



common neutrality in the past 20 years? If so, what accounts for this trend?

The understanding of how a high-end system should sound has considerably evolved. New products which have pushed the envelope showed that there is more to be expected from amplifiers than the old stereotypes of solid-state products being powerful but less musical, whereas tube amplifiers are claimed to be more natural sounding but are lacking control over the speakers. These products have clearly shown that all relevant virtues of the two approaches can be combined in one product without compromising in any dimension of sound reproduction. Over time, customers will get used to this new quality of listening and will generally expect that from products participating in the market. This automatically raises the bar in performance for all manufacturers and heavily fosters the convergence of solid-state and tube electronics.

You choose to work exclusively in Class AB solid-state. What are the advantages you see to your chosen technology?

Taking into consideration all aspects of amplification we are convinced that a properly done solid-state design is superior to its tube-based counterpart. We are deeply convinced that the technically better amplifier—this implies also better measurements results—does sound better. However, good measurement results, which are quite easy to achieve with solid-state amplifiers, do not in and of themselves automatically guarantee superior sonic results. Most measurements performed today for the assessment of audio components are done in the frequency domain. It is, of course, most important to have perfect behavior here, but it is only half the truth. Perfect performance in the time domain is no less important. This is especially true of amplifiers based on negative feedback. The theoretical concept of negative feedback is very powerful, and the simplified mathematical equations describing this concept do hold true. But they are only valid if the design addresses

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Cyrill Hammer was born 1965 in Switzerland and earned Master of Science in Electrical Engineering and Economics degrees at ETH Zurich. Before he joined his family business (Spemot AG) in 2002 Cyril was active in several management positions for Swiss SMEs and as a business consultant with BCG, focusing on strategic repositioning of major financial services institutions and telcos. Within Spemot he manages and develops the new business unit, Solution.

How much have preamplifiers and power amplifiers improved over the past decade, and why?

We have seen a tremendous improvement over the last ten years. New companies like Solution have introduced unconventional, innovative, and better approaches to resolve several technical issues of the amplification process that have never been considered before.

Have the sounds of tubed and solid-state electronics converged toward a

the limitations of the concept. The time delay from input to output must be zero! Obviously in real life this is not possible. There are two ways to deal with this problem. Either you just do not apply any negative feedback at all to your design (while giving up the advantages of the concept) or you do speed it up to the level (200MHz in the case of the Soultion 700 and 710) of a few nanoseconds of time delay from input to output, where timing errors are so small that they do not have any audible impact on the sound. Once you decide to go the latter way a whole bunch of new challenges suddenly arise. Thermal conditions, stability of supply voltages, high-frequency designs, noise induction etc., etc. With tubes as active components such designs would never ever be controllable and stable; they must be done with solid-state devices. The result of such a project is a product that seems to be ridiculously complex vis-a-vis the "simple" task of amplifying "slow" music signals. We at Soultion strongly believe that all of this is required to perform this task the best way possible.

Is Class D competitive with linear designs in sound quality, and if not, will it ever be?

Several companies have already shown that it is possible to design Class D amplifiers with decent sound quality. However, if you want to have your product performing at the cutting edge it is not possible with today's known switching technologies. In order to come close to the performance of the best linear design we would need high-current semiconductors that provide switching

frequencies of several MHz or even GHz. Even if this kind of semiconductor could become available at some point, such a design would still require a low-pass filter in the output with a cut-off frequency of about 0.5–1MHz and that also passes current peaks greater than 40 Amperes. Such a filter is not impossible to design, but would be very demanding and expensive.

Has amplifier design reached its zenith where further improvements are marginal, or will the next decade produce even better-sounding preamplifiers and power amplifiers?

The best preamplifiers available today offer residual noise and distortion levels that are really minimal. We see some potential to further reduce the noise floor resulting in better soundstaging, and also in reducing harmonic distortions. This will lead to even more natural and realistic sound quality.

The design of a power amplifier is much more demanding. There has been more margin for improvement here and there still is. The Soultion Series 7 amplifiers were a real quantum leap when we introduced them in 2005. I do not expect that another improvement of the same magnitude will be possible; however, it could be quite substantial. We are currently working on several areas involving the power supply of these amplifiers with quite promising potential for improvement. Today we do not know when this new technology can be introduced to the Series 7 amplifiers. In any case there will be an upgrade path for existing products owners.

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