# COMPUTER GRAPHICS'84



CONFERENCE PROCEEDINGS VOLUME II

NATIONAL COMPUTER
GRAPHICS ASSOCIATION

# PROCEEDINGS OF THE FIFTH ANNUAL CONFERENCE AND EXPOSITION

ANAHEIM CONVENTION CENTER ANAHEIM, CALIFORNIA MAY 13-17, 1984

> VOLUME II TECHNICAL SESSIONS

Computer graphics is one of today's most dynamic industries, experiencing an overall growth rate of more than 30 percent in the past year. Advances in the technology and explorations into new areas of applications both have contributed to this growth.

The success of NCGA's fifth annual conference and exposition, Computer Graphics '84, is just one example of the impact this technology is having on the way we work, manage and learn. Computer graphics applications, now evident in virtually every field, are bringing about significant increases in the productivity and creativity of individuals and organizations alike. The conference program, reflecting the development of the industry, has grown by almost a third since 1983. Combined with a substantial increase in attendance, this means that in 1984. more people learned more about computer graphics and its applications than ever before.

NCGA is therefore pleased to publish the conference proceedings for Computer Graphics '84. This two-volume set includes the tutorial notes and technical papers from the conference and will prove useful to new and experienced users of computer graphics.

The National Computer Graphics Association is an organization of 6,400 professionals and over 50 major corporations dedicated to developing, promoting and improving computer graphics applications in business, industry, government, science and the arts. The activities, services and publications of the association provide a forum for the exchange of important information, experience and expertise. We believe that Computer Graphics '84 and these proceedings make a significant contribution to the work of the association and to the industry.

**Stephen A. Mucchetti** Computer Graphics '84 Conference Director

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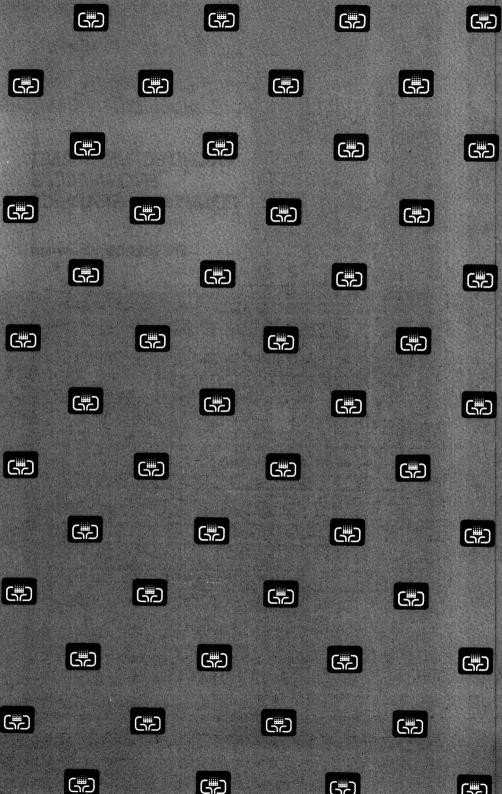
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### Available Micro Software for Architects

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#### ABSTRACT

Microcomputer applications software is becoming a rich resource of tools available to the engineer, architect, designer, manufacturer, or constructor at very low costs compared to a few years ago. In addition, the software is of a high quality and must be seriously taken into account as an option for meeting the requirements of any company. This paper stresses the importance of careful selection of software plus support services, and provides a methodology and several reference lists as resources for finding software. A few specific quality packages are listed.

#### INTRODUCTION

Something over 20 man centuries have been spent on software in the six years since microcomputers came on the scene. Engineers, designers, contractors, and manufacturers can make use of much of that resource to increase their productivity, to increase information for management, to make better products and, in short, to stay competitive.

While the 20 man centuries has produced a wealth of software, at the same time it has made the selection process more complex since there are so many choices. This paper addresses the problem by first defining some terms, then developing a methodology for selection and finally offering some resources: a list of software catalogs, a very brief list of examples of quality packages, and the addresses of those vendors.

#### DEFINITIONS

Microcomputers have application in almost every area of activity touched by engineers and designers including: engineering, design, drafting, material control, scheduling, cost control, manufacturing, fabrication, construction, or the general "running of the business".

Software that has been developed is beginning to fall into certain categories. So, the first step in looking for software is to understand which activity is to be supported, and then to bridge the nomenclature gap to find the right software. Some of the nomenclature problems are quite subtle so this can be tricky.

For example, at one time there was only one type of general ledger software. As this software was applied in various businesses, the general ledger software became tailored so that now there are special forms of the software that meet the special needs of manufacturers, construction contractors, doctors, and lawyers. Even more subtle differences exist. There are special accounting packages that meet the needs of a real estate developer but do not meet all the needs of a construction contractor and vice versa.

When the correct software is chosen, the next step is selecting the hardware and operating system. Hardware refers to the computer, disk, plotters, digitizers, and other items of electronic equipment. The operating system is the fundamental software that provides for copying disks, running programs, trapping hardware malfunctions and the like.

Hardware for microcomputers is made by companies like Apple, Radio Shack, IBM, Hewlett Packard, DEC. Data General, Commodore, and Texas Instruments.

Operating systems for microcomputers are developed by people other than the applications people and also other than the hardware manufacturers. Typical, popular operating systems include DOS which stands for disk operating system and is written by several competing companies most notably Microsoft, Unix which was originated by AT&T, but now is offered by others, CP/M or MP/M or CP/M86 by Digital Research and P-System originated by the University of California at San Diego but now handled by Softech and their licensees.

Application software, then, runs under the supervision of the operating system on the particular hardware chosen. The application software can be organized or categorized as shown in Table 1.

#### TABLE 1: APPLICATION OF MICROS

- A. GENERAL BUSINESS
- B. GENERAL UTILITY
- C. PROJECT MANAGEMENT
- D. ENGINEERING
- E. DESIGN/DRAFTING

Within each of these categories there are several types of software "packages". A software package generally means the computer programs supplied on diskettes, with a reference manual, application notes, perhaps some starter files, and perhaps some printed circuit card or cable or some device peculiar to that application. The software package is a module that will allow the user to address computerization of one particular aspect of that users business or engineering activity.

One particular area of application receiving a lot of attention is computer-aided-design or CAD. CAD generally refers to any use of the computer to facilitate the design process whether the design is of a garment, a structure, a machine, room layout, or a process. CAE has been introduced to specifically refer to computer-aided-engineering as opposed to detailing or design. CADD is used to represent computer-aided-design-drafting. The general definition of CAD as any computer activity which supports the design process is used in this paper.

Other terms which sometimes get in the way of clear communication and understanding of CAD are "2D", "3D", special purpose and general purpose.

Think of 2D as a computer system which replaces the t-square, triangle, template, pencil, and eraser. 2D is to the drafter what word-processing is to the secretary. The designer conceives the design and then commits the design to paper through the drafting process. The 2D system facilitates the drafting process.

A 3D system is one step ahead in the design process. A model of the design is put in the computer and then the computer tends to automate the drafting process.