



Thermionic Culture

Electric current through a vacuum — **NIGEL JOPSON** feels the heat in Harlow with co-founder and designer Vic Keary

Since the advent of digital recording, production pros have increasingly (re)turned to valve — vacuum tube — equipment, to lend a bit of soul and analogue warmth to their recordings. Various tests have proved that most listeners find the harmonic distortion characteristics of valve equipment to be associated with ‘musicality’. Ask any guitarist! Recording professionals would also cite transient performance as significant, and an entire sub-culture of boutique audio manufacturers has sprung up over the last 25 years to provide recreations of vintage designs to satisfy the demand for valve recording equipment.

There’s no mistaking the purpose of a company named Thermionic Culture: the manufacturer takes its name from the thermionic emission of electrons from a heated cathode (used for electrical signal amplification and current rectification) — the valve, invented in 1904 by British physicist Sir John Ambrose Fleming. Where Thermionic Culture differentiate themselves from other valve manufacturers is their impetus to come up with circuits which dramatically improved electronic performance over vintage equipment, and innovative designs — various configurations of compressors, pres, passive EQs and summing amps — which support the changing needs and workflows of producers and recording engineers.

Thermionic’s co-founder and designer, Vic Keary, is a valve evangelist who’s been arguing

the case for warm tubes ever since solid-state technology became commonplace in the late 1960s. “My mission is to prove that valves sound better than solid state,” says the industry veteran, “that’s the whole purpose, and I think we achieve it”. Keary’s professional career began in 1960 as a recording and maintenance engineer at Lansdowne Studios, London. He modified the EQ of the studio’s valve EMI console, and recorded or mastered hits of the era including Desmond Dekker’s *You Can Get It*

If You Really Want, and Acker Bilk’s *Stranger on the Shore*. “I could play you tapes of recordings I made at Lansdowne in the 1960s, all through valve equipment, valve compressors as well, and it sounds so warm and natural,” enthuses Keary.

Unlike many audio designers, Keary has extensive history as a recording studio owner. He founded Maximum Sound Studios (later sold to Manfred Mann) on the Old Kent Road, London, built the studio’s 10-channel valve console and tweaked the equipment which lent the studio its authentic reputation for ska and reggae music.

Keary took his valve console and reggae renown to his next studio, Chalk Farm, which he founded in 1968. British-Jamaican reggae musician and Trojan label producer Dandy Livingston made many of his records at Chalk Farm (such as Nicky Thomas’ *Suzanne Beware of The Devil*) and Harry J produced Bob and Marcia’s single *Young, Gifted and Black* at the studio. In 1992 Keary set up an all-valve studio at a converted brewery near the river Thames in Chiswick, West London, naming it Chiswick Reach — which also served as the moniker for his own valve compressor — later ‘re-incarnated’ as the Thermionic Culture Phoenix.

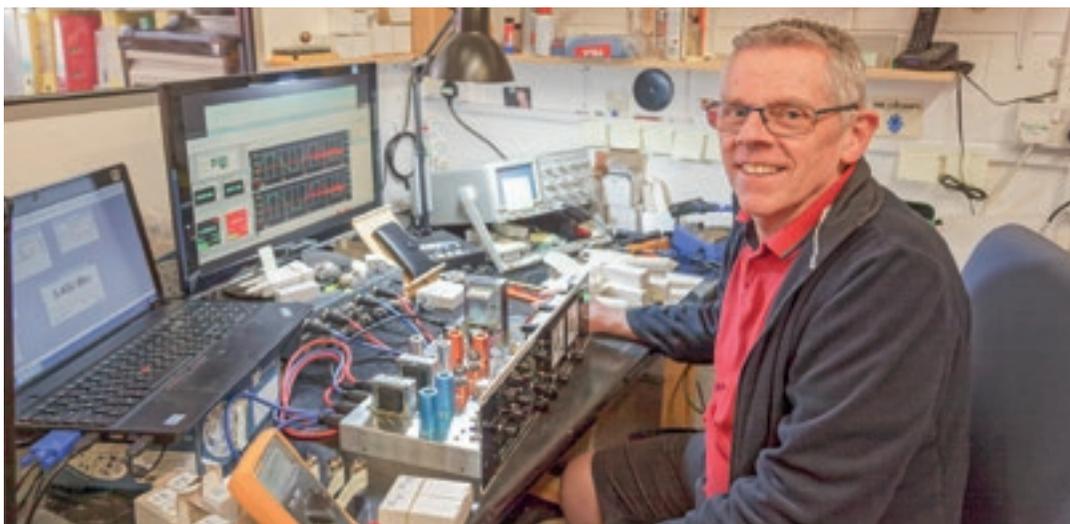
Valve gear can be better

Thermionic Culture was founded in 1999 by Vic and Jon Bailes, a designer in the electronic manufacturing industry. “It’s so silly to simply re-create designs of the past. Before solid state electronics were available, when I worked at Lansdowne studios, we used to have several compressors based on the Altec 436 design. They were good, but distortion was high,” explains Keary. “Vintage valve equipment was developed for the music and playback requirements of the time, it was often not technically as good as it could have been. My whole ambition is to design and build valve equipment which is actually better than anything previously made.”

High-spec components are used throughout, ▶



▶ The team: Ian Curtis, Tim Vine-Lott, Sandie Kent, Alan Tanner, Vic Keary, Jem Bailes, Richard Lawes



/ Prototype and test engineer Richard Lawes

including 1% metal-oxide resistors and polypropylene capacitors. “When the Altec was designed, you couldn’t possibly obtain something like a 1% resistor, all component tolerances were around ten times wider than what is available nowadays. It has helped a lot. We’re even able to use 0.1% components in some cases.” Valves are hand-selected and matched, sometimes from unusual military or industrial types, to ensure the best accuracy and highest performance.

“I’ve got the ‘bible of valves’ here right next to me, the Vade-Mecum,” says Keary. “When I initially looked at the 5965 Dual Triode [used in the Fat Bustard, reviewed in *Resolution* V15.2] it seemed as though it might have too much distortion, but then I thought I would do some extensive listening. I saw the potential, and with careful selection it really gives something extra.” Keary goes to great lengths to find just the right valve. “We experiment a lot to find the lowest noise valves to use... like the Mullard M8100 in our anniversary-edition Vulture. They’re probably some of the lowest-noise valves ever made. A slightly lower heater voltage on an input valve will give you less noise. We always play around with our designs to get the best results, not necessarily sticking to convention.” Such as? “I’m not giving away any secrets!”

It’s impossible to have a conversation about

audio with Vic without going into the technical details of valve technology, and I wondered where in the world he finds some of the more unusual vintage valves which he uses in his Thermionic designs.

“I have a couple of good friends who are valve dealers, whom I have known for a long time, and I get some pretty good advice from them,” Keary confides. Isn’t there a limit to the availability of these so-called ‘New Old Stock’ (NOS) valves? “We use something called a PCF80, an old television valve, as an output stage for the Rooster [a mic preamp with EQ, reviewed in *Resolution* V7.8]. We wondered whether it would be sensible to change to a more common valve, such as the widely-available ECC82 which is still made by most valve factories. I found an NOS supplier in the US and asked them how many PCF80s they had in stock. ‘About 30,’ they told me. ‘Is that all?’ I asked. ‘Yes, 30,000...’ so I didn’t bother to change! It’s surprising what you can find. There’s no great shortage.”

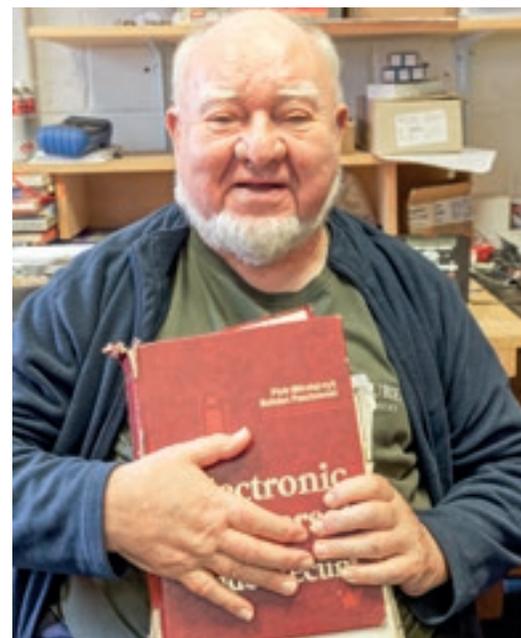
It’s remarkable to think that, from this relatively ordinary-looking light-industrial estate in Harlow, equipment is sent around the world to sweeten the tone for countless hit records. The two-thousandth Culture Vulture (from the combined three different variants) has recently been shipped, and the thousandth Phoenix



/ Cultured... you can steal my iron but not my crisps!



/ The 3M M79 tape machine in Vic’s office



/ Even *Resolution* shall not see the secret circuits!

“My mission is to prove that valves sound better than solid state”

compressor has also left the building. “We’re probably building about two Phoenix Compressors a week, now,” confirms Keary. “We have three people doing wiring, with Tim Vine-Lott, Richard Lawes and myself doing the testing and tuning. Thermionic has quite a ‘family business’ outlook, one of my partner’s sons has a small manufacturing company assembling the basic Vulture and Rooster products, with his company also providing any PCBs we use when point-to-point wiring is not implemented.” A touch of extra professionalism courtesy of the UK defence industry was added to Thermionic when production manager Ian Curtis (formerly of Raytheon) joined in 2007, along with wiring engineers Allen Tanner and Sandy Kent.

All-British quality

Thermionic are a resolutely high-quality British manufacturer. All the metal cases are made in the UK, by a company in Wimbledon, with power transformers for the equipment wound about 300 meters from Thermionic’s location, by Airlink Transformers, whose factory is on the same industrial estate. “Sowter Transformers in Ipswich [on England’s S.East coast] make all our audio transformers. Brian Sowter, who is the same age as me, still designs all his own products, and did an amazing job on the custom-made transformers for our new Snow Petrel high-gain mic preamplifier [reviewed by George

Shilling in this issue]. It's a large transformer, with the circuit design advantage of delivering a hefty 26dB of gain right at the input."

When Keary describes the design and manufacturing process for the Snow Petrel, his newest product, it's easy to understand how Thermionic's high quality reputation has been built. "I love ribbon mics, I owned a couple of Coles and RCA microphones when I ran the studio in Chiswick, but I always thought the Coles ribbon mics could sound a bit better. One of the problems is their very low output level. The Snow Petrel has actually taken about five years to develop: there were two previous versions of it which we scrapped. My first design was a balanced push-pull circuit, but it was too noisy. I tried a second version, but in the end we opted for a single-ended design, to keep it really low-noise."

Nuclear attack-proof audio

The quest for quality sound included a search for better components. "The 5654 valves used in the Petrel are not really known for audio, I managed to find a source from a dealer, who turned out to have about 20,000 of them," explained Keary. "The valves were originally used in the electronics for Mirage jet fighters — a cold war design [1961]. Valves (unlike transistors) apparently don't stop working if you fly through a nuclear radiation cloud! They're superb valves."



/ Coldplay's Nightingale in for a service visit

One of the striking features of Thermionic's product line is that it has evolved, and individual units have added features, as audio production practices have changed. It's as if the company has adopted the old commercial studio maintenance engineer model — 'I wonder if you could build me an...' — and simply expanded the scale. "I believe in giving people what they want," explains Keary. "I like to listen to requests from audio pros who've already bought our products. Nick Terry, my business partner, has his own studio in Oslo and is my 'ideas man'. He's just come up with a great concept for a de-esser which I'll be working on for next year."

It's impossible to leave the building without inquiring as to the somewhat idiosyncratic avian naming of Thermionic audio kit. "We started off with 'The Phoenix' — rising from the ashes (as it

were) of the Chiswick Reach compressor — and improving on it" explains Keary. "It was Nick's idea. Later, we were having a pint of beer in The George & Devonshire pub in Chiswick, and Nick came up with the idea of building a distortion box. I drew the circuit diagram on the back of a menu, and we named it the Vulture. The next product was a mic pre, so it had to be called the Early Bird (because it came first in the chain). I hadn't realised until then that we were actually calling our products after birds! I thought we might be calling them after rubbish disposal trucks, because there are both Phoenix and Vulture dust carts in Harlow." Birds or bins? Keary manages to keep a poker face. So there you have it — getting rid of dirt and dust — on the streets of Harlow and in audio!

"I enjoy making things, but if you're going to have to work, at least have fun, and the fun for me is in developing new things," says Keary. There are many boutique manufacturers in analogue audio, but our visit to the Thermionic factory showed the operation has a level of professionalism which might be the envy of many larger manufacturers. And, of course, a burning hot (pun intended!) sense of mission. The day after our visit, my mobile phone rang at 8:30pm: "I've just been checking the distortion with that unit on my test bench, and I'm not sure if I really demonstrated properly to you how much better valves are than transistors..." You did, Vic, you surely did! 📌