Covering the TI99/4A and the Myarc 9640

MICROpendium

Volume 12 Number 12 January 1996 $3.50

Using TI-Emulator V6.0 to transfer graphics files

How to fix blown disks

Multiplan tips from all over

The Home Computer Era — Highlights of 1981

DUMPLIST adds flexibility to listings

Reviews of TI Bar and AT Keyboard Interface

A hardware project to keep your TI working

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MICROpendium

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*READ THIS

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

1. Most BASIC and Extended BASIC programs are run through Checksum, which places the numbers that follow exclamation points at the end of each program line. Do not enter these numbers or exclamation points. Checksum is available on disk from MICROpendium for $4.

2. Long Extended BASIC 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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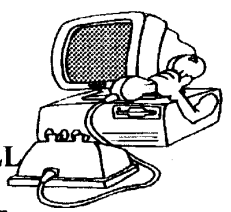

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COMMENTS

New terminal program for Geneve

A new terminal emulator for the Geneve, capable of supporting transmission rates of 38,900 baud, is being beta tested. Port, a color ANSI terminal emulator, is available on bulletin board services and from Cecure Electronics. The emulator is being developed by Tim Tesch. Tesch recently moved and be reached at 1856 Dixie Rd., Port Washington, WI 53074, or through GEnie. According to Don Walden of Cecure, Tesch would like feedback on the new program. He's interested in learning about glitches and what kind of modems are being used with the program.

Port supports VT100 and ANSI protocols and features a conference mode, XMODEM and YMODEM transfers.

I'm glad that there's a terminal emulator developed specifically for the Geneve. It's one of the few areas of computing that Geneve users have had to make due with software designed for the TI99/4A.

JIM PETERSON ACHIEVEMENT AWARD

The Multi-User Group Conference is sponsoring a series of awards honoring the memory of Jim Peterson. Peterson was a long-time TI writer and perhaps the quintessential Extended BASIC programmer. Peterson's company was called Tigercub Software which sold his hundreds of utilities and programs. He was well known for his long-running programming column Tips for the Tigercub, which was published and republished in scores of user group newsletters. The awards are a splendid way to remember a unique contributor to the TI community while recognizing the continuing achievements of those who remain.

CaDD ADDS FINISHES MICROPENDIUM INDEX

CaDD Electronics has finished updating the index of MICROpendium in its vast and growing database of TI knowledge called Cyc. Mike Wright updated it through December 1995. There's an article elsewhere for those who are interested.

NAME MISSPELLED

I misspelled Edward Swartz's name last month, this despite knowing how to spell his name. I hate it when that happens. Swartz, of course, is the developer of TI-Emulator 6.0.

—JK

READER TO READER

An Oklahoma City teacher is looking for donations of TI equipment for his special education students.

He writes that he received some programs from the Sooner 99ers users group, but his tape recorder quit working.

"I figure if I can pick up a peripheral expansion box I can borrow a tape recorder from them long enough to put the programs on disks.

"I am looking for educational programs on tape, disk or cartridges. I am looking for source code of educational programs from old (or new like yours) TI magazines. I am looking for peripherals such as speech synthesizers, printers. The only ones I have now belong to the local users group."

He would like to get any of the following cartridges:

Beyond WordWriter, TI Planner, Word Writer Xtra, Speed Reading, Multiplication 2, Number Bowling. Reading Roundup, Numeration 1, Desk Top Publisher, Great Word Race, Addition, Addition and Subtraction I, Addition and Subtraction II, Alien Addition, A-Maze-ing, Beginning Grammar, Computer Math Games I-VI, Decimals, Demolition Division, Diagnostic Test, Disk Manager, Disk Manager 2, Division I, Division, Early Logo Learning Fun, Equations and Fractional Numbers.

Also, Household Budget Management, Home Financial Decisions, Integers, Laws of Arithmetic, Measurement Formulas, Meteor Multiplication, Milliken Integers, Mind Challenger, Minus Mission, Mission "plus" and Number Magic.

Also, Number Readiness, Number Readiness Sequence, Numeration II, Percents, Reading Flight, Reading Fun, Reading On and Reading Rally.

Also, Reading Roundup, Scholastic Spelling levels 1-6, Scrabble, Story Machine, Subtraction, Speech Editor, TI Logo TI Logo II, TI-Writer, Video Chess, Word Invasion, Word Radar and Zero Zap

He notes, "This is a long list and I don't expect to fill it in one fell swoop. Anything concerning basic arithmetic and reading skills is numero uno in importance. Some of the higher kids might enjoy learning to do the Logo programming stuff. Some of the regular kids in the other two rooms might benefit from the equation, integer and home finance-budget stuff."

Contact Chris Husted TCHR, Hillcrest BMS, 2129 SW 59th, Oklahoma City, OK 73119-7024.

Reader to Reader is a column to put TI and Geneve users in touch with other users. Address questions to *Reader to Reader, c/o MICROpendium, P.O. Box 1343, Round Rock, TX 78680.* We encourage those who answer the questions to forward us a copy of the reply to share with readers.

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WE WILL BE AT TI FEST WEST '96 AND WE WILL BE BUYING AS WELL AS SELLING SO BRING YOUR GOODIES. WE ARE LOOKING FOR ORIGINAL THIRD PARTY CASSETTE SOFTWARE FOR OUR CONSOLE ONLY CUSTOMERS IF YOU HAVE SOME OF THIS STASHED AWAY BRING IT. TOMY TUTOR SOFTWARE, RARE ITEMS WANTED FOR THE TI , AND SOME NOT SO RARE . IF IT IS SOMETHING WHICH I PERSONALLY DON'T OWN YOU WILL GET TOP DOLLAR FROM ME

DISK FIXER

*INCLUDES HIDDEN POWERS

Unlocks the secrets of the disk and lets you access hidden or "lost" information. Disk Fixer is a must for the serious TI 99/4A user who has a "sick disk" which suffers from a damaged directory. This program lets you recover unscathed information by searching your disk by sector rather than file name. Disk Fixer lets you display/print the actual binary contents with a single command. It allows you to change any byte on any sector, even move data from one sector to another.

A mind-bender!

Tris

An extremely addictive mind-teaser! In Tris you must rotate and move colorful, falling shapes to fill in the holes in the bottom of the screen. Completed rows disappear but incomplete ones just cause the screen to fill up! Simple to play but difficult to master, Tris will challenge and amaze for hours. This novel game is based on the popular Russian program that perpetually tops the best-seller lists for IBM and Apple software, but it has better sound effects and color then any version ever produced! By Jim Reiss and Asgard Software.

Quick notes and envelopes!

Typewriter 99

Typewriter 99 **is the remarkable program that turns your computer into a full featured electronic typewriter! A word processor is too much for some jobs - short notes, labels, addressing envelopes, etc. - that is why we wrote *Typewriter 99*. It features bold and underline commands, text justification and auto-centering. Set margins/tabs on the screen, and even see the 6 lines previously typed.**

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FEEDBACK

Toy comparison

Although I now have some big new toys (Pentium, 486 and 386), I still run a couple of TI99/4A machines and a Geneve in a Rave PC-style box. The old TI is still a great platform, in my humble opinion, to do a great number of jobs like running little robots or just working out programming problems in Extended BASIC.

I hope the core that is still supporting the machine that taught me and hooked me keeps going for a long time yet.

Geoff Frusher
Crofton, British Columbia, Canada

RXB updated, cartridge mulled

Thanks for the several reviews of RXB, enclosed is a corrected version (V1005). It turns out that Harry Wilhelm (The Missing Link) informed me that my CALL KEY routine and CALL INIT were messed up. He was right! I had been rewriting the lower 8K support (just messing around) and cut off 78 bytes but forgot that I had it on the same disk as my source. So, versions 1003 and 1004 got the wrong CALL INIT routine installed. The key routine that was patched for the Geneve worked fine, except on a TI it slowed down the key scan and caused it to miss the correct status.

The fix for CALL INIT was simply one byte to change, the fix for the key scan took quite some time. Now the Geneve has to load an alternate set of ROMs in order to have a break key. As the Geneve has a different operating system than the TI and it has no speed problems.

Don O'Neil has designed a cartridge for RXB, but we're at a hardware impasse. We may try to install XHI and TML into the RXB cartridge, and I'll install a simple CALL XHI or CALL TML to load them instantly from the cartridge.

I have permission from Alexander Hupke and Wilhelm to do this. Hupke and have talked on the GEnie several times about this. Harry is now working on a new loading routine for TML.

I have also written CALL AMSINIT and CALL AMSPAGE(#) in GPL from RXB so the AMS card can be initialized or paged in at the lower 8K giving unlimited assembly support for RXB.

Lastly, as the cartridge has so much memory, I want to include a routine that looks for a 9938 or 9958 then moves string space to the extra memory. It would not be compatible with XHI though, but it would be compatible with TML.

Rich Gilbertson
Vancouver, Washington

Send your letters and comments to *MICROpendium Feedback*, P.O. Box 1343, Round Rock, TX 78680.

Bugs and Bytes

Going to extremes makes news

TI99/4A user Stuart Loomis recently made headlines in the *Edmonton Journal*.

Loomis, of St. Albert, Alberta, Canada, expressed his philosophy that "old does not necessarily mean useless" to an Edmonton FreeNet board member.

The board member, Paul De Groot, who is computer columnist for the *Journal*, turned the conversation into a feature called "Extreme Computing." Loomis was photographed and his system profiled as an example of computing at the "extremely low" end of technology.

De Groot writes, "Remember that the computers available 10 years ago could write a book, manage a business, communicate via e-mail or access data on a network. And many of those computers are still working today."

He notes that some of the 4A's capabilities, such as converting text to audible speech are only now being challenged by newer computers.

Backing up his drive

Richard Twyning, general secretary of the TI99/4A User Group, U.K., recently acquired a personal number plate (vanity license plate, in the U.S.) for his newly purchased auto. It reads "N99TEX."

Lessons learned about the HFDC disk controller

A failed experiment or an educational experience?

By DAN H. EICHER
and JEFFREY H. WHITE

About three years ago Beery Miller was working full bore on trying to implement the level 2 routines for the Myarc Hard and Floppy Disk Controller (HFDC) in MDOS. He was having some problems so he called Standard Microsystems, the company that makes the disk controller chip in the Myarc HFDC. At that time the support engineer he was talking to told him that the 9234 was a buggy chip — somewhat experimental. He recommended a complete redesign of the controller board to use a then newer chip that would support the then current RLL hard drives.

This not being possible, he recommended the possible retrofitting of the Standard Microsystems 9224 disk controller chip which appeared to be pin for pin and register level-compatible with the currently in-use 9234. Beery said the only difference mentioned to him by the support engineer was that the 9224 and the 9234 computed their ECC value differently. Meaning that a hard drive used on one chip could not be used on the other without reformatting.

Beery got a couple of the 9224 chips to test. He tried one of the chips in his HFDC. At that time he didn't have a spare hard drive and no easy way to back up his system. After placing a 9224 in his HFDC he found that he could no longer read his hard drive. His experimentation with the 9224 stopped there.

About two years later, Jeff and I got a couple of 9224's from Standard Microsystems. It says in their component catalog (1988 version) that these chips were designed to be used in Vaxes and Microvaxes, sometimes called Vaxen.

Another year or so went by until we got a spare HFDC and hard drives to try some experimentation. Neither of us was willing to risk doing experiments on our only HFDC, they being very temperamental and all. Jerry Coffey was kind enough to loan us an HFDC for some testing.

Now, with all that preamble, we finally got around to doing the experiments.

> How could reversing the cable make a difference on a cable with straight-through connections? Our theory is that one of the strands in the ribbon cable had a crack in it, causing high impedance, but only when it was twisted a certain way.

I set the HFDC at CRU >1000 thinking that would be a good CRU setting, allowing us to use DSK1 emulation even if, later on, we decided to add a floppy-only controller.

We hooked everything up and the floppy drives were chattering and doing all sorts of weird things.

This, the first of a long series of problems, was caused by a CRU conflict between the HFDC and the Myarc 512K card we were using. The Myarc 512K card responds at CRU >1000 and >1900.

LESSON: Make sure your HFDC is not set at a CRU-base that conflicts with another expansion card in your system.

To solve this problem, I needed to change the HFDC's CRU address to >1100 so that there would be no conflict with the Myarc 512K card. To verify that the card was set to the correct CRU, I used the Minimem module.

Here is the procedure I used to verify that the HFDC was showing up at the CRU >1100 space. I selected Minimem, then I selected Easy Bug. I typed C1100 <space> then 1, hit <return>, then the period key. This activated the card. Now its DSR memory should show up starting at >4000. So I typed M4000 and hit <return>. Easy Bug then responded back with the hex values held at the address starting at >4000. These values should be:

>4000 AA
>4001 0B

The >AA means that this is a valid DSR. The >0B is the revision of the DSR. The current revision is 11. A version 12 DSR was distributed, but it was found to be more buggy then version 11!

With the HFDC's CRU set up correctly, it was time to hook the hard drives back up and see what would happen. Still the same problem — floppy drive chatter. Argh!

Okay, the next step was to make another quick visual inspection of the card. Almost immediately I noticed a problem. The part of the card that sticks out past the end of the P-box did not have any electrical tape. Myarc made an engineering blunder. They had run control lines from the AM26LS32x chip to the hard drives on a portion of the card that is scraped by the metal clips of the P-box.

LESSON: Make sure the neck of the HFDC is protected with tape.

This was easy to fix with a little electrical tape around the neck, and we were ready to go again. We tried again. Same result. Jeff noticed that the card had an AM26LS32PC. He had had some problems with this chip in the past. This version of the chip is a marginal component. The recommended replacement is a AM26LS32AC. We didn't have one of those so we tried something else. Note: The AM in the part number signifies an AMD part number.

LESSON: If your system is acting quirky — replace the AM26LS32PC with an AM26LS32AC.

We disconnected the hard drives from the HFDC. The system powered-up but wouldn't access floppy drives. Oops! I had forgotten about the 45-second delay, while the HFDC repeatedly waits for a hard drive to activate its ready line.

After waiting for the controller to time

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LESSONS —

(Continued from Page 7)

out, I could access the floppy drives fine.

To defeat this power-up timer you must take pin 1 of the innermost LS251 (U21) to ground, pin 8 works well for this, and you may want to put this on a toggle switch. This information is courtesy of Tim A. Tesch.

LESSON: Either jumper your card to bypass the hard drive power-up wait timer or wait 45 seconds.

All we had to do now was to hook up the hard drives and test things out. There was more floppy drive chattering and then no access to the floppy or the hard drives.

At this point, I was nagging Jeff to come up with more ideas. He decided to offer his HFDC for sacrifice. No, he did not torch it — it does a good enough job toasting itself while in the P-box. Jeff swapped his with the HFDC from our test system — the HFDC Jerry had sent us. The alternative was to take the hard drives from his Geneve and try them with Jerry's HFDC. That was too risky. The data on the hard drives is worth more than the controller.

Same symptoms. Had Jeff's HFDC been fried? Jeff then decided to bring his hard drive to the test system with his HFDC. With Jeff's HFDC and hard drive, the system worked fine. Jeff then tried his hard drive with the HFDC Jerry had sent. This combination worked as well.

Using Jeff's known working set of cables, we were able to format one of the hard drives we had for testing.

We decided to try something new. We swapped our test cables one at a time with Jeff's known working cables until we determined the original problem was with the control cable — the cable with 34 pins. (The other cable is called the data cable.) I checked out this cable with a voltmeter and everything appeared fine.

Theorizing that it might be a problem with the length — it was about 6 feet long — I cut the cable in half and applied another connector (Radio Shack part No. 276-1564). We tried it with this now shortened cable with a new connector, and we still had the same problems!

We then sat down and checked each pin on the cable for continuity — the size had been reduced to half the previous length and the pins rechecked. But *still* no difference. Then, Jeff got a bright idea. He reversed the cable, not just rotating the cable 180 degrees on one end or the other, but a 180 degree turn on both ends! What we were using as pin 1, now become pin 34 and what was pin 34 became pin 1. This time the system fired up without any drive chattering.

How could reversing the cable make a difference on a cable with straight-through connections? Well, on the connector, all odd-numbered pins are used for ground and all even-numbered pins are used for controller signals. Our theory is that one of the strands in the ribbon cable had a crack in it, causing high impedance, but only when it was twisted a certain way. This strand, when connected the original way, was on an EVEN-numbered pin (i.e., a control signal); when the cable was reversed it placed the bad strand on a ground line. Having one bad ground out of 17 common grounds didn't cause a problem.

LESSON: Always suspect cables. Always have a spare set of known good working cables on hand.

With the system working, we formatted both hard and floppy drives without problem. We pulled the HFDC and put in the 9224. The first thing we noticed was terrible drive chattering. We thought this might be because of the slower step rates of the 9224 as compared to those of the 9234. We tried various DIP switch settings on the HFDC, but were not able to get the floppies working. We changed the HFDC's CRU setting to >1200, inserted a CorComp disk controller and went on.

The next test was to try to access a hard drive previously formatted with the 9234. Neither hard drive could be read. We (and Beery) expected this to happen since the two controller chips compute their ECC codes differently. We had also hoped that Beery's theory was correct, that if you reformatted a hard drive with the 9224 it would be usable. Well, despite many attempts, including upgrading the static memory on the HFDC from its factory default of 8K (6264) to the full 32K (62256), we were never able to format a hard drive with the 9224 controller chip.

LESSON: Always have the full 32K of memory on your HFDC.

After exhausting all possible hardware options, it would appear that without modification to the existing Device Service Routine software, the 9224 hard and floppy disk controller chip is not usable on the HFDC.

Other things that you can do to help make this temperamental piece of equipment more robust is to make sure the 26LS32 is an AM26LS32AC. You should also verify that the 9216 chip is a 9216B — this chip is the data separator. The 9216B is specified for faster data throughput. The 9216 is overclocked at 8 MHz, but it may work fine for double-density disks. In order to use high-density floppies or tape backup devices, you must use the 9216B. I have a handful available for $5 each (includes shipping). You should also add heat sinks to the two 7805 voltage regulators. A good cleaning with an eraser tip should also be done, if you notice any dirt on either the P-box edge connector or hard drive control cable connector — the silver-looking connector. This silver connector is coated with a tin-lead compound and does not provide a real good connection, as gold-plating would.

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THE ART OF ASSEMBLY — PART 55

We need those digits

By BRUCE HARRISON

This month's column is for those who've refused to buy a Pentium processor PC because the TI does floating point math more accurately. We're not sure that's true, but the TI does have an uncanny way of getting correct answers to complicated math problems. Last month we provided two very quick ways to make random numbers through assembly language, but both of those made only integer numbers in the range -32768 through 32767. We realize there are those among our readers who might like to cover a wider span than that, and might even want to have all those many digits available. This month we're filling that need, with two routines that can make the full range of random numbers to as much precision (14 significant digits) as the TI allows. Both of these are routines designed for use with Extended BASIC, to provide excellent random numbers in less time than the RND function.

The first routine, called RANDAR, is designed to fill any or all members of an array variable with floating point random numbers in a user-selected range.

FILLING AN ARRAY

Let's start with a simple case in which we want to fill an array with 300 random numbers between 50,000 and 100,000. The typical way to do that in XB is as follows:

```
10 RANDOMIZE :: DIM A(299)
20 FOR I=0 TO 299 :: A(I)=RND*50000+50000 :: NEXT I
```

That will work nicely, and will include all the digits possible, down to several decimal places. Unfortunately, running this loop will take about 25 seconds. That kind of job is what RANDAR is for. Using that routine, we'd accomplish the same thing by:

```
10 RANDOMIZE :: DIM A(299)
20 CALL LINK("RANDAR",A(),300,50000,50000)
```

That will do the same job, filling all members of the array A() with random numbers in the range 50,000 to 100,000, but it will take only about three seconds to do it! As with the RND case, the full range of digits will be preserved in the numbers. So far as we can tell from hours of testing, the randomness of the numbers will be every bit as good as those provided by RND.

WHAT ELSE CAN IT DO?

Like the integer routines we provided last month, this can take additional parameters. If OPTION BASE 1 is in effect, you must add one more parameter, and that must be at least 1. You can make that parameter more than one for partial fills. Let's say you want only 50 such numbers in A(), starting at A(100). The CALL LINK would be:

```
CALL LINK("RANDAR",A(),50,50000,50000,100)
```

That will fill A(100) through A(149) with random numbers, leaving all other members of the array alone. This is similar to the partial fill feature we included in last month's column.

It may be that you really don't want those extra digits past the decimal point. Yes, we've covered that for you too. In normal XB, you'd do it by A(I)=INT(RND*50000)+50000. In the RANDAR link, it would be:

```
CALL LINK("RANDAR",A(),300,50000,50000,0,1)
```

Here we've made the fifth parameter 0, so that filling of the array will start with A(0), but added a sixth parameter. The value of that parameter is irrelevant, as the routine just looks to see whether a sixth parameter is present, and does not access the value. Given that sixth parameter, the routine will truncate the numbers to their integer part only. This truncation will work a bit differently from the INT function when negative numbers are being used. In the normal INT function, the result of INT(-1.5) will be -2. With this routine's truncation, the result would be -1. For positive numbers, there will be no difference from an INT function.

HOW DOES IT WORK?

Okay, now it's time to look at this month's sidebar. The routine starts in the usual fashion, loading our workspace. Like last month's routines, it makes an adjustment to the random number seed, then clears R0 for the nonarray parameters. Next it gets the number of arguments into R12, and right-justifies that. If that number is zero, we exit without doing anything. Given that there's at least one argument, the routine proceeds to check for and get other arguments into its own space. Those include the number of numbers to assign, which goes into R13, and the multiplier and addition numbers that go into 8-byte blocks in the data section.

The real action starts at RAND2. Here we set up for the first parameter, put 7 into R7 as a counter, set R6 to 100 for division, then point R10 at FAC+1. The code down to JNE BRAN1 now makes seven random numbers ranging from 0 through 99, and places those into the seven bytes starting at FAC+1. Thus we have a Radix 100 number equivalent to 14 digits of random values. We set the exponent at 100 raised to the -1 power by placing the number 63 in the byte at FAC. Now the number represented in the eight bytes starting at >834A is in the range 0 through 0.99999999999999.

Next, we check to see if there's a third parameter, which is the multiplier. If there is, we move that number's eight bytes into ARG and multiply using an XMLLNK service. In similar fashion, we check for the presence of the fourth parameter, move that to ARG if it's there, and use XML to add it to the multiplied number at FAC. This gets us to label BRAN2.

(See Page 10)

THE ART OF ASSEMBLY —

(Continued from Page 9)

At BRAN2, we check for the presence of the sixth parameter, and if it's there we truncate the number in FAC to just its integer part. That gets us to BRAN3, where we assign the resulting number in FAC to the current member of the array variable, then INC R0 to point to the next member of the array, and DEC R13. If R13 becomes zero, we're finished. Otherwise, we jump back to RAND2 to set and send the next member of the array.

By doing the whole job in just one CALL LINK, we save lots of time. Compared to doing this kind of random number filling with an Extended BASIC FOR-NEXT loop using RND, we get about an 8.3:1 speed advantage.

The other routine, RANDFP, is for assignment of just a single number into an XB variable. Strictly speaking, this isn't really needed, as RANDAR can do the same job by simply setting the number of numbers to be assigned at 1, and using a simple variable or particular memberan array as parers.

The only real advantages to RANDFP are that it needs one fewer parameters and the assembly code takes up less memory. Like RANDAR, this performs faster than RND, but it's hard to pin down the exact amount of difference, because using a FOR-NEXT to repeat the operation many times "covers" the action of the routine itself. Generally, if lots of random numbers are needed in the XB program, it would be easier and quicker to make them members of an array, and fill them using RANDAR.

We've put in some minor protection against stupid entries in the CALL LINK. If you supply no parameters to RANDAR, or only one, then it will exit without doing anything. If you set the number of numbers required at a negative number, the routine will just take the absolute value for you and make that many numbers.

Both routines are listed in the sidebar, so our serious students can study them, make changes, and so on. Also in the sidebar are two short Extended BASIC programs which you can use to show the dramatic difference between using RND and RANDAR. Of course you'd need to assemble RANDAR to test this. We've provided the object files for those who get MICROpendium on disk, and the XB programs as FASTAR and SLOWAR.

The routines we've shown in both last month's column and this one are available on a public domain disk called RANDOMS. That can be obtained from the Lima Users' Group in the usual fashion. It includes complete instructions and the tools necessary to "embed" the routines into XB programs.

Next month perhaps we'll be off of random numbers, and perhaps not. Toss a coin for yourself to form your opinion.

* SIDEBAR 55

```
* SIDEBAR 55
* TWO ROUTINES FOR USE UNDER
* TI EXTENDED BASIC
*
* PART ONE - FOR XB ARRAY VARIABLES
*
* RANDAR/S
* ASSIGNS RANDOM NUMBER
* IN F.P FORMAT
* INTO AN XB VARIABLE
*
*  INVOKE BY:
*  CALL LINK("RANDAR",V(),N,M,A,B,1)
*  WHERE:
*    V() IS ANY ARRAY VARIABLE NAME
*      MUST HAVE DIM (N-1) MINUMUM
*    N IS NUMBER OF RANDOM NUMBERS
*    M IS THE DESIRED MULTIPLER (RANGE)
*    A IS THE DESIRED ADDITION (START #)
*    B IS THE OPTION BASE FOR ARRAY
*    1 (OR ANY NUMBER) MEANS INTEGERS
* ONLY V() AND N ARE ALWAYS REQUIRED
* OTHER PARAMETERS ARE OPTIONAL
* (SEE TEXT FOR DETAILS)
*
*    CODE BY:  Bruce Harrison
*    PUBLIC DOMAIN
*    27 December 1994
*
       DEF  RANDAR DEFINE ENTRY POINT
*
* REQUIRED EQUATES
*
GPLWS  EQU  >83E0       GPL WORKSPACE
FAC    EQU  >834A       F. P. ACCUMULATOR
FMUL   EQU  >0E88       F. P. MULTIPLY
FADD   EQU  >0D80       F. P. ADDITION
ARG    EQU  >835C       F. P. ARGUMENT
NUMREF EQU  >200C       NUMERIC REFERENCE
NUMASG EQU  >2008       NUMERIC ASSIGNMENT
XMLLNK EQU  >2018       XML LINK VECTOR
CIF    EQU  >20         CONVERT INTEGER TO F.P.
CFI    EQU  >12B8       CONVERT F.P. TO INTEGER
ARGNUM EQU  >8312       NUMBER OF ARGUMENTS
*
*
RANDAR LWPI WS          LOAD OUR WORKSPACE
       A    @>8378,@>83C0 ADJUST SEED NUMBER
       CLR  R0          CLEAR FOR NON-ARRAY
       MOVB @ARGNUM,R12  GET NUMBER OF PARAMETERS
       SRL  R12,8       RT. JUSTIFY
       JEQ  EXIT        IF ZERO, EXIT
       CI   R12,2       2 PARAMETERS?
       JLT  EXIT        IF LESS, EXIT
       LI   R1,2        2ND PARAMETER
       BLWP @NUMREF     GET VALUE
       BLWP @XMLLNK     NUMBER OF NUMBERS
       DATA CFI         MAKE INTEGER
       MOV  @FAC,R13    INTO R13
       JEQ  EXIT        IF ZERO, EXIT
       ABS  R13         ABSOLUTE VALUE
       CI   R12,3       3 PARAMETERS?
       JLT  RAND2       IF LESS, JUMP
       INC  R1          3RD PARAMETER
       BLWP @NUMREF     GE*jU1Q%A1%I5      LI   R10,HILIM
POINT AT HILIM
       BL   @FRFAC      MOVE 8 BYTES
       CI   R12,4       4 PARAMETERS?
       JLT  RAND2       IF LESS, JUMP
       INC  R1          4TH PARMETER
      BLWP @NUMREF      GET ADDITION NUMBER
       LI   R10,LOLIM   POINT AT LOLIM
       BL   @FRFAC      MOVE 8 BYTES THERE
       CI   R12,5       5 PARAMETERS?
       JLT  RAND2       IF LESS, SKIP
```

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(Continued from Page 10)

```
      INC  R1          5TH PARAMETER
      BLWP @NUMREF     GET BASE
      BLWP @XMLLNK     USE XML
      DATA CFI         TO INTEGER
      A    @FAC,R0     ADD TO R0
RAND2 LI   R1,1        PARAMETER 1
      LI   R7,7        7 BYTES IN F.P. MANTISSA
      LI   R6,100      100 FOR DIVISION
      LI   R10,FAC+1   ONE BYTE PAST >834A
BRAN1 LI   R4,28645    BIG NUMBER IN R4
      MPY  @>83C0,R4   MULT. BY SEED
      AI   R5,31417    ADD BIG NUMBER
      MOV  R5,@>83C0   PUT BACK AT SEED
      CLR  R4          CLEAR HIGH WORD
      DIV  R6,R4       DIVIDE BY 100
      SWPB R5          REMAINDER IN LEFT BYTE
      MOVB R5,*R10+    ONE BYTE TO FAC
      DEC  R7          SUBTRACT 1 FROM R7
      JNE  BRAN1       IF NOT ZERO, REPEAT
      MOVB @SIXTRE,@FAC PUT 63 IN EXPONENT BYTE
      CI   R12,3       3 PARAMETERS?
      JLT  BRAN2       JUMP IF LESS
      LI   R9,HILIM    POINT AT HILIM
      BL   @TOARG      MOVE 8 BYTES TO ARG
      BLWP @XMLLNK     USE XML
      DATA FMUL        MULTIPLY FAC BY ARG
      CI   R12,4       4 PARAMETERS?
      JLT  BRAN2       JUMP IF LESS
      LI   R9,LOLIM    POINT AT LOLIM
      BL   @TOARG      MOVE 8 BYTES TO ARG
      BLWP @XMLLNK     USE XML
      DATA FADD        ADD ARG TO FAC
BRAN2 CI   R12,6       SIX PARAMETERS?
      JLT  BRAN3       JUMP IF LESS
      CLR  R4          MAKE R4=0
      MOV  @FAC,R7     GET THE EXPONENT AND HIGH-ORDER BYTE OF
NUMBER INTO R7?
x     JEQ  BRAN3       IF FAC=0 THEN NUMBER WAS ZERO, SKIP ALL
THIS
      SRA  R7,8        SHIFT ARITHMETIC TO PRESERVE SIGN OF EX-
PONENT
      JGT  SUB62       IF POSITIVE, SKIP AHEAD
      INV  R7          INVERSIN GIVES THE CORRECT EXPONENT VAL-
UE
SUB62 AI   R7,-62      REMOVE BIAS LESS 2
      CI   R7,1        CHECK RESULT AGAINST 1
      JGT  ADDFAC      IF GREATER, JUMP
      CLR  R7          ELSE SET R7=0
ADDFAC AI  R7,FAC      ADD FAC ADDRESS TO R7, SO R7 POINTS TO
FIRST DECIMAL
INLOOP CI  R7,FAC+8    CHECK FOR END OF 8 BYTE FP NUMBER
      JGT  BRAN3       IF GREATER THAN, JUMP OUT
      JEQ  BRAN3       IF EQUAL, JUMP OUT
      MOVB R4,*R7+     MOVE ZERO BYTE INTO LOCATION, INCREMENT
POINTER (R7)
      JMP  INLOOP      GO BACK FOR NEXT BYTE
BRAN3 BLWP @NUMASGMM%9TO XB VARIABLE
      INC  R0          NEXT ARRAY MEMBER
      DEC  R13         SUBTR. 1 FROM R13
      JNE  RAND2       IF NOT ZERO, REPEAT
EXIT  LWPI GPLWS       LOAD GPL WS
      B    @>6A        EXIT TO GPL INT.
*
* SUBROUTINES
*
TOARG LI   R10,ARG     ARG IS DESTINATION
      JMP MOVBTS       MOVE BYTES
FRFAC LI   R9,FAC      FAC IS SOURCE
MOVBTS LI  R4,8        8 BYTES TO MOVE
MOV1  MOVB *R9+,*R10+  MOVE ONE BYTE
      DEC  R4          SUBTR. 1 FROM R4
      JNE  MOV1        IF NOT ZERO, REPEAT
      RT               RETURN
*
* DATA SECTION
*
WS    BSS  32          OUR OWN WORKSPACE
HILIM BSS  8           MULTIPLIER
LOLIM BSS  8           ADD-ON NUMBER
SIXTRE BYTE 63         EXPONENT (100 TO THE -1 POWER)
      END
```

PART TWO

```
* PART TWO - FOR SIMPLE VARIABLES
*

* RANDFP/S
* ASSIGNS RANDOM NUMBER
* IN F.P FORMAT
* INTO AN XB VARIABLE
*
*
*  INVOKE BY:
*  CALL LINK("RANDFP",X,M,A,1)
*  WHERE:
*    X IS ANY VARIABLE NAME
*    M IS THE DESIRED MULTIPLER (RANGE)
*    A IS THE DESIRED ADDITION (START #)
*    1 (OR ANY NUMBER) MEANS INTEGERS
* ONLY X IS ALWAYS REQUIRED
* OTHER PARAMETERS ARE OPTIONAL
* (SEE TEXT FOR DETAILS)
*
*    CODE BY:  Bruce Harrison
*    PUBLIC DOMAIN
*    26 December 1994
*
      DEF  RANDFP DEFINE ENTRY POINT
*
* REQUIRED EQUATES
*
GPLWS  EQU  >83E0      GPL WORKSPACE
FAC    EQU  >834A      F. P. ACCUMULATOR
FMUL   EQU  >0E88      F. P. MULTIPLY
FADD   EQU  >0D80      F. P. ADDITION
ARG    EQU  >835C      F. P. ARGUMENT
NUMREF EQU  >200C      NUMERIC REFERENCE
NUMASG EQ   >2008      NUMERIC ASSIGNMENT
XMLLNK EQU  >2018      XML LINK VECTOR
CIF    EQU  >20        CONVERT INTEGER TO F.P.
CFI    EQU  >12B8      CONVERT F.P. TO INTEGER
ARGNUM EQU  >8312      NUMBER OF ARGUMENTS
*
*
RANDFP LWPI WS         LOAD OUR WORKSPACE
      A    @>8378,@>83C0 ADJUST SEED NUMBER
      CLR  R0          CLEAR FOR NON-ARRAY
      MOVB @ARGNUM,R12  NUMBER OF PARAMETERS
      SRL  R12,8       RT. JUST.
```

(See Page 12)

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(Continued from Page 11)

```
       JEQ  EXIT        EXIT IF ZERO
       CI   R12,2       2 PARAMS?
       JLT  RAND2       JUMP LESS
       LI   R1,2        2ND PARAMETER
       BLWP @NUMREF     GET MULTIPLIER
       LI   R10,ARG     POINT AT ARG
       BL   @FRFAC      MOVE 8 BYTES
       CI   R12,3       3 PARAMS?
       JLT  RAND2       JUMP LESS
       INC  R1          3RD PARMETER
       BLWP @NUMREF     GET ADDITION
       LI   R10,LOLIM   POINT AT LOLIM
       BL   @FRFAC      MOVE IT THERE
RAND2  LI   R1,1        PARAMETER 1
       LI   R7,7        7 BYTES
       LI   R6,100      00 DIVISOR
       LI   R10,FAC+1   POINT AT >834B
BRAN1  LI   R4,28645    BIG NUMBER IN R4
       MPY  @>8C0,R4    MULT. BY SEED
       AI   R5,31417    ADD BIG NUMBER
       MOV  R5,@>83C0   PUT BACK AT SEED
       CLR  R4          CLEAR HIGH WORD
       DIV  R6,R4       DIVIDE BY 100
       SWPB R5          REMAINDER IN LEFT BYTE
       MOVB R5,*R10+    ONE BYTE TO FAC
       DEC  R7          SUBTR. 1
       JNE  BRAN1       NOT ZERO, RPT.
       MOVB @SIXTRE,@FAC MOVE EXPONNENT IN
       CI   R12,2       TWO PARAMS?|      JLT  BRAN2      JU
bMM5     BLWP
@XMLLNK     USE XML)x      DATA FMUL       MULTIPLY FAC BY
ARG
       CI   R12,3       3 PARAMS?
       JLT  BRAN2       JUMP LESS
       LI   R9,LOLIM    LOLIM IS SOURCE
       BL   @TOARG      MOVE TO ARG
       BLWP @XMLLNK     USE XML
       DATA FADD        ADD ARG TO FAC
BRAN2  CI    b"2=UIPARAMS?
  R1Q BRAN3      LESS, JUMP
       CLR  R4          MAKE R4=0
       MOV  @FAC,R7     GET THE EXPONENT AND HIGH-ORDER BYTE OF
NUMBER INTO R7
       JEQ  BRAN3       IF FAC=0 THEN NUMBER WAS 4ERO, SKIP ALL
THIS
       SRA  R7,8        SHIFT ARITHMETIC TO PRESERVE SIGN OF EX-
PONENT
       JGT  SUB^2       IF POSITIVE, SKIP AHEAD
       INV  R7          INVERSION GIVES THE CORRECT EXPONENT
VALUE
SUB62  AI   R7,-62      REMOVE BIAS LESS 2
       CI   R7,1        CHECK RESULT AGAINST 1
       JGT  ADDFAC      IF GREATER, JUMP
       CLR  R7          ELSE SET R7=0
ADDFAC AI   R7,FAC      ADD FAC ADDRESS TO R7, SO R7 POINTS TO
FIRST DECIMAL
INLOOP CI   R7,FAC+8    CHECK FOR END OF 8 BYTE FP NUMBER
       JGT  BRAN3       IF GREATER THAN, JUMP OUT
       JEQ  BRAN3       IF EQUAL, JUMP OUT
       MOVB R4,*R7+     MOVE ZE&O BYTE INTO LOCATION, INCREMENT
POINTER (R7)
       JMP  INLOOP      GO BACK FOR NEXT BYTE
BRAN3  BLWP @NUMASG     ASSIGN TO XB VARIABLE
EXIT   LWPI GPLWS       LOAD GPL WS
       B    @>6A        EXIT TO GPL INT.
*
* SUBROUTINES
*
TOARG  LI   R10,ARG     ARG DESTINATION
       JMP MOVBTS       MOVE BYTES
FRFAC  LI   R9,FAC      FAC IS SOURCE
MOVBTS LI   R4,8        8 BYTES TO MOVE
MOV1   MOVB *R9+,*R10+  MOVE ONE
       DEC  R4          SUBTR. 1
       JNE  MOV1        IF NOT ZERO, RPT
       RT               RETURN
*
* DATA SECTION
*
WS     BSS  32          OUR OWN WORKSPACE
LOLIM  BSS  8           BOTTOM NUMBER
SIXTRE BYTE 63          EXPONENT (100 TO -1 POWER)
       END
```

PART THREE

Part three — two Extended BASIC programs (listed in 28 columns). The first uses RANDAR to assign 300 random numbers to A().

```
10 CALL INIT :: CALL LOAD("D
SK1.RANDAR/O")
20 RANDOMIZE :: DIM A(299)
30 B=299 :: DISPLAY AT(24,1)
:"STARTING TAILORED";B+1
40 CALL LINK("RANDAR",A(),B+
1,50000,50000)
50 FOR I=0 TO B :: PRINT A(I
),:: NEXT I
60 CALL KEY(0,K,S):: IF S=0
THEN 60 ELSE IF K=13 THEN EN
D ELSE 30
```

The second program uses RND to assign 300 random numbers to A().

```
10 ! RANDOM USING RND
20 RANDOMIZE :: DIM A(299)
30 B=299 :: DISPLAY AT(24,1)
:"STARTING TAILORED";B+1 ::
FOR I=0 TO B
40 A(I)=RND*50000+50000 :: N
EXT I
50 FOR I=0 TO B :: PRINT A(I
),:: NEXT I
60 CALL KEY(0,K,S):: IF S=0
THEN 60 ELSE IF K=13 THEN EN
D ELSE 30
```

Dutch users set meeting

The Dutch TI Users Group's annual meeting is scheduled for March 23 at Buusthuis Kremerstraat 241 Utrecht, The Netherlands. For information, contact Berry Harmsen, chairman, 1E Oosterparkstraat 141E, 1091 GZ Amsterdam, The Netherlands, (phone) (31) 20-6941047.

TI-Emulator 6.0

A vehicle for exporting graphics between the TI and a PC

By ALF RUGGERI

This article first appeared in the TIsHUG News Digest of Sydney, NSW, Australia.—Ed.

I first became aware of the TI-Emulator's existence about a year ago, but at the time, with the hustle and bustle of two of my children returning home from overseas business trips, and preparations for a European holiday for my wife and me, there was little opportunity to even acquire the program.

Motivation to try out the emulator eventually materialized by somewhat of a paradox — my decision to sell my TI system.

THE MOTIVATION

Those members who attended the September TIsHUG meeting may recall that I advertised the sale of my TI equipment for reasons given on the day. The portent of this article will, of course, delay that event by a few months.

On the day following the meeting I attempted to catalog my TI disks to determine which personal text files, prepared by myself, could be discarded or should be transported across to PC format. Text transportation presented no problem through the use of Mike Dodd's PC Transfer program, but I certainly agonized over the inability to transport my collection of high resolution Asgard and TI-Artist graphics to the PC.

In an earlier article, I had quite firmly established that PC-Transfer was incapable of importing graphics from a PC. But now, faced with the reverse situation, a vague screen prompt seemed to hold some promise. Ben Takach very kindly faxed to me a copy of the original PC-Transfer documentation — whatever references I had used for my earlier article had vanished into my very organized domestic filing system, probably never to see the light of day again. Ben's documentation revealed that the vague screen prompt was a promise of a future spreadsheet transport feature, but definitely not for graphics.

The most obvious solution would be to scan prints of my graphics as PC images. For this procedure to be effective, it would be dependent on a three-component task:

Text transportation presented no problem through the use of Mike Dodd's PC Transfer program, but I certainly agonized over the inability to transport my collection of high resolution Asgard and TI-Artist graphics to the PC.

A. Preparation of nearly perfect prints of the graphics.

B. Determination of an accurate photocopy reduction ratio, to match the TI's maximum 60 DPI output with the minimum 75 DPI rate of the scanner available to me.

C. Maintenance of accurate scanner performance. No matter how feature-packed a scanner, it will inevitably and unpredictably either increase or decrease the number of picture elements it is meant to recognize.

This solution relied more on luck than user skill.

A less harrowing approach would be to have a PC display the TI graphic, in some way or another, and then save the picture via a screen capture utility. With the second solution in mind, it was time to sound out the possibilities with those in the know.

Among several of the TIsHUG members I contacted was Rolf Schreiber. As with GIF-Mania and the TIPS package, Rolf's reliable acquaintance with the more exotic programs for the TI produced a solution that definitely seemed to have merit. He was able to point me in the right direction with the TI-Emulator.

After I installed the program, I was able to determine through the documentation that it was version 6, released as recently as July 1995.

The program, as previous users will know, was produced by Edward Swartz. It was commenced as a personal project while Swartz was still at school in 1992. The result is astounding.

According to Swartz, version 6, although much improved, is quite different from earlier versions as he has had to exclude various ROM and GROM files upon which Texas Instruments still claim copyright. Therefore, with this version there is the implication that a great deal more TI to PC file transfer will be required before the emulator can work properly. I have not had the opportunity to compare this version with earlier ones.

MINIMUM TI HARDWARE REQUIREMENT

To process the TI to PC file transfer, it is necessary that the user have:

1. A working TI99/4A with 32K of expansion memory and an RS232 card.

2. Extended BASIC and Editor/Assembler cartridges.

3. A serial communication cable to interconnect the TI and a PC. A description of the serial cable's configuration will be given further on in this text.

If you do not have a working TI system, Swartz has a software license from Texas Instruments to sell all the relevant console GROMS, ROMS, and TI cartridge ROMS as files in PC format.

INSTALLING THE TI-EMULATOR

The number of installation disks, that you will need depends on the capacity media the program comes on. I was given two 3.5-inch high density disks. One disk had the main program and the other had many demonstration files of TI business and games programs.

I will only describe the installation of the main program. The additional demon-

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stration files can be installed into the main program by individual users. The INSTALL.TXT file explains the method.

The main disk has three files:
600V9T9.BUG
600V9T9.TXT
600V9T9.ZIP

The first two files are general information, it is worthwhile to print them out before installing the program.

1. The 600V9T9.ZIP contains the actual program in an archived format. Copy this file to temporary directory named EMULATOR on the PC's hard disk. The name of this directory is not important.

2. Unzip this file with PKUNZIP.EXE or from XTREE GOLD. The destination path will be the above temporary directory.

3. Five files will be unzipped. They are:
600V9T9.TXT
INSTALL.EXE
V9T9.DFL
V9T9_6.PKG
VDEN_6.PXG

The 600V9T9.TXT file is the same as on the original disk and if already printed out can be ignored. The other four files constitute the installation package. Run INSTALL.EXE to commence installation from DOS or XTREE GOLD.

4. Follow the on-screen menu prompts. The default installation directory will be C:\V9T9\V6.0, I have found that installation to an alternate drive will not be accepted. Therefore, if you have less than a 2.1-megabyte space on the C: drive (this space is required for the minimum installation I propose to describe), I suggest that unnecessary files be moved out to floppies or an alternate drive and accept the default installation directory.

5. On the screen following the default directory prompt, answer the 'Choice' prompt with a "Y" keystroke to accept installation of the V9T9 demonstration files. Accept the demos subdirectory prompt with an Enter keystroke.

6. The installation process will now commence in earnest. From the V9T9 V6.0 configuration screen, choose the processor type and speed of the PC on which the emulator is being installed. This information adjusts the V9T9.CNF file (configuration).

The installation from disk is now complete. Successive Enter keystrokes will activate a doc file reader/printer. F2 will enable selection of the different topics. ALT + P enables printout. ALT + X will exit the reader/printer.

The temporary EMULATOR directory and the installation files therein can now be deleted as they are no longer required.

TI-EMULATOR's TREE / DIRECTORY STRUCTURE AFTER DISK INSTALLATION

```
C:\V9T9
└──V6.0
    ├── V9T9.EXE
    ├── V9T9_286.EXE
    ├── V9T9_SLO.EXE
    ├── DOCS.BAT
    ├── FORTH.BAT
    ├── RECV.BAT
    ├── LST2INF.BAT
    ├── MODULES.EXE
    ├── FORTH.INF
    ├── MODULES.INF
    ├── V9T9.CNF
    ├── FORTH.CNF
    ├── V9T9.TXT
    ├── VIDEO.TXT
    ├──DEMOS
    │   ├── README.1ST
    │   ├──386DX40
    │   │   ├── MUNCH.DEM
    │   │   ├── PARSEC.DEM
    │   │   ├── READFLIG.DEM
    │   │   ├── SPEECH1.DEM
    │   │   ├── TEII1.DEM
    │   │   └── README.TXT
    │   └──386SX20
    │       ├── BLUEDANU.DEM
    │       ├── INVADERS.DEM
    │       ├── LOGO6.DEM
    │       ├── MUSICM.DEM
    │       ├── STARTUP.DEM
    │       ├── MUSICM.TXT
    │       └── README.TXT
    ├──DISK
    │   ├── FORTHDSK
    │   └── TRANS
    ├──DOCS
    │   ├── 5CHANGES.TXT
    │   ├── BINARIES.TXT
    │   ├── BUGS.TXT
    │   ├── CONFIG.TXT
    │   ├── CONTACT.TXT
    │   ├── DEMOS.TXT
    │   ├── DEVLOG.TXT
    │   ├── DISKS.TXT
    │   ├── DISTRIB.TXT
    │   ├── FORMATS.TXT
    │   ├── FORTH.TXT
    │   ├── JOYSTICK.TXT
    │   ├── KEYBOARD.TXT
    │   ├── LEGAL.TXT
    │   ├── MODULES.TXT
    │   ├── ORDERGEN.TXT
    │   ├── ORDERING.TXT
    │   ├── ORDERMIN.TXT
    │   ├── PROBLEMS.TXT
    │   ├── RS232.TXT
    │   ├── SOUND.TXT
    │   ├── SPEECH.TXT
    │   ├── THANKS.TXT
    │   ├── TRANSFER.TXT
    │   └── UTILS.TXT
    ├──MODULES
    │   └── FORTHC.BIN
    ├──ROMS
    │   ├── FORTH.ROM
    │   ├── FORTH.GRM
    │   ├── EMU2DISK.BIN
    │   ├── EMUDISK.BIN
    │   ├── EMURS232.BIN
    │   └── EMUSPCH.BIN
    ├──UPGRADE
    │   └── LST2INF.EXE
    ├──UTILS
    │   ├── DECODE.EXE
    │   ├── DOCS.EXE
    │   ├── GRAM2TI.EXE
    │   ├── NOHEADER.EXE
    │   ├── RECV.EXE
    │   ├── SWAP.EXE
    │   ├── TI2TXT.EXE
    │   ├── TI2XMDM.EXE
    │   ├── TICHKDSK.EXE
    │   ├── TICOPY.EXE
    │   ├── TIDEL.EXE
    │   ├── TIDIR.EXE
    │   ├── TIFORMAT.EXE
    │   ├── TIMATCH.EXE
    │   ├── TIRENAME.EXE
    │   ├── TXT2TI.EXE
    │   ├── XMDM2TI.EXE
    │   └── CHOP.EXE
    ├──DISKS
    └──SPEECH
```

Fig. 1

THE TI-EMULATOR'S DOCUMENTATION

It is always a good practice for first time users of a program, but, in this case, it is absolutely essential. Be sure to have plenty of paper and a fresh ribbon or ink cartridge on hand as the total printout is 125 pages.

For a shareware program, 125 pages of docs is quite unusual. But when it is considered that the docs describe the life and times of the veteran TI99/4A transported to the world of the PC, it is understandable. Swartz was concise in the way each aspect of the emulator was documented with its own topic file. Some files e.g. TRANSFER.TXT bring together several related topics in a procedural approach. Notwithstanding this approach, it is not light or casual reading. To establish a firm mental model of the emulator's role, I found it necessary to read the entire manual in twice. The second time in a single sitting.

I have included a tree/directory printout of the emulator's directory and subdirectories that is generated by the above installation. (See Fig. 1) This has been done in order to reduce the amount of description that would otherwise be required. It will also simplify my task when referring to a file's location by its subdirectory name only, rather than rattling off the directory-subdirectory-subdirectory's subdirectory-etc-etc names ad nauseum.

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THE EMULATOR'S ROLE AT THIS POINT

At this point, the emulator's role is limited to Swartz's original production of a Forth program and "replaying" of demonstration segments of typical TI programs that he prerecorded.

These demonstration segments have an extension of .DEM and are located in the DEMOS subdirectories. As indicated earlier, there are more demonstration segments available on the second disk.

To "replay" or process these segments, it is necessary to include them in an execution statement, for example:

C:\V9T9\V6.0\V9T9/D C:\V9T9\V6.0\DEMOS\386DX40\PARSEC.DEM or

C:\V9T9\V6.0\V9T9/D C:\V9T9\V6.0\DEMOS\386DX40\MUNCH.DEM

The /D switch instructs V9T9.EXE to "replay" the demonstration files.

This feature was enough proof of feasibility for my graphics export requirement. The V9T9 executable was able to tolerate the presence and successful operation of a screen capture utility. Had it not been so, I would no doubt still be conferring with those in the know for another alternative.

The V9T9 executable was able to tolerate the presence and successful operation of a screen capture utility. Had it not been so, I would no doubt still be conferring with those in the know for another alternative.

COMPLETING INSTALLATION

As mentioned above, TI-Emulator V6 as installed from disk will not completely animate its intended role. It is necessary to transport the TI99/4A operating system files, plug in cartridge files, and programs that are required to the emulator on the PC.

The way in which this is done is by linking together the TI and a PC via a serial cable. A modem is not required.

SERIAL CABLE CONFIGURATION

The cable that I use links the TI RS232's D25 serial connector to my PC's com port 1's D9 connector. There are seven connections between the PC to the TI, and they are:

PC D9 pin 1 to TI D25 pin 8
PC D9 pin 2 to TI D25 pin 3
PC D9 pin 3 to TI D25 pin 2
PC D9 pin 4 to TI D25 pin 20
PC D9 pin 5 to TI D25 pin 7
PC D9 pin 6 to TI D25 pin 6
PC D9 pin 8 to TI D25 pin 5

The cable length that I have found suitable is just over a meter. It is not shielded.

Apart from TI connections pins 2,3,7 — i.e,. Data Receive, Data Send, Logic or Signal Ground, respectively — some of the other connections I have used may be superfluous, as I have read of other users employing only the above three. However, by using all seven I have never encountered any extraneous problems.

The above serial cable configuration must not be confused with the standard null modem cable. The null modem cable's purpose is to link two PCs or two TIs, and to do so the Data Receive and Data Send lines are reversed from one end of the cable to the other.

The TI's Data Receive and Data Send pins are already reversed in manufacture, in respect to PCs and, therefore, further reversal of these two signals via a null modem cable will not permit communication between the TI and the PC.

PREPARATION OF THE TI99/4A

To transport the TI's operating system and cartridge contents to the emulator on the PC, it is first necessary to locate an assembly routine named TRANS on the TI. This routine is located on the emulator's DISK subdirectory.

In order to transport TRANS to the TI, a simple Extended BASIC program named RECEIVER has to be entered on the TI. Here is the listing of RECEIVER:

```
80 REM Receiver for TRANS object code from PC
90 REM Legal baud rates: 300, 600, 1200, 2400,
100 INPUT "Enter the baud rate: ":B
110 OPEN #1 "RS232.BA="&STR$(B)&".DA=8.PA=N",UPDATE,VARIABLE 81,INTERNAL
120 OPEN #2:"DSK1.TRANS",OUTPUT,DISPLAY,FIXED 80
130 PRINT "Receiving..."
140 INPUT #1:A$
150 IF A$="" THEN 200
160 PRINT #2:A$
170 PRINT ".";
IB0 PRINT #1:"O"
190 GOTO 140
200 CLOSE #2
210 CLOSE #1
```

Save this program to a blank. disk and label the disk ROMS EXPORT.

1. Before the export of TRANS can be commenced it is necessary to edit the FORTH.CNF file in the V6.0 subdirectory. This is done by removing the hash (#) character from the line #RS232/1=1,4 in the [Hardware Options] section. Save the edited file.

2. Run the FORTH.BAT in the V6.0 subdirectory. Insert an Enter keystroke to select the Forth kernel in the V9T9 Module Selection screen. Forth will now load.

3. When the V9T9 Forth prompt is displayed, followed by a flashing cursor, type in the word TRANSFER. Reply with any keystroke to Forth's "Press a key to start" prompt.

4 Follow Forth's instructions to load and run RECEIVER (from the ROMS EXPORT disk) on the TI in Extended BASIC. Input a baud rate of 2400. Leave the disk in drive 1 to accept TRANS's arrival.

5 Press any key on the PC followed by an entry of 4 to select the 2400 baud rate.

Export of TRANS from the PC to the TI will now take place. The event is marked by the appearance of a lengthening horizontal line of dots on the PC and TI screens. The duration of this process is 2 minutes and 40 seconds. At the end of the export press CTRL + BRK on the PC to terminate the emulator. Check that TRANS has been accepted by the ROMS EXPORT disk.

EXPORT OF CONSOLE AND E/A ROMS TO THE PC

1. Remove the ROMS EXPORT disk

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from TI drive 1 and replace the Extended BASIC cartridge with the Editor/Assembler.

2. Reinsert the ROMS EXPORT disk into drive 1. Select Editor/Assembler's option 3, Load and Run, and type in DSK1.TRANS.

3. When TRANS loads it will ask for RS232 parameters. Type in RS232.BA=2400.DA=8.PA=N.

4. A transfer menu will now be displayed, there are eight options:

(0) Output device
(1) Console ROM (required)
(2) Console GROM (required)
(3) Speech ROM
(4) Current module
(5) Disk DSR
(6) RS232 DSR
(7) Disk image

Option 0 is used only to reset the RS232 parameters.

As indicated by the menu, only options 1 and 2 are required to activate the emulator. Option 4 is required unless you wish to use only TI BASIC on the emulator.

Options 3, 5, 6, and 7 are for more adventurous users. There is enough documentation supplied as to their significance and application. For my application, I used options 1, 2, and 4.

5. The ROMS EXPORT disk can now be removed from the TI. Run the RECV.BAT file from the V6.0 directory on the PC.

6. At the com port prompt, enter 1.

7. At the IRQ of com port 1, enter 4.

8. Type in 2400 for the baud rate and Enter. The PC is now ready to import ROM and GROM contents as files.

9. Select option 1 from the transfer menu. The PC on-screen message will indicate that it is preparing a location and file name for the intended import.

Should the export from the TI not proceed due to some error, press any key on the TI to redisplay the transfer menu and try the option selection again. Restart the emulator's RECV.BAT only if an error message such as "unknown code received" is displayed on the PC screen. The RECV.BAT is restarted by any PC keystroke. Failure by the TI to export its contents could be due to stray EMF radiation or baud rate. In any case, you will be rewarded if you persevere with the transfer menu.

When export from the TI occurs, indication of this event will be acknowledged by a lengthening horizontal bar across the bottom of the TI screen. The PC will display the event by the same lengthening line of dots that indicated the export of TRANS. At the conclusion of a successful TI export select the next option.

10. Proceed with option 2.

11. After option 2 has been successfully processed, select option 4 from the transfer menu, the current module. In this case it is Editor/Assembler.

12. A PC prompt will request the entry of a seven-character name to be used for the module base name. Type in EDIASSM and press Enter.

13. The PC will now prompt for the module name. Type in E/A and Enter.

14. After the cartridge contents are successfully transported to the PC, another PC prompt will ask for acceptance that E/A be written to the emulator's MODULES.INF file. Reply with a keystroke. Press ESC to exit the operation of RECV.BAT.

The imported console ROM and GROM contents will be lodged by RECV.BAT's operation as 994AROM.BIN and 994AGROM.BIN, respectively, in the ROMS subdirectory. The imported Editor/Assembler contents will similarly be lodged in the MODULES subdirectory as EDIASSMG.BIN.

15. Run MODULES.EXE from the V6.0 subdirectory on the PC. The characters E/A as entered in step 14 will displayed in a white color on a black background. Press F1 to select E/A, the white foreground will turn to yellow. Press Enter to accept. By this step, the Editor/Assembler option will be presented as an alternative to TI BASIC when the emulator is operated.

At this point the TI-Emulator is fully equipped to operate as a TI99/4A but it will still require the import of user programs, unless it is intended to operate TI BASIC or Editor/Assembler on their own. My reason in using this program, as mentioned in the title, is as a vehicle for graphic export.

For my graphics program I have chosen TI-Artist Plus. The essential files that will allow picture display and operate from Editor/Assembler are:

ARTIST1
ARTPT1
ARTPT2
ARTPT3
ARTPT4
EXTDSR
SELECT

Also, of course, a picture HANDS_P.

These files will also have to be exported to the emulator, but not by using the TRANS/RECV method.

EXPORT OF USER PROGRAMS TO THE EMULATOR

Program files, such as the TIAP, are exported via the same serial cable but they are transferred in XMODEM protocol. Do this by using TELCO V2 in an XMODEM upload setup on the TI and NETCOMM V3 in download setup on the PC. The transfer rate is kept at 2400 baud as it is fairly reliable. Any PC modem program that supports XMODEM protocol can be used. (Any terminal program that supports XMODEM may also be used.—Ed.)

I will not give a detailed explanation of the export procedure using TELCO, as most of the readers who have used bulletin boards, will know the nature of the beast (please refer to the TELCO docs if uncertain) and, furthermore, not all potential users of the TI-Emulator would have or use NETCOMM. It is only necessary to say that it is a very simple procedure without any real traumas.

The TIAP or user program files are not to be transported to any of the emulator's established subdirectories – they are not in a format that the emulator will recognize. Instead they are to be stored in a temporary directory named TI-FILES.

Before any imported files can be used by the emulator they have to be processed by an executable named XMDM2TI.EXE in the UTILS subdirectory. The execution statement for an imported file e.g. ARTIST1 is:

C:\V9T9\V6.0\UTILS\XMDM2TI/V
C:\TI-FILES\ARTIST1
C:\V9T9\V6.0\DISK

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On-screen text informs of conversion progress.

The ARTIST1 file will be converted to the emulator's enclave environment and it will be lodged in the emulator's DISK directory. It should come as no surprise that the converted ARTIST1 will not sport the usual DOS extension, after all what would a DOS extension mean to our old friend Editor/Assembler? When all the imported programs have been thus converted, the TI-FILES temporary directory and all its contents can be deleted.

OPERATING THE EMULATOR

1. Run the V9T9.EXE in the V6.0 subdirectory.

2. A module selection screen will display the available modules installed, with a selection number. In this case, where only E/A is installed, press Enter to accept it.

3. The next screen to be displayed will be the 1981 TI99/4A initial screen. Press any key to see that TI BASIC and Editor/Assembler are offered in the same way as on the original TI99/4A.

4. Select Editor/Assembler and choose Option 5.

5. Type in DSK1.ARTIST1 and TIA will load up in the same way it always has.

I will not describe the way TIAP runs in the emulator. All the usual features appear to operate in their normal manner and, yes, my picture is unperturbed by its migration to the PC screen. As I mentioned earlier, the screen capture utility works and, therefore, mission accomplished. Soon I will have to begin the real work of mustering all the graphics ready for the same trip.

I would not attempt to call this article anything like a comprehensive review of TI-Emulator V6. There is simply too much to cover in one article.

As mentioned several times, to exit any part of the emulator, including TIAP, use CTRL + BREAK.

SOME CONCLUDING COMMENTS

A point of interest during the emulator's running of Editor/Assembler and TIAP when the path DSK1 has been entered, is the appearance of a small green horizontal bar in the loader left-hand side of the PC screen. You will no doubt notice this when you install TI-Emulator on your own PC. No, it is not a glitch. It is Swartz's faithful emulation of DSK1's L.E.D. in operation.

You will probably be wondering how the TI's original 256X192-pixel screen will appear on a typical 640x480-pixel PC screen. Well, the aspect ratio is still the same, i.e. 1.3, but the picture's proportion appears a little unusual. However, there is no distortion in the screen-captured picture. Graphic Workshop indicates that the screen picture size is 320x200 pixels, which yields an aspect ratio of 1.6, and would explain the emulator's rendition of the TI screen. But when the picture is cropped of superfluous surrounding area, the size of my original picture, chosen to be exactly 256x192, is maintained.

I would not attempt to call this article anything like a comprehensive review of TI-Emulator V6. There is simply too much to cover in one article. Instead, my approach has been linear, and that was for graphics transportation. To say that the program is packed with a wealth of features is an understatement which I hope other users in our community will venture to explore. Try it out for yourself.

It is a valuable learning experience not only in TI to PC file transfer process but also in understanding a little of what console and cartridge files animate the TI99/4A.

Remember TI-Emulator is a shareware program, and Edward Swartz should be rewarded for his effort if you use the program. His address is in the disk documentation.

Although Swartz no longer supports the emulator, payment of a shareware fee is still appropriate.—Ed.

The 1980s Home Computer Era — Part 8

Highlights of 1981

By BILL GASKILL

January 1981: On Jan. 5, TI releases prototype models of Extended BASIC and 32K memory expansion to selected users for testing. A year and a half after the TI-99 is announced to the world, TI finally gets around to beta testing optional products that some of the competition comes with as standard equipment. To make matters worse, the actual availability of these two items for consumers is still more than six months away.

February 1981: TI releases the 10-inch Panasonic-made color monitor (PHA 4100) to replace the 13-inch Zenith monitor (PHA 4000) that was originally released with the 99/4. The Zenith monitor retailed for $450 when sold separately. The new monitor sells for $374.95 at the time of release, but TI will raise the price on it to $399.95 in 1982.

• 99ers in England are told of the impending release of a Value Added Tax program in cartridge form, but it never appears. The program would surface on disk in 1988 in GRAM format.

• Pewterware of Gulf Breeze, Florida, announces the release of Decathlon and Challenge Poker games on cassette.

March 1981: Texas Instruments announces the impending release of UCSD Pascal for the 99/4.

April 1981: Charles Ehninger of Fort Worth, Texas, who would found Futura Software, wins first prize in the Author Incentive Program with his Home Inventory program.

• TI Logo is introduced on April 17 and is made available to qualified school districts. It is not available to the general public.

• Delays in the release of Extended BASIC and 32K memory are announced.

May 1981: *99er Magazine* publishes its first issue.

• The Cin-Day Users Group and TIsHUG users groups are formed — Cin-Day by Larry Morrow in the Cincinnati area, and TIsHUG by Shane Anderson in Sydney, Australia.

• TI cuts 2,800 jobs from its semiconductor division after prices and demand for chips fall dramatically.

• The as-yet-released Extended BASIC module is reviewed in *Creative Computing* and bugs are found that cause TI to push the release date back further.

June 1981: TI drops out of the digital watch and magnetic bubble memory business in order to conserve cash in a market where chip prices are depressed and the cost of capital is inflated. While TI was the last U.S. semiconductor maker to manufacture digital watches, it was losing $10 million a year doing so, thus the move was seen as a wise one. The decision to drop the bubble memory business, which only TI and Rockwell International were involved in, came as a complete surprise to most analysts. Texas Instruments had sunk between $50 million and $100 million into bubble memory technology over the previous 10 years and seemed destined to stay with it, since bubble memory promised to be a cheap and reliable replacement for mechanical rotating disc memories.

• J. Fred Bucy appoints long time TIer and senior vice-president Grant A. Dove as TI's top marketing official. Dove spreads the gospel of "marketing" among the troops and immediately decides to increase radio and television advertising a mere $10 million.

• In a move explainable only by insiders, TI announces the fall 1981 introduction of a digital watch line just two days after telling the world that it will be totally out of the digital watch business by the end of the year.

• The TI99/4A Home Computer is announced at the Consumer Electronics Show in Chicago at a suggested retail price of $525 for the console only. Additional releases are TI Logo to the general public, TexNet, Editor/Assembler, Terminal Emulator II and Addition and Subtraction 1.

• When the 99/4A is announced, the Atari 400 is selling for $399 and the Atari 800 for $1,080. Street prices though are $339.95 and $899.95, respectively. Mattel's Intellivision is available for $249.95 or $569.95 with the keyboard component that turns it into a home computer that is able to compete with Atari, Commodore and TI. On the high end of the spectrum, the Apple II+ is selling for $1,275 and the new Apple III can be had for a $3,200.

TI's own Touch & Tell, Speak & Read, Speak & Math and Speak & Spell learning aids are selling like hotcakes for between $49.95 and $59.95 each. The TI-59 programmable calculator, which now sports over a dozen solid state software modules, can be had for $199.95 street price. TI digital watches are now 40-50 percent off their suggested retail price since TI's announcement that it would be abandoning the wristwatch market. Their top of the line Model 8012 gold tone, which sold for $110 originally, can now be purchased for less that $60.

• While announcing further delays in the release of Extended BASIC, TI releases Cash Management (PHD 5029).

• TI announces that by early 1982 there will be over 1,000 programs for the 99/4A Home Computer. TI also adds 300 new members to its retail network, a move that is critical to William J. Turner's strategy of mass marketing.

• JC Penney agrees to carry the 99/4A in its fall catalog, where it enjoyed exclusive coverage since Penney's did not carry other computers at the time.

• Denali Data of Oklahoma City, Oklahoma, introduces a joystick adapter that allows Atari joysticks to be used on the TI home computer.

July 1981: Epson introduces Graphtrax for the MX-80 printer.

• The 99/4A appears on the Mike Douglas Show during the week of July 6. Representatives of Texas Instruments and students from the Lamplighter School in Dallas demonstrate TI Logo and other educational applications. Guest hosts on the show, Darrel Dragon and Toni Tenille, better known as the Captain and Tenille, hear their hit "Love Will Keep Us Together" sung by the 99/4 with a Speech Synthesizer attached.

• Texas Instruments introduces the Video Controller (PHP 1290) peripheral

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TI HISTORY PART 8 —

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which plugs into the I/O port on the right side of the console.

August 1981: Structural Engineering Library and Teach Yourself Extended BASIC are released.

• TexNet on The Source is announced by TI in the Personal Computer Users Newsletter.

• The 99/4 Home Computer Users Group offers Texpacs in support of the upcoming initiation of TexNet on The Source. Texpacs are three different hardware and software packages that will allow the user to access TexNet.

September 1981: Hustle is released.

• The Pittsburgh, Pennsylvania, Users Group meeting of Sept. 20 features a large display and presentation put on by representatives of Texas Instruments. Demonstrations of TexNet, TI Logo and the soon to be available Editor/Assembler package are given.

• Invoice Management, and Electrical Engineering Library are released.

October 1981: Blasto, Terminal Emulator II and Yahtzee are released.

• Financial problems continue to plague TI, dimming the glow of the company that had been the darling of 1970s corporate America. TI reports a 55 percent drop in profits over the last year, a three percent reduction in its work force and a 50 percent drop in the price of its stock, which has gone from $150 per share in 1980 to $75 a share in 1981.

• On Oct. 9 Texas Instruments sends the following letter to registered 99/4 and 4A users in the Southern California area:

"Join the Orange County TI-99/4 User's Group on Saturday, Oct. 17, for an afternoon with the management of TI. Mr. Don Bynum, the Personal Computer Division Manager, and Mr. Brian Gratz, User's Group Coordinator for TI, will present the program.

"Highlight of the afternoon will be demonstrations of the Editor/Assembler package, Text-to-Speech, Logo and some exciting future entertainment packages.

"The meeting is scheduled to be held at 1 p.m. in the Cafe Ricard room of the Airporter Inn, 18700 McArthur Blvd., Irvine. Join us for an afternoon with Texas Instruments."

December 1981: In a *Business Week* article on TI's inability to crack the personal computer market, a computer analyst for the Arthur D. Little consulting firm observes, "The 99/4 is neither fish nor fowl."

• Charles LaFara changes the name of the 99/4 Home Computer Users Group to the International 99/4 Users Group and moves company headquarters to Bethany, Oklahoma.

• Production problems continue to plague Extended BASIC, making the new cartridge difficult if not impossible to get.

• TexNet on The Source goes on line on Oct. 23. It would flourish for three or four years but ultimately founder because of cost, slow operation of the 300-baud limitations of Terminal Emulator II and the lack of the standard Xmodem protocol for downloading.

TexNet offered color graphics and animation on line, music and sound effects, an extensive library of programs and state-of-the-art synthetic speech. Services and features included a news section, voice chat using the Speech Synthesizer, a software library, a dictionary of phonetic words for text-to-speech, a software directory, listings of user groups, a graphics library, a music and sound library, a help section, a Logo exchange and more. Sign-up fee was $100 and $7.75 per hour weeknights and weekends 6-12 p.m., then $5.75 per hour from 12 p.m. to 7 a.m. At its start-up, The Source boasted more than 350 local access telephone numbers for users.

• Draw Poker, Bridge Bidding II, and Terminal Emulator II are released.

November 1981: Adventure, Car Wars, TI Invaders and Tombstone City are released.

December 1981: In a *Business Week* article on TI's inability to crack the personal computer market, a computer analyst for the Arthur D. Little consulting firm observes, "The 99/4 is neither fish nor fowl." The comment refers to the 99/4's position as a computer which is not powerful enough for the high-end business user, but that is also too expensive for the low-end home market.

• TI phases out the little-known PHA 2500 speech modules designed to add vocabulary to the Speech Synthesizer and begins packaging a small 4 x 6.5-inch notice saying so (part No. 1043624-1) with the Speech Editor and Speech Synthesizer instruction manuals. Here is the text of the notice:

ADDENDUM
Speech Editor and Speech Synthesizer Owner's Manuals

Please disregard any references in your manual to Plug-In Speech Modules that can supplement the Speech Synthesizer's resident vocabulary. These references are no longer applicable.
1043624-1
(Use with 1037109-111 and 1037110-1)

• Texas Instruments begins to add customer support staff as sales of the home computer pick up during the Christmas season. Marketer William J. Turner is having an effect on the sales volume of the home computer by finding ways to bring its retail price down.

CD-ROM to debut at Fest-West

Kyle Crichton of Competition Computer has announced he will demonstrate his CD-ROM of TI99/4A programs at Fest-West Feb. 17 in Tuscon, Arizona.

Crichton says the company is shipping the CD-ROM to those who have ordered it. For information on the CD-ROM, write Competition Computer, 350 Marcella Way, Millbrae, CA 94030. For information on Fest-West, call the Cactus Patch BBS at (520) 290-6227, or BJ Mathis at (520) 747-5046.

DUMPLIST

Program adds flexibility to listing

By JIRI SVOBODA

The program DUMPLIST dumps a listing of a file to a printer (the default printer name is in line 170). The file to be listed must have been saved using: LIST "DSKx.FILENAME". The statement MW-132 in line 130 designates the maximum printing width (usually 132 or 136 characters). After printing the file, the user has the option to delete the LISTed file.

The decision algorithm evaluates the current line (represented by the string X$) with the very next line (string XN$). The latter string is not considered to be a continuation of a current line if there is an even number of quotes in X$ and the length of X$ is shorter than 79 at the same time. A true condition of the following XN$ tests will append an XN$ to the current X$.

1. Length of XN$ is shorter than a current line number length plus three (the minimum length of a statement).

2. Position SP of the first space character is smaller than two or greater than six (maximum of five-digit line number,.

3. At least one of the characters in positions 1 to SP-1 is not a digit.

4. XN$ starts with a number followed by the single space, one of the reserved words listed in line 160 and another space.

Up to this point, the program should work with 100 percent accuracy if no comments designated by the exclamation mark are appended to the multiple statement lines. A very small probability of an XN$ misrepresentation as a separate new line is likely to happen only when the current X$ length is greater than 78 characters and the XN$ starts with a number followed by the single space and the exclamation mark at the same time. There is probably no simple solution to this phenomenon, judging that there are almost unlimited combinations and a varying position of a key word at the end of the X$, which is demonstrated in the following example:

-> the end of an X$	the beginning of an XN$
-> ... :: FOR I=50 TO 3000 STEP	25 ! Loop comment ...
-> ... :: IF Q=5 THEN R=	1250 ! Line comment ...
-> ... IF Q=8 THEN R=38	4 ! Statement comment ...

The program handles the above-mentioned problem with an operator's assistance. The end of an X$ in question is displayed together with the beginning of an XN$ and a single entry of Y will cause the separation of displayed lines.

DUMPLIST

```
100 REM DUMPLIST !044
110 REM by Jiri Svoboda !049
120 REM Toronto, Ontario !21
5
130 CALL CLEAR :: CALL SCREE
N(4):: MW=132 :: LF$="LISTIN
G FILE" :: PM$="... printing
 ..." !231
140 CALL HCHAR(2,1,42,160)::
 DISPLAY AT(3,1): :"      ";L
F$;" DUMP": : :: EM$(1)=LF$&
" NOT FOUND!" :: EM$(2)="DEV
ICE NOT AVAILABLE!"
150 FOR I=0 TO 4 :: READ D$(
I):: NEXT I !210
160 DATA THEN,ELSE,::,TO,STE
P !002
170 DISPLAY AT(9,1):"Filenam
e: DSK": :"Printer: PIO": :"
Left Margin: 0": :"Text Widt
h;";MW !093
180 ACCEPT AT(9,14)BEEP:FN$
:: CALL BL(24,1):: IF FN$=""
 THEN 410 ELSE FN$="DSK"&FN$
 :: ON ERROR 440 :: OPEN #1:
FN$,INPUT :: ON ERROR STOP !
211
190 ACCEPT AT(11,10)BEEP SIZ
E(-19):DN$ :: CALL BL(24,1):
: ON ERROR 440 :: OPEN #2:DN
$,OUTPUT,VARIABLE MW :: ON E
RROR STOP
200 ACCEPT AT(13,14)BEEP VAL
IDATE(DIGIT)SIZE(-3):LM :: L
M$=RPT$(" ",LM)!054
210 ACCEPT AT(15,13)BEEP VAL
IDATE(DIGIT)SIZE(-3):TW :: C
ALL BL(24,1):: FS=LM+TW !105
220 IF (TW<6)+(FS>MW)THEN CA
LL SOUND(100,175,2):: DISPLA
Y AT(24,1):"FROM 6 TO";MW-LM
;"ONLY!" :: GOTO 210 !035
230 DISPLAY AT(24,7):PM$ ::
IF FS>80 THEN PRINT #2:CHR$(
15);!009
240 IF EOF(1)THEN 380 :: LIN
PUT #1:X$ !255
250 RD=0 :: L=LEN(X$):: IF E
OF(1)THEN 370 :: K=1 :: N=0
!198
260 K=POS(X$,"""",K):: IF K>
0 THEN K=K+1 :: N=N+1 :: GOT
O 260 !156
270 IF INT(N/2)<>N/2 THEN LI
NPUT #1:XN$ :: GOTO 360 !099
280 IF L<79 THEN 370 :: LINP
UT #1:XN$ :: IF LEN(XN$)<POS
(X$," ",1)+3 THEN 360 !209
290 SP=POS(XN$," ",1):: IF (
SP<2)+(SP>6)THEN 360 !251
300 FOR I=1 TO SP-1 :: K=ASC
(SEG$(XN$,I,1)):: IF (K<48)+
(K>57)THEN 360 !045
310 NEXT I :: FOR I=0 TO 4 :
: IF POS(XN$,D$(I)&" ",1)=SP
+1 THEN 360 !205
320 NEXT I :: IF SEG$(XN$,SP
+1,1)<>"!" THEN 350 !242
330 DISPLAY AT(21,4):"....."
;SEG$(X$,61,80):SEG$(XN$,1,2
0):: IF LEN(XN$)>20 THEN DIS
PLAY AT(22,21):"....." !243
340 DISPLAY AT(24,1)BEEP:"SE
PARATE LINES? (Y/N)" :: GOSU
B 420 :: CALL BL(21,2):: DIS
PLAY AT(24,7):PM$ :: IF K=78
 THEN 360 !011
350 RD=1 :: GOTO 370 !146
360 X$=X$&RPT$(" ",80-L)&XN$
 :: L=LEN(X$)!099
370 FOR I=0 TO INT((L-1)/TW)
:: PRINT #2:LM$;SEG$(X$,I*TW
+1,TW):: NEXT I :: IF RD=1 T
HEN X$=XN$ :: GOTO 250 ELSE
240 !075
380 CLOSE #1 :: X$="" :: IF
FS>80 THEN X$=CHR$(18)!011
390 PRINT #2:X$: : :: CLOSE
#2 :: DISPLAY AT(24,1)BEEP:"
DELETE ";LF$;"? (Y/N)" :: GO
```

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How to fix blown disks

If you can remember filenames, you're halfway there

By NIRAJ N. SHAH
and MIKE BALLMAN

This article originally appeared in the Spirit Of 99, the newsletter of The Central Ohio Ninety-Niners. The instructions are for Disk Fixer, but other sector editors may be used.—Ed.

Did you ever try to catalog a disk and find out the disk controller thinks the disk is *not* initialized? But you know better! What do you usually do with the blown disk? Most people delete the file giving them the problem. Usually that corrects the problem, but it also gets rid of that file forever. The ultimate solution is to use Disk Fixer by Navarone Industries.

Here is the process to fix a blown disk.

Start by getting a hard copy catalog of the blown disk, or even better, get a complete "old" catalog of what should be on the disk. If a complete catalog is not available, try to remember the filenames that should be on the disk and write those names down. Once you have a catalog of the disk, you are ready to start using Disk Fixer.

Insert the Disk Fixer cartridge and select option 2 from the title screen. You should see the Disk Fixer menu. Do the following if the most recent catalog of the blown disk tells you there are more sections used/free than is logically possible. For example, a single-sided, single-density disk would have no more than 358 sectors. A double-sided, single-density disk would have no more than 718 sectors. If the catalog lists 500 sectors used/free on a single-sided, single-density disk, then do the following. If not, you can go to the paragraph that discusses sector one.

If a complete catalog is not available, try to remember the filenames that should be on the disk and write those names down. Once you have a catalog of the disk, you are ready to start.

FIXING SECTOR ZERO

The following instructions tell you how to fix up sector zero, which is the sector containing information about the disk name and number free/used sectors. If the disk catalog tells you the used/free sector information is in error, then sector zero needs to be repaired. The easiest way to do this is to copy a good sector zero from another disk to the blown disk. Here is how to do that:

1. Insert a good disk in the drive.
2. Read sector zero of the disk (R 0, 1 <Enter>).
3. Put the blown disk in the drive.
4. Write the good sector zero to the disk (W 0,1 <Enter>).

FIXING SECTOR ONE

If you now catalog the blown disk, you should see that the disk name and the used/free information is identical to the undamaged disk. Do not let that alarm you. We did that to fool the disk controller into thinking the blown disk is at least partially restored to normalcy. Now we need to fix up the blown disk as much as we can. This is done by changing sector one. Here is how to fix sector one:

First, get the most complete catalog and the most recent catalog of the blown disk in front of you. Compare the two catalogs to see which filenames are missing. Next, compile an alphabetical listing of all the filenames that are and should be in the catalog. Then you need to find the corresponding sector for each filename. This is done by using the Find String function of Disk Fixer.

1. Put the blown disk in the disk drive.
2. Find a filename by: F 0,208,1 <Enter>. Type in the filenane and Enter.
3. Ignore the "ERROR IN SECTOR" message.
4. Write down the sector number for that filename.
5. If that filename could not be found, make sure you typed it in correctly and try again. Otherwise that file does not exist on the disk.
6. Repeat the process from step two for all of the filenames.

You should now have an alphabetical listing that consists of two columns: filenames and sectors. With this information in hand you are ready to begin fixing up the blown disk. This is done by modifying sector one of the blown disk. First, you have to read sector 1 from the blown disk:

1. Put the blown disk in the drive.
2. Read sector one of the disk by: R 1,1 <Enter>.

Then you want to alter the contents of sector one. This is done by using the alter

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DUMPLIST—

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```
SUB 420 :: CALL BL(9,7):: IF
 K=89 THEN DELETE FN$ !184
400 DISPLAY AT(24,1)BEEP:"AN
OTHER LISTING DUMP? (Y/N)" :
: GOSUB 420 :: IF K=89 THEN
170 !108
410 CALL CLEAR :: STOP !235
420 CALL KEY(0,K,S):: IF S<1
 THEN 420 :: IF K>96 THEN K=
K-32 !042
430 IF (K<>78)*(K<>89)THEN C
ALL SOUND(100,175,2):: GOTO
420 ELSE CALL BL(24,1):: RET
URN !158
440 CALL ERR(X1,X2):: IF X1=
130 THEN DISPLAY AT(24,1):EM
$(X2):: IF X2=1 THEN RETURN
180 ELSE RETURN 190 ELSE STO
P !196
450 SUB BL(X,Y):: CALL HCHAR
(X,1,32,Y*32):: SUBEND !152
460 END !139
```

BLOWN DISKS —

(Continued from Page 21)

function of Disk Fixer. This process is best learned by observing a concrete example.

Let's say the blown disk has 14 files (filenames) on it. Thus, there should be 14 entries on sector one, one entry for each file. The rest of the sector should consist of zeros. Now let's alter sector one.

1. Keep the blown disk in the drive.

2. Enter the Alter function of Disk Fixer: R 0 <Enter>.

3. Type in the following as shown, including the spaces:
1 2 3 4 5 6 7 8 9 A B C D E

4. Do not press Enter yet.

5. If you saw a non-zero entry after the E entry in the first column, type in a zero and a space and repeat until the first column shows a zero.

6. Press Enter.

7. Write the revised sector 1 to the blown disk: L 1,1 <Enter>.

You have just entered a table of pointers to the files on the disk. The table points to the corresponding sector for each filename. This is the table that is updated and sorted when you add/delete files.

Leave Disk Fixer by typing the letter "Q" and press Enter. Then catalog the disk. Let's call this new catalog the "mixed" catalog. You will see the reason once the disk has been cataloged. Notice how the catalog is not in alphabetical order. However, it does contain all of the filenames that you hoped would be on the disk. The next step is to alphabetize the catalog. This is done by first alphabetizing the catalog on paper and carrying along the appropriate sector number of each filename. Here is an example of a mixed catalog:

Mixed Catalog Filename	Sector	Sorted Catalog Filename	Sector
CAT	1	APPLE	E
SCREEN	5	CAT	1
VOTE	2	DEMO	7
FIRE	6	FIREE	6
APPLE	E	HELLO	9
HELLO	9	JUSTIFY	D
SCROLL	C	LOAD	3
LOAD	3	LOGO	A
TIME	8	PLOT	B
DEMO	7	QUICK	4
QUICK	4	SCREEN	5
JUSTIFY	D	SCROLL	C
PLOT	B	TIME	8
LOGO	A	VOTE	2

The above example shows how you should alphabetize the filenames and the corresponding sector numbers on paper. If you are unsure when dealing with "funny" characters, the system alphabetizes by lower to higher ASCII values. These values can be found on your TI BASIC reference card. Once you have done this, you are ready to enter this information into sector one. You do not have to enter the filenames, just the sector numbers.

Here is how to do it:

1. Place the blown disk into the disk drive.

2. Read sector 1 by entering R 1,1 <Enter>.

3. Enter the Alter function: A 0 <Enter>.

4. Type in the sector numbers in the order shown in the above sorted example catalog. Separate each number by a space: E 1 7 6 9 D 3 A B 4 5 C 8 2

5. Press <Enter>.

6. Write the revised sector to disk: W 1,1 <Enter>.

7. Put a write-protect tab on the disk.

You have now fixed up the disk. For verification, quit Disk Fixer and catalog the disk. You should have no problems during the catalog process. But you are not completely done yet. DO NOT add or delete any files or programs using this disk.

Get a fresh disk and initialize it to the same configuration as the blown disk. Then back up the blown disk to the fresh disk. Then catalog the fresh disk. You should see that the used/free sector information is now correct. Thus, the fresh disk is now your working disk and the blown disk is now a disk for your archives.

Keep the blown disk in a safe place, just in case you remember a filename that was not previously recovered from it. Go through the above procedures to recover that new-but-old file.

NEWSBYTES

TI has web page

TI user Rich Polivka has posted a 99/4A web page on the Internet at: http://w3.gwis.com/ polivka/994apg.html

In a post on Internet's comp.sys.ti newsgroup, he writes, "A few months ago, I posted a 99/4A web page. I intended it to be a sort of 'memorial' to a completely dead computer. Since then, (to my delight) I found this newsgroup and I realized that the 99/4A community is still very much alive."

Polivka says he is open to suggestions or additions to the page.

UK group plans workshop

The 1996 TI Workshop sponsored by the TI99/4A User Group U.K. is scheduled March 16, 10 a.m.-5 p.m. at the Wheatsheaf Public House in Sandbach, Cheshire. Buses are available to Sandbach from Crewe.

The workshop will include demos and opportunities to sell and buy products, and is free to members of the group and their families.

For further information, contact Trevor Stevens, 249 Southwell Rd. East, Rainworth, Notts, NG21 OBN, UK, or call the MOBB BBS at 01623 491282.

UGOC winding down

The User Group of Orange County in Huntington Beach, California, has closed its membership as of Jan. 1. The group has set a target date for distribution of excess funds on or before May 1 as a disbanding procedure, according to its newsletter.

TI-Bar

Now TI/Geneve users can bar-code their mail

By JOHN KOLOEN

The postal system increases in complexity every year. This is largely because of increases in the volume of mail and in improvements in technology.

One fundamental improvement over the past decade has been the increased use of bar-coding on all classes of mail. Advantages of bar-coding include reduced costs for large mailouts. With bar-coding, a catalog or envelope can be processed by machines so that the only human involved is the letter carrier who delivers the piece to the recipient. Machine processing means lower costs and faster service for volume users of the postal service. But that's not to say that low-volume users can't benefit from bar-coding. Bar-coding an envelope means that it will be machine-processed along with the huge mailouts of volume mailers. And, while you will still have to pay 32 cents for a one-ounce envelope, the chances are good that the envelope will arrive at its destination faster than if bar-coding wasn't used.

TI users who may have wanted to use bar-coding with the computers didn't have that option until October when William F.S. Dowlding released his TI-Bar bar-code program. Dowlding is a member of the Milwaukee Area 99/4A User Group. The program is sold by Cecure Electronics Inc. of Muskego, Wisc., for $15, plus $3 shipping. Written entirely in Extended BASIC, the program is approved for use by the U.S. Postal Service. It requires Extended BASIC, memory expansion, disk system and printer. It works fine in GPL mode on a Geneve.

TI-Bar is designed to work with nine-pin dot-matrix printers in Epson emulation mode. Users without Epson emulation can modify the program to suit their needs. The bar code program segments are thoroughly commented where printer codes are concerned.

The program is auto-loading and menu-driven. It is very easy to use. The main menu consists of the following options:

1. Commentary for first-time users
2. Set up address files
3. Print address files
4. Address envelopes with 2-pass bar coding
5. Address envelopes with 4-pass bar coding
6. Leave program

Option 1 offers several screens describing how to use the program. While it doesn't answer technical questions about the program, there's enough information to get the first-time user under way.

Option 2 is used to set up an address file and enter label information. Users are limited to a maximum of 20 labels, each containing 13 fields. The fields are:

Company name or other data
Company telephone number
First name middle initial
Last name
Title in company
Street number
Street name
Apartment number
Post office box number
City
State
ZIP
Home telephone number

Since the program is unprotected, the user can modify the field names depending on individual usage. If you use it to send newsletters to user group members, you could easily change the fields labeled for company information to user group information.

Obviously, particular attention is paid to address information, with the street address being in a separate field from the street name. This level of specificity is probably what allows the program to print accurate bar codes based on postal system requirements. Of course, if a person doesn't have an apartment number, you would simply not enter any data into that field. The labels are automatically sorted in ZIP code order when the data is written to disk. This option is also used to input return address information. The label information, as well as return address information, may be edited at any time.

While the program permits use of nine-

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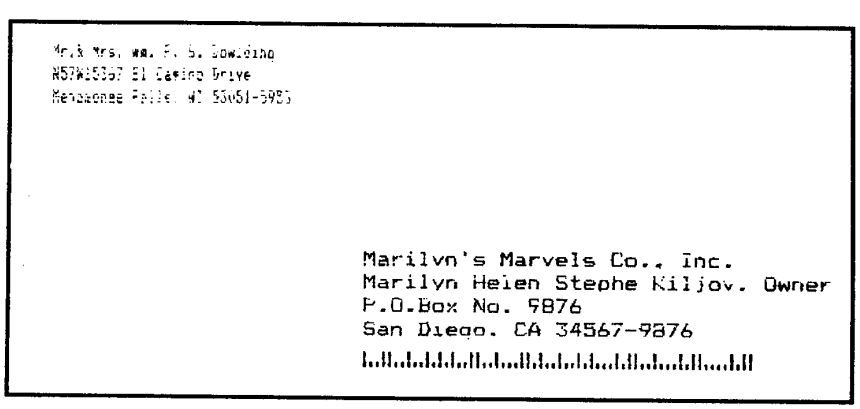
REVIEW

Report card
Peformance.....A
Ease of Use.....A
Documentation.....B
Value.....A
Final Grade.....A

Cost: $15, plus $3 shipping/handling
Distributor: Cecure Electronics Inc., P.O. Box 132, Muskego, WI 53150-0132; (800) 959-9640.
Requirements: Extended BASIC, memory expansion, disk system, printer, or Geneve 9640 in GPL mode with printer.



TI-BAR —

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digit ZIP codes, the commentary indicates that the bar codes it prints may not be accurate for some nine-digit ZIPs.

Perhaps the severest limitation of TI-Bar is the fact that it permits only 20 entries in its database. If you have a bowling team with 12 members, this would pose no problems. But if you try to do mailings to a larger organization you'd either have to modify the record entry portion of the program or, as is suggested in the commentary, copy the program to multiple disks, each containing a database of 20 labels. This would be impractical if you had a list of, say, 100 names and needed to print them out in ZIP code order.

The third option prints out a list of all the records This is a straightforward printout of all the data in label format in three columns in ZIP code order.

The fourth and fifth options are where much of the work gets done. Using a two-pass bar code is quicker than a four-pass, but the output is significantly lighter. I'd use it only with a relatively new ribbon. The four-pass printout is very clean and should be easy for machine to read. By the way, the barcodes are printed out in bit-image mode. There is an option to print out address labels without barcoding, but I can't think of any reason not to use barcoding. (Of course, the barcoding is accurate only for U.S. addresses.) The return address appears at the upper left corner of the envelope.

It's nice to see a relatively small, easy-to-use, practical program like TI-Bar in Extended BASIC. It is logically designed and user-friendly. I wasted no time trying to figure it out.

When using either the two- or four-pass options, you are presented with a list of names in the database. You select which one you want to print and send it to the printer, one at a time. Obviously, you need to make sure that you are familiar with how your printer handles envelopes. Most dot-matrix printers that I'm familiar with use a manual mode for envelopes, so you may have to do a little trial and error testing to get things working properly.

TI-Bar lets you print to legal or letter size envelopes, as well as any sheet of paper that your print can handle. If your printer is fussy, TI-Bar lets you send a command that disables the paper end detection function.

It's nice to see a relatively small, easy-to-use, practical program like TI-Bar in Extended BASIC. It is logically designed and user-friendly. I wasted no time trying to figure it out.

Obviously, unless you are able to modify it yourself, its primary limitation is that it handles relatively small address lists. But it does very well and it provides TI users with a capability that heretofore we haven't had. It's a good deal for $15.

Update on Cyc

MICROpendium now included in its entirety

By JOHN KOLOEN

MICROpendium, in its entirety, is finally available in Cyc, the ever-expanding encyclopedia of TI information produced by CaDD Electronics.

If you're already a Cyc user, then this file is a must-have. It catalogs everything in MICROpendium, a lot of it in much greater detail than any other index. Until now, only the first eight years of MICROpendium was indexed. Cyc was reviewed in December 1993.

For those who aren't familiar with Cyc, it's a massive project to compile as much information about the TI as is humanly possible. It's the brain-child of Mike Wright of CaDD Electronics. CaDD also sells PC99, a full-service TI emulator that runs on PCs.

Previously, Cyc included indices for *99er Magazine, TI Home Computer News, Computer Shopper, The Smart Programmer* and *Enthusiast 99*. The files are available as compressed files on floppy disks. The files are in WordPerfect format. The indices are designed to be searched using the WordPerfect search function. However, they are easily converted into other formats simply by exporting/importing to other programs. They can also be exported to Macintosh systems and can be exported to a TI or Geneve by saving the files in ASCII format. Depending on the program you use, you can import the files into spreadsheets, database managers or other word processors.

The files are very large. The current MICROpendium file, which covers everything from the first issue through November 1995 takes up well over 500K when uncompressed. But, hey, there's a lot of information.

I found Cyc to be valuable in 1993, and it's no less valuable today, particularly in view of the fact that it includes all of MICROpendium. The cost is $20, and includes two disks: APPX, which contains the appendices, and CYC, which contains the alphabetical files.

Wright says "We would make an offer to existing Cyc owners that if they see an announcement of an update they could simply send two formatted floppies with return postage and we would simply give them the latest updates free of charge."

Contact CaDD at 81 Prescott Rd., Raymond, NH 03077; 603-895-0119. Or email Wright at mjmw@xyvision.com.

MICRO-REVIEWS

AT Keyboard Interface

By CHARLES GOOD

AT KEYBOARD INTERFACE by Western Horizon Technologies.

An immediately obvious disadvantage of the 99/4A is its small keyboard with relatively few keys and no numeric keypad. Several years ago RAVE offered a full-sized keyboard replacement. You removed the 99/4A's keyboard, installed the RAVE interface in its place, and plugged the RAVE keyboard into the interface. I bought one of these in 1988. I think it cost me $200 and I didn't like it. The nonstandard 105-key RAVE keyboard had some strangely labeled keys I never used, felt mushy. The keyboard eventually became mechanically unsound and new replacement 105-key keyboards were unobtainable. RAVE also offered an XT keyboard interface without a keyboard, but it was also expensive ($150) and so were XT keyboards.

Times and prices have changed. The RAVE 105-key keyboard with interface and the RAVE XT interface are no longer in production and XT keyboards are hard to find in stores and catalogs. On the other hand, AT 101-key keyboards are now readily available and very inexpensive. You can get a new AT keyboard for $14 plus shipping from the MEI/Microcenter catalog (product No. 027615, phone 1-800-634-3478). My local Wal-Mart store has them starting at $20. I recently purchased at Wal-Mart for $30 a "mechanical" AT keyboard with an audible click and nice tactile feel. And most importantly for 99/4A users, you can now purchase for $65 (+ $5 shipping) an AT keyboard interface from Western Horizon Technologies that is better than the RAVE product and costs much less.

This WHT internal console circuit board allows you to attach any AT keyboard to the side of your console and use either the AT keyboard or your console's keyboard. Any computer keyboard will eventually develop mechanical problems, so the common availability of inexpensive replacement AT keyboards is an important consideration. With this console modification you always have the option of using your console keyboard as you normally do. You can also plug in an AT keyboard and then use either or both the console or AT keyboard. You will be tempted to figure out a way of hiding your console on the floor, in a drawer, behind something (out of sight out of mind) and just use the AT keyboard. The AT keyboard's long coiled cord can reach to your console's hiding place. There are unfortunately times when you must still use the console keyboard, so don't bury the console too deeply.

As originally designed, installation of the AT keyboard interface was supposed to be user friendly. Essentially all you supposedly had to do was cut one console motherboard trace with a sharp knife, make one solder connection and without soldering fit the springy prongs of the AT interface circuit board over the pins of the 9900 chip on the motherboard. Disassemble the console, cut a trace, solder one wire, press on the interface, route the keyboard jack to your preferred location on the side of the console, then reassemble the console. The keyboard jack can be located almost anywhere you want on the surface of the console. You cut a hole in the console and secure the jack through the hole. Most users will probably prefer the left side of the console near the joystick port.

I saw a public demonstration of this supposedly technoklutz friendly installation procedure at the 1994 Chicago Faire, and it didn't work! Several sources have since told me that the "press on" technique is not stable, and this has been my own experience. WHT now recommends soldering all the prongs of the interface to the corresponding pins of the 9900 chip on the console motherboard. Unless you are good with a soldering iron this can be tricky. WHT offers dealer installation of its product for an additional $30. I recommend this option. Send WHT a console you can afford to be without for awhile (Don O'Neil of WHT tells me, "three weeks worst case") along with a check for $95 ($65 + the $30 installation fee) and WHT will return your console with the AT interface installed and guaranteed for one year. You provide your own locally purchased AT keyboard.

The WHT AT keyboard interface is intended for standard 99/4A consoles without most other modifications. It is definitely *not* compatible with "32K in the console." WHT tried and failed to install the interface in a console of mine with an internal speech synthesizer board. There wasn't enough room for both the AT interface board and the speech synthesizer board. The AT interface *will* work with consoles modified for 80-column use with the Advanced Video Processor Card, TIM or Mechatronics 80-column devices. I have my interface installed on a console modified for AVPC use. If you have TIM, please note that the SOB product often sold along with TIM is not compatible with the AT keyboard interface.

The obvious reason for the interface is to let you use an AT 101-key keyboard on your 99/4A system. Such a variety of these keyboards exists on the market that I am sure you can find one that exactly suits your personal needs. Variations available at my local stores include click or nonclick keys, mushy or hard or everything in between keypress force, strangely shaped "ergonomic" designs that help keep your hands from getting tired and either a trackball or dedicated arrow keys to move the cursor. The 99/4A keyboard is OK, but if you have the room on your computer table an AT keyboard is much better. Any AT keyboard takes up less table space and is no wider than a 99/4A console plus firehose connector. My new AT keyboard is a real pleasure to use! I particularly like the big <enter> and <shift> keys and the dedicated cursor arrow keys.

When you turn on your modified console the AT interface adds about one sec-

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ond to power-up time. This means that you really do have to turn on the console after turning on the PE box, just like TI's directions tell you. You can use the console's keyboard whether or not you have an AT keyboard attached. If you do have an AT keyboard it comes up with caps lock and num lock on. This is a logical arrangement. With num lock on you get immediate access to keyboard's numeric keypad with its own <enter> key. This makes entering numerical data convenient. Except for word processing I usually have my alpha lock down, so having the AT keyboard start up with caps lock on seems very natural to me. Caps lock on or off does not affect joystick performance. You don't have to turn caps lock off to use joysticks.

Many of the 101 keys do things with a single key press that require multiple key presses on a regular 99/4A keyboard. The F1 through F10 keys act a FCTN/1 through FCTN/0 in BASIC and in TI-Writer. Separate arrow keys move the cursor in four directions. The ALT key is the same as the 99/4A's FCTN key and can be used instead of or in addition to the F1-F10 keys. A lot of the 101 keys do nice useful things in TI-Writer. Keys labeled Tab, Insert, PgUp, PgDn, Delete, End and Home do what they say in TI-Writer. Other single key presses function as kill-to-line end, oops, and window right in TI-Writer. When logged onto a BBS you can press Pause to stop and start text scrolling. The Esc key returns the escape character (ASCII 27), useful in controlling your printer. A destructive backspace (something not found on the 99/4A keyboard) is usable in both BASIC and TI-Writer.

Many of you know that other PCs have type-ahead keyboard buffers allowing you to type faster than the software can accept your input. What you may not know is that the keyboard buffer is built into the keyboard, not the PC's CPU. With the WHT AT interface, we 99/4A users can now take advantage of any AT keyboard's keyboard buffer. The main benefit of such a buffer is in word processing. No end-of-line missing characters with TI Writer or the Funnelweb editor. The keyboard buffer can give you some strange effects with some software. If you hold a key down too long some software will register multiple key presses of that key, even if the click keyboard only clicks once for the key. I notice this with REDISKIT, which requires three upper case C presses to begin to copy each disk. If at the beginning of a copy operation you just repeatedly tap the C key without counting, or hold it down too long, REDISKIT will format a copy disk, copy a master disk onto the copy disk and then immediately start reformatting the same copy disk again without pausing after the first copy is made. When using REDISKIT I have to remember to press C only three times and not keep my finger on the C key too long.

A few problems occur using some software with the AT keyboard. However, all such problems can be solved by switching to the 99/4A's keyboard when a problem is encountered. For example, the Clear key (FCTN-4) doesn't work in BASIC to break a running program or in Funnelweb's Disk Review to abort a disk management operation. Another example: software that has its own keyscan may not respond at all to the AT keyboard. Such software will, however, work just fine with the console's keyboard. This software includes Atarisoft games, Telco, Fast Term, Mass Transfer and the Horizon RAMdisk Config program.

As of this writing (late December 1995) the AT interface does not like the console's automatic screen saver. I am told that a replacement EPROM fix for this is in the works, but I don't yet have this new EPROM. If you purchase the AT interface, ask WHT whether the screen saver problem has been fixed. If you already own an AT interface, ask about obtaining a replacement EPROM. Otherwise, you will have to put up with the behavior described in the next two paragraphs, which can be annoying.

With the screen saver bug, in either BASIC if you don't type anything in command mode for about 10 minutes the cursor stops flashing and the screen does not go blank. Usually you can recover by just typing something on the AT keyboard, but not always. Sometimes you have to type a key on the 99/4A keyboard to recover. Some software, such as Funnelweb's central menus and disk review, do not allow the console's screen saver to activate. If you are running screen-saver sensitive software that uses 40 or 80 columns, when the screen saver activates then your screen may pop into 32-column mode and not clear. What you see is strange looking 32-column text and strange colors. The software is still there and functioning. Only the screen display is messed up. To recover all you need to do is press a 99/4A (not an AT keyboard) key. I notice the screen-saver problem sometimes when copying disks using DSKU, DM1000 and the Asgard Memory Systems copier. If you have large capacity disks there may be some time between key presses while the copy process continues. After a few minutes, even while disk copying is in progress, the screen pops into 32-column mode with strange colors.

Most annoying to me is the way the screen-saver bug affects the Funnelweb editor. Even when actively using the Funnelweb editor, after you do so about 10 minutes the screen goes fireworks as the console's screen saver kicks in. To recover, you have to press a console keyboard key, and this usually slightly disrupts your word processing document. Funnelweb, but not necessarily other forms of TI-Writer, is coded in such a way that AT keyboard key presses are not detected by the timer that activates the screen saver. This is annoying, but not fatal.

Special software may be written just for the AT keyboard interface. The interface has the sockets for 64K of 0-wait state 16-bit RAM in the system ROM area. Right now no software exists to use this feature but I am told that David Nieters, author of the keyboard interface software, has been working on a terminal emulator that works out of that space and gives high speed support. There are no promises that this will become a reality.

ACCESS:

Western Horizon Technologies, 3297 Woody Lane, San Jose, CA 95132. Voice phone (408) 934-0352 (ask for Don O'Neil). Fax (408) 934-9682. Internet e-mail doneil@hooked.net

Charles Good, P.O. Box 647, Venedocia, OH 45894. Phone (419) 667-3131. Internet e-mail cgood@osulima1.lima.ohio-state.edu or good.6@osu.edu

Hardware project

Keeping the TI working

By JERRY KEISLER

The following article appeared in the Ozark 99er News. As usual with hardware projects, the individual user assumes all risk in applying these instructions.—Ed.

I go through about one keyboard each year. My father also went through one keyboard a year. I used to just replace the keyboards, but they are getting scarce. I now try to repair them.

I understand there were six different keyboards made. Failure modes include keys that always repeat when hit and keys that quit working.

I have fixed the keyboard with NI-TEK 100511D on the printed circuit board keyboard several times. This one is easy, just pop the top off the offending key and you will see two gold-plated contacts. I use a piece of brown paper bag as a burnishing tool. Cut a strip of paper bag about one-eighth inch by one inch. Place it between the contacts. Depress the key and work the paper up and down several times. Then remove the paper and replace the cap on the key. This fix has worked for over six months at a time.

For those made in Japan — date code KCCBA082 — the keyboard is a little harder to fix. First, you need two of these keyboards. If you do not know how to desolder and remove printed circuit parts, forget it. You will have to partially dismantle the TI to replace keyboards. The first round, just replace the keyboard and mark the offending key on the back of the old keyboard.

The second time around requires the removal of the keyboard. Desolder the offending key. Desolder a good key from the keyboard you saved from the first round. You did save the keyboard, didn't you? Desolder one of the good keys. I usually go for the Z, Y, B, +, and - keys for my first choice.

Now remove the desoldered keys from both keyboards. This requires three hands, or long-nose pliers and a good crow bar. Remove the cap from the desoldered keys. There are spring-loaded tabs on each side of the key. Gently press them toward the center of the key. This is a good use of your long-nose pliers, not electrical long-nose pliers, the real small ones used by electronics technicians.

While holding the spring, press the key up and out of the board. You will have to slide a knife between the key and board to do this. If the key does not come out easily, wiggle the terminals you desoldered to make sure they are free and repeat with the pliers and knife. Once both keys are removed, line up the solder terminals of the good key with the holes in the board and pop the good key in the slot of the defective key. Resolder the terminals. Place the cap of the defective key on the new one.

Good luck with keyboard repair.

CONSOLE CONNECTOR REPAIR

The other complaint I had with my TI was the firehose connector on the side. When that thing wears out, I seem to get computer lockups every couple days. If speech is installed, it is twice as bad.

My fix to correct this to like-new condition follows:

You will need to dismantle the computer down to the board with all the chips on it. This board is the computer. The metal shield must go also. If you have not gone this far before, stop here. I don't think you want to try this.

The edge of this board that the firehose plugs into has solder pads on the top and bottom that mate with the firehose. These pads are normally badly grooved. With a small soldering iron (about 20 watts) and a clean cotton rag, I proceed to heat each pad and wipe the solder off. Wipe the solder away from the computer board. Do not let any solder splatter on the board.

If there are any black grooves left on a pad, remove the black. I do this by lightly scraping the groove with the point of a small pen knife. Here is where I may part company with a lot of techs. I clean the pads with a fine emery cloth. I'm told emery can short-circuit your computer.

Using the 20-watt soldering iron and some thin multi-resin core solder, I heat each pad and place a thin layer of solder on the pad. If you get too much solder on a pad, remove it and try again. If the diameter of the solder is too large, it will be had to do this.

When all pads have a new solder layer of about the same thickness of the original board (using the eyeball method), I clean the new pads with a clean cotton cloth. Then I spray the pads with a good tuner cleaner and connect and disconnect the firehose several times to clean it.

If everything looks good, reassemble the computer in the reverse order that it was dismantled.

I have fixed three computers this way, and they have all provided several more years of trouble-free service. You could do the same thing with the speech synthesizer. However, I would not do any of this without a spare computer, just in case things don't work out.

Tesch marketing CYA, PFM software for Geneve

Tim Tesch is now selling his programs directly at the following address: Tim Tesch (S&T Software), 1856 Dixie Rd., Port Washington, WI 53074, according to a recent post on Delphi

Software he has available for the Geneve is CYA 2.2 for MDOS 2.21, $15; CYA 2.5 for MDOS 4.00 and above, $20; SCSI4PFM (allows Programmable Flash Memory users to split MDOS for loading with PFM), $10; VCLR, (color ANSI file viewer, for viewing color log dumps with Port), $10; and ANSI-Tools, mainly for use with the S&T BBS, $10.

Shipping and handling is not included in the above prices. "T.TESCH1@GENIE.COM" is the Internet address for Tesch.

Getting more out of Multiplan

You don't have to do spreadsheets by the numbers

Multiplan makes a fine indexer and list keeper

This article originally appeared in TI Focus, *the newsletter of the Hamilton (Ontario) User Group. It was written by Tom Arnold. We found it in* TIsHUG News Digest.—*Ed.*

The subject is using spreadsheets, in particular Multiplan, as text editors.

Why would you want to use Multiplan as a word processor? Simply because, in certain applications, it can be very useful. I use a spreadsheet at work and I never work with numbers! It is very useful in keeping lists of things, in particular lists that you might want to update from time to time. I assume that you would want to sort these lists. How about a telephone list, an address list of your club members, a list of topics on the TI, or an index to a book, any index for that matter. For these applications, Multiplan is a very powerful tool. Let me explain.

At work I have to write job practices. Generally I type them out. All these practices need to be indexed. I used to write every topic by hand, then number each letter in alphabetical order. For example, under "P," *prince* comes before *punk* and punk before *pyke*. Then I would write all the topics in order for the typist to retype. This took a long time, especially if there were many items.

Along comes the computer and I immediately found an easier way. I type out two columns — the topic in column No. 1 and the page number in column No. 2. These are entered in the order that I come across them in the book. After finishing I "sort" the first column and I have an instant index. Very simple, and it doesn't have to be retyped.

How do you do this in Multiplan? First, do not type titles or any other text you would want on the printed page. Enter this later. Assuming we are entering an index, type in the names (topics) in column No. 1. After each entry move the arrow keys to the right and then enter the number or other references you want. Repeat this until all entries are done.

Now you are ready to sort the spreadsheet. Select Sort. You will be prompted the column you wish to sort by, in our case enter 1. CTRL-A will move you to the second field, where the row selection will be prompted. The default is between rows 1 and 255. This will be your normal selection range. However, you can use this to sort partial lists. This could be useful if you want to sort part, by one column and the other part by another column. Which brings us to the last prompt (via CTRL-A). You are given the choice of ascending order (<) or descending order (>).

I suggest you try this little experiment. List 5 names in column 1, list the numbers 5 to 1 in column 2, list the letters c, f, d, s, f in column 3, and then the numbers 1, 34, 76, and 45 in column 4. Now sort using a different column each time. See how the rows follow each other and the order changes?

You may also sort using different columns. For example, you could sort a long list by column No. 1, and then the top 20 entries could be sorted by column No. 2 to achieve a different order.

As for uses, how about starting by making a combination of phone list and address list. Then sort by name, phone numbers, and addresses, printing out a new list each time. These would then be handy references. For example, you could isolate all of your friends who live in Australia whose names begin with "P" and whose phone numbers are in area code "2456." I would think that you would find 10 or 20 anyway! Just kidding.

One more point about using Multiplan to make columns of items: You won't accidentally format them into one jumbled mess. I forgot to mention that all titles, etc. should be added after your sorting is done.

Transferring Multiplan files to a PC

This article was written by Dick Ohi of the West Penn 99'ers.—Ed.

You will need the program PC-Transfer and PC-Transfer Utilities for the Myarc disk controller and two double-sided disk drives. These programs are distributed by 9640 News and Beery Miller. The following was tested using a TI99/4A and a PC running Quattro Pro SE. These procedures should work with any PC spreadsheet that will import files in the symbolic link format.

Begin by running Multiplan on your TI. Load the file you wish to transfer to the PC.

1. Press T(ransfer), O(ptional), S(ymbolic), Enter. This sets all transfer operations to the symbolic link format.

2. Press T(ransfer), S(ave), and type in a new filename so that you do not overwrite the original file, or you may want to save the new file to another diskette. (Recommended.)

3. If you want to transfer more than one file you have to reset the normal mode for Transfer operations. Press T(ransfer), O(operations), N(ormal), Enter. Load next file to be converted and repeat steps one and two above.

4. When you have saved all the files you wish to transfer, exit Multiplan and insert the Extended BASIC cartridge in the console. Insert the PC Transfer disk in drive 1 and select XBASIC. PC Transfer will autoload.

5. Using the prompts on screen, select a DOS drive and a TI drive.

6. At the "Conversion File Name" prompt, type DSK1.SYLK and press Enter.

7. You may now remove the PC Transfer disk from the drive. Insert the disk with your TI files in the designated TI drive, and either a blank disk or a DOS-formatted disk in the designated DOS drive. Note: It is possible to format a DOS disk with PC Transfer but it is a very slow process. I recommend using a formatted 360K DOS disk.

8. Load the TI disk catalog.

9. Select the files to be transferred by pressing "C" whenever the cursor is next to the filename. Use the space bar or down arrow to move down through the list of

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files. The up arrow allows you to move back up the list.

10. When all files have been selected, press "E" to execute the procedure.

11. You will be asked for a DOS filename for each file to be transferred. Type in a filename using up to eight characters plus a period and SLK (MYFILE.SLK), and press Enter.

12. When all the selected TI files have a DOS filename entered the transfer procedure will begin.

Take the DOS disk to your PC, load your spreadsheet program and either open or import the file from the disk. All data and formulas should be transferred to the PC spreadsheet. You may have to make some changes in some cells as to how the data is displayed.

There's more than one way to speed up MP

Here's some advice about Microsoft Multiplan from Joe N. Simmons. We found it in the newsletter of the Athens (Tennessee). Simmons found them in the PUG Peripheral, *the newsletter of the Pittsburgh User Group. Simmons reworded them for the sake of brevity. The tips are particularly useful for those who are not regular users of Multiplan.*

To increase the response time of Multiplan, you should file copy to a disk the following files in the following order: OVERLAY, MPHLP, MPCHAR, MPDATA, MPINTR, and MPBASE.

• When you make a backup copy of Multiplan, you must name your diskette TIMP.

• To increase the response time of Multiplan, you should file copy to a disk the following files in the following order: OVERLAY, MPHLP, MPCHAR, MPDATA, MPINTR, and MPBASE.

• After you become familiar with Multiplan, you can eliminate the MPHLP (help file) from your work disk. This frees 158 sectors for other things.

• Normally, when I first enter Multiplan, I press Options and space over the recalculate option to "no" and press Enter. This turns off the automatic recalculation feature. I can press FCTN-8 to recalculate. With automatic recalculation, Multiplan has to recalculate after each entry.

• To recalculate individual cells, one can edit the cell and then press Enter. This will cause the cell contents to be recalculated.

• To make DSK2 the default drive, press "Transfer" (CTRL-2) and type in DSK2 and press Enter.

• In the PUG, it was noted that you could find MPINTR at sector 22 and could use a disk editor to permanently change the default drive to whatever you choose.

For those who want to speed up the recalculation time of Multiplan, write R.A. Green, 1032 Chantenay Dr., Gloucester, Ontario, Canada K1C 2K9. He has upgraded Multiplan so that recalculation occurs almost instantly. He also speeded up data entry. His latest version is V4.2.

USER NOTES

Using CALL KEY to halt a program

The following was written by Leonard W. Taffs of the SouthWest 99ers User Group. It appeared as part of his Feedforth column.

The CALL KEY routine, of which two Extended BASIC versions are shown here, can be versatile methods of interrupting or halting a program. (The same programs can be used in TI BASIC but require different program lines.)

The following version halts the program immediately when the program comes to this line:

```
100 CALL KEY(0,K,S):: IF S<1
THEN 100
```

Pressing any key lets the program continue.

The following version, by contrast, will not halt the program until you press a key:

```
100 CALL KEY(0,K,S):: IF S<>1
THEN 130
110 IF K=? THEN (line number or
program action to be taken if this key is
pressed)
120 CALL KEY(0,K,S):: IF S<>1
THEN 120 (Pressing any key will halt the
program. Then pressing any key a second
time will continue the program, but note
exceptions in the following notes.)
130 (Program lines continued)
```

Both CALL KEY versions will allow you to continue, once they have halted the program, by pressing any key. Exceptions to this are if there are any other conditional (defined keys) specified and inserted between the full CALL KEY routine.

In the case of the first example, conditions/keys can be inserted between the line separator (::) and "IF S<1 THEN 100".

In the second example, conditional key statements can be inserted between line numbers 100 and 120.

Line 110 is a condition specifier. It will direct the computer to do a certain thing when the specified key is pressed; otherwise pressing any other key will continue the program.

The question mark in line 110 is the position to put the ASCII number of the key to be pressed, a choice up to the programmer. This makes it possible to escape from a running program. Quite Commonly, the uppercase letter "Q" is used to quit a program. The ASCII number for "Q" is 81. Line 110 can be:

```
IF K=81 THEN (line number direction
```

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to quitting portion of the program).

Be certain, if any files have been opened by the program, that the program is directed so as not to bypass any file CLOSE statements. A safeguard version in line 110 (for any version of CALL KEY using "0" as the first digit in its parenthesis), is to include both uppercase and lowercase ASCII numbers. For using "Q" to quit, 113 is the ASCII number of "q":

```
110 IF (K=81)+(K=113) THEN (to
program ending)
```

Between lines 100 and 120, other program line directions can be included in addition to line 110, such as if K=80 then GOTO a printer option (80="P") or if K=82 then go back to a portion of the program you wish to repeat (82="R"), etc. Where a program is directed back to any repeat action, program running conditions must be understood. If program is to re-read DATA, a RESTORE statement is important, or if it is to re-read a file, the file must first be closed, and then re-opened. Flags and counters in the program may need to be cleared or reset! These are some brief examples of other CALL KEY options.

It's a fly, it's a mosquito, no, it's a sprite

Here's a little routine that, if it had an appropriate sound, might cause the unsuspecting TIer to reach for a flyswatter. Jim Peterson used a PEEK that he credited to Craig Miller to write this little program. It requires Extended BASIC and a memory expansion.

```
100 ! MOSQUITO by Jim Peters
on from a PEEK by Craig Mille
r
110 CALL CLEAR :: CALL SPRITE
(#1,42,2,100,100)
120 RANDOMIZE :: CALL PEEK(-
1808,A,B,):: CALL MOTION(#1,
A-128,B-128):: GOTO 120
```

If you're concerned about the mosquito escaping, you can put up a screen by adding a statement to the end of line 110. Here it is:

```
CALL CHAR(32,"FF888888FF8888
88")
```

Using hex codes to modify fonts

The following article was written by Woody Wilson and appeared in The Computer Voice, the newsletter of the Southern California Computer Group, of which he is a member.—Ed.

I am going to show you how to easily change any character in a font to suit you.

Perhaps you may be interested in how

(See Page 31)

USER NOTES

(Continued from Page 30)

this subject came up again. A member of our group asked if anyone had a font that used a slashed zero. He needed it on his 80-column TI system because he was having difficulty distinguishing between the zero and the eight. In answering his request I found a program on the Funnelweb disk that made the job real easy.

What is a font? If you look in a small dictionary you might find it described as a receptacle for baptismal water or a full assortment of one size and style of printing type. The second definition more closely covers what I am going to discuss, but even it is not always true when we discuss computer fonts. Quite often we do not have complete sets a characters in the fonts we use, therefore it is important to know what is and is not supplied in the font.

If you have the latest version of Funnelweb you should find on the disk a program called CHARUTIL, a character file analysis utility. Run this file from the loader section of Funnelweb using either GPL or Program (E/A). When it loads I see on my monitor, "DSK5.CHARA1" and "1. Save as Source File," "2. Re-save as minimum file."

The file I want to look at is on drive 3 and is called "C1," so I change the filename on the screen and press Enter. I want to use it as a source file, so I select "1" next. As the output file I select my printer, so I change DSK5.CHARDAT/S to PIO. (I have a parallel printer.) When I press Enter, the printer starts and I let it run until I have enough printout for my purpose. You can print the entire file if you want. The larger fonts take about five pages on my printer.

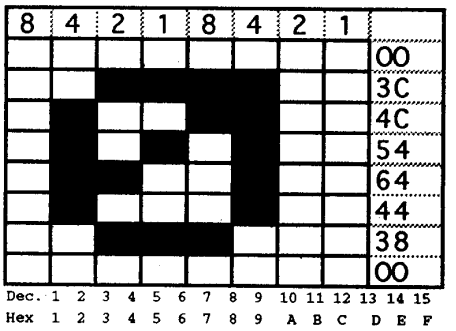
The first column will show CHAR with a two-digit hex code. To make it simple, if you don't understand hex codes, multiply the number on the left by 16 and add to it the value of the number on the right. Hex codes from zero to 9 are the same value as decimal zero to 9, 10 to 15 are called A, B, C, D, E, and F, respectively.

Look in your User's Reference Guide (the green book) on page III-1 at the ASCII Character Codes and determine the code for zero. You will find it is 48. Using a little math, we determine that hex 30 is decimal 48. Look at your printout and CHAR30 is shown as DATA >003C, >4C54, >6444, >3800.

Now that we have the value, what does it look like? If we draw a box with 64 squares and put the numbers 8, 4, 2, 1, 8, 4, 2, and 1 at the top of the column, we can fill in the boxes to correspond to the hex code. Start at the top and work down. In our example, the top row will be blank since >OO is given. The next row will have column and 2 filled in on the left half of our box and 8 and 4 on the right half. (>C is equal to 12). We continue on down the box and the result will be like the figure shown in the graphic.

We can change our character to suit ourselves and then recompute the hex code, but that does not change the way the computer sees it, unless we actually change the value in the font. And that is what we are going to do.

I find that an easy way to change any hex value in a disk-based program is to use DSKU. If we know the hex code to begin with, use the string search feature to locate the code and then edit the code, press CTRL W and the Enter key twice. Your new code is then written to the disk and the job is done. Here are the steps:



Load DSKU

Place disk having Font on it in a drive.

Select File Utilities from DSKU menu.

Select Find String

Type in Font filename. Use uppercase letters.

Type in the drive number in which the disk with the font is located.

Select "H" for hex.

Enter the hex string you want to search for on the disk.

If you know the hex code to replace the old code, enter it.

Press Enter to start search.

When the hex string is found, either edit it or replace the string.

Press CTRL-W and Enter key twice and the new string will be written to the disk.

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v12n12

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