

**The Technique of Sound Reproduction**

*Theory and Practice*

**AMPLIFIERS**



# **The Technique of Sound Reproduction**

*Edited by John Borwick*

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# AMPLIFIERS

*H. Lewis York*



**Focal Press**  
*London & New York*

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FIRST PUBLISHED 1964

PRINTED IN GREAT BRITAIN BY  
*Unwin Brothers Limited*  
*Woking and London*

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## EDITOR'S INTRODUCTION

*High Fidelity*—by which we mean the recording and reproduction of sound with maximum faithfulness to the original—has been in existence for only a decade or two. Yet in that time it has become an absorbing hobby for thousands of technical and musical enthusiasts. In countless homes it provides the key to unlimited musical enjoyment in the form of today's high quality gramophone records, tape records and the VHF/FM broadcasts.

During the same period, high fidelity has risen in importance as a subject of study at Technical Colleges where it is variously listed under Audio, Electronic, Broadcast and Telecommunication Engineering.

The decision to produce this series of books on the Technique of Sound Reproduction in such a way as to make them add up to a comprehensive Manual of High Fidelity in six volumes arose from the following considerations:

1. To treat this wide subject adequately in a single book and at a level suited to the needs of both the technical student and the keen amateur would require a work of unmanageable proportions.

2. The practice of assembling high fidelity equipment in separate components conveniently allows the student and the amateur to study or work separately at these six aspects—Acoustics, Amplifiers, Loudspeakers, Disc, Tape and Radio.

3. In this age of specialization, we were presented with the seeming paradox that six expert specialist authors were easier to find and brief than a single polyhistor of high fidelity techniques.

Accordingly, and before one word was written, the Editor was able to hold a series of meetings with the authors, each of whom is an expert in his particular field. This procedure has ensured that the technical level is uniform throughout the series, and that the volumes dovetail together to provide complete coverage while nevertheless taking their place in the literature as individual works in their own right.

Special attention has been given to terminology. Each book includes a Glossary of Terms so that anyone possessing the complete series has access to a sectionalized dictionary and reference to the whole subject of the Technique of Sound Recording and Reproduction.

JOHN BORWICK

## PREFACE

IN this book I have attempted to describe, in simple terms, the theory and practice of the audio frequency amplifier of the type comprised under the popular description 'high fidelity amplifier'.

The aim has been to deal with the subject from simple theory up to the development of the circuits most often encountered in an understandable, concise and practical way. The work is not intended to be comprehensive nor a text-book and is directed to the user of this type of equipment who wishes to have some understanding of its construction, the enthusiast and the amateur designer.

At the date of publication, the vast majority of audio amplifiers use the thermionic valve although a few transistorised amplifiers are making their appearance. At present the main advantage accruing from the use of transistors in this field is that amplifiers can be made smaller and lighter, not a matter of great significance in fixed sound reproducing equipment. One considerable advantage of a transistor output stage, however, is that it can be designed so that a loudspeaker can be connected without the necessity of using a matching transformer. Further development in the manufacture of transistors and the reduction in their cost during the next few years, will doubtless make available low priced audio amplifiers with a standard of performance superior to that of the valve amplifier. At that time, the chapter on transistors may require expansion in the form of a second volume.

Valve application reports for some of the most popular valve types have been gathered together in Appendix II and I believe that these will be found to be a useful source of information on amplifier performance and design. All illustrations are based on current valve types and data sheets from the appropriate application reports have been used for this purpose by courtesy of Mullard Ltd.

The author wishes to thank Mullard Ltd. and The General Electric Co. Ltd. of England for permission to reproduce application reports.

H. LEWIS YORK