Taiko Audio Extreme Router Manual

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Safety

The Taiko Audio Extreme Router is the perfect solution for networks requiring more than the standard router. This high-performing router is based on the NXP Layerscape® chipset technology and specifically selected router firmware to provide the utmost security. With the Taiko Audio Extreme Router, you can have full access to your network while keeping malicious actors out.

This router was carefully designed with the help of specialized cyber-security engineers to ensure that all possible scenarios to reduce the risk of a data breach and mitigate their impact were taken into consideration.

It is protected against unauthorized access and malicious activity, including disabling services, segmentation of the hardware to restrict access, configuring firewalls, and performing regular updates. As we develop and host these updates ourselves, we'll notify you if it there's something you need to apply.

Unlike other routers on the market, the Taiko Audio Extreme Router is designed for long-term availability and use, with a physical TPM that provides secure and tamper-proof hardware-based storage for encryption keys and other sensitive data. This ensures that malicious actors can't access the audio router and its audio network and that any firmware or software updates are verified and secure. With a TPM, the risk of unauthorized access, hacking, and data breaches are greatly reduced, providing users with peace of mind when it comes to the security of their audio network.

The Concept

Housed in a beautiful 22 x 22 x 5 cm / 9 x 9 x 2 inch solid copper chassis, the Extreme Router yields a significant lowering of noise using two mechanisms. First, it controls the amount and flow of data by creating a dedicated audio-only network for the Extreme or Olympus Music Server. Secondarily, it allows the user's Control Point (usually a tablet or phone) to connect directly to its built-in Wi-Fi functionality for controlling the Music Server. The result is a huge increase in the naturalness, low-level resolution, and spatial rendition of local and streaming music.

The Wi-Fi functionality has been very carefully implemented and optimized for the best Sound Quality. With these combined techniques, the Music Server is isolated from the traffic generated by the home network.

The Wi-Fi Access Point is intended exclusively for controlling the Extreme or Olympus Music Server. You can simply connect to it by selecting the Taiko Audio network in your tablet or phone's Wi-Fi settings, just like you do with your existing regular Wi-Fi Access Point.

The Extreme Router is also pre-configured for Port-Forwarding to enable the use of phones and tablets to control Roon on the Server via your regular existing Wi-Fi Access Point, if desired. However, the best sonic performance is obtained by connecting directly to the Extreme Router's built-in Wi-Fi.

It is also possible to stream Roon music from the Server to external Roon or Airplay endpoints, but only when these are connected to the Extreme Router.

The Router can also be configured to enable VNC, TeamViewer, and File Sharing, but this has not been implemented by default.

The Extreme Router is designed to work in tandem with the Extreme Switch to yield a sizable combined further increase in sound quality. The sound quality can be maximized by adding the Extreme DC Power Distributor.

The Extreme Router and Extreme Switch are most effective when used with the Extreme or Olympus Music Server, but the combo can also be used with other manufacturer's servers or streamers.

The difference between a Router and a Switch

In essence, a Switch is used to connect devices to each other within a network while a Router allows networks to communicate with each other. In general, Routers operate on a software level based on IP addresses while a switch works on a hardware level based on MAC addresses.

A Switch can reduce traffic to a device by learning and storing which MAC address is connected to which port so it can send data to that device specifically addressed to it, while sending data for other devices over its other ports, reducing the amount of traffic on the port your device uses. This does not do anything to reduce broadcast traffic which is sent to all devices on the network.

A Router can control the traffic which is sent and broadcast on your network. Talking in reduction terms, a router can reduce the amount of traffic on the entire network while a Switch can reduce the amount of traffic on a segment of that network. The combination of a Router and a Switch allows the control of traffic on a hardware and software level which can lower traffic to a larger degree than a single Switch, or even multiple daisy-chained Switches, can do.

TAIKO AUDIO

Features

- The Router creates a separate clean Audio-only network in series with (connected downstream of) your Internet Service Provider-supplied modem/router or any other router.
- By connecting an external USB drive, the Router can serve as a NAS for music storage. (under development)

Ports and connections

The Extreme Router has 4 RJ45 network connections and 1 SFP port.

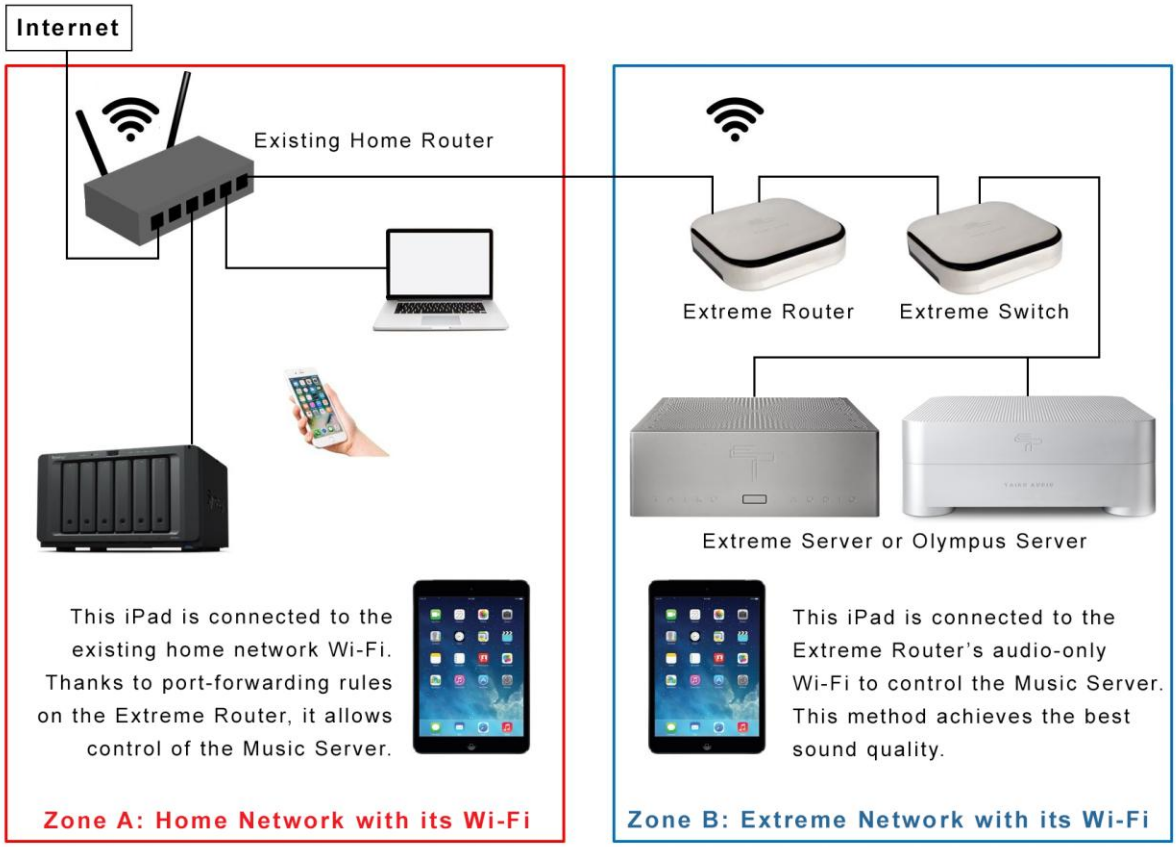
- The SFP port is intended as an output, to be connected via a DAC (Direct Attach Copper) cable, or a regular RJ45 LAN cable using an SFP to RJ45 transceiver, to the Music Server. Note that this SFP port only works with 1Gb connections. It will not work with 100mbit connections.

  Please insert the transceiver or connector with the internal contacts and pull tab facing down. When oriented correctly, it will go in fully and lock in place. If inserted with the inverse orientation, the transceiver or connector will stick out a little, and will not lock in place.
- One of the 4 RJ45 ports is intended for the WAN (Home Ethernet) connection.
- The 3 remaining RJ45 ports are for generic use. Please note that the 4th RJ45 port on the far right cannot be used simultaneously with the SFP port.
- The top USB port can be used to connect SSD- or HDD drives to enable using the Router as a NAS for music storage.
- The bottom USB port is not connected and cannot be used.

Wi-Fi Access Points

When adding the Extreme Router to an existing setup that already has a Router with Wi-Fi or a separate Wi-Fi Access Point, you'll then have two Wi-Fi access points:

- Your standard home network, with your computers, TV, video streamer, etcetera. (Zone A in the below Diagram)
- The Taiko Audio Extreme Router network that allows you to control the Extreme or Olympus Music Server. (Zone B in the below Diagram)



A basic setup would be for the user to connect the Extreme or Olympus Music Server to a generic router directly or via a generic network switch.

The addition of the Extreme Router creates an audio exclusive (isolated) network unimpaired by typical home network processes and traffic, which yields a huge increase in the naturalness, low-level resolution, and spatial rendition of local and streaming music.

This setup can be further upgraded by adding the Extreme Network Switch (and Extreme Network Card, if not already present in the server) to achieve a significant additional improvement in Sound Quality. For older Extreme Music Servers, the Extreme Network Card can be retrofitted.

To maximize the performance, the Extreme DC Power Distributor (DCD in short) can be added to power both the Switch and Router. If desired, the DCD can also be used without the Switch, or to power other devices.

The Router has a single WAN (‘input’) network port which connects to your home network to provide internet access for the audio network. It has 3 separately configurable outputs, one of which connects to your music server or, preferably, the Extreme Switch. the 2 other outputs can be used for additional desired connectivity, such as for example a dedicated Wi-Fi Access Point and/or a wired control computer.

Important Notice

Do not use a Static IP Address!

Extreme and Olympus Music Servers are supplied as standard with DHCP enabled which means that a router is free to supply it an available IP Address. However, if you have deliberately configured a static IP address on your Music Server, it is recommended to remove this and configure the Server to auto-assign an IP address before installing the Taiko router.

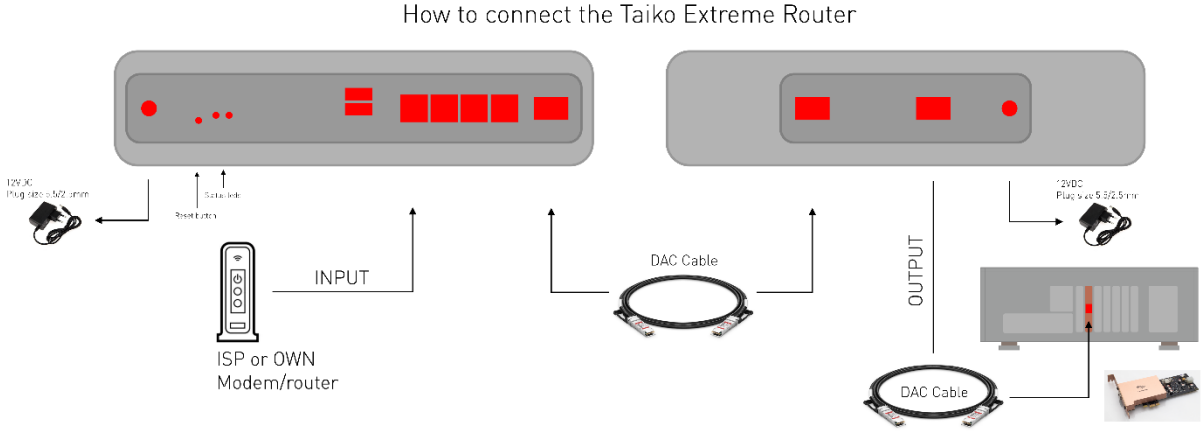
Connection

For installation, you need to connect your regular Router or Switch's output to the Taiko Extreme Router using an Ethernet cable with RJ45 connector. The first RJ45 port on the left, next to the USB ports, labeled INPUT/WAN is port which should be used as the main input.

The 2 RJ45 ports next to the WAN RJ45 port are general purpose ports. The SFP connector on the far right is used as a LAN port and is the preferred method of connection to the Extreme Network Switch.

Power

The Router is powered by any normal 12-19V DC power supply. A standard wall-wart power supply is included. Please see the following image for reference.

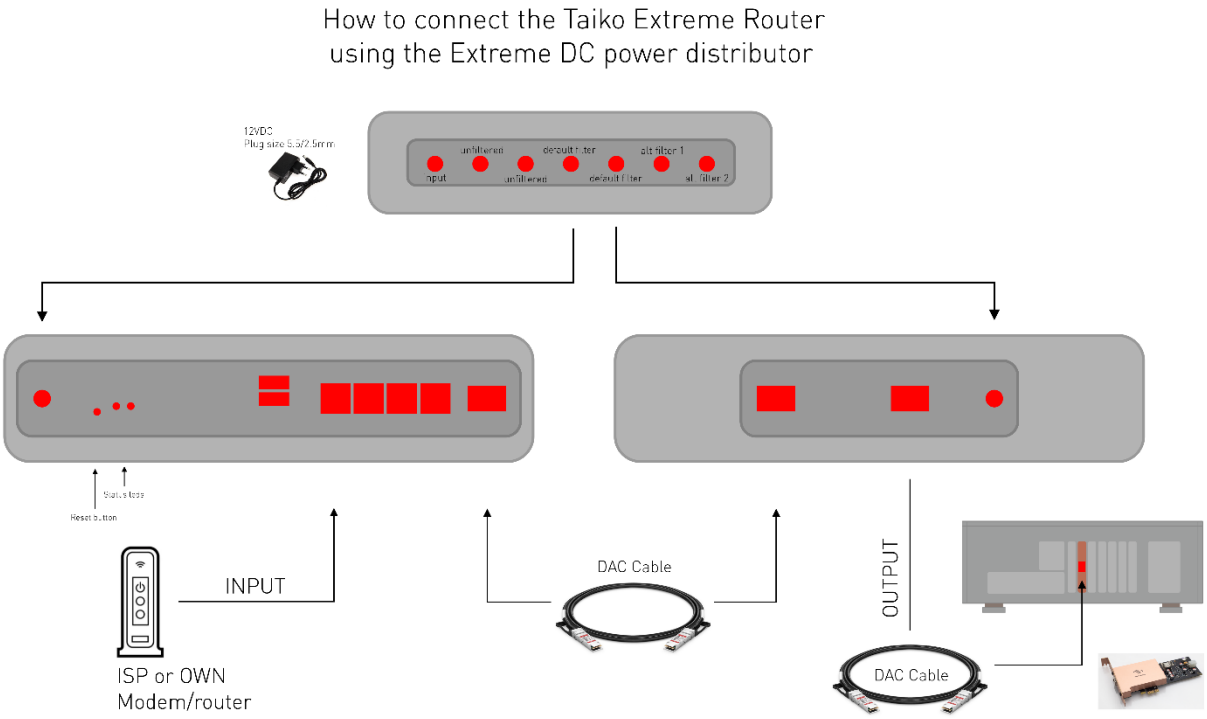


The power supply may be the supplied Wall-Wart Power Adapter or an audiophile switched or linear power supply. A better power supply does provide even better sound quality.

Optionally, the Router and Switch may also be powered by our new to be released Taiko Audio BPS (Battery Power Supply).

The ultimate current solution would be to add the Extreme DC Power Distributor. This allows you to power both the Extreme Switch and Router from a single power supply while offering improved performance over 2 separate power supplies, especially when using a DAC cable to connect the Extreme Router to the Extreme Switch.

Please see the following image for reference for how to connect the Router and Switch via the DC Power Distributor.



The DC Power Distributor offers 2 unfiltered outputs, 2 Default Outputs, and an Alt1 and Alt2 output. The Default outputs are what we recommend starting with. More information can be found in the DC Power Distributor Documentation which can be downloaded from the Downloads section on the Taiko website: https://taikoaudio.com/taiko-2020/taiko-audio-downloads

The Green ‘POWER’ LED indicates that power is on and the Router is starting.

The Orange ‘ON’ LED indicates that the Router is ready for use.

Starting up the Router

When the Router is powered on for the first time, or restarted, it takes some time to boot and establish its connections. During this time, a connected Extreme or Olympus server's network port will not be assigned an IP Address, so the server cannot establish a connection just yet.

After a few minutes, the Router is fully ready, and its port will be available. However, for Sound Quality reasons, the Extreme and Olympus are configured not to continuously check for a network connection. Thus, if the server is already running when the Router restarts, the connection will not come up automatically.

There are two ways to solve this:

1. Don't power on the server until after the Router has fully started (5 minutes should be enough)

2. Once the Router is fully ready, disconnect the SFP connector (coming from the Router and connecting to the server) for a few seconds and reconnect it. This will activate the port, prompting the server to look up its IP address.

First Use

The Extreme Router creates a dedicated 'Taiko Audio' Wi-Fi network. The password for this can be found on the bottom of the Router. Functionally, this works the same as with any other router. We also have the passwords on file and they are available by request.

To connect with your Control Point (usually your iPad) to the Extreme or Olympus Music Server via the Extreme Router, join the Extreme Router's dedicated 'Taiko Audio' Wi-Fi network. Now, your control point is connected to the Extreme Music Server.

At this point, please note that the server's IP Address will change because it is now being controlled by DHCP running on the Extreme Router rather than on your default home Router.

Connect to Roon

If you use Roon, then there is no need to find or fetch the new IP Address. The connection should simply re-establish automatically and Roon should work automatically from the Roon Remote Control Point (usually your iPad) connected to the Taiko Wi-Fi network. If it does not, try restarting the Roon app on your Control Point. In any case, make you sure you are connected to the Taiko Wi-Fi network.

Tip: Roon automatically shows your server's IP address in Settings -> General, at the top, underneath the server name.

The router is pre-configured to allow Roon discovery from the "WAN" side, which is your current home network. As a result, Roon Remote Control Points should also work from the upstream network without needing to know the server's IP address.

In other words, Roon Remote should also work when you are connected to your home Wi-Fi network instead of the "taiko audio" Wi-Fi. However, please note that the best Sound Quality is achieved when connecting via the dedicated Taiko Audio Wi-Fi network.

Connect to XDMS

With the factory-standard Extreme Router configuration, XDMS cannot be controlled from your home network. To control XDMS, you need to connect your control point (normally your tablet or phone) to the Taiko Wi-Fi network.

When using XDMS for the first time after adding the Extreme Router, you need to re-connect the XDMS app to the Server using the new IP address. Previously, the IP address was supplied by your home router, but now, a different address is supplied by the Taiko Extreme Router.

SFP/SFP network ports don't auto negotiate, in other words, they do not automatically refresh like RJ45 ports do. Because of this, you may need to trigger the Switch or Server to trigger an IP Address refresh. In other words, you may need to make the Switch or Server aware of the updated IP Address.

Normally, it will suffice to remove the power from the Switch, wait 10 seconds, and reconnect it. Instead, you may opt to disconnect one of the Switch's DAC cables, wait 10 seconds, and reconnect it. This will have the same result.

Make you sure your control point (phone or tablet) is connected to the Taiko Extreme Router's Wi-Fi network.

Now, start XDMS, go to 'Settings' - 'Connect'. Enter your Extreme or Olympus Server's Serial Number (this can be found on the rear of your server) in the upper field and then tap 'Fetch'. Sometimes, the IP address will not refresh and Fetch will keep showing the old address issued from your home router. In that case, you can use third party app 'Fing' to scan your network and obtain the new IP Address. Please note that Fing only runs on M1 chip or later. There are other so-called "IP scan" apps that function similarly.

Tip: you can also use Roon to find your server's IP address. It shows it automatically in Settings -> General, at the top, underneath the server name.

Once you have discovered your server's new IP address, manually enter it in the lower field named "Extreme local IP Address", and tap 'Connect'. The XDMS app will connect and then you are all set.

Step by Step Connection Methods

Below are detailed step-by-step instructions describing the two Connection Methods. The easiest method is to use Roon (method 1), even if you normally use XDMS for music playback. If you do not want to use Roon at all, you may also take the fully manual route (method 2).

Connection Method 1 - Using Roon for automatic Discovery:

1. The first step is to switch to Roon if you are using XDMS, before inserting the Extreme Router. Roon Discovery also works through your home router Wi-Fi, so you will not need to use an IP lookup app and change your Control Point's Wi-Fi (usually your iPad) at the same time.
2. Proceed with connecting the Extreme Router (and DC Distributor if you ordered one) per the instructions in this guide and the other documentation that can be found on the Downloads page on the Taiko Audio website: https://taikoaudio.com/taiko-2020/taiko-audio-downloads.
3. After everything is connected and powered up, unplug the network cable from the Extreme Switch to the Extreme or Olympus Music Server (usually a DAC cable) for a few seconds and plug it back in. Alternatively, you can also power off the Extreme switch for a few seconds and power it back on. This will achieve the same as unplugging the network cable. Both methods will force the Server to refresh its IP address with a new one that is provided by the Extreme router.

Now, Roon should be able to reconnect from your regular Wi-Fi, and you can see the new IP address in the Roon Control App. To see the IP Address in Roon, go to Settings --> General, and look at the top, underneath the server name. You can then enter this IP Address in XDMS.

Keep in mind that the XDMS app has a toggle switch to define the default startup software suite. Please make sure that it is set according to the app that you need to make sure it is persistent through reboots.

Connection Method 2 – For users of XDMS who do not wish to use Roon:

1. Connect the Control Point (usually your iPad tablet) (which runs the XDMS client) to the new Taiko Extreme Router Wi-Fi.
2. Disconnect and reconnect the Network Cable to the Extreme or Olympus Music Server to force the new IP address. Unplug the network cable from the Extreme Switch to the Server (usually a DAC cable) for a few seconds and plug it back in. Alternatively, you can also power off the Extreme Switch for a few seconds and power it back on. This will achieve the same as unplugging the network cable. This will force the Server to refresh its IP address with a new one that is provided by the Extreme router.
3. Run FING on the tablet to find the Server's new IP address and use this in XDMS. Do not use "Fetch" but enter the new IP address manually in the lower field labelled "Extreme local IP Address". FING should find 3 IP addresses: The Extreme or Olympus Server, Router, and tablet/client.
4. Reboot the Extreme to trigger XDMS to register the new IP Address. Then you can normally use your Extreme's Serial Number with the option "Fetch" in the 'Settings' --> 'Connect' screen of the XDMS App. If Fetch does not retrieve the new IP address you can enter it manually in the field below.

Keep in mind that the XDMS app has a toggle switch to define the default startup software suite. Please make sure that it is set according to the app that you need to make sure it is persistent through reboots.

1Gbit Network Requirement

SFP modules and -ports are designed for a single speed and 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's SFP ports will not work with 100mb connections, only with 1Gb connections:

- Extreme Switch
- Extreme Network Card (as mounted in the Extreme Server)
- Olympus Network Card (as mounted in Olympus Server or I/O)

Conversely, RJ45 ports can work in 100Mb and 1Gb mode. As a result, products that have both SFP and RJ45 ports will be partially compatible with 100Mb and 1Gb connections:

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

In Practice

Any network interfaces upstream (ahead) 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 when it concerns devices connected to its SFP/DAC port.

For the upstream network that feeds the Extreme Router via RJ45, there is no 1Gb requirement, and that network may be 100Mb or 1Gb. This is also true for a MESH router with a (lower than 1Gb-) Wi-Fi source.

Please note that some Ethernet cables are restricted to 100Mbit (as opposed to Gigabit), and as a result, these are also be incompatible.

The Gigabit requirement only pertains to your local network's maximum rated speed, not to your internet subscription. The actual speed of the data does not need to be 1Gb. Nevertheless, faster internet connections do tend to work more reliably, especially with Roon.

Wi-Fi Speed

Please note that the Taiko Wi-Fi connection is optimized for data integrity and low noise, not for speed. When copying a large batch of files or entire libraries from a computer to the Extreme or Olympus server, we recommend using wired connections to the Extreme Router. If an ethernetport is not available (for instance when using a laptop), we recommend temporarily connecting the server to your home router and connecting the laptop to the home router Wi-Fi.

Solving Connectivity Issues

If you run into connectivity issues then the most likely cause is that SFP/SFP+ network ports don't auto negotiate / automatically refresh like RJ45 ports do. SFP/SFP+ ports also do not automatically re-establish a network connection after it went down.

What this means is that when you connect the Extreme Network Switch to the Extreme Network Router, the Extreme Network Card inside the Server cannot see that something has changed and it will not refresh its IP address. In other words, the Router needs to be up and running before the Switch. This can be fixed using either of the following 3 methods.

Option 1: Power cycling the Switch (please allow up to 5 minutes for it to fully start up)

Option 2: Re-plugging the DAC cable between Server and Switch after the Router is fully started up (5 minutes).

Option 3: Restarting the Music Server after the Router is fully started up (5 minutes).

This is also automatically accomplished if you follow the following ‘startup’ procedure:

1) Power on the Router, wait until the ‘ON’ LED is on and/or the network ports are blinking (which indicates that it is on).

2) Power on the Switch.

Factory Reset

1. Hold down the ‘Factory Reset’ button and keep it down. Simultaneously press the ‘Reset’ button for 2 seconds. Keep the ‘Factory Reset’ button down.
2. The orange ‘ON’ LED will come on, but keep pressing the Factory Reset button.
3. Next, the orange ‘ON’ LED will start flashing. When it finished flashing, let go of the ‘Factory Reset’.

Accessing the Router Web Interface

For normal recommended use, it is not required to change any internal settings for the Extreme Router. But if you want to explore its settings or want to make changes, you can do this via its Web Interface. The interface can be found at the Router's default IP Address 192.168.100.1.

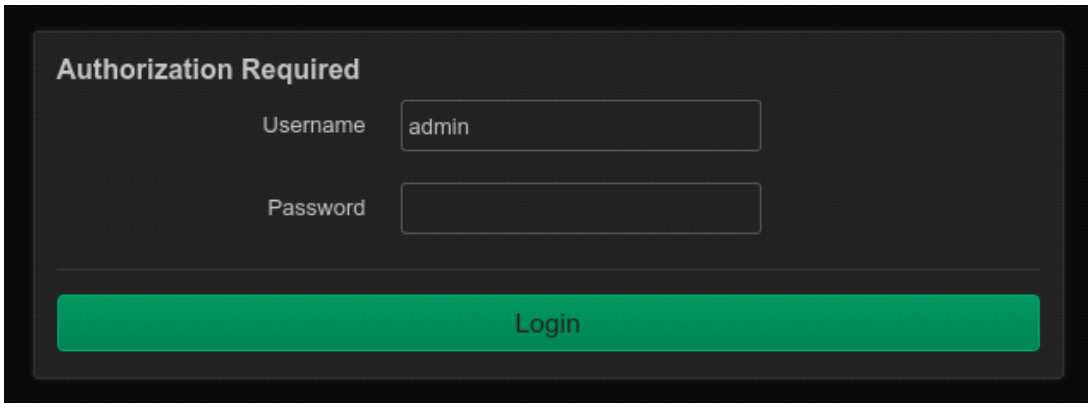
➔ Please note that the interface is not accessible from your regular home network.

There are three ways to connect. In most cases, the first option is easiest.

1. Connect your tablet, phone, or laptop directly to the Extreme Router's Taiko Wi-Fi network.
2. Alternatively, you can connect a desktop or laptop to the Extreme Router via wired Ethernet, whilst making sure to be disconnected from the home network. The desktop or laptop will now receive a new DHCP address from the Taiko router.
3. Log onto the Extreme Music Server via VNC, start an internet browser, and go from there. (Not applicable to the Olympus Server)

In an internet browser, type http://192.168.100.1 to log in to the Extreme Router's admin web UI and reconfigure it as required, per the recommendations below.

After entering the IP Address, you will see the following login screen:

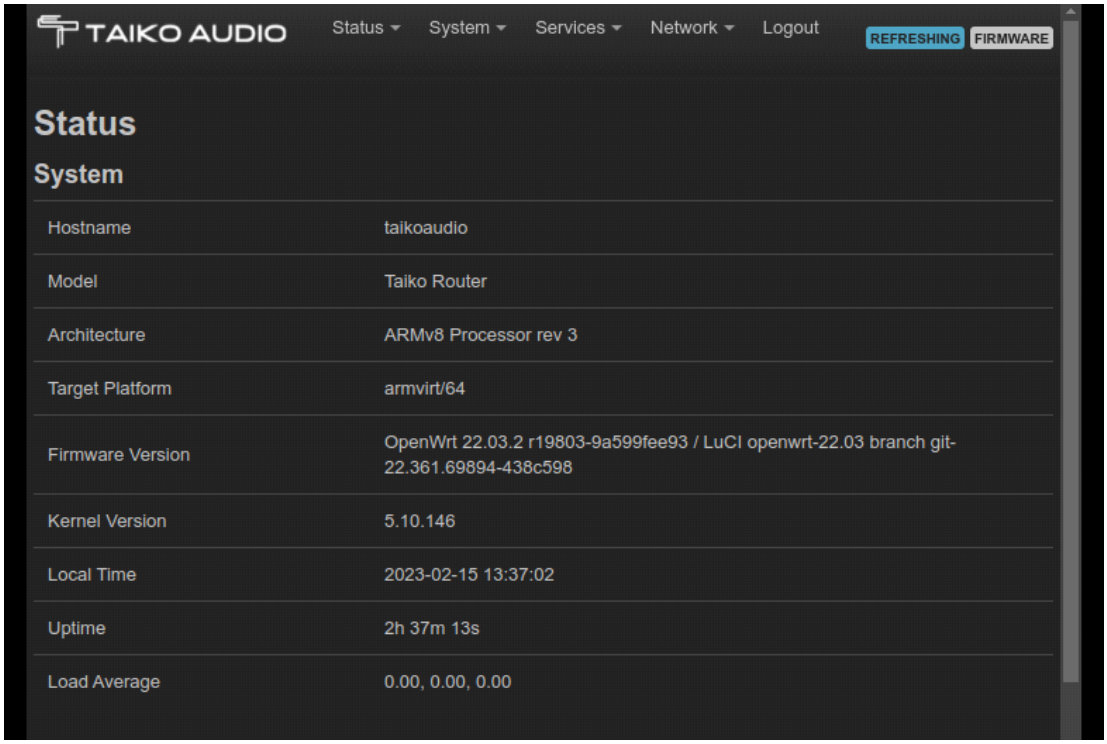


To log in, use the following credentials:

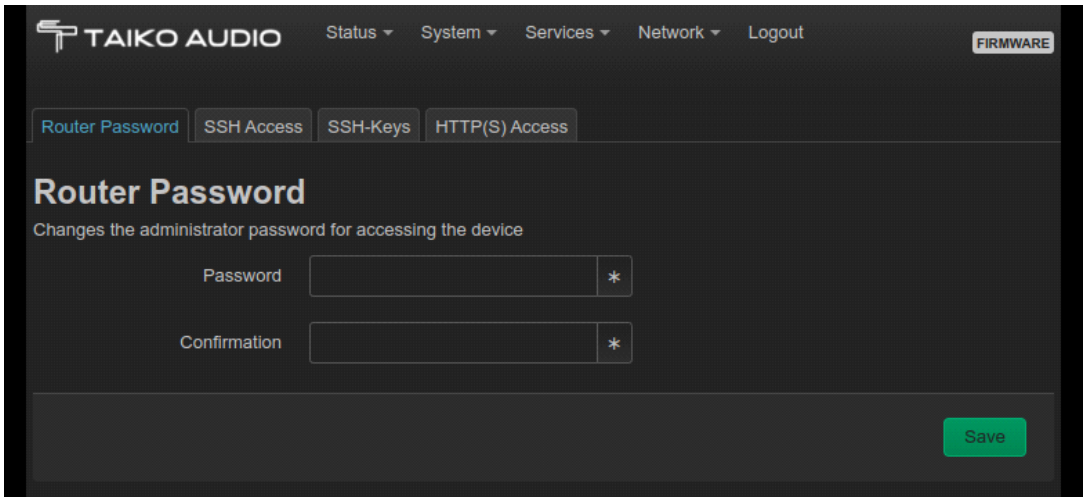
- Username = 'admin' (not 'Admin' as indicated on some early labels)
- Password = located at the bottom of the Extreme Router

All routers have random unique passwords meaning you can leave it as is. There is no need to change it for safety reasons. However, the password can be difficult to memorize so the user may decide to change it for convenience.

After successful login, you will see the following screen:



If you want to change the password, please go to ‘System->Administration’ and enter a new password. See the password change screen:

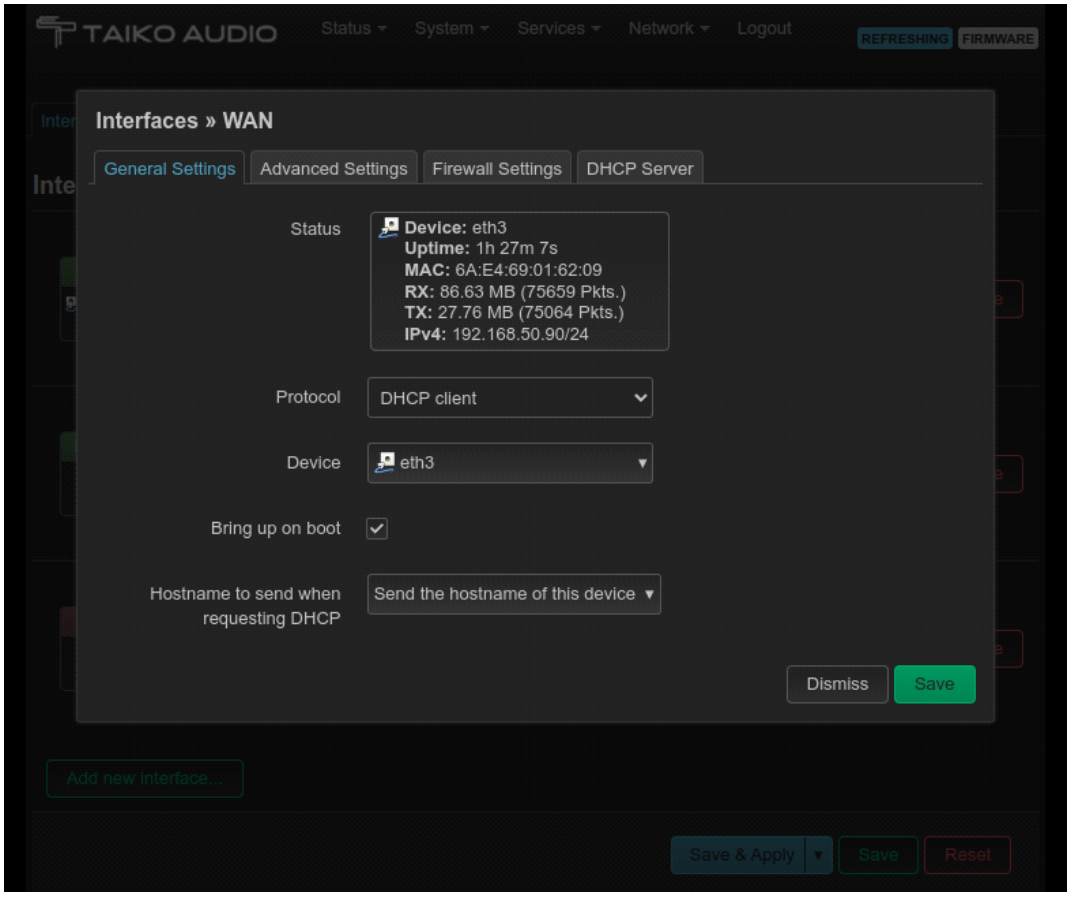


Network setup

You can set up your Internet connection.

By default, the router uses Dynamic Host Configuration Protocol (DHCP) to obtain Internet access parameters. Therefore, the Internet connection should work automatically after turning on the router. Most Routers will work this way. If you know that your router does not provide DHCP, then you need to configure access to the Internet in accordance with the recommendations of your provider.

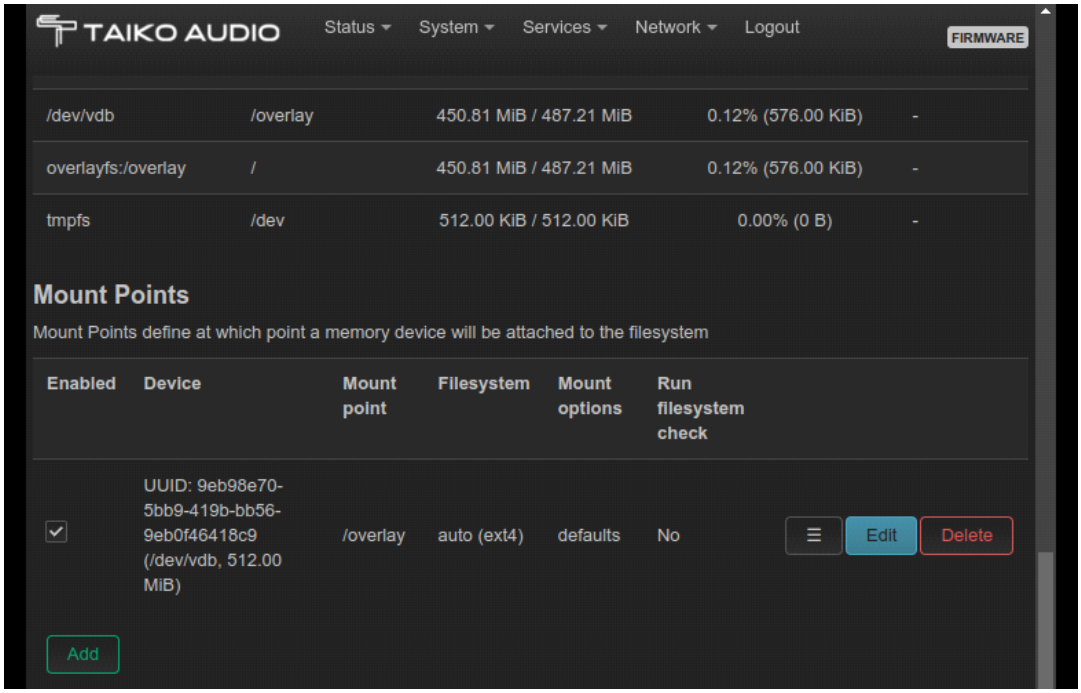
Please, go to ‘Network->Interfaces’ and click on the ‘Edit’ button on the line where the WAN/eth0 interface is located. See the screenshot below:



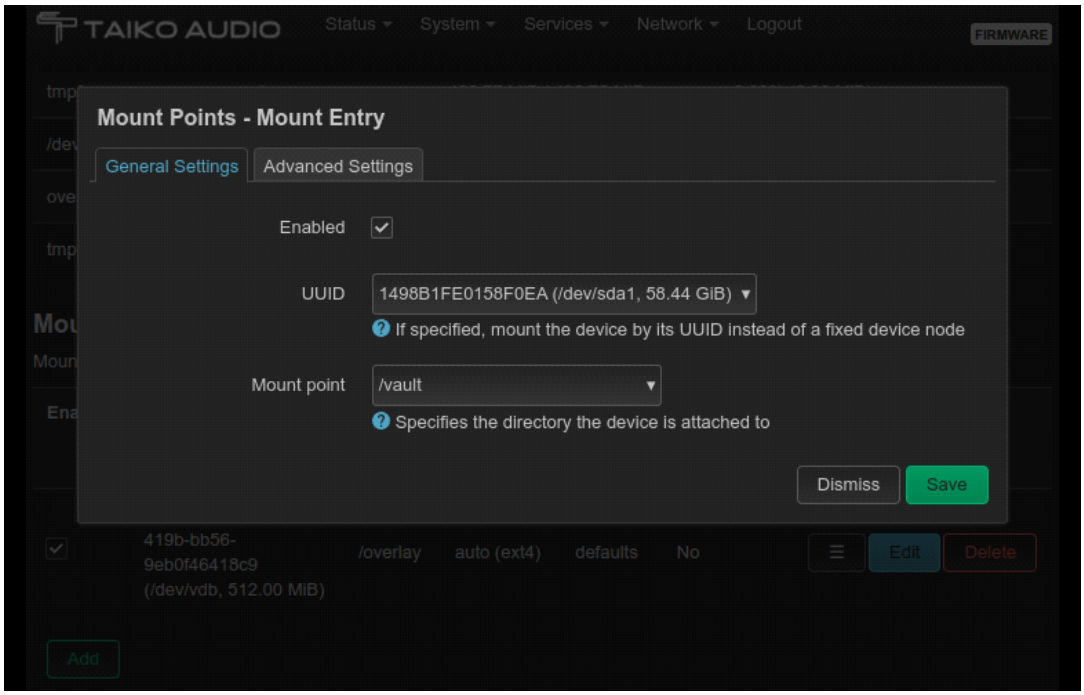
You can set it to manual or specify another protocol for Internet access.

USB drive sharing (Future functionality)

Please insert your USB drive into the uppermost USB port. Go to ‘System->Mount Points’, scroll down to ‘Mount Points’ and click on the ‘Add’ button.



In the new window, you must select your USB drive and enter the name of the directory to mount and then click the ‘Save’ button. For example, you can type ‘/vault’ directory.

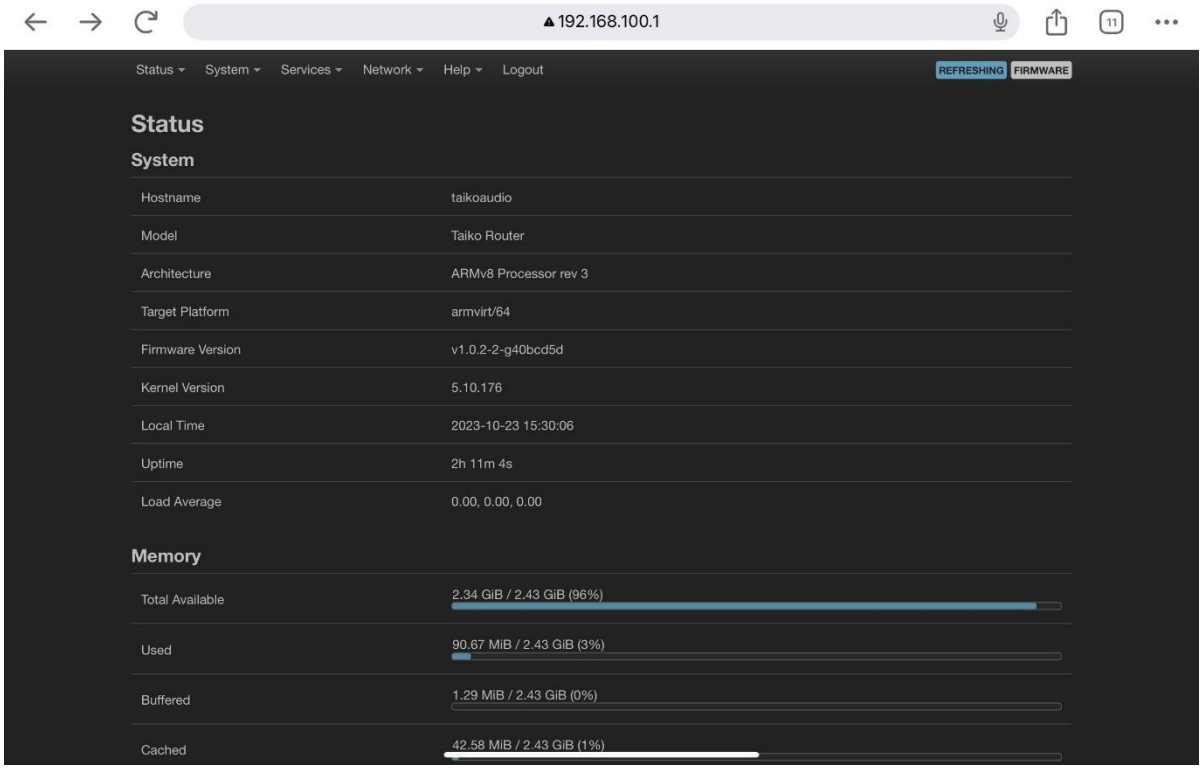


Then, you must scroll down and click the ‘Save & Apply’ button.

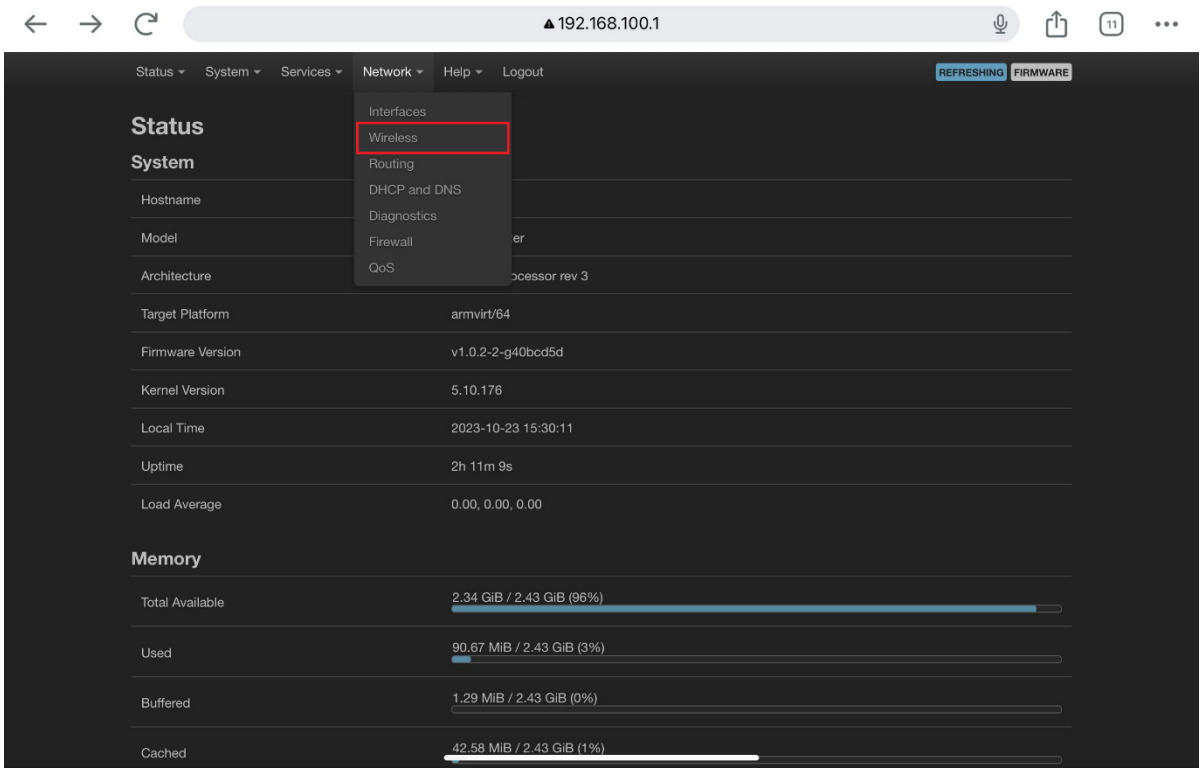
Please note that only the filesystem supported for external drives currently is ext4 (Linux). We are working on adding support for multiple filesystems, such as FAT32, exFAT, and NTFS. The Router officially offers support for drives up to 16TB, although we have only tested this up to 8TB. For now, full USB Drive functionality is not yet enabled.

Change Wi-Fi Channel

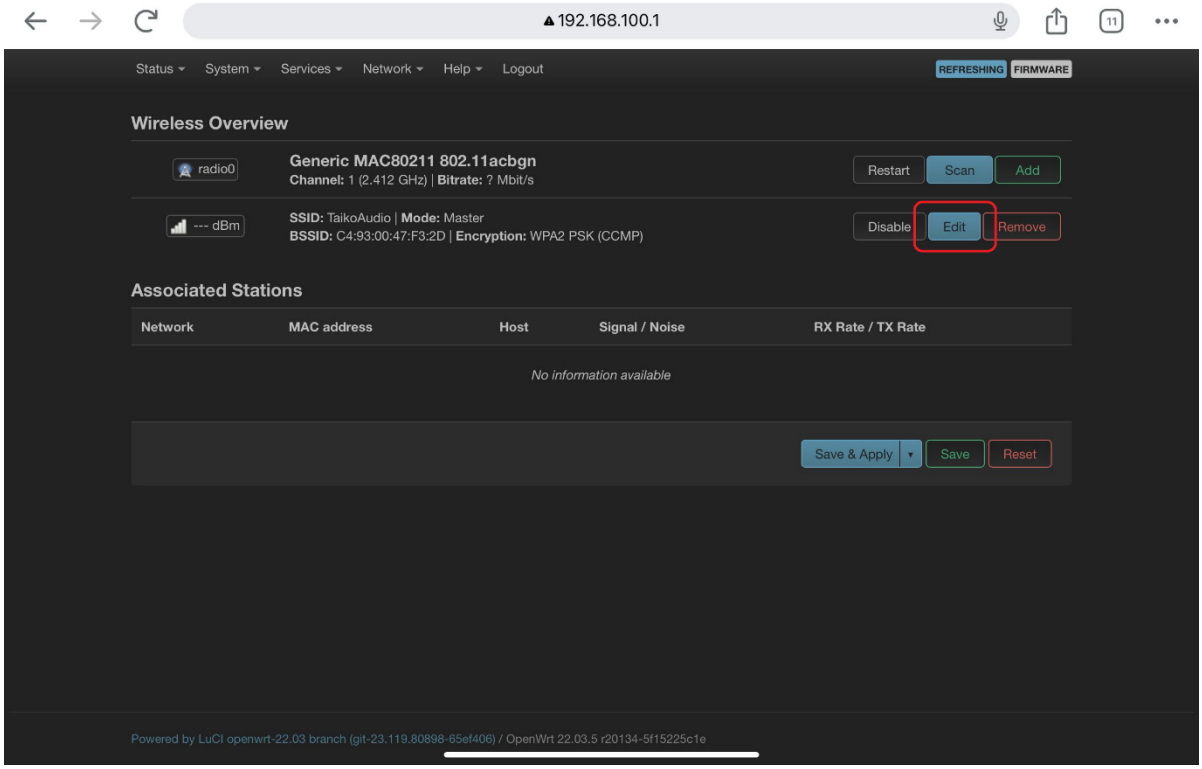
Log in to the Router's Web Interface. This takes you to the main page.



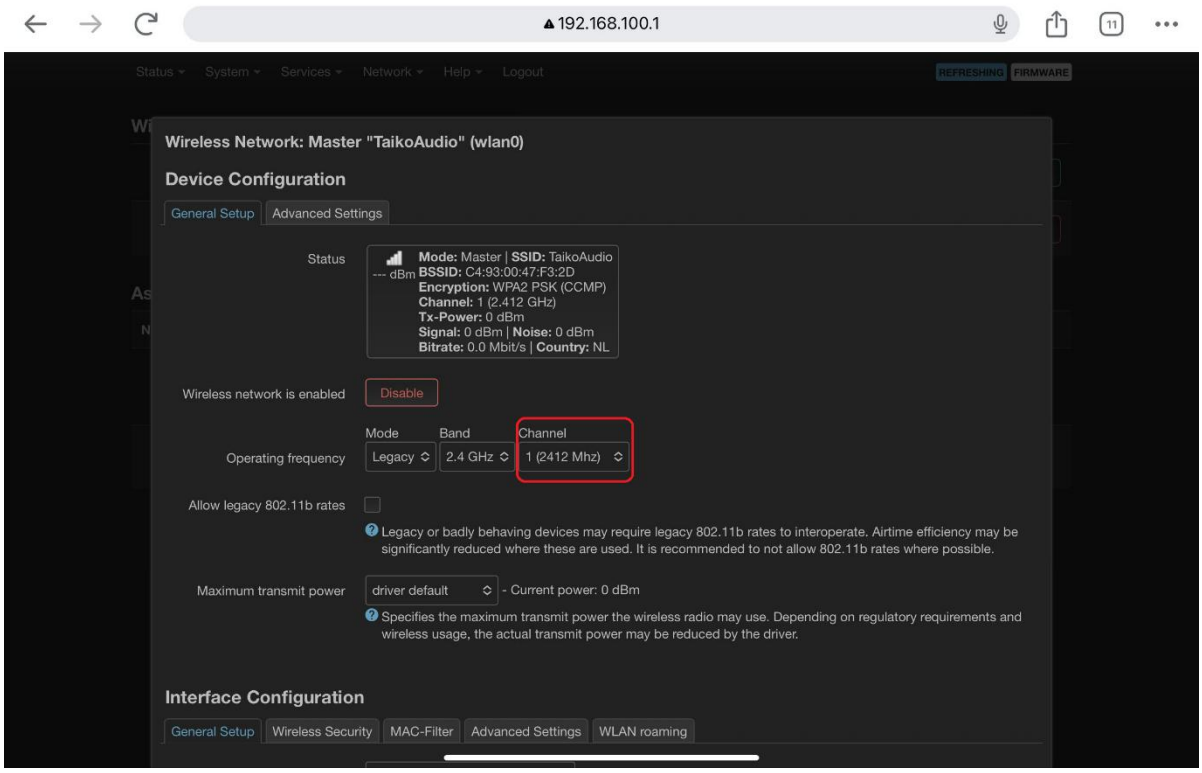
Go to Network - Wireless



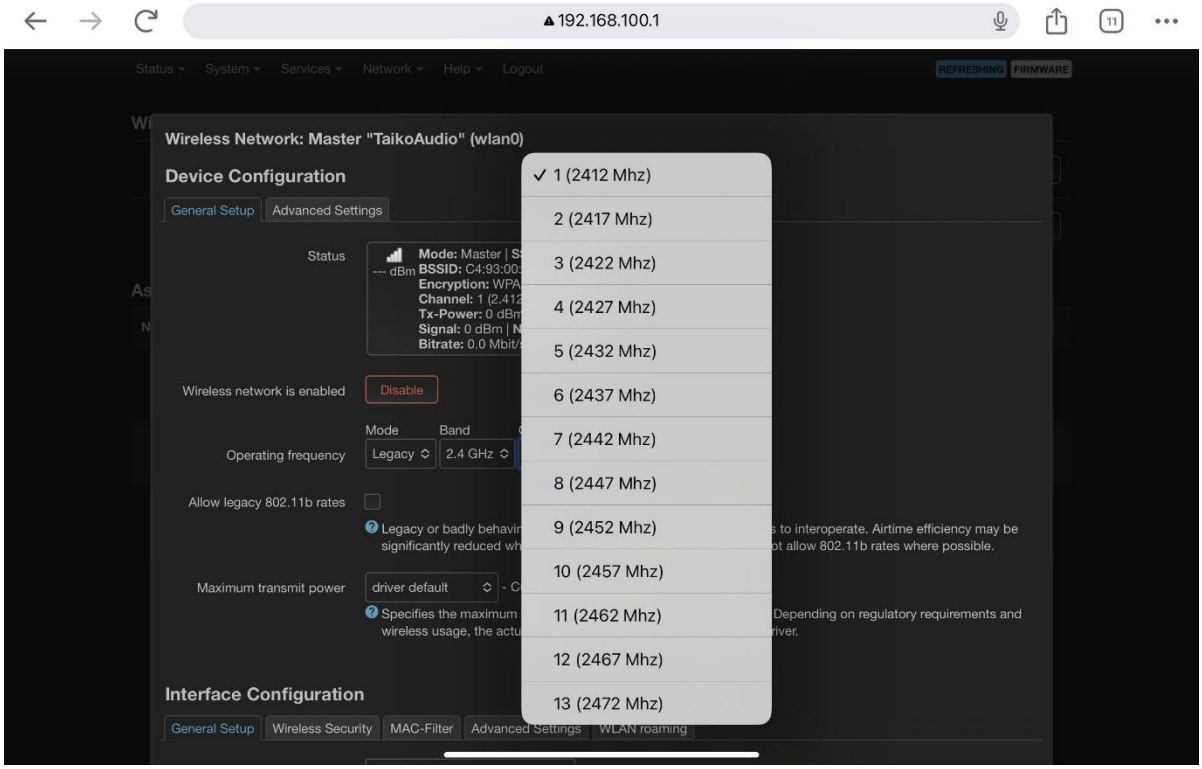
Tap "Edit" under Wireless Overview, second row



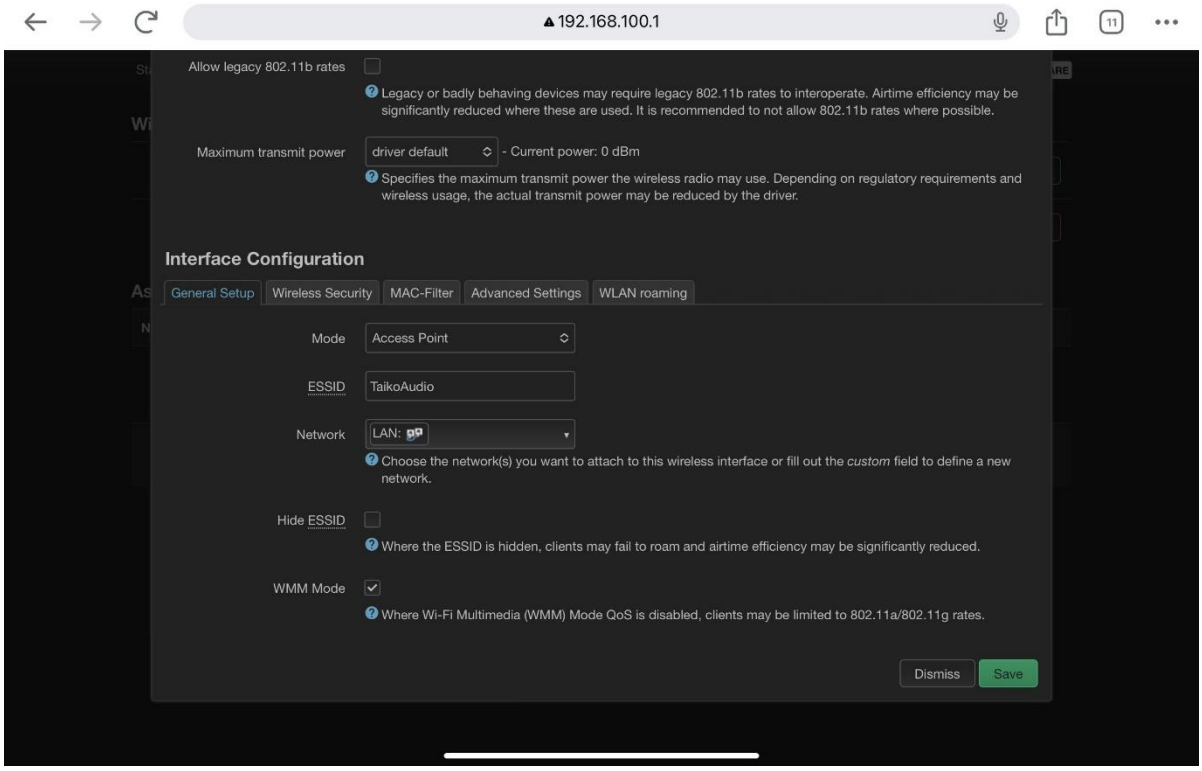
In the screen that pops up next, tap ‘Channel’



This produces a popup list



Choose your desired channel, scroll down to the bottom and tap Save



Port Forwarding

The Extreme Router offers a lot of functionality beyond the functions described in this manual. Please note that we limit our support to the standard features.

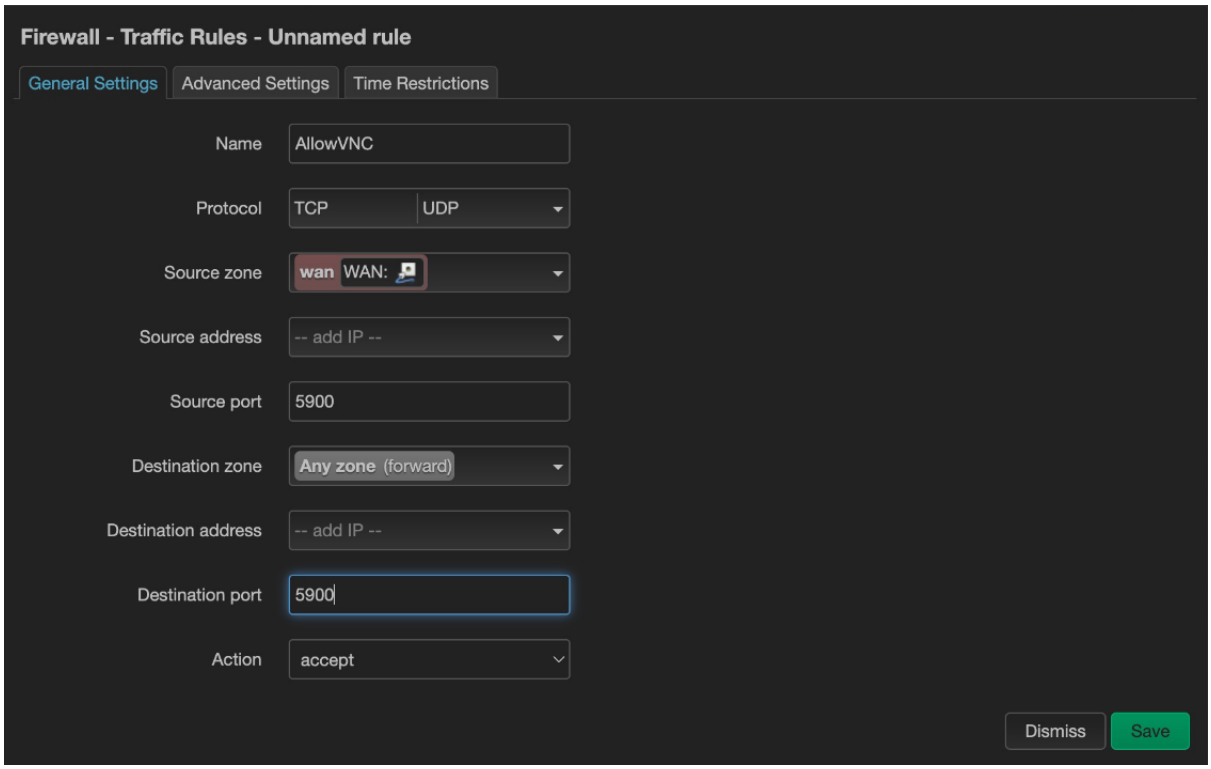
The Router is pre-configured with Port Forwarding rules to allow Roon control from devices connected to your home Wi-Fi network.

While further Port Forwarding configuration is possible, for instance to access the Server via VNC, or enable File Sharing from the Home network to the Taiko Audio network, this does not currently fall under the default supported configuration for the Router.

Below are basic guidelines for configuring Port Forwarding. Please note that we cannot provide further support for this. In case you get stuck or want to start with a clean slate, there is always the option to reset the Router back to factory settings (chapter 20).

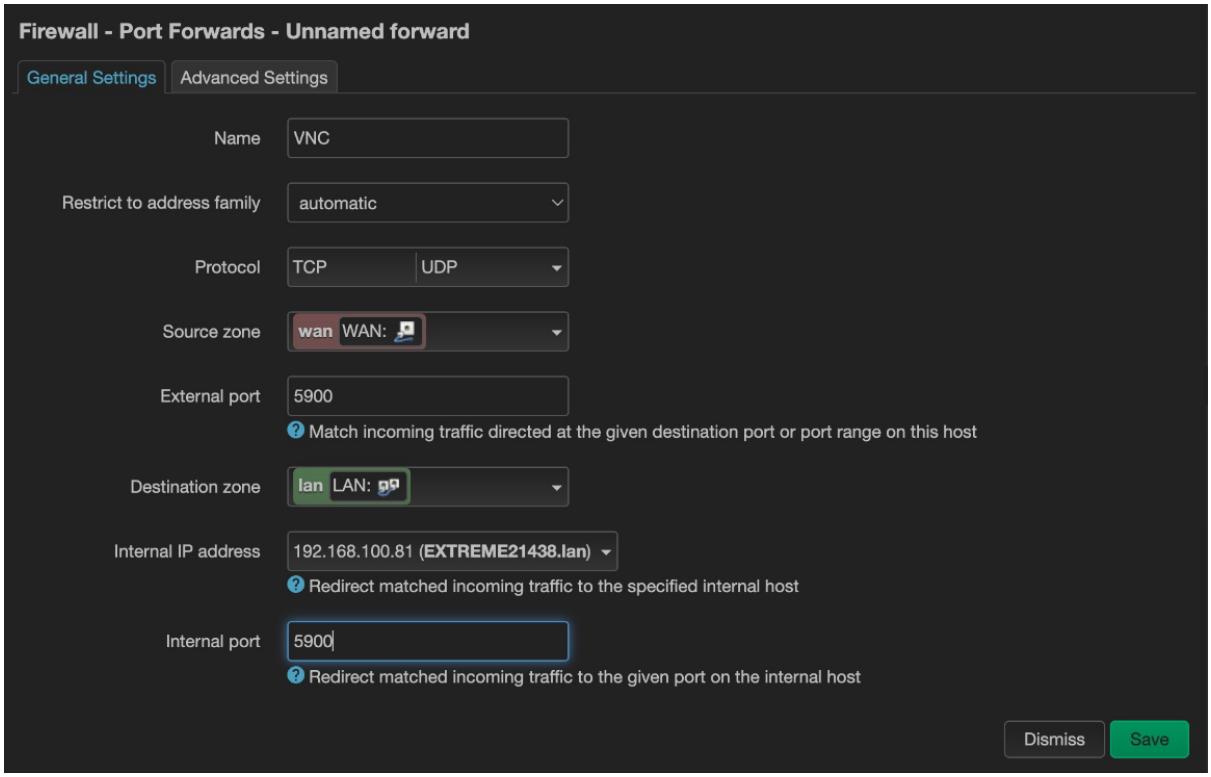
VNC

1 - On the Taiko Router to go Network-> Traffic Rules -> click on ‘Add’ at the bottom



Click save; then click Save and Apply

2 - Go to Network-> Firewall -> Port Forwards-> click ‘Add’



click Save; click Save & Apply

3 - Go to your computer on your main router (Wi-Fi or Wired) and open VNC.

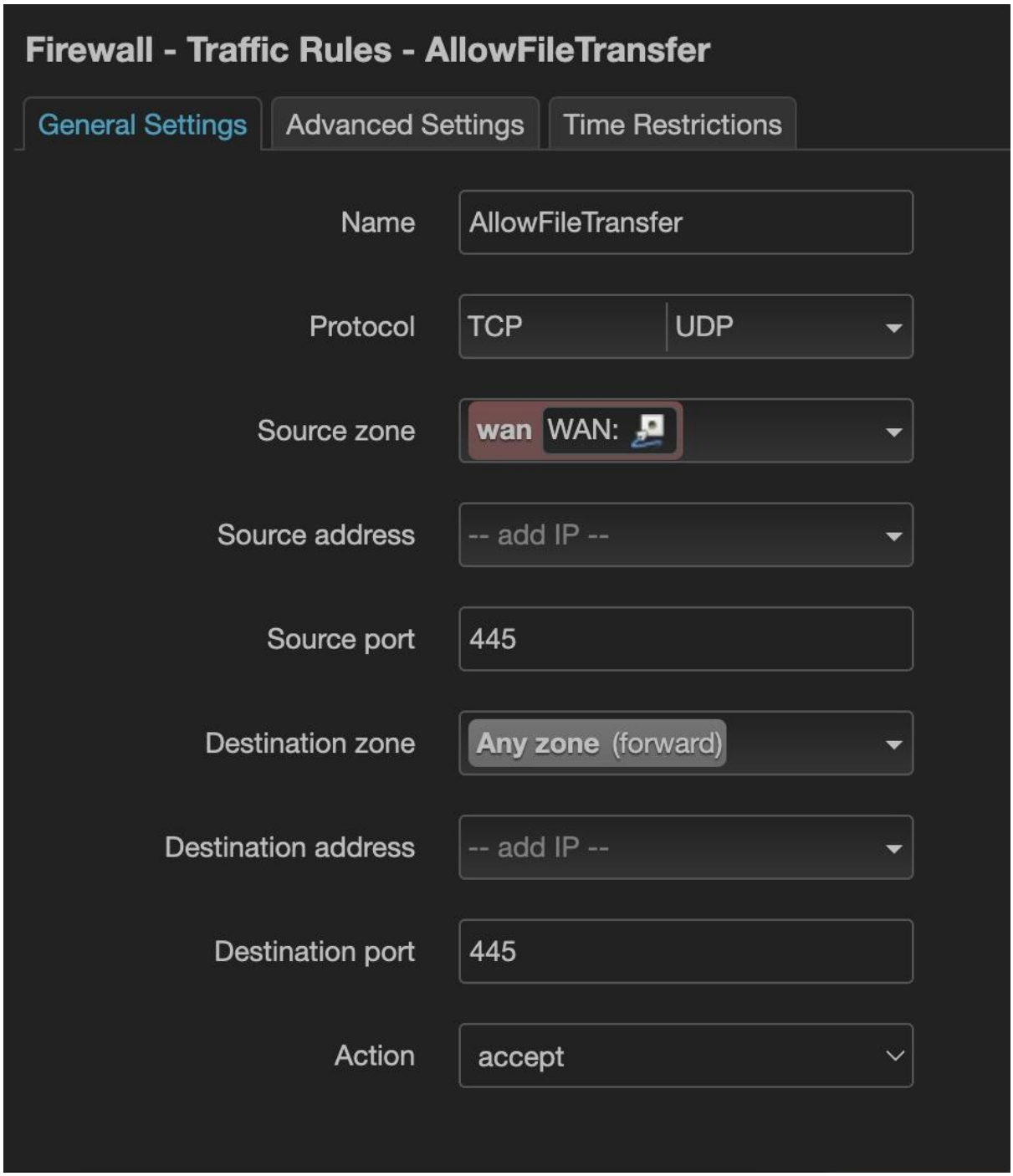
Create a new connection or edit an existing one.

The IP address is the Taiko Router's IP address on your main router. This is not the Taiko Router IP default gateway of 192.168.100.1.

You should now be able to VNC to the Extreme using your main network.

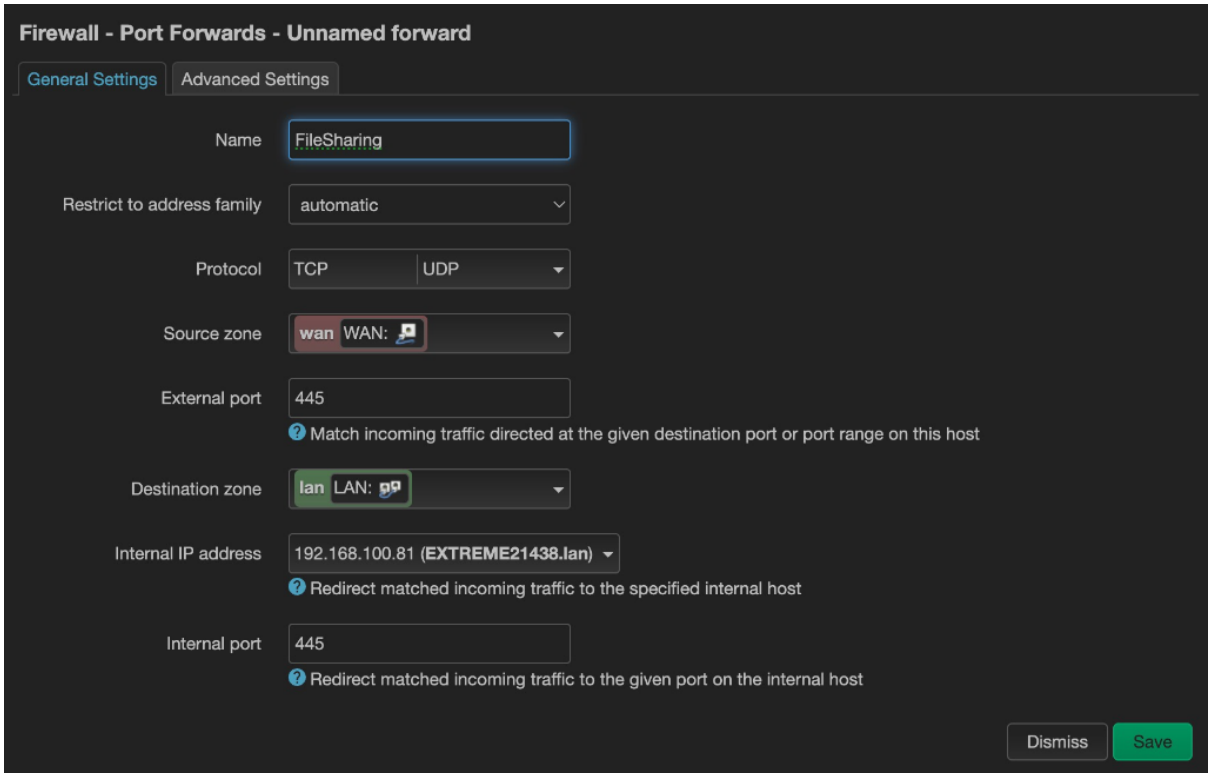
File Sharing

1 - On the Taiko Router to go Network-> Traffic Rules -> click on ‘Add’ at the bottom



Click save; then click Save and Apply

2 - Go to Network-> Firewall -> Port Forwards-> click ‘Add’



Click save; then click Save and Apply

On a windows computer you should now to be able to go into file explorer and ‘Map A Network Drive’.

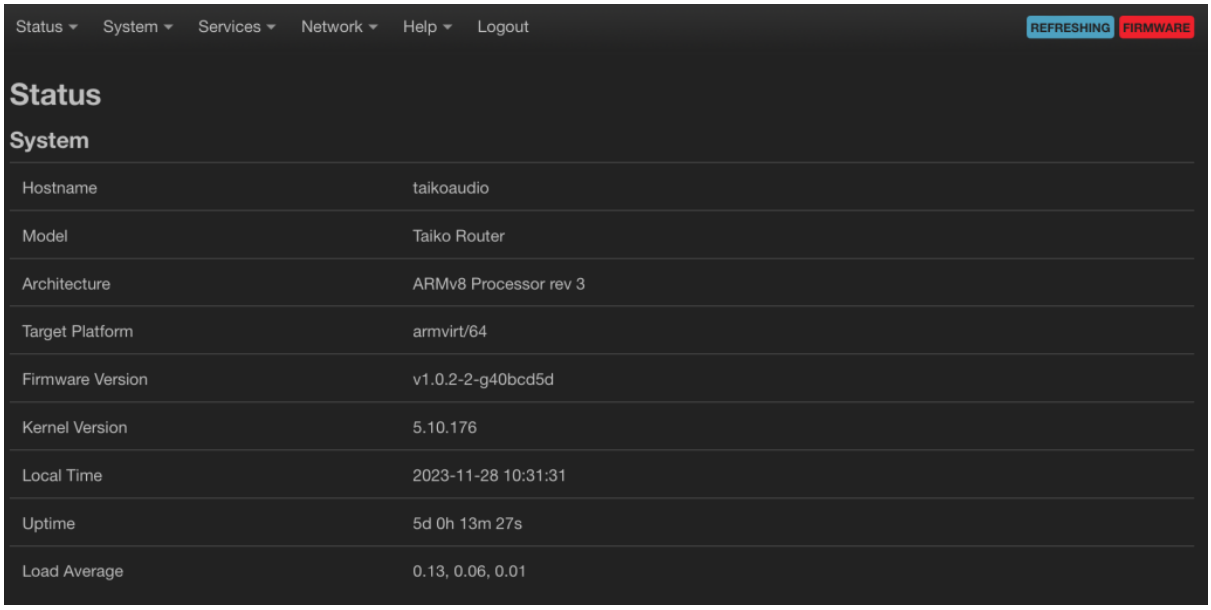
In ‘Folder’, type “\\192.168.1.180\music” where "192.168.1.180" is your actual Taiko Router IP address (same as with VNC).

The username and password are the same credentials as VNC as well.

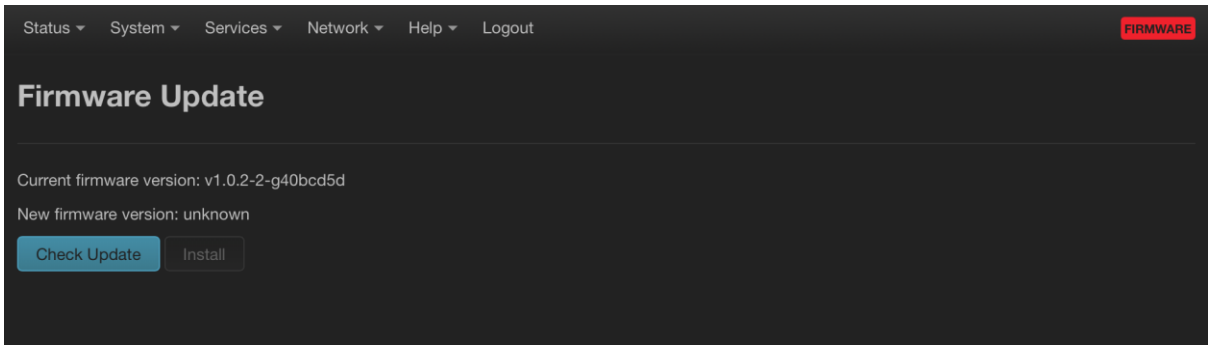
Firmware update

To ensure the highest level of security we strongly advise always keeping the router software up to date. To indicate the availability of updates in the user interface, there is a ‘FIRMWARE’ button in the upper right corner. If it is RED, then a new update is available. If it is GREY, then the system has the latest updates installed and no action is required.

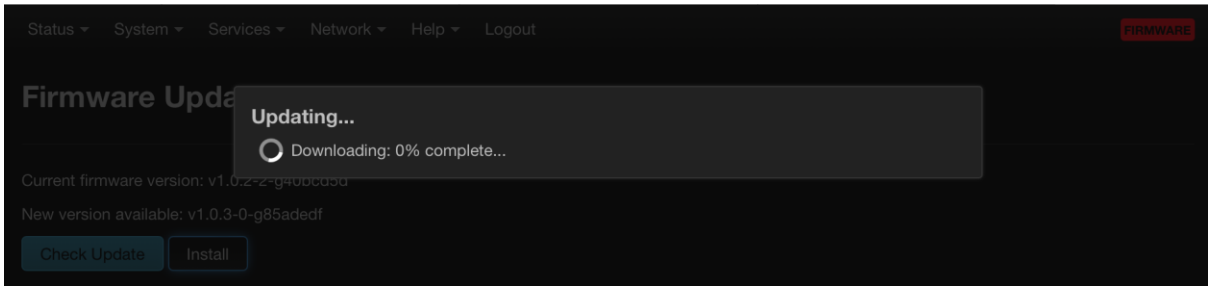
In the screenshot below, Firmware is shown as available:



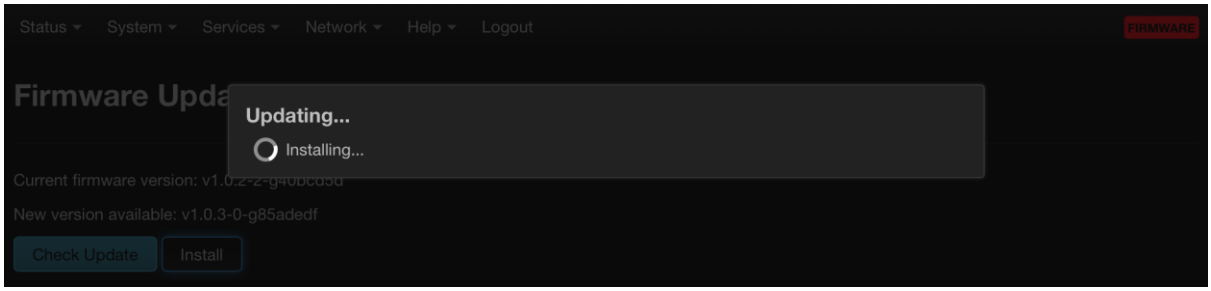
To update the firmware, click on the ‘FIRMWARE’ button or go to the ‘System’ menu, select ‘Firmware Update’ and click on the ‘Check Update’ button.



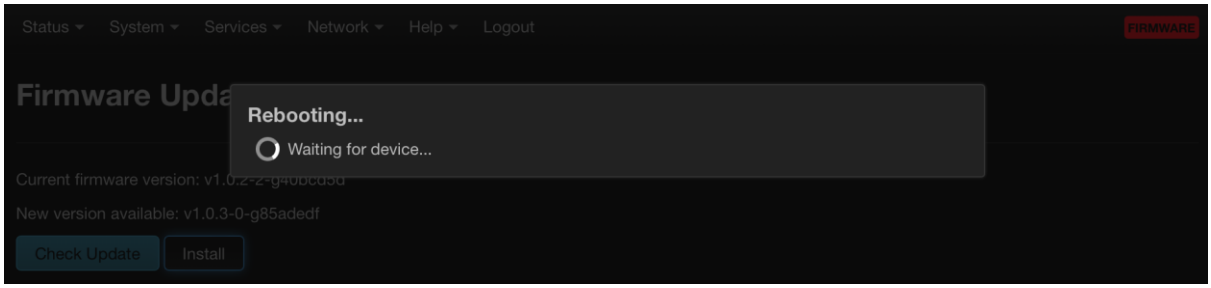
If the update is present, you can click the ‘Install’ button.



The update will auto-install:

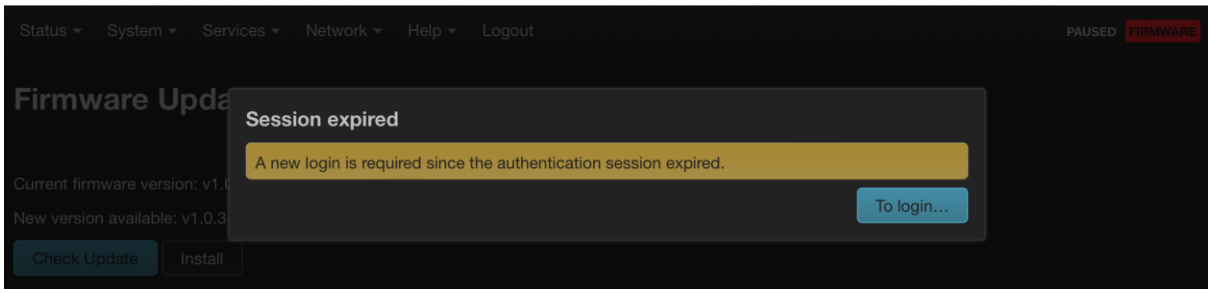


Then, the Router will be rebooted:



➔ Unless you made Taiko Wi-Fi your default network, please note that the tablet, laptop, or phone will reconnect to your Home Wi-Fi when the Taiko Router's Wi-Fi shuts down as a result from the reboot. Simply re-select Taiko Wi-Fi in your device's settings to continue.

When the Router has rebooted, please log in again with the same credentials as used before:



The grey FIRMWARE button top right indicates that the update has been completed successfully.

Specifications

The Router is powered by any normal 12-19V DC power supply. A standard wall-wart power supply is included but the Router will sound better with a higher-end power supply.

The ultimate solution would be to add the Extreme DC Power Distributor. This allows you to power both the Extreme Switch and Router from the same power supply while offering improved performance over 2 separate power supplies, especially when using a DAC cable to connect the Extreme Router to the Extreme Switch.

Power input: 12-19V DC. (12V is the optimal voltage)

Current draw at 12V: 500mA natively. Note that the total current draw depends on the supplied voltage.

Earth Screw: M6 with 4mm hex screwdriver hole (use screw length and or washers as needed)

Product Dimensions: 21 x 21 x 6 cm (with feet)

Power Connector Dimensions: 2.5 inner / 5.5 outer / 11.3mm length (14mm recommended)

Weight: 13.1 Kg / 28.7 lbs