FX Series
AIX Version 4.1

Making and Using Backups

AFXBKUPA/IS1

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This edition of *Making and Using Backups* applies to AIX 4.1 and to all subsequent releases of this products until otherwise indicated in new releases or technical newsletters.

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List of Tables

Where To Go?

Use the table below to find the information for which you are looking. For an overview of the entire system, refer to the *Fault Tolerant Systems Architecture Overview*.

	Title	Description
Installation Tasks	*Operating System Installation Guide*	instructions for installing the operating system
	Hardware Installation Guide	setting up the hardware components of the system
	Making and Using Backups	making and installing from installable backups of the operating system
	Operating System Installation Troubleshooting	basic troubleshooting procedures for dealing with operating system installation problems
	*System Integration Guide**	integrating the FX Series system into an existing telecom system
System Administration Tasks	*Managing System Storage*	information and procedures for managing system storage
	Configuring and Maintaining the System	information for understanding and performing tasks that are integral to administering an AIX system
	Administering Your Fault Tolerant System	information for understanding and performing tasks that are integral to administering an FX Series fault tolerant system
Developer's Tasks	*Writing a Fault Tolerant Device Driver**	writing a device driver that has been hardened to tolerate faults
	*Application Developer's Guide to the Configuration Management System**	using interfaces to the Configuration Management System (CMS)
Troubleshooting Tasks	*Diagnosing and Troubleshooting Your Fault Tolerant System**	advanced diagnostic techniques
	Operating System Installation Troubleshooting	basic troubleshooting procedures for dealing with operating system installation problems

You can order these publications from your sales representative or from your point of sale. Refer to the *Documentation Overview* to obtain more information on related publications.

*Contact your Motorola Computer Group Sales office or Motorola Computer Group's customer support group for information on the availability of these publications.

Introduction 1

Purpose

The *Making and Using Backups* booklet provides you information about how to make backup and then how to use the backup of your system.

Scope

The *Making and Using Backups* booklet provides information on:

- how to backup your system
- how to install the BOS from a system backup
- how to prepare for an unattended installation

Prerequisites

This guide assumes that all of the required hardware is already installed on your system. The procedures in this guide identify prerequisite tasks or conditions that must be met before performing the procedures.

Overview of Contents

The *Making and Using Backups* booklet is organized as follows:

This chapter...	Provides information on...
Chapter 2, "Backing Up Your System"	how to create a backup image of the BOS You can use this backup image to restore your configuration if your system becomes corrupted. Also, you can use a backup image to duplicate one system's configuration on other machines by installing its backup image.
Chapter 3, "Installing the BOS from a System Backup"	how to install a backup image from a tape You can now boot and install a system using a backup tape.
Chapter 4, "Preparing to Back Up for Unattended Installations"	how to edit the `bosinst.data` file If you customize this file before making a backup, you can use the unattended installation method for installing the backup. System administrators can modify the `bosinst.data` file to change the default settings used by the BOS installation program. Customizing the `bosinst.data` file enables you to install the BOS without the set of menus that are usually displayed, thus facilitating unattended installations.

Related Publications

Standard AIX 4.1 Publications

The following publications contain additional information related to standard *AIX 4.1 and FX Series systems:*

- *Operating System Installation Troubleshooting*
- *Operating System Installation Guide*
- *iFOR/LS System Management Guide*
- *System Management Guide: Communications and Networks*
- *Commands Reference* (six volumes)
- *Problem Solving Guide and Reference*
- *General Programming Concepts: Writing and Debugging Programs*
- *Documentation Overview*
- *System User's Guide: Operating System and Devices*
- *System User's Guide: Communications and Networks*
- *Getting Started*
- *Quick Reference*

FX Series Systems

The following publications contain additional information related to the FX Series system:

- *System Architecture*
- *Administering Your Fault Tolerant System*
- *FX Series Release Notes*

- *Managing System Storage*
- *Configuring and Maintaining the System*
- *Hardware Installation*
- *System Integration*
- *Diagnosing and Troubleshooting Your Fault Tolerant System*
- *Writing a Fault Tolerant Device Driver*
- *Application Developer's Guide to CMS*
- *FX Bug Manual*

Backing Up Your System 2

This chapter describes how to use the System Management Interface Tool (SMIT) to create and verify an image of your root volume group. This chapter also describes how to make separate backup copies of user volume groups.

You can also use the Installation Assistant to back up your system. For more information about the Installation Assistant, refer to the *Operating System Installation Guide*. When you back up your system using Installation Assistant, the required `bos.sysmgt.sysbr` fileset is automatically installed.

This chapter includes:

Introduction to Backing Up Your System

A backup image serves two purposes:

- to have a working copy of your system in case your system becomes corrupted
- to transfer installed and configured software from one system to others

Use the SMIT `Back Up the System` menu to make a backup image of the root volume group. Use the SMIT `Save a Volume Group` menu to make a backup image of user volume groups.

The *root volume group* is a hard disk, or group of disks, containing start up files, the BOS, configuration information, and any optional software products. A *user volume group* (also called *nonroot* volume group) typically contains data files and application software.

The SMIT `Back Up the System` menu uses the `mksysb` command to create a backup image.

Configuring before the Backup

A backup transfers the following configurations from the source system to the target system:

- paging space information
- logical volume information
- `rootvg` volume group information
- placement of logical partitions (if the `Create Map Files` field is set to `yes` in the SMIT menu)

Source and Target Configurations

The *source* system is the system from which you created the backup copy. The *target* system is the system on which you are installing the backup copy.

If you want the source and target to be identical, configure the source system before creating a backup image of it. However, if you plan to use a backup image for installing differently configured target systems, create the image before configuring the source system.

Device Configurations

Using the SMIT backup menu allows you to preserve device configuration information, thus avoiding some of the configuring tasks normally required after restoring from a system backup. A backup preserves the device configuration if both of the following are true:

- The target system has the same hardware configuration as the source system.
- The target system has enough disk space to hold the backup image.

The installation program automatically installs only the device support required for the hardware configuration of the installed machine. Therefore, if you are using a system backup to install other machines, you may need to install additional devices on the source system before making the backup image and using this backup image to install one or more target systems.

To install additional device support on the source system, use the `Install Additional Device Software` option in SMIT.

Passwords and Network Addresses Configuration

If you install the backup image on other systems, you might not want passwords and network addresses copied to the target systems. Copying network addresses to a target system creates duplicate addresses that can disrupt network communications.

Mounting and Unmounting File Systems

The procedure in this chapter backs up only mounted file systems in the root volume group. You must mount all file systems you want to back up before starting.

Similarly, you must unmount file systems you do not want backed up. The backup procedure backs up files twice if a local directory is mounted over another local directory in the file system. For example, if you mount `/tmp` over `/usr/tmp`, the files in the `/tmp` directory is backed up twice. This duplication might exceed the number of files a file system can hold, which can cause a future installation of the backup image to fail.

Procedures for Backing Up Your System

This section provides instructions for backing up your system, including how to back up the root volume group and back up a user volume group.

Complete the Prerequisites

Before backing up your system, ensure you have met all of the following prerequisites:

- All hardware must already be installed, including external devices such as CD-ROM drives.
- The `sysbr` fileset in the System Backup and BOS Utilities software package must be installed. Enter the following command to determine if the `sysbr` fileset is installed on your system:

  ```
  lslpp -l bos.sysmgt.sysbr
  ```

  If your system has the `sysbr` fileset installed, continue with the procedures in "To Back Up the Root Volume Group" on page 2-5.

  If the `lslpp` command does not list the `sysbr` fileset, install it before continuing with the backup procedure. Refer to SMIT instructions, or enter the following command:

  `installp -agqXd` *device* `bos.sysmgt.sysbr`

  where *device* is the location of the software.

To Back Up the Root Volume Group

Use this procedure to create a system backup.

1. Log in as root.
2. Mount all file systems you want to back up. Refer to the `mount` command for details.

3. Insert the medium on which you want to store the backup image.

   Note The `mksysb` command does not back up file systems which have been mounted using NFS.

4. Unmount any local directories that are mounted over another local directory.

5. Make at least 8.8MB of free disk space available in the `/tmp` directory. The `mksysb` command requires this working space for the duration of the backup.

   Use the `df` command, which reports in units of 512-byte blocks, to determine the free space in the `/tmp` directory.

   Use the following `chfs` command to change the size of the file system, if necessary:

   ```
   chfs -a size='#512K blocks' /tmp
   ```

6. If you want to exclude certain files from the backup, create the `/etc/exclude.rootvg` file with an ASCII editor, and enter the patterns of file names that you do not want included in your system backup image.

   The patterns in this file are input to the pattern matching conventions of the `grep` command to determine which files to exclude from the backup.

7. Enter the following SMIT command:

   ```
   smit mksysb
   ```

   In the AIXwindows environment, enter:

   ```
   smit -C mksysb
   ```

The Back Up the System screen appears, with the Backup DEVICE or File field highlighted:

```
                          Back Up the System

Type or select values in entry fields.
Press Enter After making desired changes.
                                        [Entry Fields]

       WARNING: Execution of the mksysb command will result
       in the loss of all the material previously stored on
       the selected output medium. This command backs up
       only the rootvg volume group.

 *Backup DEVICE or File?
 Create MAP Files?                                  no
 EXCLUDE Files?                                     no
 Make BOOTABLE backup?                              yes
   (Applies only to tape)
 EXPAND /tmp if needed?                             no
   (Applies only to bootable tape)
 Number of BLOCKS to write in a single output       []
   (Leave blank to use in system default)


   F1=Help      F2=Refresh      F3=Cancel       F4=List
   F5=Reset     F6=Command      F7=Edit         F8=Image
   F9=Shell     F10=Exit        Enter=Do
```

8. Decide which medium you want to use to store the backup, and enter it in the Back Up DEVICE or File field.
9. If you want to exclude files listed in the file /etc/exclude.rootvg, select the EXCLUDE Files field and press the Tab key once to change the value to yes.
10. To create the backup, press Return. The COMMAND STATUS screen appears, showing status messages while the system makes the backup image.
11. Exit SMIT when the backup completes.
12. Record any backed up root and user passwords. Remember that these passwords are active if you use the backup either to restore this system or to install another system.

To Back Up a User Volume Group

Back up user volume groups to images different than root volume group images with the following SMIT command:

```
smit savevg
```

In the AIXwindows environment `enter:`

```
smit -C savevg
```

The `Save a Volume Group` screen appears. Use the steps for backing up the root volume group (in "To Back Up the Root Volume Group" on page 2-5) as a guide for backing up user volume groups.

If you want to exclude files in a user volume group from the backup image, create a file named:

`/etc/exclude.`*`volume_group_name`*

where *volume_group_name* is the name of the volume group you want to back up.

Edit `/etc/exclude.`*volume_group_name* and enter the patterns of file names that you do not want included in your backup image. The patterns in this file are input to the pattern matching conventions of the `grep` command to determine which files to exclude from the backup.

Note For information on restoring a user file system and a user volume group on a standard AIX system, refer to the *System Management Guide: Operating System and Devices*. For information on restoring a user file system and a user volume group on a FX Series system, refer to *Managing System Storage*.

To Verify a Backup Tape

Use this procedure to list the contents of a `mksysb` backup tape. The contents list verifies most of the information on the tape but does not verify that the tape can be booted for installations. The only way to verify that the boot image on a `mksysb` tape functions properly is by booting from the tape.

Use this procedure to verify a system backup tape:

1. Enter the following SMIT command at the system prompt:

   ```
   smit lsmksysb
   ```

   In the AIXwindows environment, enter:

   ```
   smit -C lsmksysb
   ```

   The `List Files in a System Image` window appears.

Note Do not press Return until you finish entering values in the entry fields.

2. In the `DEVICE or FILE` field, enter the tape device name or accept the value provided.
3. In the `Number of BLOCKS to read in a single input` field, enter the number of blocks to read for your tape device, or leave this field blank to accept the system default.
4. Confirm your selections.

   The `COMMAND STATUS` screen appears, listing the contents of the backup tape.

Note It may take half an hour or more to list the contents of a backup tape from an average-sized system.

Installing the BOS from a System Backup 3

This chapter describes how to install the Base Operating System (BOS) from a backup image of a previously installed system.

This chapter includes the following sections:

3

Introduction to Backup Installations

You can install a system from a backup image.

Typical uses for a backup are to:

- restore a corrupted system
- install and configure software on one system, then duplicate that installation on other systems

This chapter refers to *source system* and *target system*. The *source system* is the system from which you created the backup copy; the *target system* is the system on which you are installing the backup copy.

Installing a system from a backup reduces, and often eliminates, repetitive installation and configuration tasks. For example, a backup installation can copy optional software installed on the source system in addition to copying the BOS. The backup image also transfers many user configuration settings.

Restoring a Backup Image

When the system installs a backup image, it checks whether the target system has enough disk space to create all the logical volumes stored on the backup. If there is enough space, the entire backup is recovered. Otherwise, the installation halts and the system prompts you to choose more destination hard disks.

File systems created on the target system are the same size as they were on the source system, unless the `SHRINK` variable was set to `yes` on the `System Backup and Installation and Settings` menu. An exception is the `/tmp` directory, which can be increased to allocate enough space for the `bosboot` command.

For information about installation settings, refer to the `image.data` file in *Files Reference*. For information about making system backups, refer to chapter 2, "Backing Up Your System."

After the installation completes, the Object Data Manager (ODM) and `/dev` directory on the target system are reconfigured. If the target system does not have exactly the same hardware configuration as the source system, the program may modify device attributes in the following target system files:

- all files in `/etc/objrepos` that begin with `Cu`
- all files in the `/dev` directory

Setup Considerations

Consider altering passwords and network addresses if you use a backup to make master copies of a source system. Copying passwords from the source to a target system can create security problems. Also, if network addresses are copied to a target system, duplicate addresses can disrupt network communications.

Use the following techniques if you do not want certain information saved on your target system:

- Use a backup image that was created before the source system was configured with this information.
- Manually modify this information on the target system immediately after installing the backup image.

Installing from a Backup Tape

This section provides the procedures for installing the BOS using a backup image from a tape.

Note If you have a standard AIX 4.1 system and are booting from a system running, PPCBug firmware, you must have PPCBug version 1.8 or later installed on your system prior to booting or installing from a backup tape.

Prerequisites

Before installing the Base Operating System backup, complete the following prerequisites:

- If you have a standard AIX 4.1 system, connect all hardware, including any external devices such as CD-ROM or tape drives. If you need instructions, refer to the hardware documentation that accompanied your system.
- Ensure that you know the terminal type of your system console.
- Locate your backup tape.
- If the target system is running and other users have access to your system, make sure they are logged off before you begin the installation.

Setting ASCII Terminal Options

If you have an ASCII terminal, set the ASCII terminal communications and keyboard options as shown in Table 3-1 and Table 3-2:

Table 3-1. ASCII Terminal Communications Options

Set This Option...	To This Value...
line speed (baud rate	9600
word length (bits per character)	8
parity	no (none)
number of stop bits	1
interface	RS-232C
line control	IPRTS

Table 3-2. ASCII Terminal Keyboard Options

Set This Option...	To This Value...
screen	normal
row and column	24x80
scroll	jump
auto LF (line feed)	off
line wrap	on
forcing insert	line (or both)
tab	field
operating mode	echo
turnaround character	CR
enter	return
return	new line
new line	CR
send	page
insert character	space

Refer to your hardware documentation for information about how to set these options.

Determining the State of Your System

To begin your backup installation, follow the steps that pertain to the current state of your system:

- "The System Is Turned Off" on page 3-6
- "The System Is Up and Running AIX" on page 3-8

The System Is Turned Off

If your system is not turned on or is running from the firmware, follow these steps:

1. Power on all attached external devices, such as terminals and monitors.
2. If you have an ASCII terminal, refer to Table 3-1 and Table 3-2 on page 3-5 for required communications and keyboard settings.
3. Power your system on.

4. Proceed according to the version of your firmware:

PPCBug or FX-Bug Firmware	After the self tests have completed, press the Esc key once when you see this message: `NVRAM Boot List about to Begin... Press <ESC> to Bypass, <SPC> to Continue`
PowerPC Open Firmware	**a** After the automatic self tests have completed, press any key when you see this message: `Type any key to interrupt automatic startup` The system then goes to the PowerPC Open Firmware `Main Menu`. **b** At the `Main Menu`, select the `Boot an Operating System` menu. The `Boot an Operating System` menu window appears. **c** Select the `Perform auto-scan Boot Operation` menu option from the `Boot an Operating System` window.

5. Insert the installation medium into the appropriate device drive. Remove any other tapes, CD-ROMs, or floppy disks from all attached devices because they may interfere with the autoboot sequence.
6. Power cycle the system by turning it off and turning it on again.
7. The system begins to boot from the installation medium.
8. Go on to "Identifying System Console and Installation Language" on page 3-9.

The System Is Up and Running AIX

If your system is running AIX, follow these steps:

1. Log in as `root`.
2. Insert the installation medium into the appropriate device drive. Remove any other tapes, CD-ROMs, or floppy disks from all attached devices because they may interfere with the autoboot sequence.
3. Reboot the system by entering:

   ```
   shutdown -Fr
   ```

4. The system begins to boot from the installation medium.
5. Go on to "Identifying System Console and Installation Language" on page 3-9.

Identifying System Console and Installation Language

1. When prompted to do so, identify your system console.

   If you have more than one directly attached display device, a screen displays on each device with a different response specified for each (standard AIX 4.1 only).

2. When the display prompts you for a language to use during installation, type `1` and confirm.

   The `Welcome to the Base Operating System Installation and Maintenance` screen is displayed:

```
                  Welcome to the Base Operating System
                  Installation and Maintenance

  Type the number of your choice and press Enter.  Choice is indicated by >>>

>>>1 Start Install Now with Default Settings

   2 Change/Show Installation Settings and Install

   3 Start Maintenance Mode for System Recovery

   88 Help?

   99 Previous Menu

>>>Choice:[1]
```

3. Continue the installation process with the procedures described in "Installing from the Backup" on page 3-10.

Installing from the Backup

1. Type 2 and press Return to select the Change/Show Installation Settings and Install option.

   The System Backup Installation and Settings screen appears:

```
                        System Backup Installation and Settings

   Either type 0 and press Enter to install with current settings, or type
   the number of the setting you want to change and press Enter.

       Setting:                                  Current Choice(s)

    1  Disk(s) Where You Want to Install.........hdisk0...
           Use Maps.............................No

    2  Shrink File Systems.......................No


>>> 0  Install with the settings listed above.

   88 Help?
   99 Previous Menu

>>> Choice [0]:
```

2. Either accept the settings or change them:

   - To accept the settings and begin the installation, skip to step 8.
   - To change the settings, continue with step 3.

Note The Use Maps option, although displayed, is not supported during installation from backup. You are not able to change the setting of this option.

3. Enter `1` in the `System Backup Installation and Settings` screen to specify disks where you want to install the backup image. The `Change Disk(s) Where You Want to Install` screen appears (standard AIX 4.1 system screen shown below):

```
                    Change Disk(s) Where You Want to Install

   Type one or more numbers for the disk(s) to be used for installation and press
   Enter. To cancel a choice, type the corresponding number and press Enter. At
   least one bootable disk must be selected. The current choice is indicated by >>>.

           Name    Location Code   Size (MB)   VG Status   Bootable    Maps

>>>     1  hdisk0  00-01-0S-0,0    80          rootvg      yes         no
        2  hdisk1  00-01-00-1,0    60          rootvg      yes         no

>>>     0  Continue with choices indicated above

       66  Disks not known to Base Operating System Installation

       88  Help?
       99  Previous Menu

>>>    Choice [0]:
```

This screen lists all available disks on which you can install the system backup image. The >>> (three greater-than signs) mark each selected disk.

The location codes of the hard disks are displayed in the Location Code column.The format for the location code of a disk depends on the type of system you have:

- If you have a standard AIX 4.1 system, the format for the location code of a direct-attached disk is:

  `AA-BB-CC-`*X,E*

- If you have an FX Series system, the format for the location code of a disk on an system is:

  `AA(A)-BB(B)-`*X,E* or
  `AA(A)-BB(B)-00-`*X,E*

where *X* is the SCSI ID and *E* is the SCSI LUN (Logical Unit Number).

Note You must keep a record of the location code for the destination disk(s). In the future, you can use this location code to identify which disk(s) contain(s) the root volume group in order to do system maintenance.

4. If it is not already selected, type the number of the disk you want to select and confirm your selection. To deselect a disk, type its number again and confirm your selection. You can select more than one disk.

5. To mirror the root volume group, follow the instructions for the type of system you have:

   - If you do *not* want to mirror the root volume group, go to step 6.

   - If you have a standard AIX 4.1 system and your backup image was created on a mirrored system, you must also mirror the system on which you are installing. You must select two disks for the installation from the backup. (If you are installing on an FX Series system, this does not apply; you can choose to mirror your system again or to only install the backup image on one disk.)

     You cannot choose to mirror your system at this point if the backup image did not come from a mirrored system. To mirror the root volume group at a later time, complete your system installation and then refer to Chapter 5, "Logical Volumes" in the *System Management Guide: Operating System and Devices*.

   - If you have an FX Series system, to mirror the root volume group, select one disk in each system domain. If you do not select disks in opposite domains, the root volume group is not mirrored.

     Refer to the location codes (with the format AA(A)-BB(B)-*X,E* or AA(A)-BB(B)-00-*X,E*) displayed on the `Change Disk(s) Where You Want to Install` screen:

- If BB(B) is in the range from f1 to f8, then the disk is in Domain 0.
- If BB(B) is in the range from f9 to f16, then the disk is in Domain 1.

For more information on mirroring the root volume group on an FX Series system, refer to *Managing System Storage*.

6. Type 0 and confirm your selection, when you finish selecting disks.

   The BOS installation returns to the System Backup Installation and Settings screen.

7. Decide whether the BOS installation should shrink the file systems on the disks where you are installing the system. When you choose this option, the logical volumes and file systems within a volume group are recreated to the minimum size required to contain the data. This reduces wasted free space in a file system.

   File systems on your backup image might be larger than required for the installed files. Press 2 to toggle the Shrink File Systems option between Yes and No in the System Backup Installation and Settings screen. The default setting is No.

8. Enter 0 to accept the settings in the System Backup Installation and Settings screen.

   The Installing Base Operating System screen appears, reporting the rate of completion and duration.

Where Do I Go Next?

Following the installation, your system reboots and either:

- displays a login prompt
- starts the *Installation Assistant*

If the *Installation Assistant* starts, refer to the *Operating System Installation Guide* to configure the installed machine with optional software, network communications, user accounts, and other settings.

Note On most systems, if the system takes a crash dump, the dump points to the paging logical volume. On FX Series systems, the system creates a separate dump logical volume(`/dev/sysdump0` or `/dev/sysdump1` depending on the I/O domain containing the rootvg).

Preparing to Back Up for Unattended Installations 4

This chapter describes how to customize a `bosinst.data` file. Your system comes with a default `bosinst.data` file, which is shipped with the installation CD-ROM. If this file is accessible during a system installation, your system uses the file to determine default installation settings.

Customizing your `bosinst.data` file is a convenient way to set the desired defaults for an unattended system installation. This file is especially useful during installations from system backup tapes, as it enables your system to remember and recreate your desired installation settings each time you install from backup. To use this file during a system backup, you must customize it before creating your backup image.

This chapter includes:

Customizing the bosinst.data File

You must install the Base Operating System (BOS) before you can access and modify the default `bosinst.data` file. Once you have installed the BOS, retrieve and edit the file like any other ASCII file.

Refer to "bosinst.data File Stanza Descriptions" on page 4-7 and "Example bosinst.data File for Nonprompted Installation" on page 4-13 for information about the contents of the file and an example of an edited file.

Note If your system does not contain a diskette drive, the only use of the `bosinst.data` file is to guide the installation of the `mksysb`.

Editing the bosinst.data File

To edit `bosinst.data`, follow these steps:

1. Copy the `/var/adm/ras/bosinst.data` file to a new name to preserve a copy of the original file.
2. Edit the `bosinst.data` file with an ASCII editor.

   For details about the values for the variables in this file, refer to "bosinst.data File Stanza Descriptions" on page 4-7.

Using the bosinst.data File

To ensure that the `bosinst.data` file is available for installations using the CD-ROM or other installation media, place the file on a diskette.

Use the following procedure:

1. Customize the `bosinst.data` file.
2. Copy the modified file to a diskette that supplements your installation medium. (See "Creating and Using a Supplementary Diskette on a Standard AIX 4.1 System" on page 4-5.)

To use the `bosinst.data` file during a system backup, make desired changes to the file before you create the backup image. Use the following procedure:

1. Customize the `bosinst.data` file.
2. Copy the modified file to the /(root) directory.
3. Proceed with the system backup.

This modified `bosinst.data` file is then used during an installation from the backup image.

Creating and Using a Supplementary Diskette on a Standard AIX 4.1 System

To create and use a diskette containing the edited `bosinst.data` file, follow these steps (standard AIX 4.1 systems only):

1. Create an ASCII file named `signature` that contains the word `data`.
2. Back up the edited `bosinst.data` file and the new `signature` file to a diskette using the following command:

   ```
   ls ./bosinst.data ./signature | backup -iqv
   ```

3. What is the current state of the target system?

- "The System Is Turned Off" on page 4-5
- "The System Is Up and Running AIX" on page 4-7

The System Is Turned Off

If your system is not turned on or is running from the firmware, follow these steps:

1. Power on all attached external devices, such as terminals and monitors.
2. If you have an ASCII terminal, refer to Table 3-1 and Table 3-2 on page 3-5 for required communications and keyboard settings.
3. Power your system on.

4. Proceed according to the version of your firmware:

PPCBug or FX- Bug Firmware	After the self tests have completed, press the Esc key once when you see this message: `NVRAM Boot List about to Begin... Press <ESC> to Bypass, <SPC> to Continue`
PowerPC Open Firmware	a. After the automatic self tests have completed, press any key when you see this message: `Type any key to interrupt automatic startup` The system then goes to the PowerPC Open Firmware Main Menu. b. At the `Main Menu`, select the `Boot an Operating System` menu. The `Boot an Operating System` menu window appears. c. Select the `Perform auto-scan Boot Operation` menu option from the `Boot an Operating System` window.

5. Insert the installation medium into the appropriate device drive. Remove any other tapes, CD-ROMs, or floppy disks from all attached devices because they may interfere with the autoboot sequence.
6. Power cycle the system by turning it off and turning it on again.
7. The BOS installation program completes the installation using the diskette file, rather than the default file `bosinst.data` shipped with the installation CD-ROM.

The System Is Up and Running AIX

If your system is running AIX, follow these steps:

1. Log in as `root`.
2. Insert the installation medium into the appropriate device drive. Remove any other tapes, CD-ROMs, or floppy disks from all attached devices because they may interfere with the autoboot sequence.
3. Reboot the system by entering:

   ```
   shutdown -Fr
   ```

4. The BOS installation program completes the installation using the diskette file, rather than the default `bosinst.data` file shipped with the installation CD-ROM.

bosinst.data File Stanza Descriptions

This section describes the contents of the `bosinst.data` file. An example file follows the stanza descriptions.

control_flow Stanza

The `control_flow` stanza contains variables that control the way the installation program works:

CONSOLE — specifies the full name of the device you want to use as the console

The default value is blank and assumes a prompted installation. If you change the *PROMPT* variable to `no`, you must specify a console here.

INSTALL_METHOD — specifies a method of installation: `preserve` or `overwrite`

PROMPT — specifies whether the installation program uses menus from which you make choices

The possible values are `yes` (default) and `no`.

Note You must fill in values for all variables in the `locale` stanza if you set the *PROMPT* variable to `no`. In addition, you must supply values for all variables in the `control_flow` stanza, with three exceptions: the *BUNDLES, ERROR_EXIT* and *CUSTOMIZATION_FILE* variables, which are optional.

EXISTING_SYSTEM_OVERWRITE — specifies that the install program can overwrite existing files

This variable is only applicable for a nonprompted installation. The possible values are `no` (default) and `yes`.

INSTALL_X_IF_ADAPTER	specifies whether to install AIXwindows The possible values are: • `yes` (default) • `no` • `all` (always install AIXwindows)
RUN_STARTUP	starts the installation assistant after the BOS installation is complete The possible values are `yes` (default) and `no`.
RM_INST_ROOTS	removes all files and directories in the `/usr/lpp/*/inst_roots` directories The possible values are `no` (default) and `yes`. If the machine is to be used as a network server, these files and directories must not be removed.
ERROR_EXIT	specifies a file or command that is executed if an error occurs during installation The default value is blank.
CUSTOMIZATION_FILE	specifies the path name of a file to be executed after the BOS installation The default value is blank.
TCB	turns on or off Trusted Computing Base The possible values are `no` (default) and `yes`.
BUNDLES	specifies bundles to install after the BOS install

target_disk_data Stanza

The `target_disk_data` stanza contains variables for disks in the machine where the program installs the BOS. The default `bosinst.data` file has one `target_disk_data` stanza. However, you can add new stanzas to install the BOS on multiple disks, one stanza for each disk.

The installation program determines a target disk by checking the variables in hierarchical order. For example, if the *LOCATION* variable specifies a location code, the program installs the BOS on that disk, regardless of the remaining variables.

If you accept the default values, which are blank, the installation program chooses a target disk based on the initial hardware query.

Warning

You can lose data if you leave the variables blank in a nonprompted installation.

LOCATION specifies a location code for the disk where the program installs the BOS

The default value is blank. If you do not specify a value, the installation program assigns a value based on the next two variables.

SIZE_MB specifies the formatted size of the disk, in megabytes, where the program installs the BOS

The default value is blank. You can specify the size of your target disk by typing the number of megabytes available on the formatted disk. Also, you can type `largest` if you want to use the largest disk (that has not already been selected) found by the installation program.

Note Use the `bootinfo -s` *hdiskname* command to find the correct formatted size to use in this variable. Another method is to use a number that is 95 percent of the total disk size. You cannot use alpha characters, such as MB or megabytes, when specifying a numerical size.

HDISKNAME specifies the path name of the target disk

The default value is blank. To name a target disk, use the *hdiskname* format, where *hdiskname* is the device name of your disk (for example, `hdisk0`).

The locale Stanza

The `locale` stanza contains variables for the primary language the installed machine uses. If you have a standard AIX 4.1 system refer to "Understanding Locales" in the *System Management Guide: Operating System and Devices* or if you have an FX Series system refer to *Managing System Storage* for a list of languages and formats to use when editing variables.

BOSINST_LANG specifies the language the installation program uses for prompts, menus, and error messages

The default value is blank.

CULTURAL_CONVENTION

specifies the primary locale to install

The default value is blank.

MESSAGES specifies the locale for messages catalogs to install

The default value is blank.

KEYBOARD specifies the keyboard map to install

The default value is blank.

Note The recommended value for the above variables is `en_US`.

Example bosinst.data File for Nonprompted Installation

The example `bosinst.data` file shows the edits you could make for a nonprompted BOS installation.

The depicted values illustrate formatting only and do not apply to your installation.

```
control_flow:
           CONSOLE = /dev/lft0 (FX Series: /dev/tty0)
           INSTALL_METHOD = overwrite
           PROMPT = no
           EXISTING_SYSTEM_OVERWRITE = yes
           INSTALL_X_IF_ADAPTER = yes
           RUN_STARTUP = yes
           RM_INST_ROOTS = no
           ERROR_EXIT =
           CUSTOMIZATION_FILE =
           TCB = no
           INSTALL_TYPE = full
           BUNDLES =

target_disk_data:
           LOCATION =
           SIZE_MB = largest
           HDISKNAME =

locale
           BOSINST_LANG = en_US
           CULTURAL_CONVENTION = en_US
           MESSAGES = en_US
           KEYBOARD = en_US
```

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