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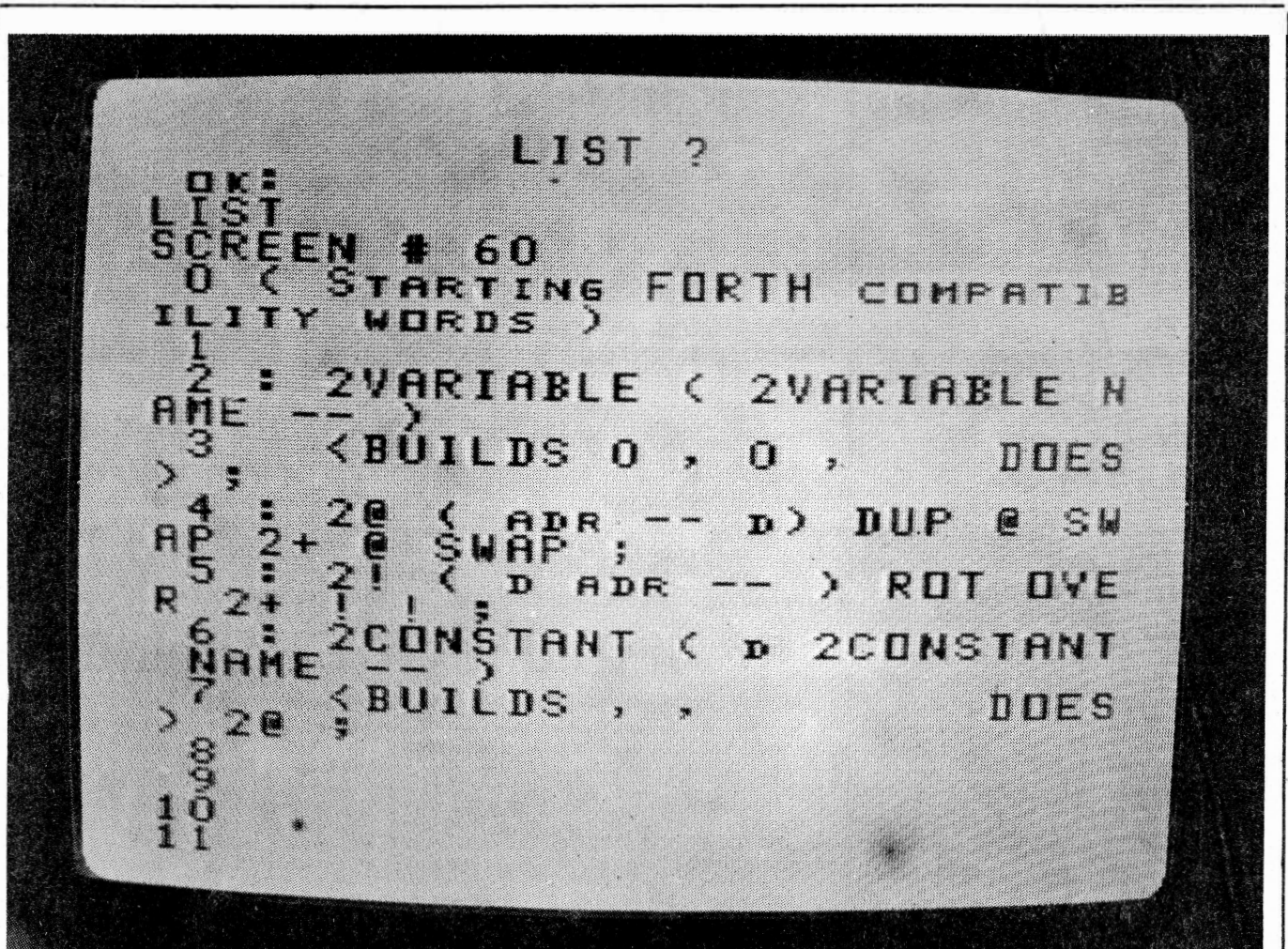
# MICROpendium

Covering The TI99/4A Home Computer And Compatibles

Volume 1 Number 8

September 1984

\$1.50



## Going Forth!

# Contents

## MICROpendium

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All editions of MICROpendium are mailed from the Round Rock (Texas) Post Office. Subscriptions are \$12 for 12 issues, delivered via third class mail. In Canada, add \$3.50. Subscribers in the United States who wish first class delivery may also add \$3.50 to the basic subscription price.

Mailing address: P.O. Box 1343, Round Rock, TX 78680

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Source: TI4596

John Koloen . . . . . Publisher  
 Laura Burns . . . . . Editor

## Coming Next Month

- Pirates and the TI
- Contest winners (we hope) for our programming challenge
- User Notes, reviews and more reviews

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TE-1200 . . . . .	August
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Galactic Battle . . . . .	August
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## Comments

# On size and other issues

This issue of MICROpendium marks something of a watershed for us. It is the biggest issue we've put together thus far, one-third larger than our standard 24-page offering. We debated over whether doing this would create unwarranted expectations about 32 pages becoming the standard but decided to do it anyway. We cannot promise that the next edition will have 32 pages, but it's certainly something to shoot for. Of course, if and when 32 pages becomes our regular output, we will start aiming for 40 pages.

(Because of the configuration of the press, we must increase or reduce the page count in increments of eight pages.)

We hope to have a review in the next edition of the first piece of TI software that erases itself if the user tries to copy it. It's called Killer Caterpillar and it's being marketed by Norton Software. It's written in Assembly language. This anti-piracy technique will be showing up on more and more software in the near future. Of course, there are others who will probably figure out a way to beat it. But for now, the programmers may have gained the upper hand against the pirates.

CorComp Inc. is finally getting its disk controller card for the TI Peripheral Expansion Box to the market. We hope to have a review of it in the next issue. Elsewhere in this issue you will find an update about the card. The debut of the card hasn't come as smoothly as the company had hoped. Company officials had expected to have not only the card by early July, but also the version for its 9900 expansion system. From what I've seen so far, I'd say the wait has been worth it. Anyone with a PEB will be interested in this card, which supports double-density drives while providing a number of powerful features that pro-

grammers will find very useful. We've detailed the features of the card in previous issues so we won't bother repeating them.

They said they would do it, and by Godfrey they did.

We've not received much of a response yet to our programming challenge. We're reprinting it in this issue. We're looking forward to receiving more entries. As I said last month, we're trying it out. If there's not interest, we'll drop it like a hot rock.

Meanwhile, the TI marketplace is changing in rather dramatic ways. At this point, MICROpendium is the only monthly publication devoted to the TI99/4A. We did not think this would be the case when we started publishing at the beginning of the year. But that is the fact today. We hope that, as our circulation increases, which it is, we can provide ever-increasing quantities of useful information to TI users. But there is a limit as to what we can do on our own. We could use some help with reviews of hardware and software and books having to do with the TI. We're looking for reviews that give the pros and cons of products, with the accent on products that are worthwhile. We aren't much interested in providing free publicity for worthless junk, unless it is such a ripoff that other users should be warned of it. Of course, we'll pay for the review upon publication. We've put together a brief outline of what we're looking for and how much we'll pay for it. We'll send it to anyone who asks for it and includes a SASE.

What kind of products are we interested in having reviewed? Just about anything, particularly hardware and applications software, that has not been reviewed in these pages. That covers a lot of territory. Anyway, write if you're interested.

—JK

## Feedback

### Will keep TI

As for pirating, I've approached it will a dual attitude. TI-based, cassette or diskette based is fair game, because the supply is limited but the demand is growing, in particular for the Scott Adams series of adventures. I've not received any bootlegged copies of the other adventures, but I cannot blame somebody who does. They can't get

it anywhere else!

Third-party goods, however, are off limits. I've told the members of my (users) group, some who feel that deprotecting and mass copying of third-party software hurts no one, at least not very much, that the practice will kill the availability of BASIC and Extended BASIC software. Pretty soon, all the software will require expansion memory, Extended BASIC and a disk drive.

I agree wholeheartedly about

keeping the TI. When my machine no longer fills my computer needs and desires, then I'll trade up. But to what? I still haven't figured that one out. Anyway, by the time my TI is totally obsolete, 256K+ machines the size of paperback books will be commonplace!

**Dan Parrott**  
President  
South Mobile and Alabama Users  
Group(SMAUG)

(Please turn to Page 4)

# Feedback

(Continued from Page 3)

## A disservice

I deliberately did not write to you concerning publishing programs meant to defeat software protection routines because, in the final analysis, the decision must be your own and not that of your readers. You seem to have reached a decision although it was based on letters from your readers. I knew most letters would be against such programs as the people most interested would be the programmers and distribution companies, and they naturally would be against it. They also would be more likely to write to you than the average user. If a real pirate wants to find out how to unprotect a program he will certainly find a way without having to read it in the MICROpendium.

I personally have changed more than one utility program to suit my needs and no one has received a copy of these programs just because I have the knowledge to copy them. You have stated that you are more interested in changing and improving an existing program than writing new programs. Surely you can see the benefit of being able to unprotect some programs in order to improve them for your personal use.

I think you are doing your subscribers a disservice by not publishing these programs. As I said, it must be your decision and I am disappointed you made it based on letters instead of thinking it out yourself.

**Charles E. Roberts**  
Springfield, Missouri

## Thanks for help

Last April I wrote to you describing the problem I was having with getting DSK3 external operational after installing two half-height TEACs in the Peripheral Expansion Box. The information you gave me together with what I learned when I called Lubbock did the trick.

You were quite right about removing the resistor pack from DSK2. The twist comes with DSK3, because

you have to remove its resistor pack also, even though the manual says not to), and replace it with a DIP switch with Nos. 1 and 4 open and the others closed. What's interesting is you can use a 12-, 14- or even a 16-pin DIP switch. It doesn't matter that two or four pins are hanging over with no socket to enter. Works like a charm.

**Robert H. Howry**  
Los Angeles, California

## Free service

I have been programming in TI Forth for many months now and have been offering a free service to anyone who desires it. I have many TI Forth words that demonstrate the various VDP modes, as well as a utility program that allows anyone with a single disk drive to copy the TI Forth system disk, or any other data disk. Also, I have translated two programs from Extended BASIC—Shoot an Airplane, and Battlestar, as well as the original TI Forth programs, A Number Guessing Game, Moire Pattern, A Real Time Clock, Diamond Draw and Suicide Ships, which is my latest program. I have been placing messages to this effect on several TIBBS boards, and have had a good response, but I feel that this offer should be on a wider scale.

Anyone desiring these free offerings send a blank diskette to: John J. Volk, Route 1 Box 291, Van Buren, AR 72956.

**John J. Volk**  
Van Buren, Arkansas

## Likes it

MICROpendium is really great! The only way to improve it would be to enlarge it!

An item of interest I haven't seen mentioned anywhere: when TI increased the warranty on the TI99/4A it seemed that those of us who bought our computers right before that, with a mere 90-day warranty, were being short-changed. However, when my computer needed repair early this year it came home without the bill I

expected. Instead, the invoice was marked "under warranty." Apparently TI covered all the consoles with the new warranty. Needless to say, I was delighted.

I was not nearly as delighted with the advice I received when I had called TI's technical advice number with a problem. My computer refused to initialize a new disk. I assumed I had a faulty disk, but couldn't try again because it was the last disk in the box. Later when I bought another box of disks and the computer refused to initialize two of them, and also refused to perform a disk test on them, I called TI for help. I was told the problem was probably in the disk drive controller, that I should send it in for repair, and that it would take around three weeks. Since that was the only problem I had, and since it was late in the fall and I didn't want my controller getting mixed up in the Christmas mail rush, I put it off. Meantime, TI exited from the home computer market, prices dropped, and I bought another console for a backup. The first thing I did was initialize a new disk—and it worked. The problem was in the console, not the disk drive controller. I would have been very unhappy if I had shipped it off for repair, only to have the same problem when it returned.

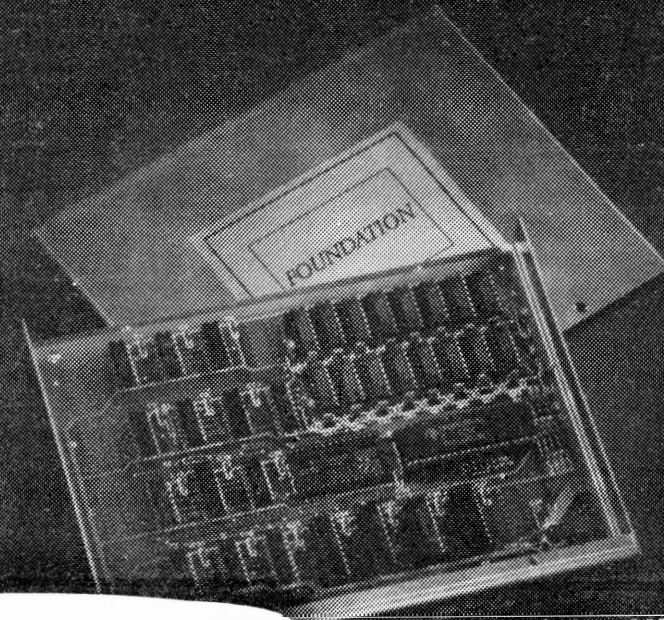
I have complained a lot about TI's lack in the field of customer relations. However, they do some things right! Extending the warranty on all consoles was one. Another is that their programs, such as "Teach Yourself BASIC," are not protected. I learn a lot from reading programs to see what brings about the results I see on my monitor. I also appreciate being able to use a hard copy as my backup to save disks.

—Mrs. Claire Roberts  
Clovis, New Mexico

The Feedback column is for readers. It is a forum to communicate with other readers. The editor will condense excessively lengthy submissions where necessary. Contributors should restrict themselves to one subject for the sake of simplicity. Mail Feedback to: MICROpendium, P.O. Box 1343, Round Rock, TX 78680.

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### 80 Columns on the 99!

**Tiburon. June 29, 1984.**

Home computing took another step closer to professional quality today as Foundation Computing unveiled a full-fledged intelligent terminal card that plugs into the TI 99/4 expansion box. Providing a 24x80 display with a 25th line of status information, the \$249 card includes its own internal computer and provides features not available on many \$1500 display terminals. Any combination of reverse video, half-intensity, double width, double height, and blinking characters can be shown. A complete set of display control codes and line drawing characters are provided. Contacted for comment, Foundation VP Kathy Hunter stated that the product was developed in direct response to customer requests. Expected uses include word processing, telecommunications, and report layout. She also stated that for many purposes, the card can replace the use of an RS232 card.

The Foundation 32K and 128K Memory Cards are designed from the beginning to be compatible with the TI99/4A Computer. The 128K Card comes with solid-state software that makes it easy to use the additional memory. Just write or call us and we'll send you a descriptive brochure.

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# To market, to market: What products get there?

By LAURA BURNS

From a gleam in the programmer's eye to a product marketed nationwide is quite a journey for an idea.

How this is achieved was discussed by several large mail-order firms, some of which also maintain stores, which deal in products used with the TI99/4A.

Craig Reitan, manager of Unisource Electronics, headquartered in Lubbock, Texas, says that his company tries to carry a good selection in each category, "but not everything."

For example, he notes, Unisource carries four word processing programs, ranging from a \$19.95 program to TI-Writer.

He says Unisource tries to select products according to the range of equipment required to operate each

program, "so that people, no matter what size system they have, can get that functionality, and we cover the range between."

Usually, he says, this means carrying from three to five "of each type of thing." This policy is true for both hardware and software, he says.

Roger Dooley of Tenex Computer Marketing Systems—which publishes a catalog called "The Everything Book for the Texas Instruments 99/4A Home Computer," says Tenex's policy is to live up to the name of the catalog.

"We carry, as far as we know, the largest selection," he says.

Dooley says that "a major frontier open to software developers" is entertainment products which utilize Assembly language and expansion memory. "We're seeing some movement in that direction, but it's a largely untapped area."

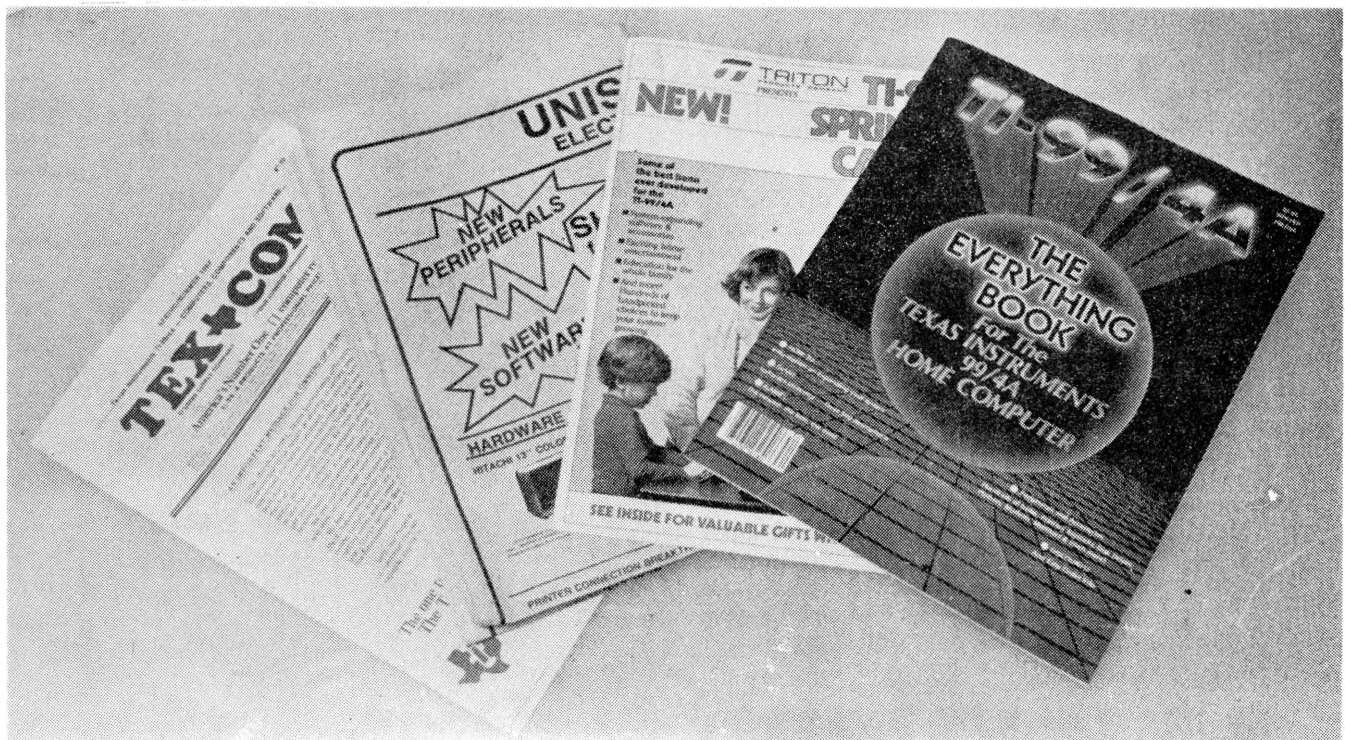
He says that TI users are disappointed in game programs written in console BASIC and Extended BASIC after comparing them to Assembly language software marketed for Atari home computers and the Commodore 64.

Jerry Price of Tex-Comp says that "an exciting game at a low cost" would be in demand. Price, quality and novelty are important, he says, in that many games "look alike."

In demand, he says, would be a good database manager, a good spelling checker for TI-Writer, a "decent Koala-type pad for TI" and a color printer for TI. (Elsewhere in this issue is a review of a spelling checker program called 99 Auto Spell Check.)

Terry Miller, general manager of the Triton Products Co., a mail-

(Please turn to Page 8)



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**FROGGER** Frogger's first challenge is to cross a busy highway, reckless with hotrods and huge trucks. Beyond is the raging river, where the safety of a slippery log or diving turtle is all Frogger can count on to stay afloat.



BEST ARCADE VIDEO/COMPUTER GAME

**NOTICE:** Non-TI modules made by Parker Bros., Atarisoft, Funware, Romox, and Navarone may not operate on TI-99/4A units with a 1983 copyright notice appearing on the main title screen. A new accessory "The Grom Buster" is now available from TEX-COMP at \$34.95 (postpaid) to overcome this problem.

**IMPORTANT JOYSTICK INFORMATION:** The standard 8-way joysticks made by firms such as TI, WICO, ATARI and SUPER STIK do not work well with maze type games on the TI-99/4A. Diagonal joystick commands on many x-y axis TI games such as Munchman, Jawbreaker, Popeye, Pacman, and Parsec tend to slow down response or confuse the logic of the program causing a missed turn or the like. There is only one joystick available for the TI-99/4A that overcomes this problem. The **SUPER JOYSTICK II** (developed by TEX-COMP and Newport Controls). This arcade quality professional joystick has a selector dial which allows the user to lock out diagonal positions when playing high speed maze and similar type of games resulting in much faster response and higher levels of play. The **SUPER JOYSTICK II** is available from TEX-COMP for **\$29.95** postpaid and has a five year warranty. It has been rated #1 by all TI Users Groups. A second unit (less adapter) is available for \$24.95.



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## EFFECTS OF PRICES—

(Continued from Page 6)

order company, claims his company has the largest selection of TI-created products and that it tries to carry products that appeal to the mass TI market. Triton is the company which took over Texas Instruments' home computer inventory after TI left the home computer market.

"We won't carry any product we may have a problem with or the manufacturer won't be strong enough to stand behind," he notes.

He says the company has a testing procedure to protect the consumer and "down the road protect us from having to take the products back."

A program that Unisource would not want to market, Reitan says, would be "probably entertainment programs where that particular game is being successfully accomplished. You don't need three or four Centipede programs." There is more duplication in game software than any other area of software production, he notes.

Dooley of Tenex also notes that "right now we are not adding a lot of entertainment products. The game market is quite saturated with Texas Instruments" and other products.

"There are a lot of copycat titles, simulating arcade games or other popular computer games that are the sort of product that has little appeal right now," he says. However, he notes, consumers are interested in adventure games.

He says that the company is always interested in looking at utility programs which enable users to incorporate high speed subroutines into their own programs without having to understand Assembly language, as well as utilities that provide sorting functions and support the speech synthesizer, among others.

Tex-Comp's Price notes that utility programs in general don't do well, as they appeal to a limited group. However, he notes, there is

**"My opinion is that charging super-high prices encourages copying. This has been proven in the home video field. Now that price has come down and they're releasing movies quicker, there's much less copying."**

**—Jerry Price**

room in the market for "outstanding" utilities, such as Navarone's Disk Fixer and the Super Duper and QUICK-COPYer programs. (QUICK-COPYer is reviewed elsewhere in this issue.)

He says educational programs sell well.

"People are clamoring for a first rate SAT preparation program for TI," he says.

He notes that there has been an "artificial deflation in prices" with TI products such as Munch Man, Alpiner and Parsec discounted to \$9.95.

"Parsec used to sell as high as \$50," he says. "It's hard to come out with a game at \$19.95," he says. "We can't even produce a module for under \$10."

He notes that Tex-Comp is selling Parker Brothers games originally retailing at \$40-50 for \$19.95.

"The public has come to expect lower prices," price says. "We looked at a couple of word processing programs which were excellent, but the people who wrote them wanted them to retail at more than \$100. We just can't market software at \$100 any more for the TI."

He says the company that makes the product usually dictates price, but the dealers have "a good idea what's going to move."

Some programmers who spend long hours in developing software will never recover their investment, he says.

"User groups today are really out of line making unauthorized copies," he says. "Today you see a more sophisticated disk or module—neither are 100 percent safe. My opinion is that charging super-high prices encourages copying. This has been proven in the home video field: now that price has come down and they're releasing movies quicker, there's much less copying."

"We're not going to carry products that are outrageously priced," Triton's Miller says, adding that price is not the only criterion used in determining whether or not to carry a product.

Reitan says that price is less important "if a product is unique and provides a function needed in the market."

He says that the TE-1200 terminal emulator, which retails for \$49.95, provides a new function in that it can download faster than TI's Terminal Emulator II (up to 1200 baud for TE-1200 versus 300 baud for TEII), and spool directly to a printer.

Though the manufacturer makes "90 percent" of the decision about the price of a product "we sometimes make a recommendation regarding whether they should adjust it. Sometimes if a product is not a good value we just won't carry it" at Unisource, he says.

Dooley of Tenex agrees that price is "important but it depends a great deal on the quality of the product and the function of the product. We are

(Please turn to Page 12)



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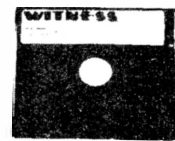
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**NOTICE:** All Infocom games are on disk and require a TI-99/4A equipped with a 32K memory expansion, a disk drive controller and a disk drive. They further require an Extended Basic, Mini-Memory, or Editor Assembler Module. **ALL** of the above are available at discounted prices from **TEX-COMP**. Send \$2.00 for the latest **TEX-COMP catalog** and order kit and we include a \$5.00 certificate that can be used for TI compatible accessories and software



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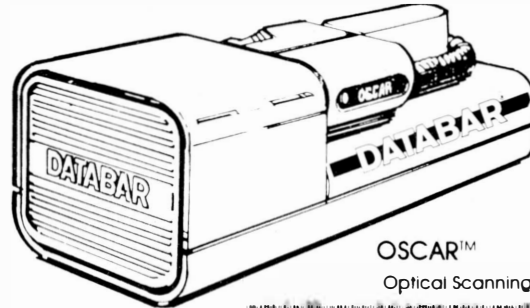
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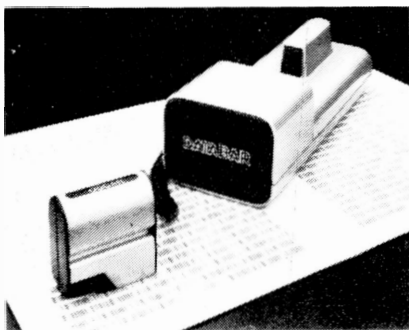
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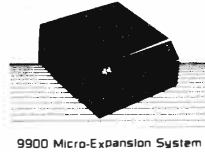


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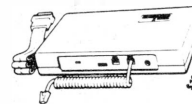
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## TESTING OUT THE PRODUCT—

(Continued from Page 8)

looking for perceived value to the consumer. We're not looking for a cheap product or a minimum price product."

Though manufacturers establish a price range, he notes, disparity exists among different retail channels regarding such things as discounting.

In considering whether to carry a product, "generally we have several different types of individuals within our company review a product," he says, in hopes of getting different viewpoints. The company requires a sample and evaluates it from the standpoint of technical performance, ease of use and general consumer appeal.

Price says the type of review depends on the product. Tex-Comp would give the sample to associates or customers familiar with similar products, such as word processors or business products. A game might

be evaluated by his own children or those of an employee, he says.

Miller says that Triton gets the product sample into its lab and persons familiar with using the TI99/4A play it or test it out according to "as many variables as possible."

He adds, "When you're dealing with a major manufacturer, you're less concerned about this. Still, we try it out."

Unisource's review process for deciding on what products to carry, Reitan says, includes reviewing a sample or demonstration disk along with the packaging and documentation that comes with it. The first hurdle for acceptance or rejection is the uniqueness of the product and the adequacy of the packaging. Then they get reaction from retailers and have customers give feedback as to how they perceive it at the price. Then the company makes the deci-

sion whether to carry it in the store, the catalog or both, he explains.

As for how soon an accepted product hits the market, this varies. Reitan says it can be a couple of weeks for the retail locations, but for marketing through mailers or the next issue of the catalog, it can be a period of months. These go out third class mail, he notes, so there is a lapse of time before the old catalog is replaced. However, he notes, the catalog is "where the value is."

Dooley says that the time it takes to get a new product marketed depends a great deal on where Tenex is in its advertising cycle, but is generally three to 12 weeks, "depending on where we are and how timely we perceive the product to be."

Price says how soon Tex-Comp gets a product on the market "depends on what shape it's submit-

(Please turn to Page 13)

## MAIL THE WAVE OF THE FUTURE—

(Continued from Page 12)

ted in. If it's in professional shape, it could be weeks. If it needs rewriting, maybe months."

He gave the example of a disk program which Tex-Comp told the manufacturer (Heritage Software of Columbus, Georgia) could "be a winner" on cassette, and is now being rewritten for that format.

Miller says that Triton "can react rather quickly." Like others, he notes the catalog as a variable.

He says that the company is "very open-minded" regarding third-party software and says, "We're not real formal here. It doesn't have to go through a board." A third-party manufacturer "could call us up or write to us" enclosing a sample of the product and the price the manufacturer hopes to get out of it.

Reitan says Unisource accepts third-party software and also deals with a local publisher "if the author doesn't want to deal with duplicating and packaging." He encourages third-party authors to submit to a publisher, noting that Unisource doesn't do publishing directly. He also notes that "it's a negative" to buy from a supplier of only one program.

"We have a tendency to buy from publishers who are already submitting programs," he says.

However, he adds, this is up to the authors of each program.

"If they have something unique we're certainly not going to not buy it from them," he says.

He says Unisource prefers that third-party authors submit their programs in a protected fashion.

"We'd never dream of doing anything but send it back to them," he says. "But we feel they'd feel better about it if it's protected."

Dooley says Tenex is also interested in third-party software and notes that they receive a great many unsolicited products. He notes that Tenex also regularly contacts third-party manufacturers.

"In the TI market, all the established people generally contact us," he says. "We solicit information

**"People by and large relate the quality of software to the quality of the packaging."**

**—Roger Dooley**

from other manufacturers about their TI development and try to encourage them to develop other TI products."

Price says Tex-Comp is extremely conservative in regard to third-party software, in that "if you deal with mama-papa companies" through retailers, as a consumer, if there are problems with your software, "they'll never find you." He says, however, that "we do deal with a number of small companies that have good track records. If we get a product from someone who is an unknown, we have to evaluate it far more thoroughly. Even TI programs have been known to have problems."

Packaging, he says, is not as important as well written documentation in products sold by mail. If a product is designed for the retail market, he says, "it not only has to look good, but be pilfer-proof."

Earlier, he notes, TI had trouble with customers switching cartridges. Packaging for stores is also important, he says, because most clerks "know nothing about the software."

Miller agrees that packaging is not very important in direct mail, "not like in a retail store."

Reitan says documentation is important, and in a retail store, "owners are more sophisticated" about what they are willing to pay for. Packaging, he says, is "very important and becoming more and more so."

In a store, "a plain brown envelope or even a poly bag with decent graphics" is less acceptable to the consumer, he says.

"It's very important at the retail level," Dooley of Tenex agrees. "People by and large relate the quality of software to the quality of packaging."

In the long run, he notes, the quality of the software itself determines its success. However, in a store, where the salespersons do not have time to demonstrate the software, the packaging may make a difference in the number of sales.

All the dealers agree that the best thing for third parties interested in obtaining wider marketing or distribution of their product should try to get listed in their catalogs.

"I think what they have to do is look at their current distribution channels and evaluate them, and contact major distributors who distribute at the retail level," Dooley says. "They should ensure they have at least one major mail-order house, like Tenex."

Direct mail order is more important as retail stores eliminate or reduce their TI product lines, he notes. Many users already have to rely on mail-order purchases to support their machines, he says.

Price says manufacturers can succeed by approaching "the heavy hitters that move a lot of stuff with a professional proposal and package." Through small ads, he says, manufacturers can sell two or three items a month, whereas through the Tex-Comp catalog they might sell 70 or 80 of the same item "because of our reputation for not carrying anything that isn't good." Many customers are reluctant to buy from small companies, he notes.

Miller of Triton agrees that "they should get in contact with companies like us. People that use direct marketing techniques like us are probably their best bet."

For small companies, he notes, it is difficult to set up a dealer network.

(Please turn to Page 14)

# CorComp distributes disk controller card

CorComp Inc. began shipping its disk controller card for the TI Peripheral Expansion Box the last week in July, according to Jackirae Sagouspe, CorComp marketing director.

Shipping began both to dealers and to user groups which had ordered the card for review purposes, she says. The disk controller carries a suggested retail price of \$199. Included is an extensive manual and a disk manager diskette.

In addition to formatting diskettes (single- and double-density as well as single- and double-sided), the card is capable of controlling up to four disk drives. The TI disk controller card can control up to three drives and supports single-density formatting only. (The double-density feature of TI's Disk Manager II cartridge can be implemented through the CorComp card.)

About 360 kilobytes of data can be stored on a double-density, double-sided 5.25-inch floppy disk, compared to about 180 kilobytes on a double-sided, single-density diskette.

Users may set the step times of their disk drives by changing the settings of dip switches within the card. The card reads and writes files noticeably faster than TI's disk controller.

Prototype boards for the disk controller and the expansion memory for the CorComp 9900 Expansion System were expected by Aug. 4, Sagouspe says. The boards will then be distributed to 10 test sites. The boards were expected to be under production during August, with shipments to dealers beginning the week of Aug. 20. The 9900 expansion box currently consists of an RS232 card. It connects directly into the side of the TI console.

Sagouspe says that the board for the 9900 system needs to be tested and marketed before the schematic is finalized for CorComp's 99000 Expansion System. The 99000 system is expected to consist of a motherboard containing an RS232 card, 32K of RAM and a disk controller.

CorComp has a network of 1,000 dealers throughout the United States. Sagouspe says that anyone who cannot locate CorComp products may contact the company at (714) 630-2903 for the location of vendors.

## DEALERS—

(Continued from Page 13)

"Being in the catalog is the place to be right now," Reitan says. "It's the pace where those million or two TI owners are getting their software today."

As evidence, he points out that Unisource "is doing more business in the July summer doldrums than we did at Christmas last year."

This, he says, is the result of most persons not having a TI retailer or, if they do, the retailer doesn't stock the range of products available from a company such as Unisource. TI users, he says, are "being forced to buy from people like us."

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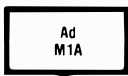
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## Wycove Forth

# Close encounters of the Forth kind

By CHRIS BOBBITT

The most difficult task a reviewer may ever encounter is to review a language. By their very nature, programming languages are not specialized to perform one specific task, but instead will perform a range of functions, depending upon their purpose. They are tools through which the programmer makes the computer perform a desired task.

Some of the languages available on the TI99/4A are more specific in purpose than others, and are generally easier to use. Such is the case with Pilot and LOGO. Both versions of BASIC available from TI are more difficult to learn, but are correspondingly less specific in the types of tasks that they can perform.

The next step up the ladder in non-specificity and capability is Pascal. Pascal is said to be as easy to learn as BASIC, once several crucial concepts are learned. But it opens up to the user a whole range of new capabilities.

The most difficult language to learn, but the most powerful and non-specific, is of course Assembly language. Less esoteric but nearly as powerful and fast as Assembly is a newer language that I would place roughly between Pascal and Assembly. This language is called Forth.

The rule of thumb in comparing languages is that the less specific a language is the faster and more powerful it is. However, when reviewing a language, it isn't very fair to compare it to other languages. Each programming language has unique capabilities, ease of use and purpose. One cannot argue that Assembly language is necessarily better than LOGO because it is faster; it is also much more difficult to learn and harder to write programs in.

## Review

### Report Card

Performance: ..... A  
 Ease of Use: ..... B+  
 Documentation: ..... B+  
 Value: ..... A  
 Final Grade: ..... A-

Cost: \$50 (diskette and cassette)  
 Manufacturer: Wycove Systems Ltd., P.O. Box 499, Dartmouth, Nova Scotia, Canada B2Y 3YB  
 Requirements: console, monitor or television, disk drive and controller or cassette recorder, Extended BASIC, Mini-Memory or Editor/Assembler cartridge

There is very little ground for comparison between most of the languages available for the TI home computer. With few exceptions, there is only one version of each. TI thought it was reasonable to supply only one version of each language to its computer owners, and most, if

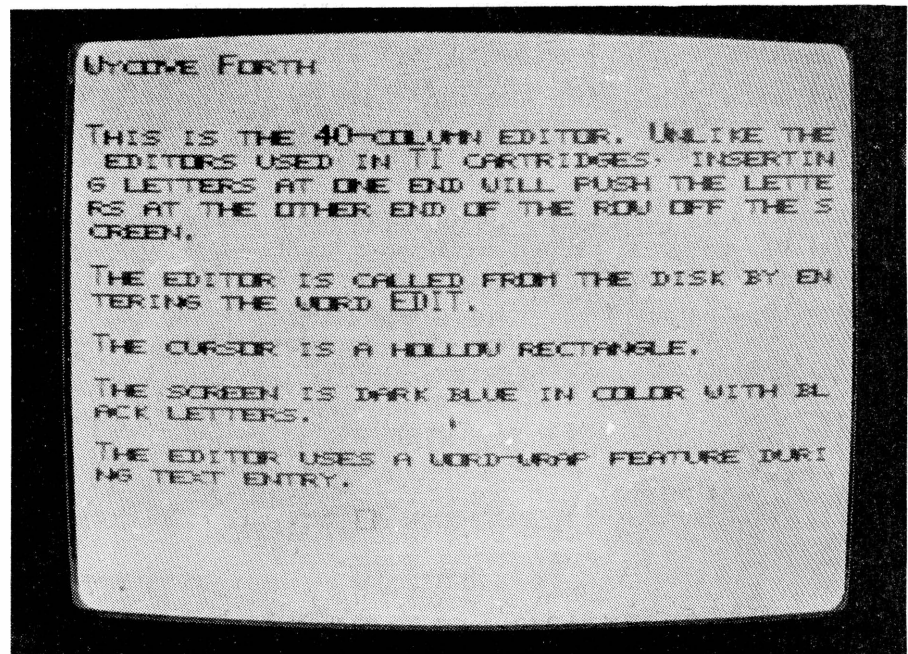
not all, of the third party software publishers do not have TI's resources to develop alternate versions. Fortunately, with Forth there are two versions available: Wycove Forth and the public domain version from TI called TI Forth. Naturally, any review of Wycove Forth is going to involve a comparison to TI Forth.

First, though, a little Forth history.

Forth was invented by a scientist named Charles Moore in the early 1970s. He developed it to help him as an astronomer. Because Forth was written by only one person, it has a unity of purpose and implementation seldom matched by those languages that were written by committees, such as Pascal and BASIC. Forth, like other languages, has evolved much to its present, sophisticated state. The present version is still true to its heritage though: it still retains its characteristic vocabulary and idioms, the 16-line by 64-column screen, its Polish notation mathematics, and its logical, yet unusual, data storage system.

To understand Forth, one has to

(Please turn to Page 17)





## WYCOVE FORTH—

(Continued from Page 16)

understand how Forth works. Forth is basically an interpreted language. That is to say, the Forth language is really a program which reads the commands in Forth programs, converts them to assembly commands and executes the assembly commands. This central program is called the "kernel." The kernel contains several of the more common commands and programming statements, but by all means not all of them.

Forth is an extensive language, and takes full use of all the disk storage that it can. Many commands reside on disk, and have to be called off the disk one by one from their resident locations when the program is run. This disk storage is divided into 90 blocks of 1024 bytes each, called "screens." On these screens reside such things as the program editor, and in the case of Wycove Forth, the commands for music, speech and graphics.

Both the Wycove version of Forth and the TI version can hold only five screens of data in memory at one time. That implies that the programming area for Forth is only 6K. But since Forth is such a compact language, once Forth words, or subroutines, are defined, they are stored outside of the program area, making 6K seem like an infinity.

Wycove and TI Forth, like all other versions of Forth, use a particular form of mathematics commonly known as Polish notation, previously implemented on, among other things, Hewlett-Packard calculators. This particular system looks at the memory of the computer as if it were a stack of empty boxes and, ironically, calls the memory the "stack." One number may be placed in each box. In order to perform an operation, the computer looks at what is in the first two boxes and performs the given operation. This doesn't seem too different until you go about writing a formula in Polish notation. In BASIC, to add to

numbers, say two and three, one would use the statement:

```
PRINT 2+3.
```

In Forth, the same statement would look like this:

```
2 3 +.
```

Forth takes any numbers entered and places them into the "stack" in the reverse order from which they are entered. Therefore, the last number entered is the first on the stack. When an operation is performed the computer takes the first two numbers off the stack, adds them in this case, and then puts the answer on the top of the stack. To print out the result, we use the Forth word or command "." which prints out the number at the top of the stack.

Mathematical operations in Forth all follow this basic pattern. Forth has many words, or commands, for manipulating the stack, which is done in much the same way as a programmer manipulates strings in BASIC.

A common question asked about every language is: "What does it do?" Well, to quote the Wycove Forth manual, "Forth is a high-speed, extensible language suitable for general computing and in particular control, game and graphics applications." More specifically, Forth allows programmers to define specialized commands that function like subroutines out of the built-in commands. Programs may be written using both the created commands and the ones built into the language. Forth is limited only to the number of the resident machine's features it can access, and the amount of memory available, both on disk and in RAM. Like Assembly language, the programmer has access to 32 independently moving objects, or sprites, and 255 redefinable characters. In both versions of Forth, the programmer has the option of writing programs on a 64-column screen that uses the bitmap graphics mode of the computer, as well as writing programs that

(Please turn to Page 18)

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## WYCOVE FORTH—

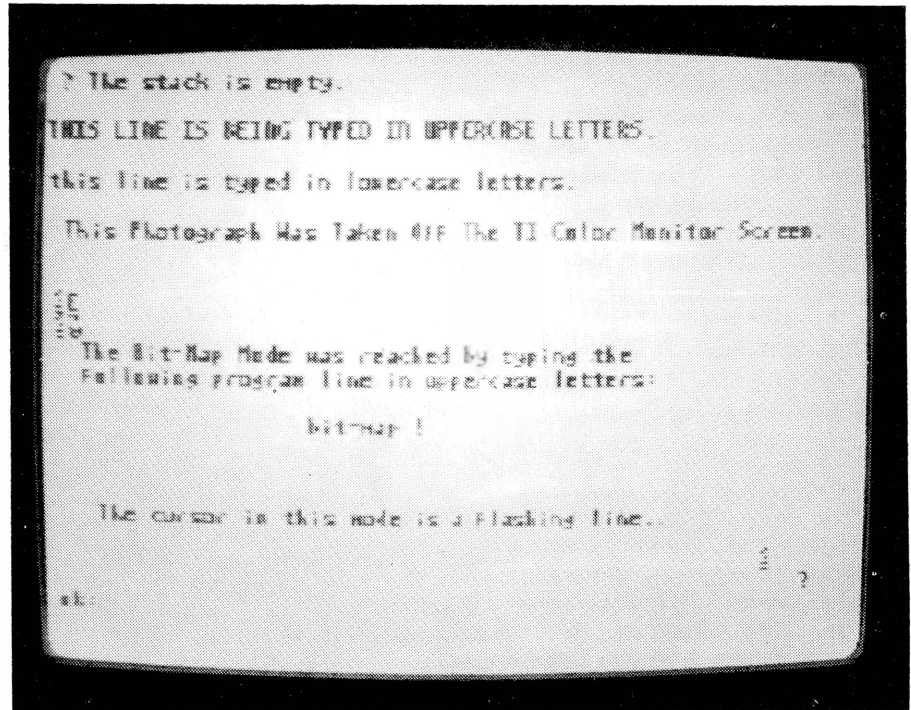
(Continued from Page 17)

specifically take advantage of the bitmap mode's drawing features. Like BASIC, Forth has a number of special commands that enable the programmer to do things such as read data off a diskette, or manipulate string data. However, Forth performs many of these tasks at a speed close to Assembly language, yet with a simplicity that rivals BASIC.

**Performance:** How is a language supposed to perform? Unlike a common program, a language has no specific function, performs no given task, and cannot be played like a game. A language's performance, as gauged in a literal sense, refers to how error-free it is. After an extensive amount of testing of Wycove Forth, which consisted of defining and destroying words, or commands, performing complex mathematics and writing small to large programs, I am happy to say I haven't found anything which can be called an error. After many attempts, I have been unable to "crash," or stop the language. I can't say that the language is "bug" free, but it performs as the manufacturer says it is supposed to.

Performance is a term describing more than just how error-free a language is. In the case of a programming language, performance is also a term describing how it stacks up to other languages, no pun intended. The most obvious comparison of performance can be drawn between Wycove and TI Forth. Each version of Forth has its particular advantages over the other.

When Wycove Systems Limited was making its version of Forth, it was implemented to take advantage of the many features found on the TI99/4A, features ignored by the TI version, among these being speech and sound. These various features can be utilized through commands unique to Wycove Forth. For example, by utilizing letters for notes and numbers for octaves, translation of sheet music using Wycove Forth is



simple. The programmer does not have to deal with frequencies of notes. Speech synthesis is also available with Wycove Forth commands if the speech synthesizer is attached. However, Wycove Forth is limited to the 300 or so words built into the speech synthesizer simply because the cartridges that allow Wycove Forth to be loaded do not support more than that. Despite this, there are instructions on how to make minor hardware modifications to the Terminal Emulator II cartridge so that it can be used by Wycove Forth to produce unlimited speech potential. These changes are not endorsed by Wycove Systems, and are only suggested as possible enhancements.

Both versions of Forth have a lot in common. Both take advantage of the machine's graphics capabilities. The TI version does allow one more graphics mode than the Wycove version, the multicolor mode. This particular graphics mode is of dubious use, however. It allows block graphics, where each block measures four by four pixels. The programmer that uses TI Forth can use this mode to color in any of the 64 by 48 blocks on the screen with one of 16

colors. The TI version also has two extra variations in bitmap mode which allow the programmer to more easily mix graphics with text. One of them, called SPLIT1, is a screen with 16 lines in the bitmap mode and eight lines in the text mode. The other, called SPLIT2, maintains 20 lines of the screen in bitmap and the remaining four lines in the text mode. These, too, are of dubious use as bitmap mode is usually used exclusively for graphics.

In both versions, the programmer has the option of choosing between a 40-column or 64-column editor. The 64-column editor uses the bitmap mode of the computer to display characters. There is really only one difference in the 64-column editors of the two versions. The TI version takes advantage of an eight-row, 40-column window in text mode for the performance of all non-programming functions, such as program execution. This gives you a clearly defined Forth standard 16-line by 64-column screen. In Wycove Forth, however, the whole screen in in bitmap mode, with the top 16 lines delineated as the programming area. While com-

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## WYCOVE FORTH—

(Continued from Page 18)

mands typed outside the editor may be easier to see in the TI version, I think the Wycove version is superior. If you try to run bitmap drawing programs in the TI version you often run off the screen, as only the top two thirds are in bitmap mode. In the Wycove version, however, you may use the entire screen as your worksheet with ease. There are ways to get the TI version to allow you to use the bottom one-third of the screen for bitmap programs, but sometimes it is more trouble than it is worth.

The 40-column editors are different in the two versions, too. The TI version uses a 40-column window on a 64-column text screen with 16 lines. This allows 1,024 characters of text. The Wycove version, however, uses a 40-column by 24-line screen in the 40-column editor, giving you only 960 characters. The TI version is slightly superior. It is recommended that you check the resolution of your TV or monitor before deciding which editor to use, as the characters are very small in the 64-column version on a small TV.

In both versions of Forth, the programmer may use 256 redefinable characters, and 32 sprites. In both versions of Forth there are appropriate words, or commands, for controlling sprites. Graphically, both versions have a lot in common. They both seem to display text and graphics at the same speed, and their graphics commands are similar. Graphics programs written in either version may be used on the other version with few changes except command names.

There is only one area in which TI Forth really stands out above Wycove Forth. That is in disk storage capability. The Wycove version allows a maximum of 70 screens of data on a disk. The TI version utilizes all the disk storage available and gives the user a full 90 screens, a difference of more than 20 kilobytes! TI Forth also has many more com-

mands for disk handling than Wycove Forth.

Overall, both versions of Forth perform equally well. Both also perform most operations at the same speed. I prefer some features over others. On the TI version I specifically like the screen color. The TI version operates in the same colors used by TI-Writer, white text on a dark blue background. I prefer this to the black on cyan used by Wycove Forth for displaying text. However, I prefer the 64-column editor of Wycove Forth.

**Ease of Use:** Obviously, the design of a computer language determines how easy it is to use. The more syntax, or the more stringent a language is about what it accepts, the more difficult it is to use. Difficulty is also determined by the number of commands the programmer must memorize. Forth has a great number of commands, a number which is limited only by the amount of external memory storage available. To the casual observer this would seem to indicate that Forth is difficult to use. However, a multitude of commands in Forth may be put together under one name to perform a specific function, much like a called subroutine. On further examination, the potential Forth programmer will find there are few more commands in Wycove's implementation of Forth than in TI Extended BASIC. In comparison, TI's own version of Forth has well over 400 commands and programming statements.

To the beginner Forth is going to seem very complex. It is designed around principles that the BASIC programmer needn't learn. A popular phrase among professional programmers is that "BASIC leads to brain damage." This is not only because BASIC is easy to use, but that is also condones, and even encourages, poor programming practices and unstructured code. What it really amounts to is that BASIC programmers often have a

(Please turn to Page 20)

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## WYCOVE FORTH—

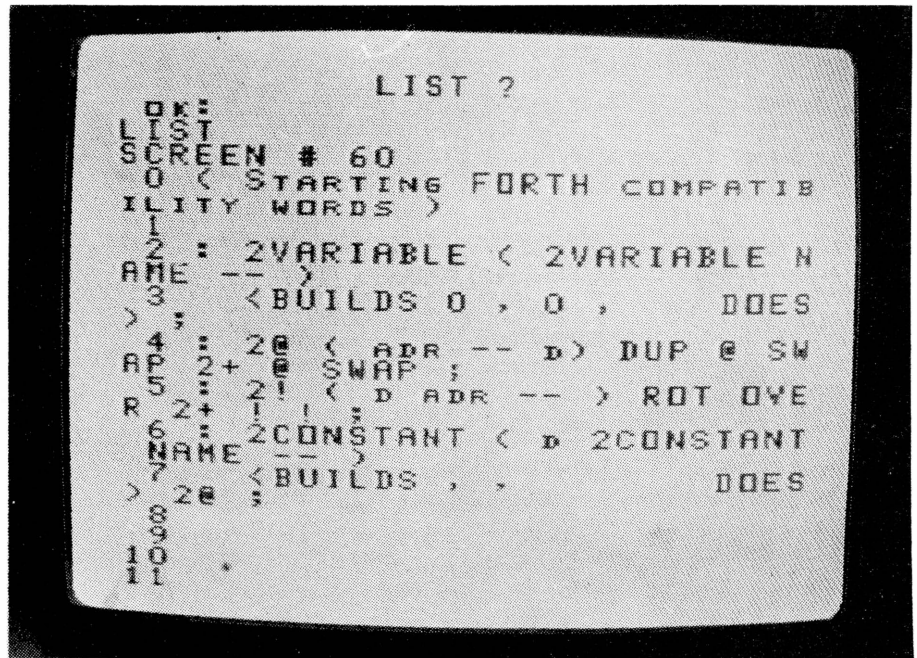
(Continued from Page 19)

more difficult time learning other languages than non-BASIC programmers have. BASIC is an anomaly in the programming world. Naturally, Forth is not going to be easy to use except by the Forth programmer. Since both the Wycove and the TI version of Forth are well done and are relatively error-free (the initial TI Forth had a few bugs in it), Forth programmers will find that both are easy to use. And the Wycove version really stands out! The Wycove version can be used with either a disk drive or a cassette recorder. It may be loaded into a variety of cartridges, including TI Extended BASIC, Mini-Memory and Editor/Assembler. Both the cassette and the diskette are included. I had never heard of a cassette-based Forth before. Surprisingly, the cassette version is very similar to the diskette version. The cassette version even has an advantage in that the user has available to him 1,999 screens of storage on a single tape! In contrast, the TI version can be used only with a disk drive and the Editor/Assembler cartridge.

Based on the number of commands, perhaps the TI version is more difficult to use, but no matter how esoteric the commands are, their ease of use depends on how well they are documented.

**Documentation:** In learning a programming language, documentation is crucial. It is absolutely imperative that every command and every programming statement is covered in the manuals accompanying the language. Often, these manuals turn out to be the major if not only source of information about the language. Other books on a particular language will sometimes enhance the user's knowledge of particular commands or constructs of a language, but nothing can replace the reference manual.

Wycove Systems took a different approach to writing its manual than



that established by TI. Wycove's manual is a true aid to the first-time user in most respects. While the manual clearly states that the first-time user should consult such works as "Starting Forth" by Leo Brodie for in-depth information about Forth and its concepts, the manual still provides a wealth of information about the differences between standard Forth and the Wycove version. The Forth beginner will really appreciate the programming examples included in the manual. The easiest way to learn a language is to practice it.

Also unlike the manual accompanying TI Forth, the Wycove manual is written in a usually easy-to-read manner. The discussions of various subjects never get too technical. By contrast, the TI Forth manual reads like so much mush to the beginner.

I believe the Wycove Forth manual is an excellent piece of work. The only difficulty I had with it was in finding where it explained how to access some of the most fundamental parts of Forth, such as the 64-column editor. In the Wycove ver-

sion of Forth, I found it is necessary to type in the following to use the bitmap 64-column editor: 20-LOAD BMEDITOR.

In comparison, to call up the 64-column editor with TI Forth it is necessary to type in: -64SUPPORT.

These commands are both rather short, if somewhat mysterious. The big difference between them is that the TI version of Forth makes its commands clear when Forth is first turned on. They are clearly displayed on the screen. In contrast, the opening screen of Wycove Forth, like that of BASIC, says plainly that the language is "on." Even the TI Forth manual, which is a very poor Forth tutorial, clearly explains what the commands do, if not what to do when the command is executed. Nowhere was I able to locate in Wycove's manual how to enter the 64-column editor! Because I have had some experience in Forth, it wasn't hard to figure out how to run the Wycove 64-column editor. But I pity the first-time user familiar only with the "friendliness" of BASIC.

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## WYCOVE FORTH—

(Continued from Page 20)

**Value:** It is difficult to assign a value to a language since that depends more on what the programmer makes of it than anything inherent in the language itself. To the knowledgeable programmer it may be very valuable. It gives the programmer the ability to write programs with the power of Assembly language without having to learn Assembly language. To the beginning user, it is really worthless. Forth is definitely not for beginning programmers. It is best to say that the value of Forth depends on the programmer who is using it.

**Conclusions:** Though Forth is not for the beginner, its concepts and capabilities are often too esoteric for even advanced programmers. BASIC programmers, like me, may find it especially difficult to learn Forth. Pascal or Logo programmers will have difficulty, but much less than BASIC programmers. This is due in part to the fact that structured programming is the only programming possible in Forth. The BASIC programmer who becomes a Forth programmer will always long for the GOTO statement of BASIC.

Both Wycove and TI Forth are easy to use. In terms of "complete-

ness," Wycove's implementation of sound and speech make it a winner. It's nice to be able to hear sound effects in Wycove Forth after writing programs in TI Forth all day. TI Forth is practically the "silent" movie of programming languages. The fact that Wycove Forth is also a "talkie" makes it stand out.

In regard to the manual, both are good though geared to different audiences. The beginner will be comfortable with the Wycove manual while the TI manual is best suited for the knowledgeable programmer. However, I believe Wycove's manual stands out because of its readability while the TI manual earns an honorable mention on the basis of its completeness.

In terms of value, Wycove Forth stands ahead of the TI version, particularly to the Forth beginner (which probably constitutes 99 percent of the market). The many programming examples in the manual and the ability to run out of cassette or diskette and any of three cartridges make it far more versatile than TI Forth.

In terms of performance, it is difficult to say which is superior. At best, it's a draw. Both versions have

essentially the same instruction set, and both work equally fast. There are minor features in each which I prefer: the 64-column editor of the Wycove version and the 40-column editor of the TI version. Perhaps if the TI version had been completed—TI never finished it because the company dropped its home computer before the Forth project was ready to be marketed—it may have been a more powerful language than it is. After all, TI has far more resources than Wycove and they weren't working in the dark as much as the Wycove people were. As you know, much of the internal workings of the TI99/4A is a mystery to virtually everyone except TI.

Overall, I prefer the Wycove version of Forth. It is consistent, well-documented and has many features not found in the TI version. Best of all, it is designed to be learned by the beginner. The people at Wycove went to great lengths to make Forth accessible to average users—there is even a complete list of every defined word available at the touch of a couple of keys—while with the TI version the user must constantly refer to the hard-to-read manual for instruction. Forth is a nice fast language.

## Win some software

Part of the joy of programming is the tinkering one does to make a program or routine just a little bit better, make it do just a little bit more than it originally was supposed to do.

Listed below is a rudimentary score-keeping program that comes from the Los Angeles 99ers Users Group. What we want to see is what readers can do with it to improve it as a score-keeping program. We ask that you use no more than 1,000 bytes.

We will accept versions written either in BASIC or Extended BASIC (only one entry per person) on either cassette, diskette or printout. We will return all media if return postage and packaging is included.

Include whatever documentation that is required for the program's use. The best BASIC and Extended BASIC versions will be published in a future edition of MICROpendium. Winners may select from the following programs, donated by the manufacturers. Indicate your first and second choice when you submit your entry.

Here are the prizes, all of which have been reviewed in previous issues of MICROpendium: On Gaming, C.A. Root Associates; Void, Kean Computing Inc.; Thief, Tom-puter Software; Mad-Dag, Data/-Ware Development Inc.; ASW Tactics II, DEJ Software; Monthly Budget\$ Master, SA2 Software; Budget Master, TXMasters; Home Budget, DCH Software; and Escape from Balthazar, Inter-8 Enterprises.

```

100 REM ***SCORE KEEPER***
110 CALL CLEAR
120 INPUT "HOW MANY PLAYERS
?" : X
130 FOR PLAYER=1 TO X
140 INPUT "NAME " : PL$(PLAYER)
150 INPUT "POINTS " : PTS(PLAYER)
160 PRINT
170 NEXT PLAYER
180 REM ***NOW ASK FOR PLAYER BY NUMBER
190 PRINT ::: "ENTER 0 TO QUIT" :::
195 INPUT "PLAYER #": N
200 PRINT "-----"
210 IF N=0 THEN 250
220 PRINT PL$(N), PTS(N)
230 PRINT :::
240 GOTO 195
250 END

```

## Mark XII Modem

# Modem may be smart buy

Until recently, there was no compelling reason for a TI home computer user to purchase a 1200 baud modem. However, this has changed with the advent of a 1200 baud terminal emulator program for the TI. TE-1200 was reviewed in last month's MICROpendium.

Anchor Automation produces a line of modems, none of which, apparently, is designed to work off the shelf with the TI. There is a version of its Mark III which has been adapted to the TI, but the Mark XII, for example, isn't compatible right out of the box. But don't let that disturb you. All that is required to make it 100 percent compatible with the TI is some minor pin switching of the 25-pin ribbon cable. I brought the modem manual and RS232 manual to a local "computer doctor" and he did the modifications for \$15. He built a double-ended connector for me. One end connects to the modem cable and the other end is plugged into the RS232 port. It would have been cheaper had I simply asked him to switch the pins in the modem cable itself. Of course, a do-it-yourselfer can do this for himself. (I do not recommend modifying the modem cable itself, since you take a chance at voiding the modem's two-year warranty.)

**Performance:** The Mark XII is a "smart" modem. That is, it contains a microprocessor and firmware to carry out various communication functions. According to the company, the firmware is compatible with the Smart 1200 modem manufactured by Hayes Microcomputer Products Inc. The Hayes modem is priced at about \$450.

The Mark XII comes with a six-foot, modular telephone cable and a 110-volt power adapter. Unlike the Mark III, the Mark XII cannot be operated off batteries. The modem measures six inches across, ten inches deep and 1.25 inches high.

## Review

### Report Card

Performance .....	A
Ease of Use .....	A
Documentation .....	A
Value .....	A
Final Grade .....	A

**Cost: \$319.95**

**Manufacturer: Anchor Automation Inc., 6913 Valjean Ave., Van Nuys, CA 91406, (213) 997-6493**

**Requirements: console, monitor or television, terminal emulator program, RS232 interface, telephone**

The modem board is enclosed in a grey, hard plastic case. On the front of the case is an on-off switch and four indicator lights. One of the lights lets you know that the power is on and the modem is ready to operate. A second light goes on only when you are operating at high speed (1200 baud). A third light indicates when a remote carrier has been

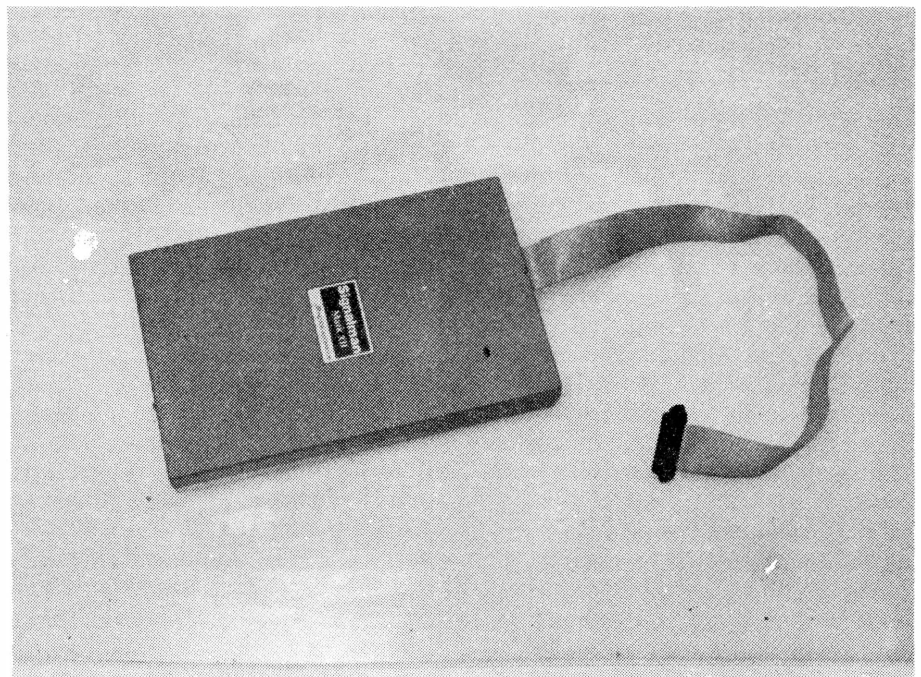
detected. The fourth light indicates that data are being transferred.

I suspect that most TI users who own modems have either the TI acoustic coupler or something like the Mark III. Neither of these is "smart" and neither can operate at transmission speeds greater than 300 baud.

The Mark XII offers the user a wide-range of functions not available with the aforementioned devices. Depending on the terminal emulator, of course, the Mark XII can be operated at speed ranging from 110 baud to 1200 baud. Data transmission at 1200 baud is roughly 3.5 times faster than data transmission at 300 baud. (At 300 baud, fewer than 40 characters are transmitted per second.)

But that's just one of the features offered by this modem. In addition to being able to send and receive data at up to 1200 baud, it allows the user to dial the phone via the keyboard. This is called "auto-dialing." If the line is busy, you will see the

(Please turn to Page 26)



## 99/4 Auto Spell-Check

# If yew kant spel, tri thiss

Like any spelling checker program, the 99/4 Auto Spell-Check is designed for those who have trouble with spelling. No spelling checker can make the user a better speller, but it can help correct misspelled words before they become a regular feature of one's correspondence, reports or articles.

The program will work using the TI-Writer or Editor/Assembler cartridges. I used TI-Writer for this review.

**Performance:** This program is the only spelling checker that I am aware of that is designed to operate with the TI home computer. There are a number of things about it that I like. For example, the user may create any number of special dictionary files that he wishes, having the program access only those that he chooses to use. In other words, let's suppose that you write articles for a computer magazine. You could create a dictionary file that consists only of specialized computer terms and have the program use it to check spellings of these rather unusual words without having to include them in a dictionary consisting of more commonly used words. Each user-defined dictionary file may contain up to 2,000 words.

I also appreciate the fact that it distinguishes between upper-case and lower-case letters.

The program operates out of the utility function of TI-Writer. The 99/4 Auto Spell-Check comes on two disks and includes a pair of main dictionary files consisting of some 20,000 words. Also included is a "seed" program for creating user-defined dictionary files. Users with a double-sided disk drive may copy the program and dictionary files to a disk that includes the TI-Writer program files if desired, thus conveniently placing the entire word processing package on one disk.

## Review

### Report Card

Performance: ..... A  
 Ease of Use: ..... B+  
 Documentation: ..... B+  
 Value: ..... B  
 Final Grade: ..... A-

Cost: \$49.95, plus \$3 shipping (diskette)

Manufacturer: Dragonslayer American Software Co., 2606 Ponderosa Dr., Omaha, NE 68123

Requirements: console, monitor or television, disk drive and controller, TI-Writer or Editor/Assembler cartridge

The program is fully prompted. After selecting the utility option of the TI-Writer menu the program prompts the user for the name of the text file. The program then issues a prompt to load the first dictionary file. The program then compares all the words in the text file with the

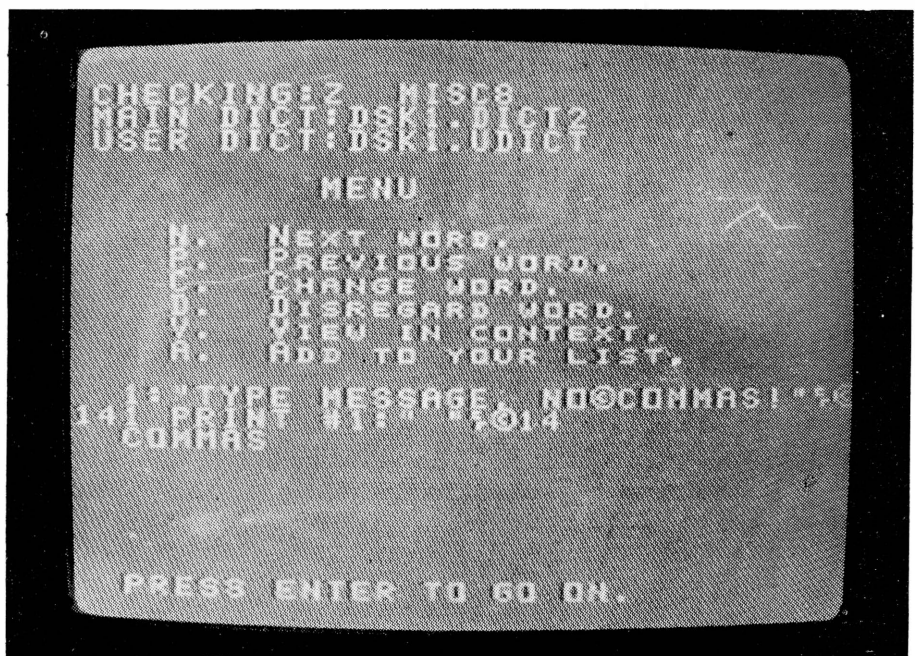
words included in the dictionary, going from A to Z. After finishing with the first dictionary file a prompt appears to load the second dictionary file. The program again compares words in the text file with the dictionary entries.

The time it takes to check the words depends entirely on the size of the text file. For example, it took seven minutes 20 seconds for this article to be checked by the 20,000 word main dictionaries, plenty of time to have a cup of coffee and scan through the morning paper.

After finishing with the second dictionary file, the program prompts for user-defined dictionary files. There may be as many of these as the user wants to create.

After running through the dictionary files, the user may review all words that were not recognized by the program. The user may choose to accept a word as it is spelled, add the word to a user dictionary, correct the spelling of the word or view the word in context. These options are available for every unrecognized word.

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# QUICK-COPYer

## Backing up your disks

QUICK-COPYer is a utility program that does only one thing, and does it very well.

As its name implies, this program is used to make backup copies of disks. And it does it much faster than TI's Disk Manager II cartridge. QUICK-COPYer was written by Oscar Farah.

**Performance:** QUICK-COPYer cannot be copied or listed nor can a disk catalog of its contents be run. The disk it comes on does not have a write notch. This review is based on the version that requires Extended BASIC. The entire program loads automatically into memory.

After loading the user is asked to indicate the disk drive number that will hold the master disk and the drive number that will hold the copy disk. With one drive, the user simply switches the copy disk with the master disk as he is prompted. That's all there is, as far as preliminaries go. From here on the only keys of use to the user are the "S" key, to start an operation, and the "Q" key, to stop.

Before detailing the results of the test I ran, a few explanations are in order. First, the copy disks must not have any other files on them, or the program will not work. Also, the copy disk will take on all the characteristics of the master disk. For example, if you initialize a double-sided disk using the Disk Manager II cartridge and then copy the contents of a single-sided disk using the QUICK-COPYer to the double-sided disk, it will become a single-sided disk too. Also, QUICK-COPYer has no provisions for copying single files. This program copies only entire disks.

The program uses a green screen when reading from the master disk and a red-orange screen when writing to the copy disk. I found this to be very helpful. Also, there is a little

## Review

### Report Card

Performance..... A  
 Ease of Use..... A  
 Documentation..... B  
 Value..... B  
 Final Grade..... A-

**Cost: \$39.95, plus \$2 shipping (diskette)**

**Manufacturer: QUALITY 99 SOFTWARE, 1884 Columbia Rd., Washington, D.C. 20009, (202) 667-3574**

**Requirements: console, monitor or television, disk drive and controller, Extended BASIC, Mini-Memory or Editor/Assembler cartridge (specify which when ordering)**

clock-like mechanism on the right side of the screen that spins around when a disk is being written to or read from.

Here are the test results, based on tests using double-sided disks:

**Single Disk Drive Operation  
 (22 files consisting of 400 sectors)**

Program .....	Time
QUICK-COPYer .....	6: 25
Disk Manager II .....	14: 15
<b>Two Disk Drive Operation</b>	
Program .....	Time
QUICK-COPYer .....	4: 25
Disk Manager II .....	6: 25

As you can see, there is a significant difference between the speed of QUICK-COPYer and the disk copying utility provided by Disk Manager II, particularly when operating out of a single disk drive. (The results include the time it took to actually switch disks while using a single drive.)

Why the difference? TI's disk manager cartridge reads and writes files one at a time while QUICK-COPYer reads and writes batches of files at a time. This is an efficient way of doing things because the program is designed to fill the computer's expansion memory up to its capacity while the Disk Manager II cartridge doesn't even access the expansion memory. The Disk Man-

(Please turn to Page 27)

99/4A  
**AUTO SPELL-CHECK**  
 \* for TI-WRITER \*

Quickly check your text  
 for unsightly spelling  
 errors.

send: \$ \$49.95+\$3.00 S&H \$  
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 phone #, expiration date.  
 to: DRAGONSLAYER ASC  
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## Wizard's Dominion

# Choose your fantasy

Wizard's Dominion is a one player fantasy-adventure that first appeared in 1982. It was among the first adventure games written for the TI home computer to incorporate graphics. The game is based on Dungeons & Dragons-type games, which require players to adopt a "personality."

The object of the adventure is to advance through a network of corridors in search of gold and the Wizard's Chamber. Each level comes complete with a Voritka Ogre whom you must invariably slay to reach the Wizard's Chamber and the next level. Gold can be used to purchase weapons and other supplies at each level while the Wizard's Chamber serves as the passageway to the next level.

The view of the corridors is simulated in three dimensions. The map spell provides a two-dimensional representation of the entire level. Movement is done through the keyboard, with a choice of moving right, left or forward. After each move the screen is "reassembled" to represent the new position with the perspective changing at each move.

**Performance:** After choosing one of the four identities offered—The Wizard's Apprentice, The Evil Wizard, The Hero or The Evil Prince—the player must decide what weapons and other accoutrements to acquire before entering the labyrinthine dominion. Choices here include a helmet, magic armor, shield, lightning bolt and magic sword among others. Perhaps the most important, however, is the map, a magic spell which gives you a bird's-eye view of the corridors and your location in it.

Finding the gold is generally not very difficult, but doing battle with the Voritka Ogre is a task that requires the proper armament and a strategy by which to use it. The victor is determined by probability-based on the type of weapon used and the type of attack. The ogre is

## Review

### Report Card

Performance: ..... A  
 Ease of Use: ..... B  
 Documentation: ..... A  
 Value: ..... B  
 Final Grade: ..... B+

**Cost:** \$19.95 (tape), \$21.95 (diskette)  
**Manufacturer:** American Software Design & Distribution Co., P.O. Box 46, Cottage Grove, MN 55016, (612)459-0557

**Requirements:** console, monitor or television, cassette recorder or disk drive and disk controller, Extended BASIC cartridge

represented by an ugly red critter on the screen that pops up very suddenly when you happen upon him. Battles can end with your character or the ogre being killed, or in a draw. A draw is of no use to you, however, since you cannot advance past the ogre while he is alive.

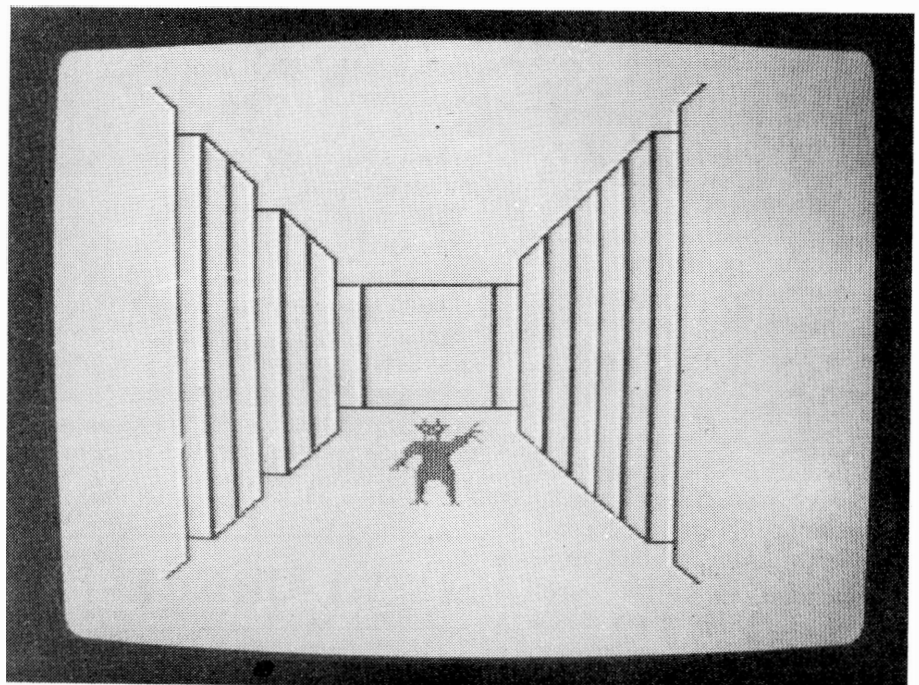
**Ease of Use:** There is no such

thing as an easy adventure game. And this one is no exception. It takes a while to learn how things work—particularly the magic spells—and your initial explorations of the dominion may prove less than successful. It took me about an hour to get the hang of things and then it was a matter of defeating the ogre and collecting the gold. A seven-year-old I know got caught up in the fantasy aspect of the game and seemed to enjoy playing it, though he never got beyond the first or second level. All entry is through the keyboard. I was not able to crash the program despite my best efforts.

Because the game is written in Extended BASIC there is a delay between moves as the screen is redrawn.

**Documentation:** The game is well-documented. Included is a manual that sets the stage for the fantasy game by briefly retelling the story of the Wizard's Dominion and outlines the various elements of the game in a well-organized manner. Also included are charts which help determine the probability of success

(Please turn to Page 27)



## ANCHOR AUTOMATION MARK XII—

(Continued from Page 22)

word "busy" appear on the screen. You can redial the number by simply hitting two keys. You can mix tone and pulse dialing, if you like, though I don't know why you would want to. You may also enter "pauses," which are necessary when using long-distance telephone services. Of course, you may manually dial the phone, too.

Complementing the auto-dial feature is the auto-answering feature. The modem can be set to answer after a specified number of rings (up to 255) or not to answer at all. When it does answer, the word "ring" appears on the screen.

The modem also provides for manual and automatic disconnect.

The user may choose to have result codes sent to the screen or a printer. Result codes serve to verify functions. They may be output as words or digits. "Ring," for example, is a result code in word form. It is also represented as the number 2.

The modem is fully programmable in terms of operating characteristics. Selection of baud rate, parity setting, etc. is done through terminal emulator software.

I've been using this modem for about two months. My Mark III is packed in its box and will probably remain on the shelf forever. The Mark XII operates equally well with TI's Terminal Emulator II cartridge and the TE-1200 software by Softmail Inc. Although I don't always use the 1200 baud capability of the modem, I have become accustomed to auto-dialing and redialing. I also find the indicator lights to be useful, particularly as a visual cue to problems that occur during data transmission. If the screen "freezes," for example, and the carrier signal light goes out, I know that I've been disconnected from the host system. A screen often appears to be frozen when using such telecommunications services as The Source and CompuServe. This is due to such factors as the number of users online at the time. The more users, the longer it takes the system to respond

to your commands. Glancing at the indicator lights can reassure you that you are still online. (Actually, it may anger you since you are paying for the online time whether the system is responding to your commands or not.)

**Ease of Use:** Anyone who has ever used a modem will find no difficulty in using the Mark XII. Reassigning the pin locations is not a very difficult task for a knowledgeable user or technician.

**Documentation:** The modem comes with a very complete, 30-page manual. The table of contents is well done. For the most part, it is written for users who are familiar with telecommunications but it includes basic information about communicating via modems and a step-by-step tutorial on installing the modem. There is also a troubleshooting section.

**Value:** Those who are using their TIs in business, either to access data bases or to transmit data, would do well to look at a 1200 baud modem. Of course, having a 1200 baud modem doesn't by itself solve all the problems TI telecommunicators face. There is still the little problem of a 40-column screen that is incompatible with many university and corporate mainframes. Although a 1200 baud modem will allow you to go online with these systems (most do not support 300 baud), the screen output will be difficult to decipher if the host system does not support 40-column display.

This modem costs about three times what you'd pay for a "dumb" 300 baud modem. I know of "smart" 300 baud modems that are nearly in the price range of this one. Those who are considering the more expensive 300 baud modems may find it worth their while to look into this one. If nothing else, this modem gives you room to grow.

—JK

## SPELL-CHECK—

(Continued from Page 23)

This program allows the user to

make significant corrections, not just replacing a letter or two. I know of some such programs that allow the user to overwrite letters but not increase the word size, which severely limits their usefulness. I find that many errors in spelling require the addition of missing letters to correct, which 99/4 Auto Spell-Check permits.

Users also have the option of stepping back to the beginning of the unrecognized word list. This allows you to double-check the words, which can be very handy.

Having gone through this procedure, the user is asked to enter a file name for the corrected text file. It is then written to disk. The user then has the option of having the unrecognized words added to the user-defined dictionary. The program automatically does this updating upon command.

If only minor corrections were required in the text, no additional work needs to be done. It stands corrected and is ready for printing. However, if you had to add a letter or two to various words, you are required to reformat the file via the TI-Writer editor mode for printing.

Prior to operating the program, you will have to remove escape control characters from the text file. Thomas W. Kirk, who wrote 99/4 Auto Spell-Check, has a suggestion which makes their removal and replacement a routine matter. He recommends simply substituting a pair of letters for the escape commands through the use of the TI-Writer editor and then reinserting them by using the search and replace command of the editor after having run the text file through the spelling checker.

**Ease of Use:** I found no problem in using this program, though I managed to lock up the computer once or twice after entering the wrong information at various prompts. No damage resulted, however, either to the text file or anything else.

**Documentation:** 99/4 Auto Spell-  
(Please turn to Page 27)

## SPELL-CHECK

(Continued from Page 26)

Check comes with a 12-page manual that provides plenty of information about the program and its operations.

**Value:** \$49.95 seems like a lot to spend for a spelling checker program, particularly in view of the fact that the word processor it operates with had a list price of \$99.95 when it was produced. While this program provides the user with the most important functions of a good spelling checker, it lacks some of the more sophisticated features of similar programs for other computers. For example, it does not provide such information as the number of words, sentences or paragraphs in the text file. Nor, for that matter, does it provide a breakdown of how many times particular words are used in a text or a listing of the words used in the text.

However, those who are in need of a proofreading tool, or can use the backup spelling support that a spelling checker can provide, have nowhere else to turn. This program does what it is supposed to do, and does it well.

—JK

## QUICK-COPYer

(Continued from Page 24)

ager II uses only the memory available in the console and then only as much of it as is necessary to hold the single file it loads at a time.

**Ease of Use:** QUICK-COPYer can be operated virtually without instruction. Using only one key to activate its functions leaves no room for confusion, and the use of different screen colors to signify different operations makes it almost foolproof.

**Documentation:** The program comes with a single page of instructions. Included are instructions for the Mini-Memory, Editor/Assembler and Extended BASIC versions.

**Value:** This program would seem to be of greatest benefit to those with

a single disk drive. Also, I found it to be a time-saver when used with multiple drives, particularly when making backups of several disks. Those who regularly make backup copies, or those who would like to if it didn't take so long using the TI disk manager cartridge, will find this program to be a great time-saver. Although the \$39.95 price tag seems a bit steep, only the user can decide if the time it saves him is worth it.

—JK

## Vendor's response

Thank you for the excellent review and "grades" of QUICK-COPYer, however we would like to mention a few points that were overlooked.

The review neglected to stress the absolute necessity of backing up a disk after every change to it. Although disks are very reliable, they are not immune to dust, smoke particles, hair, air pollution, power surges, brownouts, wear, etc. Just when you least expect it, your most critical disk will suddenly come up with "Disk not initialized." At that point, you would be willing to pay any amount of money to have a backup disk available! (Believe me, I speak from experience!) There is an old saying, "Back it up NOW, or be sorry LATER!" Truer words were never spoken.

Although many people realize that fact, they still fail to make backups after every change, due to the lengthy and cumbersome procedure involved. It is precisely this problem that QUICK-COPYer addresses. Instead of swapping a disk 30 to 40 times to get a backup, QUICK-COPYer allows you to backup a disk in three passes or less! It is now so fast and easy to backup a disk, that a person is much less likely to suffer the loss of critical data and many hours of hard work, i.e. TI-Writer files, Multiplan files, Mail List files, PRK files, etc.

Note also that the figures in the review show that QUICK-COPYer with one drive is as fast as Disk Manager with two drives, 6:25 each! (The Mini-Memory version is even faster.)

Thus by buying QUICK-COPYer instead of a second disk drive, a person can save over \$200.

In addition, for those people with two drives, the test shows that QUICK-COPYer is almost twice as fast as Disk Manager, and it has much less wear and tear on the drive.

Larry Hughes  
QUALITY 99 SOFTWARE

## DOMINION—

(Continued from Page 25)

in battle based on the type of weapon used and the type of attack the ogre launches.

**Value:** Drawing a conclusion about this game is difficult. For one thing, I am not familiar with many graphic adventure games. One that I am familiar with, Return to Pirate's Isle, offers little basis for comparison. I found that children in the age group from eight to early teens to be the most interested in this game. They were, for the most part, fascinated by the role playing. Some who played it, in fact, liked it so much that they have since taken up the Dungeons & Dragons games manufactured by TSR Hobbies.

As with any form of entertainment, the ultimate test of value is whether you get enough satisfaction out of it to make it worth the cost. I have no complaints.

—JK

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# Newsbytes

## New TI AVDP chip

The release of a new video display processor by Texas Instruments, the TMS9228, may be of some interest to TI99/4A users. The Advanced Video Display Processor can address 16, 32 or 64 kilobytes of random access memory and offers five graphics and two text modes. The text modes are 40 columns by 24 lines and 80 columns by 24 lines.

The graphics modes include 8x8 blocks, 8x1 blocks and 4x2 blocks at a 256x192 resolution and an 8x1 block at 512x192 resolution. There is also a bit map mode at 256x210 resolution.

It is believed that with minor modification the AVDP may have use as a replacement for the TMS9918A VDP used in the 99/4A console.

## Software updates

Texas Instruments is providing software enhancements for the TI-Writer and Microsoft Multiplan programs to TI user groups. The TI-Writer updates provide true lower-case letters with descenders in the edit mode. Improved formatter files eliminate the automatic form feed and provide a choice of two printer defaults for those who operate out of a serial port.

The Multiplan updates include file replacements that speed up the operation of the program to a small degree while providing an auto-repeat capability when moving the cursor around the screen.

MICROpendium will provide free copies of these files to readers who are not able to obtain them through a user group. Send a blank, formatted diskette with a self-addressed, stamped mailer to MICROpendium, P.O. Box 1343, Round Rock, TX 78680. Allow several weeks for delivery. MICROpendium will not be responsible for any diskettes that are mailed without adequate return postage. Do not send cash or checks to cover postage.

Also, by the time you read this, TI may have released its Advanced Debugger program for the Editor/Assembler cartridge to user

groups. The program was developed by Navarone Industries but the company and TI apparently could not come to terms on a contract to produce and sell it. TI apparently wanted too much for the distribution rights.

The Extended BASIC cartridge is becoming a rare bird but negotiations are said to be under way between TI and a couple of other companies over production and distribution rights to the cartridge. One of the companies involved is believed to be a Japanese firm. Many third-party manufacturers regard XBASIC to be crucial to the survival of the TI market.

## HCM changes

Home Computer Magazine, formerly 99er Magazine, has announced that it will no longer accept advertising. Speculation about what this means abounds.

According to a letter sent to advertisers, and signed by publisher Gary Kaplan, Emerald Valley Publishing, which produces HCM, will be publishing a separate Home Computer Digest nine times per year. This digest, which will carry advertising, will be mailed to domestic subscribers of HCM, according to Kaplan. The digest, as it appeared in a previous HCM edition, is about one half the size of a magazine page. Kaplan indicated that it would focus primarily on the TI market.

According to Kaplan's letter, "We want Home Computer Magazine to stand out and be recognized as the absolute best in the field. Removal of ad material provides us with the editorial and artistic freedom to produce a truly unique magazine that will set the standard for quality, integrity and readability for the entire industry."

The digest is due to be published in September. Apparently, HCM will continue to be published, but without advertising while advertising will be included in the digest, which Kaplan says will be mailed to domestic subscribers of HCM. The number of pages to be included in the digest is not known, though Kaplan said the

32-page edition published in March "is representative of the size and style...except, of course, for the substitution of advertising for a portion of the editorial material."

## Update on Atari

The Atarisoft line of products, which includes game cartridges for the TI99/4A, is now under review after a change of management at Atari. Atari Corp. was purchased last month by former Commodore boss Jack Tramiel.

Atarisoft, which is the subsidiary of Atari Corp. that produces software for non-Atari computers, markets game cartridges for a number of computers. Among the titles are Donkey Kong, Pole Position and Defender.

According to a company spokesperson, the Atarisoft products for TI are still in the inventory and the current products will continue to be produced. She says that management has said that "the new Atari will be supporting all Atari products."

## Book prices drop

Tex-Comp has taken over the distribution of all TI books by Datamost Publishing and is reducing the prices substantially.

According to Jerry Price of Tex-Comp, Kids and the TI, originally published at \$19.95, will sell for \$4.95; Games TI Plays, published at \$14.95, will sell for \$9.95, including 32 games on the customer's choice of a cassette or two diskettes; Elementary TI, published at \$14.95, will sell for \$3.95; and Computer Playground, published at \$9.95, will sell for \$1.95.

Newsbytes is a column of general information for TI99/4A users. It includes product announcements and other items of interest. The publisher does not necessarily endorse products listed in this column. Vendors and others are encouraged to submit items for consideration. Items submitted will be verified by the staff before inclusion and edited to fit the Newsbytes format. Mail items to: MICROpendium, P.O. Box 1343, Round Rock, TX 78680.

# User Notes

## TE-1200 control

Our review of the TE-1200 terminal emulator program last month indicated that it was capable of double-spacing printouts only. Not true. If you're using a parallel printer, when prompted for the device name prior to dumping data, enter PIO.LF just as you would when using the TI-Writer formatter and you'll get single-spaced printouts. You can do a similar thing if using the RS232 port, too.

## Beanstalk update

Our first edition carried a generally favorable review of the Beanstalk Adventure, marketed by Tex-Comp. The review downgraded the text adventure because of its propensity to crash when certain word combinations are entered. Well, according to Tex-Comp, these problems have been corrected and the program no longer crashes when unusual word combinations are entered.

## Mark XII pins

Very few modems are made to work with the TI99/4A without some modification to the locations of the RS232 connector pins. Users should be able to determine the necessary changes by comparing the pin designations included with RS232 cards interfaces and the modems. Concerning the Anchor Automation Mark XII reviewed in this issue, the following changes should be made to make the modem compatible with the TI: Link TI pin 2 to Mark XII pin 3 and TI pin 3 to Mark XII pin 2. Switch pins 6 and 20 and make sure pins 1 and 7 are connected. Both are grounds. When all else fails, read the manual.

## It's simple

Charles E. Roberts of Springfield, Missouri, wrote:

"At the last meeting of the Users Group here in Springfield, I mentioned that I used my printer while

writing a program in BASIC. Some knew what I had been working on and knew I needed every bit of the basic RAM I could get. Not one of the members I talked to knew how to do this without losing 2K by having the PEB turned on, so I assume most other users do not know how to either. It's simple. Do not turn on the PEB until after you power-up the computer. Although you cannot use the disk drive you can address the RS232 without any loss of RAM."

## UG for handicapped

A TI99/4A user in Florida has started a users group for the blind and handicapped. The group is called Handi/9ers. For more information, write Jim Digan, 625 Englewood Rd., Apt. 5, Englewood, FL 33533.

## Print it big

Jim Peterson, of Tigercub Software, writes: "Your articles on the blind users (July) were excellent!. You perform a valuable service by publishing articles of this kind.

"Tigercub Software has two games, Lost Plane and Submarine Hunt, which are based on matching tones. I will be glad to send them to any blind user who sends me a cassette or diskette.

"I have written the following elementary word processor in order to be able to write letters to those with very poor eyesight in enlarged, double-struck emphasized print in double-spaced lines."

Bear in mind that lines 130-132 define the printing parameters and that they may not be the same for all printers. For example, the C. Itoh Prowriter does not have "emphasized" characters. Prowriter users would use CHR\$(14) instead of CHR\$(87) for enlarged print in line 130; CHR\$(33) in line 131 for bold face; and CHR\$(78) in line 132 for pica pitch.

```

100 CALL CLEAR
110 REM ***ELEMENTARY WORD
ELEMENTARY WORD PROCESSOR T
O PRINT ENLARGED PRINT IN D
OUBLE-SPACED LINES, FOR THO
SE WITH LIMITED EYESIGHT***
120 OPEN #1:"PIO"
130 PRINT #1:CHR$(27);CHR$(
87);CHR$(1)
131 PRINT #1:CHR$(27);CHR$(
71)
132 PRINT #1:CHR$(27);CHR$(
69)
140 PRINT #1:"TYPE MESSAGE.
NO COMMAS!"
141 PRINT #1:" "
142 PRINT #1:"ENTER AFTER E
ACH 4 LINES"
150 PRINT #1:" "
160 PRINT #1:"ENTER AGAIN W
HEN FINISHED."
170 DIM W$(50),B$(250)
180 X=X+1
190 INPUT W$(X)
200 W$(X)=W$(X)&" "
210 IF W$(X)=" " THEN 230
220 GOTO 180
230 Z=1
240 FOR J=1 TO X-1
250 A$=SEG$(W$(J),1,POS(W$(
J)," ",1))
260 L$=B$(Z)&A$
270 IF LEN(L$)<41 THEN 290
280 Z=Z+1
290 L$=""
300 B$(Z)=B$(Z)&A$
310 IF POS(W$(J)," ",2)=0 T
HEN 340
320 W$(J)=SEG$(W$(J),POS(W$
(J)," ",1)+1,LEN(W$(J)))
330 GOTO 250
340 NEXT J
350 FOR J=1 TO Z
360 PRINT #1:CHR$(27);CHR$(
87);CHR$(1)
370 PRINT #1:B$(J)
380 NEXT J

```

## Nowhere to hide

Losing control is one thing, but confusing it with FUNCTION is  
(Please turn to Page 30)

# User Notes

(Continued from Page 29)

quite another. But that's what happened in last month's MICROpendium. We published an article about escape codes for TI-Writer but inadvertently referred to FUNCTION U as the means of entering the program's special character mode. Of course, as you probably figured out for yourself, the special character mode is accessed via CONTROL U. So, when the article refers to FUNCTION U read CONTROL U and everything will work out.

## Rounding off

Many teachers find computers are useful in a number of ways: they make grade keeping efficient, and the machines can be used as teaching tools. Fritz L. Mauritz, of Wilmington, California, offers a routine that rounds off numbers when using Terminal Emulator II.

He writes: "In writing and using programs for math, electronics and physics classes, end results need to be rounded off to various numbers of digits. Here is a little program that can be added to any program that calculates mathematical results but need to be rounded off, especially when more than 2-3 results are to be printed in columns on the screen. (I realize Extended BASIC, with Print Using, can round off but I like to use Terminal Emulator II with a speech synthesizer to pronounce math, electronics and physics terms not available through Extended BASIC.)

```
100 REM ***PROGRAM TO ROUND
OFF NUMBERS USING TEII
110 DEF ROUND=INT(R*10^D+.5
)/10^D
130 REM **INSERT PROGRAM LI
NES
190 INPUT W
200 D=2 !**D=NUMBER OF DIGI
TS AFTER DECIMAL
210 R=W !**W IS VARIABLE TO
BE ROUNDED OFF
220 W=ROUND !**NUMBER TO BE
ROUNDED
225 PRINT W
```

```
230 REM ***INSERT MORE PROG
RAM LINES
290 INPUT Y
300 REM ***ROUNDS SECOND NU
MBER***
310 D=1
320 R=Y
330 Y=ROUND
340 PRINT Y
350 REM INSERT PROGRAM LINE
S
```

## Postal helper

The following program comes from the Cleveland Area 99/4A Users Group and is a translation of a program written for the IBM PC jr. The program calculates the amount of postage needed to mail a letter based on the type of paper used, the number of sheets and the type of envelope. The program runs in BASIC or Extended BASIC.

```
10 CALL CLEAR
20 PRINT TAB(8);"POSTAL SCA
LE"
30 PRINT
40 FOR D=1 TO 1000
50 NEXT D
60 CALL CLEAR
70 PRINT TAB(8);"BOND WEIGH
T"
80 PRINT TAB(5);"1. - 16 #
PAPER"
90 PRINT TAB(5);"2. - 20 #
PAPER"
100 INPUT "<ENTER>1 OR 2-":
BOND
110 IF (BOND<1)+(BOND<2) TH
EN 60
120 IF BOND=1 THEN 150
130 WT=.16
140 GOTO 160
150 WT=.128
160 CALL CLEAR
170 PRINT TAB(5);"HOW MANY
SHEETS MAILED"
180 INPUT N
190 WT=N*WT
200 CALL CLEAR
210 PRINT TAB(8);"MAILER SI
ZE"
220 PRINT TAB(5);"1. BUSINE
SS SIZE"
230 PRINT TAB(5);"2. MANILA
```

```
ENVELOPE"
240 INPUT "<ENTER>1 OR 2":E
NV
250 IF (ENV<1)+(ENV<2)THEN
200
260 CALL CLEAR
270 IF ENV=1 THEN 300
280 EW=1
290 GOTO 310
300 EW=.16
310 WT=WT+EW
320 IF WT=INT(WT)THEN 340
330 WT=INT(WT)+1
340 ST=((WT-1)*.17)+.2
350 PRINT TAB(5);"POSTAGE D
UE";ST
360 PRINT "PRESS 'C' FOR AN
OTHER"
370 PRINT "CALCULATION OR
Q' TO QUIT"
380 INPUT A$
390 IF A$="C" THEN 10
400 END
```

User Notes is a column of tips and ideas designed to help readers put their home computers to better use.

The information provided here comes from many sources, including TI home computer user group newsletters. MICROpendium will pay \$10 for any item sent in by readers that appears in this column. Mail tips to: MICROpendium, P.O. Box 1343, Round Rock, TX 78680.

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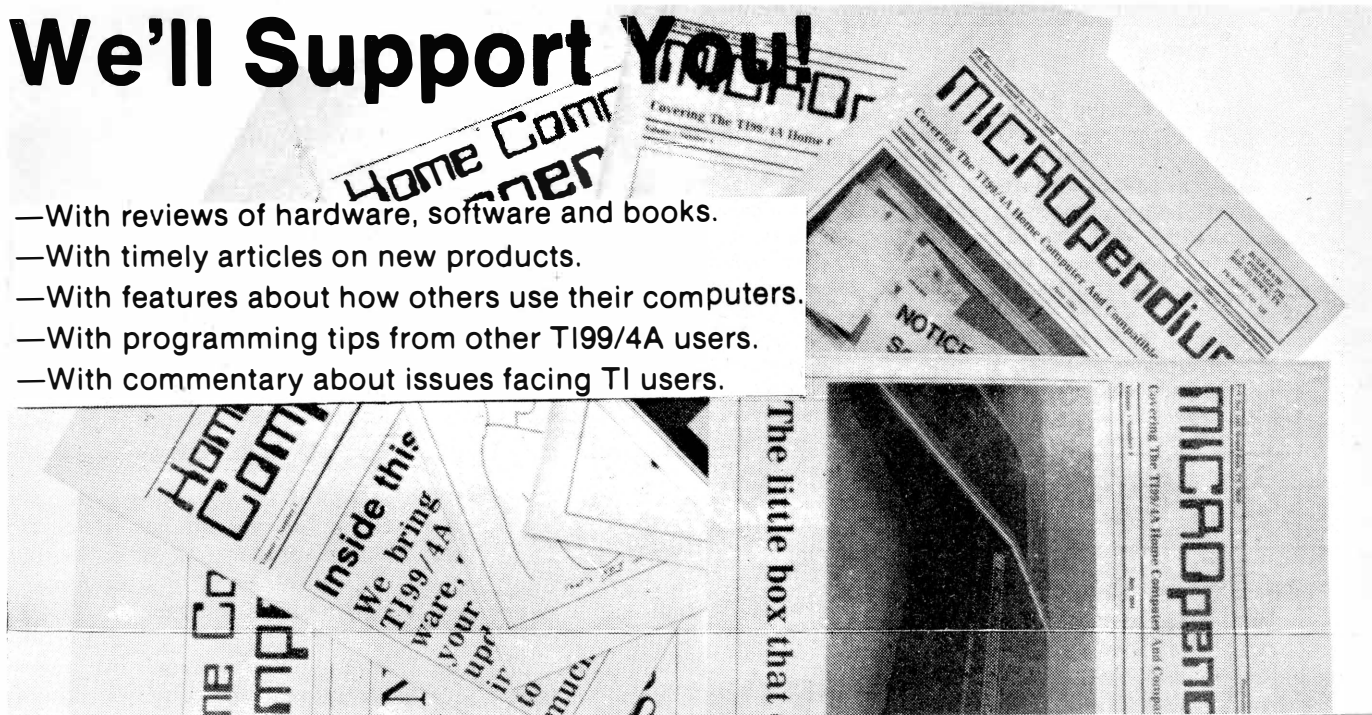
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