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Description

This section describes procedures for running Silicon Graphics, Inc., (SGI) Host Computer Hardware Diagnostics. These procedures are applicable to Octane computers.

1- QUICK REFERENCE PROCEDURES

This section contains a brief summary for running Hardware Diagnostics. If you are familiar with this, including all cautions and warnings, then use this section. If you do not have much experience with running Diagnostics, refer to the detailed procedures that follow.

1-1 Running Hardware Diagnostics

The three levels of diagnostic tests are:

- Power-on Diagnostics
- Interactive Diagnostic Environment (IDE) tests (indicated by "Run Diagnostics" Icon).
- Confidence Tests

1-2 Power On Diagnostics

When the system is booted, Power On Diagnostics Run automatically. If the tests find a faulty part, the LED in the lightbar on the front of the computer will be red and an error message may appear on the monitor.

1-3 IDE

1-3-1 Activating IDE When System Is Booting:

1. When the System is booting, click on **[Stop For Maintenance]** in the "Starting up the System" Message box.
2. The System Maintenance Menu appears: click on **[Run Diagnostics]**.
3. Follow indicated procedures.

Note

There may be little or no indications that the test are running.

4. "Run Diagnostics" should take less than 12 minutes to complete. To stop IDE tests before completion and return to the System Maintenance Menu, press the **<Esc>** key (it may take 10-30 seconds for testing to halt). To return to the System Maintenance Menu after IDE tests complete, press **<Enter>** then at the "IDE>" prompt type **quit <Enter>**. Click the **"Start System"** icon to reboot the system. Login as **"Signa"** to bring up Signa Software.

1-3-2 Activating Run Diagnostics From Running System:

1. From the service desktop, select **[System Shutdown]**.
2. When "Power Off" Message box appears, click on **[Restart]** or press any key.
3. When "Starting up the System" Message box appears, click on **[Stop for Maintenance]**.
4. Follow steps (2), (3) and (4) in Section 1-3-1 above.

1-4 Confidence Tests

1. From the service desktop, open a **[C-shell]**.
2. At the command prompt, type: **toolchest <Enter>**.
3. The Toolchest menu appears in the upper left corner of the monitor screen. Click on **[System]**, then click on **[Run Confidence Tests]**.
4. Double-click on the device you wish to test and follow indicated procedures.

2- SGI DIAGNOSTICS: INTRODUCTION

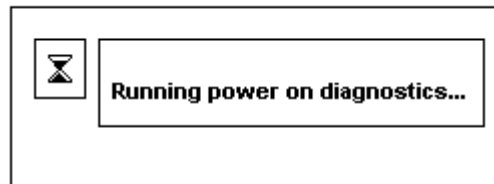
There are three Diagnostic Testing Levels:

1. Power On Diagnostics: tests the major hardware parts of the system while booting. A faulty part will cause the LED on the lightbar to turn red and an error message may appear on the monitor.
2. Interactive Diagnostic Environment (IDE) Tests: provides more comprehensive tests of the System Hardware than Power On Diagnostics.
3. Confidence Tests: tests keyboard, mouse, monitor and peripherals.

3- POWER ON DIAGNOSTICS

When the power switch is turned on, the system should go through these steps:

1. The system runs Power On diagnostics for about five seconds, as indicated by "Running Power On Diagnostics" Message box (see Illustration 3-1).



POWER ON DIAGNOSTIC MESSAGE
ILLUSTRATION 3-1

2. The disks then spin up. This takes about 15 seconds for each hard disk.
3. When the system passes all Power On tests, the LED lightbar turns solid white.
4. The system then boots IRIX.

If the above does not occur properly, there may be a problem. The following "Troubleshooting" Section describes some common problems and causes, along with procedures for correcting the problems.

4- TROUBLESHOOTING POWER ON DIAGNOSTICS.

Refer to table 4-1 for the Lightbar LED Diagnostic Guide.

**TABLE 4-1
LIGHTBAR DIAGNOSTIC GUIDE**

SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
No LED, no fan sound	<ul style="list-style-type: none"> No power to system Power supply failure 	<ul style="list-style-type: none"> Check power connections Check LEDs on small power supply Replace Power Supply
No LED, fan sound	<ul style="list-style-type: none"> System Module not seated CPU failure Frontplane failure Partial Failure Of Power Supply or loose/disconnected PS cable 	<ul style="list-style-type: none"> Reseat System Module Replace System Module Replace CPU Check Cabling Replace Power Supply
Solid red LED	<ul style="list-style-type: none"> XIO Module not seated Graphics Board not seated Graphics Board failure Monitor cable unseated 	<ul style="list-style-type: none"> Reseat XIO Module Reseat XIO Board Reseat Monitor Cable Replace Graphics Card
Solid red LED No System Drive	<ul style="list-style-type: none"> System Drive not inserted all the way System Drive failure 	<ul style="list-style-type: none"> Check that the system drive handle is locked down into position Error Message? <ul style="list-style-type: none"> Yes - Record Error Message No - Replace System Drive
Blinking red LED	<ul style="list-style-type: none"> Memory Diagnostic Failure Dual processor - secondary CPU failure 	<ul style="list-style-type: none"> Verify slots 1 & 2 are populated Reseat DIMMs on system board Verify DIMMs are the same type Replace DIMMS Replace Dual Processor
Solid white LED	<ul style="list-style-type: none"> System Diagnostics successful 	<ul style="list-style-type: none"> Message provides information on part replacement
Solid white LED No Display	<ul style="list-style-type: none"> Monitor not connected Monitor not turned on Monitor in power saving mode Monitor Brightness too low Cable failure Monitor failure System Board failure Graphics Board failure 	<ul style="list-style-type: none"> Check Monitor connections Turn on Monitor Check Monitor LED Adjust Monitor brightness Replace Monitor cable Replace Monitor Replace System Board
White LED > 2 seconds Red LED flashing for ~ 10 sec White LED flashing ~ 10 sec	System flash PROM recovered? <ul style="list-style-type: none"> Yes - Automatic reset of flash PROM No - Flash PROM failed - Red LED slow flash (2 second intervals) 	<ul style="list-style-type: none"> Power off - Replace System Module
Solid white LED No Keyboard - Keyboard prompt on display	<ul style="list-style-type: none"> Keyboard not connected Keyboard failure System Board failure 	<ul style="list-style-type: none"> Check Keyboard connection Error code? <ul style="list-style-type: none"> Yes - record message No - Replace Keyboard Replace System Board
Solid white LED No Mouse - Mouse prompt on display	<ul style="list-style-type: none"> Mouse not connected Mouse failure System Board failure Keyboard not connected Keyboard failure 	<ul style="list-style-type: none"> Check Mouse connection Check Keyboard connection Error code? <ul style="list-style-type: none"> Yes - record message No - Replace Mouse Replace System Board

5- IDE

5-1 Activating IDE When The System Is Booting.

When the System is booting, the "Starting up the System" Message box Illustration 5-1 appears.



STARTING UP THE SYSTEM
ILLUSTRATION 5-1

Attention!

The Message box in Illustration 5-2 appears for only a few seconds. Step 1 below must be done AT ONCE! If you miss the Message box, go to Section 5-2 Activating Run Diagnostics from a running system.

1. Click on **[Stop for Maintenance]**.
2. The System Maintenance Menu appears (see Illustration 5-2).



SYSTEM MAINTENANCE MENU
ILLUSTRATION 5-2

5-1 Activating IDE When The System Is Booting (continued)

3. Click on **[Run Diagnostics]** Icon.
4. Watch for messages. If the SGI hardware is good, after 10 to 12 minutes the following message appears: Diagnostics completed - Press [Enter] to continue.

Note

The screen may go blank while the test is running.

5. Press **<Enter>**; the "IDE>" prompt is displayed. To return to the System Maintenance menu, type **quit <Enter>**. You can restart the system by clicking on **[Start System]**.

Note

To stop IDE tests before completion and return to the System Maintenance Menu, press the **<Esc>** key (it may take 10-30 seconds for testing to halt).

6. If problems persist, or if the system still does not start, there may be a software problem. See Section 7- Recovering from a System Crash.
7. If the diagnostic tests find a problem, a message similar to the following appears:
ERROR: Failure detected on the CPU module
or a message indicating a failure with the CPU motherboard, audio board, or graphics board.
 - This means the part indicated has failed. Record this information.
 - Other messages may also report faulty peripherals or subsystems.
 - If an error message is displayed, see the procedure for SGI Operator Workspace Replacements to remove the faulty part and install the new part.

5-2 Activating Run Diagnostics From A Running System

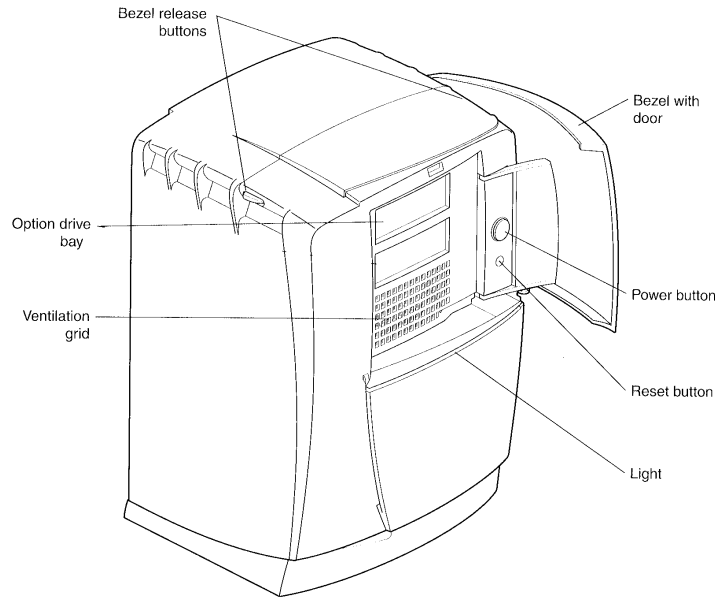
1. From the service desktop, click on **[System Shutdown]**.
2. When the "Power Off" Message box appears, click on **[Restart]** or press any key.
3. As soon as the "Starting up the System" Message box appears, quickly click on **[Stop for Maintenance]**.
4. On the System Maintenance Menu, click on the **[Run Diagnostics]** Icon.
5. Follow the indicated procedures.

Note

There may be little or no indications that the test is running. "Run Diagnostics" should take less than 12 minutes to complete. To stop IDE tests before completion and return to the System Maintenance Menu, press the **<Esc>** key (it may take 10-30 seconds for testing to halt). To return to the System Maintenance Menu after IDE tests complete, press **<Enter>** then at the "IDE>" prompt type **quit <Enter>**. Click the "Start System" icon to reboot the system. Login as "Signa" to bring up Signa Software.

5-2-1 Using Reset

If the system is malfunctioning and you cannot communicate with it over the network, or by using the mouse or keyboard, then press the Reset button located on the front of the computer (see Illustration 5-4). This will cause the system to run through Power On Diagnostics. When the "Starting up the System" Message box appears, Illustration 5-2, proceed with Section 5-1, above.



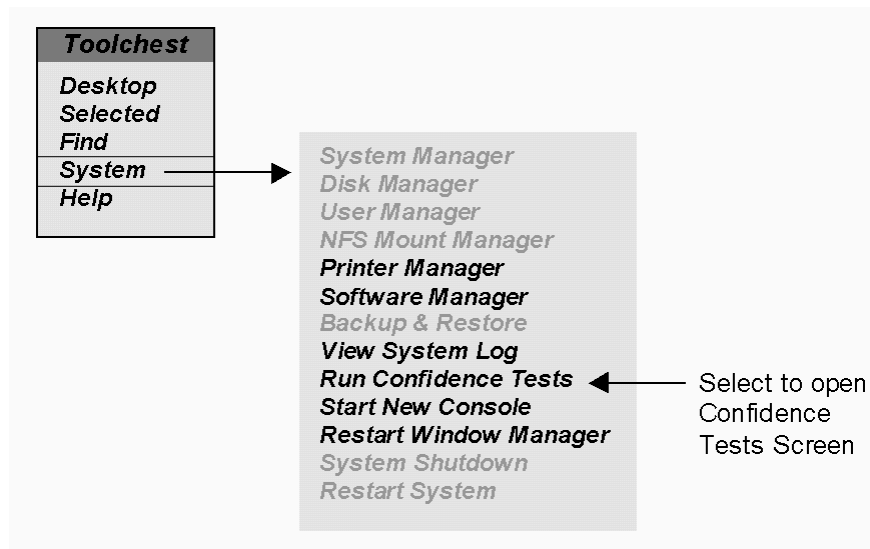
RESET BUTTON LOCATION
ILLUSTRATION 5-4

6- RUNNING CONFIDENCE TESTS

Use the Confidence Tests to verify that the Audio subsystem, Keyboard, Mouse, Monitor, and/or any of the SCSI peripherals (excluding hard disks) are working properly.

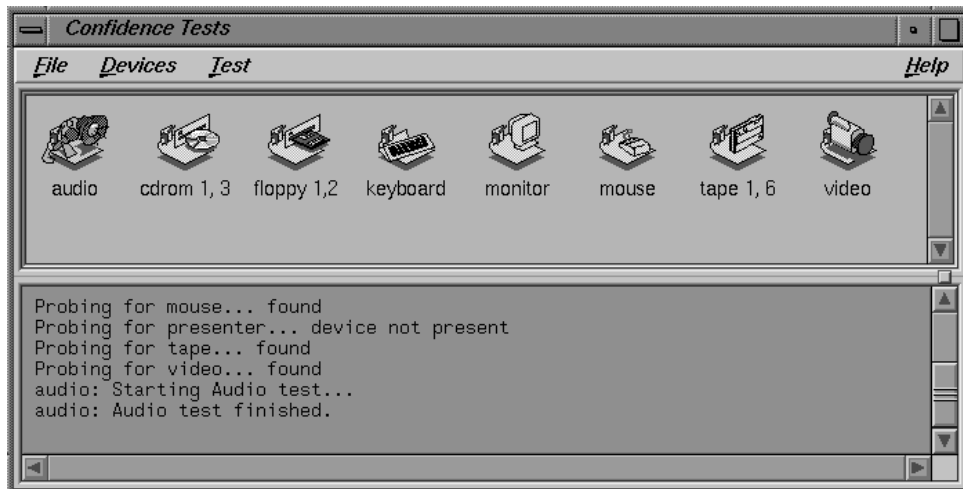
To activate the Confidence Tests:

1. From the service desktop, click on **[C Shell...]**.
2. At the command prompt, type **toolchest <Enter>**. The Toolchest menu appears in the upper left corner of the monitor screen (see Illustration 6-1).
3. Click on "System" in the Toolchest menu. The System Manager menu appears (see Illustration 6-1).



TOOLCHEST AND SYSTEM MANAGER MENUS
ILLUSTRATION 6-1

- Click on “Run Confidence Tests”. The Confidence Tests window appears (see Illustration 6-2). The Icons and test choices may be different than shown depending on the devices loaded on your system.



CONFIDENCE TESTS WINDOW
ILLUSTRATION 6-2

- If running the Confidence Tests determines that one of the devices is faulty, see the appropriate section in the Octane Indigo Workspace Replacements procedure to replace the device.

6-1 Audio

If an audio application is running and there is no audio output, first ensure that all cables are connected properly. Then use the Confidence Test to check that the audio is functioning properly.

To test audio, follow these steps:

1. From the "Confidence Tests" Window, double-click on the **[Audio]** Icon. The "Audio Confidence Test" window is displayed (see Illustration 6-3).



AUDIO CONFIDENCE TEST WINDOW
ILLUSTRATION 6-3

2. Click on **[Input]** or **[Output]** to test the proper function. Click on **[Done]** to exit when tests are complete.
3. If your audio is still not responding, you may have a bad audio system. If this is the case, you must replace the CPU board. See the procedure for *Operator Workspace Table Replacements Octane*, Section 2-2 Installing and Removing CPU and Memory.

6-2 CD-ROM Drive

To perform the confidence test on the CD-ROM drive:

1. Load a CD into the drive.
2. From the "Confidence Tests" window (Illustration 6-2), double-click on the CDROM icon to initiate CD-ROM tests.
3. Test results are listed in the bottom half of the Confidence Tests window. If the drive doesn't pass the test, see the procedure for *Operator Workspace Cabinet Replacement Octane*, Section 2-6 CD-ROM Drive Replacement, to replace the CD-ROM Drive.

6-3 Keyboard

The Keyboard Confidence Test is useful if the Keyboard is not responding to input. Before running the Confidence Test, ensure that the cable that connects the Keyboard to the system is firmly connected. Then use the Confidence Test to ensure that the Keyboard is working correctly.

1. From the "Confidence Tests" window, double-click on the Keyboard icon. The "Keyboard" screen is displayed (see Illustration 6-4).



KEYBOARD CONFIDENCE TEST WINDOW
ILLUSTRATION 6-4

Note

If the keyboard is other than the one supplied by Silicon Graphics, the key layout may be different.

2. To test, press the different keys on the Keyboard. Each key will be highlighted on the screen as it is pressed.
3. If a pressed key is not highlighted on the screen, there may be a problem with the Keyboard or with the cable that connects the Keyboard to the system.
4. To quit the Keyboard test, click the button in the upper left-hand corner of the Keyboard graphic and select **[Exit]**, or click the left mouse button anywhere on the keyboard screen.
5. If the Keyboard does not work, see the procedure for *Operator Workspace Table Replacements Octane*, Section 7-7 Keyboard/Mouse Replacement, to replace the Keyboard.

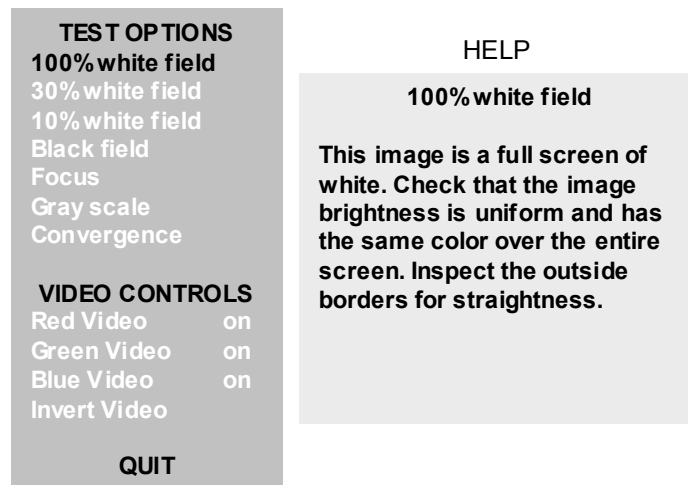
6-4 Monitor

If the monitor isn't working properly or the display is distorted, first check the cable that connects the monitor to the system.

Also check to ensure that the brightness knob provides sufficient light to the screen; that the monitor video cable is firmly connected to both the monitor and the chassis; and that the thumbscrews are screwed in all the way.

If a problem persists, use the Confidence Test to check that the monitor is working properly by following these steps:

1. From the "Confidence Tests" window (Illustration 6-2), double-click on the Monitor Icon.
2. The Monitor Test Menu is displayed (refer to Illustration 6-5).



Use mouse button 2 to toggle menu, h to toggle help, TAB to step through tests and <Esc> to quit

MONITOR CONFIDENCE TEST MENU

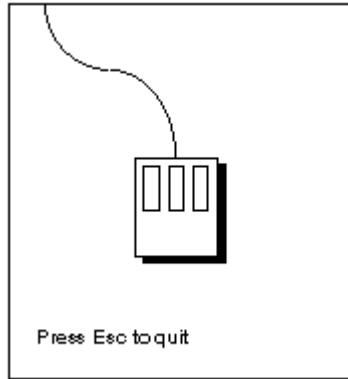
ILLUSTRATION 6-5

3. To run one of the tests from the menu, click on the menu choice and observe the response.
4. Click on **[Quit]** to end the test.
5. If the monitor tests indicate a failure, see the procedure for *Operator Workspace Table Replacements Octane*, Section 7-1 Monitor Replacement, to replace the monitor.

6-5 Mouse

If the Mouse buttons do not work, ensure that the Mouse cable is not broken and is firmly connected to the back of the system. If the buttons still do not work, run the Confidence Test using the following steps:

1. From the "Confidence Tests" window (Illustration 6-2), double click on the Mouse icon. The Mouse screen is displayed (Illustration 6-6).



MOUSE CONFIDENCE TEST
ILLUSTRATION 6-6

2. Test the Mouse by moving it around and pressing each button. These movements are reflected on the screen.
3. If the screen doesn't respond, the Mouse may be faulty. Refer to the procedure for *Operator Workspace Table Replacements Octane*, Section 7-7 Keyboard/Mouse Replacement, to replace the Mouse.
4. Press **<Esc>** to end the test.

6-6 Digital Audio Tape (DAT), Magnetic Optical (MOD) or Quarter Inch Tape (QIT) Drive

Before running this test, ensure that the drive is properly installed. If a problem with the drive is suspected, first remove it and then reinstall it. If the problem persists, run the appropriate tape or MOD drive confidence test.



Use a tape or MOD that is blank or doesn't have needed information on it. This test causes the drive to erase any information on the tape in the process of testing the hardware.

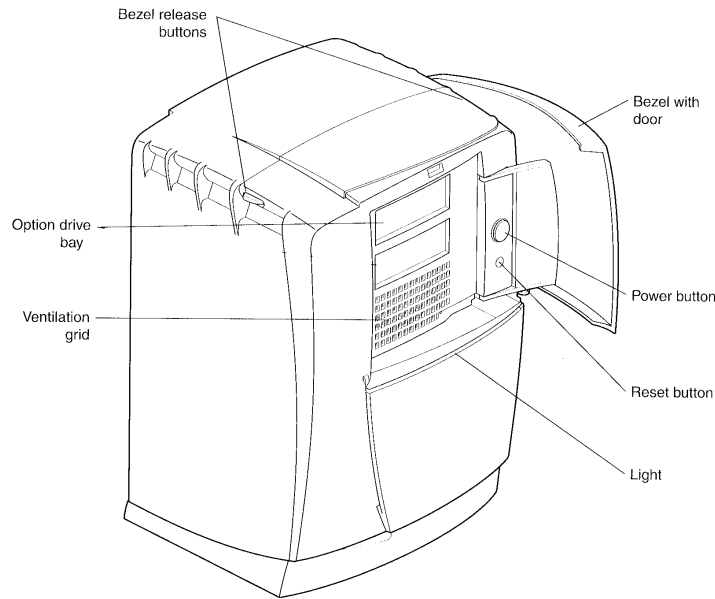
1. Insert a tape or MOD disk into the Drive.
2. From the "Confidence Tests" window, double-click on the appropriate Drive icon.
3. Follow the indicated procedure.
4. When the test is complete, the "Tape/MOD Drive Test" completion message box appears.
5. Click on **[Continue]** to dismiss the message box.
6. If the drive doesn't pass the test, see the appropriate procedure for *Operator Workspace Cabinet Replacement Octane*, to replace the Drive.

7- RECOVERING FROM A SYSTEM CRASH

If the system crashes because of a software malfunction, the IRIX CD that came with the system must be used. Data can then be recovered from the most recent full backup tape. The backup tape must be one that has been made using the System Manager backup tool, or with the /usr/sbin/Backup script.

To recover from a system crash, follow these steps:

1. If the system is malfunctioning and it cannot be communicated with using the mouse or keyboard, or over the network, press the Reset button on the front of the computer, (see Illustration 7-1).



RESET BUTTON LOCATION
ILLUSTRATION 7-1

2. The "System Startup" Message box appears (see Illustration 7-2).



STARTING UP THE SYSTEM
ILLUSTRATION 7-2

7- RECOVERING FROM A SYSTEM CRASH (continued)

3. Click on **[Stop for Maintenance]** (see Illustration 7-3).



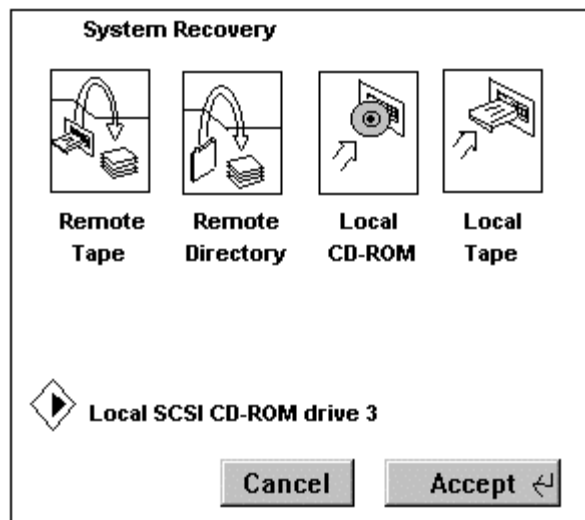
SYSTEM MAINTENANCE MENU
ILLUSTRATION 7-3

4. Click on the **[Recover System]** Icon in the System Maintenance Menu.

Note

If you are using an ASCII terminal, type 4 at the System Maintenance Menu.

5. The System Recovery Menu appears (see Illustration 7-4).



SYSTEM RECOVERY MENU
ILLUSTRATION 7-4

6. Click the appropriate drive icon from which the software is to be recovered. For example: if a CD-ROM drive is connected to the system, click the **[Local CD-ROM]** Icon. Then click **[Accept]** to start.

7- RECOVERING FROM A SYSTEM CRASH (continued)

- 7. The "Media Request" Message box then appears (Illustration 7-5), prompting insertion of the media into the drive.



MEDIA REQUEST MESSAGE BOX
ILLUSTRATION 7-5

Note

If there is no CD-ROM drive, a drive that is connected to another system on the network can be used.

- 8. At the System Recovery Menu, click the **[Remote Directory]** icon. When a Message box appears asking for the remote hostname, type the system's name, a colon (:), and the full path name of the CD-ROM drive, followed by /dist. For example, to access a CD-ROM drive on the system mars, type:
mars:/CDROM/dist
- 9. Insert the IRIX CD that came with the system, then click on **[Continue]**. The CD-ROM drive begins reading information from the CD. The system takes approximately 5 minutes to copy the information from the CD that it needs.
- 10. After everything is copied from the CD to the system disk, data can be restored from a recent full backup tape. The backup must be one that has been made using the System Manager backup tool, or with the [/usr/sbin/Backup] script.

If an action is needed to be performed on the system, a shell prompt can be brought up by typing **[sh]** at most question prompts.

The following message appears:

```
*****
SYSTEM RECOVERY
*****
```

- 11. If there is a local tape device, the following message appears:
Restore will be from <tapename> OK? ([Y]es, [N]o): [Y]
(where <tapename> is the name of the local tape device).

7- RECOVERING FROM A SYSTEM CRASH (continued)

12. If there is a remote (network) tape device, when no tape device is found, or when answering No to the question in the previous prompt, the following message appears:

```
Remote or local restore ([r]emote, [l]ocal):
```

13. If **[remote]** is selected, the restore will be from the network and the following information will be requested:

- The hostname of the remote system;
- The name of the tape device on the remote system;
- The IP address of the remote system;
- The IP address of your system.

Note

The IP addresses must consist of two to four numbers, separated by periods, such as 192.0.2.1.

14. If **[local]** is selected, a tape device that is connected to the system is chosen, and the name of the tape device is requested.

15. When the following message appears, remove the CD-ROM, insert the most recent full backup tape, and press **[Enter]**.

```
Insert the first backup tape in the drive, then press <Enter>, [q]uit (from recovery), [r]start:
```

14. There is a pause, and then the following message appears:

```
Erase /x filesystem and make new one (y,n)? [n] (where "x" is the file system).
```

Prompts are given for every file system that was known at the time of the backup.

16. Answer by typing either **[y]** or **[n]**.

Attention!

If no **[n]** is selected, the system tries to salvage as many files as possible. It then uses the backup tape to replace the files it could not salvage. No **[n]** should usually be selected, especially if the backup tape is not very recent.

If the file systems were badly damaged, or the backup was from a different level operating system, yes **[y]** may need to be selected. If yes **[y]** is selected, the system erases the file system and copies everything from the backup tape to the disk. The system loses any information on the file system that was created between now and when the backup tape was made.

The following message appears:

```
Starting recovery from tape.
```

After two or three minutes, the names of the files that the system is copying to the disk start scrolling. When the recovery is complete, the following message appears:

```
Recovery complete, restarting system.
```

7- RECOVERING FROM A SYSTEM CRASH (continued)

The system restarts. When the login screen appears, the system is ready to go.

Attention!

If the backup tapes are old, or you were changing the operating system level, the operating system should be reinstalled from the IRIX CD that comes with the system after system recovery is complete.

When the "Starting up the System" message box appears, click on **[Stop for Maintenance]**. Then click on the **[Install System Software]** Icon in the System Maintenance Menu, Illustration 7-6.



SYSTEM MAINTENANCE MENU
ILLUSTRATION 7-6

8- HOST HARDWARE CONFIGURATION

8-1 hinv (Hardware Inventory) Command

The “hinv” command can be used to view what hardware the Host computer sees attached. To use the command, go to the service desktop and open a C shell. On the command line type: **hinv <Enter>**. Table 8-1 gives an example of the output for a Octane computer. With the exception of CPU and FPU types, GEMS standard configuration should be the same. Play close attention to memory amounts and devices connected to SCSI controllers. Its important that SCSI devises are not only connected, but connected to the correct SCSI controller. As an example, cabling the disk drives to SCSI 1 will cause the system not to boot. For cabling issue refer to Direction 2153389 8x block diagrams for guidance on correct cabling. This direction can be found on the 2160623 8x Service Methods CD.

TABLE 8-1
HOST HARDWARE INVENTORY EXAMPLE OUTPUT

```
1 225 MHZ IP30 Processor
CPU: MIPS R10000 Processor Chip Revision 3.4
FPU: MIPS R10010 Floating Point Chip Revision 0.0
Main Memory Size: 256 Mbytes
Instruction cache size: 32 Kbytes
Data Cache size: 32 Kbytes
Secondary unified instruction/data cache size: 1 Mbyte
Integral SCSI controller 0: Version QL104B (Rev. 2). Single Ended
    Disk drive: unit 1 on SCSI controller 0
    Disk drive: unit 2 on SCSI controller 0
Integral SCSI controller 1: Version QL104B (Rev. 2). Single Ended
    CDROM: unit 3 on SCSI controller 1
    Optical Disk: unit 4 on SCSI controller 1
Integral SCSI controller 2: Version QL104B (Rev. 2). Single Ended
    Comm device: unit 4 on SCSI controller 2
    Comm device: unit 4 lun 1 on SCSI controller 2
IOC3 serial port: tty1
IOC3 serial port: tty2
IOC3 parallel port: plp1
Graphics board: ES1 with texture option
Intergral Fast Ethernet: cf0 version 1, pci 2
Iris Audio Processor: version RAD revision 12.0, number 1
PCI card, bus 0 slot 147, vendor 0x7, device 0x0
```

REVISION HISTORY

REV	DATE	AUTHOR	PRIMARY REASONS FOR CHANGE
A	Apr 28, 1998	K. L-P	Initial Version
0	March 3, 1998	R Hawthorne	Updates to Octane LED Troubleshooting, Rev 0 Doc
1	July 23, 1999	R Hawthorne	Added section 8 concerning using the hinv command to determine host computer hardware installed.
2	Oct 14, 1999	G. Boerner	Updated menus for Confidence Tests section and minor changes per Release 8.3 verification.
3	Jan 13, 2000	M. Keber	Added extra step to exit procedure in sections 1-3-1 and 5-1. Updated test time (only 10-12 minutes with two disk drives)
4	Jan. 3, 2001	M. Jones	Deleted references to older software.
5	Mar. 8, 2001	M. Jones	Deleted III. 5-1 (obsolete). Added note to Section 5-1, step 4. Modified III. 6-1 slightly for clarity. Expanded Section 6-3, step 4.
6	Oct. 3, 2001	K. Schraufnagel	Updated the Activating IDE When System is rebooting exit step and added a note to Section 1-3-1.
7	March 8, 2002	Hawthorne	Updated page 2 and page 6 to indicate that the diagnostics take less than 12 minutes to run and not hours. Fixed some doc format errors though out.