

## Gain: Reflections on David Tudor

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One day in 1982 I was sitting with David Tudor in the breakfast room of a small Dutch hotel, trying to help him repair one of his circuits. The box had a few jacks, a few pots -- none of them labeled -- and a connector for a battery of a sort long out of production. The odds of our being able to find and fix the problem were rather poor. Tudor mentioned that the box was *basically* a mixer, which prompted several other members of Composers Inside Electronics (lingering over coffee) to suggest alternatives available in the ton of equipment shipped from New York for an installation of *Rainforest*. David politely refused all offers, claiming them to be unsuitable but without alluding to specifics. The boys dispersed, David went back to work, I got up to leave, and the phrase "your music's all about *gain*, isn't it?" popped out of my mouth -- I'm not sure where it came from, and cannot assume credit for originality. But David looked up, slightly startled, and said, "you're right, and you're the first person to have said that." It was probably the only time I really impressed him in the 20 years I knew him.

Amplification is a mysterious thing. Whereas many people think of it as a simple linear process, the design of good-sounding audio equipment depends on distinct stages of amplification and attenuation, rather than on straightforward amplification alone -- the charm of tube amplifiers is a case in point. A good mixer is rich in gain variation, and much of its acoustic personality comes from its "gain structure" -- the sequence of boosting and cutting of the signal as it passes from input to output. From years of working with audio feedback I was perhaps acutely sensitive to issues of gain. But analyzing David's "table", with its complex chains and matrices of discrete audio modules, gave one a profound respect for the mysteries of gain. Most of David's individual modules were rather simple -- often relatively crude rock "stomp boxes", such as compressors, flangers and equalizers -- but the undulating signal level as it passed through the network defied analysis, and was often dismissed as merely illogical by house technicians hunting down a buzz or fault in the sound system. Whereas much attention has been focused on David's obsession with the loudspeaker as an active musical instrument (rather than a mere passive conduit for sound), the ups and downs of the amplification process that precede it bear scrutiny as well.

David fixed the box, somehow, after we left him in peace. The concert was stunning. Somewhere in the last third of the performance David touched a large key and the music -- which had been resting comfortably on a fine plateau of loudness -- jumped up to a higher level. It wasn't just louder, it was different. And I heard the Tudor table at its best.