

# BITS, BYTES & PIXELS

LIMA 99/4A USERS GROUP



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I recently sent Tony McGovern a new subroutine for Boot tracking which I devised. He was so delighted by its performance that he incorporated it in F'Web. On this disk is the boot track routine which is mergeable with XB programs using ALSAVE. Please treat these files as Public Domain and share with whomever you please. The source file is called DEVICES, and the object file DEVICE. This object file can be used with XB, and will report the device from which the program was loaded into a string variable. This boot tracker works with Horizon Ramdisk, with Myarc controllers, including hard drives, and of course with TI floppy disk controllers. It also works with Geneves. Hope somebody in your circle can use it. DEVTEST, an XB program when run in XB from any drive will tell you what drive that is.

Bruce Harrison  
Harrison Software  
5705 40th Place  
Hyattsville MD 20781

- ! STRING ASSIGN DEVICE NAME
- ! PLACES DEVICE NAME IN AN XB STRING
- ! HARRISON SOFTWARE - 8 OCTOBER 1990
- ! FOR USE WITH ALSAVE AND EXTENDED BASIC
- ! TAKES ONLY 42 BYTES OF MEMORY

```
STRING EQU >2010
NS EQU >20BA
DEF DEVICE
```

## DEVICE

```
LWPI NS          USE OUR WORKSPACE
MOV >8300,R12    GET THE CRU BASE IN R12
MOV >8302,R2     GET THE ROM ADDRESS FOR DEVICE IN R2
LDCR 0NES,0     ENABLE THE ROM
AI R2,4         ADDING FOUR PUTS US AT THE LENGTH BYTE
LI R1,1        FIRST PARAMETER
CLR R0         NOT AN ARRAY VARIABLE
BLNP STRASS    ASSIGN THE DEVICE NAME TO STRING
LDCR R0,0      CLEAR THE CRU, DISABLE ROM
LWPI >83E0      LOAD GPL WORKSPACE
B >006A       RETURN TO GPL INTERPRETER
END DATA >0101
END
```

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TI HAS RESPONSE OFFERS:  
Lima Ohio, May 17/18, 1991

We plan to have Eunice Spooner, TI LOGO expert and advisor to this country's most active (and only ALL KID) user group, as our special guest.

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## RECENT REVISIONS OF FUNDISK v4.31

Fundisk v4.31 has been updated twice since its initial release. Minor bugs and spelling errors have been fixed. The 80 column DISK REVIEW now has a faster MYART viewer that will now completely display YAPP pictures (412 pixels vertical resolution) on two successive screens. Boot disk tracking has been improved, thanks to Bruce Harrison, so that it now works with most ramdisks as well as with floppy drives.

Tony McGovern's comments about known bugs and the revisions are shown below. Anyone reading this can obtain these specific updated files by sending a disk and paid return mailer to the Lima User Group at P.O. Box 647, Vandalocia OH 45894. There is no copy fee.

Another bug ..... After use of Myart file View from DR80, the XB RUN from DR80 engages XB but then locks. <Del> is still there though. The cause is not yet obvious.

System bug ..... Anomalous behavior may occur with 80 and the DRs in systems with BOTH a Myarc Ramdisk and Horizon Ramdisks running ROS Vn 8.14. See FWD0C/DR81 for details.

Vn 4.31 Oct/20/90 ... Original issue

Nov/16/90 ... Various bug-fixes, minor updates, repairs (some going back to Vn 4.30) in DR40/41, DR80/81, EMAC, LIFW, CT&K/G, FW/LOAD, and FWD0C's /LOAD /TIWR /DR40 /DR81. The DR-80 document now stretches over 3 files FWD0C/DR80 to /DR82.

Nov/22/90 ... Boot disk tracking now handles 80th... on loads from any floppy or RAMDisk. FW, LOAD, SCAS-NE, and FWLW/LAD /LADN revised.

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## SEND FEEDBACK??

The following is quoted from a COMB catalog received in the mail on Nov 23, 1990:

"TEXAS INSTRUMENTS VOYAGER electronic headset computer: The Voyager (tm) is the first electronic toy to listen and respond to a child's voice, through the use of speech synthesis. This innovative headset computer is fun and easy to use! Just insert a cassette into the Voyager and a fascinating journey begins! Mfr. List \$149.80 COMB price \$99"

This is, of course, not the first. The MIB system for the 99/4A did the same thing back in 1983.

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**THE HEX BUS PRINTER/PLOTTER**  
described by Charles Good  
Lima Ohio User Group

This tiny printer, model HX1000, was released in 1983 as the main printing device for TI's CC40 computer. It can be used with any other computer that has a HexBus interface, including the 99/4A (if you have the never released HexBus adaptor), the 99/8, the 99/2, and the TI74 calculator. The Printer/Plotter measures about 15x11.5x4.5 cm and can be operated on battery power or an AC adaptor. You can carry the Printer/Plotter and the CC40 in a very small briefcase as a truly tiny completely portable computer/printer package. It is still available new or used for about \$90-\$125 from dealers such as L.L. Conner Enterprise (phone 317-742-8146) and Jim Lasher (phone 214-821-9274). Since this is an official TI product, TI still supports this device and will replace defective Printer/Plotters on a flat fee exchange basis.

If you have never seen a true plotter before you are in for a surprise when you see the HX1000 in action. It is unlike any dot matrix, daisy wheel, or laser printer I have ever seen. The HX1000 uses 4 small ball point pens, each about 2 cm long, to draw lines on 2.25 inch wide adding machine paper rolls (plain paper, not thermal paper). You can squeeze paper rolls up to 30mm in diameter completely inside the paper chamber of the HX1000 for minimum size and maximum portability. A swing out arm permits larger diameter paper rolls to dangle behind the Printer/Plotter. Such larger rolls are available in almost any store that sells paper, pens, and school supplies. The four pens, one each in black blue red and green, are held in a rotating pen holder. These little pens are currently available at several of my area Radio Shack stores. When you power up the HX1000 it draws four small boxes on the paper, each a different color, to get the ink flowing in its pens. In normal operation the HX1000, under control of the CC40 using BASIC commands, sets one of these pens at a time down on the paper and actually draws lines. The pen is moved left/right across the width of the adding machine paper roll while the printer moves the paper vertically up and down. There is lots of activity as the paper jerks up and down, the pen jerks left/right and is lifted off of and back down onto the paper, and pen colors are changed by rotation of the pen holder. Sometimes the paper roll rapidly feeds backwards or forwards several inches into or out of the printer in preparation for the next operation. This is a highly mechanical device. It is a good thing that TI still fixes these things because I suspect that due to their mechanical nature Printer/Plotters are less reliable than a typical dot matrix printer. Mine has given me no trouble, however.

Speaking of reliability, the internal battery power source of the Printer/Plotter seems strange to me. Six "1.5 volt" NiCad batteries are permanently soldered inside the

printer and cannot be removed. The HX1000 is the only battery powered HexBus peripheral with non removable batteries. An AC adaptor comes with the Printer/Plotter to charge the batteries and to power the printer from a wall electricity outlet. Even when using the AC adaptor, however, the batteries must be near full charge for the printer to function properly. I know that soldering the batteries assures good reliable flow of current. However, I also know that after lots of charge/discharge cycles, permanently installed NiCad batteries refuse to accept a charge. I have a drawer full of useless "dust buster" vacuum cleaners, electric shavers, flashlights, and power drills all with non working permanently installed batteries to prove this. My Printer/Plotter sat on a warehouse shelf from 1983 until I purchased it new in September of 1990. Its batteries work fine after all these years because they have not gone through many charge/discharge cycles. But when my Printer/Plotter's batteries eventually fail to hold a charge the AC adaptor will probably not by itself be able to power the printer. I guess I will then have to send the thing back to TI for an exchange. I think removable batteries would have made more sense.

From BASIC you can LIST programs to the Printer/Plotter. You can also OPEN #1,"IO,OUTPUT" a file to the HX1000 (it is device 10) and then PRINT #1,"text" in text mode or PRINT #1,"special graphics commands" in graphics mode. CC40 BASIC uses a comma instead of a colon in OPEN and PRINT # statements.

Two character sizes are available in text mode, with a maximum of either 18 or 36 characters across the width of the paper. This paragraph is being printed in the newsletter in both character sizes to show the difference. There is only one font, and some of its characters look a bit unusual. The exclamation point "iv", for example, looks sort of like a wine glass. Here is the complete character set as printed by the Printer/Plotter:  
 10\*9\_12C12\*002\*0C2\*010\_02\*04-1234  
 567890abade fah ijk lmnopqrstuvwxy  
 DEF0HIJKLNNOPQRSTUWXYZ

Two character sizes are available in text mode, with a maximum of either 18 or 36 characters across the width of the paper. This paragraph is being printed in the newsletter in both character sizes to show the difference.

There is only one font, and some of its characters look a bit unusual. The exclamation point "!", for example, looks sort of like a wine glass. Here is the complete character set as printed by the Printer/Plotter:

```

!@%&_{}[]|'~#$$%^&
()~?.,,.,.<>~*~+~1
234567890abcdefg
hijklmnopqrstuvw
xyzABCDEFGHIJKLM
NOPQRSTUVWXYZ

```

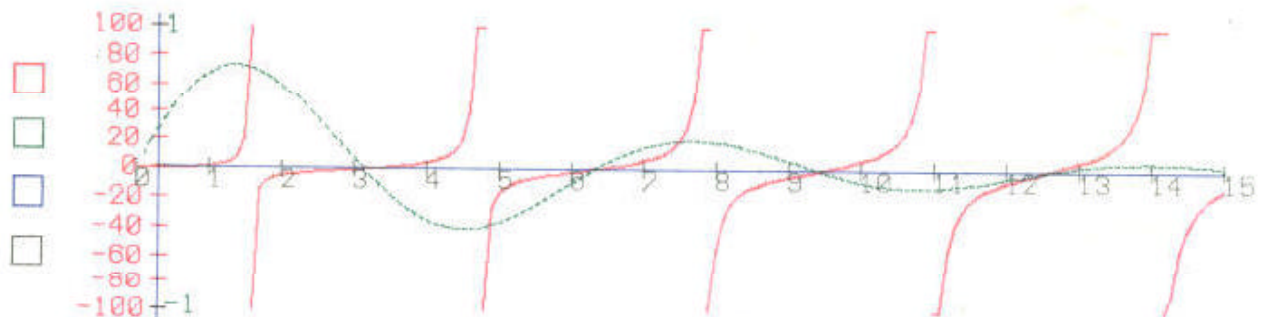
NEXT COLUMN

In graphics mode you can also use any of the normal character set as part of your graphic. Characters in graphic mode can be printed in any of 10 sizes! Letters and other predefined characters can be printed normally (right side up and left to right), rotated 90 degrees clockwise and printed down the paper (as in the banner example that accompanies this article), upside down from right to left, and rotated 270 degrees printed up toward the end of the paper roll as the paper is sucked backwards into the Printer/Plotter. The sample banner shown is an example of the largest letters printed sideways down the length of the paper roll. In this banner each letter is overwritten several times, advancing the paper slightly after each overwrite to make the letters of the banner appear thick. The Printer/Plotter printed the first line of the banner, then sucked the paper roll back in and printed the second line of text. The whole operation required lots of pen and paper movement!

When plotting lines in graphics mode the Printer/Plotter uses an X-Y coordinate system with up to 216 points across the width of the paper and 999 points along its length. Since the origin (coordinate 0,0) can be reset at any time to the pen's current position, the actual maximum length of a single graphic is unlimited. Lines can be drawn from one coordinate to another to another, along a defined sequence of

NEXT PAGE

First Line  
Second Line



coordinates. These lines between coordinates can be either solid or dotted, with 9 different degrees of spacing possible between dots of a dotted line. The pen can be moved to any coordinate without drawing. Pen color can be changed.

The graph that accompanies this article illustrates the possibilities of the Printer/Plotter in graphic mode. The CC40 BASIC program that made this graph was published in the October 1983 issue of 99er Magazine. The original graph is in 4 colors. The left side of the graph is the original end of the paper roll, complete with the 4 boxes drawn at powerup. First the HX1000 printed the short axis scale in red (-100 to 100), then it drew the short and then the long axis lines in blue. Next it sucked the paper back into the printer and drew the long axis scale (0-15) in black. Then it sucked the paper in again and plotted  $Y=X\tan(X)$  as a discontinuous solid red line. Finally the paper was sucked in again in preparation for plotting  $Y=\sin(X)/c(X/5)$  as a single dotted wavy green line.

The HX1000 lists for \$199.95 in TI's last June-December 1983 price list. This can be compared to TI's impact printer, which lists in the 1983 price list for \$750 and sold in my local J.C. Penney store in October 1983 for \$450. If the HexBus interface had been released, the Printer/Plotter would have offered 99/4A owners an inexpensive printing alternative to with unique features such as 4 colors and portability that are not found even today in other printers commonly used in the TI community.

\*\*\*DONE\*\*

[DUP EDITOR'S NOTE: The material described below is on floppy disks #321 and #322 of the Line 66 software library. Some samples are printed with this newsletter.]

Harry Allston  
10300 Kings River Road #57  
Reedley, CA 93654-3622

November 09, 1990

The enclosed disks hold the redefinition of alpha A-Z. I took the TIPS definition and traced to waxed paper then redefined them with TI-ARTIST PLUS!. What you see is the 'scrunched' 1/2 sheet version of the PRINT routine of TI-ARTIST.

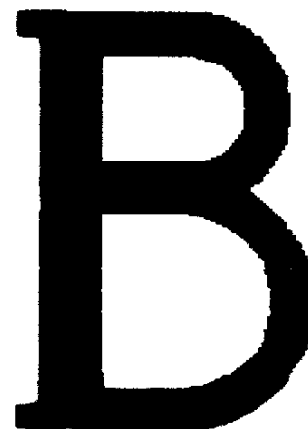
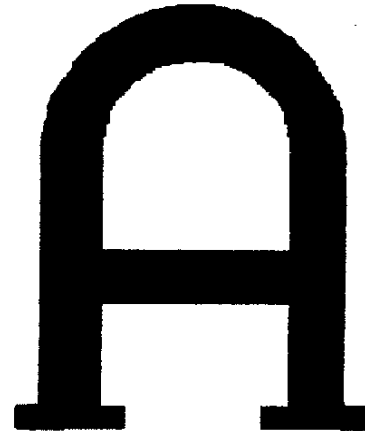
I got tired of the 'stepstair' ASC banners. The procedures to use the redefined characters are a little cumbersome and do require constant attention to the printer, BUT, they sure do make a nice looking banner. (an unbiased opinion)

1. OPEN TI-ARTIST to PRINT.
2. Make Printer ready.
3. Insert disk that includes the FIRST letter of the banner.

4. In PRINT mode, press I. ENTER 'BOX(n).ALPHA-(n). Press R (rotate), Press V (full width), Press P (print). The R and V need not be changed in the course of printing the banner.
5. I find it takes 12 passes of the printer prior to printing.
6. When the last print pass takes place, press FCTN 4 (CLEAR). This stops the program and printer.
7. Roll the printer to the space desired between letters. DISENGAGE the friction feed!!! TURN OFF PRINTER. TURN ON PRINTER. If you do not initialize the printer you will print a 'do-hickey. (see example)
8. PRESS I and enter new filename for next character. Make sure the proper disk is in the drive. Press P to print.
9. Place finger on top of printer to prevent false forward motion of paper. Continue to hold paper until you receive the FIRST PRINT PASS. QUICKLY release the friction enable lever. You are now on your second character.

I know this sounds like a lot of bother but you will like the results. I hope if a use is found for the program(s) that any improvements on the graphics will be passed on to me. Naturally this offering is FREEMAKE (no compensation expected).

Enjoy.



\*\*\*DONE\*\*

**Archiving: Is it Just a Compression Headache?**

By: Andy Frueh, Lima US

A lot of people are puzzled by archiving and how to use Barry Boone's Archiver. What follows is both a reference guide and explanation of Archiver III. It is not meant to totally replace the documentation for this program. Actually, I haven't seen a distribution copy that comes with a set of instructions. There may be hidden features of ArcIII that aren't obvious to me (for example, Disk Utilities by John Birdwell has a feature to figure decimal-to-hex conversions).

What exactly is archiving? Putting it simply, when you archive you take a file or a set of files, and group them as one file then compress them so they take up less disk space. Some software comes archived. These ALMOST always include the archiving program. Examples are Jack Sughrue's PLUS! and the Complete Adventure disk set.

What is the purpose of archiving? Well it started out as a money saver for modem users. It is faster, and thus cheaper, to send 90 archived sectors as 1 file, than 120 sectors for 3 programs. Now it is also a means of backing up disks. You can save each of your disks as a one file, squashed archive. You can specify whether you want compressed files or not. The reason you have a choice is that some unusual files actually take up more space when they are compressed. Another useful application of archiving is when you have programs you want to keep, but don't need ready to use. You can keep archives of all these files instead of taking up disk space.

OK, now that you have the "what", here's the "how". As far as I know, the only archiver is Barry Boone's program. Its operation is completely different from Archiver II. Rather than add new features to past versions, Archiver was completely re-written. It usually contains an XD LDD program, but may be loaded from E/A. The program's filename is usually ARC1. It can be found on almost all of the bulletin boards, as a commercial version with Emuave utilities, in user group libraries, with other Fairware programs or from the author. Chances are, you can definitely get a copy.

First things first, so get the program loaded. After that, you should see a Fairware notice. Press any key to pass this. You then see a menu. Each menu option is described in detail below.

1) Archive Files - These options are largely self-explanatory. As you may have guessed, this option archives files. Pressing one will deliver a set of prompts. These are "Source Drive (1-2)". Yes, you can have drive numbered from 1-9 and A-Z. Then comes, "Output Drive (1-2)". You may use one drive. Archiver will prompt you to change disks when needed. It is highly recommended that you use a blank output disk, since archives may fill or almost fill a

disk. Next comes "Output Filename". This is usually the name of the disk you are archiving, or some related heading. For example, a set of D/V 80 articles may be named "ARTICLES". The following prompt is "Pack all Files? (Y/N)". If you answer "Y" then all the files on the source disk are archived. If you answer "N", then when Archiver is working, you are asked "Include filename? (Y/N)" If you answer "Y" then that file is archived, otherwise it is ignored. This is a handy feature if you have programs and files for example, and need them separated. This process repeats for each of the files on the source disk. The final prompt is "Compress? (Y/N)". Saying "Y" and Archiver attempts to squash each file so it takes up less space. Remember that some unusual file types will actually get LARGER if compression is attempted. When all the prompts are answered, press REDO to correct an error in your answers, BACK to return to the menu, or any other key to continue. When Archiver is done performing any operation, pressing a key goes back to the main menu.

2) Extract Files - This is the opposite of archiving. It will let you pull (extract) files from an ARC file. You are first asked for the source drive. Next you input the source filename. After that, you are asked for the output drive. It must be stressed that the output drive for ALL operations of Archiver should be different than the input drive. You may run out of space or overwrite a file accidentally. Output disks should be blank.

The next prompt asks, "Extract all files?" If you answer "Y" then every file stored in the ARC file will be taken out. If you answer "N" then when extracting starts, the program asks, "Include filename?" for every separate file in the archive. Again, press REDO (to restart this option), BACK (returns to main menu), or any other key to continue.

3) Catalog Disk - This is fairly self explanatory. Simply input the source drive name. The program will ask if you want a printout. If you answer yes, then you are asked for the printer name. If there are more files than can be displayed, then [more] is printed on the screen and pressing a key advances the screen.

4) Catalog ARC File - If you aren't sure what files are contained in an archive file, than this option tells you. You are asked for the source drive, source filename, and whether or not you want a printout of the list of files.

5) File Copy - This option will copy a file (obviously). Simply supply the source drive and filename, and the output drive and filename.

6) File Rename - Again, this option should explain itself. Give the source drive and filename, then the output filename.

7) File Delete - Supply the source drive and filename.

8) File Un/Protect - You first supply the source drive and filename. You are then asked "Protect?" If you answer "Y" the file is protected. Otherwise, file protection is lifted.

9) List Text File - This will display or print a D/V 00 file. Give the source drive and filename. You are then asked if you want the file printed or not.

10) Load FW - This returns to Funnelweb. Simply give the drive number on which the UTIL1 file is located.

NOTE: When an I/O error occurs, pressing a key returns to the main menu. If you have a Geneve, this is for you. Using a sector editor, find the string 04E08C00 and replace it with 00018C00.

I think that this should get people on the road to understanding archiver. Remember that it is fairware, so if you find it very useful, send the author (Barry Boone) a donation. **\*\*DONE\*\***

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**Review of Mancala**  
By: Andy Frush, Lima US

Several other computer, especially the PC's, have several "foreign" games. These originate as folk games in some other country and are adapted in the USA for play on our computers. Tetris is a good example. These games are few because they require thinking and brainpower with coordination. They are not the simple familiar shoot-em-ups. Now, from Africa, comes...Mancala. It is very well-done, and extremely addictive to play. The rules are about as simple as the ones for Tetris.

It is sold as a cartridge, so it is very convenient to load; just plug it in. The title screen slowly forms the word Mancala to a neat "bongo" type beat. You can press any key to abort this display. Upon doing that, you are asked for the number of players. I prefer to play a human, mainly because it's an easier opponent (usually). Next you are asked for the number of stones (explained later) that you want. This is a number from 3 to 8 or a random amount. Finally, you are given the choice of which player goes first. I know some of the strategy of the game, and I can see no reason to want to move first or second. Now the game begins.

On the screen are 6 "cups" and 1 "goal" for each player. Player 1 has the bottom row and the right goal, and the second player/computer has the top row and the left goal. Each cup holds a certain number of stones, as specified in the beginning. You can play with joysticks or the keyboard. Each player is represented by an orange marker, which surrounds the cup. The idea is to get as many stones in your cup as possible.

The rules for achieving this aren't very difficult. You move the stones by moving to a cup and pressing FIRE. Then, the marker picks up all the stones in the cup. The marker moves towards your goal, depositing one stone in each cup it passes over. If there are more stones left after the goal is reached, then the marker moves to the other player's side and continues going around the board. If you make it to the goal with no stones left in the marker (for example, you move one stone from the cup next to your goal), then you may go again. If you move one stone into an empty space, then you get all of the stones from the opponent's cup opposite of yours into your goal. This provides a good amount of action.

There is a demo mode if you want to see how to play. There are also several levels of play (but I can't get passed 2). All of this makes for a great game. It isn't one of those games where after you lose or win you want to go on to something else. It is available in Triton catalogs. BUY IT!

**\*\*DONE\*\***

**THE ORIGINAL TI HOME COMPUTER SYSTEM**  
 antiques described by Charles Good  
 Lima Ohio User Group

The "original" TI Home Computer system, released to the public in 1979 and 1980, consisted of the 99/4 computer (without the "A") and a series of stand alone peripherals that plug directly into the side of the 99/4 (or 99/4A) console, or into the side of the previous peripheral (hence the unofficial descriptive term "freight train peripheral"). Each of these freight train peripherals except the speech synthesizer has a base that measures 17x26cm (a bit larger than 6.5x10 inches), a separate power supply rated at 0.2A (23 watts) at 115 volts, and its own separate power cord. I recently purchased a "4" (just to play with) and was later given many of the freight train peripherals. After using these devices for awhile I realize how fortunate we are to have the "4A" and its peripheral expansion box.

Components of the "original" TI home computer system are listed below, together with their official TI part numbers and some prices mostly quoted from an ad by CBM INC of Lexington KY published on page 12 of the first edition (May/June 1981) of 99er Magazine. These CBM INC prices are probably below TI's official list price. These peripherals are not the same as those designed to fit in the PE Box. PE box peripherals all have "PHA12xx" part numbers and are described in official TI publications as "cards".

- TI 99/4 console, (PHC004C): \$499
- RF (TV) modulator; in 1980 this was an extra cost item, (PMA2100): \$41
- Solid State Speech Synthesizer; the same one most of us still use, (PHP1500): \$122
- 32K RAM memory expansion, (PHP2200): \$325
- RS232 Accessories Peripheral, (PHP1700): \$183
- Solid State Thermal Printer, (PHP1900): \$325
- Disk Drive Controller, (PHP1800): \$243
- Disk Memory Drive, (PHP1850): \$399
- P Code Peripheral, (PHP 2400): \$399.95
- Video Controller, (PHP2300): \$699.95

Prices of the last two items are official list prices quoted from TI's suggested retail price list dated June - December 1982 (1049705-1).

You can connect a maximum of three peripherals in series to the right side of the computer. If present, the speech synthesizer has to be first and the 32K second. A "typical" freight train minimum expansion system (99/4 with modulator, 32K, thermal printer, controller and one drive) would be almost four feet wide and cost \$1832. Bringing the system up to the maximum of three SSSD drives and buying all the other freight train peripherals would bring the cost up to a total of \$4035. Wow! And you can only have simultaneous use of 3 peripherals.

In this article I will describe what I know about these freight train peripherals. I have hands on experience with the Thermal Printer, 32K, and Disk Controller. I will not

discuss the Speech Synthesizer since the 1979/80 device is the same one we are all familiar with. In a separate article I will describe my experiences with the 99/4.

--32K EXPANSION MEMORY: This functions exactly like the equivalent PE box card. These days you can, for about \$10, buy a 32K RAM chip that measures about 1x3cm and draws very little current. It amazes me that TI's original 32K was so bulky and required a 23 watt power supply. A 12 inch black and white TV only draws 29 watts. But I guess if you compare a 1955 room sized UNIVAC computer in memory, watts of power consumption, and bulk, the vintage 1979 TI 32K looks pretty good.

--RS232: This stand alone box offers only one RS232 port and no parallel port. The PE Box RS232 card allows connection of TWO RS232 (serial) devices (with a special Y cable) AND one parallel device all to the same card. The PE Box card is obviously superior to the stand alone peripheral.

--DISK DRIVE CONTROLLER: This device used the original DISK MANAGER module (the DMI), and can control up to three SSSD stand alone drives. Double sided is not available with the freight train disk controller. The main difference between the DMI and DMII modules is that the "I" has no provision for double sided disk initialization. A TI stand alone drive plugs directly into the back of the freight train Disk Controller without the need for any special adapter cable other than the cable that comes with the stand alone drive. Other drives plug into the cable of DSK1 using a small adapter board. A special cable that comes with the PE box controller card is needed to plug a stand alone TI drive to the back of the controller card for use as DSK2 or DSK3. An interesting feature of the freight train controller in combination with the DMI module is that they do not recognize the "whole disk protected" byte >10 of sector zero. With the TI PE box controller and the DMII module, if this byte is set for a value of >50 you cannot copy the disk with the DMII.

--THERMAL PRINTER: This is printer device "TP", and was sold to TI users at a time when cheap dot matrix or daisy wheel printers cost \$600+. The 1982 list price for the 99/4A's official dot matrix printer was \$750. The TP uses 3.5 inch thermal paper, prints 32 characters per line, and like all thermal printers is both quiet and slow. 3.5 inch thermal paper rolls are a non standard size these days. TP users either have to purchase 10 year old official TI paper from one of the few TI dealers that stock this item, or use a paper cutter to trim 8.5 inch FAX paper rolls down to 3.5 inches. Such 8.5 inch wide FAX rolls are commonly available these days from many stores including SEARS, KMART, and WALMART. On the title page of the TP manual it says that the TP "prints a copy of a TI BASIC program or the screen displays from certain Command Modules." And that is about it! A few modules, such as MUSIC MAKER, allow screen dumps with the TP. You can specify output to the TP with the DMI, DMII, PRK, Statistics, LOGO2, and maybe a few other modules. You can't use the TP with TI Writer, Funnelweb, the FA module, or

Microsoft' Multiplan. From BASIC you can LIST a program to the TP, a common application. You can also OPEN a file to the TP using any of these file attributes: SEQUENTIAL or RELATIVE, DISPLAY or INTERNAL, OUTPUT or APPEND, FIXED or VARIABLE. I can't imagine what use RELATIVE, INTERNAL, or APPEND have in OPENING a printer file. When opened in INTERNAL, the printer prints a meaningless graphic of the internal representation of each ASCII character. The maximum length of a VARIABLE TP attribute is 32. All printed characters of the TP's built in character set are on a 3x7 dot grid. The TP has a unique graphic set for ASCII 0-31 and the usual alpha/numeric characters for ASCII 32-127. Each printed dot of a character is printed only once and individual dots can be seen with the naked eye. There is no way to make extra dense high quality characters. Emphasized, double strike, and "NLQ" is not available. The user can also, using an 8x8 dot grid, redefine ASCII chars 32-159 in BASIC using CALL CHAR, and then directly print any of those redefined chars to the TP with the appropriate keyboard keypress as in PRINT #1:"(" where ( has been redefined, or with PRINT #1:CHR\$(xxx). This is a neat trick! It is much harder to print redefined characters with other kinds of dot matrix printers.

--VIDEO CONTROLLER: A photograph and brief description of this peripheral appears as part of an article on page 53 of Volume 1, No. 4 of 99er Magazine (Nov/Dec 1981). The photograph shows a box identical to that of the stand alone 32K or disk controller, with a cable coming out of the right side where the "pass through" expansion bus is found on other stand alone peripherals. The article describes the video controller as allowing "computer controlled interactive video with VCR's and Video Disk Players", whatever that means. As evidenced by the videos we created from the formal presentations at the 1990 Linn MUG Conference, it is possible without this device to mix human voice, computer audio and video output, and video camera footage on the same video tape. Such mixing of various audio and video sources was done by us manually however, not under computer control. An extra cost cable (\$99.95 for each of the three available cables in the June - December 1982 TI price list) is needed to interface the video controller to a Sony or Panasonic VCR or a Pioneer video disk player. I really don't understand the need for computer control of a video disk player. If I remember correctly, 1980 video disks resembled phonograph records in that you could only PLAY them from the beginning, not record onto them.

--P CODE PERIPHERAL: My June - December 1982 TI price list states that this device is "available only until replaced by peripheral card", with such a card "available in second quarter 1982." The freight train P Code peripheral is apparently exactly equivalent to the PE Box P Code card.

There you have it folks, the original TI Home Computer expansion "system". Now you know why the expansion port on the 99/4 and 99/4A is on the SIDE of the console, rather than

on the back where it should have been placed. You can only use three of these freight train peripherals at once, and they take up huge amounts of desktop space. Arn't you glad we now have the PE Box!

I want to acknowledge the generous gift of Mr. E.T. Droer of the St. Louis Missouri User Group who gave me several of the freight train peripherals described in this review.

**\*\*DONE\*\***

Programmers need to keep up with the Times  
By: Andy Frank, Linn UG

The following comments have been made by several people, but they need to be reinforced. They are geared towards anyone who programs anyone that might be used by someone else.

We are living in an era that most of us 99'ers never thought we'd see. We have devices such as multiple DD/DS disk drives, hard drives, and RAM disks. However, people who write programs are still coding in a single drive name into programs that access disk files. For example, I have written a program that uses menus to load various utilities. I could've limited the user to using drive 1 as the source drive. This wouldn't make sense though, considering some people put things on other storage devices. Therefore, I used the disk NAME, not the number. For example, on a disk named DISK with a file named XYZ in drive two, I could access this file by telling it to load "DSK2.XYZ" but what if someone moves the disk to another drive? For this reason, I decided to use "DSK.DISK.XYZ". What this does is scan all of the drives until the one containing a disk named "DISK" is found. It stops as soon as that name is found, so multiple disks with the same name may cause trouble in that the computer will ignore the ones in later-numbered drives. If a disk is not in a drive that the computer scans, the time for the whole scan will take much longer. It seems that the TI can't easily recognize when a disk is not present, and insists on checking that drive for what seems like an eternity.

Also, when a data file of some sort is created, allow the user to give the drive number and filename. I would NEVER consider having a program automatically assume that the data is, for example, in drive 1 and named FILE. That is silly for me to do. It means that for each new file someone wants to create, a new disk is needed. Also, the user must make sure the data disk is in the correct drive.

Anyone who programs needs to remember this. Not only are programs more user-friendly, but people will actually ENJOY using them more.

**\*\*DONE\*\***