Taiko Audio Router

Pre-Announcement

The Taiko Audio Router fits in the same beautiful 22 x 22 x 5 cm / 9 x 9 x 2 inch milled-from-solid-copper chassis as the Taiko Audio Extreme Switch but it may become a little bit less heavy due to the Router PCB being around 20% larger. This proprietary PCB can actually also serve as a full motherboard which can support CPUs with up to 16 cores.

While the Taiko Audio Extreme Switch has one-in, one-out connectivity, the Router offers 5 configurable ports, of which one will be the input, with 4 remaining outputs.

The way that a router handles traffic and/or distribution appears to dominate SQ and this is the reason we embarked on designing a router. The router is powered by any normal DC power supply. It may also be powered by our new to be released Taiko Audio BPS (to be detailed in a separate document). This BPS can power the Extreme in addition to the Router but if the Router is not placed close to the audio system, it will need its own power supply.

There is huge potential for our Router functionality to evolve over time. We do have backup from a company specializing in router design for this and they will also provide support and updates.

Power

Power input: 12V-19V DC

A standard wall-wart power supply is included, but the Router will sound better with a higher end power supply.

Dimensions (WxDxH): 22 x 22 x 5 cm / 9 x 9 x 2 inch

Weight: 15 Kg / 33 lbs

Pricing

The pricing for the Router is not yet set but it will cost more than the Switch. There's a substantial licensing and security support fee involved that we are still negotiating for as our expected sales volume is magnitudes of orders lower than for an Internet Service Provider. This is uncharted terrain.

Availability

We're aiming for release by the end of May 2023

Initially, the Taiko Audio Router will be available only to Extreme owners

The Concept

The switch + network card package turns a very noisy RJ45 interface into a very quiet SFP interface. This combination also offloads some network processing from the server to the switch reducing internal processing noise. This alone improves Roon playback performance to above what the XDMS Alpha testers are currently experiencing. XDMS benefits as well and remains the current Taiko SQ SOTA.

The router allows full control over the data stream being delivered to the Switch/Extreme. It can define all networking parameters and controls the actual amount and flow of data present on the network. It also allows controlling a wi-fi Access Point to control wireless networking parameters. Whether or not you replace your internet modem is actually not that important, it will achieve what we want to do regardless. However less is more, it supports a lot and if it can replace your ISP provided device, why not. It has 5 network ports and can therefor create 5 separated networks.

In a Nutshell

The Switch / network card combo reduces noise by offloading (moving) processing from the Extreme music server to the Switch.

The Router reduces noise by controlling the actual DATA on the network leading to another significant lowering of noise.

Features

- A hypervisor will be running on the Router so it can run multiple operating systems as Virtual Machines.
- One of those virtual machines can run Ubiquity software to manage a whole network of Ubiquity Access Points / Products if so desired (or possibly other brands, we use Ubiquity ourselves)
- Another virtual machine can run streaming preprocessing to improve online streaming performance for Roon
- Yet another virtual machine could run a future part of XDMS (our upcoming new server and playback system for the Extreme, currently in Alpha state)
- Serve as a NAS (for music storage)
- Route an iPad output through the Router to the Extreme. Amongst others, this would enable splitting YouTube into separate audio and video streams and then streaming YouTube audio directly to the Extreme music server.
- All 5 ports can be configured as separate networks
- The Router can be used to replace your ISP supported router if your ISP supports replacing your router, to that end, and because this is high-end, it runs the highest possible security level, guaranteed safer as your ISP modem/router, a 5 year support maintenance contract with several update options will be included, which can, and will need to be extended to stay safe in such a scenario, after (the cost for this contract is EURO 50 a year), it can also be used to create a separate network in series with your ISP or whatever other router

Why did we end up designing both a switch and a router?

Based on a post by Emile on WBF 03-12-2022, worded to be easy to understand

After years of trying and experimenting we have not found a single solution leading to full immunization to the influence of networking on sound quality. This network is an active component in your home. A perhaps shocking discovery is that your home network can even influence your analog playback chain. Every component of your network exerts a degree of influence, ranging from very minor to major. What this means is that when you introduce any type of streaming digital source into your system (and even when you don't) and you care about sound quality, you should absolutely look at the large picture, including every single component and piece of wire, not identical to but similar to how you look at for example your power utility setup, where the utility breaker box, fuses and all bits of wire make a difference.

A router is like the airport / main distribution center of your network, it performs customs clearance on international packages, checks for illegal content, and sorts and transports all packages to where they should arrive in a timely and organized fashion. It should have plenty of capacity to ensure everything runs smooth and in a timely fashion, and good management- and quality control departments.

A switch is like your local post office / distribution center, it needs a well-maintained road system and a fleet of delivery trucks with good suspension so packages arrive undamaged at their final destination even when encountering a few bumps in the road and last but not least well-mannered delivery guys.

In audiophile language, using the earlier mentioned power utility setup analogy, your house mains utility distribution box would be the router, your in-wall wiring would be the ethernet cable running from the router, your local system power strip or power conditioner would be the switch, and your power cord would be your ethernet cable. Perhaps unsurprisingly, their respective degrees of influence on sound quality are very similar. The router being the mains utility distribution box in this example can furthermore be enhanced with things like power regeneration, cleaning, stabilization etc.

Battling Networking Noise in layman's terms

We are taking 180-degree angle approach to networking noise relative to the more common methods that are currently used. Think of the following analogy:

1) Being stuck in a silent room with a leaking water tap into a bucket of water.

2) Those same drops of water falling into an ocean with you on the beach enjoying the sound of waves.

Our approach is to not drown out irregular noise by hiding it in a wideband high noise floor but rather to make the offending noise itself inaudible allowing you to relax in that silent room and enjoy the sound of silence.

2.4gHz versus 5gHz revisited

Once upon a time in our old workshop in Hengelo we achieved better sound after disabling 5G and exclusively using 2.4G wireless networking. Spacing the single 2.4G access point as far away from the listening room as possible improved the sound even further. As we had bad Wi-Fi coverage because of that anyway we didn't connect our phones to Wi-Fi which sounded even better.

When we moved to our new facilities in Oldenzaal, we had a much larger area to cover, added more machines, needed better coverage and ended up installing a Ubiquity router, switches, multiple Wi-Fi 6 access points, people working here installing wireless internet radios, etcetera. Before we knew it we had over 30 wireless devices active at all time. With the system up and running, when most of the dust of moving had settled, Emile decided to revisit the 2.4G matter which had proven to be so successful in Hengelo. Imagine our surprise as this now worked the other way around.

Emile invested more time, reconfiguring the router and access points, playing with it at night with all the non-relevant devices powered off, and big surprise, the best result was obtained using 5G and just having a lot of active devices on the network. “Best” in this case refers to a reduction of nasty glare & edginess, but these improvements came at the cost of lower overall levels of transparency AND reduced dynamics.

We realized that the only way to effectively combat this tradeoff and actually solve the problem, getting rid of the "glare" while simultaneously retaining or even improving transparency and dynamics, is to have full control over the Router and Switch software. As is now known, our new Extreme Switch already solves a significant part of it.

This is an important thing to keep in mind. A lot of network tweaks which "improve" the sound do so by making the sound more relaxing and easier to listen too, like releasing tension, and that can be perceived as a much better sound, no doubt. However, and this is something you may not notice right away or perhaps even at all, along with this also comes a reduction in dynamics, both micro and macro, often a smoothing effect in high frequencies, reduced dynamics, and ultimately reducing/smothering musical life.

Q&A

Is the Router made from a solid copper billet?

Indeed, it is. We are slowly but surely moving towards 100% in house manufacturing to get rid of external supplier dependencies as those have become increasingly “troublesome”. We don’t want our own anodizing facility hence the choice to move away from Aluminum as a base material. Copper is a material which we can finish ourselves (over time), we have years of experience working with it by now, and as a bonus, the material has an arguably “higher-end” look and feel.

Do these cases provide full Faraday shield insulation?

They come as close as you can get for an electronic appliance.

Should the Taiko Switch and Router be used in series? Or just one vs the other?

In some cases, the Taiko Router can replace the regular main router, in other cases, it can be placed behind the regular router and used “in series”.

I have the service provider fiber going into the Fiber modem, then a RJ45 cable to the router/switch. Does the new router accept the service provider fiber directly? Or will I still need a fiber modem before the Taiko router?

The Taiko Router could accept the service provider fiber directly. Subsequently, you could create a separated audio and rest-of-home network. Alternatively, it could also be placed behind the fiber modem.

For those of us that use an Edge router with our ATT (AT&T) setup, will the Taiko router replace or be an addition to the network chain?

The Taiko Router can be used both ways.

Does the router also have to be near the Switch, like the case for Switch to Extreme?

No, it can be placed anywhere.

Would the router normally be placed near the system? Surely very few people have their main router near enough to the extreme to be powered by the BPS.

It would be much more beneficial to power the switch from the BPS than the router. We’re assuming the switch being placed close to the Extreme and the router at a distance, likely where your internet enters your home.

Does the Taiko router also work as a modem?

Depending on your definition of modem, yes, but your service provider needs to permit and support using your own router.

Does the Taiko router have WiFi?

It’s not a wireless router but it can run Ubiquity management software to control an Ubiquity wireless access point which we’ll likely recommend to go with it. Most people are unlikely to replace their router but use this to create a new isolated network for Audio.

Can we use the router instead of the switch? In other words, does the router do everything the switch does, and more?

They serve different purposes.

Are you going to do some testing with the major ISPs in each region to see which work with your router?

Unfortunately, this is not realistically executable. But it's not an uncommon practice, for instance, see the information following this link: https://www.gadgetreview.com/how-to-replace-isp-router-with-your-own (first hit on googling "how to replace your internet router").

Since my ISP's Router also works for TV services, I need to place the Taiko Router after my ISP's Router. In this case, would we make a LAN-to-LAN connection with the Taiko Router's DHCP services disabled, or a LAN-to-WAN connection creating a second network for audio only?

Creating a second network for audio only would give you the maximum uplift in Sound Quality. This yields much quieter backgrounds, undisturbed by network traffic generated by other persons in the household.

Can you rank the various Taiko products by order of magnitude of improvement of the sound quality?

The Taiko Audio Extreme Switch is the star of the "show". In order of impact as things are today:

1) Switch
2) XDMS
3) Router
4) Network card + Interconnect

But it's a tight race between 1) and 2).

Is there any sonic advantage to have the router and the switch in separate boxes? If not, could you possibly offer a one-box router-switch so we eliminate one cable and possibly one external power supply?

Unfortunately, yes there is an advantage to having separate boxes. If you want just one box, we recommend picking the switch.

Although we can have separate networks assigned within Taiko router, will it still be better to have a separate ISP Fiber and modem to fully isolate traffic?

This can actually turn out negative. For obtaining a degree of separation, you could place the modem, router, and switches on a separate mains system. But if you're splitting a single phase with a common neutral it's not going to matter that much.

Which of RJ45 or Fiber would work best with the Taiko router?

RJ45 is preferred but both work well.

What are the rated speeds of the router's RJ45 ports?

1Gbps

Will the Taiko Router support creating a V-LAN upon installation?

Yes, this is indeed supported.

Is the customized QoS rule of the router important?

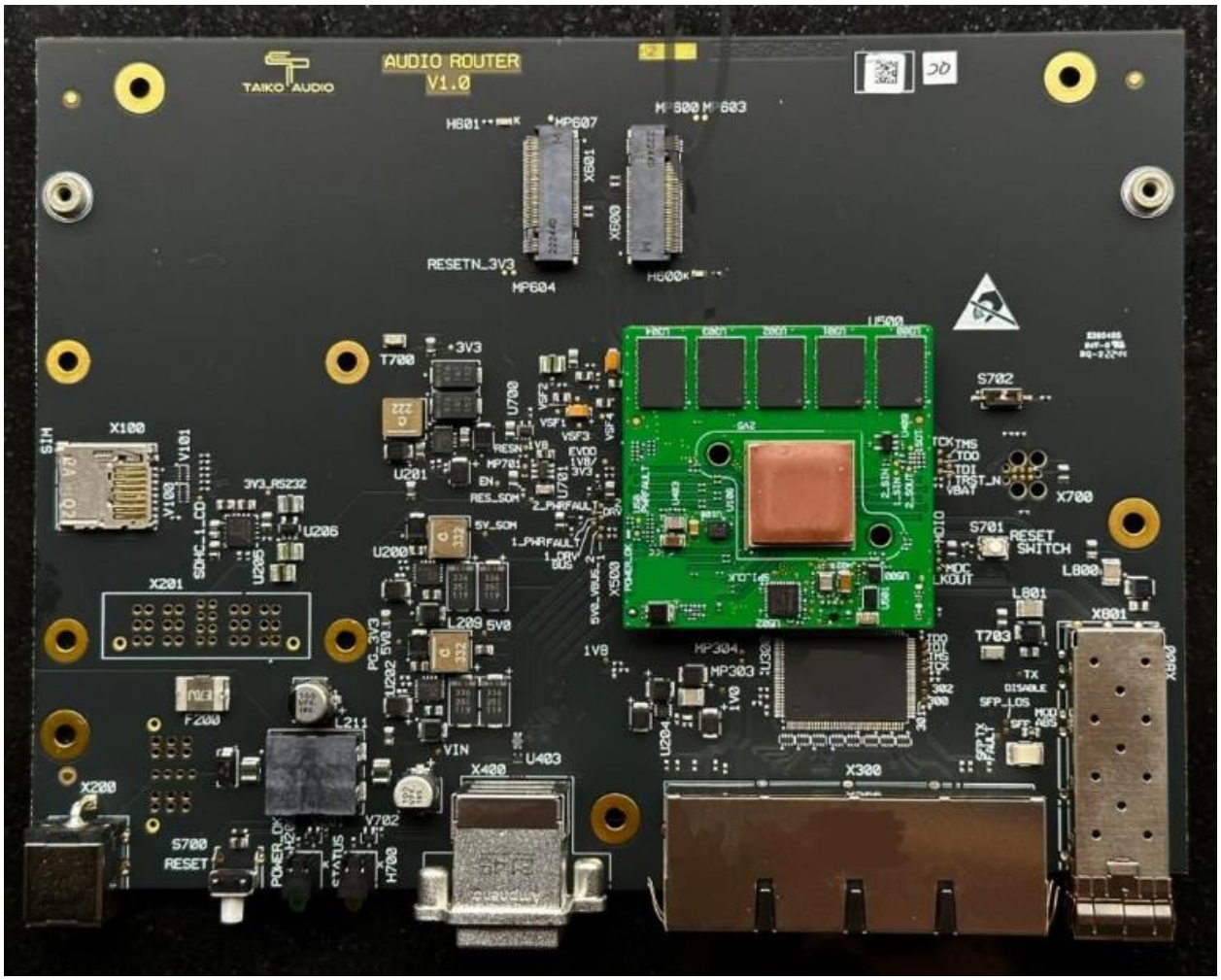
Yes, virtually all settings matter.

I will replace my current switch (before the Extreme) with the Taiko switch. Should I also remove the subnet (Edge Router x) before that?

Yes, the Taiko router should be able to do everything the Edge Router x does. However, there are some ISP devices that will prohibit direct one-on-one replacement. In that case, you can add the Taiko Router after the ISP Router.

Will the router and switch also be made available for non-Extreme users?

Never say never, but initially, the Taiko Audio Router will be available only to Extreme owners. With some adjustments it's possible for non-Extreme owners to use but it will not give the full benefit, which includes a software / firmware interaction. As it stands, it was quite a challenge to secure enough parts to be able to supply one to each current Extreme owner and have a few spares for future ones.



Above is a photo of the Taiko Router PCB. For comparison, below is a photo of a 3D print of the switch PCB.