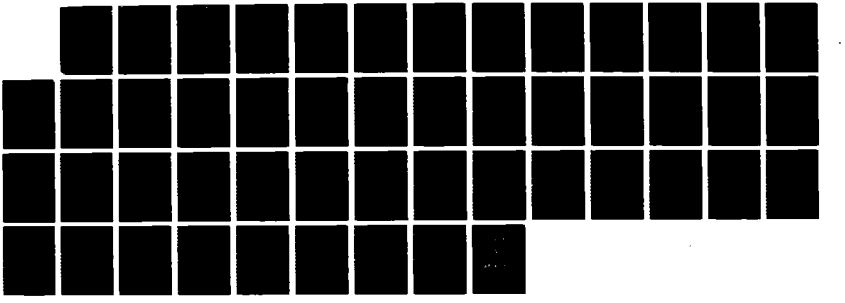
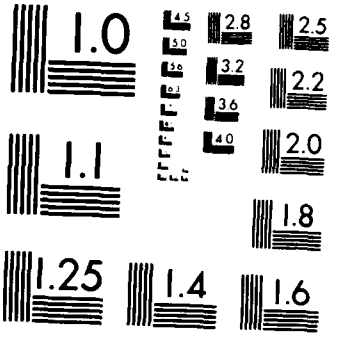
AD-A187 698 REPORT ON DESKTOP PUBLISHING(U) ADVANCED SYSTEMS DEVELOPMENT INC ARLINGTON VA* JUL 87 MDA903-85-C-0340 1/1

UNCLASSIFIED F/G 12/5 NL





Advanced Systems Development, Inc.

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REPORT DOCUMENTATION PAGE

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18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
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	22c. OFFICE SYMBOL DTIC-EB

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List all authors. If the document is a compilation of papers, it may be more useful to list the authors with the titles of their papers as a contents note in the abstract in Block 19. If appropriate, the names of editors and compilers may be entered in this block.

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Example: The subject "Solid Rocket Motors" is Field 21, Group 08, Subgroup 2 (page 32, AD-624 000).

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Prepared for:

Washington Headquarters Services
Office of the Secretary of Defense
Directorate for Computer and Office Automation Resources

July 1987

Report On Desktop Publishing

Contract No. MDA903-85-C-0340
Task 43A11

Prepared by:
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OUTLINE

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Background

In December 1985, Program Analysis and Evaluation (PA&E) tasked Advanced Systems Development, Incorporated (ASD) to assist in the evaluation of electronic delivery of Program Review documents. The evaluation was initiated by Deputy Secretary Taft to more fully integrate the CINCs into the DoD's PPBS. ASD was asked to review the program review process, to evaluate current state-of-the-art equipment, and to propose alternatives with recommendations. After the initial review ASD recommended the most feasible test for the 1986 POM cycle would be to use the USAF Multics system for document preparation and the Worldwide Military Command and Control System (WWMCCS) for distribution of selected program review documents. by memorandum, the Organization of the Joint Chiefs of Staff (OJCS) recommended against the use of WWMCCS for a noncommand and control process. ODPA&E accepted that recommendation.

ASD continued to evaluate options for the near term as well as the long term. During this evaluation ASD was directed to evaluate the use of the Defense Data Network (DDN) communications systems to support the electronic transfer of program review documents. PA&E, working in close coordination with the OJCS Message Center, was able to implement a pilot test for the electronic transmission of selected program review books from the FY 86 program review, July 1986.

The main objective of the test was to verify that technology did exist to support an electronic transfer of program review data to the CINCs. Until this test, no equipment had demonstrated that it could successfully scan program review data into a machine-readable format and then transmit that data to CINC locations where it could be stored on a personal computer (PC) to produce hardcopy reports.

The test configuration included a scanner, PC with high density storage, a secure transmission device, communications media, and a comparable receiving package. A DEST optical character recognition device (OCR) or scanner was connected to a GRID PC with Bubble Memory (GRIDS equivalent of a hard disk). With this system, data was scanned and stored in the PC. The PC was then connected to a STU-II transmission/encryption device and send to three CINC locations, Stuttgart, Germany; Tampa, Florida; Honolulu, Hawaii, using AUTODIN and commercial telephone lines. ASD analysts at these locations received the data through STU-II and GRID PC configurations identical to the system in the Pentagon. The data was received and printed generally without incident except for the problems noted below.

The test results proved that program review data could be successfully scanned and electronically transmitted to CINC locations. It also showed that in order to accommodate charts and graphs, a facsimile transfer (FAX) scanning capability would have

to be employed. The OCR technology would also need an error correction capability to handle characters and symbols not recognized by the scanner. The STU-II encryption device proved to be a major restriction since it would restrict transmission to a point-to-point environment and require transmitting to one CINC at a time. If the program review data was to be transmitted in a meaningful time frame, another solution beside the point-to-point alternative of the STU-II would need to be found. In addition, the use of commercial phone lines employing low speed modems proved to be too slow for the large amount of program review data being transferred.

The three major problem areas that were observed in the test (the scanning of charts and graphs; the point-to-point restriction of the STU-II encryption devices; and the slow data transfer speed) needed to be overcome to take full advantage of the electronic technology available. In August, after reviewing the July test results, PA&E directed ASD to investigate alternatives to the three problem areas and recommend a system that would overcome these problems. ASD provided the requested alternative to PA&E in the November 3, 1986 POM Report. PA&E directed that a final test employing this alternative, which included using the DDN, be conducted and the results provided to PA&E for review. This would provide PA&E with all the needed information to make a final recommendation on the use of electronic systems in the transfer of program review data to the CINCs.

This study was conducted to examine the state-of-the-art of Desktop Publishing Hardware and Software for the final recommendation.

Introduction and Methodology

INTRODUCTION

This market survey of microcomputer-based desktop publishing systems, both hardware and software, is intended to provide a basis for making a decision on the advisability of conducting benchmark studies of selected systems, matched against functional requirements specifications. All of the narrative material is introductory in nature, providing only highlights on the nature of desktop publishing, and pointing to elemental observations about the characteristics of the various components. The heart of the study is contained in the appended charts, which identify how completely each component has implemented its function.

A considerable amount of source material was gathered for this study, as evidenced by the list of vendors in the appendix. While the evaluators have attempted to incorporate the latest information available on the subject, the market is so dynamic that, in all likelihood, some recent material has been omitted. However, it is our opinion that there should be little significant impact on timely conclusions drawn from the content of this report.

METHODOLOGY

Research of the current market place for desktop publishing systems was conducted in the following manner:

1) Information was requested of all known vendors of Desktop Publishing software and hardware; A sample request is contained in the Appendices.

2) Technical journals, books and magazines were researched for reviews and articles on desktop publishing systems.

Composition Method

The What-You-See-Is-What-You-Get approach to desktop publishing displays all fonts and graphics on the display screen exactly as they will appear on the printed page. The compromises that must be made to accomplish this are the obvious: (a) typical screen sizes will not accommodate the size of most printed pages, therefore the display must be scrolled, zoomed, partitioned, or all of the above in order to see the page; (b) display technology cannot satisfactorily present all of the fonts and graphics at an acceptable level of resolution without magnification, therefore some of a full page display must be simulated; and (c) the complexity of page composition in this manner is such that duplication of a given page, varying only the text, as would be the case for a textbook or manual, is very inefficient and time-consuming. On the other hand, the WYSIWYG method provides the ultimate in flexibility in combining graphics and textual material and in the creation of unique and attractive single pages as required for advertising or newsmedia.

The embedded code or batch approach more closely approximates the traditional practice of typesetting, where a text file created with a word processor is modified with

typesetting software and fonts, page formatting characters, and graphics insertions to create the final output copy. Because simple discrete repetitive steps comprise the batch approach, it is more suited to automation than the free-form WYSIWYG method, and thus more efficient in its execution. This method is well suited for preparing multi-page documents such as manuals or books where a format is carried throughout the document, and a revision which ripples through the entire file is accomplished rapidly. As you might expect, the downside of simplicity and efficiency in execution is inflexibility in page composition, and a steeper and more troublesome learning curve as the software does not lend itself to user-friendly interfaces such as mouse pointing devices and pull-down windows and icons.

Supporting Software

All of the typical tools to format documents common to professional quality word processing software are essential for serious publishing applications. These include hyphenation, justification, subscripts, footnotes, and perhaps spelling checkers and automatic generation of tables of contents, appendices, and indexes. Most publishing packages currently do not incorporate the kind of heavy-duty capability that stand-alone text processing software such as Word Perfect, Wordstar , or Multimate have; thus, they may

recommend, and support, the use of separate word processing software to produce the textual material that is imported into the page composition system. Either specific word processing software is supported, and the unique document attribute symbols are incorporated, or translation into a common set of codes or clear ASCII text is recommended. Speed and efficiency are enhanced if the publishing software recognizes the codes of the word processor used, and no translation is necessary. Modifications may be made to the source document and those changes will be reflected in the composition document without intervening procedures. Should only ASCII text files be imported, then no special attributes can be incorporated into the source document, and if the composition software cannot create them, they will not appear in the output product. A special, but not universal, capability in the interface between word-processing document and composition document is that of modifying the composition document on the display and having those modifications reflected in the source document. Without that type of interface, divergent, non-matching documents are a serious possibility.

Another of the related tools that provide a source of input to the page composition process is graphics generation software. Three functionally different systems commonly give the publisher the ability to create original graphic designs and displays: so-called clip-art systems, which incorporate a library of simple, outline drawings of common objects and

symbols, to be included, via a set of utilities, in the composition and modified in any number of ways; paint software, which enables the user to paint designs on the screen using interactive cursor controlling tools such as mouse and joystick devices; and drawing software, similar to painting, but different in the way that mechanical drawings are different from portraiture, including mechanisms and procedures for creating measured and scaled graphics. Again, as in the word processing software, the publishing packages seldom provide the quality of design and execution found in stand-alone systems. Thus, they frequently incorporate interfaces with specific graphics packages such as those from Microsoft and Digital Research, and support the direct import of graphics files created using that software. Logically enough, and unlike the word processing interface, changes made to the composition graphics on the screen will not be reflected back into the source file.

An often forgotten package that has been a mainstay of personal computing is the spreadsheet. Like word processing software, it can be included in an integrated package, but may appear to be "tacked-on", and is often not up to the standards of stand-alone software such as Multiplan, Lotus 1-2-3, and Supercalc. If financial or other information that relies heavily on spreadsheets and charts is to be incorporated in the documents produced, stand-alone spreadsheet software is invaluable. Compatibility requires a

print format output file capability to facilitate importing the spreadsheet document, after which it may be modified with the page-composition software. Changes made to the imported material will not be reflected back to the source file.

Typesetting Tools

Two of the most significant properties of typeset documents that enable the publisher to enhance appearance and readability, and perhaps to emphasize or de-emphasize portions of the document, other than those concerning the appearance of the typeface itself, are those provided by kerning and leading. Kerning can require manual input of commands on the part of the user or be automatic for either selected or all cases. It reduces the space between certain characters such that a part of one may overlap the adjacent character. Each possible combination is unique; the term ligature in traditional typesetting refers to combinations accommodated with a single element of two adjacent characters. Kerning is essential in the production of a high-quality product and produces a significantly more readable document. The time consumed by kerning will be perceptibly greater if it is done in batch mode, following the creation of a whole document unit, rather than automatically, as the composition is accomplished. All automatic formatting and spelling checking is better accomplished if it is interleaved

with the much slower process of manual input; processor speed is such that the input will not be perceptibly degraded. Leading, the term originating with the typesetter's insertion of lead (metallic) strips between rows of type, also does much to accent/de-accent and delineate sections of the document. Varied spacing between rows of type can increase or decrease the speed at which the viewer reads, and thus influence or concentrate the viewer's attention on different aspects of the document. Leading, like kerning, may be automatic or manual, and can measurably affect the overall speed of composition of the product.

The facility with which the composition software automates columnar text and flows it from column to column and page to page will make a significant impact on the time spent on composition. Only a few packages are flexible and powerful enough to manipulate four and more columns and divide the page horizontally into halves or thirds and still carry the theme to multiple pages. Text should also be able to flow around the perimeter of graphic items without manual manipulation. A multipage document represents a continuous process, and should the composer find it necessary to insert or delete sections of text from the body of the document, manually reconstructing the affected balance of the text could be a very tedious task.

Other means of manipulating the appearance of text on the page, such as headers, footers, page numbering, boxes and lines, are all as essential as different fonts, but these are commonly included in most word processing as well as publishing software. The lack of one of these items may simply require that it be done by using some other tool. A singularly invaluable requirement is a "style sheet" or template, to enable the rapid and automatic application of a page format to subsequent pages. The absence or ineffective implementation of this capability, particularly likely in a WYSIWYG package, may mean that the software is not very efficient for documents over a few pages in length. The effect is as if each page were drawn freehand. If the requirement is both graphic, suggesting the WYSIWYG method, and text oriented, emphasizing the batch approach, then the ratio of each to the whole task must be estimated. Employing a WYSIWYG method to create a textbook with limited graphic content is not recommended.

Telecommunications

The complexity of the task of transmitting the output document to a recipient should not be underestimated. The output document, prior to transmission to the output device, i.e., the printer, contains as much formatting information as it does visual content. These formatting codes must be interpreted exactly by the printer to reproduce the document

accurately. The codes are very specific and unique to the software and printers, and they invariably employ eight-bit binary data to format the output. The primar means of communications for microcomputers is via asynchronous full-duplex telecommunications. In order to accommodate the occurrence of errors in transmission due to common-enough noise on two-wire switched telephone service, software has been developed which incorporates error detection and retransmission. This may be implemented either in the communications software executing on the microcomputer, or in firmware in the data communications device or modem, if used.

Supporting Hardware

Supporting hardware can be grouped into four categories: (1) the processing unit on which the software system will execute; (2) direct access storage devices (DASD) for the storage of system software and data files; (3) the input devices and media to capture text and images; and (4) the output devices for the document file or the printed product. Most publishing software vendors recommend, at the least, an IBM AT-class machine for optimum performance, although most packages will run on IBM XT's or XT compatible computers. Memory in excess of the DOS supported maximum of 640k is not required, although expansion memory beyond 640k that could be employed for memory-resident software such as windows would be

desirable. No specific conditions or reservations about the clock speed of the computer on which the software is executed have been determined.

Almost without fail, a hard disk drive is required to facilitate loading programs and data into memory. Some systems are voluminous in the amount of direct access storage space required, so the effective formatted capacity of MS-DOS disk drives should be noted. For twenty megabyte systems, the capacity available for programs and data may only approach thirteen megabytes, depending on the type of data stored and how closely it approximates cluster sizes. Another factor in disk storage requirements should also be kept in mind; graphic images use an inordinate amount of space; bit mapped images are a primary force for development of high-density optical storage devices. Vector graphics require considerably less storage space than bit-mapped graphics.

The traditional input media for system operation and data capture has been the keyboard; it is rapidly being supplanted for system operation by pointing devices like the mouse, successor to the computer game's joystick. The mouse, a device which, via a transducer, translates motion over a plane surface into CRT cursor position, identifies icons, or picture symbols representing operator actions or action-objects. When the cursor is positioned over the icon, a switch on the mouse is depressed and, combined with the positional data, is

translated into an operator command, or series of commands. The device is also used for painting, drawing, other graphics manipulation, and text modification as well. The device is controlled via either a serial communications port connection or a parallel connection to the processor bus and the appropriate software driver. It greatly facilitates both methods of page composition, and constitutes a critical feature of desktop publishing software.

A recent device for importing graphic information into digital computers is the optical scanner. While digitizers have been around for some time, they have primarily supported traditional ADP applications such as complementing the key-entry function for high-volume transaction driven applications like accounting, by having the originator of the source document manually transcribe the data on paper, forming the characters according to a scanner-recognizable pattern. Current digitizers scan and convert not only text material but graphics as well. Criteria for evaluating input digitizers is much like that for laser printers; quality of reproduction is directly related to the resolution of the device, and speed of operation is proportional to the complexity of the image.

EVALUATION

The charts in the Appendices represent characteristics of the best of the commercial offerings available at this time for IBM-PC compatible microcomputer systems that can be evaluated without a hands-on test of the software and hardware. The existence of what the evaluators consider to be an operational capability is noted, and appropriate Functions are quantified where possible. The charts easily identify software deficient in one or more critical areas, but a critical aspect that cannot be evaluated without using the various systems is speed of operation. The time required for the composition and printing of a document is dependent on the specific characteristics and content of the document itself, i.e., the complexity of the document with respect to both the formatting code of the software and the user interface facility.

The specifications of the hardware must be evaluated carefully against the existing functional requirements. For instance, Pagemaker is not recommended for systems with only a 10 megabyte hard disk (not uncommon for microcomputers until 12 - 18 months ago); little or no working space will remain after system installation. Implementation with the minimum required disk storage will leave minimal room for data especially graphics. The extended memory specification

supported by some ancillary software such as Lotus 1-2-3 is not necessary for this purpose and, indeed, cannot be utilized by most desktop publishing software. Random Access Memory available after loading the publishing software may be put to good use with RAM-resident utilities, although care must be taken to ensure compatibility with other necessary supporting RAM-resident software such as Windows. While non-support for a critical component or capability will adversely affect an evaluation of a package, the component may be provided by separately acquired software. Note that neither Ventura nor Pagemaker utilize the keyboard for cursor manipulation, meaning that a mouse or other pointing device is necessary. Neither Frontpage, PFS, nor Superpage incorporate support for an optical scanning device, but such a capability is available separately. The range of suitable output devices supported by the software seems very narrow at first glance, yet the number of laser printers which can be driven by Adobe Systems' Postscript page description language is quite large. Postscript PDL has quite recently acquired the position of a defacto standard in the industry, and support for it is growing rapidly. There is a wide range of performance among the desktop lasers, even driven by similar software. Considerable differences in printing speed exist also between software packages when measured on identical computers; Pagemaker is markedly slower than Ventura for .dent. a documents and hardware. Twenty four pin printers are still new in the market; as they are quite inexpensive relative to

the lasers, yet generate reproductions similar in quality, especially that of type quality, they are sure to gain rapidly in market share. NEC and Toshiba are leaders in the production of high-quality and high-resolution dot-matrix printers for desk top publishing.

The supported software chart points to an aspect of desktop publishing that bears close scrutiny. The publishing art requires the integration of different disciplines effected by different tools. The concentration of a vendor on a single highly efficient tool may yield a much better product than that from an integrator of tools. At the very least, there exists the opportunity to investigate and evaluate many more alternatives for satisfying specific functional requirements. So, the imported spreadsheet of Pagemaker may well be a better bet in sophistication and efficiency than an integrated spreadsheet capability. Both, however, may better satisfy the requirement than the ASCII interfaces of Deskset, PFS, Superpage, and Scenicwriter. Any special attributes such as highlighting or italics that attend the document will not accompany the ASCII text. All of the listed capabilities are regarded as critical, so software not supporting one or more of them cannot be considered as operationally feasible.

The graphics capabilities listed can generally be provided by many different software tools, and they may be a significant factor in the speed and convenience of page

composition depending on the graphics content. Evaluation of the capability is possible only through hands-on operation as considerable variation exists in the simplicity or complexity of performed functions.

All of the foregoing are the means to the end of document appearance. There is enough variation in the supported capabilities to merit careful evaluation, from universal support for multiple columns to universal non-support for spelling checking. Of critical importance are the size of document supported and the incorporation of a style sheet or template facility, whereby a given format may be carried to subsequent pages. It only seems reasonable to expect the software to support a document of the maximum length the user expects to create; if that is not the case, an output document would be composed of a number of smaller documents. Should the page numbering be inflexible, a user might find it necessary to number the pages of the continued document manually. Likewise, if a formatting template is not implemented, the format for each and every page much be composed, regardless of whether or not it is just like all that preceded it. PFS represents the extreme in page length, but Aldus' Pagemaker has a very finite constraint of 128 pages, easily exceeded by a not too prolific writer. As previously indicated, Pagemaker has no style sheet or template function nor does it automatically continue columns or flow text from one page to another. Some of the formatting tools may be provided by a

word processor (see supporting software), but if a typesetting tool such as automatic kerning is missing, as it is from Power and PFS, no reasonable alternative is available. Pagemaker has an integrated word processing function but does not provide for wrapping, justification, continuation or indexing. Harvard also has an integrated word processor, yet does not provide for footnotes.

CONCLUSION

Based on an examination of the specifications for the data contained in the charts, the evaluators consider a benchmark test, with identification of appropriate functional requirements and measurement criteria, of four of the listed desktop publishing software packages to be necessary before committing to an alternative. Sufficient documentary evidence exists on the insufficiency of the remaining software for one or more critical activities. Ventura, Harvard, Deskset, and Scenicwriter all appear to offer enough sophistication, flexibility, and power, integrated and imported, to warrant an exhaustive test. None of the four incorporate all of the requisite capabilities. Thorough selection and testing of alternative configurations, including supporting software, will result in a composite system yielding greater performance than an integrated package from a single source.

An appropriate system hardware configuration with the requisite minimal capacities and interfaces to support the benchmark study can be determined from equipment specifications, e.g., random access memory capacity, processor speed, display resolution, direct access storage capacity,

printer resolution, input-output interface requirements, etc. Once the results of the benchmark have been evaluated, the selected software vendor's recommendations on device types and manufacturers should be considered. The software vendors have very specific suggestions, based on extensive testing, for achieving maximum performance and efficiency from their product.

HARDWARE
MS/PC-DOS

REQUIREMENTS	Ventura	Harvard	Deskset	Power	Pagemaker	Froutpage	PFS:	Superpage	Scenicwriter
DOS VERSION (=>)	2.1	2.1	2.0	2.0	ANY	2.0	2.0	any	2.1
DISPLAY TYPE	GRAPHIC	HERCLES	HERCLES	ANY	ANY	HERCLES	COLOR	HERCULES	ANY
MOUSE	YES	YES	YES	NO	YES	NO	YES	YES	NO
MEMORY (K)	512	640	512	256	640	512	512	640	384
DISK STORAGE (MB)	10	5	.720	.360	20	5	.720	.720	1
COMMUNICATIONS (INCLUDED)	NO	NO	NO	NO	NO	NO	NO	NO	NO
KEYBOARD CURSOR	NO	YES	YES	N/A	NO	YES	YES	YES	N/A
OPTICAL SCANNER	YES	YES	YES	NO	YES	NO	NO	NO	YES
RECOMMENDED									
MEMORY (K)	640	640	640	256+	640	640	512+	640	384+
DISK STORAGE (MB)	20+	20+	20+	20+	20	20	20+	20+	20+
COMMUNICATIONS	BIT	BIT	BIT	ANY	BIT	BIT	BIT	BIT	ANY
PRINTERS SUPPORTED									
POSTSCRIPT-COMPATIBLE	*	*	*	*	*	*	*	*	*
HP LASERJET PLUS	*	*	*	*	*	*	*	*	*
XEROX 4045	*								
EPSON 24-PIN							*		

SOFTWARE
MS/PC-DOS

SUPPORTED SOFTWARE	Ventura	Harvard	Deskset	Power	Pagemaker	Frontpage	PFS:	Superpage	Sceniowriter
PAINT	IMPORT	IMPORT	IMPORT	NO	YES	NO	NO	NO	IMPORT
DRAW	IMPORT	IMPORT	IMPORT	NO	YES	NO	YES	NO	YES
FONTS	YES	YES	YES	YES	YES	YES	YES	YES	YES
WORDPROCESSING	YES	YES	ASCII	ASCII	YES	YES	ASCII	ASCII	ASCII
SPREADSHEET	YES	YES	ASCII	NO	IMPORT	IMPORT	ASCII	ASCII	ASCII
DATABASE	ASCII	YES	ASCII	NO	ASCII	ASCII	ASCII	ASCII	ASCII
DISPLAY TYPE									
WYSIWYG	*	*	*		*		*	*	
IMBEDDED				*		*			*
GRAPHICS									
CUT	YES	IMPORT	IMPORT	NO	YES	NO	YES	YES	YES
PASTE	YES	IMPORT	IMPORT	NO	YES	YES	YES	YES	YES
DRAG	YES	IMPORT	IMPORT	NO	NO	NO	NO	NO	NO
ROTATE	YES	IMPORT	IMPORT	NO	NO	NO	YES	YES	YES
SHADE	YES	IMPORT	IMPORT	NO	YES	YES	NO	NO	YES

SOFTWARE
MS/PC-DOS

SUPPORTED SOFTWARE	Ventura	Harvard	Deskset	Power	Pagemaker	Frontpage	PFS:	Superpage	Scriptwriter
DOCUMENT TYPES									
DOCUMENTS SIZE (LENGTH)	*5000	999	ANY	ANY	128	5000	1	999	ANY
DOCUMENT TEMPLATE (STYLE)				N/A	YES	YES			N/A
FOOTNOTES	YES	NO	NO	YES	NO	NO	NO	YES	YES
COLUMNS	YES	YES	YES	YES	YES	YES	YES	YES	YES
WRAPPING	YES	YES	YES	N/A	NO	YES	YES	YES	N/A
REFORMATION	YES	YES	YES	N/A	YES	YES	NO	YES	N/A
HYPHENATION	YES	YES	YES	NO	YES	YES	NO	YES	YES
JUSTIFICATION	YES	YES	YES	YES	NO	YES	YES	YES	YES
CONTINUATION	YES	YES	YES	YES	NO	NO	NO	YES	YES
INDEXING	YES	NO	NO	YES	NO	NO	NO	NO	YES
PAGE NUMBERS	YES	YES	NO	YES	YES	NO	NO	YES	YES
AUTOMATIC KERNING	YES	YES	YES	NO	YES	YES	NO	YES	YES
AUTOMATIC TRACKING	YES	YES	YES	NO	NO	NO	NO	YES	NO
INDENTATION	YES	YES	YES	YES	YES	YES	NO	NO	YES
CAPTIONS	YES	YES	NO	YES	NO	NO	NO	YES	YES
SPELLING	NO	NO	NO	NO	NO	NO	NO	NO	NO
PAGE (PAPER SIZE)	LASER	8.5X14	LASER	LASER	LASER	LASER	LASER	LASER	LASER

Vendors from SECTION 6
with Name and Addressee

Name of Package and Cost	Vendors Name and Addressee
Venture Publisher Edition $ 895.00	Xerox Corporation 101 Continental Boulevard El Segundo, California 90245
Harvard Professional Publisher $ 695.00	Software Publishing Corporation 1901 Landing Drive Mountain View, California 94039
Deskset Professional Desktop Publishing $ 995.00	G.O. Graphics 18 Ray Avenue Burlington,Massachusetts 01803-4
Power Text Formatter $ 89.95	Beaman Porter, Incorporated 417 Halstead Avenue Harrison, New York 10528
PageMaker $ 695.00	Aldus Corporation 411 First Avenue South Suite 200 Seattle, Washington 98104
FrontPage $ 695.00	Studio Software Corporation 17862-C Fitch Street Irvine, California 92714
PFS:Clickart Personal Publisher $ 185.00	Software Publishing Corporation 1901 Landings Drive Mountain View, California 94039
Superpage II $7000.00	Bestinfo Incorporated 1400 North Providence Road Suite 117 Media, Pennsylvania 19063
ScenicWriter Heavy Duty Desktop Publishing $ 695.00	ScenicSoft, Incorporated 100 Second Avenue South Edmonds, Washington 98020

List of Vendors

Addison-Wesley Publishing Company
Reading, Massachusetts 01867

Adobe Systems Incorporated
1870 Embarcadero Road
Palo Alto, California 94303

ALDUS Corporation
411 First Avenue South
Suite 200
Department C
Seattle, Washington 98104

Allied Linotype Company
425 Oser Avenue
Hauppauge, New York 11788

Altsys Corporation
Post Office Box 865410
Plano, Texas 75086

Amgraf Incorporated
Kansas City, Montana

Ann Arbor Softworks, Incorporated
308 1/2 South State Street
Ann Arbor, Michigan 48104

Apple Computer Incorporated
20525 Mariani Avenue
Cupertino, California 95014

Ashton-Tate
10150 West Jefferson Boulevard
Culver City, California 90230

Assimilation Incorporated
485 Alberto Way
Los Gatos, California 95030

Beaman Porter Incorporated
417 Halstead Avenue
Harrison, New York 10528

Bestinfo
33 Chester Pike
Ridley Park, Pennsylvania 19078

Borland International
4585 Scotts Valley Drive
Scotts Valley, California 95066

Boston Computer Society
One Center Plaza
Boston, Massachusetts 02108

Boston Software Publishers Inc.
1260 Boylston Street
Boston, Massachusetts 02215

BroderBund Software
17 Paul Drive
San Rafael, California 94903

Canon USA Printer Division
One Canon Plaza
Lake Success, New York 11042

Centram Systems West, Incorporated
2372 Ellsworth Avenue
Berkeley, California 94704

Century Software
2306 Cotner Avenue
Los Angeles, California 90064

CompuCRAFT
Post Office Box 3155
Englewood, Colorado 80155

CompuServe
5000 Arlington Centre Boulevard
Columbus, Ohio 43220

Control C Software Incorporated
6441 South West Canyon Court
Portland, Oregon 97221

Cordata Technologies
275 East Hillcrest Drive
Thousand Oaks, California 91360

Creighton Development Incorporated
4931 Birch
Newport Beach, California 92660

Creighton Development
16 Hughes Street
Suite C-106
Irvine, California 92718

Cricket Software
3508 Market Street
Suite 206
Philadelphia, Pennsylvania 19104

Data Transforms Incorporated
616 Washington Street
Denver, Colorado 80203

Datacopy Corporation
1215 Terra Bella Avenue
Mountain View, California 94043

Datalogica USA
Matrix Piz
1964 Westwood Bld325
Los Angeles, California 90025

Dest Corporation
1202 Cadillac Court
Milpitas, California 95035

Digital Marketing
2363 Boulevard Circle
Suite 8
Walnut Creek, California 94595

Digital Research Incorporated
60 Garden Court
Monterey, California 93942

Enterset
410 Townsend Street
San Francisco, California 94107

Epson Corporation
2780 Lomita Boulevard
Torrance, California 90505

Forethought, Incorporated
1973 Landings Drive
Mountain View, California 94043

FTL Systems Incorporated
234 Eglinton Avenue East #205
Toronto, Ontario
M4P1KS Canada

Fuji
350 Fifth Avenue
New York, New York 10118

G.O. Graphics
Burlington, Massachusetts

Genicom Corporation
509 West Grace Street
Richmond, Virginia 23220

Graphics Communications Incorporated
200 Fifth Avenue
Waltham, Massachusetts 02254

Hayden Software Company Incorporated
650 Suffolk Street
Lowell, Massachusetts 01854

Heizer Software
5120 Coral Street
Concord, California 94521

Hercules
2550 Ninth Street
Berkeley, California 94710

Hewlett-Packard
11000 Wolfe Road
Cupertino, California 95014

IBM Corporation
Boulder, Colorado

ImageSet Corporation
555 19th Street
San Francisco, California 94107

ImageWorld Incorporated
Post Office Box 10415
Eugene, Oregon 97440

Innovative Data Design Incorporated
1975 Willow Pass Road #8
Concord, California 94520

Insight Development Corporation
2005 Vine Street #4
Berkeley, California 94709

InterLeaf Incorporated
1100 Massachusetts Avenue
Cambridge, Massachusetts 02138

IOMEGA Corporation
1821 West 4000 South
Roy, Utah 84067

IQ Technologies
11811 North East 1st Street
Suite 308
Bellevue, Washington 98005

Kensington Microware Ltd.
251 Park Avenue South
New York, New York 10010

Knowledge Engineering
GPO Box 2139
New York, New York 10116

Koala Technologies
2065 Junction Avenue
San Jose, California 95131

Kodak Corporation
1555 Wilson Boulevard
Arlington, Virginia

Lexisoft
706 5th Street
Davis, California 95616

Lifetree Software Incorporated
411 Pacific Street
Suite 315
Monterey, California 93940

Linguists Software
137 Linden Street
South Hamilton, Massachusetts 01982

Lotus Development Corporation
55 Cambridge Parkway
Cambridge, Massachusetts 02142

Macadam Publishing Incorporated
4700 South West Macadam Avenue
Portland, Oregon 97201

Magna Computer Systems Incorporated
14724 Ventura Boulevard
Sherman Oaks, California 91403

Magnum Software
21115 Devonshire Street #337
Chatsworth, California 91311

Manhattan Graphics Corporation
163 Varick Street
New York, New York 10013

Media Cybernetics Incorporated
8484 Georgia Avenue
Silver Spring, Maryland

Micro Planning Software
235 Montgomery Street
Suite 840
San Francisco, California 94104

MICROGRAFIX Incorporated
1820 Greenville Avenue
Richardson, Texas 75081

MicroPro Intl.
33 San Pablo Avenue
San Rafael, California 94903

Microtek Lab, Incorporated
16901 South Western Avenue
Gardena, California 90247

Microvision Company
38 Montvale Avenue
Stoneham, Massachusetts 02180

Miles Computing Incorporated
21018 Osborne Street
Building 5
Canoga Park, California 91304

Mouse Systems Corporation
2600 San Tomas Expressway
Santa Clara, California 95051

Multimate International Corporation
52 Oakland Avenue North
East Hartford, Connecticut 06108

Mycroft Labs, Incorporated
2615 North Monroe Street
Tallahassee, Florida 32303

New Image Technology Incorporated
10300 Greenbelt Road #104
Seabrook, Maryland 20706

Oasis Systems
4909 Ostrow Street
Suite F
San Diego, California 92103

Paradise Systems Incorporated
217 East Grand Avenue
South San Francisco, CA 94080

Peripherals Computers & Supplies
2232 Perkiomen Avenue
Mountain Pennsylvania, Pennsylvania 1

Personal Computer Peripherals Inc.
6204 Benjammin Road
Tampa, Florida 33614

Personal TeX Incorporated
20 Sunyside
Suite H
Mill Valley, California 94941

Polaris Software
310 South Via Vera Cruz #205
San Marcos, California 92069

Princeton Graphis Systems
601 Ewing Street
Bldg A
Princeton, New Jersey 08540

ProSoft
7248 Bellaire Avenue
North Hollywood, California 91605

QMS
Post Office Box 81250
Mobile, Alabama 36689

Quadram
One Meca Way
Norcross, Georgia 30093

Queue Incorporated
562 Boston Avenue
Bridgeport, Connecticut 06610

Qume/Hitachi
2350 Qume Drive
San Jose, California 95131

Rabar Systems
Post Office Box 306
Westport, Connecticut 06881

RoseSoft Incorporated
4710 University Way North East
Suite 601
Post Office Box 45808
Seattle, Washington 98105

RoZet
1400 Shelbyville Street
Center, Texas 75935

ScenicSoft Incorporated
12314 Scenic Drive
Edmonds, Washington 98020

Scholastic Incorporated
Post Office Box 7502
2931 East McCarta Street
Jefferson City, Missouri 65102

Silicon Beach Software
Post Office Box 261430
San Diego, California 92126

Simon & Schuster Computer SW
1230 Avenue of the Americas
New York, New York 10020

Soft Wares Incorporated
19 Monroe Drive
Williamsville, New York 14221

SoftCraft
222 State Street
Madison Wisconsin

SoftStyle Incorporated
7192 Kalanianaole Highway #205
Honolulu, Hawaii 96825

Software Publishing Corporation
Post Office Box 7210
Mountain View, California 94039 7

SpectraFAX Corporation
2000 Palm Street South
Naples, Florida 33962

Springboard Software, Incorporated
7808 Creekridge Circle
Minneapolis, Minnesota 55435

Studio Software
17862-C Fitch
Irvine, California 92714

Summagraphics Corporation
777 State Street Extension
Fairfield, Connecticut 06430

T/Maker Company
2115 Landings Drive
Mountain View, California 94043

Tall Tree Systems
1120 San Antonio Road
Palo Alto, California 94303

Tangent Technologies Ltd.
5720 Peachtree Parkway #100
Norcross, Georgia 30092

Tech Knowledge
2615 11th Avenue West
Seattle, Washington 98119

Tegra Incorporated
900 Middlesex Turnpike
Billerica, Massachusetts 01821

Telos Software Products
3420 Ocean Park Blvd #3050
Santa Monica, California 90405

The Model Office Company
49 Wellington Street East
Flatiron Bldg
Toronto, Ontario M5E1C9 Canada

The Software Store
706 Chippewa Square
Marquette, MI 49855

Thunderware, Incorporated
21 Orinda Way
Orinda, California 94563

Unison World
2150 Shattuck Avenue
Berkeley, California 94703

Ventura Software
675 Jarvis Drive
Suite C
Morgan Hill, California 95037

VS Software
P.O. Box 6158
Little Rock, Arkansas 72216

Writing Consultants
300 Main Street
Rochester, New York 14445

Xerox Corporation
101 Continental Boulevard
El Segundo, California 90245

Xerox Vetura Publisher
Xerox Corporation
Post Office Box 24
Rochester, New York 14692

XyWrite, Incorporated
Post Office Box 372
Bedford, Massachusetts 01730

ZSoft Corporation
1950 Spectrum Circle
Suite A495
Marietta, Georgia 30067

ZyLAB Corporation
233 East Erie Street
Chicago, Illinois 60611

GLOSSARY

Typesetting, Layout, and Desktop Publishing

Baseline:

The baseline of a long line of text is the lowermost point of letters, not including descenders (the lower edges of g and j, for instance).

Bitmap:

A graphic image formed by a matrix of dots with a specific number of dots per inch.

Blue pencil:

Traditionally, a line that will not be printed when a page is photographed for offset printing.

Crop:

To trim the edges of a graphic image, thereby removing part of it.

Double-sided:

A publication that will be reproduced on both sides of a sheet of paper. The front side of a page is the odd-numbered side; the back side is the even-numbered side.

Em:

A printer's term for a square unit with the edges equal in size to the point size (height of the line of type). It gets its name from the letter "m", which is usually about as wide as the type size.

Embedded codes:

ASCII codes typed directly into a stream of text to identify type specifications. Usually called "embedded codes" to distinguish them from the invisible formatting codes created by some page composition systems. Embedded codes are especially useful when indicating that only one or two words should be bold or italic within a block of text.

En:

The printer's unit of measurement that is half as wide as the current line size. It gets its name from the width of the letter "n", which is commonly about half as wide as a capital letter is high.

Font:

One complete set of characters in the same typeface and size, including letters, punctuation, and symbols.

Generic Font:

A representation of alphanumeric characters on a screen that may not reflect what the final printed characters will look like.

Kern:

As applied to type, the part of a letter that hangs over and beyond the space normally given to that character (for example, in some type styles the tail of the "y" reaches back under the previous character).

Landscape printing:

The rotation of a page design to print text and graphics horizontally across the 11-inch width of the paper.

Layout:

The arrangement of text and graphics on a page.

Lead:

(pronounced as the name of the metal) The space added between lines of type to provide additional separation. Usually, it is specified in points (each point = approximately 1/72 of an inch or 1/12 of a pica).

Markup:

The process of adding instructions to copy or the actual formats and control-codes to a computer file so some person or machine will format the output in the correct way. Marking up copy used to require a great deal of skill and experience, but it is much easier on interactive systems that immediately show you the results of each instruction on the screen.

Orphans/widows:

The first line of a paragraph is called an orphan when it is separated from the rest of the paragraph by a page break. The last line of a paragraph is called a widow when it is forced onto a new page by a page break and separated from the rest of the paragraph.

Phototypesetting:

Producing a page image on photosensitive paper, as when documents are printed out on a Linotronic 100 or 300 typesetter. This process is sometimes referred to as cold type, to distinguish it from the older method of casting characters, lines, or whole pages inn lead, which is called hot type.

Pica:

A printing industry unit of measure, equal to approximately 1/6 of an inch. There are 12 points to a pica.

Point:

A measure of size used in layout and typesetting. One point is equal to 1/12 of a pica, and approximately equal to 1/72 of an inch. It is most often used to indicate the size of type. Typical point sizes would be 10 points for typewriter characters and most text in books, 48 points for everyday newspaper headlines, and down to 6 or 8 points for legal notices and "fine print". Note that most type styles include space between lines and thus letters are not quite as high as their nominal point size.

Portrait printing:

The normal printing orientation for a page; horizontal text on and 8 1/2 inch-wide sheet of paper. See also landscape printing.

Proportional characters:

Characters designed so that some characters, such as "m", take up more horizontal space than others such as "i". Proportional characters pack more information into the same space, are easier to read, and look more like typesetting than do constant-width monospaced fonts.

Resolution:

The number of dots per inch used to represent an alphanumeric character or a graphic image. High-resolution images look smoother and have more dots-per-inch than do low-resolution images. The resolution of images displayed on the screen is usually lower than that of the final laser printout. Laser printers print 300 dots per inch or more; typesetters print 1200 dots per inch or more.

Rules:

Black lines of various styles that can be drawn on a page and set to various thicknesses.

Sans serif:

Typefaces without serifs, such as Helvetica, Avant Garde, and Geneva. See also Serif.

Serif:

Line crossing the main strokes of a letter. Typefaces that have serifs include Times Roman, Courier, New Century Schoolbook, Bookman, Palatino, and New York. See also sans serif.

Style:

One of the variations within one family of typeface, such as roman, bold, italic, outline, and shadow.

Style sheet:

A collection of type specifications and format definitions that can be saved and used in many different documents.

Text wrap:

The ability to wrap text around graphic images on a page layout.

Typeface:

A complete set of characters in a particular design or style. Typefaces come in families of different weights, different point sizes, and different slants.

Weight:

The boldness or thickness of a letter or font.

WYSIWYG:

(pronounced "whizz-ee-wig") An abbreviation for "what you see is what you get", used to describe page makeup systems, displays of pages where you can change the shape and size of columns and pictures and text, and see the results almost instantly on the screen.

FROM NOW, WHERE?

IBM

Inasmuch as the Apple Mackintosh microcomputer and Laserwriter page printer have defined the infancy starting point for the desktop publishing segment of the personal computing industry, International Business Machines may well define the direction and magnitude of its adulthood. The April 2 marketing release of specifications for IBM's Personal System/2 integrated line of microcomputer products, compatible from 8-bit through 32-bit architecture, incorporates the enhanced display and cursor control capabilities which facilitate page composition on CRT screens into the hardware devices themselves. IBM also announced tailored application packages called SolutionPacs which address specific computing requirements. Two such SolutionPacs address publishing applications; the Personal Publishing System executes on the low-end Model 30 and selected 80286-based models and the Publishing System VM Edition operates on IBM System/370 mainframe computers running the VM Operating System. IBM has also embraced the Postscript page description language from Adobe Systems for their proprietary laser page printer. Postscript may likely be the defacto standard that Microsoft DOS is for microcomputer operating systems; Microsoft Windows will also be incorporated into IBM's Personal System/2 family.

The full extent of the proprietary nature of the IBM announcements will probably not be manifest until the new operating systems (developed jointly with Microsoft) and associated applications are released in 1988 and beyond.

DIRECTIONS

Because there are no official standards and only emerging unofficial ones in the desktop publishing market, guesses as to the specific directions it may take are just that guesses. Whatever this report has characterized as ineffective along with specific constraints as to size, speed, and flexibility are those areas which will be resolved first. Integrated packages along the lines of Framework and Symphony, combining the now separate components of word processing, database, spreadsheet, windows, mouse, enhanced graphics display, paint, draw, and support for laser printers and image digitizing devices, should also enter the marketplace in greater numbers. The more sophisticated and better supported software packages such as Ventura Publisher, Harvard, and Scenicwriter, will incorporate the most attractive features of their competition, reducing the disparity in quality among the different vendors. Some packages may, in fact, combine the aspects which we found to most differentiate the existing marketplace: the WYSIWYG page composition and the embedded typesetting code methods. Specific components of the

composition process are being written to be RAM resident, which should significantly speed up some of the more time consuming processes. Requirements for shared access publishing systems, necessary for large book publishers and the like, can be met effectively through the networking capability of minicomputer-size systems, especially with the decreasing cost of the superminicomputer class, which is infringing on territory previously reserved for mainframes. No appreciable market for publishing software resident on VM mainframes is evident, any more than an appreciable market exists for spreadsheets and wordprocessors on mainframes. These are essentially individual activities, which may benefit from the telecommunication of source material or end products, but would likely be degraded if dependent on shared access to large scale computers..

POSTSCRIPT

Studio Software Corporation, Irvine California, vendors of Frontpage, ceased operations recenthy citing lack of investor support. Company officials said the maturing desktop publishing industry required more advertising and marketing expenditures than small businesses could afford.

March 10, 1987

Dear Sir/Madam

Applied DC Technologies is providing an evaluation of desktop publishing software and hardware for a prime contractor to the Office of the Joint Chiefs of Staff, Department of Defense(DOD). Our evaluation report will support the procurement of a number of integrated systems to be installed in DOD facilities around the world.

Please provide the following information, no later than March 26th, so that we may include in our report a detailed analysis of your product.

1) A demonstration copy of your product, if it is available.

2) A copy of the user documentation for your product.

3) Any Technical literature available for your product.

4) Specifications for necessary hardware and/or software interfaces.

5) Recommendations for specific hardware and/or software.

6) Is hardware available as Tempest certified?

7) Government cost for single and multiple unit(s) up to 100.

We have enclosed a return address label for your convenience. If you have any questions concerning our request please don't hesitate to contact us.

Sincerely Yours,

Donald R. Whitcomb Jr.
Director of Research

END

FILMED

MARCH, 1988

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