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Covering The TI99/4A Home Computer And Compatibles

Volume 2 Number 11 December 1985 $1.50

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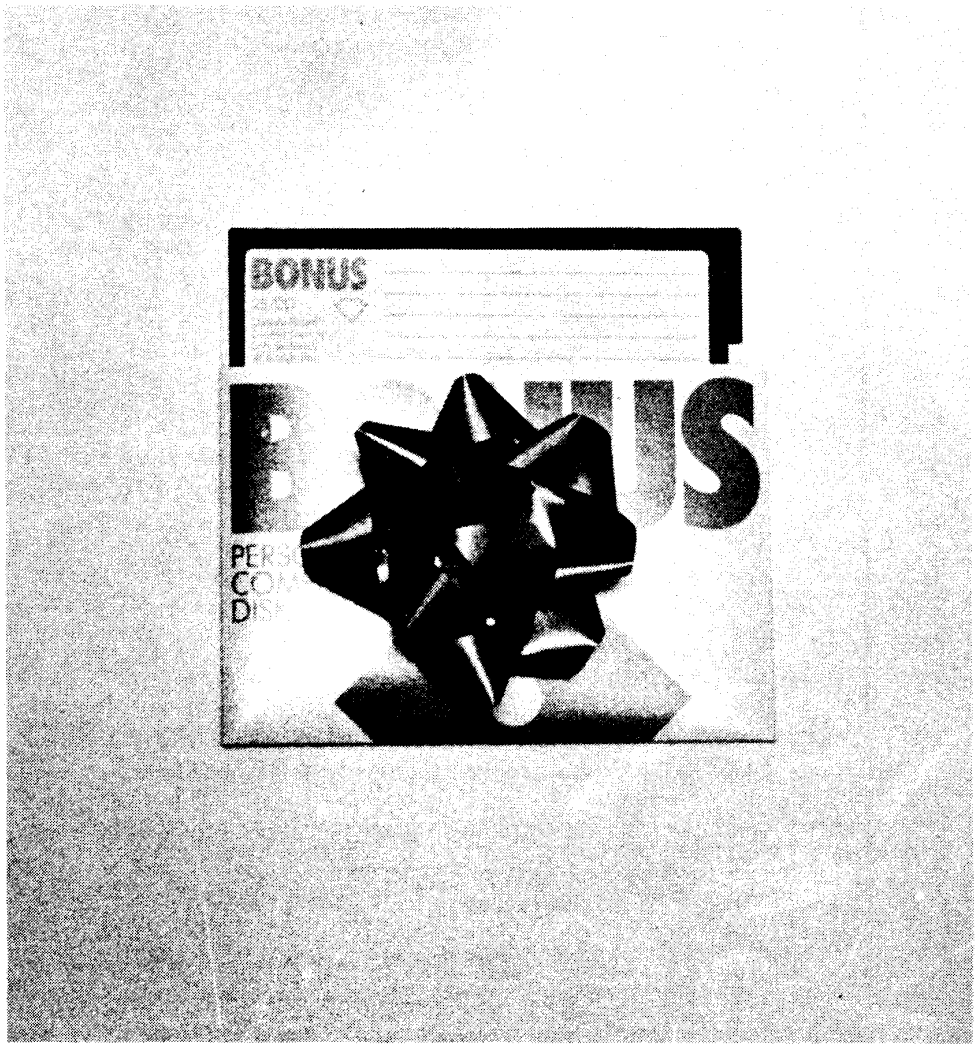

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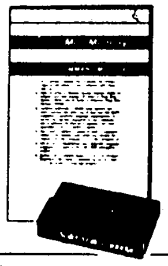

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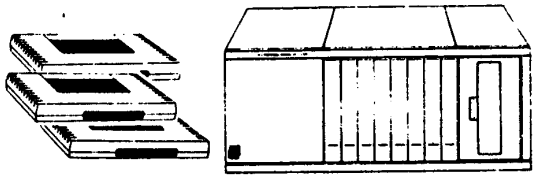

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Contents

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Laura Burns.....**Editor**
Mack McCormick....**Technical Editor**

Coming next month

—Copy programs compared
—A program for composers
—More on Myarc's XBIV

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Table of Contents

Freeware: another word for no sale?

A variety of criticisms and compliments about this distribution method.....Page 12

More screens to disk with Forth

A method using Wycove Forth which enables the user to take advantage of extra storage space.....Page 20

Keyboard and joystick access

The third in a series of assembly language tutorials by technical editor Mack McCormick.....Page 22

Freeware (or nearly so)

New listings.....Page 36

Using an external drive internally

A Feedback letter caused the authors to send in this how-to-do-it article.....Page 38

Reviews

Display Enhancement Package.....Page 43
Triple Tech.....Page 44

Newsbytes

Miller Graphics is set to send out the Gram Kracker and a book, you can write Mack McCormick direct, and the GEnie is looking for a TI sysop.....Page 46

User Notes

Drawing a circle in BASIC, sound from the keyboard, and translation of dialects from other computers.....Page 49

Classified.....Page 53

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MicroPal's Extended BASIC package now includes two free software programs! Bestsellers **Typwriter** and **Name-It** from Extended Software are included in disk *and* cassette versions with complete manual — absolutely free!! You can immediately begin using the power of Extended BASIC for word processing and data base functions.

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Comments

TI pulls list, a new TI-Writer upgrade

Texas Instruments closed another door to the TI99/4A market in November by withdrawing its mailing lists of 99/4A owners from the market. Some will say "big deal", since there were many restrictions placed on obtaining access to the list. However, it marks one more door TI is closing on the 99/4A.

Apparently, TI got tired of listening of the complaints of those who were denied access to the list, which, by the way, sold from 5.5 cents to 7.5 cents per name, depending on whether it was the warranty or buyers list. (The buyers or "hot list" as it came to be known, was made up of some 40,000 users who purchased products directly from TI.)

As sources tell us, TI withdrew the mailing lists because of threats of one third party vendor in particular who wanted the list. There are those who say that TI restricted access to the list in order to protect those wholesalers who still have large inventories of TI99/4A products, particularly cartridge-based software. However, the person who apparently raised the biggest stink with TI is not a wholesaler and does not sell any TI-produced software. As one source says, "TI wants to forget that there ever was a 99/4A." If this is true, and there is plenty of reason for it to be so, then withdrawing the mailing list is just one more step in that direction.

A REALLY NIFTY TI-WRITER UPGRADE

Anyone who uses TI-Writer will want to consider a program by Paolo Bagnaresi. (His address is: Via J.F. Kennedy 17, 20097 San Donato Milanese, Italy. His phone number is 011-39-2-514.202 direct from the U.S.) He is asking $10 for it. Called BA-Writer, this program not only allows users to load TI-Writer using Extended BASIC, Editor/Assembler, Mini-Memory or TI-Writer, but provides an outstanding disk directory facility that is a marked improvement over the disk directory feature of TI-Writer itself. (TK-Writer and other loader programs allow users to load TI-Writer without the TI-Writer cartridge, but they do not support a disk-directory feature, which BA-Writer does.) The BA-Writer disk directory is super-fast and works out of the editor and the formatter. It will go through a double-sided, double-density diskette filled with 89 programs and files in less than 40 seconds. Of course, the TI-Writer files work flawlessly. Also, once you've loaded BA-Writer, you can pull the cartridge out of the console, and it will have no effect on the program. Even if you happen to exit the editor, for example, you may reload it instantaneously (literally), with the text file still intact. It works better than the Recover File feature of TI-Writer. With BA-Writer, you can throw away your TI-Writer cartridge. Now, if only we could do the same thing with Multiplan.

LOOKING FOR A FEW GOOD COLUMNISTS

MICROpendium is looking for two columnists who specialize in BASIC/Extended BASIC programming or Forth. The persons we're looking for may be writing columns about their specialties for a user group newsletter, or they may not belong to a user group but can provide a wealth of programming information to those who are willing to listen.

GOOD THINGS FOR CHRISTMAS

Who says there's no Santa Claus? TI users have a number of new products that deserve gift wrapping, including Myarc's enhanced version of Extended BASIC and Miller Graphics' GRAM Kracker, which may find its way under a few yule trees (it was scheduled for a mid-December release).

GRAM Kracker will undoubtedly result in many users customizing existing software, such as Extended BASIC. We've already seen some suggested modifications that will let us use CALL LOADs without memory expansion. (Remember, GRAM Kracker doesn't require a memory expansion since it includes its own.) We'll have more on this and other modifications as soon as we receive our Kracker.

Those with a Foundation 128K card will be happy to learn of a new program that turns the card into a true RAMdisk while using BASIC or Extended BASIC. The program is being offered by Quality 99 Software and is being carried in the most recent Tenex Computer Express catalog. The assembly language program allows the 128K card to emulate a single-sided, single-density disk drive, allowing the user to write up to 127 files. (The Foundation card without this software has a capacity of only four programs or files.) It requires Extended BASIC and a Foundation card wit DSR (Device Service Routine) option.

We've added a few programs to our Freeware listing. These are noted elsewhere in this edition. Starting in January, we will mail an updated Freeware listing to anyone who requests it. The cost is 50 cents and a self-addressed, stamped business-size envelope, or $1 and we'll pay the postage. We will keep you abreast of additions and deletions in every issue of MICROpendium.

We promised more information about Myarc's new computer in this issue, but will wait until January when it is a little closer to making its debut. Myarc said a working model of the computer will be unveiled at the January Consumer Electronics Show.

—JK

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"The most powerful high level language available for the T.I./4A"
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The ***SST*** *EXPANDED BASIC COMPILER* package translates a Basic program into TMS9900 machine language, resulting in a great gain in program execution speed. The compiled commands are up to 160 times faster than the corresponding commands in *TI BASIC* or *EXTENDED BASIC*. For a comparison we used our Compiler to run the benchmark program for making change in the April 1984 MICROpendium. This program takes over 30 minutes in *TI BASIC*. When the program was compiled using the ***SST*** *EXPANDED BASIC COMPILER*, the program ran in 37 seconds. In fact, you can compile the program, save it on a disk, recall it, run it and still be considerably faster than *TI BASIC*.

A second benchmark program appeared in the November 1984 issue of the MICROpendium (page 22). This program took:

209.4 seconds in *TI BASIC* — 7.2 seconds in *TI FORTH*
219.6 seconds in *TI EXTENDED BASIC* — 4.9 seconds in *WYCOVE FORTH*

2.5 seconds in *SST BASIC* or *EXPANDED BASIC*

The ***SST*** *EXPANDED COMPILER* is also many times faster than *TI PASCAL*.

The ***SST*** *EXPANDED BASIC COMPILER* contains most of the standard features of *EXTENDED BASIC* and is especially useful for number crunching, text manipulation and for producing arcade type games. However, some translation of a Basic program may be required.

SST *Software* has invested about two and one half man-years in the development of this package. With the requirements of *Memory Expansion, Disk Drive* and either *Editor/Assembler* or *Mini- Memory* the ***SST*** *EXPANDED BASIC COMPILER* gives you the following features:

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Feedback

Freeware thanks

Thank you so much for including my Antenna Software in your "Freeware" section. The response has been surprising when I think of what a narrow specialty antenna design is.

Many people have been very generous, sending both return postage and a few dollars. I have returned all stamped return mailers unused, because Canadian stamps must be affixed here in Canada. The returned mailers may still be used by their senders in the USA, however. The extra envelopes and postage I buy are mostly covered by donations anyway.

I am happy, with *MICROpendium*'s help, to meet new friends with interests similar to mine, and still break even. Not very many special interest activities allow that luxury.

Tony Robinson
Vancouver, British Columbia

What, you mean you didn't feel like driving down across the border to Bellingham every time you got a return mailer with U.S. postage? *You* are the one who is generous, but listen up, my fellow non-cosmopolites, there is a way to send return postage to individuals in foreign countries, and people like Mr. Robinson deserve it. Go to your local post office and purchase international reply coupons in the nearest amount to the return postage. The recipient can take the coupons to his post office and exchange them for stamps of his own country.—Ed.

Advice on disk drives

I would like to pass along an item for any TI user who has a CorComp Disk Controller Card or 9900 System with Disk Controller who is upgrading to a fourth disk drive. I upgraded a client's system to four Shugart 455 half-height DS/DD drives and the system proceeded to ruin files and whole disks, as well as not respond to system calls and failures to load files.

The cause of these problems turned out to be the stepping motor speed which is set with the dip switches on the controller card. These switches MUST be set to at least six milliseconds to assure proper access time on the data bus for the disks on the drives to be accessed. The setting can be greater than six, but not less. This information was not available from my supplier of disk drives; nor from CorComp, although they did much to assist me in finding the solution. I hope that this notice might help some other person avoid the headaches I ran into trying to solve the problem.

Chuck Burley
Rohnert Park, California

A disservice

I believe you do a disservice to those with Myarc disk controllers. Many of the programs you have reviewed will not work with the Myarc disk controller.

Myarc supplied the original disk controller and followed TI's documented protocols for the DSR. Disks with clever protection schemes that ignored the TI protocol will not load.

When the bug has been brought to the programmers' attention, most have corrected it.

Examples still a problem include (last time I checked) Miller Graphics' Advanced Diagnostics, 4A Talk and most Quality 99 programs.

Myarc is the 99 users' hope for the future.

John W. Topham
Prospect Heights, Illinois

More on NUMTALK

In the October issue, I was both glad and surprised to see that one of my programs was in the paper (NUMTALK, page 52)....However, from the description of NUMTALK in *MICROpendium,* you might get the idea that it is incapable of saying anything outside the range 0...999. This is not really true. Although only numbers with a value less than 1000 will be pronounced correctly, NUMTALK will say whatever number you provide, positive, negative, integer or real and even numbers in scientific notation. Numbers with a magnitude of 1000 or more are pronounced digit by digit, just like it would be with a call to the normal SAY subprogram.

Unfortunately, I've found some errors in your listing. One of these errors is in a comment, hence it doesn't matter (misspelled DIGITS in line 25330). But there is an error in the DATA statement at line 25370. The fourth item is the digit "4". That is incorrect. It should be the letter "E", because it's used for saying numbers in scientific notation.

I would be grateful if you put in some notice about this....Hence, no larger or darker shadow than I actually deserve will fall on my talent!

Perhaps I should add that the reason for not saying numbers larger than 1000 correctly is the lack of the word "THOUSAND" in the predefined vocabulary.

I've found the program helpful sometimes, when I'm troubleshooting assembly language programs. NUMTALK, and its cousin HEXTALK (I suppose you can guess how that one pronounces its numbers), are very good at reading memory contents while I'm checking a listing on paper. NUMTALK and HEXTALK never make any errors. Hence, if they say something that is not on my list, there is a bug in my program or data.

```
FOR ADDR=START TO STOP
CALL PEEK(ADDR,BYTE)::CALL
SAY_NUM(BYTE) NEXT ADDR
```

This program would do the thing.

Anders Persson
Lund, Sweden

Tutorials offered

I have been spending more time than usual at the 4A (Forth, mainly)....I obtained two tutorials by Lutz Winkler from The Source (other four didn't print for some unknown reason) and the final four from Mr. Winkler directly after having phoned him to explain

(Please turn to Page 10)

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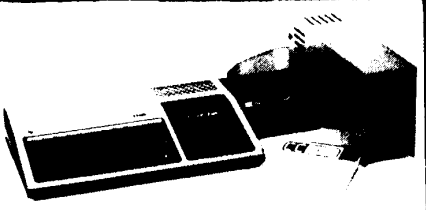

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Feedback

(Continued from Page 8)

my problems. His tutorials are excellent and I've TI-Writer'd copies of the first four. Should anyone be interested they can contact me and I'll Xerox a complete set and send them along.

Karl Reed
8522 Milne Drive
Huntington Beach, CA 92646
(It would be nice if folks also sent along return postage.—Ed.)

More wishes

In a recent issue you asked for users to send in their wish list. Well, here is mine. Let me know if any wishes have already been filled.

1) A low cost RAM disk kit (board, software and chips)

2) A way to hook up a low cost IBM motherboard to a TI

3) A TI-Faire somewhere in the southeast

4) A Print Shop program for the TI

5) A MacPaint type product with "undo" and "fat bit mode" for TI.

One more thing before I go. I wiped out a console by dropping in one of those Radio Shack power supplies. Maybe Grampa was right when he said, "Don't fix it if it ain't broke."

Paul Yorke
Stuart, Florida

Power supply board

If Randy Rossetto of Toronto, Ontario is still looking for a schematic for his TI power supply board....I have purchased a spare board with the same markings he describes from John J. Meshna Jr. Inc., P.O. Box 62, East Lynn, MA 01904. They also have a replacement transformer/adaptor available. Each item is $5 in their fall/winter catalog.

Fred Simm
Natick, Massachusetts

TI still cares

In response to Terrence Murphy's question in the November issue about becoming an official user group, I called the 1-800-TI-CARES phone number which is still in operation and asked them if they still take user group addresses. According to the representative I talked with they are still taking addresses for TI user groups for their user group list. Those user groups who wish to be on the list should send information about their group (such as name, address, phone number of a person to contact, president and whatever else you can think of) to the following address: Texas Instruments, P.O. Box 10508 Mail Station 5828, Lubbock, TX 79408, Attention: Celia.

Millers Graphics also has a list of user groups in the back of their catalog. Those who wish to be in their catalog should write to them with the name and address of their group as well as a phone contact (one or two people), BBS number, members, library size and membership information. Millers Graphics address is 1475 West Cypress Avenue, San Dimas CA 91773.

Also, the person you see in the background in your November cover picture is our librarian (Pierre Lamontange) and TIBBS sysop. I was surprised to see him in the picture! We had a great time there [at the Chicago TI-Faire] also and bought several programs while there and plan to order quite a few GRAM Krackers. I was very impressed by the GRAM Kracker and the knowledge of the people at the Millers Graphics table who were really nice people!

Gary Cox, President
Mid-South 99 User Group
Germantown, Tennessee

Sell second PEB

I would like to provide an answer for Darrel Sparkman's question in the October issue about his disk drive problems. The internal power supply does not supply enough power to run two of the old full power drives. Some half height drives also only consume only half the normal power; that is why they can be used. It is possible to beef up the PEB's supply, but it is easier just to buy a case and power supply for the second drive. My advice is for Darrel to do that and sell his second PEB. I personally know several people that would love to find one. That would also get rid of the two fan noise. As for his second drive now being DSK3, the reason is that he indicates that he used two of the short cables. In order to do so, he probably also used two of the circuit card jumpers to connect all of these cables. These cards shift the wiring on the drive select lines to increase the drive number by one. Thus with two cards the drive number increases by two. Note that only two cards can be used this way since the TI controllers only supported three drives. The drive select line for the fourth drive was not modified. The solution to his problem is either to get a longer cable and use only one jumper card (in this case, the internal strap remains selected as drive one), or not to use the jumper card at all and change the internal strap to select drive number 2. If his drive is really like the TI drives, this internal strap is a DIP pack that consists of connections that are cut to break the circuit. This pack should be replaced with a DIP switch to make things easier. Naturally, the first solution is the easiest.

Joseph H. Spiegel
Airport Area Computer Club
Coraopolis, Pennsylvania

Keeping afloat

I am in the Navy stationed overseas in Japan and have little contact with what's going on back home. Your magazine and the LA 99ers Users Group have been my only real support in this ocean of Japanese technology.

Claire J. Mero
U.S. Naval Hospital
Yokosuka, Japan

The Feedback column is for readers. It is a forum to communicate with other readers. The editor will condense excessively lengthy submissions where necessary. We ask that writers restrict themselves to one subject for the sake of simplicity. Our only requirement is that items be of interest to persons who use the TI99/4A home computer. Mail Feedback items to: MICROpendium, P.O. Box 1343, Round Rock, TX 78680.

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Freeware: just another word for no sale?

By ROBERT L. WESSLER

When I first heard about "freeware", I was very enthusiastic about it. With TI software being distributed almost solely by mail-order, it is virtually impossible to see a program first-hand before purchasing it. With the high cost of software, many users do not want to buy a program without having seen it first.

It was my impression that Freeware would alleviate this problem. All a consumer had to do was send an initialized disk, return mailer, and postage, or $5 and the programmer would supply the materials, and a request for the program. The program would then be sent to the consumer. The consumer was then on his honor; if the program was of some use to him, he could send the programmer monetary compensation for his efforts. freeware programs are usually priced at $10, $5 or less.

Many freeware programs are well written, sophisticated, and on a par with commercial software standards. Many of the programs would do well in a side-by-side comparison with the same type of program for other brands of computers, yet these freeware efforts are priced at only 10-20 percent of amount asked by authors writing for other computers.

Is freeware working? I have contacted several freeware authors, and have experienced freeware authorship first-hand. Here are a few of my conclusions:

I have a freeware program called *TRIVIA 99er* on the market. I have been asked several times if I am happy with the freeware concept. I have answered each time with a resounding "NO!"

- **What commercial producers think — Page 12**
- **Another view — Page 16**

It is my opinion, that the name "freeware" was the beginning of the trouble for freeware authors. Many people see the word "free" in freeware and get the idea that the program is public domain. I have tried to come up with a better name than freeware, but so far I haven't found a suitable one. Freeware does not mean that a program is free, it just means that you can try it before you buy it.

I've asked several freeware authors if they are happy with the results of freeware. Some said "yes," some said "no,", and some said the results are about what they had expected. The opinions differed with each author. The satisfaction seemed to depend mainly on the author's expectations going into the freeware market. No one seemed overwhelmed by it.

There were some who did not expect much and were surprised at the response they got. There were others who expected too much and were disappointed. There were others, such as myself, who didn't expect much but were still disappointed at how small the return actually was.

Since we, the authors, ask for payment only if the program is found to be of use by the user, we have been told that we should not expect payment. Maybe we shouldn't, because even the authors with the highest rate of return in terms of payment received, seem to be running only about 25 percent. Personally, of the 100+ programs that I have sent out in the past two and one half months, I have received only one payment. I have been told to be patient, people tend to wait awhile to pay for things. However, if I were to let an order sit around for three months before I got around to sending the program, I'm sure I would hear about it. We the authors, however, are supposed to be patient.

There are several things that seem to trouble freeware authors. I think the No. 1 problem is being told by someone how good the program is and how much it is enjoyed, and to be ask-

(Please turn to Page 14)

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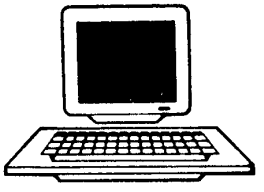

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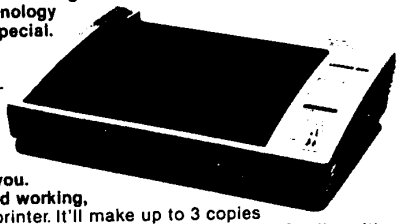

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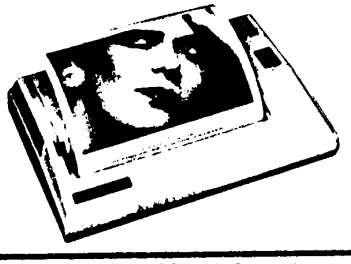

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Freeware vs. commercial

By LAURA BURNS

Some freeware authors are satisfied with the returns they receive on their programs, while others have been disappointed. But does freeware in fact affect the commercial software market? We asked three commercial software producers.

David Vaughn of Vaughn Software in Arvada, Colorado, who recently left the TI market, says that freeware was not so much the reason as the desire to program for other computers.

However, he notes, William Warren, a friend of his wrote a data base manager and released it as freeware, not knowing that Vaughn was working on a similar program for sale.

"Mine was knocked out of the water," Vaughn notes.

There's a "quite a bit of difference" between competing with a freeware program and another commercial program, Vaughn notes. "If you look at another business, they are in business."

However, one card that a commercial programmer might hold is that "freeware is not as well marketed."

He notes also that not all freeware is as high quality as commercial products and that people tend to "release it sooner," though he adds that "some people take pride in their programs" and release high quality freeware programs.

"Freeware is healthy competition," he says. "It's hard work to work against those people. You're not going to be the only person with the same idea for the same program."

He says freeware has been a "real survival for folks who have the computer."

Jim Peterson of Tigercub Software says he has stopped publicizing freeware programs because "some people wanted me to do it for programs that were not really freeware. Some people have been copying them as freeware."

He admonished these individuals in his "Tips from the Tigercub" column which appears in many user group newsletters in order to reach their consciences, he says.

Peterson says freeware programs have not really hurt his business, "but I feel sorry for somebody who has a really good program and somebody comes out with a similar freeware program."

He says that most publicizing of freeware is done through user groups and "user group members don't buy software anyway," noting that he sells most of his software through classified advertising in commercial computer magazines.

Jim Hollander, of J&KH Software, says that the biggest difference between freeware and commercial software is additional service.

"With freeware, you're lucky to get any documentation and you don't get too much support afterwards," he says. "We put in all our manuals how to contact us. Not many people will contact us, but some people do."

He notes that freeware offers can be misleading in that "people think someone's freeware product is the same as a program that is a lot more expensive, so why spend $40 or $50."

Hollander says that the low price of the TI99/4A "has a psychological effect" on how much users are willing to pay for software.

"We can only charge about a quarter of the price for a program for the TI as for the same product for an IBM PC," he says. "Freeware drags the price down further. People expect that it should be practically free. Ours are not just thrown together. With a freeware program, maybe you get a dot matrix label. We spend considerably more on packaging."

He says that not only freeware distribution is a problem, but piracy continues to be a difficulty for commercial producers.

In the case of one users group to which J&KH made a single sale, Hollander recalls, "at that point we made them a special offer with unbelievable prices on the same software, no minimum. We got no response. To me, once you get a program to a club, it's freely distributed to everybody.

FREEWARE PROBLEMS—

(Continued from Page 12)

ed to write more programs without receiving a payment.

Another problem is people who send an uninitialized disk with no return mailer and no postage. What is an author supposed to do with this order? So far I have been sending the program, supplying the mailer and the postage, and writing a note telling them that postage and a mailer are required. None of them have felt compelled to compensate me for that or for the program.

Is my faith in the system being tested? Yes, severely!

Why do some programs do better on the freeware market than others? That's anybody's guess. My opinion? There are some programs that are used very frequently, usually utility programs. These programs keep the freeware author's name in front of the

(Please turn to Page 16)

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Some Freeware authors happy

By LAURA BURNS

Three Freeware authors interviewed by *MICROpendium* expressed satisfaction with this method of marketing.

Barry Comer, of Dartmouth, Nova Scotia, Canada, says he has had "quite a bit of response" to his Wycove Forth program which brings the user into the bitmac mode.

He has received responses from Denmark and other European countries, he notes.

Noting that there are other programs commercially that do the same thing as his in a more sophisticated way, he says that his program appeals to users who are just starting with this type of program and do not want to pay as much as for the commercial software.

Response has been "a few more than what I did expect," he says. "They keep coming in, coming through a little bit at a time. It's been good. Tim McCracken that wrote Wycove Forth lives just over the hill from me, so if I run into any trouble I can go to him."

Comer says that all users who have written in for the program have received his second version in which a user can save a screen to disk and bring it back later. He is working on another version, he says.

A lot of people are going to other machines, he says, but the existence of Freeware is "definitely" preventing some defections.

He entered the Freeware market rather than attempting to market his program commercially because of feeling "sort of the underdog. It's more putting people on their own. I got a lot

in Freeware myself and I wanted to see what the response to be."

Comer's own wish is for programs in Pascal. "I always ask for stuff but I don't see it. I want to pass it out."

His Pascal system is "on the shelf," he says.

Freeware programs, whether in "machine code, Pascal, Forth or whatever, what some might not want, others might," he says, adding that the Freeware method helps distribution of these programs.

Bill Knecht of Pasadena, Texas, says response to his Freeware offer has been "more than I expected."

As of mid-November he had filled more than 100 orders.

"That's more than 200 disks I've copied," he says. "One thing nice about it is that it's coming in a few at a time. Sometimes I get four or five at once right after the magazine's come out with my offer in it, but mostly it's been one every other day, so it just takes a few minutes, and then people are sending letters back about how much they enjoy the programs."

About half the users responding to his offer send disks and the other half send money, Knecht estimates.

Knecht entered the Freeware market because of the lack of commercial demand for music programs, he says. He notes that he has ordered most of the Freeware programs *MICROpendium* has had listed, and notes that "some are quite worth selling," however.

"As a distributer I've made a lot of new friends," he comments. "People continue to communicate with me. It gives us a lot of programs people might not go out and buy for $40 or $50."

Ron Rutledge of Waukee, Iowa, says that he has not had as many responses to his offer of an XBASIC disk cataloger as he expected.

"It's been about 70 copies," he says. "I thought it might be more."

He says his payoff rate for the program has been about 15 percent.

"Percentagewise, it's been about what I expected," he says.

He receives an order "about every other day," he says. "They keep coming in slowly."

He went with Freeware, he says, because "it's too hard to market one commercially now. Freeware seemed the easy way. It's a way to do it with little risk and probably a little bit of payoff. I didn't expect to make a fortune. It's a program I wrote for myself."

Rutledge believes Freeware to be good for the TI community.

"It provides pretty good software. Most of what I have seen has been more similar to TI products, not to third-party products," he says. "I think it's a good deal for a person like me, for those who don't have the facilities to market things themselves."

FREEWARE PROBLEMS—

(Continued from Page 14)

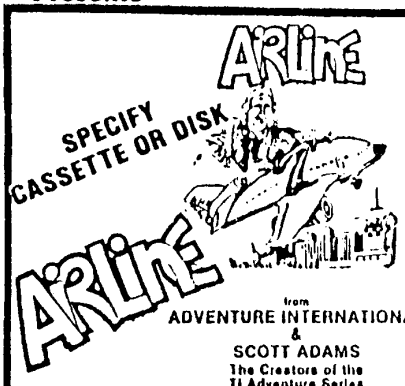
user constantly. When a program is used that often, the user feels that he is getting his money's worth and sends a payment. Games or utility programs which are used only occasionally do not do as well.

I'm not sure why, but the language that the program is written in also seems to play a part. Users tend to think that programs written in assembly language are intrinsically better than programs written in Extended BASIC. (They do not realize that some programs are better written in Extended BASIC than assembly.) Perhaps this is because most users cannot program in assembly language and do not understand it. Perhaps they feel that since they know Extended BASIC, they could write a comparable program to the freeware offering, so it is not worth their while to pay for something they

(Please turn to Page 18)

TEX COMP

Presents



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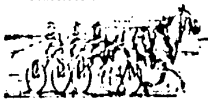

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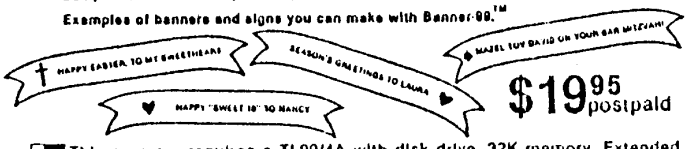

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The sysops of CompuServe's TI Forum

The signature *'bones* on the TI Forum denotes a message from Dr. Ron Albright.

Albright first logged on to the Forum about February 1984. He became a sysop 11 months later.

The post, he notes, entails "a lot of behind the scenes things. Like when we logon, a message will tell us if a file is uploaded to a data library. Nobody can access it until the file is merged. We check to make sure that it is not copyrighted material and that it doesn't have any bugs and can be downloaded."

Sysops read the entire message base daily and are able to delete any message any time. However, Albright recalls a user's message being deleted only once.

A current sysop project, he says, is "totally revamping the data libraries. About 50 percent of our files have been in Data Library 3. We are trying to redefine them and categorize them better. Right now, if you browse through Data Library 3, it would take hours."

Sysop duties, he notes, take him "about an hour a night." Another duty is to help users. "I'm able to lend minimal programming help," Albright says, "but I buy a lot of software and can review products and have got a good handle on how to get around the Forum."

Albright was born Christmas 1950 in Birmingham, Alabama, and holds a biochemistry degree from the University of Alabama at Birmingham and his M.D. from the University of Southern Alabama at Mobile.

He and his wife Louise have a nine-year-old daughter and twin boys aged five. An Army physician soon to be promoted to lieutenant colonel, he was recently transferred from Columbus, Georgia, to San Antonio, Texas, where he is an instructor at the Academy of Health Science.

A benefit of the move, he says, is that he can now access CompuServe through a direct line.

Access Compuserve
At the prompt type:
GO TEX 200

FREEWARE PROBLEMS—

(Continued from Page 16)

could produce themselves. (I would like to see them use that philosophy at a restaurant. They won't pay for dinner because they could cook the same thing at home.)

There are others who have a socialistic outlook on software. That is, from each according to his abilities, to each according to his needs. Since I can write a program, and somebody needs that program, it is my duty to write that program for him without charge. The bottom line is, it kills the incentive to produce.

I have been told that there are some users who send for the freeware with no intention of ever paying for the program. These people want it only for their libraries so they can impress their friends. Well, freeware is only to be paid for if the user finds the program to be of use. To these people I say, "pay up." The program is doing exactly what you wanted it to do. You have found a use for it. If you were to go into a bookstore and tell them that you don't want to read a particular book—you just want to have it in your library—that are your chances of getting that book for free? If you don't want to pay the programmer for the time he spent writing the program, at least send a couple of dollars for his time copying, packaging and mailing the software. Also, send him a note so he'll know what to expect from you. Otherwise, wait until it shows up in your user group library.

Where do we go from here? I don't know. Most people do not realize how much time it takes to copy these disks, package them, and mail them back. Others feel that when they send the $5 for disk, mailer, and postage, that that also includes the program. I was told by several authors and can attest to it myself, that the rate of payment from these people is very small.

Some authors are ready to change the freeware system. Some want to demand the payment up front. I feel an upfront fee of $12.50, which includes the disk and disk mailer, is not out of line for a program which was selling for $10. Others aren't sure what the answer is.

I am taking *TRIVIA 99er* off the Freeware market for the time being. It may show up in some form under a different name through mail-order houses, or it may come out again under a new "Freeware" (I hate that name) plan. Or, I may just let it sit in my library and gather dust.

If you have any suggestions, let me know. I'm fresh out.

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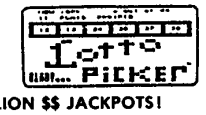

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Review errs on price

Ron Albright's review of 9900BASIC by CSI Design Group in the November 1985 issue carried the wrong price for this product.

According to Ken Dibble of CSI Design Group, the price is $49.95, not $24.95 as listed in the review.

Tex-Comp Proudly Presents
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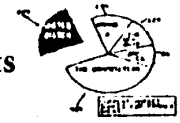

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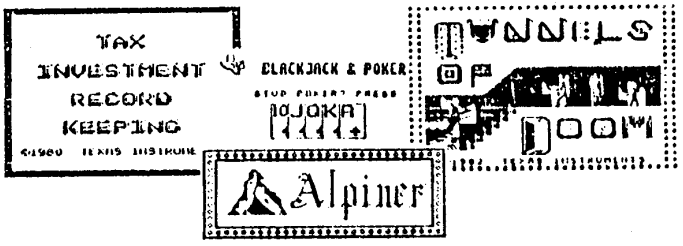

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Tips for Wycove Forth users

By BARRY COMER

Have you had the chance to wander into the world of Forth but don't know how to get more screens on your disks?

This procedure has been written for TI Forth, but not for Wycove Forth. Well, it's not as hard as TI's Forth by any means.

The following procedure will give you the ability to set up as many screens on your disks as they can hold. This will also enable you to take advantage of the extra storage space that you have if you are running different drives along with the new disk controllers on the market, or running double sided with the TI controller.

You must remember that each screen takes up four sectors, so to find out how many screens that your disk can hold just divide the number of free sectors by four. You must leave space for the Forth system, if you want it on the disk, and the loader (for XBASIC). I usually leave about 95 sectors free for the Forth system. A SAVE-SYSTEM command on a system that has its dictionary almost filled will take upwards of 90 sectors. The loader will take eight sectors.

Now you will have to define a word to be executed whenever the system is first loaded. Wycove Forth stores the number of screens that are on the disk at a memory location -13860. What you want to do is place a value into this location at boot-up.

```
100 ! by Barry Comer                    2 CLEVELAND CRES.              DARTMOUTH, NS
          B3A-2L6 CANADA                    1-(902)-466-5345
110 CALL CLEAR :: CALL SCREEN(2):: FOR A=1 TO 12 :: CALL COLOR(A,15,1):: NEXT A
120 PRINT "   POWER TO THE FORTH! ": : : : :
130 PRINT "This program is used to     convert basic char codes to Wycove forth
char codes.": :
140 PRINT "Once you have entered the   sixteen characters press     enter,and the
 forth code     will be displayed on the     screen.": :
150 PRINT "You may now enter the code  right into the CHAR,or       $PATTERN comm
ands of Wycove Forth!": : : :
160 PRINT "       PRESS ANY KEY"
170 CALL KEY(0,K,S):: IF S=0 THEN 170
180 DISPLAY AT(12,1)ERASE ALL:"BASIC CODE?"
190 ACCEPT AT(12,13)SIZE(16)BEEP VALIDATE("ABCDEF0123456789"):C$
200 X=0 :: FOR A=13 TO 1 STEP -4 :: B$(X)=">"&SEG$(C$,A,4)&" " :: X=X+1 :: NEXT
A
210 PRINT "Wycove Forth code.": : :
220 FOR X=0 TO 3 :: PRINT B$(X);:: NEXT X
230 PRINT : : : :"Want another (Y/N)?"
240 CALL KEY(0,K,S):: IF S=0 THEN 240
250 ON POS("YN",CHR$(K),1)+1 GOTO 240,180,260
260 CALL CLEAR :: END
```

The following procedure will do just that:

1. Take a newly initialized disk. See how many free sectors there are, usually 360 = SSSD, 720 = SSDD,DSDD and 1440 = DSDD.

2. If you are going to have the Forth system on the disk you should leave at least 95 sectors free for the SAVE-SYSTEM routine. Subtract 95 from the number of free sectors.

3. Load a fresh version of Wycove Forth into the machine, preferably from the master disk that you received when you bought the system.

4. Define a new word as:

": START xx -13860 ! ;". Here, xx stands for the number of screens you want.

5. Now you will want this word to be executed whenever the system is booted up. To do this, place the address of the START word into the START-UP! word, as follows:

" ' START CFA 'START-UP ! ".

Now you must save this set-up to the disk. Enter SAVE-SYSTEM and you are all set to go. When you boot up your new Forth system you will have access to the extra screens.

If you are going to carry out this procedure on the master disk, the one you bought, it is advisable to make a copy of it and test out this routine on the copy.

Myarc ships XB IV

Myarc began shipping its Extended BASIC Level IV the first week in December, according to Myarc president Lou Phillips, who also promised "big news in January."

Myarc has announced plans for a TI99/4A compatible computer with 256K RAM (expandable to 2 megabytes) 64K bytes of VDP RAM, 64K of ROM, parallel output, RS232 port, two internal expansion slots and a cartridge slot mounted on the top of the computer.

Myarc's XBASIC Level IV, whose release was originally announced for July, is a cartridge which requires use of Myarc's 128K card. The cartridge comes with a diskette. Said to be 100 percent compatible with TI Extended BASIC, the Myarc program features windowing, 40-character text display, up to three times the speed of Extended BASIC, graphics commands such as draw, circle, fill and rectangle, improved error-handling routines and integer variables.

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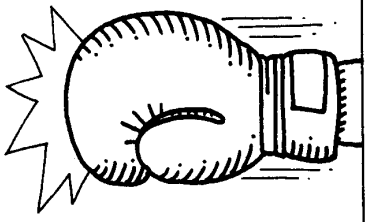

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– Dr. Ronald Albright, TI Systems Operator for CompuServ.

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Interacting with your computer

Keyboard and joystick access

By MACK McCORMICK
Technical Editor

This assembly language tutorial describes how to use the keyscan (KSCAN) utility contained in the computer for keyboard and joystick input. After you have studied this tutorial you should understand the key addresses required, how to set up for the routine, and how to invoke the utility.

A somewhat different approach has been taken with this tutorial. I have included a few advanced programming concepts to reduce the learning curve required to go from the beginning books on the market to the advanced techniques used in commercial software. If you don't understand some of these concepts then don't worry, they will come to you later. Simply disregard them for now. Concentrate on the objective of learning the keyscan routine. I would appreciate any feedback on whether you like or dislike the approach of introducing advanced techniques gradually.

Several folks have asked questions about addressing modes for opcodes. I have attempted to use all of the modes and will explain them as we go through the program. Let's get started!

If you think about it, Extended BASIC uses the KSCAN routine a lot. It's used when you are in the command mode and when in the program execution mode it is used for INPUT, CALL KEY, CALL JOYST and ACCEPT AT. In fact, it's the only way we have to interface to the computer. The KSCAN routine itself is contained in the console in the ROM chip beginning at address >20. It's a large routine and it talks to the keyboard using the Communications Register Unit (CRU) through a TMS9901 Peripheral Systems Interface chip.

It is not difficult to use. Just REFerence KSCAN in your program to tell the computer you will be using its KSCAN routine. The Extended BASIC equate is >201C. Just do a BLWP @KSCAN to use the routine. There are four single byte addresses you need to know in order to use KSCAN. >8374 tells the computer how to map out the keyboard for scanning. Place one of the following bytes at this address to change the keyboard mapping.

>00 Standard TI Keyboard.
>01 Left Side of keyboard and JOYST 1.
>02 Right side and JOYST 2
>04 PASCAL keyboard

See your BASIC reference guide for detailed information on the keycodes returned in each mode for each key.

>8375 contains the ASCII hex value of the last key pressed or >FF if no key was pressed. We use the >FF feature to allow us to detect if a key is held down for auto-repeating. >8376 contains the value of the Y (up/down) position of the JOYST and >8377 the X (right/left) position. There are three values returned: >00 for no movement, >04, and >FC (-4). These values actually are looked up in a GROM chip by the KSCAN routine based on the position of the controller.

There is another way to check if a key has been pressed. The GPL status byte at 837C is bit mapped (each bit in the byte provides different information). Here's the way the STATUS byte is mapped:

0	1	2	3	4	5	6	7
L>	A>	EQ	C	OV	OP	X	-

This status byte is set as a result of the execution of an opcode. (For a detailed explanation see your Editor/Assembler manual.) The bit we are interested in for the KSCAN routine is the EQual or bit number 2. This bit is set whenever the result from an opcode is equal. Many opcodes affect this bit and other opcodes use it to make a branching decision. For example, jump equal (JEQ) and jump not equal (JNE) check this bit to see if it is on when deciding if a jump is to be taken.

A somewhat unusual feature is frequently used in programming. If you execute MOV R1,R1 or move any byte or word to itself the equal status bit will be set if the value there is equal to zero. We use this feature to check for a key press. By MOV @STATUS,@STATUS we can see if the equal status bit is set. If set by the KSCAN routine no key has been pressed. If reset, there has been a key pressed. If a key was pressed we can get its ASCII value from >8375.

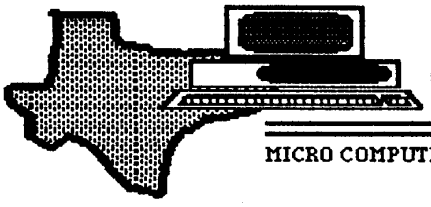
Okay, that's most of the background, let's go to the program and look at how KSCAN is used in practice.

Remember that the computer is actually dumb but very fast. Consider for a moment what is required to have a full function cursor in BASIC. You even have to tell the computer to put the cursor on the screen.

Note that we REFerenced KSCAN as a system utility we will be using. Next we establish the EQUates needed for the program. All these do is equate a label with a value and do not occupy any memory. The label may now be used instead of that value. We EQUated MYWS with >8300 which is the bottom of high speed RAM which is actually contained in the computer. I say "high speed" because the CPU can address 16 bits at a time instead of 8 bits if we placed our workspace in expansion RAM. This increases the speed of program execution as long as we keep the most frequently used values in our registers. This is generally a good place for your workspace even when LINKing from BASIC or Extended BASIC but there are exceptions so consult your manual first if you are using system ROM utilities.

Next we have the five addresses >8374 - >837C needed for the KSCAN utility. GPLWS EQU >83E0 is the address for the Graphics Pro-

(Please turn to Page 24)



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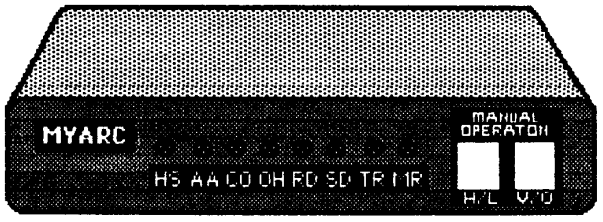

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KEYBOARD AND JOYSTICK ACCESS—

(Continued from Page 22)

gramming Utility (GPL) workspace which is used in BASIC and elsewhere, as we will see in a moment. The next address is >8C02, which is the address where the write address for the VDP chip is memory mapped in CPU RAM. More in a moment. VWD EQU >8C00-VDPWA will be used as an addressing offset later in the program. This EQUates the label VWD to >FFFE or (-2).

Next are the values we will use for comparison with the ASCII value returned by KSCAN at 8375 in the program.

The statement LI VDP,VDPWA uses the EQUates we established previously to load R15 (the R is not required to be present) with the value of >8C02 (the VDP write address).

Next we set up the screen by setting the background to white and then using a subroutine to set a block of VDP RAM (the color table in this case) equal to a value (dark blue on white characters in this case).

Look at the BLKVDP subroutine for a moment. The BL branch and link opcode branches to a subroutine which uses the same workspace registers as the main program. The computer knows where to return because the return address (next statement after the BL) is placed in R11. We can pass data to a subroutine by following the BL with a DATA statement. In this case we are passing three pieces of data. The VDP RAM location to write to, the data value to write, and the number of times to write it.

We use an addressing mode called indirect auto incrementing to help us out. The statement MOV *R11+,R0 does the following: R11 is pointing to the address of the word of memory following the BL at this time (>380 in this case). This statement says "Move the value of the data at the address contained in R11 to R0 and then increment the address in R11 to the address of the next word of memory (>4F00 in this case)." We just passed >380 to R0 for use by the subroutine. ORI R0,>4000 sets the first two bits of >380 to binary 01 or >4380 without changing the other bits. This is necessary because the first two bits set to 01 tell the VDP chip that we are going to alter the address where it writes or reads data in VDP RAM.

Once the new address is set the VDP chip will automatically increment the address to the next byte for consecutive byte writes or reads. This really saves time because a VSBW or VSBR would alter the address every time the routine is used. Data is then passed to R1 and

(Please turn to Page 26)

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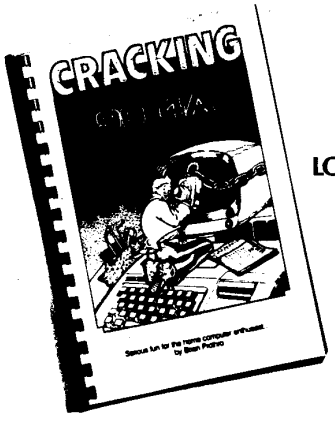

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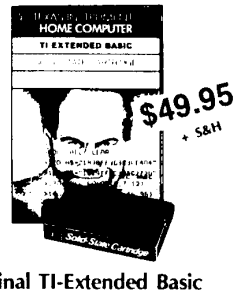

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KEYBOARD AND JOYSTICK ACCESS—

(Continued from Page 24)

R2 using the same technique.

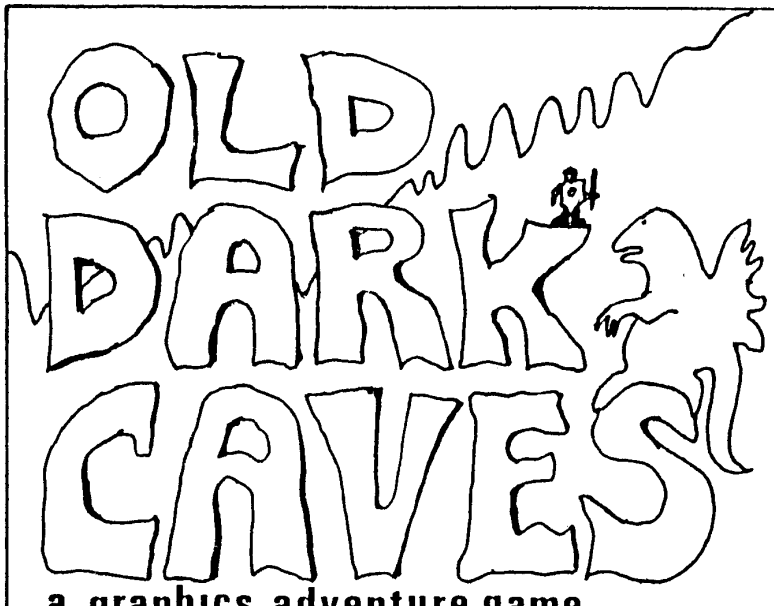
Now we are ready to alter the VDP address. We **always** write the least significant byte first so we execute a SWAp Byte command and MOVe >80 in this case to the VDPWriteAddress. Now we swap the bytes back and write the most significant byte (>43 in this case). We can now move consecutive data to or from VDP RAM very quickly using the statement MOVB R1,@VWD(VDP). This moves 4F in this case to the VDP write data address at >8C00.

How did we come up with >8C00? By using indexed memory addressing, of course. Remember, VDP is really R15 which we loaded previously with the VDPWA (>8C02). The parenthesis always contains a register. Remember that VWD contains >FFFE or -2. This statement adds the value contained in VWD to the value contained in VDP (R15 ,>8C02) and that becomes the address the data is moved to, or >8C00. Because we incremented the address in R11 to the next word in the previous statement MOV *R11+,R2 it is now pointing to the next instruction in the program or the following: BL @BLKVDP. Next we clear the screen by writing spaces (>20) to all positions and put up the prompts.

Now for the first keyscan. We previously cleared the word of memory at KEYADR or >8374 to tell the computer to scan the entire standard keyboard. Next we MOVeByte @STATUS,@STATUS to see if the equal bit is set (on). We check with a JumpEQual opcode and if the STATUS bit is set we loop back to the KSCAN routine until a key is pressed. When a key is pressed we fall out of the loop and compare the value at KEYVAL (>8375) to a constant to see which key was pressed. We are checking only for one, two, or quit being pressed in this case. If there had been multiple keys we were checking (say more than 5) then the most efficient means would have been to set up a table and use indexed memory addressing to Branch to the correct routine. When the correct key is pressed we Jump to that routine and execute.

Note the EOJQ routine. This causes the computer to return to the power-up title screen. First interrupts are enabled using a LoadInterruptMaskImmediate command because the GPL interpreter (system monitor) runs with interrupts enabled. Next we tell the computer to use the GPL Workspace. Finally, we Branch and Link Workspace Pointer

(Please turn to Page 30)



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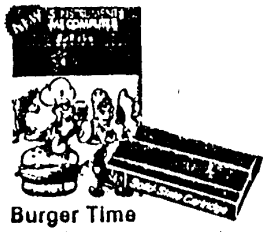

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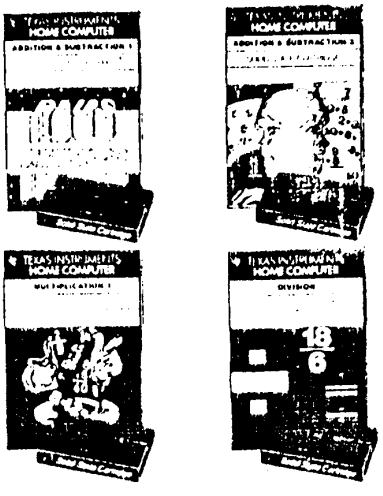

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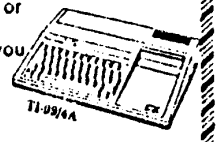

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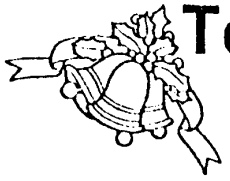

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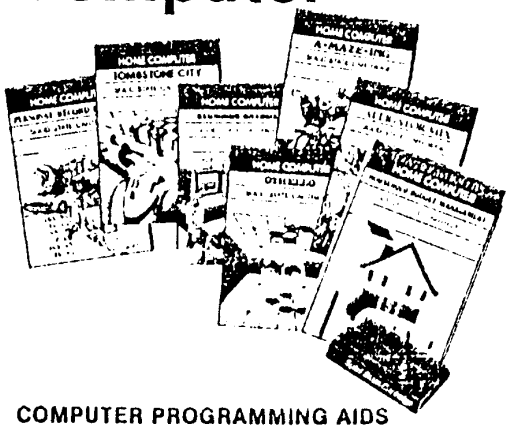

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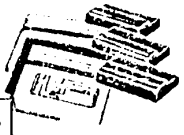

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KEYBOARD AND JOYSTICK ACCESS—

(Continued from Page 26)

to the power up reset vector contained in console ROM at address >0000.

Let's look now at the VDWTR routine. First we BranchandLink to another subroutine to clear the screen and place the MSG3 prompt at the bottom of the screen. No data (parameters) are passed to this subroutine. Note that the return address in R11 is saved in R10 because we BL to the BLKVDP routine and the original return address would be lost. **Rule: When nesting subroutines always save the return address.** This is one method when you are only going one or two levels deep. In some programs I write I go up to six levels deep. In that case I implement a stack in CPU RAM and PUSH and POP values to the stack.

Finally we B *R10. We Branch to the address contained in R10, which is our original return address. This is known as indirect addressing. Note in the next keyscan we do not check the STATUS byte to detect a keypress but rather check KEYVAL (>8375) for >FF (no key pressed). This enables the key to auto-repeat. We use some code to slow it down. You should try experimenting with these values.

Next we see if Clear, Redo, or the Left Arrow were pressed. If not we print the character on the screen. This routine is fairly straightforward and well-documented so you should have no problem following it.

Next is the JOYST routine. Again we clear the screen. Next we scan the entire keyboard. (One note on addressing here: The statement CLR @KEYADR tells the computer to clear "what's at (@)" the address of the

(Please turn to Page 32)

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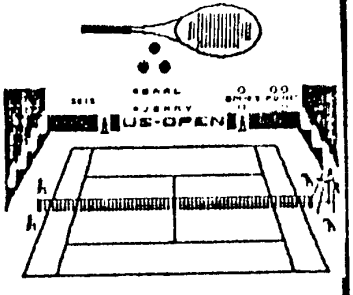

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KEYBOARD AND JOYSTICK ACCESS—

(Continued from Page 30)

KEYADR label (8374 in this case.) This is called symbolic memory addressing. MOVB @JOYVAL,@KEYVAL tells the computer to scan the left half of the keyboard and JOYST one by moving a value of 1 to >8374. Then we execute a KSCAN but don't wait for a key. We then divide the JOYST routine to check for three basic conditions: up, down, and if neither of these then left/right. We only check for left/right movement in the up and down routines if the JOYST was moved either up or down. This routine is sufficiently documented for you to follow from here.

If you are really interested in learning assembler there is only one way. Hit the books and practice programming. Please feel free to ask any questions you may have on anything I did not make clear. The next tutorial will cover File Handling. Until then "Assembler Executing."

Utilitee address right

Some readers who wrote to Utilitee Software in Dearborn, Michigan after reading the review of that company's XB Detective in our October issue had their mail returned by the Post Office.

According to the company, this is because of a postal error which has been brought to the attention of the postmaster and corrected. The address listed, P.O. Box 7275, Dearborn, MI 48121, is correct.

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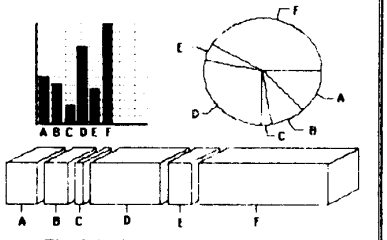

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KEYBOARD AND JOYSTICK ACCESS TUTORIAL

```
********** ****************************
****************************************
***                                  ***
***       TUTORIAL 3 (NOVICE)        ***
***   Keyboard and Joystick Access   ***
***   By Mack McCormick              ***
***      Use Load and Run from       ***
***           M/M or E/A             ***
***    Entry point is START          ***
***   Active Fctns:Clear,Redo,Quit   ***
***    and Left Arrow                ***
***                                  ***
****************************************
****************************************

      DEF  START
      REF  KSCAN,VSBW,VMBW,VWTR

      TITL 'JOYSTICK AND KEYSCAN DEMO PROGRAM 10 MAY 1985'
****************************************
*      CPU RAM EQUATES                 *
****************************************
MYWS  EQU  >8300        DEFINE MY WORKSPACE (HIGH SPEED RAM)
KEYADR EQU >8374        KEYBOARD TO SCAN (>00 TO >04)
KEYVAL EQU >8375        ADDRESS WHERE THE KEY VALUE (ASCII) IS RETURNED
YPOS  EQU  >8376        Y POSITION FOR THE JOYSTICK
XPOS  EQU  >8377        X POSITION FOR THE JOYSTICK
STATUS EQU >837C        GPL STATUS BYTE
GPLWS EQU  >83E0        ADDRESS OF GPL WORKSPACE
VDPWA EQU  >8C02        VDP WRITE ADDRESS
VWD   EQU  >8C00-VDPWA  WRITE DATA ADDRESS OFFSET
VDP   EQU  15           REGISTER FOR THE VDP WRITE ADDRESS

****************************************
* KEYSTROKE VALUES STANDARD KEYBOARD   *
****************************************
ONE   BYTE >31          ASCII VALUE FOR 1
TWO   BYTE >32          ASCII VALUE FOR 2
CLEAR BYTE 2            FCTN 4
QUIT  BYTE 5            FCTN =
REDO  BYTE 6            FCTN 8
LARROW BYTE 8           FCTN S
H04   BYTE 4            JOYST UP
H00   BYTE 0            JOYST NO MOVEMENT
HFC   BYTE >FC          JOYST DOWN (-4)
HFF   BYTE >FF          VALUE FOR NO KEY PRESSED

****************************************
*          MISC VALUES                 *
****************************************
JOYVAL BYTE 1           VALUE FOR JOYST 1
MSG   TEXT 'PLEASE SELECT'
MSG1  TEXT '1 - VIDWRITER'
MSG2  TEXT '2 - JOYST FUN'
MSG3  TEXT 'FCTN REDO-RETURN TO MAIN MENU'
      EVEN              FORCE THE PROGRAM COUNTER TO AN EVEN ADDRESS

*-- PROGRAM STARTS HERE --*
START LWPI MYWS         POINT TO OUR WORKSPACE
      LI   VDP,VDPWA    LOAD THE VDP WRITE ADDRESS IN R15

*-- SET UP THE SCREEN --*
      LI   R0,>070F     SET THE BACKGROUND COLOR TO WHITE (>F). VDP REG 7.
      BLWP @VWTR        WRITE IT TO VDP REGISTER 7

      BL   @BLKVDP      SET THE CHARACTERS TO DK BLU ON WHITE
      DATA >380,>4F00,>1E COLOR TABLE, DK BLU ON WHT, 30 BYTES

ENTER BL   @BLKVDP      NOW CLEAR THE SCREEN
      DATA 0,>2000,767  PLACE >20 IN ALL POSITIONS OF THE SCREEN IMAGE TABLE

      CLR  @KEYADR      SET TO STD TI KEYBOARD

      LI   R0,201       PUT UP 1ST PROMPT
      LI   R1,MSG       ADDRESS OF DATA TO WRITE
      LI   R2,13        NUMBER OF BYTES TO WRITE
      BLWP @VMBW        ON VDP ROUTINES eg. VMBW,VMBR, ETC.
      LI   R0,265       R0 IS ALWAYS THE VDP RAM ADDRESS
      LI   R1,MSG1      R1 IS ALWAYS THE CPU RAM ADDRESS OR CHAR TO WRITE
      BLWP @VMBW            IF SINGLE BYTE ROUTINE (VSBW,VSBR)
      LI   R0,297       R2 IS ALWAYS THE NUMBER OF BYTES TO MOVE
      LI   R1,MSG2
      BLWP @VMBW

*-- TITLE SCREEN KEYSCAN --*
SCAN1 BLWP @KSCAN       SCAN THE KEYBOARD
      MOVB @STATUS,@STATUS IS THE EQUAL STATUS BIT SET?
      JEQ  SCAN1        YEP. KEEP WAITING FOR A KEY PRESS
      CB   @KEYVAL,@ONE WAS ONE PRESSED?
      JEQ  VDWTR        YEP. GO EXECUTE THAT SUBPROGRAM
      CB   @KEYVAL,@TWO WAS TWO PRESSED?
      JEQ  JOYST        YEP. GO EXECUTE THAT SUBPROGRAM
      CB   @KEYVAL,@QUIT WAS QUIT PRESSED?
      JEQ  EOJQ         YEP. RETURN TO TITLE SCREEN
      JMP  SCAN1        ONLY ACCEPT 1,2, OR QUIT. KEEP SCANNING.

*-- RETURN TO THE POWER UP TITLE SCREEN --*
EOJQ  LIMI 2            ENABLE INTERRUPTS
      LWPI GPLWS        LOAD GPL WORKSPACE
      BLWP @>0000       BRANCH TO THE RESET VECTOR (TITLE SCREEN)

*-- VIDEO TYPEWRITER ROUTINE --*
VDWTR BL   @PRMT        CLEAR THE SCREEN AND PUT UP THE PROMPT

      CLR  R3           SCREEN LOCATION COUNTER
SCAN2 BLWP @KSCAN       SCAN THE KEYBOARD
      CB   @KEYVAL,@HFF HAS A KEY BEEN PRESSED?
      JEQ  SCAN2        KEEP CHECKING

      CB   @KEYVAL,R1   SAME KEY AS LAST TIME?
      JEQ  YEP          SAME KEY

* EXPERIMENT WITH THE VALUES FOR R4 UNTIL YOU OPTIMIZE THE SPEED
      LI   R4,>3000     DELAY TO SLOW DOWN PRINTING FOR USER REACTION (DIFF KEY
      JMP  LOOP
YEP   LI   R4,>5000     DELAY FOR AUTO REPEAT CURSOR
LOOP  DEC  R4           SUBTRACT 1 20,480 TIMES (THATS FAST!)
      JNE  LOOP         PLACE AN * IN FRONT OF THIS LINE TO SEE THE SPEED
```

(Please turn to Page 34)

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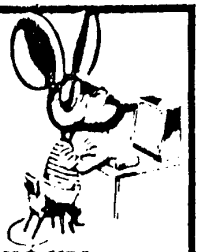

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Amulet – Search the cavernous building to find the precious Amulet.

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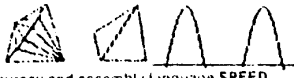

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ASSEMBLY LANGUAGE TUTORIAL—

(Continued from Page 32)

```
NOPE   CB   @KEYVAL,@CLEAR    CLEAR THE SCREEN?
       JEQ  VDWTR            RESTART THE PROGRAM AND CLEAR THE SCREEN
BYPASS CB   @KEYVAL,@REDO EXECUTE A WARM START TO TITLE SCREEN
       JEQ  ENTER            RETURN TO TITLE SCREEN
       CB   @KEYVAL,@LARROW LEFT ARROW PRESSED?
       JEQ  ARROW            YEP

       MOV  R3,R0            MOVE THE COUNT TO R0
       MOVB @KEYVAL,R1       MOVE THE KEYVALUE TO R1 MSBYTE
       BLWP @VSBW            WRITE IT TO THE SCREEN
       INC  R3               NEXT SCREEN POSITION
       CI   R3,735           ONLY ALLOW TO WRITE TO SCREEN POSN 735
       JLT  SCAN2            CONTINUE TO NEXT CHARACTER
       JMP  VDWTR            CLEAR THE SCREEN AND RESET THE CHAR COUNTER

ARROW  DEC  R3
       CI   R3,0             CHECK FOR LOWER SCREEN LIMIT
       JLT  VDWTR            CLR R0 AND START OVER
       MOV  R3,R0            MOVE THE COUNT TO R0
       LI   R1,>2000         ACSII SPACE CHAR IN MSBYTE OF R1
       BLWP @VSBW            BLANK OUT THE CHAR
       LI   R1,>0800         LOAD FOR AUTO REPEAT DELAY
       JMP  SCAN2            GET THE NEXT CHAR

*-- JOYSTICK ROUTINE --*
JOYST  BL   @PRMT            CLEAR THE SCREEN AND PUT UP THE PROMPT
       LI   R0,400           START PATTERN IN CENTER OF THE SCREEN

JOYLP  CLR  @KEYADR          SET FOR KEYBOARD SCAN
SCAN3  BLWP @KSCAN           SCAN FOR FCTN REDO
       CB   @KEYVAL,@REDO REDO PRESSED?
       JEQ  ENTER            RETURN TO TITLE SCREEN
       CB   @KEYVAL,@CLEAR CLEAR PRESSED?
       JEQ  JOYST            START OVER

       MOVB @JOYVAL,@KEYADR SCAN JOYST 1
       BLWP @KSCAN           SCAN THE JOYSTICK

       MOV  R0,R14
       LI   R0,16            * ADDED TO TEST FIRE BUTTON
       MOVB @KEYVAL,R1
       AI   R1,>2000
       BLWP @VSBW
       MOV  R14,R0

       CB   @YPOS,@H04       MOVED UP?
       JNE  CKDWN            NOPE. MUST BE DOWN

       CB   @XPOS,@H00       MOVED IN THE X DIRECTION?
       JNE  XDET             YEP GO FIND OUT IF LEFT OR RIGHT
       AI   R0,-32           MOVED UP ONLY SO -32 TO GET TO ROW ABOVE
       JMP  DRAW             DRAW THE PATTERN

XDET   CB   @XPOS,@H04       MOVED UP AND RIGHT?
       JNE  XDET1            NOPE
       AI   R0,-31           PRINT POS UP AND TO RIGHT ONE POSITION
       JMP  DRAW             DRAW IT

XDET1  AI   R0,-33           UP AND LEFT IS ALL THAT IS LEFT
       JMP  DRAW             DRAW IT

CKDWN  CB   @YPOS,@HFC       WAS JOYST MOVED DOWN?
       JNE  LAT              NOPE

       CB   @XPOS,@H00       MOVED STRAIGHT DOWN?
       JNE  XDET2            NOPE
       AI   R0,32            NEXT ROW DOWN
       JMP  DRAW             DRAW IT

XDET2  CB   @XPOS,@HFC       DOWN AND LEFT?
       JNE  XDET3            NOPE
       AI   R0,31            ONE LINE DOWN AND ONE SPACE LEFT
       JMP  DRAW             DRAW IT

XDET3  AI   R0,33            ONE LINE DOWN AND ONE POSITION RIGHT
       JMP  DRAW

LAT    CB   @XPOS,@HFC       NOT MOVED UP OR DOWN. WAS IT LEFT?
       JNE  LAT1             NOPE
       DEC  R0               IT WAS SO MOSVE LEFT ONE POSITION
       JMP  DRAW             DRAW IT

LAT1   CB   @XPOS,@H04       WAS IT MOVED RIGHT?
       JNE  JOYLP            START ALL OVER AT BEGINNING
       INC  R0               YEP MOVED RIGHT.

DRAW   CI   R0,0             CHECK FOR LESS THAN 0
```

(Please turn to Page 36)

TI 1-2-3 version 2.00

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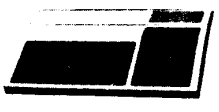

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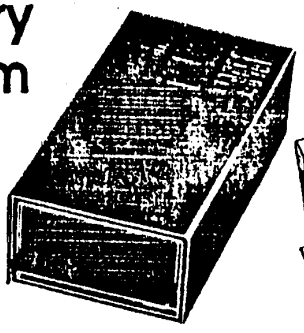

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T.O.D. EDITOR

The TUNNELS OF DOOM cartridge is perhaps the ultimate adventure for the TI-99/4A. It's three-dimensional graphics and adventure action are unparalled by any other software for the TI Home Computer. However, until recently, the avid player was limited to only the two games this cartridge came with. Now, for the first time ever, you can create your own games for this module with ASGARD SOFTWARE's TOD EDITOR. This high-quality, menu-driven utility program requires no programming knowledge or skill whatsoever, yet the user can create interesting games as complicated as desired almost immediately. TOD EDITOR is so easy to use you will be able to write your own quests soon as you open the package.

You can create your own adventures easily and relatively quickly by either encoding your favorite fantasy games and books, or by drawing on your own fertile imagination. With TOD EDITOR you can modify virtually every aspect of your quest, from the graphics to the monsters, to the treasures to the spells at the touch of a key. Games created with this useful utility can be freely traded, exchanged or sold without the bother of liscensing agreement. ASGARD SOFTWARE will even evaluate your game, free of charge, for marketing potential if you so wish. Imagine becoming a software author without even knowing a programming language!

TOD EDITOR includes a free sample game created with this program by it's author John Behnke, a backup disk for the program, and an extensive user's guide and tutorial for learning and using TOD EDITOR. The program requires an Extended BASIC cartridge, a 32K memory expansion device, and a disk drive system. The sample game and the games created with this program additionaly require the TUNNELS OF DOOM cartridge by Texas Instruments Inc.

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TUTORIAL—

(Continued from Page 34)

```
       JLT   OUTBDS       YEP OUT OF BOUNDS
       CI    R0,735       CHECK FOR GREATER THAN 735
       JGT   OUTBDS       YEP OUT OF BOUNDS
       JMP   INBDS        JUMP TO INBOUNDS
OUTBDS MOV   R2,R0        RESTORE OLD SCREEN LOCATION IN R0

INBDS  LI    R1,>4000     LOAD THE 2 SYMBOL TO DISPLAY
       MOV   R0,R2        SAVE THE OLD VALUE IN CASE NEW IS OUT OF BOUNDS
       BLWP  @VSBW        WRITE IT TO THE SCREEN

       LI    R4,>1000     DELAY FOR A FEW MSECS.
DELAY  DEC   R4
       JNE   DELAY        PLACE * IN FRONT TO SEE REAL SPEED
       JMP   JOYLP        START ALL OVER

*****************************************
* This subroutine clears the screen     *
*   and places the MSG3 on the screen   *
*    No inputs required.                *
*  Alters R0,R1,R2,R10.                 *
*   No reserved registers on exit       *
*    Levels 2                           *
*****************************************
PRNT   MOV   R11,R10      SAVE THE RT ADDRESS SINCE WE WILL NEST ANOTHER SUB

       BL    @BLKVDP      CLEAR 732 SCREEN POSITIONS
       DATA  0,>2000,737  PLACE >20 IN THE SIT FOR 732 POSITIONS

       LI    R0,738       LINE 23 OF SCREEN (BASE 0)
       LI    R1,MSG3      ADDRESS OF MSG3
       LI    R2,29
       BLWP  @VMBW

       B     *R10         RETURN TO MAIN PROGRAM

*****************************************
* This subroutine writes data to a      *
*       block of VDP RAM                *
*  by directly accessing the VDP        *
* Advantage: Very Fast and efficient    *
*  Inputs: ADDRESS,DATA,# OF BYTES      *
*  Alters:R0,R1,R2,VDPWA                *
*   Levels 1                            *
*****************************************
BLKVDP MOV   *R11+,R0      VDP ADDRESS TO WRITE TO
       ORI   R0,>4000      OR ADDRESS WITH BINARY 0100 ()4) TO INDICATE A WRITE
       MOV   *R11+,R1      DATA TO WRITE
       MOV   *R11+,R2      NUMBER OF BYTES TO WRITE
* R11 (RT ADDR) NOW POINTS TO THE INST FOLLOWING THE BL IN THE MAIN PROGRAM

       SWPB  R0            ALWAYS WRITE THE LSBYTE FIRST
       MOVB  R0,@VDPWA     MOVE THE LSBYTE TO THE VDP ADDRESS REGISTER
       SWPB  R0            SWAP THE BYTES BACK
       MOVB  R0,@VDPWA     WRITE THE MSBYTE NOW
* THE VDP CHIP ADDRESS REGISTER IS NOW POINTING TO THE ADDRESS IN R0

BLKLP  MOVB  R1,@VWD(VDP) MOVES DATA TO EACH SCREEN POSITION
* VDP CHIP ADDRESS REGISTER AUTOMATICALLY INCREMENTS TO NEXT WRITE POSITION
       DEC   R2            DECREMENT THE COUNT
       JNE   BLKLP         FINISHED? (GPL STATUS EQ BIT SET?)(=0?) NOPE...CLRLP

       RT

       END
```

FREEWARE: NEW LISTINGS

Toolkit offered

Stephen J. Trencansky, 621 Lacey Dr., Endwell, NY 13760, is offering a package of 11 utility programs that run in Extended BASIC. Included are programs that compare two files in D/F80 or D/V163 and report differences; program that dumps D/F80 files to a printer in integer of HEX; program that prints information from uncompressed object files; program that generates listings of files from multiple disks; program that generates listings of filenames on 3.5-inch labels; program to print XBASIC programs in magazine-style format; program to convert compressed object file to a more compressed file; program to convert compressed object file into uncompressed object file; program to convert an uncompressed file into a new compressed file that will load faster.

Send disk, self-addressed and stamped return mailer and $5. Or, send $10 and the disk and mailer will be provided.

Forth backup

Jim Lewis, 1907 Trout Valley Rd., Champaign, IL 61821, is offering a program called Forth Backup. This disk cloner includes an XB-loader. Send a disk, self-addressed and stamped return mailer.

(Please turn to Page 42)

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Using an external drive internally

By JEFF SHAW, RICHARD SHAW and DANIEL COLLETTE

One frequently asked question about the TI99/4A system is whether one can use a disk drive that was intended to be used inside the peripheral expansion box as an external drive.

The answer to this question routinely goes something like this: "The power supply in the peripheral expansion system is not capable of supplying power to two drives and thus it is necessary to purchase an external drive with its own power supply."

It is our purpose in this article to dispel this myth. An internal drive CAN be used as an external drive, and the user will save money in the bargain. My system is proof of this since a converted internal drive has been in use for approximately two years with no problems whatsoever. The authors are also aware of two other systems which have been similarly converted.

The point to remember about the power supply is that, if both drives are working properly, they will never be on at the same time. The disk controller sees to that. The conversion of the internal drive is not difficult and even those with little knowledge of electronics should be able to successfully carry it out. (Note that this conversion was performed using two TI internal disk drives, model PHP 1250.) Drives from other manufacturers should work also, though the details may differ from those given in this article.

The first thing to consider is the cable linking the disk controller to the external drive. Here, the most important component is a small printed circuit board (see Fig. 1). The part number of this circuit board is 040362-1 B. The purpose of this board is to close off certain lines of the cable to allow the disk controller to differentiate between the internal and external drives. This board is included with the external drive cable which comes with the TI disk controller card. If the board has been lost, it probably can be obtained from Texas Instruments by calling its helpline or technical hotline.

The rest of the cable consists of four 34-position insulation displacement connectors and some ribbon cable. These may be readily purchased at almost any electronics store. Two of

(Please turn to Page 40)

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CONNECTING DISK DRIVE—

(Continued from Page 38)

these connectors are joined by the printed circuit board. These should have "keys" corresponding to the location of the notches in the printed circuit board. The locations of the keys are at the 11-12 position on one connector and at the 19-20 position on the other. The connector that attaches to the back of the disk controller need not have a key at all. However, it must be connected right-side up. If it is connected upside down, both drives will come on at the same time.

The connector which attaches the cable to the external drive should have a key corresponding to the notch on the circuit board on the back of the drive (on the TI drive, this is the 3-4 position).

Once all materials have been obtained, simply connect them as shown in Fig. 1.

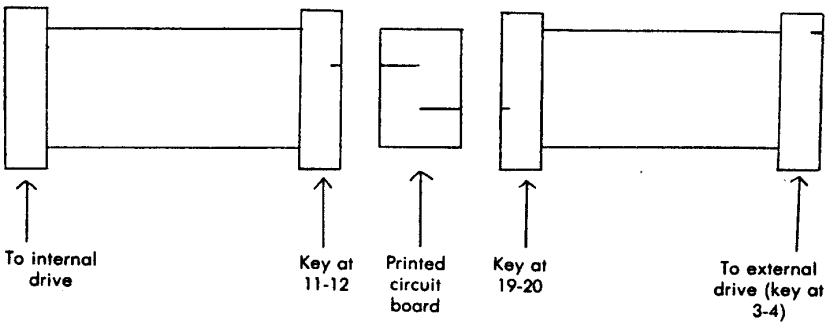
The next point to consider is how to get power to the second drive. This is accomplished by splicing into the internal drive's power supply wires. The required items are: some wire (long enough to properly position the external drive), a soldering iron, a drill, some wire insulators and optionally a four-prong connector (3A min). The connector allows one to easily disconnect the external drive.

First, remove the internal drive from the peripheral expansion box. Now splice the power supply wires to the internal drive. These wires are connected to the drive by a connector near the top on the back of the drive. Now, connect the wires to be used to power the external drive to the internal power supply wires. Insulators should be used to cover the connections.

It will now be necessary to drill a quarter-inch hole in the lower right-

(Please turn to Page 42)

Figure 1



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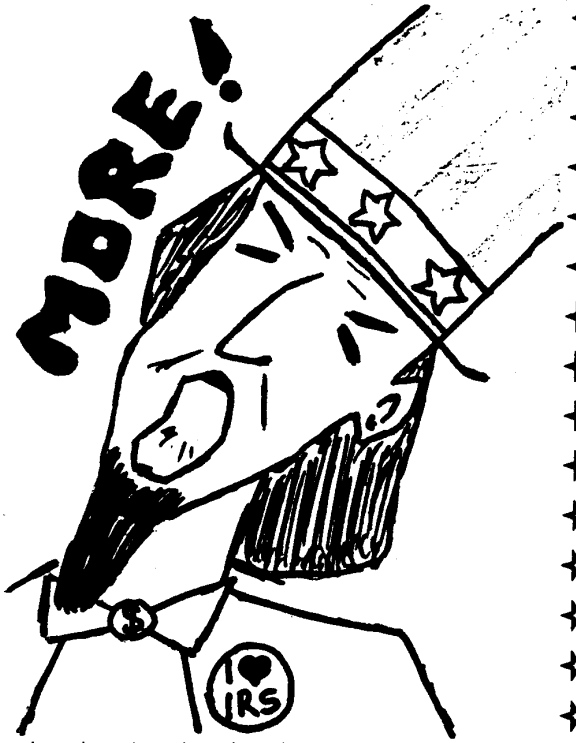

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This is an excellent choice for anyone desiring a printer without investing in an expansion system.

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MINIWRITER III - $99.95	Order #DBMOM3

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*4A/TALK, PILOT and BITMAC equipment requirements include at least one disk drive system, 32K memory expansion, RS-232 card, and a modem (modem for 4A/TALK only).

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DBT

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HOUSING THE DRIVE—

(Continued from Page 40)

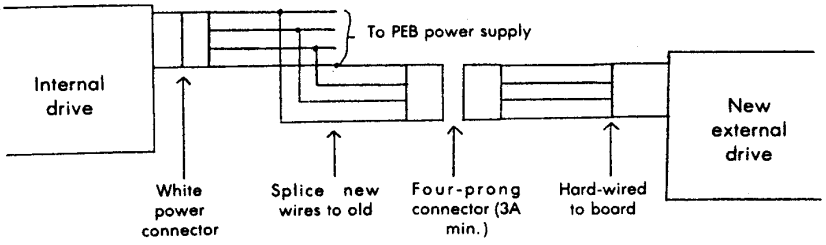
hand corner of the peripheral expansion box (right as one faces it from the front). A grommet should be inserted in the hole to prevent shorting of the wires. The external power wires can now be run outside the expansion box.

The wires must now be soldered to the external drive. First remove the white power connector on the external drive (located near the top). You will see a board with four holes. Place the ends of the wires through the holes and solder them in place. (It is important that the wires be connected in the proper location, ie. top to top, bottom to bottom.) See Fig. 2 for details.

Once the logic and power lines are hooked up, the conversion is nearly complete. It will be necessary to remove the termination resistor pack from the internal drive. This procedure is fully documented in the manual for the disk controller card.

One final consideration is a housing for the external drive. The authors constructed a wooden housing. However, metal housings are available from mail-order houses and other sources.

Figure 2



If you have followed these plans correctly, you should now have a working second drive. If the drive does not appear to be working, the following will provide a trouble shooting guide.

If both drives are coming on in parallel (at the same time), the problem could be in the placement of the logic cable. Make sure everything is right-side up. (Actually, everything can be upside down; the important thing is to be consistent.)

Other problems may be caused by the connections. Make sure that the wires which were soldered to the second drive do not have a "solder bridge" between them. Also make sure that everything is fully connected. If there is still a problem, try changing the location of the termination resistor pack.

(Please turn to Page 55)

TIRED OF TYPING THE SAME COMMAND OVER AND OVER?

PCKEYS Gives You 12 Commands, Each Available With 1 Key Press...In Extended Basic Run or Immediate Mode

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CNTL 0
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CNTL =
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Illinois residents add 7% sales tax

For TI 99/4A only, req. Extended Basic, 32K disk drive and 8 dot addressable, 8 bit printer for screen dump. 100% machine language—Uses no Extended Basic program space.

FREEWARE—

(Continued from Page 36)

Spreadsheet program

Peter Chalamish is offering a program that creates a spreadsheet of 26 rows and 14 columns. It includes many features of commercially available spreadsheets. Requires Extended BASIC. Also available is a game that simulates the landing of a 747 jet in BASIC. Send disk, postage and return mailer or $5 to 110 Post Ave., Apt. 104, New York City, NY 10034.

Director '99'

Director '99' is a disk cataloging program by Robert Neal and Ed Burt, P.O. Box 216R, Romeoville, IL 60441. The program reads disk files, updates the directory and allows the user to enter a description of each file or program. Each description may contain up to 48 characters. The user may also selectively exclude files from the catalog. Names of cartridges and system disks may also be added to the catalog. The program sorts catalog data using an assembly language routine and prints a catalog, including descriptions. Up to 200 disks may be entered. The number of programs that may be cataloged is limited by available disk space. The program is written in Extended BASIC with some assembly routines. XBASIC, memory expansion and two disk drives are required. Send initialized disk with self-addressed, stamped return mailer or $5 to the above address. Those who find the program useful are encouraged to send a donation not exceeding $10.

Anyone wishing to have a Freeware announcement included in MICROpendium's Freeware listing may do so by submitting a copy and brief description of the program, and a note indicating that it is in the public domain, to MICROpendium. Complete Freeware listings, updated quarterly, are available from MICROpendium beginning in January for $1 (or 50 cents and a self-addressed stamped envelope). Freeware announcements will continue to be published in the listing until withdrawn by the persons submitting them or the publisher.

Display Enhancement Package

40 columns for the 99

By WARREN AGEE

Most other home computers simply do not compare with the TI99/4A. We have just about all the features of other computers, plus a few others do not have. However, there is one feature found on most other computers which the TI lacks: 40-column display. This can be a distinct disadvantage when trying to write programs which involve a lot of data entry in Extended BASIC.

In 1982, Oak Tree Systems came to the rescue with its Display Enhancement Package (DEP), a set of assembly language subroutines which allows a 40-column screen. Although originally released in 1982, this remains the only utility of its kind on the market today.

DEP can be run from XBASIC, Mini Memory, or Editor/Assembler, each of which uses memory differently. In console BASIC with either E/A or Mini-Memory, no BASIC programming space is used by DEP. In Extended BASIC, however, DEP reduces the available programming space by 3842 bytes.

Performance: After booting up DEP, you are still in the standard BASIC mode. To invoke the 40-column mode, use CALL LINK("MODE40"). To switch back to 28-column mode, you only need a CALL LINK("MODE28"). You do have one limitation, however. These commands must NOT be used in command mode, only as statements in a program. Therefore, you cannot type in your program in the 40-column mode.

There are basically three different types of "display modes" which can be used in 40-column mode. These are: SCROLL Mode, SCROLL Mode with Locked Area, and PAGE Mode. Each of these modes accesses a "data storage area" that normally consists of 96 lines of 40 characters each. The act of printing text actually stores it in this area.

The SCROLL Mode acts very much like the standard 28-column mode, except that lines are added starting from the top of the screen, instead of the bottom. While in this mode, the normal INPUT and PRINT statements are replaced by CALL LINK("PRINT"...) and CALL LINK("INPUT"...). You can also scroll the screen upward and downward at will.

When using SCROLL Mode with Locked Area, you may lock from 1 to 18 lines (always starting at line 1) so that they will not scroll. You can then clear the scrolled and locked areas independently.

Finally, in PAGE Mode, you have available a minimum of 4 pages of 24 lines each. Each page may be displayed, cleared and modified independently. Since no scrolling may be done in PAGE Mode, you must use CALL LINK("DISPLAY"...) and CALL LINK("ACCEPT"...) instead of the PRINT and INPUT functions. In addition, text may be written to one page while another is being displayed.

There are several limitations when in MODE40. First of all, no sprites may be used. Any CALL CHARs must be executed *before* entering MODE40. Using the CHR$ function while in MODE40 may cause unpredictable results.

Fortunately, most of the functions that may not be used in MODE40 have been replaced with equivalent CALL LINKs. These include: INPUT, PRINT, ACCEPT, DISPLAY, ACCEPT AT, DISPLAY AT, CALL COLOR, CALL SCREEN, CALL CLEAR, CALL HCHAR, VCHAR, and GCHAR.

Another limitation is that while in MODE40, breaking a running program (by hitting FCTN 4) may be done only at an ACCEPT or INPUT situation. Doing otherwise may lock up the machine.

Ease of Use: Although DEP provides a lot of power, you have to pay the price: complexity. There are 24 CALL LINKs to remember, and the list of parameters required for some functions seems endless, like:

```
CALL LINK("ACCEPT",Y,X,L,CT
L$,IN$,STAT)
```

Omitting even one of these parameters can lock up the machine, which is easy to do.

Also, DEP provides its own error routines; when an error occurs, you are notified at the bottom of the screen, and then program execution continues. I found this very annoying. In trying to convert a long Extended BASIC program to 40 columns, somewhere along the line I made a small error in the parameters. This caused a "recursive error" situation, in which, once the error was found, the program kept looping through the error routines; at every ACCEPT statement, DEP registered another error. Therefore, I could not break the program since this could be done only at an ACCEPT statement.

Documentation: A 37-page, photocopied manual comes with DEP. It is clear, easy to understand and complete. I found no inconsistencies or omissions.

Value: If you do a lot of Extended

(Please turn to Page 45)

Review

Report Card

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

Cost: $29.95
Manufacturer: Oak Tree Systems, 3922 Valentine Rd., Whitmore Lake, MI 48189
Requirements: console and monitor or television, expansion memory, disk system, Extended BASIC, Editor/Assembler or Mini-Memory

Triple Tech

Could be a triple threat

By JOHN KOLOEN

I'm not sure that a clock/calendar, print spooler or internal speech synthesizer connection would be any great shakes taken separately, but taken together they offer a useful line-up of functions that may be of value to many users.

Of the three functions, I find the print spooling feature to be the most useful—I use a printer a lot. The clock/calendar I've found little use for, though it is an interesting novelty. The fact that Triple Tech has permitted me to remove the bulky speech synthesizer from its former home at the side of my console is a luxury that may have very practical consequences. For one thing, I'm no longer inadvertently disconnecting the speech synthesizer from the console and, hence, the PEB cable which plugs into the synthesizer.

Performance: The Triple Tech comes without the familiar clamshell enclosure. The board is populated with 64K of RAM for the print spooler, firmware and a replaceable battery for the clock/calendar and a slot for plugging in the speech synthesizer circuit board. The card includes a parallel connector for a printer. Triple Tech does not support a serial printer.

Once installed, placing it between two clamshell cards is recommended, there is little else for the user to do. Accessing the print spooler is as simple as entering PIO as a printer command. The spooler offers 64K of buffering, which means that you can dump the longest document you can create with any word-processing program for the TI and be able to continue editing or accessing disk drives while the spooler feeds the printer your document.

If there is a drawback to the spooler it is that once you've sent a document or program to the printer, it is not easy to stop it. There are two microswitches mounted on the card, one that can be pressed to wipe out the 64K buffer, thus stopping it from sending more data to the printer. This stops the print function, but the switch is difficult to get at, particularly if your PEB is placed against a wall with a monitor on top of it. Other options are to turn off the printer, which wipes out the data that is in the printer's buffer. However, when you turn it on again the spooler will continue to send data to the printer until it reaches the end of the document or program. Turning off the PEB clears the spooler memory, but this makes the task of dumping documents time-consuming, a problem meant to be solved by the spooler. A better approach would be to wire an extension cable to the microswitch so that the user may position it in a more convenient location.

I mentioned there are two microswitches. The second one, when pressed, will print a copy of the document being printed. This seems to be of limited value since most word processors allow the user to make multiple copies. Certainly, when listing a program, it is easier to enter LIST "PIO" than it is to reach behind the PEB, locate the correct microswitch and press it for a second copy.

If you have a speech synthesizer, you may remove the case, lift out the speech synthesizer circuit and plug it into the Triple Tech board (Triple Tech does not come with a speech syn-

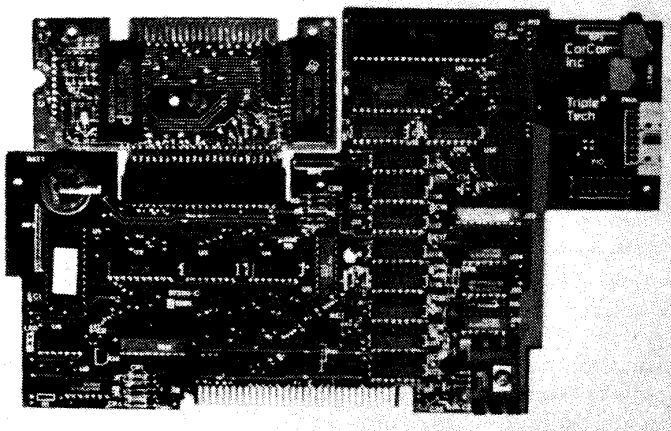
(Continued from Page 45)

Review

Report Card

Performance	**A**
Ease of Use	**B+**
Documentation	**B—**
Value	**B+**
Final Grade	**A**

Cost: $109.95, shipping and handling
Manufacturer: CorComp Inc., 1255 N. Tustin Ave., Anaheim, CA 92807, (714) 630-2903
Requirements: Console, monitor or TV, Peripheral Expansion Box, printer, speech synthesizer optional but recommended



DEP—

(Continued from Page 43)

BASIC programming and find the 28-column screen limiting, then try DEP. But be prepared to do a lot of reading and experimenting before diving into a full-length program. Also, I do not suggest converting an existing Extended BASIC program to DEP format as a first project. With the unexpected error routines inherent in DEP, this package is more suited for programs written specifically for this package. Display Enhancement Package gives you extra power, but taking advantage of it is no simple matter.

(This review was downloaded from the CompuServe TI Forum.)

TRIPLE TECH—

(Continued from Page 44)

thesizer circuit board). Having done this, you access the synthesizer in exactly the same way as you used to. I could discern no difference in the quality of sound between the synthesizer when it was plugged into the console and the synthesizer board when it was plugged into Triple Tech. One thing I am certain of now is that when I have a problem with the PEB it is not due to a poor connection with the speech synthesizer. Not much of a consolation, to be sure, but when your computer goes on the fritz eliminating even the smallest potential problem can save a lot of time in trouble-shooting.

I have not found a use for the clock/calendar feature, though I suspect some bright programmer will one day write a disk cataloger that includes the time and date files and programs were last written to disk. (The clock/calendar is accessed via an OPEN statement, similar to accessing any device.) To tell the truth, after entering the time and date and running a little program to display it, I haven't bothered to use the clock/calendar feature again.

The clock/calendar provides the day of the week, the month, date and year, hour, minute and second. Once entered, using a program supplied with the documentation, the time and date are updated automatically, even with the computer turned off. A battery in the card keeps the clock ticking, so to speak. (CorComp describes the power cell as a 3-volt, CR2032 lithium battery.) CorComp says the battery will last six months, even if the computer is never turned on. The clock/calendar is driven by a crystal controlled oscillator that CorComp says is accurate to within .002 percent. The clock/calendar is accessed through BASIC or Extended BASIC programming.

Ease of Use: Installing the Triple Tech card is a snap. Instructions for removing the circuit board from the speech synthesizer are easy to follow. The reason I didn't give it an "A" in this category is the location of the microswitch to stop the spooler function after it starts. I'm sure there are better ways of doing this, but it will probably be up to the user to find them. The print spooler includes a self-test that is activated using the microswitches.

Documentation: The manual that comes with Triple Tech consists of eight book-sized pages and a one-page addendum that includes listings of a program to change the settings on the clock/calendar (it is set at the factory to begin with) and to output the time and date to the screen. The addendum corrects an error that appears in the manual. The manual is prepunched with three holes for inclusion in a loose-leaf binder, a thoughtful touch. I gave it a "B–" primarily because I expected more instruction on how to use the clock/calendar in programming. (Providing a program listing of its use in a disk catalog program would have raised the grade to an "A."

Value: The value of Triple Tech is in the eyes of the beholder. Anyone who uses a printer a lot will appreciate the spooler. Being able to run the printer without tying up the computer console is a real advantage. Being able to relocate the speech synthesizer out of sight and out of mind is a convenience, and the clock/calendar is at this point an interesting novelty that a single piece of software yet available could turn into a virtual necessity.

Reviewed in MICROpendium

1984

February: B-1 Nuclear Bomber, Tandon TM-100 Disk Drive, Void, Beanstalk Adventure, Microsurgeon, On Gaming, Database 500
March: Star Trek, Escape From Balthazar, Garkon's Getaway, Sky Diver, Mail-Call, Prowriter 8510 Printer
April: Monthly Budget$ Master, Budget Master, Home Budget, Thief, Donkey Kong, Khe Sanh
May: Companion Word Processor, Q*Bert, Mad-Dog I & II, Programs for the TI Home Computer
June: Creative Expressions Accounts Receivable/Accounts Payable, CDC 9409 Disk Drive, Starship Concord, Lost Treasure of the Aztec, ASW Tactics II
July: Theon Raiders, Introduction to Assembly Language for the TI Home Computer, Game of Wit, Pole Position
August: TE-1200, Tower, Galactic Battle, Galaxy
September: Wycove Forth, 99/4 Auto Spell-Check, QUICK-COPYer, Wizard's Dominion, Anchor Automation Mk XII Modem
October: Killer Caterpillar, ZORK I, Defender
November: 9900 Disk Controller Card/Manager, Super Bugger, Transtar 120S printer, Floppy-Copy, Data Base-X
December: Gravity Master, Data Base Manager System, Learning 99/4A Assembly Language Programming

1985

January: Super Sketch, Foundation Computing 128K Card, PTERM-99, TI-Runner
February: Super Extended BASIC, Beginning Assembly Language For the TI, ZORK II
March: Morning Star Software CP/M Card, WDS/100 Winchester Disk Drive, Sketch Mate, BMC Color Monitor
April: 9900 Micro Expansion System, Disk + Aid, Gemini 10X-15X
May: Character Sets and Graphics Design, Draw 'N Plot
June: GRAPHX, DATA BASE I
July: Acorn 99, Advanced Diagnostics
August: Model Dow-4 Gazelle, Ti-Artist, PC-KEYS, Not-Polyoptics' Bankroll
September: Midnite Mason, Myarc 32K/128K Card, GRAPHX Companion
October: 4A/TALK, Extended BASIC II Plus, XB Detective, Console Writer 2.1
November: Foundation Z80A Card, 9900BASIC, Adventure Editor

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Newsbytes

MG to ship products

Millers Graphics expects to ship its GRAM Kracker and a new book on the TI beginning the week of Dec. 16, and plans to release a new utility in January, according to Craig Miller.

The GRAM Kracker, which fits into the cartridge slot of the TI, allows users to dump the contents of cartridges into memory and then save them to disk, RAM disk, hard disk or cassete. About 15 cartridges can be saved to a double-sided, double-density disk. These programs may then be called up at any time for use. The device also allows users to manipulate these programs. The GRAM Kracker costs $174.95 plus $4 shipping and handling.

The new book, *The Orphan Chronicles* by Ron Albright, sells for $9.95 plus $2 shipping and handling. According to Miller, the book gives a history of events leading to TI dropping the 99/4A computer and the development of user groups, publications and third party developers since then. He says appendices list 270 users groups, 129 BBSes dealing with TI, dealers and distributors who handle TI products, freeware sources and a listing by Barry Traver of books which deal with the TI99/4A.

The new utility set for a January release, according to Miller, is a disk-to-disk disassembler which will take a program off a disk without memory and "almost reassemble it, depending on the type of file." He says the program gives the user access to TI-Writer, Multiplan and assembler files and files on adventure game disks. Plans are for the program to sell for $19.95 plus $2 shipping and handling.

McCormick's address

Our technical editor, Mack McCormick has asked us to publish his address for TI users who may want to write him directly. The address is HHC, 1st INF DIV(FWD), APO NY 09137.

Canadian TIBBS

Sonny Saeling of White Rock, British Columbia, announces that he is running the second TIBBS in Canada, serving TI owners on the west coast.

According to Saeling, WHITE ROCK TIBBS supports 300 and 1200 baud and is up 24 hours a day with full TIBBS features. WHITE ROCK TIBBS number is (604)531-6423.

New users group

Craig Kellogg of Rumford, Maine, announces formation of a new users' group, the Global 99'er User's Group, to start in early 1986.

For further information, send a self-addressed stamped envelope to Kellogg at 715 Hancock St., Rumford ME 04276.

Cooling fans for sale

STATCO, Inc., says it has cooling fans made by EG&G/Rotron which can be placed in the TI Peripheral Expansion Box.

Paul Johnson of STATCO says the fans are in the "high efficiency muffin type design. Boy is it quiet!"

Fans are available for $15.50 +$1.50 shipping and handling, or a total of $17 cash, check or money order prepaid in the 50 states. Shipment is by UPS.

For further information, contact STATCO, Inc., P.O. Box 145, Townsend MA 01469-0145 or (617) 433-2070.

Tigercub releases

Tigercub Software announces the release of Nuts & Bolts No. 2, a full disk of 108 utility subprograms. As on the first Nuts & Bolts disk, these are all in MERGE format so that they can be incorporated into programs by simply typing MERGE and the filename.

According to Jim Peterson of Tigercub, almost all are in the form of subprograms so that they require only a CALL with the proper parameters. They have high line numbers so that they will not overwrite the user's program, he says, and are sequenced so that they will not overwrite each other or those on the previous disk.

Contents include 21 screen font routines; 21 screen display routines; three joystick routines; 13 math routines including every base conversion; five screen graphs and a printer graph; three self-changers to create variable GOSUB, GOTO and RESTORE; 16 programming utilities, four file handling utilities and six two-dimensional sorts. The price is $19.95 postpaid, or both Nuts & Bolts disks can be ordered together for $37 postpaid.

Tigercub Software also announces the release of 18 collection disks, each containing five or six of the Tigercub programs, for $12 postpaid. The programs on each disk are all of one category, such as Programming Tutor, Programmer's Utilities, Brain Games, Brain Teasers, Brain Busters, Maneuvering Games, Action Games, Reflex and Concentration, Two-Player Games, Kid's Games, More Games, Word Games, Elementary Math, Middle/High School Math, Vocabulary and Reading, Musical Education, Kaleidoscopes and Displays and Tigercub's Best. The remaining space on each disk has been filled with what Peterson calls "some of the best public domain programs of the same category."

Peterson says he wants to emphasize that he is not selling the public domain programs but that they are included as a free bonus on the disks, on which he says the Tigercub programs are "greatly reduced from their individual catalog price."

Winchesters reduced

Douglas Meshna of John J. Meshna Jr. Inc. says that that company's prices on its TI99/4A Winchester systems

(Please turn to Page 47)

Newsbytes

(Continued from Page 46)

have been "sharply reduced to reflect the the recent reduction in prices on hard drives and associated controller cards.

New prices are: five-megabyte Winchester system with one single-side floppy disk drive, $975; five-megabyte Winchester system with one double-side floppy disk drive, $1,175; 10-megabyte Winchester system with one single side floppy disk drive, $1,025; and 10-megabyte Winchester system with one double-side floppy disk drive, $1,225.

Meshna says the system "is fully compatible with the new Myarc computer introduced by Lou Phillips at the recent TI Faire in Chicago.

For further information, contact John J. Meshna Jr. Inc., P.O. Box 62, East Lynn, MA 01904 or (617) 595-2275.

New Tenex catalog

Tenex Computer Express has released its winter 1985/86 catalog, *The Everything Book for the Texas Instruments 99/4A Home Computer.*

Roger Dooley, Tenex president, says users who are not on Tenex's mailing list can receive a free copy of the catalog by calling 1-800-348-2778. Users in Indiana or outside the United States can call (219) 259-7051 or write Tenex, P.O. Box 6578, South Bend, IN 46660.

Users group forms

A new users group has begun for persons living east of Pittsburgh, Pennsylvania.

For further information, write the West Penn Users Group, R.D. #1, Box 73A, Jeannette, PA 15644 or telephone John D. Willforth at (412) 527-6656.

Corcomp card repairs

Don M. Scofield of Cleland Controls Corporation, Irvine, California, says his firm will repair CorComp cards for "a flat $35 a card."

The repairs have a 90-day warranty, Scofield says. He says the cards will be shipped back to the users the way they came, provided it was by UPS ground or normal mail, free of charge. Users must pay shipping charges for other types of shipments.

Scofield, one of the founders of CorComp, left that company about one year ago, he says, and says he is "getting back into the TI marketplace." He credits his decision to attending the November TI-Faire in Chicago and seeing the continued interest in TI products expressed there.

He says he is in negotiation for repair and support of Myarc products on the west coast and is committed to peripheral products for Myarc's planned new TI-compatible computer, working in cooperation with C&R Distributing of Acworth, Georgia. These will include both products which will fit into existing peripheral expansion boxes and new products, he says.

Scofield says his firm is also looking into becoming a major distributor for TI products and third-party products on the west coast.

For further information, write Cleland Controls Corporation, 2212 Dupont, Suite G, Irvine, California 92715.

GEnie seeks TI sysop

GEnie, General Electric's entry into the telecommunicating field for personal computer users, is looking for a sysop (systems operator) to begin a TI special interest group.

Bill Louden, manager of GEnie, says he hopes to have a TI group within the next few months.

He has had several requests for such a group on the service, he says and notes that it is "a matter of finding the right person with the expertise and knowledge."

GEnie would negotiate a royalty with such a person, he notes, saying that the average is between 5 and 10 percent of connect time.

Persons interested in the sysop position, he says, may write him at GE Information Services, Mail Stop 02B, 401 North Washington St., Rockville, MD 20850 or phone (301) 340-4000

After prime-time hours, connect fee is $5 per hour for 300 or 1200 baud on GEnie. This rate applies to use Monday through Friday from 6 p.m. to 8 a.m. local time, and all day on Saturday, Sunday and national holidays. GEnie is also available for prime-time use at $35 per hour.

Sign-up fee is $18, and there are no monthly charges.

GEnie is available at 2400 baud in 63 cities with a $10 surcharge, resulting in a total cost of $15 per hour for non-prime-time access and $45 per hour for prime-time access.

Louden says that 300 and 1200 baud users who subscribe to GEnie before Dec. 31, 1985, get three non-prime connect hours, a $15 value, and 2400 baud users who subscribe before that date get a $15 credit.

SIGs for the IBM PC, Apple Macintosh, Apple IIc, Tandy and Commodore are currently available on GEnie, as well as a SIG for game players.

GEnie also contains a CB simulator, an electronic mail service, various free software libraries, electronic newsletters, national real-time conferencing, shop and swapping services and a GEnie Game Room. Also, "A Networkers Journal" by Charles Bowen for PC end-users is available exclusively on GEnie, Louden says. Also available is a newsletter, "Computing Today" by Harvey and Patty Lester.

"In the first quarter of 1986 we plan to add to GEnie an online shopping service, travel services, more special interest groups, additional news services and publications and more games, in-

(Please turn to Page 48)

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.

Euroware for unique and different programs

SUPER ASTROLOGY
A program to find the values of astrological data for the construction of a natal and progressive horoscope. To utilize this program only your birth data must be entered. The package performs the computation of cusps of Placidian houses, positions of planets in the horoscope wheel, and their aspects. The program computes: 1) Julian's data, 2) sidereal time of birth, 3) locations of house cusps, 4) positions of planets by sign and house, 5) House cusps—overlay pattern, 6) aspects of planets, 7) transits of planets. With EXT-001P version results can be printed but 32K memory expansion box (or comparable memory expansion) is required.

EXT-001 TI-99/4(A). Extended BASIC. Cassette. Price: $39.95.

EXT-001P TI-99/4(A). Extended BASIC. Cassette. Memory expansion required. Price: $39.95.

HIGH LEVEL MATH PROGRAM
A program designed for scientifically oriented users such as university students, mathematicians, engineers, architects, etc. Solves problems of n-th order polynomial rootfinder, multidimensional integrals, the n-th order matrix operations (det, inverse, simultaneous equations, addition and multiplication, etc.), systems of differential equations, orthogonal polynomial approximation and others. Cassette, on 2 sides. Side 1: 1) Romberg integration, 2) Zeros of a function, 3) polynomial rootfinder, 4) first and second order differential equations, 5) convolution, 6) multiple integrals, 7) discrete Fourier series. Side 2 contains: 1) determinant of a matrix, 2) matrix inversion, 3) solution of simultaneous equations. Chapter 3 of High Level Math also includes a Complex Matrix Math program. With this program you can perform operations with matrices which contain complex and/or real elements. This program performs operations such as determinant of a matrix, matrix inversion and solution of simultaneous equations. A truly powerful and unique program.

EXT-003 TI-99/4(A). Cassette. Extended BASIC. Price: $39.95.

TIB-003B TI-99/4(A). Cassette. TI BASIC. Price: $39.95

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Newsbytes

(Continued from Page 47)

cluding multi-player games," Louden says.

A computer, an asynchronous modem (300, 1200 or 2400 baud), and a terminal emulator are required to access GEnie. Users can sign up from their own keyboard by calling 1-800-638-8369. Louden says the user should be ready with his VISA, MasterCard or checking account number and set his modem for half duplex (300 or 1200 baud). Upon connection, he should enter HHH, then press ENTER. At the U#= prompt, he enters 5JM11999,GEnie and presses ENTER. For additional information or assistance in signing up for GEnie, users may call 1-800-638-9636, ext. 21.

GEnie will lead the caller through an electronic sign-up process, asking for pertinent information concerning the user's computer or terminal. A GEnie representative will call with the new user's GEnie ID number the next business day, and the user will receive a GEnie Information Kit with a User's Guide a few days thereafter.

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We encourage writers to submit articles on disk. We prefer Dis/Var 80 files, such as those created by TI-Writer, but can convert other file types if need be. Hardcopy submissions should be double-space, using a 60-character line.

When submitting an article, include your name, address and telephone number in a cover letter. We encourage queries before submitting reviews or stories.

User Notes

Plotting circles

The question was simple: How do you draw a circle in BASIC? According to the Cin-Day (Ohio) Users Group, you can do it on paper or use the following program to plot it using CALL HCHARs. While the program doesn't actually draw a "circle,"it does calculate and draw the closest approximation based on X,Y and radius coordinates. And it runs in BASIC with nothing added.

RC equals the center row of the circle. CC equals the center column of the circle and "radius" equals the distance in blocks or tiles on the screen of the circumference from the row and column center of the circle. Thus, you would enter the following numbers when prompted: 10, 12, 16 for radius, RC and CC, respectively. Row 12 and column 16 are the approximate center of the screen.

```
100 CALL CLEAR
110 INPUT "RADIUS,RC,CC? ":R
ADIUS,RC,CC
120 CALL HCHAR(1,1,32,704)
130 FOR X=-RADIUS TO RADIUS
STEP 1/RADIUS
140 R=X+RC
150 C=SQR(RADIUS^2-X^2)+CC
160 IF (R<1)+(R>24)THEN 220
170 IF (C<1)+(C>32)THEN 190
180 CALL HCHAR(R,C,42)
190 C=2*CC-C
200 IF (C<1)+(C>32)THEN 220
210 CALL HCHAR(R,C,42)
220 NEXT X
230 GOTO 110
```

Retrieving, reusing subroutines

You know how it is: you've got a 200 line program and you'd really like to save 15 lines of it as a subroutine but you wish there was an easier way than retyping the 15 lines or deleting the other 185 lines one by one.

Fortunately there is, according to George Steffen of the Los Angeles 99ers users group. Writing in the group's newsletter, Steffen provides a six-line program that does the job so well that you may decide to go back and extract subroutines from an entire library of programs just to make up for all the tedium you've had to put up with in the past.

The program is meant to be MERGEd into the program—which is the reason the program uses such low line numbers—you wish to extract the subroutine from, so, after saving it as a program, save it again in the MERGE format: SAVE DSKX.FILENAME, MERGE. Now, load the program from which you want to extract a subroutine—any group of consecutive program lines will do—and and then MERGE the subroutine extractor into it: MERGE DSKX.FILENAME. Enter RUN. You will be prompted for the starting and ending lines you wish to extract. Having done so, the program will do its job.

The proof of the job comes after the "READY" sign appears. List the program. You should see only the lines that you want to preserve. Now, save these to disk.

One caveat: it is suggested that you save the preserved lines in a MERGE format to start, because the lines that you sought to delete actually are still there. However, we found that the extracted lines can also be saved as a program. The deleted lines did not reappear in either case.

This program requires Extended BASIC, a disk system and memory expansion.

```
1 CALL CLEAR :: CALL INIT ::
 INPUT "LINE NUMBERS OF ROUT
INE TO BE SAVED: FIRST,LAST?
 ":L,M :: G=256 :: CALL PEEK
(-31952,H,I,J,K)
2 C=INT(M/G):: D=M-C*G :: F=
(J-G)*G+K :: FOR E=(H-G)*G+I
 TO F STEP 4 :: CALL PEEK(E,
A,B):: IF A=C AND B=D THEN 4
3 NEXT E :: PRINT :"LINE";0;
"NOT FOUND!" :: STOP !@P-
4 H=INT(E/G):: I=E-(G*H):: H
=H+G :: C=INT(L/G):: D=L-C*G
 :: FOR E=E+4 TO F STEP 4 ::
 CALL PEEK(E,A,B):: IF A=C A
ND B=D THEN 6 !@P-
5 NEXT E :: PRINT :"LINE";N;
"NOT FOUND!" :: STOP !@P-
6 E=E+3 :: J=INT(E/G):: K=E-
(G*J):: J=J+G :: CALL LOAD(-
31952,H,I,J,K):: STOP !@P-
```

Atari into TI

Who'd want to make that change, right? Well, we're not suggesting that we'd rather have an Atari than a TI (we wouldn't) but there may be some BASIC programs written for the Atari—or Apple, Commodore, TRS80, etc.—that would be worth having on the TI. Unfortunately, while BASIC for each of these machines has a lot in common, none is what you could call "transportable" without a little (sometimes a lot) of fiddling.

Gene Thomas, of the Jacksonville Users Group of Jacksonville, Arkansas, published a list of some the characteristics of various dialects of BASIC. He notes, for example, that the following items are virtually identical in all brands of BASIC: ABS, ASC, CHR$, DATA, DIM, END, GOTO, GOSUB, INT, LET, PRINT, READ, REM, RESTORE, RETURN, SQR, STR$, DEF, IF-THEN AND VAL.

But he didn't stop there. He also offers a list of some of the statements that you can expect to be different and their TI equivalents. Here they are:

CLS—CALL CLEAR
CLEAR—NEW(Not used within TI programs.)
CHANGE—ASC & CHR$
CINT, FIX—INT
CLG—LOG (Base 10)
CLOAD—Open cassette file and load
COLOR—CALL COLOR
CSAVE—Open cassette file and save
DEFINT—DEF"INT"(Declare DEF statement numerals to be integers.)
DEFSNG—May be ignored
DEFSTR—May be ignored
DLOAD—Open disk file and load
DSAVE—Open disk file and save
SET, DOT—CALL HCHAR, VCHAR
EQ—Equal sign

(Please turn to Page 50)

User Notes

(Continued from Page 49)

FRE—May be ignored
GET, INKEY$—INPUT, CALL KEY
GOSUB-OF—ON GOSUB
GOTO-OF—ON GOTO
INSTR—SEG$
LLIST, LPRINT—LIST, output to printer
**MID$**—SEG$
LEFT$(S$,N)—SEG$(S$,1,N)
RIGHT$(S$,N)—S = LEN(S$/(N + 1)) :: SEG$(S$,S,N)
RND(N)—INT(RND*N) + 1
PRINT USING—PRINT, DISPLAY USING
**STRING$(10,65)**—S$ = RPT$(65,10) :: PRINT S$
WAIT—FOR-NEXT delay loop
?—PRINT

Turning DV/80 into a program

The following program, written by John Ford, has been around since 1984 and does an excellent job of turning Display Variable 80 files into runnable programs. DV/80, of course, is the format used with files created by TI-Writer, which in this case, can be used as a very powerful program editor.

The first thing you need, after entering the XLATE program, is a BASIC or Extended BASIC program. Having written it, save it in the normal manner and then save it as a DV/80 file using the LISTcommand. Enter LIST "DSKx.FILENAME". Having saved the program in this manner, load the TI-Writer editor and then load the program you saved using the LIST command.

After loading the program file, you may edit it using TI-Writer, taking advantage of its global search and replace functions to create wholesale modifications of variable names, etc. You will find that editing a BASIC or Extended BASIC program is much easier than using the relatively primitive editing capability of console BASIC or Extended BASIC. (The TI-Writer editor, afterall, is a line editor.) If you wish, you may write your BASIC or Extended BASIC program entirely through the TI-Writer editor because it is the DV/80 file that XLATE will translate into a runnable program.

Having completed your programming in TI-Writer, save it to disk in the normal way and exit the TI-Writer program. Plug in your Extended BASIC cartridge and load and RUN the XLATE program. XLATE will prompt you for the name of the DV/80 input file (respond with DSKx.FILENAME). Then it will prompt you for the output name (enter DSKx.FILENAME).

XLATE will then ask whether the program is in BASIC or Extended BASIC and whether program lines are longer than 80 characters. Having responded to these prompts, the translation will begin, with each line scrolling across the screen as it is translated. XLATE will write the program to disk in a MERGE format (DV/163). When finished, the READY sign will appear.

Now, enter NEW to clear the computer's memory and MERGE the output file into memory (MERGE "DSKx.FILENAME"). You may now RUN the program or save it to disk as a program (SAVE DSKx.FILENAME).

Although XLATE seemed to work properly when translating DV/80 files that included carriage returns into MERGE format programs, we could not get these programs to run. If writing programs in the TI-Writer environment, we recommend that you eliminate carriage returns before running the file through XLATE.

```
10 OPTION BASE 1 ! XLATE
 JOHN FORD - DEC '84
20 DIM T$(24,12),T(24),G(24,
12),H(17):: DISPLAY AT(10,2)
ERASE ALL:"TEXT TO PROGRAM C
ONVERTER": : :" writes a mer
ge format file  from text."
30 DATA 8,ABS,203,APPEND,249
,ASC,220,ATN,204,AT,240,AND,
187,ALL,236,ACCEPT,164,3,BAS
E,241,BREAK,142,BEEP,238
40 S$=RPT$(" ",80):: GOTO 14
0 :: A$,B$,P$,A,B,C,E,I,L,M,
P,X,Y,Z :: !@P-
50 DATA 4,CHR$,214,CLOSE,160
,COS,205,CALL,157,5,DEF,137,
DELETE,153,DIM,138,DISPLAY,1
62,DIGIT,233,6,ELSE,129
60 DATA END,139,EOF,202,EXP,
206,ERASE,239,ERROR,165,2,FO
R,140,FIXED,250,3,GO,133,GOT
O,134,GOSUB,135,0,4,IF,132
70 DATA INPUT,146,INT,207,IN
TERNAL,245,0,0,4,LEN,213,LET
,141,LOG,208,LINPUT,170,2,MA
X,223,MIN,224,3,NEXT,150
80 DATA NUMERIC,232,NOT,189,
5,ON,155,OPEN,159,OPTION,158
,OUTPUT,247,OR,186,4,PRINT,1
56,POS,217,PERMANENT,251
90 DATA PI,221,0,9,RND,215,R
EAD,151,RETURN,136,RESTORE,1
48,RANDOMIZE,149,REC,222,REL
ATIVE,244,RPT$,225,RUN,169
100 DATA 12,SEG$,216,STR$,21
9,STEP,178,SGN,209,SIN,210,S
QR,211,STOP,152,SEQUENTIAL,2
46,SUB,161,SIZE,235
110 DATA SUBEND,168,SUBEXIT,
167,5,THEN,176,TO,177,TAB,25
2,TAN,212,TRACE,144,5,UNBREA
K,143,UNTRACE,145
120 DATA UPDATE,248,USING,23
7,UALPHA,234,3,VAL,218,VARIA
BLE,243,VALIDATE,254,1,WARNI
NG,166,1,XOR,188
130 DATA 179,180,190,183,182
,253,191,192,193,194,196,195
,197,184
140 FOR X=1 TO 24 :: READ T(
X):: FOR Y=1 TO T(X):: READ
T$(X,Y),G(X,Y):: NEXT Y :: N
EXT X :: FOR X=4 TO 17 :: RE
AD H(X):: NEXT X
150 DISPLAY AT(2,2)ERASE ALL
:"INPUT FILE NAME:": : :" OU
TPUT FILE NAME:"
160 ON ERROR 160 :: ACCEPT A
T(3,2):A$ :: OPEN #1:A$ :: O
N WARNING NEXT
170 ON ERROR 170 :: ACCEPT A
T(6,2):A$ :: OPEN #2:A$,VARI
ABLE 163
180 DISPLAY AT(8,2):"enter 1
 for basic":" enter 2 for ex
tended basic":"   --->2"190
ON ERROR 630 :: ACCEPT AT(10
,8)SIZE(-1)VALIDATE("12"):A$
```

(Please turn to Page 51)

User Notes

(Continued from Page 50)

```
 :: IF A$="2" THEN E=1 :: GO
TO 210 ELSE IF A$="" THEN 18
0
200 T(1),T(4),T(5),T(15)=4 :
: T(2),T(22)=2 :: T(14)=1 ::
 T(18)=7 :: T(12),T(16),T(21
)=3 :: T(13),T(23),T(24)=0 :
: T(19)=9
210 DISPLAY AT(12,1):"SELECT
 MODE OF OPERATION:B": :"A.
Lines with any character
in the 80th column to be
joined with the next line"
220 DISPLAY AT(18,1):"B. Lin
es regularly sequenced" :: A
CCEPT AT(12,26)VALIDATE("AB"
)SIZE(-1):A$
230 IF A$="" THEN 220 ELSE I
F A$="A" THEN 260 ELSE DISPL
AY AT(19,4):"Enter line incr
ement:0010"
240 ACCEPT AT(19,25)VALIDATE
(DIGIT)SIZE(-4):I :: IF I=0
THEN 240
250 IF EOF(1)THEN 290 ELSE L
INPUT #1:P$ :: IF P$="" OR P
$=" " THEN 250 ELSE L=VAL(SE
G$(P$,1,POS(P$," ",1)))
260 IF I=0 THEN 290 ELSE IF
EOF(1)THEN I=0 :: A$=P$ :: G
OTO 310 ELSE LINPUT #1:B$ ::
 IF B$="" OR B$=" " THEN 260
270 IF SEG$(B$,1,LEN(STR$(L+
I))+1)=(STR$(L+I)&" ")THEN A
$=P$ :: P$=B$ :: L=L+I :: GO
TO 310
280 P$=SEG$(P$&S$,1,INT((LEN
(P$)-1)/80+1)*80)&B$ :: IF L
EN(P$)=255 THEN DISPLAY AT(2
4,1):"* error - line is too
long" :: GOTO 260 ELSE 260
290 IF EOF(1)THEN PRINT #2:C
HR$(255);CHR$(255):: CLOSE #
1 :: CLOSE #2 :: STOP ELSE A
$=""
300 LINPUT #1:B$ :: IF B$=""
 OR B$=" " THEN 290 :: A$=A$
&B$ :: IF LEN(B$)=80 THEN 30
0
310 Z=POS(A$," ",1):: A=LEN(
A$):: P,C,M,B=0 :: B$=SEG$(A
$,1,Z):: DISPLAY A$ :: GOSUB
 590
320 P=Z :: IF M>3 THEN PRINT
 #2:CHR$(H(M));:: IF M<>4 TH
EN B=0 :: GOTO 360 ELSE 360
330 IF M<>2 THEN B=0 ELSE 36
0
340 IF M=1 THEN B$="" :: GOS
UB 600 :: GOTO 360
350 IF M=3 THEN IF SEG$(A$,P
+1,1)=":" AND E THEN PRINT #
2:CHR$(130);:: P=P+1 :: C=0
ELSE PRINT #2:CHR$(181);
360 IF P>=A THEN PRINT #2:CH
R$(0):: GOTO 260
370 FOR Z=P+1 TO A :: M=POS(
""" :,;=()#<>+-/*^&",SEG$(A$
,Z,1),1)
380 IF M THEN IF Z=P+1 THEN
320 ELSE 400
390 NEXT Z
400 B$=SEG$(A$,P+1,Z-P-1)::
X=ASC(B$)-64 :: IF X<-18 OR
X>-7 THEN 430
410 IF B AND C=0 AND B<>132
AND B<>222 AND B<>241 AND B<
>149 AND B<>155 AND B<>156 A
ND B<>162 THEN PRINT #2:CHR$
(201);:: GOSUB 590 :: GOTO 3
20
420 PRINT #2:CHR$(200)&CHR$(
LEN(B$))&B$;:: GOTO 320
430 IF B=157 OR B=161 AND E
THEN 420 ELSE IF X<1 OR X>24
 THEN 520
440 FOR Y=1 TO T(X)
450 IF T$(X,Y)=B$ THEN B=G(X
,Y):: PRINT #2:CHR$(B);:: IF
 B=140 OR B=159 THEN C=1 ::
GOTO 320 ELSE IF B=129 THEN
C=0 :: GOTO 320 ELSE 320
460 NEXT Y
470 IF B$="REM" THEN PRINT #
2:CHR$(154)&SEG$(A$,Z,A-Z+1)
&CHR$(0):: GOTO 260
480 IF B$="IMAGE" AND E THEN
 PRINT #2:CHR$(163);ELSE 520
490 X=ASC(SEG$(A$,Z,1)):: IF
 X=32 THEN Z=Z+1 :: GOTO 490
500 IF X=34 THEN B$="" :: P=
Z :: GOSUB 600 :: PRINT #2:C
HR$(0):: GOTO 260
510 PRINT #2:CHR$(200)&CHR$(
A-Z+1)&SEG$(A$,Z,A-Z+1)&CHR$
(0):: GOTO 260
520 IF X=-31 AND E THEN PRIN
T #2:CHR$(131)&SEG$(A$,P+2,A
-P-1)&CHR$(0):: GOTO 260530
IF B$="DATA" THEN PRINT #2:C
HR$(147);:: P=Z+1 ELSE PRINT
 #2:B$;:: GOTO 320
540 IF P>A THEN PRINT #2:CHR
$(0):: GOTO 260 ELSE X=ASC(S
EG$(A$,P,1)):: IF X=32 THEN
P=P+1 :: GOTO 540
550 IF X=44 THEN PRINT #2:CH
R$(179);:: P=P+1 :: GOTO 540
560 IF X=34 THEN B$="" :: Z=
P :: GOSUB 600 :: P=Z+1 :: G
OTO 540
570 Z=POS(A$,",",P+1):: IF Z
=0 THEN PRINT #2:CHR$(200);C
HR$(A-P+1);SEG$(A$,P,A-P+1);
CHR$(0):: GOTO 260
580 IF SEG$(A$,Z-1,1)=" " TH
EN Z=Z-1 :: GOTO 580 ELSE PR
INT #2:CHR$(200);CHR$(Z-P);S
EG$(A$,P,Z-P);:: P=Z :: GOTO
 540
590 X=VAL(B$):: PRINT #2:CHR
$(INT(X/256))&CHR$(X-256*INT
(X/256));:: RETURN
600 Z=POS(A$,"""",Z+1):: IF
Z=0 THEN DISPLAY BEEP:"*unma
tched quotes":"*quote added
at end of line" :: Z=A+1
610 B$=B$&SEG$(A$,P+1,Z-P-1)
:: IF SEG$(A$,Z+1,1)="""" TH
EN B$=B$&"""" :: P,Z=Z+1 ::
GOTO 600
620 PRINT #2:CHR$(199)&CHR$(
LEN(B$))&B$;:: P=Z :: RETURN
630 DISPLAY BEEP:"*error in
above line":"*processing con
tinuing" :: ON ERROR 630 ::
IF P THEN PRINT #2:CHR$(0)::
 RETURN 260 ELSE RETURN 260
```

Correction to Tiny/Cal program

Bill Myers, of Denver, Colorado, points out a small error in the Tiny Calendar program that ran in the October issue. Line 310 needed to be truncated in order to make the calendar print out properly. Also, in line 200, March and May need to be changed from 32,30 to 31,30. As we all know, both months have 31 days, not 32.

Herein follows the modification to

(Please turn to Page 52)

User Notes

(Continued from Page 51)

line 310 and the addition of a new line 320. The remainder of the program is renumbered and is included only to avoid confusion.

```
310 PRINT #1:CHR$(27);"3";CH
R$(8);"S  M  T  W  T  F  S
  S  M  T  W  T  F  S":CHR$(
27);"3";CHR$(14);
320 PRINT #1:CHR$(27);"3";CH
R$(14);"-  -  -  -  -  -  -
  -  -  -  -  -  -  -"
330 IF J>D(I)THEN 330 :: IF
A>7 THEN A=A-7 :: GOTO 320 E
LSE PRINT #1:TAB(A*3-2);STR$
(J);:: IF A=7 THEN 330 ELSE
A=A+1 :: J=J+1 :: GOTO 320
340 IF K>D(I+1)THEN 340 :: I
F B>7 THEN B=B-7 :: GOTO 330
 ELSE PRINT #1:TAB(21+B*3);S
TR$(K);:: IF B=7 THEN 340 EL
SE B=B+1 :: K=K+1 :: GOTO 33
350 IF J>D(I)AND K>D(I+1)THE
N 350 ELSE PRINT #1:"" :: A=
A+1 :: B=B+1 :: J=J+1 :: K=K
+1 :: GOTO 320
360 PRINT #1:"" :: NEXT I ::
 PRINT #1:"":CHR$(27);"@" ::
 CLOSE #1 :: RESTORE :: GOTO
 190
```

Lots of sound from the keyboard

This program originally appeared in the Nittinian, a newsletter for TI users in Sweden. It's a good one for grownups to play with when young children are around. Essentially, it is a poor man's music maker using the lower three rows of keys, with the exception of the slash and period keys. The bottom row plays noises in the when the shift key is up. The translation was done by Maurice Swinnen of the Washington D.C. Area users group.

```
50 REM PIANO, NITTINIAN 84-2
100 CALL KEY(0,K,S):: IF S=0
 THEN 100
110 IF K=45 THEN 100
120 IF K<44 THEN 100 ELSE IF
 K>46 AND K<58 THEN 100 ELSE
 IF K>60 AND K<65 THEN 100
130 IF K>90 AND K<96 THEN 10
0 ELSE IF K>96 THEN 200 !CHE
CK IF LOWER OR UPPER CASE LE
TTER HAS BEEN PRESSED
140 IF K=44 THEN CALL SOUND(
-100,1568,0):: GOTO 100
150 IF K=46 THEN CALL SOUND(
-100,1760,0):: GOTO 100
160 IF K=59 THEN CALL SOUND(
-100,698,0):: GOTO 100
170 IF K=58 THEN CALL SOUND(
-100,1661,0):: GOTO 100
180 IF K=60 THEN CALL SOUND(
-120,-8,0):: GOTO 100
185 REM UPPER CASE LETTERS A
SCII=65->90
190 ON K-64 GOTO 210,220,230
,240,250,260,270,280,290,300
,310,320,330,340,350,360,370
,380,390,400,410,420,430,440
,450,460
195 REM LOWER CASE LETTERS A
SCII=97->122
200 ON K-96 GOTO 470,480,490
,500,510,520,530,540,550,560
,570,580,590,600,610,620,630
,640,650,660,670,680,690,700
,710,720
205 REM UPPER CASE LETTERS=H
ALF TONES+NOISE
210 CALL SOUND(-120,466,0)::
 GOTO 100
220 CALL SOUND(-120,-6,0)::
GOTO 100
230 CALL SOUND(-120,-1,0)::
GOTO 100
240 CALL SOUND(-120,622,0)::
 GOTO 100
250 CALL SOUND(-120,156,0)::
 GOTO 100
260 CALL SOUND(-120,740,0)::
 GOTO 100
270 CALL SOUND(-120,831,0)::
 GOTO 100
280 CALL SOUND(-120,932,0)::
 GOTO 100
290 CALL SOUND(-120,311,0)::
 GOTO 100
300 CALL SOUND(-120,1109,0):
: GOTO 100
310 CALL SOUND(-120,1245,0):
: GOTO 100
320 CALL SOUND(-120,1480,0):
: GOTO 100
330 CALL SOUND(-120,-4,0)::
GOTO 100
340 CALL SOUND(-120,-5,0)::
GOTO 100
350 CALL SOUND(-120,370,0)::
 GOTO 100
360 CALL SOUND(-120,415,0)::
 GOTO 100
370 CALL SOUND(-120,177,0)::
 GOTO 100
380 CALL SOUND(-120,185,0)::
 GOTO 100
390 CALL SOUND(-120,554,0)::
 GOTO 100
400 CALL SOUND(-120,208,0)::
 GOTO 100
410 CALL SOUND(-120,277,0)::
 GOTO 100
420 CALL SOUND(-120,-7,0)::
GOTO 100
430 CALL SOUND(-120,139,0)::
 GOTO 100
440 CALL SOUND(-120,-2,0)::
GOTO 100
450 CALL SOUND(-120,233,0)::
 GOTO 100
460 CALL SOUND(-120,-3,0)::
GOTO 100
465 REM LOWER CASE LETTERS=W
HOLE TONES
470 CALL SOUND(-100,294,0)::
 GOTO 100
480 CALL SOUND(-100,1175,0):
: GOTO 100
490 CALL SOUND(-100,988,0)::
 GOTO 100
500 CALL SOUND(-100,349,0)::
 GOTO 100
510 CALL SOUND(-100,131,0)::
 GOTO 100
520 CALL SOUND(-100,392,0)::
 GOTO 100
530 CALL SOUND(-100,440,0)::
 GOTO 100
540 CALL SOUND(-100,494,0)::
 GOTO 100
550 CALL SOUND(-100,220,0)::
 GOTO 100
560 CALL SOUND(-100,523,0)::
 GOTO 100
570 CALL SOUND(-100,587,0)::
 GOTO 100
580 CALL SOUND(-100,659,0)::
 GOTO 100
590 CALL SOUND(-100,1397,0):
```

(Please turn to Page 55)

Classified

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A diskfull of 100(!) utility subprograms for the TI99/4A in XBASIC MERGE format, ready to merge into your programs. With documentation, just $19.95 postpaid! And now ready, NUTS & BOLTS -2, another diskfull, another 100 subprograms, also $19.95, or both for $37 ppd. Tigercub Software, 156 Collingwood, Whitehall, OH 43213. v3n5

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ALL-PURPOSE QUIZ GENERATOR for TI99/4A—This program allows you to create your own computer-generated quizzes on any subject. Features include fill-ins, multiple choice and full editing capabilities. This program makes a great study aid. Requires Extended BASIC. Product carries a full money back guarantee. Please specify cassette or disk version. Send check or money order for $9.95, $1.50 shipping and handling, to: JSTI Software, 70 Stanson Dr., N. Attleboro, MA 02760. v2n11

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Business, data and game programs available on cassette or disk. Extended BASIC required. Free catalog. (513)825-6645. Extended Software Co., 11987 Cedarcreek Drive, Cincinnati, OH 45240. v2n11

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PROGRAM SET: Build molecules & Calculate properties. Van der Waals checking. Add Atoms with Cartesian, Polar or advancing Polar coordinates. Find distances, angles; move or rotate individual atoms; select location of coordinate system. Keep substituents in up to 9 cells, manipulating independently; combine when desired. Rotate, translate, expand or shrink any cell. Colored Atoms, Partial charges can be input. Calculates Debye Scattering (X-ray) patterns, Dipole moment, Moments of Inertia. User documentation & files of simple molecules included. Requires EB, disk drive, 48K, printer advisable. $20.

TALKING JOYSTICK/FINGERSPELL

Teach letters (upper or lower case), reading, phonetics, simple grammar, fingerspell. Use joystick or keyboard to construct sentences or phrases, program pronounces entries as made. Enter '.' to pronounce sentence. Graphics with words make program interesting to pre-schoolers. Use supplied file of 60 words or build your own. Instructions provided on disk. $15. EB, disk drive, 48K, joystick, speech synthesizer. Send request and check to: Jim Mentele, 208 Wilson Dr., Midland, MI 48640. v2,n11

SIM::WIN PROGRAMS

TI X-BASIC games and programs, such ones as Friday the twelfth plus one. For catalog send 25¢ or SASE, to: Sim Win Computer, P.O. Box 1325, Beaverton, OR 97075-1325. v2,n11

FOR SHAKLEE SALES LEADERS, COMplete software system, $400.00. For more information: Leroy Enterprises, 6814 Vivian Avenue, Dallas, Texas 75223, (214) 327-7021.

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Put your TI 99/4A to work for you in your home. Stock Plot maintains a record of the weekly price ranges of your favorite stocks. At your command it will plot the weekly high, low, and close prices for each stock for the last 50 weeks. It will also compute the cost, current value, average hold time and rate of return for your portfolio and each stock in your portfolio. All you have to do is enter the weekly prices from your local newspaper. Stock Plot is supplied in both cassette and disk/Extended BASIC versions each especially written to take maximum advantage of the hardware and software used. Order by check or request a detailed description to discover the full value of this useful program. Cost may be tax deductable. Cassette—$19.95 Disk—$21.95 Glen Smith, 951 Lookout Dr., Kingsort, TN 37663 v2n11

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We carry a full line of TI computer supplies. Call or write us for information and to join our Mailing List—Free
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214 N York Rd (215) 441-4262
Knowledgeable Service—Willing Support v2,n2

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I need a screendump program and graphics routines for an 8-bit 6-dot Digital LA-50 printer. Dwight, 414 Long Leaf Acres Dr., Wilmington, NC 28405. v2n11

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Enter the data requested and the computer will give you a printout on your printer or the screen of what to put on the various forms and schedules. Requires Extended BASIC, 32K Expansion, and Disk Drive.

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Schedule W	$4.95
Form 2441	$4.95
All of the above	$39.95

Send Certified Check or Money Order to: RMJ Home Computer Sales, 2982 Whileaway Cir. W., Colorado Springs, CO 80917 v3n1

ROCKETMAN CHECKBOOK PROGRAM

and THE BASIC DATA BASE PROGRAM
The Rocketman Checkbook Program is designed for reconciliation of household or business accounts. It makes balancing enjoyable and is a great aid for finding problems in accounts which will not reconcile. Cost—$39.95. The Basic Data Base is a separate program which will store all tax deductable

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items to random access files and print hard copies when needed. Cost—$9.95. Both require Extended BASIC, 1 disk drive and 32K expanded memory. Write or phone: CALIFORNIA PROGRAMS, 4104 San Pablo Dam Rd., El Sobrante CA 94803. 415-222-1626—California residents add 6.5% sales tax. Visa or Mastercharge accepted. v2n11

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If you have a Disk Drive and Memory Expansion these are for you:

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HARDWARE FOR SALE

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TI DISK CONTROLLER CARD (PHP1240); TI Stand Alone Disk Controller (PHP1800); TI SS/SD Disk Drive (bare—PHP1250); TI SS/SD Disk Drive (with case, p/s & cable—PHP1850). All used but in good condition. Best offer for any or all. Wayne McNab, 5757 S. Staples #4303, Corpus Christi, TX 78413, or call (512) 992-4267. v2,n11

HARDWARE FOR SALE

PHP-1100 $9, PHP-1220 $60, PHP-1240 $55, PHR-1250 $55, PHP-1600 $55, Pascal Card w/software $200, BMC BX-80 Printer $160, HUSH-80 Printer w/paper $90, Mike Dudeck, P.O. Box 95, Belle Plaine, KS 67013 316-488-2737. v2n11

SEVERAL COMPLETE TI99/4A COMPUter systems with Documentation and Software, from $390 to $830. Please send SASE for Complete Description to D. Whitcombe, 820 First St., Manhattan Beach, Calif, 90266 v2,n11

FULLY CONFIGURED 99/4A SYSTEM! Too much to list. Send S.A.S.E. or call for details: Dave Simpson, 200 S. Osteopathy #111A, Kirksville, Missouri 63501-1485. 816-665-0749. v2,n12

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User Notes

(Continued from Page 52)

```
: GOTO 100
600 CALL SOUND(-100,1319,0):
: GOTO 100
610 CALL SOUND(-100,247,0)::
 GOTO 100
620 CALL SOUND(-100,262,0)::
 GOTO 100
630 CALL SOUND(-100,110,0)::
 GOTO 100
640 CALL SOUND(-100,147,0)::
 GOTO 100
650 CALL SOUND(-100,330,0)::
 GOTO 100
660 CALL SOUND(-100,165,0)::
 GOTO 100
670 CALL SOUND(-100,196,0)::
 GOTO 100
680 CALL SOUND(-100,1047,0):
: GOTO 100
690 CALL SOUND(-100,123,0)::
 GOTO 100
700 CALL SOUND(-100,880,0)::
 GOTO 100
710 CALL SOUND(-100,175,0)::
 GOTO 100
720 CALL SOUND(-100,784,0)::
 GOTO 100
```

DRIVE—

(Continued from Page 45)

The authors extend their best wishes for success and hope that this project works as well for you as it has for us.

MICROpendium urges caution when undertaking any hardware modification, including the modifications described in this article. MICROpendium or the authors cannot be held responsible for any damage resulting from implementation by readers of hardware modifications.

New BBS announced

Arthur Hazboun, sysop, announces a new TI BBS subboard, TEXSUBIN, which can be reached at (213) 325-0213 24 hours a day.

The board is a subboard on the ARBBS (Average Remote Bulletin Board System) and is located on Segment 05, Hazboun says.

The LEADING monthly devoted to the TI99/4A

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