

# MICROpendium

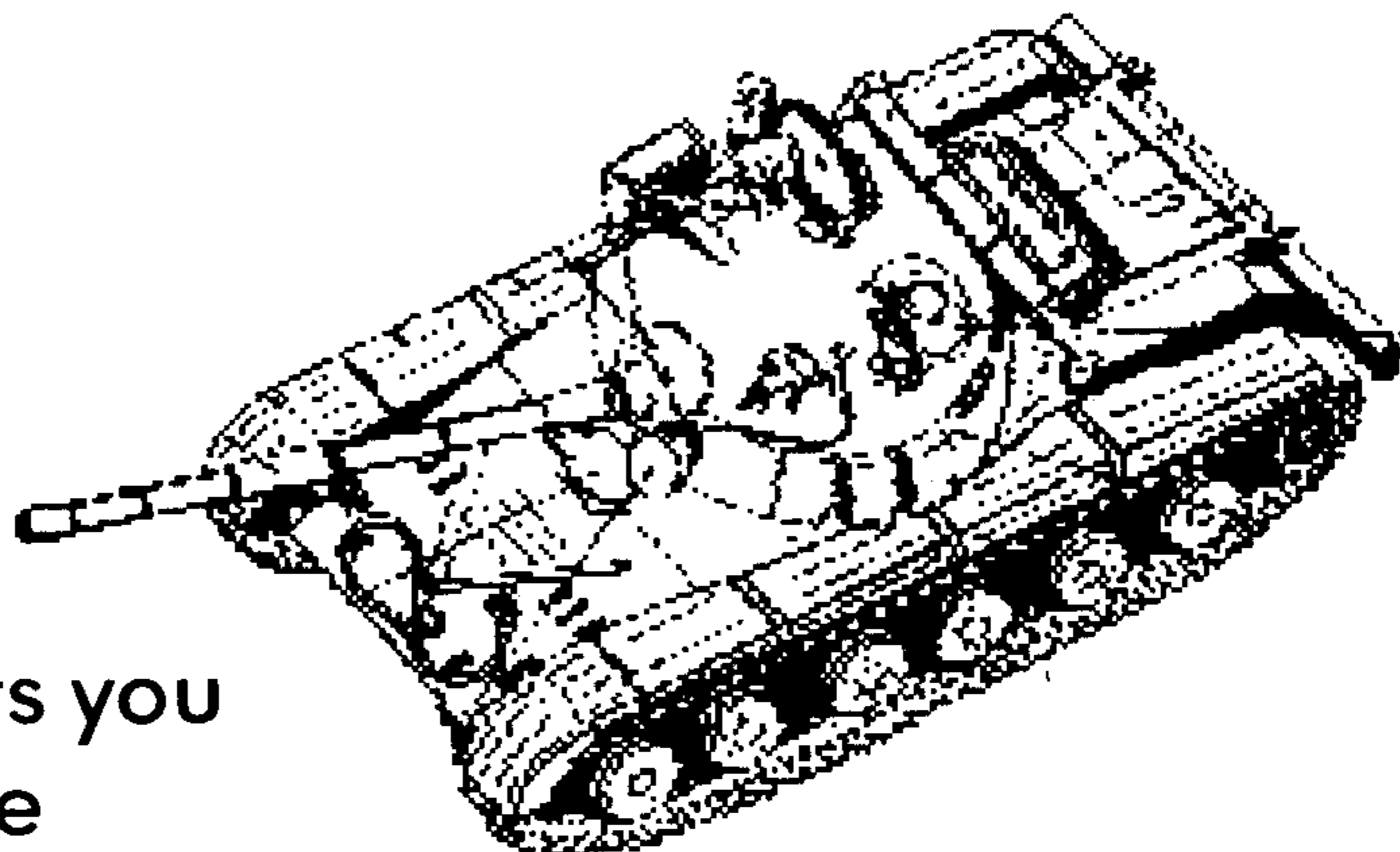
Volume 7 Number 4

May 1990

\$2.50

**Software shootout**  
Bill Gaskill compares four business graphics programs

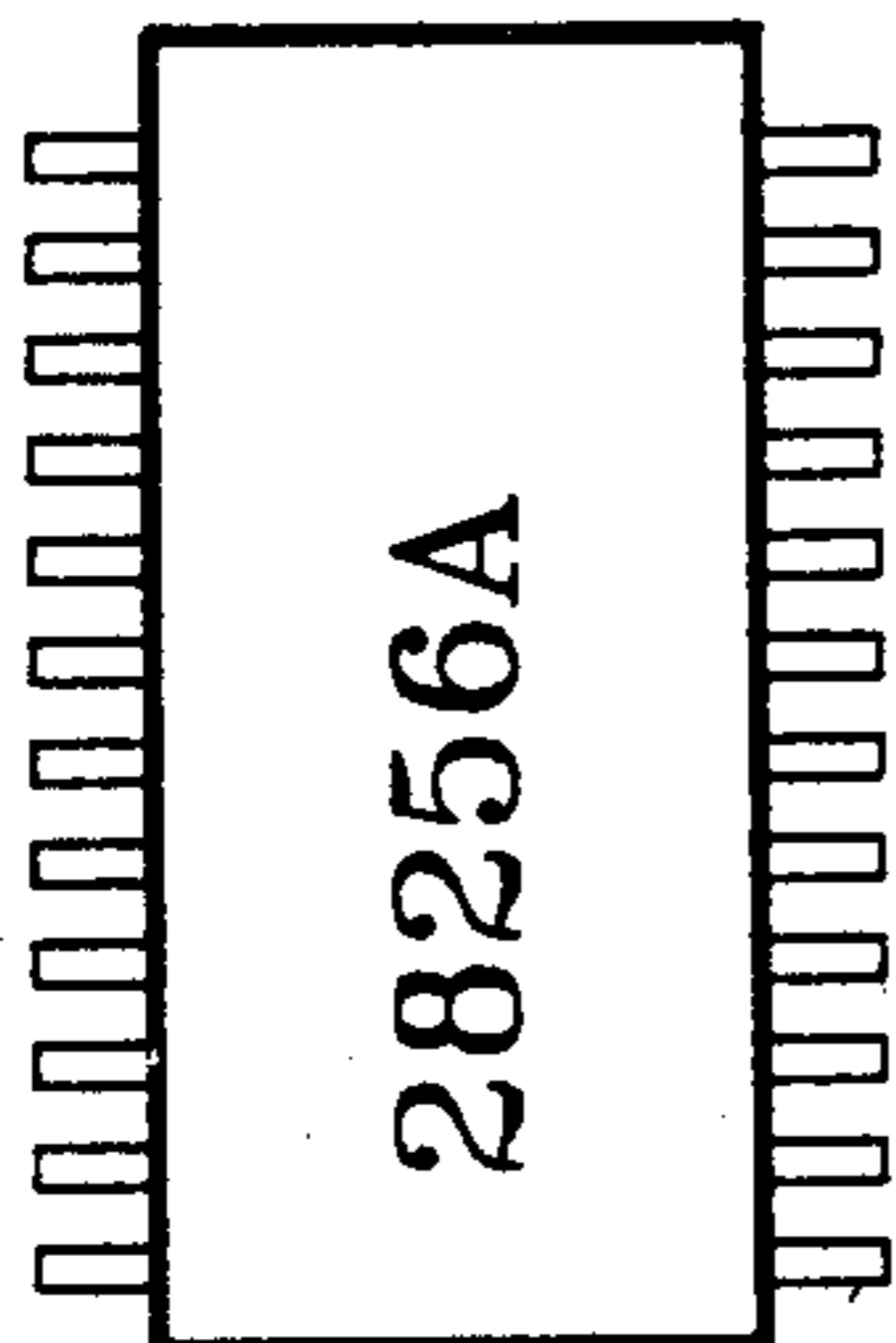
## Tank Commander



A two-player game that puts you in charge of a tank brigade

### EEPROMS

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### INSIDE

- Translating other BASIC languages into TI Extended BASIC
- Textaments releases major upgrade of TI Base
- Questions & answers about RAMdisks
- More BBS listings
- Programming in Myarc Advanced BASIC

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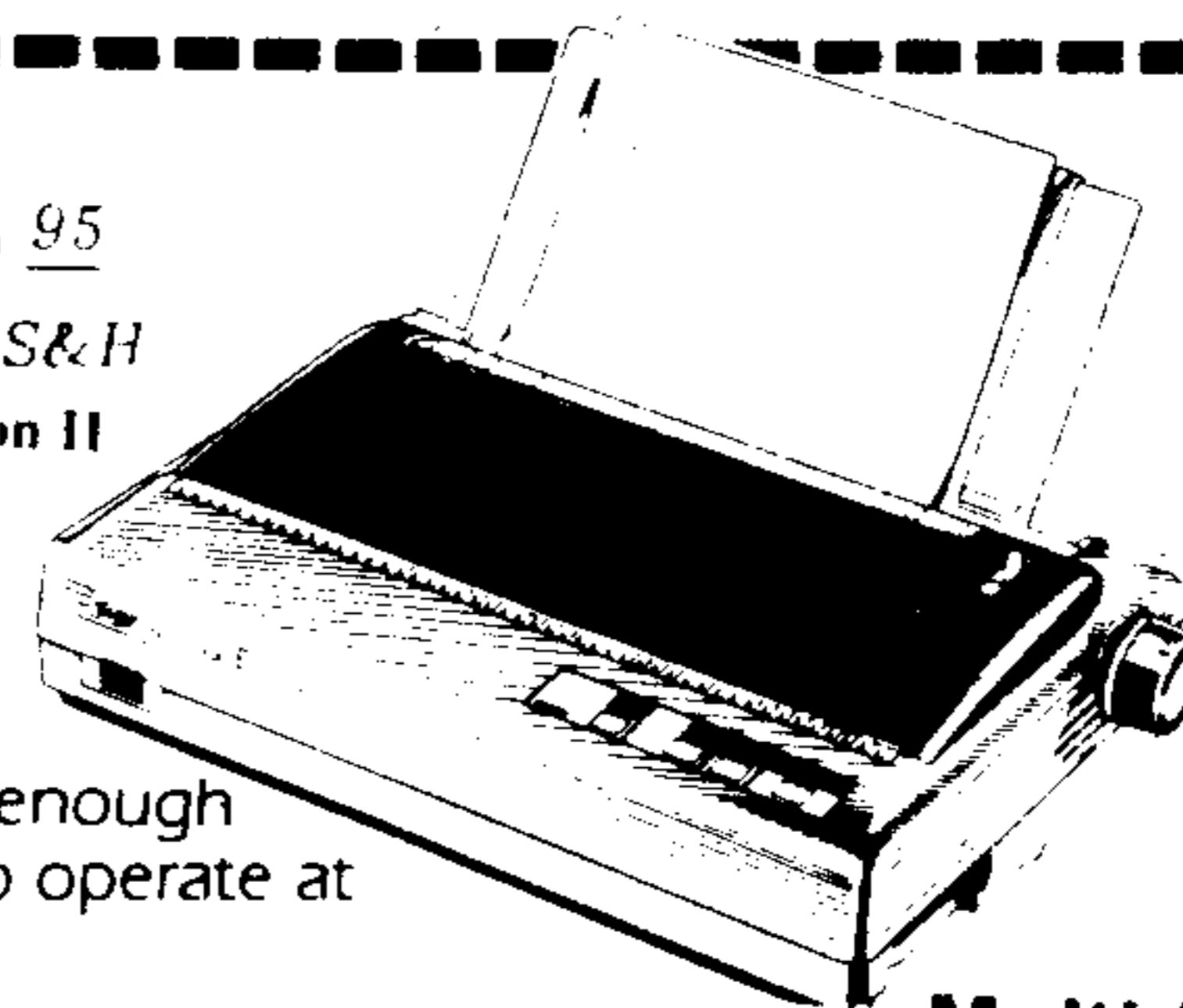
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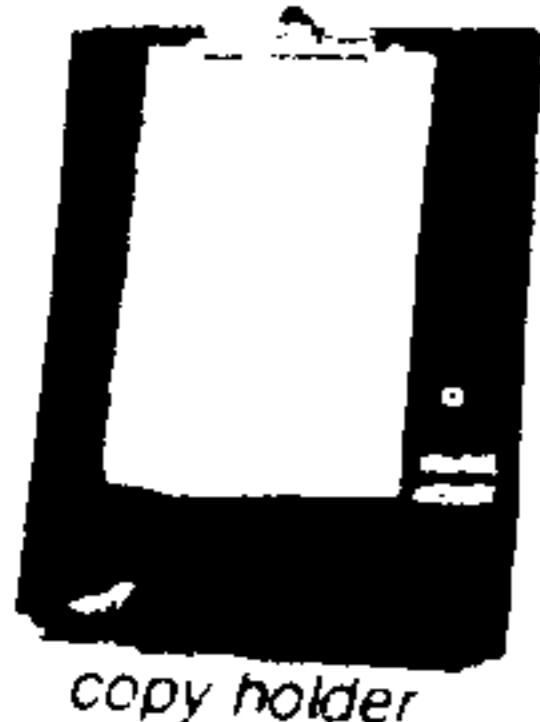
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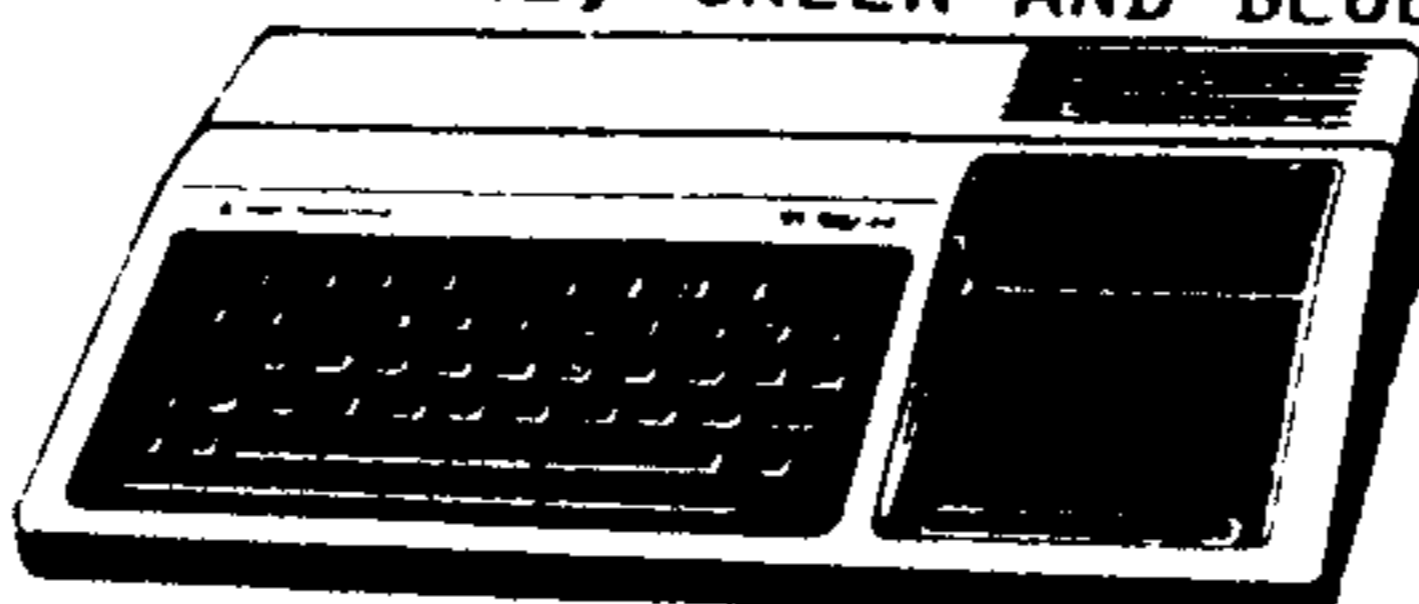
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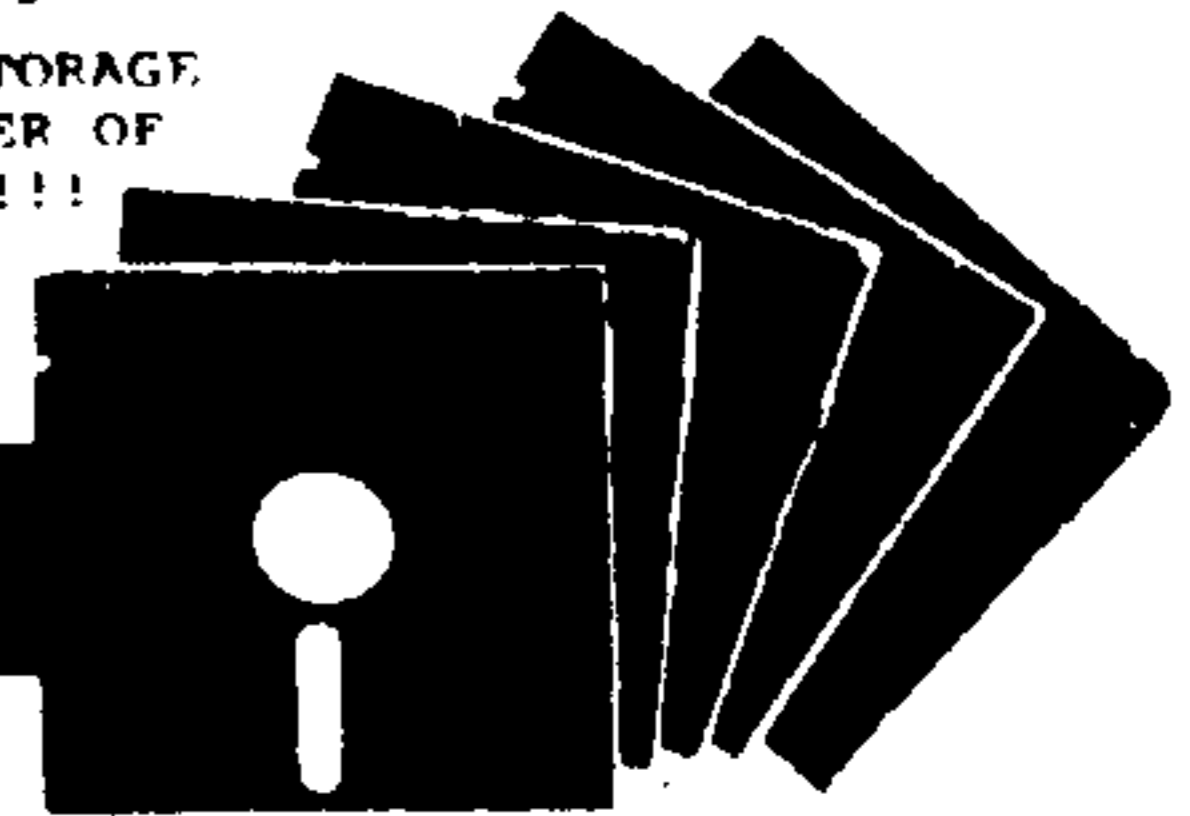
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# Contents

## MICROpendium

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#### \*READ THIS

Here are some tips to help you when entering programs from MICROpendium:  
1. All BASIC and Extended BASIC programs are run through Checksum, the numbers that follow exclamation points at the end of each program line. Do not enter these numbers or exclamation points. Checksum was published in the October 1987 edition.  
2. Long XBASIC lines are entered by inputting until the screen stops accepting characters, pressing Enter, pressing FCTN REDO, cursoring to the end of the line and continuing input.

# THE GENEVE 9640 HAS LANDED

You will recognize it by its trade mark, a graceful gray swan swimming on blue water, an apt symbol. The ugly duckling TI no longer wanted, is no ugly duckling anymore. The GENEVE has surpassed everyones expectations, even our own; with power, speed, graphics, and adaptibility not found in other microcomputers. In fact, the GENEVE does so much, this ad can only begin to tell you about it.

- **Near 100% Compatible:**

- If you have a program written in Basic, Extended Basic, XBII, Assembly Language, Fortran, Pascal, you name it, if it runs on the 99/4A then it is near certain to run on the GENEVE.

- **32K No Wait State High Speed RAM:**

- Programs like MultiPlan, which are painfully slow on the 99/4A, run many times faster, thanks in part to the High Speed RAM.

- **V9938 Video Processor with 7 Graphics Modes:**

- Compatible with the 99/4A so you can use the GENEVE with the TV or monitor you are currently using. Same resolution as the Mac but with color. Faster than the Amiga, as fast as the Atari and does it with the aspect ratio, something the Amiga and IBM AT can not do. Aspect ratio renders higher resolution, better color, and appearance, through the use of square pixels. In the high resolution mode, 256 colors may be displayed on the screen at one time by the GENEVE, eight times as many as the Amiga can display in its high resolution mode.

- **Mouse Interface:**

The mouse interface is built in and ready to use with the MYARC mouse. But, we didn't stop there, it is also ready to support the newest hardware like video digitizers, and that's just for starters.

- **6 Complete Pieces Of Software Are Included With The GENEVE. But, three you will not be able to see how you ever did without are:**

- My-Word Processor; 80 columns, help screens for all modes of operation including control-U, initialize a disk without leaving the program, print formatted text to the screen for viewing before sending it to the printer and that's still not all My-Word will do.
- Advanced Basic; the best and most powerful basic on the market today.
- 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.

GENEVE  
9640



By MYARC, Inc.

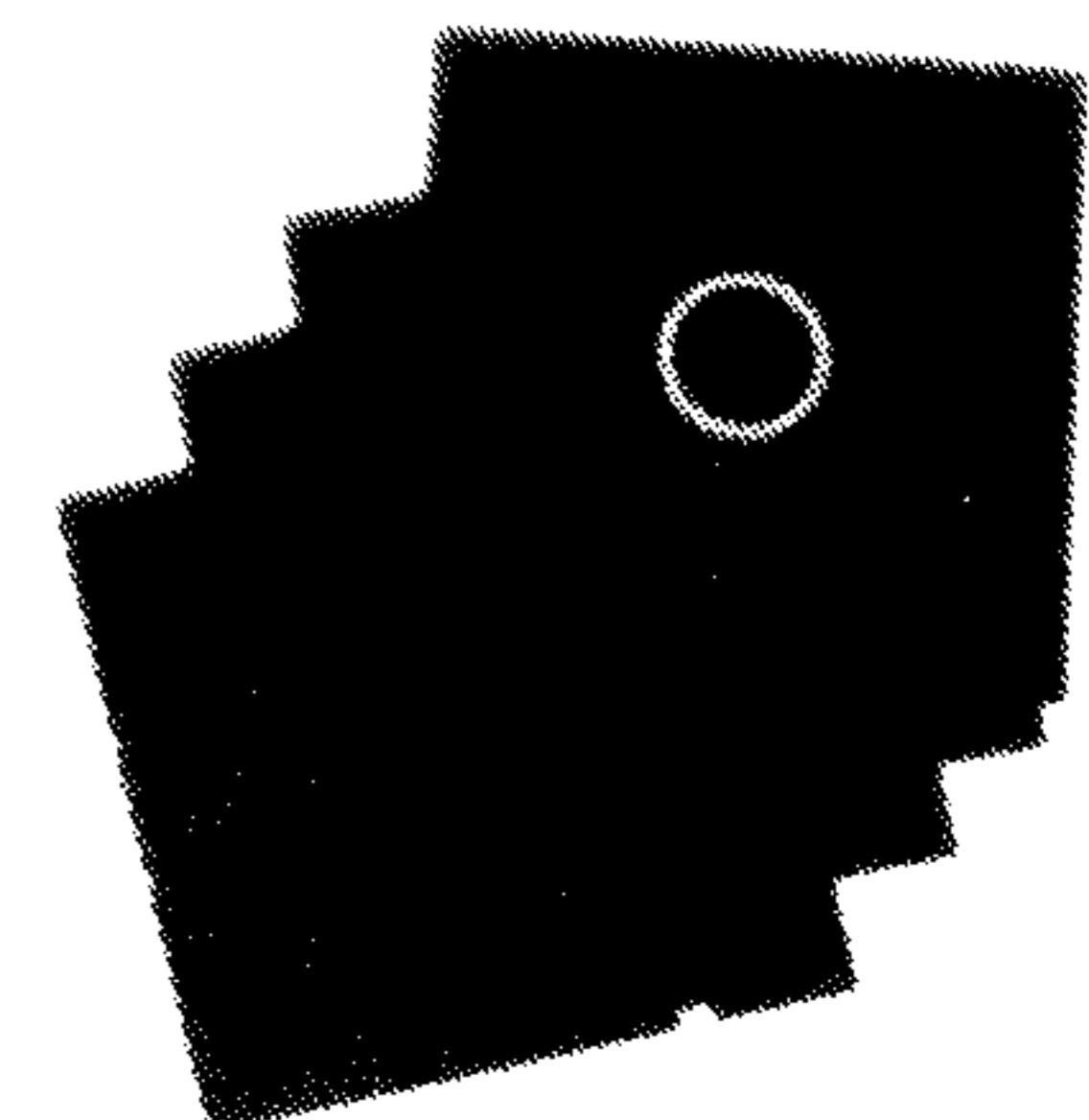
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# Comments

## Rave 99 builds new PEB

A new peripheral expansion box is in the works at RAVE 99 Co. The Connecticut-based company has announced its PE/2 (Professional Expansion Chassis, 2nd generation). According to RAVE, it supports existing PEB cards, and comes with a 200-watt power supply. The power supply will handle up to five disk drives. The front panel includes several LEDs and switches. It can hold up to eight expansion cards. RAVE says it will sell two models: PE/2-A, which replaces the TI PEB, and the PE/2-B, which allows the 99/4A motherboard to be installed in the chassis. Prices start at \$275. Check out their ad in this edition for more information.

Other products sold by RAVE include its Memory Enhancement Cards, and enhanced keyboards and keyboard interfaces.

### A TALE WORTH RETELLING

Here's a tale worth telling. I won't mention names, because it could have involved any company and any product. But it illustrates how important it is for us as consumers to keep good records.

A reader recently had to return a PEB card to the vendor for repairs. Being a cautious fellow, before sending it off he took it apart and photographed the insides. He also etched his initials in the board. Sounds a little too cautious, doesn't it. After reassembling the card, he shipped it off and waited expectantly for its return.

When it finally arrived, he took it apart and inspected it. Lo and behold, he found that a chip had been removed without being replaced. He discovered this by comparing the photos he'd taken with the card. Without the photos, he said, he'd never have known that something was amiss. Because the chip was missing, he decided not to try to use the card and instead called the vendor to find out why the chip hadn't been replaced. It was a mistake, it turned out. And the vendor shipped a replacement chip out immediately.

What would have happened if, like most of us, this reader had simply assumed everything was okay and plugged the card into his PEB? He doesn't know, and I'm not even going to guess. But he figures that if the chip wasn't important to the operation of the card, it wouldn't have been on the board in the first place.

Might he have saved himself from doing damage to the card in question or other cards in his PEB? Possibly. But more important is the length he had to go to protect himself as a consumer. Even though it may seem a bit obsessive to take photographs of the device, in this case it may have saved the day, not to mention his system. It's certainly something to think about.

### PRODUCT UPDATE

Texaments has just released Version 3.0 of TI Base. This represents a major upgrade of the database manager from previous versions. So many new features have been added or enhanced that it took a full page to list them. See page 42 for details.

A new RAMdisk, at least new to me, is being sold by the

Hunter Valley Users Group in Australia. With circuitry developed by Neil Quigg and software by Ron Kleinschafer, the RAMdisk — called Quest RD200 RAMdisk — comes as a kit for about \$60 (without memory) and lets the user expand it at his leisure up to its capacity of 512K. We'll have a review of it next month. I'm mentioning it now because the Expand Your System article this month discusses RAMdisks and mentions the Quest RD200.

We also recently received a copy of Asgard's Spell-It! spelling checker, but it came too late to publish a review of it this month. We'll have it next month.

### GENEVE UPDATE

A month or so ago version .97h of MDOS was put up on the boards. Like its predecessors, it is not a completed version and comes with a disclaimer from Myarc that the software is not supported by the manufacturer. I take such warnings as a reason to treat the software with the utmost respect. The "h" version of MDOS is required at this time to use Myarc Advanced BASIC, which means that anyone who wants to use MAB has to do it with the knowledge that the operating system that supports it is incomplete. More than one MAB programmer has told me that it is difficult to write programs because changes in MDOS frequently affect the operation of MAB programs. What these programmers are looking for right now is a stable environment in which to work. But they keep plugging along.

This month we have the start of what I hope will be a long-running column by Jim Uzzell about programming in Advanced BASIC. He's starting with a checksum program. Next month he'll have his nifty MY-MENU program.

### INSCEBOT, MILLS TALK TO DALLAS GROUP

Chris and Dennis Faherty of Inscebot are going to be at the June 9 meeting of the Dallas User Group at Infomart. Bud Mills of Bud Mills Services spoke to the group at its May meeting. The president of the group is Thierry Weber. The Dallas group maintains a 24-hour BBS at 214-233-1750.

—JK

### READER TO READER

Ralf Martin says he has a problem running PC Transfer with the Myarc HFDC. He only gets a directory from a TI drive and it is not possible to show any MS-DOS directory.

Contact Martin at Kielerstr. 148, 2000 Hamburg 50, West Germany.

Bill Soble, W3QXT, 9357 Hoff St., Philadelphia, PA 19115, writes, "I would like to get in touch with hams operating two meter packet using a TI99/4A computer with a Kantronics TNC, model KPC-2."

*Reader to Reader is a column to put TI99/4A and Geneve 9640 users in contact with other users. Anyone with a specific problem or question that may be answered by other readers is encouraged to submit an item. Be sure to address it to Reader to Reader, c/o MICROpendium, P.O. Box 1343, Round Rock, TX 78680.*

## Look Whats New at RAVE 99

### New "LOWER" prices on our MX01 Memory Enhancement CARDS

We recently signed an agreement with a major supplier of Static Ram chip which insures us of a constant supply of parts at a fixed price for 6 months. This allows us to lower our prices without the risk of the chips prices rising during this 6 month period. The NEW LOWER price of our memory cards are as follows:

**Model MX01/64 - \$199.95**

**Model MX01/288 - \$304.95**

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Also, for a limited time, we are including three RAVE 99 programs at no additional cost, SAVE \$45.00 !!

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Unleash the power of your TI-99/4A and enjoy the feeling of BIG time computing!

We are also selling 32K x 8 STATIC RAM memory chips for \$15.00 each. These chip are manufactured by HITACHI and are the SUPER SUPER LOW power type used in our MX01 cards.

### Other RAVE 99 Products

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| Model XT/101 Keyboard Enhancement              | \$224.95 |
| Includes Interface Card AND IBM Style Keyboard |          |
| Model 99/XT Keyboard Interface Card            | \$149.95 |
| Model 99/XT Keyboard Interface Card KIT        | \$92.00  |
| IBM STYLE 101 key Keyboard with dust cover     | \$75.00  |
| Speech Synth. Adapter Card                     | \$49.95  |

### NEW PRODUCT ANNOUNCEMENT!

We are proud to announce that we are currently developing a new expansion chassis for both the TI-99/4A and GENEVE computer systems. The product Model name is PE/2 which stands for Professional Expansion Chassis, 2nd generation.

Our new EXPANSION CHASSIS has modern computer styling utilizing a space-saving design. The new chassis design allows the use of existing TI-99/4A or GENEVE computers, P.E. Box cards, and disk drives into a single enclosure. A 200 Watt Power Supply provides more than enough power for the computer, P.E. Box cards, and FIVE Disk Drives. The front panel has a Power Switch, KeyLock, Reset Switch, Turbo Switch, "Power" LED, "Hard Disk" LED, and "Turbo" LED. The Expansion Chassis has 8 expansion slots for TI style P.E. Box Cards. The PE/2 Chassis is available in two version, Model PE/2-A replaces the original TI-Expansion Box, while the Model PE/2-B provides the additional space/modifications to allow the TI-99/4A motherboard to be installed in the PE/2 chassis. We are currently taking prepaid orders at the estimated prices of \$275 for the Model PE/2-A and \$325 for the Model PE/2-B. All prepaid orders will be locked in at these prices independent of the final actual costs. Units will be shipped in 4 to 6 weeks. Shipping and handling is \$12.50 for either model. This Product is required for those who wish to have both functionality and neat appearance around their computer work area.

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# Feedback

## It's all coming

First of all I want to make it clear that this is not an ad for a given piece of equipment or a particular piece of software, although what I am about to say must invariably name items to reenforce my point. I can't help that, because there just isn't enough competition to generalize what these items do.

Recently, I acquired two programs in as many days, the new GIF loader from Barry Boone and a fairware version from Germany by Achim Liese. No, let me drop back just a little further and say that six months ago I bought one of the last of the old Mechatronics cards from Asgard that remained available in this country. At the time, the purchase distressed me slightly because I had problems getting the 80-column card to work. That turned out to be a cabling problem with the Magnavox 515 monitor, and, also, I had not yet mounted the new EPROM from Barry Boone in the card. I also found that the software (TI-Writer and Multiplan) that came with the card was a mess and hardly worked at all.

To make a long story short, I finally got everything working (hardware wise), which was quite simple once I had everything I needed. During that time the Funnelweb system came through in 80-column mode giving me a magnificent and reliable 80-column word processor. This in itself opened up a whole new world to me, allowing me the privilege of *not* windowing my text all the time.

Mind you, I am a writer. I cannot get 280 pages of text into my TI, so I am forced to use a Tandy 1000A to write a whole book. This doesn't please me one little bit. I swear to all that are reading this, that is the *only* thing I use the Tandy for. I still write all my MICROpendium articles on the TI, and anything else that will fit into the memory. I love graphics, as many of you are aware. I have never found anything that beats our machine for graphics. The number of fonts (250+), the formats available, the ease of dumping it to the printer — all these are lacking in the IBM world. The writer clones we have are as versatile as anything I use, and, in most cases, more so than any word processor for the IBM. I still convert the Tandy text files to TI via

PC Transfer, in order to format them easily to my printer. In short, the Tandy is a big hammer that I *have* to use, but the final product still comes out of my TI.

Back to the beginning, the GIF loaders and the 9938 video processor (alias the Mechatronics card). The two loaders I have differ in that one can accomplish various tasks that the other cannot at this stage. Oh, yes, and to add to the plot of this story, I should tell you that my wife Hollie is a base manager on the Delphi MS-DOS sig. She has an AT clone as well as the Tandy, which she uses daily and is an expert on. She is at this moment jealous as heck of my little TI because I have something (many some-things, perhaps) she doesn't have in the AT, VGA graphics. Yes, I am now loading 256-color pictures into my TI with the aforementioned hardware and software just as they were intended to look in a \$2,500 MS-DOS machine.

So what am I getting at? Simply this. Anyone who leaves the TI community now to move to a clone is, at best, a fool, without the slightest idea of what is going on out here. We have *everything* available (more often than not of a higher caliber than any clone under \$3,000) and, if it isn't here now, it soon will be. Be advised that I am talking about the 99/4A, *not* the disaster-prone Geneve.

Everyone complained about the speed of Multiplan, so Art Green cut the speed in half. Everyone said Artist was inferior to the clone programs — Artist Plus added vectoring to the program to outperform the \$300 drawing programs for the PCs. You want 3D? McCann Software will sell you what you need for \$30. You want a hard drive? The controller from Myarc will give you capability exceeding the PCs by at least four times at half the price. You want 3.5-inch drives? No problem, just plug and play with whatever controller you have. We have mice, MIDI ports, battery backed RAM and paged-in memory. Telco does almost everything the best PC telecommunications program will do. What more do you want?

Yes, we have a little ways to go yet. Foremost, we need a word processor that will allow unlimited text size. We also need some other graphic converters and there is a bit more to do on PagePro, but all you

have to do is wait a little longer. It's all coming! I will guarantee you that.

**Harry T. Brashear**  
Newfane, New York

## One more bell to ring

*Oops!* Left out something in my Bells & Whistles for Tetris program (March 1990 User Notes). In order to use the R key to change levels, the last statement in Line 630 should read:

```
:: IF JM=114 OR JM=117 THEN 330
```

Also noted: in the published version Line 670 was tagged on to the checksum of Line 660 and Line 760 on to Line 750.

**Jack B. Cunningham**  
San Antonio, Texas

## Exceptions taken

It is with increasing chagrin and consternation that I have read Harry Brashear's last two MICROreview columns. First, I must take exception to his comments about the RAG Software Multiplan Upgrade Vn 4.00 (March '90). Basically, the program can be altered for a device other than DSK1 two ways: 1) Use a disk sector editor to alter the default disk accesses or 2) use the supplied RAGPATCH program and patch files.

Not everyone has the ability to alter a program successfully with a disk sector editor. The process can be risky at times and irreparable damage is sometimes the result. An easier (and safer) course is to use the RAGPATCH program.

Despite what Mr. Brashear says in his review, RAGPATCH provides a simple way to change drive defaults and alter the foreground/background colors in the updated programs. A few minutes spent reading the documentation and the commented patch files explain the process fully. Had he read both thoroughly before his review he wouldn't have any trouble understanding how easy and quickly the process actually works. RAGPATCH is an excellent alternative to a disk sector editor for even the novice programmer for customizing both the MPINTR and MPLOAD files.

Mr. Brashear's April column presents a different paradox. The Rave 99 Memory Enhancement card deserves a better fate than a "MICROreview." The first line of

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# Feedback

(Continued from Page 8)

his column says it all — "First of all, let me state categorically that this review doesn't belong in this column." After such a statement, he amazingly goes on to review the product anyway. The net result is that the review doesn't do justice to this fine product.

Please, Mr. Brashear, confine your reviews to those products that will fit within the parameter of a column or so of text in a true MICROreview. Those products that require more space and in-depth scrutiny should be given the dignity of a full review. To try to cover them in a MICROreview is a disservice to both the product manufacturer and the potential buyer. In such a case, "half a loaf" is *not* "better than none." A MICROreview should be just that — a short, concise review of a product that can be adequately covered in the column or two of text.

**Bob Carmany**  
Greensboro, North Carolina

## Words of praise

Thank you for your magazine. Without it I guess I would have to stop using my TI99/4A. I read it from cover to cover, even those pages I don't understand. Your articles on expanding the system have really been interesting. Wish I had had them in 1984 so I could have more carefully chosen my hardware

I am always pleased to see programs and software reviewed that are within the range of my experience and understanding. I am more than a beginner, but need simple documentation. If I get something I don't understand, the author of the program has always been helpful.

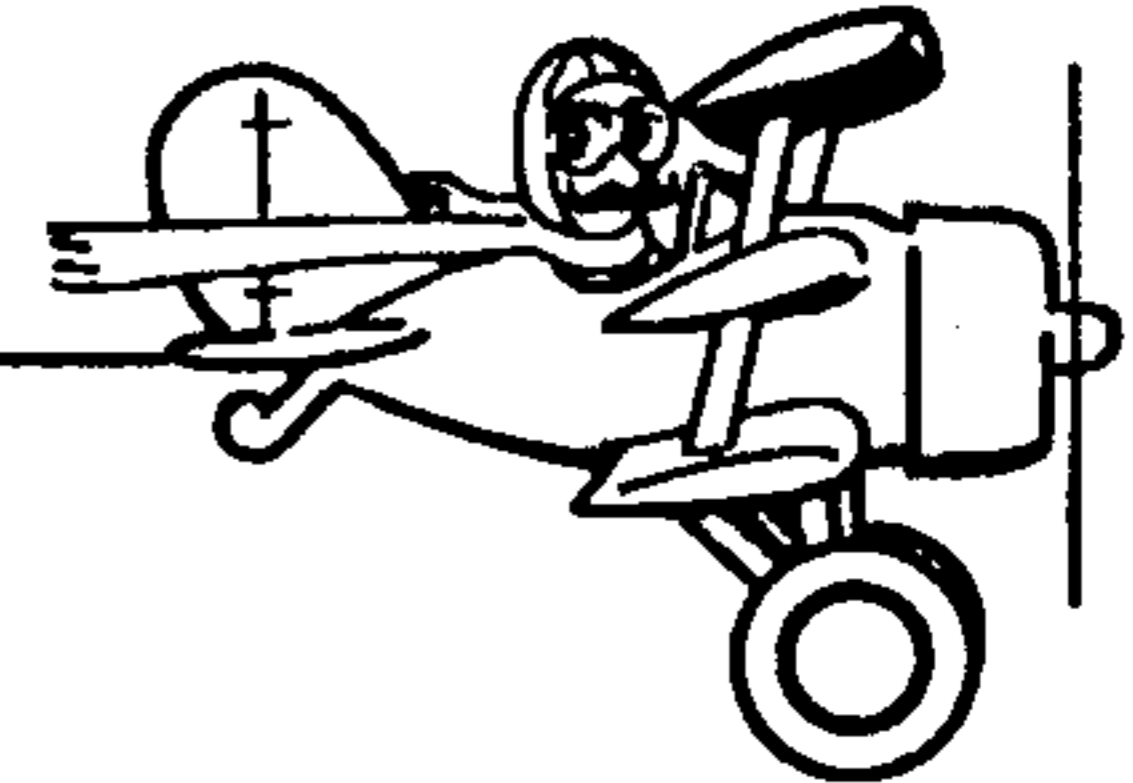
Thanks to all contributors to your magazine.

**Ouida Thompson**  
Sheffield, Alabama

*Feedback is a forum for TI99/4A and Geneve 9640 users. The editor will condense submissions when necessary. We ask readers to restrict themselves to one subject for the sake of simplicity. Mail Feedback items to MICROpendium, P.O. Box 1343, Round Rock, TX 78680.*

*Is it artwork??? Is it cartoons??? No, it's...*

# Artoons!



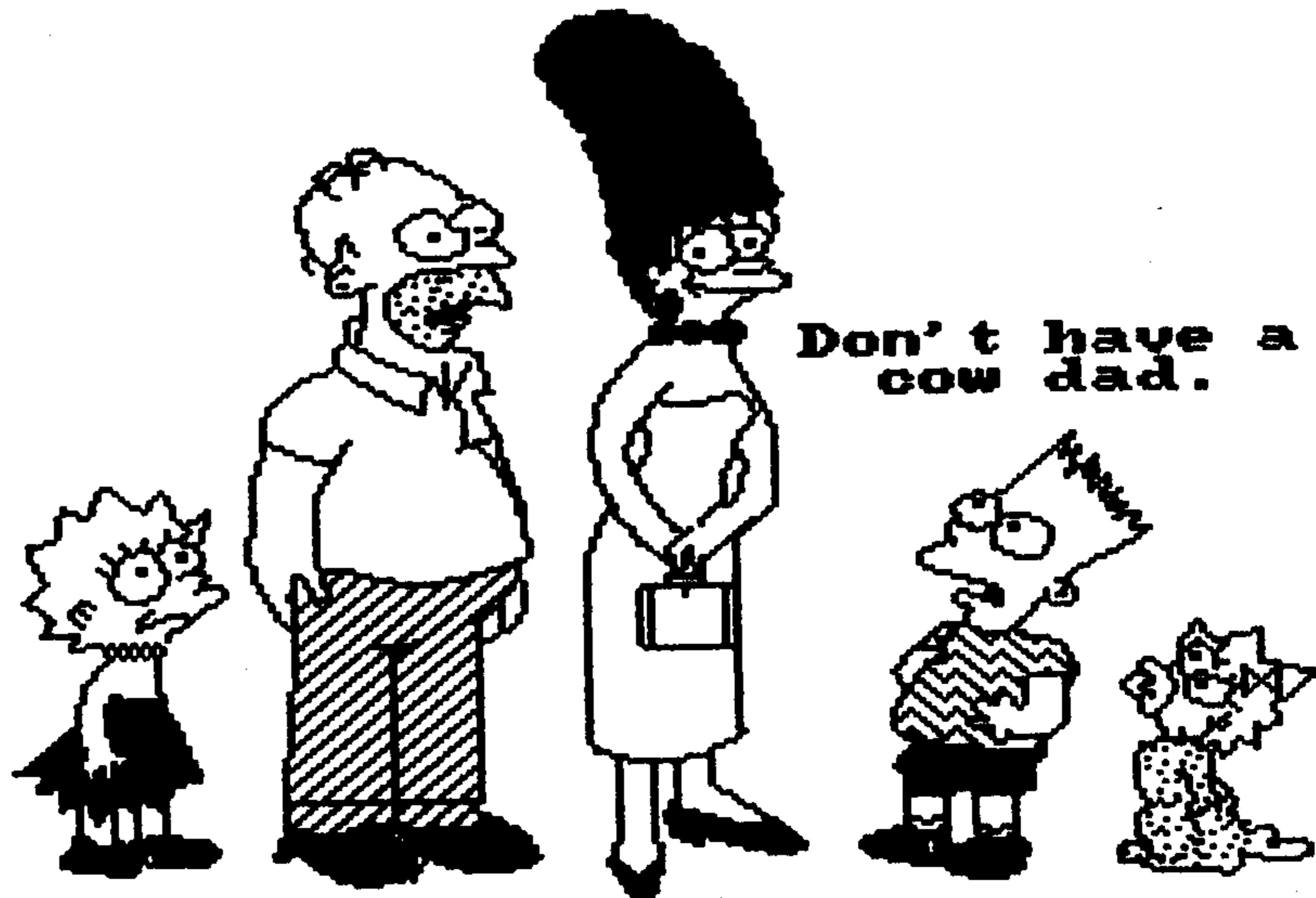
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## BASIC

## Plane Geometry

By REGENA

This year I have been reviewing the subject of plane geometry as I help my daughter with her homework. "I" got As with my older two children as they went through geometry, and so far this year we are doing OK. However, ever so often I need to look up the actual wording of a postulate or theorem. I know the general idea but need to know whether I have all the details correct for the reason in a proof.

The "Plane Geometry" program this month prints the complete postulate or theorem on the screen after you have chosen a topic or key word. For example, from the main menu of choices, you may choose "Congruent Triangles." You will then see a secondary menu of different ways to prove triangles are congruent. Pick "SAS" and you'll see the theorem for side-angle-side: If there exists a correspondence between the vertices of two triangles such that two sides and the included angle of one triangle are congruent respectively to the corresponding two sides and included angle of the second triangle, the two triangles are congruent.

I have chosen the main postulates and theorems used in the study of elementary plane geometry at the high school level. To limit the program, however, I did not include definitions, theorems used

in calculating measurements, postulates and theorems involving more than one plane or theorems involving tangents and inscribed angles.

This program consists mainly of PRINT statements, with some branching for the menu screens. I have used ON-GOTO and ON-GOSUB for the branching. For example, FLAG is a variable in the subroutine in Lines 560-670. It can be a value of 1, 2 or 3. In the main program, the ON FLAG GOTO statement branches depending on whether the ENTER key, up arrow key or down arrow key has been pressed. After the main menus, the ON-GOTO statements branch depending on which number (from 0 to 9) has been chosen.

As you are typing in the PRINT statements, you will notice some words with no space between them or other words with more than one space between them. These variations allow the printing to appear on the 28-column screen without splitting words inappropriately.

If you would like to save typing effort, you may have a copy of this program by sending \$4 to REGENA, 918 Cedar Knolls West, Cedar City, UT 84720. Be sure to specify that you need "Plane Geometry" for the TI and whether you need cassette or diskette.

## PLANE GEOMETRY

```

100 REM GEOMETRY !070
110 CALL CLEAR !209
120 PRINT TAB(7);"PLANE GEOM
ETRY" !138
130 PRINT : " POSTULATES AND
THEOREMS" !255
140 PRINT : : "CHOOSE A KEY W
ORD OR AN" !219
150 PRINT : "ABBREVIATION, AN
D THE" !195
160 PRINT : "COMPLETE POSTULA
TE OR" !040
170 PRINT : "THEOREM WILL BE
GIVEN." !008
180 PRINT : : "USE THE UP OR
DOWN ARROW KEY TO SEE MORE, O
R PRESS" !011
190 PRINT "ENTER TO GO BACK
TO THE" !102
200 PRINT "MAIN MENU.": : !12
7
210 CALL CHAR(37,"081C3E0808
0808")!164
220 CALL CHAR(38,"080808083E
1C08")!165
230 PRINT : : "PRESS ANY KEY
TO START." !033
240 CALL KEY(0,K,S)!187
250 IF S<1 THEN 240 !249
260 CALL CLEAR !209
270 PRINT "CHOOSE:": : !207
280 PRINT "1 CONGRUENT ANGL
ES" !118
290 PRINT "2 ADDITION PROPE
RTY" !218
300 PRINT "3 SUBTRACTION PR
OPERTY" !224
310 PRINT "4 MULTIPLICATION
PROPERTY" !196
320 PRINT "5 DIVISION PROPE
RTY" !246
330 PRINT "6 TRANSITIVE PRO
PERTY" !157
340 PRINT "7 REFLEXIVE PROP
ERTY" !062
350 PRINT "8 CONGRUENT TRIA
NGLES" !111
360 PRINT "9 ANGLES" !159
370 PRINT : "0 NEXT SCREEN"
!181
380 PRINT : "E END PROGRAM"
!186
390 CALL KEY(0,K,S)!187
400 IF (K=69)+(K=101)THEN 26
00 !114
410 IF (K<48)+(K>57)THEN 390
!160
420 CALL CLEAR !209
430 ON K-47 GOTO 680,850,960
,1020,1090,1130,1170,1230,12
70,1700 !009
440 PRINT : : "PRESS <ENTER>"
;!051
450 CALL KEY(0,K,S)!187
460 IF K=13 THEN 260 ELSE 45
0 !070
470 PRINT : : "PRESS & FOR OT
HER SCREEN" !065
480 PRINT "PRESS <ENTER> FOR
MAIN MENU";!120
490 FLAG=2 !211
500 CALL KEY(0,K,S)!187
510 IF K=13 THEN 540 !082
520 IF (K<>88)*(K<>120)*(K<>
10)THEN 500 !224
530 FLAG=1 !210
540 CALL CLEAR !209
550 RETURN !136
560 PRINT : : "PRESS % FOR PR
EVIOUS SCREEN" !062
570 PRINT TAB(7);"& FOR NEXT
SCREEN" !253
580 FLAG=1 !210
590 PRINT TAB(7);"<ENTER> FO
R MAIN MENU";!226
600 CALL KEY(0,K,S)!187

```

(See Page 11)

## REGENA ON BASIC—

(Continued from Page 10)

```

610 IF K=13 THEN 660 !202
620 IF (K=69)+(K=101)+(K=11)
THEN 650 !047
630 IF (K<>88)*(K<>120)*(K<>
10)THEN 600 !069
640 FLAG=2 !211
650 FLAG=FLAG+1 !173
660 CALL CLEAR !209
670 RETURN !136
680 PRINT "CHOOSE:" : !207
690 PRINT "1 PERPENDICULAR
LINES" !083
700 PRINT "2 PERPENDICULAR
BISECTOR" !055
710 PRINT "3 PARALLEL LINES
" !207
720 PRINT "4 LINES CUT BY T
RANSVERSAL" !169
730 PRINT "5 MIDLINE THEORE
M" !032
740 PRINT "6 NO CHOICE THEO
REM" !137
750 PRINT "7 CIRCLES--RADI I
" !179
760 PRINT "8 CIRCLES--CHORD
S, ANGLES" !029
770 PRINT "9 CONGRUENT ARCS
" !235
780 PRINT : "0 PREVIOUS SCRE
EN" !247
790 PRINT : "E END PROGRAM"
!186
800 CALL KEY(0,K,S)!187
810 IF (K=69)+(K=101)THEN 26
00 !114
820 IF (K<48)+(K>57)THEN 800
!060
830 CALL CLEAR !209
840 ON K-47 GOTO 260,1770,18
20,1900,1970,2220,2260,2300,
2350,2470 !070
850 PRINT "ANGLES" !035
860 PRINT : "IF TWO ANGLES AR
E RIGHT": "ANGLES, THEN THEY
ARE": "CONGRUENT." !201
870 PRINT : "IF TWO ANGLES AR
E STRAIGHT ANGLES, THEN THE
Y ARE": "CONGRUENT." !122
880 GOSUB 470 !039
890 ON FLAG GOTO 900,260 !01
2
900 PRINT : "IF ANGLES ARE SU
PLEMENTARY TO THE SAME ANGL
E, THEY ARE CONGRUENT." !230
910 PRINT : "IF ANGLES ARE SU
PLEMENTARY TO CONGRUENT ANG
LES, THEY ARE CONGRUENT."
!011
920 PRINT : "IF ANGLES ARE CO
MPLEMENTARY TO THE SAME ANGL
E, THEY ARE CONGRUENT." !205
930 PRINT : "IF ANGLES ARE CO
MPLEMENTARY TO CONGRUENT ANG
LES, THEY ARE CONGRUENT."
!242
940 GOSUB 470 !039
950 ON FLAG GOTO 850,260 !21
8
960 PRINT "ADDITION PROPERTY
" !101
970 PRINT : : "IF A SEGMENT I
S ADDED TO TWO CONGRUENT SEGM
ENTS, THE SUMS ARE CONGRUENT.
" !236
980 PRINT : "IF AN ANGLE IS A
DDED TO TWO CONGRUENT ANGLES
, THE SUMS ARE CONGRUENT."
!141
990 PRINT : "IF CONGRUENT SEG
MENTS ARE ADDED TO CONGRUE
NT SEGMENTS, THE RESULTS ARE
CONGRUENT." !118
1000 PRINT : "IF CONGRUENT AN
GLES ARE": "ADDED TO CONGRUEN
T ANGLES, THE RESULTS ARE C
ONGRUENT." !117
1010 GOTO 440 !008
1020 PRINT "SUBTRACTION PROP
ERTY" !106
1030 PRINT : : "IF A SEGMENT
IS SUBTRACTED FROM CONGRUEN
T SEGMENTS, THE DIFFERENCES A
RE CONGRUENT." !036
1040 PRINT : "IF AN ANGLE IS
SUBTRACTED FROM CONGRUENT
ANGLES, THE DIFFERENCES ARE
CONGRUENT." !197
1050 PRINT : "IF CONGRUENT SE
GMENTS ARE SUBTRACTED FROM
CONGRUENT SEGMENTS, THE D
IFFERENCES" !246
1060 PRINT "ARE CONGRUENT."
!076
1070 PRINT : "IF CONGRUENT AN
GLES ARE": "SUBTRACTED FROM C
ONGRUENT ANGLES, THE DIFFE
RENCES ARE CONGRUENT." !189
1080 GOTO 440 !008
1090 PRINT "MULTIPLICATION P
ROPERTY" !077
1100 PRINT : : "IF SEGMENTS A
RE CONGRUENT, THEIR LIKE MU
LTIPLES ARE CONGRUENT." !
088
1110 PRINT : : "IF ANGLES ARE
CONGRUENT,": "THEIR LIKE MUL
TIPLES ARE": "CONGRUENT.": : !
070
1120 GOTO 440 !008
1130 PRINT "DIVISION PROPERT
Y" !126
1140 PRINT : : "IF SEGMENTS A
RE CONGRUENT, THEIR LIKE DI
VISORS ARE": "CONGRUENT." !00
3
1150 PRINT : "IF ANGLES ARE C
ONGRUENT,": "THEIR LIKE DIVIS
ORS ARE": "CONGRUENT": : : !20
2
1160 GOTO 440 !008
1170 PRINT "TRANSITIVE PROPE
RTY" !036
1180 PRINT : : "IF ANGLES ARE
CONGRUENT TO THE SAME ANGL
E, THE ANGLES ARE CONGRUENT
." !028
1190 PRINT : "IF SEGMENTS ARE
CONGRUENT TO THE SAME SEGMEN
T, THE": "SEGMENTS ARE CONGRU
ENT." !105
1200 PRINT : "IF ANGLES ARE C
ONGRUENT TO CONGRUENT ANGLE
S, THE ANGLES ARE CONGRUENT."
!008
1210 PRINT : "IF SEGMENTS ARE
CONGRUENT TO CONGRUENT SE
GMENTS, THE SEGMENTS ARE CO
NGRUENT." !117
1220 GOTO 440 !008
1230 PRINT "REFLEXIVE PROPER
TY" !196
1240 PRINT : : "ANY SEGMENT I
S CONGRUENT TO ITSELF." !
215
1250 PRINT : : "ANY ANGLE IS
CONGRUENT": "TO ITSELF.": : :
!064
1260 GOTO 440 !008
1270 PRINT "CONGRUENT TRIANG
LES" !244
1280 PRINT : : "CHOOSE:" !207
1290 PRINT : "1 SSS" !136
1300 PRINT : "2 SAS" !119
1310 PRINT : "3 ASA" !102
1320 PRINT : "4 HL" !037
1330 PRINT : "5 AAA" !086

```

(See Page 12)

## REGENA ON BASIC—

(Continued from Page 11)

```

1340 PRINT : "6 AAS" !105
1350 PRINT : "7 BACK TO MAIN
MENU" !017
1360 PRINT : "E END PROGRAM"
!186
1370 CALL KEY(0,K,S)!187
1380 IF (K=69)+(K=101)THEN 2
600 !114
1390 IF K=55 THEN 260 !063
1400 IF (K<49)+(K>54)THEN 13
70 !118
1410 CALL CLEAR !209
1420 PRINT "IF THERE EXISTS
A": "CORRESPONDENCE BETWEEN T
HE VERTICES OF TWO TRIANGLE
S" !047
1430 ON K-48 GOSUB 1490,1530
,1570,1610,1640,1670,260 !09
9
1440 PRINT : : "PRESS <ENTER>
" !127
1450 CALL KEY(0,K,S)!187
1460 IF K<>13 THEN 1450 !164
1470 CALL CLEAR !209
1480 GOTO 1270 !073
1490 PRINT "SUCH THAT THREE
SIDES OF ONETRIANGLE ARE CON
GRUENT" !035
1500 PRINT "RESPECTIVELY TO
THE": "CORRESPONDING SIDES OF
THE SECOND TRIANGLE, THE T
WO" !109
1510 PRINT "TRIANGLES ARE CO
NGRUENT.": : "SSS" !076
1520 RETURN !136
1530 PRINT "SUCH THAT TWO SI
DES AND THE INCLUDED ANGLE O
F ONE": "TRIANGLE ARE CONGRUE
NT" !025
1540 PRINT "RESPECTIVELY TO
THE": "CORRESPONDING TWO SIDE
S AND INCLUDED ANGLE OF THE
SECOND" !144
1550 PRINT "TRIANGLE, THE TW
O TRIANGLES ARE CONGRUENT.":
: "SAS" !009
1560 RETURN !136
1570 PRINT "SUCH THAT TWO AN
GLES AND THE INCLUDED SIDE OF
ONE": "TRIANGLE ARE CONGRUEN
T" !248
1580 PRINT "RESPECTIVELY TO
THE": "CORRESPONDING TWO ANGL
ES AND INCLUDED SIDE OF THE S
ECOND" !111
1590 PRINT "TRIANGLE, THE TW
O TRIANGLES ARE CONGRUENT.":
: "ASA" !247
1600 RETURN !136
1610 PRINT "SUCH THAT THE HY
POTENUSE AND A LEG OF ONE RIG
HT TRIANGLE ARE CONGRUENT TO
THE" !240
1620 PRINT "CORRESPONDING PA
RTS OF A": "SECOND RIGHT TRIA
NGLE, THE RIGHT TRIANGLES A
RE": "CONGRUENT.": : "HL" !111
1630 RETURN !136
1640 PRINT "SUCH THAT THREE
ANGLES OF ONE TRIANGLE ARE
CONGRUENT RESPECTIVELY TO
THE" !129
1650 PRINT "CORRESPONDING AN
GLES OF A SECOND TRIANGLE,
THEN THE TWO TRIANGLES AR
E SIMILAR.": : "AAA" !001
1660 RETURN !136
1670 PRINT "SUCH THAT TWO AN
GLES AND A NON-INCLUDED SID
E ARE": "CONGRUENT RESPECTIVE
LY TO" !009
1680 PRINT "THE CORRESPONDIN
G PARTS OF A SECOND TRIANGLE,
THE": "TRIANGLES ARE CONGRUE
NT.": : "AAS" !209
1690 RETURN !136
1700 PRINT "ANGLES" !035
1710 PRINT : : "VERTICAL ANGL
ES ARE": "CONGRUENT." !117
1720 PRINT : "IF TWO SIDES OF
A TRIANGLE ARE CONGRUENT,
THE BASE": "ANGLES OPPOSITE T
HEM ARE CONGRUENT." !005
1730 PRINT : "IF THE BASE ANG
LES OF A": "TRIANGLE ARE CONG
RUENT, THE LEGS OPPOSITE THE
M ARE": "CONGRUENT." !117
1740 PRINT : "IF TWO ANGLES O
F ONE": "TRIANGLE ARE CONGRUE
NT TO TWO ANGLES OF A SECO
ND" !032
1750 PRINT "TRIANGLE, THEN T
HE THIRD ANGLES ARE CONGR
UENT." !054
1760 GOTO 440 !008
1770 PRINT "PERPENDICULAR LI
NES" !223
1780 PRINT : : "IF TWO LINES
INTERSECT TO FORM CONGRUEN
T ADJACENT": "ANGLES, THEN TH
E LINES ARE PERPENDICULAR."
!070
1790 PRINT : "IN A PLANE, IF
A LINE IS": "PERPENDICULAR TO
ONE OF TWO PARALLEL LINES,
IT IS" !180
1800 PRINT "PERPENDICULAR TO
THE OTHER." !224
1810 GOTO 440 !008
1820 PRINT "PERPENDICULAR BI
SECTOR" !194
1830 PRINT : "IF TWO POINTS A
RE EACH": "EQUIDISTANT FROM T
HE": "ENDPOINTS OF A SEGMENT,
" !233
1840 PRINT "THEN THE TWO POI
NTS": "DETERMINE THE PERPENDI
CULAR BISECTOR OF THAT SEGME
NT." !220
1850 PRINT : "IF A POINT IS O
N THE": "PERPENDICULAR BISECT
OR OF A SEGMENT, THEN IT IS"
: "EQUIDISTANT FROM THE END"
!156
1860 PRINT "POINTS OF THAT S
EGMENT." !190
1870 PRINT : "IF A POINT IS E
QUIDISTANT FROM THE ENDPoi
NTS OF A": "SEGMENT, THEN IT
LIES ON THE" !121
1880 PRINT "PERPENDICULAR BI
SECTOR OF THAT SEGMENT.": "
(LIES ON THEOREM)" !120
1890 GOTO 440 !008
1900 PRINT "PARALLEL LINES"
!089
1910 PRINT : : "PARALLEL POST
ULATE": "THROUGH A GIVEN POI
NT NOT ON A GIVEN LINE, THERE
EXISTS" !115
1920 PRINT "EXACTLY ONE LINE
PARALLEL TO THE GIVEN LINE."
!018
1930 PRINT : "IN A PLANE, IF
TWO LINES ARE PERPENDICULAR T
O A THIRD LINE, THEN THEY
ARE": "PARALLEL." !117
1940 PRINT : "TRANSITIVE PROP
ERTY": "IF TWO LINES ARE EAC
H": "PARALLEL TO A THIRD LINE
," !039
1950 PRINT "THEY ARE PARALLE
L TO EACH OTHER." !040
1960 GOTO 440 !008
1970 PRINT "LINES CUT BY A T
RANSVERSAL" !149

```

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## REGENA ON BASIC—

(Continued from Page 12)

```

1980 PRINT : "IF TWO PARALLEL
  LINES ARE CUT BY A TRANSV
  ERSAL, EACH PAIR OF ALTERNA
  TE INTERIOR" !186
1990 PRINT "ANGLES ARE CONGR
  UENT. (PAI)" !159
2000 PRINT : "IF TWO PARALLEL
  LINES ARE CUT BY A TRANSV
  ERSAL, EACH PAIR OF ALTERNA
  TE EXTERIOR" !192
2010 PRINT "ANGLES ARE CONGR
  UENT. (PAE)" !155
2020 PRINT : "IF TWO PARALLEL
  LINES ARE CUT BY A TRANSV
  ERSAL, EACH PAIR OF CORRESP
  ONDING" !102
2030 PRINT "ANGLES ARE CONGR
  UENT. (PCA)" !153
2040 PRINT : "IF TWO PARALLEL
  LINES ARE CUT BY A TRANSV
  ERSAL, EACH PAIR OF INTERIO
  R ANGLES ON" !145
2050 PRINT "THE SAME SIDE OF
  THE TRANS- VERSAL ARE SUPPL
  EMENTARY." !187
2060 GOSUB 470 !039
2070 ON FLAG GOTO 2080,260 !
  173
2080 PRINT "IF TWO LINES ARE
  CUT BY A TRANSVERSAL SUCH
  THAT A PAIROF ALTERNATE INT
  ERIOR ANGLES" !220
2090 PRINT "ARE CONGRUENT, T
  HE LINES ARE PARALLEL. (AIP)
  " !226
2100 PRINT : "IF TWO LINES AR
  E CUT BY A TRANSVERSAL SUC
  H THAT A PAIROF ALTERNATE EX
  TERIOR ANGLES" !151
2110 PRINT "ARE CONGRUENT, T
  HE LINES ARE PARALLEL. (AEP)
  " !222
2120 PRINT : "IF TWO LINES AR
  E CUT BY A TRANSVERSAL SUC
  H THAT A PAIROF CORRESPONDIN
  G ANGLES ARE" !057
2130 PRINT "CONGRUENT, THEN
  THE LINES ARE PARALLEL. (
  CAP)" !151
2140 GOSUB 560 !130
2150 ON FLAG GOTO 260,1970,2
  160 !050
2160 PRINT : "IF TWO LINES AR
  E CUT BY A TRANSVERSAL SUC
  H THAT A PAIROF INTERIOR ANG
  LES ON THE" !140
2170 PRINT "SAME SIDE OF THE
  TRANSVERSAL ARE SUPPLEMENTAR
  Y, THE LINES ARE PARALLEL." !
  106
2180 PRINT : "IF TWO LINES AR
  E CUT BY A TRANSVERSAL SUC
  H THAT A PAIROF EXTERIOR ANG
  LES ON THE" !146
2190 PRINT "SAME SIDE OF THE
  TRANSVERSAL ARE SUPPLEMENTAR
  Y, THE LINES ARE PARALLEL." !
  106
2200 GOSUB 560 !130
2210 ON FLAG GOTO 260,2080,1
  970 !226
2220 PRINT "MIDLINE THEOREM"
  !168
2230 PRINT : : "A SEGMENT JOI
  NING THE": "MIDPOINTS OF TWO
  SIDES OF A TRIANGLE IS PARAL
  LEL TO THE" !207
2240 PRINT "THIRD SIDE, AND
  ITS LENGTH IS ONE-HALF THE
  LENGTH OF THE THIRD SIDE."
  : : : !167
2250 GOTO 440 !008
2260 PRINT "NO CHOICE THEORE
  M" !016
2270 PRINT : : "IF TWO ANGLES
  OF ONE": "TRIANGLE ARE CONGR
  UENT TO TWO ANGLES OF A SE
  COND" !213
2280 PRINT "TRIANGLE, THEN T
  HE THIRD ANGLES ARE CONGR
  UENT." : : : !085
2290 GOTO 440 !008
2300 PRINT "ALL RADII OF A C
  IRCLE ARE CONGRUENT." !014
2310 PRINT : "A TANGENT LINE
  IS": "PERPENDICULAR TO THE RA
  DIUS DRAWN TO THE POINT OF":
  "CONTACT." !067
2320 PRINT : "IF A LINE IS PE
  RPENDICULAR TO A RADIUS AT
  ITS OUTER ENDPOINT, THEN
  IT IS TANGENT TO THE CIRCLE."
  !166
2330 PRINT : "IF A RADIUS IS
  PERPENDICULAR TO A CHORD, THE
  N IT BISECTS THE CHORD." !14
  8
2340 GOTO 440 !008
2350 PRINT "THE PERPENDICULA
  R BISECTOR OF A CHORD PASSE
  S THROUGH THE CENTER OF TH
  E CIRCLE." !204
2360 PRINT : "IF TWO CHORDS O
  F A CIRCLE ARE EQUIDISTANT
  FROM THE": "CENTER OF THE CI
  RCLE, THEN" !018
2370 PRINT "THEY ARE CONGRUE
  NT." !171
2380 PRINT : "IF TWO CHORDS O
  F A CIRCLE ARE CONGRUENT,
  THEN THEY ARE EQUIDISTANT FRO
  M THE CENTER OF THE CIRCLE."
  !255
2390 GOSUB 470 !039
2400 ON FLAG GOTO 2410,260 !
  248
2410 PRINT "IF TWO CENTRAL A
  NGLES OF A CIRCLE ARE CONGR
  UENT, THEN THEIR CHORDS ARE
  CONGRUENT." !076
2420 PRINT : "IF TWO CHORDS O
  F A CIRCLE ARE CONGRUENT,
  THEIR CENTRAL ANGLES ARE CONG
  RUENT." !140
2430 PRINT : "IF TWO CENTRAL
  ANGLES OF": "CONGRUENT CIRCLE
  S ARE": "CONGRUENT, THEIR CHO
  RDS ARE CONGRUENT." !241
2440 PRINT : "IF TWO CHORDS O
  F CONGRUENT CIRCLES ARE CON
  GRUENT, THEIR CENTRAL ANGLES
  ARE": "CONGRUENT." : : !000
2450 GOSUB 470 !039
2460 ON FLAG GOTO 2350,260 !
  188
2470 PRINT "IF TWO CENTRAL A
  NGLES OF A CIRCLE ARE CONGR
  UENT, THEN THEIR INTERCEPTE
  D ARCS ARE CONGRUENT." !052
2480 PRINT : "IF TWO ARCS OF
  A CIRCLE ARE CONGRUENT, THEN
  THEIR": "CENTRAL ANGLES ARE"
  : "CONGRUENT." !217
2490 PRINT : "IF TWO CENTRAL
  ANGLES OF": "CONGRUENT CIRCLE
  S ARE": "CONGRUENT, THEN THEI
  R" !081
2500 PRINT "INTERCEPTED ARCS
  ARE": "CONGRUENT." !088
2510 PRINT : "IF TWO ARCS OF
  CONGRUENT": "CIRCLES ARE CONG
  RUENT, THEN THEIR CENTRAL AN
  GLES ARE": "CONGRUENT." !169
2520 GOSUB 470 !039
2530 ON FLAG GOTO 2540,260 !
  122

```

(See Page 14)

# TI bulletin boards

By GERALD J. MACDONELL

This is the third and final part of a listing of more than 220 TI electronic bulletin boards begun in March. Here are a few considerations to keep in mind about the listing:

- Some of the boards listed here may no longer exist.
- A BBS with the notation Not Known has no listed names.
- A BBS listed as 1200 baud can handle baud rates up to and including 1200 baud.
- A BBS listed as operating out of a PC should contain TI or Geneve files.
- Call unfamiliar boards by voice first. If you hear a modem tone, you know they are still in business.

| BOARDNAME           | TELEPHONE    | BAUD | HOURS    | CPU | OTHER     |
|---------------------|--------------|------|----------|-----|-----------|
| 4A Forum            | 515-263-0796 | 300  | 24       | TI  | Iowa      |
| Unknown             | 515-842-2104 | 1200 | 24       | TI  | Iowa      |
| TI-Source/Texaments | 516-475-6463 | 1200 | 24       | TI  | NY        |
| Unknown             | 601-392-8717 | 1200 | 24       | TI  | MS        |
| Unknown             | 601-932-1884 | 1200 | 24       | TI  | MS        |
| Cactus Patch        | 602-290-6277 | 2400 | 24       | TI  | AZ(20meg) |
| Merrimack           | 603-424-5497 | 1200 | 24       | PC  | NH        |
| White Rock TIBBS    | 604-531-6423 | 1200 | 24       | TI  | Canada    |
| In Your Head        | 607-729-5943 | 1200 | 24       | PC  | NY        |
| Broome Computer     | 607-798-1734 | 1200 | 24       | PC  | NY        |
| Madison             | 608-262-4939 | 1200 | evenings | PC  | WI        |
| SNJ/DVUG            | 609-429-7792 | 1200 | 24       | TI  | NJ        |
| D.V.U.G.            | 609-435-7301 | 1200 | 24       | TI  | NJ        |
| The Shoreline TIBBS | 609-652-1965 | 300  | 24       | TI  | NJ        |
| Unknown             | 612-472-3490 | 1200 | 24       | TI  | MN        |
| Techie              | 612-774-9967 | 1200 | 24       | TI  | MN        |
| TI Ottawa 99ers     | 613-738-0617 | 1200 | 24       | TI  | Canada    |
| Spirit of 99        | 614-451-0880 | 1200 | 24       | TI  | OH        |
| Mines of Moria      | 615-267-1721 | 1200 | 24       | TI  | TN        |
| Unknown             | 615-459-9216 | 1200 | 24       | TI  | TN        |
| Unknown             | 615-573-2136 | 1200 | 24       | TI  | TN        |
| Unkown              | 615-691-9558 | 1200 | 24       | TI  | TN        |
| Unknown             | 617-273-3262 | 1200 | 24       | TI  | MA        |
| 99er Association    | 617-321-8214 | 1200 | 24       | TI  | MA        |
| Articus             | 617-329-8597 | 1200 | 24       | TI  | MA        |
| Boston C.S. #1      | 617-331-4181 | 1200 | 24       | TI  | MA        |
| 99 is Alive         | 617-331-9549 | 1200 | 24       | TI  | MA        |
| Boston C.S. #2      | 617-335-8475 | 1200 | 24       | TI  | MA        |
| Elete 99er          | 617-367-6341 | 1200 | 24       | TI  | MA        |
| 99 Zone             | 617-454-9515 | 1200 | 24       | TI  | MA        |
| Pro 99er            | 617-664-8668 | 1200 | 24       | TI  | MA        |
| Techie              | 617-699-2099 | 1200 | 24       | TI  | MA        |
| S.C.C.G. TIBBS      | 619-282-3525 | 1200 | 24       | TI  | CA        |
| Fargo               | 701-293-5973 | 1200 | 24       | PC  | ND        |
| S.N.U.G. BBS        | 702-648-1247 | 1200 | 24       | TI  | NV        |
| Unknown             | 703-631-8772 | 1200 | 24       | TI  | DC        |
| Queen City TIBBS    | 704-514-3776 | 1200 | 24       | TI  | NC        |
| 4A/Talk BBS         | 707-585-3321 | 1200 | 24       | TI  | CA        |
| H.U.G. TIBBS        | 713-475-8909 | 1200 | 24       | TI  | TX        |
| Phoenix TIBBS       | 713-537-0741 | 1200 | 24       | TI  | TX        |
| Unknown             | 714-350-8583 | 1200 | 24       | TI  | CA        |
| Unknown             | 716-433-6607 | 1200 | 24       | TI  | NY        |
| 39 Steps BBS        | 716-837-2818 | 1200 | 24       | TI  | NY(7.E,1) |
| Unknown             | 716-837-6635 | 1200 | 24       | TI  | NY        |
| WIZ/TIB             | 717-657-4992 | 1200 | 24       | TI  | PA(10meg) |
| WIZ/TIB             | 717-657-4997 | 1200 | 24       | TI  | PA        |
| Orphanage TIK       | 803-754-4996 | 1200 | 24       | TI  | SC        |
| T.U.G. TIBBS        | 804-486-1484 | 1200 | 24       | TI  | VA        |
| Unknown             | 804-898-9473 | 1200 | 24       | TI  | VA        |
| TI-KEEP             | 805-499-5415 | 300  | 24       | TI  | CA        |
| Flagship System     | 808-536-0998 | 1200 | 24       | TI  | HI        |
| Zylog               | 808-732-2305 | 1200 | 24       | TI  | HI        |
| Starfleet Techie    | 813-237-1503 | 1200 | 24       | TI  | FL        |
| Unknown             | 813-526-1265 | 1200 | 24       | TI  | FL        |
| TI-Heaven           | 813-633-1723 | 1200 | 24       | TI  | FL        |
| Tampa TIBBS         | 813-677-0718 | 1200 | 24       | TI  | FL        |
| Cy's Swap Shop      | 813-725-4568 | 1200 | 24       | TI  | FL        |
| Action Link         | 813-747-2081 | 1200 | 24       | TI  | FL(10meg) |
| Bungling Bay        | 813-849-5940 | 1200 | 24       | TI  | FL        |
| Unknown             | 814-774-4620 | 1200 | 24       | TI  | PA        |
| Unknown             | 815-357-6971 | 1200 | 24       | TI  | IL        |
| Zylog               | 815-429-3533 | 1200 | 24       | TI  | IL        |
| The Clinic Techie   | 815-741-2135 | 1200 | 24       | TI  | IL        |
| TI-Will             | 815-886-2906 | 1200 | 24       | TI  | IL        |
| U.S.S. Enterprise   | 817-795-2322 | 1200 | 24       | TI  | TX        |
| Dugout              | 818-248-0562 | 1200 | 24       | TI  | CA        |
| Techie              | 902-864-2582 | 1200 | 24       | TI  | TN        |
| Unknown             | 904-253-2992 | 1200 | 24       | TI  | FL        |
| Unknown             | 904-272-8067 | 1200 | 24       | TI  | FL        |
| TI-Unlimited TIBBS  | 904-453-4667 | 1200 | 24       | TI  | FL        |
| Topeka TIBBS        | 913-357-5334 | 1200 | 24       | TI  | KS        |
| TI-Midwest          | 913-831-4111 | 1200 | 24       | TI  | KS        |
| Unknown             | 914-343-5076 | 1200 | 24       | TI  | NY        |
| Unknown             | 916-783-0663 | 1200 | 24       | TI  | CA        |
| Sac-TIBBS           | 916-927-3012 | 1200 | 24       | TI  | CA        |
| Bull City TIBBS     | 919-383-8707 | 1200 | 24       | TI  | NC        |
| TI-Raleigh          | 919-833-3412 | 1200 | 24       | TI  | NC        |
| N.C. Central TIBBS  | 919-851-8460 | 1200 | 24       | TI  | NC        |
| The Orphanage Tech  | 919-868-4636 | 1200 | 24       | TI  | NC        |

## REGENA ON BASIC—

(Continued from Page 13)

```

2540 PRINT "IF TWO ARCS OF A
CIRCLE ARE CONGRUENT, THEN
THEIR": "CORRESPONDING CHORDS
ARE": "CONGRUENT." !007
2550 PRINT : "IF TWO CHORDS O
F A CIRCLE ARE CONGRUENT,
THEN THEIR CORRESPONDING A

```

```

RCS ARE": "CONGRUENT." !229
2560 PRINT : "IF TWO ARCS OF
CONGRUENT CIRCLE ARE CONG
RUENT, THEN THEIR CORRESPON
DING CHORDS ARE CONGRUENT."
!039
2570 PRINT : "IF TWO CHORDS O
F CONGRUENT CIRCLES ARE CON

```

```

GRUENT, THEN THEIR CORRESPON
DING ARCS ARE CONGRUENT." !21
4
2580 GOSUB 470 !039
2590 ON FLAG GOTO 2470,260 !
052
2600 CALL CLEAR !209
2610 END !139

```

## EXTENDED BASIC

# Translating from other BASICS to TI Extended BASIC

By JERRY STERN

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While rummaging around the flea market tables at a recent computer show, I found several dealers that were selling programming books from the early '80s at very cheap prices. There were books on programming in BASIC, some on stock market programs in BASIC, others on computer games, on educational topics, and lots of "things to do" with home computers. These books usually use some early form of BASIC like Radio Shack TRS-80 BASIC, PET BASIC, or the old Northstar BASIC used on teletype terminals. There don't seem to be many books using TI Extended or Console BASIC.

A lot of work went into these old programs. There are some very detailed adventure games, some text-based action games, gambling "simulations," puzzle builders, and many variations of "Eliza," the old psychoanalysis program. Eliza was the precursor to many of today's expert systems, and made an excellent demonstration of how a computer could seem to understand typed sentences, even though the program was just looking up responses in a table.

Many of these old programs are worth translating into TI Extended BASIC. Depending on the form of BASIC originally used, that translation may be quite easy, or possibly not worth the effort. We'll look at how to tell the difference, and then how to do the translations.

There are several things that can tip you off to a program worth translating. First, look at what version of BASIC was used. Most VIC-20 and Commodore 64 programs are so heavily loaded with PEEKS and POKES that only a Commodore expert could decipher them. However, programs written in PET BASIC or Northstar BASIC will probably be understandable and translatable.

Look at what each program does. If there is no input other than from the keyboard, and no output except to the screen

or printer, that is very good. Disk operations must be completely rewritten for conversion, and may not be understandable in the original program. Does the program use screen graphics, like boxes and circles? Complex graphics may be very difficult to convert. Look for remarks statements, explanations of the program, flow charts, or even long, descriptive variable names. Any of these clues can be a big help during the conversion.

Here are the trouble signs to watch for. The lists of BASIC statements in this article are combined from TRS 80 Level II BASIC, DEC system-10 BASIC, and GW-BASIC version 3.23, but most other BASICS use similar terms. A program using many of the statements in this first list will require a major rewrite. That task may still be easier than starting from scratch, but watch out for:

**BLOAD** and **BSAVE**—are used with memory files.

**CALL**—is used to call assembly language subroutines.

**CIRCLE**, **DRAW**, or **LINE**—draws circles, ellipses, boxes, or lines on screen.

**COM**—turns a communication port on or off.

**CSRLIN**—returns cursor position line number.

**DEF SEG**—assigns addresses for PEEK or POKE.

**DEF USR**—specifies the starting address of an assembly subroutine.

**DET**—calculates the determinant of a matrix.

**ENVIRON** and **ENVIRON\$**—modify or retrieve parameters of DOS environment.

**ERASE**—erases variable arrays for redimensioning or reuse. No equivalent.

**ERDEV**, **ERDEV\$**, **EXTERR**—return error information.

**ERROR**—simulates an error.

**FIELD**—assigns space for variables in a random file buffer.

**FRE(0)**—measures unused memory available in bytes.

**INP(X)**—reads a byte from port #X.

**IOCTL** and **IOCTL\$**—send or read a control data string.

**KEY**—define data entry keyboard macros.

**LOC**—returns file position.

**LOCK** and **UNLOCK**—block or unblock file access.

**LOF**—returns file length allocation.

**LPOS**—returns printer head position.

**OUT**—sends output bytes to a port.

**PEEK** and **POKE**—look at, or write to, a memory location.

**POP**—increments a nested GOSUB stack.

**USR(X)**—calls a machine language subroutine, and passes X value.

**USRLOC**—identifies the memory location containing the starting address of a machine language subroutine.

**VARPTR(X)**—returns the memory location of a variable.

**WAIT**—waits for a bit pattern input at a port.

Decided what to convert? (Say Yes.) Good. Now study a printout of the program. Draw lines separating each step or task of the program. Label each section with what it does. Label what values the variables hold, like "Balance," or "Average Price." Once you understand what each section does, you can start translating. You don't always need to understand the function of every line. Usually, those lines will explain themselves as you work with them.

Once you have a feel for what the program does, type it in. A conversion program that converts a text file to a program file could be useful here, and allow some search and replace functions, but it will not allow you to test individual lines in immediate mode. Translations are easiest typed directly into Extended BASIC. As you type, make the easier changes immediately:

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## EXTENDED BASIC—

(Continued from Page 15)

Convert single colon statement separators to double colons:  $X=Y:Z=2$  becomes  $X=Y::Z=2$

Change string addition signs to ampersands:  $A\$=B\$+C\$$  becomes  $A\$=B\$\&C\$$ .

The statement BEEP is not available in TIBX except within the DISPLAY statement, so change it to CALL SOUND(250,800,0).

Some versions of BASIC allow multiple file numbers in CLOSE statements. Change CLOSE #1,#2 to CLOSE #1::CLOSE #2. Similarly, change NEXT X,Y,Z to NEXT X::NEXT Y::NEXT Z.

Change all CLS to CALL CLEAR.

The define function statement DEF FNV(X,Y,Z)=X+Y+Z should be converted to a definition statement: DEF V(X,Y,Z)=X+Y+Z.

Change the word GOTO to THEN in IF statements: IF X GOTO 230 ELSE 400 becomes IF X THEN 230 ELSE 400.

The INPUT statement, and other statements using lists of terms, may have different punctuation. Change the semicolon to a colon: INPUT "Number?";X becomes INPUT "Number?":X. Also, change PRINT USING X\$,A to PRINT USING X\$:A

Shorten LINE INPUT "Data?";X\$ to LINPUT "Data?":X\$. Also, shorten ON ERROR GOTO 300 to ON ERROR 300.

The statement PRINT @ 12 A prints the value of A at character position 12. Change it to: PRINT TAB(X);A.

RESUME returns from a subroutine after ON ERROR GOTO. Use RETURN instead.

Because the TI 99/4A uses only high-precision variables, with no true integers, and no single or double precision variables, some functions can be skipped. You will usually be able to leave out these statements:

**CDBL**—converts variable to double-precision.

**CSNG**—converts variable to single-precision.

**CVI, CVS, CVD**—convert string values from random access disk files to numbers.

**DEFDBL letter 1 - letter 2**—assigns

variables in letter range as double precision.

**DEFINT letter 1 - letter 2**—assigns variables as integers.

**DEFSNG letter 1 - letter 2**—assigns variables as single precision.

**DEFSTR letter 1 - letter 2**—assigns variables as string variables.

Functions do not need translation. MID\$ is used in most BASICs just like SEG\$, so adding this line at the beginning of the program will convert all the MID\$ to SEG\$ automatically:

```
DEF MID$(A$,X,Y)=SEG$(A$,X,Y)
```

In addition to MID\$, most BASICs also use LEFT\$ and RIGHT\$ to take the first few characters from the left end or the right end of a string. Leave those functions alone, and add more DEF statements:

```
DEF LEFT$(A$,X)=SEG$(A$,1,X)
```

```
DEF RIGHT$(A$,X)=SEG$(A$,LEN(A$)-X,X)
```

For each of the following functions, add the corresponding DEF statement on a line number lower than the first use of the function:

```
CINT(X) (rounds off to integer)—DEF CINT(X)=SGN(X)*INT(ABS(X)+.5)
```

```
CLOG(X) (common or base 10 logarithm)—DEF CLOG(X)=LOG(X)/2.302585093
```

```
COT(X) (cotangent)—DEF COT(X)=1/TAN(X) (Some BASICs have more trigonometric functions than TI Extended BASIC. There is an excellent list of the DEF statements that convert them in the Extended BASIC manual, page 202, listed right up to Inverse Hyperbolic Cotangent!)
```

```
FIX(X) (truncates variable)—DEF FIX(X)=INT(X)
```

```
INSTR(X,A$,B$) (finds position of a string)—DEF INSTR(X,A$,B$)=POS(A$,B$,X)
```

```
INSTR(A$,B$) (finds position of a string)—DEF INSTR(A$,B$)=POS(A$,B$,1)
```

```
LN(X) (natural log)—DEF LN(X)=L
```

```
OG(X)
```

```
LOGE(X) (natural log)—DEF LOGE(X)=DEF LOG(X)
```

```
LOG10(X) (common log)—DEF LOG10(X)=LOG(X)/2.302585093
```

```
MKI$(X) (converts integer to string)—DEF MKI$(X)=STR$(X)
```

```
MKSS$(X) (converts single precision to string)—DEF MKSS$(X)=STR$(X)
```

```
MKD$(X) (converts double precision to string)—DEF MKD$(X)=STR$(X)
```

```
SPACE$(X) (returns spaces)—DEF SPACE$(X)=RPT$(" ",X)
```

```
SPC(X) returns spaces)—DEF
```

**Some functions and statements can best be replaced by subprograms, especially those functions that convert numbers between base ten, hexadecimal, and octal. The subprograms that are needed for converting a program should be merged into the translated program.**

```
SPC(X)=RPT$(" ",X)
```

```
SQRT(X) (square root)—DEF SQRT(X)=SQR(X)
```

```
STRING$(X,A$) returns repeated string X characters long of first character of string—DEF STRING$(X,A$)=RPT$(SEG$(A$,1,1),X)
```

Some functions and statements can best be replaced by subprograms, especially those functions that convert numbers between base ten, hexadecimal, and octal. The subprograms that are needed for converting a program should be merged into the translated program. With the program in memory, type:

```
MERGE DSKx.BASE
```

Or, from a cassette system, just type in the subprogram as an addition to the pro

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## EXTENDED BASIC—

(Continued from Page 16)

gram in memory.

**HEX\$(X)**—(returns string equivalent of X):**R\$=HEX\$(X)**—becomes `CALL BASE(X,16,R$)`**OCT\$(X) (converts X to octal)**—**T\$=OCT\$(X)** becomes `CALL BASE(X,8,T$)`The subprogram **BASE** does a simple math conversion from a decimal number to a number in any other base up to 36. The converted number is returned in a string variable.**&H A\$ (converts hex A\$ to decimal)**—**X=&H21D6** becomes `CALL BASE10(X,16,"21D6")`**&O A\$ (octal to decimal)**—**X=&O7112** becomes `CALL BASE10(X,8,"7112")`The subprogram **BASE10** converts from any base up to 36 back into a decimal number.**INKEY\$ (retrieves one key from keyboard)**—`CALL INKEY(A$)`The subprogram **INKEY** waits for one key press, and returns that character in a string variable.**MAT INPUT V (inputs an array of indefinite length, sets NUM to number of values in array)**—`CALL MINPUT(prompt$,NUMB,X())`DEC BASIC's **MAT**, or matrix functions, are useful for performing calculations on a matrix. Only a few special-purpose programs will need most of the **MAT** functions, but the **MAT INPUT** statement is often useful. That statement prompts for input like the TI BASIC **INPUT** statement, but allows several variables to be entered, separated by commas. For example, the statements, in DEC BASIC: `PRINT "From, To, Step"; :MAT INPUT A` would result in a prompt and a question mark at the active print line. The program user may then type 12,24,2 if a loop should print results for values from 12 to 24, in steps of 2. However, the user could also enter 12,24 to set the loop for values of 12 to 24, in steps of 1. The **MAT INPUT** statement stores numbers entered in the array **A()**, and sets the variable **NUM** equal to the number of values entered. In this example, one input line could result in many different results. The

user may press just "ENTER" and end the program, or enter one number for a single cycle through the loop.

The subprogram **MINPUT** substitutes for the **MAT INPUT** statement when the input is on the bottom screen line. DEC BASIC's lines above would become `CALL MINPUT("From, To, Step?",NUMB,A())`If the input should be somewhere on screen other than the bottom line, use the subprogram **MACEPT**, short for **MAT ACCEPT AT**. The lines above could be positioned at line 4, column 1, like this:

```

DISPLAY
AT(4,1):"From,
To, Step?":CALL
MACEPT(4,16,NUMB,A())

```

Both **MINPUT** and **MACEPT** use error trapping statements. If your program also uses these statements, reset them after the returns from the subprograms.

The conversions in the next list will not be consistent. To translate these statements, you will need to study what the program lines are doing, and adapt the Extended BASIC lines to do similar things. Often, you will need to adjust other lines to make translations possible for these lines.

**CHAIN [MERGE] filename** is **SOMETIMES** convertible to `RUN "DSKx.filename"`**CLEAR** resets all variables to start-up condition, and closes all files. Write program lines based on a list of variables and files used.**COLOR X,Y (sets screen color) becomes**—`CALL SCREEN(D)::CALL COLOR(A,B,C)` **CAUTION:** color sets do not match.**COMMON** passes variables to a chained program. Replace with a shared

disk file, or a variable array shared with a subprogram.

**DATES** retrieves current date. Set it as a constant early in the program.**ERL (error line number)**—`CALL ERR(X,Y,W,ERL)`**ERR (error fatal error number)**—`CALL ERR(ER,Y,W,Z)` **Caution:** Error numbers are not the same between versions of BASIC.**GET** reads a record from a random disk file.**LOCATE** moves the cursor to a location for printing. Include the coordinates in a **DISPLAY AT** statement.**LPRINT X (sends data to a printer)**—`PRINT #1:X`**MID\$(Y\$,W,Z) = A\$** Replaces characters starting at **W**, with duration **Z**, with characters in **A\$**. This **MID\$** is not the same as the function **MID\$** above. TI Extended BASIC requires that this statement be reversed:`Y$=SEG$(Y$,1,W-1) &SEG$(A$,1,Z)`**MOD**—`A MOD B` (returns remainder of **A/B**): `A-INT(A/B)*B`**PAGE X (sets up paged output, skipping perforations every X lines)**—`PRINT #1:CHR$(27);CHR$(78);CHR$(6)` (skips six lines, or one inch, at the end of each page.)**PLAY** and **SOUND** become `CALL SOUND`. **PLAY** uses musical notes by letter. There is a conversion chart, of musical notes to frequencies, on page 197 of the Extended BASIC manual.**POS(N)**—returns column number of cursor position. **CAUTION:** This is **NOT** equivalent to TI **POS** statement, but the syntax is the same.

(See Page 18)

The only way to remember all this is to go get a foreign BASIC program, and translate it. The power of TI Extended BASIC will allow drastic size reductions, but concentrate first on translation, and only when the translated version runs correctly, start trimming away the excess statements, and improving the screen displays.

## EXTENDED BASIC—

(Continued from Page 17)

RND(X) (if X<0, a new sequence of numbers is begun, if X=0, repeats last number, and if X>0, provides next number of current sequence.)—RND Use RANDOMIZE with a seed number to provide repeatable random numbers.

RSET and LSET provide right or left justification of strings, dependent on length. Depending on the application, the translation of these functions will vary, but will generally require SEG\$ and the addition of some blank characters, dashes, or zeroes as padding at one end of the string.

STICK and STRIG—become CALL JOYST

SWAP X,Y (reverses values)—TEMP =X::X=Y::Y=TEMP

VTAB(X) (prints X blank lines)—PRINT RPT\$(CHR\$(10),X)

WHILE expression... WEND loop (do sequence while true) becomes—IF expression THEN next line number ELSE ending of loop line number. This may vary with the original algorithm.

There is too much information here to memorize. The only way to remember all this is to go get a *foreign* BASIC program, and translate it. While you work on the program, save it frequently, and number the program versions. Many of the old BASIC programs were very long. The power of TI Extended BASIC will allow drastic size reductions, but concentrate first on translation, and only when the translated version runs correctly, start trimming away the excess statements, and improving the screen displays.

Well, it's time to end this; there is another computer show and tailgate sale starting at the fairgrounds. I think I'll see what surprises are in the boxes of old computer books this time.

GW-BASIC is a registered trademark of Microsoft Corporation. DEC is a registered trademark of Digital Equipment Corporation.

SUB BASE

```
30285 SUB BASE(D,B,N$)!083
30290 ! (DECIMAL NUMBER,BASE
,RETURN STRING FOR #) CONVER
TS BASE 10 TO OTHER BASE B !
178
```

```
30295 ! POSITIVE INTEGERS ON
LY !249
```

```
30300 T=D :: N$="" !207
```

```
30305 IF D<0 THEN 30325 !228
```

```
30310 Q=INT(T/B):: R=T-B*Q !
163
```

```
30315 N$=SEG$("0123456789ABC
DEFGHIJKLMNOPQRSTUVWXYZ",R+1
,1)&N$ !227
```

```
30320 IF Q<>0 THEN T=Q :: GO
TO 30310 !013
```

```
30325 SUBEND !168
```

SUB BASE10

```
30965 SUB BASE10(D,B,N$)!182
```

```
30970 ! (RETURN VARIABLE,BAS
E,STRING FOR #) CONVERTS BAS
E TO BASE 10 !028
```

```
30975 ! POSITIVE INTEGERS ON
LY !249
```

```
30980 H$="0123456789ABCDEFGHI
JKLMNOPQRSTUVWXYZ" !001
```

```
30985 D=0 :: FOR I=1 TO LEN(
N$):: D=POS(H$,SEG$(N$,I,1),
1)-1+B*D :: NEXT I :: SUBEND
!182
```

SUB INKEY

```
28790 SUB INKEY(X$)!215
```

```
28795 ! GETS SINGLE CHARACTE
R FROM KEYBOARD,JLS 5/90 !04
4
```

```
28800 CALL KEY(O,K,S):: IF S
=0 THEN 28800 ELSE X$=CHR$(K
)!211
```

```
28805 SUBEND !168
```

SUB MACEPT

```
30215 SUB MACEPT(R,C,N,X$)!
087
```

```
30220 ! MACEPT(ROW,COLUMN,NU
MBER OF INPUTS RETURNED,ARRA
Y OF INPUTS) !057
```

```
30225 DISPLAY AT(R,C)::!252
```

```
30230 ON ERROR 30275 !194
```

```
30235 ACCEPT AT(R,C)VALIDATE
("1234567890E+-.,")SIZE(-28)
:X$ :: N=1 :: P1=0 :: IF X$=
"" THEN N=0 :: SUBEXIT !052
```

```
30240 P2=POS(X$,"",P1+1)::
IF P2=0 THEN 30255 !245
```

```
30245 IF P2-P1=1 THEN X(N)=0
:: N=N+1 :: P1=P2 :: GOTO 3
0240 !188
```

```
30250 X(N)=VAL(SEG$(X$,P1+1,
P2-P1-1)):: N=N+1 :: P1=P2 :
: GOTO 30240 !061
```

```
30255 IF N=1 THEN X$=X$&" "
!144
```

```
30260 IF P1=LEN(X$)THEN X(N)
=0 :: GOTO 30270 !128
```

```
30265 X(N)=VAL(SEG$(X$,P1+1,
LEN(X$)-P1))!124
```

```
30270 SUBEXIT !167
```

```
30275 CALL SOUND(90,-1,0)::
CALL SOUND(400,-3,0):: RETUR
N 30230 !107
```

```
30280 SUBEND !168
```

SUB MINPUT

```
30390 SUB MINPUT(A$,N,X$)!1
51
```

```
30395 ! MINPUT(PROMPT,NUMBER
OF INPUTS RETURNED,ARRAY OF
INPUTS) !076
```

```
30400 ON ERROR 30440 :: LINP
UT A$:X$ :: N=1 :: P1=0 :: I
F X$="" THEN N=0 :: SUBEXIT
!080
```

```
30405 P2=POS(X$,"",P1+1)::
IF P2=0 THEN 30420 !154
```

```
30410 IF P2-P1=1 THEN X(N)=0
:: N=N+1 :: P1=P2 :: GOTO 3
0405 !097
```

```
30415 X(N)=VAL(SEG$(X$,P1+1,
P2-P1-1)):: N=N+1 :: P1=P2 :
: GOTO 30405 !226
```

```
30420 IF N=1 THEN X$=X$&" "
!144
```

```
30425 IF P1=LEN(X$)THEN X(N)
=0 :: GOTO 30435 !037
```

```
30430 X(N)=VAL(SEG$(X$,P1+1,
LEN(X$)-P1))!124
```

```
30435 SUBEXIT !167
```

```
30440 CALL SOUND(90,-1,0)::
CALL SOUND(400,-3,0):: RETUR
N 30400 !021
```

```
30445 SUBEND !168
```

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year.



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spend a day or two learn-  
ing about your TI99/4A or  
Geneve 9640. See Page 46  
for a listing of upcoming  
fairs.

# THANKS FOR THE MEMORIES

## EEPROMs and the TI

By **TONY LEWIS**

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In previous articles (August and September 1988), we reviewed the basics of microcomputer memory types, and introduced a relatively new type of non-volatile memory chip called Electrically Erasable Programmable Read Only Memory, or EEPROM. Here, EEPROMs will be discussed in greater detail, and some possible applications in the 99/4A system are covered. In the third and last article, schematics and plans for two EEPROM programmers and a GROM simulator using an EEPROM are presented.

### EEPROM TYPES

Recall from the last article that EEPROMs are the (almost) perfect solution to data storage for many applications. You can program an EEPROM much like a static RAM (SRAM), but the data is retained with the power removed. Unlike ultraviolet EPROMs, they do not require removal for reprogramming, because they can be reprogrammed in the circuit. Therefore, EEPROMs are a good compromise between non-volatility and convenience in reprogramming.

It turns out that there are two basic types of EEPROMs: regular and flash (see Fig. 1). The regular EEPROMs are very much like SRAM (say a 6264), use only +5V, and even have the same pinout. The time it takes to read data from a regular EEPROM is comparable to SRAM, about 80-250 nanoseconds, depending upon the type. Regular EEPROMs are written to like SRAM with one important difference — it takes about 10 milliseconds per byte to program. This is due to the internal circuitry that generates the special timing

and voltages needed to program the memory cells. So these EEPROMs are just as convenient as static RAM, but just a little slower to program.

Flash EEPROMs are a recent development that have both advantages and disadvantages over regular EEPROMs. Because they use a different type of memory cell, flash EEPROMs usually have higher memory densities (more bytes per chip) than regular EEPROM or static RAM. Cost is generally lower, too. The disadvantages are that they usually require a +12V source to erase the chip. And when you reprogram the chip, you have to erase the *whole* chip. So even if you only want to reprogram one byte out of a million, you are forced to erase and reprogram the whole thing (like UV EPROMs). But the cost per byte is significantly lower than regular EEPROMs.

### NON-VOLATILE MEMORY COMPARISONS

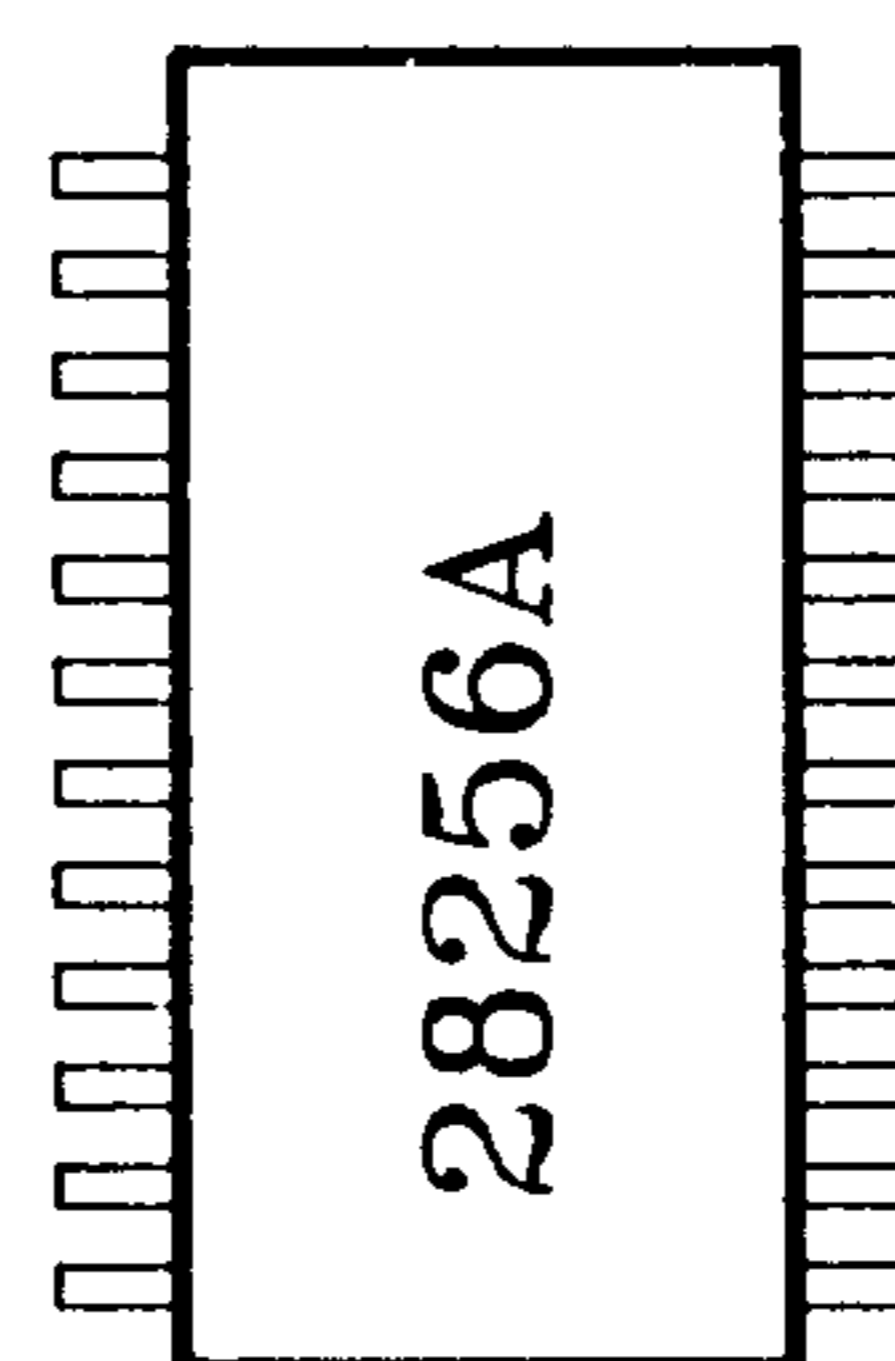
If you were a designer of a solid state storage device for the 99/4A, you would have four basic types of chips to work with: static RAM with battery backup, EPROM, regular EEPROM, and flash EEPROM. (See Table 1.)

#### Restrictions

1. Requires rechargeable battery or lithi-

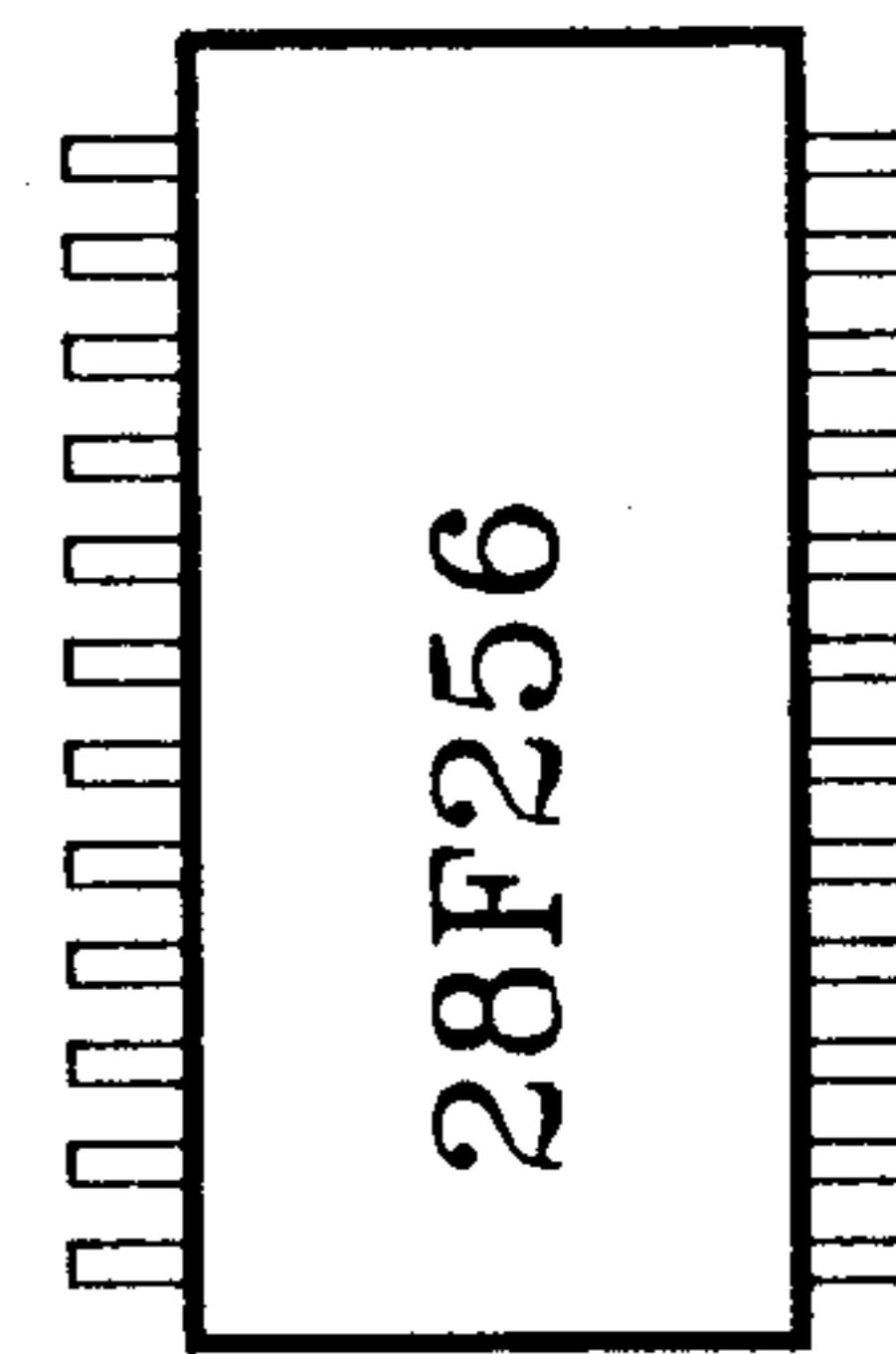
Fig. 1

#### Regular EEPROM



- Requires only +5 volts to operate.
- Can reprogram individual bytes.
- Needs 10 ms to reprogram a byte.

#### Flash EEPROM



- Needs +12 volts to program.
- Have to erase whole chip to reprogram.
- After erasure, time to reprogram individual bytes is much less.
- Higher memory densities, less cost.

um battery, loss of battery = loss of memory.

2. Must erase whole chip to reprogram.
3. Requires high voltages, special timing to program.
4. Takes a while to reprogram.
5. Must remove from circuit to reprogram.

With these features in mind, we can match the memory chip type to certain applications:

**Static RAM, with battery backup** — perfect for RAMdisks which require fast and frequent updates of stored data.

**EPROM** — good for the final version of a DSR, system ROM, etc., that is not expected to require revision.

**Regular EEPROMs** — perfect for storage of data and programs that require changes or updates as frequently as once or twice a day. Also good for use in hard to reach places (like in the console) for revision of data without removing the chip.

**Flash EEPROMs** — similar to regular EEPROMs, but limited to applications (See Page 24)

Table 1

Below is a table that compares the features of the 32K byte version of each of these chip types:

|                            | SRAM/BB | EPROM   | REG.EEPROM | FLASH EEPROM |
|----------------------------|---------|---------|------------|--------------|
| Cost?                      | \$15    | \$8     | \$35       | \$8          |
| Special Program Circuitry? | NO      | YES!    | NO         | YES          |
| Program Time               | FAST    | SLOW!   | MEDIUM     | MEDIUM       |
| Restrictions               | 1       | 2,3,4,5 | 4          | 2,3,4        |
| Memory Density             | LOW     | HIGH    | MEDIUM     | HIGH         |

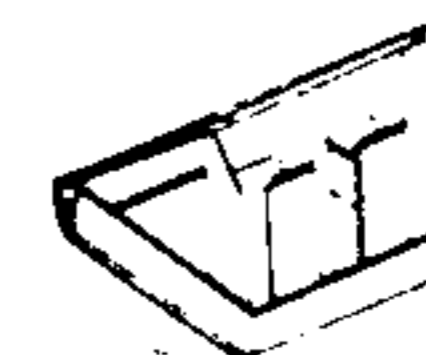
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**#1. THE SINGING TI-99/4A SPEECH & MUSIC DISK**

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**#2. WHEEL OF FORTUNE, BLACKJACK & JOKER POKER**

Three fantastic freeware programs on one disk. Professional quality and the best "wheel" game around at any price. Vanna would love it!

**#3. DUMPIT**

This disk helps you transfer many TI modules to disk. Recommended for users with some programming ability. Ed/Assembler and "widget" recommended.

**#4. PRINTART**

Two disk sides filled with files that print out great quality pictures on most printers. Many famous TV and comic characters on this disk. "Beam me up Scotty."

**#5 ORIGINAL TI SALES DEMO DISK WITH TI-TREK GAME**

This disk is packed full of assorted files of all types. Graphics, speech etc. Contains complete TI-TREK game for Speech Editor or TE-II module.

**#5A. TI MUSIC/GRAPHICS**

A great collection of music and matching graphics. Great examples of music & sprite programming.

**#6. EXBASIC MUSIC**

A two disk side collection of music & graphics that we consider some of the best.

**#7. SPACE SHUTTLE MUSIC/GRAPHICS**

One of the real outstanding examples of programming. This disk has it all. Great graphics, music, and continuity. A real salute to the space program. It is almost like watching a movie!

**#8. LOTTO PICKER**

This program randomly generates numbers for use in the various state lotto games and even runs a simulated lotto game. Easy to modify for pick 6 etc. games. A great learning and fun disk.

**#9. MONA LISA PRINT OUT**

This disk prints out a near photo quality picture of that lady with the classic smile. We understand it was made by digitizing the original with a super powerful computer and converting the output to run on the TI-99/4A. Impresses everyone who sees it! Requires Epson printer compatibility.

**#10. GOTHIC PRINT**

This disk lets you type out a phrase on the screen and then print it out in gothic (Old English) style. Looks like hand-lettered calligraphy. Use for invitations, announcements and business cards.

**#11. ANIMATED CHRISTMAS CARD "WOODSTOCK"**

This disk was actually originally sent to TEX-COMP as a greeting from master programmer Ray Kazmer. It was just too good not to share! One of the best examples of computer animation and graphics you will see on any computer!

**#12. TI-99 OLOPY**

This great piece of programming actually simulates and plays the famous board game. For legal reasons we cannot name the game but "do not pass Go! but go directly to Jail!"

**#13. STRIP POKER (PG RATED)**

Play Poker against your TI-99/4A. When you win a hand she loses--a piece of her clothes that is. Don't worry about being a lousy poker player. Another file is included where you don't even have to know an ace from a king.

**#14. FIGURE STUDY (PG RATED)**

A collection of Playboy type centerfolds that can be printed out at your command. Use with any printer.

**#15. STAR/EPSON PRINTER DEMO**

This 2 sided disk contains a large collection of demo programs to put your Star/Epson compatible printer through its paces. Learn what control codes can do! Lots of text and graphics examples. Second side has a great tutorial on printer graphics with examples!

**#16. SIDWAYS PRINTOUT**

This program allows you to print out the material from your printer sideways. Great for spreadsheets, banners and large graphics. Second side contains some new enhancements for Multiplan not available on the TI upgrade.

**#17. TI FORTH DEMO**

This demo disk was released by TI to show the power of Forth. Fantastic music and graphics. Ed/Assem and 32K required!

**#18. TI DIAGNOSTIC**

This program loads into the Mini-Memory module and checks out your entire system. Much better than disk based diagnostics that cannot be used if a problem in the disk system is at fault. Complete documentation on second side.

**#19. TI WRITER/MULTIPLAN UPGRADE**

This disk released by TI adds real lower case to your TI Writer, speed to Multiplan and other enhancements. Easy to use., just substitute new files for old! Instructions included.

**#20. ACCOUNTS RECEIVABLE**

This self contained prize winning program loads and runs in Exbasic and has all the features found in a professional accounting system. Complete with documentation and a second disk side with report generating programs.

**#21. DATA BASE DEMO DISK**

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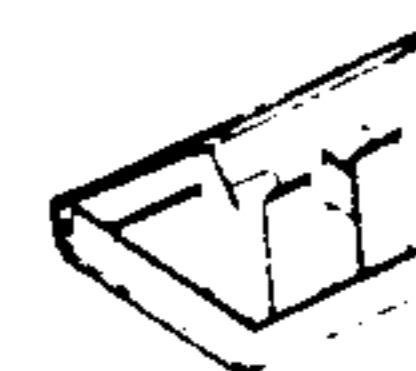
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## #22. ASTROLOGY

This one is as good as anything you will see in an arcade. Great color graphics and displays of the Zodiac. Enter your birthdate and learn about your sign, your lucky days and famous events in history on your birthday. Even prints out a report. Can be used as a great moneymaker at a charity event. Help guide your spouse's career.

## #23. WILL WRITER

Enter your answers to a group of computer asked questions and this program then writes you a last will and testament. Now you can leave your TI-99/4A to your favorite nephew. Works with any printer. Appears legal in all states but better check that out!

## #24. ENGINEERING CALCULATIONS

A two sided computer handbook of dozens of the most often used engineering and technical formulas. A real time saver. Does conversions, calculations and even designs electrical circuits. A must for anyone whose profession or hobby involves scientific calculations. Even has medical and communications applications.

## #25. MEDICAL ALERT

This disk contains many menu accessible files covering most everyday medical emergencies. A good "what to do until the doctor or paramedic comes" guide. Well written and organized. Could very easily save a life!

## #26. R RATED GAME

It was bound to happen. A talented (but demented) programmer in Germany wrote an Invaders type game but with most unusual guns and targets. Definitely not what you would find at your neighborhood arcade. Not only a great party game but some great programming. You must be over 18 to order this one!!

## #27. KIDS LEARNING

An educator in Georgia put this two sided disk collection of educational programs together. Contains great material. Math, geography, reading improvement, and even IQ testing. All high quality programs for kids of all ages.

## #28. LOADERS AND CATALOGERS

We put together a collection of the best programs that catalog and load a group of programs on a disk. Just try them, pick the one you like and transfer it to another disk with the file name LOAD and you are in business.

## #29. LABEL MAKER I

Two great programs for making custom labels for disks, addresses video tapes or any other application. Even contains a graphic display of the TI-99/4A console. Now you can create custom labels of any number by just typing in the lines as you want them. Uses standard tractor labels.

## #30. HOUSEHOLD BUDGET PRINTOUT

With this disk you print out the data you have stored with the TI HBM Module. HBM is a great module that can be used for many home and small business applications but TI forgot to include a printout function. This program comes with full instructions and we are sure that your HBM Module will now start being used. Fantastic programming job.

## #31. MORSE CODE TRAINER DISK

This disk has everything you need to learn and practice Morse Code for the various FCC license exams. It also is great for scout groups and school "ham" clubs for group training and merit badge qualification. Professional quality.

## #32. EXBASIC XMAS MUSIC

Two disk sides full of high quality xmas music that can be played throughout the holiday season and then used as a learning tool since it contains wonderful arrangements and graphics. Autoloading and menu driven.

## #33. CHECKERS & BACKGAMMON

A collection of great checkers and backgammon games for the TI-99/4A. These are professional in quality and will keep you busy for hours.

## #34. SOLITAIRE & SCRABBLE

Another collection of classic games for the TI-99/4A. Exbasic & 32K req.

## #35. PROGRAMMING AIDS & UTILITIES I

A collection of some unusual programs of interest to programmers. One program shows a group of opening title displays, another is a cross reference program as good as any of the commercial ones, plus a great disk management utility.

## #36. STRICTLY BUSINESS

A collection of various programs for evaluating loans, calculating interest, and other financial items such as return on investment and security performance. Two disk sides filled with financial and business related programs.

## #37. LAPD COOKBOOK

This unofficial police cookbook was put together by one of our boys in blue who is also a gourmet chef. (Yes, it contains jailhouse chili) Over 50 great recipes from soup to nuts on two disk sides and each separate side can be called up on screen or printer in exbasic from a menu. As good as any of the new PC computer cookbooks we have seen.

## #38. GREAT 99/4A GAMES VOL. I

A collection of professional games in assembly and exbasic that all load from a menu in exbasic. Includes a great ski game where you dodge the trees in a fast downhill run. We have included only the best.

## #39. GREAT 99/4A GAMES VOL. II

Still more of the great ones from all over the world. The quality, graphics and speed of many of these games will make you wonder why they were never released commercially.

## #40. ARTIFICIAL INTELLIGENCE

This disk contains the famous computer program "Eliza" where you type in a question or a problem you are having and "Eliza" helps you find the solution. Also contains one of the better bio-rhythm programs so you can analyze all your emotional problems at one sitting.

## #41. VIDEO GRAPHS MODULE BACKUP DISK

This disk is a backup of the discontinued Video Graphs Module from TI. For legal reasons, it can only be purchased for backup use by owners of the original module. Do not order UNLESS you have the original module and intend to use this disk only for backup purposes. Exbasic autoloading...

## #42. FUNNELWEB FARM UTILITY

You heard about this one, now direct from Australia is the latest version of this fantastic utility that puts everything at your command. From one program you can access word processing, editor assembler, telecommunications and just about everything else. A freeware program complete with documentation on a second disk side.

## #43. BEST OF BRITAIN, VOL I

Now for the first time, a collection of the best 99/4A games Britain has to offer including the famous "Billy Ball" series of arcade games. Great graphics, action and excitement.

## #44. LABEL MAKER I GRAPHICS

A disk filled with graphics for the Label Maker I disk (#29). Dozens of great graphics for custom labels!

## #45. BEST OF BRITAIN, VOL II

This disk contains an outstanding 3-D graphics adventure game for the TI-99/4A. Carfax Abbey lets you actually move through a four story mansion complete with bats and vampires. You actually are placed in each room and go up and down stairs and through secret panels. Legend of Zelda...look out!

## #46. SUPER TRIVIA 99

A great trivia game for 1 to 4 players with great questions and capability to add your own and print out the files. This one is a real challenge.

## #47. INFOCOM RAPID LOADER

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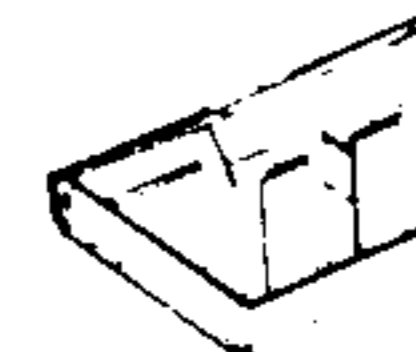
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**#48. GHOSTMAN (from England)**  
This Pacman Munchman type game starts at a slow pace and slowly speeds up to a break-neck pace. A totally new experience.

**#49. DEMON DESTROYER (from France)**  
This great assembly game starts where Invaders leaves off. Add features like descending aliens and closing walls. Hours of great arcade action.

**#50. OH MUMMY (from Germany)**  
Move through the chambers of a Pyramid in search of hidden treasure. Fantastic graphics and great entertainment.

**#51. BERLIN WALL (from Canada)**  
This game requires a mine field to be crossed before escaping from E. Berlin. Good graphics and a real challenge.

**#52. ANIMATION 99 (from Germany)**  
THIS IS THE ONE!!! A demo disk filled with computer animation routines like you have never seen before on any computer. See famous cartoon figures move with more realism than on Sat. morning TV. This disk received a standing ovation when previewed at a local users group. We have even included instructions how to do it yourself on the second disk side. This one is a show stopper!!!

**#53. HACKER/CRACKER**  
A collection of disk copying programs that copy TI disks by tracks. If one of these can't copy a protected disk nothing will. We included a collection of the very best ones including both TI and CorComp compatible. These programs require 2 disk drives and 32K of memory.

**#54. ASTRONOMY**  
This program from Australia plots the heavens and teaches you about the solar system. A great learning and reference tool. Exbasic and 32K required. Don't confuse this one with our Astrology demo. They are not the same...ask Nancy!

**#55. SCREEN DUMP**  
This program allows you to dump disk and even module programs to a Star/Epson compatible printer. Comes with easy to follow plans to build a load interrupt switch which is needed to dump module programs. This dump program by Danny Michael is considered the best of the bunch! Complete with documentation.

**#56. SPREAD SHEET**  
OK, it's not Multiplan but it works great and handles many spread sheet applications. A great way to learn to use spread sheet software. Comes with full instructions and documentation.

**#57. TELCO**  
Considered one of the best data communications programs for the TI-99/4A. Complete with documentation.

**#58. PR BASE**  
The alltime most popular and widely used data base program for the TI-99/4A. A freeware program that is widely supported and updated.

**#59. GRAPH MAKER**  
A collection of the best programs for producing graphs and charts from your data. Exbasic and printer.

**#60. FREDDY**  
A fantastic game where you guide the hero through underground passages filled with danger. Nintendo quality, great graphics and fast action. One of the best we have ever seen!!!

**#61. THE MINE**  
A fast action game from F.R.G. that will keep you going for hours. Many screens and skills required.

**#62. DISK MANAGER II MODULE BACKUP**  
The complete TI Disk Manager II on Disk. For legal reasons it is only available to owners of the original module for backup use.

**#63. ASTROBLITZ/MAZOG**  
A pair of great games that continue where Parsec and Munchman leave off. Imagine Parsec with enemy space craft coming from in front and in back of your ship!!!

**#64. MAJOR TOM/SPACE STATION PHETA**  
A pair of great space games. These two are going to keep you in front of the 99/4A for hours. Great!

**#65. PERFECT PUSH**  
An all new space game where you assemble and launch a rocket ship in outer space while avoiding a space monster. This one is professional in every way...graphics, speed and action!!!

**#66. HEBREW TYPEWRITER**  
This program converts your TI-99/4A keyboard into a typewriter that displays Hebrew letters on the screen. Can also be printed when used in conjunction with screen dump program (included). Great for religious training or making your copy of the dead sea scrolls or ten commandments!

**#67. GENEALOGY**  
Now you can set up your family tree and store or print out the records. Great for keeping track of family relationships and records.

**#68. CHESS**  
The original computer chess game Sargon has been reprogrammed for the TI-99/4A. Now play chess with your computer. Documentation included. Exbasic autoloader.

**#69. COMPUTER PLAYER PIANO/KEYBOARD CHORD ANALYSIS**  
A unique music program which displays a piano on the screen and actually plays your selections.

**#70. TI RUNNER II**  
The very latest (and best) "runner" game based on TI Runner and Star Runner. Great action, graphics, and entertainment.

**#71. KIDS LEARNING II**  
Two more disk sides loaded with the best in educational programs. Kids improve their math, spelling and comprehension skills while having fun.

**#72. CERBERUS**  
Fantastic space game from Germany. Pilot your ship through narrow and crooked channels in space without colliding. Great graphics and music.

**#73. CRYPTO (gram)**  
One of the best word games we have seen for any computer. Set up like a TV game show with great screen displays.

**#74. LABEL MAKER II**  
Make labels for holidays and special events. You compose the text and select the resident graphics for the occasion.

**#75. DISK CATALOGER**  
Now you can organize your disk files with this great utility. Files, sorts, and prints your records. Easy to use.

**#76. PROGRAMMING AIDS AND UTILITIES II**  
A collection of very useful material. Includes a program to convert basic to exbasic so your old basic programs will load & run in exbasic, even with graphics. Also includes two on screen diagnostic programs to test your keyboard and processor. A great merge utility is also on this disk.

**#77. MICROdex 99**  
A database program by Bill Gaskill which files and retrieves data such as magazine articles. A sample database is included.

**#78. ARTCON+ BY RAY KAZMER**  
ATTENTION GRAPHX AND TI ARTIST USERS!!! This program lets you convert Exbasic graphics to TI Artist and Graphx pictures. Also contains a new MAC-RLE (2) for converting from Artist to Graphx.

**#79. DM1000 V3.5**  
One of the most popular disk managers for the TI-99/4A. Originally a rip-off of the CorComp manager, it has been improved and refined by talented users all over the world. This version is deemed the most reliable to date and is far advanced over the TI Disk Manager II. Distributed by permission from CorComp.

**#80. BIRDWELL DISK UTILITY**  
A must if you are into programming and software development. Besides being a great disk manager, it has provision for copying sectors, comparing files and is menu driven. Complete with documentation.

**#81. HOME ACCOUNTING SYSTEM**  
A complete family & small business accounting system including a checkbook manager, budget analysis, mailing list and an inventory program. Complete with documentation. Easy to modify for specific needs.

**#82. CROSSWORD PUZZLES**  
This program from Australia creates a different puzzle each time you run it. Self contained with definitions and vocabulary taken from a leading crossword dictionary. Great crossword fun.

**#83. HOME APPLICATION PROGRAMS**  
A two disk side collection of useful programs for the home. Includes banking, cooking, home bar guide, utility records, and much much more. Something for everyone.

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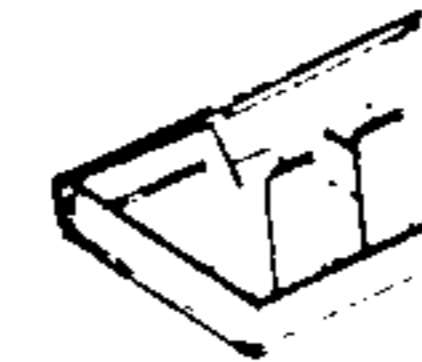
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### #84. GALACTIC BATTLE/SPY ADVENTURE

A pair of great commercial quality games from EB Software of TI Runner fame. Galactic Battle is a space "trek" type strategy game for one or more players. Spy Adventure is an adventure game that will keep you guessing for hours.

### #85. AUTOBOOT UTILITY

This utility which can be installed on a disk loads and runs or displays most files. Now you can have a disk with exbasic programs, Editor Assembler programs and TI Writer files and run or display them all from exbasic.

### #86. COLUMN TEXT III V3.2

A very useful utility for printing TI Writer and 99 Writer II files in separate spaced columns. Saves hours in producing a newsletter. Complete with documentation.

### #87. ARCHIVER III

This utility allows you to "pack" or combine several files into one for space utilization. A number of boards are sending files packed to save transmission costs. This utility will let you pack and/or unpack these files.

### #88. AUSSIE GAMES VOL 1

A collection of games from our friends down under. Includes a great card game and board game. Hours of fun and entertainment. Includes Matchmaker & TILO.

### #89. PROCALC

This is an on screen calculator for decimal/hexidecimal conversions and much more. A must for the serious programmer.

### #90. JET CHECKBOOK MANAGER

This checkbook manager is considered the ultimate with every feature you can think of for keeping track of your checking account and keeping records of your spending for budget and tax purposes. Complete with documentation.

### #91. "THE MAZE OF GROG"(St. Valentine)

Ray Kazmer has created a great maze game with fantastic graphics and the characters from his now legendary "Woodstock" disk. Fun for all!!!

### #92. HOUSEHOLD INVENTORY

Written by 99/4 programming great Charles Ehninger, this prize winner originally sold for \$59.95. Keeps track of household, business or personal items by category and provides automatic updating for inflation etc. A must for tax and insurance records!

### #93. THE 1990 KBGB GIRLIE CALENDAR

This latest offering from programming master Ken Gilliland prints out a jumbo 12 month calendar with a knock-out centerfold pinup for each month. If you like our #14 Figure Study disk, you will flip over this one. For Adults Only!! Exbasic & d/m printer.

### #94. GREAT 99/4A GAMES VOL. III

If you have seen vols. 1 & 2 of this series you know we only provide the very best. This latest volume is also filled with a collection of great ones!

### #95. WEATHER FORECASTER

The weather predictions are amazingly reliable and accurate! A great game "Lawnmower" and a mini database are also included to make this disk a fantastic value.

### #96. STATISTICS & SORTING

Two great assembly utilities by John Clulow. STAT is a set of statistic routines for use in exbasic. SORT allows sorting by two separate fields and a choice of two types of sorts.

### #97. MEMORY MANIPULATOR

This powerful utility lets you explore the entire memory in your 99/4A system and take apart what you find. User friendly!

### #98. DAYS OF EDEN & DOORS OF EDEN

Two bible games (non-fiction) that work with the TI Adventure Module.

### #99. GREAT 99/4A GAMES VOL. IV

This disk features the works of J. Peter Hoddie. All of these games are of commercial quality and well worth the donation requested!

### #100. ASSULT THE CITY (T. of DOOM)

An exciting game for use with the Tunnels of Doom module. Several Exbasic bonus games are included.

### #101. ENCHANCED DISPLAY PACKAGE

This screen enhancement utility lets you do 40 columns, windowing, reverse scrolling, clock/alarm, and a whole host of other great tricks in exbasic. Fully documented.

### #102. COLOSSAL CAVES ADVENTURE

This classic adventure now available for the 99/4A is what led to the Zork series. Hours of text adventuring.

### #103. SORGAN, THE 99/4A ORGAN

This program which is currently selling for big bucks on module turns your 99/4A into an electronic organ. Sound effects, different instruments and voices, chord forms, color graphics with complete control of all.

### #104. C99 COMPILER AND LIBRARY

This two-sided (flippy) disk gets you into C programming with your 99/4A. Comes with a great collection of utilities such as text & graphics. (E/A)

### #105. KING'S CASTLE+

A great arcade style assembly game formerly offered on module. Also includes an EB "Trek" game and a collection of sprite & graphics from Tigercub's Jim Peterson.

### #106. QUEST (Dungeons & Dragons)

One of the best D&D games around! You must destroy the Dark Lord to free your homeland! Complete with documentation on disk.

### #107. STAR TREK MUSIC ALBUM

Ken Gilliland's music and graphics version of the TV theme and the three motion pictures. (Exbasic)

### #108. FUNPLUS BY JACK SUGHRUE

Fantastic disk packed with Funnelweb (#42) templates, utilities and prog. to augment and configure Funnelweb. Unbelievable collection of fantastic aids to make the best even better!

### #109. TI-WRITER MINI MANUAL

This disk prints out a five page TI Writer manual with everything you need to know to use TI Writer or the many clones such as 99Writer II. Additional aids for using this powerful word processor are included.

### #110. DISK + AID

A powerful disk sector editor formerly sold for \$20. Menu Driven and easy to use.

### #111. POP MUSIC & GRAPHICS

This exciting disk from Germany features music/graphics written in 100% assembly and what comes from the TI sound chip is sure to astound you.

### #112. INVOICE PACK

An excellent invoice preparation and printing program with instructions on how to modify it for your own business.

### #113. LABEL MAKER 3

A collection of label programs to create mailing and disk envelopes, disk labels and much more!

### #114. PANORAMA

A drawing and illustration program that compliments Graphx and TI Artist. A must for the serious 99/4A artist!

### #115. GRAPHICS DESIGN SYSTEM

A complete system for creating graphic screens in full color for your programs by J. Peter Hoddie. Fully documented.

### #116. FOURTH TUTORIAL

A lesson in FORTH programming on how to create graphics.

### #117. UNIVERSAL DISASSEMBLER

This powerful utility written in Forth allows disassembly of programs off disk in any format, in memory, and even off of P-Box cards. Very complete with some very unique features.

### #118. FAST TERM

One of the most popular and recommended of the 99/4A terminal emulator programs. Supports TE-II, ASC11, and X-Modem transfers, print spooling and more. Loads from Exbasic or E/A.

### #119. RAG LINKER

A utility for converting DIS/FIX 80 assembly object code files to PROGRAM image. This allows files to load faster and take up less space on disk. Full Doc

### #120. BITMAC

The original BITMAC is now available at \$4.95 with all original documentation. A powerful graphics program for the 4A which lets you print where you want...even over pre-existing text. Create great graphics in 16 colors, print text sideways, mirror image, upside down etc. etc. A must for anyone into 99/4A graphics. Comes with second bonus disk with utilities such as sign & banner makers. Even can computer generate your own signature!

### #121. SUPER YAHTZEE & WHEEL II

If you like Yahtzee this disk is for you. A great version written in high speed assembly. Also included is another version of Wheel of Fortune which also lets you create your own puzzles with a puzzle edit program included.

### #122. ADULT ADVENTURE

A truly adult adventure for use with the TI Adventure Module. Also included is a bonus adventure (not adult) "LOST GOLD" which is one of the better ones we have seen recently.

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## EEPROMs—

(Continued from Page 19)

where the majority of the chip needs reprogramming, or storage of data programmed to date in another location during reprogramming is not a problem. Oddly enough, flash EEPROMs are finding their way into RAMdisks (with some important design limitations).

### TI SYSTEM APPLICATIONS

Okay. Enough talk about EEPROMs, EPROMs, etc. How can we utilize these chips in our 99/4A systems? (See Fig. 2.) Below is a short list of some possible applications for the TI computer system. The uses for EEPROMs are limited only by your imagination:

- **Console ROM.** For those adventurous souls that want to reconfigure the operating system of the /4A, EEPROMs could replace the console ROM. But be careful! One typo could crash the console until it was corrected.

- **GROMs.** EEPROMs would be perfect for GROM simulators. Replacement of the three console GROMs (they're socketed) with a GROM simulator allows neat changes without a GRAM Kracker device in the console port. Of course, EEPROM-based GROMs (GEEPROMs?) could be in a plug-in cartridge or in the P.E.B. Unlike static RAM, there would be no need to download the applications from disk at startup — they would always be there until reprogrammed.

- **DSRs.** Device Service Routines in peripherals are another candidate for EEPROMs. Revision to the code would be a snap and would not require opening the P.E.B. and removing the card. Like-

wise, EEPROMs for the >6000 space in cartridges would enjoy the same advantages.

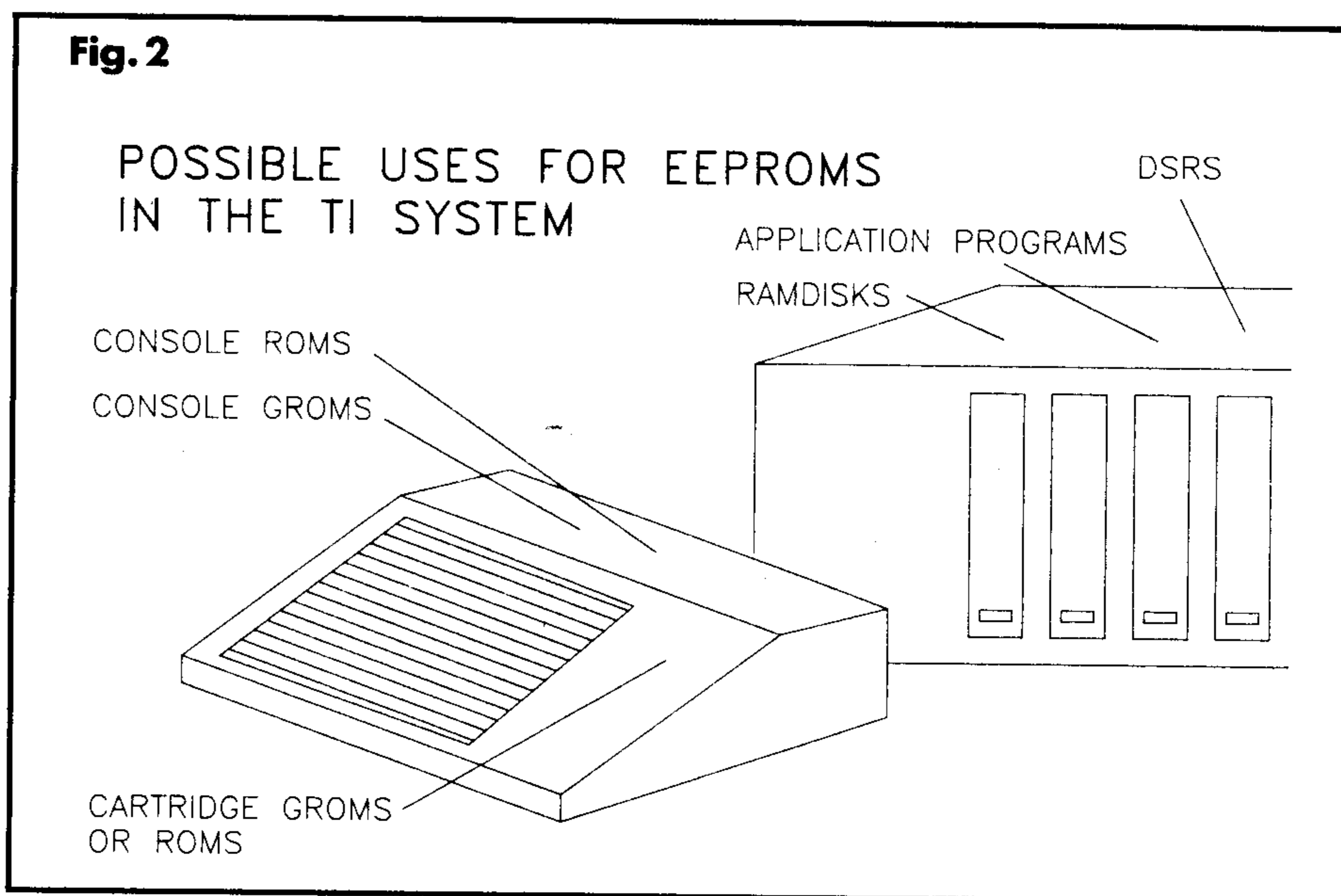
- **Applications programs** Commonly used applications programs (TIWriter, Editor/Assembler, etc.) could be stored on a storage card, then loaded quickly (faster than floppy or hard drive) by use of a loader program. Revisions to programs would be relatively easy to implement.

- **RAMdisks.** At first glance, EEPROMs would not appear to be useful for RAMdisks, due to the timing restrictions. Regular EEPROMs would take longer than most disk drives to store even an 8K file. But flash EEPROMs can be erased relatively quickly, and then reprogrammed as needed. Flash EEPROM

chips generally come in large (64K+) sizes, which also makes them better suited for RAMdisks than regular EEPROMs. The software to keep track of which chips to erase and reprogram might be tricky, but this is exactly what is being done in the IBM world for some portable computers.

### NEXT?

Next time we'll cover an EEPROM programmer circuit that you can put together on a /4A proto board. And it will be in the >4000 DSR space, which makes DSR experimentation easier. Modifications to allow use of flash EEPROMs will be included. And a reprogrammable GROM simulator circuit will also be presented.



## Beery Miller markets programs for Geneve

Beery Miller of Memphis, Tennessee, is marketing the following items for the Geneve 9640 computer:

- **Windows 9640**, described as a multitasking manager for MDOS with pop-up windows, disk manager facilities, the ability to run seven additional programs simultaneously with full mouse support (using the first MOUSE Driver) and the ability to drop back and forth between the Command Line Interpreter at will from any program at will. Miller says the program also includes information for interfacing new programs to use the code supported by **Windows** for the user to make customized pop-up windows, screen displays etc. Retail price is \$25 (\$15 for current subscribers to **9640 News Diskmagazine**).

- **Tetris for MDOS**, described as a high resolution version of Tetris with additional support for Spanish and German, along with support for monochrome and composite monitors and various skill levels. Price is \$15.

- **Barricade**, described as the first My-BASIC game supporting 3D graphics (requires v2.99a or later version). The object is to manipulate blocks down a falling pit and score points to open a gate. Price is \$15.

- **9640 News**, disk-based magazine for the Geneve computer. The first volume has been completed. The magazine arrives as DS/SD diskettes, five per volume. Price is \$25.

Write Miller at 5455 Marina Cove #1, Memphis, TN 38115.



# Tank Commander

## Two-player game takes place on battlefield

Tank Commander, by Matthias Bosse, is a West German import that runs in Extended BASIC on a TI console. It makes use of a speech synthesizer, though it is not required. It is essentially a two-player game and requires a set of joysticks.

The object of the game is to defeat your opponent by destroying his headquarters. Each side has ten tanks and four minelayer/sweepers with which to do battle. Further complicating matters are obstacles and a game clock that starts with 15 time units. Once this time has been used up, the enemy fires a missile at the opposing forces. The missiles destroys whatever it hits. The clock is then reset, and if time runs out again another missile is fired.

Players alternate turns, during which they may move one tank or minelayer four spaces in any direction. Pressing the fire button during a move will fire projectiles from tanks. Pressing

the fire button when moving a minelayer will lay a mine. If a tank runs into a mine, his own or the opponent's, it will be destroyed and replaced by an obstacle. Minelayers from either side can disarm any mine.

Obstacles, such as trees, can be removed by firing at them.

A readout at the bottom of the screen keeps track of the number of tanks and minelayers that remain for both sides. The game ends when one of the players' headquarters is destroyed.

MICROpendium translated the program from German. Some wording is awkward because of space limitations on the screen. For example, the readout mentioned above uses the word "MINE." to refer to minesweepers. Other German words have only approximate English translations that would fit into the space available.

### TANK COMMANDER

```

10 ! *****
!063
11 ! *   TANK COMMANDER   *
!155
12 ! *   Copyright by   *
!171
13 ! *   Matthias Bosse *
!014
14 ! *   Requirements:  *
!021
15 ! *   TI99/4A console *
!093
16 ! *   Extended BASIC *
!106
17 ! *   Joystick 1&2   *
!240
18 ! *   Speech Synthesizer *
!087
19 ! *****
!063
100 CALL CLEAR :: CALL DELSP
RITE(ALL):: ON BREAK NEXT !0
07
110 DIM PA(2),MI(2),SCH(2),Z
(2):: P=1 :: PA(1)=10 :: PA(
2)=10 :: MI(1)=4 :: MI(2)=4
:: SCH(1)=4 :: SCH(2)=4 :: Z
(1),Z(2)=15.00 !164
120 CALL COLOR(1,11,11,2,3,1
1,9,5,11,11,2,11):: CALL SCR
EEN(2)!016
130 CALL CHAR(40,"9999666699
996666")!036
140 CALL CHAR(43,"100884FF84
081000")!005
150 CALL CHAR(118,"182442999
9422418")!049
160 CALL CHAR(41,"8124421818
422481")!233
170 CALL CHAR(42,"105055557D
7DFFFF")!086
180 CALL CHAR(47,"1010101010
101010")!187
190 CALL CHAR(96,"5500787F7F
780055")!035
200 CALL CHAR(112,"5500787F7
F780055")!073
210 CALL CHAR(97,"B530787878
780055")!024
220 CALL CHAR(98,"AA001EFEFE
1E00AA")!127
230 CALL CHAR(99,"AA00787878
7830B1")!046
240 CALL CHAR(113,"B53078787
8780055")!062
250 CALL CHAR(114,"AA001EFEF
E1E00AA")!165
260 CALL CHAR(115,"AA0078787
87830B1")!084
270 CALL CHAR(100,"8124183C3
C182481")!054
280 CALL CHAR(116,"8124183C3
C182481")!061
290 CALL CHAR(101,"AAAFF818
1FFAAAA")!205
300 CALL CHAR(117,"5555FF818
1FF5555")!116
310 CALL CHAR(45,"000000FF00
000000")!221
320 CALL CHAR(33,"FFC3A59999
A5C3FF")!130
330 CALL ERKLAERUNG !095
340 CALL HCHAR(5,3,40,4)!123
350 CALL HCHAR(20,3,40,4)!16
9
360 CALL VCHAR(5,3,40,15)!18
8
370 CALL VCHAR(5,6,40,6)!142
380 CALL VCHAR(15,6,40,6)!19
2
390 CALL HCHAR(5,28,40,4)!17
9
400 CALL HCHAR(20,28,40,4)!2
25
410 CALL VCHAR(5,31,40,15)!2
38
420 CALL VCHAR(5,28,40,6)!19
5
430 CALL VCHAR(15,28,40,6)!2
45
440 CALL VCHAR(6,5,96,5)!152
450 CALL VCHAR(11,6,101,4)!2
33
460 CALL VCHAR(15,5,96,5)!20
1
470 CALL VCHAR(11,28,117,4)!
037
480 CALL VCHAR(6,29,114,5)!2
47
490 CALL VCHAR(15,29,114,5)!
040

```

(See Page 26)

## TANK COMMANDER—

(Continued from Page 25)

```

500 CALL HCHAR(12,4,41,1)!16
9
510 CALL HCHAR(12,30,41,1)!2
17
520 FOR I=1 TO 40 !108
530 RANDOMIZE !149
540 AA=INT(RND*23+1)!000
550 AB=INT(RND*31+1)!000
560 CALL GCHAR(AA,AB,D)!235
570 IF D<>32 THEN 540 !013
580 CALL HCHAR(AA,AB,42,1)!1
33
590 NEXT I !223
600 CALL HCHAR(21,1,34,32)!2
21
610 CALL HCHAR(1,1,34,32)!17
0
620 CALL VCHAR(1,1,34,48)!19
1
630 CALL VCHAR(1,32,34,24)!2
38
640 CALL HCHAR(1,1,34,32)!17
0
650 A=8 :: B=8 !131
660 CALL COLOR(3,2,11,4,2,11
,5,2,11,6,2,11,7,2,11,8,2,11
)!026
670 IF P=1 THEN A=16 :: B=16
!031
680 IF P=2 THEN A=16 :: B=24
8 !088
690 DISPLAY AT(22,1):"TANK";
PA(1);"MINE.";MI(1);"MOVES
";SCH(1)!034
700 DISPLAY AT(23,1):"TANK";
PA(2);"MINE.";MI(2);"MOVES
";SCH(2)!038
710 IF PA(2)=0 AND MI(2)=0 T
HEN 2190 !179
720 IF PA(1)=0 AND MI(1)=0 T
HEN 2190 !177
0 CALL SPRITE(#1,33,7,A+1,
B+1)!155
740 Z(P)=Z(P)-0.01 !057
750 DISPLAY AT(24,1):"TIME:"
;Z(P)!145
760 IF Z(1)<0 THEN GOSUB 205
0 :: CALL DELSPRITE(#4):: Z(
1)=5.00 !154
770 IF Z(2)<0 THEN GOSUB 205
0 :: CALL DELSPRITE(#4):: Z(
2)=5.00 !156
780 CALL JOYST(P,X,Y)!215
790 IF Y=-4 THEN A=A+8 !012
800 IF Y=4 THEN A=A-8 !075
810 IF X=4 THEN B=B+8 !075
820 IF X=-4 THEN B=B-8 !014
830 IF A<8 THEN A=8 !053
840 IF A=168 THEN A=A-8 !160
850 IF B=8 THEN B=B+8 !057
860 IF B=256 THEN B=B-8 !161
870 CALL KEY(P,K,S):: IF S=0
THEN 710 ELSE 880 !032
880 IF K=18 THEN 900 !192
890 GOTO 730 !043
900 C=0 :: CALL GCHAR(A/8+1,
B/8+1,D)!229
910 IF D=96 AND P=1 THEN C=9
6 !108
920 IF D=101 AND P=1 THEN C=
101 !180
930 IF D=114 AND P=2 THEN C=
114 !189
940 IF D=117 AND P=2 THEN C=
117 !195
950 IF C=0 THEN 730 !211
960 CALL DELSPRITE(#1):: CAL
L HCHAR(A/8+1,B/8+1,32)!085
970 IF C>101 THEN C1=2 !193
980 IF C<102 THEN C1=5 !196
990 CALL DELSPRITE(#2):: CAL
L SPRITE(#1,C,C1,A+1,B+1)!03
5
1000 DISPLAY AT(22,1):"TANK"
;PA(1);"MINE.";MI(1);"MOVES
";SCH(1)!034
1010 DISPLAY AT(23,1):"TANK"
;PA(2);"MINE.";MI(2);"MOVES
";SCH(2)!038
1020 IF SCH(1)<1 AND P=1 THE
N P=2 :: SCH(2)=4 :: CALL HC
HAR(A/8+1,B/8+1,C):: GOTO 67
0 !221
1030 IF SCH(2)<1 AND P=2 THE
N P=1 :: SCH(1)=4 :: CALL HC
HAR(A/8+1,B/8+1,C):: GOTO 67
0 !221
1040 CALL JOYST(P,X,Y)!215
1050 IF Y=-4 THEN 1060 ELSE
1120 !169
1060 SCH(P)=SCH(P)-1 :: A=A+
8 :: CALL GCHAR(A/8+1,B/8+1,
D):: IF D=32 THEN 1120 !051
1070 IF D=100 OR D=116 THEN
1100 !202
1080 IF D<>32 THEN A=A-8 !04
1
1090 IF D=118 THEN 1100 ELSE
1120 !098
1100 IF C=96 OR C=114 THEN C
ALL HCHAR(A/8+1,B/8+1,42)::
PA(P)=PA(P)-1 :: CALL SOUND(
1000,-7,10):: CALL DELSPRITE
(#1):: GOTO 670 !171
1110 IF C=101 OR C=117 THEN
CALL HCHAR(A/8+1,B/8+1,32)::
CALL SOUND(100,330,0):: CAL
L SOUND(100,110,10):: GOTO 1
120 !101
1120 IF Y=4 THEN 1130 ELSE 1
190 !115
1130 SCH(P)=SCH(P)-1 :: A=A-
8 :: CALL GCHAR(A/8+1,B/8+1,
D):: IF D=32 THEN 1190 !122
1140 IF D=100 OR D=116 THEN
1170 !016
1150 IF D<>32 THEN A=A+8 !04
0
1160 IF D=118 THEN 1170 ELSE
1190 !238
1170 IF C=96 OR C=114 THEN C
ALL HCHAR(A/8+1,B/8+1,42)::
PA(P)=PA(P)-1 :: CALL SOUND(
1000,-7,10):: CALL DELSPRITE
(#1):: GOTO 670 !171
1180 IF C=101 OR C=117 THEN
CALL HCHAR(A/8+1,B/8+1,32)::
CALL SOUND(100,330,0):: CAL
L SOUND(100,110,10):: GOTO 1
190 !171
1190 IF X=4 THEN 1200 ELSE 1
260 !254
1200 SCH(P)=SCH(P)-1 :: B=B+
8 :: CALL GCHAR(A/8+1,B/8+1,
D):: IF D=32 THEN 1260 !193
1210 IF D=100 OR D=116 THEN
1240 !086
1220 IF D<>32 THEN B=B-8 !04
3
1230 IF D=118 THEN 1240 ELSE
1260 !122
1240 IF C=96 OR C=114 THEN C
ALL HCHAR(A/8+1,B/8+1,42)::
PA(P)=PA(P)-1 :: CALL SOUND(
1000,-7,10):: CALL DELSPRITE
(#1):: GOTO 670 !171
1250 IF C=101 OR C=117 THEN
CALL HCHAR(A/8+1,B/8+1,32)::
CALL SOUND(100,330,0):: CAL
L SOUND(100,110,10):: GOTO 1
260 !241
1260 IF X=-4 THEN 1270 ELSE
1330 !077
1270 SCH(P)=SCH(P)-1 :: B=B-
8 :: CALL GCHAR(A/8+1,B/8+1,
D):: IF D=32 THEN 1330 !009

```

(See Page 27)

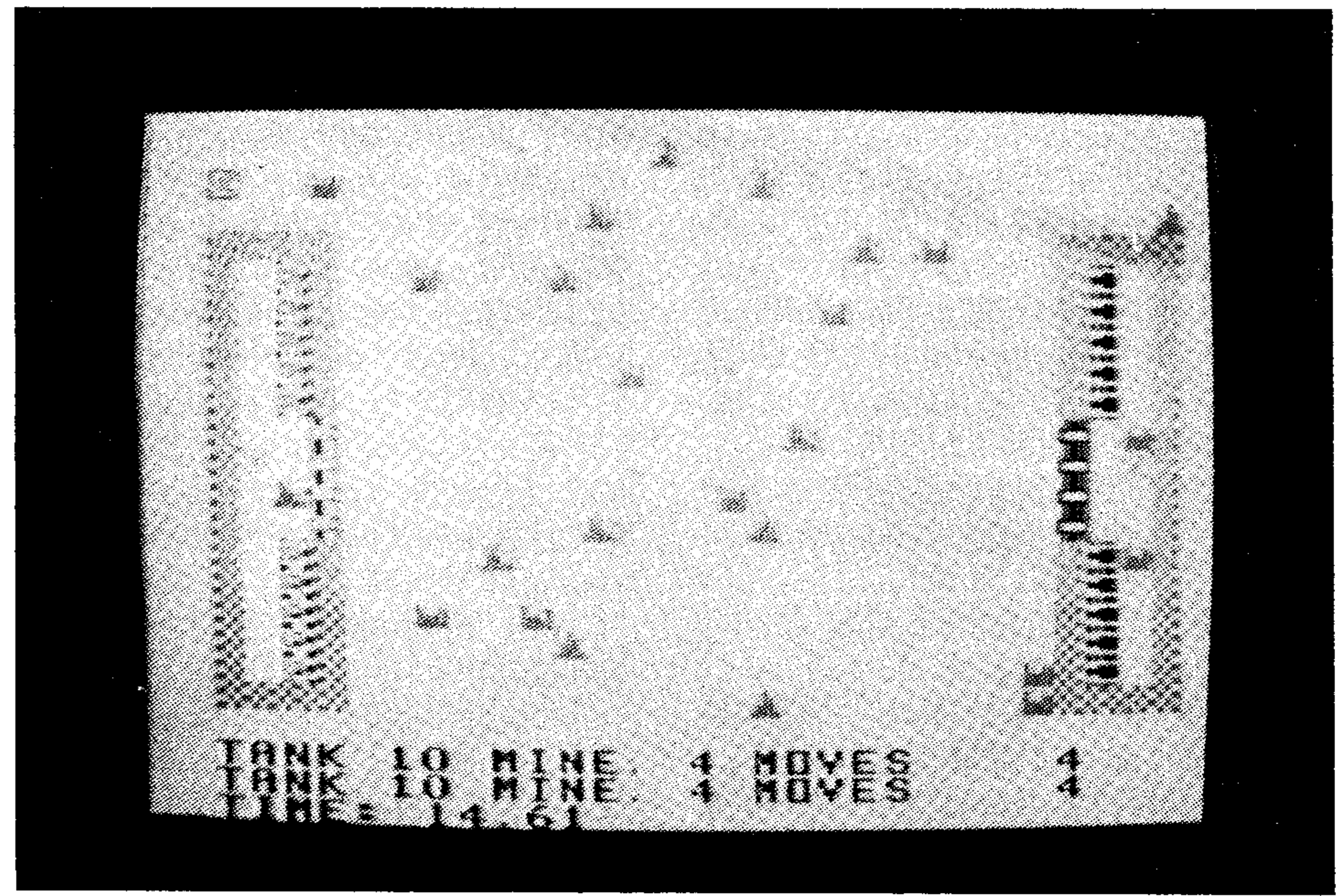
## TANK COMMANDER—

(Continued from Page 26)

```

1280 IF D=100 OR D=116 THEN
1310 !157
1290 IF D<>32 THEN B=B+8 !04
2
1300 IF D=118 THEN 1310 ELSE
1330 !008
1310 IF C=96 OR C=114 THEN C
ALL HCHAR(A/8+1,B/8+1,42)::
PA(P)=PA(P)-1 :: CALL SOUND(
1000,-7,10):: CALL DELSPRITE
(#1):: GOTO 670 !171
1320 IF C=101 OR C=117 THEN
CALL HCHAR(A/8+1,B/8+1,32)::
CALL SOUND(100,330,0):: CAL
L SOUND(100,110,10):: GOTO 1
330 !056
1330 CALL KEY(P,K,S):: IF K=
18 THEN 1380 !054
1340 CALL KEY(0,KK,SS):: IF
KK=49 THEN 1350 ELSE 1360 !0
77
1350 CALL HCHAR(A/8+1,B/8+1,
C):: CALL DELSPRITE(#1):: GO
TO 670 !218
1360 IF KK=50 AND NOT(C=101
OR C=117) THEN 1640 !080
1370 GOTO 990 !048
1380 IF P=1 AND C=101 THEN 1
390 ELSE 1410 !098
1390 CALL GCHAR(A/8+1,B/8,D)
:: IF D=32 THEN CALL HCHAR(A
/8+1,B/8,100):: CALL SOUND(1
000,1100,10):: SCH(P)=SCH(P)
-1 :: GOTO 990 !206
1400 IF D<>32 THEN 990 !208
1410 IF P=2 AND C=117 THEN 1
420 ELSE 1440 !166
1420 CALL GCHAR(A/8+1,B/8+2,
D):: IF D=32 THEN CALL HCHAR
(A/8+1,B/8+2,116):: CALL SOU
ND(1000,1100,10):: SCH(P)=SC
H(P)-1 :: GOTO 990 !077
1430 IF D<>32 THEN 990 !208
1440 IF P=1 THEN B2=+8 :: W=
0 :: SCH(1)=SCH(1)-1 :: B1=B
ELSE 1580 !183
1450 B1=B1+B2 :: CALL GCHAR(
A/8+1,B1/8+1,D):: IF D=32 TH
EN W=W+1 :: GOTO 1560 !242
1460 IF D=40 THEN CALL HCHAR
(A/8+1,B1/8+1,32):: CALL SOU
ND(300,-7,20):: GOTO 990 !04
8
1470 IF D=42 THEN CALL HCHAR
(A/8+1,B1/8+1,32):: CALL SOU

```



```

ND(300,-7,10):: GOTO 990 !04
9
1480 IF D=41 AND A>80 THEN P
A(2)=0 :: MI(2)=0 :: CALL SO
UND(1000,-7,0,110,0):: GOTO
2190 !237
1490 IF D=41 AND A<80 THEN P
A(1)=0 :: MI(1)=0 :: CALL SO
UND(1000,-7,0,110,0):: GOTO
2190 !234
1500 IF D=96 THEN CALL HCHAR
(A/8+1,B1/8+1,42):: CALL SOU
ND(400,-7,5):: PA(1)=PA(1)-1
:: D=1 :: GOSUB 1590 :: GOT
O 990 !135
1510 IF D=101 THEN CALL HCHA
R(A/8+1,B1/8+1,42):: CALL SO
UND(300,-7,5):: MI(1)=MI(1)-
1 :: D=1 :: GOSUB 1590 :: GO
TO 990 !180
1520 IF D=114 THEN D=2 :: CA
LL HCHAR(A/8+1,B1/8+1,42)::
CALL SOUND(300,-7,0):: PA(2)
=PA(2)-1 :: GOSUB 1590 :: GO
TO 990 !172
1530 IF D=117 THEN D=2 :: CA
LL HCHAR(A/8+1,B1/8+1,42)::
CALL SOUND(300,-7,5):: MI(2)
=MI(2)-1 :: GOSUB 1590 :: GO
TO 990 !190
1540 IF D=100 OR D=116 THEN
CALL SOUND(100,-7,10,2200,9)
:: GOTO 990 !106
1550 IF D=34 THEN 990 !017

```

```

1560 CALL SPRITE(#2,45,3,A,B
1)!086
1570 IF W=4 THEN 990 ELSE 14
50 !233
1580 B2=-8 :: W=0 :: SCH(2)=
SCH(2)-1 :: B1=B :: GOTO 145
0 !130
1590 IF P=1 AND D=1 THEN DIS
PLAY AT(24,1):"WRONG TARGET!
!" !015
1600 IF P=2 AND D=2 THEN DIS
PLAY AT(24,1):"WRONG TARGET!
!" !017
1610 IF P=2 AND D=1 THEN DIS
PLAY AT(24,1):"BRAVO!! A HIT
." !170
1620 IF P=1 AND D=2 THEN DIS
PLAY AT(24,1):"BRAVO!! A HIT
." !170
1630 FOR I=1 TO 1000 :: NEXT
I :: DISPLAY AT(24,1):" " ::
RETURN !016
1640 CALL DELSPRITE(#1)!126
1650 CALL HCHAR(A/8+1,B/8+1,
C)!105
1660 IF C=96 THEN 1670 ELSE
1740 !223
1670 P=1 :: CALL JOYST(1,X,Y)
:: IF Y=-4 THEN CALL HCHAR(
A/8+1,B/8+1,99)!249
1680 IF Y=4 THEN CALL HCHAR(
A/8+1,B/8+1,97)!168
1690 IF X=-4 THEN CALL HCHAR
(See Page 28)

```

# TANK COMMANDER—

(Continued from Page 27)

```

(A/8+1,B/8+1,98)!106
1700 IF X=4 THEN CALL HCHAR(
A/8+1,B/8+1,96)!166
1710 CALL KEY(0,K,S):: CALL
KEY(1,KK,SS):: IF KK=18 THEN
1810 !182
1720 IF K=49 THEN CALL HCHAR
(A/8+1,B/8+1,96):: GOTO 670
!068
1730 GOTO 1670 !219
1740 P=2 :: CALL JOYST(2,X,Y
):: IF Y=-4 THEN CALL HCHAR(
A/8+1,B/8+1,115)!033
1750 IF Y=4 THEN CALL HCHAR(
A/8+1,B/8+1,113)!206
1760 IF X=4 THEN CALL HCHAR(
A/8+1,B/8+1,112)!204
1770 IF X=-4 THEN CALL HCHAR
(A/8+1,B/8+1,114)!144
1780 CALL KEY(2,K,S):: CALL
KEY(0,KK,SS):: IF K=18 THEN
1810 !108
1790 IF KK=49 THEN CALL HCHA
R(A/8+1,B/8+1,114):: GOTO 67
0 !183
    
```

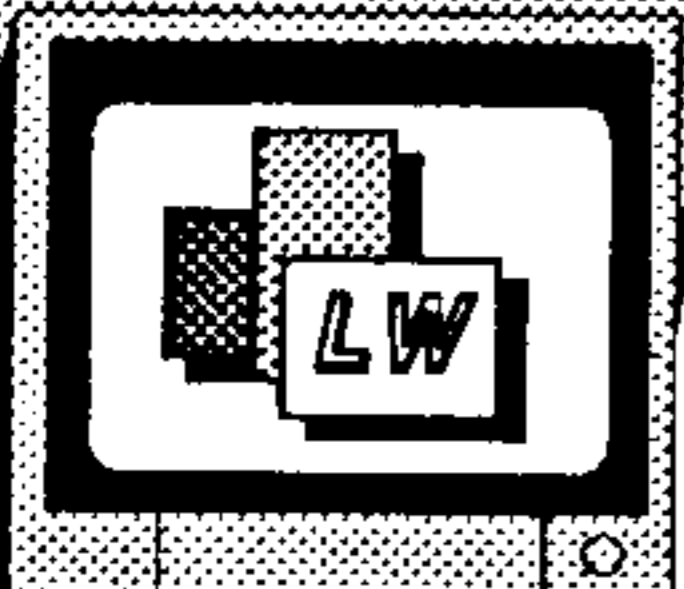
```

1800 GOTO 1740 !033
1810 CALL GCHAR(A/8+1,B/8+1,
D):: CALL HCHAR(A/8+1,B/8+1,
32):: CALL SPRITE(#1,D,C1,A,
B)!111
1820 IF D=96 THEN C=96 :: GO
TO 1440 !031
1830 IF D=98 THEN C=96 :: B2
=-8 :: W=0 :: SCH(1)=SCH(1)-
1 :: B1=B :: GOTO 1450 !173
1840 IF D=99 THEN C=96 :: B2
=+8 :: W=0 :: SCH(1)=SCH(1)-
1 :: B1=A :: GOTO 1910 !122
1850 IF D=97 THEN C=96 :: B2
=-8 :: W=0 :: SCH(1)=SCH(1)-
1 :: B1=A :: GOTO 1910 !121
1860 IF D=114 THEN C=114 ::
GOTO 1440 !111
1870 IF D=112 THEN C=114 ::
B2=+8 :: B1=B :: W=0 :: SCH(
2)=SCH(2)-1 :: B1=B :: GOTO
1450 !239
1880 IF D=115 THEN C=114 ::
B2=+8 :: W=0 :: SCH(2)=SCH(2
)-1 :: B1=A :: GOTO 1910 !20
2
    
```

```

1890 IF D=113 THEN C=114 ::
B2=-8 :: W=0 :: SCH(2)=SCH(2
)-1 :: B1=A :: GOTO 1910 !20
1
1900 END !139
1910 CALL GCHAR(B1/8+1,B/8+1
,D):: W=W+1 :: IF D=32 THEN
2020 !223
1920 IF D=41 AND A>80 THEN P
A(2)=0 :: MI(2)=0 :: CALL SO
UND(1000,-7,0,110,0):: GOTO
2190 !237
1930 IF D=40 THEN CALL HCHAR
(B1/8+1,B/8+1,32):: CALL SOU
ND(300,-7,20):: GOTO 990 !04
9
1940 IF D=41 AND A<80 THEN P
A(1)=0 :: MI(1)=0 :: CALL SO
UND(1000,-7,0,110,0):: GOTO
2190 !234
1950 IF D=96 THEN D=1 :: CAL
L HCHAR(B1/8+1,B/8+1,42):: C
ALL SOUND(400,-7,5):: PA(1)=
PA(1)-1 :: GOSUB 1590 :: GOT
O 990 !136
    
```

(See Page 29)



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## TANK COMMANDER—

(Continued from Page 28)

```

1960 IF D=101 THEN D=1 :: CA
LL HCHAR(B1/8+1,B/8+1,42)::
CALL SOUND(300,-7,5):: MI(1)
=MI(1)-1 :: GOSUB 1590 :: GO
TO 990 !181
1970 IF D=114 THEN D=2 :: CA
LL HCHAR(B1/8+1,B/8+1,42)::
CALL SOUND(300,-7,0):: PA(2)
=PA(2)-1 :: GOSUB 1590 :: GO
TO 990 !173
1980 IF D=117 THEN D=2 :: CA
LL HCHAR(B1/8+1,B/8+1,42)::
CALL SOUND(300,-7,5):: MI(2)
=MI(2)-1 :: GOSUB 1590 :: GO
TO 990 !191
1990 IF D=100 OR D=116 THEN
CALL SOUND(100,-7,10,2200,9)
:: GOTO 990 !106
2000 IF D=34 THEN 990 !017
2010 IF D=42 THEN CALL HCHAR
(B1/8+1,B/8+1,32):: CALL SOU
ND(300,-7,10):: GOTO 990 !05
0
2020 CALL SPRITE(#2,47,3,B1,
B):: B1=B1+B2 !180
2030 IF W=4 THEN 990 !240
2040 GOTO 1910 !204
2050 RANDOMIZE :: E=INT(RND*
18+2):: F=1 !095
2060 IF P=1 THEN P1,P2=1 !17
0
2070 IF P=2 THEN P1,P2=2 !17
2
2080 CALL SPRITE(#4,43,16,E*
8-7,F*8)!172
2090 F=F+1 !005
2100 CALL GCHAR(E,F,D):: IF
D=32 THEN 2170 !163
2110 IF D=96 AND P1=1 THEN C
ALL HCHAR(E,F,118):: CALL SO
UND(1000,-7,0):: PA(1)=PA(1)
-1 :: GOTO 2170 !197
2120 IF D=101 AND P2=1 THEN
CALL HCHAR(E,F,118):: CALL S
OUND(1000,-7,0):: MI(1)=MI(1)
)-1 :: GOTO 2170 !244
2130 IF D=114 AND P1=2 THEN
CALL HCHAR(E,F,118):: CALL S
OUND(1000,-7,0):: PA(2)=PA(2)
)-1 :: GOTO 2170 !240
2140 IF D=117 AND P2=2 THEN
CALL HCHAR(E,F,118):: CALL S
OUND(1000,-7,0):: MI(2)=MI(2)
)-1 :: GOTO 2170 !254
2150 IF D=41 AND F<10 AND P1
=1 THEN P=2 :: CALL HCHAR(E,
F,118):: CALL SOUND(1000,-7,
0):: GOTO 2190 !089
2160 IF D=41 AND F>10 AND P1
=2 THEN P=1 :: CALL HCHAR(E,
F,118):: CALL SOUND(1000,-7,
0):: GOTO 2190 !090
2170 IF F=31 THEN RETURN !23
8
2180 GOTO 2080 !119
2190 CALL SPGET("GAMES",Q$):
: CALL SAY(" ",SEG$(Q$,1,70)
,"OVER"):: IF P=1 AND B>80 T
HEN 2210 ELSE IF P=1 THEN 22
40 !013
2200 IF P=2 AND B<80 THEN 22
40 ELSE IF P=2 THEN 2210 !23
7
2210 CALL SAY("THIS PLAY HAS
WON BLUE BASE")!197
2220 FOR I=1 TO 20 :: CALL C
OLOR(9,11,11):: FOR L=1 TO 1
0 :: NEXT L :: CALL COLOR(9,
5,11):: NEXT I !031
2230 GOTO 2260 !043
2240 CALL SAY("THIS PLAY HAS
WON BLACK BASE")!251
2250 FOR I=1 TO 20 :: CALL C
OLOR(11,11,11):: FOR L=1 TO
10 :: NEXT L :: CALL COLOR(1
1,2,11):: NEXT I !112
2260 !!131
2270 Q=0 :: CALL SAY("ARE U
SURE TO PLAY THIS ",SEG$(Q$,
1,70),"AGAIN")!069
2280 Q=Q+1 :: CALL KEY(0,K,S)
!088
2290 IF Q=20 THEN 2270 !030
2300 IF K=89 OR K=121 THEN C
ALL SAY("U PLAY THIS",SEG$(Q
$,1,70),"AGAIN"):: RUN !057
2310 IF K=78 OR K=110 THEN 2
320 ELSE 2280 !178
2320 CALL CLEAR :: CALL SAY(
"#GOODBYE"):: ON ERROR 2340
!200
2330 RUN "" !112
2340 END !139
2350 SUB ERKLAERUNG !099
2360 CALL COLOR(3,2,11,4,2,1
1,5,2,11,6,2,11,7,2,11,8,2,1
1)!026
2370 CALL CLEAR !209
2380 A$="00000000FF00000000
0000FF00000000000000FF000000
00000000FF000000" !218
2390 CALL CHAR(32,SEG$(A$,1,
16)):: CALL COLOR(1,7,11)!11
7
2400 DISPLAY AT(2,9):"TANKCO
MMANDER" !252
2410 DISPLAY AT(4,11):"COPYR
IGHT" !025
2420 DISPLAY AT(6,15):"BY" !
250
2430 DISPLAY AT(8,8):"MATTHI
AS BOSSE" !053
2440 DISPLAY AT(19,1):"PRESS
N TO START J FOR INFO" !160
2450 A=1 !249
2460 CALL KEY(0,K,S)!187
2470 CALL CHAR(32,SEG$(A$,A,
16)):: A=A+1 !213
2480 IF A=58 THEN A=1 !099
2490 IF K=74 OR K=106 THEN C
ALL COLOR(1,11,11):: GOTO 25
20 !087
2500 IF K=78 OR K=110 THEN C
ALL COLOR(1,11,11):: GOTO 26
60 !227
2510 GOTO 2460 !244
2520 CALL CLEAR !209
2530 DISPLAY AT(1,1):"-----
--EXPLANATION-----" !034
2540 DISPLAY AT(3,1):"(...=.
...TREES" !092
2550 DISPLAY AT(5,1):"*...=.
...RUINS" !110
2560 DISPLAY AT(7,1):")...=.
...BASE FOR BOTH SIDES" !243
2570 DISPLAY AT(9,1):" `...=.
...TANK...PL.1" !208
2580 DISPLAY AT(11,1):"e...=.
...MINELAYER PL.1" !016
2590 DISPLAY AT(13,1):"r...=.
...TANK PL.2" !163
2600 DISPLAY AT(15,1):"u...=.
...MINELAYER PL.2" !037
2610 DISPLAY AT(17,1):"d...=.
...MINE" !115
2620 DISPLAY AT(19,1):"t...=.
...MINE" !133
2630 DISPLAY AT(21,1):"v...=.
...CRATER" !026
2640 DISPLAY AT(24,1):"PRESS
ANY KEY" !003
2650 CALL KEY(0,K,S):: IF S<
>0 THEN 2660 ELSE 2650 !033
2660 CALL CLEAR :: SUBEND !2
51

```

## MYBASIC

# Checksums and ASCII values

BY JIM UZZELL  
DDI Software

MY-BASIC is almost complete, and soon we will be seeing programs in MICROpendium. What is needed, however, is a checksum routine. The following is a quick and dirty checksum program that I wrote and should meet our needs for now.

As some of you know, you can load a D/V80 file saved in program format as if it was a program. However, if a program statement exceeds one line (80 characters), there must be a character in column 80. In some cases, you'll have to input a "dummy" character to eliminate a blank at column 80.

Here's a format suggestion for others who may wish to submit MY-BASIC programs: Submit it all in one D/V 80 file, including a listing of the program, MY-BASIC checksum values and documentation. When loaded and run in MY-BASIC, the checksum and docs will be rejected and the program may be resaved in program format. The documentation may be loaded into a word processor when needed.

Type in the following program in MY-Word and save as PF C DSKxFILENAME. The numbers at the end of the program are the checksums. Do not enter them. Then run the program on itself, choose the verify option, then compare the total to the total at the end of the program. If they match, save as a program. If they don't match, compare each number to find the problem. Each number represents a line. It should be noted that the current version of MY-BASIC, 2.99A, places a blank line at the beginning of the file when it is listed to disk, so the first number will be a zero.

```

100 CALL GRAPHICS(1,1) :: CALL CLEAR
110 DISPLAY AT(3,6):"MYBASIC CHECKSUM"
120 DISPLAY AT(6,6):"1 VERIFY CHECKSUM":"
2 CREATE CHECKSUM":" 1"
130 ACCEPT AT(8,6)SIZE(-1):Z
140 DISPLAY AT(12,6):"DSKx.FILENAME"
150 ACCEPT AT(12,9)SIZE(-12):F$
160 OPEN #1:"DSK"&F$,UPDATE
170 OPEN #2:"PIO",VARIABLE 132
180 PRINT #2:CHR$(15);
190 DIM B(80),E(1000) :: X=1
200 LINPUT #1:A$ :: A=LEN(A$) :: C=0
210 FOR I=1 TO A
220 B(I)=ASC(SEG$(A$,I,1)) :: C=C+B(I)
230 NEXT I
240 IF Z=2 THEN 280
250 PRINT #2:C;
260 D=D+C :: IF EOF(1) THEN 270 ELSE 200
270 PRINT #2 :: PRINT #2:"TOTAL ";D;CHR$(1
8) :: CLOSE ALL :: END
280 E(X)=C :: X=X+1 :: D=D+C
290 IF EOF(1) THEN 300 ELSE 200

```

```

300 FOR I=1 TO X-1 :: PRINT #1:E(I); :: NE
XT I
310 PRINT #1:"TOTAL ";D :: PRINT #2:CHR$(1
8)
320 CLOSE ALL
330 END

```

The following is a program that will list to a printer the default character pattern for ASCII 0 to 126. The default character pattern above 126 is defined as "5AA55AA55AA5AA5."

```

10 OPEN #1:"PIO"
20 FOR I=0 TO 9
100 CALL CHARPAT(I,C$) :: PRINT #1:" ";I;C
$;
105 CALL CHAR(I,C$) :: PRINT CHR$(I);
110 NEXT I
120 FOR I=10 TO 99
130 CALL CHARPAT(I,C$) :: PRINT #1:I;C$;
140 CALL CHAR(I,C$) :: PRINT CHR$(I);
150 NEXT I
160 FOR I=100 TO 126
170 CALL CHARPAT(I,C$) :: PRINT #1:I;C$;"
";
180 CALL CHAR(I,C$) :: PRINT CHR$(I);
190 NEXT I :: CLOSE #1
200 END

```

Table following are the values of freespace at various memory locations. Memory locations above default should be increments of 8K, depending on your needs.

|            | FREESPACE(X) |       |        |       |      |
|------------|--------------|-------|--------|-------|------|
|            | 0            | 1     | 2      | 3     | 4    |
| DEFAULT 64 | 181098       | 65536 | 63862  | 47732 | 3968 |
| 128        | 246634       | SAME  | 129398 | SAME  | SAME |
| 192        | 312170       | SAME  | 194934 | SAME  | SAME |
| 200(MAX)   | 320362       | SAME  | 203126 | SAME  | SAME |

There is a direct relationship of these allocations to memory map pages 5 and 6. For each 8K increase an additional page of memory is added.

Here are ASCII values of various keys based on the Graphics Mode in use:

| KEY       | MODE  |     |    |
|-----------|-------|-----|----|
|           | 0,3,5 | 4   | 1  |
| BACKSPACE | 8     | 136 |    |
| INSERT    | 4     | 132 |    |
| HOME      |       |     | 18 |
| PAGE UP   | 12    | 140 |    |
| TAB       | 137   | 9   |    |

(See Page 31)

# Two utilities let VCR movie directors keep track of intervals on tapes

By HAROLD HOYT JR.

VCR's are a sleeping giant, like computers. You say computers aren't sleeping, that they are very much in use? You ain't seen nothing yet! Both computers and VCRs can have an important function in both general and specific education. Every other home in the USA has a VHS VCR. VCR's are available for about \$200. High quality 6-hour T120 Polaroid tapes cost about \$3 on sale. 50 cents an hour, if you can get something on the tape.

I've seen the potential for VCRs for at least 3 years. Dr. Charles Good of the Lima (Ohio) User Group says that I helped interest him in expanding his VCR efforts. Some progress in this area has come easy, some hard. The biggest problem is producing a worthwhile script. The St Louis User Group encouraged me — they said "Go for it!"

I said, "Whoa! Just a minute!"

If I were making a Clint Eastwood movie, with little worthwhile content, we would commit resources of about \$22 million. Instructional materials with worthwhile, accurate, challenging content are at least as difficult to produce as a typical B movie. I still want to make TI 99/4A instructional tapes and distribute them through the user groups at cost, about \$5 for a 6-hour tape. (Must figure something for VCR maintenance amortization.)

Progress so far: I have two utilities to assist VCR movie directors. One, an Extended BASIC program called VCRI produces a listing of the VCR counter readings for 1 minute intervals for any VCR using a capstan-connected counter and a T120 tape. The utility is universal because you enter one easily determined number that customizes the utility for your VCR. This is a great help in tape editing.

The second utility is my interrupt driven clock — assembly language poked into memory from XBASIC — HCLOCK.

Interrupt driven clocks are really useless, except that when making a VCR tape connecting the video out of the TI directly into the VCR video input, the clock is constantly displayed on the screen and can be updated regularly in an edit interval to match the VCRI counter table. Thus, a viewer can use a table of contents at the beginning of the tape to fast forward to a desired portion of the tape. (*This program was published in the June 1989 MICROpendium. Line 740 of that program is not used in this application—Ed.*)

I've just about got this ready to fly. One of the St. Louis UG members, Ron Bushman, has produced a prototype amplifier that allowed us to use the CSI command to store and retrieve programs from a VCR tape. I visualize using two consoles: One dumping program material to VCR audio input, while the second scrolls the program, displaying it into the VCR video input. Logically, this stuff would be at the end of the tape, as a sort of appendix.

Two utilities are a start. If this program succeeds, it may extend the usefulness of the TI. Right now, we have a family that got its TI for Christmas. Our typically modern kids are too impatient to read the manuals. Computer manuals could sure use some creative writing, too. Anyway, this family has a VCR. If I had a good training tape, I would give it to them!

## VCRI is tool for editing tapes

By HAROLD HOYT JR.

This program is useful for people who want to make or edit VCR tapes. It is particularly useful as an aid to making computer training tapes using the TI-99/4A. Used with my otherwise useless interrupt driven clock program, a table of contents can be placed at the beginning of a tape. If the NTSC video output of the

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## MY-BASIC—

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| KEY          | MODE  |         |   |
|--------------|-------|---------|---|
|              | 0,3,5 | 4       | 1 |
| DELETE       | 3     | 131     |   |
| PAGE DOWN    | 2     | 130     |   |
| ESC          | 155   | 27      |   |
| UP ARROW     | 11    | 139     | 5 |
| DOWN ARROW   | 10    | 138     | 0 |
| LEFT ARROW   | 8     | 136     | 2 |
| RIGHT ARROW  | 9     | 137     | 3 |
| F1 SL ON/OFF | 226/3 | 226/131 |   |
| F2           | 227/4 | 227/132 |   |

|     |         |         |
|-----|---------|---------|
| F3  | 228/7   | 228/135 |
| F4  | 229/12  | 229/130 |
| F5  | 230/14  | 230/142 |
| F6  | 231/12  | 231/140 |
| F7  | 232/1   | 232/129 |
| F8  | 233/6   | 233/134 |
| F9  | 234/15  | 234/143 |
| F10 | 235/188 | 235/188 |
| F11 | 224     | 224     |
| F12 | 225     | 225     |

Next month: MY-Menu

# VCR1—

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computer is attached to the input of the VCR and the demonstration can be accommodated in Extended BASIC, the interrupt clock can always be in the corner of the screen, not telling what time it is, but telling where we are on the tape. The clock can be updated in the immediate mode of XBASIC so as to match the tape position.

Suppose you had five chapters of an XBASIC tutorial, each 1 hour long. Your table of contents might look like this:

|    |                        |            |
|----|------------------------|------------|
| 0. | Table of Contents      | 0 to 1min  |
| 1. | Chapter 1              | 0hr to 1hr |
| 2. | Chapter 2              | 1hr to 2hr |
| 3. | Chapter 3              | 2hr to 3hr |
| 4. | Chapter 4              | 3hr to 4hr |
| 5. | Chapter 5              | 4hr to 5hr |
| 6. | Appendix, program code | 5hr to 6hr |

It is easy to see that the tape could be divided into many more chapters, with each chapter precisely positioned, one after the other. The chapters could be written as independent modules, the same way that computer programs are better written as a set of independent modules.

One disadvantage of tape is that it is serial. To get to chapter 3, you have to pass the table of contents, Chapter 1 and chapter 2. A great help in both making and playing back the tape would be a table of VCR counter readings that would allow you to find any part of the tape easily. On my VCR in the SLP mode 3 hours (the beginning of Chapter 4) is at counter reading 3530. If chapter 3 is really at 3 hours 1 minute, as implied in the example table, then the counter reading would be 3544

This program is an improvement on my original VCR program, is more user friendly and adds features that make it compatible with most VHS VCRs. The program will produce a printout in one minute increments of the VCR counter reading for either 2, 4 or 6 hours, corresponding to Standard Play (SP), Long Play (LP), or Super Long Play (SLP) modes of recording. It is independent of the VCR model used as long as T120 industry standard tapes are used, and the VCR counter is connected to the take-up reel capstan. That includes all the VCRs I have seen, excluding the most expensive models that display the time the tape has played directly. If you are fortunate enough to have one of these, you will not need this program.

The reason that the counter doesn't read directly in hours and minutes is that, traditionally, tape recorders had a mechanical counter attached to the take-up reel and, when the reel was empty, it would turn fast. As the reel filled with tape, the take-up reel slowed down. The tape runs past the capstan at a constant speed. Logically, this is the place to measure the amount of tape (time) that has passed. With the mechanical counter, however, too much friction would occur to the capstan and even though most VCR counters are now electronic, contactless, and therefore, frictionless, the bad design has persisted.

A word about resolution and accuracy. The typical VCR counter uses 4 digits, and therefore has resolution to 4 digits. An accuracy of 5 counts or better on 1 hour of tape has been usual on the Panasonic 1340 model I've been using. Most of the error occurs in slight slippage in one direction or the other, especially as the tape stops with a jerk. The numbers published in the manual that come with the machine are accurate. I've used the machine a lot. When it was brand new, the count of 1520 for the

first hour of play was dead accurate. Now, the count is 1535 for 1 hour of play. Apparently the abrasive action of the tape has ground off the capstan, reducing its diameter to 1520/1535 of its previous value. The program encourages you to correct for any change in scale of this sort.

The program MENU asks if you are running the VCR at the 2,4 or 6 hour rate. Data from my VCR manual is then selected for the appropriate time. Then,

the program asks for your VCR counter reading at 1 hour. If you have the same model VCR that I do, you can just hit Enter and accept the defaults.

To customize the printout to your VCR, however, put a new, rewound T120 tape in your VCR, set the counter to 0, and touch one touch recording, or whatever, so that the VCR records for 1 hour and shuts off. Turn the VCR on again — what the counter reads is your program entry. I ran the program using 1520 as the 1 hour reading and the program printed a table of 361 counter readings, with 5700 at 6 hours. When the program was run again, with 1535 as the 1 hour reading, allowing for capstan wear, all the table entries were scaled by the factor 1535/1520, which gives a 6-hour reading of 5756.

**Sample of VCR tape count**

(H=Hour, M=Minutes)

| H | M  | Count | H | M  | Count | H | M  | Count | H | M  | Count |
|---|----|-------|---|----|-------|---|----|-------|---|----|-------|
| 0 | 0  | 0     | 0 | 1  | 32    | 0 | 2  | 63    | 0 | 3  | 94    |
| 0 | 10 | 303   | 0 | 11 | 332   | 0 | 12 | 361   | 0 | 13 | 389   |
| 0 | 20 | 582   | 0 | 21 | 609   | 0 | 22 | 635   | 0 | 23 | 662   |
| 0 | 30 | 840   | 0 | 31 | 865   | 0 | 32 | 890   | 0 | 33 | 914   |
| 0 | 40 | 1081  | 0 | 41 | 1104  | 0 | 42 | 1127  | 0 | 43 | 1150  |
| 0 | 50 | 1307  | 0 | 51 | 1329  | 0 | 52 | 1350  | 0 | 53 | 1372  |
| 0 | 4  | 125   | 0 | 5  | 155   | 0 | 6  | 185   | 0 | 7  | 215   |
| 0 | 14 | 410   | 0 | 15 | 445   | 0 | 16 | 473   | 0 | 17 | 501   |
| 0 | 24 | 688   | 0 | 25 | 714   | 0 | 26 | 739   | 0 | 27 | 765   |
| 0 | 34 | 938   | 0 | 35 | 963   | 0 | 36 | 987   | 0 | 37 | 1010  |
| 0 | 44 | 1173  | 0 | 45 | 1195  | 0 | 46 | 1218  | 0 | 47 | 1240  |
| 0 | 54 | 1393  | 0 | 55 | 1415  | 0 | 56 | 1436  | 0 | 57 | 1457  |

## VCR1

0 !Reprinted from 'THE COMPUTER BRIDGE' Newsletter of the St. Louis UG !079  
1 !SAVE DSK1.VCR1 !047

100 !H. Hoyt Prog 'VCR1' 1/1  
1/90 VCR tape counter locator utility !182  
110 CALL CLEAR :: DISPLAY AT

(4,8):"H. Hoyt Jr. 1/90": :  
:" VCR tape counter utility": : :TAB(15);"for": : :TAB  
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## VCR1—

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```

(6);"-- VHS T120 tape--": :
:" Tape runs 2,4 or 6 Hours
6" !145
120 ACCEPT AT(16,28)BEEP SIZE(-1)VALIDATE("246"):T :: ON
T/2 GOTO 130,140,150 !016
130 RESTORE 160 :: GOTO 190
!140
140 RESTORE 170 :: GOTO 190
!150
150 RESTORE 180 !017
160 DATA 0,0,60,3490,120,562
0 !199
170 DATA 0,0,60,2090,120,350
0,180,4640,240,5630 !130
180 DATA 0,0,60,1520,120,262
0,180,3530,240,4320,300,5040
,360,5700 !052
190 N=T+1 :: FOR I=1 TO N ::
READ XA(I),YA(I):: NEXT I :
: SCALE,SCALE1=YA(2)!235200
DISPLAY AT(22,1):"""" !210
210 DISPLAY AT(20,6):"Tape c
ounter reading":" at 1 h
our? ";SCALE :: ACCEPT AT(2
1,19)VALIDATE(NUMERIC)SIZE(-
4)BEEP:SCALE !233
220 IF SCALE<500 OR SCALE>(-
(T=6)*2600-(T=4)*3700-(T=2)*
6200)THEN 230 ELSE 240 !180
230 DISPLAY AT(22,3):"Out of
range counter input":" Try
again" :: CALL D :: GOTO 20
0 !039
240 FOR I=1 TO N :: YA(I)=YA

```

```

(1)*SCALE/SCALE1 :: NEXT I !
085
250 !Data from your VCR manu
al for time and correspondin
g tape count. Sets up the in
terpolating routine to 'find
' (calculate) points !169
260 !between those given in
the VCR manual. Revised pro
gram works with any VCR usin
g T120 industry standard tap
e !017
270 OPEN #1:"PIO",VARIABLE 1
36 :: FOR I=1 TO 8 :: PRINT
#1:CHR$(VAL(SEG$("2748271527
920113",2*I-1,2)));:: NEXT I
!Printer Setup !071
280 PRINT #1:RPT$("H M Cou
nt ",10):!Print Header !084
290 FOR H=0 TO T :: PRINT #1
: : : COL=1 :: FOR MM=0 TO
59 :: X=60*H+MM :: GOSUB 100
0 :: IF X>T*60 THEN 330 !131
300 H$=STR$(H):: M$=SEG$(" "
&STR$(MM),LEN(STR$(MM)),2)::
Y$=SEG$(" "&STR$(INT(Y+.5
)),LEN(STR$(INT(Y+.5))),4)!2
14
310 PRINT #1:TAB(COL);H$;"
";M$;" ";Y$;" ";:: COL=COL
+13 :: IF COL<119 THEN 330 !
168
320 COL=1 :: PRINT #1:"" !03
9
330 NEXT MM :: NEXT H :: CLO
SE #1 :: STOP !195

```

```

990 END !139
1000 !Subroutine POLINT(XA,Y
A,N,X,Y,DY) Num Receiptes: Th
e art Of Scientific Computin
g 001.6420151 1986 Cambridge
Press Copy H. Hoyt 6/22/87
!148
1010 !DIMENSION XA(N),YA(N),
C(NMAX),D(NMAX) !207
1020 NMAX=10 :: NS=1 :: DIF=
ABS(X-XA(1))!093
1030 FOR I=1 TO N :: DIFT=AB
S(X-XA(I)):: IF DIFT>=DIF TH
EN 1040 :: NS=I :: DIF=DIFT
!003
1040 C(I)=YA(I):: D(I)=YA(I)
:: NEXT I !242
1050 Y=YA(NS):: NS=NS-1 !253
1060 FOR M=1 TO N-1 :: FOR I
=1 TO N-M :: HO=XA(I)-X :: H
P=XA(I+M)-X :: W=C(I+1)-D(I)
!255
1070 DEN=HO-HP :: IF DEN=0 T
HEN 240 :: DEN=W/DEN :: D(I)
=HP*DEN :: C(I)=HO*DEN !098
1080 NEXT I :: IF 2*NS>=N-M
THEN 1090 :: DY=C(NS+1):: GO
TO 1100 !232
1090 DY=D(NS):: NS=NS-1 !235
1100 Y=Y+DY :: NEXT M :: RET
URN :: END !074
1500 SUB D :: CALL SOUND(1E3
,110,30):: CALL SOUND(1E3,11
0,30):: SUBEND !100

```

## FORTH

# More on high-resolution graphics

By LUTZ WINKLER

In the February 1990 installment, the introductory note by our editor contained a minor error: It referred to the fact that you must have a device with a "TI" 9938 chip if you want to use this information. Correct that to read "Yamaha" 9938 chip since TI does not manufacture this video processor.

Having dealt with the 80-column text mode (T2), the high-resolution graphics modes (G6 and G7) as well as the lowliest one (G1), let's backtrack and start once more at the beginning — that is to say with the 40-column text mode, or TEXT as it is called in TI-Forth.

I don't really expect anyone with an 80-column device would ever use it, but I like to have things sort of neat and since the other 9938 modes discussed so far are all designated with two-letter words, I feel the rest of them should follow suit. TEXT, as defined on the system disk, works as is and you could simply change TEXT (on screen 51) to T1 and let it go at that, or you can enter the definition shown on screen 107. It will be obvious that T1, unlike TEXT, no longer needs to refer to SETVDPI and SETVDP2 (screen 56).

In February we converted TI's GRAPHICS mode to G1 and  
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## FORTH—

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now let us add another one that is only available if your system is based on a 9938 chip: The graphics 2 mode shown on screens 113-114. Don't get this mode confused with TI Forth's GRAPHICS2 which in terms of the 9938 is graphics 4 mode. G2, as we shall call it, is essentially the same as G1 — 32 characters (8x8 pixels each) and 24 lines but each third of the screen (divided horizontally) can have its own screen colors (foreground and background) and character set.

For example, lines 1 through 8 could be white on blue and display a standard character set while the next third (lines 9 through 16) could show yellow italic characters on a red background, etc. Obviously, you would have to beg, borrow, steal or define other character sets and modify 13 BLOCK F0 + nn 30F VMBW according to where these sets are to be loaded from and for which third of the screen they are to be used. Lines 4-6 of screen 114 show the same character set being booted three times from screen 19 (>13) into the appropriate areas of the PDT (Pattern Descriptor Table).

Screens 116 and 117 illustrate how G4 can be implemented. This is the only true bit-mapped graphics mode of the 99/4A but only one of four available with the 9938. It is the equivalent of GRAPHICS2 of TI-Forth and the last one for which the graphics primitives provided by TI-Forth will work. Once again, since the 9938 allows the use of more sophisticated graphics modes, I doubt that anyone would use G1, G2 or G4; nevertheless — if you make these changes — you will have a more logical system where you can switch modes with simple two-letter words.

Oh yes, I did leave out G3. The 9938 has two sprite modes (more about that at a later date) and G2/G3 differ in their use of these modes. G1 and G2 use sprite mode 1, from G3 to G7 sprite mode 2 is used. I might as well mention that the 9938 also has a MULTICOLOR mode (64x48 blocks of 4x4 pixels) and I have yet to find a use for it. Therefore, I have no intention of implementing it unless someone requests it be done.

Speaking of requests: I have received requests for and mailed out quite a few disk copies of AVPC Forth yet I have not received any feedback. It is hardly likely that there isn't a bug (or two) in this material or that some of the information needs clarification. I urge those who have experienced any problems to get in touch with me. From experience I know how frustrating it is when one receives material which does not live up to one's expectations. If this is the case, vent your frustration and phone, write or contact me via the Southern California Computer Group BBS.

Lutz Winkler can be reached at 1540 Corsica St., San Diego, CA 92111; telephone 619-277-4437; BBS 619-278-8155, 300-2400 baud, 8N1, 24 hours. Leave message to Sysop #1.

```
SCR #107
0 ( AVPC TEXT 1 MODE rev 13AUG88 LW )
1 BASE->R HEX 0 CLOAD T1
2 : T1 0 E VWTR 0 0 VWTR 70 1 VWTR 70 83D4 C! A 8 VWTR
3 0 9 VWTR 0 2 VWTR 1 4 VWTR E4 7 VWTR 3E0 836E !
4 460 PABS ! 3E0 3A0 0 VFILL 1000 DISK_BUF !
5 1 PABS @ VSBW 16 PABS @ 1+ VSBW 3 834C C!
6 PABS @ 8356 ! OA OE SYSTEM
7 0 3C0 20 VFILL
8 0 SCRN_START ! 28 SCRN_WIDTH ! 3C0 SCRN_END !
9 13 BLOCK F0 + 8F0 30F VMBW
10 0 837A C!
```

```
11 1 VDPME !
12 0 0 GOTOXY ;
13 R->BASE
14 \ Note: T1 follows the same pattern as T2 except comments have
15 \ been omitted to fit it on one screen like T1's TEXT (scr 51)
```

```
SCR #113
0 ( AVPC GRAPHICS 2 MODE - 1/2 29AUG88 LW )
1 BASE->R HEX 0 CLOAD G2
2 : G2 0 E VWTR \ VRAM access base register
3 2 0 VWTR \ select graphics 2 mode
4 60 1 VWTR 60 83D4 C! \ enable screen display
5 8 8 VWTR \ select 64K VRAM
6 0 9 VWTR \ no interlace
7 3 4 VWTR \ Pattern Generator Table @ >000
8 FF 3 VWTR 0 A VWTR \ Color Table @ >200
9 E 2 VWTR \ Pattern Name Table @ >3800
10 F4 7 VWTR \ screen (border) color
11 38 5 VWTR 0 B VWTR 3 6 VWTR \ Sprite Tables
12 0 1800 00 VFILL \ initialize PGT
13 2000 1800 E4 VFILL \ initialize Color Table
14 3800 300 20 VFILL \ initialize PNT
15 3800 SCRN_START ! 20 SCRN_WIDTH ! 3B00 SCRN_END ! -->
```

```
SCR #114
0 ( AVPC GRAPHICS 2 MODE - 2/2 )
1 1800 480 00 VFILL \ initialize Sprite Tables
2 \ NOTE : This mode has not been prepared
3 \ for disk (file) I/O !
4 13 BLOCK F0 + F0 30F VMBW \ charset
5 13 BLOCK F0 + 8F0 30F VMBW \ to
6 13 BLOCK F0 + 10F0 30F VMBW \ PGT
7 \ next line sets cursor color to white
8 20F0 8 F0 VFILL 28F0 8 F0 VFILL 30F0 8 F0 VFILL
9 C VDPME ! \ VDP mode 12
10 0 0 GOTOXY ;
11
12 R->BASE
13
14
15
```

```
SCR #116
0 ( AVPC GRAPHICS 4 MODE - 1/2 23AUG88 LW )
1 BASE->R DECIMAL 124 CLOAD STAT?
2 HEX 0 CLOAD G4
3 : G4 0 E VWTR \ VRAM Access Base register
4 6 0 VWTR \ { Graphics
5 60 1 VWTR 60 83D4 C! \ { mode 4
6 A 8 VWTR \ { register 8=sprite enable
7 80 9 VWTR \ { settings
8 3F 2 VWTR \ display page 1
9 0 7 VWTR \ screen (border) color
10 F7 5 VWTR 1 B VWTR \ Sprite Attribute Table @ >7A00
11 1E 6 VWTR \ Sprite Generator Table @ >7F00
12 0 D VWTR \ turn off blink register
13 --> 0 17 VWTR \ Display offset register
14
15
```

```
SCR #117
0 ( AVPC GRAPHICS 4 MODE - 2/2 )
1
2 \ restore VDP stuff
3 460 PABS !
4 1000 DISK_BUF !
5 3E0 836E ! \ VSPTR
6 1 PABS @ VSBW 16 PABS @ 1+ VSBW 3 ( #FILE) 834C C!
7 PABS @ 8356 !
8 OA OE SYSTEM
9 0 E VWTR
10 E VDPME ! \ VDP mode 14
11 ;
12
13 R->BASE
14
15
```

## Full Moon BBS on line

The Full Moon BBS runs 24 hours a day in Memphis, Tennessee, at 300, 1200, 2400, 9600 and 14400 bauds. The board, operating on a PC, is run by the assistant librarian of the Mid-South TI99/4A User Group, according to Gary Cox, the club president, and carries the TI-ECHO, described as an echo of messages transmitted across the country.

Phone number for the board is (901) 386-1760.

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## EXPANDING YOUR SYSTEM

## A Q&amp;A on RAMdisks

By JOHN KOLOEN

RAMdisks have been available for the TI since Foundation Computer released the first in 1983. A lot of improvements have been made in RAMdisks since then, and manufacturers continue to tweak the software and hardware in a continuing spiral of upgrades.

Which makes it very difficult indeed to make comparisons. So, I'm not going to try to compare RAMdisks. I know that if I did, I would leave something important out. Rather, I'm going to answer some common questions about RAMdisks and list addresses of manufacturers where readers can obtain the latest information.

**First, what is a RAMdisk?**

A RAMdisk is a device that functions similarly to a floppy disk — it stores data and programs. It is generally a card that plugs in a TI Peripheral Expansion Box, though there are some that are side-car RAMdisks that plug into the side-port of the TI. Unlike a floppy disk, which stores data on a magnetically sensitized disk, a RAMdisk uses memory chips to store data. The advantage of using chips is that data can be retrieved and written many times faster than from a floppy disk. After all, the floppy drive is mechanical; it has to start and stop and search for data as the disk spins. The RAMdisk has no moving parts and can access data almost immediately.

However, the RAMdisk memory is active only as long as it is connected to a power supply. Turn the power off, and the contents of the memory chips are lost. As you know, data written to a floppy remains there until you erase it.

**Does a RAMdisk increase the amount of memory for programs?**

No. A RAMdisk has nothing to do with memory expansions. A memory expansion is a separate issue. In fact, in most cases, you must have a memory expansion in order to use a RAMdisk.

**How do most people use RAMdisks?**

Those who write programs find them useful because they can save and load programs very quickly compared to floppy

disks. This allows them to make minor changes to programs, save them to the RAMdisk, run them, make more changes, save them, and run them again without wasting much time. Many users create elaborate menuing systems that allow them to access their most frequently used programs from a RAMdisk rather than a floppy. Often, they will set up a program that will copy their most frequently loaded programs from a floppy or hard disk to the RAMdisk when they boot up their system so that after that everything they regularly use is loaded from the RAMdisk. If their RAMdisk is battery backed, the programs remain in memory even when the power is turned off.

**Isn't it a big disadvantage if the memory goes blank when you turn the memory off?**

It is if you want to use the RAMdisk to permanently store data and files. If you want the memory to be non-volatile, you'll need to have the memory backed up with batteries. Fortunately, many RAMdisks come with battery backup systems at extra cost that keep the circuits "alive" even after you power-down your system.

**How much memory comes with a RAMdisk?**

That varies widely. The earliest RAMdisks had no more than 128K of memory while now you can load some of them with more than a megabyte of memory. You can have multiple RAMdisks in your PEB and have several megabytes online if you can afford it. But that would be expensive. The primary variable in determining the cost of a RAMdisk is the amount of memory it contains. The more memory, the more expensive it will be.

**How expensive are RAMdisks?**

In addition to the cost of the memory chips, you have to factor in the cost of the RAMdisk card and additional features you may require, ie battery backup, etc.. For example, a Horizon RAMdisk kit starts at \$100 without memory. You can then purchase the memory chips from Horizon or some other supplier. Expect

to pay \$350-\$400 for a RAMdisk with 512K of memory. And more, of course, for more memory.

If you are looking at a RAMdisk kit, be aware that you must assemble the RAMdisk yourself. Unless you are experienced with electronics, I do not recommend purchasing a kit. One slip of the soldering iron and you can turn your investment into a pile of trash. If you have a steady hand and an eye for detail work, then by all means give the kit a try. If you buy a kit, make sure the manufacturer provides you with a phone number to call in case you need help. The call will be at your expense, but real-time advice can be priceless.

**Do the RAMdisks require software?**

In most cases, yes. A RAMdisk has to be configured for use each time it is powered-up. (If it is battery backed, this is done only the first time it is used or any time you wanted to change the configuration.) In configuring a RAMdisk, you have the option of setting up volume names so that the computer thinks you have more than one RAMdisk, as well as allotting memory to various volumes. Or you can configure it so that all the memory is regarded to be a contiguous whole. How you configure it depends on how you are going to use it.

In addition to configuring the RAMdisk, some RAMdisk software does a lot more. The RAMdisk Operating System (ROS) used by the Horizon RAMdisk is a case in point. This program has seen numerous improvements over the years and provides the basis for a complete menuing system with a Horizon RAMdisk. Other RAMdisks have similar software, so a buying decision shouldn't be made on the basis of software.

**How reliable are RAMdisks?**

As long as it has continuous power while you are using it, you shouldn't have a problem with a RAMdisk. As with any device, however, chips or a component can go bad. But this is rare with products that have been on the market for a year or so. Electrical surges can zap even a bat-

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## EXPANDING YOUR SYSTEM—

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tery backed RAMdisk, so you may not want to run it during a thunderstorm. Also, some RAMdisks don't come with clamshell cases. There is no problem plugging these exposed boards into a PEB slot, but they need to be handled more carefully than a board that is protected by a clamshell. Also, battery backed

RAMdisks that use several batteries may have stress points where the battery holders are located. If the battery holders look flimsy or are not fully attached to the board, it's a good idea to reinforce the holders if you can. I had one RAMdisk in which the battery holder came loose when I tried to replace the batteries. I ended up severing the tiny wires that carry the juice from the batteries to the RAMdisk while prying the batteries out of the holder. If I'd been aware of how little stress the board could handle, I would have been much more careful in removing the batteries.

### What's required to use a RAMdisk?

A Peripheral Expansion Box, floppy drive and probably a memory expansion are required (side-car RAMdisks aren't readily available in the U.S.). Beyond that, if you have a GROM device, such as a Gram Kracker, you can place your cartridge programs into a RAMdisk and load them into memory very quickly.

### How difficult is it to use a RAMdisk?

Once a RAMdisk is configured, it is accessed in the same way as you access a floppy drive. So it's as easy to use as a disk drive. Configuration is done through DIP switches or software, sometimes both. The simplest configuration is no configuration: The RAMdisk is simply there as a contiguous block of memory. Older RAMdisks, such as the original Foundation Computing RAMdisk, didn't behave exactly like a disk drive and so had limited usefulness and virtually no expandability.

### What about expandability?

### RAMdisk manufacturers

**CorComp 512K card**, CorComp Inc., 2211-G Winston Rd., Anaheim, CA 92806 (714-956-4450).

**Foundation Computing 128K card**, OUT OF BUSINESS.

**Grand RAM**, DataBioTics, P.O. Box 1194, Palos Verdes Estates, CA 900274 (213-867-0481; 213-925-2120).

**Horizon RAMdisk**, Bud Mills Services, 166 Dartmouth Dr., Toledo, OH 43614 (419-385-5946).

**Myarc 512K Card**, Myarc Inc., P.O. Box 140, Basking Ridge, NJ 07920 (205-854-5843).

**Quest**, Hunter Valley Users Group, 9 Thirlmere Pde., Tarro, New South Wales, 2322, Australia.

This varies from manufacturer to manufacturer. Some RAMdisks start with a relatively small amount of memory to keep the cost down. The user may purchase additional memory chips at a later date and increase the available memory. But this is not always as easy as it seems. In order to get beyond, say, 512K of memory, you may need to go to a larger chip size, which could mean that not all of your existing chips may be compatible with the newer ones. This is something you should check out before buying a RAMdisk.

Other options, such as battery backup, may be available as an upgrade, or may not. You need to check on this before buying.

### What about compatibility?

Compatibility problems may occur depending upon the CRU address (Com-

munications Register Unit) used by the RAMdisk and any other cards installed that use that address. Only one device can address a particular CRU address at one time. Some devices require a certain CRU address while others can be changed through DIP switches. In terms of a RAMdisk, it is preferred that the CRU address be switchable so as to avoid conflicts with other cards which may not be switchable.

### How about documentation?

By and large, the documentation that comes with RAMdisks is not up to the level of the docs that come with software. I attribute this to the fact that RAMdisks are made by hardware people. And my experience is that hardware people like to leave the documentation to software people. Enough said.

### Any other advice?

Yes, if possible, talk to users who already have RAMdisks and ask them what they think of them. And by all means, call the manufacturer for the latest information about their products.

**Next month:** Extended keyboards for the TI and other miscellaneous items.

## Donaldson Software ceases operations

Donaldson Software of Buckingham, Quebec, Canada, has ceased operations, according to Floyd Donaldson of the company. Donaldson Software produced mainly cassette-based software for the TI99/4A.

## Seattle fair planned for Sept. 22

The fifth annual Seattle TI Convention has been set for Sept. 22, according to Cynthia Becker, one of the organizers for the event. For further information, call the Queen Anne Computer Shoppe TIBBS, (206) 546-1865.

## LGMA relocates

LGMA Products has relocated to 5618 AppleButter Hill Rd., Coopersburg, PA 18036, according to Al Beard of the company.

LGMA (Little Green Men Associates) products include 99 FORTRAN and 9640 FORTRAN.

## Software Shootout

# Business Graphing and Charting Programs

By **BILL GASKILL**

We've all heard that a picture is worth 1,000 words and that expression holds no more truth anywhere than it does in the area of presentation graphics. In the business world we have discovered the need to effectively communicate the relationship between numbers, whether they are sales figures versus profit margins or the current rate of crime versus the number of arrests made by a police department. The ability to produce presentation graphics is fast becoming a necessary part of doing business.

In the 99/4A community there are several business graphics programs to choose from, none of which can compete with the applications out there in the business world, but all of which have a place in someone's library of software tools. Most if not all of these applications that are written for the 99/4A are certainly adequate for home use and even small business applications where a great deal of sophistication may not be required. Unfortunately, presentation graphics require a great deal of memory to produce, which is something that the 99/4A just doesn't have. But that does not mean that the programs cannot be put to good use.

### GENERAL INFORMATION

There are four main business graphics programs that have been produced for the TI that I am aware of and that I have used: Business Graphs 99 from McCann Software, Chart Maker II from Quality 99 Software, Extended Business Graphs II from Great Lakes Software and Von Graph from Utilitee Software. Business Graphs 99 is written in Forth, Chart Maker II in Extended BASIC and assembly, Extended Business Graphs II in XB and assembly and Von Graph totally in assembly language. All but Business Graphs 99 employ the TI-99's 32-column graphics mode to generate screen displays. BG99 uses a 64-column Forth screen.

Business Graphs 99 comes with a 27-page manual that is the best of the lot. Chart Maker II and Von Graph come with

## Review

### REPORT CARD

|                      | BG99 | CMII | EBG2 | VG99 |
|----------------------|------|------|------|------|
| <b>Performance</b>   | A    | B +  | A    | B    |
| <b>Ease of Use</b>   | C    | A -  | A    | A +  |
| <b>Documentation</b> | A    | D    | B    | C    |
| <b>Value</b>         | A +  | A    | B    | C    |
| <b>Final Grade</b>   | A -  | B +  | B +  | B -  |

**Business Graphs 99** (\$15.95): McCann Software, Box 34160, Omaha, NE 68134

**Chart Maker II** (\$9.95): Quality 99 Software, 1884 Columbia Rd #1021, Washington, D.C. 20009

**Extended Business Graphs II** (\$14.95): Great Lakes Software, 804 E. Grand River Ave., Howell, MI 48843

**Von Graph 99** (\$10): L.L. Connor Enterprise, 1521 Ferry St., Lafayette, IN 47904

one 8 1/2 X 11 sheet of paper and Extended Business Graphs II comes with seven 8 1/2 X 11 sheets of paper. From a content point of view, only Chart Maker II really suffers from a lack of information. Von Graph is so simple to use that the one page it does have is pretty much unnecessary. Chart Maker II could use some more information to help out the first time user.

### TERMINOLOGY

Variables, as used in this article, pertain to the names of the months. Values describe the numeric amount that is attached to each variable (each month), meaning the dollar amounts. X/Y describe coordinates on a graph. X is always the horizontal coordinate and Y the vertical.

### DATA IMPORT/EXPORT FEATURES

None of the the four programs provides built-in import/export routines to read data from Multiplan, TI-Writer or any other program, or to send completed graphs to another program. In the business world it is the norm for presentation graphics programs to possess both of these capabilities. However, only Business Graphs 99 even considers them. It tells you how Multiplan files can be converted for use in a BG99 graph (with some limitations) and it provides some help on how a BG99 graph can be converted for

inclusion into a TI-Writer file. Since no import/export facilities exist, all four programs require that data be hand-keyed.

### LOADING/SAVING FEATURES

One of the most convenient features a presentation graphics program can offer is the ability to save the data used to produce a graph and also to save the actual screen that was displayed by the graph generation process. Von Graph does not provide any load/save facility, nor does it save graphs from the screen. You must key in the data each time. Business Graphs 99 allows variables and values to be saved, but not Titles or Sub-Titles. It too does not save actual screens. They must be re-generated from saved data. Chartmaker II allows everything to be saved and you can even edit a graph in Draw 'n Plot that was produced by Chart Maker II. Extended Business Graphs II allows everything to be saved also, but saved screens cannot be edited. Instead, you must generate a new one.

### PRINTING CAPABILITIES

Another fairly common feature of presentation graphics applications is the ability to "size" the graph for output purposes. In our comparison, Chart Maker II and Extended Business Graphs II both allow

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# SOFTWARE SHOOTOUT—

(Continued from Page 37)

large or small printed output. Von Graph supports only one type, which is large. Business Graphs 99 provides an X/Y relationship option that allows the width of a graph to be altered (done mostly to allow pie charts to be printed as circular as possible), and a "density" option that allows spacing between variables to be controlled. But the output of a Business Graphs 99 graph is always done on the same plane, regardless of spacing. By that, I mean that it will not fill an entire page with a graph or chart by printing it in double size, sideways.

## TYPES OF CHARTS/GRAPHS

Von Graph provides a one-dimensional vertical bar chart with from 2 to 12 variables allowed and a one-dimensional pie chart that also allows 2-12 variables. Business Graphs 99 provides one-dimensional vertical bar charts that can be single, double or stacked, with up to 20 variables. It also offers a one-dimensional X/Y graph that can show hi-low plot, line plot or area plot, with as many as 100 variables. The pie chart is one-dimensional also, allowing up to six variables, but with exploded view capabilities, something none of the others offer. Extended Business Graphs provides one-dimensional vertical bar charts with from 2 to 12 variables and unique pie charts that include a 3-D block graph in the same printout as the pie chart. From 2 to 12 variables are allowed. Chart Maker II provides a 12-month histogram, which forces you to use the months of the year as the variables whether you want to or not, and a 10-item graph that could be used to compare five months of data from two different years, or 10 items using any variables. Either option supports 3-D horizontal and vertical graphs and one-dimensional pie charts.

## SCALING/DATA ACCURACY

Scaling is the process of making equal relationships between values based upon the low and high values that exist in the data being charted. For example, in the graphs that I have included for illustration, the low value is \$40 for utilities in July and August and the high is \$250 in February. The process of Scaling sets the other nine values at equal increments somewhere in between 40 and 250. The result of that process determines the accuracy of the values that are ultimately printed on the chart or graph. In most business world presentation graphics programs you have a choice of manual or automatic scaling.

Von Graph provides only limited scaling of values, but it does determine the size of the bars in its bar chart based upon a maximum value that you key in after all of the values have been entered for each variable name. Although the manual entry of an upper limit might seem unnecessary, it does allow you some control over the height of the bars. In the 1988 Utilities illustrations, using the \$250 max would put the bar for the month of February right at the top of the chart. To lower it and make the appearance of the chart more appealing, you could simply enter \$300 as the max value and Von Graph would bring the highest bar back into the chart's grid. Once the max value has been entered Von Graph then produces a chart or graph that contains actual values as you keyed them in. Extended Business Graphs II uses the data you key in to determine chart or graph element sizes and relationships, but does not provide actual values in any of the output. Although the charts and graphs are quite attractive, you never know what the actual values are. You get only an average and a total. Business Graphs 99 does the same type of thing. Your data is used to determine the relationships

between values, but the actual values for each variable don't show up in the end product. Chart Maker II seems to be the best in this area, providing

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### BUSINESS GRAPHS 99

#### 1988 Utilities

**Analysis**

### CHARTMAKER II

**Gas / Electric**

### EXTENDED BUSINESS GRAPHICS

### VON GRAPH 99

1988 UTILITIES ANALYSIS

## SOFTWARE SHOOTOUT—

(Continued from Page 38)

actuals in most graphs. The pie chart though shows only percentage of total for each value and the total itself.

### TITLE, VARIABLE and VALUE LENGTHS

Von Graph allows a graph title of up to 24 characters on the bar graph, but no title on the pie chart. Variable names are limited to four characters in length. Values can only be three digits long, with no decimals allowed. Business Graphs 99 allows 18 character titles and an 18-character subtitle, 9 character variables and 6-digit values, with no decimals allowed. Extended Business Graphs II allows a 28 character title, 11-character variable names and 8-digit values, but no decimals. Chart Maker II allows 28-character titles, 8-character variable names and 4-digit values including a decimal point.

### ERROR HANDLING

All programs trapped user created errors properly except Chart Maker II. Trying to print a graph without providing a printer or device name caused the

screen to go berserk and the program to lock up. Aside from that, I/O operational errors were trapped quite well.

### CONCLUSION

As with almost any piece of software, each program examined has its good points and bad points. Von Graph 99 is perhaps the easiest of the lot to use, but it also has the fewest features. Business Graphs 99 produces the best output and also has the most flexibility, but it is by far the most complex and even perplexing program of the bunch. The Extended Business Graphs II program is fairly easy to use and quite comprehensive in the options it provides, but it won't provide actual values in printed output. Chart Maker II is easy to use, feature rich, including the ability to sort data in ascending or descending order, but it limits the scope of its utility by forcing variable names to always be based upon months of the year on one-hand, or allowing only 10 variables at one time on the other.

The bottom line may be that you will have to determine which program best fits

your particular needs. If you only need visual trend analysis capability then Extended Business Graphs II may be your choice. If you need the most professional output available for a 99/4A application then Business Graphs 99 would likely be your pick. If simplicity and ease of use are your major concerns then Von Graph 99 is probably at the top of your list. If you are looking for a happy medium between the best and the worst of what all the others have or don't have, then Chart Maker II is probably going to be your choice.

**Note:** In the Report Card grading, I follow InfoWorld's standard of deducting 1 point or half of a grade for copy protection. Thus both Chart Maker II and Von Graph have lower final grades than they otherwise would have earned on their other merits. Note also, that the Final Grade is *not* an average of the other categories. Please consult the January 1988 MICROpendium, page 6, for review criteria.

## Asgard releases games, Spell It!

Asgard Software has released two new adventures for the Adventure module — **Castle Darkholm** by Randy Cook and **Rattlesnake Bend** by Mickey Schmitt, as well as the **Spell It!** spelling checker by Jim Reiss.

Both adventures are available on disk or cassette, and carry a suggested retail price of \$8.95.

**Castle Darkholm** is a two-part adventure set in a gothic castle and described as combining elements of Mary Shelley novels and sword and sorcery epics. The manufacturer rates the game as moderate in difficulty, roughly on par with Scott Adam's "The Count."

**Rattlesnake Bend** is described as "a romp through the Old West for the serious adventure player." The manufacturer rates it as very difficult, on a par with "Savage Island."

**Spell It!** is described as compatible with any word processor that can store documents in the TI standard text format (D/V80 files), including TI-Writer, RAG-Writer, BA-Writer, QS-Writer, Funnelweb, My-Word and WordWriter.

The program can be run from most word processors, from the Editor/Assembler and TI Extended BASIC modules and on the Geneve through Barry Boone's EXEC utility.

According to the manufacturer, **Spell It!** makes corrections directly to the text file so that the user does not have to return

to the editor, lets the user to view the word in context, allow additions to a user dictionary limited only by available disk space, has no limit on text file size, lets the user scan through the dictionary and supports foreign language character sets.

The manufacturer says the SmartCheck algorithm in **Spell It!** makes it equivalent to a dictionary several times its size, as disk space can be saved because the algorithm knows common English suffixes.

The program requires 32K and at least one SS/SD disk drive and TI-Writer or a compatible. At least one DS/DD drive is recommended. The program is provided unprotected and RAM-disk compatible, and is configurable for 80 columns on the TI99/4A and the Geneve.

The three-disk SS/SD version of 25,000 words sells for \$24.95; the one-disk version of 25,000 words sells for \$19.95; and the 11-disk HFDC version of more than 250,000 words sells for \$34.95. Shipping and handling is \$2.50, U.S.; \$4, Canada; air mail other countries, \$6.

The manufacturer says an "inexpensive upgrade" is available from the floppy disk to the hard-disk versions to users who later purchase a hard disk drive.

For information or to order, contact Asgard Software, P.O. Box 10306, Rockville, MD 20849, or (703) 255-3085.

## MICRO-REVIEWS

# Hardware, games praised; material needed for column

By HARRY BRASHEAR

Before we get into it this month, I have to make a request. I *need* software to review, fairware and commercial. There are other companies in the world besides Asgard and Texaments. These two companies regularly send me their new programs to review, but I *know* there are others. Don't be chicken! I haven't had a one star program — yet.

There are also many foreign programs we don't get to see until they trickle down to me; hardware too. I used to be able to get materials from the networks when I ran short but lately... well, it seems that the Geneve people are scaring off the 4A people, so there hasn't been much there.

I have an 80-column Mechatronics card and we need programs for these marvelous devices, most of which should come out of the European community. There also has to be a lot of material in Australia that I haven't seen.

I get letters of thanks all the time from people that have had good success from my reviews. Not because I'm a great reviewer, but simply because they have gotten some exposure from this column.

Come on, buy a stamp and get those programs to me. You might be surprised how many other people are looking for what you have done.

Send to: Harry T. Brashear, 2753 Main St., Newfane NY, 14108.

★★★★

### P-GRAM CARD

This is an update to a tried and proven peripheral that a lot of people have found they can't do without.

If you remember, a while back (Dec. 88) I did a major review on the P-Gram card from Horizon. I was quite impressed with it at the time, but was slightly disappointed that my Super X BASIC didn't allow for any more room in the 72K version.

That's all changed now, with the new 192K version. I don't intend to review the P-Gram again, (you can go over that in the back issue) but I do want to give a quick description for those of you unfamiliar with it.

The purpose of the P-Gram is to

eliminate the use of cartridges, our weakest link in the TI console. If you keep shoving cartridges in and out of that slot, sooner or later you get problems. It puts a lot of stress on the "L" connector and it works loose after awhile. There is also the problem of dirt etc. causing bad contacts.

The P-Gram has the ability to grab the cartridge program and store it on a floppy, and also to store the contents in its own memory. Once this easy task is accomplished, you can darn near throw the cartridge out. (Unless you like to save parts.) All menus (TI, CorComp, John Johnson's BOOT menu, etc.) see the P-Gram as a cartridge. The simulated cartridges load as quickly as the real one.

You also have the ability to edit the memory of said cartridges with the built-in editor of the card. In other words, if you have one of those old cartridges that call for RS232 I/O, you can change it to PIO with no problem and save it forever that way.

The 192K version allows four pages of cartridges to be in the card at one time. It would not be uncommon, therefore, to have six to 12 modules in place at all times. With JJ's BOOT, you can page through and grab any one you need in seconds.

Another nice thing about the P-Gram is that you can also emulate a SuperCart with it. A number of programs — MacFlix, Telco and RAG Writer, to name a few — use the SuperCart to good advantage.

The 192K P-Gram is \$250, that's \$100 more than the 72K version, but you get four times the value so it's well worth it. The clock is optional at \$20.

Write to Bud Mills Services, 166 Dartmouth Dr., Toledo OH 43614, or call Bud at (419) 385-5946.

★★★★

### 80-COLUMN CARD

Some time back, the last of the Mechatronics cards were sold out, so far as this country was concerned. The manufacturer went out of business, but the remaining stocks of parts etc. were picked

up by another individual in Germany. He has gone to work on the leftovers and put the unit back into production, with improvements. The most important of these is that it will now also operate on a composite monitor (which many of you own) as well as RGB. When I bought mine, I also had to spend \$250 for a new monitor.

This is probably the most important new accessory I have for my TI. Programs like FunnelWriter, Telco, Multiplan, Spell-It, John Johnson's BOOT, Sector One and many others, are soooooo nice in 80 columns. Most new significant software will be set up for 80 as well as 40 columns. Authors know that these things are starting to spread and they *must* accommodate them. There are no restrictions on what runs. If it isn't set up for 80, it just runs normally, except that your resolution is 500 percent better.

Probably the most impressive new program I have seen for this card is Barry Boone's GIF loader. I love to see the faces on IBMers when I run up EGA resolution in 256 colors on my 32K TI. It leaves them with their tongues hanging out and scratching their heads.

Installation of the Mechatronics is totally idiot-proof. Anyone who has ever had his console apart can do it. No need to solder anything! Two plugs on an included flat cable do the trick, along with a couple of dip switches to set, based on your requirements.

These units used to cost \$250+, but now, through Asgard Peripherals, you can get one for just \$200. Don't send money though. Drop them a card to commit yourself to it and they will call you when the units arrive. They have to order 20 at a time, so they have to have that many orders.

Believe me, folks, this is the most important investment you can make in the TI. You won't regret it, I promise.

Send a card to: Asgard Peripherals, P.O. Box 10697, Rockville, MD 20849.

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## MICRO-REVIEWS—

(Continued from Page 40)

★★★  
AIRTAXI

I think I created a monster, a programmable one, named Don Shorock. Ever since I reviewed his Japanese Language program here, he's become the most prolific education programmer in the community. He also takes a hint well. I accused him of "plain Jane" programs and his latest is anything but.

Airtaxi is a program designed to help with U.S. city geography. The following is right from the docs, giving you a good idea of what it's all about:

The scenario: You (and the other players) work for an airtaxi service. The owner spends little on navigation equipment so you are flying almost blind. When you leave your hometown, your friends and relatives always want free rides, so you make nothing any time you leave there.

When you agree to a trip, the price is set. Your costs (gas) depend on your ability to find your destination. You make a profit by choosing good customers and by going straight to your destination.

The basic rules:

1. Your fuel starts full.
2. You start with \$100.
3. Passengers from your hometown always fly free.
4. Refusing a passenger costs you \$2 each time.

5. You refill your fuel tank each time you land.
6. You are paid the agreed amount only when you get to your destination.
7. You MAY get a tip.
8. When fuel is gone, you glide to a landing.
9. If airport is near, you refuel and go on next time.
10. If too far, you damage the plane and go back home.

Back to me (HB) again. A complete map of the US is on screen and the plane is a dot that moves based on direction keys. None of the cities you are going to are marked, (except in the demo stage) so you have to know where they are. There are two skill levels, one for the number of cities, (major to minor, up to 90 of them), and also for distance from the mark. (At a high level, you have to be right over the city.)

The object of course, is to make money with your service, and up to eight people can play. It is educational, but it's also a darn nice game for any age.

The program is available on cassette for \$20 and disk for \$15.

I'd suggest you write and ask for an order blank because a lot of custom features are available for the program.

Write Don Shorock, P.O. Box 501, Great Bend KS 67530.

★★★  
ROCK RUNNER

Good assembly language games have been in short supply lately. I am told the reason is that TIers don't like to PAY for games. Hogwash! Here's a good chance to prove the pessimists wrong.

Rock Runner is not only a great game, it brings a whole new graphic mode to the TI. I was shocked to find sprites with up to 10 colors *without* layering (placing two or more sprites over one another to get more than one color.) The end result is a technical breakthrough, and some of the most beautiful graphics I have seen.

The game itself is a lot of fun, putting one in mind of "Anteater" or "DigDug." The object is to run this little guy around a scrolling screen; (looks equal to three wide by two high) picking up diamonds and points without letting a rock fall on his head, or getting attacked by a nasty critter. You are also fighting a time factor that wipes you out when it hits zero. I'm not a game person, but I spent a few hours with Rock Runner without getting bored to tears.

You work with 15 levels, running consecutively as you complete each one, but, if you like, you can start your game at any level, "A" to "0". This is a welcome feature because the intensity (my stress level) runs from sublime to ridiculous. Having the ability to start in whatever screen I left off with, instead of going through the whole game kept my interest up.

The only restriction is that you *have* to use the Editor/Assembler to load the game. It uses every bit of memory the TI has to spare.

Rock Runner is an A+ game in every respect; graphics, speed, interest holding, variation, whatever makes a good game. The nice part is that it breaks new ground. It was created by Eric Lafortune of Belgium, a brilliant TI programmer, and is being distributed by Asgard. I hope some gamers are still out there because I would hate to lose Eric to another machine.

Don't steal it, buy it for a mere \$12.95 plus 75 cents shipping from Asgard Software, P.O. Box 10306, Rockville MD 20849.

1990



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# TI Base upgraded to V3.0

Texaments has released TI Base V3.0, the first major upgrade of the TI99/4A database system in almost two years.

Incorporated into the new release of TI Base are new directives, a report generator, the ability to alter the structure of a database without losing the data, expanded command line editing features, the ability to install command files into VDP memory and several modifications and fixes to existing directives, according to Steve Lamberti, president of Texaments.

The Report Generator, designed in much the same way as the existing Printer Database, permits report formats to be created, saved and recalled when needed. Lamberti says that using the Report Generator the user will be able to define the header, footer and body of the report, and that, in addition, local variables can be created and used from within a report and various options are available to assist the user in creating and debugging reports.

Using TI Base V3.0, whenever a database structure is modified, the user is able to choose what happens to the old data, which can be destroyed, used in the existing database only or restored into the new database structure. Whenever a database structure is modified and the old data transferred into the new database structure, a copy of the old database is retained for backup.

Command file processing has also been enhanced so that users can execute command files from high-speed VDP memory. Running command files from this area of memory increases the speed at which they are processed, versus running them from a slow device such as a floppy drive. Multiple command files may be loaded, removed and cataloged while in VDP memory, and the entire command file area may be cleared, saved to disk and loaded from disk.

Expanded command line and editing features have been added to TI Base, the manufacturer says. From the dot prompt, the current line can be erased and the last non-blank line entered can be retrieved using function key commands. TI Base will now accept character input using decimal identification; this includes both printable and non-printable characters with ASCII codes ranging from 0 to 255. Also, any directive can be retrieved by depressing the

control key and the first character of the directive desired, greatly reducing the amount of typing required when using TI Base.

Other enhancements and modifications listed by Texaments include:

- In most places a variable may be used in place of an absolute number.

- The CLOSE command has been modified so that if nothing has been changed in a database, nothing will be written to the device when it is closed. This allows write protect tabs to be used on data disks where the data are used for information only and will not be modified.

- SCOPE has been added to DELETE and RECALL directives. For example, DELETE RECORD ;FOR 1=1 will delete all records in the current database.

- The catalog operation functions better; catalog output is stopped at page breaks.

- New \$ operator allows a comparison of a string within a string. For example, given a database with a character field named ITEM that has records with the following contents:

|           |      |
|-----------|------|
| Record #1 | ABCD |
| Record #2 | ACBD |
| Record #3 | BCDA |
| Record #4 | DABC |

The command DISPLAY ;FOR "BC" \$ ITEM will cause records 1, 3 and 4 to be displayed because string "BC" appears somewhere in the string.

- New LEN operator will return the length of a string. The Length value may be stored in a variable.

- New SUBSTR operator will return the portion of the string specified. For example:

```
LOCAL C C 10
REPLACE C WITH SUBSTR("ABCDE",
2,3)
```

will place "BCD" in C

- READCHAR directive has been added; it operates much like the READSTRING directive; however, it accepts only a single character of input. This command should greatly enhance the development and use of single-keystroke menus, the manufacturer says.

- The MODIFY COMMAND editor has been enhanced to display the filename being edited and the line number being processed.

- The SUM directive has been modified to allow the result to be stored in a variable.

- An AVERAGE directive has been added; it takes an average of a database variable. Like the SUM directive, the result may be stored in a variable.

- The SET directive has been modified to allow printed output to be redirected to the screen. It will also permit cr/lf suppression when printing a file.

- Literal strings may now be PRINTed and DISPLAYed.

- The capability for PRINT and DISPLAY to repeat a specified character has been added.

- When the WRITE directive is used, characters and strings can be displayed using inverse video effects.

- The directive GO has been added. For example, GO 5 will position the current database at record number 5.

- Added APPEND FROM which allows data from one database to be appended to an existing database.

- Device filenames of up to 29 characters are now legal.

Lamberti says the changes made to this version are a result of customer feedback.

TI Base V3.0 is available for \$24.95 (plus \$2.50 for shipping). Included with TI Base are system and tutor disks, keyboard overlay, quick reference card and a manual. TI Base requires a disk system, 32K memory expansion and either an Extended BASIC, Editor/Assembler or Mini-Memory cartridge to operate. TI Base has been tested (but is not guaranteed) to be compatible with the Geneve 9640 (in GPL mode), all Myarc and CorComp peripheral expansion cards and the new Horizon RAMdisk.

Previous owners of TI Base may upgrade to V3.0 for \$14.95 (plus \$2.50 shipping) by returning their original disks (both the system and tutor disks) with the upgrade fee. Anyone who purchased TI Base after April 1, 1990, may upgrade to V3.0 for \$2.50 (the cost of shipping) by returning the original disks and a dated sales receipt. A documentation supplement will be sent with all upgrades.

For information or to order, contact Texaments, 53 Center St., Patchogue, NY 11772, or (516) 475-3480 (voice) or (516) 475-6463 (BBS).

# User Notes

## Recover from Function QUIT

This comes from Merle Vogt of Von Ormy, Texas. He writes:

(Re. User Notes, page 38, April 1990) I suppose you will get 95 returns on this old chestnut since, as noted, it did not work for Chuck DeMarti. Timing is the key factor.

Step 1: Load the Extended BASIC program.

Step 2: Then, immediately, (do not run) in command mode enter:

```
CALLINIT
CALL PEEK(-31952,A,B,C,D)
PRINT A;B;C;D
```

Step 3: Record values of A, B, C and D.

Step 4: Now, you can RUN and whatever, but do not change the program lines in any way. Then, if you FCTN QUIT ....

Step 5: Call up XB, then type:

```
CALLINIT
CALL LOAD(-31952,A,B,C,D). Use the values for A, B, C and D that you got above.
```

Step 7: You should be able to LIST or RUN the program you thought you lost.

Finally, you can avoid all the above mess by killing FCTN QUIT at load time. After loading your program, enter:

```
CALLINIT
CALL LOAD(-31806,16)
```

This method requires an expansion memory to work.

## Another approach to beefing up PEB power supply

This comes from Harold Hoyt Jr. and Gene Breer, both of the Lima (Ohio) TI User Group. Since it involves hardware modifications, readers are cautioned to attempt it at their own risk. They write:

In the past, we offered a complete, redesigned Peripheral Expansion Box power supply. This new power supply design came from the frustration of not being able to add disk drives to the existing PE box, without overloading it. When we tried to add drives, the 12-volt section of the PEB power supply overloaded. However, after a number of PEB power supply rebuilds, we have decided

that for most users, a complete redesign is overkill.

Many users have been buying a disk drive power supply in a box, capable of housing and powering two external half height drives. This box costs about \$59. However, following these instructions, a person with the patience to disassemble the PEB can beef up the existing supply for \$2 (\$4 with bigger input rectifiers and an optional added heat sink).

Fred Acker, a St. Louis TI user, had 2 or 3 drives powered from the PE Box. He got by with it for a while. Then the 12-volt regulator started overheating and self-protected itself by reducing the 12-volt output on long disk drive accesses. His system was right on the edge of not working. He gave me a call, just about the time we were going to add drive No. 3 to my upstairs PE Box. Our plan was to parallel a second 7812 TO-3 regulator on the PC board to increase output current capability. I was able to give Fred enough information on the telephone to enable him to get his booster regulator up before ours was finished. If the fix can be done with a telephone call, it can't be that difficult.

We removed the screws that hold the large TO-3 7812 12-volt voltage regulator to the printed circuit board and replaced them with 1-inch long 6-32 screws, inserted from the bottom of the PC board so that they stuck up in the air above the 7812 regulator. Then we added nuts and lockwashers on the top of the 7812 regulator to hold it in place. Also, we added a second 7812 TO-3 regulator upside down on top of the first 7812, with it turned so that the input pins and output pins of both the top and bottom regulator were roughly above each other. It is important to know which pin is input and which is output — getting them crossed will break the regu-

lator when the power is applied. Note that when looking at the bottom of the 7812, that the pins are above the center line of the 7812 with the input pin on the left and the output pin on the right.



Modified PEB Power Supply

We placed the 7812 upside down on the two 6-32 screws, and added nuts and lockwashers so that the second 7812 was under compression, dimpling the covers of the 7812s ever so slightly. This is somewhat hard to do correctly. A heavy hand here will warp the 7812, cracking it internally, causing its eventual failure. Think torque wrench, if you can't judge.

On the other hand, the nuts shouldn't work loose with vibration and heat cycling. Using two sets of nuts, above and below are a good idea. So is using Loctite. The cases of the two 7812 regulators must make electrical contact to each other to provide a ground reference for the new regulator.

Next, we drilled two holes in the PC board, on both sides of the 7812. Hold the PC board up to the light before drilling so that you won't tear up any traces when you drill. If your board doesn't have two small ceramic capacitors on the pins of the PC-mounted 7812, now is a good time to add them. Either 0.01 or 0.1 microfarad will do. Another optional improvement is to replace the 1N4003 diodes with 3 amp 300-volt plastic diodes. A 1N4003 is really marginal, especially when increasing the load on the 12-volt supply. Taking the PE box apart once is enough. We soldered a wire from the PC mount 7812 input lead

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# User Notes

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to the second 7812 input lead.

With all the cards, including the flex cable connector, removed from the PE box for their safety in case we made a mistake, we connected the regulator board to its AC input power connector and turned the PE box on. Using a DC voltmeter to check for proper input voltage to the top 7812, we measured about 24 volts. The unconnected top 7812 output pin was about 12 volts.

As everything was okay, we finished wiring the output pins of the 7812s together after turning the PE box power off and waiting for the power supply capacitors to discharge. Retest, still with everything out of the PE box. You should still have +24 in and +12 out.

Now reconnect everything, load up the PE box with external drives using molex "Y" connectors that take the single disk drive power connector in the PE box and splits it into two connectors. In a system with two half-height drives internal, and one external, two of these connectors will be required. The first connector powers one drive and the second connector. The second connector powers the second (internal) drive and the external drive.

This "fix" probably hasn't been used before because purists are nervous about paralleling voltage regulators. Engineers are likely to worry about the regulators oscillating. The surplus electronics store where we purchased the regulators didn't think what we were doing would work!

Oscillation between two identical paralleled regulators is prevented by the output capacitors. What generally happens is that the two regulators are likely to regulate at slightly different voltages. (For example, No. 1 at 12.1 volts and No. 2 at 12.15 volts.) The regulator that has the higher output voltage will take control, and the second regulator will turn off. When regulator No. 1 is overloaded, however, its output will fall. The second regulator will turn on at 12.1 volts. It is like helper springs on a car. The second set of springs don't connect until the load is heavy enough to bottom out the first set of springs on the second.

While we have the skin off of the PE

box, this would be a great time to replace the cooling fan with a quieter one. Jameco and All-Electronics have quiet fans for \$9.50, new and even cheaper for perfectly good used fans.

## Down and dirty address database

This comes from Larry Tippett of Model City, New York. He writes:

Here is another one of my down and dirty programs. This one builds a database to hold your address book. It will create a file called ADDRESS and write to it any new addresses you wish to add. Any errors can be corrected or deleted using TI-Writer, as the file is in D/V80 format. However, be sure that the file is printed to disk using the PF command of the writer program. This eliminates the End of File marker. The search routine looks for a blank entry to write a new address to, or find the end of the file in the read routine.

The print codes are in Near Letter Quality (Epson compatible) and there are a few others to disable the paper-out detector and reset the printer. They can be eliminated altogether if you so choose, or changed to fit any printer.

```

80 ! CHANGE THE RETURN ADDRESS IN LINES 330,240 TO REFLECT YOUR ADDRESS !183
90 ! SAVE DSK1.LEGALSIZE !21
100 CALL CLEAR :: FOR I=0 TO 12 :: CALL COLOR(I,16,1):: NEXT I :: CALL COLOR(13,7,1) :: CALL SCREEN(6)!079
110 CALL CHAR(128,"00000000FFF0000")!060
120 CALL CLEAR :: TITLE$="ADDRESS A LEGAL ENVELOPE" :: TITLE2$="courtesy of Larry Tippett" :: DISPLAY AT(1,14-(LEN(TITLE$)/2)):TITLE$ !045
130 DISPLAY AT(3,14-(LEN(TITLE2$)/2)):TITLE2$ :: DISPLAY AT(4,1):RPT$(CHR$(128),28): DISPLAY AT(23,1):RPT$(CHR$(128),28)!032
140 DISPLAY AT(9,1):"CHOOSE: 1":"":"":TAB(4);"1 < ADDRESS

```

```

S ENVELOPE":"":"":TAB(4);"2
< ADD TO MAILING LIST":"":"":TAB(4);"3 < END PROGRAM" !0
09
150 ACCEPT AT(9,9)SIZE(-1)VALIDATE("123"):C !143
160 ON C GOTO 280,170,610 !0
76
170 OPEN #1:"DSK1.ADDRESS",DISPLAY ,VARIABLE 80,UPDATE !061
180 IF EOF(1)THEN 190 :: INPUT #1:NAME$ :: GOTO 180 !14
2
190 CALL CLEAR !209
200 DISPLAY AT(1,2):"Name:" :: ACCEPT AT(2,2):E$(1):: IF E$(1)="" THEN 270 !119
210 DISPLAY AT(3,2):"Box or Street #" :: ACCEPT AT(4,2):E$(2):: IF E$(2)="" THEN 270 !208
220 DISPLAY AT(5,2):"City and State" :: ACCEPT AT(6,2):E$(3):: IF E$(3)="" THEN 270 !222
230 DISPLAY AT(7,2):"Zipcode" :: ACCEPT AT(8,2):E$(4):: IF E$(4)="" THEN 270 !217
240 DISPLAY AT(23,1):"Data Correct? (Y/N)" !092
250 CALL KEY(0,K,S):: IF S=0 THEN 250 :: IF K<>89 THEN 200 !138
260 FOR I=1 TO 4 :: PRINT #1:E$(I):: NEXT I :: CALL CLEAR :: GOTO 200 !113
270 CLOSE #1 :: GOTO 120 !224
280 CALL CLEAR :: DISPLAY AT(2,3):"Open flap of the envelope" !186
290 DISPLAY AT(4,1):"and insert into the printer.":"":"":POSITION THE TOP OF THE":"":"":ENVELOPE SLIGHTLY ABOVE":"":"":THE RIBBON." !066
300 DISPLAY AT(23,1):"PRESS ANY KEY WHEN READY" !244
310 CALL KEY(0,K,S):: IF S=0 THEN 310 !123
320 CALL CLEAR !209
330 RETURN$="LARRY TIPPETT" !106

```

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# User Notes

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```

340 BOX$="P.O. BOX 293" :: C
ITY$="MODEL CITY, N.Y." :: Z
IP$="14107" !013
350 CALL CLEAR :: DISPLAY AT
(12,1):"READ ADDRESS FROM: F
": "" :TAB(10);"<F>ILE":TAB(10
);"<I>NPUT":TAB(10);"<E>ND"
!193
360 ACCEPT AT(12,20)VALIDATE
("FIE")SIZE(-1):A$ :: IF A$=
"" THEN 360 :: IF A$="E" THE
N 610 ELSE IF A$="I" THEN CA
LL CLEAR :: GOTO 450 !119
370 RE=1 :: CALL CLEAR :: DI
SPLAY AT(22,1):"Name to sear
ch for?" :: ACCEPT AT(23,1):
ADD$ :: IF ADD$="" THEN 350
!158
380 DISPLAY AT(22,1):"Readin
g Data File": "" :: DISPLAY A
T(3,1):"SEARCHING FOR: ";ADD
$ :: OPEN #2:"DSK1.ADDRESS",
DISPLAY ,VARIABLE 80,INPUT !
124
390 DISPLAY AT(10,1):"READIN
G RECORD #" !127
400 RE=RE+.25 :: DISPLAY AT(
10,17):INT(RE):: IF EOF(2)TH
EN 420 :: LINPUT #2:ADDRESSE
E$ :: IF ADDRESSEE$<>ADD$ TH
EN 400 !057
410 FOR I=1 TO 3 :: LINPUT #
2:AD$(1):: NEXT I :: RD$=AD$
(1):: STATES$=AD$(2):: ZIPOOD
E$=AD$(3):: CLOSE #2 :: GOTO
520 !076
420 CLOSE #2 :: CALL CLEAR :
: DISPLAY AT(22,1):"Name Not
Found." !238
430 DISPLAY AT(23,1):"Search
Again (Y/N)" !006
440 CALL KEY(0,K,S):: IF S=0
THEN 440 :: IF K=89 THEN 37
0 ELSE DISPLAY AT(22,1): "" :
Enter Data." !087
450 DISPLAY AT(1,1):"Address
to:" :: ACCEPT AT(2,1):ADDR
ESSEE$ :: IF ADDRESSEE$="" T
HEN 350 :: DISPLAY AT(1,1):"
" :: DISPLAY AT(3,1):"Box or
Street" :: DISPLAY AT(5,1):
"City and State?" !246
460 DISPLAY AT(7,1):"Zip cod

```

```

e?" :: ACCEPT AT(4,1):RD$ ::
IF RD$="" THEN 460 :: DISPL
AY AT(3,1): "" !043
470 ACCEPT AT(6,1):STATES$ ::
IF STATES$="" THEN 470 :: DI
SPLAY AT(5,1): "" !047
480 DISPLAY AT(5,1): "" :: AC
CEPT AT(8,1):ZIPOODE$ :: IF
ZIPOODE$="" THEN 480 !085
490 DISPLAY AT(7,1): "" !040
500 DISPLAY AT(23,1):"Everyt
hing OK?" !131
510 CALL KEY(0,K,S):: IF K=7
8 THEN 450 :: IF S=0 THEN 51
0 !199
520 CALL CLEAR :: DISPLAY AT
(2,3):"PRINTING ENVELOPE....
...": "" : "ADDRESSED TO: " : "" :
TAB(10);ADDRESSEE$:TAB(10);R
D$:TAB(10);STATES$:TAB(17);ZI
POODE$ !041
530 OPEN #1:"PIO" !253
540 PRINT #1:CHR$(27)&CHR$(5
6)&CHR$(27)&CHR$(71)&CHR$(27
)&CHR$(120)&CHR$(1)&CHR$(27)
&CHR$(107)&CHR$(0);!249
550 PRINT #1:RETURNS$ :: PRIN
T #1:BOX$ :: PRINT #1:CITY$
:: PRINT #1:TAB(9);ZIP$ !074
560 FOR I=1 TO 6 :: PRINT #1
:: NEXT I !179
570 PRINT #1:TAB(40);ADDRESS
EE$ :: PRINT #1:TAB(40);RD$
:: PRINT #1:TAB(40);STATES$ :
: PRINT #1:TAB(48);ZIPOODE$
!031
580 PRINT #1:CHR$(27)&CHR$(6
4)&CHR$(27)&CHR$(57):: CLOSE
#1 !101
590 CALL CLEAR :: DISPLAY AT
(14,2):"PRINT ANOTHER? (Y/N)
" !003
600 CALL KEY(0,K,S):: IF K=8
9 THEN 330 :: IF S=0 THEN 60
0 !172
610 CALL CLEAR :: DISPLAY AT
(24,1):"TI-EXTENDED BASIC" :
: END !102

```

## Advanced BASIC bugs are noted

This comes from Bob Sherburne of Las Vegas, Nevada. He writes:

After using Myarc Advanced BASIC for several months now, I believe I have run across (or created) just about every bug in it at one time or another, and there are lots of them. Here is a list:

If the second line of a multi-statement program line ends at the last character position at the right edge of the screen, that line (second line) will not list to printer. This can also cause the line to misbehave in the program.

If a double color (:) is accidentally left at the end of a program line, the syntax error is not caught and on occasion MAB will return to MDOS when that line is executed.

If the double colon is left out between statements, the syntax error is not caught and any other statements on that line will not execute.

Line too long syntax errors are not caught and inserting too much code in a line of the program can cause lines to change in another part. I have found command line words such as LIST and CONTINUE inserted after adding to a line a different part of the program. You can find lines which are too long by saving the program in MERGE format. MAB will then list the offending lines.

If data is inserted into a DATA statement so that the line is now too long, no syntax error will be issued and CHR\$(0)'s (dotted small o's) will be placed where your string or numeric data extended beyond the end of the line.

Many one line programs won't work past the first screen line when multi-statements are used and some Extended BASIC one-liners crash the machine.

When double quotes are placed around a word in a string to be displayed or printed in a program line, MAB replaces the double quotes with single quotes after the line is entered. Since the word is printed with the quote marks, it really doesn't matter until you need to edit the line. Then you receive a syntax error for the single quotes.

Graphics mode changes within a running program momentarily display parts of old screens during the change. This problem can be corrected by displaying the NULL  
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# User Notes

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string (DISPLAY AT(1,1):"") across lines of print instead of using CLS.

CALL RECTANGLE with a line type of 4 (solid fill) leaves a screen color line below the bottom of the defined rectangle which was drawn in DCOLOR.

CALL ECOLOR seems to have fixed some of the problems with hiding sprites or moving them beyond line 192.

CALL CIRCLE line type 0 doesn't erase the previously drawn circle at the same location.

CALL FILL doesn't work on small areas. It puts in a short line of the DCOLOR which cuts through other graphics.

Mouse speed in CALL SEEMOUSE(prow,pcol,speed) doesn't work, but on occasion I have rerun a program where the mouse worked fine the

first time but on the second running of the program it set itself to the slowest speed.

Since you are taking suggestions on how to utilize the extra few bytes of programming space in Advanced BASIC, I would like to see a "SAVE MYART" command as a counterpart to "LOAD MYART." Pictures can be loaded and modified in MAB but cannot be resaved. Perhaps some of the coding which loads the pictures can be used to save them.

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### MARCH

**West Coast Computer Fair**, 10 a.m.-6 p.m. March 1-4, Brooks Hall/Civic Center, San Francisco, California. San Francisco 99ers at Booth 1960. Fee \$10 per day, discounts for multiple days. Call Neil Wood, (707) 425-3854.

**TICOFF (TI Computer Owners' Fun Faire — The IBM & Clone Owners' Fun Faire)**, 9:30 a.m.-4 p.m. March 17, Roselle Park, New Jersey. For information, call (201) 241-4550 or the TICOFF BBS (201) 241-8902.

### APRIL

**Canadian TI-FEST**, April 28, Merivale High School, Nepean, Ontario, Canada. For information, contact Ruth O'Neill, 34 McLeod St., Ottawa, Ontario, Canada K2P 0Z5 or (613) 234-8050 or CompuServe 72117,3541 or Delphi REON.

### MAY

**Boston Computer Society Home Computer Fair**, 10 a.m.-4 p.m. May 5, cafeteria, Waltham Central Middle School, 55 School St., Waltham, Massachusetts. Contact Justin Dowling, The Boston Computer Society, TI99 User Group, One Center Plaza, Boston, MA 02108.

**Alberta TI Orphan Reunion**, 10 a.m.-5 p.m. May 12, Innisfail Lions Hall, Innisfail, Alberta, Canada. Contact Fred Kessler, Box 20, Sundre, Alberta,

Canada TOM 1X0. Phone: (403) 638-3916.

**TI Multi User Group Conference**, 9 a.m.-6 p.m. May 26, Reed Hall/Student Activities Building, Ohio State University Lima Campus. For information write Lima Ohio User Group, P.O. Box 647, Venedocia, OH 45894, or call Dave Szippel evenings (419) 228-7109.

**Annual Meet of TI99/4A Users Group UK**, May 26, North Gate Arena, Chester, England. Contact Stephen Shaw, 10 Alstone Rd., Stockport, Cheshire, England SK4 5AH.

### SEPTEMBER

**Seattle TI Convention**, Sept. 22. Call Queen Anne Computer Shoppe TIBBS, (206) 546-1865.

### OCTOBER

**Fourth Annual CPUG Computer/Electronics Exposition**, 7 a.m.-3:30 p.m. Oct. 14, Cocoa Avenue Plaza, 605 Cocoa Ave. Hershey, Pennsylvania. Preregistration through Aug. 3. Write Central PA 99/4A Users Group, P.O. Box 14126, Harrisburg, PA 17104-0126 or call Dave Ratcliffe (717) 238-5414 or The Data Factory BBS (717) 657-4992 or 4997 (24 hours 8-N-1 300/240).

**Columbia Northwest TI Computer Fair**, Oct. 27-28, Jantzen Beach Red Lion Inn, Portland, Oregon. Sponsored by NOVA (Ninety-Niners Of the Vancouver Area), Washington, and PUNN (Portland Users of Ninety-Nines), Oregon. Contact N. Michal Calkins, 1215 S.W. Cedar St., Lake Oswego, OR 97034, or (503) 636-1839.

**This TI event listing is a permanent feature of MICROpendium. User groups and others planning events for TI/Geneve users may send information for inclusion in this standing column. Send information to: MICROpendium Fairs, P.O. Box 1343, Round Rock, TX 78680.**

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## SOFTWARE

proceeds from sale of program will be used exclusively to purchase hymnals for the church of which Bill was a member.

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v7n6

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## USER GROUP UPDATE

These are additions and updates to our user group listings, begun in our May 1987 issue.

### California

LA 99ers Computer Group, P.O. Box 7746, Torrance, CA 90504 (address correction).

### Oklahoma

Sooner 99ers, c/o S.D. Farrar, 9100 Candlewood Dr., Oklahoma City, OK 73132.



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