Taiko Audio Extreme Network Card

The new Taiko Audio Extreme Network Card is a single-connection PCIe option board for the Extreme Server. The card is powered via an internal DC power cable from the Extreme power supply.

There is a single SFP+ module slot that can be fitted with either an RJ-45 connector module or a Fiber connector module.

Installation

The physical installation works just as with any other PCI-card. Just make sure to power off the Extreme first via the Front panel button, and then via the rear panel switch. The Extreme Network Card is preferably installed in Slot 2, in place of the old SFP card. Power to the card is provided by a split DC cable that substitutes the single cable that powered the USB cable and will then power both the USB card and network card.

Availability

The Extreme Network Card is now available

Delivery Times

See the Taiko Audio website for information or contact us via support@taikoaudio.com

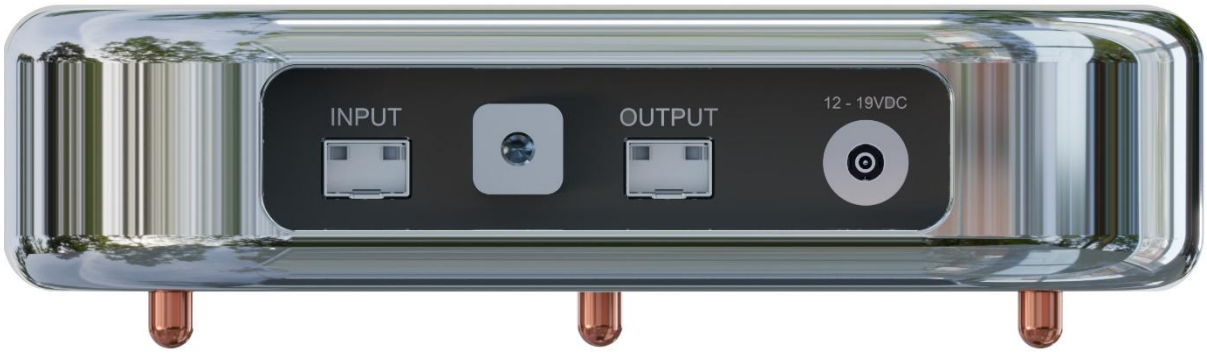
Pricing

Pricing information can be found on the order page on the Taiko website

Taiko Audio Extreme Switch

The new Taiko Audio Extreme Switch is an external network device intended to replace and optimize the direct ethernet interface to the Extreme. Milled from a solid block of copper, the Extreme Switch has a smoothly polished Chrome finish, with more finish options to come later.

TAIKO AUDIO



The provided connectivity is one in and one out. To this end, the switch contains one SFP+ input module slot and one SFP+ output module slot that both can be fitted with a range of options.

The Concept

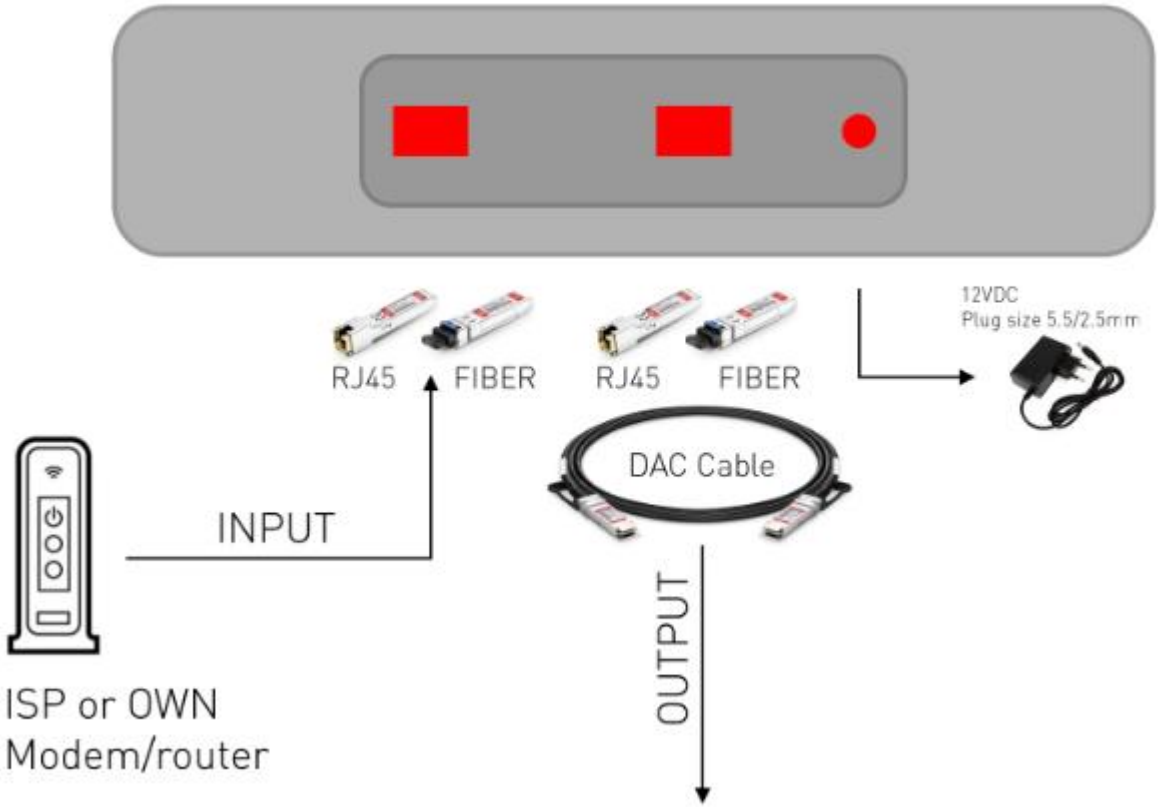
The Switch turns a very noisy RJ45 interface into a very quiet SFP interface. The Switch + Network Card combination (only available for the Extreme Music Server) goes one step further by offloading some network processing from the server to the switch reducing internal processing noise. This alone improves 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 therefore create 5 separated networks.

In a Nutshell

The Switch / network card combo reduces noise by cleaning the network and 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.



Physical properties

Dimensions (WxDxH): 22 x 22 x 5 cm / 9 x 9 x 2 inch
Weight: 15 Kg / 33 lbs

SFP+ Input options

The input SFP+ slot can be fitted with either an RJ-45 connector module or a Fiber connector module.

SFP+ Output options

The output SFP+ slot can be fitted with either an RJ-45 connector module, a Fiber connector module, or a DAC Cable in a variety of lengths ranging from 0,5 – 7m.

DAC Cable Length

The length of a DAC Cable is not critical, simply use the length you need. Longer cable lengths require a larger wire gauge to compensate for the increased signal loss. There are some marginal differences between different lengths but not really a qualitative difference, more along the lines of slightly thinner/faster for shorter lengths, slightly fuller/slower for longer lengths, but again, really minor, at Taiko, we use any length without caring about these differences.

Gigabit / 1000Mbps

The Taiko Extreme Switch facilitates a Gigabit / 1000Mbps SFP connection.

NOTE: It is not compatible with 100Mbps network components.

Ground terminal

M6, with hex 4mm screwdriver hole.

Power

The Switch consumes around 100mA @ 12V
Standard DC barrel polarity (inside = +/Positive, outside = -/negative)
Barrel size: 2.5mm internal / 5.5mm external diameter / 11.3mm length

The Switch has a pretty wide range input of 12V-19V DC (12V is optimal)

The switch and router will actually still function down to about 8V but performance will be compromised then as that will render the first regulation stage inoperable. The first regulator stage "needs" 11.5V minimum to function optimally, higher voltages don't affect things significantly, it will be slightly less efficient but we're talking at about 0.5 watts of power "wasted" when you power them at 19V for router and switch combined. Hence this will be dominated by how efficient and or noisy your power supply is at what supply voltage.

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

For the best sound quality, we recommend powering the Switch with our upcoming battery power supply (BPS) but we cannot supply this before around May 2023.

For Oyaide DC plug users - possibly the best option - they use a color-coding of red for 2.5mm and black for 2.1mm. 2.5 mm to 2.1 mm adapters are readily available.

A forum user tip is to look into the Elecaudio DC plugs which reportedly provide a great fit. They are made with solid copper rather than brass.

Availability

The full-size (5th gen) switches are now available.

The 4th gen small switch is off the agenda due to low interest

Delivery Times

See the Taiko Audio website for information or contact us via support@taikoaudio.com

Pricing

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Finish Options

- We are offering the first run in the Polished Chrome finish.
- Black will be added next which by the looks of it takes about 2-3 weeks extra, leading to an estimated April 2023.
- Natural copper will very likely be available at around the same time as Black but this is awaiting confirmation.
- Bead-blasted and Anodized Aluminum (which is identical to the silver Extreme) availability looks like about 12 weeks later (estimated to be June 2023) due to Aluminum lead times and the anodizing process. We're investigating if we can get the same color finish by coating which would make it a lot faster. More information to follow.

Please note that finishes than standard Polished Chrome will likely come at a premium.

Switch and Network Card Public Announcement

Based on a post by Emile on WBF, 10-11-2022

It has been a very long and often wondrous journey as the first PCB designs date back as far as April 2020(!) after an even longer period of data collection and research, altogether we have probably spent as much as 3 years on it. But I believe we have truly managed to solve the puzzle, and as far as I have been able to track the market, I did not see anything like it yet, hence further details will be released closer to launch.

We're not in the habit of boasting about sonic qualities, but we can say it's a very large upgrade, significantly larger than the previous hardware update to the Extreme (the April 2021 USB upgrade). And Roon also sounds sublime, better than ever.

Our new switch is very different to other switches. The first switch we designed was uniformly positive, for instance, it did not provide a cleaner sound at the expense of density, it did not compress dynamics, it did not just sound more pleasing and/or "fuller" by rolling off the top end. In our opinion, it was truly "neutral" and only lowered "noise". However, the most remarkable aspect of it was that everything just sounded better with it connected rather than disconnected. This was around halfway into 2021. We could have stopped there and just release it as it provided a good uptick in sound quality, and I'm sure everybody who would've bought one would've been pleased with it, but it did not actually *solve* anything, instead, it gave us some interesting insights.

This led to more discoveries, some of those led to the software update we released early in 2022 which provided a similar uptick in sound quality as the switch on its own.

What we have designed since then is truly different, and operates and functions on a whole different level. It also scales with your system outlay. For example, on the Alsyvox Raffaello loudspeakers, with its huge dual bass ribbons, it's almost like there's a +6dB boost at 20Hz combined with a mayor increase in transparency and detail in that range (yes there's detail in sub bass). It makes for a rather shocking difference, it produces shockwave-like bass, but it's not just that, the midrange energy and drive are on a whole different level too, like if you went from an underpowered amplifier to something with power to spare.

On the Magico A5s you don't get the same level of improvement in this area, but still, the bass is much more controlled and has more energy, grip and dynamic punch. The lowered distortion over the entire frequency range is very obvious and the midrange is more colorful and engaging.

Removing the switch leaves the listener with a suddenly rather disappointing sound, grey and lackluster. We have a lot of switches here, but none of them do anything like this, this is more fundamental, it alters your musical experience. There goes our "We're not in the habit of boasting about sonic qualities" out the window… Let's rephrase that to hoping that you will all agree with these impressions. You are welcome to visit us in Oldenzaal and hear the difference for yourself.

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

Based on a post by Emile on WBF 03-12-2022, in simplified terms

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.

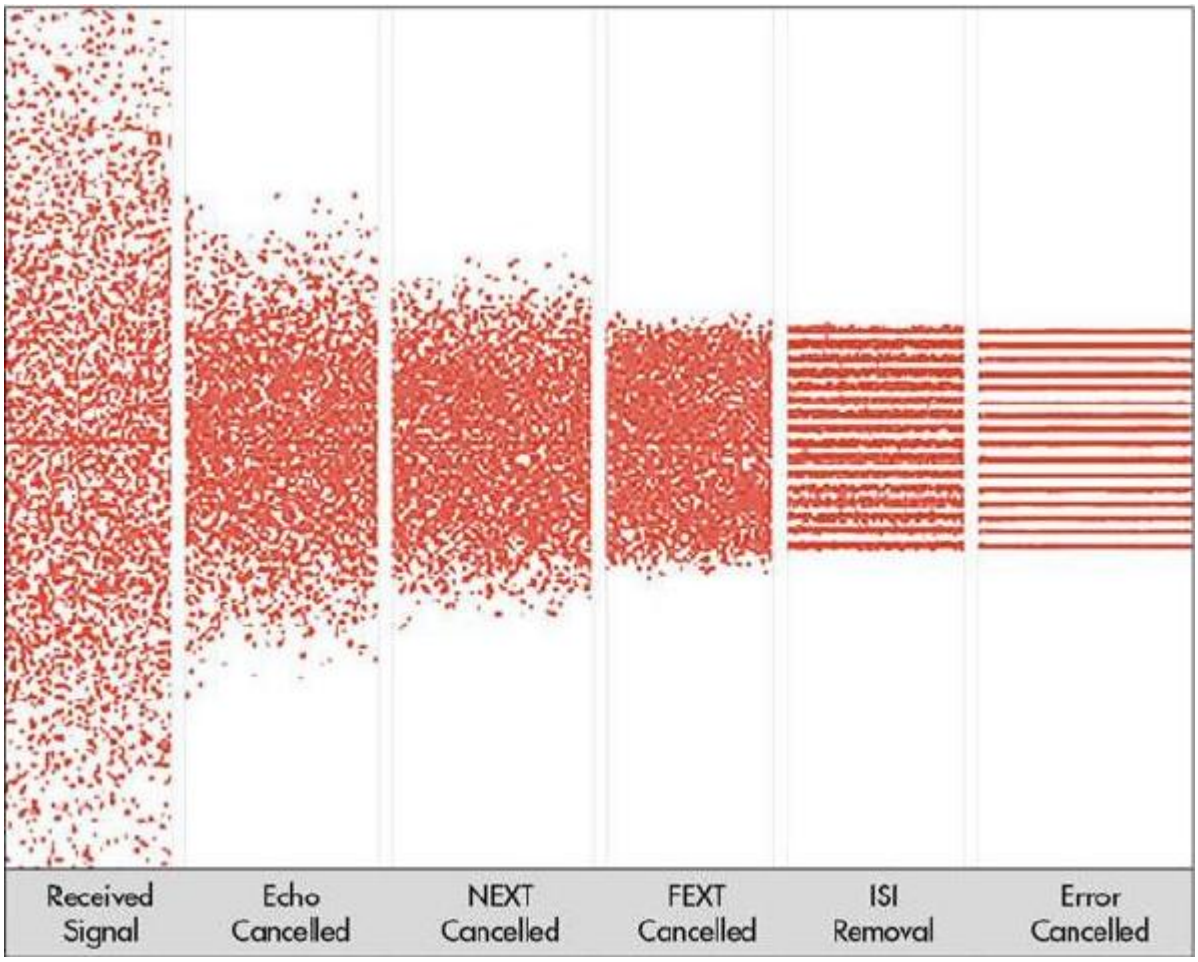
A switch is like your local post office / distribution center, it needs a well-maintained road system and a fleet of delivery trucks with good suspension so packages arrive undamaged at their final destination even when encountering a few bumps in the road and last but not least well-mannered delivery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

Why did we select the SFP interface instead of the usual RJ45?

The ethernet cabling system that we use in our homes is designed to transport large amounts of data at high speeds over an as economical as possible cabling system. For this to work it uses block coding and error correction to enable data to pass through a cheap (economical) cable and connector system without error. The block encoding requires reading the data block into the transmitter, running a mathematical function on the data, and sending the encoded data over the link. The opposite happens at the receiving end and error correction is applied.

Below is a graphical display of error correction:



To provide an indication of the processing overhead, this is standardized to take 2.6 microseconds where the actual data transfer latency is 0.1 microseconds for fiber and 0.3 microseconds for copper (or times 8.6 for copper and times 26 for fiber). But more important is the increase in power consumption which is between 5 and 25 times higher for RJ45 over SFP (for EACH port).

At a first glance, SFP fiber appears to be the ideal solution. Unfortunately, it is not as straight forward as that as a SFP fiber module, which converts an electrical into an optical signal, uses a substantial amount of power. A single fiber SFP module consumes more power than our entire switch design, and the additional noise this generates is multiple times higher than that of the switch itself.

Inside the system, there is an accumulation of several types of noise:

- Processing noise
- Noise generated by power consumption (and associated heat)
- Interface noise

We have managed to achieve the absolute lowest possible noise by minimizing these 3 by designing a Network Card and Switch by producing the lowest possible noise, consuming the lowest possible power, and with the least possible processing overhead around using a so-called DAC SFP cable between Network card and Switch.

What is a DAC cable?

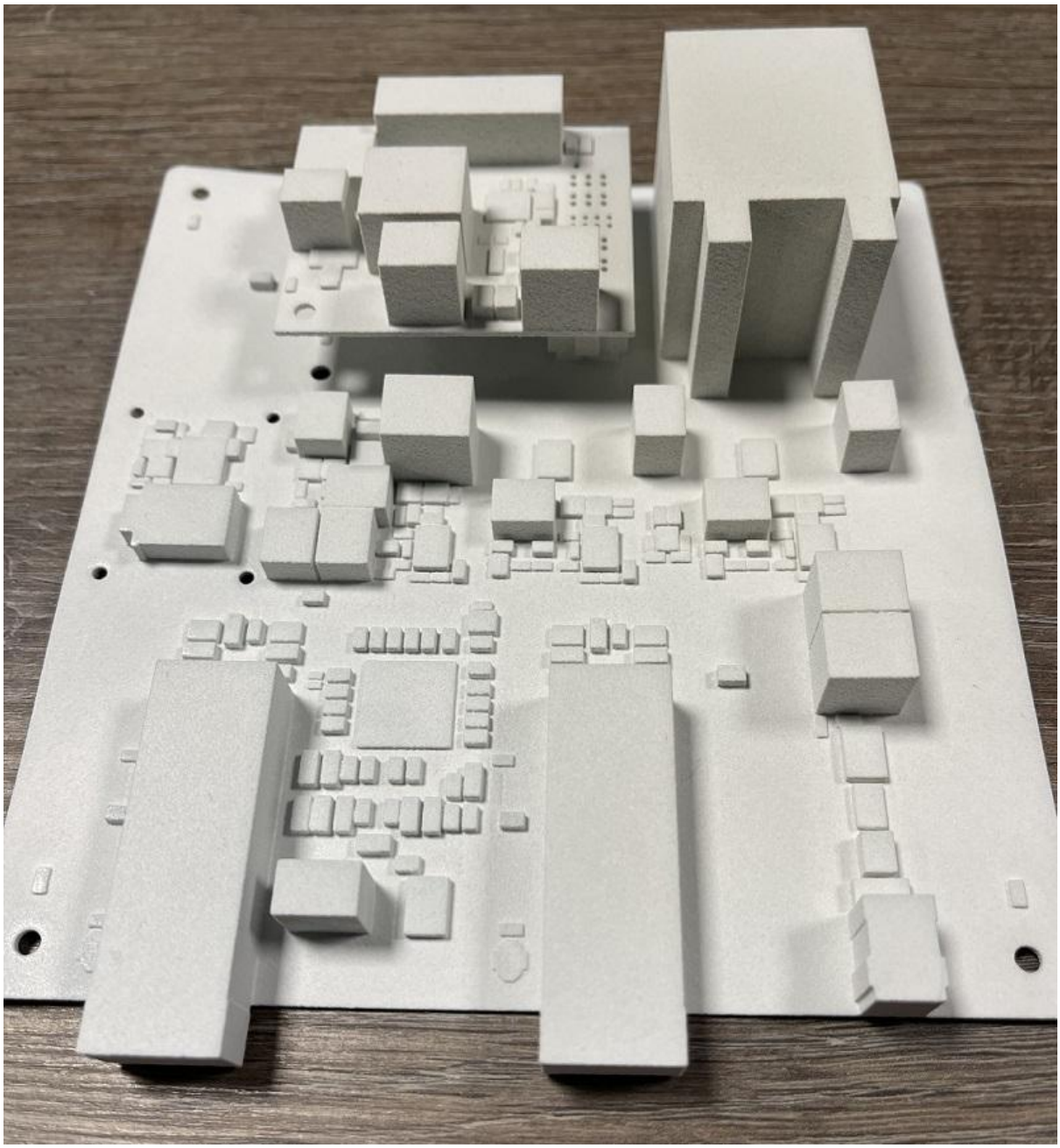
A Direct Attach Copper cable or a “DAC cable” is an Industry-Standard twinax copper cable terminated with SFP connectors that connects directly the SFP ports (or line cards) within active equipment, such as switches, routers, servers or data storage devices, in a data network.

Above is an example of a DAC SFP Cable, or in other words, a DAC cable terminated with SFP connectors

Above is a photo of a Fiber SFP Module (left) and a Copper SFP RJ45 Module (right)

Above is a photo of the DAC Cable connected to a slot of the Extreme

We *already* had an SFP card fitted in the Extreme in that position, *however*, that was not a design with the lowest possible noise in mind and it does not support the software enhancements that are provided by the upcoming Taiko proprietary TACDD interface, to be explained in another article.



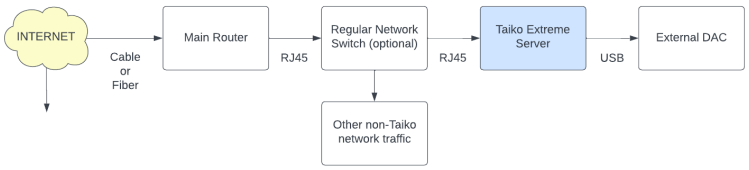
Above is a photo of a 3D print of the switch PCB which reveals that the switch employs 2 SFP ports exclusively

Our recommendation for the lowest possible noise:

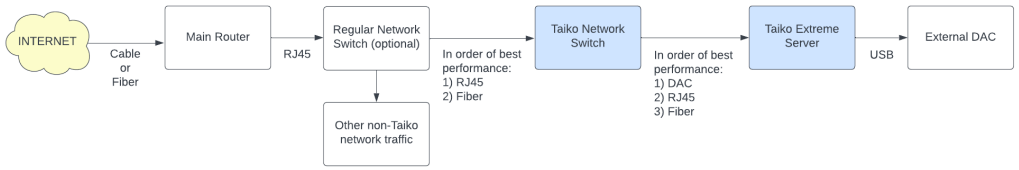
- RJ45 from router to switch as it still uses less power than dual fiber SFP modules (for which you need a SFP RJ45 module (which we can supply with the package)
- SFP DAC twinax copper cable from switch to Extreme (which can supply with the package)

Diagram showing how the Taiko Switch, Network Card, and Router can be employed

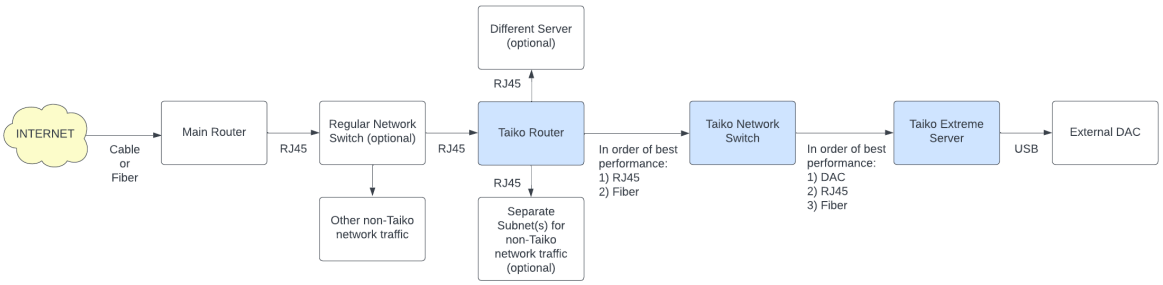
Basic Setup



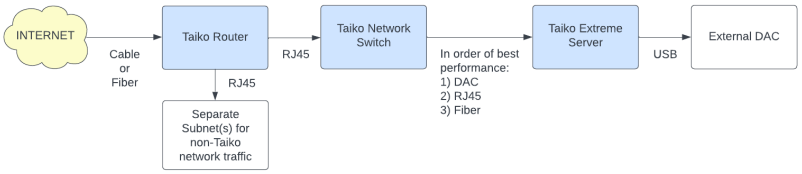
Adding Taiko Network Switch and Network Card



Adding Taiko Router basic setup



Adding Taiko Router advanced setup (check possibilities with your internet provider)



Q&A – Legacy Version

*Topics in **Blue** are also included in the interactive Richpanel FAQ Section on Taikoaudio.com*

Will non-Extreme owners also benefit from the Taiko Switch?

Yes, although the full benefit is achieved in combination with the Extreme Network Card when mounted in the Extreme Music Server.

It's possible for non-Extreme owners to use but it will not give the exact same benefit, which includes a software / firmware interaction.

Is the Extreme Switch available for non-Taiko users?

The Switch is also available to purchase by non-Taiko users. Only the pre-sale was exclusive to Extreme owners.

Is the Extreme Network Card available for non-Taiko users?

The Network Card is also available to purchase by non-Taiko users. Only the pre-sale was exclusive to Extreme owners. For DIY purposes, please note that card requires both 5V and 12V.

Is the Switch 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 is arguably “higher-end”.

Does the switch improve the sound of other servers?

Yes, it does, but not to the same extent, and there's a good reason for that, as you need the network card, and a specific software configuration to achieve the full Monty. The network card on its own is a nice upgrade, the switch on its own is a substantial upgrade, and the combination is "magical".

Does the Network card/switch solution improve local playback as well?

Yes, it does, almost to the same degree as streaming. In fact, it affects both almost to an equal degree. There is the general idea that switches mainly influence streaming sound quality as they “pass on“ the actual bits but that’s not really where it’s at. There is a slightly larger improvement for streamed over locally stored file playback with the Switch and Network Card, but if the improvement would be 25% for local files it’s perhaps 30% for streamed content.

How does the sound of streaming content through the router compare with the same file played from the Extreme storage?

This is a work in progress, honestly the hardware of the router is brand new, it just passed EMC testing very recently and it’s running a basic set of software. But it should on paper get us close if not there. For XDMS, I have zero doubts we will get it on an equal level, but for Roon we have a lot of very clever coding and even some hacking to do.

What will the switch bring in terms of sound quality?

Unfortunately, networking can have quite a negative influence on sound quality, leading to thinness, fatiguing harsh highs, pale colors shading etc. Some suffer more than others, but still, on average, there's a considerable difference.

Was all your testing done with UTP CAT6A (Unshielded) or did you experiment with anything else?

We tested with just about everything we could get our hands on.

Does Taiko still advocate for unshielded ethernet cables?

Without going in detail, with the new Taiko Network Card and Switch, it doesn't really matter anymore what kind of Ethernet cable is used.

In which slot does the network card go?

The new Network Card can go in any available PCIe slot and can replace the existing fiber optic card.

Is there a way of getting the same enclosure as the Extreme for the Switch?

Yes, but in a limited quantity, and with longer lead times.

Regarding concerns about surface durability

The glossy Polished Chrome surface finish is actually stronger then anodized aluminum, but being glossy, a scratch does show more clearly.

Regarding concerns about reflectivity

The Switch has too small a Square Footage Area for that to be a real concern. The circumstances in which an exact 90-degree angle is created with a spotlight are not very likely. But chrome is indeed a highly reflective material.

Do the different finishes affect the sound?

Fortunately, the unit's sheer mass minimizes the coating influence.

Regarding concerns about copper finish tarnish

Copper needs to be finished as it's very soft and scratches easily, and if you just briefly touch it, a black spot will start showing after a couple of weeks, also underneath lacquer. What we do in the Extreme is brushing, chemical cleaning and immediately lacquer, but this would be a very elaborate process for the Switch chassis. But we do have other options to get there.

We did a dozen or so copper mods for T+A DACs about 6 years ago, and those are all still looking identical to back then.

What about the hardness of the copper switch? Does one have to be very careful to not put any scratches in it, e.g. with fingernails or is this nothing to be concerned about?

The switch will have a tough scratch-resistant coating.

Purpose of the Recess on the rear of the switch/router

The big recess (as shown on earlier photos on WBF) is only to make the router prototype fit in the same size chassis; the switch recess is small.

Does the switch do any stabilizing for the network?

It doesn't really stabilize as such but it is a stable performer unlike a surprising amount of other gear. Virtually all of our support on Roon is caused by either a faulty automatic Roon update or poor networking performance like bad performing switches, cabling or 100Mbit networking.

Switch Chassis Size

Actually, we do have 2 versions:

190 x 150 x 40mm, weight 7.5 Kg / 16.5 lbs

210 x 210 x 50mm, weight 15.7 Kg / 34.6 lbs

The difference in the PCB sizes is caused by a more elaborate power regulation section. The cost saving is significant. We're considering releasing both.

What is the difference between the small device and the large one?

Both units are Switches. Please note that the announced Taiko Router is a separate product that will be detailed in a separate document.

The large unit is the switch we are releasing first and it looks like it'll end up near or at 5K in price. As we intended to stay below that for the switch + network card package we have decided to also release a smaller version which will be below 3K in price, more competitive in pricing to other "less extreme" switch offerings. This is still an excellent performer and allows usage of the superior SFP DAC cable connection, and brings the whole package at below 5K in price. Please note that, as it stands, the small switch is off the agenda due to low demand.

Will there be any difference in functionality/connectivity between big and small switch?

The big Switch simply sounds better, but we're certain that listeners will already be impressed with the small Switch. Please note that, as it stands, the small switch is off the agenda due to low demand.

What are the sonic differences between the two Switch size options?

The larger one is a large step up in clarity, transparency, larger & more holographic staging and significantly increases bass definition, impact and extension, very similar to adding subwoofers, a peculiar effect. But as long as you've not heard it the smaller one is excellent and still manages to make Roon sound better then XDMS (without). Please note that, as it stands, the small switch is off the agenda due to low demand.

Can we swap the RJ45 and DAC cable at a later stage after purchase? - If I have rj45 input to the switch at first, could this be changed to a DAC cable later if we wanted to go DAC between the router and switch?

Yes, you can change at any time.

Would you expect any SQ benefit from using DAC vs. CAT 6 between Router and Switch?

Perhaps, but in that location, its impact should be much smaller. Directly into the Extreme is where its impact becomes "huge".

Which type of connection is best between the new router and switch? DAC or RJ45?

This has not yet been determined, it's not just a matter of swapping cables, there's also software/firmware tuning involved.

Is there a specific brand or model SFP-RJ45 adapter that we endorse?

Not known at present.

Copper RJ45 SFP or Fiber SFP?

We prefer RJ45 for the switch. The SFP fiber modules consume more power, which means higher noise. Furthermore, Fiber isolation is irrelevant with our new Switch.

Does the Switch DC cable length affect its sonic performance?

The length of the DC cable would likely indeed matter. Ideally, the switch is positioned close to its power source, or the upcoming Taiko BPS (to be detailed in a separate document), with a shorter cable.

Is the performance target to have the new switch on the same main power line as the server? Or should we isolate them?

No noise is passing there, but unfortunately, you're still mains powered!

Does the new network card replace the current network port?

No. The current Ethernet port is motherboard-based. It replaces the current SPF card (if present).

I have an XXX Audiophile switch, should I keep it connected in series with the Taiko switch for extra "pre-conditioning"?

"Pre-conditioning" is not something which applies in this case. Overall, the noise level will be elevated when keeping other switches in, however some switches can add "noise" that may sound "pleasant", so do try and don't just take our word for it.

If an extra switch is required in a certain situation, then it can remain in place. But one should definitely check if they don't deteriorate sound quality. The Router "routing" your network where

your music server resides is the one defining your network parameters and has the largest impact over preceding routers, at like 90%.

One of the reasons this switch took so long to release is we started out designing "standard" switches, low noise regulation, better clocking, experimenting with "stacking" (our first switch design dates back to 2020 already), which is nowadays widely available from a lot of vendors.

The "big" or "extreme" switch which is in pre-sale now is our 5th switch design. The "small" switch is our 4th.

These 2 switches are a different and as far as we know unique approach offering an actual significant noise reduction in the server by other means than just designing the lowest possible noise version in an attempt at reducing noise as much as possible OR by actually adding noise introducing an effect one may like or not. Evidence of this is the large number of people removing their switches and replacing "audiophile" network cables with regular CAT5/CAT6 resulting in better sound with last year's Taiko OS update.

Please note that, as it stands, the small switch is off the agenda due to low demand.

What if I need more ports?

If extra ports are needed, for instance for a smart-TV, having another switch connected prior to the Taiko Audio Extreme Switch is a good solution. In the future, one might consider replacing that switch with the upcoming router which can create truly separated networks for a SMART TV and the Extreme.

What is the rated speed of the Switch's ports?

1Gb (the switch and network card are incompatible with 100Mb connections)

Why do the SFP ports only work with 1Gb?

SFP modules and -ports are designed for a single speed and they do not exist in a dual-speed configuration. The SFP modules and ports that we use in our Taiko Audio products are specified to work only at 1Gb.

As a result, the following Taiko Audio products will not work with 100mb connections, only with 1Gb connections:

- Extreme Switch
- Extreme Network Card

Conversely, RJ45 ports can work in 100Mb and 1Gb mode. As a result, the Taiko Audio Extreme Router will be partially compatible with 100Mb and 1Gb connections:

- Extreme Router RJ45 ports: 100Mb and 1Gb
- Extreme Router SFP/DAC port: 1Gb only

What this means is that any network interfaces upstream of the Taiko Audio Extreme Switch or Network Card, such as generic routers or switches, must be 1 Gb. For the Taiko Audio Extreme Router, the same holds true where it concerns devices connected to its SFP/DAC port.

Please note that some Ethernet cables are restricted to 100Mbit (as opposed to Gigabit) which will also be incompatible.

Finally, importantly, please note that most networks are 1Gb but what often happens is that 100Mbit devices connected to cheaper switches cause the switch to pull all ports down to 100Mbit. Or if you have a damaged cable pair you can get this too (100mbit uses half the conductors of 1Gb).

Will the Switch work with a MESH satellite router such as the Asus zenwifi? Will it meet the 1GB requirement?

The Extreme Router accepts either 100Mb or 1Gb on its RJ45 ports, so as long as the Extreme Router is used upstream of the Switch and NIC, the setup will work.

How can I check the network connection speed?

Please refer to the separate document called “How to check the network connection speed” which can be downloaded from the Downloads page on the Taiko Audio website.

How can I check that the Network Connection is active and how can I check if the Extreme Switch and Extreme Network Card are working?

Please refer to the separate document called “How to check Network Connection Status and Extreme Switch and Network Card Status” which can be downloaded from the Downloads page on the Taiko Audio website.

Why do some manufacturers offer “slow” network ports?

Providing ports that are restricted to 100Mbit especially for audio purposes (as opposed to Gigabit) is a method employed by various audiophile switches. With many, usually lower-priced, music servers, this can indeed provide "better" sound quality. This does not apply to the Extreme though, and most likely neither to other servers with ample processing power on board.

Why do some audiophile cables not work with the Taiko NIC and Switch?

Cables that are restricted to 100Mbit (as opposed to Gigabit) can indeed cause certain issues. Although reducing the network speed to 100Mbit is a strategy employed by some Audiophile switches with a school of thought that lower speed translates to lower noise, at Taiko, we do not agree with this. The low speed impacts the reliability of Roon, and with XDMS, the negative impact on SQ by running at 100Mbit is very obvious. Therefore, we do not support 100Mbit networks, but we do support diagnosing and curing the cause of running a 100Mbit network.

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100Mbit versus Gigabit Switches – what’s better?

(Added to the “Why do some manufacturers offer “slow” network ports?” question)

if you look at it from a design/component perspective, 1Gb switches are much more modern, more advanced, and further developed, and can actually end up consuming less power overall than antiquated 100Mbit switch chips. The Taiko Network switch only uses 1.3 watts with DAC cables. We

did not have much success with 10Gb though, that just uses way more power, runs much hotter, and is very difficult to get to sound right.

Is the new network card plug & play or will there be drivers to install?

There is a script that needs to be executed on the Extreme server after the card is installed to configure it properly, but there are no drivers to be installed. The card will also work without the script but the script allows the sound quality to be optimized. The Script can be downloaded from the Downloads page on the Taiko Audio website. The script is intended only for the Extreme Music Server and is not required for other servers.

Why is it called a switch if it only has a single input?

A device with a single I/O can still be a switch. It is just confined to signal transfer to one "address." Perhaps a better name for it would have been a “Media Converter” but it really is a full-blown switch, using a switch controller we‘re just using only 2 ports on it. Technically, it’s a switch, functionally it’s a media converter.

Is there any benefit for Ravenna user to buy 2 network cards? One for internet and one for Ravenna (audio over IP)?

This is unsure but worth trying. You can return the card if it doesn’t work out as planned.

Is there any merit in keeping the Uptone Audio EtherRegen in the chain, or should I go direct from router to switch?

We would expect there won’t be any merit in retaining the EtherRegen.

Is there a benefit to using the Network Card without the Taiko Switch?

There’s a small benefit but it really comes to fruition using it in tandem with the switch.

What cable to use with the Switch?

You may use unshielded twisted pair copper ethernet cable with RJ45 ends if that is what you are using now. If your existing router has an SFP cage you may use a passive DAC cable so long as the distance between your existing router and where you will put the Taiko switch is 7 meters or less.

We will include an SFP module specific for RJ45 with the switch if that is what you specify. If you plan to go with a standard passive DAC cable from the router to the Taiko switch and the distance is less than 7 meters, then you can specify that in the notes when you order on the Taiko website or with your dealer. A passive DAC cable is generally twinaxial copper and is not a Cat 6 cable.

From the switch to the network card the cable is a passive DAC cable (<7.0 meters). That is a change specific to the switch/network card combination.

Into the Taiko switch from the rest of your local area network can still be RJ-45 unshielded twisted pair (UTP) commonly CAT5, 5e, or unshielded CAT6.

However, if and when someone purchases the upcoming Taiko router (to be detailed in a separate document), they can continue to use RJ-45 from the Taiko router to the Taiko switch, or if the Taiko router and switch can be connected with a passive DAC cable < 7.0m the two can be connected by passive DAC for a slight improvement in sound quality.

How long can the DAC cable between the Taiko Switch and Extreme be?

The maximum length for a DAC cable is 10 meters (30 ft) but we recommend a 7-meter (20ft) maximum. Longer lengths require an active cable (as opposed to standard passive) which unfortunately severely degrades SQ (to fiber levels).

Will you offer shorter DAC cable lengths than 7 meters?

Sure, we offer 1,2,3,5,7-meter lengths.

Is the Switch supplied with a DAC Cable?

Yes, a DAC Cable in any desired length between 0,5 and 7 meters is also supplied and included in the price.

Is there a benefit to using a DAC cable shorter than 20 feet?

There are some minor differences but not of the better or worse kind. Over 20 feet, however, there's some deterioration. The maximum length is 10 meters (30 ft) but we recommend a 7-meter (20ft) maximum. Longer lengths require an active cable (as opposed to standard passive) which unfortunately severely degrades SQ (to fiber levels).

20 feet is just over 6 meters. Why offer a 7-meter cable if it exceeds the threshold?

We're on the metric system and for us, it's all meters. A common length offered in the US is 20ft.

Is there any SQ benefit to choose 2m over 7m, for example?

They do sound ever so slightly different but even we would fail a blind A/B test.

What length sounds best?

The differences are very small. We simply recommend picking the length that fits best.

Are there differences in sound from brand to brand?

We have tested a few different lengths and brands and in high-end everything sounds somewhat different, but the differences are relatively minor relative to the delta to an RJ45 terminated UTP cable, like 1-2% of that.

What are the physical dimensions of the PCIe card?

Right now, it's a full height card, about 4x8 inch. Low-profile will not be possible as it's fully populated on both sides.

Is the ground screw on the switch considered to be a chassis ground or signal ground?

It is Chassis ground

I use a DAC with streaming input (Merging NADAC). Does it make sense to purchase 2 Ethernet cards, with the second used to connect the Extreme to the NADAC?

We would not expect miracles from a second network card. The big advantage over the onboard UTP connection is the ability to use an SFP DAC cable.

For the Merging, our recommendation would be:

RJ45 → Extreme Switch → SFP DAC→ Extreme Server Network Card → Extreme Server using existing on-board RJ45 connection → NADAC

Do the Extreme Switch and Extreme Network card provide total isolation?

Absolute immunity does not appear to exist, not even if you use a fiber connection. Any changes to your network environment preceding the fiber link remain audible. Therefore, this goes beyond mere galvanic isolation. This is similar to how your power utility makeup, power cords, power conditioners, no matter how extensive or elaborate, is still influenced by what precedes it, and the whole is highly "tunable".

We achieved the highest level of "immunity", or a better word to use would perhaps be "control", by including the router in the equation with either a "simple" RJ45 or DAC cable interfacing the router to the switch.

We fully understand the reluctance to invest in your network environment, and we have also been reluctant to do so, but unfortunately for server/streamer based digital playback, if you want to extract the very best performance, there is no way around it.

The Extreme Switch, even used as a direct replacement via RJ45 or fiber in and out for other switches or for other sources than our Extreme server, provides a significant uptick in performance. Combined with the router, it provides another step up. The network card completes the chain with full control from start to end, it increases clarity and lowers distortion even further. You can relatively easily verify this by fitting a second RJ45 module and connecting it to the "old" RJ45 ethernet ports on the Extreme. In this hobby, everything matters.

Why an external switch rather than one built inside the Music Server?

We tried an internal version but it does not produce the same results. Although the switch provides a significant % of the performance using dual rj45 SFP modules turning it into a “regular” switch, there is an additional benefit of using a DAC cable to interface the switch to the server and powering the switch separately.

Are there sonic differences among DAC cables – best DAC cable – Audiophile DAC Cable

We have not yet looked into passive DAC cables with audiophile pretensions. DAC cables are a staple of data centers and while there are a variety of manufacturers to choose from, they all feature the same twin-axial construction, and mostly the same materials and wire gauge. While there may be very slight sonic differences between manufacturers it's nothing something we recommend obsessing over.

Can the Extreme network card be used on another Windows PC with the Taiko script software?

The card can be used on a windows PC but the script won’t do anything useful, that only applies to Extreme servers.

Connect a D-A Converter to Extreme via USB or via Network cable?

A) Case 1

Extreme Network switch - DAC cable - SFP connector - Extreme (with a new SFP card) and a DAC connected via USB.

B) case 2

Extreme Network switch - DAC cable - SFP connector - Extreme (with a new SFP card) and a DAC connected to a network hub or a router via an Ethernet cable.

Scenario A

You purchase the Network card and the Switch package which includes a DAC cable

- Option 1: You currently use a cat5 or cat6 or cat7 or cat8 / UTP or STP network cable with RJ45 connectors, also often referred to as a copper network cable, you remove that from the Extreme, plug it into the switch and connect the switch to the Extreme with the DAC cable.
- Option 2: You currently use fiber into the Extreme. You remove the fiber cable from the Extreme, plug it into the Switch and connect the switch to the Extreme with the DAC cable.

Scenario B

You purchase the Switch but not the network card

- Option 1: You currently use a cat5 or cat6 or cat7 or cat8 / UTP or STP network cable with RJ45 connectors, also often referred to as a copper network cable, you remove that from the Extreme, plug it into the switch and connect the switch to the Extreme with another cat5 or cat6 or cat7 or cat8 / UTP or STP network cable with RJ45 connectors.
- Option 2: You currently use fiber into the Extreme. You remove the fiber cable from the Extreme, plug it into the Switch and connect the switch to the Extreme with another fiber cable or a cat5 or cat6 or cat7 or cat8 / UTP or STP network cable with RJ45 connectors (which I would strongly recommend in that case).

Subsequently, you can consider removing other switches or audiophile tweaks from your network which now most likely only increase noise. We are fairly certain of this because even a single RJ45 or Fiber network port has a higher noise level then the new network card and switch combined.

Furthermore, using the full package moves a part of ethernet signal processing which currently happens inside the Extreme to the Switch reducing the total amount of processing performed inside the Extreme which in turn lowers the general noise floor. This processing always happens, during both streaming and local file playback, hence is audible with both.

Which is the best solution with the lowest-noise digital file playback?

Case A would be better as USB remains to be the currently lowest noise interface to a DAC.

What is the ideal input voltage for the Extreme Switch?

The Switch has a pretty wide range input of 12V-19V DC (12V is optimal).

Can the Extreme Network Card be used for Ravenna Setups?

With one Network Card installed for the main system, can I use a second NIC for a Ravenna setup?

We have a couple of clients who use the Extreme Network Card with a Ravenna Setup and they report good things. However, we have not tested this ourselves so we cannot make any guarantees.

There is a good chance it will improve sound, but we cannot guarantee it because we haven't tested this.

Would we achieve superior sound by using 2 Extreme Switches, connected together by fiber cable?

As much as we'd like to sell 2 switches instead of 1, it would be inferior to 1 Extreme switch with RJ45 in, mainly due to the fiber SFP module's power consumption.

If the two Extreme Switches are connected by a DAC cable, the overall result is still inferior to using one Extreme Switch?

That would sound different but we have another, smarter, method of "tuning" coming up.

So, basically, More Processing Means More Noise?

Adding the switch reduces processing in the Extreme, adding the router reduces processing in both the switch and the extreme.

Is the supplied wall-wart power supply good enough for the Extreme Switch?

It is only good enough to get you started. We strongly recommend using a LPS. One LPS powering switch and router, when using a DAC cable as the interconnect, "sounds" better than two, and even more so when using the DC Power distributor.

How do the Router and Switch reduce Noise?

Adding the switch reduces processing in the Extreme, adding the router reduces processing in both the switch and the extreme.

Switch/Network card Wiring option Examples

The bottom line is that you INSERT the switch between the network cable you currently use and the Extreme. Then you can also get the new SFP network card for the Extreme.

Is there a clear preference between RJ45 or DAC cable to connect the Router to the Switch when the router and switch are on their own individually-isolated Shunyata Denali receptacle and all grounds are connected to the ALTAIRA? I won't be getting the DC Distributor.

In this particular use case, you may prefer RJ45. In that particular setup you may want to avoid directly connecting the switch and router grounds with a DAC cable, even though it's the superior method of connection. If you use 2 power supplies there will be a noise voltage "riding" on the ground connections between the connected devices. You can then try to reduce that by different "grounding" schemes to try to get closer to single point grounding, but as these devices are both externally powered you can simply achieve superior single point grounding by using 1 shared power supply.

Is the new network card capable of 10G if I temporarily plug in a 10Gbase-T copper transceiver just to speed up file copying?

That would've been nice, but alas, it's a fixed 1Gb

Why not combine Switch and Router in a single chassis?

EMI/RFI is airborne inside the chassis and can couple back into the circuit. Of course, you could create 2 internal chambers, but the result would both be about the same size and weight as two chassis and actually a bit more expensive, especially for post-treatment / finishing.

There is a higher change of transport damage, especially since customs appears to like to unpack these frequently to check what that massive blob is showing up on their Xrays.

Is there any benefit in using SFP+ over SFP cable?

SFP = 1G (supports 100Mbit OR 1Gb ethernet)

SFP+ = 10G (supports 1Gb AND 10Gb ethernet)

We supply SFP+. We did not compare the two but the expectation is that they will perform the same.

What is the master clock frequency of the Taiko router and switch?

25MHz.

I noticed that the Taiko NIC is using I210 Intel chipset. I also noticed that this chip support IEEE 1558 standard. Does that mean the card also support this standard?

This standard establishes the minimum requirements for application software documentation throughout the software development life cycle. The old onboard NIC is an i210 as well. We did not modify that part of the firmware so it should function the same.

Could the current NIC be replaced with a 10G card to facilitate fast copying of files?

Could the current NIC be replaced with a 10G card to facilitate fast copying from the home network to the storage inside the extreme. this would be left unconnected most of the time, and only plugged into the home network when not listening to music, e.g. overnight. could this be done with no impact to SQ due to the installed but unused 10G (non-optical) NIC?

The current onboard NIC cannot be replaced. Plugging a 10Gb NIC into an unused slot is possible but audible, even if you disable it when not in use.

How can I find the Server's IP Address?

How can I find the Network Card's IP Address?

You can use iPad/iPhone app FING (works via WIFI). If you do not use WIFI for your control point, you can also use LanScan that works with macOS and iOS. There is a free version and a pro version but all you need is the free version.

What is the consensus for how long the burn in process is for the switch / NIC combo? (Assuming 24/7 playing).

Generally, the biggest changes occur in the first week with further smaller refinements for up to a month. However, Emile actually recently switched a 4-month-old switch for a 1-month-old switch and the 4-month-old switch was even a bit more sophisticated/agile sounding with clearly noticeable better micro dynamics. But to put things in perspective, something like the "NSM" upgrade of XDMS completely trounces these differences.

Why is there no power indicator LED on the Switch?

Alas, we cannot add a power LED or a network status LED to the switch because they negatively affect the noise spectrum and the shielding.

How can the sound be better with a switch connected versus no network at all?

Software actively trying to (re)establish a connection to the network can generate more activity than just being connected. You can get better performance without a network present, but you'd have to purposely design for that, aka remove network functionality in both hard- and software.

Is there any benefit to periodically restarting the Taiko switch?

This is an interesting phenomenon we have discussed before in this thread. It's also something which is hard to quantify as it's unmeasurable by conventional means, meaning perhaps we just don't know what to measure, in high-end audio this is often referred to as a quantum effect, probably because nobody, or at the very least, very few, really fully understands quantum mechanics. You can count me as one who doesn't understand the mechanics involved, but I'm also not sure this actually has anything to with that either. Bottom line, we don't really understand what this is, but we know it happens, and we know how to deal with it / address it.

This is not something which has anything to do with the switch itself, other then it having a very large highly conductive mass with its ~15 kilograms of pure copper.

The Extreme itself having a significant conductive mass, including solid copper heatsinks, has a good affinity for this phenomenon as well.

There are large numbers and types of grounding tweaks working on this effect and we used to manufacture one of those in our early years, called the "Setchi".

What it is, or rather how it's best described, is some kind of charge buildup, over time it can start affecting sound quality. What it is exactly we don't know. We do know it accumulates in large conductive masses. There are grounding tweaks creating a high affinity for this, if you use silver for example, it's more conductive then copper, and this "charge" "likes" to move there. Then there are mechanics to dissipate this charge, batteries for example. Connecting a battery negative pole to a highly conductive mass appears to be able to dissipate this energy. There are a large number of manufacturers using all types of techniques to address this. Electrostatic, electromagnetic, piezoelectric, electronic circuitry and/or "quantum technology" seemingly addressing this.

Powercycling components with large conductive masses once in a while is good practice, but if you have one of those "mysterious" grounding systems this can upset equilibrium as well.

The good news is that batteries seem to be able to have the highest affinity for this "charge", can drain it from your system and convert it(?) to useable power or something, and we're about to introduce those into our products!

Which LPS would you recommend for the Switch, Router, DCD?

We're not up to speed on commercial LPS offerings but a few popular ones we know our customers frequently use to satisfaction are Plixir, Uptone, Sean Jacobs.

Can the Extreme Switch be connected with a regular SFP single mode fiber cable?

Yes, the Switch is also a media converter, so it is basically compatible with all 1gb connection as long as the module fits.

Telegartner m12 network speed

Up to 100 mbit, not Gigabit, meaning it is not compatible with Taiko Extreme NIC, Router, and Switch

Is the PCB user-replaceable?

Yes. No cooling paste needed.