



Installation and Service Guide

Second Edition (May 1999)

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Communications Statements

The following statement applies to this product. The statement for other products intended for use with this product appears in their accompanying documentation.

Federal Communications Commission (FCC) Statement

Note: 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.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Neither the provider nor the manufacturer are responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

European Union (EU) Statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. The manufacturer cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of option cards supplied by third parties. Consult with your dealer or sales representative for details on your specific hardware.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22 / European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

International Electrotechnical Commission (IEC) Statement

This product has been designed and built to comply with IEC Standard 950.

United Kingdom Telecommunications Safety Requirements

This equipment is manufactured to the International Safety Standard EN60950 and as such is approved in the UK under the General Approval Number NS/G/1234/J/100003 for indirect connection to the public telecommunication network.

The network adapter interfaces housed within this equipment are approved separately, each one having its own independent approval number. These interface adapters, supplied by the manufacturer, do not use or contain excessive voltages. An excessive voltage is one which exceeds 70.7 V peak ac or 120 V dc. They interface with this equipment using Safe Extra Low Voltages only. In order to maintain the separate (independent) approval of the manufacturer's adapters, it is essential that other optional cards, not supplied by the manufacturer, do not use main voltages or any other excessive voltages. Seek advice from a competent engineer before installing other adapters not supplied by the manufacturer.

Avis de conformité aux normes du ministère des Communications du Canada

Cet appareil numérique de la classe A respecte toutes les exigences du Réglement sur le matériel brouilleur du Canada.

Canadian Department of Communications Compliance Statement

This Class A digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations.

VCCI Statement

この装置は、情報処理装置等電波障害自主規制協議会(VCCI)の基準に 基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

The following is a summary of the VCCI Japanese statement in the box above.

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

Electromagnetic Interference (EMI) Statement - Taiwan

警告使用者:

這是甲類的資訊產品,在居住的環境中使用 時,可能會造成射頻干擾,在這種情況下, 使用者會被要求採取某些適當的對策。

The following is a summary of the EMI Taiwan statement above.

Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user will be required to take adequate measures.

Radio Protection for Germany

Dieses Gerät ist berechtigt in Übereinstimmung mit Dem deutschen EMVG vom 9.Nov.92 das EG-Konformitätszeichen zu führen.

Der Aussteller der Konformitätserklärung ist die IBM Germany.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse A. Für diese von Geräten gilt folgende Bestimmung nach dem EMVG:

Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministers für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind.

(Auszug aus dem EMVG vom 9.Nov.92, Para.3, Abs.4)

<u>Hinweis</u>

Dieses Genehmigungsverfahren ist von der Deutschen Bundespost noch nicht veröffentlicht worden.

Safety Notices

A danger notice indicates the presence of a hazard that has the potential of causing death or serious personal injury.

A caution notice indicates the presence of a hazard that has the potential of causing moderate or minor personal injury.

Electrical Safety

Observe the following safety instructions any time you are connecting or disconnecting devices attached to the workstation.

DANGER

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.

Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.

When adding or removing any additional devices to or from the system, ensure that the power cables for those devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.

Use one hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.

During an electrical storm, do not connect cables for display stations, printers, telephones, or station protectors for communication lines.

CAUTION:

This product is equipped with a three-wire power cable and plug for the user's safety. Use this power cable with a properly grounded electrical outlet to avoid electrical shock.

DANGER

To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.

CAUTION:

This unit has more than one power supply cord. To reduce the risk of electrical shock, disconnect two power supply cords before servicing.

Laser Safety Information

The optical drive in this system unit is a laser product. The optical drive has a label that identifies its classification. The label, located on the drive, is shown below.

CLASS 1 LASER PRODUCT
LASER KLASSE 1
LUOKAN 1 LASERLAITE
APPAREIL À LASER DE CLASSE 1
IEC 825:1984 CENELEC EN 60 825:1991

The optical drive in this system unit is certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products. Elsewhere, the drive is certified to conform to the requirements of the International Electrotechnical Commission (IEC) 825 (1st edition 1984) and CENELEC EN 60 825:1991 for Class 1 laser products.



CAUTION:

A class 3 laser is contained in the device. Do not attempt to operate the drive while it is disassembled. Do not attempt to open the covers of the drive as it is not serviceable and is to be replaced as a unit.

Class 1 laser products are not considered to be hazardous. The optical drive contains internally a Class 3B gallium—arsenide laser that is nominally 0.14 milliwatts at 765 to 815 nanometers. The design incorporates a combination of enclosures, electronics, and redundant interlocks such that there is no exposure to laser radiation above a Class 1 level during normal operation, user maintenance, or servicing conditions.

About This Book

This book provides maintenance information that is specific to the system unit, adapters, and attached devices that do not have their own service information. It also contains Maintenance Analysis Procedures (MAPs) that are not common to other systems.

MAPs that are common to all systems are contained in the *Diagnostic Information for Multiple Bus Systems*.

This book is used by the service technician to repair system failures. This book assumes that the service technician has had training on the system unit.

ISO 9000

ISO 9000 registered quality systems were used in the development and manufacturing of this product.

Related Publications

The following publications are available for purchase:

- The *User's Guide* contains information to help users set up, install options, configure, modify, and solve minor problems.
- The 7014 Model S00 Rack Installation and Service Guide contains information regarding the 7014 Model S00 Rack, which the RS/6000 Enterprise Server Model H Series may be installed in.
- The Diagnostic Information for Multiple Bus Systems contains common diagnostic procedures, error codes, service request numbers, and failing function codes. This manual is intended for trained service technicians.
- The RS/6000 Adapters, Devices, and Cable Information for Multiple Bus Systems
 contains information about adapters, external devices, and cabling. This manual
 is intended to supplement information found in the Diagnostic Information for
 Multiple Bus Systems.
- The *PCI Adapter Placement Reference* contains information regarding slot restrictions for adapters that can be used in this system.
- The Site and Hardware Planning Information contains information to help you plan your installation.

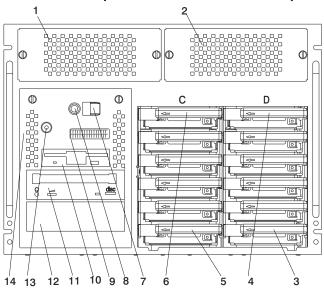
Trademarks

- · AIX is a registered trademark of the International Business Machines Corporation.
- PowerPC is a trademark of the International Business Machines Corporation.
- Velcro is a trademark of Velcro Industries.

Chapter 1. Reference Information

System Unit Locations

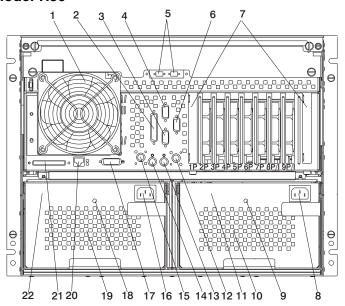
Front View with Covers Off (Model H50 and Model H70)



- Media Blower (Hot-Swappable)
 DASD Blower (Hot-Swappable)
 Hot-Swappable Disk Drive D1
 Hot-Swappable Disk Drive D6
 Hot-Swappable Disk Drive C1
- Hot-Swappable Disk Drive C1Hot-Swappable Disk Drive C6
- 7 Power Button

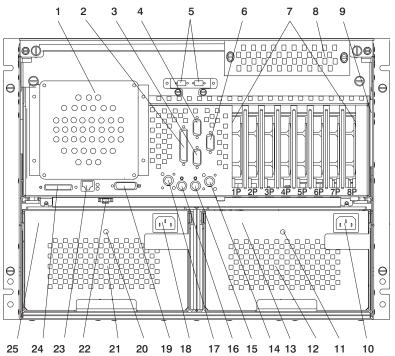
- 8 Reset Button
- 9 Operator Panel Display
- 10 Diskette Drive
- 11 CD-ROM Drive
- 12 Additional Media Bay
- 13 Power On LED
- Optional SCSI Boot Disk (behind Op Panel Display and LEDs)

Rear View Model H50



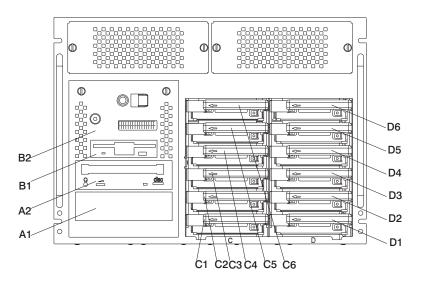
1	CPU Fan	12	Power Control Interface Connector
2	Parallel Connector	13	Mouse Connector
3	Serial Connector(S2)	14	Keyboard Connector
4	Serial Connector(S1)	15	Power Control Interface Connector
5	External SSA Connectors (Optional)	16	Power Connector for First Power Supply
6	Serial Connector(S3)	17	AUI Ethernet Connector
7	I/O Slots	18	First Power Supply Status LED
8	Power Connector for Second Power	19	Internal Fans for First Power Supply
	Supply		
9	Second Power Supply Status LED	20	RJ45 Ethernet Connector
10	Internal Fans for Second Power Supply	21	External SCSI Connector
11	Second Power Supply	22	First Power Supply

Rear View Model H70



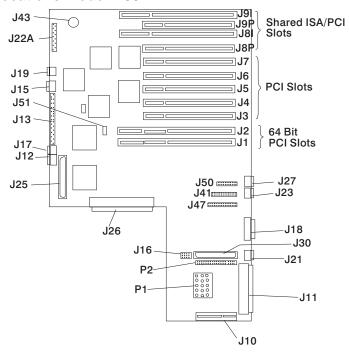
CPU Fan 1 14 Power Control Interface Connector 2 Parallel Connector 15 Mouse Connector 3 Serial Connector(S2) **Keyboard Connector** 16 4 Serial Connector(S1) 17 Power Control Interface Connector 5 External SSA Connectors (Optional) 18 Power Connector for First Power Supply 6 Serial Connector(S3) 19 **AUI Ethernet Connector** 7 I/O Slots 20 First Power Supply Status LED 8 I/O Blower (Hot-Swappable) 21 Internal Fans for First Power Supply 9 I/O Blower Connector 22 CPU Fan Connector 10 Power Connector for Second Power 23 **RJ45 Ethernet Connector** Supply Second Power Supply Status LED 11 24 External SCSI Connector 12 Internal Fans for Second Power Supply 25 First Power Supply 13 Second Power Supply

Bay Locations (Model H50 and Model H70)



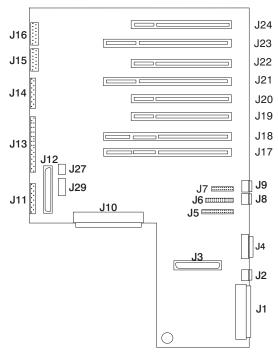
B2	Optional SCSI Boot Disk Drive (behind Op Panel Display)	C5	Hot-Swappable Disk Drive
B1	Diskette Drive	C6	Hot-Swappable Disk Drive
A2	CD-ROM Drive	D1	Hot-Swappable Disk Drive
A1	Media Bay (can be CD–ROM, Tape, or non-hot-swappable hard disk drive)	D2	Hot-Swappable Disk Drive
C1	Hot-Swappable Disk Drive	D3	Hot-Swappable Disk Drive
C2	Hot-Swappable Disk Drive	D4	Hot-Swappable Disk Drive
C3	Hot-Swappable Disk Drive	D5	Hot-Swappable Disk Drive
C4	Hot-Swappable Disk Drive	D6	Hot-Swappable Disk Drive

I/O Board Locations Model H50



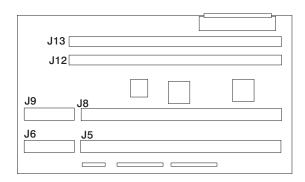
J1, J2	64-bit PCI connectors	J3, J4, J5, J6, J7, J8F J9P	32-bit PCI connectors
J8I, J9I	ISA connectors	J10	Service Processor
J11	External SCSI connector	J12	Not Used
J13	Diskette Drive connector	J15	Not Used
J16	SCSI Security Jumper	J17	Not Used
J18	Ethernet connector (thick)	J19	Not Used
J21	Ethernet connector (twisted pair)	J22A	Operator Panel
J23	Keyboard connector	J25	Internal SCSI connector (port 1)
J26	System board connector	J27	Mouse connector
J30	Internal SCSI connector (port 2)	J41	Serial connector (serial port 1 and 2)
J43	Battery Socket	J47	Parallel connector
J50	Serial connector (serial port 3)	P1, P2	Power Supply
J51	Fan Monitor Control (FMC) card		

I/O Board Locations Model H70



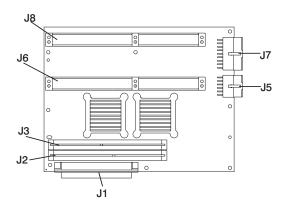
J1, J3	SCSI Port 2 connector	J2	Ethernet connector (twisted pair)
J4	Ethernet connector (thick)	J5	Parallel port
J6	Serial ports 1 and 2	J7	Serial port 3
J8	Keyboard port	J9	Mouse port
J10	System board connector	J11	Power supply
J12	SCSI port 1 connector	J13	Diskette drive connector
J14	Operator panel connector	J15	Power supply
J16	Power supply	J17, J18, J21, J23	64-Bit PCI connectors
J19, J20, J22, J24	32-Bit PCI connectors	J27	Fan monitor card connector
J29	DASD backplane connectors		

System Board Locations Model H50



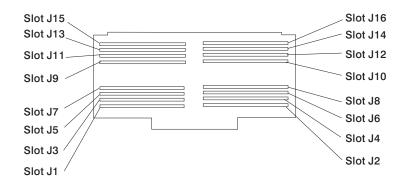
J5, J6 Processor card connector #2 J8, J9 Processor card connector #1
J12 Memory card connector #1 J13 Memory card connector #2

System Board Locations Model H70

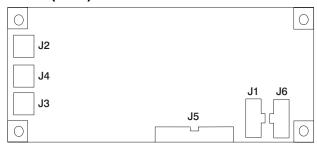


J8 Processor card connector #2 J6 Processor card connector #1
J3 Memory card connector #1 J2 Memory card connector #2
J7 3.3V Power J5 5.0V Power
J1 Connector to I/O board

Memory Card and Memory Module Locations



Fan Monitor Control (FMC) Card



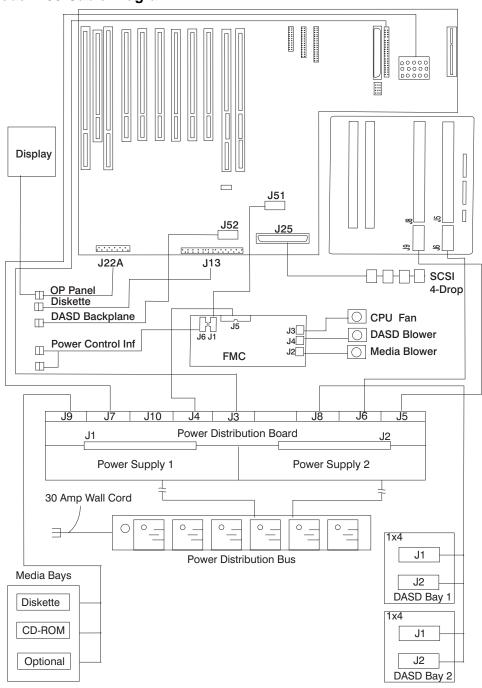
Model H50

J2	Fan 5 (Hot-Swappable Media Blower)	J5	Power Supply and Fans 1, 2, 3, 4 (Power
			Supply Fan Assemblies)
J4	Fan 6 (Hot-Swappable DASD Blower)	J1	To I/O Board
J3	Fan 7 (CPU Fan)	J6	To PCI Connectors

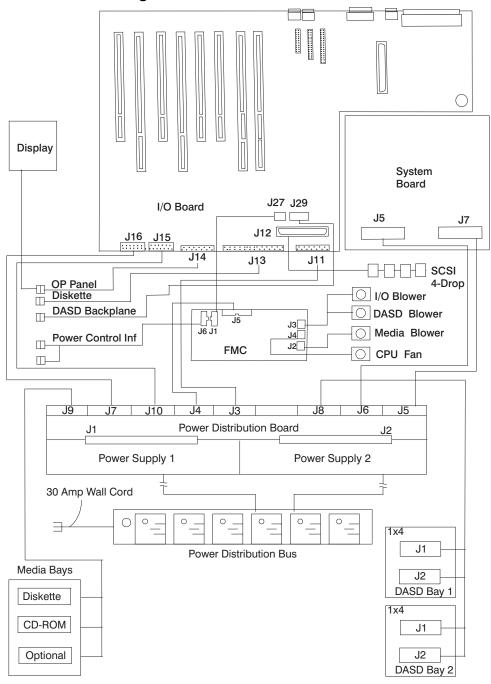
Model H70

J2	Fan 5 (Hot-Swappable Media Blower)	J5	Power Supply and Fans 1, 2, 3, 4 (Power
			Supply Fan Assemblies)
J4	Fan 6 (CPU Fan)	J1	To I/O Board
J3	Fans 7 and 8 (Hot-Swappable I/O and DASD Blower)	J6	To PCI Connectors

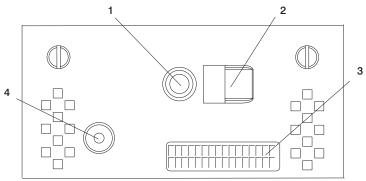
Model H50 Cable Diagram



Model H70 Cable Diagram



Operator Panel



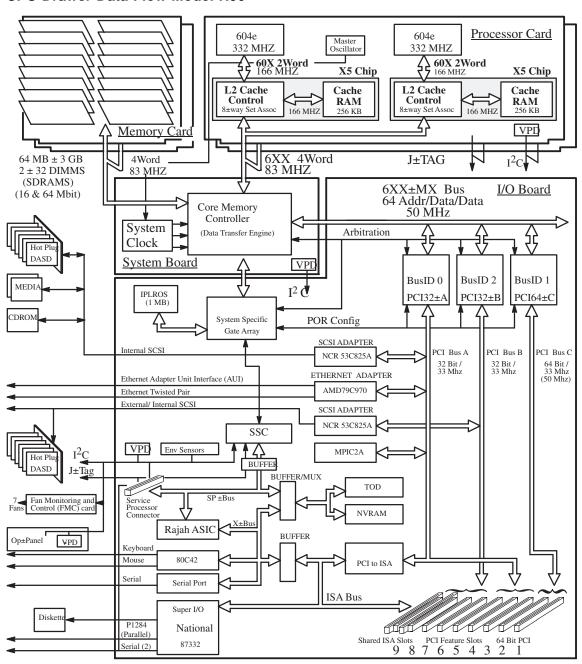
- Reset Button
 - Power On Button

- Operator Panel Display Power On LED 3
- 4

LED Indicator Status

State of LED	Operator Panel LED	First Power Supply LED	Second Power Supply LED
Off	No AC power	No AC power	No AC power
On, blinking green	System plugged in, not turned on	System plugged in, not turned on	System plugged in, not turned on
On, steady green	System plugged in and turned on	System plugged in and turned on	System plugged in and turned on

CPU Drawer Data Flow Model H50



CPU Drawer Data Flow Model H70 Master Oscillator 37.04 MHz Processor Card Processor Processor 8 Word 8 Word 🕏 Memory Memory Manager Manager L2 Cache Controller L2 Cache 6XX 6XX Controller Intf Intf VPD\ VPD RAM 4 MByte VPD Memory Card VPD 64 MB-8GB ^{I2C} 2-32 DIMMS 12C 4 Word 6XX 4 Word 85 MHz J-Tag 85 MHz I/O Board 6XX-MX Bus 6XX-Arb 64 Addr/Data 66 MHz CD ROM Memory Controller System Clock Media SSGA Bus System Board VPD Bus Id3 Bus Id0 Bus Id1 Bus Id2 I2C Plug MX Arb J-Tag PCI PCI PCI PCI Ultra Bus0 Bus1 Bus2 Bus3 Internal SCSI 32 Bit 33 Mhz 32/64 Bit 33 Mhz 32/64 Bit 33 Mhz 32/64 Bit 33 Mhz Adapter DASD External/Internal SCSI Ultra2 SCSI Extended Adapte Ethernet Adapter SSGA Bus Unit Intf (AUI) Ethernet Ethernet Twisted Pair NVRAM POR (128KB) Dual Sys Cntl Regs UART Sys Cntl PCI to ISA Reas Diskette ISA Regs RTC Serial Serial (2) ISA Bus Extende Arbitration Parallel Shared Mouse SP Local ISA Bus **IPL ROS** Keyboard Regs (1MB) ervice Processor Bus SRAM I2C to J-Tag Controller Power Supplies (512 KB) EEPROM Power I2C (1 MB) Control Hub Service 6 5 Debug VPD _ 8 4 3 2 Port Op-Panel VPD **PCI Feature Slots** Env Sensors X-I2C Serial

Specifications

The mechanical packaging, cooling, power supply, and environmental requirements for the server is shown in the following:

Dimensions						
Height			350 mm	13.8 in.		
				8 (EIA un	nits)	
Width			443 mm	17.4 in.		
Depth (H50)			844 mm	33.2 in.		
Depth (H70)			875 mm	34.2 in.		
Weight						
Empty			71 kg	157 lbs.		
Maximum Configu	ration		89 kg	195 lbs.		
Electrical						
Power source load	0 ,,		0.5	-		
	ding maximum in kVA		0.5	-		
Voltage range (V a	ac)	2	,	autoranging)		
Frequency (hertz)			50 o			
Thermal output (ty			975 B			
Thermal output (m			2460 E			
Power requiremen			285 v			
	ts (maximum) Model		600 v			
•	ts (maximum) Model	H70	750 watts			
Power factor			0.8 - 0.96			
Inrush current			50 amps 2135m (7000 ft.)			
Maximum altitude			2135m (7000 ft.)		
Temperature Req	uirements	Operating			perating	
			10 to 40°C (Sh		(Ambient)	
		(50 to 104°	(00 10 10 17)		10 to 43°C	
				(34 to 125°F	(50 to 110°F)	
Humidity Require	ements	Operating	g	Non-C	perating	
(Noncondensing)		8% to 80%	-	- , -	to 80%	
Wet Bulb		23°C (73°l	=)	27°C	(80°F)	
Noise Emissions		Operating	g	ı	ldle	
L_WAd		6.2 bels	6.2 bels 6.0 bels			
L_pAm		NA		ı	N/A	
$\langle L_{pA}\rangle_{m}$		43 dBA 40 dBA) dBA	
Impulsive or promi	inent	No			No	
discrete tones						
Clearances	Front	Back	Left	R	ight	
Service	1650 mm(65 in)	1015 mm(40 in)	915 mm	(36 in) 9	15 mm (36 in)	
Install/Air Flow	Maintenance of a	proper service cleara	nce will allow	w proper air flo	ww.	

Power Cables

To avoid electrical shock, a power cable with a grounded attachment plug is provided. Use only properly grounded outlets.

Power cables used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA). These power cords consist of:

- Electrical cables, Type SVT or SJT
- · Attachment plugs complying with National Electrical Manufacturers Association (NEMA) 5-15P.

"For 230 V operation in the United States use a UL listed cable set consisting of a minimum 18 AWG, Type SVT or SJT three-conductor cable a maximum of 15 feet in length, and a tandem blade, grounding type attachment plug rated at 15 A, 250 V."

 Appliance couplers complying with International Electrotechnical Commission (IEC) Standard 320, Sheet C13

Power cables used in other countries consist of the following:

- Electrical cables, Type HD21
- Attachment plugs approved by the appropriate testing organization for the specific countries where they are used.

"For units set at 230 V (outside of U.S.): use a cable set consisting of a minimum 18 AWG cable and grounding type attachment plug rated 15 A, 250 V. The cable set should have the appropriate safety approvals for the country in which the equipment will be installed and should be marked HAR'."

Refer to Chapter 8 on page 8-1 to find the power cables that are available.

Service Inspection Guide

Perform a service inspection on the system when:

- The system is inspected for a maintenance agreement.
- Service is requested and service has not recently been performed.
- An alterations and attachments review is performed.
- Changes have been made to the equipment that may affect its safe operation.
- External devices with their own power cables have those cables attached.

If the inspection indicates an unacceptable safety condition, the condition must be corrected before anyone can service the machine.

Note: The correction of any unsafe condition is the responsibility of the owner of the system.

Perform the following checks:

- 1. Check the covers for sharp edges and for damage or alterations that expose the internal parts of the system unit.
- 2. Check the covers for proper fit to the system unit. They should be in place and secure.
- 3. Gently rock the system unit from side to side to determine if it is steady.
- 4. Set the power switch of the system unit to Off.
- Remove the covers.
- 6. Check for alterations or attachments. If there are any, check for obvious safety hazards such as broken wires, sharp edges, or broken insulation.
- 7. Check the internal cables for damage.
- 8. Check for dirt, water, and any other contamination within the system unit.
- 9. Check the voltage label on the back of the system unit to ensure that it matches the voltage at the outlet.
- 10. Check the external power cable for damage.
- 11. With the external power cable connected to the system unit, check for 0.1 ohm or less resistance between the ground lug on the external power cable plug and the metal frame.

- 12. Perform the following checks on each device that has its own power cables:
 - a. Check for damage to the power cord.
 - b. Check for the correct grounded power cable.
 - c. With the external power cable connected to the device, check for 0.1 ohm or less resistance between the ground lug on the external power cable the metal frame of the device.
- 13. Install the covers.

Chapter 2. **Maintenance Analysis Procedures (MAPs)**

Entry MAP

Use the following table to determine your starting point.

Note: When possible, run Online Diagnostics in Service Mode. Online Diagnostics perform additional functions, compared to Standalone Diagnostics. This ensures that the error state of the system is captured in NVRAM for your use in fixing the problem. The AIX error log and SMIT are only available when diagnostics are run from the hard drive.

Notes:

- 1. If more than eight digits are displayed in the operator panel, use only the first eight digits to find the error in the tables. The digits that display beyond the first eight digits are location codes that can assist you in diagnosing the problem. See "Location Codes" on page 3-68.
- 2. Licensed programs frequently rely on network configuration, and system information stored on the VPD on the operator panel control assembly (connector U2). If the MAPs indicate that the Operator Panel Control Assembly should be replaced, swap the VPD from the old operator panel to the new one. If the old VPD module has to be replaced call technical support for recovery instructions. If recovery is not possible, notify the system owner that new keys for licensed programs may be required.
- 3. If a network adapter or the I/O board is replaced, the network administrator must be notified so that the client IP addresses used by the server can be changed. In addition, the operating system configuration of the network controller may need to be changed in order to enable system startup. Ensure that all clients or servers that address this system are updated.

Symptom	Action
Service Actions	
You have parts to exchange or a corrective action to perform.	Go to the Removal and Replacement Procedures.
	Go to MAP 410: Repair Checkout in the Diagnostic Information for Multiple Bus Systems.
You need to verify that a part exchange or corrective action corrected the problem.	Go to MAP 410: Repair Checkout in the Diagnostic Information for Multiple Bus Systems.
You need to verify correct system operation.	Go to MAP 420: System Checkout in the Diagnostic Information for Multiple Bus Systems.

Symptom	Action
Symptom Analysis	
You have OK displayed	The Service Processor (SP) is ready. The system is waiting for power on.
You have STBY displayed	The Service Processor (SP) is ready. The system was shutdown by the operating system and is still powered on. This condition can be requested by a privileged system user with no faults. See SP error log for possible operating system fault indications.
You do not have a determined symptom.	Go to "MAP 1020: Problem Determination" on page 2-5.
You have an 8-digit error code displayed.	Record the error code. Go to Chapter 3 on page 3-1.
You have an SRN.	Go to the Fast Path MAP in the <i>Diagnostic</i> Information for Multiple Bus Systems.
The system POST indicators are displayed on the system console, the system pauses and then restarts. The term "POST indicators" refer to the icons (graphic display) or device mnemonics (ASCII terminal) that appear during the power-on self-test (POST).	Go to "Boot Problems and Concerns" on page 3-65.
The system stops and POST indicators are displayed on the system console. The term "POST indicators" refer to the icons (graphic display) or device mnemonics (ASCII terminal) that appear during the power-on self-test (POST).	Use MAP 1540 to isolate the problem.
The system stops and the message "STARTING SOFTWARE PLEASE WAIT" is displayed on ASCII terminal, the boot indicator () is displayed on a graphics terminal.	Go to "Checkpoints" on page 3-44.
The system does not respond to the password being entered or the system login prompt is displayed when booting in service mode.	Verify that the password is being entered from the ASCII terminal or keyboard defined as the system console. If so, then the keyboard or its controller may be faulty.
	If entering the password from the keyboard which is attached to the system, replace the keyboard. If replacing the keyboard does not fix the problem, replace the I/O board. (See notes on 2-1.)
	2. If entering the password from a keyboard which is attached to a ASCII terminal, suspect the ASCII terminal. Use the Problem Determination Procedures for the terminal. Replace the I/O board if these procedures do not reveal a problem.

Symptom	Action	
The power light on the operator panel does not start flashing within 30 seconds of A/C power application, or the power light on the operator panel is flashing but the operator panel is blank.	Go to "MAP 1520: Power" on page 2-19.	
The power light does not come on, or stay on.	Go to "MAP 1520: Power" on page 2-19.	
The power light on the operator panel is on, but nothing is displayed on the system console, and	If using a graphic display, go to the <i>Problem Determination Procedures</i> for the display.	
the operator panel is blank.	If you do not find a problem then replace the display adapter.	
	Go to "MAP 1540: Minimum Configuration" on page 2-37.	
All display problems.	If using a graphics display, go to the Problem Determination Procedures for the display.	
	If you do not find a problem then replace the display adapter.	
	3. If the problem is with the ASCII terminal:	
	a. Make sure that the ASCII terminal is connected to S1.	
	 b. If problems persist, go to the Problem Determination Procedures for the terminal. 	
	 If you do not find a problem then suspect the I/O board. Go to "MAP 1540: Minimum Configuration" on page 2-37. 	
888 is displayed in the control panel followed by additional error codes.	Go to the Fast Path MAP in the <i>Diagnostic</i> Information for Multiple Bus Systems.	
The system stops and a 4-digit number is displayed in the operator panel display.	If the number displayed begins with the character "E0xx" then go to "Model H50 Service Processor Checkpoints" on page 3-45 or "Model H70 Service Processor Checkpoints" on page 3-49. If "E1xx-EFFF" is is displayed, then go to "Firmware Checkpoints" on page 3-52.	
	For all other numbers record SRN 101-xxx, where xxx is the last three digits of the four-digit number displayed in the operator panel, then go to the Fast Path MAP in the <i>Diagnostic Information for Multiple Bus Systems</i> .	
	Note: If the operator panel displays 2 sets of numbers, use the bottom set of numbers as the error code.	

Symptom	Action
No codes are displayed on the operator panel	Reseat the operator panel cable.
within a few seconds of turning on the system. The operator panel is blank before the system is	If problem not resolved, replace in order:
powered on (operator panel should display OK).	Operator Panel Control Assembly. Remove the VPD module from the old Operator Panel Control Assembly (connector U2) and place in the new one.
	2. I/O board (See notes on 2-1.)
The SMS configuration list or Boot sequence selection menu shows more SCSI devices attached to a controller/adapter than are actually attached.	A device may be set to use the same SCSI bus ID as the control adapter. Note the ID being used by the controller/adapter (this can be checked and/or changed via an SMS utility), and verify that no device attached to the controller is set to use that ID.
	If settings do not appear to be in conflict:
	1. Replace the SCSI cable.
	2. Replace the device.
	 Replace the SCSI adapter (or I/O board if connected to one of the two integrated SCSI controllers on the I/O board). (See notes on 2-1 if the I/O board is replaced.)
	Note: In a "Twin-tailed" configuration where there is more than one initiator device (normally another system) attached to the SCSI bus, it may be necessary to change the ID of the SCSI controller or adapter with the System Management Services.
You cannot load diagnostics.	Go to "MAP 1020: Problem Determination" on page 2-5.
You have a problem that does not prevent the system from booting.	Go to the Fast Path MAP in the <i>Diagnostic</i> Information for Multiple Bus Systems.
You suspect a cable problem.	See the RS/6000 Adapters, Devices, and Cable Information for Multiple Bus Systems.
You Cannot Find the S	Symptom in this Table
All other problems.	Go to "MAP 1020: Problem Determination" on page 2-5.

MAP 1020: Problem Determination

Purpose of This MAP

Use this MAP to get an error code if you were not provided one by the customer or you are unable to load diagnostics. If you are able to load the diagnostics, go to MAP 0020 in the Diagnostic Information for Multiple Bus Systems.

The Service Processor may have recorded one or more symptoms in its error log. It is a good idea to examine that error log before proceeding (see Service Processor System Information Menu).

The Service Processor may have been set by the user to monitor server operations and to attempt recoveries. You may wish to disable these actions while you diagnose and service the system. If you disable them, you should make notes of their current settings for restoration before you leave. Following are the settings of your interest.

Surveillance	From the Service Processor Setup Menu, go to the Surveillance Setup Menu and disable surveillance.
Unattended Start	From the Service Processor System Power Control Menu, disable unattended start mode.
Reboot Policy	From the System Power Control Menu, go to the Reboot/Restart Policy Setup Menu and set:
	1. Number of reboot attempts to 0 (zero)
	2. Use OS-Defined restart policy to No
	3. Enable supplemental restart policy to No .
Call Out	From the Call-In/Call-Out Setup Menu, go to the Serial Port Selection Menu and disable call-out on both serial ports.

Be prepared to record code numbers and use those numbers in the course of analyzing a problem. Go to "Step 1020-1."

Step 1020-1

The following steps analyze a failure to load the diagnostic programs.

Note: You are asked questions regarding the operator panel display. You are also asked to perform certain actions based on displayed POST indicators. Please be observant of these conditions.

- 1. Insert the diagnostic CD-ROM into the CD-ROM drive.
- 2. Turn the power off.
- 3. Turn the power on.
- 4. When the keyboard indicator is displayed (the word keyboard on an ASCII terminal or the keyboard icon on a graphical display), press the F5 key on the directly-attached keyboard or the number 5 key on an ASCII terminal.
- 5. Enter any requested passwords.
- 6. Wait until the diagnostics are loaded or the system appears to stop.
- 7. Find your symptom in the following table; then follow the instructions given in the Action column.

Symptom	Action
The diskette LED is blinking rapidly, or EIEA or EIEB is displayed on the operator panel.	The flash EPROM data is corrupted. The recovery procedure for the flash EPROM should be executed. See "System Firmware Recovery" on page 6-24.
The system stops with a prompt to enter a password.	Enter the password. You are not allowed to continue until a correct password has been entered. When you have entered a valid password go to the beginning of this table and wait for one of the other conditions to occur.
The diagnostic operating instructions are displayed.	Go to MAP 0020 in the <i>Diagnostic Information</i> for Multiple Bus Systems.
The system login prompt is displayed.	You may not have pressed the correct key or you may not have pressed the key soon enough when you were to indicate a Service Mode IPL of the diagnostic programs. If this was the case start over at the beginning of this Step.
	Note: Perform the systems shutdown procedure before turning off the system.
	If you are sure you pressed the correct key in a timely manner, go to "Step 1020-2" on page 2-8.
The system does not respond when the password is entered.	Go to "Step 1020-2" on page 2-8.

Symptom	Action
The system stopped and a POST indicator is	If the POST indicator represents:
displayed on the system console and an eight- digit error code is not displayed.	memory, record error code M0MEM002.
aight offor code to flot displayed.	keyboard, record error code M0KBD000.
	SCSI, record error code M0CON000.
	network, record error code M0NET000.
	 speaker (audio), record error code M0BT0000.
	Go to "Step 1020-3" on page 2-8.
The system stops and a 4-digit number is displayed in the operator panel display.	If the number displayed begins with the character "E0xx" then go to "Model H50 Service Processor Checkpoints" on page 3-45 or "Model H70 Service Processor Checkpoints" on page 3-49. If "E1xx-EFFF" is displayed, then go to "Firmware Checkpoints" on page 3-52.
	For all other numbers record SRN 101-xxx, where xxx is the last three digits of the four-digit number displayed in the operator panel, then go to the Fast Path MAP in the <i>Diagnostic Information for Multiple Bus Systems</i> .
	Note: If the operator panel displays 2 sets of numbers, use the bottom set of numbers as the error code.
The System Management Services is diaplayed.	Go to "Step 1020-4" on page 2-9.
All other symptoms.	If you were directed here from the Entry MAP, go to "MAP 1540: Minimum Configuration" on page 2-37. Otherwise, find the symptom in the "Entry MAP" on page 2-1.

Step 1020-2

There is a problem with the keyboard.

Find the type of keyboard you are using in the following table; then follow the instructions given in the Action column.

Keyboard Type	Action
Type 101 keyboard (U.S.). Identify by the size of the Enter key. The Enter key is in only one horizontal row of keys.	Record error code M0KBD001; then go to "Step 1020-3."
Type 102 keyboard (W.T.). Identify by the size of the Enter key. The Enter key extends into two horizontal rows.	Record error code M0KBD002; then go to "Step 1020-3."
Type 106 keyboard. (Identify by the Japanese characters.)	Record error code M0KBD003; then go to "Step 1020-3."
ASCII terminal keyboard	Go to the documentation for this type of ASCII terminal and continue problem determination.

Step 1020-3

Take the following actions:

1. Find the eight-digit error code in Chapter 3 on page 3-1.

Note: If the eight-digit error code is not listed in Chapter 3, look for it in the following:

- Any supplemental service manual for the device
- The diagnostic problem report screen for additional information
- The Service Hints Service Aid
- The CEREADME file (by using the Service Hints Service Aid).
- 2. Perform the action listed.

Step 1020-4

To check the error log for any errors.

- Choose Utilities
- · Choose Error Log
- If an error is logged, check the time stamp
- If the error was logged during the current boot attempt, record it
- Look up the error in the Chapter 3 on page 3-1 and perform the listed action
- If no recent error is logged in the error log, go to "MAP 1540: Minimum Configuration" on page 2-37.

MAP 1240: Memory Problem Resolution

Note:

The firmware checkpoint that sent you here could be one of the following:

• E122, E213, E214, E218, E220 or E3xx

These checkpoints are referred to as "a memory checkpoint" in this MAP.

Purpose of this MAP

This MAP is used to trouble shoot a problem during the memory test when the system stops at a memory checkpoint and no error code displays on the operator panel.

Notes:

- 1. If the symptom changes while using this MAP, check for loose cards, cables, and obvious problems. If you do not find a problem, go to "MAP 1540: Minimum Configuration" on page 2-37.
- 2. The Service Processor may have recorded one or more symptoms in its error log. It is a good idea to examine that error log before proceeding (see Service Processor System Information Menu). Check the memory configuration in the service processor menus. If a memory module has been deconfigured by the system, swap the memory module positions on the memory card. The system interprets this as an indication that the memory modules have been replaced. If this does not work, perform the following steps:
 - · Manually configure the memory module.
 - · Reseat the memory card or module.
 - · Re-ipl the system.
- 3. The Service Processor may have been set by the user to monitor server operations and to attempt recoveries. You may wish to disable these actions while you diagnose and service the system. If you disable them, you should make notes of their current settings for restoration before you leave. Following are the settings of your interest.

Surveillance	From the service Processor Setup Menu, go to the Surveillance Setup Menu and disable surveillance.
Unattended Start	From the Service Processor System Power Control Menu disable unattended start mode.

Reboot Policy	From the System Power Control Menu go to the Reboot/Restart Policy Setup Menu and set:
	1. Number of reboot attempts to 0 (zero)
	2. Use OS-Defined restart policy to No
	3. Enable supplemental restart policy to No .
Call-Out	From the Call-In/Call-Out Setup Menu, go to the Serial Port Selection Menu and disable call-out on both serial ports.

General Memory Information

Be sure to unplug the power cable before removing or installing the memory card(s) or memory modules to avoid damage to them.

Memory cards can be installed in either slot (or both) on the system board, there is no requirement that one be installed before the other.

It is perfectly acceptable for there to be two partially populated memory cards in the system, the first memory card does not have to be fully populated before memory on the second memory card is useable.

Memory modules, on the other hand, must be installed in matched (size and speed) pairs. Refer to "Memory Card Locations" in chapter 1 for labeling of the memory card and "Memory Cards" in Removal and Replacement Procedures for instructions on module removal and installation. A single memory module pair may be installed in module slots J1 and J2 (not slots J1 and J3). A second memory module pair could be installed in module slots J5 and J6 (slots J3 and J4 do not have to be populated first). Along these same lines, there is no requirement that memory module slots J1 and J2 be populated before another slot pair.

Step 1240-1

- 1. Ensure that the diagnostics and the operating system are shut down.
- 2. Turn the power off.
- 3. Remove and re-install any installed memory card(s).
- 4. Turn the power on.

Does the system stop with a memory checkpoint displayed on the operator panel?

NO Re-seating the memory card(s) has corrected the problem.

> Go to "Map 0410: Repair Checkout" in the Diagnostic Information for Multiple Bus Systems.

YES If there is only one memory card installed tag it as "suspect bad" and go to "Step 1240-7" on page 2-15.

> If there are two memory cards installed go to "Step 1240-2" on page 2-13.

- 1. Turn the power off.
- 2. Remove the memory card from slot J12 (Model H50) or J3 (Model H70).
- 3. Turn the power on.

Does the system stop with a memory checkpoint displayed on the operator panel?

NO Go to "Step 1240-4" on page 2-14.

YES Go to "Step 1240-3."

Step 1240-3

- 1. Turn the power off.
- 2. Remove the memory card from slot J13 (Model H50) or J2 (Model H70).
- 3. Install the memory card removed from slot J12 or J3 in its original location.
- 4. Turn the power on.

Does the system stop with a memory checkpoint displayed on the operator panel?

NO Tag the memory card you removed from slot J13 or J2 "suspect bad" and

go to "Step 1240-7" on page 2-15.

YES Go to "Step 1240-6" on page 2-15.

- 1. Turn the power off.
- 2. Remove the memory card from slot J13 (Model H50) or J2 (Model H70).
- 3. Install the memory card removed from slot J12 or J3 in it's original location.
- 4. Turn the power on.

Does the system stop with a memory checkpoint displayed on the operator panel?

NO Go "Step 1240-5."

Tag the memory card in slot J12 or J3 "suspect bad" and go to "Step YES

1240-7" on page 2-15.

Step 1240-5

- 1. Turn the power off.
- 2. Install the memory card removed from slot J13 or J2 in it's original location.
- 3. Turn the power on.

Does the system stop with a memory checkpoint displayed on the operator panel?

NO Re-seating the memory card(s) has corrected the problem.

> Go to "Map 0410: Repair Checkout" in the Diagnostic Information for Multiple Bus Systems.

YES Go to "Step 1240-6" on page 2-15.

- 1. Turn the power off
- 2. Exchange the following FRUs in the order listed:
 - System board
 - Processor card(s)
- 3. Turn the power on

Does the system stop with a memory checkpoint displayed on the operator panel?

NO Go to "Map 0410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

YES Reinstall the original FRU.

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, go to "MAP 1540: Minimum Configuration" on page 2-37.

Step 1240-7

- 1. Turn the power off.
- Remove all installed memory modules from the memory card you tagged "suspect bad". Record the position of the memory modules removed so that when instructed to re-install them they can be installed in their original position.
- 3. Install one pair of memory modules.
- 4. Turn the power on.

Does the system stop with a memory checkpoint displayed on the operator panel?

NO If there are no more memory modules to be installed reseating the modules on the memory card has corrected the problem.

If there was more than one pair of memory modules on the memory card go to "Step 1240-8" on page 2-16.

YES Go to "Step 1240-9" on page 2-16.

- 1. Turn the power off.
- 2. Install a pair of memory modules.
- 3. Turn the power on.

Does the system stop with a memory checkpoint displayed on the operator panel?

NO Repeat this step until all the memory modules are installed and tested.

> If all the memory modules have been installed reseating the memory modules on the memory card has corrected the problem.

Go to "Map 0410: Repair Checkout" in the Diagnostic Information for Multiple Bus Systems.

YES Go to "Step 1240-9."

Step 1240-9

The failure may be caused by the last pair of memory modules installed or the memory card. To isolate the failing FRU, do the following:

- 1. Turn the power off.
- 2. Exchange the last memory module pair installed.
- 3. Turn the power on.

Does the system stop with a memory checkpoint displayed on the operator panel?

NO Go to "Step 1240-11" on page 2-18. YES Go to "Step 1240-10" on page 2-17.

One of the FRUs remaining in the system unit is defective.

- 1. Turn the power off.
- 2. Exchange the following FRUs in the order listed.
 - Memory card
 - · System board
 - Processor card(s)
- 3. Turn the power on.

Does the system stop with a memory checkpoint displayed on the operator panel?

NO Go to "Map 0410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

YES Reinstall the original FRU.

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, go to "MAP 1540: Minimum Configuration" on page 2-37.

The memory module(s) (may be both) you exchanged in the previous step may be defective. To isolate the failing memory module, do the following:

- 1. Turn the power off.
- 2. Re-install one of the memory modules you exchanged in the previous step.
- 3. Turn the power on.

Does the system stop with a memory checkpoint displayed on the operator panel?

NO Repeat this step with the second memory module you exchanged in the previous step.

> If both memory modules have been tested go to "Map 0410: Repair Checkout" in the Diagnostic Information for Multiple Bus Systems.

YES Replace the memory module.

> If you have not tested both memory modules repeat this step with the second memory module you exchanged in the previous step.

> If the symptom did not change and both memory modules have been exchanged go to "Step 1240-10" on page 2-17.

MAP 1520: Power

Notes:

- 1. This is not a start of call MAP. Use this Power MAP only if you have been directed here from a MAP step in this book or the Diagnostic Information for Multiple Bus Systems.
- 2. Each power supply has a test switch. If you are instructed to replace a power supply, see "Power Supplies and Power Supply Fan Assemblies" on page 7-21.

This procedure is used to locate power problems in system units. If a problem is detected, this procedure helps you isolate the problem to a failing unit.

Observe the following safety notice during service procedures.

DANGER

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.

Before installing or removing signal cables, ensure that the power cords for the system unit and all attached devices are unplugged.

When adding or removing any additional devices to or from the system, ensure that the power cords for those devices are unplugged before the signal cables are connected. You must disconnect all power cords from the existing system before you add a device.

Use one hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.

During an electrical storm, do not connect cables for display stations, printers, telephones, or station protectors for communication lines.

CAUTION:

This product is equipped with a three-wire power cord and plug for the user's safety. Use this power cable with a properly grounded electrical outlet to avoid electrical shock.

DANGER

To prevent electrical shock hazard, disconnect the power cord from the electrical outlet before relocating the system.

CAUTION:

This system may have two power supplies installed. To reduce the risk of electrical shock, disconnect both power supply cords before servicing.

Step 1520-1

You may be directed to this MAP for several reasons:

1. The power light on the operator panel is not flashing and the operator panel is blank.

Go to "Step 1520-2" on page 2-21.

- 2. The power LED on the operator panel is flashing and the operator panel is blank. Go to "Step 1520-3" on page 2-22.
- OK, STBY or DIAG STBY is displayed on the operator panel. There is no indication of activity when the power button on the operator panel is pressed. None of the power LEDs light and none of the fans, including the fan in the power supply, start to turn.

Go to "Step 1520-3" on page 2-22.

4. OK, STBY or DIAG STBY is displayed on the operator panel and the power LED on the operator panel is flashing. When the power button on the operator panel is pressed, the system begins to power on, but the power LED on the operator panel does not stay on.

Go to "Step 1520-3" on page 2-22.

 A SRN referenced in the *Diagnostic Information for Multiple Bus Systems* listed MAP 1520 in the "Actions/Descriptions" column for a Voltage Sensor out of range.

Go to "Step 1520-10" on page 2-29.

- 1. Turn the power off.
- 2. If you have not already done so, open the rear door of the rack unit and locate the power supplies.
- 3. Unplug the power cord from the Power Distribution Unit (PDU)/Power Distribution Bus (PDB) and the power outlet.
- 4. Unplug the power cords from the PDU/PDB and the power supplies.
- 5. Check that the power cord from the power outlet to the PDU/PDB has continuity.
- 6. Check that the power cords from the PDU/PDB to the power supplies have continuity.
- 7. Check that the power outlet has been wired correctly with the correct voltage.
- 8. Plug the power cords into the PDU/PDB and the power supplies.
- 9. Plug the power cord into the PDU/PDB and the power outlet.

Did you find a problem?

NO Go to "Step 1520-3" on page 2-22.

YES Correct the problem. Go to "Map 0410: Repair Checkout" in the Diagnostic Information for Multiple Bus Systems.

- 1. Turn the power off.
- 2. If you have not already done so, open the rear door of the rack unit and locate the power supplies.
- 3. Unplug the power cord from the power outlet.
- 4. Unplug the power cord from the first (left) power supply.
- 5. Remove the screw from the center of the power supply handle, grasp the handle of the power supply, pivot it upward and pull the the power supply out of the drawer.
- 6. Plug the power cord into the power supply.
- 7. Plug the power cord into the power outlet.

Does the power LED on the power supply commence flashing within 30 seconds after applying AC power?

NO Replace the power supply.

Repeat this step for the second (right) power supply if installed.

Go to "Map 0410: Repair Checkout" in the Diagnostic Information for Multiple Bus Systems.

YES Repeat this step for the second (right) power supply if installed.

Go to "Step 1520-4" on page 2-23.

There is a small dark-colored test switch on the side of the power supply near the power supply connector. It is a normally off momentary switch. Press and hold this switch for a few seconds while observing the fans in the power supply and the power LED on the power supply.

Does the fan in the power supply (not the two external fans) turn on and the power LED on the power supply change from blinking to solid while you hold the switch? (When you let go of the switch, the fan will turn off and the LED on the power supply will change from solid to blinking.)

NO Replace the power supply.

Repeat this step for the second (right) power supply if installed.

Go to "Map 0410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

YES Repeat this step for the second power supply if installed.

Go to "Step 1520-5" on page 2-24.

The power supply is working normally.

- 1. Unplug the power cord from the power outlet.
- 2. Unplug the power cords from the power supplies.
- Re-install the power supplies in the drawer.Exchange the operator panel electronics assembly.
- 4. Plug the power cords into the power supplies.
- 5. Plug the power cord into the power outlet.
- 6. Press the Power button on the operator panel to turn the power on.

Does the power LED on the operator panel come on and stay on?

- **NO** Reinstall the original operator panel electronics assembly. Go to "Step 1520-6" on page 2-25.
- YES Go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

Note: Either the Fan monitor control card or the power distribution board may be defective.

To test each FRU, exchange the FRUs that have not already been exchanged in the following order.

- · Fan monitor control card
- · Power distribution board
- 1. Turn the power off.
- 2. Unplug the power cable from the power supplies.
- 3. Exchange one of the FRUs in the list.
- 4. Connect the power cables to the power supplies.
- 5. Turn the power on.

Does the fan in the power supply turn on and the power LED on the operator panel come on and stay on?

NO Reinstall the original FRU.

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, Go to "Step 1520-7" on page 2-26.

YES Go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

- 1. Turn the power off.
- 2. Unplug the power cable from the wall outlet.
- Record the slot numbers of all the ISA and PCI adapters. Label and record the location of any cables attached to the adapters. Disconnect any cables attached to the adapters and remove all the adapters.
- 4. Remove the memory card(s).
- 5. Remove the processor card(s).
- 6. Unplug the power cable(s) from the disk drive cage backplane(s).
- 7. Unplug the power cables from all the SCSI devices in the media bay.
- 8. Unplug all the fans (CPU fan, media blower, DASD blower and I/O blower), except the power supply fans.
- 9. Plug the power cable into the wall outlet.
- 10. Turn the power on.

Do the power supply fans turn on and the power LED on the operator panel come on and stay on?

NO Go to "Step 1520-8" on page 2-27.

YES Go to "Step 1520-9" on page 2-28.

Note: Either the Service Processor (Model H50), the I/O board, the System board or the power supplies may be defective.

To test each FRU, exchange the FRUs that have not already been exchanged in the following order.

- Service Processor (Model H50)
- I/O board
- · System board
- Left power supply
- Right power supply (if installed)
- 1. Turn the power off.
- 2. Unplug the power cables from the power supplies.
- 3. Exchange one of the FRUs in the list.
- 4. Connect the power cables to the power supplies.
- 5. Turn the power on.

Does the fan in the power supply turn on and the power LED on the operator panel come on and stay on?

NO Reinstall the original FRU.

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

YES Go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

One of the parts that was removed or unplugged is causing the problem. Install or connect the parts in the following order:

- 1. Processor card(s) (One at a time)
- 2. Memory card(s) (One at a time)
- 3. Disk drive cage backplane power cable(s).
- 4. SCSI device power cable(s), lowest bay to highest bay
- 5. ISA adapters, lowest slot to highest slot
- 6. PCI adapters, lowest slot to highest slot
- 7. Fans

Turn the power on after each part is installed or connected. If the system does not power on or the power light on the operator panel does not stay on, the most recently installed or connected part is causing the failure.

- 1. Turn the power off.
- 2. Unplug the power cords from the power supplies.
- 3. Install or connect one of the parts in the list.
- 4. Plug the power cords into the power supplies.
- 5. Turn the power on.

Do the power supply fans turn on and the power light on the operator panel come on and stay on?

NO Replace the last part installed.

If the memory card was just installed, remove all of the memory modules. If the system does not come up, replace the memory card.

Re-install the memory modules, one pair at a time, until the problem recurs. Replace the memory module pair that was just installed.

Note: The memory module pair must be installed in slots that are next to each other. For example, install the pair in J1 and J2, not J1 and J3.

Repeat these steps until all the parts have been installed.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, return to "Step 1520-1" on page 2-20 in this MAP and follow the instructions for the new symptom.

YES Go to "Map 0410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

Step 1520-10

Does the system contain two power supplies?

NO Go to "Step 1520-11."

YES Go to "Step 1520-13" on page 2-30.

Step 1520-11

Shut the system down, turn off the system, and remove the power cable(s) from the power supply.

Exchange the following FRUs in order. If the I/O board is to be replaced, see notes on 2-1.

- 1. Power Supply
- 2. Power Cables to I/O Board
- 3. I/O Board
- 4. Power Distribution Board
- 5. Service Processor (Model H50)

Restart the system and perform Error Log Analysis.

Do you get an SRN indicating a Voltage Sensor is out of range?

NO The last FRU exchanged is defective. Go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

YES Reinstall the original FRU.

Repeat the FRU replacement steps until a defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all FRUs have been exchanged, go to "Step 1520-12" on page 2-30.

If the symptom changed, check for loose cards, cables, and obvious problems. If you do not find a problem, return to "Step 1540-1" on page 2-38 and follow the instructions for the new symptom.

Check that the power outlet is properly wired and is providing the correct voltage.

Did you find a problem?

NO Go to "Step 1540-1" on page 2-38.

YES Correct the problem. Go to "MAP 410: Repair Checkout" in the

Diagnostic Information for Multiple Bus Systems.

Step 1520-13

Since the H Series Enterprise Server can have redundant power supplies, it is not necessary to power down the system in order to replace a power supply. The power supplies are symmetrical so replacement starts with the left-hand unit (Power Supply 1). The exception to this rule is if the green LED on the back of one of the power supplies is either blinking or not lit. In this case start with that power supply. See "Power Supplies and Power Supply Fan Assemblies" on page 7-21 for instructions on replacing a power supply. Before removing a power supply be sure the "other" power supply is operational by observing the green LED, which should be lit. Also be aware that the power supply exchange process must be completed within five minutes, including moving the fan assembly from the removed supply to the replacement power supply. After five minutes, the Service Processor shuts the system down to avoid overheating devices in the media and DASD bays.

Replace the following FRUs in order:

- 1. Power Supply 1
- 2. Power Supply 2

Perform Error log Analysis.

Do you receive an SRN indicating a Voltage Sensor out of range?

NO The last FRU exchanged is defective. Go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

YES Reinstall the original FRU.

Repeat the FRU replacement steps until a defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all FRUs have been exchanged go to "Step 1520-14" on page 2-31.

If the symptom changed, check for loose cards, cables, and obvious problems. If you do not find a problem, return to "Step 1540-1" on page 2-38 and follow the instructions for the new symptom.

Step 1520-14

The problem lies within the system unit hardware or with the line voltage/wiring.

Shut the system down, turn off the system, and remove the power cable(s) from the power supplies.

Exchange the following FRUs in order. If the I/O board is to be replaced, see notes on 2-1

- 1. Power Cables to I/O Board
- 2. I/O Board
- 3. Power Distribution Board
- 4. Service Processor (Model H50)

Restart the system and perform Error Log Analysis.

Do you get an SRN indicating a Voltage Sensor is out of range?

- NO The last FRU exchanged is defective. Go to "MAP 410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.
- **YES** Reinstall the original FRU.

Repeat the FRU replacement steps until a defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all FRUs have been exchanged go to "Step 1520-12" on page 2-30.

If the symptom changed, check for loose cards, cables, and obvious problems. If you do not find a problem, return to "Step 1540-1" on page 2-38 and follow the instructions for the new symptom.

Apply AC power to the power supply. Observe the back of the power supply while it is connected to the system.

Is the light on the back of the power supply on or flashing?

NO Go to "Step 1520-16."

YES Go to "Step 1520-22" on page 2-34.

Step 1520-16

Remove the power supply from the system. Apply AC power to the power supply.

Is the light on the back of the power supply flashing?

NO Replace the power supply. Go to "MAP 410: Repair Checkout" in

Diagnostic Information for Multiple Bus Systems.

YES Go to "Step 1520-17."

Step 1520-17

- 1. Find all the cables connecting the Power Distribution Board to the system. Disconnect these cables from the system, but leave them attached to the Power Distribution Board.
- 2. Insert the power supply and connect AC power.

Is the light on the back of the Power Supply flashing?

NO Go to "Step 1520-20" on page 2-34.

YES Go to "Step 1520-18" on page 2-33.

- Remove the service processor (Model H50), processor card(s), and memory card(s) from the I/O board. Disconnect the Fan Monitor Control (FMC) from the I/O board.
- 2. Connect Power to the I/O planar and apply AC power to the system.

Is the light on the back of the Power Supply flashing?

NO Replace in order and try again:

- 1. I/O board
- 2. System board

If the power supply light starts flashing, then the last FRU replaced is defective. Go to "MAP 410: Repair Checkout" in *Diagnostic Information for Multiple Bus Systems*. If the light still does not flash after replacing all the FRUs in the list, go to "Step 1540-1" on page 2-38.

YES Go to "Step 1520-19."

Step 1520-19

Perform each of the following steps in order. After each, apply AC power and verify that the light on the back of the power supply is flashing. If the light is not flashing, replace the last part connected to the system and go to "MAP 410: Repair Checkout" in *Diagnostic Information for Multiple Bus Systems*.

- 1. Install the Service Processor (Model H50).
- 2. Connect the FMC to the Power Distribution Board and to the I/O board.
- 3. Insert the processor card(s), one at a time and connect power.
- 4. Insert the memory card(s), one at a time.

If no defective FRU is found, go to "Step 1540-1" on page 2-38.

Remove all the cables from the Power Distribution Board.

Is the light on the back of the Power Supply flashing?

NO Replace the Power Distribution Board and go to "MAP 410: Repair

Checkout" in Diagnostic Information for Multiple Bus Systems.

YES Go to "Step 1520-21."

Step 1520-21

Reattach the cables to the Power Distribution Board one at a time. After attaching each cable, reapply AC power and observe the light on the back of the power supply.

Is the light on the back of the power supply flashing?

NO The last cable that was attached to the Power Distribution Board is defective, replace it and go to "MAP 410: Repair Checkout" in *Diagnostic Infor-*

mation for Multiple Bus Systems.

YES Attach the next cable.

Step 1520-22

Does the system appear to power on even though the operator panel is blank? NO

- 1. Verify that all cables are connected correctly.
- 2. Go to "Step 1520-23" on page 2-35.

YES

- 1. Reseat the operator panel cable and retest.
- 2. Replace the operator panel control assembly. Be sure to remove the VPD module from the old operator panel control assembly (connector U2) and place it in the new one.

Remove the processor card(s), memory card(s), and Service Processor (Model H50) from the system. Disconnect the FMC from the I/O board. Apply AC power to the system.

Is anything displayed on the operator panel?

NO Go to "Step 1520-26" on page 2-36.

YES Model Model H50 go to "Step 1520-24."

Model Model H70 go to "Step 1520-25" on page 2-36.

Step 1520-24

Install the Service Processor on the I/O board.

Does the operator panel display "OK"?

NO The service processor is defective. Replace it and go to "MAP 410:

Repair Checkout" in Diagnostic Information for Multiple Bus Systems.

YES Go to "Step 1520-25" on page 2-36.

Install the parts listed below in order. After each, verify that the operator panel displays OK. If not, the last part that was installed is defective. Replace it and go to "MAP 410: Repair Checkout" in *Diagnostic Information for Multiple Bus Systems*.

- 1. Fan monitor control card
- 2. Processor card(s)
- 3. Memory card(s)

If no defective FRU is found, go to "Step 1540-1" on page 2-38.

Step 1520-26

Remove the system board.

Is anything displayed on the operator panel?

NO Replace the parts listed below in order. After each, observe if anything displays on the operator panel. If something displays, the last FRU replaced is defective. Replace it and go to "MAP 410: Repair Checkout" in *Diagnostic Information for Multiple Bus Systems*.

- 1. I/O board
- 2. Power Distribution Board
- 3. I/O cable from the Power Distribution Board to the I/O board

If no defective FRU is found, go to "Step 1540-1" on page 2-38.

YES The system board is defective. Replace it and go to "MAP 410: Repair Checkout" in *Diagnostic Information for Multiple Bus Systems*.

MAP 1540: Minimum Configuration

Purpose of this MAP

This MAP is used to locate defective FRUs not found by normal diagnostics. For this procedure, diagnostics are run on a minimally-configured system. If a failure is detected on the minimally-configured system, the remaining FRUs are exchanged one at a time until the failing FRU is identified. If a failure is not detected, FRUs are added back until the failure occurs. The failure is then isolated to the failing FRU.

Notes:

- 1. Be sure to unplug the power cable before removing or installing the Service Processor, processor card(s), memory card(s), System board or I/O board to avoid damaging them.
- 2. This MAP assumes that a CD-ROM drive is installed and connected to the integrated SCSI adapter connector (port 1), and a Diagnostics CD-ROM disc is available.
- 3. If a power-on password or privileged-access password is installed, you are prompted to enter the password before the diagnostic CD-ROM loads.
- 4. The term "POST indicators" refer to the icons (graphic display) or device mnemonics (ASCII terminal) that appear during the power-on self-test (POST).
- 5. The Service Processor may have recorded one or more symptoms in its error log. It is a good idea to examine that error log before proceeding (see "System" Information Menu for Model H50" on page C-13 or "System Information Menu for Model H70" on page C-15).
- 6. The Service Processor may have been set by the user to monitor server operations and to attempt recoveries. You may wish to disable these actions while you diagnose and service the system. If you disable them, you should make notes of their current settings for restoration before you leave. Following are the settings of your interest.

Surveillance	From the service Processor Setup Menu, go to the Surveillance Setup Menu and disable surveillance.
Unattended Start	From the Service Processor System Power Control Menu disable unattended start mode.
Reboot Policy	From the System Power Control Menu go to the Reboot/Restart Policy Setup Menu and set:
	1. Number of reboot attempts to 0 (zero)
	2. Use OS-Defined restart policy to No
	3. Enable supplemental restart policy to No .

Call Out	From the Call-In/Call-Out Setup Menu, go to the Serial Port Selection Menu and disable call-out on both serial ports.
----------	---

Step 1540-1

1. Insert the diagnostic CD-ROM into the CD-ROM drive.

Note: If you cannot insert the diagnostic CD-ROM go to "Step 1540-2" on page 2-39.

- 2. Ensure that the diagnostics and the operating system are shut down.
- 3. Turn the power off.
- 4. Turn the power on.
- 5. When the keyboard indicator is displayed (the word **keyboard** on an ASCII terminal or the keyboard and hand icon on a graphical display), press the F5 key on the directly-attached keyboard or the number 5 key on an ASCII terminal.
- 6. Enter the appropriate password if prompted to do so.

Is the "Please define the System Console" screen displayed?

NO Go to "Step 1540-2" on page 2-39

YES Go to "Step 1540-19" on page 2-57.

- 1. Turn the power off.
- 2. If you have not already done so, configure the Service Processor with the instructions in 6 on page 2-37 and then return here and continue.
- 3. Exit Service Processor Menus and remove the power cable.
- 4. Disconnect all external cables (parallel, serial 1, serial 2, serial 3, keyboard, mouse, AUI/RJ45 ethernet, SCSI, etc.)
- 5. Place the drawer in the rear service position, as described in Removal and Replacement Procedures "Rear Service Position".
- 6. Record the slot numbers of the ISA and PCI adapters. Label and record the location of any cables attached to the adapters. Disconnect any cables attached to the adapters and remove all the adapters.
- 7. Remove the second processor card, (if present).
 - Model H50 slot J5, J6.
 - Model H70 slot J8.

(If second processor card removed, ensure first processor card is in processor card connector #1.)

8. Record the slot numbers of the memory modules. Remove all installed memory modules except for one pair from the first memory card.

Note: Memory modules must be installed in pairs and in the correct slots. For example, install the pair in J1 and J2.

- 9. Remove the second memory card, (if present).
 - Model H50 slot J13.
 - Model H70 slot J2.
- 10. Disconnect the SCSI cables from the internal SCSI connectors on the I/O board.
 - Model H50 connectors J25 and J30.
 - Model H70 connectors J3 and J12.
- 11. Disconnect the signal and power connectors from the hot-swap bay backplanes.
- 12. Remove the hot-swap disk drive(s) from the hot-swap bays.
- 13. Disconnect the signal and power connectors from all the SCSI devices except the CD-ROM drive.

- 14. Disconnect the diskette drive cable from the diskette drive connector J13 on the I/O board.
- 15. Plug in the power cable and wait for OK on the operator panel display.
- 16. Turn the power on.

Does the system stop with code E1F2, E1F3, STBY, 20EE000B or 4BA00830 displayed on the operator panel?

NO Go to "Step 1540-3" on page 2-41.

YES If a second processor card was removed go to "Step 1540-4" on page 2-42.

> If the system has only one processor card go to "Step 1540-5" on page 2-43.

One of the FRUs remaining in the system unit is defective.

If a memory module is exchanged, ensure that the new module is the same size and speed as the original module.

Turn the power off, remove the power cable, and exchange the following FRUs in order:

- 1. Processor card
- 2. Memory modules (pair)
- 3. Memory card
- 4. Fan monitor control card
- 5. I/O board (see notes on page 2-1)
- 6. System board
- 7. Service processor (Model H50)
- 8. Power distribution board

Plug in the power cable and wait for OK on the operator panel display.

Turn the power on.

Does the system stop with code E1F2, E1F3, STBY, 20EE000B or 4BA00830 displayed on the operator panel?

NO Reinstall the original FRU.

Repeat the FRU replacement steps until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, return to "Step 1540-1" on page 2-38 in this MAP and follow the instructions for the new symptom.

YES If the last FRU exchanged was the pair of memory modules go to "Step 1540-7" on page 2-44.

Go to "Map 0410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

No failure was detected with this configuration.

- 1. Turn the power off and remove the power cable.
- 2. Reinstall the second processor card.
- 3. Plug in the power cable and wait for OK on the operator panel display.
- 4. Turn the power on.

Does the system stop with code E1F2, E1F3, STBY, 20EE000B or 4BA00830 displayed on the operator panel?

NO One of the FRUs remaining in the system unit is defective.

In the following order, exchange the FRUs that have not been exchanged:

- 1. Processor card (last one installed)
- 2. System board
- 3. I/O board (See notes on page 2-1)

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

If the symptom changed, check for loose cards and obvious problems. If you do not find a problem, return to "Step 1540-1" on page 2-38 and follow the instructions for the new symptom.

YES Go to "Step 1540-5" on page 2-43.

No failure was detected with this configuration.

- 1. Turn the power off and remove the power cable.
- 2. Install a pair of memory modules.
- 3. Plug in the power cable and wait for OK on the operator panel display.
- 4. Turn the power on.

Does the system stop with code E1F2, E1F3, STBY, 20EE000B or 4BA00830 displayed on the operator panel?

NO Go to "Step 1540-6."

YES Repeat this step until all the memory modules are installed and tested.

After all the memory modules are installed and tested, record the positions of the memory modules in the second memory card. Remove all of the memory modules from the second memory card except one pair. Repeat this step with the second memory card (if previously installed).

Go to "Step 1540-9" on page 2-46.

Step 1540-6

The failure may be caused by the last pair of memory modules installed or the memory card. To isolate the failing FRU, do the following:

- 1. Turn the power off and remove the power cable.
- 2. Exchange the last memory module pair installed.
- 3. Plug in the power cable and wait for OK on the operator panel display.
- 4. Turn the power on.

Does the system stop with code E1F2, E1F3, STBY, 20EE000B or 4BA00830 displayed on the operator panel?

NO Go to "Step 1540-8" on page 2-45.

YES Go to "Step 1540-7" on page 2-44.

The memory module(s) (may be both) you exchanged in the previous step may be defective. To isolate the failing memory module, do the following:

- 1. Turn the power off and remove the power cable.
- 2. Reinstall one of the memory modules you exchanged in the previous step.
- 3. Plug in the power cable and wait for OK on the operator panel display.
- 4. Turn the power on.

Does the system stop with code E1F2, E1F3, STBY, 20EE000B or 4BA00830 displayed on the operator panel?

NO Replace the memory module.

> If you have not tested both memory modules repeat this step with the second memory module you exchanged in the previous step.

> If the symptom did not change and both memory modules have been exchanged go to "Step 1540-8" on page 2-45.

YES Repeat this step with the second memory module you exchanged in the previous step.

> If both memory modules have been tested go to "Map 0410: Repair Checkout" in the Diagnostic Information for Multiple Bus Systems.

One of the FRUs remaining in the system unit is defective.

- 1. Turn the power off and remove the power cable.
- 2. Exchange the following FRUs in the order listed.
 - · Memory card
 - · System board
 - I/O board (See notes on page 2-1)
 - · Fan monitor control card
 - Power supply
 - · Power distribution board
- 3. Plug in the power cable wait for OK on the operator panel display
- 4. Turn the power on

Does the system stop with code E1F2, E1F3, STBY, 20EE000B or 4BA00830 displayed on the operator panel?

NO Reinstall the original FRU.

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, return to "Step 1540-1" on page 2-38 and follow the instructions for the new symptom.

YES Go to "Map 0410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

- 1. Turn the power off.
- 2. Reconnect the system console.

Notes:

- a. If an ASCII terminal has been defined as the system console, attach the ASCII terminal cable to the to the S1 connector on the rear of the system unit.
- b. If a display attached to a display adapter has been defined as the system console, install the display adapter and connect the display to it. Plug the keyboard into the keyboard connector on the rear of the system unit.
- 3. Turn the power on.
- 4. If the ASCII terminal or graphics display (including display adapter) are connected differently than before, the Console Selection screen appears and requires that a new console be selected.
- 5. When the keyboard indicator is displayed, press the F1 key on the directly attached keyboard or the number 1 key on an ASCII terminal. This triggers the SMS.
- 6. Enter the appropriate password if prompted to do so.

Is the SMS screen displayed?

NO One of the FRUs remaining in the system unit is defective.

In the following order, exchange the FRUs that have not been exchanged:

- Go to the Problem Determination Procedures (test procedures) for the device attached to the S1 serial port or the display attached to the graphics adapter, and test those devices. If a problem is found, follow the procedures for correcting the problem on that device.
- 2. Graphics adapter (if installed).
- 3. Cable (async or graphics).
- 4. I/O board (See notes on page 2-1)

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

If the symptom changed, check for loose cards and obvious problems. If you do not find a problem, return to "Step 1540-1" on page 2-38 and follow the instructions for the new symptom.

YES Go to "Step 1540-10" on page 2-48.

- 1. Make sure the diagnostic CD-ROM is inserted into the CD-ROM drive.
- 2. Turn the power off and remove the power cable.
- Plug the internal SCSI connector (port 1) cable into the connector on on the I/O board.
 - Model H50 connector J25.
 - Model H70 connector J12.
- 4. Plug in the power cable wait for OK on the operator panel display.
- 5. Turn the power on.
- 6. After the keyboard indicator is displayed, press the F5 key on the directly-attached keyboard or the number 5 key on an ASCII terminal keyboard.
- 7. Enter the appropriate password if prompted to do so.

Is the "Please define the System Console" screen displayed?

NO One of the FRUs remaining in the system unit is defective.

In the following order, exchange the FRUs that have not been exchanged:

- 1. SCSI cable
- 2. CD-ROM drive
- 3. I/O board (See notes on page 2-1.)
- 4. Processor card(s)
- 5. Power Supply

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged call your service support person for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem return to "Step 1540-1" on page 2-38 in this MAP and follow the instructions for the new symptom.

YES Go to "Step 1540-11" on page 2-49.

The system is working correctly with this configuration. One of the SCSI devices that you disconnected may be defective.

- 1. Make sure the diagnostic CD-ROM is inserted into the CD-ROM drive.
- 2. Turn the power off and remove the power cable.
- 3. Connect the signal and power connectors to one of the SCSI devices (CD-ROM drive, tape drive, disk drive, etc.). Do not connect the signal and power connectors to the hot-swap bay backplanes at this time.
- 4. Plug in the power cable and wait for OK on the operator panel display.
- 5. Turn the power on.
- 6. After the keyboard indicator is displayed, press the F5 key on the directly-attached keyboard or the number 5 key on an ASCII terminal keyboard.
- 7. Enter the appropriate password if prompted to do so.

Is the "Please define the System Console" screen displayed?

NO One of the FRUs remaining in the system unit is defective.

In the following order, exchange the FRUs that have not been exchanged:

- 1. SCSI cable
- 2. Last SCSI device connected (CD-ROM drive, tape drive, disk drive, etc.)
- 3. I/O board (See notes on page 2-1.)
- 4. Processor card(s)
- 5. Power Supply

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem return to "Step 1540-1" on page 2-38 in this MAP and follow the instructions for the new symptom.

YES

Repeat this step, adding one SCSI device at a time, until all the SCSI devices that were attached to integrated SCSI adapter connector (port 1), except the hot-swap bay backplanes, are connected and tested.

Go to "Step 1540-12."

Step 1540-12

The system is working correctly with this configuration. One of the hot-swap bay backplanes may be defective.

- 1. Make sure the diagnostic CD-ROM is inserted into the CD-ROM drive.
- 2. Turn the power off and remove the power cable.
- 3. Connect the signal and power connectors to the backplane in hot swap bay C.
- 4. Plug in the power cable and wait for OK on the operator panel display.
- 5. Turn the power on.
- After the keyboard indicator is displayed, press the F5 key on the directlyattached keyboard or the number 5 key on an ASCII terminal keyboard.
- 7. Enter the appropriate password if prompted to do so.

Is the "Please define the System Console" screen displayed?

NO One of the FRUs remaining in the system unit is defective.

In the following order, exchange the FRUs that have not been exchanged:

- 1. SCSI cable
- 2. Hot-swap bay backplane
- Power distribution board

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem return to "Step 1540-1" on page 2-38 in this MAP and follow the instructions for the new symptom.

YES If a second hot swap bay backplane is installed in hot swap bay D, go to "Step 1540-13" on page 2-51.

Go to "Step 1540-14" on page 2-52.

- 1. Make sure the diagnostic CD-ROM is inserted into the CD-ROM drive.
- 2. Turn the power off and remove the power cable.
- 3. Plug the internal SCSI connector (port 2) cable into the connector on the I/O board.
 - Model H50 connector J30
 - Model H70 connector J3
- 4. Connect the signal and power connectors to the backplane in hot-swap bay D.
- 5. Plug in the power cable and wait for OK on the operator panel display.
- 6. Turn the power on.
- 7. After the keyboard indicator is displayed, press the F5 key on the directly-attached keyboard or the number 5 key on an ASCII terminal keyboard.
- 8. Enter the appropriate password if prompted to do so.

Is the "Please define the System Console" screen displayed?

NO

One of the FRUs remaining in the system unit is defective.

In the following order, exchange the FRUs that have not been exchanged:

- 1. SCSI cable
- 2. Hot-swap bay backplane
- 3. Power distribution board

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem return to "Step 1540-1" on page 2-38 in this MAP and follow the instructions for the new symptom.

YES

Go to "Step 1540-14" on page 2-52.

The system is working correctly with this configuration. One of the disk drives that you removed from the hot-swap bay may be defective.

- 1. Make sure the diagnostic CD-ROM is inserted into the CD-ROM drive.
- 2. Turn the power off and remove the power cable.
- 3. Install a disk drive in the hot-swap bay.
- 4. Plug in the power cable and wait for OK on the operator panel display.
- 5. Turn the power on.
- 6. After the keyboard indicator is displayed, press the F5 key on the directlyattached keyboard or the number 5 key on an ASCII terminal keyboard.
- 7. Enter the appropriate password if prompted to do so.

Is the "Please define the System Console" screen displayed?

NO In the following order, exchange the FRUs that have not been exchanged:

- 1. Last disk drive installed
- 2. Hot-swap bay backplane

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem return to "Step 1540-1" on page 2-38 in this MAP and follow the instructions for the new symptom.

YES Repeat this step until all the disk drives are installed.

Go to "Step 1540-15" on page 2-53.

The system is working correctly with this configuration. The diskette drive may be defective.

- 1. Make sure the diagnostic CD-ROM disc is inserted into the CD-ROM drive.
- 2. Turn the power off and remove the power cable.
- 3. Plug the diskette drive cable into the diskette drive connector (J13) on the I/O board.
- 4. Plug in the power cable and wait for OK on the operator panel display.
- 5. Turn the power on.
- 6. After the keyboard indicator is displayed, press the F5 key on the directly-attached keyboard or the number 5 key on an ASCII terminal keyboard.
- 7. Enter the appropriate password if prompted to do so.

Is the "Please define the System Console" screen displayed?

NO One of the FRUs remaining in the system is defective.

In the following order, exchange the FRUs that have not been exchanged.

- 1. Diskette drive
- 2. Diskette drive cable
- 3. I/O board (See notes on page 2-1)
- 4. Power supply

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem return to "Step 1540-1" on page 2-38 in this MAP and follow the instructions for the new symptom.

YES Go to "Step 1540-16" on page 2-54.

The system is working correctly with this configuration. One of the devices that you disconnected from the I/O board may be defective.

- 1. Make sure the diagnostic CD-ROM disc is inserted into the CD-ROM drive.
- 2. Turn the power off and remove the power cable.
- 3. Attach an I/O board device (parallel, serial1, serial2, serial3, keyboard, mouse, AUI/RJ45 Ethernet or SCSI) that had been removed.

Note: If the device you attached requires supplemental media, use the Process Supplemental Media task to load the supplemental media first.

- 4. Plug in the power cable and wait for OK on the operator panel display.
- 5. Turn the power on.
- 6. If the Console Selection screen is displayed, choose the system console.
- 7. After the keyboard indicator is displayed, press the F5 key on the directlyattached keyboard or the number 5 key on an ASCII terminal keyboard.
- 8. Enter the appropriate password if prompted to do so.

Is the "Please define the System Console" screen displayed?

NO The last device or cable that you attached is defective.

To test each FRU, exchange the FRUs in the following order:

- 1. Device and cable (last one attached)
- 2. I/O board (See notes on page 2-1.)

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem return to "Step 1540-1" on page 2-38 in this MAP and follow the instructions for the new symptom.

Go to "Map 0410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

YES Repeat this step until all of the devices are attached.

Go to "Step 1540-17" on page 2-55.

The system is working correctly with this configuration. One of the FRUs (adapters) that you removed is probably defective.

- 1. Turn the power off and remove the power cable.
- Install a FRU (adapter) and connect any cables and devices that were attached to it.

Note: If the FRU you installed requires supplemental media use the Process Supplemental Media task to load the supplemental media first.

- 3. Plug in the power cable and wait for OK on the operator panel display.
- 4. Turn the power on.
- 5. If the Console Selection screen is displayed, choose the system console.
- 6. After the keyboard indicator is displayed, press the F5 key on the directly-attached keyboard or the number 5 key on an ASCII terminal keyboard.
- 7. Enter the appropriate password if prompted to do so.

Is the "Please define the System Console" screen displayed?

NO Go to "Step 1540-18" on page 2-56.

YES Repeat this step until all of the FRUs (adapters) are installed.

Go to "Map 0410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

The last FRU installed or one of its attached devices is probably defective.

- 1. Make sure the diagnostic CD-ROM disc is inserted into the CD-ROM drive.
- 2. Turn the power off and remove the power cable.
- Starting with the last installed adapter, disconnect one attached device and cable.
- 4. Plug in the power cable and wait for OK on the operator panel display.
- 5. Turn the power on.
- 6. If the Console Selection screen is displayed, choose the system console.
- 7. After the keyboard indicator displays, press the F5 key on the directly-attached keyboard or the number 5 key on an ASCII terminal keyboard.
- 8. Enter the appropriate password if prompted to do so.

Is the "Please define the System Console" screen displayed?

NORepeat this step until the defective device or cable is identified or all the devices and cables have been disconnected.

If all the devices and cables have been removed, then one of the FRUs remaining in the system unit is defective.

To test each FRU, exchange the FRUs in the following order:

- 1. Adapter (last one installed)
- 2. I/O board (See notes on page 2-1.)
- 3. Power supply

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem return to "Step 1540-1" on page 2-38 in this MAP and follow the instructions for the new symptom.

YES The last device or cable that you disconnected is defective.

Exchange the defective device or cable.

Go to "Map 0410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

- 1. Follow the instructions on the screen to select the system console.
- 2. When the DIAGNOSTIC OPERATING INSTRUCTIONS screen is displayed, press Enter.
- 3. Select Advanced Diagnostics Routines.
- 4. If the DEFINE TERMINAL screen is displayed you must define the terminal following the instructions on the screen before you can continue with the diagnostics. This is a separate and different operation than selecting the console display.
- 5. If the NEW RESOURCE screen displays, select an option from the bottom of the screen.

Note: Adapters or devices that require supplemental media are not shown in the new resource list. If the system has adapters or devices that require a supplemental media, select option 1.

- 6. When the DIAGNOSTIC MODE SELECTION screen is displayed, press Enter.
- 7. Select All Resources (if you were sent here from "Step 1540-23" on page 2-59, select the Adapter/Device you loaded from the supplemental media).

Did you get an SRN?

NO Go to "Step 1540-21" on page 2-58.

YES Go to "Step 1540-20" on page 2-58.

Look at the FRU part numbers associated with the SRN.

Have you exchanged all the FRUs that correspond to the failing function codes?

NO Exchange the FRU with the highest failure percentage that has not been changed.

Repeat this step until all the FRUs associated with the SRN have been exchanged or diagnostics run with no trouble found. Run diagnostics after each FRU is exchanged.

If the I/O board or a network adapter is replaced, see notes on page 2-1.

Go to "Map 0410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

YES If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

Step 1540-21

Does the system have adapters or devices that require supplemental media?

NO Go to "Step 1540-22" on page 2-59.

YES Go to "Step 1540-23" on page 2-59

Consult the PCI adapter configuration documentation for your operating system to verify that all installed adapters are configured correctly.

Go to "Map 0410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

Step 1540-23

Select Task Selection.

- 1. Select Process Supplemental Media and follow the on-screen instructions to process the media.
- 2. Supplemental media must be loaded and processed one at a time.

Did the system return to the TASKS SELECTION SCREEN after the supplemental media was processed?

NO Go to "Step 1540-24" on page 2-60.

YES Press F3 to return to the FUNCTION SELECTION screen.

Go to "Step 1540-19" on page 2-57, substep 3.

The Adapter or device is probably defective.

If the supplemental media is for an adapter, replace the FRUs in the following order:

- 1. Adapter
- 2. I/O board (See notes on page 2-1)

If the supplemental media is for a device, replace the FRUs in the following order:

- 1. Device and any associated cables.
- 2. The adapter the device is attached to.

Repeat this step until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call your service support person for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, return to "Step 1540-1" on page 2-38 in this MAP and follow the instructions for the new symptom.

Go to "Map 0410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

- 1. Ensure that the diagnostics and the operating system are shutdown.
- 2. Turn the power off.
- 3. If you have not already done so, configure the Service Processor with the instructions in 6 on page 2-37 and then return here and continue.
- 4. Exit Service Processor Menus and remove the power cable.
- 5. Place the drawer in the rear service position, as described in Removal and Replacement Procedures "Rear Service Position".
- 6. Record the slot numbers of the ISA and PCI adapters. Label and record the location of any cables attached to the adapters. Disconnect any cables attached to the adapters and remove all the adapters.
- 7. Plug in the power cable and wait for OK on the operator panel display.
- 8. Turn the power on.

Does the system stop with code 26800Dxx, 45800000, 4880090A, 4B2xxx00 or 4B2xxx10 displayed on the operator panel?

NO Go to "Step 1540-27" on page 2-63.

YES Go to "Step 1540-26" on page 2-62.

One of the FRUs remaining in the system unit is defective.

Turn the power off, remove the power cable, and exchange the following FRUs in order:

- 1. System board
- 2. I/O board (See notes on page 2-1)

Plug in the power cable and wait for OK on the operator panel display.

Turn the power on.

Does the system stop with code 26800Dxx, 45800000, 4880090A, 4B2xxx00 or 4B2xxx10 displayed on the operator panel?

NO Go to "Map 0410: Repair Checkout" in the Diagnostic Information for Multiple Bus Systems.

YES Reinstall the original FRU.

> Repeat the FRU replacement steps until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, return to "Step 1540-2" on page 2-39 in this MAP.

The system is working correctly with this configuration. One of the FRUs (adapters) that you removed is probably defective.

- 1. Turn the power off and remove the power cable.
- 2. Install a FRU (adapter) and connect any cables and devices that were attached to it.
- 3. Plug in the power cable and wait for OK on the operator panel display.
- 4. Turn the power on.
- 5. If the Console Selection screen is displayed, choose the system console.
- 6. Enter the appropriate password if prompted to do so.

Does the system stop with code 26800Dxx, 45800000, 4880090A, 4B2xxx00 or 4B2xxx10 displayed on the operator panel?

- **NO** Repeat this step until all of the FRUs (adapters) are installed, then go to "Map 0410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.
- **YES** Go to "Step 1540-28" on page 2-64

The last FRU installed or one of its attached devices is probably defective.

- 1. Turn the power off and remove the power cable.
- Starting with the last installed adapter, disconnect one attached device and cable.
- 3. Plug in the power cable and wait for OK on the operator panel display.
- 4. Turn the power on.
- 5. If the Console Selection screen is displayed, choose the system console.
- 6. Enter the appropriate password if prompted to do so.

Does the system stop with code 26800Dxx, 45800000, 4880090A, 4B2xxx00 or 4B2xxx10 displayed on the operator panel?

NO The last device or cable that you disconnected is defective.

Exchange the defective device or cable.

Go to "Map 0410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

YES Repeat this step until the defective device or cable is identified or all the devices and cables have been disconnected.

If all the devices and cables have been removed, then one of the FRUs remaining in the system unit is defective.

To test each FRU, exchange the FRUs in the following order:

- 1. Adapter (last one installed)
- 2. I/O board (See notes on page 2-1)

If the symptom did not change and all the FRUs have been exchanged, return to "Step 1540-2" on page 2-39.

SSA Maintenance Analysis Procedures (MAPs)

These maintenance analysis procedures (MAPs) describe how to analyze a continuous failure that has occurred in a system that contains two or more disk drive modules. Failing field-replaceable units (FRUs) of the system unit can be isolated with these MAPs.

How to Use These MAPs

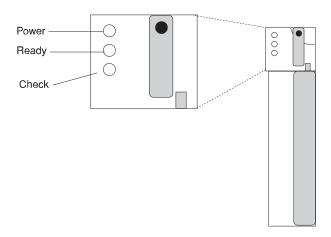
Attention: Switching off the power to an SSA Hot-Swap Disk Drive can cause a system fault unless you first make the SSA Hot-Swap Disk Drive modules unavailable to the system unit. To do this:

- 1. Use the system-management task menus to make the disk drive modules unavailable.
- 2. If the system unit has more than one SSA adapter, make the SSA Hot-Swap Disk Drive modules unavailable to the system for each of the paths to the SSA Hot-Swap Disk Drive.

Attention: Unless the system unit needs to be switched off for some other reason, do not switch off the power to the system unit when servicing an SSA Hot-Swap Disk Drive or the external SSA cable.

- To isolate the FRUs associated with in the failing SSA Hot-Swap Disk Drive, perform the actions and answer the questions given in this MAP.
- When instructed to exchange two or more FRUs in sequence:
 - 1. Exchange the first FRU in the list for a new one.
 - 2. Verify that the problem is solved. For some problems, verification means running the diagnostic programs (see the using-system service procedures).
 - 3. If the problem remains:
 - a. Reinstall the original FRU.
 - b. Exchange the next FRU in the list for a new one.
 - 4. Repeat steps 2 and 3 until either the problem is solved, or all the related FRUs have been exchanged.
 - 5. Perform the next action indicated by the MAP.

• The following table explains the meaning of the Power, Ready, and Check status LEDs.



Status LEDs		
LED	Status	Definition
Power	On	Power On
	Off	Power Off
Ready	On	Both SSA connections good and drive is ready
	Blinking	Only one SSA connection good
	Flickering	Drive is executing a command
Check	On	Disk drive failure
		Self-test running
		Drive in service mode
	Blinking	Disk drive selected

MAP 2010: SSA Hot-Swap Disk Drive-Start

This MAP is the entry point to the MAPs for the SSA Hot-Swap Disk Drive. If you are not familiar with these MAPs, read "How to Use These MAPs" on page 2-65 first.

If you get a five digit SRN but are not sure which SSA Hot-Swap Disk Drive may be defective, run the Link Verification Service Aid.

You might have been sent here because:

- The system problem determination procedures sent you here.
- · Action from an SRN list sent you here.
- A problem occurred during the installation of an SSA Hot-Swap Disk Drive module.
- · Another MAP sent you here.
- A customer observed a problem that was not detected by the system problem determination procedures.

Step 2010-1

Have you been sent to this MAP from the Configuration Verification Service Aid?

NO Go to "Step 2010-3" on page 2-69.

YES Go to "Step 2010-2" on page 2-68.

One of the following conditions exists. Take the action described.

- 1. You have an hdisk that has no associated pdisk.
 - a. Issue the system **cfgmgr** command.
 - b. Retry the Configuration Verification Service Aid.
 - c. If the problem remains, a software error has probably occurred. Call your support center for assistance.
- 2. You have a pdisk that has no associated hdisk.
 - a. Run diagnostics (using system verification mode) to the pdisk.
 - b. If you get a five digit SRN, go to Table 5-1 on page 5-3 and follow the actions described.

If you do not get a five digit SRN, the disk formatting may be incompatible with the system (the disk was formatted on a different type of using system).

- 1. Format the pdisk.
- 2. Issue the system cfgmgr command.
- 3. Retry the Configuration Verification Service Aid.
- 3. If the problem remains, a software error has probably occurred. Call your support center for assistance.

Have the system diagnostics or problem determination procedures given you a five digit SRN for the SSA Hot-Swap Disk Drive?

NO Go to "Step 2010-4."

YES Go to "Service Request Numbers (SRNs)" on page 5-1.

Step 2010-4

If the system diagnostics are available, go to "Step 2010-5."

If the stand-alone diagnostics are available, but the system diagnostics are not available, run them, then go to "Step 2010-5."

If the system diagnostics and stand-alone diagnostics are not available, go to "Step 2010-1" on page 2-67.

Step 2010-5

Run the diagnostics in the problem determination mode.

Note: Do not run the advanced diagnostics, because errors are logged on other using systems that share the same loop.

Did the diagnostics give you a SRN for the SSA Hot-Swap Disk Drive?

NO Go to "Step 2010-6" on page 2-70.

YES Go to "Service Request Numbers (SRNs)" on page 5-1.

Is the MISSING RESOURCE menu or the NEW RESOURCE menu displayed?

NO Go to step "Step 2010-8" on page 2-71.

YES Go to "Step 2010-7."

Step 2010-7

Is the MISSING RESOURCE or NEW RESOURCE an SSA device?

NO Go to "Step 2010-8" on page 2-71.

YES Go to "MAP 0020: Problem Determination Procedure, Step 0020-7,

substep 3" in Diagnostic Information for Multiple Bus Systems.

Are all LEDs on the drives in a six pack off?

NO Go to step "Step 2010-11."

YES Go to "Step 2010-9."

Step 2010-9

Are any power cables loose or in need of replacement?

NO Go to "Step 2010-10."

YES Fix or replace the power cables as required. Go to MAP 410: Repair

Checkout in Diagnostic Information for Multiple Bus Systems to verify the

repair.

Step 2010-10

Replace the backplane. Go to MAP 410: Repair Checkout in *Diagnostic Information* for *Multiple Bus Systems* to verify the repair.

Step 2010-11

Is there only one drive with no LEDs on?

NO Go to step "Step 2010-12" on page 2-72.

YES Replace the following FRUs:

- 1. Backplane
- 2. Disk drive assembly

Go to MAP 410: Repair Checkout in *Diagnostic Information for Multiple Bus Systems* to verify the repair.

Is the middle LED on any of the disk drives on a backplane off?

NO Go to step "Step 2010-13."

YES Replace the the following FRUs:

1. Backplane

2. EPOW cable

Go to MAP 410: Repair Checkout in Diagnostic Information for Multiple Bus Systems to verify the repair.

Step 2010-13

Is the middle LED in the drive at the end of the backplane flashing?

NO Go to step "Step 2010-10" on page 2-71.

YES Go to step "Step 2010-14" on page 2-73.

Replace the SSA link cable closest to the flashing LED. Did the LED stop flashing?

NO Go to step "Step 2010-15."

YES Go to MAP 410: Repair Checkout in Diagnostic Information for Multiple

Bus Systems to verify the repair.

Step 2010-15

Replace the following:

- 1. Backplane
- 2. Disk drive with the second LED flashing

Go to MAP 410: Repair Checkout in Diagnostic Information for Multiple Bus Systems to verify the repair.

Chapter 3. Error Code to FRU Index

The Error Code to FRU Index lists error symptoms and possible causes. The most likely cause is listed first. Use this index to help you decide which FRUs to replace when servicing the system.

If the codes in the following tables indicate a device which is present more than once in the system unit, a location code is needed to specify which device generated the error. Go to Chapter 6 on page 6-1 to display the System Management Services error log and obtain a location code. Location code descriptions can be found under "Location Codes" on page 3-68.

Notes:

- 1. If more than eight digits are displayed in the operator panel, use only the first eight digits to find the error in the tables. The digits that display beyond the first eight digits are location codes that can assist you in diagnosing the problem. See "Location Codes" on page 3-68.
- 2. Licensed programs frequently rely on network configuration, and system information stored on the VPD on the operator panel. If the MAPs indicate that the Operator Panel should be replaced, swap the VPD from the old operator panel to the new one. If the old VPD module has to be replaced call technical support for recovery instructions. If recovery is not possible, notify the system owner that new keys for licensed programs may be required.
- 3. If a network adapter or the I/O board is replaced, the network administrator must be notified so that the client IP addresses used by the server can be changed. In addition, the operating system configuration of the network controller may need to be changed in order to enable system startup. Also ensure that any client or server that addresses this system is updated.
- 4. Each power supply has a test switch. If you are instructed to replace a power supply, see "Power Supply Test Switch Procedure" on page 7-24.
- 5. For Service Processor Menu's, see Appendix C on page C-1.

If you replace FRUs and the problem is still not corrected, go to "MAP 1540: Minimum Configuration" on page 2-37, unless otherwise indicated in the tables.

If you replace FRUs and the problem is corrected, go to MAP 410: Repair Checkout in the Diagnostic Information for Multiple Bus Systems.

Firmware/POST Error Codes

If you replace FRUs and the problem is still not corrected, go to "MAP 1540: Minimum Configuration" on page 2-37.

If you replace FRUs and the problem is corrected, go to MAP 410: Repair Checkout in the Diagnostic Information for Multiple Bus Systems.

Error Code	Description	Action / Possible Failing FRU
203w0xyz	w=loop number	Check Cables, then Remote I/O
	x=0 missing link	
	 y=port number 	
	z=c for interconnect z=b missing link back z=E RIO de-configured	
20A80xxx	Remote initial program load (RIPL) error	
20A80000	Insufficient information to boot	Verify the IP address
20A80001	Client IP address is already in use by other network device	Change the IP address
20A80002	Cannot get gateway IP address	Refer to "Firmware Checkpoints" on page 3-52 table using code E174
20A80003	Cannot get server hardware address	Refer to "Firmware Checkpoints" on page 3-52 table using code E174
20A80004	Bootp failed	Refer to "Firmware Checkpoints" on page 3-52 table using code E175
20A80005	File transmission (TFTP) failed	Check network connection, try again
20D00xxx	Unknown/Unrecognized device	
20D0000F	Self-test failed on device, no error/location code information available	Check the System Management Services error log entry (described in "Step 1020-4 on page 2-9) for this error code. The location code (if present) in the error log entry should identify the location of the failing device.
20D00010	Self-test failed on device, cannot locate package	Contact your service support representative for assistance.
20D00011	Cannot determine Machine Model	The machine model is part of the System Vital Product Data. Perform corrective actions listed for errors 2BA00050 and 2BA00051.
	Security	

Table 3-1 (Page 2 of 40). Firmware Error Codes.			
Error Code	Description	Action / Possible Failing FRU	
20E00000	Power on Password entry error	The password has been entered incorrectly.	
		Retry installing the password.	
20E00001	Privileged-access password entry error	The password has been entered incorrectly.	
		Retry installing the password.	
20E00002	Privileged-access password jumper not enabled	The privileged-access password jumper is not in the correct position for password initial entry.	
		Consult the system's User's Guide for jumper location and position.	
20E00003	Power on Password must be set for Unattended mode	Unattended mode requires the setting of the Power On password before it is enabled.	
20E00004	Battery drained or needs replacement	Replace battery Replace I/O board (See notes on 3-1.)	
20E00005	EEPROM locked	 Turn off, then turn on system unit. Replace the I/O board (See notes on 3-1.) 	
20E00008	CMOS corrupted or tampering evident, CMOS initialized	Check your machine for evidence of tampering.	
		If no tampering evident:	
		 Replace battery, restore NVRAM data (passwords, startup data). Replace I/O board. (See notes on 3-1.) 	
20E00009	Invalid password entered - system locked	The password has been entered incorrectly 3 times.	
		Turn off, then turn on the system unit, then enter the password correctly.	
20E0000A	EEPROM lock problem	If for privileged-access password install, is jumper in correct position?	
		Consult the system's User's Guide for jumper location and position.	
		Turn off, turn on system unit. Replace I/O board (See notes on 3-1.)	
20E0000B	EEPROM write problem	Turn off, turn on system unit. Replace I/O board (See notes on 3-1.)	
20E0000C	EEPROM read problem	Turn off, turn on system unit. Replace I/O board (See notes on 3-1.)	
20E00017	Cold boot needed for password entry	Turn off, turn on system unit.	

Table 3-1 (Page 3 of 40). Firmware Error Codes.		
Error Code	Description	Action / Possible Failing FRU
20EE0xxx	Informational	
20EE0003	IP parameter requires three dots "."	Enter valid IP parameter.
		Example: 000.000.000
20EE0004	Invalid IP parameter	Enter valid (numeric) IP parameter.
		Example: 000.000.000
20EE0005	Invalid IP parameter (>255)	Enter valid (numeric) IP parameter in the range of 0 to 255.
		Example: 255.192.002.000
20EE0006	No SCSI controllers present	The I/O board should always have (at least) 2 integrated PCI SCSI controllers; replace the I/O board. (See notes on 3-1.)
20EE0007	Keyboard not found	Plug in keyboard. Replace I/O board (See notes on 3-1.)
20EE0008	No configurable adapters found in the system	This warning occurs when the selected SMS function cannot locate any devices/adapters supported by the function. If a supported device is installed:
		Replace the device or adapter.
		2. Replace I/O board (See notes on 3-1.)
20EE0009	Unable to communicate with the Service processor	 Replace the Service Processor. Replace I/O board (See notes on 3-1.) Replace the system board.

Error Code	Description	Action / Possible Failing FRU
20EE000A	Pointer to the operating system found in non-volatile storage.	Values normally found in non-volatile storage that point to the location of an Operating System were not found. This can happen for two reasons, either your installed Operating System doesn't support storing the values or some event occurred that caused the system to lose non-volatile storage information (drainage or replacement of the battery). If you are running AIX, this information can be reconstructed by running the bootlist command specifying the device that the Operating System is installed on. Please refer to your AIX documentation for the exact syntax and usage of the bootlist command.
		In order to boot the Operating System so that the above mentioned values can be reconstructed, power the system down and power it back up again, this should cause the system to look for the Operating System in the devices contained in the custom boot list or in the default boot list, depending on the condition of the system. If this is not successful, modify the Boot Sequence (also known as boot list) to include devices that are known to contain a copy of the Operating System. This can be accomplished by using the System Management Services Menus. For example, select a hard disk known to have a copy of the Operating System as the first and only device in the boot sequence (boot list) and attempt to boot again.

Table 3-1 (Page 5 of 40). Firmware Error Codes.		
Error Code	Description	Action / Possible Failing FRU
20EE000B	The system was not able to find an operating system on the device list that was attempted.	Modify the Boot Sequence (also known as boot list) to include devices that are known to contain a copy of the Operating System. This can be accomplished by using the System Management Services Menus. For example, select a hard disk known to have a copy of the Operating System as the first and only device in the boot sequence (boot list) and attempt to boot again. If the SMS menus do not display valid SCSI devices which were previously available:
		Ensure SCSI signal and power cables are securely connected and not damaged. Replace the I/O board.
21A000xxx	SCSI Device Errors	Notes:
		Before replacing any system components:
		 a. Ensure that the controller and each device on the SCSI bus is assigned a unique SCSI ID. b. Ensure SCSI bus is properly terminated. c. Ensure SCSI signal and power cables are securely connected and not damaged.
		 The location code information is required to identify the ID of SCSI device failures as well as to indicate the location of the controller to which the device is attached.
21A00001	Test Unit Ready Failed - hardware error	Refer to the notes in error code 21A000xxx.
		Replace the SCSI device. Replace the SCSI cable. Replace the SCSI backplane. Replace the SCSI controller.
21A00002	Test Unit Ready Failed - sense data available	Refer to the notes in error code 21A000xxx.
		Replace the media (Removable media devices). Replace the SCSI device.

Table 3-1 (Page 6 of 40). Firmware Error Codes.		
Error Code	Description	Action / Possible Failing FRU
21A00003	Send Diagnostic Failed	Refer to the notes in error code
		21A000xxx. Replace the SCSI device.
04400004	Out d Discussific Failed - Day Off	'
21A00004	Send Diagnostic Failed - DevOfl cmd	Refer to the notes in error code 21A000xxx.
	Citia	Replace the SCSI device.
21E00xxx	SCSI Tape	Refer to 21A00xxx for a description and
		repair action for the xxx value.
21ED0xxx	SCSI Changer	Refer to 21A00xxx for a description and
		repair action for the xxx value.
21EE0xxx	Other SCSI device type	Refer to 21A00xxx for a description and
		repair action for the xxx value.
21F00xxx	SCSI CD-ROM	Refer to 21A00xxx for a description and
		repair action for the xxx value.
21F20xxx	SCSI Read/Write Optical	Refer to 21A00xxx for a description and
		repair action for the xxx value.
25000000	Memory Controller Failed.	Replace the system board.
25010xxx	Flash Update Problem	
25010000	No diskette in drive	Insert diskette containing firmware image
25010001	Diskette seek error	1. Retry function.
		Replace diskette drive.
		3. Replace diskette cable.4. Replace I/O board. (See notes on
		3-1.)
25010002	Diskette in drive does not contain an	Insert diskette with firmware update file.
	*.IMG file	·
25010003	Cannot open OPENPROM package	Replace I/O board (See notes on 3-1.)
25010004	Cannot find OPENPROM node	Replace I/O board (See notes on 3-1.)
25010006	System id does not match image	Make sure correct firmware update
	system id	diskette is being used with this system.
25010007	Image has bad CRC	Replace firmware updated diskette.
25010008	Flash is write protected, update can-	1. Turn off, turn on system unit and retr
	celled	2. Replace I/O board. (See notes on
		3-1.)
25010009	Flash module is unsupported or not	Make sure correct firmware update
	recognized	diskette is being used with this system.
2501000A	Flash write protected	1. Turn off, turn on system unit, retry.
		2. Replace I/O board (See notes on 3-1

Error Code	Description	Action / Possible Failing FRU
25A0xxx0	L2 Cache controller problem	Remove processor card in processor card connector #2 (if installed) and see if the problem is resolved. If problem is resolved replace processor card. If not, continue. Exchange processor card in processor card connector #1 with the processor card removed in step 1 (or replace processor card if only one processor card exists) and see if problem is resolved. If problem is resolved replace processor card. If not, continue. Replace the system board. See error code 2B2xxx22 for xxx defi-
		nitions.
25A0xxx1	L2 Cache controller problem	 Remove processor card in processor card connector #2 (if installed) and see if the problem is resolved. If problem is resolved replace processor card. If not, continue. Exchange processor card in processor card connector #1 with the processor card removed in step 1 (or replace processor card if only one processor card exists) and see if problem is resolved. If problem is resolved replace processor card. If not, continue. Replace the system board. See error code 2B2xxx22 for xxx definitions.
25A1xxx1 25A1xxx2 25A1xxx3 25A1xxx4 25A1xxx5 25A1xxx6 25A1xxx7 25A1xxx8 25A1xxx8 25A1xxx8 25A1xxxA	L2 SRAM failure	Remove processor card in processor card connector #2 (if installed) and see if the problem is resolved. If problem is resolved replace processo card. If not, continue. Exchange processor card in processor card connector #1 with the processor card removed in step 1 (or replace processor card if only oneprocessor card exists) and see if problem is resolved. If problem is resolved replace processor card.
		See error code 2B2xxx22 for xxx definitions.

Table 3-1 (Page 8 of 40). Firmware Error Codes.		
Error Code	Description	Action / Possible Failing FRU
25A80xxx	NVRAM problems	NVRAM problem resolution:
		Errors reported against NVRAM can be caused by low Battery voltage and (more rarely) power outages that occur during normal system usage. With the exception of the 25A80000 error, these errors are warnings that the NVRAM data content had to be re-established and do not require any FRU replacement unless the error is persistent. When one of these errors occurs, any system customization (eg. boot device list) information has been lost, the system may need to be reconfigured.
		If the error is persistent, replace the battery.
		3. If the error is persistent after battery replacement, or the error code is 25A80000, replace the I/O board. (See notes on 3-1.)
25A80000	Initialization failed, device test failed	Refer to Action under error code 25A80xxx.
25A80001	Init-nvram invoked, ALL of NVRAM initialized	Refer to Action under error code 25A80xxx.
25A80002	Init-nvram invoked, some data partitions may have been preserved	Refer to Action under error code 25A80xxx.
25A80011	Data corruption detected, ALL of NVRAM initialized	Refer to Action under error code 25A80xxx.
25A80012	Data corruption detected, some data partitions may have been preserved	Refer to Action under error code 25A80xxx.
25A80100	NVRAM data validation check failed	Turn off, turn on system unit and retry the operation before replacing any system component. Refer to Action under error code 25A80xxx.
25A80201	Unable to expand target partition while saving configuration variable	Refer to Action under error code 25A80xxx.
25A80202	Unable to expand target partition while writing error log entry	Refer to Action under error code 25A80xxx.
25A80203	Unable to expand target partition while writing VPD data	Refer to Action under error code 25A80xxx.

Error Code	Description	Action / Possible Failing FRU
25A80211	Setenv/\$Setenv parameter error - value contains a null character	Refer to Action under error code 25A80xxx.
25AA0xxx	EEPROM problems	EEPROM problem resolution:
		 Ensure that the EEPROM Security jumper is in the correct position if doing a privileged-access password install.
		2. Retry the operation.
		3. If retries do not solve the problem, replace the I/O board. (See notes on 3-1.)
25AA0000	Unable to unlock EEPROM	Refer to Action under error code 25AA0xxx.
25AA0001	Read-Recv error	Refer to Action under error code 25AA0xxx.
25AA0002	Read-Trans error	Refer to Action under error code 25AA0xxx.
25AA0003	Write-enable error	Refer to Action under error code 25AA0xxx.
25AA0004	Write-recv error	Refer to Action under error code 25AA0xxx.
25AA0005	Write-disable error	Refer to Action under error code 25AA0xxx.
25AA0006	Write-Trans error	Refer to Action under error code 25AA0xxx.
25AA0007	Unable to lock EEPROM	Refer to Action under error code 25AA0xxx.
25B00001	No memory modules detected in either memory card 1 or 2	Reseat any installed memory card(s) and retry. Reseat any installed memory modules on the installed memory cards. Replace memory card(s).
25Cyyxxx	Memory card problems	See "Memory PD Bits" on page 3-42 for definition of "yy".
		Use the location code obtained from the SMS Error Log utility (described in MAP Step 1020-4) to identify which memory module (or memory module pair) the erro is reported against.

Table 3-1 (Pa	Table 3-1 (Page 10 of 40). Firmware Error Codes.		
Error Code	Description	Action / Possible Failing FRU	
25Cyy001	Memory module is not supported	Replace unsupported memory module.	
		Note:	
		Memory module must be replaced with a supported type memory module. If an unsupported memory module is replaced the same unsupported type, the error does not go away.	
		There may be 2 memory module related memory errors reported to indicate a memory module pair. One of the 2 indicated memory modules may be good, when replacing memory replace 1 memory module at a time, not both.	
		See "Memory PD Bits" on page 3-42 for definition of "yy".	
25Cyy002	Memory module fails memory test	 Replace memory module. Replace memory card. Replace the system board. 	
		See "Memory PD Bits" on page 3-42 for definition of "yy".	
25Cyy003	PD bits are mis-matched or missing one memory module	Make sure both memory modules in the pair are the same type. Replace the system board.	
		See "Memory PD Bits" on page 3-42 for definition of "yy".	
25Cyy004	Memory modules are disabled	Remove this unused memory module.	
25Cyy005	Memory module failed address test.	1. Replace memory module. 2. Replace memory card. 3. Replace the system board. 4. Remove processor card in processor card connector #2 (if installed) and see if the problem is resolved. If problem is resolved replace processor card. If not, continue. 5. Exchange processor card in processor card connector #1 with the processor card removed in step 1 (or replace processor card exists) and see if problem is resolved. If problem is resolved replace processor card.	
		See "Memory PD Bits" on page 3-42 for definition of "yy".	

Table 3-1 (Page 11 of 40). Firmware Error Codes.		
Error Code	Description	Action / Possible Failing FRU
25Cyy006	Memory module failed inter-extent test	1. Replace the system board. 2. Remove processor card in processor card connector #2 (if installed) and see if the problem is resolved. If problem is resolved replace processor card. If not, continue. 3. Exchange processor card in processor card connector #1 with the processor card removed in step 1 (or replace processor card if only one processor card exists) and see if problem is resolved. If problem is resolved replace processor card.
		See "Memory PD Bits" on page 3-42 for definition of "yy".
25Cyy007	Memory module failed extent access test	1. Replace the system board. 2. Remove processor card in processor card connector #2 (if installed) and see if the problem is resolved. If problem is resolved replace processor card. If not, continue. 3. Exchange processor card in processor card connector #1 with the processor card removed in step 1 (or replace processor card if only one processor card exists) and see if problem is resolved. If problem is resolved replace processor card. See "Memory PD Bits" on page 3-42
25Cyy008	Memory module has been deconfig-	for definition of "yy". 1. Swap the memory module with the
,	ured	other memory module of the same pair, and retest. Look for any new error code. 2. Replace the memory module based on the new error code.
		See "Memory PD Bits" on page 3-42 for definition of "yy".

Table 3-1 (Pa	Table 3-1 (Page 12 of 40). Firmware Error Codes.		
Error Code	Description	Action / Possible Failing FRU	
26020001	Invalid PCI adapter vendor ID	 Move adapter to another slot (behind a different PCI bridge). Check for available firmware updates for adapter. Apply update if available. Run AIX diagnostics on adapter. Replace if indicated. Replace adapter. Check for system firmware updates. Apply if update available. Replace power supply. Replace I/O board (See notes on 3-1.) 	
26020002	Invalid PCI adapter device ID	 Move adapter to another slot (behind a different PCI bridge). Check for available firmware updates for adapter. Apply update if available. Run AIX diagnostics on adapter. Replace if indicated. Replace adapter. Check for system firmware updates. Apply if update available. Replace power supply. Replace I/O board. (See notes on 3-1.) 	
26020003	Invalid PCI adapter class code	 Move adapter to another slot (behind a different PCI bridge). Check for available firmware updates for adapter. Apply update if available. Run AIX diagnostics on adapter. Replace if indicated. Replace adapter. Check for system firmware updates. Apply if update available. Replace power supply. Replace I/O board (See notes on 3-1.) 	
26020007	Failed to allocate bus resources to PCI adapter	 Move adapter to another slot (behind a different PCI bridge). Check for available firmware updates for adapter. Apply update if available. Run AIX diagnostics on adapter. Replace if indicated. Replace adapter. Check for system firmware updates. Apply if update available. Replace power supply. Replace I/O board (See notes on 3-1.) 	

Error Code	Description	Action / Possible Failing FRU
26800Cxx	Machine Check occurred	If the location code shown on the operator panel identifies a card slot:
		 Replace the adapter in the slot identi fied. Replace the I/O board (See notes or 3-1.)
		If the location code shown does not identify a card slot, or if there is no location code, replace the I/O board (See notes of 3-1.)
26800Dxx	Machine Check occurred. Unable to isolate to a single device.	Attempt to reboot the system in Service Mode, this preserves the AIX error log. If the reboot fails, attempt to reboot CD-ROM. If the reboot is successful, run Diagnotics in Problem Determination mode to determine the cause of failure. Otherwise continue. Go to MAP 1540: Minimum Configuration, "Step 1540-25" on page 2-61.
28030xxx	RTC errors	Errors reported against the Real Time Clock (RTC) can be caused by low battery voltage and (more rarely) power outages that occur during normal system usage. These errors are warnings that the RTC data content needs to be re-established and do not require any FRU replacement unless the error is persistent. When one of these errors occurs, the Power On Password and Time and Date information has been lost.
		 To set/restore a Power On Password, use the SMS utility. To set/restore the Time and Date use the Operating System facility
		If the error is persistent, replace the battery.
		If the error is persistent after battery replacement, replace the I/O board (See notes on 3-1.)
28030001	RTC initialization required- RTC not updating, corrected.	Refer to Action under error code 28030xxx.
28030002	Bad time/date values	Set the time and date. Refer to Action under error code 28030xxx.

Table 3-1 (Page 14 of 40). Firmware Error Codes.			
Error Code	Description	Action / Possible Failing FRU	
28030003	RTC initialization required. RTC not updating, not corrected.	Replace the I/O board (See notes on 3-1.)	
28030004	RTC operating parameters (data format) changed.	Set/restore the time and date. Refer to Action under error code 28030xxx.	
28030005	RTC battery error.	Replace the battery.	
		Note: Password, Time, and Date must be reset.	
		Refer to Action under error code 28030xxx.	
28030006	Processor frequency measurement	Replace the I/O board (See notes on 3-1.)	
	error.	Note: Replacing the battery does not correct this error condition.	
29000002	Keyboard/Mouse controller failed self-test	Replace the I/O board (See notes on 3-1.)	
29A00003	Keyboard not present/detected	Keyboard Replace the I/O board (See notes on 3-1.)	
29A00004	Keyboard stuck key test failed	Keyboard Replace the I/O board (See notes on 3-1.)	
29B00004	Mouse not present/detected	Mouse Replace the I/O board (See notes on 3-1.)	
2B284A00	Illegal condition detected	Contact your next level of support. Do not replace any FRUs in an attempt to fix this problem.	
2B200402	Unsupported Processor	CPU card.	
2B2xxx11	Processor manually deconfigured (H70 only)	Go to Service Processor Menus and manually reconfigure processors.	
		Use Option 3 System Information.	
		Use O\tion 8 to reconfigure processors.	
		See error code 2B2xxx22 for descripion of processor type.	

Action / Possible Failing FRU

1. Remove processor card in processor card connector #2 (if installed) and

card exists) and see if problem is resolved. If problem is resolved replace processor card.

Table 3-1 (Page 15 of 40). Firmware Error Codes.

Processor disabled

Description

Error Code

2B2xxx22

2BA00xxx

Service Processor

Table 3-1 (Pa	Table 3-1 (Page 16 of 40). Firmware Error Codes.			
Error Code	Description	Action / Possible Failing FRU		
2BA00000	Service processor POST failure	 Unplug the system power cable and wait until the system power indicator remains off and the operator panel is blank. Plug the system power cable back in and retry the operation. Replace the service processor card (Model H50 only). Replace the I/O board. (See notes on 3-1.) 		
2BA00012	Service processor reports self-test failure	1. Unplug the system power cable and wait until the system power indicator remains off and the operator panel is blank. 2. Plug the system power cable back in and retry the operation. 3. Replace the service processor card (Model H50 only). 4. Replace the I/O board (See notes on 3-1.)		
2BA00013	Service processor reports bad NVRAM CRC	If problem persists, replace battery. Replace the I/O board (See notes on 3-1.)		
2BA00014	Service processor reports bad service processor firmware	Use service processor firmware diskette to re-program firmware.		
2BA00017	Service processor reports bad or low battery	 Replace the battery. Replace the service processor card (Model H50 only). Replace the I/O board (See notes on 3-1.) 		
2BA00018	EPOW test failure	Replace the service processor (Model H50 only). Replace the I/O board (See notes on 3-1.)		
2BA00019	IRQ13 test failure	Replace the I/O board (See notes on 3-1.) Replace the service processor card (Model H50 only).		
2BA00024	Service processor reports bad Power Controller firmware	Use the System Firmware diskette to reprogram the System firmware.		
2BA00040	Service processor reports Service Processor VPD module not present	Use the Service Processor Firmware diskette to re-program the Service Processor firmware.		
		Replace the Service Processor card (Model H50 only).		

Error Code	Description	Action / Possible Failing FRU
2BA00041	Service processor VPD is corrupted	Use the service processor firmware diskette to re-program the service processor firmware. Replace the service processor card (Model H50 only).
2BA00050	Service processor reports system operator panel VPD module not present or not recognizeable	Replace the operator panel control assembly. (See notes on 3-1.) Note: Swap the old VPD module from the old operator panel control assembly to the new one.
2BA00051	System operator panel VPD data corrupted	Replace the operator panel control assembly. (See notes on 3-1.) Note: Swap the old VPD module from the old operator panel control assembly to the new one.
2BA00060	Service processor reports I/O board VPD module not present	Replace the I/O board (See notes on 3-1.)
2BA00061	Service processor reports I/O board VPD data corrupted	Replace the I/O board (See notes on 3-1.)
2BA00062	Service processor reports system board VPD module not present	Replace the system board.
2BA00063	Service processor reports system board VPD data corrupted	Replace the system board.
2BA00064	Service processor reports PCI riser card VPD module not present	Replace the PCI riser card.
2BA00065	Service processor reports PCI riser card VPD data corrupted	Replace the PCI riser card.
2BA00066	Service processor reports PCI expansion card VPD module not present	Replace the PCI expansion card.
2BA00067	Service processor reports PCI expansion card VPD data corrupted	Replace the PCI expansion card.
2BA00070	Service processor reports CPU card VPD module not present	Remove processor card in processor card connector #2 (if installed) and see if the problem is resolved. If problem is resolved replace processo card. If not, continue. Exchange processor card in processor card connector #1 with the processor card removed in step 1 (or replace processor card if only one processor card exists) and see if problem is resolved. If problem is resolved replace processor card.

Table 3-1 (Pa	Table 3-1 (Page 18 of 40). Firmware Error Codes.			
Error Code	Description	Action / Possible Failing FRU		
2BA00071	VPD data corrupted for CPU in processor card connector #1	Replace the CPU card in processor card connector #1.		
2BA00073	VPD data corrupted for CPU in processor card connector #2	Replace the CPU card in processor card connector #2.		
2BA00080	VPD module missing from memory card(s)	1. Remove the memory card at location P1-M2, if installed, and see if the problem is resolved. If the problem is resolved, replace the memory card that was just removed. If not, go to step 2.		
		2. Exchange the memory card at P1-M1 with the memory card remove in step 1 (or replace the memory card at P1-M1 if only one memory card is installed) and see if the problem is resolved. If the problem is replace the card at P1-M1.		
2BA00081	VPD data corrupted on first memory card	Replace the first memory card. location: P1-M1		
2BA00083	VPD data corrupted on second memory card	Replace the second memory card, location: P1-M2		
2BA00100	Service processor firmware recovery information could not be written to diskette	Check diskette media write protect tab. Replace the diskette drive.		
2BA00101	Service processor is not installed, update cancelled	Install the service processor (Model H50 only). Retry operation.		
2BA00102	No service processor update diskette in drive	Insert the diskette.		
2BA00103	Service processor firmware update file is corrupted, update cancelled	Obtain new service processor firmware diskette. Retry operation.		
2BA00104	Service processor firmware update file is the same level as the service processor firmware, update can- celled	Obtain new level of service processor firmware. Retry operation.		

Error Code	Description	Action / Possible Failing FRU
2BA00200	Service processor firmware update error occurred, update not com-	Service processor firmware update error recovery procedure:
	pleted Error occurred during service processor flash write operation.	 Turn the system Off. Unplug power cable and then plug power cable back in. Turn the system On. Retry operation. If problem persists: For Model H50: Replace Service Processor. For Model H70: Replace I/O board.
2BA00201	Service processor firmware update error occurred, update not completed	See error code 2BA00200 for recovery procedure.
	Error occurred while reading service processor CRC.	
2BA00202	Service processor firmware update error occurred, update not completed	See error code 2BA00200 for recovery procedure.
	Error occurred while verifying service processor CRC.	
2BA00203	Service processor firmware update error occurred, update not completed	See error code 2BA00200 for recovery procedure.
	Error occurred while reading new service processor CRC after updating service processor firmware.	
2BA00204	Service processor firmware update error occurred, update not completed	See error code 2BA00200 for recovery procedure.
	Error occurred while calculate CRC write.	
2BA00300	Service Processor reports Slow Fan number 0	Replace Fan 0. If problem persists, replace power supply. Replace I/O Board (See notes on 3-
2BA00301	Service Processor reports Slow Fan number 1	 Replace Fan 1. If problem persists, replace power supply. Replace I/O Board. (See notes on 3-1.)
2BA00302	Service Processor reports Slow Fan number 2	Replace Fan 2. If problem persists, replace power supply. Replace I/O Board (See notes on 3-

Error Code	Description	Action / Possible Failing FRU
2BA00303	Service Processor reports Slow Fan number 3	Replace Fan 3. If problem persists, replace Power Supply. Replace I/O Board (See notes on 3-
2BA00309	Service Processor reports Generic Cooling Alert	Check for cool air flow obstructions the system. Replace I/O Board (See notes on 3-
2BA00310	Service Processor reports CPU Over Temperature Alert	Check for cool air flow obstructions the system. If the problem persists, replace CPU Card
2BA00311	Service Processor reports IO Over Temperature Alert	Check for cool air flow obstructions t the system. Replace I/O Board (See notes on 3-
2BA00312	Service Processor reports Memory Over Temperature Alert	Check for cool air flow obstructions the system. Replace memory card.
2BA00313	Service Processor reports Generic Power Alert	Replace power supply. Replace I/O Board (See notes on 3-
2BA00314	Service Processor reports 5V Over Voltage Alert	Replace power supply. Replace I/O Board (See notes on 3-
2BA00315	Service Processor reports 5V Under Voltage Alert	Replace power supply. Replace I/O Board (See notes on 3-
2BA00316	Service Processor reports 3.3V Over Voltage Alert	Replace power supply. Replace I/O Board (See notes on 3-
2BA00317	Service Processor reports 3.3V Under Voltage Alert	Replace power supply. Replace I/O Board (See notes on 3-
2BA00318	Service Processor reports 2.5V Over Voltage Alert	Replace power supply. Replace I/O Board (See notes on 3-
2BA00319	Service Processor reports 2.5V Under Voltage Alert	Replace power supply. Replace I/O Board (See notes on 3-
2BA00320	Service Processor reports +12V Over Voltage Alert	Replace power supply. Replace I/O Board (See notes on 3-
2BA00321	Service Processor reports +12V Under Voltage Alert	Replace power supply. Replace I/O Board (See notes on 3-
2BA00322	Service Processor reports -12V Over Voltage Alert	Replace power supply. Replace I/O Board (See notes on 3-
2BA00323	Service Processor reports -12V Under Voltage Alert	Replace power supply. Replace I/O Board (See notes on 3-
2BA00324	Service Processor reports 5V Standby Over Voltage Alert	Replace power supply. Replace I/O Board (See notes on 3-
2BA00325	Service Processor reports 5V	Replace power supply.

Error Code	Description	Action / Possible Failing FRU
2BA00326	Service Processor reports PCI Expansion Card 5V Over Voltage Alert	Replace power supply. Replace I/O Board (See notes on 3-1.
2BA00327	Service Processor reports PCI Expansion Card 5V Under Voltage Alert	Replace power supply. Replace I/O Board (See notes on 3-1.
2BA00328	Service Processor reports PCI Expansion Card 3.3V Over Voltage Alert	Replace power supply. Replace I/O Board (See notes on 3-1.
2BA00329	Service Processor reports PCI Expansion Card 3.3V Under Voltage Alert	Replace power supply. Replace I/O Board (See notes on 3-1.
2BA00330	Service Processor reports PCI Expansion Card +12V Over Voltage Alert	Replace power supply. Replace I/O Board (See notes on 3-1.
2BA00331	Service Processor reports PCI Expansion Card +12V Under Voltage Alert	Replace power supply. Replace I/O Board (See notes on 3-1.
2BA00332	Service Processor reports PCI Expansion Card -12V Over Voltage Alert	Replace power supply. Replace I/O Board (See notes on 3-1.
2BA00333	Service Processor reports PCI Expansion Card -12V Under Voltage Alert	Replace power supply. Replace I/O Board (See notes on 3-1.
2BA00334	Service Processor reports Generic Slow Shutdown request	Replace power supply. Replace I/O Board (See notes on 3-1.
2BA00335	Service Processor reports CPU Critical Over Temperature Slow Shutdown request	Check for cool air flow obstructions to the system. Check fans for obstructions that prevent them from normal operation (example: a cable caught in the fan preventing it from spinning). If problem persists, replace CPU Card
2BA00336	Service Processor reports IO Critical Over Temperature Slow Shutdown request	Check for cool air flow obstructions to the system. Check fans for obstructions that prevent them from normal operation (example: a cable caught in the fan preventing it from spinning). If problem persists, replace I/O Board (See notes on 3-1.)

Error Code	Description	Action / Possible Failing FRU
2BA00337	Service Processor reports Memory Critical Over Temperature Slow Shutdown request	Check for cool air flow obstructions to the system. Check fans for obstructions that prevent them from normal operation (example: a cable caught in the fan preventing it from spinning) If problem persists, replace Memory Card.
2BA00338	Service Processor reports Generic Fast Shutdown request	Replace power supply. Replace I/O Board (See notes on 3-4).
2BA00340	Service Processor reports Locked fan - Fast Shutdown request fan number 1	1. Replace fan 1. 2. If problem persists, replace power supply. 3. Replace I/O Board (See notes on 3-1)
2BA00341	Service Processor reports Locked fan - Fast Shutdown request fan number 2	 Replace fan 2. If problem persists, replace power supply. Replace I/O Board (See notes on 3-4)
2BA00342	Service Processor reports Locked fan - Fast Shutdown request fan number 3	 Replace fan 3. If problem persists, replace power supply. Replace I/O Board (See notes on 3-4)
2BA00343	Service Processor reports Locked fan - Fast Shutdown request fan number 4	 Replace fan 4. If problem persists, replace power supply. Replace I/O Board (See notes on 3-4)
2BA00350	Service Processor reports Generic Immediate Shutdown request	 Replace power supply. Replace I/O Board (See notes on 3-
2BA00351	Service Processor reports Generic AC power loss EPOW	 Replace power supply. Replace I/O Board (See notes on 3-
2BA00352	Service Processor reports Loss of AC power (outlet)	Replace power supply. Replace I/O Board (See notes on 3-7).
2BA00353	Service Processor reports Loss of AC power (power button)	Replace power supply. Replace I/O Board (See notes on 3-
2BA00360	Service Processor reports Slow DASD Fan #1	1. Replace DASD Fan 1. 2. If problem persists, replace power supply. 3. Replace I/O Board (See notes on 3-4).
2BA00361	Service Processor reports Slow DASD Fan #2	Replace DASD Fan 2. If problem persists, replace power supply. Replace I/O Board (See notes on 3-1)

Error Code	Description	Action / Possible Failing FRU
2BA00362	Service Processor reports Slow DASD Fan #3	1. Replace DASD Fan 3. 2. If problem persists, replace power supply. 3. Replace I/O Board (See notes on 3-1)
2BA00363	Service Processor reports Slow DASD Fan #4	Replace DASD Fan 4. If problem persists, replace power supply. Replace I/O Board (See notes on 3-1)
2BA00364	Service Processor reports Locked DASD Fan #1	Remove Obstruction from DASD Fan 1. Replace DASD Fan 1. If problem persists, replace power supply. Replace I/O Board (See notes on 3-1)
2BA00365	Service Processor reports Locked DASD Fan #2	Remove Obstruction from DASD Fan 2. Replace DASD Fan 2. If problem persists, replace power supply. Replace I/O Board (See notes on 3-1)
2BA00366	Service Processor reports Locked DASD Fan #3	 Remove Obstruction from DASD Fan 3. Replace DASD Fan 3. If problem persists, replace power supply. Replace I/O Board (See notes on 3-1
2BA00367	Service Processor reports Locked DASD Fan #4	1. Remove Obstruction from DASD Fan 4. 2. Replace DASD Fan 4. 3. If problem persists, replace power supply. 4. Replace I/O Board (See notes on 3-1)
2BA00368	Service Processor reports Slow CEC Fan #1	1. Replace CEC Fan 1. 2. If problem persists, replace power supply. 3. Replace I/O Board (See notes on 3-1)
2BA00369	Service Processor reports Slow CEC Fan #2	Replace CEC Fan 2. If problem persists, replace power supply. Replace I/O Board (See notes on 3-1)
2BA00370	Service Processor reports Slow CEC Fan #3	Replace CEC Fan 3. If problem persists, replace power supply. Replace I/O Board (See notes on 3-1)

Error Code	Description	Action / Possible Failing FRU
2BA00371	Service Processor reports Locked CEC Fan #1	 Remove obstruction from CEC Fan 1 Replace CEC Fan 1. If problem persists, replace power supply. Replace I/O Board (See notes on 3-1
2BA00372	Service Processor reports Locked CEC Fan #2	Remove obstruction from CEC Fan 2 Replace CEC Fan 2. If problem persists, replace power supply. Replace I/O Board (See notes on 3-1)
2BA00373	Service Processor reports Locked CEC Fan #3	Remove obstruction from CEC Fan 3 Replace CEC Fan 3. If problem persists, replace power supply. Replace I/O Board (See notes on 3-1)
2BA00374	Service Processor reports power supply #1 and DASD Fans failed	Replace power supply #1 and Failing DASD Fans. Replace I/O Board (See notes on 3-1)
2BA00375	Service Processor reports power supply #2 and DASD Fans failed	Replace power supply #2 and Failing DASD Fans. Replace I/O Board (See notes on 3-1)
2BA00376	Service Processor reports power supply failure	Replace failing power supply. Replace I/O Board (See notes on 3-1)
2BA00399	Service Processor reports Unsup- ported value in EPOW	Replace I/O Board (See notes on 3-1.)
40100005	A loss of system power detected	Possible main power loss. If not, replace power supply.
40100007	Immediate shutdown	Possible main power loss. If not, replace power supply.
40110000	Redundant power supply fail	1. Power supply. 2. I/O board (See notes on 3-1.) 3. Service Processor (Model H50 only).
40110001	Power supply fail	Power supply. I/O board. (See notes on 3-1.) Service Processor (Model H50 only).
40110002	Voltage is present, but not detected	For Model H50:
	on both processor cards	 Check cable between CPU card and PDB for proper seating. Replace power supply. Replace PDB.
		For Model H70: Replace power supply.

	Table 3-1 (Page 25 of 40). Firmware Error Codes.		
	Error Code	Description	Action / Possible Failing FRU
	40110003	Voltage is present, but not detected on one processor card. (If the system is running, refer to the AIX error log to find out which processor card is failing. If the system is not running, refer to the service processor error log.)	For Model H50: 1. Check cable between CPU card and PDB for proper seating. 2. Replace CPU card. 3. Replace cable between CPU card and PDB. 4. Replace PDB.
			For Model H70: Replace power supply.
D D D	40110004	For Model H50: Loss of redundant power supply. (If the system is running, refer to the AIX error log to find out which processor card is failing. If the system is not running, refer to the service processor error log.) For Model H70: Low voltage detected in power supply main enclosure.	For Model H50: 1. Power supply. 2. PDB. 3. I/O board. (See notes on 3-1.) For Model H70: 1. Check fan monitor cable to connector on I/O Board. 2. Power supply.
D D D	40110005	For Model H50: Loss of redundant power supply and a DASD fan. (Refer to the service processor error log to determine which fan and power supply is failing.) For Model H70: Fan warning detected in power supply main enclosure.	For Model H50: 1. Power supply. 2. DASD fan. For Model H70: 1. Check fan monitor cable to connector on I/O Board. 2. Power supply.
D D D	40110006	Fan failure detected in power supply main enclosure	Check fan monitor cable to connector on I/O Board. Power supply.
D D D	40110007	Thermal warning detected in power supply main enclosure	Check fan monitor cable to connector on I/O Board. Power supply.
D D D	40110008	Thermal failure detected in power supply main enclosure	Check fan monitor cable to connector on I/O Board. Power supply.
D D D	40110009	High 5.0 volt detected in power supply main enclosure	Check fan monitor cable to connector on I/O Board. Power supply.
D D D	40110015	Service processor detects less than 200V minimum required to run the system.	Check power coming into the system to ensure it is 200-240V. Power supply.
D D D	4011000A	High 5.0 RA volt detected in power supply main enclosure	Check fan monitor cable to connector on I/O Board. Power supply.

	Table 3-1 (Pa	ge 26 of 40). Firmware Error Codes.		
	Error Code	Description	Action / Possible Failing FRU	
	4011000B	High 5.0 RB volt detected in power supply main enclosure	Check fan monitor cable to connector on I/O Board. Power supply.	
	4011000C	High 3.3 M volt detected in power supply main enclosure	Check fan monitor cable to connector on I/O Board. Power supply.	
	4011000D	High 3.3 volt detected in power supply main enclosure	 Check fan monitor cable to connector on I/O Board. Power supply. 	
0	4011000E	High +12.0 volt detected in power supply main enclosure	Check fan monitor cable to connector on I/O Board. Power supply.	
0	4011000F	High -12.0 volt detected in power supply main enclosure	Check fan monitor cable to connector on I/O Board. Power supply.	
	40111002	An unknown power problem detected	 Power supply. I/O board. (See notes on 3-1.) Service Processor (Model H50 only). 	
	40111022	A high 5.0 voltage reading detected	1. Power supply. 2. Remove processor card in processor card connector #2 (if installed) and see if the problem is resolved. If problem is resolved replace processor card. If not, continue. 3. Exchange processor card in processor card connector #1 with the processor card removed in step 1 (or replace processor card if only one processor card exists) and see if problem is resolved. If problem is resolved replace processor card.	
	40111032	A high 3.3 voltage reading detected	1. Remove processor card in processor card connector #2 (if installed) and see if the problem is resolved. If problem is resolved replace processor card. If not, continue. 2. Exchange processor card in processor card connector #1 with the processor card removed in step 1 (or replace processor card if only one processor card exists) and see if problem is resolved. If problem is resolved replace processor card. If not, continue. 3. Power supply.	

Error Code	Description	Action / Possible Failing FRU
40111042	A high 2.5 voltage reading detected	1. Remove processor card in processor card connector #2 (if installed) and see if the problem is resolved. If problem is resolved replace processor card. If not, continue. 2. Exchange processor card in processor card connector #1 with the processor card removed in step 1 (or replace processor card if only one processor card exists) and see if problem is resolved. If problem is resolved replace processor card. If not, continue. 3. Power supply.
40111052	A high +12 voltage reading detected	Power supply. I/O board (See notes on 3-1.)
40111062	A high –12 voltage reading detected	Power supply. I/O board (See notes on 3-1.)
40111072	A high +5 standby voltage reading detected	1. Remove processor card in processor card connector #2 (if installed) and see if the problem is resolved. If problem is resolved replace processor card. If not, continue. 2. Exchange processor card in processor card connector #1 with the processor card removed in step 1 (or replace processor card if only one processor card exists) and see if problem is resolved. If problem is resolved replace processor card. If not, continue. 3. Power supply.
40111082	A low 5.0 voltage reading detected	1. Power supply. 2. Remove processor card in processor card connector #2 (if installed) and see if the problem is resolved. If problem is resolved replace processo card. If not, continue. 3. Exchange processor card in processor card connector #1 with the processor card removed in step 1 (or replace processor card exists) and see if problem is resolved. If problem is resolved replace processor card.

Table 3-1 (Pa	ge 28 of 40). Firmware Error Codes.	
Error Code	Description	Action / Possible Failing FRU
40111092	A low 3.3 voltage reading detected	1. Remove processor card in processor card connector #2 (if installed) and see if the problem is resolved. If problem is resolved replace processor card. If not, continue. 2. Exchange processor card in processor card connector #1 with the processor card removed in step 1 (or replace processor card if only one processor card exists) and see if problem is resolved. If problem is resolved replace processor card. If not, continue. 3. Power supply.
401110A2	A low +5 standby voltage reading detected	1. Remove processor card in processor card connector #2 (if installed) and see if the problem is resolved. If problem is resolved replace processor card. If not, continue. 2. Exchange processor card in processor card connector #1 with the processor card removed in step 1 (or replace processor card if only one processor card exists) and see if problem is resolved. If problem is resolved replace processor card. If not, continue. 3. Power supply.
401110B2	A low +12 voltage reading detected	Power supply. I/O board (See notes on 3-1.)
401110C2	A low –12 voltage reading detected	Power supply. I/O board (See notes on 3-1.)
401110D2	A low +5 standby voltage reading detected	1. Remove processor card in processor card connector #2 (if installed) and see if the problem is resolved. If problem is resolved replace processor card. If not, continue. 2. Exchange processor card in processor card connector #1 with the processor card removed in step 1 (or replace processor card if only one processor card exists) and see if problem is resolved. If problem is resolved replace processor card. If not, continue. 3. Power supply.

	age 29 of 40). Firmware Error Codes.	T
Error Code	Description	Action / Possible Failing FRU
40111101	Power good signal low on either processor card 0 or processor card 1. (If the system is running, refer to the AIX error log to find out which processor card is failing. If the system is not running, refer to the service processor error log.)	For Model H50: 1. Check cable between PDB and CPU card for proper seatin. 2. Replace failing processor card. 3. Replace cable between PDB and CPU card. 4. Replace PDB.
		For Model H70:
		Replace failing processor card.
40111102	Wrong processor cards plugged into the system	Remove cards. Verify part numbers. Install valid card.
40200001	An unknown cooling problem detected	Cooling problem; check system fans.
40200021	A CPU temperature warning detected	Over temperature on CPU card.
40200023	A critical CPU temperature condition detected	Critical temperature on CPU card.
40200031	An I/O board temperature warning detected	Over temperature on I/O board.
40200033	A critical I/O board temperature condition detected	Critical temperature on I/O board.
40200041	A memory temperature warning detected	Over temperature on the memory card.
40200043	A critical memory temperature condition detected	Critical temperature on the memory card.
40200051	An inlet temperature warning detected	Over temperature on the air flow inlet.
40200053	An inlet memory temperature condition detected	Critical temperature on the air flow inlet.
40210011	A slow fan detected	Check:
		Room operating temperature. System fans.
40210014	 A stopped fan detected. Fan connector unplugged. Fan sensor defective. Loss of a redundant fan and a subsequent locked fan. (If the system is running, refer to the AIX error log to find out which fan is failing. If the system is not running, refer to the service processor error log.) 	Check connector. Failing fan. FMC card.

Table 3-1 (Pa	ge 30 of 40). Firmware Error Codes.	
Error Code	Description	Action / Possible Failing FRU
40210024	Loss of a redundant fan and a sub- sequent slow fan. (If the system is running, refer to the AIX error log to find out which fan is failing. If the system is not running, refer to the service processor error log.)	Failing fan. FMC card.
40210091	Loss of a redundant fan. (Refer to the service processor error log to find out which fan is failing.)	Failing fan. FMC card.
40211804	Failure to communicate with FMC	Failing fan. FMC card.
40A00000	System firmware IPL failure	 Press enter on an attached ASCII terminal keyboard to go into the Service Processor menus. Select "System Information" menu. Select "Read Progress Indicators from Last System Boot" and use the posted code indicated by the arrow. Refer to Appendix C on page C-1, if you need help. If the code is "E105" or"0xxx", where xxx is any 3 digits, continue to step 4 instead of the listed action. Otherwise, find the code in the "Model H50 Service Processor Checkpoints" on page 3-45 or "Model H70 Service Processor Checkpoints" on page 3-52 and perform the action shown there. Remove processor card in processor card connector #2 (if installed) and see if the problem is resolved. If problem is resolved replace processor card connector #1 with the processor card connector #1 with the processor card removed in step 3 (or replace processor card exists) and see if problem is resolved replace processor card. If not, continue. System board. I/O board (See notes on 3-1.) Service Processor (Model H50 only). If the problem persists, call the support center for assistance.

Error Code	Description	Action / Possible Failing FRU
40B00000	The operating system surveillance interval exceeded	Surveillance mode control is from the Service Processor(service processor) Menus. Verify that the Operating System (OS Heartbeat Utility is installed and has been activated. Check for errors or unusual condition that might prevent the OS from reporting Heartbeat messages; such as system dump, machine check or checkstop error. Review the error log 4. I/O board. (See notes on 3-1.) Service Processor (Model H50 only). If the problem persists, call the support center for assistance.
40B00100	Surveillance timeout on CPU 1	Check for errors or unusual condition that might prevent the CPU from reporting Heartbeat messages; such as system dump, machine check or checkstop error. Review the Service Processor error log. Replace the CPU card.
40B00101	Surveillance timeout on CPU 2	Check for errors or unusual condition that might prevent the CPU from reporting Heartbeat messages; such as system dump, machine check or checkstop error. Review the Service Processor error log. Replace the CPU card.
40B00102	Surveillance timeout on CPU 3	Check for errors or unusual condition that might prevent the CPU from reporting Heartbeat messages; such as system dump, machine check or checkstop error. Review the Service Processor error log. Replace the CPU card.
40B00103	Surveillance timeout on CPU 4	Check for errors or unusual condition that might prevent the CPU from reporting Heartbeat messages; such as system dump, machine check or checkstop error. Review the Service Processor error log. Replace the CPU card.
40D00003	An unknown slow shutdown com- manded	Critical cooling problem. Check to ensure the temperature is in the ambient range.
40D00004	An unknown fast shutdown com- manded	Locked fan failure detected. Make sure al fans are operating normally.

Table 3-1 (Page 32 of 40). Firmware Error Codes.		
Error Code	Description	Action / Possible Failing FRU
40D00101	Bist on I/O board failed	I/O board (See notes on 3-1.)
40D00102	BIST on system board fail	System board.
45800000	Memory controller checkstop	System board. If problem is not resolved continue to "Step 1540-25" on page 2-61.
45B00001	A non-compatible memory card is detected	Replace the memory card, as indicated by the physical location code, with a compatible memory card supported by this system.
45C00000	Memory checkstop. (Uncorrectable memory error.)	Attempt to reboot the system in Service Mode. This preserves the AIX error log. If the reboot fails, attempt to reboot from the CD-ROM. If the reboot is successful, run Diagnostics in Problem Determination mode to determine the cause of the failure. System board.
48800909	System vpd error	Check cable to op-panel
		2. Replace op-panel
		3. I/O board (See notes on 3-1.)
4880090A	Generic vpd error	Refer to "Step 1540-25" on page 2-61.
4880090B	Error identifying system type using vpd	1. I ² C bus error. 2. Call for support.
4880090C	Jtag unable to confirm system type using system vpd	1. Remove cards.
		2. Verify part numbers.
		3. Install valid cards.
		4. Call for support.

Error Code	Description	Action / Possible Failing FRU
4B2xxx00	Checkstop	 Press enter on an attached ASCII ter minal keyboard to go into the Service Processor menus. Select "System Information" menu. Select "Read Progress Indicators fror Last System Boot" and use the poster code indicated by the arrow. Refer to Appendix C on page C-1, if you nee help. If the code is "E105" or "0xxx", where xxx is any 3 digits, continue to step 4 instead of the listed action. Otherwise, find the code in the "Mode H50 Service Processor Checkpoints" on page 3-45 or "Model H70 Service Processor Checkpoints" on page 3-52 and perform the action shown there. Attempt to reboot the system in Service Mode, this preserves the AIX error log. If the reboot fails, attempt to reboot CD-ROM. If the reboot is successful, run Diagnotics in Problem Determination mode to determine the cause of failure. Otherwise continue. Remove processor card in processor card connector 2 (if installed) and ser if the problem is resolved, replace processor card, otherwise continue. Exchange processor card in processor card connector 1 with processor card removed from processor card in processor card if only one processor card is installed) and see if the problem is resolved. If problem is resolved replace processor card. If not, continue. Go to MAP 1540: Minimum Configuration, "Step 1540-25" on page 2-61.

Table 3-1 (Pa	ge 34 of 40). Firmware Error Codes.	
Error Code	Description	Action / Possible Failing FRU
4B2xxx01	Checkstop - processor card con- nector 1 fail	1. Attempt to reboot the system in Service Mode, this preserves the AIX error log. If the reboot fails, attempt to reboot from the CD-ROM. If the reboot is successful, run Diagnostics in Problem Determination mode to determine the cause of the failure. Otherwise continue. 2. CPU Card in processor card connector 1. 3. System board. 4. I/O board (See notes on 3-1.)
4B2xxx02	Checkstop - processor card con- nector 2 fail	1. Attempt to reboot the system in Service Mode, this preserves the AIX error log. If the reboot fails, attempt to reboot from the CD-ROM. If the reboot is successful, run Diagnostics in Problem Determination mode to determine the cause of the failure. Otherwise continue. 2. CPU Card in processor card connector 2. 3. System board. 4. I/O board (See notes on 3-1.)
4B2xxx10	Machine Check - 0	Attempt to reboot the system in Service Mode, this preserves the AIX error log. If the reboot fails, attempt to reboot from the CD-ROM. If the reboot is successful, run Diagnostics in Problem Determination mode to determine the cause of the failure. Otherwise continue. Remove processor card in slot 2 (if installed) and see if the problem is
		resolved. If problem is resolved replace processor card else continue. 3. Exchange processor card in processor card connector 1 with processor card removed from processor card connector 2 in step 2 (replace processor card if only one processor card is installed) and see if the problem is resolved. If problem is resolved replace processor card else continue.
		4. Refer to "Step 1540-25" on page 2-61.

Error Code	Description	Action / Possible Failing FRU
4B2xxx11	Machine Check - 1 (Stuck Active)	Remove processor card in processor card connector 2 (if installed) and see if the problem is resolved. If problem is resolved replace processor card else continue.
		2. Exchange processor card in processor card connector 1 with processor card removed from slot 2 in step 1 (replace processor card if only one processor card is installed) and see if the problem is resolved. If problem is resolved replace processor card else continue.
		3. Replace the system board.
4B2xxx41	ABIST fail	CPU Card in processor card connector 1. I/O board (See notes on 3-1.)
4B2xxx42	ABIST fail	CPU Card in processor card connector 2. I/O board. (See notes on 3-1.)

Table 3-1 (Page 36 of 40). Firmware Error Codes.			
Error Code	Description	Action / Possible Failing FRU	
4B2xxx43	Service Processor reports JTAG fail	For Model H50:	
		Service Processor is the least likely failure, but it is the tester in this case. Replace the service processor to assure true failure indication. If the failure disappears, the service processor was bad. Otherwise, reinstall the old service processor.	
		2. Remove the CPU(s) and the system board. If the failure returns, replace the I/O board. (See notes on 3-1.) Otherwise, continue.	
		 Install the system board WITHOUT the CPU(s). If the failure returns, replace the system board. Otherwise, con- tinue. 	
		Install the CPU Card in slot 1. If the failure returns, replace that CPU Card. Otherwise, continue.	
		 Install the CPU Card in slot 2 (if there was one). If the failure returns, replace that CPU Card. Otherwise, continue. 	
		If the failure is still absent, the problem was a bad connection, and you have reseated the possible connections.	
		For Model H70:	
		 Remove processor card in slot 2 (if installed) and see if the problem is resolved. If not, continue. Exchange processor card in slot 1 with processor card removed from slot 2 in step 1 (replace processor card if only one processor card is installed) and see if the problem is resolved. If not, continue. Replace the system board. I/O board. (See notes on 3-1.) 	
4B2xxx51	LBIST fail	CPU Card in processor card connector 1. I/O board. (See notes on 3-1.)	
4B2xxx52	LBIST fail	CPU Card in processor card connector	
152,0002		2. I/O board. (See notes on 3-1.)	

Table 3-1 (Page 37 of 40). Firmware Error Codes.			
Error Code	Description	Action / Possible Failing FRU	
4B200054	The CPU cards are not compatible with each other (i.e. one is a 166MHz and the other is a 332MHz)	Remove cards Verify part numbers Install valid cards	
4B200055	No processor found	1. If only one processor card is used, it must be in processor card connector 1. 2. If two processor cards are used: a. Replace the card in processor card connector 1 with the card in processor card connector 2 and see if the problem is resolved. If not, proceed to the next step. b. Replace the system board. c. Replace the I/O board (See notes on 3-1.)	
4B200056	No CPU card in first slot	 If only one processor card is used, it must be in slot #1. If two processor cards are used: a. Replace the card in slot #1. b. Replace the system board. c. Replace the I/O board (See notes on 3-1.) 	
4B200057	The CPU cards are not compatible with each other (i.e. one is a 166MHz and the other is a 332MHz)	Remove cards Verify part numbers Install valid cards	
4B200058	Compatibility test on processor card 0 failed	Remove cards Verify part numbers Install valid cards	
4B200059	Compatibility test on processor card 1 failed	Remove cards Verify part numbers Install valid cards	
4B20000A	No configured CPU found	Verify compatibility of CPU cards. Verify that cards are properly connected. Manually configure a CPU using the Service Processor menu.	

Table 3-1 (Pa	Table 3-1 (Page 38 of 40). Firmware Error Codes.			
Error Code	Description	Action / Possible Failing FRU		
4B201000	Checkstop	Attempt to reboot the system in Service Mode, this preserves the AIX error log. If the reboot fails, attempt to reboot from the CD-ROM. If the reboot is successful, run Diagnostics in Problem Determination mode to determine the cause of the failure. Otherwise continue.		
		2. CPU card.		
		3. System board.		
		4. PCI adapter.		
		5. I/O board (See notes on 3-1.)		
4B201020	TEA Error	Refer to "MAP 1540: Minimum Configuration" on page 2-37.		
4BA00000	The system support controller detects the service processor, but cannot establish communication. The system halts	 Replace the service processor (Model H50 only). Replace the I/O board. (See notes on 3-1.) 		
4BA00001	The system support controller cannot detect the service processor.	 Replace the service processor (Model H50 only). Replace the I/O board. (See notes on 3-1.) 		
4BA00800	Unknown error	Check level of Service Processor, if not the latest and problem persist, call for support.		
4BA00826	Service processor cannot call home	Replace the I/O board (See notes on 3-1.)		
4BA00827	Flash update floppy/diskette fail	Put image on another diskette and re-try. Replace the floppy drive.		
4BA00828	Flash update (crc) checksum fail	Replace the flash image.		
4BA00829	Bad system firmware.	Replace I/O board (See notes on 3-1.)		
4BA00830	Boot fail	See "Boot Problems and Concerns" on page 3-65.		

Table 3-1 (Page 39 of 40). Firmware Error Codes.				
Error Code	Description	Action / Possible Failing FRU		
4BA00831	Bad Service Processor image	 Insert a new DOS-formatted diskette containing the service processor firmware update into the diskette drive. The firmware image must be named spflash.img. 		
		Note: Insert the diskette only after checkpoint E080 displays.		
		 Cycle ac power and retry the flash recovery. Cycle the ac power again with another new diskette and retry the flash recovery. Replace the I/O board. 		
4BA00832	Error while doing flash update	Re-power the system; re-try the flash programming a few times. Replace I/O board (See notes on 3-1.)		
4BA10001	SSC sram fail	Refer to "MAP 1540: Minimum Configuration" on page 2-37.		
4BA10002	SSC sram fail	Refer to "MAP 1540: Minimum Configuration" on page 2-37.		
4BA10003	Service Processor Fail	For Model H50: Replace Service Processor. For Model H70: Replace I/O board.		
4BA10004	Service Processor Firmware Fail	Restore or update the service processor Flash EPROM.		
4BA10005	I ² C Path Fail.	1. I/O board (See notes on 3-1.) 2. Remove processor card in processor card connector #2 (if installed) and see if the problem is resolved. If problem is resolved replace processor card. If not, continue. 3. Exchange processor card in processor card connector #1 with the processor card removed in step 2 (or replace processor card if only one processor card exists) and see if problem is resolved. If problem is resolved replace processor card. If not, continue. 4. System board.		
4BA80013	NVRAM	Refer to "MAP 1540: Minimum Configuration" on page 2-37		
4BA80014	NVRAM (crc) checksum fail.	Recoverable temporary condition, unless succeeded by 4BA80015.		

Table 3-1 (Pa	ge 40 of 40). Firmware Error Codes.	
Error Code	Description	Action / Possible Failing FRU
4BA80015	NVRAM reintialization fail	Replace NVRAM module.

Reference Codes

Table 3-2. Reference Codes		
Reference Code	Description Action / Possible Failing FRU	
2B284A00	Illegal condition detected	Contact your next level of support. Do not replace any FRUs in an attempt to fix this problem.

Memory PD Bits

The following table expands the firmware error code 25Cyyxxx on page 3-10, where yy is the PD values in the table below. Use these values to identify the type of memory that generated the error.

If you replace FRUs and the problem is still not corrected, go to "MAP 1540: Minimum Configuration" on page 2-37 unless otherwise indicated in the tables.

Table 3-3. Memory Module PD bits			
PD value	Size	Clock Cycle (nsecs)	Parity/ ECC
58	32MB	10	ECC
38	128MB	10	ECC
68	256MB	10	ECC

Note: Memory modules must be installed in pairs.

Bus SRN to FRU Reference Table

The following table is used to locate defective FRUs within the I/O board PCI and ISA buses. The table indicates which devices should be tested for each SRN. For this procedure, if possible, diagnostics are run on the I/O board bus devices with all adapters removed from the failing bus. If a failure is detected on this system with all adapters removed from the failing bus, the I/O board is the isolated FRU. If a failure is not detected, the adapters are added back one at a time, to their original slot location, and the configuration is tested until a failure is detected. The failure is then isolated to the failing FRU.

If a failure has not been detected and all the FRUs have been tested call your technical service support person for assistance.

Table 3-4 (Page 1 of 2). Bus SRN to FRU Reference Table (Model H50 only)			
SRN	Bus Identifica- tion	Possible Failing Device and AIX Location Code	Associated FRU
9CC-100	PCI Bus 00	Internal SCSI port 1 (10-60)	I/O board. (See notes on 3-1.)
		Internal Ethernet port (10-80)	I/O board. (See notes on 3-1.)
		Device installed in I/O Slot 3P (10-68 to 10-6F)	Adapter
		Device installed in I/O Slot 4P (10-70 to 10-77)	Adapter

SRN	Bus Identifica-	Possible Failing Device and AIX Location Code	Associated FRU
		Device installed in I/O Slot 5P (10-78 to 10-7F)	Adapter
9CC-101	PCI Bus 01	Device installed in I/O Slot 1P (20-58 to 20-5F)	Adapter
		Device installed in I/O Slot 2P (20-60 to 20-67)	Adapter
9CC-102	PCI Bus 02	Internal/External SCSI port 2 (30-58)	I/O board. (See notes on 3-1.)
		Device installed in I/O Slot 6P (30-60 to 30-67)	Adapter
		Device installed in I/O Slot 7P (30-68 to 30-6F)	Adapter
		Device installed in I/O Slot 8P (30-70 to 30-77)	Adapter
		Device installed in I/O Slot 9P (30-78 to 30-7F)	Adapter
651-730	ISA Bus	Diskette Drive port/device	I/O board. (See
		(01-D1-00-00) Parallel port/device (01-R1)	notes on 3-1.) I/O board. (See notes on 3-1.)
		Serial ports (1-3)/device (01-S1 to 01-S3)	I/O board. (See notes on 3-1.)
		Mouse port/device (01-K1-01-00)	I/O board. (See notes on 3-1.)
		Keyboard port/device (01-K1-00-00)	I/O board. (See notes on 3-1.)
		Device installed in I/O Slot 8I (01-01 or 01-02)	Adapter
		Device installed in I/O Slot 9I (01-01 or 01-02)	Adapter

SRN	Bus Identifica- tion	Possible Failing Device and AIX Location Code	Associated FRU
9CC-100	PCI Bus 00	Internal SCSI port 1 (10-60)	I/O board. (See notes on 3-1.)
		Internal Ethernet port (10-80)	I/O board. (See notes on 3-1.)
		Device installed in I/O Slot 3P (10-68 to 10-6F)	Adapter
		Device installed in I/O Slot 4P (10-70 to 10-77)	Adapter

Table 3-5 (Pag	Table 3-5 (Page 2 of 2). Bus SRN to FRU Reference Table (Model H70 only)			
SRN	Bus Identifica- tion	Possible Failing Device and AIX Location Code	Associated FRU	
9CC-101	PCI Bus 01	Device installed in I/O Slot 1P (20-58 to 20-5F) Device installed in I/O Slot 2P (20-60	Adapter Adapter	
		to 20-67)	/ taptor	
9CC-102	PCI Bus 02	Internal/External SCSI port 2 (10-88)	I/O board. (See notes on 3-1.)	
		Device installed in I/O Slot 7P (30-68 to 30-6F)	Adapter	
		Device installed in I/O Slot 8P (30-70 to 30-77)	Adapter	
9CC-103	PCI Bus 03	Device installed in I/O Slot 5P (40-58 to 40-5F)	Adapter	
		Device installed in I/O Slot 6P (40-60 to 40-67)	Adapter	
651-730	ISA Bus	Diskette Drive port/device	I/O board. (See	
		(01-D1-00-00) Parallel port/device (01-R1)	notes on 3-1.) I/O board. (See notes on 3-1.)	
		Serial ports (1-3)/device (01-S1 to 01-S3)	I/O board. (See notes on 3-1.)	
		Mouse port/device (01-K1-01-00)	I/O board. (See notes on 3-1.)	
		Keyboard port/device (01-K1-00-00)	I/O board. (See notes on 3-1.)	
		Device installed in I/O Slot 8I (01-01 or 01-02)	Adapter	
		Device installed in I/O Slot 9I (01-01 or 01-02)	Adapter	

Checkpoints

Checkpoints are intended to let users and service personal know what the server is doing, with some detail, as it initializes. These checkpoints are not intended to be error indicators, but in some cases a server could hang at one of the checkpoints without displaying an 8-character error code. It is for these hang conditions, only, that any action should be taken with respect to checkpoints. The most appropriate action is included with each checkpoint.

Before taking actions listed with a checkpoint, it is a good idea to look for better symptoms in the Service Processor error log. See "System Information Menu for Model H50" on page C-13 or "System Information Menu for Model H50" on page C-13.

Model H50 Service Processor Checkpoints

Service Processor checkpoints are in the range E010 to E0FF. The message OK indicates successful service processor testing and initialization. Firmware checkpoints are listed in "Firmware Checkpoints" on page 3-52.

Note: Go to "MAP 1540: Minimum Configuration" on page 2-37 for any of the following conditions:

- A four-digit code in the range of E001 through EFFF displays on the operator panel but is not listed in the checkpoint table.
- · A four-digit code displays in the checkpoint table, but does not contain a repair action or FRU listing.
- All of the FRUs listed in the repair action have been replaced and the problem has not been corrected.

If you replace FRUs and the problem is corrected, go to MAP 410: Repair Checkout in the Diagnostic Information for Multiple Bus Systems.

Table 3-6 (Page 1 of 4). Model H50 Service Processor Checkpoints			
Checkpoint	Description	Action/ Possible Failing FRU	
E000	System Support Controller begins operation. This is an informational checkpoint.	See the note on 3-45.	
E010	Starting service processor self-tests	Service Processor (Model H50 only). I/O board. (See notes on 3-1.)	
E011	service processor self-tests com- pleted successfully	NA	
E012	Begin to set up Service Processor helps	Service Processor (Model H50 only). I/O board. (See notes on 3-1.)	
E020	Configuring CMOS	I/O board. (See notes on 3-1.) Service Processor (Model H50 only).	
E021	Configuring NVRAM	I/O board. (See notes on 3-1.) Service Processor (Model H50 only).	
E030	Beginning to build I ² C resources	1. Service Processor (Model H50 only). 2. CPU Card. 3. I/O board. 4. FMC Card. (See notes on 3-1.)	

Table 3-6 (Page 2 of 4). Model H50 Service Processor Checkpoints Checkpoint Description Action/		
E031	Finished building I ² C resources.	Possible Failing FRU 1. Service Processor (Model H50 only). 2. CPU Card. 3. I/O board. (See notes on 3-1.)
E040	Starting serial port tests	Service Processor (Model H50 only). I/O board. (See notes on 3-1.) CPU Card.
E042	Configuring serial port 1	Service Processor (Model H50 only). I/O board. (See notes on 3-1.) CPU Card.
E043	Configuring serial port 2	Service Processor (Model H50 only). I/O board. (See notes on 3-1.) CPU Card.
E044	Preparing to set serial port line speed	Service Processor (Model H50 only). I/O board. (See notes on 3-1.) CPU Card.
E045	Preparing to initialize serial port	Service Processor (Model H50 only). I/O board. (See notes on 3-1.) CPU Card.
E060	Preparing to auto power-on (AC restored)	Service Processor (Model H50 only). I/O board. (See notes on 3-1.) CPU Card.
E061	Preparing to auto power-on (Timer)	Service Processor (Model H50 only). I/O board. (See notes on 3-1.) CPU Card.
E070	Configuring modem	1. Modem. 2. Service Processor (Model H50 only). 3. I/O board. (See notes on 3-1.) 4. CPU Card.
E072	Preparing to call home	1. Modem. 2. Service Processor (Model H50 only). 3. I/O board. (See notes on 3-1.) 4. CPU Card.

Checkpoint	Description	Action/ Possible Failing FRU
E075	Entering SP menus	Service Processor (Model H50 only). I/O board. (See notes on 3-1.) CPU Card.
E076	Leaving SP menus; attempting to disconnect modems	Service Processor (Model H50 only). I/O board. (See notes on 3-1.) CPU Card.
E0A0	Beginning Bring-Up Phase	Service Processor (Model H50 only). I/O board. (See notes on 3-1.) CPU Card.
E0B0	Starting CPU BIST	CPU Card. I/O board. (See notes on 3-1.) Service Processor (Model H50 only).
E0C0	Starting X5 BIST	CPU Card. I/O board. (See notes on 3-1.) Service Processor (Model H50 only).
E0D0	Creating JTAG scanlog (failure diagnostic information)	N/Await for completion
E0E0	Pulling CPU out of reset	CPU Card. I/O board. (See notes on 3-1.) Service Processor (Model H50 only).
E0E1	Pull CPU out of reset: okay	1. Remove processor card in slot 2 (if installed) and see if the problem is resolved. If problem is resolved replace processor card. If not continue. 2. Exchange processor card in slot 1 with the processor card removed in step 1 (or replaceprocessor card exists) and see if problem is resolved. If problem is resolved replace processor card. If not continue. 3. System board. 4. I/O board. (See notes on 3-1.) 5. Service Processor (Model H50 only).

Table 3-6 (Page 4 of 4). Model H50 Service Processor Checkpoints		
Checkpoint	Description	Action/ Possible Failing FRU
E0E2	Check point for "Hot-Swap" fans and power supply.	Power supply hot-swap is in progress. Fans and power supply must be replaced within 5 minutes. After 5 minutes the service processor initiates a fast shutdown of the system.
ОК	SP Ready Waiting for Power-On	None. Normal operation.
STBY	SP Ready; System was shutdown by the operating system and is still powered on	This condition can be requested by a privileged system user with no faults. See service processor error log for possible operating system fault indications.

Model H70 Service Processor Checkpoints

Service Processor checkpoints are in the range E010 to E0FF. The message OK indicates successful service processor testing and initialization. Firmware checkpoints are listed in "Firmware Checkpoints" on page 3-52.

Note: Go to "MAP 1540: Minimum Configuration" on page 2-37 for any of the following conditions:

- A four-digit code in the range of E001 through EFFF displays on the operator panel but is not listed in the checkpoint table.
- · A four-digit code displays in the checkpoint table, but does not contain a repair action or FRU listing.
- All of the FRUs listed in the repair action have been replaced and the problem has not been corrected.

If you replace FRUs and the problem is corrected, go to MAP 410: Repair Checkout in the Diagnostic Information for Multiple Bus Systems.

Checkpoint	Description	Action/
		Possible Failing FRU
E000	System Support Controller begins operation. This is an informational checkpoint.	See the note on 3-49.
E010	Starting service processor self-tests	I/O board. (See notes on 3-1.)
E011	service processor self-tests com- pleted successfully	NA
E012	Begin to set up Service Processor helps	I/O board. (See notes on 3-1.)
E020	Configuring CMOS	I/O board. (See notes on 3-1.)
E021	Configuring NVRAM	I/O board. (See notes on 3-1.)
E030	Beginning to build I ² C resources.	1. CPU Card. 2. I/O board. (See notes on 3-1.) 3. FMC Card.
E031	Finished building I ² C resources.	 CPU Card. I/O board. (See notes on 3-1.)
E040	Starting serial port tests	1. I/O board. (See notes on 3-1.) 2. CPU Card.
E042	Configuring serial port 1	1. I/O board. (See notes on 3-1.) 2. CPU Card.
E043	Configuring serial port 2	1. I/O board. (See notes on 3-1.) 2. CPU Card.

Table 3-7 (Page	2 of 3). Model H70 Service Processor Che	eckpoints
Checkpoint	Description	Action/ Possible Failing FRU
E044	Preparing to set serial port line speed	 I/O board. (See notes on 3-1.) CPU Card.
E045	Preparing to initialize serial port	1. I/O board. (See notes on 3-1.) 2. CPU Card.
E060	Preparing to auto power-on (AC restored)	1. I/O board. (See notes on 3-1.) 2. CPU Card.
E061	Preparing to auto power-on (Timer)	1. I/O board. (See notes on 3-1.) 2. CPU Card.
E070	Configuring modem	 Modem. I/O board. (See notes on 3-1.) CPU Card.
E072	Preparing to call home	 Modem. I/O board. (See notes on 3-1.) CPU Card.
E075	Entering SP menus	1. I/O board. (See notes on 3-1.) 2. CPU Card.
E076	Leaving SP menus; attempting to disconnect modems	1. I/O board. (See notes on 3-1.) 2. CPU Card.
E080	Entering service processor emergency firmware flash recovery process.	Insert a new DOS-formatted diskette containing the service processor firmware update into the diskette drive. The firmware image must be named spflash.img.
		Note: Insert the diskette only after checkpoint E080 displays.
		 Cycle ac power and retry the flash recovery. Cycle the ac power again with another new diskette and retry the flash recovery. Replace the I/O board.
E0A0	Beginning Bring-Up Phase	1. I/O board. (See notes on 3-1.) 2. CPU Card.
E0B0	Starting CPU BIST	1. CPU Card. 2. I/O board. (See notes on 3-1.)
E0C0	Starting X5 BIST	1. CPU Card. 2. I/O board. (See notes on 3-1.)
E0D0	Creating JTAG scanlog (failure diagnostic information)	N/Await for completion
E0E0	Pulling CPU out of reset	1. CPU Card. 2. I/O board. (See notes on 3-1.)

Table 3-7 (Page 3 of 3). Model H70 Service Processor Checkpoints		
Checkpoint	Description	Action/ Possible Failing FRU
E0E1	Pull CPU out of reset: okay	1. Remove processor card in slot 2 (if installed) and see if the problem is resolved. If problem is resolved replace processor card. If not continue. 2. Exchange processor card in slot 1 with the processor card removed in step 1 (or replaceprocessor card if only one processor card exists) and see if problem is resolved. If problem is resolved replace processor card. If not continue. 3. System board. 4. I/O board. (See notes on 3-1.)
E0E2	Check point for hot-swap fans and power supply.	Power supply hot-swap is in progress. Fans and power supply must be replaced within 5 minutes. After 5 minutes the service processor initiates a fast shutdown of the system.
OK	SP Ready Waiting for Power-On	None. Normal operation.
STBY	SP Ready; System was shutdown by the operating system and is still powered on.	This condition can be requested by a privileged system user with no faults. See service processor error log for possible operating system fault indications.

Firmware Checkpoints

Firmware uses progress codes (checkpoints) in the range of E1xx to EFFF. These checkpoints occur during system startup and maybe be useful in diagnosing certain problems. Service Processor checkpoints are listed in "Model H50 Service Processor Checkpoints" on page 3-45.

If you replace FRUs and the problem is still not corrected, go to "MAP 1540: Minimum Configuration" on page 2-37 unless otherwise indicated in the tables.

Table 3-8 (Page 1 of 10). Firmware Checkpoints.		
Checkpoint	Description	Action/ Possible Failing FRU
E100	Reserved	See the note on 3-45.
E101	Video enabled, extended memory test	See the note on 3-45.
E102	Firmware restart	See the note on 3-45.
E103	Set memory refresh (composite img)	See the note on 3-45.
E104	Set memory refresh (recovery block)	See the note on 3-45.
E105	Transfer control to Operating System (normal boot).	See "Boot Problems and Concerns" on page 3-65.
E108	Run recovery block base memory (test 2K), set stack	See the note on 3-45.
E109	Copy CRC verification code to RAM	See the note on 3-45.
E10A	Turn on cache	See the note on 3-45.
E10B	Flush cache	See the note on 3-45.
E10C	Jump to CRC verification code in RAM	See the note on 3-45.
E10D	Compute composite image CRC	See the note on 3-45.
E10E	Jump back to ROM	See the note on 3-45.
E10F	Transfer control to Open Firmware	See the note on 3-45.
E110	Turn off cache, Check if composite image CRC is valid	See the note on 3-45.
E111	GOOD CRC - jump to composite image	See the note on 3-45.
E112	BAD CRC - initialize base memory, stack	See the note on 3-45.
E113	BAD CRC - copy uncompressed recovery block code to RAM	See the note on 3-45.
E114	BAD CRC - jump to code in RAM	See the note on 3-45.
E115	BAD CRC - turn on cache	See the note on 3-45.

Table 3-8 (Page 2 of 10). Firmware Checkpoints.		
Checkpoint	Description	Action/ Possible Failing FRU
E116	BAD CRC - copy recovery block data section to RAM	See the note on 3-45.
E117	BAD CRC - Invalidate and flush cache, set TOC	See the note on 3-45.
E118	BAD CRC - branch to high level recovery control routine.	See the note on 3-45.
E119	Initialize base memory, stack	See the note on 3-45.
E11A	Copy uncompressed recovery block code to RAM	See the note on 3-45.
E11B	Jump to code in RAM	See the note on 3-45.
E11C	Turn on cache	See the note on 3-45.
E11D	Copy recovery block data section to RAM	See the note on 3-45.
E11E	Invalidate and flush cache, set TOC	See the note on 3-45.
E11F	Branch to high level control routine.	See the note on 3-45.
E120	Initialize I/O and early memory block	See the note on 3-45.
E121	Initialize service processor	See the note on 3-45.
E122	No memory detected (system lockup) Note: Disk drive light is on continuously.	Go to "MAP 1240: Memory Problem Resolution" on page 2-10.
E123	No memory module found in socket.	See the note on 3-45.
E124	Disable defective memory bank	See the note on 3-45.
E125	Clear PCI devices command reg, go forth	See the note on 3-45.
E126	Check valid image - start	See the note on 3-45.
E127	Check valid image - successful	See the note on 3-45.
E128	Disable interrupts, set interrupt vectors for Open Firmware.	See the note on 3-45.
E129	Validate target RAM address	See the note on 3-45.
E12A	Copy ROM to RAM, flush cache	See the note on 3-45.
E12B	Set MP operational parameters	See the note on 3-45.
E12C	Set MP CPU node characteristics	See the note on 3-45.
E12D	Park secondary processors in parking lot	See the note on 3-45.
E12E	Primary processor sync	See the note on 3-45.
E12F	Unexpected return from Open Firmware (system lockup)	See the note on 3-45.

Table 3-8 (Page 3 of 10). Firmware Checkpoints.		
Checkpoint	Description	Action/ Possible Failing FRU
E130	Build device tree	See the note on 3-45.
E131	Create ROOT node	See the note on 3-45.
E132	Create cpus node	See the note on 3-45.
E133	Create L2 Cache node	See the note on 3-45.
E134	Create memory node	See the note on 3-45.
E135	Create memory module node	See the note on 3-45.
E136	Test memory	See the note on 3-45.
E137	Create openprom node	See the note on 3-45.
E138	Create options node	See the note on 3-45.
E139	Create aliases node and system aliases	See the note on 3-45.
E13A	Create packages node	See the note on 3-45.
E140	PReP style load	See the note on 3-45.
E149	Create boot mgr node	See the note on 3-45.
E14C	Create terminal-emulator node	See the note on 3-45.
E14D	Load boot image	See "Boot Problems and Concerns" on page 3-65.
E14E	Create client interface node/directory	See the note on 3-45.
E14F	NVRAM validation, config variable token generation	See the note on 3-45.
E150	Create host (primary) PCI controller node	See the note on 3-45.
E151	Probing primary PCI bus	Go to "Step 1540-25" on page 2-61
		If a network adapter or I\O board is replaced, see 3-1.
E152	Probe for adapter FCODE, evaluate	Go to "Step 1540-25" on page 2-61
	if present	If a network adapter or I\O board is replaced, see 3-1.
E153	End adapter FCODE,	Go to "Step 1540-25" on page 2-61
	probe/evaluation	If a network adapter or I\O board is replaced, see 3-1.
E154	Create PCI bridge node	Go to "Step 1540-25" on page 2-61
		If a network adapter or I\O board is replaced, see 3-1.

Checkpoint	Description	Action/ Possible Failing FRU
E155	Probe PCI bridge secondary bus	Go to "Step 1540-25" on page 2-61.
		If a network adapter or I\O board is replaced, see 3-1.
E156	Create PCI Ethernet node	See the note on 3-45.
E15A	Create 64 bit host (primary) PCI controller node	See the note on 3-45.
E15B	Transferring control to Operating System (service mode boot)	See "Boot Problems and Concerns" on page 3-65.
E15C	Probe primary 64 bit PCI bus	See the note on 3-45.
E15D	Create host PCI controller node	See the note on 3-45.
E15E	Create MPIC node	See the note on 3-45.
E15F	Adapter VPD probe	See the note on 3-45.
E160	CPU node VPD creation	See the note on 3-45.
E161	Root node VPD creation	See the note on 3-45.
E162	service processor node VPD creation	See the note on 3-45.
E164	Create PCI graphics node (P9)	See the note on 3-45.
E168	Create PCI graphics node (S3)	See the note on 3-45.
E16C	GTX100P Subsystem Open request.	See the note on 3-45.
E16D	GTX100P Planar not detected or failed diagnostics.	See the note on 3-45.
E16E	GTX100P Subsystem Open successful.	See the note on 3-45.
E16F	GTX100P Close Subsystem.	See the note on 3-45.
E170	Start of PCI Bus Probe	See the note on 3-45.
E171	Executing PCI-Delay function	See the note on 3-45.
E174	Establish host connection	Refer to "Boot Problems and Concerns" on page 3-65 for general considerations.
E175	BootP request	Refer to "Boot Problems and Concerns" on page 3-65 for genera considerations.
		Turn off then on, and retry the boot operation. Verify the network connection (network could be down). Have network administrator verify the server configuration for this client.

Checkpoint	Description	Action/ Possible Failing FRU
E176	TFTP file transfer	See the note on 3-45.
E177	Transfer failure due to TFTP error condition	See the note on 3-45.
E178	Create PCI token ring node	See the note on 3-45.
E180	Service Processor Command setup	See the note on 3-45.
E183	Service Processor Post	See the note on 3-45.
E190	Create ISA node	See the note on 3-45.
E193	Initialize Super I/O	See the note on 3-45.
E196	Probe ISA bus	See the note on 3-45.
E19B	Create Service Processor node	See the note on 3-45.
E19C	Create tablet node	See the note on 3-45.
E19D	Create NVRAM node	See the note on 3-45.
E19E	Real time clock (RTC) creation and initialization	Refer to error code 28030xxx in "Firmware/POST Error Codes" on page 3-2.
E19F	Create EEPROM node	See the note on 3-45.
E1AD	See description of checkpoint E1DE	See the note on 3-45.
E1B0	Create lpt node	I/O board (See notes on 3-1).
		See the note on 3-45.
E1B1	Create serial node	See the note on 3-45.
E1B2	Create audio node	I/O board (See notes on 3-1).
		See the note on 3-45.
E1B3	Create 8042 node	I/O board (See notes on 3-1).
		See the note on 3-45.
E1B6	Probe for (ISA) keyboard	I/O board (See notes on 3-1).
		See the note on 3-45.
E1BA	Enable L2 cache	See the note on 3-45.
E1BB	Set cache parms for burst	See the note on 3-45.
E1BC	Set cache parms for 512KB	See the note on 3-45.
E1BD	Probe for (ISA) mouse	I/O board (See notes on 3-1).
		See the note on 3-45.
E1BE	Create op-panel node	See the note on 3-45.
E1BF	Create pwr-mgmt node	See the note on 3-45.
E1C0	Create ISA Ethernet node	See the note on 3-45.

Checkpoint Description Action/ Possible Failing FRU	Table 3-8 (Page 6 of 10). Firmware Checkpoints.		
See the note on 3-45.	Checkpoint	Description	
E1C6 Create dma node See the note on 3-45. E1D0 Create PCI SCSI node See the note on 3-45. E1D3 Create (* wildcard *) SCSI block device node (SD) E1D4 Create (* wildcard *) SCSI blyte device node (ST) E1DB Create floppy controller (FDC) node I/O board (See notes on 3-1). E1DC Dynamic console selection If a console is attached but nothing is displayed on it, follow the steps associated with "All display problems" in the Entry MAP tables. If selection screen(s) can be seen on the terminals and the appropriate key on the input device associated with the desired display or terminal is pressed, within 60 seconds, but there is no response to the keystroke: 1. If selecting the console with a keyboard attached to the system, replace the keyboard. If replacing the keyboard does not fix the problem, replace the I/O board. (See notes on 3-1.) 2. If selecting the console with an ASCII terminal, Use the Problem Determination Procedures for the terminal. Replace the I/O board if these procedures do not reveal a problem. Note: Terminal settings should be set to: 9 9600 Baud No Parity 8 Data bits 1 Stop bit E1DD Early processor exception I/O board (See notes on 3-1.)	E1C5		I/O board (See notes on 3-1).
E1D0 Create PCI SCSI node See the note on 3-45. E1D3 Create (* wildcard *) SCSI block device node (SD) E1D4 Create (* wildcard *) SCSI byte device node (ST) E1DB Create floppy controller (FDC) node E1DC Dynamic console selection If a console is attached but nothing is displayed on it, follow the steps associated with "All display problems" in the Entry MAP tables. If selection screen(s) can be seen on the terminals and the appropriate key on the input device associated with the desired display or terminal is pressed, within 60 seconds, but there is no response to the keystroke: 1. If selecting the console with a keyboard attached to the system, replace the keyboard. If replacing the keyboard does not fix the problem, replace the I/O board. (See notes on 3-1.) 2. If selecting the console with an ASCII terminal, suspect the ASCII terminal. Suse the Problem Determination Procedures for the terminal. Replace the I/O board if these procedures do not reveal a problem. Note: Terminal settings should be set to: 9600 Baud No Parity 8 Data bits 1 Stop bit E1DD Early processor exception I/O board (See notes on 3-1.)		node	See the note on 3-45.
E1D3 Create (* wildcard *) SCSI block device node (SD) E1D4 Create (* wildcard *) SCSI byte device node (ST) E1DB Create floppy controller (FDC) node I/O board (See notes on 3-45. E1DC Dynamic console selection If a console is attached but nothing is displayed on it, follow the steps associated with "All display problems" in the Entry MAP tables. If selection screen(s) can be seen on the terminals and the appropriate key on the input device associated with the desired display or terminal is pressed, within 60 seconds, but there is no response to the key-stroke: 1. If selecting the console with a keyboard attached to the system, replace the keyboard. If replacing the keyboard does not fix the problem, replace the I/O board. (See notes on 3-1.) 2. If selecting the console with an ASCII terminal, suspect the ASCII terminal. Use the Problem Determination Procedures for the terminals approached the I/O board if these procedures do not reveal a problem. Note: Terminal settings should be set to: 9600 Baud No Parity 8 Data bits 1 Stop bit E1DD Early processor exception I/O board (See notes on 3-1.)	E1C6	Create dma node	See the note on 3-45.
device node (SD) E1D4 Create (* wildcard *) SCSI byte device node (ST) E1DB Create floppy controller (FDC) node I/O board (See notes on 3-1). See the note on 3-45. E1DC Dynamic console selection If a console is attached but nothing is displayed on it, follow the steps associated with "All display problems" in the Enry MAP tables. If selection screen(s) can be seen on the terminals and the appropriate key on the input device associated with the desired display or terminal is pressed, within 60 seconds, but there is no response to the keystroke: 1. If selecting the console with a keyboard attached to the system, replace the keyboard. If replacing the keyboard does not fix the problem, replace the I/O board. (See notes on 3-1.) 2. If selecting the console with an ASCII terminal, suspect the ASCII terminal. Use the Problem Determination Procedures for the terminal. Replace the I/O board if these procedures do not reveal a problem. Note: Terminal settings should be set to: 9600 Baud No Parity 8 Data bits 1 Stop bit E1DD Early processor exception I/O board (See notes on 3-1.)	E1D0	Create PCI SCSI node	See the note on 3-45.
device node (ST) E1DB Create floppy controller (FDC) node I/O board (See notes on 3-1). See the note on 3-45. E1DC Dynamic console selection If a console is attached but nothing is displayed on it, follow the steps associated with "All display problems" in the Entry MAP tables. If selection screen(s) can be seen on the terminals and the appropriate key on the input device associated with the desired display or terminal is pressed, within 60 seconds, but there is no response to the key-stroke: 1. If selecting the console with a keyboard attached to the system, replace the l/O board. (See notes on 3-1.) 2. If selecting the console with an ASCII terminal, suspect the ASCII terminal. Use the Problem Determination Procedures for the terminal. Replace the l/O board if these procedures do not reveal a problem. Note: Terminal settings should be set to: 9600 Baud No Parity 8 Data bits 1 Stop bit E1DD Early processor exception	E1D3	, ,	See the note on 3-45.
E1DC Dynamic console selection If a console is attached but nothing is displayed on it, follow the steps associated with "All display problems" in the Entry MAP tables. If selection screen(s) can be seen on the terminals and the appropriate key on the input device associated with the desired display or terminal is pressed, within 60 seconds, but there is no response to the keystroke: 1. If selecting the console with a keyboard attached to the system, replace the keyboard. If replacing the keyboard does not fix the problem, replace the I/O board. (See notes on 3-1.) 2. If selecting the console with an ASCII terminal, suspect the ASCII terminal. Use the Problem Determination Procedures for the terminal. Replace the I/O board if these procedures do not reveal a problem. Note: Terminal settings should be set to: 9600 Baud No Parity 8 Data bits 1 Stop bit E1DD Early processor exception I/O board (See notes on 3-1.)	E1D4		See the note on 3-45.
E1DC Dynamic console selection If a console is attached but nothing is displayed on it, follow the steps associated with "All display problems" in the Entry MAP tables. If selection screen(s) can be seen on the terminals and the appropriate key on the input device associated with the desired display or terminal is pressed, within 60 seconds, but there is no response to the keystroke: 1. If selecting the console with a keyboard attached to the system, replace the keyboard. If replacing the keyboard does not fix the problem, replace the I/O board. (See notes on 3-1.) 2. If selecting the console with an ASCII terminal, suspect the ASCII terminal. Use the Problem Determination Procedures for the terminal. Replace the I/O board if these procedures do not reveal a problem. Note: Terminal settings should be set to: 9600 Baud No Parity 8 Data bits 1 Stop bit E1DD Early processor exception I/O board (See notes on 3-1.)	E1DB	Create floppy controller (FDC) node	I/O board (See notes on 3-1).
is displayed on it, follow the steps associated with "All display problems" in the Entry MAP tables. If selection screen(s) can be seen on the terminals and the appropriate key on the input device associated with the desired display or terminal is pressed, within 60 seconds, but there is no response to the keystroke: 1. If selecting the console with a keyboard attached to the system, replace the keyboard. If replacing the keyboard does not fix the problem, replace the I/O board. (See notes on 3-1.) 2. If selecting the console with an ASCII terminal, suspect the ASCII terminal. Use the Problem Determination Procedures for the terminal. Replace the I/O board if these procedures do not reveal a problem. Note: Terminal settings should be set to: 9600 Baud No Parity 8 Data bits 1 Stop bit E1DD Early processor exception I/O board (See notes on 3-1.)			See the note on 3-45.
on the terminals and the appropriate key on the input device associated with the desired display or terminal is pressed, within 60 seconds, but there is no response to the keystroke: 1. If selecting the console with a keyboard attached to the system, replace the keyboard. If replacing the keyboard does not fix the problem, replace the I/O board. (See notes on 3-1.) 2. If selecting the console with an ASCII terminal, suspect the ASCII terminal. Use the Problem Determination Procedures for the terminal. Replace the I/O board if these procedures do not reveal a problem. Note: Terminal settings should be set to: 9600 Baud No Parity 8 Data bits 1 Stop bit Early processor exception I/O board (See notes on 3-1.)	E1DC	Dynamic console selection	is displayed on it, follow the steps associated with "All display prob-
keyboard attached to the system, replace the keyboard. If replacing the keyboard does not fix the problem, replace the I/O board. (See notes on 3-1.) 2. If selecting the console with an ASCII terminal, suspect the ASCII terminal. Use the Problem Determination Procedures for the terminal. Replace the I/O board if these procedures do not reveal a problem. Note: Terminal settings should be set to: 9600 Baud No Parity 8 Data bits 1 Stop bit E1DD Early processor exception I/O board (See notes on 3-1.)			on the terminals and the appropriate key on the input device associated with the desired display or terminal is pressed, within 60 seconds, but there is no response to the key-
ASCII terminal, suspect the ASCII terminal. Use the Problem Determination Procedures for the terminal. Replace the I/O board if these procedures do not reveal a problem. Note: Terminal settings should be set to: 9600 Baud No Parity 8 Data bits 1 Stop bit E1DD Early processor exception I/O board (See notes on 3-1.)			keyboard attached to the system, replace the keyboard. If replacing the keyboard does not fix the problem, replace the
No Parity 8 Data bits 1 Stop bit E1DD Early processor exception I/O board (See notes on 3-1.)			ASCII terminal, suspect the ASCII terminal. Use the Problem Determination Procedures for the terminal. Replace the I/O board if these procedures do not reveal a problem. Note: Terminal settings should
• 8 Data bits • 1 Stop bit E1DD Early processor exception I/O board (See notes on 3-1.)			• 9600 Baud
• 1 Stop bit E1DD Early processor exception I/O board (See notes on 3-1.)			No Parity
E1DD Early processor exception I/O board (See notes on 3-1.)			8 Data bits
			1 Stop bit
See the note on 3-45.	E1DD	Early processor exception	I/O board (See notes on 3-1.)
			See the note on 3-45.

Table 3-8 (Page 7 of 10). Firmware Checkpoints.		
Checkpoint	Description	Action/ Possible Failing FRU
E1DE	Alternating pattern of E1DE and E1AD is used to indicate a Default Catch condition before the firmware "checkpoint" word is available.	1. I/O board (See notes on 3-1.) See the note on 3-45.
E1DF	Create diskette drive (disk) node	See the note on 3-45.
E1E0	Program flash	See the note on 3-45.
E1E1	Flash update complete	See the note on 3-45.
E1E2	Initialize System I/O	See the note on 3-45.
E1E3	PReP boot image initialization	See the note on 3-45.
E1E4	Initialize Super I/O with default values	See the note on 3-45.
E1E5	XCOFF boot image initialization	See the note on 3-45.
E1E6	Set up early memory allocation heap	See the note on 3-45.
E1E7	PE boot image initialization	See the note on 3-45.
E1E8	Initialize primary diskette drive (polled mode)	See the note on 3-45.
E1E9	ELF boot image initialization	See the note on 3-45.
E1EA	Firmware flash corrupted, load from diskette	Ensure that the diskette installed contains recovery image appropriate for this system unit.
		The System Management Services recovery procedure for the flash EEPROM should be executed. See "Update" on page 6-23.
		If the diskette is installed with the correct recovery image, then suspect:
		 Diskette Diskette drive Diskette cable I/O board (See notes on 3-1.)
		See the note on 3-45.

Table 3-8 (Page 8 of 10). Firmware Checkpoints.		
Checkpoint	Description	Action/ Possible Failing FRU
E1EB	Verify flash EPROM recovery image	Ensure that the diskette installed contains recovery image appropriate for this system unit.
		The System Management Services recovery procedure for the flash EEPROM should be executed. See "Update" on page 6-23.
		If the diskette is installed with the correct recovery image, then suspect:
		Diskette Diskette drive Diskette cable I/O board (See notes on 3-1.)
		See the note on 3-45.
E1EC	Get recovery image entry point	See the note on 3-45.
E1ED	Invalidate instruction cache	See the note on 3-45.
E1EE	Jump to composite image	See the note on 3-45.
E1EF	Erase flash	See the note on 3-45.
E1F0	Start O.B.E.	See the note on 3-45.
E1F1	Begin self-test sequence on boot device(s)	See the note on 3-45.
E1F2	Power-On Password prompt	Prompt should be visible on the system console.
		If a console is attached but nothing is displayed on it, go to the "Entry MAP" on page 2-1 with the symptom "All display problems."
E1F3	Privileged-Access Password prompt	Prompt should be visible on the system console.
		If a console is attached but nothing is displayed on it, go to the "Entry MAP" on page 2-1 with the symptom "All display problems."
E1F5	Build boot device list	See the note on 3-45.
E1F6	Determine boot device sequence	See the note on 3-45.
E1F7	No boot image located	See the note on 3-45.
E1FB	Scan SCSI bus for attached devices.	See the note on 3-45.

Table 3-8 (Page	9 of 10). Firmware Checkpoints.	
Checkpoint	Description	Action/ Possible Failing FRU
E1FD	Default Catch	The operator panel alternates between the code E1FD and another Exxx code, where Exxx is the point at which the error occurred. If the Exxx is not listed in this table, go to "MAP 1540: Minimum Configuration" on page 2-37.
E201	Setup PHB BARC addresses	Replace the I/O board (See notes on 3-1.) See the note on 3-45.
E202	Initialize PHB registers and PHB's PCI configuration registers.	Replace the I/O board (See notes on 3-1.) See the note on 3-45.
E203	Look for PCI to ISA bridge	Replace the I/O board (See notes on 3-1.) See the note on 3-45.
E204	Setup ISA bridge PCI config. registers and initialize	Replace the I/O board (See notes on 3-1.) See the note on 3-45.
E206	Look for PRISM on PCG and switch to 50MHz	Replace the I/O board (See notes on 3-1.) See the note on 3-45.
E207	Setup Data gather mode and 64/32-bit mode on PCG	Replace the I/O board (See notes on 3-1.) See the note on 3-45.
E208	Assign bus number on PCG	Replace the I/O board (See notes on 3-1.) See the note on 3-45.
E209	Assign PCI I/O addresses on PCI	Replace the I/O board (See notes on 3-1.) See the note on 3-45.
E20?	Assign PCI I/O addresses on PCG	Replace the I/O board. (See notes on 3-1.) See the note on 3-45.
E20A	Check MCERs stuck at fault	Replace the system board. If the problem persists, go to "MAP 1240: Memory Problem Resolution" on page 2-10.
E20B	Send memory initialize command, wait for completion.	Replace the system board. If the problem persists, go to "MAP 1240: Memory Problem Resolution" on page 2-10.
E20C	Testing L2 cache	1. Processor card (See notes on 3-1.) 2. I/O board
E211	IPL ROS CRC checking	See the note on 3-45. Replace the I/O board (See notes
	E 1100 of to brioding	on 3-1.) See the note on 3-45.
E212	Processor POST	Replace the CPU card (See notes on 3-1.) See the note on 3-45.

Table 3-8 (Page 10 of 10). Firmware Checkpoints.			
Checkpoint	Description	Action/ Possible Failing FRU	
E213	Initial memory configuration	Go to "MAP 1240: Memory Problem Resolution" on page 2-10.	
E214, E218	Memory test	Go to "MAP 1240: Memory Problem Resolution" on page 2-10.	
E216	Copy ROS into RAM. Setup Translation and C environment	Replace the memory card (See notes on 3-1.) See the note on 3-45.	
E220	Final memory configuration	Go to "MAP 1240: Memory Problem Resolution" on page 2-10.	
E297	Start firmware softload path execution.	See the note on 3-45.	
E298	Start firmware recovery path execution.	See the note on 3-45.	
E299	Start C code execution	See the note on 3-45.	
ЕЗхх	Memory test	Go to "MAP 1240: Memory Problem Resolution" on page 2-10.	
E440	Validate NVRAM, initialize partitions as needed	Verify that the system and service processor firmware levels are at the current release levels, update as necessary. Replace the memory card (See notes on 3-1.) See the note on 3-45.	
E441	Generate /options node NVRAM configuration variable properties		
E442	Validate NVRAM partitions	Verify that the system and service processor firmware levels are at the current release levels, update as necessary. Replace the memory card (See notes on 3-1.) See the note on 3-45.	
E443	Generate NVRAM configuration variable dictionary words	Suspect a system firmware problem if this problem persists. Verify that the system firmware is at the current release level, update as necessary. See the note on 3-45.	

Memory Test Hang Problem

General Memory Information

Memory cards can be installed in either slot (or both) on the system board, there is no requirement that one be installed before the other.

It is perfectly acceptable for there to be two partially populated memory cards, the first one does not have to be fully populated before memory on the second memory card is usable.

Memory card memory modules, on the other hand, must be installed in matched (size and speed) pairs. Refer to "Memory Cards and Memory Modules" on page 7-34 for labeling of the memory card and instructions on module removal and installation (do not, however, replace the covers as directed while troubleshooting this problem). A single memory module pair may be installed in module slots 1 and 2 (not slots 1 and 3). A second memory module pair could be installed in module slots 5 and 6 (slots 3 and 4 do not have to be populated first). Along these same lines, there is no requirement that memory module slots 1 and 2 be populated before another slot pair.

Problem resolution steps: This section attempts to trouble shoot a problem during the memory testing where the system hangs before an error code can be displayed on the operator panel.

- 1. Power down the system.
- 2. Remove and re-install any installed memory cards, power the system up. If the system no longer stops at an E3xx code, re-seating the memory card(s) has corrected the problem.
- 3. Attempt to isolate the problem to a specific memory card.
 - a. If there is only one memory card installed, tag the card as suspect bad and skip to step 4 on page 3-63.
 - b. Remove one of the two memory cards, tag the card as suspect bad and Power the system up. If the system no longer stops at an E3xx code, skip to step 3d on page 3-63.
 - c. Power down the system, remove the installed memory card and install the memory card removed in step 3b. Move the suspect bad tag from the installed memory card to the one just removed, and power the system up. If the system stops at an E3xx code, remove the suspect bad tag and skip to step 7 on page 3-64, if the system does not stop at an E3xx code, skip to step 4 on page 3-63.

- d. Power down the system, remove the installed memory card and install the memory card removed in step 3b (tagged as suspect bad). Power the system up. If the system stops at an E3xx code again, skip to step 4 on page 3-63.
- e. Remove the suspect bad tag, re-install the second memory card and power the system up. If the system no longer stops at an E3xx code, re-seating the memory cards (again) has corrected the problem. If the system stops at an E3xx code again, skip to step 7 on page 3-64.
- 4. Attempt to isolate the problem to a specific memory module pair on the memory card tagged as suspect bad:
 - a. Power the system down.
 - b. Remove all installed memory modules from the suspect bad memory card except one pair. Record the original positions of any memory modules removed so that when instructed to re-install them they can be installed in their original position.
 - c. Power the system up.
 - d. If the system no longer stops at an E3xx code, skip to step 4g.
 - e. Exchange the memory module pair left installed in step 4b with another pair of memory modules and tag the removed memory module pair as suspect bad.
 - f. Power the system up. If the system stops at an E3xx code, skip to step 6 on page 3-64.
 - g. Power down the system.
 - h. If there are more memory module pairs to be re-installed on the suspect bad memory card, install another memory module pair in their original positions on the memory card, and continue with step 4i.
 - If there are no more memory module pairs to be re-installed, you either have a suspect bad memory module pair or simply reseating the memory modules on the memory card has corrected the problem. If you have a suspect bad memory module pair, continue with step 5.
 - i. Power the system up.
 - j. If the system does not stop at an E3xx code, continue at step 4g.
 - k. If the system has stopped at an E3xx code again, replace the memory module pair that was just re-installed and tag the removed memory module pair as suspect bad.
 - I. Power the system up. If the system again stops at an E3xx code, continue with step 6 on page 3-64. If the system does not stop at an E3xx code, continue with step 4g.
- 5. Determine which of the suspect bad memory modules is defective (may be both). For each of the two memory modules tagged as suspect bad:

- a. Power the system down. Removing the currently installed memory module first, re-install one of the two suspect bad memory modules in its original position.
- b. Power the system up. If the system again stops at an E3xx code, the memory module tagged suspect bad just installed is defective, replace it with the memory module removed in step 5a. If the system did not stop at an E3xx code, remove the suspect bad tag from the memory module just installed - it is not defective.
- 6. Replace the memory card
- 7. Replace the system board.
- 8. Replace the CPU card(s).

Boot Problems and Concerns

Depending on the boot device, a checkpoint may be displayed on the operator panel for an extended period of time while the boot image is retrieved from the device. This is particularly true for Tape and Network boot attempts. If booting from CD-ROM or tape, watch for activity on the drive's LED indicator. A blinking LED means that the loading of either the boot image or additional information required by the operating system being booted is still in progress. If the checkpoint is displayed for an extended period of time and the drive LED is not indicating any activity there may be a problem loading the boot image from the device.

Notes:

For network boot attempts, if the system is not connected to an active network or if the target server is inaccessible (this can also result from incorrect IP parameters being supplied), the system still attempts to boot and because time-out durations are necessarily long to accommodate retries, the system may appear to be hung.

This procedure assumes that a CD-ROM drive is installed and connected to the integrated SCSI port 1 connector (Model H50 J25, Model H70 J12), and a Diagnostics CD-ROM is available.

- 1. Restart the system and get to the Firmware SMS Main Menu. Select "Multiboot".
 - Check if the intended boot device is correctly specified in the boot sequence.
 - If the intended boot device is not correctly identified in the boot sequence, add it to the boot sequence using the SMS menus (if the intended boot device cannot be added to the boot sequence go to step 3 on page 3-66.
 - If attempting to boot from the network go to step 2.
 - If attempting to boot from a disk drive or CD-ROM go to step 3 on page 3-66.
- 2. If attempting to boot from the network:
 - · Verify that IP parameters are correct.
 - Attempt to "Ping" the target server using the SMS "Ping" utility. If the ping is successful, have network administrator verify the server configuration for this client.
 - Check with network administrator to ensure that the network is up (network could be down).
 - · Power Off then On and retry the boot operation.

- Check network cabling to adapter.
- 3. Try to boot and run standalone diagnostics against the system, particularly against the intended boot device.
 - Turn the power on.
 - Insert the diagnostic CD-ROM into the CD-ROM drive, if you cannot insert the diagnostic CD-ROM:
 - a. Replace CD-ROM drive.
 - b. Replace power distribution board.
 - c. Replace I/O board.(See notes on 3-1.)
 - If the intended boot device is not listed in the "NEW RESOURCE" list go to "MAP 0290: Missing Resource Problem Resolution" in the *Diagnostic Information for Multiple Bus Systems*.
 - If a SRN, not an 8-digit error code, is reported, go to the Diagnostic Information For Multiple Bus Systems manual.
 - If the diagnostics are successful, it may be necessary to perform an operating system specific recovery process, or reinstall the operating system.
 - If unable to load standalone diagnostics:
 - a. Verify proper SCSI bus termination.
 - b. Check SCSI cabling (signal and power cables).
 - c. It is possible that another attached SCSI device is causing the problem
 - Disconnect the signal and power cables from the hot-swap bay backplanes.
 - Disconnect the disk drives in the hot-swap bay from the backplane.
 - Disconnect the signal and power cables from any other SCSI devices attached to the SCSI adapter that the CD-ROM drive is attached to.
 - Try to boot the standalone diagnostics again.
 - If unable to load standalone diagnostics, go to step 4 on page 3-67.
 - If standalone diagnostics load, one of the disconnected devices is causing the problem, reconnect the devices one at a time and retry the boot operation until the problem recurs and replace the device that caused the problem (if the problem appears to be one of the disk drives in the hot-swap bay be aware it could be either the disk drive, the backplane, or the power distribution board). Go to "MAP 0410: Repair Checkout" in the *Diagnostic Information for Multiple Bus Systems*.

- 4. It is possible that another installed adapter is causing the problem.
 - · Remove all installed adapters except the one the CD-ROM drive is attached to and the one used for the console.
 - Try to boot the standalone diagnostics again.
 - If unable to load standalone diagnostics, go to step 5
 - If standalone diagnostics load, re-install adapters (and attached devices as applicable) one at a time and retry the boot operation until the problem recurs. Then replace the adapter or device that caused the problem (I/O board can also cause the device or adapter to fail). Go to "MAP 0410: Repair Checkout" in the Diagnostic Information for Multiple Bus Systems.
- 5. Either the CD-ROM drive, SCSI adapter, the graphics adapter, or the I/O board is most likely defective. A TTY terminal attached to the serial port also can be used to determine if the graphics adapter is causing the problem. This is done by removing the graphics adapter, attaching a TTY to the serial, and retrying standalone diagnostics. If the standalone diagnostics load, the graphic adapter should be replaced.
 - · Replace CD-ROM drive.
 - If the CD-ROM drive is attached to a SCSI adapter card rather than the integrated SCSI adapter on the I/O board, replace SCSI adapter.
 - Replace I/O Board.(See notes on 3-1.)
 - If you replaced the indicated FRUs and the problem is still not corrected, or the above descriptions did not address your particular situation, go to "MAP 1540: Minimum Configuration" on page 2-37.
 - Go to "MAP 0410: Repair Checkout" in the Diagnostic Information for Multiple Bus Systems.

Location Codes

This system unit uses Physical Location Codes in conjunction with AIX Location Codes to provide mapping of the failing field replaceable units (FRUs). The location codes are produced by the system unit's firmware and AIX.

Physical Location Codes

Physical location codes provide a mapping of logical functions in a platform (or expansion sites for logical functions, such as connectors or ports) to their specific locations within the physical structure of the platform.

Location Code Format

The format for the location code is an alphanumeric string of variable length, consisting of a series of location identifiers, separated by the standard dash (-) or slash (/) character. The series is hierarchical; that is, each location identifier in the string is a physical child of the one preceding it.

- The (dash) separator character represents a normal structural relationship where the child is a separate physical package and it plugs into (or is connected to) the parent. For example, P1-C1 is a CPU card (C1) plugged into a planar (P1), or P1-M1 is a memory card (M1) plugged into a planar (P1).
- The / (slash) separator character separates the base location code of a function from any extended location information. A group of logical devices can have the same base location code because they are all on the same physical package, but may require extended location information to describe the connectors they support. For example, P2/S1 describes the location of the serial port 1 controller and its connector (S1), which is located on planar P2 (its base location code), but the / indicates that further devices can be connected to it at the external S1 serial connector. The keyboard controller and its connector likewise have location code P2/K1, which means they have the same base location code (P2) as serial port 1, but a different external connector. In contrast, the location code P2-K1 actually points to the device connected to connector K1; that is, the keyboard. The location code P2/Z1 indicates an integrated SCSI controller which drives connector Z1, while location codes of P2-Z1-... point to the actual SCSI bus and devices.

Each location identifier consists of one alpha prefix character that identifies a location type, and a decimal integer number (typically one or two digits) that identifies a specific instance of this location type. Certain location types may also support sec-

ondary sub-locations, which are indicated by appending a period (".") character and a sub-location instance number.

Specifically, the format of a location code is defined as follows:

pn[.n][- or /]pn[.n][- or /]...

Where p is a defined alpha location type prefix, n is a location instance number, and [.n] is a sub-location instance number (where applicable). Sub-location notation is used only for location types which have clearly defined and limited expansion sites; for example, memory SIMMs slots on a memory card. Primarily, the [.n] sub-location notation is intended for use as an abbreviation of the location code in cases where:

- 1. Based on the device structure, the abbreviated sub-location code conveys the same information in a more concise form than an additional level of location identifier -- for example:
 - P1-M1.4 (pluggable module 4 on Memory Card 1 on Planar 1), rather than P1-M1-M4
 - P1-C1.1 (pluggable CPU 1 on CPU Card 1 on Planar 1), rather than P1-C1-C1
 - P2-Z1-A3.1 (LUN 1 at SCSI ID 3 on integrated SCSI bus 1 from Planar 2), rather than P2-Z1-A3-A1
- 2. The sub-location is either a basic physical extension or sub-enclosure of the base location, but does not represent additional function or connectivity; for example, a drawer in a rack (U1.2) or a riser card on an I/O board (P2.1).

AIX Location Codes

The basic formats of the AIX location codes are:

For non-SCSI devices/drives

AB-CD-EF-GH

For SCSI devices/drives

AB-CD-EF-G,H

For planars, cards, and non-SCSI devices the location code is defined as:

```
AB-CD-EF-GH
        Device/FRU/Port ID
      Connector ID
   devfunc Number, Adapter Number or Physical Location
 Bus Type or PCI Parent Bus
```

- The AB value identifies a bus type or PCI parent bus as assigned by the firmware.
- The CD value identifies adapter number, adapter's devfunc number, or physical location. The devfunc number is defined as the PCI device number times 8, plus the function number.
- The EF value identifies a connector.
- The GH value identifies a port, address, device, or FRU.

Adapters and cards are identified with just AB-CD.

The possible values for AB are:

00	Processor bus
01	ISA bus
02	EISA bus
03	MCA bus
04	PCI bus used in the case where the PCI bus cannot be identified
05	PCMCIA buses
ху	For PCI adapters where x is equal to or greater than 1. The x and y are characters in the
	range of 0-9, A-H, J-N, P-Z (O, I, and lower case are omitted) and are equal to the parent
	bus's ibm, aix-loc Open Firmware Property.

The possible values for CD depend on the adapter/card.

For pluggable PCI adapters/cards, CD is the device's devfunc number (PCI device number times 8, plus the function number). The C and D are characters in the range of 0-9, and A-F (hex numbers). This allows the location code to uniquely identify multiple adapters on individual PCI cards.

For pluggable ISA adapters, CD is equal to the order the ISA cards defined/configured either by SMIT or the ISA Adapter Configuration Service Aid.

For integrated ISA adapters, CD is equal to a unique code identifying the ISA adapter. In most cases this is equal to the adapter's physical location code. In cases where a physical location code is not available, CD will be FF.

EF is the connector ID. It is used to identify the adapter's connector that a resource is attached to.

GH is used to identify a port, device, or FRU. For example:

- · For async devices GH defines the port on the fanout box. The values are 00 to 15.
- For a diskette drive H defines which diskette drive 1 or 2. G is always 0.
- For all other devices GH is equal to 00.

For integrated adapter, EF-GH is the same as the definition for a pluggable adapter. For example, the location code for a diskette drive is 01-D1-00-00. A second diskette drive is 01-D1-00-01.

For SCSI the location code is defined as:

```
AB-CD-EF-G,H
         Logical Unit address of the SCSI Device
       Control Unit Address of the SCSI Device
      Connector ID
   devfunc Number, Adapter Number or Physical Location
 Bus Type or PCI Parent Bus
```

Where AB-CD-EF are the same as non-SCSI devices.

G defines the control unit address of the device. Values of 0 to 15 are valid.

H defines the logical unit address of the device. Values of 0 to 255 are valid.

There is also a bus location code that is generated as '00-XXXXXXXX' where XXXXXXXX is equivalant to the node's unit address.

Examples of physical location codes displayed by AIX are:

Processor card in system board slot 1

P1-C1

Memory module in system board slot 2

P1-M2

Memory module 12 in card in system board slot 2

U1-P1-M2.12

Examples of AIX location codes displayed are:

Integrated PCI adapter

10-80	Ethernet
10-60	Integrated SCSI Port 1
30-58	Integrated SCSI Port 2 (Model H50 only
10-88	Integrated SCSI Port 2 (Model H70 only

Pluggable PCI adapters

20-58 to 20-5F	Any PCI card in slot 1
20-60 to 20-67	Any PCI card in slot 2
10-68 to 10-6F	Any PCI card in slot 3
10-70 to 10-77	Any PCI card in slot 4
10-78 to 10-7F	Any PCI card in slot 5 (Model H50 only)
30-60 to 30-67	Any PCI card in slot 6 (Model H50 only)
40-58 to 40-5F	Any PCI card in slot 5 (Model H70 only)
40-60 to 40-67	Any PCI card in slot 6 (Model H70 only)
30-68 to 30-6F	Any PCI card in slot 7
30-70 to 30-77	Any PCI card in slot 8
30-78 to 30-7F	Any PCI card in slot 9 (Model H50 only)

Integrated ISA adapters

01-D1	Diskette adapter
01-R1	Parallel port adapter
01-S1	Serial port 1 adapter
01-S2	Serial port 2 adapter
01-S3	Serial port 3 adapter
01-K1	Keyboard adapter

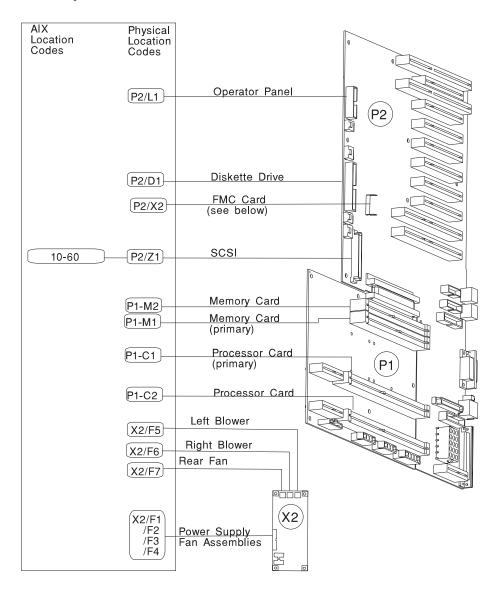
Non-integrated ISA adapters (Model H50 only)

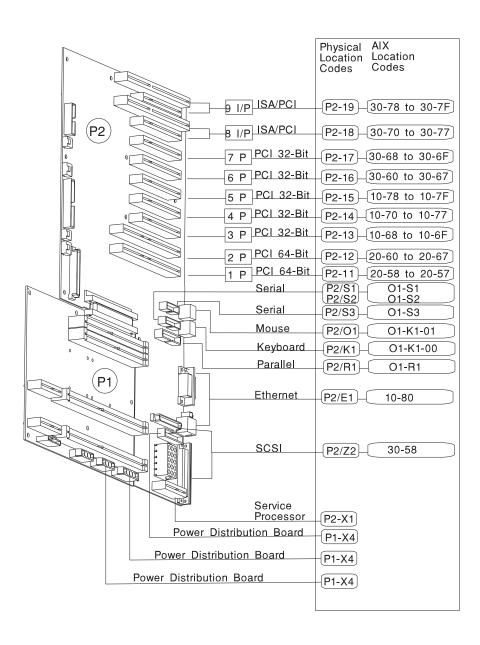
01-01	First ISA card defined/configured
01-02	Second ISA card defined/configured

Device attached to SCSI controller

10-60-00-4,0 Device attached to Integrated SCSI Port 1

AIX and Physical Location Code Reference Table Model H50





FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
	Central	Electronics Comple	ex (CEC)	
System Board	00-00	P1		
Processor Card 1	00-00	P1-C1	Processor Con- nectors J8 and J5	CPU ID 0x00 and 0x01 (if 2-way card)
Processor Card 2	00-00	P1-C2	Processor Con- nector J9 and J6	CPU ID 0x04 and 0x05 (if 2-way card)
Memory Card 1	00-00	P1-M1	Processor Con- nector J12	
Memory Card 1 modules 1 thru 16	00-00	P1-M1.1 through P1-M1.16	Memory Card Sockets J1,J2,J3,J4, J5,J6,J7,J8 J9,J10,J11,J12, J13,J14,J15,J16	Extents: 8L,8H,10L,10H, 12L,12H,14L,14H 9L,9H,11L,11H, 13L,13H,15L,15H
Memory Card 2	00-00	P1-M2	Processor Con- nector J13	
Memory Card 2 modules 1 thru 16	00-00	P1-M2.1 through P1-M2.16	Memory Card Sockets J1,J2,J3,J4, J5,J6,J7,J8 J9,J10,J11,J12, J13,J14,J15,J16	Extents: 8L,8H,10L,10H, 12L,12H,14L,14H 9L,9H,11L,11H, 13L,13H,15L,15H
I/O board	00-00	P2		
	Po	wer Distribution Bo	ard	
Power Distrib- ution Board		X4	I/O board con- nector P2 System board connectors J1, J3, J4	
FMC card	00-00	P2/X2	Connector J51	
		Integrated Devices		
Diskette Drive	01-D1-00-00	P2-D1	I/O board Con- nector J13	Base Address 0x0310
Keyboard	01-K1-00-00	P2-K1	I/O board Con- nector J23	Base Address 0x0060
Mouse	01-K1-01-00	P2-O1	I/O board Con- nector J27	0x0060
Diskette Port	01-D1	P2/D1	I/O board Con- nector J13	0x03f0

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
Keyboard Port	01-K1-00	P2/K1	I/O board Con- nector J23	0x0060
Mouse Port	01-K1-01	P2/O1	I/O board Con- nector J27	0x0060
Serial Port 1	01-S1	P2/S1	I/O board Con- nector J41	0x0318
Serial Port 2	01-S2	P2/S2	I/O board Con- nector J41	0x0218
Serial Port 3	01-S3	P2/S3	I/O board Con- nector J50	0x0898
Parallel Port	01-R1	P2/R1	I/O board Con- nector J47	0x0378
Ethernet Port	10-80	P2/E1	I/O board Con- nector J18(TH) or J21(TP)	Host Bridge ID00, Device 06
SCSI Port 1	10-60	P2/Z1	I/O board Con- nector J25	Host Bridge ID00, Device 04
SCSI Port 2	10-88	P2/Z2	I/O board Con- nector J11 and J30	Host Bridge ID02, Device 06
		Pluggable Adapters	5	
Card in PCI Slot 1P	20-58 to 20-5F	P2-I1	I/O board Con- nector J1	Host Bridge ID01, Device 01
Card in PCI Slot 2P	20-60 to 20-67	P2-I2	I/O board Con- nector J2	Host Bridge ID01, Device 02
Card in PCI Slot 3P	10-68 to 10-6F	P2-I3	I/O board Con- nector J3	Host Bridge ID00, Device 03
Card in PCI Slot 4P	10-70 to 10-77	P2-I4	I/O board Con- nector J4	Host Bridge ID00, Device 04
Card in PCI Slot 5P	10-78 to 10-7F	P2-I5	I/O board Con- nector J5	Host Bridge ID00, Device 05
Card in PCI Slot 6P	30-60 to 30-67	P2-I6	I/O board Con- nector J6	Host Bridge ID02, Device 02
Card in PCI Slot 7P	30-68 to 30-6F	P2-I7	I/O board Con- nector J7	Host Bridge ID02, Device 03
Card in PCI Slot 8P	30-70 to 30-77	P2-I8	I/O board Con- nector J8P	Host Bridge ID02, Device 04
Card in PCI Slot 9P	30-78 to 30-7F	P2-I9	I/O board Con- nector J9P	Host Bridge ID02, Device 05
Card in ISA Slot 8I	01-01 or 01-02	P2-I8	I/O board Con- nector J81	

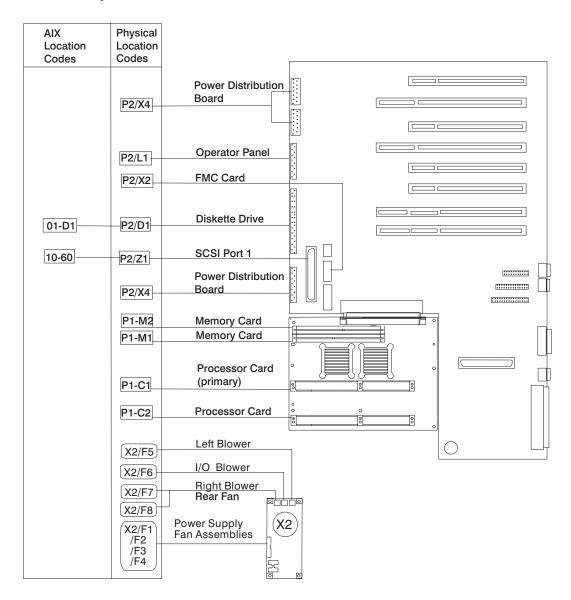
FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
Card in ISA Slot 9I	01-01 or 01-02	P2-I9	I/O board Con- nector J91	
		SCSI Devices		
Base CD-ROM (Bay A2)	10-60-00-4, 0	P2-Z1-A4		Primary SCSI Bus ID 4 (refer to the note at the end of this table)
Media Device in Bay A1	10-60-00-5, 0	P2-Z1-A5		Primary SCSI Bus ID 5 (refer to the note at the end of this table)
DASD Device in Bay B2	10-60-00-6, 0	P2-Z1-A6		Primary SCSI Bus ID 6 (refer to the note at the end of this table)
SCSI Backplane C When con- nected to SCSI Port 1 (P2/Z1)	10-60-00-15, 0	P2-Z1-B2		Primary SCSI Bus ID 15
SCSI Backplane C When con- nected to SCSI Port 2 (P2/Z2)	30-58-00-15, 0	P2-Z2-B2		Secondary SCSI Bus ID 15
DASD in Bays C1 through C6 When con- nected to SCSI Port 1 (P2/Z1)	10-60-00-G, 0 Where G identi- fies Primary SCSI Bus ID 8 through 13	P2-Z1-B2.1 through B2.6		Primary SCSI Bus ID 8 through 13
DASD in Bays C1 through C6 When con- nected to SCSI Port 2 (P2/Z2)	30-58-00-G, 0 Where G identi- fies Secondary SCSI Bus ID 8 through 13	P2-Z2-B2.1 through B2.6		Secondary SCSI Bus ID 8 through 13
SCSI Backplane D When con- nected to SCSI Port 2 (P2/Z2)	30-58-00-15, 0	P2-Z2-B2		Secondary SCSI Bus ID 15

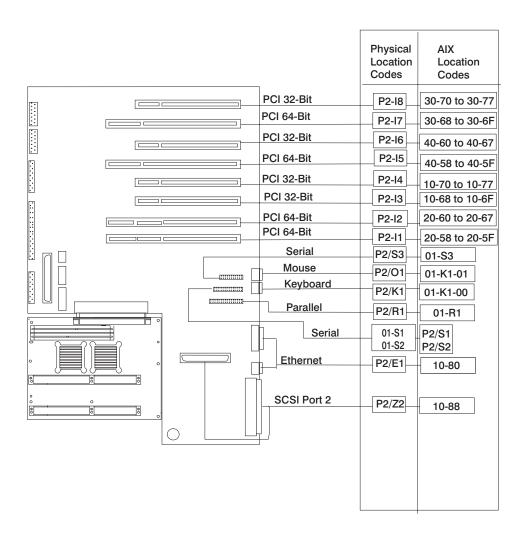
	1		T	I
FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
SCSI Backplane D When con- nected to PCI adapter in slot P2-In	AB-CD-00-15, 0 Where AB-CD identifies the adapter's slot	P2-In-Z1-B2		Bus ID 15
DASD in Bays D1 through D6 When con- nected to SCSI Port 2 (P2/Z2)	30-58-00-G, 0 Where G identi- fies Secondary SCSI Bus ID 8 through 13	P2-Z2-B2.1 through B2.6		Secondary SCSI Bus ID 8 through 13
DASD in Bays D1 through D6 When con- nected to PCI adapter in slot P2-In	AB-CD-00-G, 0 Where AB-CD identifies the adapter's slot and G identifies the SCSI Bus ID 8 through 13	P2-In-Z1-B2.1 through B2.6		Bus ID 8 through 13
SCSI Backplane E When con- nected to PCI adapter in slot P2-In	AB-CD-00-15, 0 Where AB-CD identifies the adapter's slot	P2-In-Z1-B2		Bus ID 15
DASD in Bays E1 through E6 When con- nected to PCI adapter in slot P2-In	AB-CD-00-G, 0 Where AB-CD identifies the adapter's slot and G identifies the SCSI Bus ID 8 through 13	P2-In-Z1-B2.1 through B2.6		Bus ID 8 through 13
		Fans		
Fan 1 and Fan 2 assembly		F1 and F2	Fan connectors P3 and P4 on power supply #1	
Fan 3 and Fan 4 assembly		F3 and F4	Fan connectors P3 and P4 on power supply #2	
Fan 5 (Media Blower)		F5		
Fan 6 (DASD Blower)		F6		
Fan 7 (CPU Fan)		F7		

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
Service Processor				
Service Processor		P2-X1	I/O board Con- nector J10	
		Operator Panel		
Operator Panel		L1	I/O board Con- nector J22A	
Operator Panel Connector		P2/L1	I/O board Con- nector J22A	
		Power Supply		
Power Supply #1		V1	PDB connector J1A-J1B	
Power Supply #2		V2	PDB connector J2A-J2B	

Note: The SCSI bus IDs are the recommended values. Features installed at the manufacturing site will correspond to these IDs. Field installations may not comply with these recommendations.

AIX and Physical Location Code Reference Table Model H70





	FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
		Central	Electronics Comple	ex (CEC)	
	System Planar	00-00	P1		
	Processor Card 1	00-00	P1-C1.1 and P1-C1.2	Processor Con- nector J6	CPU ID 0x00 and 0x02 (if 2-way card)
	Processor Card 2	00-00	P1-C2.1 and P1-C2.2	Processor Con- nector J8	CPU ID 0x04 and 0x06 (if 2-way card)
D D	Memory Card 1	00-00	P1-M1	Processor Con- nector J3	
	Memory Card 1 Memory modules 1 thru 16	00-00	P1-M1.1 through P1-M1.16	Memory Card Sockets J1,J2,J3,J4, J5,J6,J7,J8 J9,J10,J11,J12, J13,J14,J15,J16	Extents: 0H,0L,2H,2L, 4H,4L,6H,6L 1H,1L,3H,3L, 5H,5L,7H,7L
D D	Memory Card 2	00-00	P1-M2	Processor Con- nector J2	
	Memory Card 2 Memory modules 1 thru 16	00-00	P1-M2.1 through P1-M2.16	Memory Card Sockets J1,J2,J3,J4, J5,J6,J7,J8 J9,J10,J11,J12, J13,J14,J15,J16	Extents: 8L,8H,10L,10H, 12L,12H,14L,14H 9L,9H,11L,11H, 13L,13H,15L,15H
	I/O Planar	00-00	P2		
			Integrated Devices		
	Diskette Drive	01-D1-00-00	P2-D1	I/O Planar Con- nector J13	Base Address 0x03f0
	Keyboard	01-K1-00-00	P2-K1	I/O Planar Con- nector J8	Base Address 0x0060
	Mouse	01-K1-01-00	P2-O1	I/O Planar Con- nector J9	0x0060
	Diskette Port	01-D1	P2/D1	I/O Planar Con- nector J13	0x03f0
	Keyboard Port	01-K1-00	P2/K1	I/O Planar Con- nector J8	0x0060
	Mouse Port	01-K1-01	P2/O1	I/O Planar Con- nector J9	0x0060
	Serial Port 1	01-S1	P2/S1	I/O Planar Con- nector J6	0x03f8

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification	
Serial Port 2	01-S2	P2/S2	I/O Planar Con- nector J6	0x02f8	
Serial Port 3	01-S3	P2/S3	I/O Planar Con- nector J7	0x0898	
Parallel Port	01-R1	P2/R1	I/O Planar Con- nector J5	0x0378	
Ethernet Port	10-80	P2/E1	I/O Planar Con- nector J4(TH) or J2(TP)	Host Bridge ID00, Device 06	
SCSI Port 1	10-60	P2/Z1	I/O Planar Con- nector J12	Host Bridge ID00, Device 02	
SCSI Port 2	10-88	P2/Z2	I/O Planar Con- nector J1 and J3	Host Bridge ID00, Device 07	
		Pluggable Adapters	i		
Card in PCI Slot 1P	20-58 to 20-5F	P2-I1	I/O Planar Con- nector J17	Host Bridge ID01, Device 01	
Card in PCI Slot 2P	20-60 to 20-67	P2-I2	I/O Planar Con- nector J18	Host Bridge ID01, Device 02	
Card in PCI Slot 3P	10-68 to 10-6F	P2-I3	I/O Planar Con- nector J19	Host Bridge ID00, Device 03	
Card in PCI Slot 4P	10-70 to 10-77	P2-I4	I/O Planar Con- nector J20	Host Bridge ID00, Device 04	
Card in PCI Slot 5P	40-58 to 40-5F	P2-I5	I/O Planar Con- nector J21	Host Bridge ID03, Device 01	
Card in PCI Slot 6P	40-60 to 40-67	P2-I6	I/O Planar Con- nector J22	Host Bridge ID03, Device 02	
Card in PCI Slot 7P	30-68 to 30-6F	P2-I7	I/O Planar Con- nector J23	Host Bridge ID02, Device 03	
Card in PCI Slot 8P	30-70 to 30-77	P2-I8	I/O Planar Con- nector J24	Host Bridge ID02, Device 04	
	SCSI Devices				
Base CD-ROM (Bay A2)	10-60-00-4, 0	P2-Z1-A4		Primary SCSI Bus ID 4 (refer to the note at the end of this table)	

	AIX	Physical	Physical	Logical
FRU Name	Location Code	Location Code	Connection	Identification
Media Device in Bay A1	10-60-00-5, 0	P2-Z1-A5		Primary SCSI Bus ID 5 (refer to the note at the end of this table)
DASD Device in Bay B2	10-60-00-6, 0	P2-Z1-A6		Primary SCSI Bus ID 6 (refer to the note at the end of this table)
SCSI Backplane C When con- nected to SCSI Port 1 (P2/Z1)	10-60-00-15, 0	P2-Z1-B2		Primary SCSI Bus ID 15
SCSI Backplane C When con- nected to SCSI Port 2 (P2/Z2)	10-88-00-15, 0	P2-Z2-B2		Secondary SCSI Bus ID 15
DASD in Bays C1 through C6 When con- nected to SCSI Port 1 (P2/Z1)	10-60-00-G, 0 Where G identi- fies Primary SCSI Bus ID 8 through 13	P2-Z1-B2.1 through B2.6	Backplane con- nector J6 through J11 Slots A through F	Primary SCSI Bus ID 8 through 13
DASD in Bays C1 through C6 When con- nected to SCSI Port 2 (P2/Z2)	10-88-00-G, 0 Where G identi- fies Secondary SCSI Bus ID 8 through 13	P2-Z2-B2.1 through B2.6	Backplane con- nector J6 through J11 Slots A through F	Secondary SCSI Bus ID 8 through 13
SCSI Backplane C When con- nected to PCI adapter in slot P2-In	AB-CD-00-15, 0	P2-IN-Z1-B2		Secondary SCSI Bus ID 15
DASD in Bays C1 through C6 When con- nected to PCI adapter in slot P2-In	AB-CD-00-G, 0 Where G identi- fies Secondary SCSI Bus ID 8 through 13	P2-Z2-B2.1 through B2.6	Backplane con- nector J6 through J11 Slots A through F	Secondary SCSI Bus ID 8 through 13
SCSI Backplane D When con- nected to SCSI Port 2 (P2/Z2)	10-88-00-15, 0	P2-Z2-B2		Secondary SCSI Bus ID 15

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
DASD in Bays D1 through D6 When con- nected to SCSI Port 2 (P2/Z2)	10-88-00-G, 0 Where G identi- fies Secondary SCSI Bus ID 8 through 13	P2-Z2-B2.1 through B2.6	Backplane con- nector J6 through J11 Slots A through F	Secondary SCSI Bus ID 8 through 13
SCSI Backplane D When con- nected to PCI adapter in slot P2-In	AB-CD-00-15, 0 Where AB-CD identifies the adapter's slot	P2-In-Z1-B2		Bus ID 15
DASD in Bays D1 through D6 When con- nected to PCI adapter in slot P2-In	AB-CD-00-G, 0 Where AB-CD identifies the adapter's slot and G identifies the SCSI Bus ID 8 through 13	P2-In-Z1-B2.1 through B2.6	Backplane con- nector J6 through J11 Slots A through F	Bus ID 8 through 13
		Fans		
Fan 1 and Fan 2 assembly		F1 and F2	Fan connectors P3 and P4 on power supply #1	
Fan 3 and Fan 4 assembly		F3 and F4	Fan connectors P3 and P4 on power supply #2	
Fan 5		F5-Media blower	Fan monitor card connector J2	
Fan 6		F6-I/O blower	Fan monitor card connector J4	
Fan 7		F7-CPU fan	Fan monitor card connector J3	
Fan 8		F8-DASD blower	Fan monitor card connector J3	

FRU Name	AIX Location Code	Physical Location Code	Physical Connection	Logical Identification
		Operator Panel		
Operator Panel		P2/L1	I/O Planar Con- nector J14	
	Fan I	Monitor and Control	Card	
Fan Monitor and Control Card		X2	I/O Planar Con- nector J27	
Power Supplies				
Power Supply 1		V1		
Power Supply2		V2		

Note: The SCSI bus IDs are the recommended values. Features installed at the manufacturing site will correspond to these IDs. Field installations may not comply with these recommendations.

Chapter 4. Loading the System Diagnostics

The system diagnostics can be booted either from the default boot list or from the service mode boot list. (The service mode boot list can be modified using the system diagnostics Display or Change Bootlist Service Aid. The service mode boot list cannot be modified under the System Management Services.)

To load Stand-alone Diagnostics from the default boot list, perform the following procedure:

- 1. Verify with the system administrator and users that all programs may be stopped, then do so.
- 2. Turn off the system.
- 3. Wait 30 seconds, and turn on the system.
- 4. Immediately insert the diagnostic CD-ROM into the CD-ROM drive.
- 5. When or after the keyboard indicator appears during startup, press the F5 key on a directly-attached keyboard (or the number 5 key on an ASCII terminal).
- 6. Enter requested passwords.

Online Diagnostics can be loaded by booting from the service mode boot list by pressing the F6 key (on a directly-attached keyboard) or the number 6 key on an ASCII terminal.

The procedure for booting from the devices listed in the service mode boot list (Online Diagnostics) is the following:

- 1. Verify with the system administrator and users that all programs may be stopped, then do so.
- 2. Turn off the system.
- 3. Wait 30 seconds, and turn on the system.
- 4. When or after the keyboard indicator appears during startup, press the F6 key on a directly-attached keyboard (or the number 6 key on an ASCII terminal).
- 5. Enter requested passwords.

After requested passwords have been entered, the system attempts to boot from the first device of each type found on the list. If no bootable image is found on the first device of each type on the list, the system does not search through the other devices of that type for a bootable image; instead, it polls the first device of the next type.

If all types of devices in the boot list have been polled without finding a bootable image, the system restarts, this gives the user the opportunity to start the System Management Services (by pressing the F1 key on a directly attached keyboard or the number 1 on an ASCII terminal) before the system attempts to boot again.

Default Boot List and Service Mode Boot List

The default boot list is:

- 1. Diskette
- 2. CD-ROM
- 3. Tape
- 4. Hard File
- 5. Network
 - Token-Ring
 - Ethernet

Pressing the F5 key on a directly-attached keyboard (or the number 5 key on an ASCII terminal) causes the system to load Stand-alone Diagnostics if a Diagnostic CD is in the CD-ROM drive.

Pressing the F6 key on a directly-attached keyboard (or number 6 key on an ASCII terminal) loads Online Diagnostics from the service mode boot list, no Diagnostic CD should be in the CD-ROM drive since Online Diagnostics is typically run from a hard disk, which is in the service mode boot list defined using the system diagnostics Display or Change Bootlist Service Aid. Like the default boot list, the service mode boot list can contain five entries. The F6 or 6 keys work like the F5 or 5 keys, with the following exceptions:

- The system searches for a boot record according to the service mode boot list.
- If the service mode boot list is corrupted, the system rebuilds the service mode boot list according to the default boot list. (The default boot list contains five entries, and for each matching device type found in the system unit, the system makes an entry in the service mode boot list.)
- If no service mode boot list is present, the system uses the default boot list.

Chapter 5. SSA Software and Microcode Errors

Service Request Numbers (SRNs)

Service request numbers (SRNs) are generated for the SSA Hot-Swap Disk Drive by the system error-log analysis, system configuration code, diagnostics, and customer problem-determination procedures. SRNs help you to identify the cause of a problem, the failing field-replaceable units (FRUs), and the service actions that might be needed to solve the problem.

The SRN Table

Table 5-1 on page 5-3 lists the SRNs and describes the actions you should perform. The table columns are:

SRN The service reference number

FRU list The FRU or FRUs that might be causing the problem (see also "FRU

Names Used in the SRN Table" on page 5-2)

% How likely it is (by percentage) that the FRU is causing the problem

A description of the problem and the action you must take

Abbreviations used in the table are:

DMA Direct memory access

FRU Field-replaceable unit

IOCC Input/output channel controller

POS Programmable option select (POS registers)

POST Power-on self-test

PAA P = adapter port number

AA = SSA address

Using the SRN Table

Important: You should have been sent here from "SSA Maintenance Analysis Procedures (MAPs)." Do not start problem determination from the SRN table; always go to "SSA Maintenance Analysis Procedures (MAPs)" on page 2-65 first.

1. Locate the SRN in the table. If you cannot find the SRN, you have a problem with the diagnostics, the microcode, or the documentation. Call your support center for assistance.

- 2. Read carefully the "Action" you must perform for the problem. Do not exchange FRUs unless you are instructed to do so.
- 3. Normally exchange only one FRU at a time, starting from the top of the FRU list for that SRN. Always use instructions given in the page reference when exchanging FRUs. After each FRU is exchanged, go to MAP 410: Repair Checkout in Diagnostic Information for Multiple Bus Systems to verify the repair.

Software and Microcode Errors

Some SRNs indicate that a problem might have been caused by a software error or by a microcode error. If you have one of these SRNs, perform the following actions:

- 1. Make a note of the contents of the error log for the device that has the problem.
- 2. Go to the using-system service aids and select Display Vital Product Data to display the VPD of the failing system. Make a note of the VPD for all the SSA adapters and disk drive modules.
- 3. Report the problem to your support center. The center can tell you whether you have a known problem and can, if necessary, provide you with a correction for the software or microcode.

FRU Names Used in the SRN Table

This section provides a glossary of the FRU names used.

FRU Name in Table	Definition
Backplane assembly	The disk drive modules, blank disk drive modules, and internal SSA cables, are connected to the backplane assembly.
Disk drive module	A disk drive assembly to a carrier that plugs into the backplane in the system unit.
Blank Disk drive module	This module must be installed in a slot that does not contain a disk drive module. This completes the SSA loop through the system unit.
External SSA cable	A cable that connects the bulkhead to the SSA adapter or to an SSA subsystem.
Internal SSA cable	Attaches the backplane to the SSA adapter card.
SSA adapter card	The SSA adapter card, which is located in the using system.

Table 5	-1 (Page 1 of 9). Service Request	Numbers	
SRN	FRU List	%	Problem
10101	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.)	100	Description: Disk drive motor stopped. The disk drive module is bad. Action: If this SRN was received by one disk drive module only, then exchange that disk drive module.
10112	None	_	Description: Format degraded. A format operation has been ended before it has completed. Action: Use the Format service aid to format the disk drive module.
1 <i>xxxx</i>	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.)	100	Description: Disk drive module error. Action: Exchange the FRU for a new FRU.
			Note: In this SRN, an <i>x</i> represents a digit from 0 to F.
20PAA	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.) SSA adapter card (See the	45 45	Description: An open SSA link has been detected. Action: Run the Link Verification Service Aid to isolate the failure. If the SSA
	installation and service guide for the using system.)		service aids are not available:
	External SSA Cables Backplane assembly (See "SCSI or SSA Backplane" on page 7-66.)	6 2	When the failing device is an SSA Hot-Swap Disk Drive, go to "SSA Maintenance Analysis Procedures (MAPs)" on page 2-65.
	Internal SSA Cable	2	When the failing device is not an SSA Hot-Swap Disk Drive, go to the service information for that device.
21PAA to 29PAA	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.)	45	Description: An SSA threshold-exceeded- link error has been detected. Action: Run the Link Verification Service
	SSA adapter card (See the installation and service guide	45	Aid to isolate the failure. If the SSA service aids are not available:
	for the using system.) External SSA Cables Back- plane assembly (See "SCSI or SSA Backplane" on page 7-66.)	6 2	When the failing device is an SSA Hot-Swap Disk Drive, go to "SSA Maintenance Analysis Procedures (MAPs)" on page 2-65.
	Internal SSA Cable	2	When the failing device is not an SSA Hot-Swap Disk Drive, go to the service information for that device.
2A002	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.)	50	Description: Async code 02 has been received. A software error has probably occurred.
	SSA adapter card (See the installation and service guide for the using system.)	50	Action: Go to "Software and Microcode Errors" on page 5-2 before exchanging any FRUs.

Table 5	Table 5-1 (Page 2 of 9). Service Request Numbers		
SRN	FRU List	%	Problem
2A003	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.) SSA adapter card (See the installation and service guide for the using system.)	50 50	Description: Async code 03 has been received. A software error has probably occurred. Action: Go to "Software and Microcode Errors" on page 5-2 before exchanging any FRUs.
2A004	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.) SSA adapter card (See the installation and service guide for the using system.)	50 50	Description: Async code 04 has been received. A software error has probably occurred. Action: Go to "Software and Microcode Errors" on page 5-2 before exchanging any FRUs.
2A005	Backplane (See "SCSI or SSA Backplane" on page 7-66.)	-	Description: Async code 05 has been received. This code indicates that a disk drive module has detected a loss of power. Action: Use the Link Verification Service Aid to determine if any devices are missing from the SSA link.
			If a device is missing, go to "SSA Maintenance Analysis Procedures (MAPs)" on page 2-65 to isolate the problem.
			 If no device is missing, the problem might have been caused by a tempo- rary, or partial, loss of power to the SSA Hot-Swap Disk Drive.
2A006	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.) Backplane (See "SCSI or SSA Backplane" on	70 30	Description: Async code 06 has been received. This code indicates that a disk drive module has detected the loss of one of its power inputs. Action:
	page 7-66.)		 If the failing device is an SSA Hot-Swap Disk Drive, go to "SSA Maintenance Analysis Procedures (MAPs)" on page 2-65, exchange the disk drive module. If the failing device is not an SSA Hot-Swap Disk Drive, go to the service information for that device.

Table 5	Table 5-1 (Page 3 of 9). Service Request Numbers		
SRN	FRU List	%	Problem
2A106	Backplane assembly (See "SCSI or SSA Backplane" on page 7-66.)	100	Description: Async code 06 has been received. This code indicates that multiple disk drive modules have detected the loss of one of its their power inputs. Action:
			 If the failing devices are SSA Hot-Swap Disk Drives, exchange the backplane. If the failing devices are not SSA Hot-Swap Disk Drives, go to the service information for those devices.
2A206	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.)	100	Description: A disk drive module has detected that one of its SSA links has failed the POSTs. Action:
			 Use the Link Verification Service Aid to determine where the SSA link is broken. Run diagnostics in the system verification mode to the two disk drive modules that are nearest to, and on each side of, the place where the link is broken. The diagnostics show which disk drive module detected the problem.
2FFFF	None	_	Description: An async code that is not valid has been received. Action: Go to "Software and Microcode Errors" on page 5-2.
300C0	Backplane (See "SCSI or SSA Backplane" on page 7-66.)	100	Description: A disk drive module has detected the loss of one of its power inputs. Action:
			 If the failing device is an SSA Hot-Swap Disk Drive, exchange the backplane. If the failing device is not an SSA Hot-Swap Disk Drive, go to the service information for that device.

Table 5-1 (Page 4 of 9). Service Request Numbers			
SRN	FRU List	%	Problem
301C0	Backplane assembly (See "SCSI or SSA Backplane" on page 7-66.)	100	Description: Multiple disk drive modules have detected the loss of one of their power inputs. Action: If the failing devices are SSA HotSwap Disk Drives, exchange the back-
			 plane. If the failing devices are not SSA Hot- Swap Disk Drives, go to the service information for those devices.
303FF	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.)	100	Description: A SCSI status that is not valid has been received. Action: Go to "Software and Microcode Errors" on page 5-2 before exchanging any FRUs.
40000	SSA adapter card (See the installation and service guide for the using system.)	100	Description: The SSA adapter card has failed. Action: Exchange the FRU for a new FRU.
43PAA	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.) SSA adapter card (See the installation and service guide for the using system.)	90	Description: An SSA device on the link is preventing the completion of the link configuration. Action: If the SSA service aids are available, run the Link Verification Service Aid to determine which device is preventing configuration. (That device is the one beyond the last-configured device on an open SSA link.)
			Run Set Service Mode on the failed pdisk.
44PAA	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.)	100	Description: A disk drive module has failed. Action: If the SSA service aids are available, run the Link Verification Service Aid to find the failing disk drive module.
			Run Set Service Mode on the failed pdisk.
			Before you exchange the failing disk drive module, run diagnostics in the system verification mode to the module to determine the cause of the problem.

SRN	FRU List	%	Problem
45PAA	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.) External SSA Cables Backplane assembly (See "SCSI or SSA Backplane" on page 7-66.)	40 40 20	Description: The SSA adapter has detected an open SSA link. This problem is caused either by a disk drive module that is failing, or by a disk drive module that has been switched off from another using system on the same SSA link. (That using system has itself been switched off.) Action: If the SSA service aids are available, run the Link Verification Service Aid to determine which device is preventing configuration. (That device is the one beyond the last-configured device on an open SSA link.)
48000	None	-	Description: The SSA adapter has detected a link configuration resource that is not valid. Action: See "SSA Loop Configurations That Are Not Valid" on page 5-12.
50000	SSA adapter card (See the installation and service guide for the using system.)	100	Description: The SSA adapter failed to respond to the device driver. Action: Exchange the FRU for a new FRU.
50001	SSA adapter card (See the installation and service guide for the using system.)	100	Description: A data parity error has occurred. Action: Exchange the FRU for a new FRU.
50002	SSA adapter card (See the installation and service guide for the using system.)	100	Description: An SSA adapter direct memory access (DMA) error has occurred Action: Exchange the FRU for a new FRU.
50004	SSA adapter card (See the installation and service guide for the using system.)	100	Description: A channel check has occurred. Action: Exchange the FRU for a new FRU.
50005	SSA adapter card (See the installation and service guide for the using system.)	100	Description: A software error has occurred. Action: Go to "Software and Microcode Errors" on page 5-2 before exchanging the FRU.
50006	SSA adapter card (See the installation and service guide for the using system.)	100	Description: A channel check has occurred. Action: Exchange the FRU for a new FRU.

SRN	FRU List	%	Problem
50007	SSA adapter card (See the installation and service guide for the using system.)	100	Description: The input/output channel controller (IOCC) detected an internal error. Action: Exchange the FRU for a new FRU.
50008	SSA adapter card (See the installation and service guide for the using system.)	100	Description: Unable to read or write the POS registers. Action: Exchange the FRU for a new FRU.
50010	SSA adapter card (See the installation and service guide for the using system.)	100	Description: An SSA adapter or device drive protocol error has occurred. Action: Go to "Software and Microcode Errors" on page 5-2 before exchanging the FRU.
50012	SSA adapter card (See the installation and service guide for the using system.)	100	Description: The SSA adapter microcod is in a suspended state. Action: Run diagnostics in System Verification mode to the SSA adapter.
			 If the diagnostics fail, exchange the FRU for a new FRU. If the diagnostics do not fail, go to "Software and Microcode Errors" on page 5-2 before exchanging the FRU.
50100	None	-	Description: An attempt was made to lo an error against a pdisk that is not available to the using system. Action: This problem has occurred for one of the following reasons:
			A user has deleted a pdisk from the system configuration. In such an instance, the hdisk that is related to the pdisk continues to operate normally. If the disk drive module tries to log an error, however, this SRN (50100) is produced. Enter the cfgmgr command to return the pdisk to the system configuration.
			 A disk drive module has tried to log a error during system configuration. To find the failing disk drive module, run diagnostics to the disk drive modules that are connected to this SSA adapter.

Table 5-1 (Page 7 of 9). Service Request Numbers			
SRN	FRU List	%	Problem
60000	SSA adapter card (See the installation and service guide for the using system.)	100	Description: The SSA adapter is missing from the expected configuration. Action: Verify that the SSA adapter card is installed in the expected slot of the using-system. If it is in the expected slot, exchange the FRU for a new FRU. If it is not in the expected slot, enter
			the diag -a command, and answer the questions that are displayed.
7xxxx	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.) Backplane assembly (See "SCSI or SSA Backplane" on page 7-66.)	80 20	Description: An SP module is missing from the expected configuration of the SSA loop. Action: Replace the FRUs one at a time. Go to MAP 410: Repair Checkout in Diagnostic Information for Multiple Bus Systems to verify each repair.
D0000	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.)	100	Description: The using system cannot configure the disk drive module. This is probably a software problem. Action: 1. Try again to configure the disk drive module. 2. If the problem remains, go to "Software and Microcode Errors" on page 5-2 before exchanging the FRU.
D0100	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.)	100	Description: Unable to clear a disk drive module reservation. Action: Exchange the FRU for a new FRU.
D0101	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.)	100	Description: The disk drive module has been reserved since the diagnostics started. The disk drive module is in use. Action: Release the disk drive module, and run the diagnostics again.
D0200	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.)	100	Description: The disk drive module timed out while the diagnostics were running. Action: Rerun the diagnostics. If the problem remains, exchange the FRU for a new FRU.
D0300	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.)	100	Description: The disk drive module failed the diagnostic test. Action: Exchange the FRU for a new FRU.

SRN	FRU List	%	Problem
D0400	Disk drive module (See "Hot-Swappable Disk Drives" on page 7-13.)	100	Description: The disk drive module is not ready while the diagnostics are running. Action: Rerun the diagnostics. If the problem remains, exchange the FRU for a new FRU.
D0450	None	_	Description: A format operation is in progress. The format operation that was started on this disk drive module has not yet finished. A format operation can take up to 30 minutes to run. Action: Wait for the format operation to finish before you run the diagnostics again. You can observe the progress of the format operation by running the format service aid again on this disk drive module.
D0460	None	-	Description: A format operation has been degraded. The format operation that was started on this disk drive module did not finish. Possibly, the disk drive module was switched off while the format operation was running. Action: Run the format service aid to format this disk drive module.
D4000	SSA adapter card (See the installation and service guide for the using system.).	100	Description: The diagnostics cannot configure the SSA adapter. Action: Exchange the FRU for a new FRU.
D4100	SSA adapter card (See the installation and service guide for the using system.)	100	Description: The diagnostics cannot oper the SSA adapter. Action: Exchange the FRU for a new FRU.
D4300	SSA adapter card (See the installation and service guide for the using system.)	100	Description: The diagnostics have detected an SSA adapter POST failure. Action: Exchange the FRU for a new FRU.
D44xx	SSA adapter card (See the installation and service guide for the using system.)	100	Description: The diagnostics have detected that the SSA adapter has corrupted the microcode, but cannot download a new version of the microcode. Action: Exchange the FRU for a new FRU.
			Note: In this SRN, an x represents a digit 0 through F.

Table 5-1 (Page 9 of 9). Service Request Numbers			
SRN	FRU List	%	Problem
DFFFF	SSA adapter card (See the installation and service guide for the using system.)	100	Description: A command or parameter that has been sent or received is not valid. This problem is caused either by the SSA adapter or by an error in the microcode. Action: Go to "Software and Microcode Errors" on page 5-2 before exchanging the FRU.

SSA Loop Configurations That Are Not Valid

Note: This section is related to SRN 48000.

SRN 48000 shows that the SSA loop contains more devices or adapters than are allowed. The following condition exists: the loop contains more than 48 devices.

If the SRN occurred when either you or the customer switched on the using system:

- 1. Switch off the using system.
- 2. Review the configuration that you are trying to make, and determine why that configuration is not valid.
- 3. Review "Rules for SSA Loops" on page 5-16.
- Correct your configuration by reconfiguring the SSA cables or by removing the excess devices or adapters from the loop.
- 5. Switch on the using system.

If the SRN occurred because additional devices or adapters were added to a working SSA loop:

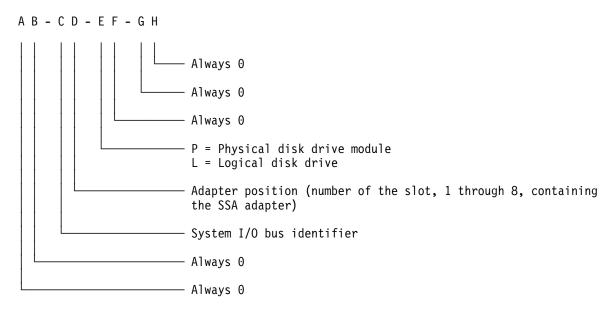
1. Remove the additional devices or adapters that are causing the problem, and put the loop back into its original, working configuration.

Note: It is important that you perform these actions, because they enable the configuration code to reset itself from the effects of the error.

- 2. Review "Rules for SSA Loops" on page 5-16.
- 3. Review the configuration that you are trying to make, and determine why that configuration is not valid.
- 4. Correct your system to a valid configuration.

SSA Location Code Format

Location codes identify the locations of adapters and devices in the using system and their attached subsystems and devices. These codes are displayed when the diagnostic programs isolate a problem. For information about the location codes that are used by the using system, see the operator guide for the using system.



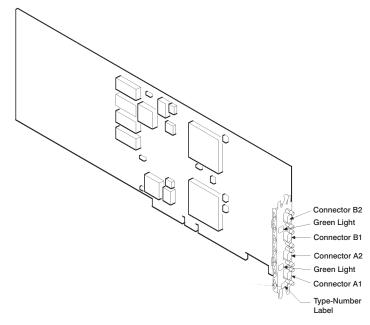
The location code shows only the position of the SSA adapter in the using system and the type of device that is attached. Use a service aid to find the location of the device (disk drive module). For more information, see "Using the Service Aids" in RS/6000 Enterprise Server Model H Series User's Guide.

SSA Loops and Links

The disk drive modules of the system unit are connected through two SSA links to an SSA adapter that is located in the using system. The disk drive modules, SSA links, and SSA adapter are configured in loops. Each loop provides a data path that starts at one connector of the SSA adapter and passes through a link (SSA cable) to the disk drive modules. The path continues through the disk drive modules, then returns through another link to a second connector on the SSA adapter.

The SSA Adapter

The system unit can be attached to an SSA adapter. The adapter card has four SSA connectors that are arranged in two pairs. Connectors A1 and A2 are one pair; connectors B1 and B2 are the other pair.



The SSA links must be configured as loops. The loop is connected to the internal connectors at the SSA adapter card. These connectors must be a valid pair (that is, A1 and A2, or B1 and B2); otherwise, the disk drive modules on the loop are not fully configured, and the diagnostics fail. Operations to all the disk drive modules on a particular loop can continue if that loop breaks at any one point.

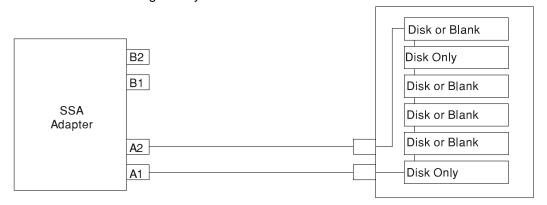
Each pair of connectors has a green light that indicates the operational status of its related loop:

Status of Light	Meaning
Off	Both SSA connectors are inactive. If disk drive modules are connected to these connectors, either those modules are failing, or their SSA links have not been enabled.
Permanently on	Both SSA links are active (normal operating condition).
Slow flash	Only one SSA link is active.

Disk Drive Module Strings

In the system unit, the disk drive modules are arranged in a string of two to six disk drive modules. This string has its own two SSA connectors. This string is connected through an internal SSA cable to a pair of connectors on the SSA adapter to make an SSA loop. (The SSA cables provide the SSA links.)

The following diagram shows the relationships between the SSA connectors and the disk drive module string in a system unit.



Pdisks, Hdisks, and Disk Drive Module Identification

The physical disk drives (pdisks) in an SSA subsystem can be configured as logical units (LUNs). A LUN is also known as an hdisk, and can consist of one or more physical disk drives. An hdisk in an SSA subsystem might, therefore, consist of one pdisk or several pdisks.

The configuration software also allocates an identification (hdisk and pdisk number) to each disk drive module during the configuration of the SSA link. The disk drive modules do not have fixed physical addresses.

The configuration software first recognizes the disk drive module by the machinereadable serial number that is written on the disk. Then, it assigns an identification that is related to the position of the disk drive-module in the SSA string. After configuration, the disk drive module always has the same identification. It can be moved to any position on the SSA link, but can always be found by the software.

Service actions are always related to physical disk drives. For this reason, errors that occur on SSA disk drives are always logged against the physical disk drive (pdisk).

The numeric identifier of pdisks, hdisks, and disk drive module slots of the system unit are not related to each other. For example, pdisk1 is not necessarily installed in slot 1 of the six-pack.

The disk drive module serial number, on the label on the front of the carrier, is also displayed by the service aids. It is the last eight digits of the drives IEEE SSA unique ID, which is stored on the drives electronics card.

Rules for SSA Loops

The following are rules for SSA loops.

- The SSA loop must be connected to the internal pair of connectors on the SSA adapter.
- Only one pair of adapter connectors can be connected to a particular SSA loop.
- A maximum of 18 disk drive modules can be connected in a particular SSA loop.
- A maximum of three dummy disk drive modules can be connected next to each other in a particular SSA loop.

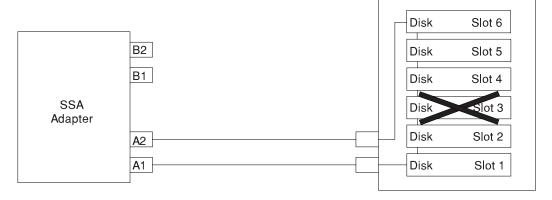
Loops and Data Paths

All devices that are attached to an SSA adapter card are connected through SSA links. The SSA links are configured as loops. Data and commands to a particular device pass through all other devices on the link between the adapter and the target device.

Data can travel in either direction around a loop. The adapter can, therefore, access the disk drive modules through two data paths. The using system cannot detect which data path is being used.

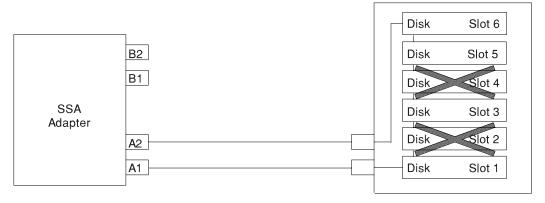
If a disk drive module fails or is turned off, the loop is broken and one of the data paths to a particular module is no longer available. The disk drive modules on the loop continue to work, but an error is reported to the using system.

The following diagram shows that the disk drive module in slot 3 has failed. The disk drive modules in slots 1 and 2 can communicate with the using system only through connector A1 of the SSA adapter. The disk drive modules in slots 4, 5, and 6 can communicate only through connector A2 of the SSA adapter.



If two or more disk drive modules are turned off, fail, or are removed from the loop, some modules might become isolated from the SSA adapter.

The following diagram shows that the disk drive modules in slots 2 and 4 have failed. The disk drive module in slot 1 can communicate with the using system only through connector A1 of the SSA adapter. The disk drive module in slots 5 and 6 can communicate with the using system only through connector A2 of the SSA adapter. The disk drive module in slot 3 is isolated from the SSA adapter.



Chapter 6. System Management Services

The System Management Services provides a way to view information about your computer and perform tasks such as setting passwords and changing device configurations.

If you are using a graphical display as your system console, use the Graphical System Management Services below.

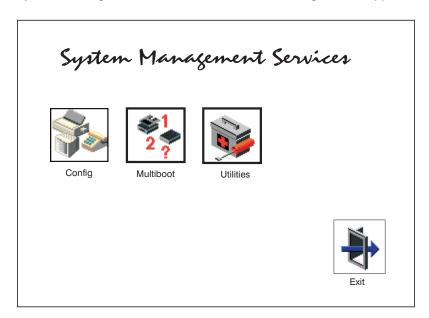
If you are using an ASCII display as your system console, see "Text-Based System Management Services" on page 6-25.

Graphical System Management Services

To start the Open Firmware command line or graphical System Management Services, turn on or restart the computer.

After the logo is displayed, initialization icons appear across the bottom of the screen.

After the System Management Services starts, the following screen appears.



You may also press F8 to enter the Open Firmware command line and get the 0K> prompt.

The System Management Services screen contains the following choices.







MultiBoot: Invokes the Mulitboot menu which provides several functions:

- To Select a Common Hardware Reference Platform (CHRP) compliant operating system to boot
 - In the case of AIX this is a supported option, if you receive an informational icon after making this selection this would mean that information in non-volatile storage could have been lost, as would happen if the battery had been removed. In order to recreate this value, issue the bootlist command under AIX with the appropriate parameters as to the location of the operating system in a particular hard disk. Please see the explanation of the bootlist command in your AIX documentation.
- To select a CHRP compliant operating system as the default operating system
- · To install from the list of possible devices
- To set the sequence in which devices are searched for operating system startup code
- · To go to the Open Firmware command prompt
- · To set the Multiboot menu so that it comes up immediately as the system powers up





Utilities: Enables you to set and remove passwords, enable the unattended start mode, set and view the addresses of your system's SCSI controllers, select the active console, view or clear the error log, and update your system firmware.

Exit: Returns you to the previous screen.

To select an icon, move the cursor with the arrow keys to choose which icon is highlighted, then press the Enter key. You can also select an icon by clicking on it with your left mouse button. To leave the current screen, either press the Esc key or select the Exit icon.

Config



Selecting this icon makes it possible for you to view information about the setup of your system unit. A list similar to the following appears when you select the Config icon.

```
<Device Name>
PowerPC, 604
L2-Cache, 0256K
Memory
    slot A=8 MB
    slot B=8 MB
LPT
    addr=3BC
IDE
    addr=1F0
COM
    addr=3F8
COM
    addr=2F8
Audio
Keyboard
Mouse
Diskette
    addr=3F0
Integrated Ethernet
    addr=9999FF111B
Video
    enhanced graphics
```

Selecting the down arrow key or Page Down key displays the next configuration screen, which lists your computer's firmware version, the date of its development, and the firmware part number.

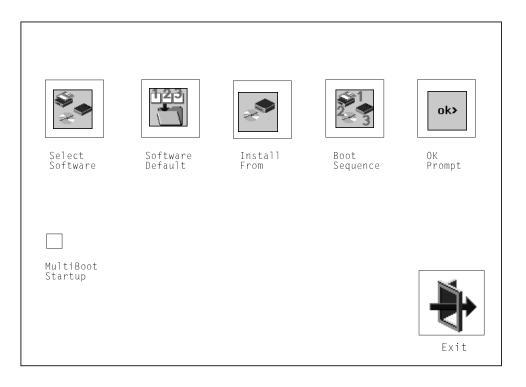
SCSI cntlr id=7 CD-ROM id=3 1084 MB Harddisk id=6 PCI Adapters SCSI cntlr id=7 slot=1 Security OK <System Information> Firmware Version 1/06/1997 Firmware Date 40H5174 Firmware P/N XXXXXXX Serial Number <IO Information> xxxxxxx Serial Number Part Number XXXXXXXX xxxxxxxxEC Number XXXXXXX FRU Number <Service Processor Information> XXXXXXXX Serial Number XXXXXXX Part Number XXXXXXXX EC Number XXXXXXXX FRU Number

MultiBoot



This selection invokes the Mulitboot menu which provides several functions:

- To Select a CHRP compliant operating system to boot
 - In the case of AIX this is a supported option, if you receive a an informational icon after making this selection this means that information in non-volatile storage could have been lost, as would happen if the battery had been removed. In order to recreate this value, issue the bootlist command under AIX with the appropriate parameters as to the location of the operating system in a particular hard disk. See the explanation of the bootlist command in your AIX documentation.
- To select a particular operating system as the default operating system
- To install from the list of possible devices
- To set the sequence in which devices are searched for operating system startup code
- To go to the Open Firmware command prompt
- · To set the Multiboot menu so that it comes up immediately as the system powers up



The **Select Software** option, if supported by the operating system, shows the names of the operating system installed. This option may not be supported by all operating systems.

In the case of AIX this is a supported option only for the CHRP compliant version. If you receive a message saying:

No Operating System Installed

information in non-volatile storage could have been lost, as would happen if the battery had been removed. In order to recreate this value issue the bootlist command under AIX with the appropriate parameters as to the location of the operating system in a particular Hard disk. Please see the explanation of the bootlist command in your AIX documentation.

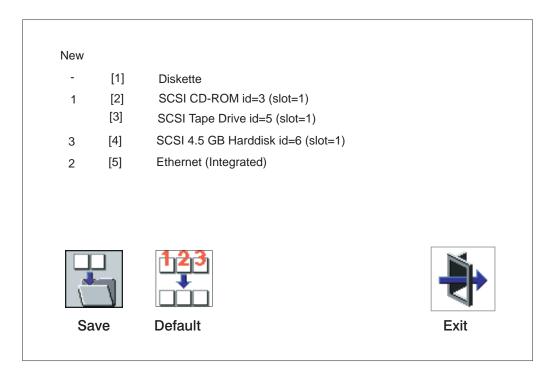
The **Software Default** option, if supported by the operating system, lets you select the default operating system to start the system. This option may not be supported by all operating systems.

The **Install From** option produces a list of devices, for example the CD-ROM, where the operating system is installed from. You select one of the devices and the system searches the device for an operating system to install and if supported by the operating system in that device, the name of the operating system displays.

The **Boot Sequence** option provides a list of devices that can be selected for the boot list. Up to five devices are supported.

The **Multiboot Startup** option toggles between OFF and ON and selects if the Multiboot menu invokes automatically on startup or not. To toggle, select the Multiboot Startup option, then press the Enter key.

This selection enables you to view and change the custom boot list (the sequence used to search devices for operating system startup code).



Attention: If you change your startup sequence, you must be extremely careful when performing write operations (for example, copying, saving, or formatting). You can accidentally overwrite data or programs if you select the wrong drive.

The default boot sequence is:

- · The primary diskette drive
- CD-ROM drive(For CD-ROM boot, go to the Install From icon and then select CD-ROM Drive as a boot device.)
- Tape id=5 (slot=1)
- Hard disk drive id=6 (Slot=1)
- Network device

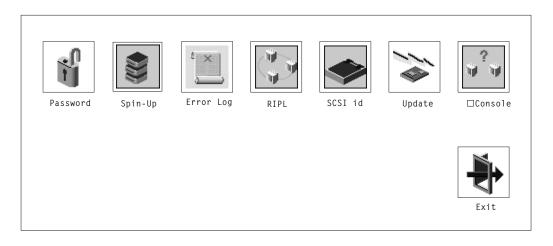
To change the custom boot list, enter a new order in the New column, then select Save. The List of Boot Devices is updated to reflect the order you have chosen.

You can choose one to five devices for the custom boot list. To change the boot sequence back to the default values, select Default. (The default sequence is automatically saved.)

Utilities



Selecting this icon enables you to perform various tasks and view additional information about your computer.



The following describes the choices available on this screen.



Password: Enables you to set password protection for turning on the computer and for using system administration tools



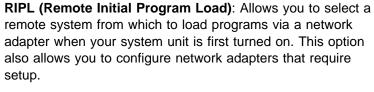
Spin-Up: Enables you to change the spin up delay for SCSI hard disk drives attached to your system



Error Log: Enables you to view and clear error log information for your computer







Update: Allows you to update the firmware programs on your computer.

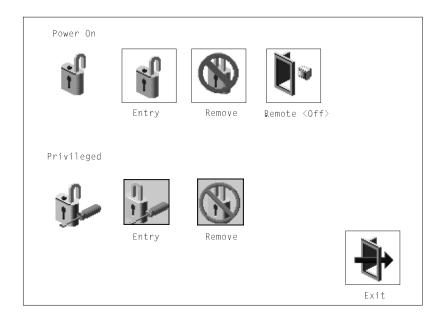


Console: If you have more than one display attached to your system unit, or if you have an ASCII terminal attached to your system unit in addition to a keyboard and display, this tool allows you to define which one is active. If no console is selected within two minutes, the console defaults to Serial Port 2.

Password

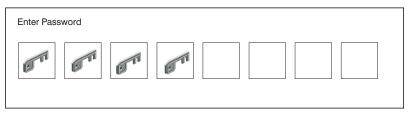


When you select this icon, the following screen is displayed.

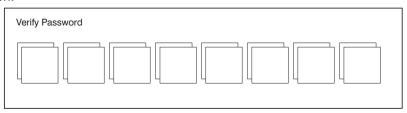


Power-On Password: Setting a power-on password helps protect information stored in your computer. If a power-on password is set for your computer, the Power On icon is shown in the locked position; if a power-on password is not set, then the Power On icon is shown in the unlocked position (as in the screen above).

When you select the Entry icon, a screen with eight empty boxes appears. Type your password in these boxes. You can use any combination of up to eight characters (A-Z, a-z, and 0-9) for your password. As you type a character, a key appears in the box.



Press Enter when you are finished; you are required to type the password again for verification.



If you make a mistake, press the Esc key and start again.

After you have entered and verified the password, the power-on password icon flashes and changes to the locked position to indicate that the power-on password is set.

To remove a previously set power-on password, select the Remove icon.



Note: If you forget the power-on password, the battery must be removed for longer than 30 seconds to reset the NVRAM, contact your service representative.

Attention: After you remove the battery, you must reconfigure your system (bootlist, IP parameters, console information, support processor, etc).

A password can be set only after the system is turned off and on again.



Remote Mode: The remote mode, when enabled, allows the system to start from the defined boot device. This mode is ideal for network servers and other computers that operate unattended. When the remote mode is set, the icon changes to Remote <On>.

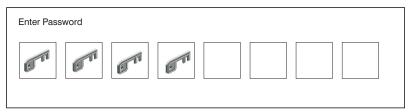
If you remove the power-on password, the remote mode is automatically reset, and the icon returns to Remote <Off>.



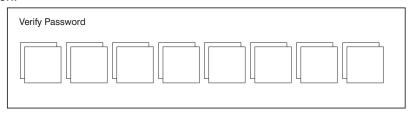
Privileged-Access Password: The privileged-access password protects against the unauthorized starting of the system programs.

When you select the Entry icon, a screen with eight empty boxes appears. Type your password in these boxes. You can use any combination of up to eight characters

(A-Z, a-z, and 0-9) for your password. As you type a character, a key appears in the box.



Press Enter when you are finished; you are required to type the password again for verification.



If you make a mistake, press the Esc key and start again.

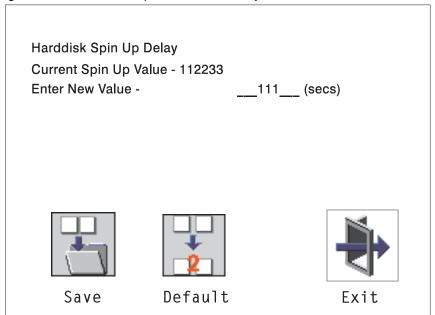
After you have entered and verified the password, the privileged-access password icon flashes and changes to the locked position to indicate that your computer now requires the password you just entered before running system programs.

Note: If you *forget* the power-on password, the battery must be removed for longer than 30 seconds to reset the NVRAM. Contact your service representative for assistance.

Hard Disk Spin Up Delay



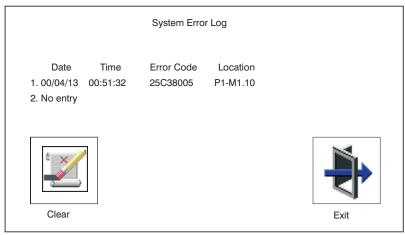
This selection allows you to change the spin up delay for SCSI hard disk drives attached to your system. Spin up delay values can be entered manually or a default setting can be used. All values are measured in seconds. The default is two seconds. After you have entered the new Spin up delay values, use the arrow keys to highlight the Save icon and press the Enter key.



Error Log



Selecting this icon displays the log of errors your computer has encountered during operations.

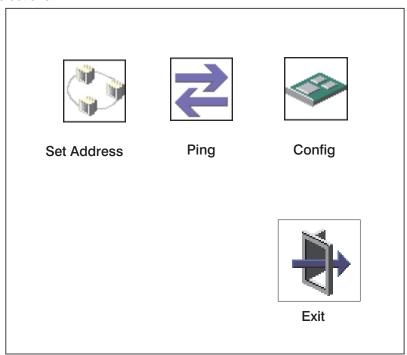


Selecting the Clear icon erases the entries in this log. For an explanation of errors in the system error log, see your System Service Guide.

RIPL

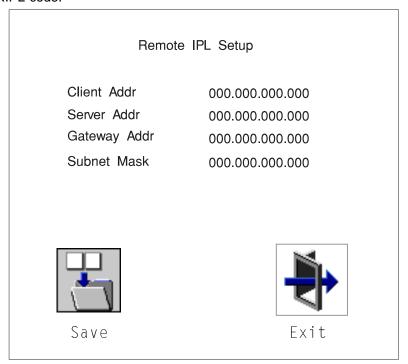


Selecting the Remote Initial Program Load (RIPL) icon gives you access to the following selections.





The Set Address icon allows you to define addresses from which your computer can receive RIPL code.



Note: Some applications may require that IP addresses contain leading zeroes for numbers less than 100. For example, 129.132.4.20 may need to be entered as 123.132.004.020. If any of the addresses is incomplete or contains a number other than 0 to 255, an error message is displayed when you select the Save icon. To clear this error, change the improper address and select Save again.

Note: You should save a copy of your changes in case you need to replace your battery.

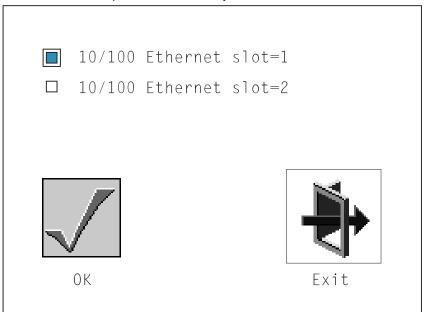


The Ping icon allows you to confirm that a specified address is valid by sending a test transmission to that address.

After choosing the Ping option, you may be asked to indicate which communications adapter should be used to send the test transmission.



The Config icon allows you to configure network adapters that require setup. Selecting the Config icon presents a list of the adapters requiring configuration. Use the arrow keys to highlight an adapter, press the spacebar to select the adapter, then highlight the OK icon and press the Enter key.



The next screen allows you to select the configuration of the adapter you have just chosen (or allow the system to select the configuration automatically). As on the previous screen, use the arrow keys to highlight, press the space bar to select, then highlight the OK icon and press Enter.

SCSI ID



This selection allows you to view and change the addresses (IDs) of the SCSI controllers attached to your system unit. To change an ID, use the arrow keys to highlight the entry, then use the spacebar to scroll through the available IDs. After you have entered the new address, use the arrow keys to highlight the Save icon and press the Enter key.

At any time in this process, you can select the Default icon to change the SCSI IDs to the default value of seven.

	Change	SCSI ID	
Type Fast Fast/Wide	Slot 5 7	ID 7 7	Max ID 7 15
Save	Default		Exit

Update





This selection allows you to update the service processor and system firmware in your system unit from an image on a 3.5-inch diskette. After choosing to update the firmware and confirming this choice, you must insert the diskette containing the firmware image.

In order to create a firmware diskette with the latest level of firmware available, see: http://www.rs6000.ibm.com/support/micro

When prompted, insert the firmware update diskette containing the new firmware image.

ATTENTION: While the new firmware image is being copied into your system unit, **you must not turn off the system unit**. Turning off the system unit during the update process may render your system unit inoperable.

After the flash update is complete, the system unit restarts. If the flash update does not complete successfully or the system unit does not restart after the flash update, contact your authorized reseller or marketing representative.

System Firmware Recovery

If a troubleshooting procedure has indicated that the firmware information in your system unit has been corrupted, then you must perform a firmware recovery.

To perform a firmware recovery, do the following:

- 1. Locate your firmware update diskette
- 2. Using another system unit, rename the *.img file on the firmware update diskette to precover.img
- 3. Make sure your system unit is turned off
- 4. Insert the firmware recovery diskette into your system unit
- 5. Turn on your system unit
- 6. When the keyboard indicator appears, press the 1 key if the system console is an ASCII terminal, or the F1 key if the system console is a directly-attached keyboard
- 7. When the System Management Services appear, choose Utilities and perform a Firmware Update as described above

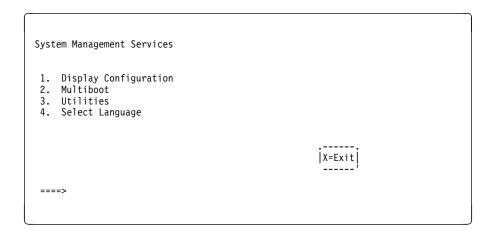
Service Processor Firmware Updates

See "Service Processor Firmware Updates" on page C-37 for details about updating the service processor.

Text-Based System Management Services

The text-based Open Firmware command line and System Management Services are available if an ASCII terminal is attached to your system unit. The text-based Open Firmware command line allows you to configure some adapters, and the System Management Services makes it possible for you to view information about your system unit and to perform such tasks as setting passwords and changing device configurations.

After the text-based System Management Services starts, the following screen appears.



Selecting the numbered options provides capabilities described on the following pages.

After you have finished using the text-based System Management Services, entering ${\bf x}$ (for exit) boots your computer.

Display Configuration

This option provides information about the setup of your computer. A screen similar to the following is displayed.

```
Device
PowerPC 604
L2-Cache, 0512K
{\tt Memory}
    slotA=8MB
    slotB=8MB
    addr=3BC
COM
    addr=3F8
COM
addr=2F8
Audio
Keyboard
Mouse
Diskette
    addr=3F0
Integrated Ethernet
addr=80005AF67BD
SCSI cntlr id=7
PCI Adapters
|P=prev-page| |N=next-page|
                                                                   |x=Exit|
```

MultiBoot Menu

```
Multiboot Menu

1. Select Software
2. Software Default
3. Install From
4. Select Boot Devices
5. OK Prompt
6. Mulitboot Startup <0FF> (or <0N>)
```

The **Select Software** option shows the names of the operating system installed. This option may not be supported by all operating systems.

In the case of AIX, this is a supported option if you receive a message saying: No Operating System Installed

information in non-volatile storage could have been lost, as would happen if the battery had been removed. In order to recreate this value issue the bootlist command under AIX with the appropriate parameters as to the location of the operating system in a particular hard disk. Please see the explanation of the bootlist command in your AIX documentation for more information.

The **Software Default** option lets you select the default operating system to start the system. This option may not be supported by all operating systems.

The **Install From** option produces a list of devices, for example the CD-ROM, where the operating system is installed from. You select one of the devices and the system searches the device for an operating system to install and, if supported by the operating system in that device, the name of the operating system displays.

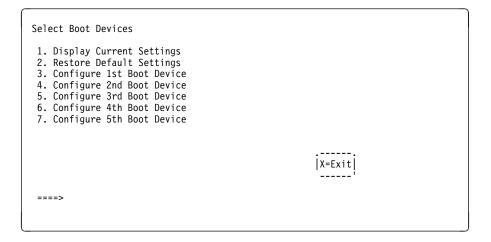
The **Select Boot Devices** option provides a list of devices that can be selected to be stored on the boot list. Up to five devices are supported.

The **OK** prompt provides access to the Open Firmware command prompt.

The Multiboot Startup <OFF> (or <ON>) option toggles between OFF and ON and selects if the Multiboot menu invokes automatically on startup or not.

Select Boot Devices

This selection enables you to view and change the custom boot list, which is the sequence of devices read at startup time.

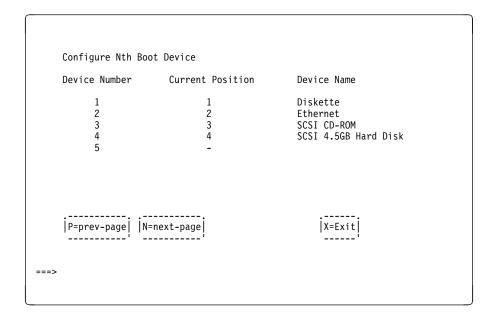


Selecting the Display Current Settings option lists the current order of devices in the boot list. The following screen shows an example of this display. For CD-ROM boot, go to the Install From icon and then select CD-ROM Drive as a boot device.

```
Current Boot Sequence

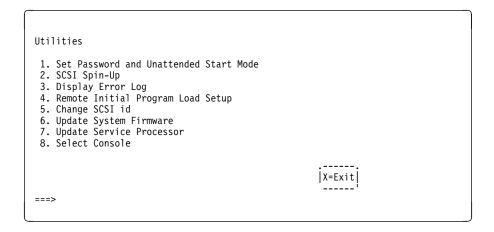
1. Diskette
2. Ethernet (Integrated)
3. SCSI CD-ROM id=3 (slot=1)
4. SCSI 500MB Hard Disk id=6 (slot=1)
5. SCSI 500MB Hard Disk id=5 (slot=5)
```

Selecting any of the Configure Boot Device options displays the following screen.

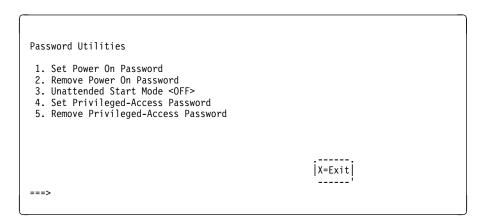


Utilities

The Utilities screen enables you to select from the following system management tools.



Set Password and Unattended Start Mode: Entering this selection permits access to the following options.



Set Power On Password: Setting a power-on password helps protect information stored in your computer. You can use any combination of up to eight characters (A-Z, a-z, and 0-9) for your password. The password you type is not displayed on the screen. Press Enter when you are finished; you are required to type the password again for verification.

To remove a previously set power-on password, select Remove Power-On Password.

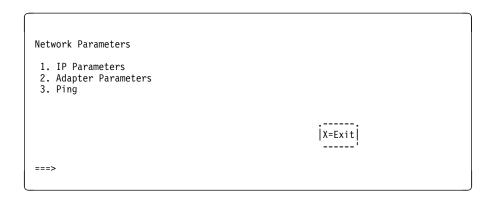
Note: If you forget the power-on password, the battery must be removed for longer than 30 seconds to reset the NVRAM. Contact your service representative for assistance.

A password can be set only after the system is turned off and on again. Set Privileged-Access Password: The privileged-access password protects against the unauthorized starting of the system programs.

If you previously set a privileged-access password and want to remove it, select Remove Privileged-Access Password.

Note: If you forget the power-on password, the battery must be removed for longer than 30 seconds to reset the NVRAM. Contact your service representative for assistance.

Remote Initial Program Load Setup: This option allows you to enable and set up the remote startup capability of your computer. You are asked to specify the network parameters.

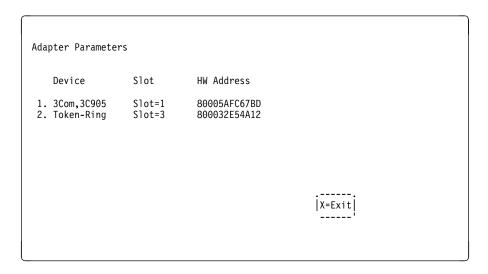


Note: Some applications may require that IP addresses contain leading zeroes for numbers less than 100. For example, 129.132.4.20 may need to be entered as 123.132.004.020.

Selecting the **IP Parameters** option displays the following screen.

```
IP Parameters
4. Subnet Mask
              000.000.000.000
                               |X=Exit|
===>
```

Selecting the Adapter Parameters option allows you to view an adapter's hardware address as well as configure network adapters that require setup.



Selecting option 1 (3Com,3C905) displays the following 100Mb Ethernet configuration menus.

```
3Com Etherlink Fast XL
                                [Auto]
[Auto]

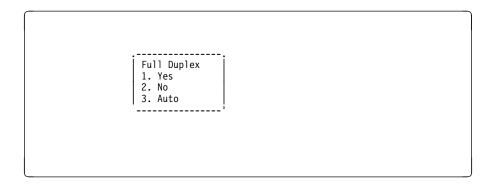
    Media Type
    Full Duplex

                                                                             |X=Exit|
```

Selecting the Media Type option allows you the change the media employed by the Ethernet adapter.

```
MEDIA TYPE
 1. 10 BaseT
2. 100 Base TX
3. Auto
```

Selecting the Full Duplex option allows you to change how the Ethernet adapter communicates with the network.



Ping, the last option available from the Network Parameters Menu, allows you to test a connection to a remote system unit. After selecting the Ping option, you must choose which adapter communicates with the remote system.

Device	Slot	Hardware Address	
1. Ethernet 2. Token Rin	Integrate ng Slot=3	od 0231589248 5123848932	
===>			

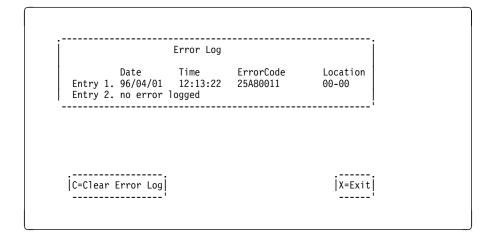
After choosing which adapter to use to ping the remote system, you must provide the addresses needed to communicate with the remote system.

```
Ping
 1. Client IP Address
2. Server IP Address
3. Gateway IP Address
4. Subnet Mask
229.132.4.20
129.132.4.10
129.132.4.30
255.255.255.0
               |E=Execute|
                                                                                                                                         |X=Exit|
===>
```

Hard Disk Spin Up Delay

Selecting this utility allows you to adjust the hard disk spin up delay in your system unit.

Display Error Log: A screen similar to the following is displayed when you select this option. You can view or clear your computer's error log.



Change SCSI ID: This option allows you to view and change the addresses of the SCSI controllers attached to you computer.

Update System Firmware: This option allows you to update your system firmware. Note that you must insert a diskette containing the firmware update image after you see the following confirmation screen.

In order to create a firmware diskette with the latest level of firmware available, see: http://www.rs6000.ibm.com/support/micro

When prompted, insert the firmware update diskette containing the new firmware image.

```
This selection will update your System Firmware. Do you want to continue? Press Y(Yes) N(No).
```

System Firmware Recovery: If a troubleshooting procedure has indicated that the firmware information in your system unit has been corrupted, then you must perform a firmware recovery.

To perform a firmware recovery, do the following:

- 1. Locate your firmware update diskette
- 2. Using another system unit, rename the *.img file on the firmware update diskette to precover.img
- 3. Make sure your system unit is turned off
- 4. Insert the firmware recovery diskette into your system unit
- 5. Turn on your system unit
- When the keyboard indicator appears, press the 1 key on the system console ASCII terminal
- 7. When the System Management Services appear, choose Utilities and perform a System Firmware Update as described above

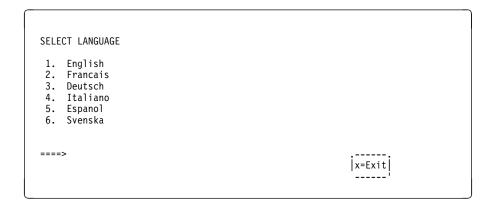
Update Service Processor Firmware: See "Service Processor Firmware Updates" on page C-37 for details about updating the service processor.

Select Console: Selecting this option allows you to define which display is used by the system for system management.

If no console is selected within two minutes, the console defaults to Serial Port 2.

Select Language

This option allows you to change the language used by the text-based System Management Services screens.



Note: Your ASCII terminal must support the ISO-8859 character set in order to properly display languages other than English.

Open Firmware Command Prompt

To enter the Open Firmware command line, you must press the F8 key after the keyboard icon appears during startup.

If you have pressed the F8 key, the Open Firmware command line (an "OK" prompt) appears after the initialization and power-on self test (POST) are complete.

The OK Prompt provides access to the Open Firmware command prompt. The Open Firmware command prompt is used for debug purposes and device driver development. Information about the commands are available in the IEEE Standard 1275.

The Open Firmware command line is used to set up adapters that are not configurable with the System Management Services. Your adapter documentation directs you to use this option if it is needed.

To exit from the Open Firmware command enter reset-all or power the system down and reboot.

To enter the graphical System Management Services instead of the Open Firmware command line, you must press the F1 key after the keyboard icon appears during startup.

To start the text-based System Management Services instead of the Open Firmware command line, press 1 on the ASCII terminal keyboard when the keyboard text symbol appears during startup.

Chapter 7. Removal and Replacement Procedures

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Service Precautions

Before performing any of the removal or replacement procedures in this chapter, read the following notices.

DANGER

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.

Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.

When adding or removing any additional devices to or from the system, ensure that the power cables for those devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.

Use one hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.

During an electrical storm, do not connect cables for display stations, printers, telephones, or station protectors for communication lines.

CAUTION:

This product is equipped with a 3-wire power cable and plug for the user's safety. Use this power cable in conjunction with a properly grounded electrical outlet to avoid electrical shock.

CAUTION:

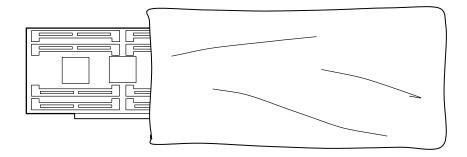
This unit has more than one power supply cord. To reduce the risk of electrical shock, disconnect two power supply cords before servicing.

Handling Static-Sensitive Devices

Attention: Disk drives, tape drives and CD-ROM drives are sensitive to static electricity discharge. These devices are wrapped in antistatic bags to prevent damage caused by electrostatic discharge.

Take the following precautions:

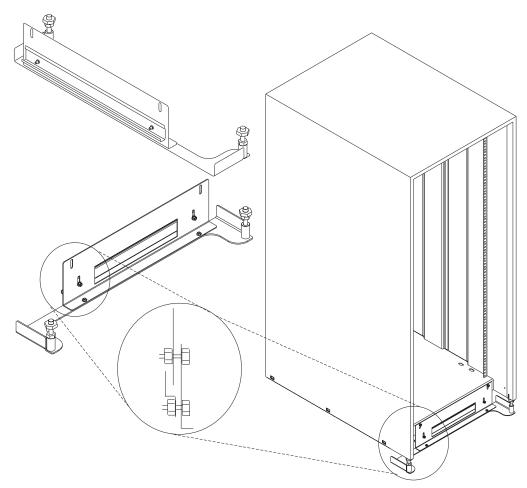
- If you have an antistatic wrist strap available, use it while handling the device.
- Do not remove the device from the antistatic bag until you are ready to install the device in the system unit.
- With the device still in its antistatic bag, touch it to a metal frame of the system.
- · Grasp cards and boards by the edges. Hold drives by the frame. Avoid touching the solder joints or pins.
- If you need to lay the device down while it is out of the antistatic bag, lay it on the antistatic bag. Before picking it up again, touch the antistatic bag and the metal frame of the system unit at the same time.
- Handle the devices carefully in order to prevent permanent damage.



Installing the Enterprise Server H Series CPU Drawer Into A Rack Unit

Installing the Rear Stabilizer on the Rack Unit

- 1. Loosen the lower screws on the stabilizer assembly.
- 2. Slide the stabilizer assembly onto the bottom of the rack.
- 3. Install screws at the top of the stabilizer assembly and tighten.
- 4. Tighten the lower screws on the stabilizer assembly.
- 5. Adjust the bolts to the floor to ensure that the stabilizer is level and does not move.



Installing Drawer Rails

Notes:

- 1. The Enterprise Server H Series CPU Drawer must be installed in the topmost position of the rack unit, or have another drawer unit in the position immediately above it to prevent the drawer from tipping out of the rack unit while in the service position.
- 2. The Enterprise Server H Series CPU Drawer has two service positions. One is with the drawer pulled out the front of the rack and the other is with the drawer pulled out the rear of the rack.
- 3. Two stabilizers are required to service the Enterprise Server H Series CPU Drawer. One must be installed at the bottom front of the rack unit, and the other at the bottom rear of the rack unit. Both must be installed prior to servicing the Enterprise Server H Series CPU Drawer.

CAUTION:

The stabilizer must be firmly attached to the bottom front of the rack to prevent the rack from turning over when the drawers are pulled out of the rack. Do not pull out or install any drawer or feature if the stabilizer is not attached to the rack.

CAUTION:

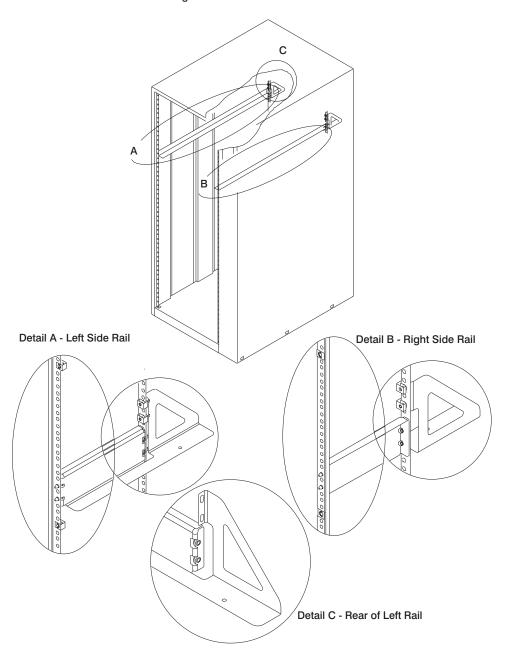
The stabilizer must be firmly attached to the bottom rear of the rack to prevent the rack from turning over when the drawers are pulled out of the rack. Do not pull out or install any drawer or feature if the stabilizer is not attached to the rack.

Note: The lowest EIA number completely occupied by a drawer is said to be that drawer's EIA position. An EIA number is also used in identifying cables attached to that drawer. The Enterprise Server H Series CPU Drawer occupies 8 EIA units.

This procedure is for installation in the topmost position in the rack unit. (See the illustration on the following page.)

- 1. If you have two top drawer guides to install, at the rear of the rack put nut clips in the 2nd and 3rd holes from the top on both sides. Then from the rear of the rack, install the two top drawer guides (the dimples on the front of the guide fit into the 1st and 3rd holes at the front).
 - If you do not have two top drawer guides to install, at the front of the rack, install one nut clip in the 2nd hole from the top on both sides.
- 2. At the rear of the rack install nut clips in the 15th and 17th holes from the top on each side of the rack.
- 3. From the rear of the rack, insert the two pins of the rail into the 20 and 22nd holes from the top at the front of the rack. On each side attach the rail to the 15th, 17th, 20th, and 22nd holes from the top at the rear of the rack, using four M5x14 hex head screws.

Mounting Hardware for Rack Drawer



Installing the Enterprise Server H Series CPU Drawer

Observe the following statements: CAUTION:

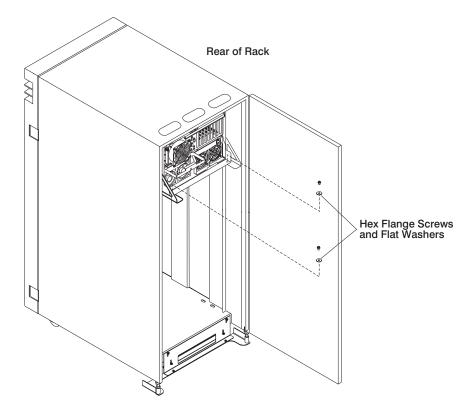
This unit weighs between 32 kg (70.5 pounds) and 55 kg (121.2 pounds). Three persons are required to safely move it. Using less than three persons to move it can result in injury.

CAUTION:

This unit weighs more than 55 kg (121.2 pounds). Material handling systems such as levers, slings, or lifts are required to safely move it. When this is not possible, specially trained persons or services (such as riggers or movers) must be used.

- 1. Slide the shipping box containing the CPU Drawer in front of the rack.
- 2. If present, remove the front door of the rack to make installing the drawer easier. See "7014 Model S00 Rack Front Door Removal and Replacement Procedures" on page 7-11.
- 3. Remove the following parts to facilitate lifting the CPU Drawer into the rack unit:
 - · Both power supplies
 - Front DASD cover
 - All Hot-Swappable disk drives (ensure that the drive location is labeled)
 - Both blowers
 - · Front top cover
 - · Rear top cover
- 4. Lift the CPU Drawer onto the support rails, and slide it **slowly** into the rack.
- 5. Continue sliding the drawer into the rack until the front of the CPU Drawer rests against the nut clips on the rack.

6. Attach the rear of the CPU Drawer to the rack rails with the two M4 screws and the two M4 washers provided with the CPU Drawer. This secures the drawer to the rack.

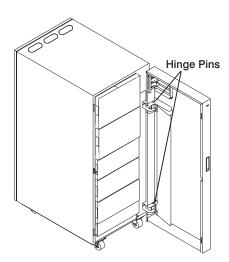


- 7. Using four M5 x 14 hex head screws supplied with this unit, attach the disk drive drawer to the two nut clips and the rails in the front of the rack at the sides.
- 8. Replace the parts that you removed earlier:
 - · Rear top cover
 - · Front top cover
 - · Both blowers
 - All Hot-Swappable disk drives
 - · Front DASD cover
 - · Both power supplies

7014 Model S00 Rack Front Door Removal and Replacement Procedures

Removal

- 1. Open the front door.
- 2. Remove the C-clip from the bottom of the hinge pins.
- 3. Remove the pins from the door hinges and lift the front door off the hinges.
- 4. The hinge assemblies can be removed for better access to the sides of some drawers.



Hot-Swappable FRUs

Note: You do not have to power down the system to remove a hot-swappable FRU from the CPU Drawer.

The following FRUs are hot-swappable:

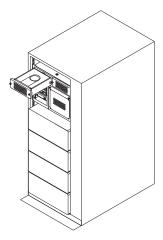
- · Disk drives in bays C and D.
- · Media and DASD blowers at the front of the drawer.
- Power supplies if the drawer has two power supplies and only one needs to be removed.
- Power supply fan assemblies. If the drawer has only one power supply, the fan assembly on the power supply blank is Hot-Swappable.
- · CPU fan at the rear of the drawer.
- I/O blower at the rear of the drawer.

Hot-Swappable Media or DASD Blower Assembly

Note: You do not have to power down the system to remove a hot-swappable blower assembly from the CPU Drawer.

Removal

- 1. If the rack unit has a front door, open the door.
- 2. Loosen the two retained screws holding the blower assembly in position.
- 3. Remove the blower assembly by pulling it out.



Replacement

Replace in reverse order. Ensure that the retained screws are properly engaged as they draw the blower assembly into the blower connectors.

Hot-Swappable Disk Drives

Note: You do not have to power down the system to remove a Hot-Swappable assembly from the CPU Drawer, but you must have the system administrator remove the drive from the system configuration.

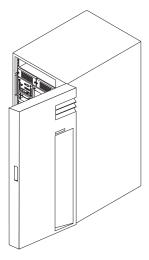
Removal

This procedure describes how to a remove hot-swappable disk drive while the CPU Drawer is powered on. If you remove a hot-swappable disk drive when the CPU Drawer power is off, steps 3 and 4 do not apply.

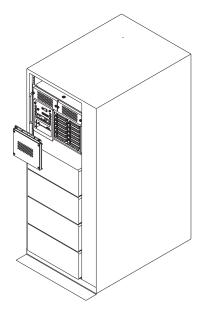
Attention: Follow all procedures for ESD-sensitive parts while performing these procedures. For ESD information, see "Handling Static-Sensitive Devices" on page 7-4.

Note: SSA bays require a carrier in all six connectors of each backplane. Either an SSA drive in a carrier or a blank carrier must be in each SSA drive position. To add an SSA drive, you must first remove the blank carrier from the bay.

1. Open the front door of the rack unit, if it has one.



2. Loosen the screws that hold the disk drive cover to the drawer and remove the disk drive cover, store it in a safe place.

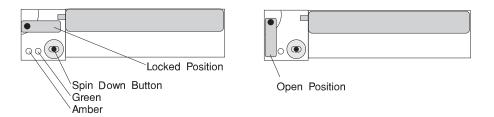


Attention: Physically removing a hot-swappable disk drive from the CPU Drawer before it has been removed from the operating system configuration may cause unrecoverable data corruption.

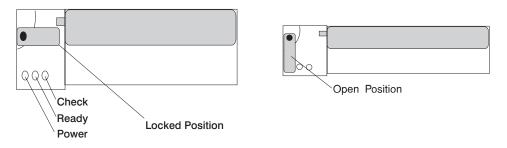
3. Verify that the disk drive has been removed from the operating system configuration. The yellow LED on the hot-swap disk drive should be off.

Attention: Use caution while handling disk drives. Drives are more likely to be damaged during installation and service. Bumping or handling a drive roughly can cause latent failures. Don't stack drives and always use appropriate ESD practices. Dropping a drive as little as 1/4 inch can cause latent failures. Disk drives can take 30 seconds to spin down, so allow at least 30 seconds after switching off the hot-swappable disk drives for removal.

- If you are removing a SCSI disk drive, press the Spin Down button on the drive. Look at the green LED and wait until it stops flashing before continuing with the next step.
- 5. Rotate the carrier latch to the open position.
 - · SCSI Disk Drive



· SSA Disk Drive



- 6. Pull the disk drive out of the drive bay, keeping it straight to prevent damage.
- 7. Place the disk drive in an antistatic bag.
- 8. **Reminder:** drawers with SSA disk drives must have a carrier in all positions. If you are not exchanging the disk drive, install a blank carrier and replace the disk drive cover.

Replacement

This procedure describes how to add an additional hot-swappable disk drive or install a new hot-swappable disk drive in a disk drive bay while the CPU Drawer is powered on.

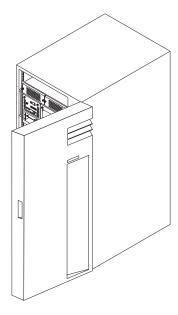
Attention: Do not open the drive; no user adjustments or serviceable parts are inside.

Notes:

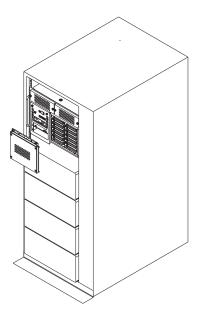
- 1. This procedure is the same for any hot-swappable disk drive that is supported by this drawer.
- 2. SSA bays require a carrier in all six connectors of each backplane. Either a SSA disk drive in a carrier or a blank carrier must be in each bay. To add a SSA disk drive you must first remove the blank carrier from the bay.
- 3. For additional information regarding the operation of the hot-swappable disk drives, see the Installation and Users Guide that came with the drives.

This section gives the instructions for installing a hot-swappable disk drive in banks C and D.

1. Open the front door of the rack unit if it has one.



2. Loosen the screws that hold the disk drive cover to the drawer and remove the disk drive cover; store it in a safe place.



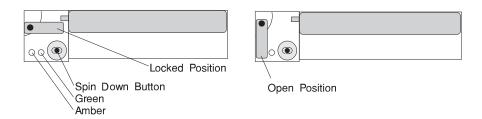
3. Each hot-swappable disk drive you replace must have a carrier attached.

Attention: Handle the disk drive with care as it is very fragile and easily damaged if exposed to shock, electrostatic discharge, or rough handling.

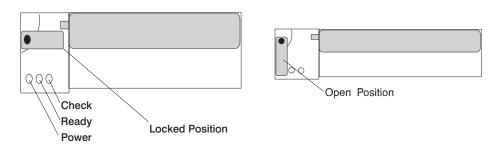
4. It is recommended that you install the hot-swappable disk drive in the next unused position of bank C first, and then bank D.

Attention: Setting the SCSI address jumpers on the hot-swappable disk drive rather than using the automatic SCSI address furnished by the backplane is not advised. Setting the SCSI address jumpers directly on the disk drive can cause service problems, multiple drives at the same address, or confusion locating the correct drive.

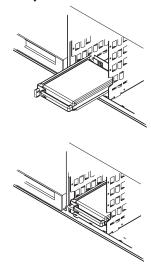
- a. Rotate the carrier latch to the open position.
 - · SCSI Disk Drive



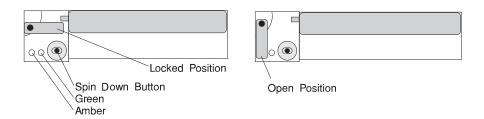
· SSA Disk Drive



- b. Position the carrier horizontally, with the connector facing into the bay.
- c. Align the side of the carrier with the raised guides on the left of the bay.
- d. Gently slide the carrier into the bay to keep from damaging the drive. Slide the carrier to the rear of the bay until it is seated into the connector.



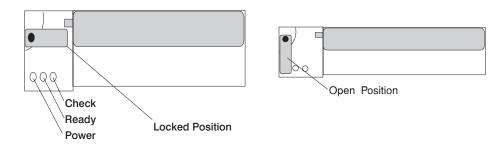
- e. Move the carrier latch to the locked position. If the carrier does not lock, be sure the carrier is fully seated in the backplane connector. When the carrier is fully seated and power is turned on, the green LED on the carrier is illuminated.
 - · SCSI Disk Drive



The following table explains the meaning of the Green and Amber status lights and Spin Down button on a SCSI disk drive.

SCSI Disk Drive Status Lights				
Light or Button	Status	Definition		
Amber	On	Drive spinning		
	Off	Drive not spinning		
Green	On	Power On		
	Off	Power Off		
	Blinking	Power Off/Drive identify		
Spin down	Depressed	Spin down drive and remove power		

· SSA Disk Drive



The following table explains the meaning of the Power, Ready and Check status LEDs on the SSA disk drive.

SSA Status LEDs				
LED	Status	Definition		
Power	On	Power On		
	Off	Power Off		
Ready	On	Both SSA connections good and drive is ready		
	Blinking	Only one SSA connection good		
	Flickering	Drive is executing a command		
Check	On	Disk drive failure		
		Self-test running		
		Drive in service mode		
	Blinking	Disk drive selected		

- 5. Go to "Installed Device Records" in *RS/6000 Enterprise Server Model H Series User's Guide* to record the drive location and the SCSI address assigned to the drive; then return here to determine your next step.
- 6. If you have other hot-swappable disk drives to install, go to page 7-17.
- If you have other devices to install, refer to "Media Devices (CD-ROM Drive, Tape Drive, Diskette Drive, Non-Hot-Swappable SCSI Disk Drives)" on page 7-62.
- 8. If you do not have any other procedures to perform, replace the cover that you removed in step 2 on page 7-17.
- 9. Close the rack unit door if it has one.

Power Supplies and Power Supply Fan Assemblies

Notes:

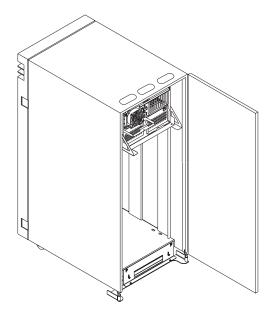
- 1. The CPU Drawer can have up to two power supplies. You can replace each power supply separately. The removal and replacement procedures are the same for each power supply.
- 2. If the CPU Drawer has two power supplies, each is hot-swappable. If only one needs to be removed, you do not have to power down the system.
- 3. Each power supply has a test switch. See "Power Supply Test Switch Procedure" on page 7-24.
- 4. If your system has only one power supply, the unused power supply position must be filled with a power supply blank which must have a power supply fan assembly attached to it.
- 5. Do not hot-swap a power supply if the ambient room temperature is greater than 32°C (90°F), as it can cause loss of data or data corruption.
- 6. Be sure that the replacement power supply is ready to install, as the CPU Drawer can encounter problems if the power supply is removed for longer than five minutes.
- 7. Power supply fans 1 and 2 are located on the primary power supply. Power supply fans 3 and 4 are located on the secondary power supply. If only one fan in a fan assembly is bad, the fan assembly must be replaced.
- 8. You need a 6mm nutdriver to perform this procedure.

Removal

DANGER

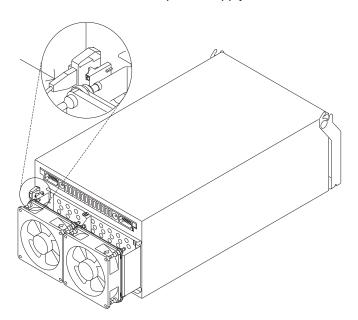
Do not attempt to open the covers of the power supply. Power supplies are not serviceable and are to be replaced as a unit.

- 1. If you have not already done so, open the rear door of the rack unit and locate the power supply you need to work on.
- 2. Unplug the power cord from the power supply.
- 3. Reposition any other cables necessary to allow the removal of the power supply.
- 4. Remove the screw from the center of the power supply handle and save it for replacement.
- 5. Grasp the handle of the power supply and pivot it upward.



6. Pull the power supply out of the drawer.

- 7. Remove the external fan assembly from the power supply and save it for replacement.
 - a. Using a fingernail, depress the tab on each plug and pull the plug to disconnect the cables from the front of the power supply.



- b. Loosen, but do not remove, the screw that holds the fan assembly to the power supply.
- c. Slide the fan assembly off of the power supply.

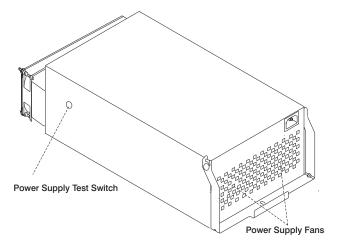
Replacement

Replace in the reverse order.

Power Supply Test Switch Procedure

Before you replace a power supply, use this procedure to determine if the power supply needs replacing.

- 1. Perform steps 1 through 6 in "Power Supplies and Power Supply Fan Assemblies" on page 7-21.
- Connect a power cord to the power supply and plug the power cord into a suitable power outlet.
 - If the green LED on rear of the power supply does not blink, the power supply is defective. Move the external fans from the defective unit to the new unit per step 7 in "Power Supplies and Power Supply Fan Assemblies" on page 7-21, then replace the power supply.
 - If the LED is blinking then the auxiliary (standby) section of the power supply is good.



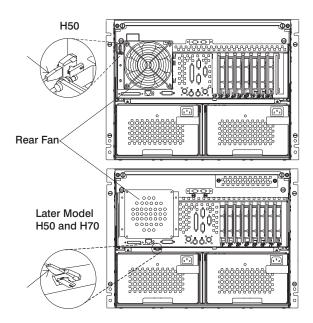
- 3. Using a pencil or other nonmetalic object, press the "test switch" that is located on the side of the power supply. This is a momentary contact switch, so you must keep the switch pressed during the entire test period of at least 30 seconds. As soon as the switch is released the self-test will stop.
 - If the INTERNAL fans inside the Power Supply do not spin (you should be
 able to hear and/or feel them spin up) and the green LED is not on solid,
 replace the power supply and move the external fans from the defective unit

- to the new unit per step 7 in "Power Supplies and Power Supply Fan Assemblies" on page 7-21.
- If the INTERNAL fans spin and the green LED is on solid, then hold the test switch for at least 30 seconds.
- If the INTERNAL fans stop or the green LED goes off before 30 seconds then replace the power supply and move the external fans from the defective unit to the new unit per step 7 in "Power Supplies and Power Supply Fan Assemblies" on page 7-21.
- If the INTERNAL fans and the green LED stay on for 30 seconds, then the power supply has passed its internal self-test. All output voltages are working within specifications. Look for other possible causes before replacing the power supply.

Hot-Swappable CPU Fan

Removal

- 1. Open the rear door of the rack unit.
- 2. Reposition any cables that hinder access to the CPU fan.
- 3. Using a fingernail, depress the tab on the CPU fan plug and pull to disconnect the cable from the bulkhead connector.



4. If the CPU fan is in a bracket, remove the screws and remove the CPU fan.

Notes:

- a. If the CPU fan is mounted to the bulkhead using isolators, the isolators should remain in the bulkhead. (If both top isolators are damaged, the drawer must be placed in the rear service position, as described in "Rear Service Position" on page 7-28, to replace them.)
- b. If any of the rubber isolators are damaged, three of the four are sufficient to hold the fan in position.
- 5. If the CPU fan is mounted to the bulkhead using isolators, carefully remove the fan from each of the four isolators that hold the fan to the drawer.
 - a. Pull the fan away from the bulkhead.
 - b. Use needle nose pliers to firmly grasp the rubber isolator between the fan and the bulkhead.

- c. Gently pull the fan off the isolator while holding the isolator to prevent damage.
- d. Repeat for each isolator, then remove the fan from the drawer.

Replacement

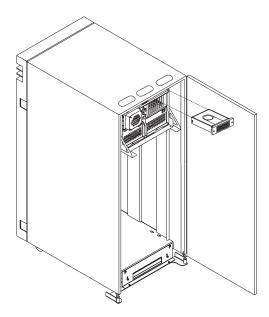
Replace in the reverse order.

Hot-Swappable I/O Blower (Model H70)

Note: You do not have to power down the system to remove a hot-swappable blower assembly from the CPU Drawer.

Removal

- 1. Open the rear door of the rack unit.
- 2. Reposition any cables that hinder access to the I/O blower.
- 3. Using a fingernail, depress the tab on the I/O blower plug and pull to disconnect the cable from the bulkhead connector.
- 4. Remove the I/O blower mounting screws, then slide the blower out.



Replacement

Replace in the reverse order.

Rear Service Position

Notes:

- 1. Perform this operation only if the rails with specially designed rear extenders are installed in the rack to support the Enterprise Server H Series CPU Drawer.
- 2. Some operations in this procedure may require a step stool, depending on the height of the individual. Either of the following may be used:

P/N 46G5947 Six foot step ladder

P/N 93G1147 Step stool

Attention: The Enterprise Server H Series CPU Drawer must be installed in the topmost position of the rack unit or have another drawer unit in the position immediately above it to prevent the drawer from tipping out of the rack unit while in the service position.

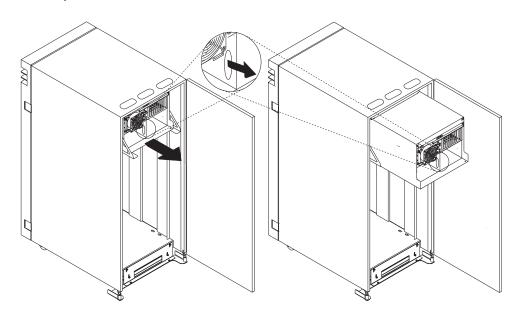
CAUTION:

The stabilizer must be firmly attached to the bottom rear of the rack to prevent the rack from turning over when the drawers are pulled out of the rack. Do not pull out or install any drawer or feature if the stabilizer is not attached to the rack.

Follow these steps to place the CPU Drawer in the Rear Service Position:

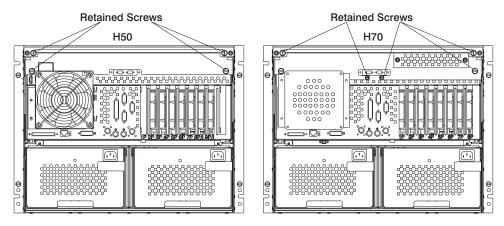
- 1. Do the steps in the power off procedure as detailed in "Stopping the System Unit" in chapter 2 of RS/6000 Enterprise Server Model H Series User's Guide.
- 2. If the rack has a front door, open it.
- 3. Remove the two blower units from the top of the drawer.
- 4. Remove the media cover from the drawer.
- Remove the DASD cover from the drawer.
- 6. Remove the screws that hold the drawer to the rack unit.
- 7. Remove the screws that attach the front bezel to the drawer.
- 8. Grasp the handles on each side of the front bezel and pull it off of the drawer.
- 9. If the rack has a rear door, open it.

- 10. Remove the screws that attach the drawer to the rear of the rails in the rack.
- 11. Note the locations of the following; then, disconnect them from the back of the **CPU Drawer:**
 - Power cords
 - · Display cable
 - Keyboard cable
 - Any other cables and cords
- 12. Remove the screws securing the power supply handles and remove both power supplies.
- 13. Grasp the handle (an opening located between the power supplies) and pull the drawer out (approximately 16 inches) until it is stopped by the two detents on the top of the drawer. The drawer may tilt slightly downward when it is in the rear service position.



14. Disconnect and remove the I/O blower, see "Hot-Swappable I/O Blower (Model H70)" on page 7-27.

15. At the top rear of the CPU Drawer, loosen the two upper retained screws (one on each side) and slide the outer rear access cover to the rear to remove it.

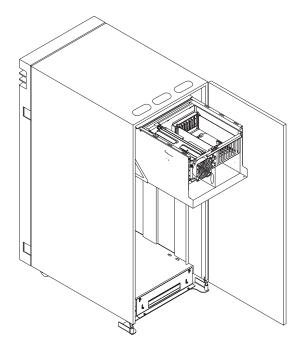


- 16. Loosen the lower retained screws (2 or 3) and slide the inner rear access cover to the rear to remove it.
- 17. For Model H50 only; remove the screws from each end of the cross bar at the top rear of the CPU Drawer, and remove the cross bar.
- 18. Return to the procedure that directed you to place the drawer into the rear service position.

Note: The Enterprise Server H Series CPU Drawer must be installed in the topmost position of the rack unit or have another drawer unit in the position immediately above it to prevent the drawer from tipping out of the rack unit while in the service position.

CAUTION:

The stabilizer must be firmly attached to the bottom front of the rack to prevent the rack from turning over when the drawers are pulled out of the rack. Do not pull out or install any drawer or feature if the stabilizer is not attached to the rack.



Rear Operating Position

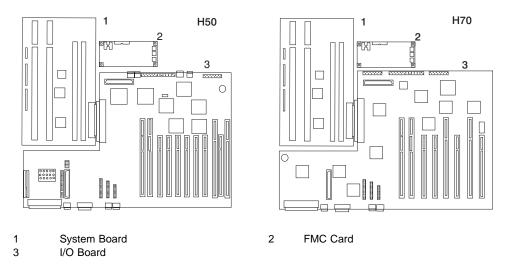
To place the drawer into the operating position from the rear service position, follow these steps:

- 1. Replace in reverse sequence all covers, adapters, I/O blower, and power supplies that were removed from the rear of the CPU Drawer.
- 2. Slide the CPU Drawer into the rack.
- 3. Use a screwdriver to press the spring loaded stops inward to allow the drawer to travel past the stops when returning to the operating position. If the drawer still does not slide all the way in, go to the front of the rack and realign the drawer, and then slide it in the rest of the way.
- 4. Replace the screws that attach the drawer to the rear of the rails in the rack.
- 5. Connect the following cables that were removed earlier from the back of the CPU Drawer:
 - Adapter cables and cords
 - · Keyboard cable
 - · Display cable
 - Power cords
- 6. If the rack has a rear door, close it.
- 7. Replace the front bezel.
- 8. Replace the screws at the front of the drawer that secure it to the rack.
- 9. Replace, in reverse, sequence all covers and blowers that were removed from the front of the drawer to place the CPU Drawer into the rear service position.
- 10. Do the steps in the power on procedure as detailed in "Starting the System Unit" in chapter 2 of RS/6000 Enterprise Server Model H Series User's Guide.
- 11. If the rack has a front door, close it.

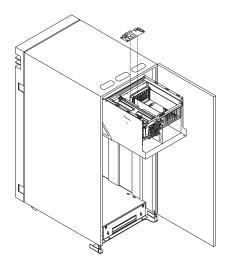
Fan Monitor Control Card

Removal

- 1. Place the drawer in the rear service position, as described in "Rear Service Position" on page 7-28.
- 2. Disconnect the cables from the fan monitor control (FMC) card, noting the locations. Label if necessary.



3. Remove the screws that hold the FMC card and lift the card out.



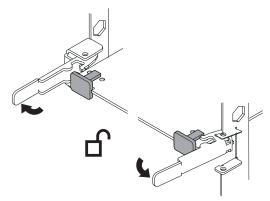
Replacement

Replace in the reverse order.

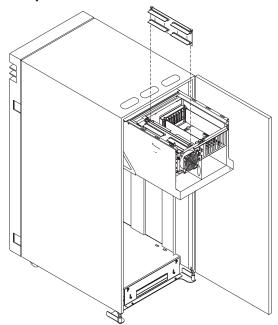
Memory Cards and Memory Modules

Removal

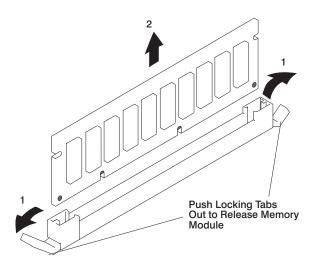
- 1. Place the drawer in the rear service position, as described in "Rear Service Position" on page 7-28.
- 2. Locate the memory cards and determine which one you want to remove.
- 3. Lift both camming latch mechanisms at the same time that hold the memory card in position.



4. Carefully lift the memory card out of the slot.

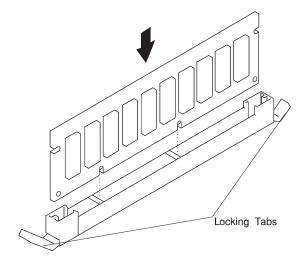


5. Remove the memory module by pushing the tabs out on the memory module connector.



Note: Memory modules must be installed in identical pairs (size and speed). They may be replaced individually, provided the replacement module is identical in size and speed.

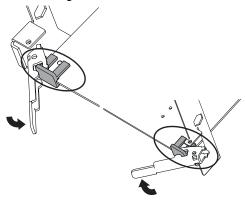
- 1. With one hand, touch any metal surface of the chassis to minimize static electrical charges, and then pick up a memory module and locate the desired memory module connector on the memory card.
- 2. Install the new memory module by pushing down on the memory module until the locking tabs lock it into the connector. (Do not move the locking tabs yourself. They lock automatically when you fully insert the module.)



Attention: Inserting the memory module crooked could damage the memory module.

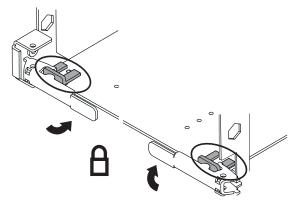
- 3. Store any memory modules you are no longer using in a static-protective package. Label the package for size and speed.
- 4. Carefully place the memory card into the card guide rails.

5. Slide the memory card in, making sure that the tabs on each end of the card are captured in both of the camming latches.



- 6. Align the card with the card connector on the system board.
- 7. Close and firmly press both of the camming latches at the same time to insert and seat the memory card.

Attention: If you do not close both latches at the same time, you may damage the card or the card connector.

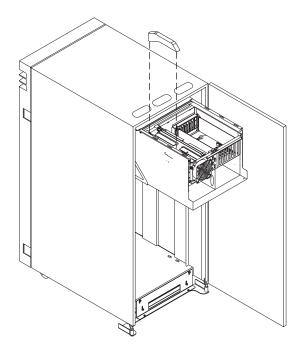


8. If you have no more removal and replacement procedures to perform, place the drawer in the rear operating position, as described in "Rear Operating Position" on page 7-32.

Second CPU Air Flow Duct (Model H50)

Removal

- 1. Follow the steps in "Rear Service Position" on page 7-28.
- 2. Carefully lift the air flow duct up and away from the first CPU card if it has a second processor. If the CPU card has only one processor, this air duct is not required.
- 3. Carefully lift the second air flow duct up and away from the second CPU card if it has a second processor.



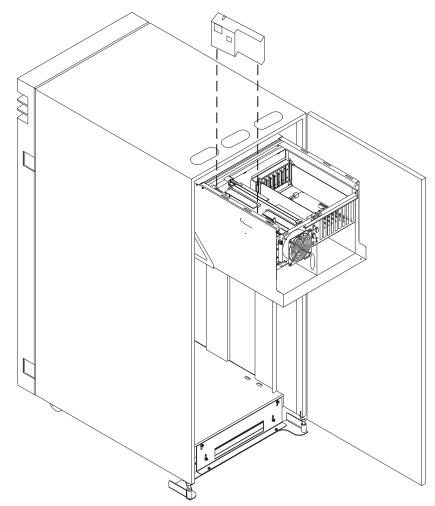
Replacement

Replace in reverse order.

CPU Air Duct (Model H70)

Removal

- 1. Follow the steps in "Rear Service Position" on page 7-28.
- 2. Carefully lift the air flow duct up and away from the first CPU card.



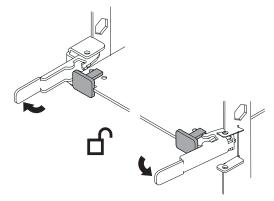
Replacement

Replace in reverse order.

CPU Card

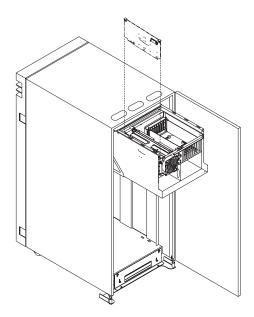
Removal

- 1. Place the drawer in the rear service position, as described in "Rear Service Position" on page 7-28.
- 2. Locate the CPU card that needs replaced.
- 3. For Model H50 only, disconnect the power cable from the top of the CPU card.
- 4. Lift both camming latch mechanisms at the same time that hold the CPU card in position.



Attention: Do not use the heat sink as a handle, as this can damage the CPU card.

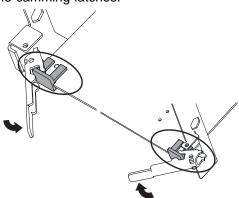
5. Carefully pull the CPU card out of the slot.



Replacement

Notes:

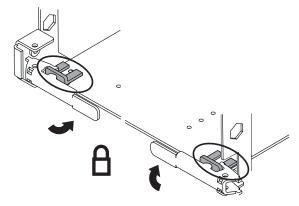
1. Slide the CPU card in, making sure that the tabs on each end of the card are captured in both of the camming latches.



2. Align the card with the card connector on the system board and firmly press both of the camming latches at the same time to insert and seat the card into the connector.

To replace, perform the removal steps in reverse order.

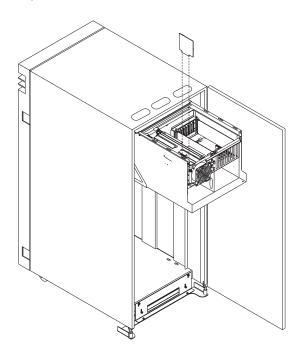
Attention: If you do not close both latches at the same, you may damage the card or the card connector.



Service Processor Card (Model H50)

Removal

- 1. Remove the memory cards, as described in "Memory Cards and Memory Modules" on page 7-34.
- 2. Remove the CPU cards, as described in "CPU Card" on page 7-40.
- 3. Remove one screw from the back, and two screws from the base of the CPU card latch mechanism assembly.
- 4. Remove the CPU card latch mechanism assembly.
- 5. Disconnect the power cables to the I/O board.
- 6. Remove the service processor card.



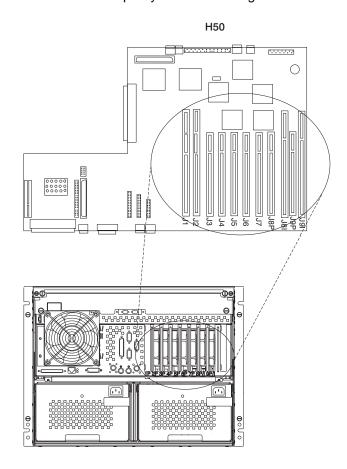
Replacement

To replace, perform the removal steps in the reverse order.

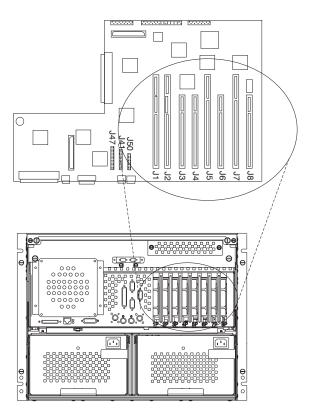
Adapters

Removal

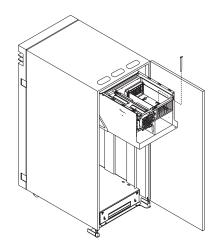
- 1. Place the drawer in the rear service position, as described in "Rear Service Position" on page 7-28.
- 2. Note the slot number of the adapter you are removing.





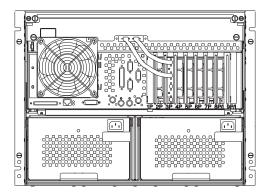


- 3. If there are any external cables attached to the adapter, disconnect them.
- 4. Loosen and remove the screw on top of the adapter's bracket.
- 5. If there are any internal cables attached to the adapter, disconnect them.
- 6. Carefully pull the adapter out of the slot.
- 7. If you are installing another adapter in this expansion slot, follow the instructions given under "Replacement" on page 7-46.
- 8. If you are not installing another adapter in this expansion slot, replace the expansion-slot cover:
 - a. Slide the cover over the open expansion slot.
 - b. Tighten the expansion-slot screw on the top of the expansion-slot cover.



To replace, perform the removal steps in the reverse order.

Note: If you replaced an SSA adapter card, be sure to connect the cables from the external SSA connectors to connectors B1 and B2 on the SSA adapter card.



System Board and I/O Board (Model H50)

Note: Before doing this procedure, review the safety notices at the start of this chapter.

Attention: Do not try to separate the system board from the I/O board until both boards are completely out of the drawer.

Removal

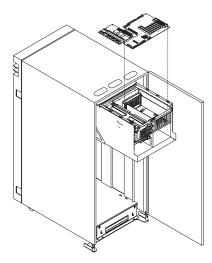
- 1. Place the drawer in the rear service position, as described in "Rear Service Position" on page 7-28.
- 2. Do the removal procedure in "Memory Cards and Memory Modules" on page 7-34.
- 3. Do the removal procedure in "CPU Card" on page 7-40.
- 4. Do the removal procedure in "Service Processor Card (Model H50)" on page 7-43.
- 5. Do the removal procedure in "Adapters" on page 7-44.
- 6. Remove the flexible fiberglass cable guard.
- 7. Note the locations of all cables that are connected to the I/O and system boards and then disconnect all cables from the boards and position the cables away from the I/O and system boards.
- 8. Remove the screws that hold the SSA connectors to the CPU Drawer, and move the internal SSA cables and connectors away from above the I/O and system
- 9. Remove the parallel and serial connectors from the drawer.
- 10. Remove the screws that hold the keyboard, mouse, and power control interface connectors to the CPU Drawer.

Note: Be sure to retain the threaded plastic block that holds the connectors to the drawer.

- Remove the screws that hold the AUI Ethernet connector and the external SCSI connector to the CPU Drawer.
- 12. Remove the screws that attach the I/O board and the screws that attach the system board to the CPU Drawer.

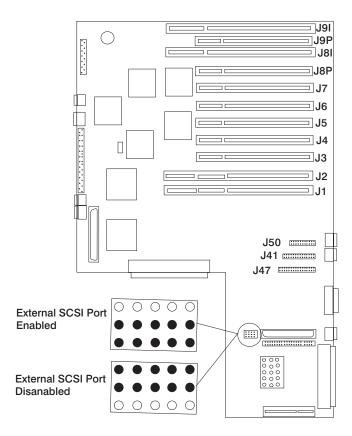
Attention: Use extreme care when lifting the I/O and system boards. Do not allow them to bend at the connector.

13. Carefully slide the I/O and system boards toward the front of the system unit, tilt the right side of the I/O and system boards upward and remove them.



14. Disconnect the system board from the I/O board.

To replace, do the removal steps in the reverse order. Verify that the security jumpers (J16) are in the correct position (same as the replaced I/O planar).



System Board (Model H70)

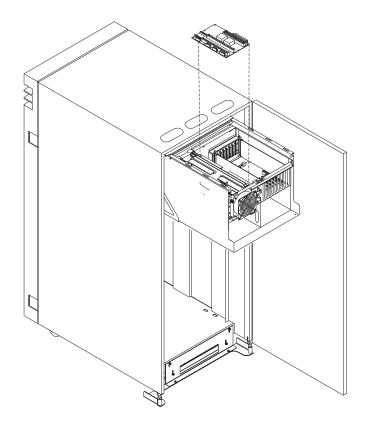
Note: Before doing this procedure, review the safety notices at the start of this chapter.

Removal

- 1. Place the CPU Drawer in the rear service position, as described in "Rear Service Position" on page 7-28.
- 2. Do the removal procedure in "Memory Cards and Memory Modules" on page 7-34.
- 3. Do the removal procedure in "CPU Card" on page 7-40.
- 4. Remove the screws that attach the system board to the CPU Drawer.

Attention: Use extreme care when separating the system board from the I/O board. Do not allow it to bend at the connector.

- 5. Carefully slide the system board toward the outside of the CPU Drawer to disconnect it from the I/O board.
- 6. Lift the system board from the CPU Drawer.



To replace, do the removal steps in the reverse order.

I/O Board (Model H70)

Note: Before doing this procedure, review the safety notices at the start of this chapter.

Removal

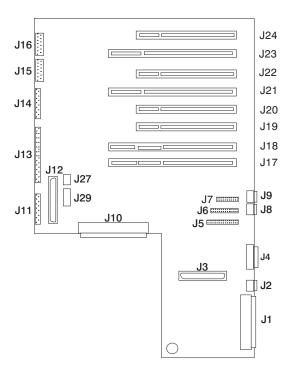
- 1. Place the drawer in the rear service position, as described in "Rear Service Position" on page 7-28.
- 2. Do the removal procedure in "System Board (Model H70)" on page 7-50.
- 3. Note the locations of all cables that are connected to the I/O board, then disconnect all the cables and position them away from the I/O board.
- 4. Remove the screws that hold the SSA connectors to the drawer, and move the internal SSA cables and connectors away from above the I/O board.
- 5. Remove the screws that hold the keyboard, mouse, and power control interface connectors to the drawer.

Note: Be sure to retain the threaded plastic block that holds the connectors to

- Remove the screws that hold the AUI Ethernet connector and the external SCSI connector to the drawer.
- 7. Remove the screws that attach the I/O board to the drawer.
- 8. Carefully disconnect the I/O board from the system board and lift the I/O board out of the drawer.

To replace, do the removal steps in the reverse order.

Note: Connect the I/O board securely to the system board before tightening the I/O board mounting screws.



Battery

CAUTION:

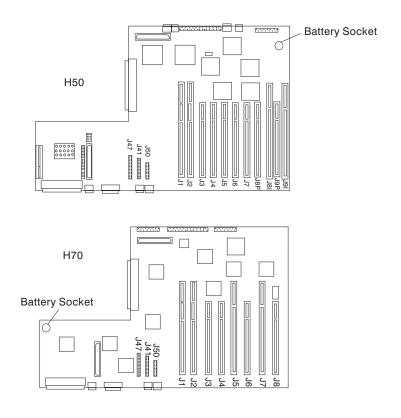
A lithium battery can cause fire, explosion, or severe burn. Do not recharge, disassemble, heat above 100°C (212°F), solder directly to the cell, incinerate, or expose cell contents to water. Keep away from children. Replace only with the part number specified for your system. Use of another battery may present a risk of fire or explosion.

The battery connector is polarized; do not attempt to reverse polarity.

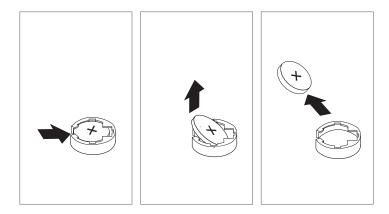
Dispose of the battery according to local regulations.

Removal

- 1. Place the drawer in the rear service position, as described in "Rear Service Position" on page 7-28.
- 2. If your have a Model H70, remove the CPU and memory cards, see "CPU Card" on page 7-40 and "Memory Cards and Memory Modules" on page 7-34.
- 3. Locate the battery on the I/O board.

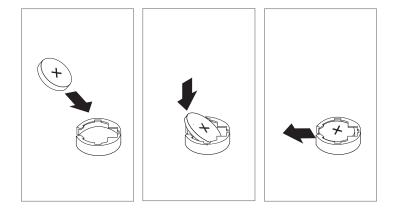


4. Use one finger to slightly slide the battery away from the notch in the battery socket; then use your thumb and index finger to hold the battery as it pushes out of the socket. (The spring mechanism behind the battery pushes it out.)



Replacement

Tilt the battery so that you can insert it into the battery socket. Slide the battery into the battery socket, then push it down into the socket.



Notes:

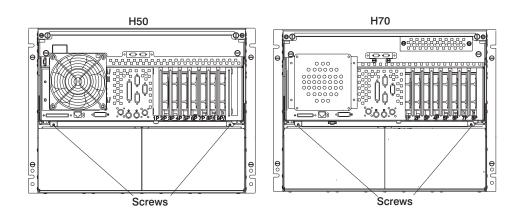
- 1. Be sure to tell the customer to reset the time and date.
- 2. Ensure that the battery polarity is correct; place the battery in the socket with the positive side facing up.

Power Distribution Board

Attention: Note the disk bay positions of all disk drives in each bank before you remove them from the drawer.

Removal

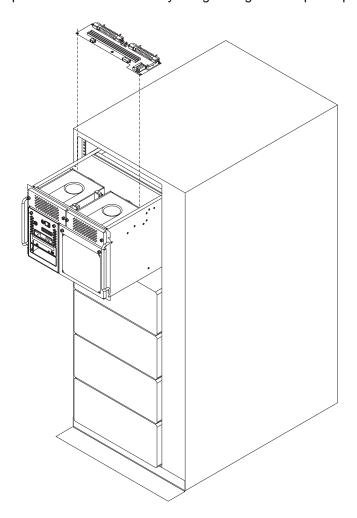
- 1. Place the drawer in the rear service position, as described in "Rear Service Position" on page 7-28.
- 2. Remove the screws (one on each side near center) holding the central electronics complex (CEC) in position.
- 3. Slide the CEC back no more than 2 inches (50mm). To slide the CEC out more may cause damage to some cables.



Note: Do not replace the rear covers at this time.

- 4. Slide the drawer back into the rack unit.
- 5. Place the drawer in the front service position, as described in "Front Service Position" on page 7-59.
- 6. Note the locations of the cables that attach to the power distribution board.
- 7. Disconnect the cables that attach to the power distribution board.
- 8. Remove the screws that hold the power distribution board in place.

- 9. Disconnect the top cable that attaches to the backplane for bank D.
- 10. Remove the power distribution board by lifting the right side up and pulling it out.



Attach the new power distribution board to the bracket, and replace in reverse order.

Front Service Position

CAUTION:

The stabilizer must be firmly attached to the bottom front of the rack to prevent the rack from turning over when the drawers are pulled out of the rack. Do not pull out or install any drawer or feature if the stabilizer is not attached to the rack.

Note: Some operations in this procedure may require a step stool, depending on the height of the individual. Either of the following may be used:

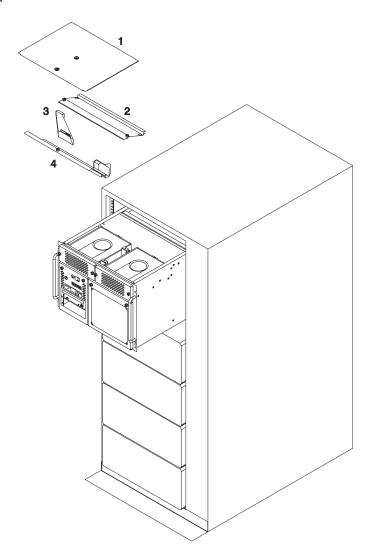
P/N 46G5947 Six foot step ladder

P/N 93G1147 Step stool

To put the drawer in the front service position, follow these steps:

- 1. Do the steps in the power off procedure as detailed in "Stopping the System Unit" in chapter 2 of RS/6000 Enterprise Server Model H Series User's Guide.
- 2. If the rack has a rear door, open it.
- 3. Note the locations of the following; then disconnect them from the back of the CPU Drawer:
 - Power cords
 - · Display cable
 - Keyboard cable
 - Any other cables and cords
- 4. Remove the screws that attach the drawer to the rear of the rails in the rack.
- 5. If the rack has a front door, open it.
- 6. Remove the screws that attach the front bezel to the rack.
- 7. Pull the drawer out until it is stopped by a detent on the top of the drawer. The drawer will come out approximately 12 inches. The drawer may tilt downward slightly while in the front service position.
- 8. Remove the screws from the top center of the drawer and slide the cover to the left and lift the front access cover up.
- 9. Loosen the retained screws and lift the top air baffle from the drawer.
- 10. If you have a Model H50, remove the I/O air duct, which is held in place with velcro, from the plenum area. Place the duct in a safe location to prevent damage.
- 11. If you have a Model H70, remove the foam block at the center of the air duct. Keep the foam block for replacement.

- 12. Loosen the retained screw, slide the bottom air baffle to the left and lift it from the drawer.
- 13. Return to the procedure that directed you to place the drawer into the front service position.



- 1 Top Cover
- 3 Model H50 I/O Air Duct, Model H70 Foam Block
- 2 Top Air Baffle
- 4 Bottom Air Baffle

Front Operating Position

To place the drawer into the front operating position from the front service position, follow these steps:

- 1. Replace, in reverse order, the bottom air baffle, the I/O air duct or the foam block, the top air baffle, and the front access cover.
- 2. Slide the drawer into the rack. If the drawer does not slide all the way in, go to the rear of the rack and realign the drawer, and then slide it in the rest of the way.
- 3. To perform the next step, use a screwdriver or similar tool to depress the spring detents that hold the stops in position.
- 4. Replace the screws that attach the front bezel to the rack.
- 5. Replace the screws that attach the drawer to the rear of the rails at the rear of the rack.
- 6. Connect the following cables that were removed earlier from the rear of the CPU Drawer:
 - · Adapter cables and cords
 - Keyboard cable
 - · Display cable
 - · Power cords
- 7. If the rack has a rear door, close it.
- 8. Do the steps in the power on procedure as detailed in "Starting the System Unit" in Chapter 2 of RS/6000 Enterprise Server Model H Series User's Guide.
- 9. If the rack has a front door, close it.

Media Devices (CD-ROM Drive, Tape Drive, Diskette Drive, Non-Hot-Swappable SCSI Disk Drives)

CAUTION:

Do not open the drive; no user adjustments or serviceable parts are inside.

CAUTION:

A class 3 laser is contained in the device. Do not attempt to operate the drive while it is disassembled. Do not attempt to open the covers of the drive as it is not serviceable and is to be replaced as a unit.

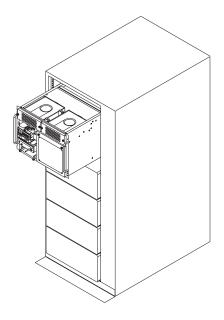
Notes:

- This procedure is the same for any media device that is supported by this drawer. It also applies to non-hot-swappable SCSI disk drives and the SCSI boot drive, if both disk drive banks have SSA backplanes or the SCSI RAID feature is installed.
- 2. For additional information regarding the operation of the media drives see the installation and user's guide that came with the drives.

Attention: Use caution while handling all drives. Drives are more likely to be damaged during installation and service. Bumping or handling drives roughly can cause latent failures. Do not stack drives and always use appropriate ESD practices. A drop of as little as 1/4 inch can cause latent failures. The drive can take 30 seconds to spin down, so wait at least 30 seconds after switching off the hotswappable drives for removal.

Removal

- 1. If the rack unit has a front door, open it.
- 2. Place the drawer in the front service position, as described in "Front Service Position" on page 7-59.
- 3. Loosen the retained screws at the top of the media bank cover and remove it from the media bank.
- 4. Slide the drive forward to remove.
- 5. Note which cables are connected to the drive. Label them to ensure that each cable is returned to the correct location when replacing them.
- 6. Disconnect the power and signal cables from the drive you are removing.
- 7. If there is an interposer, remove it from the drive and save it for installation on the replacement drive.
- 8. Remove the metal plate from the drive you just removed and save it for installation on the replacement drive.



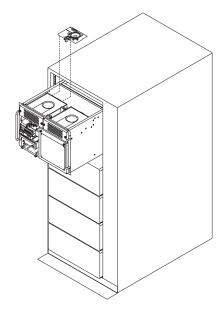
- 1. Attach the metal plate to the replacement drive.
- 2. Attach the interposer that you removed earlier to the replacement drive.
- 3. Connect the power and signal cables to the drive you are installing, making sure that the correct cables are connected to each drive.
- 4. Slide the drive into the media bay. You may need to arrange the cables at the rear of the drive while sliding the it into the bay to prevent any pinching of the cables.
- 5. Place the drawer in the front operating position, as described in "Front Operating Position" on page 7-61.

Operator Panel Control Assembly

Attention: The system ID is stored in the VPD, which is located on connector U2 of the Operator Control Panel assembly. Contact the system administrator if you replace the Operator Control Panel assembly.

Removal

- 1. Follow the steps described in "Media Devices (CD-ROM Drive, Tape Drive, Diskette Drive, Non-Hot-Swappable SCSI Disk Drives)" on page 7-62.
- 2. Remove the diskette drive, as described in "Media Devices (CD-ROM Drive, Tape Drive, Diskette Drive, Non-Hot-Swappable SCSI Disk Drives)" on page 7-62.
- 3. Note the locations of the cables that attach to the card.
- 4. Disconnect all cables from the operator panel control assembly.
- 5. Release the assembly by compressing the spring clip at each side of the assembly.
- 6. Remove the card by pushing it to the rear and pulling it up.

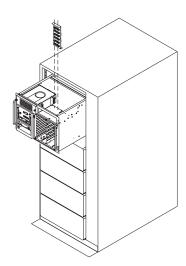


- 1. Remove the VPD module from the old operator panel and insert it in the new operator panel. Make sure you insert the module in the same position as it was in the old panel.
- 2. To replace, perform removal steps in reverse order.

SCSI or SSA Backplane

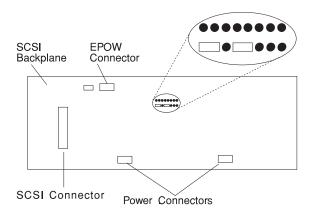
Removal

- 1. Place the drawer in the front service position, as described in "Front Service Position" on page 7-59.
- 2. Loosen the retained screws at the top of the disk drive cover and remove the disk drive cover from the front of the drawer.
- 3. Disconnect the disk drive carriers from the backplane and slide them out just enough that they clear the backplane connectors.
- 4. Remove the blower from over the disk drive banks to get to the access hole for the backplane screw.
- 5. Remove the screw that holds the backplane card in place.
- 6. Note the locations of the cables that attach to the backplane card.
- 7. Disconnect the cables that attach to the backplane card.
- 8. Remove the card by pulling it up and out.



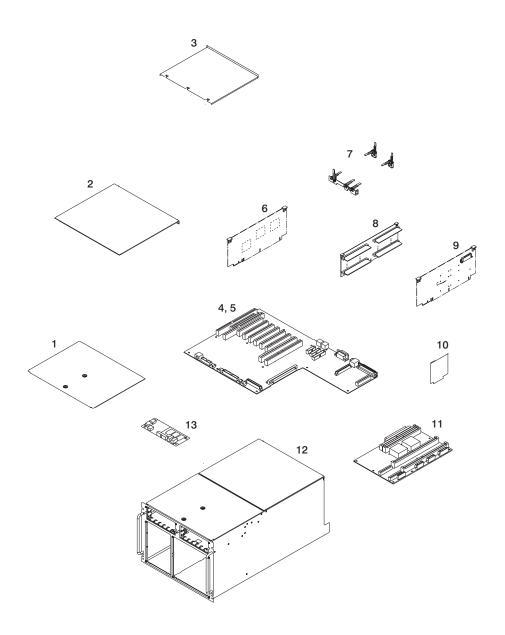
Replace in reverse order.

If you installed a SCSI backplane, check the jumpers on the new backplane for proper setting. The jumpers should be set as shown.



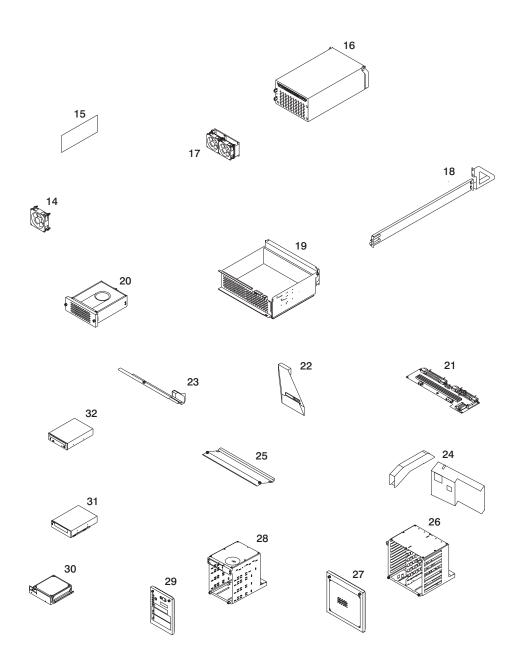
If you installed a SSA backplane, be sure to connect the internal SSA cable between the backplane and the internal connectors on the external SSA connector.

Chapter 8. Parts Information



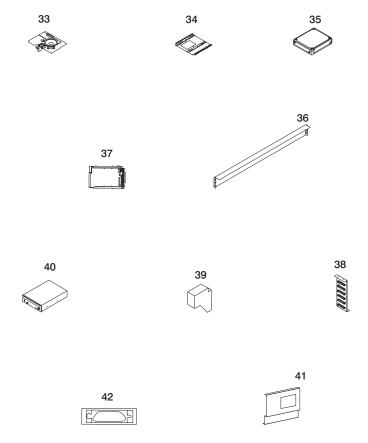
Index	Part Number	Units Per	Description
1	93H8808	1	Top cover, front
2	93H8809	1	Top Cover, back (Model H50)
	08L0746	1	Top Cover, back (Model H70)
3	93H8548	1	Inner Cover, back (Model H50)
	08L0743	1	Inner Cover, back (Model H70)
4	07L6594	1	I/O Board (Model H50)
	08L0617	1	I/O Board (Model H70)
	00G1268	1	Screw (I/O board)
	00G1007	1	Screw (Keyboard, Mouse connector mounting)
	94H0083	1	EMC gasket (attaches to I/O board)
5	33F8354	1	Battery
6	See note	1-9	Adapter
7	08L0733	1	CPU/Memory Lever, front (Model H70)
	08L0729	1	CPU/Memory Lever, rear (Model H70)
	93H8549		CPU Levers, Rear (Model H50)
	93H8554		Front Lever Assembly (Model H50)
	93H8558		Memory Levers, Rear (Model H50)
8	03N4173	1 or 2	H50 Base Memory Card
	00P1967	1 or 2	H70 Base Memory Card
	93H4700	Up to 8 pair	32MB memory module
	93H4702	Up to 8 pair	128MB memory module
	07L9030	Up to 8 pair	256MB memory module (H70 Only)
9	93H9018	1 or 2	CPU card (1 way) (Model H50)
	93H8945	1 or 2	CPU card (2 way) (Model H50)
	94H1013	1 or 2	CPU card (1 way) (Model H70)
	94H1008	1 or 2	CPU card (2 way) (Model H70)
10	08L0449	1	Service processor (Model H50)
11	07L9718	1	System Board (Model H50)
	08L0988	1	System Board (Model H70)
12	93H8819	1	Chassis
13	93H8686	1	Fan monitor control (FMC) card

Note: See Diagnostic Information for Multiple Bus Systems for part numbers.



Index	Part Number	Units Per	Description
14	41L5329	1	Fan, CPU (Model H70)
	08L0530	1	Fan, I/O blower (Model H70)
	08L0727	1	Fan enclosure, CPU (Model H70 & later Model H50)
	93H6015		Fan Grill (Model H50)
	93H8570	1	Fan, CPU (Model H50)
15	05L0111	1	Cable guard
16	94H1041	1-2	Power Supply (Model H70 AC)
	41L4881	1-2	Power Supply (Model H70 -48V DC)
	93H8958	1-2	Power Supply (Model H50 AC)
	97H9464	1-2	Power Supply (Model H50 -48V DC)
	93H8954	0-1	Power Supply Blank
17	93H8868	1-2	Fan Assembly, DASD/media
18	93H9159	1	Rail, right side
	93H9156	1	Rail, left side
19	05L0044	1	CEC cage (Model H50)
	05L0723	1	CEC cage (Model H70)
20	41L6269	2	Blower assembly
21	93H9551	1	Power Distribution Board (Model H50)
	08L0388	1	Power Distribution Board (Model H70)
22	94H0097	1	Air Duct, adapters (Model H50)
23	93H8831	1	Air Baffle, bottom
24	05L0112	0-2	Air Duct, second CPU (Model H50)
	41L6084	1	CPU Air Duct (Model H70)
25	93H8832	1	Air Baffle, top
26	93H8840	1	DASD cage
27	93H8807	1	DASD Banks Cover (Model H50)
	07L7747	1	DASD Banks Cover (Model H70)
	07L7745	1	DASD Banks Cover (OEM)
28	93H8837	1	Media cage
29	93H8806	1	Media bezel
30	93H8810	0-1	SCSI boot disk drive tray
31	See note	0-1	Tape drive
32	See note	1	CD-ROM drive

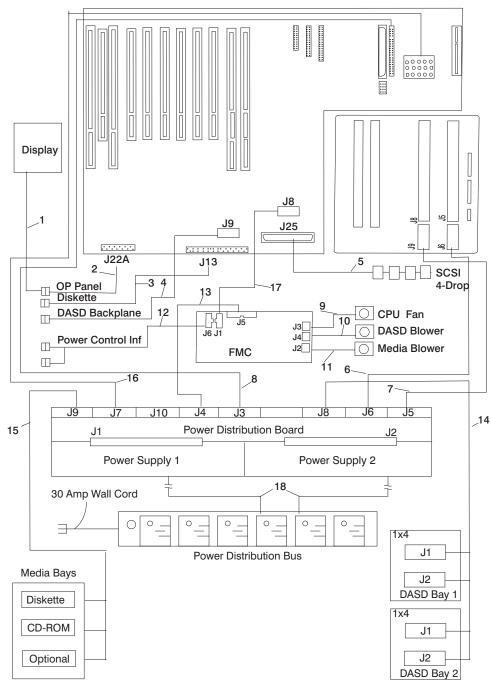
Note: See *Diagnostic Information for Multiple Bus Systems* for part numbers.



Index	Part Number	Units Per	Description
33	93H2922	1	Operator panel control assembly (Model H50)
	41L6006	1	Operator panel control assembly (Model H70)
34	06H2792	1	Media mounting plate
35	See note	Up to 12	Disk drive, SCSI
	See note	Up to 12	Disk drive, SSA
36	41L6228	1	Guide, Top Left (Model H70)
	41L6229	1	Guide, Top Right (Model H70)
37	See note	Up to 12	Disk drive carrier assembly, SCSI
	See note	Up to 12	Disk drive carrier assembly, SSA
	59H7210		SSA Blank Carrier
38	93H2166	1-2	SCSI Backplane (Hot swap)
	93H6321	0-2	SSA Backplane (Hot swap)
39	41L4875	1	Foam baffle (Model H70)
	See note	1	Diskette drive
40	06H7082	1	LCD Display Panel
	06H7946	1	Bracket (Display Panel)
41	94H0137	1	Diskette mounting plate
42	11H9760		Ethernet Slide Snap Latch
	81F9137		Stud Slider
	81F9178		Ethernet Latch
	93H6017		Plastic Rivet
	08L0335	4	20 Amp Circuit Breaker (for 7014 Model S00 Rack Rack PDP Assembly)
	11H8297	4	30 Amp Circuit Breaker (for 7014 Model S00 Rack Rack PDP Assembly)
	33G3907	As required	Screw
	78X8993	As required	Screw
	88G3977		16 Bit Terminator Adapter
	0257984	As required	Washer
	1621180	As required	Screw M3.5 panhead
	1621182	As required	Screw
	6410857	As required	Screw

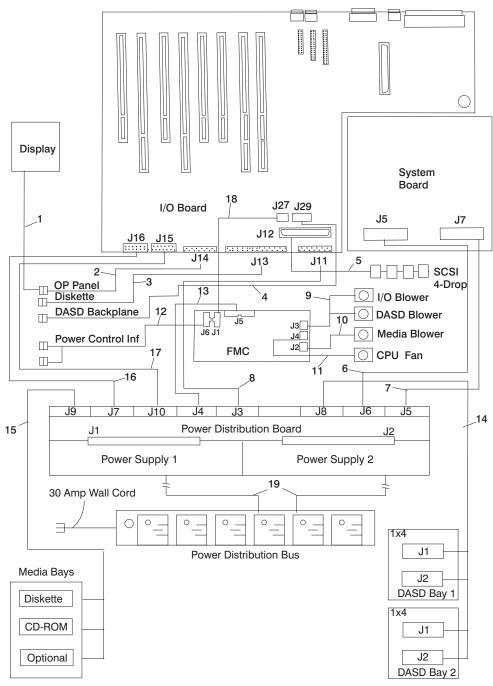
Note: See Diagnostic Information for Multiple Bus Systems for part numbers.

Model H50 Cables



	Index	Part Number	Units Per	Description
	1	93H1816	1	Signal Cable, Operator Panel Assembly to LCD
	2	94H0679	1	I/O Board to Operator Panel
	3	73H1894	1	Cable (diskette)
	4	07L6763	1	EPO Signal Cable, I/O Board to DASD Back- planes
	5	93H9613	1	Signal Cable, I/O Board to Internal SCSI Devices (4-Drop)
	6	93H8562	1	Power Cable, PDB to CPU Card 2
D	7	93H8568	1	Power Cable, PDB to CPU Card 1
D	8	93H8565	1	Power Cable, Signal, I/O Brd.
	9	93H8566	1	Power Cable, FMC to CPU Fan
	10	93H8564	1	Power Cable, FMC to Left Blower
	11	93H8563	1	Power Cable, FMC to Right Blower
	12	93H9653	1	PCI Signal Cable, FMC to Bulkhead
	13	93H8567	1	Power Cable, PDB to FMC
	14	93H8571	1	Power Cable, PDB to DASD Banks
		93H8876	1	Power Cable, DASD Banks
	15	93H8572	1	Power Cable, PDB to Media Docking Cable
		93H8875	1	Power Cable, Media Docking Cable
	16	93H8561	1	Power Cable, I/O Brd.
D	17	93H8569	1	Signal Cable, I/O Brd to FMC.
D		06H6660	Up to 2	Cable (SCSI) adapter to backplane)
D		92F1294	3	Cable clamp
D		93H4339	1	Int. Signal Cable, Bulkhead to SSA Backplane
D		93H4340	1	Int. Signal Cable, SSA Adapter to Bulkhead
D D		93H4341	1	Int. Signal Cable, SSA Backplane to SSA Backplane
D	18	39H9994	1	Cable (Power 2-drop)
D		6952300	1-2	Power cable

Model H70 Cables



Index	Part Number	Units Per	Description
1	93H1816	1	Signal Cable, Operator Panel Assembly to LCD
2	94H0679	1	I/O Board to Operator Panel
3	73H1894	1	Cable (diskette)
4	41L5596	1	EPO Signal Cable, I/O Board to DASD Back- planes
5	93H9613	1	Signal Cable, I/O Board to Internal SCSI Devices (4-Drop)
6	08L0538	1	Power Cable, PDB to Sys. Brd. (+5V)
7	08L0539	1	Power Cable, PDB to Sys. Brd. (+3V)
8	08L0540	1	Power Cable, Signal, I/O Brd.
9	41L5869	1	Power Cable, FMC to Right Blower & CPU Fan
10	93H8564	1	Power Cable, FMC to Left Blower (Model H50)
11	41L5870	1	Power Cable, FMC to I/O Blower
12	41L6252	1	PCI Signal Cable, FMC to Bulkhead
13	93H8567	1	Power Cable, PDB to FMC
14	93H8571	1	Power Cable, PDB to DASD Banks
	93H8876	1	Power Cable, DASD Banks
15	93H8572	1	Power Cable, PDB to Media Docking Cable
	93H8875	1	Power Cable, Media Docking Cable
16	08L0542	1	Power Cable, I/O Brd. (+5V)
17	08L0541	1	Power Cable, I/O Brd. (+3V)
18	93H8569	1	Signal Cable, I/O Brd to FMC.
	06H6660	Up to 2	Cable (SCSI) adapter to backplane)
	92F1294	3	Cable clamp
	93H4339	1	Int. Signal Cable, Bulkhead to SSA Backplane
	93H4340	1	Int. Signal Cable, SSA Adapter to Bulkhead
	93H4341	1	Int. Signal Cable, SSA Backplane to SSA Backplane
19	39H9994	1	Cable (Power 2-drop)
	6952300	1-2	Power cable

D D D D D D D D





Keyboard

Index	Part Number	Units Per	Description
1	82G3278	1	Keyboard, United States English
	1391402	1	Keyboard, French
	1393395	1	Keyboard, Italian
	1391403	1	Keyboard, German/Austrian
	1391406	1	Keyboard, United Kingdom English
	1391405	1	Keyboard, Spanish
	79F0167	1	Keyboard, Japanese
	64F7707	1	Keyboard, Brazilian Portuguese
	82G3279	1	Keyboard, Canadian French
	1391526	1	Keyboard, Belgian French/Dutch
	1391411	1	Keyboard, Finnish
	1391407	1	Keyboard, Danish
	1399583	1	Keyboard, Bulgarian
	1395881	1	Keyboard, Swiss French
	1385882	1	Keyboard, Swiss German
	1391409	1	Keyboard, Norwegian
	1391511	1	Keyboard, Dutch
	1391410	1	Keyboard, Portuguese
	1399046	1	Keyboard, Greek
	1391408	1	Keyboard, Hebrew
	1399581	1	Keyboard, Hungarian
	1391407	1	Keyboard, Icelanic
	1399580	1	Keyboard, Polish
	1399582	1	Keyboard, Romanian
	1399571	1	Keyboard, Slovakian
	1399570	1	Keyboard, Czechoslovakian
	1393286	1	Keyboard, Turkish (ID 179)

Index	Part Number	Units Per	Description
	8125409	1	Keyboard, Turkish (ID 440)
	8131596	1	Keyboard, Arabic
	06H5286	1	Keyboard, Korean
	1393990	1	Keyboard, Chinese
	006H3048	1	Keyboard, United States (OEM)
2	11H4878	1	Mouse, 3-button

Appendix A. High Availability Solutions

The RS/6000 High Availability Cluster Server - High Availability Solution is a two-node high-availability cluster consisting of two Model H Series Drawer drawers and one or two 7133 Serial Disk Systems mounted in a 7014 Model S00 Rack with two power distribution units. Each Model H Series Drawer comes with AIX system software and HACMP high-availability cluster software. The base High Availability Solution system uses and shares the external SSA disks in the Model 7133 SSA Disk Storage Subsystems.

Each RS/6000 High Availability Cluster Server - High Availability Solution includes required PCI SSA disk adapters, SSA cabling, two 10/100 Mbs Ethernet PCI adapters, one Ethernet transceiver, one CD-ROM, one AIX (1-2 user) license and one HACMP license. It is highly recommended that a 3153 ASCII terminal (or equivalent) be purchased even if graphics adapters or remote work stations are used as the control console. This will permit a software or service person to work on one CPU through the serial port without affecting the other CPU or applications. If a graphical display is preferred to the 3153 display, a low cost workstation can be connected to one of the Ethernet transceivers or into the local network.

The 7133 Serial Disk System comes with eight SSA disk drives on two loops and a redundant AC power supply

Two additional SSA adapters can be put in each Model H Series Drawer.

Configuring the High Availability Solution System With No Single Points of Failure

Redundant adapters and mirrored disks are the only way to guarantee redundancy in the High Availability Solution serial disk system. In this configuration, no single hardware component failure can cause the serial disk system to be unavailable. If single disk adapters are used with mirrored disks, then AIX and HACMP error notification methods must be developed to:

- 1. Identify all critical adapter errors
- 2. Escalate a critical adapter error to an HACMP failover

The adapter outage in a single adapter configuration will cause a brief application outage while HACMP failover transfers control of the disks and application to a backup node.

It is strongly recommended that both disks and adapters are mirrored if possible. This minimizes both HACMP configuration and application disruption should a disk adapter fail.

The following table describes outages and their impacts for the minimum High Availability Solution configuration with redundant SSA adapters (2 Ethernet, 2 SSA adapters, mirrored disk subsystem, HACMP):

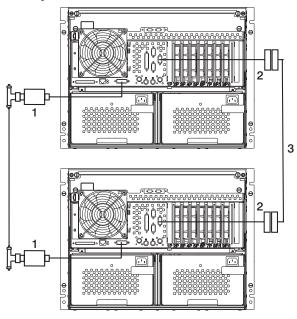
Hardware Failure Description	Failure Behavior If HACMP Is Not Configured	Extra Work Required To Provide Recovery Action (in addition to normal HACMP configuration)	Recovery Action and Behavior If HACMP Is Con- figured
Node Outage or AIX crash	Node unavailable	None	HACMP failover; application(s) unavailable for brief time during failover
Ethernet adapter failure	Access to node through Ethernet lost; error log entry.	None	HACMP swap adapter event moves IP address to spare adapter. Node Ethernet IP address unavailable for an extremely brief period as address is swapped.
SSA adapter failure	None seen; error log entry	None	N/A (no failover)
Power supply or cord failure	Node/disks supply feeds made una- vailable	None	N/A (no failover)

Basic High Availability Solution System Cabling Diagrams and Parts List

This section shows the heartbeat connections of the RS/6000 High Availability Cluster Server - High Availability Solution: the power cable locations, the SSA cable connections, and the cabling for server system consoles and cluster administration stations.

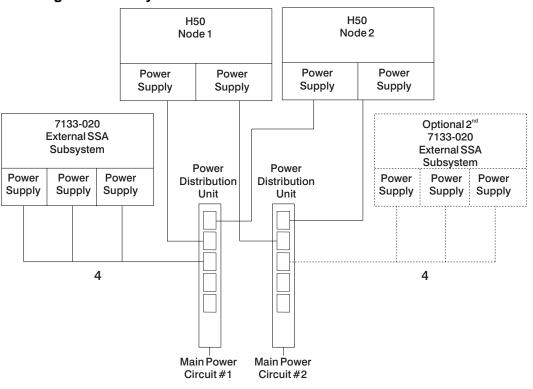
D Note: Use only serial port 3. See "System Unit Locations" in Chapter 3.

Base High Availability Solution Heartbeat Connections



Index	Part/Feature Number	Units Per	Description
1	4223	2	Ethernet Transceiver 10Base2 (D Shell to BNC). The customer is responsible for furnishing the T Connector, co-axial cable and terminator for the Ethernet connections.
2	40H6328	2	1 Foot Adapter DB9fDB25M (supplied with CPU drawer)
3	3124	1	HACMP, Serial to Serial Port Cable (Drawer to Drawer)

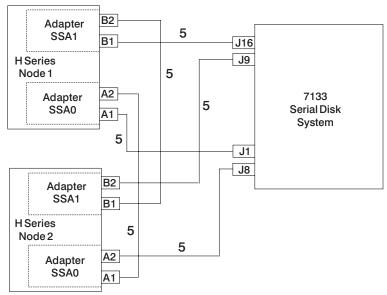
Base High Availability Solution AC Power Connections



Index	Part/Feature Number	Units Per	Description
4	67G1246	1 or 2	Power Cable, PDU to 7133

Note: The only way to ensure a truly robust HA operation is to connect the optional second 7133 Serial Disk System, as shown in the dotted lines above.

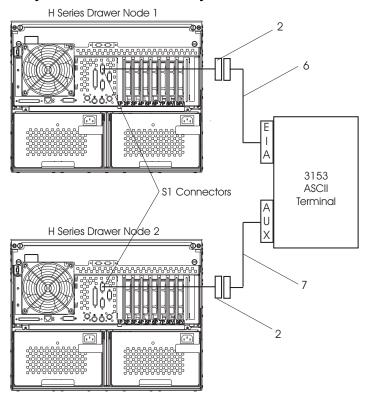
Base High Availability Solution Logical Configuration with One Serial Disk System



Index	Part/Feature Number	Units Per	Description
5	5050	6	7133 SSA Cable

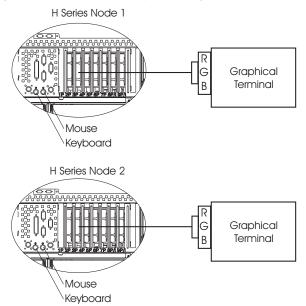
Cabling For Server System Consoles and Cluster Administration Stations

High Availability Solution with ASCII System Console



Index	Part Number	Units Per	Description
6	12H1204	1	Serial Cable with Internal Null Modem
7	88G0093	1	Serial Cable without Internal Null Modem
2	40H6328	2	1 Foot Adapter DB9fDB25M (supplied with CPU drawer)

High Availability Solution With Graphical System Console

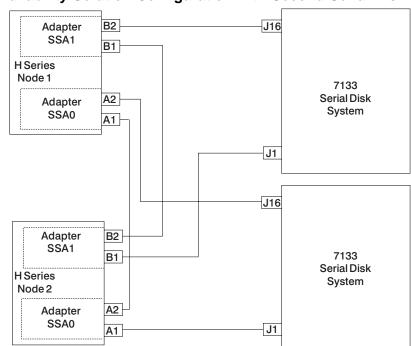


H Series Node 1 Cluster LAN Connection Administration Workstation H Series Node 2

High Availability Solution With Graphical Cluster Administration Station

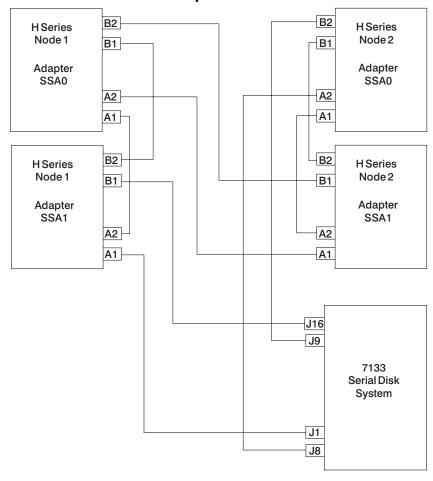
Supplemental Cabling Information

Because the basic cabling information in this document is not the only way to configure the High Availability Solution, this appendix shows some other ways to configure the High Availability Solution.

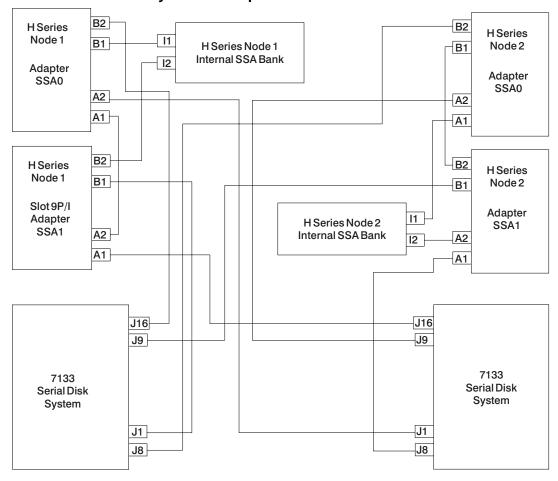


High Availability Solution Configuration with Second Serial Disk System

High Availability Solution Configuration with Single Serial Disk System and Redundant Internal SSA Adapters



High Availability Solution With Redundant Internal SSA Adapters, Second Serial Disk System and Optional Internal SSA Banks



Appendix B. -48 Volt DC Applications

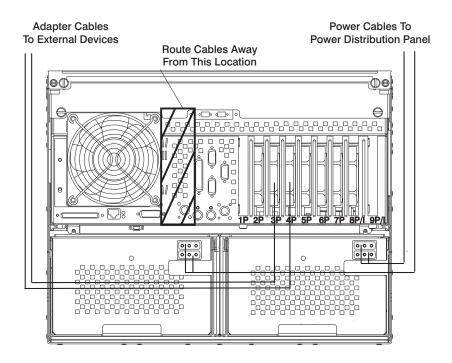
The RS/6000 Enterprise Server Model H Series -48 Volt DC CPU Drawer is a RS/6000 Enterprise Server Model H Series that operates on -48 volts direct current.

This book provides information specific to the -48 volt RS/6000 Enterprise Server Model H Series that is not found in the RS/6000 Enterprise Server Model H Series Installation and Service Guide or the 7014 Model S00 Rack Installation and Service Guide.

Cable Routing

All cables must be organized and routed at least 2 inches away from the rear surfaces of the RS/6000 Enterprise Server Model H Series system. This will help optimize the system cooling and EMC performance. No labels or other objects should be added where they will obstruct air flow though the rear chassis ventilation holes.

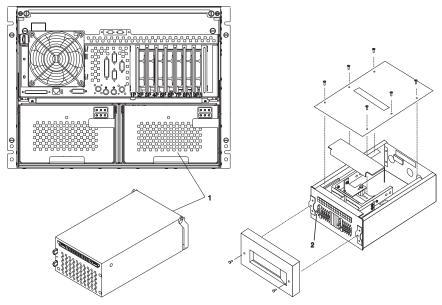
The following diagram shows one example of how to route the cables at the rear of the drawer.



-48 Volt DC Specific Parts List

This section provides information that is specific to the RS/6000 Enterprise Server Model H Series -48 Volt DC CPU Drawer that is not found in the RS/6000 Enterprise Server Model H Series Installation and Service Guide or the 7014 Model S00 Rack Installation and Service Guide.

The following parts are found on the RS/6000 Enterprise Server Model H Series -48 Volt DC CPU Drawer All other parts for the RS/6000 Enterprise Server Model H Series are listed in Chapter 8 on page 8-1, and for the 7014 Model S00 Rack are found in the 7014 Model S00 Rack Installation and Service Guide.



Index	Part Number	Units Per	Description
1	97H9464 (Model H50) 41L4881 (Model H70)	1-2	-48 volt DC power supply (for RS/6000 Enter- prise Server Model H Series)
2	08L0335 93H6391	4	20 Amp Circuit Breaker (Model H50 for 7014 Model S00 Rack PDP Assembly) 30 Amp Circuit Breaker (Model H70 for 7014 Model S00 Rack PDP Assembly)

Appendix C. Service Processor Menus

The Service Processor menus enable you to configure Service Processor options and to enable and disable functions.

Service Processor menus are available using an ASCII terminal when the server is powered off and the Service Processor is operating with standby power. Service Processor menus are also available when server power is on and the Service Processor has detected a server problem (such as loss of surveillance).

During the first power up (i.e. power cord is plugged into the outlet), Service Processor menus are not available for 45 seconds while the Service Processor is running self-tests and initializing the server. If the server powers down, Service Processor menus become available after 15 seconds.

For a summary of the Service Processor functions and the methods for invoking them, see the table on page C-2.

Service Processor Functions	Service Processor Menus (ASCII ter- minals)	Service Processor Service Aids (ASCII or graphics terminals)	SMS (ASCII or graphics terminals)
Read VPD	Y ³	Y ³	Y ³
View System Environmental Conditions	Y ³		
Read System POST Errors	Y ³		
Read Service Processor Error Logs	Y ³		
View Progress Indicators from last Boot	Y ³		
Power-on System	Y ³		
Power-off System	Y ²		
Read NVRAM	Y ²		
Reset Service Processor	Y ²		
Setup Reboot/Restart Policy	Y ²	Y ³	
Start Talk Mode	Y ²		
Enable/Disable Console Mirroring	Y ²	Y ¹	
Select Modem Line Speed	Y ²	Y ¹	
Enable/Disable Modem	Y ²	Y ¹	
Setup Modem Configuration	Y ²	Y ¹	
Setup Ring Indicate Power-On	Y ²	Y ¹	
Setup Dial-out Phone Numbers	Y ²	Y ¹	
Setup Surveillance	Y ²	Y ¹	
Update Service Processor Flash EPROM	Y ²	Y ¹	Y ²
Change General Access Password	Y ²		Y ²
Change Privileged Access Password	Y ²		Y ²
Select Language	Y ²		Y ²
Enable/Disable Unattended Start Mode	Y ²	Y ³	Y ²

¹ Operating system root password

² Privileged access password

³ General access (power-on) password

Service Processor Menus

The Service Processor menus are divided into two groups:

- General user menus the user must know the general access password.
- Privileged user menus the user must know the privileged access password.

The following section describes these two groups of menus, how to access them, and the functions associated with each option.

When the server is powered down, the Service Processor menus may be accessed locally or remotely.

Menu Inactivity

To prevent loss of control in unstable power environments, the Service Processor leaves the menu mode after 5 minutes of inactivity. Menus may be resumed by pressing any key on the terminal, local or remote.

How to access Service Processor menus locally

Service Processor menus may be accessed locally by connecting an ASCII terminal to either serial port. Because the presence of the ASCII terminal cannot be confirmed by the Service Processor, you must press a key on the ASCII terminal to confirm its presence. Next the Service Processor prompts you for a password (if set), and when verified, displays the Service Processor menus.

How to access Service Processor menus remotely

Service Processor menus may be accessed remotely by connecting a modem to serial port 1 or serial port 2.

- Power off the server, unplug the power cord, and press the power button to drain capacitance while power is disconnected.
- Connect the modem to the appropriate serial port and turn the modem on.
- · Plug in the server.

Note: If your modem has not been configured, go to "Call-in/Call-out Setup Menu" on page C-22.

With a terminal or terminal emulator, call the server's modem. The Service Processor prompts you for a password (if set), and when verified, displays the Service Processor menus.

General User Menus

The menu options presented to the General user are a subset of the options available to the Privileged user. The user must know the General Access Password in order to access these menus.

GENERAL USER MENU

- 1. Power-On System
- 2. Read VPD
- 3. Read Progress Indicators from Last System Boot
- 4. Read Service Processor Error Logs
- 5. Read System POST Errors
- 6. View System Environmental Conditions
- 99. Exit from Menus

• Power-On System

Allows the user to power-on the system.

Read VPD

Displays manufacturer vital product data, such as serial numbers, part numbers,

Read Progress Indicators from Last System Boot

Displays the boot progress indicators (check points), up to a maximum of 100, from the system boot prior to the one in progress now. This historical information may be useful to help diagnose system faults.

The progress indicators are displayed in two sections. Above the dashed line are the progress indicators (latest) from the boot that produced the current sessions. Below the dashed line are progress indicators (oldest) from the boot preceding the one that produced the current sessions.

The progress indication codes are listed top (latest) to bottom (oldest).

Use the posted code indicated by the <-- arrow.

Read Service Processor Error Logs

Displays the Service Processor error logs.

The time stamp in this error log is Coordinated Universal Time (CUT), a.k.a. Greenwich Mean Time (GMT). AIX error logs have more information available and are able to time stamp with local time. See C-39 for an example of the error log.

Read System POST Errors

Selecting this item lets you review the results of the POST (Power-On Self Test). Your server may be able to start in the presence of POST errors if there is sufficient working system resources. If POST errors occur during start-up, this error log when used with the diagnostics helps to isolate faults. See C-40 for an example of the POST error screen.

View System Environmental Conditions

On selection of this menu, the Service Processor reads all environmental sensors and reports the results to the user. This option maybe useful when surveillance fails, as it allows the user to determine the environmental conditions that may be related to the failure.

Privileged User Menus

The following menus are available to privileged users only. The user must know the Privileged Access Password in order to access these menus.

MAIN MENU

At the top of the MAIN Menu is a listing containing:

- Your Service Processor's current firmware version
- The firmware copyright notice
- The System Name given to your server during setup

You need the firmware version for reference when you either update or repair the functions of your service processor.

The System Name, an optional field, is the name your server reports in problem messages. This name helps your support team, (for example, your system administrator, network administrator, or service representative) to more quickly identify the location, configuration, and history of your server. The System Name is set from the Main Menu using option 6.

Note: The information under the Service Processor Firmware heading in the Main Menu example that follows is example information only.

Service Processor Firmware

EPROM: 19970915 FLASH: 19970512

Copyright 1997, IBM Corporation SYSTEM NAME

MAIN MENU

- 1. Service Processor Setup Menu
- 2. System Power Control Menu
- 3. System Information Menu
- 4. Language Selection Menu
- 5. Call-In/Call-Out Setup Menu
- 6. Set System Name
- 99. Exit from Menus

Service Processor Setup Menu

Service Processor SETUP MENU

- 1. Change Privileged Access Password
- 2. Change General Access Password
- 3. Enable/Disable Console Mirroring: Currently Disabled
- 4. Start Talk Mode
- 5. OS Surveillance Setup Menu
- 6. Reset Service Processor
- 7. Reprogram Service Processor Flash EPROM
- 98. Return to Previous Menu
- 99. Exit from Menus

- Note

Unless otherwise stated in menu responses settings become effective when a menu is exited using option 98 or 99.

Passwords

Passwords can be any combination of up to 8 alphanumeric characters. You can enter longer passwords, but the entries are truncated to include only the first 8 characters. Passwords can be set from the Service Processor menu or from the SMS menus.

For security purposes, the Service Processor counts the number of attempts to enter correct passwords. The results of not recognizing a correct password within this error threshold are different, depending on whether the attempts are being made locally (at the server) or remotely (via a modem). The error threshold is 3.

If the error threshold is reached by someone entering passwords at the server, the Service Processor exits the menus. This action is taken based on the assumption that the server is in an adequately secure location with only authorized users having access. Such users must still successfully enter a login password to access AIX.

If the error threshold is reached by someone entering passwords remotely, the Service Processor disconnects the modem to prevent potential security attacks on the server by unauthorized remote users.

The following illustrates what you can access with the Privileged Access Password and the General Access Password.

Privileged Access Password	General Access Password	Resulting Menu
None	None	MAIN MENU displayed
None	Set	MAIN MENU displayed
Set	None	User's with password see the MAIN MENU Other users see the GENERAL USER MENU
Set	Set	Users see menus associated with the entered password

Change Privileged Access Password

Set or change the Privileged Access Password. It provides the user with the capability to access all Service Processor functions. This password is usually used by the system administrator or root user.

Change General Access Password

Set or change the General Access Password. It provides limited access to Service Processor menus, and is usually available to all users who are allowed to power-on the server.

Enable/Disable Console Mirroring

When Console Mirroring is enabled, the Service Processor sends information to both serial ports. This capability may be enabled by local or remote users. This provides local users the capability to monitor remote sessions. Console mirroring may be enabled for the current session only. For more information, see "Console Mirroring" on page C-36.

Start Talk Mode

In a console mirroring session, it is useful for those that are monitoring the session to be able to communicate with each other. Selecting this menu item activates the keyboards and displays for such communications while console mirroring is established. This is a full duplex link, so message interference is possible. Alternating messages between users works best.

Surveillance Setup Menu

This option may be used to setup operating system surveillance.

OS Surveillance Setup Menu

- 1. Surveillance: Currently Enabled
- 2. Surveillance Time Interval: Currently 5
- 3. Surveillance Delay: Currently 10
- 98. Return to Previous Menu

- Surveillance

May be set to Enabled or Disabled.

Surveillance Time Interval:

May be set to any number from 2 to 255 minutes.

- Surveillance Delay:

May be set to any number from 0 to 255 minutes.

Refer to "Service Processor System Monitoring - Surveillance" on page C-34 for more information about surveillance.

- Reset Service Processor Allows the user to reinitialize the Service Processor.
- Reprogram Service Processor Flash EPROM This is an automatic process.

An update diskette can be acquired from the RS/6000 Support page on the Internet or from your service team. The Internet address is:

http://www.rs6000.ibm.com/support/micro

The update files must be downloaded to a DOS-formatted diskette. You should format the diskette just prior to receiving the download, to be sure it is clean. Reformatting is worth the time and effort. When this process is selected, you are prompted to place the diskette into the drive and to indicate to the system that the diskette in available and the automatic process starts. If the system has other needs, you are prompted. See "Service Processor Firmware Updates" on page C-37 for additional information and update methods.

System Power Control Menu

SYSTEM POWER CONTROL MENU

- 1. Enable/Disable Unattended Start Mode: Currently Disabled
- 2. Ring Indicate Power-On Menu
- 3. Reboot/Restart Policy Setup Menu
- 4. Power-On System
- 5. Power-Off System
- 98. Return to Previous Menu
- 99. Exit from Menus

• Enable/Disable Unattended Start Mode

This option may be used to instruct Service Processor to immediately power-on the server after a power failure, bypassing power-on password verification. Unattended Start Mode can also be set via SMS Menus. It is intended to be used on servers that require automatic power-on after a power failure.

Ring Indicator Power-On Menu

Ring Indicate Power-On is an alternate method of dialing in, without establishing a Service Processor session. If the system is powered off, Ring Indicate Power-On is enabled, the server is powered on at the predetermined number of rings, If the server is already on, no action is taken. In either case, the telephone call is not answered. The caller receives no feedback that the server powered-on. The Ring Indicator Power-On Menu and defaults are shown below:

```
Ring Indicator Power-On Menu
```

- 1. Ring Indicate Power-On : Currently Disabled
- 2. Number of Rings: Currently 6
- 98. Return to Previous Menu

- Ring Indicate Power-On may be set to 'Enabled' or 'Disabled'
- Number of Rings may be set to any number from 1 to 255
- Reboot/Restart Policy Setup Menu, see "Reboot/Restart Policy Setup Menu" on page C-28.

Power on System

Lets you power on the system immediately. For other power-on methods see "System Power-On Methods" on page C-31.

Power off System

Allows the user to power off the server following a surveillance failure.

System Information Menu for Model H50

SYSTEM INFORMATION MENU

- 1. Read VPD
- 2. Read VPD Image from Last System Boot
- 3. Read Progress Indicators from Last System Boot
- 4. Read Service Processor Error Logs
- 5. Read System POST Errors
- 6. Read NVRAM
- 7. View System Environmental Conditions
- 98. Return to Previous Menu
- 99. Exit from Menus

Read VPD

Displays manufacturer's vital product data, such as serial numbers, part numbers, etc.

Read VPD Image from Last System Boot

Displays the VPD information that was in effect after the last system boot. This information will usually be identical with the results from the menu selection "Read VPD," but in the case of configuration updates or certain faults, this historical comparison can be useful to System Administrators and service personnel.

Read Progress Indicators from Last System Boot

Displays the boot progress indicators (check points), up to a maximum of 100, from the system boot prior to the one in progress now. This historical information may be useful to help diagnose system faults.

The progress indicators are displayed in two sections. Above the dashed line are the progress indicators (latest) from the boot that produced the current sessions. Below the dashed line are progress indicators (oldest) from the boot preceding the one that produced the current sessions.

The progress indication codes are listed top (latest) to bottom (oldest).

Use the posted code indicated by the <-- arrow.

Read Service Processor Error Logs

Displays error conditions detected by the Service Processor.

The time stamp in this error log is Coordinated Universal Time (CUT), a.k.a. Greenwich Mean Time (GMT). AIX error logs have more information available and are able to time stamp with local time. See C-39 for an example of the error log.

Read System POST Errors

Selecting this item lets you review the results of the POST (Power-On Self Test). Your server may be able to start in the presence of POST errors if there is sufficient working system resources. If POST errors occur during start-up, this error log when used with the diagnostics helps to isolate faults. See C-40 for an example of the POST error screen.

Read NVRAM

Displays Non-Volatile Random Access Memory (NVRAM) content.

View System Environmental Conditions

The Service Processor reads all environmental sensors and reports the results to the user. This option is most useful when surveillance fails, as it allows the user to determine the environmental conditions that may be related to the failure.

The following is an example of system environment conditions:

```
System Environmental Conditions
                       (System Power is currently off.)
Fan 0: A stopped fan detected
Fan 1: A stopped fan detected
Fan 2: A stopped fan detected
Fan 3: A stopped fan detected
I/O Temperature is operating within normal tolerances 5.0 Volts: A low 5.0 Voltage reading detected
3.3 Volts: A low 3.3 Voltage reading detected
5.0 Standby Volts: is operating within normal tolerance
+12.0 Volts: A low +12.0 voltage reading detected
-12.0 Volts: A high -12.0 voltage reading detected
            (Press Return to Continue)
```

System Information Menu for Model H70

This menu provides access to system configuration information, error logs, system resources, and processor configuration.

```
SYSTEM INFORMATION MENU
  1. Read VPD Image from Last System Boot
  2. Read Progress Indicators from Last System Boot
  3. Read Service Processor Error Logs
  4. Read System POST Errors
  5. Read NVRAM
  6. Read Service Processor Configuration
  7. View System Environmental Conditions
  8. Processor Configuration/Deconfiguration Menu
   9. Memory Configuration/Deconfiguration Menu
  10. Enable/Disable CPU Repeat Guard
      Currently Enabled
  11. Enable/Disable MEM Repeat Guard
      Currently Enabled
 98. Return to Previous Menu
 99. Exit from Menus
1>
```

Read VPD Image from Last System Boot

Displays manufacturer's vital product data (VPD), such as serial numbers, part numbers, and so on, that were stored from the system boot prior to the one in progress now.

Read Progress Indicators from Last System Boot

Displays the boot progress indicators (checkpoints), up to a maximum of 100, from the system boot prior to the one in progress. This historical information can help to diagnose system faults.

The progress indicators are displayed in two sections. Above the dashed line are the progress indicators (latest) from the boot that produced the current sessions. Below the dashed line are progress indicators (oldest) from the boot proceeding the one that produced the current sessions.

The progress indicator codes are listed top (latest) to bottom (oldest). If the <=== arrow occurs, use the 4-digit checkpoint or 8-character error code being pointed to as the beginning point for your service actions.

Read Service Processor Error Logs

Displays error conditions detected by the service processor.

The time stamp in this error log is Coordinated Universal Time (CUT), also known as Greenwich Mean Time (GMT). AIX error logs have additional information available and are able to time stamp the errors with the local time. See page C-39 for an example of the error log.

Read System POST Errors

Select this item to review the results of the POST (power-on self-test). Your system unit may be able to start in the presence of POST errors if there are sufficient working system resources. If POST errors occur during startup, this error log, when used with the diagnostics, helps to isolate faults. See "System POST Errors" on page C-40 for an example of the POST error screen.

Read NVRAM

Displays nonvolatile random-access memory (NVRAM) contents.

Read Service Processor Configuration

Displays all service processor settings that are changeable by the user.

View System Environmental Conditions

The service processor reads all environmental sensors and reports the results to the user. Use this option when surveillance fails, because it allows the user to determine the environmental conditions that may be related to the failure.

Processor Configuration/Deconfiguration Menu

Use this option to view and modify processor configuration.

The following is an example of the Processor Configuration/Deconfiguration Menu:

```
Processor Configuration/Deconfiguration Menu
Processor number
0. Configured by system (0x0)
1. Configured by system (0x0)
2. Configured by system (0x0)
3. Configured by system (0x0)
98. Return to Previous Menu
To change the configuration, select the processor number
```

The user can manually configure or deconfigure any processor, regardless of failure status, through this service processor menu. The configuration process takes place during the system power-up. Therefore, the configuration displayed in standby mode reflects the configuration during the last boot.

To view the current configuration, access the service processor menu after the system starts. When the user selects a processor, its state toggles between configured and deconfigured. Processors that are not present are not listed. A processor can be in any of the following four states:

- Configured by system: The processor is present, and has not exceeded the failure threshold. It has been configured by the system and is available.
- Deconfigured by system: The processor is present, but has exceeded the failure threshold. It is deconfigured by the system and is currently unavailable.
- Manually configured: The processor is present and available. It has been configured by the user through the service processor menus.
- Manually deconfigured: The processor is present, but unavailable. It has been deconfigured by the user through the service processor menus.

The error status of each processor is shown in parenthesis after the state of the DIMM, according to the following table:

- -0x0No failures logged against the processor
- 0x1R Built-in Self-test (BIST) failure
- 0x2R Power-on Self-test (POST) failure
- 0x3n Run-time non-recoverable machine check error

- Run-time non-recoverable checkstop error 0x4n
- 0x5n Run-time recoverable error threshold exceeded (CPU internal errors)
- 0x6n Run-time recoverable error threshold exceeded (L2 single-bit ECC errors)

where

R=additional reason codes for BIST or POST failures (not used byfield personnel)

n= number of failures or thresholds exceeded

Memory Configuration/Deconfiguration Menu

The following is an example of the Memory Configuration/Deconfiguration Menu:

```
Memory Configuration/Deconfiguration Menu
Memory DIMMs on memory card number 0:
Memory DIMMs on memory card number 1:
                                2. Configured by system (0x0)
1. Configured by system (0x0)
98. Return to Previous Menu
Enter card number and memory DIMM number separated by a space
```

The user can manually configure or deconfigure any memory DIMM (dual inline memory module), regardless of failure status, through this service processor menu. The configuration process takes place during the system power-up. Therefore, the configuration displayed in STANDBY mode reflects the configuration during the last boot.

To view the current configuration, access the service processor menu after the system starts. When the user selects a memory DIMM, its state will toggle between configured and deconfigured. Memory DIMMs that are not present are not listed. A memory DIMM can be in any of the following four states:

- Configured by system: The memory DIMM is present, and has not exceeded the failure threshold. It is configured by the system and is available.
- Deconfigured by system: The memory DIMM is present, but has exceeded the failure threshold. It has been deconfigured by the system and is currently unavailable.
- Manually configured: The memory DIMM is present and available. It has been configured by the user through the service processor menus.
- Manually deconfigured: The memory DIMM is present, but unavailable. It has been deconfigured by the user through the service processor menus.

The error status of each DIMM is shown in parenthesis after the state of the DIMM, according to the following table:

- 0x0No failures logged against the DIMM
- 0x2R Power-on Self-test (POST) failure
- 0x3n Run-time non-recoverable error

Run-time recoverable error threshold exceeded (single-bit ECC 0x5n errors)

where

R=additional reason codes for BIST or POST failures (not used byfield personnel)

n= number of failures or thresholds exceeded

- Enable/Disable CPU Repeat Guard : Use this option to enable or disable CPU Repeat Guard. Selecting this option causes the state to switch between enabled and disabled.
- Enable/Disable MEM Repeat Guard: Use this option to enable or disable MEM Repeat Guard. Selecting this option causes the state to switch between enabled and disabled.

Language Selection Menu

LANGUAGE SELECTION MENU

- 1. English
- 2. Francais
- 3. Deutsch
- 4. Italiano
- 5. Espanol
- 6. Svenska
- 98. Return to Previous Menu
- 99. Exit from Menus

Note: Your ASCII terminal must support the ISO-8859 character set in order to properly display languages other than English.

This menu allows selecting languages into which Service Processor and system firmware menus and messages are displayed.

Call-in/Call-out Setup Menu

CALL-IN/CALL-OUT SETUP MENU

- 1. Modem Configuration Menu
- 2. Serial Port Selection Menu
- 3. Serial Port Speed Setup Menu
- 4. Telephone Number Setup Menu
- 5. Call-Out Policy Setup Menu
- 6. Customer Account Setup Menu
- 7. Call-Out Test
- 8. Ring Indicate Power-On Menu
- 98. Return to Previous Menu
- 99. Exit from Menus
- Modem Configuration Menu, see C-22.
- Serial Port Selection Menu, see C-23.
- Telephone Number Setup Menu, see C-24.
- Call-Out Policy Setup Menu, see C-26.
- Customer Account Setup Menu, see C-27.
- Ring Indicate Power-On Menu, see C-12.

Modem Configuration Menu

The first two lines of the Modem Configuration Menu are status lines showing the current selections. Selections are made in the two section labeled Modem Ports and Modem Configuration File Name. Select the serial port that you that you want to activate and then select the modem configuration file for the modem on the port. If you wish to set up both serial ports with modems, make your selections one port at a time.

For information on choosing a modem configuration file, see "Sample Modem Configuration Files" on page E-1 and "Seamless Transfer of a Modem Session" on page E-6.

```
Modem Configuration Menu
   Port 1 Modem Configuration File Name:
   Port 2 Modem Configuration File Name:
To make changes, First select the port and then the configuration file
name
Modem Ports:
  1. Serial port 1
  2. Serial port 2
Modem Configuration File Name:
  3. modem f sp
   4. modem_f0_sp
  5. modem_f1_sp
  6. modem_z_sp
  7. modem_z0_sp
  8. none
  9. Save configuration to NVRAM and Configure modem
  98. Return to Previous Menu
```

Serial Port Selection Menu

```
Serial Port Selection Menu
 1. Serial Port 1 Call-Out:
     Currently Disabled
 2. Serial Port 2 Call-Out:
     Currently Disabled
 3. Serial Port 1 Call-In:
     Currently Disabled
 4. Serial Port 2 Call-In:
     Currently Disabled
98. Return to Previous Menu
```

You can enable and disable the call-in and call-out functions of each serial port in any combination.

Serial Port Speed Setup Menu

```
Serial Port Speed Setup Menu
```

- 1. Serial Port 1 Speed: Currently 9600
- 2. Serial Port 2 Speed: Currently 9600
- 98. Return to Previous Menu

Serial port speed can be set for terminal performance or to accommodate modem capabilities. A speed of 9600 baud or higher is recommended. Valid serial port speeds are shown below:

50	600	4800
75	1200	7200
110	1800	9600
134	2000	19200
150	2400	38000
300	3600	57600
		115200

Telephone Number Setup Menu

This menu may be used to set or change the telephone numbers for reporting a system failure. The Service Processor allows setting or changing telephone numbers for:

- Service Center Telephone Number: The telephone number of the maintenance provider's computer.
- Customer Administration Center Telephone Number: The telephone number of the local system support provider's computer.
- Digital Pager Telephone Number: The number for a pager carried by someone who will respond to problem calls from your server.
- Customer Voice Telephone Number: The telephone number service personnel will use to reach the system user.
- Customer System Telephone Number: The telephone number to which the server's modem is connected.

Telephone Number Setup Menu

- 1. Service Center Telephone Number: Currently Unassigned
- 2. Customer Administration Center Telephone Number: Currently Unassigned
- 3. Digital Pager Telephone Number: Currently Unassigned
- 4. Customer Voice Telephone Number: Currently Unassigned
- 5. Customer System Telephone Number: Currently Unassigned
- 98. Return to Previous Menu
- Service Center Telephone Number is the number of the service center computer. The service center usually includes a computer that takes calls from servers with call-out capability. This computer is referred to as "the catcher." The catcher expects messages in a specific format to which Service Processor conforms. For more information about the format and catcher computers, refer to the README file in the AIX /usr/samples/syscatch directory. Contact your service provider for the correct telephone number to enter here. Until you have that number, leave this field blank.
- Customer Administration Center Telephone Number is the number of the System Administration Center computer (catcher) that receives problem calls from servers. Contact your system administrator for the correct telephone number to enter here. Until you have that number, leave this field blank.
- Digital Pager Telephone Number is the number for a pager carried by someone who will respond to problem calls from your server. Contact your administration center representative for the correct telephone number to enter here. For test purposes, enter your telephone number here. You can change it later when testing is complete.

Note: Some modems, such as IBM 7857-017, are not designed for the paging function. Although they can be used for paging, they will return an error message when they do not get the expected response from another modem. Therefore, even though the paging was successful, the error message will cause the Service Processor to retry, continuing to place pager calls for the number of retries specified in the Call-Out policy Setup Menu. These retries result in redundant pages.

For digital pagers that require a personal Identification Number (PIN) for access, include the PIN in this field as in the following example:

```
1 800 123 4567,,,,87654
```

where the commas create pauses¹ for the voice response system, and the 87654 represents the PIN.

• Customer Voice Telephone Number is the telephone number of a phone near the server or answered by someone responsible for the server. This is the telephone number left on the pager for callback. For test purposes, enter your telephone number here. You can change it after testing is completed.

Customer System Telephone Number is the telephone number to which your server's modem is connected. The service or administration center representatives need this number to make direct contact with your server for problem investigation. This is also referred to as the **call-in** phone number.

Call-Out Policy Setup Menu

```
CALL-OUT POLICY SETUP MENU

1. Call-Out policy (First/All):
    Currently First

2. Remote timeout, (in seconds):
    Currently 120

3. Remote latency, (in seconds):
    Currently 2

4. Number of retries:
    Currently 2

98. Return to Previous Menu
```

- Call Out policy may be set to 'first' or 'all'. If call out policy is set to 'first', the Service Processor will stop at the first successful call out to one of the following numbers in the order listed:
 - 1. Service Center
 - 2. Customer Admin Center
 - 3. Pager

¹ The length of these pauses is set in modem register S8. The default is usually 1 or 2 seconds each.

If call out policy is set to 'all', the Service Processor will attempt a call out to all the following numbers in the order listed:

- 1. Service Center
- 2. Customer Admin Center
- 3. Pager

Remote timeout and Remote latency are functions of your service provider's catcher computer. You should take the defaults or contact your service provider for recommended settings.

Number of retries is the number of times you want the server to retry calls that resulted in busy signals or other error messages.

Customer Account Setup Menu

Customer Account Setup Menu

- 1. Customer Account Number: Currently Unassigned
- 2. Customer RETAIN Login UserID: Currently Unassigned
- 3. Customer RETAIN Login Password: Currently Unassigned
- 98. Return to Previous Menu
- Customer Account Number is assigned by your service provider for record keeping and billing. If you have an account number, enter it here. Otherwise, leave this field blank.
- Customer RETAIN Login UserID and Customer RETAIN Login Password apply to a service function to which your service provider may or may not have access. Leave these fields blank if your service provider does not use RETAIN.

Reboot/Restart Policy Setup Menu

Reboot describes bringing the system hardware back up from scratch, for example, from a system reset or power on. The boot process ends when control passes to the operating system process.

Restart describes activating the operating system after the system hardware reinitialized. Restart must follow a successful reboot.

Reboot/Restart Policy Setup Menu

- 1. Number of reboot attempts: Currently 3
- 2. Use OS-Defined restart policy? Currently Yes
- Enable supplemental restart policy? Currently No
- 4. Call-Out before restart: Currently Disabled
- 98. Return to Previous Menu
- **Number of reboot attempts** if the server fails to successfully complete the boot process, it attempts to reboot the number of times specified. Entry values equal to or greater than 0 are valid. Only successive failed reboots attempts count, not reboots that occur after a restart attempt. At restart, the counter is set to 0.
- Use OS-Defined restart policy lets the Service Processor react or not react the same as the operating system to major system faults, by reading the setting of the operating system parameter Automatically Restart/Reboot After a System Crash. This parameter may, or may not be defined depending on the operating system or its version/level. If the operating system automatic restart setting is defined, then it may be set to respond to a major fault by restarting or by not restarting. See your operating system documentation for details on setting up operating systems automatic restarts. The default value is YES.

- Enable supplemental restart policy The default setting is NO. If set to YES, the Service Processor restarts the system when the system loses control as detected by the Service Processor surveillance, and either:
 - 1. The Use OS-Defined restart policy is set to NO
 - 2. The Use OS-Defined restart policy is set to YES and the operating system has NO automatic restart policy.
 - Refer to "Service Processor Reboot/Restart Recovery" on page C-32.
- · Call-Out before restart (Enabled/Disabled) If a restart is necessary due to a system fault, you can enable the Service Processor to call out and report the event. This item is valuable if the number of these events becomes excessive, signalling a bigger problem.

Service Processor Functions and Features

The following section discusses some of the Service Processor functions and features more fully.

The RS/6000 Enterprise Server Model H Series supports the following functions:

Built-in Functions	Initialization and Test	Service Processor Basic Instructions Test (BIST)
		JTAG System Chip Initialization
	Error Data Collection	BIST/POST errors and status
		Checkstop FIR data logout
		Machine check logout
	Configuration	CPU Complex validation
		VPD Collection
	System Management	Reset and Reboot on System Firmware fail
		Reboot on system failure

Local User Function	User Interface	Local async console
		Text based menus with NLS
		Operator Panel messages
	Power and Miscellaneous	Power On/Off
		Configurable Reboot Policy
	Status and Data Access	VPD
		Error data (Service Processor)
		Error data (system)
		Environmental data
	Service Processor Setup Utili-	Passwords
	ties	Phone numbers
		Language (NLS) selection
		Call In/Call Out enable/disable
		Flash (Gold/Recovery block) Update
		Flash (Composite block) Update
		System Name
		Modem Configuration
Remote User Functions	Call Out (Call Home) Reporting	Boot failure
		OS Termination
		Surveillance failure
		Critical EPOW reporting
		Checkstop
		Machine check
	Identify system by name	Call In
		Power-on via ring-indicate
		Password/security check
		Console mirroring/Quick dis- connect
Application Interface Functions	Monitor/Sense	Thermal/Voltage/fan speed
		SP Flash Update(Recovery and Composite)

System Power-On Methods

- Power-on Switch see 'Starting the System Unit' in RS/6000 Enterprise Server Model H Series User's Guide.
- SP Menu power-on request

You can request a power-on via the Service Processor menus from either a local or remote terminal.

If a remote terminal is to be used, the modem must be connected to serial port 1, and the operating system set up to enable a TTY login session on that port.

Refer to "Seamless Transfer of a Modern Session" on page E-6 for information on transferring modem sessions from Service Processor to the operating system.

• Unattended start mode - refer to Enable/Disable Unattended Start Mode on page C-12.

The Service Processor can be enabled to recover from the loss of AC power (see Enable/Disable Unattended Power-On Mode in the SYSTEM POWER CONTROL MENU). When AC power is restored, the system returns to the then current power state at the time AC loss occurred. For example, if the system was powered-on when AC loss occurred, it reboots/restarts when power is restored. If the system was powered-off when AC loss occurred, it remains off when power is restored.

Timed power-on - refer to the shutdown -t command on servers using AIX.

Working in conjunction with AIX, the Service Processor in your server can operate a timer, much like the wake-up timer on your clock radio. You can set the timer so that your server powers on at a certain time after shutting down. The timer is battery operated, so power interruptions occurring while the server is off do not affect its accuracy. Refer to the shutdown -t command of AIX for details on setting the timer.

Because of the potential for AC power loss, the Timed Power-On function of AIX can only be assured when Unattended Power-On Mode is enabled. If a Timed Power-On event occurs during an AC power loss, and if Unattended Power-On Mode is enabled, the system starts when AC power is restored.

If Unattended Start Mode is disabled (the default), the system power state remains off when AC power is restored, regardless of the power state of the system when AC loss occurred.

• Ring Indicate Power-On

Enabling ring indicate power-on disables remote call-in. If ring indicate power-on is enabled, the server will power on at a predetermined number of rings. If the server is already on, no action is taken. In either case, the telephone call is not answered. The caller receives no feedback that the server powered on.

Follow-up to a Failed Boot Attempt

The Service Processor will initiate a power-on sequence upon detection of a failed boot attempt.

Service Processor Reboot/Restart Recovery

Reboot describes bringing the system hardware back up from scratch, for example, from a system reset or power on. The boot process ends when control passes to the operating system process.

Restart describes activating the operating system after the system hardware reinitialized. Restart must follow a successful reboot.

Failure During Boot Process: During the boot process, either initially after system power-on or upon reboot after a system failure, the Service Processor (SP) monitors the boot progress (via surveillance). If progress stops, the Service Processor can reinitiate the boot process (reboot) if enabled to do so. The Service Processor can re-attempt this process according to an entry on the Reboot/Restart Policy Setup Menu.

Failure During Normal System Operation: When the boot process completes and control transferers to the operating system (OS), the Service Processor can monitor operating system activity (see the SERVICE PROCESSOR SETUP MENU item Set Surveillance Parameters). If OS activity stops, the Service Processor can initiate a reboot/restart process based on the settings in the Service Processor Reboot/Restart Policy Setup Menu and the OS automatic restart settings (see OS documentation).

If the operating system is AIX, the menu item under SMIT for setting the restart policy is Automatically Reboot After Crash (True/False), and the default is False. When the setting is True, and if the SP parameter, Use OS-Defined Restart Policy, is Yes (the default), the Service Processor takes over for AIX to reboot/restart after a Check Stop or Surveillance failure.

Service Processor Reboot/Restart Policy Controls: The operating system's automatic restart policy (see operating system documentation) indicates the OS response to a system crash. The SP can be instructed to refer to that policy, or not, by the Use OS-Defined Restart Policy menu item.

If the operating system has no automatic restart policy, or if it is disabled, then the Service Processor restart policy can be controlled from the Service Processor Menus by using the Enable Supplemental Restart Policy selection.

Use OS-Defined restart policy:: The Use OS-Defined restart policy default setting is YES. This causes the SP to refer to the OS Automatic Restart Policy setting and take action, the same action the OS would take if it could have responded to the problem causing the restart.

When this setting is NO, or if the OS did not set a policy, the Service Processor refers to Enable supplemental restart policy for its action.

Enable Supplemental Restart Policy:: The default setting is NO. If set to YES, the Service Processor restarts the system when the system loses control as detected by the Service Processor surveillance, and either:

- 1. The Use OS-Defined restart policy is set to NO OR
- 2. The Use OS-Defined restart policy is set to YES and the operating system has NO automatic restart policy.

Refer to "Service Processor Reboot/Restart Recovery" on page C-32.

The following provides a more thorough understanding of the relations among the OS and Service Processor restart controls:

OS Automatic reboot/restart after crash setting	SP to use OS-Defined restart policy	SP Enable supple- mental restart policy	System response
None	No	Noı	
None	No	Yes	Restarts
None	Yesı	Noı	
None	Yesı	Yes	Restarts
False2	No	No ₁	
False2	No	Yes	Restarts
False2	Yesı	Noı	
False2	Yesı	Yes	
True	No	No ₁	
True	No	Yes	Restarts
True	Yesı	No ₁	Restarts
True	Yesı	Yes	Restarts

¹ Service Processor default

² AIX default

Service Processor System Monitoring - Surveillance

Surveillance is a function in which the Service Processor monitors the system, and the system monitors the Service Processor. This monitoring is accomplished by periodic samplings called heartbeats.

Surveillance is available during two phases:

- 1. System firmware bringup (automatic)
- 2. Operating system runtime (optional)

System Firmware Surveillance: Provides the Service Processor with a means to detect boot failures while the system firmware is running.

System firmware surveillance is automatically enabled during system power-on. It cannot be disabled via a user selectable option.

If the Service Processor detects no heartbeats during system IPL (for 7 minutes), it cycles the system power to attempt a reboot. The maximum number of retries is set from the Service Processor menus. If the fail condition repeats, the Service Processor leaves the machine powered on, logs an error and offers menus to the user. If Call-out is enabled, the Service Processor calls to report the failure and displays the operating system surveillance failure code on the operator panel.

Operating System Surveillance: Provides the Service Processor with a means to detect hang conditions, hardware or software failures while the operating system is running. It also provides the operating system with a means to detect the Service Processor failure by the lack of a return heartbeat.

Operating system surveillance is enabled by default. This is to allow the user to run operating systems that do not support this Service Processor option.

Operating system surveillance can be enabled and disabled via:

- service processor Menus
- service processor Service Aids

Three parameters must be set for operating system surveillance:

- 1. Surveillance enable/disable
- 2. Surveillance interval

This is the maximum time in minutes the Service Processor should wait for a heartbeat from the operating system before timeout.

3. Surveillance delay

This is the length of time, in minutes, for the Service Processor to wait from when the operating system is started to when the first heartbeat is expected.

Surveillance will take effect immediately after setting the parameters from the Service Processor menus.

If operating system surveillance is enabled (and system firmware has passed control to the operating system), and the Service Processor does not detect any heartbeats from the operating system, the Service Processor assumes the system is hung. The machine is left powered on and the Service Processor enters standby phase, displaying the operating system surveillance failure code on the operator panel. If Call-out is enabled, the Service Processor calls to report the failure.

Call Out (Call-Home)

The Service Processor can call out (Call-Home) when it detects one of the following conditions:

- System firmware surveillance failure
- Operating system surveillance failure (if supported by Operating System)
- · Critical environmental failures
- Restarts

To enable the call out feature, you need to do the following:

- Have a modem connected to serial port 1 or 2
- Set up the following using the Service Processor Menus or Diagnostic Service Aids:
 - Enable call out for the serial port where the modem is connected
 - Set up serial port line speed
 - Enter the modem configuration filename
 - Set up site specific parameters (i.e. phone numbers for call out, call out policy, etc).
- · To call out before restart, set "Call-Out before restart" to ENABLED from the Reboot/Restart Policy Setup menu.

Note: Some modems, such as IBM 7857-017, are not designed for the paging function. Although they can be used for paging, they will return an error message when they do not get the expected response from another modem. Therefore, even though the paging was successful, the error message will cause the Service Processor to retry, continuing to place pager calls for the number of retries specified in the Call-Out policy Setup Menu. These retries result in redundant pages.

Console Mirroring

Console mirroring allows a person on a local ASCII terminal to monitor the Service Processor activities of a remote user. Console mirroring ends when the Service Processor releases control of the serial ports to the system firmware.

System Configuration:

- Service Processor
- Modem connected to one serial port and enabled for incoming calls
- Local ASCII terminal connected to the other serial port. This local terminal may be connected directly to your server or connected through another modem

There are two scenarios in which console mirroring can be invoked:

- 1. Remote session first, then local session added:
 - a. Remote session already in progress
 - b. Remote user uses the Service Processor menus to enable console mirroring, allowing both consoles to be active
- 2. Local session first, then remote session added:
 - a. Local session is already in progress
 - b. The Service Processor receives a call from the remote user
 - c. The local user selects the option to enable console mirroring. The Service Processor immediately begins mirroring Service Processor menus

Note: A quick disconnect is accomplished by hitting the key sequence Ctrl+D on either console. Both sessions will exit the Service Processor menus.

Service Processor Firmware Updates

The Service Processor EPROM may need to be updated for two different reasons:

- 1. The UPDATE (composite) portion of the EPROM has become corrupted.
- 2. The Service Processor firmware upgrades, without any corruption present.

The use of a Flash EPROM allows updates to occur without physically replacing the memory.

The firmware in your server can be updated using one of four available initiation processes:

- 1. Service Processor initiation
- 2. SMS Utilities initiation
- 3. Service Aids initiation
- 4. AIX initiation

Each initiation method is described below. In each case, the process prompts you for your authority and shows the contents of the update media. Verify the file with which to perform the update, and follow any other instructions that may appear. After initiation, the processes are identical and automatic.

There are two areas in each firmware module that may need updating:

- 1. The gold code or base code or EPROM area
- 2. The custom or main program or FLASH area

Each update file contains matching gold and custom firmware, so it is not possible to update to a conflicting set.

Before the update process begins, the versions of each of the two areas of the target firmware module are compared to the versions on the update diskette. Only the area(s) that need updating are updated. In most cases, only the custom area is updated.

An update diskette can be acquired from the RS/6000 Support page on the Internet or from your service team. The Internet address is:

http://www.rs6000.ibm.com/support/micro

The update files must be downloaded to a DOS-formatted diskette. You should format the diskette just prior to receiving the download, to be sure it is clean. Reformatting is worth the time and effort.

Refer to the downloaded update instructions, or to the System Management Services "Config" on page 6-4 or "Display Configuration" on page 6-26 or Service Processor menus on page C-7, to determine the level of the system unit or service processor flash.

Updating Firmware from the Service Processor Menus: The Service Processor Menus are available while the server is powered off. From the Service Processor Main Menu, select Service Processor Setup to bring up a menu containing the item, Reprogram Service Processor Flash EPROM. Selecting that item starts the update process. The process requests the update diskette(s) as needed. After inserting the first diskette and informing the system, the process continues automatically. If the process requires user assistance, it is requested.

Updating Firmware from the SMS Utilities: From a powered down or reset condition, bring up the SMS Utilities and select the menu item for updating firmware. The process requests the update diskette(s) as needed. After inserting the first diskette and informing the system, the process continues automatically. If the process requires user assistance, it is requested.

Updating Firmware from the Service Aids

Note: This service aid is only supported for Online Diagnostics.: This service aid allows you to update the system or service processor flash.

Additional update and recovery instructions may be provided; also you need to know the fully qualified path and file name of the flash update image file. If the flash update image file is on a diskette, you need the AIX DOS utilities package to process the diskette. You can use the dosdir command to find out the name of the update image file. This service aid uses the dosread command to put the file into the /var file system.

Using this service aid to update the system or service processor flash will not save the current contents of the flash.

The flash image file will be copied in the /var file system. If there is not enough space in the /var file system for the flash update image file, an error is reported. If this occurs, exit the service aid, increase the size of the /var file system and retry the service aid. After the file is copied, a warning screen will ask for confirmation to continue the flash update. Continuing the flash update will eventually cause the system to reboot and return to the AIX login prompt. After the system unit reboots, the file /var/update_flash_image can be removed to conserve space in the /var file system.

Updating Firmware from AIX

You must delete the file /var/update_flash_image before proceeding.

The flash update image file must have already been placed in the /var file system. This could have been done with a file transfer from another server or with the dosread command of the AIX DOS Utilities. For example, with the flash update image in place, issuing the following AIX command

```
shutdown -u /var/*filename*.img
```

initiates the update process. Where *filename* is the name of the flash update image. During the process, the server powers down and reboots. The process is complete when the login prompt reappears.

Service Processor Logs

Service Processor Error Log: The Service Processor error logs contain error conditions detected by the Service Processor.

Error Log

40210091

Press "C" to clear error log, any other key to continue. >

The time stamp in this error log is Coordinated Universal Time (CUT), a.k.a. Greenwich Mean Time (GMT). AIX error logs have more information available and are able to time stamp with local time.

System POST Errors: If POST (Power-On Self Test) errors occur during start-up, this error log helps isolate faults when used with the diagnostics.

Read System POST Errors Version: 0 Severity : 0 Disposition: 0 Initiator: 0 Event being reported : 0 Extended Error Log Data: 0xC2 0x00 0x84 0x09 0x00 0x00 0x00 0x00 0x20 0x00 0x00 0x00 0x00 0x00 0x72 0x74 0x63 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x28 0x03 0x00 0x05 0x00 0x01 0x49 0x42 0x4D 0x00 0x55 0x30 0x2E 0x31 0x2D 0x50 0x31 0x2D 0x58 0x31 0x00 (Press Return to Continue)

Appendix D. Service Processor Setup and Test

For your convenience, here is an example Service Processor setup checklist. It is basic. Your setup may include more or less of the available features, so you may wish to adjust this checklist for your own application. This checklist will at least provide you with a starting place.

Service Processor Setup Checklist

- 1. Unplug the power cord from the server.
- 2. Attach a local terminal for this setup procedure.
- 3. Plug in the server and power on the local terminal.

Attention: Server power should remain off.

- 4. Bring up the Service Processor menus, see Appendix C on page C-1.
- 5. Set the System Name, "Privileged User Menus" on page C-6.
- 6. Enable Surveillance, see C-8, and "Service Processor Functions and Features" on page C-29.
- 7. Configure Call-In/Call-Out, see "Call-in/Call-out Setup Menu" on page C-22.
- 8. Exit the Service Processor menus
- 9. Unplug the power cord from the server.
- 10. Attach modems (if needed), page C-3
- 11. Plug in the server

Attention: Server power should remain off.

12. Test

Call-In, page D-2 Call-Out, page D-3

13. Backup the service processor settings, as described in 'Save or Restore Hardware Management Policies Service Aid' in RS/6000 Enterprise Server Model H Series User's Guide.

Note: This is strongly recommended to protect the usefulness of the service processor and the availability of the server.

Your Service Processor is ready to go to work.

Testing the Setup

The following is a sample procedure to assure your setup is working.

These tests include communicating with the server operating system. Be sure the necessary serial port(s) is configured. If you need assistance, refer to "Serial Port Configuration" on page D-4.

The server should be powered off as a result of the "Service Processor Setup Checklist" on page D-1.

Call-In:

- 1. Go to your remote terminal and call-in to your server. Your server answers and offers you the Service Processor Main Menu after requesting your privileged access password.
- Select item 2, System Power Control.
- 3. Select item 4, Power-On System.

Answer y when asked if you wish to continue powering on the system.

- 4. After the system firmware and operating system have initialized the server, the login prompt appears at your remote terminal if you set up Seamless Modem Transfer (refer to page E-6 for more information). This may take several minutes. When this occurs, you have successfully called the Service Processor.
- 5. Type logout to disconnect from the operating system. The message No Carrier displays on your remote terminal.
- 6. Call your server again. The operating system answers and offers you the login prompt. If these tests are successful, call-in is working.
- 7. Login and command your server to shutdown and power off. (The AIX command shutdown -F will do this.)
- 8. The message No Carrier displays on your remote terminal.

Call-Out:

During the setup, you entered your phone numbers for the Pager (on page C-25) and Customer Voice (on page C-26). These numbers are used for this test.

- 1. Your remote terminal is disconnected as a result of the Call-In test.
- 2. Call your server again.
- 3. At the Service Processor Main Menu, select Call-In/Call-Out Setup menu, then select Call-Out test. This causes a simulated error condition for the purposes of this test.
- 4. After a few moments, a message appears regarding an illegal entry. Press Enter to clear the message and return to the main menu.
- 5. When your telephone rings, answer the call. You should hear the sound of a telephone being dialed. This is your computer trying to page you.

If this test is successful, call-out is working.

You now need to go back through the "Telephone Number Setup Menu" on page C-24 to enter the actual telephone numbers your server will use for reporting problems.

Serial Port Configuration

To configure the serial port on an AIX system, enter the following commands from an AIX console:

- 1. Log in as root.
- 2. To find if you have any serial ports already configured, enter:

```
1sdev -Cc tty
```

If no serial ports are configured, none are listed. If you wish to configure serial ports that are not listed, continue with the remaining steps.

- 3. Identify the serial port(s) with the modem(s).
- 4. Enter

smit tty

- 5. Select add tty
- 6. Select RS232
- 7. Select Baud rate 9600 or higher.
- 8. Select login enable and set the flow control to RTS.
- 9. Commit the selections and set up any other needed serial ports.
- 10. Exit SMIT.

Appendix E. Modem Configurations

Sample Modem Configuration Files

With hundreds of modems to choose from, and various modem programming standards, configuring a modem for use with the &hacave. can be challenging. The &hacave. is designed to place little demand on an attached modem, thereby increasing the setup and connection success rates. Several sample modem configuration files are supplied that either work directly with your modem, or provide a good starting point for a custom setup.

The sample modem configuration files are in your RS/6000 Enterprise Server Model H Series firmware in the /usr/share/modems subdirectory (if your server is using AIX) with the following names. A listing of each specific file is included in this appendix. A listing of each generic file is in the RS/6000 Enterprise Server Model H Series Installation and Service Guide.

Generic Modem Configuration Files

AIX File Name	Service Processor Firmware File Name
modem_z.cfg	modem_z_sp
modem_z0.cfg	modem_z0_sp
modem_f.cfg	modem_f_sp
modem_f0.cfg	modem_f0_sp
modem_f1.cfg	modem_f1_sp

Specfic Modem Configuration Files

AIX File Name	Service Processor Firmware File Name
modem_m0.cfg	modem_m0_sp
modem_m1.cfg	modem_m1_sp

One of these configuration files should be suitable for your use with the following selection procedures and your modem manual,

Configuration File Selection

1. Is your modem an IBM 7852-400?

If Yes, use modem configuration file **modem_m0.cfg** and go to step 7 on page E-3.

Note: The IBM 7852-400 modem has dip switches on the right hand side of the unit. See "IBM 7852-400 DIP Switch Settings" on page E-4 for the correct switch settings.

If No, continue with step 2.

2. Is your modem an IBM 7857-017?

If Yes, use modem configuration file **modem_m1.cfg** and go to step 7 on page E-3.

Note: The IBM 7857-017 modem has two telephone line connections on the back of the unit. One is marked "LL" (for Leased Line), and the other is marked "PTSN" (for Public Telephone Switched Network). The service processor expects to use the modem on the public network, so the telephone line should attach to the PTSN connector. Also, see the note on page E-3.

If No, continue with step 3.

3. Does your modem respond to the extended command set (prefixed with &)?

If Yes, go to step 5.

If No, continue with step 4.

- 4. Does your modem respond to:
 - a. ATZ reset command, or
 - b. ATZn reset commands, where n can be 0, 1, etc.?

If ATZ, configuration file **modem_z.cfg** is recommended. If ATZn, configuration file **modem_z0.cfg** is recommended.

Go to step 7 on page E-3.

5. Does your modem command set include a test for V.42 error correction at the remote modem (often called "Auto-Reliable Mode")?

If Yes, this test must be disabled. Sample configuration files /usr/share/modem_m0.cfg or /usr/share/modem_m1.cfg can be used as models to help you create a file for your particular modem. See "Customizing the Modem Configuration Files" on page E-4. Go to 7 on page E-3.

If No, go to step 6.

6. Does your modem respond to:

E-2 RS/6000 Enterprise Server Model H Series Installation and Service Guide

- a. AT&F reset command, or
- b. AT&Fn reset commands, where n can be 0, 1, etc.?

If AT&F, configuration file **modem_f.cfg** is recommended. If AT&Fn, configuration file **modem_f0.cfg** or **modem_f1.cfg** is recommended, depending on which provides the hardware flow control profile.

7. Selection is complete.

If your modem configuration selection is not available in the Service Processor Modem Configuration Menu, you must access it through the Configure Remote Maintenance Policy Service Aid.

If you find it necessary to adjust any of these configuration files, do so with reference to the manual that came with your modem. It is recommended you select settings that enable hardware flow control and respond to DTR.

Note: Some older modems do not respond to the commands **X0** or **&R1**. You should edit out these commands from the modem configuration file if yours is such a modem. See your modem manual for more information.

Note: Some modems, such as IBM 7857-017, are not designed for the paging function. Although they can be used for paging, they return an error message when they do not get the expected response from another modem. Therefore, even though the paging was successful, the error message causes the Service Processor to retry, continuing to place pager calls for the number of retries specified in the Call-Out Policy Setup Menu. These retries result in redundant pages.

Examples For Using the Generic Sample Modem Configuration Files

Modem	Setup Z	Setup Z0 (Rare)	Setup F	Setup F0	Setup F1
AT&T DataPort 2001 **				Х	
Bocamodem 1440E			Х		
Hayes Smart Modem 300	Х				
IBM 5841	Х				
IBM 5843	Х				
IBM 7851				Х	
IBM 7852-10				Х	
IBM 7855					Х
USRobotics 36.6K Sportster					Х
Zoom V.32			Х		

Note: ** Ring interrupt only on first ring.

Customizing the Modem Configuration Files

You can create your own modem configuration files or modify the samples provided. After you customize your modem configuration files, you MUST access them via the Configure Remote Maintenance Policy Service Aid rather than from the Service Processor menus.

Note: If you have already set up your serial ports, line speeds, authorizations and telephone numbers from the Service Processor menus, specify your customized modem configuration files from the service aid.

If you have not already set up your serial ports, line speeds, authorizations, and telephone numbers from the Service Processor menus, you may set them up with the service aids while you specify your customized modem configuration files.

To disable Auto-Reliable Mode testing of the remote modem, use the sample modem configuration file /usr/share/modems/modem_f.cfg as a model to modify.

- 1. Find the necessary command in your modem manual.
- Copy /usr/share/modems/modem_f.cfg to a new file with a different name (for example modem_fx.cfg).
- 3. In the new file (modem_fx.cfg), change the line Send "ATEOT\r" to Send "ATCCCEOT\r" where ccc is the added command found in your modem manual.

Change the third line of each of the following stanzas:

- condout
- condin
- ripo
- 4. Save the changes.

Use this new modem configuration file as described earlier in this section.

IBM 7852-400 DIP Switch Settings

If you are using a 7852-400 modem to enable service processor communications, for proper operation, the DIP switches must be set according to the following table.

Switch	Position	Function	
1	Up	Force DTR	
2	Up	Flow Control &E4	
3	Down	Result Codes Enabled	
4	Down	Modem Emulation Disabled	
5	Up	Auto Answer Enabled	
6	Up	Maximum Throughput Enabled	
7	Up	RTS Normal Functions	
8	Down	Enable Command Mode	
9	Down	Remote Digital Loopback Test Enabled	
10	Up	Dial-Up Line Enabled	

Position	Function
*Up	AT Responses Enabled (Extended Responses Disabled)
*Down	Asynchronous Operation
UP	28.8KB Line Speed
Up	
Up	CD and DSR Normal Functions
Up	2-Wire Leased Line Enabled
	*Up *Down UP Up Up

^{*} Only switches 11 and 12 are changed from the factory default settings.

Xon/Xoff Modems

Some modems of the mid-80's vintage assume software flow control (Xon/Xoff) between the computer and the modem. Modems with this design send extra characters during and after the transmitted data. The Service Processor cannot tolerate these extra characters. If your configuration includes such a modem, your functional results may be unpredictable.

The sample modem configuration files included in this package do not support these modems, so custom configuration files would be necessary. Anchor Automation 2400E is an example of such a modem.

Most newer modems do not use this design. It is recommended you use modems of newer vintage if you experience unexplainable performance problems that may be due to Xon/Xoff characters.

Ring Detection

Most modems produce an interrupt request each time they detect a ring signal. Some modems generate an interrupt only on the first ring signal they receive. AT&T DataPort 2001 is an example of such a modem.

The Service Processor uses the ring interrupt request to count the number of rings when Ring Indicate Power-On (RIPO) is enabled. If your modem produces an interrupt on only the first ring, set Ring Indicate Power-On to start on the first ring. Otherwise, you may choose to start Ring Indicate Power-On on any ring count that makes your operation convenient.

Terminal Emulators

The Service Processor is compatible with simple ASCII terminals, and therefore compatible with most emulators. It is for the cases when a remote session is handed off from the Service Processor to the operating system that agreeing terminal emulators becomes important.

The server's operating system will have some built-in terminal emulators. You may also have a commercially available terminal emulation. It is important that the local and host computers select the same or compatible terminal emulators so the key assignments and responses will match. This will assure successful communications and control.

For best formatting, choose line wrap in your terminal emulator setup.

Recovery Procedures

Line noises, power surges, etc., can sometimes cause your modem to enter an undefined state. When it is being used for dial-in, dial-out or ring indicate power-on, your modem is initialized each time one of these actions is expected. If one of these environmental conditions occur after your modem has been initialized, it may be necessary to recover your modem to a known state.

If your modem communicates properly with remote users, it is probably in control. It may be wise to occasionally change some of the functional settings and then change them back, just for the sense of security that the modem is communicating, and to assure it has been initialized recently.

Another strategy, particularly if your system is difficult to access physically, is to protect it with an Uninterruptable Power Source (UPS) and a phone-line surge protector.

In case recovery becomes necessary, your system should be shut down as gracefully as possible. Disconnect the power cable and press the power button to drain capacitance while power is disconnected. Disconnect and reconnect modem power, then reconnect system power to allow complete reinitialization of your system.

Seamless Transfer of a Modem Session

There are about as many modem command variations as there are modems. The sample modem configuration files have been written to capture the largest number of workable modem settings.

The modem command &Dn (where 'n' is a number) generally sets the modem response to the Data Terminal Ready (DTR) signal from the server's serial port. The desired response is that the modem will hold a connection while DTR is enabled, and drop the connection when DTR is released. This is the mechanism by which the server hangs up on a connection under normal conditions.

Usually the command &D2 will work, but not always. The sample modem configuration files¹ take this high percentage position. You should consult your modem manual for its specific response scheme for the &Dn command.

There are two methods for dealing with the modem's response to DTR:

- 1. Recovery
- 2. Prevention

Before proceeding with one of these strategies, you need to determine if your server's modem is set up properly to respond to DTR.

With the remote terminal connected to serial port 1 and defined as the Primary Console Device, there are two tests you can perform:

- 1. Will the modem drop the connection after the System initialization complete message appears at the remote terminal?
 - If Yes, this is the correct response. The modem is set up correctly.
 - If No, try another &Dn setting for your server's modem. See your modem manual for this information. The &Dn command appears in three places each in three of the sample modem configuration files1.
- 2. Will the server's modem disconnect when the power drops? You can make this observation at the remote terminal by commanding your server to shutdown and power off. (The AIX command shutdown -F will do this.) Watch for the message NO CARRIER on your remote terminal.
 - If Yes, this is the correct response. The modem is set up correctly.

If No, try another &Dn setting for your server's modem. See your model manual for this information. The &Dn command appears in three places each in three of the sample modem configuration files1.

¹ Only the following sample modem configuration files contain the &Dn command (in three places each):

modem_f.cfg

modem_f0.cfg

modem_f1.cfg

If you are using modem_z.cfg or modem_z0.cfg, you cannot control DTR response. If your remote terminal does not disconnect after logging off, you must command the remote terminal emulator to hang up. This then breaks the connection.

Recovery Strategy

The recovery strategy consists of making two calls to establish a remote session. This is the easiest solution to implement, and allows more freedom for configuring your server's serial ports.

To set up a remote terminal session, dial into the Service Processor and start the system. After the operating system is loaded and initialized, the connection will be dropped. At this point, you call the server back and the operating system will answer and offer you the login prompt.

Prevention Strategy

The disconnect is caused by the operating system when it initializes the Primary Console. The tests listed above are conducted with the remote terminal selected as the primary console to manifest the modem's response to DTR transitions.

If a local ASCII terminal or a graphics console is to be a permanent part of your server, then make one of them the primary console. Your remote terminal will no longer experience the connection loss.

If a local console is not a permanent part of your server, you can still assign either the unused graphics console or the unused serial port as the primary console. This gives you the desired seamless connection at your remote terminal.

If you choose to use the unused serial port as the primary console, some initialization traffic will be sent to any serial device attached to that port. As a result, that serial device's connection and function could be affected. These impacts may make that port unattractive for devices other than a temporary local ASCII terminal.

Modem Configuration Samples

Sample File modem_m0.cfg

```
# COMPONENT NAME: (ESPSETUP) ENTRY SERVICE PROCESSOR SETUP: modem m0
\# FUNCTIONS: Modem configuration file specifically for IBM 7852-400
# modem with Auto-Reliable feature. This feature must be turned off
# for Catcher calls. This example uses the AT&F reset command to
# choose the factory defaults.
# (C) COPYRIGHT International Business Machines Corp. 1996
# All Rights Reserved
# Licensed Materials - Property of IBM
# US Government Users Restricted Rights - Use, duplication or
# disclosure restricted by GSA ADP Schedule Contract with IBM Corp.
# The modem has configuration switches. They should be set to the
# factory default settings, except switches 11 and 12. These must be
# to UP ("AT" responses) and DOWN (Asynchronous operation), respectively.
ICDelay 1
DefaultTO 10
CallDelay 120
# %N Call-Out phone number
                               %R Return phone number
# PROGRAMMING NOTE: No blanks between double quote marks (").
            send "AT&F&E2E0T\r"
condout:
                                                # Reset to factory defaults
                                                # Reliable mode
                                                # Echo off
            ignore "0\r" or "0K\r\n" timeout 2 \# Ignore modem response.
            send "AT&E12&E14\r"
                                                # Disable pacing
                                                # Disable data compression
            expect "0\r" or "OK\r\n" timeout 2 # Confirm commands successful.
            send "AT&SF1&S0S9=1\r"
                                                # DSR independent of CD
                                                # Force DSR on.
                                                # CD respond time=100ms
            expect "0\r" or "OK\r\n" timeout 2 # Confirm commands successful.
            send "ATV0S0=0\r"
                                                # Numeric response code
                                                # Auto-Answer off
            expect "0\r" or "0K\r\n" timeout 2 # Confirm commands successful.
            done
connect:
           send "ATDT%N\r"
                                                # Tone dialing command.
                                                # %N from Call Home setup.
```

```
expect "33\r" or "31\r" or "28\r" or "26\r" or "24\r" or "21\r" or
"19\r" or "13\r" or "12\r" or "1\r" busy "7\r"
             timeout 60
             done
retry:
             send "A/"
                                                  # Repeat the previous command.
                                                  # Expect a connection response.
             expect "33\r" or "31\r" or "28\r" or "26\r" or "24\r" or "21\r" or
"19\r" or "13\r" or "12\r" or "1\r" busy "7\r"
             timeout 60
             done
disconnect:
             delav 2
                                                  # Separate from previous data.
             send "+++"
                                                  # Assure command mode.
             delay 2
                                                  # Allow mode switching delay.
             send "ATHOT\r"
                                                  # Set modem switch-hook down
                                                    (i.e., hang up).
             ignore "0\r" or "0K\r" timeout 2
                                                  # Ignore modem response.
             send "ATE0Q1\r"
                                                  # Initialize modem: Echo OFF,
                                                  # Disable responses.
             ignore "0\r" timeout 1
             done
             send "AT&F&E2E0T\r"
condin:
                                                  # Reset to factory defaults.
                                                  # Reliable mode
                                                  # Echo off
             ignore "0\r" or "0K\r\n" timeout 2 \ \mbox{\# Ignore modem response.}
             send "AT&E12&E14\r"
                                                  # Disable pacing
                                                  # Disable data compression
             expect "0\r" or "0K\r\n" timeout 2 # Confirm commands successful
             send "AT&SF1&S0S9=1\r"
                                                  # DSR independent of CD.
                                                  # Force DSR on.
                                                  # CD respond time=100ms
             expect "0\r" or "0K\r\n" timeout 2 # Confirm commands successful.
             send ATV0S0=2\r
                                                  # Numberic response code
                                                  # Answer on 2nd ring
             expect "0\r" timeout 2
                                                  # Confirm commands successful.
             done
waitcall:
             ignore "2\r" timeout 1
                                                  # Ignore first ring.
             expect "2\r" timeout 10
                                                  # Pickup 2nd ring or timeout
                                                  # Expect a connection response.
             expect "33\r" or "31\r" or "28\r" or "26\r" or "24\r" or "21\r" or
"19\r" or "13\r" or "12\r" or "1\r" busy "7\r"
             timeout 60
             done
             send "ATDT%N,,,,%R;\r"
                                                 # %N = pager call center number
page:
                                                  # Add enough commas to wait for
                                                  # time to enter paging number.
```

Expect a connection response.

```
# %R = paging number
            expect "0\r" timeout 60
                                                # Confirm successful command.
            delay 2
                                                # Wait before hanging up.
            send "ATHO\r"
                                                # Hang up.
            expect "0\r" timeout 2
                                                # Confirm successful command.
            done
            send "AT&F&E2E0T\r"
                                                # Reset to factory defaults.
ripo:
                                                # Reliable mode
                                                # Echo off
            ignore "0\r" or "0K\r\n" timeout 2 # Ignore modem response.
            send "AT&E12&E14\r"
                                                # Disable pacing
                                                # Disable data compression
            expect "0\r" or "0K\r\n" timeout 2 \# Confirm successful command.
            send "AT&SF1&S0S9=1\r"
                                                # DSR independent of CD.
                                                # Force DSR on.
                                                # CD respond time=100ms
            expect "0\r" or "0\r" timeout 2 # Confirm commands successful.
            send "ATV0S0=0\r"
                                                # Numeric response code
                                                # Auto Answer OFF
            expect "0\r" timeout 2
                                                # Confirm commands successful.
            done
                                                # Handle unexpected modem
error:
                                                # responses.
            expect "8\r" or "7\r" or "6\r" or "4\r" or "3\r"
            delay 2
            done
```

Sample File modem_m1.cfg

```
# COMPONENT NAME: (ESPSETUP) ENTRY SERVICE PROCESSOR SETUP modem m1
# FUNCTIONS: Modem configuration file specifically for IBM 7857-017 modem with
  Auto-Reliable feature. This feature must be turned off for Catcher calls.
  This example uses the AT&F reset command to choose the factory defaults.
  To allow dial commands for digital pagers, it is necessary to reduce
  the number of characters in the dial command. Each comma (delay) has
   been set to 6 seconds (S8=6) for that reason.
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ICDelay 1
DefaultTO 10
CallDelay 120
  %N Call-Out phone number
                                     Return phone number
                                %R
# PROGRAMMING NOTE: No blanks between double quote marks (").
            send "AT&F*E0E0\r"
condout:
                                                # Reset to factory defaults.
                                                # *E0=data compression disabled
                                                # E0=echo disabled
            ignore "0\r" or "0K\r\n" timeout 2 # Ignore modem response.
            send AT#F0*Q2S8=6\r"
                                                # Trellis modulation disabled
                                                # Retrain with adaptive rate
                                                # Set ,=6second
            expect "0\r" or "0K\r\n" timeout 2 \# Confirm commands successful
            send "ATV0X0S0=0\r"
                                                # Numeric response code
                                                # AT compatible messages
                                                # Auto-Answer disabled
            expect "0\r" or "0K\r\n" timeout 2 # Confirm commands successful.
            done
            send "ATDT%N\r"
                                                # Tone dialing command.
connect:
                                                # %N from Call Home setup.
            expect "1\r" busy "7\r" timeout 60 # Expect a connection response.
            done
            send "A/"
                                                # Repeat the previous command.
retry:
            expect "1\r" busy "7\r" timeout 60 # Expect a connection response.
```

done

disconnect:

```
delay 2
                                                 # Separate from previous data.
            send "+++"
                                                 # Assure command mode.
            delay 2
                                                 # Allow mode switching delay.
            send "ATHO\r"
                                                 # Set modem switch-hook down
                                                 # (i.e., hang up).
            ignore "0\r" or "0K\r" timeout 2
                                                 # Ignore modem response.
            send "ATE0Q1\r"
                                                 # Initialize modem: Echo OFF,
                                                 # Disable responses.
            ignore "0\r" timeout 1
            done
condin:
            send "AT&F*E0E0\r"
                                                 # Reset to factory defaults.
                                                 # *E0=data compression disabled
                                                 # E0=echo disabled
            ignore "0\r" or "0K\r\n" timeout 2 # Ignore modem response.
            send "AT#F0*Q2\r"
                                                 # Trellis modulation disabled
                                                 # Retrain with adaptive rate
            expect "0\r" or "OK\r\n" timeout 2
                                                 # Confirm commands successful
            send "ATV0X0S0=2\r"
                                                 # Numeric response code
                                                 # AT compatible messages
                                                 # Answer on 2nd ring
            expect "0\r" timeout 2
                                                 # Confirm commands successful.
            done
            ignore "2\r" timeout 1
waitcall:
                                                 # Ignore first ring.
            expect "2\r" timeout 10
                                                 # Pick up second ring
                                                 # or timeout.
                                                 # Expect a connection response.
            expect "1\r" timeout 60
            done
            send "ATD%N,%R\r"
page:
                                                 # %N = pager call center number
                                                 # commas=6sec wait time to
                                                     enter paging number.
                                                 # %R = return number
            expect "0\r" or "3\r" timeout 30
                                                 # Confirm successful command.
            delay 2
                                                 # Wait before hanging up.
            send "+++"
                                                 # Assure command mode.
            delay 2
                                                 # Allow mode switching delay.
            send "ATHO\r"
                                                 # Hang up.
            expect "0\r" timeout 2
                                                 # Confirm successful command.
            done
ripo:
            send "AT&F*E0E0\r"
                                                 # Reset to factory defaults.
                                                 # *E0=data compression disabled
                                                 # E0=echo disabled
            ignore "0\r" or "0K\r\n" timeout 2 # Ignore modem response.
            send "AT#F0*Q2\r"
                                                 # Trellis modulation disabled
                                                 # Retrain with adaptive rate
```

```
expect "0\r" or "0K\r\n" timeout 2 \# Confirm successful command.
            send "ATV0X0S0=0\r"
                                                # Numeric response code
                                                # AT compatible messages
                                                # Auto-Answer disabled
            expect "0\r" timeout 2
                                                # Confirm commands successful.
            done
error:
                                                # Handle unexpected modem
            # responses.
expect "8\r" or "7\r" or "4\r" or "3\r"
            delay 2
            done
```

Sample File modem_z.cfg

```
# COMPONENT_NAME: (ESPSETUP) ENTRY SERVICE PROCESSOR SETUP Z
\# FUNCTIONS: Modem configuration file for many early Hayes* compatible modems.
  This example uses the ATZ reset command to choose the factory defaults.
  This setup will work for many modems, but it is required for early vintage
# modems which respond to neither the ATZO reset command nor the extended (&)
# commands. Refer to your modem manual.
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\# If the modem has configuration switches, they should be set to the
# factory default settings.
ICDelay 1
DefaultTO 10
CallDelay 120
# AT Attention Code
                                      Inserts delay in dialing commands
# Z Reset to factory defaults Q0 Turn on responses
# E0 Turn echo off
                                 Q1
                                     Turn off responses
                                 S0=0 Automatic answer inhibit
# V0 Use numeric responses
                                 S0=2 Answer on second ring
      Escape to command mode
                                 T = Tone mode. When used as T\r, it is a
# H0 Hang-up
                                      no op to maintain program synchronization
                                      when modem may/will echo the commands.
\# %N Call-Out phone number %P Paging phone number
# %S Modem speed (available to users)
# Following are common responses from a wide range of modems:
# 16, 15, 12, 10, 5 and 1 are connection responses. Add others as required.
# 7=busy; 6=no dial tone; 4=error; 3=no carrier; 2=ring; 0=0K
# PROGRAMMING NOTE: No blanks between double quote marks (").
            send "ATZQOT\r"
                                                # Reset to factory defaults.
condout:
            ignore "0\r" or "0K\r\n" timeout 2 \# Ignore modem response.
            send "ATEOT\r"
                                                # Initialize modem: Echo OFF,
            expect "0\r" or "0K\r\n" timeout 2 \# Enable responses (Numeric),
            send "ATQ0V0T\r"
                                                # Limit response codes.
            expect "0\r" timeout 2
                                                # Confirm commands successful.
            send "ATS0=0\r"
                                                # Set AutoAnswer OFF
            expect "0\r" timeout 2
                                                # Confirm command successful.
            done
            send "ATDT%N\r"
                                                # Tone dialing command.
connect:
                                                # %N from Call Home setup.
                                                # Expect a connection response.
 expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"
 timeout 60
retry:
            send "A/"
                                                # Repeat the previous command.
# Expect a connection response. expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"
```

```
timeout 60
            done
disconnect:
            delay 2
                                                  # Separate from previous data.
            send "+++"
                                                  # Assure command mode.
                                                  # Allow mode switching delay.
            delay 2
            send "ATHOT\r"
                                                  # Set modem switch-hook down
                                                  # (i.e., hang up).
            ignore "0\r" or "0K\r" timeout 2
                                                 # Ignore modem response.
            send "ATE0Q1\r"
                                                  # Initialize modem: Echo OFF,
                                                  # Disable responses.
            ignore "0\r" timeout 1
            done
condin:
            send "ATZQOT\r"
                                                  # Reset to factory defaults.
            ignore "0\r" or "OK\r\n" timeout 2 # Ignore modem response.
            send "ATEOT\r"
                                                  # Initialize modem: Echo OFF,
            expect "0\r" or "OK\r\n" timeout 2 # Enable responses (Numeric),
            send "ATQ0V0T\r"
                                                  # Limit response codes.
            expect "0\r" timeout 2
                                                 # Confirm commands successful.
            send "ATS0=2\r"
                                                  # Set AutoAnswer ON
            expect "0\r" timeout 2
                                                 # Confirm command successful.
            done
waitcall: ignore "2\r" timeout 1
                                                 # Ignore first ring.
          expect "2\r" timeout 10
                                                  # Pick up second ring
                                                  # or timeout.
# Expect a connection response. expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r"
timeout 60
            done
            send "ATDT%N,,,,%R;\r"
page:
                                                  # %N = pager call center number
                                                  # Add enough commas to wait for
                                                    time to enter paging number.
                                                  # %R = paging number
                                                  # Confirm successful command.
            expect "0\r" timeout 60
                                                  # Wait before hanging up.
            delay 2
            send "ATHOT\r"
                                                  # Hang up.
            expect "0\r" timeout 2
                                                 # Confirm successful command.
            done
ripo:
            send "ATZQOT\r"
                                                  # Reset to factory defaults.
            ignore "0\r" or "0K\r\n" timeout 2 # Ignore modem response.
            send "ATEOT\r"
                                                  # Initialize modem: Echo OFF,
            expect "0\r" or "0K\r\n" timeout 2 # Enable responses (Numeric), send "ATQ0V0T\r" # Limit response codes.
                                                  # Limit response codes.
            expect "0\r" timeout 2
                                                  # Confirm commands successful.
            send "ATS0=0\r"
                                                  # Set AutoAnswer OFF
            expect "0\r" timeout 2
                                                  # Confirm command successful.
            done
                                                  # RI Power On enabled.
error:
                                                  # Handle unexpected modem
            # responses.
expect "8\r" or "7\r" or "6\r" or "4\r" or "3\r"
            delay 2
            done
```

Sample File modem_z0.cfg

```
# COMPONENT_NAME: (ESPSETUP) ENTRY SERVICE PROCESSOR SETUP Z0
\# FUNCTIONS: Modem configuration file for some early Hayes* compatible modems.
  This example uses the ATZO reset command to choose the factory defaults.
  This setup is recommended for modems that will respond to the ATZO command
# and which do not respond to the extended (&) commands. Refer to your modem
# manual.
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# If the modem has configuration switches, they should be set to the
# factory default settings.
ICDelay 1
DefaultTO 10
CallDelay 120
# AT Attention Code
                                    Inserts delay in dialing commands
# ZO Reset. Restore Profile 0 QO Turn on responses
  E0 Turn echo off
                               Q1 Turn off responses
                               S0=0 Automatic answer inhibit
# V0 Use numeric responses
      Escape to command mode
                               S0=2 Answer on second ring
# HO Hang-up
                               X0=0 Limit modem response codes
                               T = Tone mode. When used as T\r, it is a
                                    no op to maintain program synchronization
                                    when modem may/will echo the commands.
# %N Call-Out phone number
                               %P Paging phone number
# %S Modem speed (available to users)
# Following are common responses from a wide range of modems:
# 16, 15, 12, 10, 5 and 1 are connection responses. Add others as required.
# 7=busy; 6=no dial tone; 4=error; 3=no carrier; 2=ring; 0=0K
# PROGRAMMING NOTE: No blanks between double quote marks (").
           send "ATZ0Q0T\r"
condout:
                                               # Reset modem. Select profile 0
            ignore "0\r" or "0K\r\n" timeout 2 \# Ignore modem response.
            send "ATEOT\r"
                                               # Initialize modem: Echo OFF
           expect "0\r" or "0K\r\n" timeout 2 \# Enable responses (Numeric),
            send "ATQOVOXOT\r"
                                               # Limit response codes.
            expect "0\r" timeout 2
                                               # Confirm commands successful.
            send "ATS0=0\r"
                                               # Set AutoAnswer OFF
            expect "0\r" timeout 2
                                               # Confirm command successful.
            done
           send "ATDT%N\r"
connect:
                                                # Tone dialing command.
                                                # %N from Call Home setup.
                                                # Expect a connection response.
 expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"
 timeout 60
           send "A/"
                                                # Repeat the previous command.
retry:
                                                # Expect a connection response.
```

```
expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"
 timeout 60
disconnect:
            delay 2
                                                # Separate from previous data.
            send "+++"
                                                # Assure command mode.
            delay 2
                                                # Allow mode switching delay.
            send "ATHOT\r"
                                                # Set modem switch-hook down
                                                # (i.e., hang up).
            ignore "0\r" or "0\r" timeout 2
                                                # Ignore modem response.
            send "ATE0Q1\r"
                                                # Initialize modem: Echo OFF,
                                                # Disable responses.
            ignore "0\r" timeout 1
            done
condin:
            send "ATZ0Q0T\r"
                                                # Reset modem. Select profile 0
            ignore "0\r" or "0K\r\n" timeout 2 # Ignore modem response.
            send "ATEOT\r"
                                                # Initialize modem: Echo OFF,
            expect "0\r" or "OK\r\n" timeout 2 # Enable responses (Numeric),
            send "ATQ0V0X0T\r"
                                                # Limit response codes.
            expect "0\r" timeout 2
                                                # Confirm commands successful.
            send "ATS0=2\r"
                                                # Set AutoAnswer ON
            expect "0\r" timeout 2
                                                # Confirm command successful.
waitcall: ignore "2\r" timeout 1
                                                # Ignore first ring.
          expect "2\r" timeout 10
                                                # Pick up second ring
                                                # or timeout.
                                                # Expect a connection response.
 expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r"
 timeout 60
            done
page:
            send "ATDT%N,,,,%R;\r"
                                                # %N = pager call center number
                                                # Add enough commas to wait for
                                                # time to enter paging number.
                                                # %R = paging number
                                                # Confirm successful command.
            expect "0\r" timeout 60
                                                # Wait before hanging up.
           delay 2
send "ATHOT\r"
                                                # Hang up.
            expect "0\r" timeout 2
                                                # Confirm successful command.
            done
            send "ATZ0Q0T\r"
                                                # Reset modem. Select profile 0
ripo:
            ignore "0\r" or "0K\r\n" timeout 2 \# Ignore modem response.
            send "ATEOT\r"
                                                # Initialize modem: Echo OFF,
            expect "0\r" or "OK\r\n" timeout 2 # Enable responses (Numeric),
            send "ATQ0V0X0T\r"
                                                # Limit response codes.
            expect "0\r" timeout 2
                                                # Confirm commands successful.
                                                # Set AutoAnswer OFF
            send "ATS0=0\r"
            expect "0\r" timeout 2
                                                # Confirm command successful.
            done
                                                # RI Power On enabled.
error:
                                                # Handle unexpected modem
                                                # responses.
            expect "8\r" or "7\r" or "6\r" or "4\r" or "3\r"
            delay 2
            done
```

Sample File modem_f.cfg

```
# COMPONENT_NAME: (ESPSETUP) ENTRY SERVICE PROCESSOR SETUP F
# FUNCTIONS: Modem configuration file for many recent Hayes* compatible modems.
      This example uses the AT&F reset command to choose the factory defaults.
 # This set up is preferred for modems with extended (&) commands. For early
  # vintage modems, setup Z or Z0 is recommended. If your modem responds to
 # the extended (&) commands and to factory default choices (&Fn), setup file
 # F0 or F1 is recommended.
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\# If the modem has configuration switches, they should be set to the
# factory default settings.
ICDelay 1
DefaultTO 10
CallDelay 120
# AT Attention Code
                                                                                                            Inserts delay in dialing commands
                   Reset to default profile Q0
                                                                                                            Turn on responses
# E0 Turn echo off
                                                                                              Q1 Turn off responses
 # VO Use numeric responses
                                                                                              S0=0 Automatic answer inhibit
 # +++ Escape to command mode
                                                                                              S0=2 Answer on second ring
 # H0 Hang-up
                                                                                              X0=0 Limit modem response codes
                                                                                               T = Tone mode. When used as T\r, it is a
                                                                                                             no op to maintain program synchronization % \left( 1\right) =\left( 1\right) \left( 1
                                                                                                             when modem may/will echo the commands.
# &C1 Detect CD
                                                                                               &D2 Respond to DTR (often the default)
 # %N Call-Out phone number
                                                                                              %P Paging phone number
 # %S Modem speed (available to users)
# Following are common responses from a wide range of modems:
# 16, 15, 12, 10, 5 and 1 are connection responses. Add others as required. # 7=busy; 6=no dial tone; 4=error; 3=no carrier; 2=ring; 0=0K
# PROGRAMMING NOTE: No blanks between double quote marks (").
condout:
                                    send "AT&FQ0T\r"
                                                                                                                                               # Reset to factory defaults.
                                    ignore "0\r" or "0K\r\n" timeout 2 # Ignore modem response.
                                    send "ATEOT\r"
                                                                                                                                              # Initialize modem: Echo OFF,
                                    expect "0\r" or "0\r" or "0\r" timeout 2 # Enable responses (Numeric),
                                   send "ATQ0V0X0T\r"
                                                                                                                                            # Limit response codes.
                                                                                                                                           # Confirm commands successful.
                                    expect "0\r" timeout 2
                                   send "ATS0=0\r"
                                                                                                                                           # Set AutoAnswer OFF
                                   expect "0\r" timeout 2
                                                                                                                                           # Confirm command successful.
                                    send "AT&C1&D2\r"
                                                                                                                                             # Detect carrier and DTR.
                                    expect "0\r" timeout 2
                                                                                                                                             # Confirm command successful.
                                    done
                                   send "ATDT%N\r"
                                                                                                                                               # Tone dialing command.
connect:
                                                                                                                                               # %N from Call Home setup.
   # Expect a connection response. expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"
   timeout 60
```

```
done
retry:
            send "A/"
                                                 # Repeat the previous command.
                                                 # Expect a connection response.
 expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"
timeout 60
            done
disconnect:
            delay 2
                                                 # Separate from previous data.
            send "+++"
                                                 # Assure command mode.
            delay 2
                                                 # Allow mode switching delay.
            send "ATHOT\r"
                                                 # Set modem switch-hook down
                                                 # (i.e., hang up).
            ignore "0\r" or "OK\r" timeout 2
                                                 # Ignore modem response.
            send "ATEOQ1\r"
                                                 # Initialize modem: Echo OFF,
                                                 # Disable responses.
            ignore "0\r" timeout 1
            done
            send "AT&FQOT\r"
condin:
                                                 # Reset to factory defaults.
            ignore "0\r" or "0K\r\n" timeout 2 \# Ignore modem response.
            send "ATEOT\r"
                                                 # Initialize modem: Echo OFF,
            expect "0\r" or "0\r" or "0\r" timeout 2 # Enable responses (Numeric),
            send "ATQOVOXOT\r"
                                                 # Limit response codes.
            expect "0\r" timeout 2
                                                 # Confirm commands successful.
            send "ATS0=2\r"
                                                 # Set AutoAnswer ON
            expect "0\r" timeout 2
                                                 # Confirm command successful.
            send "AT&C1&D2\r"
                                                 # Detect carrier and DTR.
            expect "0\r" timeout 2
                                                 # Confirm command successful.
            done
waitcall: ignore "2\r" timeout 1
                                                 # Ignore first ring.
          expect "2\r" timeout 10
                                                 # Pick up second ring
                                                 # or timeout.
                                                 # Expect a connection response.
 expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r"
timeout 60
           send "ATDT%N,,,,%R;\r"
                                                 \# %N = pager call center number
page:
                                                 \ensuremath{\text{\#}}\xspace Add enough commas to wait for
                                                 # time to enter paging number.
                                                 # %R = paging number
                                                 # Confirm successful command.
            expect "0\r" timeout 60
            delay 2
send "ATHOT\r"
                                                 # Wait before hanging up.
                                                 # Hang up.
            expect "0\r" timeout 2
                                                 # Confirm successful command.
            done
```

```
ripo:
                                                                          # Reset to factory defaults.
                                                                          # Initialize modem: Echo OFF,
                   expect "0\r" or "OK\r\n" timeout 2 # Enable responses (Numeric),
                  expect "0\r" or "OK\r\n" timeout 2 # Enable responses (Numeric), send "ATQ0V0X0T\r" # Limit response codes. expect "0\r" timeout 2 # Confirm commands successful. send "ATS0=0\r" # Set AutoAnswer OFF expect "0\r" timeout 2 # Confirm command successful. expect "0\r" timeout 2 # Confirm command successful. expect "0\r" timeout 2 # Confirm command successful.
                  send "AT&C1&D2\r"
expect "0\r" timeout 2
                                                                         # RI Power On enabled.
                   done
error:
                                                                           # Handle unexpected modem
                                                                           # responses.
                   expect "8\r" or "7\r" or "6\r" or "4\r" or "3\r"
                   delay 2
                   done
```

Sample File modem_f0.cfg

```
# COMPONENT_NAME: (ESPSETUP) ENTRY SERVICE PROCESSOR SETUP F0
    FUNCTIONS: Modem configuration file for many recent Hayes* compatible modems.
        This example uses the AT&FO reset command to choose the factory defaults.
        This set up is preferred for modems with extended (&) commands. For early
        vintage modems, setup Z or Z0 is recommended. If your modem responds to
        the extended (&) commands and to factory default choices (&Fn), but doesn't
        work properly with this setup file, setup F1 is recommended.
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# If the modem has configuration switches, they should be set to the
# factory default settings.
ICDelay 1
DefaultTO 10
CallDelay 120
# AT Attention Code
                                                                                                         Inserts delay in dialing commands
# &FO Reset. Restore profile 0 Q0
                                                                                                         Turn on responses
                                                                                          Q1
# E0 Turn echo off
                                                                                                         Turn off responses
# V0 Use numeric responses
                                                                                            S0=0 Automatic answer inhibit
    +++ Escape to command mode
                                                                                          S0=2 Answer on second ring
    HO Hang-up
                                                                                           X0=0 Limit modem response codes
                                                                                           T = Tone mode. When used as T\r, it is a
                                                                                                          no op to maintain program synchronization % \left( 1\right) =\left( 1\right) \left( 1
                                                                                                         when modem may/will echo the commands.
    &C1 Detect CD
                                                                                            &D2 Respond to DTR (often the default)
    &R1 Ignore RTS (CTS)
       %N Call-Out phone number
                                                                                        %P Paging phone number
     %S Modem speed (available to users)
# Following are common responses from a wide range of modems:
# 16, 15, 12, 10, 5 and 1 are connection responses. Add others as required.
    7=busy; 6=no dial tone; 4=error; 3=no carrier; 2=ring; 0=0K
# PROGRAMMING NOTE: No blanks between double quote marks (").
                                  send "AT&F0Q0T\r"
                                                                                                                                          \mbox{\#} Reset modem. Select profile 0
condout:
                                  ignore "0\r" or "0K\r\n" timeout 2 # Ignore modem response.
                                  send "ATEOT\r"
                                                                                                                                          # Initialize modem: Echo OFF,
                                  expect "0\r" or "OK\r\n" timeout 2 # Enable responses (Numeric),
                                  send "ATQOVOXOT\r"
                                                                                                                                         # Limit response codes.
                                  expect "0\r" timeout 2
                                                                                                                                         # Confirm commands successful.
                                  send "ATS0=0\r"
                                                                                                                                         # Set AutoAnswer OFF
                                  expect "0\r" timeout 2
                                                                                                                                         # Confirm command successful.
                                 send "AT&C1&D2&R1\r"
                                                                                                                                         # Detect carrier and DTR.
                                                                                                                                           # Ignore RTS.
                                  expect "0\r" timeout 2
                                                                                                                                         # Confirm command successful.
                                  done
                                 send "ATDT%N\r"
                                                                                                                                         # Tone dialing command.
connect:
                                                                                                                                          \# %N from Call Home setup.
                                                                                                                                         # Expect a connection response.
```

```
timeout 60
retry:
            send "A/"
                                                # Repeat the previous command.
                                                 # Expect a connection response.
 expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"
 timeout 60
            done
disconnect:
            delay 2
                                                 # Separate from previous data.
            send "+++"
                                                 # Assure command mode.
            delay 2
                                                 # Allow mode switching delay.
            send "ATHOT\r"
                                                # Set modem switch-hook down
                                                 # (i.e., hang up).
                                                # Ignore modem response.
            ignore "0\r" or "0K\r" timeout 2
                                                # Initialize modem: Echo OFF,
            send "ATE001\r"
                                                # Disable responses.
            ignore "0\r" timeout 1
            done
condin:
            send "AT&F0Q0T\r"
                                                # Reset modem. Select profile 0
            ignore "0\r" or "0K\r\n" timeout 2 # Ignore modem response.
            send "ATEOT\r"
                                                # Initialize modem: Echo OFF,
            expect "0\r" or "OK\r\n" timeout 2 # Enable responses (Numeric),
            send "ATQ0V0X0T\r"
                                                # Limit response codes.
            expect "0\r" timeout 2
                                                # Confirm commands successful.
            send "ATS0=2\r"
                                                # Set AutoAnswer ON
            expect "0\r" timeout 2
                                                # Confirm command successful.
            send "AT&C1&D2&R1\r"
                                                # Detect carrier and DTR,
                                                 # Ignore RTS.
            expect "0\r" timeout 2
                                                # Confirm command successful.
waitcall: ignore "2\r" timeout 1
                                                # Ignore first ring.
          expect "2\r" timeout 10
                                                # Pick up second ring
                                                # or timeout.
 $\# Expect a connection response. expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r"
 timeout 60
            done
page:
            send "ATDT%N,,,,%R;\r"
                                                 # %N = pager call center number
                                                 # Add enough commas to wait for
                                                 # time to enter paging number.
                                                 # %R = paging number
                                                 # Confirm successful command.
            expect "0\r" timeout 60
                                                # Wait before hanging up.
            delay 2
            send "ATHOT\r"
                                                 # Hang up.
            expect "0\r" timeout 2
                                                # Confirm successful command.
ripo:
            send "AT&F0Q0T\r"
                                                # Reset modem. Select profile 0
            ignore "0\r" or "0K\r\n" timeout 2 # Ignore modem response.
            send "ATEOT\r"
                                                 # Initialize modem: Echo OFF,
            expect "0\r" or "OK\r\n" timeout 2 # Enable responses (Numeric),
            send "ATQ0V0X0T\r"
                                                # Limit response codes.
            expect "0\r" timeout 2
                                                # Confirm commands successful.
            send "ATS0=0\r"
                                                # Set AutoAnswer OFF
            expect "0\r" timeout 2
                                                # Confirm command successful.
            send "AT&C1&D2&R1\r"
                                                # Detect carrier and DTR,
                                                 # Ignore RTS.
            expect "0\r" timeout 2
                                                # Confirm command successful.
```

expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"

```
# RI Power On enabled.
              done
error:
                                                          # Handle unexpected modem
             # responses.

expect "8\r" or "7\r" or "6\r" or "4\r" or "3\r"

delay 2

done
```

Sample File modem_f1.cfg

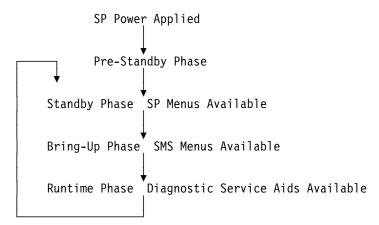
```
# COMPONENT_NAME: (ESPSETUP) ENTRY SERVICE PROCESSOR SETUP F1
# FUNCTIONS: Modem configuration file for many recent Hayes* compatible modems.
      This example uses the AT&F1 reset command to choose the factory defaults.
      This set up is for modems with extended (&) commands and which do not work
 # properly with setup FO. For early vintage modems, setup Z or ZO is
 # recommended.
# * Trademark of Hayes Microcomputer Products, Inc.
# (C) COPYRIGHT International Business Machines Corp. 1996
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 # disclosure restricted by GSA ADP Schedule Contract with IBM Corp.
\# If the modem has configuration switches, they should be set to the
# factory default settings.
ICDelay 1
DefaultTO 10
CallDelay 120
 # AT Attention Code
                                                                                                               Inserts delay in dialing commands
# &F1 Reset. Restore profile 1 Q0 Turn on responses
 # E0 Turn echo off
                                                                                               Q1 Turn off responses
                                                                                                S0=0 Automatic answer inhibit
 # V0 Use numeric responses
                  Escape to command mode
                                                                                               S0=2 Answer on second ring
 # HO Hang-up
                                                                                                X0=0 Limit modem response codes
                                                                                                T = Tone mode. When used as T\r, it is a
                                                                                                                no op to maintain program synchronization % \left( 1\right) =\left( 1\right) \left( 1
                                                                                                                when modem may/will echo the commands.
# &C1 Detect CD
                                                                                                &D2 Respond to DTR (often the default)
# &R1 Ignore RTS (CTS)
 # %N Call-Out phone number
                                                                                               %P Paging phone number
 # %S Modem speed (available to users)
# Following are common responses from a wide range of modems:
# 16, 15, 12, 10, 5 and 1 are connection responses. Add others as required. # 7=busy; 6=no dial tone; 4=error; 3=no carrier; 2=ring; 0=0K
# PROGRAMMING NOTE: No blanks between double quote marks (").
condout:
                                    send "AT&F1Q0T\r"
                                                                                                                                                 # Reset modem. Select profile 1
                                    ignore "0\r" or "0K\r\n" timeout 2 # Ignore modem response.
                                    send "ATEOT\r"
                                                                                                                                                 # Initialize modem: Echo OFF,
                                    expect "0\r" or "0\r" or "0\r" timeout 2 # Enable responses (Numeric),
                                    send "ATQ0V0X0T\r"
                                                                                                                                               # Limit response codes.
                                    expect "0\r" timeout 2
                                                                                                                                              # Confirm commands successful.
                                    send "ATS0=0\r"
                                                                                                                                               # Set AutoAnswer OFF
                                    expect "0\r" timeout 2
                                                                                                                                                # Confirm command successful.
                                    send "AT&C1&D2&R1\r"
                                                                                                                                                 # Detect carrier and DTR,
                                                                                                                                                 # Ignore RTS.
                                    expect "0\r" timeout 2
                                                                                                                                                 # Confirm command successful.
                                    send "ATDT%N\r"
connect:
                                                                                                                                                 # Tone dialing command.
                                                                                                                                                 # %N from Call Home setup.
   # Expect a connection response. expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"
```

```
timeout 60
            done
            send "A/"
retry:
                                                 # Repeat the previous command.
# Expect a connection response. expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r" busy "7\r"
timeout 60
disconnect:
            delay 2
                                                 # Separate from previous data.
            send "+++"
                                                 # Assure command mode.
            delay 2
                                                 # Allow mode switching delay.
            send "ATHOT\r"
                                                 # Set modem switch-hook down
                                                   (i.e., hang up).
            ignore "0\r" or "OK\r" timeout 2
                                                 # Ignore modem response.
            send "ATE001\r"
                                                 # Initialize modem: Echo OFF,
                                                 # Disable responses.
            ignore "0\r" timeout 1
            done
condin:
            send "AT&F1Q0T\r"
                                                 # Reset modem. Select profile 1
            ignore "0\r" or "0K\r\n" timeout 2 # Ignore modem response.
            send "ATEOT\r"
                                                 # Initialize modem: Echo OFF,
            expect "0\r" or "0K\r\n" timeout 2 # Enable responses (Numeric),
            send "ATQOVOXOT\r"
                                                 # Limit response codes.
                                                 # Confirm commands successful.
            expect "0\r" timeout 2
            send "ATS0=2\r"
                                                 # Set AutoAnswer ON
            expect "0\r" timeout 2
                                                 # Confirm command successful.
            send "AT&C1&D2&R1\r"
                                                 # Detect carrier and DTR,
                                                 # Ignore RTS.
            expect "0\r" timeout 2
                                                 # Confirm command successful.
            done
waitcall: ignore "2\r" timeout 1
                                                 # Ignore first ring.
          expect "2\r" timeout 10
                                                 # Pick up second ring
                                                 # or timeout.
# Expect a connection response. expect "16\r" or "15\r" or "14\r" or "12\r" or "10\r" or "5\r" or "1\r"
timeout 60
            done
page:
            send "ATDT%N,,,,%R;\r"
                                                 \# %N = pager call center number
                                                 # Add enough commas to wait for
                                                   time to enter paging number.
                                                 # %R = paging number
                                                 # Confirm successful command.
            expect "0\r" timeout 60
            delay 2
                                                 # Wait before hanging up.
            send "ATHOT\r"
                                                  # Hang up.
            expect "0\r" timeout 2
                                                 # Confirm successful command.
            done
            send "AT&F1Q0T\r"
ripo:
                                                 # Reset modem. Select profile 1
            ignore "0\r" or "0K\r\n" timeout 2 # Ignore modem response.
            send "ATEOT\r"
                                                 # Initialize modem: Echo OFF,
            expect "0\r" or "0K\r\n" timeout 2 # Enable responses (Numeric),
            send "ATQOVOXOT\r"
                                                 # Limit response codes.
            expect "0\r" timeout 2
                                                 # Confirm commands successful.
            send "ATS0=0\r"
                                                 # Set AutoAnswer OFF
            expect "0\r" timeout 2
                                                 # Confirm command successful.
            send "AT&C1&D2&R1\r"
                                                 # Detect carrier and DTR,
                                                 # Ignore RTS.
            expect "0\r" timeout 2
                                                 # Confirm command successful.
            done
                                                 # RI Power On enabled.
```

```
$\#$ Handle unexpected modem $\#$ responses. expect "8\r" or "7\r" or "6\r" or "4\r" or "3\r" delay 2 done
error:
```

Appendix F. Service Processor Operational Phases

This section provides a high-level flow of the phases of the Service Processor (SP).



Pre-Standby Phase

This phase is entered when the server is connected to a power source. The server may or may not be fully powered on. This phase is exited when the Power-On Self Tests (POSTS) and configurations tasks are completed.

The Pre-Standby phase components are:

- · SP Initialization
 - SP performs any necessary hardware and software initializations.
- SP POST
 - SP conducts Power-On Self Tests on its various work and code areas.
- · SP Unattended Start Mode Checks

If unattended start mode is set, the SP automatically reboots the server to assist fault recovery. SP will not wait for a user-input or power-on command, but will move straight through the phase and into the Bringup Phase. The unattended start mode can be reset by accessing SMS menus, or SP menus.

Standby Phase

The standby phase can be reached in two ways:

- 1. With the server OFF and power connected (the normal path), recognized by 0K in the LCD display
- 2. With the server ON after an operating system fault, recognized by STBY or an 8-digit code in the LCD display

In the Standby phase, the SP takes care of some automatic duties and is available for menus operation. The SP remains in the standby phase until a power-on request is detected.

The Standby phase components are:

Modem Configuration

SP will configure the modem (if installed) so that incoming calls may be received, or outgoing calls may be placed.

Dial In

Monitor incoming phone line to answer calls, prompt for a password, verify the password and remotely display the standby menu. The remote session can be mirrored on the local ASCII console if the server is so equipped and the user enables this function.

Menus

The SP menus are password protected. Before you can access them you need to know either the General User (Power-On Password or POP) or the Privileged User (Privileged Access Password or PAP).

Bring-Up Phase

This phase is entered upon power-on, and exited upon loading of the operating system.

The Bring-up phase components are:

Retry Request Check

The SP will check to see if the previous IPL attempt failed. If two consecutive fails are detected, the SP displays an error code and places an outgoing call to notify an external party if the user has enabled this option.

Dial Out

The SP can dial a pre-programmed telephone number in the event of an IPL failure. The SP issues an error report with the last reported IPL status indicated and any other available error information.

Update Operator Panel

The SP displays Operator Panel data on the ASCII terminal if a remote connection is active.

Environmental Monitoring

Environmental Monitoring is now controlled by the SP instead of the base system, with expanded error recording and reporting.

System Firmware Surveillance (Heartbeat Monitoring)

The SP will monitor and time the interval between system firmware heartbeats.

Responding to System Processor Commands

The SP will respond to any command issued by the system processor.

Runtime Phase

This phase includes the tasks that the SP performs during steady-state execution of the operating system.

Environmental Monitoring

The SP monitors voltages, temperatures and fan speeds (on some servers).

Responding to System Processor Commands

The SP will respond to any command issued by the system processor.

Run-Time Surveillance (Heartbeat Monitoring)

If the device driver is installed and surveillance enabled, the SP will monitor the system heartbeat. If the heartbeat times out, the SP places an outgoing call. This is different from the Bringup Phase scenario where two reboot attempts are made before placing an outgoing call.

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