Electronics Engineers' Handbook

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About the Editors

DONALD G. FINK, Director Emeritus, Institute of Electrical and Electronics Engineers, is well known in his field. His many books—including *The Standard Handbook for Electrical Engineers, Radar Engineering, Television Engineering,* and *Computers and the Human Mind*—have sold over half a million copies. An MIT graduate, he joined the research staff of the Philco Corporation in 1952 and was appointed Vice President, Research in 1961. From 1963 to 1975 he was Executive Director of the IEEE. In addition, from 1957 to 1974, he was an active member of the Army Scientific Advisory Panel. He is a Fellow of the Radio Club of America and the IEEE and appears in *Who's Who in America* and *Leaders in Electronics.*

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Preface to the Third Edition

The widely used Electronics Engineers' Handbook in this new edition now covers the entire range of electronics—from classic theory to contemporary practice. For user convenience the handbook is organized, sequentially and systematically, into four major parts.

Part one covers the principles employed in electronics engineering—from particle physics through electric fields and electromagnetic phenomena. It includes mathematical formulas, circuit theory and principles, information and communications theory, and noise and interference. In this part, the section on systems engineering has been completely revised and now includes an example of the application of systems engineering to a communications system. It also includes a discussion of the new Karmarkar algorithm useful in linear programming.

Part two covers materials, devices, components, and assemblies. It includes a comprehensive treatment of materials used in electronics components and devices, as well as extensive coverage of active and passive circuit components ranging from resistors to integrated circuits and microprocessors. A comprehensive section on transducers and sensors and one on sources and sensors of infrared, visible, and ultraviolet energy are included.

Part three treats electronic circuits and functions in seven separate sections. These cover filters, attenuators, amplifiers, oscillators, modulators, demodulators, and converters. The section on power electronics has been thoroughly revised. The section covering pulsed circuits, logic circuits, and waveform generators has been expanded to include material on multiplexers, demultiplexers, decoders, ROMs, and PLAs, as well as D/A segment converters, codecs, and video A/D converters.

Part four covers major electronic systems and applications. The digital revolution continues to extend itself into new areas. This is reflected in the section on audio reproduction and recording systems, in which are included the latest developments in digital encoding and decoding, digital audio tape recording and playback, digital aid disks, and optical digital disks.

Sections on television, facsimile, telecommunications, electronic data processing, radar, and sonar are also included in this part of the handbook. New material on advanced television systems, direct broadcast satellite systems, high-definition TV, and digital television standards and techniques is included, as well as information on multichannel sound, picture enhancement circuits, and optical video recording. Major new techniques in digital (audio and video) tape recording are covered. Not surprisingly, the section on electronic data processing has been extensively revised.

By popular demand of handbook users, the section on computer-aided design of electronic circuits and systems has been extended to include a listing of CAD programs and languages, along with an extensive bibliography.

Finally, a completely new section covering standards and symbols has been included at the suggestion of the users of earlier editions of the handbook.

In all, this new volume contains 2400 pages and has benefited from the expert contributions of 181 authors. Many of the illustrations have been updated or are new. In addition, where appropriate, new bibliographic entries have been added to bring the total to more than 3800.

The editors express their appreciation not only to those contributors who have been so conscientious in their review and revisions, but also to several new contributors.

In addition, we wish to thank George F. Watson of AT&T Bell Laboratories for his particular assistance with Sections 13 and 14, Lucy Mullins for her conscientious copy editing, and Nancy T. Hantman for her administrative aid.

Donald G. Fink

Donald Christiansen

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Section 1

Basic Phenomena of Electronics

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