control (more [HERE](#)). Such a high number of parameters would not work with consumer customers, so the de-esser we have in the Series 5 products (DAC50x, DSP50x) has just a single knob to control the amount of de-essing.

**WP** Do you you keep in mind the target group (audiophile vs pro) for the product under development when working on it?

**DW** No. We do not design the sound to begin with. First we try to have a very good technical specs and after that we may tune some parameters for best performance in terms of sound. But that does not differ between pro and consumer.



**D/A Converter's assembly for the "Pro" line**

WP Is there an upsampler, sampling frequency converter, or some other DD converter in the DAC502?

DW Yes, the DAC50x re-samples to 195kHz and has the D/A chips running at that sampling frequency. Also DSD signal is converted to PCM.

WP Is the headphone amplifier's circuit a symmetrical one starting from the DAC?

DW In fact, the 4-pin XLR output does not serve a balanced signal. It is exactly the same signal as from RCA output but with a separate ground.

WP I can see only one D/A chip on the PCB, but company materials mention two converters per channel...

DW Yes, DAC502 features only one D/A chip. It is an 8-channel D/A Converter though, so there are two converter channels per each of four channels. We use two converter per channel to improve signal to noise ratio.

WP I know that you used to offer a CD Transport once – is the Compact Disc still an important medium for you?

DW Not anymore. But we still plan to introduce a new CD Transport, since in the previous one, the Jason, we used Philips CD PRO-2M transport, that has been obsolete for some time now.

WP What do you think about audio files? What about MQA?

DW Files for music distribution is a good concept, basically. Be it downloads or streaming. The problem is that musicians are not paid enough by the companies offering the streams. MQA may seem like a good approach to get a higher audio quality through a smaller internet bandwidth. But that could be done in a less complicated way and at lower cost for all involved.



**A rack with professional A/D converter in Abbey Road Studio—they were used for the orchestral tracks in *Star Wars* movies.**

WP Could you name some albums recorded using your devices?

DW There are many albums of course as our pro audio equipment is the de-facto standard in Mastering Studios. There also are plug-in versions available and thus are now used by an even broader clientele (more [HERE](#)). One popular album which comes to mind and which I know has been mastered with our equipment is Daft Punk's *Random Access Memories*.

It is clear that the DAC section is key for this product. It offers four digital inputs: USB, AES/EBU, S/PDIF, and Toslink, as well as a LAN input for computer control and for downloading audio files from the Internet or NAS disk. The USB input supports PCM signals up to 384kHz and DSD up to DSD128.

The analog outputs are available in balanced (XLR) and unbalanced (RCA) forms, there is also a headphone output—a four-pin socket (XLR 4) and a 6.3 mm TRS socket; both deliver an unbalanced signal. All outputs are gain adjustable in four steps: 0, -10, -20 and -30 dB; during the test I played with the gain set at "0 dB." The level of the output signal is adjusted in the digital domain, the DAC (for the sake of simplicity I will call the device this way) can therefore be connected directly to the inputs of power amplifiers.

The device is well-made, and it has a low profile. These are classic 1U (U = Unit) dimensions for studios—both across and up. Unlike in the case of studio products, there are almost no manipulators here, even though it is one of the most functional devices of this type I know. On the front panel, apart from the headphone output, there is only a small knob and an equally small touchscreen. It is much too small for a convenient operation, so when you need to work on your settings, I would suggest using the interface available using a web browser.

Let's add that the sockets on the back of the device are really good ones—the XLRs come from Neutrik and the RCAs from Furutech. There is also a headphone output on the rear with a balanced 4-pin XLR socket. The signal delivered by it is unbalanced though.



## Features

The primary function of the DAC502 is to convert the digital signal to analog. The Mk2 version does this in a special way as it is a four channel version. So we can turn the device into a multi-channel system and play surround recordings from files. The manufacturer also pays attention to the precise clocking of the signal and the extensive power supply—digital and analog circuits are powered separately.

However, the functions taken directly from the Gambit series of Weiss studio products seem to be more important. The user can correct the tonality of the recordings (creative equalizer) and/or correct the imperfections of the room acoustics (room EQ). Digital parametric equalizers are used for this purpose, and the manufacturer offers a special sheet to calculate the necessary changes; beware—this is not an automatic correction. The crosstalk canceling (XTC) can also be useful, as it helps to match the recordings made with the use of the "artificial head" for listening through the loudspeakers. In many cases, it will also help to better organize the sound of live recordings.

There are also two settings that allow for more sophisticated changes: de-essing and vinyl emulation. The first one is the basic tool in the mastering engineer's work. It is a dynamic, multi-band compressor that removes too strong "s" sounds from the sound, that is ones so irritating to us. There are two ways to do this with the DAC502 Mk2 and to adjust the depth of the operation. We get similar possibilities with the vinyl emulation feature, but here it is about adding harmonics to the sound in such a way that it gets warmer. But it's not only about harmonics. In the manual, we will learn that many different changes that the turntable brings to the signal have been taken into account, including mechanical changes related to cartridge

compliance, tonearm resonance, etc. Here, too, you can adjust the depth of the features impact on the sound.

Two further functions allow you to correct the sound depending on how loud and what material you are listening to. Loudness EQ is a dynamic tone correction depending on the volume level. When we listen quietly, it raises the upper and lower bass, but not in a linear way, but in a way suited to the sensitivity of the ear. Dynamic adaption is used to equalize the sound volume according to the maximum digital signal level. This will come in handy when we listen to various types of "playlists," with recordings from different albums.

We know these types of functions from the former DVD players, and nowadays from streaming services. It was supposed to help you watch movies with a dynamic soundtrack in the evenings when you can't turn up the volume knob too much. Streaming is all about equalizing the volume differences between different songs. Those solutions in relation to the algorithms written by Weiss seem like a child's play, even a toy. Compression—because we are talking about it—in the DAC502 Mk2 is very advanced.



And there are two settings for headphone lovers: headphone EQ and crossfeed. The first one is simply the timbre correction, but you can add your own headphones to the Weiss memory with the change initially proposed by the manufacturer. In the one I tested, these were the settings for the Audeze headphones. Crossfeed allows you to simulate the sound from the speakers on the headphones, mixing the signals of the left and right channels in the appropriate way.

All these functions are algorithms written by Weiss engineers. Although theoretically it should not matter who writes such an algorithm, as long as the input and output signal are mathematically correct, in practice it is not quite so. The DSP chip with the sequence of instructions written in it is a "black box" from which we get different effects, depending on what the algorithm looks like. Even though, I repeat, it shouldn't matter. Which once again reminds us that a digit is not equal to the digit and a bit is not always the same bit.

Knowing this, it will be easier to understand the importance of the volume control in this device. It is done in the digital domain, but one of studio origin, with a sophisticated dithering circuit. This means that even in at the low levels, where the most bits are lost, the signal is resolving enough that it should not affect the sound to a large extent. Weiss describes this process in great detail in the manual, same as all of the other functions mentioned above.

The DAC502 is an extremely functionally complex product. Its "heart" beats in the DSP circuit with 40-bit resolution. All algorithms, including digital filters, were written in-house by Weiss team. Interestingly, we cannot change the filters, although this is a standard option in most D/A converters. This is because they have been selected for this specific application and work in a slightly different system than usual. All signals from the digital inputs and from the files transport are converted into a PCM signal with a sampling frequency of 195kHz; this also applies to the DSD signal. This unusual frequency was chosen to minimize distortions, mainly jitter.

Selecting inputs, changing the volume and entering the menu are also available from the remote control - a solid, quite nice and functional unit.



## **SOUND**

### **HOW WE LISTENED**

The DAC502 was placed on the top shelf of the Finite Elemente Pagode Edition Mk II rack. The device was powered using the Harmonix X-DC350M2R Improved Version cable. The digital signal was sent to the RCA input from the transport section of the SACD Ayon Audio CD-35 HF Edition player. The sound of the Swiss file player was compared to both the Ayon player and the Mytek Brooklyn Bridge files player. I listened separately to the USB input with the signal played from the Musical Fidelity MX-Stream file transport. The analog signal from the DAC was sent via unbalanced Siltech Triple Crown cables to the Ayon Audio Spheris III preamplifier.

I chose three models of headphones for listening to the headphone amplifier: the magnetostatic HiFiMAN HE-1000 v2 and Audeze LCD-3 and the dynamic Sennheiser HD800. The latter was also used to compare the balanced XLR 4 output and the 6.3 mm unbalanced TSR. With the Audeze headphones I used the tone correction preset stored in the DAC502 memory.

The wealth of features that the DAC502 Mk2 provides can seem overwhelming but it can actually be 'grasped' quickly. I tried them all and each of them offers real, interesting solutions. The test, however, concerns a device that works without any filters—the only exception was when listening through the Audeze LCD-3 headphones.

I did not use them because the acoustics of my room seemed optimal to me, and also because activating each successive filter slightly decreased the signal resolution. This is normal because the more computation a DSP has to do, the more current it draws, usually in pulses. And that increases the noise. However, my situation is special, because I work in a system that has been refined over the years, in a room whose acoustics have also changed. I am convinced that in most other rooms the adjustments offered by the DAC502 Mk2 will be worth their weight in gold.



One more word about the files transport module. It is a child of the main function of the device. To use it, you need to use the free UPnP Bubble application, which is not one of the most "friendly" ones. Therefore, I would suggest installing Roon as it will solve most functionality problems. The sound of this section is really nice. If you do not want to spend more than 5000-6000 zlotys for external file transport, you can safely stay with the DAC502 Mk2. During the test, I compared its operation with the Mytek Brooklyn Bridge files player and the Musical Fidelity MX-STREAM files transport.

### **Recordings used for the test | a selection**

#### **SACD/COMPACT DISC**

Freddie Hubbard, *Open Sesame*, Blue Note/Audio Wave AWMXR-0012, XRCD24 (1960/2020); review [HERE](#).

Stan Getz & Joao Gilberto, *Getz/Gilberto*, Verve/Lasting Impression Music LIM K2HD 036, K2HD Mastering, "24 Gold Direct-from-Master Edition UDM" series, Master CD-R (1964/2009).

George Michael, *Older*, Epic | Aegean/Sony Music Labels (Japan) SICIP-31544-5, 2 x Blu-Spec CD2 (1996/2022).

Valdimir Horowitz, *Horowitz at the Met*, RCA Red Seal/BMG Classics 63314 2, seria "High Performance," (1982/1999), more [HERE](#).

Fred Simon, *Dreamhouse*, Naim Label naimcd044, CD (2000)

Radiohead, *OK Computer. OKNOTOK Edition*, XL Recordings/Beat Records XLCDJP868, 2 x Ultimate HiQuality CD (1997/2017).

Tal Farlow, *This is Tal Farlow*, Verve Records 314 537 746-2, seria "Verve Elite Edition," CD (1958/1997), more [HERE](#).

## FILES

Dieter Ilg, *Bass, Sommelier Du Son sds 0013-1*, Studio Master Flash DSD256 (2008).

Rafael Fraga, *Trova Caminhada*, TRPTK TTK0014, Master Flash DXD Studio Master (2017); review [HERE](#).

Dido, *Still on My Mind*, BMG 405053 8455847/Tidal, FLAC MQA Studio 24/44,1 (2019).

Dead Can Dance, *Anastasis*, [PIAS] Entertainment Group PIASR311CDX, "Special Edition Hardbound Box Set," CD+USB drive 24/44,1 WAV (2012); review [HERE](#).

Thomas Kessler, *Close to Silence*, Hypersensitive Recs. LC 91631, WAV 24/96 Studio Master (2022).

As I said in the introduction, the designer's belief in his products must find its final stage in the high-end statement that "what I do is the best." Psychologically, the mechanism is easy to explain, especially in audio. Maybe there is not as much money in our industry as in other luxury goods, maybe we lack the marketing tools that they have. But the one thing we don't lack is ego. And that's good. Without it, there would be no real progress in audio, but rather a reeling in to the rhythm of market "revolutions" aimed at either facilitating access to music or minimizing costs.

In this context, what Daniel Weiss writes on his website, namely that the DAC502 is "the best digital-to-analog converter currently available on the market," makes sense. Because it is actually *one* of the best D/A converters you can get. In addition, one that blurs the differences between the technologies, an analog and digital, tube and transistor ones. In short, its tonality and, in general, the structure of the sound, that is its internal structure, resembles what I get from the tube output of the Ayon Audio CD-35 HF Edition SACD player.

The main point is that the Swiss DAC preserves the harmonic richness of the instruments. Which turned out perfectly with the Freddie Hubbard's *Open Sesame* and Stan Getz and Joao Gilberto's *Getz/Gilberto*. Both are characterized by a deep, sonorous sound. The Hubbard disc is more dynamic and has a better defined attack of the instruments. In turn, on the Getz/Gilberto duo's album, the voice of the latter and his guitar are unmatched in terms of "presence" and tangibility.

These albums are well-recorded, but the release method seems even more important in their case: *Open Sesame* was remastered by Alan Yoshida and released in Japan on XRCD24, and

*Getz/Gilberto* is a Studio Master CD-R, prepared by the First Impression Music label. In both cases, these treatments resulted in a density that will not be experienced from other versions.



And now the Swiss converter showed these advantages as easily as the Ayon. In the sense that it did not stop my attention on unimportant things, that is, "how the treble sound like" or "how's the bass," and went straight into the sound. This is because, let me repeat, it sounds in a structurally ordered, dense and resolving way. Everything has its place and time in it. Without rushing, but also without delay, everything is delivered to us as an "open image," not a "package" that we would have to unpack.

I will say right away that the saturation of the vocals and their depth were slightly lower than with the Ayon. This was mainly heard in Joao Gilberto's voice. It seemed a bit quieter with the DAC502 than with the reference player (while maintaining the same output levels of both devices). As I had set the sound level to the exact same level on both devices beforehand, I knew that it wasn't about Ayon's output level, and that it showed textures and "blackness" *behind* sounds even better. On the other hand, the other instruments, such as Hubbard's trumpet, piano and drums, were on a similar level.

"Slightly lower" in this case, however, still means "excellent." Let's not forget that the Austrian device serves as a reference point in all comparisons, also in cases where the tested system is several times more expensive. Therefore, I was amazed at how close the Weiss came to what I know from my system.

Perhaps because the DAC seems to sound quite warm. I mean, it is not warm, but it can be perceived this way. Although in the sound of Ayon and other sources with tubes in the output there is more saturation in the midrange, in a direct comparison the DAC502 seems to offer a bit more creamy treble. Certainly there is no more of it, and if anything, there is less. Which does not mean that there is not enough. After all, the long reverb accompanying the vocal of George Michael in the *Jesus To a Child* from the new remaster of the *Older* was shown by the converter very precisely and accurately.

The reverberation in question creates the illusion of a very large room in which the reverberation time is very long, almost as long as—and that is what it was supposed to be about—in a cathedral. It also allowed us to capture another feature of Weiss's sound, namely the way of constructing the body of the sound source. The device shows them clearly, there is no doubt that the electronic bass, generated here by Michael himself, is strong and contoured, and the guitar has been withdrawn by the mixing engineer and covered with the effect. This is what it should sound like, at least that's how I understand it, and Weiss perfectly showed both these details and the proportions between the different sound sources.

At the same time, it does not build clear, three-dimensional bodies. Instead, it draws a complete picture. It has the exact location of the instruments in it, and there is also high energy. This is helped by the precise, but also differentiated presentation of low tones. On the *Getz/Gilberto*, the lower end is soft, warm, and on the *Older*, it is contoured, almost hard. The DAC had no problems with showing these differences. But it didn't highlight them either.

Although it does not extend bass ultra-low, it can play extremely expressively when necessary. This was the case with the Dieter Ilg double bass from the album *Bass*, which I have in the form of Studio Master DSD256 files, recorded for me by Dirk Sommer on a pendrive directly from the "master" tape, which he recorded and mastered. With the DAC502 the bass was precise in attack and dense in sustain. The damping of the sound was also good, although here the best and most expensive converters I know go a bit further. Mainly because they better define the slow decay of the sound of the instrument and the accompanying (natural) reverberation.

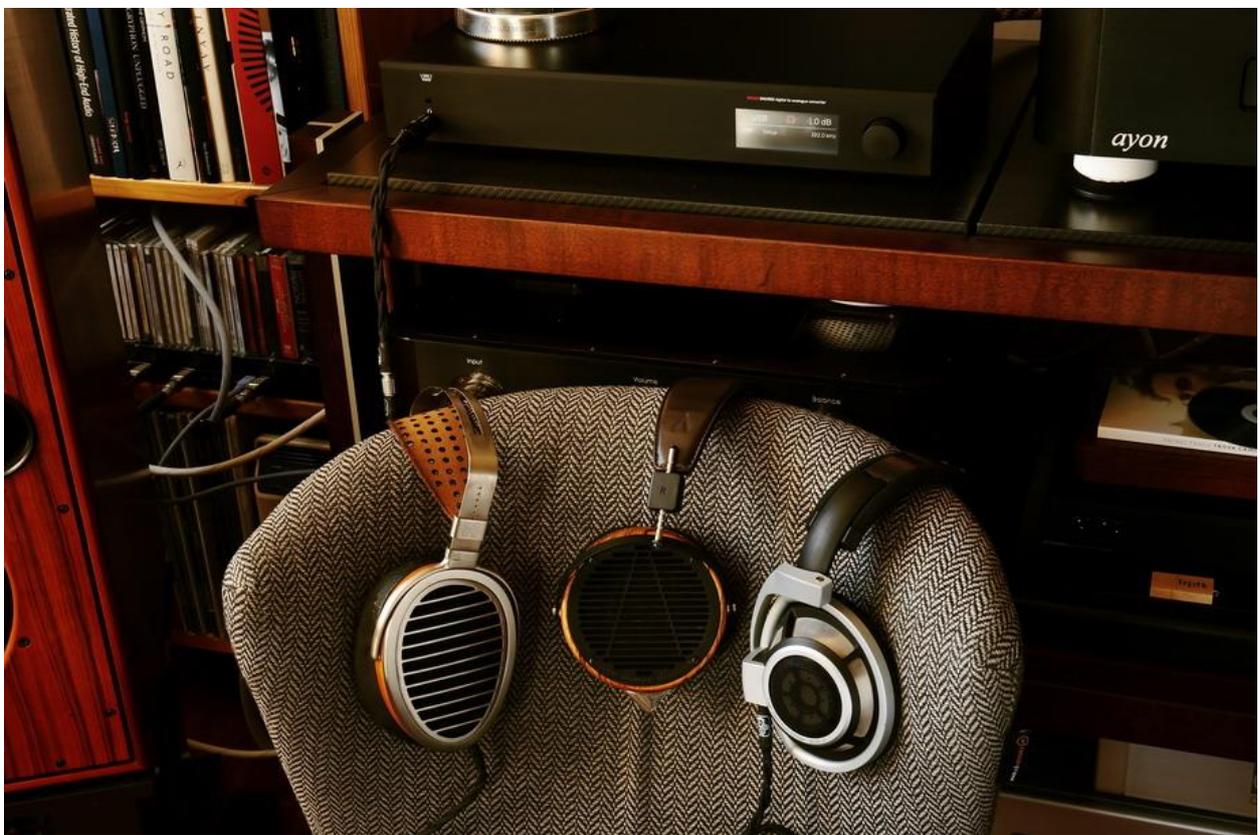
I say this with warmth and sympathy. I don't mean to point it out as some sort of downside of the DAC502 because it has nothing to be ashamed of. However, you should know that Weiss prefers the sound as a whole, taking care of dynamics, stereo imaging—excellent, by the way—and tonal balance. It takes care of all aspects of the sound. It is one of the few converters that is so resolving that it completely "loses" the "digital signature," and it does not indicate the technique used to amplify the analog signal in the output stage. It plays with equal commitment rock albums and purist recordings from Chesky Records. It is simply extremely versatile.

## Headphones

The headphone amplifier in the tested converter is an extremely transparent device. Its main features are fantastic resolution and strong selectivity. In fact, it is largely a "tool."

It sounded best with magnetostatic headphones. The HiFiMAN HF-1000 v2 sounded open, but also had a lot of weighted bass. With the Fred Simon *Dreamhouse* by Naim, I got an incredibly natural sound. This is a recording made with two microphones on a Nagra IV-S analog tape recorder in the real acoustics of Union Church. The musicians were positioned so as not to jam one another—on the left a double bass, in the center a piano, and on the right, much further away, drums.

The decisions of Ken Christianon, who was responsible for this recording, were clear with Weiss, and the choices were spot-on. Equally important was that this recording was amazingly musical which allowed me listen to it with great pleasure. Same goes for the new remaster of George Michael's album. It was with the latter that I tried the DeEsser and vinyl emulation functions. Both of them gave interesting effects and actually allowed me to refine the tonal aspect of the presentation. Both, however, slightly reduced the resolution. Maybe not by much, but since the DAC502 is a very "transparent" device such changes were immediately audible with it.



The Audeze LCD-3 headphones also sounded very interesting. Their timbre is more focused on the midrange than with the HiFiMANs. So the headphone EQ was very useful as it lowered the timbre and added all the energy. On the other hand, listening to the Sennheiser HD-800 headphones was not so satisfying, because it seemed to me too light and too little saturated. Probably the correction that can be downloaded for this model will help with it.

Summing up, I must say that the headphone amplifier in the tested device is exceptionally good. But also rather open than saturated, its sound goes more towards dynamics than fullness. Not all headphones will work well with it. HiFiMAN and Audeze cans are what we should think about in its context.

## Summary

Ten years ago we would have said that the Weiss DAC502 converter sounded "tube-like." Not because it really does, but because we would perceive its sound in this way by comparing it to "non-tube" semiconductor devices. This is interesting, because the Swiss DAC was compared to the tube output section of the Ayon Audio player. Today we call this type "natural" sounding.

And this is what the Swiss DAC is like. It is precise in the drawing of instrument outlines, differentiates them and separates them nicely. But it also has an amazing depth of sound and a wealth of harmonics in store. The timbre is very even, although it seems to sound "warm." As it seems, the point is that the "interior" of the sound can be heard better than its bright, strong attack.

The device is also extremely functional, and digital tonal correction will help many rooms where passive acoustics correction elements cannot be used. And there is a very good headphone amplifier on board too, which one shouldn't forget about. Modest, simple and great. Hence our most important award GOLD FINGERPRINT.

## Design

The DAC502 IS A SHORT, mechanically compact device. Its dimensions of exactly 1 U (U = Unit) correspond to the dimensions of studio devices. The chassis is made of stainless steel and the front of aluminum. The top cover is damped from the inside with a piece of bituminous mat. The DAC can be purchased in black or silver version. It stands on four low aluminum feet with small rubber hemispheres glued to it. It is worth considering upgrading them with some specialized product.



## Front and Rear

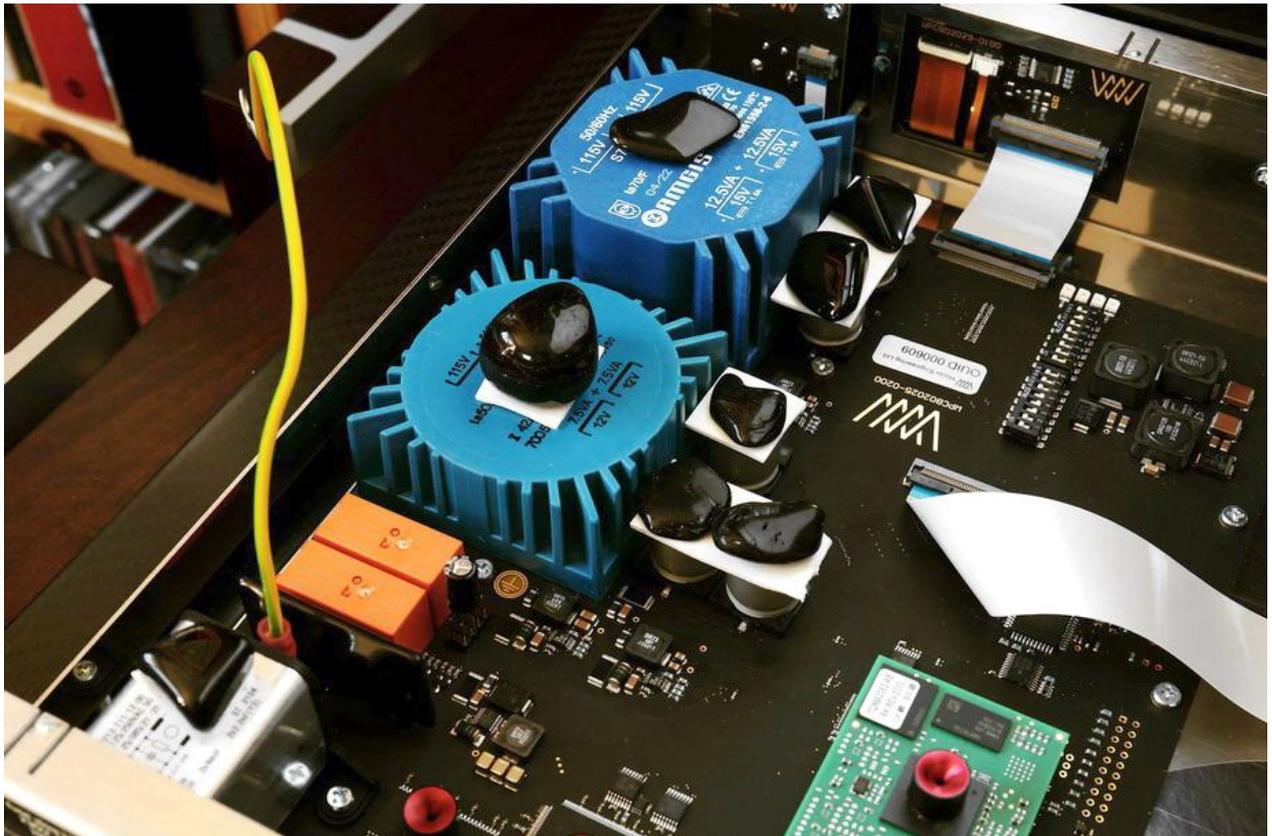
The front is minimalist. There is only a volume /controller knob, a small, liquid crystal touch display and a 6.3mm "big jack" headphone output. The second, balanced socket is placed on the rear panel. And there are great Furutech (RCA) sockets and good, classic Neutrik (XLR) ones there as well.



## Inside

The inside hides high-class engineering, not only the classic one, which can be found in professional devices, but also several solutions known from niche high-end companies. These are also engineering solutions, but quite expensive to apply. This part is the contribution of the Polish distributor Audiofast.

The device is divided into two sections: digital one with power supply and proper D/A converter. The former takes up a large printed circuit board. It features two transformers, separate for the digital and analog parts, and input circuits, along with a large Analog Devices SHARC IV DSP circuit. It is here that the algorithms improving the quality of the digital signal, as well as all correction filters, are stored. Separate voltage filtering circuits are dedicated to the left and right output channels. At the RCA input you can see the impedance matching transformer.



The special thing about the version I listened to are the treatments straight from the high-end world. Elements made of semi-precious stones are glued to the transformers and all capacitors. The distributor does not want to reveal where he gets them from and what they exactly are. These elements are used to dampen vibrations—they contain iron compounds to minimize the dispersed electromagnetic field. On the other hand, on active systems, i.e. DSP, there are elements called by the manufacturer, Synergistic Research, ECTs—Electronic Circuit Transducers. They are used to minimize high-frequency noise.

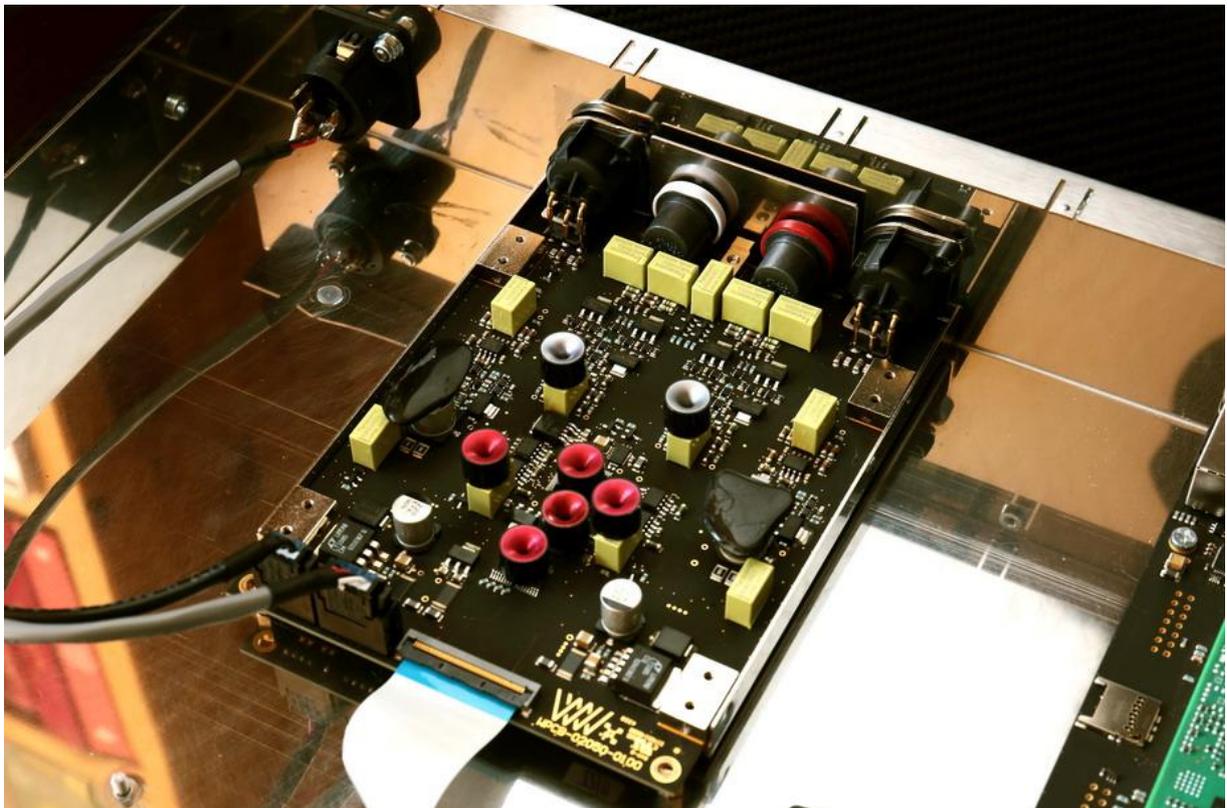
Let's go back to the layout itself—on the main board you can also see the files transport module. Its software was saved in a ready-made programmable DSP chip with Ethernet and USB inputs, it is the TQMa335xL model based on the Cortex-A8 chip. It is produced by the TQ company, which has branches in several countries but is managed by people from Germany. The player algorithm was written by Weiss engineers.

The digital signal from the files transport and from the digital inputs is sent via a computer tape to a separate board with an appropriate D/A converter. It has been moved away from the input

section and screened. There is a digital receiver in its input, behind which you can see a single converter chip. The manufacturer talks about two chips, maybe the second one was on the bottom of the PCB.



The conversion of current to voltage is performed in OT OPA1612 integrated circuits, and the output's gain and its buffering in a discrete circuit composed of medium power bipolar transistors. The system is surface mounted, while very good Panasonic relays, rarely found in consumer electronics, are threaded.



The components of the headphone output are arranged parallel to the balanced audio circuit. The signal is led from the line output and the path includes the IT OPA1611 integrated circuit and, in the output, a pair of transistors working in a push-pull system, the same as in the line output. OPA1611 works in the "unity gain" mode, ie it does not amplify the signal, but only adjusts the input impedance to the output one - it is a buffer.

The whole thing is made very professionally, it is well thought out and you can see years of practice in it.

### **Technical specifications (according to the manufacturer)**

Digital inputs:

- audio  $\square$  AES/EBU or S/PDIF via XLR, Toslink, and RCA, USB
- files  $\square$  UPnP/DLNA over Ethernet.

Room Ready.

Supported digital signals:

- USB PCM 32-bits up to 384 kHz, DSD up to DSD128
- others PCM 24-bits, up to 192 kHz

Max output signal:

- XLR 6.8 V, 2.2 V, 680 mV, 220mV
- RCA 3.4 V, 1,1 V, 340 mV, 110 mV

Frequency range:

- 0 Hz – 20 kHz ( $\pm 0.25$  dB,  $F_s=44.1$  kHz)
- 0 Hz – 40 kHz ( $\pm 0.8$  dB,  $F_s=88.2$  kHz)
- 0 Hz – 80 kHz ( $\pm 2.5$  dB,  $F_s=176.4$  kHz)

THD+N: 0.00016% ( $-3$ dBFS)

Dimensions (W x H x D): 450 x 66 x 300 mm

Weight: 5 kg

Manufacturer: WEISS ENGINEERING Ltd.

Price (as reviewed):

- basic version – 62 080 PLN
- reviewed version – + 3.260 PLN

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