
Boot ROM Functions

Power-Up Displays

When the controller is powered up, there are several messages displayed. Refer to your controller's *Owner's Guide* for information on these displays. To use the Boot ROM's configuration capabilities, Configuration Control Mode must be entered. This mode allows the Boot ROM to control and set several configuration settings stored in an EEPROM. These configurations include:

- Internal I/O Configurations: what select code, bus address, etc., the internal interfaces are set to.
- Auto System Select: which operating system will automatically be booted.

Configuration Control Mode

Configure Control Mode is run and controlled by your controller's Boot ROM. You do not need to have an operating system installed to use Configuration Control Mode. To enter Configuration Control Mode, do the following:

1. Turn on the monitor and the controller. The power-up messages will appear.
2. As soon as you hear two beeps or the line *HP-HIL.Keyboard* appears in the messages, press the **Space Bar** to prevent an operating system from booting.
3. Next, enter **C** **Return**/**ENTER** to enter Configuration Control Mode:
4. You should see this menu appear in the power-up display's upper right-hand corner:

```
Configuration Control
Keys Control Class
-----
1  I/O Configuration
2  Auto System Selection

A  Abort without changes
-----
Type [key] RETURN ?
```

5. You are now in Configuration Control Mode.

Configuration Control Mode Menu

You have three choices on the Configuration Control Menu:

- Press **1** and enter Configurable Interface Mode.
- Press **2** and enter OS Selection Mode.
- Press **A** and return to the boot up process

Configuring the Internal Interfaces

Press **(1)** to configure the internal I/O interfaces.

If you see error messages, refer to the section in this chapter titled 'Configuration Error Messages.'

The Configurable Interface Menu replaces the Configuration Control Menu and looks similar to the following.

```
Configurable Interfaces
Keys Interface  Select Code
-----
 1 LAN          21
 2 SCSI         14
 3 HP Parallel  12
 4 RS-232       9
 5 HP-IB

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

The order that interface identifiers appear and their respective number keys may be different on your controller. Only interfaces that are configurable from the Boot ROM's Configuration Control Mode will be listed. The Select Code currently assigned to the interfaces is shown in the column marked "Select Code".

- To change the configuration of an internal face, first press the appropriate identifying number. In our example, press **(1)** for LAN, **(2)** for SCSI, **(3)** for HP Parallel, **(4)** for RS-232, and **(5)** for HP-IB. Don't forget to press **(Return)**/**(ENTER)** to complete the command. For the HP-IB, there is no select code nor interrupt level, so the only change can be to make the internal HP-IB the System Controller.
- Make the appropriate changes on the interface menu presented.
- To store the new values, press **(N)**.
- To restore the original default values, press **(D)**.
- To abort the process, leaving the values unchanged, press **(A)**.
- Pressing **(N)**, or **(D)**, or **(A)** returns the system to the boot up process.

Note Some accessory cards may use the same select codes as the internal interfaces. You may need to change either the internal interface or accessory card select codes to prevent a conflict.

Internal Interface Default Values

Each of your controller's several internal interfaces is factory set to a default value. Table 5-1 lists the default configurations.

Table 5-1. Built-In Interface Default Configurations

Built-In Interface	Function	Default Configuration	Options
SCSI	Select Code	14	0 to 31
	Interrupt Level	3	3 to 6
	Bus Address	7	0 to 7
	Parity	Yes	No
LAN	Select Code	21	0 to 31
	Interrupt Level	5	3 to 6
HP Parallel	Select Code	12	0 to 31
	Interrupt Level	3	3 to 6
HP-IB	Select Code		n/a
	Interrupt Level		n/a

Example Interface Configuration

In this example, the SCSI interface will be reconfigured. Other interfaces use similar menus. To select and configure the SCSI interface, do the following:

Start from Configuration Control Mode. That means the following Configuration Control menu is shown in your display's upper right-hand corner:

```
Configurable Interfaces
Keys Interface  Select Code
-----
 1 LAN          21
 2 SCSI         14
 3 HP Parallel  12
 4 HP-IB        9

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

Press **2** **Enter**/**Return** to get the SCSI interface menu:

The Configurable Interfaces Menu gets replaced with this 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 ?
```

Use the specified keys to change the features listed. To change the Select Code, press **1**, or the change the bus address, press **4**. When you select a value to change, the prompt line changes. For example, to change the SCSI's Select Code, do the following:

Press **1** **Return**/**ENTER**

Then the command line changes to:

```
 1 Select Code      14
   used select codes are :
 12 14 15 21
Type 0.. 31 except used RETURN ?
```

- The select code function line shows the current information.
- Select codes already used and not available and are listed in the third line.
- The prompt line is next.

To change the SCSI select code to 23, enter 23 **Enter**/**Return**. The display would not look like the following:

```
 1 Select Code      23
   used select codes are :
 12 15 21 23
Type 0.. 31 except used RETURN ?
```

Other interfaces and features would be selected and changed the same way. After you have made interface configuration changes your controller needs, exit the interface menu by entering **X** **Enter**/**Return**. The Configurable Interfaces Menu will re-appear.

Select any other interface and configure it according to your application needs.

After configuring your controller's internal interfaces as required store the new interface values in memory by entering **N** **Enter**/**Return**.

The system will re-boot with the new values.

Auto System Selection Mode

Most users will leave this feature in the default setting, and can skip this section. To see if this feature is for you, ask yourself the following two questions:

1. Is my controller connected to a network that contains multiple operating systems?
2. Do I have a need to auto boot from a different operating system than the other people on the network?

Skip this section if you answered 'No' to either question. If you answered 'Yes' to both questions, follow these instructions to select your specific operating system to boot automatically.

1. Enter Auto System Selection Mode by entering **2** **Enter**/**Return** from the Configuration Control Mode.
2. The following menu will appear in the upper right corner:

```
Auto System Selection
Keys Option          Status
-----
1 Scan for System    Y
2 Selected System    N
3 Store Selected Sys. N

E Execute
A Abort without changes
-----
Type [key] RETURN ?
```

Note Keep this perspective in mind: When the Auto System Selection screen is selected, what you see first is the way the controller is currently set. As you change different key options, the menu shows what will be, as soon as you execute the changes by pressing **E**.

The Menu

While reading this section, remember that "Key" and "line" are used interchangeably; that is, you press **1** to select line 1. The letter *Y* means YES and *N* means NO.

- Default is Key 1 = Y, Key 2 = N and Key 3 = N.
- Pressing **1**, **2**, or **3** will change the way the autoboot selects and stores an operating system. Selecting a key also causes the Status value to toggle between Y and N.
- Pressing **E** executes the selected changes as the operating system re-boots.
- Pressing **A** will ignore any changes just made, and will re-start the Boot ROM using the previous setting.

Menu Options

- Key 1 = Y tells the controller to boot the first bootable operating system it finds.
- Key 2 = Y tells the controller to boot a specific operating system.
- Key 3 = Y causes the Boot ROM to store the specified operating system path in the EEPROM. This allows the selected system to auto-boot unattended.

Note that some key combinations are valid but others are either invalid or meaningless. The following are the valid combinations:

- Key 1 = Y and Key 2 = Y;

This will cause the Boot ROM to try auto-booting from the selected system once. If the selected system can not be accessed because its power switch is off or data cable is not connected, then the first bootable system will be booted. This is the most useful selected system option.

- Key 1 = N and Key 2 = Y;

This will cause the Boot ROM to try auto-booting from the selected system only, until it boots.

- Key 1 = Y and Key 2 = N;

This default mode causes the Boot ROM to boot the first bootable system it finds. No selected system specified.

Here are the invalid or meaningless combinations. The bootROM will toggle another line in order to produce a usable combination.

- Key 1 = N and Key 2 = N;

Key 1 or Key 2 must = Y. Trying to set both to N is not allowed and the opposite key will be automatically toggled.

- Key 2 = Y and Key 3 = N;

Changing Key 2 to Y will automatically set Key 3 to Y. This means a new system is to be selected, and Key 3 = Y says to store that new system in the EEPROM.

System Selection Example

Suppose that the operating system which you wish to select for automatic booting is labeled 2H in the list of bootable operating systems displayed when you do an attended boot (press **SPACE** before an operating system is booted). Furthermore, you want the controller to try to boot the system once, and if it is not accessible, to scan for and boot the default system.

This situation is listed as number one in the above list of valid combinations. To set it up, follow these steps:

1. Toggle Key 2 status to Y by entering **2** **Enter**/**Return**. Key 3 status will automatically toggle to Y.
2. Check to make sure Key 1 = Y.

3. Press: **E** **Enter**/**Return**

At this point the screen clears and the system starts re-booting. When HP- HIL.Keyboard is displayed or the beeper sounds, press **Space Bar** to invoke Attended Mode. Wait until all the devices are listed on the left and all bootable operating systems are listed on the right. The display now looks almost identical to an attended mode power-up display. The one difference is an additional message on the next to bottom line indicating that the Boot ROM will store the selection.

4. Select the number-letter combination listed in front of the operating system you want to select. For our example, enter **2 H** **Enter**/**Return**. The Boot ROM stores the selected system path information in the EEPROM while clearing the screen and re booting. The selected system will now be booted.

This completes the process, and the selected system will continue to boot until a different unattended system is selected.

Error Messages

When you turn on your controller, one error condition is related to the internal interface configurations. If an error message appears, such as:

Configuration EEPROM Failed

Configure Mode Failed

one of several conditions may exist. A hardware problem with the Boot ROM or its associated circuits probably occurred. Refer to Table 5-2 for possible error messages you may see when entering Configuration Mode.

If the Boot ROM or EEPROM has problems after you enter one of the configuration commands, the mode lines display one of the error messages listed in Table 5-3.

Table 5-2. Configuration Mode Entry Error Messages

Error Message	Meaning and What To Do
(No error message) Cannot enter Configuration Mode.	If Configuration Mode does not start and no error message appears, a hardware failure probably occurred.
Configure Mode Failed	One or more of these situations exists:
Configuration EEPROM Failed	All of the interface values have been set to their default (factory) values.
	Some default and some changed values have been set.
	All the interface values have been set to their changed values. Some minor error occurred that should not affect the interface's configurations.
	Check your controller's Boot Mode Selection and Interface Configuration Modes and verify they are correct for your application.
EEPROM Has Bad Information	Configuration Mode started, main menu may appear, but something failed. Try again.
EEPROM Load Section Missing	Could not load new configuration data. Hardware failure.
EEPROM Defaults Section Missing	Default configurations could not be found. Hardware failure.
Too much data to save	Too many interfaces for EEPROM to manage. Reconfigure controller with fewer interfaces.

Table 5-3. Configuration Mode Exit Error Messages

Command	Error Message	Meaning and What To Do
N or D	Too many configuration saves	More than 64 000 saves were tried. Unlikely to occur.
N or D	Can not save new configuration	Something prevented saving the new configuration. Hardware failure.
N or D	EEPROM can not save information	EEPROM may not save any or all of the new configuration information. Hardware failure.
A	(No message should appear)	No error messages should appear when you abort configuration mode and reset your controller.