Covering the TI99/4A, the Myarc 9640 and compatibles

MICROpendium

Volume 4 Number 7 August 1987 $1.50

Reviews

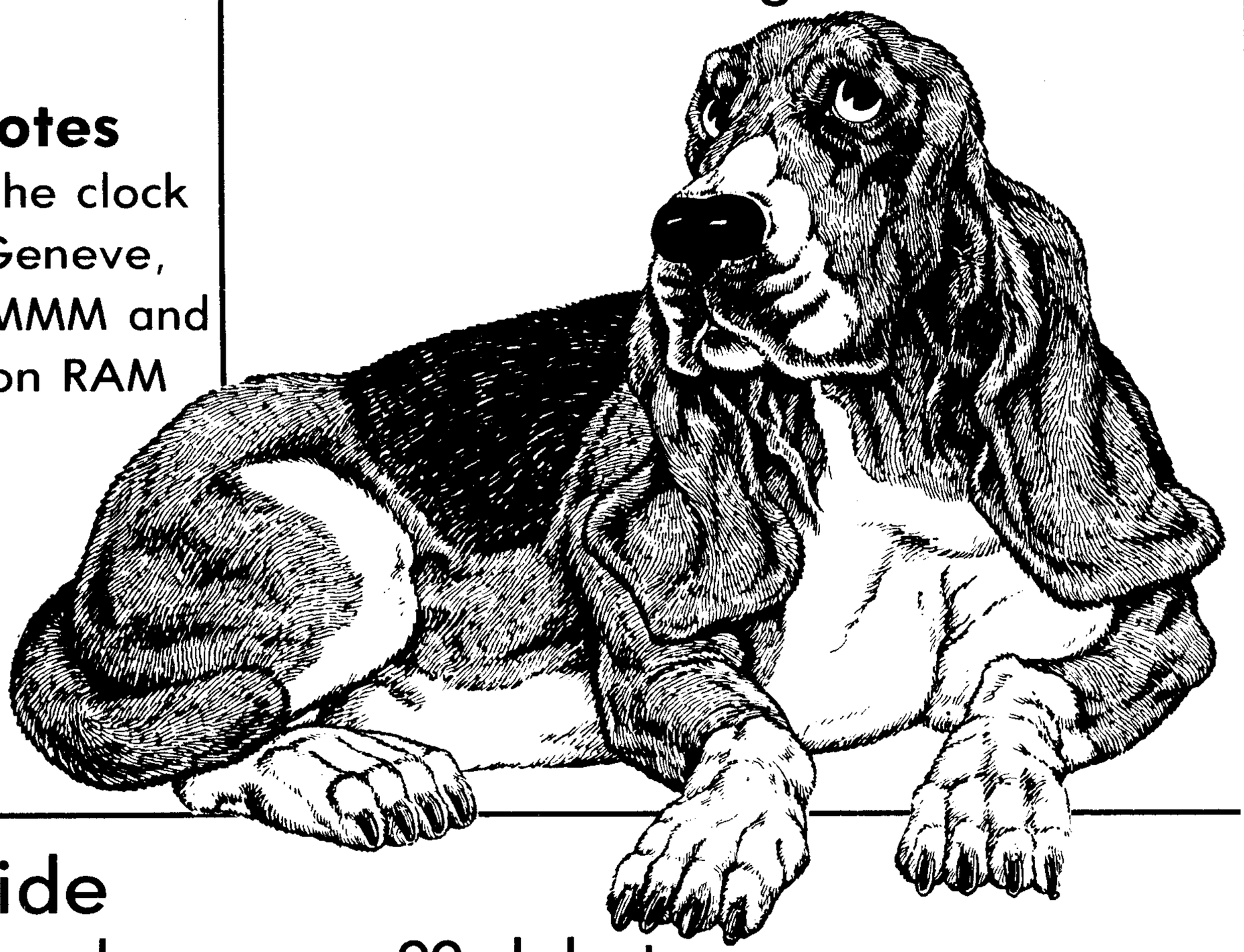
Prostick
The Brain
Rocketman
Menu Ver. 6.3

User Notes

Setting the clock on the Geneve, testing MMM and expansion RAM

B-I-N-G-O

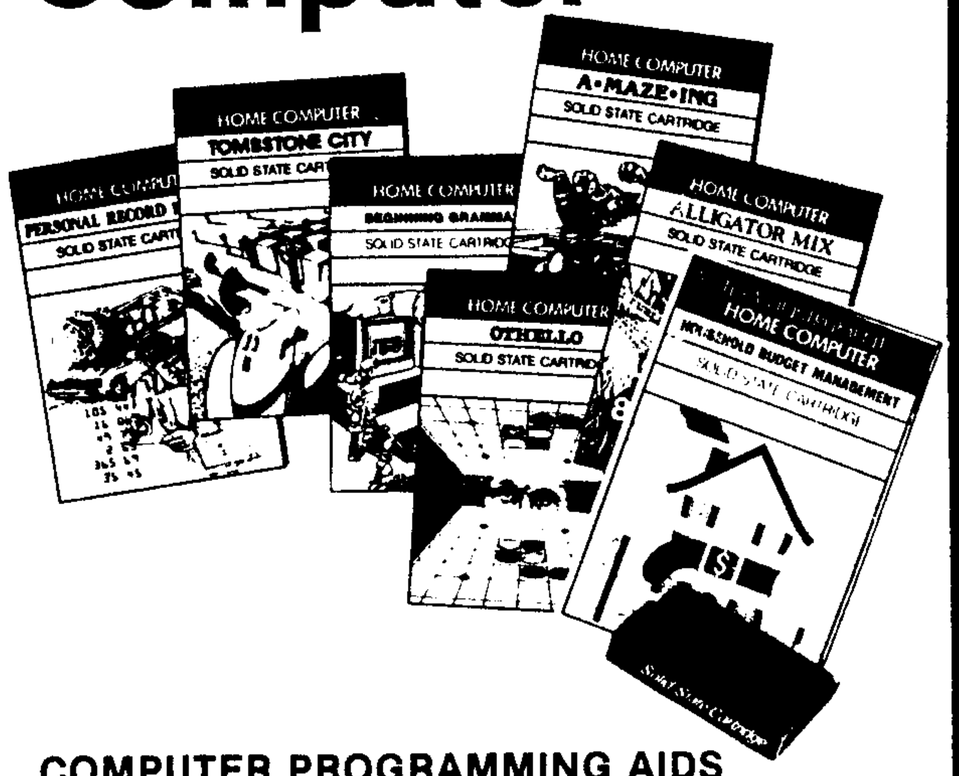
See Page 18



Inside

A column on c99 debuts
Exploring the power of Mini-Memory
Using string variables in BASIC

Texas Instruments TI-99/4A Home Computer



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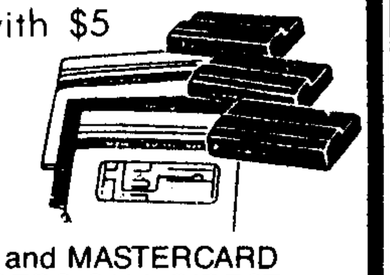

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Coming next month

- Super Extended BASIC review
- New Geneve column
- Manipulating character sets

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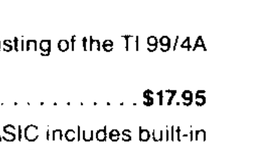

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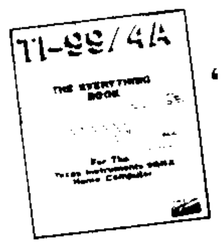

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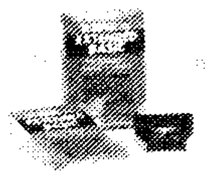

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Here's the good news... the new Myarc Geneve Computer you've been hearing about is to be shipping by press time! Imagine a computer that is 99/4A compatible but has the speed and incredible graphics capabilities that even IBM, Amiga, and Atari ST owners would envy!

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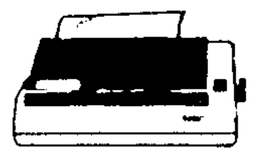

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Comments

Columnists to cover c99, Geneve

We weren't perfect with our listings of TI user groups, and we've read the references in the newsletters. It hurts.

But by way of defense, some groups were left out because they didn't send us specific information about the group as we had requested. You see, we had a box — still do — that is set aside to hold nothing but data about user groups. We also have boxes for User Note submissions, Newsbytes, reviews, articles, etc.

From this box we entered our first listing of user groups, which appeared in the May 1987 edition. Then we started getting the razz from those who didn't send us information about themselves. These we plugged into the very next issue.

While some user groups just assumed that we would put them on the list and didn't bother to send information — yes, we knew the Boston Computer Society existed, and we knew it when we printed the first listing sans BCS — some of the problems resulted from the limitations of our F.U.M. filing system.

Unfortunately, many letters sent to MICROpendium cover a variety of topics, ranging from ordering back issues to sharing information about programming. Regardless of the topic, all letters are filed by what I call the First Use Method: that is, if the letter starts with a request for a subscription it gets filed under subscriptions. Never mind that in the second paragraph the writer asks that we send his brother in Spain a sample copy. Or that TI is reentering the home computer market. Once the subscription is fulfilled, it's likely that the letter will get filed with the thousands of other subscription requests, which are kept in very large boxes under a table. As these boxes fill up, they are closed and placed in a stack in the room where we keep our back issues. The same goes for letters that start with requests for bulk orders, back issues, magazine holders or freeware.

In a more perfect world, we would re-read the letters and file them according to a theoretical Second Use Method. Unfortunately, filing is not our forte. And we apologize for that. But to minimize these problems we ask that when writing to MICROpendium you keep in mind the limitations of our First Use Method of filing. If you've got more than one subject to bring up, send us two letters. That way we can give each of your subjects the full attention they deserve without violating our First Use Method.

c99 COLUMN DEBUTS

Beginning with this issue, we will be carrying a column about the programming language c99. c99 was created by Clint Pulley and is available from him for $20. (See the column for details.) Charles Kirkwood is a former college professor who taught computer science courses at Clemson University in South Carolina. We've asked him to start from the beginning and work forward, so those who are c99 afficiandos are asked to indulge us for a couple of months and send us suggestions for topics they would like to see covered.

ADVICE SOUGHT ON CC40

A reader called to tell us that he recently acquired a CC40 computer and would like to get in touch with others who can help him acquire peripherals and information about TI's hex bus interface. Responses to MICROpendium will be forwarded to him.

GENEVE COLUMN TO START NEXT MONTH

Mike Dodd, president of the K-Town 99/4A Users' Group, will begin writing a column about the Geneve in the September issue. He programs in Extended BASIC and assembly language and has produced a number of programs, including Disk Manager 99 and XBasher, an XBASIC compacting utility. He also wrote some of the new CALLs for Triton's Super Extended BASIC cartridge and a demonstration program used on the Geneve by Myarc at the Summer Consumer Electronics Show in Chicago.

And as reassurance to our readers, MICROpendium is not going to abandon coverage of the 99/4A. We will expand to cover the Geneve as it develops and as much as possible to make sure that programs published in MICROpendium are usable with both computers. At some point, I suppose, a separate Geneve publication could be considered, though that would depend entirely on Geneve users. It would take a minimum of 4,000 subscribers to adequately support such a publication, and even then a lot would depend on whether there are enough ads to help pay the costs.

—JK

Reviwed 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, QUICKCOPYer, 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, Extende BASIC II Plus, XB Detective, Console Writer 2.a
November: Foundation Z80A/80-column cards, 9900BASIC, Adventure Editor
December: Display Enhancement Package, Triple Tech

1986

January: BITMAC, Starcross
February: Night Mission, Peripheral Diagnostic Module, BA-Writer
March: Super Duper, Tunnels of Doom Editor, Business Graphs 99
April: U.S. Open Tennis, PRBASE
May: 4A Flyer, GRAM Kracker, Artist's Companion
June: Myarc Disk Controller Card, Maximem
July: Horizon RAMdisk, Old Dark Caves, Funlwriter, TI99/4A Macro Assembler
August: JOYPAINT 99, GPL Assembler, TI99/4A Intern, GPL Linker
September: Mechatronic 128K Card
October: TI-Forth Utilities, CorComp Memory Plus
November: Submarine Commander, PEP, MAX-RLE
December: GK Utility I and II and GRAM Packer, X-10 Powerhouse, RAVE 99/101.

1987

January: MG DISKASSEMBLER, Myarc XBII
February: TI-Tax, Mechatronic Mouse
March: Wycove Forth version 3.0, DIJIT Systems RGB Conversion Kit, Spad XIII Flight Simulator
April: Geneve 9640, Disk Utilities
May: QS-Solitaire, Geneve 9640 (Part 2), Technical Drive, Console Calc
June: Character Sets and Graphic Design III, Writerease Ver. 1.1, 4A DOS, Prescan_It
July: Junkman Junior, Avatex 1200/1200hc modem, Bubble Plane

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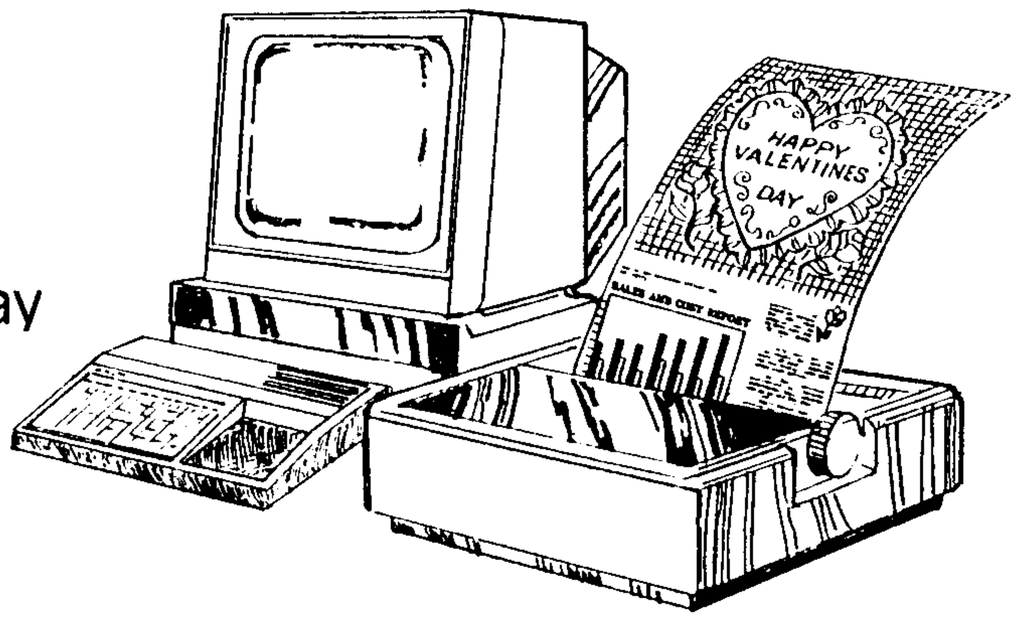

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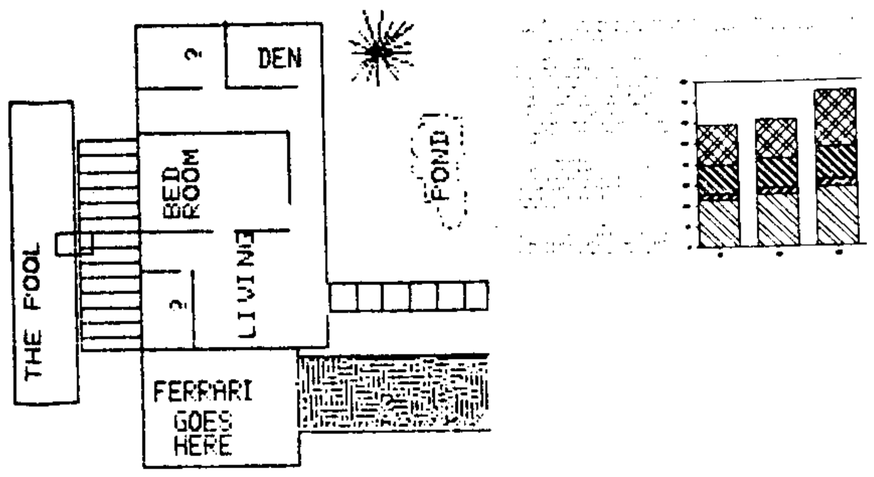

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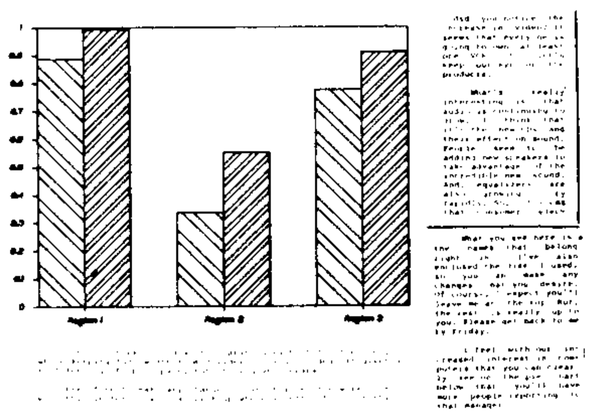

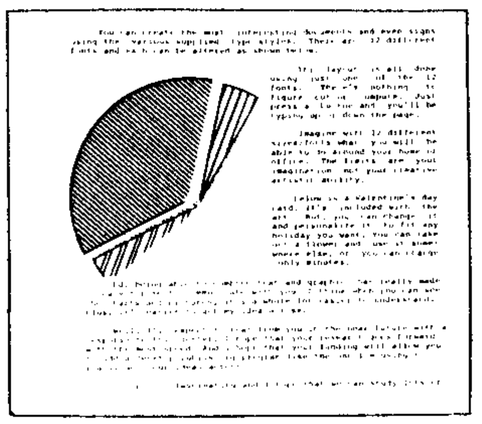

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Feedback

Printer compatability woes detailed

A year ago (MICROpendium July '86) we heard in Feedback of the sorrows of Mr. Hazboun, who had a Seikosha (Axiom) GP-100TI printer, and found it to be incompatible with TI Artist and with any screen dump he could locate.

In response to Hazboun, a Mr. Lamberti, writing in August '86 for Texaments and TI Artist, explained Axiom's behavior as a "habit of altering the internal software within its printers of a similar model, thus making them incompatible with certain software packages like TI Artist."

I have the same problems as Hazboun: I too have a Seikosha (Axiom) printer, a GP-550TI, and the label adds, "TI99/4A printer," and I too have found no screen dump for this printer, although it seems reasonable to expect a TI99/4A printer to be compatible with that computer. And I also bought TI Artist when I read a notice (Sept. '86) reporting Lamberti as stating that their version 2.01 was compatible with the Axiom GP-550A printer. My mistake was in assuming that 550A and 550TI were the same thing. I haven't had the nerve to complain to Texaments, and I have fiddled away a 90-day warranty period trying to make it work, with about 20 percent success—on some things it behaves.

Aside from the shortcomings of Seikosha (Axiom), what we seem to need is user-friendly advertising: Texaments COULD have said that Hazboun's GP-100TI was not compatible with TI Artist, and Lamberti COULD have said that his product was not compatible with the GP-550TI. They could have saved a heap of trouble. Or is this unreasonable? In any case, Texaments was concerned enough to modify their product so that the GP-100TI now works with TI Artist. ("A small revision," says Lamberti.) Dare I hope for a small revision in my case?

The problems we owners of foreign printer breeds run into might be eased somewhat if we had access to the printer codes for Epson compatible printers. I have what I suspect is a perfectly lovely calendar printing program, but it's written for Epson. If I knew what the Epson is supposed to do with a given printer code, I might be able to translate into Axiomese. Is there a kind-hearted Epson owner out there?

Elton Schooling
Sacramento, California

How but not why

Referring to the program line length question by James H. Webb of Tampa, Florida (July 1987), his question was "Why?" as well as "How?"

Your answer was only how to cope with the problem and not "why?" programmers use extra long lines which tend to confuse newer people working with computers.

To an experienced programmer the answer may be so obvious that he feels it isn't worth mentioning and yet to an inexperienced person starting out with a new computer it is a major problem.

Things that come to mind are: Have some parts burned out? Is there a misprint in the program? Is the correct language being used? Is the program really written for my computer? How can I find out what is wrong?

ENTER MICROpendium Feedback if the person is lucky and then comes the How but in this particular case, no Why.

I bring this to your attention because I have just been through this. Fortunately I belong to a TI user group.

James F. Murta
Glendale, California

Using long program lines appeals to some programmers from an aesthetic point of view. They like to write tightly packed code. In some cases, keeping a program operation in one line results in greater speed and efficiency. In most cases, large program lines started as a group of shorter lines that were later combined.

Found a users group

I have learned more from [MICROpendium] than any other magazine I have taken. And thanks to your May issue I have finally found a TI users group.

Darlene V. Gaerte
Nampa, Idaho

Making progress with GRAM Kracker

I have finally taken by GRAM Kracker out and got down to using it. I had briefly tried it shortly after buying it last November, to check it out and to have a go at Plato (a big anti-climax), but several drawn-out moves and other demands have meant all forward progess has had to be shelved. Now, at last, I am finding a little time for other than bare necessities.

One advantage of the delay is that there is now more advice available — I have devoured all references I could find in MICROpendium, LA99er's TopIcs and Smart Programmer. One was the elimination of the other language selections for TI-Writer, and in this connection information in the February User Notes was interesting. However, I didn't quite work for me, though it set me on the right road.

Following this lead, I found myself at address >6010, changing this to >60CB removed all but the last selection. I found that I had to go further back to >6006, where I found reference to >6010. Changing this to >60CB removed all but the top selection.

Similarly, I also eliminated the other two selections of Disk Manager 2 — changing >8006 from >802A to >805B.

I found that not eliminating these selections on long menus caused the menu to go over the page, resulting in extraneous garbage and fouling up some operations.

John R.R. Bingham
Stord, Norway

Sorry about that

In your July, 1987 issue you printed a program under User Notes called "Stop-It." You mentioned that you did not know the author. The program appeared in a book entitled *Terrific Games for the TI99/4A*, by Hal Renko and Sam Edwards. The book was copyrighted in 1983 by Addison-Wesley Publishers, Ltd.

There are only minor differences in REM statements, and an error in line 70 of your program. Line 70 should read:
70 CALL VCHAR(1,192*A,30,24)

Making this correction will line up the

(See Page 10)

Feedback

(Continued from Page 8)

vertical bars properly with the letters on the righthand side of the screen, and keep the letters from blanking them out when they cross. Incidentally, the letter that moves across the screen is not a sprite. It is printed with a CALL HCHAR.

Jim R. Van Scyoc
Hayward, California

Thanks for letting us know the program was copyrighted, and the correction. It is not the policy of MICROpendium to knowingly publish copyrighted materials without the permission of the copyright holder.

Notes from Houston

In reference to my disk Menu-Run program submitted in the May 1987 issue, line 19 should have read:

19 ON ERROR 17 ! :: ZZD=1 :: GOTO 22

which would create a problem only if someone follows the instructions in line 18 to set the program to run automaticly from DSK1. No effect on running "as is" with drive selection appearing each time, but it was "my mistake."

Thanks for printing the program. I have since encountered a similarly structured menu in some of the Johnson Users Group disks, the use of which would have saved me about a week of hacking to arrive at duplicate methods for creating the phantom RUN line in Line 04, but then I would have never gained all that knowledge of how TI XBASIC "can't do that," or how it COULD do it.

Houston Users Group (H.U.G.) TIBBS has been down recently due to serious illness of Bill Knecht, sysop. He has, through the years, been the source of many attractive music and graphics programs which are in circulation.

NOTE: In reference to the July 1987 issue, page 36, some of the "TI" switching power supplies sold by Radio Shack seem to be defective, with a pulsing 12v or a spike on the 5 volt output. BEFORE installing, place a 100 ohm resistor across all three outputs and check with a scope. At least one unit locally reportedly had a 15-volt spike on the 5-volt output. I had one with a sawtooth on the 12-volt side. As with any non-standard or non-OEM power supply parts or components, check and RE-CHECK before powering up your equipment.

Sorry to see you lose the contributions and expertise of Mack McCormick—his insight into the hardware operations of the 4A gave a lot of encouragement to the rest of us who want to know "how it REALLY works.

Richard Lumpkin
Houston, Texas

Get a surge protector

I thought that you may want to share a recent experience that I had with surge protectors with your readers. I have been a big believer in surge protectors for a long time now, ever since a power surge wiped out my printer many years ago.

Recently the purchase of my surge protectors paid off. Not long ago an electrical storm hit Memphis. Usually I have my computer turned off during such storms but this time I really needed to write a letter and decided to turn it on for a few minutes, as the storm seemed to be moving away anyway so I felt it was safe.

Only a few minutes after I had turned on my system a big clap of thunder hit! Lightning had definitely hit a power line nearby, as the lights all dimmed down but the power remained on.

After peeling myself off the ceiling I quickly saved what I had and shut down my system which was still running. However, a TV in another room, which was on at the time, was not so lucky, as the lightning had caused a power surge and totaled the TV! The TV did not have a surge protector on it, although our VCR connected to the TV did and the VCR was not harmed.

The point is the surge protectors I had purchased a long time ago probably just saved my computer equipment and VCR! This is not just an isolated case, as I have seen many systems blown by surges because people did not have a surge protector. I even know one person whose system was blown on a clear day by a sudden surge.

It is not necessary to have a fancy surge protector, as any is better than none at all, as your computer is probably the most sensitive piece of equipment to voltage changes that you have. I even purchased one for the phone line as I have a direct connect modem and a surge can come through the phone line just the same as the power line. Surge protectors for the phone line cost a little more and can be found at Radio Shack, computer stores and sometimes even regular department stores.

A surge protector will not provide 100 percent protection, as a direct hit of lightning on your power line will probably get through, but in my case it really saved me a lot of money. By the way, all of our TVs now have surge protectors as well.

Gary Cox
Memphis, Tennessee

Program lines need changes, author says

I was surprised to discover an article I had written ("Put your speech synthesizer to work as a proofreader," p. 14) in the June 1987 issue of MICROpendium, especially since I had nearly forgotten having written it.

However, now that the article is in print and being shared among friends (all TI protectors are my friends) your readers should be made aware of two errors in the program listing. The following lines should be corrected to read:

63 B$="^GREATER THAN."
74 B$="^(BRACKUT?"

I'm happy to announce that the most difficult BASIC programs to type, those that have been translated from machine language to CALL LOADs (for example, Jim Jagielski's delightful Wordcount II, Nov. 86 p. 51) can be proofread in nearly half the time by simply loading the Extended BASIC program into BASIC, with TE II module connected, then entering the command LIST "SPEECH":50-100. You will then hear those lines read to you so rapidly that you may have trouble keeping up with them.

Steven L. Richardson
Magna, Utah

The Feedback column is a reader forum. The editor will condense excessively lengthy submissions if necessary. We ask that writes limit themselves to one subject per submission. Our only requirement is that submissions be of interest to those using the TI99/4A home computer or compatibles. Send items to: MICROpendium Feedback, P.O. Box 1343, Round Rock, TX 78680.

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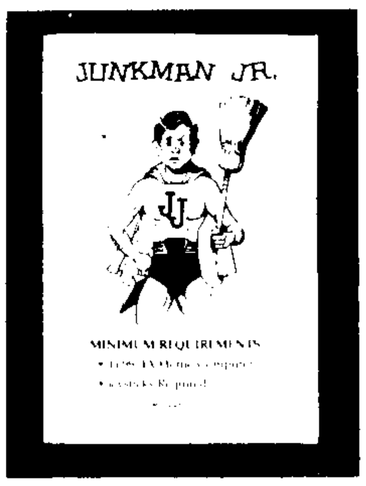

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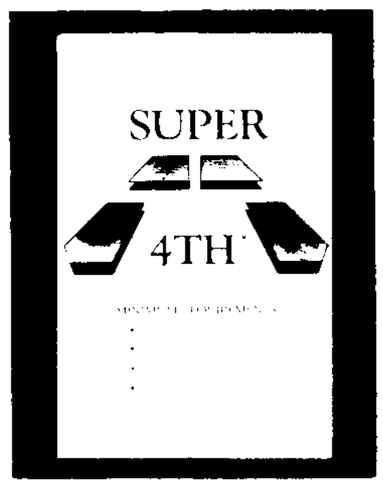

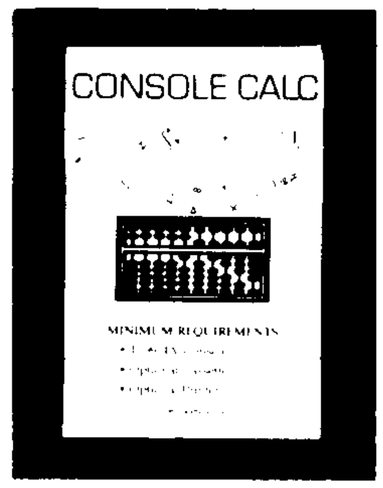

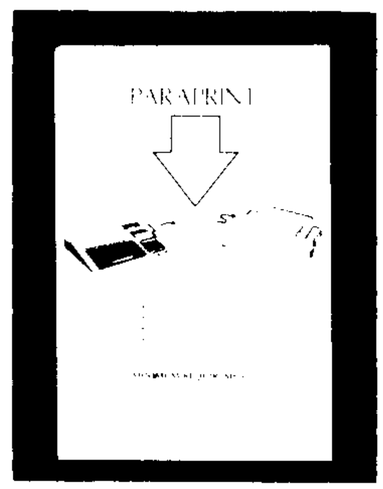

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BASIC

A word about strings

By REGENA

There are two main kinds of constants, variables and expressions — numeric and string.

Numeric refers to numbers, either positive or negative real numbers.

A "string constant" is a string of characters which may include numbers, letters, symbols and spaces. The string constant is enclosed in quote marks.

A "string variable" is a string that may change within a program and is named with a regular variable name ending in the dollar sign, such as N$ or XYZ$.

A "string expression may consist of string constants, variables and functions.

We'll talk this month about the capabilities of our TI BASIC in working with strings.

A string constant is expressed between quotes. If you print a string of define a string, you must use quotes, and there must be matched pairs of quote marks. For example, to define a string variable NAME$.

```
150 NAME$="BOB"
```

To print a string,

```
200 PRINT "HELLO"
```

The quotation marks are necessary to let the computer know you are using a string, but they will not be printed. If you do want quote markes printed, use two quote marks instead of one before and after the string:

```
220 PRINT """HI THERE!"""
```

To combine or concatenate strings, TI BASIC requires the ampersand symbol, &. (Other versions of BASIC use the plus sign, +.) Here are some examples of combining strings.

```
230 NAME$="RANDY"
240 PRINT "HELLO "&NAME$
250 P$="1212"
260 PHONE$="801 555-"&P$
270 PRINT PHONE$
```

The length of a string is the number of characters it contains. In TI BASIC a string may be zero length, or the null string "", up to 255 characters in length. Within a program line you may be limited in using a string by the length of the line (four screen lines). However, you may create a longer string by defining the strings then concatenating them.

Strings in a DATA statement do not require the quote marks unless you have leading or trailing spaces in the string (spaces ARE significant in a string). The quote marks are optional but are ususally not used (to save memory). Here is a sample DATA statement using strings.

```
300 DATA CHERY,CINDY,RICK,BOB,RANDY
310 FOR J=1 TO 5
320 READ NAME$(J)
330 PRINT NAME$(J)
340 NEXT J
```

In some of my programs you may have noticed DATA statements with commas that don't have anything between them. These represent null strings. Again, the quotes are not necessary. However, if a null string is at the beginning or end of a list of data items, then the quotes are needed.

```
500 DATA GRANT,,CHRISTINE,ROGER,SHERYL
600 DATA "",1,,,,3,GREEN
700 DATA LENA,ANDY,,AURA, ""
800 DATA PHONE NUMBER, "AGE      ",ADDRESS," STATE"
```

Line 500 shows a DATA statement with five names, and the second name is the null string. Line 600 starts off with a null string, then the number 1, then two more null strings, then two more data items. Line 700 has two names, a null string, a name, then an ending null string. Line 800 shows a DATA statement using strings with spaces. The first item PHONE NUMBER has an embedded space, and no quotes are necessary. The second item uses quotes because there are trailing spaces. The third item doesn't need quotes. The fourth item uses quotes because there are leading spaces.

By the way, within DATA statements, numeric values and strings may both be included—as long as the corresponding READ statements can handle the variables in the right order.

Just as there are many built-in numeric functions (such as trigonometric functions), there are some very powerful built-in string functions. The string functions that end in a dollar sign will return a string result. There are other functions associated with strings that return numeric results. You may not combine string and numeric functions within one expression.

CHR$(n) is the Character function that returns a character for the number n. For example, CHR$(65) is "A". In TI BASIC, some of the characters will be graphics characters or control characters. CHR$(13) is often used to represent ENTER, and CHR$(32) represents a space (" "). Examples are:

```
100 CALL CHAR(100,"FF00F")
110 PRINT CHR$(100)
300 S$=A$&CHR$(Y)&" *"
```

The inverse of the CHR$( ) function is the ASC(s$) function. The ASC(s$) function returns the ASCII code number of the first character of the string s$. Examples are:

```
400 PRINT ASC("*")
410 A=ASC(C$)
```

STR$(n) and VAL(s$) are related functions. STR$(n) makes a string out of a number or numeric expression. VAL(s$) converts a string (of numeric characters) to a numeric value. Since you cannot combine strings and numeric values in an expression, these two functions allow you to convert, then combine. You might want to use the string of a number to combine it with other strings or to use other string functions on it.

```
300 A=59.6
310 A$=STR$(A)
320 MESSAGE$="THE TOTAL IS "&A$
500 ADDRESS$="918 CEDAR STREET"
520 N=VAL(N$)
```

LEN(s$) returns the length of the string s$, which is the number of characters contained in the string. The length of the null string is zero.

```
700 INPUT "ENTER A WORD "W$
720 PRINT LEN (W$)
```

(See Page 14)

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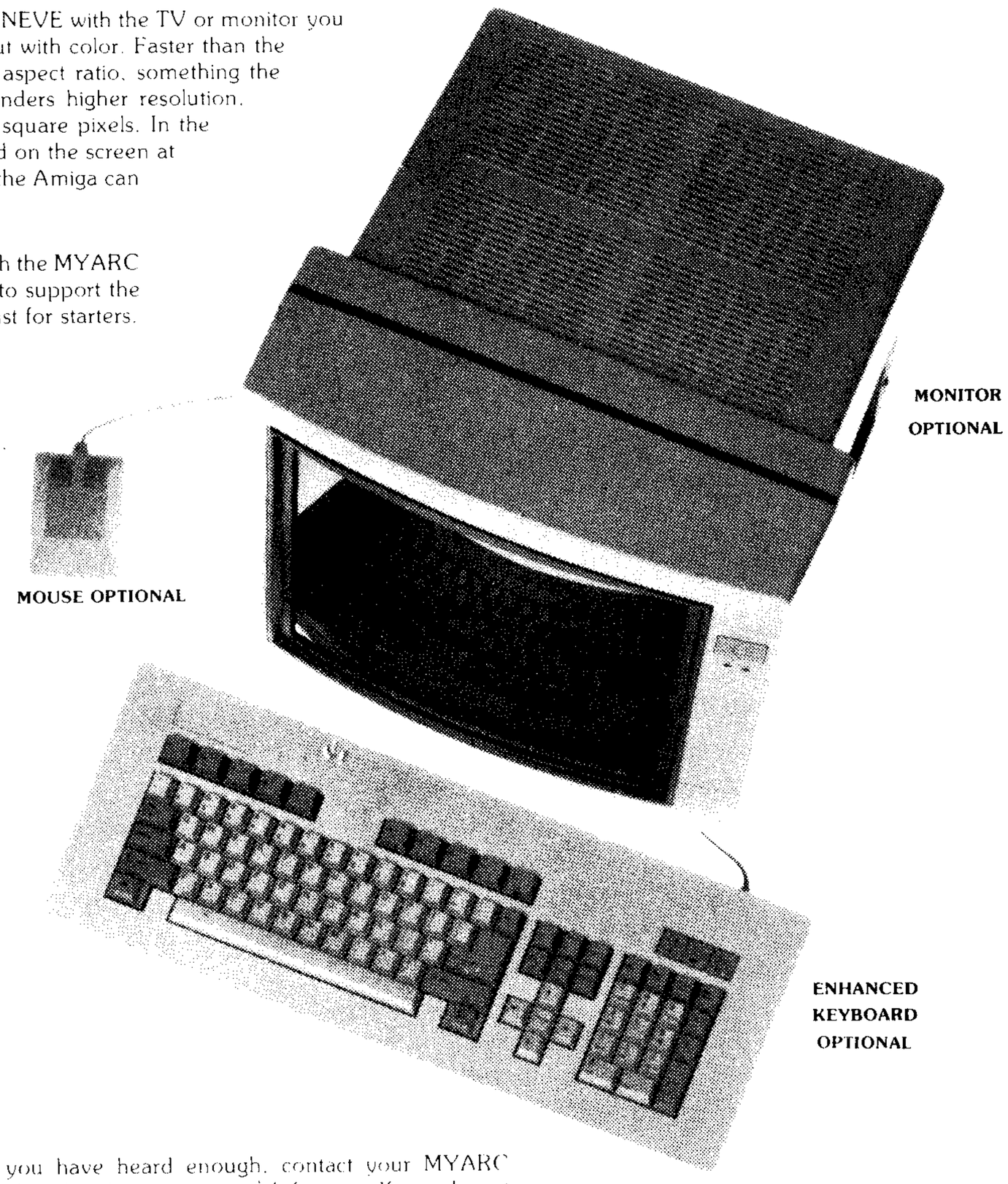
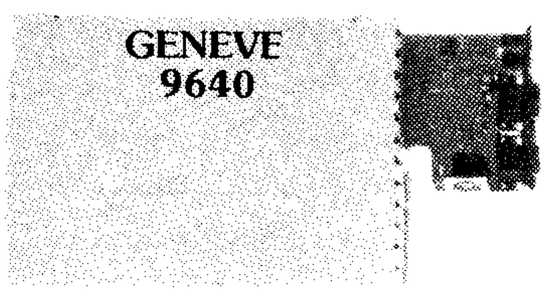
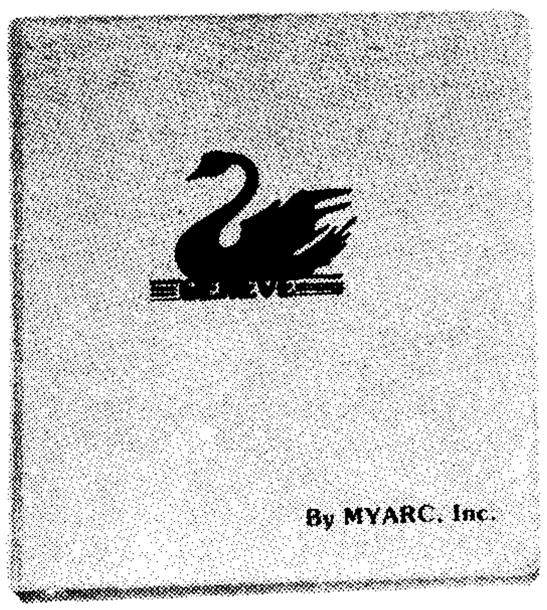
    Pascal V4.21, if you have a standard USCD Pascal program, you will be able to run it with this program. If you do not have any Pascal programs, let me tell you, one of the largest library of programs available, is Pascal. Compilers for Fortran, Modula 2, Lisp, and Pilot, as well as business programs from A to Z, are all there. USCD Pascal Software developed for computers from Apple to IBM, will run on the GENEVE, without modification.







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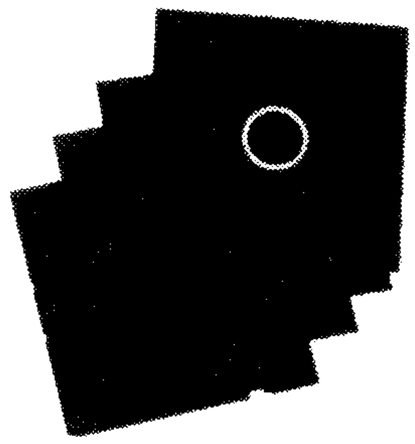

c99

Trials of a c99 beginner

By CHARLES E. KIRKWOOD, JR.

Learning to program c99 can be an interesting experience. That isn't to say that there won't be frustrations. There will be.

We are quick to forget that when we first started to learn any language, even BASIC, that we made many mistakes. c99 is an in-between language; it is easier than assembler and harder than BASIC.

With only one disk drive, we can compile and assemble some good programs with little or no disk swapping. I believe you will find the time learning c99 well-spent when you compare the run time between programs written in c99 and BASIC.

A good C reference book or text is indispensable when trying to learn the c99 language on your own. C has structure and restrictions that develop a disciplined approach to writing programs. For that reason I started with short programs with character manipulation that do very little more than input and output, and gradually increased the program complexity. It can be quite frustrating to go through the steps of compiling and assembling a program only to end up in the final stage with errors.

c99, written by Clint Pulley, is based on small-c published by Ron Cain in *Dr. Dobb's Journal,* May 1980. Small-c is a subset of the C programming language. The c99 compiler produces assembler source code, which is assembled by the assembler to produce an object code. The object code, along with required libraries, is loaded and run.

c99 is a structured language. There is no "goto." c99, as written by Pulley, supports only characters and integers. Functions or blocks are written. There must be one main function called

main ()

which is where the program will begin.

However, other programmers, including Tom Bentley, Jay Holovacs, Joseph Ross and Tom Wible have written floating point, bit, speech and string manipulation functions which are included with the c99 compiler diskette.

All variables must be declared before they are used. The statements must end with a semicolon. To illustrate the general concept a simple program will be written

(See Page 16)

REGENA—

(Continued from Page 12)

SEG$(s$,nl,n2) is equivalent to the LEFT$, RIGHT$, and MID$ functions of other versions of BASIC. This function for TI BASIC says to return the SEGment of the string s$ starting with the character in position nl and taking n2 number of characters. In Lines 500-520 of the example for STR$ and VAL, the string variable ADDRESS$ is defined as "918 CEDAR STREET". The SEG function in the next line says to take the segment of ADDRESS$ starting with character number 1 and using 3 characters. The result will be "918".

The nl and n2 numeric expressions in the function may be constants, variables or expressions. If the first value is less than or equal to zero or the second value is less than zero, you will get a BAD VALUE error message. If the first value is greater than the length of the original string, or if the second value is zero, the string returned will be the null string. If you specify a second value that is longer than the number of characters available, you'll simply get the remainder of the string. Here is a short example program to give you an idea how to get an equivalent LEFT$, RIGHT$ and MID$ segment of a string.

```
800 NAME$="BRETT LYNN WHITELAW"
810 L=LEN(NAMES)
820 FN$=SEG$(NAME$, 1,5)
830 PRINT FN$
840 LN$=SEG$(NAME$,L-8+1,8)
850 PRINT LN$
860 MN$=SEG$(NAME$,7,4)
870 PRINT MN$
```

Line 800 defines NAME$. Line 810 determines the length L of the string. Line 820 is the equivalent of LEFT$ taking the left five characters—starting with character 1, use five characters. Line 840 is the equivalent of RIGHT$ taking the right eight characters. Line 860 takes a middle segment, starting with the seventh character and using four characters.

POS (s1$,s2$,n) is another string function that can be useful. This function is used to find the POSition of string s2$ within string s1$, starting with charactaer number n. You might want to try several examples to see when you get a zero, when you get a logical number and when you get a BAD VALUE error. Here is one example:

```
900 NAME$="BRETT LYNN WHITELAW"
910 PRINT POS(NAME$, "WHITE",1)
920 X=POS(NAME$,"T",6)
930 PRINT X
```

We'll use the same name as before. Line 910 asks for the position of "WHITE" within the name, starting with the first character. Line 920 says to find the position of the letter "T" in NAME$, but start with the sixth character. Notice that the first two occurrences of the letter "T" will be ignored because the search starts with the sixth character. Only the first occurrence of the string will be reported.

The functions may be imbedded within each other. For example, here is a routine for printing a message on the screen without scrolling.

```
200 ROW=16
210 COL=12
220 M$="TRY THIS EXAMPLE **"
230 FOR T=1 TO LEN (M$)
240 CALL HCHAR(ROW,COL+T,ASC(SEG$(M$,T,1)))
250 NEXT T
```

You can see that the string functions in TI BASIC can be pretty powerful and useful in string manipulation in your programming.

McCANN SOFTWARE PRESENTS

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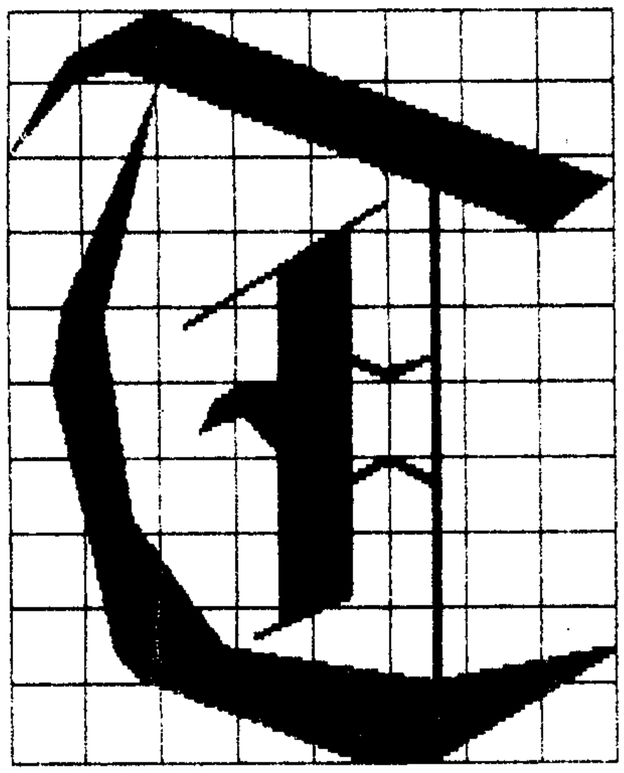

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c99—

(Continued from Page 14)

to input a character and print out that character on the screen. Programs are written with lower case.

Comments are written between /* and */.

Braces { and } are used at the beginning and end of a block.

See Example 1 for a way in which this program could be written.

```
/*EXAMPLE 1    To input a character and print it out*/
int a;              /*a declaration*/
main ()             /*note: no semicolon here, heading of block*/
{
  a=getchar();      /*input a character from the keyboard*/
  a=putchar(a);     /*print character on the screen*/
}
```

EXAMPLE 1

In this example the declaration *int a;* could be written as *char a;* The difference will be the amount of memory set aside for the variable a. *int a;* sets aside 16 bits and *char a;* sets aside eight bits.

Type up the above program using EDIT of your Editor/Assembler and store on diskette as Variable 80. It is quite advantageous to have two disk drives, one for the c99 compiler and library functions and the second one for the program. However, one drive can suffice for a good number of programs. For the present, store the following on one disk: Editl, ASSM1 and ASSM2 from the E/A*PARTA disk, C99C, C99D, C99E and CSUP from the c99 disk. Make copies of this disk for future programs. Additional c99 routines can be added later as needed.

This will use 190 bytes of storage on the dis, leaving the rest for the program. As an example, store the c99 program by some name such as EX1C.

Select 5 from the E/A menu and type DSK1.C99C. Two questions will appear on the screen: Include c/text? [n] and Inline pushcode? [n]. For the present, answer them both with n. The input filename is DSK1.EX1C, and pick a name such as DSK1.EX1A for the output filename. The compiler will now process the source program and the first six characters of each function name will be displayed on the screen as it is encountered. In this case the only function name will be *main*. FCTN 4 (CLEAR) will abort execution at any time and close all files. If the compiler encounters an error, it will display an error message on the screen and stop. After the error has been noted, press ENTER to resume compilation. After compilation is completed, the number of errors will be displayed if there are any. Now, do you want to make any more compilations? Answer with y or n. In this case the answer is n. If errors are encountered, analyze the error(s) and go back to the c99 program. Error messages can be quite confusing. Remember that we can usually make more types of errors than there are error messages.

Assuming no errors, select 2 from the E/A menu to load the ASSEMBLER. After the prompt SOURCE FILE NAME? type DSK1.EX1A, which is the assembler language form of the original c99 program. Type some other name for the OBJECT FILE NAME, such as DSK1.EX10. Press ENTER after each prompt, LIST FILE NAME? and OPTIONS?

Return to the E/A selection list. If there are errors, LOAD EX1C and EDIT (correct) the original c99 program and recompile. Otherwise, select 3, LOAD AND run. After the FILE NAME prompt, type the filename of your object code, which in this case is DSK1.EX10, and ENTER. The file name prompt FILE NAME will again appear. Type DSK1.CSUP and press ENTER. CSUP is the compiler support library required by all c99 programs as well as console I/O functions. When the prompt FILE NAME appears again, press ENTER. After the program name prompt, type START and press ENTER.

The cursor should now appear in the upper left-hand corner of the screen. Type a character. The input is first echo-printed, then this character is printed with no space between the echo-print and the result of the program. Note the speed in which the echo-print and the answer appear on the screen.

Two control functions are given in Table 1.

So if we rewrite the previous example with the first function between the input and output functions, the echo-print will appear on the first line and the result on the second. b can be defined either as a character or an integer. The program might be written like this:

```
/*EXAMPLE 2*/
int a,b;
main ()
{
  a=getchar();
  b=putchar(10);
  a=putchar(a);
}
```

Indenting is good programming practice. This makes the block stand out. Now refer to the c99 instructions that come with the compiler diskette and try a few variations of your own. You might intentionally make some mistakes, such as misspelling or omitting the semicolon, just to see the error messages. Good luck!

For information on ordering c99, write Clint Pulley, 38 Townsend Ave., Burlington, Ontario, Canada L7T 1Y6.

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For further information, contact Barry Long at (717) 564-2975 or Nick Varnali at (717) 238-9215.

TABLE 1

Two control functions

```
b=putchar(10); /*the ASCII number 10 returns to*/
                /*the beginning of the next line.*/
b=putchar(12); /*the ASCII number 12 clears the screen*/
```

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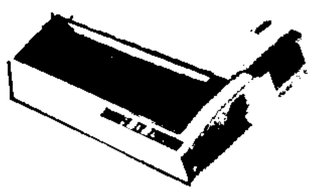

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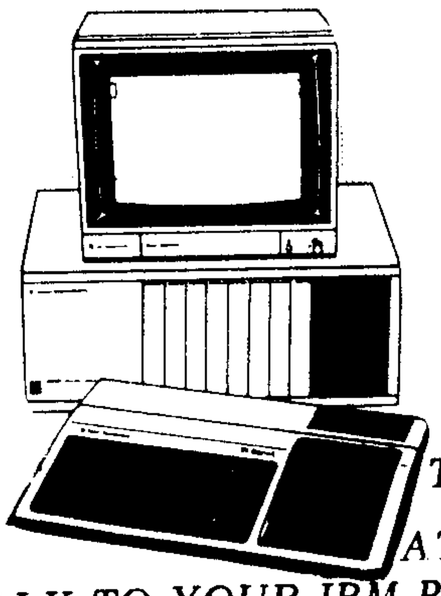

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Animated video using Logo

By SUSANNE L. JOHNSTON
and BRUCE W. JOHNSTON

Music videos can be created using your TI and Logo II. We made a video for our five-year-old daughter using the children's song B-I-N-G-O (composer unknown). The song suggests a farm scene with a farmer and dog that can easily be implemented using tiles and sprites. First we will look at how music is played on the computer with Logo and then we'll synchronize music to graphics to make an animated music video.

In Logo, the music is entered into a buffer where it is saved until we give the command to play. Music can be represented by notes and the duration of each note (rhythm). Logo recognizes notes and rhythm when they are presented in two lists in the form MUSIC [notes] [rhythm]. Table 1 shows the Logo representation of B-I-N-G-O.

Table 1. Logo representation of B-I-N-G-O.

```
TO SONG
MUSIC [2 7 7 2 2 4 4 2 2 7 7 9 9 11 7] [1 1 1 1 1 1 1 1 1 1 1 1 1 2 2]
MUSIC [11 11 12 12 12] [2 2 1 1 2]
MUSIC [9 9 11 11 11] [2 2 1 1 2]
MUSIC [7 7 9 9 9] [2 2 1 1 1]
MUSIC [7 6 2 4 6 7 7] [1 1 1 1 1 2 1]
END
```

These numbers were translated from the table on page 128 in the Logo manual. Each number corresponds to a note in B-I-N-G-O. Now type SONG to load the notes into the music buffer, and then PLAYMUSIC (PM) to play the notes. The words of the song with their corresponding music numbers are:

1. *There was a farmer had a dog and*
2 7 7 2 2 4 4 2 2
Bingo was his name-o.
7 7 9 9 11 7

2. *B I N G O B I N G O*
11 11 12 12 12 9 9 11 11 11
B I N G O
7 7 9 9 9

3. *And Bingo was his name-o.*
7 6 2 4 6 7 7

The Logo default tempo is a bit fast for B-I-N-G-O so we can change it by SETTEMPO T, where a note of length D will last 60/T x D seconds. The default is 300 so let's try 250 to hear the difference. Type SETTEMPO 250, then SONG and PM.

With a basic understanding of Logo music we are ready to design the music video. The software architecture is described in Table 2.

The song B-I-N-G-O involves a farmer and his dog so we will draw a farm scene with grass, barn and cloud. Then a farmer sprite will walk on screen, followed by his dog sprite, Bingo. Finally, letter sprites will appear on the screen. Before the video starts drawing we can execute some procedures so they don't delay action later. First we'll define the sprites shown in Fig. 1.

With sprites defined we call procedure SET.LETTERS to position the letter sprites on the screen. It first places all the B-I-N-G-O sprites in one location and sets their heading to 260. Next it defines three lists, GRAPHIC (the sprites themselves), COLORS (colors of the rainbow) and MOVES (distance each sprite will move).

To move the letter sprites to their respective locations, we set a REPEAT 5 loop, once for each letter, and TELL the first GRAPHIC (sprite 3) to go forward the first MOVES (220 units). Then we rewrite MOVES to be all but the first MOVES ([1801409040]). Next we rewrite GRAPHIC, but instead of eliminating the first element we rearrange the elements with Logo primitive ROTATE. ROTATE takes the first element of the list and places it at the end of the list so GRAPHIC is now [4 5 6 7 3].

The second REPEAT in SET.LETTERS TELLs sprite 4, forward 180 units and then rewrites MOVES to [140 90 40] and GRAPHIC to [5 6 7 3 4]. After the fifth repeat, MOVES will be [ ] and GRAPHIC will be [3 4 5 6 7] as it was originally. Notice that we have not assigned colors to the sprites so while they are in positio they are not yet visible.

```
I. VIDEO
  A. DEFINE.SPRITES
  B. SET.LETTERS
  C. BINGO
    1. DEFINEMUSIC
    2. BINGO.PLAIN
      a. ROTATEMUSIC
  D. MAKEGROUND
    1. GROW
  E. BUILDBARN
    1. COLORBARN
    2. WALLBARN
    3. ROOFBARN
      a. ROOFROW
  F. CLOUD
    1. COLORCLOUD
    2. CLOUDROW
  G. WALK.FARMER
  H. RUN.DOG
  I. PRINT.LETTERS
    1. FLY.LETTERS
```

Table 2. Software architecture fo BINGO music video.

Next in the software development w load the music into the buffer. If you ar familiar with B-I-N-G-O you know that i is sung six times. The first time singing B I-N-G-O, the second time replacing B wit clap (clap-I-N-G-O), the third time wit two claps (clap-clap-N-G-O) and so on un til the sixth time with five claps. The ke to this video is to replace one note fro each B-I-N-G-O with a clap in each vers while synchronizing the music to graphics

As mentioned, Logo music is stored i list data structures. We can perform opera tions on these lists to simulate a clap, bu first must investigate the organization o Logo lists. A list is a sequence of word enclosed in square brackets. A word is series of characters, and words ar separated by spaces. So for Logo musi purposes, numbers are treated as words The important feature of lists that we us is that they can be manipulated a word a a time rather than a character at a time.

The first step in arranging the musica score is to define the notes and rhythm i procedure DEFINEMUSIC. Each phras of the song is placed in one list and th

(See Page 20)

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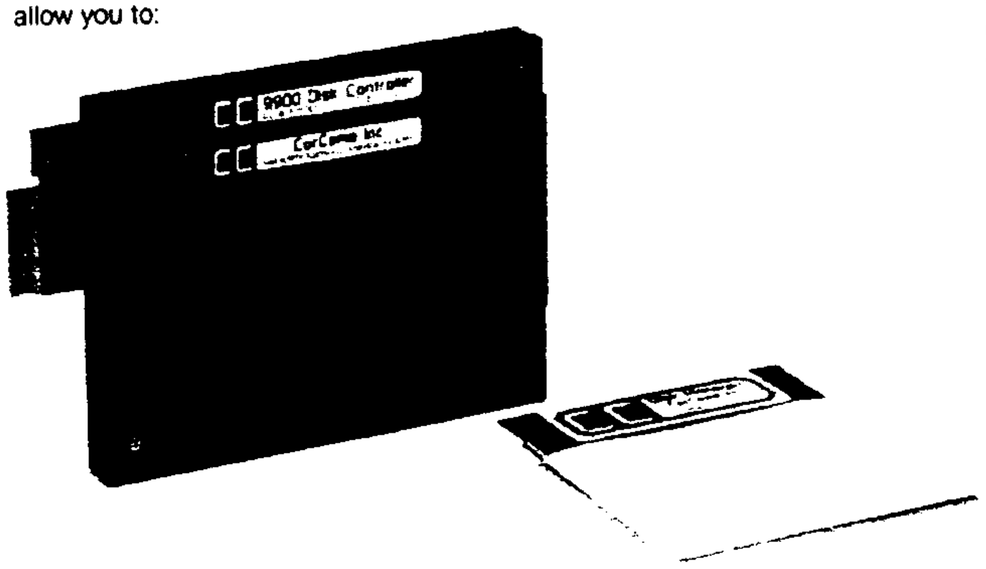

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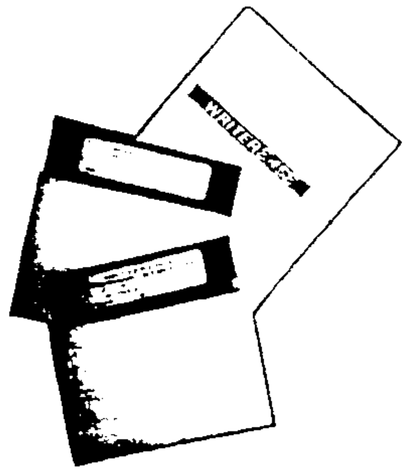

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LOGO—

(Continued from Page 18)

rhythm to accompany the phrase is placed in another list (Table 3).

LINE	NOTES	RHYTHM
1	BINGO1M	BINGO1T
2	L1,L2,L3	T1,T1,T2
3	BINGO2M	BINGO2T

Table 3
Music lists corresponding to song lines.

L1, L2 and L3 must be altered to include claps after the first verse. So we define three other lists (L11, L21, L31) that initially are.identical to L1, L2 and L3. For the clap we initially define the empty list C [ ].

The phrases of the song for one verse are combined in BINGO.PLAIN. It will be called six times to complete all six verses. The first line is defined by MUSIC :BINGO1M :BINGO1T. Next, BINGO.PLAIN calls ROTATEMUSIC to define the letters and rewrite the letter lists to include a clap.

Table 4 shows the results of the first two calls to ROTATEMUSIC.

On the first verse, ROTATEMUSIC loads the music buffer with three versions of B-I-N-G-O using L11, L21 and L31 with T1, T1 and T2, as defined in DEFINEMUSIC. Next, using BUTFIRST, it rewrites L1 to be all but the first word of L1, [11 12 12 12], then rewrites L2 and L3 in the same manner. Then C, the clap list, is rewritten with Logo primitive SENTENCE to combine itself, which is empty initially, with 24, making C [24]. We chose 24 to be our simulated clap and it corresponds to high C in the Logo table.

This makes two lists, a single clap [24] and three versions of I-N-G-O in L1, L2 and L3. We combine these with SENTENCE and rewrite L11, L21 and L31 to be [clap I-N-G-O]. Control then returns to BINGO.PLAIN where the last line is defined as BINGO2M AMD BINGO2T.

Now we can combine the music procedures in procedure BINGO. First we clear the music buffer with SETVOICE 0 and SETTEMPO 275. This is a bit faster than we set it in SONG, due to music interaction with graphics. Then

(See Page 22)

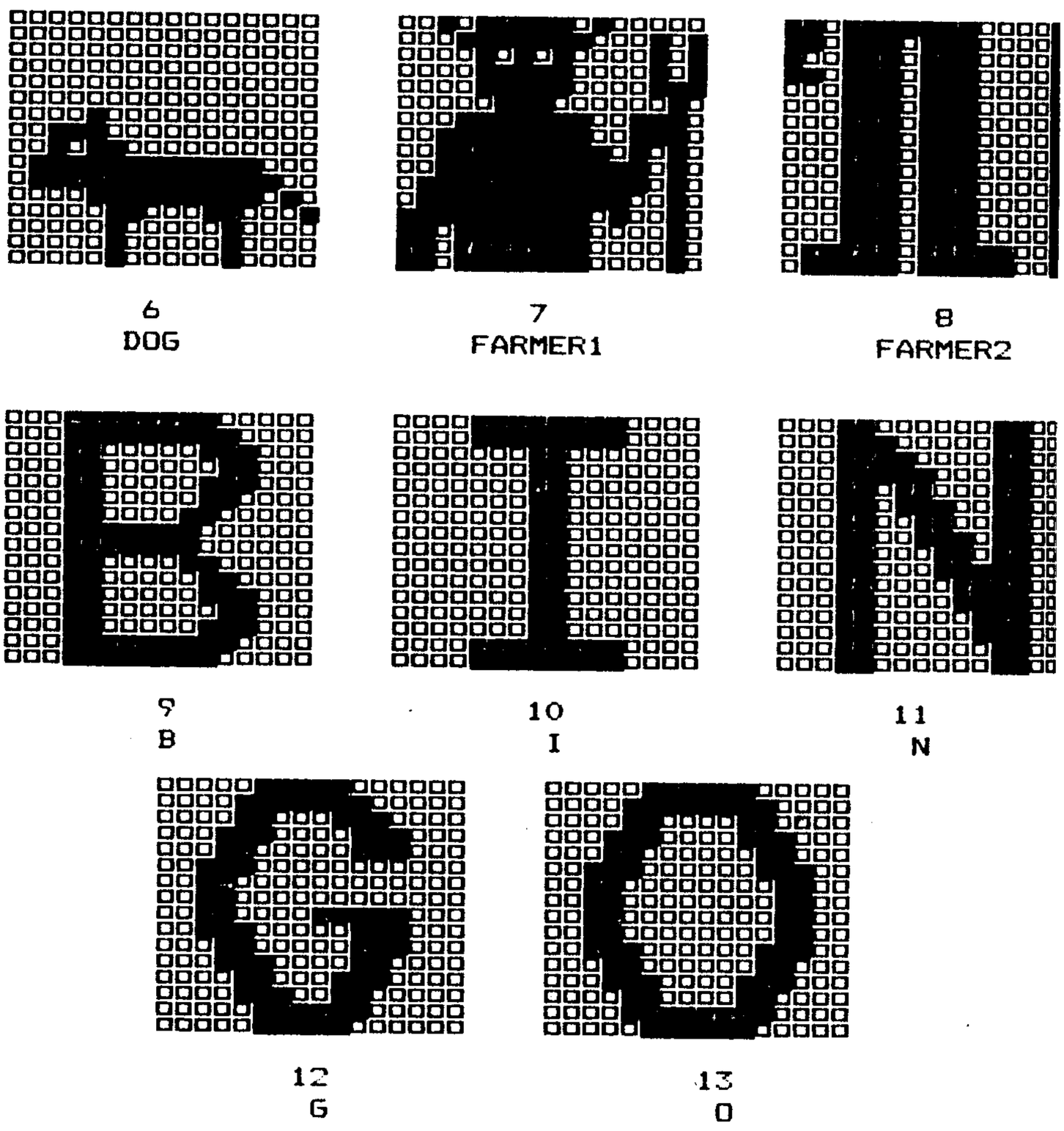

Fig. 1 Bingo Video sprites. Make (name) (number) for each sprite.

Verse 1

```
        L1                L2                L3          C
[11 11 12 12 12] [9 9 11 11 11] [7 7 9 9 9]  [ ] INITIAL LISTS
[11 12 12 12]    [9 11 11 11]   [7 9 9 9]    [24] REWRITTEN LIST
        L11               L21               L31
[11 11 12 12 12] [9 9 11 11 11] [7 7 9 9 9]  LOADED INTO BUFFER
[24 11 12 12 12] [24 9 11 11 11] [24 7 9 9 9] REWRITTEN TO L+C
```

Verse 2

```
        L1                L2                L3          C
[11 12 12 12]    [9 11 11 11]   [7 9 9 9]    [24] INITIAL LISTS
[12 12 12]       [11 11 11]     [9 9 9]      [24 24] REWRITTEN LIS
        L11               L21               L31
[24 11 12 12 12] [24 9 11 11 11] [24 7 9 9 9] LOADED INTO BUFFER
[24 24 12 12 12] [24 24 11 11 11] [24 24 9 9 9] REWRITTEN TO L+C
```

Table 4 Results of first two calls to ROTATEMUSIC.

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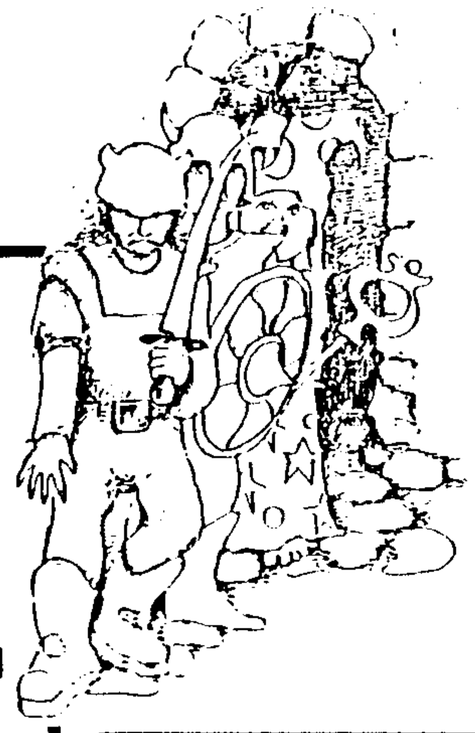

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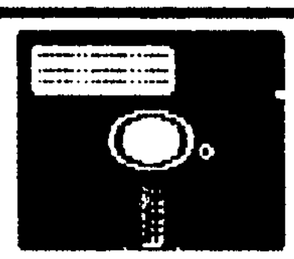

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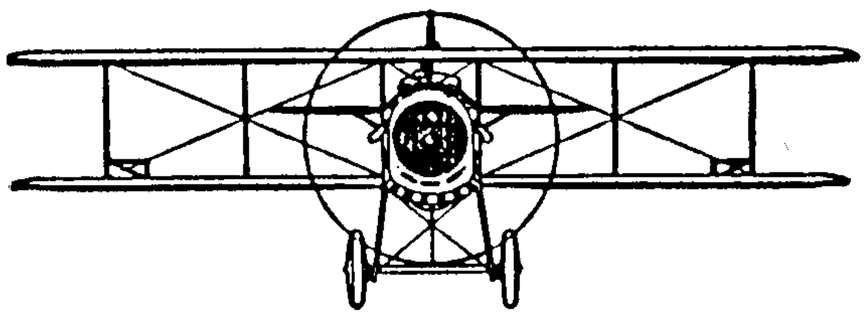

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LOGO—

(Continued from Page 20)

DEFINEMUSIC is called to define the note and rhythm lists used in B-I-N-G-O. Next we call BINGO.PLAIN six times, which in turn calls ROTATEMUSIC and inserts 'claps' for letter notes. After each call we rest four notes to catch our breath if we are singing along. Now type BINGO and PM and you will hear six verses of BINGO. When BINGO is called in the music video it will load six verses of B-I-N-G-O into the music buffer that will wait there until we give the command to play.

So far in our video nothing has been printed on the screen but we have our sprites ready and the music buffer is loaded. Now we turn our attention to the farm scene, which will be designed with tiles. The grass and cloud each use two tiles while the barn uses five, one for the building, one for a window (with a chicken in profile), and three for the roof (Fig. 2).

Tile numbers were selected so that each tile could be a separate color, with the exception of BARNROOF1 and BARNROOF2 which are colored the same, and can thus use numbers within a single group of eight. First we lay the grass in MAKEGROUND. It defines tile colors and then calls GROW to lay the tiles.

Next we build the barn. Procedure BUILDBARN first calls COLORBARN to define tile colors. Then BUILDBARN calls WALLBARN which puts up the barn walls and four windows. Next, ROO BARN is called, which calls ROOFRO and places three rows of roof tiles abo the barn walls.

Finally, we place a cloud in the sky wi CLOUD. It first calls COLORCLOUD define tile colors and then ca CLOUDROW to lay the cloud tiles. Wi

(See Page 24)

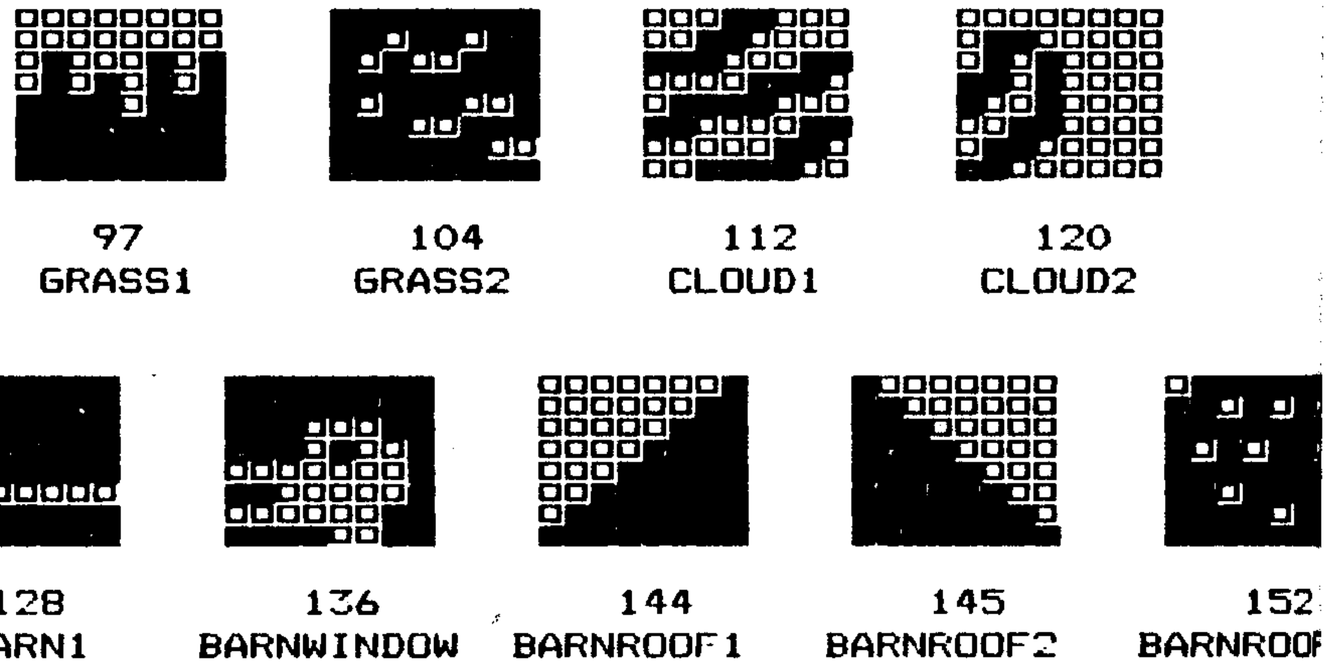

Figure 2. BINGO video tiles. MAKE (name) (number) for each tile.

LOGO—

(Continued from Page 22)

the background set we are ready for some action.

We wanted the farmer and his dog to enter the farm scene, and then the letters B-I-N-G-O to flash across the screen for each of the six verses. Therefore, the sprite procedures are repeated six times in procedure VIDEO.

To synchronize the farmer with the words "There was a farmer had a," procedure WALK.FARMER first positions the sprites, colors them blue, sets their heading and puts them in motion. Then the first note in the music buffer is played with PLAYNOTE, which plays one note each time it is addressed. That leaves six notes left for the farmer synchronization, so we repeat the following three times: PLAYNOTE, change farmer heading, PLAYNOTE, change farmer heading. Then the farmer stops to wait for Bingo.

Now it is time for the star to make an appearance with RUN.DOG. First we position the sprite, color it black, set heading set him into motion. The notes we want to play correspond to "dog and Bing was his name-o." These eight notes are played by:

```
PLAYNOTE
REPEAT 6 [PLAYNOTE RIGHT 10]
PLAYNOTE
```

The dog turns 10 degrees for each note played in the repeat loop.

It is timely to note here that PLAYNOTE takes some time to execute and sprite movement must take this into account. Try running RUN.DOG without music and you will find Bingo just getting his head into the picture because the pauses caused by PLAYNOTE aren't there to give him time to move forward. Graphics also slow down music tempo, which is why we SETTEMPO to 275 rather than 250.

Finally, we want the letters B-I-N-G-O to be synchronized with notes B-I-N-G-O. We have already positioned the sprites with SET.LETTERS and now need to make them appear with PRINT:LETTERS. We want the letters B-I-N-G-O to appear three times, as they are sung in the song, so REPEAT 3. Next, there are five letters each time, so we use a nested loop to REPEAT 5 and call FLY.LETTERS. FLY.LETTERS first plays a note and then tells the first GRAPHIC (sprite 3) to SETCOLOR 6, or red, the first element in the list COLORS. A red 'B' appears. Then FLY.LETTERS ROTATEs GRAPHIC to [4 5 6 7 3] and ROTATEs COLORS to [9 10 2 4 6].

On the second repeat of FLY.LETTERS an orange 'I' appears, and so on until B-I-N-G-O appears in rainbow colors. Then the sprites are set to clear. So they disappear and reappear, one at a time three times. Since all letters are set to clear in the REPEAT loop, we set them to purple before playing the final seven notes, corresponding to "And Bingo was his name-o." The last thing we do each time is to make all sprites disappaer before the next verse.

Now look at procedure VIDEO. In a REPEAT 6 loop we have WALK.FARMER, RUN.DOG, PRINT.LETTERS and PLAYNOTE. Bu

(See Page 26)

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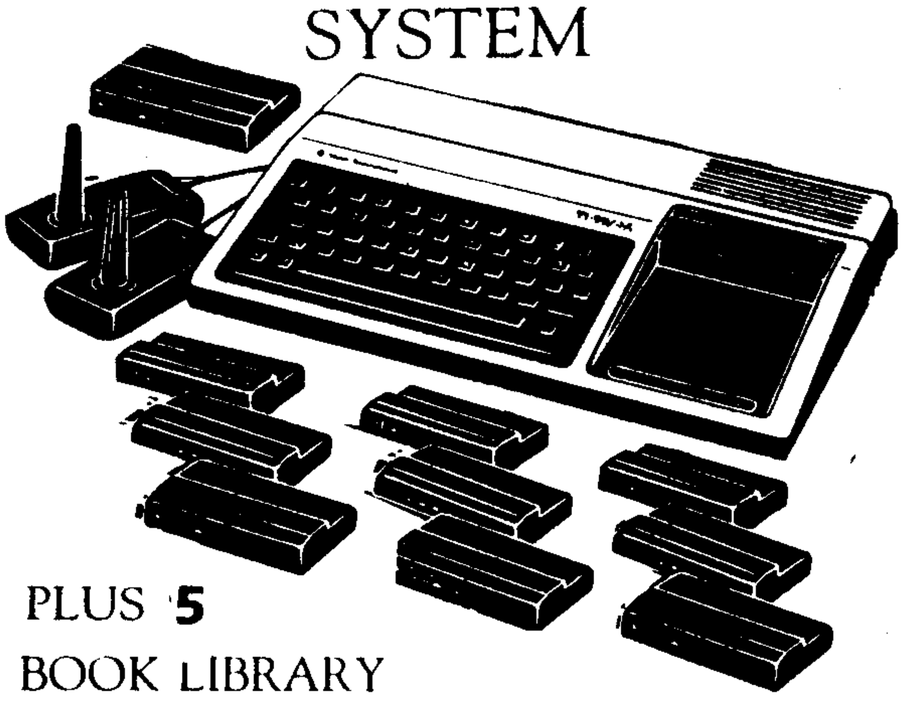

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LOGO—

(Continued from Page 24)

at the end of PRINT.LETTERS one round of the song is finished, so why do we need to PLAYNOTE? If you look back to procedure BINGO, you will see that in the REPEAT 6 loop we have BINGO.PLAIN and REST 4, so there is a pause between each verse. The REST command is considered to be one note, so PLAYNOTE plays the REST. Otherwise, when our farmer starts in again he would be one note behind because his first PLAYNOTE would play the REST.

To complete the video, we color the letters purple and put the farmer and our star back on the screen (remember, all sprites are "colored" clear at the end of PRINT.LETTERS). This video has been kid-tested in the 4- to 5-year-old age group, and they love it.

To add a final touch to Logo Music Video, we can record it on videotape with a VCR. If you use a monitor with your computer, you can disconnect the monitor cable from the monitor and attach it to the "audio in" and "video in" inuts on your VCR. A conventional TV set can then be connected to the VCR VHF output terminal to monitor the recording session.

If you use a TV set with your computer, simply disconnect the RF modulator cable from the TV and attach it to the VHF input terminal on the VCR.

We briefly mentioned lists in this article and next time we'll delve more into applications of list processing in Logo.

PROCEDURES

Susanne L. Johnston

```
TO CLOUDROW
REPEAT :COLS [PT :CLOUD1 :COL :ROW MAKE "COL :COL + 1 ]
PT :CLOUD2 :COL :ROW
MAKE "COL 0
MAKE "ROW :ROW + 1
END

TO COLORCLOUD
TELL TILE :CLOUD1
SC SE :WHITE :GRAY
TELL TILE :CLOUD2
SC :WHITE
TELL TILE :CLOUD3
SC :WHITE
END

TO CLOUD :COL :ROW
COLORCLOUD
MAKE "COLS 2
REPEAT 6 [MAKE "COLS :COLS + 1 CLOUDROW ]
REPEAT 2 [MAKE "COLS 8 CLOUDROW ]
REPEAT 2 [MAKE "COLS :COLS - 3 CLOUDROW ]
END

TO VIDEO
CS
TELL :ALL SC 0 SS 0
DEFINE.SPRITES
SET.LETTERS
BIG
CB :CYAN
BINGO
MAKEGROUND
BUILDBARN
CLOUD 0 3
REPEAT 6 [WALK.FARMER RUN.DOG PRINT.LETTERS PLAYNOTE ]
TELL [3 4 5 6 7 ] SC :PURPLE
TELL [0 1 ] SC :BLUE
TELL 2 SC :BLACK
END

TO DEFINE.SPRITES
TELL 0 CARRY :FARMER1
TELL 1 CARRY :FARMER2
TELL 2 CARRY :DOG
TELL 3 CARRY :B
TELL 4 CARRY :I
TELL 5 CARRY :N
TELL 6 CARRY :G
TELL 7 CARRY :O
END

TO SET.LETTERS
TELL [3 4 5 6 7 ]
SXY 127 96
SH 260
MAKE "GRAPHIC [3 4 5 6 7 ]
MAKE "COLORS [6 9 10 2 4 ]
MAKE "MOVES [220 180 140 90 40 ]
REPEAT 5 [TELL F :GRAPHIC FD F :MOVES MAKE "MOVES BF :MOVES MAKE "GRAPHIC ROTATE
 :GRAPHIC ]
END

TO BINGO
SETVOICE 0
SETTEMPO 275
DEFINEMUSIC
REPEAT 6 [BINGO.PLAIN REST 4 ]
END

TO MAKEGROUND
TELL TILE :GRASS1
SETCOLOR :GREEN
TELL TILE :GRASS2
SETCOLOR SENTENCE :GREEN :LIME.
GROW 0 15
END

TO BUILDBARN
COLORBARN
WALLBARN
ROOFBARN 19 10 10
END

TO WALK.FARMER
TELL [0 1 ]
EACH [SXY 127 ( YN * -30 ) ]
SC :BLUE
SH 80
SS 5
WAIT 45
PLAYNOTE
REPEAT 3 [PLAYNOTE SH 170 PLAYNOTE SH 80 ]
SS 0
END

TO RUN.DOG
TELL 2
SXY 120 -30
SC :BLACK
SH 240
SS 22
PLAYNOTE
REPEAT 6 [PLAYNOTE RIGHT 10 ]
PLAYNOTE
SS 0
END

TO PRINT.LETTERS
REPEAT 3 [REPEAT 5 [FLY.LETTERS ] TELL [3 4 5 6 7 ] SC 0 ]
TELL [3 4 5 6 7 ] SC :PURPLE
REPEAT 7 [PLAYNOTE ]
TELL :ALL
SC 0
END
```

(See Page 28)

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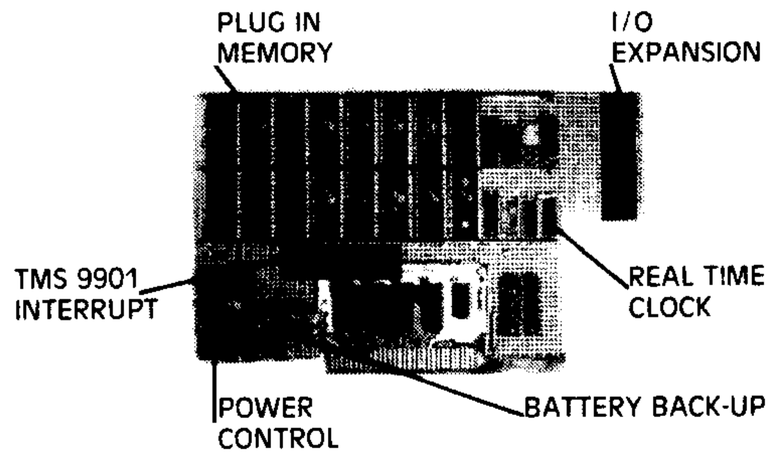

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LOGO—

(Continued from Page 26)

```
TO DEFINEMUSIC
MAKE "BINGO1M [2 7 7 2 2 4 4 2 2 7 7 7 9 11 7 ]
MAKE "BINGO1T [1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 ]
MAKE "BINGO2M [7 6 2 4 6 7 7 ]
MAKE "BINGO2T [1 1 1 1 1 2 1 ]
MAKE "L1 [11 11 12 12 12 ]
MAKE "L2 [9 9 11 11 11 ]
MAKE "L3 [7 7 9 9 9 ]
MAKE "T1 [2 2 1 1 2 ]
MAKE "T2 [2 2 1 1 1 ]
MAKE "L11 :L1
MAKE "L21 :L2
MAKE "L31 :L3
MAKE "C [ ]
END

TO BINGO.PLAIN
MUSIC :BINGO1M :BINGO1T
ROTATEMUSIC
MUSIC :BINGO2M :BINGO2T
END

TO GROW :COL :ROW
MAKE "GRASS :GRASS1
REPEAT 32 [PT :GRASS :COL :ROW MAKE "COL :COL + 1 ]
MAKE "GRASS :GRASS2
REPEAT 8 [MAKE "COL 0 MAKE "ROW :ROW + 1 REPEAT 32 [PT :GRASS
:COL :ROW MAKE "COL :COL + 1 ] ]
END

TO COLORBARN
TELL TILE :BARN1
SC SE :RED :SKY
TELL TILE :BARNWINDOW
SC SE :YELLOW :SKY
TELL TILE :BARNROOF1
SC :RUST
TELL TILE :BARNROOF2
SC :RUST
TELL TILE :BARNROOF3
SC SE :RUST :GREEN
END

TO WALLBARN
MAKE "ROW 19
REPEAT 9 [MAKE "COL 20 REPEAT 10 [PT :BARN1 :COL :ROW MAKE "
COL :COL + 1 ] MAKE "ROW :ROW - 1 ]
PT :BARNWINDOW 25 12
PT :BARNWINDOW 26 12
PT :BARNWINDOW 25 13
PT :BARNWINDOW 26 13
END

TO ROOFBARN :COL :ROW :N
REPEAT 3 [ROOFROW :COL :ROW :N MAKE "COL :COL + 1 MAKE "N :N
- 2 MAKE "ROW :ROW - 1 ]
END

TO FLY.LETTERS
PLAYNOTE
TELL F :GRAPHIC
SC F :COLORS
MAKE "GRAPHIC ROTATE :GRAPHIC
MAKE "COLORS ROTATE :COLORS
END

TO ROTATEMUSIC
MUSIC :L11 :T1
MUSIC :L21 :T1
MUSIC :L31 :T2
MAKE "L1 BF :L1
MAKE "L2 BF :L2
MAKE "L3 BF :L3
MAKE "C SE :C 24
MAKE "L11 SE :C :L1
MAKE "L21 SE :C :L2
MAKE "L31 SE :C :L3
END

TO ROOFROW :COL :ROW :N
PT :BARNROOF1 :COL :ROW
MAKE "COL :COL + 1
REPEAT :N [PT :BARNROOF3 :COL :ROW MAKE "COL :COL + 1 ]
PT :BARNROOF2 :COL :ROW
END
** DONE **
```

The power of Mini-Memory

By MERLE VOGT

One of TI's most unpublicized but useful and powerful modules is the Mini-Memory. Combined with the "line by line" assembler and expansion RAM one can make the 99/4A perform as well as many newer machines.

There are probably several reasons that Mini-Mem never hit the popularity it deserved. First, too many users let the words "assembly language" booger them, which is a pity, because for 10 years I found it no great strain to teach assembly to teenagers, part of them girls, who were spending part of their time on romance. Some of my best were girls. Another boogy is that assembly requires attention to many details, which is not all that bad, because there is a lot of code you can write once and recycle into the next 200 programs. Let me explain. Every program has three parts, as I will show.

1. **Begin job housekeeping.** You cannot leap into the middle of a task. The computer must be set up in several ways to make the main task run. You must set up registers, pointers, counters, accumulators, data identifiers, data structures, file structures, etc.

2. **Main task.** This is always a loop. The main reason we use computers is their speed and accuracy at repetitious work. In passing, the way to do any big main task it to break it into a bunch of small subtasks which feed each other and club the work to death. This obvious approach now has the fancy name of "structured programming." But I was so taught 15 or 20 years before the buzzword came along. More on this "modulizing" later.

3. **End of job housekeeping.** Finally, you must disengage your control of the machine. There may be files to close and return to the control system; no fall out with a thud allowed.

You will find that rather standard code will be developed. It can be saved and plugged into many other programs, sometimes intact, other times after fudging a bit.

4. Here I will list some **useful information sources:** "Mini Memory Intro," *99er Magazine,* vol. 1, no. 5; "Using Line by Line Assembler," *99er,* Jan. '83; "Assembly Won't Byte," Part 1, *99er,* Oct. '83, Part 2, *99er* Nov. '83, Part 4, *Home Computer,* vol. 4, no. 1, Part 4, *Home Computer,* vol. 4, no. 4; book, *Fundamentals of TI99/4A Assembly Language*, M.S. Morley; book, *Introduction to Assembly Language for the TI Home Computer*, Ralph Molesworth; Disassembler, *99er Magazine*, March '83 (in BASIC but works on assembly code).

Now, back to Mini-Mem. There are a lot of facilities in the module. Let's first look at those control features.

5. **Easy Bug.** The No. 2 selection on the menu.

This one opens up the inside of the console. You can look at expansion RAM or VDP RAM to see if the expected data, or code, is at the expected address. Sometimes the (unexpected) garbage will give you an idea about what blew up. Most important, you can execute some code you assembled. You can correct simple errors without assembling it all again.

6. **Mini-Memory.** The No. 3 selection on the menu is named Mini-Memory. This goes to a submenu of three items. No. 2, Run, is the other way to execute some assembly code. More later on this.

7. There is a 4K ROM containing a number of **executable routines called utilities** which are quite complex tasks. You can transfer control into these with one instruction and get some work done without writing large chunks of code.

8. There is a 4K RAM bank where the **line by line assembler** usually resides. You can put other code here, if needed.

9. **You can run a RAM disk in expansion RAM.** It can be either a sequential or a relative file. You can save or load this file to or from the cassette, as needed. The file is named "EXPMEM2". The RAM area used is not available for programs or data. Note: This file is accessed through a BASIC program, not assembly. A second RAM file, only 4K, named "MINIMEM" is also separately available. This one resides in the 4K module.

10. Further, while you key in BASIC programs you can regularly stop coding and use the command: **"SAVE EXPMEM2".** This is not documented in the manual. Your program gets stored into expansion RAM. As you know, if you hit "Quit" accidentally, a BASIC program is gone. But it is not gone from EXPMEM2 unless you power off. If you lose the BASIC program while keying or testing, then the command: "OLD EXPMEM2" will bring it back. Alternately, if the program is not too big, the commands "SAVE MINIMEM" and "OLD MINIMEM" also work. In this case, you won't lose the program if you power off because Mini-Mem is battery-backed. Note: Can't do these in Extended BASIC.

11. Mini-Mem provides facilities to create **hybrid programs** of a BASIC master program combined with assembly subtasks. The BASIC is the control and the assembly provides routines where BASIC is too slow. The BASIC can pass raw data to the assembly and the assembly passes back the resuls to BASIC.

12. You can create **assembly subtask routines** individually and save each separately. You can then merge them into a program of 32K, if needed. You don't have to grind out huge blocks of code at one horrible programming session.

13. There is one critical factor about Mini-Mem facilities and usage orientation. The TI person who created the module organized its operations almost totally toward a **cassette system** of hardware. Line-by-line is on cassette. The program code goes into RAM and must be saved/loaded only from cassette. Note: You can write programs which will process disk files, or cassette files, for data input or output. Another important factor, which the manual does not strongly emphasize, is that expansion RAM is absolutely required to exploit the module's capabilities fully. Remember, line-by-line resides in the module's RAM and expansion RAM is required to hold the program code.

Now to exploit the powerhouse, following will be some assembly code for you to study. Note: coding assembly, with the line-by-line (hereafter L. by L.), leads to somewhat obscure labels because they can be only two characters long.

1. **Housekeeping, again, begin and end job.**

A. When you consider creating an assembly routine, think of a bare-bones console handed to you with a big thud. Nothing is set up, so the first code has to get the ball rolling. There are two very, very

(See Page 31)

MINIMEM—

(Continued from Page 30)

skimpy control systems to help, but all they will do is transfer the machine to you.

B. Easy Bug, selecton 2 on the menu, has a command: EXXXX, which starts a program at address (hex) >XXXX. It has a big fat bug in it. It will not run any code which contains these: GPLLNK, XMLLNK and DSRLNK. More on these later.

C. Mini-Memory, selection 3 on the memory, pulls in a submenu of three items. Selection 2, "RUN", is our baby, but not quite yet. It demands that the program be named. There is an area in the 4K RAM called the "REF/DEF" table. It starts ad address >7FE8, and contains eight-byte pointers to programs. A pointer is six bytes (program name) and two bytes (address). Now note: loading L. by L. places three ref entries into the RAM table, as follows:

AT >7FE8, NAME "LINES " WITH ADDRESS >7CD8

AT >7FF0, NAME "OLD " WITH ADDRESS >71AC

AT >7FF8, NAME "NEW " WITH ADDRESS >71A6

The first two, "LINES" and "OLD", won't be used, so you can simply stock your address into them at locations >7FEE and 7FE6, using Easy Bug. You could also change the names, but why bother?

Then, after entering code, starting at the indicated address and exiting L. by L., you can select No. 2, "RUN". It will ask program name. Enter LINES or OLD (no quotes) and the system will try to run the code.

D. Finally, now, some of that begin job stuff to get the console up from where "RUN" dropped you. Study the code carefully.

(See Table 1 on page 32).

The code in Table 1 is only a framework. There is a lot more to do in the begin setup and in the end job wrapup.

Note that by using this same code in every program we can have programs run other programs, and every one will get started correctly and will terminate correctly.

E. BLWP loops provide an alternate scheme for setting up subtasks. With the instruction "BLWP" linking into subtasks

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MINIMEM—

(Continued from Page 31)

is somewhat simpler. Exit is by the instruction "RTWP". Look at code below:

```
------ MAIN PROGRAM -----
        BLWP @SS
-------------------------
------- SUB TASK -------
        AORG >E500
SS      DATA >E700
        DATA TT
TT      NOP
------MORE SUBTASK CODE
-------------------------
        RTWP
```

As can be seen, this scheme needs less code than the first method shown.

F. There is still more to begin job setup, to get ready to enter the main loop. Look at programs in MICROpendium. These have been coded to be assembled with the TI Editor/Assembler system. Reference MICROpendium April 1987, page 24; February 1987, page 30; November 1986, page 12, etc. Watch out for the differences between how Mini-Memory and Editor/Assembler work. These programs are structured for the "Load and Run" system. Here, the E/A loader does a lot of setup for you. Programs created with L. by L. are more labor intensive. First, the program is loaded from cassette, which is slow. You could write code that causes data to be initialized by the load operation, but I advise against that. You have to test the program. If you set up code dependent on load initalization, then there could be a nightmare loop of load, test, bomb out, reload again, etc. So I urge that you spend the effort to code the instructions in the begin job HSKPG to set up data. Then, when testing, you can use Easy Bug to patch bugs in the code, avoiding a certain amount of reassembling.

G. Saving code with Easy Bug, thus:

Program in RAM at E100 to E600

Type SE100 (TO) E600

Messages prompt how to operate cassette machine to save the code.

H. Loading code with Easy Bug; program from casette.

Type L (that's all, just L).

Messages prompt operation of cassette machine to load the program.

The addresses above, >E100 and >E600 are also saved, and the code is shoved into RAM exactly where it came out. If there was something else at >E100 through >E600 it is gone.

This is the first of a two-part article on Mini-Memory power.—Ed.

TABLE I

```
(LINE 1)            AORG  >E100   Here, talking to L. by L., put
                                   code into RAM, starting at ad-
                                   dress >E100 (hex)
(LINE 2)    AA      B     @A2     Label "AA" is program entry
                                   point; at address >E100. L. by
                                   L. displays all the good stuff
                                   as you type each line. Look at
                                   it as you go along.
(LINE 3)    EJ      LWPI  0000    I sneaked in the end-of-job
                                   here, so you can see it now. I
```

said you must properly exit from your code. The 9900 CPU chip in the console must have a 32-byte area, called the workspace, for units called registers. Your program must use a separate workspace because you cannot use the system's space. But, you must save that old address and must restore it to exit (end job).

```
(LINE 4)            B     *R11    Exit to system.
(LINE 5)    MW      BSS   32      Tell L. by L. area for my
                                   workspace.
(LINE 6)    A2      STWP  R12     Push Old W.S. address into
                                   R12.
(LINE 7)            MOV   R12,@EJ+2  Now, push it into that zero
                                   space in line 3. When you ex-
                                   it, line 3 restores Old W.S.
                                   pointer.
(LINE 8)            LWPI  MW      Now, define your workspace.
-------------------------------------------------------------
  REST OF BEGIN JOB CODE GOES HERE
-------------------------------------------------------------
(LINE XX)   MA      NOP           Main loop code from here.
-------------------------------------------------------------
  LOOP DONE,
  END OF JOB CODE GOES HERE
(LINE ZZ            B     @EJ
```

IRS to continue pilot test on computer-based tax filing

As a result of a growing number of tax preparation firms using computers to prepare tax returns, the Internal Revenue Service is planning to continue in 1988 the pilot test begun in 1987. The test allows qualified filers the opportunity to file forms 1065 and 1041 via electronic transmission or on magnetic tape.

The IRS plans to extend the electronic and magnetic media filing capability to forms 1120S for the first time in 1988 for 1987 tax returns. These returns will be filed in the IRS service center in Andover, Massachusetts, beginning in January.

Applications to participate in the pilot must be received by Sept. 1. Applications should be sent to Assistant Commissioner (Planning, Finance and Research), Internal Revenue Service, 1111 Constitution Ave., N.W., Washington, D.C. 20224, Attn: Technology Research Office. Call (202) 376-0388 for more information.

Update on the 9640

DOS, My-Word getting better

By JOHN KOLOEN

The Geneve 9640 is turning into an amazing little computer. Already several versions of M-DOS have turned up on the bulletin boards — none of them the finished version, I might add — but each a little better than the previous. The same goes for My-Word. Each week, it seems, it gets better.

M-DOS, while remaining essentially a 99/4A emulator, now automatically partitions a 180K RAMdisk in the Geneve and supports print-spooling. It will also support up to two Horizon RAMdisks at CRU addresses >1400 and >1600. This version was dated July 23 and is numbered version 0.9.

Version 0.9 also eliminated a bug that was present in the July 11 version I wrote about in last month's Comments column. (Although this version of M-DOS corrects a problem found when using a CorComp RS232 card, I use a TI RS232 card and had I/O problems with the previous version.) Access to I/O ports is flawless now, as far as I can tell. More versions and improvements are expected before the final M-DOS hits the boards, and I can see where one could conclude that the excitement is building. To use a word from the vocabulary of Ollie North, it's "neat."

MY-WORD GETTING BETTER ALL THE TIME

My-Word — now up to version 0.8 — is getting to look more and more like a fully configured word processor. In addition to displaying the disk drive and filename of the document you're working on, it uses an asterisk next to the drive designation to let you know that the file has been loaded from disk and is not a new or unused name. In the center bottom of the screen is an indicator reporting how much memory has been used in terms of percentages, and at the right lower portion is a readout of the time. By the way, there is a lot more RAM available for documents now. As an example, the article about Logo in this issue took up 24 percent of the available memory. It takes up 56 sectors on this disk, not including the graphics or most of the tables.

Another nifty feature is the ability to print formatted files directly to the screen without interfering with the document in memory. To do this, you enter the Formatter from the editor screen — the main menu screen has been eliminated — enter the drive designation and filename and when prompted for the print device name enter SCREEN. The remaining familiar prompts also appear and then, voila, the formatted file scrolls up the screen. (The scrolling is paused by holding down the space bar.) It's very handy for making a document look just right without wasting tons of paper. To see what the document in memory will look like through the formatter, enter BUFFER for the input device name.

Incidentally, the formatter remains in the 32-column format, the only operation of My-Word that is not in 80-column mode.

Finally, the Search-Find/Replace function can be used with a wildcard character. This function may be executed either forward or backward through a document. (At this point, My-Word itself operates in the Geneve mode while I/O functions executed through My-Word are done in the 99/4A mode.) Oh, yes, My-Word's Utility program can be used to load Myarc's XBII and XBII can be used to load My-Word by entering RUN DSKx.MYWORD. Those with a MW/G file on their distribution disk can load My-Word directly from the GPL interpreter by entering DSKx.MW/G, then pressing enter and selecting My-Word from the selection screen.

CLOCK SUPPORT

Using a program written by J. Peter Hoddie, which is reprinted in User Notes, you can now start the Geneve clock. This time/date data shows up in the My-Word directory, giving the time and date a document was entered and the time and date of the most recent update. The format is basically the same as the time/date stamp of the Myarc Winchester operating system, only in 80 rather than 40 columns. The time/date stamp is battery backed, so it keeps track of the time and date even when the computer is off.

MULTIPLAN GAINS SPEED

With the release of the most recent M-DOS, Multiplan becomes a functional, 80-column spreadsheet. Though Myarc has yet to finish the Multiplan upgrade — the company wants to make it look more like the IBM-PC version of Multiplan — it is plenty useful the way it is. It's much faster than the 40-column TI version in virtually every way, from data entry to recalculation. Of course, the version that runs on the 4A also runs on the Geneve, with the same increase in speed. However, the Geneve at this point doesn't provide more memory for larger spreadsheets. Both the 40- and 80-column versions take much longer to write to disk than Multiplan running on the 4A.

Once this upgrade is finished, it's not likely that Myarc will do more with Multiplan. The cost of licensing from Microsoft one of the more recent PC versions of Multiplan probably isn't worth it. Besides, Myarc has ported a 1-2-3 clone from a PC to be modified and run out of the Geneve. This program is expected to read and write Lotus-compatible files. The name of the clone escapes me, but it was selected as software product of the year by one of the big PC computer magazines a year or two ago.

TIPS FOR THE LOST

I've had some first-hand experience with Geneve buyers who are lost without better documentation. I feel sorry for those who have a Geneve and a TI disk controller. Using CSAVE to save cartridges with a TI disk controller is difficult, and for such users nearly impossible. Typically, it seems, these users are not familiar with cartridge-saving techniques developed by MG with the GRAM Kracker. Even though CSAVE does the same thing as the GRAM Kracker in this regard, a user who has never tried it may not understand what a saved file "looks like" on a disk. To these, I address the following comments:

When you use CSAVE, the cartridge will be written to the disk as a batch of files. Each will be filed under the name you give and appended with a number. This number is added by the CSAVE program. When you load the cartridge from the disk using the GPL interpreter that serves as M-DOS at this point, you will use the following format: DSKx.FILENAME. Don't include the number that is appended to the filename by CSAVE.

If you save a cartridge and only one file name appears under

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GENEVE UPDATE—

(Continued from Page 33)

the name you used you can be certain that something went wrong.

The most cartridges you can save in this format to a single-sided, single-density disk is three. With Extended BASIC you can save only one additional cartridge to a disk. It's a big program and takes up a lot of space. A DS/DD disk has enough room for a bunch of programs.

To load Myarc's XBII, which comes with Geneve — it will eventually be replaced by Advanced BASIC, which requires the final version of M-DOS, which is not available, yet — load the Editor/Assembler via the GPL interpreter. The distribution disk comes with a program called EA. Enter DSKx.EA. After E/A is loaded, press enter and select E/A from the selection menu. Then select option 5. Then enter DSKx.BASIC.

If you have a copy of Myarc's Disk Manager on the same disk you may need to open the drive door after XBII has been loaded. You'll know it's loaded when the version number of XBII appears in the lower righthand portion of the screen. At that point, the drive will continue to operate. To stop it, you may remove the disk with XBII on it and replace it with any other disk. The drive will stop spinning after a few seconds.

With Multiplan, make sure you copy the MPDATA and MPINTR to your working TIMP disk. These two files support the 80-column version. Everything remains as it has been, except that you load Multiplan from a disk through the GPL interpreter rather than plugging in a cartridge. You'll find that when you run a catalog of a disk through Multiplan that garbage will appear near the bottom of the screen. Most of this transient junk will vanish after the file is loaded. Garbage characters may still exist near the bottom of the screen on the extreme left and right sides of one row, but are not saved when a spreadsheet is written to a disk. This junk is expected to be eliminated with the final Multiplan version.

Of course, you have the option of running the familiar 40-column version of Multiplan. It will gain from the same increase of speed as the 80-column version.

WHAT ABOUT MONITORS

There are many monitors that will work with the Geneve. Which one you use depends on your budget. The trusty TI monitor is thoroughly adequate for any 40-column-or-less operation but won't do for 80-column display.

A number of color monitors will support the Geneve, which can be run in an analog RGB or composite mode. A switch on the Geneve card is used to set the RGB or composite modes.

I've tried the Geneve with an Amiga xxx monitor in both the composite and RGB mode. RGB is better in most circumstances, but the SEP (CHECK THE AMIGA MANUAL ON THIS) works fine, even when using the 4A monitor cable. A special cable is necessary for RGB mode. Check last month's user notes for data on this.

I've also used the Geneve with a cheap BMC monochrome monitor using the TI monitor cable. Worked just fine with 80-column software, though color is definitely better. The BMC cost about $75 new, and can probably be had for a song at a resale shop.

Here are the names of some monitors that can be used with the Geneve, though I haven't used all of them:

NO HARD DISK SUPPORT, YET

Pending the release of the final version of M-DOS, the Geneve won't work with a hard disk, even a Myarc hard disk. You can read files from the hard disk and do some cataloging operations, but you'll have lots of trouble writing to it. When Myarc releases its combination hard disk/floppy controller — expected near the end of the summer — the personality card I use for the WDS/100 will be obsolete. Incidentally, the new controller will support hundreds of megabytes of storage across three hard disks (if you can afford Winchesters with that kind of capacity), and a streaming tape backup that offers the option of using a VCR as the backup device.

MY-ART NEARLY READY

My-Art, the mouse-based drawing program that will eventually be bundled with the Myarc mouse, is nearly finished. The current version supports all the drawing capabilities of the program but won't output to a printer. We already have the mouse, but the current version of My-Art requires the replacement of an EPROM in the Geneve. I've got it only for demo purposes. The final version should be quite an achievement. I only hope that the documentation will be adequate. Of course, what would hobbyists do if everything is spelled our for them?

Forth tips

In-between disk copier

By LUTZ WINKLER

From the time TI-Forth was first released, a number of disk-copying routines have been published. This was mainly in response to TI's implementation of FORTH-COPY which—being nothing more than a DO-LOOP of SCOPY—tediously copies one screen at a time while giving the disk drives a good workout.

My complaint about those three-pass copiers is that they necessitate rebooting and, for the most part, also disk-swapping. In essence, not much time is saved. One might as well leave Forth and boot a disk manager. That, of course, is something a true fanatic is not going to do.

From my point of view, too much is made of speed anyway (I am in the enviable position of having plenty of time) and I am inclined to look for convenience. That is the reason my disk copier does not set any speed records, but it does away with disk-swapping and rebooting. It copies from drive 1 to 2 (0 to 1, if you want to be finicky about it) and takes up about 720 bytes of memory. Five screens are read/written per pass. If will copy formats other than SS/SD; however, the disk-formatting feature will provide only the format which is invoked by your FORMAT-DISK word.

By the way, the first parameters in M1 and M2 (as well as the one preceding 7 VWTR in DISK-COPY) change the text and background colors. (>F1 = white text on black screen.) You may substitute others to suit, just make sure you do it in HEX. READ5 and WRITE5 are DO-LOOPs which read (write) five screens at a time. XFER combines them into a DO-LOOP which derives its limit from DISK__SIZE. The top level word COPY-DISK is an indefinite loop which allows repeated execution by way of MORE?. About the >1400 in READ5 and WRITE5: Screen contents are put into an unused area of VDP memory. As I said, convenience, not speed, was my main objective. So, please excuse me while I fetch that second cup of coffee.

```
0 ( DISK-COPIER - 1 )   39 CLOAD AD  0 CLOAD COPY-DISK
1 BASE->R HEX     0 DISK_LO !   0 CONSTANT INC
2 : AT GOTOXY ;  ( skip this if already in your autoboot )
3 : .SCR#  DUP 6 .R ; ( format for screen number display )
4 : READ5  5 0 DO I INC + .SCR#
5                BLOCK I 400 * 1400 + 400 VMBW
6              LOOP ;
7 : WRITE5  5 0 DO I 400 * 1400 + I INC +
8                DISK_SIZE @ + .SCR# BLOCK 400 VMBR UPDATE
9              LOOP  FLUSH  EMPTY-BUFFERS ;
10 : M1  F1 7 VWTR CLS 2 A AT ." Reading source screens" CR CR ;
11 : M2  1E 7 VWTR CLS 2 A AT ." Writing copy screens" CR CR ;
12 : M3  CLS CR ." FORGET INC to clear memory" CR ;
13 : MORE?  ( --- f ) CLS 0 ' INC ! 4 E AT ." Continue (Y/N) ? "
14          KEY DUP 59 = SWAP 79 = OR 0= ;
15 -->
```

```
0 (DISK-COPIER - 2 )
1 : TITLE  CLS 4 5 AT ." @>------  COPY-DISK  ------>1"
2              4 8 AT ." Insert source disk in drive 0,"
3              4 A AT ."          copy disk in drive 1,"
4              4 D AT ." Press 1 to format copy disk or"
5              4 F AT ." any other key when ready  "
6           KEY 31 = IF 1 FORMAT-DISK THEN ;
7 : XFER  DISK_SIZE @ 5 / 0
8         DO M1 READ5 M2 WRITE5  5 ' INC +!
9         LOOP ;
10 : COPY-DISK  EMPTY-BUFFERS
11              BEGIN TITLE XFER  F1 7 VWTR MORE?
12              UNTIL  M3 ABORT ;
13
14 R->BASE  COPY-DISK  ;S
15
```

Freeware

Freeware is user-supported software available for little or no cost. When ordering Freeware, always include media and postage-paid return mailer. Allow six weeks for orders to be filled. Those who include donations with their orders encourage the development of more user-supported programs.

RAM/LOADER FOR RAMDISK

Steven D. Mehr, of 633 Hollyburne Lane, Thousand Oaks, California 91360, has released RAM/LOADER. The program is designed for use with John A. Johnson's CALL MENU ROS (Ramdisk Operating System) for the Horizon RAMdisk. It requires Extended BASIC, disk system and memory expansion. It is an Extended BASIC utility loader generic enough to be used outside the RAMdisk environment. A RAMdisk is not required.

Features include the capability to load Extended BASIC programs of any size, ability to load from Extended BASIC assembly language programs that require a D/F80 loader and the ability to select 8 color choices using the spacebar. Documentation is on disk and includes READ/DV80 by J. Peter Hoddie. READ/DV80 allows the user to view D/V80 files without loading a word processor.

Mail a self-addressed and stamped return mailer and formatted floppy disk to obtain RAM/LOADER. Specify RAM/LOADER when ordering.

LUCKY LANG'S LATEST LEGAL LOTTERY LICKER

Chris Lang, of 1906 Jackson Rd., Baltimore, Maryland 21222, has released Lucky Lang's Latest Legal Lottery Licker. The program runs in Extended BASIC and requires a disk system and expansion memory.

The program contains a mathematical system to select numbers for each state's weekly lotto drawing, and the daily pick-3 and pick- 4 numbers games. The program will also select the weekly lotto numbers for those in Canada and Australia as well as any any country or state whose lottery agencies require players to select six numbers ranging from 1 through 49.

Documentation is included on the disk. The author asks for a $5 donation if the buyer supplies a SS/SD formatted disk and postage-paid return mailer. He will supply the program, media,

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Prostick II

An oldie but a goodie

By BOB CARMANY

How many sets of TI joysticks have you gone through in the past year or so? Have you tried some of the "$6 specials" as well? If, like most of us, you are tired of flimsy, non-responsive joysticks, here is some good news for you!

I bought my first Prostick II a couple of years ago, largely enticed by the advertisements in the Tex-Comp material that I saw from time to time. I have had two of them for two years now and they are truly "oldies but goodies."

Performance: The Prostick II was one of the very first joysticks to come with a "switchable gameplate." What that means is that there is a collar on the top of the joystick that allows you to select either four-way or eight-way response. The four-way response locks out the diagonals and gives you horizontal and vertical movement. that is a big plus when you are playing a maze-type game like Munchman. The joystick is designed for either right- or lefthand use—there are dual fire buttons on the front of the housing. The response of both the fire buttons and the control lever are excellent. The first time that I played Munchman using the Prostick II, I tripled my previous best score. The joysticks take some getting used to, however, because they are so much more responsive than the TI joysticks that you may be using.

Ease of use: This category is similar to "performance." However, in considering it, I came to the conclusion that there are some qualities of the joystick that really did not fit in that category but could better be addressed here. Have you ever had "joystick hand"? You know, when your fingers refuse to uncurl after gripping a joystick for an hour or so in a Parsec session. The Prostick II is conveniently shaped to reduce fatigue from a "death grip" on the joystick for an extended period of time. The fire buttons are also located to take advantage of the superior dexterity of your forefinger rather than trying to use your thumb as you must with the TI joysticks. It makes for a much less tiring effort when playing games.

The "switchable gameplate" is easy to use. Just pull up on the collar and turn it and push it back in place. It is efficient and improves responsiveness, especially when you use it in the four-way mode for playing maze games.

Review

Report Card

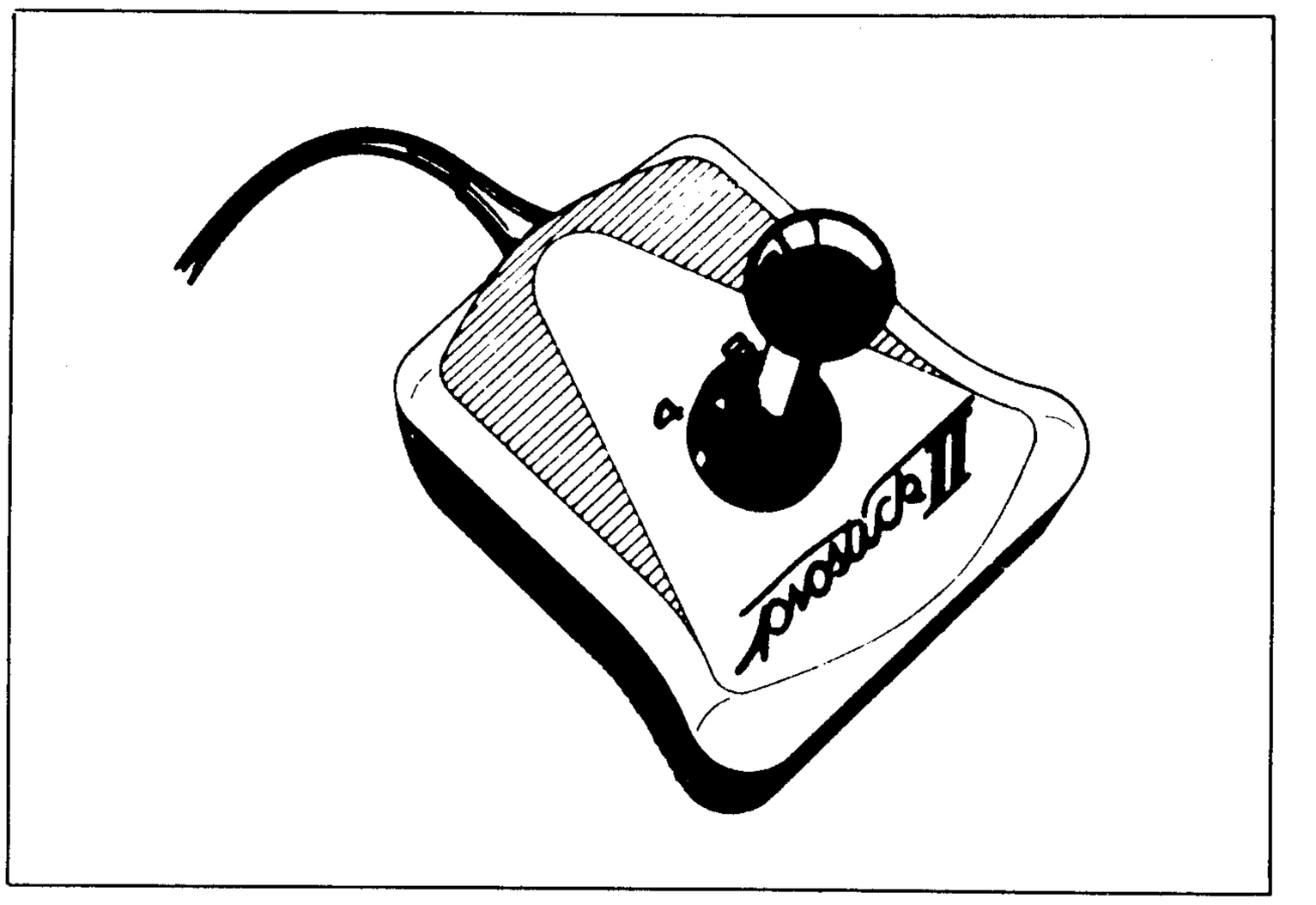
Performance.....A
Ease of Use.....A
Service/Warranty.....A
Value.....A
Final Grade.....A

Cost: $29.95 (including adaptor)
Manufacturer: Newport Controls, Route 2, Box 8, Dixon Lane, Bishop, CA 93514
Requirements: Console and monitor or TV, appropriate game program

Service/Warranty: The Prostick II comes with a five-year warranty! This is one of the longest warranties around. During the warranty period, the manufacturer will repair a broken or defective joystick for $5 per unit to cover shipping and handling. After many hours of Munchman, Parsec and the like, my two joysticks had lost some of their responsiveness so I shipped them off to the factory to be "overhauled." No problem! A proof of purchase and a $10 check took care of the whole thing. The service was truly excellent! It took just over a week from the time I mailed the package off until the UPS truck pulled up with my refurbished joysticks. My contact with the people at Newport Controls has always been cordial and they are a very helpful and pleasant bunch.

Value: The Prostick II is a durable and responsive joystick. It will outperform the TI joystick and will also outlast several pairs of them. There are other joysticks that cost less than the Prostick II but their performance is not as good. If you are looking for a responsive, durable joystick, the Prostick II is an outstanding value.

The only problem is, where to find the Prostick II? It does not appear in many of the catalogs any more and they can be hard to find. However, Newport Controls still makes the Prostick II, and if your TI dealer does not have them, you can buy directly from the manufacturer. Simply write to them and request Stock No. 2002 (TI model) and you are all set. Incidentally, the adapter that comes with the joystick will allow you to use any Atari-compatible joystick with your TI as well—an added benefit!



The Brain

Smarts for your computer

BY HARRY BRASHEAR

To begin this review, I would like to make one very important point concerning "Brain" by Datax: This is probably the most professional *looking* program I have seen for the TI for some time.

When they told me I was going to review this program, I panicked. How could I possibly review a program of calculations and make it interesting? I was reminded of a college course in which I had to write a 5,000-word paper on "How to Take Nosedrops Out of a Bottle". (Think about it!) However, as I got into the documentation, I found that it really was quite a piece of software.

Generally speaking, The Brain is a tool for programmers, students, engineers, and most any other TI'er that needs accurate answers and conversions for problems requiring advanced mathematics and formulas. That's a mouthful, but it tells in one sentence what the program is all about. More accurately, the main menu of the program gives you the following initial options:

1) Annuities and Compound Amts
2) Math and Calculus
3) Electronics
4) Trajectories
5) Conversions
6) Geometry
7) Physics
8) Vectors
9) Tables

Each press of the key brings in another menu for the specific major category. There is also a "Help" screen available for each sub-menu that explains what each item is for, what it does, or what formula it offers. For instance, it doesn't give math lessons. I will go over the main menu items one by one and generally tell you what they are all about, but you will have to buy it to really appreciate its many options.

Annuities and Compound Amts is a great general business aid that calculates present and future values and the interest rates required.

Math and Calculus will give you the answers you need for exponents, factorials and logs.

Electronics works out your problems for Ohm's law, parallel resistance and power dissipations plus a few others.

Trajectories, something we all are acquainted with. It's darn handy for the catapult engineer in calculating where the rocks are going to fall.

Conversions. This segment really impressed me. I think it covers everything on the back page of your dictionary and then some. Each sub-menu option carries a sub-sub-menu and help screen. Length conversions, energy, pressure, speed, temperature and even number bases are covered fully.

By the way I might also tell you that there is a screen dump available for all of your calculations when they are finished. It's a little slow, but really handy if you are doing a lot of this stuff. Just to maintain the class of the program, it dumps to PIO in Script.

Geometry simply gives you various area and volumn calculations.

Physics was an area of fun for me because it told me, among other things, that if I jumped off the top of an 800-foot high tower, I would have only 7.05192 seconds in which to change my mind.

Vectors calculates dot and cross products and also vector add and subtract.

Tables is another interesting area, particularly for the programmer. It contains the complete ANSII code list, color codes and, of all things, the TMS9900 instruction set. There is also a complete list of the elements, including atomic weights etc, and sine, cosine and tangent tables.

That was not a complete list but it should give you an idea of the coverage of the Brain.

A nice added feature in the program is a calculator that's available at every entry that requires a number input. Pressing FCTN X brings it up in the lower left cor-

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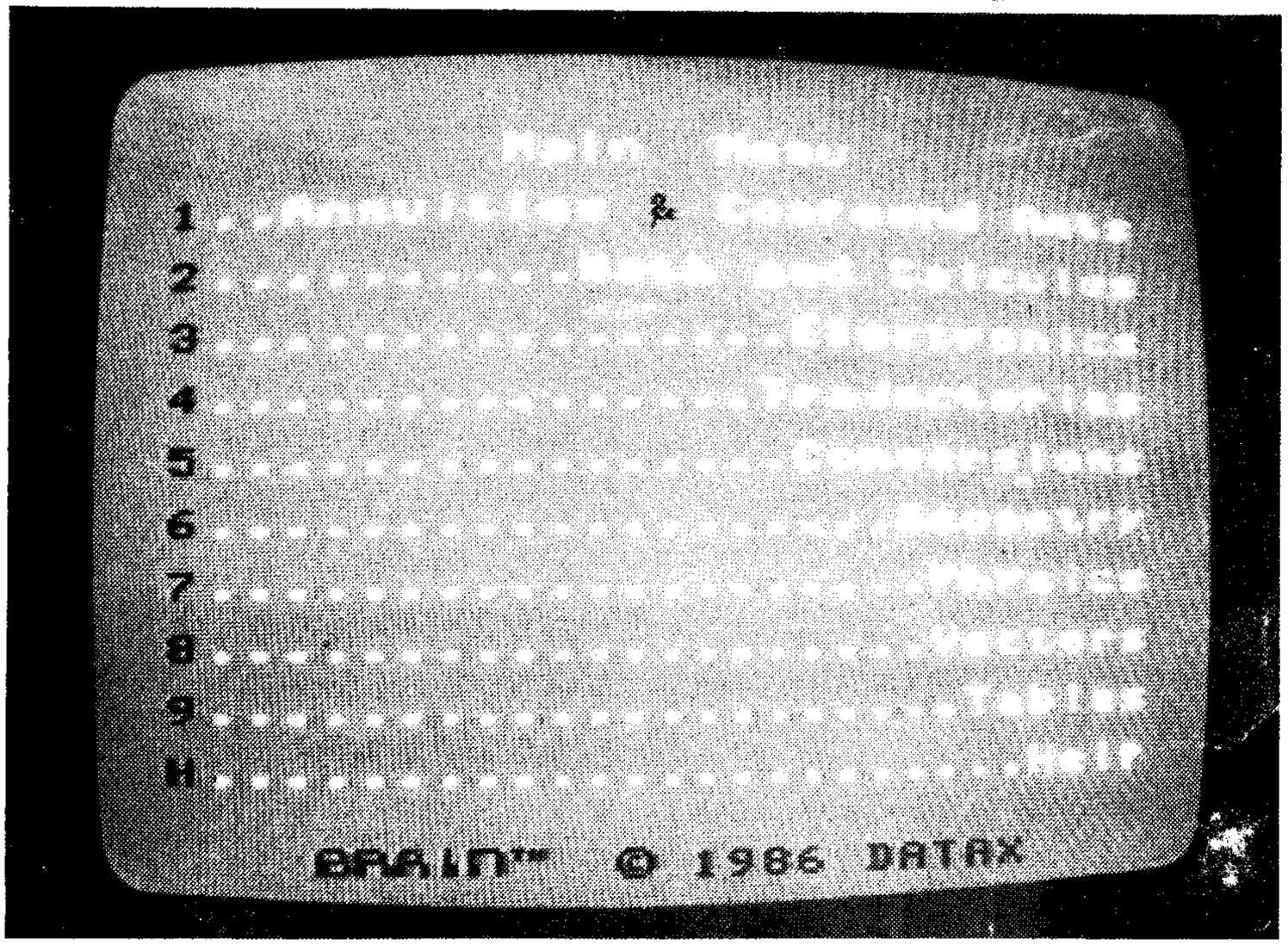
Review

Report Card

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

Cost $29.95
Manufacturer: Datax, 1923 Linden Street, Ridgewood NY 11385
Requirements: Console, Single drive, 32K, and Extended BASIC



Rocketman

Slow and steady gets you there

By G.P. NEVILL

Rocketman is an odd title for a checkbook reconciling program. I called the creator of it to get the history behind the name.

It turns out that he started this program around the height of the Pacman craze and wanted something more fun-sounding than Checkbook Reconcile. When you open the binder the program comes in, you are greeted with the cartoon of a turtle driving a car towards a rocket. The turtle, Rocketman, may be slow to start, but he is first to finish. That is the idea. By working methodically through all the steps, you end with a reconciled checkbook and a minimum of hair pulling.

How many times have you tried to balance your monthly checkbook statement and given up in disgust or frustration? Even if you had to do it just once, you will appreciate what this program can do for you.

You might ask, "Why not use a paper and pencil, or a calculator if you really need to?" And you would be right. You don't really need to use your computer to balance your checkbook; it just makes it a lot easier and might even make it fun. I had been using a calculator for some time to balance mine finding that I would occasionally have to add a correction factor to make everything balance. After going through the procedure and finding it off three or four dollars I would be too frustrated to go through the additions and subtractions of 30 checks to find the error. This new program changed all that.

Performance: After loading the program, you arrive at the main menu. This includes: storing data, retrieving data, a calculator for adding and subtracting, printer setup and graphic controls.

By following the instructions on screen, you go through the steps of checking through the cancelled checks, listing outstanding checks, deposits, credits and fees. It then gives a final readout with the checkbook data on the other side of the screen. If your balance does not agree with the bank statement, you can go back and correct any data entries without starting from scratch.

If you have trouble finding an error, or want to quit and come back, you can save what you are doing on disk and continue at a later time.

Once everything agrees, you can use the calculator function to find the balance of any new checks written between the statement cut-off date and the present balance. This function is especially helpful for finding a math error when the checkbook does not agree with the statement. Again, if you make an error, you can correct the mistake without starting over—a definite plue.

When finished, you can print all or part of the statement for your records. The printer function will work with RS232 Port 1 and 2 as well as the parallel port.

Ease of Use: I found Rocketman to be extremely simple to operate. The program loads automatically when you enter Extended BASIC. From there you need only follow the prompts and screen instructions to the end of the program. The data save feature allows you to stop if things get too frustrating to continue. There are no special commands to learn and if you make a mistake you can easily correct it.

The only possible problem some people might have is with the print option. If your printer is set up for a serial baud rate other than 300, you will either need to break into the code (it is protected) to change the speed or ask the vendor to change it when you order. They are very anxious to please on this point, so there should be no real problem.

Documentation: The manual is excellent. The 38-page, in-depth documentation comes in a three-ring binder, is indexed and filled with screen displays with accompanying text to explain each step. At the back, a reference section gives advice

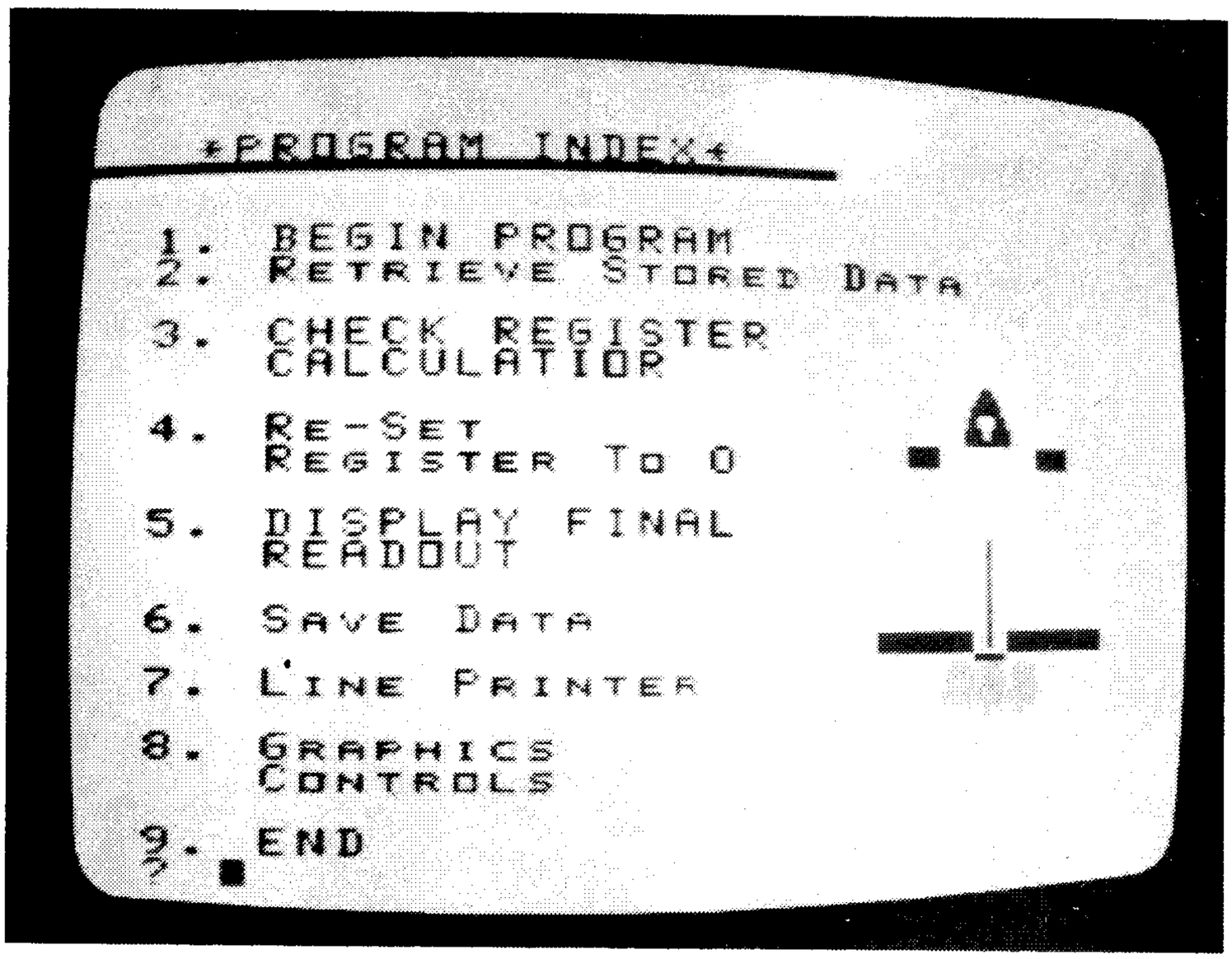
(See Page 40)

Review

Report Card

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

Cost: $29.95
Manufacturer: California Programs, 4426 Appian Way, El Sobrante, CA 94803
Requirements: Extended BASIC, one disk drive, 32K expansion memory



Menu Ver 6.3

Broadening your Horizons

By JOE NUVOLINI

I recently received a copy of John A. Johnson latest version of Menu for the Horizon RAMdisk. It is version 6.3 and it came to me from a friend in California. I was pleasantly surprised. This program bypasses the TI title screen and presents a 10-option menu on power-up. Six of the options on this menu are user-definable and both Editor/Assembler program image (PI) and Extended BASIC programs can be run directly from this menu. Here's a quick rundown on this amazing program!

The program consists of three programs: MENU, ROS and CONFIG. There are also DOC files, DM-1000 and a LOAD program that will load either DM-1000 or the CONFIG files. First, print out and read the DOCs.

The Operating System (ROS) will work with SSSD, DSDD or with a modified 256K Horizon RAMdisk. The ROS supports the following CALLs:

DM—This loads DM-1000. I have modified my ROS program so that DM loads a file called MG and MH instead of MGR1 and MGR2, so that it is more compatible with Funnelweb.

DN(x)—Assigns drive number (1-9) to the Horizon RAMdisk.

WO/WF—Turn write protect on and off, respectively.

AO/AF—Turns the automatic menu at power-up on or off. If off, you will get the TI screen at power-up. If AO is on and no MENU program on the Horizon RAMdisk, the computer will immediately go to the GROM cartridge. This is useful and could be used to auto-boot a program, such as a BBS, when power is applied to the console. The BBS could then automatically boot up after a power failure.

MENU—This will run a program called MENU (XB or PI) if one is located on your RAMdisk.

U1-U9—These will load nine programs of your choosing called U1TIL through U9TIL, located on your Horizon RAMdisk. These too can be XB or PI.

Also, any of these CALL programs can be from a running XB program. The format to do this is:

```
100 DELETE "DM"
```

Review

Report Card

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

Cost: Public domain, donations accepted
Manufacturer: Available from CompuServe, GEnie, or write Miami TI Users Group, Attn. Burt Schreiber, 19301 N.E. 19th Ave., North Miami Beach, FL 33179.
Requirements: Console, TV or monitor, expansion memory, disk drive, Horizon RAMdisk, Extended BASIC

By the way, there are provisions for operating more than one Horizon RAMdisk with this system. These procedures are in the DOCs and won't be covered here.

The CONFIG program allows you to load, modify and save your ROS program. You can load CONFIG with the LOAD program provided or through the E/A option 5 loader. When loaded, the Horizon RAMdisk size and CRU location appear at the top of the screen. The bottom line looks like this:

N)ext, E)dit, S)ave, L)oad, M)isc, Q)uit

Pressing the N will move you to your next Horizon RAMdisk if you have more than one. To see what E and S do we must first L)oad the ROS, so press L and do it. Once it is loaded, you will see the U1TIL through U9TIL that we talked about earlier. The number (2) before is the length of the call, U1, U2, etc. Below that, there are provisions to set the foreground and background colors you desire. You can also set write-protect on or off, set the drive number and the maximum number of sectors available. Since the ROS is smaller than the original operating system by 16 sectors, a SSSD Horizon RAM disk will now give you 376 sectors, a DSSD, 736, and a modified 256K card, 992. Finally you can set the AO/AF feature, previously discussed, on or off.

Now, let's talk a bit about the nine calls. They don't have to be called U1 through U9. Enter the E)dit mode. If you have a program called TERM, you can enter TERM as the name, leave the size as 2 and use CALL TE to call up the program. If you have a program called PRINT and enter it as the name with the size of one, you can run it with CALL P. I have found that a size greater than 2 can cause a problem sometimes when you use the CALL function. Once you get your system the way you want it, then S)ave it back to disk. The M)isc option of the menu gives you a four-selection menu with the following on it:

1) Check RAMdisk Memory
2) Load Character Set
3) Load AORG Object Code
4) Return to editor

Option 1 will perform a nondestructive test of your Horizon RAMdisk. Option 2 allows you to load the TI or a CHARA1 character set into your ROS. Option 3 is there to load a newly-assembled ROS into your Horizon RAMdisk. The final option, of course, returns you to the edit mode. Remember, if you load a new character set, to S)ave it to make it permanent. By the way, I keep the CONFIG program on my HRD as GC and have it as a call so I can make changes when desired.

Now you have the ROS installed and no MENU program on your Horizon RAMdisk, so as stated earlier, you will get whatever is in the >6000 area when you power up. Let's get the MENU program out to the Horizon RAMdisk. Put in the XB cartridge, place the MENU disk in drive one and boot up. Select DM-1000 from the menu that appears and copy MENU from the disk to the Horizon RAMdisk. Now you should get the menu, and it's time to talk about the MENU program. The screen will look like this when it first comes up:

1 Show Directory
2 View a file
3 Run a program
4 Disk Manager
5 Your Option 5
6 Your Option 6
7 Your Option 7
8 Your Option 8

(See Page 40)

FREEWARE—

(Continued from Page 35)

mailer and postage for $7.50.

ENVELOPER ADDRESSER

Bradford Hearn, of 914 W. Bertrand, Houston, Texas 77088, is offering a TI-Writer enhancement that prints addresses on envelopes. System requirements are a memory expansion, disk system, printer and TI-Writer.

The program is loaded through the utility loading option of TI- Writer. It takes addresses from documents written with TI-Writer and prints those addresses on envelopes. Documentation is on disk.

The author that those who order the program include a $5 donation, media and postage-paid return mailer. He will supply postage and media for an additional $1.

VERSION 2 OF FRACTAL EXPLORER

Steve Langguth, of 2956 South Barnes, Springfield, Missouri 65804, has released Version 2 of Fractal Explorer. Version 2 is twice as fast as Version 1, according to the author. Version 2 also allows the user to output the images to Gemini 10X-compatible printers. The source code is included to allow users to modify the printer routines for use with other printers. The program requires Editor/Assembler, expansion memory and disk system. Images may be saved to disk.

Fractals are shapes that are "infinitely squiggly." Images explored with the program are based on the Mandelbrot Set, named after Benoit Mandelbrot, developer of fractal geometry. The program comes with extensive documentation.

The program requires a DS/SD disk or two SS/SD disks. The author asks for a donation from those who order. Send media and return, postage-paid mailer.

BRAIN—

(Continued from Page 37)

ner and provides basic calculator input including percentages. Nothing new in that, but when you leave calculator mode the answer you got there appears at the input prompt. You can erase it or disable it if you wish but the answer is expected to be your input.

There is also a "change default" program so you can customize the colors, theprinter output, and choose which of the two main program files is loaded first.

I told you the program had a real pro look about it, and it does. It comes packaged like something for those "other" expensive machines. You know, the "bookshelf pack", a neat little three-ring binder in a heavy slip in/out cover. The documentation is as excellent as the container, 36 easy to read pages that a child could understand. The disk is color coded so if you decide to remove it from the plastic disk holder in the front of the notebook, you will always be able to find it in your files. The bottom line is that Datax spared no expense in packaging. Frankly, though, I would rather see them put the docs on a second disk, shrink wrap the pair and cut the price to $19.95.

The program is written in Extended BASIC with links to various assembly routines when required. However, this in no way detracts from its usefulness because, in my opinion, it was programmed by a master of Extended BASIC efficiency. Because the program is so large, the help screens have to be retrieved from the disk and this, of course, slows things down a bit. Since you are not going to need them all that much after your first run-through, I don't consider this an important factor. Error routines make up a lot of the code and this is certainly commendable. There could be nothing worse than a program of this nature blowing up in the middle of important calculations. No one can predict what the end user is going to do to an input, but I believe the Brain hascovered 99.9 percent of the possibilities.

I think it is also important to note that the program has a lifetime guarantee attached. If you should ever crash the disk, two dollars, the original, and a simple whimper will get you a new copy immediately. There is also a nine to five telephone number for customer support. How can you beat that in todays TI software market?

I couldn't find anything to say bad about this program. The price is high considering what we pay for many other software products for our machine, but the guarantee, the packaging and the customer support have got to be added into the cost. It's not a program that everybody wants, but if you need it, then by all means buy it. I haven't seen anything else that comes close to what it does.

I have had experience with companies before that touted "customer support." One company I required help from first accused me of piracy, and then indicated that I was a twit because I couldn't get around a bug in their program.

My final act for this review was to call Datax just to check out the customer support they promised. I was greeted by a telephone answering device, but half way through my message the phone was picked up by Julian Achim, the author of Brain. Achim was pleasant, helpful and courteous. He also writes programs for the PC but says he really enjoys working with the TI. As usual with this program, what is required and what is promised is what I had gotten.

MENU VER 6.3—

(Continued from Page 39)

9 Your Option 9
C (cartridge name)

You won't get the C option if a cartridge is not installed.

One important note here: This menu will run both Program Image and XB programs but will not load the XB programs unless you have the XB cartridge installed. This caused me some grief when I first started using the program.

The keys active on the console are: 0-9, SHIFT 1 and 2, B, C, E, H, M, P, S, T, SPACE, FCTN 9 and FCTN =. Here's what they do:

Key	Action
0	Blanks screen
1	Disk directory (1-9) on screen
SHIFT 1	Disk directory to printer
2	View ANY file on screen
SHIFT 2	View ANY file to printer
3	Runs any XB or PI program
4-9	Runs user definable programs
B	Go to BASIC or prog. in GROM 1
C	Runs an installed cartridge
E	Edit menu options 4-9
H	This information (help)
P	Change print device (temp)
M	Run CorComp disk manager

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Newsbytes

User group runs TIBBS

The Kaw Valley TI Computer Users Group operates Topeka TIBBS in Topeka, Kansas.

The board operates 24 hours, seven days a week at 300 and 1200 baud. Phone number is (913) 357-5334.

Asgard announces GRAPHX Slideshow

Asgard Software was scheduled to release GRAPHX Slideshow by Paul Charlton and Ken Gilliland Aug. 15.

GRAPHX Slidewho is an assembly utility designed for creating slideshow presentations or for quickly viewing pictures stored on disk.

The utility requires no programming, but automatically finds all the pictures stored on disk and displays them in alphabetical order at a user-defined interval. Simple key presses allow the user to switch disks or jump ahead to the next picture at any time during a pause, according to the manufacturer, and will automatically repeat the program ad infinitum until told otherwise.

Included are a number of new fonts by Ken Gilliland for use with GRAPHX.

The program requires a TI99/4A with 32K; disk; Extended BASIC, Mini-Memory or Editor/Assembler; or a Myarc Geneve 9640.

For further information, or to order, contact Asgard Software, P.O. Box 10306, Rockville, MD 20850 or (301) 559-2429.

Chris Bobbitt of Asgard Software says he wishes to clarify that there is no connection between his company and Asgard Industries, headquartered in Minnesota.

Asgard Industries specializes in products for the Adam computer.

Texaments releases new CSGD packages

Texaments is introducing three new Character Sets and Graphics Design support software packages. They are CSGD User Disk #5, CSGD User Disk #6 and CSGD Cataloger.

According to the manufacturer, CSGD User Disk #5, a two-disk set, contains 16 new and two revised fonts for use with CSGD Messages, Letterheads, Labels and Banners. There are also eight Docuprint fonts for use with the CSGD III Docuprint program. Also included in User Disk #5 are 28 monogram graphics, 24 assorted small graphics and 15 large pictures (used exclusively for CSGD I). Price is $10.95, plus $2 shipping and handling.

CSGD User Disk #6, another two-disk set, contains 16 new fonts and one revised font, 26 monogram graphics, 18 different small graphics and 13 large pictures. Price is $10.95, plus $2 shipping and handling.

The CSGD Cataloger allow the user to print out CSGD small graphics and fonts to paper for easy reference, according to Steve Lamberti of Texaments. CSGD Cataloger is designed to allow all CSGD graphic files and TI Artist graphic files to be cross-referenced on data sheets. Price is $6.95, plus $2 shipping and handling.

All CSGD fonts and graphics, including the new User Disks, may be used by programs which are CSGD graphics compatible, the manufacturer says.

For further information, or to order, contact Texaments, 53 Center St., Patchogue, NY 11772 or (512) 475-3480.

IPS has 4A/TALK BBS

Innovative Programming of Rohnert Park, California, has a bulletin board service titled 4A/TALK BBS. It operates 24 hours a day at 300 and 1200 baud. Phone number is (707) 585-3321.

Galen Read of Innovative Programming advises that terminals should be set to eight data bits, no parity and one stop bit.

FLUG fair postponed

The first TI fair for the Dallas, Texas, area, originally intended to be held in October, is now tentatively scheduled for April, according to Richard Fleetwood of the Forest Lane Users Group in Dallas.

FLUG is coordinating the fair with the assistance of several other Texas users groups, Fleetwood said.

FREE-NET goes on line

FREE-NET, a free, open access computer network, began operations July 24 on the campus of Youngston State University in Youngstown, Ohio. The network is sponsored by the university and St. Elizabeth's Hospital Medical Center's Health Education Center.

The system is the first of an eventual nationwide network of similar community systems. This network is being sponsored by the Society for Public Access Computing.

The sponsors say that the network occupies a middle ground between a BBS and a large commercial system such as The Source or CompuServe.

According to their description, "FREENET is a multi-user system with the sophistication and power of the commercial systems, but is owned and operated locally with a distinct local orientation."

Phone number for the system is (216) 742-3072.

Oregon TI BBS has 9 message bases

Oregon TI is the second TI electronic bulletin board in Oregon, according to Sysop Rich Hill of Tualatin, Oregon. The BBS features nine message bases, Electronic Main, patched for file transfer to non-TI systems, four file transfer sections, including one dedicated to the Myarc 9640, a creative writing section to which users may submit messages directly into the system, a library "room" that is constantly updated with tutorials, program use information, jokes and miscellaneous information.

Oregon TI went on-line July 1. It operates 24 hours a day. Since July 1, Hill reports, the BBS has taken over 1,100 calls from users in 16 states. The protocol calls for no parity. The BBS may be accessed via PC Pursuit at 503-226-7652 or 503-692-7024. Calls to the BBS are remotely call-forwarded from Portland, according to Hill.

DataBioTics offers programs, RAM disks

DataBioTics has released a number of new products for the TI, including a RAM disk, called Grand RAM, with configurations ranging from 64K to 512K of RAM.

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Newsbytes

(Continued from Page 41)

Prices range from $129.95 to $229.95. According to DataBioTics, up to four of the RAM disks may be plugged into a PEB, providing more than 2 megabytes of memory. It is compatible with CorComp, TI, Myarc, Geneve, Morning Star and Foundation peripherals and may be used with the RAM disk menu system designed by John Johnson.

Accessories for the RAM disk include a plug-in real-time clock and a analog-to-digital device to interface with other devices and an emulator to create cartridges. The clock is priced at $29.95. Prices for the other accessories were not available.

Among the new software DataBioTics is introducing is Desktop Publisher. The cartridge-based word processing program requires only a console and a printer. The word processor may be used to create fonts and includes a picture editor that is used to select graphic elements. The graphics may be modified by the user, according to the manufacturer. Users may also produce line art. The program works with any parallel printer and may be used with a cassette recorder or disk drive. The list price is $69.95.

Other programs marketed by DataBioTics include Barrage, Jumpy, Spotshot, Black Hole, Spy's Demise, Stargazer I, II and III, Pro Typer and TI Workshop.

Barrage, for one or two players, lists for $17.98. As commander of Missile Control, the object is to subvert the Draks, who rain acid balls on the planet. Twin laser cannons are at the displosal of Missile Control. Joysticks are optional.

Jumpy is a Q*Bert-like game. Purple and black monsters join forces in a relentless chase of Jumpy. The list price is $17.98. Joysticks are optional.

In Spotshot the player is a giant dragonfly with a laser-like tongue used to defend against insects. Joysticks are optional. The list price is $17.98.

Black Hole puts the user in control of two spacecraft against the Black Hole empire's fleet. For one or two players. Joysticks are optional. The list price is $17.98.

Spy's Demise has nine screens and the object is to penetrate embassy security and avoid security guards. It lists for $17.98.

The Stargazer series allows the user to visit constellations on the screen and test your ability to identify constellations. The program lists for $37.95.

Pro Typer is a typing tutor program with a list price of $17.95.

TI Workshop is described by DataBioTics as a "program support environment." The program allows the user to view, display and edit the contents of any type of computer memory. Also included is a disk manager, menu-driven program debugger, and an enhanced editor and assembler and cross-referencer that lets the user load and edit text files, print text, merge, saved and display D/V80 and D/F80 files, purge, assemble and cross-reference. With the cross-referencer users may identify the line number where a label was defined or referenced. The program requires a memory expansion and disk system. The list price is $59.95.

Newsbytes is a column of general information about products and services relating to TI users. The publisher does not necessarily endore products listed in this column. Vendors, manuafacturers and others are encouraged to submit items for consideration. Photos will be used when space permits. Materials cannot be returned.

User group update

The following are additions and updates to our user group listings, which we began publishing in the May 1987 issue.

Kansas

Mid/America 99 Users Group, 8726 Marty Lane, Overland Park, KS 66212 (new address). Arnie Simpson, president, (913) 648-6380. Meets at 7 p.m. second Tuesday of each month in Room 104, Overland Park Community Center, corner of 87th and Lamar, Overland Park. Library; BBS. Annual dues $20 individual, $23 family.

New Mexico

Bernalillo Users Group, P.O. Box 27571, Albuquerque, NM 87125. Meets at 7 p.m. first Tuesday of month in Questa Building at Sunset Mesa School. Newsletter. Annual dues $15.

Pennsylvania

Airport Area Computer Club, P.O. Box 710, Coriaopolis, PA 15108. Joe Spiegel, president (412) 457-8284. Meets at 6:30 first Sunday in John Jay Room 22 at Robert Morris College. Has large PD library, monthly disk sale, monthly newslettr. "Despite the generic name, exclusively for TI99ers.

Washington

Puget Sound 99ers, P.O. Box 6073, Lynnwood, WA 98036. Chuck Wynne, president, (206) 745-3249. Meets at 7 p.m. third Thursday of month at Kirkland Library. TIBBS Data Line. Annual dues $15.

Magazine holders

Dear buyers,

We have run out of magazine holders and are awaiting a new shipment from the manufacturer. Orders will be filled again by the first week of September. Sorry for the inconvenience.

MICROpendium

User Notes

Program sets Geneve clock

The following program was written by J. Peter Hoddie and released to the public domain via numerous electronic bulletin boards. He calls it a "Junk Demo/Date Set For 9640" and says it is "for demo purposes only." We find it to be thoroughly adequate for setting the time/date function of the 9640.

After entering the program in any version of Extended BASIC, run it. You will be prompted for time and date entries. Use up to two digits to answer each query. The time stamp uses a uses a 24-hour format.

```
100 CALL CLEAR
110 PRINT "JUNK TIME/DATE SE
T FOR 9640"
120 PRINT :"BY J. PETER HODD
IE FOR DEMO PURPOSES ONLY"
130 PRINT :"ENTER ALL VALUES
 AS 1 OR 2  DIGITS": :"TIME
IS IN 24 HOUR FORM"
140 PRINT :"IT MAY BE UGLY,
BUT IT WORKS": :"ENTER TO CO
NTINUE                (USER FRIEN
DLY, NO?)"
150 INPUT "":A$
160 CALL CLEAR
170 CALL INIT
180 C=-32752
190 A$=""
200 FOR Z=C+13 TO C+2 STEP -
1
210 CALL PEEK(Z,A):: A=A-16+
48 :: A$=A$&CHR$(A)
220 IF Z/2=INT(Z/2)THEN A$=A
$&":"
230 NEXT Z :: A$=SEG$(A$,1,L
EN(A$)-1)
240 DISPLAY AT(1,1):A$
250 RESTORE 400
260 Q$=""
270 FOR Z=1 TO 5
280 READ Z$ :: DISPLAY AT(Z+
10,1)SIZE(9):Z$
290 ACCEPT AT(Z+10,10)BEEP S
IZE(-2):Z$
300 IF Z$="" THEN 170
310 Z$="0"&Z$ :: Z$=SEG$(Z$,
LEN(Z$)-1,2)
320 Q1=ASC(Z$)-48 :: Q2=ASC(
SEG$(Z$,2,1))-48
330 Q$=CHR$(Q2)&CHR$(Q1)&Q$
340 NEXT Z
350 C1=-32748
360 FOR Z=1 TO 10 :: CALL LO
AD(C1,ASC(SEG$(Q$,Z,1)))
370 C1=C1+1
380 NEXT Z
390 RUN 170
400 DATA YEAR,MONTH,DATE,HOU
R,MIN
```

Program aids daisywheel users

Enrico Gasperini, of Towaco, New Jersey, writes:

Like most TI users, I get a lot of mileage from my TI-Writer. But, unlike most, I prefer a daisywheel printer for true letter-quality printing. I have several printwheels of different fonts and pitch (10, 12 and 15). I also have several programs to do different types of printing, such as labels, disk catalogs and mini-word processors like 99'er Tex-Scribe. When I want to print something with proportional spacing, I found it to be a bit of a hassle to set up the printer. So I devised this short program as a setup precedure to be run before I load my other program. The program will set characters per inch and lines per inch in any combination.

Of course, the program will have to be modified to comply with your printer codes. The codes are in line 280. Lines 230 and 250 contain the calculations to generate the proper number for the spacing. On the Silver Reed EXP 400, the formula for linefeed amount is:

Linefeed amount 1/48 inch X (n-1)

Spacing pitch 1/120 inch X (N-1)

The program becomes especially useful if you print on preprinted forms, such as invoices, applications or tables.

```
100 !************************
110 !*  PRINTER SETUP FOR  *
120 !* LINEFEED &  SPACING *
130 !* SILVER REED  EXP400 *
140 !*  VERSION 1.2  4/87  *
150 !* by Enrico Gasperini *
160 !************************
170 CALL CLEAR :: CALL SCREE
N(5):: FOR I=0 TO 14 :: CALL
 COLOR(I,16,5):: NEXT I
180 RVCHAR$="808080808080808
0" :: LVCHAR$="01010101010101
01" :: BHCHAR$="FF000000000000
0000" :: THCHAR$="000000000000
00FF"
190 CALL CHAR(91,RVCHAR$)::
CALL CHAR(93,LVCHAR$):: CALL
 CHAR(123,BHCHAR$):: CALL CH
AR(125,THCHAR$)
200 CALL HCHAR(1,3,125,28)::
 CALL HCHAR(7,3,125,28):: CA
LL VCHAR(2,2,93,22):: CALL V
CHAR(2,31,91,22):: CALL HCHA
R(24,3,123,28)
210 DISPLAY AT(3,4):"PRINTER
 SETUP UTILITY" :: DISPLAY A
T(4,4):"----------------------
-" :: DISPLAY AT(5,4):"LINE
FEED AND SPACING"
220 DISPLAY AT(12,4):"Lines
per Inch 6";F$ :: ACCEPT AT(
12,19)VALIDATE(DIGIT)SIZE(-2
)BEEP:F
230 V=1/F :: L=(V/.0208333)+
1
240 DISPLAY AT(14,4):"Char.
per Inch 10";S$ :: ACCEPT AT
(14,19)VALIDATE(DIGIT)SIZE(-
2)BEEP:S
250 P=1/S :: C=(P/.0083333)+
1
260 DISPLAY AT(16,4):"Is PRI
NTER READY with" :: DISPLAY
AT(17,4):"proper printwheel?
 Y":Y$ :: ACCEPT AT(17,23)SI
ZE(-1)VALIDATE("YN")BEEP:Y$
270 IF Y$="Y" THEN 280 ELSE
260
280 OPEN #1:"PIO" :: PRINT #
1:CHR$(27)&CHR$(30)&CHR$(L):
: PRINT #1:CHR$(27)&CHR$(31)
&CHR$(C)
290 DISPLAY AT(20,4):"WANT T
EST SAMPLE? N":T$ :: ACCEPT
AT(20,22)SIZE(-1)VALIDATE("Y
N")BEEP:T$
300 IF T$="Y" THEN 310 ELSE
320
310 PRINT #1:"Sample printin
g for" :: PRINT #1:"Spacing
and Line Feed" :: PRINT #1:"
SILVER REED EXP400 "
320 END
```

Program checks, MMM, Xmemory

Chuck Reinhart, of Bellaire, New York, a frequent contributor to MICROpendium, has developed the following utility to test the Mini Memory Module and 32K expansion memory. It will identify failing memory storage locations.

To check the Mini Memory Module, the program must be run with the Mini Memory in the 4/A cartridge port. To check expansion memory, the program

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User Notes

(Continued from Page 43)

must be run from Editor/Assembler. Load the memory test program from BASIC, enter RUN and select the test you wish to run. The program requires a disk drive.

```
100 REM  SAVE DSK1.32K/MMTES
T
110 CALL CLEAR
120 CALL INIT
130 PRINT "  32K CARD/MINI M
EMORY TEST":::,"  BY":,"CHUC
K REINHART":::::"THIS PROGRA
M USES THE EDITOR"::
140 PRINT "ASSEMBLER OR MINI
 MEMORY"::"CARTRIDGE AND RUN
S IN BASIC":::::"  1-32K CARD
":::"  2-MINI MEMORY"
150 INPUT T
160 IF T=1 THEN 200
170 M=28672
180 N=32760
190 GOTO 220
200 M=8192
210 N=16376
220 CALL CLEAR
230 PRINT "ENTER NUMBER OF P
ASSES":::
240 INPUT P
250 CALL CLEAR
260 FOR Y=1 TO P
270 FOR Z=1 TO 2
280 ON Z GOSUB 300,330
290 GOTO 360
300 C=42
310 PRINT "PART 1"::
320 RETURN
330 C=85
340 PRINT "PART 2"::
350 RETURN
360 PRINT "  WRITE"
370 FOR X=M TO N STEP 8
380 CALL LOAD(X,C,C,C,C,C,C,
C,C)
390 NEXT X
400 IF T=2 THEN 440
410 FOR X=-24576 TO -8 STEP
8
420 CALL LOAD(X,C,C,C,C,C,C,
C,C)
430 NEXT X
440 PRINT "    READ"::
450 FOR X=M TO N STEP 8
460 CALL PEEK(X,A,B,D,E,F,G,
H,I)
470 IF A+B+D+E+F+G+H+I<>C*8
THEN 590
480 NEXT X
490 IF T=2 THEN 540
500 FOR X=-24576 TO -8 STEP
8
510 CALL PEEK(X,A,B,D,E,F,G,
H,I)
520 IF A+B+D+E+F+G+H+I<>C*8
THEN 590
530 NEXT X
540 NEXT Z
550 PRINT "PASS =";Y::
560 NEXT Y
570 PRINT "**** TEST COMPLET
E ****"::"    NO FAILURES"::
:
580 END
590 CALL CLEAR
600 N$=STR$(A)&STR$(B)&STR$(
D)&STR$(E)&STR$(F)&STR$(G)&S
TR$(H)&STR$(I)
610 FOR P=1 TO 17 STEP +2
620 Z=POS(N$,STR$(C),P)
630 IF Z<>P THEN 650
640 NEXT P
650 X=X+INT(P/2)
660 P=X
670 P=P/16
680 Z=(P-INT(P))*16
690 P=INT(P)
700 IF Z>9 THEN 730
710 N$=STR$(Z)
720 GOTO 740
730 N$=CHR$(Z+55)
740 H$=N$&H$
750 Q=Q+1
760 Z=P
770 ON Q GOTO 670,670,700,78
0
780 PRINT " **** MEMORY FAIL
URE ****":::"   PASS =";Y::
:"   ADDRESS DEC =";X::"   A
DDRESS HEX = ";H$:::
790 PRINT"    DATA =";A;B;D;
E::TAB(10);F;G;H;I
```

It's all in fun, really it is

Mike Stanfill, of the Dallas (Texas) TI Home Computer Users Group, published this Tinygram in the group's newsletter. It's called Nuke the Whales.

He writes: They Tinygram below is in bad taste. It is vicious, vile, contemptible, in short, everything I stand for. It's called, as you can see with your beady little eyes, Nuke the Whales! And it's real simple to play. Extended BASIC is required.

First, type it in and RUN it. You'll see a happy little school of blue whales contentedly cruising along in the big, wide wonderful ocean. Above them is your super-sonic fighter-bomber, the F-27½ Budget-Buster. Your mission: Seek out and destroy the krill-nibbling vermin. As you pass over the unsuspecting little darlings press any key, and it's launch time.

```
1 ! *** NUKE THE WHALES ***
*** A TINY GRAM *** *** BY M
IKE STANFILL *** *** MEMBER
DTIHCUG ***
2 CALL CLEAR :: RANDOMIZE ::
 J$(1)="0A15040E3F7F86" :: J
$(2)="00000087BF7F0E" :: CAL
L SPRITE(#3,97,2,9,1,0,-22)
3 CALL CHAR(97,"00000003FE10
0800007EFF3C18183C1818")
4 DIM A(24):: FOR T=10 TO 24
 :: IF A(T)THEN 5 ELSE IF RN
D).7 THEN CALL SPRITE(#T,96,
5,T*8-7,1,0,4):: A(T)=1
5 P=110 :: CALL CHAR(96,J$((
-(T/5=INT(T/5)))+1)):: CALL
KEY(0,K,S):: IF S THEN CALL
POSITION(#3,C,Y)ELSE 9
6 G=G+1-(G=0)*2 :: IF G=25 T
HEN 8 ELSE CALL SPRITE(#1,42
,7,G*8-7,Y,-1,0):: CALL COIN
C(#1,#G,6,M):: IF M=0 THEN 6
 ELSE CALL DELSPRITE(#G)
7 CALL PATTERN(#1,98):: FOR
H=1 TO 30 :: CALL SOUND(-P,-
7,H,P,H):: NEXT H :: A(G)=0
8 G=0 :: CALL DELSPRITE(#1)
9 NEXT T :: GOTO 4
```

Pick your color with Extended BASIC

Those with a GRAM Kracker have the ability to modify Extended BASIC and other programs. Those without, can't. However, if you'd like to select the background and foreground colors of Extended BASIC in the edit mode and maintain them even when a program crashes or you use FCTN 4 to break, read on.

This program appeared in the newslet-

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User Notes

(Continued from Page 44)

ter of the Jackson County 99ers, of Blue Springs, Missouri. The program requires a memory expansion. The colors are set in line 110. Enter whatever color number you want for B (background) and F (foreground). If you save the program to disk as LOAD, whenever you boot up Extended BASIC the colors you selected will be effect.

```
100 CALL CLEAR
110 B=2 :: F=16
120 C=16*(F-1)+(B-1)
130 CALL INIT :: CALL LOAD(9
984,C,C,C,C,C,C,C,C,2,0,7,15
+B,4,32,32)
140 CALL LOAD(9999,48,2,0,8,
0,2,1,39,0,2,2,0,8,4,32,32,3
6,2,0,8,8,4)
150 CALL LOAD(10021,32,32,36
,2,0,8,16,4,32,32,36,2,0,8,2
4,4,32,32,36,4,91)
160 CALL LOAD(-31804,39,8)
170 CALL LOAD(-31952,255,231
,255,231)
180 END
```

Digital clock in BASIC or XBASIC

The following program, by Robert T.J. Marshall, appeared in the TI*MES newsletter published by the TI99/4A User Group of the United Kingdom. It will run in BASIC or Extended BASIC. It's purpose is to display and update a digital clock readout in the upper righthand corner of the screen. The clock displays hours, minutes and seconds.

As published below, the program increments the clock by 0.5 seconds via line 1000. By using this statement in FOR-NEXT loops and with a CALL KEY the clock can be made to run throughout a program. The subroutine can be adapted to speed up the clock, slow it down, run backwards, to show hours and minutes only or to display two clocks. Anyone want to design a TI99/4A chess clock?

```
100 REM -CLOCK-
110 REM -BY ROBERT MARSHALL-
120 REM
130 REM
140 REM -DEMONSTRATION PROGR
AM-
150 CALL CLEAR
160 GOSUB 1000
170 GOTO 160
980 STOP
990 REM -SUBROUTINE-
1000 T=T+.5
1010 IF T=INT(T)THEN 1030
1020 RETURN
1030 M(1)=INT(T/3600)
1040 M(2)=INT(T/60)-M(1)*(60
)
1050 M(3)=T-(M(1)*3600)-(M(2
)*60)
1060 FOR A=1 TO 3
1070 IF M(A)<10 THEN 1100
1080 M$(A)=STR$(M(A))
1090 GOTO 1110
1100 M$(A)="0"&STR$(M(A))
1110 NEXT A
1120 T$=M$(1)&":"&M$(2)&":"&
M$(3)
1130 FOR A=1 TO 8
1140 CALL HCHAR(1,20+A,ASC(S
EG$(T$,A,1)))
1150 NEXT A
1160 RETURN
```

PR-Base print tip

Robert Neal, of the TI User Group of Will County (Illinois), writing in the group's newsletter offers a suggestion to users of PR-Base who've had problems accessing printers. He credits other newsletters as the source of the information.

(It) seems that a problem may occur when trying to print out a report. The problem is due to the printer name being entered. When you enter the printer name, there is some data (E5s) in the field. An E5 won't appear on the screen, but screws up the printer name by tacking E5s to the end. To defeat this, before entering the printer name, press FCTN 3 (delete) to clear out the field.

You can also enter your printer name and then space across the rest of the field.

Before I ran across this I had to enter a printer name as PIO.EC, which worked, but this now works as well and is easy to do.

TI-Writer tips

This comes from the Jacksonville (Arkansas) User Group. It should be of interest to those who use TI-Writer.

The Find String command in TI-Writer has several features that are either ignored or simply not known by many people. For instance, when using Find String (FS), if you simply enter /Debits/ it will find the next occurrence of the word "Debits." However, if you enter 2 15 /Debits/ it will find the next occurrence of the word in columns 2 through 15. (See Page of the TI-Writer manual.)

Another little used fact is that in Word Wrap mode when using the Replace String (RS) function, your text will be reformatted automatically. This is not bad if you are working with normal text, but can be disastrous with columnar material. (See page 87 of the manual.)

Slashed zero

The following comes from Jean Wilcox in the Suncoast Beeper, the newsletter of the Suncoast Users Group of Tampa, Florida.

If your printer doesn't have a slashed zero when using TI-Writer, use this transliteration:

TL. 48:48,8,47

It prints the normal zero CHR$(48), then backspaces CHR$(8) and then prints a slash CHR$(47) over the zero.

Build a detached keyboard/joyst port

Steven Long, of Prairie Village, Kansas, writes:

By utilizing one of the surplus TI keyboards, one can make a fairly inexpensive, movable keyboard which alows you to move your console and the cables off of your desk. I also added a joystick port to my keyboard, which makes it more versatile.

MOVABLE PARTS

TI keyboard ($5-10)

3-5 feet of 34-wire (2x17) ribbon cable with a male and female connector (about $10)

3/8-inch piece of plywood or particle board

¾ x ¾-inch lumber (dimensions will vary)

Assorted screws

Bendable metal or adjustable "feet"

JOYSTICK PORT

Thin wire (20-24 gauge)

(See Page 46)

User Notes

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Soldering iron and solder
Male joystick port
Additional screws and ¾ x ¾-inch wood
Continuity tester

While not very difficult to build, I suggest that *only those with electrical circuit experience and an out-of-warranty computer* attempt this.

Finding or building the ribbon cable is probably the biggest problem that will be encountered. Unable to find parts at Radio Shack, I managed to order a specially assembled 34-conductor cable for about $10. The keyboard actually requires 15 wires (plus 1 for the joystick). But the connectors don't appear to be standard, so I settled on a bulky cable.

To attach the cable, first disconnect the TI console from all its wires. Then unscrew the back and pull the power switch grip off and open the computer with the bottom up. It is necessary to remove some of the components and the shielding on the motherboard. Do this carefully so you don't lose the screws or damage the chips. It will be necessary to remove the power supply board (it unplugs).

Once the connection to the keyboard is found, unplug the console's keyboard. Then snake the cable through the top row of keys. With a little work you should be able to push the original cable out of the way and attach the new cable. If you are adding the joystick port, solder a wire to an extra lead on your cable. Run this wire to the joystick port and solder it to Pin 7. (Pin 2 can also be added for the second joystick.)

Partially reassemble the computer and carefully check to make sure that the connections are good. If the keyboard doesn't respond, try to plug it in a different direction. Once it works, reassemble and reconnect the console.

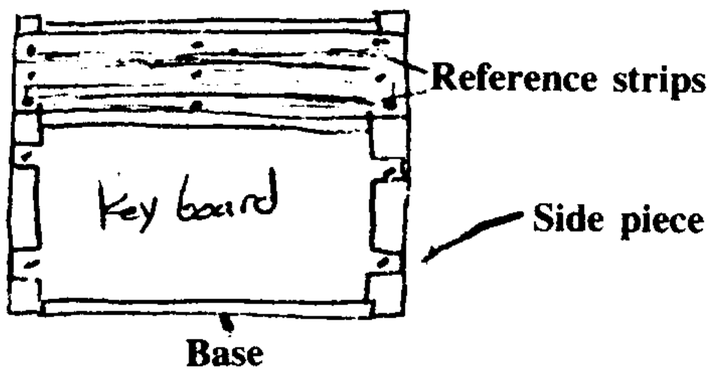
Here is a general description of how I built the support for my keyboard: First, cut the playwood so that it fits the outer perimeters of the keyboard on the front and sides — add an extra two inches on the back. Make two identical pieces using the ¾ inch lumber. Each piece should span the depth (front to back) of the keyboard. It should also be angled so that it is comfortable for typing.

If you are attaching a joystick port, you will have to solder five wires to the keyboard and one wire to the extra wire in the cable. Solder a wire on Pins 4, 5, 1, 2 and 7 of the keyboard. These correspond to Pins 5 (fire), 4 (left), 9 (right), 8 (down), and 3 (up) of the TI joystick. To adapt these to other joysticks, determine which pins correspond to these commands using a continuity tester. Solder these wires and the common terminal to the joystick port. Screw the keyboard and the two side pieces to the base. Add another chunk of lumber to hold the joystick port. (Mount the port between a side piece and this small piece of lumber on the back.) Pull the keyboard plug so that it lies flat on the back. Attach the cable and secure the connection by clamping it with screws. Attach some feer (or some metal, bent) so that the keyboard doesn't rest on the cable connection.

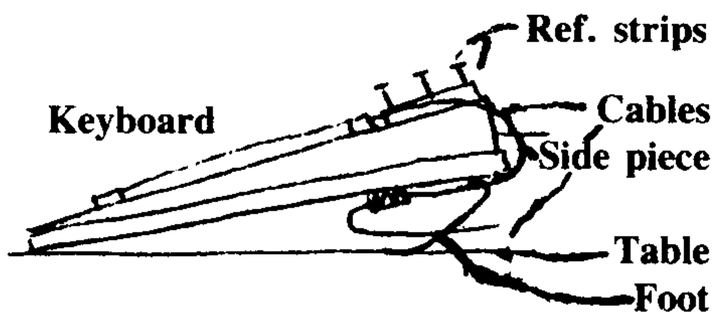
To finish off the keyboard, cut a piece of plywood to fit directly behind and at the same angle as the keyboard. Secure this to the side pieces and add nine screws so that two groups of FCTN reminder strips can be displayed, test it all out and enjoy the new portability of your keyboard.

Here are three diagrams showing views from the top, side and back of the portable keyboard.

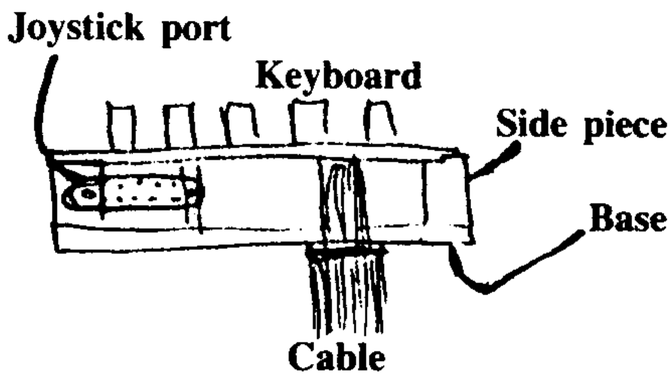
TOP VIEW



SIDE VIEW



BACK VIEW



MENU—

(Continued from Page 40)

S	Switches from GROM to ROM cart
T	Displays time on screen
SPACE	Switches to CALL option menu
FCTN 9	TI title screen if AO is on
FCTN =	Reset computer

I won't go into most of these as their functions are, for the most part, self-explanatory and are expanded on in the DOCs. Options E and H were not in John's version but have been added by Mike Rotolo, and are nice. The E option allows you to customize your options, 4-9, on screen. You enter the names of the XB or PI programs you want and their filenames, press FCTN 9, and save them to your menu program. H simply gives you a help screen to remind you what the options do. M won't work if you don't have a CorComp disk controller.

T won't work without a Triple Tech or MPB clock card. P will temporarily change your output device. If you want to change your printer name permanently, you must go into sector two of the MENU program with a sector editor and enter the new device name. Then change the byte just prior to the first character of the device name to reflect the size, in HEX, of the device name and resave the sector.

This is really a fine program and version 6.4 will be out in the near future. The program is available for download on both GEnie and CompuServe. It is public domain, but if you want to send a few bucks, send it to the Miami Users Group at the address given with the Report Card.

ROCKETMAN—

(Continued from Page 38)

on keeping the checkbook reconciled and minimizing errors.

Value: I think this program is definitely worth having in the library. The price is modest for what it does, and it is easy to use. It might even teach someone starting out how to balance a checkbook without suffering or pain. Your money will be well spent, and you will know, to the penny, how much you have left after buying it.

Classified

Software

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v4n7

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