

Tonochi's Audio Room - Supplemental Information

About PC-based Audio



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[The contents of this document were reprinted from my previous website 'Tonochi's Audio Room'. The original was written in May 2015]

From 2004 through 2014, I tried a PC-based audio system and evaluated it in my way. As I did that in my spare time, my evaluation is not so perfect, though, I got a knowledge about PC-based audio in a way. Here, I'll show my experience and comment about it.

My First Experience of PC-based Audio w/ ONKYO WAVIO

My first experience was **ONKYO WAVIO SE-U55GX(B)**, which I bought in December 2004.

I spotted it when I was looking for some PC parts at a PC shop in Akihabara. At that time, I already knew that a PC can be used as an audio recorder, though I didn't expect high sound quality (SQ). However, I bought the WAVIO expecting higher SQ than ordinary sound cards, as it was a product of an audio products corporation, ONKYO.

I used it with a small lap top PC, NEC Lavie (Windows XP).

The first impression of WAVIO was so bad. I felt its SQ was so bad.

I stopped using it for a couple of years for that bad impression. But I realized the cause was not WAVIO itself but the line cable.

At that time, I used Audio Technica Fine Gold (screened wire) and Mogami 7551 (RCA plug) as Gaudi's standard parts for line cables. I had selected both parts only because they were products of reliable manufactures and inexpensive. I should have done thorough evaluation.

Fine Gold was particularly no good. Trebles sounded unnaturally rolled off as if the tweeters hadn't been working, although the measured frequency response didn't indicate any problem.

7551 had a poor SQ just as Mogami's website said without any hesitation that it was not designed as a high SQ plug. The combination of these parts was the worst I'd ever experienced. I realized this for the first time when I used this combination to connect the SACD player (SONY SCD-555ES) with the preamp (PA-210).

After the cable was replaced with the one using Belden 8412, the SQ was improved. Still the replay sounded apparently worse than the original.

I used WAVIO several times in order to rip LPs and burnt the data on CD-Rs for my friends and relatives. But I didn't feel like ripping my LPs. I came to forget it before I used it for my own sake.



Audio Technica
Fine Gold



Belden
8412

2nd Wavio

When my small lap top PC (NEC Lavie), which was used for audio, was broken in May 2012, I bought a new PC instead of having the old one repaired. The new one was Lenovo ThinkPad X121e. The OS was Windows 7. The device driver for WAVIO SE-U55GX(B) supporting Windows 7 was already discontinued at that time. So I decided to buy a new WAVIO.

I bought **SE-U55SXII** at an online store where it was sold at the lowest price.

I had expected its sound quality (SQ) was better than the former WAVIO (SE-U55GX), though, it didn't live up to my expectation. I guess its SQ was worse because of the switching regulator in the power supply (a transformer type power supply was used for SE-U55GX).

When I was using SE-U55GX, I studied almost nothing about PC-based audio. I used it according to its manual.

Those days, PC-based audio was more and more arousing interest among not only PC users but audiophiles. I found a magazine article featuring PC-based audio for audiophiles at a nearby public library.

I learned a lot from the article: hi-res music files were available at several websites;

WASAPI of Windows should be set in exclusive mode; some free programs were supporting the exclusive mode; etc.

I employed **foobar2000**, a freeware audio player, and installed it with **WASAPI output support component** in order to use it in the API exclusive mode.

I looked for hi-res music files in domestic websites, but only limited number of titles were available. So I decided to get hi-res files from Linn Records in England and HDtracks in USA. Though HDtracks offered many titles, its service was restricted in USA only. Linn restricted its service to Japan too. I figured out the magazine article was not trustworthy.

In spite of the difficulty, I could download some hi-res files.

The downloaded hi-res files sounded far better than files recorded with WAVIO. I lost interest in recording and began wanting a high-definition replay equipment or USB DAC.

I stopped using WAVIO in Gaudi soon, and used it in my second audio system for a while. I was not so happy with the system, and I sold my WAVIO soon.



KORG DS-DAC-10

In May 2013, I bought a USB DAC, KORG DS-DAC-10 after reading a magazine article that said it was a quality USB DAC on a budget. It cost me about JPY 50,000. Though I usually don't rely on magazine articles, I exceptionally consulted the reviewer's report. Other than price/performance ratio, the feature I liked was the support of DSD. I was already familiar with DSD sound as I had been using SACDs since 2001. At that time, I believed DSD was the best digital format. I was keen to listen to DSD recordings directly (without SACD discs). Moreover, DS-DAC-10 supported DSD5.6M, whose sampling rate is doubled from SACD. It was very attractive.



The magazine article said USB cable should be more expensive than JPY 10,000 per meter. But it didn't show any scientific grounds or technical data. I didn't feel like spending that much money for the cable.

I bought a 3m long, high quality USB cable with gold-plated plugs at a PC shop, and Oyaide d+ USB ClassA 0.7m at Oyaide's online shop (JPY 4,725).

In addition to that, I bought Oyaide d+ RCA ClassB 2.0m (JPY 4,200) for the line cable.



I installed **AudioGate 2** and **ASIO** driver. Both of them were genuine software products of KORG.

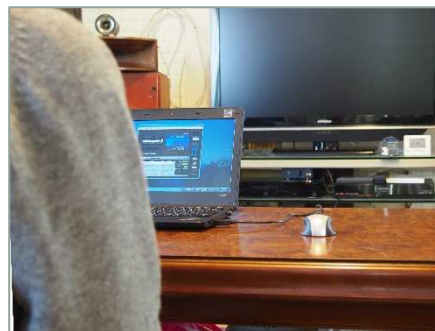
Installation #1 - PC placed near the Listening Position

The PC was placed near the listening position with the 3m USB cable. The PC was so small that the display couldn't be read unless being placed near the listener. If the PC is near the listener, all the operations can be done at the listening position. It is so handy. I intended to keep this installation if SQ was fairly good.

DS-DAC-10 was installed on the TV rack and connected to the preamp (PA-210) with d+ RCA ClassB 2.0m.

This installation didn't live up to my expectation. SQ aside, the fan noise was so loud that I couldn't concentrate on music. I realized a small PC like ThinkPad X121e is rather noisy. Though the noise level is not so loud for other applications, it is a little too loud when it comes to audio application.

The larger fan makes less noise at the same airflow level, but only a very small fan can be used in a small lap top PC. I think it's difficult to suppress the fan noise.



Installation #2 - PC placed on TV rack

The PC was placed on the TV rack. The distance between the PC and DS-DAC-10 was so short that the shorter USB cable, d+ USB ClassA 0.7m, could be used.

I connected the PC with the TV via HDMI so that the large screen of the TV could be used as the PC display. The wireless mouse was placed near the listening position so that the PC could be operated from there.

Despite of using the USB cable for audio, I felt SQ got worse. It was so terrible that I made a phone call to KORG's Customer Support and consulted about how to use DS-DAC-10.

First of all, I was told "Are you using a USB cable for audio? Probably it's worsening sound quality. Use the accessory cable." I was not pointed out that there were any other problems.

I hadn't used the accessory USB cable because it looked cheap (with thin wire and nickel-plated plug). I replaced the USB cable soon, and SQ was dramatically improved. Now the USB DAC sounded like hi-res.

Once again, I experienced the same old thing, 'the more expensive an audio accessory is, the less effective it is'. I guessed the anomalistic construction of d+ USB ClassA increased the error rate, though luxury parts like a 24-carat gold-plated plugs were used. The plugs were questionable because they were not precise in dimension and loosely fit to the jacks. The maker's website didn't mention any theoretical explanation and technical data. I don't recommend such a cable.

At the same time, I replaced the line cable with Gaudi standard cable (Belden 8412).



Installation #3 - Adding BusPower-Pro



Though SQ was improved thanks to the USB cable, I was still not satisfied. I doubted the power supplied from ThinkPad via the USB cable was not good enough in quality.

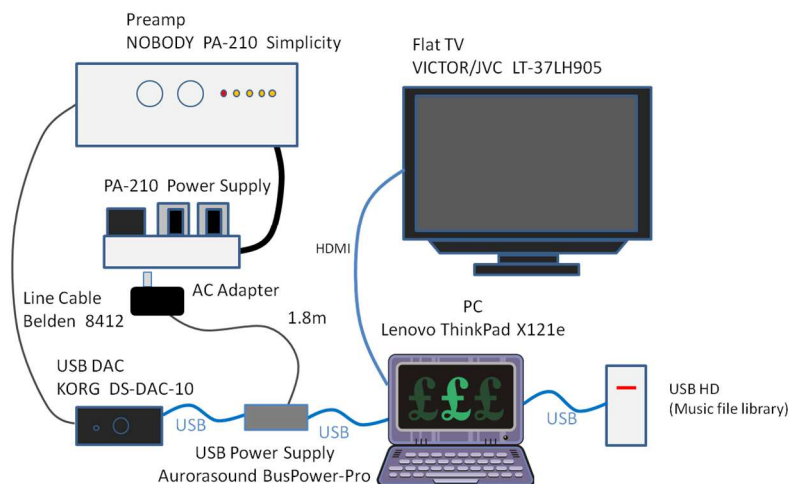
I found online a USB hub that supplies DC +5V and passes signals and ground through. It was **Aurorasound BusPower-Pro**. I bought it without hesitation. The price was about JPY 10,000.

What I thought at my first glance of its inside was "it must be designed by a novice engineer."

BusPower-Pro regulates the unregulated DC power supply from the AC adapter with the 3-terminal regulator (7805) in the main unit. I guessed the designer didn't care much about the quality of the AC adapter as the power supply was regulated in the main unit anyway.

However, the cable length was as long as 1.8m, and it was too long to regard the ground potentials of the two units as the same. Based on my experience with the preamp PA-203, it is my theory that the cable should be 20cm or shorter in length. That's why the cable length of PA-210 PSU (Power Supply Unit) is 20cm.

Block Diagram of PC-based System



There were some obvious problems in this product.

The shield of the PC-side cable was not connected to anything so it was electrically floating. It worked as an antenna to catch noises. It was so defective that turning on/off a florescent lamp in the next room often caused an error and aborted replay.

I connected the shield to SG of the device port and errors never happened thereafter.

One more catch was that BusPower-Pro had no power switch. Fortunately, PA-210 PSU has a switched outlet, so I plugged the AC adapter to it.

SQ was slightly improved. It sounded more open and brilliant, but I was still not satisfied.

Installation #4 - DS-DAC-10 displaced

It was a little change, but it improved SQ much; I placed DS-DAC-10 a little far from PC.

PC used to be placed on the top of the TV rack and the DAC just under PC. I displaced the DAC sideways by only 30cm. This apparently improved SQ.

I guessed unwanted radiation from PC was so intense, especially underneath it. It's certain that PC complies to regulation for information devices, though, it's not enough for audio devices. I concluded that audio devices with analog circuits in them like DAC should be kept away from PC.

I quit using BusPower-Pro, because the new installation improved SQ far more than using it.



Now AudioGate has been updated to Ver. 3, but I still use Ver. 2 as of June 2015. Though Ver. 3 is better in SQ, it needs more CPU power than ThinkPad X121e can offer, and replay interrupts sometimes.

I hadn't supposed music player programs need so powerful CPU to replay only sounds. When I checked KORG's website before buying DS-DAC-10, it said Pentium 1GHz or higher was required. I judged E300 1.3GHz of X121e met the requirement.

Now I know the algorithm is so complex to achieve the best sound quality, and powerful CPU is required. Ver. 3 requires Core 2 Duo 2.66GHz or higher, the manual says.

AudioGate 2 looks like a game program. I don't like it, especially when it appears on TV screen. I prefer more artistic appearance.

Comparison with other sources

Vinyl vs hi-res

I could get the same album in the different media. It was Bill Evans Trio, Waltz for Debby. I compared them.

- LP: Analog Productions APJ 009 Seq. #4419

- Hi-res: 96kHz/24bit, HDtracks

I judged the vinyl excelled the hi-res. If the seq # of the LP had been lower or it had been the original disk in vg or better condition, the difference would have been larger.

SACD vs hi-res

I couldn't compare them thoroughly because I didn't have the same title. But SACDs replayed with the SACD player (SONY SCD-555ES) sounded better than hi-res files played with PC and DS-DAC-10 to my ears.

As you know, SACD's format is DSD, so I wanted to download DSD files (DSF or DSDIFF). But there were few websites offering DSD files and no titles familiar to me were available. I hope all the master files released in SACD would become available at download websites.

CD vs ripped data

I had ripped all the CDs in my collection and saved the files in a hard disk drive. I compared them with the original CDs played with SCD-555ES in a way replaying the two media at the same and switching them with the selector of the preamp (PA-210). I used more than 30 albums. I felt CD was better for every album.

Most CD players have signal processing feature to improve SQ of CD, and SCD-555ES is one of them. SQ of CD is nearly as good as SACD. On the other hand, DS-DAC-10 doesn't seem to have such feature. SQ of CD quality files is evidently not as good as hi-res.

As the majority of my collection was CD quality, I thought I needed a digital player that replays CD quality files in high SQ.

Conclusion

I guessed radiated noise from PC worsens SQ more seriously than I had anticipated. To make sure, I carried out some simple experiments.

Experiment using AM radio

I got my radio-cassette recorder receiving AM radio close to PC. Noise was heard.

I did the same thing to TV. Noise was heard too. I guessed its powerful DSP and driver of the LCD were the source of the noise. Strong noise came from the blowholes at the top.

SCD-555ES didn't radiate noise as might have been expected.

Confirmation

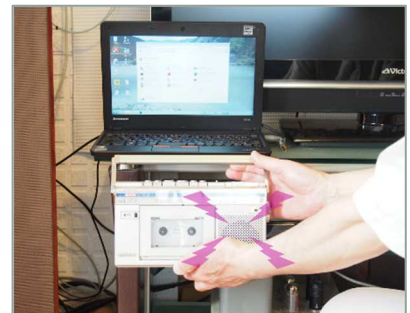
The radiation noise is electromagnetic wave, which is the combination of magnetic and electric fields. Shielding magnetic field is more difficult than shielding electric field. NOBODY amps have electric shield but not magnetic shield. They are likely to be affected by radiation noise.

I got PC close to the preamp (PA-210), and confirmed that PC lowers SQ though it was not connected.

PC should be kept away from the preamp. But I think turning off PC is better solution. If it is connected, conduction noise will be added. It's obvious that PC is a cause of low SQ for an audio system.

My conclusion: a digital device like PC that is not an audio device always impairs SQ. In addition to radiation and conduction noises, the noise of the cooling fan is the cause of trouble too, especially in summer (in high ambient temperature).

A digital player that is designed as an audio equipment is desirable to replay digital music files.



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NOBODY Audio

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