the ear
HI-FI MUSIC GEAR

Dan D'Agostino

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At the High End Show in Munich Dan D'Agostino and I talked about the latest developments in his amplifiers, the ones that bear his name and rather than those that he made with Krell Industries, the company he founded in 1980. It was very interesting to hear what he had to say, this not only to gives a better understanding of the choices he made but I also reveals bit more about the technology inside the beautiful boxes.

RE: How did you start the design?

DD: First of all I started to design the outside of the amplifiers I wanted to realize. Of course I already had an idea what was going inside, but I wanted to have these special looks and use copper as a cooling metal without the need for those ugly black aluminium pieces normally found on power amps. So I started working with the aid of CAD software on my PC and could show my wife Petra the results. Often, women dislike audio devices because of their looks, I think it is important that they look good enough, that even partners find them visually attractive. Also the PCB layout was made with the help of CAD software to realise the first prototypes.

You probably had to buy a lot of test equipment.

In the eighties top testing equipment was very expensive and at Krell we couldn't always afford it. When I started the new company in 2010 I could buy as much analogue equipment as I wanted for testing, since everyone else wants digital tools. So an HP analyser only cost me $500 on eBay instead of ten grand. With 30 years of experience and all this stuff on hand I could make a very good start.

Did you use any special techniques in the circuit?

I realized that every time we build power amplifiers, most of the distortion comes from the front end stage, which easily gets overloaded and starts clipping. What I did first is to remove the gain from the front end of the driver stage. The front end has a high voltage rail, high enough to handle any incoming signal, a bit like what happens in a tube

amp. The driver stage has a gain of 26dB overall and we use current feedback. Not the normal voltage kind of feedback, to be correct we use very little feedback. The power stage is able to deliver 1200 Watts into two Ohms. It is built in Class AB, otherwise it would dissipate too much heat. The amp is fully DC coupled, has a very wide bandwidth, very low distortion and very linear distortion over the complete bandwidth, and we made very sure it sounds extremely good.

Now what I did was make the amps and invited my golden eared friends to come over at the weekend and have a listen. Since I did all the work at home it was very easy to take their comments, modify the amp and present it again sometimes just minutes later. I designed, we all listened, I made the changes, we listened again and so on till I finally was convinced that I had the best amp that I could make. But that was not the end to the story. Now we had to source parts. For instance the power transformer had to fit into the chassis and that was not easy to find. I like to source my parts in the USA and whenever available locally. Lucky for me a well-known transformer manufacturer nearby helped me out.

They are not that easy to make in their special casing.

As I said the looks are important to me. Now the copper parts of the chassis are made on CNC machines of course. Highly polished and smooth. But when you use copper you have to deal with corrosion. And the better you polish, the faster it corrodes. I had to find a tool shop that could machine and polish the copper and then anodize it no longer than an hour later. It's hard to find anyone who can do that I can assure you. All the amps are built by hand, decent old fashioned quality. I pay my six employees about double from what they could earn elsewhere as assembler, to make sure they do an excellent job and to keep them satisfied. They are proud to make my amps.

An important part of the design is the meter in front. Not that it adds to the sound, but for design reasons. I like classic cars (Ferrari, Bugatti etc.) and I like watches. So what I wanted was an analogue meter that looked a bit like the meters in a Bugatti or like a tourbillion movement in a watch. With my name on the dial and a classical looking pointing part. I have been asked if I was influenced by steam punk, but this is not the case. I did not even know what steam punk meant till somebody told me about it.

This was all about the power amplifiers, how about the preamp you made?

What we did with the preamp was develop an amplifier without a specific sound. It should not detract anything, neither will it add to the sound. The amp has been compared with a number of DACs connected directly to the power amplifier against routing the analogue signal through the preamplifier.

Could you not have used a passive preamp?

No, because a passive preamplifier always limits dynamics. An active one has more space, more weight, does not have to colour the signal and gives you more layers for the complete sound. The output stage of the preamp is equal to the input stage of the power amp. They match perfectly. In the preamp we do not use feedback and to lower the noise floor we use a pure differential circuit with bipolar transistors (not FETs) that is fully balanced. Although you can make use of single ended sources, the best way to use it is balanced only from the source. The gain is switchable between 6 dB and 12 dB. Again we made sure we have a large bandwidth, low distortion and low linear distortion.

The volume control matches the meter on the power amp perfectly.

The volume control was very hard to design. First of all I do not want to use a potentiometer. But I also do not want clicks, either mechanical or from the speakers. Mechanical clicks get annoying and my amps should never be annoying. What I designed is a volume control that adds just one resistor into the signal path on any setting. This is done by reed relays, in vacuum metal cases normally used by the aerospace industry and the army. These parts, even the resistors I use, are very hard to get since the army buys them all. Since I only need limited quantities the manufacturer also sells them to me. Even if I wanted too and had the customers I could not build my amps in large quantities due to this. All parts in all of my amps are matched by hand.

Now, to make a volume control with a liquid feel and touch on turning, without any wobble, I use two bearings (you will also find these in a Porsche) to move the optical encoder. The meter indicates the volume setting, which I think is easier to remember than any digital numbers displayed in red, blue or green.

Tone controls are reintroduced?

I have added a tone control of +/- 6 dB for bass and treble. I made sure that at its zero point the tone control has no influence at all. The circuit has its own power regulators and PCB. The use of a tone control will give the listener the ability to repair old recordings or make old recordings playable. When the recordings were made, the engineers did not have the electronics we buy today. They could not hear very deep bass or such much high frequencies. So there might be errors (rumble or hiss) that we want to get rid of and that is when a tone control comes in handy.

How about powering the preamplifier?

The power parts of the preamp are built into the stand under the preamp itself. To keep hum and other influences as far away as possible from the signal path. This power supply is mechanically decoupled from the amp itself. Last but not least, we use plug-in cards for the preamp sections. If we ever come up with a better board, all the customer or his dealer needs to do is to install a new board. No need to sell an entire amp and get a new one.

Any future plans?

We will add a phono stage to the range. Again with the same output circuit we find in the preamp and input section of the power amp. The gain stage is about the same as I designed 30 years ago. But with better components. It will have a single ended input and balanced output. I will make the input from active parts and do not use step-up transformers for MC cartridges. I want to make sure that I don't have to depend on others for quality parts. I design my own circuits and build them myself.

Do you like the show here in Munich?

Yes, it probably is the best show in the world. It brings together manufactures, distributors, dealers and customers. The space and openness is preferable over hotel rooms and we have far better rooms to demonstrate our products. So yes, I like Munich and I will probably bring the phono stage with me the next time we meet.

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