

Trevor Owen de Clercq
Digital Audio Processing
E85.2600, Prof. K. Peacock
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Status Report on Research Activities

I was not too sure about where to begin with my research activity (and still am not sure). Since I am interested in developing high quality sound recording techniques at NYU through the tonmeister track, I wanted to explore the more musical ramifications of digital audio upon the recording medium. But what does that mean, really? I started off by examining the "excellent introduction to digital audio" by P. J. Bloom mentioned at the end of Chapter I in Watkinson's book.¹ Bloom's article indeed covered a broad array of digital audio topics, but was unfortunately a bit outdated (published in 1985). One specific topic by Bloom, though, seemed still appropriate in this day and age. Apparently, with the increased frequency and dynamic range of digital audio, consumers were complaining that the new digital techniques sounded "too good." His main example concerned the BBC switch over to DAB (Digital Audio Broadcasting). Supposedly, consumers who had previously been receiving a significantly reduced bandwidth signal to accommodate long-distance transmission were now distracted and annoyed by being able to hear clocks ticking in the radio studio or the shuffling of the radio announcer's papers, etc. Bloom goes on to touch on the more contemporary subject of analog recorders having more high-frequency roll-off than digital recorders and thus a "smoother" high-end, but does so only briefly.

This topic of analog recorders being preferred to digital recorders struck me as a sharp irony of the development of digital audio. Can digital audio reproduce sound too exactly, i.e. can digital recorders be too transparent? A musician first and foremost, I am always a little leary about the development of technology for technology's sake; in my mind, new technology should always be subservient to the purposes of the medium for which it was created. In this case, technology must serve a musical means, and if it doesn't, technology is useless no matter what the specifications. One only has to do minimal research into the field of modern rock recording to see that analog machines are still being used on the most expensive and most successful work despite our "digital age".² Is this preference the result of the analog audio industry being a more mature industry than the digital audio industry (and thus more familiar to engineers), or is analog inherently better in some ways than a purely transparent digital medium? If so, are digital audio manufacturers engineering new products to take into consideration these inherent advantages of recording analog?

¹Bloom, P. J. "High Quality Digital Audio in the Entertainment Industry." *IEEE ASSP Mag.*, 2, pp. 2-25 (1985)

² Daley, Dan. "Music from Garbage." *Studio Sound*, pp. 64-72 (Nov. '96)

Perhaps these analog advantages are only applicable to certain styles of music making. Do classical music recordings benefit from the inherent characteristics of analog? In general, classical music has probably seen more benefit from the greater tonal response of new digital recording equipment than any other musical style. There is no doubt in the mind of the consumer that certain music reproduction systems are better tailored for a particular genre of music.³ Therefore, both studio and home musical equipment currently is in need of genre specific audio qualities. Can digital equipment manufacturers develop systems which tie together the best of analog and the best of digital for any given musical style, or is the future landscape of music technology a hybrid of different equipment from the invention of electricity to the present?

Unfortunately, due to the age of Bloom's article, his copious references seemed unapplicable to today's techniques. Also, due to my lack of extensive training in electrical engineering and acoustics, many of the more promising articles were unintelligible for their high dependence on mathematical explanations and proofs.^{4,5} Hopefully, I will be able to find more articles written in lay terminology to analyze the way digital technology is incorporating the advantages of analog. I run the danger of having this research be a mere compilation of subjective listening tests and new products information. But perhaps a more specific or slightly related topic lies somewhere out there that can address the musical engineering of digital audio. Only more research will tell.

³Atkinson, John. "Equipment Report: Myriad Systems MC 100 CD player." *Stereophile*, pp. 126-136 (Jan '98)

⁴McNally, G. W. "Dynamic Range Control of Digital Audio Signals." *JAES*, vol. 32, no. 5, pp. 316-327 (May '84)

⁵ Moorer, J. A. "Digital Coding of High-Quality Musical Sound." *JAES*, vol. 27, no. 9, pp. 657-666 (Sept. 1979).