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MICROpendium

Volume 4 Number 12

January 1988

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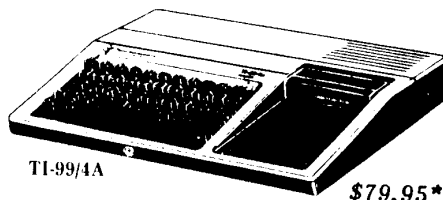
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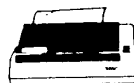
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Comments

What's in a report card?

What does the format of the MICROpendium Report Card really mean? You're familiar with the reviews we do and the way that the report card is designed, i.e. Performance, Ease of Use, Documentation, Value and Final Grade. Long ago I think I described what the significance of these categories is in reviews that I write. But what about others? A review of Memocal that appears in this issue ended with a note from its author, Bill Gaskill, explaining what the report card categories mean to him. I'm reprinting his definition here because it's pretty close to mine, and it's been a long time since we've discussed it. To wit:

"When evaluating a product for published review, I use and support the Micropendium standard of rating a product for performance, ease of use, documentation, value and final grade. However I think that some parameters need to be established to standardize and explain to the user what criteria are considered under each of these categories. I don't presume to be the one who has the right to establish those parameters, but I have provided mine here so that you may better determine the validity of the review. Perhaps such guidelines will be published for all of us to use in the future.

"Performance — Measures how well the product lives up to its advertised capabilities and also measures its flexibility in the area it is designed to address. Also considered are the number of features provided to the user and such concerns as error trapping, speed of operation and tolerance for user error.

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"Final Grade — The reviewer's overall assessment and impression of the product, based upon the results in the other rating categories and areas not covered, such as support after the sale, replacement costs if the product is defective or fails to work, backup copy protection if it applies, product warranty, etc. It is in essence the reviewer's statement to the reader on whether or not this product is worth owning."

Couldn't have put it better myself. Thanks Bill.

ON INDEXES

After years without an index of MICROpendium (yes, I know, we were working on one. We just haven't finished it.) we've suddenly been deluged by them. Well, deluged may not be the correct description. For accuracy's sake, we've received indexes from three readers covering everything from Volume 1 Number 1 through Volume 4 Number 10. One of them is based on BASIC DATA statements, another is done with PR-Base and the third uses TI-Writer as the medium. We'll decide which to use and publish it in consecutive issues

of MICROpendium (it would take up too much space to publish the entire index in a single issue). If we're lucky, the first installment should appear in February, which, incidentally, will mark the beginning of our fifth year of publication. Arrangements will also be made for readers to obtain the index on disk.

NICE WORDS ABOUT MYARC

I've been asked to say a few nice words about Myarc. I really don't think I should have to be asked. But it occurs to me that I haven't been saying nice things about the company despite the fact that it is doing so much with so little and so rapidly. I can't think of any small company (tiny is a better description) that has created its own computer and operating system. But that's not why Myarc deserves a few nice words in MICROpendium. In the past, we've offered space to readers to lodge their complaints about Myarc with very little offered to counterbalance it. This struck me recently because we received a very angry letter from a reader who complained about Myarc's Geneve and that he couldn't get it to work. Myarc, of course, also received a copy of the letter. Myarc worked with the reader to solve his problems, but to no avail. Finally, the company asked the reader to ship his Geneve card, PEB and disk drive to Basking Ridge, New Jersey, for examination. Myarc's technicians found that the problem wasn't in the Geneve but in the reader's disk drive, which needed to be realigned. Myarc realigned the drive and returned the system to the reader. Everything worked fine. The reader sent us another letter, urging us not to publish his first letter. Which we didn't.

But I wonder how many times this type of thing has happened? I also wonder how many times we heard the complaints but never learned what resulted? And not just with Myarc.

My opinion is that Myarc is doing a great job. I think the Geneve is the beginning of a fine computer system. I say "beginning" because there's so much to learn about it. It has more potential than a PC or an Atari and probably should be compared to an Amiga or an AT. And I think we'll see a lot of third-party development for the machine in 1988.

TIPS ON INTRUDER

Several readers have reported problems loading the screens from Intruder, which was published in MICROpendium in November. When the program tries to load the Dining Room screen (which is the second screen that the player faces), the program crashes with the error message File Error in 2780. This error message can result from an improperly converted file as well as an inputting error. The former can be solved by making sure that the screen data file (FROGDATA) is properly converted into an I/V80 format. Make sure that line 130 of the conversion program uses LINPUT, and not INPUT. The file characteristics will be I/V80 regardless of whether LINPUT or INPUT is used, but the data won't be readable to the main program unless LINPUT is used.

The latter problem is likely to result because the instructions may not have been explicit. When entering the file using TI-Writer as recommended, we noted that the Alpha Lock key should be depressed. Well, that's not enough. When entering the number 2 as required, the shift key should also be depressed because, as we all know, the uppercase characters on the top row of keys is not controlled by the Alpha Lock key. This will produce a proper control character. If it produces a lowercase r, you didn't hold down the shift key.

—JK

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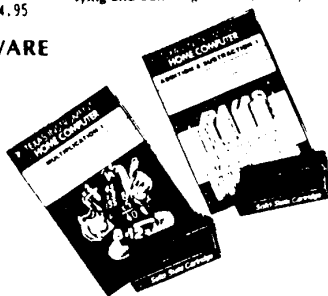
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Feedback

Reply to review

Thanks for reviewing our game disk called Spin-To-Win (Nov. '87). We're sorry your reviewer was unhappy with both the programs he reviewed, but would like to put out a couple of words in our own defense.

Your reviewer complained of two problems which turn out to be related. He didn't like the fact that our program did not start with a LOAD program, and he also complained that the other program always gave him the same puzzle when it started. We know these problems are related, because we tried making our "Title Screen" a program called load, and found that doing so interferes with the operation of the RANDOMIZE statement. We don't know why that's so, but when we found that problem, we elected not to use a LOAD program. Incidentally, if the user wants to skip the title screen of our program, he can simply call for running the "SPINSPIN" program directly, and everything will work just fine.

His idea about giving the user an option of having our hostess turn the letters is a good one, and we'll incorporate that in our next batch of changes, because it can become a pain waiting for the letters to be turned.

Finally, a word about the "Wheel." We would dearly love to make a really good wheel simulation, but opted to have a simulation of the *edge* of a wheel, simply because the programming necessary to truly simulate the wheel on TV would eat up all the TI's memory, leaving no program to actually play the game. Our choice does allow you to see what's happening with the numbers, bankrupts and lose-a-turns, etc. We felt that was more important than cosmetic effects per se.

The program is selling at a modest price, and we've had no complaints from purchasers.

Bruce Harrison
Harrison Software
Hyattsville, Maryland

Intruder line numbers

While typing in the programs from the November issue a drifting thought ran through my head when a problem cropped

up with the listing that I produced of the Intruder program. What happened was that some of the line numbers just were not the same. Why? Well, when I type in a program I use the NUM command which produces consistent line numbers. Had the published program been RES or RESEQUENCED then my problem would not have existed.

In some rare cases by using RES there appears in the program the line number 32767 in some GOTO or GOSUB statement. This can only come about if the command is used on a partially written program, or if the original program really had some existing problem in it.

One way that I check out programs is to list them to disk and then use the RS command in the TI-Writer Editor to find those strings of line numbers that should not exist.

Just though I might pass this along as a suggestion.

By the way, the games in the November issue are outstanding.

William A. Ragsdale
Mission Viejo, California

File transfers

After being asked if it was possible to transfer any type of file between the 4A and the IBM format I decided to find out. So I tried hooking up the 4A and my XT using the XT serial cable.

I used Mass Transfer and Fast-Term on the 9640 and a program called Telix on my XT. I was able to transfer at 2400 baud using Mass and up to 9600 baud between both machines. Every type of file went both ways and was not trashed or garbaged by doing so. So, know my computer configurations are set up with the XT tied to the modem using COM1, COM2 goes to the TI RS232 port. My XT comm program allows for very fast and easy port changing. To download a file, I dump to my XT on the hard disk, switch ports and transfer it to my 9640, usually in about one minute or less. I then unarc, unpack or whatever I need to do with the file to get it to whatever point I want. Thus, I can change the file(s) and send them back to the XT and retransfer the code. I hope you can see I no longer need to change modem cables or use a switchbox to change things for me.

So what reason do I need to do all this manipulation? I have taken files archived in MS-DOS, unarced them and then converted them over to 4A format. True, this is only ASCII files, but if there is ever a file conversion program to modify BASIC programs either way, then I can do even more.

Scott Darling
Spokane, Washington

Terminal emulators, video capability

We in the TI community have been blessed with terminal emulators generations ahead of TE-II. Although there are many things I would like to see, I will mention only two.

1. I would like to see an implementation of the KERMIT protocol. Although not popular in the micro community, this way of transferring files gets a lot of use in the mainframe and academic community.

2. I would like to see the TE-II sound and graphics protocol kept. Can you imagine what some of the 300 baud graphics would look like at 1200 or even 2400 baud?

The TI community now has three ways to upgrade their video capability:

1. The Mechatronics 80-column expansion system.

2. The Digit ADVDP 80-column expansion card.

3. The Geneve by Myarc.

I would like to see programs developed that would run on all three. Of course, on a Geneve the program could do more, but it seems like such a waste to write a program that just runs on one, but not the other two. Writing assembler programs that run on all three would not be that difficult since they all three use the 9938 VDP by Yamaha.

Yamaha of America's address is P.O. Box 6600, Whena Park, CA 90622. Phone is (714) 522-9011.

Dan H. Eichler
Indianapolis, Indiana

The Feedback column is for readers. It is a forum to communicate with other readers. The editor will condense excessively lengthy submissions where necessary. Mail Feedback items to: MICROpendium, P.O. Box 1343, Round Rock, TX 78680.

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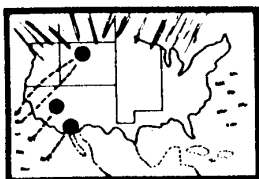
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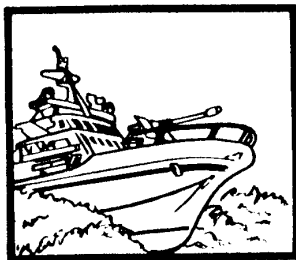
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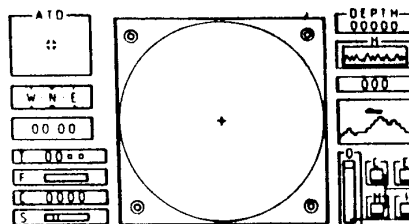
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1. 99/4 or 99/4A console.
2. 1 Disk Drive and Controller.
3. 32 K Memory Expansion.
4. Extended Basic Module.



BASIC

Programming reminder hints

By REGENA

Are you still having FUN with your computer? Life has been so hectic for me the last little while that I haven't had as much time to program. Once in a while, however, I do like to sit at the computer and program. (In fact, I'd rather program than write the articles, but of course most programmers are like that.) This month I am going to offer you a few "reminder" programming hints. These may be things you've known about for a long time but haven't used for a while — or they may be things you use in every program you write. I hope you find these hints helpful.

When you start a program, number your lines by 10s (100, 110, 120, etc.). If you need to add lines later, you'll be able to insert them with numbers within existing lines. You may want to start major sections with 1000, 2000, 3000, and so forth, so you can keep track of them. When the program is working in final form, you can use RESequence to renumber your lines. If you really need to conserve memory, you can RES 1,1 to number your lines by ones, starting with Line 1.

I usually clear the screen with CALL CLEAR, but you can use other methods. For example, if you have all black printing on the screen, you can turn the screen black with CALL SCREEN(2).

If you have graphics on the screen, you can change the color of those characters to "invisible" with CALL COLOR(S,1,1), where S is the set number for the characters involved. Or you may change the characters to be a blank. For example, if you have Character 99 defined as a tree, and there are trees randomly placed on the screen, you can make all the trees disappear with CALL CHAR(99,"")

You may fill the screens with blanks with statements such as CALL HCHAR(1,1,32,768)

or

CALL VCHAR(1,1,32,768)

The computer starts in the upper left corner, Row 1 and Column 1, and places the blank character or space in each position for 24 rows and 32 columns.

You may also use CALL HCHAR or CALL VCHAR to clear parts of the screen. As in the above examples, you do not need to restrict the number of characters in the fourth parameter to one row or one column. Let's say you have graphics on the top half of the screen and some printing on the bottom half. If you want to erase the bottom part of the screen only, you can use CALL HCHAR(13,1,32,32*12)

Another hint is to remember that the colon in the PRINT statement means to go to the next line. If you are translating from other computer versions of BASIC, you may have noticed that the colon is a statement separator. If you want to print several blank lines, you need to use PRINT or ? for each line you want in other versions of BASIC. In TI BASIC, you may use the colon, such as PRINT ::::: You may use colons along with other numbers or strings, such as

```
PRINT ::"HELLO"::::"HERE IS THE TITLE"::::
```

Remember to use the ON-GOTO procedure rather than a series of IF-THEN statements. An example of this situation is when you ask the user to choose among several choices. Let's say you have a menu screen of choices A, B, C and D. You may use IF-THEN

statements to branch, such as if the answer is A, go to Line 1000; if the answer is B, go to Line 2000; if the answer is C, go to Line 3000; if the answer is D, go to Line 4000. A more efficient way to direct the computer is to use the ON-GOTO. If you have used CALL KEY to get the answer, you will get the ASCII code of the ASCII key pressed. First make sure the key pressed is A, B, C or D, then branch:

```
400 CALL KEY(0,K,S)
```

```
410 IF (K<65)+(K>68) THEN 400
```

```
420 ON K-64 GOTO 1000,2000,3000,4000
```

To create a pause or delay in a program, you may use either a FOR-NEXT loop or a CALL SOUND delay:

```
300 PRINT "ONE"
```

```
310 FOR DELAY =1 TO 400
```

```
320 NEXT DELAY
```

```
330 PRINT "TWO"
```

```
340 PRINT "THREE"
```

```
350 CALL SOUND (500,9999,30)
```

```
360 CALL SOUND (1,9999,30)
```

```
370 PRINT "FOUR"
```

Sometimes when you read and process data in a FOR-NEXT loop you will notice a slight delay before the last data item. You can avoid the delay if you use one more loop than you need and add a dummy variable. For example, if you are printing lots of graphic characters on the screen you might notice a delay before the last character is put on. Increase the loop and use the last data item twice (print the last character in the same place two times).

```
300 FOR N=1 TO 25
```

```
310 READ ROW,COL,C
```

```
320 CALL HCHAR(ROW,COL,C)
```

```
330 NEXT N
```

```
340 DATA 3,5,42, . . . (your data items here)
```

```
350 DATA . . . 10,12,65,10,12,65
```

If you really have to "squeeze" your program to fit in the available memory, remove all the REMark statements. Use short variable names. For example, instead of NUMERATOR and DENOMINATOR as variable names in a fractions program, use N and D. Also look through your program for any repetitious programming that could be more efficient using subroutines or FOR-NEXT loops or DATA statements.

If you have a lot of graphic characters, redefine the lowercase letters and symbols in ASCII codes 91 through 126. Use PRINT rather than CALL HCHAR or CALL VCHAR to place the characters on the screens faster. For example, redefine the characters, then use a statement such as PRINT "abcd" rather than four CALL HCHAR statements. Many of the other character numbers are the same as CONTROL characters and may also be printed, although your listing will contain funny looking characters and will be harder to understand. You may also use a method such as PRINT CHR\$(130);CHR\$(131);" ";CHR\$(132)

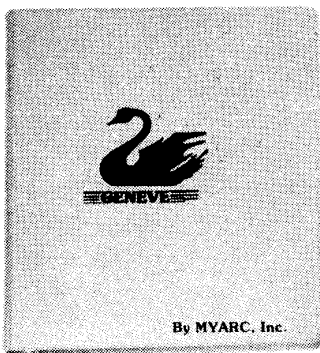
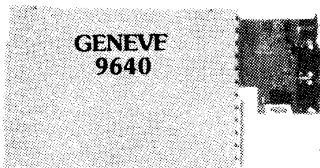
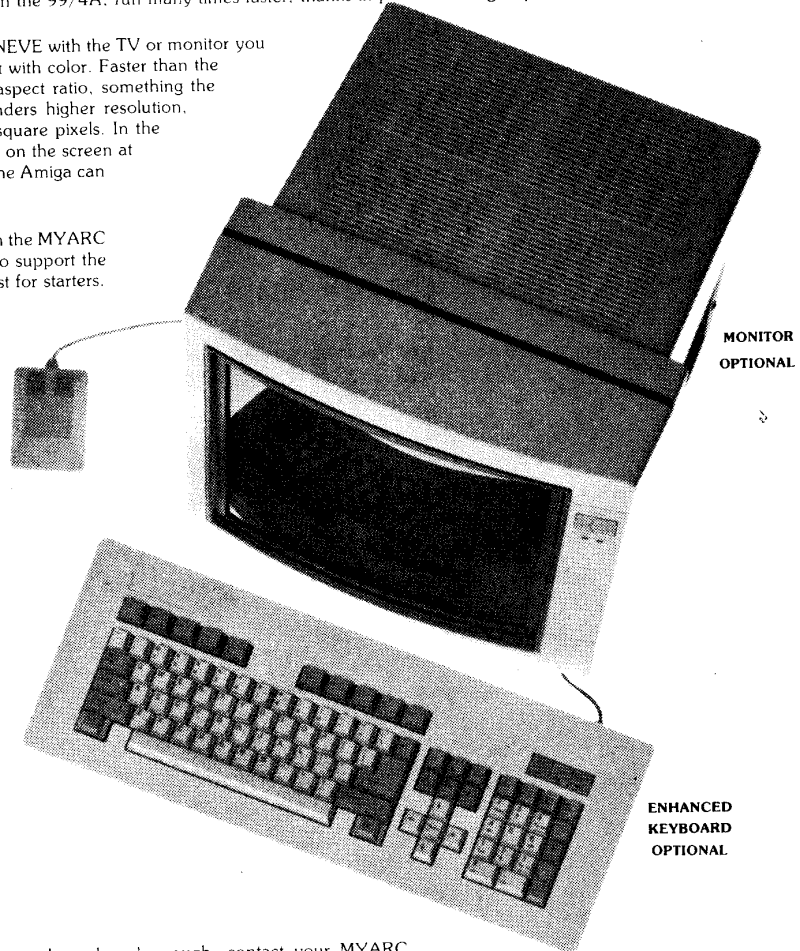
In speech programming with the Terminal Emulator II command module, I like to use the caret symbol before the word or phrase and the period after it to get a more natural voice. For example, PRINT #1: " TRY AGAIN."

(See Page 12)

THE GENEVE 9640 HAS LANDED

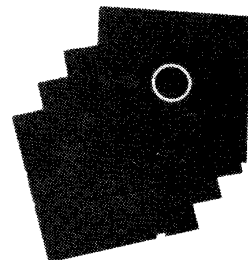
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BASIC—

(Continued from Page 10)

When you use IF-THEN statements, don't forget that we also have the ELSE option. You may specify a line number for branching if the condition is true and another line number if the condition is not true:

```
IF SCORE =10 THEN 500 ELSE 250
```

Also, you may check more than one condition in an IF-THEN statement by using parentheses and the + and * signs.

```
IF (A=B)*(C>D) THEN 300
```

You may combine strings to save data that otherwise might be in several parts and use lots of memory. For example, if you have a series of numbers 5,7,1,3,8,9, you may read them in as 571389 then use the SEG\$ function to separate them for calculations or other use:

```
200 READ N$,A$
```

```
210 FOR M=1 TO 6
```

```
220 X$=SEG$(A$,M,1)
```

```
230 NEXT M
```

```
400 DATA RICK,571389
```

My final reminder is that if you have the disk system and do not need a lot of open files, gain valuable bytes by using this procedure:

1. From the title screen, press any key to begin.
2. Press 1 for TI BASIC.
3. Enter CALL FILES(1)
4. Enter NEW
5. Proceed as usual.

I use this as a standard procedure every time I sit down to program. Some of my longer programs will not run (you'll get an OUT OF MEMORY error) if you do not do this before loading and running the program.

The trials of a c99 beginner Integer arithmetic

By CHARLES E. KIRKWOOD JR.

Integers, like strings, are input as characters and the characters must then be converted to an integer. After conversion, the number of bits necessary to store an integer is 16 or 2 bytes. After using the first bit as a sign bit, the range of integers will be from -32768 to 32767, which is 5 digits and a sign. The buffer array for integers needs to contain only 7 elements (1 for the sign, 5 for the digits, and 1 for the NULL), such as `char buff[7]`.

The input characters in the buffer are first stored as a character string. This character string is then converted to an integer by using the function `atoi()` which is in the string-integer conversion library `CONV;C`. An integer can be printed out by using the function `printf()`, which is an object file. The first argument of `printf()` is always a string, called the **control string**. To print an integer, this string would be `%d`. This is analogous to the `IMAGE` in `XBASIC` or a format in `FORTRAN`. The control character `n` can be included if a new line is desired. The function `print()` can also be used to print out a character or a character string. The control character for a character is `c` and for a character string is `s`. The number of arguments is determined by the number of control characters.

The operators +, -, *, and / are the conventional ones that are used in other languages. There is no exponentiation.

Store files `CONV;C` and `PRINTF` on your program disk. The disk should now have the following files: `ASSM1`, `ASSM2`, `C99C`, `C99D`, `C99E`, `C99PFF`, `C99PFI`, `CONIO`, `CONV;C`, `CSUP`, `EDIT1`, `PRINTF`, `SAVE`, and `STRING`. This will leave over 100 bytes to write your c99 program, the assembled version, the object program, and the program you want to save. If you need more than 100 bytes, it will be necessary to use two disks and swap. Probably it will be best to store `ASSM1`, `ASSM2`, `C99C`, `C99D`, `C99E`, `CONIO`, `CONV;C`, `EDIT1`, and `STRING` on the program disk. Change to your master disk to link the files together and then back to the program disk after the linked files are in the computer.

Example 1 will input two integers, add them, and print out the result.

```
/*EXAMPLE 1*/
extern printf();
#include DSK1.CONV;C
main()
{
    int a,b,i,j,k;
    char buff[7];
    a=gets(buff);
    i=atoi(a);
    b=gets(buff);
    j=atoi(b);
    k=i+j;
    printf("%d\n",k);
}
```

Any function file, such as `CONV;C`, which is written in c99, can be linked to your program by the `#include` instruction outside of the program or a function.

The print function `printf()` is an object file and must be linked to your program in what is generally called the **link-edit** step. A good place to load `DSK1.PRINTF` is after `DSK1.CSUP`.

Functions or variables that are defined in other files may be identified by `extern`, followed by the function or variable name; such as `extern printf();`, `extern int x;`, `extern char z[5];`, etc.

Try these two output statements with Example 1 and see the results:

```
printf("%d %s %d %s %d\n",i," + ",j," = ",k);
printf("%d + %d = %d\n",i,j,k);
```

The sort program given in previous c99 articles will now be rewritten to sort integers. Example 2. First input the number of integers to be sorted and then the integers are input and stored into an array. The integers are then printed out as they are input, sorted, and printed out again. The sort function `chrsrt` will have only two

(See Page 14)

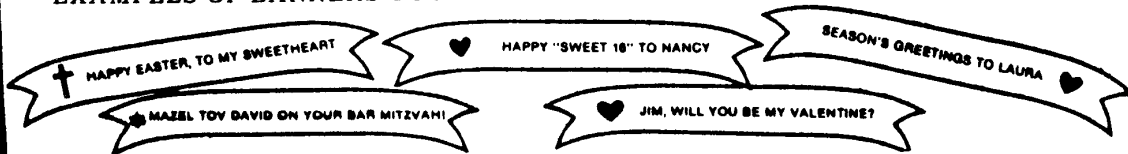
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c99—

(Continued from Page 12)

changes from the previous article. Change the name to `intsrt` and change `char a[];` to `int a[];`.

```

/*EXAMPLE 2*/
#include DSK1.CONV;C
extern printf();
main()
{
    char a[7];
    int b[100];
    int c,d,i,n;
    /*input number*/
    /*of integers*/
    c=gets(a);
    d=atoi(c);
    /*last subscript*/
    n=d-1;
    /*input integers*/
    /*and store in array*/
    for(i=0;i<n;++i)
    {
        c=gets(a);
        b[i]=atoi(c);
    }
    putchar(10);
    /*output of array*/
    for(i=0;i<n;++i)
    {
        c=b[i];
        printf("%d ",c);
    }
    /*sort array*/
    intsrt(n,b);
    putchar(10);
    putchar(10);
    /*output of sorted*/
    /*array*/
    for(i=0;i<n;++i)
    {
        c=b[i];
        printf("%d ",c);
    }
}

```

The array `b` is printed out twice, once before the sort and again after the sort. This array output can be written as a function. Let us call this output function `prtarr` with two arguments, `n` and `b`. Remove the output statements from Example 2:

```

for(i=0;i<n;++i)
{
    c=b[i];
    printf("%d ",c);
}

```

before and after sorting and replace them with:

```
prtarr(n,b);
```

Now add the function `prtarr` after `intsrt`.

```

/*function prtarr*/
prtarr(n,a)
int n;
int a[];
{
    int c,i;
    for(i=0;i<n;++i)
    {
        c=a[i];
        printf("%d ",c);
    }
    return;
}

```

If these two functions are to be used a great deal, they can be added to one of your library files.

Since no exponentiation is included, Example 3 has a function for this purpose. You can use any name you like for this function; however, I used `intpwr`. There are two arguments, one the number and the other the power or exponent. Two versions of the function `intpwr` to take an integer to a power are included (one using the `while` loop and the other the `for` loop). A program is written also to test the function. The function `intpwr` can be added to a function library.

```

/*EXAMPLE 3*/
extern printf();
#include DSK1.CONV;C
main()
{
    int a,n,p,r;
    char b[7];
    puts("INPUT A NUMBER ");
    a=gets(b);
    n=atoi(a);
    puts("INPUT AN EXPONENT ");
    a=gets(b);
    p=atoi(a);
    r=intpwr(n,p);
    puts("result ");
    printf("%d\n",r);
}

```

```

/*function intpwr*/ /*function intpwr*/
/*version 1*/      /*version 2*/
intpwr(x,p)         intpwr(x,p)
int x,p;            int x,p;
{
    int i,r;         {
    r=1;              int i,r;
    i=1;              r=1;
    while(i<=p)        for(i=1;i<=p;++i)
    {                  r=r*x;
        r=r*x;          return(r);
        ++i;
    }
}

```

(See Page 16)

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(Continued from Page 14)

```

    }
    return(r);
}

```

Another way to make variables known to both **main()** and any function is to declare the variable(s) before **main()**. The declared variable(s) will be known to **main()** and all functions that follow the declaration. This is called **external** or **global** declaration. Arguments may be omitted and also additional declaration(s) within the function(s). Any change to an external variable in a function will also change it in the program, since the addresses are the same. External variables are analogous to **COMMON** in **FORTAN**. Functions are always external, for **c99** does not allow functions to be defined within another function.

One way to illustrate global variables is to make the following

changes to Example 3. Type the external declaration **int n,p;** prior to **main()** and omit **int x,p** in the function **intpwr**. The variables **n** and **p** will be common in the program and all functions that follow after you also make the following additional changes:

from	to
int a,n,p,r;	int a,r;
r=intpwr(n,p);	r=intpwr();
intpwr(x,p)	intpwr()
r=r*x;	r=r*n;

The C Programming Language by Kernighan and Ritchie, C Programming Guide by Purdum, and others have been valuable references and have given some excellent ideas for these articles. Dennis Ritchie originally designed the C language for the UNIX operating system at Bell Laboratories.

Working with Logo

Let the turtle do fractals

By SUSANNE L. JOHNSTON
and BRUCE W. JOHNSTON

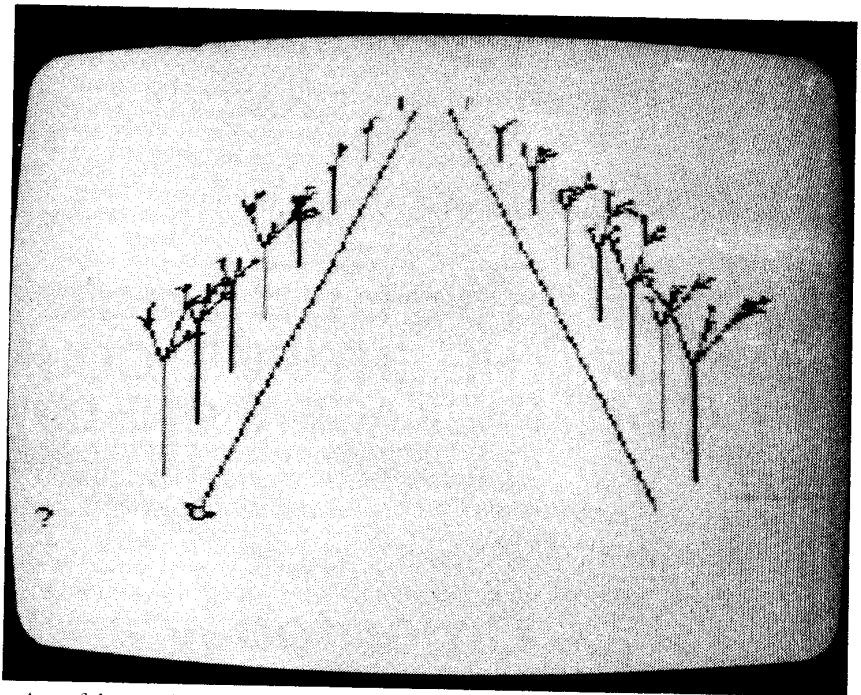
A procedure that calls itself is recursive. Recursion is a powerful tool that allows complex operations to be performed by seemingly simplistic procedures. First we will investigate the use of recursion in Logo programs and then use it to create fractals with turtle graphics.

First, let's review what occurs when one procedure calls another procedure. At the point of the call, the calling procedure is put on hold until the call is complete. Following execution of the call, control returns to the line following the call in the calling procedure. Each time a procedure is called an activation record is built that records important information relating to that particular activation of the procedure. The activation record contains the following:

1. Information on how to return to the calling procedure (the location of the instruction following the call);
2. Any parameters that are passed in the procedure call.

When the called procedure is complete, control returns to the calling program and the activation record can be discarded.

The key idea is that repeated procedure calls, whether nested or recursive, will generate a long stack of activation records that can quickly exhaust available memory space. For that reason, recursion must be used cautiously.



A useful mental picture of recursion is that of a child's set of blocks. Each time the procedure calls itself another block is placed on the stack. Eventually, each block must be taken down, in turn, until only one block remains, the original calling procedure. At some point the procedure must come back and complete each of the recursive calls until control reverts to the top level at the location of the first call. The best way to illustrate this is to look at a

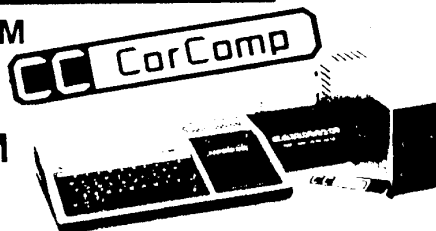
recursive procedure. We will have the computer draw a tree with turtle graphics (Table 1).

- 1 TO TREE :SIZE
- 2 IF :SIZE < 5 STOP
- 3 FD :SIZE
- 4 LT 20
- 5 TREE :SIZE/2
- 6 RT 40
- 7 TREE :SIZE/2

(See Page 18)

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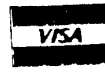
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LOGO—

(Continued from Page 16)

8 LT 20
9 BK :SIZE
10 END

Table 1. Recursive TREE procedure. TELL TURTLE and HT.

This is a short procedure that looks relatively simple, but how does it really work? It's a bit more complicated than it first appears. Every recursive program must have a stopping point or the recursion will run forever (or until it runs out of memory). Line two is a STOP rule when branches of the tree are less than five turtle units. Table 2 illustrates the recursive process showing how the calls build upon each other and are later unstacked and completed.

The procedure begins by drawing a line 20 units long then turns left 20 degrees. Now the first recursive call occurs, TREE 20/2. At this point the calling procedure is put on hold and an activation record is generated. This way the procedure can return to this point later to complete the call. The execution will not end until all calls have been completed.

Five calls are made before the procedure starts to unstack. Calls four and five stop immediately and then the procedure returns to the last incomplete call, call three in line seven (Table 2). This call was made from line five, TREE 10/2 in Table 1, so the line after the call is executed; RT 40 (line 16 in Table 2). You may find it helpful to draw the tree by hand as you go through Table 2. You can see that the procedure stacks upon itself and then unstacks until it is back to the original calling level. This short ten line procedure actually executes 51 lines of code and calls itself 15 times.

This gives you some idea of the power and complexity of recursion but what is it used for? Well, it is being put to some remarkable uses in the field of fractals.

Fractals were invented by Benoit Mandelbrot and are discussed at length in his book *The Fractal Geometry of Nature* (W.H. Freeman, 1982). A non-mathematical definition of a fractal is a design with innate self-similarity. That is, at any scale, the basic pattern of the design is the same. Looking at our tree, this is evident in the branching. The trunk splits into two branches which each split into two smaller branches. Thus, the branching pattern remains the same at all scales. Therefore, our tree is a fractal. But we can go a step further.

In his article *Formulating Fractals* (Computer Language v.4 n.4 April 87, pp. 28-40), Stephen Casey discusses seed fractals and squig fractals. Seed fractals are designs created by repetition of a given geometric pattern, such as our tree. Squig fractals are designs created by repetition of a given geometric pattern with controlled randomness. In this way, fractals can emulate nature's own controlled randomness. Table 3 is a refinement of

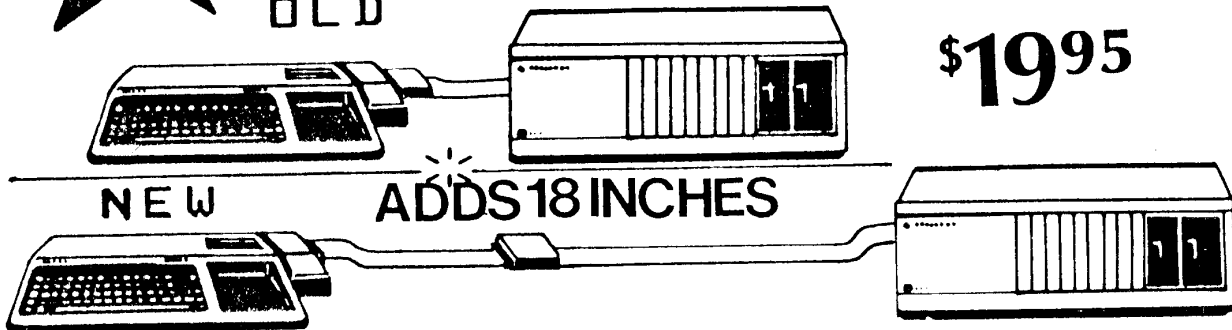
(See Page 20)

Table 2 (at right). Recursive TREE procedure showing all recursive calls and how each is completed. Line 5 or 7 refers to the line in procedure TREE (Table 1) where the call is made. (SIZE = 20).

		CALL #		SIZE		LINK #	COMMENT
						IN TREE	
1	TO TREE 20	1	20	1			
2	FD 20						
3	LT 20						
4	TO TREE 20/2	2	20	5			
5	FD 10						
6	LT 20						
7	TO TREE 10/2	3	10	5			
8	FD 5						
9	LT 20						
10	TO TREE 5/2	4	5	5		STOP	
11	RT 40						
12	TO TREE 5/2	5	5	7		STOP	
13	LT 20						
14	PK 5						
15	RETURN TO CALL 3		10				
16	RT 40						Line 6, Table 1
17	TO TREE 10/2	6	10	7			
18	FD 5						
19	LT 20						
20	TO TREE 5/2	7	5	5		STOP	
21	RT 40						
22	TO TREE 5/2	8	5	7		STOP	
23	LT 20						
24	PK 5						
25	RETURN TO CALL 6		10				
26	LT 20						Line 8, Table 1
27	PK 10						
28	RETURN TO CALL 2		20				
29	RT 40						Line 6, Table 1
30	TO TREE 20/2	9	20	7			
31	FD 10						
32	LT 20						
33	TO TREE 10/2	10	10	5			
34	FD 5						
35	LT 20						
36	TO TREE 5/2	11	5	5		STOP	
37	RT 40						
38	TO TREE 5/2	12	5	7		STOP	
39	LT 20						
40	PK 5						
41	RETURN TO CALL 10		10				
42	RT 40						Line 6, Table 1
43	TO TREE 10/2	13	10	7			
44	FD 5						
45	LT 20						
46	TO TREE 5/2	14	5	5		STOP	
47	RT 40						
48	TO TREE 5/2	15	5	7		STOP	
49	LT 20						
50	PK 5						
51	RETURN TO CALL 13		10				
52	LT 20						Line 8, Table 1
53	PK 10						
54	RETURN TO CALL 9		20				
55	LT 20						Line 8, Table 1
56	PK 20						
57	END						

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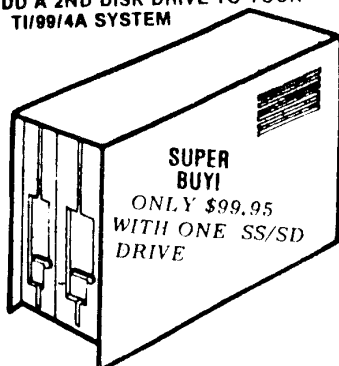
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LOGO—

(Continued from Page 18)

the tree procedure with some randomness added.

```

TO TREE3 :SIZE :THETA
  IF :SIZE < 2 STOP
  FD :SIZE
  LT :THETA
  TREE3 :SIZE / ( (RANDOM + 9) / 4 ) ( (RANDOM + 5) * 2 )
  RT :THETA * 2
  TREE3 :SIZE / ( (RANDOM + 9) / 4 ) ( (RANDOM + 5) * 2 )
  RT :THETA
  TREE3 :SIZE / ( (RANDOM + 9) / 4 ) ( (RANDOM + 5) * 2 )
  LT :THETA * 2
  BK :SIZE
END

```

Table 3. Refinement of TREE procedure to create a squig fractal.

There are now two inputs to TREE3; SIZE and THETA. SIZE determines trunk and branch length and THETA controls the angle between the branches. On the recursive calls a random number is added to the equation to determine SIZE and THETA so the branches are not all uniform. The TI Logo primitive RANDOM generates a value between 0 and 9. Using the formulas in Table 3, SIZE will be in the range SIZE/2 to SIZE/4. THETA will vary from 10 degrees to 28 degrees. We also added a third branch and decreased the stop rule to two, to make the tree more interesting. Now when you execute TREE3 40 20 you see a much more natural looking tree. You may have to run it several times to get a tree you like; after all, it is a random process. This is the first step in producing a realistic computer generated landscape. Many features could be added to complete the design, such as leaves, coloring, shading, shadowing and other computer graphics techniques. But you can imagine the potential that fractals hold.

Some films are now using fractal images for landscape scenes because it is cheaper than going on location. Because fractals do have the ability to emulate nature so well they have been used to

```

TO FOREST :N :SIZE :THETA
  IF :N = 0 STOP
  SXY ( -10 - ( :N - 1 ) * 10 ) ( 90 - ( :N - 1 ) * 10 )
  TREE3 :SIZE :THETA
  SXY ( 10 + ( :N - 1 ) * 10 ) ( 90 - ( :N - 1 ) * 18 )
  TREE3 :SIZE :THETA
  FOREST :N - 1 :SIZE - 5 :THETA
END
TO ROAD
CS
FOREST 8 40 20
SXY ( 5 ) ( 90 )
SKTHREADING 155
FD 150
SXY ( -5 ) ( 90 )
SKTHREADING 205
FD 150
END

```

Table 4. Procedures to draw numerous fractal trees along a country lane.

model nature in chemistry, biology, physics and other fields.

With the TI 99/4A we can explore fractals on a small scale. For example, we can use our tree to draw a forested lane (Table 4).

By drawing numerous trees (N) at different locations (SXY) we can simulate a forest. ROAD draws two rows of trees along a road giving a sense of diminishing perspective. You might also try drawing over TREE3 numerous times without clearing the screen, but change SIZE and THETA to draw a fuller tree. You can fractal computer graphics.

User group update

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

California

Central Valley TI99/4A Users Group, 1914 Regis Dr., Davis, CA 95616. Ratchford Higgins, president. TIBBS at (916) 927-3012. Woody Large, sysop. More than 50 members. Meets at 8 p.m. third Thursday of month at Rancho Cordova Library, 9845 Folsom Blvd. (Sacramento area). Meetings open to public, no charge. Software and book library and newsletter membership \$12 per year.

Florida

Manasota Users Group, 6625 Roxbury Dr., Sarasota, FL 33581. Has 20 members, meets first Monday of each month except July and August at Sarasota County Vocational-Technical Center, 4748 Beneva Rd., Sarasota, Florida. Meetings usually tutorials on TI utilities, with occasional guest speakers on general computer applications. Newsletter. Annual dues \$20.

Mississippi

Jackson TI User Group (formerly Metro Jackson Microcomputer Group), P.O. Box 4425, Jackson, MS 39216. Meets at 7:30 p.m. every Monday at 231 Gaddis St. Annual dues \$12.

Texas

Sun City 99/4A Computer Club, P.O. Box 6966, El Paso, TX 79906. William Borchardt, president. New phone: (915) 751-6844.

Virginia

Old Dominion Users' Group, c/o Gary Sydnor, president, 709 Timken Dr., Richmond, VA 23229, phone (804) 741-3689 or c/o Wayne Stith, vice president, 715 Timken Dr., Richmond, VA 23229, phone (804) 740-6131. Meets second Tuesday of each month in a member's home.

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Cleaning module contacts

Having trouble with computer lockups or just getting your computer started (such as screen garbage when you go into Extended BASIC)? If so the following two-part series may help you solve your problem.

The first part of the series is taken from the Central Iowa Users Group newsletter. The article is by Ron Rutledge. Part II is by Gary Cox and will appear next month. Readers who use the suggestions for cleaning the 4A and its cartridges do so at their own risk.—Ed.

By RON RUTLEDGE

Dirty contacts can screw-up any electrical device and the 4A is not an exception. The only place you are likely to run into this problem is in using command modules. Both the module contacts and the port itself can become dirty, but cleaning the port itself is a big job as you have to disassemble the console. The good news is that cleaning the cartridge will almost always suffice and can be done quickly without special tools or cleaners. All you need is a screwdriver, a rag, a standard pencil eraser, and in some cases a medium phillips screwdriver.

Remove the screw from the center of the cartridge if there is one. Then pry the clips in the outside slots to the bottom left and right of the center screw. If there is a clip in the center instead of a screw, pry it back after the bottom left and right slots are pried

off. If it should bend off don't worry, it won't effect the performance of your module.

The module board can now be removed. Do this carefully and note how the spring-loaded "door" is assembled, if there is one, so that you can put it back together if it pops out.

Once the board has been removed take the rag (a facial tissue will work but cloth is better) and rub off any residue from the edge connector contacts. Do the contacts on both sides if the module has them. Once the worst is removed take any soft rubber eraser and "erase" the contacts until they become dry, clean and shiny. You need to do only the outer half of the contacts as that is much as ever gets worn (you can see the scratch marks on the contacts).

After the cleaning, put the cartridge back together and go.

Symptoms of dirty contacts include the console locking-up and unusual errors where none occurred before. (For example, my dirty Extended BASIC cartridge gives me syntax errors in programs where there were no errors when it was clean.)

Don't jump to clean a cartridge on the first appearance of an error. Such problems may be caused by static and not having the module firmly seated in the cartridge port, among other things. But if you have a continuing problem, cleaning the contacts is quick and cheap and may get you running again.

Seattle company builds box to accommodate 4A-9640-PC combination

A box to hold the Geneve 9640 plus other cards has been developed by Miller Communications of Seattle, Washington, for the Queen Anne Computer Shoppe.

The IBM-AT-style box has a 220-watt power supply with a disk drive controller slot and seven other slots, and will accommodate two hard drives and three floppy disk drives, according to Dave Miller of Miller Communications.

The box will hold two RS232 cards, and Miller Communications' videoflex and frame grabber cards. Key lock and LE status lights are provided, he says.

He notes that the box is configured for TI users and the boards will be vertical as in the TI box. A disk controller card for an IBM clone is available with a switch whereby the user can go between the IBM or the 9640 or 4A, he noted. He said the IBM-type card will also fit in the TI peripheral expansion box. The user would need a new keyboard with the TI, but the board can be used with the same drives. The 256K RAM IBM-type card has a floppy disk controller on board, he notes, and the user can add "layers" to make an extensive IBM system, if desired.

Miller says the box was developed because of the need for a heavy power supply for the 9640 and his fear of packing the TI PE box for fear of overheating.

(See Page 30)

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Archivers confer on Delphi

A committee to establish archiving standards for the TI was established at an archiving conference held Dec. 17 on Delphi's TI NET.

Although such a committee has no "official" status, it is composed of three persons who were described by TI NET sysop Jeff Guide as "in the forefront of developing archiving programs." Al Beard, Barry Boone and Barry Traver. Further along in the discussion, Beard and Traver asked Jerry Coffey, who chaired the conference, to join the committee.

Others participating in the conference from the TI community were Art Byers, Paul Charlton, Paul Gray, Walt Howe, Dave Ramsey, Jim Horn and Scott Darling. Peter Olson, programmer for Delphi and sysop of its Macintosh and Apple sigs, also participated.

Traver said the ability to unpack an individual file "without having to unpack the whole shebang" is an essential feature to an archiving program and one present even in his earlier version of his program ARCHIVER. He noted that the feature is especially important to persons with SS/SD systems.

He said that if he were doing his program now, he would include reserve bytes and room for expansion. He suggested that Boone's projected ARCHIVER III have "librarying" done last if compression and librarying are seen as separate activities so that files can be accessed or cataloged individually. Boone said he had already planned to do so. He said ARCHIVER II 2.3 was released earlier than he had intended because Darling, sysop on GENie, convinced him to do it.

Ramsey commented that the slant on archivers is as a telecommunications device, but that is only one aspect of their possible uses. He said he routinely uses LBR files under CP/M for many other applications, including storing programs that are occasionally run and running them directly from inside the LBR and storing documents in LBRs and accessing them through special utilities. He said TI standards need to be flexible enough to accommodate other applications of the archived files.

Boone said the only problem with this is lack of memory, particularly where compressed files are concerned. Decom-

Archiving conserves disk space, saves money on downloading

Archiving of computer programs is being used by software distributors to save money on media. This is particularly true of non-commercial software distributed or sold under the label of shareware, freeware, user-supported software, etc. In most cases, the distribution diskettes include utilities to decompress the archived programs.

The process of archiving is most beneficial with programs that include multiple files or are very long. The percentage of compression depends on the archiving technique, but it is not unusual to archive a file in such a way that it occupies only 60 percent of the disk space the unarchived program occupies.

Obviously, this also has benefit to those who download software from telecommunications services. Downloading a compressed file doesn't take as long as downloading the same unarchived program. In a medium where every minute costs money, the savings can be significant.

As archiving gains in popularity, it is necessary to adopt a standard so that users won't be confused by a surfeit of archiving utilities. That was one purpose of the Delphi TI NET conference. Of course, whatever standards are eventually adopted or proposed, it would be prudent for users of other telecommunications to do likewise.

pressing LZW (Lempel-Ziv compression algorithm) files is not a problem on the Geneve 9640, he noted, but the TI99/4A defines the standard.

Beard said it is important that archivers contain the ability to least each individual file. Another possible use for archivers, he said, is object (subroutine) libraries. He said archivers should be able to recognize and unpack the TRAVER format.

Olson said he has a "plea" for MS-DOS ARC compatibility because of the "Tower of Babel" effect of different ARC programs for different machines.

Beard noted that "the big missing thing in that archiver format that we need is a file type byte."

Charlton said that since MS-DOS names are 11 characters (8+3 extension), TI names could be treated in the same way, through 10 character+1 type, with the rest of the information TI needs in the first sector of the packed file. After Beard and Ramsey brought up the difficulties other computers would have reading the 11th byte, Charlton said this would not be a problem since it would appear to be part of the 11 characters of the filename. Questioned by Boone, Charlton said it is possible to change a terminal program with file

transfers to download something other than a file with a TIFILES header.

Ramsey said there should be compression and archiving utilities to provide greater flexibility for the user.

Beard said a single file archive is "a pretty isolated case." The usual archive upload is an archive with program source, executables, documents, disclaimers, etc., he said.

Traver commented, however that it can make sense to archive or library a single file, because de-arc'ing restores the original filenames. This can be important for the "average" user, he said, who otherwise can end up with files that can't access one another or can't be accessed at all. "Standard" filenames for other computers and telecommunications services don't work on the 4A, he noted.

He noted that some programs don't run unless they have exactly the right filename, and some novice users don't know how to change filetimes or what to change them to. Un-archiving an archived file automatically gives every file the intended correct name, he said.

A transcript of the conference is available on the Delphi TI-NET.

Printing in multiple columns

By WILLIAM R. BROWN

Brown originally wrote this article for publication in the newsletter of the Sun City TI99/4A Computer Club, of El Paso, Texas. It has been condensed. — Ed.

Multicol is a supplemental format program written in Extended BASIC which uses data files that are produced by TI-Writer. It can produce printouts in either 2- or 3-column formats and in any of three print styles (Pica, Elite or Condensed). Any TI-Writer file may be used provided it has been reformatted to conform to the requirements of this program.

The program generates printouts in a style similar to those used by magazines and newspapers. In addition to the three print styles that are available, all of the capabilities of the printer can also be used. It does require extra care and editing in preparing the data files so that the printouts are what is desired. It will use any D/V 80 file. However, these files will need re-editing and resaving by the Editor Save File function to operate properly with this program.

I recommend using the TI-Writer Editor to produce your data files. The Editor gives you a variety of features plus the use of CONTROL U printer control code functions.

The program provides additionally such features as pagination and left margins for both front and back side of sheet printing to allow for binding. It also has the ability to remove unwanted carriage return and line feed symbols from the data file. Right margin justification is provided by the use of the Formatter print to disk option.

HOW THE PROGRAM WORKS

The first screen is the title screen. Press Enter to advance to the next screen. The second screen has three options. These options are for selecting which control characters are to be removed. Option "C" is for files that have carriage return symbols in them. Option "L" is for files that have line feed symbols in them. Option "N" is for files that have had both carriage return and line feed symbols previously removed.

Files that are saved by the Editor SF function will have carriage return symbols. Files saved by using the Formatter print to disk option (which is used to obtain right margin justification) will have line feed symbols.

Saving files by using the Editor Print File C option will have all control codes stripped off. Note that files saved by the Print File method will need to be resaved by the Save File method so that the program can then use them.

Press Enter and the next prompt asks for Pagination Y or N? If Y is entered, then another prompt asks for page number. If N is entered, then the next prompt is for printout margins on front or back side of page. After this is entered the program goes to the next screen. The first prompt asks for which disk drive number is the data file located. The second prompt then asks for the data file name.

After entering the file name the program goes to another screen which says "LOADING" This remains until the data is entered by the computer into its memory buffer. Then "LOADED" is flashed on. If, at this point there is an error in the data file, a

message will come up on the screen giving the error code number and a message "FILE CANNOT BE FOUND." Then the program goes back to disk drive selection and so forth. The screen does not clear here. This is done so that you can check to see if the wrong disk number was entered or if the file name is incorrect.

After the data has been loaded another screen comes up with the prompt "NUMBER OF COLUMNS PER PAGE." You enter either 2 or 3 here.

The next prompt is for your printer's name. The default name here is PIO. If this is your printer's name then press Enter. Or else, enter your printer's name then press Enter. The next prompt asks for the style of print. "N" is for normal Pica, "C" is for Condensed and "E" is for Elite. After this is entered, a new screen comes up saying "PRINTING" and re-

mains until the printing is completed.

When the printing is completed, the next screen comes up asking "Do you wish to continue?" If continuing is selected, then another prompt asks "Want to clear the stack? Y or N?" You will need to clear the buffers before you can enter another page of text. If "Y" is entered then the screen flashes "CLEARING STACK." When the stack is cleared the screen then flashes "STACK IS ENPTY" and the prompt "PRESS ENTER TO CONTINUE."

Part II of this two-part series will be published next month. Next month's installment includes information about using this Multicol with the TIW Formatter as well as other tips and hints.

MULTICOL

```

100 ! FILENAME MULTICOLS !19
2
110 ! *****
***** !017
120 ! *
* !023
130 ! * A SUPPLEMENTAL - FOR
MAT * !108
140 ! * PROGRAM FOR USE WI
TH * !031
150 ! * THE TI-WRITER
* !031
160 ! * VERSION 2.2
* !143
170 ! * REVISED 18 DEC 198
5 * !053
180 ! * by William R. Brow
n * !073
190 ! * Sun City User Grou
p * !146
200 ! * El Paso, Texas
* !012
210 ! *
* !023
220 ! *uses Ext.Basic, Mem.E
xpan* !173
230 ! *2 Disk Drives, Printe
r & * !247
240 ! *TI-WRITER Word Proce
ssor* !090
250 ! *
* !023
260 ! *****
***** !017
270 ! TI-WRITER REG. T/M TEX
AS INSTRUMENTS !151
280 !131
290 CALL CLEAR :: CALL SCRE
N(5):: FOR B=0 TO 12 :: CALL
COLOR(B,16,5):: NEXT B !215
300 DISPLAY AT(2,3):"A SUPP
LIMENTAL - FORMAT" :: DISPLA
Y AT(4,5):"PROGRAM FOR USE W
ITH" !217
310 DISPLAY AT(6,8):"THE TI
-WRITER" :: DISPLAY AT(8,9):
"Version 2.2" !123
320 DISPLAY AT(14,5):"by Wi
lliam R. Brown" :: DISPLAY A
T(16,5):"Sun City Users Grou
p" !098
330 DISPLAY AT(18,8):"EL PAS
O, TEXAS" !037
340 DISPLAY AT(22,4):"PRESS
ENTER TO CONTINUE" !227
350 CALL KEY(0,K,S):: IF S=0
THEN 350 :: IF K>13 THEN 3
50 :: CALL CLEAR !204
360 DISPLAY AT(2,6):" - FILE
OPTIONS -" :: DISPLAY AT(4,
2):"for files saved by EDITO
R -" !254
370 DISPLAY AT(6,2):"Save Fi
le PRESS 'N'" :: DISPLAY
AT(8,2):"Print File PRESS
'C" !067
380 DISPLAY AT(10,2):"For fi
les saved by" :: DISPLAY AT(
12,2):"FORMATTER PRESS 'L'
" :: ACCEPT AT(12,26)SIZE(-1
)VALIDATE("NCL")KEEP:F$ !254
(See Page 24)

```

MULTICOL—

(Continued from Page 23)

```

390 DISPLAY AT(14,1): "INCLUDE
PAGINATION?(Y/N)" :: ACCEPT
AT(14,28)SIZE(-1)VALIDATE(
"YN")BEEP:C$ :: IF C$="N" TH
EN GOTO 410 !080
400 DISPLAY AT(16,1): "STARTI
NG PAGE NO. " :: ACCEPT AT(1
6,22)VALIDATE(NUMERIC)BEEP:A
!235
410 DISPLAY AT(18,2): "PRESS
'F' FOR FRONT PAGE" :: DISPL
AY AT(20,2): "PRESS 'B' FOR B
ACK PAGE" !066
420 ACCEPT AT(20,26)SIZE(-1)
VALIDATE("FB")BEEP:H$ :: IF
H$="F" THEN H=6 ELSE H=3 !10
3
430 CALL CLEAR !209
440 DIM B$(300):: FOR I=1 TO
L :: B$(I)=" " :: NEXT I ::
L=0 !071
450 DISPLAY AT(7,2): "INPUT F
ROM DISK DATA FILE" !235
460 DISPLAY AT(9,1): "ENTER D
ISK NUMBER 1.2 OR 3" :: ACCP
T AT(9,28)SIZE(-1)BEEP:IN$
!148
470 DISPLAY AT(12,4): "ENTER
DATA FILENAME" :: ACCEPT AT(
14,9)SIZE(-10)BEEP:FN$ !139
480 ON ERROR 990 !234
490 DISPLAY AT(17,6): "LOADIN
G . . . " !164
500 OPEN #2: "ISK&DN$&". "&FN
$,INPUT,SEQUENTIAL,DISPLAY
,VARIABLE 80 !159
510 IF EOF(2) THEN 780 !062
520 IF F$="N" THEN 550 !099
530 IF F$="L" THEN 930 !222
540 IF F$="C" THEN 960 !243
550 INPUT #2: X :: FOR I=L+1
TO L+X :: LINPUT #2: A$ !007
560 B$(I)=A$ :: NEXT I :: IF
ASC(B$(I))>127 THEN B$(I)="
" !129
570 DISPLAY AT(19,11): "LOADE
D" :: L=L+X :: CLOSE #2 !072
580 FOR DELAY=1 TO 400 :: NR
XT DELAY !074
590 CALL CLEAR :: DISPLAY AT
(2,7): "READY TO PRINT" !111
600 DISPLAY AT(4,2): "NUMBER
OF COLUMNS PER PAGE" :: DISP
LAY AT(6,2): "PRESS '2' FOR 2
COLUMNS" !203
610 DISPLAY AT(8,2): "PRESS
'3' FOR 3 COLUMNS" :: ACCEPT
AT(8,28)SIZE(-1)VALIDATE("23
")BEEP:T$ !061
620 DISPLAY AT(10,2): "PRINTE
R PIO" :: ACCEPT AT(10,11)S
IZE(-16)BEEP:PR$ !237
630 DISPLAY AT(14,6): "STYLE
OF PRINT" :: DISPLAY AT(16,2
): "ENTER 'N' FOR NORMAL (PIC
A)" !012
640 DISPLAY AT(18,2): "ENTER
'E' FOR ELITE PRINT" :: DISP
LAY AT(20,2): "ENTER 'C' FOR
CONDENSED" !196
650 ACCEPT AT(20,27)SIZE(-1)
VALIDATE("NFC")BEEP:PP$ :: I
F PP$="N" THEN GOTO 670 ELSE
GOTO 660 !060
660 IF PP$="E" THEN GOTO 680
ELSE IF PP$="C" THEN GOTO 6
90 !001
670 PL=80 :: SP$=CHR$(18)&CH
R$(27)&CHR$(69):: GOTO 700 !
250
680 PL=96 :: SP$=CHR$(27)&CH
R$(66)&CHR$(2):: GOTO 700 !1
98
690 PL=136 :: SP$=CHR$(15)::
GOTO 700 !200
700 CALL CLEAR :: DISPLAY AT
(14,8): "PRINTING . . " !229
710 OPEN #1: PR$,VARIABLE PL
:: PRINT #1: SP$ :: PRINT #1:
CHR$(27);CHR$(80);CHR$(64);C
HR$(0)!104
720 IF T$="3" THEN 880 !161
730 FOR I=1 TO L/2 !073
740 IF LEN(B$(I))=0 THEN PRI
NT #1: CHR$(11):: GOTO 780 !2
24
750 IF PP$="N" THEN Z=39 ELSE
IF PP$="E" THEN Z=47 ELSE
Z=67 !123
760 PRINT #1: TAB(H);B$(I);TA
B(H+Z);B$(I+L/2)!229
770 NEXT I :: PRINT #1: CHR$(
11)!024
775 IF PP$="N" THEN YY=39 EL
SE IF PP$="E" THEN YY=43 ELSE
YY=65 !125
780 IF C$="Y" THEN PRINT #1:
TAB(YY); "Page "; A :: A=A+1 :
PRINT #1: : !160
790 CLOSE #1 !151
800 CALL CLEAR :: DISPLAY AT
(6,2): "DO YOU WANT TO CONTIN
UE?" :: DISPLAY AT(8,2): "PRE
SS ENTER TO CONTINUE" !090
810 DISPLAY AT(10,2): "PRESS
ANY KEY TO QUIT" :: CALL KEY
(0,K,S):: IF S=0 THEN 810 ::
IF K<>13 THEN 820 ELSE 830
!089
820 END !139
830 DISPLAY AT(12,1): "WANT T
O CLEAR STACK?(Y/N)" :: ACCP
T AT(12,28)SIZE(-1)VALIDATE
("YN")BEEP:S$ !142
840 IF S$="Y" THEN 850 ELSE
500 !231
850 CALL CLEAR :: DISPLAY AT
(8,2): "CLEARING STACK" :: FO
R I=1 TO L :: B$(I)=" " !182
860 NEXT I :: L=0 :: DISPLAY
AT(14,7): "STACK IS EMPTY" :
DISPLAY AT(22,2): "PRESS EN
TER TO CONTINUE" !149
870 CALL KEY(0,K,S):: IF S=0
THEN 870 :: IF K<>13 THEN 1
020 ELSE 1010 !098
880 FOR I=1 TO L/3 !074
890 IF LEN(B$(I))=0 THEN PRI
NT #1: CHR$(11):: GOTO 780 !2
24
900 IF PP$="N" THEN W=25 ELSE
IF PP$="E" THEN W=31 ELSE
W=45 !098
905 IF PP$="N" THEN YY=39 EL
SE IF PP$="E" THEN YY=43 ELSE
YY=65 !125
910 PRINT #1: TAB(H);B$(I);TA
B(H+W);B$(I+L/3);TAB(H+(2*W
));B$(I+2*L/3)!230
920 NEXT I :: PRINT #1: CHR$(
11):: GOTO 780 !248
930 INPUT #2: X :: FOR I=L+1
TO L+X :: LINPUT #2: A$ :: P=
POS(A$,CHR$(10),1):: IF P=0
THEN B$(I)=A$ ELSE B$(I)=SEG
$(A$,1,P-1)!125
940 IF ASC(A$)>127 THEN B$(I
)=" " !201
950 NEXT I :: GOTO 570 !236
960 INPUT #2: X :: FOR I=L+1
TO L+X :: LINPUT #2: A$ :: P=
POS(A$,CHR$(13),1):: IF P=0
THEN B$(I)=A$ ELSE B$(I)=SEG
$(A$,1,P-1)!128
970 IF ASC(B$(I))>127 THEN B
$(I)=" " !128

```

(See Page 34)

What the manual doesn't say

Getting started with MDOS

©Copyright 1987 by Walter Howe
By WALT HOWE

This article is the first in a series designed to help you get the most out of the Myarc Geneve 9640's operating system, MDOS. The article is being written after release of MDOS, version 1.0. Version 1.1 is scheduled to appear soon, and probably will have been released by the time you read this. What I have to say this month about MDOS should apply to either version, but if there are any exceptions, they will be brought up to date in a future article.

MDOS takes care of all your routine disk and file utilities and a lot more. If you are a long-time 99/4A user, you took care of disk management first with TI's Disk Manager 1 or 2 cartridge. Later on, improved disk managers came along, including the CorComp Disk Manager, DM1000 from Canada and Myarc's Disk Manager III, among others. Whichever one you used, you need the utilities to initialize (format) disks, catalog disks, copy disks, copy files, protect files from accidental erasure, delete files, rename files and disks, and so on. With MDOS, all these capabilities and much more are resident in the operating system and can be used without loading any other programs.

Those who work with IBM PCs or their clones are already familiar with many of the features of MDOS. MDOS was designed to look like PC-DOS or MS-DOS for those computers. The program code is completely different, but its familiar appearance makes it easier to learn. (This article is written primarily for non-PC users, although it will help point out some of the differences from MS-DOS as well as some of the disparities in the 9640 manual. The article does not try to replace the manual, which is better written than most, but concentrates on those things that are incomplete, have changed since the manual was written, or that new users have repeatedly had questions about. The focus this month will be on the commands that everyone must use in a basic 9640 system.

BOOTING MDOS

Before you turn on the Geneve, you must have MDOS in one of three places.

The built-in software tells the computer to look for a file named SYSTEM/SYS (the filename for MDOS) on either a hard disk, a Horizon or comparable RAMdisk or on disk drive 1. The Geneve manual does not mention the Horizon RAMdisk for booting, but it was included, because the Horizon RAMdisk was well-designed for the purpose and many 99/4A owners were buying or building them, including some of the programmers working on the system software. However, the 9640 will NOT boot from MYARC's own RAMdisk.

The first time you boot the system, you will probably be using drive 1. (The uses of the Horizon or hard drives will be covered in future articles.) When you turn on the power to the system, it runs some diagnostic checks, loads MDOS, asks you for the correct time and date if not already entered (or sometimes even if it has been), looks for a file named AUTOEXEC on the same drive you loaded from, and confronts you with the:

A > prompt.

There are two systems of designating drives in the 9640 that MDOS recognizes. One is the familiar designation of DSK1, DSK2, etc. used with the 99/4A. The other is the use of letters A, B, C, etc. When you power up, the letters A through D stand for floppy drives 1 through 4, respectively. The letters E through G stand for hard drive s 1 through 3, whether you have them or not. On the other hand, while DSK1 through DSK4 represent the same thing as the letters A through D, DSK5 represents an internal RAMdisk (if you have one set up with an AUTOEXEC file), and DSK6 and DSK7 are set aside to represent RAMdisks on separate cards such as Horizon's. When performing disk operations, you can use the letters or the usual DSK designations, although the syntax (format) is different for each.

The letter in the prompt is the designated active drive, and you can change it by typing another letter followed by a colon. If you type:

A > c:

or

A > C:

the prompt will change to C >. The advan-

tage of this system is that as long as you want to use the drive designated by the prompt, you do not have to enter the drive in a command at all. For example, to get an onscreen directory of DSK3, all of the following commands will produce the same result:

C > DIR

A > DIR C:

B > DIR DSK3.

Note that the colon (:) after the letter or the period after the disk number is essential. If you type just DIR C, for example, after an A > prompt, MDOS will look for a file named C on the A drive to list in the directory instead of using it as the drive indicator.

ASSIGN

The ASSIGN command (page 76 of the 9640 manual) can be used to redesignate what drives the letters represent. The command does not work exactly as shown in the manual. If you have set up a RAMdisk in an AUTOEXEC file (more on this next month) and you want to redesignate the letter C to stand for the RAMdisk at DSK5, you must use the following exactly as shown:

ASSIGN C=DSK5:

This is not done automatically as the manual suggests. A similar common application is to assign D or E to a Horizon RAMdisk at DSK6 using exactly the same format. If you type the command ASSIGN by itself, it does not cancel previous changes as stated in the manual, but instead lists the current assignments on screen.

FORMATTING DISKS

Before you can use a floppy disk of your own, it must be initialized or formatted (page 39). Depending on which controller card (Myarc, CorComp or TI) you are using, there may be several formats you can use ranging from 360 sectors to 2880 sectors. The one common format that all controllers and drives can use is single-sided, single-density (SSSD). This format places 9 sectors with room for 256 bytes or characters per sector on each of 40 concentric circular tracks on the disk for a total of 360 sectors and approximately 90,000 or 90k bytes of information. Because this

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MDOS—

(Continued from Page 25)

is the common denominator for all controllers and drives, nearly all commercial disks for the 4A and the 9640 come in that format. If you have double-sided drives, the available space doubles to at least 180k and 720 sectors with all disk controllers.

When you format a disk, MDOS can tell whether you have double- or single-sided drives and picks the larger available format. To format in single-density, just type the word **FORMAT** after the prompt and enter it. If you want to format a single-side only when two are possible, type **/1** after the word **FORMAT**. For example:

```
A> FORMAT /1
```

To format in another drive than the prompt, just include the drive designator. For example:

```
A> FORMAT B:
```

or

```
A> FORMAT DSK3.
```

Most disks, even if they are marked single-sided, will work on both sides if you have a double-sided drive. When you format a disk, the operating system looks for bad sectors and omits them from the sectors available for use, so that you won't spoil a copied file by writing part of it on a bad sector.

With the Myarc and CorComp controllers, you can use double-density drives as well. All but the oldest disk drives will work just as well in double-density as in single-density. Double-density places 16 or 18 sectors on a track instead of 9. To format in double-density, include **/16** or **/18** after the **FORMAT** command. To format a single-sided, double-density in drive 3, the correct syntax is:

```
A> FORMAT C: /1 /18
```

or

```
C> FORMAT /1 /16
```

If you want to add a volume label (diskname) to the disk when you initialize it, include **/V** and you will be prompted for the name at the appropriate time.

```
B> FORMAT /V /1 /18
```

One more option is available that is not mentioned in the Geneve manual. MDOS also supports 80-track drives, either 5 ¼ inch or 3.5 inch (720k type ONLY — you CANNOT use the variable speed 1+ megabyte drives), with the Myarc and CorComp controllers. This option can be used only with specifically 80-track drives.

Eighty-track is sometimes referred to as quad-density, although strictly speaking quad-density correctly refers to higher density per track rather than more tracks. With 80-track drives, a double-sided drive has 2880 sectors or 720k at 18 sectors per track. Many ordinary floppies can handle 80-tracks, but if you find problems with one brand, try another, or switch to a brand rated for 80-tracks. Do NOT use so-called high density floppies, which are for true quad-density and are not compatible. To format in 80-tracks, add **/80** at the end of the command line, for example:

```
A> FORMAT C: /V /1 /16 /80
```

If you have 80-track drives and a CorComp controller, you may find that 18-sector format does not work properly. If so, try 16-sector format. With 80-track, we have looked at all the options directly supported by MDOS, at least until someone writes or activates routines to change interlace and skew, two more characteristics of disk initialization that can affect the speed of reading and writing to floppies. MDOS does have built-in support for these characteristics, but they cannot be accessed through direct commands at present.

NOTE: If you have a Myarc controller, high quality drives, and want to increase the speed of your drives even further, do not use MDOS to initialize your drives! Use Myarc's Disk Manager III instead, in which you can set interlace. With the 4A or 9640, the number specified as the interlace refers to the number of disk rotations that are required to read a track of a disk completely. An interlace of 2 means that the track is completely read in two revolutions by reading every other sector in each rotation. When the disk is formatted, it is set up so alternate sectors are used and the remaining sectors are used on the second revolution. An interlace of 1 would mean that the complete track could be read in one revolution, but this is beyond the capability of most systems, because there must be enough time after reading a sector to move the contents out to memory before reading the next sector. Similarly, there must be time for the disk drive head to move to the next track after a track has been fully read. By the time this is done, the beginning of the next adjacent sector has already gone by.

For single-density, try an interlace of 2. With good drives, you will see very fast read operations. For double-density, try an interlace of 3 or 4. Use the fastest setting on the DIP switches found inside the controller. If you have older drives, such as TI's original drives for the PE Box, you will have to use the slower setting in most cases and a larger interlace.

DISKCOPY

DISKCOPY (page 41) makes a duplicate of a disk. The advantage of **DISKCOPY** in MDOS over similar features in separate managers is that it will use all available memory, if necessary, to copy a disk. You can copy up to a **DSDD** 16-sector track disk in one pass this way. This is particularly convenient with single drive systems. The format is:

```
A> DISKCOPY [sourcedrive] [targetdrive]
```

such as

```
A> DISKCOPY DSK2. DSK3. or DISKCOPY B: C:
```

If you only list one drive, it assumes that the drive listed is the source drive and the drive represented by the prompt is the target. Remember the phrase "PROMPT IS TARGET" or "PIT" and you will keep them straight. If no drive is listed, MDOS assumes single drive copying using the prompted drive. Exactly the same rules apply to designating drives for file copying with the **COPY** command.

COPY

The **COPY** command (page 43) lets you make a copy of one or more files (see **WILDCARDS** below). Normally the new files will have the same filename as the source files, but if you type a different filename for the target, the filename will be changed for the target. A word of warning! MDOS recognizes commands in both upper and lower case, and you can even create files with lower case filenames. Use lower case filenames with caution. You can create a file with a lower case filename, but many programs in 4A mode, for example, MY-Word, will not recognize it or even let you enter it in order to load it.

A problem that many 9640 users run into very quickly is trying to **COPY** a file with a slash (/) in the filename, as for example, when trying to back up the **SYSTEM/SYS**

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MDOS—

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file. MDOS recognizes slashes as parameter indicators, not as part of the filename. Attempts to COPY SYSTEM/SYS do not work! The problem can be solved easily through the use of WILDCARD characters (page 37). Replace the last part of the filename with an asterisk or replace the slash with a question mark and you can then COPY the file. If you refer to the filename as SYS* or SYSTEM?SYS, it will copy successfully. Another way to do it if you need an exact match because of similar filenames is to enclose it in quotes.

4A programmers have been systematically using slashes in filenames for years. They are often used to separate filename extenders where other computers use periods. With the 9640, avoid slashes from now on. Use a dash or underline in its place. See the top of page 37 for the complete list of allowable symbols.

Note that the 4A's system of using consecutive filenames for sections of assembly programs or for saved cartridges lends itself to wildcard usage. You can COPY the full set of GPL files with a command like:

```
A> COPY GP* B:
which will copy all six GPL files from drive B to drive A.
```

COPY is a versatile command that can copy information to and from devices other than disk drives (see page 69). If you use

CON (for console) as the first listed (source) device and a filename as the second (target) device, you can create a text file consisting of what you type from the console. In this case you continue until you type a control-Z, which writes the file to disk. Next month we will look at using this method to create AUTOEXEC files to configure the system on power-up, tailor your prompts, load files, and create menus. Entering the command:

```
A> COPY CON AUTOEXEC
will start a text file in the A> drive with the filename AUTOEXEC.
```

Another use of the COPY command lets you turn your system into a typewriter. PRN is the device name for your printer. COPY CON PRN will print whatever you type from the console after you enter the command until you type a control-Z.

You can similarly COPY a text file to printer with: A> COPY TEXTFILE PRN COPY TEXTFILE CON will display the textfile onscreen, but the more usual way to do that is to use the TYPE command (page 43). TYPE TEXTFILE will rapidly scroll the text of the file name TEXTFILE on the screen. If you want the file to pause after every page (22 lines), follow with the parameter /M. This does not appear in the manual, but the command TYPE TEXTFILE /M will pause after every page until you strike any key to go on to the next page.

OTHER DIFFERENCES FROM THE MANUAL

To scroll the command stack (page 34), use the up and down arrow keys instead of F1 and F2. Screen scroll using F3 and F4 (page 35) is not supported at all in MDOS, version 1.0, but will be in a future release.

The TIMODE command (page 74) is not supported in MDOS 1.0, but the RAMdisk and Spool functions are automatically set when you load the GPL files for 4A mode. In MDOS 1.0, you cannot set up the RAMdisk from MDOS, load files and carry them forward into GPL mode. When the TIMODE command is implemented, it will add the carry forward capability.

Hard disk functions are not supported in MDOS 1.0 and will probably not be supported in MDOS 1.1. A special version will be issued for hard disk controller purchasers, to be tentatively called MDOS 1.1H.

CONFIGSYS files are not supported as described on page 71. Use the filename AUTOEXEC in all such applications.

NEXT MONTH

This month's article has concentrated on differences between the manual and undocumented features that you can use. Next month, we will look at practical ways to use AUTOEXEC and BATCH files to customize your system and make it more useful.

Geneve

Using the Horizon RAMdisk

By MIKE DODD

Using the Horizon RAMdisk with the Geneve has been a major cause of confusion. The following is an attempt to clarify the problem somewhat.

To use the Horizon RAMdisk with the Geneve, you must set the CRU base to >1400 or >1600. A Horizon at >1400 will respond as DSK6., and a Horizon at >1600 will respond as DSK7.

The Genial Computerware Horizon RAMdisk EPROM is NOT required to use the Horizon for normal storage. It is required, however, if you wish to boot MDOS (SYSTEM/SYS) from the Horizon

— MDOS will not boot from a Horizon using the Horizon-supplied ROS.

If you do not have the Genial Computerware Horizon RAMdisk EPROM, you must format the Horizon with a Geneve (i.e. the MDOS command FORMAT DSK6. /18 /2). After doing so, you will not be able to access the RAM-disk using a 99/4A, unless you reformat with the 4A. In other words, you can use the Horizon on either the 99/4A or the Geneve, but not interchangeably.

If you have the Genial Computerware EPROM, you can use the Horizon RAM-disk interchangeably between the 99/4A

and the Geneve. It may be formatted with a 99/4A or MDOS.

There now exist much larger Horizon RAMdisks, in sizes up to one megabyte. However, their compatibility with the Geneve has yet to be fully established.

There is one small error in the 9938 VDP manual: on page 78, the EQ bits are inverted. It should read:

“EQ: When 1, ends execution when border color is found.

When 0, ends execution when a color other than the border color is found.”

Thanks to Ron Walters of Cleveland,
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OH, for this information.

A commonly asked question about the Geneve is whether or not it is possible to add external DSRs to the Geneve. Some explanation is required here: a DSR (Device Service Routine) is a program that controls a peripheral, i.e. disk controller, RS232, RAMdisk, clock card, etc. On the 99/4A, whenever you attempt file access (e.g. OPEN #1:, SAVE, OLD, etc.), the computer searches all the external peripherals (i.e. the cards in the PEB) for a name equal to the name of the device you are trying to access (e.g. DSK1, RS232, RD, etc.). The disk controller card has five devices listed: DSK1, DSK2, DSK3, DSK4, and DSK (except the TI controller, which does not have DSK4). When the computer finds the correct name, it executes the program contained in the DSR. This program handles interfacing to the hardware and passing information back to the computer. Almost all future devices, such as a RAM-disk, will require a DSR to work.

The Geneve, instead of searching the external peripherals, contains a single master DSR routine for almost all current peripherals: the disk controllers, RS232 cards, and Horizon RAMdisk. If you were to plug in a new card with an external DSR, such as DataBioTics' soon-to-be-released Grand RAM card, you could not access it with the Geneve, as MDOS does not do external searches if it does not have the DSR programmed into it. In other words: no, it is not currently possible to add external DSRs to the Geneve. However, a programmer for MYARC has stated that MYARC is considering adding a routine to MDOS that will do external searches if it doesn't recognize the device, so perhaps sometime in the future this will change.

MG EXPLORER

MG Explorer is a wonderful debugger program. It may easily qualify as the single most complex program ever written for the 99/4A. Since Bytemaster Computer Services (171 Mustang St, Sulphur, LA 70663-6724) is now offering Explorer in an unprotected form (available for \$25 + \$2 s/h), Geneve owners can run this program — almost.

MG Explorer uses many direct CRU

keyscans, which often have a nasty habit of thinking you pressed a control key, when, in fact, you didn't. This causes MG Explorer to take off on some other task, often locking up the program. The easiest solution is to remove the CRU keyscans. While this is not a total fix, it does help quite a bit. A word of warning: once you start continuous execution (with CTRL-2), you can not switch screens (CTRL-1) or stop until MG Explorer hits a breakpoint. So, don't forget to set the breakpoint!

To make the changes, use a sector editor. Don't forget to change both versions (EXP/Q/R, EXP½/3). Make sure you change a backup copy! All sector and byte numbers are in decimal.

In the first file (EXP and EXP1), you will need to make nine changes. In sector 23 of the file (24 if counting from 1), change hex >3606 to >0706 at the following bytes: 18, 80, 108, 164, 192, 242. In the next sector, change the word at bytes 14, 64, 92.

In the second file (EXQ and EXP2), you will need to make two changes. In sector 24 (25 if counting from 1), change the word at byte 254. In the next sector, make the change at byte 28.

I have heard many complaints that the Thorn EMI games (i.e. River Rescue, Submarine Commander, and Computer War) will not run on the 9640. The reason for this is that those games use a CRU keyscan — that is, they scan the 99/4A keyboard directly, rather than use the standard console routine for this. Since the Geneve uses such a different keyboard approach, the programs do not work on the Geneve.

There is one type of CRU keyscan that will work on the 9640 — direct scanning of the joystick. One program that uses this method is J. Peter Hoddie's joystick interrupt program, published in the October 1986 issue of MICROpendium. The article with the program states that it will not work on the 9640 — this is because at that time it was assumed that the joystick scan method would be different, as well as the keyboard. However, Myarc decided to use the same method as the 99/4A did for scanning the joystick — thus, Hoddie's program will work on the Geneve.

Few terminal emulator programs will work on the 9640. This is because most TE programs use a CRU keyscan for faster

speed. The 99/4A standard key scan is horribly slow (relatively speaking) and would cause a loss of characters with many TE programs. The known working TE's are: P-Term, Mass Transfer V3.9 and earlier, some versions of Terminal Emulator II, and Paul Charlton's Geneve version of Fast-Term. A note about the Geneve version of Fast-Term: the print spooler will not work with a TI or Myarc RS232 card if PIO is selected. The program will spool to the CorComp PIO or any RS232 port.

OTHER NEWS

J. Peter Hoddie has released two loaders for MY-Word that are different from the MY-Word loader being distributed by Myarc. One, called ED, does not load the formatter or help screens. This is useful for quick edits of text files or assembly source files, where the formatter is not needed. The other loader, called RE, only loads one file (CONTROL) and then restarts MY-Word. RE assumes that MY-Word had been previously loaded and has not been corrupted by any other programs. Currently, the only programs that run from GPL mode which use the additional memory and therefore might kill MY-Word are: Myarc Disk Manager III V2.0 and higher, the Myarc version of Multiplan, and Hoddie's MEGASORT96 program.

One programmer is currently working on a mouse interface for the 9640 that would use the mouse much as the Macintosh computer does. This would be a major addition to the currently rather sparse number of applications that use the mouse.

Many people have reported difficulties using their joysticks on the 9640. The problem is that MDOS scans the joysticks backwards — all calls to joystick 1 actually go to joystick 2, and vice versa.

Several people have reported difficulty using the TI-Artist program as patched from the instructions in the November 1987 MICROpendium Geneve article. I am trying to ascertain why these problems exist — on some systems, the patch works perfectly, while on others, the program will not work at all. The problem occurs when you exit the TI-Artist section with FCTN = to return to the main menu. Once you get there, the computer seems to lock up, refusing to accept any additional

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keypresses. Chris Faherty, author of TI-Artist, is reportedly working on a solution to the problem.

Interlace refers to a condition set in the VDP chip which causes all horizontal lines to be doubled. With interlace off, every other line is blank, which can cause dotted-looking text. With the interlace on, however, the blank lines are filled in, causing the text to look fully formed. The problem is that not all monitors can handle interlace mode — selecting it causes the screen to rapidly vibrate, which can quickly cause severe eye-strain. Some Geneve programs allow you to select whether or not you want interlace on or off. MY-Word toggles the interlace with the I com-

mand from the main command line. MY-Art toggles interlace with the CTRL-I key. For those programs that do not allow toggling, if it is in GPL mode, you can press CTRL-SHIFT-ALT (all on the left side of the keyboard) to toggle interlace. The CTRL-SHIFT-ALT keypress also toggles the number of lines on the display (24 or 26 ½). The first time you press the keys, it switches to 24 lines, interlace on, then 26 ½ lines, interlace off, then 26 ½ lines, interlace on, then back to 24 lines, interlace off. This can be useful for those people with monitors that can handle interlace mode, since almost all programs run with interlace off. It can also be used in Fast-Term Geneve to turn the interlace off, for those who do not have compatible

monitors. This keypress does not currently work from MDOS.

An undocumented keypress from MDOS is CTRL-SHIFT-SHIFT. When running in GPL, of course, this will return you to the cartridge loader screen. When running in MDOS, however, this will do a cold boot of the system, returning you to the swan screen and reloading SYSTEM/SYS.

Mike Dodd is planning to devote a future column to problems that users have with the Geneve. Readers who'd like to submit a problem for consideration should mail it to Dodd at 116 Richards Dr., Oliver Springs, TN 37840.

Software planned for 1st quarter

Geneve 9640 owners have several software releases to keep track of during the first quarter of 1988, according to company spokesman Jack Riley. Among these are Version 1.0 of the GPL interpreter, Version 1.1 of MDOS, Myarc Advanced BASIC and Pascal Runtime.

Also scheduled for release during the first quarter is the Myarc floppy/hard disk controller. A 1.5 megabyte memory expansion is planned for a mid-year release. According to Riley, up to 1 megabyte of RAM can be partitioned for use as a battery-backed RAMdisk.

Expected for release in the second quarter is GEME (Graphics Enhanced Multi-Tasking Environment), a windowing-multi-tasking program. A database manager with relational capabilities is expected by September. Also contracted for development is a Computer Aided Design (CAD) program by the author of MY-Art. Also, Myarc is soliciting suggestions from users about a terminal program that would be released this summer. Submit suggestions to Myarc at TE Ideas, P.O. Box 140, Basking Ridge, NJ 07920.

Other programs to look for are a mouse-supported disk manager, Forth and an upgrade of MG's Advanced Diagnostics for the Geneve. A flight simulator is under development as well as a MIDI. Most of

the products mentioned in this article are being developed outside of Myarc, and under contract. The flight simulator is a third-party project.

An upgrade of MY-Art also has been released. MY-Art 1.4 supports mirror imaging in both the vertical and horizontal axis. Expected for February release is the capability to output MY-Art drawings to color printers.

As of Jan. 1, all 9640s are being shipped with a 101-key AT-style keyboard. Full use of this keyboard requires GPL interpreter Version .99 because of additional key codes. Version .98 of the GPL interpreter does not read all the key codes of the new keyboard.

Previously, Myarc has announced development of a 1-2-3 clone called MY-Numbers, a C compiler and a BASIC compiler for the Geneve.

Riley noted that Myarc will release a "fix" for Plato programs that will allow them to be used on the Geneve. Riley said that other TI programs that fail to run on the Geneve may also be addressed in this way. He indicated that such program patches will be made available through dealers.

Also released is PDS (Programmers Development System) with links, macros and manuals. Riley described it as "a professional grade developers kit," and said

that it is patterned after the programmers development package for the Commodore Amiga.

Version 1.1 of MDOS supports all commands. Version 1.0 of the GPL interpreter carries forward print spooler and RAM-disk memory configured while in MDOS. Both of these are being shipped, along with the final version of Multiplan.

The Pascal and Advanced BASIC programs are going through a beta test loop involving a number of users in February. According to Riley, this should assure completely finished products prior to shipping. In the past, Myarc has shipped software, such as MDOS, in varying stages of completion. While some users appreciated this approach, rather than having to wait for a final version, others were frustrated. Both of these programs will be shipped to 9640 purchasers in late February.

The Pascal program, developed by Pecan Software, of Brooklyn, New York, is expected to run any Pascal program written to USCD Version 4.22 specifications. It will provide access to Fortran 77 and LISP, according to Riley.

Advanced BASIC promises several advantages over Myarc Extended BASIC 2.1, which has been included with the Geneve. XB 2.1 runs on 128K of memory out of the GPL environment. This limits

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KWIKFONT

Assembly language made easier

By BOB CARMANY

Have you ever tried to read the TI Editor/Assembler manual and, like most of us, just got discouraged and gone on to something a little more simple?

Have you ever wished you could understand what all these "strange" A/L directives are?

If you have ever used the TI-supplied character definition program from the BASIC manual, this program is a real eye-opener! Nothing can be more trying than trying to redefine some graphics characters for a game program and it can be impossible to try to redefine an entire character font for that "special" effect in your programs. KWIKFONT will make these chores much, much easier.

The program was written by Wayne Stith (author of HYPHENATOR) and, amazingly enough, takes up both side of a "floppy." A long program? Not really, the program itself is short — 45 sectors for both files. The rest of the disk is taken up with documentation!

Performance: KWIKFONT is a font/character redefinition program that is supplied as two program image A/L files. It has a multitude of functions (rotate, mirror, load, save, etc.) These are all documented in a nice little "Help" option that is selectable with a single keystroke, as are all the functions. The redefinition program works quite smoothly and presents a magnified box with cursor control to edit any character that you wish from ASCII 32 to 143. It loads easily from any cartridge that will load a program image file. Although the Editor/Assembler cartridge is the primary loader, KWIKFONT will also load from TI-Writer and, naturally, from FUNNELWEB.

Everything works smoothly and the redefinitions are fast and convenient to use. KWIKFONT works faster and more efficiently than any of the other font design or character definition programs that I have seen.

Ease of Use: This is probably one of the most "user-friendly" programs I have encountered recently. It requires NO documentation because it is completely menu-driven. The "Help" option will answer

Review

Report Card

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

Cost: \$6

Manufacturer: Wayne Stith, 715 Timken Ave., Richmond, VA 23229

Requirements: Console, monitor or TV, disk system, 32K memory expansion, E/A, TI-Writer or FUNNELWEB (or other program image file loader), printer optional but strongly recommended.

any questions you may have and there is even a short program included to help you retrieve the characters you create. I had no problems loading the program and redefining and changing characters from the first time I used it.

Documentation: This is the truly amazing part of the program package! When I got my copy of KWIKFONT, one of my friends mentioned that the documentation included "commented source code." I was prepared for a terse half-line of comments after every line or two of source code. Well, this hardly prepared me for what followed! The first thing I did was made up a little TI-Writer print file to load the separate documentation files that come with the package. I then ran the whole "mess" through the Formatter. I had doubts, as time wore on, if there was an end to the documentation. The Formatter "churned" out some 78 pages of documentation that are among the best I have seen. This was truly a labor of love.

The whole thing is done much in the pattern of the MG Night Mission package. Each section of source code is *fully* commented — not with a few lines, but in most cases with paragraphs or more. When used in conjunction with the texts referenced in the beginning of the documentation, it

becomes an excellent "idiot's" tutorial in assembly language. If there were a way to rate the documentation I would certainly do it! The documentation alone is worth far more than the asking price for the package.

Value: This is probably one of the best values I have seen on the "fairware" market. The program is excellently put together. The character redefinition portion is fast, convenient to use and completely user-friendly. The documentation is excellent and well-written. Everything is clear and easy to understand. It makes an excellent beginning A/L tutorial when it is used along with the E/A manual. Much of the material that is either missing or not fully explained in the E/A manual is clarified in Stith's documentation. For the price of \$6 (which includes the disk as well), you can hardly go wrong! I would encourage anyone who does significant work with graphics to latch on to this little beauty at the first opportunity! This package takes the drudgery out of character development and has encouraged my feeble attempts at assembly language programming.

I would encourage anyone who has struggled with the complexities of assembly language to send Stith a \$6 "donation" for his efforts — you won't be disappointed!

BOX—

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The basic box retails for \$329.95, according to Barbara Wiederhold of the Queen Anne Computer Shoppe. The 256K IBM-type card sells for \$399. Dealer inquiries are welcomed, she says.

She notes that the boxes are assembled in the United States and all the parts needed for them are readily available in this country.

For further information, contact the Queen Anne Computer Shoppe, 6102 Roosevelt Way, N.E., Seattle WA 98114 or (206) 522-6558 or (206) 622-9400 (answering service 8:30 a.m.-5 p.m. M-F).

EZ Keys

Taking the drudgery out

By HARRY BRASHEAR

I want you to remember a name. Harry Wilhelm! Got that? I'm pretty sure you've never heard it before, but you're going to hear it very often, very soon. The upper echelon of TI-dom had best get on its toes because Harry's the originator of EZ-KEYS, which is being distributed by Asgard Software. This is his first attempt at commercial software and it looks like a super pro job. He's working with a minimum TI system right now and I shudder to think of what he's going to do with a full blown system. I can't wait to see, either!

At first I had a little problem figuring out exactly what kind of program EZ-KEYS really is because it's very hard to describe. There are at least two or three pieces of software on the market already that allow you to program your function and control keys, and this seemed for all the world like another one of them. Frankly, that kind of thing never excited me. The ability to hit one key and have LIST "PIO" execute seemed like the epitome of laziness. After thoroughly reading the extensive docs, though, I decided that EZ was a lot more than that. Some say there has never been anything like this for the TI, and it's true.

EZ-KEYS is a programmer's environment, made up by the programmer to take all the drudgery out of his work. At the same time, however, it's also for the non-programmer, the user, if you will. Everyone has need for this package.

Yes, it does what you suspect it does — program your keys, 55 of them to be exact. It also allows you 668 characters of programming per key, and you can embed up to 16 levels of key passes. In other words, one key can call a second, etc. It sounds very complicated, but it's not. I was able to set up this program after one good reading of the docs, and about an hour later I was comfortable with it.

That's not to say I mastered it. I just started figuring out a small percentage of the fantastic power it has for making computer chores a lot easier.

Lets get on with the details. First of all, a couple of built-in CALL LINKs.

Review

Report Card

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

Cost: \$14.95 — 50 cents shipping
Manufacturer: Asgard Software, P.O.
Box 10306, Rockville, MD 20850

How many times have you locked up your computer in the middle of line 1200 and haven't saved to disk since line 250? (Darn! and you promised yourself that you would save every 10 lines.) That will never happen to you again. EZ-KEYS has a built in "savings plan" you can "bank" on. CALL LINK("AUTO",8) will save your program to disk approximately every eight minutes all by itself. The time period can be from one to 18 minutes. (Of course, it's based on an interrupt, so the time is not accurate.) It's quite a shock to be typing along madly on a program, finish a line, hit enter and up pops SAVE DSK1.BACKUP1. You don't have to hit enter or anything, it just goes to the drive. Spooky, huh! Well, you wanted your computer to do things for you, didn't you?

CALL LINK("HILITE") is simple, and valuable. It highlights all numbers and arithmetic operators while you are programming. No more confusion between "I" and "1" or "O" and zero. Great for debugging that type-in program that won't run.

CALL LINK("RCOLOR",Fground,Bground) will set color to all character sets from within a running program.

CALL LINK("EZKEYS") and CALL LINK("OFF") toggles the EZ editor, the meat of this package.

The EZ-KEY EDITOR is, to say the least, the invention of a diabolical mind. Real twilight zone stuff to the TI computer, but easy enough for anybody to handle. The program is accessed via XBASIC autoload. I should point out that I have had no

trouble using it with the Super Extended BASIC cartridge and am presently keeping it in my Horizon RAM for quick retrieval. (It's only 40 sectors, and you are expected to make copies of the disk for your own use.)

You are greeted with a title screen and a blinking cursor ready for programming on a colored screen. At this point you may want to use the final CALL LINK, which will set your programming screen colors, editor screen colors, and the colors of some special characters we will discuss later.

FCTN 5 puts you into EZ-KEY editing mode. There is a status screen first, telling you what keys have been programmed, and how many bytes of memory are left for you to use. By pressing the key you want to program (i.e. CTRL=), you are sent to the editing screen. If you just bought the program and would like to see what's happening, by all means, press CTRL=. This macro has been preset to give you a disk catalog.

The cataloguer is just an Extended BASIC program, but that's where the similarity ends to anything you have ever seen before. This macro looks like you had set up a program in TI-Writer without carriage returns, and then hit reformat. The line numbers are buried in with the code, as are various predefined control characters that show up in a reverse color pattern. These characters are for ENTER, CTRL, FCTN, arrow keys, or anything you normally can't detect in a program. In other words, the cataloguer looks like one continuous chain of code, no spaces. You can edit anything you like there, and that's another neat wrinkle — full screen editing! The FCTN arrow keys will put you anywhere you want on the screen, and you can use standard editing controls from there.

Okay, fine. Now kick out with the FCTN 5 again twice and you will return to BASIC. (EZ-KEYS calls it "BASIC," it's really XBASIC.)

Try the macro out by pressing CTRL= from command mode and here's what happens: The macro first LISTS itself as a program would, as lines 1 to 9, then

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EZ-KEYS—

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You enter the drive number, it executes a directory, then it deletes itself! It has no effect on the program you are working on as long as you follow the instructions. It is recommended that you start your programming at line 100 so that the macros don't use your line numbers.

One of the permanent features of EZ-KEYS is the ability to run up and down through a program line with the FCTN 6 and 7 keys, very handy for those long code lines that you need to get to the end of quickly. There are also macros provided that will delete everything to the right of the cursor and kick you back to the beginning or end of a line of code. If you would like, you can set up a super eraser by programming a macro as FCTN 3:FCTN X. This would erase the line the cursor is on and then bring up the next line with a single key press. Neat, huh?

I want to straighten out an idea that some of you may have gotten by now. Many people have been buying the Super Extended BASIC and may think that they have many of the features of EZ-KEYS program already covered. I don't agree. It's true that many of the editing features and color calls are already yours, but this program makes these all the more powerful. Things such as LIST "PIO":28:1-30000 can be had with one key stroke instead of typing it all out. Plus, you can initialize the printer to enhanced mode at the same time.

Here's one that I created that was a real step saver: To get to Draw 'n' Plot in Super XBASIC, you have to type in four commands (refer to MICROpendium review, September, 1987). Since NEW has no effect on EZ-KEYS, I was able to set up a macro to take me right to Draw 'n' Plot by pressing FCTN "J".

There is no end to the possibilities, and no matter what you're using, or what you're programming, EZ-KEYS may double or triple your power.

Let me quote from the EZ-KEYS documentation: "The uses for programmable macros aren't well defined — there being no precedent set elsewhere." True. I haven't been able to find any program like this for any computer.

You can use other assembly language routines with EZ-KEYS as long as you don't exceed the 8K that Extended BASIC

uses for such routines, and that must include the macros you have developed. As a matter of fact, the object code and loader are included to load a bare bones version of the program along with your own.

Here's another interesting possibility for EZ-KEYS. Let's assume you had a program that demanded a lot of repetitious input. EZ-KEYS can be laid in behind the program with macros set up to enter multiple inputs on a single keypress. I tried it using a short file manager program. The program required input of the words "FAMILY", "ASSOCIATE" or "PERSONAL" and then a date that was always the same. I set up CTRL 1, 2 and 3 with the words and then the date along with each one. By George, all I had to do was press one of the three keys depending on the requirement and, bingo, there were the inputs.

EZ-KEYS also comes with a couple of nifty utilities:

1. POKER: This program is designed to load a text file into the macros. (Help files for that program you've been working on?)

On the other side of the coin, though, you can convert a program to DV/80 and dump it to the keys you want, or it's possible to make up your functions in TI-Writer and then use this utility to load them to EZ-KEYS.

2.)LISTMACROS: This one will look at the custom version you have made and print the complete listing of the macro coding to your printer.

There was really only one thing that bothered me about EZ-KEYS. It's an old problem with so many software products today. The author and distributor leave too much to the imagination of the user. This program has potential that could take months to discover, so a lot of time could be saved if more examples were given. When I called Asgard to make sure I had the latest version of the program, the company indicated the possibility of a newsletter to tell people about new discoveries for this program, and others that they distribute. Sounds like a good idea to me.

Asgard's price for EZ-KEYS is only \$14.95, a pittance for this kind of power.

SOFTWARE—

(Continued from Page 29)

programs to a length of about 10K. Advanced BASIC will load directly out of MDOS and will allow programs up to 64K, not including string data. Information about variables and strings is paged in and out of memory as it is required. A feature not addressed in the documentation is overwrite protection. When saving a program or writing a file to disk, Advanced BASIC will ask whether the data or file should be overwritten. This feature can be implemented from within a program as well as from a running program.

GEME (pronounced Jimmy) will probably be Myarc's major software release of the first half of 1988. The program provides mouse support in an icon-based environment, a windowing-multi-tasking environment that will allow more than 100 tasks to be run simultaneously if memory is sufficient, and an intelligent print spooler that can direct output from various tasks to multiple printers. The spooler will also direct traffic of output to a single printer so that each task is outputted sequentially.

One name suggested for the product is MY-Works.

GEME will also allow the user to define screen fonts for any window. Riley says the program is relatively easy to develop for the Geneve because support for it is built into the hardware and accessed by CALLs and because the Geneve utilizes memory dynamically where it finds it.

The data base manager, expected between July and September, will be a departure from those available for the 4A. Data base sizes will be determined solely by available memory and storage. Entry screens will be free-form and designed entirely by the user. Data from word processors and spreadsheets can be imported, and it will support math functions.

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Newsbytes

Index of everything for the TI

Bill Gaskill, of Grand Junction, Colorado, is attempting to put together an index "literally everything that I can find that has been written about the TI99/4 and 4A."

"Currently, I have information available from most of the major magazines that supported the 99, many books, monthly tabloids and a couple of user group newsletters. I am soliciting any and all contributions for this project, with the ultimate goal being to offer any contributing user a 26-disk (A-Z) Master Index for the cost of the diskettes, mailer and postage." Gaskill says the index will be made available to non-participants for a nominal fee.

Gaskill says the index will be in a D/V80 format. He also plans to offer an Extended BASIC or assembly language utility that will allow the user to find items in the index. Anyone who wishes to contribute to the project is encouraged to write Gaskill at 2321 Wintergreen Dr., Grand Junction, CO 81506.

1988 TI-Tax version slated for January

William Chavanne has announced that the 1988 version of his program TI-Tax, for the 1987 tax year, is scheduled for release in January. The 1987 TI-Tax version was reviewed in the February 1987 MICROpendium.

He says TI-Tax will be capable of doing "almost all, if not all, calculations for many taxpayers and printing IRS approved forms. A most significant addition is the ability to overprint the standard IRS pre-printed Form 1040, freeing users from having to copy to that form by hand in order to comply with the IRS rules that prohibit the computer generation of forms that require signature."

Chavanne says prices will be the same as last year (from \$9.95 to \$19.95 per disk), with additional distributors (such as Disk Only Software), and a new fairware rebate plan. He says TI-Tax owners may register their legitimately paid-for copy with him. Then, when they give away cop-

ies containing their registration number, they will be eligible to receive 30 percent of the amount paid by persons who, in turn, pay Chavanne and register their copies.

Chavanne notes he has acquired a Geneve 9640, so TI-Tax is available for users wanting to take advantage of that machine's speed and 80-column capability.

For a flyer on TI-Tax, write Chavanne at 4549 English Ave., Fort Meade, MD 20755.

Forth clearinghouse initiated by user

John H. Carver Jr. has announced his intention of acting as a "clearing house" for Forth programmers.

He asks that anyone "even remotely interested in Forth" write him at RR #1, Box 125-2, Brighthurst IN 46913 or leave messages for him on GENie, CompuServe, The Source or Delphi. He also asks that readers post this message on their local BBS.

Carver said he would like to point out the existence of the TI-Forth International Information Center, 4122 Glenway St., Wauwatosa, WI 53222, which has public domain Forth applications and tutorials, and the Forth Interest Group, P.O. Box 8231, San Jose, CA 95155, which offers memberships for \$30 per year.

DataBioTics shipping Grand RAM

DataBioTics began shipping its Grand RAM to dealers in limited quantities this month and will "ship to everyone" in early February, according to Bill Moseid of the company.

The company is attempting to complete its desk-top publishing program this month, he said.

He says the company is also selling TI Workshop, a program support environment with memory manager, disk manager, Editor/Assembler, a cross-reference program and the equivalent of E/A options 3 and 5 in a 64K module for \$59.95, which includes a 63-page manual. TI Workshop requires extended memory. A disk system is optional but recommended.

He commented that the module underwent extensive beta-testing with the

Brea Users Group in California, equivalent to three or more man-months of testing.

For further information, contact DataBioTics, P.O. Box 1194, Palos Verdes Estates, CA 90274 or call (213) 867-0481 or (213) 925-2120.

Knecht corrects item

Bill Knecht of the Houston Users Group has written to correct a statement in the December MICROpendium.

He writes: "I did not resign because of ill health; in fact, I did not resign at all. I chose not to run for another term as sysop of HUG TIBBS several months before any signs of cancer were discovered. I wanted to start discovering other areas of the TI99/4A and as sysop, there was no spare time for these other areas . . . Don't worry. I am doing GREAT!!! (my opinion and the doctor's opinion also)."

Correct spelling of the new HUG TIBBS sysop's name is Henri Schlereth.

Worldwide Echo Conferencing for TI

A system of Worldwide Echo Conferencing for the TI is now operational, according to Rich Hill, sysop of Rich's Oregon Opus, located near Portland, Oregon.

The conference was founded by Hill and Rory Binkerd, sysop of Dakota InfoNet Opus, located in Sioux Falls, South Dakota.

According to Hill, both had been operating independent TI based bulletin board systems and both switched to IBM based systems within weeks of each other, as their user list and file bases had outgrown the storage capabilities of the TI at the time. Both systems are almost identical, using Opus 1.03a Computer-Based Conversation System software. They formed the International Texas Instruments and 9640 Echo Conference using the established International Fido Net Association's parameters as a guide.

Systems in California and North Carolina have joined the network and Hill says the Boston Computer Society has indicated

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(Continued from Page 33)

that its system will be linked to the network and the groundwork is being laid to connect it to Australia and parts of Europe.

There is no charge for the use of the service, but the sysops will accept donations, Hill says.

Boards currently in the service are:

Oregon Opus (503) 692-7204, Rich Hill, sysop. Accessible by PC Pursuit.

Dakota Infonet Opus (605) 336-3578, Rory Binkerd, sysop.

North Carolina Central Opus (919) 852-8460, Amnon Nissan, sysop. Accessible by PC Pursuit.

Compulink Opus (805) 494-3350, Eric Daymo, sysop.

Each of these boards operates 24 hours a day and is closed from 1 to 2 a.m. in its respective time zone for mail processing.

Hill says the speed legends of these systems are listed at 2400 bauds per second and can receive calls at speeds of 300, 1200, 2400 and upwards to 9600.

Hard to phone IP

Several readers have reported difficulty with receiving orders or refunds from Innovative Programming, P.O. Box 2737, Rohnert Park, CA 94928.

The company's phone at (707) 585-3922 was disconnected at one point recently. It has apparently been reconnected. However, no one has been answering the phone when MICROpendium has called as of press time, and a letter from us has received no response.

Gramulator designed

The Gramulator, described as a direct equivalent for the out-of-production GRAM Kracker by MG, has been designed by Mark Van Copenole of Haverhill, Massachusetts.

A wire-wrapped prototype has been demonstrated to Massachusetts users groups.

Van Copenole has not built production models yet. He says to go from a prototype to a production model would require an investment of about \$1,000. He is interested in hearing from users who would consider purchasing the product or who have questions about it.

Features listed for the Gramulator are:

- Simulates 64K of GRAM and 16K of RAM (in two 8K banks at >6000->7FFF).

- Gives ability to backup GROM and ROM cartridges to disk. All TI, Atarisoft and Parker Brothers cartridges can be backed up (does not work with MBX).

- Acts as a "Super Space cartridge allowing the user to run programs requiring RAM at >6000->7FFF (including Myarc's XBII).

- Allows the user to use a customized GROM 0, 1 or 2 while a cartridge is in the slot. One application is that the user can use his own character set with a cartridge like TI-Writer.

- Can load user-written GPL code.

- Has 80K memory with lithium battery backup.

According to Van Copenole, the software needed to load and save GRAM and GROM will be built in for instant access. A memory editor, which will be supplied on disk, will allow the editor to alter and save any program loaded into the built-in GRAM or RAM. User documentation and technical information will be included.

Memory expansion and a disk drive are required to take full advantage of the Gramulator, he says.

For further information or to express interest in purchasing the Gramulator, contact Mark Von Copenole, 52 Audobon Rd., Haverhill, MA 01830 or (617) 372-0336.

CompuServe guide new edition released

The third edition of *How to Get the Most Out of CompuServe* by Charles Bowen and David Peyton has been published by Bantam Books.

The book, part of the Bantam On-Line Services Library, retails for \$19.95 in the United States and \$24.95 in Canada.

For further information, contact Bantam Books, 666 Fifth Ave., New York, NY 10103.

Instant Yellow Pages provided on-line

The Instant Yellow Page Service, online 24 hours a day, is said to provide instant online access to every Yellow Page direc-

tory in the United States, a database of more than 13 million Yellow Page listings.

Any personal computer or terminal with modem can be used to access the Instant Yellow Page Service. Charges are \$1 per minute for connect time, plus 12 cents per record printed or displayed. A prepaid subscription of \$95 for the first year (\$60 annual renewal rate) is also required.

According to Mary Kay Hyde, product manager for the Instant Yellow Pages, MICROpendium readers are offered a sign-up offer of \$100 free usage when they mention MICROpendium.

The service offers selection options including multiple Standard Industrial Classification and ZIPcode retrievals, county or state selection and franchise/brand or professional specialty selection (physicians, dentist, etc.). "Company Profile" shows all the Yellow Page categories a company lists under by simply entering their phone number. The profile includes the Yellow Page category title, the size of the ad in that category and the year the ad first appeared, in addition to the name and address of the company.

Access is available at 300, 1200 or 2400 baud.

For more information, or to subscribe, contact Instant Yellow Page Service, Division of American Business Lists Inc., 5711 S. 86th Circle, Omaha, NE 68127 or (402) 593-4593.

Newsbytes is a column of general information for TI99/4A users. It includes product announcements and other items of interest. The publisher does not necessarily endorse products listed in this column. Vendors and others are encouraged to submit items for consideration.

MULTICOL—

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```
980 NEXT I :: GOTO 570 !236
990 CALL ERR(CODE,TYPE,SEVER
,LINE):: IF CODE=130 THEN DI
SPLAY AT(17,4): "FILE CANNOT
BE FOUND" !134
1000 PRINT "ERROR";CODE;"IN
LINE";LINE :: RETURN 460 !15
8
1010 CALL CLEAR :: GOTO 360
!011
1020 CALL CLEAR :: GOTO 490
!141
```

User Notes

Clean those print heads

"It takes only three things to get good, dark, crisp print from you printer," writes Chuck Reinhart, of Bellaire, New York.

1. A properly adjusted printer
2. A good ribbon
3. A clean print head.

The guide for the fine print wires gradually gets clogged with a mixture of lint, ink and oils from the ribbon. As this dirt builds up and dries out, the pin wires drag in the guide. The result is you get light, low-contrast print even from a new ribbon. The following is a procedure for cleaning the print head that is quick, simple and does not require removal of the print head.

- Obtain an aerosol can of Color TV Tuner Cleaner (Radio Shack No. 64-2320 or equivalent). Make sure the label states that it contains silicone, that it will not harm plastic and that it has a plastic tube to plug into the spray nozzle.

- Turn off the printer. Leave paper in the printer, but remove the ribbon. Gently move the print head to the middle of the carriage.

- Cut a two-inch square from a lint-free cotton handkerchief. Fold the cut cloth over on top of itself a couple of times until it is about the width of your printer ribbon and is about four layers.

- Insert the cloth into the print head exactly where the ribbon was, between the pin guide and the ribbon shield. The cloth should not fit too tightly.

- Insert the tube into the aerosol spray cap. Put the end of the tube in contact with the cloth next to the pin guide of the print head and give a short quick press to wet the cloth.

- Turn on the printer and send a page of print to the printer (self-test may be used). Now, move the cloth a little to the side so that you have a clean spot. If necessary, give the cloth another shot of fluid and print out another page.

- Remove the cloth from the print head and print a page (without the ribbon). If you see any printing on the paper, put the cloth back into the print head and repeat the whole process until the page prints clean.

- Finally, install the ribbon and enjoy the improved print.

CHECKSUM update

This comes from Frank Geitzler, of Dartmouth, Nova Scotia. He writes:

Tom Freeman wrote an excellent article and group of programs to calculate checksums in your October 1987 issue. I would be very interested to see the E/A source code in a future issue.

One minor bug seems to have crept into the Create Checksum program. With lines 130 through 160 in the published order, the screen scrolls down one line after entering DSK1.XXXXX for the input file, so that the cursor does not rest on the default DSK1. for the output file. This can be corrected simply by moving line 150 to become line 135, as shown in the attached listing. Since the default is displayed after the screen scrolls, the cursor will now rest on the default DSK1.

I found that the Create program displayed the line number of one line immediately after displaying the checksum of the previous line, making it difficult to do a comparison. Deleting line 170, inserting line 215, and changing lines 190 and 220 resolved that minor problem. Now the line number and checksum are displayed together, and remain until the next line number/checksum pair is displayed.

Notice that line 90 has been added to the program. Whenever I key in a program, I use line 90 as a file-name line. After keying for a few minutes, I REDO line 90, blank out the line number and REM, and press enter to save my work. No worries about forgetting the filename, and I am apt to save frequently, avoiding major losses if a cable is moved, or the power is lost.

```
90 REM SAVE "DSK1.CHECKAD12"
!231
```

```
100 !CREATE CHECKSUMS FOR XB
ASIC PROGRAMS, BY TOM FREEMA
N, LA 99'ERS !250
```

```
110 !SHOULD BE USED TOGETHER
WITH "CHECK" ASSEMBLY FILE
THAT WILL PRINT CHECKSUMS ON
SCREEN !099
```

```
120 DISPLAY AT(2,1)ERASE ALL
:"CREATE CHECKSUMS FOR XBASI
C ERROR CHECKING": : " by
```

```
Tom Freeman" !085
```

```
130 DISPLAY AT(10,1): "INPUT
MERGE FILE?": " DSK1." !007
135 ACCEPT AT(11,3)SIZE(-15)
BEEP: I$ :: OPEN #1: I$,VARIA
LE 163,INPUT !192
```

```
140 DISPLAY AT(13,1): "OUTPUT
MERGE FILE?": " DSK1." !108
160 ACCEPT AT(14,3)SIZE(-15)
BEEP: O$ :: OPEN #2: O$,VARIA
LE 163,OUTPUT !053
```

```
180 LINPUT #1:A$ :: IF LEN(A
$)=2 THEN CLOSE #1 :: PRINT
#2: CHR$(255)&CHR$(255):: CL
SE #2 :: STOP !115
```

```
190 Z=ASC(A$)*256+ASC(SEC$(A
$,2,1))!000
```

```
200 B$=SEC$(A$,3,163):: L=LE
N(B$):: IF L>157 THEN 230 !1
62
```

```
210 N=0 :: FOR X=1 TO L :: Y
=ASC(SEC$(B$,X,1)):: N=N+Y :
: NEXT X :: N=N AND 255 :: N
$=STR$(N):: N$=RPT$("0",3-LE
N(N$))&N$ !088
```

```
215 DISPLAY AT(20,1)BEEP: "AN
ALYZING LINE "; Z: "CHECKSUM I
S ": N$ !081
```

```
220 PRINT #2: SEC$(A$,1,L+1)&
CHR$(131)&N$&CHR$(0):: GOTO
180 !088
```

```
230 DISPLAY AT(22,1)BEEP: "WA
RNING!": " LINE"; Z: "IS TOO LO
NG!": "PRESS ANY KEY TO CONTI
NUER" !123
```

```
240 CALL KEY(0,K,S):: IF S=0
THEN 240 ELSE PRINT #2: A$ :
: GOTO 180 !232
```

```
250 END !139
```

Variable coder and retriever

Floyd Donaldson, of Buckingham, Quebec, writes:

Unlike the TI, a few computers such as the IBM have a command or procedure to link or chain programs, so that the next program or series of programs can contain and use the same values. Since the TI resets all numeric variable to zero and all alpha variables to null strings, I set out to find a method to chain a program. Remembering from my Extended BASIC

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User Notes

(Continued from Page 35)

manual that character hexadecimal codes above 32 are not reset when the present program in memory executes a RUN command, I realized that the values of numeric variables could be stored in the area of memory where the character definitions are kept by first converting the values into strings and then using CALL CHAR to load them in.

I have included two programs as examples. The first program stores the values and the second program retrieves the values from the character codes. The following is an explanation of the two programs.

The first program generates ten random numbers to be stored in the character codes 128 and 129. The numbers in this program can be a maximum of three digits long, although the program can be changed to accept more or fewer digits. If the random number is less than three digits long a zero is added to it when it is placed in the string — 33 would become 033. To verify the numbers the program prints them out. When it is finished it resets characters 128 to 143 so that any definitions remaining there do not affect the values in the string. Using a CALL CHAR statement, it loads the string into characters 128 and 129, and waits for you to run the second program.

The second program, after being loaded in, uses the CALL CHARPAT command to retrieve the string stored in characters 128 and 129, converts them to numeric values using a FOR-NEXT statement and prints out the values, which should be the same numbers that were displayed on the screen in the first program. The programs require Extended BASIC. Those with disk systems will want to change line 120 in the first program to access a disk drive rather than a cassette recorder.

```
1 REM VARIABLE RETRIEVER !21
6
10 CALL CHARPAT(128,A$)!090
20 CALL CHARPAT(129,B$)!092
30 A$=A$&B$ !166
40 FOR A=1 TO LEN(A$)-3 STEP
  3 !073
50 N=VAL(STR$(A$,A,3))!160
60 PRINT INT(A/3)+1;N !150
70 NEXT A !215
```

```
1 REM VARIABLE COIWER !141
10 FOR A=1 TO 10 !097
20 RANDOMIZE !149
30 N=INT(100*RND)+10 !042
40 IF LEN(STR$(N))<3 THEN A$
=A$&"0" !255
50 A$=A$&STR$(N)!214
60 PRINT A;N !223
70 NEXT A !215
80 FOR A=128 TO 143 !005
90 CALL CHAR(A,"")!175
100 NEXT A !215
110 CALL CHAR(128,A$)!114
120 RUN "CS1" !058
```

Axiom interface may have problem

The Axiom printer interface unit may have a built-in failure potential due to its design. The wires of the multi-conductor cable going to the printer are connected at the control board by press-in insulation displacement connectors. The slot into which the wire is jammed is rather small. One reader notes the very fine strands comprising each wire were almost all cut in two by the jamming process. The result was that after using the unit for awhile, including movement of the cable, the wires broke loose and the output turned to garbage.

To fix this problem (do this only if the interface has been giving you a problem, at your own risk), remove the covers of the control unit. Pull the wires of the cable loose, one at a time. Clean out the jam connector. Nip off the damaged ends of the wire, take off 1/8-inch insulation, tin the wire end, and solder it into the jam connector. Proceed slowly, and don't overheat the connectors. Fix one wire at a time so as to avoid mistakes and crossing wires.

Improving quality of TV display

This comes from Joe Constance, of Pittsburgh, Pennsylvania.

Here's a tip that helped me improve the picture quality on the TI RF modulator using a 19-inch color TV.

I live in an area where there are many TV and radio station broadcasts and can pick up a picture without using rabbit ears. Add to that ribbon cable from the console

to the PEB interface card and also for disk drives and RS232 interface. Most of the year I get a good picture from the TI using the RF modulator, but in the fall-winter picture quality suffers. Disk drive accesses always caused picture distortion, which became worse in the fall-winter.

The steps that I describe here have produced remarkable results for me. For \$5 and about an hour's labor they be worth trying by other users.

Parts needed:

Newspaper or some other non-conducting material

50 feet aluminum foil

75-300 ohm converter with same type of antenna lead wires as the TI converter has coming out on one side and a screw connector for the 75 ohm wire

2 small bolts and nuts

3-6 feet coaxial cable

Step 1 Cover RF modulator cord from console to its silver box with aluminum foil. Do not allow foil to touch the silver box.

Step 2: Attach RF modulator to 300-75 ohm converter using the two screws.

Step 3: Stuff newspaper-aluminum foil combo between the RF modulator to 300-75 ohm converter so that the lead wires are separated as far apart as possible and only newspaper touches the wires and connectors. Make sure the aluminum foil is in the middle.

Step 4: Attach 3-6 foot coaxial cable to the converter and TV coaxial connection. Do not use another converter at the TV.

Step 5: Wrap RF modulator tin box and lead wires with newspaper, covering it totally. Use several layers. Cover newspaper with many layers of aluminum foil.

Step 6: Locate RF modulator box in best place by trying it in different places while accessing the disk drive. Firmly secure it in the place of least interference.

This worked well for me. I still get a little noise from sound but little interference when accessing the drives. The noise on the TV sound is also reduced.

Moving RAMdisk by menu

This comes from Jack H. Miller, of (See Page 37)

User Notes

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Trenton, Michigan. He writes:

The following programs allow the moving of the Horizon RAMdisk from Version 6.4 of John Johnson's menu program without exiting to BASIC or XBASIC.

The commented source code for moving the RAMdisk to DSK1 is shown first and then the program for moving it to DSK3. Not everyone will want the RAMdisk moved to DSK3 but the comments in the source code allow changing the destination. Not that where the RAMdisk doesn't matter (at least for CRU > 1000), the program only sets up the destination.

The first thing to do using the Editor/Assembler is to enter the first program as listed and save it to disk as DSK->1/S.

Then enter the second program, modifying it if you do not want the RAMdisk to go to DSK3. The first two LI instructions are destination. The following table shows the required entries:

Moves		
LI R1,	LI R2,	RAMdisk to
>0001	>3131	1
>0002	>3231	2
>0003	>3331	3
>0004	>3431	4
>0005	>3531	5

After typing the correct items save this to disk as DSK->3/S. Of course, you may use other save names but keep track of which is which.

Then assemble each source code into separate D/F80 files. I labelled these DSK->1/O and DSK->3/S, respectively.

These D/F 80 object files must then be converted to program files by use of the SAVE utility on the E/A disk. See the E/A manual for directions.

You will then end up with two program-type files which I called RD->1 and RD->3. These files (two sectors each including the directory) are then to be copied to the RAMdisk using the disk manager. You now have the capability of moving the RAMdisk, although the programs do not appear on the menu.

Now use the menu program and go to the edit function as described in the documentation. Use the edit function to enter two new items on the menu such as Move RAMdisk to 1 and Move RAMdisk to 3, listing the files as DSK*.RD->1 and

```
*****
*SOURCE DSK->1/S
*OBJECT DSK->1/O
*PROGRAM RD->1
*This does the same as CALL DN(1) but is usable from
*the MENU program Ver 6.4 for the ramdisk as an option
*By Jack H. Miller 7/28/87
*****
```

```
DEF SFIRST,SLAST,SLOAD
DRIVE EQU >400E      DISK NUMBER HEX
DSKNO EQU >4008      ADDR OF x FOR DSKx. ASCII
SFIRST
SLOAD LWPI MYWS
      LI R1,>0001     DISK #1
      LI R2,>3131     DSK1. ASCII
      LI R12,>1000    CRU ADDR
      SBO 0           TURN ON RAMDISK
      MOV R1,@DRIVE  LOAD DRIVE 1
      MOV @DSKNO,R3  FIND DSK ADDR POINTER
      AI R3,8         FIND ACTUAL DSK ADDR
      MOV R2,*R3     LOAD DSK1. ASCII
      SBZ 0           TURN OFF RAMDISK
      BLWP @0        GO HOME
MYWS BSS 32          WORKSPACE
SLAST END
```

```
*****
*SOURCE DSK->3/S
*OBJECT DSK->3/O
*PROGRAM RD->3
*This does the same as CALL DN(3) but is usable from
*the menu program Ver 6.4 for the ramdisk as an option
*By Jack H. Miller 7/28/87
*****
```

```
DEF SFIRST,SLAST,SLOAD
DRIVE EQU >400E      DISK NUMBER HEX
DSKNO EQU >4008      ADDR OF x FOR DSKx. ASCII
SFIRST
SLOAD LWPI MYWS
      LI R1,>0003     DISK #3
      LI R2,>3331     DSK1. ASCII MSB
      LI R12,>1000    CRU ADDR
      SBO 0           TURN ON RAMDISK
      MOV R1,@DRIVE  LOAD DRIVE 3
      MOV @DSKNO,R3  FIND DSK ADDR POINTER
      AI R3,8         FIND ACTUAL DSK ADDR
      MOV R2,*R3     LOAD DSK3. ASCII
      SBZ 0           TURN OFF RAMDISK
      BLWP @0        GO HOME
MYWS BSS 32          WORKSPACE
SLAST END
```

DSK*.RD->3. Be sure to use DSK*. Then save the edited menu back to the RAMdisk. Remember, you have to unprotect your old menu on the RAMdisk first.

Troubleshooting the 9640

This comes from Walt Howe:

If you should encounter intermittent and unexplainable problems with accessing disk drives with the 9640, check the TIME setting from MDOS or any of the application programs that display the current time. If the clock chip goes into a test mode so that the time changes uncontrollably, it will interfere with disk access. From MDOS, set the TIME and DATE again, and the

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problems should cease.

Tinygram correction

Mike Stanfill, the author of TINYHUS-TLE published in the December 1987 User Notes, points out two errors in the program. The errors are in program line 6. This is how the line should be corrected: ...THEN F=(K=5)-(K=0)::G=(K=2)-(K=3)

GRAM Kracker batteries

How long are the batteries in the MG GRAM Kracker supposed to last? And what are good replacements? A.S. Whiteman published an article about his experiences in this regard in TopIcs, the newsletter of the Los Angeles 99ers. The information here is condensed from the article.

According to Whiteman's observations with his GRAM Kracker, a battery lasts between 203 and 213 days. Battery failure shows up as lost data and unusual performance of the GRAM Kracker.

While the manual recommends a Duracell DL2430 be used as a replacement, he's used three types. They are:

Duracell DL2430

Duracell DL2430B

Varta CR2430

Finding a battery for the GRAM

Kracker can be difficult. Electronic supply houses are a good place to start. Radio Shack doesn't usually carry these batteries.

Taking off

This little program produces the sound of an airplane taking off. It comes from the Tasmanian TI User Group and was written by P. Bruce.

The noise -4 and -8 vary the tone of the third tone specified in a sound statement. By use of these noises, any noise can be created. Where -4 can create noise -1, -2 and -3 and where -8 can create noises -5, -6 and -7. The program uses 129 noises created by -4 to form the sound of the airplane engine.

```
100 FOR T=110 TO 4000 STEP 3
0
110 CALL SOUND(-100,110,30,1
10,30,T,30,-4,0)
120 NEXT T
130 CALL SOUND(-100,110,30,1
10,30,T,30,-4,0)
```

Get to the bottom of TI-Writer

Know how to get to the end of a document while using the TI-Writer editor? Just enter S (for Show Line) from the command line and then enter E. The next thing you know the cursor will be on the last line of the document. To get back to the top, enter S and then 1.

The letter E for "end" can also be used when deleting, copying or moving lines. For example, after entering D for delete in the command line, enter 10 E to delete everything from line number 10 to the end of the document.

Another ending for label printer

Wanda Clark, of Austin, Texas, put last month's label printing to work right away. And she made a small improvement. She modified it so that the program queries the user as to whether he wants to run another set of labels.

```
490 PRINT #1: CHR$(13),CHR$(10) ::
NEXT I
```

```
510 PRINT: "DO YOU WANT TO CO
NTINUE? (Y or N)"
```

```
520 INPUT C$
```

```
530 IF C$="Y" THEN 390
```

```
540 END
```

Time-saver for X BASIC users

The following tip appeared in Ozark 99'er News, the newsletter of the Ozark 99'er User Group. Harold Hoyt gets the credit for it.

Lots of programmers put their program identification in line 100 as a REMark. Six months later, listing the program, it answers you questions. What the heck is this? When did I write it? Why did I write it?

I've been pulling a little trick in X BASIC that the more I do it, the handier it seems. I add another program line, so that the beginning of my program looks like this:

```
1 !SAVE DSK1.PROGRAMNAM
100 !Prog 'PROGRAMNAM' H. Hoyt
7/28/87 Demonstration Prog
```

Note all of the 10 characters in the program name can be used to describe the program. One of my friends was using single letter program names because he hated the extra typing.

If you type line 100 program description data once, and then hit Enter followed by FCTN 8 (REDO), you can edit out 00 in 100 to create line 1 and further edit it to create SAVE DSK1.PROGRAMNAM and delete the rest of the stuff. By itself, this wouldn't be worth the trouble, but just see what happens next.

After line 1 has been properly entered, hit FCTN 8 again and then FCTN 3 (DELETE) to eat the line number, space and exclamation mark. What results is SAVE DSK1.PROGRAMNAM in the screen buffer. Just hit Enter and the program is automatically saved. This saves so much typing that it encourages you to save program pieces more frequently, reducing the loss in case of a program crash.

User Notes is a column of tips and ideas designed to help readers put their computers to better use. The information provided here comes from many sources, including TI user group newsletters and MICROpendium readers. MICROpendium pays \$10 for any item sent in by readers that appears in this column. Mail User Notes to MICROpendium, P.O. Box 1343, Round Rock, TX 78680.

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