

Taiko Audio BPS – Battery Power Supply

13-02-2023 - Pre-announcement

The Taiko Battery Power Supply has been under development for almost 3 years and the release is now coming closer into focus.

Purpose

These days, there is unfortunately a lot of energy pollution from solar cells and heat pumps and various other sources. Our upcoming BPS (Battery Power Supply) aims to rid the Extreme and supporting devices such as a router and switch of these negative influences.

The BPS will power the entire Extreme whilst offering true isolation.

A major goal of this project has been to match or exceed the dynamics of a mains-powered linear supply, and to our delight, we have succeeded. Our BPS not only significantly outperforms even our biggest most elaborate linear powered build, but it is also more durable and uses less resources, both in build and in after sales support. It has an advanced regulator section which is also employed in the "5th gen Switch", or "Big Switch", that lowers overall noise levels to below what Linear Power Supplies are capable of.

Control

We implemented a Bluetooth controller that will interface with an iOS App to manage the BPS. Android support will likely be added later. At the moment, this is a separate app but we may integrate it into XDMS later on. Naturally, an important aspect of this was to implement the controller in such a manner that it is extremely low noise and remains inaudible even though it is mounted inside the chassis.

Made to Last

The battery that we use supply sports a life expectancy of over 30 years and the BMS (Battery Management System) has been designed to meet the most stringent of safety requirements and certifications, and with sound quality in mind. For instance, we are using no electrolytic capacitors, which is quite a challenge on its own.

For safety purposes, all connected devices will need to have a TPM (Trusted Platform Module) chip installed with a Taiko key communicating with the BPS to enable a DC output. The BPS can supply over 1000A of instantaneous current.

Government Grand

We received a government innovation grand for the BPS for applications outside of High-end audio as it has some unique features like for example a direct very high efficiency ATX power supply for servers which can power a whole server rack in a data center, and last for 30 years, bypassing the need for a UPS solution.

Battery Capacity

The BPS can power the Extreme for 24 hours on a full charge. It can be configured and programmed to automatically recharge in a specific time window, for instance every night between 4 and 6AM, or perhaps you'd like to charge when you have spare solar power.

Output Voltage

The battery itself supplies a single voltage but the BPS includes an array of regulators which can potentially power other devices.

Connectivity

The BPS has 3 outputs and can be expanded. The Extreme Music Server would occupy one of these outputs.

DC cables will be supplied.

Availability

No fixed release date has been set just yet. Realistically, we may be able to launch in April-May 2023 (but as we are currently managing a multitude of projects, this is not a guarantee!)

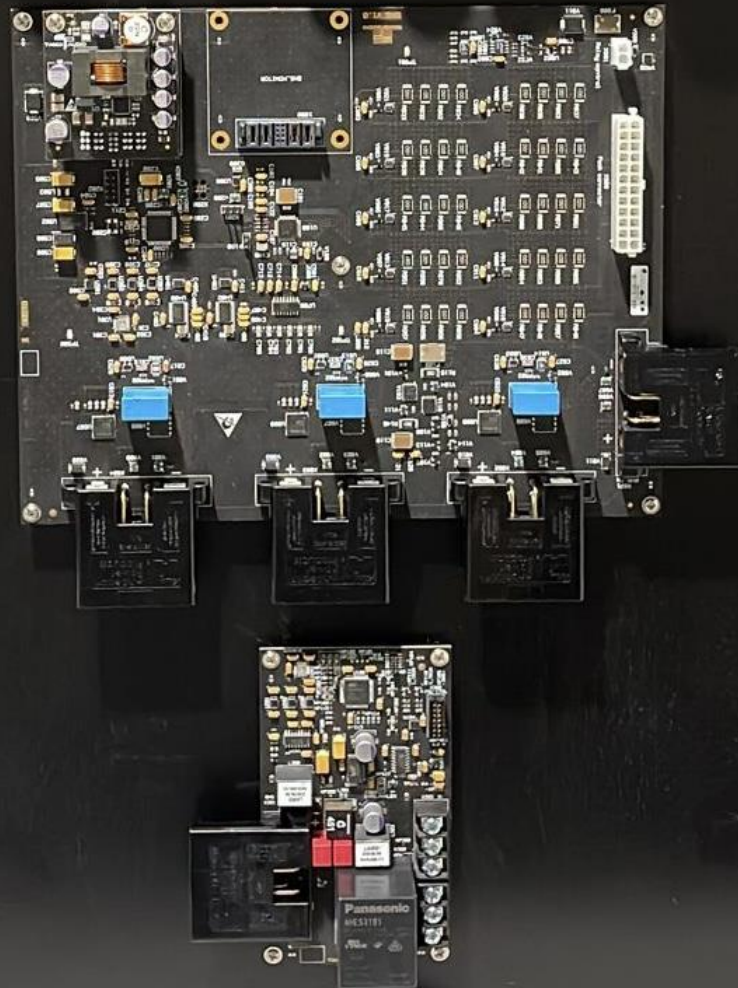
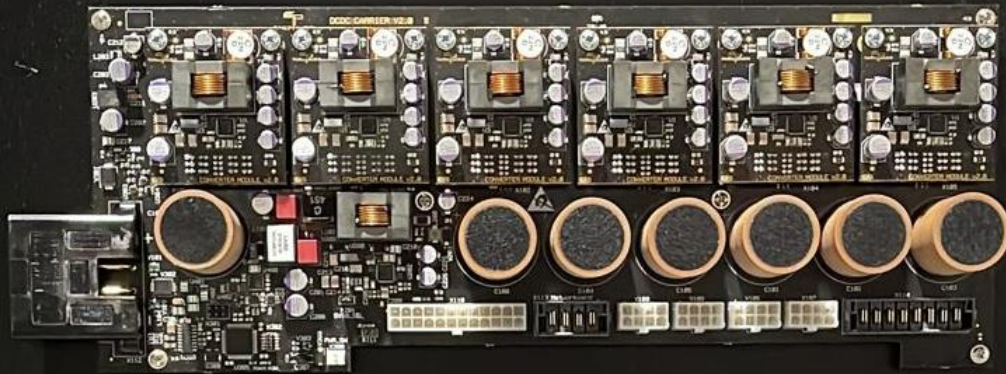
Smaller version BPS

We're also aiming at releasing a smaller version of our BPS (Battery Power Supply). We're most likely not developing a Linear Power Supply as there are so many on the market already. A smaller size also means less hours on a charge. However, you can also charge while listening, you're still running of batteries but in a noisier environment, something I've not spend much time with yet. This smaller version will only power the switch and router, not the Extreme.

Projected Pricing

We don't have final pricing yet but the full BPS may have a similar price as the Extreme itself.

TAIKO AUDIO
NEXT GENERATION TECHNOLOGY



Next Gen Technology

DC input power supply

The top PCB is a DC input power supply enabling the usage of an external power supply. This utilizes GaN (Gallium Nitrate) FETs, can supply up to 11.500 watts, and run cool while doing it. This PCB would be placed inside the Extreme Music Server.

Battery Management System

The middle PCB is a BMS (Battery Management System), this allows the usage of a battery pack to power the top DC input power supply. So, why did we go through the trouble of designing this while a BMS is widely available and/or included in virtually every battery pack? Because they sound bad and severely degrade battery supply audio performance to below an elaborate high-end AC-DC supply. With our approach, this is no longer the case. This PCB would reside inside the BPS.

Charger

The bottom PCB is a battery charger and controller with a remote-control interface that allows controlling the BMS. This PCB would also reside inside the BPS.

Q&A

Does everyone “need” a BPS?

The improvement will always be audible but just how much of an upgrade the BPS is depends on the mains “quality”. In any case, it offers a significant upgrade at Taiko HQ.

How many hours are you getting on full charge while only powering the Extreme server?

A full day, and this is fully manageable by a remote app that allows you to configure when/how to charge.

Will there be multiple IEC inlets?

There will be just one IEC inlet

Will the BPS render expensive power cables obsolete?

Indeed, it does

How would you rank xdms alone vs battery alone?

The SQ uplift delivered by BPS and XDMS is very much system dependent and they really cannot be compared.

Are passive Power Conditioners that filter high-frequency grid noise rendered obsolete by this tech? And does the battery conversion create its own noise which could benefit from filtration?

Those passive Power Conditioners will indeed be obsolete, even if you were to use them, they would increase the overall noise as their self-generated noise most like exceeds the BPS noise which tops out at about 200nV (yes that is nanoVolt).

Don't batteries sound slow? Are there any downsides to the BPS?

A lot of people have an adversity to battery supplies as they can have a characteristic slow and unfavorably colored sound, but we are very confident that this does not apply at all to what we designed here.

Can we expect also a battery-powered Taiko DAC and power amp?

Never say never 😊

Will the new Extreme and BPS be available in the same design and finishes as the Switch?

Perhaps 😊

Will there be a smaller Extreme (new chassis) with external BPS?

Perhaps 😊

Is the footprint of the BPS the same as the switch and router?

No, the BPS is larger. We're also designing a mini BPS, aimed to launch in May, but that would need to be twice as large. It could be the same width + height but twice as deep. We're currently trying to fit the BMS on a PCB to make this possible.

The BPS for the Extreme is much larger. It will need a large amount of cells to be able to get a workable amount on playing time (and require a charge only once every 24 hours).

If an Extreme owner does not want to install the BPS, can its associated newer and better power supply section be made available and installed in the Extreme in place of the original power supply, without the battery section?

Possibly yes.

Does this mean that there will be 2 power supply upgrade options, one that is battery powered and one that is not?

It's something we could potentially do if there's a demand for it. The most "extreme" thing we've ever built was a 3 box 530lbs prototype that would've been in the 100K+ retail range. But in all honesty the BPS is better, cheaper and simply a much smarter approach.

Single-Box all-in-one version and 2-Box version

We're working on casing options. We have a few 2-box prototypes but we've also managed to fit everything into an ~180lbs single box (BPS, BMS, and Extreme server). This enclosure is slightly larger at 483*483*185mm without footers. (For reference, the current Extreme is 483*455*165mm), but otherwise, this casing will have more or less the same looks as the current Extreme, though with improved finish options. If we were to offer this option, we would naturally accept a trade in of the old "chassis" which could then be stripped/refinished/repurposed.

For a 2-box version a double Extreme chassis would make sense however soaring raw material and energy prices have made this a very expensive option. We therefore have a secondary, cheaper to manufacture 2 chassis option that we're also considering to offer.

We are currently working on 3 scenarios:

1) An internal BPS in the existing current chassis.

2) An internal BPS in a new chassis matching the new Switch and Router looks. This chassis would be slightly larger and considerable heavier than the current Extreme and comes with IOHO improved looks. Of course, you can exchange your current chassis under the same upgrade value protection plan. This new chassis will be much easier for us to manufacture and assemble.

3) An external BPS to power your current Extreme externally.

We will have a myriad of options to choose from, which is actually not problematic for us as we can manufacture all of it in house.

How do the 2-box solution and the 1-box solution compare in terms of sound quality?

The difference is negligible.

If you convert an original Extreme to a 2-box battery powered version, do you plan to leave the original case as is, remove the current PS and have a 2nd box with the battery?

There are several options. You can keep your current extreme chassis and add the external BPS and there will be some chassis options for that. If you would like to have a dual matching Extreme chassis that will be very costly. A dual alternative chassis is another option and that will be cheaper. In that case the BPS could just be in a different chassis.

Will any human being be able to lift a single-box BPS Extreme onto their shelf?

It would be 28mm / 1.1 inches deeper and 20mm / 0.8 inches taller than the Extreme. It would indeed become significantly heavier, but the one-box solution is also significantly "cheaper".

After an upgrade, can the existing Extreme power supply still be used? For instance, after the DC input power supply PCB is installed in the Extreme, can the pre-existing Extreme power supply be installed in a new external box to power the Extreme via DC?

This is possible; however, this may not be a mayor upgrade when used that way. The biggest benefits of this development are:

- 1) being able to use smaller and easier to manufacture cases at a reduced weight.
- 2) the ability to run off batteries, useful for power "quality" fluctuations, no need for a power cable, and/or fuse rolling, and the breaking of ground loops.

The bottom line is that the Extreme as you know it stays as it is. You have the option to run off batteries.

Can an AC supply and precious bespoke componentry from the Extreme be repurposed by Taiko?

Potentially, yes.

Will there be a trade-in of the current Extreme's power solution?

As always, our upgrade at price differential guarantee applies. We are investigating doing on-site upgrades when the time comes, and are talking to an interested party for the US right now.

What are the economics of upgrading versus buying the new BPS version?

You will not lose any money if you already own an Extreme and you want to move to using a battery power supply. The upgrade cost will match the retail differential. This is the first more incisive / mayor upgrade we have developed since the Extreme launched 3.5 years ago. You don't "need" it,

it's fully optional should you want to run off battery power. The Extreme is here to stay as it is right now.

So, I guess this is the earlier alluded-to "problem solving power supply", correct? Will you be releasing some more information about the planned usage as well as sonic improvements?

Yes, we will release a lot more information as part of a roadmap as we have 17 development projects running, releasing over the next 2 years.

If the BPS is not used to power the Taiko switch or router, then do you suggest a good aftermarket LPS?

Both the Switch and Router have a 12-19V DC input and neither are supplied with an LPS. Both can be power by the upcoming BPS options.

We are not very keen on investing precious R&D into developing a small LPS to fill a 6-month gap. We could consider supplying a LPS at a later stage which would be a lower cost alternative to a BPS, especially considering it would not need to be regulated, but our manufacturing capacity is currently maxed out.

Most of our customers already own an audiophile LPS, if you don't, the Switch even provides a very large uptick when powered by a standard wall-wart SMPS. But we do not recommend investing heavily in an audiophile LPS as however good it may be, it will always, IOHO, be inferior to our upcoming BPS.

Could the BPS be used to power more items in a stereo system over and above the Extreme, like a whole digital front end and excluding power amps?

Well, if those are AC powered you lose some benefits needing to introduce an DC-AC inverter and then subsequently route it through the AC-DC conversion in your appliance again, but sure, in theory, it's possible.

Any chance the Taiko BPS can power one more piece of equipment that takes a regular AC plug, like the Sennheiser Orpheus?

That would require designing a DC-AC converter, not saying we won't do that but we will not have that come May 2022 for sure. But there is a chance that we will investigate this.

Would the router need to 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 it make any sense to use a good (linear) power supply or BPS to power my Huawei B535-232 router?

Yes, absolutely

What about DC cable length?

DC cable length matters. If one is going to power a Taiko accessory with the Taiko BPS it's best to have it sit closer to BPS and using a short DC cable. Alternatively, the router or switch can be used in a more remote location with a standalone (simple) power supply.

Will these Next Gen developments be applicable to our current Extremes as an upgrade/extension or will they only be compatible with a not yet announced Extreme v2?

The top PCB fits into an existing Extreme after which it can be powered by either moving its existing power supply to an external box, or by using an external battery supply.

Is the plan to power the entire Extreme via battery or only selected parts/rails?

The BPS will power the entire Extreme.

How does this affect those of us that ordered Extremes under the current pricing structure but haven't taken delivery just yet?

Once the BPS is available, we will make sure you do not end up paying more than you would have right now.

Would a Stromtank be a good match with the Extreme?

Well, that does not negate the influence of power cables / fuses, and it's not as purist as directly running off batteries skipping a DC to AC conversion in the Stromtank, and a AC to DC conversion in the Extreme.

Is this an essentially different tech from say the StromTank?

The BPS is indeed very different tech, and incomparable in efficiency.

Power Supply Grounding - Some supplies are grounded (the negative leg), others prefer to keep the ground floating for device isolation. What is Taiko's take on this?

True isolation by means of a BPS :)

Would it be possible to implement a BPS option where the end user supplies their own LiPo battery or similar?

We will not be offering that option. The batteries that we use are special kinds that are not available to consumers and that outperform those that are. As such, using your own batteries would undermine the sound quality. And that goes against our nature... :) Additionally, the BMS is incompatible with commercially available battery cells.

Can the BPS power an external DAC as well as the extreme?

Technically, it could potentially power some external DACs, but this is currently not in the scope for our development.