LOUDSPEAKERS

An anthology of articles on loudspeakers from the pages of the Journal of the Audio Engineering Society Vol. 1—Vol. 25 (1953-1977)

preface

The history of loudspeakers is now well into its second century and the development of really effective practical devices has already been underway for more than fifty years. The importance of the loudspeaker in the emergence of the entertainment industry can scarcely be overestimated for, without it, none of the popular media such as radio, television and film could exist in their present form and the development of the phonograph would have taken an altogether different course.

The main impetus to the commercial growth and wider application of high quality loudspeakers began after the end of the Second World War. Development was encouraged by improvements in disc recording and by the advent of VHF broadcasting which reduced the limitations on both bandwidth and dynamic range. Both media were also greatly influenced by the introduction of magnetic tape recording which made the long playing record a commercial possibility and subsequently reduced the dependence of broadcasting on live performances. These developments influenced loudspeaker development as the need arose to keep pace with improvements in the quality of programme sources.

Before World War II, the majority of loudspeakers were characterised by limited bandwidth—usually restricted to a frequency range of 70 to 7,000 Hz—large physical dimensions arising from a need for high sensitivity to operate satisfactorily with available tube amplifiers (average continuous power 10-15 watts) and irregular amplitude-frequency response. During the decade 1945-1955 attention was concentrated mainly on extending bandwidth by about one octave at each end of the range, i.e. 35 to 15,000 Hz.

With these objectives satisfactorily accomplished, high quality loudspeakers still remained large enough, and some would say ugly enough, to cause resistance to their introduction in domestic settings. This state of affairs altered rapidly towards the end of the Fifties due to the introduction of so-called air suspension speakers which traded sensitivity against internal air volume. By this means it was possible to reduce the overall bulk of loudspeakers to about one quarter of their former size. These developments were given quite considerable encouragement by the advent of commercial stereo disc records, and by the end of the 1955-65 decade the majority of domestic loudspeakers were less than two cubic feet in volume, with low sensitivity and correspondingly wide bandwidth. At this time (1965) high-fidelity was still a rarified hobbyist pursuit, but there quickly followed what can only be described as an explosion of interest in domestic sound reproduction, and just as quickly it became big business on a world-wide scale.

The focusing of attention and the availability of funds for research inevitably led to the development of even better loudspeakers. This period has so far been marked by the introduction of new diaphragm materials, better constructional methods for enclosures and studies for improving the integration of sound in multi-way speaker systems. Along with these developments have come radically new methods of measurement and evaluation made possible by advances in digital computer technology and associated industries. These new techniques are not only more accurate but are also considerably faster and therefore more convenient than conventional methods of measurement.

Throughout this period, beginning with the formation of AES in 1948, the Journal of the Audio Engineering Society has published more than 160 papers on loudspeakers. The collection of papers presented here has been selected from those which are considered to be of significance, either because they mark an important stage in the development of loudspeaker technology or because they contribute to the understanding and the history of the subject. Recognising that much of significance has appeared outside the pages of the Society's journal, we have also included a list of references to other important published work. The publication of this anthology, together with the list of related reading at the end of this volume, represents a fitting monument to all those whose endeavors have advanced the art and science of sound reproduction to its present state.

Raymond E. Cooke — October 1978
Maidstone, Kent, England

contents

PART I: 1953 THROUGH 1969

PART II: 1970 TO 1978

PART II: 1970 TO 1978 (Cont.)