

Feb 86

# NEW HAMPSHIRE OWNERS

## FEBRUARY 1986

### NEWSLETTER



NH99UG NEWSLETTER - PO BOX 5991 - MANCHESTER, NH 03108-5991

VOL. 4 NO. 2

## RANDOM RAMBLINGS

The most exciting news this month is the implementation of our 1986 Fundraiser. In order to defray expenses and purchase additional peripherals for the club, we have negotiated to distribute NEW Centronics friction-fed GLP-1's, the optional GLP tractor assemblies, PIO cables and ribbons. You may remember that last month we reprinted a review of the GLP which recently appeared in "inCider" magazine. Bear in mind that this review was written with the \$299 price tag in mind. The NH99UG is selling the PIO version, ready to hook up to your TI (assuming you have the proper interfacing), for only \$75 plus S/H. Please take a look at the last page of this newsletter and check out the GLP's specs which include among other capabilities NLD and sub/superscript... at this price it IS a Great Little Budget Printer!

During the last month we have tested various interfaces to assure ourselves of compatibility. Of course, the PIO port of the RS232 cards works fine, it works directly with Multi Video Services' (POB 246 - E.Amherst, NY 14051 (716) 688-0469)) standalone parallel printer interface, and with the AXIOM Parallax TI standalone interface. It will not work with a standalone interface which does not have an AC adapter (which is required to by printers that do not provide 5V on pin 18).

We have also contracted with a local cable manufacturer to distribute compatible cables. These are shielded 6ft long PIO cables. If you require longer lengths tell us! They can supply them at an additional cost of \$1 a foot. By the way, these cables also are compatible with the Star Micronics and Epson (not TI Impact) printers. If you would like to convert your TI Impact printer to parallel operation, we can supply you with the appropriate cable for \$15 + S/H (6ft shielded cable).

Many thanks to all those who have contributed to the initiation of this fundraiser. Notables include Brian Doane, Paul Johnson, Ellen Rule, and Robert Cason. Without their efforts, there wouldn't be a fundraiser! REMEMBER... all revenues generated by this fundraiser go to providing more and better services by the NH99UG... SUPPORT OUR EFFORTS!

Another bright note... member, Paul Johnson of Pepperell MA, has donated a 32K expansion card and internal disk drive to the club. This helps him with a tax deduction while it helps us all with our equipment fundraiser. Many, many, thanks! By the way, many of you who read MICROPENDIUM have probably noted that this is the same Paul Johnson who has been distributing EG&G/ROTRON SU2J7 Sprite Fans as a replacement to the P-Box hurricane. These are super quiet and come with complete, detailed instructions for direct replacement. They are available for \$18 postpaid, by contacting Paul at STATCO, Inc. POB 145 Townsend, MA 01469-0145 (617)-433-2070.

Leave it to Bailey to SPREAD the WORD! By popular demand, we have reprinted Richard Bailey's complete article on Lithium Batteries and the Mini-Memory Battery Replacement. We have received numerous requests for the reprints from TI owners from as far away as Sweden and South Africa! Please note that there is an addendum to the article by M. Rice of Scottsbluff, NE. Mr. Rice took the time (and expense) to call me with the Tidbit. We must also thank those gracious souls who included a contribution to defray copying costs!

### MORE Tidbits...

Paul Lanoie (NH99UG member from Berwick, ME) wrote to tell us that Service Merchandise carries Epson LX-80 ribbons for \$5. I hope it lasts longer than the ribbon I bought there for my SG-15 (1 month!... it, by the way, didn't fit; I had to rewind it onto my old spool!). Hopefully mine was an isolated case.

Bad news... member John Arduino of Newton Highlands, MA called to inform us that the Waltham Exchange Center is closing as of 3/19/86 and that exchanges will have to be handled in Lubbock, TX! You can reach them (TI Waltham) at 617/895-9100.

Montgomery Ward is conducting a clearance on soft/hardwares in stock. The Commodore 1702 monitor is selling for \$173 and is compatible with the TI. Software selections will vary by store.

Chuck Bower of Smyrna, DE supplied me with a list of TI wares which he sells (Chuck notes: "I am not in business, just trying to help other TI99/4A owners save money"). The list is too long to reprint here, but the prices are excellent and will be posted at the next meeting. Send a S.A.S.E. if you can't make it and want a reprint. All items are new and warrantied. He has three remaining GE 3-5160 computer cassette recorders available @ \$20 ea.

DAK (1-800-325-0800) is having a final closeout sale on the COMPUTER INFO GRABBER #4110 @ \$45 postpaid. This includes a 10 number memory speakerphone with built-in 300 baud modem. For those just getting into telecommunications this is a great buy! It has uncluttered my desk, which in itself is quite a bonus. Super easy to hook up. We have pinouts for both the TI99/4A and the Tandy Color Computer. The code to order at this price is "BCUS".

*Helene*

# LAST MINUTEs



It seems that lately every meeting has opened with the good news that there are additional new members! While the news may seem repetitious at this point, it is nonetheless exciting to know that people continue to use their TIs, and continue to be involved in the User Group. "Welcome" to the new members, as well as "thanks" to those die-hards who faithfully renew their memberships and contribute their ideas and energy to the NHUG. Be sure to post those cards from the last page of the January newsletter with your name and phone number. Suggested places are the store where you buy your computer supplies, the public library, grocery store or post office bulletin boards, or at your place of work. The survival of the group depends on your investment and enthusiasm!

Helene announced the club's purchase of a PE Box and disk drive; we are currently looking for an RS232 card. (Remember, your donations to a non-profit organization such as NHUG are tax-deductable!) The club is selling printer ribbons for a very small handling fee, with the proceeds going into an "equipment fund". Likewise, the small handling fee we realize for the sale of the GLP printers goes into the club coffers, not into the pockets of those who worked diligently to negotiate the deal!

The meeting proceeded with the exciting demonstration of the Centronics GLP (Great Little Printer). A Star enthusiast myself, I was amazed at the performance of this GLBP (Great Little Budget Printer)! While the normal print mode is 50 cps, the bidirectional capability speeds this little printer on its way. I say "little" because this printer is definitely a plus where space is a problem. The overall dimensions (without the optional tractor attached) are 13" w x 7.5" d x 2.5" h, and the unit weighs only 6.6 pounds. The printer uses any paper (4 to 10 inches) via the friction feed mechanism. The optional tractor feed insures alignment of the paper in lengthy printouts. A roll paper option is also available. Best of all, the printer is Epson compatible dot-matrix, so programs such as Danny Michael's Screen Dump, Graphx, and CSGO should function with only a minor line-spacing adjustment. In addition to the bit-image graphics, print modes options include enlarged, condensed, emphasized, super- and subscript. The manual is laid out in a way similar to the TI X-BASIC manual, with each function addressed separately, and includes programming examples of the functions. The printer operates via the RS232 card (RS232 or PIO) or with the newer Parallax interface (the one with the power supply), good news for those with unexpanded systems. For \$75.00 (plus \$15.00 for the tractor unit) this printer is unbeatable!

Curtis presented a tutorial in which he demonstrated the BASIC and X-BASIC DEFINE statement. He showed us how this versatile function can be used for centering, trigonometric functions and error trapping. Curtis used DEF to redefine CLEAR to a function which would change the screen color, a thought-provoking concept indeed!

Curtis also discussed the Supercartridge, a cartridge that contains an Editor/Assembler GROM, an 8K RAM chip and a Lithium battery. Using Cartbuster (available from the club library), programs can be loaded into the RAM chip where they remain until you delete them. An example of this use is to load the TI Writer loader into the RAM; this would facilitate speedy access to Editor and Formatter without waiting for the loader each time. The Supercart can be built by the technically inclined, or, purchased as Superspace (\$49.95 for cartridge and disk) from Model Masters, 22411 Mountain Laurel Way, Diamond Bar, CA. 91765. ((714) 861-8146) (No kits are available at present time.)

Richard Bailey demonstrated some interesting changes to TI-Writer made by Paul Lavoie. These allow one to change the screen color from the loader program, and to change the Tab numbers from 0-79 to 1-80. (Read more about this in Paul's article.)

Richard then demo'd Mack McCormick's Disk Cataloger which reads and sorts file names from disks. Richard reports that the sort of 235 file names took only a minute and one half! The main disadvantage seems to be that the program will read and catalog any disk without checking to see if its already been included in the file, and will then print file names as many times as the disk is read. Additionally, the program does not create a file of the finished product and must be run every time you want a printed list. Despite these short-comings, the program certainly will be welcome addition to any disk library.

Congratulations, Richard, on yet another article published in MICROpendium! For those unaware, MICROpendium is a monthly publication of approx. 50 pages devoted solely to the TI 99/4A. The publication may be seen at club meetings, or may be ordered from MICROpendium, P.O. Box 1343, Round Rock, TX. The rate is \$18.50/year for 1st class delivery or \$15/year for 3rd class.

A reminder to members that you may borrow club-owned items such as Paint & Print, Oscar, Jotto, or Diagnostic Module. If you are thinking of purchasing any of these soft/hardware items, take advantage of the opportunity to try them out first! Additionally, newsletter packets are available on loan (see Helene). If you, like many, are hungry for information about the TI, then you will enjoy perusing the letters from the clubs in our exchange group.

Lastly, be thinking about election of officers. Elections are only four meetings away, and the club's Constitution requires that nominees be determined by the May meeting. At this point, the offices of Treasurer and Newsletter Editor are "up for grabs", and any member is eligible to run for any office. Again, the club depends on its members for their input and efforts.

File closed---  
Ellen Rule, Secretary

REPLACING YOUR MINI MEMORY  
BATTERY FOR UNDER \$2.00

Richard J. Bailey  
68A Church Street  
Gonic, N. H. 03867  
NH99ER USER GROUP



CALENDAR by Richard Bailey

REVIEW by Ellen Rule  
NH 99'ers Users' Group

Apparently some people have checked with T.I. and found that it would cost up to \$35 to replace the battery in their Mini Memory. However for those brave souls who are willing to replace the battery themselves, it can be done for \$1.79. To find if your battery needs to be replaced, measure the battery voltage, it should be 3 volts, if it's much less than that, replace it.

The battery you need is a Radio Shack CR2032 (CAT#23-162). These cells have a shelf life of between 5 and 10 years and should last almost that long in the circuit. The case is the positive terminal just like the original but unlike the original, the CR2032 doesn't have leads and these must be carefully soldered on.

**WARNING!! Lithium batteries can be destroyed by heating them and certain types can explode!!!!**

If you don't think you're competent to make this modification, don't try, you might destroy your Mini Memory, or worse.

Scrape the center of the case where you are going to solder a solid #20 (or thereabouts) wire. A lead from a 1 or 2 watt resistor is ideal. Melt a small glob of solder onto the end of the wire and quickly solder it to the battery case. This is best done with a 100 watt soldering gun. Make sure the gun is hot before you try to solder the wire on. Soldering should take 1 second. Have a helper with a wet paper towel ready to press on the battery as soon as you remove the soldering gun. The insulation between terminals may be thermal plastic and could deform allowing the battery to short if you aren't quick. Cut the soldered lead close to the resistor body and flip the battery over and solder a lead on the other side, making sure that it doesn't touch the positive terminal. Make sure that this lead points 180 degrees away from the other lead so the battery will mount the same way as the original battery. Bend the leads so they will fit into the slots for the original battery. Before you remove the original, note that the positive lead is connected toward the outside of the board. Quickly solder the replacement in the same way. Check the voltage across the battery. If it reads 3 volts, you're all set.

ADDENDUM 2/15/86

M. Rice of Scottsbluff, NE called to inform us that TI now sells the SANYO 2430 Mini-Memory replacement battery complete with leads. The stock # is 1034598-0002. Each costs \$2.48 and shipping and handling is \$3.00 no matter the volume. TI Dealer Parts can be reached @ 806/741-3090 and 3094.

Did you know that a leap year occurs every four years unless the year is a century year not divisible by 400? Are you aware of the leap day that occurs every 327 years, causing September to have 31 days? These tidbits are only a small part of the information included on the Document file of the Calendar freeware by the NHUG's own Richard Bailey.

As informative as the documentation is, reading the file isn't a necessary prerequisite to using the Calendar disk. The programs are self-prompting and virtually foolproof. However, if you need to modify the program(s) or just want to know how the algorithms were developed, the four pages of documentation will provide the information you seek.

This disk contains two types of programs. The first, APPOINTCAL, prints an engagement calendar for the month (and year) you specify, giving the day of the week, the day of the year, and a space to jot down appointments or reminders. (The documentation explains that this program was written in response to a C-64 owner's query "You don't have anything like this for the old T.I., do you?" Who could resist such a challenge?) The second type of program will print out a standard calendar format for any year you specify from 1776 to 2099. You may select a size from 2.5 by 3.25 inch (TINYCAL) to three 8x10 inch sheets (BIGCAL).

The programs make full use of the Epson printer's capability for expanded, condensed and subscripted print. If your printer is Epson-compatible, like my Star SG-10, then you need to make minor changes to the line increment codes and the reset line; fortunately, the author has made the code readable by using variable names such as WDN\$ for "double-width on" and SOFF\$ for "subscript off." In the documentation, you will find a section on modifications should you desire, for example, to change the first day of the week to Monday instead of Sunday. (Make sure your modifications are on a back-up copy of the disk, not the original!)

This freeware item is straightforward and does exactly what it promises. (I have all the calendars I'll need for the next three years!) The versatile sizes are a bonus -- you can put TINYCAL in your checkbook, tack BIGCAL to the wall, or include SMALLERCAL in your Christmas cards! The disk is available from the club library, or send an initialized disk and prepaid mailer to the author,

Richard Bailey,  
68A Church St.,  
Gonic, NH 03867.

Remember that freeware authors receive their reward from the comments and monetary contributions you make, so send yours in!



## LITHIUM BATTERIES



RICHARD J. BAILEY  
68A CHURCH STREET  
GONIC, N.H. 03867  
NH99ERS USER GROUP

Judging from the letters in the August issue of MICROpendium, there seems to be a great deal of confusion and misunderstanding regarding lithium batteries. While I'm no battery expert, I would like to try to clear up some of the confusion with the information I've picked up over the years.

All batteries can be considered to be chemical systems consisting of electrodes of dissimilar materials with an electrolyte between them. The common flashlight battery most people are familiar with has a carbon center electrode, a zinc case, and a paste electrolyte of ammonium chloride. The characteristic voltage of a cell is determined by the cell chemistry and generally related to the elements used for the anode electrode. The electrolyte used in most cells is either a strong acid like sulfuric in a car battery or a strong base like potassium hydroxide in a nickel-cadmium (nicad) battery. In lithium batteries there is a wide range of materials used for the cathode electrode and a wide range of electrolytes used depending on the cell design. Some lithium cells have sulphur dioxide gas as the cathode material. Because the molecules in a gas are much further apart than in a liquid, these cells are not capable of current output in excess of a few milliamps (1000ths of an amp). To compensate for this some lithium cells designed for higher current output are pressurized to several atmospheres pressure to turn the gas to a liquid. These cells have had FAA restrictions because they could explode if shipped in unpressurized cargo holds. Defective hermetic seals on these cells can cause what the manufacturers of these cells refer to as "rapid venting" but you might call an explosion. Fortunately the cells used in digital watches and the Mini-Memory module are not highly pressurized. All lithium cells are hermetically sealed no matter what their internal pressure is because lithium is highly reactive and can burst into flame in air containing more than 2% moisture. Never open a lithium cell!

As a cell is discharged a chemical reaction takes place within the cell. The electrodes are the "fuel" for the reaction and the output is a current flow that operates a device such as a flashlight or the Mini-Memory module. When the "fuel" is depleted or the chemical equation that represents the reaction that takes place during discharge is satisfied, the battery is dead.

Depending on the cell chemistry cells can have either a reversible or non-reversible chemical system. If the cell is non-reversible it is called a primary cell and must be replaced when discharged. Trying to charge a primary cell will not work and can cause cell heating, internal pressure, and even "rapid venting". All lithium cells currently (pun) produced are primary cells and must not be charged, or for that matter, even discharged rapidly. Secondary cells have a reversible chemical system and charging them generally restores them to their original state. Examples of secondary cells are lead-acid (car) batteries and nicad batteries. Depending on the cell chemistry the cell will require either a constant-current (for nicad) or a constant-voltage (for

lead-acid) type charger. Charging either type by the opposite method can have disastrous results. Charging a secondary cell generally results in a gaseous chemical byproduct. While chargers are sold for carbon flashlight batteries, these are not too effective. As these cells discharge a chemical reaction produces hydrogen gas bubbles around the carbon rod that is the center electrode. Charging these cells does not remove the gas bubbles and eventually the carbon electrode will be totally isolated from the electrolyte by the gas bubbles. In nicad cells the released gasses recombine and the cell can be considered a closed (sealed) system. In a lead-acid battery the hydrogen gas produced can be ignited by a spark causing the battery to explode spewing acid and shrapnel in all directions. ( $2H_2O \rightarrow H_2 + O_2$  plus energy)

The bottom line is: 1) never charge any lithium battery, or any other primary cell, **PERIOD!**; 2) never charge any nicad cell except in a charger specifically designed for that type and capacity cell. Nicads require constant-current type chargers; 3) never charge a lead-acid cell including gelled-electrolyte type cells in a nicad charger. These cells require a constant-voltage type charger. Only charge these cells in a well vented area.

The above explanation is somewhat generalized and oversimplified and does not deal with some of the other characteristics of different types of cells. Lithium cells have a shelf life of 5-10 years. Nicads can be recharged up to 1000 times and perform almost as well as lithium in cold temperatures, making them ideal for use in flashlights if you're into winter mountain climbing like I am. Since none of the cells I've mentioned have a gauge to tell you when the cell is about to hit "empty", rechargeable cells are great for applications where you must know the amount of energy left in the cell. Nicads do not do well at higher temperatures around 100-125 degrees F. The self-discharge rate increases rapidly with temperature and cells might lose their charge in one week at these temperatures. Using nicads in the Mini-memory or a flashlight in a hot climate would not be a good idea. If nicads are allowed to go completely flat and stay in that condition for some time, the cells may develop internal shorts called "hairs" between the electrodes, rendering them useless unless you are familiar with the procedure of zapping shorts in nicads. It would also require three nicad cells wired in series (1.2 volts per cell) to replace one lithium cell (3 volts per cell) and where lithium watch cells are priced under \$2.00 at Radio Shack there is no reason to resort to nicads as replacements in the Mini-Memory.

To find if your Mini-Memory battery needs to be replaced, measure the cell voltage with a high impedance voltmeter. If the cell voltage is much less than 3.0 volts, the cell needs to be replaced. If you want complete instructions on replacing your Mini-Memory battery with a lithium watch battery, see my article in the August, 1985, New Hampshire User Group newsletter available through your user group if they exchange newsletters with us, or send a SASE (required!) to:

New Hampshire 99'ERS User Group, Inc.  
P.O. Box 5991  
Manchester, N.H. 03108-5991

# WHAT IS C?

by Ellen Rule  
NH 99er's User Group



What is C and what is its significance for the TI 99/4A? Although I had a vague idea of what C is, when this question was recently posed, I floundered. "It's sort of like Logo or Forth," I mumbled. Surprised at my own lack of information, I decided to investigate this new language, to learn how it is like or unlike other programming languages (such as BASIC, Logo, Forth, Pascal and Assembly) to which I've been exposed.

BASIC (Beginners' All-purpose Symbolic Instruction Code) is built into, or available for almost every computer, and is the most popular general purpose programming language. By memorizing 50 or so commands, then breaking your idea into step-by-step sequences, you can control just about any personal computer on the market. However, critics of this "high-level language" (meaning highly removed from the language of the computer itself) argue that BASIC doesn't meet everyone's needs, citing in particular its slow speed of execution -- slow for games, slow for number crunching and slow under intensive disk access. While millions have learned to program in BASIC and enjoy its relative simplicity and general purpose capabilities, others argue that BASIC has evolved to an unstructured, inefficient language which teaches poor programming habits. In contrast to BASIC, low level languages (Assembler and machine code) are structured, machine specific, and require intensive study and understanding of computer architecture and function in order to yield programs which execute with lightning speed. Between these extremes, the simplicity of BASIC and the versatility and speed of Assembly, are languages like Pascal, Logo, Forth and C. In researching C (see reference list at end of this article), I found that in many ways it is like Pascal, Logo, Forth and even BASIC, but in other ways unlike these languages. Perhaps C is a combination of the best features of all of them. Proponents of C describe C's virtues as a good blend of readability, portability, efficiency and raw speed.

Readability refers to the terms used in the code itself as well as how easily the code is followed and understood. Critics of BASIC argue that while the words are familiar, unstructured programming leads to code which is incomprehensible sometimes even to the author. Pascal, on the other hand, is cited frequently as the tool of the structured programmer, and by virtue of its English-like words, is reasonably easy to understand. Like Pascal, C is structured and uses many commands familiar to the BASIC and Pascal programmer. (It is said that if you know BASIC, you are halfway to knowing C; if you know Pascal, you are 80% there. (Commander)) For example, the BASIC statement `x*x+1` could be written in C as `x++` or `x+=1` or `x=x+1`. The BASIC FOR-NEXT loop, written in C could read: `for(x=1;x<=10;x=x+1)`. The statement initializes the value

of `x` to equal one, operates while `x` is less than or equal to ten, and increments `x` by one each time the statement is executed. Commands such as `if`, `else`, `while`, `do`, `for`, `switch`, `case`, `default`, `break`, `continue`, `return`, and `goto` demonstrate that C isn't the giant mental leap from BASIC that one might think.†

BASIC, in contrast to today's "modern" languages which use word processing-style editors, is considered by some to be "archaic" by virtue of its line-number based editor. Some versions of BASIC (like Macintosh Microsoft) and languages such as Logo use a format with no line numbers, as does C. In a way similar to CALLing a subprogram in TI Extended BASIC, these new statements access identified program units rather than GOingTO specific line numbers. In C, new functions can be written into the language, which means that, unlike BASIC, these new mid-level languages are "extensible". Function libraries can be built up and programs designed by combining pretested routines. (TI owners who have dabbled in Forth or Logo are familiar with this concept of building functions or "words" which are then combined to do bigger and faster things.) In contrast to BASIC, an interpreted language, many of these beyond-BASIC languages (including Pascal and C) are compiler languages, a feature which considerably increases speed of execution. While the BASIC interpreter trudges along, interpreting each command before execution, the C compiler generates true Assembly source code, the speed of which is beyond dispute. A drawback to working with a compiler language is some loss of the convenience of BASIC; to create a swift-running compiled language program, a sequence of accesses to the editor, compiler and linker must be plowed through every time you want to correct and test even a trivial bug. To relieve this tedium, some compiled languages have interpreters which are used for the interactive process of building and debugging modules, and compilers which are then used for running the finished product. By building and combining small units of code, the final compile/link process produces fast, efficient programming modules. Compiled C's speed of execution is said to be excellent. One benchmark, a simple bubble sort of 100 integers, took two minutes in BASIC and just over 4 seconds via C Power in a Commodore 64. (Brannon) Even on a computer with somewhat limited resources, C can perform exceptionally well. For programmers with "limited resources", the final consideration is cost.

While the availability and cost of C varies from one computer to another, C99, a version of C, is available for

†For those who want to read more about C, Commander has suggested two references for the C programmer: *The C Primer*, a beginners' reference by Les Hancock and Morris Kreiger, and *The C Programming Language* by Brian Kernighan and Dennis Ritchie (C's designer), considered the Bible of the C language.

# DORG



Curtis Alan Provance  
New Hampshire 99er's User Group

the 99/4A, according to Randy Holcomb. This user-supported software is available for a suggested donation of \$20.00 from Clint Pulley, 38 Townsend Ave., Burlington, Ontario Canada 67T 1Y6. Based on the small-C compiler by Ron Cain, this C has been, after some 30 revisions, ported from the original DEC PDP11/60 to the TI 99/4A. C99 is written mostly in C and is self-compiling, leaving it open to future modification and extensions. This should facilitate access to the many GPL-based routines "hiding" in the 99/4A console (floating point, interrupt processing, display formatting, etc.) and allow the addition of custom features to the compiler. The compiler generates assembly source (object code after you assemble it); additionally it can handle in-line assembly code. Code generated by this C compiler is claimed to be fully relocatable and can be saved as program-image files, according to Holcomb. Consequently, a wide variety of programs written in C for other machines can be ported to the 99/4A. Portability means that once a program has been written in C, it can be translated easily to run on another machine. New machines including the Apple Macintosh, the Atari 520 ST and Commodore Amiga support C as a primary applications language, a significant indication of the direction programming is going to take. What makes C special? Created in 1972, why has C suddenly become so popular just in the last few years? C seems to be readable (plain English, similar to BASIC or Pascal code with which we're familiar), versatile and open to modifications and extensions like Forth and Logo, widely available and portable (as ideal BASIC should be), inexpensive for the TI owner (like Forth and unlike Pascal), and fast in its execution without resorting to the complexity of writing one's own Assembly code. Like most programming languages, C has its ardent supporters, and only time will tell its lasting significance. Meanwhile, it seems that yet another sustaining breath of air has been given to TI 99/4A owners; as well, an exciting avenue has been opened for 99'er programmers to explore.

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- Heimark, Todd and Kathy Yakal, "Programming Languages: Communicating With Your Computer", Compute!, November 1985, 31-40.
- Holcomb, Randy, "Randy's Ravings", Computer Shopper, February 1986, p.77
- Thornburg, David, "Compilers, Interpreters, and Flow...", Compute!, September 1985, p.104.

How many times have you reserved memory for workspaces, screen buffers, etc.? Assume that you will need three separate workspaces and a buffer location to save a graphics screen. Generally, the code would look something like this:

```
(MINUS isn't required, merely an example of data);
MINUS DATA >FFFF (equates, data, or whatever)
VDPBUF BSS >300 (graphics screen)
MYWSP1 BSS >20
MYWSP2 BSS >20
MYWSP3 BSS >20
(remainder of code)
```

When assembled, this will generate numerous lines of >0000's in the object code. This wastes time during each load and wastes storage space on the disk. One solution is to use DORG as follows:

```
MINUS DATA >FFFF (equates, data, or whatever)
DORG (label is optional)
VDPBUF BSS >300 (graphics screen)
MYWSP1 BSS >20
MYWSP2 BSS >20
MYWSP3 BSS >20
RORG $+>360
(remainder of code)
```

Note that the RORG contains an operand of \$+>360. The '\$' refers to the address of the last relocatable address which in our example is MINUS+2 (the address after MINUS). If we had simply written 'RORG', the remainder of the code would have been assembled and loaded at the address immediately following MINUS. However, we have to reserve a block of >360 bytes! For numerous blocks, data, bytes, etc., the easiest to keep track of the reserved space is to use labels to determine the size of the block:

```
MINUS DATA >FFFF (equates, data, or whatever)
DSTART DORG
VDPBUF BSS >300 (graphics screen)
MYWSP1 BSS >20
MYWSP2 BSS >20
MYWSP3 BSS >20
DSIZE EQU $-DSTART
RORG $+DSIZE
```

DORG can also be used to change the loading address. For example, we may want to use the scratch pad for our workspaces, since the scratch pad is much faster:

```
MINUS DATA >FFFF (equates, data, or whatever)
DSTART DORG (label is optional)
VDPBUF BSS >300 (graphics screen)
DORG >8300
MYWSP1 BSS >20
MYWSP2 BSS >20
MYWSP3 BSS >20
```

RORG \$+>300

Remember that the VDP buffer still takes up space in the expansion memory, hence the RORG \$+>300.

DORG can also be used for more exotic purposes. How many times have you set up a PAB in VDP and then had to change it? How many times have you had to access character definitions, color bytes, sprite bytes, etc? You can use DORG to generate 'equates' simply and quickly. A good example is the Sprite Attribute List. I wish to access each sprite's X and Y location, pattern code, and early clock attribute with the minimum amount of typing (being rather lazy) as well as making my code easy to understand. First I will set up a dummy block for the first sprite:

```
DORG >300 address in VDP of list
SPROOY BYTE 0 Y value
SPROOX BYTE 0 X value
PAT00 BYTE 0 pattern code
ECA00 BYTE 0 early clock attribute
```

Now use the 'COPY' command in the EDITOR to copy the four BYTE lines; place the copy immediately after the original. Now place the cursor on the first line of the copy and use 'REPLACE STRING' to change '00' to '01' (I used two digits here to reserve space for sprites 10->31). Continue to copy and replace until you have a four line block for each sprite you will be using. Once that is done, you may return to normal code with an 'RORG'. No offset is required, since we aren't reserving room in expansion memory. In the remainder of your source code, you may refer directly to each sprite byte as needed. For example:

```
EXAMPL LI R0,SPR25X
LI R1,>80
BLWP @VSBW
```

This code will change the horizontal position of the 25th sprite to center screen. I realize that you could have done the same thing with equates; but imagine what it would take to type in 128 different equates! With this method, you don't have to worry about keeping track of memory and you have reduced the number of keystrokes from ~4300 to ~820 (for 32 sprites).

Don't think that this trick is only good for VDP RAM, though! If you wish to access bytes in the scratch pad, you may set up a dummy block to give them names. First set a single line:

```
BYTE 0
```

Now make a copy of it (you now have two). Make a copy of both of those (now four). Double once more for a total of 8 lines. Return to the first line and insert a line which reads DORG >8370. Now enter labels. I used the guide on pages 404-405 of the E/A manual.

```
DORG >8370
HADVDP BYTE 0 HIGHEST VDP ADDRESS
BYTE 0
DATPTR BYTE 0 DATA STACK POINTER
SUBPTR BYTE 0 SUBROUTINE STACK POINTER
KEYBRD BYTE 0 KEYBOARD NUMBER TO BE SCANNED
KEYCOD BYTE 0 KEY CODE DETECTED DURING KSCAN
```

JOYSTY BYTE 0 JOYSTICK Y VALUE

JOYSTX BYTE 0 JOYSTICK X VALUE

† etc. Enter as many as you like! †

In this example, the use of DORG saved only a few keystrokes over the use of equates. However, you could easily map out the entire scratch pad with this method, using BSS for large areas such as the subroutine and data stacks.

Don't forget to return to RORG or AORG when you are through with your dummy blocks. Remember that the advantages of DORG over equates are that you 1) save keystrokes, and 2) don't have to worry about keeping track of memory values. Enjoy!

### FROM THE PREZ

It seems I do nothing but apologize lately. If I slighted Ellen, I'm extremely sorry! Ellen, among other things, sends away for (AND PAYS FOR) most of the club's 'FREWARE' programs. There are also numerous other unsung heroes who bring in their monitors, cartridges, etc. Hooray to you all!

This next meeting will mainly be a MULTI-PLAN night. I will have my print codes file which will allow anyone to put printer control codes in their MULTI-PLAN files. I will also show you how to enter a large sheet of print codes easily using a disk fixer program.

The Boston Computer Society's TI special interest group is having a TI fair on April 5th. I know I will be going; maybe our club can have a 'presence' there, too. We'll pass on more info' as we get it.

The club now has not only a console and PEB, but also an internal drive and a 32K card. We still need a drive controller, etc. You people with extra peripheral devices - don't forget the tax credit you'll get from your generous donations!

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ZAP THE ZERO  
AND OTHER TI-WRITER  
IMPROVEMENTS



Paul G. Lanoie  
PO Box 658  
Berwick, ME 03901  
NH 9 9 U G

Hi! I'm still alive, but I have been busy. I've really been smoking the keys right off the keyboard and burning the ribbon off of the printer, fighting a gigantic dump that Waste Management Inc. wants to put in Berwick. Yupp; this TI/99 4A can be one heck of a tool, not just a toy.

I've been hacking away at TI-Writer again, and I have come up with some changes that you might like. The 1st change involves all versions of TI-Writer, while the other changes involve the revised character set (CHARA1), and the X-Basic auto loader. All of these changes involve the EDITOR mode of operation.

1st and what I think is the neatest. When you need to set your margins and tabs, you enter the COMMAND mode and select the TABS option. Ever notice how the first column is numbered 0, and the last column is numbered 79? So when you need a left margin of 6, you have to set the L at 5, and when you need a right margin of 74, you have to set the R at 73? A little strange and agrevating isn't it. Well you can ZAP the ZERO!!! and make column 1, column 1 etc.

2nd; the \*End of File Version 1.0 marker at the end of your text has been changed to .-----  
I find this less distracting than the original which pulls the eye like a magnet from the job at hand. Not last but probably least; I have never been in love with the "e" in the file CHARA1, so I modified it a bit. (To the author of CHARA1; the rest is great!)

Also, you can modify the X-Basic auto loader to give you any screen/character color that you want. And you select these from a menu.

How? OK here goes, but first for you people who have to fight dumps etc. and don't have time to mess around, get your revised copy of TI-Writer from the club. I had Bailey (you know, the guy from Gonic?) bring a revised disk to the Feb. meeting. I couldn't make it.

All of the changes were made using the Miller Graphics "Advanced Diagnostics", however I'm sure that DISKE or other disk access programs would allow you to do the same.

ZAP the ZERO: Look at the last sector of the EDITA1 file. (this is sector 73 on the clubs' auto loader version, and sector 67 on the original TI-Writer disk). Displaying in ASCII you will see at bytes 77 thru 242 the text for the column numbers. When you get done, the text must still be at bytes 77 thru 242. Delete the zero, then pad a space in at the end of what would be the 1st line displayed in the TABS mode. ("b" means space)

delete the zero>0123456789 123456789 ...789 123456789 b<extra space here.

1 2 7 8

Actually, from what I can figure, you can put anything you want in these bytes. So long as it uses the same bytes, 77 thru 242. The object of the spaces of course, is to keep everything lined up for a proper display.

End of File Version 1.0 marker: You'll find this guy in the 2nd sector of the EDITA1 file. This is sector 43 of the clubs' X-Basic auto loader version, and sector 35 of the original TI-Writer disk. The EOF marker is at bytes 44 thru 67. Change it to whatever you like. As I said, I kind of like .-----

Note: the next 2 changes don't apply to the original TI-Writer.

To change the "e" in "CHARA1" go to sector 37. Display the sector in Hex mode. Change bytes 49 thru 52 as follows; change 1C28301C to 182C201C. Some of the small characters are made up from a 4x4 dot matrix, so there's only so much that you can do with these, but I do like my "e" better.

Screen color options in X-Basic auto loader. I'll show you what I did, but keep in mind that you can use any choice of colors that you want in the CALL SCREEN(x) and CALL COLOR(x,x,x) statements that appear in the "LOAD" program. What follows are the lines of the "LOAD" program that have been either changed or added.

```
110 CALL CLEAR :: CALL SCREEN(2):: CALL INIT :: GOTO 130 :: CALL LOAD :: CALL CHAR :: CALL COLOR :: CALL CHAR :: CALL LINK  
:: CALL KEY  
130 FOR K=0 TO 12 :: CALL COLOR(K,16,15):: NEXT K :: CALL CHAR(129,"000000FF"):: CALL COLOR(13,1,15,14,16,15)  
200 DISPLAY AT(19,2):" FROM YOUR":" MASSACHUSETTS BBS SYSOPS":" Rus sell,John Gary Rev. by NH/99ers, 2/2/86"  
250 DISPLAY AT(12,4):" Screen Color Options"  
251 DISPLAY AT(8,3):"PRESS 1 Black on White" :: DISPLAY AT(10,10):"2 Black on Gray" :: DISPLAY AT(12,10)BEEP:"3 White on  
Gray" :: DISPLAY AT(14,10):"4 Whit e on Black"  
252 CALL KEY(3,K,ST):: IF ST<1 OR K<49 OR K>52 THEN 252  
253 ON K-48 GOTO 255,256,257,258  
255 DISPLAY ERASE ALL :: CALL COLOR(10,2,16,11,2,16,12,2,16,13,2,16,14,2,16) :: CALL LINK("EDITA","PIO"):: RUN  
256 DISPLAY ERASE ALL :: CALL COLOR(10,2,15,11,2,15,12,2,15,13,2,15,14,2,15) :: CALL LINK("EDITA","PIO"):: RUN  
257 DISPLAY ERASE ALL :: CALL COLOR(10,16,15,11,16,15,12,16,15,13,16,15,14,16,15) :: CALL LINK("EDITA","PIO"):: RUN  
258 DISPLAY ERASE ALL :: CALL COLOR(10,16,2,11,16,2,12,16,2,13,16,2,14,16,2) :: CALL LINK("EDITA","PIO"):: RUN
```

As you can see, my color choices in the CALL SCREEN(x), and the CALL COLOR(x,x,x) statements use either 2, 15, or 16, black, gray, and white respectively. I have a monochrome monitor, so these colors give me the best resolution. Again, use whatever you like. The added lines are what create the menu at the start of the EDITOR mode. After entering the EDITOR mode you must hit CTRL 3 (screen color) to get your color choice. Also note that you should edit lines 255 thru 260 to match your type of printer port. (PIO in my case)

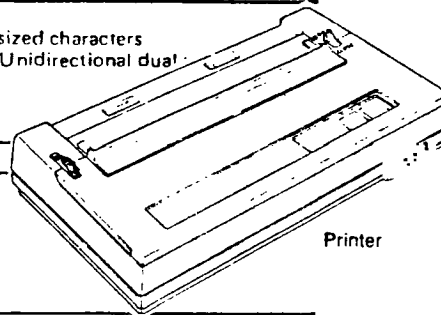
I hope you like the changes. Like I said, I got the biggest zing out of zapping the zero.



# NH99UG 1986 FUNDRAISER

## GLP-1 SPECIFICATIONS

Print Method	Impact dot matrix
Print Head	9 pins
Print Speed	50 cps
Print Direction	<ul style="list-style-type: none"> <li>• Bidirectional logic seeking printing:                     <ul style="list-style-type: none"> <li>- Pica/Enlarged/Condensed/Emphasized characters</li> <li>- Superscript/Subscript characters (Unidirectional dual one line)</li> </ul> </li> <li>• Unidirectional printing:                     <ul style="list-style-type: none"> <li>- Bit image/Graphic characters</li> </ul> </li> </ul>
Copies	3 copies including an original
Character Set	ASCII 96 characters 48 European characters 16 Greek characters 48 graphic characters 16 mathematical and extra symbols 5 symbols



Character Size	Pica	Enlarged	Superscript/ Subscript
Pica	2.4 (H) x 2.0 (W) mm	2.4 (H) x 4.0 (W) mm	1.2 (H) x 2.0 (W) mm
Condensed	2.4 (H) x 1.2 (W) mm	2.4 (H) x 2.4 (W) mm	1.2 (H) x 1.2 (W) mm
Graphic character		2.8 (H) x 2.4 (W) mm	
Special graphic character		4.2 (H) x 2.4 (W) mm	
Character Formation	Pica characters Graphic characters Bit image	9 x 9 dot matrix (half dot 4) 8 x 6 dot matrix 8 x 480 (standard density) 8 x 960 (double density) 8 x 1920 (quadruple density)	
Dot Pitch	Horizontal pitch Vertical pitch	1/60" 1/72"	
Line Spacing	1/6 inch, 1/8 inch or programmed pitch 1/216" x X		
Characters Printable on One Line	Normal mode Enlarged mode Condensed mode Condensed enlarged mode	80 chars/line (10 cpi) 40 chars/line (5 cpi) 132 chars/line (17 cpi) 66 chars/line (8.5 cpi)	
Printing Paper Width	Cut sheet (A4 size) (Letter size) Roll paper (option) Fanfold paper (option)	210.8 mm (8.3 inches) 216 mm (8.5 inches) 216 mm (8.5 inches) or 210.8 mm (8.3 inches) (Max. dia. of roll 70 mm) 101.6 mm (4 inches) to 254 mm (10 inches)	
Ink Ribbon	Cassette type (fabric ribbon loop) Ribbon: width 8 mm, length 10 m, color: black Lite Design Value: 500,000 characters (alphanumeric print)		
Environmental Conditions	Temperature: 5 ~ 35° C (in operation), -20 to 60° C (in storage) Humidity: 20 ~ 80%		
Power Supply	117,220 or 240VAC ± 10%, 50/60 Hz		
Power Consumption	30W		
Dimensions	330 (W) x 190 (D) x 70 (H) mm		
Weight	3.0 kg (6.6 lbs.)		
Interface	• Centronics parallel interface		

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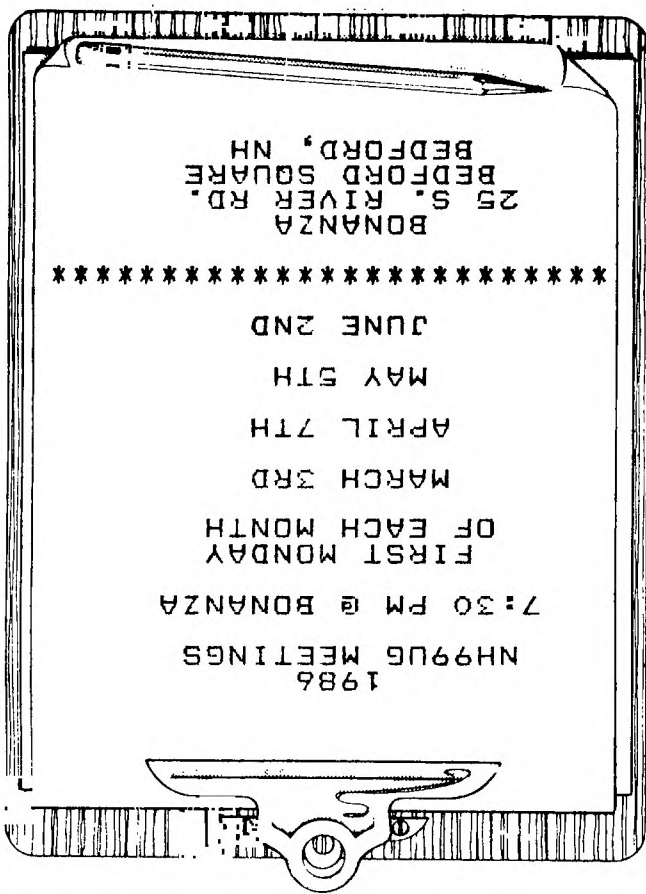
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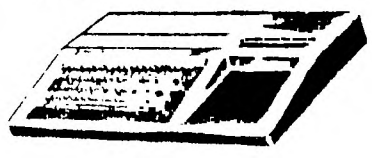
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