

Playback Designs MPD-8

During the last edition of the Bacco, Tabacco & Vinile exhibition, held last October at Hi-Fi Di Prinzio in the Italian town of Chieti, I had the pleasure to spend a couple of days with Andreas Koch, founder, CEO and design engineer of Playback Designs on the occasion of the presentation to the Italian public of the new Dream Series, the top series of the Californian firm. It is based on three products: the MPS-8, an integrated player with built in DAC, streamer and CD/SACD transport, a CD/SACD transport with several internal digital options (MPT-8) and, last, but not at all least, the star of our test the MPD-8 that only features the function of digital to analog converter. Series 8 thoroughly substitutes the old Series 5 and fills up an offer that shows, in the less expensive price range, the Sonoma Series, Merlot DAC included, of which I wrote abundantly on the 381 AR issue and that has been part of my main system for over a year.

Just a few words about Andreas Koch and Playback Designs

When talking about Playback Designs it is mandatory to mention Andreas Koch's curriculum vitae, in the digital Audio field: in 1982, for Studer ReVox he built the world's first fully asynchronous digital audio sample rate converter. Later on he went to work with Dolby Labs in San Francisco, where, in 1985, he built the DSP encoder/decoder for Dolby's first professional digital audio product, the AC-1, used for television transmission. In 1986 he built the hardware for the very first incarnation of what is today the widely used AC-3 compression algorithm, that is to say the predefined audio format for DVD-Video and DVD-Audio. In 1987, back to Studer ReVox, Koch managed the development of a professional digital audio tape recorder which was a 48-channel format on 1/2 inch tape and designed a digital recorder based on PC and Hard disk. He moved to the States and, still working for Studer, managed a group of engineers who, in 1992, developed a digital system of audio editing on hard disk called Dyaxis. In 1997, for Sony, he guided the group of designers that developed the world's first 8-channel DSD recording/editing/mixing machine: "Sonoma". He designed all the digital parts of A/D and D/A converters. In 2003 Andreas joined Ed Meitner's EMM labs where, in the ensuing four years, he designed the digital audio products, for EMM Laboratories; both professional and audiophile. Various revolutionary algorithms for sample rate conversion stand out, a D/A converter and a unique architecture for clock management from digital audio transmission inputs. In 2008 he launched Playback Designs.

MPD-8: the building up

Talking to Andreas Koch I realized that the goal of Series 8 was that of optimizing the best of the best the firm could produce, regardless of economic considerations. This attitude is crystal clear when analyzing the product and its project criteria; the bright up side of it, as I see it, is that in the MPD-8 everything is strictly technical and nowhere do we find those frivolous and annoying shows of luxury, that have no technical justification whatsoever and that are so commonly found nowadays.

Among the key points of this design there is **expandability**, a major feature also in the previous Series 5, which, over its lifetime of 10 years in catalogue has received 20 software and one hardware upgrade. This means that the DAC was able to keep pace with the innovations that audio digital went through in the course of time. Series 8 goes far beyond all this: new features can be installed by the end user in perfect autonomy and furthermore all products are equipped with a proprietary high-quality optical link called P-Link that guarantees the compatibility to whatever audio digital format can be developed in the future, through external accessory boxes that will allow support of future streaming protocols and encoding formats like today's RAAT or MQA.

The second principle, which is thoroughly in chief, is that of **separation**; this is surely why the latest set up of Dream Series is designed with two separate boxes for transport and D/A conversion. Even inside the MPD-8 everything is separated; the reason is the certainty that the core D/A circuitry and its associated analog output are one of the most sensitive in the digital playback chain, due to the many influences from clocked circuits (such as processors, displays etc.), power supplies and external sources that are connected to it via galvanic (copper) cables.

Here is what Mr Koch said during the presentation of the product.

"The Dream DAC is all about separation between analog and digital, between left and right, between power supplies and between clock generator and digital inputs. For this we have used separate PCB's for each analog output channel, separate power supplies for each analog output channel and digital circuit (3 in

total), designed each entity on its own individual ground plane, used multiple stages of power regulation and gave each entity its own programmable resource. Each analog output stage is double differential – i.e. 8 identical circuits for stereo output. All are design features that the MPD-5 does not have. The core DAC is running at 4 times the rate of the original MPD-5 and therefore allows for much more resolution and better SNR”.

Having a deep look inside this DAC one cannot but remain bewildered by some building details that are absolutely out of the ordinary: the power supply section is next to the front panel and offers 3 regulated analog power supplies with 3 toroidal transformers and, for each channel, 10 of the lowest noise linear regulators with Mu-metal shielding. Going on to the rear panel we find the two analog boards, each connected to its stereo channel and, over them, the digital board which is, by every means, separated from the two channels.

It is interesting to note that also the double display on the front panel, even if connected to the digital section, has its own independent linear power supply because it could be a potential source of disturbance. Let's focus on the case of the display which is a perfect means to understand the way the designer operated. Most available displays are driven by internal processors with simple built in clock generators that run freely at frequencies that are not related or coupled to any audio sample rate. Often enough when two independent clock generators within the same product are not coupled or synchronized in any way, they will create inter modulation distortion: a big problem for the audio sample clock. This is why Playback Designs strict design rule is to only use one single clock generator in the most critical element, the A/D converter; a limit in the choice of front panel displays that can only use monochrome models and have a rather simple graphic that can be driven, though, with an external clock that we can then synchronize with the audio sample rate. To cut a long story short: fancy aesthetic is sacrificed to superlative performance. This is why, coherently, the DAC MPD-8 uses a single clock to drive every circuit from control processor to signal processor, to digital input, to display and uses a proprietary generator to eliminate whatever noise might cause listener fatigue and irritation during long listening sessions.

It is also interesting to note that this detail – very critical in a DAC – is altogether the natural outcome of a basic idea introduced, some 20 years ago, by Mr Koch. His algorithms could take advantage of latest generation FPGA processing power; even in this particular case attention is focused on the analog circuit of the clock generator, matching it with the lowest linear regulators now available on the market.

The MPD-8 offers a wide range of inputs including asynchronous USB that supports direct PCM sample rates up to 384kHz and DSD up to 11.2MHz. An AES/EBU input supports PCM up to 24 bits/192kHz and single rate DSD encoded in DoP. The coaxial input is the same as AES, but S/PDIF formatted on an RCA connector. The TOSLINK input is on an optical connector limited to 96kHz max. Playback Designs also offers a proprietary high-quality optical link called PLINK that is used with the MPT-8 Dream Transport. An additional PLINK IN allows a proprietary and high-quality optical link to other Playback Designs equipment that supports PCM up to 384kHz and DSD up to 11.2MHz. This PLINK IN input also allows Playback Design to offer external accessories, like the OpBox for the Oppo 103, that I usually use with my Merlot DAC. An Ethernet connection, which is not to be used, as one might think, for audio streaming, is located on the back of the unit that will allow remote control of the MPD-8 with an iPad or Android tablet in the future. The outputs, placed on both sides of the rear panel, are unbalanced (RCA) and balanced (XLR), and are controlled by an analog volume controller, which can be easily excluded: a great difference if compared to the old Series 5 that came without it.

Focusing on the analog output stage, created by Bert Gerlach, it is important to note that it shows a differential double structure which means, that one channel of audio is actually built out of four fully differential digital signals that are driven by an FPGA dedicated to the analog section only! The data transfer to this FPGA from the digital board is also differential, and balanced, without any galvanic ground connections. Again the concept of maximum separation and isolation is applied to the analog section of the DAC to achieve maximum performance.

It is now high time to consider the aesthetic side. The MPD-8 is a large DAC tipping the scales at 19 kilos. The external aluminum case is very attractive with its dark grey brushed aluminum finish. This enclosure is reminiscent of the discontinued Playback Designs MPD-3 DAC which I have owned for a couple of years. The faceplate has the 2 LED displays: one for the volume control and the other showing the input used and PCM/DSD sample rate. This LED display also serves as the settings display, with the same display which controls the various functions. At the top right of the DAC four buttons allow the mute to be toggled on/off, the sequential selection of activated inputs (up/down), and power standby. The main switch is placed on the

rear next to the IEC socket. A well built aluminum remote is included. It not only offers control of the volume and several other functions but allows one to access the settings menu and provides the user with the ability to invert the phase of both analog outputs.

Listening

The Playback Designs MPD-8 was plugged into my main audio system: I used a Lamm L2 Reference preamplifier, Lamm M1.2 monoblock power amps and Vivid Audio Kaya 90 loudspeakers; as for the signal cables I used Neutral Cable Reference, Audioquest Aspen for the speakers and Curious Cable for the USB, choosing to substitute the very good one that came with the product. The MPD-8 was connected via USB to a mini ITX PC equipped with a JCat USB card powered by an HDPLEX external power supply, OS Windows 10/Fidelizer Pro; a Roon Rock server provided the audio files. To listen to CDs I used my Oppo 103 modified with the OpBox card of Playback Designs for optical connection through PLink protocol. I thoroughly respected the run-in period which is a priority for all the products of the Californian firm. I started my "critical" listening evaluation only when the DAC had reached 500 playback hours (certified by the convenient timer on the DAC).

I believed, right from the start, that the MPD-8 would play much better than my Merlot; the structure of the machine, its high build level, and last but not least the price gap, all led to this conclusion. What I frankly could not imagine was, in terms of performance, the chasm between the two products. Given the fact that I still consider the Merlot one of the best DACs in the price range of 10 thousand euros (and even capable of competing with more expensive products), hence the conclusion is a rather easy one. I might end my article here, but, as a critic, I must respect all my duties. This is why I come to give proof of my point of view. I will start by the element that mostly struck me because on this parameter, the MPD-8 is extraordinarily superior to any DAC that ever passed through my listening room: the talent this DAC has to convey the dynamic variations, big and small, is absolutely terrific; one cannot but be thrilled by the coherence of it all, because, given the perfect resolution of micro-dynamic, I did fear that it would somehow or other affect the macro-dynamic. Not in the least. During the orchestra in full flight, one is completely overwhelmed by a powerful, full sound, that is nevertheless able to be nimbly convincing even when the crescendo dies down and we come to have only just one instrument. Speaking of which I want to write something that happened to me lately. During a lesson on jazz, I was lucky enough to have a really close up hearing (I was actually at a meter from the instrument!) of a jam session of the great Italian sax player Stefano Di Battista. Ok, even during the faintest, most intimate and pensive passages the sound of the soprano sax was dramatically intense: there was no trace whatsoever of – find me the word – the "wimpiness" that is typical of reproduced music.

Back home I was wild to find all the tracks that could be vaguely similar to the one I had heard live; the result was that of the three DACs available (one was the Merlot), the MPD-8 has been the only one able to send me back what I felt a few hours before. I do not mean to say that the other two did not work, but I did feel that their sound seemed a bit compressed, while with our champion it just flowed freely expressing all its energy, regardless of the recording resolution. On this account I must say that the "MPD-8" cure adds beauty and life to 16/44 files and, as a result, to the CDs read by Oppo 103 via PLink.

On considering the bass range too, the differences are so very noteworthy that my job seems to be too easy and maybe even embarrassing at the same time, because it is not my habit to go over the edge. But I must say – and so I will say it – that this DAC has the best ever bass range I ever listened to, both at depth and articulation level. The amazing thing is that it manages to be, all in one, deep yet mellow and relaxed: when the impressive "bangs" come about one feels prepared to hear the tail dragging along, but, no, it does not happen. This is when you realize that the years gone by (and the money spent) clearing up the room and getting the proper equipment and well performing loudspeakers – something I am really proud about – have probably been spent searching for a culprit that was not there. If I consider the low range of my setup, starting from the listening environment up to the last cable, passing through amps, loudspeakers and so on, it had never expressed itself at such levels.

I seem to start lacking space, but this will not be a drawback to say how much the MPD-8 has increased and improved the soundstage of my room: not only, might I say, it has been the largest I had ever experienced in my house, with the illusion, the dazzling illusion, that the side walls had disappeared – but it has been also the most articulate in terms of depth. Each instrument appeared isolated, easy to be recognized and I knew which was standing in front and which one at the back and even HOW MUCH in front or in the back instruments and voices were in respect to each other.

There is another aspect that I only experienced once, on a smaller scale, with the Chord DAC Hugo2: the capacity to extract surrounding information even in recordings that seem to lack them when reproduced on

other DACs. I suppose it is due to some algorithm which is capable of mining and catching whoever knows what information embedded deeply in the data flux, in any case the result is that the spatiality this DAC offers makes listening really engaging.

Timbrically, I do reckon this Playback offers first-rate resolution, because it never stresses this or that accent on this or that frequency range. From such a powerful machine, it is just what is to be expected; I would rather focus on the extraordinary way this DAC portrays beautifully the whole chromatic palette and the full harmonic richness of the instruments, which seem to bloom in personality and come alive. Proceeding in the evaluation of the different frequency ranges, I must say that the high end is wonderfully bright and extended, no sign of harshness there; the medium range is the only one that made me wonder, even if only once. Let me explain: with some choir and solo voice recordings I had the feeling that the solo singer, standing out against the background, suffered from some kind of hardness. Difficult to say how much this perplexity might weigh. Let's put it this way: the same track, on the same parameter, played on the MSB Premier DAC made me feel even more vaguely uncertain because I did feel that it had that little extra tinge of softness, which I appreciate.

But of course I feel I am simply splitting the hairs, craving to find something less positive to write about this machine, searching in my memory what happened during the testing of the MERLOT DAC. After all, the "problem" only happened once... What's more, truly speaking, it was completely overcome when that DAC surpassed the 800 hours playback; same story, no doubt, would happen with the MPD-8. On the other hand, in a track, with two feminine and a male voice plus acoustic instruments, I realized that the women singing were two, whereas, on a previous listening session, done with another DAC (I will not reveal its name), I was tricked into thinking that there was only one woman singing.

Conclusions

The MPD-8, alas, is no more in my audio room. Doing this kind of job, I should be used to it: a set comes, a set goes, end. Who knows, the next one might be even more thrilling. In this case I do believe it would be very difficult, if not impossible. This DAC is part of the "Dream Series". At the beginning I considered this name an exaggeration. Not any more. Now I think it is absolutely appropriate.

Giulio Salvioni

Management of the input signal and D/A conversion (by Ing. Fulvio Chiappetta)

Technical notes

As soon as the Playback converter had been delivered at our studio, which has a spacious listening room and a fully equipped laboratory, we could not resist the temptation to test it. It did a pretty wonderful job, as was largely predictable. After the evaluation only one peculiarity stood out, and it is useful to talk about it, because it has many practical effect for an optimized installation. Reporting this seems to us relevant when a column (Audio Club) is concerned, which instead of dealing with the technical analysis of the product, evaluates its sonic value.

This is what it is all about. According to what we can call a custom more than a rule to strictly adhere to, the AC phase is placed on the left terminal, looking at the IEC connector on the back of the device to be powered, with the third pole central at the top. Well, testing the dispersion of the Playback DAC, just as we always dutifully do for any audio electronic equipment which arrives in the laboratory, we discovered that the value of this dispersion is significantly lower (over 60% less) if the phase is placed on the right, exactly the opposite to what practice would suggest. We therefore invite the enthusiast, who is well informed even on fairly marginal aspects, which however become fundamental if we seek the maximum of sonic performance, to keep in mind the aforementioned signaling. On listening, all along the tests we have done in rigorous double blind, we have been able to realize that the musical message, flowing naturally, respecting the correct phase of the alimentation, grows quite a bit, just like the depth of the scene. What reported here, does not, in any way, alter the results of the test performed by Giulio Salvioni, since in his home, as in many others in Rome, (by the way this occurs also in other places), the AC does not have a phase and a neutral, but only two phases and therefore the direction of the spine is indifferent. As a matter of fact, this indifference is not always fully verified, because of the inevitable unevenness in the distribution of electrical capacities, and therefore we suggest carrying out a definitive validation test, which Giulio always carries out with the meticulousness that distinguishes him.

Given all this, the next paragraph is dedicated to analyzing the original design philosophy that characterizes D/A conversion according to Playback.

The Playback philosophy

Like all Playback Designs products, this DAC does not use a standard D/A conversion chip produced by third parties but is based on a Xilinx's FPGA (Field Programming Gate Array) on which the code developed by Koch runs. This approach, of which Playback was among the pioneers, is now increasingly followed by DAC manufacturers as it allows a freedom of manoeuvre otherwise impossible.

Very often the products offered by the market seem to be all made with a cookie cutter: if, for example, we observe the circuits of many digital converters, the first thing that leaps out is the near perfect equality of them all, going from one model to another. There are undoubtedly deep differences in the components used, in the care with which the power supply and/or analogue section has been sized, which, by the way, surely have a not minor importance, but the core, the beating heart, that is to say of the conversion section is schematically organized always in the same way, even if the integrated circuit in charge of this role changes. It is basically in total homologation and rarely, at a pure technical level, that real innovation can be found. Used to and even resigned to this, perhaps, to such flatness of ideas, out of the greyness of uniformity some deeply innovative products can bloom, not so many however if we can count them all on the fingers of one hand. Among these, like beacons of light, MSB, Emm Labs and, indeed, Playback Designs stand out. The latter, thanks to its very original proprietary conversion system, enters fully fledged into the category of these virtually unique objects, a pure mix of technology and innovation. It is, actually, the entire range of digital products of this company that revolves around an intriguing idea, a fine alternative to classic realizations. The idea, initially introduced by Emm Labs (where Andreas Koch, now CEO of Playback, worked as chief designer), was at the time, more than a decade ago, a real revolution and up to now it still remains the template.

To understand the substance of this innovation, it is necessary to start by briefly explaining the performances of the DSD conversion system.

When the DSD appeared, it was rightly considered profoundly innovative because with it we were faced, probably for the first time in the digital world, with a system conceived, designed and implemented keeping in mind the principles underlying the High End sector. Finding this in the realm of analogue men like Kondo

or other gurus (we are obviously talking about the real ones) who follow in some respects a philosophical path rather than mere mathematical thinking is something we are used to, but for digital technicians, before the DSD, it was something yet to come, simple make belief, an illusion.

In the world of extreme high end the rule is that the most direct and shortest the signal path is, the better. Therefore, a maximum-simplified conversion, as long as it is rigorous, is certainly better than another which achieves the same result following a higher number of steps. So, a DSD analog digital converter is, in short, nothing but a very effective low-pass filter, not even of a very complex implementation, considering the extreme distance between the useful band and the one to be eliminated.

The total lack of manipulation of the signal is full guarantee of total transparency. The problem, however, apparently insurmountable, is that this conversion can be used only with a coded DSD signal. And here comes the stroke of genius. Why not convert a PCM signal into DSD, in order to always benefit from the advantages of the latter system? The conversion of a PCM file into DSD is a mathematical operation that, if some boundary indications are strictly respected and if implemented in a scientifically rigorous way, reaches, thanks to the computing power of the currently available microprocessors, almost perfection, getting very close to an accurate operation and therefore almost completely transparent under the sonic profile. All this sounds obvious, maybe even trivial, but it was not so till someone thought about it!

The scheme adopted by Andreas Koch (4) therefore favours the DSD format for the technical reasons we have just explained; It should also be noted that most DSD files (dsf) available for download are DSD64, but also that the best results in sonic terms can be obtained from Double DSD (DSD128) or Quad DSD (DSD256) files. The MPD-8 has the ability to play the DSD in native form rather than in DoP (DSD on PCM). This type of playback of DSD files results in an increase in CPU processing load of 30 to 50 percent. This can negatively effect the sound when the DAC is driven directly by the computer. In addition, the DoP implementation for the DSD256 requires 705.6 kHz and 768 kHz PCM support. Such high sampling rates represent a not insignificant effort for the computer's CPU and USB audio interface. Most DACs, including the MPD-8, support the DoP with a maximum DSD128 limit. The ASIO driver for Windows by Playback Designs allows you to natively play DSD256 files, so without DoP. There is also support for playback DSD256 for Linux operating system, while OSX users are limited to DSD128 using DoP.

Image captions

Fig. 1- the image allows to appreciate the triple power supply section placed inside a shielding metal box.

Fig. 2 - in the top view the subdivision of the various functional areas and the arrangement of the three boards is captured. Note the presence of multiple FPGA units.

Fig. 3 - although the MPD-8 has been designed to work in combination with the MPT-8 transport unit, the input and output equipment is sufficient to cover all requirements. Note the presence of the three PLink connectors in a central position.

Fig. 4 - the D/A conversion scheme from the DSD format consists of a low pass filter.

Fig. 5 - simplified block diagram illustrating the various processing phases of the signal input to the DAC. (Source: Playback Designs)