



Sun Enterprise™ 6x00/5x00/4x00/ 3x00 Systems Flash PROM Programming Guide

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Part No. 802-5579-13
February 2000, [Revision A](#)

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Preface

The *Sun Enterprise 6x00/5x00/4x00/3x00 Systems Flash PROM Programming Guide* provides instructions on how to upgrade your system flash PROM. The CD-ROM containing the new firmware code for updating your system flash PROM is included with this document. This document is for network administrators, system administrators and network and system service providers.

Using UNIX Commands

This document may not contain information on basic UNIX[®] commands and procedures such as shutting down the system, booting the system, and configuring devices. See one or more of the following for this information:

- AnswerBook2[™] online documentation for the Solaris[™] operating environment
- Other software documentation that you received with your system

Typographic Conventions

Typeface	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. % You have mail.
AaBbCc123	What you type, when contrasted with on-screen computer output	% su Password:
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be superuser to do this.
	Command-line variable; replace with a real name or value	To delete a file, type <code>rm filename</code> .

Shell Prompts

Shell	Prompt
C shell	<i>machine_name%</i>
C shell superuser	<i>machine_name#</i>
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#

Related Documentation

The following documents contain topics that relate to the information

in the *Sun Enterprise 6x00/5x00/4x00/3x00 Systems Flash PROM Programming Guide*.

TABLE P-1 Related Documentation

Title	Part Number
<i>Sun Enterprise 3500 System Reference Guide</i>	805-2630
<i>Sun Enterprise 6500/5500/4500 Systems Reference Guide</i>	805-2632

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Hardware

This chapter describes hardware features and reprogramming of security procedures.

1.1 Flash PROM

Sun Enterprise™ 6x00/5x00/4x00/3x00 systems conform to the Sun-4u architecture and use flash PROMs. Flash PROMs enable the following:

- Reprogramming of specific code blocks
- Remote reprogramming of the PROM chip by a system administrator over a local area network

1.2 Reprogramming Security Features

To provide flash PROM reprogramming security, the system flash PROMs cannot be reprogrammed while the key switch is in the locked position. This feature can be augmented by removing jumper P0601 on the system clock board.

- With the jumper *installed*, the flash PROM *can* be reprogrammed.
- With the jumper *removed*, the flash PROM *cannot* be reprogrammed.

1.2.1 Checking for the Jumper

Note – FIGURE 1-2 shows a 16-slot system. Systems also come in 4-, 5- and 8-slot configurations.

1. Turn the key switch to the Standby position. (FIGURE 1-1).

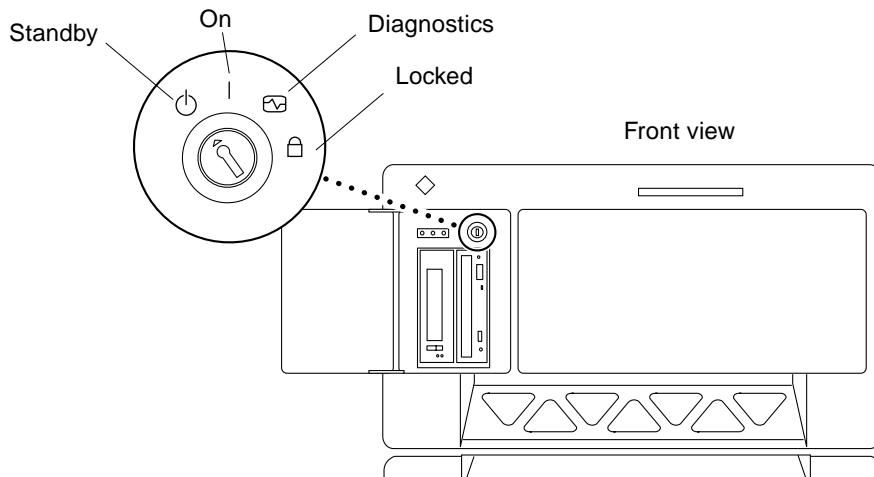


FIGURE 1-1 Key Switch Location

2. Locate the clock board in the system.

In 8- and 16-slot systems, it is the top board in the system (FIGURE 1-2). In 4- or 5-slot systems, it is the first slot on the right.



Caution – The clock board is not hot-pluggable. Do not remove the clock board until the system has been halted and powered off.



Caution – Use a grounding wrist strap to prevent static damage.

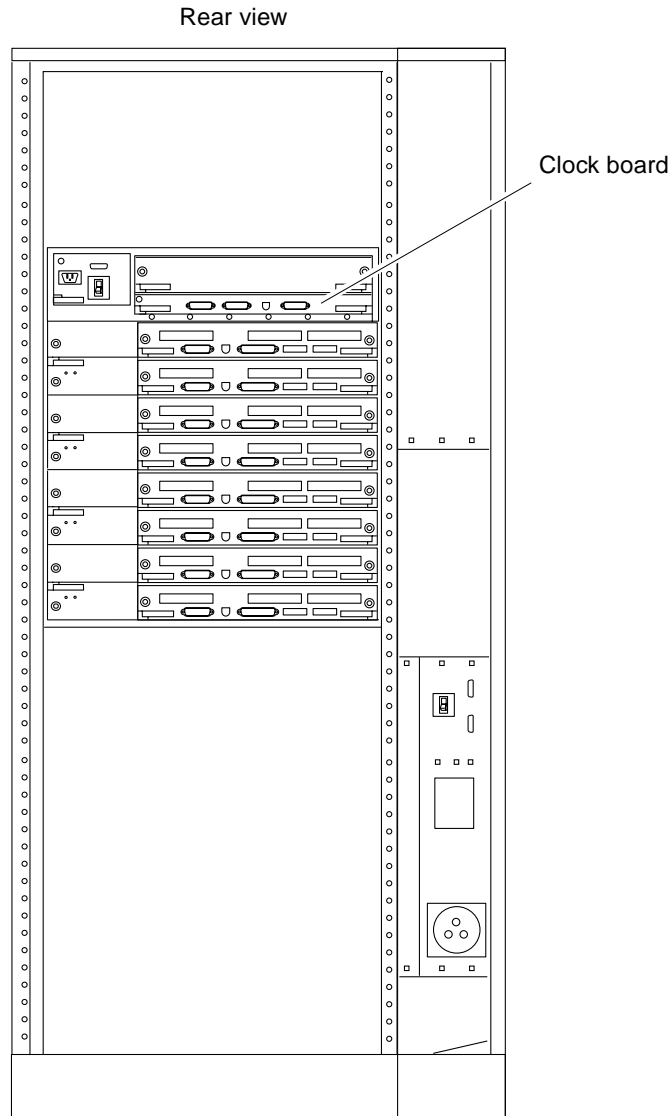


FIGURE 1-2 Sun Enterprise System

3. Remove the clock board from the system (FIGURE 1-3).

Refer to the clock board chapter in your systems reference manual for the detailed procedure.

4. Locate and check the status of the P0601 jumper (FIGURE 1-3) on the clock board.

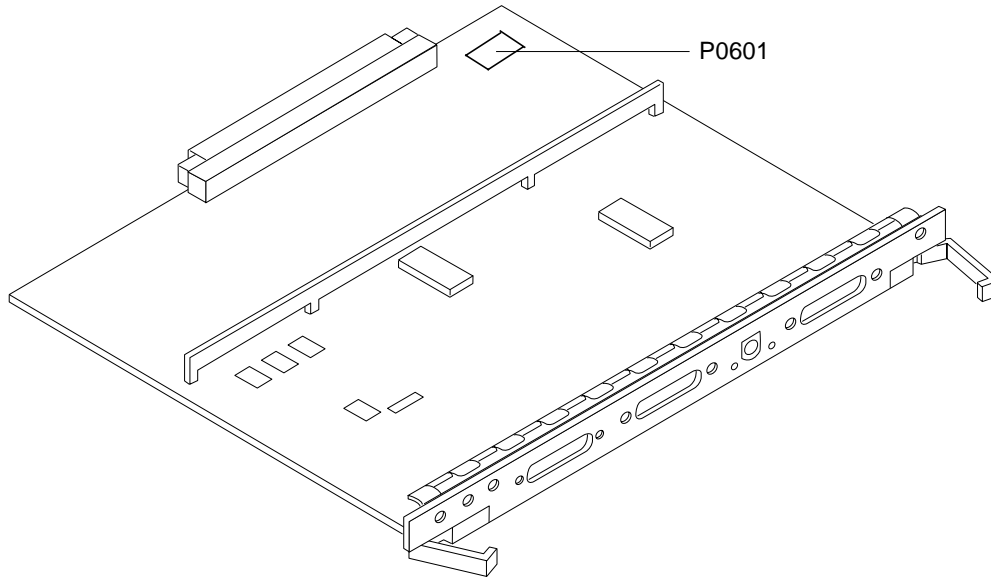


FIGURE 1-3 Jumper Location on Clock Board

- a. If the jumper is in place, replace the clock board in the system.**
 - b. If the jumper is not in place, install the P0601 jumper on to the clock board.**
Refer to your systems reference manual for the detailed procedure.
- 5. Turn the key switch to the On or Diagnostics position (FIGURE 1-1).**
The system flash PROM can now be reprogrammed.

Software

This chapter describes flash PROM reprogramming procedures.

2.1 Reprogramming Flash PROMs



Caution – Do not interrupt power during flash PROM reprogramming. After the reprogramming utility has been booted, do not remove or insert system boards. In the event of power interruption, see Chapter 3, *Emergency Recovery Procedures*.



Caution – Some combinations of old and new PROM versions are incompatible, and flash programming may cause default NVRAM values to overwrite customized NVRAM variables. Be sure to record the custom and default values displayed so that you can restore them afterward if necessary.

Note – If power is interrupted during flash PROM reprogramming, do one of the following:

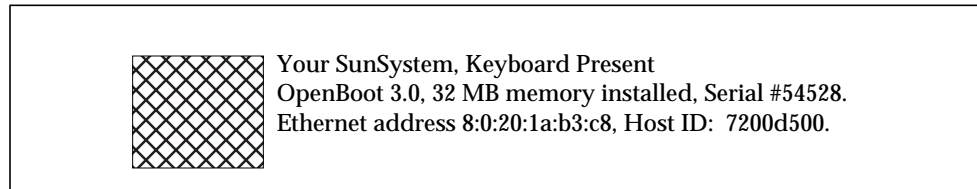
- In a single-board system:
 - Call your Sun service provider or local Sun service Authorized Service Provider.
 - In a multiple-board system:
 1. Follow the instructions in Section 3.1, *Recovery Procedures*
 2. If rebooting and/or reprogramming is unsuccessful, call your Sun service provider or local Sun service Authorized Service Provider.
-

The following flash PROM reprogramming procedure is for Sun Enterprise 6x00/5x00/4x00/3x00 systems.

1. Turn the key switch to either the On or Diagnostics position (FIGURE 1-1).

The power-on self-test (POST) runs. POST completion time varies and depends on the number of system boards and system memory capacity.

When POST is complete, the screen displays a banner, as shown below.



Once the banner screen is displayed, the system may attempt to autoboot.

2. Press the Stop-a keys (or press the Break key if running from a terminal connected to a serial port) to abort the autoboot sequence.

3. Insert the compact disc into the CD-ROM drive. At the ok prompt, type `boot cdrom` to start the flash PROM programming utility.

```
ok boot cdrom
boot /sbus3,0/SUNW,fas@3,8800000/sd@6,0:f
```

The firmware update screen is displayed (CODE EXAMPLE 2-1) showing the current PROM revision in the system followed by a list of PROM update versions available.

CODE EXAMPLE 2-1 Firmware Update Screen Beginning

```
SUNW,Ultra-Enterprise System Flash PROM Update, Rev. 2.3

Current System Board PROM Revisions:
-----
Board 1:  I/O Type 1   FCODE 1.8.3  1997/11/14  iPOST 3.4.4  1997/08/26
Board 2:  CPU/Memory  OBP   3.2.11  1997/11/20  POST  3.7.3   1997/11/20

Available 'Update' Revisions:
-----
          CPU/Memory  OBP   3.2.12  1998/01/13  POST  3.8.4   1998/01/21
          I/O Type 1   FCODE 1.8.3  1997/11/14  iPOST 3.4.4  1997/08/26
          I/O Type 2   FCODE 1.8.3  1997/11/14  iPOST 3.4.4  1997/08/26
          I/O Type 3   FCODE 1.8.7  1997/05/09  iPOST 3.0.2  1997/05/01
          I/O Type 4   FCODE 1.8.7  1997/12/08  iPOST 3.4.4  1997/08/26
          I/O Type 5   FCODE 1.8.7  1997/12/08  iPOST 3.4.4  1997/08/26
```

If the screen displays an error message (CODE EXAMPLE 2-2) after the initial update revision list, check to see that the flash PROM programming jumper P0601 is in place (see Section 1.2.1 “Checking for the Jumper” on page 1-2) and that the key switch is either in the On or the Diagnostics position (FIGURE 1-1). The flash-update procedure will not succeed until both of these conditions are met. Once the jumper is in place and the key switch is in the correct position, restart the programming with Step 1.

CODE EXAMPLE 2-2 Error Message

```
FEPROM Write Protected: Check Write Enable jumper or Front Panel Key switch.

Flash-update aborted.

ok
```

4. Type *y* and press Return when asked,

Do you wish to flash update your firmware? y/[n] :

5. Type *y* and press Return when asked,

Are you sure you wish to continue? y/[n] :

Your system proceeds to update all installed flash PROMs (CODE EXAMPLE 2-3)

6. After programming is completed, power off the system, wait a few seconds, and then power on again.

This power-cycling flushes any old firmware code out of system memory.

The following example shows a successful update for a system with boards installed in slot 1 and slot 2.

CODE EXAMPLE 2-3 Firmware Update Screen

```
SUNW,Ultra-Enterprise System Flash PROM Update, Rev. 2.3

Current System Board PROM Revisions:
-----
Board 1:  I/O Type 1  FCODE 1.8.3  1997/11/14  iPOST 3.4.4  1997/08/26
Board 2:  CPU/Memory  OBP    3.2.11  1997/11/20  POST  3.7.3   1997/11/20

Available 'Update' Revisions:
-----
          CPU/Memory  OBP    3.2.12  1998/01/13  POST  3.8.4   1998/01/21
          I/O Type 1  FCODE 1.8.3  1997/11/14  iPOST 3.4.4  1997/08/26
          I/O Type 2  FCODE 1.8.3  1997/11/14  iPOST 3.4.4  1997/08/26
          I/O Type 3  FCODE 1.8.7  1997/05/09  iPOST 3.0.2  1997/05/01
          I/O Type 4  FCODE 1.8.7  1997/12/08  iPOST 3.4.4  1997/08/26
          I/O Type 5  FCODE 1.8.7  1997/12/08  iPOST 3.4.4  1997/08/26

Do you wish to flash update your firmware? y/[n] : y

**IMPORTANT** As a consequence of the firmware upgrade that is about
to take place, it is very possible that the customized values in the
configuration variables will revert to their *default values* upon the
next system power-cycle or soft-reset. If this happens, it could have
a significant effect on the behavior of the system after the power-cycle
or soft-reset.

Following is a list of the system's NVRAM configuration variables which
have been customized (i.e. they are different than the default values).
You may wish to write down the values of the indicated configuration
variables so that they may be restored (if necessary) after the next
power-cycle or soft-reset.

Name: auto-boot?
      Current: false
      Default: true

Name: boot-device
      Current: /sbus@2,0/SUNW,soc@d,10000/SUNW,pln@a0000000,7774a7/SUNW,ssd@0,0
      Default: disk diskbrd diskisp disksoc net

Are you sure you wish to continue? y/[n] : y
```


CODE EXAMPLE 2-3 Firmware Update Screen *(Continued)*

```
Board 1: I/O Type 1 (PromID=4a4)
  Erasing PROM ..... Done.
  Verifying erase ..... Done.
  Programming PROM ..... Done.
  Verifying program ..... Done.

Board 2: CPU/Memory (PromID=4a4)
  Erasing PROM ..... Done.
  Verifying erase ..... Done.
  Programming PROM ..... Done.
  Verifying program ..... Done.

Programming was successful.

Please power-cycle the system.

Program terminated
ok
```


Emergency Recovery Procedure

This chapter describes emergency recovery procedures in the event of a power interruption during the flash PROM updating process.

3.1 Recovery Procedures

Only one board is updated at any given time in the flash PROM updating process. If there is a power interruption to the system while the flash PROMs are being reprogrammed, only one board will have its flash PROMs in an inconsistent state.

Note – Power interruption during reprogramming of the flash PROMs aborts the reprogramming at the point of the power interruption. Turn the key switch to the Standby position (FIGURE 1-1) to prevent power surge to the system when power is restored.

The following recovery procedure requires another board of the same type with an uncorrupted PROM image (if you are reprogramming an “I/O Type 1” board, you must use another “I/O Type 1” board). In the following code examples, the flash PROM on board 3 recovers by copying the flash PROM image from board 0.

1. **Connect a null modem cable to port A and to either a terminal or a workstation.**
2. **Set the serial port at 9600 bps, 8-bit word, no parity, and 1 stop bit.**
3. **Remove the board that was being programmed when the power went out.**
4. **Turn the key switch to the On position (FIGURE 1-1).**

The system responds with the message:

```
Hardware Power ON
```

5. Wait 15 seconds and type `s` on the keyboard terminal or the tip window connected to the serial port.

The system responds:

```
0,0>  
*** Toggle Stop POST Flag = 1 ***
```

This message shows that POST has recorded your request to stop after testing is completed.

When POST stops, it will display the following options menu:

```
0,0>Extended POST Menu  
0,0>Select one of the following functions  
0,0>  '0'      Return  
0,0>  '1'      Reset  
0,0>  '2'      Peek/Poke device  
0,0>  '3'      Environmental Status  
0,0>  '4'      Test Menu  
0,0>  '5'      State Dump  
0,0>  '6'      Frequency Margining  
0,0>  '7'      Display System Summary  
0,0>  '8'      Display Fatal Reset Info  
0,0>  '9'      Scan System Board Ring  
0,0>  'a'      Set Memory Test Megs  
0,0>  'b'      Print SIMM Info  
0,0>  'c'      Focus CPU  
0,0>  'd'      CPU State  
0,0>  'f'      fcopy  
0,0>  'g'      System Power Off  
0,0>  'h'      Bounce Patterns  
0,0>  'i'      Focus I/O Board  
0,0>
```

6. Type f to select fcopy.

```
Command ==> f
0,0>Flash PROM Copy Menu
0,0>Select one of the following functions
0,0>  '0'      Return
0,0>  '1'      Copy
0,0>  '2'      Verify
0,0>  '3'      Display Version
0,0>  '4'      Activate System Board
0,0>

Command ==>
```

7. Insert the board with the corrupted flash PROM. Be sure its power LED is lit.

8. Type 4 to select Activate System Board.

The system prompts you to enter the board number in hexadecimal notation. In the example below, board 3 is entered as the board to be activated.

```
Command ==> 4
0,0>Input board number in hex ('0' thru '9' and 'a' thru 'f')
?3
0,0>
0,0>Flash PROM Copy Menu
0,0>  '0'      Return
0,0>  '1'      Copy
0,0>  '2'      Verify
0,0>  '3'      Display Version
0,0>  '4'      Activate System Board
0,0>

Command ==>
```

9. Type 1 to select Copy. Respond to the prompts for source (where to copy from) and destination (where to copy to) board numbers in hexadecimal notation.

In the example below, board 0 is entered as the source and board 3 is entered as the destination:

```
Command ==> 1
0,0>Input board number in hex ('0' thru '9' and 'a' thru 'f')
0,0>
      from board? 0
      to board? 3
0,0> Mfg code 04, Dev code a4
0,0>Erasing prom at 000001cc.f8000000
0,0>Copy prom at 000001c0.f8000000 to prom at 000001cc.f8000000
0,0>.....
0
```

10. Type 3 to select Display Version.

The system responds by showing all PROM versions in the system.

```
Command ==> 3
0,0>Slot 0 CPU/Memory OBP 3.2.1 1996/3/11 09:57 POST 3.0.1 1996/3/11 18:38
0,0>Slot 1 IO Type 1 FCODE 1.6.0 1996/1/23 13:44 iPOST 1.1.4 1996/3/05 04:06
0,0>Slot 2 CPU/Memory OBP 3.2.1 1996/3/11 09:57 POST 3.0.1 1996/3/11 18:38
0,0>Slot 3 Memory OBP 3.2.1 1996/3/11 09:57 POST 3.0.1 1996/3/11 18:38
0,0>Slot 5 CPU/Memory OBP 3.2.1 1996/3/11 09:57 POST 3.0.1 1996/3/11 18:38
0,0>Slot 7 Memory OBP 3.2.1 1996/3/11 09:57 POST 3.0.1 1996/3/11 18:38
0,0>
```

11. Turn the key switch to the Standby position (FIGURE 1-1). Wait 15 seconds.

12. See Section 2.1 of this document, “Reprogramming Scenario” and follow the reprogramming procedure to attempt the flash PROM updating process again.

Instructions for Manually Installing Patch 103346

Appendix A describes a procedure for manually installing the flash PROM firmware.

Patch 103346-10 and later are designed to work with both 32-bit and 64-bit Solaris versions. Patch versions 103346-09 and earlier are designed for 32-bit Solaris versions only.

Note – Use this appendix if the CD-ROM is not available. To download the current patch, visit the SunSolveSM web site at: <http://sunsolve.Sun.COM/>

The patch is downloaded as a compressed tar file.

A.1 Installing the Flash PROM Firmware

To install the latest flash PROM firmware to your system, use the following commands:

1. **Log in as `root` on the system that needs its flash PROM firmware upgraded.**
2. **Type the following, replacing the variable with the current patch version number to be installed in your system:**

```
# uncompress 103346-xx.tar.Z
# tar -xvf 103346-xx.tar
# cd 103346-xx
```

You are now in the directory containing all the flash-update files.

3. Type `./flash-update` in this directory.

The script will extract the flash PROM driver from the directory and install the driver on the system. It then extracts the program that actually updates the flash PROMs with the new images.

The current PROM revision in the system is displayed followed by a list of PROM versions that are available in the release of the `flash-update` program that you have executed. This command always points to the latest version in that directory.

Note – When the firmware has been updated, the system cannot use the new firmware until the system has been power-cycled. You can do this immediately or schedule it for a later time when disruption will be minimized.

4. Halt and reboot the system complete the following steps:

c. Turn the power off and wait for approximately 15 seconds.

d. Turn the power back on. The reprogrammed flash PROMs is functional at this point.

A.1.1 Sample Program Output

The program displays its progress at every stage of execution. In CODE EXAMPLE A-1, the flash PROMs are being updated for boards 0, 1, 4, 5, and 6.

CODE EXAMPLE A-1

```
# ./flash-update
Generating flashprom driver...
Generating SUNW,Ultra-Enterprise flash-update program...

Current System Board PROM Revisions:
-----
Board 0: cpu OBP      3.2.2 1996/03/20 10:07 POST 3.0.3 1996/03/16 17:54
Board 4: cpu OBP      3.2.2 1996/03/20 10:07 POST 3.0.3 1996/03/16 17:54
Board 1: dual-sbus
          FCODE       1.7.0 1996/03/20 10:07 iPOST 3.0.3 1996/03/16 17:55
Board 5: upa-sbus
          FCODE       1.7.0 1996/03/20 10:07 iPOST 3.0.3 1996/03/16 17:55
Board 6: dual-sbus
          FCODE       1.7.0 1996/03/20 10:07 iPOST 3.0.3 1996/03/16 17:55

Available 'Update' Revisions:
-----
          cpu OBP      3.2.3 1996/04/04 20:23 POST 3.1.4 1996/04/04 20:23
          dual-sbus FCODE 1.7.0 1996/04/04 20:23 iPOST 3.1.4 1996/04/04 20:23
```


CODE EXAMPLE A-1 (Continued)

```
upa-sbus FCODE 1.7.0 1996/04/04 20:23 iPOST 3.1.4 1996/04/04 20:23

Verifying Checksums: Okay

Do you wish to flash update your firmware y/[n] : y

Are you sure y/[n] : y

Updating Board 0: Type 'cpu'
1 Erasing ... Done.
1 Verifying Erase ... Done.
1 Programming ... Done
1 Verifying Program ... Done.

Updating Board 4: Type 'cpu'
1 Erasing ... Done.
1 Verifying Erase ... Done.
1 Programming ... Done.
1 Verifying Program ... Done.

Updating Board 1: Type 'dual-sbus'
1 Erasing ... Done.
1 Verifying Erase ... Done.
1 Programming ... Done.
1 Verifying Program ... Done.

Updating Board 5: Type 'upa-sbus'
1 Erasing ... Done.
1 Verifying Erase ... Done.
1 Programming ... Done.
1 Verifying Program ... Done.

Updating Board 6: Type 'dual-sbus'
1 Erasing ... Done.
1 Verifying Erase ... Done.
1 Programming ... Done.
1 Verifying Program ... Done.
```

Each step in the process is repeated until it succeeds. The number at the beginning of a line indicates the number of attempts for that update step. If any of the steps fail, then all four steps are repeated and the number is incremented on each try.

When the flash update is successfully completed, the script removes the flash PROM driver from the machine and cleans up any temporary files that were created in the /tmp directory.

If the process is interrupted by a loss of power, the update is incomplete. If this happens, see Chapter 3 “Emergency Recovery Procedure.”

A.2 Reprogramming Previous Versions

Patch 103346 exists in several versions, starting with version -01 (Patch 103346-01). Later versions are sequentially numbered. Each patch contains all files from previous versions.

If system flash PROMs need to be reprogrammed to a previous firmware version, the procedure can be executed with `./flash-update-xx`, where `-xx` is the version number.