

# Peelings II™



THE MAGAZINE OF APPLE  
SOFTWARE AND HARDWARE EVALUATION

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- DOS File Exchange II
- Tekterm
- Teletext
- Data\*Trans
- Intelligent Terminal System-80
- Super Smart
- STC Call

## BUSINESS & FINANCE

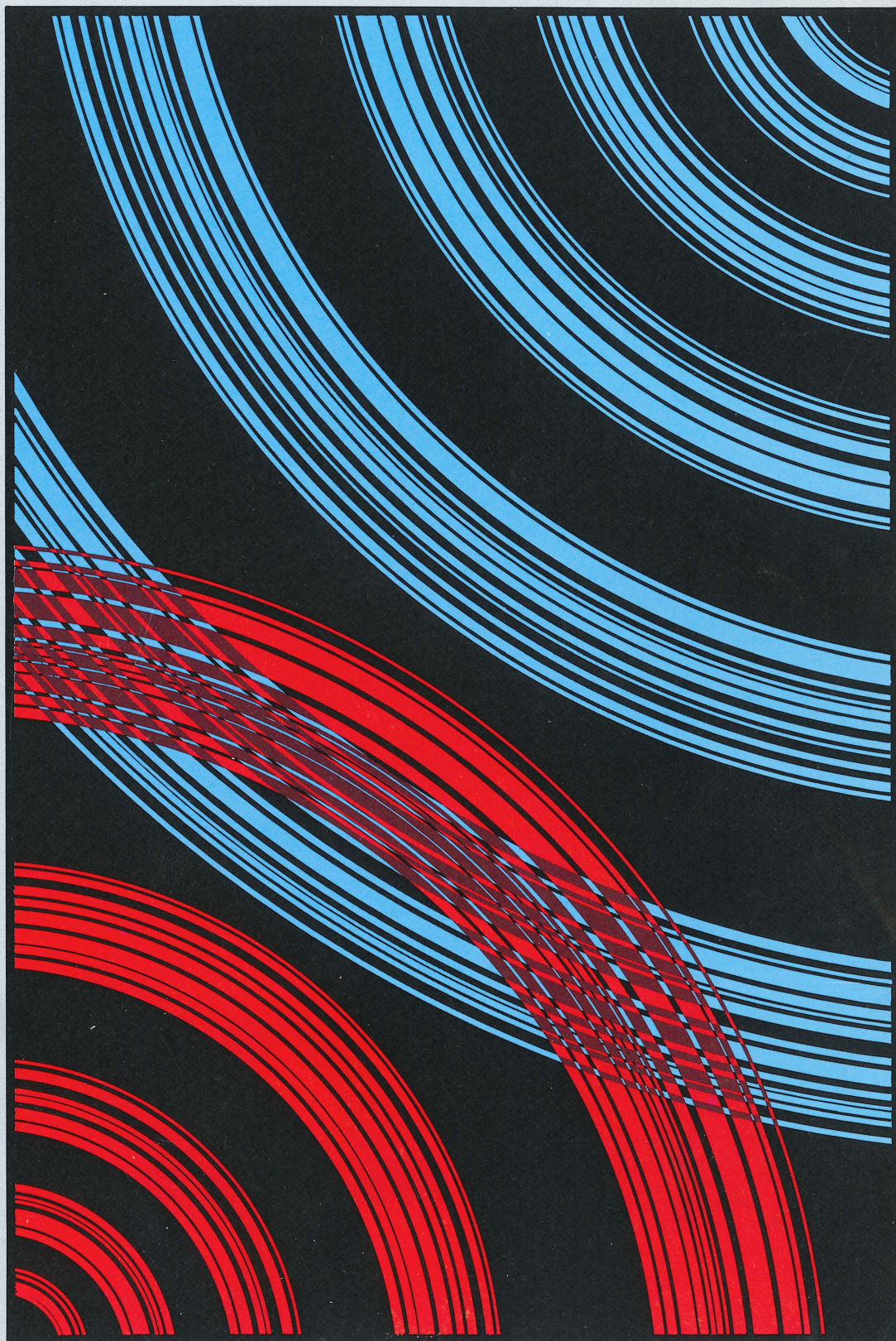
- Millionaire
- Market Illustrator
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## COMPILERS

- The Compiler Plus
- The Einstein Compiler

## LANGUAGES & ASSEMBLERS

- EnBASIC
- The Visible Computer —6502
- ORCA/M
- The Assembler



BEGINNER COLUMN "The Anything Machine"  
CHAPTER FIVE: "Pascal"

# Data work.

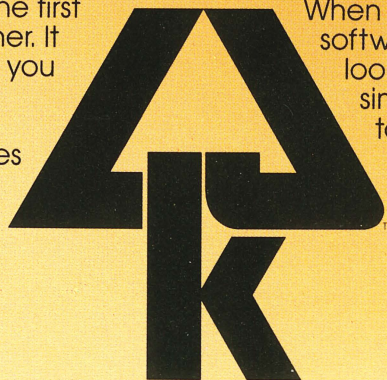


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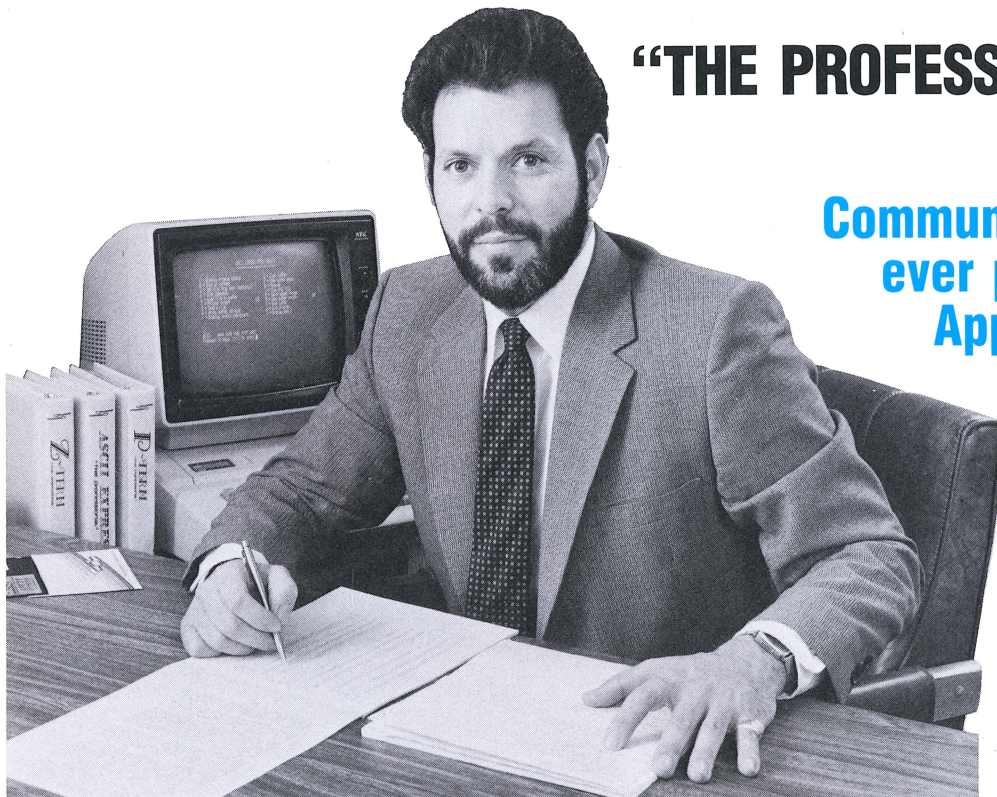
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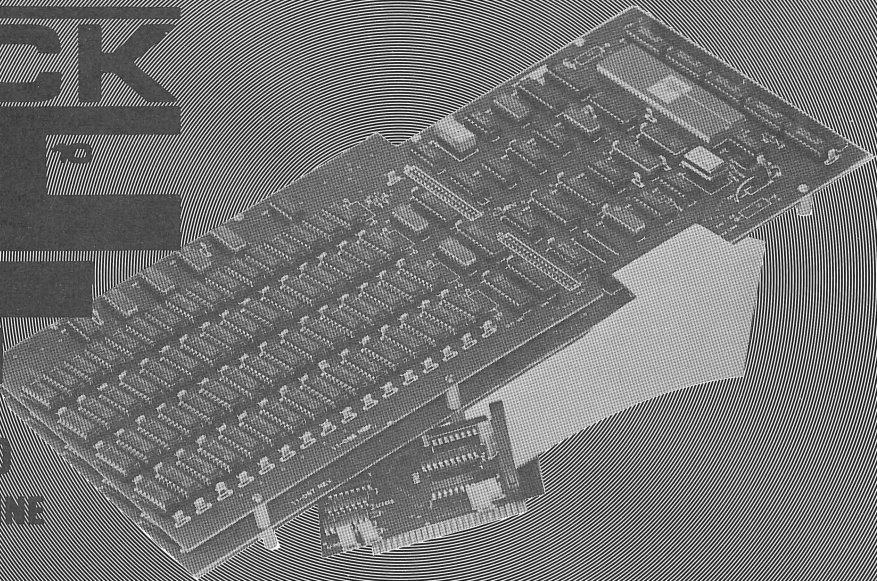
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# DTACK

# GRANDE

## The 68000 DREAM MACHINE



### THE DTACK GRANDE:

Above is a photograph of the prototype for the DRAM version of our Apple compatible 68000 board. We have modestly named it the DTACK Grande because it has a **Grand(e)** amount of memory: a megabyte! That's called a *full gallon* here in California. (You can buy one with only 128K if you like.) This one has a 25MHz Xtal oscillator which we divide by two to generate the 12.5MHz clock for the 68000. DTACK is **not** grounded; there is one wait state. Refresh is performed in software, with a hardware assist so that the overhead is exactly the same for a megabyte as for 128K (4%). Thus the effective speed of this board is equivalent to 10MHz with no wait states.

Which makes our one megabyte 68000 exactly twice as fast as **another** one megabyte 68000 system that you Apple types may have heard of. The other one doesn't work with Apple II's, of course. Ours does.

Because the refresh is interrupt-driven, this board is inherently capable of multi-tasking so all you print spooler and type-ahead buffer fans should *love* this board. We think it will make a **dandy** RAMDISK. Oh, yes: it has a big, fast 68000 microprocessor (we almost forgot while we were admiring all that memory!).

### TRUTH IN ADVERTISING:

Many of you have seen that ad with the tricycle falling apart which asserts that the iAPX 286 is faster than the 68000. Here are the facts:

- 1) The board pictured above, with one wait state, can perform a 32 bit add in **less than half a microsecond** and an 8MHz *can't*.
- 2) Intel is currently running ads offering 6MHz 286 boards, projecting delivery of 7.7MHz boards early next year. **What 8MHz 286?**
- 3) The 68000 has exactly seventeen more 32-bit registers than the 286. That's because the 286 doesn't have any.
- 4) Back to that tricycle ad: have you noticed the fine print that says the speed of the 68000 has been "**adjusted**"?
- 5) AMD and Intel like to compare against a slow 8MHz 68000, burdened down with a memory management chip for **multi-user** systems. We are offering 12.5MHz 68000s for **single-user** applications. BIG difference!

6) The 68000 can **linearly** and **directly** address up to 16 megabytes of RAM. The 286 **can't**. That's important when you have a megabyte of RAM!

However, since we believe in 'truth in advertising' ourselves, that prototype pictured above doesn't work yet. We have not yet programmed the PAL memory decode chips or the bootstrap PROMs. This ad is being written on 23 May '83, so things may have changed by the time you read this.

### THE 'STUFFER' BOARD:

In our last ad we told you about a 'block DMA' interface we were developing. The production boards just walked in the door and we will be shipping that interface this month. It works with both the static and the dynamic RAM 68000 boards we make. (However, it was designed before the Apple IIe was available, so it is **not** compatible with the IIe.)

### SOFTWARE:

All the stuff we mentioned in our previous ads is still available. We are well along the road developing HALGOL, a high speed BASIC-like language that runs at close to 68000 assembly language speeds - and that is **very** fast! Right now we are finishing up the BIOS. That stands for Basic I/O System. It turns the 6502 in the Apple into an I/O handler exclusively, and lets the 68000 take over and run things.

### SHOULD YOU BUY OUR BOARD?

Our board is still not suitable for persons who just want to turn on their computer and run canned software. You **must** have some interest in doing some programming yourself, or you will not want to buy one of our boards.

We still provide **lots** of 68000 source code on unlocked, easily copyable disks. Three disks with demo programs and source code are shipped with each board.

Aside from that, we can only think of a **million reasons** why you might like to buy one of the boards pictured above.

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# PEELINGS RATINGS

The Peelings Rating is a letter grade designed to indicate an overall impression of the product. It is a measure of how well the publisher did the job he intended to do taking into consideration comparison to other similar products, price to performance, ease of use, documentation, and sophistication.

We stress that you should not skip a review or disparage a program because it receives a low rating. The rating alone can never tell the whole story. Only reading the entire review will give you all the information you need. For this reason, the rating should never be quoted alone without reference to text of the review.

The Peelings II rating categories follow: some example criteria are given for the categories, but they are not meant to be all inclusive.

**AAA** — Absolutely astounding software. We have seen one program in two years that fits this category.

**AA** — Top notch, superb. These programs generally use the most sophisticated programming techniques and have excellent documentation.

**A** — Very good. Software in this class incorporates very good programming techniques and has clear and informative documentation.

**B** — Good. This software may have minor errors or be slightly flawed, it may be lacking in thorough documentation, or it may just be unexciting.

**C** — Average. Software of a mediocre nature. There may be a lack of good programming concepts or poor error trapping. It may be a repeat of other work, or have a low performance/price ratio.

**D** — Below Average. Software with a blatant disregard for the user in terms of programming design, unacceptable documentation or performance/price ratio.

**F** — Unacceptable. Software of such poor quality or usability that it should not be marketed.

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# CUT AND DRIED

Guest article by Michael Weasner

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Anaheim, California was the place to be in April and May of this year. First there was Applefest as reported on by John Martellaro in this column last issue. In May there was the National Computer Conference or as it is better known, NCC. For four days, computer hardware, software, and paperware were on display. NCC is actually two events. The first one is the display of the wares and the second is a series of conferences and seminars, which this year had over 100 sessions in such areas as personal computers, office automation, software engineering, human and social issues, and career development. I was unable to attend any of these, but the speakers listed were tops in their fields. The sponsors of NCC had a logistics nightmare at Anaheim and I must applaud both them and the City of Anaheim for pulling it off almost without a hitch.

At the Convention Center, a big circus tent was set up in the lot used for parking during the Applefest in April. After registering, I proceeded to the west end of the tent, had a seat, looked over the list of exhibitors, and unfolded the big floor map. I noticed the tent top seemed to be flapping in the breeze and several people remarked that they hoped the tent would stay up (it did), but the famed Southern California Santa Ana wind was making its appearance at NCC. While looking at the map, I made a discovery: the entire Convention Center and two areas at the Disneyland Hotel were used for NCC. And that wasn't enough, so

some inflatable buildings were set up in the parking lot next to the circus tent. These bubble structures were to become the worst of the nightmares for the sponsors. I moved outside (hastily, since I was getting concerned about the ability of the tent to stay up) and up to the doors of the Convention Center. A large crowd of people must have had the same idea since I was not alone in my exit from the tent. At 10:00 am the doors were opened, and men and women in business suits and others (gender indeterminate) dressed in normal Southern California attire all began pressing to enter the hall simultaneously. Some comments were made about Bernoulli's theorem. After violating theory, we all managed to enter the hall where I made another discovery: the West Coast Computer Faire and Applefest were never like this. There were big booths, little booths, booths with raised floors, two-story booths, booths with entrances from four sides, booths with pretty girls, booths that enticed you to approach them with free jellybeans or mouth-fresheners (Apple Computer gave away 20,000 Disneyland tickets; there's a message in that somewhere), and oh yes, booths with computers, disk drives, printers, and just about everything else imaginable.

Since I only had one day to spend at NCC, I necessarily rushed to see everything. I think I succeeded in seeing it all but none of it to the extent I would have wished if I had

been able to spend all four days at NCC. What follows are some observations and comments about new or just different products that were shown at NCC. Not everything I will mention can be used with your Apple II or //e, but they all have relevance to the world of computing and that's where we live regardless of the machine we use.

Apple Computer was showing the //e, Lisa, and their line of printers. Unveiled at NCC was AppleNet, which allows almost any configuration of Apple Computers to be networked. Expect to see more about AppleNet.

VisiCorp demonstrated their new VisiOn (Operating eNvironment) integrated software package. The software is indeed good (the version used for the demo was a little slow) and it can be used on various microcomputers. A mouse is provided for easier interface with the computer. My first impression on seeing the demonstration was that the script the lady was reading (yes, she read it word-for-word) must have been written by Apple Computer for the first Lisa demonstrations back in January. It did sound very much the same except that the Lisa demonstrators didn't use scripts. So much for originality. Integrated software packages are the current market trend and there were several others on display.

Many companies were showing their briefcase computers. Sharp had one, Radio Shack had their Model 100, the Grid Compass was there

(nice if you can afford \$8000 for one), and a new entry called the Gavilan Mobile Computer (watch out for this one). Also in abundance were larger portable computers but no Apple II compatible ones. The most impressive of the portables was the new KayPro 10 with a built-in 10 MegaByte (MB) hard disk.

For the Apple II, there were a couple of detached keyboards; the nicest-looking one came from Key Tronic. Look for reviews of these keyboards in upcoming issues.

Printers and thinline floppy disks were well represented. The newest addition to the low end of the printer price range was the Canon Color Printer for \$795 (currently OEM only). This seven-color, medium-speed (40 cps), high-resolution (640 dots per line), quiet printer uses the new ink-jet technology that recently cost upwards to \$3000. The improvement in quality of ink jet printing over that of color ribbon printing is considerable. At this price, one hopes to see this area expand. PrintaColor also had their ink jet printer on display.

Two of the more impressive 5-1/4 inch floppy disk drives were from Trak Microcomputer Corp. and Drivetec. The Trak Pi-3 intelligent drive for the Apple II has a pressure sensitive panel to control the write protect, a display of the read/write status and a digital track counter. The Drivetec drive claims 3.33 MB on a standard double-sided 5/1-4 floppy diskette with its 320 SuperMinifloppy drive. Vista was showing its V1200 cartridge mass storage drive with 6 MB. One drive caught my eye because it was the cutest. The Taiwanese booth had a 2-1/2 inch microfloppy drive and disks on display. Whether it will gain any popularity in the States remains to be seen. With the current battle over the standardization of the sub 5-1/4 drives, I doubt it will ever take hold, but it certainly was "cute".

Finally, the book companies were much in evidence at NCC. Sams, Prentice-Hall, Hayden, John Wiley and Sons, and Van Nostrand Reinhold were just some of the companies with booths. Van Nostrand

Reinhold had some of its line of Apple II Computer Assisted Instruction (CAI) software on display. We hope to begin reviewing this line of CAI products in the near future.

The Anaheim NCC was definitely an event worth attending no matter what your computer persuasion might have been. It didn't have the relaxed atmosphere of the Anaheim Applefest but it was an enjoyable event. The only major problem that surfaced was a result of the high air temperatures brought by the Santa Ana winds. The Convention Center remained comfortably cool at all times, the Disneyland Hotel areas became slightly warm, but the inflated structures became downright hot. Overall, NCC was good for both the exhibitors and the visitors. Next year's NCC will take place at the Las Vegas Convention Center, 9-12 July. Make plans now to attend. For information about NCC '84, write to or call: NCC '84

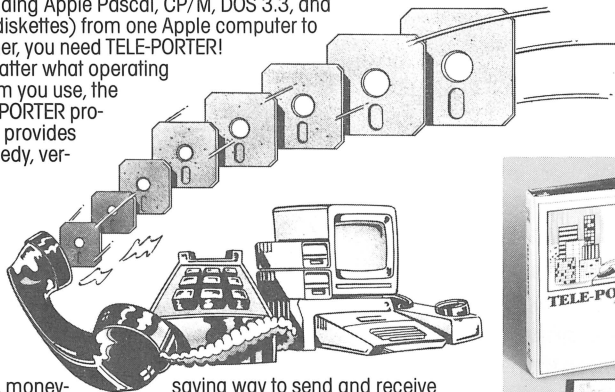
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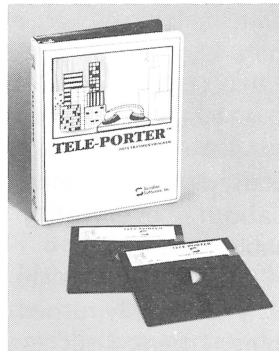
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# THE ANYTHING MACHINE

## Chapter Five: PASCAL

by Tom Little

---

### BACKGROUND

Originally (thirty years ago), all programming was done in machine language. The programmer would create a sequence of numbers which, when read by the computer's processor, would result in some useful actions taking place. This kind of numeric programming was very tedious and difficult. Assembly language is basically the same as this, with the difference that some of the numbers can be given by names or abbreviations.

Then came FORTRAN (short for "FORmula TRANslator"), a sophisticated program whose main purpose was to allow programmers to type instructions for mathematical computations in a way that looked more like a formula and less like a sequence of machine instructions. This was the first high-level programming language. A great deal of effort and time went into its development.

The idea caught on. All kinds of new languages were created, offering this or that set of special features. Some, like BASIC, were imitations of FORTRAN designed for small systems and beginning programmers. Others, like ALGOL, were designed by computer scientists to reach even greater heights of abstraction. FORTRAN is more abstract than machine language because each operation is not specified explicitly:

$F = Q1 * Q2 / (4 * PI * E0 * (R ** 2))$  is equivalent to a long and involved sequence of machine instructions. ALGOL is more abstract than FORTRAN because the operation of the machine is even more concealed: special control words such as WHILE replace enigmatic GOTOs, and data need not be numbers but can be thought of as TRUE/FALSE values, character strings, and complex combinations of other simple types. ALGOL, however, has more than its fair share of tricks and gimmicks, and some dangerous features as well.

Pascal was developed by Niklaus Wirth as a language for students which was both sophisticated and safe. It keeps many of the abstractions of ALGOL, but constrains the subtleties of the language to the extent that the results of a program can be easily anticipated by reading it!

Pascal was implemented for microcomputers at the University of California at San Diego. The combination of the Pascal language and the UCSD operating system became quite popular, and Apple Pascal is one version of this system.

Since the Apple comes with BASIC installed, what reasons are there for going to the trouble of buying an extra 16K RAM memory board and the Apple Pascal disks and manuals? Is Pascal enough "better" than Applesoft BASIC to warrant the expense and trouble?

There is no type of program which cannot be written in either language. The differences lie in the ease with which the program can be written and debugged and in the execution speed of the final product. A lot depends on the "style" of the programmer—not just the technical aspects of the languages. So we'll put off our question about the relative worth of Applesoft and Pascal until we discuss how the "Pascal style" differs from the "BASIC style", which is what this column is about.

### THE OPERATING SYSTEM

Applesoft runs under the Apple DOS operating system, described in the previous issue (V4N4, 1983). The UCSD Operating System is different. So different, in fact, that the two systems can't use each other's disks. What the user sees is different, too. Apple DOS is always there, listening for possible commands (CATALOG, LOAD, etc). UCSD is like a house with many rooms (see figure 1). You have to be in the right room to give a certain command.

Coming in the front door when you boot a Pascal disk, you find yourself in the Command Level. From here you can compile or execute a program which has already been written, or enter another room. The top of the screen displays a *prompt line* which lists your choices.

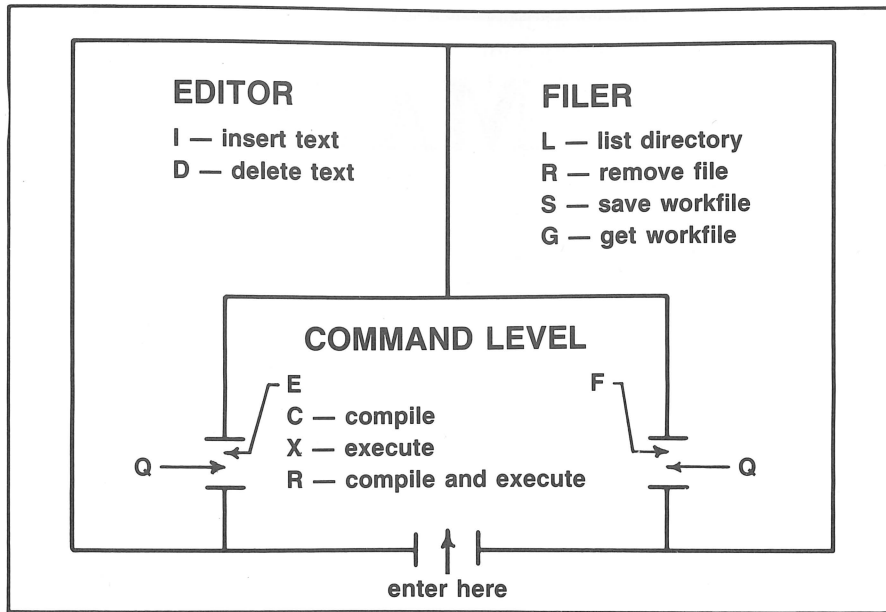


FIGURE 1. "Floorplan" of UCSD operating system.

You need type only the single letter which corresponds to the option you choose.

Remember that Pascal programs must be *compiled*, that is, translated into an executable form all at once before they can be run, rather than being translated a line at a time during execution, like a BASIC program. Typing "C" will compile a source program (a *text file*) into an executable program (a *code file*). Typing "X" will execute (run) a code file, and typing "R" will compile first (if necessary), then execute. These are the three important actions available from the Command Level.

Typing "E" puts you in a new room: the Editor. Here is where you may type a Pascal program. You may type anything else, too. Since the Pascal language really only comes into play when the text is compiled, you are free to type a FORTRAN program, an assembly language program, or a love letter. The Editor doesn't care. (Try typing a love letter when BASIC is expecting a program and see how far you get!). Because only editing can be done in this room, the Editor is much more sophisticated than the few meager facilities provided by Applesoft. The Pascal Editor is, in fact, a full-feature word processor.

An "F" from the Command Level puts you into the Filer. This is where many of the functions like those of Apple DOS are available. You can list the files on the disk ("L"), remove them ("R"), and get them into, and save them from, the Editor's workfile ("G" and "S", respectively). This workfile shows up on the disk as a special file, SYSTEM.WRK.TEXT. The Editor and Compiler automatically use this file if it is present.

Wherever you go in UCSD Pascal, there is a prompt line explaining what your options are. You always know what commands you can use.

Already there is a stylistic difference between UCSD Pascal and Applesoft/Apple DOS. With Applesoft/DOS you get a single prompt, ] and everything that you can possibly do, can be done when you see this prompt, *if you know what to type*. With UCSD Pascal, you have to spend some time going back and forth between the rooms, but your options are always explicit (in the prompt line), and the capabilities are generally greater. (The Editor and Compiler do more than BASIC, the Filer does more than DOS.)

## THE LANGUAGE

The preceding section was just about the UCSD operating system. It

is no more or less connected to Pascal than DOS is to Applesoft. The Pascal language was written without a particular operating system in mind, and it is the language itself we'll now focus our attention on.

Because Pascal is compiled, it need not (and does not) execute each line with total disregard to its place in the program. The Compiler studies the whole program at once, figuring out what the *context* of each instruction is. For example, consider a large program. One part might be written to sort a list of numbers. Perhaps there is a variable named N whose value is the number of entries in the list. Elsewhere in the program I might want to use the name N for the I.Q. of the programmer (well, I *might!*). In Applesoft, the two N's **MUST BE THE SAME**, because the Applesoft interpreter goes blindly ahead one line at a time and really has no idea what it is doing. In Pascal, though, I can use the same name for two different variables if they are in different blocks of the program.

And it goes much deeper than this. Pascal blocks are logically independent of each other. This means I can write a sorting procedure and put it in all my Pascal programs without having to worry about whether the names and line numbers interfere with those in other parts of the program.

In order to make this logical independence really happen, Pascal creates a new area in memory every time a procedure or function is entered (a procedure is like a subroutine in Applesoft—when the procedure is called, the computer executes the procedure, then returns to carry on where it left off before the call; a function does this but also returns a value, a datum). Thus memory is structured in Pascal, and is just a vast wasteland in BASIC (see figure 2).

There are no line numbers in Pascal. All the procedures and functions have names, and you call them by giving their names. In effect, this means that you create new com-

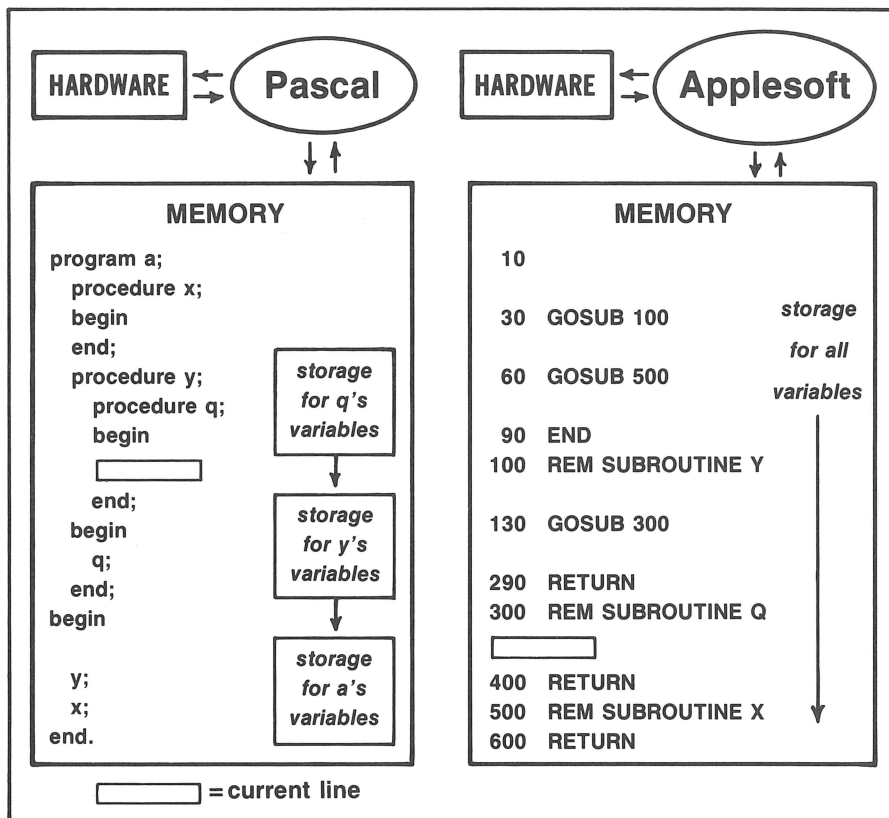


FIGURE 2. Memory organization with Pascal and Applesoft.

mands for the language. A procedure call looks just like a command statement. If you name your procedures well, this can make the whole program trivially easy to read and understand (see figure 3).

In Pascal, all variables must be declared before they are used. The compiler must know what type they are (integer, real number, character string, etc.) so that it knows how much space to set aside for each activation of each procedure or function. Applesoft doesn't need variable declarations because it uses up memory with wild abandon—it imposes no structure—until it runs out. But the variable declarations have the further advantage that the compiler will catch a misspelled variable name or a nonsensical use of a variable.

Now we come to controlling program flow in Pascal. In Applesoft, you remember, the GOTO statement is used to cause the "control" to

transfer to a different line rather than just executing the next statement in

**program easy-to-read**  
**{variable declarations**  
**and procedures}**

```
begin
  input (information);
  sort (information);
  while (more_requests) do
    begin
      getname (item);
      search_for (item);
      printout (item)
    end;
end
```

FIGURE 3. Using procedures and functions as new commands, (Input, sort, getname, search\_for, and printout are procedures, more\_requests is a function returning a value TRUE or FALSE, and information and item are variables.)

the program. With GOTO's and IF's it is possible to execute a section of program repeatedly if some condition are true:

```
10 I = 1
20 IF I > 64 GOTO 60
30 PRINT I*I
40 I = 2*I
50 GOTO 20
60 END
```

The example shows a complete Applesoft program, which prints the square of the numbers 1, 2, 4, 8, 16, 32, and 64. There is one IF and two GOTO's. It's not clear at a glance that's what it does—you have to figure out where the GOTO's go to! In Pascal, the same program would be written like this:

```
program squares;
var i:integer;

begin
  i := 1;
  while i <= 64 do
    begin
      writeln(i*i);
      i := 2*i;
    end;
end.
```

The statements between the BEGIN and END immediately following the WHILE are the body of the loop. The word WHILE makes the intention of the programmer clearer than do the IF's and GOTO's of BASIC.

Both languages have their own fluff: in Pascal, it is BEGIN's, END's and semicolons. In BASIC, it is line numbers.

Besides taking more concentration to read correctly, GOTO's have another problem: they are dangerous. You can GOTO a nonexistent line or into the middle of a loop or some other place. You can't tell by looking at part of a BASIC program if somewhere else there are GOTO's leading into it. Pascal has enough special words like WHILE and IF that you never need a GOTO. Again, this makes part of a program (say the inside of a loop) independent of the rest. If you figure out how a part works, you can move on to the next

part without worrying about them being connected by GOTO's or in some other strange way.

You can almost understand a Pascal program without knowing about the flow of control. Pascal reads enough like English that this is possible. BASIC does not.

Another exciting feature of the Pascal language is that variables may be of any type, not just numbers or character strings. There is a Boolean type which can have a value of either true or false. This is handy, for example, in keeping information about individuals. You could declare a variable named MARRIED which would have the value TRUE for a married person and FALSE for a single person. In Applesoft, you would be inclined to use a code: the variable M might have a value 1 for married, and 0 for single. But such a code would be arbitrary, and looking at the program a month later, the 1s and 0s might be hard to interpret. And what happens if there's a mistake and M ends up with the value 2? This can't happen in Pascal because a Boolean variable can't be given any value except TRUE or FALSE.

You can define your own types:

```
type marital_status = (single, married,
    divorced, widowed, looking);
var M:marital_status;
```

Now any of the words in the list in parentheses can be used as a value for variable M. In situations like these, the worth of a new type over some elaborate code is apparent. (Could you tell what M = 4 might mean in a BASIC program, where numbers were used as a code for the marital status of an individual, if someone else had written it or you had forgotten the code?)

These are the main features of the "Pascal style": programs are easy to read and understand and are divided into independent units with all interconnections explicit. Everything is systematic, orderly, and in the open. The rules of the language encourage this style.

## THE ANSWER

To try to answer our question "Is Pascal worth it?" let's compare the two languages and systems, UCSD Pascal vs. Applesoft/DOS:

	UCSD Pascal	Applesoft/DOS
<b>Operating System</b>	Sophisticated and powerful; prompt lines show options at all times; screen-oriented editor	Much software available for use with DOS but not UCSD; no time wasted going between levels
<b>Program Development</b>	Programs easier to write in Pascal; editor helps make complicated changes; compiler finds many errors before run time	Changes can be made in a program without having to recompile entire text; no time wasted going from editor to compiler to run, then back to editor.
<b>Program Maintenance</b>	Programs easy to read much later if only minimal care is taken writing them: Pascal is "self-documenting"; new code can be added as separate blocks without disturbing rest of program.	No benefits here—BASIC actually discourages programming documentation because REMark statements waste space and slow execution.
<b>Disk Space Required</b>	A lot: system files take up space, and two files (text and code) must be saved for each program (this can be a problem with Apple 5" floppies).	Not much: BASIC is compressed when stored; no big system files to worry about.
<b>Language Capabilities</b>	Abstract data types, records, sets, procedures, and functions—all useful and toil-saving	Easier access to hardware (PEEK, POKE, CALL, PR#, IN#); more Apple-specific.
<b>Execution Speed</b>	Fairly fast	Very slow: Applesoft must waste time interpreting each line
<b>Compatibility</b>	Pascal is standardized (more or less): a text file can be compiled and run on a different machine	All Apples run Applesoft/DOS: all Apple-compatible products support Applesoft/DOS
<b>Status</b>	Shows class	Indicates a hacker.

With all these things in the balance, I must say I usually use Applesoft, though I prefer the Pascal language for any program over about 50 lines long. Pascal really requires two disk drives to work well, and I feel better with important files on an Apple DOS disk where I know they can be used with all sorts of software. Pascal is a first choice for writing a database program, adventure game, or anything that requires large amounts of nonnumeric information to be stored in an organized manner.

Pascal's strong points—data/control abstraction, maintainability and execution speed—make it suited for

serious projects involving a substantial investment in time and subsequent use. Applesoft's flexibility and compatibility with other software make it often preferable for day-to-

day jobs and small programs.

Is there such a thing as an ideal computer language? Will there be?

It seems unlikely. The best that can be hoped for is to find a language that suits the task at hand and the disposition of the programmer. Perhaps from this month's column you have a sense of what Pascal has to offer, and whether it's worth experimenting with or embracing.

Two languages down, n to go. This column won't tell you about all n languages available for the Apple. But number three deserves a fair shake: Assembly language next! □

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# DATA COMMUNICATIONS SOFTWARE INTRODUCTION

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Over the past two years, several data communications packages for the Apple II have been reviewed in *Peelings II* (see the Software & Hardware Index in V4N1 (1983), page 50 and in this issue). In this issue we will review the following:

**Super Smart**  
**STC-CALL**  
**ITS-80**  
**Data\*Trans**  
**Hayes Terminal Program**  
**DOS File Exchange**  
**TEKTERM**  
**TeleText**

Due to the length of time since the earlier reviews and due to the diverse nature of all the programs, no comparison chart will be provided. Please refer to all the articles before making your decision on which package to purchase.

As you will notice from the reviews of these communications programs, there is a large range in the capabilities. One of the first points to consider in selecting a communication package is the extent of your need for data communication. Are you a serious user with a requirement to access mainframe systems

and use screen editors that require a particular terminal emulation? Is your projected use limited to timesharing services such as the Source and Compuserve? Do you communicate solely from Apple to Apple? Do you operate with Apple DOS, CP/M, and pascal, or do you use only one of these operating systems? What types of data communications do you anticipate in the future? Answering these types of questions will help you establish your requirements and perhaps, keep you from purchasing a program that does not support what you want to do.□

---

## STC CALL

---

by David Meredith  
Old Blood Road  
Merrimack, NH 03054  
Source ID: CL1011

\$16.00

Rating: B-

Reviewed by Michael L. Weasner

### INTRODUCTION

STC CALL is strictly for use with The Source information network and requires a 48K Apple II+, with a Hayes Micromodem II. It simplifies

the transfer of text files to and from The Source, but it does have some serious limitations.

### DOCUMENTATION

There is no hard-copy documentation provided, but when the unlocked program disk is booted, a CATALOG of the disk is provided.



There you will see two files of instructions: one for displaying (40-column format) and one for printing (80-column format). Since most Source users probably have a printer, this presents no problem. Instructions are also available from within the main program. The instructions are clear and sufficient, even though there are only one-and-a-half printed pages of text.

## OPERATION

When STC CALL is RUN, you are asked if you want to send a file. If you answer "Y", then you are prompted for the filename to read from your disk and the filename to write to on The Source. If this is the first time you have run STC CALL, you will be prompted for the phone number you use to call The Source. All subsequent uses of the program will ask if you want to change the number. No other logon information is used by the program. After reading the file, the number is dialed and you are placed in terminal mode to logon The Source. When you are ready to send or receive a file, you do a CTRL-A CTRL-X sequence to return to the STC CALL program where you are shown a menu of four options: send file, receive file, hang up, or return to terminal mode. While at the command level of The Source, the process of sending or receiving files is totally automatic. Received files are written to disk as they are received and are named SOURCE-0, SOURCE-1, etc. When you are finished with a Source session, you logoff normally and then access the STC CALL menu (CTRL-A CTRL-X) to hang up.

A program on the disk can be used to read the text files, but as they are standard sequential text files, any word processor that can read normal DOS sequential text files can be used. No program is provided that will write the text file, but again, you can use a word processor to create

the file as long as it writes normal DOS sequential text files.

## LIMITATIONS

STC CALL has two basic flaws. The first flaw is that you can "upload" only one file per run of the program (as many as you want can be "downloaded"). If you have several files to send, you will have to send them one per session since you must logoff and restart the whole process. This could result in considerable extra expense due to the logon/logoff process being excessively used.

The second flaw is that STC CALL is structured around the COMO-type of Source file. The COMO files are normally used to create a file on The Source which will contain everything that is sent to or received from The Source as long as the file is open. If you open the COMO file and then read a UPI news story, all the commands you used plus the story will be written to this file. The flaw is that if the file you download does not have "-- >COM" as the last entry, the program "hangs", and you must press RESET to disconnect from The Source and hang up the modem. This is not a proper or acceptable way of disconnecting from The Source. While most of the time The Source will automatically log you off after three minutes of inactivity, I have had some disconnects that left me on the system for up to 52 minutes. You can call Source Customer Service to advise them of the improper disconnect if you have this problem, but this is an unacceptable mode of operation.

During a transfer operation no text is echoed to the screen. Thus you are unable to monitor the progress of the transfer and will not know if the transfer is proceeding normally. When the transfer is successfully completed you will receive a prompt.

Another limitation is that the program as written runs only on the stan-

dard Apple 40-column screen. If you access an 80-column card before running the program, you will find very quickly that you can't see anything happening since all the terminal mode activity is going to the 40-column display.

While not a limitation, it should be noted that the STC CALL program requires that a line count of the text be the first line of the text file. This is not a normal entry when writing sequential text files from a word processor, but STC CALL will not read a file without this entry. If you plan to read the file back from The Source, then the "-- >COM" entry must be the last line; again, this is not normal.

The maximum file size (bytes) is not indicated, but the program is DIMensioned for 200 lines. There is no auto-save when the buffer becomes full.

## SUMMARY

STC CALL is a limited-use program. It cannot be used (as written) to send text to the Source mail system. The lack of 80-column card compatibility is not serious if the program is just used to upload/download COMO files for use with your word processor. Since the program is modifiable and written in Applesoft BASIC, a user can correct the error and deficiencies to customize the program as desired. The price is right considering the limitations of the program. However, for more general capabilities and for use with other than The Source, you will have to turn to one of the standard terminal programs.

One last point: the name of this program is misleading. It is not an STC (Source Telecomputing Corp.) call program since it really doesn't "call" The Source. It is not a general Source utility program as the name implies. All the program does is transfer files, and it should have been named more appropriately. □

---

# SUPER SMART

---

by John V. Longawa  
Softspoken  
P.O. Box 7000-863  
Redondo Beach, CA 90277

\$60.00

Rating: A -

Reviewed by Michael L. Weasner

## INTRODUCTION

SUPER SMART is another communications package that works only with the Hayes Micromodem II on a 48K Apple II. The main program has many of the features of much higher-priced packages but lacks some of the features of other comparably priced ones. With SUPER SMART you can communicate Apple to Apple or Apple to timesharing system (such as The Source) in order to transfer text, programs, and Hi-Res pictures. The main program is also a full-screen editor when not in terminal mode. The disk can be copied or you can move the machine language programs to another work disk with FID.

## DOCUMENTATION

The 28-page, 5 1/2 X 8-inch manual is an explanation of the program's use and its features. It includes a thorough discussion of making some custom changes to the SUPER SMART program, and though the changes require working at the monitor level (machine language), the explanations should be understandable by the novice. Most of the changes can be performed automatically by the SET-

UP program on the disk. The manual was printed on a dot-matrix printer and reproduced; it is, however, very readable.

## OPERATION

When you boot the SUPER SMART diskette, you will see a short description of the programs on the disk and will be given the option of running the INTRO file. This INTRO program displays the title and author and plays sounds such as those heard if you pick up the phone during a terminal communication session. The INTRO program is not required, so you can exit and then BRUN SUPER SMART. No menu of options is available from the boot program. When SUPER SMART is run, you will be presented with a main menu of 14 options:

MODEM CONFIG	EDIT MODE
PHONE LIST	SAVE BUF
CALL	LOAD FILE
HANGUP	ERASE BUF
REDIAL	PRINT BUF
AUTO ANSWER	BLOCK XMIT
RESUME	QUIT

The program scans the Apple's slots to locate the Micromodem, so no slot configuration is necessary. If a Micromodem is not found, only the menu items on the left are disabled; you will receive an ERRor notice and be placed in the monitor. If you have a properly installed Micromodem, then receiving the ERR message may be an indication of a modem problem. If you do not have a Micromodem, then follow the manual for instructions about using the editor function only (menu items on the right).

When I first tried to use SUPER SMART, I could not get it to locate

my Micromodem. Since I knew my modem was operational with other programs, I felt something was wrong with my copy of SUPER SMART. I called Softspoken and talked to the author about my problem. I found the customer support to be excellent, and although he couldn't solve my problem, we did eventually identify the cause. SUPER SMART does a string search of the Micromodem firmware and hence requires the Hayes firmware chip. The Videx firmware chip I had installed to make the modem prompts display properly on my Videoterm 80-column card apparently changed the locations of the search string, and so the program could not find my modem. When the Hayes chip was reinstalled (after not being used for over two years) the program worked properly (and so did the Micromodem).

To select one of the menu options, you move the cursor—called a "light bar" because it INVERSEs the selected text—with the Arrow keys and press RETURN to use the selected option. The light bar will wrap from the MODEM CONFIG option to QUIT or back, so you don't have to move through the complete list to quit. The MODEM CONFIG option allows you to change the parameters for communication (baud rate, duplex, carriage return delay, parity, data, and stop bits, etc.) either before or during a terminal session. To change the default values you can run the SETUP program which will configure SUPER SMART to come up in a different configuration if the current defaults are not what you like.

The PHONE LIST option will CAT-ALOG the disk and prompt for a

filename. This file can have more than 500 entries of a name and number format. When the file is loaded, you are asked for a search key, and the program will then display each name and number that matches the key. When you find the one you want to call, the program will dial the number for you. This file can be edited with the editor portion of SUPER SMART.

The CALL option will prompt for a telephone number or, if you enter "?", the program will use an "Instant Access" number. The SETUP program will configure this number for you. The functions of the HANGUP and REDIAL options are obvious; the RESUME option will return to the previously selected mode, i.e., to terminal mode if connected to another computer.

The AUTO ANSWER mode is a slick message retrieval system. Your computer will answer the phone, receive messages and place them in the text buffer, hangup the modem when the calling party disconnects, increment a counter of the number of calls received, and allow you to intervene at any time. The received text can be saved or printed. Except for the garbage received when the calling party disconnects, this function is very well done. Although there is no way to automatically transmit sign-on messages to callers, this mode can come in very handy at those times when you need to leave your computer unattended but still want to receive messages.

The EDIT MODE functions just like a screen-oriented text editor; in fact, many of the control sequences are similar to other word processors that I have used. Only the more basic of the text editing functions are available: move cursor, delete or insert characters and lines, scroll through document, go to top of buffer, etc. The editor has a 21,224-byte buffer and so is big enough for most applications. The LOAD and SAVE options use a standard binary file; so if your word processor does also (as does PIE), then you can use the word

processor to create or edit text for use with SUPER SMART. I found this to be a worthwhile ability even though the SUPER SMART editor is fairly good.

The ERASE BUF option will do just that, without asking for confirmation. This is really the only lack of user friendliness in the SUPER SMART program. The PRINT BUF will prompt for a slot for your printer; if you specify slot 0, the text will be routed through a routine at \$300 (a common location for printer drivers). Default values for page width, linefeeds, etc. can be changed with the SETUP program. During the printing there is a display of the number of bytes left to be printed. Printing can be aborted or paused at any time. The BLOCK XMIT option will send the entire buffer to the other computer. The text is not displayed during transmission, but you will see a count of bytes remaining; not echoing to the screen speeds up the transmission.

Since the SUPER SMART program uses binary files, a CONVERT program is provided on the disk which will convert normal text files (type "T" in the CATALOG) and BASIC programs to binary files or from SUPER SMART binary files back to either text or BASIC files. It also can convert to upper case only. Other options will allow use of DOS Toolkit Hi-Res character sets with SUPER SMART, or vice versa. Since SUPER SMART uses a Hi-Res character set for display instead of the normal text page of the Apple, this feature can be useful if you have the DOS Toolkit package from Apple Computer.

## LIMITATIONS

There are two major limitations in using SUPER SMART. (1) Even though the text is Hi-Res, the author chose to stay with a standard Apple display width of 40 columns. Using Hi-Res does allow for lower-case display, but true descenders are not allowed in the character set. No shift-key modification is accepted (including the Videx Enhancer II), so you will have to use the ESCape key

for a shift key. To some this is not an inconvenience, but to others it might be. The use of 40 columns may prove to be a limitation when using some timesharing systems that are formatted for 65 to 80 columns. According to the author an 80-column version may be forthcoming. Use of the Hi-Res screen does not slow down communication since 300 baud (the maximum for the Micromodem) is fairly slow itself.

(2) The other major limitation is that the program works only on the entire buffer; there is no capability to transmit, save, or print part of the buffer. Since the "text capture" is on at all times when in terminal mode, you will have to save the buffer when you have completed receiving each separate piece of information, be it text or programs. When you have several things to send, you will have to load and send each file; there is no merge-files feature; loading a file erases the buffer.

Two minor limitations are no autologon capability and no auto-save of the buffer when it becomes full. SUPER SMART will give an audible warning when the buffer approaches full, but then writes over the previous contents of the buffer when it becomes full.

## SUMMARY

For the price, SUPER SMART is a good program that has some very nice features. Its limitations may not be of concern in your normal mode of operation. The Apple-to-Apple capabilities are useful for transferring programs. A test of communicating with another Apple running COMMWARE and the Novation Apple CAT modem was performed, and we were successful in transferring Hi-Res pictures, an Applesoft program, and text; SUPER SMART is not required at both ends. The program CONVERT could be useful at both ends but is not necessary. When communicating with a system such as The Source, SUPER SMART is useful but slightly inconvenient due to its "entire buffer" mode of operation. □

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# Data\*Trans

---

by Mingche M. Li  
ABT Microcomputer Software  
55 Wheeler Street  
Cambridge, MA 02138  
617-492-7100

\$100.00

Rating: B-

Reviewed by Michael L. Weasner

**Editors note:** A new version is available which corrects the 80-column bugs and most of the others, as well. It was not received in time to rewrite the review. Please bear this in mind when reading the following review.

The new back-up policy is: one back-up is provided free of charge upon receipt of the Warranty Registration Card. Additional back-ups are available for \$15.00 each.

## INTRODUCTION

Data\*Trans is a communications program with many features and options. It works with a Hayes Micromodem II, SSM AIO Serial/Parallel card, SSM AIO-II card, or an Apple Communication card. An acoustic coupler, modem, or Hayes Smartmodem is required for use with all but the Micromodem II. The only requirements of the Apple are 48K and Applesoft; a 16K card is not supported. A Videx Videoterm 80-column display card or lower-case

display chip is optional as is a printer. A built-in editor, auto-dial, auto-logon, total control over communication parameters, and text buffer on/off toggles are just some of its features.

The major portion of the program is Applesoft BASIC with some short machine language files to support display modes and some other features. Because the disk is locked and a modified DOS is used, modification of the programs is not possible. The program only transfers DOS sequential textfiles, but its editor can be used to write the files. A utility is provided to convert Applesoft programs to textfiles for transmittal. The Hayes Micromodem II was used for the evaluation.

## DOCUMENTATION

The manual is wire-bound and contains sixty-seven 6 X 9-inch pages printed on both sides. The manual first discusses getting started and each of the program's options in depth. Next are the configuration instructions, and finally 15 short tutorials on using the major options. The manual provides all the information necessary to get comfortable using Data\*Trans in a minimum amount of time, and would have been excellent except for one minor detail. The program is advertised as being for use on either the Apple II Plus or //e computer, but the manual was written for the II Plus only; references to characters are for the Plus keyboard and not the //e improved keyboard. For II Plus owners this is fine, but for new //e owners it may cause some brief confusion.

## OPERATION

When the disk is booted the first time, the title display appears on the standard 40-column screen. At the bottom of the screen you are prompted to press any key to go to the configuration menu (called a maintenance program). This option is available for only about two seconds before the default programs are loaded. This is a good method for those who may have to change parameters or defaults often, but for those who configure once for their system, the two second delay everytime can get to be annoying. A separate maintenance program that can be run at anytime is preferable.

As was mentioned earlier, the DOS is modified, but the author thoughtfully provided a disk utility to delete, unlock, or lock files. Unfortunately it too is only available during the two seconds following bootup and *ONLY* works on the files on the Data\*Trans diskette. This means that all files on your other disks will have to be set properly before running Data\*Trans, and then you will have to catch the maintenance option during the two-second period if you need to perform some disk operation on the files on the program disk. Using a nonstandard DOS does have its drawbacks and inconveniences for the user.

Also available from the maintenance program are: change to different versions (40 column at 300/1200 baud, 40 column at 1200 baud, or 80 column at 300 baud) and modify several program parameters (buffers on/off default, lower-case display, auto linefeed, delay loops,

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- (^) R — READ  
Read diskette textfile into buffer
- (^) S — SAVE  
Save buffer to disk
- (^) T — TRANSMIT  
Transmit disk file directly
- (^) U — UPLOAD  
Upload buffer to another computer
- V — VISI-TRAN  
Convert data into DIF format
- W — WAIT  
Await calls
- (^) X — SP.CHAR  
Special characters ON/OFF

Commands available only in terminal mode are:

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Since the use of most of these options is obvious, I will mention only those that are not normally available in terminal programs for the Apple. The Dial option will display the default values as loaded from the file MACRO#0:

It will prompt for any changes to the above. Using the Macro option from the menu, you can load in a different file of numbers. The current options can be modified, saved to disk, and used as modified. The H/F is for Half or Full duplex, and the FSW is a code for parity, word length, and stop bits. This is one of the few programs that gives you such total control over the configuration of your system.

The Edit option provides a powerful line-oriented text editor for use off-line to create text to send or to edit text before saving or printing. It has all the expected features of line insert/delete, character search/replace, and the unusual function of "delete a range of columns in a range of lines." This last function is designed for use in the DIF conversion process.

The Remote and Wait call options are similar in operation but have one major difference: the remote call option is supposed to allow the remote caller to have complete access to your Apple system. When connected, it is just as if he were sitting at your keyboard; he can CATALOG any disk, LOAD or RUN programs, etc. The Data\*Trans program is removed from memory when the

### MODEM CONFIGURATION IN SLOT #2

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B. SSM AIO CARD

C. APPLE COMM. CARD/SSM AIO-II CARD

SEQ	NAME	PHONE NUMBER	H/F	BAUD	FSW
1	ROLM	1	H	300	21
2	DOWJONES	482-7035	F	300	21
3	CALLAPPL	1-206-935-9119	H	300	17
4	PRIME	492-7243	H	1200	9
= >5	SOURCE	338-1400	F	300	21



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stop/start list character, default logon file). Once you are finished with the maintenance option, the changes can be saved to disk and the proper program loaded and run. All future boots will come up in the configured display mode, 40 or 80 columns.

When the main program is loaded, the main menu is displayed. This menu contains all the options available in Data\*Trans and is always available by pressing the ESCape one or more times. The commands that are functional while in terminal mode, on- or off-line, are also immediately available from the terminal mode screen by using the ↑ character to tell the program that the next character is for program use only and is not to be transmitted or placed in the text buffer. A help screen can be immediately displayed by pressing ^H. The following is a list of options displayed on the main menu (the ^ means the option is also available from terminal mode without returning to the menu):

(^) **A — BUFFER**  
Keyboard buffer copy ON/OFF

(^) **B — BUFFER**  
Incoming buffer copy ON/OFF

(^) **C — CLEAR**  
Clear the buffer

**D — DIAL**  
Automatic or direct dialing

(^) **E — EDIT**  
Edit buffer

(^) **F — DUPLEX**  
FULL/HALF duplex

**H — HANG UP**  
Hang up phone

(^) **K — CATALOG**  
Catalog a disk

(^) **L — LIST**  
List or print the buffer

**M — MACRO**  
Phone directory/modem configuration

**O — REMOTE**  
Remote control of the Apple

(^) **P — PRINTER**  
Printer ON/OFF

**Q — QUIT**  
Quit with or without disconnecting

(^) **R — READ**  
Read diskette textfile into buffer

(^) **S — SAVE**  
Save buffer to disk

(^) **T — TRANSMIT**  
Transmit disk file directly

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4	PRIME	492-7243	H	1200	9
= >5	SOURCE	338-1400	F	300	21

caller is connected, and so it will not interfere. However, this mode did not work correctly during this evaluation and was no different than the wait call mode. The wait call mode just connects two systems for communications and file/buffer transfers.

The Printer option has several nice features. You can print text as received if your printer is fast enough or is buffered. You can also print directly from a disk file without disturbing text in the program's text buffer. This doesn't mean you can edit the buffer and print a file simultaneously, but at least you won't have to save the buffer just to print a file. This print mode is slow but is a nice feature.

The Transmit option differs from the Upload option in that it will transmit a file directly from disk. This allows transfers of files that are too large to fit in the text buffer of 19,000 characters. There is no similar write-directly-to-the-disk option during download operations. When the buffer fills up, the stop list character is sent, and after a short pause to receive the last few characters, the buffer is automatically written to disk. A problem surfaced during my testing: the file was not successfully written, but the program proceeded as though the write was successful. It cleared the buffer, sent the Start List command, and continued to capture text. So my first text was lost without my being notified of the disk error and given the chance to correct it. This is unacceptable.

The Visi-Tran option converts received text into the Data Interchange Format (DIF) for use with Visicalc, Visiplot/Visitrend, and other programs that can use the DIF format. This option was not evaluated but should prove useful to heavy users of data communications and DIF.

The Special Characters option allows display of lower-case letters (if you have a lower-case chip or 80-column card) and entry of certain characters not normally available from the Apple II keyboard. If you do not have lower-case display capabili-

ty, then turning off the Special Characters option will convert all incoming lower case to upper case, eliminating what would appear to be garbage from the screen.

The commands only available in terminal mode are used to control options that you would need while on-line. Only two are not obvious: the ^ M to load the Macro logon file and the ^ V to view a disk file. Once connected to a host computer such as The Source, you can use the ^ M command to quickly load a previously set up sequence of logon commands that the program will send just as though you had typed them from the keyboard. The ^ V command will prompt for a filename to display on the screen. This displaying of the file does not disturb the existing text buffer and so can be used to preview a file before transmitting it with the send-direct-from-disk option. A nice feature to have.

At all the prompts for a filename, a CATALOG can be displayed by just pressing RETURN for the filename. However, in the 80-column mode the lower half of a long CATALOG will be erased almost as fast as it is displayed, so you won't have much of a chance to see a filename.

## LIMITATIONS

Several problems surfaced during my use of the program that seriously hampered its use. Some screen formatting errors were noted. I don't mean misspellings but flags that weren't cleared (buffer empty and keyboard ON/OFF) and failure to clear the 80-column screen before writing to it, resulting in overwriting existing displays.

On several occasions the program bombed during access to drive #2. There is no clean exit from a requested disk access; you have to enter a filename or reboot. A bug in the Edit mode caused the last line number to edit entry to become the first character of the next line entered. Trying to delete the character only results in the line number being placed at the begin-

ning of the next entered line. And around and around and...

During one session I could not send a file because all the DOS buffers were full; one of the benefits (?) of the modified DOS. I had to reboot. How the buffers became full I have no idea. During uploads or saves, the entire text buffer is used.

There is no way to specify a range of line numbers to use. This means you have to have a file for each item you wish to transmit; i.e., separate letters to send via Source electronic mail must be in separate files—not very convenient. During the transfer no text is displayed on the screen as it is sent; this may cause concern about the progress of the transfer.

And finally, the acceptance of lower-case command inputs is not uniform. For some commands lower case is accepted and on others it isn't.

## SUMMARY

I found Data\*Trans to be simple to use and very capable for many data communications requirements. It has most of the features you need and adds some that you normally don't expect in terminal programs, such as a BREAK key using CTRL-B.

The program disk is locked, but according to the manual, a backup is available for a reasonable price. I contacted ABT to find out what this reasonable price is. While the people at the Customer Service were very kind and courteous, they were very unknowledgeable about their product. No one was able to tell me the cost of a backup, so messages were left for the author, Mr. Li, to contact me. As of the deadline for this article, no return call has been received.

The concept of Data\*Trans is very good, but the implementation still needs work. This program should have received more testing before being marketed. Once the errors are corrected, Data\*Trans has the potential of being a very good program, but for now it must receive a B-□



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# SSM MODEM CARD

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*SSM Microcomputer Products*  
2190 Paragon Drive  
San Jose CA, 95131  
408-946-7400

\$299.00

*Reviewed by: John Martellaro*

The SSM Modem Card is a single card that provides all the features of a conventional 110/300-baud modem device. That is, the serial card and modulator/demodulator circuitry all fits on one card which can go into any Apple II or //e slot except slot 0. The entire package is Hayes Micromodem II compatible, which means that software designed to use the Hayes system should work on the SSM Modem Card.

I used the SSM Modem Card in its normal dumb-terminal mode and found its operation to be identical to that of the Hayes Micromodem II. I also exercised it with Southwestern Data Systems' ASCII Express Pro, Southeastern Software's Data Capture 4.0, and Arrow Micro Software's DFX. All worked as usual. These packages were all used on an Apple //e.

The SSM Modem Card has some features that the Hayes system does not. The most important are the addition of Touch-Tone dialing and an audio monitor through the Apple speaker. When dialing a number, a "T" prefix invokes Touch-Tone dialing. An "A" suffix causes the audio of the dialing process to be sent to the Apple speaker. This is useful for verifying that the dialed computer

has answered and turned on a carrier. Since the card fits entirely inside the Apple, there is no Microcoupler™ to go bad on you. (My three-year old Hayes Microcoupler has failed twice in the last year—the serial card inside never has.) A six-foot telephone cord is supplied, terminating in an RJ-11 jack.

## DOCUMENTATION AND WARRANTY

The documentation is less than it should be. It covers only the bare rudiments of operation and is only 11 pages of text. It appears that it is a preliminary manual, but *Peelings* has not received, as of this time, any updates. The section marked "software" is left blank. The manual assumes that the user knows everything about the device except the basics of its operation. There is a list of the important hardware addresses, but it somehow seems as terse as the rest of the manual. Even if the manual is preliminary, I don't think this is the kind of manual that a user wants to see after paying \$300.

The ad for the card states that it has self-testing, but I could find no mention in the manual of how to initiate any self-testing. The Hayes Micromodem II comes with a substantial manual which also explains the operation of the diskette of software supplied (and its self-test program).

There is a two-year warranty against defects in materials and workmanship.

## CONCLUSION

With respect to the hardware and the operation of the SSM Modem Card, I was very pleased. The one

disadvantage that it has compared to the Hayes system is that there is no visible "off-hook" light. I have gotten used to this indicator light, and I like it. With respect to the documentation, I look forward to doing an updated review that will discuss a considerably expanded manual and sample software.

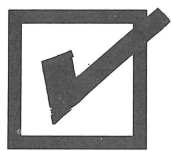
If you already own a Hayes Micromodem II and are planning to supply a second Apple II with a modem that will support your current software, the SSM Modem Card is an excellent choice. You already know a lot about your system. If you are a first-time buyer, you will have to make a choice between the Hayes system with its superior documentation and software and the SSM Modem Card with its advanced features. □

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# INTELLIGENT TERMINAL SYSTEM-80

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by Art English  
Unisoft  
5520 12th Avenue South  
Minneapolis, MN 55417  
612-824-4131

\$29.95

Rating: A-

Reviewed by Michael L. Weasner

## INTRODUCTION

Intelligent Terminal System-80, or ITS-80, is a terminal program for use in the Apple Pascal operating system. Requirements for use are a printer in slot 1 (optional), Hayes Micromodem II in slot 2, an 80-column display card in slot 3, one or two drives, and the Apple Pascal Language System. It offers the standard call, send, receive, save, and print options as in most other terminal programs, but has the added feature of full-screen editing while on-line. The program disk is unlocked and can be copied using the normal Pascal Transfer routine.

## DOCUMENTATION

The documentation provided is twelve 8 1/2 X 11-inch pages of dot-matrix printed text. The manual has a description of the program, list of requirements, instructions for configuring the program to your printer and keyboard, details of the full-

screen edit mode, explanation of the menu commands, instructions for configuring the communications parameters, and finally, tips on using ITS-80 with slow 80-column boards (like the Apple //e 80-column card). Notice that I didn't mention operating instructions; that's because there aren't any. While you guess at the operating instructions by reading the manual and then calling up a system, I feel there should have been a sample session included in the manual. I felt a little lost the first time I tried using the Full Screen mode while on-line. The rest of the data in the manual is simple to follow and use.

## OPERATION

Once you have the Pascal system up, you can then execute the ITS-80.CODE file. This file can be transferred to any of your system disks to simplify use. The first time the program is executed, a configuration file will be created. This file is configured for your printer and keyboard. You first enter the ASCII codes for setting your printer to 80 columns/line, then for 132 columns/line. Codes are supplied in the documentation for 11 popular printers. Next you indicate whether you have the SHIFT key (game paddle port) modification installed. Answering "N" will allow lower-case characters to be entered using a replacement keyboard (Videx Enhancer or detached keyboard). The

Apple //e keyboard is also recognized by answering "N". That completes the hardware configuration. To reconfigure the system, just Remove the ITS80:ITS80.DATA file and it will be recreated.

The title page will next be displayed with a two-line command menu at the top of the screen. Pressing the ESCape key will display the second set of commands menu. The ESC key is used to toggle between these menus or to call up the menus when on-line to a system. Selections are made by pressing the appropriate number key; no RETURN is required. One minor distraction was noted. Any error messages are not cleared from the screen without toggling the two menus a few times to get the message to scroll beneath the menu.

The first menu has these options:

1. Home cursor
  2. Home cursor and clear screen
  3. Clear to end of line
  4. Clear to end of screen
  5. Printer ON/OFF (for simultaneous printing on-line)
  6. Capture buffer ON/OFF/CLEAR
  7. Display buffer
  8. Save buffer
  9. Print buffer
  0. Call
- ESC Go to second menu

The second menu has these options:

1. Change communications configuration

2. List Directory
  3. Send file
  4. Dial
  5. Hang up telephone
  6. Exit program
- ESC First menu (off-line) or terminal mode (on-line)

A little more logical organization of the menus would be helpful—for example, placing all the file options on the first menu and all the terminal options on the second. But when on-line, you will have to press ESC twice anyway in order to return to terminal mode. The file options do not have an option to back out if you change your mind; pressing RETURN for the filename only results in a name of “.TEXT” being used. At least there is a directory option available in the menu. The simultaneous print option will only work if you have a print buffer—none is provided in the program. The capture buffer has a 17,499-byte capability, and when less than 2K bytes are remaining, the incoming text is displayed in INVERSE as a warning of the approaching full buffer. Some 80-column cards will not display this warning if they don't recognize a CTRL-O as the INVERSE command. If the title page appears INVERSE, then you will have this feature. To change the communications parameters, you select that option, and after a momentary disk access, you are presented with a display of the current configuration. Configurations are named, and many different configurations can be saved or recalled. Besides all the standard data communications parameters (baud rate, duplex, stop/start bits, etc.), you can also specify: one phone number, print-page length and width, character to indicate the start of a line, and the name of the configuration. When you select the Call option, you are prompted for the name of the system you wish to call, and this name will be the one you saved the configuration under. The configuration data is not saved as separate files but as part of the program data file. The Dial op-

tion only prompts for a telephone number.

All of the menu options are straightforward and can be used with little or no experimentation. Once connected to a system, you have the option of activating the Full Screen editor. The current version of ITS-80 uses a CTRL-F as the toggle key between Full Screen and normal mode; a future version will use an ESCape F sequence as the toggle. In normal mode (the default) the program acts just like a dumb terminal in communicating with another computer. The capture buffer can be turned on and text received or sent. But when the Full Screen editor is turned on, you have a feature not present in any other Apple II terminal program known to *Peelings II*.

## FULL SCREEN EDITOR

When you first turn on the Full Screen editor, the cursor is homed and the screen cleared. This is the only indication you will have that Full Screen mode is on. Whether or not the Full Screen editing commands are functional is another indication, but they should not be used to test this since these commands are sent as text if you are in the dumb terminal mode.

The concept behind the Full Screen editor is to wait for a carriage return before sending the line of text. ITS-80 even allows you to specify where the line starts if not at column 1 on the screen. In use, you type a line of text to be sent. You can then use the Left and Right Arrow keys to position the cursor over your mistakes and edit them. Pressing CTRL-I allows for the insertion of a single character at the cursor position, and CTRL-D deletes the character. Both options move the text to the right of the cursor to correct the display, but 80 columns is the maximum; any text pushed past 80 columns is lost. Once RETURN is pressed, the line of text left of the cursor will be transmitted. Nothing will appear to be happening during the transmission since each character

has to be sent. Once the line is transmitted, the cursor moves to column 1 of the next line down to allow you to enter the next line of text. If you should desire to repeat some text that is displayed elsewhere on the screen, you can use CTRL-O and CTRL-L to move the cursor up or down, respectively, and the Arrow keys to position the cursor left or right. You can make any changes necessary, and then place the cursor one column past the text to be sent. Press the RETURN key, and the repeated text will be sent. If the screen becomes messy, you can clear the screen.

The Full Screen editor is a good way to be certain that text you are sending is correct. It is simple to use and it gave me a good feeling to know that my typing mistakes while on-line could be corrected without receiving nasty error messages from the system or having to edit the lines using the system's editor. One problem did surface and this concerned answering system prompts when the Full Screen mode is on. If the answer is on the same line as the prompt, the prompt will also be sent, as you might expect, since it is part of the line on the screen. This means you have to toggle the mode on and off, but even then there is a problem (see LIMITATIONS below).

## LIMITATIONS

Only a few minor limitations were noted during the use of ITS-80. Most of these can be overcome by experience in using the program. Since only files can be sent, you must have a way to create text to send (the Pascal editor can perform this function); but you might wish for the capability to type text directly into the buffer while off-line and then save the buffer. There is no auto-save of the buffer when it becomes full, so you must stop the text from being sent from the other computer and call up the menu to select the Save Buffer command. However, I found I could not stop the other system and still get the menu; the system could

be stopped, but the ESC key would not call up the menu. I had to restart the text and then press ESC. This resulted in lost text. Should the buffer fill up, the remaining text is lost and you are notified that the buffer is full. When configuring the communications parameters, one must use caution when entering text for phone numbers or names; the Back Space key is interpreted as a character, so your entry will be incorrect. There is no good indicator of

whether the Full Screen mode is on or off, and this can result in unwanted text being sent if you think you are in Full Screen mode but actually are not. The CTRL-F to turn off the Full Screen mode is also sent to the other system and will probably result in an error message. A future version should correct this problem. There is no auto-answer capability, although the Micromodem has this feature.

## SUMMARY

ITS-80 is a good buy at \$29.95 if you are a heavy user of the Pascal operating system. Its basic features will allow you to have a nearly complete communications package, and the Full Screen mode will give you a capability that is very worthwhile and not found in other terminal programs. If its limitations are not important for your data communications needs, then ITS-80 may be a program worth investigating. □

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# HAYES TERMINAL PROGRAM

---

*Author unspecified*  
Hayes Microcomputer  
Products, Inc.  
5923 Peachtree Industrial Blvd.  
Norcross, GA 30092  
404-449-8791

\$99.00

Rating: A+

Reviewed by Michael L. Weasner

## INTRODUCTION

The Hayes Terminal Program is an optional item when purchasing a Hayes Micromodem II, Smartmodem 300, or Smartmodem 1200. It can also be purchased separately. The program performs all the expected communications functions available in the Hayes modems: auto-dial, auto-answer, and file transfer. However, unlike most other data

communications programs, it will operate in the DOS 3.3, CP/M, or Pascal environments and can transfer files of any type in any of these operating systems. The software will recognize 80-column display cards and will work with most printers and interface cards. Lower-case text can be generated but Apple II and Apple II+ require a Shift Key Modification or the installation of a lower-case keyboard such as the Videx Enhancer II or EPS detached keyboard. Lower-case characters will only be displayed with a lower-case chip or 80-column card installed. One to six disk drives can be defined for use by the program. Other features are explained below. The program disk is locked, but a backup disk is included in the package. Both are warranted for 90 days. For this review the Micromodem II version was used.

## DOCUMENTATION

Included with the two disks is a 5 X 7-inch wire-bound manual of about

125 pages. It covers installation and use of the Micromodem II as well as instructions on using the Terminal Program. All explanations are clear, but the more technical discussions will require some study to fully utilize all the power of the Micromodem and the software. For most uses the technical points can be skipped, and only the configuration setups understood. The program is simple to operate, so a one-time reading of those sections of the manual will suffice.

## OPERATION

The first time the program disk is booted, the configuration module is run automatically. The program can be reconfigured at a later date should you change your printer, modem slot, or number of disk drives. The program will default to the 80-column display if such a card is found. There is no way to change the display configuration without removing the card. If no card is found, the

display will be standard 40 column. The configuration module prompts for a printer interface card type:

1. **Standard Parallel**
2. **CCS Serial**
3. **Apple Communications Serial**
4. **Apple Serial**
5. **Mountain Hardware CPS Card-Serial**
6. **Mountain Hardware CPS Card-Parallel**
7. **Silentype**

The printer card must be in slot 1. It should be noted that not all print options will work with some cards or printers. A table of test results is available in the manual. My Spies Laboratories SUPER-MX card worked when dumping a file from disk but would not allow concurrent printing (see below). When the standard Epson parallel card was installed, all print options worked. The SUPER-MX card is a Grappler-type interface, and since the Grappler wasn't listed in the manual as a compatible interface, one assumes the Grappler will not function in the concurrent print mode.

Next you are asked if your printer needs linefeeds. Then you enter the number of drives you have. If you input one drive, you are asked for the operating system you wish to use. If you answer two or more, drive #2 will be accessed to determine what operating system is on the disk in drive #2. If no disk is installed, you will receive an error message and be given a chance to correct the situation. Not having a disk in drive #2 is not a fatal error; the program will default back to the last used system. All versions of the Hayes Terminal Program are contained on the program disk, so there is no requirement to own a CP/M or Pascal system disk, although it is obviously necessary if you plan to work in that system. A Z-80 card is not required to read from or save to a CP/M-formatted disk.

Changing operating systems only requires inserting a disk containing the new system in drive #2 and rebooting (if using multi-drives) or

selecting the new system from the configuration menu (if only one drive is being used). I found either method to be simple and error free. In either case an existing terminal connection will be lost because the Micromodem will be hung up.

Next you are prompted for the modem slot. The parameters will be saved to disk automatically if this was the first time the disk was booted. If you decide to change parameters at a later date, the configuration will again be saved automatically unless the only changes concern the printer; then the program will prompt whether to save the changes or not.

Once the configuration is completed, the following single-keystroke menu appears:

1. **Originate Call**
2. **Answer Call**
3. **Terminate Call**
4. **Create File**
5. **Receive File**
6. **Send File**
7. **List File**
8. **Printer Status OFF/ON**
9. **Change Parameters**

The configuration module can be run by entering "0", or a delete file module can be run by entering "/". Not displaying these options makes the screen less cluttered, but months later when you need to change the configuration, can't remember how, and can't find the manual, you might regret the uncluttered display.

The Change Parameters option allows for setting the duplex, baud rate, delays, stop/start characters, BREAK character, data and stop bits, parity, up to three phone numbers, and allows for redefining the character translation table (used to enable keyboard entry of certain characters not normally available from the Apple II keyboard). A phone number prefix may also be specified, but it will be used for every call made with this configuration.

When the Originate Call option is selected, you are prompted for a phone number. You can use one of the three numbers specified by enter-

ing PH1, PH2, PH3, or you can enter the complete number. The modem will then automatically dial and wait for a carrier. There is no auto-logon feature, but a file can be created with your logon commands in proper sequence; this file is then sent to perform the logon for you. If you attempt to do a logon from a file, the manual says to redefine the start character to the system prompt character. The program can then wait for this prompt before sending each line. I found that this technique will not work with some systems because the prompt character changes during the logon process. There is also a mode to send each line of a file when a key is pressed, and this mode works fine for performing an auto-logon.

The Answer Call option just sets up your Apple to answer calls and place you in terminal mode if a carrier is detected. The Terminate Call option hangs up the modem and returns you to the menu.

Each of the file options (4, 5, 6, and 7) will prompt for a filename and check the disk for a file with this name. If the format of the disk is incorrect, you will be warned. If the file exists, you will be asked if you want the old one deleted. All options are performed directly on the disk, with only a small memory buffer being used. When creating a file, no editing capabilities are available after a carriage return has been entered. The program can transfer files of any type in any of the operating systems. You are prompted for a file type when in DOS, but filename extensions have certain meanings to the way the program interprets incoming text and writes it to disk in all operating systems. This is one of the technical areas in the manual, but for most uses it can be overlooked. Because the program reads/writes directly on the disk, you can transfer files of any length up to the capacity of the floppy disk.

The Send File option has three protocols that can be used: Stop/Start,

Send Lines, and Verification. The Stop/Start protocol is the default and is used for transferring text files to most systems. Most systems use a CTRL-S, CTRL-Q sequence, but the program configuration can be changed. The Send Lines protocol has three modes of operation: press any key to send the next line, wait for the (configurable) start character before sending the next line, and wait until the (configurable) delay has elapsed. The Verification protocol is the most complicated to understand for the beginner, and it only works when both ends of the communications are running the Hayes Terminal Program or the Hayes Smartcomm Program. It performs error checking on the transmitted data and will keep trying for a specified number of times to get an error-free transmission.

The List File option will print the file on the screen in either 40- or 80-column format or on the printer. If listing to the printer, the program defaults to 66 lines/page (not configurable) and automatically skips over the perforation. If listing to the screen, the program will display 22 lines and then prompt to "press any key" to continue.

The Printer Status flag is only for "concurrent printing" of a terminal session and has no effect on the List File option. If the flag is ON, all text sent or received (depending on the duplex selected) will be sent to the printer as well as the screen. The text to be printed is buffered by the program so no text will be lost. This feature worked outstandingly and is very useful for those who want immediate hardcopies of a session. This option is disabled during the Receive File mode.

## LIMITATIONS

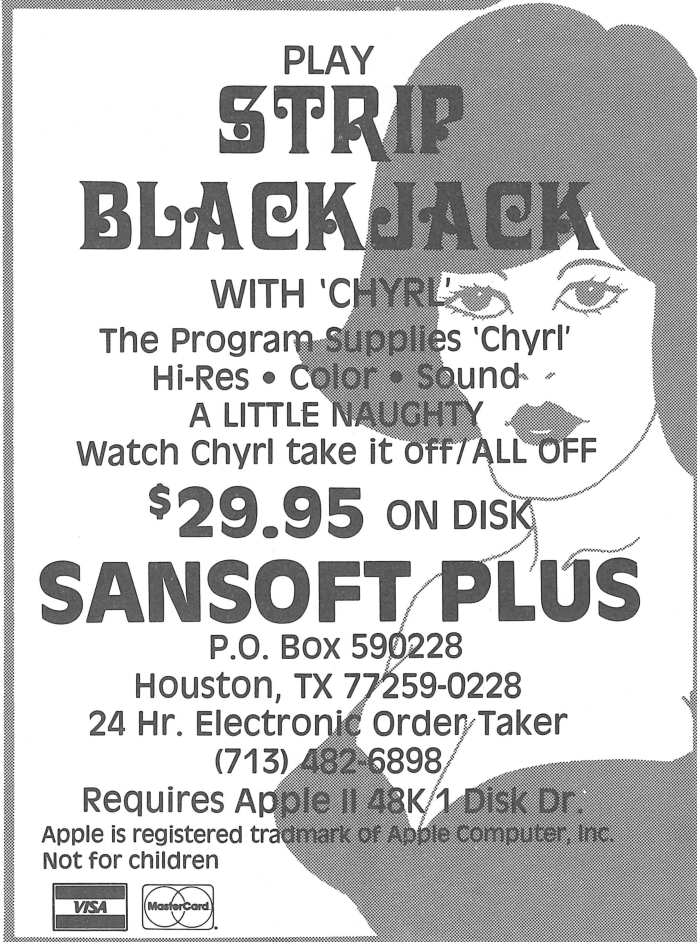
There are only a few limitations in the Hayes Terminal Program. Most of them are very minor and should cause the user little inconvenience. Since text to be sent is not read into a large buffer before being sent, there is no way to send portions of a file. The entire file will always be transferred. As with the other programs with this limitation, it can be overcome by having separate files for each item you wish to transfer. This limitation is not as serious as with the other programs since the file is sent directly from the disk. Should you transfer a DOS file that has an inaccurate sector count (due to deleting text and then resaving over an existing larger file), the extra sectors will be sent, even though they no longer belong to the file. When you return to terminal mode from the menu, the screen is cleared. Any text you might have wanted to see is lost unless you are in the Receive File mode. There is no Quit option, so you have to remove the disk and reboot or power down.

In the Originate Call mode there is no display of what system each number PH1 through PH3 is for, so you will have to remember them or select the Change Parameters option to review them. When selecting filenames, no disk CATALOG option is available; this causes considerable difficulty when you have changed operating systems and can't remember the name of the file you want to use. To determine what the proper filename is, you will have

to remove the program disk, insert the proper system disk in drive #1, reboot, CATALOG the appropriate disk, write down the filename so you won't forget it again, remove the system disk, and reboot with the Hayes Terminal Program disk in drive #1. Truly a painful process. These two limitations are the most serious and will cause the user the most problems.

## SUMMARY

The Hayes Terminal Program, if purchased with the modem, will allow the new Hayes modem user to be up and running with a minimum of delay and training. It is simple to use in its basic configuration and still has the capability for expanded use as your Apple system and communications span increase. If purchased separately as an upgrade, it can give you certain features not in other commercially available data communications programs. It can interface to most mini-computers and mainframe computers; in fact, it is the only program I have used which will transfer files to a certain mini-computer editor I have occasion to use. Being able to send DOS files at one session and CP/M or Pascal files during another session, and doing it with only one terminal program, is a tremendous advantage of the Hayes Terminal Program. The program would have been rated AA, but having to remember what dial-up system is PH1 and what the filenames are for several files to be sent reduces the rating to A+ .□



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# Dos File Exchange II

---

by Graeme Scott  
Arrow Microwave  
Box 13252  
Kanata, Ontario Canada K2K 1X4  
613-592-4609

\$65.00

Rating: AAA

Reviewed by John Martellaro

Dos File Exchange was the first program to receive the *Peelings II* AAA rating. Until this issue, it was the *only* program to have received this honor. The initial review was in V3N4, (1982). Arrow Microwave has now released a revised and enhanced version called DFX II. It has maintained its heritage.

## BACKGROUND

For those who missed the first review, DFX (as it is typically called) is a program especially designed to transmit files between two Apples, with the addition of a Simultaneous Chat mode. It does this by interleaving (in time) the data of the files and the chat characters. It makes for a most pleasant experience and allows a great savings of time.

What makes DFX different is its performance compared to the price, and its coherency. While it does not work as intelligent terminal software with mainframes and does not buffer Chat beyond a single page, it is the smoothest and most powerful program that we know of for transmitting Apple files. (The name

has even become a verb: "I'll DFX you the article.")

## CURRENT EXTENSIONS

All but one of the major criticisms of DFX have been corrected in DFX II. The fixes are:

- Either the Hayes Micromodem II or the Novation Apple CAT is supported. For the Novation, either the RAK-WARE Mirror ROM or the Novation ROM is supported.
- The modems can be in any slot versus slot 2 for DFX I.
- The program now supports multiple slots and drives.
- There is word wrap during Chat, and Chat may be in lower case.
- A key clicker has been added to alert to Chat from the opposite end of the connection.
- The estimated transmission time is displayed and counted down to zero.
- Selected files may be deselected, and the transmission may be aborted benignly.
- A compression algorithm speeds up the transmission of redundant data.
- One end may force the cycling of the other end's display for instructional purposes.
- Reflexive VisiCalc, Reflexive Pie (Writer), and Reflexive DOS are now included in the price.

What has not been added is the buffering of Chat text and the ability to write that buffer to disk. The

documentation is not elaborately printed; it is 23 pages of dot-matrix print plus some sample displays in the appendices, but it is clearly written and will do the job. Two "master" diskettes are now supplied and, as before, you may create or transmit a "secondary" copy of DFX II. However, at least one user in the pair must have a "master" copy.

Regarding compatibility, DFX II works with an Apple IIe and the SSM modem card.

DFX II, with its improvements, support of the Novation Apple CAT, the Reflexive programs, and the ability to send a secondary copy to as many friends as you wish, plus the modest price all combine to make this the premiere program for transmitting files between Apple IIs. □

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# TELETEXT

---

by Gary B. Little  
Micro-SPARC, Inc.  
10 Lewis St.  
Lincoln, MA 01773  
617-259-9710

\$79.00

*Two backups allowed*

*Rating: A*

*Reviewed by Edward Burlbaw*

## STANDARD FEATURES

TeleText has all the features of the more common smart-terminal programs and holds its own with the so called "professional" packages. All menu options are selected using the "Magic Bar". This Magic Bar can be moved from option to option with the Right and Left Arrow keys. The highlighted option is selected by hitting the RETURN key. Text may be displayed on the normal 40-column screen, with lower-case adapters supported. Configuration options allow use of the Videx 80-column board, with softswitch, during terminal mode only. TeleText is compatible with the Apple IIe in the 40-column mode.

The following menu gives some idea of the features included.

- Communications System**
- Filing System**
- Editing System**
- Printing System**
- Answering System**

- Configuration System**
- Macro Editor**
- Phone Number Editor**
- Quit Program**

The Filing System is used for disk access: loading, saving, deleting, and renaming files. The Editing System contains a live-screen editor in which each line is operated on individually. Characters may be inserted, deleted, or the line contents may be overwritten. As characters are inserted or deleted, the remainder of the line is adjusted to compensate for the changing length. All editing takes place on the normal 40-column screen. The Printing System can be configured to send a setup string to your printer, adjust left and right margins and page length, and pause after each page. Incoming messages can be received from remote systems with the auto-answer features of the Answering System. The messages are stored on disk and can be viewed at a later date. Two macros of up to 37 characters may be associated with each phone number and stored on disk. Macros are sent using a two-keystroke command.

If you have selected the 80-column option, text is displayed on the 80-column screen during the communications session. All other displays occur on the 40-column screen. The screens are automatically switched via softswitch commands. Symbols which are normally inaccessible from the Apple II keyboard can be generated using special <ESC > sequences. Other <ESC > sequences are used to shift case (shift-key mod is also supported),

send BREAK, send the text in the buffer, send the macros, toggle Capture mode, or exit terminal mode to the menus.

There are two transmit options available. With Handshake On, characters are sent one at a time, and TeleText waits for each character to be echoed from the remote system before transmitting the next character. If the character is not echoed properly, the transmission quits. This is sometimes called Full Duplex mode and is usually slow but sure. With Handshake Off, a line at a time is sent, and then the prompt character is awaited. The prompt character can be changed to anything, including a null for systems that don't use a prompt symbol. In this mode, an intercharacter delay of up to 25 seconds can be set. Transmission can be aborted at any time by pressing <ESC >.

The Phone Number Editor can be used to create a directory of up to nine numbers with associated macros. When the number is selected, the macros are automatically loaded and available.

## UTILITIES

TeleText has utility programs for creating TEXT files from BASIC programs, Binary programs, and Pascal textfiles. Previous to sending the file, it may be compressed. Compression eliminates the excess spaces from the program listings and replaces the PRINT statement with the "?". An alternate compression for Integer programs does not replace the PRINT statement. These commands are used from the Editor just prior to send-

ing the file and do not effect the file on disk. The receiving Apple must EXEC the file into memory and then save the program. This is the standard procedure.

## EVALUATION

TeleText is a fine package. The manual is clear and useful, and there

are no apparent programming errors. The number of features is quite remarkable for a program at the low end of the price range for communications packages. The support of 80-columns only during terminal mode gives the appearance that this feature was an afterthought. Still, it is nice to have 80-columns there. I

would have appreciated it in the Editor System, also. Then again, some communications packages don't even offer an editor and you must use your own word processor to create text. While support for the Apple //e is not explicitly stated, TeleText works fine on it in the 40-column mode.□

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# TEKTERM

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by Larry Fish  
Fountain Computer Products  
1901 Kipling  
Lakewood, CO 80215  
303-232-4336

\$90.00

Unlocked

Rating: A

Reviewed by Edward Burlbaw

## FEATURES

TEKTERM has many of the features of other capture terminal programs, with one major difference: the ability to emulate a Tektronics 4010 graphics terminal.

In its most basic level, TEKTERM acts like a normal terminal program. With simple commands, one can dial a number (providing this is supported by the hardware), transmit and save disk files to and from other systems, and alter several of the communication parameters. This mode uses the normal 40-character Apple text

screen, with lower case displayed in inverse video, and is referred to as the high-speed terminal mode of TEKTERM. The feature which places TEKTERM apart from other terminal programs is its graphics capabilities. In the mode the manual calls the "expanded character set," 70 upper- and lower- case characters per line are displayed on 24 lines. According to the manual, this mode only works well at baud rates less than 600. (For higher baud rates the high-speed terminal mode must be used.)

The other aspect of the graphics mode is the Tektronics Compatible mode. In this mode TEKTERM will accept Tektronics graphics commands and plot them on the Apple's high resolution graphics pages. Either Hi-Res page can be used. A normal Tektronics graphics page contains 780 points vertical and 1024 horizontal. Since the normal Apple resolution is considerably less, everything is scaled down to fit. This reduction in resolution is considerable; however, it is not so great as to prevent one from using TEKTERM to create graphics before plotting with a pen plotter. Plotting on any other Tektronics compatible device is quite

easy because of the capture features of TEKTERM. The actual graphics commands can be captured for replay to the Apple's Hi-Res screen, Tektronics graphics terminal, or any other device which correctly interprets Tektronics graphics commands.

Because of this replay feature, TEKTERM can also be used from BASIC. If one creates a program to write Tektronics graphics commands into a normal text file, it is then possible to replay it and see the image drawn on the Apple's Hi-Res screen. Once the image is satisfactory, it can be sent to any compatible device just as a normal text file can be sent. Some aspects of Tektronics graphics are covered in the TEKTERM manual. For more detailed information the user is referred to the Tektronics 4010 operating manual. To facilitate the use of Tektronics from BASIC, a program is included on the TEKTERM disk.

Hi-Res screen images may be saved on disk in two ways. One is the normal Apple binary save of the screen memory. The other is to save the actual graphics commands on disk for replay at any later time. Saving and loading images using either

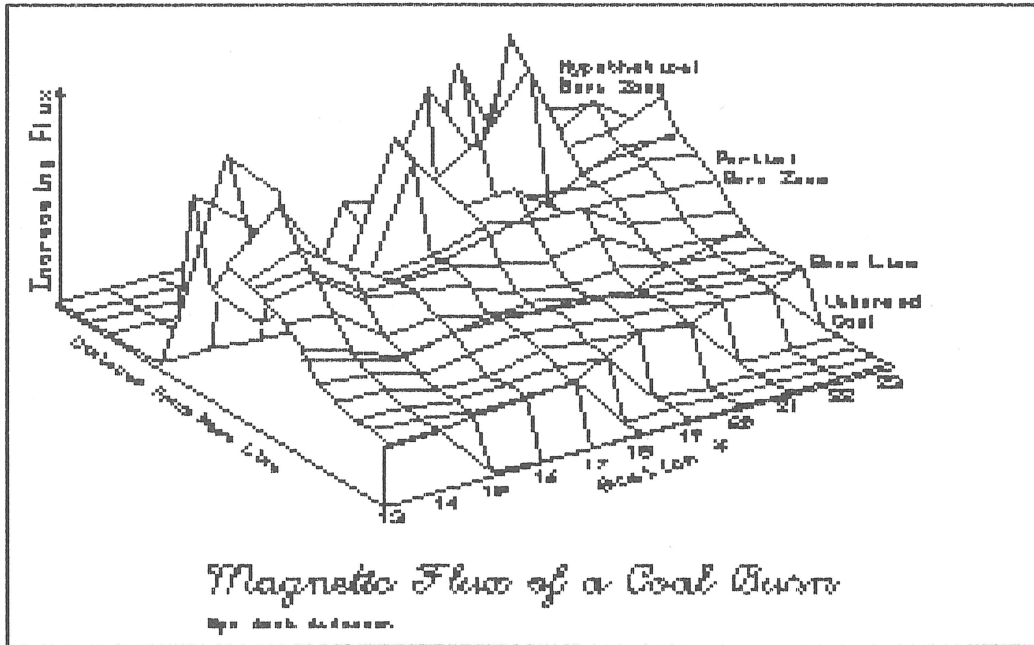


FIGURE 1.

of the methods is done from the main menu. The Hi-Res images may be printed with a graphics printer using standard techniques because the program is not locked and the files are normal DOS files.

## DOCUMENTATION

The documentation consists of ninety-five 8.5 X 5.5 inch pages. There is a table of contents, but no page numbers are listed. The index is comprehensive and adequate. The documentation is well laid out with the simple "getting started" items first and the more advanced features later. There are chapters devoted to Tektronics graphics, interfacing, and serial communications. Other chapters deal with customizing TEKTERM, trouble shooting, and the utilities included on the disk. The entire manual gives the impression that the authors want to convey as much information as possible and make your use of their product enjoyable.

## OTHER FEATURES

TEKTERM supports cross hairs. They may be moved with the game paddles, and the coordinate can be entered by striking a single key. The cross hair location is then transmit-

ted to the on-line device.

Macros are supported. There is a program for creating simple (up to 10 lines long) macros. It is suggested that longer or more complicated macros be created with a full-scale word processor. Examples of macros are given. Other utilities include one to print a text file with selectable line length, number of lines per page, etc.

Also included are programs to convert BASIC programs to TEXT files, convert binary to hex, hex to binary, list a file to the screen, and dump a file in hex and ASCII format. The conversion from binary to hex creates a file that can be transmitted over any serial device. The file must be converted back to binary at the other end for use by that machine. This enables one to transmit and receive Hi-Res images, for example. TEKTERM can be toggled between the two Hi-Res pages so that two images may be compared. The two pages can also be merged or overlaid to form a single image.

## CONCLUSION

I do not think that TEKTERM is the most powerful communications package on the market. Let me qualify that. If you are only interested

in a data capture program that supports 80-column cards, this is not it. If you can live with 70 columns of upper- and lower- case text on the Hi-Res screen (at baud rates up to 600 baud), this will do nicely; TEKTERM appears to have most of the common features of the other programs. If, however, you are interested in Tektronics compatible graphics, there is no other program on the market that will do the job. For that, TEKTERM is unique and without equal.

To approach the utility of TEKTERM from another angle: if you are only interested in a Tektronics compatible terminal, it is possible to obtain one with reasonable resolution for approximately \$2000. An Apple //e starter system costs approximately the same and for another \$100 (for TEKTERM) you will have a low-resolution (256 X 192) graphics terminal. If you have access to a mainframe with sophisticated graphing packages, the use of this package could eliminate any need for an Apple resident plotting package. TEKTERM will probably not appeal to everyone in search of a communications package, but it will be the answer for some. □



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#### TERMS & CONDITIONS



There is a \$2.00 shipping fee on all software and a 2% fee on hardware and supplies with a \$2. minimum. No overseas shipments. Texas residents add 5% on all products except software. Immediate shipment with money order, cashiers check or charge card. Allow 10 days for personal checks to clear. Exchange on defective merchandise only. Exchange made if returned within 10 days. Prices and availability subject to change without notice. Send for free catalog with complete listing of product line.



**Wildcat Computing, Inc.**  
**1160 Park Boulevard**  
**Plano, Texas 75074**  
**(214) 424-3582.**

# WILDCAT

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# STOCK OVERVIEW

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To be successful in the stock market, unless you are extremely lucky, you must contend with and solve several problems--when to buy and sell stocks or other securities, which securities to buy and which to sell, and what mix of securities to include in your portfolio in order to achieve your investment goals with an acceptable level of risk.

In a past issue (V4N3), we reviewed two programs (Stock Price Forecast and Market Maverick) designed to help determine which securities to buy and one program (The Permanent Portfolio Analyzer) to assist in determining the proper mix of an investment portfolio. In this issue are reviews of two programs (Stock Market Advance/Decline and Market Illustrator) that deal with timing of purchases and sales of securities and one program (Millionaire, The Stock Market Simulation™) that will let you try your luck without losing anything except the cost of the program.

When to buy or sell is, of course, a matter of timing. Ideally, we would like to buy a security at the time it is beginning a trend upward in price and sell at the time the trend reverses and starts downward. The difficulty is in recognizing when a trend has actually been established, when it has run its course, and when it has made more than a temporary change in direction. Since individual securities do not sell in a vacuum, we are interested in overall market trends as well as price trends for individual securities.

Price trend analysis is the domain of the technician or technical analyst.

These people have developed literally hundreds of schemes, using data relating to market activity or individual securities, whose objective is to identify and project these trends. Some of these are based upon only one or two items of information and some fairly simple calculations such as moving averages.

For example, if we calculated five-day and forty-day moving averages of the closing price of a particular security and plotted these on a graph for several weeks, we would probably see points at which the two lines crossed each other. A "buy" signal would be indicated when the average based on the shorter period crossed and rose above the average price based on the longer period of time, and a "sell" signal would be indicated when the five-day average crossed and fell below the forty-day average.

The same basic concepts may be applied to the overall market, using published market data. The Stock Market Advance/Decline Timing Program and Market Illustrator reviewed in this issue are examples of this. The Advance/Decline program calculates a trend line and two moving averages from two items of published data. The only options are whether to use weekly or daily data.

Market Illustrator allows you to generate the commonly computed indicators or to create as many of your own as you like using combinations of any two of 164 items of published market data provided with the program. With Market Illustrator you can also analyze price trends for individual securities from data that

you supply. (And there is only \$46.00 difference in the price of these two programs.)

Technical analysis is a fascinating subject, replete with interesting ratios and indexes such as the disparity index, advance/decline oscillator, odd-lot buy/sell ratio, specialist/public shorts ratio (how about that one?); and price movement patterns like triangles, flags, double and triple tops, wedge formations, and diamonds; and theories like the Dow Theory, the Random Walk Theory, and the Efficient Market Theory. The argument over the usefulness of technical analysis is far from settled, but there is an increasing body of evidence that suggests that security markets in the United States are intrinsic-value, random-walk markets and that technical analysis techniques are of little value, particularly for short term trading.

There is a striking resemblance between many of the 'How to get Rich In the Stock Market' books (which contain impressive charts and graphs and schemes for calculating fool-proof indicators from public information in order to generate automatic buy/sell signals for buying and selling stocks) and the books on 'How to Get Rich at the Race Track' (which contain impressive charts and fool-proof techniques for selecting winners at the race tracks). There are probably some computer programs out there in the software market that make similar claims for both the stock market and the race track, but I wouldn't bet the family fortune on either. □

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# Stock Market Advance/Decline Timing Program

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by Dr. Roger Altman  
P.O. Box 1197  
Hightstown, N. J. 08520

\$149.00

Rating B

Reviewed by W. K. Daugherty

As its name suggests, the purpose of this program is to make predictions about the performance of the stock market itself rather than about individual investment vehicles. It is based on an extrapolative forecasting approach. When using this approach, we are attempting to predict the future based on the past. This program attempts to predict the future from published data—the number of stocks that advanced in price and the number of stocks that declined in price on the New York Stock Exchange. The theory is that these numbers indicate underlying market strength or weakness.

The program calculates an advance/decline trend line and two exponential moving averages from either daily or weekly data. A change in the direction of the advance/decline line is signaled when the lines plotted from the moving averages cross each other. (Neither the number of days included in the two averages nor the extent of penetration required to generate a

signal is disclosed.) Daily data is used to generate short term (5-25 days) and weekly data is used to generate intermediate term (3-13 weeks) buy/sell recommendations. The program disk contains historical daily and weekly data. The program user must update the data to keep it current.

Output is in both tabular and Hi-Res graphical form. When the advance/decline line predictions are bullish (advancing), the tabular output simply indicates BUY ON (date) or SELL ON (date). When the predictions are bearish (declining), the messages are SHORT ON (date) or COVER ON (date). SHORT is a signal to sell Short. (Short selling involves the sale of a security which you don't own, with the hope that you will be able to cover, that is, buy it later at a cheaper price.) If graphical output is selected by the program user, the advance/decline line appears in the upper-half of the graph and two curves appear in the lower-half. The two curves are cumulative advance/decline point gains from taking positions in (1) anticipation of a rising market and (2) in anticipation of a falling market.

The program is written to use a Silentype printer for hard copy listings. There is no provision for using any other printer.

## EVALUATION

The program is quite limited in scope. It simply allows one to main-

tain two files of published advance/decline data and generate buy/sell signals based on fairly simple manipulation of this data. Since its recommendations are regarding the market itself, the investor still has the problem of determining specifically which securities to buy and sell. The program user is warned several times that "Since this program provides guidance on the market direction as a whole, there is no guarantee that you will profit from individual trades including (but not limited to) stocks, options, mutual funds or index futures."

Documentation consists of 15 pages of typewritten material in a plastic cover. The author does a quite adequate job of explaining what the program does and providing specific instructions on how to operate the program. The program itself works very nicely and quickly. Screens are well laid out. There is no response to incorrect input except to ignore it and wait for a correct answer to be supplied. The time required for the program to be loaded, executed, and terminated can be as little as two minutes, depending upon the choices made by the user. About half this time is consumed in the loading of files.

Overall, the program does very well what it is designed to do, and the documentation is good—but in my opinion the program is overpriced when compared to other stock market programs I have reviewed. □

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# MILLIONAIRE, The Stock Market Simulation™

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By Jim Zuber  
Blue Chip Software  
19824 Ventura Blvd #125  
Woodland Hills, CA 91364  
213-881-8288

\$59.95

Rating: AA

Reviewed by W. K. Daugherty

MILLIONAIRE is a stock market game in which a player is initially provided with \$10,000.00 in cash and challenged to become a millionaire by buying and selling stocks and stock options. The market consists of 15 stocks in five industry groups. A new player begins as a novice and may advance to investor, speculator, professional, broker, and millionaire status. Each increase in status brings additional investment opportunities. For example, an investor may buy on margin, a professional may buy on margin but may also invest in put and call options. A promotion in status can only be obtained by achieving a specified increase in net worth in the current status.

Play begins in week 14 of a 91-week session. At the beginning of each week stock prices, financial news, and graphs of the overall stock market trend and one industry group market trend are automatically

displayed by the program. Following the display of this information, the player selects any of twelve commands from a main menu. With these commands a player can display additional information about the market, industry groups, individual stocks, and his investment portfolio; or the player can issue commands to buy, sell, borrow, save the game status, quit, or advance the game to the next week. At week 91, all assets are converted to cash and another session can be started. The objective, of course, is to become a millionaire, and after achieving this status, to earn another million. Apparently this can go on forever. Only one player can play at a time, but up to 14 players' game status can be saved and continued in later sessions.

The game comes with one disk and a 25-page instruction manual. The manual includes a discussion of stock market basics in addition to a description of the game environment and detailed instructions on playing the game itself. The manual and disk are packaged in a very impressive-looking, black vinyl cover with gold letters.

## EVALUATION

Documentation is excellent. Descriptions and instructions are concisely but clearly written. Examples of each menu are shown along with an explanation of the individual commands on the menu.

There is an index and a quick-reference guide at the end of the manual. The manual clearly is the work of a professional.

The program responds to incorrect input with a beep or two and simply waits for the correct input to be provided without displaying error messages or any additional information. Although I tried, I couldn't get the program to bomb.

While no simulation can possibly include all the intricacies of the stock market, Millionaire is realistic in several respects. It is based on actual stock market trends. Interest is charged on loans and taxes are calculated on profits. Commissions are calculated and charged on buy/sell transactions. There are margin calls when the speculator's equity drops below 30%. If there is not enough cash to cover the call, some or all the stocks will be sold by the broker. The market is made up of stocks of real, well-known companies such as Exxon, IBM, General Motors, and Dow Chemical.

I found the game to be interesting and educational. My wife, a high school business teacher who played longer and more successfully than I, also said that it is fun. At list, I think it is a bit overpriced, but if you are interested in the stock market and would like to try your hand at investing without risking anything except the price of the program, I recommend it highly.□



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# MARKET ILLUSTRATOR

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by Norman R. North  
N-SQUARED COMPUTING  
5318 Forest Road  
Silverton, Oregon 97381  
503-873-5906

\$195.00

Unlocked

Rating: AA

Reviewed by W. K. Daugherty

## INTRODUCTION

Market Illustrator is one of three related programs produced by N-Squared Computing. It includes two complementary programs for plotting and comparing individual stocks and commodities with major market indicators and some 164 data files grouped under 20 major categories of market information. Data files can be created, deleted, edited, modified, merged, and updated. Data from any two files can be selected, exponentially smoothed, and plotted for any of three different time periods.

Indicators based on the percentage of values in one file to corresponding values in another file or on the differences between values in one file and corresponding values in another file can be created from market data. Some of the more popular indicators such as the speculation index, disparity index, advance/decline differential, advance/decline oscillator, high-low differential, odd-lot short

sales ratio, and the odd-lot buy/sell ratio are described in the user's manual. An Auto-Run mode allows preselection of data files to be compared to one another and the automatic generation of a new graph about every 20-30 seconds. Graphs may be viewed on the Hi-Res screen, printed, or saved to disk.

Data for individual stocks must be supplied by the user. Individual stock data files can be created and updated using historical data downloaded from CompuServe or Dow Jones. Closing prices are plotted on the upper portion of the screen, and volume, open/interest, or net positive volume is plotted on the lower portion. The user may select line, dot, or bar plotting, and multiple plots may be overlaid on one chart.

Additional plotting features include automatic scaling of graphs, viewing two graphs on a split screen or one graph on a single screen, and cursor/data readout. The Cursor/Data Readout option can be invoked when a Hi-Res screen is displayed to create a vertical line (cursor) across the screen without disturbing the plotted data. The cursor is moved across the graph with the Right and Left Arrow keys. The date and data values represented on the graphed lines at their intersection with the vertical line cursor are displayed. This feature allows a closer examination of the information displayed on the screen.

Statistics of stock prices—high, low, close, mean, and standard deviation—are automatically calculated and can be displayed by pressing the "D" key.

The package comes with a 54-page

manual and two disks: a program and data disk, both of which can be copied with the COPYA program on the DOS 3.3 System Master.

The first five pages of the manual provide an overview of the programs and a description of the startup procedure. Three extensive examples in tutorial form occupy the next 11 pages. Information contained in the first sixteen pages is then presented in a two-page summary of program procedures. (A very nice touch.) The remainder of the manual contains descriptions of important program features, operational techniques, plotting features, analysis aids, data base characteristics, data base structure, utility programs, and data base listings.

## EVALUATION

Market Illustrator is top-notch in all respects—documentation, programming, error detection and handling. The user manual is well written, organized, and edited. Explanations and descriptions are clear and concise. The author covers the topics but doesn't waste words in doing so. My only criticism of the documentation is lack of an index, which means more page thumbing than is really necessary.

Menus and screens are well designed and easy to use. An interrupt key that would let the user terminate a procedure and return to the main menu would be nice to have. After letting the auto-run option run for several minutes, I finally terminated it by pulling both disks between loading operations and turning off the computer.

I highly recommend this package for the person who is or wants to be a serious student of the stock market and its behavior. A person with no background in market forecasting or technical analysis may want to get one or two of the more recently published books on these subjects before investing in the programs.

Anyone who acquires Market Illustrator and gets seriously interested in the subject will probably not be satisfied until he acquires the companion programs: Stock Analyzer and Market Analyzer. I haven't seen these yet, but if they are anything like Market Illustrator, they must be good.

In summary, Market Illustrator is a well-designed and well-documented program package with a number of very impressive features. It is a very versatile tool for studying broad-market data and individual stocks or futures and, in my opinion, the price is right. □

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# EZ-LEDGER

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*Highlands Computer Service  
14422 S.E. 132nd Street  
Renton, Washington 98056  
206-228-6691*

\$60.00

*Unlocked*

*Rating: C*

*Reviewed by W. K. Daugherty*

EZ-LEDGER is promoted as the ideal record keeping system for somebody running a small business out of their home or the self-employed professional. Basically it is a cash-basis, single-entry system that allows its user to record all transactions under either income or expense. Expense items may be classified under any one of 99 expense codes. Expense codes may be added, deleted, or revised to suit the needs of the user. Expense codes can be grouped in deductible or nondeductible groups by specifying a range of account codes for each category. Accounts

Receivable or Accounts Payable "holding" files can also be set up. Items entered into these files can be "posted" (transferred) to income or expense accounts when they are collected or paid. Invoices may also be produced and automatically entered into the Accounts Receivable file. All the files can be scanned or listed on a printer. A profit/loss report can be produced. EZ-LEDGER will support 80- to 132-column printers and one or two disk drives.

## EVALUATION

There are some nice features in this program. It is menu driven, and the menus are well laid out and easy to use. The user is continually prompted to indicate whether a particular item of information just entered is correct or not. Entering an "N" causes the program to cycle back and ask for entry of the item again. Entering a "Y" (or hitting the RETURN key in most cases) indicates that the item is correct, and the program prompts for the next item. The "CORRECT?" prompt can be turned off by selecting the "expert option" on the SYS-GEN menu.

Items in any of the four files can be

located and displayed or printed by searching any one of several fields in the transaction record. A number of well-designed reports can be produced. When entering transaction amounts, the program will accept any number of other symbols in lieu of a decimal point and patiently correct it without displaying an error message or beeping at you. If more than two numerals are entered to the right of the decimal, the amount will be rounded off by the program.

On the negative side are a number of annoying deficiencies. The attractive, red, three-ring manual is poorly organized and poorly edited. Three misspelled words in the first three pages didn't particularly bother me. A rather confusing and discouraging discussion of item 5 (Set Printer Specifications) on the Sys-Gen menu did nothing to bolster my confidence in the program or its producers. Fortunately the system comes set up to run on an Epson Printer with a parallel interface card, so I didn't have to interpret the material or call Highlands for help. Other users may not be so fortunate.

Following the three-page discussion of items on the Sys-Gen menu is another three pages explaining

how to produce and automatically post Invoices. This comes before the explanation of Invoice Sys-Gen which must be done before invoices can be produced. Invoice Sys-Gen is not listed in the table of contents.

The seven or so pages of instructions on how to use the main program and two sub-programs called TOTALS and SCAN are more clearly written than the rest of the manual. There is no index, no glossary, and no tutorial on setting up and using the system. Overall, there is a lot of room for improvement in documentation. I give it a "C".

The programs are better than the documentation but not enough better to raise the overall rating to a "B". The programs are generally fast, but there is a delay of several seconds between the time an error message is displayed and the program recycles to allow reentry of the incorrect data. The first few times this happened, I thought the program had died. On one occasion, the program died after I answered "no" to the question "Do you want printer on?", and I had to start over. While entering an invoice, I decided that I wanted to abort the entry but could not, so I went ahead with it and entered a zero amount. The program accepted it and processed it along with the other invoices I had entered. There is room for improvement here too. I give programming a "B-".

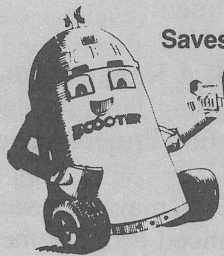
Finally, I don't agree that the system is ideal for a small business operated out of the home or for a self-employed professional person. There is no balance sheet, no provision for accounting for cash balances, inventories, depreciable or other assets or noncash expenses such as depreciation expense or other liabilities. Perhaps a few small businesses would have no need for these, but it would be a rare self-employed professional that would

not. EZ-LEDGER is better suited for recording and accumulating personal income tax information than for business accounting. Sell me this program for 25 or 30 dollars, and I

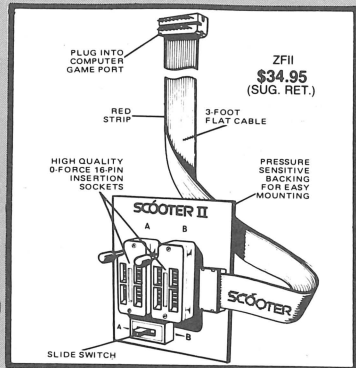
would probably feel that I got my money's worth—but for \$60 I expect a bit more than EZ-LEDGER has to offer. □

**INTRODUCING THE SCOOTER™**

**Ø-FORCE TWIN PORT**



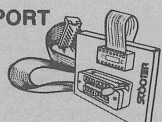
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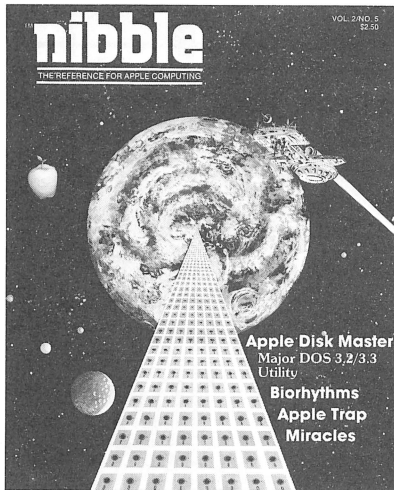
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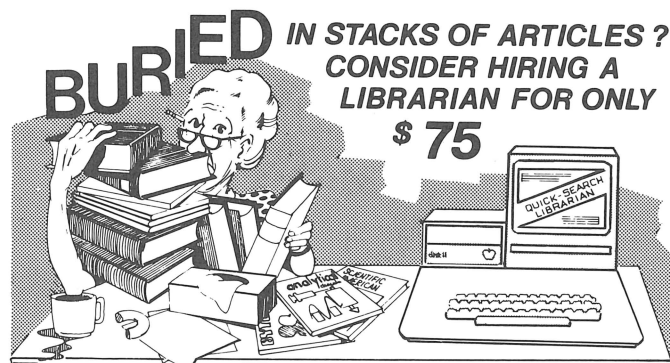
# INTERPRETERS VS. COMPILERS

An interpreter, like the BASIC interpreters on the Apple, is a machine language program that scans a BASIC program in memory and deciphers or translates it and then jumps to appropriate subroutines to execute the intended code. If looping causes code to again be examined, then it is again interpreted. The processes of both parsing the code and re-executing repeated code are two factors that slow down interpreters. In addition, the interpreter in your Apple has to search the entire list of line numbers to find the line of a GOTO or GOSUB. Other interpreters on bigger computers keep addresses for each line number so that jumps are faster. In addition, some code in loops may be partially compiled.

Compilation is the process of creating a machine language program that does the same thing as the source code intends. The program that does this is itself a machine language program called a compiler. Since the compiler analyzes the program ahead of time, it can provide memory addresses for program lines and variables. The compiler must do many things: it must analyze the source code and identify key words of the language and be sure that the syntax is correct. (Normally, you avoid this by checking out the program with the interpreter.) It must then parse the code to identify program logic. Then it must generate machine code that represents the source logic. It is here that some compilers optimize the code by deciding that there is a more efficient way to do the same things. Permanent addresses are assigned to variables so they can be referenced by address directly.

Some operations are so typical to the programming environment that it would be inefficient to include code every place the operation occurs. FORTRAN does this by having a library of often used functions like SQRT, TAN, INT and others. Making calls to these subroutines is a little slower but produces more compact code. BASIC compilers do the same thing, and it is referred to as a "runtime" library. In addition, to save even more space, calls are made to the Applesoft interpreter itself which provides handy subroutines for frequent operations. The result is that the compiled code must nevertheless have Applesoft resident.

An interesting note is that most compilers are bootstrapped. In the case of some Applesoft compilers, the compiler is written in Applesoft and used to compile itself. The first time through, however, it is running under the interpreter and the compilation can take many hours. (Fifteen hours for The Einstein Compiler.) Once done, the result is a machine language program that can be used to compile improved versions of the compiler itself. One Applesoft Compiler was written from scratch in assembly language: Hayden's Compiler Plus by Jonathan Eiten. □



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# THE COMPILER PLUS

---

by Jonathan Eiten  
Hayden Software  
600 Suffolk Street  
Lowell, MA 01853  
617-937-0200

\$99.95

Rating: A+

Reviewed by: John Martellaro

## INTRODUCTION

The Compiler Plus, like The Einstein Compiler, is a program designed to convert Applesoft programs into machine language. Some comments about The Compiler Plus were made in The Einstein Compiler review, and you might want to read that review as well. The original version of this compiler was copy protected, but Hayden Software has wisely decided to remove the copy protection. As a result of this policy and the price, I expect that this program may become the most popular compiler for general purpose use. It already has a good reputation for producing code that runs very fast, as documented in the *Byte* article (see Compiler References on page 47) and duplicated here.

## OPERATION

Like The Einstein Compiler, the Applesoft program is loaded into memory and compiled from there. A BRUN COMPILER command starts the process and terminates with the option to BSAVE a binary file. In the

simplest case, this binary file is all that is needed since the compiler selects the necessary routines from the Runtime Library and attaches them to the end of the object code. I like this idea because it allows you to have stand-alone programs and eliminates the unnecessary overhead of a large, perhaps mostly unused Runtime Library. In the case where there will be several routines in memory, there is an option to explicitly force the use of a single Runtime Library in the style of Microsoft Applesoft Compiler (formally TASC, The Applesoft Compiler) and The Einstein Compiler.

The Compiler Plus compiles at an astonishing speed of approximately 150 characters/sec of source code. In addition to what seems to be a highly refined compiler code, an enhanced disk I/O routine speeds up disk access considerably. The compilation goes so fast that it is hard to believe that the job has been done.

In order to eliminate the time required to compute the location of array elements, The Compiler Plus generates subarray lookup tables. These give faster access to array elements. Also, integer arithmetic is maintained as long as possible in expressions. Only when a floating-point operation is necessary, is it performed. Strings are dynamic. It is up to the user to either force house cleaning through the FRE command or select the G compiler option to monitor the string status. Nevertheless, these dynamic strings (as well as ordinary variables) may be shared in common areas among submodules. Like Microsoft Applesoft Compiler, the positions in memory of the object

code, variables, external library, and the string pool default in a given stacked sequence. There are compiler options to specify a desired address for any one of those blocks. The rest will continue to be stacked in the default order. I find this somewhat more convenient than the explicit method of The Einstein Compiler.

In the event that you need more compilation memory and have a 16K RAM card, Hayden supplies a DOS mover that will relocate DOS. Be careful to note that you must boot on a DOS 3.3 master prior to the DOS move and that The Compiler Plus diskette has a slave DOS. If you intend to use page 1 of high resolution graphics in your program, you will be forced, in many cases, to start the object code at \$4000 or higher. The DOS mover comes in handy here.

Unlike Microsoft Applesoft Compiler and The Einstein Compiler, The Compiler Plus supports the "&" command and will work with Ampersand routines that do not use the interpreter's variable table to pass parameters. As usual, you must have Applesoft in ROM because the compiler will generate CALLs to ROM routines. The program is //e compatible.

A feature available in The Einstein Compiler that is not available in either The Compiler Plus or Microsoft Applesoft Compiler is the line trace. As a result, it is not possible to TRACE or interrupt The Compiler Plus program with a CTRL-C.

COMMON is achieved by specifying variables in a "REM=" line in the same order in each submodule and with the same specified variable

space address. In addition, there are options that allow various degrees of independence in the submodules. This ranges from a submodule that has no variables or data of its own up to those that have their own data, variables, and local strings.

From an ease-of-use standpoint, both in the syntax and the documentation, I would rank The Compiler Plus easiest to use when building a compiled program that uses several modules. Microsoft Applesoft Compiler would be second easiest, and The Einstein Compiler last.

## DOCUMENTATION

The weakest part of the original version of this program was the documentation. It is now much better, but it is still weak. The 44-page

(5 X 7-inch) manual is softbound and is placed in a plastic protector. It does not seem like an appropriate manual for a \$100 compiler. There is no index. The diagrams are crudely drawn, even though the text is typeset and clearly written. The adventure and background contained in the Microsoft Applesoft Compiler and The Einstein Compiler manuals are missing. There are only a few details on the operation and philosophy of a compiler. There are no listings of sample programs utilizing the various compiler directives. There are some files on the diskette that are not explained, though their utility is fairly obvious upon inspection. The page-zero memory locations used by the compiled code are not specified. There are no references for further reading. In

summary, while the package is easily used and understood, the documentation does not bear the marks of a package geared to *serious* program development.

## SUMMARY

I like The Compiler Plus for several reasons. The documentation, while not complete, is easy to understand and gets right to the point. The diskette is copyable. The compilation speed is astounding, and the speed of the compiled code is very fast. The price, while substantially higher than many utilities, is much lower than Microsoft Applesoft Compiler, and that makes it attractive for occasional use by average users. With documentation that measures up, it would rate AA.□

---

# THE EINSTEIN COMPILER

---

by Dennis Goodrow  
and Shmuel Einstein  
The Einstein Corporation  
11340 W. Olympic Blvd  
Los Angeles, CA 90064  
213-477-4539  
(Version 5.3)

\$129.00

Rating: A+

Reviewed by John Martellaro

## INTRODUCTION

The Einstein Compiler is a program that converts Applesoft programs into machine language. Such a process

is called compilation. There are several advantages to compiling a BASIC program, but the most important one is a gain in execution speed. For a more detailed explanation of this process, see *INTERPRETERS VS. COMPILERS* on page 41 of this issue.

This compiler has its origins in "The Expediter" series formerly sold by Sierra On-Line. Thus, the current number of Applesoft compiler remains at four. At the end of this article is a list of references of previous compiler reviews done in *Peelings II* and elsewhere. Heretofore, the Applesoft compiler that received the highest *Peelings II* rating was the Microsoft Applesoft Compiler (formerly TASC), but the rating is well over a year old and may need adjustment.

## THE BIG QUESTION

If you are currently using another Applesoft compiler or have read previous reviews on these products, the first question you will want answered is: "What is new or better about this one?" The answer appears to be that there is nothing earth-shaking or extremely different about The Einstein Compiler. It does do some things better than the other compilers, but the improvements are essentially minor differences in philosophy and certain enhancements that will be described below.

## OPERATION

The Einstein Compiler is a hybrid disk-based and memory-based com-

piler. It operates on the Applesoft program in memory, destroys it, and uses the Apple memory plus its own disk space as working areas. When the compilation is finished, there remains in memory a single Applesoft line of the form NNNN CALL XXXX. This is convenient in the simplest cases because it gives the user a convenient way to run the compiled program. It also allows the user to do a conventional `SAVE <filename>` after compilation since the pointers used in the DOS `SAVE` command have been adjusted appropriately to include the machine language along with the one-line Applesoft program. The alternative to save the compiled program as a binary file is also provided. Compare this to the Microsoft Applesoft Compiler in which one must either take note of the decimal starting address of the machine code and use `CALL XXXX` or use the "&" to restart. However, the Microsoft Applesoft Compiler always produces a machine language file written to disk during compilation. This is the principal advantage of the Microsoft Applesoft Compiler; it is compiling to *disk* and need not worry about overwriting DOS or running out of physical memory. While on this subject, it should be noted that Hayden's Compiler Plus gets around this problem partially by supplying a DOS mover utility for those users who have an upper 16K RAM bank. The Einstein Compiler, version 5.3, does not allow DOS to be moved during compilation.

The Einstein Compiler compiles fairly quickly. The rate is approximately 30 characters/sec of source code. The code that is produced runs as fast as Hayden's Compiler Plus and generally faster than the Microsoft Applesoft Compiler. The pure object code uses less space than The Compiler Plus and about the same as the Microsoft Applesoft Compiler, but that is not all there is to this aspect either. All compilers rely on the presence of a "Runtime Library" of mathematical routines

which is of fixed size. (However, The Compiler Plus extracts only what it needs from a Runtime Library and attaches this code to the end of the compiled code.) To be completely accurate in computing the size of the code, one must add the size of the Runtime Library.

The Microsoft Applesoft Compiler has the explicit option of declaring certain variables as 16-bit integers while The Einstein Compiler does not. Hence, in certain applications that use heavy integer arithmetic, the Microsoft Applesoft Compiler can out perform any of the other Applesoft compilers by a factor of up to 2.0.

In order to do execution speed benchmarks, I have used several of the programs referenced in the *Byte* article mentioned in the references on page 47. See the accompanying Compiler Comparison Chart and Compiler Timing Programs which show the results. In order to compact a program with a large number of REMarks, The Einstein Compiler supplies a utility to remove them. This utility is smart enough not to remove REM lines that are referenced; it simply removes the text after the REM. Those REMarks that have compiler directives are untouched.

Your Apple must have Applesoft in ROM and the compiler is //e compatible.

## COMPILATION OPTIONS

The Einstein Compiler provides a comprehensive set of compiler diagnostics during the compilation. These include the memory map, number of lines compiled, number of variables, a symbol table of the addresses for all variables, and the bytes saved due to the compression algorithm. Missing, however, are the name of the source file and the option to print a listing of the source file.

Compiler parameters are variables that the user can set prior to the compilation in order to control memory allocation and certain compiler

features. For example, The Einstein Compiler is the only compiler that provides a choice between static strings and dynamic strings. Static strings avoid garbage collection and are useful when strings never exceed a given length. Dynamic strings are faster and more flexible, but because of the way they are stored, the program is subject to the dreaded garbage collection. As with the Microsoft Applesoft Compiler, provision is made for global variables which may be shared between modules. Unlike the Microsoft Applesoft Compiler, however, global (or COMMONed) strings must be static.

There are occasions when the default memory allocation will not suffice. This may be due to a memory conflict with user-supplied machine language routines or the use of the high resolution graphics pages. (The occurrence of the HGR or HGR2 command is recognized and accounted for in the simplest case.) For really complicated configurations, the compiler parameters must be overridden manually. The first time I tried to do this, it was not perfectly clear to me how to compile a large complicated program using the options presented for the memory management. The documentation does indeed point out how to select default values on page 32, but this procedure should be emphasized more clearly. In fact, the Einstein Compiler gives so much flexibility in the memory management that the beginner would be wise to venture into this area very carefully. In contrast, the Microsoft Applesoft Compiler sets up its memory usage so that a change in the base address of the object code has a minimum impact on the user, and one can get a little fancy without having to know too much.

The Einstein Compiler supplies a debug option, called `LINE TRACE`, that enables the Applesoft `TRACE`, `CTRL-C`, and Applesoft error messages. This uses up an extra seven bytes per line of source code. There



is also an option to omit the compress code option. Normally, one would like the compression algorithm to be invoked, but if it is suppress the address versus line-number dump, select a slot number to which the compilation diagnostics are sent, and enable the pause-on-compilation error flag. In summary, I would say that the compilation options of The Einstein Compiler are better than those of the Microsoft Applesoft Compiler or the Compiler Plus and would be near perfect with the addition of the option to print the source code and name.

For the advanced user, there are facilities to create linked routines with a machine language driver or an Applesoft driver. Routines may be chained or co-resident.

## DOCUMENTATION

The Einstein Compiler manual is very well done. It is the 5 X 7-inch size, spiral bound, has 130 pages, and it fits into a hard-cover protective binder. It is clearly written, has a complete table of contents, and an index. The paper is heavy and will last, and the printing is clear and dark. There are plenty of examples. The type size is about twice that of the Microsoft Applesoft Compiler manual, and it makes for easier reading.

As with the Microsoft Applesoft Compiler and The Compiler Plus, the first-time user is led through a tutorial on the compilation of a simple program so that anxiety is minimized.

## LIMITATIONS

The Einstein Compiler does not recognize the Applesoft "&" command. The largest Applesoft program that can be compiled is 31K bytes. There is no provision to relocate DOS at compile time. However, DOS may be relocated at runtime.

## SUMMARY

The Einstein Compiler is similar in most respects to the other Applesoft compilers. It tends to excel in the areas of the compiler parameters and compiler diagnostic listing. It is also the only compiler that allows the option of static or dynamic strings. The code compression algorithm can produce significant space savings for large programs.

If you want the best overall combination of compile time, object file size, execution speed, and price, The Compiler Plus wins handily. If you need the flexibility of compiling to disk, fast running integer oriented programs, and the best possible documentation, the Microsoft compiler is the natural choice. However, if you need the smallest possible object code, flexibility of string handling, Line Trace, maximum flexibility in compile directives and memory management, and the ability to save a program as an apparent Applesoft program, then The Einstein compiler is the choice.

Through version 5.3 of this compiler, the single diskette supplied was copy protected. After seeing a preliminary copy of this review (in which such a practice was not favorably received) The Einstein Corporation has elected to lift the copy protection. There has been a kind of unwritten code in the Apple Community that assemblers and compilers are not to be copy protected, and we are happy to find that The Einstein Corporation now agrees.

It is not clear to me at this time that any one of the available compilers is clearly superior in all respects. Until compiler standards are developed, it is recommended that you pay particular attention to features that are important to you by carefully reading this article and those in the references on page 47 of this issue. □

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# COMPILER TIMING PROGRAMS

```
1 REM *****
2 REM * PRIME *
3 REM *****
7 HOME
8 A = 1000: PRINT "THIS IS AN APPLESOFT
PROGRAM TO COMPUTE PRIME NUMBERS"
9 PRINT
10 INPUT "ENTER HIGH LIMIT ";A
15 VTAB 10: PRINT CHR$ (7):
PRINT "2 3 ";
20 FOR B = 5 TO A STEP 2
30 FOR C = 3 TO SQR (B) STEP 2
40 IF B / C = INT (B / C) THEN 70
50 NEXT
60 PRINT B;" ";
70 NEXT B
80 PRINT CHR$ (7);"END"
```

```
100 REM *****
110 REM * ALPHA *
120 REM *****
130 HOME
140 B$ = CHR$ (7)
150 INPUT "READY ? ";A$
160 PRINT START"START" + B$
170 DIM A$(40)
180 FOR I = 1 TO 40: READ A$(I)
190 IF A$(I) = "ZZZ" THEN 210
200 NEXT I
210 N = I
220 S = 0
230 FOR I = 2 TO N
240 IF A$(I - 1) < = A$(I) THEN 290
250 Z$ = A$(I - 1)
260 A$(I - 1) = A$(I)
270 A$(I) = Z$
280 S = 1
290 NEXT I
300 IF S = 1 THEN 220
310 PRINT B$ + "STOP": PRINT
320 K = 0
330 FOR I = 1 TO N
340 PRINT TAB( 12 * K + 1);A$(I);
350 K = K + 1: IF K < 3 THEN 380
360 K = 0
370 PRINT
380 NEXT I
390 END
400 DATA NOTE, THAT, THE, ORDER, OF
410 DATA SORT, CAN, BE, CHANGED, FROM
420 DATA ASCENDING, DESCENDING, BY
430 DATA MAKING, GREATER, THAN, TEST
440 DATA IN, LINE, LESS, ALSO, SAYS
450 DATA REPEAT, LOOP, FOUR, TIMES
460 DATA FIVE, DUE, FACT, LOOKS, AHEAD
470 DATA ONE, STEP
480 DATA ZZZ
```

```
100 REM *****
110 REM * SORT *
120 REM *****
130 HOME
140 INPUT "READY ? ";A$
150 B$ = CHR$ (7)
160 PRINT "START" + B$
170 DIM A(41)
180 X = 17
190 FOR I = 1 TO 40
200 X = X * 37
210 X = X - 100 * INT (X / 100)
220 A(I) = X
230 NEXT I
240 N = I
250 S = 0
260 FOR I = 2 TO N
270 IF A(I - 1) < = A(I) THEN 320
280 Z = A(I - 1)
290 A(I - 1) = A(I)
300 A(I) = Z
310 S = 1
320 NEXT I
330 IF S = 1 THEN 250
340 PRINT B$ + "STOP"
350 K = 0
360 FOR I = 1 TO N
370 PRINT TAB( 12 * K + 1);A(I);
380 K = K + 1: IF K < 3 THEN 410
390 K = 0
400 PRINT
410 NEXT I
420 END
```

```
100 REM *****
110 REM * SIGAV *
120 REM *****
125 REM ! INTEGER D(4096),P(20),I,J
130 HOME
140 PRINT "GENERATING DATA"
150 DIM D(4096),P(20)
160 FOR I = 1 TO 4096
170 D(I) = 0: NEXT I
180 FOR I = 3 TO 4096 STEP 7
190 D(I) = D(I) + 1
200 NEXT I
210 B$ = CHR$ (7)
220 INPUT "READY ? ";A$
230 PRINT "START" + B$
240 GOSUB 1000
250 PRINT B$ + "END"
260 FOR I = 1 TO 7
270 PRINT P(I)
280 NEXT I
290 END
1000 REM -----
1010 REM - SIGNAL AVERAGER-
1020 REM -----
1030 FOR I = 1 TO 7
1040 P(I) = 0
1050 FOR J = 0 TO 4089 STEP 8
1060 P(I) = P(I) + D(I + J)
1070 NEXT J
1080 NEXT I
1090 RETURN
```

# COMPILER COMPARISON CHART

PROGRAM	COMPILER	COMP TIME (SEC)	EXEC. TIME (SEC)	CODE SIZE + RUNTIME LIB. (BYTES) &&
<b>Prime #</b>				
	Applesoft	—	52	224
	The Einstein Compiler	20	40	475 + 2560
	The Compiler Plus	5	41	583 + 1078
	Microsoft Applesoft Compiler	65	41	431 + 4012
<b>Sort</b>				
	Applesoft	—	25	396
	The Einstein Compiler	35	5	687 + 2560
	The Compiler Plus	5	5	1072 + 1077
	Microsoft Applesoft Compiler	90	7.5*	691 + 4012
<b>Alpha</b>				
	Applesoft	—	15	629
	The Einstein Compiler	35	2.5*	841 + 2816
	The Compiler Plus	5	2.5*	1042 + 1289
	Microsoft Applesoft Compiler	95	5	875 + 4012
<b>Sigav</b>				
	Applesoft	—	44	425
	The Einstein Compiler	30	10.5	580 + 2560
	The Compiler Plus	5	10.5	916 + 1118
	Microsoft Applesoft Compiler	93	5.5*	497 + 4012
	Microsoft Applesoft Compiler	93	17.5	497 + 4012

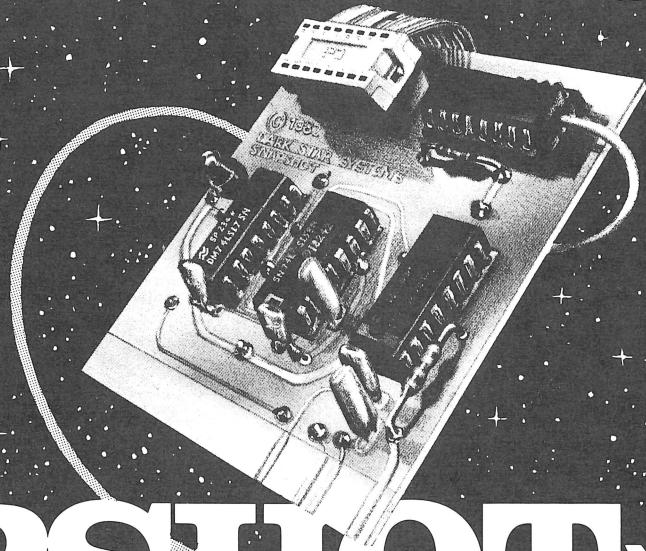
&& Executable code only. Additional space required for variables

\* Using pure integer arithmetic

## COMPILER REFERENCES

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- Taylor, Joseph and Jeffrey Taylor "A Comparison of Five Compilers for Apple BASIC", *Byte*, Sep 1982, p 440.□

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and Allen Avner

COMPress  
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\$150.00

Rating: A+

Reviewed by John Martellaro

## AUTHORING SYSTEMS

An authoring system is a software package that assists an author in the design of interactive software that quizzes a student. There is even a language, called Pilot, dedicated to the authoring process. It turns out that there are characteristic processes that occur over and over again in interactive testing, and it is often troublesome to recreate these program structures over and over again. In general, there are three ways to solve this problem. One can use a dedicated authoring language such as Pilot, one can augment a language like BASIC, or one can use a generalized language like FORTRAN that supports a wide variety of time-proven subroutines. While FORTRAN is available for the Apple II, there are some things that weigh against it. The result is that the third option above has been neglected on microcomputers. There remains the dedicated language and the enhanced BASIC. The package reviewed here goes the route of an en-

hanced BASIC, and this option has certain advantages over, say, Pilot.

## THE ENHANCEMENTS

Applesoft BASIC is augmented by creating a new set of commands, some of which accept arguments, accessed through the "&". Some people may have nonneutral feelings about this kind of usage, but as far as this reviewer is concerned, it is hard to overlook the immediate advantages of this technique. The user works with a language and operating system with which he is already familiar. All of the action takes place on the high-resolution graphics screen with the possibility of mixed text and graphics. Programs already written in Applesoft for educational purposes can be further enhanced. The approach seems reasonable and flexible.

The commands that have been implemented are those that have been shown to be "critical paths" in the implementation of educational software. This means that there are some processes that, if not done properly, result in the failure of the software to achieve its intended purpose. By providing assistance in the commonly used and critical areas, the instructor is free to be more creative in other programming areas. Since all of the other well-known and refined Applesoft facilities are still available, the result can be compact, effective, and visually exciting educational software.

It would be tedious, I think, to go into a discussion of all of the additional commands EnBASIC provides. I will list the commands, and then discuss a few of them.

**&N "string"**  
specify an answer

**&D**  
delay for ZS seconds, ZS = Applesoft variable

**&E**  
erase screen (HGR2)

**&E=[n**  
erase n characters at current screen position

**&I**  
accept student input

**&K**  
put ASCII key # in Applesoft variable ZK%

**&M**  
markup (analyze) unacceptable student input

**&N**  
prepare for a new display = &E + &R

**&O "string"**  
specify alternative answers following &A

**&P**  
pause for key input, put ASCII key in ZK%

**&R**  
reset counters for &I

**&S**  
set bit ZB% in ZO%

**&T**  
test key buffer, set ZK% to first key in buffer

**&U**  
reset bit ZB% in ZO% (unset)

**&X**  
set screen x coordinate (0 = left)

**&Y**  
set screen y coordinate (0 = top)

Two of the most powerful of these commands are the &A and the &O

commands. These accept an argument list that provides excellent facilities for analyzing student input. Again, space does not permit a detailed discussion of the possibilities here, so I will list the options and touch on them lightly.

```
<I, w1,w2,... >
  ignore word w1,w2...

<S, w1,w2,... >
  treat words w1,w2... as synonyms

<X, w1,w2,... >
  reject responses containing the words
  w1,w2,...

<L >
  judge on letters only, ignore
  capitalization

<M >
  accept words that are probably
  misspelled

<P >
  treat punctuation like regular
  characters

<W >
  accept words in any order

<X >
  exclude no words
```

An example of how these commands can be used is best illustrated with an example from the DEMO diskette. Incidentally, most of the example programs in the instructions are found on the DEMO diskette. The following program has been modified slightly by the reviewer.

```
100 GOSUB 1000
110 & N
120 PRINT "WHAT GOES MEOW?"
130 & I
140 & A" <S,@LCAT,@LFELINE> "
150 & M
160 IF ZA% THEN 300
170 ZK% = 0
180 HTAB 10: VTAB 10
190 IF ZC% = 1 THEN PRINT
  "BEGINS WITH 'C' ";
200 IF ZC% >1 THEN PRINT "TRY
  'CAT' ";
210 IF ZK% THEN 130
```

```
220 & T: IF NOT ZK% THEN 220
230 GOTO 180
300 HTAB 10: VTAB 10: PRINT
  "GOOD"
305 ZS=2: &D
310 TEXT
320 END
1000 REM
1010 REM -----
1020 REM A HIGH RES ROUTINE TO
  DRAW A CAT
1030 RETURN
```

Lines 100 to 120 set up the display. Line 130 accepts the response. Line 130 specifies that the correct answers are "cat" and "feline". (The @L symbol indicates lower case.) Line 150 will "mark up" the answer. That is, it will display on the graphics screen various proofreading symbols showing how the response is wrong if it is close. If the answer was entered as one of the options allowed in line 140, the variable ZA% is set to 1 and can be tested in line 160. The variable ZC% is a counter for the number of responses to a given question. In this case, the author declares that on the first failure, the text in line 190 is displayed. On subsequent failures, the text in line 200 is displayed. The subsequent code is designed to handle an incomplete response and provide feedback, and it allows the user to continue typing to finish, perhaps, a correct response, and have the final results evaluated.

There are several other interesting features about this program segment. Since EnBASIC works on the Hi-Res screen with a user-definable character font, there are possibilities for lower case, foreign alphabets, superscripts and subscripts, and overlaid accent characters. The &D command accesses the Applesoft variable to produce a delay of two seconds in this case. I tried setting this variable early in the program, and &D did not work. Setting the value in the same line does. I do not yet know why this happened. (A variation on this is the &P command which pauses until a

key is struck.) Line 1000 shows how it is possible to prepare a graphics display which will later be overlaid with text. In fact, because of the way the character fonts are set up, it is possible to provide a simple level of animation. Questions like "What just happened in this story" are possible. I will say more about the animation later.

The Markup command is apparently unique and well done. The parser is able to, with the aid of the supplied list of possible answers, evaluate a word based on missing characters, transposed characters, extra characters, proper case, proper superscripting or subscripting, proper accent mark, and missing or extra words. Symbols are placed below the response to indicate these types of errors (see figure on next page). This is an example of very good design in a software tool, and it is something that takes that extra amount of effort to do.

## DEFINABLE FONTS

One stumbling block that would make a less capable package unsuitable for general use is the diversity of character fonts required in various educational disciplines such as languages, chemistry, mathematics, logic, astronomy, and physics to name a few. EnBASIC provides a default character set with 128 symbols that includes the standard ASCII set. In the style of the Gutenberg word processor, an editor is supplied that allows the user to edit, on a blown-up pixel display, any of those 128 symbols. The new character set may be saved as a named file for specific purposes. An excellent feature of the editor is the CONTEXT feature which allows the user to see, during editing, the physical appearance of the character in the context of a two-row by four-character grid. As each pixel is changed on the grid, the context display updates immediately to show the effect. Suitable warnings are displayed when you exit the editor so that you realize that you will

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name for the star Polaris.

ORTH STAR NO

try again.

Remember

Toggle UPPER/lower case  
Judges the answer  
Erase last character  
Edits answer

could be made to Applesoft to bring it up to the required level. I was pleasantly surprised by the apparently enormous amount of work that went into developing the highly coherent system found in EnBASIC. The fact that it was written by a team seems to show in the sheer completeness of the package. There are extensive appendices, an excellent index, sample programs on diskette, a self-paced demonstration, consideration for varying character fonts, and a readable style in the manual. I would recommend this package to those educators who enjoy programming and have a need to write interactive tutorials and testing programs. □

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commands. These accept an argument list that provides excellent facilities for analyzing student input. Again, space does not permit a detailed discussion of the possibilities here, so I will list the options and touch on them lightly.

- <I, w1,w2,... >  
ignore word w1,w2...
- <S, w1,w2,... >  
treat words w1,w2... as synonyms
- <X, w1,w2,... >  
reject responses containing the words w1,w2,...
- <L >  
judge on letters only, ignore capitalization
- <M >  
accept words that are probably misspelled
- <P >  
treat punctuation like regular characters
- <W >  
accept words in any order
- <X >  
exclude no words

An example of how these commands can be used is best illustrated with an example from the DEMO diskette. Incidentally, most of the example programs in the instructions are found on the DEMO diskette. The following program has been modified slightly by the reviewer.

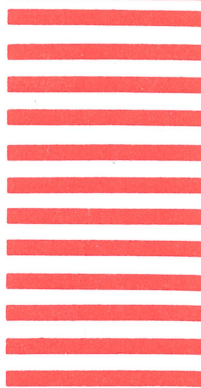
```

100 GOSUB 1000
110 & N
120 PRINT "WHAT GOES MEOW?"
130 & I
140 & A" <S,@LCAT,@LFELINE> "
150 & M
160 IF ZA% THEN 300
170 ZK% = 0
180 HTAB 10: VTAB 10
190 IF ZC% = 1 THEN PRINT
    "BEGINS WITH 'C' ";
200 IF ZC% >1 THEN PRINT "TRY
    'CAT' ";
210 IF ZK% THEN 130

```



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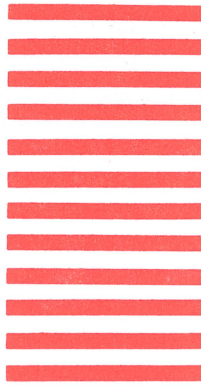
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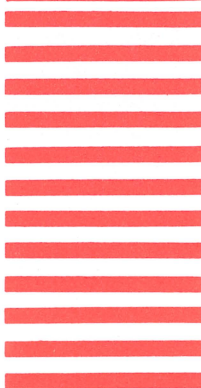
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Give another name for the star Polaris.

➤ NORTH STAR NO

No, please try again.

Remember

ESC-ESC	-	Toggle UPPER/lower case
RETURN	-	Judges the answer
←	-	Erase last character
→	-	Edits answer

FIGURE 1.

Give another name for the star Polaris.

➤ NORTHH STAR NO

No, please try again.

Remember

ESC-ESC	-	Toggle UPPER/lower case
RETURN	-	Judges the answer
←	-	Erase last character
→	-	Edits answer

FIGURE 2.

create a new character set on diskette.

Since the context display is two by four characters, it is possible to create an associated set of eight characters which fit together logically. These can then be displayed as part of an animation set. It is a very flexible and powerful system when added to the already resident Applesoft capabilities.

It is also possible to edit a "key table" since there are more characters than can be uniquely assigned to a key press.

### DOCUMENTATION

The documentation appears to be based on sound pedagogical principles. I had no trouble following most of the documentation. One exception was the description of the Display table editor on page 48. The text is about 100 pages in a large three-ring binder; it is not typeset, but in this case I found that not to be a shortcoming, for it is clearly printed and well written. There is an index that references all commands and includes something I haven't seen much of: major references to commands have the page numbers underlined. This provides a reference to all occurrences of a command and acts as a special pointer to its original definition. We need to see more of this in computer documentation.

### COPY PROTECTION

There are three diskettes supplied: a master, a duplicate of the master, and a demonstration diskette. The first two are copy protected and they work in the style of The DOS Enhancer and Diversi-DOS. From the original diskette, an unlocked user diskette is created. This user diskette contains the EnBASIC binary file that contains the code for the "&" jumps and, optionally, character font tables. In a sense, you are halfway there since your user diskettes are copyable. However, the character and key-table editors remain on the locked masters. This technique allows multiple copies of testing software to be made for a curriculum, but insures that some of the software that makes it a complete package remains protected. I would say that this is a workable arrangement, considering the school environment.

### CONCLUSION

I guess it is no secret that this reviewer feels that an enhanced Applesoft is a better approach to an authoring system than the Pilot language. The reason for this belief stems from an observation about how much work must be done to "avoid learning programming by learning Pilot". However, prior to reviewing this package, I doubted whether suitable enhancements

could be made to Applesoft to bring it up to the required level. I was pleasantly surprised by the apparently enormous amount of work that went into developing the highly coherent system found in EnBASIC. The fact that it was written by a team seems to show in the sheer completeness of the package. There are extensive appendices, an excellent index, sample programs on diskette, a self-paced demonstration, consideration for varying character fonts, and a readable style in the manual. I would recommend this package to those educators who enjoy programming and have a need to write interactive tutorials and testing programs. □

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Unlocked

Rating: AAA

Reviewed by Tom Little

## INTRODUCTION

ORCA/M is perhaps the first truly full-feature assembly language development system for the Apple computer. It is modeled after the IBM/370 assembler, and surpasses assemblers I have used on mini-computers and mainframes in terms of total power and usability. The amazing thing about ORCA/M is that in addition to being clearly superior to its competition, it also was written with future improvements in mind. The combination of power and potential is what warrants the AAA rating.

## SYSTEM OVERVIEW

ORCA/M is a complete development system: assembler, editor, linker, and monitor. Although ORCA/M uses its own operating system, the disks are DOS-compatible: the system itself and the files it produces are all accessible under DOS. The system is configured by reassembling the operating system (no, it's not painful). ORCA/M supports a printer, an 80-column card, a clock/calendar card, and up to eight disk drives. If

a clock/calendar card is present, source files are automatically date stamped and the system reports the elapsed time for all commands. Very nice. ORCA/M also supports the Apple IIe and Franklin Ace computers.

The system is designed to allow for a variety of languages and compilers in the future. The source files are marked with the language ("Assembler" in this case), and the compiled (or assembled) modules are linked together with the Link Editor. I must say this strikes me as a step in the right direction, even though the other languages are not currently available. A big drawback to using different languages on the Apple is that they are all mutually incompatible. ORCA/M holds the promise of breaking down this incompatibility problem. The linker also adds flexibility to programming in assembly language: subroutines can be compiled separately and linked together before running.

The Text Editor, where the source files are created, is screen oriented, which is still a rarity with assemblers. This also shows that ORCA/M is a system designed for maximum generality and usability: many assemblers have just a barebones, assembler-specific editor.

ORCA/M comes as three disks. One has the system, and the other two contain source code. They are simply filled with macro libraries and useful subroutines, in addition to containing the entire source code for the ORCA/M operating system. For the enthusiastic assembly language programmer, this provides the opportunity to reconfigure the system for whatever bizarre machine configuration may be present.

The system is not entirely bug-free: a program malfunctioned when run under the assemble-load-and-go command, but not when assembled and BRUN later; and the printer had problems when the 80-column board was in use. It is hoped that after the system has had more use, such things will be discovered and worked out. (*Editors' note: Hayden is aware of these and they will be fixed in an upgrade.*)

## ASSEMBLER FEATURES

There are almost too many features to list. All the standard features are here, as well as a genuine full-fledged macro capability. Parameters to macros may be given either positionally (the order in the call line corresponds to the order in the macro definition) or by using their names. For example,

```
MACRO          ;in
a MACRO FILE

MPRINT &CHAR,&COUNT
LDX &COUNT
LDA &CHAR
LCLA &LAB
&LAB          SETA *
JSR COUT
DEX
BNE &LAB
MEND

MPRINTCOUNT=#10,CHAR=
*** ; in the main program

which expands to:

LDX #10
LDA #'
&LAB JSR COUT
```

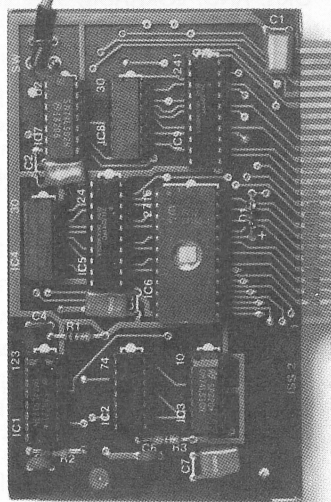
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Here the symbolic parameters &COUNT and &CHAR are assigned values explicitly by the call, and the symbolic parameter &LAB is assigned a value by the EQU statement. &LAB is a label variable which can be redefined with each call to the macro, making it truly local to the macro definition.

This assembler has three levels of symbol scope. There are the symbolic parameters (assembler variables) which begin with & and can be reused indefinitely. Other labels are considered local to each subroutine (actually, program module is a better phrase), while others can be defined as global symbols valid for all modules. This seems to be an ideal method for handling symbols in assembly language.

The assembler accepts floating-point and double-precision floating-point constants in data definition statements.

The assembler *itself* is programmable. Not only is conditional assembly available, but there are the equivalents of looping, GOTO's, and keyboard input. These features make it possible to reassemble the same source file in countless different ways under user control, and to repeatedly assemble a section of source code, which need only be typed once.

Of course, source file linking and object file saving are available as assembler directives, as are the special commands for directing the assembler to a set of macro libraries.

## USER INTERFACE

As mentioned above, the editor with ORCA/M is screen oriented and has all the features one would expect in a good editor, such as global search/replace, a copy/delete buffer, and upper-/lower-case entry. Heavy use is made of the Escape mode (ESC I,J,K,M for cursor motion and other codes as well), which is done here a bit like in Applesoft editing: an island of familiarity.

The monitor is nice to use and includes such goodies as a disk-sector editor and a file copier. All disk file commands accept wild cards (a la Apple FID) in filenames.

The documentation is a whopping 364 pages in a professional-looking binder. It includes source code listings and a great deal of information about the system. Unfortunately it is only a mediocre tutorial. The deficiency is not as bad as it might be, though: the two disks of source code and macro libraries provide working examples of well-written programs.

The reference card is one of the best around, having Apple information (6502 instruction set, memory maps, I/O addresses) on the backside, with complete ORCA/M information on the front.

Here comes the bombshell. Everything discussed so far in this review makes up about half the reason to purchase ORCA/M. The other half is the macro libraries. Recently, there have been several software packages available to make assembly language programming a bit higher level by using subroutines or macros to emulate BASIC commands (see MacroSoft, reviewed elsewhere in this issue). ORCA/M provides an extravagant set of macros that actually go beyond Applesoft. Not only is there floating-point arithmetic, there's *double precision* floating-point. Not only is there two-byte integer arithmetic, there's *four-byte* integer arithmetic. There are trigonometric functions, Hi-Res graphics, Lo-Res graphics, and input/output. There are all the features you wished were part of 6502 assembly language: conditional jumps, increment and decrement integers, branch-greater-than, and decrement-and-branch-if-not-zero. All of this really gets the programmer over the assembly-language hurdle. The pain of figuring out how to do serious operations such as graphics and floating-point arithmetic has all disappeared.

Believe it or not, we're not yet at

the end of the story. Read on.

## THE 3.5 UPGRADE

As the product was under review, we received version 3.5, shipped free of charge to all registered ORCA/M owners. The upgrade gives Apple //e 80-column support, accommodation of off-color disk drives, and use of the clock on the Prometheus Versacard. Perhaps there is a bug—ORCA/M reads the year as 2033 from my Versacard—or perhaps it is just another manifestation of the future-looking design of this system.

The most intriguing feature of the upgrade is its support for the new 65SC02 chip. This chip is a processor which is pin-for-pin compatible with the 6502 but has an expanded instruction set. People who have spent over a year in intimate contact with the old 6502 are guaranteed to drool when they hear of the features of this new chip:

- There is an unconditional relative branch instruction.
- There are PHX, PHY, PLX, and PLY instructions to directly push and pop the X- and Y-registers.
- There are bit-set and bit-test instructions.
- There are accumulator increment and decrement instructions.
- There is genuine indirect addressing for ORA, AND, EOR, ADC, SBC, LDA and STA.
- And finally: There is an indexed, indirect jump.
- Support for this new chip is really quite laudable, especially when one considers that CP/M still comes with an assembler that doesn't know the Z80 has been invented.

## CONCLUSION

ORCA/M is a system that can't help but grow with you. And even without the anticipated future enhancements, it is far and away the most professional assembler on the market for the Apple. And the price is not a penny more than you'd expect to pay for any assembler whose documentation comes in a binder. The copious supply of macros and subroutines provided on the disks makes possible the truly serious programming that this whole system is directed toward.

ORCA/M is a whale of an assembler. □

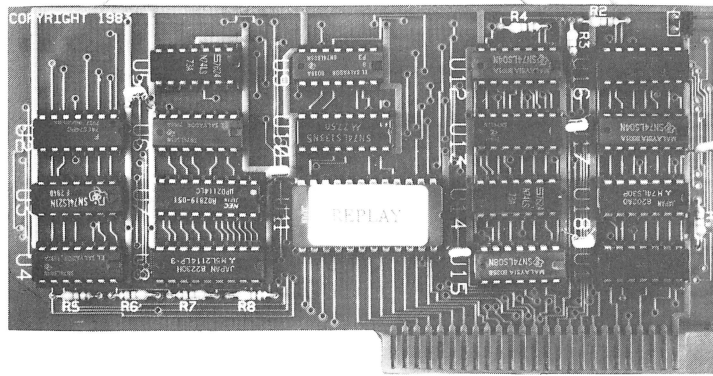
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REPLAY II is an interface card that is slot independent. Users can stop a program, examine and change memory, or copy the program, and restart. Control of the APPLE is obtained by pressing the remote switch which comes on an 18 inch cord outside the APPLE. REPLAY II does not copy the original disk, rather it copies the program executing in memory. If a copy is desired a blank disk is inserted in drive 1 and the options on the menu are contained in the eeprom on the REPLAY II card, no other disk needs to be booted for copying, unlike other copy cards. The very act of booting another disk alters memory which is detectable by some protected software.

REPLAY II does not change ANY memory. Extra memory is buffered to allow copying and analysis without altering the original memory contents. Other copy cards always change specific points in the original memory. REPLAY II faithfully reproduces the lower 48K of memory in a fast load format. The upper 16K can also be copied for a 64K copy. Standard DOS 3.3 files are created automatically for storage on floppy or hard disks. A RAM card is needed for this.

REPLAY II is fully documented in a 60 page manual. Utility programs supplied with the REPLAY II card include Program Analysis, Comparisons, Packing and Compression. A language card is not needed to run packed program copies.

Because most programs are written in Assembly language, the user should be familiar with Assembly in order to fully utilize the advanced Analysis and Packing programs. Users can now freeze a binary program and perform a transparent step or trace while continuous disassembly is shown. View text or hires during trace.

REPLAY II can automatically move protected APPLESOFT programs to a standard DOS 3.3 disk for listing or modification.

Now game players can save a game at any level and QUICKLY restart with the REPLAY II card. Users can freeze games, change variables to obtain unlimited ships or power, etc., then restart the program. Saving high scores is easy!

Minimum requirements are an APPLE II and a single disk drive.

---

# THE ASSEMBLER

---

by Alan D. Floeter  
and Valerie A. Floeter  
Micro-SPARC, Inc.  
P.O. Box 639  
Lincoln, MA 01773  
617-259-9710

\$69.95  
(The Assembler  
+ MacroSoft \$99.95)

Unlocked

Rating: A

Reviewed by Tom Little

## INTRODUCTION

The Assembler from Micro-SPARC is a full-feature macro assembler which may be purchased either by itself or together with MacroSoft, a macro library to provide Applesoft-like functions (reviewed in this issue), for a slightly reduced price. Macro assemblers are much more common now than they once were, and the Micro-SPARC assembler faces some serious competition in the form of ORCA/M (reviewed in this issue), The S-C Macro Assembler, and BIG MAC.LC The comparison chart on page 61 is intended as a guide to these various products. The reader may also wish to refer to *Peelings II*, V3N7 (1982) for reviews of some of these newer macro assemblers.

## ASSEMBLER FEATURES

The Assembler offers such useful features as conditional assembly, source file inclusion, local labels and

variables, in addition to the macro capability. These features provide the flexibility needed for large-scale assembly language programming, and are now rather standard features even on microcomputers.

An interesting aspect of The Assembler's macro capability is the interpretation of parameters. Symbols (essentially addresses) may be passed as parameters by simply listing them in sequence on the call line. Within the macro definition, these are referred to as :A, :B, etc., according to position. Parameters can also be given to macros in the form of a text string. This allows macros to be expanded by textual substitution, which is quite valuable. The Micro-SPARC assembler takes a rather offbeat approach to this, giving the programmer the responsibility to parse the parameter string. Individual segments are extracted by specifying character-position ranges. The Slash character is used in place of a character-position index to indicate characters taken from the beginning of the as yet unparsed portion. If all this sounds a little involved, it is. There is something to be said for being able to parse the macro parameter string yourself, and entire string parameters can be picked up using a single command.

The Micro-SPARC assembler shares with ORCA/M the use of special directives for dealing with macro libraries. This is a valuable feature in a macro assembler, freeing the programmer from worry about where to include the macro files and possible definition conflicts.

Aside from these few points, the assembler proper is quite standard.

## USER INTERFACE

The documentation for The Assembler is 130 pages and is spiral bound. This is interesting, because at \$69.95 this program is creeping up on the traditional padded-binder price range. The spiral is very easy to work with, though, not being as bulky as a binder. The manual is organized in a more-or-less tutorial style, and effectively teaches the use of the editor, system menu, and assembler in a logical sequence. It is well written and easy to follow. The typewriter-style printing makes the section divisions stand out less than they should, and it is sometimes difficult to find individual sections by leafing through. The table of contents, however, is quite detailed and thorough.

The manual contains a very nice instruction summary, showing the proper format for all 6502 instructions and assembler directives, including allowed addressing modes and so on. This will be especially handy for beginning assembly language programmers who are often confronted with instructions which inexplicably refuse to take a certain type of operand.

There is a reference-card summary of commands printed in the manual as Appendix A, but it not detachable. This deficiency is nearly compensated for by the presence of "help screens" throughout the system. This is a nice touch, especially in the editor.

Said editor is line oriented and not as powerful as might be hoped, but there is a replace command and a powerful search command (although it is disguised in the form of a print

command). An interesting touch is the use of the game paddles to control the speed of listings. I frankly don't see the use of this at all in the editor, though it has value for viewing the assembly listings. This feature can be disabled, which may be desirable. I had trouble getting full-speed listings with the paddles in use.

If you have a language card, the editor and assembler programs are made co-resident, making transfer between them painless and instantaneous. It seems that The Assembler swaps the source file during assembly, though, since there are disk accesses during assembly of a moderately sized program.

### SYSTEM CHARACTERISTICS

The Assembler system consists of three basic modules: the editor, the assembler, and the system menu. The menu level provides entry into the assembler or editor, as well as entry into DOS or the monitor. Also from the system menu, the source and object files may be saved and loaded. A rather annoying feature is the "helpful" display of the disk catalog before every load and after every save. Since only a single keystroke is necessary to get a catalog display when you want it, this feature is nothing more than a waste of time when it is not desired.

The system menu also provides access to a set of utility programs, including the text-file/binary-file converter, and a cross-reference program.

There is a single macro library supplied on the disk, and an example program for use with the tutorial in the manual.

There is no support for an 80-column board.

The Assembler can be used with MacroSoft, a collection of macros which provides many Applesoft functions, such as floating-point arithmetic, FOR loops, and graphics. Rather than providing these macros on the disk, Micro-SPARC is marketing them as a separate package (see the review of MacroSoft in this issue).

Both may be purchased together for \$99.95, which is slightly less than the combined individual prices.

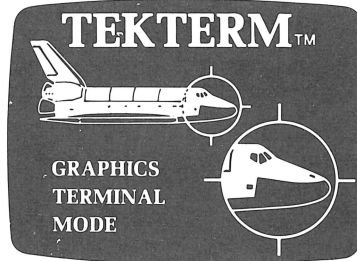
### CONCLUSION

The Assembler from Micro-SPARC is a good product, providing a genuine macro capability and some other interesting features as well.

However, it is too high-priced to fit in the "bargain" range, and has not quite the sophistication and professionalism to compete with the slightly higher-priced assemblers.

The product is given an A rating: it is good. A year or two ago it would have been outstanding.

The times they are a-changin'. □



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Communications	YES	YES	YES
Macro Capability	YES	YES	NO
High Speed Terminal	YES	NO	NO
Cost	\$90	\$100	\$70

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# MACROSOFT

---

by Alan D. Floeter  
and Valerie A. Floeter  
Micro-SPARC, Inc.  
P.O. Box 639  
Lincoln, MA 01773  
(617) 259-9710

\$49.95  
(MacroSoft +  
The Assembler \$99.95)

Unlocked

Rating: A+

Reviewed by Tom Little

## INTRODUCTION

MacroSoft is a macro library for use exclusively with The Assembler from Micro-SPARC (reviewed in this issue). The macros are designed to make assembly language programming look as much as possible like Applesoft programming. The goal is to combine the ease of writing in Applesoft with the execution speed of machine language. You must have the Micro-SPARC assembler to use MacroSoft.

MacroSoft is used by writing a source file with MacroSoft commands (using the editor in The Assembler system), then assembling this source file. The result is a machine language object module which can be BRUN from disk like any other machine language program. Assembly language commands can be mixed freely in the source because MacroSoft is assembly language. The final result does execute (naturally) at the speed of

machine language. The question is: How easy is it to program in MacroSoft?

## THE MACROS

The answer: fairly easy. Not at all as easy as Applesoft, but leaps and bounds ahead of machine language.

Variables are declared with VAR and DIM macros, and MacroSoft places them in a special region of memory. It is much more like BASIC or FORTRAN than like assembly language where the programmer is responsible for allocating space for the variables in the same memory range as the program itself. Integers, floating-point, and strings are all allowed types, and arrays of any of these may be dimensioned.

Different assignment statements are used for each variable type (ALET, FLET, SLET), and computation on the right-hand side of an assignment is severely limited, especially in the case of floating-point numbers where the expression is to be a constant or a one- or two-variable expression. After a little practice, though, this is not a large impediment to programming.

String functions (take length and concatenate) are available, and so are I/O statements for each variable type. Paddles, buttons, and speaker are supported, more naturally even than in Applesoft. There is a complete set of graphics macros, including some with no Applesoft analog: "give coordinates of last plotted point", a Hi-Res SCRNM function, and "position cursor without plotting."

Special macros are provided to increment, decrement, and multiply or divide by two for integers. These en-

courage the programmer to take advantage of the expediency of these operations in machine language.

Floating-point math is fully supported, including the Applesoft built-in trigonometric and exponential functions. Integers and floating-point numbers are interconvertible with macros.

Finally, there is a nice selection of control statements, including IF-THEN-ELSE (Applesoft one-upped), FOR-NEXT, WHILE, and REPEAT. The syntax with these is a little restrictive because of their macro implementation, but this is made up for by the very presence of these looping structures, not to be found in BASIC (except FOR-NEXT, of course).

Unlike some similar packages available, MacroSoft actually has enough of these pseudo-statements available to make it possible to program in MacroSoft without knowledge of machine language.

## THE DOCUMENTATION

The manual is 79 pages, spiral bound like The Assembler manual, and is basically a tutorial plus a reference section. The text is clear and straightforward about what can and cannot be done and how MacroSoft works. The Appendix is a listing of programs in both Applesoft and MacroSoft form, giving real-life examples of how to get an actual program written and running. A MacroSoft program will generally require about twice as many lines as the corresponding BASIC program, owing to the necessity to evaluate expressions bit by bit.

It is perhaps a little showy for the manual to speak of MacroSoft as "a new language", though MacroSoft



does take you far enough from the Assembly level to make that claim where some other programs cannot.

## CONCLUSION

To leave you with a bit of the flavor of MacroSoft, consider the Applesoft and MacroSoft versions of a simple program as shown in Figure 1.

This is a carefully designed and useful set of macros. It is too bad that something similar could not be worked up for other assemblers, or as a stand-alone system. It seems a little strange to sell this package separate-

ly when it can only be used with the Micro-SPARC assembler. Also, some knowledge of assembly language will be genuinely helpful: MacroSoft is not quite a "free lunch."

Also bear in mind that several macro assemblers offer macros similar to these as part of the total system.

MacroSoft is a good pseudo-Applesoft macro library. Whether it is good enough to merit purchase of the Micro-SPARC assembler over some other is a matter of personal choice. □

### APPLESOFT

```

10 PI= 3.1415926
20 T=0
30 PRINT "SINES AND COSINES"
40 INPUT "HIT <RETURN> FOR
   NEXT";I$
50 IF I$ < >" " THEN END
60 PRINT "SIN(";T;) = ";SIN(T);" ";
70 PRINT "COS(";T;) = ";COS(T)
80 T=T+2*PI/100
90 GOTO 40

                               LOOP
                               SPRINT "SINES AND COSINES"
                               SPRINT "HIT <RETURN>FOR NEXT",
                               SINPUT I
                               LEN ITEMP,I
                               IF ITEMP#0,GOTO STOP
                               SPRINT "SIN(",
                               FPRINT T,
                               SPRINT ") = ",
                               SIN TEMP,T
                               FPRINT TEMP,
                               SPRINT " ",
                               SPRINT "COS(",
                               FPRINT T,
                               SPRINT ") = ",
                               COS TEMP,T
                               FPRINT TEMP
                               FP TEMP=TWO*PI
                               FP TEMP=TEMP/HUNDRED
                               FP T=T+TEMP
                               GOTO LOOP

                               STOP

```

### MACROSOFT

```

USE FPSOFT 1.0
USE MACROSOFT 1.0
UEN
MUL
BEGIN
FVAR PI,T,TEMP,TWO,HUNDRED
DIM I(20)
VAR ITEMP
FLET TWO=2
FLET HUNDRED=100
FLET PI= 3.1415926
FLET T=0
SPRINT "SINES AND COSINES"
SPRINT "HIT <RETURN>FOR NEXT",
SINPUT I
LEN ITEMP,I
IF ITEMP#0,GOTO STOP
SPRINT "SIN(",
FPRINT T,
SPRINT ") = ",
SIN TEMP,T
FPRINT TEMP,
SPRINT " ",
SPRINT "COS(",
FPRINT T,
SPRINT ") = ",
COS TEMP,T
FPRINT TEMP
FP TEMP=TWO*PI
FP TEMP=TEMP/HUNDRED
FP T=T+TEMP
GOTO LOOP

                               STOP

```

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---

# THE VISIBLE COMPUTER

## 6502

---

by Charles Anderson  
Software Masters  
3330 Hillcroft/Suite BB  
Houston, TX 77057  
713-266-5771

\$49.95

Rating: AA

Reviewed by Tom Little

### SO YOU WANT TO LEARN MACHINE LANGUAGE, EH?

From every side, the programmer is confronted with the suggestion that he should program in assembly language or machine language. He knows that all arcade games are written in assembly language because "BASIC isn't fast enough." Major magazines have regular columns to teach machine language, not to mention an occasional glowing review of an assembler or two. The really frustrating thing is that it is quite difficult to learn machine language. Even a trivial program is likely to contain several virtually undetectable errors, and even something equivalent to a BASIC "PRINT" statement must be written and tediously debugged by the programmer-in-training.

Yet hands-on experience is crucial. In machine language especially, it is easy to think you understand something just from reading about it—but the machine knows better.

The Visible Computer is a sophisticated simulator program which lets you witness the execution of machine language programs one step at a time, with all the effects visible. It comes with a manual which is really a top-notch machine language textbook.

### THE BOOK

The Visible Computer book is 142 pages (paperbound). It starts at the beginning (it is assumed you know a little about programming in general, such as experience with BASIC), and carries you step by step through the whys, hows and wherefores of machine language programming on the Apple. The explanations given are truly excellent, being that rare combination: correct and intelligible.

The first three chapters contain basic material on number systems and computer architecture. Most of the remainder of the book is devoted to teaching one facet of machine language after another, to the accompaniment of The Visible Computer program. The book wraps up with lessons on writing your own programs, including some genuinely useful ones. I think perhaps the writing of programs might have been worked into the course at an earlier point, but the overall educational quality of The Visible Computer is excellent.

At the back, the book has a summary of commands for The Visible Computer program, and the usual ASCII charts and 6502 instruction

summary. All of these things are brought in one at a time in the main text, and are placed at the end of the book for easy reference.

The book alone is very good, and the material it contains is really a very complete course on assembly language, not just a guide to using the program. The Visible Computer is an example of text and program built to complement each other—a refreshing change from text which seems to be thrown together after the fact by some marketing department.

The printing quality is not exceptionally good, and there are a few typos. It is safe to say that content surpasses form. With an educational system, it is ultimately the content that counts. (*Editors' note: the next edition of the manual, to be shipped effective August 1, 1983, will be wire bound and typeset.*)

### THE PROGRAM

The Visible Computer uses the Hi-Res graphics screen to display a diagram of the 6502 processor with its internal registers. It simulates the action of the real processor, displaying all the internal changes that occur during execution. A novel aspect of this simulator is that it shows instructions executed on the micro-level. That is, you see the individual steps *within* the execution of a single instruction. The Visible Computer display shows the address and data latches, normally not considered by the assembly language programmer. One corner of the machine offers a

written description of each micro-step as it occurs. A particularly nice touch is animated hexadecimal digits quickly darting across the screen to show data transfer to and from memory.

When not simulating execution, The Visible Computer allows the student to examine and modify memory, BLOAD a machine language file, or disassemble a range of memory. Simulation may be set to any of four levels of detail, the lowest being the micro-step display described above, and the highest being full-speed execution by the actual processor (no simulation). The number base used to display the registers and memory may be changed: binary, hexadecimal, and decimal are all available separately for each register. There is also a "calculator" mode, where two's-complement arithmetic can be

done in any number base from the keyboard.

The Visible Computer program is used together with the book, as increasingly complex programs are BLOADed from the disk, executed under the program, and discussed in the text. This combination of textbook and real-life examples that can be studied and scrutinized at any level of detail is a tremendous learning aid.

Some features are conspicuously absent, such as a CATALOG command to see the names of the files on disk, or a command to break directly into the Apple monitor (perhaps the copy protection is involved here).

When the student feels more comfortable with machine language, he may put the program into Master mode, allowing him to do things which were prohibited before as

potentially dangerous. These things include BLOADing his own programs from a standard DOS disk, BSAVing memory, executing at full-speed (Nonsimulated mode), and using all regions of memory. This distinction allows for some flexibility for the advanced student, while also protecting the novice from potential system crashes.

## CONCLUSION

The Visible Computer is an excellent way to learn machine language and a good deal about the internal operation of the 6502. The program is easy to use and flexible, the book is very instructive, and the price is reasonable. The Visible Computer and a good assembler should be all the student programmer needs to become quite proficient at this most obscure of languages. □

---

# ASSEMBLER COMPARISON CHART

## Second Supplement

---

ASSEMBLER FEATURES	ORCA/M		Micro-SPARC	
	YES/NO	POINTS	YES/NO	POINTS
Macros (20)	yes	20	yes	16
Local labels/variables (10)	yes	10	yes	10
Conditional assembly (5)	yes +	5	yes	5
Expression arithmetic (10)	yes	10	yes	10
Assembles SWEET 16 (5)	no <sup>10</sup>	5	yes	5
Time required to assemble 250 lines (10)	10 s	5	17 s	3
<b>USER INTERFACE</b>				
Documentation quality (10)	good	7	ok	5

# ASSEMBLER COMPARISON CHART

## Second Supplement (Continued)

USER INTERFACE Continued	ORCA/M		Micro-SPARC	
	YES/NO	POINTS	YES/NO	POINTS
Detailed line editing (5)	screen	5	yes	4
Usability (15)	excel.	15	good	12
<b>SYSTEM CHARACTERISTICS</b>				
Lower case compatible (5)	yes	5	yes	5
Utilizes Language Card memory (5)	no	0	yes	5
Reads/writes DOS text file (10)	yes	10	yes	10
Disassembler provided (10)	no	0	no	0
“Goodies” on disk (10)	yes	10	few	3
Price	\$99.95		\$69.95	
<b>TOTAL POINTS POSSIBLE 130</b>		<b>108</b>		<b>93</b>
<b>PERFORMANCE/PRICE RATIO</b>		<b>1.1</b>		<b>1.3</b>

For comparison, here is a summary with four other popular assemblers reviewed in previous issues (V3N2, 1982 and V3N7, 1982) of *Peelings II*

Name	Price	Points (assembler/usr.int/system/total)	Rating
LISA 2.5	79.95	37 / 15 / 36 / 88	B+
Apple Computer Inc. <sup>8</sup>	75.00	15 / 19 / 16 / 50	B
BIG MAC.LC	28.50	55 / 22 / 39 / 116	AA+
S-C MACRO	80.00	59 / 25 / 17 / 96	A+
ORCA/M <sup>9,11</sup>	99.95	55 / 27 / 25 / 108	AAA
Micro-SPARC	69.95	52 / 21 / 23 / 96	A

### NOTES: (See individual reviews for more details)

<sup>8</sup> total price for Applesoft Tool Kit (reviewed in *Peelings II*, V2N6, 1981)

<sup>9</sup> includes a customized DOS and machine language monitor not evaluated in the comparison chart.

<sup>10</sup> assembles 65SC02 opcodes and addressing modes.

<sup>11</sup> extensive macro library and system source code on disks.

## CONCLUSIONS

ORCA/M is far and away the best assembler for professional use or substantial program development. BIG MAC.LC still stands out as a good buy, ideal for the dabbler.

---

# LETTER

---

If you are an Apple PIE or PIE Writer word processor user with an Apple II or //e, then you will be interested in a new Users Group now forming:

## Apple PIE Writers

As the name indicates, we plan to support all Apple versions of PIE. This support will include tips, tricks, modifications, help, and just about anything to enhance your use of the already outstanding PIE word processor.

If you have made some modifications to PIE, let us know; maybe others would be interested. If you have questions, ask the Group; somebody will have the answer. This is your Users Group, we are just the clearinghouse.

Depending on the response we receive, a newsletter will be published whenever we have sufficient material to warrant one.

Right now membership is free, so if you are a PIE user send us your name, Source or Compuserve ID (if applicable), and your U.S. Mail address. Include which version of PIE you use: Apple PIE or PIE Writer, 40 or 80 column (specify your board), and II or //e.

Send to: **Apple PIE Writers**

12841 Hawthorne Blvd, Box 589  
Hawthorne, CA 90250

or

Source: CL1312  
Compuserve: 74405,764

Monty Lee  
Mike Weasner

# Why Your Apple Needs DAVID-DOS™

Your Apple is easier to use and runs much faster with this new, licensed by Apple, DOS 3.3 update.

DAVID-DOS (rhymes with moss), is rated AA, (top of its class), by the highly respected software review magazine PEELINGS II.

### Novices and Pros

DAVID-DOS is licensed by programmers for inclusion in the software they sell. 30 out of 60 bought it on the spot when DAVID-DOS was demonstrated at the Original Apple Corps, UCLA. DAVID-DOS receives applause from Apple novices. That's why you need DAVID-DOS.

### What's Going On

Every Apple II/IIe boots up with DOS 3.3 software.\* DOS 3.3 is right there on the first three tracks of all your program disks. Your Apple is supervised constantly by DOS 3.3.

### Easier and 5 Times Faster

Our Installation Program goes in and makes specific permanent improvements to DOS 3.3 on all your disks in a few seconds. (The programs on your disks are not touched). From then on your programs load up to 5 times faster. And you have new features that make your Apple easier to use.

### 100 Sectors in 7 Seconds

Speed Load Applesoft, Integer & Binary 100 sector programs in 7 seconds. Tload Random and Sequential Text Files at the same speed with a simple command.

### Automatic Card Support

Automatically supports an Integer or Applesoft Rom Card in Any slot (without configuring). Single key stroke Catalog and Catalog Abort. Shows Free Sectors Left on each Catalog.

### Nine New DOS Commands

1. TLOAD speeds loads all Text Files.
2. TLIST lists all Random/Sequential Text Files.
3. DUMP Binary/Ascii to screen or printer.
4. DISA disassembles Binary to screen/printer.
5. AL prints program Address & Length.
6. / Single keystroke, second Catalog command.
7. HIDOS moves DOS to the Language Card.
8. FIND hex group in 64K memory in 3 seconds.
9. DATE prints out. Use with Mtn. clock card.

Commands 8 & 9 in Hidos only.

### 10K More Memory

These nine commands operate identical to existing DOS commands. Use A or A\$ for address and L or L\$ for length. Enter new commands on the Keyboard and use them in Basic programs with the familiar D\$. Use HIDOS in Hello program for turnkey startup, adding 10K free memory.

### Variable Speed Scrolling

TLIST, DUMP, and DISA Features are:

1. Print with PR#.
2. Key operated variable speed control.
3. Instant pause with Space Bar.
4. Exit anytime with Return Key.

### Compatible

All DOS entry addresses have been preserved. DOS is Same length and compatible with most software. David-Dos is copyable and creates fully copyable updated disks. Init areas were used for David-Dos. Works with all Apple IIs including IIe 80 Col. Requires 48K. Complete documentation for screen or printing and many utilities are on the disk.

California residents  
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**\$39.95**

Foreign add \$2.00.

\*Exceptions are Pascal & CPM Operating Systems.  
Apple II and Applesoft are trademarks of Apple Computer inc.



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LOS ANGELES, CA 90025 (213) 478-7865

---

# PERIPHERAL PERUSAL

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## DISKFILES

Diskus Products  
7851 Hanna Ave.  
Canoga Park, CA 91304  
213-999-4466

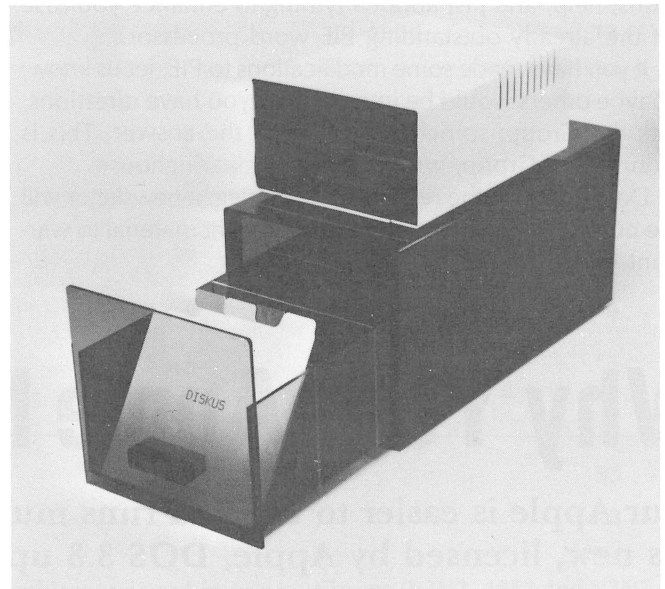
\$59.95

Perused by John Martellaro

Diskus Products makes a dark plastic diskette file box (see photo) that is quite a bit more for the money than the usual plastic flip-top file boxes that are commonly used. The area used on a desk is only a little larger than that used by the flip-top boxes but the Diskfile holds about three times the number of diskettes. Also, the top of the Diskfile provides a handy platform for stacking another box or a disk drive. In the drawer are four clear plastic dividers in fixed positions that provide five compartments, each slightly less than three inches deep. In addition, the Diskfile comes with a set of dividers that have plastic labels.

The quality of the construction is superb. The drawer

slides in and out easily and the smoked plastic has a professional look. I have found that I still make use of a flip-top file box for diskettes that are used every day, but the Diskfile provides a handsome way to store diskettes that are used fairly often. I have not seen anything else that looks as good and is as well made as the Diskfile.



## Look For The Following Features In Upcoming Issues Of PEELINGS II:

- #6 WORD PROCESSORS
- #7 SPREAD SHEETS, EDUCATION
- #8 DATA BASE (Part 1), HOME ENTERTAINMENT
- #9 DATA BASE (Part 2), MASS STORAGE

# PEELINGS II SOFTWARE & HARDWARE INDEX

V3N1 (Jan 82) through V4N4 (Apr 83)

## ASSEMBLERS-COMPILERS

B	V3N2	Apple 6502 Assembler/Ed.	Apple Computer
D	V3N2	Apple Assembly Lang. Sys.	Hayden Book Co.
AA	V3N2	Big MAC	A.P.P.L.E.
AA+	V3N7	Big MAC.LC	A.P.P.L.E.
A-	V3N2	Edit 6502	LJK Enterprises
A+	V4N1	Flash!	Laumer Research
A	V4N1	Integer BASIC Compiler	Synergistic Software
B+	V3N2	Lisa 2.5	On-Line Systems
A+	V3N7	Merlin	Southwestern Data Systems
A+	V3N7	S-C Macro Assembler	S-C Software
AA	V3N3	TASC	Microsoft

## BUSINESS & FINANCE

A	V4N2	Accountant, The	Decision Support Software
AA	V4N2	B.P.I. General Ledger	B.P.I. Systems
C	V3N8	Color Calendar	Spectrum Software
	V3N9	Consolidator, The	Omega Microware
A+	V4N2	Financial Mgmt System II	Southwestern Data Systems
C-	V3N5	Home Accountant	Continental Software
A	V4N3	Market Maverick	Financial Software
AA	V4N3	Permanent Portfolio Anal.	C.R. Hunter & Assoc.
F	V3N5	Personal Check Manager	Donald Poling
C-	V4N3	Stock Price Forecast	J R Software
A	V3N8	Tax Preparer	Howard Software
A-	V3N8	Time Manager	Image Computer Products
AA-	V4N1	Versaform	Applied Software Technology
A+	V3N8	Visidex	VisiCorp
A	V4N1	Visischedule	VisiCorp
AA	V3N9	Visicalc Preboot	Videx

## CODE GENERATORS

C-	V3N7	Last One, The	DJ "AI" Systems Ltd (review -1)
D	V3N7	Last One, The	DJ "AI" Systems Ltd (review -2)
C+	V4N2	Programmer, The	Advanced Operating Systems
N	V4N2	C.O.R.P	Gary Scotto

## COMMUNICATIONS

AA+	V3N8	ASCII Express, Profes.	Southwestern Data Systems
C	V3N1	Auto Modem	Computer Station
AAA	V3N4	DOS File Exchange	Arrow Micro Software
A	V4N1	P-Term	Southwestern Data Systems
A+	V3N4	Reflexive Visicalc	Arrow Micro Software
B	V3N8	Telephone Transfer II	Telephone Software Connect.
A+	V3N7	Transend 2	SSM Microcomputer Products
AA	V3N7	Z-Term, The Professional	Southwestern Data Systems

## DATA BASE PROGRAMS

C-	V4N2	Cardfile	Digital Marketing
A	V3N8	Data Factory 5.0	Micro Lab
AA	V3N5	Datafax	Link Systems
A	V3N9	DataStar	Micro Pro Int'l
B	V4N2	Quick-Search Librarian	Interactive Microware
B+	V4N4	Super File Cabinet	Abacus Computing
B+	V4N4	Notebook	NIKROM Technical Products

## DOS ENHANCERS

P	V4N1	David-DOS	David Data
AA	V4N3	David-DOS	David Data
A-	V4N1	Diversi-DOS 1-A	Diversified Software Research
AA	V4N3	Diversi-DOS 2-C	Diversified Software Research
AA	V4N1	DOS Enhancer, The	S & H Software
B-	V4N1	HyperDOS	Softkey Publishing
B	V4N3	Pig-DOS 2.0	Big Pig Software
A+	V4N3	ProntoDOS	Beagle Brothers
B-	V4N3	SpeedDOS	Softkey Publishing
B+	V4N1	Turbo Charger	Silicon Valley Systems
B-	V4N1	Ultra Fast Loader	Computer Advanced Ideas

## EDUCATIONAL

D	V3N4	A.E.N. Grading System	Avant-Garde Creations
B	V4N1	A.E.N. Grading System	Apple Educator's Newsletter
B	V3N1	Algebra I	Edu-Ware
C	V3N4	Apple Grade Book	J & S Software
B	V4N1	Apple Grade Book 2.4	J & S Software
A	V3N1	Assembly Teacher	Computer Works
A-	V4N3	Bumble Games	The Learning Company

A	V4N2	Class Records	Educational Systems Software
B	V3N1	Crossword Machine	L & S Computerware
B	V3N1	Crossword Magic	L & S Computerware
B	V3N1	Elementary My Dear Apple	Apple Computer
B	V4N2	E-Z Learner	Silicon Valley Systems
C	V3N1	Hand Holding BASIC	Apple Computer
A	V3N1	Isaac Newton	Krell Software
A	V3N1	Link Sampler	Link Systems
A	V3N3	MasterType	Lightning Software
A	V3N1	Mathware	Math City
B	V3N3	Micro Atlas	Columbia Software
C	V4N3	Story Machine	Spinnaker Software
A	V3N1	Quicktrace	Aurora Systems
C	V3N4	Vectors & Graphing	Cross Educational Software
C	V3N4	Vocabulary Game	J & S Software

## GAMES

A	V3N8	Choplifter	Broderbund
B-	V3N9	Congo	Sentient Software
AA+	V3N9	Crisis Mountain	Synergistic Software
A	V3N9	Firebug	Muse Software
C	V3N4	Goblins	Highlands Computer Services
A	V3N9	Gold Rush	Sentient Software
AA	V3N7	Guardian	Continental Software
AA	V3N5	Hadron	Sirius Software
B+	V2N1	HIRES Football	On-Line Systems
B+	V3N3	HIRES Golf	Avant-Garde
A-	V3N9	Jellyfish	Sirius Software
A	V3N9	Microwave	Cavalier Computer
C	V3N2	MyChess	Datasoft
B+	V3N9	Neptune	Gebelli Software
B	V3N9	Norad	Southwestern Data Systems
A	V3N9	Pie Man	Penguin Software
AA+	V4N3	Pinball Construction Set	BudgeCo.
AA+	V3N4	Pool 1.5	Innovative Design Software Inc
B-	V3N2	Race For Midnight	Avant-Garde Creations
A+	V3N1	Raster Blaster	BudgeCo.
A+	V3N9	Rendezvous	Edu-Ware
A+	V4N3	Repton	Sirius Software
C	V3N9	Seafox	Broderbund
AA	V3N9	Serpentine	Broderbund
A	V3N9	Singles' Night at Molly's	Soft Images
A+	V3N9	Solitaire	Computek
A	V3N7	Snack Attack	DataMost
A	V3N9	Snapper	Silicon Valley Systems
A	V3N7	Starblaster	Piccadilly Software
A	V3N5	Swashbuckler	DataMost
AA	V3N4	Threshold	On-Line Systems
A	V3N5	Track Attack	Broderbund
A-	V3N4	Trick Shot	Innovative Design Software Inc
C	V3N9	U-Boat Command	Synergistic Software
A	V3N8	Ultima	California Pacific

## GRAPHICS UTILITIES & GRAPHICS DUMPS

A	V3N3	A2-3D1 Animation Package	SubLOGIC
A	V3N3	A2-3D2 Graphics Package	SubLOGIC
A	V3N3	A2-GE1 Graphics Editor	SubLOGIC
A+	V4N4	Accu-Shapes	Accent Software, Inc
B	V3N5	Amperdump	Madwest Software
A+	V3N5	Ceemac	Vagabondo Enterprises
AA	V4N4	Delta Drawing	Spinnaker Software, Inc
D	V3N5	EZEPSON	MicroComPac
AA	V3N7	Graphics Magician	Penguin Software
A-	V4N4	Graphics Processing Sys.	Stoneware, Inc
B	V3N5	Graphtrix	Data Transforms
N	V3N3	HIRES Secrets	Avant-Garde Creations
A-	V3N5	Image Printer	Sensible Software
A+	V4N4	Paper Graphics	Penguin Software
A-	V3N8	Printographer	Southwestern Data Systems
A+	V4N4	Printographer	Southwestern Data Systems
A-	V3N3	Special Effects	Penguin Software
A	V4N4	TGS: The Graphics Solution	Accent Software
A+	V3N5	Zoom Grafix	Phoenix Software

## LANGUAGES

AA	V3N5	GraFORTH	Insoft
AA+	V3N9	Krell Logo	Krell (review #1)

C	V3N9	Krell Logo	Krell (review #2)
AA+	V3N9	Terrapin Logo	Terrapin Inc

#### PERSONAL

B+	V3N1	Agenda Files	Apple Computer
B	V3N3	Chequemate	MasterWorks Software
B	V3N2	Menu, The	C & H Video
F	V3N1	Sex Rated	No-Name Software
N	V3N1	Softporn	On-Line Systems

#### PLOTTERS

A	V3N5	Ampergraph	Madwest Software
A-	V4N4	Apple Business Graphics	Apple Computer
B	V3N5	Hires Graph-fit	Microware Dist.
B	V4N4	PFS Graph	Software Publishing Corp
A+	V4N4	Prime Plotter	PrimeSoft Ind
A-	V3N5	SuperPlotter	Dickens Data Systems
B	V3N2	UltraPlot	Avant-Garde Creations
D	V4N4	Versaplot	Spectrasoft
C	V3N2	Visiplot	VisiCorp

#### SCIENTIFIC

P	V3N2	HSD ANOVA	Human System Dynamics
C-	V3N3	HSD STAT	Human System Dynamics
F	V3N3	Statistics 3.0	Edu-Ware
B-	V3N5	Statistics With Daisy	Rainbow Computing

#### SIMULATIONS

B	V3N4	AIRSIM-1	Mind Systems Corp. (see also V3N8)
B	V3N8	A2-FS1	Sublogic
A+	V3N9	Air Navigation Trainer	Space-Time Associates
B	V4N4	IFR Simulator	Programmers Software
A	V4N4	Spitfire Simulator	Mind Systems Corp

#### UTILITIES

A-	V4N2	Amper-Magic	Anthro-Digital Software
B+	V4N2	Amper-Magic II	Anthro-Digital Software
A+	V3N2	APLIST	Unified Systems
C+	V3N4	Apple-cillin I	XPS, Inc
B+	V4N3	Apple Mechanic	Beagle Brothers
B+	V3N9	Arcade Machine, The	Broderbund
AA	V3N7	Bag of Tricks	Quality Software
A-	V3N7	Bug, The	Sensible Software
A+	V3N7	Build Using	Sensible Software
A+	V4N2	Copy II Plus	Central Point Software
AA-	V3N5	Electric Duet	Insoft
AA	V4N2	Inspector	Omega Microware
C	V3N3	MasterDisk	Masterworks Software
C-	V4N2	Mathemagic	International Software Marketing
A	V3N3	Memory Management System	Computer Data Services
B	V3N9	Programmers Library	Telephone Software Connection
A+	V4N2	Routine Machine	Southwestern Data Systems
AA	V3N3	Super Disk Copy III	Sensible Software
N	V4N3	Typefaces	Beagle Brothers
A	V4N3	Visiblend	Micro Lab
AA	V3N2	Univ. Boot Initializer	S & H Software
A	V3N3	Utility City	Beagle Brothers
A+	V3N5	Videoterm Utilities	Videx
AA	V4N2	Watson	Omega Microware

#### WORD PROCESSORS-EDITORS-SPELLERS

A	V3N6	Apple Writer II	Special Delivery Software (Apple)
AA	V4N3	Bank Street Writer	Broderbund Software
B	V3N6	Correspondent, The	S.W. Data Systems
B+	V4N4	ES-CAPE	S-C Software
N	V3N6	Gutenberg	Micromation Ltd.
A+	V3N6	Letter Perfect 5.0	LJK Enterprises
AA+	V3N6	Pie Writer	Hayden Book Co.
C	V3N6	Sandy	Software & Peripherals
A+	V3N6	Screen Writer II	On-Line Systems
B	V3N8	Spellbinder	Lexisoft
B	V3N6	Super-Text 40/80	Muse Software
C	V3N6	Word Handler	Silicon Valley Systems
AA+	V3N8	Word Star	Micropro Int'l
AA	V3N2	Word, The	Oasis Systems
B+	V3N8	Write-Away	Midwest Software Associates
B	V3N6	Zardax	Computer Solutions

#### WORD PROCESSOR UTILITIES (OTHER)

B+	V3N8	Lexicom 2.0	Micro-Sparc
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#### HARDWARE

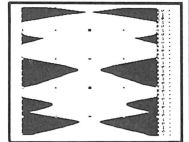
V3N4	68000 board	Digital Acoustics
V3N4	Command ROM	Soft Control Systems
V4N1	Crack-Shot	Pirates Harbor
V3N7	Gibson Light Pen (LPSII)	Gibson Laboratories
V4N4	Gibson Light Pen (LPSII)	Gibson Laboratories
V3N8	Graphtrax Plus	Epson America
V4N3	Guild Apple Stand	Guild Musical Instruments
V4N2	HP-16C Calculator	Hewlett-Packard
V3N1	Keyboard Enhancer (I)	Videx
V3N6	Keyboard Enhancer (II)	Videx
V3N4	Microspeed	Applied Analytics
V3N8	MXPLUS	Dresselhaus Computer Products
V4N4	Omniscan Laser Disc Ctrlr	Anthro-Digital Inc
V3N7	Pi-3 Amber monitor	USI Computer Products
V3N6	RAMDISK 320	Axlon
V4N1	Snapshot	Dark Star Systems
V3N6	Sup'R'Fan	M&R Enterprises
V3N6	Super Fan II	R.H. Electronics
V4N1	Super-MX Interface Card	Spies Laboratories

#### COMPARISON CHARTS AND STANDARDS

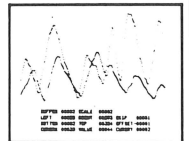
Assembler Comparison Chart	V3N2 & V3N7
Data Base Standards	V2N5
Flight Simulator Standards & Chart	V3N8
Flight Simulator Chart	V4N4
Graphics Dump Comparison Chart	V3N5, V3N8, V4N4
Word Processor Standards & Chart	(1982) V3N6 & V3N8
Word Processor Draft Stds 1983	V4N3

## VERSATILE DATA REDUCTION, DISPLAY AND PLOTTING SOFTWARE FOR YOUR APPLE\* II

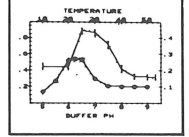
**STRIPCHARTER** — Turns your APPLE and Epson MX series printer into an economical 4-pen chart recorder. Prints and displays continuous 1 to 4-channel strip-charts of any length. Ideal for large data sets. Numerous user-selectable graphics options enhance output quality. Includes 5 demos on disk with 37-page manual **\$100**



**VIDICHART** — Proven tool for lab data management. Fast plots of 4 data sets with scrolling in 4 directions, zoom scaling on X and Y axes, 2 types of graphic cursors and on-screen STATUS REPORT, even plots A/D input while sampling. ADD, SUBTRACT, MULTIPLY, DIVIDE, INTEGRATE, DIFFERENTIATE, AVERAGE or NORMALIZE data sets with SIMPLE COMMANDS. Ideal for spectra, chromatograms, rate curves, etc. Includes SAMPLE DATA on disk with 28-page manual **\$75**

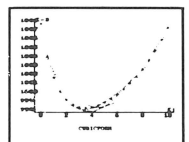


**SCIENTIFIC PLOTTER** — Draws professional-looking graphs of your data. You choose data format, length and position of axes, 20 symbols, error bars, labels anywhere in 4 orientations. Includes 5 demos on disk plus 30-page manual **\$25**



(For DIF file and Houston Instrument or H-P 7470A plotter adaptations, add \$25 for each option selected.)

**CURVE FITTER** — Select the best curve to fit your data. Scale, transform, average, smooth, interpolate (3 types), LEAST SQUARES fit (3 types). Evaluate unknowns from fitted curve. Includes 5 demos on disk with 33-page manual **\$35**



**SPECIAL: VIDICHART, SCIENTIFIC PLOTTER, CURVE FITTER on 1 disk **\$120****

Add \$1.50 shipping on all U.S. orders. VISA or MASTERCARD orders accepted. \*Trademark of Apple Computer, Inc.

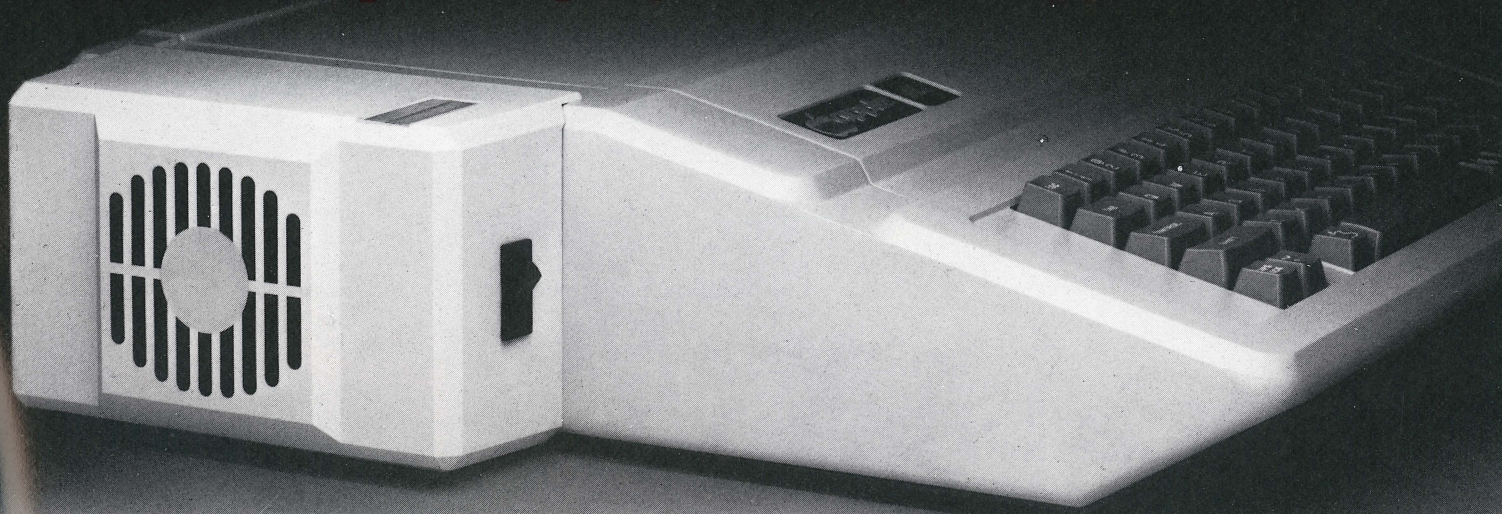


**INTERACTIVE MICROWARE, INC.**  
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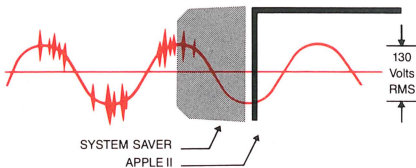
# System Saver™

The most important peripheral for your Apple II and IIe®.



## For Line Surge Suppression

The SYSTEM SAVER provides essential protection to hardware and data from dangerous power surges and spikes.

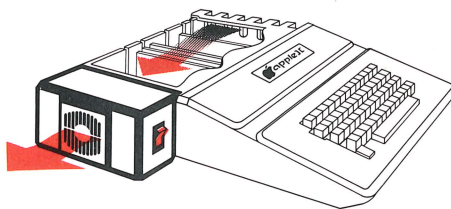


By connecting the Apple II power input through the SYSTEM SAVER, power is controlled in two ways: 1) Dangerous voltage spikes are clipped off at a safe 130 Volts RMS/175 Volts dc level. 2) High frequency noise is smoothed out before reaching the Apple II. A PI type filter attenuates common mode noise signals by a minimum of 30 dB from 600 khz to 20 mhz, with a maximum attenuation of 50 dB.

## For Cooling

As soon as you add 80 columns or more memory to your Apple II you need SYSTEM SAVER.

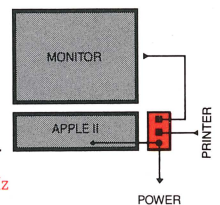
Today's advanced peripheral cards generate more heat. In addition, the cards block any natural air flow through the Apple II creating high temperature conditions that substantially reduce the life of the cards and the computer itself.



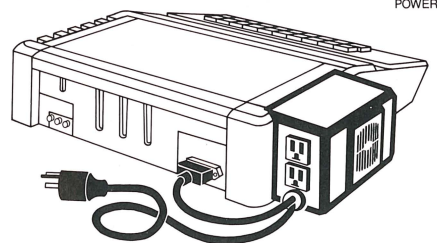
SYSTEM SAVER provides correct cooling. An efficient, quiet fan draws fresh air across the mother board, over the power supply and out the side ventilation slots.

## For Operating Efficiency

SYSTEM SAVER contains two switched power outlets. As shown in the diagram, the SYSTEM SAVER efficiently organizes your system so that one convenient, front mounted power switch controls SYSTEM SAVER, Apple II, monitor and printer.



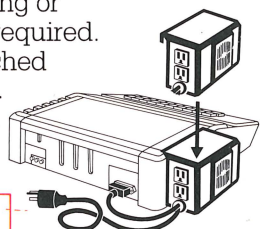
Available in 220/240 Volt, 50 Hz



The heavy duty switch has a pilot light to alert when system is on. You'll never use the Apple power switch again!

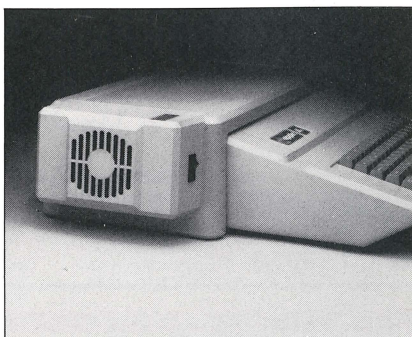
## Easy Installation

Just clips on.  
No mounting or hardware required.  
Color matched to Apple II.



PATENT PENDING

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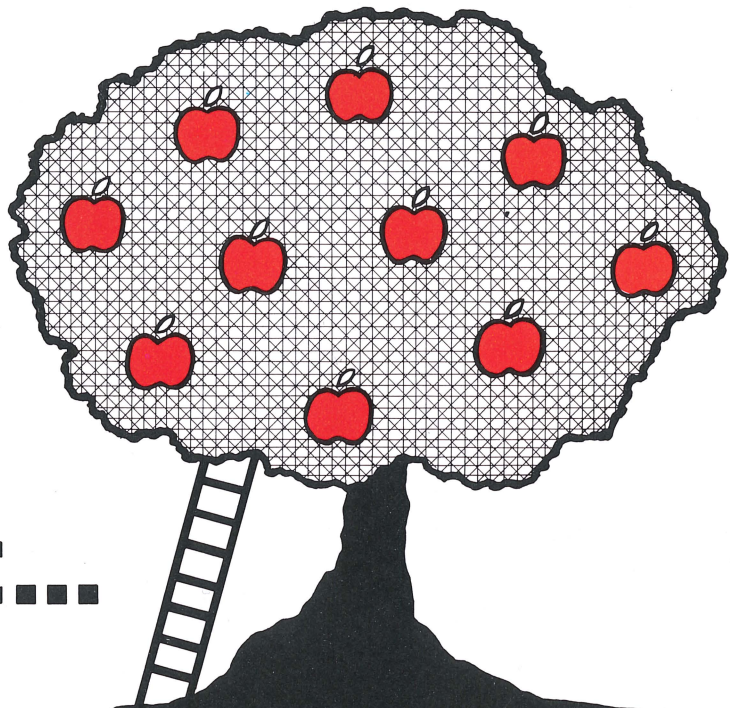


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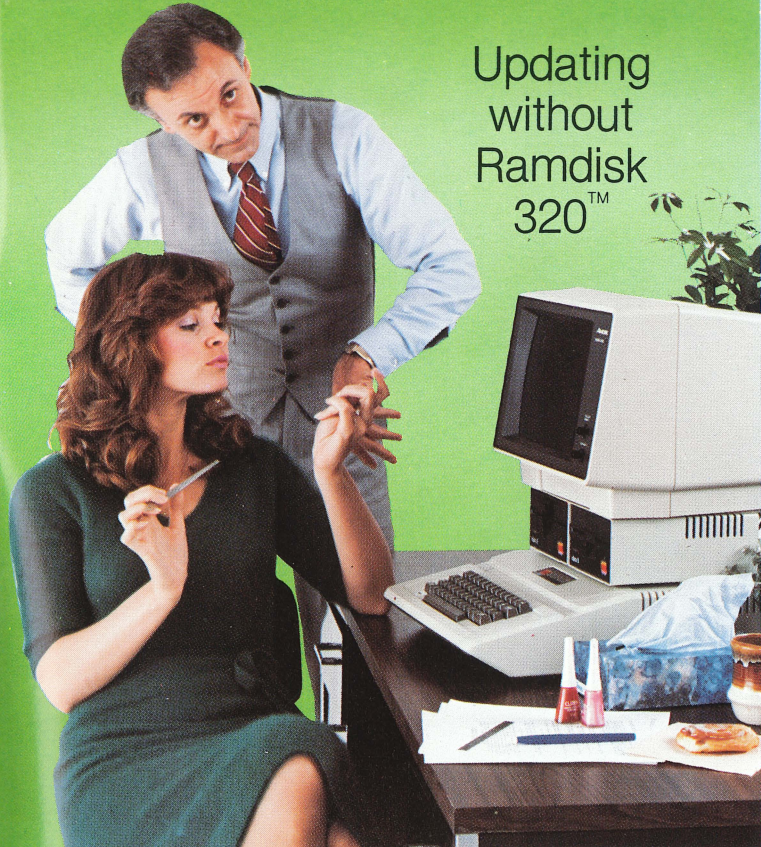
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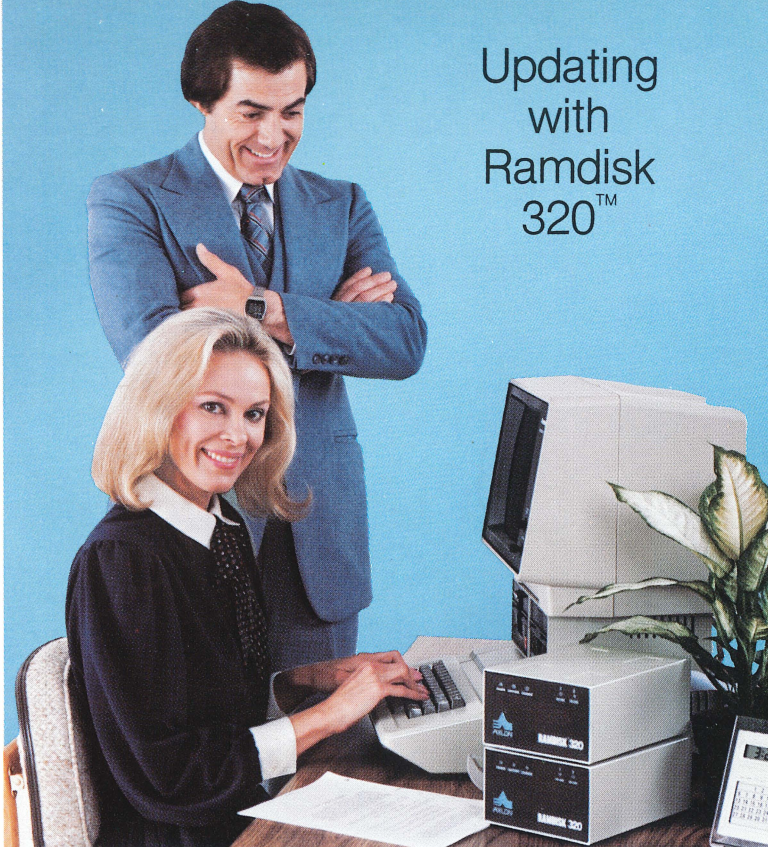
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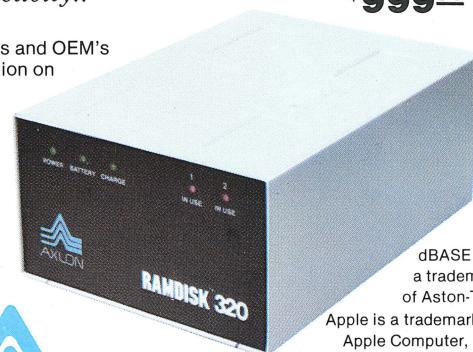
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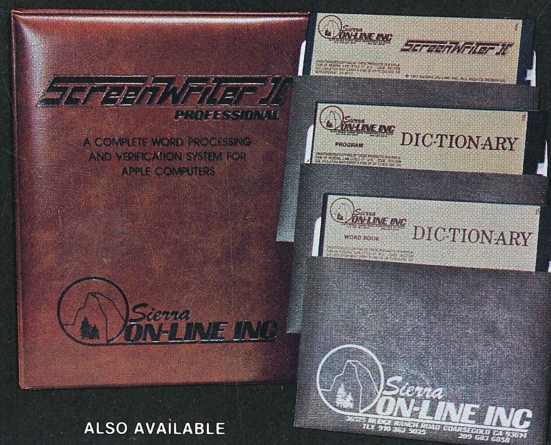
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