



With their fully active LS1 Grimm Audio throws many familiar conventions overboard and achieves a superb signal fidelity by means of switching amplifiers and DSP-controlled crossovers. User comfort and neutrality are on world-class level.

For Head AND Heart

Author: Wolfram Eifert

Despite or simply because of their ultramodern digital signal processing Grimm Audio's LS1 are easy to control. All relevant settings can be done using a computer or – haptically way more appealing – via the included controller. But also in other respects the first sound transducer from this young Dutch company appears to be utterly smart.

Active speakers with their onboard amplifiers are old hat, however besides DSP-controlled frequency crossovers the LS1 also offers A/D and D/A converters of the very highest quality grade. The LS1 are indeed much more than just a pair of loudspeakers, but rather a complete gear which makes a conventional chain with its numerous single devices and cables look quite cumbersome.

For studio users, who have sworn by active designs since the year dot without hardly an exception, an LS1 doesn't mean a fundamental cultural change. Private users who have become used to customising their mostly passive loudspeakers with the most diverse amplifiers and cables, need to rethink, for DSP-controlled active speakers are pretty much resistant to optimisation.

The user will find nothing to adjust on the converters, crossovers and switching

amplifiers which occupy the left speaker base. Likewise it would make little sense to dabble at the internal wiring between chassis and power amps. This undertaking would not only be tedious, but also yield a fat lot.

Tinkerers should see the plug & play character as a chance and use the time thus saved otherwise. Especially since digitally controlled speakers offer plenty of optimisation potentials, too. Improvements of the room acoustics are virtually always possible, just like the expansion of your record collection with both sound-wise and artistically first-class recordings.

Of course the electronics will "understand" all common audio sampling rates between 32 and 192 kilohertz. In spite of all trendiness the Dutch will leave no analogue fans out in the rain. Vinyl connoisseurs and other conservatives will find the suitable input in the base, with a balanced layout like its digital neighbour. Due to its completeness the system relieves the user of many decisions, saving space and quite a few cables. Network players are ideal sources for this speaker genre, but basically a simple computer will do.

The software required to operate the system is provided for download on grimmaudio.com. There are clearly structured menus for all basic settings, which in most

cases will be done only once. But the software can also replace the jogwheel armed controller and thus elevate the Mac or PC to a command centre.

Although DSP filters can modify the response characteristics of a loudspeaker in virtually any desired way with the suitable programming, company founder Eelco Grimm only makes use of the blessings of digital technology where he can't get ahead on the mechano-acoustical level. The frequency and time behaviour are therefore perfected first with conventional means and only refined digitally to such an extent as it makes sense in a sonic and also in a metrological context.

Hence the software allows merely a few, yet all the more sensible adjustments. For instance, the user can choose how much he wants to angle the speakers, how strong the bass shall play compared to the rest and if the maximum lower limit frequency of 20 hertz shall be savoured to the full or only halfway.

As is typical of active speakers, a limiter will detect any kind of overdrive and prevent unpleasant distortions and hardware defects by temporarily lowering the levels. Braking actions are indicated by a flashing LED. Brave personalities, who prefer to listen unplugged, can deactivate the protection circuit in the default settings or suppress the prompting of the LED.

One of the many musical pieces that the reviewers were demanding from the Grimm was the first movement of Beethoven's Trio for Piano, Violin and Violoncello Opus 1.1. The recording with the legendary Abegg Trio dates from 1987, thus from the early days of digital technology, and consequently offers no



Viewed from behind, the switching amplifiers and filter electronics are mounted together in the right speaker base. The very energy-efficient power amps produce only little heat and therefore need no special heatsinks or fans. The woofers have separate power supplies and amplifiers which are controlled from the speaker base.

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Technology at its finest: the measuring specs are beyond any doubt

“Dead straight frequency curves, excellent omnidirectional behaviour, perfect transient response: the LS1 is one of the best speakers ever measured.”

hi-res standard, but only the usual CD resolution. Over the Grimm the popular work sounded extremely supple and full-bodied, while at the same time with fabulously natural acoustic timbres.

The classic lovers in the team – and not only those – were speechless. The illusion of a concert hall, including a pinpoint localisation and depth of focus, was reproduced so perfectly by the Grimm like with hardly any other loudspeaker ever reviewed by AUDIOphile.

But why does the speaker sound so uniquely homogeneous and true-to-life now? Indeed, the LS1 sets itself apart quite obviously from the common speaker

biz mainstream. For example, the cabinets are noticeably wider and less deep than usual. The ample baffle makes the dispersion behaviour less contingent on angular patterns. By this all-rounder Grimm, a lecturer for studio technology in his regular occupation, hopes to achieve a markedly even energy distribution

over all radiation angles and frequency ranges.

The Dutch pursue the optimisation of the cabinet geometry very consciously, for DSPs can only flatten a frequency response efficiently if the errors occur within a broad angular range. A similar behaviour can be seen with anoma- >

The controller has a large jogwheel for the input selection



and for adjusting the volume level.

lies in a diffuse sound field, which are caused by imbalanced room acoustics. For this reason they totally dispense with any kind of acoustic room calibration.

The lateral roundings serve to reduce edge diffraction effects and also help to smooth out the SPL curves. The drivers, supplied by Seas from Norway, can thus cover an unusually broad sound field very evenly.

The assignment of the frequency ranges and the final linearisation is done in two steps. In a first step of calculation the frequency response of the single drivers is equalised by DSPs, as if each of them would have to cover the entire frequency band. Hence the subsequent crossover will “see” two very broadband transmission curves and can calculate on this basis precisely mirror-inverted filter slopes, so that the summation of the SPL curves will come off smoothly in the cross-over zone without perceptible ripples.

Since even the best chassis show certain tolerances, every loudspeaker is individually finetuned at the headquarters in Eindhoven. More technology and production details of the LS1 can be found in the spread at the end of this review.

The subject of amplification is handled by so-called Ncore switching amplifiers from Hypex, another Dutch-based manufacturing company. Due to their design layout they produce only little heat and, together with power supply and filter stages, sit on a slim pc board located in the left speaker base.

When used in passive mode, a loudspeaker with the size of the LS1, which offers a net volume of merely 14 litres and a “small” 8-inch low-mid driver, would largely fade out frequencies below 50 hertz. But here the electronics department provides an active feedback control to make her go down to 20 hertz after all, depending on the settings. Since this

can only be achieved through greater cone excursions, the maximum volume levels with extremely deep basses are limited accordingly.

With acoustic instruments, whose spectrum contains only faint low-end signal components in most cases, this is rarely a problem - with electronic music it is, however. So to increase the reserves there are custom-built subwoofers available which are simply slid onto the base plate and driven from the speaker base. The sub bass modules are equipped with 10” long-stroke chassis from Peerless which, like the low-mid drivers in the head section, have a closed-back enclosure behind them. The woofers, too, have an electronic bandwidth and transient behaviour optimisation.

The integration of the subs does not necessarily produce a deeper bass, but spares the low-mid drivers in the head piece a good deal of travelling work which is audible by an enhanced overall tranquility. Without the woofers – waiving them will save you a full 7000 EUR per pair – the LS1 does not sound any different in tonal respect, but makes less fun

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A dream for high-enders: the naturalness of the LS1 turns me on big time

“A grand bouquet of tonal hues, unexcited dynamics, details aplenty: the best sources display their full potential on the Grimm.”

and hits the brick wall with electronic music. Due to their sophisticated filtering one needn’t be afraid of negative effects from the upfiring bass units that work about two feet away from the speaker’s acoustical centre. The subs perform like a perfectly integrated third way and are another proof of the musically correct system design.

Homogeneity and the absence of exaggerations are the hallmark of the LS1, not only in the bass, but in general. So please do not expect sound descriptions applying exuberant raves or demo sounds of the hyperspecial kind. Sure, the Grimm sounds wonderfully pure with a superb resolution, but it won’t depict an orchestra as more exciting than it can be by

nature. The LS1 won’t let you get closer to singing voices than originally intended by musicians and sound engineers, and it won’t open three-dimensional sound stages that aren’t there on the recording. These speakers are neither charming nor flattering, but honest and pure.

What makes the Grimm so emotionally engaging and convincing is its outstanding naturalness. My personal listening tip would be “High Days” from the album “The Black Swan” featuring Scottish folk singer Bert Jansch, published by Drag City in 2006. His unpretentious voice and the acoustic guitar sound so pure and vibrant over the Grimm that I got goosebumps while listening. I know you’ll be no different.



Demo-CD

Bert Jansch:
The Black Swan

Folk singer and guitarist Bert Jansch is no stranger to the scene. His latest album contains 12 particularly emotional songs. The sound is marvellously intimate and yet full of energy. (Drag City, also on LP).



The Author
Wolfram Eifert

The graduate media engineer has been active as specialised journalist for about 20 years and knows the scene like hardly any other. For his private chain neutrality is the leading virtue. True to the motto “Feelings arise in your mind, not in devices.”



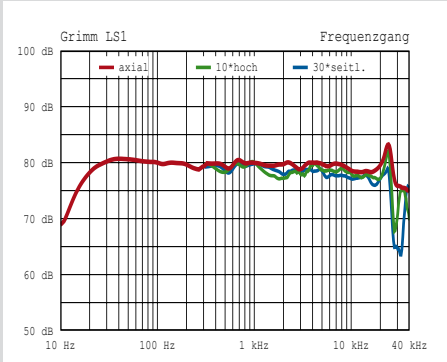
The connection between speaker electronics and computer is controlled via a little USB interface which is supplied.

The subwoofers sit on the base plate and have their own power amps. The grey protective covers are detachable.

Grimm Audio
LS1/LS1s

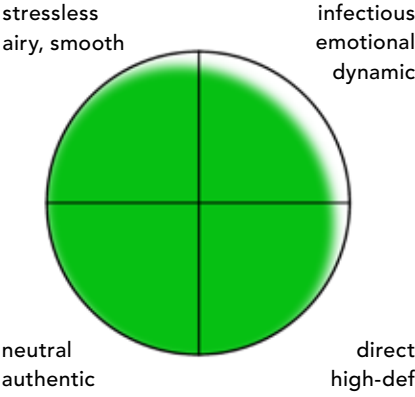
List price: 25,000 EUR
Warranty: 2 years
Weight: 68 kg
Dimensions: (W x H x D):
52 x 115 x 16 cm
Finishes: Light or dark bamboo veneer, white Corian. All specifications incl. subwoofer.
Distributor:
Audio Import GmbH
Herrlinghausen 43
42929 Wermelskirchen
Phone: +49 (0) 21 96 / 88 31 36
Internet:
www.grimmaudio.com
www.audio-import.de

Frequency Response



The SPL curves are extremely linear, even angles of 10 and 30 degrees off the main axis (red) are perfectly covered. The sub-low range has a cutoff frequency of 17 Hz @ -3 dB. The loudspeaker produces peak levels of 105 dB. Distortion and step response (not shown) are just as excellent.

AUDIOphile Character



AUDIOphile Potential



AUDIOphile Advice

Owing to the location filters the LS1 may stand freely or close to a wall. The subwoofers are extremely helpful. Room acoustics and source devices offer potential for optimisation.

Each speaker a Unicum

With Grimm Audio every speaker is measured individually and then trimmed to perfection. The decisive part is the programming of the DSPs.

Author: Wolfram Eifert

Products come and go, but some have kind of a personal history. Our editor-in-chief Bernhard Rietschel had discovered the LS1 – hitherto virtually unknown on the German hifi scene – at the Norddeutsche HiFi-Tage in February this year and even several days after his return from Hamburg was still raving about the hyper natural sound he had heard in the Grimm suite at that HiFi show. Following his gut instinct, he left no stone unturned to summon this obviously exceptional product to the editorial rooms for AUDIO and AUDIOphile as fast as possible. That his assessment was dead on, became already apparent during the first review for AUDIO's May issue, where the speakers received highest praise from everyone who had heard it.

Indeed, there's a painstakingly well-conceived concept behind the LS1, which is also sold to professional recording

studios in a version with longer legs. To begin with, co-owner and name giver Eelco Grimm tries to achieve a maximum of signal fidelity with electromechanical means and uses digital technology only in those places where conventional methods fail.

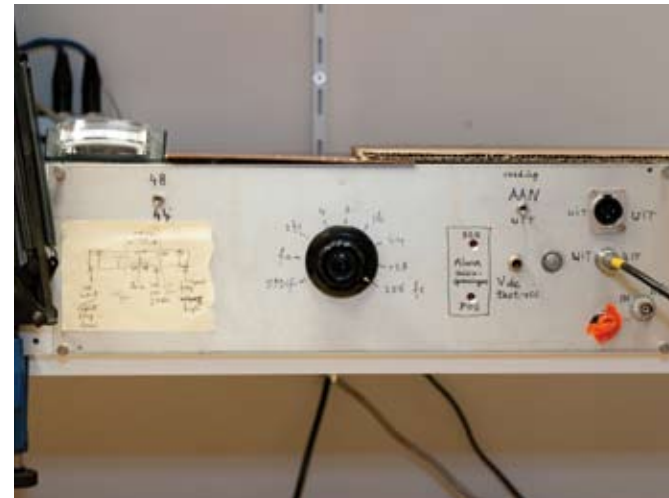
A loudspeaker that is to sound one hundred per cent neutral must radiate its energy homogeneously over all room angles and may not only show a linear behaviour within a narrow range. In order to meet this requirement the 8" low-mid driver, which is pretty large for medium frequencies, must be faded out as early as 1500 hertz. For dome tweeters, which again must not be too large, such a low coupling poses a big challenge, because it considerably strains the moving system. After an extensive search the designers found a suitable bass/midrange and dome tweeter combination from driver specialist Seas of Norway.

Together with the Scandinavians the Dutch thoroughly finetuned the respon-

se characteristics of the drive units. Modifications were controlled regularly by measurements both in the anechoic room and under free-field conditions, because only that way reliable statements can be made for all frequencies. When it became obvious that the usual measuring tools didn't yield the necessary precision, they built their own ones without further ado. One example is the jitter analyser shown on the following page.

To make sure that all loudspeakers function equally perfect, the inevitable remaining tolerances of the individual units are smoothed out by means of the DSPs. But this isn't done using the sledgehammer. Based on the measuring protocols specially trained employees decide where corrections need to be made. After all the data sets differ for each loudspeaker.

The processors and converters built into the LS1 benefit from the experiences with the in-house studio DAC called AD1 that enjoys a legendary reputation among professionals and which mastermind Grimm



A home-made analyser delivers super precise jitter measuring values.



The offices at Grimm Audio are remarkably bright and friendly. As is usual in hightech companies, the PC is the number one work equipment.

quite unhumly refers to as the world's metrologically best D/A converter. The amplifiers of the LS1 are the result of a cooperation with Hypex, another manufacturer from the Netherlands. Their product development manager Bruno Putzeys is a specialist for digital signal processing in the broadest sense. The unorthodox switching amplifiers in the left base rest on his experience. Despite all their passion for facts the Dutch are also die-hard music fans. If they discover a component that appears to act as a sound brake, it will be replaced. This might even mean the death of an allegedly negligible capacitor.



The enclosures that are purposely styled broad and flat get a sheep's wool damping, which promises best acoustical properties.



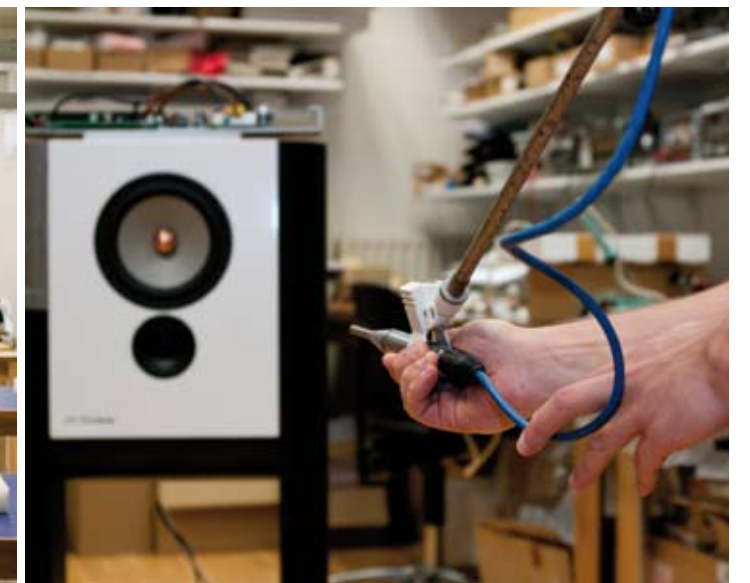
Co-founder and mastermind Eelco Grimm answers e-mails in style with Mac-Book and Skywalker Sound shirt.



Bruno Putzeys is responsible for the DSP programming. In his main job he's the product manager with Hypex.



Electronic parts, enclosures and chassis are prepared at this station for their final assembly.



A freshly mounted LS1 with white Corian enclosure is waiting for its final measuring check.