



Software Packages By Vendor

The product reports in this section cover most major vendor microcomputer software packages in considerable detail. The reports are structured in alphabetic order by vendor name within the section, but this table of contents is designed to identify these reports by software type so that the reader can quickly and easily identify the scope of product report coverage to date. Since some software cannot easily be categorized, they may therefore appear under more than one software class.

The subcategories used in the breakdown of the contents of this section are defined as follows:

Spreadsheets, Finance & Planning Packages

Data Management

Word Processing

Graphics Software

Communications Software

Multifunction Packages

Training

Utilities

■ SPREADSHEETS, FINANCE & PLANNING PACKAGES

Comshare Target Software TARGET FINANCIAL MODELING
Conceptual Instruments DESK ORGANIZER
Context Management Systems MBA
Dow Jones MARKET MANAGER
Haba Systems III E-Z PIECES
IBM TIME MANAGER
IT Software CALCIT
Lotus Development LOTUS 1-2-3
MicroPro International CALCSTAR
Microsoft MULTIPLAN
Microsoft MULTI-TOOL BUDGET
Microsoft MULTI-TOOL FINANCIAL STATEMENT
National Microware SALES PLANNER
Peachtree Software PEACHCALC
Perfect Software PERFECT CALC
Sofstar BUSINESS PLANNING TOOL
Software Arts TK!SOLVER
SORCIM SUPERCALC-2
SORCIM SUPERCALC-3
Techland Systems SHOEBOX
VisiCorp DESKTOP/PLAN II
VisiCorp VISICALC
VisiCorp VISISCHEDULE

■ DATA MANAGEMENT

Alpha Software DATA BASE MANAGER II—THE INTEGRATOR
Ashton-Tate dBASE II
BROCK Software Products KEYSTROKE DATA BASE
BROCK Software Products KEYSTROKE REPORT GENERATOR
Concentric Data Systems C.I.P.
Day One DAY ONE DBMS
Fastware THOR

Goldata Computer Services GOLDDATABASE
Haba III E-Z PIECES
Howard W. Sams & Co INSTANT RECALL
Innovative Software FAST FACTS
Innovative Software T.I.M. IV
Lotus Development LOTUS 1-2-3
MicroPro International DATASTAR
MicroPro International REPORTSTAR
Microrim R:BASE SERIES 4000
Pearlsoft PERSONAL PEARL
Quic-N-Easi Q-PRO 4
Softcraft BTRIEVE
Software Publishing Corp PFS:FILE
Software Publishing Corp PFS:REPORT
Stoneware ADVANCED DB MASTER
VisiCorp VISIFILE

■ WORD PROCESSING

Apple Computer APPLE WRITER
Broderbund Software BANK STREET WRITER
Bruce & James Publishers WORDVISION
Context Management Systems MBA
Haba Systems III E-Z PIECES
Hayden Software PIE WRITER
HFK Software QWERTY
IBM PERSONAL EDITOR
Information Unlimited Software EASYWRITER II
Lexisoft SPELLBINDER
LJK LETTER PERFECT
Mark of the Unicorn FINALWORD
Metasoft Corp BENCHMARK
Metasoft Corp BENCHMARK MAIL LIST
Metasoft Corp BENCHMARK SPELLING CHECKER
MicroPro International MAILMERGE



Software Packages By Vendor

MicroPro International SPELLSTAR
MicroPro International STARINDEX
MicroPro International WORDSTAR
Microsoft WORD
On-Line Business Systems WYLBUR/PC
Palantir PALANTIR WORD PROCESSOR
Peachtree Software LIST & LABEL MANAGER
Peachtree Software PEACHTEXT
Perfect Software PERFECT WRITER
Rocky Mountain Software Systems NEW WORD
Samna Corp WORD II
Satellite Software International WORDPERFECT
Select Information Systems SELECT
Software Publishing Corp PFS:WRITE
SoftWord MULTIMATE
SORCIM SUPERWRITER
VisiCorp VISIWORD

■ GRAPHICS SOFTWARE

Business & Professional Software BPS BUSINESS GRAPHICS
Context Management Systems MBA
Innovative Software FAST GRAPHS
Lotus Development LOTUS 1-2-3
Peachtree Software BUSINESS GRAPHICS SYSTEM (BGS)
Redding Group GRAFTALK
Sensible Software GRAPHICS DEPARTMENT
Software Publishing Corp PFS:GRAPH
VisiCorp VISITREND/PLOT

■ COMMUNICATIONS SOFTWARE

Alpha Software THE APPLE-IBM CONNECTION
Communications Research Group BLAST
Hayes Microcomputer Products SMARTCOM II

Headlands Press PC-TALK III
IBM ASYNCHRONOUS COMMUNICATIONS SUPPORT
Mark of the Unicorn PC/INTERCOMM
Microstuf CROSSTALK
Perfect Software PERFECT LINK
ReadiWare READITERM
Southeastern Software DATA CAPTURE
VisiCorp VISILINK

■ MULTIFUNCTION PACKAGES

Context Management Systems MBA
Haba Systems III E-Z PIECES
Lotus Development LOTUS 1-2-3

■ TRAINING

Alpha Software THE EXECUTIVE PACKAGE
Comprehensive Software Support DB TUTOR
Digital Learning EXPLORING THE IBM PERSONAL COMPUTER
Kapstrom WRITING IS THINKING
Knowware KNOWWARE
Reston Publishing THE EXECUTIVE'S GUIDE TO THE IBM PC

■ UTILITIES

DataViz ONESHOT
Harvard Software PROJECT MANAGER
IBM PERSONAL EDITOR
Jupiter Island Corp COLORTEXT
MicroPro International MAILMERGE
MicroPro International SPELLSTAR
MicroPro International STARBURST
MicroPro International STARINDEX
Norton Computing NORTON UTILITIES
On-Line Business Systems WYLBUR/PC



Software Evaluations

A Discussion of the Methodology Used for Microcomputer Software Evaluation

Selection of Personal Computer Software is a new experience for corporations, and the development and sale of such products to corporations is relatively new to the personal computer software supplier. Many companies have found that the published commentaries on software products don't seem to relate to their type of users. In the

following reviews, Data Decisions presents personal computer software from a corporate perspective reviewed in our laboratories under corporate use conditions, at the direction of our specialists. The structure and use of these reviews are explained in this report.

THE CORPORATION AS A PERSONAL SOFTWARE USER

Many of the personal computer products available today were designed by and for data processing professionals or serious computer hobbyists, and reflect an assumption that the users of the product know a great deal about the way their systems work. Other products are targeted to small businesses who will use personal computers as their primary computer resource.

The average corporation will rarely employ personal computers for mainstream data processing functions, and often the personnel who will use corporate PCs are clerical or office professionals who have no desire to learn computers beyond the limits required to do their jobs. Certain types of PC use may even be contrary to corporate policies on information processing or information resource management. Where corporation do want PC usage is where it can assist in the management decision process, where it can increase local productivity, and where it can offload corporate computer resources without diluting the corporate MIS database.

Many large companies do not rigidly control the purchase of personal computer software, and as a result department heads and managers with sufficient purchase authority have been able to acquire copies of the programs they felt might be valuable without regard as to whether other programs of a similar type might have been better, and possibly already in use in other areas of the company. Decentralized purchase of software leads to lost opportunity for volume discounts, incompatibilities between organizations, and increased complexity where changes in policy force a business to centrally collect data which had previously been considered to be a local departmental property.

Central purchase or central software review, however, must be timely to be effective. While there is no question that a large corporation could purchase every commercially available PC word processor for evaluation, the fact is that only a small portion would meet the basic requirements of the company. The savings in the cost of discarded candidate-products can be considerable if a form of pre-screening is employed, but there is a more important savings to be considered—time. An in-house review of 20 word processors could take months to complete and would

absorb a cadre of microcomputer specialists better applied elsewhere. Users waiting for results would be inclined to make a purchase without guidance. In combination, these effects could easily cost tens of thousands of dollars and be largely or wholly unproductive.

Most corporate microcomputer software purchasers will probably find that the value of software product reviews is not so much to facilitate the selection of a single, best, product as it is to select a narrow field of likely candidates which can then be evaluated live in the environment they are intended to support. Reviews to support this purchase philosophy must convey to the user the basic intentions of the product and the soundness of its design rather than dryly list features and functions.

DATA DECISIONS SOFTWARE REVIEW FORMAT

Each of the software reviews which follow are divided into sections to facilitate reference. The content of some sections will vary with the type of package, but the kind of information contained in each section will be absolutely consistent from review to review. Furthermore, because a well defined, highly structured process is used to evaluate and analyze each package, there is great validity to be found in comparing reports on like products. This consistency and comparability differentiates Data Decisions from any other information service in the marketplace.

■ PROFILE

The Profile section provides a summary of the key characteristics of each software product, including a brief description of the function which it provides, the computers and operating systems required for its execution, and the minimum hardware configuration (memory, disk, and device requirements) necessary to run it. The current version and the version we reviewed together with the date of first customer shipment are given. The number of users of a microcomputer package is sometimes an indication of its suitability, and that figure is also provided.

Selected comparable and competitive products are listed. While these do not represent the only products which may also be worthy of competitive review, they are representative of the products available and should be compared during the review process. Where appropriate, optional and associated software products are listed. We recom-



Software Evaluations

A Discussion of the Methodology Used for Microcomputer Software Evaluation

mend that these products also be reviewed to determine if their addition to the basic package will enhance the benefits of the software. The retail price of the package is also included here followed by the software vendor name, address, and telephone number. The vendor's Canadian headquarter's address and telephone number or a list of distributors completes the Profile section. It may not be desirable to call each vendor during the early screening phase of software selection, but a conversation with the vendor is generally warranted when final selection is being made.

A product price range is shown as a bar in chart form in each report. The retail price of the specific product being evaluated is shown vs. the full price range for the competitive products. While price may not be the primary consideration in corporate software selection, the relationship between the features offered by a package and its position in the range of comparable package prices could indicate an overpriced product or suggest that additional investment might improve functionality.

■ ANALYSIS

The Analysis section provides a concise summary of the product—its intended application, its approach to the application, an overall impression of its usefulness, and a recommendation on its applicability to a corporate environment. If a product receives a generally unsatisfactory review, the Analysis section will indicate whether there are any special circumstances which may make further consideration of the package worthwhile.

□ Strengths

The Strengths section defines the most significant advantages of product. Like the Analysis, this section is written in general business terms rather than technical terms, and should provide a non-technical user with a good idea of the positive aspects of the product. Where a product has a strength in an area particularly important to an application it should be a strong candidate for further review.

□ Limitations

The Limitations section is similar to the Strengths section but lists any product limitations designed into the package by the vendor or otherwise that might impact the usefulness of the package in a business application. This section is also written in general business terms rather than technical terms, and should provide a non-technical user with some limiting aspects of the product. A limitation associated with an important business application may serve to disqualify a product completely.

Both the Strengths and Limitations sections will generally highlight three to four of the most significant characteristics in each area, so the fact that a package has listed limitations does not necessarily mean that it has major restrictions or operational problems.

■ PRODUCT QUALITY RATINGS

Associated with the above sections will be a bar chart showing the Product Quality Ratings. This chart presents the results of a highly structured rating process described below that rates the product on a scale of one (unacceptable) to 10 (exceptional) in seven categories. The same

seven categories serve as a basis for the written review of the package which follows. A product with a rating of 5 in a category is judged to possess the basic qualities a corporate user would demand. Lower ratings indicate that some problems may be encountered in that category, and higher ratings indicate a product which exceeds basic requirements. Packages with high ratings in some categories and low ratings in others should be reviewed very carefully regardless of the overall average value of the ratings, because the variation may indicate an immature or incomplete product.



■ HANDS-ON EVALUATION

This section contains the results of a carefully administered, standardized hands-on evaluation in Data Decisions own Microcomputer Laboratory. Each software product is evaluated according to a specific set of criteria deemed by Data Decisions to fully capture the essence of the type of product being reviewed. In particular, we look at how well the software package satisfies the business needs for that type of package in a corporate environment. The guidelines used are calibrated against live user experience to ensure that the quantitative results derived from the testing are valid and meaningful in the real world. This dimension of Data Decisions Microcomputers service is unique, and is the only systematic, consistent expert rating process of Microcomputer software available today.

The Hands-On Evaluation section of the review summarizes the initial impression of the product, the general experience with it, and the reaction of the organization to the test usage. If any special tasks are associated with the use, such as coordination with the corporate data center, they will be mentioned in this section. If a product is noted to have a long learning curve or start-up cycle in this section, it may indicate that it would require special support to be useful if an application is expected to have a short start-up time.

□ User Interface

There are many ways in which a software package can present itself to the user, can accept input from the user, and can transmit replies to the user. The User Interface section indicates each software package's means of communicating with the user by describing the following 7 methods of interface: Menus, Control Characters, Function/Special Keys, Command Language, Positive Feedback, Status Display, and Help Facilities. In a paragraph on each of these capabilities, the style of interface and the quality of implementation are discussed.

The "Menus" paragraph indicates whether menus are used, and provides a description of the menu structure, menu by-pass techniques, and the quality of menu text and graphics.

The section on "Control Characters" states if control characters are used as commands; it also describes the quality of control-character assignment (i.e., if they are logical and easy to remember), whether they are single or double characters, and if the control characters are user-modifiable.

The "Function/Special Key" paragraph states if Function or Special keys are used by the system and whether func-



Software Evaluations

A Discussion of the Methodology Used for Microcomputer Software Evaluation

tion key assignments are employed in conjunction with a shift, control, or alternate key. It is also indicated here if a keyboard template showing function key assignments is available.

The "Command Language" section describes the way commands are structured and the general command options available.

In the "Positive Feedback" paragraph the method the system employs to alert the user to input errors is stated and how the system responds to a user's request for a potentially destructive command.

The "Status Display" paragraph indicates the presence of a status line on the screen and the contents of the status line.

Finally, "Help Facilities" paragraph describes system provisions to assist the user in working with the package. A discussion of online facilities and special documentation are included in this section.

□ Environment

Following the User Interface section is a summary of the experiences of our analysts in the use of the product, divided according to the seven categories shown on the Product Quality Ratings chart.

The Environment section defines the restrictions and limitations which the product places on the computer system and operating environment in which it is used. Generally, a product is highly rated in this category if it will run acceptably on a minimum configuration and if it will utilize additional memory and disk resources if they are available. A product which does not support a standard configuration, will not run on the latest version of the computer's operating system, or which requires unusual setup for execution will be given a low rating.

One aspect of environment which is a source of controversy in the computer field is the copy protection of the software product. Many vendors have attempted to reduce the sales lost to illegal copying of their product. They have incorporated technical protections to the source diskette which prevent its being copied by standard utility programs. While their concern for profit is understandable, the fact that a product is copy protected will nearly always place some restriction on the legitimate user. A corporate user may not be able to wait a week for a backup copy to be mailed by the vendor if the user's disk is damaged. Copy protection may also prevent a product from being installed and run on hard disk; but special hard disk installation programs may be provided. Such considerations will be discussed in this section.

The most common problem associated with copy protection on the IBM PC, for example, is the inability to install a copy of the operating system on the program disk, or to place other programs on the disk with the new product. The original PC had single-sided disk drives with a capacity of 160K bytes. To retain compatibility with these early systems, many vendors continue to distribute their product on a single-sided media. IBM's new PC-DOS 2.0 is significantly larger than the earlier Version 1.1, and many copy-protected products do not have sufficient disk space on the distribution diskette to hold the new version. Since the software cannot be copied to a disk with greater capacity,

the program cannot be set up to boot when the system is powered on, and at the termination of execution a disk containing IBM's COMMAND.COM file must be loaded to regain the "A" prompt.

□ Documentation

This section covers one of the most important aspects of any software product, either as a training aid immediately after purchase or as a reference source for information on expansions in package use or in dealing with problems. An ideal package would have three distinct documents: a tutorial manual with a set of examples and a disk file containing samples to accompany it, a reference manual organized by the functions supported rather than alphabetically by the command names, and a pocket guide or reference card which summarizes the commands and which can be employed as an experienced-user reference.

Some vendors attempt to solve all these needs in a single manual. If such a manual has multiple sections, it is equivalent to the multi-document standard; but a general-purpose manual normally serves all purposes poorly. The document which skips tutorial issues makes the user dependent on consultative support or experimentation during startup, and encourages the development of inefficient or otherwise bad usage habits. It also increases both the time it takes for the organization to become productive with a product and the likelihood that members of the staff will "reject" it at a later date due to frustration.

A reference manual which is incorrectly organized, either because it attempts to use a tutorial structure or because it takes the easy path of being an encyclopedia of commands, may complicate the learning process. It can extend the problem-solving time of the organization and discourage the use of new concepts and features by making them difficult to locate. A proper reference manual should be structured according to task or function rather than by command; and the index should contain not only references to the common technical term(s) for each function/task but the normal business names as well.

Sub-standard documentation may be tolerable to organizations with significant technical support available, or with internal users experienced in the product. Dealer support may also help overcome documentation problems. Organizations without recourse to either should consider poor documentation a major deficiency.

□ Functionality

Functionality defines the features a product possesses to accomplish its intended task or function. Obviously, these will vary depending on the type of product involved; word processor features cannot be compared to spreadsheet features. While some program products have unique applications which cannot be easily categorized for review, we've established major feature highlights for five of the most popular product types; 1) word processors, 2) spreadsheet programs, 3) database programs, 4) graphics programs, and 5) communication programs. These feature highlights are presented later in this report.



Software Evaluations

A Discussion of the Methodology Used for Microcomputer Software Evaluation

A feature is not significant unless it meets a present or anticipated need, and a list of every feature in a package would serve little purpose in facilitating software review; it would be a synopsis of the documentation for the product. In the Functionality section, the reviews emphasize the use of the product in a corporate environment, and discuss how corporate users can apply the features of the package to their particular PC applications. Features are presented in the context of their likely use, often in the form of brief histories of a business application which succeeded or failed.

Comparisons to other products are made in the Functionality section where the other product(s) is (are) an accepted industry standard and is (are) likely to be familiar to business users. An example of such a standard would be the VisiCalc spreadsheet package. Comparisons highlight feature differences which might be significant and point out variations in approach which may cause problems with users having some experience in the "standard" product.

Another form of comparison found in this section are references to "non-standard" personal computer hardware or keyboard features. New PC users may wonder why the fact that a program uses a particular key, rather than another key, to invoke a function poses a significant problem. For each system there are conventions concerning hardware and keyboard use established by the standards of the computer vendor and which are influenced by the sum total of the software which is written for the system. If a package uses the backspace key as a non-destructive cursor-left command rather than erase-my-last-keystroke commands, and nearly every other software program uses it the other way, the difference will be a continuing source of awkward operation and errors.

Functions in a software package are like options on a car; everyone has a unique perspective on the little details, but most agree on the major elements. The Functionality section details user trials intended to exercise those major elements, and thus to indicate the general suitability of the package for a corporate office environment.

□ Ease of Use

Elements in this section are best explained by a reference to a comment made by a marketing specialist reviewing a spreadsheet program. When asked by a supervisor if she could perform a particular kind of manipulation on the data, she replied, "Yes, I can do that; but I'd really hate to have to!"

Users who really hate to have to do something will eventually stop doing it, and a feature that is so unpleasant in its implementation that it is avoided, is equivalent to no feature at all. The Ease of Use section of the review outlines the attitudes of the users on the ease with which the product could be applied to business problems. There is some overlap between Ease of Use and Functionality, since the absence of a function can make a product more difficult to use, but in general the Functionality section discusses what can be done and the Ease of Use section how easily it can be done.

Some common factors which affect the Ease of Use are:

- Effective use of hardware features
- Logical design of features
- Menus and HELP functions
- Function key or keyboard templates for special key usage
- Documentation, particularly reference material
- Conformance to normal operating practices and conventions.

The most significant example of the effect of hardware features on Ease of Use is that of the special and function keys on a keyboard. Computers such as the IBM PC have a number of special-purpose keys which perform such tasks as moving the cursor and deleting a character. If a package uses the keys for the intended function, it is more easily used, and its use is less likely to conflict in operating practice with other packages.

Logical feature design is a requirement for software programs because users, even novices, rapidly develop a sense of how something should work. A package which does what is expected in the way expected requires less training, and users are more likely to expand their expertise through experimentation with new features. Logical design should extend from a selection of the command structure of the system to prompting and internal mechanization of a command.

Menu structures and Help features are important in keeping a novice user in touch with their context in the use of the package and in restoring that connection if it is lost. Most people prefer a product within a hierarchical command and menu structure, one which allows the selection of a major functional area, then a sub-area, and so forth. Each level should be identified with "menu title" and each menu should indicate how to return to the previous menu. Commands should return to the appropriate menu level. Since expert users find menus restrictive, it is helpful if an expert can bypass a menu by entering the entire selection in a single string. Thus, for example, the third major system option, first area, and fifth sub-area might be entered as "3.1.5" at the first menu prompt, taking the user directly to the desired function. IBM's Information Network employs this technique.

Help functions should be available at each level of menu structure and at each point within a command. Many packages use a single help file which the user must scan for any form of information. Help functions keyed to the particular operation being performed are far more effective. Help displays may replace the current screen if the loss of contact with the application is not a factor, but command-level Help displays which overlay the command entry and prompts are not particularly useful.

Where special functions are invoked by keystroke control, there are various ways of prompting the operator. An on-screen menu structure such as that used by MicroPro's WordStar is flexible and adaptable to nearly any number of commands if the hierarchical structure is used, but programs which use fewer commands and map them to specific keys may provide a function key or keyboard template. A template which covers the border of the keyboard is preferred to one which requires sticking information on



Software Evaluations

A Discussion of the Methodology Used for Microcomputer Software Evaluation

key caps—these usually come off and often change the “feel” of the key.

Documentation is covered in an earlier section of the review, but it has a significant impact on Ease of Use. Reference manuals which do not present the user a logical structure cannot help to locate lost functions, and a 10-minute session with a document loses a lot of time, even if it happens only occasionally. The tutorial aspects of documentation will not normally be related to ease of use, but a manual which never provides a good overview of the product may be judged to contribute to user difficulties such as failure to recognize the proper features to use.

There are normal system practices even in microcomputers. For example, it is rare to develop an application which requires the user to change disks while the program is executing. Some programs, in fact, sternly warn against this action. A package which violates a practice such as this is judged difficult to use because it requires a user to “unlearn” a dictate which is possibly well established and perhaps should not be unlearned at all.

Like the functions of a package, the things which make a product easy to use will vary depending on the type of product. We recommend that you review the material in the next section of the report to identify the key issues for the type of package you are considering before reading individual reports.

□ Support

Support is, to be candid, something which corporate users may have some difficulty accepting in a microcomputer software environment. The vendor who flies a specialist to a user location to help with a software problem may justify the action when the software costs \$50,000 and is in use at only a few hundred locations. The same package, costing \$500 and used in tens of thousands of locations must be supported differently. You can expect otherwise, but you will not get it.

The key issues in the support of microcomputer software are:

- Are any forms of training available from dealer or vendor?
- How much must the dealer supply in answering questions?
- How are product revisions and updates handled?
- Are known problems published in a newsletter or circulated?
- Will the vendor answer phone inquiries in a competent way?

Training is most often accomplished by a tutorial document or a tutorial section of the manual plus a diskette. Audio or video-tape aids are highly beneficial in cutting the time needed to be productive with a new product, but very few companies provide them. Actual classroom training is even more unusual, and on-site training is almost certain to be a special-negotiation item.

Microcomputer software suppliers traditionally expect the dealer to support the products sold through them. This phi-

losophy is well-suited for mass-market software which the dealer will stock and will demonstrate daily, but less fruitful, for example, for the special graphics package needed by a large corporation. Corporate users often do not buy mass-appeal products, and dealers who supply them in many cases have never even seen the product out of its box. A software package which provides no support phone number or keeps referring callers to their dealer is unsuitable for corporate purchase unless the local dealer is highly qualified, or unless the company wants to support the product internally.

Product revisions to mainframe software are generally covered by a software maintenance agreement: something very rare in microcomputer products. Microcomputer software is revised most often to increase functions or features to gain competitive advantage rather than to correct problems. Some “bugs” may be known for months before any new release is made to correct them. This new release may improve functionality, and thus will probably not be provided free-of-charge. A company with a software maintenance agreement, with specific policies on supplying new versions to users affected by outstanding problems, and with a fair way of making new and improved versions available to all users of older software is preferred.

There is nothing more frustrating than calling a vendor with a problem report developed after days of checking and research, only to be told “we knew about that one.” Some form of newsletter which conveys the existence of problems and defines possible corrective or preventive measures is very desirable, but like software maintenance agreements it is very rare. Unless we were a test site for a particular software product, we have never been notified of the existence of a problem. The most common way for users to find out about a software problem in a purchased product is to read about it in the trade press; so a subscription to one or more popular publications may be advisable for any serious software purchaser.

Some vendors will not supply a support phone number at all, and some will send it only once a warranty card has been returned. Either method exposes a legitimate user to an unnecessary problem period during which support may not be available. The names and phone numbers of the software vendors are supplied with the reports which follow, but just having a phone number does not necessarily imply getting helpful information. If you must call for support, be sure to have the serial number of the product and of the dealer or source who supplied it. Some vendors will refuse assistance unless this information is available, but the majority will at least attempt to be helpful. Very good phone support consists of having specialists who can relate to problems stated in non-technical terms and can offer suggestions on how to do something rather than just telling you it cannot be done or it is covered in the manual.

□ System Interface

The Interface of a product with the remainder of the personal computer environment, and perhaps with the mainframe data center environment, is a requirement of most corporations not often addressed. Some product types are inherently incompatible; for example, few word processors will operate successfully on files created by another word



Software Evaluations

A Discussion of the Methodology Used for Microcomputer Software Evaluation

processor. In all cases, however, the vendor should give some indication that potential for interface with other products and systems has been considered. This may take the form of a chapter or appendix in the manual, detailing the file structures and the issues associated with the data exchange with foreign systems. Some may provide specific features or companion programs to aid this exchange.

In some product classes, particularly in spreadsheet programs, some de facto standard file formats have developed. The Software Arts DIF (Data Interchange Format) structure is an example. Where these standards exist, they should be supported. A user with a spreadsheet program supporting a DIF structure has a high probability of successfully exchanging data with another product likewise supporting DIF files. This data portability cannot help but work to the advantage of a large company, who may have several types of computers and software products in use.

The most important issue to be covered in the System Interface section is the data center interface. It may not be mentioned in many of the products reviewed, because no such communication was envisioned or supported by the developer. This oversight may indicate a lack of understanding of corporate information movement requirements, itself a symptom of a more general lack of understanding of corporate requirements.

□ Experience of Vendor

The Experience of the Vendor is a factor whose importance in software selection is difficult to measure. One of the best and most successful spreadsheet programs on the market was developed by a start-up company, and one of the oldest and most experienced software developers has recently produced a less-than-ideal product. We do not suggest that an old, established vendor is necessarily a good vendor; or even that a product long in use and widely purchased is necessarily a superior candidate for corporate use.

One real issue with vendor experience is survival probability. A product offered by a firm just entering the microcomputer market or just opening for business may suddenly be unsupported if the supplier withdraws or fails. This may leave a user stranded with large amounts of data and with a big investment in training of personnel. One firm who left the market between the release of Version 1.1 of IBM's popular PC-DOS operating system and the more sophisticated Version 2.0 stranded several hundred users in the early version. The users had the choice of staying with an obsolete operating system or discarding the program, data and training already accumulated. It is wise to consider the stability of a vendor when contemplating a significant investment in a particular program product, even if that investment represents archival information and personnel expertise rather than software cost.

■ PRODUCT OVERVIEW

The overview of the product is the last section of each software report. That section defines the purchase Terms and Support, Component Summary, Computers & Operating Systems Supported, Minimum Operating Requirements, a Features summary, and Other Facilities.

□ Terms & Support

Terms • Purchase or acquisition terms for most software

products are alike—the buyer purchases a license to use the product. In most cases, this entitles use on a single computer. Some vendors may offer discounts to purchasers of multiple system licenses, and any business intending to purchase many copies of a program should contact the vendor directly for a quote and any use restrictions which apply. Failure to do this may result in a significant overcharge. One user made a deal for the purchase of nearly 100 copies of a program from a local dealer, receiving a discount of 40%. A direct purchase from the software manufacturer, however, would have yielded the user a discount of nearly 90%.

Support • This section describes the facilities available to support the product. These facilities may be an indication of the presence of an 800-telephone number, the availability of a newsletter, or a better indicating known bugs or a statement that support is provided by the vendor.

□ Component Summary

The Component Summary describes the software elements which make up the product. These elements may be program or file names used to implement the product; they may also indicate the programs used in on-line tutorials.

The price of the product is indicated in this section.

□ Computers & Operating Systems

This section describes those microcomputer systems and operating systems on which the package runs.

□ Minimum Operating Requirements

This paragraph includes a discussion of the minimum memory, disk, and device requirements to implement the software package.

□ Features

This section focuses on a discussion of the features of the package. The structure of this section depends on the product type. In general, we have defined a number of functional areas which most influence the usefulness of a product in a corporate environment and described the features of the particular product in each of these. The summary information is not intended to represent a complete list of features (which could be gathered by looking at the manual, and would probably change with each version of the product), but a summary of the most important attributes of the package.

□ Other Facilities

This final paragraph is an optional heading. Many software packages have multiple purposes or come with useful "utility" programs, secondary programs which are supplied to help a user deal with a particular problem or to provide an extension of functionality. These additional programs with their price will be listed in this section.

■ FEATURES & RATING VALUES FOR SPECIFIC SOFTWARE CATEGORIES

The following paragraphs include a discussion of important features of each of the five major categories of software that we evaluated: word processors, spreadsheet programs, database programs, graphics programs, and communications programs.



Software Evaluations

A Discussion of the Methodology Used for Microcomputer Software Evaluation

We also included the quantitative rating value guidelines our analysts used in our lab to evaluate each type of software. In the scoring guideline section will be shown the specific numeric points structure used to arrive at the ratings for the 7 software characteristics in the Product Quality Rating charts.

□ Word Processor Features

Word Processing features that are important in a corporate environment depend on the level at which the product will be used. Studies have shown that frequent users of word processors are less sensitive to the format in which the text is displayed on the screen and more sensitive to advanced features for unusual format and print situations. This characterizes users in a typing pool, or professional users who create many pages of work on the system each day. Typical professional/managerial users, however, are likely to use word processors at irregular intervals and thus depend heavily on document appearance on the screen as an assurance of having made the correct command choices. They are also less fussy about precision in formatting, making sophisticated print and format features unnecessary.

Specific features of word processors which should be evaluated are:

- **Display type**—the way in which the document is displayed on the screen. Many products attempt to display in print-image, even with special print options such as underscore shown correctly. No PC display, however, is capable of supporting all format and display options (proportional spacing, for example). Some users find that the exception conditions are so annoying that they overcome the advantages, and prefer a word processor at the other extreme—one which makes no attempt to display text in printer form until it is printed.
- **Display feature utilization**—whether the text is displayed with print attributes or not, the display features of the PC such as reverse video, high intensity, etc. can be used to advantage in such operations as deletions (to mark the area to be affected) and to highlight changed portions of a document. Such features improve accuracy by providing positive feedback that an operation is going to be performed properly. They are particularly important in systems to be used by occasional typists.
- **Command structure**—in addition to the entry of text data, word processors must support the issuing of commands for such functions as deleting data, printing, or changing formats. These commands may be mechanized through the special function keys of the computer, through a menu structure, by special multiple-key sequences, or a combination of two or more of these. The ways in which commands are entered is largely a matter of personal preference, but experience shows that beginners favor menu systems while frequent users favor key sequences, such as striking a key together with the control (CTRL) or alternate (ALT) keys.
- **Error recovery**—system and operating errors are certain to occur occasionally, and any word processor must act to protect the user's investment in data. Since program or system failure while data is being keyed normally causes that data to be lost, the major issue on dealing with catastrophic errors is whether the user can save data periodically and whether a crash could possibly corrupt even the original copy of the file. Less serious errors of the "Oh my, I didn't mean to do that" type can be addressed by a form of "undo" facility which may back the user up to a point before the last action or just allow the reversal of critical operations such as deletions and movements of text.
- **Block operations**—simple insertion and deletion of characters is too time-consuming for some forms of document correction, so operations to move, copy, and delete groups of characters are desirable. Ideally, a system should be able to manipulate words, sentences, pages, paragraphs, and user-marked blocks of text; moving, deleting, or copying them as required. Block operations should also affect columnar text.
- **Merge/print functions**—many businesses use word processors to produce form letters or other forms of mass printing. The ability to support this, creating a letter which is properly paginated and formatted even with the introduction of variable data from a list such as a name and address file, is thus important. Many products offer this as a standard feature, but some require additional optional support. Merge capabilities can also be used to assemble large documents from smaller elements, a book from chapters, for example. This can be valuable in dealing with very large documents, since it eliminates the need to revise a large manual to change a single page.
- **Spelling checking and spelling aids**—probably one of the more controversial features of a word processor are spelling check programs or features. Well designed, these can improve document appearance and reduce production time. But good design is rare. A good spelling checker should probably scan the text, indicating each word which is suspicious and offering alternative spellings. The user should then either select a correction or declare the word to be correct as is, in which case it would be added to the dictionary. Beware of products which substitute words without reformatting the text in which they appear. Also, beware of products with small dictionaries and limited abilities to add to them, unless your users have an unusually limited vocabulary. Many corporate users feel spelling checkers are useless and should be avoided. In any case, they are most often optional features.
- **Multiple window/multiple document capability**—this refers to any set of features which permits a user to either view multiple parts of a single file together or alternately, or to view multiple files in that manner. Packages with true WINDOW capa-



Software Evaluations

A Discussion of the Methodology Used for Microcomputer Software Evaluation

bility will offer a user two or more display divisions, which may be "windows" into different parts of a document or different documents. Two windows make creative writing very much easier; you can browse around in old text while retaining view of the current work area. More than four windows are probably overkill. Another variation of the window system is the ability to open multiple documents and switch from one to the other with a few key-strokes. This is most often associated with the ability to move or copy ranges or blocks of data from one document to another. With any window/multiple file system, it should be possible to execute any from-to range or block operation between windows/documents.

Users with simple feature desires may find "personal" word processors such as pfs:Write or VisiWord satisfactory products. Those with more complex needs must choose between products with print-image displays such as WordStar, SuperWriter, or WordPerfect, or those with a more complex formatting feature set but a non-print-image display such as PeachText.

Word Processor Scoring Guidelines

Environment (1 to 10)	Points
Configuration required to run the package includes hardware not available from the normal hardware vendor (i.e., a custom board)	0
If the configuration required is larger than the average system (0 = configuration is much larger than average; 4 = configuration is average)	0-4
If the software will run on a system with less memory or disk than average (0 = software will not run with less memory or disk; 6 = software will take full advantage of extra memory and disk)	0-6
If files less than half of a disk cannot be edited	-1
If the system cannot take advantage of extra memory to gain speed with functions such as searching ...	-1
If the operating system required is not the standard one	-1

Documentation (1 to 10)	Points
Package whose documentation is technical in nature and which is indexed by the system's name for each command rather than by the function which is to be performed (e.g. deleting a line should be referenced under "deleting" and not under "control/Y function")	0
Packages that have a single manual which is written for users and is functionally presented	5
or	
Systems that have both a tutorial and reference documentation/diskette and are well written, non-technical, and rich in visual examples	10
Lack of screen image examples	-1
Lack of alphabetic list of error or system messages with good explanations	-1

Functionality (1 to 10)	Points
Full-screen editing	1
Display format matches printed page	1
On-screen indicator for line	1
On-screen indicator for page	1
Global search and replace	1
Fast forward and backward movement (by page, or to start or end of document)	1
Function key control for cursor	1
Block text operations (marking, moving, deleting, copying, writing)	1
Heading and footing control	1
Margin size control	1
Page size control	1
Ability to imbed special print characters	1
Letter and mail list merge capability	1
Spelling checker	1
Dictionary update capability	1
Column movement and totalling capability	1
Ability to store phrases by code for later recall	1
Mixed margins on same page	1
Automatic upward-building footnotes	1
Ability to edit program statements	1
Single-sheet and continuous page handling	1
Multistrike printing	1
Underlining without printer backspace	1
Multiple windows on document	1
File copy and deletion ability	1
Additional functions (0 = no extra features; 5 = 5 or more additional features)	0-5
DIVIDE TOTAL BY THREE TO ARRIVE AT SCORE	

Ease of Use (1 to 10)	Points
Fullness of Help explanations (0 = no explanation; 5 = thorough explanation)	0-5
Degree to which Help is availability (0 = no Help facility; 5 = full Help commands, can be called from several places in program)	0-5
Non-editing command structure—e.g. opening files, copying files, invoking printing, etc. (0 = no non-editing command structure; 2 = full command structure with easy to remember commands)	0-2
Editing command friendliness (0 = non-friendly; 3 = very user friendly)	0-3
Function key availability for the most frequently used editing commands—backspace, cursor position (0 = no function key use; 2 = several function keys used)	0-2
Two-step delete process—e.g. Mark/Delete, Delete?/Y or N (0 = no 2-step delete; 2 = 2-step delete with confirmation)	0-2
Undo function	1
Print-image display	3
Page, row, and column indicator	1
Tab ruler	1
Ability to print page as shown on screen	1
Selectable printing of pages	1
Print spooling	1
Support for special functions such as bold face, underscore, super/subscript, etc	1
Ability to emerge several documents into one	1
DIVIDE TOTAL BY 3 TO ARRIVE AT SCORE	



Software Evaluations

A Discussion of the Methodology Used for Microcomputer Software Evaluation

Support (1 to 10)	Points
Designated customer support personnel.....	1
800 telephone number	1
Regional or local support	1
Online assistance	1
Formal problem reporting system	1
User notification of new releases.....	1
User discount on new releases	1
Free updates to users for problem correction	1
Retailer authorized to provide update	1
Update frequency 12 months or less.....	1
System Interface (1 to 10)	Points
Detailed formats of the document structure including definition of line breaks and soft spaces used for block formats	2
Instructions on converting format to that of other popular systems	2
Built-in facility to convert documents from or to other formats	2
Ability to read page-formatted documents and convert them to word process format	2
Disk format compatibility with other word processing systems (0 = compatibility with no other system; 2 = compatibility with several systems such as Wang, Lanier, DEC)	0-2
Vendor Experience (1 to 10)	Points
Vendor in business 3+ years	2
or	
Vendor in business 2-3 years	1
100 to 1,000 packages installed	1
or	
1,001 to 10,000 packages installed	2
or	
10,001+ packages installed	3
Product first installed 24+ months ago	2
or	
Product first installed 12-24 months ago	1
New and untried supplier	0
Known major vendor (1 = 1 major product in marketplace; 3 = well-known management team and software developers on the staff)	1-3
DIVIDE TOTAL BY 1.5 TO ARRIVE AT SCORE	

Spreadsheet Features

Spreadsheet Features are a greater interest to users as the number of products on the market increases. VisiCalc, the original spreadsheet program, has set the basic style for spreadsheet systems, and in general it is wise to avoid any which deviate too much from the standard row/column basic form. Most popular computer literacy and training material is useful with traditional spreadsheet programs but difficult to adapt to others.

Corporations have widely varying requirements for spreadsheet programs, even within the same organization. For some, large spreadsheets are needed to record large volumes of information, while others require special statistical, financial, or mathematical functions built into the formula features which calculate the value of an individual field, or "cell". The key elements of spreadsheet programs are:

- **Spreadsheet size**—sometimes given in row-by-

column limits but more often limited by the memory of the computer system. It's usually a good idea to have at least 64,000 bytes of memory free in the system for spreadsheet use, but many users of Apple computers have happily operated with much less. Users tend to think they need more than they really do.

- **Command type**—important in spreadsheet programs because there are often many different commands. The most popular systems, designed to mimic VisiCalc, use a single-character command entered in a menu. Function and control keys may also be used. Some form of command menu or help function is a must for the occasional user, but it should not be intrusive to the expert since many top technical specialists whose time is very valuable will be spreadsheet users.
- **Financial functions available**—most spreadsheet programs will calculate the maximum, minimum, average, sum, and count of a list of cells. Functions such as Net Present Value may have to be developed by the user based on combinations of mathematical operations, something which can be challenging to say the least. Special financial functions make the use of the package by accounting and other financial departments much easier, and makes individual users more productive.
- **Statistical functions available**—actuarial, statistical, and predictive/analytical functions will likewise make the use of the product by some users much easier. Mean, standard deviation, and variance should be considered minimum functional support if statistical uses are contemplated.
- **Cell reference**—any complex form of spreadsheet use will eventually result in a sheet too large to see all cells at once. Finding the right cells for inclusion in formulas can thus be frustrating. The ability to locate cells by moving to them is a time-saver; the feature is called "pointing". Another good feature is the ability to name cells symbolically. It is easier to remember that the discount rate is called DISC and not that it is at cell E4. It is also helpful to be able to refer to cells either absolutely or relatively; add THESE CELLS or add THE THREE CELLS ABOVE THIS CELL. Relative forms of formula are more easily moved or duplicated.
- **Window capabilities**—the ability to break up the display to show multiple parts of the sheet may be very valuable. For example, a list of products, representing rows on the sheet, may be fixed on the left of the display as the right half moves through a sequence of weekly totals. If the entry were done without windows, the meaning of each row would be lost. Two windows are helpful, and more than four just result in a cluttered display if used. Windows should be defined either as a vertical or horizontal segment of the screen, but the ability to isolate by both row and column to any size rectangle may be useful in some applications.



Software Evaluations

A Discussion of the Methodology Used for Microcomputer Software Evaluation

- **Range facilities**—cells are often logically grouped into ranges by row, column, or both. Ideally, a range should be a valid destination or source of data wherever the group identity would be logical. Ranges should be named, for example, if desired. A range is normally defined as a group of cells between a designated set of rows and columns; a rectangle.
- **Print facilities**—it's annoying to have to print an entire spreadsheet, and further it is not always possible. Printing by a designated range is thus virtually a necessity. It may also be desirable to print with or without the row and column letter/number label, or to print the formulas within a cell rather than its current value.
- **Load/save facilities**—many spreadsheet programs require that all the data in a spreadsheet be loaded from disk or saved to disk at once. This prevents using a "master" spreadsheet to collect data on individual secondary sheets for such purposes as the summary of monthly detail information. It would be ideal to be able to save to disk any range of a spreadsheet, and to load from disk any range of a previously saved sheet. Loads of data should not affect the portions of a spreadsheet not actually "covered" by the new information. Some packages permit the arithmetic combination of data in cells which match between newly-loaded data and the existing spreadsheet.

Spreadsheets are often the basis of so-called multifunction packages such as Lotus 1-2-3, Context MBA, or SuperCalc3. These popular combination products should be evaluated by all spreadsheet purchasers. Users should consider such packages first in their primary category of spreadsheet programs, and if they are suitable consider the advantages (if any) offered by secondary functions such as word processing and database support. If no advantages are offered, traditional spreadsheet programs may be a better buy.

Spreadsheet Scoring Guidelines

Environment (1 to 10)	Points
Only 1 disk drive required for operation	4
Operates in 64K bytes of memory or less	1
Program can use 128K bytes of memory if available	1
Program can use additional 128K byte memory blocks (1 point for each additional 128K block)	1-3
Program and data reside on the same disk	1
Operating system is not standard for the hardware, or package uses its own operating system	-1

Documentation (1 to 10)	Points
Reference manual	2
Tutorial manual/diskette	2
Pocket guide	1
Functional organization in reference manual rather than by command	1
Detailed glossary of commands	1
Progressive course in use of spreadsheet	1
Business oriented examples	1
Screen-image of examples	1

Functionality (1 to 10)	Points
Left-right/up-down cursor control	2
Ability to go to a selected cell	1
Ability to go to upper left or lower right of the worksheet	2
Ability to move left-right/up-down in current row/column	4
Numeric or alphabetic data permitted in cell	1
Column width control	1
Default decimal control	1
Ability to name a particular cell and use the name as reference to the cell	1
In calculation, cells should be referenced by absolute location, relative location, or name	3
Constants allowed in calculation	2
Parentheses control order of operation	1
Ability to copy worksheet from one section to another	1
Load and save of worksheet from disk	1
Load multiple, non-overlapping worksheets	1
Ability to print part of a worksheet	3
Support of table look-up for calculation or translation	1
Ability to blank or zero a set of cells or delete a row or column	2
Ability to insert a row or column	1
Graph tabular data	1
Write segments of worksheet to disk	1
Define multiple display windows	1
Sort data in column into increasing or decreasing order	1
Reference a cell in a formula by moving the cursor to it	1
Ability to directly enter percent values	1
Support of exponentials	1
Support of Logical operators (And, Or, etc.)	1
Ability to use IF statements in formula	1
Support for iterative modeling	1
Protected fields	1

ADD AND DIVIDE BY 4 FOR THE FINAL SCORE.

Ease of Use (1 to 10)	Points
Help Function:	
Command list	4
Assistance with use of commands	4
Assistance on the entry of fields within a command	2
Command Structure:	
List of command options on the screen at selection time	2
Prompting of entry fields within command	2
Logical command codes	2
Numbers and text recognized without command code	3
Display format:	
Row/column identification	4
Ability to display multiple windows	2
Ability to print segments of worksheet by command	2
Ability to print row/column designations	2

DIVIDE TOTAL BY 3 TO ARRIVE AT SCORE

Support (1 to 10)	Points
Designated customer support personnel	1
800 telephone number	1
Regional or local support	1
Online assistance	1



Software Evaluations

A Discussion of the Methodology Used for Microcomputer Software Evaluation

Support (1 to 10) continued	Points
Formal problem reporting system	1
User notification of new releases.....	1
User discount on new releases	1
Free updates to users for problem correction	1
Retailer authorized to provide update	1
Update frequency 12 months or less.....	1

System Interface (1 to 10)	Points
No information on file structure and no facility for reading or producing standard file formats	0
Quality of information on internal file structures (0 = poor quality; 3 = complete description of file structure)	0-3
Ability of package to use or produce outside formatted files (0 = no ability to use other vendor formatted files; 3 = ability to use and produce formatted files for other systems).....	0-3
Availability of specific instructions or support for transfer of files to other computers, spreadsheet packages, or applications (0 = no instructions or support; 4 = clear instructions and vendor supplied support for transfer to more than 1 other computer or spreadsheet package)	0-4

Vendor Experience (1 to 10)	Points
Vendor in business 3+ years	2
or	
Vendor in business 2-3 years	1
100 to 1,000 packages installed	1
or	
1,001 to 10,000 packages installed	2
or	
10,001+ packages installed	3
Product first installed 24+ months ago	2
or	
Product first installed 12-24 months ago	1
New and untried supplier	0
Known major vendor (1 = 1 major product in marketplace; 3 = well-known management team and software developers on the staff)	1-3

□ Data Management Features

Data Management Program Features are often at the heart of a debate on the extent to which user organizations should be encouraged to actually write computer programs. In their most basic form, a database program provides the user with the ability to define a form to collect data from the keyboard, store it on a file and locate or update records as required, then report it in one or more basic forms. These simple packages are often called "file" programs; VisiFile, Perfect File, or pfs:File are examples.

More complex database packages approach the complexity of mainframe programs, and in fact some mainframe products such as FOCUS have a PC counterpart. These software systems are combinations of data file creation and management, query, and reporting, and often have a symbolic high-level language which permits a form of programming. Such sophistication can be helpful in trying to perform programming tasks within a user organization; it's certainly easier to do that with a database package than with a conventional programming language. But users of

these packages can get mired in the programming process, spending valuable time learning skills which their organization may not feel they need. Complex user databases may also be immune to traditional data processing controls, backup and recovery, and auditing. Taken to extreme, they can depopulate the corporate database to the extent that meaningful centralized information resource management becomes impossible.

These key features in a database system help categorize the product as a "filer" or a "pseudo-programming system":

- **Record size limitations**—most users will find that 32 fields per record and about 512 characters will be satisfactory, but it's a good idea to calculate the requirements of the most demanding application.
- **File size limitations**—a floppy diskette usually holds between 150 and 350K bytes, and file sizes up to about half that size can be considered reasonable. If you think that you need more than a floppy disk would hold, the application may be a little too much for a local computer. Check with the corporate data processing organization. Most packages will also limit the number of records; 65,535 is a typical number.
- **Field size limitations**—be careful with this limitation, since it is the one most likely to affect an application. Field sizes are usually related to binary values, so at least 127 is good, and 255 is better. Beware of 31-character fields, since many name and address or product description fields will not be served by that limit.
- **Key field limitations**—most packages will support multiple key or "file-on" fields. The total number and total size supported may limit your ability to find records in a large file. Three key fields is almost a must, but much more than that may not be useful. A size limit of 127 or more is needed if mailing sorts are to be made with full functionality.
- **Screen format definition**—the way in which data entry forms are defined is important if an end user is going to do the definition. Menu structures with on-screen examples and simple terminology in prompting are needed in that case. More complex, almost programmatic, formatting is desirable if the application is very complex. Again, beware of excessive requirements as a possible indication of an unsuitable application. The ability to position entry fields either in default locations or at user-defined locations is a useful extension to the basic structure.
- **Entry edit capabilities**—data which is entered into a database should be validated to the limit of the entry vehicle, or corruption of the file is inevitable. Minimum requirements are simple alphabetic/numeric testing, and range tests, table lookups, and relational tests are desirable IF THEY CAN BE ENTERED IN MENU FORM. Avoid packages which require a form of programming to perform this type of testing.



Software Evaluations

A Discussion of the Methodology Used for Microcomputer Software Evaluation

- **Report format definition**—like screen definition, this should be menu-driven and well supplied with default values so that a simple "list file" report should take only a moment to define. A second level of reporting, using the programming-language concept, may be helpful in special situations if well controlled. Valuable report features include column placement and width definition, column headings, pre-sorting of data, totals based on changes in values of key fields, and decoding of coded values via table. Program-driven report features are more forgivable than programming in other areas, as database contents are not affected.
- **Sort/merge capabilities**—the ability to extract, sort, and combine information, involving multiple data files, is an advanced feature. Sorting a database has processing implications which sorting a report does not, and the facility should be controlled if available. Extraction and sorting as a preliminary to transmission of data to a data center system may justify the use of these features.
- **Query/selection capabilities**—these are best if offered in menu form so beginners can use them. Query in the form of a structured language, containing no processing features, is acceptable but will require more training to use. Programming languages which support query and processing should be regulated as programming functions.
- **Programming and batch processing capabilities**—definitely features to be considered only if the application conforms to corporate goals on user programming control. The potential for destructive errors inherent in these features are considerable, and specific file backup and integrity controls MUST be implemented if they are to be used. If you MUST have such features, look for a language structure which forces IF-THEN-ELSE conditional blocks and is not so terse that programs cannot be understood and maintained. Some systems may offer a limited menu-generated language.

There are three rules to follow with database programs in a corporate environment: certify the application, select the package which will best serve the immediate need and reasonable extensions, and CONTROL any growth.

Data Management Scoring Guidelines

Environment (1 to 10)	Points
Two disks and 64K bytes of memory required for configuration.....	5
If the system will operate with a single drive.....	2
If program uses 128K bytes of memory	1
For each 128K byte memory block beyond the first 128K.....	-1-2
Use of non-standard operating system	-2
Documentation (1 to 10)	Points
Reference and tutorial manual/diskette available	3
If tutorial manual includes sample programs	1
If tutorial manual teaches by successive examples	1
Commands grouped by function in manual (e.g. Creating a screen for entry, adding records, etc.)	1

Description of syntax of all commands in the manual with each parameter or field explained	1
Examples of each command structure	1
Technical explanation of file structure.....	1
Explanation of data format within files.....	1

Functionality (1 to 10) See scoring method at end of this section

- File maintenance functional area:
- Ability to design data entry screens
 - Definition of input field data types with editing for proper data
 - Ability to define a record with a large number of fields
 - Field size limits of 255 or more characters
 - Ability to define where the field prompt and entry will appear on the entry form
 - Ability to access any record entry entered by record number or by a key, and to locate a record or group of records by the contents of its fields
 - Delete records with confirmation
 - Multiple record key support and multiple key fields
- Report Generation functional area:
- Automatic totalling
 - Control break recognition with subtotals
 - Column heading specification including multiline headings
 - Specification of column width or override to field or heading size
 - Support for various page sizes and margins
 - Detailed program support of report formats which are not standard columns
 - Ability to print mailing labels or invoices
 - Ability to send reports to CRT or printer
- Special programming functional area:
- Capability to test field values and to maintain internal data areas or indicators
 - Support for all forms or arithmetic
 - Ability to access and test portions of alphabetic fields and to search through an alphabetic field looking for a specific character
 - Presence of sort feature
 - Ability to copy and merge files
 - Ability to add a field to a file already entered
 - Ability to select data from a data base file to produce another file with a different structure or a non-database file

FROM 0 TO 3 POINTS ARE GIVEN IN EACH FUNCTIONAL AREA DEPENDING ON THE NUMBER OF FEATURES PRESENT. 1 ADDITIONAL POINT IS GIVEN IF A PACKAGE HAS SIGNIFICANTLY MORE FEATURES IN AT LEAST TWO AREAS.

Ease of Use (1 to 10)	Points
English-like command structure	2
Logical command names	1
Free form command entry on multiple lines	1
Position of error in the command is pointed out (e.g., "Syntax Error—Expected Data Name, Found "the" and not merely ("Command Rejected")	2
Ability to edit errors in commands	1
Ability to save/invoke groups of commands.....	2
Help function available	1



Software Evaluations

A Discussion of the Methodology Used for Microcomputer Software Evaluation

Support (1 to 10)	Points
Designated customer support personnel.....	1
800 telephone number	1
Regional or local support	1
Online assistance	1
Formal problem reporting system	1
User notification or new releases	1
User discount on new releases	1
Free updates to users for problem correction	1
Retailer authorized to provide update	1
Update frequency 12 months or less	1

System Interface (1 to 10)	Points
If database file structure is defined for reference by programs written in other languages	2
If file structure is designed for reference by programs written in other languages	1
Capability to produce files in non-database format from the database package	2
Capability to read files in non-database format and generate database files	2
Integration with at least one mainframe program for file exchange	2
Guidelines for exchange of data provided.....	1

Vendor Experience (1 to 10)	Points
Vendor in business 3+ years	2
or	
Vendor in business 2-3 years	1
100 to 1,000 packages installed	1
or	
1,001 to 10,000 packages installed	2
or	
10,001+ packages installed	3
Product first installed 24+ months ago	2
or	
Product first installed 12-24 months ago	1
New and untried supplier	0
Known major vendor (1 = 1 major product in marketplace; 3 = well-known management team and software developers on the staff)	1-3

DIVIDE TOTAL BY 1.5 TO ARRIVE AT SCORE

□ Graphics Features

Graphics Program Features will vary considerably depending on whether the program is intended to graph data presented in numeric form or to permit the development of visual aids such as slides. In our reports on graphics programs, we highlight the major features of the package rather than categorize the features into a fixed form.

Numeric graphics packages should support a useful form of input and deliver a flexible output. Direct entry of data into the package is needed for ad hoc graphs, but an interface to a spreadsheet program or other source of columnar data is necessary for any serious decision support applications. Output formats should include the popular pie, bar, and line formats. All must have title, label, and scaling flexibility in addition to the ability to select colors or hatching patterns. Numerical analysis features and special graphs such as histograms or scatter distributions are useful for advanced statistical functions, but generally not needed for decision support systems. Hard copy output via

a good selection of printers and plotters should be considered a requirement, even if the initial application does not require it.

Drawing and lettering support systems should support multiple input media such as keystrokes, a mouse, a drawing tablet, light pen, etc. Text should be fully selectable in size and tilt, and multiple fonts are very desirable; look for a system which can replace the popular KROY lettering machine. Images created by such a package should be stored to disk with the option to replay according to a script which defines both sequence and display time. "Dark intervals" should be supported. Another useful feature is a library of shapes such as circles, ellipses, etc. These will facilitate complex drawings by the unskilled, and make professional slides more easily achieved even by graphics experts.

Graphics Scoring Guidelines

Environment (1 to 10)	Points
If package runs with the operating system and a display optional from the computer vendor	3
If standard display can be used	2
If support provided for popular pen plotters (1 = support of 1 pen plotter; 2 = support for 2 or more)	1-2
If support provided for printers with graphics capability (1 = support for 1 printer; 2 = support for 2 or more)	1-2
Color graphics capability	1
For spreadsheet graphics: if graphics are callable from spreadsheet.....	1
For image graphics: if graphics will accept non-key input such as graphic tablet or mouse	1
Non-standard operating system.....	-1

Documentation (1 to 10)	Points
For spreadsheet graphics:	
Every graphic option illustrated (0 = no illustrations; 3 = every option clearly illustrated)	0-3
Tutorial diskette	1
External device operation explained	1
Explanation of relation of graphics to spreadsheet	2
Explanation of how to select graphics options depending on the way in which information is to be used	2
Ability to manipulate graphics image in size, scale, etc. without changing the spreadsheet	1
For image graphics:	
Every graphic option illustrated (0 = no illustrations; 3 = every option clearly illustrated)	0-3
External device operation explained	1
Tutorial and reference manual	2
Demonstration program in tutorial	1
Tutorial diskette	1
Quality of help in design concepts (0 = no help; 2 = help with what to avoid, what color mixes are best, how much information is helpful on a screen)	0-2

Functionality (1 to 10)	Points
For spreadsheet graphics:	
Pie chart graph support.....	2
Line graph support	2
Bar chart support.....	2
Ability to specify axis headings	1



Software Evaluations

A Discussion of the Methodology Used for Microcomputer Software Evaluation

Functionality (1 to 10) continued	Points
Ability to define maximum value on each axis...	1
Ability to specify the scale of the chart.....	1
Automatic color selection with manual override	1
For image graphics:	
Ability to draw free-form images.....	0-2
Ability to generate geometric shapes at various points and at specified sizes.....	0-2
Ability to change colors and to fill in spaces with color.....	0-2
Variety of palette colors.....	0-2
Variety of text sizes and fonts.....	0-2
Multiple axes for text.....	0-2
Ability to change the entire screen or individual portions in scale or aspect ratio.....	0-2
Ability to enlarge portions of a drawing as a separate image.....	0-2
Ability to combine images.....	0-2
Ability to sequence images with a preset interval between images.....	0-2
Support of image erasure by "overlying".....	0-2
Support of global color change.....	0-2
SUM POINTS AND DIVIDE BY 2.4 TO ARRIVE AT THE FINAL SCORE FOR IMAGE GRAPHICS	

Ease of Use (1 to 10)	Points
For spreadsheet packages:	
Method of invoking (5 = if graphics is invoked from spreadsheet package; 4 = if graphics is called separately).....	4-5
Ability to override graph type, scale, and color defaults.....	2
Menu-driven command structure.....	2
Help capability.....	1
For graphics packages:	
Mouse input.....	2
Joystick input.....	2
Data tablet input.....	2
Menu structure for commands.....	1
Keyboard drawing by cursor control.....	1
Ability to draw lines by specifying direction/length.....	1
Ability to draw figures by specifying size/location	1

Support (1 to 10)	Points
Designated customer support personnel.....	1
800 telephone number.....	1
Regional or local support.....	1
Online assistance.....	1
Formal problem reporting system.....	1
User notification of new releases.....	1
User discount on new releases.....	1
Free updates to users for problem correction.....	1
Retailer authorized to provide update.....	1
Update frequency 12 months or less.....	1

System Interface (1 to 10)	Points
For spreadsheet packages:	
Ability to graph spreadsheet data (0 = package will graph only a limited set of spreadsheets; 5 = package will graph normal spreadsheets).....	0-5
Capability of package to work with multiple spreadsheet programs.....	2

Ability of package to work with other types of programs with instructions for such use (1 = limited ability to work with other programs; 3 = more complete ability to interact with other programs)		1-3
For graphics packages:		
Support of Tektronix graphics protocol.....		2
Support of Hewlett-Packard graphics protocol...		2
Support of IBM color 3270 graphics protocol....		2
Support of NAPLPS videotex graphics protocol		2
Quality of instructions on the use of the graphics data with other non-supported hardware (0 = very little instructions; 2 = thorough instructions with potential trouble areas highlighted).....		0-2

Vendor Experience (1 to 10)	Points
Vendor in business 3+ years.....	2
or	
Vendor in business 2-3 years.....	1
100 to 1,000 packages installed.....	1
or	
1,001 to 10,000 packages installed.....	2
or	
10,001+ packages installed.....	3
Product first installed 24+ months ago.....	2
or	
Product first installed 12-24 months ago.....	1
New and untried supplier.....	0
Known major vendor (1 = 1 major product in marketplace; 3 = well-known management team and software developers on the staff).....	1-3
DIVIDE TOTAL BY 1.5 TO ARRIVE AT SCORE	

□ Communication Features

Communication Product Features may be vital to many corporations because they represent a way to combat data isolation in a PC environment. Users should never attempt to select such products without the assistance of the data center communication specialists, or incompatibilities may arise.

Key communication features are:

- **Type of product**—the most common microcomputer product for communication is the so-called "dumb terminal emulator" or "TTY emulator". This is a program designed to respond as a very primitive teleprinter, and usually recognizes only carriage return and line feed commands. Such a program will do many different things, and support a surprising number of host connection types. The support will almost certainly require some customization at the host interface, however, and a second product class, the TERMINAL EMULATOR may serve better. This allows the PC to emulate a popular CRT terminal; the DEC VT100 or the IBM 3101 are the preferred targets. A product such as this will allow the PC to replace a terminal of the emulated type with no changes at the host end of the connection. A final product is the integrated communication system, designed to join software elements at both ends of the circuit to facilitate a more free exchange of data. Integrated systems usually do one particular exchange task (such as interface



Software Evaluations

A Discussion of the Methodology Used for Microcomputer Software Evaluation

between a PC database program and a similar mainframe program) very well, but little else.

- **Target host computer**—most terminals are designed for use with a particular computer, and thus most emulators have a preferred partner. Having a correct product for the target system assures a minimum of connection difficulty, but some changes may still be required in communication option selection if terminals of the type emulated are not already installed. Conversely, most host systems can be MADE to support nearly any terminal if the effort is justified.
- **Protocol**—most communication programs for microcomputers support a basic asynchronous protocol using the ASCII code set. Other products which support synchronous protocols such as IBM Binary Synchronous (bisync) or IBM's SNA will commonly be associated with custom hardware interfaces. It's best to stay basic unless a data center specialist says otherwise.
- **Data rates supported**—this may not be important for communication via modems over phone lines, since this type of exchange is typically limited in speed by the modem used. Most microcomputers operate at 1200 bps over phone lines. Directly connected to computers via RS-232 cables, many systems can operate to 9600 bps or higher, if the software product will support it. Reliability at high speeds may be questionable, particularly if the vendor has few customers who use the product that way. If a product does not claim support of high speeds, believe the claim. If they do claim it, they MAY be correct. It's best to test anything over 4800 bps if that speed is required for the application.
- **Format conversion features**—some products will include "utility programs" to convert the structure of popular microcomputer files to a form suitable for use on the target system, or at least to a form more easily accommodated. These are a plus if available, and if a product is said to possess a utility to convert, for example, DIF files for transmission to a target host, it probably means that some conversion IS required and thus should be looked for in alternative packages.
- **Automatic setup features**—these permit the storage of communication dialing commands, setup parameters, and other sequences of instructions to simplify the operation of the product for unskilled users. Another variation on this facility is the ability to generate a sequence of transmitted characters by pressing a single "function key". Both capabilities will make the package easier to use and will reduce the number of connections or data transfers aborted due to operator error.

Communications Scoring Guidelines

Environment (1 to 10)	Points
If system will run on the normal configuration of the target computer	5

If package runs with normal operating system	2
Ability to utilize additional memory to improve performance	1
If all hardware is supplied by the computer vendor	2

Documentation (1 to 10) Points

For Communication link:	
If documentation defines communication terms and explains the various communications options, modems, etc. which are associated with the package	1
If detailed explanation of setup of the communication line is included	1
If errors and problems which might be encountered are outlined and explained	1
For Local Operation:	
Description for loading and running the program	1
Description of mapping of "target terminal" keys to the PC keyboard	1
Description of comparative operating procedures	1
For Remote System Operation:	
If documentation defines the setup required at the remote system or systems	1
If error conditions of the remote system are related to the local package operation	1
Tips on using the remote system to diagnose problems on the connection	1
If package explains how to use the package message to diagnose and current problems with the communication path or the remote system setup	1
Tutorial diskette	1

NOTE: IF THE MAXIMUM OF 11 POINTS IS AWARDED, THE FINAL SCORE WILL BE TRUNCATED TO 10.

Functionality (1 to 10) Points

For Terminal Emulation programs:	
If all host messages to the terminal are handled correctly (0 = host messages are not handled; 3 = all host messages are handled accurately and thoroughly)	0-3
If local status displays available at the emulated terminal are available	1
If data entry and normal function keys of the terminal emulated are available (0 = no keys are available; 3 = most keys are available)	0-3
If data entry and normal function keys are mapped one for one to a PC key	1
If package can support the popular communication options for the target terminal by operator selection	1
If any test and diagnostic capabilities provided by the target terminal are also emulated	1
For Transparent File Transfer Packages:	
Ability to receive data into a file	4
Ability to send data to a file	4
If option is available to strip received data of display control information	1
If transmitted data can have display and protocol data appended to it before sending	1
For Programmed File Transfer Programs:	
If downward file movement supported	3
If upward file movement supported	3



Software Evaluations

A Discussion of the Methodology Used for Microcomputer Software Evaluation

Functionality (1 to 10) continued	Points
If package will provide error detection and correction	2
If communication overhead of the package is low (less than 20%).....	1
If program can recognize an attempt to use it without a compatible partner at the other end	1

Ease of Use (1 to 10)	Points
Ease of setting up connection (0 = difficult to set up; 3 = detailed explanation available in set up including description of any special procedures on the other system, if any)	0-3
Ease with which an operator trained in the use of the target terminal would adjust to the new package (0 = no similarity; 3 = many similarities between the target terminal and local facilities)	0-3
Ease with which non-emulator functions can be invoked (0 = difficult emulation; 3 = product can switch from emulator mode to command mode easily and return in context).....	0-3
If the package allows the user to escape from the communication circuit to gain access to function menus or help documentation	1

Support (1 to 10)	Points
Designated customer support personnel.....	1
800 telephone number	1
Regional or local support	1
Online assistance	1
Formal problem reporting system	1
User notification of new releases.....	1
User discount on new releases	1
Free updates to users for problem correction	1
Retailer authorized to provide update	1
Update frequency 12 months or less.....	1

System Interface (1 to 10)	Points
Support of asynchronous, bisynchronous 3270 interface, SNA 3270 interface, or 2780/3780 protocols	5
Support of multiple code sets (e.g., ASCII, EBCDIC)	2
Support of transmission speeds from 1200 to 9600 bps.....	2
If product can share a line with other devices	1

Vendor Experience (1 to 10)	Points
Vendor in business 3+ years	2
or	
Vendor in business 2-3 years	1
100 to 1,000 packages installed	1
or	
1,001 to 10,000 packages installed	2
or	
10,001+ packages installed	3
Product first installed 24+ months ago	2
or	
Product first installed 12-24 months ago	1
New and untried supplier	0
Known major vendor (1 = 1 major product in marketplace; 3 = well-known management team and software developers on the staff)	1-3

DIVIDE TOTAL BY 1.5 TO ARRIVE AT SCORE

The section which follows contains a series of software product reviews which were completed and formatted as described above. Users will find that the exploration of software alternatives using these reviews will reduce the time required to evaluate microcomputer software, the time expended by key personnel, and the cost of acquiring packages for evaluation. More important, it will make it possible to accelerate the corporate evaluation of products for company-wide use, eliminating the dilution of corporate standards by purchases which, because of real business requirements, could not wait for a long review process.

• END