

**Waversa**systems  
WLAN EXT 1 Isolator



Recently, I connected a LAN noise isolator from Waversa Systems in the main room of the Hi-Fi Club. As it had been referred to by several names, I asked the Waversa CEO Collin Shin the official name. He replied 'the WLAN EXT 1' as it is the external type. I tracked the difference in sound quality between attaching this isolator to the front of the MSB Premier streaming DAC and simply plugging the LAN cable into the DAC LAN port.

A little concerned the difference would be small, I was pleasantly surprised at how easily it was. There were significant changes in the sense of the experience, mainly in terms of resolution, signal to noise ratio, and sound stage. In the auditory sense, the result was very similar to when a shield is well formed or when electromagnetic noise (EMI, RFI) was effectively blocked, and when vibration and resonant noise was removed through a well-made insulator or audio rack.

#### WLAN Isolator Fact Check



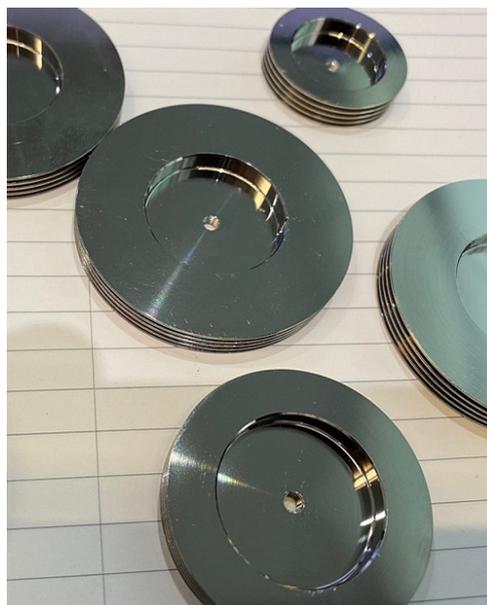
WLAN Isolator is an isolator that removes a variety of noise coming through the LAN cable. Looking at the exterior, it is a simple design with two ethernet terminals on a chrome-plated

chassis. Naturally, one side is the input and the other side is the output. The provided short LAN cable can be used for input or output. This will be discussed in detail later.



Isolator module installed inside WCore (WLAN INT Module)

First, let's start with the birth process of this "external" LAN noise isolator. The term 'external type' suggests that an 'internal type' exists too. In March, Waversa made a paid upgrade to install a WLAN noise isolator inside the popular WCore. The patented isolator module (WLAN INT Module) was installed to dramatically block noise from entering the LAN cable. It was also explained that it will be applied to WDAC3, WDAC3T, and WVDAC in the future.



Looking at the photos and drawings that Waversa released, the isolator module looks like a round disk and varies in size. According to Waversa, 'the background is clean by completely blocking noise by applying a combination of technologies such as a shield and

electromagnetic field.' The product we have puts this module in a case and released it literally as an external type being the WLAN Isolator.

### **CEO Collin Shin talks about the WLAN INT module**

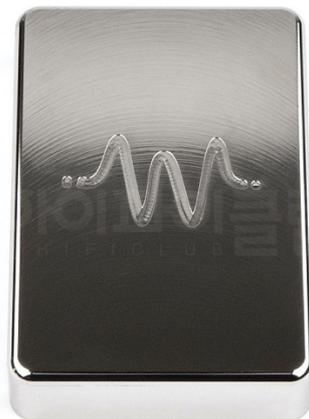
I made a phone call to CEO Collin Shin. After all, the key is this WLAN INT module, because a more detailed explanation was needed. I had to convince myself more than anything else.

-Is the transformer concept used in some brands of LAN switching hubs?

Collin: No, The concept itself is different.

-So, what principle do you use to remove noise?

Collin: We have to be careful because this technology has been patented, but I can tell you this much. Once this module forms an electric field and an electromagnetic field, it excludes noise that intervenes in the signal passing through it. A lot of RFI noise comes through the LAN cable, which is impossible (cannot be removed) with an existing low pass filter. It also removes noise from the signal itself.



-Not only electromagnetic noise, but also the noise of the signal itself?

Collin: Yes, that's correct. Digital signals create new noise in the process of transmission. It's noise caused by mutual interference. Especially when there are multiple pairs of data cables, this noise gets worse.

-Looking at the LAN noise isolator, a short LAN cable is provided as standard. Should this cable be plugged into the wall LAN terminal, or should it be plugged into the device side?

Collin: It depends on what the noise provider is. If the wall noise is severe, a short cable should be plugged into it. In short, you should place the WLAN Isolator on the side close to the noise. That way, you can quickly get rid of the noise. Therefore, it is not recommended to attach it to the back end of the WCore (low noise). Because there is no difference. On the other hand, if you connect a long LAN cable to the side close to the noise, the cable itself creates jitter.

## LAN cable and electromagnetic noise



In summary, the LAN noise isolator module is the core of the W LAN Isolater, and this module 'forms an electric field and a magnetic field to remove RFI noise from the LAN cable and noise generated by the digital signal line itself'.

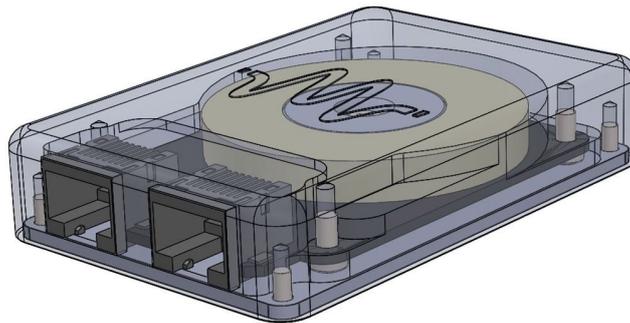
Let's weigh them one by one. First of all, it is safe to assume that electromagnetic waves are ever present in our daily lives. In the Anglo-American region, the phenomenon in which the original signal is disturbed by such electromagnetic waves is called electromagnetic interference, that is, Electro-Magnetic Interference (EMI). In particular, in the case of audio, since it deals with a frequency band that is very sensitive to human ears, EMI is commonly referred to as electromagnetic wave noise. Interference caused by an electromagnetic field is viewed as a type of noise.



Radio frequency interference, that is, RFI (Radio Frequency Interference) refers to when EMI noise occurs in a radio frequency band (10 kHz to 1 GHz). RFI noise is fatal in audio because this band affects the audible range (20Hz-20kHz) as well as the harmonic range (6kHz-20kHz), which determines the tone and spatiality of the instrument. The only bands that are

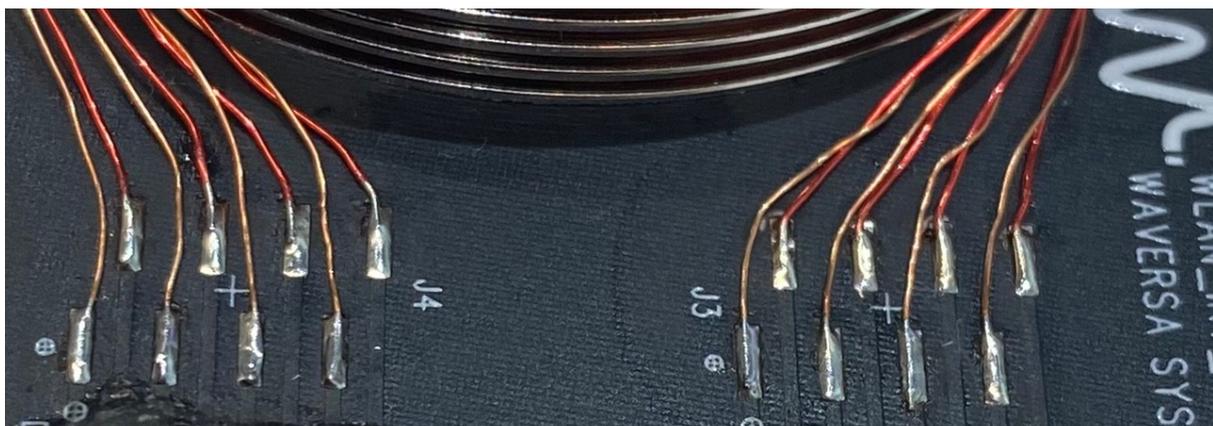
safe from RFI noise are microwaves (1GHz~100GHz) or infrared rays (300GHz~430THz) that are irrelevant to audio or video signals.

And, as everyone knows well, shielding is a representative solution to block such EMI and RFI noise. By the way, Waversa explains that it blocks RFI noise by using electric and magnetic fields as well as this shield. Therefore, in my opinion, Waversa's LAN noise isolator module is a principle that removes electromagnetic noise from a LAN cable through a kind of active shielding.



Inside the WLAN Isolator

The basis for my assumption is a picture released by Waversa. In the WLAN Isolator, eight very thin coils are connected to each of the two LAN ports, and each coil is output through a different port after returning from a round disk-shaped module. In other words, these coils wound around the disk act as a kind of solenoid coil to form an electromagnetic field, and this electromagnetic field may "cancel" the electromagnetic wave noise that has "already" entered through the coil.



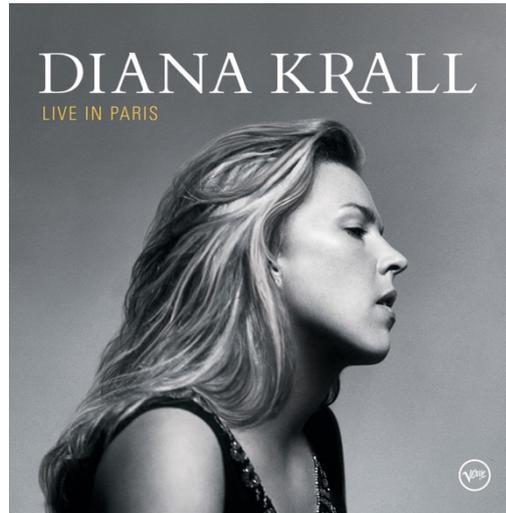
8 wires assigned to the LAN port

Meanwhile, the reason that 8 coils per LAN port are allocated inside the device is because the LAN cable contains eight wires. Four strands are for music signal and the remaining four are for power supply. In general, wires 1 and 2 are for "transmitting" plus and minus signals, respectively, 3 and 6 are for "receiving" plus and minus signals, respectively, and the remaining 4 wires are for DC plus and DC minus. 'Active', which means electricity flows in



## Auditioning

### Diana Krall's Wonderful Live In Paris



First, I listened with the isolator plugged in. The sense of distance and resolution between vocals and instruments is good, and the stage is very wide. The sound itself is very fresh. Disconnecting the isolator and connecting the existing LAN cable directly to the streaming DAC, the stage suddenly becomes narrow enough that it feels cramped as in other recording versions.

The sound of the piano's right-hand keyboard touch is also less prominent. When the isolator is put in again, the rhythm and pace feel live and even the dynamic range increases. Most of all, I can hear improvements on guitar, percussion, and vocals. In the past, we reduced the harm of electromagnetic wave noise by demanding a well-shielded LAN cable, but I think there was such a big difference here. It's an abstract word, but it just seems to have increased musicality and increased the intensity and fine control.

### Keith Jarrett-Part II-A The Koln Concert

KEITH JARRETT  
THE KÖLN CONCERT



ECM

It's a piano sound that's so lush that it demands your attention. It is rich in overtones and the background is quiet. Overall, the sound played back is well-organized. As much as it is a sound laboratory, star-like notes pop out from the single piano.

The WLAN Isolator seems to be working more than expected. If you listen without it, the dense air that filled the stage disappears, and the front of the stage appear to be masked by a curtain. Keith Jarrett's moans are inaudible. Maybe it's because the noise floor has risen. When the isolator is put in again, the overtones of the piano become rich and soft, of course. When I heard it without, I think it was a very rigid note. Each note is sketched in detail.

### Piano Trio No.1 Brahms Piano Trios Nos. 1&2



When you listen with the isolator on, a really quiet background unfolds. It's been a long time since the cello's texture sounded so vivid. The violin that appeared next gives a fierce and straightforward tone compared to the cello. It is a violin that clearly makes its own voice this day.

If you remove the isolator and connect the LAN cable directly, the cello becomes thinner and softer, and its thick texture is less alive. The feeling that both sides of the stage are cut off also continues. The recording space is an auditorium at the University of Munich, but it is regrettable that the reverberation is less alive, isolated.

### Conclusion

Waversa's WLAN Isolator showed a clear sound quality improvement effect by removing electromagnetic noise from a LAN cable. The biggest change was that the stage background became quieter and every note defined, followed by a wider sound stage, an increased sense of space, and energy; especially the low-frequencies were revived. More than 10 significant improvements can be said to have resulted.

In addition, it is also noteworthy that a separate power supply is not required, and the input location can be selected according to the noise environment, such as between the wall, LAN port and the router, or between the router and the device. Nowadays, when streaming sound sources have become the norm and LAN cables have become a necessity, Waversa seems to have created a revelatory product. We encourage you to listen to and give it serious comparison.

by Kim Pyeon Audio Columnist, HiFi Club