John Petersen

The man behind the Tube-Tech brand is a true valve die-hard but mixes this with a refreshingly practical attitude. He talks to ZENON SCHOEPE about the eternal original versus reissue issue and why tubes will be here for the foreseeable future.

LYDKRAFT WAS FOUNDED in Denmark in 1977, originally to serve the PA market but turned away from this area of business in 1980 when John Petersen took over the company and focused his efforts towards the design, development and manufacturing of direct boxes, mixing desks and speaker systems. The demand for vintage tube gear was increasing and John started development of his own units in 1984. The first tube-based unit bearing the Tube-Tech name was almost a direct copy of the Pultec EQP 1A. The Program Equaliser PE 1A shipped in 1985 and was followed in the next years by the PE 1B, ME 1A, CL 1A and MP 1A. It continues today with John still running the company and designing the products through a wide variety of innovative interpretations of valve outboard, such as multiband compressors and summing amps.

John was educated as an electronics engineer at Danish Post and Telegraph and worked for the Danish Broadcasting Company as maintenance engineer on a host of different applications. He was factory trained at Solid State Logic, EMT, Studer, Sony, Neumann, NTP and Lyrec and designed the tape recorder playback/recording amps for Lyrec tape recorders.

When not toiling over a hot soldering iron, he collects old radios, wireless equipment, gramophones, phonographs and related literature and plays bass guitar in his spare time.

What is the appeal of original 'classic' valve outboard to end-users?

There is, of course, the nostalgia aspect but also the mystique because the classic gear was used for all the great hits of yesterday and the sound of some of those was quite good; on others it was quite bad. I guess that both have an appeal to today's recording engineers and artists. Also, classic gear has quite a high price so it must be good.

It's not a simple question and there are so many factors involved. For example, is it a bargain to buy a Fairchild 670 for around £10k? If you look at it from a manufacturing point of view it could be manufactured for that kind of retail price. But it would not be the original.

Even if a manufacturer makes a reissue of an old classic — think Fender Stratocasters from the early 1960s — they still don't have the same vibe around them and certainly not the same high price on the used market.

Think of a painting by Rembrandt. It's only some dried out paint on an old canvas put into a frame but nonetheless people are willing to pay £1m or more for it. You can make a copy of the painting that would look as wonderful as the original, but it's still a copy and it's worth much, much less. People get satisfaction from knowing they own something unique that others would give their right arm for.

What are the technical reasons for this appeal in 'classic' valve outboard and how much of it is legend and how much is fact?

The classic gear has a sound of its own, caused by limitations in bandwidth, phase distortion and harmonic distortion. The limitations came from components like capacitors, resistors not to mention transformers. Good components were very expensive in the old days, but many of them were not as good as they are made today. Capacitors did have higher losses, higher failure rate and wider tolerance. There were also quite a few inferior tubes manufactured. A resistor with a tolerance of 1% has the same relative price today as a 20% resistor 40 years ago.

So today you are able to get more precise, more reliable, smaller and cheaper components and you are also able to make much more complex circuits.

I know that when I designed the first PE 1A, some recording engineers claimed that they preferred the Pultec because it didn't sound so clean as the PE 1A. On the other hand there was a mastering studio in New York that modified the PE 1B to get it even cleaner. Both units were hardwired, the difference being that the PE 1B has an extended frequency range in the high boost. To achieve the cleaner sound and an extended low frequency response, the unit was redesigned getting rid of an interstage transformer. Furthermore, the whole amplifier and PSU was made in one PCB to make it easier to assemble and to avoid assembling faults caused by misconnected components.

What are the technical and practical limitations of 'classic' valve outboard?

Actually there are no technical limitations to what you can design with valves. However, there are certainly some practical physical limitations because of the maximum density of components. Just the fact that a normal ECC 83 (12AX7) uses about 2W in heater power sets a limit to the density — unless you use fans to get the heat out of the box.

When you're talking about rackmounted gear, the heat can be a problem. Just think about computers in the 1950s and 60s. They were contained in 15-20 racks packed with tubes and used several kilowatts of power.

Another practical limitation is the availability of different valve types. If we again take as an example the Fairchild 660/670 compressor, it uses a very special tube (6386 — in fact the 670 uses 2x four) that was only made by General Electric and is not made any more. There are other tubes like it, but they are not made any more either.

A problem with obsolete and rare tubes, like the 6386, is that you can't be sure that the ones you do get are the real ones. There are some dubious people out there who find a tube that looks like it mechanically and has the same pin-out, they remove the original printing on the tube and print 6386 on them.

When designing tube equipment today, you have to work with tubes that are still being manufactured and preferably ones that are manufactured by more than one factory otherwise you might end up with problems. The ones we use are the ECC81, ECC82, ECC83, and ECC88, which are available from several manufactures.

How do you address these issues in your own designs?

I only use the most commonly available valves. The quality of the tubes today is as good as it was yesterday. I'm not quite sure why the Chinese and Russian tubes have got this 'crap' reputation, because in my opinion (based on measurements and listening tests) it is not true. Both countries manufacture pretty good tubes.

In the circuit designs I use, all active elements (valves) have local feedback applied. This has several benefits, the most important of which is that is makes the circuit more immune to spread in the valves' parameters so you get stages that behave as expected concerning gain, distortion and frequency response. You don't have to consider any specific brand when changing valves in a Tube-Tech unit as opposed to, for instance, guitar amps, which are very susceptible to changes in valve parameters even within the same brand.

But again, if you can say that the unit is equipped with Telefunken valves people will say that it sounds better and the value of the unit will be higher!

What other component issues do you have to contend with?

As the world gets more and more digital, some components, such as potentiometers and rotary switches, get rare. Not many manufactures make them any more and the price is high.

High quality transformers are getting expensive because the Mu-metal, which is used for all Tube-Tech transformer cores except output and main transformers, is getting harder and harder to find. The price of Mu-metal is also increasing — in 10 years the price has increased by more than 200%.

Another expensive part is the VU meter. The VU meter standard is very specific in describing the attack and release times, input impedance, scale layout and the 0 VU point. When working with VU meters in a studio, you get familiar with the behavior of how it reacts on a specific sound, such as continuous levels and transients.

It is of course possible to use cheap meters but they don't stand up to the standard so you don't know what your levels are and there's a danger of overloading following inputs. One overlooked flaw of the VU meter is that when it is connected across an output, it introduces distortion. To avoid this distortion a high impedance buffer drives the VU meter on the SSA 2A.

Some valve outboard connoisseurs believe that all the best units were built a long time ago; do valves have a continued role to play in all-new designs?

Yes, I believe so. The new equipment doesn't differ so much from the old designs — we have better and more reliable components today but the basic characteristics and configurations are the same.

If you get an old unit that hasn't been maintained for the last 30 years you can expect crackling potentiometers, noisy switches, leaking capacitors, resistors quite out of value and tubes that are worn out plus shorted/broken transformers. Some of the faults can be remedied easily, others will give you quite a problem to get fixed, but either way you can expect to have to do quite some work on it. You can do this by replacing old components with new modern components or you can replace them with new old stock components. The old components that haven't needed to be replaced are likely to give you problems at a later stage — they're just waiting for you to have your most cherished client in the studio and then they will start crackling, getting noisy or just plain stop working.

How real are valve maintenance issues in outboard and how does valve degradation manifest itself?

Because the valve is a thermionic device there will be a gradual degradation of performance, especially in power valves. This normally takes quite a few years to appear and it is not uncommon to see valves run for 10 years or more. The degradation of the thermionic emission manifests itself as a gradual increase in distortion and a decrease in upper bandwidth and maximum output. Mechanical faults, such as microphony, can happen at any time in a valve's life. Noise is also caused by pollution of the vacuum, leaking current between electrodes and faults in the cathode layer.

The maintenance of valve equipment doesn't differ much from other analogue units because basically the same types of component are used. It is easier to find faults caused by valves than it is to find a faulty transistor in solid-state equipment because valves are in sockets and are easy to pull out and check. To spot microphony, you just tap the tubes individually until you find the one that's causing the problem and noisy tubes can be isolated by a process of simply replacing them one by one.

How do you reconcile valves in an increasingly digital world and do you see a continued role for them in 30 years time?

Thirty years from now is a long time but when I look into my crystal ball I still see them around. Our world is analogue and whatever equipment we use to store the audio, the input will be analogue and so will be the output unless we get implanted electrodes so we can just plug in. Analogue gear will be around for a long time and the most useful equipment will still have an important role to play. The Fairchild 670 was designed in the late 1950s and is an example of valve equipment that is still sought after.

New technology always follows a pattern. At first it is looked at with scepticism and you hold on to your old technology. Next, it gets fancy and convenient to use and a new fashion of sound is created, which everyone believes is the way to go and the old technology is discarded. Finally, people decide that the old technology did have some good qualities and they start using it again but in a more specialised and limited way. Valves have lived through quite a few 'new' technologies already and they're still here. ■