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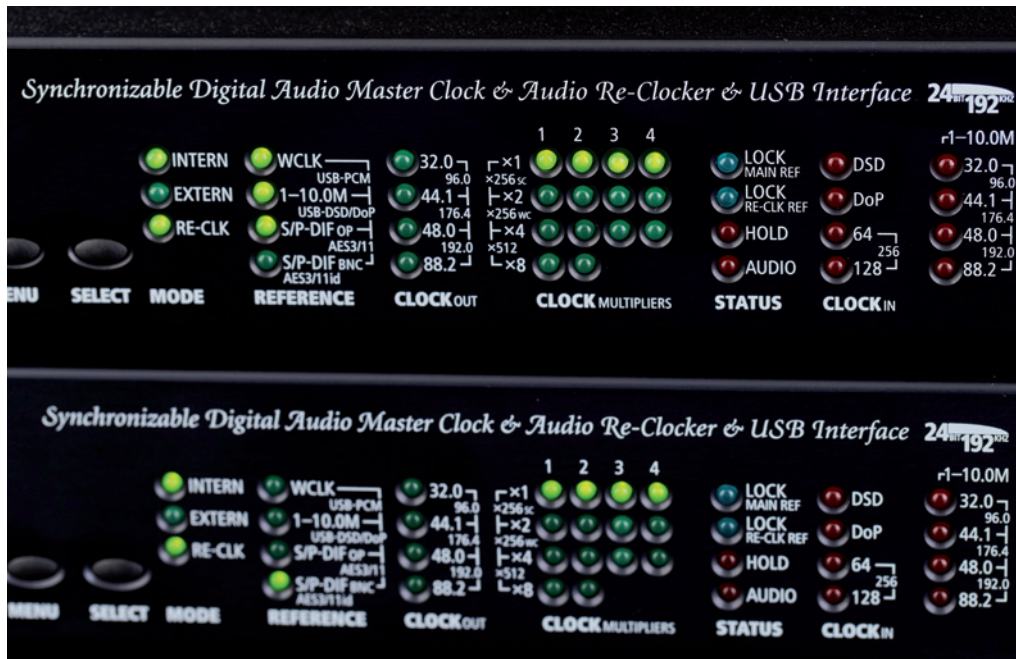
MUTECH MC-3+ Smart Clock USB

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Nowadays, USB is the most common interface to transfer digital audio data from a PC or a special audio server to an audio device, at least when it comes to consumer audio at home. As simple as the USB connection is in its handling, it is so difficult to come to grips with the sonics. Exactly at this point, the MUTECH MC-3+ Smart Clock USB enters the game.

The MC-3+USB is a rather inconspicuous little box from the Berlin-based company MUTECH, a leading manufacturer of high-quality A/V studio clocks, audio re-clockers, interfaces, format converters and signal distributors for professional applications. Though professional audio equipment is rather rare in domestic high-end systems, it is always worthwhile to think outside the box.

From a sonic point of view, computer-based music sources offer a rather inadequate environment for audiophile music enjoyment. Due to their construction, they operate with high clock rates while they keep a variety of processes running parallel to the music reproduction that create a wide spectrum of high-frequency interference of all kinds. The MC-3+USB is equipped with a special USB interface to minimize these unavoidable interferences and to prevent the sensitive digital-to-analogue conversion process from being adversely affected. It is completely galvanically isolated from the rest of the device, operating with its own ultra-low noise audio clock oscillators, which are fed by a carefully designed power supply consisting of a pre-regulator with a downstream main regulator. The MC-3+USB thereby acts as an isolator between the audio computer and the subsequent digital signal path. According to MUTECH, "interferences from the USB data stream can be suppressed as far as possible, resulting in an almost interference immune behaviour of the USB interface towards the connected PC, laptop or music server."



The MC-3+USB's front panel: 37 LEDs provide information on every conceivable operating condition

In the subsequent re-clocking unit, the digital audio signal is freed from interferences caused by a computer connected via USB and is then re-clocked under optimal conditions. For this purpose, the clock data contained in the incoming signal are first completely removed and then replaced by the clock data of the proprietary internal high-precision clock. The clock generation and its distribution are undoubtedly core competencies of MUTECH. The MC-3+USB uses a high-precision low-jitter clock generator with an extremely high system clock of one gigahertz. I will spare you further technical details at this point but here is what is important: the signal present at the MC-3+USB's output provides an optimal clock quality and the re-clocking is completely bit-transparent. It is particularly important in studio environments that this clock signal can be passed to other devices via four clock outputs at the rear panel. At the end of my article, I will revisit this aspect.



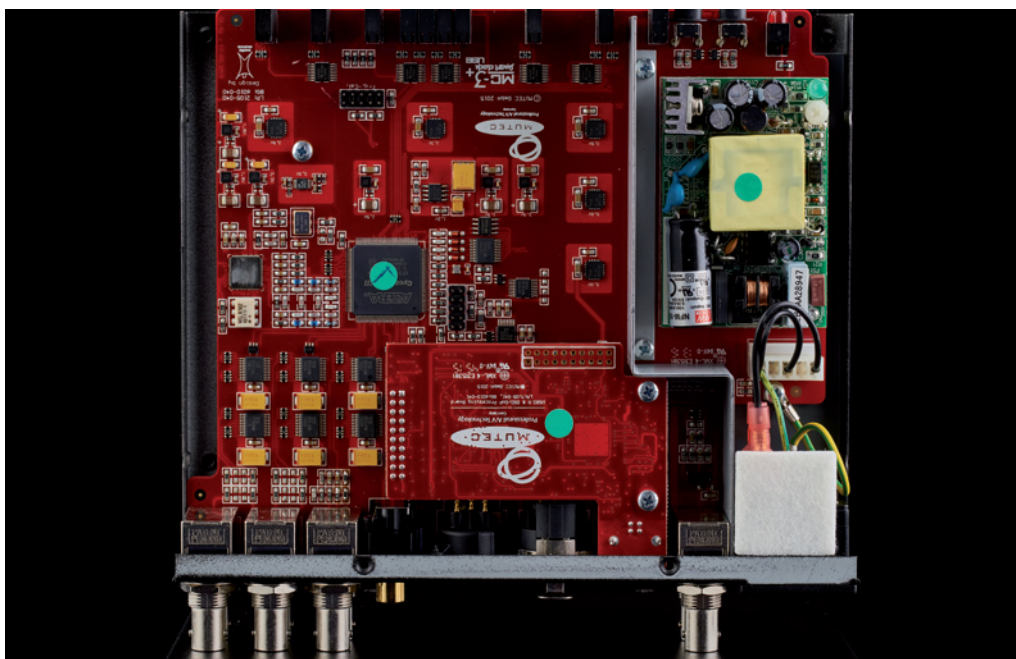
The MC-3+USB's rear panel is completely filled with various inputs and outputs

The MC-3+USB allocates the incoming USB signal to five digital audio outputs in the formats AES3 (XLR), AES3id (BNC) and S/P-DIF (BNC, RCA or Toslink). In addition to USB, the MC-3+USB also accepts all other common digital input connections in the formats AES3 (XLR), AES3id (BNC) and S/P-DIF (BNC, Toslink or RCA via included adapter). All input signals run through the re-clocking unit. The USB interface works bi-directionally. Thereby, for example, the path from S/P-DIF back through USB into the PC is available - a convenient option when you digitize analogue recordings and store them on a PC's hard disk.

In addition, the USB interface is capable of receiving not only standard PCM audio up to 192 kHz but also native DSD and DoP streams with a clock rate up to four times (DSD256), as well as converting those streams to PCM audio at user-definable sampling rates (176.4 kHz, 88.2 kHz, and 44.1 kHz). For this purpose, the MC-3+USB contains its own special converter chip. The output offers here also the already mentioned five audio and interface formats, whereas their sampling frequency is selectable between 44.1-, 88.2- or 176.4 kHz. Thus, DSD streams, for example, can also be reproduced with a ladder DAC which, inherent by design, does not provide a DSD conversion.

The MC-3+USB's outward appearance can not deny its origin from the pro audio world. The front panel is equipped with a large number of light-emitting diodes for displaying the various operating modes whereas the extensive labeling does not really contribute to clarity. The unit's rear is fully equipped with the input and output jacks for the above mentioned audio and interface formats, the USB port, the power switch and the power jack. Inside the device, a small switching power supply can be found that accords to the medical standard and is shielded from the other circuit parts by a separating plate. Numerous modern, rather high-quality linear voltage regulators with extremely low noise values follow the switching power supply. For further optimization, as a rule, several voltage regulators are connected in series. As MUTECH is obviously aware of the importance of a good power supply, the components used in the device are consistently of high quality.

In practice, the operation of the MC-3+USB proves itself easier than it first seems. All settings are controlled by only two buttons on the front panel. Pressing the Menu button invokes the basic function menus, which generally correspond to the vertical LED rows from left to right. Subsequently, individual functions can be selected by using the Select button within a basic function menu, which means switching between the individual LEDs within a vertical LED row. Once you got used to it, it works amazingly well in practice whereas I have the feeling that the manual is not really helpful.



The interior: the switching power supply on the right, the USB-unit down in the middle and underneath the large main board

My review of the MC-3+USB turned out to be much more extensive than I had originally planned. In the last few weeks and months, I tried the MC-3+USB in many different configurations and was repeatedly very pleasantly surprised. But let us take one step at a time. I started with my Sony laptop, running a special installation of Windows 10 that was optimized as far as possible with the program AudiophileOptimizer which I will cover in a separate article. The installed media servers include MinimServer and the media players JPLAY and JRIVER 19. Since we work with Windows, first the corresponding USB driver has to be installed for the MC-3+USB which behaves like a DAC in this respect. Then I connected the MC-3+USB's input with the laptop via a USB connection and its output by S/P-DIF with the Mytek Brooklyn's appropriate input. At any time, even with the often critical switching between files with different sampling rates or data formats, the USB connection worked perfectly. In JPLAY, the extreme settings for the DAC connection could be fully thrashed out. Apparently, the ever so important matching of the USB driver and USB input module is a brilliant success.

The MC-3+USB provides a significant tonal improvement that is instantly audible without any major difficulties. All recordings - no matter what genre - sound a lot cleaner and more natural. The treble gains in suppleness, the important timing is much tighter and there are clear changes in spaciousness. This sonic gain can be very well perceived at the 'Intermezzo from Goyescas' of Enrique Granados with the New Philharmonia Orchestra, directed by Rafael Frübeck des Burgos (Decca Legacy Volume One - FIM UHD). Without any harshness, the expressive string entries at the beginning and in the middle of the piece gain a lot of charismatic power. Without the MC-3+USB, the comparison appears almost coarse-grained. The horns, which lead to the song's climax stand no longer more or less diffuse in the room but suddenly become clearer defined in terms of their size and their placement in the orchestra.

Applying to all musical genres, the spaciousness of the recording thereby improves considerably, less so in absolute depth but in clarity and concision. With one of my favourites 'Don't know why' (Norah Jones: Come Away With Me; 96 kHz), Norah Jones' wonderful and sensitive voice is now clearly focused while the instrumental accompaniment at the same time shows much more to advantage. It's simply fun!

Admittedly rather skeptical, I now change to DSD files. What use might the conversion to PCM by the MC-3+USB have when the Mytek Brooklyn can process and convert DSD directly? A surprise follows instantly: over the intermediate MC-3+USB also 'Night And Day' or 'Fine and Dandy' in the recording with the Joe Holland Quartet (Joe Holland Quartet The Joe Holland Quartet - Klipsch Tape Project Vol. II - HDTT DSD128) sounds



The left half of the rear panel with the four clock and the five digital audio outputs in detail



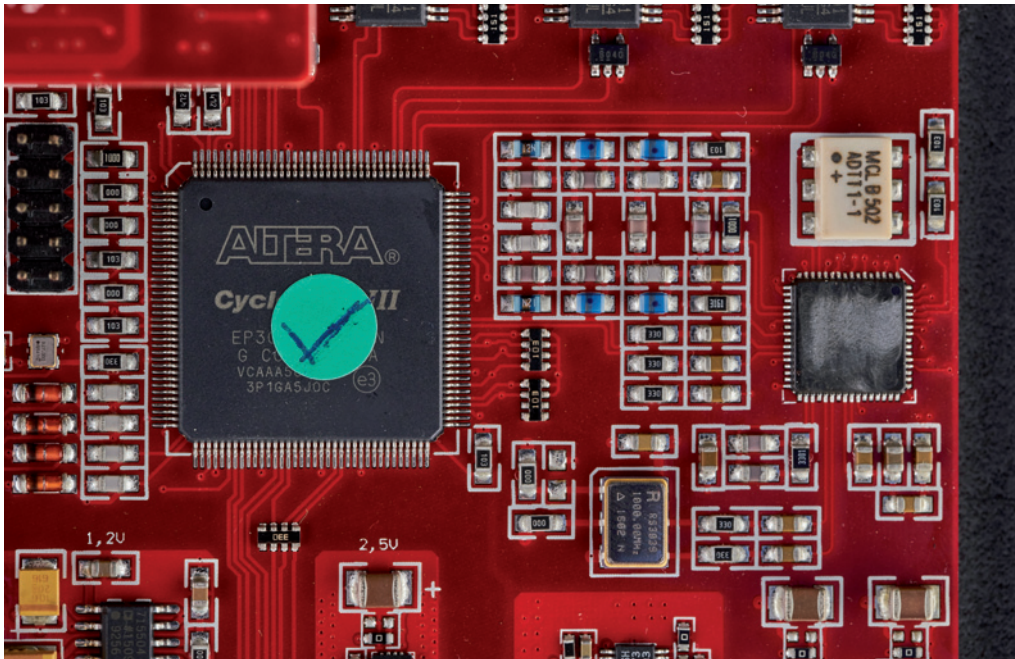
The right half of the rear panel with clock and digital inputs in detail

excellent even in comparison with the "direct" DSD playback without any detour. Yes, I actually tend to the MC-3+USB since I simply prefer its imaging and spatial placement of instruments, too - very good to spot with the bongos and the drums.

As the MC-3+USB impresses me so rather positively, I wonder whether the described effects are not only resulting of a special random constellation of my setup. To be sure, I change in a second setup the source and connect the MC-3+ USB to a MacBook Pro with a likewise optimized operating system and Amarra 3.0 as an audio player. The MC-3+USB immediately works with the MacBook Pro. A separate driver installation is not required under Mac OSX. As Amarra 3.0 basically sounds a bit different, especially a bit more mellifluous than JPLAY- I never feel certain that Amarra does not add anything artificial to the music -, the above-mentioned sonic impressions absolutely apply also to the Mac system. I cannot remember having listened to music with a Mac in a better way. The same applies to the playback of the DAC M2Tech Young which was also used for the comparison and that benefits profoundly from the MC-3+USB.

As I now would like to explore the MC-3+USB's limits, I use the not only by me highly appreciated MELCO N1A as a player. Here too - MELCO is known for using Linux as operating system - the MC-3+USB immediately works without any driver installation. To my admittedly big surprise, the MELCO N1A in combination with the MC-3+ USB gains in the same degree as the previously used PCs. During my vacation, I leave Dirk Sommer the MC-3+USB who uses it in conjunction with the significantly more expensive, with separate power supplies equipped MELCO N1ZH. Completely independent from me, Dirk Sommer comes also to a very similar sound assessment of the MC-3+USB. These experiences clearly show me how critical the USB interface and a precise clock are for a superb sound reproduction.

Is now everything fine using an MC-3+USB, fine in the sense that the quality of music servers or accessories, such as USB cables, does not play any or only a minor role? Unfortunately, I have to disappoint you. The difference between a "normal" Windows 10 system and a Windows 10 tuned with AudiophileOptimizer is also significant with the MC-3+USB. The same applies to the used player software. For me, the JPLAY Streamer ranks first. Obviously, the MC-3+USB cannot iron out all errors in the chain. Despite or just because of the MC-3+USB, I can still distinguish the JPLAY USB reference cable effortlessly - a review will follow - from any cheap USB wire. However, due to my gained experience, I would, next to the optimization of the operating system, first invest in the MC-3+USB, followed by a reasonable USB cable and, if necessary, some additional accessories.



The latest FPGA technology is used in the MC-3+USB

Actually, my report would have ended at this point had it not been for a long phone call at the beginning of September with MUTEK's CEO, Mr. Christian Peters that led to consequences. In the course of this conversation, he explained to me that the MC-3+USB could also be cascaded, that two devices connected in series could achieve yet an additional sonic improvement. As we quickly agreed that this would be worth trying out, at short notice Mr. Peters allocated me another MC-3+USB.

In my experimental setup, the cascade of connecting two MC-3+USB units via a BNC connectors equipped S/P-DIF cable worked right away. No matter what sampling rate the audio data has, both devices synchronize fast and reliably. I am amazed what additional positive effect another re-clocking has on the sonic image. Im-



The two MC-3+USB units for cascading

mediately, the improvements are clearly audible and given in the same direction as already described, meaning still more cleanliness and naturalness in combination with an improved spatial resolution and clarity. In the 'Intermezzo from Goyescas', the strings lose their remaining rest of sharpness. At this point corresponding a lot better to the piece's character, the size of the horn instruments is reproduced even more realistic, appearing less obtrusive and at the same time more intense. It is always amazing how fast one can get used to an improved sound which becomes evident when you go back to the initial state, in my case to a single MC-3+USB. Quite obviously – not contradicting the MC-3+USB's quality but being rather a nature of things – the effect of a re-clocking process is not limitless. Thus, a subsequent re-clocking process based on a very clean signal can achieve a further improvement. Do not get me wrong, the sonic improvement of cascading two MC-3+USB devices is not twice as much as one can achieve by using only one MC-3+USB. Here again the rule is true that the expenditure for a particular result does not increase linearly but rather exponentially with the progressive optimization. Still, two MC-3+USB units are better than one MC-3+USB alone!

In the above-mentioned discussion, the idea arose to use the clock signal at the MC-3+USB's clock output once for the external clocking of the Mytek Brooklyn. The Mytek Brooklyn, having its roots also in the studio, is one of the few DACs providing an input for an external clock signal. On its front panel, one can conveniently switch between internal and external clock, too. I did not expect any improvement since the Mytek Brooklyn already uses a very high-quality internal clock and the manual interestingly does not recommend the use of an external clock. Nevertheless, I tried this configuration out. To my great astonishment, a further improvement could be found which in my system is reflected in an additional more refined high frequency reproduction, a clearer separation of individual instruments and their more precise placement in the room. It is surprising that all mentioned improvements by the MC-3+USB, without fundamentally changing or even assimilating the sound characteristics of the used components, somehow tend into the same sound direction.

STATEMENT

For me, the MUTEK MC-3+USB is one of this year's big surprises. Due to its versatility in a digital signal chain, the device proves to be a true all-rounder. Using just a USB connection, the resulting sound improvement is striking. Do not miss to try it out!

LISTENED WITH

Computer	Intel Core i5 2,5 GHz, 6 GB Windows 10 with AudiophileOptimizer 2.0, MacBook Pro 13"
Software	MinimServer, JPlay 6.2, JRiver 19, Amarra 3.0, Roon
D/A converter	Mytek Brooklyn, M2Tech Young
Pre-amp	Omtec Anturion
Poweramp	Omtec CA 25, Einstein – The Poweramp
Speaker	Outsider Jota with Velodyne Subwoofer Management System SMS-1
Cable	Van den Hul, JCAT Reference USB, JCAT Reference LAN, Analysis Plus Digital Oval Yellow, AudioQuest Eagle Eye Digital Cable

MANUFACTURER'S SPECIFICATIONS

MUTEC MC-3+ Smart Clock USB

Digital inputs	USB2.0 interface, bidirectionally usable XLR input for AES3/11, 110 Ohm termination, transformer-balanced BNC input for S/P-DIF + AES3id, 75 Ohm termination, unbalanced Optical input for S/P-DIF, Toshiba Toslink™, EIAJ RC-5720 1 x BNC input for Word Clock + 1-10 MHz, 75 Ohm termination, can be switched off unbalanced
Digital outputs	XLR output for AES3/11, terminated, transformer-balanced, buffered BNC output for AES3id, terminated, unbalanced, buffered BNC output for S/P-DIF, terminated, unbalanced, buffered Cinch output (coaxial) for S/P-DIF, terminated, unbalanced, buffered Optical output for S/P-DIF, Toshiba Toslink™, EIAJ RC-5720 4 x BNC outputs for Word Clock, terminated, unbalanced, individually buffered, pairwise adjustable
Weight	1350g
Dimensions (W x H x D)	Housing size: 196 x 42 x 156mm without connections / housing feet Front panel dimensions: 198 x 44 x 4mm
Recommended retail price	1059 Euro

MANUFACTURER

MUTEC

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