

No. 160

fundamentals of

**TRANSISTORS**

by

**LEONARD KRUGMAN**

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# FUNDAMENTALS OF TRANSISTORS

by

LEONARD M. KRUGMAN B.S., M.S., P.E.,

*Signal Corps Engineering Laboratories*



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## PREFACE

Ever since the point contact transistor was announced by the Bell Telephone Laboratories in 1948, a considerable effort has been directed toward the improvement of transistor manufacturing and circuit design techniques. As a result, the transistor has now evolved to a point where it is suitable for many applications, both as a direct replacement for and as a supplement to electron tubes.

That the transistor caused an immediate and intense interest in the electronic field is not difficult to understand. Here is a device which acts like a triode, yet together with its protective housing is smaller than a jelly-bean. It requires little power, no warm-up time, is extremely rugged, promises indefinite life, and in addition, has certain unique characteristics which make it suitable for many novel applications.

The superiority of the transistor over the electron tube in applications where miniaturization of space and power requirements are primary factors has already been established. Transistor hearing aids and car radios that operate directly from a battery supply are typical applications. The RCA Princeton Laboratories built and demonstrated a completely transistorized television set some time ago. There is no doubt that everyone connected with the electronic arts will have to meet this latest addition to the family — the transistor.

While a massive quantity of literature is available for the physicist, the mathematician, and the research and development engineer, little has been consolidated in practical form for the technician and the amateur. "Fundamentals of Transistors" is intended for this group. It is also intended that this book will serve the initial needs of engineering students and engineers who are confronted with transistors for the first time. For this reason, advanced physical and mathematical concepts have been purposely avoided. However, all the fundamentals necessary to assure a complete understanding of basic transistor operation, performance, and characteristics have been included.

Space limitations, and the large amount of duplication in existing material, preclude listings of exact credits. However, the author would be lax indeed if he did not offer his gratitude to Mr. Seymour D. Uslan and Mr. Sidney Platt for their patience and assistance in editing the manuscript; to Mr. C. L. Hunter of the Signal Corps Engineering Laboratories for his assistance in circuit fabrication; and in particular to Mr. C. E. Bessey of the Signal Corps Engineering Laboratories for his assistance and guidance.

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L.M.K.

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