

## Stan's Safari Part.2.

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**My ongoing re-assessment** of all that I know about the business of sound reproduction was originally going to lead into the subject of amplifiers; a topic upon which I've been known to pontificate whilst claiming to have designed more models than most people have had hot dinners. Not strictly true, of course; it's just that sometimes it feels that way. Instead this month we are going to look at the philosophy of keeping the sound system and its constituent parts as simple as simple can be.

My musings on this subject were triggered by the need to install a quick lash-up of a stereo system in one of the rooms of my home. Casting around for a few unused pieces of gear I quickly assembled a workable system and wired everything together. For the train-spotters amongst you the loudspeakers were the single unit Eclipse TD512 loudspeakers driven by an amplifier of my own design fed from a modified Denon CD player; the whole lot being wired together with sundry Atlas cables I had about the place. Right from the off this system sounded much better than my experience had led me to expect and after 24 hours of Lynyrd Skynyrd (my personal favourite for burning in systems and annoying the neighbours) the results were really good. I knew that the sound quality was heading in the right direction because I proceeded to play a number of long forgotten tracks until my wife turned up to berate me for being anti-social and ignoring our weekend guests. To be honest I'd completely forgotten about them so that must justify another star on the "Sound Quality" rating.

Yet frankly not one of the components of the system would appear in any "Top 100" list drawn up by the contributors to this magazine so why were the results so satisfying? Well I put it down to simplicity. The simplicity of the system itself and in the design of the individual components.

I've always liked simplicity and I've largely tried to follow such a philosophy in my own designs. The Cambridge Audio amplifiers of the 1970s had pre-amplifiers composed of just a few single transistor stages; a ridiculously simple design which worked surprisingly well. In the 1980s I designed what seemed like an endless series of Rotel amplifiers which were well received and sold in prodigious numbers yet were based upon a power amplifier circuit of almost schoolboy simplicity. And when we toured the world demonstrating the Cambridge CD1 two-box CD player I always used the simplest of set-ups to great effect. The CD player stood on top of a power amplifier connected by 4 inches of interconnect and a pair of 2 metre cables to the adjacent loudspeakers.

It doesn't take much in the way of deductive powers to realise that if a simple audio system, such as the one I've described, can have the quality of sound degraded through stuff being added to or taken away from the original music signal then how many more problems could come into play with a more complex system with more stages; networks and connection interfaces. That doesn't mean that complex sound equipment cannot achieve outstanding sound reproduction; it just seems to be less elegant to my way of thinking and certainly more difficult to optimise with so many more variables.

But to get the true benefits of this philosophy of elegant simplicity you need to know in advance what it is you want. You cannot just start modifying things in expectation of a sudden blinding revelation. So many people just do not have a clear idea of what accurate sound reproduction sounds like so they are forever chasing their own tails. It is very easy to change a parameter or component in a system and then to hear an improvement (or more correctly a change) in some aspect of the reproduction but then to change the piece of music and hear that perhaps something else has got worse. So then another adjustment or change is needed but that change in turn creates other imbalances. That way lies aural madness! Unfortunately many of us cannot leave well alone and we are forever seeking the greener grass on the other side of the field; we just need a better power-supply and whole new layers of the music will be revealed. And it is the way of engineers that as soon as they

become aware of a problem they set to work to find a solution because there is a real buzz to be had from having finally solved a problem at two in the morning. Life gets even better if you are the first with a solution and you can market your product as being unique. I guess Harold Leak marketed his amplifiers for years on the basis that they, and they alone, generated less than 0.1% distortion and other hi-fi manufacturers have been treading the same path with similar marketing strategies pretty much ever since.

But all too often engineers fail to devote time to that first essential step; “Yes we’ve found something that degrades the signal, but honestly does it make any real difference?” All too often there is a tendency for engineers to improve things because they can and then write down the justifications later. Our industry is littered with improvements which caused a stir for a year or two and then gradually faded out of sight. And yes I have been guilty of this “over enthusiasm” from time to time. But an ability to know what really matters and what does little more than impress the ill-informed is what so often separates out the good designers from the crowd

From time to time I’ve designed complex products where every known form of audio degradation has been reduced to minuscule levels. An amplifier with almost immeasurable distortion; noise within 1dB of the theoretical minimum; outstanding transient response; indeed a device where the Quad maxim of “a straight wire with gain” could be measurably demonstrated. And yet in terms of listening pleasure and a convincing reproduction of a musical event these particular products just never excited me. Instead there was a sense that the sound had become too sanitised; too perfect; too synthesised. But then I’ve also designed comparatively simple products that measured appallingly yet gave people immense pleasure. Indeed I recall one amplifier that was tested by one of the UK’s leading magazine writers who was preparing to pan the product on the basis of some poor measurements but then was completely thrown by hearing his music delivered by the angels themselves. He never figured out what was going on and I wasn’t about to tell him.

It is not always apparent where the problems lie but what has always been obvious to me is that there is something very critical about the low-level signals in the  $-60\text{dB}$  to  $-100\text{dB}$  region. I must confess that in engineering terms I don't always fully understand what happens. From time to time I've gained insights to different mechanisms and effects and their consequences and as a result my design abilities have moved forward. However I do seem to lack the "Grand Unified Theory of Recorded Music Reproduction" which would allow me to bring together the numerical effects of all the different things that could degrade the quality of the sound reproduction. And because I am aware of my own limitations in this area I also harbour grave doubts about the credentials of anyone who does claim to fully understand the subject; and here I have several of the American cable manufacturers firmly in my sights.

What I do know is that somewhere between a super-simple device (be it an electronic circuit or an electro-mechanical device such as a loudspeaker) producing a raw yet degraded sound and a heavily developed and refined device producing a perfect yet sterile facsimile of the original sound there is often an optimum point where everything seems to hang together properly. And this insight has led me to apply two processes to my own designs over the years.

The First Curtis Law of Diminishing Returns requires the removal of components and a reduction in the specification of components until there is an identifiable performance or reliability loss. Then go one step backwards. This is the law that keeps products profitable for the manufacturer. The Second Curtis Law of Diminishing Returns requires a halt to the refining and development of a device when there ceases to be any identifiable further improvement in performance. Again at this point go one step backwards. This is the law that gets the device close to its optimal performance. Notice the emphasis on the word "identifiable" because it can mean a subjective or an objective measurement and this criteria can be changed to suit the application or, more often, my personal whims.

Unfortunately it seems to be increasingly the case that designers do not believe that simple designs can work in a satisfactory manner so they strive to improve the design. These improvements inevitably have side effects which eventually come to light and require other modifications to rebalance the design but, of course, in doing so there are yet more side effects. I've seen this approach to design in so many products from respected manufacturers where, in my humble opinion, a whole load of stuff in the product could be usefully ripped out. I can only assume that as children they never learned the nursery rhyme about the old lady who swallowed a fly and we all know what happened to her, don't we.

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