MICROPOLIS™ NEWS

Volume 7 Spring 1982

LEARNING WITH MICROS

by Louis E. Frenzel

Industrial Training Applications

When you think of computers and education, you probably think of microcomputer applications in colleges, high schools and elementary schools. However, because micros are excellent dispensers of self-paced learning materials, they can be used in virtually any educational or training situation.

Business, industry and government are now discovering this. Business and industry are rapidly adopting microcomputers for word processing, forecasting and decision making, budgeting, accounting, inventory and other data processing functions. Meanwhile, many managers and executives are beginning to see that the micro can also be an excellent training tool.

Most companies use some form of training to teach new employees or to train existing employees. In an effort to improve productivity and efficiency in the work place, industrial trainers are developing and presenting courses teaching subjects applicable to the company's work.

Such programs have proven remarkably effective in minimizing employee mistakes, improving quality, changing attitudes, reducing absences and generally increasing overall employee performance. Whether it's a course to teach new hires how to operate a fork lift truck, solder a printed circuit board or deal with telephone complaints from customers, industrial training has demonstrated its ability to change people's behavior. The result is often improved company performance and greater customer satisfaction.

Training in business and industry also affects management. There is a variety of courses given to improve managerial effectiveness and to teach managers new skills. Training in sales techniques is a particularly big field, as sales training invariably produces impressive sales increases.

No movement in progress

This whole business/industry training movement is generally known as human resources development (HRD). The whole HRD movement is a huge and growing market. Accurate data on market size are hard to come by, but one estimate puts the figure at nearly ten billion dollars per year. This is money spent by industry and government directly on all forms of training, including seminars and workshops, in-house courses, video tapes, films, A/V machines, books, and all manner of learning paraphernalia. Industrial trainers are just now recognizing that the microcomputer is part of all this.

Recently I attended the annual conference of the American Society for Training and Development (ASTD) in Boston. ASTD is the professional society of HRD practitioners and industrial trainers. They meet each year to discuss experiences, share new methods and techniques and learn how to perform their jobs better. I was pleasantly surprised to see several talks and meetings on CAI and the use of computers in industrial training. There were even several hardware and software firms displaying applicable ware at the exhibits. We can expect to see a lot of microcomputer and CAI action in the industrial training field in the future.

Because of the computer's unique ability to sequentially present information to be learned, provide feedback and test automatically, it is an ideal tool for industrial training. Although micros do not fit well in all learning applications, they are highly effective for many subjects. Subjects that adapt themselves to programmed instruction or, in some cases, to A/V methods are prospective candidates for CAI.

Individualized training is possible

The micro facilitates self-paced learning. In many training situations, it is undesirable to keep an employee from his job too long. Conducting long residence classes is expensive and the employee is non-productive during the training period. So trainers try to teach as much as possible in the least amount of time. Also the training situation is not always convenient with the employee's work schedule. Self-paced training programs can often solve this problem. When a micro is used, the employee can sit down when he or she has time and go through the learning process.

Perhaps the biggest problem is the lack of software. What else is new? There is never enough good software, although some really significant advances have been made in the past year. While a tremendous amount of software is now being developed for the school market, little or nothing is being done for industrial training. This is not surprising in view of the very broad range of subjects taught in industry.

It is difficult to identify subjects that will be of interest to a broad audience. Many companies need special training materials on unique subjects, such as a course in how to operate or repair a machine they manufacture. According to one study, 70% of the industrial training courses given are developed internally by company trainers. The reason for this is the need for specialized programs that only the company, with its unique expertise, can develop. But it is also a reaction to the fact that there are not enough packed or canned courses available.

The industrial training market is an excellent opportuntity for some publisher or software house. With little study, it would be possible to identify hot subject areas and market niches that need filling. When software becomes available, trainers will also buy micros. They don't buy movie projectors before films are available. And unlike schools which have tiny, limited budgets and complicated purchasing procedures, business and industry has money and efficient purchase practices. Industry is typically a lot easier to deal with in this regard than most educational institutions.

One company that has recognized the industrial training market is Bell & Howell (Chicago, IL). The company's Audio Visual Products Division sells a modified and private labelled version of the Apple II computer as an industrial training device, just as it sells 16mm. slide and overhead projectors.

To take care of the lack of software, the company has developed PASS, the Professional Authoring Software System. This piece of software allows virtually anyone with a knowledge of the subject to develop a CAI program without having to know how to code in Basic or another computer language. PASS includes an authoring segment that allows you to write the learning material in English. Even high resolution graphics capability is included. PASS also includes a presentation segment that allows the material developed to be prsented to the student. The management segment permits all forms of branching and record keeping for each student.

Finally, the reporting segment allows analysis of learner performance and keeps track of the success rate of the lesson material and the exams. An industrial trainer can create his own unique training programs. This is the type of authoring system that will help industrial trainers use micros. It will be

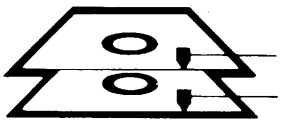
Data Manager
is here!

DATA MANAGER is the Data Management System designed especially for users of MICROPOLIS BASIC. It has been optimized for maximum performance and ease of use because it is not an adaptation of a system written in a different language.

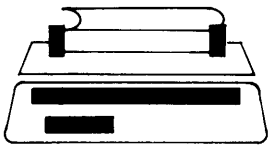
The result of several years of development in turnkey business systems, DATA MANAGER is designed to be used by ordinary office personnel. The entire system is menu driven, allowing use of every feature without learning a command language; thereby increasing operator efficiency. The system is also designed for ease of maintenence, modification, and expansion. The majority of the system is written in BASIC, with machine language utilities used to increase speed where needed.

At the user level, DATA MANAGER makes a microcomputer seem like a much larger machine. Data displays and user interaction are presented in immediately updated page format instead of scrolling, and highlighting and reverse video are used for emphasis on terminals with these features. DATA MANAGER is configured with a special program to use the features of your terminal and printer to best advantage. It will even simulate random cursor addressing on some terminals that don't have this feature.

Data entry is fast and reliable. DATA MANAGER'S data entry and update functions reduce the number of keystrokes required and validation routines keep errors out of the database. For jobs requiring cross-referencing or lookup, several files can be made available for data update or inquiry at the same time.



Files used in the database created with DATA MANAGER are maintained according to a user-defined record structure that is flexible and easy to understand. Files may be of any size up to 10,000 records or until disk drive capacity is exceeded, and several records are stored per disk sector when possible. The size of the database is limited only by available disk storage. Disk access is available in a variety of different modes including instant random access by relative position, fast lookup by key, image fitting, and sequential. DATA MANAGER includes high speed file processing and data transfer features such as a fast multi-level sort, selective edit and copy, and file compression.



The user has complete control over the content and layout of reports, including adaptation to various form sizes, multiple-line titling, footnotes, and any size label format. One of DATA MANAGER'S most powerful features, the report package allows printing of either individual sheets or continuous forms and can make use of special printer features such as expanded print. Any mathematical operation, function or precision available in MICROPOLIS BASIC can be used to compute report information, making the storage of computed data unnecessary. There can even be eight levels of subtotals printed in priority sequence automatically.

DATA MANAGER has applications in every field where records must be kept, data processed, and reports printed. It's generalized nature allows complete flexibility in database maintenance and it's professional design makes it a wise business choice. The standard system, including custom configuration for your terminal and printer is only $450.00 on MICROPOLIS MOD II format diskette. If you are an OEM, System House, or Retail Dealer, we can show you how DATA MANAGER can be customized into an application-oriented turnkey system at a fraction of the cost of custom software. Write on your company letterhead for complete dealer information.

CALL OR WRITE:

DATASMITH
BOX 8036
SHAWNEE MISSION, KANSAS 66208

PHONE: (913) 381-9118

A JOINT VENTURE

Computer Center
. . a BYTE SHOP
the affordable computer store
5815 JOHNSON DRIVE MISSION, KANSAS 66202
PHONE 913-432-BYTE

DATASMITH
Micro Software Systems
Box 8036 Shawnee Mission, Kansas (913) 381-9118

nteresting to see if any publishers or software houses also respond with CAI packages specifically aimed at the industrial market.

Reprinted with permission from Interface Age, September 1981, Volume 6, Issue 9.

THAT'S INCREDIBLE

Recently we received a call from the owner of a Micropolis 1037-II dual drive for a TRS-80 who wanted to send it to us for repair. We always ask what the problem is, and this time it was one for the books. It seems the gentleman was guilty of attempted "drivicide" -- the weapon used was a pistol.

Needless to say, we anxiously awaited its arrival to see what condition it was in. When the unit finally arrived, the only visible evidence was a protrusion on the back of the enclosure, indicating that the muzzle of the gun had been put directly against the door. The repairs necessary were replacing the receiver on the top drive, a new door switch and fixing the head spring, also on the top drive. The enclosure was dented, but did not have to be replaced.

Naturally, we don't advise you to shoot your drive if something goes wrong, but it's nice to know our products are tough.

GROWING PAINS

The summer of '81 was a busy time for Micropolis. We opened a European Operations office in England to handle sales and rvice for our many European customers. Located at 210 Elgar oad in Reading, the office is headed by Terry Ostridge. He is assisted by Angie Gumbrell, and Richard Hodgson is responsible for technical support. A secretary and salesperson were recently added to the staff.

At the same time, we opened an Eastern Regional Sales office in Cherry Hill, New Jersey. Bob Otten is the manager and is responsible for the territory east of the Mississippi.

In January of '82 we made the move to our new 60,000 sq. ft. facility one block east of the 50,000 sq. ft. building we occupied in late 1979. That building is still in use and is devoted to producing 20,000 rigid disk drives a year. The new building houses our corporate offices, sales, marketing, personnel, accounting, and of course, floppy disk production. This new facility gives us the capability to produce 500,000 96 tpi drives a year. The address of the new building is 21123 Nordhoff Street and the phone number is the same.

AN OVERVIEW OF MICROPOLIS BASIC

by Burks A. Smith

Micropolis has a reputation for manufacturing an extremely reliable disk drive that manages to pack 315K bytes on a single sided 5 1/4 inch minifloppy. Besides their excellent hardware, Micropolis BASIC, which is usually provided with the drives, (subsystems) is one of the most powerful versions of BASIC available. For the benefit of those who are not familiar with it, we hope to provide some insight into its features.

Micropolis BASIC is a large interpreter, occupying the first 24K of RAM. This means that you'll need at least a 32K system to use it at all, and more memory is advisable if you intend to write very long programs without having to CHAIN them. Interestingly, this version of BASIC does not require a separate operating system. There is an operating system called MDOS included with the Micropolis software package, but when BASIC is loaded MDOS is almost completely overwritten in memory. The only code that MDOS and BASIC have in common is the custom-configured I/O module needed to communicate with the terminal and printer. In fact, it is a simple matter to make a system disk that boots directly to BASIC without having to load the operating system first.

The majority of commands used in Micropolis BASIC are typical of those found in other extended disk BASICs. A complete inventory of general mathematics and trigonometry functions is provided, along with full string handling, including string lengths up to 250 characters and three dimensional string arrays. Also included are extensive editing and renumbering features. However, there are some very unique features that greatly add to the versatility of the system and deserve special mention.

User Specified Precision

The precision of a variable stored in a computer's memory depends on how much storage space is allocated to that variable. What this means to the user is that he or she only has a certain number of significant digits available in any mathematical operation. This may not be important for balancing a checkbook or simple calculations, but for keeping the books of large companies or for certain engineering purposes it becomes a major consideration. For instance, accurately storing a sum of money in the ten million dollar range down to the cents requires ten significant figures. Most larger versions of BASIC have provision for using either single precision or double precision variables through some sort of assignment statement, but Micropolis BASIC allows the user to specify exactly how much storage is used for with what is called a SIZES statement. For example, the user may specify that the precision may be anywhere from four signifgicant figures all the way up to a mind-boggling 58 figures for accuracy freaks. The uses of the SIZES statement allows good memory management, since you only use the accuracy you need for a particular program.

Numeric Formatting

Almost all extended BASIC versions make use of the PRINT USING command to format a numeric value for output. This command takes a numeric value and formats it according to a "picture" of the desired output form represented as a string variable. Therefore, the command:

```
PRINT USING A$, X
```

will output the variable X according to a format determined by the value of A$. Micropolis does things differently. Instead of a PRINT USING command, they provide a format function (FMT) which returns a string value determined in the same way PRINT USING works. In Micropolis BASIC

```
PRINT FMT(X,A$)
```

performs exactly the same function as the PRINT USING statment above. In other words, the value X is formatted according to the value of A$. While this may seem as simply a different way of doing the same thing, it provides flexibility that may not be immediately obvious. For example, with the FMT function, several values may be formatted differently in the same PRINT statement as follows:

```
PRINT FMT(X,A$),FMT(Y,B$),FMT(Z,C$)
```

In the above example, the values X, Y, and Z are each formatted according to a different "picture" represented by A$, B$, and C$

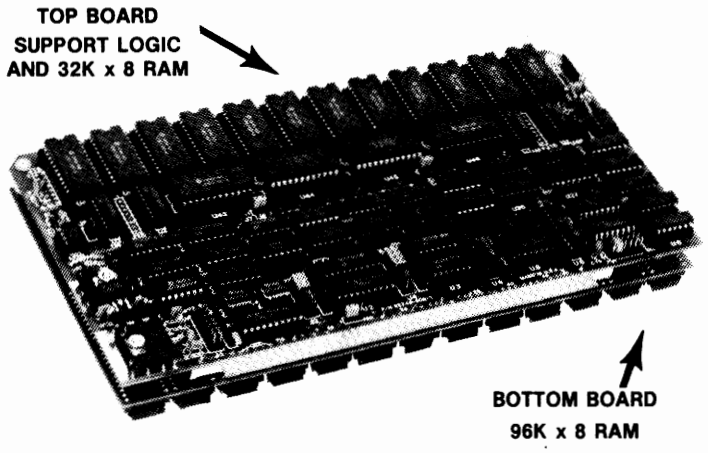
The NO Compromise on P³* S-100 Plug-Ins

*(Performance, Power, Price)

THE FIRST DOUBLE MODULE S-100/IEEE-696

ONE MEGABIT STATIC RAM FOR ONLY $1024.00

THAT'S LESS THAN 1¢ PER BIT (Regular Price $1295.00)



- 128K x 8/64K x 16 organization
- 2K x 8 150nsec. Max. RAM devices (70, 90 or 120 nsec, optional)
- Pin compatible with Intel 2716 type EPROMS
- Dynamic 16 or 8 bit configuration selection
- 24 bit extended address or 16 bit S-100 Std.
- Physical board address on 16K/8K boundaries
- Memory Management functions. (Software or hardware selectable)
  - Bank select / deselect
  - Bank write protect
  - Bank readdress
  - } 32K / 16K Banks
  - Phantom select/override
  - Wait cycle select/deselect
- I/O Port selection independent of Memory address (2 out of 256)
- MWRITE & PHANTOM logic selection
- Error signal on write attempts into write protected areas
- Battery back-up capability
- Low input power requirements: 600Ma. Max. active 8VDC in. 30Ma. Avg. battery back-up
- Modular construction — Module can be easily and quickly disassembled for maintenance (no solder connections between boards)
- Single Bus Connector Interface
- Dimensions — 5.125"H x 10.0"W x 1.25"D
- Weight — 1.5 lbs.
- Comprehensive Users Manual
- On-board Test circuit
- Plus more...

PART 52748-650-128 (Assembled and Tested)
Inquire about other versions

Please ship _____ Megaram Boards as described above @ $1024.00 each.

☐ CHECK ☐ VISA OR MASTERCARD

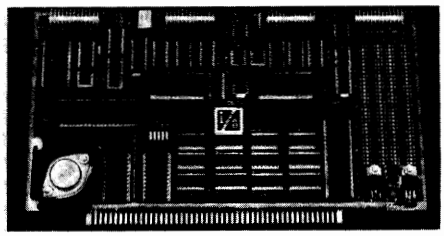
CARD # _____ EXP. _____

NAME _____

STREET _____

CITY, STATE, ZIP _____

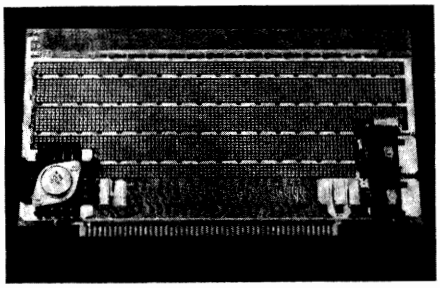
MULTI-FUNCTION I/O BOARD



The multiple on-board functions allow for complete software and hardware I/O task(s) control. **Features:** Two independent SYNC/ASYNC serial ports (Software programmable with status read interface: RS-232-C or current loop — 20 or 60ma — or TTL with handshaking. Dedicated output connectors for each port) ■One strobed 8-bit parallel port with handshaking (Software status read) ■Three 8-bit parallel ports undedicated & user configured (Software programmable for input, output, plus input/output/bidirectional with handshaking or combinations thereof. Software status read for handshake logic) ■Three independent 16-bit timers (software programmable for 5 operating modes. Indiv. clock source input & gate control — int. or ext. Uninterrupted read. Two buffered outputs) ■Eight level priority interrupt controller (Software programmable highest interrupt level. 8080/Z80 auto restart command) ■Two software programmable baud rate generators with crystal controlled frequencies ± .01% ■Large prototyping area with access to regulated +5, +12, — 12VDC.

Assembled and Tested — P/N 52748-100-101 — $325, Kit P/N 52748-100 — $225, Bare Board P/N 52748-1XX — $85

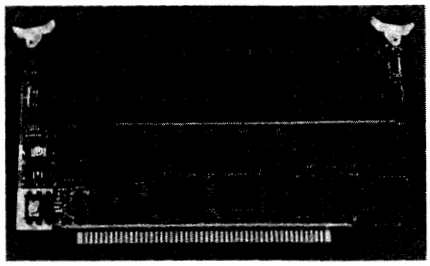
PROTOTYPING BOARD



Provides flexibility and saves hours of power busing layout time.
Features: Bus-bar power distribution ■Allows wire-wrap or soldering of sockets and discrete components ■Accepts all std. sockets on .30" & .60" centers ■3 regulators (+5V ±12V) with filter and decoupling capacitors ■Accepts edge connectors or components on .10" centers.

Kit includes: 3 regulators w/3 heat-sinks/filter capacitors/2 bus bars and manual **P/N 52748-400** **$49.95**

STATIC RAM BOARD



The **32K x 8/16K x 16** STATIC RAM BOARD uses low power and its fast device access time of 200 nsec (max.) allows for operation @4MHz without any wait cycles. **Features:** IEEE-696 compatibility with extended addressing ■Memory address may start and stop on any 4K/2K boundary ■Special Memory Management and Control Functions (selectable via output port control word(s): Bank select/deselect 8K/4K, Bank write protect 8K/4K, Bank readdress 8K/4K ■Software page select/override ■Software wait cycle select (if slower devices utilized by user) ■External power source back-up capability for Memory Array ■Low input power requirements (full memory array - 150 MA max. @8VDC IN — support logic-500 ma typ @8VDC IN) ■Socketed RAMs and support logic IC's for easy maintenance ■Comprehensive Manual.

Assembled and Tested — P/N 52748-500-100 $485, Bare Board P/N 52748-5XX $95.

MasterCard VISA

CA residents add 6% tax
U.S. Domestic Price, FOB Factory

I/O TECHNOLOGY

POST OFFICE BOX 2119
CANYON COUNTRY, CA 91351
(805) 252-7666

respectively. To do the same thing with PRINT USING would require three separate statements. Also, it should be noted that FMT is a general function, and does not have to be used in conjunction with a PRINT statement. It can also be used to convert a numeric variable to a string with a specified format anywhere in the program.

Numbers in Any Base

Normally, any number appearing in a program or input from the keyboard is assumed to be in base 10 arithmetic, but Micropolis BASIC allows numbers in any base. This is done by using an optional notation system called RADIX FORMAT. For example, in the notation 2R10110, the 2 means that the number is base 2, the R specifies RADIX FORMAT and 10110 is a binary number which evaluates to 22 in decimal. Similarly, the notation 16R1EOA is the hexadecimal number 1EOA. This type of notation is often useful when it is inconvenient to translate a hex, octal, or binary number into decimal for use in a program or as input. For simple conversions, the PRINT statement will also print a RADIX FORMAT number's decimal equivalent on the terminal. RADIX FORMAT accepts any base that can be represented in the digits 0 through 9 and the letters A through Z, making the use of bases from 2 to 36 possible.

The most powerful features of Micropolis BASIC are undoubtedly the disk file handling, which is due to the fact that the people who wrote the BASIC also manufacture the drive. Unlike other versions of BASIC where disk operations are performed through an operating system which may be configured for a variety of different types of disk drives, Micropolis BASIC is designed only for Micropolis drives. The media used is a 5 1/4 inch mini diskette with sixteen "hard" sectors for each of 77 tracks. One of the tracks is dedicated to the disk directory, so users have access to 76 tracks with a total of 1216 sectors, each capable of holding 250 bytes.

Disk space is allocated to a file a track at a time and is totally dynamic. BASIC keeps track of which tracks are free and will allocate additional space for a file as it is needed. This eliminates the necessity of defining the size of a file in advance and makes programming very easy. A single file may occupy as little as a single track or as much as the entire disk and deleting a file immediately makes its space available for other files.

All file access is done with PUT and GET statements, which function in exactly the same way as PRINT and INPUT statements and access one physical sector of 250 bytes. In fact, Micropolis uses the identical logic for accessing the printer or terminal as is used to access a disk file. To print on the printer rather than the terminal, for example, a special file called "*P" (for printer) is opened and data is sent to the printer through the PUT statement as if the printer were a disk file. There is also another special file "*T" (for terminal) that outputs to the terminal in the same way. This allows output to be directed to a disk file, the printer, or the terminal with exactly the same program, depending only on which file has been opened.

Because of this file handling structure, a physical sector on a disk can be thought of as a print line. The PUT statement is followed by a list of variables to be output and they will be stored on the disk in the same format as they would appear if a PRINT statement had been used. To get the information off the disk, a GET statement has exactly the same structure as an INPUT statement. It differs from the INPUT statement only in the way it sees delimiters, which are the characters that tell the system when one variable ends and another one starts.

As everyone who uses BASIC knows, several values may be input using an INPUT statement by separating the values by commas. The comma is the "delimiter". In Micropolis BASIC, the comma is the default delimiter, but the delimiter may be changed by defining it as any other character. This allows the INPUT of strings with imbedded commas such as "city, state." With disk access operations using the GET statement, a blank is assumed to be the delimiter for numeric values because a blank is always output following a numeric value in a PRINT or PUT statement. However, in the case of strings, a delimiter must follow the string so the system will know when one string ends and another begins. As already mentioned, the delimiter may assume any value that may be represented in eight bits, even "non-printable" values such as the hexadecimal value FF, so strings of any length and containing any characters except the defined delimiter may be stored on disk and read back as needed.

All Micropolis files are of the true random-access type, although they may be treated as sequential files if desired. In the case of sequential access, if a record number is not specified in the PUT or GET statement, the record accessed is determined by PUT or GET pointers, respectively. When a file is first opened, the GET pointer is automatically set to the first record, and the PUT pointer is set to the last record plus one. Subsequently, every time a PUT or GET is executed, the proper pointer is incremented by one, so the file may be read sequentially from the beginning and written with new records going to the end of the file. As an option, the PUT and GET pointers may be set under program control for flexibility in implementing more sophisticated file access schemes. In the case of random access, the desired record is simply specified in the PUT or GET statement and it is accessed without affecting the pointers.

Micropolis disk drives are available either in dual or quad-density formats and can be used with any S-100 8080 or Z-80 based computer system. The controller board supports up to four drives and comes with an on-board bootstrap program in ROM that brings the system up with a simple jump to its address. The compact storage, relatively low price, and powerful features of Micropolis BASIC make an excellent choice for anyone wanting to get the most out of their computer.

Reprinted by permission of INTERFACE AGE Magazine, Volume 7, Number 9, September 1981.

AND THE DRIVES KEEP ROLLING

We're pleased to announce that we've received some very large orders in recent months. Among them are:

Monroe Systems for Business, a subsidiary of Litton Industries, has ordered floppy drives valued at more than $4 million. The drives will be incorporated into Monroe's OC 8800 professional work station and EC 8800 educational computer.

Tektronix in Beaverton, Oregon has ordered 45MB rigid disk drives. The contract is for more than 1,000 drives over a 2 year period. The units are used in Tektronix' 8560 Multi-User software development system to speed application program development for a variety of microprocessor systems.

Luxor AB of Motala, Sweden has signed a contract for more than $3 million. We will supply them with 96tpi floppy drives for use in their ABC 800 high-performance dual drive computer system. Luxor is the largest manufacturer of computer systems in Scandinavia.

Another rigid disk order was signed with Micom of Canada, an affiliate of Philips. They will be buying over 1,000 units a year for the Standalone systems.

MICROPOLIS™ NEWS

NEW FACES

In December, Dan Flaherty joined Micropolis as vice president, finance and chief financial officer. He has held financial positions at Unitek, Anderson, Clayton and TRW.

Dan received a bachelor of science degree in engineering from the U.S. Naval Academy and a master of business administration from the Harvard Graduate School. He served as a fighter pilot in the U.S. Air Force and presently lives with his family in Malibu, CA.

After a long search to find just the right person, we hired Craig Maxwell in January to fill the position of Product Manager for the floppy and rigid disk lines. He came to us from Lexitron in Westlake, CA, a division of Raytheon.

Craig has a bachelors of science degree in electronic enginering and computer science from UCLA and attended graduate school in computer science at the same institution. He lives with his wife and two children in Ventura, CA.

MICROPOLIS NEWS PROFILES

Vickie Whitfield

Vickie is a true Micropolis success story. With 2 years of college study in electronics and no practical experience behind her, she came to Micropolis in February of 1979 as a temporary employee and was trained to do product testing. Three months later she became a permanent employee and was moved to CE alignment, a position that was created at the time to insure higher quality on the floppy drives. She later was promoted to test tech, troubleshooting boards, and then moved to debug doing the same thing on mechanics and electronics on boards and drives.

With all that experience, it wasn't long before she was promoted to lead in the product test area with responsibility for instructing and training testers and insuring we built what was ordered and that these drives got shipped.

About a year ago, Vickie was again promoted; this time to supervisor of the test department with 38 people reporting to her. The next step she would like to take is to either field repair or manufacturing manager.

Vickie likes to participate in company activities and was on the winning softball team and was a member of our bowling league. Last summer she and a few other employees decided to do their part for energy conservation, and for a week rode their bikes to work — for Vickie this meant 8 miles each way. She gave it up because after riding for an hour in 95° heat, no one would go near her.

Vickie's hobbies include horseback riding, sailing and riding her Kawasake 400.

SPENDING BUCKS FOR BITS

Guidelines for Buying Game Software

by David Lubar

A trip to any computer store...will produce the rather shocking insight that software is not cheap. Some programs can set you back more than a week's groceries. But the situation is not all bad. With a bit of thought, and some careful buying, it's possible to develop a good software library for your computer. The key here, as in most consumer areas, is getting the most for your money.

In the case of software, the "most" means several things. First it refers to a concept that could be described as play value. A game that you will play for extended periods of time, or that you will play often, has more play value than a game of the same price which you play only a few times. For instance, if you enjoy a game in an arcade, you'll probably enjoy the computer version, assuming the computer version is similar to the arcade one. "Super Invasion", "Asteroids in Space", and "Galaxian" would be examples of this. Most people who buy these games have already played them and know what they are getting. And there is the comfort of knowing that each time you play the game, you're saving a quarter.

Unfortunately, some games are unknown quantities. All you have to go by is an advertisement. That's where your local computer store can come in handy. Most store have computers available for customers who want to try a program before buying it. The trick here is looking beyond the first impression. Most games, through novelty alone, will be fun at first. But the game that was thrilling in the store might become boring after a few hours of play. You can avoid this problem by looking for certain qualities that most good games contain.

A good game isn't easily mastered. If you can win every time, there is no challenge. In many arcade games, you never win, you just survive, trying to get as high a score as possible. Theoretically, there is no limit to the score you can reach. Some of these games offer bonuses at certain scores, giving you an extra ship every 10,000 points, for instance. This gives you something to shoot for, and increases the play value of the game.

Another important factor is variety. Doing the same thing over and over is fine if you work on an assembly line, but I wouldn't want to pay cash for the opportunity. Variety comes in two forms. Some games become more difficult as you progress, some throw in certain extra features at random or at predetermined times, some do both. In "Asteroids" and "Super Invader", you have an occasional enemy ship floating by for variety, in "ABM" some of the warheads split into multiple missiles, in "Star Raiders" there are two types of enemy ships. Imagine these games without this variety and you'll have an idea of programs that don't offer enough play value. Imagine playing a version of "Pacman" where the ghosts didn't get tougher at higher levels. That could be as exciting as practicing touch typing.

If you can't get to a computer store, you have to rely on advertisements, but you can still look for such factors as multiple skill levels, variety, and bonuses. Another guideline is to deal with known factors. Some companies can do no wrong while others can't seem to do anything right. If one product from a company is good, the odds are in your favor when you make another purchase from them. If a company with which you aren't familiar has several games that interest you, it might be a good idea to buy the least expensive game first. This will give you a feel for the general product line, as well as insight into how well they fill orders, how well they package programs, and how good their documentation is.

Of course, not all games are of the arcade type. It isn't easy tell a good chess program from a great one without extensive play. Luckily, programs of this sort receive a great deal of attention in magazines. If all reviews are favorable, you're dealing with a known quantity. The only qustion remaining is whether the game gives you what you want. A program for practicing bridge bidding won't satisfy you if you want to play the actual game against the computer. On the other hand, you can also save money by making sure you don't pay for more than you need. A casual chess player who just wants a game now and then doesn't need the top program on the market. He'll be just as happy with a less expensive program that doesn't play at the Master level.

Adventures are the sort of games that can quickly empty your bank account. Most can be compared to crossword puzzles in that once solved, there is nothing to do but move on to the next one. Still, many people are addicted to the challenge and, for them, the programs are worth the price. There are many companies offering such games and the quality varies. Again, reading the reviews is a good way to start. Some Adventures offer random factors or changes, providing for more play value. Since this is a strong selling point, the ads usually specify such features when they exist. Even here, you have to be careful. If a game just changes the names of the rooms, you aren't getting as much variety as you would if it changed the locations of the treasures, or adjusted the strength of the monsters as you progressed.

There are many games designed for two players. In some, the computer just acts as a refereee. This can be either an advantage or a waste of money, depending on the game. A program that flips Othello pieces for two players is a handy thing to have (though it should cost considerably less than a program that actually plays the game); a program that moves checkers for two players would be a total waste of money. You have to decide whether the function provided is worth the cost.

It may seem that obtaining a decent software library is a costly task, but there are ways to get a good selection of games without going broke and without violating copyright laws. While the really spectacular games are usually only offered as software, many good games appear in magazines and books. A few hours of typing can help fill out your library. Some companies offer game packs containing four or five programs on a single disk or tape. Again, these are good library builders, giving you some choice and variety in your collection. Finally, if you don't like the games that are available, you can always try writing one. Give it variety, challenge, and a lot of play value, and it might end up as a part of many other people's libraries.

Copyright C 1981 by Creative Computing, 39 E. Hanover Ave., Morris Plains, NJ 07950. Sample issue $2.50, 12-issue subscription $20.

CATALOG OF AVAILABLE APPLICATIONS SOFTWARE

The following software has been submitted for publication and is arranged in alphabetical order by author name.

Micropolis assumes no liability for this software, nor has Micropolis evaluated or tested the programs listed.

AFB Micro Controls — PROGRAMS UTILIZING MICROPOLIS BASIC

Complete Attorney's Business Package	$495
Mfg. Order-Entry/Inventory Control	$495
Invoice-Writer	$275
Payroll/Job Cost	$275
Medical/Dental	$495

For further information contact:

AFB Micro Controls
1444 Pioneer Way #11
El Cajon, CA 92020
(714) 442-3152

Ashley, Allen — PDS DEVELOPMENT SYSTEM

Mr. Ashley has developed a complete 8080/8085/Z80 assembly language development system which includes a relocating macro assembler, an interactive assembler/editor, a text editor, a trace debugger/disassembler, a linkage editor and a linking loader. The programs are written in 8080 assembly language and are supplied on Micropolis MOD II CP/M compatible media. The system requires a CP/M operating system and a minimum of 16K RAM and one MOD II disk drive. The price of $99includes the diskette, a User's Manual, and full user support.

— CROSS ASSEMBLER

This series of cross assemblers enables any CP/M system to serve as a development station for the Intel 8048 or 8051, RCA 1802/1804/1806, National COP400, Zilog Z8, AMI S2000 series or Fairchild F8/3870 single-chip processors. Each system features a macro-assembler, an interactive editor/assembler, and a text editor. Instruction mnemonics and syntax are as defined by the processor manufacturers. Each system is available with complete

BASIC/S. . .
BASIC/Z. . .

SYSTEM INDEPENDENCE

These exciting new languages offer immediate compatibility with both MDOS* (rev. #4.x) and CP/M** (rev. #2.x). Though filled with features never before found on a micro, the syntax is essentially a super-set of Micropolis BASIC, so conversion is a "snap" !

HARDWARE INDEPENDENCE

One set of source programs for practically any hardware ! For the first time, sophisticated i/o is supported at the level of source code. Absolute cursor addressing (for the CRT and printer), reverse video, blinking fields, erase to end-line and end-screen, clear screen, and more. Even screen oriented editing of console input is fully supported !

ADVANCED FILE HANDLING

Choose from true sequential, or two forms of random files, with logical records of any length. Numerics may be written in ASCII, or optionally in internal binary/BCD format, to dramatically improve efficiency. An entire array (or just a designated portion) may even be read or written with a single statement. Automatic de-blocking of logical records is also supported, from masks constructed dynamically at run-time !

VARIETY OF DATA TYPES

Five data types are fully supported, as well as complete conversion functions. All floating point math is done in decimal (BCD), avoiding "round-off" errors common to binary systems. BCD integers are provided with a range up to 18 digits. One and two byte control (binary) types are also included, with functions provided to insert or extract strings from control arrays ! Unlike many other compilers, arrays may now be dimensioned dynamically (by an expression), and even erased to re-claim memory space. Multiple programs may be linked together with CHAIN, and share only declared COMMON variables.

* trademark of Micropolis ** trademark of Digital Research

THE ULTIMATE
NATIVE CODE COMPILERS

PROGRAMMING EFFICIENCY

Sort 2000 elements in two seconds ! A SORT verb is part of the language. Scan an array for a match with any relational operator. The SEARCH function does it fast ! Structure your programs with DO/UNTIL and WHILE/WEND constructs. User-defined functions are now fully recursive, support multiple arguments, and may even contain an unlimited number of statements ! Alpha-numeric labels are fully supported, so there is never a need to reference line numbers. Variable and function names may be any length, with all characters significant. Multi-tiered error handling allows your program to trap any error, including BDOS ERRORS which have been fatal in the past. PUSH/POP even allow manipulation of the subroutine stack.

A TRULY INTERACTIVE COMPILER

Included is a full function program editor, with advanced features such as global search and change, sixteen local edit commands, and complete syntax testing as you type ! Never again wait until "run-time" to locate a typographical syntax error. An extensive debugging facility is provided, including line trace, error line retention, and the unique ability to "single-step" a compiled program, with continuous display of selected variables !

BASIC/S single site package (MDOS) $345.00
RUN/S run-time package only (MDOS) 65.00

BASIC/Z single site package (CP/M) 345.00
RUN/Z run-time package only (CP/M) 65.00

(RUN/S or RUN/Z run-time package is included with the compiler package, but must be purchased separately by users desiring only to execute compiled object programs).

NEED MORE INFO?

A complete literature package and a "mini-manual" may be obtained at no charge from your dealer, or:

System/z, inc.
P.O. Box 11
Richton Park, IL 60471
(312) 481-8085

documentation on Micropolis MOD II (Lifeboat adaptation) diskette for $150. Full user support by mail or phone is provided.

For more information on the above systems, contact:

Mr. Allen Ashley
396 Sierra Madre Villa
Pasadena, CA 91107
(213) 793-5748

Bonjoel Enterprises -- BUSINESS SYSTEMS

DATABASE TWO is a complete data base management system for small businesses or offices. It allows the user to create, maintain, add, edit, delete, sort, search, inspect and print data files of up to 1200 entries each. The system provides up to 30 user defined data fields for each file with the lengths determined by the user. Sorting can be done without disturbing the data in the master file. Reports can be selected with regard to heading information, fields, field sequence, upper and lower limits of a control field, etc. Totals, averages, maximum and minimum values for each field are a user option. All programs are menu driven and emphasis is on operator prompting and error trapping. All programs are written in Micropolis BASIC for use with a 48K system, dual Micropolis drives and a printer of 80-132 character/line as a minimum system. The program is priced at $50.

DATABASE TWO File Modification Programs, and INVENTORY ONE are both compatible with the DATABASE TWO system.

REACT, in Micropolis 4.0 BASIC, is a reminder system that allows you to enter dates and reminders and retrieve them in a variety of ways. Individual reminders can be coded for retrieval of one or many groups of reminders. Designed for a minimum system of 48K with dual drives, it can be used at reduced capacity in single drive systems. A printer is useful but not required. REACT is supplied in Micropolis BASIC source code on MOD II media for $50.

New from Bonjoel is PONY-PICK, a handicapping program that can be used for any race track. You enter the data for each racing day and it will "Fine-Tune" itself to the track and its conditions. The system will pick up short term variables such as a new jockey, and consider these in its forecast. It even tells you how accurate it thinks it is. PONY-PICK requires 48K, dual-drives, a CRT with an 80 character screen and an 80 character /line printer. It is supplied in object code on a MOD II disk and runs under the Systemation, Inc. RUN/Z Run Time software. Consult your dealer regarding specific disk formats and media. The price of $300 includes the program and instruction manual. For more information contact:

Bonjoel Enterprises
P.O. Box 2180
Des Plaines, IL 60018
(312) 297-2921

CE Software -- LISTING DISASSEMBLER

This system utility is a relocatable listing disassembler which writes a named file to disk of the disassembly. The software is totally compatible with the line editor or the assembler currently supplied by Micropolis. Cost is $50 retail; dealer inquiries are welcome.

-- DATA MANAGEMENT SYSTEM

This CCA Data Management System distributed by Custom Electronics, will maintain, sort, and print reports or mailing labels for any type file the user needs. The system can be used for such applications as name and address lists, payroll, A/R, A/P, inventory control, customer lists, and many more. The DMS consists of 15 programs written in Micropolis BASIC, and requires a minimum of 32K bytes of RAM. A system printer is optional. Records for any file can be added, updated, deleted, scanned for, or inspected. The system allows the user to define the file and field name for each file. The file scan then can also be easily accessed by user programs written for specialized applications. The report writer allows the user to select such report options as fields, titles, totalling, editing, and record selection. The system is priced at $150.

The CCA Data Management System is available in CP/M Rev. 5.2b with a number of additional features including the Microsoft runtime monitor Brun. The CP/M compiled version is priced at $225; the source version is $300 and comes with the compiled version.

For more information contact:

Mr. Dave Culbertson
CE Software
238 Exchange Street
Chicopee, MA 01013
(413) 592-4761

Computer Mart of New Jersey -- CP/M FOR MICROPOLIS

CP/M version 2.2 for Micropolis MOD I and MOD II is available, giving the Micropolis disk owner the full capabilities of the CP/M operating system while retaining full access to the Micropolis operating system. The upgrade allows the Micropolis disk owner to participate in the standard by acquiring a superior disk operating system with the following features:

- Automatic execution of any program prior to sign-on when system is cold-started.
- Self-configuring logic in both initial system and MOVCPM, for easy system installation.
- Machine-readable assembler source code is provided for Boot, CBIOS and Configurator.

Dealer inquiries invited. For more information contact:

Computer Mart of NJ
501 Route 27
Iselin, NJ 08830
Attn: Sales Dept.
(201) 283-0600

Daman -- MDOS CATALOG SYSTEM

Written in Micropolis BASIC 3.0 or 4.0, this system allows the user to compile the names within one's disk into a single file or into three separate catalogs. The data can be listed to screen or printer in sequential order to see the contents. Data can be sorted by file name and listed to quickly find the particular name sought. Listings show file name, type (in condensed English, i.e. BAS,DAT), and disk location. Available for $30 in MOD I or II format, Micropolis BASIC version 3.0 or 4.0. Requires two drives.

For more information contact:

GMS Software

MDOC *Cost of software with manual/manual only* **$125/$35**

MDOC Document processor has over 40 directives, including user defined variable input parameters, solicited console input, and indexing and table of contents. Files can be merged to create variable documents or form letters. Written in BASIC and assembly language. Includes ED, an editor written in assembly language with over 50 command variations, global search and replacement, and more. Requires BASIC 4.0. 48K*

BASIC UTILITY DISK **$49**

MAX and **MIN** remove and restore the Micropolis BASIC 4.0 extended features EDIT, RENUM, and MERGE while leaving the BASIC program residing in memory intact.

PLOADG System patches for BASIC 4.0 allows specification of the basic program to be run each time BASIC is loaded from MDOS (BASIC "1:TEST"). *Not for BASIC-only disks (disks that boot up to BASIC).*

BASPAC MDOS user command to prepare BASIC programs for smaller memory size or vendor program distribution by removing all "!" comments and blanks. "REM" comments, DATA statements and strings are left intact.

FMTASC **$39**

MDOS program converts BAS, ASM and DOC files to CP/M® format. ASM ctl-i tabs are inserted at the proper position.

GAMEDISK **$35**

BLACKJACK One to six deck blackjack. Self play and rules options. Options allow player to select five card premium rule, surrender or not, doubling of split hands, and computer advice on basic strategy of hands played. Authentic internal handling of cards. 48K*

BIORHYTHM Plots biorhythm charts showing intellectual, physical, and emotional cycles. The graph width is selectable to fit your printer page. 32K*

BANNER Creates eight inch banners in script format. 48K*

LUCAS Computer version of the pegboard puzzle, Lucas' puzzle. 32K*

CP/M® is a registered trademark of Digital Research

MAIL **$150/$35**

Maintains mailing lists up to 2300 records per disk. Optional five levels of password protection. Access for modification or display by account number or name. Creates 1 to 5 labels across. Formats variable content form letters. Addresses envelopes. Sorts on 1 to 5 fields, ascending or descending. Powerful record selection with boolean operators. Character masking and ambiguous matching allow selection down to individual characters by position. Requires BASIC 4.0. 48K*

FILE UTILITY DISK **$49**

FLIST MDOS user command to list the contents of all or selected ASM, BAS, or DOC files onto the printer. Provides headings with page numbering. Page size user definable.

LIST MDOS user command to list a specified ASM, BAS or DOC source file on the system console. Screen height and width are easily configurable.

XFILES MDOS routine to display the directory with alphabetic type and flags plus decimal size.

XTYPE MDOS routine to set file types and permissions attributes with alphabetic command syntax, not hexidecimal.

FLIST AND XFILES can select files of a type or by ambiguous file name specification.

FLIST, XFILES and XTYPE have user re-definable symbolic file types; i.e., ASM, BAS.

Currently available for Mod II systems only. Specify memory size and system version. We pay shipping charges on pre-paid orders. COD orders pay shipping and COD fees. VISA/MC—Maryland residents include 5% sales tax.

For more information, contact: **Gary Mays**

GMS Software
P. O. Box 2685, Baltimore, MD 21215
301/578-9807 or 301/466-9600

*Minimum memory size for BASIC programs

DAMAN - Suite 207
604 Springwood Circle SE
Huntsville, AL 35803
(205) 881-1697

Datasmith -- BUSINESS SOFTWARE

Datasmith offers two programs in Micropolis BASIC - payroll and bookkeeping. The payroll system provides a user-oriented package for performing all commonly required payroll functions for a small to medium-sized business. A menu driven system, its use does not require familiarity with computers or programming, so clerical personnel can use the system after brief instruction. Payroll has been designed for flexibility and can handle a variety of "special" pay amounts and deductions if necessary. The system is fully documented and programs are written in modular form which facilitates program modification to accomodate changes in tax laws, etc. The price for Payroll is $350.

-- DEVELOPMENT PROGRAMS

These are for people who are writing whole systems in BASIC or who wish to trade programs via telecommunications. All the programs below are in 8080 source code with instructions for assembly and use:

TEXT CONVERSION: Converts programs written in Micropolis BASIC to LINEEDIT-compatible text files and back again. $75

VARIABLE LISTER: Searches a program file in BASIC and creates a list of all variables and dimensioned arrays used. $30

MULTIPLE MERGE: Merges a single BASIC program segment into up to ten other BASIC programs without operator invervention. $30

SYSTEM LISTER: Lists on the system printer up to ten BASIC programs without operator intervention. Performs the same function as several LOAD and LISTP operations automatically. $30

SMASH: Removes all comments and non-critical blanks from a BASIC program; reduces program size. $30

DATA MANAGER: For creating and maintaining access to files containing up to 10,000 records or 300,000 characters. Includes a report generation program able to performa extensive mathematical computations, etc. Cost including instruction, documentation and customer configuration to the user's system is $450.

For more information on the above packages, contact:

Datasmith
P.O. Box 8036
Shawnee Mission, KS 66208
(913) 381-9118

Greenlaw, Richard -- CP/M FILE DISTRIBUTION VIA CUTS CASSETTE TAPE

Three CP/M programs, DISKTAPE, TAPEDISK and MFDT provide a method of transferring files between systems with incompatible disk systems, such as between Micropolis based systems and standard 8" diskette systems. TAPEDISK copies files from a tape to a specified disk drive until a file named END is read. DISKTAPE copies one CP/M file to tape. MFDT allows the user to build up a list of file names and drives and then let writing to tape occur without manual intervention. TAPEDISK and DISKTAPE require about 16K CP/M system. MFDT needs about 26K. All need SOLOS or CUTER monitor program. Pricesare $5 for 1200 baud cassette with TAPEDISK and DISKTAPE COM files and a DOC file; $10 for above with addition of the ASM source files, and $20 for above plus MFDT COM file and C language source. For more information contact:

Richard Greenlaw
251 Colony Court
Gahanna, OH 43230

Imagination Software -- ADVENTURE

Not a game but the source of a system for Adventure creation. With this you can write your own Adventures. Written in Assembler (Zilog), this program may be linked to your database to create Adventures with optional split screen, depending on YOU.

- Inputs up to full line, ie: Get ax and look at it then go west
- Abbreviations allowed, directions 1 letter, etc. under database control.
- Main program under 4K, hence games may be created for under 16K use on non-disk systems, TRS-80, etc.

Available on MOD II diskette, minimum 48K, Microsoft Basic, CP/M, Z80 Macro-assembler required. (BASIC not essential.) Price of $48 includes diskette, full documentation, sample run and shipping. For more information contact:

Imagination Software
24 Percy Park
Tynemouth
Tyne & Wear
Great Britain

Information Systems of Arkansas -- MICRO BUSINESS SOFTWARE

This set of software packages operates on the Micropolis disk systems under the CP/M operating system. ISA has expanded their list of packages offered. In addition to general ledger, accounts receivable, accounts payable, and payroll, they now offer inventory, order entry, job costing, job costing payroll, and job costing accounts payable.

ISA will support any customization or enhancement requirements of its customers on a fee basis.

The price of each individual package is $750. For more information contact:

Information Systems of Arkansas
P.O. Box 56126
8901 Kanis Road, Ste. 303
Little Rock, AR 72215
(501) 225-3534

I/O Technology — POLYMORPHIC I/O DRIVER

I/O Technology is offereing a 2708 EPROM that will plug into the user's Ploymorphic CPU board or any S-100 compatible EPROM board and replace the CDINIT, CDIN, CDOUT and CDBRK routines in MDOS. The EPROM software allows standard 16 x 64 display, scroll mode, page mode, screen erase, full graphics, cursor control and meets all standard MDOS control code requirements. The 2708 EPROM resides at location F800H and utlizes scratch pad RAM at 00 to 0AH. I/O Technology is offereing the EPROM for $35 and will relocate to user's defined area for a $5 service fee.

In addition, I/O Technology offers a detailed description on how to implement their Multi-Functioned I/O board's serial and parallel ports with the Micropolis operating system. This contains software implementation procedures forCDINIT, CDIN, CDOUT, CDBRK, LDINIT, and LDOUT. For more information on any of the above, contact:

I/O Technology
P.O. Box 2119
Canyon Country, CA 91351
(805) 252-7666

SEE OUR AD ON PAGE 4

Lenz, G.B. - BANKING PROGRAMS

This comprehensive package of programs is designed for use by anyone who must maintain a checking account, especially in commercial applications. The programs allow the user to input detailed information as to all checks drawn and all deposits made. The programs include a user-modifiable chart of accounts and each check can be charged to a user-specified account number. Printouts furnish a list of all checks drawn and deposits made for any specified period. The program will also furnish audit runs of any account or all the accounts. Bank balance information is displayed after each check or deposit input and printouts. Any record can be corrected and the balances can be corrected.

The price of $75 includes the complete set of programs, which are accompanies by detailed HELP messages for every operation. For more information contact:

G.B. Lenz
3231 Vinyard #42
Pleasanton, CA 94566
(415) 846-8406

Lifeboat Associates -- MICROSPELL™

Microspell is a dictionary program that not only checks spelling errors, it stores prefixes, suffixes and roots, enabling it to recognize hundreds of thousands of spellings and various tenses. It scans as you go and signals the user when it detects a misspelling, which can then be corrected immediately. When it does not recognize a word it is either misspelled or the word is not in Microspell's dictionary.

If a word is misspelled, Microspell lists all the similar words it knows and the right alternative can be selected. If none are satisfactory, a "PROBE" command searches for specific words. Words can be added to the dictionary, either permanently or temporarily.

A user manual and demo run are included in each package. The program runs on 8080, 8085 or Z-80 microcomputers equipped with at least one drive with 70K capacity and a 48K CP/M compatible operating system. The program retails for $249 and is available through software dealers or by contacting:

Microspell
Lifeboat Associates
1651 Third Ave.
New York, NY 10028
(212) 860-0300

Matrix Systems — PROPERTY ANALYSIS SYSTEM

Matrix is offering a Real Estate Software package for residential, income and commercial property management and analysis. The package consists of three modules: PROPERTY MANAGEMENT SYSTEM II, PROPERTY ANALYSIS SYSTEM, and BUSINESS SUPPORT SOFTWARE.

PMS II automates most of the accounting required to manage and control all types of income property. In consists of a complete General Ledger, A/R, and A/P optimized for property management and a Data Base Management system for tenant, vendor and owner data files. The system provides complete formatted reports, cash receipts, disbursements, balance sheets, budget analysis, operating statements, chart of accounts, etc.

PAS analyzes all types of income properties for cash flow, tax benefit, return on investment and equity. All economic variables are considered and can be changed instantly to show the user the economic effect. This program is ideal for modeling existing or future investments and making sales presentations.

BSS consists of many programs that apply to both real estate business; depreciation, loan amortization, future value, etc. Each software system can be run separately andis supplied in CBASIC2 object code on CP/M.

The software is available for S-100 computer systems with two Micropolis floppy drives or hard disk, a CRT with cursor controls and 56K of memory. Prices are as follows:

PMS II	Vers. 6.0	$725
PAS	Vers. 2.11	$250
BSS	Vers. 6.0	$ 65

For more information contact:

Mr. Joseph Castaldo
Matrix Systems
916 Via Nogales
Palos Verdes, CA 90274
(213) 375-7784

Micro-Ap -- SELECTOR V™

New from Micro-Ap is this powerful data base management system / stand-alone applications package. It was produced using the new Digital Research compiler, CB80™, a machine language version that expands its ability to handle one-to-many, many-to-many, many-to-one, and one-to-one based applications. This allows for the production of multi-paged invoices, statements and other such documents. It includes all the required utilities needed to bring virtually any multi-file, multi-level list or accounting oriented application on line quickly.

SELECTOR V has increased record capacities with up to 99 fields and up to 99 assignable record keys. Record length has been increased to the limits of memory. SELECTOR V sells for $495.

-- CB80 BUSINESS LANGUAGE COMPILER

This business language compiler generates 8080 relocatable machine code instead of P-code. Its linker can combine CB80 overlay modules with the output from Digital Researches RMAC™ macro-assembler. Among its features are:

- dynamic allocation of strings, arrays and files
- long variable, function and label names
- stream and fixed records of any length
- 14-digit, BCD number precision

CB80 sells for $419.

Micro-Ap's other offerings include:

SELECTOR IV	$295
SELECTOR III-C2	$195
GLector V/IV/III-C2	$495/295/195
CBASIC 2	$125
CBASIC 2 w/system purchase	$ 85
SBASIC	$295
Automatic Update Plan SEL V/IV	$150
Automatic Update Plan SBASIC	$ 50
MANUAL for SEL. V & IV*	$ 50
MANUAL for other Systems	$ 35

*Manual credit is applied to subsequent system purchase.

For more information on any of these systems contact:

Micro-Ap, Inc.
7033 Village Pkwy. Ste. 206
Dublin, CA 94566
(4125) 828-6697

Business Software in Micropolis Basic

DATASMITH announces the availability of two new turnkey business systems designed especially for MICROPOLIS-Based computers, including the VECTOR MZ. Both systems are completely menu driven and highly interactive, so they can be used effectively by your present office staff.

- **GENERAL LEDGER.** Everything you need to keep the books. Features easy-to-use data entry and error correction, trial balance, posting, and a variety of comprehensive reports. Automatic error detection keeps the books in balance. Writes checks and makes journal entries in one operation.
- **PAYROLL.** A very flexible system that adapts to a wide variety of needs. Features federal, state, and local tax calculations, EIC credit, and special pay and deduction amounts. Prints all necessary reports, paychecks, and W-2 forms.

Put your computer to work with these comprehensive systems now. Call or write for complete details. Custom services also available.

DATASMITH
Box 8036, Shawnee Mission, KS 66208, (913) 381-9118

Micro Applications Group -- MAG/base

This is a data base management system designed for end-users and systems developers, with 3 levels, each offering more sophisticated functions. Multi-keyed data files are easily created and maintained, reports, special forms and queries can be produced without programming. Programming interfaces for the multi-keyed data files, screen management functions, and data security support are available. Written in CBASIC, 52K of memory is required, along with two 180K disks. The price is $250 - $795 for the package and $35 - $50 for documentation only.

-- MAG/sam

This keyed file management system is designed specifically for microcomputers. It provides access techniques that include random, sequential, and generic record retrieval. Multiple keys and record deletion with automatic space reclamation are also supported. The system requires 32K memory, 1 disk, and is written in BASIC (MAG/sam III) or Assembler (MAG/sam IV). The package price is $145 - $295; documentation only is $25.

-- MAG/sort

MAG/sort is a record sort, select, and merge routine that can be run stand-alone or called from user programs written in BASIC or other popular languages. When called from a user program, it uses a proprietary technique that eliminates the need for dedicated memory, program relocation, or special interfacing, and has been optimized for long data files. Files may be sorted on up to 10 keys and selected and/or excluded based on up to 4 keys. 32K memory and 1 disk are required. Source language is 8080/Z80 Assembler. Package price is $250; $25 for documentation only. For more information on any of the above packages, contact:

SOFTWARE & NEWS for MICROPOLIS

MDOS & CP/M For use on Micropolis S-100 drives. VG, Exidy, COMPAL, Blackhawk, CDS, SOL, IMSAI, Poly. Micropolis S/W is also compatible with some Tandon & Teac configurations.

Distributor for most S/W vendors, incl the MDOS S/W of BOJOEL, DATASMITH & SYSTEMATION - the CP/M S/W of Organic S/W, Digital Research, Micro Pro, Microsoft & Systems Plus ..... Cat. $2

MICROPOLIS USERS GROUP, Mthy news'r, yr ..... $ 18

	LIST	SALE
BASIC/S & Z Compilers	$345	$308
UTL-1 Set of 9 MDOS utilities. Incl MDOS to CP/M, CP/M to MDOS translator	$ 95	$ 85
SORT/A, SORT/B MDOS & CP/M assm lg sorts	$ 75	$ 67
REACT Calendar Reminder Activity (MDOS) .	$ 50	$ 42
DATABASE TWO (MDOS)	$ 50	$ 42
PONY-PICK (MODS & CP/M)	$300	$252
TEXTWRITER Text Formatter (MDOS & CP/M)	$125	$110
BOOKKEEPING in MpBASIC or BASIC-80	$250	$189
PAYROLL in MpBASIC or BASIC 80	$350	$263
MAILSYS I (MDOS).....	$ 50	$ 37
MEMBERSYSI (MDOS).....	$ 50	$ 37
MDOS CATALOG SYSTEM.....	$ 30	$ 22
SPELLBINDER*	$495	$319
dBASE II*.....	$695	$589
SPELLGUARD*.....	$295	$253
MUG Library Disks, 11 MDOS Vols., ea.	$3 to $15	

Products postpaid to N. Amer. Add $7 elsewhere. All funds in U.S. dollars. VISA & MC accepted. AL residents add 5% tax. Prices and availaoility subject to change without notice.

**Most CP/M S/W available in formats other than Micropolis. CP/M is trademark of Digital Research.*

DAMAN (205) 881-1697
Suite 207, 604 Springwood Cir., Huntsville, AL 35803

Micro Applications Group
20201 Sherman Way, Ste. 205
Canoga Park, CA 91306
(213) 700-1426

Micropolis Users Group -- System Utilities

Library disks 6 and 9 contain commented disassemblies of RES, MDOS and LINEEDIT, an enhanced lineedit, utilities for unscratching a file, and for changing any byte in any track. Also available on other disks are a Z-80 assembler, many other utilities, application packages, and games.

Membership in the Micropolis Users Group is required. Cost for any one library disk can be as little as $3, but certain restrictions apply. MUG membership is $18/year in North America, $25 elsewhere. Membership includes a monthly newsletter and discounts on commercial software. For further information contact:

Micropolis Users Group
604 Springwood Circle SE, Ste. 207
Huntsville, AL 35803
(205) 881-1697

Shaw Labs, Ltd. -- A-FORTH

Shaw Labs has available a multi-tasking (multi-user if hardware permits) version of FORTH. A-FORTH 2.0 is supplied both stand-alone and in versions which will run under either MDOS or CP/M. The MDOS or CP/M versions are used to configure the I/O for the stand-alone version, or may be run as a complete system under their respective OS. Standard configurations are available as per Micropolis MDOS convention. The system includes A-FORTH with the ammended Forth '79 Standard compatible capability, memory mapped and serial editors, documentation utilities, double numbers, and much more. The package includes A-FORTH on Micropolis diskette, language manual and 1 year warranty. Price is $150 plus applicable taxes.

Also available is a Utilities disk of several programs with source listings. For further information contact:

Acropolis
17453 Via Valencia
San Lorenzo, CA 94580
(415) 276-6050

Syntax Corporation -- SHORTAX

This income tax planning program is now available for review on a trial basis by dealers and prospective buyers. The demo package is available for 30 days and consists of the reference manual and a program disk that prevents the use of the program for purposes other than review and analyis. The demo is available for $50 - which is fully refundable or can be credited toward purchase.

SHORTAX will compute the income and social security taxes of individuals, trusts or corporations for six tax years - 1979 through 1984 - and will compute the regular income tax, tax using income averaging, the 50% maximum tax on earned income, the add-on minimum tax and the alternative minimum tax. Users of the program must be reasonably familiar with the tax rules but need not be familiar with computers. The program is in CP/M 2.2 and requires 48K memory and one drive with 90K storage. For further details contact:

Syntax Corporation
Box 8137
4500 W. 72nd Terrace
Prairie Village, KS 66208
(913) 362-9667

System/z, inc. -- SOFTWARE FOR MICROPOLIS

System/z has expanded their offerings of software for Micropolis to include:

AUTO/EXEC	System Generator	$ 40
BASIC/S	Extended BASIC Compiler (MDOS)	$345
BASIC/Z	Extended BASIC Compiler (CP/M)	$345
BCOMPARE	Basic Source Comparator	$ 35
BEM	Basic Expansion Module	$ 65
CRUNCH	Basic Program Compactor	$ 35
DSM-1	8080/8085 Disassembler	$ 65
EDIT/S	Text Editor	$ 45
RUN/S	Run-Time Package only (MDOS)	$ 65
RUN/Z	Run-Time Package only (CP/M)	$ 65
SORT/A	Hybrid Sort (for Micropolis	$ 75
SORT/B	Hybrid Sort (for BASIC-80)	$ 75
TR/II	BASIC/ASCII Translator	$ 55
UNDELETE	File Recovery (for CP/M)	$ 45
UNPROTECT	Basic Source Recovery (for CP/M)	$ 70
UTL-1	Disk Utility Package	$ 95
XREF	Cross-Reference Generator	$ 85

System/z's latest release is BASIC/Z, a native-code compiler for the CP/M operating system. With a syntax similar to that of the Micropolis interpreter, it provides a number of extensions, including long variable names, SORT and SEARCH verbs, alpha-numeric labels, as well as multi-line, multi-argument user functions. An extended debugging facility is provided, which

allows "single-stepping" of a compiled program with continuous display of selected variables.

A complete literature package and a BASIC/Z "mini-manual" may be obtained at no charge from:

System/z, inc.
P.O. Box 11
Richton Park, IL 60471
(312) 481-8085

Wordcraft — THE MICRO LINK

Micro Link enables minicomputer users to communicate with each other, large computers and terminals over telephone lines. Files may be prepared in advance and transmitted automatically and the entire two-way communication may be recorded in memory and on disk.

Micro Link scans The Source, other data bases and bulletin boards quickly, recording segments that interest the user for review off line. It hosts another computer or terminal and operates at one end without being required at the other end.

The Micro Link requires any 8080 or Z-80 computer with serial port and modem, 16K of memory. It runs under Micropolis DOS or CP/M 1.4 and up. The price of $89 includes object code and manual; supplied on 16 sector, 77 track 51/4" disk, 8" disk; inquire about other formats. The program is supplied ready to go for some popular computers. For others, you fill out a serial port survey form supplied by Wordcraft, who configure the program based on this information. For more information contact:

Wordcraft
3827 Penniman Ave.
Oakland, CA 94619

EMPLOYMENT OPPORTUNITIES

Engineering Manager - Rigid Disk: Responsible for activities from development through to manufacturing support. Requires minimum 10 years engineering experience and 5 years engineering management. Must be take-charge individual with strong employee orientation. Rigid disk technology background essential. MS in related field or equivalent experience.

Unit Manager - FD Manufacturing & Test Equipment Engineer: Lead group of tech personnel in design, development and maintenance of all tooling and test equipment. Monitor life and quality of vendor tooling, manufacturing assembly instructions and maintenance of factory standards and yield. Five years related experience including high-volume experience and understanding of peripherals. ATE/software experience preferable. BS Engineering or equival

Section Manager - Manufacturing Engineering: Responsible for overall process implementation, mechanical and electronic sections and test design for for industrial engineering. Requires experience in high volume production and peripheral experience, preferably in high disk technology. Good communications skills and ability to interface on all levels.

Electronic Engineer - FD Test Equipment: Design of automatic and semi-automatic factory test equipment including hardware and software for interface control and fault isolation. Will do cost analysis. Requires several years design experience directly related to test equipment and/or disk drives. High volume experience a must. BSEE or equivalent.

Senior Electronic Engineer - 8" RD: Responsible for detailed electronic design and analysis of high performance 8" Winchester drive. Minimum 6 years experience in design and development of high performance peripherals including servo mechanism control circuits, interface and control logic circuits. BSEE/MSEE or equivalent.

Senior Electronic Engineer - 5 1/4" Drive: Detailed design and analysis for new product including development of analog circuits. Five + years in electronic product design and development and background of demonstrated ability in analog and digital electronics application. Understanding of magnetic recording technology desirable. BSEE or equivalent.

Electronic Engineer - Firmware: Work with test equipment engineering groupin logic and firmware design for microprocessor based control logic. Perform servo system analysis and simulation. Experience should include real time programs for high performance peripheral products, ability to perform hardware/software trade-offs and work in assembly language with minimal guidance.

Mechanical Engineer - 5 1/4" RD: Detailed design and analysis for new products including metal and plastic castings, precision positioner, motors, shock and vibration, etc. Three + years experience in these areas required with knowledge of RD technology highly desirable. Must be able to work in volume production, low cost, high performance environment.

Manufacturing Engineer - FD: Generate, update and release manufacturing assembly instructions, monitor vendor tooling, review and select vendors etc. May serve on Material Review Board. Requires 3 years experience in electromechanical manufacturing methods and tooling including high precision mechanisms for medium to high volume production. Perpherial experience desirable. Must be innovative self-starter.

Senior Mechanical Designer - RD: Design of new RD product from concept through product support. Duties will involve low cost structures and mechanisms for high volume production. Minimum 8 years in drafting and design with increasing responsiblity.

Senior Mechanical Designer - FD: Responsible for detail layout and design of components and systems including follow-up on prototype fabrication. Tolerance analysis, cost trade-offs, high volume production understanding. Must have in-depth understanding of injection moldings and die casting processes and several years directly related experience. Peripheral experience highly desirable.

Senior Technical Writer: Will write instruction, end-user and maintenance manuals, design specs and test procedures. Requires excellent communications skills and thorough technical understanding of peripheral products, preferably disk drives. Must have 2-3 years experience which can be combination of tech and writing responsibilities. Associates degree or equivalent.

Send resume or contact Micropolis Personnel Department at 213/709-3337.

PATCH TO MDOS 4.0 FOR A DISTRUCTIVE BACKSPACE

When using a standard MDOS 4.0, the RUBOUT, BASKSPACE or BACKARROW key will delete the last character entered, MDOS will acknowledge this by printing a BACKARROW or UNDERSCORE. This is necessary if your console is a hardcopy terminal (printer like). However, if you are using a CRT, you may be interested in the following patch.

This patch will backup the cursor and erase the last character typed. When this patch sees a ROBOUT, BACKSPACE or BACKARROW character from the keyboard, it will print a backspace, space, backspace sequence to erase the last character, at the same time, it will also subtract the buffer counter to keep the proper line width count.

Before making the patch, make a DISKCOPY of a bootable diskette so that if a mistake was made, it will not damage your orginal diskette.

To make the patch:

1. Boot up to MDOS (Not BASIC)

2. Type in the following patch, the <return> mean the RETURN key:

```
ENTR 5E4 <return>
6 8 CD DA 5 6 20 CD DA 5 E 8 25 25 C9 / <return>

ENTR 59F <return>
E4 5 / <return>
```

3. The patch is now complete, try it out by typing something on the keyboard and type the RUBOUT, BACKSPACE or BACKARROW key, the cursor should move to the left one space and erase the character for each ROBOUT, BACKSPACE or BACKARROW key.

4. If the patch seems to be working properly, resave the "RES" module following the instructions in the Micropolis Users Manual.

5. Copy the "RES" file to your other boot system diskettes you wish to have this patch.

6. End

Below is the source listing of the Backspace patch program.

```
                                                                PAGE 1

ADDR B1 B2 B3 E LINE LABEL          OPCD   OPERAND

0000            0001 *
0000            0002 *
0000            0003 * Patch to MDOS 4.0 for a distructive BACKSPACE
0000            0004 *
0000            0005 *
0000    05DA    0006 DEV060     EQU    5DAH     ;Output routine in MDOS
0000            0007                            ;
0000            0008                            ;
0000            0009            ORG    59EH     ;Patch to handle BASKSPACE
059E CD E4 05   0010            CALL   BSPATCH  ;Go where is more room
05A1            0011                            ;
05A1            0012            ORG    5E4H     ;Free space here
05E4 06 08      0013 BSPATCH    MVI    B,8H     ;Control H into B
05E6 CD DA 05   0014            CALL   DEV060   ;Print it.
05E9 06 20      0015            MVI    B,20H    ;A Space character into B
05EB CD DA 05   0016            CALL   DEV060   ;Print the Space
05EE 0E 08      0017            MVI    C,8H     ;Another Control H
05F0 25         0018            DCR    H        ;Dec the buffer counter
05F1 25         0019            DCR    H        ;Do it twice
05F2            0020                            ;
05F2 C9         0021            RET             ;All done with patch.
05F3            0022                            ;The content of C will be printe
05F3            0023                            ;
05F3            0024            END

ERRORS THIS ASSEMBLY  0000
```

MICROPOLIS™ NEWS

Micropolis Corporation
21329 Nordhoff Street
Chatsworth, California 91311
(213) 709-3300 Telex 651486

Volume 7 Spring 1982

Copyright Micropolis Corporation 1982

FIRST CLASS MAIL

CONTAINS
PRINTED MATTER
OF NO
COMMERCIAL VALUE