

SOPHISTICATED FROM TOP TO BOTTOM



Many streamers overwhelm the user with functions and possibilities. Lumin's stunning X1 puts its capabilities into an easy-to-understand interface.

Carsten Barnbeck

A clock-FPGA and the double mono power guidance are unique so far.

A few weeks ago we struggled with a nasty humming loop in one of our listening rooms. It crept in via one of the in-wall LAN sockets. The reason for the sudden malfunction were minor alterations to the publishing house's internal server architecture – which is not exactly simple. After all, we have to link a secure company network with a home network that supports open standards such as UPnP and DLNA, accepts streamers without login procedures and can access web services such as Qobuz regardless of firewalls. We didn't notice the buzzing until weeks after the change, which immediately prompted the IT staff to speculate about our "gold ears". We were able to fend off these offenses thanks to Lumin's X1, which played in our listening rooms for almost five weeks – basically completely on its one. You really don't need any other streamers besides a machine like this. The X1 doesn't care for LAN disturbances, LF distortions from the power grid and any similar

problems, because it galvanically decouples all signal feeds – so there was no hum at all until we switched streamers again.

Its power supply unit is located in a separate cabinet. This massive, black anodized metal block fits the Streamer perfectly and is milled from aluminum. As is usual for high-end devices, the PSU ("Power Supply Unit") contains a number of separate voltage processing units that supply analog and digital modules with perfectly tailored energy. The network player is connected to its external power supply via a nine-pole, multi-insulated cable. By the way, if you have taken the trouble to take a closer look at the power connections in the figure below, you might have recognized that there is a tenth pin. However, that is not being used. Even in the device itself the power supply was realized with maximum effort. The X1 has a channel-separated mains conditioning. Even its two high-quality symmetrical output stages are electrically isolated from each other.

The network connection is even more extraordinary: if you like, you can connect the X1 conventionally with a LAN cable. However, a second data access in the form of the professional SFP socket ("Small Form-Factor Pluggable") is located directly next to the traditional input. You may never have heard of this standard, but you've certainly seen it on pictures: these connectors are employed in professional server farms and fiber optic is used for the cables – proven technology that is offered at acceptable prices. On top of that, the optical conductors can transport data over considerable distances. Lumin packed a LAN-to-SFP converter from TP-Link (fig. right) into the box, and you can get adequate devices for around 60 euros from a well-stocked computer shop. During its whole time in the listening room our test sample was therefore isolated from the standard power and data grid. So it's not surprising that we couldn't notice the faulty LAN socket...

Let's take a look at the backgrounds of the X1. Have you ever heard of Lumin? Don't worry, neither did we. Behind the fresh brand name hides a company called Pixel Magic. Sounds a bit like an advertising agency, but the Hong Kong-based business is actually developing **smart-receivers** for televisions that are enjoying considerable popularity in Asia. The team around company owner Nelson Choi is so successful with its products that they can afford Lumin as a kind of high-end hobby, as well as a prestige and dream project: a flawless network player without any compromise!

The shape of the X1 might indicate that they initially had a prominent role model in mind. The X1 immediately reminded us of Linn's large Klimax models. There's nothing wrong with that, because as a look at Devialet and other brands reveals, they're not the only ones inspired by the Scots' iconic design. It is also priced at just under 13,000 euros, like its competitors. In this class we naturally expect perfection in haptic as well as in terms of its technical solutions – and Lumin delivers! The workmanship of the X1 is simply breathtaking. At the front of the device there is a small fine font display that shows the most necessary information about the current title. A fine circle appears next to it during operation, illustrating the position within the current song. The app can be used

We used a device from TP-Link as a LAN-to-SFP converter. The thin fiber-glass cables are ideal for fixed installations at home.



to completely deactivate the screen, which is barely readable from a few meters anyway. Its surface is then so black that it fuses with the front of the device.

Wherever possible the developers have avoided using off-the-shelf components and parts. For example, they chose two femto-crystal oscillators as clock generators. Nothing really special so far, since the high precision clocks of the manufacturer (yes, "Femto" is a brand name) can also be found in other devices. However, here both oscillators feed their signals directly into a specially developed FPGA. This is responsible for distributing the clock information to the other areas of the X1. With minimal delays, it ensures that the switching commands are sent to the media player, memory management or D/A converters in such a way that the function groups mesh with each other with the highest precision. Such a trick may sound a little bit over the top, but in the fight against the last remnants of jitter the enormous effort is indispensable.

Another special feature is the internal signal processing. More and more often we stumble upon the sound format of the SACD during data processing. Also Lumin uses a DSP to convert all incoming music signals directly after the input into the DSD format. While conventional PCM converts analog oscillations into samples and displays them as a fast sequence of amplitudes, DSD delivers its ultra-fast instructions directly to the D/A converter: a one means the slope climbs, a zero means the slope falls. Like the grooves of a record, the sound format transports a comparatively unaltered image of the original vibration. The clock frequency defines how precise this image turns out. Since the X1 works with DSD128, there are about 5.6 million information per second – that is sufficiently accurate.

In addition, with such a high data bandwidth, the clocks can no longer have a

KEYWORD

Smart-Receiver

The term „smart“ is used to describe receivers that, in addition to conventional TV channels, also bring web content, such as that from Youtube or Netflix, onto the screen.

TEST DEVICES

Sources: Audiodata Music Server MS II, Lumin L1, Melco N1A

Integrated amplifier: Audionet SAM 20 SE and „Watt“, T+A PA3100HV

Loudspeaker: B&W 800D3, Canton Smart Vento 9, Vimberg Mino

Cable: Cable sets from Audioquest, Van the Hul and HMS

WHAT WE'VE HEARD
Fever Ray:
Fever Ray



Great songwriting, breathtaking synth percussions and Karin Dreijer Andersson's unique voice make this one of the most interesting debuts of the 2000s. 100 percent Electro warranty.

KEYWORD

Resampler

While an upsampler upscales the clock rate of a signal, the resampler transforms it into something completely new. Whether from AAC to FLAC or PCM to DSD, all this is the task of a resampler.



LUMIN X1					
DSD 128	DSD 64	nativ	192kHz	96kHz	48kHz
352.8kHz PCM					
DSD 128	DSD 64	nativ	176.4kHz	88.2kHz	44.1kHz
192kHz PCM					
DSD 128	DSD 64	384kHz	nativ	96kHz	48kHz
176.4kHz PCM					
DSD 128	DSD 64	352.8kHz	nativ	88.2kHz	44.1kHz
96kHz PCM					
DSD 128	DSD 64	384kHz	192kHz	nativ	48kHz
88.2kHz PCM					
DSD 128	DSD 64	352.8kHz	176.4kHz	nativ	44.1kHz
48kHz PCM					
DSD 128	DSD 64	384kHz	192kHz	96kHz	nativ
44.1kHz PCM					
DSD 128	DSD 64	352.8kHz	176.4kHz	88.2kHz	nativ
PCM-Ausgang-Bit-Tiefe					
nativ		16 Bit		24 Bit	

Two of the Lumin Remote views: on the top left the main screen with playlist overview is shown. To the right you will find a view of the extensive resampler settings.

negative influence on the analog signal processing, and the output filter has to do less work. Lumin kills two birds with one stone!

However, the developers do not want to force anyone to use their converter system. Whoever opens the device features of the well arranged app for the first time will probably be overwhelmed by all the fine tuning possibilities. In addition to DSD resampling, signals can also be refined using a PCM upsampler. Which algorithm is used can be determined individually for each kilohertz frequency. For example, CD audio with its 16/44 can be converted to DSD128, while high-resolution PCM is processed natively at 24/96, i.e. at its original clock rate. We have experimented with the countless possibilities of up- and resamplers, and in fact you can hear fine, sometimes decisive differences in every constellation. The internal processing with DSD usually sounds a bit softer and a bit more fluid than the more biting and crisp PCM.

The difference becomes particularly clear when one listens to a bright voice that has been processed "modern", i.e. with plenty of compression. Amongst others Karin Dreijer Andersson (e.g. "Fever Ray") served us as a

reference. The Swede has an incredibly clear timbre, which always has a minimally biting note in the PCM processing. Especially when her vocals are doubled, it added up. The two resamplers on DSD64 and DSD128 noticeably softened the bite, sanded of the edges of Deijer's voice to such an extent that her intense vocals became beautifully harmonious. In addition, the stage image of the DSD variants seemed a bit more holographic and had a bit more depth.

The effect is increased by the fact that the streamer has been designed to emphasize timbres. Already at the first listening, terms like "velvety", "creamy" or "silky" were on our lips. The X1 has beguiling dynamics, plays thrillingly musically and is a master of subtlety. However, most prominent is its uniquely nuanced coloration. An ability in which it once again awakens associations with its role models. We haven't heard a streamer that can add such a noble touch to music since the Klimax.

However, there are certain fellows who react allergically to such a depth of adjustment and all the possible fine tuning. We also have good news for them: the re-sampling

The back of the X1 is not very spectacular: LAN, USB and two alternative analog outputs. Note the optical network access and the ten-pin socket of the external power supply.



and upsampling settings are hidden in a sub-level of the Lumin app. The atmospheric DSD resampling is pre-selected on delivery. So you can confidently ignore the countless options and still get optimal results. You don't have to worry about the capabilities of the streamer either.

The X1 plays all sound formats and accepts data with up to 32/768 or DSD512 via its two LAN interfaces. It processes MQA, understands Roon's RAAT format and can log in to Qobuz, Tidal and Spotify. If one of the three streaming services is added, a corresponding symbol appears directly in the top operating level of the Lumin app. Web radio is of course also on board. In short: you don't have to worry about formats or the like – this streamer is a comprehensive media center.

Meanwhile, audiophiles who don't like networks can even easily do without a separate NAS. Lumin put their in-house "Music Library" L1 (from 1100 Euro) in our listening room. The small box fits optically well to the streamer and holds up to five terabytes of music. You can tap it over the network or connect it to the X1 via USB 3. The streamer has such fast processors and enough memory to index drives of this size. Of course, this also works with drives from other brands and has another advantage: since it manages the content lists of connected USB devices itself, access from the app feels smoother. Although the X1 is also fast in the network, the complex processes behind UPnP or DLNA do not come close to the directness of a USB drive.

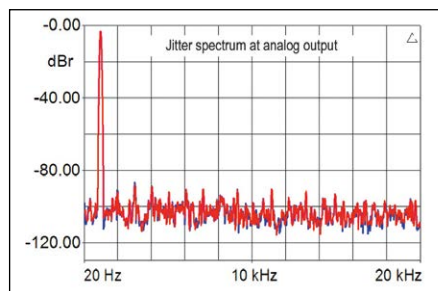
The operation via the app is incredibly joyous. It is certainly not completely self-explanatory, but as described above, it is very easy to ignore the deeper settings. The interface is divided into three sections: at the top is the playback control including a 32-bit volume control that can be deactivated. On the left is a playlist overview. Here, the X1 collects all played tracks and allows loading and saving the playlist sequences. The central area shows albums, tracks or artists and can be maximized with a button. It is convenient that you can scale the display size of the cover images using "Swipe" (pull two fingers together or apart). As already mentioned: Lumin has thought its X1 through from top to bottom! ■

Lumin X1

Price: around 13000 €
(incl. power supply)
Dimensions: 35 x7 x34 cm (WxHxD)
Warranty: 2 years
Contact: Pixel Magic Systems
www.luminmusic.com


With its colorful, uniquely noble character, a huge variety of functions and uncompromising workmanship, Lumins X1 is one of the best digital sources on the market.

Measurement results



Output resistance XLR	36 Ohm
Output voltage XLR 0 dBFS	2/6 V
Signal-to-noise ratio bez. auf 16 Bit	96,4 dB
Signal-to-noise ratio digital zero	116,1 dB
Distortion factor at -9dBFS	0,005 %
Distortion factor at -60dBFS	0,1 %
Converter linearity at -90dBFS	0,2 dB
Emphasis detection (DAC)	not ok
Rectangle	ok
Pulse	ok
Jitter	1,4 ns
Deviation from the fs	+1,2 ppm
Amplitude of the data stream	483 mV
Power consumption Stby/idle (at)	19 W

Lab Comment

Main Phase on tested device  Excellent distortion and noise values. Just the linearity is minimally off, but that is intentional: the gentle drop emphasizes its sonorous character.

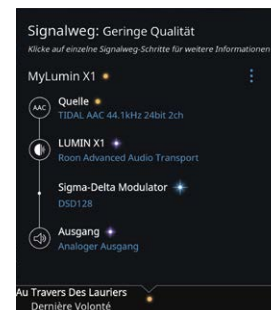
Features

UPnP/DLNA-Streamer with optical and conventional LAN, USB for data storage, two analog outputs (Cinch/XLR), digital level control (can be switched off), Qobuz, Tidal, Spotify Connect, Roon ready, Open Home, Gapless-Play and lots more ...

STEREO - TEST

SOUND QUALITY	100%
PRICE/PERFORMANCE	
	
EXCELLENT	

ROONS QUALITY CONTROL



Roon's RAAT transmission protocol is more than just an alternative to remote control. The software analyzes the signal path from the source to the D/A converter and indexes the status using its own color code. Above you can see that the software is satisfied with the X1 (blue and purple). However it doesn't like the source (an AAC stream from Tidal) at all (orange).

Its knowledge of formats makes the X1 a comprehensive media center