

Frank D. Sop

basic audio

by NORMAN H. CROWHURST

VOL. 3



JOHN F. RIDER PUBLISHER, INC.
116 West 14th Street • New York 11, N. Y.

Copyright August 1959 by John F. Rider Publisher, Inc.

All rights reserved. This book or any parts thereof may not be reproduced in any form or in any language without permission of the publisher.

Library of Congress Catalog Card Number 58-13425

Printed in the United States of America

PREFACE

Audio is like Topsy: it wasn't born, it just grew. Whatever Topsy may have been like, Audio has grown like a gawky child—not always in proportion! Originally associated with radio and later with high fidelity, audio now finds application in many other places—to name a few: computers, automation, ballistics and guidance for missiles, sonar detection for navigation, ultra- and infra-sonics for medicine, both diagnostic and therapeutic, as well as geophysical and other work. In fact Audio is now one of the largest and most basic divisions of electronics.

Courses in audio were nonexistent not too many years ago. Since then, textbooks and courses have appeared. But their approach follows the principle of many professors: "I learned it the hard way—you'll have to!" It's like learning watchmaking from a bridge-building man.

My wide experience in various aspects of audio has shown the need for a better way. In industry, in academic education, and particularly in working with graduates from college, this need is evident. My extensive technical writing for magazines and consultant work in the industry have also shown me audio's educational needs.

Many competent "practical men" find themselves hindered by lack of academic background in the subject. They can do their job in their own established "groove." But they do not have—and find it impossible to acquire—the background to enable them to expand outside this groove. These people need help in closing the gap between "theory" and "practice."

Engineers are conversant with the accepted "technical language," but they read the literature with only an "intuitive comprehension" (or should it be apprehension?). Their education dragged them past many "awkward spots" about which they have never felt really "comfortable." Like the King of Siam in "The King and I," they find many facts of which they wish they were more certain they are sure.

Very important are the new students, technicians, and audiophiles. They will need a basic education in audio to enable them to add their contribution to progress (and to earn themselves a living!). Why make it difficult? They'll do much better if they can get a good start.

All-in-all, it is time that certain roundabout approaches to this key subject were eliminated. We need a direct, meaningful way to take the place of the difficult detours. Then each of our three groups can not only "learn audio," but also understand it! This three-volume book results from the author's extensive education research. The finished arrangement achieves a completely new directness.

Let me give just one example: how many understand the behavior of a coupling capacitor, particularly its contribution to amplifier transient performance, and what sometimes happens to feedback? This has always been based on the concept of capacitive reactance, which does not adequately *explain* all the effects. We have adopted a practical "what happens?" approach.

As a result, someone who learned this the old way may miss the familiar landmark of the reactance concept—when he expects it; a closer examination will reveal the reason for postponing it: the whole presentation has been arranged to avoid the "dead spots" left by the traditional approach.

Inevitably such a change of approach will mean a change of stress. I make no apology for this. I know from practice that it is far more successful in getting Basic Audio "across."

It would be impossible to acknowledge the very many who have, knowingly or unknowingly, contributed to my experience, making this book possible. But I would like to express my thanks to the John F. Rider staff for their cooperation in "packaging" it in a form that interprets my intentions so well.

NORMAN H. CROWHURST

New York, N.Y.
August 1959

CONTENTS

VOL. III — BASIC AUDIO

Feedback Fundamentals	1
Questions and Problems	14
Feedback	15
Feedback Applications	25
Controls	31
Questions and Problems	39
Plate Voltage Supply	40
Grid Bias Supply	51
Screen Bias Supply	56
Filament or Heater Supply	59
Transformerless Power Supply	61
Questions and Problems	63
Shielding	64
Audio Transmission Lines	71
Transient Effects	75
The Audio Amplifier	78
Audio Oscillators	79
Questions and Problems	83
Recording	84
Electro-Acoustics	94
Audio and Hearing	98
Questions and Problems	106
Index	107