HP 250
change sheet

MANUAL IDENTIFICATION
Part Number: **45251-90015**
Print Date: **May 1980**
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CHANGE IDENTIFICATION
Change Number: **1**
Print Date: **September 1980**

THE PURPOSE OF THIS MANUAL CHANGE is to accumulate all changes to the current edition of the manual. Earlier changes, if any, are contained herein for your convenience. (If you have made all previous changes to this manual, you need only make the changes described under the change number indicated above.) This change notice may consist of changed pages, new pages, write-in change instructions, or a combination of all.

CHANGED PAGES ARE IDENTIFIED by the change number at the bottom of the page and a vertical line (change bar) in the outside margin to indicate the area of the text that has been changed.

NEW PAGES ARE IDENTIFIED by the change number at the bottom of the page. "New" pages are those which were not present when the current edition of the manual was published.

WRITE-IN CHANGE INSTRUCTIONS are presented on the following pages of this Manual Change Notice in procedural form.

TO UPDATE YOUR MANUAL proceed to the next page of this Manual Change Notice and follow the procedures in sequence.

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Page	Change
1-3	If your flexible disc drive has a label on it that says it is a 9895K drive, you should delete the references to the green and yellow lights in Step 3 of the power-on procedure. The 9895K flexible disc drive does not have a green light labeled "READY" or a yellow light labeled "IN USE"; it does have a red light on the latch. When this light comes on, it indicates that the drive is in use. While in use, the drive door is locked.
8-2	Add the following sentence to the explanation of the TRACE statement: When you specify a beginning line ID, that line number must be present for tracing to begin; in the same manner, when you specify an ending line ID, that specific line number must occur for tracing to be disabled.
B-29	The syntax for the READ LABEL statement is incorrectly specified. It should be changed to the following format, which also appears on page 6-17 of this manual. READ LABEL { string variable [ON volume spec] / string array name }
C-1 C-7 C-26 C-35 C-51 C-56 C-57	In the description of the several utilities and binary programs, you are told that they are accessed from the SYSTEM disc. This is not true. They are accessed from the UTILITY disc. For all of the following utilities, note that change: INIT, DUPL, ROUTIL, CATBIN, XREF, DUP, R-ONLY

Insert the new pages provided with this update into their correct location in this manual. Remove any existing pages that may have become outdated because of these new pages. All new pages are listed on the print history page.

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BASIC/250
Programming Manual

Manual Part No. 45251-90015

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Printing History

New editions of this manual will incorporate all material updated since the previous edition. Update packages may be issued between editions and contain replacement and additional pages to be merged into the manual by the user. Each updated page will be indicated by a revised date at the bottom of the page. A vertical bar in the margin indicates the changes on each page. Note that pages which are rearranged due to changes on a previous page are not considered revised.

The manual printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates which are incorporated at reprint do not cause the date to change.) The manual part number changes when extensive technical changes are incorporated.

September 1978 ... **FIRST EDITION**
December 1978 ... revised pages for O.S. 1.C: C-20 thru C-32; pages C-7 thru C-32 rearranged.
February 1979 ... **SECOND EDITION** revised pages: 1-11, 1-18, 2-4, 2-15, 3-7, 4-19, 6-10, 6-12, 6-22, 6-25, A-1, B-2, B-3, B-4, B-6, B-7, B-13, B-14, B-16, B-18, B-19, B-23, D-3.
June 1979 ... revised pages for O.S 2.D: iii, v, vii, x, xi, 1-3, 1-12, 1-29, 1-33, 4-2, 4-23 thru 4-30, 6-4, 6-25, 6-25.1, 6-25.2, 7-2, 7-5, 7-21, 7-38, 8-1, 9-1 thru 9-16, A-1, A-11, A-12, B-4 thru B-39, C-1 thru C-38, D-2 thru D-5.
May 1980 ... **THIRD EDITION**
September 1980 . . . revised pages for O.S. 3.03: ii, xii, A-11 through A-16, C-58.

2608A Printer Control

With the P2608 DROM, you can configure one 2608A printer in your HP 250 system. The 2608A offers you the advantage of increased print speed along with features such as double-sized print, 14 software selectable character sets, variable form length, extended vertical format control characters, and graphics.

Getting Started

Your first task is to properly configure the 2608A printer into your system. Run the CONFIG utility and perform the following steps:

1. Enter 2 for DROM EDIT and add the P2608 DROM.
2. Enter 4 for PERIPHERAL EDIT and add the P2608 as one of the peripheral devices; in addition, set the form length and the number of lines per inch.
3. Reload the operating system so that the new configuration can be used.

Language Set Access

When using escape sequences to select Primary and Secondary character sets, refer to the following table for values of n. Physical switch settings are also shown.

Character Set	n	switch settings
USASCII	0	0000
ARABIC	1	0001
CYRILLIC	2	0010
KATAKANA	3	0011
DRAW	4	0100
APL	7	0111
FRENCH	8	1000
GERMAN	9	1001
SWEDISH/FINNISH	10	1010
DANISH/NORWEGIAN	11	1011
SPANISH	12	1100
BRITISH	13	1101
JAPANESE ASCII	14	1110
ROMAN EXTENSION	15	1111

The following tables list control codes and escape sequences which are valid on the 2608A.

Control Code[1]	Function	Description
H_c	Backspace	Move one column left.
J_c	Linefeed	Move to same column position on next line.
L_c	Formfeed	Move to first print position at top of next page.
M_c	Carriage Return	Move to left margin.
N_c	Shift Out	Use the following characters from secondary character set until receipt of Shift In.
O_c	Shift In	Use the following characters from the primary character set.
$[_c$	Escape (Esc)	The following characters are an escape control sequence.

Escape Sequence	Description
Esc Y	Display Function mode on.
Esc Z	Display Function mode off.
Esc E	Power-on Sequence.
Esc z	Self-test Routine.
Esc o	Switch Printer Offline.
Esc (n A	Select Primary Character Set n, where n is from 0 thru 15 and indicates the ROM location.[2]
Esc) n A	Select Secondary Character Set n.[2]
Esc & d @	Auto Underline Off. (@ can be replaced with A,B,C,H,I,J or K.)
Esc & d D	Auto Underline On. (D can be replaced with D,E,F,G,L,M,N or O.)
Esc & l n V	Select VFC channel n, where n is from 1 thru 16.
Esc & l n F	Specify form length of n lines, where n is from 1 thru 127.
Esc * b n W	Set Graphics Mode, where n is from 1 thru 115 and indicate the number of following bytes.
Esc & k 0 S	Set Normal Print Mode.
Esc & k 5 S	Set Double-sized Print Mode.
Esc & l n M	Set Left Margin to n column, where n is from 0 thru 15.

1 Press (ctrl) while pressing character key.

2 When a new primary or secondary character set is selected, the other set is automatically set to US ASCII.

Vertical Format Control (VFC) Considerations

The 2608A printer requires all VFC channel definition information to be output at the time a new form size is selected (the 2608A driver will not output channel information to emulate the standard 60/80 lines per form channel formats described in the table below). If the form length is not specified as the US standard (66 lines/form), all VFC channel information is invalid.

VFC Standard Format

		*Line positions of Logical One	
Channel	**Functions**	**6 LPI****	**8 LPI****
1	Slew to top of next form	0	0
2	Slew to bottom of form	59	79
3	Single space	0,1,2,...59	0,1,2,...79
4	Slew to next double space line	0,2,4,...58	0,2,4,...78
5	Slew to next triple space line	0,3,6,...57	0,2,4,...78
6	Slew to half form line	0,30	0,40
7	Slew to next quarter form line	0,15,30,45	0,20,40,60
8	Slew to next 10th line	0,10,20,...50	0,10,20,...70
9	Slew to bottom of form	59	79
10	Slew to one line previous to bottom of form	58	78
11	Slew to one line previous to top of next form	65	87
12	Slew to top of next form	0	0
13	Slew to next 7th line	0,7,14,...56	0,7,14,...77
13	Slew to next 6th line	0,6,12,...54	0,6,12,...78
15	Slew to next 5th line	0,5,10,...55	0,5,10,...75
16	Slew to next 4th line	0,4,8,...56	0,4,8,...76

*Logical one is analagous to the hole in a paper tape or destination point for that channel.
**Assume 10-inch printed form area on 11-inch page: at 6 LPI, 60 lines possible; at 8 LPI, 80 lines possible.

Using the Features of the 2608A

The following section includes descriptions of how to take advantage of the features of the 2608A printer.

1. Changing form length
   a. Run the CONFIG utility (as described in Appendix C).
   b. Enter 4 for Peripheral Edit.
   c. Press the EDIT softkey and then enter the desired form length and lines/inch.
   d. Press the UPDATE softkey.
   e. Reload the operating system.

2. Resetting the top of form
   a. Put the printer offline.
   b. Position the paper to the new top of form.
   c. Press the reset button on the printer.

3. Changing Language Sets (Primary and Secondary)

This can be performed by either setting switches on the printer or through CRT or program control.

Switch Setting

a. To select the primary language you desire, set the primary language switches on the 2608A appropriately (see the Language Set Access Table). Press the reset button on the printer; the secondary language defaults to ASCII.

b. To select the secondary language you desire, use the secondary switches and press the reset button on the printer. The primary language defaults to ASCII.

Program or CRT Control

a. To set the primary language print "ESC(nA" , where n is the decimal value as shown in the Language Set Access Table (e.g., if you wanted French as the primary language you would print "ESC(8A". The secondary character set defaults to ASCII. Do not press the reset button on the printer; doing so will return to the switch-set language.

b. To set the secondary language set, print "ESC)nA", where n is the language set desired (e.g., if you wish to select German as your secondary set, print "ESC)9A".). The primary character set defaults to ASCII.

NOTE

Specifying a language set through software escape sequences overrides the hardware setting until the next reset or escape sequence.

Multiple User Considerations

Selected modes of printing are not saved from user to user. Therefore, the following procedure is recommended to guard against unwanted print formats.

1. REQUEST the printer.
2. Set the required printing formats.
3. Print the data.
4. RELEASE the printer.

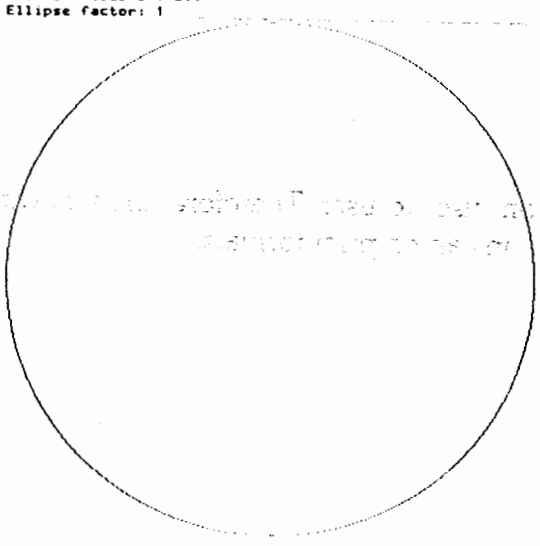
2608A Graphics Mode

The graphics mode is enabled via an escape sequence. Each byte of data following the sequence (from 1 thru 115 bytes) is converted to an eight-dot horizontal line (115.5 bytes per line). After data is output, the printer exits the graphics mode and returns to the standard print size and lines per inch. Both graphics and alphanumeric data cannot be printed on the same line.

Here's an example program using the 2608 graphics mode —

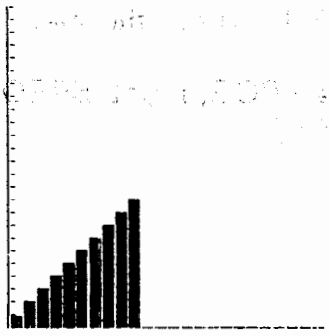
```
10   ! Let's draw a circle on the HP2608A Printer.
20   DIM Line$[115]
30   INTEGER Rad,Xc,Yc,Yi,Vi
40   DISP CHR$(255)                    ! Clear the display.
50   INPUT "Enter radius (1 thru 400 dots wide):";Rad
60   INPUT "Enter X,Y center point (0,0 thru 400,400):";Xc,Yc
70   INPUT "Enter an ellipse factor (0 thru 10):";Ell
80   PRINTER IS 1,WIDTH(-1)            ! Specify 2608 address & default line width.
90   PRINT "%%&k5S"&"Draw a Circle"    ! Print title in double-size mode.
100  PRINT "%&k0S"&"Circle at:";Xc;",";Yc
110  PRINT "With a radius of:";Rad
120  PRINT "Ellipse factor:";Ell
130  Rad2=Rad*Rad
140  FOR Yi=Yc TO -Rad STEP -1         ! Start drawing.
150    Line$=RPT$(CHR$(0),115)         ! Clear Line$.
160    IF Yi>Rad THEN Pr               ! Output blanks if circle not started.
170    Vi=Ell*SQR(Rad2-Yi*Yi+.5)
180    Xi=Xc-Vi                        ! First X value on line.
190    IF Xi>=0 THEN Line$[INT(Xi/8)+1;1]=CHR$(2^(7-INT(Xi MOD 8)))
       ! In case circle beyond left margin.
200    Xi=Xc+Vi                        ! Second X value on line.
210    IF Xi<=920 THEN Line$[INT(Xi/8)+1;1]=CHR$(2^(7-INT(Xi MOD 8)))
220  Pr:PRINT "%*b115W"&Line$;         ! Print graphics block of 100 bytes.
230  NEXT Yi                           ! Continue printing blocks.
235  PRINT "%"
240  PRINTER IS 8
250  END
```

```
Draw a Circle
Circle at: 200 , 200
With a radius of: 200
Ellipse factor: 1
```



Here is another sample program which outputs a bar graph; it is designed to show how to set specific bits in a print line.

```
100  ! * This program uses 2608A Graphics Mode to output a bar graph. *
110  !
120  !
130 PRINTER IS 1,WIDTH(-1)
140  E$="&"                                    !Set escape sequence to variable.
150  DIM A$(1:10)[25],B$[25]                   !Define array 25 bytes by 10 lines.
160  B$=RPT$(CHR$(0),25)                       !Clear the line.
170  N=1                                       !Read counter.
180  Tic=200                                   !Counter for tic incrementing on Y-axis.
190  READ X,Y
200  !
210  ! * Loop to print individual rows of graph. *
220  !
230  FOR I=200 TO 1 STEP -1                    !Y-axis is 25 bytes long at 8 bits per byte.
240       A$(N)=RPT$(CHR$(0),25)               !Clear the line.
250       B$[1;1]=CHR$(1)
260       J=Y*8
270       IF J=I THEN                          !Checks if current row.
280            L=X*8                           !Find X column to set.
290            IF L<200 THEN B$[INT(L/8+2);1]=CHR$(127)
300            IF L>199 THEN B$[19;1]=CHR$(127)
310            A$(N)=B$
320            IF I=Tic THEN                   !Check if tic is to be printed.
330                 A$(N)[3,2]=CHR$(112)
340                 Tic=Tic-8
350            END IF
360            PRINT E$&"&l1SM";E$&"*b25W"&A$(N);      !Print a line.
370            IF N<10 THEN
380                 N=N+1
390                 READ X,Y
400            END IF
410       ELSE
420            A$(N)=B$
430            IF I=Tic THEN                   !Check if tic is to be printed.
440                 A$(N)[2,2]=CHR$(112)
450                 Tic=Tic-8
460            END IF
470            PRINT E$&"&l1SM";E$&"*b25W"&A$(N);
480       END IF
490 NEXT I
500  !
510  ! * Loop to set up X-axis print-line.*
520  !
530 FOR I=2 TO 25
540       B$[I]=CHR$(127)
550 NEXT I
560 PRINT E$&"&l1SM";E$&"*b25W"&B$
570 PRINT "Y AXIS IN SALARY SCALE"
580 PRINT "X AXIS IN YEARS FROM 1 TO 9"
590 DATA 9,10,8,9,7,8,6,7,5,6,4,5,3,4,2,3,1,2,0,1      !Data is sorted in descending order Y.
600 END
```



```
Y AXIS IN SALARY SCALE
X AXIS IN YEARS FROM 1 TO 9
```

If you look at line 590, you see that the data is sorted in descending order for the Y-axis values. This is required to print this type of graph. If you wish to enter data interactively or via a data file, you would need to implement a sort routine with the primary key being the Y-axis value in descending order, and the secondary key being the X-axis values in ascending order.

The REVCHK Utility

The REVCHK (revision check) utility is a short binary program which immediately compares the current operating system revision level with its own revision level. If both revision levels do not match, ERROR 999 occurs.

Since many system utilities (INIT, CONFIG, etc.) have been updated with revision 2.D, they do not run correctly on earlier operating system revisions. The REVCHK binary is included in these utilities to ensure that they are not run on earlier systems. REVCHK is invoked by the statement:

```
LOAD BIN "REVCHK"
```

The REVCHK utility should be invoked at the start of any program which uses rev 2.D binary programs, utilities, or additions to the operating system (e.g., structured statement or CURSOR UPALL). REVCHK will then return ERROR 999 to warn the operator, rather than allow the program to continue with unexpected results. Refer to the footnote on page 4-2.

The R-ONLY Utility

The R-ONLY utility is a binary program which loads the RUN-ONLY statement, allowing you to convert individual programs to run-only (RO). To load the R-ONLY utility from the SYSTEM disc, execute -

```
LOAD BIN "R-ONLY, SYSTEM"
```

The RUN-ONLY syntax is -

RUN-ONLY file spec

The program file must be type PROG; if not, ERROR 58 is returned. The program file must not be protected (*).

The ACCEPT Binary Program

The ACCEPT binary program loads one statement, ACCEPT; it provides the HP 250 with a command that prevents input from being displayed. The ACCEPT statement is especially suited for entering passwords or any other sensitive information.

To use the ACCEPT binary program, you must load it along with your program, by executing the following statement —

```
LOAD BIN "ACCEPT.UTILITY"
```

The ACCEPT Statement

The syntax for the ACCEPT statement is the following —

ACCEPT string variable

When you use this form of input, remember to note the following —

1) The cursor does not appear while you are inputting the string. Once the ENTER key is pressed, the cursor appears in its usual state.

2) All softkeys are ignored while input is being ACCEPTed.

3) Line drawing characters are ignored if you input them. They will not be returned in the input string.

Here is a sample program using the ACCEPT statement —

```
10   PRINT "Please enter your name (To exit press the ENTER key)"
20   ACCEPT Name$
30   IF Name$="" THEN 100
40   PRINT " Nice to meet you, ";Name$
50   PRINT ""
60   GOTO 10
100  PRINT ""
110  PRINT ""
120  PRINT "   *** program done ***"
130  END
```