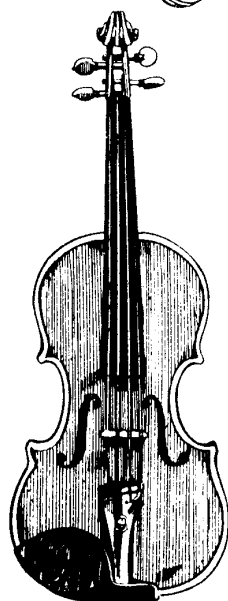


# MICROpendium

Volume 7 Number 7

August 1990

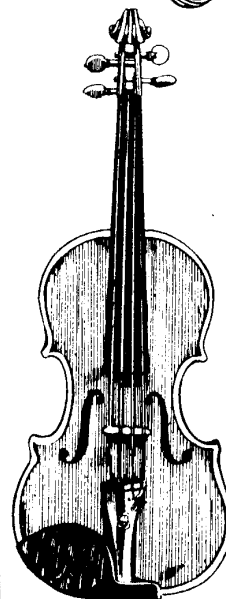
\$2.50



```

);VNE(AC):"Chord Name:";N$(A
C)!008
400 ACCEPT AT(6,18)VALIDATE(
IO$,"-")SIZE(-5):T :: IF T=0
THEN 770 ELSE IF ABS(T)>425
0 THEN 400 ELSE D(AC)=T !031
410 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
420 ACCEPT AT(9,18)VALIDATE(
IO$)SIZE(-6):T :: IF T=0
N 420 ELSE S(AC)=T !
430 CALL KEY(3,K,W)::
0 THEN 770 !122
440 ACCEPT AT(13,2)VA
IO$)SIZE(-5):T :: IF
R T>44733 THEN 440 ELSE
C)=T !104
450 CALL KEY(3,K,W)::
0 THEN 770 !122
460 ACCEPT AT(13,10)VA
IO$)SIZE(-5):T :: IF
OR T>44733 THEN 460 E
AC)=T !173
470 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
480 ACCEPT AT(13,18)VALIDATE
IO$)SIZE(-5):T :: IF T<110
OR T>44733 THEN 480 ELSE F3(
AC)=T !202
490 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
EN 580 ELSE V1(AC)=T
590 CALL KEY(3,K,W)::
0 THEN 770 !122
600 ACCEPT AT(19,10)\
IO$)SIZE(-2):T :: IF
HEN 600 ELSE V2(AC)=T
610 CALL KEY(3,K,W)::
0 THEN 770 !122
620 ACCEPT AT(19,18)V
IO$)SIZE(-2):T :: IF
HEN 620 ELSE V3(AC)=T
630 CALL KEY(3,K,W)::
0 THEN 770 !122
640 IF FN(AC)=0 THEN
7
650 ACCEPT AT(19,26)V
IO$)SIZE(-2):T :: IF
HEN 650 ELSE VN(AC)=T
660 CALL KEY(3,K,W)::
0 THEN 770 !122
670 ACCEPT AT(22,2)VA
IO$)SIZE(-2):T :: IF
EN 670 ELSE V1E(AC)=T
680 CALL KEY(3,K,W)::
0 THEN 770 !122
690 ACCEPT AT(22,10)V
IO$)SIZE(-2):T :: IF
HEN 690 ELSE V2E(AC)=
700 CALL KEY(3,K,W)::
0 THEN 770 !122
710 ACCEPT AT(22,18)V

```



## Orchestration

Of noises, sounds and silence —Page 12

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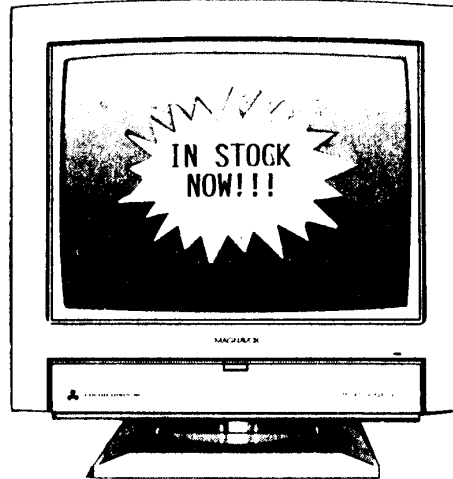
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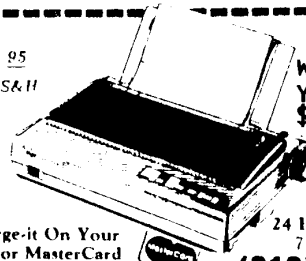
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### \*READ THIS

Here are some tips to help you when entering programs from MICROpendium:

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

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

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- **Mouse Interface:**

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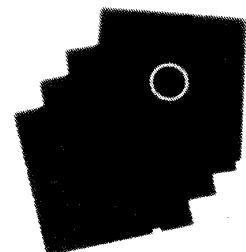
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## Comments

# Yes, we left out part of the EEPROM series

An addendum to last month's review of Interface Standard & Design Guide for TI99/4A Peripherals manual by Tony Lewis. Although the reviewed implied that the manual was a one-man job, Lewis says that a number of people provided feedback and suggestions that helped the manual earn its plaudits. Among these, he notes, are Matt Beebe, Barry Boone, Paul Charlton, Mike Dodd, Peter Hoddie, John Johnson, Jim Reiss and John Willforth. Credit should also go to the Mid-Atlantic 99ers user group, Lewis says.

**OOPS:** This month we're running the third part of a three-part series on EEPROMs by Tony Lewis. The second part was published in May 1990. However, as Sharp readers may have noticed, we never published the first part. Yes, we blew it. The first article in this series covered basic information about types of memory chips and their development over the years. Even though it is not in its proper order,

we hope to use the article in an upcoming issue. It provides a lot of interesting information for technical and non-technical readers.

### MDOS UPDATE

According to Paul Charlton, the principal developer of MDOS, Geneve users with hard drives shouldn't expect an update to version 0.97H of MDOS until he receives "updated HFDC DSR code from Myarc. The last release from me is 0.97H, not to be confused with the other versions of 0.97H released by Myarc with various changes for support of ABASIC."

Concerning non-HFDC versions of MDOS, he says that nothing will be forthcoming until "no further changes to MDOS will be necessary to support the final version of ABASIC." These comments were posted on Delphi.

—JK

## 1990 TI FAIRS

### FEBRUARY

**TI-Fest West '90**, Feb. 17-18, Day's Inn, 88 E. Broadway, Tucson, Arizona. Sponsored by Southwest 99ers. For information, call (602) 747-5046 or the Cactus Patch BBS, (602) 795-1953, check GEnie or write P.O. Box 17831, Tucson, AZ 85730. For room reservations, call (602) 622-4000 by Jan. 16 and mention Fest-West.

### MARCH

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

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

### APRIL

**Canadian TI-FEST**, April 28, Merivale High School, Nepean, Ontario, Canada. For information, contact Ruth O'Neill, 34 McLeod St., Ottawa, Ontario, Canada K2P 0Z5 or (613) 234-8050 or CompuServe 72117.3541 or Delphi REON.

### MAY

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

**Alberta TI Orphan Reunion**, 10 a.m.-5 p.m. May 12, Innisfail Lions Hall, Innisfail, Alberta, Canada. Contact Fred Kessler, Box 20, Sundre, Alberta, Canada T0M 1X0. Phone: (403) 638-3916.

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

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

### SEPTEMBER

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

**5th International TI Users Meeting**, Sept. 29, Burgerhaus, Wiesbaden-Erbenheim, Germany. Write TI-Workshop Wiesbaden, Eleanorenstr. 6, 6200 Wiesbaden, Germany, or Gerald D. Turner, PSC 1 Box 6895k APO NY 09633, or call 06134/53419 (for U.S. callers, the country code is 49 and drop the 0 when dialing).

### OCTOBER

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

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

### NOVEMBER

**Eighth Annual Chicago TI International World Faire**, 9 a.m.-6 p.m. Nov. 3, Holiday Inn, 3505 Algonquin Rd., Rolling Meadows, Illinois. Social mixer Nov. 2, dinner after faire. Contact Hal Shanafield, Faire Manager, Chicago TI99/4A Users Group, P.O. Box 578341, Chicago, IL 60657, or (708) 864-8644 (2-6 p.m.); hot line answering machine, (708) 869-4304; or BBS (708) 862-0182 (leave message to #162).

**Milwaukee TI-Faire**, 9 a.m.-5 p.m. Nov. 4, Quality Inn, 5311 South Howell, Milwaukee, Wisconsin. Contact Gene Hitz, Milwaukee Area 99/4A Users Group, 4122, North Glenway, Wauwatosa, WI 53222.

## 1991 FAIRS

### FEBRUARY

**Fest West 91**, Feb. 16-17, Ramada Main Gate, Anaheim, California. Contact Fest West 91 Committee, c/o Bill Nelson, 11692 Puryear Lane, Garden Grove, CA 92640, or call Users Group of Orange County BBS, (714) 751-4332.

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

### USER GROUP UPDATE

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

#### California

Saddleback Valley Users Group, Costa Mesa, disbanded May 1990 (members have joined the Brea and/or Orange County users groups).

# TI BASE

Version 3.0

**More Features • More Power • More Flexibility**

When it comes to database management systems, TI Base is the only choice. With its overwhelming file handling capabilities, extensive command programming language, and unmatched information processing facilities, TI Base is clearly most advanced and flexible database management system available for the TI-99/4a and Geneve 9640. It's also the most widely supported database system available.

Some of TI Base's outstanding features include: support for up to 5 active databases of 16129 records each, with 17 fields per record, and 255 characters per field; procedural command language consisting of over 50 commands similar to those used by Ashton-Tate in dBASE; full database manipulation and on-the-fly restructuring without data loss; formatted display and printing capabilities; math functions; sorting; disk management; 40 column editor; plus more!

**Only \$24.95**

*Owners of the original TI Base may upgrade to TI Base 3.0 for only \$14.95 (plus shipping). To be eligible for the reduced rate return both of your original TI Base disks along with your upgrade fee.*

A TI-99/4a system with 32K, disk drive and an XB, MM, or E/A cartridge is required to operate TI Base. Compatible with Geneve in GPL mode.

# The MISSING LINK

**The Ultimate Extended Basic Upgrade**

The Missing Link is a powerful extension of the Extended Basic language that allows programmers to access all of the high resolution bit-mapped graphics and advanced text modes of the TI-99/4a. Before The Missing Link was developed these advanced display modes could only be accessed through assembly language programs, or by using optional and often expensive hardware. But now, using The Missing Link, ordinary Extended Basic programs, without the aid of any additional hardware, can be written to take full advantage of these advanced display modes.

Included free with The Missing Link is PaperSaver, the first program ever written for The Missing Link. PaperSaver is an impressive utility program that, for the first time ever, lets you see precisely how text prepared with TI Writer is going to look *before* it is printed.

**Only \$24.95**

If you would like to see a complete demonstration of this incredible Extended Basic enhancement product, send us \$3.00 and we'll send you our exclusive *Live Demonstration of The Missing Link*.

A TI-99/4a system with 32K, disk drive and an Extended Basic cartridge is all that is required to operate The Missing Link. Compatible with Geneve in GPL mode.

***This summer Texaments turns up the heat with the hottest software line-up ever!***

# TI Artist Plus!

More than just an ordinary drawing package, TI Artist PLUS! is a complete drawing system that consists of six dynamic graphics development modules. With these modules virtually anyone can create, edit, transform, scale, print and present the most dazzling of graphics. And with its innovative point-and-shoot menu system, TI Artist PLUS! is extremely user friendly.

TI Artist PLUS! is also the most compatible program available. It works with almost any printer, including a few color printers. It's backwards compatible with all of the existing artwork available for the original TI Artist. And it's compatible with the Geneve 9640 (in GPL mode), most RAMdisks, and the Myarc HFDC. (Please contact us regarding specific product compatibility).

**Only \$24.95**

*Owners of the original TI Artist may upgrade to TI Artist PLUS! for only \$14.95 (plus shipping). To be eligible for the reduced rate, return your original TI Artist disk and the front page of your existing TI Artist manual along with your upgrade fee.*

A TI-99/4a system with 32K, disk drive and an XB, MM, or E/A cartridge is required to operate TI Artist PLUS! Compatible with Geneve in GPL mode.

## How To Place Your Order

Ordering any of our hot products is easy! Just write down what it is you want, tell us the address you would like your order shipped to, include a check or money order as payment, and send it off to us at the following address:

**Texaments  
53 Center Street  
Patchogue, NY 11772**

It's that easy! We'll even ship your order within 48 hours of receipt!

Please make sure that you include the proper shipping charges when placing your order: \$3.00 for domestic first class and Canadian delivery, \$8.00 for foreign air mail delivery.

## **Get our ALL NEW Fall 1990 Catalog!**

Our new Fall 1990 catalog will automatically be included free with all orders. If you do not place an order at this time -- **DON'T WORRY** -- you are still eligible to receive our free catalog. Simply write to us at the address above, or call our office at (516)475-3480, to request your free Fall 1990 catalog.

More detailed information regarding the products listed here is now available in our new Fall 1990 catalog. Ask for yours today!

# Feedback

## Configurations asked

Apparently the "Micro-Reviews" are very popular with the Tiers. In June my "Multiplan Exercises" was mentioned and I have had a very rapid response from your readers.

If it is possible I would like to call attention to the many different configurations out there. When I am sent a blank disk for my offering, which requires two single-density sides, I don't know what to send. So far I have been making flippies when in doubt, but it would be better if I knew what the people really needed.

If you publish a note of this please note that my Zip has changed to 48334. I will also gladly make a floppy if a SSSD system sends one disk.

**Herb Schlesinger**  
Farmington Hills, Michigan

## Getting in touch

It was disturbing to read in the June issue that the TI community would be losing Laflamme & Wrigley Wholesale. Canadian users will unfortunately suffer from this unavoidable event. I certainly hope that the customers they served will be picked up by other wholesalers in the TI world.

The scaleback of Triton Products Co. is also of concern. In the business world, sales mean support, and support means more sales. A business that does not make money will not be in business for long. The best business strategies will fail if the market cannot sustain the effort. What are we to do? Buy more software and such? That would be one answer, another would be to find more customers, ergo, more TI users.

People do not throw computers away, even if they go out and buy an IBM compatible. They put them in the back of closets, give them to friends and family or sell them at rummage sales. TI99/4As are tough machines and do not wear out easily. If a million were made, then at least 900,000 of them are still out there working.

I live in a small town with a population of about 17,000, and have only recently become aware of a number of new TI owners. These are people who have acquired TI99/4A computers second hand. And they have all asked a common question, "Where

do I get support for this machine?"

None of them had any contact with the TI community. I found them by talking with a friend, who talked with a friend, who had seen one at someone's house, and so it goes. How many other "lost Tiers" are out there waiting to join us? Considering the small, local area I found these lost users in, there must be thousands of others across the United States and abroad.

I realize that it would be impossible to go door to door looking for solitary TI computer users, but we must make some type of effort to reach these people.

I belong to an organization called the Society for Creative Anachronism. My local group routinely has membership drives. These drives sometimes consist of nothing more than posters on the many bulletin boards around town announcing who, when and where to contact for more information. This is a simple suggestion, and I am sure that many creative people out there in the TI world can come up with numerous ways to reach this new generation of TI users. We must, if our machine is going to continue into the 21st century.

I am quite positive that any computer community that has survived as long, or prospered as well, as the TI's, will have no problem in putting out the effort to keep our machine progressive and moving forward.

**Randy A. Cook**  
Parsons, Kansas

## Gave up on Geneve

I would like to inform Bob Sherburne (Feedback, June 1990) that I am a Geneve 9640 owner who gave up on the system after extensive attempts to get it to perform satisfactorily.

I was an early purchaser, having received my Geneve in July of 1987. My expectations were high as I had been using my 99/4A for a number of business applications, one of which was extensive use of "Multiplan." The increase in speed which the 9640 offered was to be welcomed.

The problems with the early software were compounded by problems with the hardware. It became a nightmare trying to work with the 9640. I made many calls to Mr. Phillips and Mr. Riley. Mr. Riley was

helpful on the software problem but did not think I had a hardware problem.

I finally received help after I called Mike Dodd. Mike was very helpful and was the one who diagnosed the equipment problem. With the information he supplied I was able to get Myarc to correct the situation. However, I had to send my entire system, expansion box and all, to New Jersey. The system was returned in April 1988.

The last software was received in February 1988. The last reply to any letter concerning software upgrades was in January 1989 from Ms. Coffee assuring me that I was on the list of registered owners and would receive upgrades when issued. MICROpendium carried an item indicating that upgrades were to be released in mid-1989. When I did not receive an upgrade I sent letters to Myarc in October 1989 and December 1989 asking about upgrades. These letters have gone unanswered.

I purchased the 9640 to further my business applications and not to become a beta tester for Myarc. I'm one who acted in good faith on the ads and found the items they supplied to be so unreliable that I had to abandon using the system for anything of value. They failed to deliver the software or to inform their registered owner of what is the true situation. Nor do they reply to letters requesting information.

Perhaps if Myarc had been straightforward and kept to their advertised statements and supplied finalized software as their ads imply even today, I might not be writing this letter. Because of the experience with the 9640 I found it necessary, in 1988, to go to a 286 system and have been pleased with the equipment I purchased from Northgate and with their support. I have not had any software failures as I experienced with the Myarc software.

Mr. Sherburne, I am glad you did not have the experience which I had and that you can give such wholehearted testimony. Perhaps, now that I have a mechanically sound system, if I had updated copies of MDOS, MY-Word, Advanced BASIC, etc., I would get a better feeling.

**R.D. Cramer**  
Midland, Texas

(See Page 9)



# Feedback

## In the same boat

I'd like to respond to Jim Uzzell's letter (June 1990) on "editorial mistakes." I am the editor for *Swan's Song*, a Geneve 9640 newsletter, and even I have mistakes, although the newsletter numbers under 10 pages. For one person to dedicate his time to a 38-plus-page periodical and have only one or two mistakes per issue is something I can live with. I have asked for help with *Swan's Song* from several people and have had very little response and no help. For this reason and more, I have the utmost respect for John's efforts and mistakes. Try getting into the other man's shoes, the fit tends to uncomfortable.

As for Jim's comments on Harry Brash-ear's comments from the May '90 issue, I agree wholeheartedly, but with a different angle. I see some unfortunate friction building up between TI99/4A users and Geneve 9640 users. Delphi's TI-NET is a prime example. Many TI users on TI-NET feel that they are going to get "tromped" by the Geneve users. This is untrue. Sure, I'd love to see a whole platoon of Geneve-only programs come marching out, but that does not mean that I'd like to see all the TI users move aside to let this happen. We're in the same boat, folks, even if it's opposite ends. It is my opinion that the 9640 will help keep the TI community alive. Take a look at what's available before making snap judgements about Geneve's "problems." They've all but disappeared. Sometimes I feel that I'm the only one around that has any optimism for the 9640 at all.

**Gerald J. Macdonnell**  
Binghamton, New York

## Business software sought by user

I need a home/business application. I would like to be able to have on each record customers' name, their balance brought/forward from last month, weekly terms, goods received, goods returned, weekly payments, date of payments, faulty goods, reductions, etc.

In all this I would like the program to calculate balance B/F from last month,

calculate goods returned from goods rec. and minus payment and reductions and finally calculate the up-to-date balance, but also leaving room in the program for a couple of lines of comments.

I would be most grateful if you could recommend a program that will do all or most of these calculations. First of all the program would have to be pretty fast; it would also have to look good on screen. I have two TI original SS/SD disk drives, sidecar expansion (no box), 32K and PIO and CONTROLLER standalones, also TI Impact. I have the original TI programs Invoice and Inventory Management and Mailing List. These seem to be very long-winded and rather slow, as they are programmed in BASIC. I use for my data storage Navarone DBM module, but will not do calculations. Wordwriter I use for my letter writing. I have thought about using Multiplan, but it's not a spreadsheet I need. I need the correct software (preferably in machine code).

**D.H. Caine**  
Crewe, England

*We are not sure what to suggest to you and invite comments from readers. — Ed.*

## Spell It! to be revised

Thank you for the review of Spell It! in your July issue. Jim Reiss agreed with all your suggestions, and has promised to have a version 1.1 soon that corrects the problem with run-on words (that was supposed to have been in 1.0, but evidently no one thought to check it), and addresses the unique word limitation. It will also probably be a tad faster (knowing Jim) This upgrade will most likely be available at a nominal charge — announcements will be sent to registered users when it's available.

I also wanted to comment on your article on creating Page Pro 99 line fonts. While the coverage of this program is appreciated, I think the author went to unnecessary trouble. A Line Font Editor for Page Pro 99 is included in the Page Pro Utilities package, sold separately. It is also available to registered users (along with many other things) in the Page Pro 99 sections of GENie and CompuServe. Designed to function like a standard sprite editor, the

Line Font Editor doesn't require the use of a sector editor — only a little imagination. This utility was described in the Vol. 1, No. 2 issue of *Page Pro Times* — a free quarterly magazine for registered Page Pro 99 users.

Finally, regarding the letter from Jere Turner regarding Page Pro 99's incompatibility with non-Epson printers — for better or worse, Epson is *the* standard in dot-matrix printers. The vast majority (upwards of 99 percent at this point) sold nowadays are Epson-compatible. Texas Instruments even resold an Epson printer as the TI Impact Printer. For better or worse, the number of Prowriter, Okidata, Axiom and other printers in use is too small to justify the extensive rewriting that compatibility requires. Once upon a time computer equipment was very expensive and a programmer's time was relatively cheap. Since 1980, computer equipment has become relatively cheap and programmer's time, particularly the time of experienced assembly programmers, has become very expensive. As a result, it usually doesn't pay to spend hundreds of hours rewriting programs to support nonstandard printers. Since few nonstandard printers are even sold these days, and good Epsoms and compatibles are commonly available for less than \$200, this has become less of an issue than it once was.

**Chris Bobbitt**  
Asgard Software  
Rockville, Maryland

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

## USER GROUP UPDATE

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

### California

Saddleback Valley Users Group, Costa Mesa, disbanded May 1990 (members have joined the Brea and/or Orange County users groups).

### Italy

TI99 9640 Club, c/o Marino Pizzotti (secretary), via Matteotti 9, 20060 Cassina Pecchi — MI — Italy. Founded December 1989. Publishes quarterly diskazine.

## BASIC

# Reviewing math facts

By REGENA

My children are in the middle of their lazy summer vacation from school. How often do students forget things they have learned in school and get kind of "rusty" during the summer. Here are two simple programs that can serve as flashcard reviews for multiplication and division. Feel free to embellish them with your own graphics and sounds for your children.

In the multiplication program, you may choose a multiplier from 1 through 9. The quiz then consists of that number M times each multiplicand R from 0 through 9 but in a random order. The problem is printed on the screen, and you type in the answer, which may be in one or two digits. CALL KEY is used to receive the answer, and within the CALL KEY loop is a counter T. The longer it takes to type an answer, the higher the number T is. At the end of the quiz, T is printed. The object is to go through the quiz as quickly as possible so the timing score T is low. Try to get the timing score lower each time the quiz is run.

Lines 240-270 initialize N() and T for each quiz. Lines 440-460 choose the random number R and make sure that number has not been previously used. Line 470 prints R in the problem, and Line 480 clears space for the answer. Line 490 beeps a starting signal. Lines 500-520 receive the first digit pressed, a number from 0 through 9. Line 530 prints the digit. Line 550 checks to see if the answer is two digits, and if it is, then Lines 560-600 get the second digit. Line 610 calculates the final answer.

Line 620 checks the answer. If the answer is incorrect, Lines 630-640 play an "uh-oh" sound, Line 650 erases the answer and Line 660 branches back to 490 to get another answer. If the an-

swer is correct, Lines 670-700 play a quick arpeggio and Line 710 prints asterisks for the number of correct problems in the quiz.

If you want to change the sounds, change Lines 630-640 and Lines 670-700. If you would like to add graphics after each problem, do so between Lines 700 and 720.

Line 730 prints the timing score T. Lines 740-780 offer the option to try again.

The division program is similar to the multiplication program. In this program, you may choose a divisor from 1 through 9. Division facts are presented, and the answer is a number from 1 through 9. Since the answer is a single digit, there is only one CALL KEY loop, Lines 530-550. However, the product in the problem, the first number, may be one or two digits; and it is printed in Lines 450-500.

Character 35 is redefined as the "divide by" symbol in Line 140. The divisor is chosen in Lines 190-240 and is represented by the variable D. For the problem, a random number R is chosen (which is actually the answer), and the number to be divided is  $R*D$  or  $RD$ , Lines 400-500.

If you want to change the sounds, the incorrect response is in Lines 590-600, and the correct response is in Lines 630-660. Add graphics between Lines 660-680, replacing Line 670.

If you wish to save typing effort, you may have copies of both these programs by sending \$4 to REGENA, 918 Cedar Knolls West, Cedar City, UT 84720. Be sure to specify cassette or diskette and that you need MULTIPLY and DIVIDE on the TI.

## MULTIPLY

```

100 REM MULTIPLY !090
110 REM BY REGENA !071
120 CALL CLEAR !209
130 PRINT " ** MULTIPLICATIO
N ** " !174
140 PRINT : : "SEE HOW FAST Y
OU CAN REVIEW" !034
150 PRINT : "YOUR MULTIPLICAT
ION FACTS!" !129
160 PRINT : : "GET AS LOW A
TIMING SCORE" !038
170 PRINT : "AS YOU CAN." !24
4
180 PRINT : : : "CHOOSE A M
ULTIPLIER:" !206
190 PRINT : "1 2 3 4 5 6
7 8 9": : : !226
200 CALL KEY(3,K,S)!190
210 IF (K<49)+(K>57)THEN 200
!226
220 CALL HCHAR(24,3,K)!026
230 M=K-48 !078
240 FOR J=0 TO 9 !064
250 N(J)=0 !188
260 NEXT J !224
270 T=0 !011
280 CALL CLEAR !209
290 CALL HCHAR(2,3,77)!210
300 CALL HCHAR(2,4,85)!210
310 CALL HCHAR(2,5,76)!211
320 CALL HCHAR(2,6,84)!211
330 CALL HCHAR(2,7,73)!210
340 CALL HCHAR(2,8,80)!209
350 CALL HCHAR(2,9,76)!215
360 CALL HCHAR(2,10,89)!004
370 CALL HCHAR(11,10,M+48)!0
62
380 CALL HCHAR(11,12,120)!09
0
390 CALL HCHAR(11,16,61)!049
400 FOR PROB=0 TO 9 !041
410 K=0 !002
420 K2=0 !052
430 RANDOMIZE !149
440 R=INT(10*RND)!017
450 IF N(R)<>0 THEN 440 !059
460 N(R)=1 !197
470 CALL HCHAR(11,14,R+48)!0
71
480 CALL HCHAR(11,18,32,2)!2
23
490 CALL SOUND(20,1000,2)!12
2
500 CALL KEY(3,K,S)!190
510 T=T+1 !033
520 IF (K<48)+(K>57)THEN 500
!014
530 CALL HCHAR(11,18,K)!077
540 ANS=K-48 !227
550 IF M*R<10 THEN 620 !183
560 CALL KEY(3,K2,S)!240
570 T=T+1 !033
580 IF S<1 THEN 560 !059
590 IF (K2<48)+(K2>57)THEN 5
60 !175

```

(See Page 11)

## REGENA ON BASIC —

(Continued from Page 10)

```

600 CALL HCHAR(11,19,K2)!128
610 ANS=10*(K-48)+(K2-48)!22
5
620 IF ANS=M*R THEN 670 !159
630 CALL SOUND(50,165,2)!087
640 CALL SOUND(50,131,2)!080
650 CALL HCHAR(11,18,32,2)!2
23
660 GOTO 490 !058
670 CALL SOUND(40,262,2)!084
680 CALL SOUND(40,330,2)!080
690 CALL SOUND(40,392,2)!088
700 CALL SOUND(100,524,2)!13
1
710 CALL HCHAR(24,2,42,PROB+
1)!159
720 NEXT PROB !201
730 PRINT : : "TIMING =" ; T
!183
740 PRINT : : "TRY AGAIN? (Y/
N)" !226
750 CALL KEY(3,K,S)!190
760 IF (K=89)+(K=121)THEN 18
0 !248
770 IF (K<>78)*(K<>110)THEN
750 !180
780 CALL HCHAR(23,21,78)!056
790 PRINT : : !006
800 END !139

```

---

**DIVIDE**

---

```

100 REM DIVIDE !143
110 REM BY REGENA !071
120 CALL CLEAR !209
130 PRINT TAB(5); " ** DIVISI
ON ** " !250
140 CALL CHAR(35,"001000FE00
1")!232
150 PRINT : : "SEE HOW FAST Y
OU CAN REVIEW" !034
160 PRINT : "YOUR DIVISION FA
CTS!" !178
170 PRINT : : : "GET AS LOW A
TIMING SCORE" !038
180 PRINT : "AS YOU CAN." !24
4
190 PRINT : : : "CHOOSE A D
IVISOR:" !228
200 PRINT : "1 2 3 4 5 6
7 8 9": : : : !226
210 CALL KEY(3,K,S)!190
220 IF (K<49)+(K>57)THEN 210
!236
230 CALL HCHAR(24,3,K)!026
240 D=K-48 !069
250 FOR J=1 TO 9 !065
260 N(J)=0 !188
270 NEXT J !224
280 T=0 !011
290 CALL CLEAR !209
300 CALL HCHAR(2,3,68)!210
310 CALL HCHAR(2,4,73,3)!126
320 CALL HCHAR(2,5,86)!212
330 CALL HCHAR(2,7,68)!214
340 CALL HCHAR(2,8,69)!216
350 CALL HCHAR(11,12,35)!046
360 CALL HCHAR(11,14,D+48)!0
57
370 CALL HCHAR(11,16,61)!049
380 FOR PROB=1 TO 9 !042
390 K=0 !002
400 RANDOMIZE !149
410 R=INT(9*RND)+1 !163
420 IF N(R)<>0 THEN 410 !029
430 N(R)=1 !197
440 RD=R*D !173
450 CALL HCHAR(11,9,32,2)!17
4
460 IF RD<10 THEN 500 !114
470 A=INT(RD/10)!192
480 CALL HCHAR(11,9,A+48)!00
9
490 RD=RD-10*A !219
500 CALL HCHAR(11,10,RD+48)!
135
510 CALL HCHAR(11,18,32)!049
520 CALL SOUND(20,1000,2)!12
2
530 CALL KEY(3,K,S)!190
540 T=T+1 !033
550 IF (K<49)+(K>57)THEN 530
!046
560 CALL HCHAR(11,18,K)!077
570 ANS=K-48 !227
580 IF ANS=R THEN 630 !103
590 CALL SOUND(50,165,2)!087
600 CALL SOUND(50,131,2)!080
610 CALL HCHAR(11,18,32)!049
620 GOTO 520 !089
630 CALL SOUND(40,262,2)!084
640 CALL SOUND(40,330,2)!080
650 CALL SOUND(40,392,2)!088
660 CALL SOUND(100,524,2)!13
1
670 CALL HCHAR(24,2,42,PROB)
!228
680 NEXT PROB !201
690 PRINT : : "TIMING =" ; T
!183
700 PRINT : : "TRY AGAIN? (Y/
N)" !226
710 CALL KEY(3,K,S)!190
720 IF (K=89)+(K=121)THEN 19
0 !002
730 IF (K<>78)*(K<>110)THEN
710 !140
740 CALL HCHAR(23,21,78)!056
750 PRINT : : !006
760 END !139

```

## German group to host international meeting

The Fifth International TI Users Meeting is scheduled for Sept. 28-30 at the Burgerhaus, Wiesbaden-Erbenheim, Germany.

The "official part" will be 10 a.m.-6 p.m. Sept. 29, according to Gerald D. Turner of TI-Workshop Wiesbaden, hosts for the meeting.

Turner says limited sleeping arrangements can be provided at the Burgerhaus at no cost with advance reservations for guests who provide their own sleeping bags.

He says TI-Workshop Wiesbaden's new disk controller will be available at the fair. It will handle four disk drives and format up

to DSDD, with quad forthcoming, according to Turner. The cost is 350 DM (\$212 @ 1.65 DM to \$1 exchange rate). He says SuperModule II, a GRAM simulator that fits into a standard TI cartridge and allows the user to dump and run all TI and third-party cartridges from either disk or cassette, will also be available. It has 8K RAM space to use as a supercart, Turner says.

Table space is available at no cost and the entry fee will be about \$3 at the door, according to Turner.

The organizers are planning a special exhibit to mark the TI's 10th year in Germany,

and requests that attendees bring items such as "rare modules," homemade hardware or items from third-party manufacturers to display. All shipping cost and protection of items will be provided, Turner says.

For further information contact TI-Workshop Wiesbaden, Eleonorenstr. 5, 6200 Wiesbaden, Germany. Tel 06121/307951; or Gerald D. Turner, PSC 1 Box 6895, APO NY 09633, Tel 06134/53418. After Sept. 1, the new number for Wiesbaden will be 0611. For U.S. callers, the country code is 49, and drop the 0 when dialing.

## EXTENDED BASIC

# Orchestrating noises, sounds and silences

By JERRY STERN

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Putting together a collection of sound effects was too close to actual work for my taste. Each of last month's subprograms had to be independently written, tested, rewritten, retested, re-rewritten, re-re .... You get the idea. There has to be an easier way.

First, the problems; it's too awkward to be constantly calculating the numbers for the CALL SOUND statements for every test of each new sound. As new sounds are added, stringing the sounds together without tying the loops into knots gets to be a progressively more complex and tangled mess. Assembling the sounds into a program, and allowing for repetitions of various sounds in different combinations, requires organization, maybe printed listings of sounds and their names.

Of course, it is always possible to use a program to save calculations, but there are compromises to be made. This month's program is a sound effects editor. By temporarily giving up some speed in the sound playback on the more quickly changing effects, we gain the ability to test sounds from within an editor environment. The sounds can be written, tested, edited, printed, saved, or strung together from within the program. Once the set of sounds, or "score," is ready, the program will write an Extended BASIC program to play those sounds at full speed. That resulting program can then be converted into a subprogram for merging into another project, or just played by itself.

Throughout the program, I've used terms from music to name the chunks of the sound file. Each set of sounds forming one CALL SOUND statement is one "chord." Sets of chords can be saved as subscores, or refrains. The largest musical set is the score, which can contain either chords or subscores. Despite the musical terminology, SOUNDSTAGE is best suited to sound effects creation. Notes are entered as frequencies, not letters, and the difficulty of playing very fast notes will

make the more complex musical applications awkward. Outside those limitations, the program will allow extremely complex sound creations.

Each chord can include up to three notes and a noise, played in a loop. From the main menu of SOUNDSTAGE, choose 1) Edit Chord. Each chord is identified by a letter, so 26 different chords are available. On the editing screen, you may set the duration or length in thousandths of a second for each cycle of the loop. Sounds may be as long as 4250 milliseconds, or four

**SOUNDSTAGE is best suited to sound effects creation. Notes are entered as frequencies, not letters, and the difficulty of playing very fast notes will make the more complex musical applications awkward. Outside those limitations, the program will allow extremely complex sound creations.**

and one quarter seconds each. Each of the three notes may have starting and ending frequencies entered. The step sizes will be calculated automatically. Each note and noise may have starting and ending volumes entered, and those step sizes will also be calculated for you. Each chord may also be given a name.

Some data entry hints: To keep the program from becoming too complex, I've assumed that all three notes will always be played in every chord. However, the default value of volume 30 is the lowest setting, completely inaudible. Zero is the loudest setting. For frequencies, use a number between 110 hertz (cycles per second) and 44,733 hertz. A negative duration will cause each sound to interrupt the preceding sound if it has not yet finished. Sounds that use a negative duration will be

noticeably slower played from the editing or play score screens than they will be when the final merge file is played.

Using a negative duration for the sound length is useful for creating sounds that change continuously as they play, like a siren or a reverberating and fading bell. But the negative duration causes the SOUND statement to interrupt not only the preceding sound in the sequence, but also the last sound played from the previous sound effect. For example, a pause can be placed between chords by creating a silent

chord. A chord with a positive duration of 1000, one repetition, and all volumes set at 30 would produce a one second pause if it is followed by a sound with a positive duration. If the following sound's duration is negative, the one second pause will be shortened to just the small fraction of a second required to process the program statement of that following sound. To prevent this, write the pause chord to contain eleven repetitions, each of duration 100. That pause will be one second long if followed

by an "interrupting" sound, or 1.1 seconds if followed by a sound with a positive duration.

Noises are entered in a sound statement as frequencies negative one through eight. The negative, or minus, has already been assumed on the input screen. You may enter zero through eight for the noise. Zero means no noise will be played, and no inputs for noise volumes will be requested.

The chord editing screen is complex, so rather than forcing you to press Enter for every setting, you may also use the down arrow key (function X) to end each entry. That technique will take the cursor down to the bottom line of the screen, to choose to play the chord, redo (edit the same chord again), edit the next chord, or return

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## EXTENDED BASIC—

(Continued from Page 12)

to the main menu.

**Editing the Score:** The 26 chords may be placed directly in the main score by simply entering their letters in the score. Or, those letters may be entered into one of the ten subscores, identified by the numbers 0 to 9. Subscores may only contain chord letters, not the numbers of other subscores or themselves. The main score may contain either the numbers of subscores or the letters of chords. If you plan to use a sequence of sounds together, enter them into a subscore.

**Playing the Score:** This menu option will play the score all the way through. Hold down any key to stop the sequence. It may take several seconds for the computer to shut up.

**Saving or Loading the Score:** SOUNDSTAGE can save the entire data set of chords, subscores, main score, and chord names in a file that only SOUNDSTAGE can read. Options four and five save and load these files.

**Printing the Score:** The score and chord set may be printed out with option six. Change the default printer name in line 90 to match your system. No matter how long your composition, the printout will always fit on one page. Using the longest possible chords, and nesting them in subscores, the upper limit of a composition played by SOUNDSTAGE is much longer than anyone will need, in theory, the longest possible play time is 808 years, but testing will continue.

**Clearing the Score:** This option is for starting over, for wiping out everything. Be sure; there is no "Oops" key.

**Writing a Merge File:** Once a composition is complete, or ready for more detailed testing, use this option to create a program file on disk. While this file is being created, SOUNDSTAGE will delete any of the sounds not needed, or all of the inaudible sounds that do not affect any other sound. Totally silent chords are retained as pauses, and all sounds are kept in chords that use the variable noises numbers four or eight. Each letter in the main score is converted into a GOSUB statement in the merge file, and each chord and subscore becomes a subroutine.

The merge routine builds up each state-

ment from a series of number codes. Every Extended BASIC reserved word has its own code. GOSUB is 135. CALL is 157. Numbers are stored with a length indicator, and the numbers are processed by the DEF NC\$ statement in line 210. DEF CR\$ (line 200) converts line numbers into a two-byte code in base 256. No matter what line number is used, it ALWAYS uses two bytes in merge format. (So resequencing a program to use very low line numbers saves no memory at all.) Every line in the merge file ends with the number zero, and the file always ends with a line containing nothing but two repetitions of the number 255.

After the merge file has been built, it must be entered into memory as a subprogram would be, using the merge statement:

```
MERGE DSKx.NEWSCORE
```

Large files of chords and scores will take several minutes to load from a merge file, so resave the file in program format:

```
SAVE DSKx.NEWSCORE
```

**Quitting the Program:** A lot of data could be lost if you quit accidentally, so if you try to leave the program without saving your score, you will be reminded to save. But if you're sure, then press the space bar to quit. Any other key will take you back to the main menu. And if you try to save data to an empty drive, or otherwise fall asleep at the keyboard, there is a fatal error trapping routine to wake you up and send you back to the main menu.

This is a complex program, but each section was written separately, and marked with comments at its start. If you are feeling alert, try deciphering the merge file creation section. Or if that feels too much like hard labor, just go explore line 410, and figure out how to use the down arrow for an Enter key. Either way, write some sound effects first, and have fun.

### SOUNDSTAGE

```
90 PR$="RS232.DA=8.BA=4800"
!DEFAULT PRINTER !071
100 ! SOUNDSTAGE !160
110 ! SOUND EFFECTS GENERATOR; JLS 8/90 !071
120 DIM D(26),F1(26),F2(26),
F3(26),NS(26),V1(26),V2(26),
V3(26),VN(26),F1E(26),F2E(26)
```

```
),F3E(26)!!111
130 DIM V1E(26),V2E(26),V3E(
26),N$(26),SSN$(10),SS$(10),
VNE(26),S(26),CL$(26),FN(26)
!059
140 CALL CLEAR :: CALL BLUE
:: CALL TITLE !082
150 MN$="Edit A Chord Edit
t Score Play Score
Save Score Load Score
Print Score Clear S
core Write Merge FileQui
t" !164
160 ON WARNING NEXT !215
170 CF=1 :: MS$=RPT$(" ",125
)!145
180 IO$="0123456789"&CHR$(3)
&CHR$(4)&CHR$(7)&CHR$(8)&CHR
$(9)!059
190 ON ERROR 20000 !119
200 DEF CR$(S)=CHR$(INT(S/25
6))&CHR$(S-INT(S/256)*256)!
CONVERTS LINE NUMBER INTO CR
UNCH FORMAT !034
210 DEF NC$(X)=SEG$(CHR$(194
)&CHR$(200),2+(X<0),1-(X<0))
&CHR$(LEN(STR$(ABS(X))))&STR
$(ABS(X))!CRUNCHES +/- INTEG
ERS !141
220 GOTO 1970 !008
230 CALL CLEAR !209
240 DISPLAY AT(1,3):"Sound S
tage Control Panel" :: CALL
HCHAR(2,5,95,25)!165
250 CALL MENU(MN$,X)!213
260 CALL CLEAR :: TMP$=SEG$(
MN$,X-1)*16+1,16):: L=POS(T
MP$&" ",",",1):: DISPLAY A
T(1,14-INT(L/2)):TMP$ !050
270 CALL HCHAR(2,1,95,32)!17
8
280 ON X GOTO 290,800,970,11
10,1300,1470,1900,2050,1680
!126
290 ! EDIT A CHORD !186
300 SF=-1 !019
310 DISPLAY AT(3,1):"Chord L
etter?" !240
320 ACCEPT AT(3,15)SIZE(-1)V
ALIDATE(UALPHA):A$ :: IF A$=
"" THEN 230 ELSE AC=ASC(A$)-
64 !025
330 DISPLAY AT(5,1):"Duratio
n of Each Tone:""(0 to +/-4
(See Page 14)
```

## EXTENDED BASIC—

(Continued from Page 13)

```

250)" :: DISPLAY AT(6,17)-(D(
AC)<0)):D(AC)!227
340 DISPLAY AT(8,1):"Number
of Steps in Chord:";TAB(17);
S(AC)!088
350 DISPLAY AT(11,2):"1";TAB
(10);"2";TAB(18);"3";TAB(26)
;"N" !149
360 DISPLAY AT(12,1):"Start
Frequencies: 110-44733":F1(A
C);TAB(9);F2(AC);TAB(17);F3(
AC);TAB(24);"-";FN(AC)!044
370 DISPLAY AT(15,1):"Ending
Frequencies:";F1E(AC);TAB(9
);F2E(AC);TAB(17);F3E(AC);TA
B(26);"*" !030
380 DISPLAY AT(18,1):"Starti
ng Volumes: 0-30":V1(AC);
TAB(9);V2(AC);TAB(17);V3(AC)
;TAB(25);VN(AC)!210
390 DISPLAY AT(21,1):"Ending
Volumes:";V1E(AC);TAB(9);V2
E(AC);TAB(17);V3E(AC);TAB(25
);VNE(AC):"Chord Name:";N$(A
C)!008
400 ACCEPT AT(6,18)VALIDATE(
IO$,"-")SIZE(-5):T :: IF T=0
THEN 770 ELSE IF ABS(T)>425
0 THEN 400 ELSE D(AC)=T !031
410 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
420 ACCEPT AT(9,18)VALIDATE(
IO$)SIZE(-6):T :: IF T=0 THE
N 420 ELSE S(AC)=T !056
430 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
440 ACCEPT AT(13,2)VALIDATE(
IO$)SIZE(-5):T :: IF T<110 O
R T>44733 THEN 440 ELSE F1(A
C)=T !104
450 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
460 ACCEPT AT(13,10)VALIDATE
(IO$)SIZE(-5):T :: IF T<110
OR T>44733 THEN 460 ELSE F2(
AC)=T !173
470 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
480 ACCEPT AT(13,18)VALIDATE
(IO$)SIZE(-5):T :: IF T<110
OR T>44733 THEN 480 ELSE F3(
AC)=T !202
490 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
500 ACCEPT AT(13,26)VALIDATE
("12345678")SIZE(-1):FN(AC)!
064
510 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
520 ACCEPT AT(16,2)VALIDATE(
IO$)SIZE(-5):T :: IF T<110 O
R T>44733 THEN 520 ELSE F1E(
AC)=T !001
530 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
540 ACCEPT AT(16,10)VALIDATE
(IO$)SIZE(-5):T :: IF T<110
OR T>44733 THEN 540 ELSE F2E
(AC)=T !070
550 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
560 ACCEPT AT(16,18)VALIDATE
(IO$)SIZE(-5):T :: IF T<110
OR T>44733 THEN 560 ELSE F3E
(AC)=T !099
570 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
580 ACCEPT AT(19,2)VALIDATE(
IO$)SIZE(-2):T :: IF T>30 TH
EN 580 ELSE V1(AC)=T !057
590 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
600 ACCEPT AT(19,10)VALIDATE
(IO$)SIZE(-2):T :: IF T>30 T
HEN 600 ELSE V2(AC)=T !126
610 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
620 ACCEPT AT(19,18)VALIDATE
(IO$)SIZE(-2):T :: IF T>30 T
HEN 620 ELSE V3(AC)=T !155
630 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
640 IF FN(AC)=0 THEN 670 !21
7
650 ACCEPT AT(19,26)VALIDATE
(IO$)SIZE(-2):T :: IF T>30 T
HEN 650 ELSE VN(AC)=T !211
660 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
670 ACCEPT AT(22,2)VALIDATE(
IO$)SIZE(-2):T :: IF T>30 TH
EN 670 ELSE V1E(AC)=T !210
680 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
690 ACCEPT AT(22,10)VALIDATE
(IO$)SIZE(-2):T :: IF T>30 T
HEN 690 ELSE V2E(AC)=T !023
700 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
710 ACCEPT AT(22,18)VALIDATE
(IO$)SIZE(-2):T :: IF T>30 T
HEN 710 ELSE V3E(AC)=T !052
720 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
730 IF FN(AC)=0 THEN 760 !05
1
740 ACCEPT AT(22,26)VALIDATE
(IO$)SIZE(-2):T :: IF T>30 T
HEN 740 ELSE VNE(AC)=T !108
750 CALL KEY(3,K,W):: IF K=1
0 THEN 770 !122
760 ACCEPT AT(23,12)SIZE(-16
):N$(AC)!115
770 DISPLAY AT(24,1):"Play,
Redo, Next, or Menu?" :: AC
CEPT AT(24,27)VALIDATE("PRNM
prnm")SIZE(-1):T$ !073
780 ON POS("PRNMprnm",T$,1)G
OTO 790,400,290,230,790,400,
290,230 !155
790 GOSUB 1730 :: GOTO 770 !
238
800 ! EDIT SCORE !101
810 SF=-1 !019
820 DISPLAY AT(3,1):"Chords
will be played in this or
der... Main Sc
ore:" !216
830 FOR L=0 TO 9 :: DISPLAY
AT(6+L,1):SEG$(MS$,1+L*25,25
):: NEXT L :: CALL HCHAR(16,
1,95,32)!154
840 DISPLAY AT(24,1):"Edit,
Subscores, or Menu?" :: AC
CEPT AT(24,27)VALIDATE("ESMe
sm")SIZE(-1):T$ !192
850 ON POS("ESMesm",T$,1)GOT
O 860,880,230,860,880,230 !2
19
860 FOR L=0 TO 9 :: ACCEPT A
T(6+L,1)VALIDATE(DIGIT,UALPH
A)SIZE(-25):T$ :: T$=SEG$(T$
&RPT$(" ",25),1,25):: MS$=SE
G$(MS$,1,L*25)&T$&SEG$(MS$,2
6+L*25,225-L*25):: NEXT L !1
92
870 GOTO 840 !154
880 CALL HCHAR(3,1,32,702)!2
23
890 DISPLAY AT(3,1):"Subscor
es:" !033
900 FOR L=0 TO 9 :: DISPLAY
AT(4+L*2,1):STR$(L);TAB(3);S
S$(L):"Name:";SSN$(L):: NEXT
L !246
910 DISPLAY AT(24,1):"Edit,
(See Page 15)

```

## EXTENDED BASIC—

(Continued from Page 14)


```

main Score, or Menu?" :: ACC
EPT AT(24,27)VALIDATE("ESMes
m")SIZE(1):T$ !160
920 ON POS("ESMesm",T$,1)GOT
O 930,260,230,930,260,230 !1
39
930 DISPLAY AT(24,1):"Edit W
high Subscore?" :: ACCEPT AT
(24,27)VALIDATE(DIGIT)SIZE(2
):L :: IF L<0 OR L>9 THEN 93
0 !219
940 ACCEPT AT(4+L*2,3)VALIDA
TE(UALPHA)SIZE(-24):SS$(L)!0
79
950 ACCEPT AT(5+L*2,6)SIZE(-
22):SSN$(L)!074
960 GOTO 910 !224
970 ! PLAY SCORE !117
980 DISPLAY AT(5,1):"Now Pla
ying..." !230
990 FOR L=1 TO LEN(MS$)!071
1000 AC$=SEG$(MS$,L,1):: IF
AC$=" " THEN 1080 ELSE IF AS
C(AC$)>64 THEN 1050 !1651010
Q=VAL(AC$):: DISPLAY AT(7,1
):"Subscore:";Q:SSN$(Q)!193
1020 FOR L2=1 TO LEN(SS$(Q))
!061
1030 AC=ASC(SEG$(SS$(Q),L2,1
))-64 :: DISPLAY AT(9,1):N$(
AC):: GOSUB 1730 :: CALL KEY
(0,K,W):: IF W<>0 THEN 1090
!227
1040 NEXT L2 :: GOTO 1070 !0
23
1050 AC=ASC(AC$)-64 :: DISPL
AY AT(7,1): : N$(AC)!217
1060 GOSUB 1730 !024
1070 CALL KEY(3,K,W):: IF W<
>0 THEN 1090 !086
1080 NEXT L !226
1090 CALL PAUSE !232
1100 GOTO 230 !053
1110 ! SAVE SCORE !110
1120 DISPLAY AT(5,1):"The sa
ved score will only bereadab
le by Sound Stage.": "Outpu
t file name?":"DSK1." !118
1130 CALL KEY(3,K,W):: ACCEP
T AT(9,4)VALIDATE(DIGIT,UALP
HA,"._@")SIZE(-24):DEST$ !13
3
1140 IF LEN(DEST$)<3 THEN 23
0 !052
1150 OPEN #1:"DSK"&DEST$,INT
ERNAL,VARIABLE 254,OUTPUT !0
97
1160 DISPLAY AT(12,1):"Now S
aving...":"Main Score" !207
1170 PRINT #1:MS$ !012
1180 DISPLAY AT(13,1):"Subsc
ores" !024
1190 FOR L=1 TO 10 :: PRINT
#1:SS$(L),SSN$(L):: NEXT L !
161
1200 FOR L=1 TO 26 !115
1210 IF D(L)=0 THEN 1260 !16
1
1220 DISPLAY AT(13,1):"Chord
";CHR$(L+64)!164
1230 PRINT #1:L,D(L),S(L),F1
(L),F2(L),F3(L),FN(L)!175
1240 PRINT #1:F1E(L),F2E(L),
F3E(L),V1(L),V2(L),V3(L),VN
(L)!252
1250 PRINT #1:V1E(L),V2E(L),
V3E(L),VNE(L),N$(L)!115
1260 NEXT L !226
1270 CLOSE #1 !151
1280 SF=0 !080
1290 GOTO 230 !053
1300 ! LOAD SCORE !095
1310 DISPLAY AT(5,1):"The lo
aded score will write over t
he sounds in memory.": "Inp
ut file name?":"DSK1." !015
1320 CALL KEY(3,K,W):: ACCEP
T AT(9,4)VALIDATE(DIGIT,UALP
HA,"._@")SIZE(-24):SRCE$ !13
0
1330 IF LEN(SRCE$)<3 THEN 23
0 !049
1340 OPEN #1:"DSK"&SRCE$,INT
ERNAL,VARIABLE 254,INPUT !24
9
1350 DISPLAY AT(12,1):"Now R
etrieving...":"Main Score" !
138
1360 INPUT #1:MS$ !002
1370 DISPLAY AT(13,1):"Subsc
ores" !024
1380 FOR L=1 TO 10 :: INPUT
#1:SS$(L),SSN$(L):: NEXT L !
151
1390 IF EOF(1)THEN 1450 !221
1400 INPUT #1:AC,D(AC),S(AC)
,F1(AC),F2(AC),F3(AC),FN(AC)
!045
1410 DISPLAY AT(13,1):"Chord
";CHR$(AC+64)!220
1420 INPUT #1:F1E(AC),F2E(AC
),F3E(AC),V1(AC),V2(AC),V3(AC
),VN(AC)!122
1430 INPUT #1:V1E(AC),V2E(AC
),V3E(AC),VNE(AC),N$(AC)!129
1440 GOTO 1390 !194
1450 CLOSE #1 !151
1460 GOTO 230 !053
1470 ! PRINT SCORE !204
1480 DISPLAY AT(8,1):"Printe
r name?":PR$ !149
1490 ACCEPT AT(9,1)VALIDATE(
DIGIT,UALPHA,".")SIZE(-28):
PR$ !081
1500 IF PR$="" THEN 230 !046
1510 OPEN #1:PR$,DISPLAY ,VA
RIABLE 132,OUTPUT !023
1520 PRINT #1:CHR$(15)!187
1530 CALL KEY(5,K,W):: DISPL
AY AT(12,1):"Enter Date or T
itles.":"Press Enter when do
ne." :: ACCEPT AT(14,1):TMP$
!200
1540 IF TMP$="" THEN 1550 EL
SE PRINT #1:TMP$ :: GOTO 153
0 !089
1550 DISPLAY AT(12,1):"Now P
rinting...":"Main Score": " "
!081
1560 PRINT #1: "Score:";MS$
:"Subscores:"!166
1570 DISPLAY AT(13,1):"Subsc
ores" !024
1580 FOR L=1 TO 10 :: PRINT
#1:L,SS$(L),SSN$(L):: NEXT L
!160

```

(See Page 16)

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## EXTENDED BASIC—

```

(Continued from Page 15)
1590 PRINT #1: "Chord Step
Steps Starting Frequen
cies Ending Frequenc
ies Starting Volumes En
ding Volumes Chord" !016
1600 PRINT #1: "Letter Length
1 2 3 N
oise 1 2 3
1 2 3 Noise Name" !072
1610 FOR L=1 TO 26 !115
1620 IF D(L)=0 THEN 1650 !04
1
1630 DISPLAY AT(13,1): "Chord
";CHR$(L+64)!164
1640 PRINT #1,USING 1890:CHR
$(L+64),D(L),S(L),F1(L),F2(L
),F3(L),-FN(L),F1E(L),F2E(L
),F3E(L),V1(L),V2(L),V3(L),VN
(L),V1E(L),V2E(L),V3E(L),VNE
(L),N$(L)!192
1650 NEXT L !226
1660 CLOSE #1 !151
1670 GOTO 230 !053
1680 ! QUIT !230
1690 IF SF THEN DISPLAY AT(2
0,1): "You have not saved the
file since the last changes
were made!" !047
1700 CALL HCHAR(23,1,32,12)!
219
1710 CALL ENDING !032
1720 GOTO 230 !053
1730 !PLAY SUBROUTINE !233
1740 IF D(AC)=0 THEN RETURN
!168
1750 S1=(F1E(AC)-F1(AC))/S(A
C)!142
1760 S2=(F2E(AC)-F2(AC))/S(A
C)!145
1770 S3=(F3E(AC)-F3(AC))/S(A
C)!148
1780 S4=(V1E(AC)-V1(AC))/S(A
C)!177
1790 S5=(V2E(AC)-V2(AC))/S(A
C)!180
1800 S6=(V3E(AC)-V3(AC))/S(A
C)!183
1810 IF FN(AC)=0 THEN 1860 !
132
1820 S7=(VNE(AC)-VN(AC))/S(A
C)!238
1830 FOR Z=0 TO S(AC)-1 !078
1840 CALL SOUND(D(AC),F1(AC)
+Z*S1,V1(AC)+Z*S4,F2(AC)+Z*S
2,V2(AC)+Z*S5,F3(AC)+Z*S3,V3
(AC)+Z*S6,-FN(AC),VN(AC)+Z*S
7)!114
1850 NEXT Z :: RETURN !250
1860 FOR Z=0 TO S(AC)-1 !078
1870 CALL SOUND(D(AC),F1(AC)
+Z*S1,V1(AC)+Z*S4,F2(AC)+Z*S
2,V2(AC)+Z*S5,F3(AC)+Z*S3,V3
(AC)+Z*S6)!200
1880 NEXT Z :: RETURN !250
1890 IMAGE ## ##### ###
##### ##### ##
##### #####
## ## ## ## ## ##
## ## #####
!204
1900 ! CLEAR SCORE !166
1910 DISPLAY AT(8,1): "Start
Over?": "Clear Everything?": "
Are You SURE? Yes/No N" !
232
1920 ACCEPT AT(10,25)SIZE(-1
)VALIDATE("YN"):TMP$ !201
1930 IF TMP$<>"Y" THEN 230 !
152
1940 DISPLAY AT(13,1): "Now d
estroying data..." !076
1950 MS$="" !073
1960 FOR L=1 TO 10 :: SS$(L)
,SSN$(L)="" :: NEXT L !222
1970 FOR L=1 TO 26 !115
1980 N$(L)="" !176
1990 D(L),S(L),FN(L)=0 !115
2000 F1E(L),F2E(L),F3E(L),F1
(L),F2(L),F3(L)=110 !143
2010 V1E(L),V2E(L),V3E(L),VN
E(L),VN(L),V1(L),V2(L),V3(L)
=30 :: N$(L)="" !086
2020 NEXT L !226
2030 SF=0 !080
2040 GOTO 230 !053
2050 ! MERGE FILE !083
2060 DISPLAY AT(5,1): "The sa
ved score will only bereadab
le as a program file.": "Ou
tput file name?": "DSK1." !14
2
2070 CALL KEY(3,K,W):: ACCEP
T AT(9,4)VALIDATE(DIGIT,UALP
HA,"._@")SIZE(-24):DEST$ !13
3
2080 IF LEN(DEST$)<3 THEN 23
0 !052
2090 OPEN #1:"DSK"&DEST$,DIS
PLAY ,VARIABLE 163,OUTPUT !0
13
2100 DISPLAY AT(12,1): "Now S
aving...": "Main Score" !207
2110 FOR L=1 TO LEN(MS$)!071
2120 AC$=SEG$(MS$,L,1):: IF
AC$=" " THEN 2140 ELSE IF AS
C(AC$)>64 THEN AC=ASC(AC$)*1
0 ELSE AC=(ASC(AC$)-48)*30+3
00 !047
2130 PRINT #1:CR$(L);CHR$(13
5);CHR$(201);CR$(AC);CHR$(0)
!184
2140 NEXT L !226
2150 PRINT #1:CR$(290);CHR$(
152);CHR$(0)!030
2160 DISPLAY AT(13,1): "Subsc
ores" !024
2170 FOR L=0 TO 9 !066
2180 PRINT #1:CR$(30*L+300);
CHR$(131);"Subscore ";STR$(L
);" ";SSN$(L);CHR$(0)!099
2190 FOR L2=1 TO LEN(SS$(L))
!056
2200 AC$=SEG$(SS$(L),L2,1)::
IF AC$=" " THEN 2220 ELSE A
C=ASC(AC$)*10 !047
2210 PRINT #1:CR$(30*L+300+L
2);CHR$(135);CHR$(201);CR$(A
C);CHR$(0)!006
2220 NEXT L2 !020
2230 PRINT #1:CR$(30*L+326);
CHR$(136);CHR$(0)!029
2240 NEXT L !226
2250 FOR AC=1 TO 26 !171
2260 DISPLAY AT(13,1): "Chord
";CHR$(AC+64)!220
2270 IF D(AC)=0 THEN 2550 !2
32
2280 S1=(F1E(AC)-F1(AC))/S(A
C)!142
2290 S2=(F2E(AC)-F2(AC))/S(A
C)!145
2300 S3=(F3E(AC)-F3(AC))/S(A
C)!148
2310 S4=(V1E(AC)-V1(AC))/S(A
C)!177
2320 S5=(V2E(AC)-V2(AC))/S(A
C)!180
2330 S6=(V3E(AC)-V3(AC))/S(A
C)!183
2340 ! IF FN(AC)=0 THEN FN(A
C)=1 :: VN(AC),VNE(AC)=30 ::
RF=-1 !012
2350 S7=(VNE(AC)-VN(AC))/S(A
C)!238
2360 PRINT #1:CR$(AC*10+640)
(See Page 18)

```



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# TI NET - YOUR 99/4A / 9640 NETWORK

## EXTENDED BASIC—

(Continued from Page 16)

```

;CHR$(140);"L";CHR$(190);NC$(
0);CHR$(177);NC$(S(AC)-1);C
HR$(0)!119
2370 TMP$=CR$(AC*10+642)&CHR
$(157)&CHR$(200)&CHR$(5)&"SO
UND"&CHR$(183)&NC$(D(AC))!BE
GIN SOUND !086
2380 IF (V1E(AC)<30)+(V1(AC)
<30)THEN 2410 !024
2390 IF (FN(AC)=4)+(FN(AC)=8
)THEN 2410 !143
2400 IF (V2E(AC)=30)*(V2(AC)
=30)*(V3E(AC)=30)*(V3(AC)=30
)*((FN(AC)=0)+(VN(AC)=30)*(V
NE(AC)=30))THEN 2410 ELSE 24
20 !204
2410 TMP$=TMP$&CHR$(179)&NC$(
F1(AC))&CHR$(193)&"L"&CHR$(
195)&NC$(S1)&CHR$(179)&NC$(V
1(AC))&CHR$(193)&"L"&CHR$(19
5)&NC$(S4)!FREQ&VOL 1 !074
2420 IF (V2E(AC)<30)+(V2(AC)
<30)THEN 2440 !056
2430 IF (FN(AC)=4)+(FN(AC)=8
)THEN 2440 ELSE 2450 !146
2440 TMP$=TMP$&CHR$(179)&NC$(
F2(AC))&CHR$(193)&"L"&CHR$(
195)&NC$(S2)&CHR$(179)&NC$(V
2(AC))&CHR$(193)&"L"&CHR$(19
5)&NC$(S5)!FREQ&VOL 2 !079
2450 IF (V3E(AC)<30)+(V3(AC)
<30)THEN 2470 !088
2460 IF (FN(AC)=4)+(FN(AC)=8
)THEN 2470 ELSE 2480 !206
2470 TMP$=TMP$&CHR$(179)&NC$(
F3(AC))&CHR$(193)&"L"&CHR$(
195)&NC$(S3)&CHR$(179)&NC$(V
3(AC))&CHR$(193)&"L"&CHR$(19
5)&NC$(S6)!FREQ&VOL3 !052
2480 IF FN(AC)=0 THEN 2500 !
006
2490 TMP$=TMP$&CHR$(179)&NC$(
-FN(AC))&CHR$(179)&NC$(VN(A
C))&CHR$(193)&"L"&CHR$(195)&
NC$(S7)!NOISE !063
2500 TMP$=TMP$&CHR$(182)&CHR
$(0)!END !151
2510 PRINT #1:TMP$ !093
2520 PRINT #1:CR$(AC*10+644)
;CHR$(150);"L";CHR$(0)!026
2530 PRINT #1:CR$(AC*10+646)
;CHR$(136);CHR$(0)!088
2540 ! IF RF THEN FN(AC)=0 :
: VN(AC),VNE(AC)=0 :: RF=0 !
108

```

```

2550 NEXT AC !026
2560 PRINT #1:CHR$(255);CHR$
(255)!080
2570 CLOSE #1 !151
2580 GOTO 230 !053
20000 ! ERRORS SUBROUTINE !1
76
20010 CALL SCREEN(7)!152
20020 DISPLAY AT(2,1)ERASE A
LL:"An error has bee caused
by your activies." !0922003
0 CALL ERR(A,B)!244
20040 DISPLAY AT(6,1):"Error
# ";A !145
20050 IF A=130 THEN DISPLAY
AT(8,1):"Input/Output Error"
:: GOTO 20080 !086
20060 IF A=109 THEN DISPLAY
AT(8,1):"File Error" :: GOTO
20080 !004
20070 DISPLAY AT(8,1):"Unkno
wn Error" !080
20080 CALL PAUSE !232
20090 ON ERROR 20000 !119
20100 CALL CLEAR :: CALL BLU
E !228
20110 RETURN 230 !ADD RETURN
LINE NUMBER !180
20120 ! END OF ERROR SUBROUT
INE !009
29160 SUB ENDING !036
29165 !CONFIRMS PROGRAM QUIT
JLS 9/89 !129
29170 CALL SOUND(800,130,0,1
60,0):: DISPLAY AT(24,3):"PR
ESS SPACE BAR TO QUIT" !105
29175 CALL KEY(0,K,S):: IF S
<1 THEN 29175 ELSE IF K<>32
THEN SUBEXIT !003
29180 STOP :: SUBEND !194
29505 SUB BLUE !149
29510 ! SWITCHES DISPLAY TO

```

```

WHITE ON BLUE; JLS 7/88 !230
29515 CALL SCREEN(5):: FOR L
=0 TO 14 :: CALL COLOR(L,16,
1):: NEXT L :: SUBEND !202
30595 SUB MENU(A$,X)!127
30600 ! A$ IS LIST OF OPTION
S, EACH 16 CHARACTERS LONG !
085
30605 ! X : RETURN VARIABLE
FOR NUMBER OF CHOICE !043
30610 FOR L=1 TO LEN(A$)/16+
.9 !207
30615 DISPLAY AT(4+L,1):L;SE
G$(A$,(L-1)*16+1,16)!208
30620 NEXT L :: L=L-1 !118
30635 DISPLAY AT(23,3):"CHOI
CE?" !074
30640 CALL SOUND(200,-1,4)!2
20
30645 CALL KEY(0,X,S):: IF S
<1 OR X>L+48 OR X<49 THEN 30
645 ELSE X=X-48 !131
30655 SUBEND !168
30820 SUB PAUSE !236
30825 FOR D=1 TO 100 :: NEXT
D !241
30830 DISPLAY AT(24,2):"PRES
S ANY KEY TO CONTINUE" !088
30835 CALL KEY(0,K,S):: IF S
<1 THEN 30835 !049
30840 SUBEND !168
31565 SUB TITLE !240
31575 DISPLAY AT(7,9)ERASE A
LL:"SOUNDSTAGE" :: CALL CHAR
(95,"00FF"):: CALL HCHAR(8,1
1,95,10)!146
31580 DISPLAY AT(12,4):"Soun
d Effects Editor" !220
31590 DISPLAY AT(19,9):"Jerr
y Stern": August 190
0" !162
31595 SUBEND !168

```

## KBCC selling blank diskettes

KB Computer Concepts is offering blank disks for sale. Keith Bergman, president of the company, describes them as "top-notch diskettes" which come with Tyvek sleeves, labels and write-protect tabs.

The disks are offered for 50 cents each, in any quantity, with a 75-cent shipping charge for each 10 disks or fraction of 10.

Bergman notes that he has fulfilled orders which have come in without payment for shipping in the past, but cannot continue to do so.

Write KB Computer Concepts, 653½ Fair Ave., NW, New Philadelphia, OH 44663-3541.

## BASIC ASSEMBLY

# This is some fun, right?

## Or, how memory is used in assembly routines

By BARRY A. TRAVER

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What's scheduled for this month's article? Some useful assembly string routines as well as some byte-size instruction concentrating on getting a feel for how simple chunks of memory are used in assembly routines. (Next time, in addition to giving you additional useful string routines, we'll go over how to go about embedding assembly routines in your Extended BASIC program.)

A computer is nothing more (we're often told) than a complicated system of on-off switches. (Early computers, we're told further, required some manual turning on and off of those switches, something which — if true — I prefer not to think about right now!). Each on-off switch is known as a binary digit or bit.

Since it can be very tedious to work with individual on-off switches, we prefer to work with "chunks" of switches whenever possible. In the beginning, that may seem as forbidding as learning the metric system when you're used to using the British system of measurement, but (a) it really isn't that difficult to learn, and (b) it's really worth the effort.

### NYBBLES, BYTES AND WORDS

All right, here's what you need to know. A *nybble* is a group of four bits. A *byte* is two nybbles or eight bits. A *word* is two bytes or four nybbles or sixteen bits. (We do have a 16-bit computer, right?) Now, that wasn't that hard was it?

The hard part is getting a feel for what a word or byte or nybble is, and that comes with time. For now, we'll tackle the byte-size task of thinking about what a byte can represent. If you can get a handle on that, then other things should gradually fall into place. A byte is eight bits, which is the same thing as saying that it can represent a eight-digit binary number (from 00000000 to 11111111 binary or from 0 to 255 decimal or from >00 to >FF hexadecimal).

Since a byte can represent a number from 0 to 255, if we think of that number as an ASCII value, we can think of a byte as roughly corresponding to a single character

in a string. A byte whose value is 65 decimal would thus correspond to the capital letter "A," for example, whereas a byte whose value is 122 would correspond to the lower case "z". A string in BASIC (e.g., "This is some fun, right?") is thus represented by a string or chunk of bytes (not words or nybbles) in memory. That is, each byte corresponds to a character in the string.

In XB, we ordinarily indicate how long a string is by marking the beginning and end with quotation marks. Assembly ordinarily uses a different technique: The very first byte doesn't stand for the first character in the string, but rather is an indication of the length of the string. Specifically, if *AS* is the name we give to where the string

104, 116, 63 (the ASCII value for a question mark).

One more thing we need to know is how our workspace of Registers is set up. Since a Register is sixteen bits long (we're using a 16-bit computer, remember?), a Register has room for two bytes, a left byte and a right byte. Maybe you can think of your workspace area as standing metal shelving with sixteen shelves (each shelf corresponding to a Register), and with each shelf subdivided into a left compartment and a right compartment (corresponding to a left byte and a right byte).

### HERE'S THE TRICKY PART

Here's the tricky part, so read this paragraph carefully. Assembly has word operations (like *MOV* or *MOVE word*) and byte operations (like *MOVB* or *MOVE Byte*). Important: Byte operations work only on the left byte in a Register. Word operations work on both bytes, but if we clear out the left byte of the Register, we can then think of word operations (like *CI* or *Compare Immediate*) as operations working on the right byte in the Register. Since sometimes we want to use byte operations (like *MOVB*) and sometimes we want to use word operations (like *CI*), we may

need to move what we're working with from the left byte in the Register to the right, or vice versa. We use *SLA Rn,8* (Shift Left Arithmetic) to shift a byte value one byte (i.e., 8 bits) to the left, and *SRL Rn,8* (Shift Right Logical) to shift a byte value one byte (i.e., 8 bits) to the right. (In each case, the other byte is automatically cleared so as not to confuse matters, as could easily be the case with word instructions.)

Okay. A byte can represent either a number from 0 to 255 or a character in a string, and a workspace Register has a space for two bytes, a left byte and a right byte. That's essentially what you need to know to understand what's going on in the code

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All right, here's what you need to know. A *nybble* is a group of four bits. A *byte* is two nybbles or eight bits. A *word* is two bytes or four nybbles or sixteen bits. (We do have a 16-bit computer, right?) Now, that wasn't that hard was it?

begins in assembly, then the byte at *AS* tells the length of the string, the byte at *AS+1* represents the first character of the string, the byte at *AS+2* represents the second character of the string, and so on. (Since the byte at *AS* can only stand for a number from 0 to 255 decimal, this relates to why the maximum length of a string in BASIC or XB is 255 characters.)

### THIS IS SOME FUN, RIGHT?

The string "This is some fun, right?" would thus be represented in assembly as a string of bytes with the following values: 24 (the length of the string), 84 (the ASCII value for "T"), 104 (the ASCII value for "h"), 105, 115, 32 (the ASCII value for a blank space), 105, 115, 32, 115, 111, 109, 101, 32, 102, 117, 110, 44 (the ASCII value for a comma), 32, 114, 105, 103,

## BASIC ASSEMBLY—

(Continued from Page 19)

in this month's article. (You will also need the GET/SEND/S file that was published in this column in the June 1990 issue of MICROpendium.)

### 'CAPS' AND 'CLEAN'

This month's two string routines are CAPS and CLEAN. The purpose of the first is to change all lower case letters to capital letters, and the purpose of the second is to change any characters whose ASCII is greater than 127 to blank spaces. In addition to illustrating some techniques of working with strings, the routines do have very practical applications. What they do is (among other things) allow you to process a DV80 file so that that file can be used in situations it could not have been used in before.

If you've used TI's text-to-speech diskette or TI's TE2 module, you know that words in lower case are not pronounced as words, but are spelled out, letter by letter. You can use CAPS to change lower case to capital letters so as to avoid this problem.

If you've logged to disk a telecommunications session that may have included some stray characters, you may have discovered later when trying to read the file that the TI-Writer editor does not like characters with an ASCII value greater than 127. In fact, if such a character is at the beginning of a line, usually the TI-Writer editor will lock up when trying to load in that line of the file. You can use CLEAN to eliminate those upsetting characters so as to avoid that problem.

You can use CAPS or CLEAN directly in an XB program (after loading the assembly code into memory). Or you can use a separate XB program to process the file, using code something like this (again, after having loaded the assembly code into memory):

```
100 INPUT "INPUT FILE? ":I$
110 OPEN #1:I$,INPUT
120 INPUT "OUTPUT FILE? ":O$
130 OPEN #2:O$,OUTPUT
140 IF EOF(1) THEN 190
150 LINPUT #1:A$
160 CALL LINK("CAPS",A$,B$)
170 PRINT #2:B$
180 GOTO 140
190 CLOSE #1
```

### 200 CLOSE #2

If you're using CLEAN instead of CAPS, line 160 would of course be modified accordingly.

As usual, my assembly source code is not the only way to perform the operation nor necessarily the most efficient way. (Bud Wright, for example, has already written his own version of CAPS which works as well as or better than mine, and I included his version in a past issue of the Genial TRAVeLER.) My goal here is twofold: To write code that works, and to write code whose logic is fairly easy to follow. For sake of clarity, I have been willing to compromise at times on efficiency (e.g., as noted in the previous article, I may often use more Registers than necessary in order to make it easier to follow exactly what each one is doing), but assembly is so much faster than a BASIC counterpart (where one exists, which is not always the case!) that a small loss in efficiency is rarely significant.

### MISCELLANEOUS NOTES

We close this article with some miscellaneous additional notes for the interested novice and a few technical comments.

Contrary to the supposed scientific law which says that two things cannot be at different places at the same time, that is not true of things moved with the MOV (or MOVB) command. When you MOVE a value from one place (e.g., a Register) to another, it is not removed from where it started! In my opinion, the names MOV and MOVB are rather misleading: it would have been more accurate to name the operations COP and COPB (for COPY word and COPY Byte), since that is really what is happening. Unfortunately, you're stuck with MOV and MOVB (unless you write your own Editor/Assembler), but when you use these two operations, remember that what you moved is also still where it was originally!

If you've gotten a feeling for what a byte is, a good way to get a handle on a nybble is to consider it roughly equivalent to a hexadecimal digit. That is, a nybble may vary in value from >0 to >F hexadecimal, or 0 to 15 decimal. A byte is thus roughly equivalent to two hexadecimal digits (varying from >00 to >FF), and a word is thus roughly equivalent to four hexadeci-

mal digits (varying from >0000 to >FFFF). Thus the contents of a Register can be represented as a four-digit hexadecimal number, and each byte (left or right) of that Register can be represented as a two-digit hexadecimal number. (The two routines in this article are byte-oriented rather than nybble-oriented, but being able to "think in hex" is often a valuable asset in assembly.)

Getting back to the two string routines, note that CALL LINK("CAPS",A\$,B\$) will leave A\$ "as is" with B\$ being all caps, whereas CALL LINK("CAPS",A\$,A\$) will change A\$ itself to all caps. (CLEAN works in a similar fashion.) This approach gives you the choice of putting the result of the assembly operation into a second string (leaving the first string unchanged) or putting the result into the original string.

### TECHNICAL NOTES

MOVB \*R2+,R0 not only puts a character from A\$ into R0 to be checked; it also increments the address in R2 (setting it for the address of the next character in A\$ to read). Likewise MOVB R0,\*R3+ not only puts the character in R0 into the proper place in B\$: It also increments the address in R3 (setting it for the next address to which to write). Remember also that DEC R1 followed by JNE NEXT acts as though there were a CI R1,0 between them. Finally, AI R0,-32 (Adding Immediately -32 to R0) has the same effect as subtracting 32 from R0 (which is the way to change lower case letters to capitals — check your ASCII chart!).

### FINAL NOTE

Take these routines and experiment with them. For example, can you write a routine that will (turning things around) change caps to lower case? How about a routine to change characters with an ASCII value of less than 32 to blank spaces? Or a routine that will encode or decode a string (e.g., to take a English sentence and make a cryptogram out of it, say, substituting "A" for "Z," "B" for "Y," etc., down to "Z" for "A")? Or, for a task a bit more complicated, can you write a routine to fix the length of a string or remove leading or trailing blanks (or

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## BASIC ASSEMBLY—

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both)? How about a routine to "swap" two strings? Use your imagination, and see what you can come up with!

**CAPS/S**

```

0001 * CAPS/S
0002 * (C) COPYRIGHT 1990
0003 * BY BARRY A. TRAVER
0004
0005     COPY "DSK1.GET/SEND/S"
0006
0007 *   CALL LINK("CAPS",A$,B$)
0008 *   changes lower case to caps
0009
0010     DEF CAPS
0011 A$   EQU PARAM1
0012 B$   EQU PARAM2
0013
0014 * R0 = character being worked with
0015 * R1 = length of A$ and B$ (also
0016 *   used as backwards counter)
0017 * R2 = address of character in A$
0018 *   to read
0019 * R3 = address of character in B$
0020 *   to write
0021
0022 CAPS  LWPI WS
0023
0024 * GET THE PARAMETERS FROM XB
0025
0026     BL  @GET
0027
0028 * PUT STARTING VALUES IN REGISTERS
0029
0030 * Put length of A$ in left byte of
0031 * R1, and shift it to right byte
0032     MOV B @A$,R1
0033     SRL R1,8
0034
0035 * Put in R2 the address of first
0036 * actual character in A$
0037     LI  R2,A$+1
0038
0039 * Put in R3 the address of first
0040 * actual character in B$
0041     LI  R3,B$+1
0042
0043 * SET B$ TO SAME LENGTH AS A$
0044
0045     MOV B @A$,@B$
0046
0047 * TEST FOR NULL STRING
0048

```

```

0049 * If LEN(A$)=0, then jump out!
0050     CI  R1,0
0051     JEQ OUT
0052
0053 * CREATE NEW STRING
0054
0055 * Put character to work on in R0,
0056 * and shift it to right byte
0057 NEXT  MOV B *R2+,R0
0058     SRL R0,8
0059
0060 * Compare it with 122 (ASCII "z")
0061     CI  R0,122
0062
0063 * If greater, treat it normally
0064     JGT NORMAL
0065
0066 * Compare it with 97 (ASCII "a")
0067     CI  R0,97
0068
0069 * If less, treat it normally
0070     JLT NORMAL
0071
0072 * Anything left must be from "a"
0073 * to "z", so change it to caps!
0074     AI  R0,-32
0075
0076 * Put character back in left byte
0077 * of R0, and move it to B$
0078 NORMAL SLA R0,8
0079     MOV B R0,*R3+
0080
0081 * Decrease "to do" counter by one
0082     DEC R1
0083
0084 * If still more to do, do another!
0085     JNE NEXT
0086
0087 * SEND THE PARAMETERS TO XB
0088
0089 OUT   B  @SEND
0090
0091     END
0092
0093 -

```

**CLEAN/S**

```

0001 * CLEAN/S
0002 * (C) COPYRIGHT 1990
0003 * BY BARRY A. TRAVER
0004
0005 * (See CAPS/S for explanation of
0006 * most of this code.)

```

```

0007
0008     COPY "DSK1.GET/SEND/S"
0009
0010 *   CALL LINK("CLEAN",A$,B$)
0011 *   changes to blank spaces all
0012 *   characters with ASCII>127
0013
0014     DEF CLEAN
0015 A$   EQU PARAM1
0016 B$   EQU PARAM2
0017
0018 CLEAN LWPI WS
0019
0020     BL  @GET
0021
0022     MOV B @A$,R1
0023     SRL R1,8
0024     LI  R2,A$+1
0025     LI  R3,B$+1
0026
0027     MOV B @A$,@B$
0028
0029     CI  R1,0
0030     JEQ OUT
0031
0032 NEXT  MOV B *R2+,R0
0033     SRL R0,8
0034
0035 * Compare character being worked
0036 * on with 128 (the first of the
0037 * troublesome ASCII characters)
0038     CI  R0,128
0039
0040 * If less, treat it normally
0041     JLT NORMAL
0042
0043 * Else change to blank space!
0044     LI  R0,32
0045
0046 NORMAL SLA R0,8
0047     MOV B R0,*R3+
0048
0049     DEC R1
0050
0051     JNE NEXT
0052
0053 OUT   B  @SEND
0054
0055     END
0056
0057 -

```

Barry Traver publishes a diskazine for TI users called Genial TRAVeER. He can be reached at 835 Green Valley Dr., Philadelphia, PA 19128.



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THIS IS THE FREEWARE VERSION OF JIM REISS' UTILITY THAT CAN DISPLAY TI-ARTIST, GRAPHX AND RLE GRAPHICS AND CONVERT FORMATS.

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A TI FIRST! THE BIOGRAPHIES OF EVERY U.S. PRESIDENT ON TWO DISK SIDES. GREAT FOR SCHOOL, TRIVIA AND HISTORY BUFFS.

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THE BEST "CALENDAR MAKER" PROGRAM WE HAVE SEEN. KEEP TRACK OF APPOINTMENTS, SPECIAL OCCASIONS AND PRINT OUT ANY MONTH. INCLUDES A GREAT CALENDAR UTILITY FOR ANY DAY/DATE IN THE FUTURE!

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TWO TOP RATED GAMES BY BOB GASTONI. THE VERY BEST AND REALISTIC KENO GAME WE HAVE SEEN. JUST LIKE VEGAS!

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The TEX-COMP Freeware program is a disk distribution service which is operated to support the TI-99/4A user and programmer and to keep the TI-99/4A the best value in the computer world. The nominal charge (\$4.95) that is charged for each title is for distribution services only and includes the cost of duplication, premium grade disks, labels, advertising and packaging including plastic disk cases that we include at no extra cost with orders of four or more disks. When a program requires more than one disk side, we supply a floppy or even a second disk at no extra cost. The programs we distribute come from all over the world and are either public domain or the author has expressly agreed to freeware distribution or has placed the program into freeware distribution by providing it to a commercial bulletin board service.

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

This is the disk everyone is talking about. The computer voice actually sings to animated graphics. Includes routines by master programmer Ken Gilliland. Bert & Earnie, Maltilda & much much more. 2 disk sides, speech & 32 K req. Exbasic autoloader.

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

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

### **#3. DUMPIT**

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

### **#4. PRINTART**

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

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

This disk is packed full of assorted files of all types. Graphics, speech etc. Contains complete TI-TREK game for Speech Editor or TE-11 module.

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

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

### **#6. EXBASIC MUSIC**

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

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

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

### **#8. LOTTO PICKER**

This program randomly generates numbers for use in the various state lotto games and even runs a simulated lotto game. Easy to modify for pick 5 etc. games. A great learning and fun disk.

### **#9. MONA LISA PRINT OUT**

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

### **#10. GOTHIC PRINT**

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

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

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

### **#12. TI-99 OLOPY**

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

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

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

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

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

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

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

### **#16. SIDEWAYS PRINTOUT**

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

### **#17. TI FORTH DEMO**

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

### **#18. TI DIAGNOSTIC**

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

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

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

### **#20. ACCOUNTS RECEIVABLE**

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

### **#21. DATA BASE DEMO DISK**

A professional data base program that was originally written to store various magazine articles from computer magazines and then find them by name, subject, key word, or publication. Fast, easy to use and easy to adapt for other applications. Come complete with sample data to make learning data base processing easy. Completely menu driven and unprotected.

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### #22. ASTROLOGY

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

### #23. WILL WRITER

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

### #24. ENGINEERING CALCULATIONS

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

### #25. MEDICAL ALERT

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

### #26. R RATED GAME

It was bound to happen. A talented (but demented) programmer in Germany wrote an invaders type game but with most unusual guns and targets. Definitely not what you would find at your neighborhood arcade. Not only a great party game but some great programming. You must be over 13 to order this one!!

### #27. KIDS LEARNING

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

### #28. LOADERS AND CATALOGERS

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

### #29. LABEL MAKER I

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

### #30. HOUSEHOLD BUDGET PRINTOUT

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

### #31. MORSE CODE TRAINER DISK

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

### #32. EXBASIC XMAS MUSIC

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

### #33. CHECKERS & BACKGAMMON

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

### #34. SOLITAIRE & SCRABBLE

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

### #35. PROGRAMMING AIDS & UTILITIES I

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

### #36. STRICTLY BUSINESS

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

### #37. LAPD COOKBOOK

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

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

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

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

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

### #40. ARTIFICIAL INTELLIGENCE

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

### #41. VIDEO GRAPHS MODULE BACKUP DISK

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

### #42. FUNNELWEB FARM UTILITY

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

### #43. BEST OF BRITAIN, VOL I

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

### #44. LABEL MAKER I GRAPHICS

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

### #45. BEST OF BRITAIN, VOL II

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

### #46. SUPER TRIVIA 99

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

### #47. INFOCOM RAPID LOADER

If you have Infocom games this is for you. Loads all TI Infocom games in only 28 seconds and permits new screen colors and improved text display. Comes with all documentation on disk.

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## #48. GHOSTMAN (from England)

This Pacman/Munchman type game starts at a slow pace and slowly speeds up to a break-neck pace. A totally new experience.

## #49. DEMON DESTROYER (from France)

This great assembly game starts where Invaders leaves off. Add features like descending aliens and closing walls. Hours of great arcade action.

## #50. OH MUMMY (from Germany)

Move through the chambers of a Pyramid in search of hidden treasure. Fantastic graphics and great entertainment.

## #51. BERLIN WALL (from Canada)

This game requires a mine field to be crossed before escaping from E. Berlin. Good graphics and a real challenge.

## #52. ANIMATION 99 (from Germany)

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

## #53. HACKER/CRACKER

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

## #54. ASTRONOMY

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

## #55. SCREEN DUMP

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

## #56. SPREAD SHEET

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

## #57. TELCO

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

## #58. PR BASE

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

## #59. GRAPH MAKER

A collection of the best programs for producing graphs and charts from your data. Exbasic and printer.

## #60. FREDDY

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

## #61. THE MINE

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

## #62. DISK MANAGER II MODULE BACKUP

The complete TI Disk Manager II on Disk. For legal reasons it is only available to owners of the original module for backup use.

## #63. ASTROBLITZ/MAZOC

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

## #64. MAJOR TOM/SPACE STATION PHETA

A pair of great space games. These two are going to keep you in front of the 99/4A for hours. Great!

## #65. PERFECT PUSH

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

## #66. HEBREW TYPEWRITER

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

## #67. GENEALOGY

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

## #68. CHESS

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

## #69. COMPUTER PLAYER PIANO/KEYBOARD CHORD ANALYSIS

A unique music program which displays a piano on the screen and actually plays your selections.

## #70. TI RUNNER II

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

## #71. KIDS LEARNING II

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

## #72. CERBERUS

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

## #73. CRYPTO (gram)

One of the best word games we have seen for any computer. Set up like a TV game show with great screen displays.

## #74. LABEL MAKER II

Make labels for holidays and special events. You compose the text and select the resident graphics for the occasion.

## #75. DISK CATALOGER

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

## #76. PROGRAMMING AIDS AND UTILITIES II

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

## #77. MICROdex 99

A database program by Bill Gaskill which files and retrieves data such as magazine articles. A sample database is included.

## #78. ARTCON+ BY RAY KAZMER

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

## #79. DM1000 V3.5

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

## #80. BIRDWELL DISK UTILITY

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

## #81. HOME ACCOUNTING SYSTEM

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

## #82. CROSSWORD PUZZLES

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

## #83. HOME APPLICATION PROGRAMS

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

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### #84. GALACTIC BATTLE/SPY ADVENTURE

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

### #85. AUTOBOOT UTILITY

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

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

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

### #87. ARCHIVER III

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

### #88. AUSSIE GAMES VOL 1

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

### #89. PROCALC

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

### #90. JET CHECKBOOK MANAGER

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

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

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

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## Thanks for the memories

# Practical EEPROM circuits

By TONY LEWIS

We have presented background information on EEPROMs and their possible TI 99/4A applications in a previous article (May 1990, MICROpendium). In this, the last article in the series, the design of a 5V EEPROM programmer that can be easily built on a TI prototype card is discussed, along with some software tips. Schematics and information on a flash EEPROM programmer circuit, and EEPROM-based GROM simulator are also included.

**\*WARNING** — This article provides design information concerning the hardware and software that could be used in creating EEPROM programmers and EEPROM-related circuits. The accuracy of the text and schematics is not guaranteed. Neither the author or MICROpendium shall be held liable by anyone who utilizes the information in this article. Any reader who constructs a device based upon this article is responsible for: 1) understanding the design basis of the hardware and software; 2) construction and testing techniques; 3) the consequences of implementing the design. Readers are encouraged to contact the author directly for more detailed information, if desired.

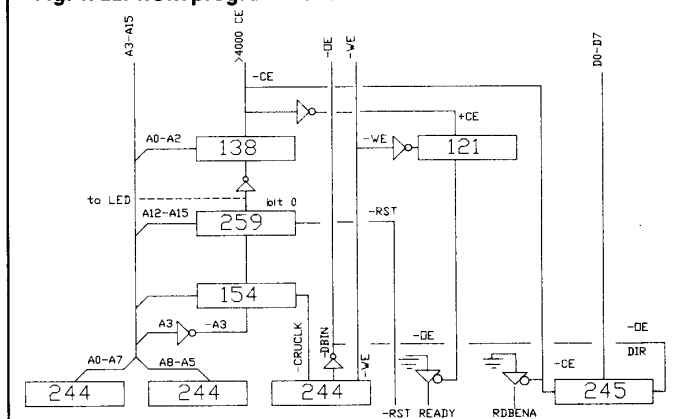
### THE EEPROM PROGRAMMER

I have built and tested a 5V EEPROM programmer on a TI prototype card that will program 2864A (8K bytes) EEPROMs. Figure 1 is the overall diagram for the card. Readers who have constructed 32K RAM, Superspace, or DSR RAM cards will find the circuitry to be very familiar. I used a 74LS154 to decode all 16 possible peripheral spaces, and set the CRU address for the programmer to >1900, which corresponds to the "programmer" space as defined in the *Interface Standard and Design Guide* manual (reviewed July 1990, MICROpendium) (Readers not familiar with accessing peripherals should consult sections I-K of the manual. The DSR Save and Load program, DSRSL, mentioned later, is on the software disk issued with the manual.) The 74LS259 decodes the CRU activation bit, and the 74LS138 selects the >4000->5FFF memory block. The 8K EEPROM was placed in a DSR memory space to

avoid conflicts with other established items in the memory map, and to allow for easy development of DSR software. The EEPROM could be placed at the >6000 block, but would be limited to use with the E/A cartridge only.

Note that the 74LS154 is a large chip, and a 74LS138 could be

Fig. 1: EEPROM programmer schematic



utilized for selecting the peripheral space. A 74LS125 open collector driver is used to drive RDBENA and READY. The address and data lines are connected as described in Chart 1.

There's a method to this madness: TI's numbering convention for most significant bits (MSb) and least significant bits (LSb) is reversed from the "conventional" chips, and must be connected in reverse order as shown. The -CE, -OE, and -WE signals are more straightforward. If you are familiar with wire wrapping techniques, a TI prototype card could be wired up and tested in about a weekend. The bit 0 of the '259 is used to drive the LED indicator on the protoboard.

### READY? WAIT!

Sharp-eyed readers have already noticed the 74LS121 sitting innocently in the middle of Figure 1, driving a '125 gate to the READY signal. Why? If you recall from the previous article, the 5V EEPROMs need a 10 millisecond (10 x 10<sup>-3</sup> second) 'rest' time each time you write to a

Fig. 2a: Normal memory access

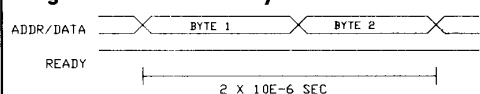
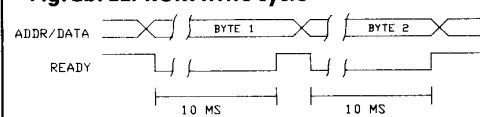


Fig. 2b: EEPROM write cycle



byte. The '121, along with a resistor and a capacitor, generates a 10 ms low pulse to the READY pin, which causes the 9900 to suspend operation until the READY line goes high again. But, as I (See Page 28)

Chart 1

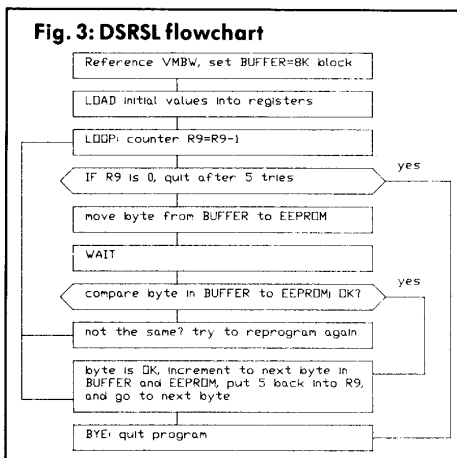
TI	EEPROM
A3	A12 (MSb)
A4	A11
A5	A10
A6	A9
A7	A8
A8	A7
A9	A6
A10	A5
A11	A4
A12	A3
A13	A2
A14	A1
A15	A0 (LSb)
D0	D7 (MSb)
D1	D6
D2	D5
D3	D4
D4	D3
D5	D2
D6	D1
D7	D0 (LSb)

## EEPROMS—

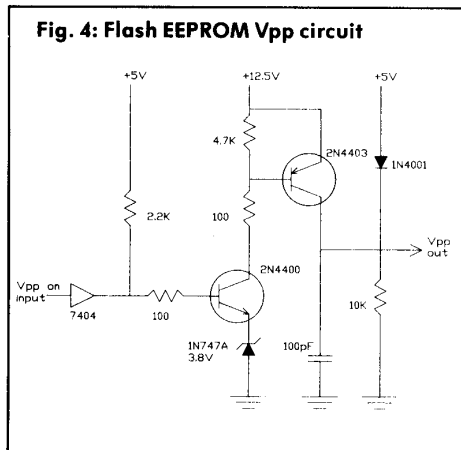
(Continued from Page 27)

found out the hard way, that is not enough.

Without getting into too much detail, take it for granted that although the Peripheral Expansion Box bus has only 8 data bits, the 9900 is a 16-bit micro, and it accesses all memory as 16 bits;



also access its companion byte. (In other words, if you try to write to just the byte at >4001, the 4A will automatically read >4000 and >4001, then write the old value back in >4000 and your new value in >4001.) So,



The 4A system automatically inserts 2 wait states for each byte when reading or writing, but they don't really help us. Figure 2b shows the effects of inserting the 10 ms -WAIT signal on the READY line. Individual bytes are now extended from about 1 microsecond to 10 milliseconds each for a write cycle (the 10 ms delay is **not** used for Reads). Now, when you rewrite a byte, the computer is 'slowed down' enough to allow the EEPROM to complete its internal timing requirements.

## PROGRAMMING

Much to my surprise, I found that the -WAIT circuitry wasn't enough. When I used the DEBUGGER or EXPLORER to change individual bytes, the EEPROM was programmed perfectly. But

in our case, this is done as two back to back 8-bit accesses to the PEB (see Fig. 2a).

It is important to note for our system that even if you access only one byte to read or write, the 4A system

forces you to

a low READY, or -WAIT pulse must be inserted for each byte write access to achieve the 10 ms delay. Figure 2a shows a 2-byte access with the READY line high.

when I used John Johnson's DSR Save & Load (DSRSL) program to load a file from disk to the EEPROM, I found that only the odd byte was being programmed. The reason was that entering individual byte or word values by hand allowed the capacitor in the '121 circuit to charge back up between bytes and produce a full 10 ms -WAIT signal. But if you try to send a bunch of bytes at full bus speed, the capacitor doesn't have time to charge back up, except for every other byte. Also, the DSRSL program transfers bytes directly from the 9918A VDP to the EEPROM, and the VDP is funny about access timing. To fix DSRSL, I replaced the following source code. Figure 3 is a flowchart of the code:

## OLD

```

NO9640 LI R12,0      identify the CRU base
SBO 0      turn the card on
LI R0,>1000    initial VMBR info-VDP start addr.
LI R1,>4000    -CPU addr. to write to
LI R1,>2000    -# of bytes to transfer (8K)
BLWP @VMBR    write multiple bytes
SBZ 0      turn card off
  
```

Note: The original DSRSL source code includes VMBR routine. This is provided for people who already have DSRSL and its source code. DSRSL is available on many BBS, and from the author.

## NEW

```

REF VMBR    assume using E/A cart.
BUFFER BSS >2000    create a transfer buffer area
-
-
NO9640 LI R12,0      identify CRU base
SBO 0      turn card on
LI R0,>1000    move bytes from VDP >1000 addr.
LI R1,BUFFER    to CPU 'BUFFER' area
LI R2,>2000    move 8K bytes
BLWP @VMBR    move bytes to CPU memory
*
LI R6,BUFFER    R6=CPU buffer addr. start
LI R7,>4000    R7=EEPROM address
LI R8,>2000    R8=# of bytes to move
LI R9,>0005    R9=counter for # of tries to write
*
LOOP DEC R9      R9=R9-1
JEQ BYE        zero? quit program
MOVB *R6,*R7    move byte from CPU to EEPROM
NOP            wait....
NOP            ....wait...
NOP            .....and wait
CB *R6,*R7      compare bytes, are they the same?
JNE LOOP        no, try to write again
INC R6          byte write OK, increment CPU addr.
INC R7          and increment EEPROM addr.
LI R9,>0005      and reload R9 with 5 for new byte
DEC R8          decrement byte #
  
```

(See Page 30)

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## EEPROMS—

(Continued from Page 28)

**JNE LOOP    do it again until R8=9**

Now the DSRL program will load a disk file into the VDP, then put it into a 8K memory block starting at 'BUFFER'. A byte is transferred from the 8K BUFFER to the EEPROM. Then the bytes are compared to see if the EEPROM was correctly programmed. If not, the EEPROM byte is reprogrammed again (up to 5 tries). If the EEPROM byte doesn't program correctly in 5 tries, the program stops. Otherwise, the program continues on until all 8K of bytes are programmed. Both the TI DEBUGGER and Millers Graphics EXPLORER programs are good for reviewing the contents of an EEPROM after programming.

In summary, we need both hardware and software to slow down the 9900 when programming an EEPROM:

\*The '121 -WAIT circuit generates an automatic 10 ms signal for each byte when writing.

\*The program which writes to the EEPROM must have enough delays to allow the '121 capacitor to charge back up. Software alone cannot put 10 ms of delay between the 1st and 2nd bytes.

**A FLASH PROGRAMMER**

Flash EEPROMs offer the possibility of lots of storage for fewer dollars than other types of non-volatile memory. But flash memories take considerably more effort on programming logic than 5V EEPROMs do. This article will not cover flash EEPROM programming in detail; those readers interested in developing a programmer should write to: Intel Corporation, 3065 Bowers Ave., Santa Clara, CA 95051.

Ask for data sheets and application notes for their flash EEPROMs. Timing restrictions for these chips may make it impossible to use the circuit from Figure 1. An alternate design would be to program the EEPROM via even bytes first (4000, 4002, etc.) then go back and do the odd bytes (4001, 4003, etc.), using a CRU bit to control the data bus and EEPROM.

Figure 4 is a schematic for producing a highly controlled +12V Vpp signal for flash EEPROMs. Use of simpler 12V control cir-

cuits could lead to possible failure of the flash EEPROM to program properly, or possibly ruin the chip itself. A full description of the 12V Vpp circuit is given in the June 8, 1989 issue of Electronic Design.

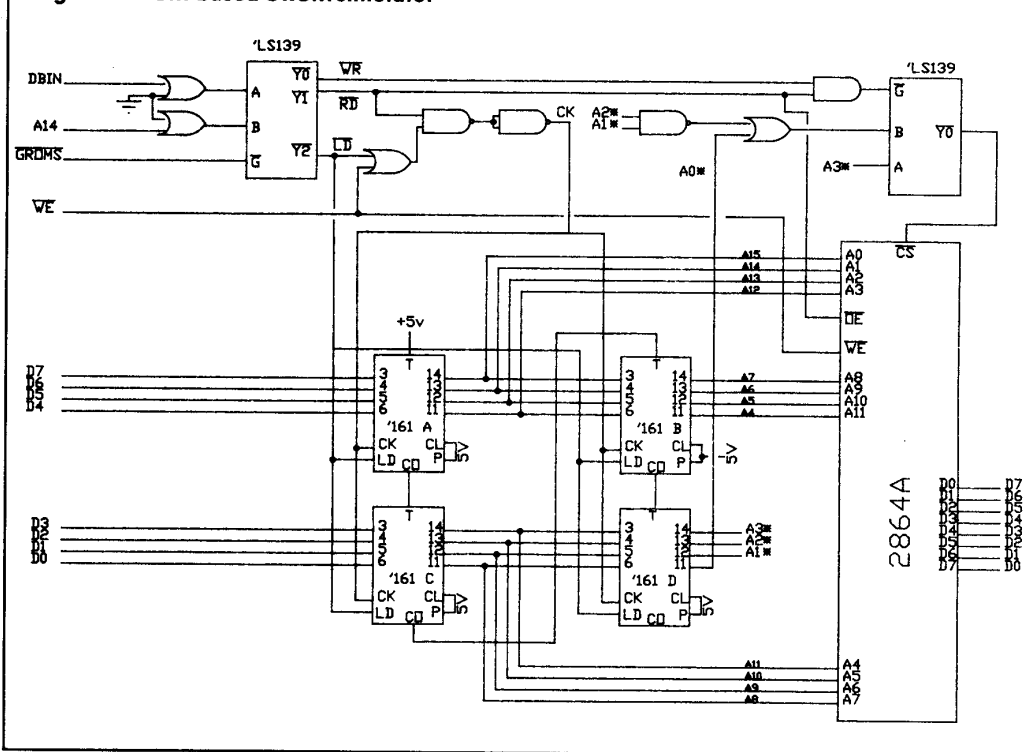
**Fig. 5: EEPROM-based GROM simulator****A GREEPROM**

Figure 5 is the schematic for a GROM simulator that utilizes a regular EEPROM as non-volatile memory. This circuit is similar to the circuit presented in the Bunyard Hardware manual, but is not dependent upon the GROMCLK signal for timing (see the Hardware manual for an excellent description of how GROMs work). The circuit is meant for use with the cartridge port and the EEPROM is accessed through the GROM ports. The delay timing for writes to the EEPROM should not be a problem due to the byte-only access nature of GROMs. With the appropriate loader, one may now program a cartridge from a disk file, and it need not be reprogrammed each time the computer is turned on. And worries about an unexpected battery death are eliminated.

**THAT'S ALL, FOLKS**

Quite a bit of information has been presented on memories and EEPROMs in this series of articles. Readers who desire more information should write to the many EEPROM manufacturers and request data sheets and application notes, both of which provide much more information than can be presented in MICROpendium. Then, who knows? Maybe *your* EEPROM project will appear in MICROpendium some day!

## THE TI-BASE USER'S GUIDE — 3

# Selection of printer drivers makes TI-Base adaptable

By BILL GASKILL

©1990 By B. Gaskill

Printer drivers are software switches that can be used to control various modes and fonts that are supported by your printer. Because printers are intelligent peripherals, which means that they have a chip in them with a set of pre-programmed instructions, computer programs can access those instructions via messages sent in codes that your printer understands. Because not all printers share the same method of access to the instructions on their chip, nor do they all have the same instructions (capabilities), professional software authors create printer drivers to match up their program with your printer.

TI-Base provides a PRINTER driver file on the system disk that contains switches to access fifteen of the most common functions a user would access in any printing session. The list below shows the default functions that the TI-Base PRINTER drivers file supports.

NAME	Name of your printer.
(FF)	Form feed.
(LF)	Line feed.
(CR)	Carriage return.
(DS)	Double strike.
(UL)	Underline.
(EX)	Expanded print.
(CM)	Compressed print.
(IT)	Italics.
(B)	Bold or double strike.
(SPS)	Superscript.
(SBS)	Subscript.
(HT)	Tab horizontally.
(ST)	Set horizontal tabs.
(NM)	Normal printing mode.
(BLANK)	User defined option.

Although I have not actually done so, I see no reason why a user could not create their own totally new printer drivers file, complete with new field names in fields 5-15 as well as customized escape codes. A few basic rules would have to be adhered to though.

You must be certain that the NAME field remains the first field in the file and that it is 10 characters long. You must also ensure that the next three fields in the file are FF, LF and CR and that each are exactly 2 characters long per field. When you are done creating the new data base it must be named PRINTER and the file must be sorted on the NAME field.

As it was intended to be used, any of the data in the existing fields may be edited to fit your printer, or you may APPEND a new record to the file if one of the existing drivers does not match the printer that you are using.

If you discover that none of the existing drivers match your printer then you will want to add a new record to the PRINTER file. To do so, boot your TI-Base program and then load the file

by typing in USE DSK#.PRINTER, where the pound sign (#) is the drive number where your TI-Base program disk resides. Type in APPEND when the file is active and then TYPE in a NAME for your printer such as AXIOM, GORILLA, SEIKOSHA etc. Next find the hex codes for Form Feed, Line Feed and Carriage Return in your printer's manual and key them into fields 2-4. The same reference is used to determine the remaining hex codes for fields 5-15.

After you have appended the new record onto the PRINTER file press Fctn 9 to return to the dot prompt and then type in SORT ON NAME so that the file remains sorted by the NAME field's contents. If you do not sort the file after appending the new record you will find that the drivers are not properly accessed.

After sorting the file, CLOSE it to ensure that the changes are written to disk. Then call up the SETUP file into the command file editor. After the word PRINTER, type in the name for your printer that was entered into the NAME field in the record that you just appended to the PRINTER file. Press Fctn 8 and you are done. Now, type in PRINTER (your printer name) and TI-Base will read in the driver for your specific printer.

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# Chaining Disk Drives

## Different drives call for different configurations

By MERLE VOGT

*This is the second of a two-part series on connecting external floppy disk drives to the TI.—Ed.*

### STRAIGHT ACROSS CONFIGURATIONS

In this one the resistors go across the unit, Pin 1 to Pin 14, Pin 7 to Pin 8, etc. (See Fig. 4C.) Except, watch out for the 16-pin units where the pin numbers advance by one position. The resistors are nominally 150 ohms, but it does not seem to be very critical as some drives use 200 ohm packs.

Here is a list of parts found in this type: AB 314B150, Bourns 4114-R-001-150, 4116-R-001-150, CTS 760-3-R150, Beckman 899-3-R150.

These types have been found in these drives: Mitsubishi M4851-362U, MPI 51 and 52, Panasonic JU-455-5AAG, QumeTrak 142, Shugart 400L, Shugart 450 (16-pin), Tandon TM 100-4 and TM 65-2.

### DOUBLE SERIES CONNECTIONS

This configuration contains 13 or 15 resistors. Only Pin 14 (Pin 16) connects to the +5 volts. Many of the resistors do not connect to any circuit.

Part numbers for these include: Bourns 4114R-002-150 and Bourns 4116R-002-150.

This type has been found in the following drives: CDC BR8B1A, Magnetic Peripherals BR8b1A, Pertec FD 200 and Siemens 82.

### SHUNT OR LINE TERMINATION TYPE

This unit uses two resistors in a series shunt connection to feed the pins. (See Fig. 4E.) The top resistor is 220 ohms, to +5 volts, and the bottom resistor is 330 ohms to Ground, 0 volts. The tap point feeds the pins and there is nominally +3 volts on each pin. Note that only Pin 14 (Pin 16) goes to +5 volts, and Pin 7 (Pin 8) must go to Ground, 0 volts.

Part numbers on this are AB 314E221331 and Bourns 4116-003-221/331.

This type has been found in these drives: Remex RFD 480, Siemens FDD-100-5 and Wangco 82.

There is a superficial similarity between drives that use the double series connections and those that use the shunt termination type. I think these could be substituted but I have not had time to work out the possibilities. Note that purchase of correct resistor packs is impossible in my area. I have had to use 14- or 16-pin DIP headers and single resistors or SIP resistor packs, CTS-750-81-R150, or CTS 770-105R221/331 and fabricate units as needed.

### APPLICATION OF RESISTOR PACKS

All of the above configurations energize the control circuits through a rather low value resistance, 150 ohms or so. This value is the absolute limit of current to these control lines as it forces

the disk control board to sink about 32 milliamperes. Any heavier load may damage the control board driver chips. The current was engineered at this somewhat high value to increase circuit response speed.

This means there must not be more than one resistor pack in a system chain. Standard practice is to pull the packs from all lower-numbered units, leaving the pack in the last, highest numbered, drive unit.

Generally this is satisfactory. But, as usual, there are exceptions.

### NOTES ON SPECIFIC DRIVES

**Shugart 400L:** This one has its own peculiar tricks in its connections to the resistor pack. As

Larry Thompson noted, the drive select lines are enabled by one resistor in the pack. (See MICROpendium December 1988.) So, if you try to use this unit any place except stand alone or as last unit, then drive select gets disabled when the pack is pulled, and the drive will not work. So you will usually see that this unit is recommended as last unit and that only one

be used in a chain.

In addition, when I got a Shugart manual, I discovered that the manufacturer had tied a resistor to chip 4A-9, which enabled the side 0 select pin.

Now that I have just told you why not to chain this Shugart drive, I will show how to defeat it. Get a 14-pin DIP header and two 150 ohm one-quarter watt resistors. Solder one across Pin 5 to Pin 10, and the other across Pin 6 to Pin 9. That Pin 5 resistor will enable the drive select, as Thompson noted. Then — this is the new trick — the Pin 6 resistor enables what is

called the side 0 select circuit. I discovered this last item by studying the Shugart service manual. Install this kludge pack in the resistor pack socket. Now you can position that drive at location No. 1 or No. 2 in a chain. Note that the regular resistor pack must still be used in the last unit.

I believe that last item solved some very erratic problems in our user group system. We are using a Shugart 400L in drive No. 1 with a kludge resistor pack in place having only a resistor between pins 5 and 10. Adding the resistor from Pin 6 to Pin 9 cleared the

(See Page 33)

Fig. 4C: Straight across connections

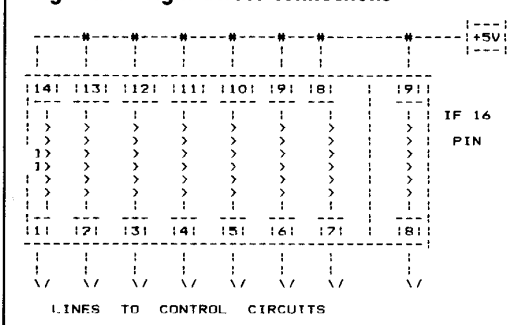
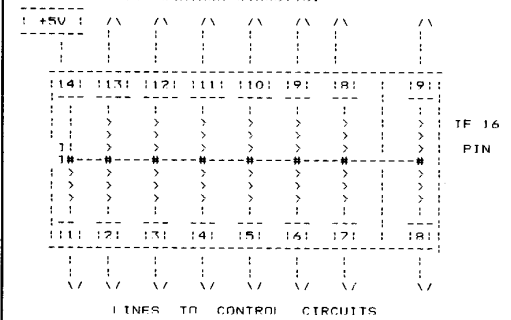


Fig. 4D: Double series connections





# CHAINING DISK DRIVES—

(Continued from Page 32)

problem.

**Shugart 450:** This drive has some circuits shifted from standard, and differently from the 400L, plus it uses a 16-pin pack. Use one resistor, Pin 5 to Pin 12, for device select.

I will say that it seems feasible to connect, in chain, a wide mixture of different drives. Extreme care about massaging the signal control lines is required. Note that you can even get into trouble trying to use two or three units of the same model of some brands.

**Wangco 82:** I discuss this one next because, like the Shugart, it plays a trick, also, and does not readily fit any place except as the last unit. Again it is the drive select line problem. But this time the extra resistor must be patched from Pin 14 to Pin 13 of the pack socket. Then you can use this drive at lower-numbered positions.

Here is a list of drives that were tested that worked normally:

- Magnetic Peripherals BR8B1A
- Mitsubishi M4851-362U
- MPI 51 and 52
- Pertec FD 200
- QumeTrak 142
- Remex RFD 480
- Shugart 400L (per above)
- Shugart 450 (per above)
- Siemens 82 and FDD 100-5
- Tandon TM 65-2 and TM 100-2A
- Wangco 82 (per above.)

I have had my hands on all of these drives. All seem to be internally wired in the standard manner. To chain units it is necessary only to:

Configure the shunt pack to select either DS1, DS2 or DS3; and enable the HS line.

Remove resistor pack from all but the last unit in the chain. Install the kludge pack in Shugart 400L or 450, or in Wangco 82, if not the last drive in the chain. The easier way is to place these type drives at the last position, with their normal resistor pack

installed.

I have tested a variety of these drives in chain setup, without having any problems. Also, I have made the Shugart and Wangco drives mix with any other type by cobbling the resistors as described above.

Again, as pointed out by Thompson, Teac drives take a totally different approach. The resistor packs are 500 ohm links. Thus, for one to three units, there will not be any overload to the disk control unit. All that is needed is to place the shunt pack to enable DS1, DS2 or DS3, as needed.

Warning: Generally on the TI99/4A disk system, the unit in the Peripheral Expansion Box will be set up as drive No. 1. The added

drives, No. 2 or No. 3, will be in a separate external enclosure with power supply. Since the system enabling the resistor pack is "out there," that external enclosure must be powered-up to get the internal drive to run.

## TWO HALF-HEIGHT DRIVES IN THE PEB

The rules still apply. Unit No. 2 will retain the resistor pack and until No. 1 must not. The shunt packs must be configured to conform to position.

## OTHER BRANDS

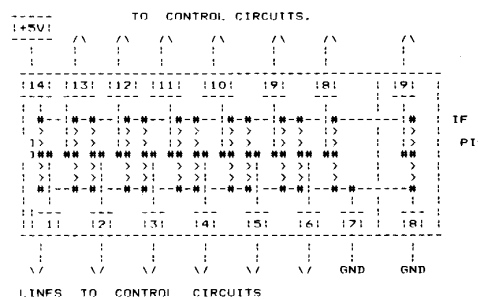
I have had hands-on for all of the above discussed units, and have tested them as stand-alone and as No. 1 in a chain.

**OKI GM-3315B:** This one runs from DIP switch configuration. It appears to have the standard wiring, per above. I have not had an operable unit to test.

Here is a list of compatible drives: CDC 9409, Epson SD521, Shugart SA455, Tandon TM 100-2 and TM 100-4, and TEC FB503.

All of these drives have been mentioned in publications as compatible on the TI99/4A disk drive system. I have not yet had any to examine, or to make test runs on.

**Fig. 4E: Shunt-type resistor pack connections**



(Continued from Page 46)

```

360 ON ERROR 510 :: IF B=1 T
HEN LINPUT #1:C$ ELSE INPUT
#1:C$ !155
370 IF D$="P" THEN PRINT #2:
C$ ELSE PRINT C$ !166
380 CALL KEY(0,P,Q):: IF P=1
5 THEN 410 ELSE IF Q=0 THEN
400 !045
390 CALL KEY(0,P,Q):: IF Q<1
THEN 390 !206
400 IF EOF(1)THEN 410 ELSE 3
60 !124

```

```

410 IF D$="P" THEN CLOSE #2
:: GOTO 440 !148
415 IF P=15 THEN 440 !244
420 DISPLAY AT(24,7)BEEP:"-
END OF FILE -" !193
430 CALL KEY(0,P,Q):: IF Q<1
THEN 430 !246
440 CLOSE #1 :: GOTO 200 !04
8
450 OPEN #1:"DSK"&STR$(E)&".
"&B$(G,I),INPUT ,DISPLAY ,FI
XED D(G,I):: RETURN !253460
OPEN #1:"DSK"&STR$(E)&". "&B$

```

```

(G,I),INPUT ,DISPLAY ,VARIAB
LE D(G,I):: RETURN !246
470 OPEN #1:"DSK"&STR$(E)&".
"&B$(G,I),INPUT ,INTERNAL,FI
XED D(G,I):: RETURN !080480
OPEN #1:"DSK"&STR$(E)&". "&B$
(G,I),INPUT ,INTERNAL,VARIAB
LE D(G,I):: RETURN !073
490 RUN 120 !234
500 RETURN 300 !126
510 B=3-B :: ERR=ERR+1 :: IF
ERR=2 THEN 410 ELSE RETURN
360 !196

```

## MY-BASIC

# Appointment scheduler keeps track of activities

By JIM UZZELL

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This is the second part of MY-Schedule, an appointment scheduler that runs in MY-BASIC. The first part, a setup program, was published last month. Operating instructions were included in last month's installment.

After entering the program through MY-Word and verifying the checksums that appear at the end of the program, remove the REMs from the following lines: 1310, 1260, 1380 and 1400. Also, in the above lines, the references to 0, 1, 2 and 3 are actually entered as CTRL 0, CTRL 1, etc., (i.e. KEY(3)="2 DAY 3"), so change these prior to saving. MY-Word will lock-up if you try to load a listed program that has control codes embedded in text.

Color used in the program looks best on an RGB monitor.

This and other programs appearing in this column require MY-BASIC V.2.99A. This version of MY-BASIC can be loaded through MDOS 1.14F or MDOS 0.97h only. The program will not work with earlier versions of MY-BASIC or MDOS. MDOS 0.97h is the hard disk version of MDOS and requires a double-sided, single-density disk. MY-BASIC 2.99A and MDOS 1.14F can be run out of a SSSD system.

MICROpendium will provide copies of these programs to readers who cannot obtain them through other sources. The cost is \$5. Specify which programs you want as well as the disk format when ordering. Order through: MICROpendium MY-BASIC, P.O. Box 1343, Round Rock, TX 78680.

## MY-SCHEDULE

```
100 CALL GRAPHICS(3,3) :: CA
LL CLEAR :: CALL MARGINS(1,8
0,1,24)
110 KEY OFF :: FOR X=1 TO 10
:: KEY(X)=" " :: NEXT X
120 CALL INIT :: CALL TCOLOR
(16,5)
130 CALL CHAR(124,"181818181
```

```
8181818") :: CALL CHAR(244,"
CCCCCCCCCCCCCCCC") :: CALL C
HAR(140,"B448B4FCFCB448B4")
:: CALL CHAR(154,"A8A850A850
A850A8")
140 CALL CHAR(119,"000030282
830") :: CALL CHAR(122,"0000
38101038")
150 CALL CHAR(176,"002060FC6
0200000") :: CALL CHAR(177,"
001018FC18100000") :: CALL C
HAR(178,"10387C1010100000")
:: CALL CHAR(179,"202020F870
200000")
160 DDI$=CHR$(119)&CHR$(119)
&CHR$(122)
170 DIM ML(12),WP(12),AS(589
),CM$(4),EV$(60),FT$(12)
180 DIM MOS(12),NMS(31),TMS(
14)
190 CE$=CHR$(133) :: CP$=CHR
$(144) :: D$=CHR$(132)
200 E$=CHR$(95) :: Q$=CHR$(3
4) :: GY$=CHR$(140)
210 RV$=CHR$(60) :: SP$=CHR$
(32)
220 CL$=SP$ :: FOR L=2 TO 39
:: CL$=CL$&SP$ :: NEXT L
230 DK$=CHR$(11)&CHR$(10)&CH
R$(8)&CHR$(9)
240 CM$(1)="PQ"&CHR$(13)&DK$
250 CM$(2)=DK$&E$&CP$&CE$&CH
R$(142) :: CM$(3)=DK$&E$&D$
260 CM$(4)=SEG$(DK$,1,2)&CHR
$(129)&E$&D$&CP$&CE$
270 CALL TCOLOR(16,7) :: DIS
PLAY AT(12,23)SIZE(34):GY$;"
MYBASIC APPOINTMENT SCHEDUL
ER ";GY$
280 KEY ON :: KEY(1)=" " ::
KEY(2)=" " :: KEY(3)=" COP
Y" :: KEY(4)="RIGHT " :: KEY
(5)="1989" :: KEY(6)=" DD
I" :: KEY(7)=" SOFT" :: KE
Y(8)="WARE" :: KEY(9)=" " ::
KEY(10)=" "
290 DAT$=DATE$ :: M=VAL(SEG$
(DAT$,1,2)) :: F$="S"
300 CALL TCOLOR(16,5)
310 GOSUB 1190 :: CALL TCOLO
R(16,7) :: DISPLAY AT(12,27)
```

```
SIZE(27):" LOADING C A L E
N D A R " :: OPEN #2:"DSK."
&"SCH-DATA."&FL$
320 FOR L=1 TO 31 :: INPUT #
2:NMS(L) :: NEXT L :: FOR L=
1 TO 12
330 INPUT #2:FT$(L),MOS(L),M
L(L),WP(L) :: NEXT L
340 FOR L=1 TO 14 :: INPUT #
2:TMS(L) :: NEXT L
350 INPUT #2:DA$,UL$,V$
360 INPUT #2:CY :: CLOSE #2
:: CD=VAL(SEG$(DAT$,4,2)) ::
WF=0
370 CALL MARGINS(25,65,1,24)
:: CALL TCOLOR(16,5)
380 CALL CLEAR :: MP=1 :: GO
SUB 1240 :: GOSUB 1830
390 GOSUB 1420 :: GOSUB 1440
:: IF CK=0 THEN 390
400 CALL MARGINS(1,80,1,24)
410 IF CK<3 THEN CALL CLEAR
420 ON CK GOTO 440,610,630,4
30,430,430,430
430 CK=CK-3 :: GOSUB 1470 ::
GOSUB 1240 :: GOTO 390
440 LS=1 :: GOSUB 2120 :: CA
LL CLEAR
450 DISPLAY AT(23,1):"PRINT
THIS MONTH'S <A>PPOINTMENTS/
NOTES"
460 DISPLAY AT(24,1):"OR THE
<S>PECIAL EVENTS?"
470 GOSUB 1420 :: IF K$=E$ T
HEN 370
480 IF K$<>"A" AND K$<>"S" T
HEN 470
490 CALL CLEAR :: C$=K$ :: G
OSUB 1570 :: IF K$=E$ THEN 3
70
500 OPEN #4:"PIO" :: IF C$="
S" THEN 560
510 FOR D=1 TO ML(M) :: GOSU
B 1620
520 IF D/2=INT(D/2) THEN 530
ELSE 540
530 FOR W=1 TO 6 :: PRINT #4
:: NEXT W
540 NEXT D :: IF ML(M)/2=INT
(ML(M)/2) THEN 370
(See Page 35)
```

## MY-SCHEDULE—

(Continued from Page 34)

```

550 FOR L=1 TO 36 :: PRINT #
4 :: NEXT L :: GOTO 600
560 DISPLAY AT(12,25):"PRINT
ING SPECIAL EVENTS" :: PRINT
#4:" SPECIAL EVENTS FOR";MO
$(M);",",;CY
570 C=1 :: FOR W=1 TO 60 ::
T$=EV$(W)
580 IF T$<>"" THEN PRINT #4:
T$ :: C=C+1
590 NEXT W :: FOR W=1 TO 66-
C :: PRINT #4 :: NEXT W
600 CLOSE #4 :: GOTO 370
610 DISPLAY AT(12,23):"ARE Y
OU SURE YOU WANT TO QUIT? Y/
N" :: GOSUB 1420
620 IF K$<>"Y" THEN 370 :: C
ALL CLEAR :: KEY OFF :: END
630 WF=-1 :: LS=1 :: GOSUB 2
110
640 TM=0 :: LM=0 :: WW=37 ::
WH=21 :: GOSUB 1700
650 GOSUB 2000 :: PG=1 :: AP
=1 :: NP=1 :: A=1 :: B=14
660 CALL TCOLOR(4,5)
670 DISPLAY AT(16,1):CHR$(24
4);DDI$;RPT$(GY$,32);CHR$(24
4)
680 CALL TCOLOR(12,6) :: DIS
PLAY AT(16,16)SIZE(9):CHR$(1
54);" NOTES ";CHR$(154); ::
CALL TCOLOR(4,5) :: GOSUB 17
50 :: GOSUB 1790
690 FG=-1 :: MP=2 :: GOSUB 1
240 :: WX=9 :: WY=AP :: FL=2
6
700 V=19*CD-19+AP :: T$=A$(V
) :: GOSUB 2240
710 A$(V)=T$ :: GOSUB 1440 :
: IF CK=0 THEN 700
720 ON CK GOTO 730,730,750,7
50,780,790,830,1090
730 DY=(CK=1)-(CK=2) :: AP=A
P+DY :: WY=WY+DY
740 IF AP>0 AND AP<15 THEN 7
00
750 CK=CK+(CK>2)*2 :: GOSUB
1470 :: GOSUB 1240
760 AP=1 :: A=1 :: B=14 :: G
OSUB 1750
770 WY=1 :: GOSUB 1790 :: GO
TO 700
780 LS=2 :: GOSUB 2110 :: WF
=0 :: GOTO 370
790 GOSUB 1570 :: IF K$=E$ T
HEN 810
800 D=CD :: OPEN #4:"PIO" ::
GOSUB 1620 :: CLOSE #4
810 MP=4+FG*2 :: GOSUB 1240
:: IF -FG THEN GOTO 640
820 GOTO 1110
830 IF CK=7 THEN TM=2 ELSE T
M=2-FG*8
840 LM=40
850 WW=35 :: WH=10 :: FL=33
860 WX=41 :: WY=TM :: T$=" S
PECIAL EVENTS FOR "&MO$(M)&S
P$
870 CALL TCOLOR(4,5) :: DISP
LAY AT(TM,40):CHR$(244);RPT$(
GY$,35);CHR$(244)
880 DISPLAY AT(TM,(39+INT((3
7-LEN(T$))/2)))RV$;T$;CHR$(
62);
890 MP=3 :: P=0 :: EP=1
900 CALL TCOLOR(4,5)
910 FOR W=P*10+1 TO P*10+10
:: T$=EV$(W)
920 DISPLAY AT(TM+1,40):CHR$(
244);T$;SEG$(CL$,1,35-LEN(T
$));CHR$(244) :: TM=TM+1 ::
NEXT W
930 CALL TCOLOR(4,5)
940 DISPLAY AT(13,40):CHR$(2
44);RPT$(GY$,35);CHR$(244)
950 CALL TCOLOR(12,6) :: DIS
PLAY AT(13,55)SIZE(10):CHR$(
154);" PAGE " ;STR$(P+1);SP$;
CHR$(154) :: CALL TCOLOR(4,5
) :: GOSUB 1240
960 V=P*10+EP :: T$=EV$(V) :
: TM=(TM-TM)+2 :: GOSUB 2240
970 EV$(V)=T$ :: GOSUB 1440
:: IF CK=0 THEN 960
980 ON CK GOTO 990,990,1020,
1020,1040,1060
990 DY=(CK=1)-(CK=2) :: EP=E
P+DY
1000 IF EP>0 AND EP<11 THEN
WY=WY+DY :: GOTO 960
1010 CK=3-(EP=9)
1020 P=P+(CK=3)-(CK=4) :: P=
P+((P=6)-(P=-1))*6
1030 WY=TM :: EP=1 :: TM=(TM
-TM)+2 :: GOTO 900
1040 TM=1 :: LM=1 :: IF FG T
HEN A=9 :: B=14 :: GOTO 650
1050 A=1 :: B=14 :: GOSUB 17
50 :: GOTO 1100
1060 IF V=60 THEN 1080
1070 FOR W=V TO 59 :: EV$(W)
=EV$(W+1) :: NEXT W
1080 EV$(60)=" " :: GOTO 900
1090 FG=0
1100 MP=4 :: GOSUB 1240 :: W
X=2 :: WY=15+NP :: FL=33
1110 V=19*CD-5+NP :: T$=A$(V
) :: GOSUB 2240
1120 A$(V)=T$ :: GOSUB 1440
:: IF CK=0 THEN 1110
1130 ON CK GOTO 1140,1140,69
0,780,1160,790,830
1140 NP=NP+(CK=1)-(CK=2)
1150 NP=NP+((NP=6)-(NP=0))*5
:: WY=15+NP :: GOTO 1110
1160 T=19*CD :: IF V=T THEN
1180
1170 FOR W=V TO T-1 :: A$(W)
=A$(W+1) :: NEXT W
1180 A$(T)=" " :: GOSUB 1790
:: GOTO 1110
1190 FL$=F$
1200 GOSUB 1210 :: GOSUB 123
0 :: RETURN
1210 CALL TCOLOR(16,13) :: D
ISPLAY AT(24,1):" PRESS <SPA
CE BAR> TO CONTINUE"; :: CAL
L TCOLOR(16,5)
1220 GOSUB 1420 :: IF (K$<>S
P$) THEN GOTO 1220 :: RETURN
1230 CALL CLEAR :: RETURN
1240 IF MP=2 THEN DISPLAY AT
(1,38):
1250 IF MP=1 THEN 1290
1260 IF MP=3 THEN 1400
1270 IF MP=4 THEN 1380
1280 IF MP=2 AND K=8 OR K=9
OR K=10 OR K=11 THEN RETURN
ELSE 1340
1290 KEY ON
1300 CALL TCOLOR(16,7)
1310 !KEY(1)=" " :: KEY(2)="
" :: KEY(3)="2 DAY 3" :: KE
Y(4)="0 MTH 1" :: KEY(6)=" E
NTER="
1320 KEY(5)="P)rtMO " :: KEY
(7)="APPMT'S" :: KEY(8)=" "
:: KEY(9)=" " :: KEY(10)="Q)
UIT"
1330 CALL TCOLOR(16,5) :: RE
TURN
1340 FOR X=1 TO 10 :: KEY(X)
=" " :: NEXT X :: DISPLAY AT
(1,38):
1350 CALL TCOLOR(16,7)
1360 !KEY(1)="2 LIN 3" :: KE
(See Page 36)

```

## MY-SCHEDULE—

(Continued from Page 35)

```

Y(2)="0 DAY 1" :: KEY(3)="de
Line" :: KEY(4)="^PrtDAY" :
: KEY(5)="^Notes" :: KEY(6)=
"^Events" :: KEY(7)="^D CHAR
" :: KEY(9)=" "
1370 KEY(8)="<_>SAVE" :: KEY
(10)="ESC" :: CALL TCOLOR(16
,5) :: RETURN
1380 !FOR X=1 TO 10 :: KEY(X
)=" " :: NEXT X :: CALL TCOL
OR(4,7) :: KEY(1)="2 LIN 3"
:: KEY(3)="de^Line" :: KEY(4
)="^Prtday" :: KEY(6)="^Even
ts" :: KEY(8)=" "
1390 KEY(2)="^D CHAR" :: KEY
(5)="^Apmts" :: KEY(7)="<_>S
AVE" :: KEY(9)="ESC" :: KEY
(10)="NOTES" :: CALL TCOLOR(
16,5) :: DISPLAY AT(1,38) ::
: RETURN
1400 !CALL TCOLOR(4,7) :: KE
Y(2)="0 PAG 1" :: KEY(7)="<_
>APTS" :: KEY(4)="^D CHAR" :
: KEY(5)=" " :: KEY(6)=" " :
: KEY(8)="ESC" :: KEY(9)=" "
:: KEY(10)="EVENTS"
1410 CALL TCOLOR(16,5) :: RE
TURN
1420 CALL KEY(0,K,S) :: IF S
=0 THEN 1420
1430 K$=CHR$(K-(K>96)*(K<123
)*32) :: K=ASC(K$) :: RETURN
1440 CK=0 :: FOR L=1 TO LEN(
CM$(MP))
1450 IF SEG$(CM$(MP),L,1)=K$
THEN CK=L :: L=10
1460 NEXT L :: RETURN
1470 ON CK GOTO 1480,1510,15
40,1540
1480 CD=CD-1 :: IF CD>0 THEN
GOSUB 2000 :: RETURN
1490 LS=2 :: GOSUB 2110 :: M
=M-1
1500 M=M-(M=0)*12 :: CD=ML(M
) :: GOTO 1560
1510 CD=CD+1 :: IF CD<=ML(M)
THEN GOSUB 2000 :: RETURN
1520 LS=2 :: GOSUB 2110 :: C
D=1 :: M=M+1
1530 M=M+(M=13)*12 :: GOTO 1
560
1540 M=M+(CK=3)-(CK=4) :: M=
M+((M=13)-(M=0))*12
1550 IF CD>ML(M) THEN CD=ML(
M)
1560 LS=1 :: GOSUB 2110 :: G
OSUB 1830 :: RETURN
1570 !
1580 DISPLAY AT(23,1):"PLEAS
E PRESS <SPACE BAR> WHEN"
1590 DISPLAY AT(24,1):"PRINT
ER IS READY OR<"ES;"> TO EX
IT. "
1600 GOSUB 1420 :: IF K$<>E$
AND K$<>SP$ THEN 1600
1610 RETURN
1620 DISPLAY AT(12,45):"PRIN
TING APPOINTMENTS" :: PRINT
#4:MO$(M);D;"",CY
1630 PRINT #4:"DAILY APPOINT
MENTS" :: PRINT #4 :: P=D*19
-18
1640 FOR W=P TO P+13 :: T$=T
M$(W-P+1)&A$(W)
1650 IF LEN(T$)=7 THEN T$=T$
&UL$
1660 PRINT #4:T$ :: NEXT W :
: PRINT #4 :: PRINT #4
1670 PRINT #4:"NOTES" :: PRI
NT #4
1680 FOR W=P+14 TO P+18 :: P
RINT #4:A$(W) :: NEXT W
1690 FOR W=1 TO 4 :: PRINT #
4 :: NEXT W :: DISPLAY AT(12
,45) :: DISPLAY AT(23,1) ::
: DISPLAY AT(24,1) :: RETUR
N
1700 CALL TCOLOR(4,5)
1710 FOR W=1 TO WH
1720 DISPLAY AT(TM+W,LM)SIZE
(WW):CHR$(244);SEG$(CL$,1,WW
-2);CHR$(244) :: NEXT W
1730 DISPLAY AT(TM,LM):CHR$(
244);RPT$(GY$,WW-2);CHR$(244
)
1740 RETURN
1750 FOR W=A TO B :: T$=A$(1
9*CD-19+W) :: R=W+1
1760 CALL TCOLOR(4,5)
1770 DISPLAY AT(R,2):TM$(W);
T$;SEG$(CL$,1,28-LEN(T$));CH
R$(244)
1780 NEXT W :: RETURN
1790 FOR W=1 TO 5 :: T$=A$(1
9*CD+W-5)
1800 CALL TCOLOR(4,5)
1810 DISPLAY AT(W+16,2):T$;S
EG$(CL$,1,35-LEN(T$));CHR$(2
44)
1820 NEXT W :: DISPLAY AT(22
,1):CHR$(244);RPT$(GY$,35);C
HR$(244) :: RETURN
1830 IF WF THEN 2000
1840 CALL MARGINS(25,65,1,24
)
1850 T$=SP$&MO$(M)&" "&STR$(
CY)&SP$ :: T=11-INT(LEN(T$)/
2)
1860 CALL TCOLOR(4,5)
1870 CALL TCOLOR(4,5) :: DIS
PLAY AT(5,1)SIZE(24):CHR$(24
4);RPT$(GY$,22);CHR$(244) ::
CALL TCOLOR(4,5)
1880 DISPLAY AT(6,1):CHR$(24
4);SEG$(DA$,1,T);T$;SEG$(DA$
,1,22-T-LEN(T$));CHR$(244)
1890 DISPLAY AT(7,1):CHR$(24
4);" S M T W TH F S ";
CHR$(244)
1900 CALL TCOLOR(4,5) :: DIS
PLAY AT(8,1)SIZE(24):CHR$(24
4);RPT$(GY$,22);CHR$(244) ::
CALL TCOLOR(4,5)
1910 C=6 :: P=WP(M) :: T$=CH
R$(244)&SEG$(CL$,1,P*3+1)
1920 FOR D=01 TO ML(M) :: IF
P<>7 THEN 1940
1930 P=0 :: DISPLAY AT(C+3,1
):T$;CHR$(244) :: C=C+1 :: T
$=CHR$(244)&SP$
1940 P=P+1 :: T$=T$&NM$(D) :
: NEXT D
1950 IF P<7 THEN T$=T$&SEG$(
CL$,1,21-P*3)
1960 DISPLAY AT(C+3,1):T$;CH
R$(244)
1970 DISPLAY AT(C+4,1):CHR$(
244);RPT$(GY$,22);CHR$(244)
1980 IF C<>6 THEN 1990 ELSE
2000
1990 DISPLAY AT(C+5,1):CL$
2000 T$=MO$(M)&" "&STR$(CD)&
" "&STR$(CY)&SP$
2010 CALL MARGINS(25,65,1,24
) :: CALL TCOLOR(16,5)
2020 IF WF THEN 2060
2030 CALL TCOLOR(2,16)
2040 DISPLAY AT(17,1)SIZE(24
):"DATE: ";T$
2050 CALL TCOLOR(16,5) :: RE
TURN
2060 T$=" APPOINTMENTS FOR "
&T$ :: T=LEN(T$)
2070 CALL MARGINS(1,80,1,24)
:: CALL TCOLOR(4,5)
2080 Z=INT((37-T)/2) :: IF Z
(See Page 37)

```

## MY-SCHEDULE—

(Continued from Page 36)

```

<2 THEN Z=2
2090 DISPLAY AT(1,2):SEG$(GY
$,1,31); :: CALL TCOLOR(5,4)
:: DISPLAY AT(1,2):T$;
2100 CALL TCOLOR(4,5) :: RET
URN
2110 IF NOT WF THEN RETURN
2120 GOSUB 1230
2130 F$=FT$(M) :: FL$=F$
2140 IF LS=2 THEN 2190
2150 CALL TCOLOR(16,13) :: D
ISPLAY AT(23,1)SIZE(27):"LOA
DING ";SEG$(F$,1,3)&" "&SEG$(
F$,4,2)&" APPOINTMENTS" ::
CALL TCOLOR(16,5) :: FOR X=1
TO 10 :: KEY(X)=" " :: NEXT
X
2160 OPEN #2:"DSK."&"SCH-DAT
A."&FL$,DISPLAY ,VARIABLE 80
2170 FOR W=1 TO 19*ML(M) ::
INPUT #2:A$(W) :: NEXT W
2180 FOR W=1 TO 60 :: INPUT
#2:EV$(W) :: NEXT W :: GOTO
2230
2190 CALL TCOLOR(7,16) :: DI
SPRAY AT(23,1)SIZE(26):"SAVI
NG ";SEG$(F$,1,3)&" "&SEG$(F
$,4,2)&" APPOINTMENTS" :: CA
LL TCOLOR(16,5)
2200 OPEN #2:"DSK."&"SCH-DAT
A."&FL$,DISPLAY ,VARIABLE 80
2210 FOR W=1 TO 19*ML(M) ::
PRINT #2:Q$;A$(W);Q$ :: NEXT
W
2220 FOR W=1 TO 60 :: PRINT
#2:Q$;EV$(W);Q$ :: NEXT W
2230 CLOSE #2 :: GOSUB 1230
:: RETURN
2240 EX=LEN(T$)
2250 IF K=11 OR K=10 THEN XX
=0 ELSE XX=1
2260 CALL TCOLOR(2,16)
2270 DISPLAY AT(WY+1,WX)SIZE
(FL+2):RV$&SP$&T$;SEG$(CL$,1
,FL-EX)
2280 IF EX=FL THEN 2310
2290 !
2300 DISPLAY AT(WY+1,WX+EX+2
)SIZE(1):RV$
2310 CALL KEY(0,K,S) :: IF S
=0 THEN 2470
2320 IF K=155 THEN WF=0 :: C
ALL CLEAR :: GOTO 370
2330 IF K=140 THEN T$="" ::
GOTO 2240

```

```

2340 IF K=132 THEN 2410
2350 IF K=81 THEN END
2360 K$=CHR$(K) :: IF K$<SP$
OR K$>CHR$(93) THEN 2440
2370 IF EX=FL THEN 2310
2380 T$=T$&K$
2390 DISPLAY AT(WY+1,WX+EX+2
)SIZE(1):K$
2400 EX=EX+1 :: GOTO 2280
2410 IF EX=0 THEN 2310
2420 IF EX=1 THEN T$="" :: G
OTO 2240
2430 T$=SEG$(T$,1,EX-1) :: G
OTO 2240
2440 IF K$=CHR$(13) THEN K$=
CHR$(10)
2450 IF K$=CHR$(142) THEN RE
TURN
2460 DISPLAY AT(WY+1,WX)SIZE
(FL+2):T$;SEG$(CL$,1,FL-LEN(
T$)) :: RETURN
2470 WH$=TIMES :: CALL TCOLO
R(2,16) :: DISPLAY AT(24,1)S
IZE(21):"THE TIME IS ";WH$ :
: CALL TCOLOR(16,5) :: GOTO
2310
0 3710 2989 2047 4479
3811 3457 4235 3581 2038
2739 1646 2656 2515 176
3 3027 2195 1475 2852 2
512 5002 770 4339 4343
954 2727 1243
4664 2618 3622 2826 267
6 1335 3500 2849 2904 2
729 1542 1651 2214
2900 2101 4110 2952 195
5 1910 3273 2156 1958 2
098 2239 2673 2945
5117 829 2054 2202 3029
1354 4486 3216 1738 27
14 2884 1201 3349
4674 2799 3256 2377 255
4 2497 2640 1717 2598 2
008 1957 2378 1965
2881 2933 726 2176 502
1514 3500 4352 3495 127
0 1198 2214 4603 618 120
1 3096 4652 2738 3207 2
660 2231 1863 2905 873
2465 2686 3077
2333 1223 2735 1414 484
2966 2381 2642 2430 13
62 3014 1815 2624
2154 584 2325 4875 1096
3313 1597 2095 1245 12
41 1250 3888 690

```

```

1294 4169 636 4465 493
1987 3613 1299 4746 471
6 4129 4558 5018
4774 4135 4573 4332 32
1986 2268 3157 2062 261
2 1354 1884 2931
1789 2314 3245 2206 168
0 2499 1792 2789 302 33
26 3973 2812 744
4601 3592 2426 1854 294
1 1969 2970 4704 2020 1
245 1079 4791 3421
748 2615 1251 3654 1370
2035 1246 3374 4401 11
29 1656 3246 1252
4695 1234 4563 93 3502
4692 1234 2875 2448 394
2 2009 2288 2019
3155 1793 1532 2381 289
0 1127 1290 2402 1987 2
645 2788 2237 4653
1932 1712 843 1274 1247
4551 4656 619 3347 302
2 3480 4607 2796
3342 3366 3100 2208 874
2399 1295 3873 1340 30
2 2512 2273 2864
2033 1260 1264 2958 134
0 687 2428 1426 1237 20
15 1987 1993 1950
4354 4791 2075 TOTAL 664
900

```

## Italian users group has 50 members

Italy now has a TI users' group, TI-99/4A e 9640 Computer Club Italia, with 50 members throughout the country, according to Giancarlo Antici of Rome, who edits the groups quarterly "diskazine" newsletter.

Antici says 30 members went to the meeting held in Milan in December 1989 to constitute the group.

He writes, "We hope to do many things, notwithstanding the fact that the great majority of members are professionally engaged and very busy."

To contact the group, write TI-99 9640 Club, c/o Marino Pizzotti (secretary), via Matteotti 9, 20060 Cassina Pecchi — MI — Italy.

## DISKASSEMBLER V2.0

# A great program for the TI is upgraded for the Geneve

By WAYNE L. STITH

When Millers Graphics published Tom Freeman's DISKASSEMBLER several years ago, the age of clumsy disassemblers for the TI came to an end. The novelty of Mr. Freeman's approach lay in the program's ability to disassemble code on disk as well as code in memory. In addition, a number of features were included which allowed the disassembled parts to be easily modified and reassembled. DISKASSEMBLER deserved the high marks it received in the review of January 1987.

The purpose of a review of an upgrade is not to rehash known features, but to introduce and evaluate the merits of new features, in short, to assist the reader in deciding whether to purchase the upgrade.

DISKASSEMBLER comes packaged with the original manual and an eight-page addendum which corrects the manual and documents new features. Version 2.0 is more than a simple hack to provide 80 columns without that irritating windowing which we abhor. It is a true upgrade designed solely for the Myarc Geneve 9640. It boots directly from MDOS, and since the disk is not copy-protected like its predecessor, the program can easily be moved to a utilities disk or a directory on the hard drive.

Because of the available memory on the Geneve (128K is required to run DISKASSEMBLER), new approaches were possible. First, the output generated by DISKASSEMBLER will now produce up to 1852 labels, almost twice as many as before. The problem which arises when R is used both as a label and a register has disappeared because DISKASSEMBLER avoids labels in the range R0-R9 and R01-R91. And since MY-Word has a much larger text buffer than TI-Writer, the size of the output files has been changed from 65 to 129 sectors (catalog size).

Of the major improvements version 2.0 offers, the most useful is the expanded loading range. The original program was forced to limit program files to 48 sectors (catalog size) because program files were

## Review

### REPORTCARD

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

**Cost: \$22.95 (includes shipping and handling)**

**Manufacturer: T and J Software, 515 Alma Real Drive, Pacific Palisades, CA 90272.**

**Requirements: Myarc Geneve 9640. Printer recommended.**

loaded into memory before disassembly. DISKASSEMBLER dedicates a 64K block of memory for loading of files. program files which are chained for loading via the 6-byte header can now be handled with the batch option by prefixing a filename with :B, as in :BDSK1.PART1.

The allocation of this memory block

Version 2.0 is more than a simple hack  
to provide 80 columns without that  
irritating windowing which we abhor.  
It is a true upgrade designed solely for  
the Myarc Geneve 9640.

allows a similar procedure to be used with DIS/FIX 80 files, although the details are a bit different. Prefixing the filename with :L causes the program to ask the user where relocatable (RORG) code should be placed, and a number of files may then be loaded. When all loading is complete, references are resolved. This is a major improvement over version 1 and answers one complaint from the earlier review. In

order for references to be resolved, you should load in a REF/DEF table. If you fail to do so, the program will resolve references as appropriate for the EA cartridge.

The REF/DEF table you load may be one of your own design or one of those provided in the package. In addition, you may add defaults for the options list, printer name, and output filename. The original DISCONFIG file is no longer used.

Once files have been loaded, you may specify various options for disassembly. Most of the old options are still there, such as D for disassembly of peripheral DSR cards. Two which are missing are the G and M options, which dealt with RAMdisks and Myarc floppy controllers, respectively. Since MDOS controls all peripheral access regardless of the type of card in use, these options are unneeded. The X option (extend label checking outside the file range) has been modified to allow you to specify a range to check. This will allow you to account for buffers which were set up outside the range of the files with an EQUate instead of BSS in the original source code. It will also allow you to avoid labels for low values which are likely to be DATA instead of addresses.

There are several new options which improve considerably the output generated. The K option will suppress the loading of the EA REF/DEF table and is the default. This option is overridden in the event that you have loaded DIS/FIX 80 files and not loaded a REF/DEF table yourself.

The A option forces display of the 6-byte header if the file loaded was in program format and is also a default. The S option forces the program to generate files of 65 sectors instead of 129, and the Z option will save you a lot of paper and disk space. Have you ever disassembled something and found page after page of DATA >0000 or DATA >FFFF and cursed because you

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## DISKASSEMBLER—

(Continued from Page 38)

forgot to set up data/text blocks on page 2? The Z option will recognize this mess and create a DATA or TEXT block and not generate lines until the data changes.

The E option is a curious feature which will allow the shifting of embedded assembly code in an Extended BASIC program. Because of the way such code is saved, it is possible that it could be one byte off for disassembly when loaded by DISKASSEMBLER. The E option will shove the entire block of code down one byte so that it will reside on even memory boundaries and disassemble properly.

The next two screens (DATA/TEXT blocks, and words after subroutines) differ from the original in that you may enter 30 instead of 15 items, and the information is preserved for the next run.

The input line on the first page contains some minor enhancements, such as tabbing to the first spot after a period. CTRL-

S takes you to the beginning of the filename, and CTRL-E takes you to the end. And what would a program be without a disk catalog? Pressing CTRL-C will allow you to catalog any device, including the hard disk.

The most intriguing feature for me is the memory mapping facility. Although the original version allowed the disassembly of memory, it is now possible to bring in code from anywhere in the system by simply typing :M on the input line and giving the physical page number, such as >33. Although I have not had time to disassemble all of resident MDOS, the possibility is very tempting. I did, however, disassemble part of the EPROM on the 9640 card. It resides at >F0 and >F1. I wonder, could that be a debugger hidden on that chip?

Another feature which MDOS programmers will appreciate is the fact that the new version correctly disassembles the

added instructions of the 9995 chip (DIVS, MPYS, LST, LWP).

I am giving this product a straight A rating for several reasons. It meets every demand one could make of an upgraded product by adding new features and eliminating all the problems mentioned in the original review. Version 1 was rated B+ in ease of use because disassemblers are by nature difficult to use. I agree, but I consider that the extra features of DISKASSEMBLER make a tedious task so much easier that the higher rating is warranted. You know that a program had to meet high standards in order to be sold by Millers Graphics. Version 2.0 of DISKASSEMBLER exceeds those standards.

Those who own version 1 of DISKASSEMBLER may obtain the new version at a discount by sending the warranty page and \$17.95 directly to T and J Software.

## TI-Base Version 3.0

# Better than ever

Enhancements extend potential for data management

By BILL GASKILL

©1990 B. Gaskill

Texaments recently released version 3.0 of its TI-Base database manager and, from an outward appearance, it looks no different than version 2.0, or any of the maintenance releases that followed. However, inside the program is incredibly enhanced and more feature-packed than ever. Right away you will notice that the program disk is virtually full, where previous versions had somewhere around 300 sectors of programming code and support files. Nothing was given up in the new version to make room for the enhancements, though. There are over 20 major additions or enhancements to the package that resulted in the increased use of disk space.

### NEW OR ENHANCED FEATURES

■ APPEND TO/FROM; allows you to merge two like data files with assembly language speed instead of having to write a command file to do it.

■ An AVERAGE command has been

## Review

### REPORT CARD

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

Cost: \$24.95+shipping (\$14.95+shipping to upgrade)

Manufacturer: Texaments, 53 Center St., Patchogue, NY 11772; 516-475-3480

Requirements: X BASIC, Editor/Assembler or Mini-MemoryMemory expansion, disk system.

added that includes SCOPE capabilities so that one can determine the average of a specific set of numeric values.

■ GO; allows you to GO directly to a

record, such as GO 5 to go to the 5th record in a file.

■ File names and paths for different files/devices can now be up to 29 characters long, where previous versions supported a maximum of 19 characters.

■ In most circumstances, a variable can now be used in place of an absolute number, which means you can now program TI-Base to accept a value from the screen and then have that value interpreted and used in the program.

■ The CLOSE directive has been modified so that if nothing has been changed in a file, nothing is written back to the data disk. This allows write protect tabs to be used on data disks where data is to be used for read-only purposes.

■ String access and manipulation has been enhanced tremendously! You can now search anywhere in a text string, for a partial word, a word or an entire phrase. The length of a string can also be deter-

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## TI-BASE VERSION 3.0—

(Continued from Page 39)

mined and a new dBase-like SUBSTR command has been added that allows REPLACEMENTS anywhere in a string.

■ The SCOPE option has been added to the DELETE and RECALL directives. This means that a global delete of all records in a file could be performed with a simple DELETE RECORD ;FOR 1=1, or one could delete all records in a file where ZIPCODE="12345" etc. V3.0 now gives you a nice screen display of the number of records deleted or recalled at the end of the operation, too.

■ The CATALOG directive has been improved to provide automatic paging of output so that when a screen fills with program or file names the display halts and prompts the user to press a key to continue.

■ The command file editor now displays the name of the command file being edited and even tells you the line number the cursor is positioned at.

■ The SUM directive has been enhanced so that it now can direct its output to a variable. SUM A TO B, where A is a field in your data base and B is a pre-defined LOCAL, will place the results of summed field A into LOCAL B. SUM also supports the SCOPE feature too. SUM A ;FOR (CHECKNUM>1034) would total field "A" for only those records where the CHECKNUM field contained record data greater than 1034. Because of the changes in SUM you can now also determine the value or contents of any LOCAL by typing in DISPLAY (or PRINT) (NAME) where NAME is the name of the LOCAL.

■ You can now "print" data to the screen by setting the PRINTER=DISPLAY.

■ Carriage returns and line feeds can now be suppressed in data files printed to disk.

■ PRINT, DISPLAY and WRITE now have REPEAT capabilities similar to Extended BASIC's RPT\$ command.

■ ERASE LINE and INSERT LINE capabilities are now available from the dot prompt. You can press Fctn 3 to erase a command or Fctn 4 to repeat it, thus saving a lot of re-typing time.

■ A brand new REPORT function has been added that allows total control and

placement of printed output. This means that you can now design a report that can create forms, tables or labels and the format can be saved to disk. This is an exciting enhancement that will challenge even the Navarone Data Base Manager's Report Writer in output, but not in ease of use. The Navarone Report Writer uses a true Cut and Paste method to design a report, while TI-Base V3.0's Report Writer requires conceptualization on the part of the user. But the output possibilities are almost limitless in TI-Base, where the Navarone product limits the report design screen to 80 columns, and it performs

The TI-Base Report Writer will support virtually any function within a report that can be designed in a command file, including calculations and accessing of multiple data files for information to be included in one report. How's that for POWER?

only SUMming of data. The TI-Base Report Writer will support virtually any function within a report that can be designed in a command file, including calculations and accessing of multiple data files for information to be included in one report. How's that for POWER?

■ A major enhancement of the MODIFY STRUCTURE command has been provided in V3.0 that allows existing data to be recovered after you change a file's structure. All previous versions of TI-Base caused existing data to be lost forever when you went in to change the structure of an existing data base. No more. Once a file's structure has been modified, an operator selection menu allows you to;

- Use Old Data
- Restore Into New Structure
- Destroy Data
- Abort

If you only change field names in the MODIFY STRUCTURE, no manipulation or restructuring of existing data is required. It is only when actual field lengths and types are altered that a

restructure is offered or required.

■ Dennis Faherty has also given us access the resident inverse video character set that TI-Base uses, so that we can now program our own inverse video displays. To top that off, it can be done in two different methods. The first is via the command SET INVERSE ON/OFF. This is a toggle switch to turn inverse on or off. The second method allows individual characters to be set to inverse display by adding 128 to the ASCII value of the character and then punching that number in with the Control key down. For example, you could display an inverse video UPPER case A by holding down Ctrl and typing in the number 193 (65+128=193).

Another use for the control key is instantaneous command retrieval at the dot prompt, for any of the fifty or so commands TI-Base supports. For example, if you wished to DELETE data in the current data base you could press Ctrl D and TI-Base would display the DELETE directive at the dot prompt, with the cursor automati-

cally positioned at the second space to the right of the directive to accept the rest of your statement. If you wanted DISPLAY instead of DELETE, you would simply press Ctrl D again to toggle the options available in the "D" area until DISPLAY appeared. A nice, professional feature.

Finally, V3.0 has an INSTALL feature that allows command files to be loaded into memory so they are RUN from memory rather than disk, which allows them to execute much faster. Up to 2500 bytes are available, which translates into about three or four sizeable command files stuffed in VDP RAM. How that kind of space was squeezed out of VDP RAM I'll never know. INSTALL options include;

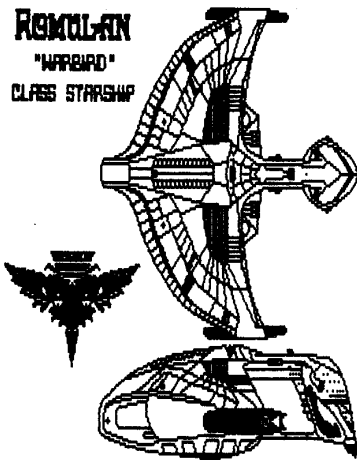
- Add
- Remove
- Load
- Save
- Catalog

A spin-off of the new INSTALL feature is that command files which exist in the INSTALL area of memory can now be executed from the dot prompt without

(See Page 41)



# Newsbytes



## Starfleet series gets new addition

Texaments has released **Starfleet Technical Drawings III**, the third volume in its Starfleet Technical Drawings Series.

Like the previous two volumes, **Starfleet Technical Drawings III** is a collection of detailed pictures of the various spacecraft that have appeared in the original Star Trek television series, the television series Star Trek: The Next Generation and the five Star Trek movies. Included in Volume III are drawings of civilian starships from various world members of the Federation (including Earth, Vulcan, Alpha Centauri and Andorian); starships from Federation adversary worlds (including the Romulans,

the Gorn Empire, Orion Pirates and the Tholian Assembly), the latest two versions of the Starship Enterprise (1701-B and 1701-C) as seen on a recent episode of Star Trek: The Next Generation; a chart comparing all five USS Enterprises; numerous recognition charts of Federation, Romulan and Klingon starships shown in scale to each other; and miscellaneous Federation and Klingon ships.

In addition, each disk of the Starfleet Technical Drawings includes a small command file that allows the drawings to be viewed in an automated slide show format using Display Master (sold separately).

**Starfleet Technical Drawings III**, a four-disk package, is available for \$12.95. Starfleet Technical Drawings I and II, both three-disk packages, are available for \$9.95 each. For a limited time, according to Steve Lamberti of Texaments, all three Starfleet Technical Drawings volumes may be purchased together for \$27.95. Add a \$2.50 shipping charge to all orders, he advises.

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

## Changes on Delphi

The Delphi telecommunications network has changed its rate structure, and the TI NET special interest group on Delphi is offering bonus free time for uploads.

Delphi's new rate structure, effective

Oct. 1, offers two membership options, the 20/20 Advantage Plan and the Basic Plan.

With the 20/20 Advantage Plan, members receive their first 20 hours of evening access per month for \$10, with additional time available at \$1.20 per hour. According to the company, the 20/20 plan represents a reduction of close to 80 percent off the previous Advantage Plan rate. The Basic Plan, designed for members who use the service less often, is \$5.95 per month for the first hour and \$6 for each additional hour. Direct access to the Delphi network in Boston or Kansas City is available at no additional charge. Members in other parts of the country can use the Tymnet data network to connect to Delphi with a local call at no additional charge in the evening and what is described as a modest surcharge during business hours.

Members now receive free access to help files, billing records and other service-related information, according to Dan Bruns, president of General Videotex Corporation, which operates Delphi.

TI NET owner Jeff Guide announces that effective immediately, TI NET will provide all persons successfully uploading new program or text files, bonus free time, which is additional free time equal to the time it took to upload the file. Other networks offer only the uploading time free, he says.

A special \$9.95 sign-up offer includes one hour off-peak connect time. Dial 1-800-365-4636, press Enter twice and at Password type MYTI and Enter.

## TI-BASE VERSION 3.0—

(Continued from Page 40)

having to use the DO directive. Instead, you would just type in the name of the command file. For example, if you had a command file named MENU1 that you wished to execute, and it was loaded using INSTALL, you would simply type in MENU1 from the dot prompt instead of DO MENU1 as in previous versions of TI-Base.

Another by-product of INSTALL is a MACRO capability that allows you to create a function or series of functions that could be accessed by typing in one word.

For example, you could create a MACRO that summed and then averaged the DEPOSIT field in your checking account data base, all with a simple command at the dot prompt like DEP, if that is what you named your macro. A macro can be as complex as a command file and as many macros can be defined as the 2500 byte area of INSTALL memory will hold.

### CONCLUSION

If management of data is one of your needs, then you should seriously consider TI-Base V3.0. Speed-wise, it won't compete with PR-Base or FirstBase in some

areas, but in flexibility and overall power to the user, it simply has no competition to be compared against. If you already own TI-Base the upgrade to V3.0 is a must. You will not want to be without the powerful features and enhancements that this upgrade offers. It is awesome!

For more information on TI-Base V3.0, contact: Texaments, 53 Center St., Patchogue, NY. 11772; 516-345-2134; or Insebot Inc., PO Box 291610, Port Orange, FL. 32029; 904-767-3922.

# User Notes

## Subroutines simplify programming

This comes from Andrew Bender, of Austin, Texas. He writes:

Below are some of the subprograms that I routinely use in my Extended BASIC programs. They programming easier since I do not have to retype the same code repeatedly, just MERGE them in, and use.

- **CALL K:** This subprogram will wait until a key is pressed before the program will be allowed to continue. This subprogram will not report what key was pressed. It takes no input.

```
30000 SUB K
30010 CALL KEY(0,K,S):: IF S=0
THEN 30010
30020 SUBEND
```

- **CALL KM(row,message\$):** This subprogram will do the same as SUB K except it allows a message to be placed at any row desired. It takes input of the row for the messages, and the message.

```
30030 SUB KM(X,MSG$) :: DISPLAY
AT(X,1):MSG$ :: CALL K :: SUBEND
```

- **CALL KK(key):** This subprogram awaits a specific keypress before continuing. Input required is the ASCII of the specific key.

```
30040 SUB KK(X)
30050 CALL KEY(0,K,S) :: IF K<>X
THEN 30050
30060 SUBEND
```

- **CALL KKM(key,row,message\$):** This is a combination of SUB KK and a message.

```
30070 SUB KKM(K,X,MSG$) :: DIS-
PLAY AT(X,1):MSG$ :: CALL KK(K) ::
SUBEND
```

- **CALL CLS(start.row,stop.row):** This subprogram will clear a portion of the screen from start.row to stop.row. No output produced.

```
30080 SUB CLS(X,Y):: FOR I=X TO Y
:: DISPLAY AT(I,1):" " :: NEXT I ::
END
```

- **CALL SCRCHG(color):** This subprogram will change the screen color in a 32-column screen. The color is in the form of 1416 (Foreground=14, Background=16-). Black on white would be 216, while white on black would be 1602. No output is produced.

```
30090 SUB SCRCHG(X):: F=INT(X/10
```

```
0):: B=X-F*100 :: CALL SCREEN(B) ::
FOR I=0 TO 14 :: CALL COLOR(I,F,B)
:: NEXT I :: SUBEND
```

- **CALL IN(number):** This subprogram accepts only two values, 0 or 1. CALL IN(0) will allow upper- and lowercase text, while CALL IN(1) accepts uppercase text only.

```
30100 SUB IN(X):: IF X<0 OR X>1
THEN SUBEXIT
```

```
30110 IF X=0 THEN CALL KEY(5,K,S)
:: SUBEXIT
```

```
30120 CALL KEY(3,K,S):: SUBEND
```

- **CALL CLRSCR(color):** This subprogram will clear the screen, either keeping the current background color, or changing it to one that the user defines. To keep the same color CALL CLRSCR(0), to change it CALL CLRSCR(15), or whatever you wish.

```
30130 SUB CLRSCR(X):: IF X=0 THEN
CALL CLEAR :: SUBEXIT
```

```
30140 IF X>16 THEN SUBEXIT EL
```

## Scrum is fast-moving 'Brain game'

This comes from Jim Peterson, of Tiger-cub Software. He writes:

This is one of the fastest-moving "brain games" ever produced for a computer. In fact, it could only be played on a computer.

You are shown a 3x3 grid of nine red squares number 1 to 9. The first challenge is to turn all the squares to white, except the center square.

If you select a corner square, the other three squares in that corner also instantly change color — to the opposite of whichever color they already are. If you select a side square, the other two squares on that side also change color. And if you select the center square, the squares above and below it, and on each side, will also change color. Perhaps the easiest way to understand that is to play the game.

When you solve the first puzzle, you will then be challenged to change the center square to red and all the others to white. The third puzzle is to get everything white and then to return everything to red. To keep you from giving up before you even get to the hard part, I will give you a clue — think of the spots on the "5" side of dice.

Once you have worked your way through these first four puzzles, the computer will randomly select a pattern for you to solve. This puzzle is based on 9 squares being on or off, corresponding to any binary number from 0 0000 0000 to 1 1111 1111, or in decimal 0 to 511, for a total of 512 puzzles — and all can be solved!

If you don't have time to key this in, send \$3 for a diskfull of this and many other games to: Jim Peterson, 156 Collingwood Ave., Columbus, OH 43213.

```
100 GOTO 140 !219
110 R,C,J,SET,D,W,M$,K,ST,P,
NB,X,A(),Q,CK,I,N1,N2,N3,DUM
MY,CC,QV,QR,QC,QK(),QD !096
120 CALL CLEAR :: CALL SCREE
N :: CALL MAGNIFY :: CALL SP
RITE :: CALL CHAR :: CALL CO
LOR :: CALL DELSPRITE :: CAL
L CHARSET :: CALL KEY :: CAL
L HCHAR :: CALL SOUND !221
130 !@P- !064
140 CALL CLEAR :: CALL SCREE
N(5):: R=60 :: C=80 :: CALL
MAGNIFY(2):: FOR J=1 TO 5 ::
CALL SPRITE(#J,ASC(SEG$( "SC
RUM",J,1)),INT(11*RND+6),R,C
):: R=R+15 :: C=C+15 :: NEXT
J !151
150 DISPLAY AT(18,3):"512" :
: DISPLAY AT(20,3):"PUZZLES"
: : DISPLAY AT(22,3):"IN ONE
" !141
160 FOR D=1 TO 700 :: NEXT D
: : CALL DELSPRITE(ALL):: CA
LL CLEAR :: CALL CHARSET ::
CALL SCREEN(16)!130
170 CALL CHAR(128,RPT$( "F",1
0)&RPT$( "F8",6)&RPT$( "F",20)
&RPT$( "1F",6)&RPT$( "F",10)):
: CALL CHAR(64,"FF8181818181
81FF")!229
180 CALL CHAR(34,"007E7E7E7E
7E7E0000"):: CALL COLOR(1,7,1
):: W=1 !075
190 R=7 :: C=24 :: CALL MAGN
IFY(4):: FOR P=1 TO 9 :: C=C
+48 :: IF C>216 THEN 200 EL
SE C=72 :: R=R+48 !169
200 CALL SPRITE(#P,128,7,R,C
):: NEXT P :: R=3 :: C=5 ::
FOR NB=49 TO 57 :: C=C+6 ::
IF C>29 THEN 210 ELSE C=11
```

(See Page 43)

# User Notes

(Continued from Page 42)

```

:: R=R+6 !212
210 CALL HCHAR(R,C,NB):: NEX
T NB :: FOR X=1 TO 9 :: A(X)
=1 !129
220 DISPLAY AT(21,2):"GET EV
ERYTHING WHITE EXCEPT THE CE
NTER SQUARE" !229
230 NEXT X :: DISPLAY AT(19,
2):"ENTER NUMBER TO CHANGE"
!211
240 CALL KEY(0,K,ST):: IF (S
T<1)+(K<49)+(K>57)THEN 240 !
041
250 Q=K-48 :: ON Q GOSUB 340
,350,360,370,380,400,410,420
,430 :: IF W<>1 THEN 500 !19
3
260 FOR CK=1 TO 4 :: IF A(CK
)<>1 THEN 240 !164
270 NEXT CK :: FOR CK=6 TO 9
:: IF A(CK)<>1 THEN 240 !08
4
280 NEXT CK :: IF A(5)<>0 TH
EN 240 !183
290 W=W+1 :: GOSUB 300 :: GO
TO 330 !066
300 DATA 150,196,392,150,220
,440,300,247,392,150,196,392
,150,220,440,300,247,392,150
,196,392,150,220,440,1 !187
310 RESTORE 300 :: FOR I=1 T
O 8 :: READ N1,N2,N3 :: CALL
SOUND(N1,N2,5,N3,5)!116
320 NEXT I :: CALL SOUND(600
,330,5,392,5,523,5):: READ D
UMMY :: RESTORE :: CALL HCHA
R(19,1,32,192):: RETURN !222
330 DISPLAY AT(21,2):"NOW GE
T IT ALL WHITE EXCEPT" :: DI
SPLAY AT(22,2):"THE CENTER S
QUARE" :: MS="THE CENTER SQU
ARE." :: GOTO 240 !110
340 GOSUB 460 :: Q=Q+1 :: GO
SUB 460 :: Q=Q+2 :: GOSUB 46
0 :: Q=Q+1 :: GOSUB 460 :: R
ETURN !220
350 GOSUB 460 :: Q=Q-1 :: GO
SUB 460 :: Q=Q+2 :: GOSUB 46
0 :: RETURN !161
360 GOSUB 460 :: Q=Q-1 :: GO
SUB 460 :: Q=Q+3 :: GOSUB 46
0 :: Q=Q+1 :: GOSUB 460 :: R
ETURN !222
370 GOSUB 460 :: Q=Q-3 :: GO

```

```

SUB 460 :: Q=Q+6 :: GOSUB 46
0 :: RETURN !167
380 GOSUB 460 :: Q=Q-3 :: GO
SUB 460 :: Q=Q+2 :: GOSUB 46
0 :: Q=Q+2 !055
390 GOSUB 460 :: Q=Q+2 :: GO
SUB 460 :: RETURN !100
400 GOSUB 460 :: Q=Q-3 :: GO
SUB 460 :: Q=Q+6 :: GOSUB 46
0 :: RETURN !167
410 GOSUB 460 :: Q=Q-3 :: GO
SUB 460 :: Q=Q+1 :: GOSUB 46
0 :: Q=Q+3 :: GOSUB 460 :: R
ETURN !224
420 GOSUB 460 :: Q=Q-1 :: GO
SUB 460 :: Q=Q+2 :: GOSUB 46
0 :: RETURN !161
430 GOSUB 460 :: Q=Q-1 !187
440 GOSUB 460 !029
450 Q=Q-3 :: GOSUB 460 :: Q=
Q+1 :: GOSUB 460 :: RETURN !
003
460 IF A(Q)<>1 THEN 480 !086
470 CC=16 :: A(Q)=0 :: GOTO
490 !105
480 CC=7 :: A(Q)=1 !125
490 CALL COLOR(#Q,CC):: RETU
RN !231
500 IF W<>2 THEN 560 !000
510 FOR CK=1 TO 4 :: IF A(CK
)<>0 THEN 240 !163
520 NEXT CK !036
530 FOR CK=6 TO 9 :: IF A(CK
)<>0 THEN 240 !173
540 NEXT CK :: IF A(5)<>1 TH
EN 240 !184
550 GOSUB 300 :: W=W+1 :: DI
SPLAY AT(21,2):"NOW GET EVER
YTHING WHITE":" " :: GOTO 24
0 !046
560 IF W<>3 THEN 590 !031
570 FOR CK=1 TO 9 :: IF A(CK
)<>0 THEN 240 !168
580 NEXT CK :: GOSUB 300 ::
W=W+1 :: DISPLAY AT(21,2):"N
OW BACK TO ALL RED AGAIN" ::
GOTO 240 !218
590 IF W<>4 THEN 620 !062
600 FOR CK=1 TO 9 :: IF A(CK
)<>1 THEN 240 !169
610 NEXT CK :: GOSUB 300 ::
W=W+1 !204
620 DISPLAY AT(21,1)SIZE(13)
:"NOW TRY THIS!" :: IF QV=1
THEN 690 !006

```

```

630 QR=20 :: QC=17 :: RANDOM
IZE :: FOR I=1 TO 9 :: QK(I)
=INT(2*RND):: IF QK(I)=1 THE
N 650 !228
640 QD=64 :: GOTO 660 !238
650 QD=34 !132
660 CALL HCHAR(QR,QC,QD):: Q
C=QC+1 :: IF QC<20 THEN 680
!058
670 QC=17 :: QR=QR+1 !197
680 NEXT I :: QV=1 :: GOTO 2
40 !129
690 FOR CK=1 TO 9 :: IF (A(C
K))<>(QK(CK))THEN 240 !032
700 NEXT CK :: GOSUB 300 ::
QV=0 :: GOTO 620 !066

```

## Directory note

This comes from Arthur Dubeau, of Woonsocket, Rhode Island. He writes:

RE: "A DOS-like directory program for the TI" (June 1990). There's an error in line 470 which gives a "bad value" which can be fixed by changing SEG\$(B\$,LEN(B\$)-2,3) to SEG\$(B\$,LEN(B\$)-1,3).

I like to see whatever was previously on the screen disappear so I put a CALL CLEAR at the beginning and line 220 CALL CLEAR :: FOR L= 1 TO 4.

Lines 330 and 340 showed solid lines but the minus ASCII 45 can be used with CALL CHAR(45,"00FF").

I've also added two lines:  
 530 DISPLAY AT(2,1):"AGAIN Y/N ?"  
 :: ACCEPT AT(2,1)SIZE(-1)VALIDA  
 TE("YN"):AS  
 540IF AS<> "N" THEN 90ELSEEND

## Colorful designs using MY-BASIC

This following program, in Myarc BASIC, comes from Bob Sherburne, of Las Vegas, Nevada. The program places colorful, triangular forms on the screen in an overlapping fashion. According to Sherburne, "My wife asked why I spend time writing programs that seem to do nothing but display pretty pictures and I replied: 'Why do you hang pictures on the walls? They don't do anything....'"

1 ! TRIART from Bob Sherburne (S.N.U.G.)

(See Page 44)

# User Notes

(Continued from Page 43)

```

2 ! KEYS: <P>=pause <S>
=stack designs <N>=new st
art <Q>=quit program 100
CALL GRAPHICS(2,3) :: CALL S
CREEN(1) :: CALL ECOLOR(1) :
: CALL TCOLOR(1,1) :: CLS ::
B=106 :: C=128 :: Q=125
110 CALL DCOLOR(1,1) :: CALL
FILL(195,128) :: CALL DCOLO
R(Q,1) :: RANDOMIZE :: ST=IN
T(RND*17)+3
120 FOR W=5 TO 300 STEP ST :
: RANDOMIZE :: P=INT(RND*65)
+20 :: Q=P*3
130 FOR A=1 TO W*100 :: GOSU
B 170 :: E=X :: F=Y :: A=A+W
:: GOSUB 170 :: G=X :: H=Y
:: A=A+W :: GOSUB 170 :: I=X
:: J=Y
140 CALL DRAW(1,E,F,G,H) ::
CALL DRAW(1,G,H,I,J) :: CALL
DRAW(1,I,J,E,F) :: CALL DCO
LOR(Q,1) :: Q=Q+1 :: NEXT A
:: IF V THEN 150 ELSE CLS
150 NEXT W :: CLS :: GOTO 11
0
160 CALL SOUND(4000,-3,0) ::
CALL TCOLOR(16,5) :: CALL G
RAPHICS(3,1) :: STOP
170 X=B+SIN(A)*P :: Y=C+COS(
A)*P
180 CALL KEY(3,K,S) :: IF S=
0 THEN 200 ELSE IF K=81 THEN
160 ELSE IF K=78 THEN CLS :
: V=0 :: GOTO 110 ELSE IF K=
83 THEN V=1 :: GOTO 200 ELSE
IF K=80 THEN 190 ELSE 200
190 FOR DEL=1 TO 100 :: NEXT
DEL :: CALL KEY(0,K,S) :: I
F S=0 THEN 185
200 RETURN

```

## Multicol update with Funnelweb

This comes from Ralph Mills, of Selkirk, Manitoba. He writes:

Since my last letter to you about the Multicol program (User Notes, April 1990) a problem has developed.

At the time when the work described in the April User Note was done, the formatter (file FO/FP) from Funnelweb V4.0 was used. Since then, I have loaded and

started using Funnelweb V4.21. Somehow the Special Character denoting the number of spaces required to make up for the loss of the printer control characters and the carriage return symbol at the end of the line are stripped. The formatter from V4.13 also does this.

The loss of these characters messes up the Multicol operation, and since I've discarded the older Funnelweb files, (assuming compatibility with V4.2) I have been forced to correct the formatted file by adding the deleted characters using the Special Character Mode.

## Mechatronic mouse and TI Artist

This comes from Stephen Shaw, of Stockport, England. It is in response to a Reader-to-Reader item that was published in the January 1990 edition. He writes:

Denver Sullivan is making the mistake of using EXTDSR supplied by Inscebot with TI-Artist and TI-Artist Plus, both of which have the failings he lists.

When I purchased my Mechatronic mouse I received with it an EXTDSR file which operates happily with both TI-Artist and TI-Artist Plus, and shows the elastic banding that Denver cannot see using the Inscebot file.

The file supplied with Artist uses the second mouse button to change between the drawing screen and the menu screen.

The EXTDSR file I received with my mouse uses the second button to change the scanning rate (speed) — toggling between fast and slow. Slow must be used when in draw mode, fast is useful for skipping around the menu.

As the size of the rubber band becomes larger, there is a conflict of processor timing, and the mouse may cease to control the effect concerned — switching from slow to fast scan brings some improvement but still requires the mouse to be moved very slowly. Possibly this is why Inscebot did not enable this feature.

Below is the EXTDSR file, as shown by a sector editor — it is not very large so perhaps your readers can use this data to modify or overwrite the Inscebot file they have (using a copy of the original file, of course.)

```

DISK TI-MOUSE SECTOR...0090
0000 = 0101 6420 2020 2020 2020 2041 0000 42C1
0010 = 6F42 0000 42C1 AF42 0000 4202 0042 0004
0020 = 4204 2043 00E2 4206 0042 16FC 4202 0442
0030 = 0001 42C8 2043 00DE 4300 DE42 1302 4202
0040 = 0442 0005 4288 C543 0002 4213 0846 2020
0050 = 4100 2A42 1104 42C1 6F43 0026 42A1 4442
0060 = 1003 42C1 6F43 002E 4261 4442 88C6 4300
0070 = 0642 1308 4211 0442 C1AF 4300 3C42 A184
0080 = 4210 0342 C1AF 4300 4442 6184 4288 0542
0090 = 0000 4211 0442 8805 4200 0046 2020 2020
00A0 = 4100 5A42 1504 4288 0642 0000 4211 0442
00B0 = 8806 4200 0042 1504 4210 0842 C160 4300
00C0 = 5242 10F6 42C1 0043 0058 4210 F342 C1A0
00D0 = 4300 5E42 1002 42C1 0043 0064 42D8 2043
00E0 = 008A 4300 BA42 1308 42C3 BE46 2020 2020
00F0 = E5E5 E5E5 E5E5 E5E5 E5E5 E5E5 E5E5

```

```

DISK TI-MOUSE SECTOR...0091
0000 = 4100 BA42 1304 42C8 2043 00B8 4300 8B42
0010 = 1107 4207 2043 00B8 4207 2042 0000 4210
0020 = 0442 04E0 4300 8B42 04E0 4300 9A42 C8C5
0030 = 4300 3642 C8C6 4300 4C42 0200 4205 FF42
0040 = C800 4283 7442 0458 4200 0046 2020 2020
0050 = 4100 BA42 0000 42FF 0041 00BE 4100 DE42
0060 = 0000 4200 0043 00BE 4300 E642 06A0 4301
0070 = 1042 BB40 4200 0842 06A0 4301 1042 BB40
0080 = 4200 0D42 D820 4300 8B43 00BA 421F FF42
0090 = 1303 42D8 2043 00B8 4300 BA46 2020 2020
00A0 = 4101 0642 020C 4200 2442 04CA 4230 C442
00B0 = 0380 4204 E043 00E0 4202 0442 0002 4202
00C0 = 0C42 0024 4202 0442 0600 4230 C442 0200
00D0 = 4200 0542 0600 4216 FE42 0204 4207 0042
00E0 = 30CA 4202 0C42 0008 4235 0046 2020 2020
00F0 = E5E5 E5E5 E5E5 E5E5 E5E5 E5E5 E5E5

```

```

DISK TI-MOUSE SECTOR...0092
0000 = 4101 3642 0280 4207 0042 1608 4206 4442
0010 = 16EC 42C8 2043 00E0 4300 E042 16E8 4205
0020 = 6043 00DE 4207 2043 00E0 4210 E342 3500
0030 = 4202 2042 F100 4202 8042 FE00 4214 0242
0040 = 0240 4207 0042 0458 4620 2020 2020 2020
0050 = 3300 AB41 2020 2020 2033 00AC 4220 2020
0060 = 2020 3300 A446 4952 4520 2033 00AC 5840
0070 = 494E 2020 3300 7258 4D41 5820 2046 2020
0080 = 2020 2020 2020 2020 2020 2020 2020 2020
0090 = 2020 2020 2020 2020 2020 2020 2020 2020
00A0 = 3300 7859 4D49 4E20 2033 007E 5940 4158
00B0 = 2020 4620 2020 2020 2020 2020 2020 2020
00C0 = 2020 2020 2020 2020 2020 2020 2020 2020
00D0 = 2020 2020 2020 2020 2020 2020 2020 2020
00E0 = 2020 2020 2020 2020 2020 2020 2020 2020
00F0 = E5E5 E5E5 E5E5 E5E5 E5E5 E5E5 E5E5

```

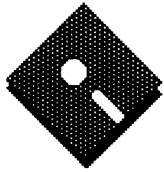
```

DISK TI-MOUSE SECTOR...0093
0000 = 3A20 2020 2020 2020 3939 2F34 2041 5320
0010 = 2020 2020 2020 2020 2020 2020 2020 2020
0020 = 2020 2020 2020 2020 2020 2020 2020 2020
0030 = 2020 2020 2020 2020 2020 2020 2020 2020
0040 = 2020 2020 2020 2020 2020 2020 3030 3130
0050 = E5E5 E5E5 E5E5 E5E5 E5E5 E5E5 E5E5
0060 = E5E5 E5E5 E5E5 E5E5 E5E5 E5E5 E5E5
0070 = E5E5 E5E5 E5E5 E5E5 E5E5 E5E5 E5E5
0080 = E5E5 E5E5 E5E5 E5E5 E5E5 E5E5 E5E5
0090 = E5E5 E5E5 E5E5 E5E5 E5E5 E5E5 E5E5
00A0 = E5E5 E5E5 E5E5 E5E5 E5E5 E5E5 E5E5
00B0 = E5E5 E5E5 E5E5 E5E5 E5E5 E5E5 E5E5
00C0 = E5E5 E5E5 E5E5 E5E5 E5E5 E5E5 E5E5
00D0 = E5E5 E5E5 E5E5 E5E5 E5E5 E5E5 E5E5
00E0 = E5E5 E5E5 E5E5 E5E5 E5E5 E5E5 E5E5
00F0 = E5E5 E5E5 E5E5 E5E5 E5E5 E5E5 E5E5

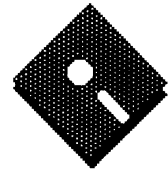
```

## Read-all lists files

Yes, this is another file listing program. But, it's a little different than others we've published. For one thing, this one doesn't require you to know the file type you want to read. Here's what the author, Michel Montmigny, of Sherbrooke, Quebec, has (See Page 46)



# The first and only MICROpendium disk sale



If you've been waiting for a sale on MICROpendium program disks, this is it! For a very limited time (through August 31, 1990) Series 1, Series 2 and Series 3 disks are available for a special price. Series 1 disks include all programs that appeared in MICROpendium from April 1988 through March 1989. Series 2 disks include all programs that appeared in

MICROpendium from April 1989 through March 1990. Series 3 disks include all programs that appeared in MICROpendium from April 1990 through March 1991 (for this offer, disks are mailed monthly starting with the August 1990 edition, programs from March 1991 through July 1990 will be mailed with the August disk).

MICROpendium disks			
SERIES #	REGULAR PRICE	SALE PRICE	SAVINGS
Series 1	\$25.00	\$20.00	\$5.00
Series 2	\$25.00	\$20.00	\$5.00
Series 3	\$40.00	\$30.00	\$10.00
<b>But that's not all, if you order more than one series, you get an additional discount.</b>			
Series 1 & 2	\$50.00	\$35.00 for both	\$15.00
Series 1 & 3	\$65.00	\$45.00 for both	\$20.00
Series 2 & 3	\$65.00	\$45.00 for both	\$20.00
Series 1, 2 & 3	\$90.00	\$60.00 for all three	\$30.00

## SPECIAL BACK ISSUE OFFER

It should be noted, that in many cases use of the programs on these disks requires reference to the appropriate edition of MICROpendium. As a special offer, again limited to orders received prior to Aug. 31, 1990, these will be made available at the reduced rate of \$15 for the 12

issues covering series' 1 and 2. The normal cost is \$2.50 per issue.

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Credit Card: MC Visa Exp. Date \_\_\_\_\_  
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Signature \_\_\_\_\_  
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# User Notes

(Continued from Page 44)

to say about it:

Read-All is an Extended BASIC program that can read all kinds of files (Int/VAR, Dis/Fix, etc.) with the greatest of ease.

To start, load the disk containing the files you want to read. Read-All will prompt you for the disk drive to read. The program will then produce a catalog of the readable files to the screen. If there are more than eight files, use CTRL-X to read the names of additional files. Then choose the file you want to read, and whether you want to output the file to screen or a printer. Pressing FCTN-9 will return you to the main screen.

To read other disks, press FCTN-8, to stop the reading process simply press FCTN-9. To send a file to a disk instead of a printer, replace the printer description in line 310 with DSKx.FILENAME.

```
15 ! R E A D A L L !184
20 !!131
30 ! VERSION 1.1 !217
40 ! BY MICHEL MONTMIGNY !24
2
50 ! SHERBROOKE, QUEBEC !152
60 ! AUGUST 1989 !215
70 !!131
80 DISPLAY ERASE ALL :: CALL
SCREEN(5):: FOR A=0 TO 14 :
: CALL COLOR(A,16,1):: NEXT
A !126
90 DISPLAY AT(11,8)BEEP:"R E
A D A L L" :: DISPLAY AT(1
9,9):"VERSION 1.1": :TAB(7);
"MICHEL MONTMIGNY":TAB(6);"S
HERBROOKE, QUEBEC" !132
100 DISPLAY AT(24,4):"PRESS
ANY KEY TO BEGIN" !087
110 CALL KEY(0,K,S):: IF S=0
THEN 110 !178
120 B=1 :: AS="1" :: E=1 ::
DIM B$(16,8),C(16,8),D(16,8)
:: ON WARNING NEXT !197
130 DISPLAY AT(12,4)ERASE AL
L BEEP:"MASTER DISK (1-3)?"
E :: ACCEPT AT(12,23)VALIDAT
E("123")SIZE(-1):E :: IF E<1
OR E>5 THEN 130 !171
140 ON ERROR 490 :: OPEN #1:
"DSK"&STR$(E)&".",INPUT,REL
ATIVE,INTERNAL :: INPUT #1:C
$,F,F,F !006
```

```
150 G,H=1 :: I=0 :: FOR A=1
TO 127 :: INPUT #1:C$,F,J,K
:: IF C$="" THEN 190 ELSE IF
ABS(F)=5 THEN 180 !073
160 I=I+1 :: IF I>8 THEN H=H
+1 :: I=1 !087
170 B$(H,I)=C$ :: C(H,I)=ABS
(F):: D(H,I)=K !110
180 NEXT A !215
190 CLOSE #1 :: IF H=1 AND I
=0 THEN 130 ELSE L=H :: M=I
!252
200 DISPLAY AT(2,7)ERASE ALL
BEEP:"R E A D A L L" :: "
PRESS" :: DISPLAY AT(24,9)
:"REDO OR BACK" !153
210 IF H>1 THEN DISPLAY AT(5
,16):"PAGE";G;"OF";H :: DISP
LAY AT(23,3):"CTRL-E, CTRL-X
, REDO OR BACK" !201
220 FOR I=1 TO 8 :: IF G=L A
ND I>M THEN DISPLAY AT(5+I+I
,2):"" ELSE DISPLAY AT(5+I+I
,2):I;"FOR ";B$(G,I)!032
230 NEXT I !223
240 CALL KEY(5,N,0):: IF N=6
THEN 130 ELSE IF N=15 THEN
DISPLAY ERASE ALL :: END !07
0
250 I=N-48 :: IF N=152 THEN
```

```
270 ELSE IF N=133 THEN 280 E
LSE IF (I<1)+(I>8)THEN 240 !
100
260 IF G=L AND I>M THEN 240
ELSE 290 !188
270 IF G<H THEN G=G+1 :: GOT
O 210 ELSE 240 !102
280 IF G>1 THEN G=G-1 :: GOT
O 210 ELSE 240 !026
290 DISPLAY AT(24,1)BEEP:" S
CREEN OR PRINTER (S/P)? S" :
: ACCEPT AT(24,27)SIZE(-1)VA
LIDATE("PS"):D$ :: IF D$=""
THEN 290 !107
300 IF D$="P" THEN DISPLAY A
T(24,1):"DEVICE NAME: PIO" :
: ACCEPT AT(24,14)SIZE(-15):
E$ :: ON ERROR 500 :: OPEN #
2:E$ !193
310 DISPLAY ERASE ALL :: IF
D$="P" THEN DISPLAY AT(23,7)
:"PRINTING NOW..." !230
320 PRINT TAB(5);"PRESS FCTN
-9 TO STOP" !249
330 ON C(G,I)GOSUB 450,460,4
70,480 !154
340 IF D$="S" THEN CALL CLEA
R !070
350 ERR=0 !160
```

(See Page 33)

## Classified

### SOFTWARE

#### GAMES

SUPER MARIO BROS. FOR 99/4A? \$9.50! Other titles \$4.00. Disk, 32K, XB required. TURBO 2056 — fast 2pl racing, over 50 screens. RECON #17 — top secret 1 pl action\*(E/A). LINKAGE — space challenge, 3D graphics, top seller. Now try LINKAGE II. FOOTBALL — 2 pl Total control, with stats! X\*MASTER\*5 (E/A) sure to drive you nuts. 4\*WHEELIN' — take your racing skills off road. Order separate or try Super Game Pack, any 4 (excluding Marios) for the price of 3, \$12.00. Add \$1.50 S&H. CK or MO to BAKER SOFTWARE, 8301 Stevenson Ave., Sacramento, CA 95828. 12pm-4pm Pac. (916) 689-6946. v7n7

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# Classified

## SOFTWARE

### FOR SALE

KB Computer Concepts offers Memory Motel, Spinner, Quizzard, and YALP! for only \$6.00! Yes, for less money than it takes to feed the family at the local fast-food emporium, you can have a great program on a disk only slightly less edible than those burgers! And no cholesterol, either! SASE for current catalog to KBCC, 653½ Fair Ave. NW, New Philadelphia, OH 44663-3541.v7n7

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