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NEWS80S



SUMMER 1982 SPECIAL ISSUE For HP Series 80 Users

IN THIS ISSUE

- * NEW! The HP-86 Computer.
- * FOIL'D — A program to make overhead projector foils using the HP-85 and an Epson printer.
- * HP—85 ASSEMBLER ROM REVIEW (from Issue #1).
- * A PERSONAL OPINION OF THE HP—87A COMPUTER (from Issue #2).
- * FOR/NEXT Beginner's column — featuring "LOADBIN".

RAMBLING

Welcome to News80s, the independent newsletter for HP-83, HP-85, HP-86 and HP-87 computer users.

This issue is a special one. It's a sample being sent to thousands of Series 80 users to acquaint them with our publication, and it contains both reprints from past issues and new material.

News80s is currently published four times a year, and it's been growing in size and content with each issue. Perhaps you've seen us mentioned in Software News, Interface Age, Personal Computing or HP's Basic Exchange. You may have also seen our technical analysis of the HP—87, which was reprinted in the August issue of Interface Age Magazine. But even if you've never heard of us before, we feel this sample will give you a good idea of what News80s is all about.

If you like what you see, we'd like to ask for your support in two ways. First, we'd obviously like your subscription, and the "Do Everything" coupon on the last page should make it easy to subscribe. A one year's subscription is only \$10 for U.S. users, \$12 for Canada and Mexico, and \$20 elsewhere.

We'd also like you to mention our publication when you respond to our advertisers. This has a very positive effect on advertisers, and it takes a combination of advertising dollars and subscribers to allow us to grow as rapidly as we'd like to.

By the way, if you subscribe immediately, you won't miss out on the exciting things we have planned for upcoming issues. For Instance:

- * PACK'R — A program that takes a Basic program, strips the REMark statements, and combines lines to achieve a more compact, faster running program. (For those of you that can't wait, you'll note that PACK'R is being offered on HP-85 tape on our "Do Everything" coupon).
- * MENU'D — A program that will take parameters from you and actually write the Basic code to create menu screens for the HP—85, all ready for you to merge with your own programs.
- * Reviews of HP-85 word processing programs.
- * Expanded coverage of HP-85, HP-86 and HP-87 peripherals, software and binary program writing.

We hope you enjoy this special Sample Issue. If you do, use our "Do Every thing" coupon on the last page to subscribe today.

THE NEW HP-86 COMPUTER

The first even numbered Series 80 computer represents a more than even deal. In the HP-86, the computer buyer is presented with almost all the features of the top-of-the-line HP87 for a retail price of \$1795. Incredible.

Obviously there has to be a "catch somewhere, and in this case the catch is that for \$1795 you don't get a fully functional system; you have to add a video monitor, a disk drive and a printer. Even after you add the necessary peripherals, you can still cart off an all-HP system for \$3735 that has almost exactly the same features of an HP-87 that will cost you over \$1500 more!

The HP-86 offers almost all of the features of the HP-87, as described by Rich Harrison in this issue. You get 64K of built-in user memory with the HP-86 (actually more than the 32K of the HP-87A, although not more than the recently announced HP87XM's 128K built-in RAM). You get the same 48K Basic with disk operating system, automatic translation of HP-85 programs, and printer controls. You get that same memory expansion capability to over 1/2 million bytes. You get the same superb keyboard with 14 function keys. You get the same ability to use the CP/M operating system (a trademark of Digital Research) with a plug-in module. In fact, about the only things you don't get with the HP-86 are the HP-87's built-in screen and the built-in HP-IB interface.

For a screen, you use an external monitor. HP offers a 9" screen (\$295) and a 12" screen (\$325) monitor with the HP-86. The HP-IB interface is eliminated from the 86 because the printer interface is now a parallel one, of the "Centronics" type. HP is offering the HP82905B dot matrix printer with a parallel interface for \$795.

The most exciting HP-86 peripheral is the HP 9130 5 1/4" disk drive. This drive offers the same 270K capacity and format of other HP drives, but it costs only \$850. Since the previous lowest cost HP Series 80 drive was \$1500, that's news. The HP 9130 drive gets its power from the computer itself, and it may only be used with the HP-86. The 86 has provisions for plugging in two of these drives. If you want to use HP Series 80 hard disk drives with the 86 (or any other HP-IB device), you'll have to buy a plug-in Interface, just as you currently have to with the HP-85.

Since the Basic and operating system of the 86 and 87 are the same, almost any HP-87 software will also work on the HP-86. The major exception to this are graphic packages, because the HP-87's screen has a different aspect ratio than the 86's. Circles plotted on the HP-87 will look like ovals, unless the software is modified or compensates for the differences in screens. The other kind of software that won't work without buying extra hardware are packages that use the HP-IB interface for something. Otherwise, the HP-86 is completely software compatible with the HP-87. Because of this (and the CP/M module), HP claims that the HP-86 has more software available for it at the time of introduction than any other computer, and they're probably right.

Regular News80s readers know we were very enthused by the HP-87, and to be presented with almost the same power at significantly lower costs is a pleasing prospect. Quite frankly, it's hard to maintain journalistic detachment with the HP-86 when we're also in the process of reaching for our checkbook to buy one! The HP-86 will receive continued coverage in News80s, because it's a safe prediction that this new "even numbered" Series 80 will soon become the most numerous and popular Series 80.

FOIL'D
by Dale Flanagan, editor, NEWS80S

I used overhead projector transparencies for several years before I found out that they're called "foils". It took me considerably less time to figure out that making the masters for the creation of foils can be a real pain.

I have occasion to use overhead transparencies quite often for presentations, meetings and training sessions. I like my overheads to have a series of "bullets" (or concise statements) that emphasize Important points or facts. Ideally, these "bullets" should be centered, and should use different type styles to add interest. This is where the pain comes in.

If you've ever watched someone making masters for foils that have to be centered, or If you've done it yourself, you know it can quickly become a drag. First you count the number of letters per line, then you figure out the number of spaces to center the line, then you space—space—space and type—type—type until you get done. If you use different type sizes, all this spacing and typing is interspersed with changing the type element in your typewriter. If you have to do 25 or 50 of these things, you can see that it can become very old very fast. There has to be a better way. With your HP-85 and an Epson printer, there is.

FOIL'D was written because I had a large training session to put together for a client. I don't claim that it's a shining example of the programmer's art, but it works well and it should be fairly easy to modify to work with printers other than an Epson MX80, MX100 or HP 89205A (in fact, the commands for the newer HP89205B version of the printer are shown as REMark statements).

FOIL'D cranks out overhead transparencies like a champ, and it could also be used for creating report covers or similar tasks (like the title above).

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PAGE 4
HARDWARE

FOIL'D requires an HP-85 and an Epson MX80, MX100 or HP89205A printer. It's written to use the Printer/Plotter ROM's PRINTER IS statement for directing output to the printer. The program can easily be used with an HP-83, and an HP-87 version should also be easy. FOIL'D was written using an HP-85 with 32K of memory. It can probably be squeezed down to 16K.

PROGRAM OPERATION

FOIL'D permits you to enter and edit lines of text that you want printed on the Epson or HP printer. Along with these lines of printable text, FOIL'D also lets you enter a selection of commands which change printer settings to allow you to achieve varied effects.

The commands in FOIL'D must start a new line. Each command begins with the "@" sign. Commands currently implemented by FOIL'D are:

- @CN — Center following lines.
- @CO — Centering off.
- @80 — Print at 80 characters per page.
- @40 — Print at 40 characters per page (double width).
- @FL — Flip keyboard mode (Typewriter style/Uppercase).
- @EM — Emphasized printing.
- @EO — Emphasized printing off.
- @DB — Double strike printing.
- @DO — Double strike printing off.
- @SKn — Skip "n" number of lines before printing next line.
- @CHn,n,n... — Transmits ASCII character specified by n to printer.
- @EN — End text input/printing.

Upper and lowercase letters are acceptable for commands. The "@CH" command expects the decimal ASCII values of one or more characters you want transmitted to the printer. For instance, to transmit an Escape "A", you'd place "@CH 27,65" in the text. @CH does not terminate in a carriage return (ASCII 13) or line feed (ASCII 10) unless you specify them (i.e. @CH27,65,13,10). With this command you can transmit virtually any control codes specified by your printer's manual.

When you start the program, a main menu is displayed to you. The first thing you'd usually do is enter the text and printing commands, line by line. With text input, a series of dashes are displayed to show you the current maximum line length. If you exceed this maximum, the line will be truncated, after giving you a warning message. This is a line that you'll probably have to edit later.

If you enter a FOIL'D command that changes the maximum line length, the number of dashes displayed will be adjusted accordingly. You'll note that FOIL'D doesn't support the Epson 132 character per page mode, because a line with characters this small is almost impossible to read on a foil.

Because FOIL'D uses the "LINKEY" binary program, you can enter commas, quotes and other characters that a regular INPUT statement will reject. In fact, you can even enter control characters that can adjust the Epson's printing within a line (if you do this, please note that it can affect the centering routine, because FOIL'D doesn't parse each print line looking for embedded printer commands). By the way, to get an Escape character entry from the HP-85 keyboard, you use a shifted control— Why HP didn't give us an escape key on the HP-85 keyboard certainly escapes me.

After text input is done, entering the "@EN" command at the start of a line will stop the input routine and return you to the main menu.

From the main menu you can then list the text to the printer or display the text on the screen. Since the list routine strips trailing spaces from each text line, there is a perceptible delay as each line is listed.

The editing choice in the menu leads you to an editing sub—menu. From this editing menu,

word power for the series 80



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you can insert lines, delete lines or change lines. These commands are keyed to text line number, so make sure you write down the proper line numbers to edit, which are shown when you list the text.

The "Printer Is" number is displayed to you on the menu, and may be changed. The default for this number is set in program line 180 (the "P1" value), and on the listing this is set for "10", the Serial Interface.

When the text is to your satisfaction, the print command from the main menu will produce the overhead transparency foil master on the Epson or HP89205 printer. If you don't like the effect you get, simply go back to the editing menu and add, delete or change commands and text lines until you do like the foil master produced. Then you can use the foil master to produce the overhead projector foil, as per the directions of the transparency manufacturer.


After completing a foil master, the input choice on the menu will allow you to erase the existing text and enter the text for the next master.

PROGRAM AVAILABILITY

FOIL'D uses the LINPUT statement, which is implemented with the "LINKEY" binary program from the HP User's Library. You might want to read this issue's "FOR/NEXT" column, which covers program entry with a binary program, as well as more information on "LINKEY".

If you want, you could also enter FOIL'D without "LINKEY" by changing each LINPUT to INPUT. This isn't recommended, however, because the normal INPUT statement restricts entry of quotes, commas and other useful pieces of punctuation!

If you don't care to enter FOIL'D yourself, it's available for \$39.95 on HP-85 tape from Joseki Computer Corporation. This tape also includes the "LINKEY" binary program, courtesy of the nice folks at Hewlett-Packard. See the "Do Everything" coupon on the last page.



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3. CADD/87 Computer Aided Drafting & Drawing for HP-87.....price to be announced

CADD/87 has been under development since early 1980 and should be available Fall 1982. Some of CADD/87 features include: LINES, VECTORS, CIRCLES, ARCS, POLYGONS, BOXES, TEXT, SYMBOLS, GRAPHICS CURSOR, PLOTTER OUTPUT, GRAPHICS EDITING...and much more. If interested, contact us to get on our CADD/87 mailing list.

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PAGE 7

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10 ! "FOIL'D" — Copyright 1982 Dale Flanagan
20 ! All commercial rights reserved.
30 ! Makes overhead foil masters using an HP85 and an
EPSON
40 ! MX-80, MX-100 or an HP 82905A printer
50 LOADBIN "LINKEY" ! load binary program
60 DIM A$[8000],B$[150],C$[2],E$[1]
70 ! A$ is main text storage string (80 characters X 100
lines)
80 !
90 ! B$ is input buffer string CS is temporary string
100 !
110 ! E$ is Escape character (ASCII 27)
120 INTEGER P,L,C,I,X,Y,Z,Z9
130 ! P=pointer to text string
140 ! P1= printer number
150 ! L=current maximum line length
160 ! C=centering flag
170 ! I,X,Y,Z,Z9=temp variables
180 P=-1@P1=10 @L=80@C=1@E$=CHRS(27) !
initial values
190 CLEAR ! $$$ MAIN MENU
200 DISP TAB(5); "FOIL'D OVERHEAD MAKER"
210 DISP @ DISP @ DISP "MENU CHOICES:"
220 DISP @ DISP "1 = INPUT TEXT"
230 DISP "2 = LIST TEXT"
240 DISP "3 = EDIT TEXT"
250 DISP "4 = PRINTER IS : ";P1
260 DISP "5 = PRINT FOIL"
270 DISP "0 = EXIT PROGRAM"
280 DISP @ DISP "YOUR CHOICE (0-5)";
290 LINPUT B$@ X=NUM(B$) ! extract ASCII value
of B$
300 IF X<48 OR X>53 THEN BEEP@DISP "0-5
ONLY!"@ GOTO 280
310 X=X-47 ! reduce to 1 through 5
320 ON X GOTO 330,460,690,860,1480,1550
330 ! $$$ END OF PROGRAM
340 DISP @ DISP
350 DISP "DO YOU WANT TO END PROGRAM
(Y/N)";
360 ON FNY GOTO 370,190,340 ! see 800 for function
def
370 DISP "PROGRAM ENDED" @ END
380 DEF FNY
390 LINPUT B$@ IF B$ = "" THEN 430
400 B$=UPC$(B$[1,1]) ! get 1st letter & make uppercase
410 IF B$ = "Y" THEN Z9=1 @ GOTO 440
420 IF B$ = "N" THEN Z9=2 @ GOTO 440
430 BEEP @ Z9=3 @ DISP 'Y OR N ONLY!' ! 3 means
error
440 FNY=Z9
450 FN END
460 ! $$$ INPUT TEXT
470 CLEAR @ DISP TAB(11); "TEXT INPUT"
480 IF P=-1 THEN 560 ! no text in memory
490 DISP ">> TEXT IN MEMORY"
500 DISP @ DISP "ERASE TEXT (Y/N)";
510 ON FNY GOTO 520,530,500
520 P 3 8010 560 ! reset text pointer for new input
530 DISP @ DISP "ADD TO EXISTING TEXT (Y/N)";
540 ON FNY GOTO 550,190,530 ! if no, return to main
menu
550 P=P-1 ! eliminate last line with '@EN
560 P=P+1
570 IF P>99 THEN BEEP @ DISP "TOO MANY
LINES" @ WAIT 1500 @ GOTO 190
580 FOR X=1 TO L1 @DISP"-"@NEXT X @DISP
!show line
590 DISP "INPUT NEW LINE";P @ DISP "(@EN
ENDS
INPUT)"

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600 LINPUT B$
610 IF LEN(B$)>L THEN BEEP @ DISP "LINE TOO
LONG - MAX. OF ";L @ GOTO 580
620 A$[P$80+1 , P$[80+80]=B$
630 IF LEN(B$)<3 THEN 560 ! blank or short line
640 IF UPC$(B$[1,3])=@EN THEN 190 ! end input
650 IF UPC$(B$[1,3])="380" THEN L=80
660 IF UPC$(B$[1,3])="340" THEN L=40
670 IF UPC$(B$[1,3])="@FL" THEN FLIP ! change
keyboard code
680 GOTO 560
690 ! $$$ LIST TEXT
700 CLEAR
710 IF P<0 THEN BEEP @ DISP "NO TEXT TO
LIST!" @ WAIT 1500 @ GOTO 190
720 DISP TAB(10); "LIST TEXT"
730 DISP @ DISP "PRINT TEXT ON PRINTER
(Y/N)";
740 PRINTER IS ! reset printer to CRT just in case
750 ON FNY GOTO 760,770,740
760 GOSUB 2140
770 PRINT "LINE # : TEXT"
780 FOR X=0 TO P
790 B$=A$[X$80+1 , X$80+80]
800 GOSUB 2020 ! strip trailing blanks
810 PRINT X; " : ";B$
820 NEXT X
830 DISP @ DISP "PRESS [END LINE] FOR MENU";
840 LINPUT B$
850 GOTO 190
860 ! $$$ EDIT TEXT
870 CLEAR
880 IF P<0 THEN BEEP @ DISP "NO TEXT TO
EDIT" @ WAIT 1500 @ GOTO 190
890 DISP TAB(11); "EDIT MENU"
900 DISP @ DISP
910 DISP "1 = EDIT A LINE"
920 DISP "2 = ADD A LINE"
930 DISP "3 = DELETE A LINE"
940 DISP "0 = RETURN TO MAIN MENU"
950 DISP @ DISP
960 DISP "YOUR CHOICE (0-3)";
970 LINPUT B$
980 X=NUM(B$) ! extract ASCII value of B$
990 IF X<48 OR X>51 THEN BEEP @ DISP "0-3
ONLY!" @ GOTO 960
1000 X=X-47 ! reduce to 1 through 4
1010 ON X GOTO 190,1020,1150,1320
1020 CLEAR @ DISP TAB(10); "EDIT A LINE"
1030 DISP @DISP
1040 DISP "TEXT LINE # TO EDIT ";
1050 LINPUT B$
1060 Y=VAL(B$)
1070 IF Y>P THEN BEEP @ DISP "LAST LINE IS ";P
@ GOTO 1050
1080 DISP "OLD LINE ";Y; " : ";
1090 DISP A$[Y$80+1,Y$80+80]
1100 DISP "NEW LINE ?"
1110 LINPUT B$
1120 A$[Y$80+1,Y*80+80]=B$
1130 DISP @ DISP "EDIT ANOTHER LINE (Y/N)";
1140 ON FNY 8010 1020,190,1130
1150 CLEAR ! add a line
1160 DISP TAB(11); "ADD A LINE"
1170 DISP @ DISP
1180 IF P=99 THEN BEEP @ DISP "THIS FILE
FULL!"@ WAIT 2000 @ GOTO 860
1190 DISP "ADD BEFORE WHICH LINE #"
1200 DISP "(-1 ESCAPES TO EDIT MENU)";
1210 LINPUT B$ @ IF B$ = "" THEN 1190
1220 X=VAL(B$) @ IF X<0 THEN 860

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PAGE 8

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1230 IF X>P THEN BEEP @ DISP "ONLY ";P;
"LINE IN MEMORY!" @ GOTO 1190
1240 DISP @ DISP "NEW LINE ";X; ":"
1250 LINPUT B$
1260 FOR I=P+1 TO X+1 STEP -1
1270 A$[I*80+1,X*80+80]=A$[I-1]*80,(I-1*80+80) !
move up
1280 NEXT I @ P=P+1
1290 A$[X*80+1,X*80+80]=B$ ! assign new line
1300 DISP @ DISP "ADD ANOTHER LINE (Y/N)";
1310 ON FNY GOTO 1170,190,1300
1320 CLEAR ! delete a line
1330 DISP TAB(9); "DELETE A LINE"
1340 DISP @ DISP
1350 DISP "DELETE WHICH LINE #"
1360 DISP "(-1 ESCAPES TO EDIT MENU)";
1370 LINPUT B$ @ IF B$="" THEN 1350
1380 X=VAL(B$) @ IF X<0 THEN 860
1390 IF X>P THEN BEEP @ DISP "ONLY ";P; "
LINE IN MEMORY!" @ GOTO 1340
1400 DISP @ DISP A$[X*80+1, X$80+80]
1410 DISP @ DISP "RIGHT LINE TO DELETE (Y/N)";
1420 ON FNY GOTO 1430,1340,1410
1430 FOR I=X TO P- 1 ! move down
1440 A$[I*80+1, I*80+80] = A$[(I+1)*80+1,
(I+1)*80+80]
1450 NEXT I @ P=P-1
1460 DISP @ DISP "DELETE ANOTHER LINE
(YIN)";
1470 ON FNY GOTO 1320,190,1460
1480 CLEAR ! $$$ SET PRINTER
1490 DISP "CURRENT PRINTER IS ";P1
1500 DISP @ DISP
1510 DISP "NEW PRINTER IS : ";
1520 INPUT P1
1530 IF P1<1 THEN BEEP @ GOTO 1500
1540 GOTO 190
1550 CLEAR ! $$$ PRINT FOIL
1560 IF P<0 THEN BEEP @ DISP "NO TEXT TO
PRINT" @ WAIT 1500 @ GOTO 190

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1570 DISP TAB(10); " PRINT FOIL"
1580 DISP @ DISP
1590 DISP "PRESS [END LINE] WHEN READY"
1600 LINPUT B$
1610 GOSUB 2130 ! turn on the printer
1620 PRINT CHR$(128+20) @ CHR$(128+18); @
L=80 ! reset printer
1630 ! for HP82905B print E$&"&k0S"
1640 FOR I=0 TO P ! Main print loop
1650 B$=A$(I*80+1, I*80+80)
1660 IF B$[1,1]<>"@" THEN 1870 ! can't be a
command
1670 C$=UPC$(B$[2,3]) !extract command
1680 IF C$= "CN" THEN C=1 @ GOTO 1910 ! set
center flag
1690 IF C$= "CO" THEN C=0 @ GOTO 1910 !
centering off
1700 IF C$="80" THEN PRINT
CHR$(128+20)@CHR$(128+18)@ L=80 @ GOTO
1910
1710 ! 80 cols - for HP829058 print E$&"&k0S"
1720 IF C$="EM" THEN PRINT E$&"E"; @ GOTO
1910
1730 ! emphasized - HP8905B print E$&"&k9S" (80
cols only)
1740 IF C$= "EO" THEN PRINT E$&"F"; @ GOTO
1910
1750 ! esphasized off
1760 IF C$= "40" THEN I=40 @ GOTO 1910
1770 ! 40 cols, double width - part of print routine
1780 IF C$= "SK" THEN GOSUB 2100 @ GOTO 1910
! skip some lines
1790 IF C$= "EN" THEN I=P @ GOTO 1910 ! end
printing loop
1800 IF C$= "DB" THEN PRINT E$&"G"; @ GOTO
1910 ! double strike
1810 IF C$= "DO" THEN PRINT E1&"H"; @ GOTO
1910 ! double off

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This package can choose the correct routines based on data, instead of the user deciding on a routine before data is entered. The easy-to-read manual includes step-by-step instructions. All data entry is completely prompted.

POWERFUL

Internal point capacity is 4000 points (9999 w/318k), 999 drawing figures (2000 w/318k) and 50 lines text memory. The main program is over 92k in length, just load and remove the program disk if you wish. 7 sub programs are included for other features. After using the set-up program the software knows what plotter, printer, computer, CRT, and disk drive is to be used. If you change a device or memory, just update the set-up file.

INNOVATIVE FEATURES

This program has very easy to use plotting commands for CRT and external plotting (HP-7225, 7470, or 7580 plotter). You can fit the drawing to the surface or draw to any size and scale on the plotter. This will even draw plants and trees and put a shadow on them if you wish! To write legal descriptions, simply inverse points -

saving time and eliminating transposition errors; use a daisy wheel for final copy if you wish! Other programming for hydraulics, earthwork, vertical geometry, profile plotting, text management, estimate form writing, planimeter, HP-41CV software on bar-code included and interface software for HP-IL loop, and Spanish printout software included!

ADDITIONAL NOTE

Software is on the HP-PLUS program and costs only \$895.00.

INTERFACE PROGRAM

This program will link the 87/86 package to the PACSOFT, HP Survey Pack and Houseman 41-CV Data Collection with intelligent functions. Price \$105.00.

HP-85 CivilSoft

This software performs some features of the HP-87/86 package with point capacity of 999 points and 400 drawing figures. It has the ability to strip plot any scale or size drawing on the built-in thermal printer, with the computer unattended. Cost is only \$595.00.

NEW 3D SOFTWARE

This easy-to-use software (RUSSELL & AXON as author on HP-85 pack) will project three-dimensional drawings on the HP-85 thermal printer and CRT using easy-to-use commands. The HP-87/86 package will drive the same plotters as the HP-87/86 CivilSoft. Isometric and perspective can be selected under user control. Great for

presentation work! Costs only \$350.00 for HP-85, and \$400.00 for HP-87/86 package.

INTERIOR DESIGN PACKAGE

This package for the HP-86 is currently under development. It will enable the user to search the library of furniture which includes the specifications, stock number and drawing instructions. After you decide on the furniture and accessories, use the HP-9111A graphic tablet for layout; the plan will be plotted on the large 12 inch CRT of the HP-86, then press a key for final drawing by the 7470 or 7580 plotter; all furniture specs will be printed at the same time. Add your own furniture and accessories to a file. Software is scheduled for release by year's end. Price not available.

FOR ADDITIONAL INFORMATION

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Additional data on the software can be sent to you. The HP-87/86 CivilSoft package is available direct from any HP-80 series dealer! Ask for a demonstration and purchase locally, if you wish!



```

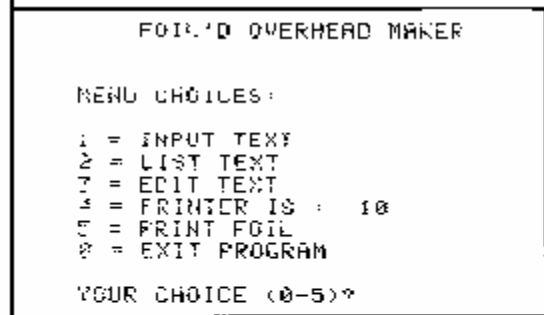
1820 IF C$ THEN 1910 ! ignore flip
1830 IF C$= "CH" THEN GOSUB 1940 @
GOTO 1910 ! print ASCII
1840 BEEP @ DISP "???" UNKNOWN
COMMAND!"
1850 DISP "IN LINE # ";I @ DISP B$@ GOTO
1910
1860 DISP B$
1870 GOSUB 2020 ' strip trailing blanks
1880 IF C=1 THEN GOSUB 2050 ! center the line
1890 IF L=40 THEN PRINT CHR$(14);! before
double width lines
1900 PRINT B$ ! finally print it
1910 NEXT I
1920 PRINTER IS 2 ! reset the printer
1930 GOTO 190 ! return to main menu
1940 ! handle transmission of ascii characters to
printer
1950 B$=B$(4) ! strip "@CH" off
1960 IF B$= "" THEN RETURN
1970 Z=VAL(B$)
1980 PRINT CHR$(Z); ! print ascii character
1990 Z =POS(B$, ",") @ IF Z THEN RETURN !
no more numbers
2000 B$=B$(Z+1) ! strip off first number & get
next
2010 GOTO 1960 ! process next number, if any
2020 ! strip trailing blanks
2030 Y=LEN(B$) @ IF Y>2 AND B$(Y,Y)=" "
THEN B$=B$(1,Y-1) @GOTO 2030
2040 RETURN
2050 ! center line
2060 Y=LEN(B$) @ IF Y=0 THEN RETURN
2070 Z=INT((L-Y)/2) ! number of spaces

```

```

2080 FOR Y=1 TO Z @ B$= ""&B$ @ NEXT Y !
add leading spaces
2090 RETURN
2100 ! skip lines
2110 Z=VAL(B$(4)) ! extract # of lines to skip
2120 FOR Y=1 TO Z @ PRINT @ NEXT Y @
RETURN
2130 ! $$$PRINTER TURN ON GOSUB
2140 PRINTER IS P1,80
2150 RETURN

```



```

LINE # : TEXT
0 : @FL
1 : This is a test file
2 : @40
3 : @db
4 : set 40 column & double strike
5 : @ch10,10
6 : Send two line feeds (ASCII 10)
7 : @EN

```

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HEWLETT PACKARD'S ASSEMBLER ROM FOR HP-85

Machine language is the “natural” language of your computer. It lets you do anything your imagination and the physical constraints of the hardware allow. It works as fast as your computer works, and it gives you total control over data structures. So why don't we all use machine language? Because it's usually a tremendous amount of work when compared to a language like Basic. With all the control comes more responsibility for handling every little thing that the computer is supposed to do, and you often have to roll up your sleeves to slug it out at the bit and byte level.

Still, to handle specific problems, machine language is often the only way. An assembler is a program/tool to help you write machine language programs (called Binary programs in the HP Series 80 programming manual). The assembler doesn't make binary program creation a snap, but it does ease the burden on the programmer considerably. With an assembler, you can express things in more human terms (called “mnemonics”), so if you want to load a particular value at a byte in memory, you can write “LDB” instead of “240”. The assembler also keeps track of physical locations in memory for subroutines and jumps (which are like GOTO's in Basic), and allows you to use label names (instead of line numbers or memory location values) to indicate sections of code. It also allows much easier editing and modifications to the code you're writing. When you've completed the program, the assembler will then “assemble” the binary program, substituting the proper machine language codes for the assembler's mnemonics and labels.

The Hewlett Packard Series 80 assembler is in a Read Only Memory (ROM) chip. The Assembler goes for \$295 retail (plus the cost of a ROM drawer, if you don't already have one) . For your money you get the Assembler ROM; a large manual; sample programs; and a “Global” file, on both tape and disk, that contains various system labels and subroutine locations.

HP's approach to assembly language programming in the Series 80 is rather unique. Instead of using special commands, like PEEK, POKE, CALL and USRs that other versions of Basic use to access machine language routines, HP actually allows you to expand the “vocabulary” of Basic, to include new reserved words that execute machine language routines.

Because a Series 80 binary program expands the Basic reserve word set, you also have to learn how Basic parses (or interprets) a program. The binary program must be in memory before you can use any of the new words you've defined (or you'll get a syntax error), because the computer won't know how to parse the new reserved word properly.

The manual assumes that you already know about assembly language programming. With all the other material that has to be covered, this is a reasonable approach, although a beginner's tutorial never hurts. If you don't know about assembly language programming, trying to learn from the HP manual would be difficult, at best, and you should probably learn assembly language concepts by studying a beginner's book. Unfortunately, this will have to be a book written for some other microprocessor, because to my knowledge the HP manual is “it” when it comes to information on the Series 80 microprocessor. One book that I can recommend is “How to Program Microcomputers” by William Barden, Jr. (Howard W. Sams & Co., publishers), which covers 8080, 6800, and 6502 microprocessors, as well as general concepts that will also apply to the Series 80.

The manual covers Assembler statements and operation, an overview of the Series 80 microprocessor, Assembler instructions, Series 80 systems architecture, writing binary programs (for ROM and RAM), and built—in HP Series 80 routines which might be useful in writing your own binary programs. A short chapter also covers the HP—82928A System Monitor ROM, which is NOT necessary for Assembler ROM operations. -

A good deal of time is spent on writing binary programs for ROM's. This information

is mixed in with information on writing RAM based binary programs that are loaded in from tape or disk. Unfortunately, at this time there's no way for the Series 80 user to make his/her own ROMs, so all this material on ROM creation is intrusive and not too useful.

Tape and disk data formats and program formats are also missing from the manual, making any binary program manipulation of both harder. The manual has only 6 complete examples of binary programs. To my taste, this isn't nearly enough, because I usually learn a great deal by studying program examples.

Most of these gripes are admittedly small, and to offset them the manual has many strong points. The description of addressing modes available, for instance, is extremely clear. The manual also has a complete description of how the Series 80 operating system works when parsing, running a Basic program and when running in the calculator mode.

Also included in the manual is a complete description of many of the internal ROM routines found in the HP 85. This is a veritable gold mine for the assembly language programmer, chock full of good stuff that otherwise you'd have to write for yourself. This section alone is worth the price of the Assembler ROM, if you do a large amount of assembly language programming.

The actual operation of the Assembler is very much like writing a Basic program. The lines of code have line numbers (yes, the AUTO and REN commands work), and all the HP's powerful editing keys can be used.

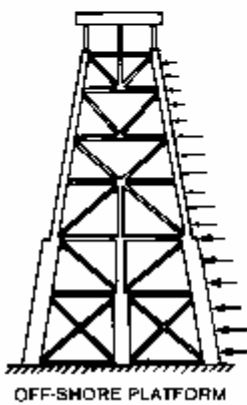
The Assembler also offers several powerful new features that can make life a little easier for the programmer. For instance, you can find any label or reference in the assembly program with the new FREF and FLABEL commands. HP even redefines the "K2" and "K3" keys to display the new commands for you! You can translate from octal to decimal or vice-versa with new commands, show or not show remarks (at your option), link source files, refer to a "Global" file that has all the system addresses of the HP routines mentioned earlier, and

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use a variety of pseudo opcodes (or assembler mnemonics) that control all sorts of options. Some of the more interesting pseudo opcodes are ones that allow conditional assembly of sections of code, based on the status of flags set by the programmer. Sorry, no assembler macro facility is provided, but I guess every thing can't be crammed into one little ROM.

With the Assembler ROM, you can also examine sections of memory (directly or indirectly), and change memory if desired. With the HP Monitor ROM, you can set breakpoints and do some other things, but with the Assembler ROM's memory examine and change features, I can see why HP says the Monitor is not necessary for Assembler operations.

The HP Assembler ROM is currently the only assembly language tool available for the Series 80. Fortunately, it's a very good assembler and well worth the price for the programmer that wants to expand out of Basic into machine language programs.

(NOTE: The above review is for the HP-85 Assembler ROM. The HP-87 Assembler, although different, takes the same approach to binary programs.)

A PERSONAL OPINION OF THE HP-87A COMPUTER

by Richard M. Harrison

Owner, LARD INNOVATION, P.O. Box 50662, Dallas, TX 75250

I have the pleasure of being the first owner of an HP-87A computer, which was allocated to me for test site purposes, and for software development.

When I first received the computer, I was not too Impressed with its appearance. I expected something more complex looking, and it resembled an HP-83 with a wider screen. So far, that has been the only thing that has not impressed me about the machine.

My unit has no markings, as it is a prototype, and not an actual production unit. The HPIB interface and Mass Storage ROM is built into the HP-87, which saves you \$500 or so over the HP-85, where these are extra cost items. The mass storage features are the same as for the HP-85 with disk. You can title a disk program as "Autost", and with the HP-87 the program will be automatically loaded and run (the same feature as the HP-85's tape drive).

You can put up to four 128K memory modules in the computer, which will give you 544K of random access memory (RAM) and 48K of read only memory (ROM). The memory modules come in 32K, 64K and 128K sizes (the 128K is quite large in size). There are only 4 expansion slots in the HP-87.

The standard HP-85 ROM drawer and most of the Interfaces can be used, but the enhancement ROMs from the HP-85 can not be used because of a different binary program format. The HP-87 has its own collection of enhancement ROMs.

There is a 64K CP/M module that you can install, giving you the capability of using any of the thousands of software packages that are written for the CP/M operating system. The '87 has 14 function keys, with their functions appearing on the display in Inverse video. The function keys serve a dual purpose. During program operation they can serve as function and control keys, and when you are writing a Basic program they also serve as user definable typing aids. If you are writing a program and need to include the Basic keyword PRINT, for instance, you can define the number 3 function key so It will display PRINT each time you press It.

With all its memory, It seems as if the HP-87 can hold any program, no matter what its size. Our Civilsoft package has over 40K of programming, organized into a half dozen HP-85 programs which must be CHAINED together because of the HP-85's 32K memory limit. I wanted to transfer all these programs to the HP-87, for an expanded Civilsoft package. I set the HP-87 into ALPHALL mode, which gives you a screen of 80 characters by 24 lines. With ALPHALL mode, you actually have 204 lines available If you scroll the screen to view them In 24 line segments. I loaded an HP-85 program in and waited for the '87 to automatically translate It. The HP-87 will ignore tape and COPY commands, and will actually turn an entire

HP-85 program line into a Remark if a COPY or other untranslatable command is encountered when translating.

After translating the HP-85 program with the HP-87, I RENumbered it and added the other programs until all the programs were translated into an HP-87 file. Most of this program was re-written to use the advanced features of the HP-87A, retaining less than 40% of the HP-85 programs, and adding to it until the main program was over 84K in length. That's 20,000 bytes more than the total capacity of a fully expanded Apple II or Osborne computer!

With the HP-87, you can now have string arrays, which is a real plus when working with text editing and manipulating words. Variables are not limited to 2 characters, as in the HP-85. For example, in the HP-85 you would use a variable like H1 or H1\$ to store a total figure, but with the HP-87 you can use a variable name like TOTALPOP or TOTALPOPS\$, so you can readily see what your variables are. Naturally, in programs where memory is a concern, you should use short variable names, because long, complex names take away from the available memory.

The HP-87 transfers data and programs much faster to and from disk than the HP-85. In fact, it's so fast that I thought that there was something wrong with the system because it seemed too fast. All arithmetic functions have a 12 digit precision. There is a DATE function that can transfer time functions into year and day.

Program lines can be numbered up to 99999, which you will find useful when writing large programs. Error messages and tracing functions are similar to the HP-85, although the '87 has a special Trace/Normal key which allows the programmer to initiate tracing anywhere during program execution. Be aware that in the GRAPHALL mode error messages will not be displayed, so you will have to do a "CRT IS" command to direct them to the printer when debugging a program using this mode.

Speaking of graphics, this is one area where the HP-87 really shines. Basically, you can plot

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anything on the '87's display screen that you can with an HP-85, a Printer/Plotter ROM, and a plotter like the HP-7225. Characters can be of any size and angle. Labels can be in any direction. Even though you have all the functions of an HP-85 with a Printer/Plotter ROM, you will still need an HP-87 Plotter ROM to control an external plotter.

With the HP-87 Plotter ROM, you can dump the entire contents of the screen to your printer, with either DUMP GRAPHICS or DUMP ALPHA commands. There are also commands to specify what printer you're dumping to. I have an old Epson MX-80 with the Graphtrax option, and I've had excellent results with these features. The time it takes to dump the screen is less than a minute, which is much better than on the HP-85, when you take into account there is so much more screen to dump.

The characters on the HP-87 screen are smaller than on the HP-85, but they are also much crisper. The resolution for graphics is also better, as is the speed for drawing lines. I could write a book on the features of the HP-87, but the main point is that a computer is a number crunching and text editing and formatting machine that is supposed to relieve mankind of work and save time. With the numeric accuracy, the expansion capability, the relatively low cost, incredible graphics and ease of use, there is no computer on the market that even comes close to the HP-87.

FOR/NEXT. . . "LOADBIN"

Many Basic programmers associate Binary programs with more work, complication, and bother. With the HP Series 80, this isn't necessarily true.

You do have to learn a few more commands in order to use binary programs with the Series 80, but the result is often a tremendous savings in programming time as the binary program can do things which are difficult or impossible to do with Basic. In this installment of For/Next, we'll discuss how to use binary programs and where to get binary programs. In this column we won't teach you how to write binary programs, how they're structured, or any of the other arcane stuff that fascinates advanced users and puzzles beginners. For the Series 80s, you don't have to know all these things to use binary programs.

The HP-85 programming manual doesn't provide much illumination on the use of binary programs. Essentially, the manual says you can save binary programs with the STOREBIN command and you can call a binary program into memory with the LOADBIN command. It also says the LOADBIN command can be included in a program. There are a lot of Series 80 programmers that would dispute that last statement (at one time I was one of them), but I've found Out LOADBIN can be included in a program if you follow a few simple rules.

1. Prior to entering or editing any program that uses a binary program, you must get it in memory manually by typing LOADBIN "binary program name" from the keyboard.

2. If the Basic program doesn't have a COM statement, you can program it to load the binary program with something like '10 LOADBIN "binary program name"'. The way to do this is to make sure you press the INIT key prior to storing the Basic program. If you don't press, the INIT key, the program may not function properly when you LOAD and RUN it.

3. If the program has a COM statement, you can not have the program LOADBIN the binary program if it's also trying to use some binary commands. The way around this is to start your program with a short Basic program that only loads the binary program, then CHAINS to the "real" Basic Program:

```
10 COM A,B,C$ ! SAME COM AS 'REAL' PROGRAM
20 LOADBIN "binary program name" !GET THE BINARY PROGRAM IN MEMORY
30 CHAIN "Basic program name" !GET 'REAL' PROGRAM IN MEMORY
40 END
```

Once you get the binary program in memory they're a snap to use. With a Series 80 binary program, you add new Basic commands or functions, and you use them like any other Basic command or function. The major difference is that these new commands usually do things that are difficult or impossible with "regular" basic commands!

Where do you get binary programs without writing them yourself? The best source is the Hewlett-Packard Series 80 User's Library (1000 N.E. Circle Blvd., Corvallis, OR 97330). The User's Library puts out a thick catalog of programs that you can trade original programs for or buy. Many of these are binary programs filled with all sorts of powerful new Basic commands. Yearly dues to the Library are \$40, and programs run from \$6-12 for members (plus a media cost of \$14 for HP-85 tape). Binary programs are usually \$12. For a few dollars more, you can buy programs from the library without joining. You should check with your Series 80 dealer to see if he/she has a User Library catalog, or you'll get your own catalog if you join the Library.

If you join the Library, they currently send you a small collection of Basic and binary programs. One of these programs is the "LINKEY" program used in the FOIL'D program presented in this issue. Besides a new kind of input statement (LINPUT) which accepts commas, quotes and other punctuation a regular INPUT won't, LINKEY gives you cursor movement commands, the ability to make any key a special function key, and several other features.

If you're a beginner to Series 80 programming, we invite you to join us for other installments in this series. For/Next is intended as a column for new and intermediate programmers. In it, we try to examine Basic commands and programming techniques to illustrate how you can improve your programming ability.

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If you have a completed or nearly completed program for any HP Series 80 computer, the IBM Personal Computer, or the Apple II, please contact us so we can discuss your program.

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