

## \$700 DIY Roon ROCK Audio Streamer



This article will teach you how to build a very nice Roon [ROCK](#) (Roon Optimized Core Kit) Audio Streamer. I first considered getting Roon's own [Nucleus](#) streamer and or another manufacturers' [streamer](#), but none of them seemed great and the good ones were all overpriced for the hardware you get. I knew I could make a better mouse trap and I couldn't be happier with the results. It sounds fantastic, looks cool and works flawlessly. Hopefully some of you will be inspired to try this relatively easy DIY project and post your findings and results to help others.

A little general info about what Roon is will help audiophiles understand why they would want to build a dedicated server to run as a Roon Core. Roon software creates an audio ecosystem that eloquently organizes and plays music files. It overrides many audio functions of a computers operating systems in order to send a better digital signal (usually to a network attached DAC). Roon can use your music archive in combination with subscription services like [Tidal](#) & [Qobuz](#). The Roon player simply sounds better, even if you are using your computer as the Roon Core.

Roon relies on your network and internet connection. It will find network connected music devices that are Roon ready and use them as endpoints. Endpoints can be computers with DACs attached, Roon ready devices like Node or my favorite: a [Raspberry Pi](#) mini-computer with a DAC.

There's a lot I could explain about the way Roon works and why it's a great system, but this paper is about building a DIY Roon Audio Streamer. Roon sells their own streamer but they also offer the software as a package called ROCK. It's designed to be installed on an [Intel NUC](#) mini-computer. It's an OS that's based on Linux but designed to do nothing other than stream music elegantly. It dedicates one of the streamers processor cores for those processes that require timing like decoding.

The simplest and cheapest approach would be to buy a NUC and install the ROCK package. Nothing wrong with that but for a little more money and some DIY time, you can make a top-notch streamer. I believe that a streamer should be in a fan-less case and use a low noise linear power supply. I also added some extended antennas so it could be placed anywhere. I'm connecting mine using an ethernet cable, but many people may want to try the wireless route.

Below, I will list the parts used and why I chose them. Then I will discuss putting the hardware together. Finally, I will talk about installing ROCK and setting up Roon to play.

Note: my build came out to \$905 but read carefully. Some of these parts are not necessary for Roon ROCK. I might use this NUC for other functions in the future, so I paid a little more for memory, storage, cooling, antennas, etc. I also purchased a \$100 power supply that may not be necessary (I think it is). You could easily do this for \$600 and not be missing anything.

NUC Kit [NUC813BEH \\$312](#)



I chose the 8<sup>th</sup> Generation Core i3 Kit Model for \$300. I considered buying the Core i7 model for \$600 but I'm not sure that kind of power would be utilized. The i3 model only has two cores but I think that may be all Roon uses. I was unable to confirm this. If you have a giant archive or want to do multiple streams at one time, the i7 would be nice. I'm not having any issues with the core i3 though I have not figured out how to monitor the CPU usage yet. I'd love to have more info about Roon hardware needs if anyone can fill me in. Intel sells NUC boards as well but it was cheaper and easier for me to get the kit which has everything except Ram and Hard Drive.

Fan-less Case - [Akasa Turing \\$150](#)



There are a couple of options for fan-less cases. I choose the Akasa Turing Compact fan-less case and I could not be happier. I looked at some reviews and it keeps the CPU much cooler than the stock fan. It's basically one giant aluminum heat sink. I like the look of this case in a horizontal configuration. I did not install the side plates as they look cheesy to me and serve no purpose.

Boot Drive M.2 PCI-E SSD – [Silicon Power 512 \\$65](#)



A good SSD to run the OS is vital. It can be small, like 128-256GB. Look carefully at the read and write speeds. Some smaller drives have substantially slower speeds than the larger versions of the same brand/model. You can't put files on the drive that Roon is installed on, so no need to go big.

### Boot Drive Cooling - [M.2 Heat Sink \\$11](#)



### Storage 2.5" SATA SSD - [Silicon Data 1TB \\$90](#)

This is where you put all your music files. I decided to put an internal 2.5" SSD in the case. You can also use an external USB drive. In some ways, the external USB method is easier because you can plug it into another computer and copy files to it, then plug it back in. You cannot preload the internal drive. It must be formatted by the Roon OS and then have files added from the network.

### RAM - [Gskill 2X16GB \\$115](#)



I put 32GB of fast RAM in because I had it already. I don't think Roon currently uses more than 8GB but that's another question I could not find a solid answer to. Anybody who knows how much RAM and how many cores Roon uses, please let us know.

### RAM Cooling - [Graphite Silica \\$22](#)



I added these cooling fins to my memory. You need to buy one for each Dim.

### Micro SD - [Card Silicon Power \\$30](#)



The NUC Gen 8 motherboards have a slot for a Micro SD card. The Akasa case cuts off access to this port and Roon does not support Micro SD cards. I'd love having a 256 GB Micro SD to back up the OS, but for now you can forget about that

Micro SD port. I added one (only \$30) before I sealed off the port just in case Roon adds this feature or I use the unit for something else in the future.

**19V Linear Power Supply** - [eBay best-for-sell \\$100](#)



There is much debate about the need for fancy power supplies on streamers. In one camp are the people who say it does not matter until you get to the DAC. I'm in the camp that thinks everything that generates noise matters when it comes to streaming music. I found a company that makes linear power supplies to your specs and bought one for \$100.

**Wireless Antennas** - [Highfine \\$10](#)



The antennas that come with the NUC utilize a steel plate in the chassis. The new aluminum case will not suffice, so I replaced the antennas with better quality external antennas. I'm not intending to use my wireless network as my whole house has CAT 7 ethernet run but many people will use wireless. I do not know how using wireless will affect response time and sound quality in the Roon ROCK software. Anyone who can fill us in, please do.

**Assembly**



I've done a lot of DIY projects and this is by no means a simple one, but it's also not difficult. Take your time and look at the video tutorials if you need help.

The first step is to get the motherboard out of the case and remove the fan ( [Video Tutorial](#) ). Be very careful to not break off any wires. There are mics/speakers attached to the front panel and antennas taped on. After taking out all the screws, I had to pry out the back side using a screwdriver under the USB port. I did this gently and after that it came right out.

There's not much to putting the motherboard into the fan-less case ( [Video Tutorial](#) ). I cleaned off their thermal paste and applied the thermal paste that came with the case. It fits perfectly. I did put in the Micro SD card. The microphones that are on wires still had enough glue to stick them on the new case. You do not need to remove any buttons or parts from the old case if you are using the Akasa model I used.

Install the RAM and PCI-E M.2 Drive. Look for a computer building video if you do not know how to do these basics. If you are using an internal drive, there are hanging bars and cables that come with the case; it's self-explanatory.

I made two mods to my case. First, I used motherboard standoffs as spacers to leave a gap for airflow under the lid. I believe this will help keep parts cooler. I'm not worried about the processor getting hot, but there was no airflow for the other components. Second, I had to do some minor metal work to attach the antennas where I wanted them. They would easily fit in the holes on the back cover but that spot wasn't "perfect" and I couldn't live with the imperfection. I drilled two holes and grinded a slot in one case fin using a Dremel tool in order to have perfection.

## Loading ROCK

I followed the [guides](#) Roon provides and everything worked out for me. It's complicated but completely doable if you have some computer skills. You may have to research a few common computer terms and procedures if you are new to computer building. I'm not going to repeat the whole process that is clearly documented by Roon but I will give my experience with those instructions and that process.

Plug in a HDMI screen of some kind: computer monitor, TV, etc. I had an issue with my monitor not liking the resolution the NUC was displaying. I used another monitor and everything was fine. Also, plug in a USB keyboard and a mouse.

Boot into the Bios. Instructions say to hold down f10 during boot but it was F2 for my NUC. Make sure everything is working and you can see your drives in the bios.

Update the bios by downloading the file onto a USB drive and follow the [instructions](#).

Plug your streamer into your network using Ethernet a cable. Even if you are going to use wireless later, it's probably much easier to plug into the network with a Ethernet cable to get started.

Download ROCK and unzip it (right click Extract All). Put the files on a USB thumb drive. Follow the [instructions](#) and Roon will load Rock on the streamer. It will end by giving you an IP Address that was assigned by your network. This might change if you unplug it or restart it. Now you are done with the monitor and keyboard. It's time to go headless.

Go to another computer and type in the IP Address into a browser. Here you can set up ROCK and then you can set it as your core and control it from any device with Roon installed.

I missed something and lost my Roon playlists when I assigned the streamer as my new core. No big deal for me because my playlists are mostly Tidal and Qobuz but you probably want to follow the [migration instructions](#) to transfer info from your old core machine to the new ROCK installation.

If you used an internal SSD SATA drive for storage, then you need to format it before transferring files to it. External USB drives can be formatted and loaded with files from another computer. Internal drives have to be loaded through the network using Roon. It's easy to connect to any drives connected to the streamer by using [Roon's Data Directory](#). Just type `\\ROCK\` into Windows Explorer(not a browser). You can use this to add files through your network.

For those of you industrious souls who want to add a [CD Ripper](#).

## **Conclusion**

I could not be happier with my ROON ROCK STREAMER's performance so far. I have seen no reason that I should have gone with the Core i7 for \$300 more. I hear a huge difference in the sound quality I get using the streamer core vs my laptop as core. I did not do a fancy double blind, but wow does it sound great. It also looks cool, stays cool and doesn't make any noise. It just sits there giving me whatever music I want, instantly, with exquisite detail and clarity. I understand why audiophiles appreciate vinyl: there are many issues with the fidelity of digital music, but my ROON ROCK STREAMER solves most of them and a really good modern DAC solves the rest. I hope you'll give it a listen.