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Paragon™

System Diagnostic DIAG1.2.1 Release Notes

Intel® Corporation

WARNING

Some of the circuitry inside this system operates at hazardous energy and electric shock voltage levels. To avoid the risk of personal injury due to contact with an energy hazard, or risk of electric shock, do not enter any portion of this system unless it is intended to be accessible without the use of a tool. The areas that are considered accessible are the outer enclosure and the area just inside the front door when all of the front panels are installed, and the front of the diagnostic station. There are no user serviceable areas inside the system. Refer any need for such access only to technical personnel that have been qualified by Intel Corporation.

CAUTION

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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Preface

Organization

Chapter 1	This chapter describes the features of the Paragon system diagnostics.
Chapter 2	This chapter describes the compatibility, limitations and workarounds for the Paragon system diagnostics.
Chapter 3	This chapter describes how to install the Paragon system diagnostic software.
Chapter 4	This chapter describes how to update GP node firmware.
Appendix A	This appendix describes how to install the Diagnostic Station SCO ODT operating system software.
Appendix B	This appendix contains information to help you interpret MRC and NIC register information in diagnostic error messages.

Notational Conventions

This manual uses the following notational conventions:

Bold	Identifies command names and switches, system call names, reserved words, and other items that must be used exactly as shown.
Italic	Identifies variables, filenames, directories, processes, user names, and writer annotations in examples. Italic type style is also occasionally used to emphasize a word or phrase.

`Plain-Monospace`
: Identifies computer output (prompts and messages), examples, and values of variables. Some examples contain annotations that describe specific parts of the example. These annotations (which are not part of the example code or session) appear in *italic* type style and flush with the right margin.

Bold-Italic-Monospace
: Identifies user input (what you enter in response to some prompt).

Bold-Monospace
: Identifies the names of keyboard keys (which are also enclosed in angle brackets). A dash indicates that the key preceding the dash is to be held down *while* the key following the dash is pressed. For example:

<Break> **<s>** **<Ctrl-Alt-Del>**

`[ ]` (Brackets) Surround optional items.

`...` (Ellipsis dots) Indicate that the preceding item may be repeated.

`|` (Bar) Separates two or more items of which you may select only one.

`{ }` (Braces) Surround two or more items of which you must select one.

Applicable Documents

For more information, refer to the *Paragon™ Diagnostic Reference Manual* and the *Paragon™ Diagnostic Troubleshooting Guide*.

Comments and Assistance

Intel Supercomputer Systems Division is eager to hear of your experiences with our products. Please call us if you need assistance, have questions, or otherwise want to comment on your Paragon system.

U.S.A./Canada Intel Corporation
Phone: 800-421-2823
Internet: support@ssd.intel.com

Intel Corporation Italia s.p.a.
Milanofiori Palazzo
20090 Assago
Milano
Italy
1678 77203 (toll free)

France Intel Corporation
1 Rue Edison-BP303
78054 St. Quentin-en-Yvelines Cedex
France
0590 8602 (toll free)

Intel Japan K.K.
Supercomputer Systems Division
5-6 Tokodai, Tsukuba City
Ibaraki-Ken 300-26
Japan
0298-47-8904

United Kingdom Intel Corporation (UK) Ltd.
Supercomputer System Division
Pipers Way
Swindon SN3 IRJ
England
0800 212665 (toll free)
(44) 793 491056 (*answered in French*)
(44) 793 431062 (*answered in Italian*)
(44) 793 480874 (*answered in German*)
(44) 793 495108 (*answered in English*)

Germany Intel Semiconductor GmbH
Dornacher Strasse 1
85622 Feldkirchen bei Muenchen
Germany
0130 813741 (toll free)

World Headquarters
Intel Corporation
Supercomputer Systems Division
15201 N.W. Greenbrier Parkway
Beaverton, Oregon 97006
U.S.A.
(503) 629-7600 (Monday through Friday, 8 AM to 5 PM Pacific Time)
Fax: (503) 629-9147

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Product Features 1

Features of This Release

This release of the Paragon™ system diagnostics includes the following additional features and enhancements:

The PSD Program

Neighbor Concurrent Com

The **Neighbor Concurrent Com** test (in the *Message Passing Tests* menu) is now *enabled* by default, instead of *ignored.*

RPM Counter Test

The **RPM Counter** test (in the *Node Tests* menu) now fails on node boards that do not have RPMs installed.

New Disk Tests

Four new disk tests have been added to the PSD menu. The Disk Total Write Test, Total Read Test, and Total Write/Read Test use the entire user-writable/readable areas on the disk. These tests can take 70 minutes to run with the Total Write/Read Test taking 140 minutes, depending on the size of the installed disk. The Disk Total Seek Test uses the entire readable area of the disk. It can take up to 10 minutes to run, depending on the size of the installed disk.

```
Disk Total Write Test (Ignored)
Disk Total Read Test (Ignored)
Disk Total Write/Read Test (Ignored)
Disk Total Seek Test (Ignored)
```

WARNING

The tests that write data to the disks destroy the data on those devices.

New Array Controller Tests

Four new Array Controller tests have been added to the PSD menu. The Array Controller Disks Total Write Test, Total Read Test, and Total Write/Read Test use the entire user writable/readable areas on the disks. These tests can take 70 minutes to run, with the Total Write/Read Test taking 140 minutes, depending on the size of the installed disks. The Array Controller Disks Total Seek Test uses the entire readable area of the disks. It can take up to 10 minutes to run, depending on the size of the installed disks.

```
Array Controller Disks Total Write Test (Ignored)
Array Controller Disks Total Read Test (Ignored)
Array Controller Disks Total Write/Read Test (Ignored)
Array Controller Disks Total Seek Test (Ignored)
```

WARNING

The tests that write data to the array controller disks destroy the data on those devices.

Operator Functions

The Operator Functions *MFG Set Up RAID Controller* and *Change RAID Controller* have been updated. They both now configure the RAIDs EPROM to report down drives upon start-up.

PSD Commands

The Abort Command

A new **abort** command has been added, which you may include in macro files (specified with PSD's **-m** command line switch). The **abort** command changes the way that <CTRL-C> or <DEL> keyboard interrupts are handled while a macro file is executing.

When **abort** is placed in a macro file, keyboard interrupts that follow will:

- Abort the current macro command,
- Skip the remaining commands in the macro file,
- And switch back to interactive input.

If the **abort** command is not used, a keyboard interrupt while a macro file is executing causes the current macro command to stop, then execution continues with the next command in the macro file.

The syntax for the **abort** command is:

```
abort
```

The Ignore Command

The **ignore** command only applies to tests, and not to utilities. Because utilities are not tests, they cannot be *ignored*. This is not a change, only a clarification of how **ignore** works.

Diagnostic Utilities

flashutil

The **flashutil** utility includes the following new command-line switches, in addition to those in previous version, to allow you to verify the versions of Flash EPROMs in your system:

flashutil [**-e**][**-q** *version*][**-r**][**-t** *select*]

-e Exclude the version selected by the **-q** switch from the **-r** Flash EPROM version report.

-q *version* Search for the *version* specified, on the type specified by the **-t** switch. You may not specify multiple version types.

-r Verify the version of the Flash EPROMs. If a target type is specified with a **-t** switch, only those types are verified. If a version is specified with a **-q** switch, only those versions are verified. If a **-e** switch is used with **-q**, the specified versions are excluded and the versions of all other Flash EPROMs are verified. The ROM version report is sent to standard output.

-t *select* Specifies the target Flash EPROM types for a **-r** version report. The *select* target may be either *gp*, *mio*, *hippi*, or *mdc*. Multiple types may be specified in a comma-separated list (with no spaces). If **-t** is not specified, all types are reported.

To use **flashutil** as a standalone utility to verify all GP node boards with V3.3 firmware, for example, use the following command:

```
DS#flashutil -r -t gp -q V3.3

Paragon Flash EPROM Utility
Copyright (c) 1994 Intel Corporation
DIAG_REL_1.2.1 Wed May 04 15:34:47 PDT 1994

ROM Version Report Selected
Romver selected targets [ gp ]

  loNode: 00A00(0), hiNode: 00A09(9)

This program will reset the attached Paragon system
Please confirm with y/n (n) y

Intializing nodes...
Loading /u/paragon/diag/flash.node

GP FLASH -                    (expected count=4, actual count=4)
Version V3.3 found on the following nodes:
  00A00 00A03 00A007 00A08
Test Clean-Up.
```

The new menu for **flashutil** includes a selection for the added Flash EPROM verification function. Type **flashutil** on the command line without the **-r** switch to enable the menu:

```
 1 ---> Program the GP Flash Memory
 2 ---> Program the MIO Flash Memory
 3 ---> Program the HIPPI Flash Memory
 4 ---> Program the MDC Flash Memory
28 ---> Flash version report
30 ---> Exit flashutil no Flash programming
```

The **-t**, **-q** and **-e** switches must be used on the command line—there is no way to select those functions from the menu.

romver

romver is now a script that runs **flashutil -r**. The script accepts all arguments for **romver** except **-x**, which allowed you to specify a checksum. Use the new **-q** switch in **flashutil** to specify a version string. **romver** now produces the same report as described above under **flashutil**.

initutil

initutil has a new **-c** option to specify a binary configuration file. If you want to use a different binary configuration file than the default */u/paragon/diag/SYSCONFIG.BIN*, specify it with the following syntax:

```
initutil [-c bin_file]
```

Documentation Errata

Diagnostic Reference Manual

Note the following errors in the *Paragon Diagnostic Reference Manual* for DIAG1.2 (312702-003):

- On page 2-14, the *showconfig* command should be **showconf**.
- The configuration file format information is now located in **Appendix D**.
- On page B-3, the **cfgmod** manual page indicates that the default for the **-b** *binfile* switch is */usr/paragon/diag/SYSCONFIG.BIN*. The correct path is */u/paragon/diag/SYSCONFIG.BIN*.

Limitations and Workarounds 2

This chapter contains known limitations and workarounds in this release of the Paragon system diagnostics (PSD). Please read this chapter before you use the diagnostic software.

Note

The Paragon system diagnostics should not be running when the Paragon OSF/1 operating system is to be booted.

Hard Reset Error Recovery

If you use the reset button on an XP/E system diagnostic station to do a hard reset, or cycle the power on the diagnostic station of any system, you will make an "ungraceful" exit from Paragon System Diagnostics.

When **psd** begins its initialization, it saves a copy of the *SYSCONFIG.BIN* file into *SYSBIN.ORIG*. If the diagnostic station reports:

```
Cannot save the binary configuration file: /u/paragon/diag/SYSBIN.ORIG already
exists
```

Remove this file to run **psd** without error.

Hardware Revision Levels

The minimum hardware revision level supported by this release of PSD is listed in Table 2-1. Refer to the Comments and Assistance section in the Preface for instructions on contacting Intel SSD Customer Service for this information.

Table 2-1. Compatible Hardware Revision Levels for DIAG1.2.1

Field Replaceable Unit (FRU)	Component	Revision	Comments
GP Node	Node Board	Fab7-011	
	FLASH EPROM	V3.3	Contains the correct address to check for the existence of an MRC.
	NIC ASIC	A step	
MDC	Memory Daughtercard	V1.3	Needs GP 3.3 firmware
MIO Board	Node Board(s)	as per GP	See above entry
	Daughtercard	Fab2	
		Fab3	
	FLASH EPROM	tftp - 1.13 MIO - 1.0	
		tftp - 1.13 MIO - 1.1	Adds Ethernet tests and fixes SCSI and asynchronous bugs
		tftp - 1.13 MIO - 1.2	Adds Ethernet tests and fixes SCSI and asynchronous bugs
		tftp - 1.13 MIO - 1.3	Fixes Ethernet tests
HIPPI Board	Node Board(s)	Fab8-007	
	Daughtercard	Fab2	
	FLASH EPROM	V1.1	
	Daughtercard	Fab3	
	FLASH EPROM	V1.2	
RAID Controller	Controller Board	92/01	PSD 1.2 provides RAID OS 3.06
Disk Drives	Maxtor	MXT-1240	Intel P/N 317961-001
	Seagate	ST31200N	Intel P/N 340573-001
Tape Drive	HP	35470	Intel P/N 316897-001
	HP	1533	Intel P/N 340744-001

If you make any system changes, first consult the *Paragon™ Diagnostic Reference Manual* and the *Paragon™ OSF/1 User's Guide.*

Compatible Software

The results of booting the Paragon O/S with different combinations of scan driver, Paragon O/S, and diagnostics software are shown in Table 2-2. A successful boot or test is indicated with a 'Y' (minimal testing was done) and an unsuccessful boot or test is indicated with a 'N'.

Table 2-2. Paragon Software Compatibility (1 of 3)

O/S	Diagnostics	Scan Driver	O/S Boot Method	O/S Boot Results	PSD Test Results
R1.1	R1.1	0.6	async	Y	Y
			fscan	Y	
			scanio	Y	
		0.8	async	N	Y
			fscan	N	
			scanio	N	
R1.1	DIAG1.2 and DIAG1.2.1	0.6	async	Y	Y
			fscan	Y	
			scanio	Y	
		0.8	async	N	Y
			fscan	N	
			scanio	N	
R1.1.3	R1.1	0.6	async	Y	Y
			fscan	Y	
			scanio	Y	
		0.8	async	Y	Y
			fscan	Y	
			scanio	Y	

Table 2-2. Paragon Software Compatibility (2 of 3)

O/S	Diagnostics	Scan Driver	O/S Boot Method	O/S Boot Results	PSD Test Results
R1.1.3	DIAG1.2 and DIAG1.2.1	0.6	async	Y	Y
			fscan	Y	
			scanio	Y	
		0.8	async	Y	Y
			fscan	Y	
			scanio	Y	
R1.1.4	R1.1	0.6	async	Y	Y
			fscan	Y	
			scanio	Y	
		0.8	async	Y	Y
			fscan	Y	
			scanio	Y	
R1.1.4	DIAG1.2 and DIAG1.2.1	0.6	async	Y	Y
			fscan	Y	
			scanio	Y	
		0.8	async	Y	Y
			fscan	Y	
			scanio	Y	
R1.2	R1.1	0.6	async	Y	Y
			fscan	N	
			scanio	Y	
		0.8	async	Y	Y
			fscan	Y	
			scanio	Y	

Table 2-2. Paragon Software Compatibility (3 of 3)

O/S	Diagnostics	Scan Driver	O/S Boot Method	O/S Boot Results	PSD Test Results
R1.2	DIAG1.2 and DIAG1.2.1	0.6	async	Y	Y
			fscan	N	
			scanio	Y	
		0.8	async	Y	Y
			fscan	Y	
			scanio	Y	

- The 0.6 scan driver was released with the R1.1 Diagnostics.
- The 0.8 scan driver was released with DIAG1.2.
- The combination of R1.1 Paragon O/S and the 0.8 version of the scan driver should not be used. This is the reason why patch R1.1.3 had a modified reset script.
- All test results are for V3.x of GP node firmware.
- **fscan** and the scan driver should be compatible. For example, R1.1 **fscan** is built with the 0.6 scan driver, and R1.2 **fscan** is built with the 0.8 scan driver, which has large-system improvements in it.

GP Node Identification

The codes in Table 2-3 identify the FRU (Field Replaceable Unit) numbers for the different

Table 2-3. GP Node FRU Identification

FRU Number	Description
AI	All Pre-1.2-compatible GP Nodes (except 32 MB Fab 8 boards)
AJ	Pre-1.2-compatible 32 MB Fab 8 GP Nodes
AK	1.2-compatible Fab 7 GP Nodes
AL	Not used
AM	1.2-compatible Fab 8 (16 MB) GP Nodes
AN	1.2-compatible Fab 8 (32 MB) GP Nodes

GP Node boards that might be in a system. They are shown in the *SYSCONFIG.TXT* file, as in the following example line. The "AK" entry identifies a 1.2-compatible Fab 7 unit.

```
S 0 GPNODE AK00 16 MIO B02
```

Refer to Appendix D of the *Diagnostics Reference Manual* for more information.

Installation Instructions 3

This chapter describes the steps necessary to install the Paragon™ Diagnostic Software.

NOTE

To install the Paragon Diagnostic Software, you must have completed the installation of the SCO OPEN DESKTOP Release 3.0.0. (This is the same release used with the previous version of Diagnostic Software.) If the operating system is not in place, follow the procedure shown in Appendix A to install it before installing the diagnostic software.

The procedures in this chapter use the conventions described in the Preface. You should also be aware of the following conventions:

- The instruction "Enter ***character(s)***" means type the indicated character(s), and then press the **<Enter>** key. For example, "Enter *y*" means type the letter "y", and then press the **<Enter>** key.

- In prompts, square brackets surround a default value. Pressing **<Enter>** selects the indicated default value.

- Some steps in these procedures cause a great deal of information to be displayed. However, the step as described here may show only the last message displayed. Also, do not be concerned if the indicated message does not appear immediately. Some steps take several minutes to complete.

Installing the Paragon™ Diagnostic Software

Installation Time:	Approximately 10 minutes.
Installation Media:	One cartridge tape labeled "Paragon™ Diagnostic Software Release 1.2.1" (313080-002).
Information you need:	*root* password. IP address of the Paragon Boot Node. IP address of the Diagnostic Workstation. The total number of cabinets in the Paragon system.

Requirements for Installation

You will need certain data on hand for use during the installation. Use this form to gather and record the required data.

Data Needed	Enter data in this column
Total number of Paragon system cabinets	
The *root* password for the diagnostic station	*Protect system passwords in a secure place.*

Installing the Diagnostic Software

1. Verify that the correct version of the SCO Open Desktop® operating system is installed on the diagnostic station:

   A. Login as *root* on the diagnostic station.

   B. Issue the following command to find out what version of the operating system is installed.

```
DS#uname -X
```

Eleven lines of information will be printed on the display. The *Release...* line should read:

```
Release = 3.2v4.2
```

If it does not, you must install a new version of the operating system onto the diagnostic station, using the procedure in Appendix A, before continuing with this procedure.

2. Change to the root directory:

```
DS#cd /
```

3. Change the **umask** for directory creation:

```
DS#umask 022
```

4. If a diagnostic daemon is running, stop it with the following command:

```
DS#dsdc stop
```

NOTE

Ignore either the error message `dsdc: Command not found` or `DSD shutdown: DSD is not running` and continue with the installation.

The daemon will either be restarted automatically when the diagnostic station is rebooted, or restarted manually at the end of this procedure.

5. Insert the Paragon Diagnostic Software Release 1.2.1 tape in the tape drive.

6. Extract the files from the tape:

   (This step takes a few minutes.)

```
DS#tar xvpf /dev/rct0
```

7. Remove the Paragon Diagnostic Release 1.2.1 tape.

8. If Release 1.1.4 or later of the Paragon OSF/1 operating system has been installed or you have previously installed Diagnostic Software 1.2 or later, go to Step 15. If you are unsure, check to see whether the Diaboard driver is version 0.8, with the following command:

   ```
   DS#strings /unix | grep Dia
   ```

   If the version is 0.8, go to Step 15. Otherwise, continue to Step 9.

9. The scan utilities directory has now been created. Change to that directory:

   ```
   DS#cd /etc/conf/pack.d/scan
   ```

10. Install the Driver:

    ```
    DS#./buildscan
    ```

    If the OS has previously been installed, you may be prompted about whether you want to rebuild the kernel. Answer *yes* (*y*).

    The system now builds */unix*.

    (This step takes a few minutes.)

Note

The following messages are normal; ignore them:

```
device driver for scan does not exist configuring
scan driver into kernel

/dev/scan does not exist, building into kernel
```

11. When asked if you want this kernel to boot by default, enter ***y*** (for yes).

12. When asked if you want the kernel environment to be rebuilt, enter ***y*** (for yes).

13. Shutdown the diagnostics station:

    ```
    DS#shutdown -y -g0
    ```

14. When prompted to reboot, press **<Enter>**.

15. Login as *root* on the diagnostics station.

16. Do one of the following:

    - Check that *DIAG_ALIAS* and *PARA_ALIAS* are defined in the */etc/hosts/* file. The alias variables should be included on the lines that contain the Paragon and Diagnostic Station IP numbers. (This is the recommended way to define system IP addresses.)

      ```
      xxx.xx.xx.xx DS_name DIAG_ALIAS DS_name.def.com
      xxx.xx.xx.xx Paragon_name PARA_ALIAS
      ```

    - Modify the */u/paragon/diag/psdenv* file to include the IP definition lines as follows. (This is the old way of defining system IP addresses for PSD.)

      ```
      OUR_IP_ADDR=Paragon Boot Node IP Address
      DS_IP_ADDR=Diagnostic Station IP Address
      ```

17. Change directory to */usr/paragon/boot*:

    ```
    DS#cd /usr/paragon/boot
    ```

    Find out if *DEVCONF.TXT* and *MAGIC.MASTER* files exist. If they are not found in */usr/paragon/boot*, then do the next step. If the files are present, skip the next step.

18. Do one of the following:

    - Restore the *DEVCONF.TXT* and *MAGIC.MASTER* files now if you saved them prior to installation of SCO ODT 3.0.0.

    - Create *DEVCONF.TXT* and *MAGIC.MASTER* files. You can alter the samples found in */u/paragon/diag/sample*. Refer to the *Paragon Diagnostics Reference Manual* for a detailed description of these files.

19. Change directory to */u/paragon/diag*:

    ```
    DS#cd /u/paragon/diag
    ```

20. Run the **hwcfg** utility to generate an intermediate hardware configuration file (see manual page for **hwcfg**). It will generate intermediate file */usr/paragon/boot/HWCONFIG.TXT*.

    ```
    DS#hwcfg
    ```

    If PSD was installed before, it will prompt you to ask whether you want to overwrite *HWCONFIG.TXT*. Answer ***yes*** (***y***).

Note

The message `Check cable: Warning Cable E (power control) not present` is normal; ignore it.

If the message `hwcfg: The number of cabinets must be specified` is reported, use the **-c** switch with **hwcfg** to specify the number of cabinets in your system.

21. Run the configuration merge utility, **mergecfg**, to generate *SYSCONFIG.TXT* (see manual page for **mergecfg**). It will generate */usr/paragon/boot/SYSCONFIG.TXT* file.

```
DS#mergecfg
```

If *SYSCONFIG.TXT* already exists, it will prompt you to ask if you want to overwrite the file. Answer *yes (y)*.

22. Run the configuration parser, **cfgpar**, to generate *SYSCONFIG.BIN* (see manual page for **cfgpar**). It will generate the binary file */u/paragon/diag/SYSCONFIG.BIN*.

```
DS#cfgpar
```

23. Use **flashutil -r** or **romver** to check the version of the Flash EPROM contents in your system. Refer to Table 2-1 for compatible version levels, and to the *Paragon OSF/1 Release Notes*, to determine whether any EPROMs need to be updated. See Chapter 4 of these release notes for how to update the Flash EPROMs.

24. If you did not do Steps 10 through 14 to build a new scan driver and did not reboot the diagnostic station, restart the diagnostic daemon manually:

```
DS#dsdc start
```

25. To enter the diagnostic menu, enter:

```
DS#psd
```

Updating GP Node Firmware 4

Installation Time:	Approximately 1 minute.
Installation Media:	The update is part of the diagnostic software.
Information you need:	*root* password.

Note

You must install the Paragon system diagnostic software before you update the Paragon GP node firmware.

If your current system firmware is an earlier version than V3.1, you need to update to V3.1 prior to updating to V3.3. Refer to the *Release Notes* for DIAG1.2 for instructions.

If you receive `Response timeout: node...` errors, when using **flashutil**, check that the small power connecters (1" x 1", with three wires) in the lower-right corner of the backplanes are seated properly.

Caution

This procedure updates all nodes at the same time. There is a very small risk in this method: if a power glitch occurs during the approximately 25 seconds required for updating, it is possible that the contents of every EPROM could be corrupted.

The alternative is to update one node at a time, or a small range of nodes. A power glitch would then disturb the EPROM contents in only a single node or a small set of nodes. However, a 512-node machine, for example, would require several hours to update that way.

If a power glitch occurs while updating the specified node, you may not be able to recover this node. The GP node and MIO firmware are at the greatest risk. Recovering from a power glitch may require an external EPROM programmer to reprogram the baseboard Flash EPROM.

1. There are three methods for updating the Paragon System firmware. Choose one of the following methods:

   - Update one node at a time:

     ```
     DS#flashutil -s node
     ```

     This is the safest method for protecting against power glitches.

   - Update a range of nodes:

     ```
     DS#flashutil -s first_node..last_node
     ```

     You may use the node-range option to do a section of your system at a time. This method localizes the risk to a group of nodes. Updating a cabinet of nodes is possible with this method.

   - Update your entire system:

     ```
     DS#flashutil
     ```

     This choice carries the greatest risk, but provides the quickest update. All nodes are updated in parallel.

2. Choose the update target from the menu that **flashutil** displays:

```
Please select the Flash memory for the update

     1 ---> Program the GP          Flash memory
     2 ---> Program the MIO         Flash memory
     3 ---> Program the HIPPI       Flash memory
     4 ---> Program the MDC         Flash memory
    28 ---> ROM version report
    30 ---> Exit flashutil no Flash programming
```

To update the GP (for example), enter ***1***

NOTE

The HIPPI selection works on 256 Kbyte firmware. It will not program older 128 Kbyte HIPPI devices.

3. The **flashutil** program returns a message asking if you want to reset the Paragon system.

```
This program will reset the Paragon system. Do you wish to
continue? (y/n)
```

To cancel at this point, enter either a carriage return or ***n*** (for no).

To update, enter ***y*** (for yes).

4. The program initializes and loads the nodes, then displays a warning message. You now have one last chance to abandon the update:

```
Warning! current Flash EPROM contents will be erased and
replaced.
Proceed? (yes/no)
```

Enter "no" to abandon the update, or enter "yes" to update.

Any response other than ***yes*** (fully spelled out) cancels the update.

flashutil then sends a command to each node in sequence, causing the node to program the Flash EPROM image that now resides in RAM into the node's Flash EPROM. **flashutil** displays a "+" for each node that is programmed, and a "-" for each node that isn't programmed. For example, if there are five nodes in a system, with the third one including an MIO daughtercard, **flashutil** displays the following series as it goes through the nodes to reprogram MIO Flash EPROMs:

```
--+--
```

If no error message follows the "+" sign, the node programmed correctly. A "-" sign indicates that the selected target was not found on that node—it does not indicate an error or an empty slot.

NOTE

A system that contains a mix of old and new firmware (for example when a board is placed in a system that has previously been updated) will need to be operated the same as if all nodes in the system contain the old firmware.

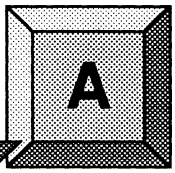
5. If you do enter ***yes***, the update proceeds. After about 30 seconds the update is complete and the UNIX prompt returns.

6. Confirm that the GP node firmware now contains the correct updated version number. Use the **flashutil** utility with the **-r** and **-t** switches to display the version number that it finds on the GP node boards:

```
DS#flashutil -r -t gp
```

flashutil will display a report showing the version numbers of the GP node Flash EPROMs in your system.

Installing the SCO Operating System



This appendix describes the steps necessary to install SCO Open Desktop Release 3.0.0.

The procedures in this appendix use the conventions described in the Preface. You should also be aware of the following conventions:

- The instruction "Enter ***character(s)***" means type the indicated character(s), and then press the **<Enter>** key. For example, "Enter ***y***" means type the letter "y", and then press the **<Enter>** key.
- In prompts, square brackets surround a default value. Pressing **<Enter>** selects the indicated default value.
- Some steps in these procedures cause a great deal of information to be displayed. However, the step as described here may show only the last message displayed. Also, do not be concerned if the indicated message does not appear immediately. Some steps take several minutes to complete.

Installing SCO OPEN DESKTOP Release 3.0.0

Installation Time: Approximately 45 minutes.

Installation Media: One cartridge tape labeled "SCO OPEN DESKTOP R3.0.0 for the Paragon™ Diagnostic Workstation SCO Mass Install Tape Vol 1 of 1" (312978-001).

One disk labeled "SCO OPEN DESKTOP R3.0.0 for the Paragon™ Diagnostic Workstation N1 Boot Disk" (312974-001).

One disk labeled "SCO OPEN DESKTOP R3.0.0 for the Paragon™ Diagnostic Workstation N2 File System Disk" (312975-001).

One disk labeled "SCO OPEN DESKTOP R3.0.0 for the Paragon™ Diagnostic Workstation M01 Master Install Disk" (312976-001).

Requirements for Installation

You will need certain data on hand for use during the installation. Use this form to gather and record the required data.

Data Needed	Enter data in this column
The SCO Serial Number (located in the SCO OPEN DESKTOP box)	
The SCO Activation Key (located in the SCO OPEN DESKTOP box)	
The system name of the diagnostic station	
The root password of the diagnostic station	*Protect system passwords in a secure place.*
The IP address of the diagnostic station	

Data Needed	Enter data in this column
The domain name of the diagnostic station (use the **hostname** command to find it)	
The Netmask of the diagnostic station	
The Broadcast IP address of the diagnostic station	
The IP address of the Paragon Boot Node	
The total number of cabinets	

It is essential to make backup copies of:

- Diagnostic station-specific files */etc/hosts* and */etc/resolv.conf* (if they exist)
- Paragon diagnostic configuration files */usr/paragon/boot/DEVCONF.TXT*, */usr/paragon/boot/MAGIC.MASTER*, and */usr/paragon/BOOTMAGIC.md* files (if they exist)
- Paragon OSF/1 files which reside on the diagnostic station in the directory trees */usr/local/bin* and */usr/paragon/boot*

Reinstalling SCO OPEN DESKTOP

If you are reinstalling SCO OPEN DESKTOP over an existing system, use a utility, such as **fdisk**, to delete the active UNIX partition on the diagnostic station.

1. To find the active partition (see the manual page for fdisk to interpret the returned information), enter:

```
fdisk -p
```

2. Delete the active partition. For example, if partition 1 is active, enter:

```
fdisk -d 1
```

Install SCO OPEN DESKTOP Procedure

WARNING

These procedures overwrite the Paragon diagnostic station disk drive. Make a backup of any user file(s) you want to retain.

1. Insert the SCO N1 Boot disk into the disk drive.
2. Boot the diagnostic station by turning the power on.
3. At the boot prompt, press **<Enter>**.
4. When prompted, insert the SCO N2 File System disk and press **<Enter>**.

Note

Ignore the normal message `warning: /dev/ropipe was not in mount table.`

5. When prompted to select the type of tape drive, enter the following:

   scsi

Note

The prompt in the next step refers to the MIT System Image Vol. I tape. Our corresponding product is called the *"SCO Mass Installation Toolkit Tape Vol. I"* and is used in place of the MIT tape.

6. When prompted:

   A. Verify that the SCO M01 Master Install diskette is in the floppy drive.

   B. Verify that the SCO Mass Installation Toolkit Tape Vol. 1 is in the tape drive.

   C. Press **<Enter>**.

   (This step takes about 30 minutes.)

Note

Ignore the message `errno 26, Text file busy....`

7. When prompted to set system time, enter ***y*** (for yes).

   If you are not in North America, enter ***n*** (for no) in response to step 8 and go to step 11.

8. When asked if you are in North America, enter ***y*** (for yes) or enter ***n*** (for no).

9. When asked for your time zone, enter your time zone number and press **<Enter>**.

10. When asked if daylight savings applies to your time zone, enter either ***y*** (for yes) or ***n*** (for no).

11. Enter the correct date and time using the format of year, month, day, hour and minute. This example is for a date and time of March 9, 1994 at 6:22 p.m.:

    9403091822

12. When asked if you want to set the system name, enter ***y***.

13. Enter your diagnostic station name and press **<Enter>**.

14. When asked if the mail system should be a different name, enter ***n***.

15. When prompted, press **<Enter>** to continue.

16. When prompted to serialize the system, respond with ***y***.

Note

If you respond "Yes" to the question in step 17, you will be forced to start this procedure over at step 1.

17. When asked if you want to execute floppy-based serialization, respond with ***n***.

18. Enter Serial Number and Activation Key codes at the prompts.

    (This step takes about 20 seconds.)

19. When asked if you want to change your answer to any of these questions, respond with ***q***.

    The system now builds */unix*. (This step takes a few minutes.)

20. When prompted to reboot the system, remove any remaining floppy disk(s) and/or tape(s) and press **<Enter>** to reboot.

Note

In the next step you have only 5 seconds to press **<Enter>** after the boot prompt appears.

21. When the boot prompt appears, enter single-user mode by pressing **<Enter>** within 5 seconds.

22. Wait for the single-user mode login prompt, then enter the password:

    paragon3

23. Run the password utility:

    passwd

24. When prompted to choose your own password, respond with **1.**

25. When prompted, enter your new password.

26. When reprompted, reenter your new password.

27. Edit the file */etc/default/tcp* by changing the lines in the *tcp* file as shown in Table A-1.

Table A-1. Edit Values in the */etc/default/tcp* File

Current	Change To:
DOMAIN = default.com	DOMAIN = *DS system's Domain name*
IPADDR = nnn.nnn.nnn.nnn	IPADDR = *DS system's IP address*
NETMASK = nnn.nnn.nnn.nnn	NETMASK = *netmask*
BROADCAST = nnn.nnn.nnn.nnn	BROADCAST = *broadcast IP address*

28. Restore your */etc/hosts* file from your backup copy, if one was created, or modify the existing */etc/hosts* file.

Note

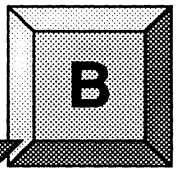
When you restore the */etc/hosts* file, you must also alias the DS domain name to the DS IP number. Use the **hostname** command to find the domain name.

29. Reboot the diagnostic station:

```
reboot
```

This completes the installation of the basic SCO OPEN DESKTOP Release 3.0.0 software on the diagnostic station.

MRC and NIC Register Definitions



This appendix provides detailed information about the contents of the registers in both MRC and NIC devices. The information may be used to elaborate on diagnostic error messages that contain raw register information.

MRC Register Definitions and Organization

The MRC status and control register is a 64-bit read-only register that is used to read the internal state and configuration of the MRC, and to control MRC operation (Figure B-1). A description of the function of each bit is shown below. When a register bit is set to one, the condition is true. In the following description,

- Bit 0 is the first bit read.
- The first 18 bits are the status bits.
- The next 26 locations are reserved. These can not be written to and are always "0".
- The final 20 locations are the control bits.

Control registers

PIS	=	Input Streaming Processor port
EIS	=	Input Streaming East port
WIS	=	Input Streaming West port
NIS	=	Input Streaming North port
SIS	=	Input Streaming South port
PS1	=	Upper bit Streaming Processor port
PS0	=	Lower bit Streaming Processor port
PBB	=	Misroute Enable Processor port
ES1	=	Upper bit Streaming East port
ES0	=	Lower bit Streaming East port
EBB	=	Misroute Enable East port
WS1	=	Upper bit Streaming West port

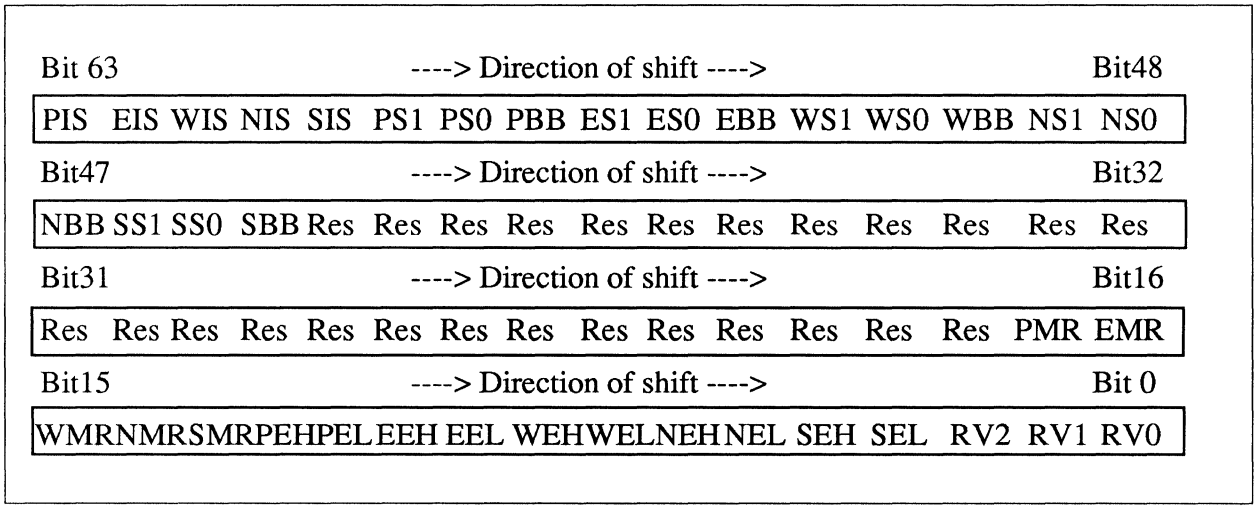


Figure B-1. MRC Register Bits

WS0	=	Lower bit Streaming West port
WBB	=	Misroute Enable West port
NS1	=	Upper bit Streaming North port
NS0	=	Lower bit Streaming North port
NBB	=	Misroute Enable North port
SS1	=	Upper bit Streaming South port
SS0	=	Lower bit Streaming South port
SBB	=	Misroute Enable South port

Status Registers

PMR	=	Misrouted message detected on processor port
EMR	=	Misrouted message detected on east port
WMR	=	Misrouted message detected on west port
NMR	=	Misrouted message detected on north port
SMR	=	Misrouted message detected on south port
PEH	=	Upper byte plus tail parity error on processor port
PEL	=	Lower byte parity error on processor port
EEH	=	Upper byte plus tail parity error on east port
EEL	=	Lower byte parity error on east port
WEH	=	Upper byte plus tail parity error on west port
WEL	=	Lower byte parity error on west port
NEH	=	Upper byte plus tail parity error on north port
NEL	=	Lower byte parity error on north port
SEH	=	Upper byte plus tail parity error on south port
SEL	=	Lower byte parity error on south port
RV2	=	Revision level most significant bit
RV1	=	Revision level bit 1
RV0	=	Revision level least significant bit

NIC Status Register Definitions

The NIC status register (status_reg) is a 64-bit read-only register that is used to read the internal state and configuration of the NIC. A description of the function of each bit is shown below. When a status register bit is set to one, the condition is true except where notes (bits 0, 1, 6, 9). Bits 43 to 63 always read zero.

FIFO Flag Status

STATUS REGISTER BIT	FUNCTION
status_reg(0)	*transmit FIFO not full* flag - When asserted, (i.e. "zero") indicates the transmit FIFO is full.
status_reg(1)	*transmit FIFO not almost full* flag - Asserted (i.e. "zero") if the transmit FIFO is at or within 32 64-bit words from being full.
status_reg(2)	*transmit FIFO almost empty* flag - When asserted, indicates the transmit FIFO is almost empty.
status_reg(3)	*transmit FIFO empty* flag - When asserted, indicates the transmit FIFO is empty.
status_reg(4)	*receive FIFO full* flag - When asserted, indicates the receive FIFO is full.
status_reg(5)	*receive FIFO almost full* flag - Asserted if the receive FIFO is almost full.
status_reg(6)	*receive FIFO not almost empty* flag - Asserted (i.e. "zero") if the receive FIFO is at or within 32 64-bit words from being empty.
status_reg(7)	*can read two words* - When asserted, indicates the receive channel contains at least two 64-bit words.
status_reg(8)	*can read one word* - When asserted, indicates the receive channel contains as least one 64-bit word.
status-reg(9)	*receive FIFO not empty* - When asserted, (i.e. "zero") indicates the receive FIFO is empty. When deasserted (i.e. "one") indicates receive FIFO is holding data.

Figure B-2. FIFO Flag Status

Processor Port Status

STATUS REGISTER BIT	FUNCTION
status_reg(10)	*eod in NIC* - When asserted, indicates that the NIC receive FIFO contains at least one complete packet.
status_reg(11)	*receive channel ready* - When asserted, indicates that the NIC has data that can be read from the processor port.
status_reg(12)	*transmit channel ready* - When asserted, indicates that the NIC is able to accept input data from the processor port.
status_reg(13)	*eod last word* - This bit is set when the most recent word transferred to the processor interface carried with it the *end of data* bit (eod). Software uses this bit to make sure the "eod marked" word was the last word in the packet. This bit stays set until the next non-eod word is delivered to the processor interface.

Figure B-3. Processor Port Status

Error Status Bits

STATUS REGISTER BIT	FUNCTION
status_reg(14)	*network crc0 error* - When asserted, indicates that a CRC error has occurred in the lower 32 bits of an incoming packet.
status_reg (15)	*network crc1 error* - When asserted, indicates that a CRC error has occurred in the upper 32 bits of an incoming packet.
status_reg (16)	*processor port parity0 error* - When asserted, indicates that a parity error has occurred in the lowest byte of an incoming word from the processor port.
status_reg(17)	*processor port parity1 error* - See description above.

Figure B-4. Error Status Bits

STATUS REGISTER BIT	FUNCTION
status_reg(18)	*processor port parity2 error* - See description above.
status_reg (19)	*processor port parity3 error* - See description above.
status_reg(20)	*processor port parity4 error* - See description above.
status_reg(21)	*processor port parity5 error* - See description above.
status_reg(22)	*processor port parity6 error* - See description above.
status_reg(23)	*processor port parity7 error* - See description above.
status_reg(24)	*network parity0 error* - When asserted, indicates that a parity error has occurred in the lower byte of an incoming packet from the network.
status_reg(25)	*network parity1 error* - When asserted, indicates that a parity error has occurred in the upper byte of an incoming packet from the network. This parity bit also covers the tail bit with the upper byte.
status_reg(26)	*transmit FIFO overrun* - When asserted, indicates that an attempt to write the transmit FIFO was made when it was full.
status_reg(27)	*receive FIFO overrun* - When asserted, indicates that an attempt was made to write the receive FIFO when it was full.
status _reg(28)	*receive underrun* - When asserted indicates that an attempt was made to read the receive channel when it was empty.

Figure B-4. Error Status Bits

Miscellaneous Status Bits

STATUS REGISTER BIT	FUNCTION
status_reg(29)	*xreq - state of transmit request* pin (xreq)
status_reg(30)	*xack - state of transmit acknowledge* pin (xack)
status_reg(31)	*rreq - state of receive request* pin (rreq)
status_reg(32)	*rack - state of receive acknowledge* pin (rack)
status_reg(33)	*xmip* - If set, indicates a transmit message is in progress. In other words, a header of a message has gone out, but the tail has not. This bit will stay set as long as the "tail" of the message is inside the NIC.
status_reg(34)	*rmip* - If set, indicates a receive message is in progress. Function is similar to xmip. This bit will stay set from the arrival of the first 16-bit portion of a message header until the tail of the same message arrives.

Figure B-5. Miscellaneous Status Bits

NIC Identification Bits

These bits identify the revision level and type of the NIC.

STATUS REGISTER BIT	FUNCTION
status_reg(37:35)	NIC revision code. Reserved for internal use.
status_reg.(42:38)	NIC type code. Reserved for internal use.

Figure B-6. NIC Identification Bits