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amplifier builder's guide

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Amplifier Builder's Guide

chapter 1 . . . audio theory and design

chapter 2 . . . practical audio amplifiers

preface

THE ORDINARY audio amplifier seems a simple thing compared to r.f. equipment. Yet the average radioman is frequently dismayed at the results when he builds an amplifier. And when it comes to devising an effective equalizer system or volume expander, even the more experienced builder can run into trouble. Audio circuit-design must follow well-established rules. Trouble will result if it doesn't.

In this book we have attempted to clarify some of the basic theory of audio amplifiers so that the reader will be better able to design his own or service commercial audio amplifiers. In addition, a number of practical amplifiers are described. Amateurs should find useful material since practically all of the circuits may be adapted to serve as modulators for low-power transmitters or as drivers for high-power modulators. There is little to interest the amplifier engineer in this book. It was not written for him.

The material is organized in two parts: The first section covers the essential theory and design of audio amplifiers. Phono-pickup, tone-control and expander-compressor circuits have been given special attention, since incorrect design in either will ruin an otherwise satisfactory amplifier. The second section includes a number of proven amplifier circuits which use either resistance-capacity, direct, or transformer coupling, or a combination of the three. The recent entry of wire recorders into the field of sound equipment has not been forgotten—we have included complete information on constructing a steel-wire sound recorder and playback amplifier.

Theory and practical material have been interwoven wherever possible so that the builder may learn from the equipment how and why certain component values are used under specific conditions and what will be the results of varying these values.

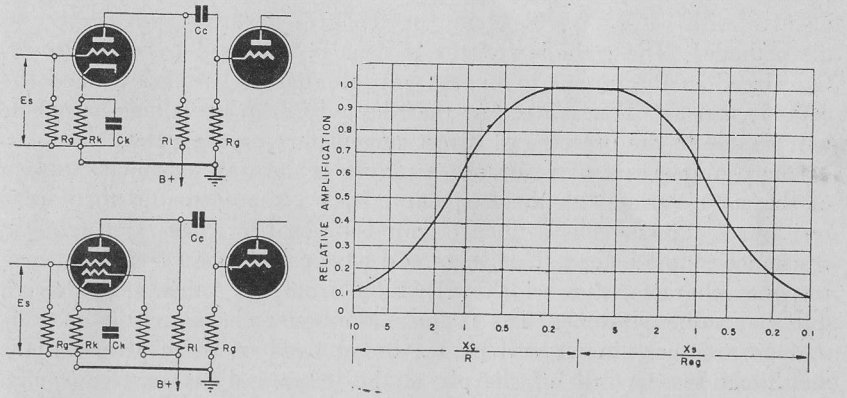
While most of the material is not new (it originally appeared in RADIO-CRAFT or RADIO & TELEVISION magazines), it has been extensively rewritten, revised and corrected. The illustrations have also been revised and corrected where necessary. And, more important, the material has been organized in logical sequence to make a convenient reference book.

Chapter 1...Audio Theory and Design

FREQUENCY RESPONSE

LET US attempt to throw some light on the theory behind the operation of the lowly speech amplifier found in so many types of electronic equipment: radios, electric phonographs, public address apparatus, electronic pianos and sound-on-film projectors.

The primary purpose of such an amplifier is to properly amplify feeble electrical impulses to a value where they will be able to operate



Figs. 1 and 2—Left—Typical resistance-coupled amplifer stages, using triode and pentode. Fig. 3—Right—General response curve of resistance-coupled amplifiers.

headphones, drive power amplifiers or operate metering or recording devices. These very minute voltages may be the output of a microphone, electric eye, phonograph pickup or other voltage-generating device. Hence a speech amplifier is merely a voltage amplifier designed to operate properly over audio frequency ranges.

Speech amplifiers are designed to produce a sufficient amount of voltage amplification without distortion. In order to do this, it is necessary