COVER Book Cover

Personal System/2

High Availability External Disk Array
Service Information

Document Number SY31-0712-01

Part Number 46G4116

NOTICES Notices

Take Note!

Before using this information and the product it supports, be sure to read the general information under "Notices" in topic FRONT_1.

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Second Edition (April 1993)

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Subtopics

FRONT_1.1 Safety and Environmental Notices

Subtopics
FRONT_1.1.1 Danger Notices
FRONT_1.1.2 Caution Notices
FRONT_1.1.3 Warning Notices
FRONT_1.1.4 Product Recycling
FRONT_1.1.5 Product Disposal

FRONT_1.1.1 Danger Notices

A danger notice calls attention to a situation that is potentially lethal or extremely hazardous to people.

The following danger notices pertain throughout this manual.

DANGER

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the products that attach to the system. It is the customer's responsibility to ensure that the outlet is correctly wired and grounded to prevent an electrical shock. *(RSFTD201)*

DANGER

To prevent a possible electrical shock when installing the device, ensure that the power cord for that device is unplugged before installing signal cables. *(RSFTD204)*

DANGER

To prevent a possible electrical shock when adding the device to a system, disconnect all power cords, if possible, from the existing system before connecting the signal cable to that device. *(RSFTD205)*

DANGER

To prevent a possible electrical shock from touching two surfaces with different electrical grounds, use one hand, when possible, to connect or disconnect signal cables. *(RSFTD004)*

FRONT_1.1.2 Caution Notices

A caution notice calls attention to a situation that is potentially hazardous to people because of some existing condition.

FRONT_1.1.3 Warning Notices

A warning notice indicates the possibility of damage to a program, device, system, or data.

FRONT_1.1.4 Product Recycling

This unit contains recyclable materials. These materials should be recycled where facilities are available and according to local regulations. In some areas IBM will provide a product take-back program that ensures proper handling of the product. Contact your IBM representative for more information.

FRONT_1.1.5 Product Disposal

This unit may contain batteries that are accessible to certified service personnel only. Before disposing of the unit, these batteries must be removed and discarded or recycled according to local regulations. Contact your service representative to remove these batteries.

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PREFACE About This Manual
This manual contains information on:

- Control panel operation procedures
- Problem analysis procedures to determine the failing field replaceable unit (FRU) or a guide to the correct reference code
- Unit reference code information to determine what caused the failure
- Service procedures to:
  - Locate field-replaceable units (FRUs) and to locate the model number and serial number
  - Exchange and install an FRU and verify a good repair
  - Inspect for safety conditions that could be of danger to the service representative
  - Order parts

Subtopics
PREFACE.1 Who Should Use This Manual
PREFACE.2 Related Printed Information

PREFACE.1 Who Should Use This Manual

This manual is for service representatives who service or repair the IBM 3514 PS/2* High Availability External Storage Subsystem. The term disk unit will be used throughout this manual when referring to this unit.

PREFACE.2 Related Printed Information

See one of the following 3514 Disk Unit manuals for more information:

- *3514 Hardware Maintenance Service*, SY31-0713.

- *3514 Safety Information*, SA21-9614. Contains text of the caution and danger notices from the manuals that are not translated. This manual is assembled so that it can be translated into the national language of any person using the 3514 Disk Unit. Anyone who works with the 3514 Disk Unit should be familiar with and understand the safety notices contained in this manual.

- *3514 Quick Reference Manual*, SA21-9613.

- *3514 Technical Directory Supplement*, SA21-9612.

1.0 Chapter 1. Always Start Here

Subtopics

1.1 Introduction

What is the 3514?

The 3514 is a high availability disk array subsystem that is designed to minimize the effect of hardware failures on the operation of the host system. Redundant parts are used to provide improved availability.

The power system consists of three power modules, only two of which are needed to operate the 3514. A failing power module can be exchanged without affecting the overall operation of the 3514. Also, the power system permits specific disk drives to be powered off. Many failures can be corrected without switching off power to the 3514.

The 3514 also features the IBM* implementation of RAID-5 (Redundant Array of Independent Disks). This is a form of data redundancy across multiple disk drives. A single disk drive failure does not cause a loss of data, because the data on that disk drive can be created again from parity data contained on the other disk drives.

Because of its design for high availability and concurrent maintenance, the 3514 must be serviced differently than other disk units. The procedures in this manual must be followed or your customer can lose data.

Note the following differences:

- The 3514 maintains a set disk drive configuration. Disk drives must be in the correct slots as defined by the 3514 internal configuration record. **Swapping disk drives between 3514s or inside a 3514 can cause loss of data.**

- Disk drives must be added or removed from the 3514 in a set determined sequence. The procedures in this manual show you the correct sequence. **A disk drive inserted in a wrong slot will not be recognized, and disk drives removed from a wrong slot may cause a loss of data.**

- Many repair procedures can be done without turning off power to the 3514. For many failures, only a single disk drive inside the 3514 needs to be powered off. This can be done without losing access to any data.

This section instructs you to perform procedures to analyze the problem with your 3514. The procedure you use will rely on the model number of your 3514 and the error condition.

You should not switch off the power to your 3514 unless instructed to do so by the procedures in this manual.

Follow all procedures in this manual carefully and completely.

Subtopics
1.1.1 Model Chart

1.1.1 Model Chart

The following table shows the 3514 capacity by model.

Model	Minimum capacity	Maximum capacity	Capacity per disk drive feature
001	797 Mb	2790 Mb	398 Mb
004	1973 Mb	6906 Mb	986 Mb
008	3934 Mb	13769 Mb	1967 Mb

1.2 Starting Problem Analysis

Following are error conditions that could have been reported at the system or that you could have found on the 3514 control panel. Select the error condition that matches your problem, then perform the problem analysis procedure for that problem. The starting location for each procedure is given with the associated error condition.

- Any of the following conditions:

  - The 3514 does not display *000 (Ready) after powering on
  - The 3514 displays BBxx
  - The 3514 displays a 3514C9A0 or ****C9A0, 3514C9B0 or ****C9B0, or 3514C9C0 or ****C9C0 unit reference code (URC)
  - The 3514 displays a 3514C990 or ****C990, 3514C991 or ****C991, or 3514C992 or ****C992 unit reference code (URC)

  Go to "Analyzing No-Response Problems" in topic 1.4.

- 3514/A Array Adapter test programs run on the system indicate an error.

  Go to "Analyzing 3514/A Array Adapter Problems" in topic 1.3.

- The system reports a 3514 unit reference code (URC) *or* the 3514 Data display shows 3514xxxx or ****xxxx, where xxxx is the unit reference code.

  Go to Chapter 3, "Unit Reference Codes" in topic 3.0.

- No reference code reported. You think there is a problem with the 3514. For example, you see smoke or fire, smell something unusual, hear an unusual sound, or feel an unusual vibration.

  Go to "Analyzing Other Problems" in topic 1.7.

- The control panel does not respond to input or you suspect some other control panel problem.

  Go to "Analyzing Control Panel Problems" in topic 1.8.

1.3 Analyzing 3514/A Array Adapter Problems

3514/A Array Adapter test programs (diagnostics) have been run from the host system. A problem has been found. Use the error number to find the correct service action in the following table. The error number is the characters in positions 5 and 6 of the system error code. For example, system error code xxxx10xx is error number 10.

Error Number	Error Message	Recovery Action	Part Number
01	Cannot enable slot for setup cycles.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
02	POS(x) read/write error. Out = xx In = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
03	POS(x) read/write error. Out = xx In = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
04	POS(6) read error.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
07	Configuration (POS) read error.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
08	DMA Data Port read/write error. Out = xx In = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
09	DMA Data Port read/write error. Out = xx In = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
10	DMA Command Port read/write error.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
11	Can not send command to DMA Command Port.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
13	3514A BIOS ROM read error. Segment = xxxx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
14	3514A BIOS ROM checksum test error. Segment = xxxx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
15	Can not change 3514A ROM base address. Segment = xxxx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
18	Can not enable write access to memory-mapped I/O.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
19	Can not disable write access to memory-mapped I/O.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
20	Status Register bit 5 error.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
21	Single-Ended cable connected to Differential connector.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
22	53C916 I/F Register read/write error. Address = xxxx Out = xx In = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927

23	Can not disable read access to memory-mapped I/O.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
24	Upper 2K ROM check-sum error.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
25	80C31 command execution time-out. Command = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
26	DMA completion error. Command = xx Error Code = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
27	80C31 RAM location 000BH read error.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
28	80C31/86C05 self-test error. Error information: xx xx xx xx xx xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
31	Dual-Port RAM read/write error. Address = xxxx Out = xx In = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
32	Dual-Port RAM read/write error. Address = xxxx Out = xx In = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
33	80C31 Dual-Port RAM read error. Address = xxxx Out = xx In = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
34	80C31 Dual-Port RAM write error. Address = xxxx Out = xx In = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
36	53C916 Reset Status Register error.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
37	53C916 reset time-out.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
38	53C916 reset error. Register xx not cleared.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
42	53C916 Sequence Instruction RAM read/write error. Address = xxxx Out = xx In = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
43	53C916 Sequence Instruction RAM read/write error. Address = xxxx Out = xx In = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
44	53C916 FIFO Buffer x read/write error. Address = xx Out = xx In = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
45	53C916 FIFO Buffer x read/write error. Address = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927

	Out = xx In = xx		
46	53C916 interrupt test error. Interrupt # = xx No interrupt occurred.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
47	Interrupt test error. Interrupt # = xx Flag = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
48	53C916 interrupt test error. Interrupt # = xx Status = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
50	End-of-DMA interrupt test error. Interrupt # = xx No interrupt occurred.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
51	End-of-DMA interrupt test error. Interrupt # = xx Status = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
52	DMA test error (MCA to 3514A). Data transfer error. DP RAM address = xxxx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
53	DMA test error (3514A to MCA). Data transfer error. DP RAM address = xxxx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
54	53C916 DMA turn-around test error. 53C916 Transfer Counter not zero. TC = xxxxxx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
55	53C916 DMA turn-around (W) test error. Transferred data miscompare. Out = xx In = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
56	53C916 DMA turn-around (R) test error. 53C916 REQ/ACK offset count not equal to 0.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
57	53C916 DMA turn-around (R) test error. 53C916 FIFO pointer not equal to 0. FIFO 1 = xx FIFO 2 = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
58	53C916 DMA turn-around (R) test error. Transferred data miscompare. Out = xxxx In = xxxx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
59	Host to 53C916 DMA test error. Transferred data miscompare. Out = xxxx In = xxxx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
60	53C916 to host DMA test error. Transferred data miscompare. Out = xxxx In = xxxx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
61	I/O command execution error. TA = xx	Go to "Analyzing No-Response Problems" in topic 1.4.	

	OP = xx DRC = xx TCS = xx SDRC = xx		
62	I/O command execution error. TA = xx OP = xx DRC = xx TCS = xx SDRC = xx	Go to "Analyzing No-Response Problems" in topic 1.4.	
63	3514 Check Condition. Address = xx OP = xx EC = xx SK = xx IB = xxxxxxxx CSIB = xxxxxxxx ASC = xx ASCQ = xx FRU = xx SKSb = xx SKSB = xxxx DADURC = xxxx URC = xxxx DADSD = xx xx xx xx xx xx xx xx xx xx	Go "Starting Problem Analysis" in topic 1.2. Use the URC displayed on the screen to analyze the problem.	
64	I/O Check Condition. Address = xx OP = xx EC = xx SK = xx IB = xxxxxxxx CSIB = xxxxxxxx ASC = xx ASCQ = xx FRU = xx SKSb = xx SKSB = xxxx	Go "Starting Problem Analysis" in topic 1.2. Use the information displayed on the 3514 data display to analyze the problem.	
65	bus/buffer read write error. Out = xx In = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
66	The 3514A in slot #x can not detect any device.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
67	Check Condition status occurred, but Sense Key is 0. Address = xx OP = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
80	53C916 Command/Sequence Busy bit always high.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
81	53C916 command execution time-out. Command = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
82	53C916 sequence execution time-out.	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
83	53C916 command execution error. Command = xx Error code = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927
84	53C916 sequence execution error. Error code = xx	Failure in 3514/A Array Adapter. See "Adapter Card" in topic 4.5.16.	86F0927

Note: Each x in the messages is a hexadecimal number, so, xx is an 8-bit byte, xxxx is a 16-bit word..., and so on.

1.4 Analyzing No-Response Problems

The 3514 does not respond to commands, or fails to indicate Unit Ready after a switch-on power sequence was performed.

This procedure and the procedures that follow help you determine the cause of the failure.

If your system indicates that the 3514 is not responding, it should supply you with the serial number of the failing 3514.

1. Look at the 3514 Data display.

Use the error code information and the following list to isolate the problem. Follow each step in sequence.

- Blank display (no characters displayed); go to "Analyzing Blank Data Display Problems" in topic 1.5.
- B000 is displayed; go to step 19.
- BBA0 is displayed; go to step 25.
- All other Bxxx displays; go to step 9.
- 90FF is displayed; go to step 2.
- 3514C9A0 or ****C9A0, 3514C9B0 or ****C9B0, or 3514C9C0 or ****C9C0 is displayed; go to "Analyzing DC Power Problems" in topic 1.6.
- 3514C990 or ****C990, 3514C991 or ****C991, or 3514C992 or ****C992 is displayed; go to "Analyzing DC Power Problems" in topic 1.6.
- *000 is displayed; go to step 13.
- 3514xxxx is displayed (xxxx indicates any reference code that has not been previously identified in this step); go to Chapter 3, "Unit Reference Codes" in topic 3.0.
- Any other display; go to "Analyzing Control Panel Problems" in topic 1.8.

PICTURE 1

2. A display of 90FF indicates that the 3514 is in offline mode.

Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

3. Enter the following sequence on the control panel to put the 3514 online:

9 0 7 9 PICTURE 2

A series of Bxxx characters are displayed. After 3 minutes, *000, B000, or BBA0 should be displayed.

4. After 3 minutes, is *000, B000, or BBA0 displayed on the Data display?

Yes No

- Return to step 1.

5. From your computer system, run the diagnostic test programs for the 3514/A Array Adapter. (See the *3514 Quick Reference Manual*, SA21-9613 for instructions on running diagnostics.)

Did the test programs run without error?

Yes No

- Go to "Starting Problem Analysis" in topic 1.2.

6. Is *000 displayed on the Data display?

Yes **No**

☐ Go to "Starting Problem Analysis" in topic 1.2.

7. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

8. The 3514 is operational and ready to be used by the system.

End of procedure.

9. The 3514 is performing the switch-on power sequence:

Note: Normal switch-on power sequence is completed in 3 minutes and *000 is displayed on the Data display.

Has the Power switch in the 3514 been set to the On position for more than 3 minutes?

Yes **No**

☐ Go to step 10.

Exchange the part (indicated in the table with this step) to correct the problem. For the exchange procedure, see "Controller Card" in topic 4.5.8.

CAUTION:
The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries. *(RSFTC228)*

Location	**Probable Cause**	**Description**
D	90%	Controller card (see caution notice)
9	8%	Control panel
F	1%	Connector panel
A-C	1%	Power module
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.		

End of procedure.

10. A series of Bxxx characters are displayed. After 3 minutes, *000, B000, or BBA0 should be displayed.

After 3 minutes, is *000, B000, or BBA0 displayed on the Data display?

Yes **No**

☐ Return to step 1.

11. From your computer system, run the diagnostic test programs for the 3514/A Array Adapter. (See the *3514 Quick Reference Manual*, SA21-9613 for instructions on running diagnostics.)

Did the test programs run without error?

Yes **No**

☐ Go to "Starting Problem Analysis" in topic 1.2.

12. Is *000 displayed on the Data display?

Yes **No**

☐ Go to "Starting Problem Analysis" in topic 1.2.

End of procedure.

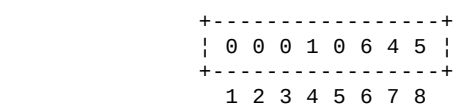
13. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

14. To verify that the serial number shown on the control panel and the 3514 frame match with the serial number reported to the host system, perform the following:

Using the control panel, display the 3514 serial number by entering the following sequence on the control panel:

0 0

Example:



Notes:

a. The example indicates the 3514 serial number is 10645.
b. If the serial number does not match those on the control panel or the 3514 frame, use the one shown in the Data display on the control panel.
c. The serial number recognized by the host system is the one shown in the Data display on the control panel.
d. If this serial number does not match the one reported by the system, you are not servicing the correct 3514.

15. Set the 3514 Power switch to the Off position.

16. Set the 3514 Power switch to the On position.

A series of Bxxx characters are displayed. After 3 minutes, *000, B000, or BBA0 should be displayed.

After 3 minutes, is *000, B000, or BBA0 displayed on the Data display?

Yes No

☐ Return to step 1.

17. From your computer system, run the diagnostic test programs for the 3514/A Array Adapter. (See the *3514 Quick Reference Manual*, SA21-9613 for instructions on running diagnostics.)

Did the test programs run without error?

Yes No

☐ Go to "Starting Problem Analysis" in topic 1.2.

18. Is *000 displayed on the Data display?

Yes No

☐ Go to "Starting Problem Analysis" in topic 1.2.

End of procedure.

19. Data display B000 indicates that the 3514 is online and ready but the host system has not started communications with the 3514.

From your computer system, run the diagnostic test programs for the 3514/A Array Adapter. (See the *3514 Quick Reference Manual*, SA21-9613 for instructions on running diagnostics.)

Did the test programs run without error?

Yes No

☐ Go to "Starting Problem Analysis" in topic 1.2.

20. Is *000 displayed on the Data display?

Yes No

□ Go to step 21.

End of procedure.

21. Check the external signal cable connections between the failing 3514 and the adapter card.

Are all the signal cable connections tight and is the terminating plug tightly connected at the end of the cable path?

Yes No

□ Tightly connect all the signal cable connections and the terminating plug. Then, return to step 19.

22. From your computer system, run the diagnostic test programs for the 3514/A Array Adapter. (See the *3514 Quick Reference Manual*, SA21-9613 for instructions on running diagnostics.)

Is B000 still displayed on the Data display?

No Yes

□ Go to step 24.

23. Is *000 displayed on the Data display?

Yes No

□ Go to "Starting Problem Analysis" in topic 1.2.

End of procedure.

24. Exchange the failing part indicated in the following table, one at a time, starting with the part that has the highest percent of probable cause, until the problem is corrected.

CAUTION:
The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries. *(RSFTC228)*

Location	**Probable Cause**	**Description**
D	60%	Controller card (see caution notice)
	36%	3514/A Array Adapter
9	1%	Control panel
F	1%	Connector panel
J2	1%	Terminating plug
J1	1%	External signal cable
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.		

End of procedure.

25. Data display BBA0 indicates that the 3514 is performing internal recovery. The recovery should complete within 20 minutes. Observe the Data display for at least 20 minutes.

Did the Data display change during the 20 minutes?

Yes No

□ Exchange the part (indicated in the table with this step) to correct the problem. For the exchange procedure, see "Controller Card" in topic 4.5.8.

CAUTION:
The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries. *(RSFTC228)*

Location	**Probable Cause**	**Description**
D	100%	Controller card (see caution notice)

Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.

End of procedure.

26. Did the Data display change to *000?

Yes No

□ Go to step 27.

The 3514 is operating correctly and ready to be used by the system.

End of procedure.

27. Did the Data display change to B000?

Yes No

□ Go to "Starting Problem Analysis" in topic 1.2.

28. From your computer system, run the diagnostic test programs for the 3514/A Array Adapter. (See the *3514 Quick Reference Manual*, SA21-9613 for instructions on running diagnostics.)

Did the Data display change to *000?

Yes No

□ Go to "Starting Problem Analysis" in topic 1.2.

End of procedure.

1.5 Analyzing Blank Data Display Problems

This procedure helps you to determine why status is not being displayed.

1. Is the Power switch-on the 3514 set to the On position?

No **Yes**

□ Go to step 8.

2. Set the 3514 Power switch to the On position.

3. Look at the Data display on the 3514.

A series of Bxxx characters are displayed. After 3 minutes, *000, B000, or BBA0 should be displayed.

4. After 3 minutes, is *000, B000, or BBA0 displayed on the Data display?

Yes **No**

□ Go to "Starting Problem Analysis" in topic 1.2.

5. From your computer system, run the diagnostic test programs for the 3514/A Array Adapter. (See the *3514 Quick Reference Manual*, SA21-9613 for instructions on running diagnostics.)

Did the test programs run without error?

Yes **No**

□ Go to "Starting Problem Analysis" in topic 1.2.

6. Is *000 displayed on the Data display?

Yes **No**

□ Go to "Starting Problem Analysis" in topic 1.2.

7. The 3514 is operational and ready to be used by the system.

End of procedure.

8. Is the Data display background light on?

PICTURE 3

No **Yes**

□ Exchange the parts listed in the following table one at a time, starting with the part that has the highest percent of probable cause, until the problem is corrected.

Location	**Probable Cause**	**Description**
9	90%	Control panel assembly
F	10%	Connector panel
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.		

End of procedure.

9. Is the control panel interface cable seated in the control panel connector?

Note: You may want to move the control panel to the service position to help in seating the control panel connector.

Yes **No**

□ Set the 3514 Power switch to the Off position and seat the control panel cable in the control panel connector.

Return to step 2.

PICTURE 4

10. Are any of the power module LEDs on?

No **Yes**

□ Exchange the parts listed in the following table one at a time, starting with the part that has the highest percent of probable cause, until the problem is corrected.

Location	**Probable Cause**	**Description**
9	90%	Control panel assembly
F	10%	Connector panel
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.		

End of procedure.

11. Set the Power switch to the Off position.

12. Is the power cable plugged into the 3514 and into the ac power outlet?

Yes **No**

□ Plug the power cable into both the 3514 1 and the ac power outlet 2 and then return to step 2.

PICTURE 5

13. Remove the ac power cable from the rear of the 3514.

DANGER

Dangerous voltage being measured. *(RSFTD005)*

Measure the ac voltage at the 3514 end of the ac power cable (measure the two outside pins in the connector).

PICTURE 6

Is the ac voltage from 100 V ac to 127 V ac or from 200 V ac to 240 V ac?

No **Yes**

□ Exchange the parts listed in the following table one at a time, starting with the part that has the highest percent of probable cause, until the problem is corrected.

Location	**Probable Cause**	**Description**
F	40%	AC power cable filter
F	40%	Connector panel
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.		

End of procedure.

The ac power outlet or the power cable is defective.

Either have your electrician repair the ac outlet or exchange the ac power cable (see "AC Power Cable" in topic 4.5.14).

End of procedure.

1.6 Analyzing DC Power Problems

This procedure helps you to determine where a dc power failure occurred.

1. Look at the control panel Data display on the failing 3514.

Use the following Data display contents to continue isolating the problem:

- 3514C990 or ****C990 is displayed; multiple power module failure, go to step 78.
- 3514C991 or ****C991 is displayed; +5 V dc over-current condition, go to step 2.
- 3514C992 or ****C992 is displayed; +12 V dc over-current condition, go to step 41.
- 3514C9A0 or ****C9A0, 3514C9B0 or ****C9B0, or 3514C9C0 or ****C9C0 is displayed; power failure, go to 90.

PICTURE 7

2. A +5 V dc over-current condition occurred.

3. Set the Power switch to Off position.

4. Remove the rear cover (see "Rear Cover Removal or Installation Procedure" in topic 4.4).

5. Disconnect the power cable.

PICTURE 8

6. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

7. Loosen the screw 1 and place the control panel in the service position.

PICTURE 9

8. Remove the front EMC shield.

PICTURE 10

9. Remove the rear EMC shield:

a. Loosen screw 1 .
b. Remove screws 2 .

PICTURE 11

10. Look at the following parts to see if there is visible damage to any of the parts (burned, discolored from heat, or broken):

- Power modules
- Controller card
- Connector panel
- All disk drives
- All disk drive power cables

11. Are any parts damaged?

No **Yes**

- Exchange the damaged parts.

CAUTION:
The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery.

Discard the controller card as instructed by local regulations for lithium batteries. *(RSFTC228)*

Location	Description
A-C	Power module
D	Controller card (see caution notice)
1-8	Disk drive assembly
1-8	Disk drive power cable
F	Connector panel
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

End of procedure.

12. Connect the ac power cable to the 3514.

PICTURE 12

13. Install the rear cover (see "Rear Cover Removal or Installation Procedure" in topic 4.4).

14. Disconnect the power cable from the disk drive that is located in slot 1 of the 3514.

PICTURE 13

15. Set the 3514 Power switch to the On position.

16. Within 30 seconds, is ****C991 displayed in the 3514 Data display?

Yes **No**

□ Exchange the disk drive. See "Disk Drive" in topic 4.5.1.

Location	Description
1-8	Disk drive assembly
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

End of procedure.

17. Set the 3514 Power switch to the Off position.

18. Connect the power cable to the disk drive that you removed it from in the previous step.

PICTURE 14

19. Disconnect the power cable from the disk drive that is located in the next slot number higher than the disk drive that you just connected the power cable to.

20. Set the 3514 Power switch to the On position.

21. Within 30 seconds, is ****C991 displayed in the 3514 Data display?

Yes **No**

□ Exchange the disk drive from which you removed the power cable. See "Disk Drive" in topic 4.5.1.

Location	Description
1-8	Disk drive assembly

Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.

End of procedure.

22. Have all the disk drives in the 3514 been tested as described in steps 17 through 21?

Yes **No**

☐ Return to step 17.

23. Set the 3514 Power switch to the Off position.

24. Connect the power cable to the disk drive that you removed it from in the previous step.

25. Remove the screw that fastens power module A to the guide and remove power module A.

DANGER

Up to 240 V ac is present at the power module connectors when the main power cord is connected to a power source. *(RSFTD010)*

PICTURE 15

26. Set the 3514 Power switch to the On position.

27. Within 30 seconds, is ****C991 displayed in the 3514 Data display?

Yes **No**

☐ Exchange power module A. See "Power Module" in topic 4.5.5.

Location	Description
A-C	Power module

Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.

End of procedure.

28. Set the 3514 Power switch to the Off position.

29. Install power module A in the 3514 using the screw and power module removed in a previous step.

30. Remove the screw that fastens power module B to the guide and remove power module B.

DANGER

Up to 240 V ac is present at the power module connectors when the main power cord is connected to a power source. *(RSFTD010)*

31. Set the 3514 Power switch to the On position.

32. Within 30 seconds, is ****C991 displayed in the 3514 Data display?

Yes **No**

☐ Exchange power module B. See "Power Module" in topic 4.5.5.

Location	Description

A-C	Power module
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

End of procedure.

33. Set the 3514 Power switch to the Off position.

34. Install power module B in the 3514 using the screw and power module removed in a previous step.

35. Remove the screw that fastens power module C to the guide and remove power module C.

DANGER

Up to 240 V ac is present at the power module connectors when the main power cord is connected to a power source. *(RSFTD010)*

36. Set the 3514 Power switch to the On position.

37. Within 30 seconds, is ****C991 displayed in the 3514 Data display?

Yes **No**

☐ Exchange power module C. See "Power Module" in topic 4.5.5.

Location	**Description**
A-C	Power module
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

End of procedure.

38. Set the 3514 Power switch to the Off position.

39. Install power module C in the 3514 using the screw and power module removed in a previous step.

40. Exchange the parts (indicated in the following table) one at a time, starting with the part that has the highest percent of probable cause, until the problem is corrected.

CAUTION:
The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries. *(RSFTC228)*

Location	**Probable Cause**	**Description**
D	90%	Controller card (see caution notice)
1-8	5%	Disk drive power cable
F	5%	Connector panel
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.		

End of procedure.

41. A +12 V dc over-current condition has occurred.

Set the 3514 Power switch to the Off position.

42. Remove the rear cover (see "Rear Cover Removal or Installation Procedure" in topic 4.4).

43. Disconnect the power cable.

PICTURE 16

44. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

45. Loosen the screw 1 and place the control panel in the service position.

PICTURE 17

46. Remove the front EMC shield.

PICTURE 18

47. Remove the rear EMC shield:

a. Loosen screw 1 .
b. Remove screws 2 .

PICTURE 19

48. Look at the following parts to see if there is visible damage to any of them (burned, discolored from heat, or broken):

- Power modules
- All disk drives
- All disk drive power cables
- All fans

49. Are any parts damaged?

No **Yes**

- Exchange the damaged parts.

  CAUTION:
  The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries. *(RSFTC228)*

Location	**Description**
A-C	Power module (see note)
D	Controller card (see caution notice)
1-8	Disk drive logic card
1-8	Disk drive assembly
1-8	Disk drive power cable
F	Connector panel
F1, F2	Fan

Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.

End of procedure.

50. Connect the ac power cable to the 3514.

PICTURE 20

51. Install the rear cover (see "Rear Cover Removal or Installation

Procedure" in topic 4.4).

52. Disconnect the power cable from the disk drive that is located in slot 1 of the 3514.

53. Set the 3514 Power switch to the On position.

Within 30 seconds, is ****C992 displayed in the 3514 Data display?

Yes No

□ Exchange the disk drive (see "Disk Drive" in topic 4.5.1).

Location	**Description**
1-8	Disk drive assembly
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

End of procedure.

54. Set the 3514 Power switch to the Off position.

55. Connect the power cable to the disk drive that you removed it from in step 52.

56. Disconnect the power cable from the next disk drive (next slot above the one that you just connected the power cable to in step 55).

57. Set the 3514 Power switch to the On position.

58. Within 30 seconds, is ****C992 displayed in the 3514 Data display?

Yes No

□ Exchange the disk drive (see "Disk Drive" in topic 4.5.1).

Location	**Description**
1-8	Disk drive assembly
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

End of procedure.

59. Have all the disk drives in the 3514 been tested as described in steps 54 through 58?

Yes No

□ Repeat steps 54 through 59.

60. Set the 3514 Power switch to the Off position.

61. Connect the power cable to the disk drive that you removed it from in the previous step.

PICTURE 21

62. Remove the screw that fastens power module A to the guide and remove power module A.

DANGER

Up to 240 V ac is present at the power module connectors when the main power cord is connected to a power source. *(RSFTD010)*

PICTURE 22

63. Set the 3514 Power switch to the On position.

64. Within 30 seconds, is ****C992 displayed in the 3514 Data display?

Yes **No**

□ Exchange power module A. See "Power Module" in topic 4.5.5.

Location	**Description**
A-C	Power module

Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.

End of procedure.

65. Set the 3514 Power switch to the Off position.

66. Install power module A in the 3514 using the screw and power module removed in a previous step.

67. Remove the screw that fastens power module B to the guide and remove power module B.

DANGER

Up to 240 V ac is present at the power module connectors when the main power cord is connected to a power source. *(RSFTD010)*

68. Set the 3514 Power switch to the On position.

69. Within 30 seconds, is ****C992 displayed in the 3514 Data display?

Yes **No**

□ Exchange power module B. See "Power Module" in topic 4.5.5.

Location	**Description**
A-C	Power module

Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.

End of procedure.

70. Set the 3514 Power switch to the Off position.

71. Install power module B in the 3514 using the screw and power module removed in a previous step.

72. Remove the screw that fastens power module C to the guide and remove power module C.

DANGER

Up to 240 V ac is present at the power module connectors when the main power cord is connected to a power source. *(RSFTD010)*

73. Set the 3514 Power switch to the On position.

74. Within 30 seconds, is ****C992 displayed in the 3514 Data display?

Yes **No**

□ Exchange power module C. See "Power Module" in topic 4.5.5.

Location	**Description**
A-C	Power module

Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.

End of procedure.

75. Set the 3514 Power switch to the Off position.

76. Install power module C in the 3514 using the screw and power module removed in a previous step.

77. Exchange the parts (indicated in the following table) one at a time, starting with the part that has the highest percent of probable cause, until the problem is corrected.

Location	**Probable Cause**	**Description**
F1, F2	50%	Fan
F	30%	Connector panel
1-8	20%	Disk drive power cable

Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.

End of procedure.

78. A multiple power module failure occurred.

Set the 3514 Power switch to the Off position.

79. Remove the screw that fastens power module A to the guide and remove power module A.

DANGER

Up to 240 V ac is present at the power module connectors when the main power cord is connected to a power source. *(RSFTD010)*

PICTURE 23

80. Install a new power module in position A using the screw removed in a previous step.

81. Set the 3514 Power switch to the On position.

82. Within 30 seconds, is ****C990 displayed in the 3514 Data display.

Yes No

☐ Go to step 89.

83. Set the 3514 Power switch to the Off position.

84. Remove the screw that fastens power module B to the guide and remove power module B.

DANGER

Up to 240 V ac is present at the power module connectors when the main power cord is connected to a power source. *(RSFTD010)*

85. Install a new power module in position B using the screw removed in a previous step.

86. Set the 3514 Power switch to the On position.

Within 30 seconds, is ****C990 displayed in the 3514 Data display.

Yes No

☐ Go to step 89.

87. Set the 3514 Power switch to the Off position.

88. Exchange the parts (indicated in the table below) one at a time, starting with the part that has the highest percent of probable cause, until the problem is corrected.

Location	Probable Cause	Description
C	75%	Power module
F1, F2	15%	Fan
F	6%	Connector panel
1-8	4%	Disk drive power cable

Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.

End of procedure.

89. Wait 3 minutes. Is *000 displayed?

Note: The Data display may be changing for up to 3 minutes while the 3514 is running the power-on basic tests.

Yes No

☐ Go to "Starting Problem Analysis" in topic 1.2.

End of procedure.

90. A +5 V dc or +12 V dc over-current condition may have occurred.

Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

91. Remove the rear cover (see "Rear Cover Removal or Installation Procedure" in topic 4.4).

92. Look at the LEDs on the power modules at the back of the 3514.

Are the LED indicators on all three power modules off?

No Yes

☐ Go to step 97.

93. Using the control panel, enter the following sequence to display the quick status of the power modules:

0 3

The control panel displays a power module quick status with the location of failing power modules (A, B, or C) indicated by an x.

Example:

```
 PICTURE 24   Power B is failing
                 Modules A and C are
                 operating correctly
```

94. Are two power modules indicated by an x as failing?

Yes No

☐ Go to Chapter 3, "Unit Reference Codes" in topic 3.0.

95. Set the 3514 Power switch to the Off position.

96. Exchange the power module that is indicated by an PICTURE 25 as operating correctly. See "Power Module" in topic 4.5.5.

Location	Description
A-C	Power module

Note: See the "Failing Item Table" in topic 3.3 for the correct

| part number for a specific FRU part. |

End of procedure.

97. An over-current condition has occurred.

Set the Power switch to Off position.

98. Disconnect the power cable.

PICTURE 26

99. Loosen the screw 1 and place the control panel in the service position.

PICTURE 27

100. Remove the front EMC shield.

PICTURE 28

101. Remove the rear EMC shield:

a. Loosen screw 1 .
b. Remove screws 2 .

PICTURE 29

102. Look at the following parts to see if there is visible damage to any of the parts (burned, discolored from heat, or broken):

- Power modules
- Controller card
- Connector panel
- All disk drives
- All disk drive power cables
- All fans

103. Are any parts damaged?

No **Yes**

- Exchange the damaged parts.

  CAUTION:
  The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries. *(RSFTC228)*

Location	**Description**
A-C	Power module
D	Controller card (see caution notice)
1-8	Disk drive assembly
1-8	Disk drive power cable
F	Connector panel
F1, F2	Fan

Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.

End of procedure.

104. Connect the ac power cable to the 3514.

PICTURE 30

105. Install the rear cover (see "Rear Cover Removal or Installation Procedure" in topic 4.4).

106. Disconnect the power cable from the disk drive that is located in slot 1 of the 3514.

PICTURE 31

107. Set the 3514 Power switch to the On position.

108. Within 30 seconds, is 3514C9A0 or ****C9A0, 3514C9B0 or ****C9B0, or 3514C9C0 or ****C9C0 displayed in the 3514 Data display?

Yes **No**

□ Exchange the disk drive. See "Disk Drive" in topic 4.5.1.

Location	**Description**
1-8	Disk drive assembly
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

End of procedure.

109. Set the 3514 Power switch to the Off position.

110. Connect the power cable to the disk drive that you removed it from in the previous step.

PICTURE 32

111. Disconnect the power cable from the disk drive that is located in the next slot number higher than the disk drive that you just connected the power cable to.

112. Set the 3514 Power switch to the On position.

113. Within 30 seconds, is 3514C9A0 or ****C9A0, 3514C9B0 or ****C9B0, or 3514C9C0 or ****C9C0 displayed in the 3514 Data display?

Yes **No**

□ Exchange the disk drive from which you removed the power cable. See "Disk Drive" in topic 4.5.1.

Location	**Description**
1-8	Disk drive assembly
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

End of procedure.

114. Have all the disk drives in the 3514 been tested as described in steps 109 through 113?

Yes **No**

□ Return to step 109.

115. Set the 3514 Power switch to the Off position.

116. Connect the power cable to the disk drive that you removed it from in the previous step.

117. Remove the screw that fastens power module A to the guide and remove power module A.

DANGER

Up to 240 V ac is present at the power module connectors when the main power cord is connected to a power source. *(RSFTD010)*

PICTURE 33

118. Set the 3514 Power switch to the On position.

119. Within 30 seconds, is 3514C9A0 or ****C9A0, 3514C9B0 or ****C9B0, or 3514C9C0 or ****C9C0 displayed in the 3514 Data display?

Yes **No**

□ Exchange power module A. See "Power Module" in topic 4.5.5.

Location	**Description**
A-C	Power module
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

End of procedure.

120. Set the 3514 Power switch to the Off position.

121. Install power module A in the 3514 using the screw and power module removed in a previous step.

122. Remove the screw that fastens power module B to the guide and remove power module B.

DANGER

Up to 240 V ac is present at the power module connectors when the main power cord is connected to a power source. *(RSFTD010)*

123. Set the 3514 Power switch to the On position.

124. Within 30 seconds, is 3514C9A0 or ****C9A0, 3514C9B0 or ****C9B0, or 3514C9C0 or ****C9C0 displayed in the 3514 Data display?

Yes **No**

□ Exchange power module B. See "Power Module" in topic 4.5.5.

Location	**Description**
A-C	Power module
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

End of procedure.

125. Set the 3514 Power switch to the Off position.

126. Install power module B in the 3514 using the screw and power module removed in a previous step.

127. Remove the screw that fastens power module C to the guide and remove power module C.

DANGER

Up to 240 V ac is present at the power module connectors when the

main power cord is connected to a power source. *(RSFTD010)*

128. Set the 3514 Power switch to the On position.

129. Within 30 seconds, is 3514C9A0 or ****C9A0, 3514C9B0 or ****C9B0, or 3514C9C0 or ****C9C0 displayed in the 3514 Data display?

Yes **No**

☐ Exchange power module C. See "Power Module" in topic 4.5.5.

Location	**Description**
A-C	Power module
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

End of procedure.

130. Set the 3514 Power switch to the Off position.

131. Install power module C in the 3514 using the screw and power module removed in a previous step.

132. Exchange the parts (indicated in the following table) one at a time, starting with the part that has the highest percent of probable cause, until the problem is corrected.

CAUTION:
The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries. *(RSFTC228)*

Location	**Probable Cause**	**Description**
D	80%	Controller card (see caution notice)
F1, F2	10%	Fan
1-8	5%	Disk drive power cable
F	5%	Connector panel
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.		

End of procedure.

1.7 Analyzing Other Problems

1. Do you observe any of the following conditions:

- ☐ See smoke or fire
- ☐ Smell something unusual
- ☐ Hear an unusual sound
- ☐ Feel an unusual vibration

No Yes

☐ Go to step 4.

2. Is the 3514 Power light on, Unit Attention light off, and *000 displayed?

PICTURE 34

Yes No

☐ Go to step 9.

3. From your computer system, run the diagnostic test programs for the 3514/A Array Adapter. (See the *3514 Quick Reference Manual*, SA21-9613 for instructions on running diagnostics.)

End of procedure.

4. The 3514 is not operating correctly:

Warning: Check with the customer to see if the system can be interrupted and stopped. Turning power off on the 3514 and exchanging FRUs could cause loss of data.

5. Set the 3514 Power switch to the Off position.

6. Disconnect the ac power cable from the rear of the 3514.

PICTURE 35

7. Exchange the FRUs that appear to have a problem (parts that match the symptoms indicated in step 1 of this procedure).

Notes:

a. For a list of FRUs that can be exchanged, see "Failing Item Table" in topic 3.3.
b. See Chapter 4, "Service Procedures" in topic 4.0 for the correct procedures to exchange any FRU.

8. If exchanging any parts does not correct the problem, call your next level of support.

End of procedure.

9. Is the Unit Attention light on?

Yes No

☐ Go to "Analyzing No-Response Problems" in topic 1.4.

10. Find the first URC in the URC error log and go to "Unit Reference Code Table" in topic 3.2. The URC is the 4 leftmost characters in the error log entry. (See "Using the 3514 Unit Reference Code (URC) Error Log" in topic 2.6.)

End of procedure.

1.8 Analyzing Control Panel Problems

This procedure helps you to determine if the control panel is functioning correctly.

1. Is a control panel command being performed?

No **Yes**

□ Wait for the command to complete, then continue with step 2.

2. Press the Home key (*).

Is *000, B000, BBA0, BBxx, or 90FF displayed?

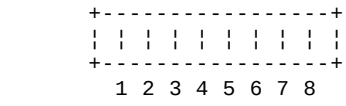
Yes **No**

□ Exchange the control panel using the exchange procedure "Control Panel" in topic 4.5.9.

3. Perform a lamp test by entering 09.

Are all solid boxes displayed with the Unit Attention, Unit Ready, and Power On LED indicators on?

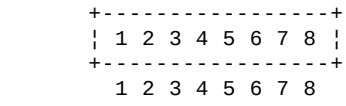
Example of a lamp test:



Yes **No**

□ Exchange the control panel using the exchange procedure "Control Panel" in topic 4.5.9.

4. Press keys 1 through 8. Did the solid boxes change to the number of each position as shown?

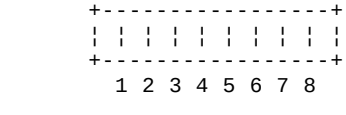


Yes **No**

□ Exchange the control panel using the exchange procedure "Control Panel" in topic 4.5.9.

5. Press the Enter key PICTURE 36

Are all solid boxes displayed as shown?



Yes **No**

□ Exchange the control panel using the exchange procedure "Control Panel" in topic 4.5.9.

6. Press the Home key (*).

Is *000, B000, BBA0, BBxx, or 90FF displayed?

Yes **No**

□ Exchange the control panel using the exchange procedure "Control Panel" in topic 4.5.9.

The control panel is operating correctly.

End of procedure.

2.0 Chapter 2. Control Panel

Subtopics

2.1 Control Panel Functions

The 3514 control panel is used to display information and perform functions used to service the 3514. Using the information in this chapter, you can perform the following functions from the control panel:

- Display status information
- Display information
  - Vital product data (VPD)
    - 3514 VPD
    - Disk drive VPD
    - Control panel VPD
  - Disk drive status
  - Power module status
  - Unit reference code (URC)
- Switch-on power to the 3514
- Switch off power to the 3514

Also from the control panel, you can perform the following functions (see Chapter 4, "Service Procedures" in topic 4.0 for information on how to use these procedures):

- Enable or disable the 3514 interface to the system
- Display service information and perform service functions
- Add disk drives

Information concerning the 3514 can be displayed by entering a quick status command or a display command. A quick status command displays common information concerning the configuration or operating condition of the 3514. A display command supplies more detailed information concerning the 3514 or its specific parts. For a description of the quick status and display commands see "Quick Status Commands" in topic 2.5.1 and "Display Commands" in topic 2.5.2.

Service commands are used in most conditions to service the 3514 or to add disk drives. These commands are described in the service procedure that needs to use this command. You should use these commands only as they are described in a specific procedure.

Warning: Service procedures used on the 3514 differ from those used on other products. If you do not use the commands correctly, you can cause loss of availability or loss of data.

Service commands are not frequently used. Normally, the functions they perform are included in the higher-function service commands, but under some conditions they are useful for problem isolation and analysis. For a description of service primitive commands see Appendix A, "Support Tools" in topic A.0.

If you perform a service command or a service primitive command, the control panel will display information concerning how far the command has advanced.

If a function needs more than a few seconds to complete the function specified (such as formatting a disk drive), the control panel displays the command code followed by a percent complete number. This number indicates what percent of the function has been processed. If an error occurs, the control panel displays the command code followed by a return code. For a description of these return codes, see "Control Panel Command Return Code Information" in topic 3.4.

2.2 Control Panel Switches, Indicators, and Data Display

PICTURE 37

1 Unit Attention light

When on, the Unit Attention light indicates conditions that need manual intervention.

2 Disk Activity light

When on, the Disk Activity light indicates that the 3514 is performing a data read or write requested by the host system.

3 Power switch

The Power switch controls direct current (dc) power in the 3514.

4 Power Good light

When on, the Power Good light indicates that the dc power is active in the 3514.

5 Data display area

The Data display can display 8 characters of status information concerning the 3514. The information includes power sequence codes, unit reference codes (URCs), operational status, and service functions.

6 Keypad

The keypad is used to enter the function code of the specific control panel function. Use the keypad as follows:

- Start a function by entering the function code on the keypad.
- After you have entered a specific function on the keypad, the display may direct you to press the Enter key PICTURE 38
- When a function is complete, related information is displayed in the Data display area.
- Press the * (Home) key to return the 3514 to a home condition or display. The display must be in a home condition before any other function can be started.

2.3 Using the Control Panel

The Data display can contain up to 8 characters of status information.

The Data display indicates a normal switch-on power sequence (see "How to Switch-On Power to the 3514" in topic 2.4) by the following:

- A display of BBnn (where nn is any number) for 3 minutes after the Power switch is set to the On position.

- Then a display of either *000, B000, or BBA0 with the Unit Ready light on and the Unit Attention light off. If the Unit Attention light is on, or if a display other than *000, B000, or BBA0 appears, an error exists that needs service.

The following tables describe commands that can be performed from the control panel:

- "Quick Status Commands" in topic 2.5.1.
- "Display Commands" in topic 2.5.2.

2.4 How to Switch-On Power to the 3514

1. The Power switch is located on the front of the 3514 in the upper right corner.

Set the Power switch to the On position.

PICTURE 39

2. Observe the condition of the Unit Ready light, the Unit Attention light, and the characters that are displayed on the Data display.

Note: The 3514 is ready approximately 3 minutes after the Power switch is set to the On position. During this time, a series of 4-character codes that start with BB followed by two numbers (BBnn) are displayed.

The 3514 power is on and the 3514 is ready when either *000, B000, or BBA0 is continuously displayed, the Unit Ready light is on, and the Unit Attention light is off continuously.

Note: When B000 or BBA0 is displayed, the 3514 is ready, but has not communicated with the host system.

PICTURE 40

Any display other than *000 that appears on the Data display after approximately 3 minutes indicates that service is needed.

Is *000 on the Data display?

Yes No

□ Go to "Starting Problem Analysis" in topic 1.2.

3. The 3514 power is now switched on and is communicating with the host system.

2.5 How to Switch Off Power to the 3514

1. Set the Power switch to the Off position.

PICTURE 41

When the Power switch is set to the Off position, the Unit Ready light should be off, the Unit Attention light should be off, and the Data display should be blank.

PICTURE 42

Did the 3514 switch off power?

Yes No

□ The 3514 needs service. Go to "Starting Problem Analysis" in topic 1.2.

2. The 3514 power is now switched off.

Subtopics
2.5.1 Quick Status Commands
2.5.2 Display Commands

2.5.1 Quick Status Commands

Quick status commands are used to display information concerning the overall condition of the 3514. The information provided by these commands is used in the problem recovery and service procedures in this manual. Do not use these commands unless you are instructed by the procedures in this manual or by your next level of support.

Command Sequence	Function and Description
0 0	**Display the 3514 serial number.** This command is used to display the serial number of the 3514. Example: 0 0 0 1 0 6 4 5 This device has the serial number 10645. 1 2 3 4 5 6 7 8
0 1	**Display the address of the 3514.** This command is used to display the address of the 3514. Example: 5 The target address of the 3514 is 5. 1 2 3 4 5 6 7 8
0 2	**Display disk drive quick status** This command is used to display status information concerning the disk drives in the 3514. The status is indicated by the character shown in the position of the display that represents the number of the disk drive slot. For example, the status of the disk drive in slot 3 is indicated by the character in position three of the disk drive quick status display. **Note:** You will be directed by a specific exchange procedure under Chapter 4, "Service Procedures" in topic 4.0 on how to use this command. Also, what to do concerning any valid character that may appear as described below. Valid characters are: **1-8** The disk drive is operating normally. _ No disk drive has been recognized for this slot. □ The disk drive has been powered up but has not been added to the configuration. □ The disk drive has been powered off. **X** The disk drive is broken or missing. Examples: 1 2 3 4 5 6 7 8 All disk drives are operating normally. 1 2 3 4 5 6 7 8 1 2 □ 4 5 _ 7 8 No disk drive is recognized in slot 6. 1 2 3 4 5 6 7 8 The disk drive in slot 3 is powered off. All other disk drives are operating normally.
0 3	**Display power module quick status** This command is used to display status information concerning the power modules in the 3514. The status is indicated by the character shown next to the letter of the power module slot. For example, the status of the power module in location B is indicated by the character rightmost to the letter B in the power module quick status display. Valid characters are: □ The power module is powered on and operating correctly.

	□ The power module has been powered off. **X** The power module is broken. Service is needed. PICTURE 43 The power module is powered on, but cannot be powered off without loss of availability. This occurs if another power module is broken or powered off. Examples: +------------------+ ¦ A □ B □ C □ ¦ All Power modules are operating +------------------+ correctly. 1 2 3 4 5 6 7 8 PICTURE 44 Power module B is broken. Power modules A and C are powered on. Power modules A and C cannot be turned off without losing availability. PICTURE 45 Power module B is powered off. Power modules A and C are powered on. Power modules A and C cannot be turned off without losing availability.
0 5	**Display copyright information** **Note:** The copyright information scrolls through the display.
0 9	**Display the lamp test and perform the keypad key test** This command is used to test all displays and indicators on the control panel and to indicate the correct operation of the keypad keys. Example of a lamp test: +----------------+ ¦ ¦ ¦ ¦ ¦ ¦ ¦ ¦ ¦ ¦ Data display characters are active. +----------------+ 1 2 3 4 5 6 7 8 **Note:** All control panel LED indicators should be on. Example of keypad key test: **Notes:** 1. By pressing a key on the keypad, the corresponding number is displayed in the respective slot number. 2. This example displays the result of pressing the following keys: 1 2 4 5 8 +----------------+ ¦ 1 2 ¦ 4 5 ¦ ¦ 8 ¦ Data display characters are active. +----------------+ 1 2 3 4 5 6 7 8 3. Pressing the PICTURE 46 key returns the display to all solid blocks (¦). 4. The 0 and 9 keys do not function with this keypad test. 5. Press the * (Home) key to return the control panel to the home state.

2.5.2 Display Commands

Display commands are used to display information about specific parts of the 3514 or about the entire 3514.

Notes:

1. After each command is performed, it is necessary to press the * (Home) key to return the operator panel display to the home condition.
2. The PICTURE 47 key top symbol is used to represent the Enter key.
3. When entering any command for a disk drive, n = slot number of the disk drive.
4. When using any command for a power module, x = A, B, or C (location of the power module).

Command Sequence	**Function and Description**
1 0 1 PICTURE 48	Display the 3514 model number This command is used to display the 3514 model number. **Model Number** **Features** **001** 398 Mb disk drives 3-8 disk drives **004** 986 Mb disk drives 3-8 disk drives **008** 1967 Mb disk drives 3-8 disk drives Example: 3 5 1 4 0 0 4 Machine type is 3514, 1 2 3 4 5 6 7 8 model number is 004.
1 0 2 PICTURE 49	Display the 3514 serial number This command is used to display the 3514 serial number.
1 2 1 n PICTURE 50	Display the assembly part number of the disk drive in slot **n** This command is used to display the assembly number of a disk drive that is installed in the 3514. The following numbers are recognized: **73F8987** 398 Mb disk drive **55F9827** 986 Mb disk drive **86F0107** 1967 Mb disk drive **Note:** These are not FRU part numbers. For the correct orderable part number, see the "Failing Item Table" in topic 3.3.
1 2 2 n PICTURE 51	Display the serial number of the disk drive in slot n This command is used to display the serial number of a disk drive that is configured in slot *n* of the 3514.
1 2 6 n PICTURE 52	Display the internal code load identification number of **the disk drive in slot n** This command is used to display the internal code load identification number of the selected disk drive slot *n* of the 3514.
1 2 7 n PICTURE 53	Display the internal code release level change number of **the disk drive in slot n** This command is used to display the internal code load identification number of the selected disk drive slot *n* of the 3514.
1 4 1 D PICTURE 54	Display the assembly part number of the controller card This command is used to display the assembly number of the controller card installed in the 3514.
1 4 2 D PICTURE 55	Display the serial number of the controller card This command is used to display the serial number of the controller card installed in the 3514.
1 4 6 D PICTURE 56	Display the internal code load identification number of **the controller card**

1 4 7 D PICTURE 57	Display the internal code release level change number of **the controller card**
1 5 1 PICTURE 58	Display the control panel part number
1 5 6 PICTURE 59	Display the control panel internal code level
1 5 7 PICTURE 60	Display the release level change number of the control **panel**
1 6 9 PICTURE 61	Display the URC error log This command displays the first entry in the URC error log. This is the most recent entry. Additional entries may be displayed as follows: n PICTURE 62 Display URC error log entry number n PICTURE 63 **Note:** The time stamp is the number of 0.1 second intervals since ac power was applied. This number is displayed in hexadecimal. 0 PICTURE 64 Display current time stamp

2.6 Using the 3514 Unit Reference Code (URC) Error Log

The 3514 error log can contain up to a maximum of 8 entries. If more than 8 entries are logged, only the latest 8 entries are kept in the error log.

Subtopics
2.6.1 What the Error Log Contains
2.6.2 How to Display the Error Log

2.6.1 What the Error Log Contains

The 3514 unit reference code (URC) error log contains two types of entries:

- URC entries
- Marker entries

Subtopics
2.6.1.1 URC Entries
2.6.1.2 Marker Entries

2.6.1.1 URC Entries

URC entries contain 8 characters of which the leftmost 4 characters are the URC error code and the rightmost 4 characters contain additional information for the third level support representative.

An example of a URC entry is as follows:

93130120

Notes:

1. The characters 9313 are the URC.
2. The characters 0120 are coded information used by the third level support representative.

2.6.1.2 Marker Entries

Markers are used to record each command that was entered and when the command ends.

Marker entries contain 8 characters of which the leftmost 4 characters are fill characters and the rightmost 4 characters contain the command or sequence of characters entered.

An example of a marker entry is as follows:

```
  11114292
```

Notes:

1. The characters 1111 are fill characters.
2. The characters 4292 is the command that was entered on the 3514 control panel.
3. When the command ends, the rightmost position will contain the character F.

An example and description of the last 4 entries in an error log is as follows (the latest entry is shown on line 1):

```
  1     1111429F
  2     7F1A0000
  3     11114292
  4     4*******
```

Notes:

1. Line 4 (4*******). No errors occurred before the line 3 entry.
2. Line 3 (11114292). The command 4292 (exchange disk drive in slot 2) was started.
3. Line 2 (7F1A0000). An error occurred during the exchange procedure.
4. Line 1 (1111429F). The command 4292 has completed.

2.6.2 How to Display the Error Log

To display information in the error log, enter the following sequence on the 3514 control panel. This displays the first entry in the error log.

1 6 9 PICTURE 65

Using the example shown under "Marker Entries" in topic 2.6.1.2, the first entry shown is:

1111429F

To display other entries that are in the error log, use the 3514 control panel and enter the line number of the entry you want to display. For example:

2 PICTURE 66 (displays the second entry)
or
3 PICTURE 67 (displays the third entry)

A time stamp for each log entry is also stored by the 3514. The time stamp is given in 1/10-second intervals of time since ac power was attached to the 3514. To display the time stamp of any log entry, press the PICTURE 68 key after you display a log entry. Each time you press the PICTURE 69 key, the display changes between the log entry and the associated time stamp. The current log can be displayed by pressing the Enter key PICTURE 70

When you are done with the URC error log, press the * (Home) key to clear the display and return to ready status (*000).

3.0 Chapter 3. Unit Reference Codes

This unit reference code table is to be used by a service representative.

Subtopics

3.1 Introduction

When the system or the 3514 displays a 3514 reference code (URC):

1. Go to the "Unit Reference Code Table" in topic 3.2 and find the unit reference code in the table. The "Unit Reference Code Table" is arranged in reference-code sequence, with numeric characters appearing before alphanumeric characters. For example, reference codes AAA0 through AAA9 appear before reference codes AAAA through AAAF.

2. If a problem recovery procedure is indicated with a unit reference code (URC), perform the problem recovery procedure. This procedure will direct you to exchange procedures. If the problem recovery procedure does not correct the problem, exchange the remaining failing items one at a time until the problem is corrected.

3. Use this table for a list of the failing item part numbers, a description of the failing items, and a document reference (if any) including a recovery procedure for the parts that need to be exchanged.

4. If no problem recovery procedure is indicated with a reference code, exchange the failing items, starting with the failing item that has the highest percent of probable cause. Exchange the failing items one at a time until the problem is corrected.

3.2 Unit Reference Code Table

Warning: **Do not enter the manual here unless you have been directed to do so by another procedure in this book. Go to** "Starting Problem Analysis" in topic 1.2.

Note: Some of the URCs in the following table are shown with the character **n** in the third position. This position in the URC contains a number 1 through 8 which indicates the slot number of the FRU that is reporting the error. To locate the FRUs in this table, see "Locations" in topic 4.1.

URC	Description/Action -- Perform all recovery procedures before exchanging Failing Items	Failing Item	Probable Cause (%)	Location
102E	Out of alternate sectors for disk storage	AJEFAD00	100	
51n0	Device error, position n Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	16G7002	100	Slot 1-8
51n1	Bus parity error, device n Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	16G7002 16G6990 86F0843	49 49 02	Slot 1-8 D Slot 1-8
51n2	Communications failure, device n Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	16G7002 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
51n3	Device error, position n Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	16G7002	100	Slot 1-8
51n7	Disk drive missing from disk array internal configuration Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	16G7002 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
51n9	A disk drive was improperly substituted in the disk array Perform "Problem Recovery Procedure 7b" in topic 3.5.18.			
51nA	Predictive Failure Analysis threshold reached Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	16G7002	100	Slot 1-8
51nB	Predictive Failure Analysis threshold reached Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	16G7002	100	Slot 1-8
51nF	LRC error Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	16G7002	100	Slot 1-8
53n0	Device error, position n Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	16G7003	100	Slot 1-8

53n1	Bus parity error, device n Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	16G7003 16G6990 86F0843	49 49 02	Slot 1-8 D Slot 1-8
53n2	Communications failure, device n Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	16G7003 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
53n3	Device error, position n Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	16G7003	100	Slot 1-8
53n7	Disk drive missing from disk array internal configuration Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	16G7003 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
53n9	A disk drive was improperly substituted in the disk array Perform "Problem Recovery Procedure 7b" in topic 3.5.18.			
53nA	Predictive Failure Analysis threshold reached Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	16G7003	100	Slot 1-8
53nB	Predictive Failure Analysis threshold reached Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	16G7003	100	Slot 1-8
53nF	LRC error Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	16G7003	100	Slot 1-8
56n0	Device error, position n Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	86F0110	100	Slot 1-8
56n1	Bus parity error, device n Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	86F0110 16G6990 86F0843	49 49 02	Slot 1-8 D Slot 1-8
56n2	Communications failure, device n Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	86F0110 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
56n3	Device error, position n Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	86F0110	100	Slot 1-8
56n7	Disk drive missing from disk array internal configuration Perform "Problem Recovery Procedure 7b" in	86F0110 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8

	topic 3.5.18.			
56n9	A disk drive was improperly substituted in the disk array Perform "Problem Recovery Procedure 7b" in topic 3.5.18.			
56nA	Predictive Failure Analysis threshold reached Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	86F0110	100	Slot 1-8
56nB	Predictive Failure Analysis threshold reached Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	86F0110	100	Slot 1-8
56nF	LRC error Perform "Problem Recovery Procedure 7b" in topic 3.5.18.	86F0110	100	Slot 1-8
61n0	Device error, position n Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	16G7002	100	Slot 1-8
61n1	Bus parity error, device n Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	16G7002 16G6990 86F0843	49 49 02	Slot 1-8 D Slot 1-8
61n2	Communications failure, device n Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	16G7002 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
61n3	Device error, position n Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	16G7002	100	Slot 1-8
61n7	Disk drive missing from disk array internal configuration Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	16G7002 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
61n9	A disk drive was improperly substituted in the disk array Perform "Problem Recovery Procedure 7a" in topic 3.5.17.			
61nA	Predictive Failure Analysis threshold reached Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	16G7002	100	Slot 1-8
61nB	Predictive Failure Analysis threshold reached Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	16G7002	100	Slot 1-8
61nF	LRC error	16G7002	100	Slot 1-8

	Perform "Problem Recovery Procedure 7a" in topic 3.5.17.			
63n0	Device error, position n Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	16G7003	100	Slot 1-8
63n1	Bus parity error, device n Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	16G7003 16G6990 86F0843	49 49 02	Slot 1-8 D Slot 1-8
63n2	Communications failure, device n Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	16G7003 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
63n3	Device error, position n Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	16G7003	100	Slot 1-8
63n7	Disk drive missing from disk array internal configuration Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	16G7003 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
63n9	A disk drive was improperly substituted in the disk array Perform "Problem Recovery Procedure 7a" in topic 3.5.17.			
63nA	Predictive Failure Analysis threshold reached Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	16G7003	100	Slot 1-8
63nB	Predictive Failure Analysis threshold reached Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	16G7003	100	Slot 1-8
63nF	LRC error Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	16G7003	100	Slot 1-8
66n0	Device error, position n Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	86F0110	100	Slot 1-8
66n1	Bus parity error, device n Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	86F0110 16G6990 86F0843	49 49 02	Slot 1-8 D Slot 1-8
66n2	Communications failure, device n Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	86F0110 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
66n3	Device error, position n	86F0110	100	Slot 1-8

	Perform "Problem Recovery Procedure 7a" in topic 3.5.17.			
66n7	Disk drive missing from disk array internal configuration Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	86F0110 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
66n9	A disk drive was improperly substituted in the disk array Perform "Problem Recovery Procedure 7a" in topic 3.5.17.			
66nA	Predictive Failure Analysis threshold reached Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	86F0110	100	Slot 1-8
66nB	Predictive Failure Analysis threshold reached Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	86F0110	100	Slot 1-8
66nF	LRC error Perform "Problem Recovery Procedure 7a" in topic 3.5.17.	86F0110	100	Slot 1-8
71n0	Device error, position n	16G7002	100	Slot 1-8
71n1	Bus parity error, device n	16G7002 16G6990 86F0843	49 49 02	Slot 1-8 D Slot 1-8
71n2	Communications failure, device n	16G7002 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
71n3	Device error, position n	16G7002	100	Slot 1-8
71n7	Disk drive missing from disk array internal configuration Perform "Problem Recovery Procedure 4c" in topic 3.5.10.	16G7002 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
71n9	A disk drive was improperly substituted in the disk array Perform "Problem Recovery Procedure 4d" in topic 3.5.11.			
71nA	Predictive Failure Analysis threshold reached	16G7002	100	Slot 1-8
71nB	Predictive Failure Analysis threshold reached	16G7002	100	Slot 1-8
71nC	Command issued to disk drive not supported The system has issued an invalid command to the 9337 disk unit.	16G7002	100	Slot 1-8
71nF	LRC error Perform "Problem Recovery Procedure 6a" in topic 3.5.12.	16G7002	100	Slot 1-8

73n0	Device error, position n	16G7003	100	Slot 1-8
73n1	Bus parity error, device n	16G7003 16G6990 86F0843	49 49 02	Slot 1-8 D Slot 1-8
73n2	Communications failure, device n	16G7003 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
73n3	Device error, position n	16G7003	100	Slot 1-8
73n7	Disk drive missing from disk array internal configuration Perform "Problem Recovery Procedure 4c" in topic 3.5.10.	16G7003 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
73n9	A disk drive was improperly substituted in the disk array Perform "Problem Recovery Procedure 4d" in topic 3.5.11.			
73nA	Predictive Failure Analysis threshold reached	16G7003	100	Slot 1-8
73nB	Predictive Failure Analysis threshold reached	16G7003	100	Slot 1-8
73nC	Command issued to disk drive not supported The system has issued an invalid command to the 9337 disk unit.	16G7003	100	Slot 1-8
73nF	LRC error Perform "Problem Recovery Procedure 6a" in topic 3.5.12.	16G7003	100	Slot 1-8
76n0	Device error, position n	86F0110	100	Slot 1-8
76n1	Bus parity error, device n	86F0110 16G6990 86F0843	49 49 02	Slot 1-8 D Slot 1-8
76n2	Communications failure, device n	86F0110 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
76n3	Device error, position n	86F0110	100	Slot 1-8
76n7	Disk drive missing from disk array internal configuration Perform "Problem Recovery Procedure 4c" in topic 3.5.10.	86F0110 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
76n9	A disk drive was improperly substituted in the disk array Perform "Problem Recovery Procedure 4d" in topic 3.5.11.			
76nA	Predictive Failure Analysis threshold reached	86F0110	100	Slot 1-8
76nB	Predictive Failure Analysis threshold reached	86F0110	100	Slot 1-8
76nC	Command issued to disk drive not supported The system has issued an invalid command to the 9337	86F0110	100	Slot 1-8

	disk unit.			
76nF	LRC error Perform "Problem Recovery Procedure 6a" in topic 3.5.12.	86F0110	100	Slot 1-8
7Fn0	Device error, position n	16G7002 16G7003 86F0110	100	Slot 1-8
7Fn1	Bus parity error, device n	16G7002 16G7003 86F0110 16G6990 86F0843	49 49 02	Slot 1-8 D Slot 1-8
7Fn2	Communications failure, device n	16G7002 16G7003 86F0110 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
7Fn3	Device error, position n	16G7002 16G7003 86F0110	100	Slot 1-8
7Fn9	A disk drive was improperly substituted in the disk array Perform "Problem Recovery Procedure 4d" in topic 3.5.11.			
7FnA	Predictive Failure Analysis threshold reached	16G7002 16G7003 86F0110	100	Slot 1-8
7FnB	Predictive Failure Analysis threshold reached	16G7002 16G7003 86F0110	100	Slot 1-8
7FnC	Command issued to disk drive not supported The system has issued an invalid command to the 9337 disk unit.	16G7002 16G7003 86F0110	100	Slot 1-8
7FnF	LRC error Perform "Problem Recovery Procedure 6a" in topic 3.5.12.	16G7002 16G7003 86F0110	100	Slot 1-8
81n0	Device error, position n	16G7002	100	Slot 1-8
81n1	Bus parity error, device n	16G7002 16G6990 86F0843	49 49 02	Slot 1-8 D Slot 1-8
81n2	Communications failure, device n	16G7002 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
81n3	Device error, position n	16G7002	100	Slot 1-8
81n7	Disk drive missing from disk array internal configuration Perform "Problem Recovery Procedure 4c" in topic 3.5.10.	16G7002 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
81n9	A disk drive was improperly substituted in the disk array Perform "Problem Recovery Procedure 4d" in topic 3.5.11.			

81nA	Predictive Failure Analysis threshold reached	16G7002	100	Slot 1-8
81nB	Predictive Failure Analysis threshold reached	16G7002	100	Slot 1-8
81nC	Command issued to disk drive not supported The system has issued an invalid command to the 9337 disk unit.	16G7002	100	Slot 1-8
81nF	LRC error Perform "Problem Recovery Procedure 6a" in topic 3.5.12.	16G7002	100	Slot 1-8
83n0	Device error, position n	16G7003	100	Slot 1-8
83n1	Bus parity error, device n	16G7003 16G6990 86F0843	49 49 02	Slot 1-8 D Slot 1-8
83n2	Communications failure, device n	16G7003 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
83n3	Device error, position n	16G7003	100	Slot 1-8
83n7	Disk drive missing from disk array internal configuration Perform "Problem Recovery Procedure 4c" in topic 3.5.10.	16G7003 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
83n9	A disk drive was improperly substituted in the disk array Perform "Problem Recovery Procedure 4d" in topic 3.5.11.			
83nA	Predictive Failure Analysis threshold reached	16G7003	100	Slot 1-8
83nB	Predictive Failure Analysis threshold reached	16G7003	100	Slot 1-8
83nC	Command issued to disk drive not supported The system has issued an invalid command to the 9337 disk unit.	16G7003	100	Slot 1-8
83nF	LRC error Perform "Problem Recovery Procedure 6a" in topic 3.5.12.	16G7003	100	Slot 1-8
86n0	Device error, position n	86F0110	100	Slot 1-8
86n1	Bus parity error, device n	86F0110 16G6990 86F0843	49 49 02	Slot 1-8 D Slot 1-8
86n2	Communications failure, device n	86F0110 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
86n3	Device error, position n	86F0110	100	Slot 1-8
86n7	Disk drive missing from disk array internal configuration Perform "Problem Recovery Procedure 4c" in topic 3.5.10.	86F0110 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8

86n9	A disk drive was improperly substituted in the disk array Perform "Problem Recovery Procedure 4d" in topic 3.5.11.			
86nA	Predictive Failure Analysis threshold reached	86F0110	100	Slot 1-8
86nB	Predictive Failure Analysis threshold reached	86F0110	100	Slot 1-8
86nC	Command issued to disk drive not supported The system has issued an invalid command to the 9337 disk unit.	86F0110	100	Slot 1-8
86nF	LRC error Perform "Problem Recovery Procedure 6a" in topic 3.5.12.	86F0110	100	Slot 1-8
8Fn0	Device error, position n	16G7002 16G7003 86F0110	100	Slot 1-8
8Fn1	Bus parity error, device n	16G7002 16G7003 86F0110 16G6990 86F0843	49 49 02	Slot 1-8 D Slot 1-8
8Fn2	Communications failure, device n	16G7002 16G7003 86F0110 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
8Fn3	Device error, position n	16G7002 16G7003 86F0110	100	Slot 1-8
8Fn9	A disk drive was improperly substituted in the disk array Perform "Problem Recovery Procedure 4d" in topic 3.5.11.			
8FnA	Predictive Failure Analysis threshold reached	16G7002 16G7003 86F0110	100	Slot 1-8
8FnB	Predictive Failure Analysis threshold reached	16G7002 16G7003 86F0110	100	Slot 1-8
8FnC	Command issued to disk drive not supported The system has issued an invalid command to the 9337 disk unit.	16G7002 16G7003 86F0110	100	Slot 1-8
8FnF	LRC error Perform "Problem Recovery Procedure 6a" in topic 3.5.12.	16G7002 16G7003 86F0110	100	Slot 1-8
90FF	Disk unit offline To isolate the problem, see "Analyzing No-Response Problems" in topic 1.4.			
91n0	Device error, position n	73F8994 16G7002	100	Slot 1-8

	Perform "Problem Recovery Procedure 4a" in topic 3.5.8.			
91n1	Bus parity error, device n	73F8994 16G7002	49	Slot 1-8
	Perform "Problem Recovery Procedure 4a" in topic 3.5.8.	16G6990 86F0843	49 02	D Slot 1-8
91n2	Communications failure, device n	73F8994 16G7002	48	Slot 1-8
	Perform "Problem Recovery Procedure 4a" in topic 3.5.8.	16G6990 86F0843 85F7839	48 02 02	D Slot 1-8 Slot 1-8
91n3	Device error, position n Perform "Problem Recovery Procedure 4a" in topic 3.5.8.	73F8994 16G7002	100	Slot 1-8
91n7	Disk drive missing from disk array internal configuration Perform "Problem Recovery Procedure 4a" in topic 3.5.8.	16G7002 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
91nA	Predictive Failure Analysis threshold reached Perform "Problem Recovery Procedure 4b" in topic 3.5.9.	16G7002	100	Slot 1-8
91nB	Predictive Failure Analysis threshold reached Perform "Problem Recovery Procedure 4b" in topic 3.5.9.	16G7002	100	Slot 1-8
91nF	LRC error Perform "Problem Recovery Procedure 4a" in topic 3.5.8.	16G7002	100	Slot 1-8
93n0	Device error, position n Perform "Problem Recovery Procedure 4a" in topic 3.5.8.	55F5000 16G7003	100	Slot 1-8
93n1	Bus parity error, device n	55F5000 16G7003	49	Slot 1-8
	Perform "Problem Recovery Procedure 4a" in topic 3.5.8.	16G6990 86F0843	49 02	D Slot 1-8
93n2	Communications failure, device n	55F5000 16G7003	48	Slot 1-8
	Perform "Problem Recovery Procedure 4a" in topic 3.5.8.	16G6990 86F0843 85F7839	48 02 02	D Slot 1-8 Slot 1-8
93n3	Device error, position n Perform "Problem Recovery Procedure 4a" in topic 3.5.8.	55F5000 16G7003	100	Slot 1-8
93n7	Disk drive missing from disk array internal configuration Perform "Problem Recovery Procedure 4a" in topic 3.5.8.	16G7003 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
93nA	Predictive Failure Analysis threshold reached Perform "Problem Recovery Procedure 4b" in topic 3.5.9.	16G7003	100	Slot 1-8
93nB	Predictive Failure Analysis threshold reached Perform "Problem Recovery Procedure 4b" in topic 3.5.9.	16G7003	100	Slot 1-8
93nF	LRC error Perform "Problem Recovery	16G7003	100	

	Procedure 4a" in topic 3.5.8.			
96n0	Device error, position n Perform "Problem Recovery Procedure 4a" in topic 3.5.8.	86F0110 86F0110	100	Slot 1-8
96n1	Bus parity error, device n Perform "Problem Recovery Procedure 4a" in topic 3.5.8.	86F0110 86F0110 16G6990 86F0843	49 49 02	Slot 1-8 D Slot 1-8
96n2	Communications failure, device n Perform "Problem Recovery Procedure 4a" in topic 3.5.8.	86F0110 86F0110 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
96n3	Device error, position n Perform "Problem Recovery Procedure 4a" in topic 3.5.8.	86F0110 86F0110	100	Slot 1-8
96n7	Disk drive missing from disk array internal configuration Perform "Problem Recovery Procedure 4a" in topic 3.5.8.	86F0110 16G6990 86F0843 85F7839	48 48 02 02	Slot 1-8 D Slot 1-8 Slot 1-8
96nA	Predictive Failure Analysis threshold reached Perform "Problem Recovery Procedure 4b" in topic 3.5.9.	86F0110	100	Slot 1-8
96nB	Predictive Failure Analysis threshold reached	86F0110	100	Slot 1-8
96nF	LRC error Perform "Problem Recovery Procedure 4a" in topic 3.5.8.	86F0110	100	Slot 1-8
C010	Data error, sector reassignment required Perform "Problem Recovery Procedure 1c" in topic 3.5.1.	16G7002 16G7003 86F0110	100	Slot 1
C01C	Disk unit,load Licensed Internal Code Perform "Problem Recovery Procedure 2" in topic 3.5.2.			
C020	Data error, sector reassignment required Perform "Problem Recovery Procedure 1c" in topic 3.5.1.	16G7002 16G7003 86F0110	100	Slot 2
C02C	Disk unit,load Licensed Internal Code Perform "Problem Recovery Procedure 2" in topic 3.5.2.			
C030	Data error, sector reassignment required Perform "Problem Recovery Procedure 1c" in topic 3.5.1.	16G7002 16G7003 86F0110	100	Slot 3
C03C	Disk unit,load Licensed Internal Code Perform "Problem Recovery Procedure 2" in topic 3.5.2.			
C040	Data error, sector reassignment required Perform "Problem Recovery Procedure 1c" in topic 3.5.1.	16G7002 16G7003 86F0110	100	Slot 4

C04C	Disk unit,load Licensed Internal Code Perform "Problem Recovery Procedure 2" in topic 3.5.2.			
C050	Data error, sector reassignment required Perform "Problem Recovery Procedure 1c" in topic 3.5.1.	16G7002 16G7003 86F0110	100	Slot 5
C05C	Disk unit,load Licensed Internal Code Perform "Problem Recovery Procedure 2" in topic 3.5.2.			
C060	Data error, sector reassignment required Perform "Problem Recovery Procedure 1c" in topic 3.5.1.	16G7002 16G7003 86F0110	100	Slot 6
C06C	Disk unit,load Licensed Internal Code Perform "Problem Recovery Procedure 2" in topic 3.5.2.			
C070	Data error, sector reassignment required Perform "Problem Recovery Procedure 1c" in topic 3.5.1.	16G7002 16G7003 86F0110	100	Slot 7
C07C	Disk unit,load Licensed Internal Code Perform "Problem Recovery Procedure 2" in topic 3.5.2.			
C080	Data error, sector reassignment required Perform "Problem Recovery Procedure 1c" in topic 3.5.1.	16G7002 16G7003 86F0110	100	Slot 8
C08C	Disk unit,load Licensed Internal Code Perform "Problem Recovery Procedure 2" in topic 3.5.2.			
C0DC	Disk unit, load Licensed Internal Code Perform "Problem Recovery Procedure 2" in topic 3.5.2.			
C9n7	LRC error Perform "Problem Recovery Procedure 6e" in topic 3.5.15.	16G7002 16G7003 86F0110 16G6990 85F7839	100	Slot 1-8 D Slot 1-8
C900	Operator panel assembly failure	17G2012	100	9
C901	Fan 1 failure	85F7862 74F2525 16G6990 85F7732	97 01 01 01	F1 A,B,C D F
C902	Fan 2 failure	85F7862 74F2525 16G6990 85F7732	96 02 01 01	F2 A,B,C D F
C903	Fan sense logic failure	16G6990 74F2525 85F7732	96 02 02	D A,B,C F

C908	Communications failure with all power modules	17G2012 85F7732 74F2525	96 02 02	9 F A,B,C
C909	Controller card	16G6990 17G2012 85F7732	49 49 02	D 9 F
C90A	Communications failure with a single power module	74F2525 17G2012 85F7732 16G6990	90 08 01 01	A 9 F D
C90B	Communications failure with a single power module	74F2525 17G2012 85F7732 16G6990	90 08 01 01	B 9 F D
C90C	Communications failure with a single power module	74F2525 17G2012 85F7732 16G6990	90 08 01 01	C 9 F D
C90D	IOP card, Licensed Internal Code stopped	16G6990 17G2012 85F7732	59 39 02	D 9 F
C990	Power supply failed	17G2012 74F2525 85F7732	59 39 02	9 A,B,C F
C991	Current more than limit, 5-volt supply	74F2525 16G6990 16G7002 16G7003 86F0110 85F7732 85F7839	40 29 29 01 01	A,B,C D Slot 1-8 Slot 1-8 Slot 1-8 F 1-8
C992	Current more than limit, 12-volt supply	16G7002 16G7003 86F0110 74F2525 85F7862 85F7862 85F7839 85F7732	46 40 05 05 02 02	Slot 1-8 Slot 1-8 Slot 1-8 A,B,C F1 F2 1-8 F
C9A0	A single power module failed	74F2525 17G2012 85F7732	98 01 01	A 9 F
C9A1	+5 volt over-current condition on a single power module	74F2525 17G2012 85F7732	98 01 01	A 9 F
C9A2	+12 volt over-current condition on a single power module	74F2525 17G2012 85F7732	98 01 01	A 9 F
C9A3	A single power envelope has failed in a power module	74F2525 17G2012 85F7732	98 01 01	A 9 F
C9AA	Communications failure with a single power module	74F2525 17G2012 85F7732	90 09 01	A 9 F
C9B0	A single power module failed	74F2525 17G2012 85F7752	98 01 01	B 9 F
C9B1	+5 volt over-current condition on a single power module	74F2525 17G2012 85F7732	98 01 01	B 9 F
C9B2	+12 volt over-current condition on a single power module	74F2525 17G2012 85F7732	98 01 01	B 9 F
C9B3	A single power envelope has failed in a power module	74F2525 17G2012 85F7732	98 01 01	B 9 F

C9BB	Communications failure with a single power module	74F2525 17G2012 85F7732	90 09 01	B 9 F
C9C0	A single power module failed	74F2525 17G2012 85F7732	98 01 01	C 9 F
C9C1	+5 volt over-current condition on a single power module	74F2525 17G2012 85F7732	98 01 01	C 9 F
C9C2	+12 volt over-current condition on a single power module	74F2525 17G2012 85F7732	98 01 01	C 9 F
C9C3	A single power envelope has failed in a power module	74F2525 17G2012 85F7732	98 01 01	C 9 F
C9CC	Communications failure with a single power module	74F2525 17G2012 85F7732	90 09 01	C 9 F
C9D0	Controller card	16G6990 17G2012 85F7732	49 49 02	D 9 F
C9D1	Controller card	16G6990	100	D
C9D2	Controller card	16G6990	100	D
C9D3	Controller card	16G6990	100	D
C9D4	Controller card	16G6990	100	D
C9D5	Controller card	16G6990	100	D
C9D6	Controller card	16G6990	100	D
C9D7	LRC error Perform "Problem Recovery Procedure 6c" in topic 3.5.13.	16G6990 16G7002 16G7003 86F0110 86F0843	100 100 100	D Slot 1-8 Slot 1-8 Slot 1-8 Slot 1-8
C9D8	LRC error Perform "Problem Recovery Procedure 6d" in topic 3.5.14.	16G6990	100	D
C9DA	Controller card	16G6990	100	D
C9DB	Controller card	16G6990	100	D
C9DC	Controller card	16G6990	100	D
C9DD	Controller card	16G6990	100	D
C9DE	Controller card	16G6990	100	D
C9DF	Controller card	16G6990 86F0927 21F9046 56F0383 85F7732	60 37 01 01 01	D J1 J2 F
CE00	Extra disk drives are installed in the disk array Perform "Problem Recovery Procedure 3a" in topic 3.5.3.			
CE10	Disk array internal configuration error Perform "Problem Recovery Procedure 3b" in topic 3.5.4.			
CE27	Disk drive missing from disk array internal configuration Perform "Problem Recovery			

	Procedure 3c" in topic 3.5.5.			
CE29	A disk drive was improperly substituted in the disk array Perform "Problem Recovery Procedure 3d" in topic 3.5.6.			
CE2D	Configuration error, minimum configuration assumed Perform "Problem Recovery Procedure 3e" in topic 3.5.7.			

3.3 Failing Item Table

Failing Item	Description	Document Description
AJEFAD00	Disk unit Licensed Internal Code	Call your next level of support for assistance
16G6990	Controller Card	See "Controller Card" in topic 4.5.8.
16G7002	Disk drive assembly (Model 001)	See "Disk Drive" in topic 4.5.1.
16G7003	Disk drive assembly (Model 004)	See "Disk Drive" in topic 4.5.1.
17G2012	Control panel assembly	See "Control Panel" in topic 4.5.9.
21F9046	Cable assembly (1.5 meters/5.0 feet)	See "Cable Assembly" in topic 4.5.15.
55F5000	Disk drive logic card (Model 004)	See "Disk Drive Logic Card" in topic 4.5.2.
56F0383	Terminating plug	See "Terminating Plug" in topic 4.5.13.
73F8994	Disk drive logic card (Model 001)	See "Disk Drive Logic Card" in topic 4.5.2.
74F2525	Power module	See "Power Module" in topic 4.5.5.
85F7732	Connector panel	See "Connector Panel" in topic 4.5.11.
85F7839	Disk drive power cable	See "Disk Drive Power Cable" in topic 4.5.4.
85F7845	AC Power cable filter	See "AC Power Cable" in topic 4.5.14.
85F7862	Fan	See "Fan" in topic 4.5.10.
86F0927	3514/A Array Adapter	See "Adapter Card" in topic 4.5.16.
86F0110	Disk drive logic card (Model 008)	See "Disk Drive Logic Card" in topic 4.5.2.
86F0843	Disk drive data cable	See "Disk Drive Data Cable" in topic 4.5.3.
86F0921	Disk drive assembly (Model 008)	See "Disk Drive" in topic 4.5.1.

3.4 Control Panel Command Return Code Information

Return codes are displayed to right of the command when an error is found.

For example:

You want to switch off power to disk drive 6. After entering the command: 6 2 0 6 PICTURE 71, the following error code (E6) is displayed:

```
+-----------------+
¦ 6 2 0 6   E 6   ¦  This command cannot be performed.
+-----------------+  This drive is not present or not in the configuration.
  1 2 3 4 5 6 7 8
```

The following table shows the possible return codes that are logged when an error is found while processing a command.

Return Code	**Description**
D0	**Command completed OK but drive format is needed.** The disk drive accessed by this command is not formatted to 516 bytes per sector. Using the control panel, enter the command to format the disk drive (see command **6 2 2 n** under Appendix A, "Support Tools"). **Note:** The service command for exchanging a disk drive, described in Chapter 4, "Service Procedures" in topic 4.0, automatically formats the disk drive if it is needed.
D1	**Command completed but an error was detected; check the URC log.** If the Unit Attention light is off, the problem that was performed corrected the failure and no more action is necessary. If the Unit Attention light is on, find the first error in the URC log (see "Using the 3514 Unit Reference Code (URC) Error Log" in topic 2.6). Then, go to the "Unit Reference Code Table" in topic 3.2.
D9	**Command cannot be performed; a disk drive is not active, or a data rebuild or parity resynchronization is in progress.** If a disk drive is broken, it must be exchanged before this command can be performed. If a disk drive is powered off, it must be reset before this command can be performed. If a data rebuild or parity resynchronization is in progress, the function must end before this command can be performed.
DD	**Disk drive capacity is not large enough to include in array.** The disk drive does not have a large enough capacity or could not be formatted to the correct block size to be included in the array. A different disk drive must be used.
DE	**Drive error was reported after the command was started; check the URC log.** This command did not run because of a disk drive error. Find the first error in the URC log (see "Using the 3514 Unit Reference Code (URC) Error Log"). Then, go to the "Unit Reference Code Table" in topic 3.2 to solve the problem. Repeat this command after the problem has been fixed.
DF	**FORMAT command to a disk drive failed.** Install a new disk drive and repeat the procedure from the step that called out this command.
E1	**Command cannot be performed, this disk drive is powered off.** Switch the power on to this disk drive (see command **6 2 9 n** under Appendix A, "Support Tools") and repeat the command.
E2	**Command cannot be performed, this disk drive is configured and active.** This command cannot be performed on a disk drive while it is active. **Data on this disk drive will be damaged.**

	For this command to be used, the disk drive must be deleted from the 3514 configuration. **Note:** This command may have been intended for a disk drive in a different slot. Verify the slot number and repeat the command if needed.
E3	**Command cannot be performed, this disk drive is broken.**
E4	**Command cannot be performed, this disk drive needs to be formatted.** Format this drive and repeat the command that caused this error (see command **6 2 7 n** under Appendix A, "Support Tools").
E5	**Command cannot be performed, this disk drive is not being tested.** **Note:** This command may have been intended for a disk drive in a different slot. Verify the slot number and repeat the command if needed.
E6	**Command cannot be performed, this drive is not present or not in the configuration record.** **Note:** This command may have been intended for a disk drive in a different slot. Verify the slot number and repeat the command if needed.
E8	**Command cannot be performed, the 3514 must be offline.** See command **9 1 7 0** in Appendix A, "Support Tools." **Note:** Setting the 3514 offline may cause the loss of system availability.
E9	**Command not valid.**
EA	**A parity resynchronization is in progress and a second disk drive has failed.** Find the most recent URC in the URC log (see "Using the 3514 Unit Reference Code (URC) Error Log" in topic 2.6). Go to "Unit Reference Code Table" in topic 3.2.
EB	**Command not valid for this model**
EE	**User stopped the command**
EF	**Password entry is not correct** Repeat the command and enter the correct password.
F0	**Command cannot be performed, no disk drive was selected.** See the service procedures in Chapter 4, "Service Procedures" in topic 4.0 for a description of how to use this procedure.
F1	**Command cannot be performed, a disk drive is broken.** A disk drive other than the one accessed by this command is broken. Use command **0 2** under "Quick Status Commands" in topic 2.5.1 to find the slot number of the broken disk drive. Use the following procedure to repair the disk drive: 1. Perform the procedure "Reset Disk Drive" in topic 4.5.7. 2. Perform the exchange procedure "Disk Drive" in topic 4.5.1. Repeat the command.
F2	**Command cannot be performed, a power module is broken.** Find the location of the broken power module using command **0 3** under "Quick Status Commands" in topic 2.5.1. Exchange the broken power module using the exchange procedure "Power Module" in topic 4.5.5. Repeat the command.
F3	**Command cannot be performed, a disk drive is powered off.** A disk drive other than the one accessed by this command is switched off. The other disk drive must be exchanged. See "Reset Disk Drive" in topic 4.5.7 or "Disk Drive" in

	topic 4.5.1. If a double disk drive failure exits, the 3514 must be set offline before the command is repeated. The problem recovery procedure that you came from should have instructed you to set the unit offline before this command was performed. Return to the problem recovery procedure that sent you here and follow the instructions to set the unit offline, then repeat the command.
F4	**Command cannot be performed, a power module is switched off.** Find the location of the power module that has been switched off using the command **0 3** under "Quick Status Commands" in topic 2.5.1. Exchange the power module using command **4 3 9 x** as described in "Power Module" in topic 4.5.5. If the **0 3** command displays an **x** in the position that was being exchanged by the **4 3 9 x** command, see return code F5. Repeat the command.
F5	**Power module cannot be found.** **Note:** For this return code only, seat the power module with power on. Do not switch off power to the 3514 or power module. Reseat the power module and repeat the command, or swap it with a new power module and repeat the command.
F5	**Power module cannot be found.** Reseat the power module and repeat the command, or install a new power module and repeat the command.
F6	**Command cannot be performed, a drive format is in progress.** Repeat the command after the format is complete. **Note:** The format can take up to 40 minutes to complete.
F7	**Command cannot be performed, a data reallocation is in progress.** Repeat the command after the data reallocation is complete. **Note:** The data reallocation can take up to 40 minutes to complete.
F8	**Command cannot be performed, a data rebuild is in progress.** Repeat the command after the data rebuild is complete. **Note:** The data rebuild can take up to 40 minutes to complete.
F9	**Command cannot be performed, a data resynchronization is in progress.** Repeat the command after the data resynchronization is complete. **Note:** The data resynchronization can take up to 40 minutes to complete.
FB	**Disk drive not in the configuration record.** This command cannot be performed when disk drives are present that are not in the 3514 configuration.
FC	**Wrong disk drive was selected to be exchanged when multiple disk drives are broken.** The other failing disk drive must be exchanged first.
FD	**A data rebuild is in progress and a second disk drive has failed.** Find the most recent URC in the URC log (see "Using the 3514 Unit Reference Code (URC) Error Log" in topic 2.6). Go to "Unit Reference Code Table" in topic 3.2.
FE	**Command cannot be performed with multiple broken drives; the 3514 is protected and online** Find the most recent URC in the URC log (see "Using the 3514 Unit Reference Code (URC) Error Log" in topic 2.6). Go to Chapter 1, "Always Start Here" in topic 1.0.

FF	**Power has failed to switch off a power module.**

3.5 Problem Recovery Procedures

Use the following problem recovery procedures to restore the 3514 and the system to an operating condition that permits the customer to run jobs.

Subtopics

3.5.1 Problem Recovery Procedure 1c

Description: Customer data has been damaged. An unrecoverable data error has occurred. A sector assignment required.

Warning: Do not attempt to save data from any disk drive in the failing 3514.

To correct this problem, perform the following:

1. Is this the second time in 1 week that data errors have caused damaged data on the same disk drive?

No **Yes**

□ Go to step 11

2. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

3. Find and record the serial number of the failing disk drive.
S/N _ _ _ _ _ _ _

Using the control panel, enter the following sequence in which *n* is the slot number for the failing disk drive indicated by the third character (n) of the URC.

1 2 2 n PICTURE 72

The following is an example of a disk drive serial number:

```
+-----------------+
¦ 0 1 9 0 0 6 4 5 ¦ This disk drive should
+-----------------+ be serial number 1900645
  1 2 3 4 5 6 7 8
```

4. Enter the command to switch off power to the failing disk drive.

Using the control panel, enter the following sequence in which *n* is the slot number for the failing disk drive indicated by the third character (n) of the URC.

6 2 0 n PICTURE 73

Wait until the command is completed.

5. Enter the command to switch on power to the failing disk drive.

Using the control panel, enter the following sequence in which *n* is the slot number for the failing disk drive indicated by the third character (n) of the URC.

6 2 9 n PICTURE 74

Wait until the command is completed.

6. Enter the command to format the failing disk drive.

a. Using the control panel, enter the following sequence in which *n* is the slot number for the failing disk drive indicated by the third character (n) of the URC.

6 2 7 n PICTURE 75

The Data display shows:

```
+-----------------+
¦ > - - - - - - < ¦
+-----------------+
  1 2 3 4 5 6 7 8
```

b. Using the control panel, enter the following sequence in which *s s s* are the last 3 characters in the serial number of the failing disk drive indicated by the third character (n) of the URC.

8 2 0 s s s PICTURE 76

This command can take up to 40 minutes to complete.

7. Begin the Exchange Disk Drive command from the control panel:

Note: The Exchange Disk Drive command will do the reset function.

a. Using the control panel, enter the following sequence where *n* is the location number of the disk drive:

   4 2 9 n PICTURE 77

b. The control panel will display a disk drive configuration with the slot number of the drive to be reset indicated by a solid block.

   Example:

```
+-----------------+
¦ 1 2 3 _ ¦ _ 7 _ ¦  Indicates the disk
+-----------------+  in slot 5 is to
  1 2 3 4 5 6 7 8     be reset
```

   Note: If an X is displayed in another position and you are not repairing a double disk drive failure, the exchange command may have been issued to the wrong disk drive. Verify that the slot number at the disk drive being reset was not determined from the direct select address reported by the system.

c. If the 3514 detects an error during the 4 2 9 n command, a return code is displayed.

   To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 2 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

   Note: A return code of DE may indicate an address jumper or cable is not installed correctly.

8. Complete the Exchange Disk Drive command by entering the following sequence on the control panel:

a. 9 PICTURE 78

   Note: This command can take up to 80 minutes to complete. Data on this disk drive will be built again.

b. As the command processes, the display indicates the percent completed.

c. When the operation ends without error, a quick status of the disk drives is displayed.

   Example:

```
+-----------------+
¦ 1 2 3 _ 5 _ 7 _ ¦  Indicates the disk
+-----------------+  configuration
  1 2 3 4 5 6 7 8
```

d. If the 3514 detects an error during the 4 2 9 n command, a return code is displayed.

   To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 2 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

   Note: A return code of DE may indicate an address jumper or cable is not installed correctly.

e. Press the * (Home) key to clear the display and return it to ready status (*000).

   Warning: Do not continue with step 9 until the exchange is complete.

9. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

10. The data on the 3514 must be recovered using the latest backup data available. See your system unit and operating system manuals for instructions.

Do not attempt to save data from the failing 3514.

End of procedure.

11. Using the exchange procedure "Disk Drive" in topic 4.5.1, exchange the failing disk drive. Then return to step 12 in this procedure.

12. The data on the 3514 must be recovered using the latest backup data available. See your system unit and operating system manuals for instructions.

Do not attempt to save data from the failing 3514.

End of procedure.

3.5.2 Problem Recovery Procedure 2

Description:

Licensed Internal Code load must be loaded on the 3514

To complete the problem recovery, see the *3514 Quick Reference Manual*, SA21-9613 for information on how to load Licensed Internal Code on the 3514.

End of procedure.

3.5.3 Problem Recovery Procedure 3a

Subtopics
3.5.3.1 URC CE00

3.5.3.1 URC CE00

Extra disk drives are present: At least 1 disk drive was detected in a slot that should be empty. All disk drives recorded in the *device location record* (configuration) are present.

To determine which installed disk drives are extra, perform the following:

1. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

2. Using the control panel, enter the following sequence to display the quick status of the disk drives:

0 2

Compare the disk drives in the 3514 with the disk drives shown in the Data display. The extra disk drives will be in the slots indicated by an underline (_) in the Data display. Other characters indicate that the disk drive is in the 3514 configuration and cannot be removed.

The example indicates that slot 6 is not configured. If it contains a disk drive, it is reported as an extra disk drive and can be removed.

Example:

```
+-----------------+
¦ 1 2 3 4 5 _ 7 8 |
+-----------------+
  1 2 3 4 5 6 7 8
```

3. Do you want to add the extra disk drives to the 3514?

Yes No

□ Go to step 5.

4. Warning: Data on the extra disk drives will be destroyed.

Go to "Installing Additional Disk Drive Features" in topic 5.1.

End of procedure.

5. Warning: Before you proceed, use the ESD handling kit, IBM part 6428316 or similar.

Loosen the screw 1 and place the control panel in the service position.

PICTURE 79

6. Remove the front EMC shield.

PICTURE 80

7. Disconnect the following cables from the disk drives to be removed.

Note: If the data cable is attached to another disk drive, hold this connector in place with one hand while disconnecting the other connector from the disk drive to be removed.

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 81

8. Remove the disk drives from the slots (slot 3 shown as an example).

PICTURE 82

9. Insert the airflow blocking plate into the 3514 (slot 3 shown as an example).

PICTURE 83

10. Attach the following cables to the airflow blocking plate cable retainers:

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 84

11. Attach the front EMC shield.

Note: Engage both thumbscrews before you tighten either screw.

PICTURE 85

12. Restore the control panel to operating position and tighten screw 1 :

PICTURE 86

13. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

End of procedure.

3.5.4 Problem Recovery Procedure 3b

Subtopics
3.5.4.1 URC CE10

3.5.4.1 URC CE10

Disk drives are swapped: Some disk drives recorded in the *device location record* (configuration) are in the wrong slot. All disk drives recorded in the *device location record* are present. The 3514 does not respond to the host system.

To correct this error, perform the following:

1. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

2. Using the control panel, determine the serial number of the disk drive recorded in the *device location record* (configuration) that should be in each slot.

3. To do this function, enter the following sequence in which *n* is the disk drive slot number:

1 2 2 n PICTURE 87

The following is an example of a disk drive serial number:

Example:

```
+-----------------+
¦ 0 1 9 0 0 6 4 5 ¦ This disk drive should
+-----------------+ be serial number 1900645
  1 2 3 4 5 6 7 8
```

4. Record the serial number in the following chart:

Slot Number	**Serial Number**
1	_____
2	_____
3	_____
4	_____
5	_____
6	_____
7	_____
8	_____

5. Repeat steps 3 and 4 for all eight slots.

6. Set the Power switch to the Off position.

7. Loosen the screw 1 and place the control panel in the service position.

PICTURE 88

8. Remove the front EMC shield.

PICTURE 89

9. Disconnect the following cables from the disk drives to be removed.

Note: If the data cable is attached to another disk drive, hold this connector in place with one hand while disconnecting the other connector from the disk drive to be removed.

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 90

10. Remove the disk drives from the slots (slot 3 shown as an example).

PICTURE 91

11. Check each disk drive serial number (printed on a label on top of the

disk drive).

PICTURE 92

12. If the serial number on the disk drive does not match the serial number recorded in step 4, it is in the wrong slot. Move each disk drive to the correct slot for that serial number.

Note: Ensure that each disk drive is connected to the correct power cable and signal cable. Also, ensure that the address jumper is installed in the position shown and is only installed on disk drives in odd-numbered slots (1, 3, 5, or 7).

PICTURE 93

13. Set the Power switch to the On position.

14. After 3 minutes, is *000, B000, or BBA0 displayed on the Data display?

Yes No

□ Go to "Starting Problem Analysis" in topic 1.2.

15. From your computer system, run the diagnostic test programs for the 3514/A Array Adapter. (See the *3514 Quick Reference Manual* SA21-9613 for instructions on running diagnostics.)

Did the test programs run without error?

Yes No

□ Go to "Starting Problem Analysis" in topic 1.2.

16. Is *000 displayed on the Data display?

Yes No

□ Go to "Starting Problem Analysis" in topic 1.2.

End of procedure.

3.5.5 Problem Recovery Procedure 3c

Subtopics
3.5.5.1 URC CE27

3.5.5.1 URC CE27

More than one disk drive is missing: The 3514 does not respond to selection.

The 3514 cannot find a disk drive recorded in the *device location record* (configuration) in any slot of the 3514.

Warning: The original disk drive needs to be found or the data on the 3514 will be damaged.

To correct this error, perform the following:

1. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

2. Using the control panel, determine the serial number of the disk drive recorded in the *device location record* (configuration).

3. To do this function, enter the following sequence in which *n* is the disk drive slot number:

1 2 2 n PICTURE 94

The following is an example of a disk drive serial number:

Example:

```
+-----------------+
¦ 0 1 9 0 0 6 4 5 ¦ This disk drive should
+-----------------+ be serial number 1900645
  1 2 3 4 5 6 7 8
```

4. Record the serial number in the following chart:

Slot Number	**Serial Number**
1	_____
2	_____
3	_____
4	_____
5	_____
6	_____
7	_____
8	_____

5. Repeat steps 3 and 4 for all eight slots.

6. Set the Power switch to the Off position.

7. Loosen the screw 1 and place the control panel in the service position.

PICTURE 95

8. Remove the front EMC shield.

PICTURE 96

9. Disconnect the following cables from the disk drives to be removed.

Note: If the data cable is attached to another disk drive, hold this connector in place with one hand while disconnecting the other connector from the disk drive to be removed.

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 97

10. Remove the disk drives from the slots (slot 3 shown as an example).

PICTURE 98

11. Verify that each disk drive serial number matches those recorded in step 4.

Are all disk drives present in their correct slots?

Yes **No**

□ Go to step 18.

12. Check the following parts for correct installation:

□ Address jumpers are installed and fully seated in the position shown and are only installed on disk drives in odd-numbered slots (1, 3, 5, or 7).

PICTURE 99

□ Power cables to the disk drives are correctly installed and not swapped (cable must be fully seated).
□ Data cables are correctly installed and connected (cable must be fully seated).

13. Set the Power switch to the On position.

14. After 3 minutes, does the error code 3514CE27 still appear in the Data display?

No **Yes**

□ Set the 3514 Power switch to the Off position.

Note: Start each procedure with the 3514 Power switch in the Off position one at a time until your problem is corrected.

Exchange the following FRUs:

CAUTION:
The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries. *(RSFTC228)*

Location	**Description**
1-8	Data cables for disk drives indicated as missing
D	Controller card (see Caution notice)
F	Connector panel
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

End of procedure.

15. After 3 minutes, is *000, B000, or BBA0 displayed on the Data display?

Yes **No**

□ Go to "Starting Problem Analysis" in topic 1.2.

16. From your computer system, run the diagnostic test programs for the 3514/A Array Adapter. (See the *3514 Quick Reference Manual* SA21-9613 for instructions on running diagnostics.)

Did the test programs run without error?

Yes **No**

□ Go to "Starting Problem Analysis" in topic 1.2.

17. Is *000 displayed on the Data display?

Yes No

□ Go to "Starting Problem Analysis" in topic 1.2.

End of procedure.

18. For those slots that have a serial number indicated in step 4 but do not have a disk drive present, perform the following:

Can the disk drives with the serial numbers recorded in step 4 be found?

Yes No

□ Go to step 24.

19. Warning: If these disk drives have been installed in another device or system, data corruption may be present. Go to step 24 if you are not sure about the data integrity of the disk drives.

Install the disk drives in the slots that match the serial numbers recorded in step 4.

Note: Ensure that each disk drive is connected to the correct power cable and signal cable. Also, ensure that the address jumper is installed in the position shown and is only installed on disk drives in odd-numbered slots (1, 3, 5, or 7).

20. Set the Power switch to the On position.

21. After 3 minutes, is *000, B000, or BBA0 displayed on the Data display?

Yes No

□ Go to "Starting Problem Analysis" in topic 1.2.

22. From your computer system, run the diagnostic test programs for the 3514/A Array Adapter. (See the *3514 Quick Reference Manual* SA21-9613 for instructions on running diagnostics.)

Did the test programs run without error?

Yes No

□ Go to "Starting Problem Analysis" in topic 1.2.

23. Is *000 displayed on the Data display?

Yes No

□ Go to "Starting Problem Analysis" in topic 1.2.

End of procedure.

24. Can all the disk drives recorded in step 4 except one be found?

No Yes

□ Go to step 29.

25. Set the Power switch to the On position.

After 3 minutes, 3514CE27 will be displayed.

26. Using the control panel, set the 3514 offline by entering the following sequence:

9 1 7 0 PICTURE 100

A display of 90FF indicates that the 3514 is offline.

27. Exchange the disk drives using the exchange procedure "Disk Drive" in topic 4.5.1.

28. Using the control panel, set the 3514 online by entering the following sequence:

9 0 7 9 PICTURE 101

End of procedure.

29. Insert each disk drive, except the one which could not be found, in the slot recorded in step 4.

Attach the disk drive power and data cables.

Warning: If these disk drives have been installed in another device or system, data corruption may be present. Go to step 24 in topic 3.5.6.1 if you are not sure about the data integrity of the disk drives.

Note: Ensure that each disk drive is connected to the correct power cable and signal cable. Also, ensure that the address jumper is installed in the position shown and is only installed on disk drives in odd-numbered slots (1, 3, 5, or 7).

PICTURE 102

30. Insert a new disk drive in the slot for which the disk drive could not be found.

Attach the disk drive power and data cables.

31. Set the Power switch to the On position.

32. After 3 minutes, a URC should be displayed on the 3514 control panel?

Is 35147xx7 or 35148xx7 displayed on the 3514 control panel?

Yes No

□ Go to "Starting Problem Analysis" in topic 1.2.

33. Install the new disk drive. Use "Reset Disk Drive" in topic 4.5.7 with the slot number of the new disk drive.

This will make the new disk drive part of the 3514 configuration and will rebuild the data on it.

End of procedure.

3.5.6 Problem Recovery Procedure 3d

Subtopics
3.5.6.1 URC CE29

3.5.6.1 URC CE29

More than one new disk drive is present: The 3514 does not respond to selection.

For more than one slot, the disk drive serial number detected is not the one recorded in the *device location record* (configuration) for that slot and the serial number expected is not installed in the 3514.

Warning: The original disk drives must be found or the data on the 3514 will be damaged.

To correct this error, perform the following:

1. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

2. Determine the serial number of each disk drive recorded in the *device location record* (configuration) that should be in each slot.

3. Using the control panel, enter the following sequence in which *n* is the slot number for the defined disk drive serial number:

1 2 2 n PICTURE 103

The following is an example of a disk drive serial number:

Example:

```
+-----------------+
¦     9 0 0 6 4 5 ¦ This disk drive should
+-----------------+ be serial number 900645
  1 2 3 4 5 6 7 8
```

4. Record the serial number in the following chart:

Slot Number	**Serial Number**
1	_____
2	_____
3	_____
4	_____
5	_____
6	_____
7	_____
8	_____

5. Repeat steps 3 and 4 for all eight slots.

6. Set the Power switch to the Off position.

7. Loosen the screw 1 and place the control panel in the service position.

PICTURE 104

8. Remove the front EMC shield.

PICTURE 105

9. Disconnect the following cables from the disk drives to be removed.

Note: If the data cable is attached to another disk drive, hold this connector in place with one hand while disconnecting the other connector from the disk drive to be removed.

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 106

10. Remove the disk drives from the slots (slot 3 shown as an example).

PICTURE 107

11. Can all the disk drives recorded in step 4 be found?

Note: Check each disk drive serial number (printed on a label on top of the disk drive).

PICTURE 108

No **Yes**

□ Go to step 18.

12. Can all the disk drives recorded in 4 except one be found?

Yes **No**

□ Go to step 24.

13. Insert each disk drive, except the one which could not be found, in the slot recorded in step 4.

Attach the disk drive power and data cables.

Warning: If these disk drives have been installed in another device or system, data corruption may be present. Go to step 24 if you have any doubt concerning the data integrity of the disk drives.

Note: Ensure that each disk drive is connected to the correct power cable and signal cable. Also, ensure that the address jumper is installed in the position shown and is only installed on disk drives in odd-numbered slots (1, 3, 5, or 7).

PICTURE 109

14. Insert a new disk drive in the slot for which the disk drive could not be found.

Attach the disk drive power and data cables.

15. Set the Power switch to the On position.

16. After 3 minutes, a URC should be displayed on the 3514 control panel?

Is 35147xx9 or 35148xx9 displayed on the 3514 control panel?

Yes **No**

□ Go to "Starting Problem Analysis" in topic 1.2.

17. Install the new disk drive. Use "Reset Disk Drive" in topic 4.5.7 with the slot number of the new disk drive.

This will make the new disk drive part of the 3514 configuration and will rebuild the data on it.

End of procedure.

18. Set the Power switch to the Off position.

19. Insert each disk drive in the slot recorded in step 4.

Attach the disk drive power and data cables.

Warning: If these disk drives have been installed in another device or system, data corruption may be present. Go to step 24 if you have any doubt concerning the data integrity of the disk drives.

Note: Ensure that each disk drive is connected to the correct power cable and signal cable. Also, ensure that the address jumper is installed in the position shown and is only installed on disk drives

in odd-numbered slots (1, 3, 5, or 7).

20. Set the Power switch to the On position.

21. After 3 minutes, is *000, B000, or BBA0 displayed on the Data display?

Yes No

□ Go to "Starting Problem Analysis" in topic 1.2.

22. From your computer system, run the diagnostic test programs for the 3514/A Array Adapter. (See the *3514 Quick Reference Manual* SA21-9613 for instructions on running diagnostics.)

Did the test programs run without error?

Yes No

□ Go to "Starting Problem Analysis" in topic 1.2.

23. Is *000 displayed on the Data display?

Yes No

□ Go to "Starting Problem Analysis" in topic 1.2.

End of procedure.

24. The data on the missing disk drives cannot be restored. To make the 3514 operational again, do the following:

Using the control panel, set the 3514 offline by entering the following sequence:

9 1 7 0 PICTURE 110

A display of 90FF indicates that the 3514 is offline.

25. Install the new disk drives into the missing disk drive slots using the procedure "Reset Disk Drive" in topic 4.5.7.

This will make the new disk drives part of the 3514 configuration. No data will be written to the new disk drives in this step.

Return here when you have completed the procedure "Reset Disk Drive" in topic 4.5.7.

26. Using the control panel, set the 3514 online by entering the following sequence:

9 0 7 9 PICTURE 111

End of procedure.

3.5.7 Problem Recovery Procedure 3e

Subtopics
3.5.7.1 URC CE2D

3.5.7.1 URC CE2D

No device location record can be found: The 3514 has been changed. There is not enough information available to determine the correct configuration of the 3514.

To correct this error, perform the following:

1. The 3514 has been configured with two disk drives. If the 3514 contains more than two disk drives, use the procedure "Installing Additional Disk Drive Features" in topic 5.1 to add the remaining disk drives. Then return to step 2 in this procedure.

2. Using the control panel, enter the following sequence of commands:

3. Set the 3514 offline:

   9 1 7 0 PICTURE 112

A display of 90FF indicates that the 3514 is offline.

4. Enter:

   3 0 8 9 PICTURE 113

The Data display shows:

```
+-----------------+
¦ > - - - - - - < ¦
+-----------------+
  1 2 3 4 5 6 7 8
```

5. Enter:

   8 0 7 9 s s PICTURE 114

Note: s s are the last two numbers of the 3514 serial number.

This command can take up to 80 minutes to complete.

6. Using the control panel, set the 3514 online by entering the following sequence:

   9 0 7 9 PICTURE 115

7. The data on the 3514 must be recovered using the latest backup data available. See your system unit and operating system manuals for instructions.

Do not attempt to save data from the failing 3514.

End of procedure.

3.5.8 Problem Recovery Procedure 4a

Subtopics
3.5.8.1 URC 9tpx

3.5.8.1 URC 9tpx

t=1, 3, or 6
p=1 through 8
x=0, 1, 2, 3, or F

A second disk drive failure has occurred on a 3514: The failure reported by this URC must be corrected before any other service is performed on this 3514. The first failing disk drive will be exchanged later.

To correct this error, perform the following:

1. To prevent data loss, the disk drive in the slot indicated by the third rightmost position of the URC must be returned to the 3514 configuration.

2. Using the control panel, enter the following sequence of commands:

3. Set the 3514 offline:

   9 1 7 0 PICTURE 116

   A display of 90FF indicates that the 3514 is offline.

4. This error may have been caused by electrical noise or an unseated cable. Attempt to reset this disk drive by performing the procedure "Reset Disk Drive" in topic 4.5.7. Then, continue with the next step.

5. Did the procedure "Reset Disk Drive" complete without an error?

   No Yes

   □ Go to step 26.

6. Use the URC error log to find the URC that occurred during the exchange command in step 5. The URC is the 4 leftmost characters in the error log entry. (See "Using the 3514 Unit Reference Code (URC) Error Log" in topic 2.6.)

7. Is the rightmost character of the URC (the fourth character in the error log entry) a 0 or 3?

   No Yes

   □ Go to step 11.

8. Exchange the controller card using the exchange procedure "Controller Card" in topic 4.5.8. Then return to step 9 in this procedure.

   CAUTION:
   The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries. *(RSFTC228)*

Location	**Description**
D	Controller card (see Caution notice)
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

9. Set the Power switch to the On position.

   After 3 minutes, is 3514CE27 or the same URC that initiated this repair action (35149tpx) displayed on the 3514 control panel?

   Yes No

   □ Go to step 26.

10. Set the 3514 offline:

9 1 7 0 PICTURE 117

A display of 90FF indicates that the 3514 is offline.

11. Perform the exchange procedure "Disk Drive Logic Card" in topic 4.5.2. Then return to the next step in this procedure.

Location	**Description**
1-8	Disk drive logic card
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

Note: Where indicated, exchange the disk drive logic card using the same disk enclosure.

12. Did the exchange procedure "Disk Drive Logic Card" with the new logic card complete without an error?

Yes **No**

□ Go to step 19.

13. Using the control panel, enter the following sequence to display the quick status of the disk drives:

0 2

The location of the first failing disk drive is indicated by an **X** in the corresponding position of the Data display.

14. Using the exchange procedure "Disk Drive" in topic 4.5.1, exchange the first failing disk drive. Then return to the next step in this procedure.

Wait until the command completes before continuing.

15. Did the exchange procedure "Disk Drive" with the new disk drive complete without an error?

Yes **No**

□ Go to step 19.

16. The disk drive on which you exchanged the disk drive logic should be exchanged. Use "Disk Drive" in topic 4.5.1.

17. Using the control panel, set the 3514 online by entering the following sequence:

9 0 7 9 PICTURE 118

18. After 3 minutes, is *000 displayed on the 3514 control panel?

Yes **No**

□ Go to step "Starting Problem Analysis" in topic 1.2.

End of procedure.

19. Warning: Some data on the 3514 will be damaged.

Using the exchange procedure "Disk Drive" in topic 4.5.1, exchange the second failing disk drive as indicated by the second rightmost position of the URC (9tpx). Where p = slots 1 through 8.

Location	**Description**
1-8	Disk drive assembly
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

20. Enter:

3 1 8 0 PICTURE 119

The Data display shows:

```
+-----------------+
¦ > - - - - - - < ¦
+-----------------+
  1 2 3 4 5 6 7 8
```

21. Enter:

8 1 7 0 s s PICTURE 120

Note: s s are the last two numbers of the 3514 serial number.

This command can take up to 40 minutes to complete.

22. Enter:

3 0 8 9 PICTURE 121

The Data display shows:

```
+-----------------+
¦ > - - - - - - < ¦
+-----------------+
  1 2 3 4 5 6 7 8
```

23. Enter:

8 0 7 9 s s PICTURE 122

Note: s s are the last two numbers of the 3514 serial number.

This command can take up to 80 minutes to complete.

24. Using the control panel, set the 3514 online by entering the following sequence:

9 0 7 9 PICTURE 123

25. The data on the 3514 must be recovered using the latest backup data available. See your system unit and operating system manuals for instructions.

Do not attempt to save data from the failing 3514.

End of procedure.

26. Use the URC error log to find the URC indicating the first failing disk drive. (See "Using the 3514 Unit Reference Code (URC) Error Log" in topic 2.6.)

27. Using the exchange procedure "Disk Drive" in topic 4.5.1, exchange the first failing disk drive.

28. Using the control panel, set the 3514 online by entering the following sequence:

9 0 7 9 PICTURE 124

29. After 3 minutes, is *000 displayed on the 3514 control panel?

Yes **No**

□ Go to step "Starting Problem Analysis" in topic 1.2.

End of procedure.

3.5.9 Problem Recovery Procedure 4b

Subtopics
3.5.9.1 URC 91pA 91pB 93pA 93pB 96pA 96pB

3.5.9.1 URC 91pA 91pB 93pA 93pB 96pA 96pB

p=1 through 8

A second disk drive predictive replacement request has occurred: The first disk drive failure must be corrected before the second disk drive is exchanged. The second disk drive still may be operational.

To correct this error, perform the following:

1. Record the URC: (_ _ _ _ _ _ _ _)

2. Using the control panel, enter the following sequence to display the quick status of the disk drives:

0 2

The location of the failing disk drive is indicated by an **X** in the corresponding position of the Data display. Other characters indicate that the disk drive is not failing.

The failing disk drive indicated by the Data display should be different than the one indicated by the third character (**p**) in the URC recorded above.

3. Does the Data display indicate that more than one disk drive is broken (more than one x)?

No **Yes**

□ Go to "Problem Recovery Procedure 4a" in topic 3.5.8.

4. Exchange the first failing disk drive (indicated by **X** on the Data display). Use "Disk Drive" in topic 4.5.1. Then return to step 5 in this procedure.

5. Exchange the second failing disk drive (indicated by the URC that sent you to this procedure). Use "Disk Drive" in topic 4.5.1.

End of procedure.

3.5.10 Problem Recovery Procedure 4c

Subtopics
3.5.10.1 URC 71p7 73p7 76p7 81p7 83p7 86p7

3.5.10.1 URC 71p7 73p7 76p7 81p7 83p7 86p7

p=1 through 8

A disk drive recorded in the device location record (configuration) is missing: The 3514 cannot find a disk drive recorded in the *device location record* (configuration) in any slot of the 3514.

To correct this error, perform the following:

1. Check to see if the slot indicated by the third character (**p**) of the URC has the a disk drive installed.

Is the a disk drive installed in slot **p**?

Yes No

□ Go to step 5.

2. Reset the disk drive. Use "Reset Disk Drive" in topic 4.5.7. Then, return to the next step in this procedure.

3. Did the "Reset Disk Drive" complete successfully without return code?

No Yes

□ **End of procedure.**

4. Use the URC error log to find the URC that occurred during the exchange command in step 3. The URC is the 4 leftmost characters in the error log entry. (See "Using the 3514 Unit Reference Code (URC) Error Log" in topic 2.6.)

Is this URC the same one that sent you to this procedure?

Yes No

□ Go to "Starting Problem Analysis" in topic 1.2.

Go to step 6.

5. Can the missing disk drive be located?

Yes No

□ Go to step 7.

6. Install the disk drive in the correct slot (indicated by the third position of the URC) by performing the exchange disk procedure "Disk Drive" in topic 4.5.1.

Location	**Description**
1-8	Disk drive assembly
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

End of procedure.

7. Reset the disk drive. Use "Reset Disk Drive" in topic 4.5.7. Then, return to the next step in this procedure.

8. Did the "Reset Disk Drive" complete successfully without return code?

Yes No

□ Go to step 9.

End of procedure.

9. Install the disk drive in the correct slot (indicated by the third position of the URC) by performing the exchange disk procedure "Disk Drive" in topic 4.5.1.

End of procedure.

3.5.11 Problem Recovery Procedure 4d

Subtopics
3.5.11.1 URC ktp9

3.5.11.1 URC ktp9

k=7 or 8
t=1, 3, 6, or F
p=1 through 8

One or more disk drives are new: The disk drive serial number detected in a specific slot is not the one recorded in the *device location record* (configuration) for that slot and the serial number expected is not installed in the 3514.

To correct this error, perform the following:

1. Are you exchanging a disk drive?

Yes No

□ Go to step 3.

2. Complete the exchange disk drive procedure using the procedure "Reset Disk Drive" in topic 4.5.7.

End of procedure.

3. The slot containing a new disk drive is indicated by the second rightmost character of the URC (indicated by position 7 of the Data display).

Example:

```
+-----------------+   Disk drive in slot
¦ 3 5 1 4 7 8 3 9 ¦   three has a wrong
+-----------------+   serial number.
  1 2 3 4 5 6 7 8
```

4. Find and record the serial number of the missing disk drive.
S/N _ _ _ _ _ _ _

Using the control panel, enter the following sequence in which *n* is the slot number for the new disk drive.

1 2 2 n PICTURE 125

The following is an example of a disk drive serial number:

```
+-----------------+
¦ 0 1 9 0 0 6 4 5 ¦ This disk drive should
+-----------------+ be serial number 1900645
  1 2 3 4 5 6 7 8
```

5. Record the serial number: (_ _ _ _ _ _ _)

6. Can the missing disk drive be located?

No Yes

□ Go to step 8.

7. Warning: Installing a disk drive will cause all data on that disk drive to be erased. If this is not acceptable to the customer, use a replacement disk drive.

Install a new disk drive by performing the exchange disk procedure "Disk Drive" in topic 4.5.1.

Location	**Description**
1-8	Disk drive assembly

Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.

End of procedure.

8. Install the disk drive in the correct slot (indicated by URC position 7 of the Data display) by performing the exchange disk procedure "Disk Drive" in topic 4.5.1.

End of procedure.

3.5.12 Problem Recovery Procedure 6a

Subtopics
3.5.12.1 URC 71pF 73pF 76pF 7FpF 81pF 83pF 86pF 8FpF

3.5.12.1 URC 71pF 73pF 76pF 7FpF 81pF 83pF 86pF 8FpF

p=1 through 8

A longitudinal redundancy check (LRC) error has occurred: Customer data has been damaged.

Warning: Do not attempt to save data from the failing 3514.

To correct this problem, perform the following:

1. Set the 3514 Power switch to the Off position.

2. Disconnect the ac power cable from the rear of the 3514.

PICTURE 126

3. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

4. Loosen the screw 1 and place the control panel in the service position.

PICTURE 127

5. Remove the front EMC shield.

PICTURE 128

6. Warning: Use the ESD handling kit, IBM part 6428316. Attach the ground lead to the frame of the 3514.

Disconnect all disk drive data cables from the controller card and move them away from the card.

PICTURE 129

7. CAUTION:
The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries. *(RSFTC228)*

Remove the controller card from the 3514.

PICTURE 130

8. Install the replacement controller card.

9. Connect all four disk drive data cables to the controller card.

PICTURE 131

10.

Note: If the data cable is attached to another disk drive, hold the connector in place with one hand while disconnecting the other connector from the disk drive to be exchanged.

Disconnect the following cables from the disk drive to be exchanged as indicated by the third character of the URC.

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 132

11. Remove the failing disk drive assembly from the slot.

PICTURE 133

12. Move the address jumper to the same position (shown below) on the new disk drive.

Note: Only disk drives in odd-numbered slots (1 3 5 7) have an address jumper.

PICTURE 134

13. Insert the new disk drive assembly into the 3514.

PICTURE 135

14. Attach the following cables:

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 136

15. Connect the ac power cable to the rear of the 3514.

PICTURE 137

16. Set the 3514 Power switch to the On position.

After 3 minutes, the power-up sequence should be complete. (An error message is expected.)

17. Begin the Exchange Disk Drive command from the control panel:

Note: The Exchange Disk Drive command will do the reset function.

a. Using the control panel, enter the following sequence where *n* is the location number of the disk drive:

4 2 9 n PICTURE 138

b. The control panel will display a disk drive configuration with the slot number of the drive to be reset indicated by a solid block.

Example:

```
+-----------------+
¦ 1 2 3 _ ¦ _ 7 _ ¦  Indicates the disk
+-----------------+  in slot 5 is to
  1 2 3 4 5 6 7 8     be reset
```

Note: If an X is displayed in another position and you are not repairing a double disk drive failure, the exchange command may have been issued to the wrong disk drive. Verify that the slot number at the disk drive being reset was not determined from the direct select address reported by the system.

c. If the 3514 detects an error during the 4 2 9 n command, a return code is displayed.

To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 2 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

Note: A return code of DE may indicate an address jumper or cable is not installed correctly.

18. Complete the Exchange Disk Drive command by entering the following sequence on the control panel:

a. 9 PICTURE 139

Note: This command can take up to 80 minutes to complete. Data on this disk drive will be built again.

b. As the command processes, the display indicates the percent completed.

c. When the operation ends without error, a quick status of the disk drives is displayed.

Example:

```
+-----------------+
¦ 1 2 3 _ 5 _ 7 _ ¦  Indicates the disk
+-----------------+  configuration
  1 2 3 4 5 6 7 8
```

d. If the 3514 detects an error during the 4 2 9 n command, a return code is displayed.

To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 2 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

Note: A return code of DE may indicate an address jumper or cable is not installed correctly.

e. Press the * (Home) key to clear the display and return it to ready status (*000).

Warning: Do not continue with step 19 until the exchange is complete.

19. Attach the front EMC shield.

Note: Engage both thumbscrews before you tighten either screw.

PICTURE 140

20. Restore the control panel to operating position and tighten screw 1 :

PICTURE 141

21. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

22. The data on the 3514 must be recovered using the latest backup data available. See your system unit and operating system manuals for instructions.

Do not attempt to save data from the failing 3514.

End of procedure.

3.5.13 Problem Recovery Procedure 6c

Subtopics
3.5.13.1 URC C9D7

3.5.13.1 URC C9D7

A protection exception error has occurred, or a command has been canceled: Customer data has been damaged.

Warning: Do not attempt to save data from any disk drive in the failing unit.

To correct this problem, perform the following:

1. Set the 3514 Power switch to the Off position.

2. Disconnect the ac power cable from the rear of the 3514.

PICTURE 142

3. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

4. Loosen the screw 1 and place the control panel in the service position.

PICTURE 143

5. Remove the front EMC shield.

PICTURE 144

6. Warning: Use the ESD handling kit, IBM part 6428316. Attach the ground lead to the frame of the 3514.

Disconnect all disk drive data cables from the controller card and move them away from the card.

PICTURE 145

7. CAUTION:
The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries. *(RSFTC228)*

Remove the controller card from the 3514.

PICTURE 146

8. Install the replacement controller card.

9. Connect all four disk drive data cables to the controller card.

PICTURE 147

10. Connect the ac power cable to the rear of the 3514.

PICTURE 148

11. Set the 3514 Power switch to the On position.

After 3 minutes, the power-up sequence should be complete (an error message is expected) and data resynchronization begins. The data resynchronization can take up to 40 minutes and is complete when the Ready light stops blinking.

Warning: Do not continue with step 12 until the resynchronization is complete.

12. Using the control panel, enter the following sequence of commands:

13. Set the 3514 offline:

9 1 7 0 PICTURE 149

A display of 90FF indicates that the 3514 is offline.

14. Enter:

3 1 8 0 PICTURE 150

The Data display shows:

```
+-----------------+
¦ > - - - - - - < ¦
+-----------------+
  1 2 3 4 5 6 7 8
```

15. Enter:

8 1 7 0 s s PICTURE 151

Note: s s are the last two numbers of the 3514 serial number.

This command can take up to 40 minutes to complete.

16. One at a time, exchange the disk drives in slots 1-7 using the procedure "Disk Drive" in topic 4.5.1. Then return to step 17 of this procedure.

17. Enter:

3 0 8 9 PICTURE 152

The Data display shows:

```
+-----------------+
¦ > - - - - - - < ¦
+-----------------+
  1 2 3 4 5 6 7 8
```

18. Enter:

8 0 7 9 s s PICTURE 153

Note: s s are the last two numbers of the 3514 serial number.

This command can take up to 80 minutes to complete.

19. Using the control panel, set the 3514 online by entering the following sequence:

9 0 7 9 PICTURE 154

20. Attach the front EMC shield.

Note: Engage both thumbscrews before you tighten either screw.

PICTURE 155

21. Restore the control panel to operating position and tighten screw 1 :

PICTURE 156

22. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

23. The data on the 3514 must be recovered using the latest backup data available. See your system unit and operating system manuals for instructions.

Do not attempt to save data from the failing 3514.

End of procedure.

3.5.14 Problem Recovery Procedure 6d

Subtopics
3.5.14.1 URC C9D8

3.5.14.1 URC C9D8

A longitudinal redundancy check (LRC) error has occurred on the controller card: Customer data has been damaged.

Warning: Do not attempt to save data from the failing 3514.

To correct this problem, perform the following:

1. Set the 3514 Power switch to the Off position.

2. Disconnect the ac power cable from the rear of the 3514.

PICTURE 157

3. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

4. Loosen the screw 1 and place the control panel in the service position.

PICTURE 158

5. Remove the front EMC shield.

PICTURE 159

6. Warning: Use the ESD handling kit, IBM part 6428316. Attach the ground lead to the frame of the 3514.

Disconnect all disk drive data cables from the controller card and move them away from the card.

PICTURE 160

7. CAUTION:
The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries. *(RSFTC228)*

Remove the controller card from the 3514.

PICTURE 161

8. Install the replacement controller card.

9. Connect all four disk drive data cables to the controller card.

PICTURE 162

10. Connect the ac power cable to the rear of the 3514.

PICTURE 163

11. Set the 3514 Power switch to the On position.

After 3 minutes, the power-up sequence should be complete (an error message is expected) and data resynchronization begins. The data resynchronization can take up to 40 minutes and is complete when the Ready light stops blinking.

Warning: Do not continue with step 12 until the resynchronization is complete.

12. Using the control panel, enter the following sequence of commands:

13. Set the 3514 offline:

9 1 7 0 PICTURE 164

A display of 90FF indicates that the 3514 is offline.

14. Enter:

3 1 8 0 PICTURE 165

The Data display shows:

```
+-----------------+
¦ > - - - - - - < ¦
+-----------------+
  1 2 3 4 5 6 7 8
```

15. Enter:

8 1 7 0 s s PICTURE 166

Note: s s are the last two numbers of the 3514 serial number.

This command can take up to 40 minutes to complete.

16. Enter:

3 0 8 9 PICTURE 167

The Data display shows:

```
+-----------------+
¦ > - - - - - - < ¦
+-----------------+
  1 2 3 4 5 6 7 8
```

17. Enter:

8 0 7 9 s s PICTURE 168

Note: s s are the last two numbers of the 3514 serial number.

This command can take up to 80 minutes to complete.

18. Using the control panel, set the 3514 online by entering the following sequence:

9 0 7 9 PICTURE 169

19. Attach the front EMC shield.

Note: Engage both thumbscrews before you tighten either screw.

PICTURE 170

20. Restore the control panel to operating position and tighten screw 1 :

PICTURE 171

21. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

22. The data on the 3514 must be recovered using the latest backup data available. See your system unit and operating system manuals for instructions.

Do not attempt to save data from the failing 3514.

End of procedure.

3.5.15 Problem Recovery Procedure 6e

Subtopics
3.5.15.1 URC C9p7 C9p8

3.5.15.1 URC C9p7 C9p8

p=1 through 8

A longitudinal redundancy check (LRC) error has occurred on the controller card: Customer data has been damaged.

Warning: Do not attempt to save data from the failing 3514.

To correct this problem, perform the following:

1. Set the 3514 Power switch to the Off position.

2. Disconnect the ac power cable from the rear of the 3514.

PICTURE 172

3. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

4. Loosen the screw 1 and place the control panel in the service position.

PICTURE 173

5. Remove the front EMC shield.

PICTURE 174

6. Warning: Use the ESD handling kit, IBM part 6428316. Attach the ground lead to the frame of the 3514.

Disconnect all disk drive data cables from the controller card and move them away from the card.

PICTURE 175

7. CAUTION:
The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries. *(RSFTC228)*

Remove the controller card from the 3514.

PICTURE 176

8. Install the replacement controller card.

9. Connect all four disk drive data cables to the controller card.

PICTURE 177

10.

Note: If the data cable is attached to another disk drive, hold the connector in place with one hand while disconnecting the other connector from the disk drive to be exchanged.

Disconnect the following cables from the disk drive to be exchanged as indicated by the third character of the URC.

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 178

11. Remove the failing disk drive assembly from the slot indicated by the third character of the URC.

PICTURE 179

12. Move the address jumper to the same position (shown below) on the new disk drive.

Note: Only disk drives in odd-numbered slots (1 3 5 7) have an address jumper.

PICTURE 180

13. Insert the new disk drive assembly into the 3514.

PICTURE 181

14. Attach the following cables:

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 182

15. Connect the ac power cable to the rear of the 3514.

PICTURE 183

16. Set the 3514 Power switch to the On position.

After 3 minutes, the power-up sequence should be complete. (An error message is expected.)

17. Begin the Exchange Disk Drive command from the control panel:

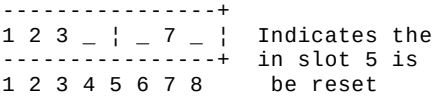
Note: The Exchange Disk Drive command will do the reset function.

a. Using the control panel, enter the following sequence where *n* is the location number of the disk drive:

   4 2 9 n PICTURE 184

b. The control panel will display a disk drive configuration with the slot number of the drive to be reset indicated by a solid block.

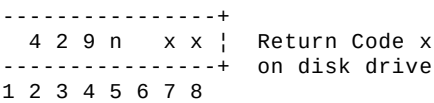
   Example:



   Note: If an X is displayed in another position and you are not repairing a double disk drive failure, the exchange command may have been issued to the wrong disk drive. Verify that the slot number at the disk drive being reset was not determined from the direct select address reported by the system.

c. If the 3514 detects an error during the 4 2 9 n command, a return code is displayed.

   To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.



   Note: A return code of DE may indicate an address jumper or cable is not installed correctly.

18. Complete the Exchange Disk Drive command by entering the following

sequence on the control panel:

a. 9 PICTURE 185

   Note: This command can take up to 80 minutes to complete. Data on this disk drive will be built again.

b. As the command processes, the display indicates the percent completed.

c. When the operation ends without error, a quick status of the disk drives is displayed.

   Example:

```
+-----------------+
¦ 1 2 3 _ 5 _ 7 _ ¦  Indicates the disk
+-----------------+  configuration
  1 2 3 4 5 6 7 8
```

d. If the 3514 detects an error during the 4 2 9 n command, a return code is displayed.

   To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 2 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

   Note: A return code of DE may indicate an address jumper or cable is not installed correctly.

e. Press the * (Home) key to clear the display and return it to ready status (*000).

   Warning: Do not continue with step 19 until the exchange command is complete.

19. Attach the front EMC shield.

   Note: Engage both thumbscrews before you tighten either screw.

PICTURE 186

20. Restore the control panel to operating position and tighten screw 1 :

   PICTURE 187

21. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

22. The data on the 3514 must be recovered using the latest backup data available. See your system unit and operating system manuals for instructions.

   Do not attempt to save data from the failing 3514.

End of procedure.

3.5.16 Problem Recovery Procedure 6f

Subtopics
3.5.16.1 URC 91pF 93pF 96pF

3.5.16.1 URC 91pF 93pF 96pF

p=1 through 8

A longitudinal redundancy check (LRC) error has occurred on a second disk drive: Customer data has been damaged.

Warning: Do not attempt to save data from the failing 3514.

To correct this problem, perform the following:

1. Using the control panel, enter the following sequence to display the quick status of the disk drives:

0 2

The location of the two failing disk drives are indicated by an **X** in the corresponding position of the Data display.

2. Set the 3514 Power switch to the Off position.

3. Disconnect the ac power cable from the rear of the 3514.

PICTURE 188

4. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

5. Loosen the screw 1 and place the control panel in the service position.

PICTURE 189

6. Remove the front EMC shield.

PICTURE 190

7. Warning: Use the ESD handling kit, IBM part 6428316. Attach the ground lead to the frame of the 3514.

Disconnect all disk drive data cables from the controller card and move them away from the card.

PICTURE 191

8. CAUTION:
The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries. *(RSFTC228)*

Remove the controller card from the 3514.

PICTURE 192

9. Install the replacement controller card.

10. Connect all four disk drive data cables to the controller card.

PICTURE 193

11.

Note: If the data cable is attached to another disk drive, hold the connector in place with one hand while disconnecting the other connector from the disk drive to be exchanged.

Disconnect the following cables from the first (by slot position) failing disk drive indicated in step 1.

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 194

12. Remove the failing disk drive assembly from the slot.

PICTURE 195

13. Move the address jumper to the same position (shown below) on the new disk drive.

Note: Only disk drives in odd-numbered slots (1 3 5 7) have an address jumper.

PICTURE 196

14. Insert the new disk drive assembly into the 3514.

PICTURE 197

15. Attach the following cables:

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 198

16. Connect the ac power cable to the rear of the 3514.

PICTURE 199

17. Set the 3514 Power switch to the On position.

After 3 minutes, the power-up sequence should be complete. (An error message is expected.)

18. Using the control panel, set the 3514 offline by entering the following sequence:

9 1 7 0 PICTURE 200

A display of 90FF indicates that the 3514 is offline.

19. Begin the Exchange Disk Drive command from the control panel:

Note: The Exchange Disk Drive command will do the reset function.

a. Using the control panel, enter the following sequence where *n* is the location number of the disk drive:

4 2 9 n PICTURE 201

b. The control panel will display a disk drive configuration with the slot number of the drive to be reset indicated by a solid block.

Example:

```
+-----------------+
¦ 1 2 3 _ ¦ _ 7 _ ¦  Indicates the disk
+-----------------+  in slot 5 is to
  1 2 3 4 5 6 7 8     be reset
```

Note: If an X is displayed in another position and you are not repairing a double disk drive failure, the exchange command may have been issued to the wrong disk drive. Verify that the slot number at the disk drive being reset was not determined from the direct select address reported by the system.

c. If the 3514 detects an error during the 4 2 9 n command, a return

code is displayed.

To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 2 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

Note: A return code of DE may indicate an address jumper or cable is not installed correctly.

20. Complete the Exchange Disk Drive command by entering the following sequence on the control panel:

a. 9 PICTURE 202

   Note: This command can take up to 80 minutes to complete. Data on this disk drive will be built again.

b. As the command processes, the display indicates the percent completed.

c. When the operation ends without error, a quick status of the disk drives is displayed.

   Example:

```
+-----------------+
¦ 1 2 3 _ 5 _ 7 _ ¦  Indicates the disk
+-----------------+  configuration
  1 2 3 4 5 6 7 8
```

d. If the 3514 detects an error during the 4 2 9 n command, a return code is displayed.

   To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 2 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

   Note: A return code of DE may indicate an address jumper or cable is not installed correctly.

e. Press the * (Home) key to clear the display and return it to ready status (*000).

   Warning: Do not continue with step 21 until the exchange command is complete.

21. Exchange the second (by slot position) failing disk drive indicated in step 1. Use the procedure "Disk Drive" in topic 4.5.1.

Warning: Do not continue with step 22 until the exchange command is complete.

22. Using the control panel, set the 3514 online by entering the following sequence:

9 0 7 9 PICTURE 203

23. After 3 minutes, is *000 displayed on the 3514 control panel?

Yes No

□ Go to step "Starting Problem Analysis" in topic 1.2.

24. Attach the front EMC shield.

Note: Engage both thumbscrews before you tighten either screw.

PICTURE 204

25. Restore the control panel to operating position and tighten screw 1 :

PICTURE 205

26. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

27. The data on the 3514 must be recovered using the latest backup data available. See your system unit and operating system manuals for instructions.

Do not attempt to save data from the failing 3514.

End of procedure.

3.5.17 Problem Recovery Procedure 7a

Subtopics
3.5.17.1 URC 6tpx

3.5.17.1 URC 6tpx

t=1, 3, or 6
p=1 through 8
x=0, 1, 2, 3, 7, 9, A, B or F

An array checksum synchronization error has occurred: Customer data was damaged.

To correct this error, perform the following:

1. To prevent data loss, the disk drive in the slot indicated by the third position of the URC must be returned to the 3514 configuration.

2. Using the control panel, enter the following sequence of commands:

3. Set the 3514 offline:

9 1 7 0 PICTURE 206

A display of 90FF indicates that the 3514 is offline.

4. This error may have been caused by electrical noise or an unseated cable. Attempt to reset this disk drive by performing the procedure "Reset Disk Drive" in topic 4.5.7. Then, continue with the next step.

5. Did the procedure "Reset Disk Drive" complete without an error?

No Yes

□ Go to step 20.

6. Use the URC error log to find the URC that occurred during the exchange command in step 4. The URC is the 4 leftmost characters in the error log entry. (See "Using the 3514 Unit Reference Code (URC) Error Log" in topic 2.6.)

7. Is the rightmost character of the URC (the fourth character in the error log entry) a 0 or 3?

No Yes

□ Go to step 11.

8. Exchange the controller card using the exchange procedure "Controller Card" in topic 4.5.8. Then return to step 9 in topic 3.5.8.1 in this procedure.

CAUTION:
The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries. *(RSFTC228)*

Location	**Description**
D	Controller card (see Caution notice)
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

9. Set the Power switch to the On position.

After 3 minutes, is 3514CE27 or the same URC that initiated this repair action (35146tpx) displayed on the 3514 control panel?

Yes No

□ **End of procedure.**

10. Set the 3514 offline:

9 1 7 0 PICTURE 207

A display of 90FF indicates that the 3514 is offline.

11. Perform the exchange procedure "Disk Drive Logic Card" in topic 4.5.2.

Then return to the next step in this procedure.

Location	Description
1-8	Disk drive logic card
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

Note: Where indicated, exchange the disk drive logic card using the same disk enclosure.

12. Did the exchange procedure "Disk Drive Logic Card" with the new logic card complete without an error?

Yes No

☐ Go to step 16.

13. The disk drive on which you exchanged the disk drive logic card should be exchanged. Wait until the automatic data resynchronization is completed. This can take up to 40 minutes and is complete when the Unit Ready light stops blinking.

Use the procedure "Disk Drive" in topic 4.5.1 to exchange the disk drive. Then return to step 14 in this procedure.

14. Using the control panel, set the 3514 online by entering the following sequence:

9 0 7 9 PICTURE 208

15. After 3 minutes, is *000 displayed on the 3514 control panel?

Yes No

☐ Go to step "Starting Problem Analysis" in topic 1.2.

End of procedure.

16. Warning: Some data on the 3514 will be damaged.

Using the exchange procedure "Disk Drive" in topic 4.5.1, exchange the second failing disk drive as indicated by the second rightmost position of the URC (6tpx) where p = slots 1 through 7.

Location	Description
1-8	Disk drive assembly
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

17. Using the control panel, set the 3514 online by entering the following sequence:

9 0 7 9 PICTURE 209

18. After 3 minutes, is *000 displayed on the 3514 control panel?

Yes No

☐ Go to step "Starting Problem Analysis" in topic 1.2.

19. The data on the 3514 must be recovered using the latest backup data available. See your system unit and operating system manuals for instructions.

Do not attempt to save data from the failing 3514.

End of procedure.

20. The disk drive that you reset should be exchanged. Wait until the automatic data resynchronization is completed. This can take up to 40 minutes and is complete when the Unit Ready light stops blinking.

Use the procedure "Disk Drive" in topic 4.5.1 to exchange the disk drive. Then return to step 21 in this procedure.

21. Using the control panel, set the 3514 online by entering the following sequence:

9 0 7 9 PICTURE 210

22. After 3 minutes, is *000 displayed on the 3514 control panel?

Yes **No**

□ Go to step "Starting Problem Analysis" in topic 1.2.

End of procedure.

3.5.18 Problem Recovery Procedure 7b

Subtopics
3.5.18.1 URC 5tpx

3.5.18.1 URC 5tpx

t=1, 3, or 6
p=1 through 8
x=0, 1, 2, 3, 7, 9, A, B or F

An error has occurred while rebuilding data: Customer data was damaged.

To correct this error, perform the following:

1. To prevent data loss, the disk drive in the slot indicated by the third position of the URC must be returned to the 3514 configuration.

2. Using the control panel, enter the following sequence of commands:

3. Set the 3514 offline:

   9 1 7 0 PICTURE 211

   A display of 90FF indicates that the 3514 is offline.

4. This error may have been caused by electrical noise or an unseated cable. Attempt to reset this disk drive by performing the procedure "Reset Disk Drive" in topic 4.5.7. Then, continue with the next step.

5. Did the procedure "Reset Disk Drive" complete without an error?

   No Yes

   □ Go to step 20.

6. Use the URC error log to find the URC that occurred during the exchange command in step 4. The URC is the 4 leftmost characters in the error log entry. (See "Using the 3514 Unit Reference Code (URC) Error Log" in topic 2.6.)

7. Is the rightmost character of the URC (the fourth character in the error log entry) a 0 or 3?

   No Yes

   □ Go to step 11.

8. Exchange the controller card using the exchange procedure "Controller Card" in topic 4.5.8. Then return to step 9 in topic 3.5.8.1 in this procedure.

   CAUTION:
   The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries. *(RSFTC228)*

Location	**Description**
D	Controller card (see Caution notice)
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

9. Set the Power switch to the On position.

   After 3 minutes, is 3514CE27 or the same URC that initiated this repair action (35145tpx) displayed on the 3514 control panel?

   Yes No

   □ **End of procedure.**

10. Set the 3514 offline:

   9 1 7 0 PICTURE 212

   A display of 90FF indicates that the 3514 is offline.

11. Perform the exchange procedure "Disk Drive Logic Card" in topic 4.5.2. Then return to the next step in this procedure.

Location	Description
1-8	Disk drive logic card
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

Note: Where indicated, exchange the disk drive logic card using the same disk enclosure.

12. Did the exchange procedure "Disk Drive Logic Card" with the new logic card complete without an error?

Yes No

☐ Go to step 16.

13. The disk drive on which you exchanged the disk drive logic should be exchanged. Wait until the automatic data rebuild is completed. This can take up to 40 minutes and is complete when the Unit Ready light stops blinking.

Use the procedure "Disk Drive" in topic 4.5.1 to exchange the disk drive. Then return to step 14 in this procedure.

14. Using the control panel, set the 3514 online by entering the following sequence:

9 0 7 9 PICTURE 213

15. After 3 minutes, is *000 displayed on the 3514 control panel?

Yes No

☐ Go to step "Starting Problem Analysis" in topic 1.2.

End of procedure.

16. Warning: Some data on the 3514 will be damaged.

Using the exchange procedure "Disk Drive" in topic 4.5.1, exchange the second failing disk drive as indicated by the second rightmost position of the URC (5tpx) where p = slots 1 through 7.

Location	Description
1-8	Disk drive assembly
Note: See the "Failing Item Table" in topic 3.3 for the correct part number for a specific FRU part.	

17. Using the control panel, set the 3514 online by entering the following sequence:

9 0 7 9 PICTURE 214

18. After 3 minutes, is *000 displayed on the 3514 control panel?

Yes No

☐ Go to step "Starting Problem Analysis" in topic 1.2.

19. The data on the 3514 must be recovered using the latest backup data available. See your system unit and operating system manuals for instructions.

Do not attempt to save data from the failing 3514.

End of procedure.

20. The disk drive that you reset should be exchanged. Wait until the automatic data rebuild is completed. This can take up to 40 minutes and is complete when the Unit Ready light stops blinking.

Use the procedure "Disk Drive" in topic 4.5.1 to exchange the disk

drive. Then return to step 21 in this procedure.

21. Using the control panel, set the 3514 online by entering the following sequence:

9 0 7 9 PICTURE 215

22. After 3 minutes, is *000 displayed on the 3514 control panel?

Yes **No**

□ Go to step "Starting Problem Analysis" in topic 1.2.

End of procedure.

4.0 Chapter 4. Service Procedures

Warning: Do not enter the manual here unless you have been directed to do so by another procedure. If you have any question about using this manual, go to "Starting Problem Analysis" in topic 1.2.

Subtopics

4.1 Locations

Subtopics
4.1.1 Field Replaceable Units

4.1.1 Field Replaceable Units

All field replaceable units (FRUs) that can be exchanged by service representatives are shown in the following diagrams.

For the specific exchange procedure for each FRU, see "Exchanging FRU Procedures" in topic 4.5.

Subtopics
4.1.1.1 Location Codes for the Unit Reference Code Table

4.1.1.1 Location Codes for the Unit Reference Code Table

Location	**Description**
A-C	Power module
D	Controller card
F	Connector panel
F1 or F2	Fan
G	AC power cable
H	AC power cable filter
J1	Host adapter cable
J2	Host adapter terminating plug
1-8	Disk drive power cable
1-8	Disk drive data cable
1-8	Disk drive logic card
1-8	Disk enclosure
9	Control panel assembly

PICTURE 216

PICTURE 217

4.2 Working with Electrostatic Discharge (ESD) Sensitive Parts

When holding or exchanging ESD-sensitive parts, use the ESD kit, IBM part 6428316 or similar. Read the instructions inside the top cover of the carrying case.

Note: The ESD kit must be used correctly during maintenance procedures to maintain system availability.

All 3514 logic cards and disk drives are sensitive to electrostatic discharge (ESD). To prevent damage to these ESD-sensitive parts, follow these instructions:

- Before exchanging any part, control the electrical power to the part as instructed in the procedure you are using.
- Keep the ESD-sensitive part in its original shipping container until you install the part in the machine.
- When holding the ESD-sensitive part, move your body as little as possible to prevent an increase of static electricity from clothing fibers, carpet fibers, and furniture.
- Just before touching the ESD-sensitive part, discharge any static electricity in your body by touching the metal frame of the machine. If possible, keep one hand on the frame when you are installing or exchanging a ESD-sensitive part.
- Hold the ESD-sensitive part by the edge or connector shroud cover. Do not touch any connector or test point pins. If you are exchanging a field-replaceable module, use the correct tool.
- Return the part to its special container when it is not being used. Do not place the ESD-sensitive part on the machine cover or on a metal table. Machine covers and metal tables are electrical grounds. They complete a discharge path from the ESD-sensitive part through your body to ground, increasing the risk of damage to the card. Large metal objects can be discharge paths without being grounded.
- Prevent ESD-sensitive parts from being accidentally touched by other persons. Reinstall machine covers when you are not working on the machine. Do not place unprotected ESD-sensitive parts on a table.
- Be careful when working with ESD-sensitive parts during cold weather heating. Cold weather heating causes low humidity and increases the risk of static electricity.

4.3 Front Cover Removal or Installation Procedure

1. To remove the front cover, see the following diagram.

PICTURE 218

2. To install the front cover, see the following diagram.

PICTURE 219

4.4 Rear Cover Removal or Installation Procedure

1. To remove the rear cover, see the following diagram.

PICTURE 220

2. To install the rear cover, see the following diagram.

PICTURE 221

4.5 Exchanging FRU Procedures

Subtopics

4.5.1 Disk Drive

Do not switch off power to the 3514 unless directed by the procedure in this manual.

Warning: When a disk drive assembly comes from an environment where the temperature is outside the specified operating range, the operating range being 10°C to 40°C (50°F to 104°F), that disk drive assembly should not be used for at least 3 hours. This delay permits the disk drive assembly to reach the temperature of its new environment. During this time, the disk drive assembly should be removed from its shipping box, but must remain in the sealed bag to prevent moisture from getting on the disk drive.

Notes:

1. This procedure will place a new disk drive into the 3514 configuration in place of an existing disk drive.
2. When the Exchange Disk Drive command (4 2 9 n) is performed, the following happens:
   a. The disk drive is formatted.
   b. Data is put back on the disk drive, if a single disk drive failed.
3. When this procedure is completed, you may be directed to a system recovery procedure by the procedure that sent you here.

The electronic card is electrostatic discharge (ESD) sensitive. When working with the card, use an ESD kit, IBM part 6428316 or similar. Read the instructions inside the top cover of the carrying case.

1. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

Note: If you do not know the location of the failing FRU, the character in the third position of the URC that initiated this repair action indicates the slot number (1 through 8).

2. Warning: Before you proceed, use the ESD handling kit, IBM part 6428316 or similar.

To exchange the disk drive, begin the Exchange Disk Drive command from the control panel:

a. Using the control panel, enter the following sequence where *n* is the location number of the disk drive being exchanged:

```
  4 2 9 n  PICTURE 222
```

b. The control panel displays a disk drive configuration with the slot number of the drive to be exchanged indicated by a solid block.

Example:

```
+-----------------+
¦ 1 2 3 _ ¦ _ 7 _ ¦  Indicates the disk
+-----------------+  in slot 5 is ready
  1 2 3 4 5 6 7 8    to be exchanged
```

Note: If an X is displayed in another position and you are not repairing a double disk drive failure, the exchange command may have been issued to the wrong disk drive. Verify that the slot number of the disk drive being exchanged was not determined from the direct select address reported by the system.

c. If the 3514 detects an error during the 4 2 9 n command, a return code is displayed.

To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 2 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

3. Loosen the screw 1 and place the control panel in the service position.

PICTURE 223

4. Remove the front EMC shield.

PICTURE 224

5.

Warning: Do not disconnect the disk drive data cable from the controller card or the other disk drive (if installed).

Warning: Disconnecting the wrong power or data cable may result in loss of data and system availability

Note: If the data cable is attached to another disk drive, hold the connector in place with one hand while disconnecting the other connector from the disk drive to be exchanged.

Disconnect the following cables from the disk drive to be exchanged as indicated by the solid block (¦).

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 225

6. Remove the failing disk drive assembly from the slot.

PICTURE 226

7. Move the address jumper to the same position (shown below) on the new disk drive.

Note: Only disk drives in odd-numbered slots (1 3 5 7) have an address jumper.

PICTURE 227

8. Insert the new disk drive assembly into the 3514.

PICTURE 228

9. Attach the following cables:

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 229

10. Attach the front EMC shield.

Note: Engage both thumbscrews before you tighten either screw.

PICTURE 230

11. Restore the control panel to operating position and tighten screw 1 :

PICTURE 231

12. Complete the Exchange Disk Drive command by entering the following sequence on the control panel:

a. 9 PICTURE 232

Note: The 3514 will attempt to return the disk drive to its configuration.
b. As the command processes, the display indicates the percent completed.
c. When the operation ends without error, a quick status of the disk drives is displayed.

Example:

```
+-----------------+
¦ 1 2 3 _ 5 _ 7 _ ¦  Indicates the disk
+-----------------+  configuration
  1 2 3 4 5 6 7 8
```

d. If the 3514 detects an error during the 4 2 9 n command, a return code is displayed.

   To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 2 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

   Note: A return code of DE may indicate an address jumper or cable is not installed correctly.

e. Press the * (Home) key to clear the display and return it to ready status (*000).

   Note: Do not attempt to correct new problems at this time. Return to the problem recovery procedure that sent you here.

13. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

End of procedure.

4.5.2 Disk Drive Logic Card

Do not switch off power to the 3514 unless directed by the procedure in this manual.

Notes:

1. The disk drive logic card is shipped in a container that is used as the ESD-protected work surface. Setup the ESD-protected work surface before continuing. Use the instructions printed on the top of the container.
2. When the Exchange Disk Drive command (4 2 9 n) is performed, the disk drive with new disk drive logic card will be returned to the 3514 configuration. If this occurs successfully, you will be directed to exchange the entire disk drive assembly after recovery is completed.

Warning: The disk enclosure and logic card are sensitive to electrostatic discharge. The following procedures **must** be performed on the ESD-protected work surface. The ESD wrist strap is supplied in the ESD handling kit, IBM part 6428316.

Warning: Do not hold or apply pressure to the disk enclosure cover. This can cause the disk enclosure cover to touch and damage the disks inside. Hold the disk enclosure by its shock mounts to prevent damage.

1. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

Note: If you do not know the location of the failing FRU, the character in the third position of the URC that initiated this repair action indicates the slot number (1 through 8).

2. Warning: Before you proceed, use the ESD handling kit, IBM part 6428316 or similar.

To exchange the disk drive logic card, begin the Exchange Disk Drive command from the control panel:

a. Using the control panel, enter the following sequence where *n* is the location number of the disk drive logic card being exchanged:

4 2 9 n PICTURE 233

b. The control panel displays a disk drive configuration with the slot number of the drive to be exchanged indicated by a solid block (¦).

Example:

```
+-----------------+
¦ 1 2 3 _ ¦ _ 7 _ ¦  Indicates the disk
+-----------------+  in slot 5 is ready
  1 2 3 4 5 6 7 8    to be exchanged
```

Note: If an X is displayed in another position and you are not repairing a double disk drive failure, the exchange command may have been issued to the wrong disk drive. Verify that the slot number of the disk drive being exchanged was not determined from the direct select address reported by the system.

c. If the 3514 detects an error during the 4 2 9 n command, a return code is displayed.

To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 2 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

3. Loosen the screw 1 and place the control panel in the service position.

PICTURE 234

4. Remove the front EMC shield.

PICTURE 235

5. Warning: Do not disconnect the disk drive data cable from the controller card or the other disk drive (if installed).

Warning: Disconnecting the wrong power or data cable may result in loss of data and system availability

Note: If the data cable is attached to another disk drive, hold the connector in place with one hand while disconnecting the other connector from the disk drive to be exchanged.

Disconnect the following cables from the disk drive to be exchanged as indicated by the solid block (¦).

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 236

6. Remove the disk drive assembly from the slot.

PICTURE 237

7. Place the disk drive on the ESD-protected work surface.

PICTURE 238

8. Remove the mounting bracket from the disk drive.

PICTURE 239

9. Use the instructions included in the disk drive logic card FRU to exchange the disk drive logic card. Then return to step 10 in this procedure.

10. Install the mounting bracket onto the disk drive.

PICTURE 240

11. Move the address jumper to the same position (shown below) on the new disk drive logic card.

Note: Only disk drives in odd-numbered slots (1 3 5 7) have an address jumper.

PICTURE 241

12. Insert the disk drive assembly into the 3514.

PICTURE 242

13. Attach the following cables:

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 243

14. Attach the front EMC shield.

Note: Engage both thumbscrews before you tighten either screw.

PICTURE 244

15. Restore the control panel to operating position and tighten screw 1 :

PICTURE 245

16. Complete the Exchange Disk Drive command by entering the following sequence on the control panel:

a. 9 PICTURE 246

   Note: The 3514 will attempt to return the disk drive to its configuration.

b. As the command processes, the display indicates the percent completed.

c. When the operation ends without error, a quick status of the disk drives is displayed.

   Example:

```
+-----------------+
¦ 1 2 3 _ 5 _ 7 _ ¦  Indicates the disk
+-----------------+  configuration
  1 2 3 4 5 6 7 8
```

d. If the 3514 detects an error during the 4 2 9 n command, a return code is displayed.

   To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 2 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

   Note: A return code of DE may indicate an address jumper or cable is not installed correctly.

   If an address jumper or cable is the cause of the problem, correct the problem.

   If an address jumper or cable is not the cause of the problem, continue with the next step.

e. Press the * (Home) key to clear the display and return it to ready status (*000).

   Note: Do not attempt to correct new problems at this time. Return to the problem recovery procedure that sent you here.

17. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

End of procedure.

4.5.3 Disk Drive Data Cable

Do not switch off power to the 3514 unless directed by the procedure in this manual.

1. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

Note: If you do not know the location of the failing FRU, the character in the third position of the URC that initiated this repair action indicates the slot number (1 through 8).

2. Warning: Before you proceed, use the ESD handling kit, IBM part 6428316 or similar.

Loosen the screw 1 and place the control panel in the service position.

PICTURE 247

3. Remove the front EMC shield.

PICTURE 248

4. Locate the disk drive data cable that is to be exchanged.

Is this data cable attached to two disk drives?

No **Yes**

☐ Go to step 13.

5. Has power been switched off to the 3514?

No **Yes**

☐ Go to step 13.

6. To exchange the disk drive data cable FRU, begin the Exchange Disk Drive command from the control panel:

a. Using the control panel, enter the following sequence where *n* is the slot number of the disk drive attached to the broken disk drive data cable FRU:

4 2 9 n PICTURE 249

b. The control panel displays a disk drive configuration with the slot number of the drive to be exchanged indicated by a solid block.

Example:

```
+-----------------+
¦ 1 2 3 _ ¦ _ 7 _ ¦  Indicates the disk
+-----------------+  in slot 5 is ready
  1 2 3 4 5 6 7 8   to be exchanged
```

Note: If an X is displayed in another position and you are not repairing a double disk drive failure, the exchange command may have been issued to the wrong disk drive. Verify that the slot number of the disk drive being exchanged was not determined from the direct select address reported by the system.

c. If the 3514 detects an error during the 4 2 9 n command, a return code is displayed.

To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 2 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

Note: A return code of DE may indicate an address jumper or cable is not installed correctly.

7. Disconnect the disk drive data cable from the:

a. Disk drive connector 1 .
b. Air blocking plate 2 (no disk drive is installed in slot).
c. Controller card connector 3 .

PICTURE 250

8. Install the replacement disk drive data cable to:

a. Disk drive connector 1 .
b. Air blocking plate 2 (no disk drive is installed in slot).
c. Controller card connector 3 .

PICTURE 251

9. Attach the front EMC shield.

Note: Engage both thumbscrews before you tighten either screw.

PICTURE 252

10. Restore the control panel to operating position and tighten screw 1 :

PICTURE 253

11. Complete the Exchange Disk Drive command by entering the following sequence on the control panel:

a. 9 PICTURE 254

Note: This command can take up to 80 minutes to complete.

b. As the command processes, the display indicates the percent completed.
c. When the operation ends without error, a quick status of the disk drives is displayed.

Example:

```
+-----------------+
¦ 1 2 3 _ 5 _ 7 _ ¦  Indicates the disk
+-----------------+  configuration
  1 2 3 4 5 6 7 8
```

d. If the 3514 detects an error during the 4 2 9 n command, a return code is displayed.

To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 2 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

Note: A return code of DE may indicate an address jumper or cable is not installed correctly.

e. Press the * (Home) key to clear the display and return it to ready status (*000).

Note: Do not attempt to correct new problems at this time. Return to the problem recovery procedure that sent you here.

12. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

End of procedure.

13. Ensure that the 3514 Power switch is set to the Off position.

14. Disconnect the disk drive data cable from the:

a. Disk drive connector (or airflow blocking plate) 1 and 2 .
b. Controller card connector 3 .

PICTURE 255

15. Install the replacement disk drive data cable:

a. Disk drive connector 1 and 2 .
b. Controller card connector 3 .

PICTURE 256

16. Attach the front EMC shield.

Note: Engage both thumbscrews before you tighten either screw.

PICTURE 257

17. Restore the control panel to operating position and tighten screw 1 :

PICTURE 258

18. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

19. Verify that the 3514 is operating correctly. See "Verifying a Repair" in topic 4.5.17.

End of procedure.

4.5.4 Disk Drive Power Cable

Do not switch off power to the 3514 unless directed by the procedure in this manual.

1. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

Note: If you do not know the location of the failing FRU, the character in the third position of the URC that initiated this repair action indicates the slot number (1 through 8).

2. Warning: Before you proceed, use the ESD handling kit, IBM part 6428316 or similar.

Loosen the screw 1 and place the control panel in the service position.

PICTURE 259

3. Remove the front EMC shield.

PICTURE 260

4. Locate the disk drive power cable that is to be exchanged.

Note: A data cable is attached to the disk drive in this slot.

Is this data cable attached to two disk drives?

No Yes

□ Go to step 18.

5. Has power been switched off to the 3514?

No Yes

□ Go to step 18.

6. To exchange the disk drive power cable FRU, begin the Exchange Disk Drive command from the control panel:

a. Using the control panel, enter the following sequence where *n* is the slot number of the disk drive attached to the broken disk drive power cable FRU:

4 2 9 n PICTURE 261

b. The control panel displays a disk drive configuration with the slot number of the drive to be exchanged indicated by a solid block.

Example:

```
+-----------------+
¦ 1 2 3 _ ¦ _ 7 _ ¦  Indicates the disk
+-----------------+  in slot 5 is ready
  1 2 3 4 5 6 7 8   to be exchanged
```

Note: If an X is displayed in another position and you are not repairing a double disk drive failure, the exchange command may have been issued to the wrong disk drive. Verify that the slot number of the disk drive being exchanged was not determined from the direct select address reported by the system.

c. If the 3514 detects an error during the 4 2 9 n command, a return code is displayed.

To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 2 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

Note: A return code of DE may indicate an address jumper or cable is not installed correctly.

7. Disconnect the following cables from the disk drive:

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 262

8. Remove the disk drive assembly from the slot.

PICTURE 263

9. Remove the airflow blocking plate next to the disk drive assembly that was removed.

PICTURE 264

10. Disconnect the disk drive power cable from the connector panel.

Then, remove the power cable from the cable retainer clips.

PICTURE 265

11. Install the replacement disk drive power cable.

Note: Ensure that the power cable is installed in the cable retainer clips.

PICTURE 266

12. Insert the disk drive assembly into the slot from which it was removed.

PICTURE 267

13. Put the airflow blocking plate into the slot next to the disk drive assembly that was installed.

PICTURE 268

14. Attach the following cables:

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

Note: Place the other end of the disk drive data cable in the clip on the airflow blocking plate.

PICTURE 269

15. Attach the front EMC shield.

Note: Engage both thumbscrews before you tighten either screw.

PICTURE 270

16. Restore the control panel to operating position and tighten screw 1 :

PICTURE 271

17. Complete the Exchange Disk Drive command by entering the following sequence on the control panel:

a. 9 PICTURE 272

Note: This command can take up to 80 minutes to complete.

b. As the command processes, the display indicates the percent completed.

c. When the operation ends without error, a quick status of the disk drives is displayed.

Example:

```
+-----------------+
¦ 1 2 3 _ 5 _ 7 _ ¦  Indicates the disk
+-----------------+  configuration
  1 2 3 4 5 6 7 8
```

d. If the 3514 detects an error during the 4 2 9 n command, a return code is displayed.

To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 2 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

Note: A return code of DE may indicate an address jumper or cable is not installed correctly.

e. Press the * (Home) key to clear the display and return it to ready status (*000).

Note: Do not attempt to correct new problems at this time. Return to the problem recovery procedure that sent you here.

End of procedure.

18. Ensure that the 3514 Power switch is set to the Off position.

19. Disconnect the following cables from both disk drives that are attached to the disk drive data cable:

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 273

20. Warning: Note the exact location of each drive. Installing drives in a different location can result in loss of data or system availability.

Remove both disk drive assemblies from their slots.

PICTURE 274

21. Disconnect the broken disk drive power cable from the connector panel.

PICTURE 275

22. Install the replacement disk drive power cable.

Note: Ensure that the power cable is installed in the cable retainer clips.

PICTURE 276

23. Insert the two disk drive assemblies into their original slots.

PICTURE 277

24. Attach the following cables to both disk drives:

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

Note: Place the other end of the disk drive data cable in the clip on the airflow blocking plate or on the second disk drive that was removed.

PICTURE 278

25. Attach the front EMC shield.

Note: Engage both thumbscrews before you tighten either screw.

PICTURE 279

26. Restore the control panel to operating position and tighten screw 1 .

PICTURE 280

27. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

28. Verify that the 3514 is operating correctly. See "Verifying a Repair" in topic 4.5.17.

End of procedure.

4.5.5 Power Module

Do not switch off power to the 3514 unless directed by the procedures in this manual.

Use the following procedure to exchange a power module.

1. Has power been switched off to the 3514?

No **Yes**

□ Go to step 12.

2. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

Note: If you do not know the location of the failing FRU, the character in the third position of the URC that initiated this repair action indicates the power module (A, B, or C).

3. Warning: Before you proceed, use the ESD handling kit, IBM part 6428316 or similar.

To exchange the power module, begin the Exchange Power Module command from the control panel:

a. Using the control panel, enter the following sequence where *x* is the location (A, B, or C) of the power module being exchanged:

4 3 9 x PICTURE 281

b. The control panel displays a power module quick status with the location of the power module to be exchanged indicated by a solid block (¦).

Example:

PICTURE 282

Module B is selected
Modules A and C are on
Modules A and C cannot
be turned off without
losing availability.

c. If the 3514 detects an error during the 4 3 9 n command, a return code is displayed.

To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 3 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

d. Verify that the LED indicator on the power module you powered off is off. If it is not off, go to step 12.

4. Remove the rear cover (see "Rear Cover Removal or Installation Procedure" in topic 4.4).

5. Remove the rear EMC shield:

a. Loosen screw 1 .
b. Remove screws 2 .

PICTURE 283

6. Remove the screw that fastens the selected power module to the guide and remove the power module.

DANGER

```
+-------------------------------------------------------------------+
¦ Up to 240 V ac is present at the power module connectors when the  ¦
¦ main power cord is connected to a power source.  (RSFTD010)       ¦
+-------------------------------------------------------------------+
```

PICTURE 284

7. Install the replacement power module in the 3514 using the screw removed in the previous step.

8. Complete the Exchange Power Module command by entering the following sequence on the control panel:

a. 9 PICTURE 285

Notes:
1) A power module quick status is displayed when the command is complete.
2) All power modules are operating correctly when the power module quick status display shows:

```
+-----------------+
¦ A □   B □   C □ ¦ All Power modules
+-----------------+ are operating
  1 2 3 4 5 6 7 8   correctly.
```

3) If the 3514 detects an error during the 4 3 9 n command, a return code is displayed.

   To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 3 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

b. Press the * (Home) key to clear the display and return it to ready status (*000).

9. Attach the rear EMC shield.

□ Install and tighten screws 2 .
□ Tighten screw 1 .

PICTURE 286

10. Install the rear cover (see "Rear Cover Removal or Installation Procedure" in topic 4.4).

11. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

End of procedure.

12. Ensure that the 3514 Power switch is set to the Off position.

13. Remove the rear cover (see "Rear Cover Removal or Installation Procedure" in topic 4.4).

14. Warning: Before you proceed, use the ESD handling kit, IBM part 6428316 or similar.

Remove the rear EMC shield:

a. Loosen screw 1 .
b. Remove screws 2 .

PICTURE 287

15. Remove the screw that fastens the selected power module to the guide and remove the power module.

DANGER

```
+-------------------------------------------------------------------+
¦ Up to 240 V ac is present at the power module connectors when the  ¦
¦ main power cord is connected to a power source.  (RSFTD010)       ¦
+-------------------------------------------------------------------+
```

PICTURE 288

16. Install the replacement power module in the 3514 using the screw removed in the step 15.

17. Attach the rear EMC shield.

- Install and tighten screws 2 .
- Tighten screw 1 .

PICTURE 289

18. Install the rear cover (see "Rear Cover Removal or Installation Procedure" in topic 4.4).

19. Verify that the 3514 is operating correctly. See "Verifying a Repair" in topic 4.5.17.

End of procedure.

4.5.6 Airflow Blocking Plate

Do not switch off power to the 3514 unless directed by the procedure in this manual.

Warning: This procedure must not be used to remove a disk drive in the 3514 configuration. Do not perform this procedure unless you have been sent here by a problem recovery procedure in this manual.

Use the following procedure to install the airflow blocking plate.

1. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

Note: If you do not know the location of the failing FRU, the character in the third position of the URC that initiated this repair action indicates the slot number (1 through 8).

2. Warning: Before you proceed, use the ESD handling kit, IBM part 6428316 or similar.

Loosen the screw 1 and place the control panel in the service position.

PICTURE 290

3. Remove the front EMC shield.

PICTURE 291

4. Is a disk drive installed in a slot that is not configured?

Yes No

□ Go to step 7.

5. Disconnect the following cables from the disk drive to be exchanged.

Note: If the data cable is attached to another disk drive, hold this connector in place with one hand while disconnecting the other connector from the disk drive to be removed.

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 292

6. Remove the disk drive from the slot.

Note: Place the disk drive on a flat surface with the part number label face down.

PICTURE 293

7. Insert the airflow blocking plate into the 3514.

PICTURE 294

8. Attach the following cables to the airflow blocking plate:

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 295

9. Attach the front EMC shield.

Note: Engage both thumbscrews before you tighten either screw.

PICTURE 296

10. Restore the control panel to operating position and tighten screw 1 :

PICTURE 297

11. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

Return to the procedure that sent you here.

4.5.7 Reset Disk Drive

Do not switch off power to the 3514 unless directed by the procedure in this manual.

This procedure is used to return a disk drive to an operational state, if it has not been removed from the 3514. Using the control panel, the Exchange Disk Drive command, will install the disk drive into the 3514 again.

Note: This procedure is not used to physically exchange the disk drive. This procedure just makes a disk drive operational that was not operating due to some other fault.

Perform the following:

1. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

Note: If you do not know the location of the failing FRU, the character in the third position of the URC that initiated this repair action indicates the slot number (1 through 8).

2. Warning: Before you proceed, use the ESD handling kit, IBM part 6428316 or similar.

Begin the Exchange Disk Drive command from the control panel:

Note: The Exchange Disk Drive command will do the reset function.

a. Using the control panel, enter the following sequence where *n* is the location number of the disk drive:

4 2 9 n PICTURE 298

b. The control panel displays a disk drive configuration with the slot number of the drive to be exchanged indicated by a solid block.

Example:

```
+-----------------+
¦ 1 2 3 _ ¦ _ 7 _ ¦  Indicates the disk
+-----------------+  in slot 5 is ready
  1 2 3 4 5 6 7 8    to be exchanged
```

Note: If an X is displayed in another position and you are not repairing a double disk drive failure, the exchange command may have been issued to the wrong disk drive. Verify that the slot number of the disk drive being exchanged was not determined from the direct select address reported by the system.

c. If the 3514 detects an error during the 4 2 9 n command, a return code is displayed.

To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 2 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

Note: A return code of DE may indicate an address jumper or cable is not installed correctly.

3. Loosen the screw 1 and place the control panel in the service position.

PICTURE 299

4. Remove the front EMC shield.

PICTURE 300

5. Check the following cables to ensure that they are not damaged and that the connectors are tightly seated. Also, check that the power cables are not swapped.

If these cables are called out in the URC that initiated this procedure, it is recommended that you exchange them now.

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 301

6. Check the address jumper to ensure that it is not damaged and that it is tightly seated.

Note: Only disk drives in odd-numbered slots (1 3 5 7) have an address jumper.

PICTURE 302

7. Attach the front EMC shield.

Note: Engage both thumbscrews before you tighten either screw.

PICTURE 303

8. Restore the control panel to operating position and tighten screw 1 :

PICTURE 304

9. Complete the Exchange Disk Drive command by entering the following sequence on the control panel:

a. 9 PICTURE 305

Note: This command can take up to 80 minutes to complete. Data on this disk drive will be built again.
b. As the command processes, the display indicates the percent completed.
c. When the operation ends without error, a quick status of the disk drives is displayed.

Example:

```
+-----------------+
¦ 1 2 3 _ 5 _ 7 _ ¦  Indicates the disk
+-----------------+  configuration
  1 2 3 4 5 6 7 8
```

d. If the 3514 detects an error during the 4 2 9 n command, a return code is displayed.

To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 2 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

Note: A return code of DE may indicate an address jumper or cable is not installed correctly. **Do not attempt to correct other problems at this time.**
e. Press the * (Home) key to clear the display and return it to ready status (*000).

Note: Do not attempt to correct new problems at this time. Return to the problem recovery procedure that sent you here.

10. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

End of procedure.

4.5.8 Controller Card

Use the following procedure to exchange the controller card.

1. Set the 3514 Power switch to the Off position.

2. Disconnect the ac power cable from the rear of the 3514.

PICTURE 306

3. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

4. Loosen the screw 1 and place the control panel in the service position.

PICTURE 307

5. Remove the front EMC shield.

PICTURE 308

6. Warning: Use the ESD kit. Attach the ground lead to the frame of the 3514.

Disconnect all disk drive data cables from the controller card and move them away from the card.

PICTURE 309

7. CAUTION:
The controller card contains a lithium battery. To avoid possible explosion, do not burn, exchange, or charge the battery. Discard the controller card as instructed by local regulations for lithium batteries. *(RSFTC228)*

Remove the controller card from the 3514.

PICTURE 310

8. Install the replacement controller card.

9. Connect all four disk drive data cables to the controller card.

PICTURE 311

10. Attach the front EMC shield.

Note: Engage both thumbscrews before you tighten either screw.

PICTURE 312

11. Restore the control panel to operating position and tighten screw 1 :

PICTURE 313

12. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

13. Connect the ac power cable to the rear of the 3514.

PICTURE 314

14. Did you come to this procedure from "Problem Recovery Procedure 4a"?

No Yes

- Return to the problem recovery procedure that sent you to this exchange procedure.

15. Verify that the 3514 is operating correctly. See "Verifying a Repair" in topic 4.5.17.

End of procedure.

4.5.9 Control Panel

Use the following procedure to exchange the control panel.

1. Set the 3514 Power switch to the Off position.

2. Disconnect the ac power cable from the rear of the 3514.

PICTURE 315

3. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

4. Loosen the screw 1 and place the control panel in the service position.

PICTURE 316

5. Warning: Before you proceed, use the ESD handling kit, IBM part 6428316 or similar. Attach the ground lead to the frame of the 3514.

Disconnect the control panel interface cable from the control panel.

PICTURE 317

6. Remove the control panel shield assembly from the control panel.

Note: Do not pry on the shield with any tool. Press on the area around each clip-tab and carefully loosen each clip-tab one at a time. Start at the right side of the control panel and proceed to the left side.

7. Remove the control panel from the metal mounting plate.

PICTURE 318

8. Attach the replacement control panel to the metal mounting plate.

9. Attach the control panel shield assembly to the control panel.

Note: Position the clip-tabs on the left side of the control panel shield assembly into the holes on the mounting plate. Then, carefully press each clip-tab into its respective hole starting on the left side of the control panel and proceeding to the right side.

PICTURE 319

10. Connect the control panel interface cable to the control panel.

PICTURE 320

11. Restore the control panel to operating position and tighten screw 1 :

PICTURE 321

12. Connect the ac power cable to the rear of the 3514.

PICTURE 322

13. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

14. Verify that the 3514 is operating correctly. See "Verifying a Repair" in topic 4.5.17.

End of procedure.

4.5.10 Fan

Use the following procedure to exchange the fan.

1. Set the 3514 Power switch to the Off position.

2. Remove the rear cover (see "Rear Cover Removal or Installation Procedure" in topic 4.4).

3. Disconnect the ac power cable from the rear of the 3514.

Warning: Before you proceed, use the ESD handling kit, IBM part 6428316 or similar.

PICTURE 323

4. Remove the rear EMC shield:

- Loosen screw 1 .
- Remove screws 2 .

PICTURE 324

5. Remove the screw that fastens each power module to the guide and remove all three power modules.

DANGER

Up to 240 V ac is present at the power module connectors when the main power cord is connected to a power source. *(RSFTD010)*

PICTURE 325

6. Disconnect the fan power cable.

7. Remove the fan from the connector panel.

Note: Use a screw driver to pry loose the spring clip that holds the failing fan to the connector panel.

PICTURE 326

8. Attach the replacement fan in the connector panel using the spring clip that was removed from the failing fan. Use a screwdriver to attach the clip to the connector panel.

9. Reconnect the fan power cable.

10. Install all the power modules using the screw that fastens each power module to the guide plate.

PICTURE 327

11. Attach the rear EMC shield.

- Install and tighten screws 2 .
- Tighten screw 1 .

PICTURE 328

12. Connect the ac power cable to the rear of the 3514.

PICTURE 329

13. Install the rear cover (see "Rear Cover Removal or Installation Procedure" in topic 4.4).

14. Verify that the 3514 is operating correctly. See "Verifying a Repair" in topic 4.5.17.

End of procedure.

4.5.11 Connector Panel

Use the following procedure to exchange the connector panel.

1. Set the 3514 Power switch to the Off position.

2. Disconnect the ac power cable from the rear of the 3514.

PICTURE 330

3. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

4. Warning: Before you proceed, use the ESD handling kit, IBM part 6428316 or similar.

Loosen the screw 1 and place the control panel in the service position.

PICTURE 331

5. Disconnect the control panel interface cable from the control panel.

PICTURE 332

6. Remove the front EMC shield.

PICTURE 333

7. Disconnect the following cables from all disk drives:

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 334

8. Remove the controller card.

Note: You do not have to remove the disk drive data cables from the controller card.

PICTURE 335

9.

Warning: Note exact location of each disk drive. Moving the drives to different locations can result in loss of data and system availability.

Remove all disk drives and airflow blocking plates.

PICTURE 336

10. Note the serial number and location of each disk drive in the 3514.

You can record the serial number of any disk drive installed using the following diagram:

PICTURE 337

11. Disconnect all disk drive power cables from the connector panel.

Note: You do not need to remove the power cables from the cable retainer clips.

PICTURE 338

12. Remove the right and left disk drive guides and separator plates.

PICTURE 339

13. Remove the rear cover (see "Rear Cover Removal or Installation Procedure" in topic 4.4).

14. Disconnect the adapter cable and terminating plug from the 3514.

PICTURE 340

15. Remove the rear EMC shield.

a. Loosen screw 1 .
b. Remove screws 2 .

PICTURE 341

16. Remove all three power modules by removing the one screw securing each module.

DANGER

Up to 240 V ac is present at the power module connectors when the main power cord is connected to a power source. *(RSFTD010)*

PICTURE 342

17. Remove the two screws securing the top cover.

Remove the top cover by sliding the cover to the rear of the 3514.

PICTURE 343

18. Remove the side covers.

PICTURE 344

19. Remove the mounting plates as follows:

a. Disconnect the line filter power cord attached to the connector panel from the line filter.
b. Remove the screws holding each mounting plate to the 3514 enclosure:
   - Four screws on the left mounting plate.
   - Two screws on the right mounting plate.

PICTURE 345

20. Remove the four screws securing the two cable connectors to the enclosure.

PICTURE 346

21. Disconnect both fan power cable connectors.

PICTURE 347

22. Remove the screws securing the connector panel to the enclosure.

a. Six screws 1 outside the enclosure.
b. Two screws 2 inside the enclosure.

Then, remove the connector panel.

Note: The end of the connector panel with the control panel cable must be pivoted out first.

PICTURE 348

23. Remove the fans from the connector panel.

Note: Use a screw driver to pry loose the spring clip that holds the fan to the connector panel.

PICTURE 349

24. Attach the fans to the replacement connector panel using the clips removed in step 23.

25. Insert the replacement connector panel.

Notes:

a. Insert the control panel cable toward the front.
b. Ensure that the adapter cable is to the rear.
c. Firmly seat the connector panel seats into the guide flange on the side of the 3514 frame.

26. Attach the connector panel and screws to secure the connector panel to the disk enclosure.

a. Two screws 2 inside the enclosure.
b. Six screws 1 outside the enclosure.

PICTURE 350

27. Attach the two cable connectors to the enclosure.

PICTURE 351

28. Connect both fan power cable connectors.

PICTURE 352

29. Install the mounting plates using the screws and holding each mounting plate to the 3514 enclosure.

Connect the line filter power cord to the connector panel.

PICTURE 353

30. Attach the side covers.

31. Attach the top cover.

32. Install all power modules using the screws removed in step 16.

33. Attach the rear EMC shield.

- Install and tighten screws 2 .
- Tighten screw 1 .

PICTURE 354

34. Connect the adapter cable and terminating plug to the 3514.

PICTURE 355

35. Install the rear cover (see "Rear Cover Removal or Installation Procedure" in topic 4.4).

36. Install the right and left disk drive guides and separator plates.

PICTURE 356

37. Reconnect all disk drive power cables that were disconnected.

Note: Ensure that each power cable is installed in its cable retainer clips.

PICTURE 357

38. Warning: Ensure that each disk is installed in the slot from which it was removed or else the 3514 configuration will not match.

Insert all disk drive assemblies and airflow blocking plates into the slots from which they were removed.

PICTURE 358

39. Install the controller card with attached disk drive data cables.

PICTURE 359

40. Attach the following cables:

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

Note: Place the center connector of the disk drive data cable and any power cables into the airflow control plate or on the second disk drive that was removed.

PICTURE 360

41. Reconnect the control panel interface cable to the control panel.

PICTURE 361

42. Attach the front EMC shield.

Note: Engage both thumbscrews before you tighten either screw.

PICTURE 362

43. Restore the control panel to operating position and tighten screw 1 .

PICTURE 363

44. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

45. Connect the ac power cable to the rear of the 3514.

PICTURE 364

46. Verify that the 3514 is operating correctly. See "Verifying a Repair" in topic 4.5.17.

End of procedure.

4.5.12 Line Filter and Cable

Use the following procedure to exchange the line filter and cable.

1. Set the 3514 Power switch to the Off position.

2. Remove the rear cover (see "Rear Cover Removal or Installation Procedure" in topic 4.4).

3. Disconnect the ac power cable from the rear of the 3514.

PICTURE 365

4. Remove the rear EMC shield:

a. Loosen screw 1 .
b. Remove screws 2 .

PICTURE 366

5. Remove the screw that fastens power module C (bottom-most position) to the guide and remove the power module.

PICTURE 367

6. Disconnect the connector panel power cord from the line filter.

Remove the two screws that secure the line filter and line filter cover to the mounting plate.

PICTURE 368

7. Remove the line filter as follows:

a. Remove the line filter cover.
b. Remove the screw from the green ground wire terminal lug and star washer.
c. Press on the retaining clips that hold the connector panel power cord connector to the mounting plate. Then, remove the connector from the mounting plate.

8. Install the replacement line filter and cable.

Notes:

a. Ensure that the green ground wire terminal lug is attached to the mounting plate with the star washer under the terminal lug.

PICTURE 369

b. Ensure that the power cord connector of the connector panel is seated in the mounting plate.
c. Ensure the line cord connector is secured to the mounting plate.
d. Ensure that the line filter cover is installed and secured to the mounting plate.
e. Connect the power cord of the connector panel to the line filter.

9. Install all power modules using the screws removed in step 5.

10. Attach the rear EMC shield.

- Install and tighten screws 2 .
- Tighten screw 1 .

PICTURE 370

11. Connect the ac power cable to the rear of the 3514.

PICTURE 371

12. Install the rear cover (see "Rear Cover Removal or Installation Procedure" in topic 4.4).

13. Verify that the 3514 is operating correctly. See "Verifying a Repair" in topic 4.5.17.

End of procedure.

4.5.13 Terminating Plug

Use the following procedure to exchange the terminating plug.

1. Remove the rear cover (see "Rear Cover Removal or Installation Procedure" in topic 4.4).

2. Remove the terminating plug.

PICTURE 372

3. Attach the replacement terminating plug.

PICTURE 373

4. Install the rear cover (see "Rear Cover Removal or Installation Procedure" in topic 4.4).

5. Verify that the 3514 is operating correctly. See "Verifying a Repair" in topic 4.5.17.

End of procedure.

4.5.14 AC Power Cable

Use the following procedure to exchange the ac power cable.

1. Set the 3514 Power switch to the Off position.

2. Remove the rear cover (see "Rear Cover Removal or Installation Procedure" in topic 4.4).

3. Disconnect the ac power cable from the rear of the 3514 and the electrical outlet.

PICTURE 374

4. Install the replacement ac power cable to the rear of the 3514 and the electrical outlet.

5. Install the rear cover (see "Rear Cover Removal or Installation Procedure" in topic 4.4).

6. Verify that the 3514 is operating correctly. See "Verifying a Repair" in topic 4.5.17.

End of procedure.

4.5.15 Cable Assembly

Use the following procedure to exchange the I/O cable assembly at the system rack.

DANGER

To prevent a possible electrical shock from touching two surfaces with different electrical grounds, use one hand, when possible, to connect or disconnect signal cables. *(RSFTD004)*

1. Switch off system (see the "Quick Reference Manual" for your system). Then, continue with step 2.

2. At the system, turn the two thumbscrews counterclockwise to remove the cable from the adapter.

3. At the 3514, turn the two thumbscrews counterclockwise to remove the cable from the back of the 3514.

4. At the 3514, connect the new cable to the back of the 3514 by inserting the connector and turning the two thumbscrews clockwise.

5. At the system, connect the new cable to the adapter by inserting the connector into the adapter socket and turning the two thumbscrews clockwise.

6. Switch on system (see the "Quick Reference Manual" for your system).

7. Verify that the 3514 is operating correctly. See "Verifying a Repair" in topic 4.5.17.

End of procedure.

4.5.16 Adapter Card

Use the following procedure to exchange the host adapter card.

1. Set the 3514 Power switch to the Off position.

2. Use the system unit *Quick Reference Manual* to remove and install the adapter card.

3. Set the 3514 Power switch to the On position.

4. Run the 3514/A Array Adapter diagnostics. (See the *3514 Quick Reference Manual*, SA21-9613 for information on how to run diagnostics.)

Did the diagnostics run without error?

Yes **No**

□ go to "Starting Problem Analysis" in topic 1.2.

End of procedure.

4.5.17 Verifying a Repair

Use the following procedure to verify a 3514 repair:

1. Did you exchange a power module?

Yes **No**

□ Go to step 3.

2. Locate the power module that has been exchanged (A, B, or C) and go to step 17.

3. Did you exchange a FRU because of a URC of C9Dx or C9xD?

No **Yes**

□ Go to step 12.

4. Did you exchange a FRU because of a URC of C9xx?

Yes **No**

□ Go to step 6.

5. Locate the power module that reported the error and go to step 17. The third character of the URC contains the location (A, B, or C) of the power module.

6. Did you exchange a FRU because of one of the following URCs?

5xxx
6xxx
7xxx
8xxx
9xxx
Dxxx
Exxx

Yes **No**

□ Go to step 8.

7. Locate the disk drive that reported the error and go to step 25. The third character of the URC contains the slot number (1-8) of the disk drive.

8. Did you come to this procedure from a problem recovery procedure in this manual?

Yes **No**

□ Go to step 12.

9. Set the 3514 Power switch to the On position.

10. After 3 minutes, the power-up sequence should be complete.

Is *000 or B000 displayed?

Yes **No**

□ The exchange procedure was **not** successful. Return to the problem recovery procedure that sent you to this procedure.

11. The exchange procedure was successful. Return to the problem recovery procedure that sent you to this procedure.

End of verifying a repair.

12. Set the 3514 Power switch to the On position.

13. After 3 minutes, is *000, B000, or BBA0 displayed on the Data display?

Yes **No**

□ Go to "Starting Problem Analysis" in topic 1.2.

14. From your computer system, run the diagnostic test programs for the 3514/A Array Adapter. (See the *3514 Quick Reference Manual* SA21-9613 for instructions on running diagnostics.)

Did the test programs run without error?

Yes **No**

□ Go to "Starting Problem Analysis" in topic 1.2.

15. Is *000 displayed on the Data display?

Yes **No**

□ Go to "Starting Problem Analysis" in topic 1.2.

End of procedure.

16. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

End of verifying a repair.

17. Set the 3514 Power switch to the On position.

18. After 3 minutes, the power-up sequence should be complete.

Is *000 or B000 displayed?

No **Yes**

□ Go to step 21.

19. Is the code BBA0 displayed?

Yes **No**

□ Go to "Starting Problem Analysis" in topic 1.2.

20. Wait until the display changes. This can take up to 30 minutes.

Is *000 or B000 displayed?

Yes **No**

□ Go to "Starting Problem Analysis" in topic 1.2.

21.

Note: The failure has been corrected, but the error must now be cleared using the Exchange Power Module command.

Using the control panel, enter the following sequence where *x* is the location (A, B, or C) of the power module that was exchanged or is reporting an error.

4 3 9 x PICTURE 375

The control panel displays a power module quick status with the location of the power module (A, B, or C) indicated by a solid block (¦).

Example:

PICTURE 376

Module B is selected

If the 3514 detects an error during the 4 3 9 n command, a return code is displayed.

To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 3 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
```

1 2 3 4 5 6 7 8

22. Complete the Exchange Power Module command by entering the following sequence on the control panel:

9 PICTURE 377

A power module quick status is displayed when the command is complete.

All power modules are operating correctly when the power module quick status display shows:

```
+-----------------+
¦ A □   B □   C □ ¦ All Power modules
+-----------------+ are operating
  1 2 3 4 5 6 7 8   correctly.
```

If the 3514 detects an error during the 4 3 9 n command, a return code is displayed.

To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 3 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

23. Press the * (Home) key to clear the display and return it to ready status (*000).

24. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

End of verifying a repair.

25. Set the 3514 Power switch to the On position.

26. After 3 minutes, the power-up sequence should be complete.

Is *000, B000, or 3514xxxx displayed?

No Yes

□ Go to step 29.

27. Is the code BBA0 displayed?

Yes No

□ Go to "Starting Problem Analysis" in topic 1.2.

28. Wait until the display changes. This can take up to 30 minutes.

Is *000, B000, or 3514xxxx displayed?

Yes No

□ Go to "Starting Problem Analysis" in topic 1.2.

29.

Note: The failure has been corrected, but the error must now be cleared using the Exchange Disk Drive command.

Using the control panel, enter the following sequence where *n* is the location (1 through 8) of the disk drive that was exchanged or is reporting an error.

4 2 9 n PICTURE 378

The control panel displays a disk drive configuration with the slot number of the drive to be reset indicated by a solid block.

Example:

```
+-----------------+
¦ 1 2 3 _ ¦ _ 7 _ ¦  Indicates the disk
+-----------------+  in slot 5 is to
```

```
  1 2 3 4 5 6 7 8    be reset
```

If the 3514 detects an error during the 4 2 9 n command, a return code is displayed.

To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 2 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

Note: A return code of DE may indicate an address jumper or cable is not installed correctly.

30. Complete the Exchange Disk Drive command by entering the following sequence on the control panel: 9 PICTURE 379

Note: This command can take up to 80 minutes to complete. Data on this disk drive will be built again.

As the command processes, the display indicates the percent completed.

When the operation ends without error, a quick status of the disk drives is displayed.

Example:

```
+-----------------+
¦ 1 2 3 _ 5 _ 7 _ ¦  Indicates the disk
+-----------------+  configuration
  1 2 3 4 5 6 7 8
```

If the 3514 detects an error during the 4 2 9 n command, a return code is displayed.

To determine if further action is required, go to "Control Panel Command Return Code Information" in topic 3.4.

```
+-----------------+
¦   4 2 9 n   x x ¦  Return Code x x
+-----------------+  on disk drive n.
  1 2 3 4 5 6 7 8
```

Note: A return code of DE may indicate an address jumper or cable is not installed correctly.

If you came here from a problem recovery procedure in this manual, **do not** attempt to correct problems indicated by any other return codes. If another return code is displayed, return to the problem recovery procedure that sent you here.

31. Press the * (Home) key to clear the display and return it to ready status (*000).

32. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

End of verifying a repair.

4.6 Safety Inspection Guide

Safety items to protect operators and service personnel from injury are included in the design and assembly of IBM machines. This inspection guide identifies areas of the machine that should be checked. Use good judgment to identify other safety conditions not covered by this inspection guide.

These procedures are for use by IBM service representatives only. If these procedures are used by persons other than IBM service representatives, IBM cannot verify that the machine has met all safety conditions.

Subtopics

4.6.1 Getting Ready

Before you perform inspection procedures in this guide, ensure that conditions are safe and that the machine is powered off.

Subtopics
4.6.1.1 Safety Conditions
4.6.1.2 Safety Education
4.6.1.3 Chemicals
4.6.1.4 Reference Information

4.6.1.1 Safety Conditions

If conditions are not safe, correct the condition before you service this device. For example, the following conditions are not safe:

- Electrical: In the primary power area, a frame is not grounded
- Mechanical: Missing covers
- Other: Leaking capacitors

You must determine if the problem should be repaired before you can continue with this inspection.

4.6.1.2 Safety Education

Before you perform the inspection procedures in this guide, complete the Electrical Safety Training Course for IBM Customer Engineers (77170 or later).

4.6.1.3 Chemicals

Do not use solvents, cleaners, or other chemicals not approved by IBM.

4.6.1.4 Reference Information

Ensure that the following reference information is available:

- *Customer Engineering Memorandums (CEMs)*, *Engineering Change Announcements (ECAs)*, and *Service Aids (SAs)* for this machine type.
- System installation or upgrade instructions that you used to exchange the 3514.
- Electrical Safety for IBM Customer Engineers, S229-8888.

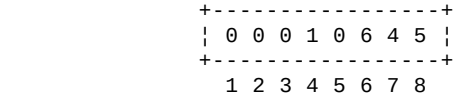
4.6.2 Verifying Serial Numbers

Both the 3514 and each installed disk drive have a serial number.

1. To display the 3514 serial number from the control panel, press the following sequence on the control panel:

1 0 2 PICTURE 380

Example:



2. The 3514 serial number is in the following locations:

- Control panel
- Frame (bottom)

Verify that the serial number matches with the serial number shown in the display.

PICTURE 381

3. Continue to the next procedure.

4.6.3 Checking the AC Power Cable

1. Set the 3514 Power switch to the Off position.

2. Remove the rear cover.

3. Disconnect the ac power cable from the power outlet and from the rear of the 3514.

PICTURE 382

4. Check the power cable for visible cracks, wear, or damage.

5. Check for 1.0 ohm or less of resistance between the power cable ground terminal and the power supply frame.

6. Connect the ac power cable to the power outlet and to the rear of the 3514.

7. Continue to the next procedure.

4.6.4 Checking the Safety Labels

1. Ensure that the 3514 has all its safety labels visible:

- 240 V ac on each of the three connector panel power supply connectors 1
- Weight label at two locations 2
- Main power rating on the enclosure of the 3514 3
- 240 V ac on the cover of the line filter 4
- Hazardous Area Trained Service Personnel Only on the rear EMC shield 5
- Do Not Open-Do Not Service label on each power module 6

PICTURE 383

2. Continue to the next procedure.

4.6.5 Checking the Shields or Safety Covers

1. Ensure that the following shields are in place:

- Fan shields on both sides of each fan.
- Front EMC shield.
- Rear EMC shield.
- Line filter cover.

PICTURE 384

2. Ensure that the front cover is present and that no sharp edges are exposed from broken or bent parts.

3. Attach the rear cover.

4. Continue to the next procedure.

4.6.6 Checking the AC Safety Grounds

1. Ensure the following ground points make contact and all ground screws are tight:

- One spring contact for each power module mounted on the power module mounting plates (top and bottom 1).
- Ground screws that hold the mounting plates to the 3514 enclosure (left plate 2 , right plate 3).
- Ground wire attached to the inside of the connector panel 4 .
- One ground screw that holds each power module to the mounting plate (note the ground symbol next to the screw). 5 .
- Ground screws on the appliance coupler ac input on the line filter 6 .
- Ground screw and green/yellow terminal wire attaching the line filter to the power module mounting plate (note the ground symbol next to the screw) 7 .

PICTURE 385

2. Verify that the 3514 is operating correctly.

3. End of procedure.

5.0 Chapter 5. Installing Additional Disk Drive Features

Subtopics
5.1 Installing Additional Disk Drive Features

5.1 Installing Additional Disk Drive Features

Warning: This procedure erases all the data on the 3514. Ensure that the data has been backed up before performing this procedure.

When installing additional disk drives in the 3514, the control panel Data display indicates which slot will receive the new disk drive. The 3514 maintains an already determined sequence of which disk drive should be installed next. The 3514 accepts only disk drives installed in the correct sequence and slot.

Warning: When a disk drive assembly comes from an environment where the temperature is outside the specified operating range, the operating range being 10°C to 40°C (50°F to 104°F), that disk drive assembly should not be used for at least 3 hours. This delay permits the disk drive assembly to reach the temperature of its new environment. During this time, the disk drive assembly should be removed from its shipping box, but must remain in the sealed bag to prevent moisture from getting on the disk drive.

The disk drive assembly is electrostatic discharge (ESD) sensitive. When working with this part, use an ESD kit, IBM part 6428316 or similar. Read the instructions inside the top cover of the carrying case.

Note: The disk drive that you are installing must have at least the same capacity as the disk drives currently in the 3514. The disk drive must also be able to be formatted to the correct bite size.

Use the following procedure to upgrade or install additional disk drives.

1. Remove the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

2. Warning: Before you proceed, use the ESD handling kit, IBM part 6428316 or similar.

Loosen the screw 1 and place the control panel in the service position.

PICTURE 386

3. Remove the front EMC shield.

PICTURE 387

4. Perform an Add Disk Drives command by entering the following sequence on the control panel:

3 0 2 9 PICTURE 388

Note: The control panel displays a disk drive status with a solid block (¦) to indicate the slot to install the next additional disk drive. For example, slot 7 is shown in the following illustration.

```
+-----------------+
¦ 1   3   5   ¦   ¦
+-----------------+
  1 2 3 4 5 6 7 8
```

5. Warning: Do not disconnect the disk drive data cable from the controller card or the other disk drive (if installed).

Disconnect the following cables from the airflow blocking plate:

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 389

6. Remove the airflow blocking plate from the enclosure.

PICTURE 390

7. Attach the address jumper in the position shown to the additional disk drive to be installed:

Note: Only disk drives in odd-numbered slots (1 3 5 7) have an address jumper.

PICTURE 391

8. Insert the disk drive assembly into the unit.

PICTURE 392

9. Attach the following cables:

a. Disk drive data cable 1 .
b. Disk drive power cable 2 .

PICTURE 393

10. Enter n PICTURE 394 on the control panel where *n* is the slot number of the disk drive that was just installed.

Notes:

a. The control panel displays a disk drive status with the up arrow (□) in the position of the added disk drive and a solid block (¦) in the position of the next disk drive to be added. For example, the following illustration shows that you just installed a disk drive in slot 7 and the next slot available is slot 2.

```
   +-----------------+
   ¦ 1 ¦ 3   5   □   ¦
   +-----------------+
     1 2 3 4 5 6 7 8
```

b. If you get an error, see "Control Panel Command Return Code Information" in topic 3.4 for a description of the error.

Example:

```
+-----------------+
¦ 3 0 2 9   E 6   ¦  This command cannot be
+-----------------+  performed.  This drive
  1 2 3 4 5 6 7 8    is not present or not
                     in the configuration
                     record.
```

c. A return code of DE may indicate an address jumper or cable is incorrectly installed.

11. Do you want to install another additional disk drive?

No Yes

□ Return to step 5 and repeat these steps for each additional disk drive that needs to be installed.

12. Attach the front EMC shield.

Note: Engage each thumbscrew before you tighten either screw.

PICTURE 395

13. Restore the control panel to operating position and tighten screw 1 .

PICTURE 396

14. Enter 9 PICTURE 397 on the control panel.

Notes:

a. The 3514 controller adds all the disk drives you just installed to the configuration.
b. This procedure can take up to 80 minutes to complete Progress is shown by displaying the percent of the function that has been completed.

The following functions are performed by the controller at this time:

- If the disk drive format is not correct, the disk drive is formatted to the correct format.
- Vital product data (VPD) from the disk drives you just installed is added to the 3514 configuration.
- All the disk drives in the 3514 are written with zeros.

15. Install the front cover (see "Front Cover Removal or Installation Procedure" in topic 4.3).

End of procedure.

6.0 Chapter 6. Parts Listing

Subtopics
6.1 How To Use This Parts Listing
6.2 Assemblies

6.1 How To Use This Parts Listing

□ Similar Assemblies: If two assemblies contain a majority of identical parts, they are included on the same list. Common parts are shown by one index number. Parts peculiar to one or the other of the assemblies are listed separately and identified by description.

□ AR: (As Required) in the ***Units*** column indicates that the quantity is not the same for all machines.

□ NP: (Non-Procurable) in the ***Units*** column indicates that the part cannot be ordered and that the individual parts or the next higher assembly should be ordered.

□ NR: (Not Recommended) in the ***Units*** column indicates that the part can be ordered but not recommended for field replacement, and that the next higher assembly should be ordered.

□ R: (Restricted) in the ***Units*** column indicates that the part has a restricted availability.

□ Indenture: The indenture is marked by a series of dots located before the parts description. The indenture indicates the relationship of a part to the next higher assembly. For example:

Indenture Relationship of Parts

(No dot) Main Assembly

(One dot) □ Detail parts of a main assembly

(One dot) □ Subassembly of the main assembly

(Two dots) □ □ Detail part of a one-dot subassembly

(Two dots) □ □ Subassembly of a one-dot subassembly

(Three dots) □ □ □ Detail part of a two-dot subassembly

Asm-Index	**Part Number**	**Units**	**Description**
3-	2512667	1	Cover Asm, Rear, Red
	2513714	1	Cover Asm, Rear, White
			For Next Higher Asm, See Assembly 1-2
-1	5373637	1	□Seal, Top
-2	5356429	2	□Clip, Retaining
-3	1847630	1	□Finger Stock Asm
-4	1847602	NR	□□Channel, Finger Stock
-5	5373639	AR	□Seal, Bottom
-6	5356429	2	□Clip, Retaining
-7		NP	□Cover, Rear, Without Paint
-5	0416629	R	□Screw, Panel

6.2 Assemblies

Subtopics

6.2.1 Assembly 1: Cover Assembly

PICTURE 398

Asm-Index	Part Number	Units	Description
1-1	85F7869	1	□ Top Cover Assembly
-2	85F7871	1	□ Right Side Cover Assembly
-3	85F7742	1	□ Overlay, English US
-3	85F7745	1	□ Overlay, French, French/Canadian
-3	85F7748	1	□ Overlay, German
-3	85F7760	1	□ Overlay, Italian
-3	85F7763	4	□ Overlay, Spanish
-3	85F7766	1	□ Overlay, Belgium/Dutch, Belgium/French
-3	85F7750	1	□ Overlay, Japanese
-3	85F7754	1	□ Overlay, Korean
-3	85F7757	1	□ Overlay, Chinese (ROC)
-3	85F7769	1	□ Overlay, Chinese (PRC)
-3	85F7772	1	□ Overlay, Norwegian
-4	85F7872	1	□ Front Cover Assembly
-5	8265462	2	□ □ Clip
-6	85F7868	1	□ □ Bezel
-7	7366312	5	□ □ Screw
-8	85F7805	1	□ □ Nameplate
-9	85F7870	1	□ Left Side Cover Assembly
-10	85F7873	1	□ Rear Cover Assembly
-11	85F7853	2	□ Mounting Brace
-12	1624776	2	□ Screw
-13	1624779	2	□ Screw
-14	1624779	2	□ Screw
-15	1624779	2	□ Screw
-16	85F7700	1	□ Drawer

6.2.2 Assembly 2: Final Assembly

PICTURE 399

Asm-Index	Part Number	Units	Description
2-1	85F7812	1	□ Right File Guide
-2	85F7813	1	□ Left File Guide
-3	85F7814	4	□ Separator Plate
-4	1621308	16	□ Screw
-5	85F7827	16	□ Ground Spring
-6	85F7839	8	□ Power Cable
-7			□ DASD See Assembly 3.
-8	85F7810		□ Air Blocking Plate See Assembly 3.
-9	85F7833	1	□ Rear Panel Plate
-10	85F7834	1	□ Hinge Pin
-11	85F7837	1	□ Front Panel Plate Assembly
-12	86F0912	1	□ Control Panel Assembly
-13	85F7863	1	□ Front EMC Screen Assembly
-14	85F7847	1	□ □ EMC Gasket
-15	16G6996	4	□ Data Cable Assembly
-16	16G6990	1	□ Control Card Assembly
-17	85F7815	1	□ □ Control Card Carrier
-18	85F7819	1	□ □ Control Card Guide
-19	92X6809	5	□ □ Screw
-20	86F0802	1	□ Shield

PICTURE 400

Asm-Index	Part Number	Units	Description
2-21	85F7732	1	□ Connector Panel Assembly
-22	1624776	6	□ Screw
-23	85F7862	2	□ □ Fan Assembly
-24	92X7012	2	□ □ Fan Clip
-25	85F7875	1	□ Right Mounting Plate Assembly
-26	74F2525	3	□ Power Module
-27	92X6859	3	□ Screw
-28	85F7822	1	□ Rear EMC Screen
-29	85F7824	1	□ Line Filter Cover
-30	85F7845	1	□ AC Power Cable Filter
-31	1621170	3	□ Screw
-32	85F7874	1	□ Left Mounting Plate
-33	1622346	1	□ Starwasher
-34	92X6859	6	□ Screw
-35	92X6859	2	□ Screw
-36	92X6859	2	□ Screw
-37	92X6859	4	□ Screw
-38	85F7788	4	□ Screwlock Connector

6.2.3 Assembly 3: DASD/Airflow Block Assemblies

PICTURE 401

Asm-Index	Part Number	Units	Description
3-1	85F7730	AR	□ File Assembly
-2	16G7002	AR	□ Disk Drive Assembly (Model 001)
-2	16G7003	AR	□ Disk Drive Assembly (Model 004)
-2	86F0921	AR	□ Disk Drive Assembly (Model 008)
-3	17G1910	AR	□ Air Blocking Plate Assembly
-4	93X2420	4	□ Screw - DASD
-5	73F8994	AR	□ Disk Drive Logic Card (Model 001)
-5	55F5000	AR	□ Disk Drive Logic Card (Model 004)
-5	86F0110	AR	□ Disk Drive Logic Card (Model 008)

6.2.4 Assembly 4: Cables

Asm-Index	Part Number	Units	Description
4-1	21F9046	1	□ Cable Assembly (1.5 meters/5.0 feet)
-2	56F0383	4	□ Terminating Plug

7.0 Chapter 7. Service Log

Machine Type:	Serial Number:

Date	Description of Problem/Action Taken (Do not record hours or part numbers.)	Service Representative

A.0 Appendix A. Support Tools

Support tools provide commands that perform specific functions on a component of the 3514. These commands are not normally used for service.

For example, you may be asked to verify that a new disk drive is good before you attempt to add or exchange the disk drive into the 3514. To do this you would be directed to do the following:

- Ensure that the new disk drive is installed and correctly cabled into slot n (n = slot number of the disk drive).
- Switch on the power to the disk drive in slot n.
- Format the disk drive if required.
- Verify that the disk drive is operating correctly.

Notes:

1. When entering any command for a disk drive, n = slot number of the disk drive.
2. When using any command for a power module, x = A, B, or C (location of the power module).

Command Sequence	**Function and Description**
6 0 1 PICTURE 402	Perform extended BATS
6 0 7 1 PICTURE 403	Format the array This command is used to format all the disk drives (zero out all data) in the 3514. **Password (9 3 3 7 s s): The last two characters (s s) are the last two characters of the 3514 serial number.**
6 0 8 PICTURE 404 9 3 3 7 s s PICTURE 405	Synchronize the array checksum This command is used to rewrite all parity information on the 3514. Password (9 3 3 7 s s): The last two characters (s s) **are the last two characters of the 3514 serial number.**
6 2 1 n PICTURE 406	Start data verifications on the disk drive in slot n This command causes data written to the disk drive in slot n to be verified after it is written. It should be used when disk drive data cable is being attached to or disconnected from another disk drive. The Stop data verifies on the disk drive in slot n (6 2 3 n) command should be used when you want to return the 3514 to its normal operating condition. **Note:** This command does not run on a disk drive that can be used by the system.
6 2 3 n PICTURE 407	Stop data verifications on the disk drive in slot n This command is used to stop data verifications to the disk drive in slot n. **Note:** See the 6 2 1 n command for the information on data verifications.
6 2 4 n PICTURE 408	Verify the disk drive in slot n (Short function test) This is a short test of the disk drive in slot n. This command will run for a few seconds and then end. **Note:** This command will not run on a disk drive that can be used by the system.
6 2 5 n PICTURE 409	Start tests of the disk drive in slot n (extended tests) This command starts an extended test of the disk drive in slot n. Most functions of the disk drive, including the read and write functions are tested. **Notes:** 1. The 6 2 6 n command must be used to stop this test. 2. This command does not run on a disk drive that can be used by the system.
6 2 6 n	Stop tests of the disk drive in slot n

PICTURE 410	This command stops the extended test of the disk drive in slot n. **Note:** See the 6 2 5 n command for more information about the extended disk drive command.
6 2 7 n PICTURE 411 8 2 0 s s s PICTURE 412	FORMAT the disk drive in slot n (erases data on disk **drive)** This command formats the disk drive in slot n to 524 bytes a sector and erases all data that is on the disk drive. **Note:** This command does not run on a disk drive that can be used by the system. **Password (8 2 0 s s s):** The last three characters (s s s) are the last three characters of the disk drive serial number.
6 2 9 n PICTURE 413	Switch on power to the disk drive in slot n This command switches on power to the disk drive in slot n. The disk drive is checked to make sure that the part number is the same as the other disk drives installed in the 3514.
6 2 0 n PICTURE 414	Switch off power to the disk drive in slot n This command switches off power to the disk drive in slot n. **Notes:** 1. This command does not run if it would cause a loss of availability. 2. The display will indicate the disk drive status of all slots.
6 3 9 x PICTURE 415	Switch on power to the power module in location x
6 3 0 x PICTURE 416	Switch off power to the power module in location x
7 1 D x PICTURE 417	Set address to x This command is used to set the address. The address can be 0 through 6. The default is 0.
9 1 0 3 PICTURE 418	Reset the 3514 Warning: This command will cause loss of availability until the 3514 is in a ready condition (Power-on light is on continuously). This command can take up to 3 minutes to complete. This command resets the 3514 and causes internal diagnostics to be run.
9 6 7 PICTURE 419	Erase the URC error log
9 0 7 9 PICTURE 420	Set the 3514 Online The 3514 is reset and then set to online. **Note:** This command can take up to 3 minutes to complete.
9 1 7 0 PICTURE 421	Set the 3514 Offline Warning: This command will cause loss of availability until the 3514 is set online. The 3514 is set offline and does not respond to selection.

GLOSSARY Glossary of Terms and Abbreviations

capacity. Size or amount.

checksum protection. A function that protect data stored in an auxiliary storage pool from being lost because of the failure of a single disk. When checksum protection is in effect and a disk failure occurs, the system automatically reconstructs the data when the system program is loaded after the device is repaired.

DASD. Direct access storage device.

EIA unit. A unit of measure, established by the Electronics Industries Association, equal to 44.45 millimeters (1.75 inches).

keypad. A small keyboard on the control panel.

mirrored protection. A function that protects data by duplicating all disk data in an auxiliary storage pool (ASP) to another disk unit (mirror unit) in the same ASP. If a disk failure occurs, the system keeps running, using the mirrored unit of the mirrored pair until the disk unit is repaired or replaced.

rack. A framework that holds devices.

RAID-5. A level of redundant array of independent disks (RAID) data protection.

SCSI. Small computer system interface.