



Communications Research Group BLAST

General Purpose Communications

■ PROFILE

Function • general-purpose communication package for computer-to-computer communications using asynchronous interfaces and modems.

Computers/Operating Systems Supported • IBM PC, PC/XT, and other 8088/8086 systems using PC-DOS, MS-DOS, or CP/M-86; Apple II and IIe; 8080/Z80/8085-based systems using CP/M-80; Data General computers using DOS, RDOS, ICOS, MPOS, AOS, or AOS/VS; DEC VAX computers using VMS 3.0; IBM mainframes under VM/CMS or MVS/TSO; other micros, minis, and mainframes.

Configuration • IBM PC version requires a minimum of 64K bytes of memory and one disk drive, an asynchronous card, a communications modem, and a display device.

Current Version/Version Reviewed • Version 4.4 for Data General; current LP/M version is 5 and 6/Revision 6.1 on an IBM PC.

First Delivery • late 1981.

Number of Installations • information not available.

Comparable Products • Microstuf CrossTalk XVI, IBM's ASYNCH, Headlands Press PC-TALK III.

Optional Associated Hardware • BLAST BOX half-duplex interface.

Price • \$250 retail price.

Vendor • Communications Research Group, Inc.; 8939 Jefferson Highway, Baton Rouge, LA 70808 • 504-923-0888.

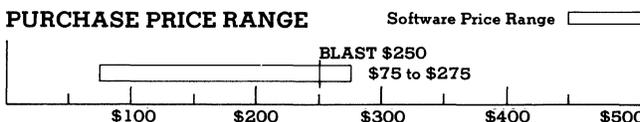
Canada • currently no distributors in Canada.

■ ANALYSIS

BLAST stands for BLocked ASynchronous Transmission. It is a general-purpose communications package for use on inexpensive, low-speed asynchronous communications hardware connected via the dial-up telephone network. It was designed to provide high throughput and utilization efficiency of these low-speed lines, reducing the connect cost while providing a high level of resistance to transmission errors common to dial-up telephone lines.

BLAST is an ideal package for environments that require a lot of transfer of information between computer systems. It provides a reliable, low-cost, high-throughput mechanism for data transfer. It is particularly well suited for mixed system environments, with versions available for practically any computer system. Though it includes dumb

PURCHASE PRICE RANGE



COMMUNICATIONS RESEARCH GROUP BLAST PRICING • open bar shows the typical range of prices for COMMUNICATIONS software used in a corporate environment • the vertical line within the bar graph indicates the price of BLAST, the evaluated product, relative to the price range of similar products.

PRODUCT QUALITY RATINGS*

	1	2	3	4	5	6	7	8	9	10
ENVIRONMENT	████████████████████									
DOCUMENTATION	██████████████									
FUNCTIONALITY	████████████████████									
EASE OF USE	██████████████████									
SUPPORT	██████████████████									
SYSTEM INTERFACE	████████████████████									
EXPERIENCE OF VENDOR	██████████████████									

*For an explanation of rating criteria, please refer to the Communication Features section in the Software Evaluations (805) report.

terminal emulation capabilities, this is an adjunct to the other services provided. Small system users primarily requiring terminal emulation with only occasional file transfer needs will find other programs more suited to their use in terms of both price and capabilities.

□ Strengths

The greatest strengths of BLAST are in the accomplishment of its initial goals: reliable and efficient throughput using dial-up lines. Its use of blocked asynchronous transmission over full-duplex lines provides much higher throughput than is typically available from other protocols, particularly ones using the "ACK-NAK" method of transmission acknowledgement. Use of full-duplex lines also allows for the simultaneous transmission and reception of data, further increasing overall throughput. High throughput using asynchronous equipment means cost savings over high-speed hardware and lines, while minimizing the connect-time charges of slower-speed equipment.

BLAST combines high throughput with a very high degree of reliability through the use of a CRC algorithm for computing block check characters and selective block retransmission in the event of errors. More reliable block framing is implemented through the use of a bit-oriented encoding technique similar to that used in the SDLC protocol. In addition, file transmission procedures may be configured to automatically reestablish and continue file transfer operations in the event of line failure.

The other strength to be mentioned is the large number of systems for which BLAST is available. Versions have been created for practically all microcomputers, minicomputers, and mainframes available. This allows the sharing of information within almost any end-user system configuration.

□ Limitations

The main limitation of BLAST is the lack of documentation providing an organized approach to the installation and



Communications Research Group BLAST General Purpose Communications

use of BLAST tailored for the communications novice, and particularly for the personal computer user. Most of the literature received with the package consisted of detailed technical information on protocols used, error detection and correction strategies, how to build modem cables and strap modems, and how to measure line utilization and efficiency rates. This is probably very useful information for mainframe and minicomputer shops where systems managers are paid to worry about such things, but is of limited interest to the personal computer user wishing to simply access or transfer information between his system and some other. The Operator's Guide for MS-DOS systems is too brief and somewhat randomly organized.

Another disadvantage that applies primarily to the personal computer user is its inability to support half-duplex communication. BLAST can only communicate in 8-bit full-duplex mode. For users of large systems that use half-duplex or must communicate with systems that do, a BLAST BOX protocol converter is available. The BLAST BOX is inserted into the comm line of the mainframe computer between the computer and its modem, and converts messages to and from BLAST protocol for the mainframe. This is a simple and relatively inexpensive solution for large system users that wish to communicate with other BLAST-using systems. However, there is no easy solution for the personal computer user who needs to communicate, even if just for terminal emulation, with a half-duplex system that does not have a BLAST BOX. The user must purchase one of the other asynchronous communications packages in addition to BLAST for this purpose, making it a less attractive alternative.



■ HANDS-ON EVALUATION

BLAST is delivered for the IBM on 1 single-sided floppy disk. The program may be backed up or installed on a hard disk using standard copying procedures. It is delivered ready for use on an IBM PC, using the generic modem interface.

The first reference to the installation procedures was found on the fourth page of the Operation's Guide, during the discussion of terminal emulation. The BLAST executable may be configured for certain modems or comm ports through the use of an INSTALL control file. After copying the DOS LINK program to the BLAST disk, the user invokes the INSTALL control file with the names of each driver desired. We reconfigured the program to use the Hayes modem driver. No difficulties were encountered.

After installation, the program was run on two IBM PCs, both using Hayes Smartmodems. After some experimentation with trying to get the system to select a line on a multiline office phone system, we discarded the idea and we hooked the two systems up to 2 separate, single-line phone lines. One system was put in auto-answer mode, and the other used to call the first. Unfortunately, the first system refused to answer the call. When repeated attempts produced the same result, we took a break waiting for inspiration. Upon picking up the manual during the break and flipping through the remaining chapters, it was discov-

ered that the last chapter, number 6, contained explicit switch settings for each modem supported, including the Hayes. A quick check showed the auto-answer switch disabled. A slightly more organized manual would have shortened the start-up time significantly.

From this point on, the program performed as expected. The menu system leads the user through the different functions available. The only difficulty in using the menus was caused by the fact that sometimes a cursor return is required following the number typed, and other times not. Also, in some instances a cursor return alone will suffice for the selection of option zero, and at other times not. These problems are caused by the well-intentioned attempt to reduce the keystrokes required by the user when the number of options available can be expressed as a single character. This would be reasonable if all menus contained single character options, which can easily be accomplished by lettering the options instead of numbering them. But BLAST mixes the two menu types in what appears to be an indiscriminate manner. This eventually causes many more keystrokes to back out of an option selected accidentally by hitting cursor return when it wasn't needed.

□ User Interface

The BLAST user interface consists of a simple menu system where the user enters the number of a particular action desired. File transfer operations may be accomplished via the menu system, entered interactively as transfer commands, or executed from a command file for unattended operation.

Menus: The menu system used by BLAST consists of a numbered list of all of the options available at a given point. Selection is done by typing the number of the option desired. If less than ten options are available, the program does not wait for the cursor return. If more than ten are listed, the user must supply a cursor return, an unfortunate inconsistency. Options that require user input explicitly prompt for the necessary information.

Control Characters: Control characters are not used as commands per se in BLAST. Control-K followed by "m" is used during terminal emulation and auto-answer mode to signal BLAST to return to menu operation. Otherwise, control characters are passed on to the host during terminal emulation.

Function/Special Keys: BLAST does not contain any function key or special key usage.

Command Language: A simple command language exists for specifying file transfer operations to specify the source and destination file names. These commands are intended primarily for use within command files for unattended file transfer functions, but can be used by the experienced user interactively.

Positive Feedback: Aside from obvious on-screen changes as a result of a particular command, BLAST provides little positive or negative feedback. During file transfer mode, a measure of the line quality is displayed. Other option selections vary in their response time and feedback information.



Communications Research Group BLAST

General Purpose Communications

Status Display: No status display is provided except for the display of the line quality during file transmission.

Help Facilities: BLAST contains no help facility.

Environment

For users who have the need to transfer information between radically different types of computer environments, BLAST should be welcome. It has been implemented on most microcomputers, minicomputers, and mainframes. Single task implementations exist for micro and personal computer implementations, and require 64K bytes of memory on most systems. Full multitasking implementations exist for mainframe computers.

The IBM PC version also includes four separate modem drivers and two communication port drivers. Special-purpose modem drivers are provided for using the Hayes Smartmodem, the Bizcomp 1012 modem, and the Vadec 212PA modem. The fourth modem driver is a generic version for interfacing with other general purpose modems. The two comm port drivers allow BLAST to be used with COMM Port 1 or COMM Port 2 on the IBM PC.

Documentation

The BLAST documentation consists of two small, spiral bound 8.5 x 11 notebooks, printed on one side. One is a Technical Overview of BLAST, and contains protocol information, software structure information, the calling sequences for the user-callable protocol generator, and numerous test report and analysis data. It contains a few block-structure diagrams of the communications software and operation, and some data graphs of the analysis data.

The second binder is the BLAST Operator's Guide for MS-DOS systems. It is a poorly organized manual that is best read from back to front. It contains the BLAST installation procedures (Appendix A), information on switch settings for particular modems (Chapter 6), and instructions on the actual usage of BLAST (Chapters 1-5). The information contained is fairly brief and to the point, and assumes a fair amount of familiarity with communication jargon. A lot of detailed technical information is included, such as how to wire your own RS-232 interface cable for connection to a communications port, with no guidance as to what parts are actually necessary for the novice to understand. It contains no menu displays, charts, or pictures of any type.

All in all, the BLAST documentation has not received the same level of attention as have the technical aspects of the program itself. It would greatly benefit from a well-organized manual with step-by-step instructions for the novice separated from the technical detail for the experts.

Functionality

The major goals of BLAST are to provide reliable throughput under worst-case line quality and transmission delay conditions, to provide the ability to transmit 8-bit binary data in addition to 7-bit text, and to provide a high level of throughput and utilization efficiency. BLAST stands for BLocked, ASynchronous Transmission—the protocol used to accomplish all of these goals. Data is divided into blocks, and transmitted using a full-duplex sliding-window block

acknowledgement mechanism that provides high throughput even in the face of block transmission errors. Each file block can be individually accessed, so that if a block transmission failure occurs, only the affected block is retransmitted.

In addition to binary and text file transmission facilities, BLAST also allows for host terminal emulation facilities. No attempt is made to emulate any special version of the terminal. All control characters are echoed to the host, and vice versa. Files may be transmitted as command sequences to the host computer, using the XON/XOFF protocol, or terminal entry may be made interactively. Incoming data may be captured and saved to disk. In terminal mode, no data file verification is done. Local file management functions may be accomplished by leaving and returning to terminal emulation mode. This allows the execution of such functions as directory inquiries, file copying, and file deletion without breaking an established phone connection.

Communication parameters are specified via a configuration menu. The menu contains all information necessary to establish a communications link with another system, including phone number, baud rate, special function key assignments, and logon procedure. Configuration menus may be saved into disk files and called back for later usage.

The file transfer capability can also be operated as an unattended function through the use of transfer command files. Command files specifying explicit file transfer operations that are to occur can be created, saved on disk, and recalled for later use. Command files may be invoked automatically by specifying the command file name in the configuration menu, or manually by entering the command file name interactively during file transfer mode.

Included as part of the BLAST system is a user-callable BLAST protocol generator. This is an object module containing a set of routines that can package data received and transmit it using the BLAST protocol. The documentation includes the explicit routine calling sequences necessary for use by an end-user application package.

Ease of Use

The ease of bringing up BLAST and establishing communications for the first time is a direct function of the user's familiarity with a communications environment. Due to the technical and promotional nature of the documentation provided, novice users will have difficulty sorting out the organizational information needed, and will encounter many pitfalls with the hardware, wiring, switch setting, and overall configuration initialization. Experienced communications personnel will know what to look for in the documentation, will spend the time to find it, and should not encounter any real difficulties. This overall lack of an organized approach to communications for the non-expert user is the biggest weakness in an otherwise very useful product.

As soon as the one-time initial setup process is complete, use of BLAST becomes a simple and straightforward operation. Easy-to-use menus display the various function options available for selection, and lead the user through to



Communications Research Group BLAST

General Purpose Communications

the desired operation. Configuration files detailing particular communications links can be created and saved, simplifying the operation even more.

Through the use of configuration files and file transfer command files, a system may be constructed that is very simple to operate, even for the performance of complex file transfer applications. This allows use of the system by novice users once the environment is established by an experienced communications person or one who has taken the time to decipher the documentation.

Support

Support is provided for registered purchasers through the main corporate phone number, 504-923-0888. A warranty period of one year provides for free bug-fix releases in the event of problems. There is also a reduced-fee plan for the purchase of enhancements.

System Interface

Versions of BLAST for practically all major microcomputers, minicomputers, and mainframes have been implemented, allowing file transfer operations to and from almost any configuration. Automatic text file format translation is done by each version at its host. Binary files may also be transmitted.

Besides file transfer operations, a BLAST system may perform simple dump terminal emulation for any system operating with a full-duplex interface. No special terminal-brand emulation is performed, and no half-duplex terminal emulation interface is provided.

Vendor Experience

Communications Research Group, Inc was incorporated as a separate entity in 1982. It is a subsidiary of Data Systems in Baton Rouge, which has been in existence since 1973. BLAST has been available as a product for over two years now, the first customer shipment occurring in late 1981.

■ PRODUCT OVERVIEW

Terms & Support

Terms • BLAST is available for purchase only from Communications Research Group, Inc. through computer dealers, software dealers, and mail-order firms throughout the U.S. and internationally; quantity discounts are available to volume corporate purchaser.

Support • support is provided for registered purchasers through the main corporate phone number, 504-923-0888; a warranty period of one year provides for free bug-fix releases in the event of problems; there is also a reduced-fee plan for the purchase of enhancements.

Component Summary

BLAST for the IBM PC is provided on one single-sided floppy disk containing the following files: BLAST.EXE is the main BLAST

LCNS: license fee.

executable file; INSTALL.BAT is an installation control file for customizing the BLAST executable with the proper modem and communications port drivers; GMODEM.OBJ is a generic modem driver; BMODEM.OBJ is a Bizcomp 1012 modem driver; VMODEM.OBJ is a Vadic 212PA modem driver; HMODEM.OBJ is a Hayes Smartmodem driver; TRMEM is a dumb terminal emulator; CM1DVR.OBJ is a communications driver for comm port 1; CM2DVR.OBJ is a communications driver for comm port 2; and *.OBJ contains other object modules necessary to re-link BLAST.EXE.

Micro Version:

\$250 lcns

Mini Version:

495

Mainframe Version:

845

Computers & Operating Systems Supported

Versions of BLAST are available for all of the following systems: IBM PC, PC/XT, and other 8088/8086 systems using PC-DOS, MS-DOS, or CP/M-86; Apple II and IIe; 8080/Z80/8085-based systems using CP/M-80; Data General computers using DOS, RDOS, ICOS, MPOS, AOS, or AOS/VS; DEC VAX computers using VMS 3.0; IBM mainframes under VM/CMS or MVS/TSO; other micros, minis, and mainframes.

Minimum Operating Requirements

The IBM PC version of BLAST requires a minimum of 64K bytes of memory and one disk drive, an asynchronous card, a modem, and a display device.

Features

Type of Product • BLAST is a general-purpose communication package for computer-to-computer communications using asynchronous interfaces and modems; it provides file transfer facilities, or terminal emulation capabilities.

Target Host Computers • BLAST is available on most microcomputers, minicomputers, and major mainframe computers; it can provide terminal emulation capabilities for any system using 8-bit full-duplex communications.

Protocol • 8-bit, full-duplex asynchronous transmission.

Data Rates Supported • from 110 to 19200 bps.

File Transfer Functions • both 7-bit text files and 8-bit binary files may be transmitted to or from a BLAST system, either interactively or unattended.

Format Conversion Features • when transmitting text files between two computers running BLAST, the BLAST program at each end will perform all text file conversion necessary, allowing text file transmission between micros and mainframes.

Automatic Setup Features • configuration files may be defined and saved on disk containing all details of a particular communications link; phone number, baud rate, logon sequence, etc; command files may also be created and executed from either end of a communications link.

Activity Logging • BLAST automatically generates a log of all files and console commands transmitted and received, and all error messages generated.

Other Facilities

Included in the BLAST package is a set of user-callable facilities that allow the end user to implement the BLAST protocol in his own applications.

• END



Comprehensive Software Support DB Tutor Database System Tutorial Package

■ PROFILE

Function • computer-aided instruction on database manipulation.

Computers/Operating Systems Supported • IBM PC and PC/XT with PC-DOS.

Configuration • single disk drive, which may be double-sided or single-sided; any form of 80-column monitor is satisfactory; no memory requirements are stated.

Current Version/Version Reviewed • Version 1.0/Version 1.0.

First Delivery • December 1983.

Number of Installations • information not available.

Comparable Products • no known major comparable products; vendor claims first generic database tutorial.

Optional Associated Software • none.

Price • \$95 retail price.

Vendor • Comprehensive Software Support; 2316 Artesia Boulevard, Suite B, Redondo Beach, CA 90278 • 213-318-2561.

Canada • Distributors: Citation Software; 1062 Portage Avenue, Winnipeg, Manitoba R3G 0S3; 800-352-1381 • CompuServe; 1675 West 8th Street, Vancouver, BC V6J 1V2; 800-848-4455.

■ ANALYSIS

Database products can be among the most valuable PC software products available to business users, but their use by non-programmers is often restricted by lack of understanding of the concepts of databases and their application to business problems. A tutorial to define database concepts and acquaint users with the operation of some popular database systems is therefore potentially very useful.

DB Tutor is such a program. It offers the user a look at database systems and their terms and jargon, and goes into several popular packages. Through the use of computer-aided instruction, a beginner is given a reasonable grounding in the principles of database systems and a chance to try a simple problem in 3 different database programs. The technique employed is sound, and the examples of database applications are particularly good. The only limited flaw in the product is an apparent lack of understanding of some of the basic database terms—dBase II is called a "relational database" because it relates 2 files. Not only is dBase II not a relational product, the definition of a

PRODUCT QUALITY RATINGS*

	1	2	3	4	5	6	7	8	9	10
ENVIRONMENT	████████████████████									
DOCUMENTATION	██████████████████									
FUNCTIONALITY	████████████████████									
EASE OF USE	████████████████████									
SUPPORT	██████████									
SYSTEM INTERFACE	-									
EXPERIENCE OF VENDOR	██████████									

*For an explanation of rating criteria, please refer to the Software Evaluations (805) report.

relational database system as one that relates multiple files is not totally correct.

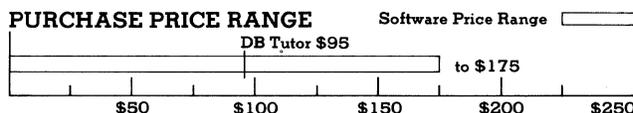
While one might question the wisdom of using a tutorial that provides inaccurate information, the definition flaw is minor in the scope of the package, and users who want an exact definition of relational versus hierarchical databases may find such a definition easily in reference material. What they frequently cannot find is hands-on experience with several packages and an introduction to database concepts in a real business environment. DB Tutor provides that, and for that benefit alone a few lapses can be forgiven in terminology.

□ Strengths

Nowhere is learning by doing more important than in the area of database programs. These packages often bridge the gap between simple canned application programs which are designed to do one basic task, and programming languages, which support the creation of many different applications. DBMS programs are probably the most powerful software a user organization can justify learning. When used in conjunction with actual documentation on the databases shown, DB Tutor can take a user from basic concepts to actual dBase II programming.

DB Tutor is highly interactive, and offers the user plenty of opportunity to reinforce acquired skills through review questions. The data entry by the user in response to questions is validated, and a congratulatory or sympathetic message is displayed, as appropriate. It is difficult to lose interest unless the entire topic of database is so inherently uninteresting that the course should never have been started.

The preliminary introduction to several popular databases is followed by a more detailed tutorial on a limited example of a database system called "PC BASE." This product actually has enough functionality to be usable in a live environment, but it is primarily designed as a vehicle for



COMPREHENSIVE SOFTWARE SUPPORT DB TUTOR PRICING • open bar shows the typical range of prices for TRAINING software used in a corporate environment • the vertical line within the bar graph indicates the price of DB TUTOR, the evaluated product, relative to the price range of similar products.



Comprehensive Software Support DB Tutor Database System Tutorial Package

imparting further database skills through minimally supervised exploration. PC BASE lets a user play with a database system, learning the strengths and weaknesses, and thus becoming more capable of judging and using complex commercial products.

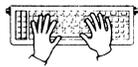
Limitations

There are some regrettable lapses in terminology in the tutorial, the most startling being the definition of relational databases, and to a lesser extent, hierarchical databases. They don't detract significantly from the material, but getting it right would not have taken too much effort.

The database examples given, T.I.M., dBase II, and Lotus 1-2-3, should be used in conjunction with the documentation on the real package if full benefit is to be derived. Users who don't have the real package may be reduced to the role of a robot in this section, pressing keys when told to do so without understanding the process at all.

The dBase II example is far too complex for a beginner tutorial, and the explanations are particularly sparse. A beginner faced with the same program screen is likely to find an excuse to work on another project.

There is essentially no written documentation provided with the product, and a well-designed manual with more information on each of the topics would have served as an excellent jumping-off point for users who wanted more information. Some form of bibliography would also have made further exploration of the topic easier.



HANDS-ON EVALUATION

DB Tutor has a binder, which suggests that it has documentation. Our first impression was that ours had gotten lost. While the third of 3 diskettes has a chapter of the manual devoted to its use, there is virtually no information on the first 2 diskettes, beyond instructions on how to load them. While CAI tutorials without documentation are not uncommon, we felt that the additional effort to provide some documentation on disks 1 and 2, given a manual for diskette 3, would have been justified.

Loading DB Tutor gave us some immediate reassurance. The first screen presents a short message, followed by another which asks, "Can you read this?." We couldn't, and by answering "N", the program configured itself to our color graphics display. Nice work, and it spares the user the usual guessing game with PC-DOS MODE commands. Our technical specialist said, "It's about time somebody read the DOS manual!"

DB Tutor, it was quickly apparent, is not a general computer literacy course. If a user doesn't want to learn database concepts (and doesn't have some background in computer terminology,) he is well advised to buy the PC Tutor product instead. We gave the material to everyone in the office, including the secretarial staff and the sales force, and half of them returned it with glazed expressions.

Those who did have a desire and a need to learn database concepts were delighted with the program and everything

it did. When pressed for criticisms, they found a few things that were not "up to the general level of quality," but nothing they just could not learn to like. Our technical specialist had a few unkind words on those definitions of relational and hierarchical databases, but grudgingly admitted that the package was worth using.

User Interface

DB Tutor uses an essential text-oriented display system with limited graphics capabilities. Users are asked questions and must respond by keying in an alphabetical text value or matching scrambled questions and answers in parallel lists. The material is highly interactive, and entries are checked for accuracy at all points.

Menu: A single menu selects the major section of the tutorial to be presented. The tutorial material itself is not menu-oriented. Text information is interspersed with some graphics and charts. In the sections which present popular database packages, the structure of the packages, including menus, is faithfully reproduced. The user may not select an inappropriate option with these menus. Within PC BASE, the tutorial example of a database, all options are presented in menu form with selection made by entering a number associated with the choice of functions.

Control Characters: Not used; ignored by the product if keyed.

Function/Special Keys: Function keys F7 and F9 are used to move backward and forward, respectively, in the tutorial material. Function keys are used in the PC BASE product, and the currently active function keys are displayed on a status line at the bottom of the screen. Key usage is not representative of any popular product.

Command Language: None.

Positive Feedback: Correct responses result in messages of praise, while incorrect ones are gently chided.

Status Displays: None in the tutorial portion of the material. The PC BASE product has a status line at the top of the screen, which indicates the record number, file name, and operating mode (add, modify, etc). Another line at the bottom of the screen indicates the function keys active at that point in the program.

Help Facilities: None.

Environment

DB Tutor runs on any IBM PC. We had what was probably the oldest IBM PC still outside the Boca Raton museum, equipped with (save us!) single-sided diskettes and limping along on DOS 1.1. It ran DB Tutor. So did our PC/XT with all the bells and whistles, and a Columbia portable we tried it on. There are no memory restrictions given, but the package seemed to run on 64K-byte RAM systems.

The 2 lesson diskettes are copy-protected, something we generally do not like and like even less in tutorial diskettes where a beginner is likely to spill coffee or tear it out of the drive in panic. Replacements are available at a nominal charge, and we ordered a set on the chance that our originals would crash, which of course they did not. Disk 3,



Comprehensive Software Support DB Tutor

Database System Tutorial Package

the PC BASE sample, is not protected and may be moved to a hard disk. Instructions for that task are included.

□ Documentation

You tend to look at the page numbers the first time through the manual, because the sections on diskettes 1 and 2 of the package are so short they seem to be missing. Only the third diskette, used for exploration of a simple database called PC BASE, and developed specifically for the course, has any real documentation.

Each section of the manual covers one of the diskettes, and begins with a description of how to load the diskette and how to copy DOS to the disk. Each section ends with a short list of troubleshooting tips which guide the user through some of the common problems with that material. The troubleshooting is largely confined to installation difficulties and not to questions on the material itself. The sections on disks 1 and 2 have nothing describing these 2 elements. The third disk's section covers the operation of PC BASE for advanced tinkering.

The material presented on PC BASE is surprisingly good, considering the fact that the product is basically a training aid. Each function of the program is explained, and there is a full screen illustration of every screen used in the product, something we would have liked to have seen in real commercial database documentation. At the end of the PC BASE part of the manual is a list of other application ideas, and some sample database formats for each. This is done to encourage the user to refine database skills by trying some live applications, and we found that it was effective.

There were 2 disappointments to the manual, as reported by our staff. First, the tutorial material provided on disks 1 and 2 could have been easily extended by providing 20 pages or so of text and examples, taking users from the early beginner point where the tutorial leaves them to at least a comfortable level. This could then have been further extended through a bibliography, the lack of which was our second complaint. DB Tutor gives the user a glimpse of database concepts, and often whets the appetite for more. We would have liked to have been able to encourage further research, but could not provide any vehicle to accomplish it.

□ Functionality

DB Tutor starts off with a definition of database, goes through how databases work, and into a review of terms. This section of the product is strict CAI format, with the program giving the user several paragraphs or screens of data and then following it with one or more questions to assure that the user understood. You can move forward or backward within the lesson through the use of function keys, or escape to the main menu and select a chapter to review. Because the chapters are selected from the main menu and not forced on the user in sequential form, a user can skip material which is too basic.

Our staff was divided on the material presented in these early sections. The majority of the nontechnical personnel in the department felt that the material started at too high a level, a criticism which probably would have been elimi-

nated had the PC Tutor product been used first. A few in the organization staff, more familiar with computer systems, pointed out some inaccuracies and oversimplifications in the early sections. We wondered whether the complaints were of any substance—does a user really have to know what a relational database is in order to use one? Our customer support manager had an answer: "Maybe not, but if you have to teach it, teach it right." We couldn't argue with that.

The early material covers the elements of a database, files, fields, records, etc, and the concept of data types such as alphabetic, integer, floating-point, date, etc. This material was conceded to be reasonable in quality and level of presentation by most of the staff. The extension of the basics into database concepts was a little abrupt for some of the uninitiated, and "How Databases Work" left many in the dust.

By the time the material got to examples of 3 popular databases, we had lost all but the truly interested. These practical examples show the use of a simple database (T.I.M.), a popular and complex one (dBase II), and a DBMS quite different in terms of style—Lotus 1-2-3. All 3 packages were presented in a sample application form, and users were encouraged to enter information where appropriate. To keep the thing from getting too repetitious, the tutorial filled in screens once the principle had been established. The result was a "running" application in each of the languages.

T.I.M. and Lotus examples were judged to be excellent and useful. We have been users of Lotus, and had honestly not utilized the database part of the package to any extent because of lack of understanding. Based on the tutorial, we were able to gradually work features into our spreadsheet applications, much to our benefit.

Ashton-Tate's dBase II was the black sheep of the examples, in the view of all of the staff. While some of the users found the material interesting and useful in contrasting the power of a program-language approach to a purely select-the-option system such as that used by T.I.M., most were unable to comprehend the example. Our technical specialist, who knew dBase II, said that the problem was that users should take that part of the course with the dBase manuals in hand, and look up the commands for reference. We tried that, but the material was still too complex. In general, we felt that more attention was needed to dBase II if the example given was to be retained, or that a new example was needed.

Diskette 2 introduced users to a new tutorial-form database program called PC BASE. This is a very simple example of database features, but still would prove as satisfactory for basic applications as commercial products sold at 3 times the cost of the tutorial. Those of the staff who got to this point in the material were pleased by the quality of the instruction. It was distinctly better than the rest (and that was considered good!). The definition of a database application, its installation on the database package, and its use are all covered with a sample restaurant application that is used throughout the package.



Comprehensive Software Support DB Tutor Database System Tutorial Package

The user is then given some additional PC BASE topics to prepare for the third diskette.

In this last disk, the user is given instructions on installing the program (which could have been automatic but was included because most database programs require installation). Once the program has been installed for the proper display type, the user is taken through the creation of a new file, file maintenance, sorting and printing, and utility functions such as compressing a file or erasing a file. While the operations in this area are simplistic in commercial terms, the normal functional spectrum of database applications is covered. This part of the tutorial has a good manual to backstop it, and at the end of the manual there is a series of application suggestions for further exploration. Nearly all of our staff modified these ideas slightly and created samples of custom files ranging from a list of members of the local symphony support committee to a dog breeding file.

We asked those who finished the tutorial if they felt that the material had helped them understand database concepts and apply those concepts more easily to their jobs; all said yes.

Ease of Use

How easy DB Tutor is to use seemed to depend on the level of basic computer literacy of the student and the degree to which they believed database knowledge would be helpful. About half the organization was either unable to understand the material or could not accept that learning database concepts would be useful to them. This group did not get past the first diskette, and often quit within an hour.

The staff members who had read a little on computers and used our office system to some extent were able to follow the material and generally complete the entire course. Our technical specialist quizzed each on their reactions, introducing a few questions to assess the amount of information retained. We found that the people who had never thought of database applications or speculated on how certain database problems they encountered might be solved remembered little of the material. It seemed that a frame of reference was necessary to absorb the course properly.

The subset of the staff who actually wanted to know about databases, and perhaps had tried to use some form of database, found the material useful, easily handled, and very helpful. The only complaint in this group was that there should have been several examples for each type of database package, providing a more complex vehicle for those who had mastered the basics.

Tutorials that educate without providing applicable knowledge may be useful in institutions of higher learning but are less so in business. Since you cannot learn enough from the tutorial about any given database program (except PC BASE) to actually use it, the ease with which the package can be extended to acquire a skill level that can be exploited is an important factor in its ease of use. DB Tutor falls short in this area. There is no advanced material in the documentation, and no list of books recommended for reading. The sections on individual packages do not reference the documentation for those packages.

Our staff felt that DB Tutor provided someone with a very basic knowledge of computers and a magazine-level knowledge of databases, a big push toward understanding them. They wished that the material had gone further.

Support

We called Comprehensive Software on the question of hard disk support, and the person who answered the phone offered to help us. We asked the question and were immediately placed on hold. Very shortly thereafter the person returned and informed us that running the tutorial from hard disk was not supported. We asked about a reference or reading list and were again placed on hold while the question was relayed to someone else. The answer here was also negative. When we expressed our disappointment on the relational database description, no offer was made to pass the comment on to our unseen "expert", nor were our names taken.

System Interface

You don't interface DB Tutor with anything else. The files created by the program are not defined in terms of format, and there are no hints provided on getting information into or out of the internal format of PC BASE, the trial database package. The sample programs provided for T.I.M., dBase II, and Lotus 1-2-3 are not provided in a form which could actually be loaded onto one of those products if the user had it.

Vendor Experience

Comprehensive Software Support is a small company established in 1981. The primary offerings of the company are educational software products, and DB Tutor is one of 4 available. The product was first marketed in 1983.

■ PRODUCT OVERVIEW

Terms & Support

Terms • DB Tutor is available on a purchase license basis from Comprehensive Software Support, through personal computer dealers, or software dealers.

Support • telephone support provided by vendor.

Component Summary

DB Tutor is a totally integrated tutorial program which provides an introduction to database concepts and several popular database programs. The entire module is resident on diskette number 1 of the distribution series, which must be kept loaded during execution.

Tutor is a tutorial module dealing with more advanced database concepts using a private, simple database called PC BASE. It is located on diskette number 2 of the set.

PC BASE is a pseudo-database system provided for training and familiarization, but suitable for basic applications. It is provided on diskette number 3 of the set.

DB Tutor:

\$95 lens

Computers & Operating Systems Supported

DB Tutor is designed to run on any IBM PC or PC/XT system under

LCNS: license fee.



Comprehensive Software Support DB Tutor Database System Tutorial Package

DOS 1.0, 1.1, or 2.0. No formal claims have been made that the package is able to run on compatible systems; however, there is some evidence that compatibles may be able to accommodate the product.

Minimum Operating Requirements

No formal minimum memory requirements were given, but it is assumed that any "moderately" configured system would accommodate the package. DB Tutor requires at least one disk drive (single- or double-sided) and any system-supported 80-character monitor.

Features

Training Area • general familiarization with the concepts of database systems and the features of 3 popular database packages: T.I.M., dBASE II, and Lotus 1-2-3.

Target Audience • users with a working knowledge of computer systems and some familiarity with database terms; beginners with

no background are unlikely to profit from the material; users should also have a specific desire to learn database concepts and possess a framework within which to apply the knowledge.

Method of Instruction • computer-aided instruction, using a major topic menu and a highly interactive set of questions; material is presented in text and picture form, then reviewed with questions to test user understanding; material in prior sessions may also be reviewed from time to time.

Degree of User Interaction • highly interactive, with data verification at all points in the product.

Average Time to Complete Course • 4 to 6 hours, with an additional 4 to 8 hours possible on extended topics.

Course Value as a Reference • sections on popular database products are useful as refresher examples at any time, and advanced material presented on diskettes 2 and 3 are generally useful as a sample of database application design.

• END



Comshare Target Software Target Financial Modeling Financial Planning & Spreadsheet Package

■ PROFILE

Function • a spreadsheet and report generator designed to provide financial statements and specialized business analyses.

Computer/Operating Systems Supported • IBM PC or PC/XT using PC- or MS-DOS 1.0, 1.1, or 2.0.

Configuration • PC-DOS and MS-DOS versions require a minimum of 128K bytes Random Access Memory (RAM), at least one double-sided disk drive, though 2 are recommended (one can be a hard disk); a black-and-white or color monitor; and a printer capable of 80-column widths.

Current Version/Version Reviewed • Version 3.2 for the IBM is the current and reviewed release.

First Delivery • Spring 1982.

Number of Installations • information not available.

Comparable Products • Microsoft Expert Systems; VisiCorp Desktop Plan/PC; Sofstar Business Planning Tool.

Optional Associated Software • Target Planner Calc: \$99; Target Image Maker: \$175; Target Task: \$329; and Target Applications Library: \$125.

Price • \$325 retail price.

Vendor • Comshare Target Software, Inc; 1935 Cliff Valley Way, Suite 200 Atlanta, GA 30329 • 404-634-9535.

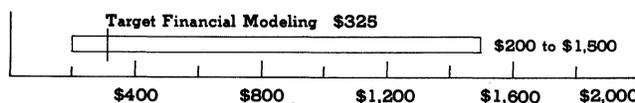
Canada • Holt, Reinhardt & Winston; 55 Horner Avenue, Toronto, ON M82 4X6; 416-255-4491.

■ ANALYSIS

Target Financial Modeling is a package designed as an interactive tool with which you can define your data and their interdependent mathematical relationships according to the planning needs required in your model. It is a diversified and changeable program which can accommodate financial analysis models, general business analysis, and virtually any mathematical model you wish to design, define, and implement to run on a microcomputer.

Once defined, your model can be re-used ad-indefinitum simply by changing the data entered into it. It also gives you great flexibility in report output, allowing several scenarios to be run using slightly changed data, or for presenting a variety of report formats for the same data

PURCHASE PRICE RANGE Software Price Range



COMSHARE TARGET SOFTWARE TARGET FINANCIAL MODELING PRICING • open bar shows the typical range of prices for **FINANCIAL PLANNING** software used in a corporate environment • the vertical line within the bar graph indicates the price of **Target Financial Modeling**, the evaluated product, relative to the price range of similar products.

PRODUCT QUALITY RATINGS*

	1	2	3	4	5	6	7	8	9	10	
ENVIRONMENT	████████████████████							7.2			
DOCUMENTATION	██								9.2		
FUNCTIONALITY	██									9.2	
EASE OF USE	██										10.0
SUPPORT	██								8.2		
SYSTEM INTERFACE	██						6.0				
VENDOR EXPERIENCE	██								8.0		

*For an explanation of rating criteria, please refer to the Spreadsheet Features section in the Software Evaluations (805) report. The Overall Package Average is 8.2.

analysis.

Strengths

The major feature of Target Financial Modeling is its use of English language commands to accomplish the functions required both in defining and executing models. The program is extremely fast, able to re-calculate a model of 18 columns and 60 lines in less than 5 seconds. The speed of the package is, of course, somewhat dependent upon the main memory installed in your particular computer, but has been optimized for speed all the same.

With the addition of the template programs available in the optional Target Applications Library, a large amount of model definition is done for you. With these templates it is only necessary to edit them to fit your particular organizational needs for format, content, and security. These same strengths also apply to models that you create independently of the Applications Library.

Limitations

The only major drawback of the package is its inability to draw upon the data files and model definitions you may have created with other packages. Additionally, it is necessary to gain access to a graphics package that can read ASCII file formats, and to off-load the data into such a program to gain the virtues of graphics-based analysis or presentation.

While not a serious drawback, the package does not present much information on the appropriateness or strategic use of analysis via models for the new user. Although it does include a treatise on the importance and usage of planning and forecasting models, it would have been helpful to present some case examples of success or failure with the process. At the very least, you might expect the company to have provided some list of



Comshare Target Software Target Financial Modeling Financial Planning & Spreadsheet Package

reference texts that explain the underlying concepts and theory of financial and general business analysis through modeling techniques.



■ HANDS-ON EVALUATION

To use Target Financial Modeling, you are first cautioned to make a backup of the program diskette(s). It is also necessary to prepare a formatted work disk, unless you plan to use your hard disk. Installation on the hard disk is faster and simpler with this program, as is generally the case.

Our professional staff used floppies to test the speed of the package in a variety of models, and was, to say the least, quite impressed with the result. On a hard disk system, the package is even faster. With a RAM-disk, the program is simply a dream in terms of speed of executing calculations, re-calculations, and printing reports or storing files.

Due to the use of English language commands, the program is very easy to learn, that is in terms of operation. To learn financial analysis is not so easy a task. The point of the program is that much of the work is done for you. If you need to accomplish these tasks and do not have the requisite background, it would be a good idea to pick up the optional Target Applications Library and work it over with someone in your organization or outside that can explain the appropriateness and subtleties of financial analysis.

In the process of evaluating this package, we built a model which took the column and row headings from the DOME Bookkeeping Service and added the calculation formulas to allow automation of their process. The number of line items, including blank lines, totaled 68. The number of columns was 12 for months, 4 for quarterly periods, and 1 for an annual total, giving a total of 17 columns. This automation allowed a significant improvement over a similar exercise built for Lotus 1-2-3.

□ User Interface

Menus: The only menu provided is the print menu which allows modifications to be made to the defaults set by either Comshare Target Software, Inc or the user. There is prompting in the configuration program that appears in menu form to allow the user to set default values for the package.

Control characters: No control characters are used, except for control of printing output reports. Any of the typical escape code sequences can be inputted into the print control menu to re-direct output from user-selectable defaults.

Function/special keys: Due to the English-like nature of commands, only a few special keys needed to be defined. These include: the return key; the escape key, which tells the system to ignore the previous entry; the F9 key, pre-configured to act as the print execution key; the F10 key, which is the help key—this allows access to the help network from within the display mode; and the Del key, which deletes a line or portions of the contents of a line of text.

Command language: There are 105 commands included in Target Financial Modeling (TFM), all of which are easy to recognize as the English equivalent of their particular function.

Positive feedback: TFM uses a series of audible beeps and error messages to indicate an incorrect action. In addition, it is possible to abort a specific executable command by waiting for the warning message to disappear from the screen.

Status displays: Target Financial Modeling separates the viewing screen into 4 parts: the guideline, the status line, the spreadsheet, and the cursor line. The guideline appears at the top of the screen on line 1. It includes: the name of the model, the approximate amount of computer memory remaining (in number of cells), model size (the number of columns defined by the model), and the calculation mode (Immediate or Defer). Line 2, the status line, displays error messages, gives the current mode of operation (e.g., Enter a command), and indicates processing during calculations. The spreadsheet area begins on line 3 and continues to line 24. Line 25 is reserved for the cursor. When in Display mode, it doubles as a viewing port for the formula or data kept in a particular cell.

Help facilities: the TFM Help network provides you with information not specifically associated with command word. Help can be invoked either by typing Help Hel, which brings up the main help menu, listing all of the general words for which help is provided, or by typing Help xxx, where xxx is the first 3 letters of the word for which help is needed. It is necessary to access Help from the command or cursor line. Help access is provided for over 100 command words within TFM.

□ Environment

The Target Financial Modeling program is both the applications manager and the model building element of the Comshare Target Software, Inc product line. It requires 128K bytes of internal RAM to operate, but can take advantage of up to 192K bytes, thus speeding the operation (especially the calculation time) of the package.

Target Financial Modeling does not provide any database management functions, such as sorting or query, but does provide the ability to send any of the common escape sequences for printout control. Its size parameters are notable for a financial or other modeling program. It can have up to 999 forecast columns, from 2 to 30 characters or spaces per column, from 2 to 30 characters or spaces as a line heading before a column, up to 28 decimal places per value, and significance levels between 2 and 20 digits. The number of line items (data lines, blanks, subtitles and so on) are unlimited, and selectable by the user.

□ Documentation

Target Financial Modeling is described in a hard-bound 3-ring binder which is enclosed in a cardboard sleeve. The documentation is mostly comprised of a tutorial. A separate 22-page pamphlet (which fits into the front of the binder) provides the installation procedure information for the package. A separate 2-page sheet precedes the



Comshare Target Software Target Financial Modeling Financial Planning & Spreadsheet Package

pamphlet indicating the system requirements and recommended options, and a quick summary of the key designations used with the package.

The main body of the documentation includes 11 chapters, a command dictionary, an appendix on error messages, and a solid cross-referenced index. The 11 chapters are listed as follows: Target Financial Modeling Tutorial; Beginning; The Basic Display Screen; Recalling and Printing Files; Model Creating; Building Upon the Base; Functions, Operations, and Conditions; Advanced Functions and Uses; Editing; Formats and Printing; The HELP Network and Error Handling.

The tutorial in chapter 1 provides an excellent overview of the features, functions, and benefits of the package, and takes the user through the process of entering the program, entering the model definition, entering the data, and finally running, saving, and printing the results. There is also a short prefatory section to chapter 1 which details the organization of the manual, and the documentation conventions used for type style, entering commands, locator and cursor display, symbols used, and screen displays. The entire manual is rich with full screen displays (highlighted in light gray) which apply directly to both the on-screen and manual presentation of material.

□ **Functionality**

While billed as a financial modeling package, the Target Financial Modeling product can in fact be used to create any type of mathematical model you are capable of designing to run within the constraints of a microcomputer's memory limitations.

Target Financial Modeling provides the user with several example files (listed under the Component Summary) which can be easily modified to handle a variety of tasks. As with any model building program, it is necessary for the user to define a model in terms of the functions for which the package was designed. What this package does that many do not is offer the user a method for model design in simple English.

The package contains its own command language of sorts, but stops short of allowing you to define new commands or to perform database management functions. It is what it is advertised to be, a financial modeling package, but with some initiative, you can make it into much more. And with the purchase of the optional Target Applications Library, the vendor helps it to become much more as well.

□ **Ease of Use**

Our professional staff had no difficulty in installing the program, and in getting it to perform the functions as described in the tutorial. Several modifications were made to report formats, model definitions, and data to allow it to report the information needs of several of our office staff for current work at hand, both personal and professional. The templates provided in the Target Applications Library were used as the starting point to determine the best method of acquiring some needed printer equipment via the Lease vs Purchase Analysis template, and this reviewer and 2 other office members used the loan amortization template to determine the impact of several

loan programs for home computer equipment; one even successfully analyzed the purchase of a home, given data supplied by several banking institutions with the mortgage calculation program template.

The general use of the program is quite easy to learn and very easy to remember. It is the use of financial analysis itself that is the issue. If you are adept in such areas, you will find no problem with using the samples and templates available to conduct your work. If you need to conduct other analyses, and need to learn the concept of model building on a microcomputer, the package will fit you like a glove as well.

The only area in which the package falls down is in providing detailed knowledge regarding the underlying theory and strategies of financial and general business analysis. However, a dearth of texts exists on these topics which can serve the user well. Incorporation of this theory is not all that difficult with some practice.

□ **Support**

Purchasers that return the warranty registration card are entitled to receive replacement disks for defective ones at a cost of \$25. This applies even during the warranty period.

The technical support available from the vendor was found to be quite good. A user may call Comshare Target Software, Inc during normal business hours (8:00 AM to 5:00 PM) East Coast time.

□ **System Interface**

Target Financial Modeling is not designed to interface to other than Comshare Target Software, Inc packages. In fact, it acts as the applications manager for several of the products in their line, including the Target Applications Library, and the Target Image Maker.

□ **Vendor Experience**

Comshare Target Software, Inc introduced the Target Financial Modeling program in early 1982, and has since issued the associated Target Applications Library, a package of 21 template overlay models for financial and general business analysis. The writing of the templates and the Target Financial Modeling program took place over a period of more than 4 years.

The basis for the information contained both in the template models and the main program itself was an evolutionary series of interviews and experiments with financial analysts, accountants, and other business analysts.

The company has a very good overall reputation, although it is not as widely known as some of its competition in this field.

■ **DETAILED PRODUCT DESCRIPTION**

□ **Terms & Support**

Terms • Target Financial Modeling is available for purchase only from the vendor, through computer retail stores, software retail stores, at vendor-selected trade shows, and via mail-order discount outlets.

Support • Comshare Target Software, Inc warrants only that the



Comshare Target Software Target Financial Modeling Financial Planning & Spreadsheet Package

program disk(s) will be free from defects in materials and workmanship under normal use for 90 days from the date of purchase; defective disks must be returned directly to the vendor, and will be replaced (even during the warranty period) at a cost of \$25; end-user support is available from Comshare Target Software, Inc by calling 404-634-9535 during normal business hours (8:00 AM to 5:00 PM), East Coast time.

Component Summary

Target Financial Modeling (TFM) consists of 10 major files plus the demonstration files. FM.EXE is the executable file program for TFM, STARTUP.COM is the startup file program, and LEARN.LD is the tutorial program file. LEARN.SAM provides a sample model file and NEWPROD.TGT is a sample model used in the tutorial. INSTALL.BAT is the initialization file for computers. STANDARD.TGT is a sample model used in the tutorial and CONDAIRE.TGT provides a sample model used in advanced functions. XP.HP is the data file for the Help network, CONDAIRE.TGT is a sample model used in advanced functions, and SO.DEM is a series of demonstration files for TFM:

\$325 lcns

Computers & Operating Systems Supported

TFM arrives pre-configured for specific computer systems; Version 3.2, which was evaluated, came pre-configured for the IBM PC for use with MS- or PC-DOS 2.0. Other versions are available which run under MS-DOS 1.0, 1.1, and 2.0 for use with other computers.

Minimum Operating Requirements

Version 3.2 requires an IBM PC with at least one double-sided disk drive, internal memory of 128K bytes RAM, an IBM or compatible monochrome or color graphics monitor (this also requires a color graphics adapter card) and PC- or MS-DOS 2.0 or later. The list of recommended options includes any printer capable of printing a minimum of 80 columns that can be controlled by the IBM PC, and a second disk drive to contain data space for model storage (a hard disk is supported). Additional internal memory up to 192K bytes of RAM will improve the operational speed of TFM.

Features

The Target Financial Modeling program is the model builder and

LCNS: license fee.

applications manager for other products in the vendor's line. Its features are extended by the models designed and implemented both by its users and by those contained in the Target Applications Library, a package option available at additional cost.

Command Type • English-word commands are used exclusively, but the user can opt to enter only the first 3 letters (or in some cases, a 3-letter acronym) to execute the commands.

Financial Functions Supported • this is a function of the creativity of the user; however, more than 20 are supported with the addition of the templates available in the Target Applications Library.

Command Structure • there are 60 English-word commands that can be used in the program, plus the print menu and configuration file, which both allow for defaults to be established and/or modified; the only hierarchy exists in accessing certain areas within the Help network.

Account Types • as with the financial functions support, mentioned above, this is a function of the user's creativity.

Error Recovery • either the edit mode or the escape key can be used for error recovery; the edit mode allows either deletion or replacement, while the escape brings the user back one step.

Output Commands • output can be made either to the screen, the printer, or to disk by invoking the English language commands: output, print, or save.

Print Facilities • printing is completely handled through the print menu which allows the output of draft results, final results, and worksheet model definitions; with the draft results output, the line and column designations are shown; through the configuration program, you can set defaults to accommodate the special print enhancements you require; in the print menu, you are given the opportunity to modify these for the particular file being worked on via the replace or delete commands available through the edit command.

File Transfer Capabilities • there is a save facility which allows the model definition and worksheet results to be stored to disk for access to other programs available from Comshare Target Software, Inc, and programs which can read ASCII file formats.

Window Capabilities • it is possible to open vertical and/or horizontal windows in the form of a quadrant. You can scroll synchronously or asynchronously through any or all of the 4 allowable windows.

• END



Concentric Data Systems C.I.P. Data Management & Report Writer Package

■ PROFILE

Function • database, information management, and report writing.

Computers/Operating Systems Supported • IBM PC, IBM PC/XT, and IBM PC compatibles; DOS 1.1 or 2.0.

Configuration • DOS 1.1—2 double-sided drives, 128K bytes of RAM; DOS 2.0—2 double-sided drives, 192K bytes of RAM; DOS 1.1 or 2.0—1 double-sided drive, hard disk, 192K bytes of RAM; the IBM PC/XT requires DOS 2.0.

Current Version/Version Reviewed • Version 1A/1A (serial number less than 200).

First Delivery • January 1984.

Number of Installations • 1,000 plus.

Comparable Products • Ashton-Tate dBase II; Software Publishing pfs:Write, pfs:File.

Optional Associated Software • none.

Price • \$395 retail price.

Vendor • Concentric Data Systems, Inc; 18 Lyman Street, Westboro, MA 01581 • 617-366-1122.

Canada • currently no Canadian distributor.

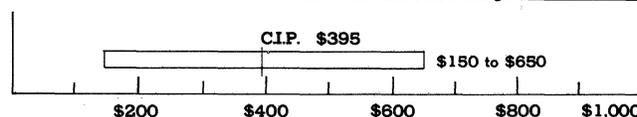
■ ANALYSIS

C.I.P. is an advanced file management/report writing system. Compared to many other such systems, new applications can be set up with minimal time and effort. For situations where a novice desires to modify database and report formats, this product has the potential of doing the job. It would appear to be especially good in situations where many small files are being worked with.

The product is particularly useful where a staff member has a unique database with little if anything in common with the rest of the organization, and is left to devise a means of manipulating it. In organizations where technical support is difficult to obtain but where some degree of application independence exists, C.I.P. may be applicable where more complex products would not be. In this environment, its non-traditional file structure is not a serious liability.

When applied on a company-wide basis, C.I.P. allows testing and modification of applications based on a small sample database, much like a what-if scenario. In this

PURCHASE PRICE RANGE Software Price Range



CONCENTRIC DATA SYSTEMS C.I.P. PRICING • open bar shows the typical range of prices for **DATA MANAGEMENT** software used in a corporate environment • the vertical line within the bar graph indicates the price of **C.I.P.**, the evaluated product, relative to the price range of similar products.

PRODUCT QUALITY RATINGS*

	1	2	3	4	5	6	7	8	9	10	
ENVIRONMENT	████████████████					5.8					
DOCUMENTATION	██████████████				4.0						
FUNCTIONALITY	██████████████████						6.0				
EASE OF USE	██████████████████							7.0			
SUPPORT	██████████████					5.0					
SYSTEM INTERFACE	██████████████████							7.0			
VENDOR EXPERIENCE	██████████████					5.0					

*For an explanation of rating criteria, please refer to the Data Management Features section in the Software Evaluations (805) report. The Overall Package Average is 5.7.

manner a user is able to determine what works best before involving a programming staff for potential mainframe implementation. The program can thus be the basis for a trial application, used to test the viability of any form of program support for an application before programming resources are committed.

On the negative side, C.I.P. is not a program one would want to turn loose in the organization without preparation. Even though it is a relatively simple and flexible package, users seem to have a problem understanding the way in which it is presented and operates. The fact that the vendor holds the function key template hostage against the return of the warranty registration makes the introduction to the product difficult.

In the balance, C.I.P.'s benefits as a quick database product probably outweigh the start-up difficulties, and the product is a good choice for businesses that demand a little more flexibility than that found in the average "simple" product. It is particularly useful where screen and report formats must be almost custom tailored.

□ Strengths

The ability to arrange file and print formats directly on the screen is a major advantage. Objects are identified using a pointing technique that highlights the area of interest which is then interactively moved around the screen. Instantly seeing the results of your action decreases the amount of time required to learn the system and produce results. This visual approach is implemented throughout the system.

One of the most important features of C.I.P. is its report writing ability. In addition to rearranging fields, unnecessary fields can be deleted, and field names can be separated from their data and edited to produce a different format. Averages, counts, totals, and headers and footers of up to five lines can also be included.



Concentric Data Systems C.I.P. Data Management & Report Writer Package

Key field attributes may be assigned with single keystrokes to any number of fields within a record, allowing random access and making it much faster to locate records. They can be changed at any time just as easily.

Formulas for fields requiring calculations are entered as responses to appropriate prompts. This prompting method simplifies the process by requesting only the information pertinent to the type of calculation being performed. A printed summary is optionally available.

□ Limitations

Compared to the overall sophistication of the product, the tutorial and reference manual seem tedious and difficult to comprehend, especially since many other vendors are producing documentation of a high caliber. This can be critical if one is dealing with people who may not be all that excited about the introduction of a computer into their life, or if they are in too much of a hurry. For people who have experienced quality documentation, this sort of first impression can chase them away or prejudice their view before they can discover what the product can do for them.

The context-oriented Help menus are wonderful in their operation, but seem to suffer from too much information being crammed into too little space. The result is that one cannot merely glance at the screen to locate the needed information.

The frustration of not being able to use the same function key for essentially the same purpose from one screen to another is incomprehensible. Depending upon where one is in the program, either TAB, ENTER, or in some cases CTRL ENTER is the method by which one communicates to the system that a command should be executed.



■ HANDS-ON EVALUATION

Since ease of use was greatly emphasized, we assigned the task of installing this product to a junior member of our department. He had no difficulty installing DOS because of clear instructions and a command file provided by the vendor. Difficulty did arise when he attempted to configure a non-standard printer and interface card. Provision is made for non-standard printers, but as in most cases this is best left to the dealer or someone else more familiar with the proper procedures. When set up with a standard hardware configuration, the product ran properly.

Our more advanced users have been successful with products like dBase II, but we wanted similar power and flexibility in a product that could be easily used by the less sophisticated. Our desire was to provide everyone with the ability to manipulate data and generate reports in formats that would be meaningful and useful to them. Then everyone would be able to have it "Their Way."

We found that the difficult things, like setting up the data entry and report formats, were relatively easy. In spite of that, the difficulty in getting familiar with, and more importantly, comfortable with the product, was more than

most of our staff anticipated. It seems that they did not expect such an advanced product to have such an average manual, or inconsistent operation of function keys. Once past that minor disappointment, everyone settled in and was able to start to like using the product.

Except for the confusion of when to use TAB or ENTER to enter information and other such minor inconsistencies, we were impressed with the overall operation of the product. Even the tutorial, in retrospect, is not all that bad. The more we thought about the product, the more we liked it. Our task of introduction would have been easier if more could have been appreciated in anticipation, rather than on reflection.

□ User Interface

C.I.P. is an attempt to eliminate the need for users to deal with a programming language. It appears to have done so quite successfully. If you have any idea about what it is you want to do, chances are you will be able to do it through the combined facilities of the context-oriented Help menus and calculation prompting.

Menus: Context-oriented menus are available whenever needed. They are thorough, but each screen contains so much information that they are difficult to comprehend easily.

Control Characters: Limited and unorthodox use, mainly CTRL RETURN to cause information to be entered or a command to be executed, and CTRL BACKSPACE to erase to beginning of field. Not user modifiable.

Function/Special Keys: F1 through F4, Pg Up, Pg Dn, TAB, Cursor, End, and Enter keys inconsistently perform similar functions. Graphic representations of keys that are active are displayed on the screen. They are not always all-inclusive.

Command Language: None.

Positive Feedback: Invalid commands activate BEEP for each invalid keystroke. Confirmation of potentially destructive commands with 2 keystrokes is required. The default answer negates the command.

Status Display: File name, drive I.D., % disk space used, menu function selected, and function keys active are displayed at the bottom of the screen. CAPS LOCK and NUM LOCK indication is also provided.

Help Facilities: The F1 key activates the context-oriented Help menu which also gives access to additional topics and the main Help screen. No command card or keyboard guide is provided. There is mention of a "complimentary" command guide sent after the user returns the registration card.

□ Environment

The product will run a modestly configured system. The configuration program allows one to fully utilize the features of a specialty printer—if one can figure out the appropriate codes or has access to a good dealer.

To perform certain operations such as printing and file maintenance, some disk swapping is required. Many of the necessary programs reside on more than one disk, so



Concentric Data Systems C.I.P. Data Management & Report Writer Package

this should not pose a major problem to anyone. A hard disk system would be more convenient for large and/or multiple file users.

The diskette required to operate the system is copy protected. This disk cannot be write protected, thereby increasing the possibility that someone could quite easily damage it. One backup copy is provided, but people have been known to make the same mistake twice.

Documentation

The now-standard ring binder and slip case is provided. The diskettes are packaged in a separately sealed inner envelope, providing one last opportunity to change your mind.

The tutorial is lethargic, tedious, boring, and all the other things one detests in a learning experience. The sections within each lesson are not clearly delimited. One topic runs into another, making it very difficult to go back and repeat something. It is filled with black boxes representing keystrokes, and the overall impression is cluttered.

The manual is divided into chapters on each topic, separated by tabs. Finding the desired topic is fairly easy, understanding the explanation isn't. Much of the difficulty stems from the way screen examples are depicted. The screen is printed as white and grey on a black background, making it difficult to read. As one reads through, a page turn forward or backward is often necessary to see an example of the screen that is being discussed. More examples would certainly help, but the style and structure seem to cause the material to drag, making page changes necessary because it takes a half-dozen paragraphs to come to the point.

A glossary of terms is provided. The terms listed are sensible and limited to those which are pertinent to the program. The index is functional, rather than by command, so finding things in the manual via the index is probably the easiest course.

For some reason no overlays, keyboard guides, or command cards are provided. Copious menus are always available, but a keyboard guide would be more expedient in many cases. A function key template is offered in exchange for return of the registration card.

Analyzed in abstract, the manual shouldn't have been that much of a problem, but it was. It did not present the benefits of the product in a clear enough way; and lacking any statement of why something was a good idea, the door was open to conclude that it wasn't.

Functionality

A special configuration program allows the full utilization of available printer functions. In addition, the printer functions may be modified at the report level from within the program itself, permitting additional flexibility.

Tasks are accomplished visually on the screen, eliminating command languages, hard-to-remember key combinations, parameters, switches, user-defined screen positions, etc. This makes setting up to initial application unusually easy for beginners (who manage to get through the manual). We found that nearly anyone on the staff

could actually set up databases and reports.

In most cases, all available options are presented on the screen. There is little need to thumb through the manual because of the context-sensitive Help screens which are always available at the touch of a single key. Formatting of records and reports is likewise done directly on the screen. Fields are moved interactively around the screen, eliminating the need to produce paper layouts and report grids ahead of time.

Both numerical and date calculations may be performed. The numerical range is from .000001 to 999,999,999,999.999999. Date arithmetic can be used to calculate due dates, a person's age, the age of an account, or a call-back date for a tickler file. These calculations are performed at record creation time, making them accessible on the file. Modification and creation dates for records are accessible for historical/audit purposes, something our internal auditors appreciated.

The product's report writing ability allows the user to visually arrange fields on the screen and select which fields and records will appear in the report. Averages, counts, totals, headers, and footers allow for the inclusion of additional information. While the calculation capabilities at this point are not limitless, they are certainly adequate for the job. We found the ability to manipulate formats to be the most significant benefit of the report writer segment; it turns out that most reports have a relatively simple set of calculation/content rules but a complex format.

Selection criteria may be defined for report data. Again, the product does not support full programming flexibility, but multiple conditionals and the typical comparison operators are supported. We found a few complex cases where the statement of selection took a little thought, but no significant problems with meeting our objectives.

Files may be changed and modified after they have been created. Fields can be added, deleted, or rearranged. The length or characteristics of a field may also be changed. You can even delete a field from the file, but doing so will obviously affect the reports on which that field appears. We found that deleting a field on which selection is made is also possible; a non-existent field seems to be "less" than everything. We would have liked to have a warning that a field which was used in selection had been deleted, but for the most part we tended to add fields rather than to remove them.

Both data security and reliability are addressed. A reasonable effort has been made to provide for file backup. Copy and archive utilities, along with examples for maintaining backups, are given. Password protection is available, as well as the ability to easily override it in the event the password is forgotten. This is done outside of the program with a separate utility, but still partially defeats the purpose of a password.

Ease of Use

For those anxiously awaiting the availability of a database management system that is powerful, easy to learn, and easy to use—this may be it. There do exist some rough



Concentric Data Systems C.I.P. Data Management & Report Writer Package

edges. The installation and configuration routine can seem complex and confusing, especially if any printer other than the IBM 80, Okidata, or NEC 3550 and a standard interface card is used.

No reference card or key guide is provided with the product (the customer support plan makes mention that a "complimentary function key template" will be sent after the vendor receives the Purchase Registration Card). The use of the TAB, ENTER, and CURSOR keys is confusing. In some portions of the program, TAB is used in place of ENTER or the cursor, but sometimes the cursor keys do move the cursor and ENTER causes information to be entered or commands to be executed. While no damage is caused by using the inappropriate key, the frustration resulting from this confusion is distracting at best.

The context-oriented Help menu system was one of the better ones we have experienced. It did, however, suffer from some of the same problems as the manual—too much material crammed into too little space. In many cases a simple command card placed on the keyboard would have been much faster and easier to use than the Help menu.

All staff members had no trouble creating a record format. Field attributes are set with a single keystroke: N for Numeric, U for Unique, F for Full Field Required, etc. More than one attribute may be chosen from a total selection of eight. Attributes may be deselected in the same manner, the key acting as a toggle.

Reports are easy to format due to the ability to move fields around on the screen and actually see how the report will appear on paper. Unnecessary fields are deleted with the DEL key and can be restored with the F3 key. Averages, totals, counts, headers, and footers are all available to save time and enhance the appearance of reports. When finished, one has the option of printing, viewing, or writing to disk for word processing.

We found the product to be useful in situations where the structure and use of information was not clearly defined and subject to frequent change. Our staff now has the ability to quickly and easily set up an initial format on a trial basis and make appropriate modifications on an as-needed basis without assistance. The file conversion utilities provide the necessary compatibility to allow a fairly easy conversion to or from one of our other systems should the need arise.

Support

Vendor support is available by phone at 617-366-1482 between the hours of 9:00 AM and 5:00 PM (Eastern Standard Time) in the event that problems cannot be solved by referring to the reference manual or the local dealer.

New product information and updated versions at special prices are available to registered owners.

The diskettes are covered by a 90-day warranty against defects due to material and workmanship. Replacement diskettes are to be available for at least 3 years. Regardless of how many of the three disks is in need of replacement, the cost is \$20 if outside of the warranty period. Warranty

and replacement diskette service is available only if the purchase is registered. Only the original purchaser is eligible.

System Interface

C.I.P. does not use a standard data format. Utilities are provided to convert to and from DIF (Data Interchange Format) used by other systems such as VisiCalc and Lotus 1-2-3.

C.I.P. can also read in data from labeled or delimited ASCII files and write data to delimited ASCII files to be used by programs such as WordStar's MailMerge. This also provides a bridge, but not a direct link, to dBase II.

Vendor Experience

The vendor has been in business for 4 years producing software marketed by other vendors. C.I.P. was first released in the fourth quarter of 1983 and is the first product to be marketed directly by the vendor.

■ PRODUCT OVERVIEW

Terms & Support

Terms • C.I.P. is available on a purchase license basis through retail dealers.

Support • telephone hot-line provided by the vendor; new product information and updates are provided to registered users at a separate optional cost • 90-day warranty on diskettes.

Component Summary

The product is supplied on 4 diskettes, one of which is a backup for the copy-protected system disk, without which the product will not function. Program Disk 1 consists of some of the C.I.P. programs, including those necessary for starting the system. Program Disk 2 is the Report Writer program to format, print, view, or save a report and arrange the record format. Program Disk 3 is used for copying, archiving and retrieval, merging files, file format conversion, password protection bypass, and other utilities.

All program disks allow the listing of files, and the Add and Find file management functions.

C.I.P.:

\$395 lcms

Computers/Operating Systems Supported

C.I.P. runs on the IBM PC and PC/XT with PC-DOS; the package also supports IBM PC compatibles running MS-DOS.

Minimum Operating Requirements

For those systems running DOS 1.1, 2 double-sided drives and 128K bytes of memory are required; DOS 2.0 requires 2 double-sided drives and 192K bytes of memory. If a hard disk is configured, 1 double-sided diskette is necessary with 192K bytes of RAM.

The IBM PC/XT requires DOS Version 2.0.

Features

Field Size Limitations • 50 characters.

Record Size Limitations • 40 fields.

File Size Limitations • 65,000 records.

Disk Limitations • 76 files.

Key Field Limitations • 40.

Screen Format Definition • full position control.

LCNS: license fee.



Concentric Data Systems C.I.P. Data Management & Report Writer Package

Entry Edit Capabilities • field attributes can be set for valid date, full, required, numeric, and unique relative to the contents of the file (must be a key field).

Report Format Definition • fields can be repositioned on the screen, edited, and unnecessary fields deleted; headers, footers, titles, and sorting are all menu driven.

Sort/Merge Capabilities • any field can be a sort field up to a maximum of 4 sort fields; merging of C.I.P., DIF, labeled ASCII, or delimited ASCII to C.I.P. files is permitted • error checking, if selected, displays the incorrect data whenever a recoverable

error occurs; summary of number of records read, written, and containing errors is provided.

Query/Selection Capabilities • individual records may be located from the file management menu; groups of records must be located from the report writing menu; both features require that the fields in question be key fields.

Programming & Batch Processing Capabilities • none.

• END



Conceptual Instruments Desk Organizer

Time & Information Management Package

■ PROFILE

Function • combines and integrates common desktop tools: appointment calendar, file card systems, calculator, notepad, clock, and telephone dialer.

Computers/Operating Systems Supported • IBM PC, PC/XT, Compaq, and many other compatibles/supplied with proprietary operating system which allows other operating system normally used to run concurrently in available memory.

Configuration • 64K bytes of memory, 2 diskette drives, 80-column monitor.

Current Version/Version Reviewed • Fall 1983.

First Delivery • December 1982.

Number of Installations • information not available.

Comparable Products • Key Systems Prospecting, SORCIM Superdata.

Optional Associated Software • none.

Price • \$250 retail price.

Vendor • Conceptual Instruments Company; 4730 Warrington Avenue, Philadelphia, PA 19143 • 215-726-7856.

Canada • currently no distributors in Canada.

■ ANALYSIS

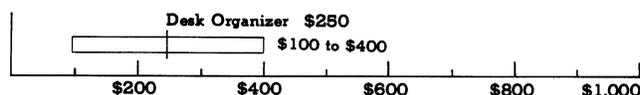
With more and more business being conducted on the phone, the product is very much tailored to that end. It allows the basic functions associated with the phone call to be dealt with in an orderly and efficient manner. And fortunately it does not require that users change in order to conform with it (other than to get organized).

It can save a great deal of time for those types of people who find themselves constantly reaching for a phone book to look up someone's number and days later trying to remember what was said and whether or not it is time to call back. An accurate log of conversations can be made with the notepad feature which can be accessed at the same time that a phone number is retrieved.

A fairly large system configuration is required to take full advantage of the product. Unless the extra power is needed by other applications, the cost for additional memory and disk storage may not be justifiable.

The Desk Organizer is a novel product. Managers, purchasing agents, anyone with a busy schedule and lots

PURCHASE PRICE RANGE Software Price Range



CONCEPTUAL INSTRUMENTS DESK ORGANIZER PRICING • open bar shows the typical range of prices for TIME MANAGEMENT software used in a corporate environment • the vertical line within the bar graph indicates the price of Desk Organizer, the evaluated product, relative to the price range of similar products.

PRODUCT QUALITY RATINGS*

	1	2	3	4	5	6	7	8	9	10
ENVIRONMENT						6.0				
DOCUMENTATION									8.4	
FUNCTIONALITY								8.6		
EASE OF USE										9.2
SUPPORT										9.2
SYSTEM INTERFACE						5.0				
VENDOR EXPERIENCE			2.0							

*For an explanation of rating criteria, please refer to the Software Evaluations (805) report. The Overall Package Average is 6.9.

of ideas to keep track of, will find it very useful if they have a fully configured system (lots of memory and a hard disk).

□ Strengths

The ability to run additional programs concurrently is what makes the product work. Even other operating systems can be used without interference.

All of the major functions normally performed at the desktop level are accommodated. The user is allowed to tailor the system to whatever needs he might have. If speed of operation is very important, confirmation of commands and frequent saves to disk can be turned off.

Disk space is used very efficiently. Even when maintaining small notes, such as names and addresses, thousands will fit on a floppy disk.

□ Limitations

Maximum memory and a hard disk is almost essential to reap the benefits of the product. On a minimally configured system, operation gets very cumbersome.

The use of a proprietary operating system means that even a directory listing is impossible. The only way to determine how much disk space is available is to consult the program's "Data Gauge." This also means that file transfer is limited to the provisions within the program. Although adequate for many situations, there is no way for direct interaction with other data files.



■ HANDS-ON EVALUATION

We found the concept of eliminating the desktop clutter a very appealing one. Just finding a method to keep track of all those little slips of paper with critical notes and appointments scribbled on them would be of great value.

Our main concern was whether or not the PC would be able to handle other functions at the same time. Obviously,



Conceptual Instruments Desk Organizer Time & Information Management Package

it would not be cost-effective to dedicate a complete system to the functions of a pocket notebook. Our objective, then, was to install the product and continue to run our normal applications. We approached the idea with cautious optimism. It seemed a little too good to be true.

We were pleasantly surprised. Not only was the product easy to install, but it really did take the place of many of the things scattered around our desks. We were able to continue operating many of our current applications with no interference from the product.

Staff members tended to be reluctant, as people often are, when asked to change their habits. But fortunately the product is not overly complex or difficult to learn. It did, however, require more than a casual reading of the documentation.

More important, some people found themselves in a position where they were forced to organize themselves and make immediate decisions. For instance, everyone makes notes. The product requires one to both label and file the note immediately, as opposed to just sliding it under the corner of the blotter or wherever. Some of those who were willing to change, and also willing to put forth some effort, found the product to be helpful. Reactions were based more on personal preference, rather than logic.

User Interface

The Desk Organizer uses simple on-screen menus to guide the operator through system functions. Function key definitions are displayed on the screen, eliminating the need for keyboard overlays. Command names clearly indicate their function and are activated with a single keystroke. The result is a system that is simple to use.

Menus: Multiple quadrant screen shows the various project functions. The user may vary the size of each display. Commands are entered by function keys and command keys.

Control characters: The Control Break key is used to switch to and from other programs. The Alt key is used with command keys to alter their characteristics and functions.

Function/special keys: Function keys are used to eliminate repetitive typing. The Alt key, when used in conjunction with any of the function or command keys, is used to alter their characteristics and functions.

Command language: None available.

Positive feedback: Potentially destructive commands request confirmation, which may be deactivated by the user. Inappropriate commands activate a beep. The original options remain displayed until an acceptable response is given or the command is cancelled.

Status display: A graphic representation of available disk space is displayed at the bottom of the screen. The current function and available commands are listed at the top of the screen in addition to the current time and a symbol to indicate the active state of the hourly chimes.

Help facilities: Context-oriented Help menu system available via the Break key.

Environment

The product can be adjusted to use 64K bytes or 128K bytes of memory. As a practical matter, the product should be set to operate in the larger amount of memory to reduce diskette swapping when operating another program concurrently. Therefore, the product actually requires a system with at least 256K bytes of memory, not 64K bytes, leaving 128K bytes for use by other programs and their operating systems.

Depending upon the memory requirements of the other programs, one could very easily be looking at needing maximum allowable system memory and a hard disk.

Printers do not appear to pose any problems. Menus for Centronics and PC/Epson special control codes are provided. Instructions are also given for easily inserting the appropriate control codes for whatever printer is being used.

No copy protection scheme is used. In a letter enclosed with the documentation, the vendor acknowledges the reality that in order for someone to fully utilize a product, that product must allow for the ability to make fully operational backup copies.

Documentation

A standard 3-ring binder in slip case is provided. Tabs are used to separate and identify the various sections.

The tutorial, stated as being optional for those who prefer to jump in and go exploring, is well organized, clear, and thorough. It begins with the standard instructions to start the program, and immediately gives instructions for backing up both the program and data diskettes. Lessons begin with a quotation from Mark Twain, Charles Babbage, Levi Hutchins (the inventor of the alarm clock), and other such notables.

Each lesson covers a limited amount of material and gives the opportunity to easily return later to continue with the next lesson. At the beginning, objectives of the lesson are stated, and the start of each objective is printed in bold letters. Graphic representations of the screen are provided at appropriate places within the text. At the end of each lesson is a summary of the functions and operations that had been covered plus the specific commands which were introduced in that lesson.

No keyboard overlays or command cards are supplied. The need for them is relatively minor. Most of the commands available at any given moment are clearly displayed on the screen along with their functions. Others are accessible via a single keystroke.

Assistance is available at any point within the program via a context-oriented Help menu. The Help menus are activated by the Break key.

The reference is simple and easy to use. It contains detailed information on the operations of the product, broken down into 3 sections: screen arrangement, general procedures, and alphabetical command summary. The command summary describes the purpose of each command, the options available and how to alter them,



Conceptual Instruments Desk Organizer

Time & Information Management Package

and the default settings. Where appropriate, examples are also given.

No problems were encountered with either the tutorial or reference material. While not extremely elegant, the documentation is definitely functional.

An overview section provides a quick and easy-to-read synopsis of the functions and capabilities of the product. It enables one to put into perspective the remaining information regarding the product's actual operation.

An interesting and very useful section, called "Briefing," is provided for those who care to get started right away. It is actually a separate booklet which can be removed from the ring binder and also serves as a handy reference. Material is listed according to function, with an index which makes use of icons to help one speedily find the subject of interest. Each command is described with great efficiency in no more than 5 or 6 sentences.

Included is a copy of New Tools, a quarterly user publication containing tips, answers to user's questions, and product enhancements. It provides added insight into the uses of the product and serves as a user forum. As in the tutorial, it contains interesting quotes and observations on life.

□ **Functionality**

The heart of the product is an electronic notebook and filing system. No particular structure is required when making notes, which are filed alphabetically by the system according to the label one assigns. Cross-referencing of labels is also available.

A calendar keeps track of dates from the first through the 99th century (adequate for our application), and monitors for any scheduled appointments. The total number of appointments for each day is displayed as one page through the calendar. Appointments can be set to trigger chimes or graphic symbols. Even notes or instructions can be automatically displayed on the screen at a preset time.

Extensive printer control is allowed from within the program. Margins can be set, line spacing adjusted, even special printer control codes such as those to change typeface or size can be accommodated.

Rather sophisticated calculations can be done with up to 8 variables allowed. Formulas and equations can be easily set up for many different situations and filed for repeated use. A limited amount of error checking (such as division by 0) is automatically done.

When used with an appropriate modem, the product can automatically find a person's phone number from within a note and dial via tone or pulse method. Prefixes, area codes, and special services such as Sprint or MCI are also accommodated automatically.

If adequate system memory is available, the product can run concurrently with other programs. Schedules are still monitored and alarms, if set, will sound. A single keystroke switches back and forth between programs. Since the program has its own custom operating system, it can even coexist with non-DOS operating systems. This ability is what moves the product from the realm of the ordinary.

Some of the ways in which the product operates and the user interacts with it can be easily changed. For example, a Return is normally required after selecting a potentially destructive command. If one is confident and careful enough, the requirement can be eliminated, thereby speeding up overall operations. The 10 function keys can also be re-defined to produce a system tailored to the individual.

□ **Ease of Use**

The product required no installation. It automatically booted, determined how much memory was available, and used the system printer, with no changes whatever.

Making changes to suit our needs was easy. One of the first things we did was to set the clock to read the date and time from our clock board. As with the changing of other functions, the Alt key is used in conjunction with the key representing the function to be modified. In this case, Alt A permits the time to be set or a clock board to be selected. By moving the highlighted area to clock boards and touching the space bar to flip through the selections, we were able to select the name of our board.

One of our purchasing agents used the product's ability to transfer files to and from other programs to copy his supplier list into the product. He quickly began to depend on the ability to automatically call up the suppliers of a given product using the cross-reference capability. By pressing P, the supplier's phone number was automatically dialed, including dialing 9 for an outside line and accessing Sprint or MCI. By the time he was off the phone he had made and filed notes regarding the conversation and what was said, including setting any necessary call-back dates or times.

The function keys, F1 to F10, are user definable. They are used for any information that is to be accessed frequently, such as current date and time, a message that says "Call back in two weeks," the standard format for a telephone message, or whatever. The keys can be re-programmed at any time by simultaneously holding down the ALT key and the function key to be changed.

The ability to switch to another program and still have the product announce appointments was easy to invoke by typing M and placing a bootable program disk into the A: drive. One can then switch back and forth with Ctrl Break. Some disk swapping is necessary. For example, loading a word processing program requires switching the program disks. The Desk Organizer program disk must be replaced in the A: drive to access any of its functions. At that point no further disk swapping is necessary unless the word processor requires access to its disk, as for printing or to save a file. If needed, both drives may be used for another program without affecting the announcing of scheduled appointments. The diskettes would then need to be swapped to retrieve the information related to the appointment.

We have tried several forms of time management programs, and the results were disappointing because many of the programs could only function when running alone on the system. The true value of an "organizer" program cannot be realized if it must be removed from the



Conceptual Instruments Desk Organizer Time & Information Management Package

box, taken out of its jacket, loaded, and run. That long chain of events is killing to the person who needs to find something immediately. Many times, these unfavorable sequences of events result in the program being bypassed for the conventional "paper on the wall" method of organization. This product eliminates that, at least for the user who has the memory and disk space to manage it.

For those who spend a great deal of time on the phone and do not require the use of a disk-intensive program, the product is worth trying. With so many features, anyone willing to make a change for the better will find at least one or 2 of them to be of great value.

Support

The product is supported directly by the vendor. A phone number is given.

Returning the registration card includes a one-year subscription to the quarterly publication *New Tools*, a printed newsletter which includes useful ideas and sometimes a disk with product enhancements.

Complete support for the first year is included in the purchase price. Replacement disks, product upgrades, the *New Tools* newsletter, everything. Annual renewals after the first year will be available on a subscription basis, the pricing of which is yet to be determined.

System Interface

The ability to transfer text to and from the notepad and index areas is the only interface available due to the use of a proprietary operating system. There is no way to access data files other than through the program itself.

The program can reside in memory with nearly anything, one of its most significant strengths. We did not verify that it could actually operate with some of the modern super-packages, but according to the vendor, most software is compatible, given the memory.

Vendor Experience

The vendor has been in business since 1981, but indicated that the product has been in development since 1978.

LCNS: license fee.

■ DETAILED PRODUCT DESCRIPTION

Terms & Support

Terms • the product is available on a purchase license basis from retail outlets; beginning in May, the product will be distributed under the Warner software logo.

Support • telephone support provided by the vendor; the retail price includes one year of complete support (including updates) and one year's subscription to the quarterly user's magazine.

Component Summary

A program and tutorial diskette are provided. Due to the proprietary nature of the operating system, no listing of files is available:

\$250 lens

Computers/Operating Systems Supported

The package runs on the IBM PC and PC/XT; the vendor claims it also runs on the Compaq and other IBM PC-compatible systems. The package is supplied with a proprietary operating system that allows the operating systems provided with the microcomputer system to run concurrently in the available memory.

Minimum Operating Requirements

The program resides in 64K bytes of memory and requires 2 diskette drives and an 80-column monitor. For practical operation, a system with 256K bytes of memory may be necessary. This extra memory is used by other programs and their operating systems.

Features

Command Structure • none available.

Multiple Program Support • product resides in 64K or 128K bytes of system memory, allowing another program to be operating in the remaining system memory (if available).

Calendaring • keeps track of dates and monitors appointments which can be set to trigger alarms and display pre-selected information on the screen.

Printer Control • allows use of special printer commands from within the program.

Calculations • formulas can be filed for later use; 8 registers available for maintaining variables.

Autodialer • identifies a phone number anywhere within a selected portion of text; can be programmed to include access codes, area codes, etc.

• END



Context Management Systems MBA

Integrated Decision Support Program

■ PROFILE

Function • Integrated Decision Support Program providing 5 functions: spreadsheet, graphics, communications, word processing and data management.

Computers/Operating Systems Supported • IBM Personal Computer, IBM PC/XT, other computers supporting UCSD p-System (Version 4).

Configuration • 256K bytes of RAM, one floppy drive containing at least 320K bytes each; color/graphics board and the appropriate monitor; printer with appropriate interface card is optional.

Current Version/Version Reviewed • 2.3/Release 2.0.

First Delivery • June 1982.

Number of Installations • over 10,000.

Comparable Products • Lotus Development Lotus 1-2-3 (but MBA provides 5 integrated functions, 1-2-3 provides 3).

Optional Associated Software • none.

Price • \$695 retail price.

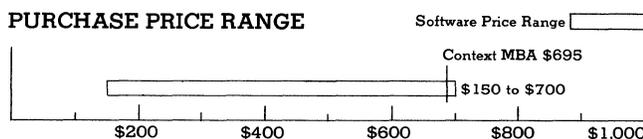
Vendor • Context Management Systems; 23864 Hawthorne Boulevard, Suite 101, Torrance, CA 90505 • 213-378-8277.

■ ANALYSIS

MBA by Context Management Systems is an ambitious software package which offers a wide range of business functions including modeling, graphing, and word processing. Generally it succeeds in providing the basic functionality of each area, but it does not offer as much power as the best dedicated programs which concentrate on the particular area. It is the same problem usually encountered when a generalist meets a specialist: the generalist can do more things than the specialist can, but within the range of specialization the specialist can do them better.

As a spreadsheet program, MBA offers basic arithmetic, logical, trigonometric, and financial functions, but when an item is entered, it is entered on a command line then moved to the appropriate cell via the carriage return key. Then the user must position the cursor in the next cell to be updated. The fact that the program is implemented in the UCSD p-System rather than in a high-speed language causes MBA to be VERY slow in recalculations and other spreadsheet functions.

PURCHASE PRICE RANGE



CONTEXT MANAGEMENT SYSTEMS MBA PRICING • open bar shows the typical range of prices for **INTEGRATED DECISION SUPPORT** software used in a corporate environment • the vertical line within the bar graph indicates the price of **MBA**, the evaluated product, relative to the price range of similar products.

PRODUCT QUALITY RATINGS*

	1	2	3	4	5	6	7	8	9	10
ENVIRONMENT	████████████████████									
DOCUMENTATION	██									
FUNCTIONALITY	██									
EASE OF USE	████████████████████████████████									
SUPPORT	████████████████████████████████									
SYSTEM INTERFACE	-									
EXPERIENCE OF VENDOR	████████████████████████████████									

*For an explanation of rating criteria, please refer to the Spreadsheet Features section in the Software Evaluations (805) report.

As a graphics program, MBA offers nine separate graphing functions which include pie, scatter, line, area, and bar types, but it offers little diversity in the form of headings and titles. To be sure, headings and titles can be added to the graph, but the pitch and font are not readily controllable. We found that having the graphs displayable at the same time as the data used to create them was very useful. Like spreadsheet operations, graph operations are usually very slow.

And, while an adequate word processor, MBA does not possess the sophisticated features of a dedicated program to control highlighting, underlining, and the like. The general approach to word processing is simplistic; the assumption seems to be that a professional or executive user couldn't possibly be keying enough to require a full-feature product.

The integration of functionality within the product had some definite advantages over trying to tie unrelated products from different sources, and the individual functions of MBA are reasonable to use. Lack of functionality may be a high price to pay for integration, particularly in environments where work is carefully scheduled and switches between functions can be expected to be rare. "Reasonable" to use is not the same as "useful," and when offered a choice between Context MBA and a combination of specialized software for the same total functionality, the average corporation will probably be most happy with the latter.

□ Strengths

The most obvious strength of this product is its integrated functionality. It provides spreadsheet processing, graphics, communications, word processing, and data base management facilities all under one roof. The transition between functions is particularly painless as neither place nor data is lost during the change. Professional/managerial personnel whose activities cannot be as easily planned may find this rapid and fully-controlled context switch to another application a very valuable feature in dealing with momen-



Context Management Systems MBA Integrated Decision Support Program

tary interruptions and in integrating graphics, spreadsheet results, and text.

Another feature which our professional staff found particularly helpful was the windowing function which allowed us to view up to four separate areas of the workspace. Each area can take the form of any acceptable option of the program (spreadsheet, graphics, and the like). It also gives the professional an immediate visual response to changed data from one area to another when applicable.

MBA supports a communication facility with which the user can interface with other computers with a similar facility. If the other computer has MBA, spreadsheets/models can be exchanged. The default values employed by MBA in communications include the conventions of most popular networks.

□ Limitations

Our technical staff found it ironic that Context Management Systems would include the following instructions taken from the Tutorial manual (section 3.6, page 41): "Back up everything you value!" and yet not permit the backing up of their product. The lack of a copyable master diskette is a severe constraint to be placed on the system. Context does provide a backup copy of the diskette when the program license agreement is returned to them, but there is ample time for a catastrophe to happen while waiting for the reserve copy.

Most IBM PC program products run under PC-DOS. Having this program utilize the UCSD p-System causes a distinct communication gap. We could solve our problem by using the communication facility of the program to transmit and receive information from other sources with the minor inconvenience of using a second IBM PC.

The most significant limitation associated with MBA is inherent in its integrated approach. The individual elements of the product are not as flexible, fast, and powerful as separate programs which addressed the same areas could be. The word processor lacks many modern features, the spreadsheet product is very slow, and the data base operates in a spreadsheet context, making it more a feature extension of the spreadsheet function than an independent product.

■ HANDS-ON EVALUATION



As is our general practice, our technical staff spent the first few minutes of the analysis of this product skimming through all of the documentation provided with the package to uncover any obvious problems and to find the installation instructions. At this stage the special machine requirements for the package were noted for installation and the fact that the program diskette was **copy protected** and the conditions for acquiring a backup copy of the program diskette were uncovered. In this case, the End User License Agreement must be filled out and sent in to get the reserve copy.

Installation required no special functions or equipment. In fact, the installation procedure is the same each time the program is run: put the diskette containing the program into drive "A" and boot the system. The user then selects how much of available memory is to be used for work

space which allows the user to tune the performance of the system for the particular application which is to be undertaken.

Loading MBA is a startling experience—it takes over a minute to complete and is accompanied by strange disk noises. We thought there was a problem with the package at first. When MBA completes and requests another disk to boot, it displays a bordered screen that convinced one operator it was eating the disk supplied, causing him to power the system down. In all, you needed a lot of faith to just sit and watch the process.

We found that the tutorial was a necessary first step for all of our staff. There are thirteen lessons which take an estimated half an hour each to complete. We found that the estimate supplied was optimistic; an hour per lesson is more accurate. The thirteen lessons are well organized and presented and exercised all of the major functions of the product.

After approximately two days with the tutorial, we went on to our own applications. Perhaps because our organization had experience with specialized packages in each of the functional areas covered by MBA, the product was generally poorly received. There were no major faults found, but in each application trial our users complained of inefficiencies, quirks and functional omissions, or just lack of features. There was little WRONG with the package, but neither was there enough RIGHT.

□ User Interface

Context MBA uses a multiwindow, multifaceted approach to enter, update, and report on data. The command structure is mnemonic with the available options displayed across the screen. The net result is an easy-to-use method for keeping track of your data with minimal need for the reference manual.

Menus: A hierarchy of menus is available to the user by pressing the HELP (?) key. This will display the options available at that point in the command structure. No conventional menu structure is present.

Control characters: None.

Function/special keys: Commands are entered as a slash followed by a letter followed by any appropriate options. The commands are mnemonic, generally the first letter of the word they represent; however, the large number of commands means that some have to settle for the second or third letter of the word.

Command language: Formulas may be entered into any cell using conventional mathematical/algebraic notation. Formulas may also contain references to predefined functions (generally, a word preceded by an @ sign such as @plot).

Positive feedback: A counter is provided in the status display to reassure the user that the program is functioning, this is used for those commands which do not produce results that are immediately apparent. Potentially destructive acts such as initializing a folder (file) require confirmation from the operator.

Status display: The volume name or number, the document



Context Management Systems MBA Integrated Decision Support Program

name, the current cell address and the available memory comprise the first status line. The second status line is blank most of the time. It is used in conjunction with the replicate command and with database commands. The third status line is used for prompts, echoing commands, and as a counter.

Help facilities: Additional information may be obtained on any command by entering the command followed by a question mark. Thus /E? will fill the current window with the options available for editing a text cell.

□ Environment

Context MBA is written to run under the UCSD p-System operating system which isolates it from the standard PC-DOS environment. This means that the system must be rebooted in order to begin the program unless one is already in the p-System environment. During the lengthy program load, MBA asks for an option choice to select a system optimized for execution time or worksheet size. You halve your workspace by selecting time optimization, but the performance of the package in calculating large worksheets is unacceptable in the maximize-space mode.

Context Management Systems indicate that only one double-sided disk drive is necessary for the program, but that drive must be the left drive. That is the drive from which the operating system will be read when the system is turned on or "boot" strap loaded. For PC-DOS this is drive "A". Since a PC is supposed to work with the double-sided drive of a mixed system set as EITHER the "A" or "B" drive, there is a 50% chance that MBA will not work on a mixed-drive system. We had one such system, and it would not support this product. However, the standard configuration for the PC/XT currently contains a double-sided drive as drive "A". MBA cannot be installed to hard disk because the operating system for the p-System must be loaded each time from floppy.

At least 256K bytes of random access memory (RAM) is required to operate the system. Additional memory will be utilized by the system either as additional work space or as program space based upon options offered at installation time. The configuration of the available memory is a trade-off between performance and space. We generally chose the performance option for our system as our files would comfortably fit in the lesser work space.

A color/graphics card and monitor are noted as required for the operation of the system. In fact, the program can be run with the monochrome display board and monitor, but wherever graphics are used, a message indicating that a graph should be there is displayed instead of the actual graph.

□ Documentation

Context MBA is delivered in a large slipcase binder which looks similar to those supplied by IBM. Inside, we found two large manuals, an MBA Tutorial and an MBA Reference Manual; two small pamphlets, "Using the MBA on your IBM Personal Computer" and "Demo Models for the MBA"; and a plasticized MBA Desktop Reference. Also included is a protective folio with two diskettes, one for the program the other for the tutorial files. The binder and manuals are heavy enough to surprise you; one of our staff dropped the package within hours of receipt.

The tutorial manual is a MUST with this product because of its complexity. The lessons will require as much as several days to complete, however, and the resulting effect on department efficiency successfully created a backlog of applications to try the package on, as well as a typical "I-want-that-now" air of expectancy.

We found that the documentation was organized with each major function in a segregated area which assisted each member of our staff in finding the specific instructions which were applicable to their questions. We also found that the number of illustrations provided with the text varied with subject matter; there were far more illustrations contained in the graphics section than included in the word processing section. We felt that the amount of illustrations was adequate, but we would have preferred a few more, especially sample screens for word processing and communications.

Our professional staff was pleased with the wording of the documentation. They indicated that it was not loaded with technical jargon and was, consequently, easy to understand. Our secretarial staff also found the manuals well written and generally easy to understand, but had some questions on the more technical issues. Our technical staff found the documentation generally good.

□ Functionality

MBA offers five means of handling data: modeling, graphs, database, word processing, and communications.

The modeling or spreadsheet processing program contains thirty-six logarithmic, trigonometric, financial, and logical functions ranging from obtaining the "absolute value" of a number through the financial calculation of "net present value" to the statistical calculation of the "variance" of the non-blank values in a specified range. Our professional staff found the functions available within the modeling segment to be very helpful. MBA offers functions to calculate two forms of internal rate of return directly, rather than requiring the construction of a formula. In general, the functions were extensions of the common functions of spreadsheets such as VisiCalc.

Cell reference in MBA is also generally standard. A useful extension is the ability to insert up to 28 "markers" in the spreadsheet, each with a name up to 15 characters long. The marker can be used to position the cursor (move to "xyz") or as an operand in commands such as "blank." A "box" is a range marker, and can also be defined. Unfortunately, a marker cannot be used in any function references, so you cannot use markers to name cells for reference in such things as financial calculations. Markers are used for the @CPY function, which copies from disk to the current worksheet, making this function somewhat limited due to the limitations in the number of markers.

Graphic capabilities are integral with worksheet processing. The worksheet can be graphed, and graphs may be displayed in a worksheet "window," making it possible to view the graph as well as the original data which created it. This proved very useful in diagnosing problems with graph structure or determining the source of stray or illogical values. Nine separate format options are offered including pie, scatter, high-low-close, line, area, and bar charts which should be enough for most corporate applications.



Context Management Systems MBA Integrated Decision Support Program

The major drawback of the graphic system is not its capacity to produce a valid representation of the data supplied, but rather is concerned with the presentation of the data to upper management. Both our professional and technical staffs found the lack of control over the titular data to be a serious deficiency. This was felt to be an example of the trade-off features for integration. Our department head did not like the trade.

Database operations are extensions of the spreadsheet functions. It is possible to define a "form" for database entry, that is a section of the spreadsheet into which data is keyed before being "moved" elsewhere or copied into the data base. Our users found the idea of entry forms difficult to grasp, particularly since the documentation does not really explain it. Our technical staff, on the other hand, found the use of the data base entry form to be workable. They set up a small invoice file and were able to perform all of the standard input/output operations. In addition, the program allowed them to present the data in sequence (sorted on up to six fields at one time) and in an output form for review or printing. They particularly liked the windowing function which allowed for a simultaneous display of both data and form.

Our secretarial staff was not overly impressed with the capabilities of the word processing segment of the product. They created inter-office memoranda with generally good results, but were disappointed with the results of business letters. This stemmed from a lack of controls over the presentation of the text such as underscore and enhanced characters for highlighting.

The communications facilities of MBA are basically functional. They did not attempt to sign on to all of the networks listed, but they had no problems with any which they tried. We were pleased to notice that a very brief overview of telecommunication theory and a glossary of communication terms was included in the reference manual. We successfully set up an IBM-PC to IBM-PC link (to transfer a file to the other system so that we could get it into IBM's standard DOS format.) Our technical staff did indicate that the instructions provided in the reference manual were sufficient for most professionals to use successfully and our professional staff, after careful review, concurred.

Ease of Use

We found the product to be cumbersome to use in standard operation. It required a system reboot each time we wished to change from a PC-DOS operation to MBA. This would not have been as pronounced if our usage had been primarily utilizing the UCSD p-System; however, most of our applications are designed to run under PC-DOS.

The lexicon of the p-System user is apparently somewhat different from the DOS user, and Context MBA adds to its own jargon in some areas. The result is that it can be difficult to relate their terms to the real world. "Volume name" or "unit name" are not common terms in the PC world; and why can't a "folder" be a "file" the way it is with every other package? One secretary asked if she would have to learn a new language for EVERY new product we tried!

We also were disappointed that Context Management Systems has chosen to **copy protect** the program diskette. This

makes it difficult to use on the IBM-XT, especially since no program to install the product on hard disk is provided. It is possible to run the program on the XT from the floppy disk drive, but it would be more convenient to have the program resident on the hard disk.

The product performed as represented. We were able to accomplish each phase of the tutorial without undue problems. The instructions provided for each task were adequate. Most of the problems which we encountered were a result of attempting operations not specifically documented in the product such as highlighting and underscoring. Since the product, particularly in the area of word processing, is restrictive relative to industry standard, it would have been helpful if either a list of supported functions or a list of common functions NOT supported could have been provided. It would have saved a lot of documentation searching.

The program requires special disk formatting which creates "documents" within "folders." This format is analogous to the tree structure found within PC-DOS, but the two are mutually exclusive.

Support

We found support an interesting challenge with MBA. When we had questions on the package, we attempted to locate a support phone number. In the process of doing so we found a nice description of spreadsheet concepts in the reference manual (it should have been in the tutorial) and a page which listed the names of the lead programmers on the MBA project, but no phone number.

Resorting to an industry tabloid whose ad had a phone number, we contacted Context Management Systems to discuss the long recalculate delays with the product. They gave us a short tutorial on the advantages in portability of a p-System product and told us that the performance of the p-System was satisfactory for most applications on most commercial microcomputers. Apparently we were not representative of either category.

With questions on procedure and features, the technical support was more satisfactory. A support number is provided when the warranty card is returned, and calling that number generally resulted in quick and accurate solutions to problems.

System Interface

All interfacing with other products is performed via the communication facility. This allows the product to interface with any other product regardless of operating system considerations. There is no provision, however, for file format changes or conversions. We could not find any reference to the format of MBA files, nor any reference on the use of files created by other spreadsheet programs. MBA apparently does not support the more-or-less standard DIF file structure, since it is not covered in any documentation.

Vendor Experience

Context Management Systems is relatively new to the computer market joining in 1980. They are a small company having less than 20 employees.



Context Management Systems MBA Integrated Decision Support Program

■ PRODUCT OVERVIEW

□ Terms & Support

Terms • Context MBA is available for purchase only from Context Management Systems, through computer dealers, software dealers, and mail order firms throughout the United States and internationally.

Support • support phone number is provided when the Warranty Card is returned.

□ Component Summary

Software elements include 2 diskettes. Disk 1 contains the operating system and the programs. No specific files are listed.

Disk 2 contains the 20 models for the tutorial each of which demonstrates the utility of the system.

Context Management MBA:

\$695 lcns

□ Computers & Operating Systems Supported

MBA runs on the IBM Personal Computer, IBM PC/XT and other systems supporting UCSD p-System (Version 4).

□ Minimum Operating Requirements

MBA requires a minimum memory of 256K bytes and one 320K-byte floppy disk drive. A color/graphics card and a monitor are required. If a monochrome display board and monitor are used, when the graphics function is implemented a message indicating that a graph should appear is displayed instead of the graph.

A printer with appropriate interface card is optional.

□ Features

Spreadsheet Size • variable based on system memory and selec-

LCNS: license fee.

tion of optimization for spreadsheet size or execution speed; on a 256K-byte system, the largest worksheet available is approximately 118K bytes, and the size provided if execution speed is optimized is about 50K bytes.

Command Type • single-character commands entered on a command line; no menu features are available; a Help function provides entry assistance at all command stages.

Financial Functions Supported • internal rate of return, modified internal rate of return based on reinvestment rate, net present value.

Statistical Functions Supported • count of elements in a list, sum of values of elements in a list, maximum and minimum value of elements in a list, standard deviation of elements in a list, variance of elements in a list.

Cell Reference • via pointing with cursor control keys or entry of absolute references; relative reference not supported; limited cell naming available, but names may not be used in formulas.

Window Capabilities • up to 4, split horizontally or vertically; windows may display independent parts of the worksheet or may display according to a form defined by the user; graphs may also occupy a window.

Range Facilities • ranges may be specified for most functions and formulas; groups of cells may also be named via a "box" label for function references such as blanking.

Print Facilities • printing by cell, by screen, by range, and by spreadsheet are supported; headings may be printed or suppressed.

Load/Save Facilities • basic facilities permit loading and saving of complete spreadsheets; CPY command supports restricted, selective loading and saving.

• END

