





The TEAC CD drive is housed in the thick-walled aluminum cover.

Lindemann musicbook 15 DSD

AUDIO BOOK FOR AUDIOPHILES

By Harald Wittig. Photos: Harald Wittig

Lindemann's new musicbook 15 DSD was conceived and created for the infatuated audiophile. We could all put it at the top of our list of favorite books.

_____Lindemann Audio is a name that resounds in the refined ears of its devotees as the best possible music playback. Designed and produced in-house by the manufacturer located not far from Munich, the devices have inspired audiophiles since the early 1990s. The musicbook series devices belong to the more recent Lindemann success stories: The company found success right from the start with its first model, the high-end network player musicbook 20. Released in 2013, it drew strong praise from fans and the trade press alike. Just one year later, the USB DACs musicbook 10 and musicbook 15 produced waves of enthusiasm among audiophiles with an affinity for digital music. That led colleague Stefan Gawlick to review the musicbook 15 in issue 2/2015 of FIDELITY: "The musicbook is the best USB converter I've ever had the pleasure of listening to." No wonder our ears really perked up when Lindemann Audio announced in 2016 that it had completely

overhauled the musicbook: The latest device generation converts all digital input signals into DSD 128 or 256. The result is a truly great sound, in keeping with the promising Lindemann slogan: "DSD is the new analog." Norbert Lindemann explains what's behind the provocative statement: "Both digital recordings in 16-bit/44.1-kilohertz resolution and high-res files are significantly upgraded by resampling in DSD." At the same time, signal processing in the new musicbook is thoroughly reduced to synchronous resampling. Digital overkill in the form of extensive signal processing using D(igital)S(ignal)P(rocessors) or F(ield)P(rogrammable)G(ate)A(rrays) is strictly forbidden, however all processing steps do lead to a digital signature. Even though the conversion of all digital signals to DSD is factory standard for the musicbooks, the devices are also capable of conversion to a DXD signal with a 352.8 kilohertz sampling rate and even PCM upsampling to a maximum of 384 kilohertz. The ▶

The large knob on the upper right is the main control element. The headphone jack underneath is hardly visible and is operated by its own powerful and pleasant-sounding amplifier stage. The fine-resolution OLED display provides superior readability even from extreme angles.



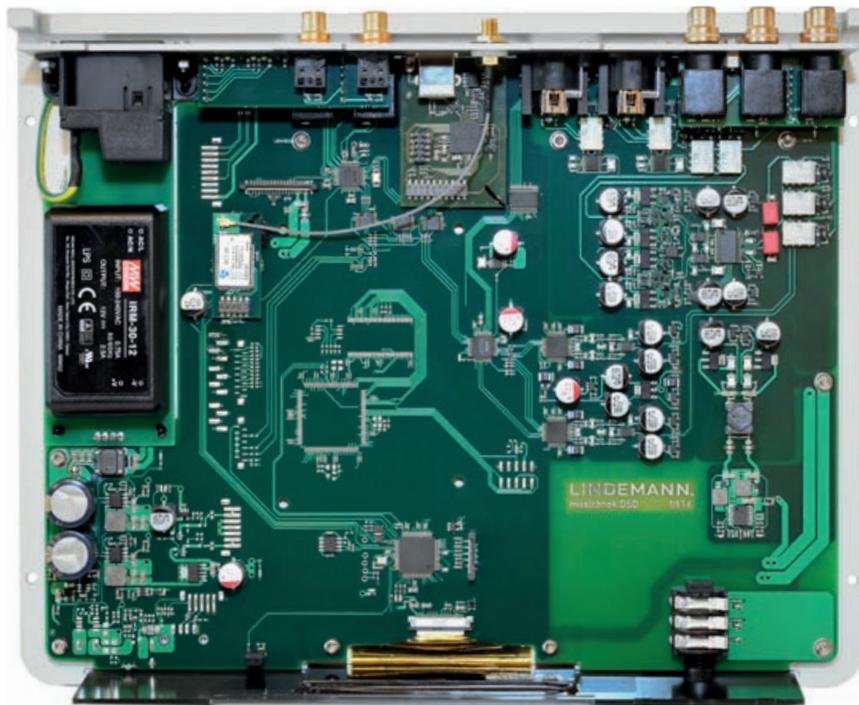
upsampling can eventually be omitted altogether. In the “native” setting, the data word and sampling rate at least remain unchanged—but more on the details later.

Let’s first take a general look at the musicbook series: At €3,2000, the USB Audio Music Player musicbook 15 DSD—new just with this appendage—was the second least expensive model in the series to face the FIDELITY test. In contrast to the basic musicbook 10, the 15 is equipped with a CD drive so you can enjoy your music without needing a PC. The integrated streamer that enables the most extensive range of possible uses is reserved for the two top models, the musicbook 20 and musicbook 25. All of the models offer wireless data transmission using Bluetooth, although this does produce a lower sound quality.

High-tech purism

The ingredients so crucial for sound are the same in all four musicbooks. Inside the premium book-style aluminum-housing design top components installed with engineering ingenuity produce optimal sound: The sample rate converter AK4137 from the Japanese specialists AKM provides the conversion, or better said, the resampling and upsampling of the digital input signals into DSD 128 or 256, DXD, and PCM up to a maximum of 384 kilohertz. This, supplemented by two type AK4490 converter chips from the same company. Experts smack their lips appreciatively at this. After all, these chips are some of the best anywhere and are often found in reference-class converters. At the same time, the signal routing ▶

The excellent AK4137-SRC from Asahi Kasei Microdevices supplies the DSD resampling; the two converter chips AK4490-DACS bypass all other components to work as flat S(witched)C(apacitor) filters at 100 kilohertz, thereby serving as a purely analog component.



in the Lindemanns remains as puristic as possible. If a musicbook is connected with a PC over USB, only a AK4137-SRC and the two AK4490-DACs lie in the path after the asynchronous USB/XMOS interface. DSD stream production is not just interesting for technical enthusiasts: The AK4137, which incidentally goes about its outstanding dynamic response of 180 decibels with 32-bit precision, generates the data stream employing an integrated delta-sigma modulator. This creates an exceptional division of tasks. The two AK4490 converters bypass all other components to work as flat, S(witched) C(apacitor) filters at 100 kilohertz and thereby function as a purely analog component. Because the converter chips work through oversampling filters or modulators and without high frequency disruptions, the risk of crosstalk and high-frequency noise at the musicbook outlets is considerably minimized compared with other devices. An additional welcome effect of the puristic signal path is jitter reduction, which is also true for the PCM mode. This type of operation requires different filtering from the system: The manufacturer relies on the “very good” 32-bit filters of the AK4490 DACs, which allow no or only the slightest pre- and post-ringing as minimum phase apodizing filters. In the native setting, the AK4137 SRC serves as a synchronous resampler with the input and output signals remaining locked in the same phase. The output signal is, however,

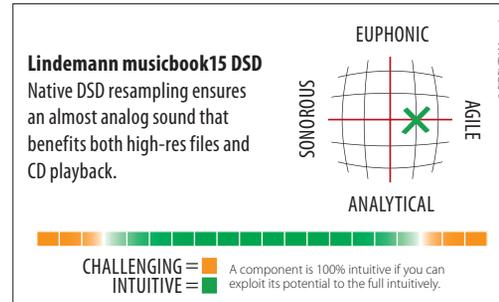
synchronized with the master clock of the musicbook in order to reduce jitter. The Lindemann clock, which incidentally cannot be bypassed, minimizes the undesired variations in frequency to a picosecond, thereby creating sound virtually free from jitter. When the musicbook 15 is used as a CD player, the option is always available to activate reclocking and resampling, a choice that promises above-average CD playback. The chips are assembled on a complex proprietary circuit board that involves a sixfold multilayer, digital and analog section with completely clean separation, says Norbert Lindemann, who adds: “The digital section also has an extremely low-noise supply for the XMOS and SRCs. All components are selected within the narrowest of tolerances. This, along with production being located in Germany, results in significant cost factors, which is why we can call the final price for the equipment reasonable.”

Native DSD is king

The other features are exceptional as well: TEAC provides the pleasantly quiet CD drive, and an analog Class A headphone amp powers low- to mid-impedance headphones. In addition, a fully symmetric analog preamp switch made to recording-studio standards with symmetric volume control is designed to provide interference-free operation at all times. Two



The high-quality remote control included with the device further enhances user convenience. The inputs can be renamed at will.



line inputs enable alternative sources like a phono pre-amplifier, tape deck, or tuner to be connected. Thanks to both symmetric XLR and asymmetric RCA analog outputs, it's no problem to integrate the book into a system.

The musicbook 15 DSD primarily processes digital signals. In addition to the USB audio Class 2 interface, the device is equipped with two optical and two coaxial S/PDIF inputs for connecting digital sources. The USB audio interface supports PCM to a maximum of 32 bits or 384 kilohertz and DSD 128; the converter modules guarantee bit-transparent PCM or, typical for Lindemann, native DSD playback. For sound-quality reasons, hidden conversion of the DSD signal to PCM, which other DSD DACs are prone to do, has never been an issue with Lindemann. The

innovative SACD player 820 had already been filtering just DSD as far back as 2004. This is why the analog volume control is provided since, unlike PCM, DSD cannot be edited, which the controversial digital control excludes. This is the same volume control knob as on the legendary Pass preamps, which means it's quite classy—a point that further bolsters Lindemann's high-end claim.

Your ears are for listening ...

Just how did Lindemann translate these fine ingredients into sound? The musicbook is meant to show off tone quality and is used as a CD player and for playing high-res files on a MacBook and the software player Audirvana as well as for connecting turntables and ▶

There are plenty of connections for digital and analog sources, such as phono amps; symmetric and asymmetric analog outputs make it easy to integrate the device into existing setups.



phone preamps. The book makes a fine presentation of CDs: Bebop clarinetist Buddy de Franco breathes a beautiful “I Can’t Get Started” for the opening of the album *Cooking The Blues* and solos with his typical agility; guitarist Tal Farlow, his congenial bop partner, answers with knotty wooden tones. It’s music to dive into and lose yourself. Here, the musicbook is initially set to “native”. The ears once again hear that precise re-locking comprises a large portion of the digital rent. Compared to the reference combination Mutec MC-3+ USB/Mytek Stereo192-DSD DAC, the musicbook 15 plays effortlessly at eye level. Bravo! Next, the CD is played in DSD-128 format—and it’s really true: The difference in sound is unmistakable. The DSD resampling offers a softer, less edgy—a more analog—sound, if you will, than PCM. This primarily benefits the highs and overtones. Is DSD the “new analog”? What could be more appropriate than to compare the original LPs *Standards Vol. 1* from the Keith Jarrett Trio and *In Tune* from Singers Unlimited with the Oscar Peterson Trio with high-res flac files in 24/192 or 24/88.2 resolution. When it comes to spaciousness, the PCM sounds a bit more precise in terms of localization, but the resamplings in DSD 256 seem closer to the LPs. The soft piano of Keith Jarrett or the full sound of the vocal ensemble are incredibly close to the analog original. The same is true for the round, deep bass tones. At most, they have somewhat more contour in PCM format; only the DSD mode à la Lindemann produces an “analog signature.” The

headphone amp also preserves this sound, even if it seems a touch more present in direct comparison with the ultra-neutral elite HPA Violectric V200. The audiophile book consistently serves up a sound that is highly addictive—beginning with its CD playback, mind you. The sophisticated ear is sure to be captivated. And puts the musicbook 15 DSD right at the top of his or her list of favorite books. ■

USB audio music player | Lindemann musicbook 15 DSD

Functional principle: USB audio interface with analog preamp stage and CD drive | **Digital inputs:** 4 x S/PDIF (2 x optical, 2 x coaxial), USB, Bluetooth | **Analog inputs:** 2 x line asymmetrical (cinch) | **Outputs:** 2 x line (symmetric, XLR/asymmetric, cinch), headphones (6.3 mm jack) | **Compatible formats:** WAV, FLAC, AIFF, ALAC, APE, DSD (DIFF/DSF, DSD 64 and 128) among others, max. resolution DSD 128 (5.6448 MHz); PCM 32 bit/384 kHz | **Special features:** resampling in native DSD, separate SRC and DAC, control over pressure knob or remote control | **Finish:** natural aluminum | **Dimensions (W/H/D):** 28/6.5/22 cm | **Weight:** 3.4 kg | **Warranty period:** two years | **Price:** €3,200

Lindemann audiotechnik GmbH | Am Anger 4 | 82237 Wörthsee | Germany | Telephone: +49 8153 9533390 | www.lindemann-audio.de

ACCOMPANYING EQUIPMENT

USB interfaces and DAC converter Mutec MC-3+USB, Violectric V800, Mytek Digital Stereo192-DSD DAC | **PC:** MacBook Pro with software player Audirvana Plus | **Turntable:** Sony PS-X75 | **Phono cartridge:** Denon DL-103 | **Phono amplifier:** Violectric V600 | **Headphones:** AKG K 702 Studio | **Headphone amplifier:** Violectric V200 | **Active speakers:** Nubert NuPro A 200, ME Geithain RL 906 | **Cables:** Vovox, AudioQuest