

References

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Book Review

Pulse Technology, by WILLIAM A. STANTON, 1964; 255 pages. (London and New York: John Wiley and Sons Ltd., 53s.).

Once the author's preface is read and the objective of the book is fully understood, the initial impression of disappointment formed after a cursory examination of the text is rapidly dispelled. This would suggest that a more explanatory title such as "The Fundamentals of Pulse Technology" would be more appropriate than the broad title the book now possesses.

Although the book is primarily intended for the laboratory technician, the author hopes that it will prove of value to those engineers and scientists who need to know the fundamentals of electronic circuits. One feature of the work is that the level of the mathematics involved is such that a knowledge of calculus is not essential. Within these constraints, the author has produced a readable, lucid and concise introductory textbook on the basic essentials of pulse technology.

The first chapter is devoted to a review of fundamental circuit theory. The main differences between the treatment of sine and pulse waveforms are clearly explained. Thevenin's and Norton's equivalent network theorems are adequately covered, aided by examples and applications of these theorems to circuit analysis. Circuit parameters of transistors are discussed leading to comparisons of the operation of these devices and of thermionic valves as amplifiers. The effect of negative feedback in amplifiers and the advantages gained by its use are also clearly explained. The chapter closes with a short and useful commentary on that most essential tool of the circuit engineer, the oscilloscope.

Wave-shaping techniques are outlined in Chapter II, covering the classical methods of clipping, differentiation, integration and clamping.

Multivibrators are covered fairly exhaustively in Chapter III. The operation cycles of both valve and transistor versions of free-running, monostable and bistable multivibrators are explained by means of waveform diagrams. A similar technique is used in Chapter IV dealing with pulse generation, in which the operation cycles of (a) blocking, (b) shock-excited and (c) phase-shift oscillators are discussed. The chapter concludes with sections on sweep generators and the Schmidt Trigger.

The use of the circuit elements so far studied is treated in Chapter V for switching and counting applications. The operation of chains of bistables with interstage feedback is lucidly explained for a number of typical counting and timing scales. Methods of display are also treated, including a description of the operation of the cold-cathode Dekatron.

No introduction to pulse technology would be complete without some reference to number systems and coding and the elements of logic, so the author has covered these subjects in the next two chapters. In Chapter VI conventional methods of conversion from one number system to another are given with typical uses of systems of different radix. A section on arithmetic operation in binary completes the chapter. Chapter VII contains a concise but clear exposition of the basic rules of Boolean algebra, developed with the aid of Venn diagrams. The use of this algebra is then considered in terms of circuits for performing various logical functions, illustrated by examples in code conversion.

A brief introduction to computer programming is given in the final chapter again clearly illustrated by two examples of simple programming. The book is rounded off with a glossary, a useful bibliography on pulse technology and three appendices. The first two of the latter are added no doubt as a sop to the more mathematically-minded reader. The first covers the use of complex quantities for solving AC network problems, while the second is a thumbnail outline of calculus and its application to circuit theory. The third appendix is an extract from the U.S. National Bureau of Standards' List of prefixes and symbols.

The method of presentation of the book is called by the author the lesson plan approach, in which, once essential facts have been presented and discussed in some detail, repetition is achieved by consideration of examples. Furthermore, each chapter is followed by a series of questions, quizzes and problems, designed to high-light the main points of the chapter. Some of these are of the restricted answer type; others to determine the nature, false or true, of given statements. Most of the problems are vehicles for the introduction of formulae and degenerate into arithmetical exercise. Unfortunately, there are a few misprints and errors. Problem 5 of Chapter I introduces the formula for the deflection of an electrostatic cathode-ray tube. The parameter d_s is given as the "deflection sensitivity," whereas it should be the "deflection." Some also occur in the answers at the end of the book, the magnitude of which are such that they cannot be attributed to rounding-off or slide-rule inaccuracies. These would be unimportant when the book is used as a text in a class room but would be disturbing to a student working on his own.

However, apart from these minor criticisms the author has produced an admirable primer on pulse technology, which more than adequately attains the objectives outlined in the Preface.

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