

## **Music Servers For Audiophiles – The Time Has Finally Come**

By Steven Stone, published by Absolute Sound in 2008

What exactly does a music server do? Despite its high-tech name, a music server is basically a fancy digital jukebox. So why should an audiophile who puts fidelity first and foremost care about music servers? Because a music server can provide all the sonic quality of a stand-alone CD transport and deliver instant access to your entire music library. Some music servers also supplant your FM tuner by presenting the entire spectrum of Internet and international radio. What's not to like about that? The only downside is the reduced exercise you'll get during marathon listening sessions. Having all your music available at the touch of a button is so addictive that you'll wonder why you wasted so much time looking for music instead of listening to it.

Until recently most servers fell into one of two categories, either toys for the ultra-wealthy or gizmos for the uber-geek. Most complete "turnkey" music server systems start above \$5k and easily exceed \$30k. Some include complementary disc burning services (from your own library of course) or come already bundled with titles that can be purchased a la carte by buying "keys" from their creators. These systems are designed and assembled so that anyone can use them with minimum aggravation, but you must pay for the time and effort required to make a Windows-based PC server user friendly.

Sophisticated users with advanced computer skills have been assembling their own music servers for years. All that's required is a PC with a nice big hard drive, a CD/DVD reader/burner, some I/O boards, and the right software. The problem is making all these parts "play nice" while delivering maximum fidelity. Spend a few minutes surfing the Internet and you'll discover that for every stable working home-brew music server there are at least ten that are buggier than a roach motel. Building a do-it-yourself music server is a great hobby, but if your primary avocation is listening to music, a DIY server can prove to be a frustrating allocation of time and effort.

What's an audiophile with middling technical skills and a limited budget, plus a hankering to access to an entire music library from the comfort of their primary listening position, to do? Nothing when the options were all either ridiculously expensive or God-awful geeky. However some manufacturers are making products that don't involve either barrel-loads of money or time to get them to work properly. This is the first installment in a series dedicated to music servers for audiophiles who want to spend their time listening to music, not mucking around with music servers. My goal is simple – to find devices that easily access music while maintaining sufficient fidelity so music remains emotionally and intellectually stimulating.

### **iPods; The Greatest Thing to Ever Happen to Music or Not?**

To send an old-school audiophile writer I've known for years into apoplectic fits, all I have to do is utter the word iPod. He blames Apple's iPod for single-handedly destroying high-end audio. He claims that its utilization of low-resolution lossy MP3 digital music files have made it impossible for high-definition music to remain commercially viable. I think he's nuts.

iPods aren't merely low-resolution portable MP3 players for the Clearasil set. You can upgrade any iPod to the level of an upper mid-fi CD player by changing the preferences in the iTunes program mated to your iPod! You can adjust the settings in the preferences file so all your music will be imported and stored in a non-lossy digital format. iTunes actually gives you three options, Apple lossless, WAV, or AIFF files that preserve digital files in a lossless format. Any of these deliver CD quality music files. As to whether CD quality (44.1 16 bits) is good enough for your music is an argument best left for another time and place.

Why am I discussing iPods within the context of an article about music servers? Because an iPod makes a pretty darn good music server. After

all, what is an iPod? It's a portable hard-drive coupled with sorting/filing software designed specifically for music files. To use it as a music server you merely connect the iPod's headphone output to your audio system via a stereo mini-plug to RCA cable. Sure, you can't navigate through its menus from your listening seat and the iPod's D/A only qualifies as a middling level converter. But if you already have an iPod you can begin to enjoy many of the benefits of a music server for only the cost of a cable.

The next step up the ergonomic ladder is to use an iPod "dock" to tether an iPod to your audio system. A basic dock supplies an analog audio output plus powers the iPod so it won't run out of juice. Apple offers a basic dock with a remote control for \$49. Apple's dock preserves all the functionality of an iPod, but since the remote doesn't have any menus, you have to keep your iPod within your reading range to decipher the menus on its display. More sophisticated docking systems, such as the Keyspan Tuneview, supply a remote with a color display that mimics the iPod's menus. Since the Tuneview remote uses radio frequencies rather than infra-red signals you can navigate from your listening position even if the iPod is situated in another room.

For an audiophile seeking a simple but high fidelity music server the iPod has one glaring problem; the internal D/A doesn't qualify as high-end. Until recently this internal D/A was the sonic Achilles heel preventing many audiophiles from using an iPod as a music server. But recently Apple began allowing third-party developers to access the digital stream via the iPod's power/USB connector. Wadia is the first audiophile company to bring a high-end iPod dock to market. Wadia's 170iTransport lets you send the raw unadulterated PCM digital stream from your iPod to the external DAC of your choice.

For audiophiles who have been leery of music servers, hooking up an iPod to their audio system can be a revelation. Suddenly instead of spending time scrunched down in front of numerous CD storage cabinets situated throughout their home looking for a particular CD track, they

can find it quickly and easily on their iPod and have it playing in a matter of seconds. Listening instead of searching, what a concept! The advantages of consolidating an entire collection in one location can't be underestimated. Eliminating multiple CD equipment racks not only engenders greater domestic détente, but also improves the sound of a listening room since CD racks are not among the most sonically benign of furniture.

### **Look Ma, No Wires!**

To assemble a music server you need a computer, either a PC or a Mac, with iTunes installed on it, where you can burn your CDs and store their contents as digital music files. Then you need a network to move these files around your home. This network can be either wired or wireless or a combination of both. Finally you need some kind of interface device that lets you choose what you want to hear on your audio system.

The iTunes software, which is available for free for either PCs or Macs, makes the whole burning/sorting/accessing process simple enough that anyone with minimal computer skills can create an extensive music library. However for music server applications iTunes does have several problems. First, it was designed for your computer desktop, not for an audio system in the next room. Secondly iTunes was created by pop music fans, not classical music lovers. Its methods for organizing music, which work nicely for artist-driven titles, but are less than ideal when the composer, composition, title, or ensemble is the primary search criteria. None of these problems are insurmountable, but they can sometimes limit an iTunes-based music server's ergonomic ease.

You can move music data from room to room only two ways - via wires or wireless. 99.99% of wired systems rely on Ethernet cables to connect the various parts of the server system with each other. Ethernet has several advantages over wireless methods – it is impervious to interference from wireless phones and other devices, offers faster response times in complex multi-user systems, and is more robust over

long distances. It has one obvious disadvantage – Ethernet requires wires to get from point A to point B.

Most wireless systems use Wifi to connect their parts together. Wireless has the advantage of infinite physical flexibility since no wires are needed, but it has issues with interference and retaining signal robustness over distances greater than 25 feet, depending on any walls, floors, furniture, and other objects that impede reception. Wireless connections can have noticeable command execution lag-times and occasional problems with dropouts. Some older Wifi networks lack a sufficiently fast or wide pipe to deliver an adequate throughput for data intensive high definition audio and video sources. Microwave ovens and 2.4 mHz portable phones can occasionally interfere with Wifi signals.

Obviously neither Ethernet nor Wifi are perfect methods for moving music around, but each have particular advantages. Used together you can assemble a glitch-free and robust music server system that will function properly 99.99% of the time.

### **My Server System – The Grand Tour**

I'm a Mac guy. I've owned five generations of MacIntosh computers. My current model is a MacPro Duo-core with 10 GB memory, four internal hard drives, and two external hard drives. Why six drives? Redundancy, my friends, redundancy. My first 250 GB drive has my operating system, applications, and word-processing data files. The second 250 GB drive is dedicated to image files. The third 250 GB drive is a mirror backup of the second. The fourth 500 GB drive has all my music files, including my iTunes library. My first external 500 GB drive mirrors my internal music files drive. Finally, my second 500 GB external file mirrors my first drive and serves as an external boot drive in case of emergencies.

This is far more computer than you need for a basic music server system. A Mac Mini with a monitor and a 500 GB external drive would

be completely adequate. The other piece of gear needed to make music skip merrily from room to room is a Wifi receiver/router. The simplest and most easily integrated Wifi device for a Mac System is an Apple Airport Extreme. It can work as a Wifi hub, a cable or DSL Internet modem interface and Ethernet connector. I just replaced an earlier generation Airport Extreme snow model with the latest version that supports the new 802.11n high-speed protocols. Set-up was easy and the results have been glitch-free. Currently I have my Mac Pro hard-wired via Ethernet cable to the Airport, which sends wireless music to any Wifi-enabled device in my home. I also sometimes use a wireless connection the airport as well.

### **Apple's Airport Express.**

Another WiFi device sold by Apple is the Airport Express. It delivers a simple and inexpensive way to move music around your home. Its ergonomic limitations prevent it from being a full-fledged music server, however. It can't send control commands back to the iTunes player on your computer; it only supports "music streaming." This means whatever is playing on your main computer's iTunes will come through the Airport Express. Fortunately the Airport Express does have Toslink digital outputs in addition to analog audio outputs so you can connect it to any external D/A converter. For under \$100 it lets you easily and simply stream music from your computer to an audio system in another part of your home, but the Airport Express is not by any stretch a full-fledged music server.

Sonically the Airport Express's digital outputs connected to a decent D/A will surpass an iPod's analog outputs. If you want to get an idea of how a music server will sound in your system, for under \$100 the Airport Express will give you a taste of the future.

### **The Apple TV**

The Apple TV makes a far better music server than a high-definition

video source. The Apple TV has a hard drive (either 40 or 160 GB) a simple Mac operating system, i-Tunes software, built-in Wifi, and outputs for two-channel analog, Toslink digital, HDMI video, component video, and Ethernet. All this is contained in an enclosure only slightly larger than a portable hard drive.

When you first set up an Apple TV a built-in expert system walks you through the basic installation process. You have the option of using either a Wifi or Ethernet connection. You must also choose one of several different video display resolutions. This is a good place to mention that the Apple TV must have a display to work properly. If you wish to use it primarily as a music server this may be an issue. No audiophile wants to be forced to put a video display in a music only system. I installed my Apple TV in my home theater, which of course already has video capability, but I didn't want to turn on my projector every time I listen to music. Instead I purchased a 17" NEC 1770 NX LCD monitor for the Apple TV's HDMI outputs. When I want to use the Apple TV for videos I simply remove the NEC's video cable and attach another one that's routed to my video scaler.

After the initial set-up the Apple TV loads your main iTunes library onto its own hard drive. The current model has no provisions for an external drive. This limits your storage space. Simply put - for any serious music server applications the 40 GB version of the Apple TV is useless. The hard drive isn't large enough to hold a music library of any size. Even the 160GB version is on the small side if you intend to assemble a library of more than 2500 uncompressed CDs. However for most audiophiles this 2500 CD limit should be adequate.

Storing your music library internally in the Apple TV does have several advantages. Response time is quicker when the music doesn't have to travel through a networked system. Chances of dropouts and buffering failures affecting the sound are also minimized. Furthermore you don't need to have your main computer running to use the Apple TV. Once music files are downloaded the Apple TV becomes a completely

autonomous system. Unfortunately Apple TV's hard drive storage methodology does have one glaring shortcoming - you might assume that the music files on the Apple TV's hard drive could serve as a backup in case your main computer's hard drive fails. But at present there is no way to export the Apple TV's data back into your main computer.

The initial transfer of music files from your main iTunes library to the Apple TV can take some time. To shorten the process you can, in theory, connect the Apple TV directly via Ethernet to your main computer. After over an hour of trying to make this method work I gave up and used the slower Wifi connection method. I was pleasantly surprised to discover that it only required 45 minutes to transfer my entire 65 GB library! After the initial transfer the iTunes program on your main computer will locate your Apple TV as a remote device and synch with it every time you use the iTunes program. After enjoying the initial transfer's alacrity I was bemused to discover that some of these subsequent updates, especially if I added more than ten CDs at a time, took as long, if not longer, than the initial transfer.

If you are familiar with iTunes, navigating through the Apple TV's menus will be very *deja-vu*. Apple TV has identical sort and search functions. One difference, however, is that instead of iTunes' popular "cover-flow" display option, Apple TV uses only alpha-numeric lists. You still see your cover art, but only while music is playing. Periodically the album covers flip and move to prevent any screen burn-in.

The Apple TV remote is identical to the one that comes with the \$49 Apple iPod dock. If you lose it, which is easy to do because it is absolutely tiny, you can easily synch another one to your unit. To put the Apple TV to "sleep" you must hold down the pause button for several seconds (just like you would on an iPod), but pause is not the same as "off." Actually it's impossible to turn off the Apple TV unless you disconnect it from AC power. But when you reconnect its AC power you must wait through a several minute-long boot-up before it becomes

usable. This may present an ethical dilemma for those of us attempting to live “green” as the Apple TV generates substantial amounts of heat while it’s on whether asleep or awake. Its entire cabinet serves as one giant heat sink. I strongly recommend putting it onto tiptoes to allow more air to circulate around its chassis.

I mentioned earlier that the Apple TV is better as a music server than as a video device. This is due primarily to software and media delivery issues. Although the Apple TV has the capability to store and display up to 1080i high-definition video material, most of the video available through the iTunes on-line store and You Tube (the Apple TV can directly access You Tube videos) is only 480i. The Apple TV, or your external video scaler, must upscale this material to match the resolution of a high-definition display. Even as more high-definition material becomes available the speed limitations of many users’ DSL lines will affect the Apple TV’s efficacy as a video device. Not many of us have the patience or desire to wait twelve hours for a high-resolution movie to download.

### **Apple TV Sonics**

Since the Apple TV has two-channel analog outputs some users will be tempted to try them out. Don’t bother. They only deliver slightly better sonics than the analog outputs on an iPod. Do yourself a favor and use the Toslink digital audio connection. I realize that Toslink digital connections have long received a bad rap in comparison to SPDIF connections. Many audiophiles feel that Toslink is less robust and likely to introduce higher levels of jitter. When given the option any audiophile worth their salt will choose RCA SPDIF over Toslink. But on the Apple TV you don’t have that choice, which may actually be a good thing. The Apple TV is a computer, and computers can generate copious amounts of power supply noise. The best solution for reducing possible negative effects on an audio system is to isolate this noise-producing device. A Toslink digital connection makes this easier to accomplish since it does not create a common ground between the Apple TV and the rest of your

system. Merely attach the Apple TV's AC power to its own dedicated AC filter and you have effectively isolated it from other audio components.

Most of the time I did not connect the Apple TV directly to the digital inputs of my Lexicon MC-12 HD A/V processor. Instead I used a Meridian 518 between the Lexicon and the Apple TV. I set the Meridian device to upsample the Apple TV's 16-bit digital stream to 24 bits. In addition to upsampling, the Meridian also served as a de-jittering and buffering device. When compared to a straight connection I immediately noticed that the Meridian delivered a better sense of depth and overall musicality. This difference was far more pronounced on 320 KPB MP3 files than on Apple lossless or AIFF files.

After a couple of weeks of burn-in I settled down to serious listening. I compared AIFF files on the Apple TV to the original CD tracks played back through both the Lexicon RT-20 and CEC TL-2 transports. The sonic differences between the Apple TV and the two transports were not as great as I had expected. The Apple did not sound identical to either transport, but neither do these two transports sound the same as one another. Actually the Apple sat somewhere between the two in terms of overall sonic personality. The CEC was the most musical and romantic sounding of the three. It excels at creating a more three-dimensional sense of depth, but it also delivers slightly softer transients and less dynamic impact. The Lexicon had the most matter-of-fact and detailed portrayal of the music. Its dynamic agility allows transients to retain the full measure of their startle effect.

But in terms of overall sonic quality the Apple TV was these two transports' peer. It delivered a wide soundstage that matched either transport. It also produced an equally precise lateral image with excellent specificity and focus. The Apple matched both transports in terms of harmonic balance, dynamic energy, dynamic contrast, low bass extension, and inner detail. Most importantly, the Apple retains the essential nature and feeling of the music. I never got the impression that

the music was merely “there” as with many mid-fi components. Regardless of whether I listened to commercial pop, classical, or one of my own live recordings, the Apple always delivered enough musical information to keep me completely involved.

After two months of almost continuous use I’ve been very pleased with not only the Apple TV’s sonic capabilities, but also its ergonomic elegance and reliability. It hasn’t crashed, jammed, or failed to function properly since its initial installation. The ability to cruise through my entire music library without leaving my comfy couch is more addicting than a jumbo-sized box of Cracker Jack. When you consider its price and sonic capabilities it’s hard to understand why any audiophile with a computer and Wifi doesn’t have an Apple TV in their system. A true 21<sup>st</sup> century music delivery device is finally here. The Apple TV offers every audiophile a gold-leaf-trimmed invitation to join the party.

### **The Logitech Squeezebox™ Duet – Another Voice for Other Rooms**

Fortunately for those of us who like to have choices, the Apple TV is not the only sub \$400 i-Tunes-friendly music server in town. Logitech’s Squeezebox™ Duet network music player presents Apple with a worthy adversary in the battle for music server supremacy. The Duet not only offers full iTunes interactivity and a remote with a full-color LCD screen, but also delivers a range of other network music options. Does it leave the Apple TV in the dust? The short answer is “different horses for different courses.” For many music lovers it makes perfect sense to own both.

### **What is a Network Music Player?**

The Logitech Duet offers a very different technological solution to the problem of how to move, stream and store music. Instead of an internal hard drive the Duet depends on other networked sources such as your computer’s music library and the Internet for its music. When you initially unpack the Duet you will be led through the installation process

by a very well designed instruction set. The first step is to install its server software on your computer. This program not only controls the Duet's configuration but also gives you access to a number of Internet music sources including Pandora, Rhapsody, Slacker, Shoutcast, Live 365, and Radio Time. Some of these are subscription services, such as Rhapsody, but others are free Internet radio portals. Although you don't need to have your computer up and running to access any of the Internet music sources you do need to set up accounts through the "SqueezeCenter" program, even for the free ones. Your Squeezebox account not only grants you access to copious amounts of music but also allows Logitech to automatically send firmware updates to your Duet. During set-up you have the option of either Wifi or Ethernet connectivity for the Duet. Since I suspect most owners will use Wifi, that's how I set up my review sample.

To play music from your own iTunes library you MUST have your home computer up and running. This is a fundamental difference between the Duet and Apple TV. The Squeezebox Duet is not an autonomous device. If you try to access your iTunes library when your computer is turned off it won't be in your Duet's menu. Once you boot up your computer the library will magically reappear. Anyone who doesn't want to leave his or her computer on 24/7 could find this a significant drawback.

The Duet itself is a smallish box with only one light on the front. This light can glow either amber, green, orange, red, or white depending on the Duet's operating state. During initial set-up and normal operation this colored LED delivers continuous feedback as to whether the Duet is completely happy. The other part of the Duet's dynamic duo is its remote, which easily ranks among the best I've ever grasped. Its 2.4 square inch color LCD screen is located at the top of its 6" by 2" by 3/4" case. Underneath the display is a circular click-wheel with a central enter button flanked by buttons at the four corners. At the bottom the remote has volume up/down, pause, fast forward and reverse buttons. The buttons all glow whenever you activate the remote, but the LCD screen and the circular click wheel are the stars of the show. Apply a bit

of downward pressure to the click wheel as you move your fingers around in a clockwise or counter-clockwise motion and it will take you anywhere you want to go. When not resting in the palm of your hand the remote lives in a recharging cradle. Logitech has included several screensaver clock options for its display so it can double as a very nice digital clock while at rest.

The menus on the Duet remote offer a multiplicity of ways to find music in your library. You can choose by artist, album, genre, year, personal playlist, random mix, or search via artist, album, song, or playlist. Even though the Duet system must gather its information from the i-Tunes music files on your home computer, which means it must send requests and get responses via the Wifi or Ethernet network, response time is remarkably fast. Once you've made a selection the Duet begins playing the music just as fast as the hard-drive-based Apple TV.

Unlike many remote controls, the Duet operates via radio frequencies rather than infrared light. That means you don't have to point, aim, or worry about whether the remote has line-of-sight to the Duet base station. In my home I can control the Duet from downstairs at my computer, which is at least 65 feet from the base station. When I walked outside I went over 100 feet down my driveway before the Duet remote lost its connection.

In theory the Duet has full access to all the artwork in your iTunes library. This was not the case for my review unit. Only about 25% of my iTunes artwork showed up on the remote. According to Logitech, Apple recently changed their artwork library specifications, which has resulted in a lot of "lost" artwork. Logitech hopes to find a solution soon and incorporate it into a future firmware update.

## **Radio! Radio!**

If you routinely use FM radio to discover new music the Duet will be a revelation. Not only can you access any American radio station with a

web feed, you can also listen to radio stations located anywhere in the world, and I do mean anywhere. Latin America, Asia, Europe, and Africa are all just a few push buttons away. Sonic quality varies wildly however. Some stations, such as WNYC2, one of New York City's classical stations, broadcasts at 128 kbps, which is good enough to rival all but the best analog FM. Many selections from WNYC had actual three-dimensionality and excellent low-level detail. Others stations, such as Denver Colorado's classical radio station KVID, are only 32 kbps, which isn't good enough for anything more than casual listening. Fortunately the Duet remote lets you know the bit rate of any radio station before you select it. The Duet also lets you develop your own radio "favorites" list. I can go from San Francisco's KDFC to Boston's WGBH in a few seconds. In the past month I've listened to more engaging radio than during the past several years!

Unlike the Apple TV you can actually turn off the Logitech Duet. But if you turn off the Duet base station you must also turn off the Duet remote. If you don't it will lose its link with the base station. Logitech is working on a solution to this bug and hopefully the next firmware update will solve this problem. Most likely by the time you read this review they will have turned this ergonomic hiccup into a non-issue.

### **The Sonic Shoot-out**

For audiophiles who make all their purchasing decisions based solely on sound quality I have some bad news – I couldn't hear a lick of difference between the Apple TV and the Logitech Squeezebox™ Duet using their digital outputs. I hooked up both units to the Meridian 518 so I could match their output levels since the Duet's native level is 1 dB louder than the Apple TV. Also the Lexicon MC-12 HD has a one second delay and fade-up to full volume whenever you change inputs which makes it less than ideal for critical A/B/X listening. Yet regardless of whether I listened to MP3, apple lossless, AIFF, or WAVE files the sound from these two servers was sonically identical. I conducted multiple blind listening tests using a friend as a human switchbox. I couldn't identify

either unit with any level better than random chance.

The Duet also has analog outputs, but just like the Apple TV, their sound quality falls into the mid-fi category. Some audiophiles claim that earlier generations of Logitech/Slim Devices' Squeezeboxes can be vastly improved by substituting a better power supply for the original digital switching supply. Because the Duet uses a better quality regulated supply this tweak should have less, if any, sonic effect. But even after performing mega-tweaks I can't imagine that the Duet's analog output sound quality will begin to rival any high-end stand-alone D/A. Stick with the Duet's digital output and you'll be happy.

Since I couldn't hear any sonic differences between the Apple TV and Logitech Squeezebox™ Duet I didn't bother comparing the Duet to a stand-alone CD transport. I'm confident that even the most golden-eared subjectivist will discover lossless digital files played through the Duet will keep them as emotionally involved as the original CD played by a high-end transport.

### **This or That?**

Faced with the choice of buying either the Apple TV or the Logitech Squeezebox™ Duet which one would I choose? The answer is easy – both! These two units, whose combined street-price is less than \$800, complement each other. The Duet is the radio king. Through it you can listen to almost any FM radio station in the world. Its full-color remote can leap through tall buildings with a single bound and it even doubles as a nice digital clock. Apple TV's ability to store your entire iTunes music library on its own internal hard-drive gives it a unique level of autonomy. Accessing any music video in iTunes or YouTube's vast libraries makes it tempting to spend an entire evening surfing from one vintage performance to another. One viewing of Ry Cooder's band on BBC's "The Olde Whistle Stop" and you'll be hooked.

For audiophiles who haven't yet made the leap to a music server the

time to jump is finally here. The sound quality and ergonomics of either the Apple TV or the Logitech Squeezebox™ Duet make them worthy of installation in even the most exalted high-end system. It doesn't hurt that they are ridiculously inexpensive. Never before has so much high-quality music been so readily available at the touch of a button. One last warning - after you install a music server in your system you'll never be able to go back to hunt, find, load, listen, again.