

Book Reviews

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In this section, the IEEE Computer Society publishes reviews of books in the computer field and related areas. Readers are invited to send comments on these reviews for possible publication in the Correspondence section of this TRANSACTIONS. Please address your comments and suggestions to the Book Reviews Editor: Richard R. Shively, Bell Laboratories, Inc., Whippany, N.J. 07981. The Computer Society does not necessarily endorse the opinions of the reviewers.

B74-35 Minicomputers—International Computer State of the Art Report. (Maidenhead, Berks., England: Infotech Information, I td., 1973, 553 pp., individual volume—\$95.00.)

This book is vol. 13 in a series of 16 state-of-the-art reports put out by Infotech. The book, as in the other Infotech reports that have been reviewed [1]–[3], appears to be more like the proceedings of a conference. The report is definitely not meant to be an introduction to minicomputers. Consequently, the novice student or unfamiliar engineer would be better off using the publication as a reference after he has become conversant in the field.

Volume 13 is made up of three distinct parts which appear to be typical of all the Infotech reports. These parts are a dialogue section, a presentation section, and an invited papers section. The dialogue section takes the form of a conversation between various invited speakers on the present state of the minicomputer field covering both hardware and software developments. The presentation section is simply a series of talks that are quite relevant to the use of minicomputers. The final section consists of eight invited papers that complement the presentations and are tutorial. The dialogue section appears to have been constructed by taking contextual material from the papers given by the various authors and juxtaposing editorial comments between this material to convey the impression that a discussion has actually taken place between the authors. An excellent example of this is the comments attributed to R. Cady of Digital Equipment Corporation (DEC) on p. 51 of the dialogue section covering microprogramming. The word-for-word equivalent is found on p. 238 and 239 of the report which forms a part of Cady's presentation, "Design Considerations in Minicomputer Architecture." In point of fact, this reviewer did not find the dialogue section objectionable, and found the interleaving of various authors' comments from their papers to be a reasonable way to compare different ideas.

The presentation section is made up of nine papers, and they are listed as follows.

"The Relative Merits of Minicomputers Versus Shared Machines," by J. Henderson, identifies certain areas in large computing systems which could better be served by functionally distributed processors performing selected system housekeeping functions.

"A Survey of Minicomputers," by J. McNeil presents an overview of the general attributes of current minicomputers specifically considering data communications as the area in which to make an evaluation. The points made by McNeil concerning important machine features and their correlation with user application needs are well stated.

"Software Development for Minicomputers," by D. T. Ross examines several of the problems that will be encountered in software production for small machines in the immediate future. In particular, he gives an excellent presentation of the software engineering tradeoffs that may be made using a large host computer in conjunction with a minicomputer.

"Design Considerations in Minicomputer Architecture," by R. Cady speaks for the manufacturers and examines new directions in hardware for the minicomputer field. This is a truly excellent account of the hardware-software considerations in developing new

minicomputer architectures which will optimize the overall total system cost. Well worth reading.

"Hardware Trends in Minicomputer Design," by Dr. K. J. Dean provides an interesting projection on where technology is headed in developing more complex, regular patterned devices on a single chip. He advocates trading software packages for off-the-shelf hardware modules that are much less expensive and thus impacting the overall cost of software in the market place.

"Technical Problems of the Interface between Minicomputers and Large Machines," by F. Whitehouse. Whitehouse considers the problems of linking minicomputers to large host machines via their data channels. Two areas of concern are the operating system interactions on the host machine and the continuous interchange of status information between the two computers.

"Minicomputers in Banking," by D. M. Cainer considers the use of minicomputers in Barclays Bank in England in the area of branch accounting. This is a well-written exposition and includes projections for future banking applications of small computers.

"Minicomputers in Process Control," by M. G. Shortland identifies the major application areas for minicomputers in process control, examines the market place in the United Kingdom, and projects directions for the small computer in this industry.

In "Minicomputers as Commercial Processors," by N. C. Dunlap contends that most design efforts should go toward optimizing the use of peripherals on the small machines as opposed to hardware configurations and operating systems. Along this line he introduces the concept of functionally distributed processing using public and private buses where minicomputers are used to perform specialized operations and communicate with each other via common core. This is a thought-provoking article.

The invited papers section is made up of eight papers that are educational. They are listed as follows.

"A Survey of Minicomputers," by J. Bamford is a striking survey article covering past history, market trends, mainframes, peripherals, and applications. It is well written, technically correct, and highly informative. This reviewer can find only one serious flaw with it: the charts in the appendices have been photographically reduced and are very difficult to read.

"Architectural Trends in Minicomputers," by R. C. Ferreira, includes a particularly good overview of microprogramming. In addition, multiprocessor configurations are mentioned and the functions that may be performed by such systems.

In "Minicomputers, Computers and Business Systems," by A. L. Freedman, indicates that the minicomputer manufacturers have been motivated to make a direct entry into the Electronic Data Processing (EDP) marketplace.

"Front-End Processing," by T. Hughes, is a good discussion on what network protocol is, advantages and disadvantages of using an alien front-end processor, and the desirable features for a minicomputer used in this application.

In "Considerations in the Design of Standard Software for Minicomputers," by F. O'Brien, guidelines are set up for economic designs of operating systems, the use of proven facilities available on large computer systems for applications program development, and estimation of resources needed to implement standard software.

In "Software Consideration for Minicomputers," by D. W. Roberts, the commercial use of minicomputers is considered in regard to software development.

In "An Introduction to Minicomputer Architecture," by E. M. Robertson, the architectural features of the modern minicomputer are considered from the point of view of what is relevant for a given application. The discussion of interrupt structures is particularly well presented.

"Interrupt Handling Strategies for Minicomputers," by P. T. Wilkinson, is an excellent discussion of the types of interrupt and how they may be handled by a small machine. Of equal interest is the author's discussion of multitask executives and how the executive treats interrupt.

It is this reviewer's opinion that while there are several survey books now available dealing with minicomputers, there are none that summarize the state of the art and point out possible future

directions of evolution. Volume 13 of the Infotech series does this in a real sense. It should be a worthwhile addition to any technical library.

REFERENCES

- [1] V. O. Gagliardi. "The fourth generation—International Computer State of the Art Report/#1." *IEEE Trans. Comput.* (Book Rev.), vol. C-21, p. 1459, Dec. 1972.
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- [3] L. C. Hobbs. "Computing terminals: International computer state of the art report—F. D. Sherwood, Ed." *IEEE Trans. Comput.*, vol. C-22, pp. 429–430, Apr. 1973.

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