

## DIGITAL HEARING AIDS

J M Kates

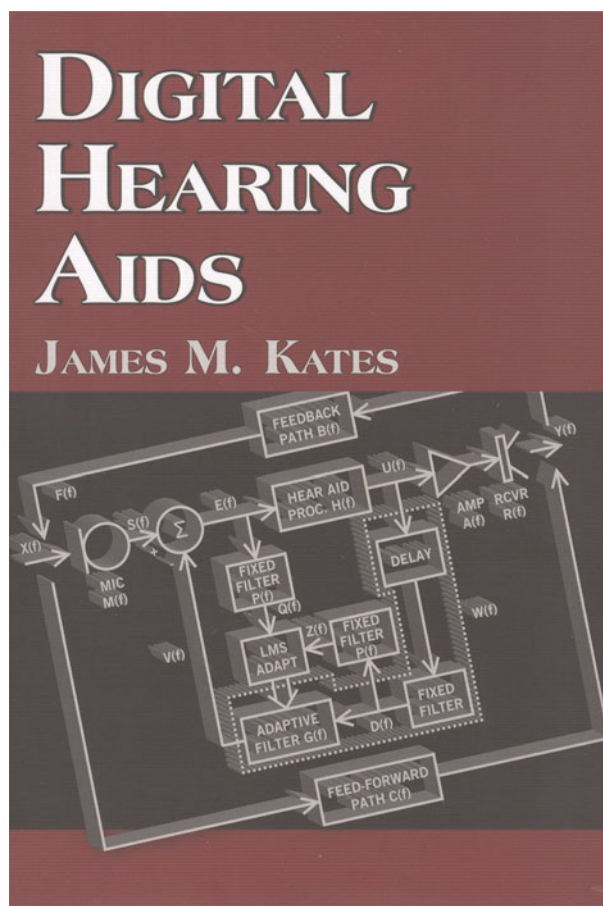
Plural, 2008

ISBN 978 1 59756 317 8 pp 464 Price £57

The rapidly increasing complexity of digital hearing aid technology has sparked a profusion of manufacturers' jargon, which the professional must interpret when attempting to understand how the features of a hearing aid work. Such knowledge is needed in order to select a device with appropriate signal processing for a particular hearing loss, to 'problem-shoot' and resolve issues that the wearer reports, and to counsel the wearer in the limitations of the technology. However, until the arrival of this book, there has not been a text which bridges this gap and demystifies digital hearing aid technology.

I was a little daunted when I flicked through the book, due to the many mathematical equations and circuit diagrams (which threw me back to my A levels and reminded me why I didn't study maths beyond this point). However, I need not have worried, as the book is very well written and it is possible to follow the explanations without fully appreciating the details of the equations.

The book follows a logical progression, from an introduction to hearing aid technology, signal processing and electroacoustics, through to separate chapters on directional microphones, adaptive and multimicrophone arrays, wind noise, feedback cancellation, dynamic range compression, noise suppression, spectral subtraction, spectral contrast enhancement, sound classification, and binaural signal processing. The book gives detailed explanations of various signal processing methods, such as frequency warping and envelope modulation filters. It also includes details of some of the physical challenges associated with various styles of hearing aid, such as air turbulence around the ear, and explains how well the various features work in day-to-day listening (as opposed to the test lab). For example, the text explains why directional microphones work less effectively in everyday listening situations, typically due to less spatial separation of sounds and the distance of the signal from the listener, and how adaptive feedback suppression is challenged by room reflections. Thus, it is a reminder that there is still a need for further



development and refinement of processing algorithms, which are comparatively 'old hat' in the fast-moving digital world.

This book would be an excellent reference resource for those involved in selecting and programming hearing aids and counselling users in the limitations of their aids. Those who are responsible for evaluating new hearing aids, or those who fear the patient who reveals that he or she is an engineer and is keen for you to fully explain their hearing aid, would find this book particularly useful.

H MARTIN  
Middlesbrough, UK