MAY 15/16 LIMA MULTI USER GROUP CONFERENCE
REED HALL, OHIO STATE UNIVERSITY LIMA CAMPUS
SCHEDULE OF EVENTS: (updated April 13)

WHO'S COMING:
We expect guests from the far corners of North America including Edmonton Alberta Canada, Florida, Maine, and California. Numerous user groups have requested tables as have these dealers: L.L. Conner, Competition Computer, Cooprodine, Bud Mills Service, Harrison Software, O.P.A., Geneal Computerware, Crystal Software, Dave Connery, Ramchargd Computer, Tigercub, and MS Express. Asgard

DISK COPYING:
ONLY disks added to the Lima user group software library since the 1991 MUG conference will be available at no cost for copying by a designated representative of any user group. This offer is open only to user groups and not to individuals. Commented listings of any of these disks have already been distributed to other user groups with our April newsletter, but more disks have been added to our library since this distribution. Specifically, Lima library floppy disk numbers 557-710 will be available, a total of 153 disks (= 306 disk sides). Almost everything is in SSSD format. Several printed annotated descriptions of these disks will be available for examination. Bring your own blank disks.

SCHEDULE AND SPEAKER LIST:
Friday May 15: 4PM-8PM. Setup time. Disk copy stations will be available. This is a good time to meet copy informally with other TI computer users and maybe help us move tables and chairs. You can come and go as you please, but the doors will be locked after 8PM.

Saturday May 16:
7:30AM Doors open. Setup time. Disk copying until 8PM
8:00 - 9:00AM Room 101. Speaker Ken Gladyszewski- "Do it yourself products for the TI, including analog to digital conversion"
8:30 - 9:30AM Room 150, Speaker Charles Good- "A review of FUNNELWEB v5 with a completely rewritten editor" 9:00 - 10:00AM Room 101. Meeting of "National Committee for TI Standards", Don O'Neil presiding
9:30 - 10:30 Room 150. Speaker Joe Ross- "Applications for C-SHELL 99"
10:00-11:00AM Room 101. Speaker Deloris Werths- "Programming music for the MIDI Interface: new music from Harrison Software"
10:30 - 11:30AM Room 150. Speaker Bill Nelson- "Comprodine Products"
11:00AM - 12:30PM Room 150. Speaker Gary Bowser- "Hardware and software from O.P.A."
12:30 - 1:30PM Room 150. Speaker Bruce Harrison- "The newest non-music offerings from Harrison Software"
1:00PM - FOOD SERVICE CLOSES
1:00 - 2:00PM Room 101. Speakers Glenn Spooner and Jeannine Good- "Teaching TI LOGO to a first grade student: a real lesson taught to a real first grader"
1:30 - 2:30PM Room 150. Speakers Mike Sealy and Mickey Schait- "The latest software from MS Express"
2:00 - 3:00PM Room 101. Speaker Beery Miller- "Software for the Geneve from 9/640 news"
2:30 - 3:15PM Room 150. Speaker Jim Peterson- "A Programmable Calculator"
3:00 - 4:00PM Room 150, Speaker Bud Mills- "Products of Bud Mills Services"
3:00 - 4:00PM Room 101. Speaker Karl Romstedt- "A new character editor"
4:00 - 5:00PM Room 150 Speaker Lee Bendick- "A demonstration of the TI-99/8 and its unique set of peripherals"
5:00 - 6:00PM Room 150. Speaker Barry Traver- "Porting MS-DOS text files and software over to the 99/4A"

(Videotapes will be available for $15 at the Lima table. Make sure your tapes and/or money are clearly marked with the address. If you can't attend the conference, your user group can send $15 or three tapes and $3.75 to the address below.

FOR MORE INFORMATION: (such as hotel phone numbers)
Write the Lima User Group at P.O. Box 647, Venedocia Ohio 43594 or phone Dave Szipl (419-286-7106) or Charles Good (419-667-7311) evenings eastern time. **DONE**
THE TI-74 "BASICALC": A MODERN BK POCKET SZIZED
REINCARNATION OF THE CC40 AND 99/4A
reviewed by Charles Good
Lima Ohio User Group

Why did TI suspend further HexBus product development and stop selling the CC40 in late 1984 less than two years after the CC40 introduction in January 1983? No, it probably wasn’t because TI’s non release of the “didn’t work very well” Wafertape Digital Tape Drive left the CC40 without any means of mass storage. TI had that problem solved with the CC40+, which had a built in reliable cassette interface. But the CC40+ was never released. Why? A probable answer to these questions is that TI had something better up its sleeve. In 1985 TI began selling the TI-74, a downsized improved version of the CC40 with an optional cassette interface. In 1992 these products are still available.

The TI-74 is “modern” in the sense that TI still actively sells the product through dealers. Although first released in 1985, my TI-74 user guides have a 1990 copyright indicating TI’s continuing support of the machine. The TI-74 is a “reincarnation” of the CC40 and 99/4A in the sense that its BASIC is very similar to TI Extended BASIC for the /4A and almost identical to the BASIC used in the CC40. Anyone familiar with Extended BASIC on the /4A will have no trouble programming the TI-74. The similarities between the 99/4A and the TI-74 are so profound that both the Lima Ohio user group and the Swedish user group have members who own a TI-74 and do NOT own a 99/4A. I have typed in several games and application programs written for the 99/4A into my TI-74 with very little modification. Finally the TI-74 can be considered a “pocket” computer because it measures only about 4 x 8 x 1 inches. You can carry the thing around in your shirt pocket if you don’t mind having half the computer sticking out beyond top of the pocket.

The TI-74 can best be described as a reduced-sized CC40 with more memory, a greatly enhanced set of scientific calculator functions, and a slightly reduced suite BASIC commands compared to the CC40. The keyboard layout of the TI-74 is very similar to that of the CC40. Anyone familiar with the key combinations of the CC40 will find the same keys, usually in the same place on the keyboard, do the same things on the TI-74. Typing FRE(0) on the TI-74 shows 7710 bytes of program space available for BASIC programs. On the unenhanced 6K CC40 a FRE(0) shows 5730 bytes available to BASIC.

PHYSICAL DESCRIPTION:
The TI-74 is powered by 4 AAA batteries or an optional AC transformer. Most memory contents are preserved when the computer is “OFF”. Although TI makes no claims about how long the batteries should last, my experience suggests several tens of hours of “ON” time on a single set of batteries and many more hours of “computer is OFF” time. Unlike many “modern” laptop and palmtop computers, the TI-74
does not have battery eating features such as a backlit display screen or a built in hard drive. Like the CC40 the TI-74 has an LCD display that shows 31 5x7 pixel characters of an 80 character line. You can scroll or window left/right with arrow keys and can use the up/down arrow keys to display adjacent lines. A contrast adjustment allows viewing in most lighting situations.

The keyboard has slightly concave rectangular (chicklet style) keys which provide a definite tactile response when a keypress is detected. Keys are arranged in a manner similar to, but not identical with, the CC40 keyboard. The alphanumeric keys are arranged typewriter style with a large <ENTER> key and (unlike the CC40) a shift key on both sides of the space bar. Cursor and other special purpose keys (FNC Mode Break Run) are lined up in a row above the letter keys where one usually expects to find number keys. The number keys form a numeric keypad to the right of the letter keys along with large ON and OFF keys. Most keys have at least two functions and many have more. For example, the letter keys all have specific calculator functions in CALC mode and in BASIC mode these same letter keys can be used to display on screen most BASIC commands with just two keypresses. Keys are closer together than on the CC40 so touch typing is not possible. However two finger typing is fairly easy. I am composing the first draft of this article on my TI-74.

CALCULATOR MODE:
Pressing the MODE key while in BASIC command mode switches the TI-74 to calculator mode. A total of 70 "scientific calculator" functions are available by entering a number and then pressing one or two keys to perform some action on the number. CALC functions include linear regression, permutations, regular and hyperbolic trig functions, a full range of statistics, and much more. One interesting CALC function allows you to enter angles in degrees as degrees-minutes-seconds and have this converted to degrees-decimals. Factorials up to 83 can be calculated by just entering a whole number and then pressing the "n!" key. An INV(erase) key will reverse the effect of most CALC functions. For example pressing INV and TAN will yield the ARCTAN of the displayed number.

Mathematical display and accuracy are identical to that of the 99/4A and the CC40. Ten digits are displayed on screen with internal calculations carried to 13 or 14 digits. Large and very small numbers are displayed in scientific notation.

As an educator, one feature of CALC mode I particularly appreciate is STAT mode. I can enter a long list of student test scores and then obtain statistical information such as the median and standard deviation of these data. Other statistics available once you enter a set of numbers (data) include sum, sum of squares, number of data entries, regression, line intercept and slope, and correlation coefficient. Stastical data can be entered as single data values (as I do for student grades) or paired values (such as plots on a two dimensional graph).

BASIC programs as well as text assigned to "hot keys" (up to 10 hot keys each of which will recall from memory up to 80 characters of text and/or mathematical formulas) remain in memory when in CALC mode and can be immediately recalled by pressing the MODE button to enter BASIC mode. Stastical data remain in memory when you switch from CALC to BASIC mode and can later be accessed by going back to CALC. When you turn the computer "OFF" and later turn it "ON" you are returned to the mode you left when you pressed "OFF". Memory contents (BASIC programs, the contents of "hot keys", and stastical data) are all preserved when the computer is "OFF".

BASIC MODE:
Except for lacking commands for user defined graphics, speech, color, sprites, and sound, TI-74 BASIC is very similar to TI Extended BASIC on the 99/4A. Keeping in mind the limited screen display of the TI-74, 99/4A users should have no trouble programming the TI-74. Although TI-74 BASIC has a few fewer functions than CC40 BASIC the differences between the two are minor. Most CC40 BASIC software listings can be typed into the TI-74 with no modifications at all and will run with no problems.

The following functions in CC40 BASIC are not available on the TI-74:
-- BEEP (Used in the CC40 with DISPLAT AT. There is no sound at all available on the TI-74).
-- ATTACH and RELEASE (A feature of CC40 subprograms I have never actually seen used).
-- CALL CHAR (There are no user definable display characters).
-- CALL INDIC (No user definable display indicators are available).
-- CALL SETLANG (No alternative languages for text prompts. All built in text prompts in the TI-74 and its software modules are in English).
-- CALL VERSION (The version of BASIC is identical on all TI-74's).
-- CALL CLEANUP (Instead you can remove from memory variables not being used in the current program by SAVEing to a non existent device).
-- There is no direct access to assembly language except for CALL 10 on the TI-74. Therefore the following CALL's of CC40 BASIC are not available on the TI-74; SETMEM POKE PEEK LOAD EXEC RELMEM and DEBUG.

The only important CC40 BASIC software I have that can't be modified to work with the TI-74 are "DIR" programs designed to read the directories of mass storage devices such as the Mafertape drive and Quickdisk drive. These programs are very useful because they give you the exact spelling of program and data file names. You need the exact spelling to load from these devices. The directory reading software uses assembly CALL's not available on the TI-74. The only other
important assembly CALL known to me on the CC40 is a CALL EXEC(xxxx) to deactivate the battery saving automatic power down. The same thing can be done on the TI-74 by a specific sequence of keypresses.

ACCESSORIES AND PERIPHERALS:
Standard equipment that comes with the TI-74 includes two book length guides, a set of alkaline batteries, a plastic hard case, and a quick reference card that fits into the inside of the hard case's hinged lid. I really like the hard case and keep my TI-74 in the case most of the time, even when I am actively using the computer as I am now to enter the text of this article. The case is very tough and prevents accidental keypresses. The increased size of the TI-74 plus case does, however, make it more difficult to keep the computer in one's shirt pocket. If you open the case lid all the way you can lean the TI-74 against a small object at a convenient viewing/typing angle and position the case lid over the object's top for stability. Right now as I type this article I have my TI-74 resting against an apple!

A cartridge port to the right of the display accepts a solid state software or RAM cartridge. Available software cartridges include LEARN PASCAL, STATISTICS, CHEMICAL ENGINEERING, FINANCE, and MATHEMATICS. The capabilities of these software cartridges are almost identical to cartridges of the same name sold for the CC40 and the TI-95 programmable calculator. When I sent in my TI-74 registration card to TI, I received back a large color brochure describing TI's custom module service for industry. For about $100 per module TI offers to manufacture (burn eromos for) custom TI-74 software modules tailored to a customer's specifications. Specific examples of some custom modules are described in the brochure.

For me the most useful TI-74 module is the battery backed 8K RAM. A similar module exists for the CC40. You can save an "image" of the TI-74's memory into the module, remove the module, and later reinstall the 8K RAM and load its contents back into the TI-74. Used this way the 8K RAM serves as a mass storage device. You can also leave the RAM module in the TI-74 and exchange the contents of the computer's memory for what is stored in the module. You can thus keep two different BASIC programs in the computer at the same time, one in the RAM module and one in the computer's memory, switching back and forth between the two. This memory flip-flop trick is something you can't do with a CC40. You can also use the 8K RAM as additional CPU memory by invoking CALL ADDMEM. This makes about 15700 bytes of memory available in BASIC instead of the the TI-74's normal 7710 bytes.

The TI-74 has a 10 pin peripheral connector TI calls the Dock Bus. Available TI peripherals that fit this connector include an AC adapter adapter (the "adapter adapter" plugs into the TI-74 and TI's AC201 AC adapter plugs into the "adapter adapter"), a battery powered thermal printer, a cassette tape recorder interface, and an MS-DOS computer interface. I don't yet own any of these peripherals, so the descriptions below are based on information published by TI and on articles that have appeared in past issues of TI PCC NOTES.

The PC-324 THERMAL PRINTER is set up as device #12 and uses an unusual size thermal paper roll. You can either purchase FAX paper and cut it to size with a hack saw or pay $5 at a dealer for a 3 roll pack of "official" paper. Sort of reminds you of the paper "problem" with the 99/4's Thermal Printer (TP)! The small PC-324 printer is about the same length and width as the TI-74. It runs on batteries or an optional AC adapter. Text is only 24 columns. There is only one text font and there are no dot addressable graphics. From CALC mode you can use the PRINT key at any time to print the screen display. From BASIC mode you can LIST programs or OPEN the printer in a program or from command mode and print whatever you want.

The CI-7 CASSETTE INTERFACE CABLE allows you to use most cassette audio recorders, even those that use miniature cassettes, to save BASIC programs or data files to tape. It appears to work the same way as the cassette interface of the never released CC40 PLUS. Its operation also resembles that of the Watertape drive. You can save several files sequentially on the same tape each with a different file name. If you don't know the exact starting position of a particular file the TI-74 can search the tape from the beginning for a particular file name and when found load that file. The TI-74 can also be programmed to load the next file found on the tape irrespective of file name. Screen prompts are available telling the operator to press the recorder's PLAY, RECORD, and STOP buttons and the computer automatically senses the beginning and end of the requested file. You cannot use the CI-7 to save programs from a CC40. Many have tried and failed to do this. Apparently the TI-74 contains within it specific code needed to operate the CI-7 cassette interface, code which is lacking in the CC40.

The PC INTERFACE CABLE connects between the Dock Bus and the 25 pin parallel port of an MS-DOS computer. With this cable you can use the TI-74 to directly control the MS-DOS computer via several device numbers. Addressing device 14 lets you print using a parallel printer connected to the PC. Device 45 lets you direct output from the TI-74 to the PC's monitor for a nice 80 column multi line display. You can save or load TI-74 programs to and from the PC's disk drives by referencing device 100. Text in ASCII format can be saved to the PC's drives with device 101. If you own an MS-DOS computer this cable would seem to be a very useful TI-74 peripheral. Can it be used with the CC40? I don't know, but someone should find out. The PC interface may be the mass storage solution for CC40 owners who cannot obtain a Quickdisk or Watertape drive.

NEXBUS COMPATIBILITY:

Superficially the 10 pin Dock Bus looks quite different...
from the 8 pin HexBus. However, as first noted in 1990 in articles published in TI PCC NEWS AND later in an article by Dan Eicher in the March 1992 issue of the Lima User Group newsletter, the Dock Bus and HexBus are electronically identical. Two extra Dock Bus lines not found in the HexBus allow an external 6 volt source to power the computer or peripheral through the bus. By connecting the proper wires of a HexBus cable to corresponding wires of a Dock Bus cable all HEXBUS PERIPHERALS ARE COMPATIBLE WITH THE TI-74! If you don't want to make your own cable you can buy one from L.L. Conner for $10. Plug one end of the Conner cable into the TI-74's Dock Bus and attach a HexBus cable to the other end. With this HexBus/Dock Bus cable I have used my TI-74 with the following HexBus peripherals: RS232, Printer BO, Printer Plotter, Wafertape Drive, and Quicksisk drive.

I much prefer to use my use Printer 80 with my TI-74 rather than the 24 column PC324 printer. Like the PC324 the Printer 80 can be run on batteries or an AC adapter. Unlike the small hard to find expensive rolls of thermal paper used by the PC324, the Printer 80 uses easily obtainable FAX paper rolls or with a Thermal Ribbon obtainable from Sears or by mail from TI regular sheets of typing paper.

MASS STORAGE AND CC40/TI-74 SOFTWARE COMPATIBILITY:

With my TI-74 I can OLD SAVE and OPEN files to and from my Quicksisk (device B) with no problems at all. This is in spite of the fact that I have the HexBus rather than the Dock Bus version of the Quicksisk drive. All I need is the HexBus/Dock Bus interface cable made by L.L. Conner. I know of someone who uses a Dock Bus Quicksisk drive with his CC40, also with no problems. The few CC40 applications written for the Wafertape drive assume this device is configured as device 8. That's how I have always used my Wafertape Drive with my own CC40. It is fortunate that the tape drive can be switched to other device numbers because I can't successfully use my Wafertape drive as device 1 with the TI-74. The TI-74 expects the CI-7 cassette interface to be device 1. If I switch my Wafertape drive to some other device number (I use device 2) then I can OLD SAVE and OPEN files to and from wafertapes with my TI-74.

I knew when I bought my TI-74 that the syntax of TI-74 BASIC is almost identical to that of CC40 BASIC. I now know that the similarities between the BASICS of these two devices are more profound. Any BASIC program written on a CC40 and saved to Quickisk or Wafertape will successfully OLD into the TI-74 and if the program doesn't use any of the BASIC functions unique to the CC40 will RUN in the TI-74. Almost my entire library of CC40 BASIC programs stored on disk or wafertape will LOAD and RUN out of my TI-74! The two computers use similar 8 bit central processor chips (TMS70C20 for the CC40 and TMS70C46 for the TI-74) that use the same assembly instruction sets and BASIC token codes.

GENERAL CONCLUSIONS: COMPARING THE CC40 AND TI-74:

The only reason for using for using small "notebook" or "palatop" computers such as the CC40 or TI-74 is portability and/or ease of operation. The additional memory and better displays of desktop computers mean that in general desktops are more powerful. Software is available for desktops that can accomplish anything that can be done with ROM cartridge or BASIC software available for the CC40 and TI-74. There is a lot to be said for portability! The ability to carry the CC40 or TI-74 around with you and use them anywhere (a classroom, the office on a camping trip etc) is the raison d'être of these small computers. Unlike modern laptop computers whose batteries usually last less than 4 hours per charge these small TI machines last tens or a couple of hundred hours of on time on a set of batteries. For use in the field the TI-74 and CC40 and their battery operated peripherals offer lots of convenience. For example, I am typing this article while I lay in bed propped against a couple of pillows. A few minutes ago I made a phone call from the phone by my bed that required me to look up the phone number. I have my name/address/phone data base stored in my TI-74's 8K RAM cartridge, so I did a CALL GET(1) to store this article in the RAM cartridge and at the same time put my data base in the TI-74's memory, I looked up the number and made the call. Then I did another CALL SET(1) to bring back my document into memory and put my data base back into the RAM cartridge.

ADVANTAGES OF THE CC40:

--1-Its CHEAPER. You can get one used for $55. Used TI-74s are hard to find and a new one costs $100.
--2-CC40 BASIC is a bit more powerful.
--3-The KEYBOARD is physically larger and thus according to some people easier to type on than the keyboard of the TI-74.
--4-There is an assembly language word processing cartridge called MEMO PROCESSOR available from TI for the CC40. No commercial word processing software is available for the TI-74. I am using a BASIC word processor program I wrote myself to enter this article into my TI-74.

MEMO PROCESSOR is much better than my BASIC word processor.

ADVANTAGES OF THE TI-74:

--1-CALC MODE: Scientists, engineers, and educators will appreciate the rapid availability of 70 scientific and statistical functions on the TI-74. The same sorts of calculations can be done in BASIC with the CC40 (and the TI-74) by putting formulas into BASIC programs, but doing the math directly from the keyboard is much easier and faster.
--2-More user memory is available on the TI-74 than you get in an unexpanded CC40.
--3-Physical size. The CC40 is just a little too big to get your hand around and is slightly awkward to carry around or hold in one hand. No matter how you carry the CC40 it seems the keyboard overlays are about to fall off and your gripping fingers have trouble finding a place where they don't press some keys. In my opinion the TI-74 is much easier to handle. You can easily and grasp the TI-74 with the fingers of one hand. The hard case prevents dust accumulation, accidental keypresses, and the accidental loss of the quick reference card for the LEARN PASCAL keyboard.
overlay). I feel very comfortable about carrying my TI-74 around with me in my hand, in my briefcase, or in my coat or shirt pocket just about everywhere I go. Personally I have no more difficulty typing on the TI-74 keyboard than I do on the CC40. In both cases two finger "must keep looking at the keyboard" is my technique. Touch typing is not really possible on either machine.

--4- The Dock Bus is physically superior to the HexBus. Although the two bus designs are electronically identical the HexBus is structurally flimsy. When inserting a HexBus I/O cable into the bus on a CC40 or HexBus peripheral it is hard to seat the cable properly. There is lots of "play" in the HexBus opening and it is possible to bend some pins in the bus as you fool around with inserting the I/O cable. The HexBus cables themselves are flimsy. They are very flexible and it is difficult to avoid pulling on the cable rather than the small rigid cable end piece when removing an I/O cable from the HexBus. The DockBus and its I/O cables are more substantial. Cables fit snugly into the bus with no free play and little likelihood of bending a bus pin. The cables are stiffer than HexBus cables and have large easy to grasp ends. Physically the DockBus and its cables seem more substantial and thus probably more reliable than the HexBus.

The capabilities of the CC40 and TI-74 are similar. The TI-74 is a better math calculator. The CC40 has a better word processor but both can be used as calculators or text processors. Because of the memory flip-flop capability of the 8K RAM and for physical reasons I prefer the TI-74.

SOURCES OF TI-74 SUPPLIES:

Available by credit card directly from TI at 806-747-1882:
--HX1010 Printer 80, the 80 column HexBus printer, $70
--Cl-7 Cassette interface $35
--PC324 Thermal printer $60
--Technical manual $5
--8K constant RAM cartridge $50
--Learn Pascal, Statistics, Mathematics, Finance, Chemical Engineering software cartridges $50 each
--TP324 thermal paper and PC Interface cable also probably available directly from TI, prices unknown.

Available from EDUCALC at 800-677-7001 or (credit card orders only 24 hours) 800-535-9650
--TI74 (the topic of this article) $99.95
--Statistics, chemical engineering, finance cartridges $39.95 each.
--8K constant RAM cartridge $39.95
--PC324 Thermal printer $89.95
--TP324 paper for printer $4.95
--Cl-7Cassette interface $26.95
--PA201 AC interface for TI74 (the "adaptor adaptor", uses adaptor below) $6.95
--AC9201 adaptor to power printer and/or TI94 $18.95
--PC interface cable, allows storage of TI74 software on PC disks and use of PC screen controlled by TI74 $54.95

Available from T.A.P.E. 1439 Solano Place, Ontario California 91764, phone 714-989-9906
--Quickdisk disk drives, either the DockBus version or the HexBus version (with the L.L. Conner cable) will work with the TI-74.

Jim Lesher, 722 Huntley, Dallas Texas 75214, phone 214-821-9274
--nice selection of HexBus peripherals

**DONE**

A "BASIC" WORD PROCESSOR FOR THE TI-74 AND CC40

by Charles Good
Lima Ohio User Group

One of the big software limitations of the TI-74 compared to the CC40 is the lack of a commercial word processor for the -74. The CC40 has TI's MEMO PROCESSOR. The TI-74 has nothing. So I wrote a the accompanying BASIC word processing program for use on my new TI-74. It also works on a CC40. Instructions are in the REM statements at the beginning of the program.

The only way to store anything other than "hot key" strings in battery backed memory when the TI-74 or CC40 is "off" is to use DATA statements within a BASIC program. All numeric and string variables generated from a running BASIC program are lost when automatic powerdown occurs or the "off" button is pushed. My program includes lots of "empty" DATA statements that the user can fill with text. When an 80 column line fills with text just push the down arrow to bring up the next empty DATA statement and continue adding more text. Each line of text can hold a maximum of 71 characters. The other nine characters of each 80 character DATA program line are needed for the line number the word DATA and the required spaces before and after this word.

LIMITATIONS:

--1-This program suffers from the same limitation that is common to all word processing programs written in BASIC, namely editing only one line of text at a time. If you insert or delete text this does not reposition the text in adjacent lines of the document. You can however insert additional DATA program lines between existing text in a document in order to insert new text in the middle of the document.

--2-Another annoying limitation is the fact that you can't put any commas in your text.
-- 3-For reasons I don't understand you can't put a quote immediately after the word DATA at the beginning of a line of text. Quotes anywhere else cause no problem.

The software uses 2210 bytes of memory. This means I can enter the equivalent of about seventy full 80 column lines of text into my TI-74 before I get a MEMORY FULL error. This is the equivalent of about 23 sector 8080 text file stored on a 99/4A disk. On an unexpanded (8K) CC40 my program allows storage of about 45 full 80 character lines of text.

Once text is entered the program allows you to do three things with this text. You can view the document on the TI-74 or CC40 screen, print the document to a HexBus printer or dump the document directly to the Funnelweb or TI Writer editor via the HexBus RS232 and a cable connecting it to the 99/4A's RS232. Line 4005 has a provision for dumping the document to an MS-DOS PC if you have TI's PC interface cable but this hasn't been tested. If you get a MEMORY FULL error while attempting to perform one of these actions on the document you can delete the REM statements at the beginning of the program. This will free up enough extra memory to perform any of the permitted actions on the document without having to delete part of the document.

There isn't anything fancy about my word processing program but it does the job almost as well as MEMO WRITER. It allows you to enter and edit text virtually anywhere with the TI-74 or CC40. Right now as I type this I am laying in bed. Later you can print the document directly out of the little battery powered computer or dump the document to a desk top computer's full featured word processor. ***DONE***

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<td>101</td>
<td>PC Interface -ASCII text file on PC disk (Dock Bus)</td>
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* denotes products never officially released ***DONE***
I have secret information that a few members of your user group are in fact DOUBLE TI ORPHANS. The tapping of chicklet-like keys has given you away! There are those among you that possess a CC-40. Well, so do I, and in recent months, I too have begun to take the little bugger off the shelf and USE IT. Allow me to tell my tale.

Some years back I purchased a CC-40 for no good reason except that it was there, and cheap. I played around for a bit, worked out programming problems on it before reprogramming it for the 99/4A. And then it sat on the shelf until I got wind of a small but active 99/4A in Lima Ohio. I began a very rewarding correspondence with Charles Good and ordered up a bunch of disks from their library, which is quite extensive. And in among those disks were a series of articles about the CC-40, more information than I had ever seen. In this article I want to show you what you may not already know about your 9" by 6" by 1" "computer". Did you know there is a disk drive for it. And an 80 column printer for SEVENTY BUCKS! And a printer/plotter and an RS232 with a parallel output option as well! And now - the big news. You can prepare a document using the Memo Processor - Telecommunications cartridge and port it over to Funnelweb! You need the proper cable (not TI’s serial printer cable) to connect the CC40’s RS232 to the TI’s RS232. The cable and both kinds of RS232s are available from L.L. Conner Enterprise. This cable has to be properly configured and I suppose if I took out my Radio Shack Multimeter I could tell you the proper pin-outs and outs so you could build your own, but why not give Mr. Conner a little business and support the dealers that still support us. Without any further delay, I’ll tell you the procedure for doing this. I borrow liberally from Charles Good and his articles. As a matter of fact, I will quote directly from his letter to me.

-1. Boot the Funnelweb editor, type LF (enter), then type RS232 CR (enter). The 99/4A cursor locks up and ceases to flash. This is normal.

-2. After connecting the CC40 to the HexBus RS232, turn on the RS232 and then the CC40.

-3. Enter Memo Processor. When your document in memory is on the LCD screen, press FN and then the comma key (If you have the overlay, it says <COMM over the comma key). The CC40 says NOW IN COMMUNICATIONS, then READY TO COMMUNICATE.

-4. Press FN and the + key (SEND DOC). The CC40 displays SENDING DOCUMENT TO HOST. You will observe your document’s text scroll across the CC40’s screen.

-5. When the document ceases to scroll across the CC40’s screen this means it has all been sent. On the 99/4A press FCTN/4 and (enter) to display the document on the monitor of your 99/4A.

It works! Now you can prepare text for the 99/4A laying in bed, on the beach, or sitting in a car (on the passenger side, lets not be ridiculous!). Anywhere your large computer can’t go there is surely room for the CC40.

Let me briefly go over what goodies are available for this pre-laptop machine. I will quote TI direct prices as of November 1991 unless otherwise noted. Among the application cartridges, the MEMO PROCESSOR, SS3004 ($20), is probably the most useful to own. Also available are FINANCE (SS3006 $20), ELECTRICAL ENGINEERING (SS3007 $20), STATISTICS (SS3008 $20), MATHEMATICS (SS3009 $20), and GAMES (SS3024 $20). Also available are the BK CONSTANT MEMORY (SS2000 $30) which may be used to store programs much like the MINI memory or to add BK RAM to the CC40’s standard 6K. There is also a 16K cartridge (SS1000 $40) for increased RAM. TI also has 8 inch HexBus cables (HX COB, $9.95), an AC adaptor (A9201 $18.95), and the PRINTER 80 (H1010 $70) which can be used as a thermal printer or used with ribbons that are available from TI and elsewhere. I know of two working WAFER TAPE DRIVES in existence. These are storage devices that resemble the Adam computer’s tape drives. There are printer/plotters available from L.L. Conner and Jim Lesher, but for my money the disk drive from T.A.P.E. of California and the PRINTER 80 are the most needed peripherals. Any computer is almost worthless unless you can store your programs and call them up on demand. You want to type in a program every time you need it? There is a PASCAL cartridge unavailable from TI that seems to be way over priced at $50 from Jim Lesher (Yes, . paid for it...through the nose!!). You may also upgrade the 6K to 18K internal RAM following the directions contained on the disk. If you are not good with small parts or soldering, L.L. Conner will sell you one all done up with the extra memory. Jim Lesher has recently advertised good prices on CC40s and HexBus peripherals (Micropendium, March 1992). There are some good deals out there, particularly compared to the cost of a "modern" laptop computer.