Boot ROM Configuration Mode Users Manual

HP 9000 Products

Contents

Figures

Tables

1

System Features

These system administration notes provide information on the HP-UX Release 7.0 operating system as it directly relates to the HP 9000 345/375. This information supplements information found in various HP-UX Release 7.0 software manuals including the following:

- *Installing HP-UX* (HP part number 98594-90013).

- *HP 9000 Series 300: System Administration Task Manual* (HP part number 98594-90061).

- *HP-UX Installing Peripherals* (HP part number 97005-90002).

The material in this system administration notes will be included in the standard HP-UX manuals upon the next release of HP-UX.

The HP 9000 345/375 include the following features:

- 11.4 VMIPS performance.

- 50 MHz 68030 processor.

- 40 MHz 68882 co-processor.

- 8 Mbytes of ECC DRAM (4 Mbytes in 345MH).

- HP-UX Release 7.0 preloaded on hard disk drive (345 only).

- MH, C+, CH, SRX, TurboSRX graphics interfaces available.

- 375 upgradable to 68040 processor.

2

Configuration Mode

Introduction

The HP 9000 345/375 Configuration Mode allows you to set your SPU's built-in interface's select codes, addresses and interrupt levels. These built-in interfaces are on the system board. As they do not have physical configuration switches like other interface cards, their configurations are set by keyboard entry while in the Boot ROM's Configuration Mode before booting the operating system. SPU's that have a configuration mode available are identified by the message:

    Configuration EEPROM

appearing in the power-up and self-test display, as shown below, directly after the MC68882 Co-processor message and just before the HP-HIL.Keyboard message.

```
Copyright 1989,
Hewlett-Packard Company,
All Rights Reserved.

BOOTROM Rev. D
Bit-Mapped Video
MC68030 Processor
MC68882 Coprocessor
Configuration EEPROM
HP-HIL.Keyboard
HP-IB
DMA-CO
RAM 4194080 Bytes
HP98644 (RS-232) at 9
HP98265 (SCSI S 32) at 14
HP98625 (HS HP-IB) at 15
HP98643 (LAN) at 21 080009AAAAAA
HP PARALLEL at 23




 System Search Mode
 RESET to Power-up
```

Figure 2-1. Power-Up and Self-Test Display

If the configuration information in the EEPROM could not be accessed or
correctly applied to the built-in interfaces, the message would read:

```
   Configuration EEPROM Failed
```

which means something failed and one of three situations may exist:

■ All the built-in interfaces have been set to default values.

■ Some default and some changed settings have been set.

■ All the built-in interfaces have been set to their changed values.

It is possible that all interfaces have been configured properly, but you will still receive the error message. After you have confirmed that all interfaces have been configured properly, continue with the system bootup process.

Configurable Interfaces

You should enter configuration mode and find out what each built-in interface configuration values are set. Interfaces that have their configurations controlled by configuration mode are:

- HP-IB.

- RS-232.

- Small Computer Systems Interface.

- High-Speed HP-IB.

- Local Area Network.

- HP Parallel.

After you have set your built-in interface select codes and addresses, these values are stored in Electrically Erasable Programmable Read-Only Memory, or EEPROMS. If you turn your SPU off, then back on, your configuration values are still set. You may change them to suit your applications whenever you want by resetting your SPU and entering the Configuration Mode.

In the next chapter, using the menus and user responses are shown in order. This is done to show you what the menus look like. Menu items may be selected in any order.

Note that menu changes will not be shown in the self-test results on the left side of the screen until the changes effected by the menus are saved and the self-test re-run.

3

Using Configuration Mode

Entering Configuration Mode

When you see the following power-up and self-test display, type $\boxed{C}$ $\boxed{\text{Return}}$ to enter the Configuration Mode.

```
Copyright 1989,
Hewlett-Packard Company,
All Rights Reserved.

BOOTROM Rev. D
Bit-Mapped Video
MC68030 Processor
MC68882 Coprocessor
Configuration EEPROM
HP-HIL.Keyboard
HP-IB
DMA-C0
RAM 4194080 Bytes
HP98644 (RS-232) at 9
HP98265 (SCSI S 32) at 14
HP98625 (HS HP-IB) at 15
HP98643 (LAN) at 21 080009AAAAAA
HP PARALLEL at 23




 System Search Mode
 RESET to Power-up
```

Figure 3-1. Power-Up and Self-Test Display

Your display changes to indicate your SPU has entered Configuration Mode as
shown below.

```
┌──────────────────────────────────────────────────────────────────┐
│                                                                    │
│  Copyright 1989,                    Configurable Interfaces         │
│  Hewlett-Packard Company,           Keys Interface   Select Code    │
│  All Rights Reserved.               ---------------------------     │
│                                       1  HP-IB                      │
│  BOOTROM Rev. D                       2  RS-232              9      │
│  Bit-Mapped Video                     3  SCSI               14      │
│  MC68030 Processor                    4  HS HP-IB           15      │
│  MC68882 Coprocessor                  5  LAN                21      │
│  Configuration EEPROM                 6  HP PARALLEL        23      │
│  HP-HIL.Keyboard                                                    │
│  HP-IB                                 N  store New values          │
│  DMA-C0                                D  store Default values      │
│  RAM 4194080 Bytes                        (then cycle SPU power)    │
│  HP98644 (RS-232) at 9                 A  Abort without changes     │
│  HP98265 (SCSI S 32) at 14            ---------------------------   │
│  HP98625 (HS HP-IB) at 15             Type [key] RETURN ?           │
│  HP98643 (LAN) at 21 080009AAAAAA                                   │
│  HP PARALLEL at 23                                                  │
│                                                                    │
│                                                                    │
│                                                                    │
│   System Search Mode                                               │
│  RESET to Power-UP, SPACE to clear input                  ? C      │
└──────────────────────────────────────────────────────────────────┘
```

Figure 3-2. Configuration Mode Display

Note the Configuration Menu in the upper-right corner. Depending on how your specific computer lists the interfaces, they may be in different order. Interface key numbers may also be different. Be sure you use the correct key number for the interface you want to configure.

If an error message appears in the mode line at the bottom, for example:

```
  Configure Mode Failed
  RESET to Power-UP, SPACE to clear input                      ? C
```

or if the `Configuration EEPROM Failed` error message appears at power up, a hardware problem with the Boot ROM or its memory probably exists. Refer to the following table for possible error messages you may see when entering Configuration Mode.

Table 3-1. Configuration Mode Entry Error Messages

Error Message	Meaning and What To Do
(no message)	Configure Mode could not start. Error messages can not be displayed. Hardware failure.
`Configure Mode Failed`	Configure Mode started but something failed.
`EEPROM has bad information`	Configuration Mode started, menu may have appeared, but something failed.
`Too much data to save`	Re-configure computer with fewer interfaces.
`EEPROM Load section missing`	Could not load new configuration data. Hardware failure.
`EEPROM Defaults section missing`	Default settings could not be found. Hardware failure.

Configuration Menu

The Configuration Menu's user actions are explained below:

- **Keys** - the keyboard's number keys representing the built-in interface you want to configure. Letter keys N, D, and A are control keys. You may select one or more keyboard configurable interfaces in any order.

- **Interface** - built-in interfaces listed in the display's left column that do not have configuration switches are listed by their name.

- `Select Code` - lists select code for interfaces that can have one. The built-in standard-speed HP-IB interface has a select code, but it cannot be changed. When you turn ON the SPU, each interface's default select code is listed.

Below the menu, the prompt line:

    Type [key] RETURN ?

means:

- `?` - waiting for keyboard input.

- `Type [key] RETURN` - type the key for the interface you want to configure, then type (Return).

Example Interface Menu

You may select one or more keyboard configurable interfaces in any order. For each interface, you're able to go to its Interface Menu. An example Interface Menu for the RS-232 Interface is:

```
        RS-232
  Key Feature          Value
  ---------------------------
    1  Select Code       9
    2  Interrupt Level   5
    3  Remote/Local      L
    4  Fast/Normal       N
    5  Modem Enable      Y

    X  to eXit menu
  ------------------------------
  Type [key] RETURN ?
```

Three columns have this information for you to use:

- `Key` - the keyboard number keys represent the interface function you want to configure. Type (X) (Return) to exit and return to the Configuration Menu.

- `Feature` - Lists the interface's function. The menu control features are at the bottom.

- `Value` - Lists state or value of that interface function.

Note that all Interface Menus are not the same. Each has its own functions available for configuration.

Below the menu, the prompt line:

```
Type [key] RETURN ?
```

means:

- ? - waiting for keyboard input.

- `Type [key] RETURN` - type the key for the interface you want to configure, then type (Return).

- You may just type (Return) exit the Interface Menu and return to the Configuration Menu.

When you select an interface's function, the prompt line changes. An example is the RS-232's Select Code. After you have selected the RS-232 interface to configure, and you want to change its select code you would type (1) (Return). The RS-232 Menu's prompt would change to:

```
  1   Select Code        9
  used select codes are :
 14 15 21 23
Type 0.. 31 except used RETURN ?
```

Note the select code function line appears like it does in the main part of the RS-232 Menu. The current select code appears at the right. Select codes already used in your SPU are listed in the line:

```
  used select codes are :
 14 15 21 23
```

The bottom prompt line:

```
Type 0.. 31 except used RETURN ?
```

tells you to type in a select code number between 0 and 31 except for those codes already used. In this case, codes 14, 15, 21, and 23 are already used by other interfaces.

Recommended Procedures

A good way for you to use the Configuration Mode is explained below:

1. Find out and write down what interface configurations your application and peripherals need for:

   ■ Select Codes.

   ■ Interrupt Levels.

   ■ Addresses.

   ■ Fast or Normal Speed.

   ■ DMA bus width.

   ■ System Controller.

   ■ Remote or Local.

   ■ Modem Enable.

2. Turn ON your SPU and get it into Configuration Mode.

3. Determine what interface you will configure first.

4. Go to that section in this chapter for instructions.

5. Read the instructions and change that interface's configuration.

6. Return to the main Configuration Menu.

7. Go to the following section titled 'Using the Control Functions.'

8. Do those steps and exit Configuration Mode.

Using the Control Functions

The last three lines of the Configuration Menu are control functions.

```
     Configurable Interfaces
     Keys Interface  Select Code
     ---- ---------- -----------
       1  HP-IB
       2  RS-232             9
       3  SCSI              14
       4  HS HP-IB          15
       5  LAN               21
       6  HP PARALLEL       23

       N  store New values
       D  store Default values
          (then cycle SPU power)
       A  Abort without changes
     ------------------------------
     Type [key] RETURN ?
```

Here's how they work:

Typing ⓝ (Return) saves all listed interfaces reconfigured values in
non-volatile memory. You can turn OFF your SPU, then turn it back ON
and the values you configured the interfaces to will be used. Then the
self-test will run.

Typing ⓓ (Return) exits the Configuration Mode and resets the default
configurations. You must cycle SPU power to then reconfigure the interfaces
to these default values.

Typing Ⓐ (Return) causes the Boot ROM to reset and run the self-test
without saving any of the changes.

If the Boot ROM has problems as you exit configuration mode, the mode lines
provide you with one or more of these error messages:

Table 3-2. Configuration Mode Exit Error Messages

Keys Typed	Error Message	Meaning and What To Do
(M) (Return), or (D) (Return)	Too many configuration saves	More than 64000 saves.
	Can not save new configuration	Something prevented saving new configuration. Hardware failure.
	EEPROM can not save information	EEPROM may not save all of the new configuration information. Hardware failure.
(A) (Return)	(no message)	No messages should be seen when you abort the configure mode and reset your SPU.

Configuring Interfaces

HP-IB

When you type (1) (Return), the Configuration Menu changes to the HP-IB Menu:

```
    HP-IB
Key Feature          Value
--------------------------
 1  Sys. Controller    Y

 X  to eXit menu
----------------------------
Type [key] RETURN ?
```

The (1) key now changes definition to mean when typed, you want to change the built-in HP-IB interface's system controller function. System controller is the only function this interface has. A Y in the value column means 'yes', built-in HP-IB is the system controller.

If you want to change your built-in HP-IB interface's system controller function
to 'no':

1. Type ① (Return) and the HP-IB Menu prompt changes to:

```
     1  Sys. Controller     Y
     Type Y or N RETURN ?
```

2. Type Ⓝ (Return) and the HP-IB Menu prompt changes to:

```
         HP-IB
     Key Feature          Value
     ---------------------------
      1  Sys. Controller    N

      X  to eXit menu
     ---------------------------
     Type [key] RETURN ?
```

To go back to the Configuration Menu, type ⓧ (Return):

```
     Configurable Interfaces
     Keys Interface  Select Code
     ---- ---------- -----------
      1  HP-IB
      2  RS-232          9
      3  SCSI           14
      4  HS HP-IB       15
      5  LAN            21
      6  HP PARALLEL    23

      N  store New values
      D  store Default values
         (then cycle SPU power)
      A  Abort without changes
     ---------------------------
     Type [key] RETURN ?
```

RS-232

Enter the RS-232 Menu by typing ②〔Return〕. The Configuration Menu changes
to the RS-232 Menu:

```
     RS-232
Key Feature          Value
--------------------------
 1  Select Code        9
 2  Interrupt Level     3
 3  Remote/Local        L
 4  Fast/Normal         N
 5  Modem Enable        Y


 X  to eXit menu
--------------------------
Type [key] RETURN ?
```

Five RS-232 functions are explained in the next five sections.

Select Codes

Typing ①〔Return〕 changes the prompt line to:

```
   1  Select Code         9
   used select codes are :
   14 15 21 23
Type 0.. 31 except used RETURN ?
```

The RS-232's current select code (9) appears to the right. Select codes set for
other interfaces are identified. In the above example, select codes 14, 15, 21,
and 23 are currently used. The bottom prompt tells you to enter a select code
between 0 and 31 except those already used. If you enter a select code that's
already used, the prompt line won't change.

For example, to set the RS-232 select code to 10, type ①〔0〕 and the bottom
prompt line will show:

```
   Type 0.. 31 except used RETURN ? 10
```

Then type 〔Return〕 and the RS-232 Menu changes to:

```
     RS-232
```

```
Key Feature            Value
---------------------------
 1  Select Code          10
 3  Interrupt Level        3
 2  Remote/Local           L
 4  Fast/Normal            N
 5  Modem Enable           Y

 X  to eXit menu
---------------------------
Type [key] RETURN ?
```

Interrupt Level

To enter the Interrupt Level Menu, type ② (Return). You'll see these lines
appear:

```
    2   Interrupt Level     3
  Type 3, 4, 5 or 6 RETURN ?
```

Your two options are to type:

(Return) if the listed interrupt level will be used.

One key, ③ through ⑥, then (Return), to set the interrupt level to 3 through
6.

The RS-232 Menu appears and the interrupt level's value shows what you set it
to.

Remote/Local

Typing ③ (Return) changes the prompt line to:

```
    3   Remote/Local        L
  Type L or R RETURN ? L
```

The local (L) mode is the default setting. To change the remote/local function,
type:

(R) (Return) to change to remote.

(L) (Return) to change to local.

Then your RS-232 Menu reappears and the value for the remote/local function shows up in the Value column.

Fast/Normal

If you are in the RS-232 Menu and type ④ (Return), the prompt lines change to:

```
    4   Fast/Normal        N
  Type N or F RETURN ? F
```

Type the indicated to set the RS-232 speed:

Ⓕ (Return) to change to Fast speed from Normal.

Ⓝ (Return) to change to Normal speed from Fast.

When the main RS-232 menu appears, its speed line indicates what it's set to.

Modem Enable

While in the RS-232's main menu, go to the Modem Enable Menu by typing ⑤ (Return), then the prompt lines display:

```
    5   Modem Enable       Y
  Type Y or N RETURN ?
```

If the Modem Enable function shows Y, you can disable it by typing Ⓝ (Return).

Typing (Return) gets you back to the RS-232 Menu without changing the Modem Enable's value.

After you have set your built-in RS-232 interface functions, return to the Configuration Menu from the RS-232 menu by typing ⓧ (Return).

Small Computer Systems Interface

Enter the SCSI Menu by typing ③ (Return). The Configuration Menu changes to the SCSI Menu:

```
      SCSI
  Key Feature         Value
  -------------------------
    1 Select Code        14
    2 Interrupt Level     3
```

```
    3  Parity              Y
    4  Bus Address         7

    X  to eXit menu
    -------------------------
    Type [key] RETURN ?
```

Select Code

Like the other interface menus, to choose the select code function to change, type ① (Return). The prompt changes to:

```
    1  Select Code         14
    used select codes are :
    9 15 21 23
    Type  0.. 31 except used RETURN ?
```

As before, used select codes are listed. Your options are to type:

(Return) if the current select code will be used; no changes.

⓪ through ③ ① then (Return), except for used codes, to change select code.

In either case, the SCSI menu returns.

```
        SCSI
    Key Feature         Value
    -------------------------
    1  Select Code         14
    2  Interrupt Level      3
    3  Parity               Y
    4  Bus Address          7

    X  to eXit menu
    -------------------------
    Type [key] RETURN ?
```

Interrupt Level

Your SCSI Interrupt Level control is entered by typing ② (Return). Prompt lines then appear as:

```
    2  Interrupt Level     3
```

```
Type 3, 4, 5, or 6 RETURN ?
```

As before, your options are to type:

[Return] if the current interrupt level will be used; no changes.

[3] through [6] then [Return] to change interrupt level.

In either case, the SCSI menu returns.

Parity

Your SCSI parity control is entered by typing [3] [Return]. Prompt lines then appear as:

```
    4   Parity              Y
  Type Y or N RETURN ?
```

Your options are to type:

[Return] if the current parity state will be used; no changes.

[N] [Return] to change from 'yes' to 'no.' Parity checking will not be done by your SCSI interface. Each peripheral may have its own control.

[Y] [Return] to change from 'no' to 'yes.' Parity checking will be done by your SCSI interface.

In either case, the SCSI menu returns.

```
        SCSI
  Key Feature           Value
  --------------------------
    1  Select Code       14
    2  Interrupt Level   3
    3  Parity            Y
    4  Bus Address       7

    X    to eXit menu
  ----------------------------
  Type [key] RETURN ?
```

Bus Address

Your SCSI bus address is entered by typing ④ (Return). Prompt lines then appear as:

```
3  Bus Address          7
Type O.. 7 RETURN ?
```

Your options are to type:

(Return) if the current bus address will be used; no changes.

⓪ through ⑦ then (Return) to change bus address.

In either case, the SCSI menu returns.

After all SCSI functions have been configured to your application, you may type Ⓧ (Return) to go back to the main Configuration Menu.

High-Speed HP-IB

Type ④ (Return) to enter high-speed HP-IB Mode and see this Menu:

```
      HP-IB
Key Feature           Value
---------------------------
 1  Select Code          15
 2  Interrupt Level       4
 3  Sys. Controller       Y
 4  Fast/Normal           N
 5  98625B mode          16

 X  to eXit menu
---------------------------
Type [key] RETURN ?
```

Select Code

By typing ① (Return), the HS HP-IB menu's prompt changes to:

```
 1  Select Code         15
 used select codes are :
 10 14 21 23
```

```
Type 0.. 31 except used RETURN ?
```

Remember you cannot use a select code already used. Choices available are:

[Return] if the current select code will be used; no changes.

[0] through [3] [1] then [Return], except for used codes, to change select code.

After making your choice, the HS HP-IB menu returns.

Interrupt Level

Your HS HP-IB Interrupt Level control is entered by typing [2] [Return]. Prompt lines then appear as:

```
    2    Interrupt Level    4
  Type 3, 4, 5 or 6 RETURN ?
```

As before, your options are to type:

[Return] if the current interrupt level will be used; no changes.

[3] through [6] then [Return] to change interrupt level.

In either case, the HS HP-IB menu returns.

System Controller

If you want to change your HS HP-IB interface's system controller function, type [3] [Return] and the HS HP-IB Menu prompt changes to:

```
    3    Sys. controller      Y
  Type N or Y RETURN ?
```

Your options are to type one of these:

[Return] if the current system controller state will be used; no changes.

[Y] [Return] to change from 'no' to 'yes.' Your SPU's HS HP-IB interface will be the system controller.

[N] [Return] to change from 'yes' to 'no.' Your SPU's HS HP-IB interface will not be the system controller.

Then your HS HP-IB menu returns.

Fast/Normal

If you are in the HS HP-IB Menu and type ④ (Return), the prompt lines change to:

```
    4   Fast/Normal        F
  Type N or F RETURN ? F
```

Type one of these to set the HS HP-IB speed:

(F) (Return) to change to Fast speed from Normal.

(N) (Return) to change to Normal speed from Fast.

When the HS HP-IB menu appears, its speed line indicates what it's set to.

98625B Mode

Your HS HP-IB interface's direct memory addressing (DMA) emulates the HP 98265B Interface Card. Its bus width can be set to either 16- or 32-bit mode.

If your SPU's HS HP-IB interface has 32-bit DMA width set, the self-test will identify it as HP-IB (HS 32) in the power-up display.

Note	Operating systems cannot boot on the high-speed HP-IB interface when in 32-bit mode. Nor will the interface be tested in test mode. If software requires the 32-bit DMA mode, it will change the interface from 16-bit to 32-bit mode as needed. Then the software will reset it to the 16-bit mode.

From the HS HP-IB Menu, type ⑤ (Return) to change the prompt to:

```
    5   98625B mode        Y
  Type Y or N RETURN ?
```

Set the DMA width by typing:

③ ② (Return) to change from 16-bit wide to 32-bit wide.

① ⑥ (Return) to change from 32-bit wide to 16-bit wide.

You may type (Return) to go back to the HS HP-IB Menu.

Then the HS HP-IB Menu appears with the 98625B mode indicated in the value column.

After your HS HP-IB Menu shows the configuration you need, type ⊠ (return)
to get back to the main Configuration Menu.

Local Area Network

To enter the LAN Menu, get the main Configuration Menu, then type ⑤
(Return). The LAN Menu appears:

```
      LAN
Key Feature            Value
--------------------------
  1  Select Code          21
  2  Interrupt Level        5

  X  to eXit menu
--------------------------
Type [key] RETURN ?
```

Select Code

Typing ① (Return) makes the prompt change to:

```
  1    Select Code        21
  used select codes are :
  10 14 15 23
Type 0.. 31 except used RETURN ?
```

Remember you cannot use a select code already used. Choices available are:

(Return) if the current select code will be used; no changes.

⓪ through ③ ① then (Return), except for used codes, to change select code.

After making your choice, the LAN menu returns.

Interrupt Level

Enter your LAN Interrupt Level control by typing ② (Return). Prompt lines
then appear as:

```
  2    Interrupt Level     5
Type 3, 4, 5 or 6 RETURN ?
```

As before, your options are to type:

(Return) if the current interrupt level will be used; no changes.

(3) through (6), then (Return) to change interrupt level.

In either case, the LAN Menu returns.

When your LAN Menu shows the configuration you need, type (X) (Return) to get back to the main Configuration Menu.

HP Parallel Interface

Enter the HP Parallel Menu by typing (6) (Return). Its menu looks like:

```
    HP PARALLEL
  Key Feature          Value
  --------------------------
   1  Select Code        23
   2  Interrupt Level     3

   X  to eXit menu
  --------------------------
  Type [key] RETURN ?
```

Select Code

Typing (1) (Return) makes the prompt change to:

```
   1   Select Code        23
   used select codes are :
   10 14 15 21
   Type 0.. 31 except used RETURN ?
```

Remember you cannot use a select code already used. Choices available are:

(Return) if the current select code will be used; no changes.

(0) through (3) (1) then (Return), except for used codes, to change select code.

After making your choice, the HP Parallel Menu returns.

Interrupt Level

Your HP Parallel Interrupt Level control is entered by typing ②　(Return).
Prompt lines then appear as:

```
    2   Interrupt Level    3
  Type 3, 4, 5 or 6 RETURN ?
```

As before, your options are to type:

(Return) if the current interrupt level will be used; no changes.

③ through ⑥ then (Return) to change interrupt level.

In either case, the HP Parallel Menu returns.

When your HP Parallel Menu shows the configuration you need, type ⓧ
(Return) to get back to the main Configuration Menu.

Refer to the HP-UX 7.0 manuals, especially *HP 9000 Series 300: System
Administration Task Manual* (HP part·number 98594-90061) and *Installing
HP-UX* (HP part number 98594-90013) for general information relating to
system administration tasks on the HP 9000 345/375.

C = configuration Menu
P = Pause
R = Reset (in some Menus)
T = Tests
L = Local / Remote Mode

READER COMMENT SHEET

GSY System Learning Products

SAN for the HP 9000/345/375
Manual Part Number 98574-90600   January 1990

A reader comment sheet helps us to improve the readability and accuracy of the document. It is also a vehicle for recommending enhancements to the product or manual. Please use it to suggest improvements.

Editorial suggestions (please include page numbers): _____

_____

_____

_____

_____

_____

Recommended improvements (attach additional information, if needed):

_____

_____

_____

_____

_____

Name: _____   **Date:** _____

Job Title: _____   **Phone:** _____

Company: _____

Address: _____

_____

☐ Check here if you would like a reply.

Hewlett-Packard has the right to use submitted suggestions without obligation, with all such ideas becoming property of Hewlett-Packard.
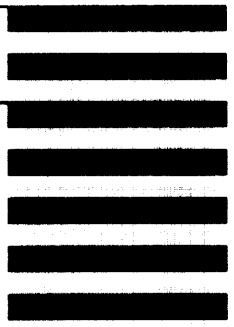
‖‖‖‖

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
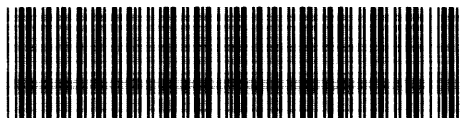FIRST CLASS PERMIT NO. 1070, CUPERTINO, CA 95014

- POSTAGE WILL BE PAID BY ADDRESSEE-

USO System Learning Products Manager
General Systems Division, Mailstop 48SO
Hewlett-Packard Company
19483 Pruneridge Avenue
Cupertino, California 95014-9786

HEWLETT PACKARD

98574-90600