

rudimentary form. The range of data structures is limited, only essential statistics are collected, and, at present, only a single folio is used. It has proved of value in formulating a route-

finding mechanism and in consolidating rather vague ideas. This model is described in a subsequent paper.

References

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Book reviews

TTL and Its Interconnections, by J. A. Scarlett, 1972; 247 pages. (Van Nostrand Reinhold, £6.00)

The book commences with a comprehensive survey of the functions provided by the range of basic TTL integrated circuits, from the NOR gating brick through the full range of gate circuit variants to the various types of bistable, including a summary of MSI devices presently available. The final chapters present a useful summary of the adaptation of transmission line theory to predict electrical characteristics of printed board layouts, and related these to the speed potentialities of contemporary TTL circuits.

Since the book is essentially practical, detailed analysis of the electrical characteristics of the circuits is kept to a minimum, and the book is most likely to appeal to systems designers who require a fuller understanding of the electrical capability of TTL circuits, and a quick reference to the range of TTL circuits currently available; and to electronic engineers to whom the concept and range of TTL circuits may be relatively unknown.

The book is useful in providing a summary of the essential electrical parameters of TTL and comparative specifications from various manufacturers, and includes two particularly useful chapters on interconnection problems. One of these relates the basic characteristics of printed board layouts (characteristic impedance, propagation delay per unit length, etc.) to physical construction, and the other gives guide rules applicable to the design of board layouts suitable for use with TTL circuit packages. The quick guide to the best design of systems using TTL, given in Appendix I, is also a concise and valuable summary resulting from the wide practical experience of the author.

As a book intended to provide a basic understanding of TTL, it might have been preferable to start with a design analysis of the simplest basic gate and from this to develop the reasons for the various modifications which are used in practice, rather than introduce a large number of variants in the first main chapter. There is also insufficient differentiation between concepts and specifications which are uniquely associated with TTL, and those which are applicable to most types of digital integrated circuits; 'fan-out' and 'noise immunity' are examples. The chapter on quality and reliability is again basically sound, but would be generally applicable to all silicon integrated circuits.

From the purist's point of view, there is insufficient explanation of some of the terms used. Examples in point are the introduction of 'edge-triggered' circuits which are described in terms of a logic function, rather than an electrical function as is more usual; and some ambiguities in the definitions of certain types of bistable circuit.

The book should prove a valuable work of reference to the practical digital systems engineer, but has some limitations as a basic academic textbook.

J. N. BARRY (Uxbridge)

Man-Machine System Experiments, by H. M. Parsons, 1972, 633 pages. (John Hopkins University Press, £7.90)

This book describes a number of experiments with man-machine systems carried out between 1948 and 1966, mainly by the US military, but with some air traffic control and other civilian applications. The military work is mainly US Navy or Air Force simulation exercises to test command and control systems for defence against aircraft and missiles. The author, who is a 'system psychologist', points out that a great deal of this expensive experimental work is accessible only through research reports. Although computers were an essential tool in most of this work there is only the barest description of their role, with no details of the design of the programs. The main emphasis is on the objectives of the experiments and the experimental design. After a short description of methodology and problems encountered in computer man-machine experiments the bulk of the book is a digest of the original reports of twenty-odd programmes of experiments, by no means easy reading. The book's interest seems limited to specialists.

R. M. BURSTALL (Edinburgh)

High Level Languages. (Infotech State of the Art Report 7, £20.00)

Reprints of conference papers never seem to have the same impact as the verbal delivery of those papers. Thus, whilst this State-of-the-Art Report, mostly a reiteration of well-known ideas from well-known theoreticians, might have sparked off a useful train of thought at the conference, it appears rather lifeless in cold print.

I am not sure that the book presents a true current picture of high level languages. For example, there is little said about FORTRAN, except that it is now too old, too constraining, and should be 'stamped out'. No comment is made about current work in developing the language, and, whether it be good or not, FORTRAN is an important language. Again, possibly more programmers use COBOL than any other language, yet apart from a paper on 'COBOL weaknesses', there is little but adverse comment on the language—certainly no mention of the current developments in COBOL. There is not much constructive said about PL/I, either.

However, ALGOL (both 60 and 68—the paper by Fox is an excellent introduction to ALGOL-68) and 'ALGOL-like' languages capture the lion's share of the book. This ALGOL emphasis puts the book in perspective—it is mainly by academics for academics, and at £20 it is too expensive for all but the most dedicated software men.

This big 500-page book has an easy-to-read typeface, but there are quite a number of typing errors. These are of a relatively trivial nature, and, though regrettable in a volume of this price, do not really spoil the book, but at this price, it is only for ALGOL compiler-writing addicts.

J. L. BERRY (Manchester)