



# Andy Marshall

s the founder and CEO of THD, nobody is better-qualified than Andy Marshall to explain its design philosophy. After all, he designed the Flexi-50 and 4-12 cabinet, the Class A BiValve and UniValve amps and the Hot Plate attenuator, among others. "I'm a guitar player whose records don't sell... I was a session player, a producer, recording engineer, studio manager... I have a very specific taste in sound, but beyond taste and opinion, I know what prints to tape well. There's lots of amps that will sound good to your ear, but when you take them over to the recording studio, you wonder, 'Why the *heck* doesn't this sound good on tape?' And the first thing you do is you say, 'Well, the recording engineer must have been shit.' But not necessarily. [Then] there's amps that print well to tape but they sound so terrible nobody wants to play them. Printing to tape also relates very well to what works onstage. Too many people, out of necessity, buy something based on how it sounds in their guitar store. Then they go to the rehearsal studio and they can't hear themselves! I know what it takes to be heard above a band, and it has *nothing* to do with volume. It has *something* to do with frequency response, and a lot more to do with phase response."

The idea is to align the harmonics created by overdrive so they are perfectly in phase with the fundamental, instead of slightly smeared as is normally the case. "It has to do with the selection of the

capacitors in the signal path, the type of resistors, the physical layout of the board: are these two resistors parallel, are they perpendicular, parallel but offset, parallel but with a ground strip between them? How wide is this trace compared to that trace? If this trace is four times as wide, then this one will influence that one but not be influenced *by* it... This all makes a difference. Even the varnish which is vacuum-impregnated in the transformer."

One of the Flexi-50s biggest triumphs is the three-band EQ section – the knobs may be labelled the same as everywhere else, but that's only skin-deep. "The midrange control posed an incredible challenge. The Univalve and Bivalve use what's typically called a Baxandall circuit. People best know it as the Ampeg V4, V2 type circuit. It is a treble and bass control, and when the treble and bass are turned all the way up, the midrange is scooped. When they're turned all the way down, the mid is boosted. So you don't technically need a midrange control. But most guitar players are expecting treble, middle and bass. And if we're going to go after the A/B, push-pull market, where there's more Fender, Marshall type people there, I just don't want to field all the phone calls, 'Why the *hell* doesn't it have a midrange control?' So I started playing with midrange controls that I could add to the Baxandall.

"As often happens, I woke up in the morning with a circuit idea. And I remembered seeing a type of circuit

that's called a parallel T, which is used in all analogue FM receivers... A parallel T does a frequency response curve which represents an infinite cut at a specific frequency. Not just a dip: a properly tuned parallel T is down 150dB at that frequency. I'd only ever seen them used in RF. But I thought, 'You know, just change the impedances, change the values of the resistors and capacitors, it should work in audio.' And I built one, and sure enough it worked like a dream." From there it was just a matter of detuning the frequency response to behave within a voicing appropriate for a midrange pot.

It's not such an unreasonable call to describe Andy Marshall as a bit of a sorcerer in the world of amplifier design. Even a casual conversation will reveal his incredible understanding of what goes on inside an amplifier.

"I don't want to come across as a know-it-all, but I've just spent an astounding amount of time learning how to do this. And I seem to have – for no particular reason other than the alignment of the stars or being raised mostly on hippo milk instead of cow," he grins, "a relatively uncommon understanding of the interaction of the wires and the components. I don't honestly know why I know it... there are times it just comes together when you let your subconscious work on it instead of your conscious."

It's the same combination of factors, one might suggest, as goes together to make any guitar legend. 6