# Peter Thomas, PMC

The boss of the well-known British speaker manufacturer talks about his early career at the BBC, how Robbie Williams appeared in an advert for free, and his company's almost accidental move into making domestic loudspeakers alongside monitors used in studios around the world

Peter Thomas, co-founder and now managing director of the Professional Monitor Company Ltd — better known simply as speaker manufacturer PMC — is the real-deal: an audio industry heavyweight with an engineering and broadcast background who's a genuine and life-long lover of music, rather than an accountant with an in-the-minute faux 'passion' for this or that.

The latecomer of the family, with two much older siblings, Thomas was born into a household in Ramsgate where music had an important role. His father never performed publicly but was a piano player of some accomplishment who encouraged his children to learn. "He could sight read," says Thomas. "You could put any piece of music in front of him and he could play it. I learned piano until I was 10, but then my teacher became ill and I didn't keep it up. I don't have many regrets but that's one of them."

He acknowledges a gift as the primary spur for his career in audio. "My paternal grandfather gave me a gramophone and a big pile of 78s and it fascinated me because it wasn't electric, it was wind-up, and all-acoustic. I still love that music and still collect 78s: I love the sense of immediacy, the fact that they had three minutes to cut it, live and without mistakes – sometimes you can hear the band speed up towards the end to fit it all in. Once you get into the 1920s the recording quality isn't all that bad."

At Chatham House School Thomas excelled at engineering subjects including electronics. "I was always more comfortable with practical subjects: I really wanted to work in audio, but there were no local companies and my father was unwell so I didn't want to leave the area to work or to go to university. When I left school I did an electronics Higher National Certificate with Racal Marine, a local company that specialised in radio communications. The project I eventually got involved with, and really loved, was a back-pack radio for the army. It was very advanced, the first to use a CMOS 4000 integrated circuit-based synthesised tuner. It turned out I was the only person there who could work on them – by pure chance I'd studied IC theory during my HNC."

Thomas's HNC study sessions were at Canterbury Technical College and, while on a lunch break there, he happened upon a BBC pop-up recruitment booth in the high street. The BBC had taken on a lot of staff immediately after the end of the war, and many of them were coming up to retirement. "The BBC suddenly realised it had to recruit a new generation very quickly. I made a complete hash of the interview — I genuinely did the classic of trying to walk out through the broom cupboard — but by some miracle they gave me a job as a music studio service maintenance engineer."

It was the making of Thomas the audio man. "I was part of the new wave, all jeans and long hair, and that was quite a clash of culture with the old BBC suits and ties. But the training was the best in the world: in four months you were taught how to maintain everything in the broadcast chain from microphones through transmitters to the tuner in the home. I loved it: it gave you this perspective of the whole audio world and your place in it."

With the retirement of the 'old guard', Thomas and his fellow young joiners were rapidly propelled into positions of responsibility; by the age of 30 he was running a team of 50 people, and not just maintaining equipment but designing it too.

At that time, the BBC's Maida Vale music studios were using Tannoy and JBL large monitors during recordings of live music performances, having tried and failed to find an alternative with the measurement and voicing characteristics of the BBC-designed miniature LS3/5A while being genuinely full-range and able to handle very high SPLs.

"When you're recording a live band you're balancing it without any compression and seeing peak loudness of 120 dB. That'd fry most hi-fi speakers, so you've got to build a very resilient monitor to cope with it — not just robust, but accurate too. The studio couldn't buy what they wanted, knew that my colleague Adrian Loader and I we were hi fi enthusiasts as well as engineers, and they challenged us to design something at home."

The result was the BB (Big Box) series of transmission line prototypes. Thomas and Loader put a 15" woofer, a three inch dome midrange and a one



I was part of the new wave, all jeans and long hair, and that was quite a clash of culture with the old BBC suits and ties. But the training they gave you was the best in the world

# **INTERVIEW**



Robbie Williams did an advert for nothing. I still can't quite believe it, but he did, and it really put us on the map inch dome tweeter into a transmission line cabinet about 40" high,16" wide by 35" deep, which was then stacked on top of a second identical cabinet containing just a 15" woofer and transmission line, all for an all-up height of around 80 inches.

They were active, driven by analogue amplifiers, the design requiring in excess of 500W on each driver for the specified SPL. The two couldn't find a hi fi quality amplifier that suited, so they decided to manufacture their own. With the help of Quad they developed a bridged version of the current dumping circuit that delivered over 600 watts.

Why active? "The highest sensitivity drive units we could design without horn loading were 94 dB per watt. We didn't want to give up headroom with a passive crossover, so active was a must: it also allowed us to provide electronic protection for the tweeters and midranges, and electro-mechanical control over the drive units, to keep distortion low.

#### Better by the book

"It took five prototypes before the studio was happy: there was a book in the studio and all the engineers would write down their unfiltered comments. It was brutal, but such an environment in which to develop a product: your work was being critiqued by the most golden ears in the business. By the time we got to the BB5 we had something the studio really liked. They said 'Yes, we'll buy two pairs, but you can't remain BBC employees because of the conflict of interest.'

"I said, "OK, I'll leave and we'll start making them." Looking back it was mental. I'd been 14 years with the BBC, had two young children, a large mortgage, and the Professional Monitor Company began with just one customer."

Thomas observes that the BB5, which achieved 124 dB at one metre, was the industry's first large speaker with serious accuracy. 30 or so years on, and with a few changes, the design is in use in studios globally, and still in production as the BB6 series. The original BB5s are still in use at Maida Vale.

The ex-BBC pair had found that the performance of a transmission line could be improved, and its size halved, through the knowing use of different absorptive materials along the length of the line. It is a technology PMC still employs today right across its professional and domestic range of speakers.

The BB5 wasn't going to pay two mortgages, so Thomas and Loader designed the LB1 (Little Box) passive monitor, notably the smallest transmission line speaker ever produced. It used 24 dB per octave crossovers to achieve the required power handling and off-axis response.

Thomas acknowledges that transmission line had a less than stellar reputation 30 plus years ago: with the materials and technologies in the 70s, transmission line speakers were rather patchy, with slow, ploddy bass and very big cabinets. In a bid to differentiate itself, PMC dubbed its application of the technology ATL (Advanced Transmission Line).

Thomas and Loader both loved the natural sound of electrostatic speakers, but had to accept that it was impossible for them to generate the sound pressure a studio needs. "Transmission line and electrostatic are of course quite different, but we eventually learned what they had in common. Electrostatics don't have a huge amount of bass, but what they do offer is low distortion. Transmission line done well offers enormous amounts of bass at high pressure levels but controls distortion way more effectively than infinite baffle or ported designs — in fact over a range of nearly three octaves. Reduce low-end distortion and you unmask the midrange. This gives an open quality to the sound that approaches that available from electrostatics, but combined with proper full-range performance and high SPLs."

Within a year the company employed seven, and has grown organically to its present 50 or so staff in the UK, with sales in 55 countries. Thomas estimates some 75% of Hollywood film output is produced using PMC monitors and the number of studios and musicians using PMC speakers is legion..

## Moving into the home

The move into domestic audio came about by happenstance: 'I'd love to tell you that we had a fantastic marketing strategy but we didn't. Also, we didn't and still don't voice our monitors and domestic differently. We take the view that when it's right, it's right. Having driven around Hollywood in a van with some speakers in the back to open up the movie market, Adrian did the same thing in London with a few hi-fi shops. We soon started to sell some of the smaller models into domestic settings and it gradually snowballed from there. The real breakthrough was our first floorstander, the FB1, the first speaker we designed solely for the domestic market; it didn't physically dominate the room and it gave amazing bass performance from such a tiny mid-woofer. Robbie Williams did an advert for nothing. I still can't quite believe it, but he did, and it really put us on the map.'

Is PMC a little dogmatic about its technology choices? "We've done a lot of work with sealed cabinets, and on the face of it they look appealing. If damped well they roll off gently and produce quite low distortion, but the gotcha comes when the volume knob is turned up in order to generate pseudo-real-world pressure levels.

"People usually measure them at, like, 2W? I don't know about you but that's not how I listen, and as soon as you turn them up, the cone excursion

## **INTERVIEW**

gets so huge at low frequencies that the distortion starts to become really significant. Then you go to a reflex enclosure and impose a degree of control, but you've introduced some huge phase errors, and distortion goes up. For us, the transmission line combines the best of the sealed and the ported box. As you go down in frequency the excursion of the woofer remains fairly similar for the same sound pressure level, and it rolls off gently, unlike a ported design, so you have superior distortion, superior phase characteristics and serious bass."

As Thomas points out, the term transmission line is actually a bit of a misnomer: "It's two bassloading principles in one cabinet – that's not been widely discussed, either because companies didn't understand it, or they do and keep the understanding to themselves. You've got basically an acoustic crossover, and getting that right is the key to making it work. Believe me, I'd use another method if we could find something better.

Look at our drive units: we use soft domes, aluminium, carbon fibre, paper; all sorts of materials – basically what works best in the given application. But we're wedded to transmission line, even though it' a real pig to design. That's why it takes us a long time to bring new models to market, and probably why most designers shy away from it."

Thomas stresses he's not claiming PMC is wholly right and other manufacturers wrong: "Look, there are some speakers that are designed in a way we wouldn't in a million years, but I still think they are great. There are so many ways to skin a cat."

PMC drive units are designed in-house, then some contracted out to specialist suppliers such as SEAS (tweeters) and Volt (woofers). But the threeinch dome midrange and 34mm dome tweeter in more costly models are hand-built in-house.

I'm keen to get his perspective on why speakers can measure similarly well yet sound quite different, and remind him of my dislike of the acronym PRAT (pace, rhythm and timing). Thomas chuckles as I note that Beethoven didn't build his career on PRAT: he manipulated dynamic contrast, tonality, timing and room pressurisation, the qualities against which i think we should be benchmarking our audio kit.

My observation takes Thomas back to his BBC days: "We used to categorise speakers as boring but true, or dynamic and coloured. The former were undynamic, with the life damped out of them to make them measure well and sound neutral. Then you had the dynamic sounding speakers that were not neutral at all. They were punchy and powerful and exciting – but the BBC way, for neutral speech quality, just wasn't their design brief. Really what we are aiming for at PMC is a combination of the two: it's dead easy to design a boring and neutral speaker – you damp the hell out of it – and easy to design a dynamic speaker by not damping it very much. The difficult thing is accurate *and* dynamic."

PMC uses the voicing methodology the BBC evolved over 40 years from the 1930s. New designs are developed up to around 80% in mono, using a brutally objective listening panel, then measuring, then listening again in as many repeats as prove necessary. The audio benchmark used is simply human voice. As Thomas points out, all of us are exposed to speech every day of our lives; our senses are focused on speech and our brains are recalibrated every day to tune in for it.

#### **Vocal development**

"If a speaker can't reproduce speech it's had it. Speech is the ultimate test of crossovers, integration of drive units, dispersion — all of those things. Also, we'll do that really near-field, so your head will be like 12" away from the baffle to take out the effect of the room. Eventually you get to the point where you are going to go stereo, and then we have certain very fixed pieces of music, material we really know inside and that shows off key attributes. It needs to be stuff you don't like because you're really going to hate it after you've listened to it 5,000 times."

PMC's listening room, where the final phases of development take place, has acoustic treatment but not, says Thomas, "within an inch of its life", as a studio might be. "You don't want it so tight it's dead and hides an undynamic speaker. As you listen and make further changes you return to measuring from time to time and gradually build the balance of the design. It is a combination of engineering-led advancement and subjective evaluation.

"Good timing and the other key qualities arise almost naturally out of this process. Measurements tell us a lot about how a speaker is likely to perform, but we still don't have a measurement for all the things we can hear, so development in those areas is a matter of long experience."

Thomas acknowledges my charge that some speaker vendors deliberately engineer 'sonic hacks' to seduce ignorant buyers, but says some poor results come from well-meaning but wayward engineering. "Then there's the whole issue of how you measure. In our case we take a mean average of multiple measurements to plus or minus 90 degrees from the axis. The on-axis result might be slightly 'hotter' than 'flat', but then the average radiation into the room will be even over frequency.

"But I agree some companies cheat. There used to be tweeter in a brand I'll not name with a 6 dB peak at 15 kHz. It added this lovely spatial quality to the speaker and people would go 'wow, that's good', but after only a few hours it would start to get wearing – it added this little twinkle to everything. And it's been going on for decades: in the 70s



## **INTERVIEW**



The latest arrival from the PMC domestic range, the Twenty5i series features technology trickled down from the flapship Fenestria

another favourite trick was to boost the top and the bottom, and as a designer, no matter how pure your intentions, you can be sucked in by this 'loudness button' syndrome. Over a day's development you can end up adding more bass and more top and thinking: 'Wow, I've just come up with the best speaker in the world'. The following morning and go 'Uhh, what was I thinking?' That's why repeated measuring at every stage is so very important.

"This issue's also well recognised by the mastering guys in studios. They are prone to exactly the same tendency. They'll spend a day on a recording and think they've done the best balance ever. They'll come back the following morning and realise that actually it's far from right."

### **Bouncing cartridges**

On the topic of mastering, I ask Thomas why so many albums recorded in the 70s sound thin and undynamic. "It's the lowest common denominator syndrome and the mono/stereo compatibility issue. Hi-fi was 3% of the market: most record players were cheap mono chiselers with no vertical compliance. Studios cutting stereo had to dial back the dynamic range so the record would play without those mono crystal cartridges jumping all over the place because of the vertical modulation in the groove. Otherwise 50% or more of the records would come back because people couldn't play them."

Thomas offers *Led Zeppelin II* as an illustration. "It was first cut at a level that made a lot of record cartridges bounce, so they dropped it by 6dB and they still bounced. I think they then dropped another 4dB: that's the one everyone listens to. Get one of those original cuts – I have one – and it sounds fantastic. I always used to buy the quadrophonic releases in the 70s: they knew that if you bought quad pressings you were a hi-fi buff and would play them on better kit."

I ask him about his home system. He has two: a surround sound/movies set up and a dedicated two-channel room, using PMC Fact 12s driven by a Bryston BP26/4B Cubed combination, with three dedicated turntables — for 78, mono and stereo. Sources are a Studer reel to reel, a studio cassette deck and a Levinson CD player. His library includes some 14,000 records including a large number of 45s, plus 'a lot' of CDs and tapes. The two-channel system gets used most, the evening wind-down usually including an hour or so of blues and jazz.

I want to know whether Thomas thinks speaker design has improved over the last three decades or so, and whether he believes the science, or is it perhaps to a degree an art, is approaching the end of the road? "Aww no. The speaker is still the worst thing in the world for distortion. They're appalling. We have loads more to do." I ask him if he believes that all speakers will be active before too long. He's not so sure. "The best active speaker you can design will always beat the best passive you can design, because you have direct amplifier control of the drive units. But most active systems compromise on the amps due to the cost; if you use good quality amps then active is so much cleaner. But the Fenestria is probably the first passive speaker we've developed that can hold its own with the best of our actives and I'm really pleased with it."

#### The state of the industry

We move on to discussing the state of the highend audio industry. "As a hifi customer in the 70s you knew what the best components were — the top five turntables, amplifiers, speakers and so on — and there were no dogs in there. We seem to embrace anything now and I think that's dangerous.

"As an industry we used to work really hard at making good hifi desirable and aspirational. All the top manufacturers in the 50s and 60s used to get together and put on shows at local theatres and cinemas where they'd have a live band on stage or an orchestra and then they'd play a recording of it. I think we've lost that ability to work together as an industry. If ever I do retire from PMC, that's something I'd love to get involved in. You've got to engage with customers and I think as an industry – we're very poor at that."

I ask Thomas about audio shows: there's a deep sigh of frustration and then: "When people can be bothered to go to a show they're confronted by a series of rooms that sound appalling because the exhibitors don't know anything about acoustics. What's slightly concerning is that the vendors apparently don't realise, or don't care. Nobody is trusting their ears and as soon as you lose trust in your ears — and I think possibly the industry has — then you're done. We're selling the gold and the aluminium and the polished bits as saying something about the sound quality, and they don't."

Thomas is isn't making a plea for ugly hi-fi, but rather saying the industry would do well to return to its roots and rediscover an appetite for constructive self-criticism. "People aren't stupid. If someone has bought a £400 micro system and his neighbour has spent £3,000 and it sounds exactly the same or even worse, he's not going to be impressed is he?

His sons, Oliver and Tom both work in the business – as CTO, and head of purchasing, procurement and logistics – and I wonder if Thomas still enjoys his own role. "Oh yes. Speaker technology still has a long way to go. It's not as if we can say: 'Well, we cracked that. It's perfect. We can go home now'. We are still learning, still advancing, and that's what is exciting about it."