

# Technical Brain's Idea of the Perfect Amplifier

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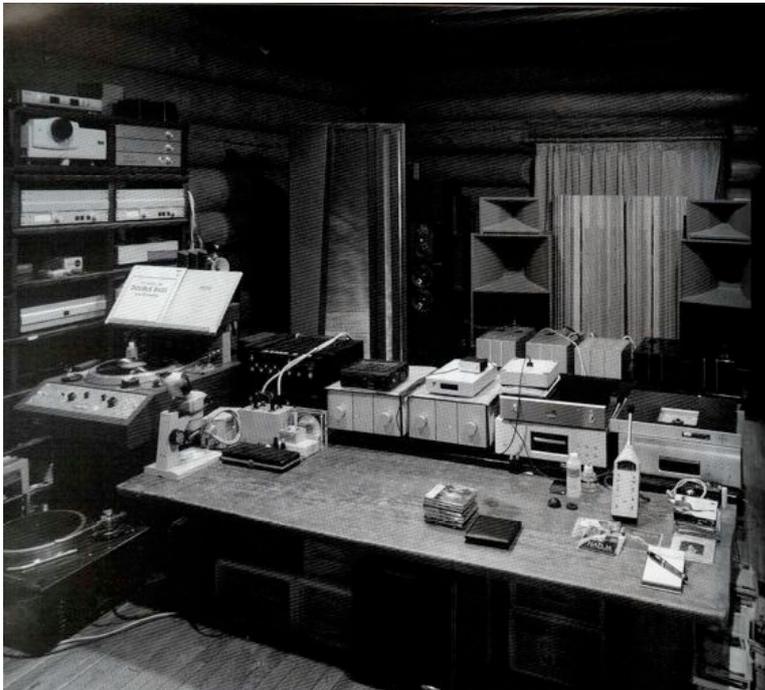
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If you pursue sports cars, you may come to think that the perfect sports car is something similar to a race car. Its attractiveness is not luxury equipment or accessories but a dedication to performance. If I say the Porsche 911 GT3 RS or the Ferrari 599 GTO is the ultimate car, is that being a bit too radical?

I cannot help thinking that Technical Brain's amps have something in common with those ultimate sports cars.

Technical Brain's pursuit of "reproduction ability at the ultra-micro level", "high-fidelity at every sound level", "high-resolution even when multiple sound sources are mixed", "elimination of modulation" and so on, along with the company's technology and production methods, which are all orthodox but extremely difficult to materialize and produce, appeal to anyone interested in high-end audio.

I recently visited Mr. Naoto Kurosawa of Technical Brain. As far as I can remember, this is the first time in 20 years that I have met him. When the company's main job was to maintain and service high-end audio equipment from overseas, I visited his office in Kanda-Awaji-cho, Tokyo through an introduction from a friend. Because his office was filled with highly-accurate, high-performance measuring instruments that were not usually used for the maintenance of audio equipment, I thought he must have been working at this job as a hobby.



Later, the office was relocated to the suburb of Kawagoe-city, Saitama and Technical Brain started developing their original amplifiers, along with providing maintenance and consultancy to other companies and individuals. The listening room and café in a Canadian log house attached to the office/workshop provide discussion space for audiophiles. Mr. Kurosawa seems to be actively involved in their discussions to train genuine audiophiles.

The listening room has a high ceiling and is full of various speakers, old and new. I started my audition of the latest version of the TBC-Zero preamp and TBP-Zero/2 power amplifiers

with the original Apogee speakers.

I could feel a strange sensation. The singer and musicians played on a stage that appeared to be between the speakers, but I found the distance from the sound source interesting. The sound was not at my very nose, but was some distance away. Yet, the sound itself was extremely realistic. If these amps had been available when the Apogee speakers were first released, I am sure I would have been surprised by the sound quality. When the amps drove the Technics SB-M10000, the speakers' true ability was fully revealed by reproducing a neutral sound. It is no wonder that Technical Brain used them as a reference when the amps were being developed. For me, the highlight was when the amps drove the B&W Signature 800 speakers. I was truly surprised by how well these speakers sounded. When I tried the Apogee speakers, I set the volume relatively low because I was worried blowing them, but I tried the cutting edge B&W speakers at an extremely high volume.

Even at an extremely high volume, the amps were driving the speakers very easily. At every volume level, the sound did not get blurred. A lingering sound was attenuated very naturally and faded away into background noise, while an indescribable presence was left in the air. What is this sound that lets me forget "the existence of the amps"? The TBP-Zero/2 monaural power amplifiers are 35 × 25 × 60 cm in size and 60 kg in weight (each), with a rated output of 350 W. In my previous experience, such extremely high power amplifiers have usually reproduced a looming sound, as if they were trying to assert their own existence to the listener. I had become very interested in discovering Mr Kurosawa's idea of the perfect amplifier.

He spent over thirty years maintaining high-end audio equipment. During that time, he had some unforgettable experiences. On the one hand, he was inspired by amplifiers such as the GAS Ampzilla and the Phase Linear, whose unique ideas, he thought, were beyond the imagination of the Japanese. On the other hand, he was sometimes upset with the unreliability of some imported amplifiers, which was unthinkable for Japanese made amplifiers. However, although Japanese amplifiers were reliable and stable, they had another problem. They just could not express the dynamics of music fully.

As he maintained famous imported amplifiers, his desire to develop his own amplifiers gradually grew. When I asked Mr. Kurosawa if he had ever thought of making his amplifiers by improving already existing models, like ALPINA and RUF did in the car industry, he flatly denied the idea. As an engineer, his ambition was to develop "original" amplifiers.

When creating his amplifiers, he wanted to make them truly original, beyond people's imaginations, challenging the limits of existing amplifiers. His ideas for amplifiers started to emerge.

To enjoy music and to be moved by music, to reproduce the essence of music precisely, what abilities does an amplifier need?

Mr. Kurosawa was most concerned with the ability to reproduce sound at the ultra-micro level. If this ability is limited, a fading sound is not accurately reproduced and, as a result, a lingering sound disappears unnaturally within a short period of time. As conventional amplifiers have been unable to accurately reproduce sounds at every volume level, musical dynamics are not fully expressed. Rather the sound is compressed or oppressed at a high volume level. Moreover, when multiple instruments are played, especially at a high volume level, the resolution often becomes low. On top of that, as a combined result of small mechanical vibrations, various noises and the operation/performance of the amplification circuit, modulation occurs and the sound consequently becomes blurred.

Technical Brain's main goal is the reduction of such problems close to "Zero". To achieve this, Technical Brain has eliminated emitter resistors and any unnecessary mechanical contacts and relays in their amplifiers, because these all cause sound deterioration.

On the one hand, emitter resistors compensate for the differences between power transistors and protect devices from overheating or over-current conditions. On the other hand, they become one of the main causes of sound deterioration. Therefore, developing a method to solve this problem tests the skill of an amplifier designer. Mr. Kurosawa meticulously tested and



Naoto Kurosawa of Technical Brain is a real audio guy. He talks with great enthusiasm about audio.

matched transistors until the difference in the performances of the individual transistors is marginal. In addition, he made it possible to eliminate emitter resistors by developing an original duplex temperature compensation circuit (patented in Japan).

Sound deterioration as a result of poor contacts and protection relays at the output stage was one of the most common problems when Technical Brain performed maintenance on amplifiers. Mr. Kurosawa has experienced how much a sound is improved just by polishing the contacts and keeping the right contact pressure. The TBP-Zero/2 has eliminated all of the mechanical contacts, including protection relays. Of course, the speakers are well protected by an original protection circuit developed by Technical Brain, which operates very stably and responds swiftly.

It is needless to say that the power supply was also strengthened. Because all of the energy is released just as a sound is produced, the power supply has to have both high power output and durable power. Both the peak power and durable power are important. Of course, high transient performance is also essential. For this purpose, the power transformer is 1.6 kVA and uses a 20 kg (!) EI core. Technical Brain's original coil is made of low resistance flat copper wire (3.5 × 2 mm at the primary stage; 5 × 2 mm at the secondary stage) and floats in the case to reduce vibration.

Mr. Kurosawa not only strengthened the power supply but also thoroughly improved the means of supplying the power. With the TBP-Zero/2, each transistor is directly soldered by "complete equal-length-octopus-wiring" without using a printed circuit or a buss bar.

Moreover, no compromise has been made in the construction of the amps. A large power transformer and rectifying circuit board are loaded on the front side, separated by a rubber vibration insulator. They are also isolated from a power block by using a very thick aluminium shield panel. Close to the input/output terminals, the input stage and drive stage circuit boards (including part of the protection circuit) are loaded, with an aluminium shield panel behind them. Much attention has been given to the wiring for the current path, which can cause electromagnetic radiation noise. Rather than coming out of the rear panel, the power cable exits from the bottom panel, directly under the power transformer.

The preamplifier has also been developed to reduce incidental sound and have a high S/N ratio, with exceptional power. To achieve these goals, it was essential to minimize modulation as much as possible. When the input signal passes through an amplifier circuit, the audio signal is affected by electric modulation and mechanical modulation. The TBC-Zero preamplifier has a structure/circuit that is little affected by such modulation. By keeping the impedance low, high frequency modulation has been reduced, while the transient response and intermodulation distortion have been improved enormously by making the TBC-Zero a complete DC preamplifier.

Moreover, there is a reason why the case of the preamp is exceptionally large compared with conventional preamplifiers. Generous space is included between the circuit board and the case in order to reduce any intermodulation distortion caused by a change in stray capacitance. The board is 2 mm thick epoxy glass and has sufficient strength. Various vibration absorption measures have been taken, including the use of rubber to mount the board to the case.

The inside is divided into three blocks by 8 mm thick aluminium panels; the front block is for the power source, the middle block is used for the amplifier circuits for each channel and the rear panel block is for the input circuit and the volume. A rotary attenuator is used for sound quality. Considering the layouts of the parts and wiring, the attenuator is placed in the middle block near the input terminal and is connected to the volume control with a cogged belt. I was fascinated by this construction, which makes sense in every way. The same is true for the power amplifier.

It is also worth mentioning that the TBC-Zero and TBP-Zero are fully balanced amplifiers. For this reason, you can expect high performance without noise. Of course, high reliability is guaranteed. Apart from the input/output terminals, the mechanical contacts in the signal system are limited to the input selector's relay and the inside of the attenuator. Technical Brain carefully selects high quality parts and only uses the best among them for their products to ensure stable performance. This attitude guarantees stable operation on a long time basis. Technical Brain has been highly trusted by many users.

If you listen to Technical Brain's amps and understand the idea behind their monolithic design, you will understand why they are so heavy and have such a unique look. Of course, some

might have reservation about this look, as I once did. However, when they were brought into Stereo Sound's listening room after my initial listening session in Technical Brain's listening room, I found myself looking at the amps with the full assurance of satisfaction. Those who have become used to a slim size preamplifier may find the TBC-Zero a bit large, but its finish quality and performance are phenomenal.

We borrowed the TBC-Zero and TBP-Zero to try the JBL 4365 (many thanks for moving them from Technical Brain's listening room) in the SS listening room. I think I listened to them for over six hours, with nothing but amazement at their quality. Although I was tired after this session, I also tried the S9900 because I just could not miss this rare opportunity.

I apologize for my limited vocabulary, but I still cannot find the right word to explain the sound that I heard. I was just lost in the sound. If you allow me to say so, the S9900 sounded like the DD66000. Moreover, the response of the bass was exceptionally fast. Once I started listening to "Thriller" (single-layer SACD), I just couldn't stop listening until the end of the album. I was totally knocked out by Michel Jackson. I think I could hear all of the sounds that he was trying to create.

Translated by Mioko Kawamura