

Assassin HTPC

Testing the Assassin Audiophile AR-1 Media Server for Noise

1) The Setup:

The listening room is a dedicated, 2-channel listening room with Wilson Audio MAXX2 speakers, Krell monoblocks (650Mc's), Krell HCT pre-amp, Berkeley Alpha DAC, and Marantz SA11S2 SACD/CD player. Speaker cables are Transparent Reference XL ; interconnects are XLR by MIT. Power conditioner is by Tice. Sound Pressure Level meter is a NADY digital DSM-1 mounted on a tripod at a distance of 1-meter and at the listening distance of 13' 9". Testing is done without the room's air conditioning system on. Sound meter settings are LO (30-100DBA) and Fast (to capture variable sound peaks). When sounds are not highly variable, the tester captured the low sound via the use of the MAX-HOLD function on the testing device. With highly variable sound levels, the range of sound levels is shown.

2) Baseline tests: Listening Station located 1-meter from audiophile equipment:

- a) Ambient room noise (A/C off, windows closed, no fridge within listening range) = 33.6 dba
- b) Audio system on CD player on standby (Note that the Assassin AR-1 media server or its monitor are both off at this time), CD player on standby = 33.7 dba (figure 1)



Figure 1: Noise Level with all Audio Components on except AR-1

- c) Audio system and AR-1 on standby = 33.7 dba (the noise from the PC is solely the fans, a contribution of ZERO dba to the sound of the system – at 1 meter). This means the fans being used in the AR-1 machine have the same output as a fully fanless computer (relative to ambient noise), but the AR-1 can play a full range of audio files, including blu-ray audio and video tracks, that are not available to the sound cards on the fan-less computers.
- d) Audio system and PC on standby with microphone at listening station distance of 13' 9" = 33.7 dba. Obviously, if no sound above ambient room noise can be heard at a 1 meter distance from the audiophile PC, then the same is true at over 4 meters.

- e) Audio system on, AR-1 starting up and loading operating system and JRiver software: 33.8 to 33.9 dba. While the one or two-tenths of a decibel produced by the machine at start-up can be registered by the sound meter, it is not registered by the human ear (except for the noise of pushing the start button). This silent start-up is due to the use of a solid-state hard drive to house the Windows 7 Ultimate (64-bit) operating system plus the JRiver Media Center software, plus other necessary software. An ultra-quiet 2T Green hard drive houses the actual audio files.
- f) Reference CD player (not the Assassin AR-1) loading an audio disc = 44.2 dba



- g) CD player playing an audio disc with pre-amp on MUTE = 33.7 dba. In other words, during playback, the CD player exhibits its reference quality – no sound is added to the ambient noise in the listening room.
- h) Assassin AR-1 playing an audio file with the pre-amp on MUTE = 33.7 dba. In other words, like the high-end CD player, the reference quality Assassin AR-1 adds no measurable noise to that of the sound system being on standby. Remember, the noise coming from the playback process involves ONLY the spinning hard drive taking less than a second to retrieve the FLAC file, place it in RAM, and then begin playing the file from memory. Importantly, even this very brief noise of the modern generation of internal Green hard drives cannot be heard at the 1-meter distance, over and above ambient listening room noise.
- i) To provide an even more dramatic test of the quietness of the Assassin AR-1 spinning green drive, we transferred a 30G blu-ray file from the PC's 2T hard drive to an external Western Digital hard drive running on a USB 3.0 port. At transfer rates of over 100megs per second, the sound of the two hard drives together did not register over the ambient room noise of 33.7dba! *Note that the external drive is quiet but not as quiet (according to the manufacturer's data) as the Assassin AR-1's internal Green drive. The external drive was placed behind the audiophile PC, thus blocking a portion of its inherent noise.
- j) Assassin Ar-1 ripping an audio CD to a FLAC file using the JRiver software. When the AR-1 is ripping a file, the optical drive is spinning at several times its normal speed than when simply playing a CD. This higher speed does produce some noise over the ambient noise of the listening room – 37.2dba instead of 33.7dba. In comparison, the same task performed

by the reference CD player resulted in a noise level of 44.2 (see above), over 10 decibels louder than the Assassin AR-1. Most importantly, the CD player makes this noise every time the disc is played, while the reference PC makes its ripping noise only once – when the audio file is being copied and stored on the computer’s hard drive. Future playbacks of an audio file on the PC involve only a brief retrieval from the hard drive – and this brief sound does not register above the ambient noise level in the listening room!

In summary, the Assassin reference media server is virtually silent within the audio system of the audiophile. This silence completely negates the claims made by very high-end media server manufacturers who say that audio computers must:

- a) be fan-less,
- b) have no spinning hard drives.

These manufacturers (such as Sooloos and Naim) have developed systems that rely on remote servers, managed by the manufacturers, to house audio files. The audiophile himself loses control of the process (in some cases, even the deletion of an individual audio file must involve company intervention). Even worse, the fan-less computer designs have led to the use of CPUs and motherboards that do not permit the media server to take advantage of the latest high-definition forms of audiophile-quality music. That is, these chips must be less powerful than otherwise, so as not to produce much heat. The less powerful chips, in turn, do not permit the audiophile to listen to audio from blu-ray files, or from the few web sites that stream hi-def audio (such as certain sites available only through a fully functioning browser – e.g., the Berlin Philharmonic Digital Music Hall).

The Assassin AR-1 allows all of this and more (such as the use of 3D video sources) via the use of the latest generation of Intel “Sandy Bridge” chips. To control the necessary heat from these chips, the Assassin AR-1 uses a proprietary cooling system.

The same thing goes for the new generation of hard drives. The Assassin AR-1 2T Green drives are perfectly quiet in a very low noise listening room. To give you an idea of how quiet the Assassin reference model is, note that the sound measurements taken above involve the user breathing behind his cupped hands. Conversely, when the user of the sound meter breathes normally, the sound level meter registers, at a distance of 1 meter, a noise level of about 34.2 dba! That’s right, breathing involves noise of about one-half a decibel above the ambient noise of the room, while running the Assassin AR-1 involves only about one-tenth of a decibel of noise above ambient noise. Breathing is 5 times louder than the Assassin AR-1!

So, these tests make clear that the old days of audiophiles shunning PCs with fans and hard drives are over. Audiophiles, in this second decade of the 21st century, will want to focus on having not only the very best in sound quality but also the very greatest degree of flexibility in finding and listening to great audio. Some of this audio exists on blu-ray discs and on websites.

There is also the question of longevity. The new computers have not had enough time to demonstrate their longevity. But heat readings via the built-in sensors in the new machines suggest

that lower heat levels result in longer lasting components. When compared with the fan-less models, the Assassin AR-1 runs much cooler.

This paper has focused only on the issue of noise. Other issues relate to the quality of the software doing the ripping of the audio CD or blu-ray disc, the quality of the software's interface(s) – including so-called Theater Views – and the use of Android-based or iPad-based touch-screen remote controls. See a review of these issues at the Assassin Audiophile website.

Please Review Table 1 below for a summary of the data reviewed above.



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Table 1: Sound Testing on the Assassin AR-1 from 1 meter listening distance:

| | Sound Level | Notes |
|---|-----------------|--|
| Ambient Room Noise (controlled environment in remote location) | 33.6 dba | No Air Condition or refrigerator present |
| Audio System on Standby, Assassin AR-1 off | 33.7 dba | Control Group |
| Audio System and Assassin AR-1 on Standby | 33.7 dba | No sound added to ambient noise |
| Audio System on and Assassin AR-1 starting up and loading initial programs. | 33.8 dba | 0.1 dba added to ambient noise; (sound of Hard drive spooling) |
| Competitor Reference CD player loading an audio disc. | 44.2 dba | 10.5 dba added to ambient noise |
| Assassin AR-1 one-time ripping audio CD to FLAC file using jRiver software. | 37.2 dba | 3.5 dba added to ambient noise; (compared with +10.5dba added with reference CD Player) |
| Assassin AR-1 transferring 30GB blu-ray movie to external HD | 33.7 dba | No sound added to ambient noise |
| Competitor Reference CD playing an audio disc (with pre-amp on mute) | 33.7 dba | No sound added to ambient noise |
| Assassin AR-1 playing audio file (with pre-amp on mute) | 33.7 dba | No sound added to ambient noise |
| Sounds of listener breathing | 34.2 dba | 0.5 dba added to ambient noise |

Listening Room is a dedicated 2-channel listening room with double sheet rock on all walls; 3 miles from nearest roadway or other dwelling. System consists of Wilson Audio MAXX2 speakers, Krell FPB amps (650Mc's), Krell HCT pre-amp, Berkeley Alpha DAC, and Marantz SA11S2 SACD/CD Player. Speaker cables are Transparent Reference XL; interconnects are XLR by MIT. Power conditioner is by Tice. Testing done with a NADY digital SPL meter.

Summary: AR-1 is virtually silent with only minimal noise contributed to environment during CD ripping. In comparisons with totally passive systems, the AR-1 shows no difference in noise contribution, and actually is quieter due to not having to load CD/Media each time because it is able to store content electronically. This directly disproves the claim that an audiophile machine has to be fan-less, with no spinning hard drives to be silent.

Benefits: Greater User flexibility as well as protection from hardware burn-out commonplace in passive systems. Importantly, the audio bit-streaming is perfect, using the JRiver software, allowing error-free testing of alternative external DACs. Also, the more powerful components and drivers allow the user to listen to highest-quality audio from blu-ray files and hi-def streaming websites, in addition to hi-def audio.