
LINDEMANN MUSICBOOK:25 NETWORK MUSIC PLAYER



Despite being a small boutique brand, German company Lindemann audiotechnik has been consistently ahead of the game for most of its twenty-plus-year existence. It was one of the first high-end manufacturers to build a USB–SPDIF adaptor, which preceded its introduction of one of the first USB DACs. So you can see that the company has embraced the concept of what's now being called 'computer audio' right from the start. Yet unlike some manufacturers of computer audio equipment, Lindemann has not eschewed legacy formats entirely. If you look very closely at the photograph of the musicbook:25 network music player reviewed here, you'll see a CD slot, so you

do have the option of 'conventional' digital playback if you would like. And if you don't want a CD capability, Lindemann makes an almost-identical model *sans* transport, called the musicbook:20. But the musicbook:25 is much more than a CD player and a network music player. It also has analogue and digital inputs (six in all) so it's also a pre-amplifier... plus, thanks to the provision of a separate amplifier, it's a high-end headphone amplifier as well.

THE EQUIPMENT

I have to get one thing off my chest at the outset, which is that I can't recall ever seeing a more beautiful hi-fi component than the musicbook:25. It's not only elegantly

small (at 280 by 220 by 65mm you'll be able to fit it anywhere), and not only are the corners sculpturally rounded, but the deep iridescent blue of the front panel is almost hypnotic. Every time I looked at the musicbook:25 I marvelled at how beautiful it was. Indeed, as a reviewer, I began to wonder if its good looks might exert any influence over my impressions of its sound quality, so after a few weeks I placed a small cardboard box over it in order that I couldn't see it, operating it solely by navigating using the free app available for iOS and Android (I used both versions... on different devices of course. For details of my experiences, please refer to the separate break-out box).

Lindemann does supply a conventional

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infra-red remote control, but although this is useful for arranging system settings, adjusting volume levels and so on, and I actually preferred to use it over the app when playing back ordinary CDs, the standard remote can't be used to access music stored on your network or attached storage: for that you'll need the app.

For many operations, there's no need to use any kind of remote, because that single horizontally-placed wheel at the top right of the chassis has a multiple functions including volume control, input selection, output muting, and stopping and ejecting CDs... all accomplished by variously pushing the top of the control down to initiate function switching, and turning the control to initiate further adjustments. Using the remote control for CD operation is quick, easy and intuitive. I liked it. It's not quite so intuitive when it comes to system settings, and I had to resort to the manual to tell me what the various strange icons meant, but system set-up is something usually done only the once, so having to use the manual to do it is no real burden.

Everything you do with the top-mounted dial, the remote, or the app, is reflected by changes in the hi-res gold-on-black OLED display inside the front panel. Like the player itself, it's super-classy, and the crispness with which it displays text, including CD-Text, has to be seen to be truly appreciated. The crispness and clarity of the display also means Lindemann has been able to make the type very small, which means you don't get any annoying scrolling of long lines of text... the type is small enough that all the text can be shown in a single, stationary line, and sharp enough that it's easily readable.

The front panel headphone socket is full-sized, as it should be, and it's fed by a discrete Class-A headphone amplifier whose volume can be controlled separately from the main output... or more precisely,

outputs, since the musicbook:25 has both balanced (via XLR) and unbalanced (via RCA) outputs.

At the left of the front panel is a USB input... sensibly placed where it's easy to access, rather than hidden away on the rear panel, like many high-end manufacturers. The USB accepts both thumb drives (aka 'sticks') and hard drives, so you can get both a 'quick fix' as well as extensive storage, as you prefer. But that said, an additional rear-panel USB input would have been appreciated, as it would be a lot neater for those who plan on accessing tracks only from a standard hard drive, rather than from a server.

The rear panel sports two unbalanced analogue inputs (via gold-plated RCA), four digital inputs (two optical, two coaxial), as well as the aforementioned line outputs, plus an Ethernet port and a screw terminal for the provided wireless antenna, should you wish to link wirelessly to your network. But if you choose to link wirelessly, be aware that you'll be limited to 96kHz/24-bit operation, whereas if you hardwire, you can enjoy 192kHz/24-bit perfection. Gapless playback is possible with AIFF, ALAC, FLAC, MP3 and WAV files.

LISTENING SESSIONS

I started my listening sessions using ordinary CDs, since I figured that if I started with hi-res music files, it would be hard to go back to listening to CD, but I'd played no more than a few discs before I realised that the musicbook:25 was doing such an outstandingly good job with standard 16-bit/44.1kHz files that I probably need not have concerned myself with the bitrate/sampling rate hierarchy. By way of example I'd offer up the highly rewarding time I spent with Mike Nock and Laurence Pike, whose latest album, 'Beginning and End of Knowing', is absolutely outstanding both musically (thanks to the combined talents

of the duo) and sonically (thanks to the engineering talent of Jan Erik Kongshaug). And yes, as you may have guessed, it was recorded at Oslo's famous Rainbow Studio. Kongshaug has not only captured the sound of Nock's piano to perfection, but also every one of Pike's drums, most notably an almost subsonic bass drum that I don't think I'd previously appreciated until I listened using the musicbook:25. There's also plenty of space in the music to let you revel in the enormous dynamic range made obvious by the Lindemann, and also in extensiveness of the sonic spectrum. Who would have thought drums and piano (OK... plus some tasteful electronics) could have stretched the audio spectrum so far?

Also on my current playlist is a debut album from Memphis-based Julien Baker ('Sprained Ankle'). When she's not performing, she's studying at Tennessee State, where her subjects appear to revolve around death and disaster, based on her track titles and lyrics. And what lyrics they are! One sample, about the break-up of a romance: 'I knew I should have said something/But I couldn't find anything to say/So I just said nothing/Sat and watched you drive away.' I also love that although the sound is mostly Spartan, with just her guitar (and some FX pedals) she's not been afraid to multi-track her own voice, or her own guitar, so there's an intensity of depth



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to this album... and it's an intensity that's made stunningly clear by the clarity of the musicbook:25's delivery of those sonics. Listen and wonder that she's also not afraid of not singing, *per se*, but instead using her voice to convey emotions via whispers, screams and moans. I don't know if this album will be cathartic for you, but be prepared for Cohen-like lyrics: *'I know my body is just dirty clothes/I'm tired of washing my hands/God, I want to go home.'*

I needed a bit of a break after that, so it was fun to revel in the musical mayhem of an old, old favourite, The Who's soundtrack to Ken Russell's rock opera, 'Tommy'. Gotta love Tina Turner singing *The Acid Queen*, with Ronnie Wood's guitar wailing in the background, or (and even better) the purely infectious funk of *Eyesight to the Blind*, with Eric Clapton, John Entwistle and Kenney Jones. Listening to Clapton bending his Strat's strings with the musicbook:25 was not only soul-inspiring... it inspired me to bring out my own air guitar and aspire to greatness. Also indicative of greatness was

the way in which the Lindemann musicbook:25 perfectly preserved the rhythm, pace and timing of this track. Just incredible... as is Sir Elton's piano and vocal on the undoubted star of the show, *Pinball Wizard*.

Most of my hi-res tracks you probably won't have heard of, because I source them from iTrax, which is one of the very few sites where I trust that all of the music available on it was actually recorded at 96kHz/24-bit. (I find it rather depressing that most of the so-called 'hi-res' music available for download is nothing more than upsampled 16-bit/44.1kHz material... so, IMO, mutton dressed as lamb.) But there was no doubting the superiority of the musicbook:25's sound with true hi-res, as demonstrated to me when I listened to Lisbeth Scott's album 'Charmer', which I'd downloaded as a WAV file. (Call me a conspiracy theorist, but I still feel safer with WAV files than I do with FLAC files. WAV tagging is still an issue, or course... but hey, nothing's perfect!) You may not have heard of Scott, but if you've watched Stephen Spielberg's 'Munich' or

Mel Gibson's 'Passion', you've have certainly *heard* her, because she's the 'voice' on both films. Even though she's a pianist as well as a composer and vocalist, she's backed on piano on this album by Paul Schwartz (he of the new-age 'State of Grace' trilogy). The hi-res capture of the piano sound is excellent—though the Michael Nyman-like arpeggiation annoys me—but it's the vocal capture that is most amazing on this recording... Scott's voice is uncannily realistically reproduced: immediate, breathy, and achingly true to how her voice sounds in person.

CONCLUSION

I don't think I have allowed the beauty of the musicbook:25 to sway my opinions of its sound quality, operation and performance, but I think you'll agree—especially when you see one for yourself—that I could be forgiven if it had. I have to say yet again that I cannot recall ever seeing a more beautiful hi-fi component than Lindemann's musicbook:25. And all you have to do is add one of Lindemann's equally-gorgeous musicbook power amplifiers and a pair of loudspeakers to create a complete high-end, high-fidelity, fully-networked music system. Sure it's pricey, but to borrow a lyric from Miley Cyrus: *'When you're a VIP / You get whatever you please / What's not to like?'*  Hugh Douglas

IOS/ANDROID APP

The beauty of having an app to control a device is that the manufacturer can re-jig or upgrade that app anytime in order to address needs, desires or issues brought up by users. So I expect... or rather hope ... that Lindemann's app is a work in progress, because I think it does needs some further development. For starters, it's very dependent on the operating system of the phone, and appears to use some of the phone's functions, rather than provide its own. 'Search' for example, uses the 'phone's own predictive text function. This is great if your phone has a good predictive text function, but not so great if it doesn't. The result was that I found searching for album titles and artists etc was really easy when I used my iPad, but torture when I used an old Samsung phone running Android 4.0.4. And although there are 'Volume Up/Down' buttons on the app, there's no actual volume indication on the app, so in order to see the volume you've selected, you need to look at the musicbook:25's own screen. There is no 'Queue' function, so you can't quickly queue a number of tracks or albums for replay. You instead have to create and name a Playlist, then select an album in Browse view

and add it to that Playlist using the 'Add to' function. Then, to use the Playlist, you have to choose it in the Source view in order to play it. A further complication is that if you're 'Play' view, rather than 'Source' view, you can only add single songs to the Playlist. There is also a 'Favourites' function, which Lindemann says can be used *'to create a list of your favourite songs and web radio stations'* but I found this rather confusing to use, even with the help of the manual (page 23), and having two 'Mute' icons on-screen (one at top right, the other bottom left) seemed rather a waste of screen real-estate. It was probably my old phone with its old operating system, but I couldn't get the 'Go Back' icon to work at all. I'd suggest using only the latest phone (or iPad etc) running the latest software to run the app. The app is also dependent on your server software, and may not 'play nice' with Synology NAS drivers or other servers set to the Linn DS standard. Lindemann recommends its app will work best with servers running Twonky or Asset. But, as I said at the beginning of this section, the beauty of an app is that it can be updated/upgraded at any time, so by the time you read this, Lindeman may very well have addressed one or more—or all—of these issues. 

LINDEMANN MUSICBOOK:25 NETWORK MUSIC PLAYER

Brand: Lindemann audiotechnik
Model: musicbook:25
Category: Network Music Player
RRP: \$6,220
Warranty: Five Years
Distributor: Audio Magic
Address: 23/22 French Avenue
Northcote VIC 3070
T2: ((03) 9489 5122
E: info@audiomagic.com.au
W: www.audiomagic.com.au

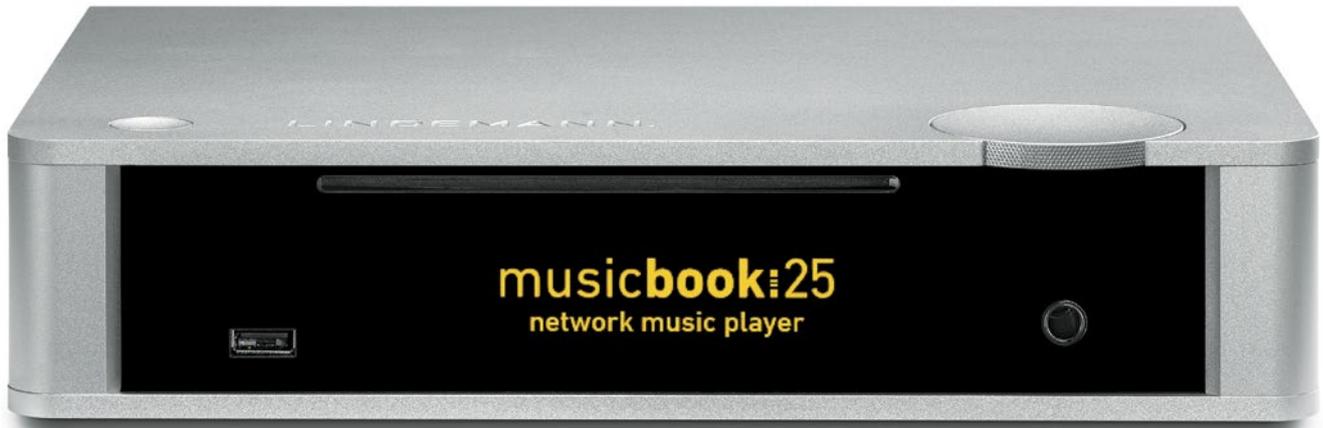


Stunning visually
State-of-the-art
performance
Does almost everything



Ordinary app
Server-sensitive

TEST LAB REPORT: See page 83
Test results apply to review sample only.



LABORATORY TEST REPORT

Newport Test Labs did not perform some of its usual tests on the CD section of the Lindemann musicbook:25 because the Teac CD transport would not recognise any track numbered greater than 19 on its standard test disc (Philips SB429), which has 99 tracks and includes data tracks. It seemed to be a glitch only with this particular pressing/transport combination, because the musicbook:25 worked correctly on another test CD with 35 tracks, which was used instead.

Output voltage for a 0dB recorded signal was measured in the 'fixed output' mode as being 2.5 volts, with channel balance measured at 0.026dB.



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Channel separation at 1kHz was an excellent 103dB. Channel separation is graphed (for the digital input, using a 24-bit/48kHz test signal) in Graph 12. You can see that it's also around 103dB at 1kHz, and better than 130dB at 10Hz, but reduces to around 93dB at 20kHz... still more than you'll ever need at this frequency. Channel phase was good at low and mid-frequencies, but lagged at higher frequencies, and interestingly was slightly better when

Lindemann mb:25 (AES-17 Standard using 48kHz/24-Bit)

Digital Section	Result	Units/Comment
Out of Band Spurious Components	-111.918dB	
Suppression of Imaging Components	-106.472dB	(Worst Case)
Level Dependent Logarithmic Gain	-0.068dB	
Intermodulation Distortion (1)	-111.285dB	18kHz/20kHz 1:1 Ratio
Intermodulation Distortion (2)	-101.120dB	41Hz/7993Hz 4:1 Ratio
Low Level Noise Modulation	+7.733dB	Worst Case
Idle Channel Noise	-109.90dB	CCIR-RMS weighting
Signal-to-Noise Ratio	-109.995dB	CCIR-RMS weighting
Power Line Products	-135.141dB	50Hz
Non-Linear Interchannel Crosstalk (a)	-116.175dB	3kHz (2nd-order ref 17kHz/20kHz)
Non-Linear Interchannel Crosstalk (b)	-115.799dB	6kHz (3rd-order ref 17kHz/20kHz)
Non-Linear Interchannel Crosstalk (c)	-118.112dB	10.040kHz (2nd re 40Hz/10kHz)
Non-Linear Interchannel Crosstalk (d)	-109.475dB	10.080kHz (3rd re 40Hz/10kHz)
Absolute Phase	Normal	Normal/Inverted

Lindemann musicbook:25 - CD Section - 16/44.1 Test Results

Analogue Section	Result	Units/Comment
Output Voltage (Bal, fixed)	2.5000 / 2.4923	volts (Left Ch/ Right Ch)
Frequency Response	-0.01@8Hz/-0.49@20kHz	dB (also see graph)
Channel Separation	103dB	at 1kHz
THD+N	0.0018%	@ 1kHz @ 0dBFS
Channel Balance	0.026dB	@ 1kHz @ 0dBFS
Channel Phase	0.02 / 0.03 / 0.32	degrees at 16Hz / 1kHz / 20kHz
Signal-to-Noise Ratio (No Pre-emph)	100 / 105	dB (unweighted/weighted)
Linearity Error @ -60.00dB	0.01	dB (Test Signal Not Dithered)
Linearity Error @ -80.00dB	0.05	dB (Test Signal Not Dithered)
Linearity Error @ -90.00dB	0.95	dB (Test Signal Not Dithered)
Power Consumption	0.14 / 13.77	watts (Standby / On)
Mains Voltage During Testing	242 - 248 volts	(Minimum - Maximum)
Digital Section	Result	Units/Comment
Digital Carrier Amplitude	87.98mV	Audioband
Digital Carrier Amplitude	1.05V / 469mV	Differential / Common Mode
Audioband Jitter	1.8 / 0.009	nS (p-p) / UI (p-p)
Data Jitter	2.0 / 0.010	nS (p-p) / UI (p-p)
Deviation	7.1	ppm
Frame Rate	44099.690	
Eye-Narrowing (Zero Cross)	2.7 / 0.019	nS (p-p) / UI (p-p)
Eye-Narrowing (200mV)	10.2 / 0.059	nS (p-p) / UI (p-p)
Absolute Phase	Normal	Normal / Inverted

playing CDs (0.32° at 20kHz) than when converting 24-bit/48kHz signals (around 1.1° at 20kHz, see Graph 7).

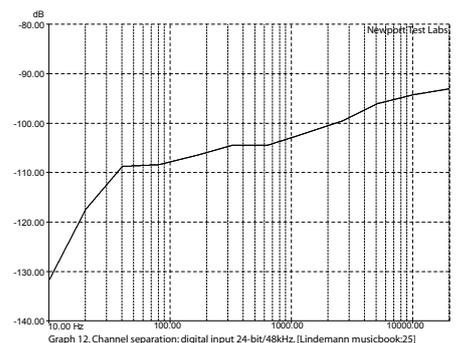
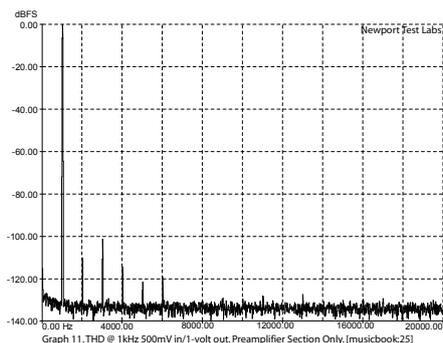
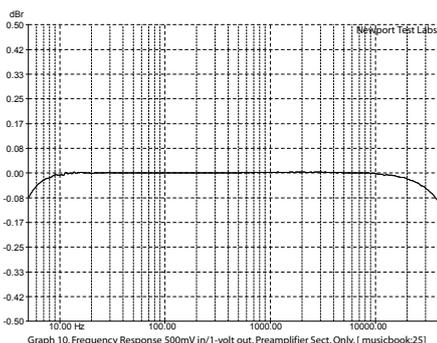
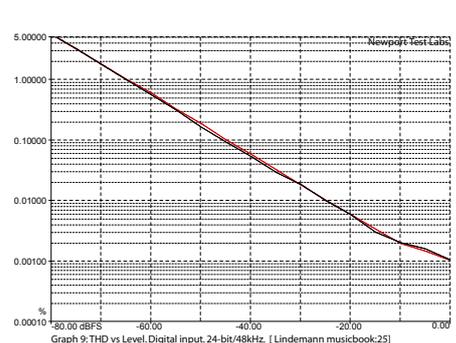
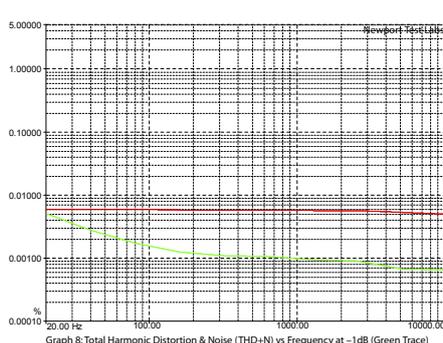
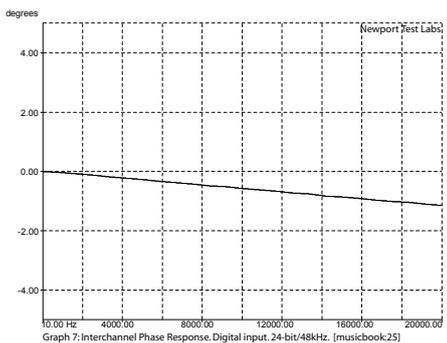
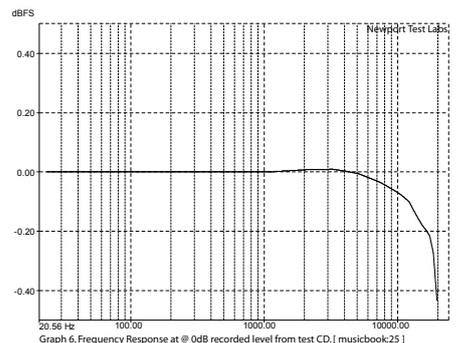
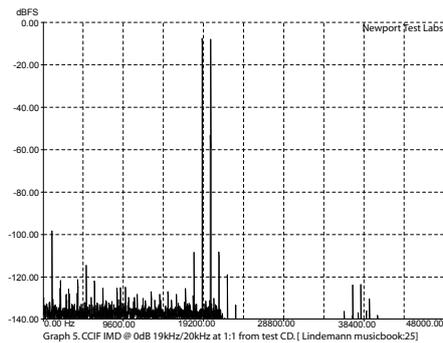
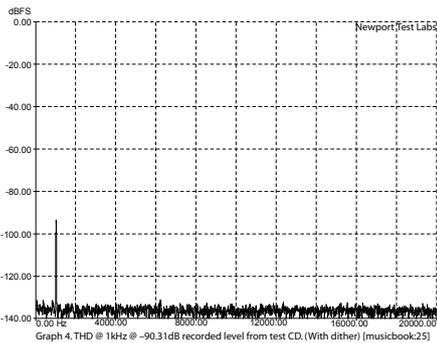
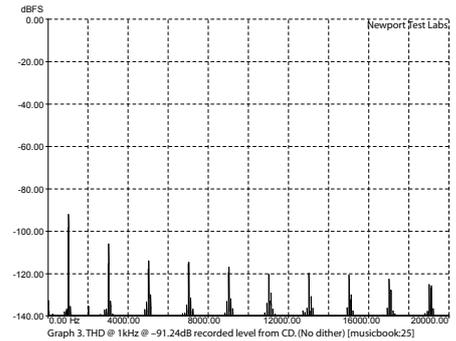
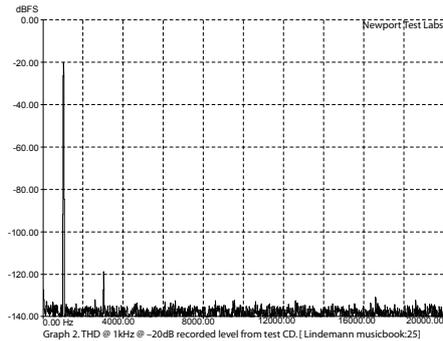
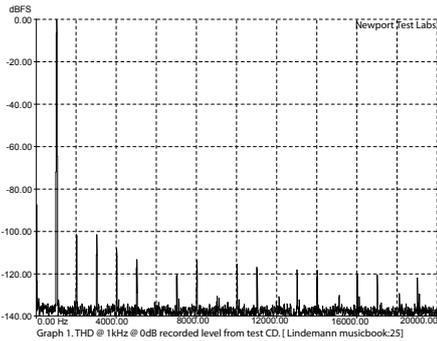
The square wave and impulse responses (pictured) show that Lindemann is using software-implemented filtering in order to reduce the level of pre-ringing, which it's done successfully, though some pre-ringing is still visible, and the post-ringing remains

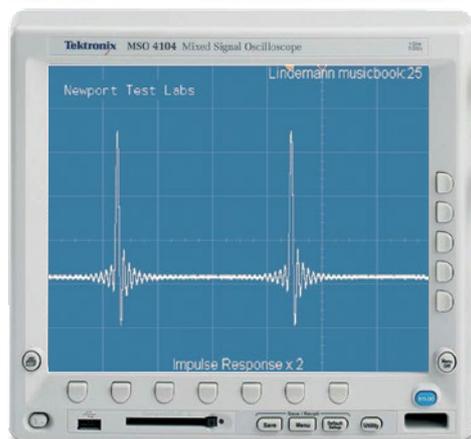
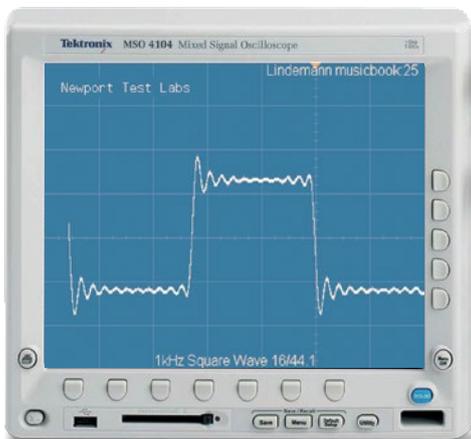
at the levels I'd expect from commercially-available oversampling devices.

Distortion from CD was very low, with the tabulated figure at 0dB coming in at just 0.026%. The distortion output spectrum for this is shown in Graph 1, and you can see second and third harmonic components at -102dB (0.0007%), and a fourth at around -108dB (0.0003%). All others are more

than 110dB (0.0003%) down. Using a test signal more like the maximum you'd get on a music disc (-20dB), distortion reduced even further, so that just a single third harmonic distortion component is visible, at a level of -119dB (0.0001%). This is excellent performance.

Very low-level distortion performance was also excellent. Using an undithered test





signal at -91.24dB (Graph 3) you can see the expected distortion components, but all except the third are more than 110dB down (0.0003%) and most are more than 120dB down (0.0001%). When dithered, a test signal at almost the same recorded level (Graph 4) occupies the converters and removes the distortion entirely, but results in an increase in the level of the noise floor. However, as you can see, even the dithered noise floor is close to -140dB down, which is quieter than any amplifier. THD+N vs. Frequency is shown in Graph 8, for -1dB and -20dB , using a 24-bit/48kHz test signal. You can see that both are very low and remarkably linear, irrespective of test frequency.

CCIF IMD was very low with CD, as you can see from Graph 5, with an unwanted 1kHz signal regenerated at -98dB (0.0012%), but everything else was basically more than 120dB down except for two IMD sidebands at 18kHz and 21kHz that were at -109dB (0.0003%). Overall IMD for a 24-bit/48kHz signal was around -111.285dB for CCIF IMD and -101.12dB for SMPTE IMD.

As for total noise, it was measured with CD as being 100dB unweighted, improving

to 105dB A-weighted. With a 24-bit/48kHz signal, the signal-to-noise (S/N) ratio was measured by *Newport Test Labs* at 109dB CCIR-RMS weighted.

Frequency responses were excellent across the board, with even the CD response being only 0.49dB down at 20kHz , for an overall response of 20Hz to $20\text{kHz}\pm 0.245\text{dB}$, which is the one shown in Graph 6. Low-frequency CD response (not graphed) was just 0.17dB down at 7Hz . The frequency response of the preamplifier section is shown in Graph 10, with *Newport Test Labs* measuring the 1dB down-points at 5.3Hz and 127kHz , and the 3dB down-points at 4.9Hz and 217kHz . Distortion for the preamplifier section is shown in the following graph: you can see that there's a second harmonic at -110dB (0.0003%), a third at -101dB (0.0008%) and a fourth at -114dB (0.00019%) while all others are more than 120dB down (0.00010%). Total overall THD+N was measured at 0.002% .

In sum, the Lindemann musicbook:25 proved to be an outstanding performer, as a CD player, as a DAC, and as a pre-amplifier, returning state-of-the-art test results across all measurements.  Steve Holding

