

COVER Book Cover

**7133 SSA Disk Subsystems
for PC Servers**

User's Handbook

Document Number S96H-9763-00

Part Number 96H9763

ABSTRACT Abstract

This book gives installation and operating information for the 7133 SSA Subsystem. The book covers both rack-mounted and desk-side subsystems. The book describes:

- The lights and switch on the subsystem that you may have to use
- How to identify subsystems and disk drives within them may have to use
- How to install additional disk drives and fan-and-power-supply assemblies in the subsystem
- How to move a desk-side unit safely
- How to deal with problems encountered when using the subsystem, such as:
 - How to change a faulty disk drive module
 - How to change a faulty fan-and-power-supply assembly
- How to install a Model 010 or 020 into a rack
- How connect a 7133 unit into an SSA loop with an SSA adapter
- How to turn on and test a 7133 unit
- Sample cabling configurations
- The internal SSA connections of a 7133 unit

No previous experience of DP equipment is required to follow these instructions.

You will need the appropriate system operation manuals and diagnostic programs to complete all the tasks associated with the subsystem.

NOTICES Notices

+--- **Note** -----+
| Before using this information and the product it supports, be sure |
| to read the general information under "Notices" in topic A.2 |
+-----+

EDITION Edition Notice
First Edition (November 1996)

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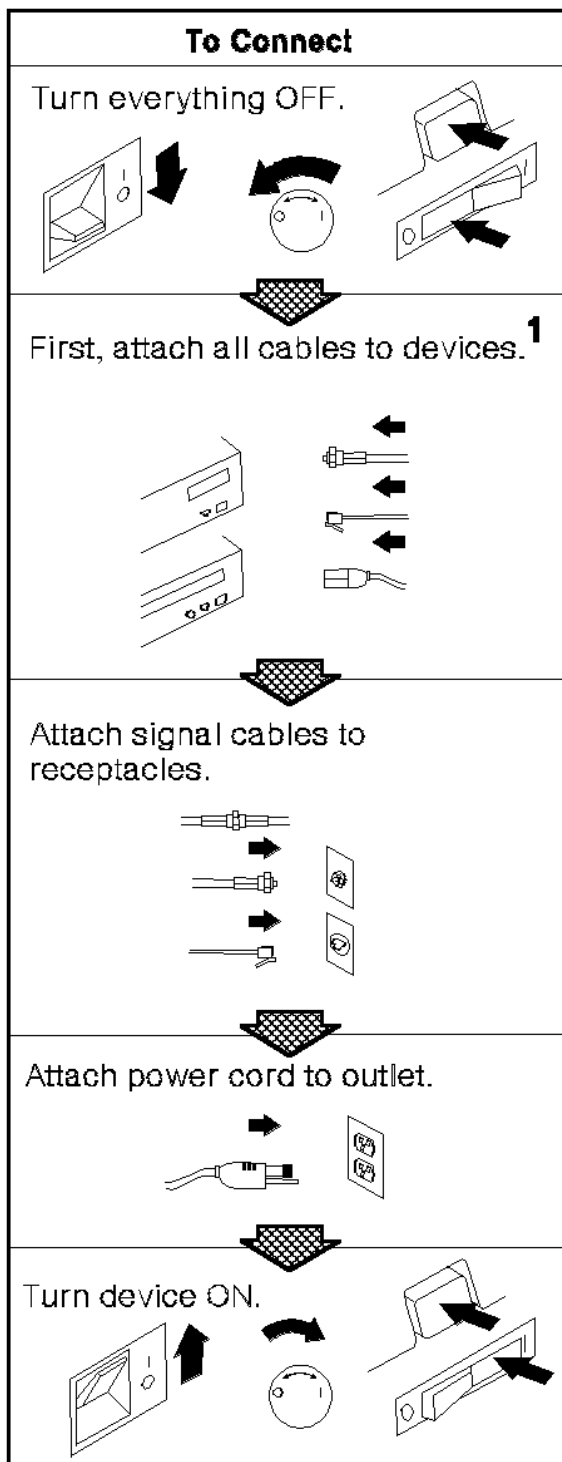
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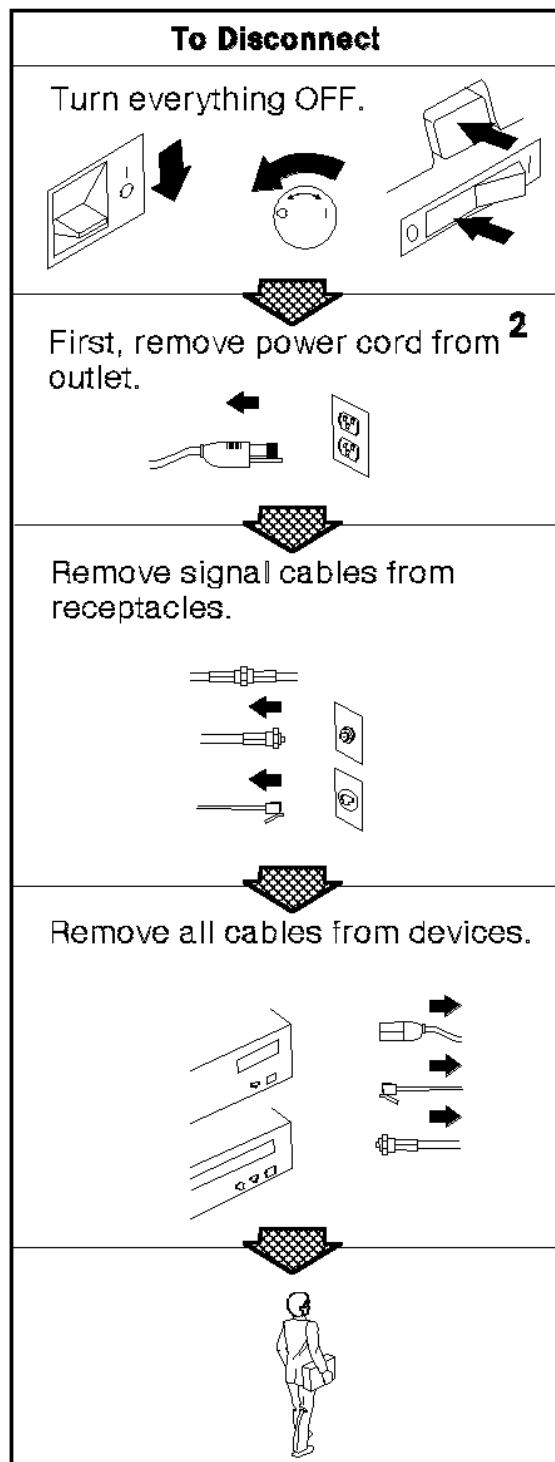


DANGER:

Electrical current from power, telephone, and communication cables is hazardous. To avoid shock hazard, connect and disconnect cables as shown below when installing, moving or opening the covers of this product or attached devices. The power cord must be used with a properly-grounded outlet.



¹ In the U.K., by law, the telephone cable must be connected after the power is disconnected.

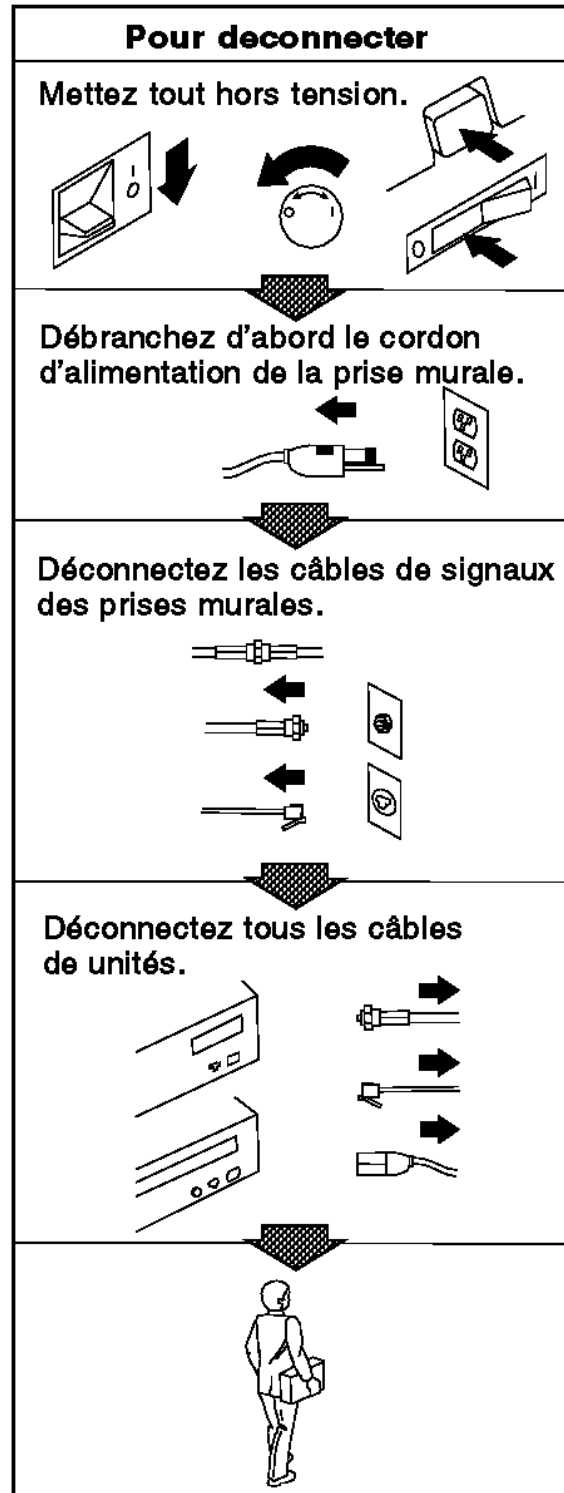
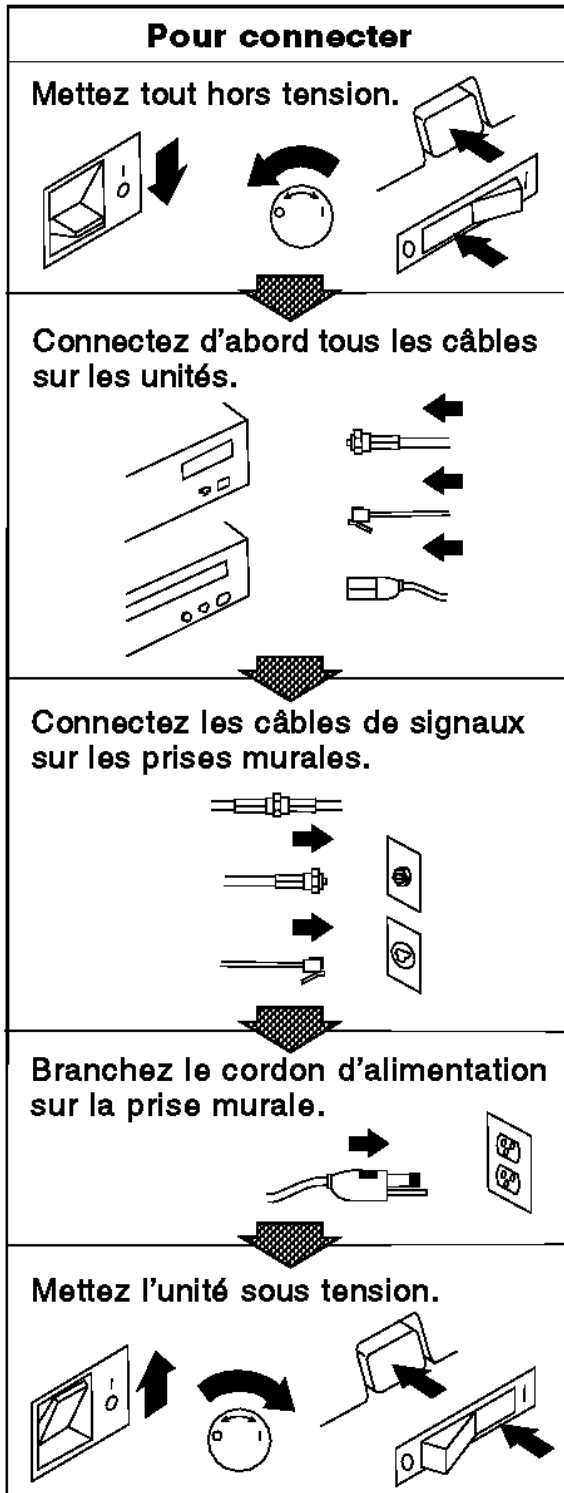


² In the U.K., by law, the power cord must be disconnected after the telephone cables are disconnected.



DANGER:

Le courant électrique provenant des câbles d'alimentation, téléphoniques et de transmission peut présenter un danger. Pour éviter tout risque de choc électrique, connectez et déconnectez ces câbles comme indiqué ci-dessous lorsque vous installez ou déplacez ce matériel ou les unités connectées, ou que vous soulevez un carter.*



CAUTION:

A lithium battery can cause fire, explosion, or a severe burn. Do not recharge, disassemble, heat above 100°C (212°F), solder directly to the cell, incinerate, or expose cell to water. Keep away from children. Replace only with the part number specified for your system. Use of another battery might present a risk of fire or explosion.

The battery connector is polarized; do not try to reverse the polarity.

Dispose of the battery according to local regulations.

A module on the SSA adapter card contains a lithium battery.

Subtopics

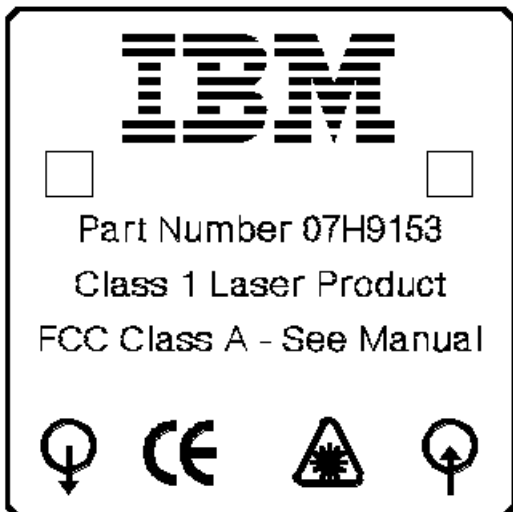
FRONT_1.1 Laser Safety Information

FRONT_1.1 Laser Safety Information

Note: The information given here applies only to 7133s that have the SSA Fibre-Optic Extender feature.

This system contains a laser product called the SSA Fibre-Optic Extender. In the United States, the SSA Fibre-Optic Extender is certified as a Class 1 laser product that conforms to the requirements contained in the Department of Health and Human Services (DHHS) regulation 21 CFR Subchapter J. Internationally, the SSA Fibre-Optic Extender is certified as a Class 1 laser product that conforms to the requirements contained in the International Electrotechnical Commission (IEC) standard 825-1 (1993).

Class 1 laser products are not considered to be hazardous. The SSA Fibre-Optic Extender internally contains an indium gallium arsenide / indium phosphide (InGaAs/InP) semiconductor laser diode emitting in the wavelength range of 1280 to 1340 nanometers. This laser diode is a Class 1 laser that is rated at 5.0 milliwatts. The design of the SSA Fibre-Optic Extender is such that access to laser radiation above a Class 1 level during operation, user maintenance, or service conditions is prevented.



```
+-----+
| CLASS 1 LASER PRODUCT
| APPAREIL A LASER DE CLASSE 1
| LUOKAN 1 LASERLAITE
|
| TO IEC 825-1:1993
+-----+
```

PREFACE About This Book

This book provides user and installation instructions for any person who is required to use or install a 7133 Serial Storage Architecture (SSA) Disk Subsystem. That person could be an employee (technical or nontechnical) of the owner of the subsystem, a service representative, or an installation engineer.

Subtopics

PREFACE.1 How This Book is Organized

PREFACE.2 Notices Used in This Book

PREFACE.3 Numbering Convention

PREFACE.4 Related Publications

PREFACE.1 How This Book is Organized

This book contains three parts:

- The first part is for the person who is going to use a 7133 subsystem. The information that is contained in this part describes:
 - Using the subsystem
 - Adding features to the subsystem
 - Dealing with problems.

- The second part is for the person who is going to install a 7133 subsystem. The information that is contained in this part describes:
 - Installing Models 010 and 020
 - Installing Models 500 and 600
 - Connecting the 7133 to the using system
 - Connecting the 7133 to the power source
 - Turning on and testing the 7133
 - Example configurations
 - Changing the bypass card jumpers on Models 020 and 600.

- The last part contains warranty statements and other notices.

PREFACE.2 Notices Used in This Book

□ **Danger**

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

□ **Caution**

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

□ **Attention**

An attention notice indicates an action that could cause damage to a program, device, system, or data.

PREFACE.3 Numbering Convention

In this book, one gigabyte (GB) equals 1 000 000 000 bytes.

PREFACE.4 Related Publications

The *User's Handbook* for your server

IBM SSA RAID Adapter for PC Servers: Installation and User's Guide, S32H-3816

IBM 7133 SSA Disk Subsystems for PC Servers: Hardware Maintenance Manual Supplement, S96H-9764

1.0 Chapter 1. Using the Subsystems

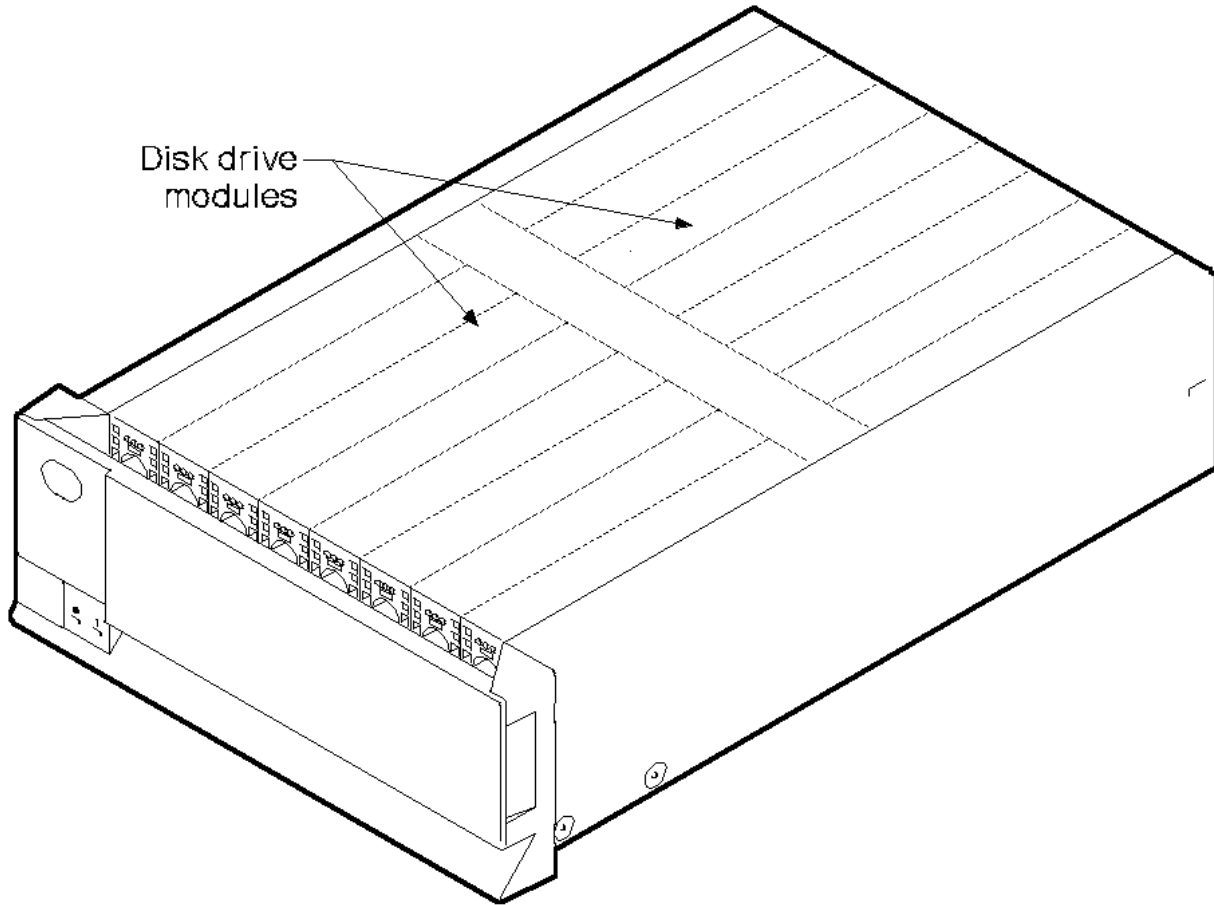
This chapter describes the 7133 Serial Storage Architecture (SSA) Disk Subsystems, their controls, and how to use them.

The 7133 is an SSA disk storage subsystem that can be attached to PC Servers. The Models 010 and 020 are rack-mounted units. The Models 500 and 600 are deskside units. Up to 16 SSA disk drive modules, in groups of up to four, can be installed in a 7133 subsystem.

Each group of disk drives in a 7133 subsystem is connected in a loop that must also contain an SSA adapter. The rules for connecting SSA loops are described in topic 7.0. Details of sample configurations are described in Chapter 9, "Example Configurations" in topic 9.0.

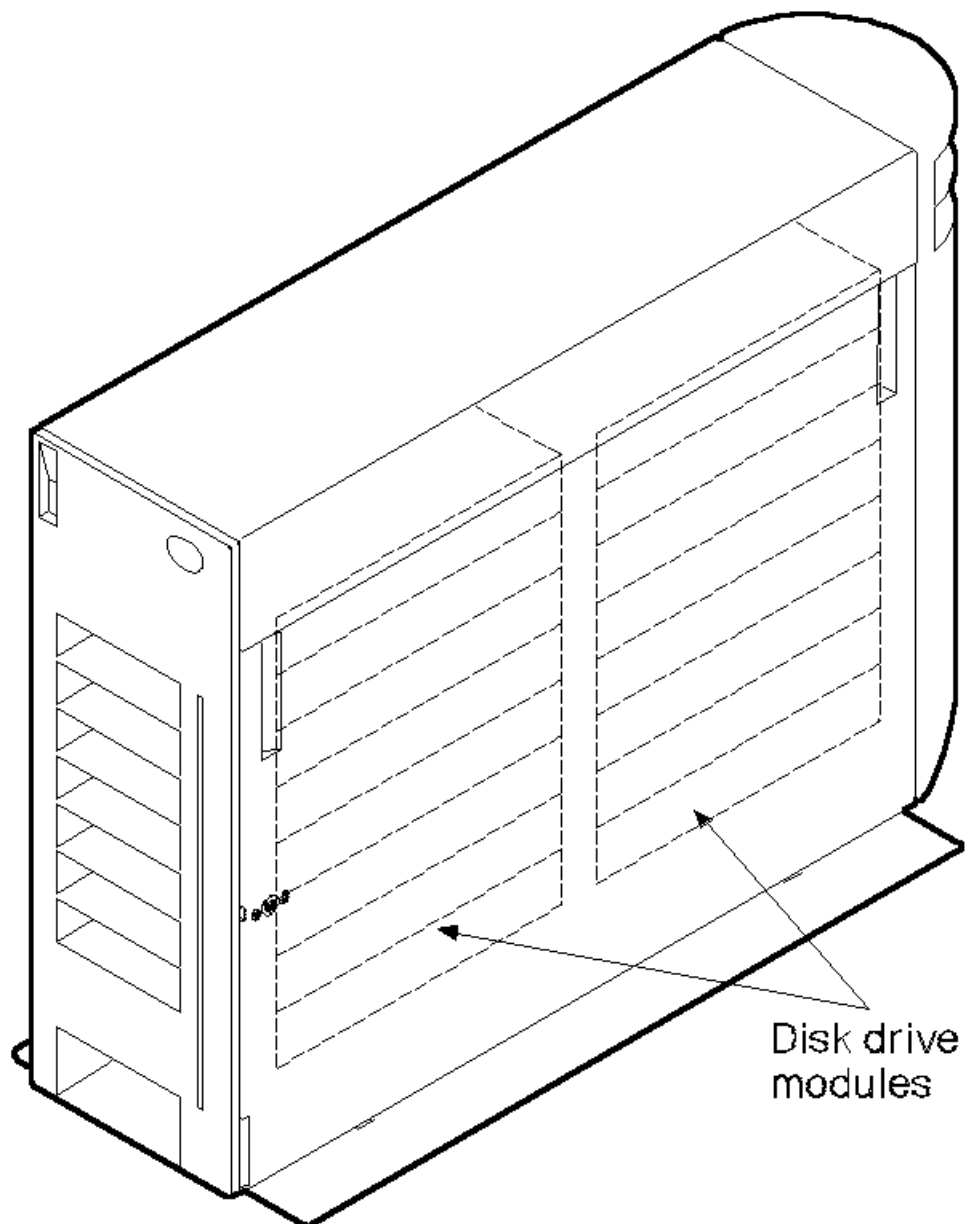
An SSA Fibre-Optic Extender feature can be installed. This allows the 7133 unit to be connected by fiber optic cables to host systems or other SSA units up to 2.4 km (7874 feet) away.

A fully configured Model 010 or 020 looks like this:



The whole of the later type of front cover hinges downward to give access to the disk drive modules installed at the front of 7133 rack-mounted units. The early type of front cover has a movable panel that hinges downward.

A fully configured Model 500 or 600 looks like this:



The front and back covers hinge to the left to give access to the disk drive modules installed behind them. Locks are provided on the covers to prevent unauthorized access to the disk drive modules and system connections.

Subtopics

- 1.1 Controls and Lights
- 1.2 Identifying a Disk Drive Module
- 1.3 Security
- 1.4 External Connectors

1.1 Controls and Lights

This section describes the Power switch and lights on a 7133 subsystem.

For Models 010 and 020, the internal power of the 7133 is turned on and off automatically when you turn power on and off to the rack containing the subsystem.

During normal operations, you do not need to check the lights on 7133 subsystems.

Subtopics

1.1.1 Subsystem Controls

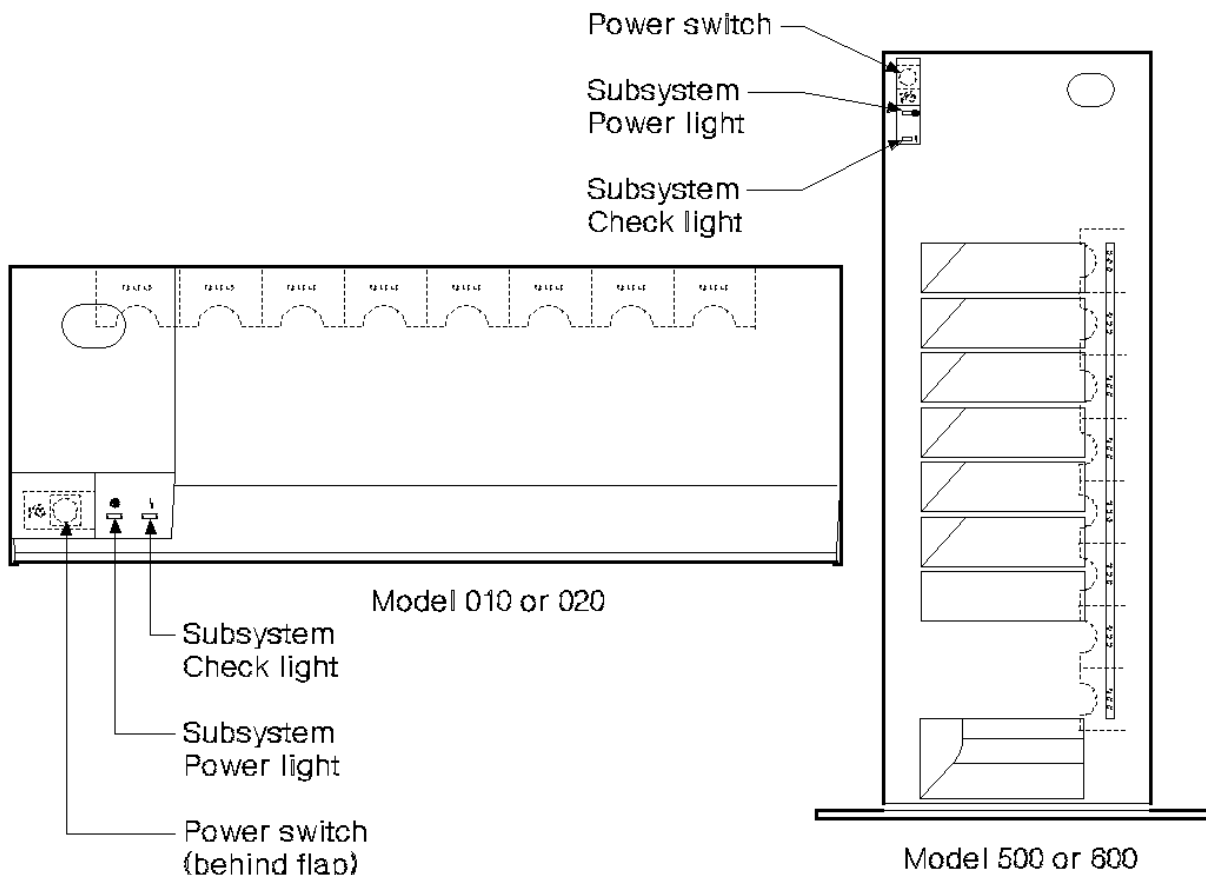
1.1.2 Disk Drive Module Lights

1.1.1 Subsystem Controls

Each 7133 has the subsystem Power switch and subsystem lights at the front.

On Models 010 or 020, the Power switch is behind a flap on the front cover. To reach the switch:

- On a Model 010, hinge the flap upward,
- On a Model 020, hinge the flap to the right.



Power switch

The Power switch controls electrical power from the power-supply units within the 7133 subsystem to the disk drives and other components. To connect this internal electrical power, press the Power switch and, on a Model 010 or a Model 500 only, hold it pressed for at least two seconds. To remove this power, press the switch again and, on a Model 010 or a Model 500 only, hold it pressed for at least two seconds.

When you have pressed this switch to remove the internal power and the subsystem power light is off, mainline electrical power can still be present within the 7133 subsystem. To remove electrical power completely from the subsystem, disconnect the mainline electrical supply.

Attention: Pressing this switch when the subsystem power light is on can cause a system fault unless you first ensure that the operating system is not using the disk drives of the 7133.

Subsystem Power light

The Subsystem Power light, which is green, comes on when the power-supply units within the 7133 subsystem are supplying power to the rest of the subsystem.

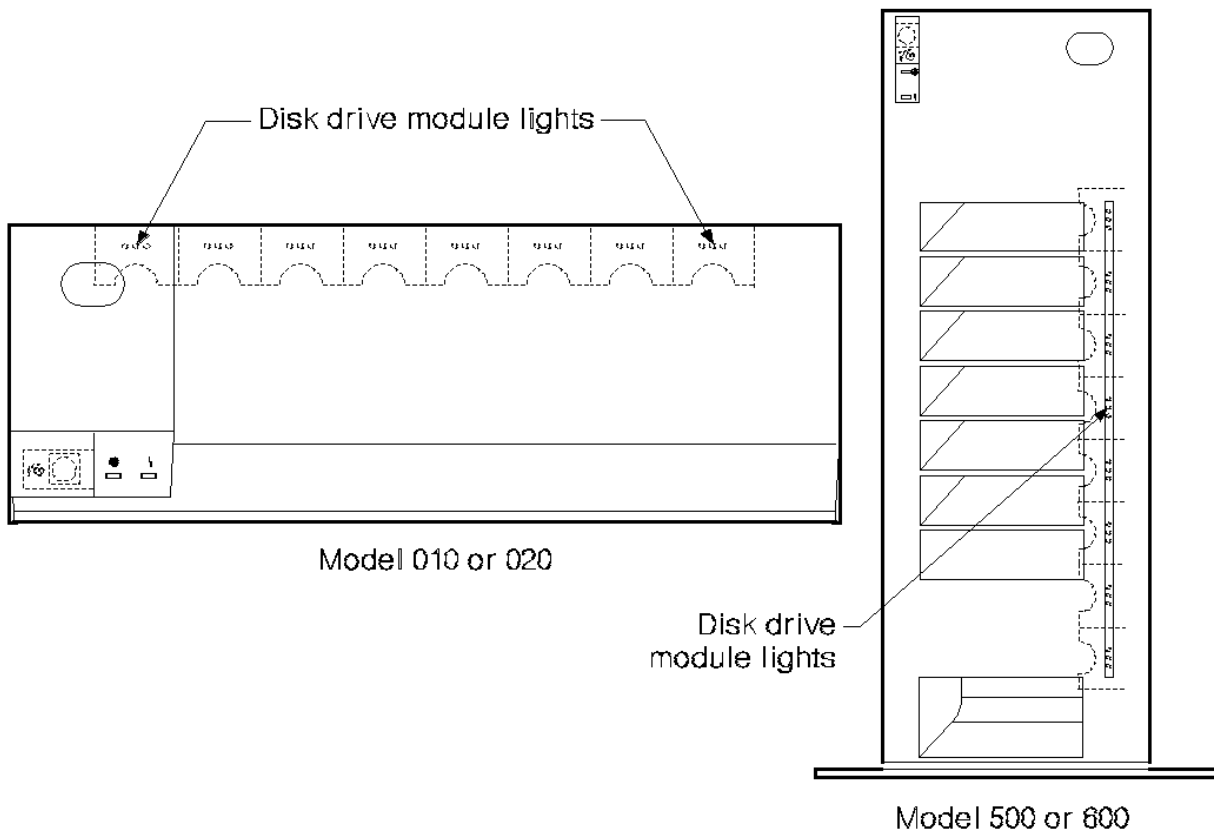
Subsystem Check light

The Subsystem Check light, which is amber, comes on:

- Continuously, if a failure occurs within the 7133 subsystem. The subsystem might be able to continue operating satisfactorily even when the failure of a single part has been detected.
- Continuously, when a disk drive within the subsystem is in service mode.
- Flashing, when a disk drive within the subsystem has been selected with the identify option.

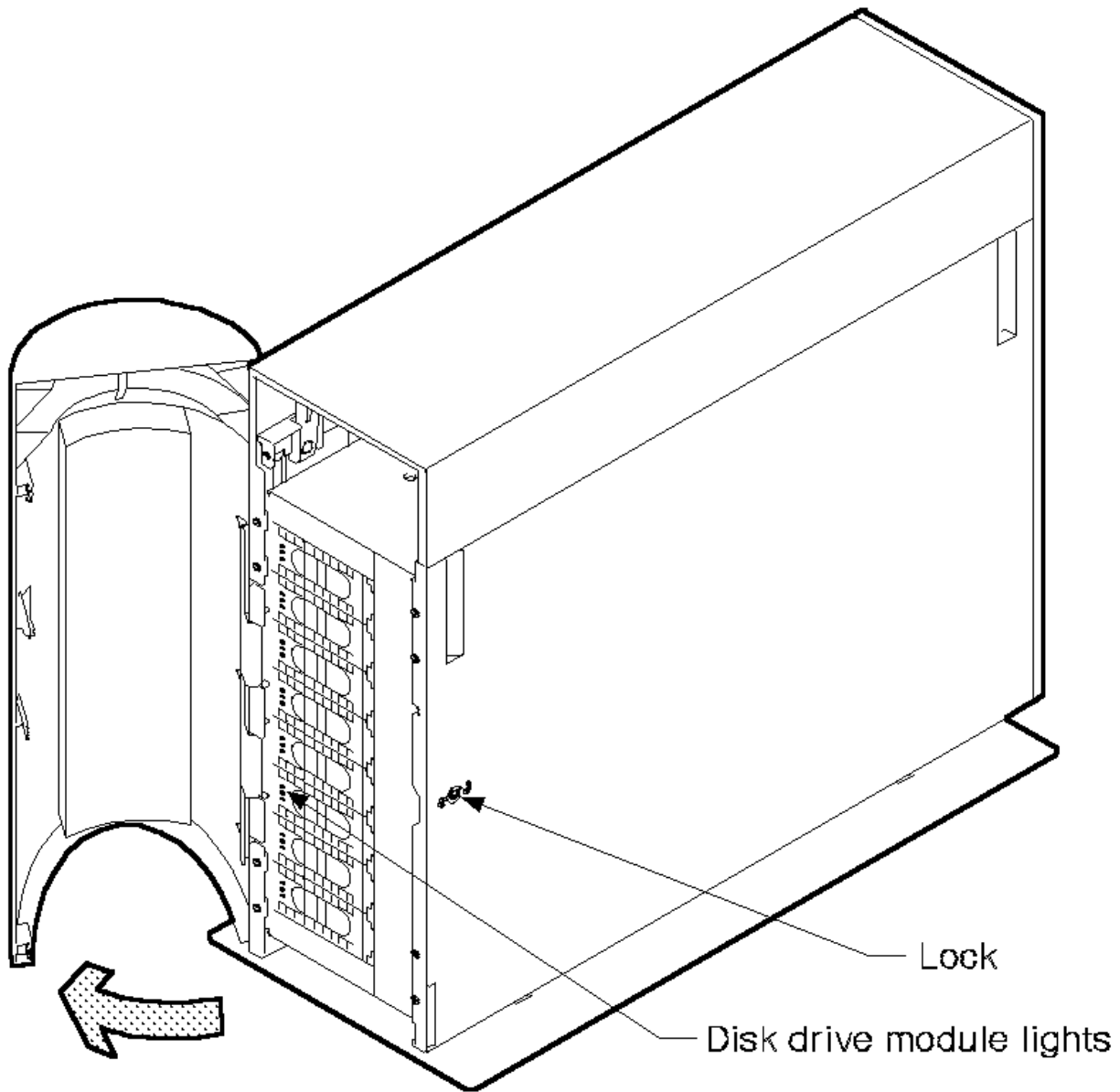
1.1.2 Disk Drive Module Lights

You can see the lights on disk drive modules installed in the front part of a 7133 through a transparent part of the cover.



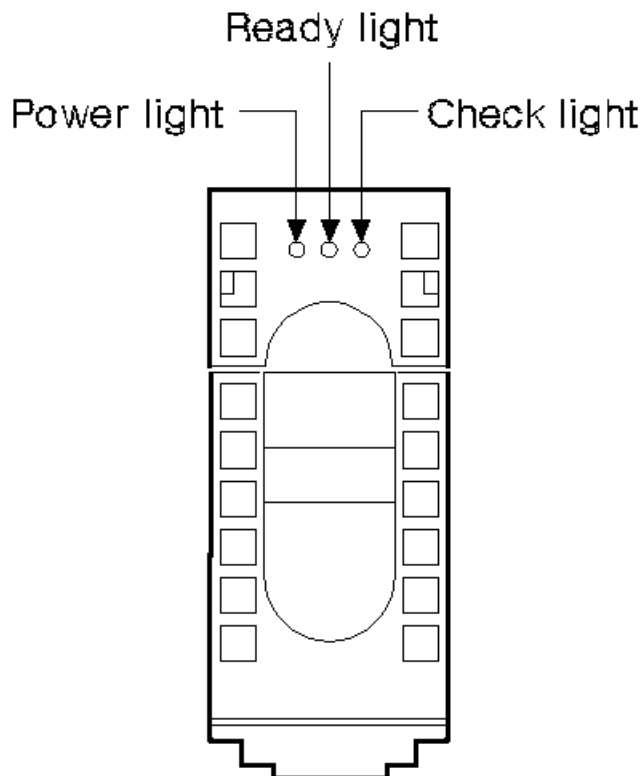
To see the lights on disk drive modules installed at the back of a 7133:

- For a Model 010 or 020, open the back door of the rack containing the 7133.
- For a Model 500 or 600, open the back cover of the 7133 by:
 1. If necessary, unlocking the cover using the key provided
 2. Gripping the back cover on the right and hinging it to the left.



Model 500 or 600 (back view)

Each disk drive module has three lights.



Power light

The Power light, which is green, comes on when the required power supplies are present in the disk drive module.

Ready light

The Ready light, which is green, comes on and remains on when both SSA connections to the disk drive module are good and the disk drive is ready to accept commands from the host system.

The light flashes slowly when only one SSA connection is good.

The light flickers when the disk drive is executing a command.

Check light

The Check light, which is amber, comes on and remains on:

- If a failure in the disk drive module is detected
- While the automatic self-tests are running
- To indicate *service mode*; that is, use of the disk drive by the system programs has ended and repair actions can be performed.

The light flashes to show that the disk drive has been selected with the Identify option from the Set Service Mode service aid. "Identifying a Disk Drive Module" in topic 1.2 describes how to use this aid.

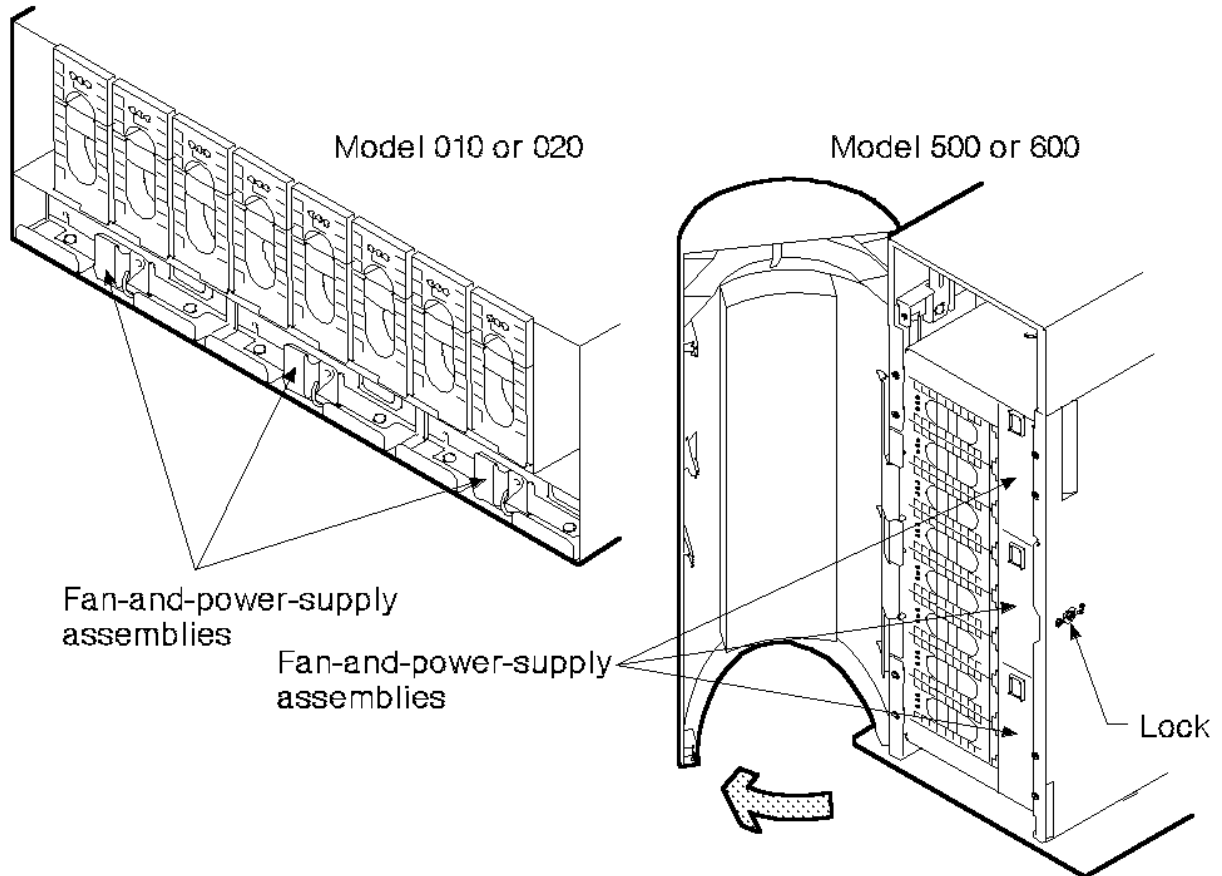
Subtopics

1.1.2.1 Fan-and-Power-Supply Assembly Lights

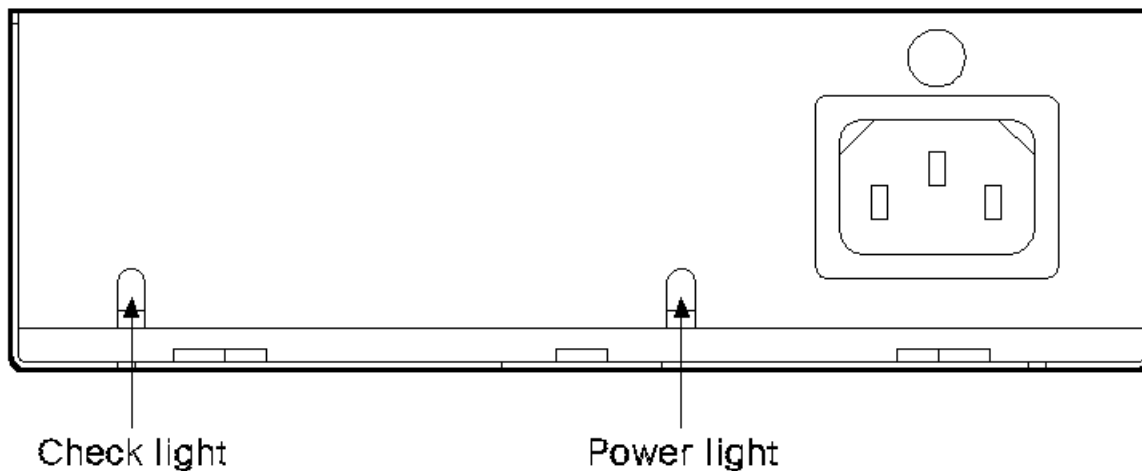
1.1.2.1 Fan-and-Power-Supply Assembly Lights

Fan-and-power-supply assemblies are installed in the back of 7133s. To see their lights:

- For a Model 010 or 020, open the back door of the rack containing the 7133.
- For a Model 500 or 600, open the back cover of the 7133 by:
 1. If necessary, unlocking the cover using the key provided
 2. Gripping the back cover on the right and hinging it to the left.



There are up to three fan-and-power-supply assemblies in a 7133. These assemblies have the following lights:



Power light

The Power light, which is green, comes on when the mainline power supply is connected to the fan-and-power-supply assembly.

Check light

The Check light, which is amber, comes on and remains on if the power-supply unit fails.

This light flashes if the fan within the assembly fails.

1.2 Identifying a Disk Drive Module

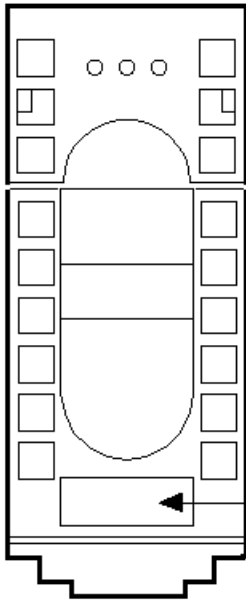
1. Start the SSA Configurator and Service Aids Utility. (See the *IBM SSA RAID Adapter for PC Servers: Installation and User's Guide* for how to do this.)
2. From the Main menu, select **SSA Adapter List**, select the adapter to which the disk drive is attached, and then select **Disk Service Aids**. A list of the physical disk drives that are attached to the adapter is displayed:

```

+-----+
+-----+
|CONFIG  SSA Configurator and Service Aids  Vyyymmdd  XX Version|
+-----+
+-----+
|          Main Menu          |
+-----+
|          Disk Service Aids  |
+-----+
| Link      SSA UID      Status |
| Port A1   UID1xxxx    Good  |
|           UID2xxxx    Good  |
|           UID3xxxx    Good  |
|           UID4xxxx    Good  |
|           UID5xxxx    Good  |
|           UID6xxxx    Good  |
| Port A2   No disks     |
+--| Port B1   |
| Port B2   |
+-----+
|<ESCAPE> Exit  <ENTER> Select  <F1> Help  <F2> Format  |
|<F3> Certify  <F4> ServiceMode  <F5> Diagnostics  <F9> FlashOn  |
|<F10> FlashOff  |
+-----+
    
```

3. To identify a disk drive module, select the disk drive, and press F9 (FlashOn). The Check light on the selected disk drive module flashes. This action does not affect any operations that are running.

Note: The SSA Unique ID (SSA UID) of the disk drive module is on a label that is on the front of the module:



SSA Unique ID

1.3 Security

To protect your subsystem from unauthorized access, locks are provided on the covers of Models 500 and 600, and are available as accessories to secure individual disk drive modules.

Subtopics

1.3.1 Disk Drive Module Locks

1.3.2 Cover Locks for Models 500 and 600

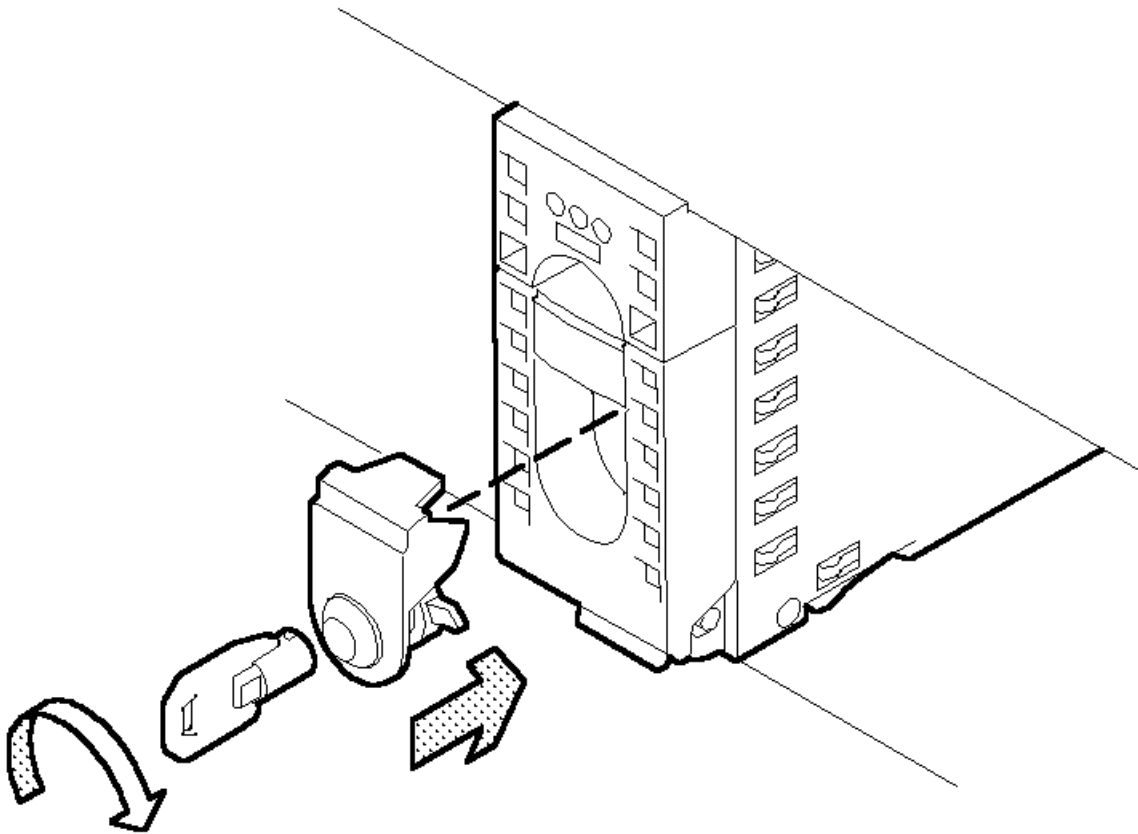
1.3.3 Ordering Cover-Lock Keys

1.3.1 Disk Drive Module Locks

Disk drive module locks prevent the unauthorized removal of disk drive modules from either Models 010 and 020, or Models 500 and 600. You need one lock for each disk drive module that you want to secure.

To lock a disk drive module into a unit:

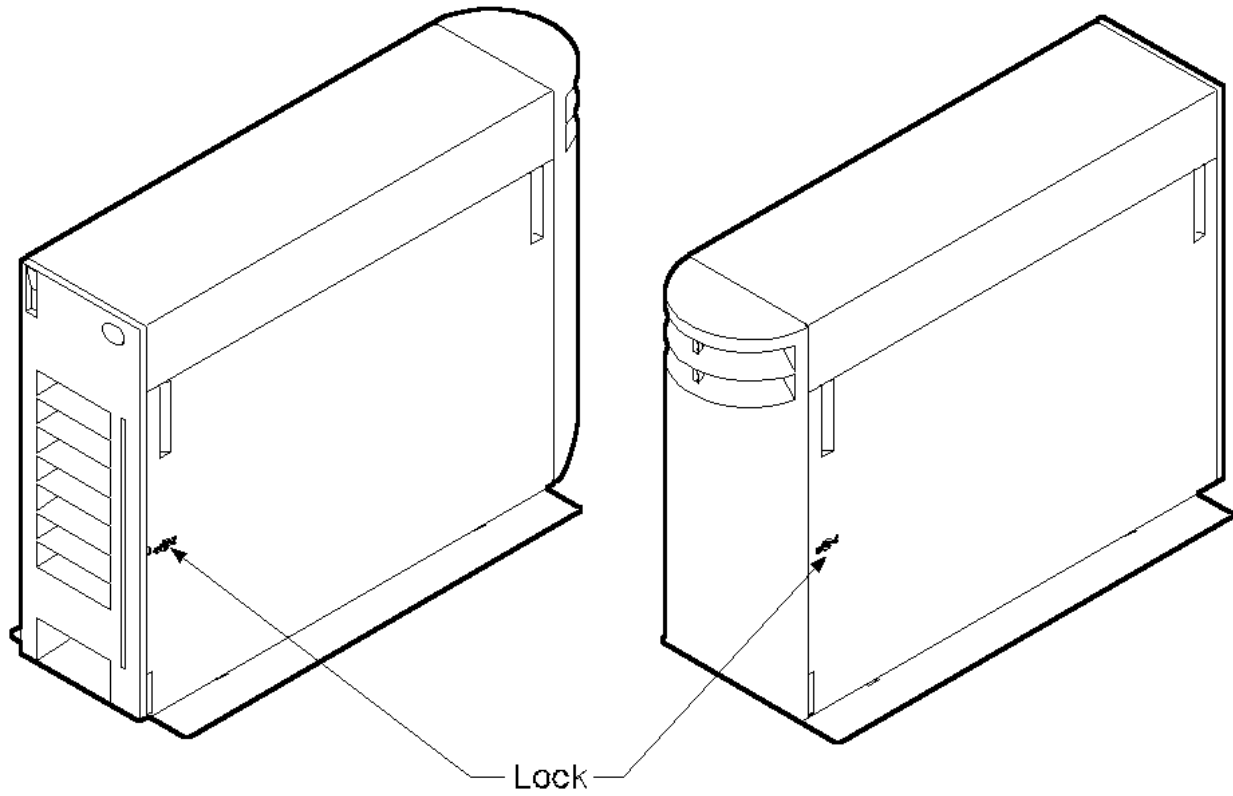
1. Put the lock into the space in the handle of the disk drive module.
2. Put the end of the key into the lock.
3. Turn the key half a turn clockwise.



Three keys, that fit all locks, are supplied with the first lock that you order. Keep at least one of these keys in a secure area.

1.3.2 Cover Locks for Models 500 and 600

On Models 500 and 600, locks on the front and back covers provide physical security for the drives and the connections to the system unit. You do not need to remove these covers during normal operations. The two locks use the same key. If you lock the covers, neither of them can be opened for servicing without the use of the key. You do not need to lock the covers for them to stay closed.

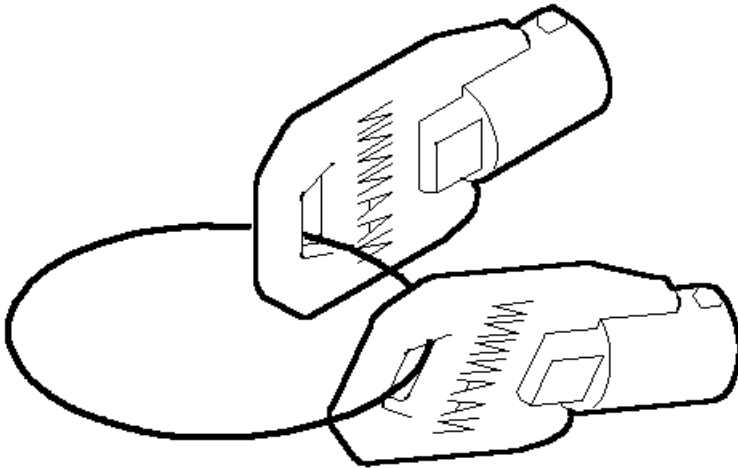


1.3.3 Ordering Cover-Lock Keys

For protection against unauthorized key duplication, the cover locks are high-security locks. Keys for these locks are a factory-restricted series and duplicate keys are *not* available through normal commercial channels. The serial number of the lock is stamped on each key; make a note of this number. The additional key supplied and your note of its number should be stored in separate secure areas.

Make a copy of the official order form in the 7133: *Installation and User's Guide*, fill in the details, and send it to the address printed on the form. As a security precaution, the manufacturer will not honor orders that are not on the official order form.

If a lock becomes faulty, contact your sales representative for a replacement.

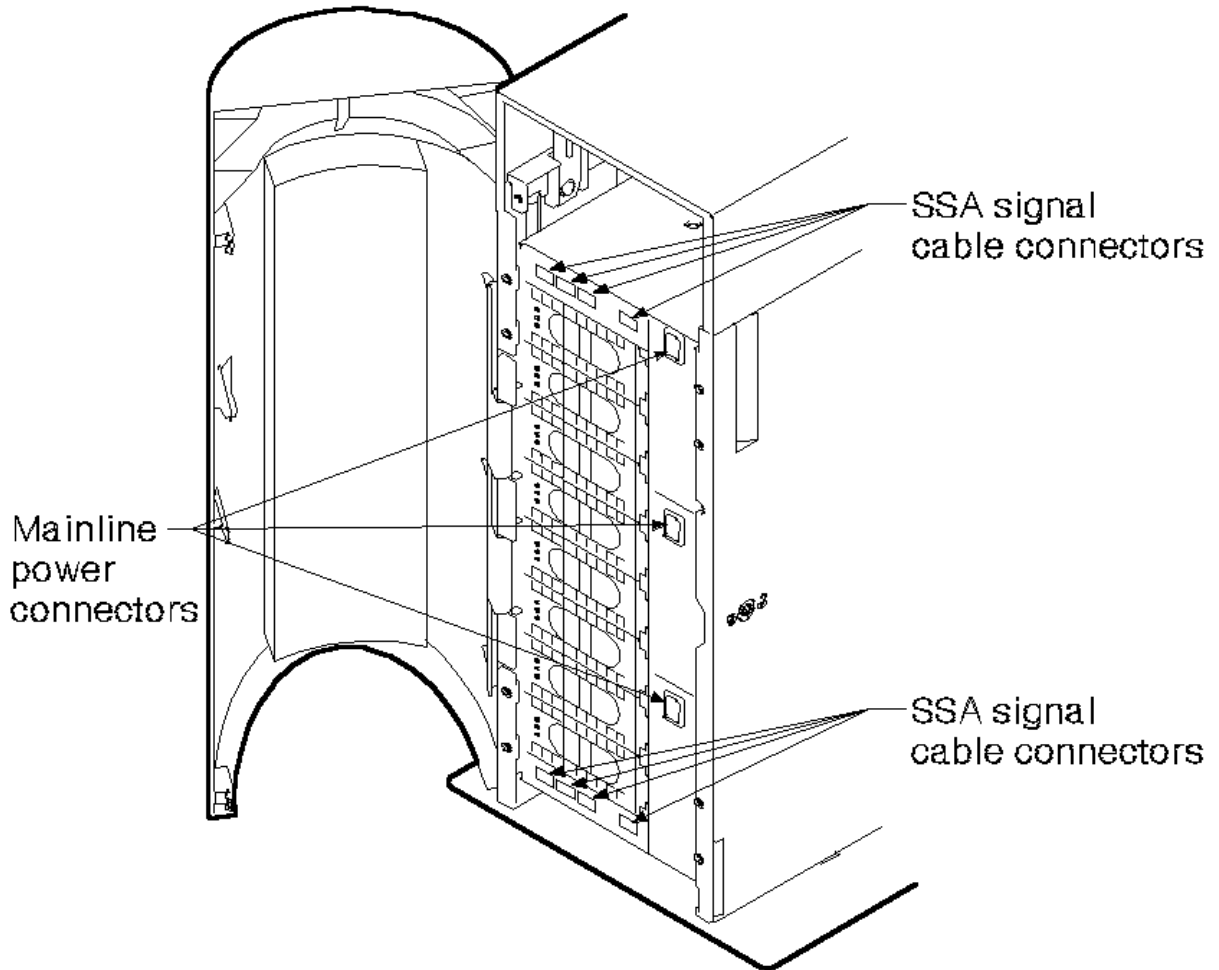


1.4 External Connectors

If you open the back cover of a Model 500 or 600 (if necessary, using the key provided to unlock the cover), you can reach the connectors for the signal cables to the system unit.

DANGER

-----+
| An electrical outlet that is not correctly wired could place hazardous |
| voltage on metal parts of the system or the devices that attach to the |
| system. It is the responsibility of the customer to ensure that the |
| outlet is correctly wired and grounded to prevent an electrical shock. |
|
| Use one hand, when possible, to connect or disconnect signal cables to | prevent a
| possible shock from touching two surfaces with different | electrical potentials. |
|
| During an electrical storm, do not connect cables for display | stations, printers,
| telephones, or station protectors for | communication lines. |
|-----+-----



2.0 Chapter 2. Adding Features

This chapter describes how to add certain optional features to a 7133 SSA Disk Subsystem that is already installed as part of your system.

Subtopics

2.1 Adding Disk Drive Modules

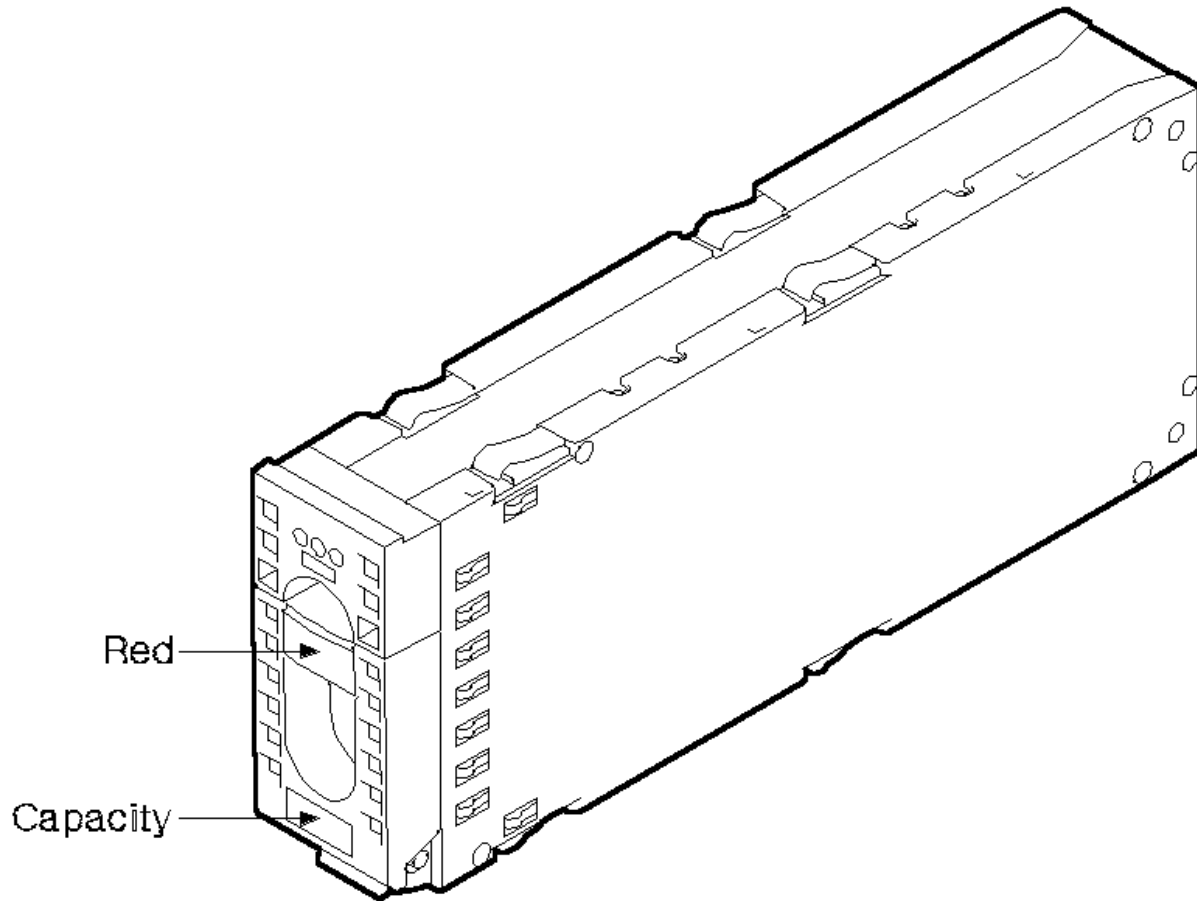
2.2 Adding a Fan-and-Power-Supply Assembly

2.1 Adding Disk Drive Modules

In some circumstances, you can add one or more disk drive modules to a 7133 SSA Disk Subsystem.

You can do this only if:

1. You are authorized by your organization to do this.
2. You have the correct disk drive module. Only disk drive modules that have a red panel on the front can be installed in 7133s. The storage capacity of a disk drive module is shown on the label at the front of the module:



+-- Attention -----

- Do not remove two disk drive modules from the subsystem at the same time.
- Disk drive modules are fragile. Handle them with care. Keep them well away from strong magnetic fields.

+-----

+-- Attention -----

When disk drive modules are present in the back of a 7133, that 7133 must have three fan-and-power-supply assemblies, rather than two fan-and-power-supply assemblies and a dummy fan-and-power-supply assembly.

+-----

You do not need to remove power from the subsystem when adding a disk drive module.

After you have added a disk drive module to a 7133, you must add it into your system software configuration by using the system programs.

Subtopics

2.1.1 Before Adding a Disk Drive Module

2.1.2 To Add a Disk Drive Module

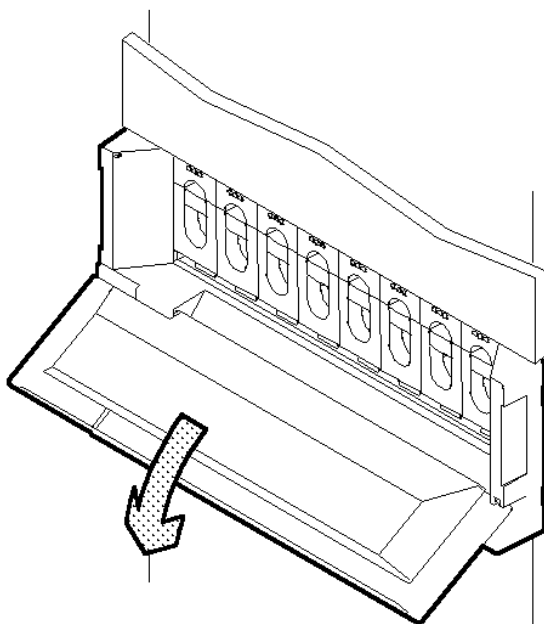
2.1.1 Before Adding a Disk Drive Module

1. If you are adding the first disk drive module to be installed at the back of a 7133 Model 010 or 500, **Stop**. Check whether the 7133 has three fan-and-power-supply assemblies (see step 2 in topic 2.2.1). If two fan-and-power-supply assemblies and a dummy fan-and-power supply assembly are installed, exchange the dummy fan-and-power-supply assembly for a third fan-and-power-supply assembly before installing the disk drive module. "Adding a Fan-and-Power-Supply Assembly" in topic 2.2 describes how to do this. 7133 Models 020 and 600 always have three fan-and-power supply assemblies installed.
2. Identify the slot for the new disk drive module using the configuration planning information for your system. There should be a dummy disk drive module in the slot.

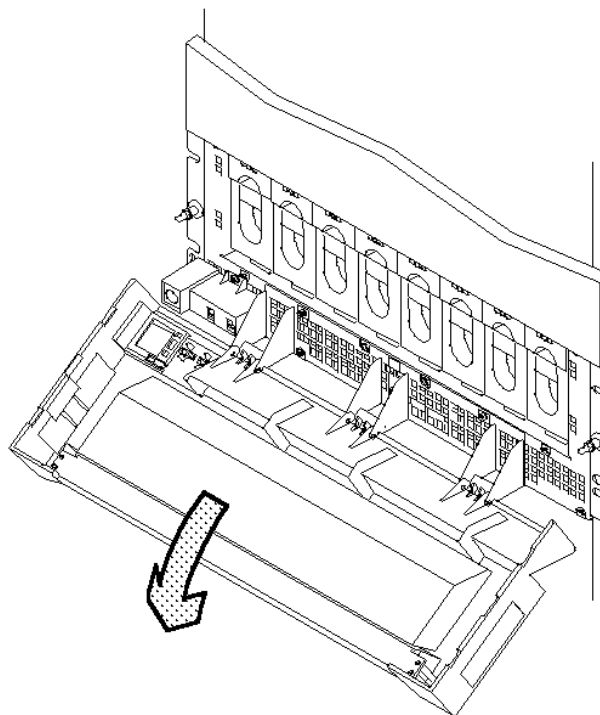
You can identify the disk drive modules that will be next to the new disk drive module by using the Disk service aid. (The *SSA RAID Adapter for PC Servers: User's Guide* describes how to use this aid.) You cannot use the Disk service aid to identify the dummy disk drive module itself because dummy disk drive modules do not have lights or serial-number labels.

3. Open the front cover of the unit by:

- For units with early covers, gripping the movable part of the cover at the sides and hinging it downward.
- For units with later covers, gripping the cover at the sides and hinging the whole front cover downward.



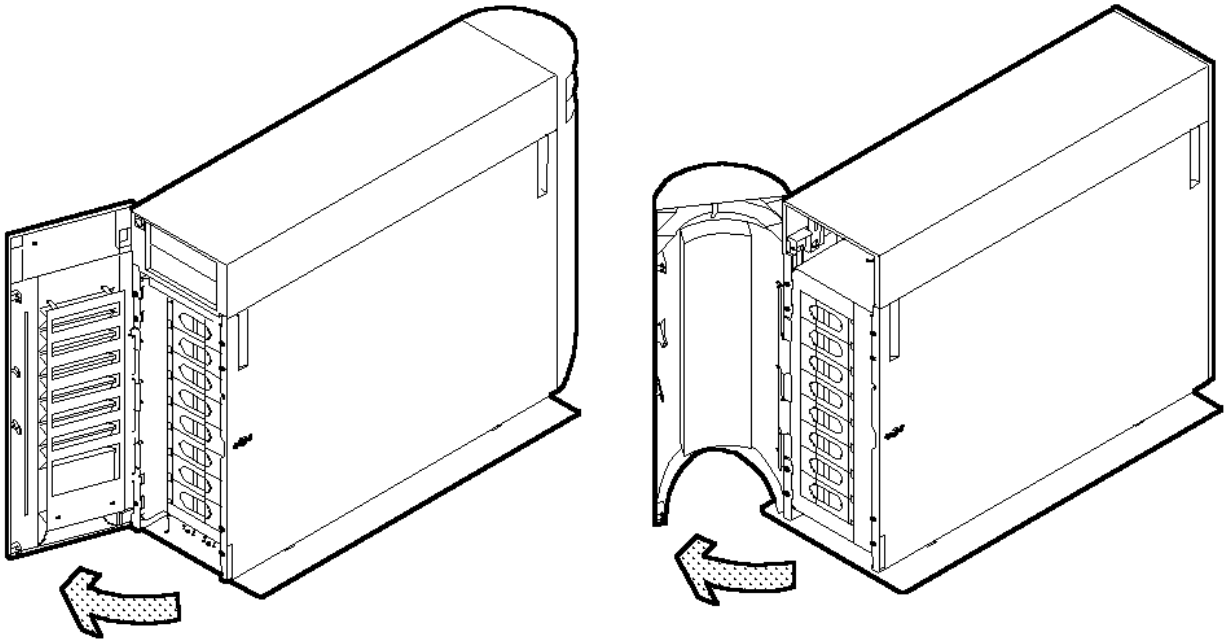
Early Covers



Later Covers

If the slot for the new disk drive module is in a Model 500 or 600, open the front or back cover of the unit by:

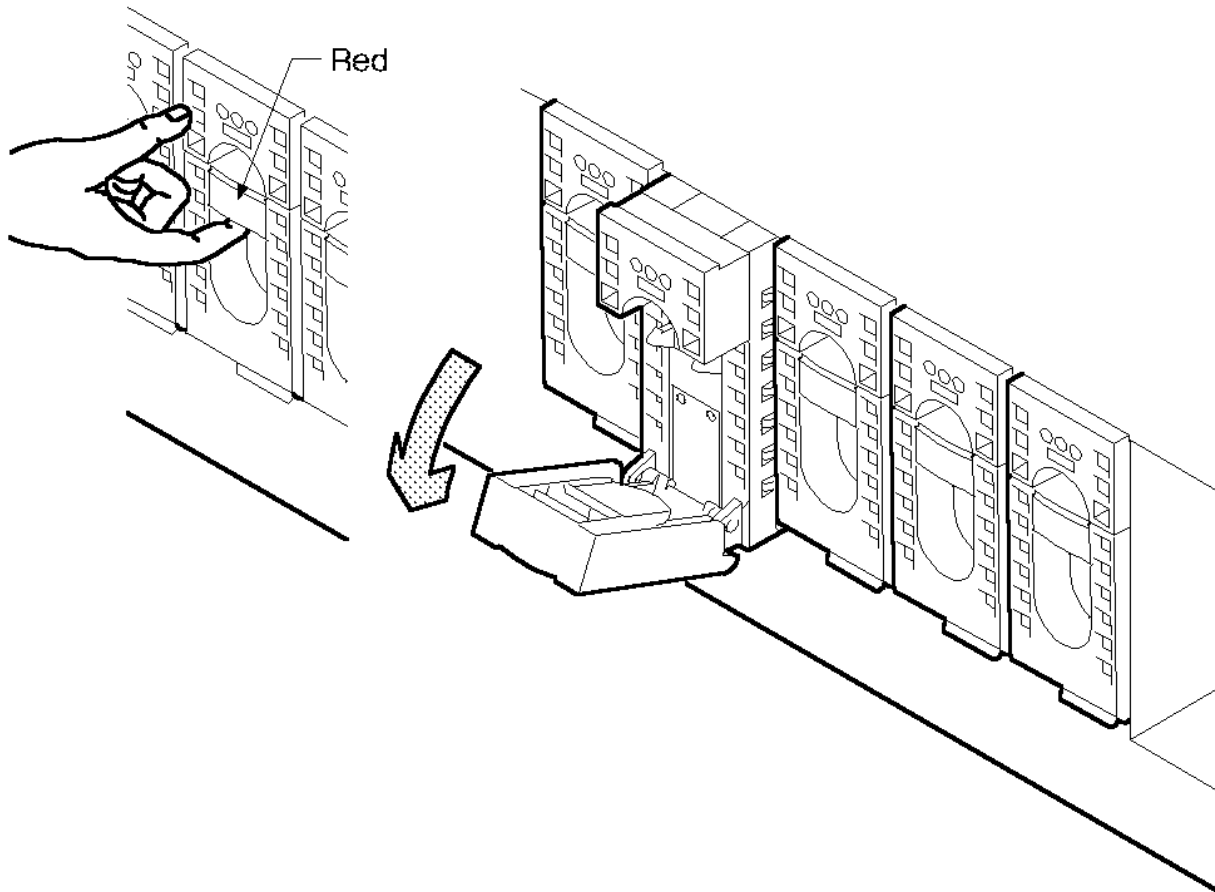
- a. If necessary, unlocking the cover using the key provided.
- b. Gripping the right-hand edge of the cover and hinging it to the left.



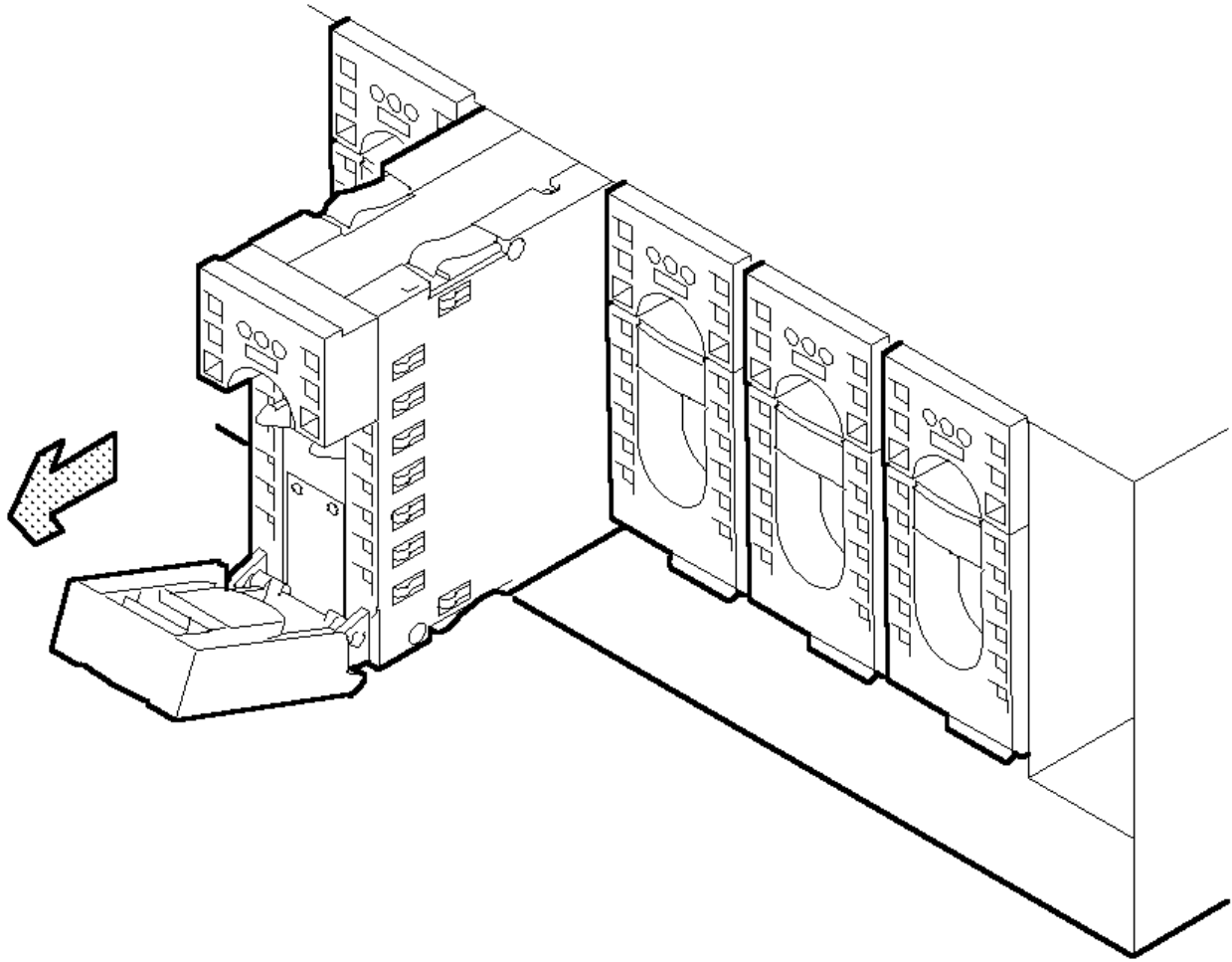
The diagrams in the following instructions show a rack-mounted unit. The steps for adding a disk drive module to a deskside unit are the same, but the parts are turned through 90 degrees.

2.1.2 To Add a Disk Drive Module

1. Press upward behind the red panel and pull the handle of the dummy disk drive module. This action moves the module partly out of the slot.



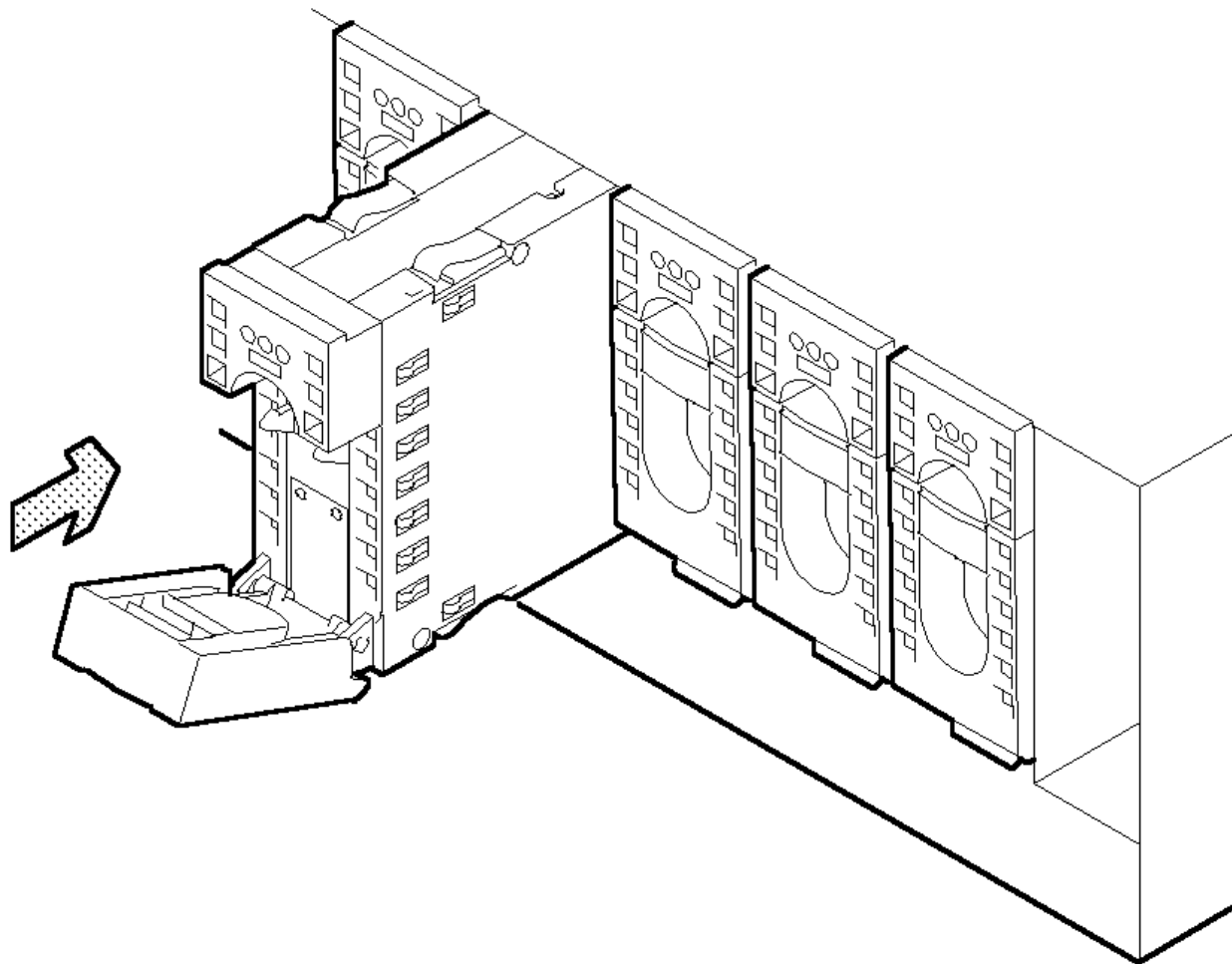
2. Carefully pull the dummy module out of the 7133. Support the module with your other hand as you take it from the unit.



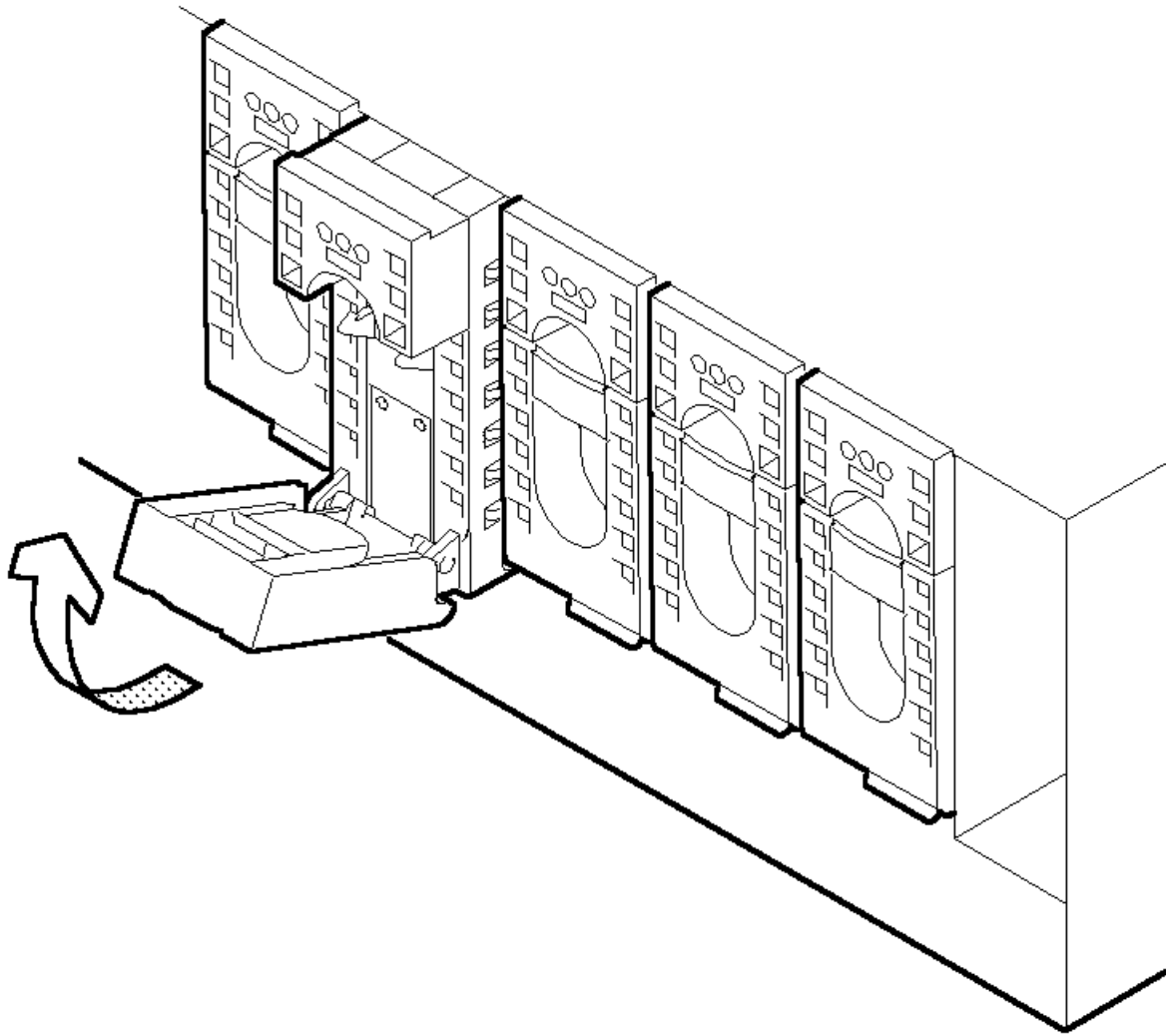
+-- **Attention** -----
+-- Do not leave the slot empty for more than 30 minutes; if you do,
+-- the 7133 and the disk drive modules within it might overheat and
+-- be damaged.
+--

3. With one hand supporting the new module, engage it in the groove and push it into the slot from which you have just removed the dummy module.

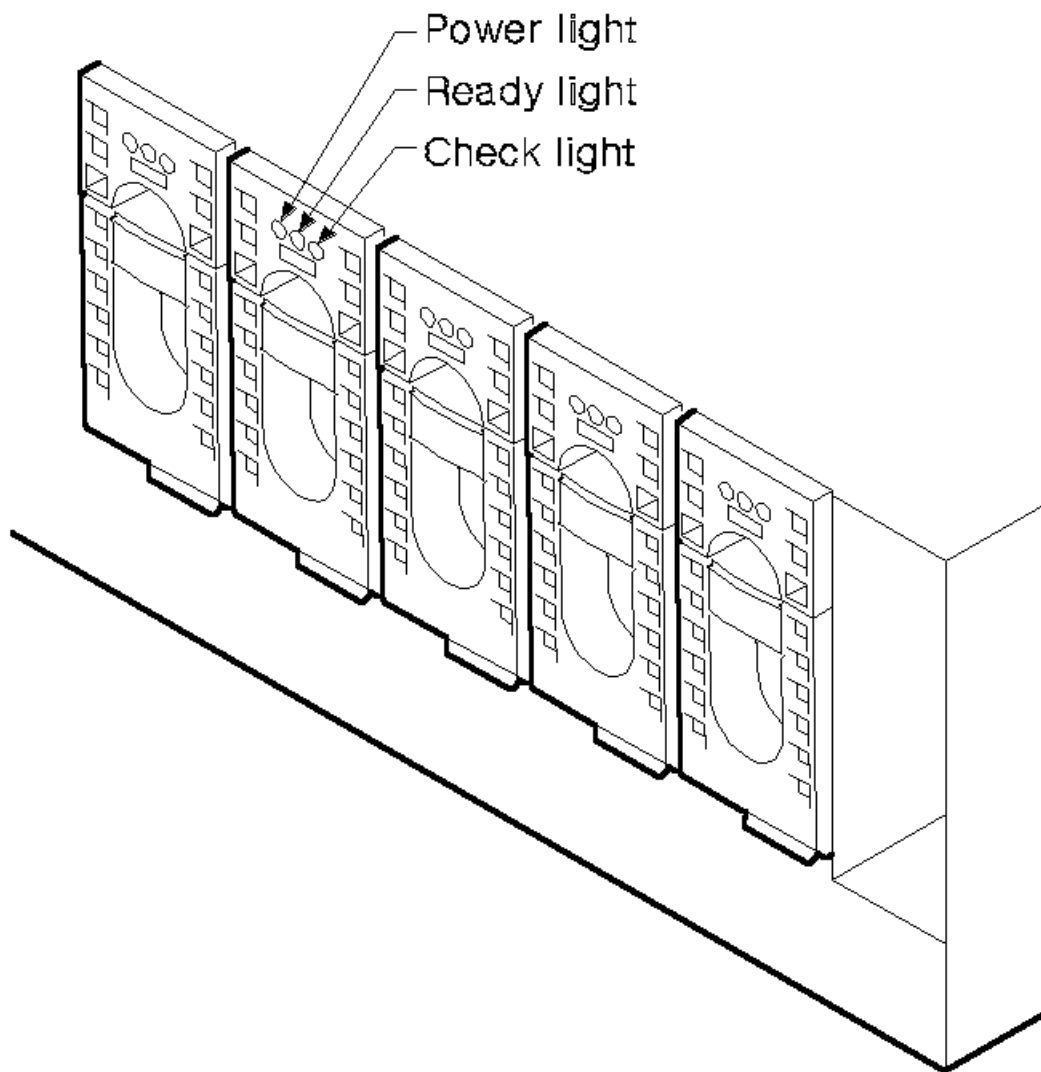
The module stops before it is completely into the slot.



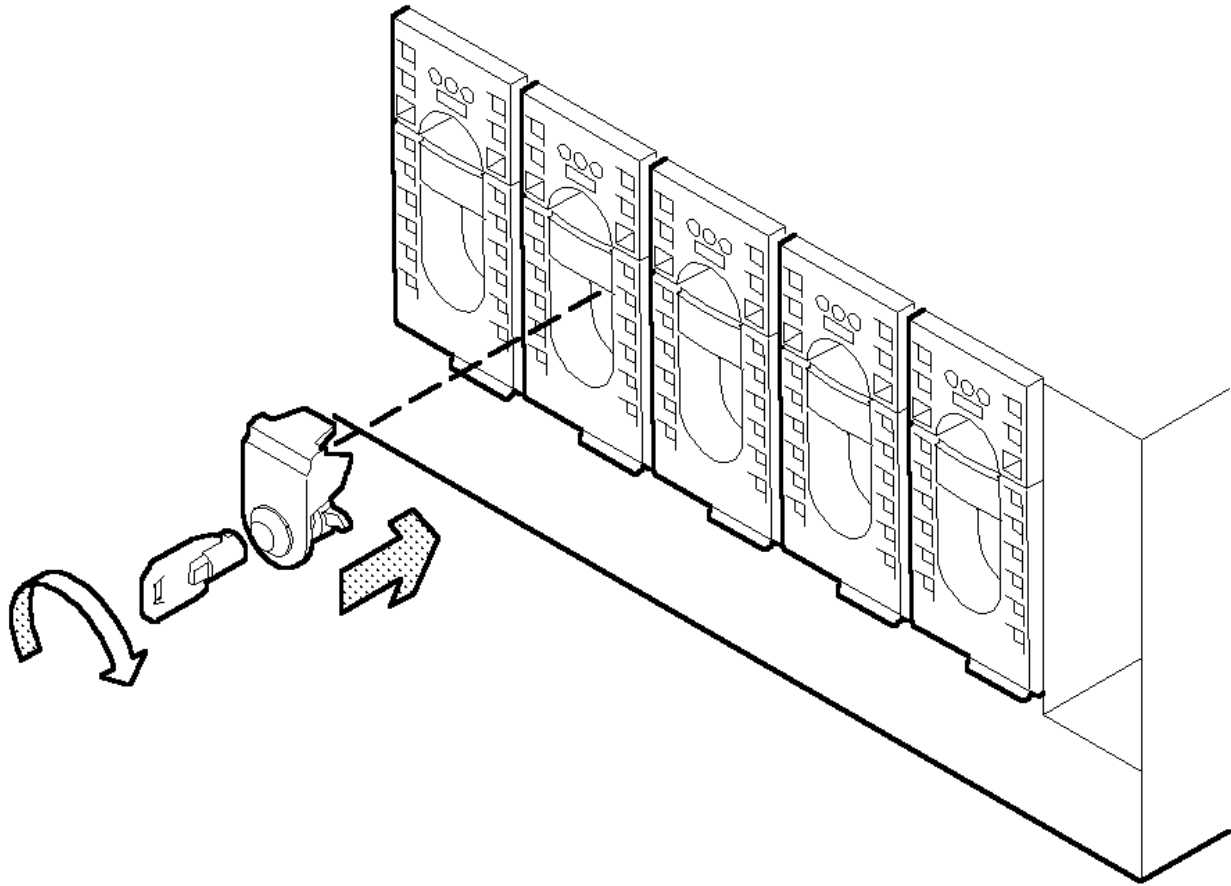
4. Close the handle of the module until it shuts with a click. This action pulls the module completely into the slot.



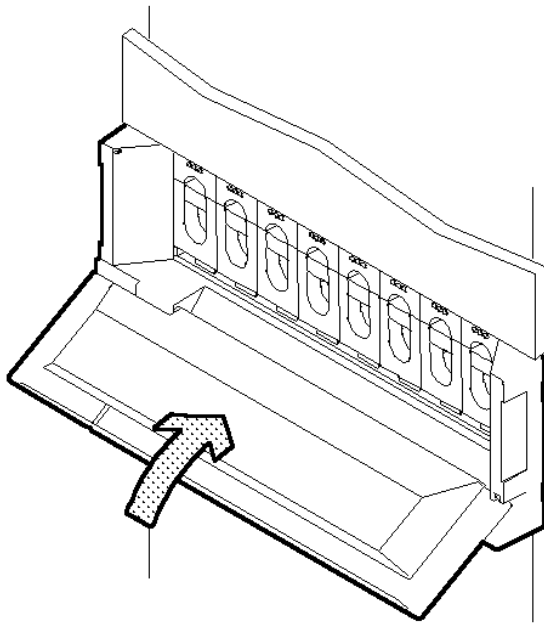
5. Push on the front of the module to ensure that the module is fully home.
6. Check that all three lights come on immediately and that the Check light goes out after approximately 2 seconds. (If this does not happen, after checking that the new module is properly installed, restart the diagnostic programs to analyze the new fault.)



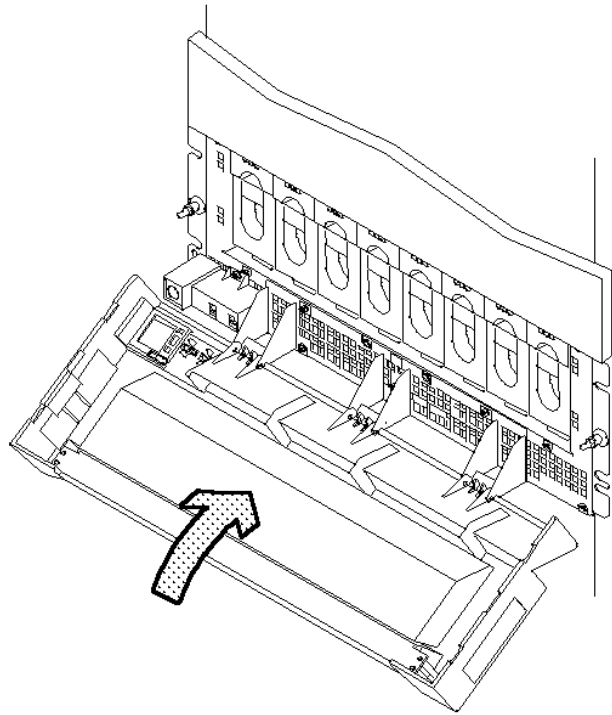
7. If required, lock the new disk drive module into the unit, using the lock and key that you can order as a feature of the unit.



8. If you have just added a disk drive module at the front of a Model 010 or 020, close the front cover.

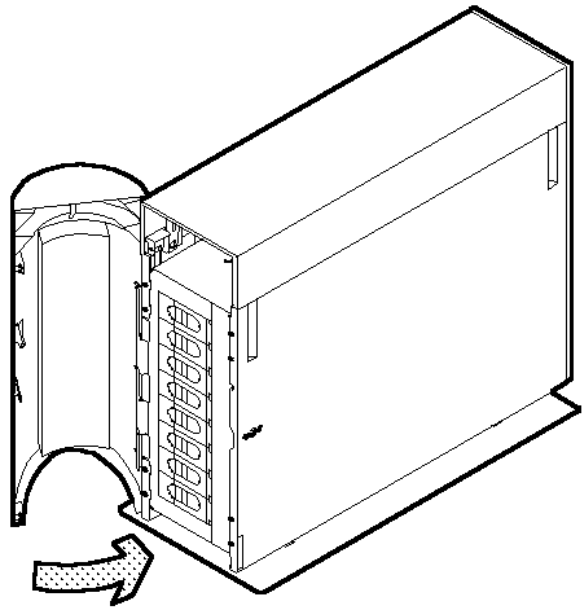
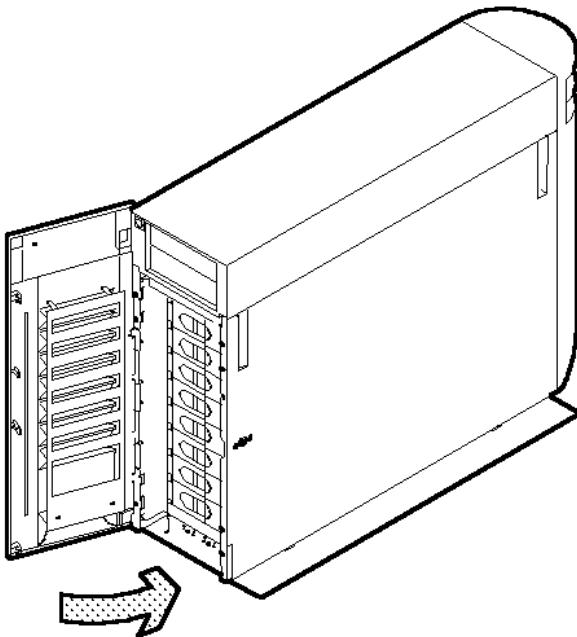


Early Covers



Later Covers

9. If you have just added a disk drive module to a Model 500 or 600, close the cover and, if required, lock it with the key provided.



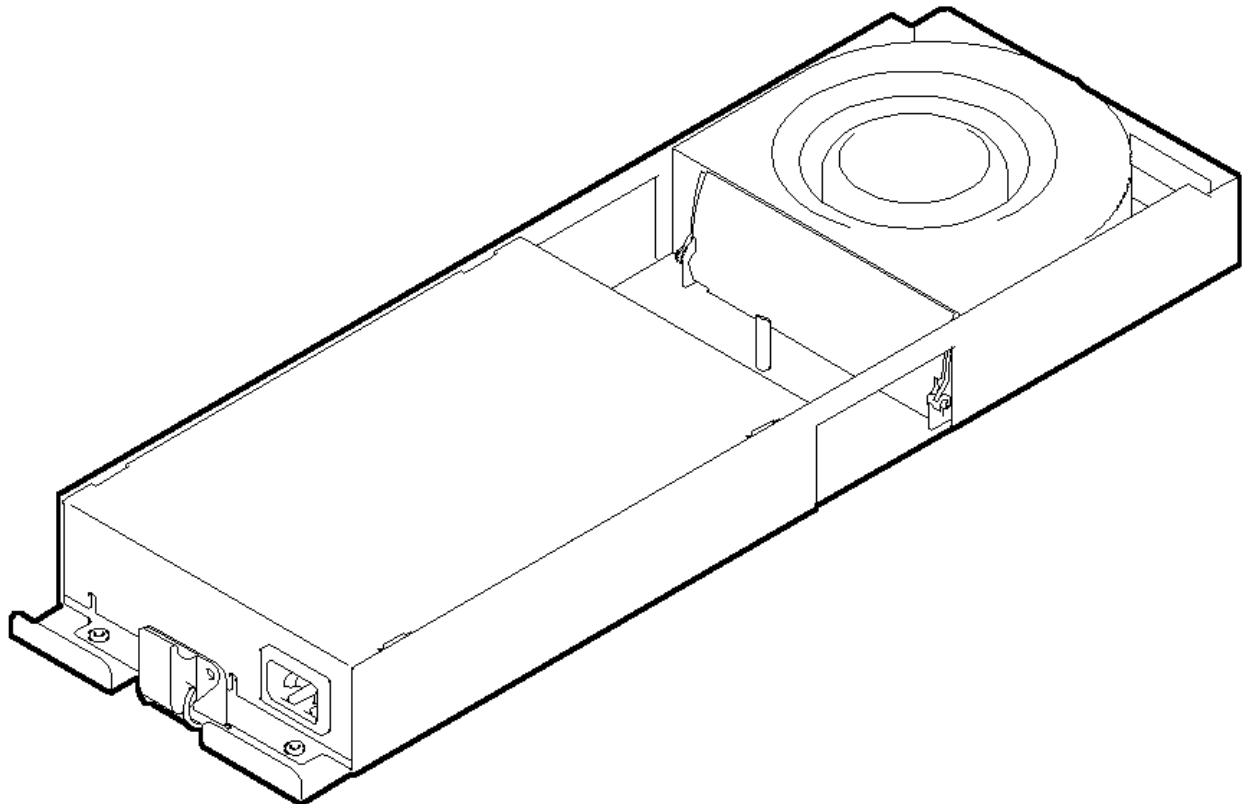
10. Add the new disk drive module into your system software configuration, using the system programs.

2.2 Adding a Fan-and-Power-Supply Assembly

If your 7133 has only two fan-and-power-supply assemblies installed, you must add a third fan-and-power-supply assembly before installing disk drive modules into the back of the 7133. If your 7133 has disk drive modules installed only at the front, you can add a third fan-and-power-supply assembly to provide increased protection against the chance of losing access to your disk drive modules should a fan-and-power-supply assembly become faulty. Models 020 and 600 always have three fan-and-power-supply assemblies installed.

You can add a fan-and-power-supply assembly only if:

- You are authorized by your organization to do this.
- You have the correct fan-and-power-supply assembly.



You do not need to remove power from the subsystem when adding a fan-and-power-supply assembly.

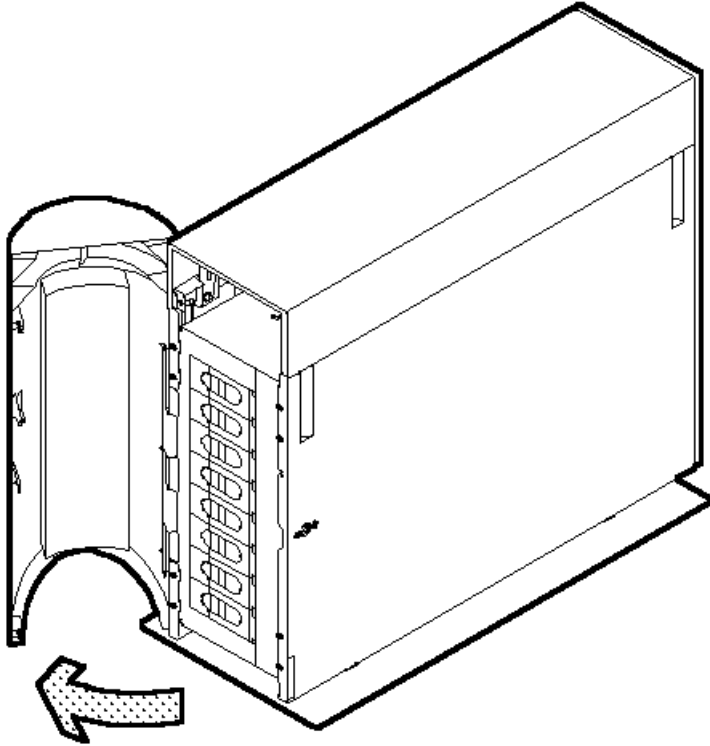
Subtopics

2.2.1 Before Adding a Fan-and-Power-Supply Assembly

2.2.2 To Add a Fan-and-Power-Supply Assembly

2.2.1 Before Adding a Fan-and-Power-Supply Assembly

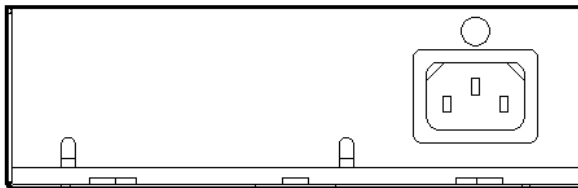
1. If you are going to add a fan-and-power-supply assembly to a Model 500, open the back cover of the unit by:
 - a. If necessary, unlocking the cover using the key provided.
 - b. Gripping the right-hand edge of the cover and hinging it to the left.



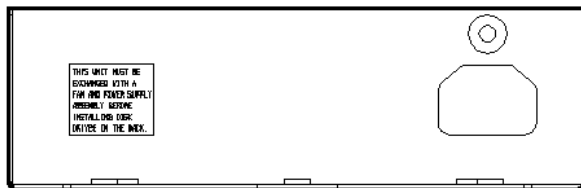
2. Identify the space for the new fan-and-power-supply assembly:

- The left-hand (bottom) position contains either a fan-and-power-supply assembly or a dummy fan-and-power-supply assembly.

A fan-and-power-supply assembly has a socket for the mainline power plug; a dummy fan-and-power-supply assembly has a hole for holding a spare power plug. The following instructions describe how to replace a dummy fan-and-power-supply assembly in this position with a fan-and-power-supply assembly.



Fan-and power-supply assembly



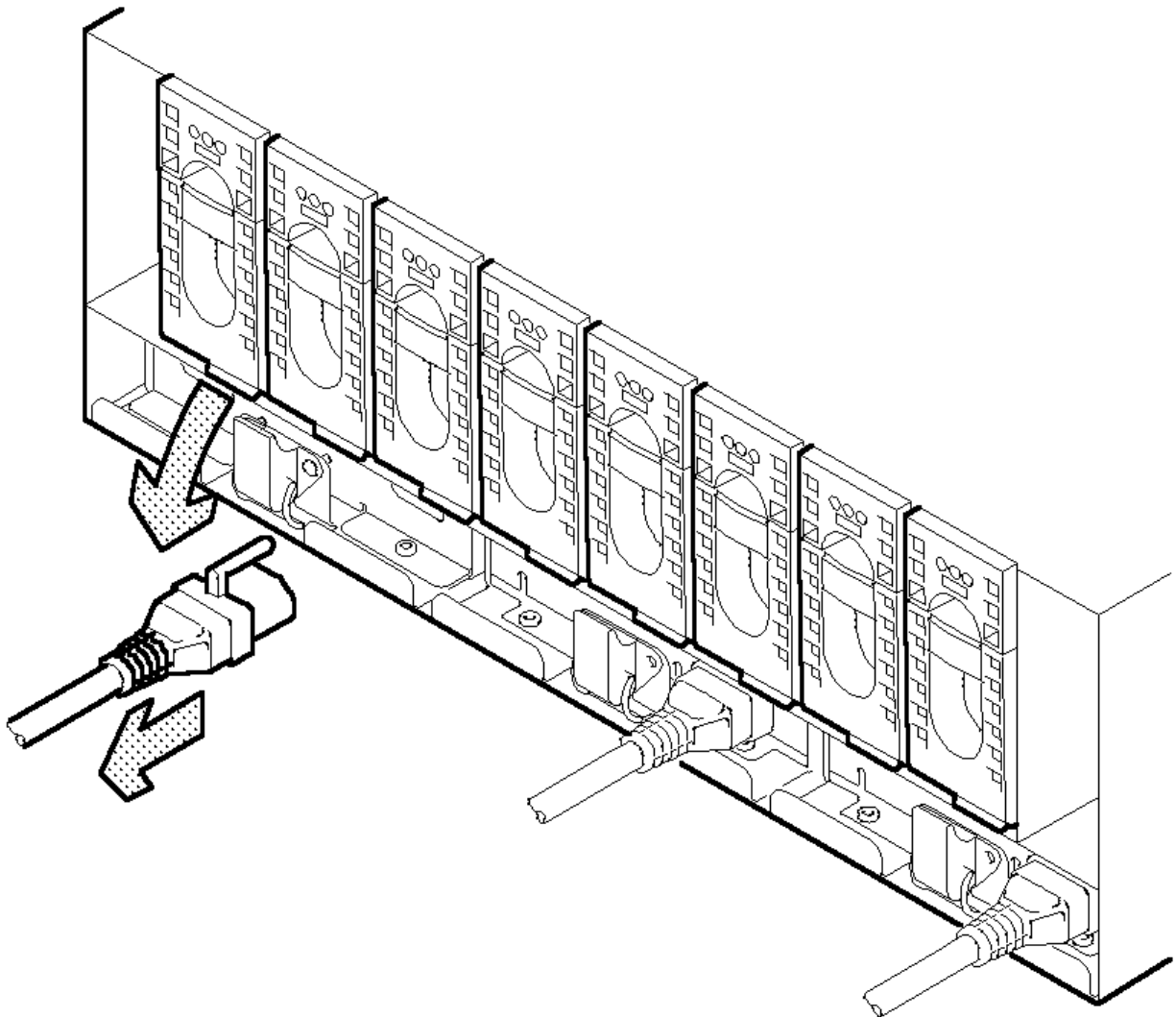
Dummy fan-and power-supply assembly

- Fan-and-power-supply assemblies are always present in the right-hand (top) and middle positions.

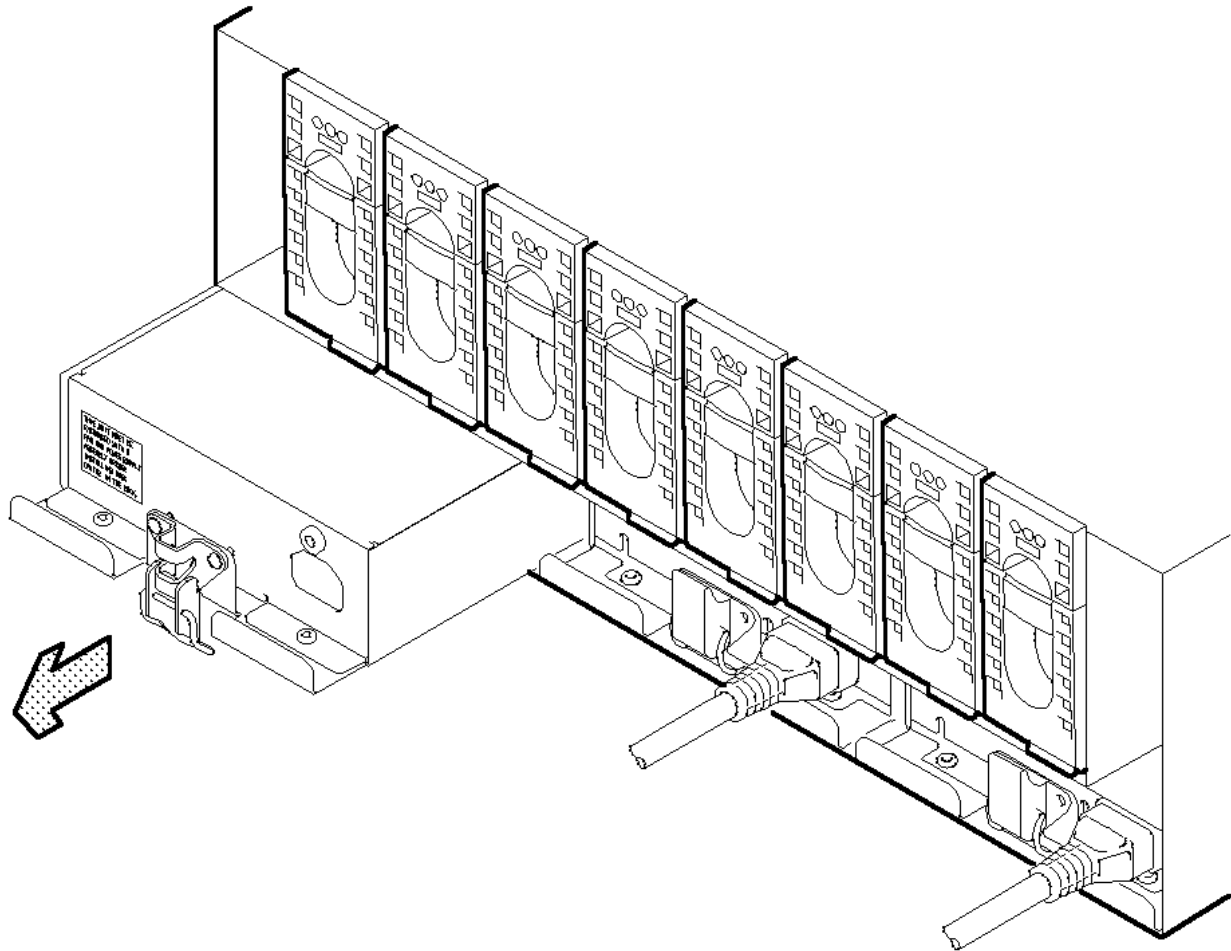
2.2.2 To Add a Fan-and-Power-Supply Assembly

The illustrations in the following instructions show a rack-mounted unit. The steps for adding a fan-and-power-supply assembly to a deskside unit are the same, but the parts are turned through 90 degrees.

1. Remove the unused power plug from the hole in the dummy fan-and-power-supply assembly. Open the latch on the dummy fan-and-power-supply assembly.

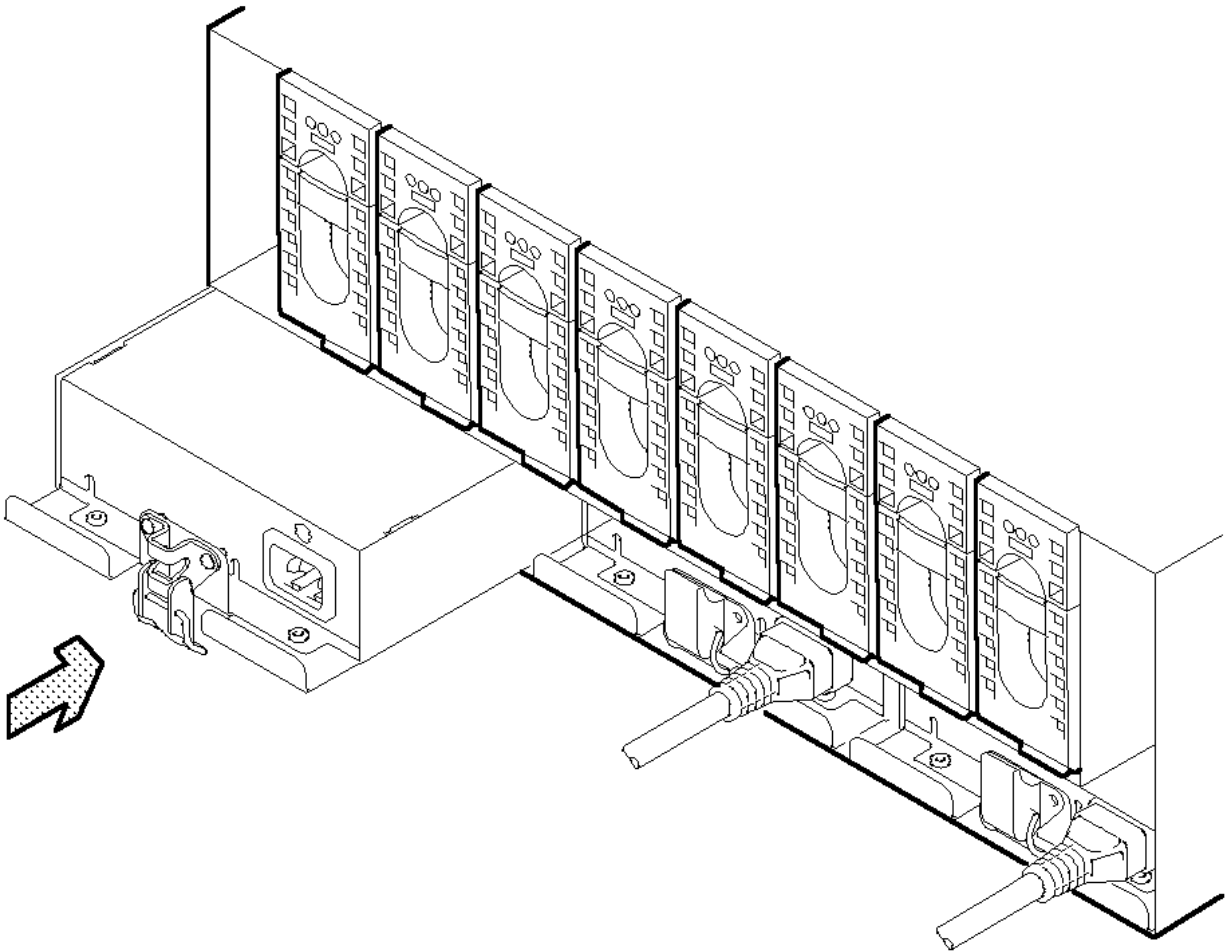


2. Pull the dummy fan-and-power-supply assembly from the 7133, and discard it.

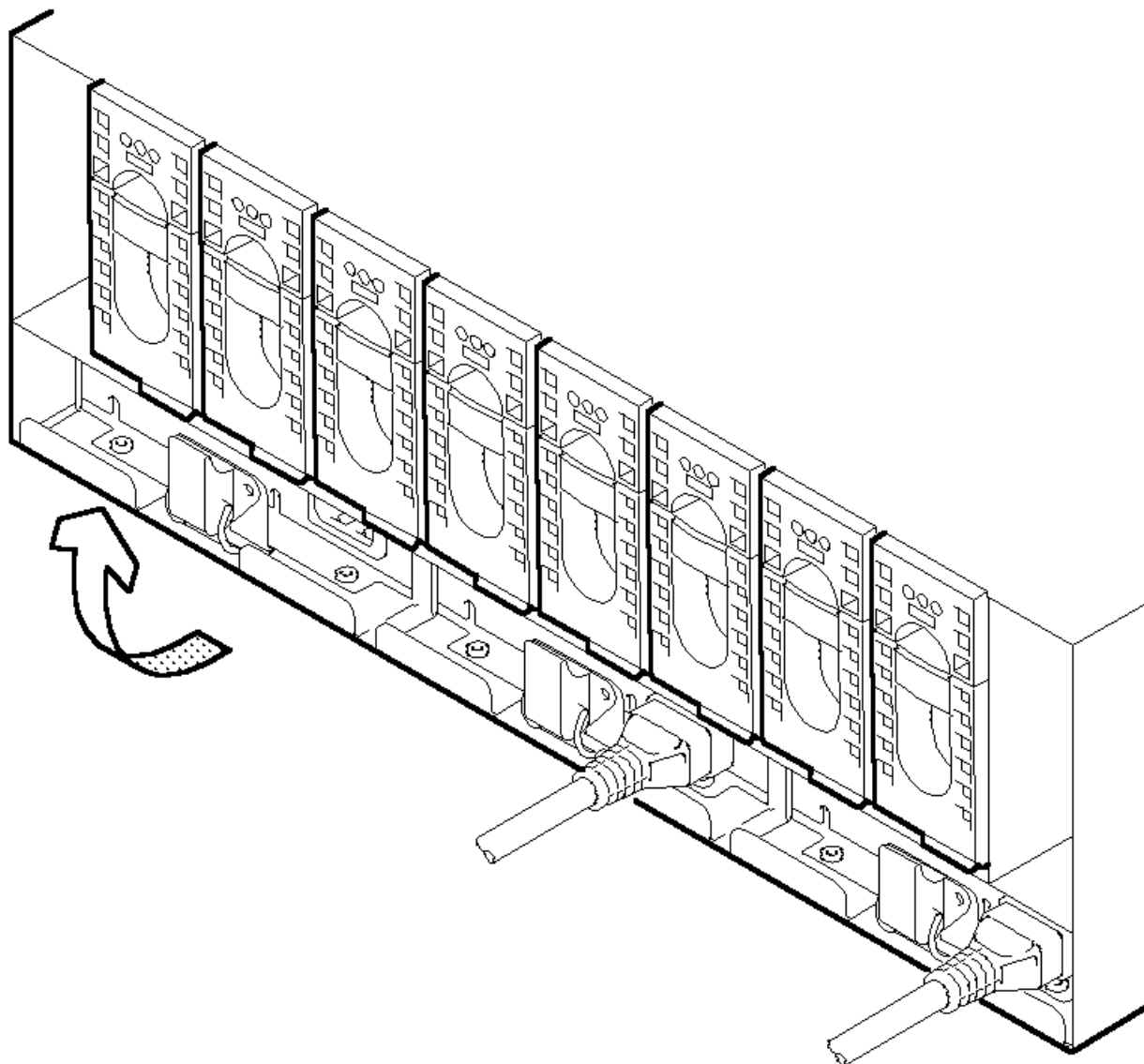


----- **Attention** -----
Do not leave the space empty for more than 30 minutes; if you do,
the 7133 and the disk drive modules within it might overheat and
be damaged.

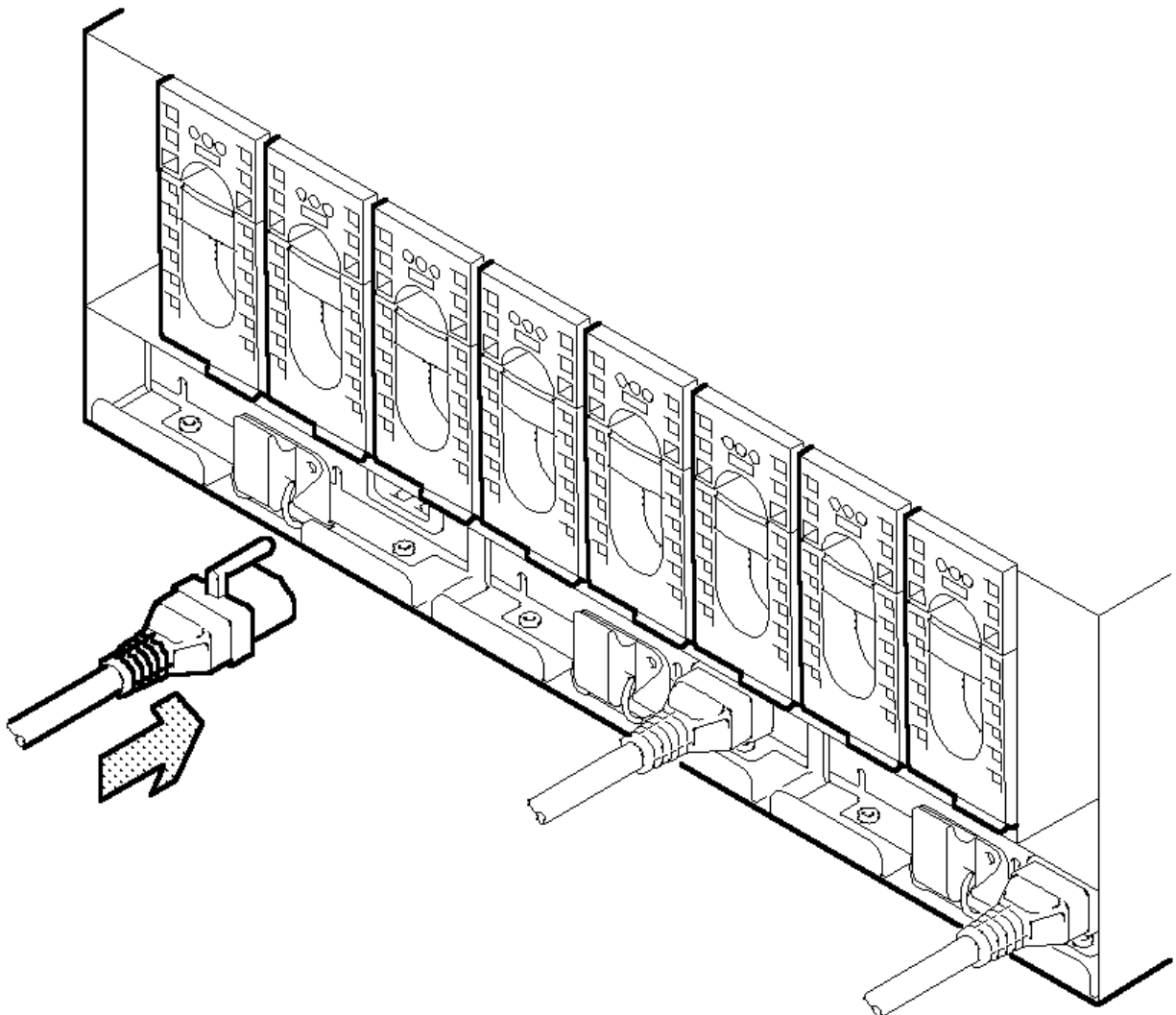
3. Push the new fan-and-power-supply assembly fully into the unit.



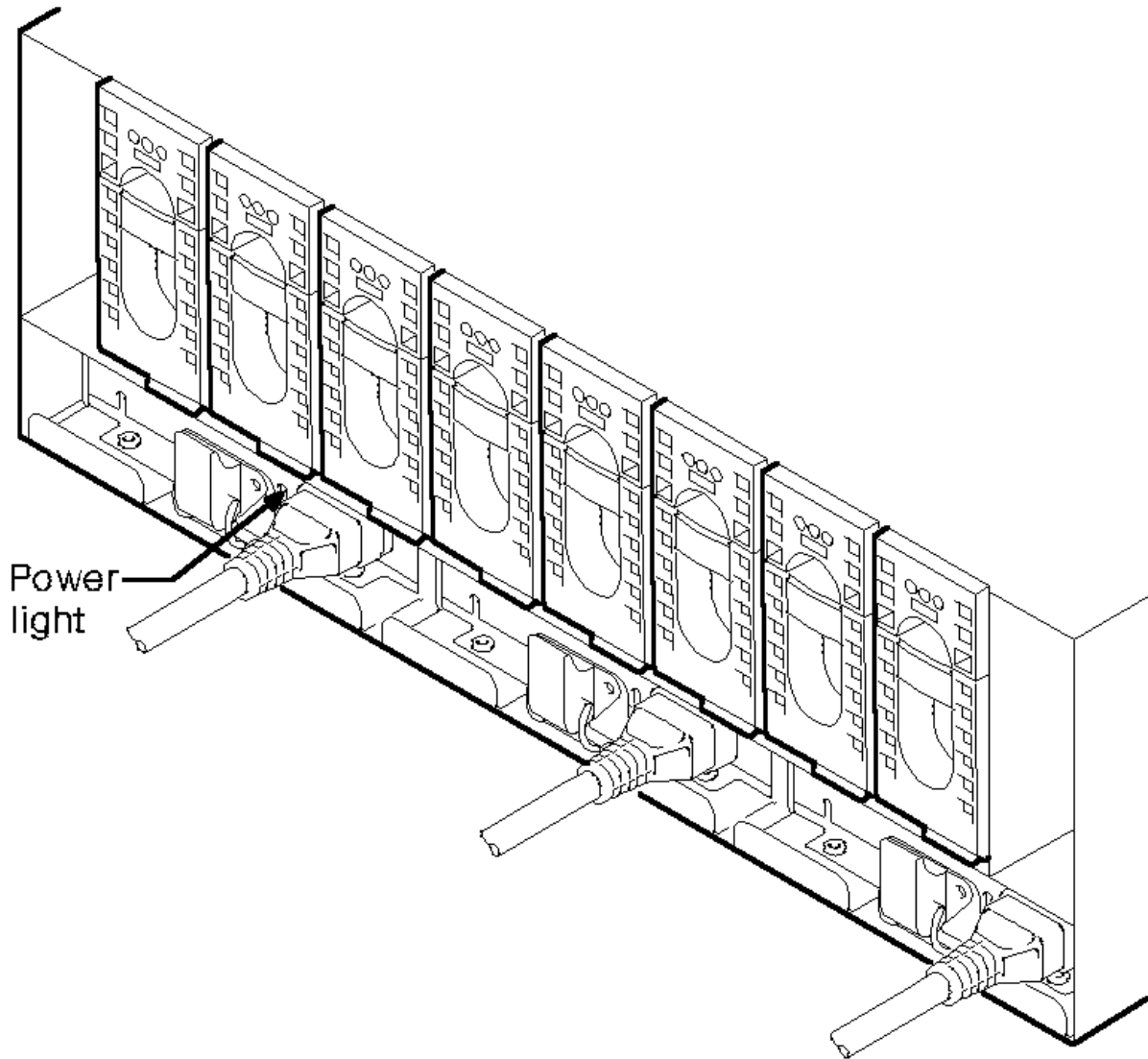
4. Close the latch that holds the fan-and-power-supply assembly in the 7133.



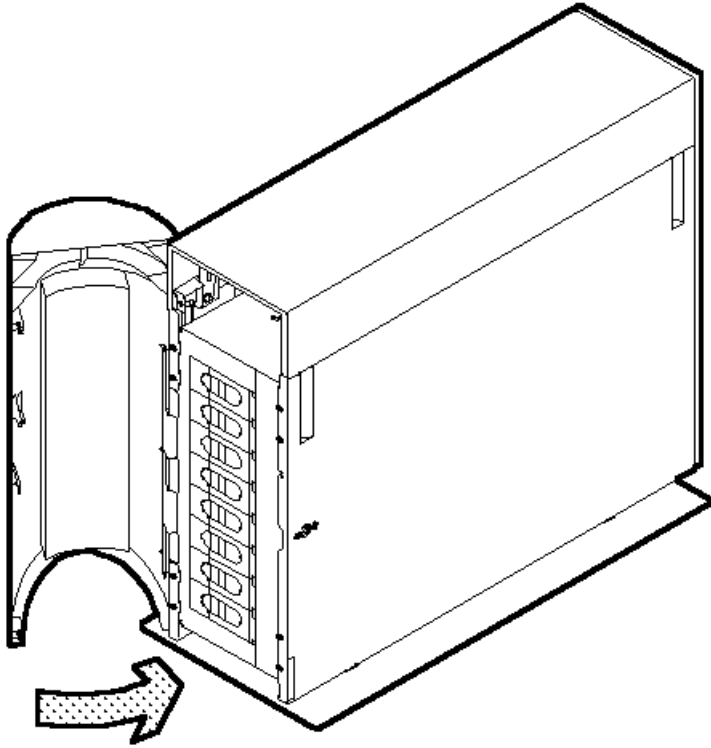
5. Plug the unused plug of the main power cable into the new fan-and-power-supply assembly.



6. Check that the green Power light comes on within 5 seconds. (If it does not, after checking that the new fan-and-power-supply assembly is correctly installed, go to the system diagnostic programs to analyze the new fault.)



7. If you have just added a fan-and-power-supply assembly to a Model 500, close the back cover and, if required, lock it with the key provided.



3.0 Chapter 3. Moving a 7133 Deskside Unit Safely

Attention: Damage as a result of improper handling may void your equipment warranty. Contact your service representative to obtain packing materials or assistance to prepare your unit for moving.

You should not try to move a 7133 rack-mounted unit yourself. Always ask a trained service representative to do this for you.

If you want your system or deskside unit moved, you should contact a trained service representative, and ask for help. However, if you decide to move a deskside unit yourself, you should take the following precautions.

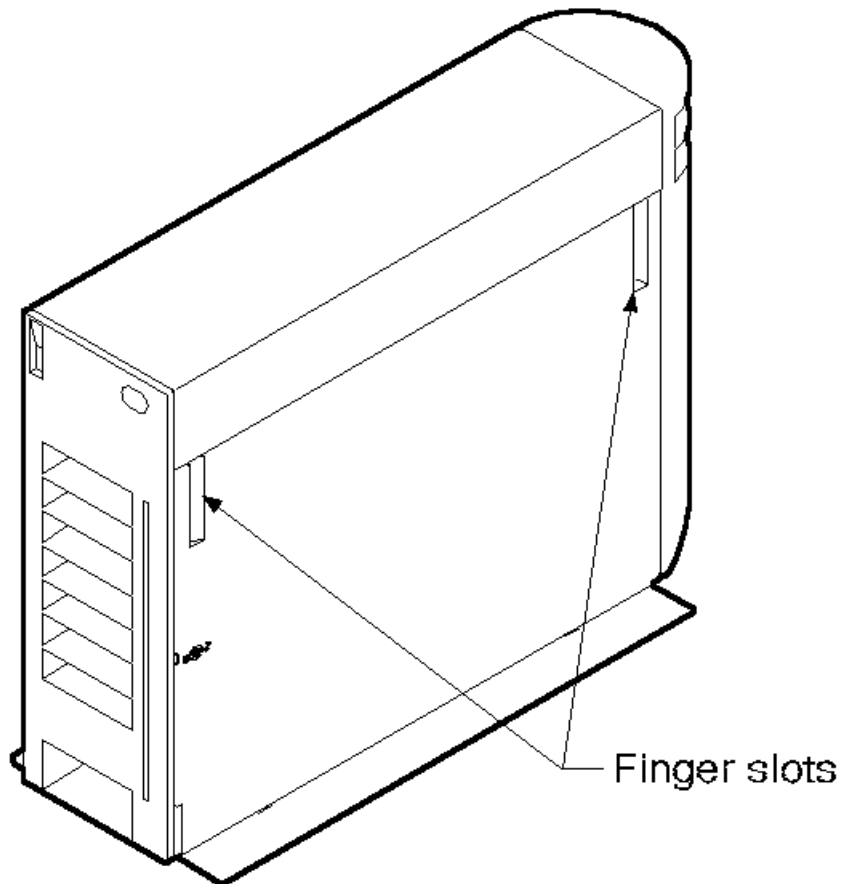
DANGER

```
+-----+
| An electrical outlet that is not correctly wired could place hazardous |
| voltage on metal parts of the system or the devices that attach to the |
| system. It is the responsibility of the customer to ensure that the    |
| outlet is correctly wired and grounded to prevent an electrical shock.  |
|                                                                           |
|                               | Use one hand, when possible, to connect or disconnect signal cables to | prevent a
| possible shock from touching two surfaces with different | electrical potentials. |
|                                                                           |
|                               | During an electrical storm, do not connect cables for display | stations, printers,
| telephones, or station protectors for | communication lines. |
+-----+
```

Attention: Ensure that the system is not using any of the devices within the 7133 before you begin to move it, otherwise data loss can occur.

To move a deskside unit:

1. Turn power off from the 7133.
2. Unplug the 7133 from the mainline power outlet.
3. Ensure that all of the cables connected to the back of the 7133 are properly labeled at both ends before you unplug them.
4. Unplug the SSA cables from the SSA adapter in the system unit.
5. Pull or push the 7133 to its new location. When pulling, use the finger slots.



CAUTION:

A 7133 deskside unit weighs 58.5 kg (129 lb) empty, and approximately 72.5 kg (160 lb) with 16 disk drives installed. Do not attempt to lift the 7133.

6. Because removing the power cable is the means of disconnecting mainline power from the 7133, in the location you are moving to, ensure that the power outlet is located near the equipment and is easily accessible. Check the power outlet for correct wiring, voltage, and grounding before attaching the 7133 unit or the system unit.
7. Connect the SSA cables to the SSA adapters in the system unit and to the 7133.
8. Plug the 7133 power cable into the mainline power outlet.

4.0 Chapter 4. Dealing with Problems

If you have a problem with a 7133 SSA Disk Subsystem, refer to the *SSA RAID Adapter for PC Servers: Installation and User's Guide*. That book describes how to deal with common SSA loop problems and how to check the error log. Each problem record in the error log includes a Service Request Number (SRN). Some SRNs indicate that the problem can be resolved by exchanging a disk drive module or a fan-and-power-supply assembly for a new one; this chapter describes how to do that. For other problems, you must call for service; this chapter also describes what information to provide when you report a problem.

Subtopics

4.1 Exchanging Disk Drive Modules

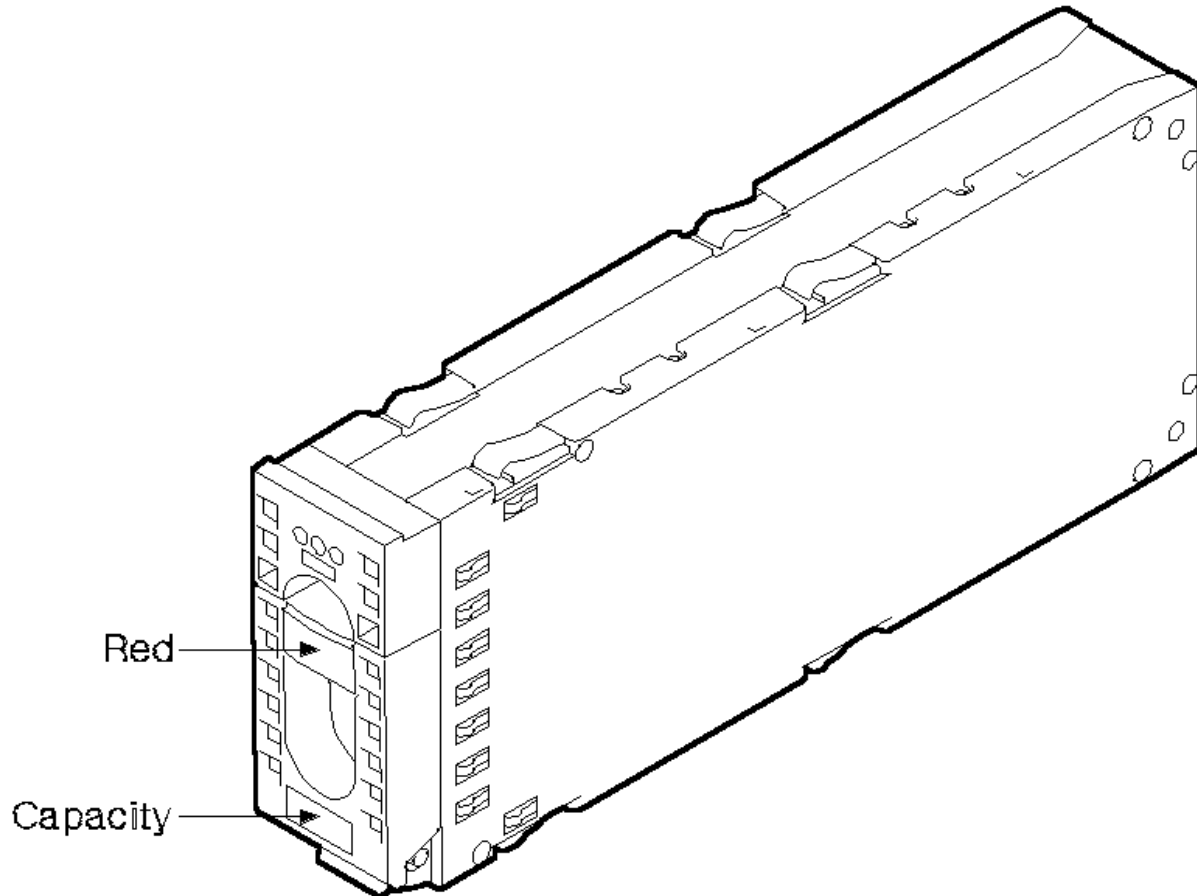
4.2 Exchanging Fan-and-Power-Supply Assemblies

4.3 Reporting Problems

4.1 Exchanging Disk Drive Modules

In some circumstances, you can exchange a faulty disk drive module without the assistance of a service representative. You can do this only if:

- You are authorized by your organization to do this.
- You have the correct disk drive module. Only disk drive modules that have a **red** panel on the front can be installed into 7133s. The storage capacity of a disk drive module is shown on the label at the front of the module:



Attention

- Do not remove two disk drive modules from the subsystem at the same time.
- Disk drive modules are fragile. Handle them with care. Keep them well away from strong magnetic fields.

You do not need to remove power from the subsystem when changing a disk drive module.

After you have changed a disk drive module in a 7133, you must restore it into your system by using the system programs.

Subtopics

- 4.1.1 Before Exchanging a Disk Drive Module
- 4.1.2 To Exchange a Disk Drive Module

4.1.1 Before Exchanging a Disk Drive Module

1. Check the Service Request Number (SRN) recorded in the error log. The *SSA RAID Adapter for PC Servers: Installation and User's Guide* describes how to do this.

If the SRN is in the following list, it means that a disk drive module has a fault that can be corrected by exchanging the disk drive module for a new one:

```
Any SRN whose first character is '1'  
60210  
D0100  
D0300
```

If the SRN is not in the list, do not change the disk drive module; call for service.

If the SRN is in the list, continue at the next step.

2. Find the failing disk drive module by using the Disk Service Aid (see "Identifying a Disk Drive Module" in topic 1.2).
3. Put the failing disk drive module into service mode by pressing F4.
4. Check the lights on this disk drive module. ("Disk Drive Module Lights" in topic 1.1.2 describes where these are and how to see them.)

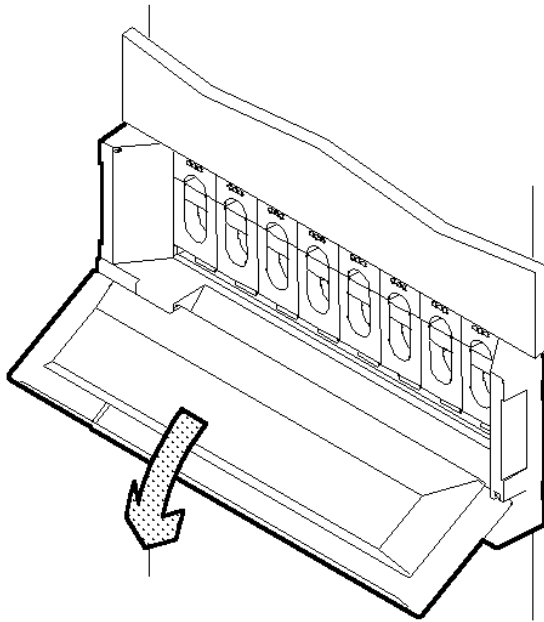
If the Check light is not on, you cannot change the disk drive module; call for service.

If the Check light is on, change the disk drive module using the procedure starting in topic 4.1.2.

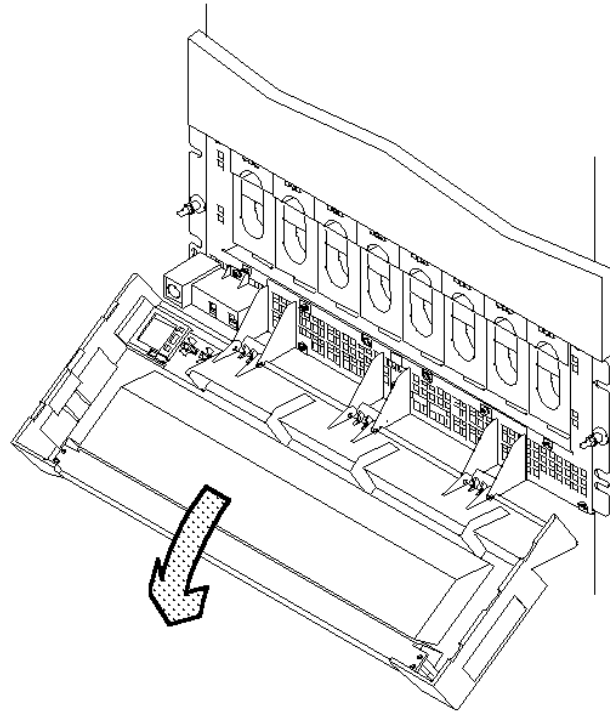
4.1.2 To Exchange a Disk Drive Module

1. If the failing disk drive module is at the front of a Model 010 or 020, open the front cover of the unit by:

- For units with early covers, gripping the movable part of the cover at the sides and hinging it downward
- For units with later covers, gripping the cover at the sides and hinging the whole front cover downward.



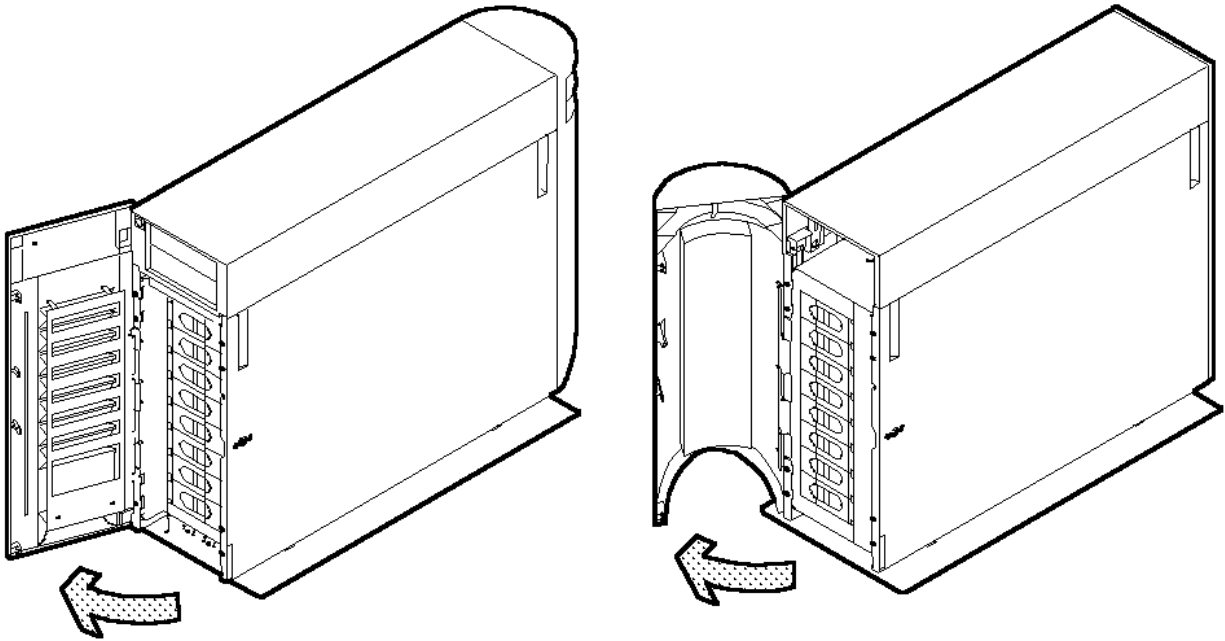
Early Covers



Later Covers

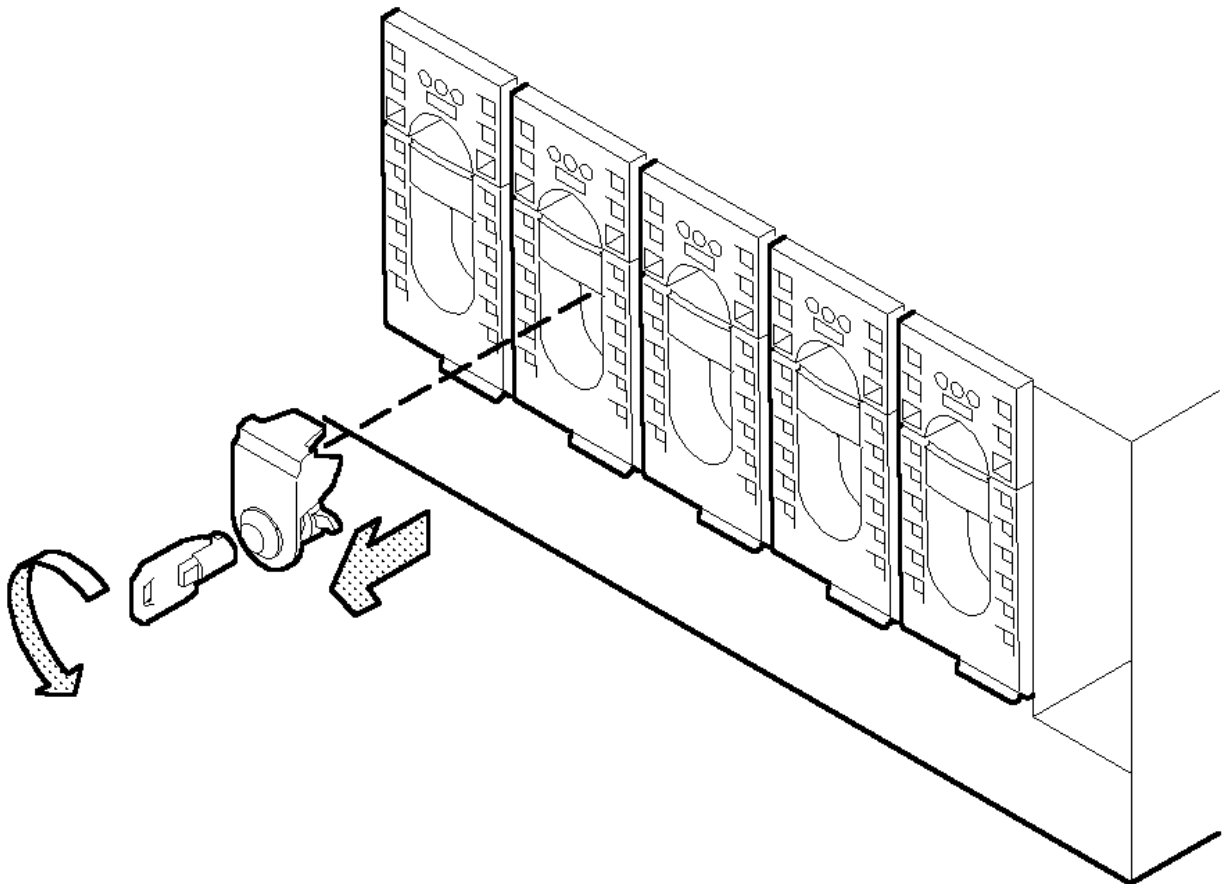
2. If the failing disk drive module is in a Model 500 or 600, open the front or back cover of the unit by:

- a. If necessary, unlocking the cover, using the key provided
- b. Gripping the cover at the right and hinging it to the left.

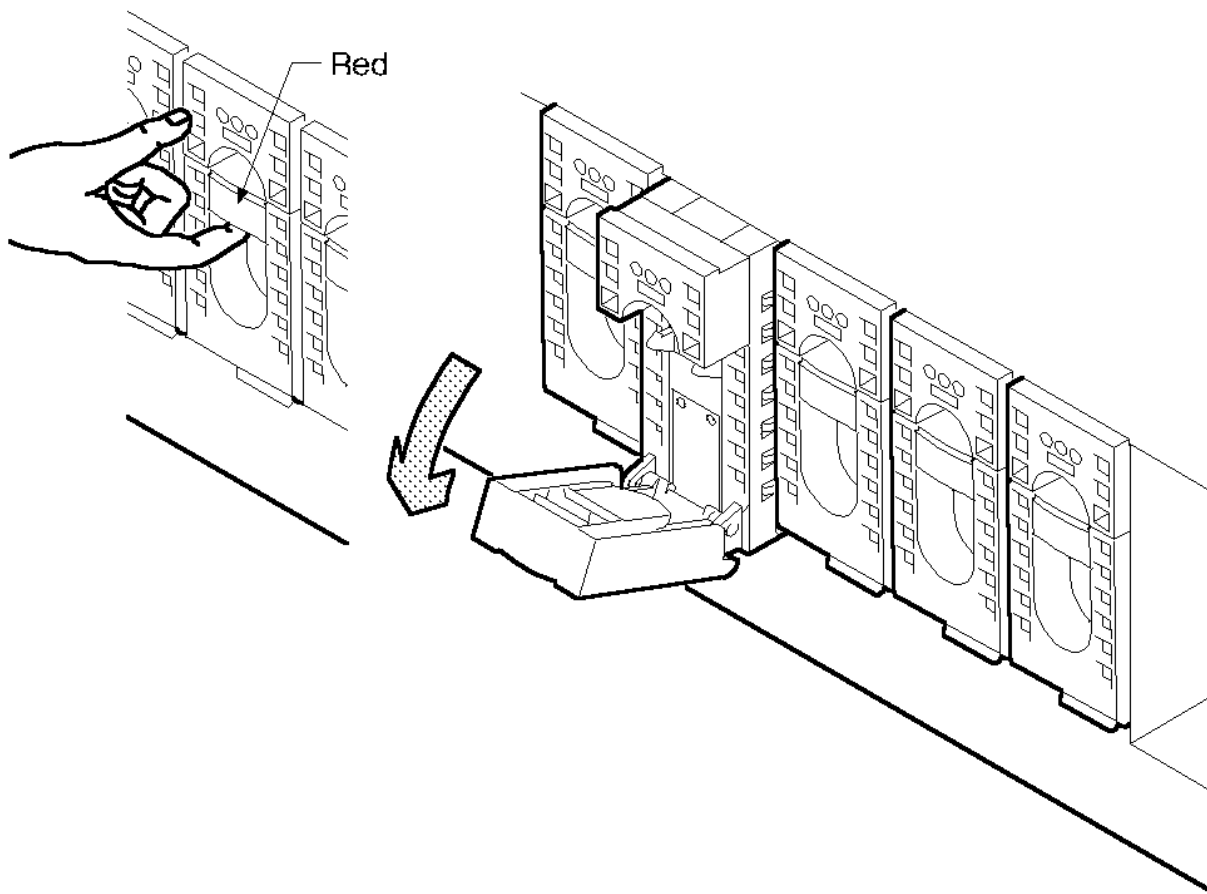


The illustrations in the following instructions show a rack-mounted unit. The steps for changing a disk drive module in a desk-side unit are the same, but the parts are turned through 90 degrees.

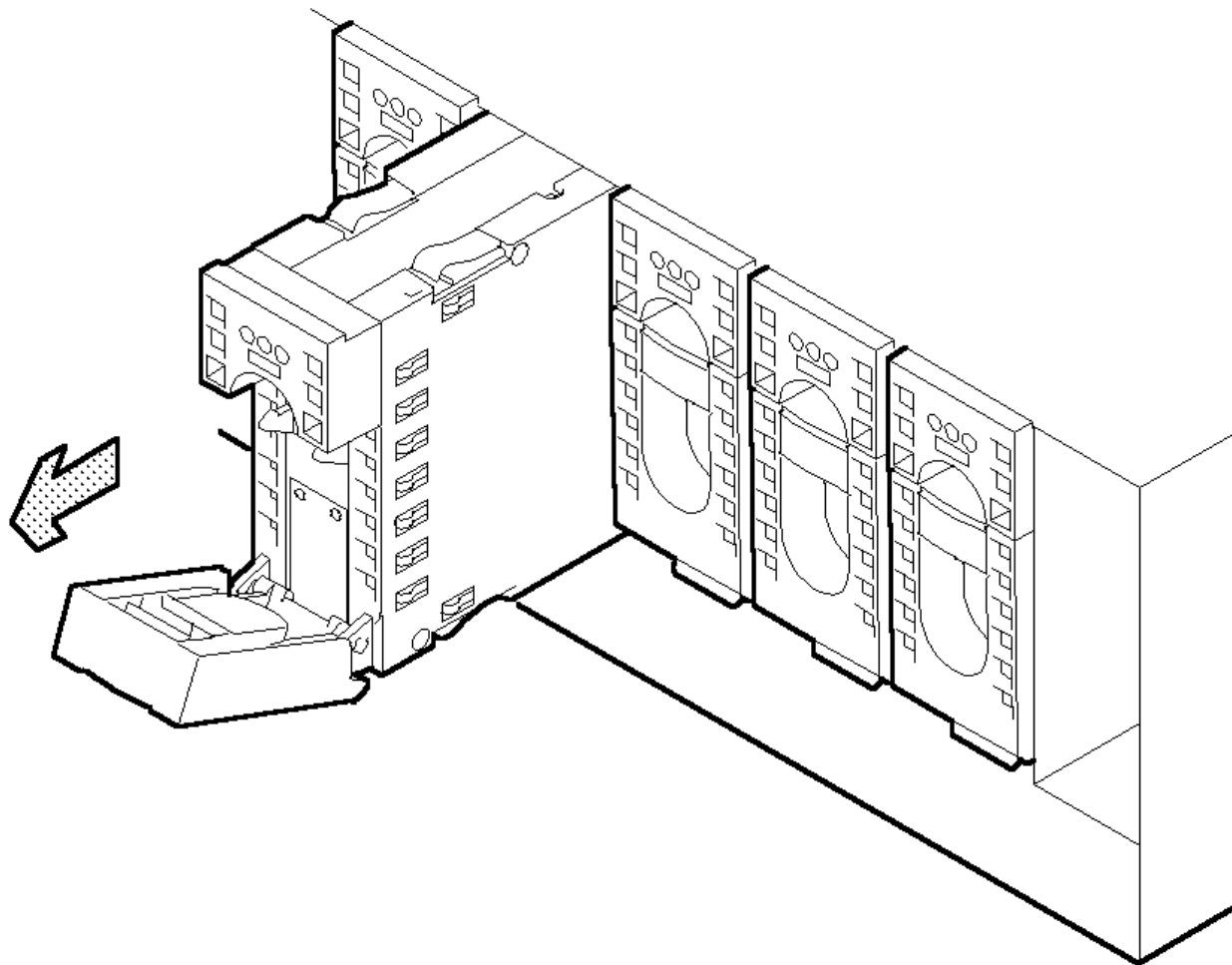
3. If necessary, unlock the failing disk drive module, using the key provided with the lock. Remove the lock.



4. Press upward behind the red panel and pull the handle of the failing disk drive module. This action moves the module partly out of the slot.



5. Carefully pull the module out of the 7133. Support the module with your other hand as you take it from the unit.

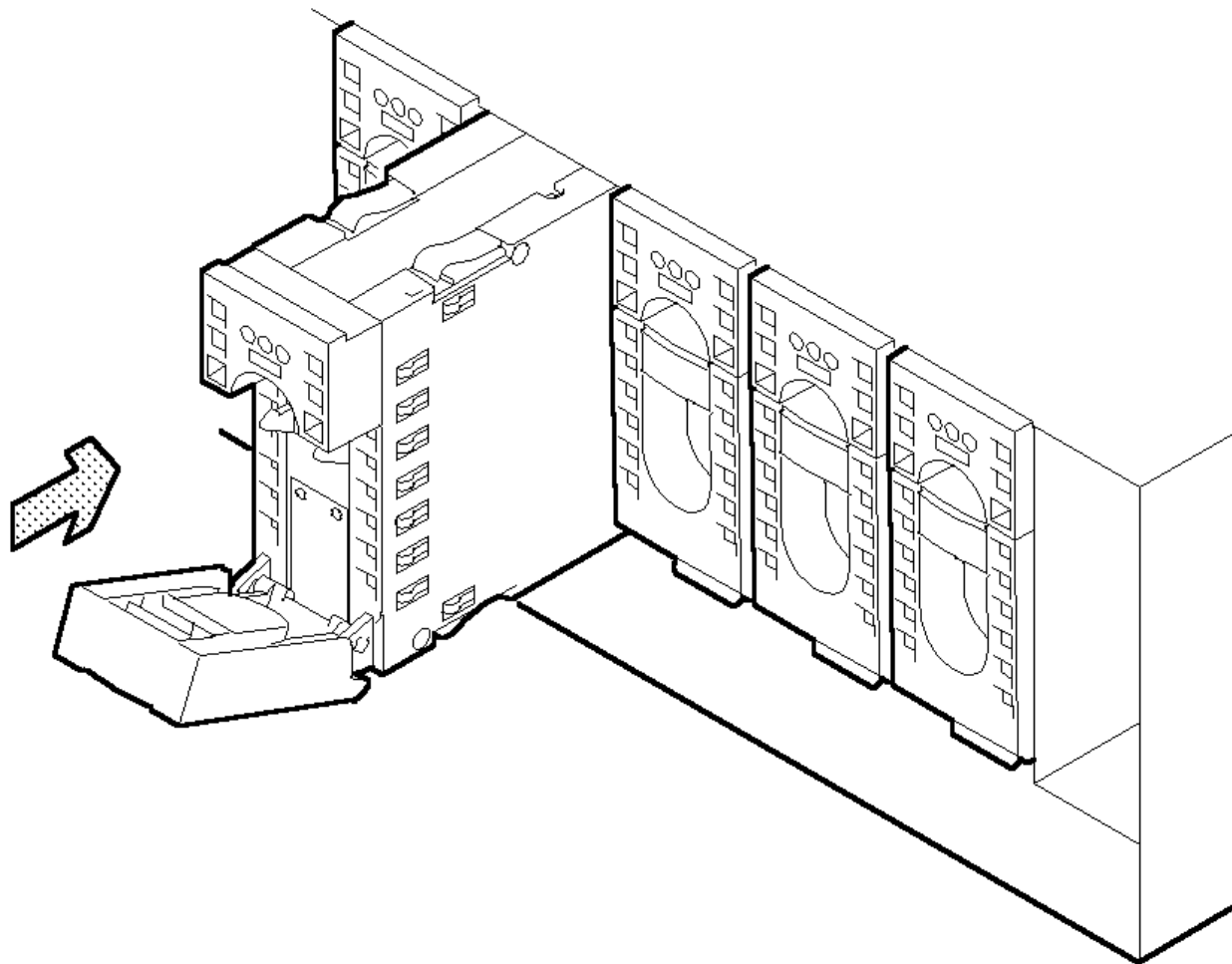


Attention

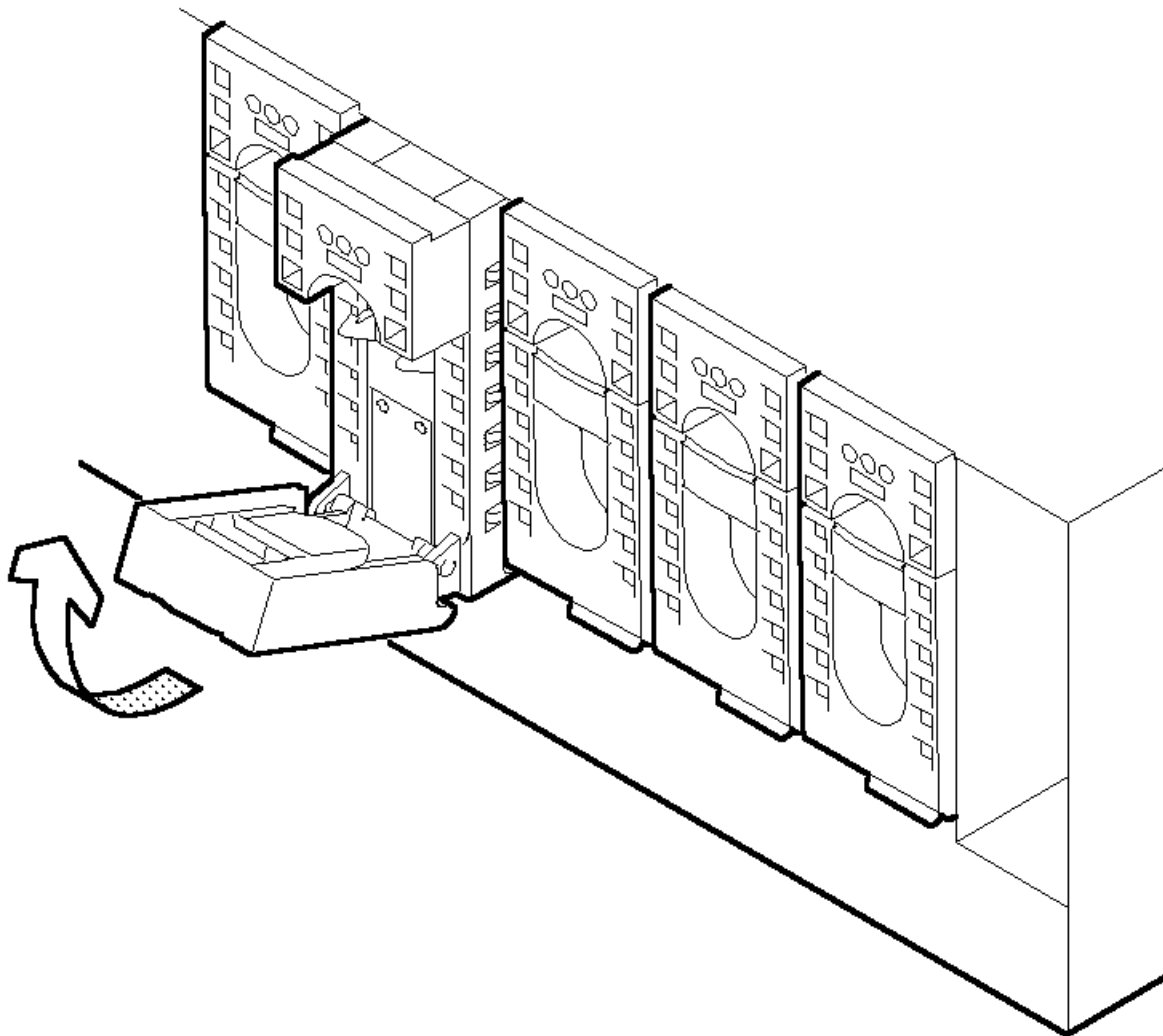
Do not leave the slot empty for more than 30 minutes; if you do, the 7133 and the disk drive modules within it might overheat and be damaged.

6. With one hand supporting the new module, engage it in the groove and push it into the slot from which you have just removed the failing module.

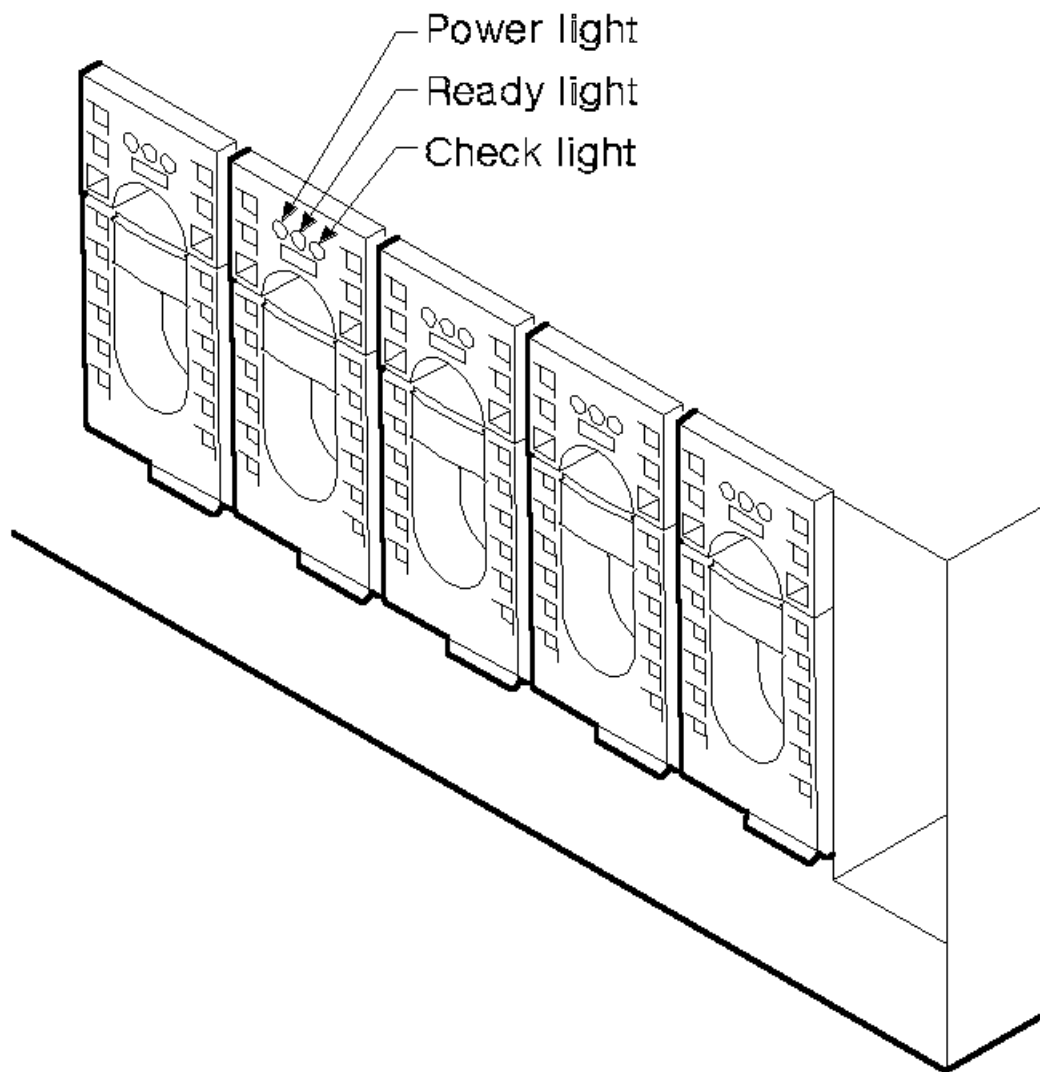
The module stops before it is completely into the slot.



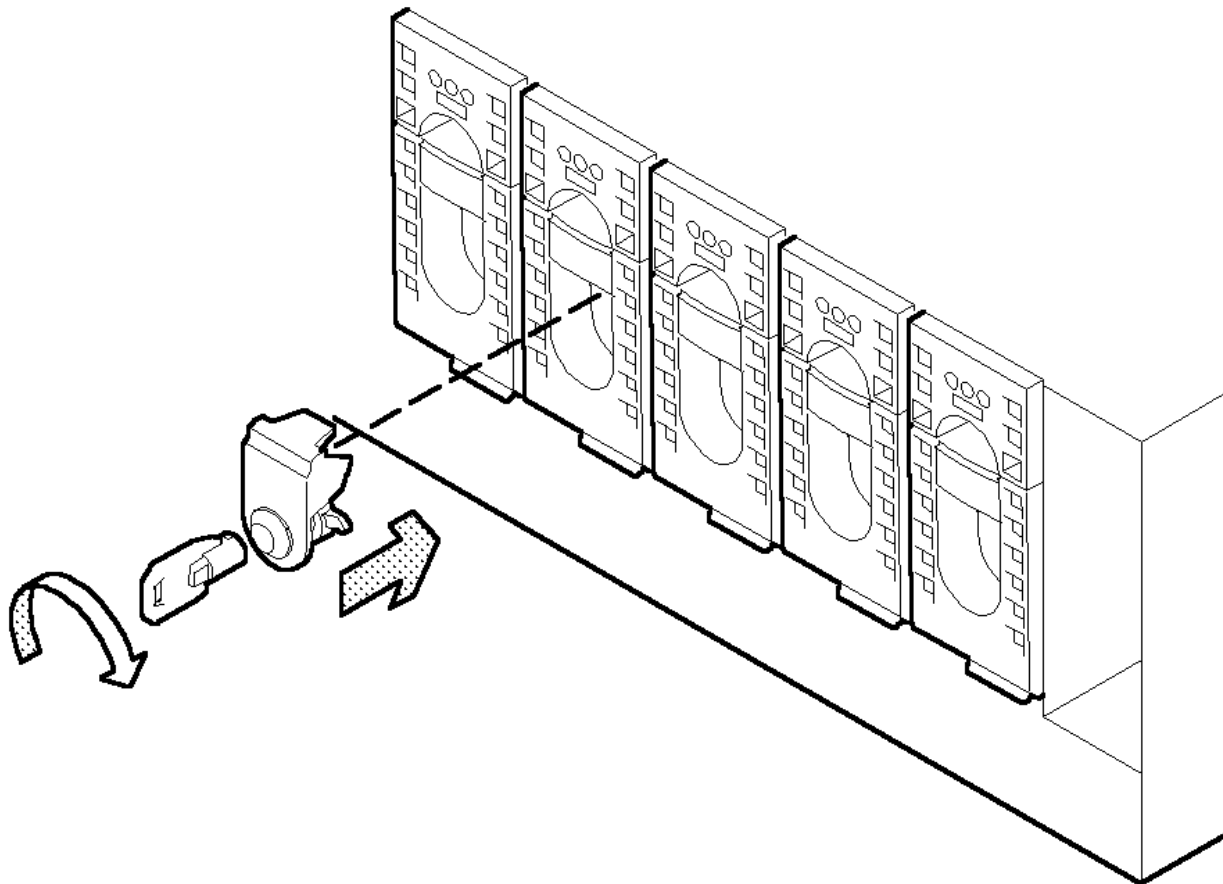
7. Close the handle of the module until it shuts with a click. This action pulls the module completely into the unit.



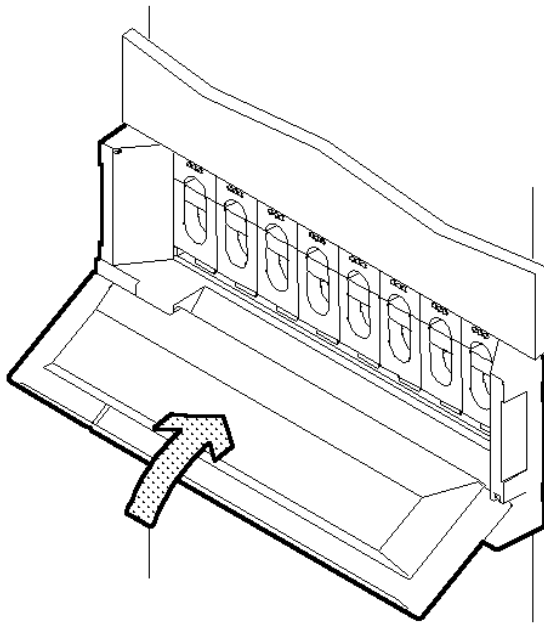
8. Push on the front of the module to ensure that the module is fully home.
9. Check that the Power and Check lights come on immediately. (If this does not happen, check that the new module is properly installed, then look for the new fault in the error log.)



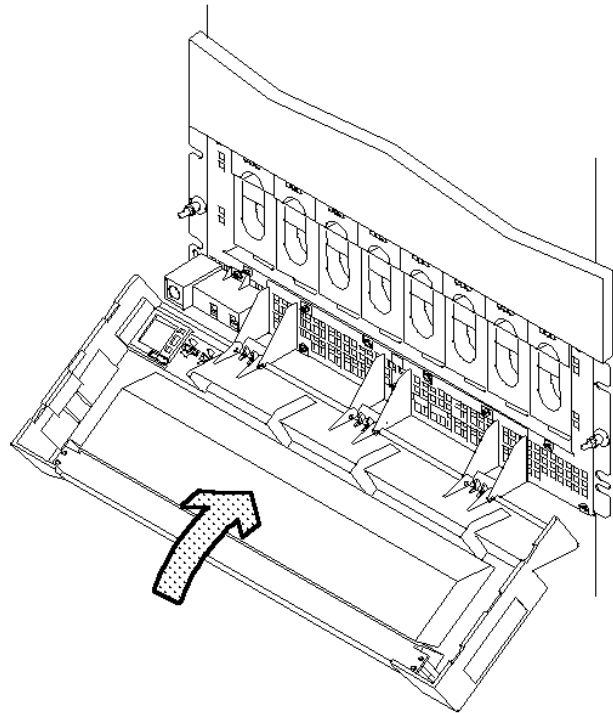
10. Release the disk drive from service mode by pressing F4 at the Disk Service Aids screen. Check that the Check light goes out and the Ready light comes on. (If this does not happen, look for the new fault in the error log.)
11. If required, lock the disk drive module into the unit, using the key and lock that you can order as an feature of the unit.



12. If you have just changed a disk drive module at the front of a Model 010 or 020, close the front cover.

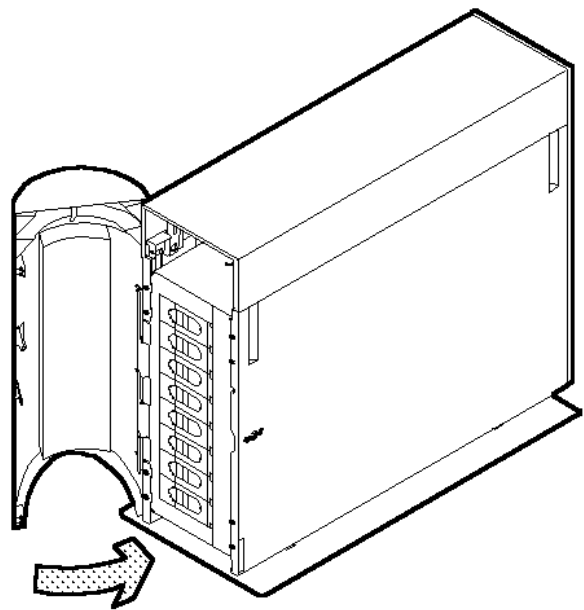
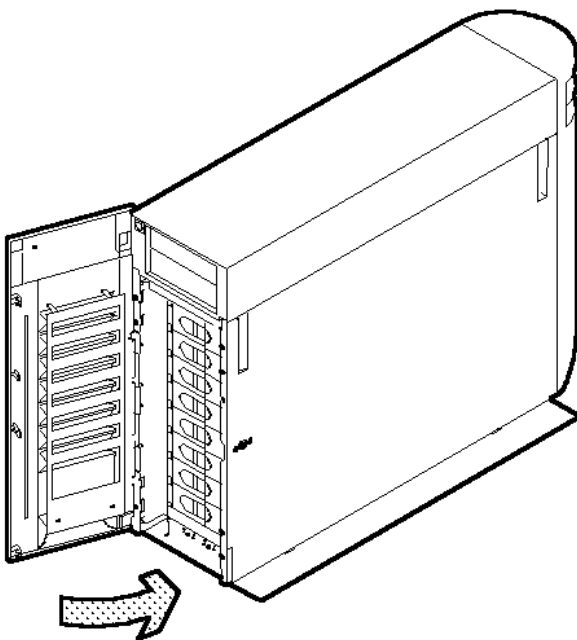


Early Covers



Later Covers

13. If you have just changed a disk drive module in a Model 500 or 600 close the cover and, if required, lock it with the key provided.

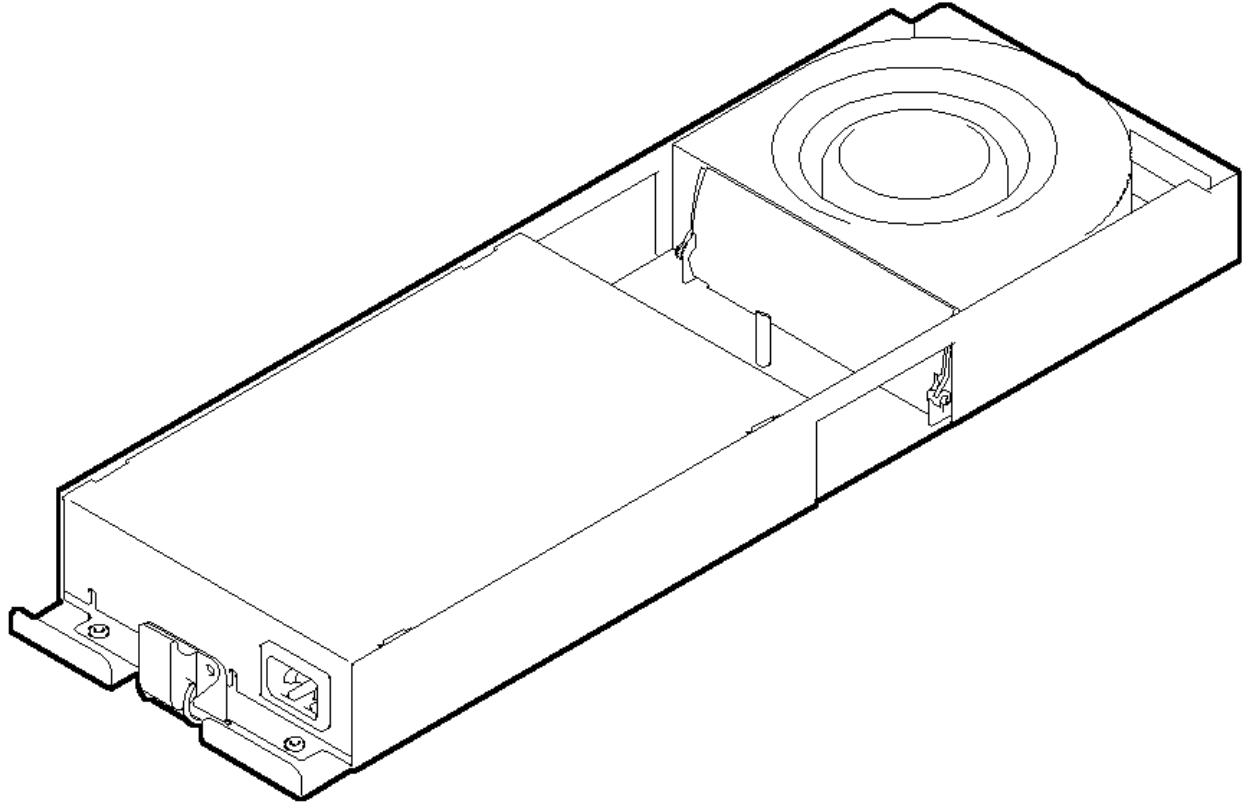


14. Restore the disk drive module into your system using the system programs.

4.2 Exchanging Fan-and-Power-Supply Assemblies

In some circumstances, you can change a faulty fan-and-power-supply assembly without the assistance of a service representative. You can do this only if:

- You are authorized by your organization to do this.
- You have the correct spare fan-and-power-supply assembly



Attention

- Do not remove two fan-and-power-supply assemblies from the subsystem at the same time.

You do not need to remove power from the subsystem when changing a fan-and-power-supply assembly.

Subtopics

4.2.1 Before Exchanging a Fan-and-Power-Supply Assembly

4.2.2 To Exchange a Fan-and-Power-Supply Assembly

4.2.1 Before Exchanging a Fan-and-Power-Supply Assembly

1. Identify the failing fan-and-power-supply assembly.
2. Check the lights on this fan-and-power-supply assembly ("Fan-and-Power-Supply Assembly Lights" in topic 1.1.2.1 describes these lights and how to see them.)

If the Check light is not on, you cannot change the fan-and-power-supply assembly; call for service.

If the Check light is on, continue at the next step.

3. Check the Service Request Number (SRN) recorded in the error log.

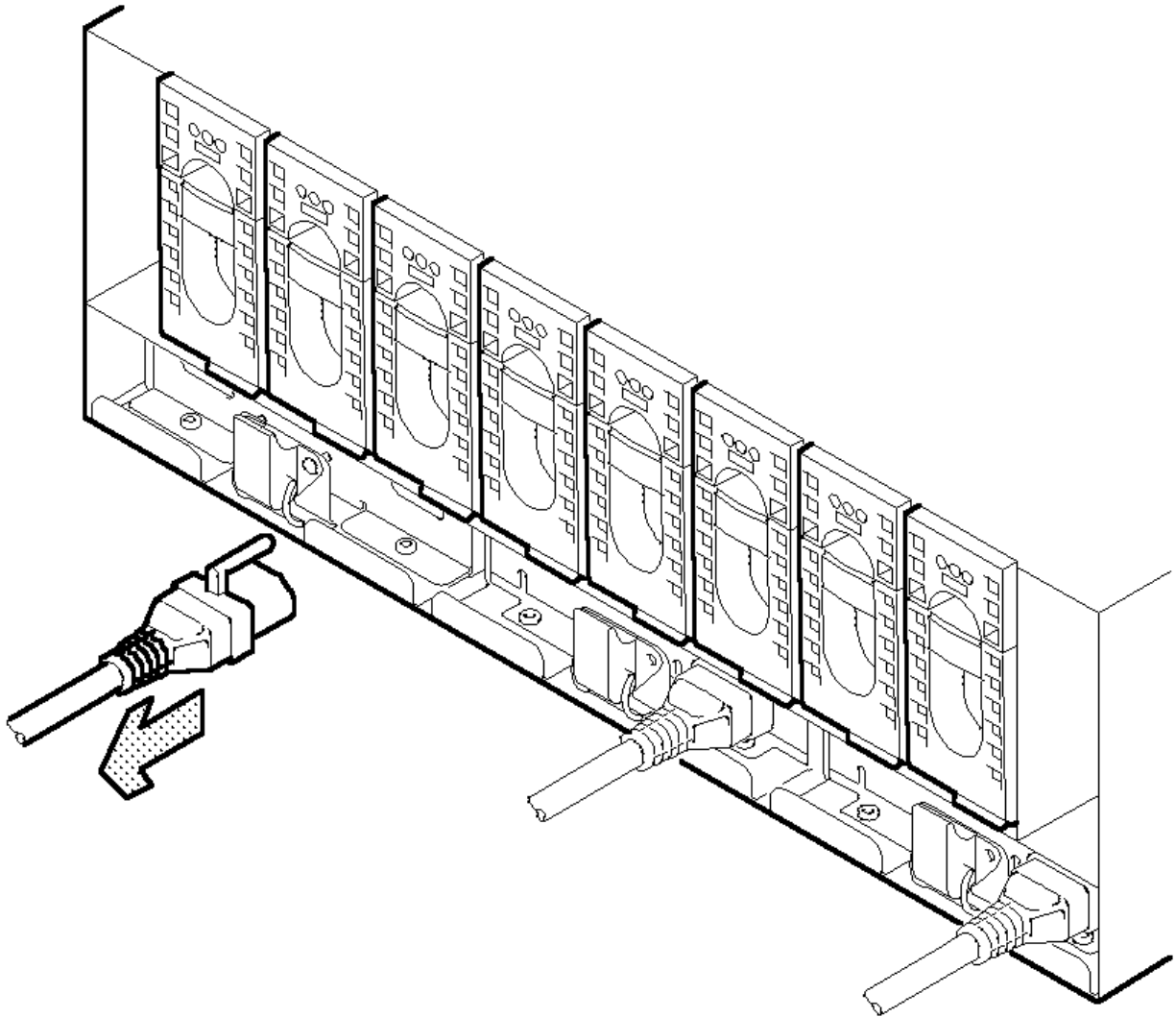
If the SRN is **60220**, it means that a fan-and-power-supply assembly has a fault that can be corrected by exchanging the fan-and-power-supply assembly for a new one.

If the SRN is not 60220, do not change a fan-and-power-supply assembly; call for service.

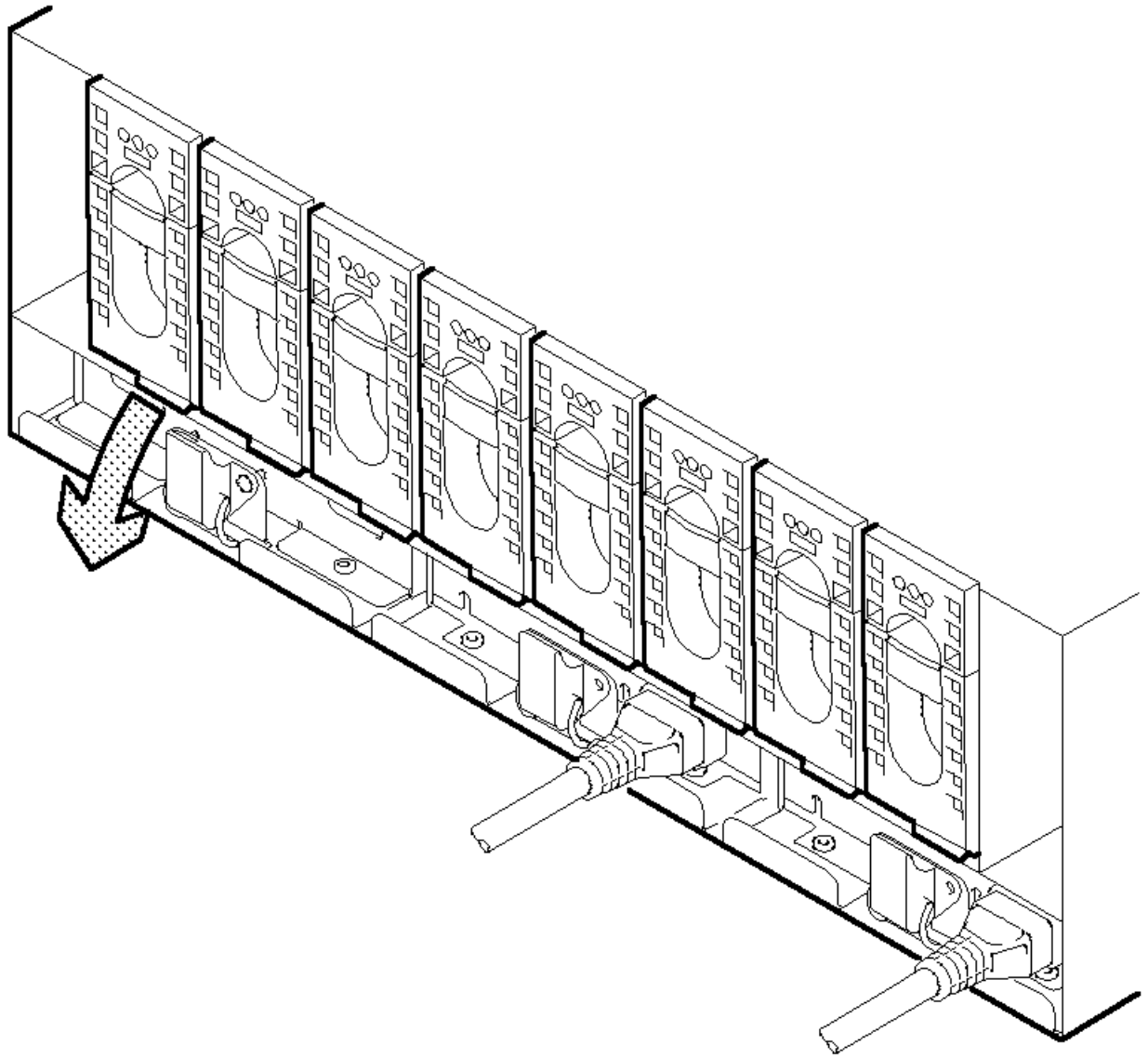
4.2.2 To Exchange a Fan-and-Power-Supply Assembly

The illustrations in the following instructions show a rack-mounted unit. The steps for changing a fan-and-power-supply assembly in a deskside unit are the same, but the parts are turned through 90 degrees.

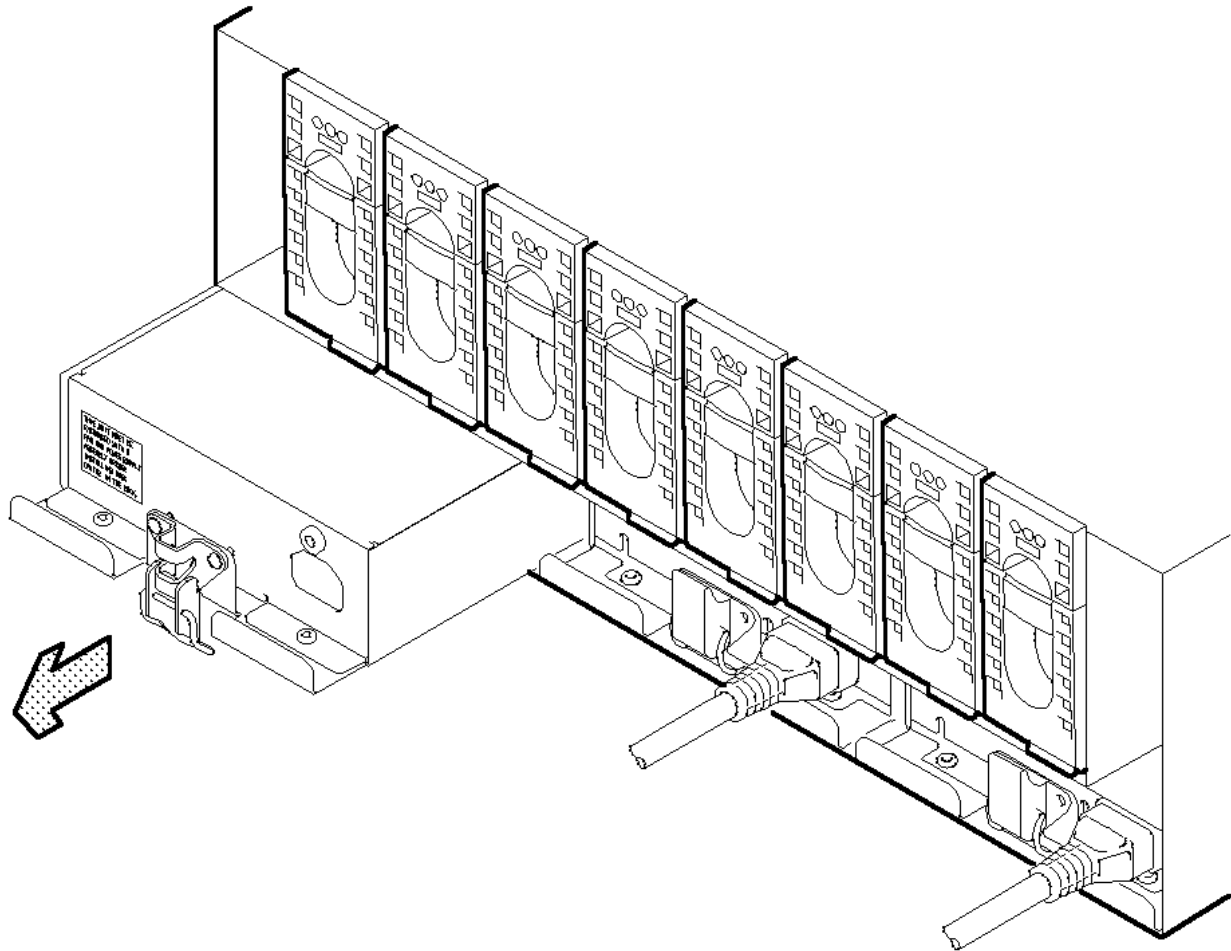
1. Unplug the mainline power cable from the failing fan-and-power-supply assembly.



2. Open the latch on the failing fan-and-power-supply assembly.

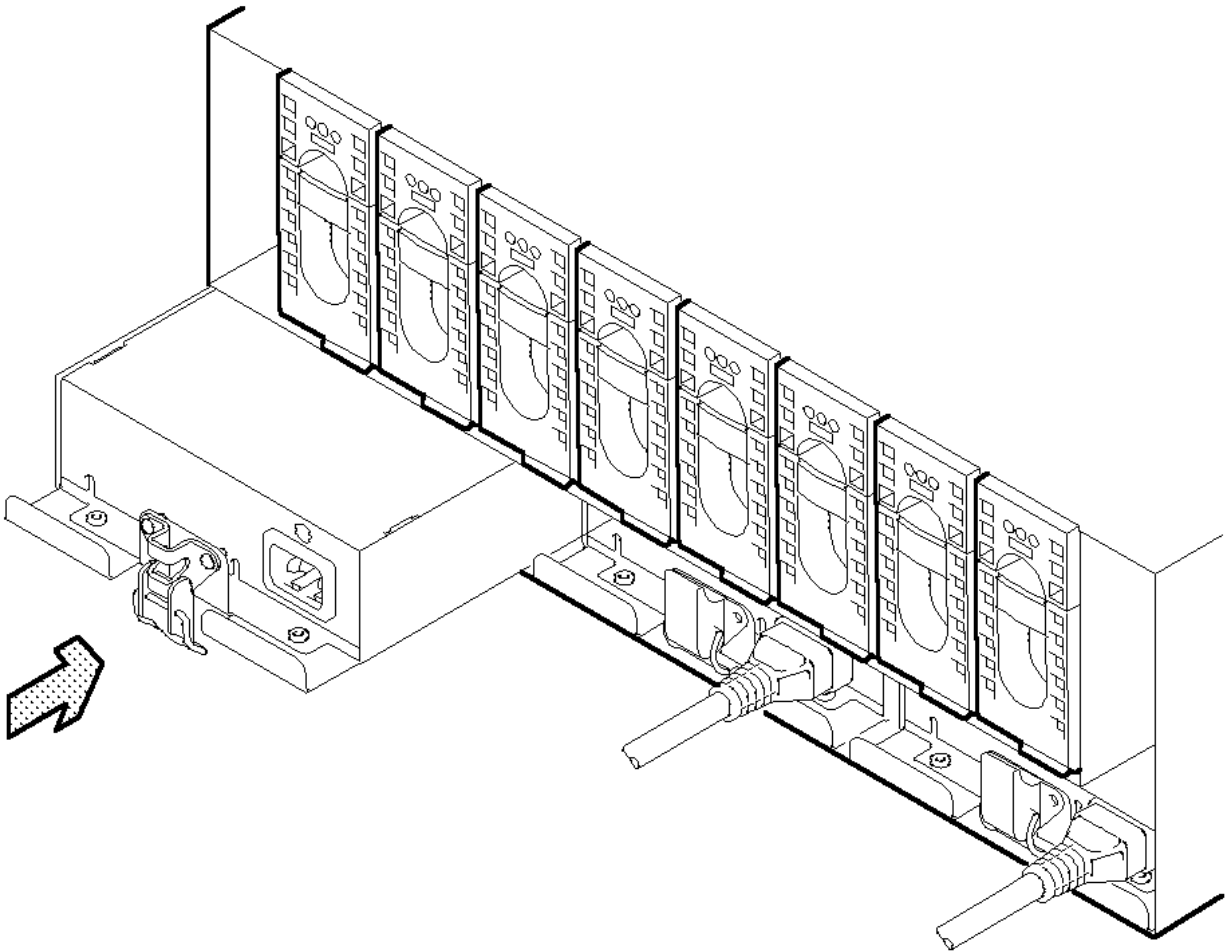


3. Pull the fan-and-power-supply assembly from the 7133.

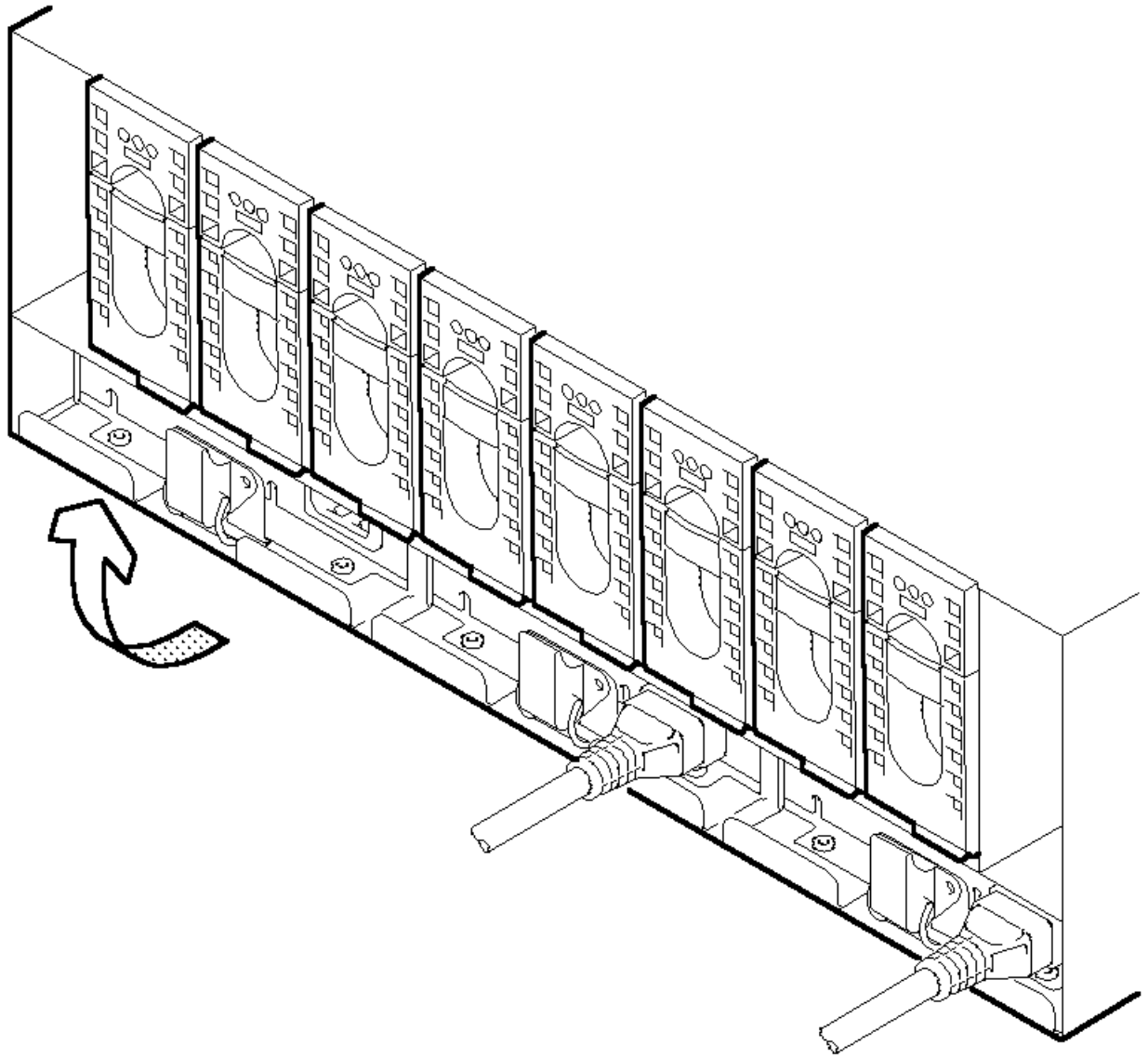


----- **Attention** -----
Do not leave the space empty for more than 30 minutes; if you do,
the 7133 and the disk drive modules within it might overheat and
be damaged.

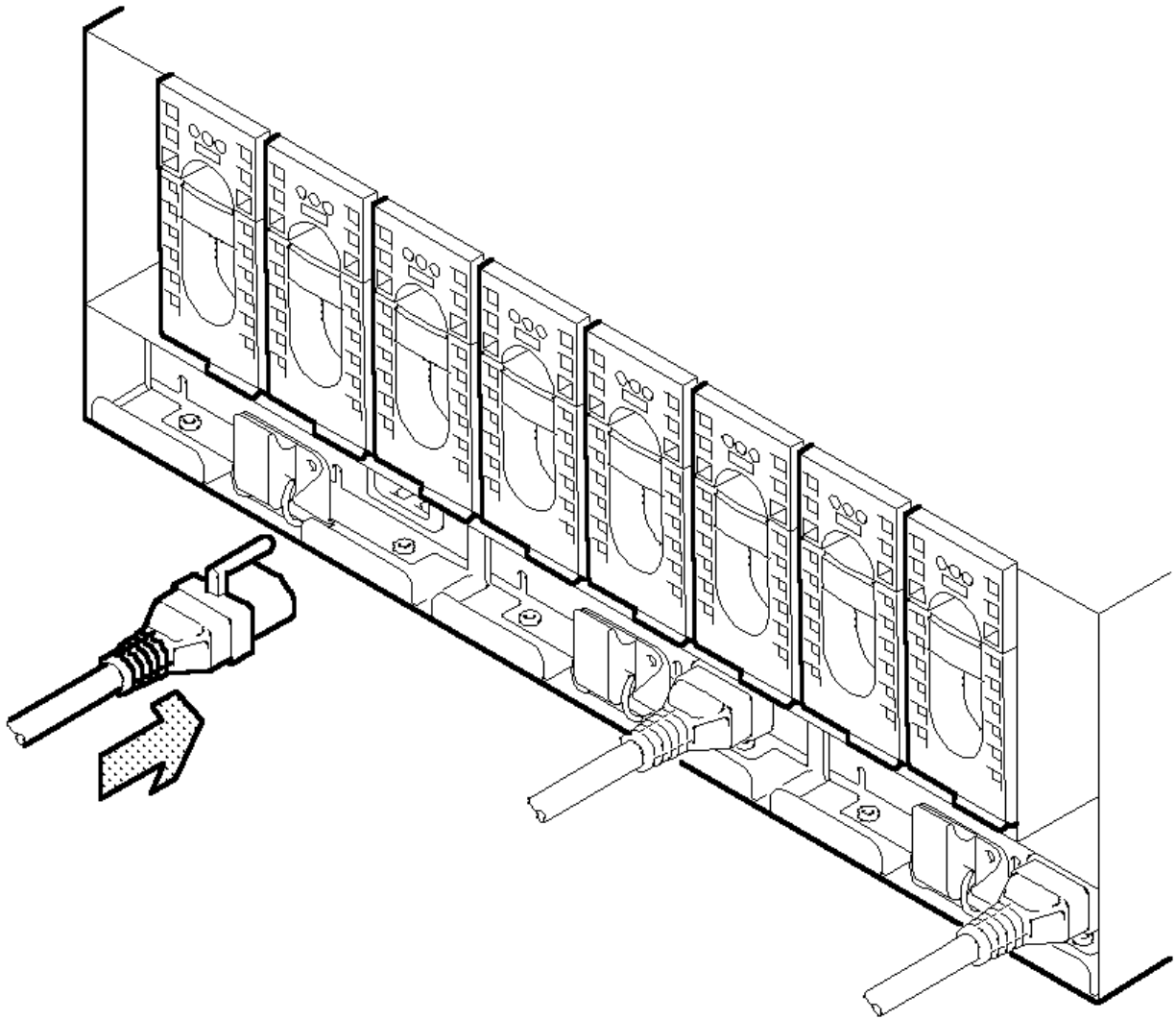
4. Push the replacement fan-and-power-supply assembly fully into the 7133.



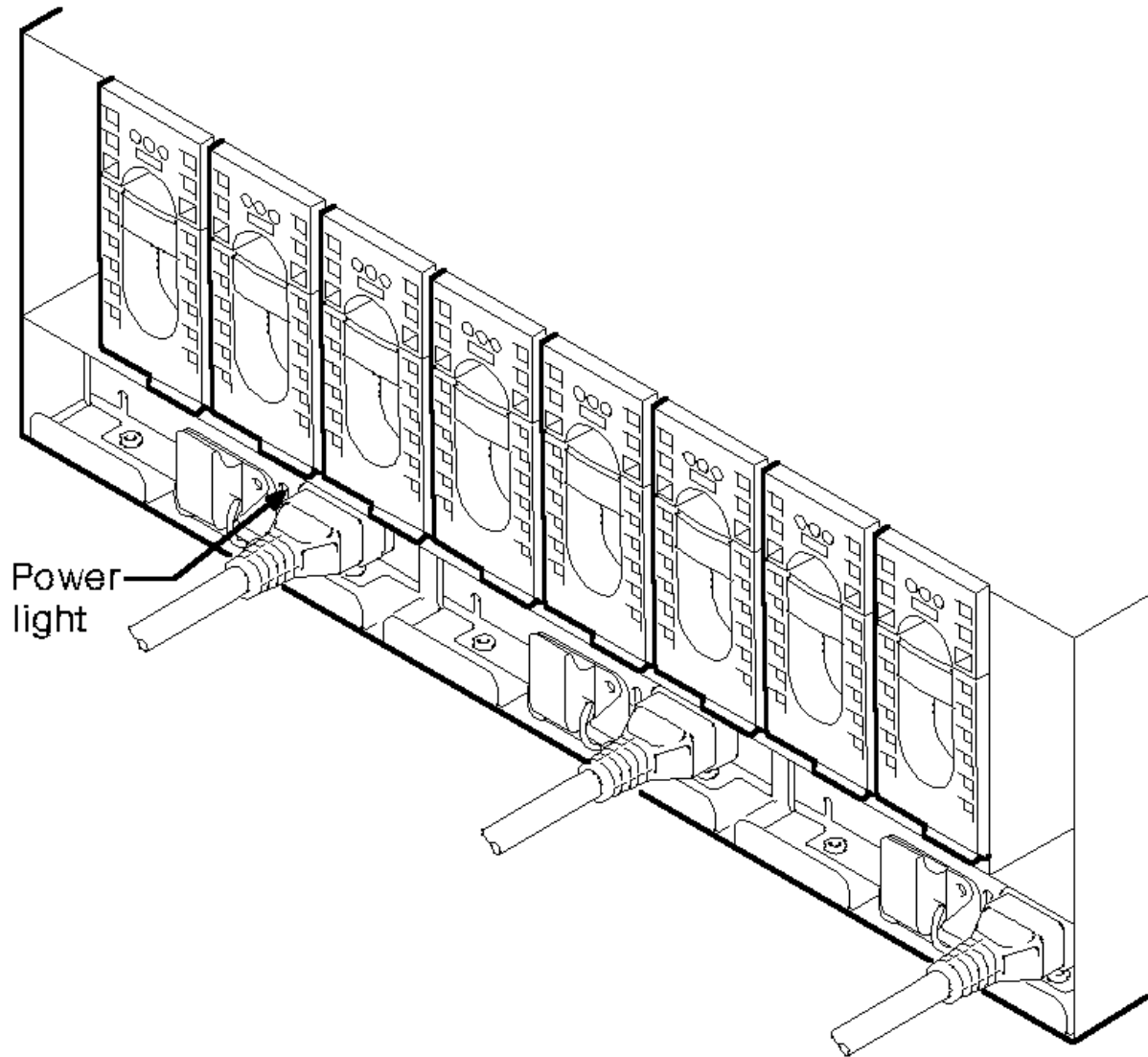
5. Close the latch that holds the fan-and-power-supply assembly in the 7133.



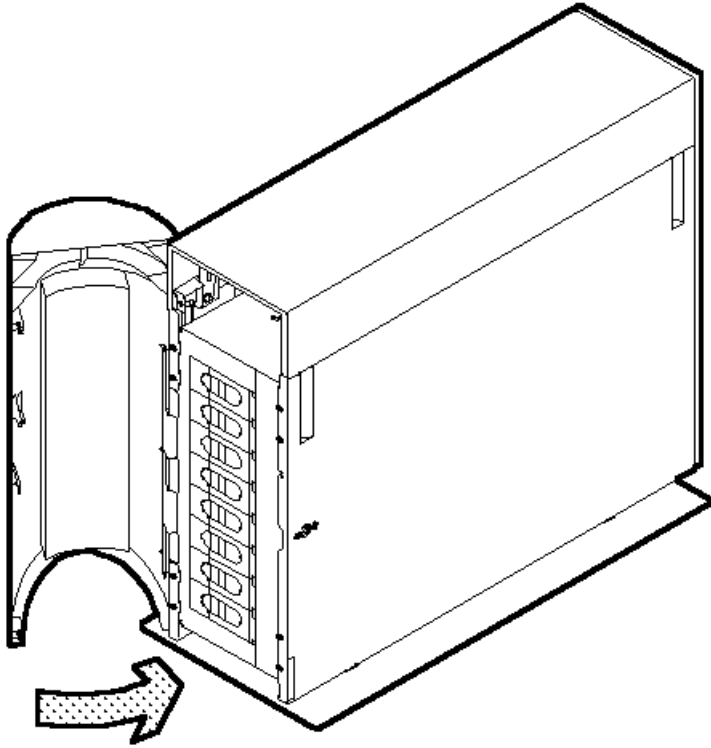
6. Plug the mainline power cable into the new fan-and-power-supply assembly.



7. Check that the green Power light comes on within 5 seconds. (If it does not, check that the new fan-and-power-supply assembly is correctly installed, then check the error log for the new fault.)



8. If you have just changed a fan-and-power-supply assembly in a Model 500 or 600, close the back cover and, if required, lock it with the key provided.



4.3 Reporting Problems

When you report a problem with a 7133 SSA Disk Subsystem, or with a device that is mounted in a 7133, it is important that you report the following information, in addition to the error information (the SRN) given to you by your operating system:

The machine type number...7133

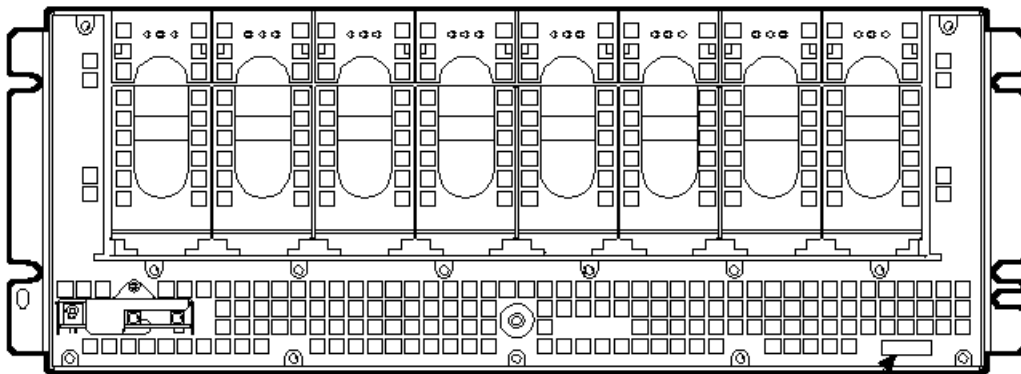
The machine model number...xxx

The machine serial number.xx-xxxxxx

To see the machine serial number of a Model 010 or 020, open the front cover of the unit by:

- For units with early covers, gripping the movable part of the cover at the sides and hinging it downward.
- For units with later covers, gripping the cover at the sides and hinging the whole front cover downward.

The serial number is stamped on the metal plate behind the cover:

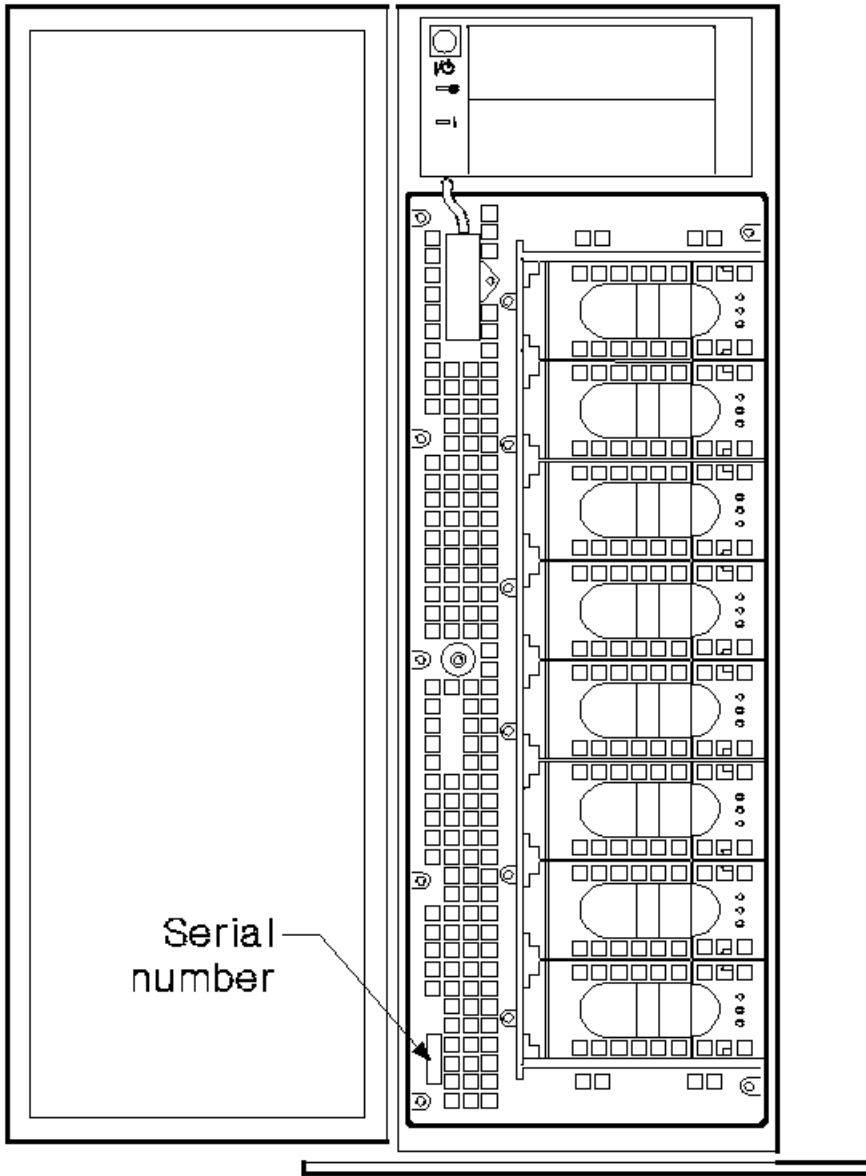


Serial number

To see the machine serial number of a Model 500 or 600, open its front cover by:

1. If necessary, unlocking the cover using the key provided
2. Gripping the cover at the right and hinging it to the left.

The serial number is stamped on the metal plate behind the cover:



5.0 Chapter 5. Installing a 7133 Model 010 or Model 020

Note: Because these instructions describe two models of 7133, some diagrams might not specifically show the model that you are installing.

This chapter describes the preparations for installing a 7133 Model 010 or 020 and how to install a 7133 Model 010 or Model 020 into a rack. To complete the installation, you must also connect the 7133 to the using system, connect the 7133 to a power source, and turn on and test the subsystem; instructions for these actions are in the following chapters.

The instructions assume that:

- The rack has already been set up.

Notes:

1. Each 7133 rack-mounted unit requires an airflow of 2.46 cubic meters per minute (87 cubic feet per minute). When racks containing many 7133 units are to be installed together, the following requirements must be met to ensure that the 7133 units are adequately cooled:
 - The airflow enters at the front of the rack and leaves at the back. To prevent the air that is leaving the rack from entering the intake of another piece of equipment, racks should be positioned in alternate rows, back-to-back and front-to-front.
 - The front of racks should be positioned on floor-tile seams, with a full line of perforated tiles immediately in front of the racks. Each perforated tile should have an air flow of at least 11.34 cubic meters per minute (400 cubic feet per minute). The underfloor temperature must be at most 15°C (60°F).
 - Where racks are in rows front-to-front or back-to-back, there should be a gap of at least 1220 mm (48 in) separating the rows.
 - To ensure proper air flow within each rack, the rack filler plates must be installed in unused positions. Also, all the gaps in the front of the racks must be sealed, including the gaps between the 7133 units.
 2. The recommended operating temperature is 22°C (72°F) or lower. At lower temperatures, the risk of failure in the unit is reduced. If the operating temperature is above 22°C (72°F) for long periods of time, the unit is exposed to a greater risk of failure from external causes.
- A stabilizer has been correctly attached to the bottom front of the rack to prevent the rack from tipping forward while the 7133 is being installed into the rack. (If necessary, see the *Installation and Service Guide* for the rack.)
 - You have access to:
 - Preinstallation planning information for the system.
 - Your plan for the subsystem configuration.

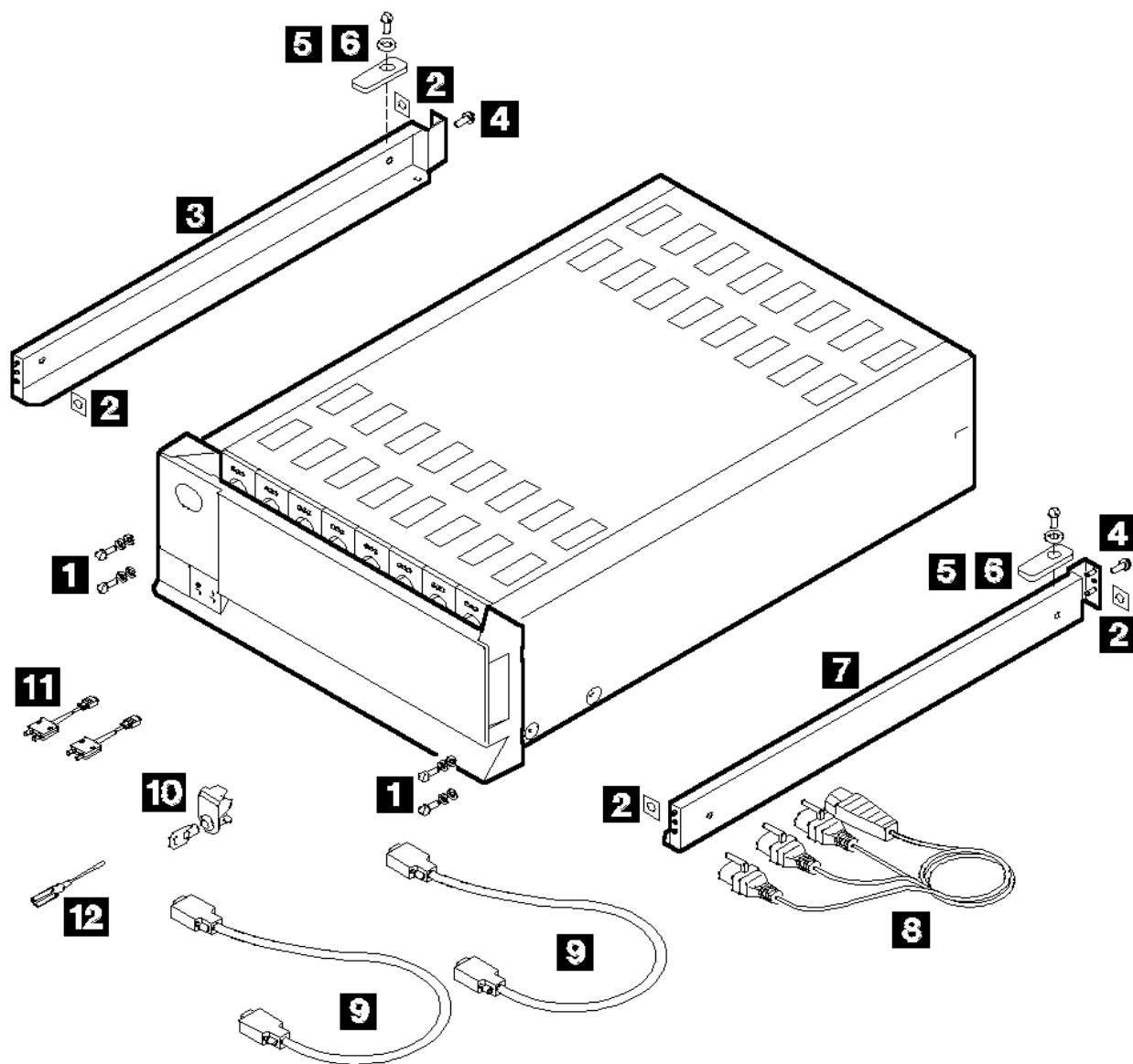
Subtopics

- 5.1 Preparing for the Installation
- 5.2 Preparing the Rack
- 5.3 Removing the Disk Drive Modules and Dummy Disk Drive Modules
- 5.4 Installing the 7133 into a Rack
- 5.5 Reinstalling the Disk Drive Modules and Dummy Disk Drive Modules

5.1 Preparing for the Installation

1. A detailed list of items is shipped with the 7133. Ensure that you have all the items that are shown on the list. Refer to the diagram below to identify the items. If the 7133 was already installed in the rack when it was delivered, only items 9 and 11 will be separate.

1	Front mounting screws, lock washers, and flat washers
2	Nut clips
3	Support rail, left
4	Rail screws
5	Back mounting screws and washers
6	Back clamp plates
7	Support rail, right
8	Three-way power cable
9	SSA cables
10	Disk drive module locks (optional)
11	Fibre-Optic Extenders (optional)
12	SSA screwdriver



Note: If 7133 manuals other than this manual and the *7133 SSA Disk Subsystems for PC Servers: Hardware Maintenance Manual Supplement* are delivered with the 7133 unit, discard them; they refer to using the 7133 with other types of system.

2. Ensure that an SSA adapter is either available for installation, or already installed into the using system.

For information about the SSA adapter, see the *SSA RAID Adapters for PC Servers: Installation and User's Guide*.

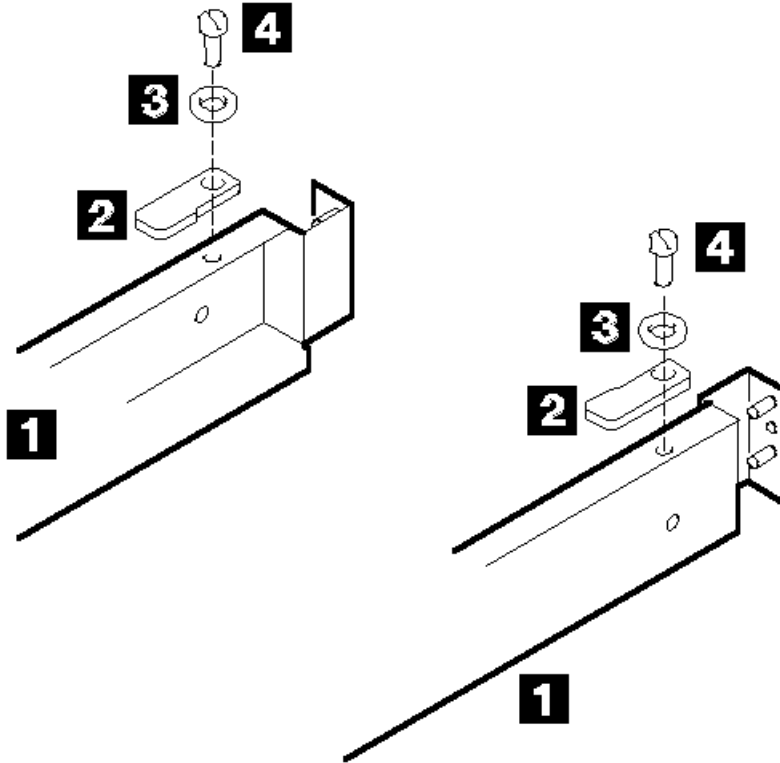
3. If the 7133 has the SSA Fibre-Optic Extender feature, Fibre-Optic Extenders (11 in the diagram) are provided. A wrap cable and adapter assembly is provided with each Fibre-Optic Extender. This assembly is used during diagnostic procedures. It consists of a fiber optic wrap cable and a fiber optic wrap adapter. The complete assembly is contained in a plastic bag. When not in use, the wrap cable and adapter assembly must be kept in its plastic bag in a safe place that is as close to the installed Fibre-Optic Extender as possible.

Because the fiber optic cables that connect the 7133 to an SSA adapter, or to another device, can be up to 2.4 kilometers (7874 feet) long, ensure that at least one wrap cable and adapter assembly is available at each end of the fiber optic cables.

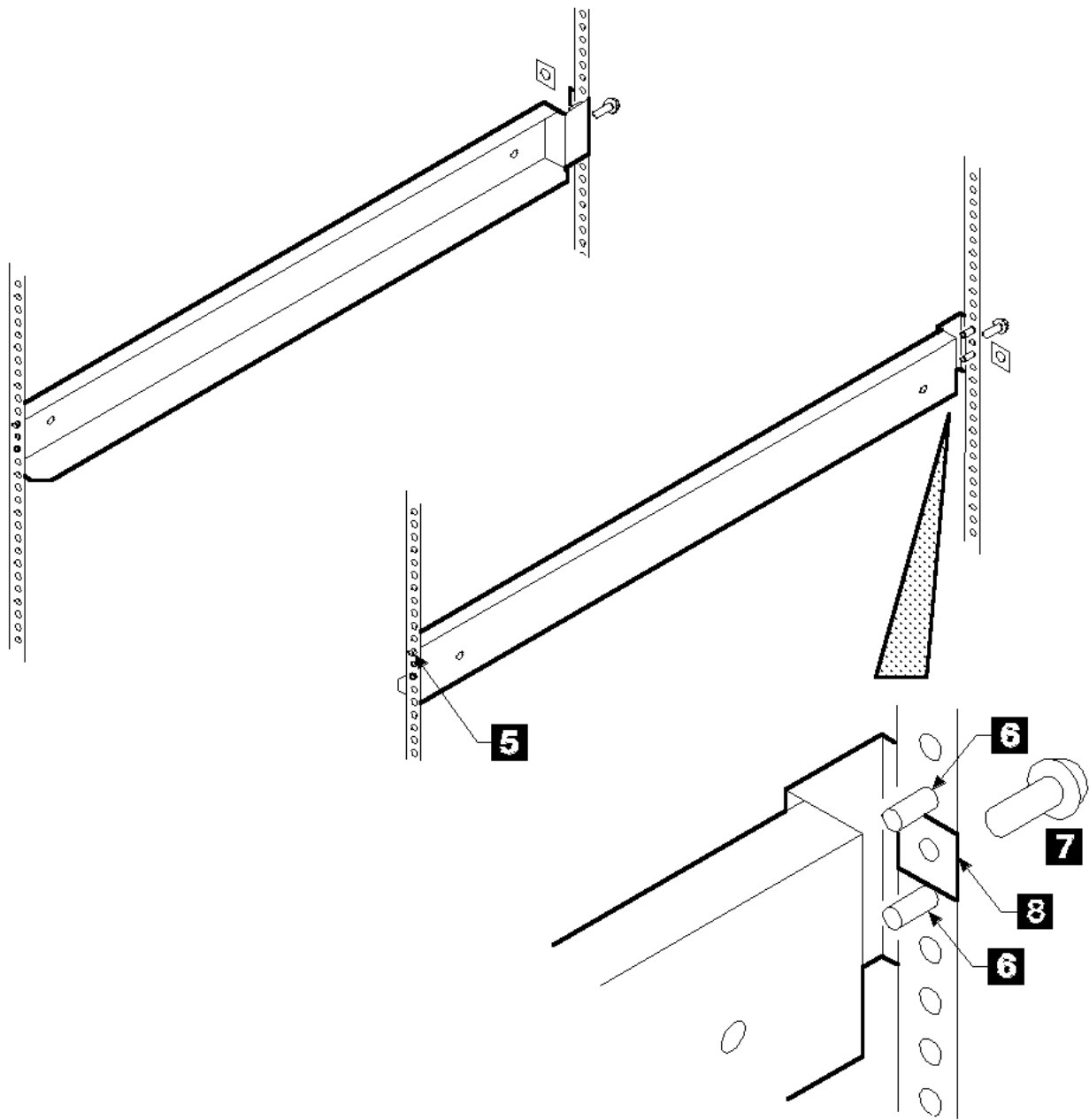
4. Diskettes containing microcode for SSA adapters, for SSA disk drives, or for both, might be supplied with the 7133 and with the SSA adapter. If such diskettes are supplied, instructions for installing the microcode are supplied also. These instructions might not mention PC Servers; in which case, do not attempt to install the microcode. Use the instructions only if they do mention PC Servers.
5. If the 7133 was already installed in the rack when it was delivered, go to Chapter 7, "Connecting the 7133 to the Using System" in topic 7.0.

5.2 Preparing the Rack

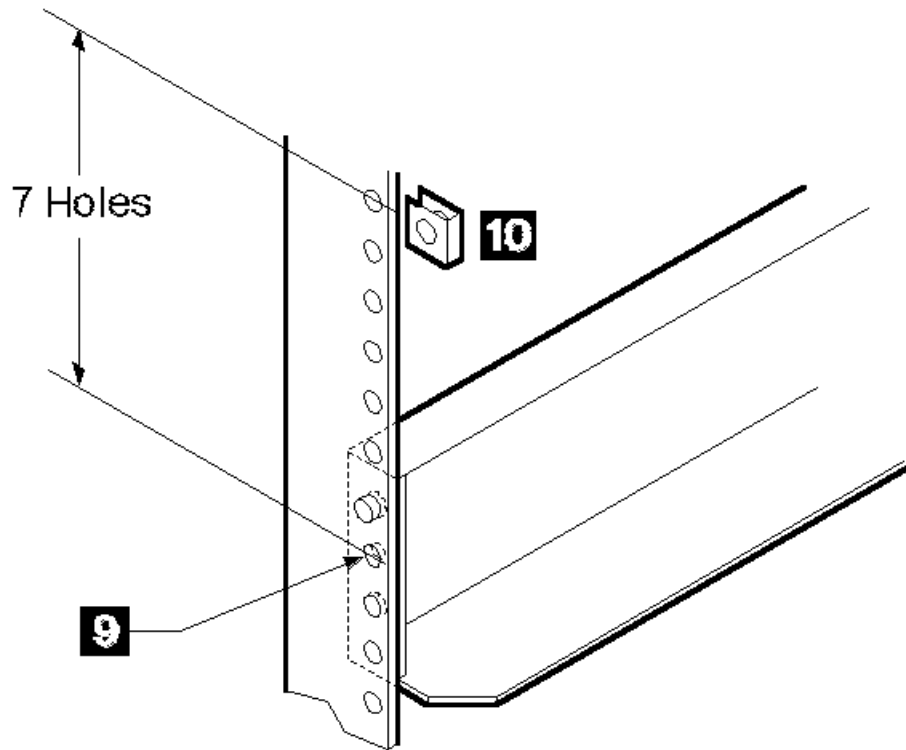
1. Find the two support rails 1 that are supplied with the 7133.
2. Onto each support rail, install a clamp plate 2, washer 3, and screw 4. Ensure that the clamp plates are oriented as shown in the diagram.



3. Tighten the screws just enough to prevent the clamp plates from moving.
4. The 7133 is four Electronics Industries Association (EIA) units high. Using the preinstallation planning information, or other relevant information, determine where you are going to locate the 7133 in the rack.
5. Refer to the EIA markings on the rack and decide where you are going to install the support rails. If appropriate, allow for possible future installation of other subsystems.
6. For each support rail:
 - a. Attach a nut clip 8 at the selected hole in the back of the rack.
 - b. Insert the two studs 6 of the support rail into the back of the rack. Hold the support rail so that it is horizontal, and push it forward so that the stud 5 enters the matching hole in the front of the rack.
 - c. Check whether the support rail is horizontal (a spirit level might be useful here). If the rail is not horizontal, remove it from the rack, then repeat step 6b.
 - d. Insert the rail screw 7 into the nut clip 8 and tighten it.



7. At the front of the rack, observe the threaded hole 9 in each of the support rails that you have just installed.
8. Count seven holes upward from each threaded hole, and install a nut clip 10 .



9. Go to "Removing the Disk Drive Modules and Dummy Disk Drive Modules" in topic 5.3.

5.3 Removing the Disk Drive Modules and Dummy Disk Drive Modules

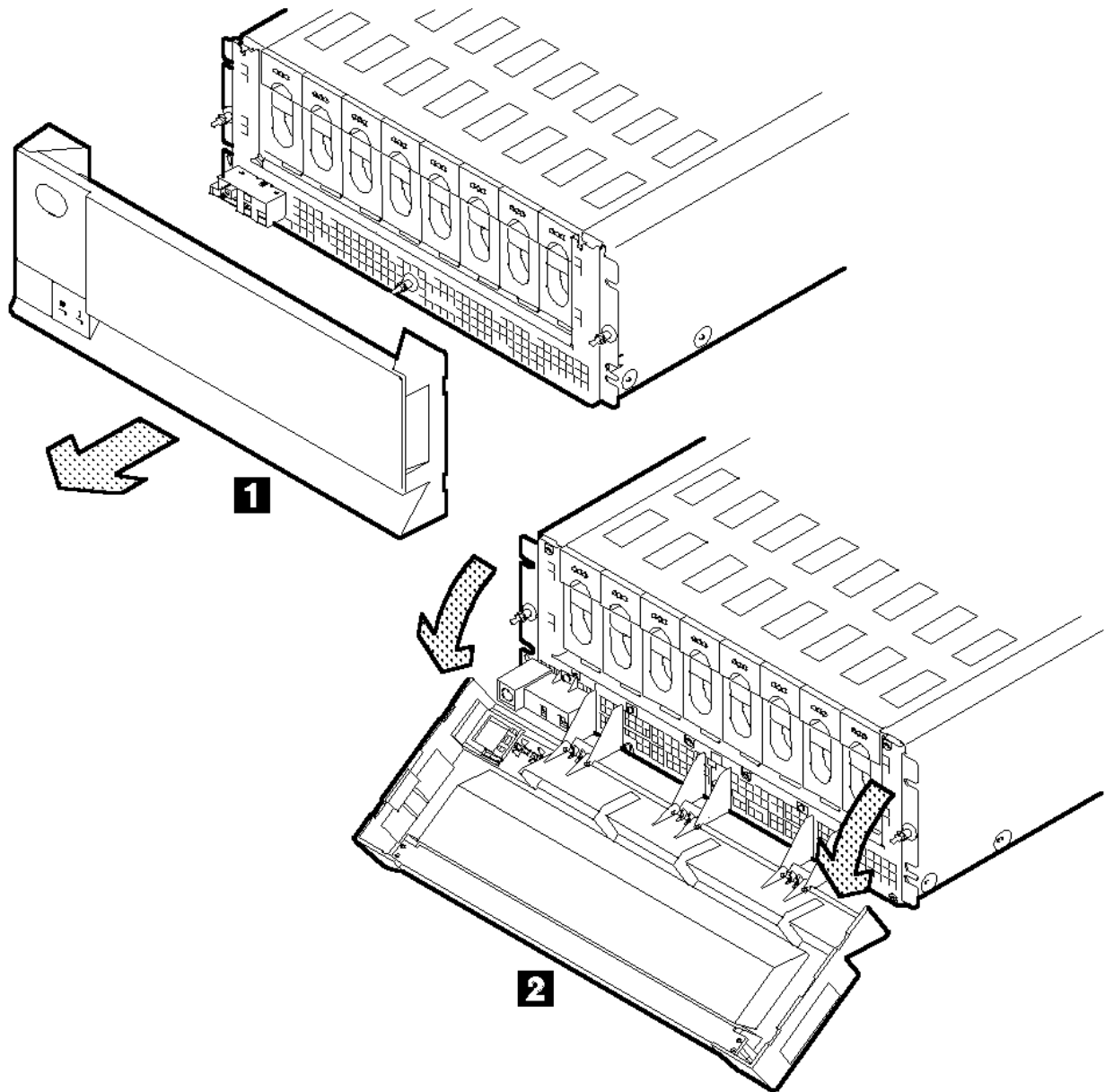
CAUTION:

A 7133 weighs up to 50.0 kg (110 lb) with disk drive modules installed. Do not attempt to lift the 7133 into the rack unless all the disk drive modules have been removed.

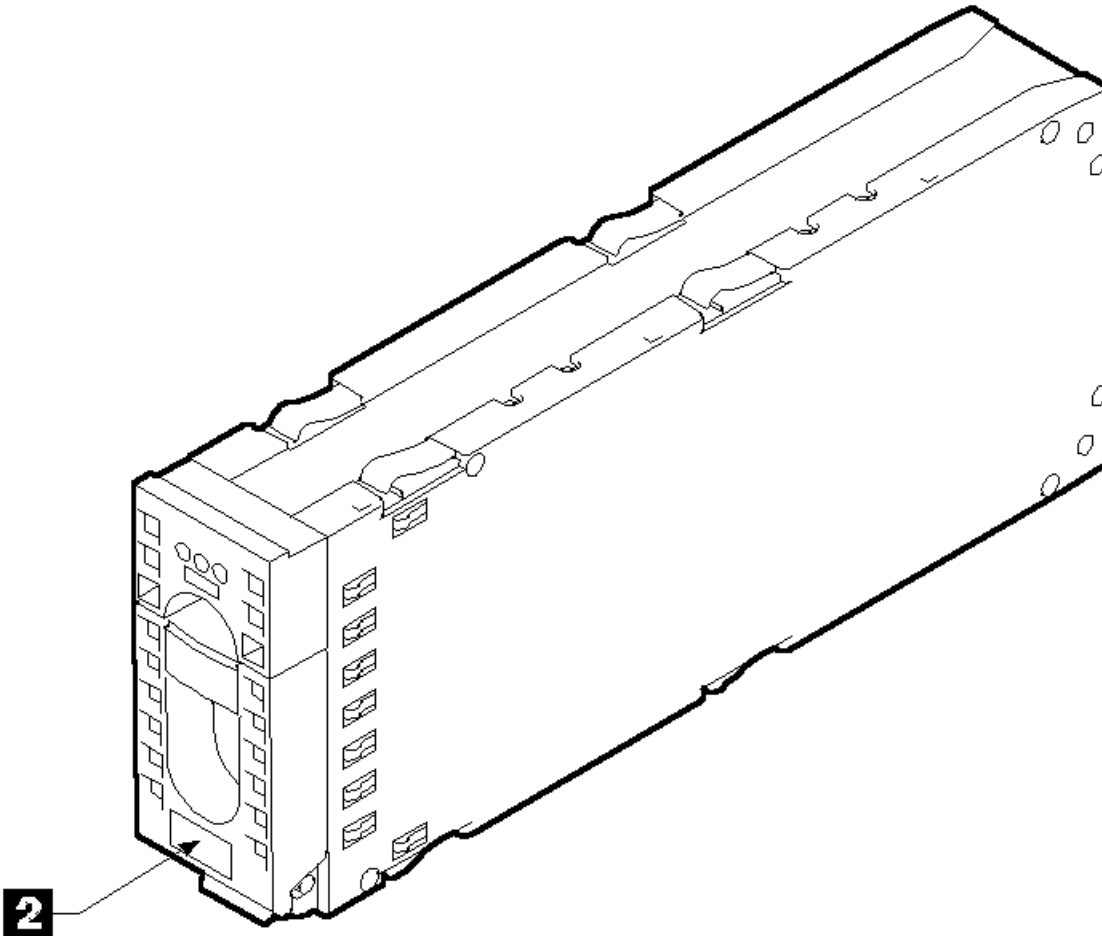
Attention: Disk drive modules are fragile. Handle them with care, and keep them well away from strong magnetic fields.

1. If the 7133 has an early type of front cover 1, grip the bottom of the cover, and pull the cover forward.

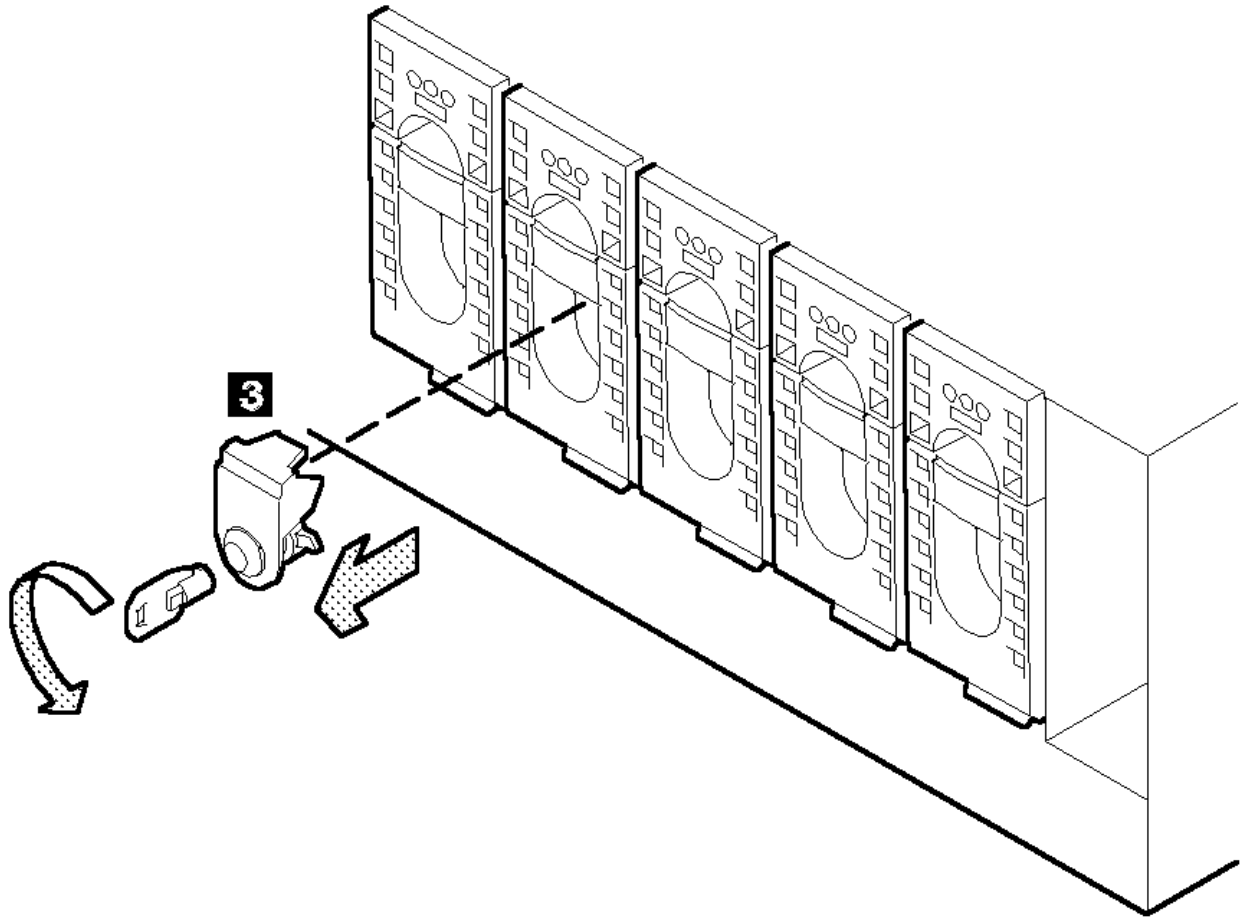
If the 7133 has a late type of front cover 2, grip the sides of the cover, and pivot the cover downward.



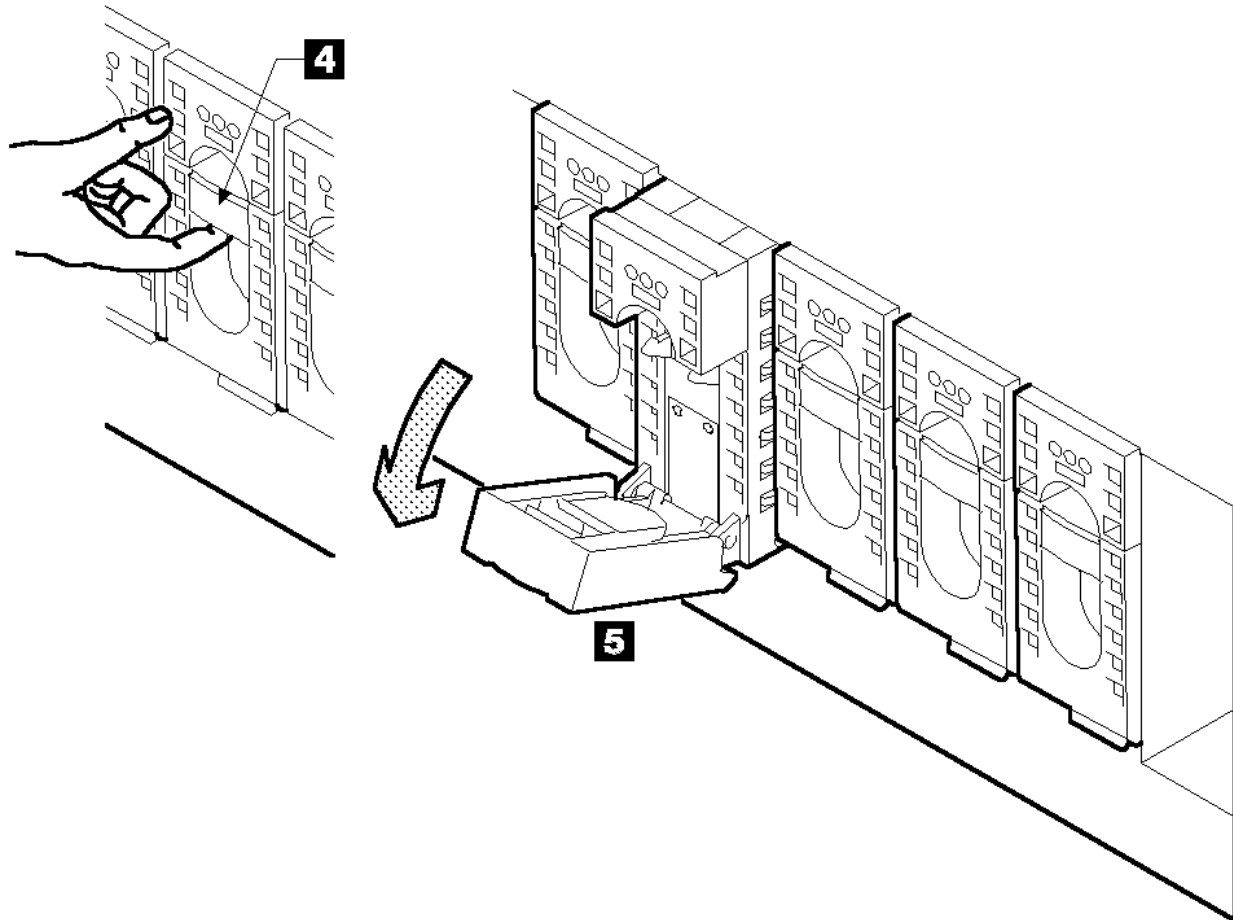
2. Before you start to remove any modules, note which slots in the 7133 contain disk drive modules, and which contain dummy disk drive modules. This action helps you to reinstall the modules into their correct slots after you have installed the 7133 into the rack. (Disk drive modules have a serial-number label 2; dummy disk drive modules do not.)



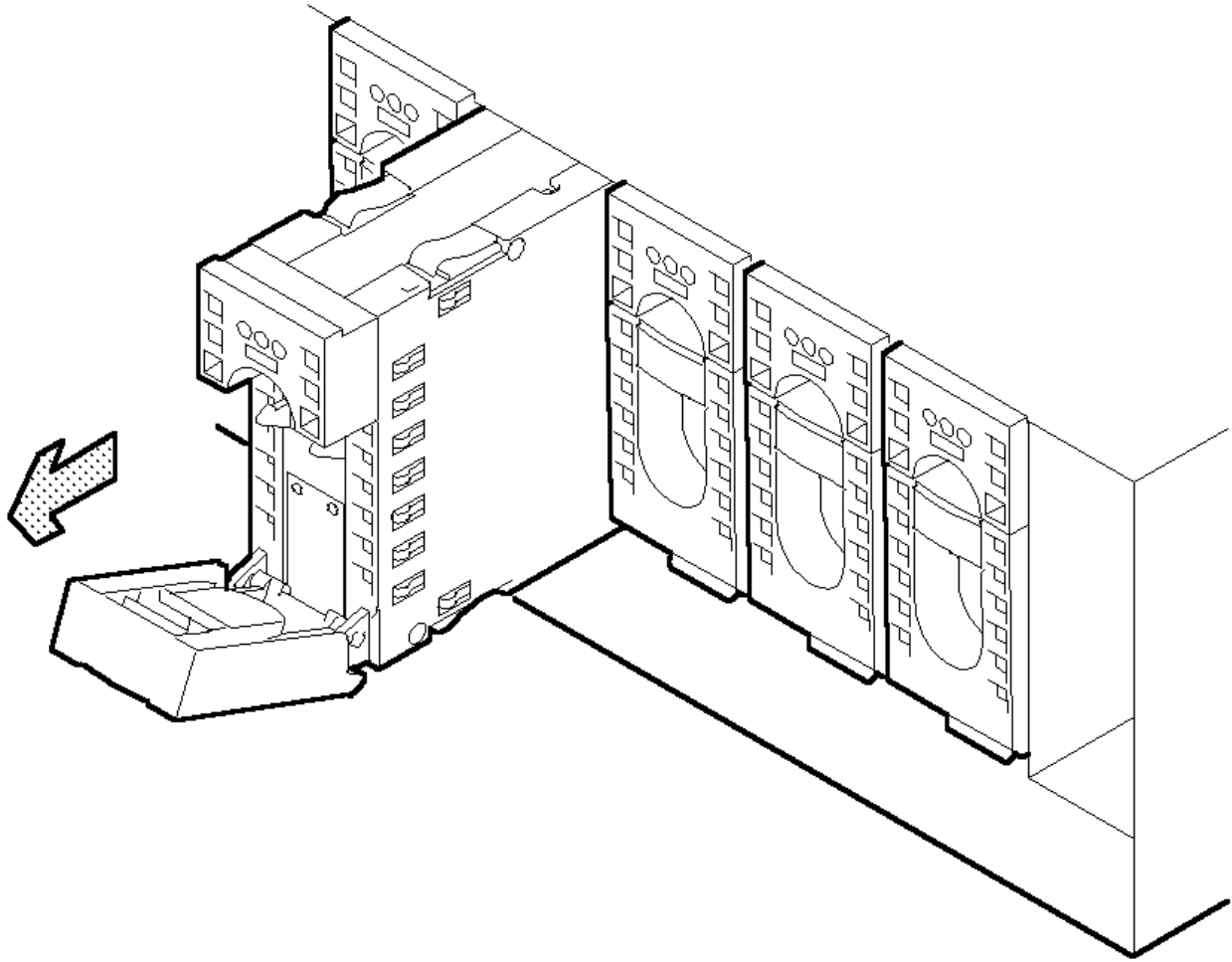
3. If the disk drive modules have locks 3 , find the key (supplied with the 7133).
4. Insert the key into the lock, turn it counterclockwise, and remove the lock.



5. Press upward behind the red panel 4 , and open the handle 5 . This action pulls the disk drive module partially out of its slot.



6. Carefully pull out the disk drive module. As the module comes out, put one hand under its base to prevent it from falling.



7. Repeat steps 4 through 6 for each disk drive module or dummy disk drive module. Ensure that you remove all the modules from the front and back of the 7133.

5.4 Installing the 7133 into a Rack

CAUTION:

The stabilizer must be correctly attached to the bottom front of the rack to prevent the rack from tipping forward while the 7133 is being installed into the rack. Do not install or pull out any unit if the stabilizer is not attached to the rack.

1. CAUTION:

A 7133 weighs up to 50.0 kg (110 lb) with disk drive modules installed. Do not attempt to lift the 7133 into the rack unless all the disk drive modules have been removed.

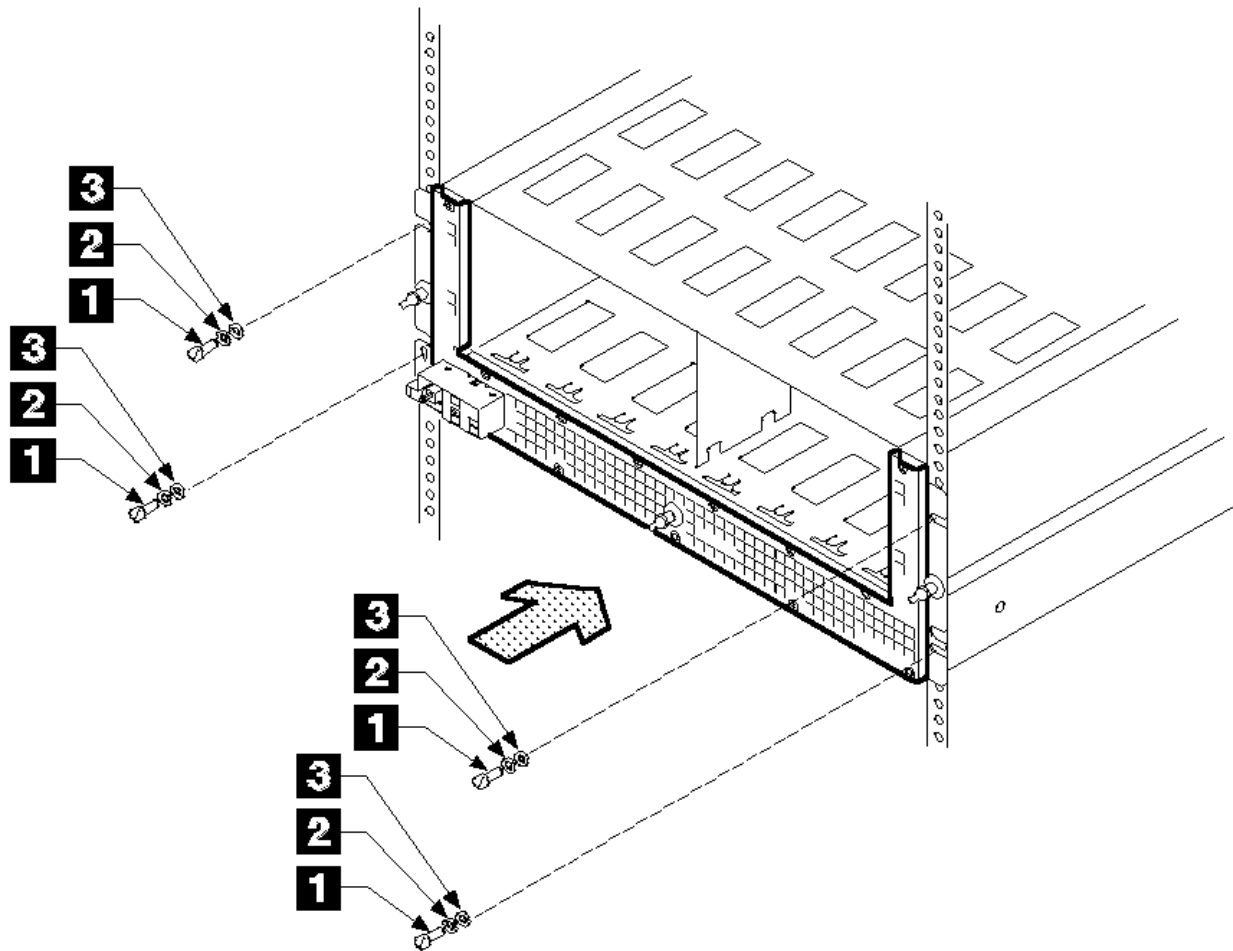
If you have not already done so, remove all the disk drive modules from the 7133 (see "Removing the Disk Drive Modules and Dummy Disk Drive Modules" in topic 5.3).

2. CAUTION:

Do not attempt to lift the 7133 by yourself. Ask another person for aid.

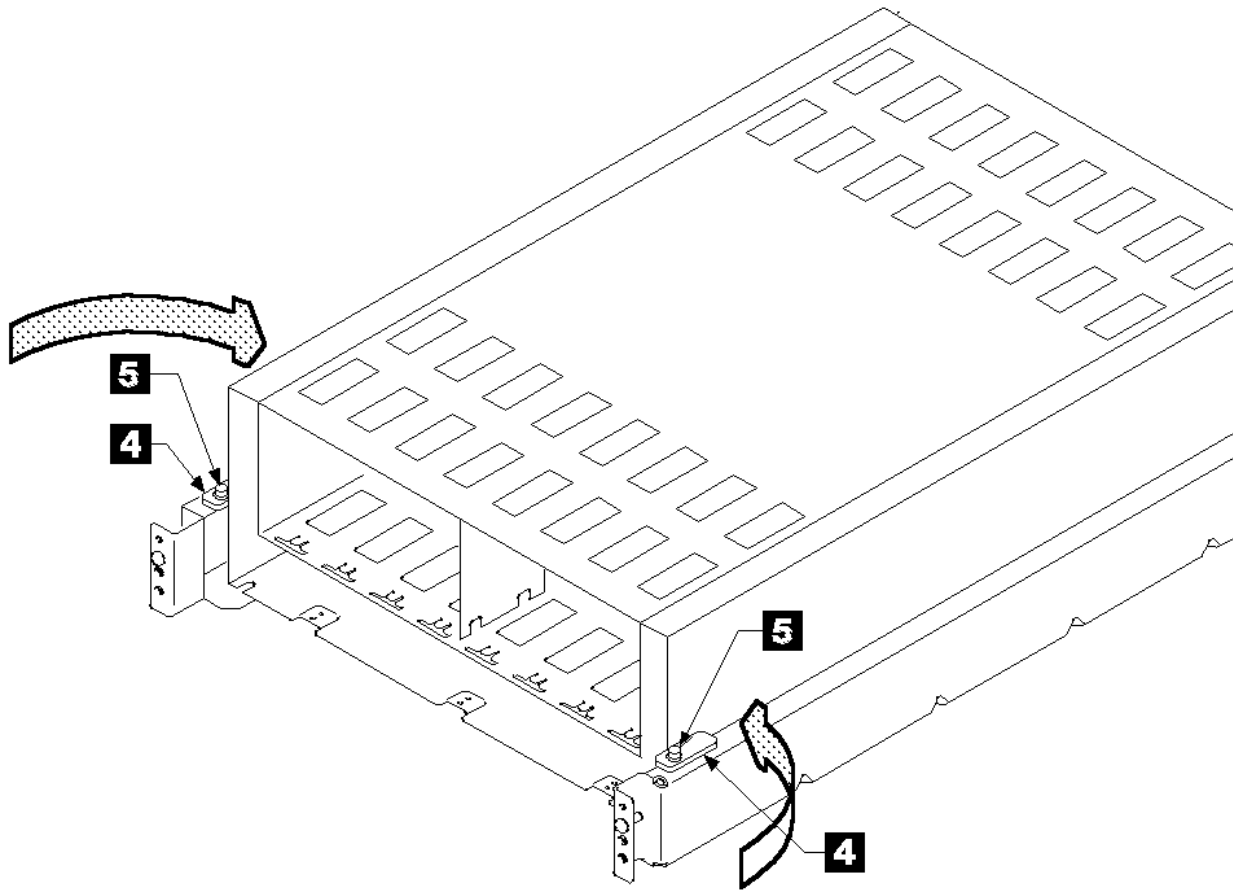
Stand at the front of the rack and, with aid from another person, place the back of the 7133 onto the support rails, then slide the 7133 into the rack.

3. Install the four front mounting screws 1 with their lock washers 2 and flat washers 3. Do not fully tighten the screws yet.



4. At the back of the rack, loosen the two screws 5, and turn the two clamp plates 4 inward so that they engage the slots in the sides of the 7133.

5. Tighten the two screws 5.



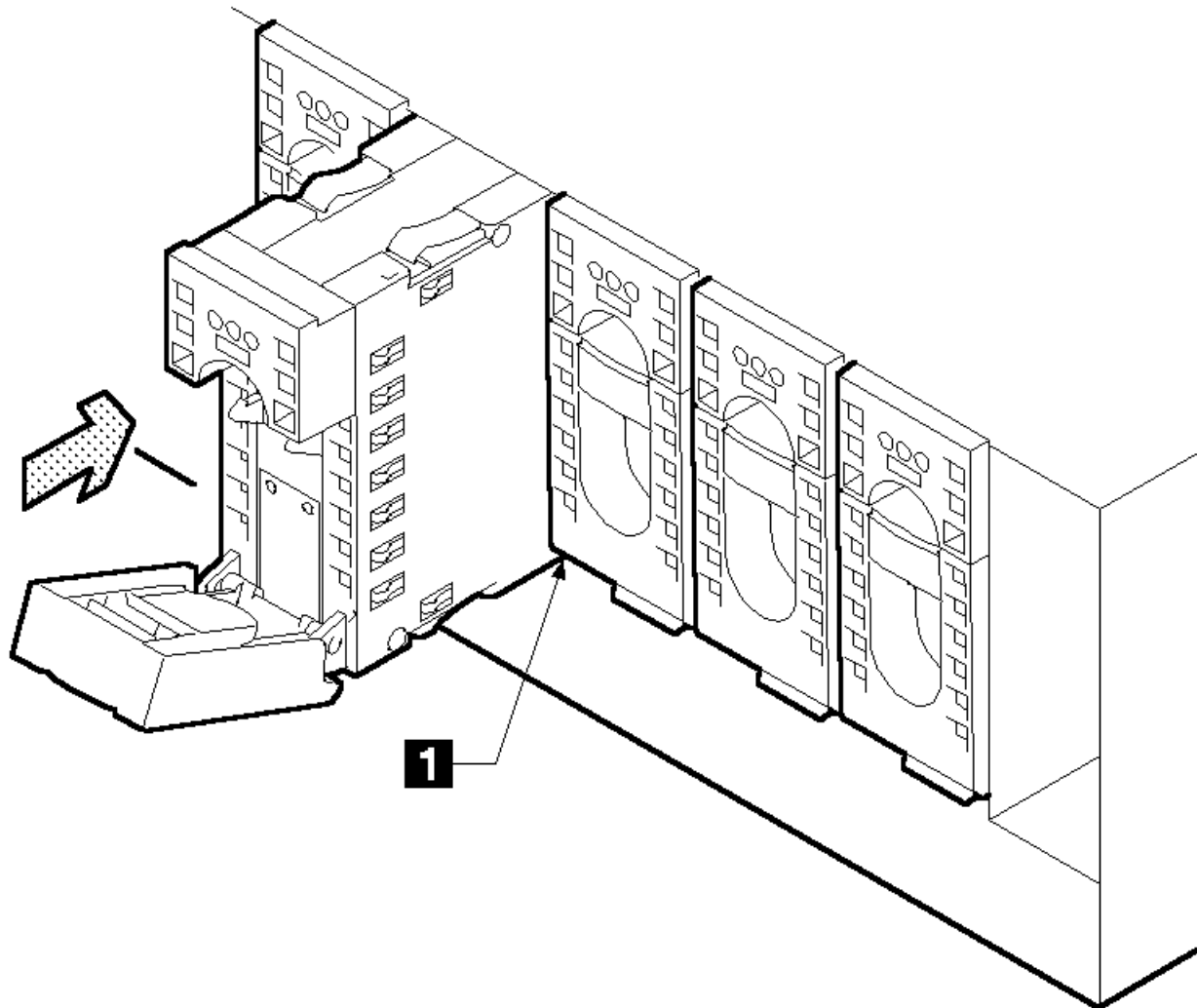
6. Fully tighten the four front mounting screws 1 .
7. Go to "Reinstalling the Disk Drive Modules and Dummy Disk Drive Modules" in topic 5.5.

5.5 Reinstalling the Disk Drive Modules and Dummy Disk Drive Modules

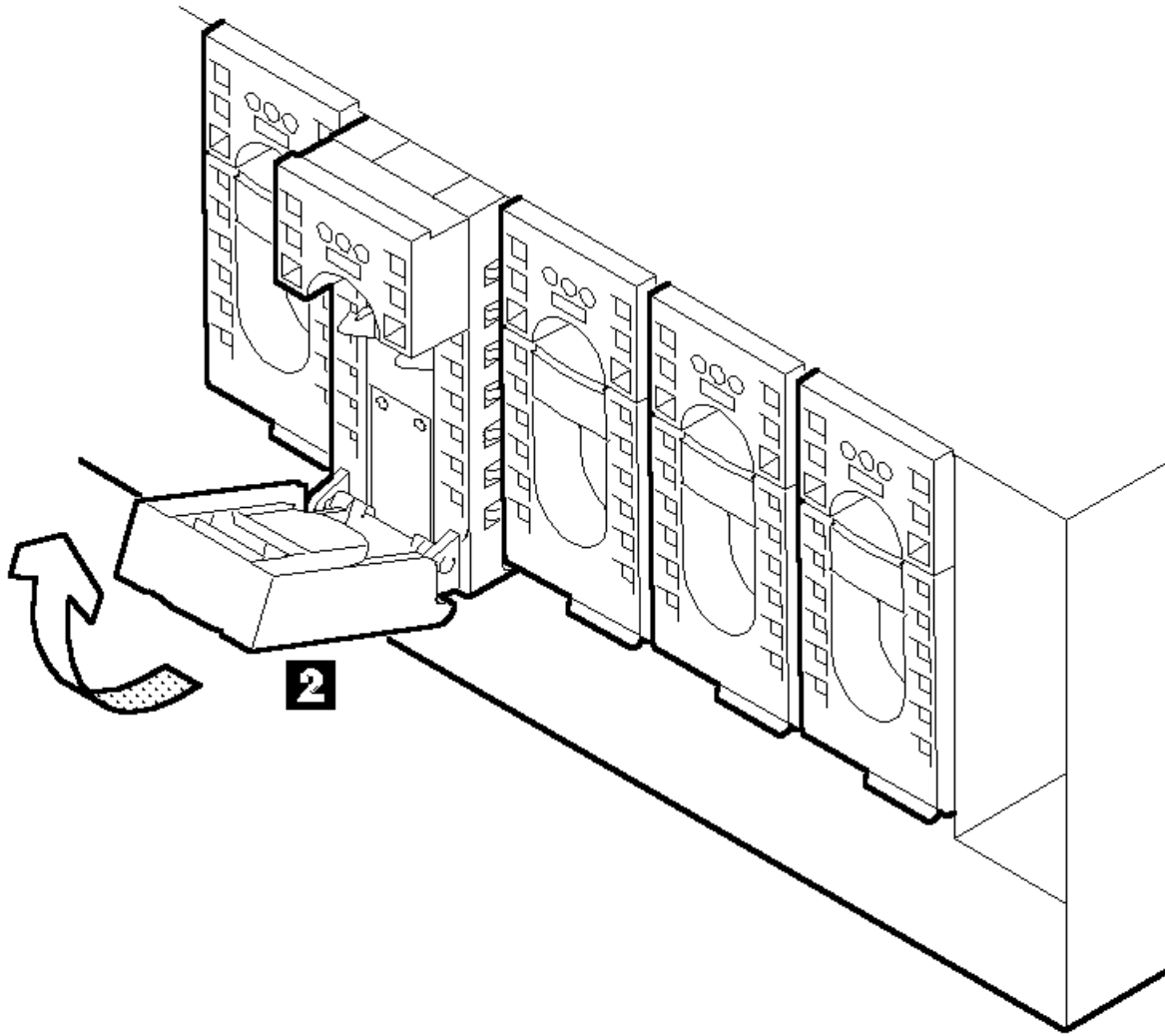
Attention:

- Disk drive modules are fragile. Handle them with care, and keep them well away from strong magnetic fields.
- Any slot that has no disk drive module installed *must* contain a dummy disk drive module. The dummy disk drive module provides continuity of the SSA loop, and ensures that the correct airflow is maintained around the disk drive modules in the other slots.

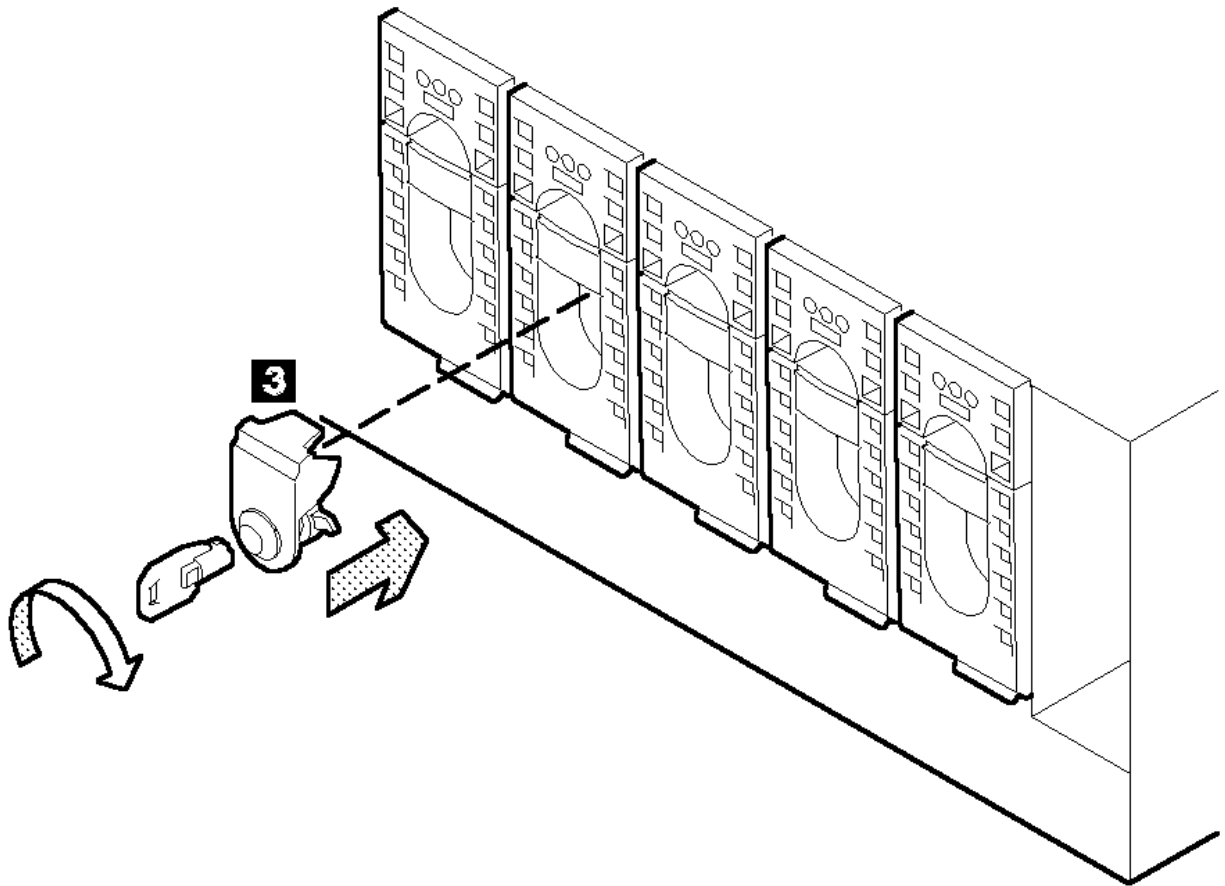
1. Referring to the note that you made about the original locations of the modules, reinstall the modules as described in the following steps.
2. With one hand giving support to the base of the module, engage the module in the groove 1, and push it into its slot. The module stops before it is completely into the slot.



3. Close the handle 2. Press it in until you hear a click. This action pulls the module completely into the slot.



4. If required, install the lock 3 and turn the key clockwise.



5. Repeat steps 2 through 4 for each disk drive module and dummy disk drive module. If the modules have locks, put the key into a safe place when you have finished.
6. **Attention:** Any slot that has no disk drive module installed *must* contain a dummy disk drive module. The dummy disk drive module provides continuity of the SSA loop, and ensures that the correct airflow is maintained around the disk drive modules in the other slots.

Ensure that the 7133 has no empty slots. Install dummy disk drive modules if necessary.

7. Go to Chapter 7, "Connecting the 7133 to the Using System" in topic 7.0.

6.0 Chapter 6. Installing a 7133 Model 500 or Model 600

This chapter describes how to start the installation of a 7133 Model 500 or Model 600 SSA Disk Subsystem. To complete the installation, you must also connect the 7133 to the using system, connect the 7133 to a power source, and turn on and test the subsystem; instructions for these actions are in the following chapters.

Subtopics

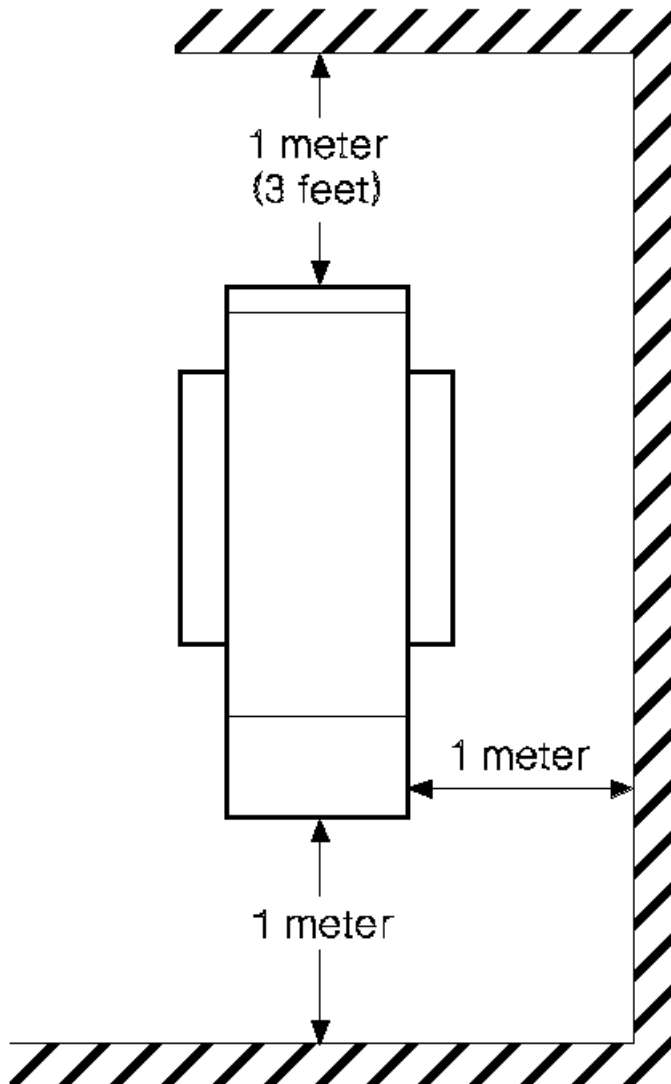
6.1 Locating the 7133

6.2 Preparing for the Installation

6.1 Locating the 7133

1. Ensure that the place where you are going to install the 7133 meets one of the following conditions:

- The necessary service clearances (shown in the following diagram) are provided around the 7133.
- The 7133 can easily be moved into a position that provides the necessary service clearances (shown in the following diagram).

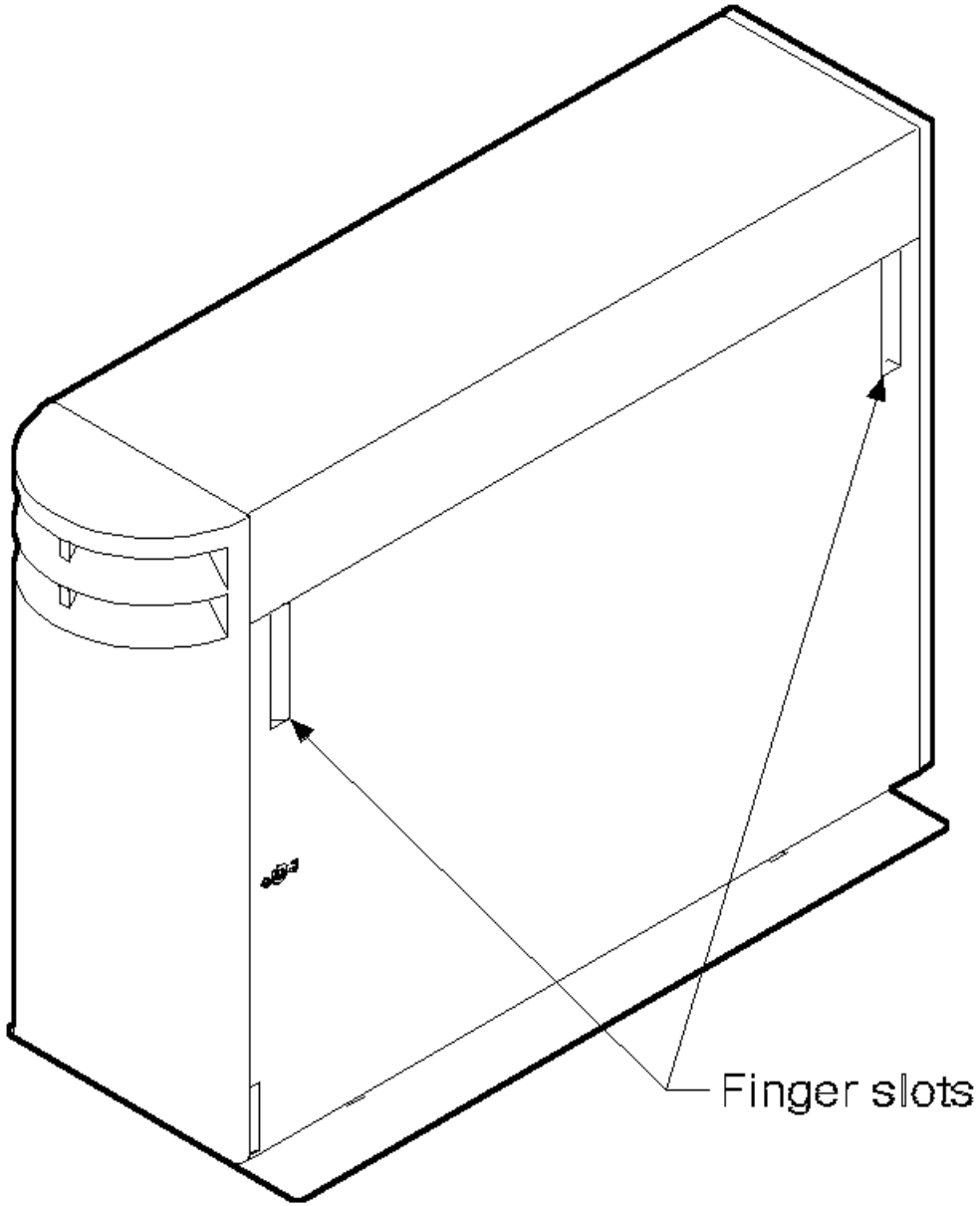


- The recommended operating temperature is 22°C (72°F) or lower. At lower temperatures, the risk of failure in the unit is reduced. If the operating temperature is above 22°C (72°F) for long periods of time, the unit is exposed to a greater risk of failure from external causes.

2. CAUTION:

The 7133 can weigh from 58.5 kg (129 lb) up to 72.5 kg (160 lb). *Do not attempt to lift it.*

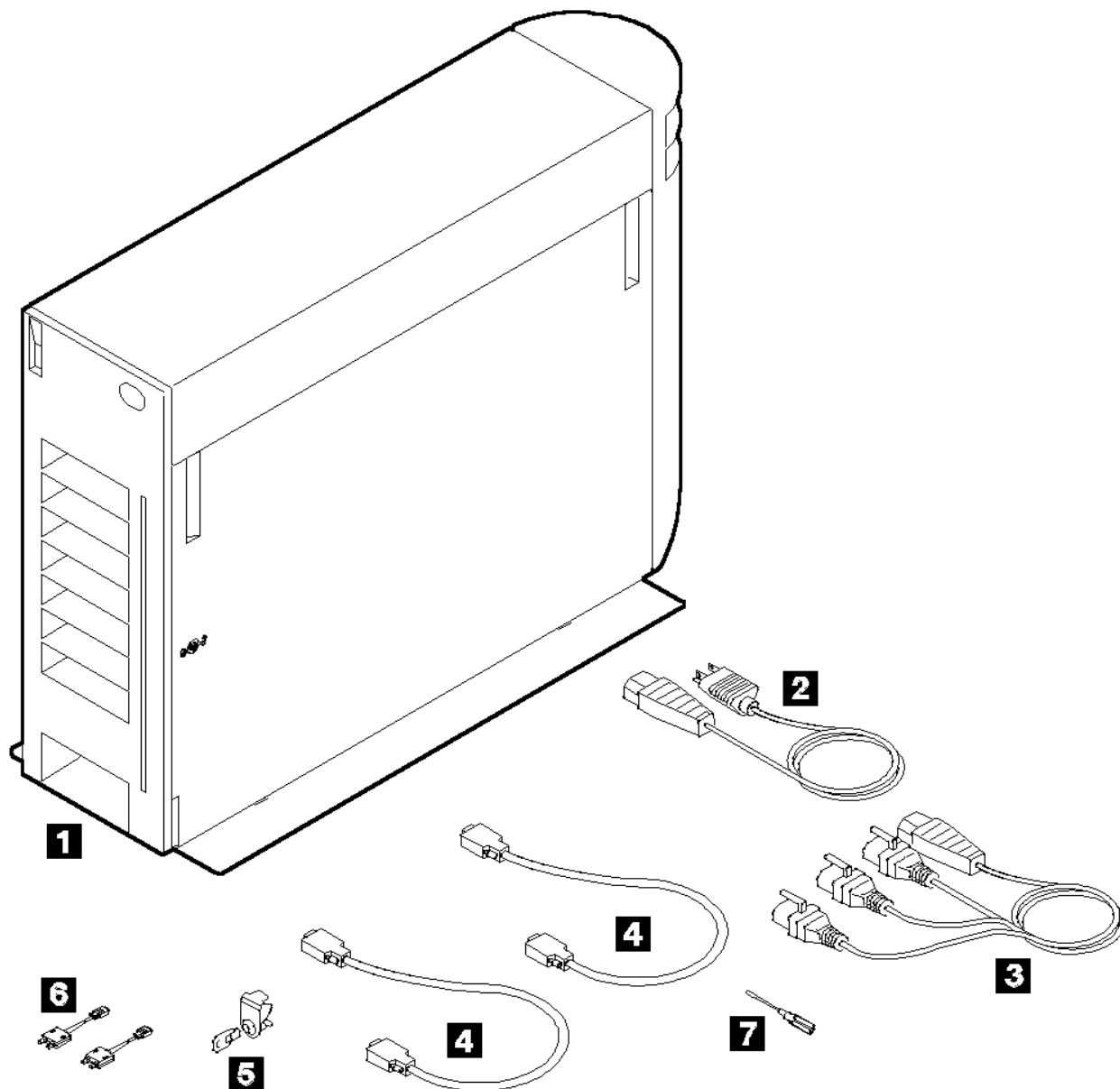
Move the 7133 into its operational position. Pull or push it in the required direction, using the finger slots 1 provided.



6.2 Preparing for the Installation

1. A detailed list of items is shipped with the 7133. Ensure that you have all the items that are shown on the list. Refer to the diagram below to identify the items.

1	7133 Model 500
2	Power cable
3	Three-way converter cable
4	SSA cables
5	Disk drive module locks (optional)
6	Fibre-Optic Extenders (optional)
7	SSA screwdriver



Note: If 7133 manuals other than this manual and the *7133 SSA Disk Subsystems for PC Servers: Hardware Maintenance Manual Supplement* are delivered with the 7133 unit, discard them; they refer to using the 7133 with other types of system.

2. Ensure that an SSA adapter is either available for installation, or already installed into the using system.

For information about the SSA adapter, see the *SSA RAID Adapters for PC Servers: Installation and User's Guide*.

3. If the 7133 has the Fibre-Optic Extender feature, Fibre-Optic Extenders (6 in the diagram) are provided. A wrap cable and adapter assembly is provided with each Fibre-Optic Extender. This assembly is used during diagnostic procedures. It consists of a fiber optic wrap cable and a fiber optic wrap adapter. The complete assembly is contained in a plastic bag. When not in use, the wrap cable and adapter assembly must be kept in its plastic bag in a safe place that is as close to the installed Fibre-Optic Extender as possible.

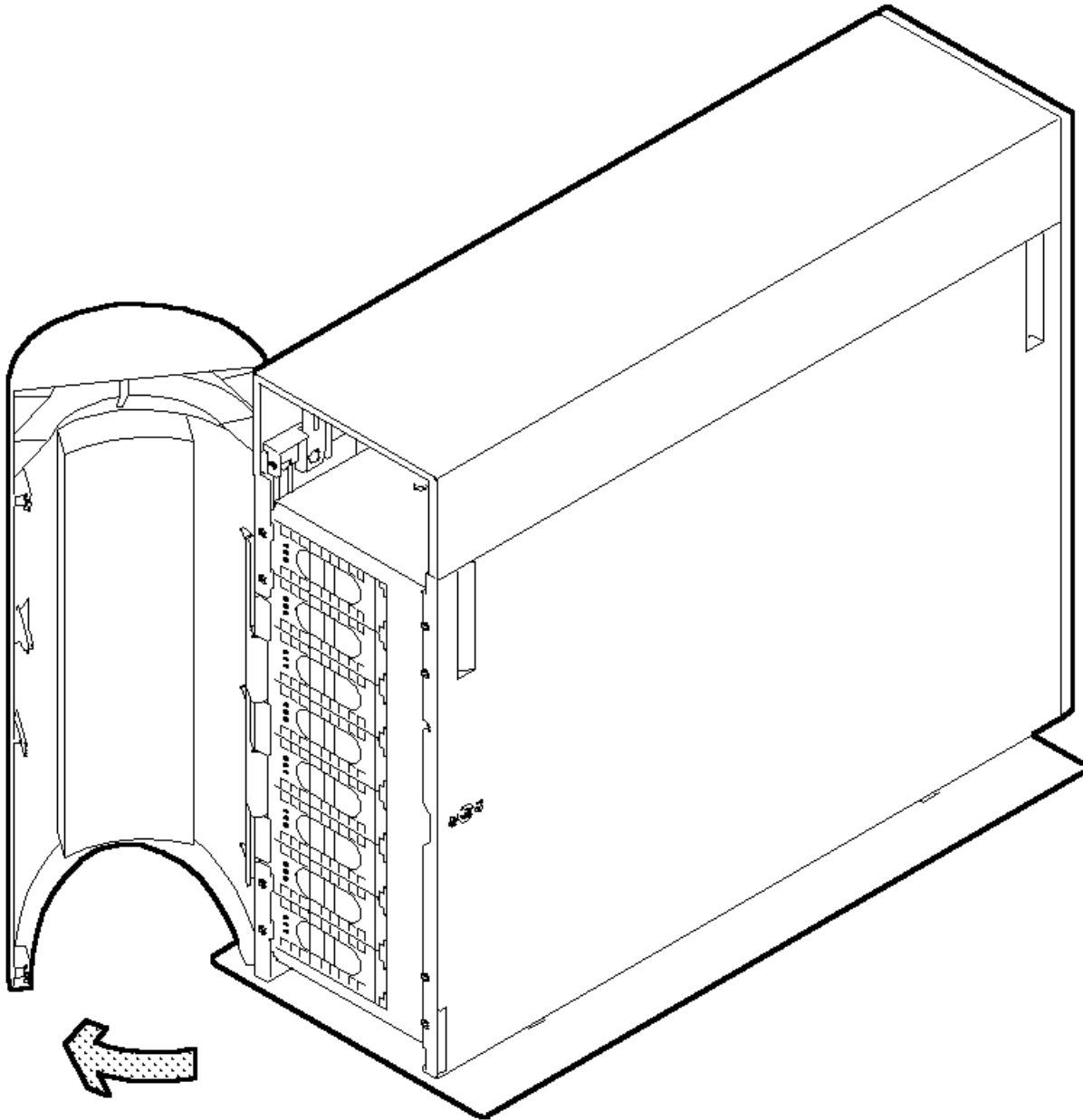
Because the fiber optic cables that connect the 7133 to an SSA adapter, or to another device, can be up to 2.4 kilometers (7874 feet) long, ensure that at least one wrap cable and adapter assembly is available at each end of the fiber optic cables.

4. Diskettes containing microcode for SSA adapters, for SSA disk drives, or for both, might be supplied with the 7133 and with the SSA adapter. If such diskettes are supplied, instructions for installing the microcode are supplied also. These instructions might not mention PC Servers; in which case, do not attempt to install the microcode. Use the instructions only if they do mention PC Servers.
5. Go to Chapter 7, "Connecting the 7133 to the Using System" in topic 7.0.

1. If you are connecting a Model 010 or Model 020, open the back door of the rack containing the 7133 unit.

If you are connecting a Model 500 or Model 600, open the back cover of the 7133 unit by:

- a. If necessary, unlocking the cover using the key provided
- b. Gripping the back cover on the right and hinging it to the left.



2. If the SSA adapter has not yet been installed into the using system, install it now (see the *SSA RAID Adapters for PC Servers: Installation and User's Guide*).
3. The disk drive modules of a 7133 are connected to the SSA adapter, or to other devices, by way of SSA loops. Before you go any further in these instructions, read carefully the following note.

Important Note:

Rules for SSA Loops:

For SSA loops that include the SSA RAID Adapter for PC Servers, the following rules apply:

- Each SSA loop must be connected to a valid pair of connectors on the SSA adapter (that is, either connectors A1 and A2, or

connectors B1 and B2).

- A maximum of 48 devices can be connected in a particular SSA loop.
- Only one pair of adapter connectors can be connected in a particular SSA loop.

SSA loops that include the disk drive modules of a 7133 must also follow these additional rules:

- A maximum of three neighboring dummy disk drive modules can be connected in a particular SSA loop.
- The maximum permitted length for an external SSA cable that connects two SSA nodes (for example, disk drives) is 25 meters (82 feet).
- The maximum permitted length for an external fiber optic cable that connects two SSA nodes (for example, disk drives) is 2.4 kilometers (7874 feet).

4. If the 7133 is a Model 010 or 500, go to step 6.

If the 7133 is a Model 020 or 600, go to step 5.

5. The SSA connectors at the back of the 7133 Model 020 are mounted on four bypass cards. These bypass cards can set up in Bypass mode or in Forced Inline mode. "Bypass Cards" in topic 10.5 describes these modes and when Forced Inline mode should be used. The mode in which the card operates is set by two jumpers. The default setting is for Bypass mode. You can change the mode by swapping the positions of the two jumpers.

Refer to your plan for the subsystem configuration, and check whether all four bypass cards are to remain in Bypass mode.

Note: The cards need not all be in the same mode.

If the cards are to remain in Bypass mode, take no further action. Go to step 6.

If any card is to be changed to Forced Inline mode, go to "Changing the Jumpers on a Bypass Card" in topic 10.6, and make the change. When you have finished, return here, and go to step 6.

6. If the 7133 is a Model 010 or 020 that was already installed in the rack when it was delivered, go to step 7.

If the 7133 is a Model 010 or 020 that you have just installed into a rack, or a Model 500 or 600, go to step 8.

7. Refer to your plan for the subsystem configuration, and verify that the 7133 has been connected to the using system as required. For some configurations, you might need to install additional cables.

If you need to install additional cables, go to "Connecting SSA Cables" in topic 7.1 or to "Installing and Connecting Fibre-Optic Extenders" in topic 7.2, as required for the configuration.

If all the cables have been installed, go to Chapter 8, "Turning On and Testing the 7133" in topic 8.0.

8. Refer to your plan for the subsystem configuration, and verify that the rules for SSA configurations have been observed (the rules for SSA loop are given in topic 7.0). When you have verified this, go to "Connecting SSA Cables" in topic 7.1 or to "Installing and Connecting Fibre-Optic Extenders" in topic 7.2, as required for the configuration.

Note: If you do not have a plan for the configuration, choose one of the example configurations that are shown in Chapter 9, "Example Configurations" in topic 9.0, then go to "Connecting SSA Cables" in topic 7.1 or to "Installing and Connecting Fibre-Optic Extenders" in topic 7.2, as required.

Subtopics

7.1 Connecting SSA Cables

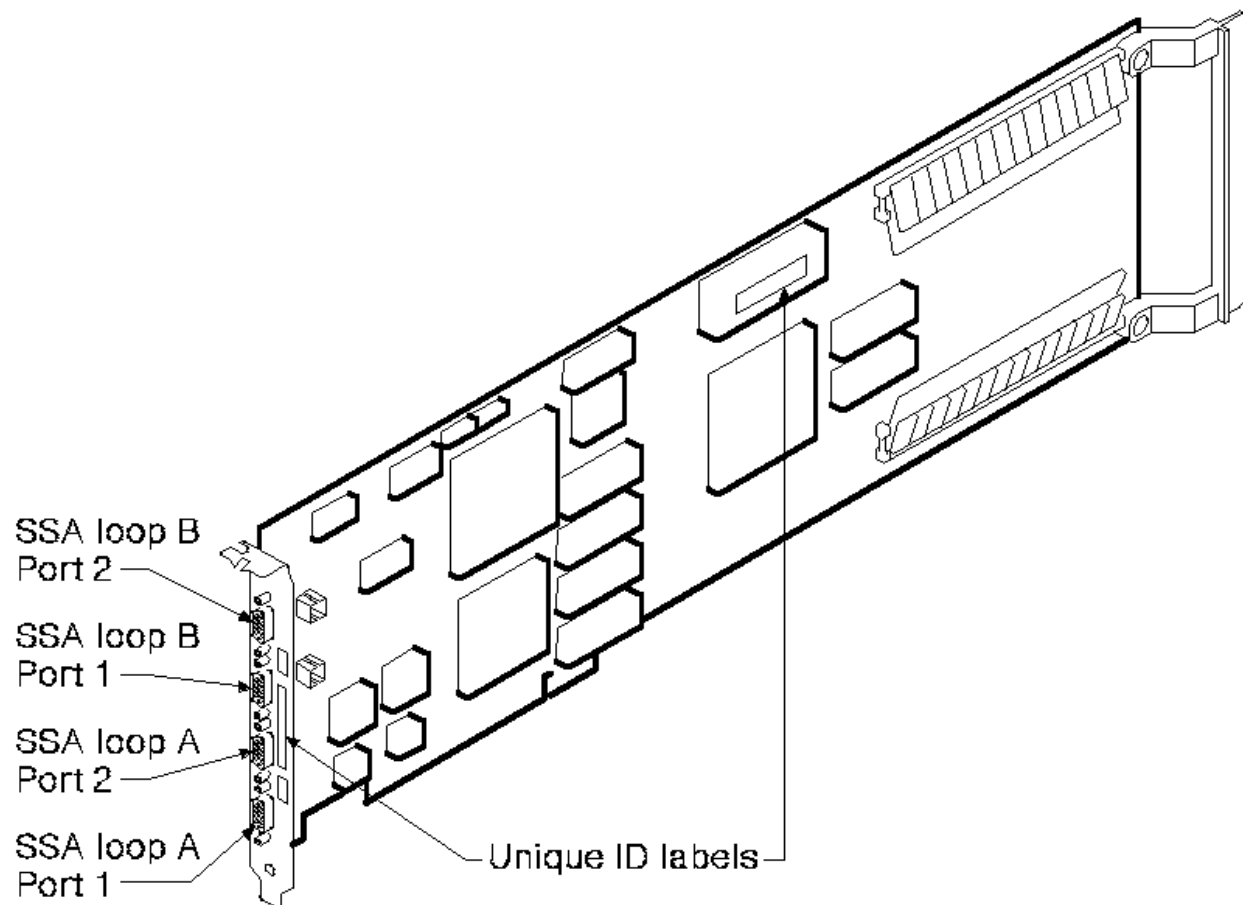
7.2 Installing and Connecting Fibre-Optic Extenders

7.1 Connecting SSA Cables

Note: For details of SSA cables, see "SSA Cables" in topic 9.3.

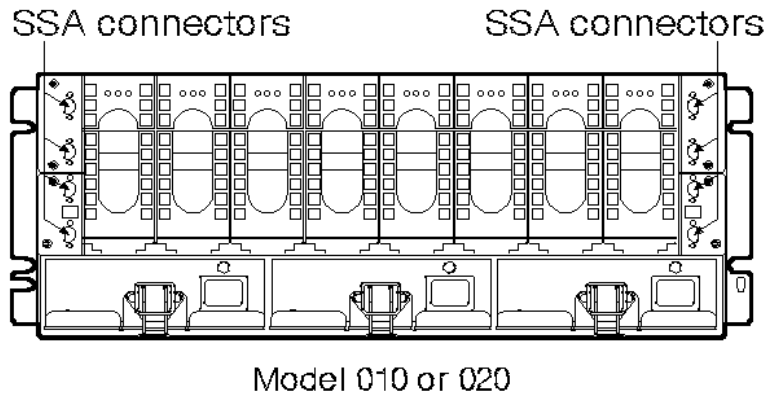
1. Attach identification labels to the SSA cables.
2. Find the SSA adapter in the using system.
3. Using your plan for the subsystem configuration and the information from step 3 in topic 7.0, plug one end of each SSA cable into the appropriate connector on the SSA adapter. Ensure that you tighten the screws on the cable connectors.

Note: To prevent damage to the SSA connector screws, ensure that you use the special screwdriver (SSA tool, part 32H7059) to tighten them. The screwdriver is supplied with the 7133.

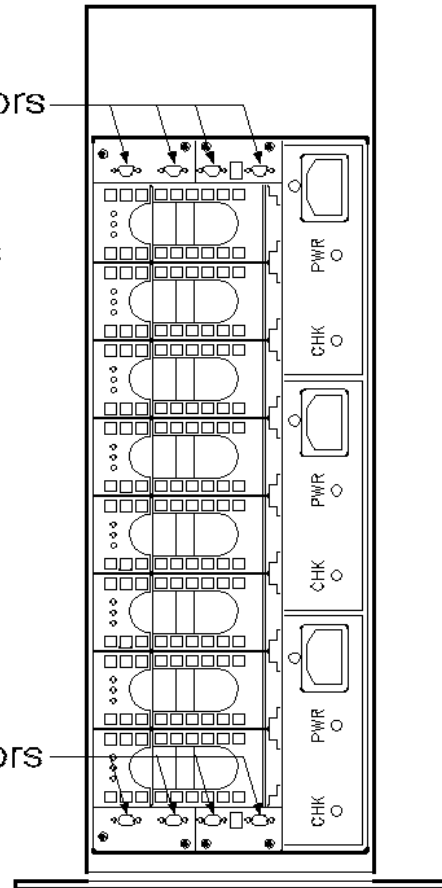


4. Using your plan for the subsystem configuration and the information from step 3 in topic 7.0, plug the other end of each SSA cable into the appropriate connector at the back of the 7133. Ensure that you tighten the screws on the cable connectors.

Note: To prevent damage to the SSA connector screws, ensure that you use the special screwdriver (SSA tool, part 32H7059) to tighten them. The screwdriver is supplied with the 7133.



SSA connectors



5. Ensure that all the SSA cables are correctly connected.
6. If you are also connecting the 7133 to fiber optic cables, but have not done so yet, go to "Installing and Connecting Fibre-Optic Extenders" in topic 7.2. Otherwise, go to Chapter 8, "Turning On and Testing the 7133" in topic 8.0.

7.2 Installing and Connecting Fibre-Optic Extenders

1. Using your plan for the subsystem configuration and the information from step 3 in topic 7.0, determine how the cables are to be connected to the using system, to the 7133, or to other devices.

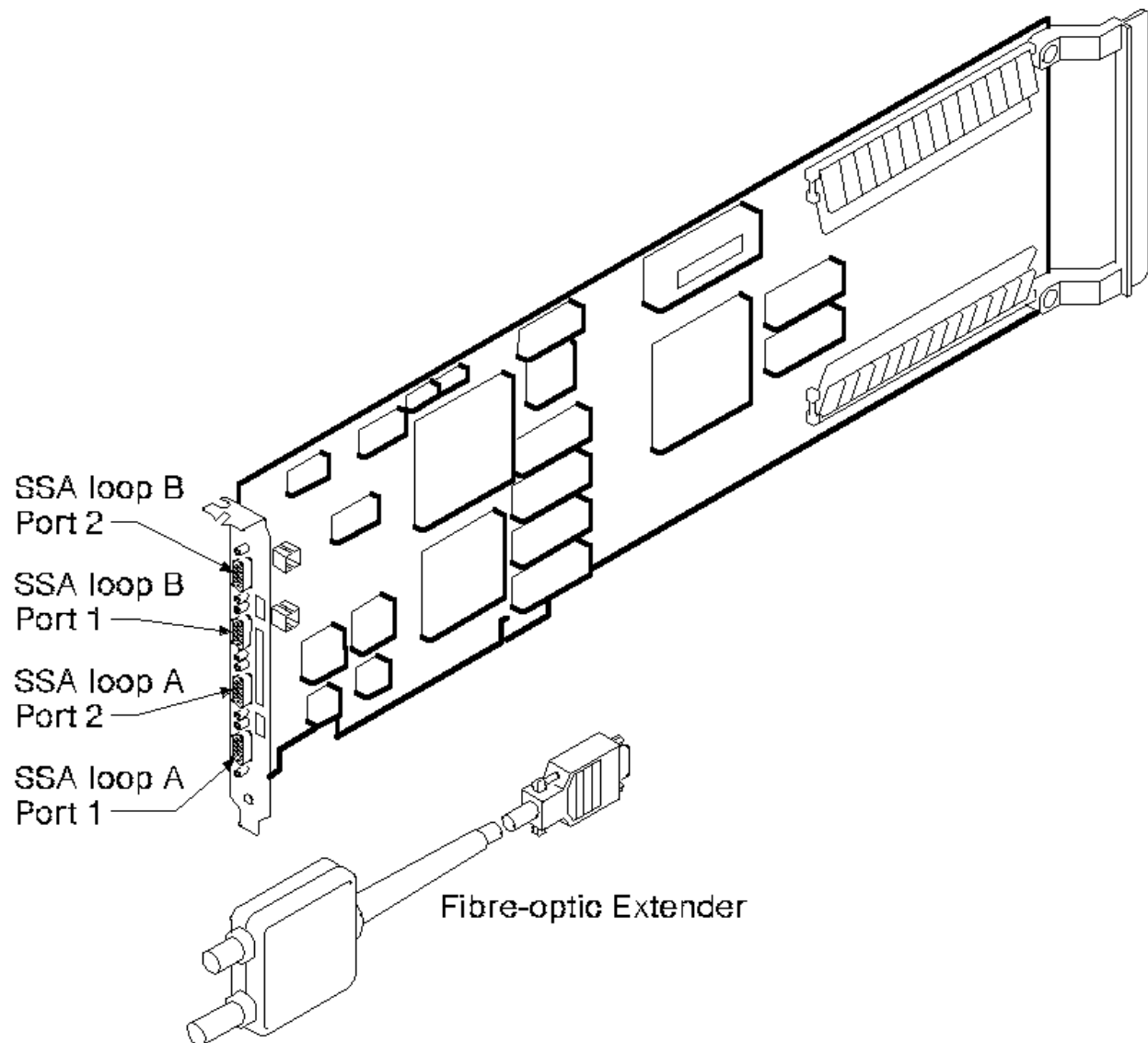
Note: The fiber optic cables can be up to 2.4 kilometers (7874 feet) long. We recommend that you complete the installation at one end of the fiber optic cables before you start work at the other end.

2. If you are connecting fiber optic cables to the using system, go to step 3. Otherwise, go to step 10.
3. When the fiber optic cables were installed, they were marked with some type of identification to enable you to recognize opposite ends of the same cable.

Attach identification labels to the fiber optic cables.

4. At the using system, plug the Fibre-Optic Extenders into the appropriate connectors on the SSA adapter. Ensure that you tighten the screws on the connector of each Fibre-Optic Extender.

Note: To prevent damage to the SSA connector screws, ensure that you use the special screwdriver (SSA tool, part 32H7059) to tighten them. The screwdriver is supplied with the 7133.

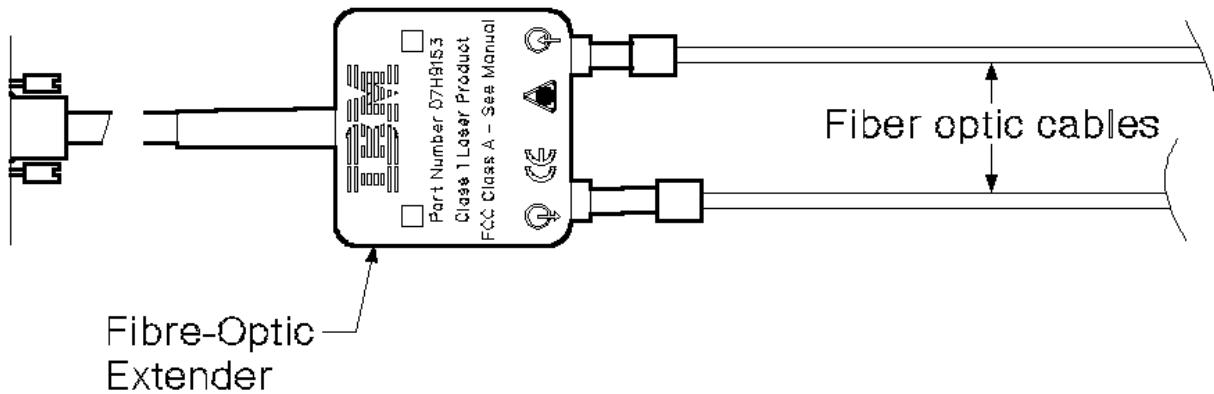


5. Attention:

- The two bayonet connectors of a Fibre-Optic Extender are of different lengths. Ensure that each fiber optic cable is connected between the shorter (Receive) connector of one Fibre-Optic Extender and the longer (Transmit) connector of the other Fibre-Optic Extender.

- Before connecting fiber optic cables and devices, ensure that the end faces of the cables are clean.

Connect the fiber optic cables to each Fibre-Optic Extender.



Note: The fiber optic cables have:

- An inner connector with an alignment lug that engages a slot in the connector of the Fibre-Optic Extender
- An outer, bayonet (push-and-twist) connector that locks the cable to the Fibre-Optic Extender.

To connect a fiber optic cable:

- Push it into the connector of the Fibre-Optic Extender. As you push the cable, use a twisting motion to ensure that the alignment lug engages the slot in the connector of the Fibre-Optic Extender
- Fasten the bayonet connector in the normal way.

If you cannot fasten the bayonet connector, disconnect the cable, and try again.

6. Ensure that all fiber optic cables and SSA cables, if present, are correctly connected to the adapter.

7. **Attention:** Excessive movement at connections in a fiber optic link might cause link errors.

Ensure that the fiber optic cables are held tightly by cable ties to prevent strain and movement at the Fibre-Optic Extenders.

8. If not already done, put the wrap cable and adapter assembly into its plastic bag, and put the bag into a safe place that is as close to the Fibre-Optic Extender as possible.

9. If you have not yet connected the other end of the fiber optic cables to the 7133, go to step 10.

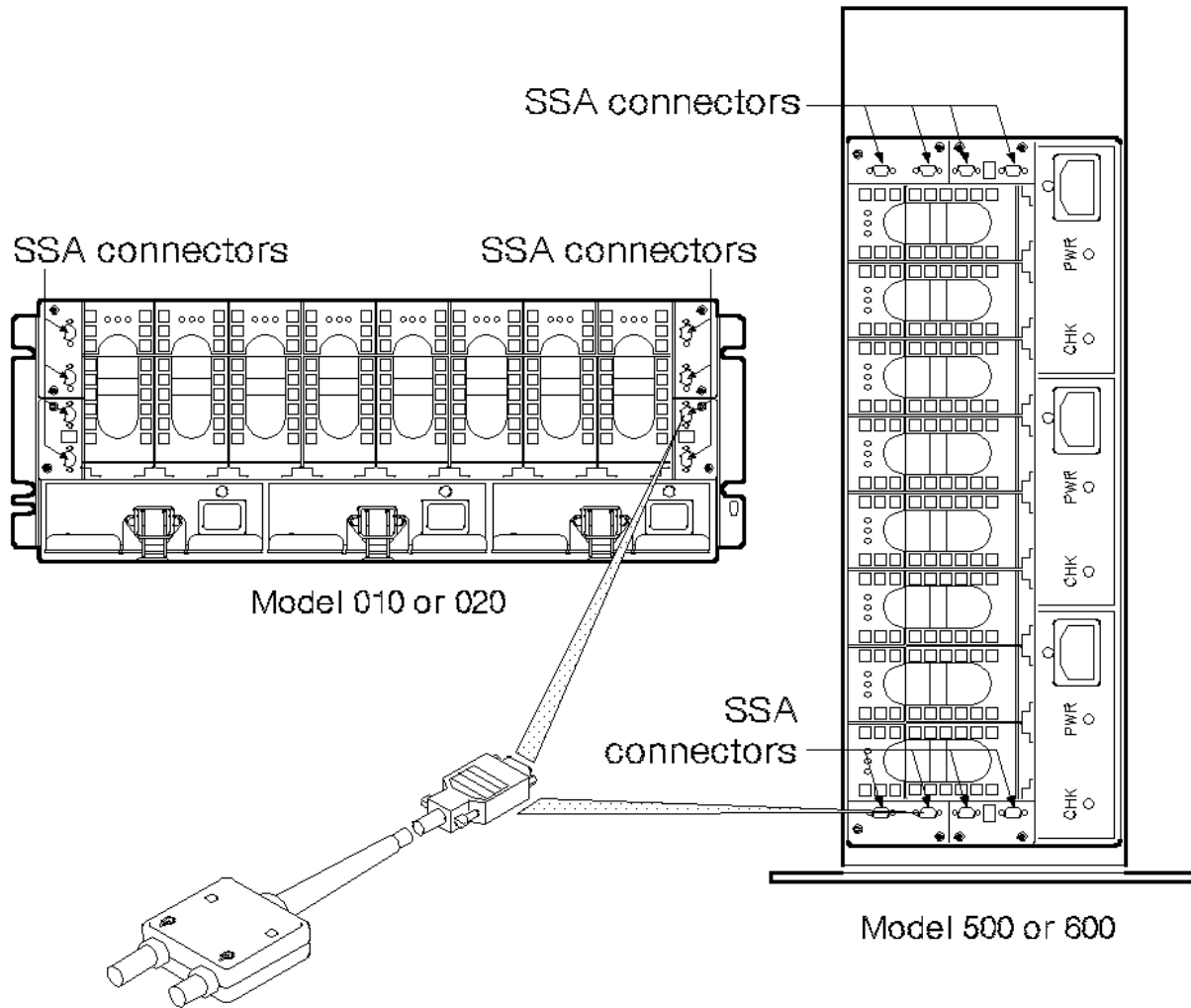
If you have connected both ends of the fiber optic cables, go to step 18.

10. When the fiber optic cables were installed, they were marked with some type of identification to enable you to recognize opposite ends of the same cable.

Attach identification labels to the fiber optic cables.

11. At the back of the 7133, plug the Fibre-Optic Extenders into the appropriate SSA connectors. Ensure that you tighten the screws on the connector of each Fibre-Optic Extender.

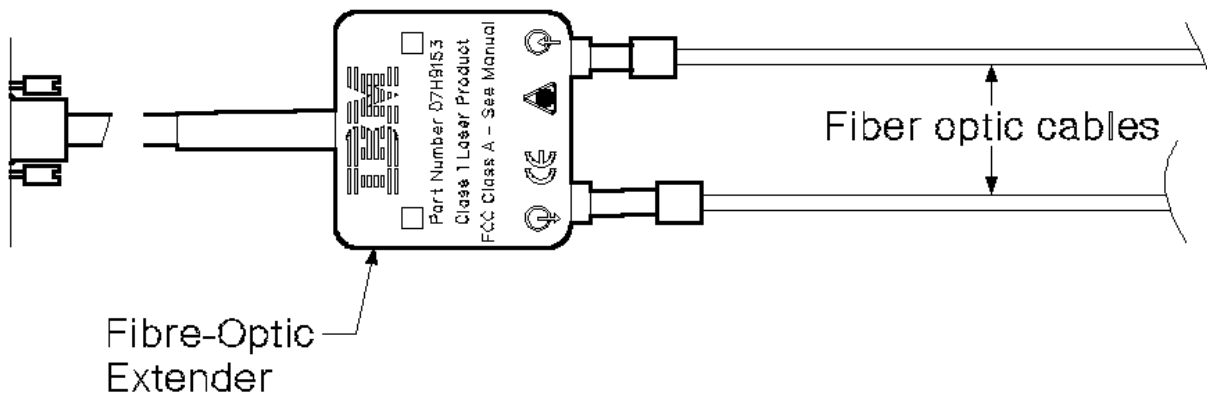
Note: To prevent damage to the SSA connector screws, ensure that you use the special screwdriver (SSA tool, part 32H7059) to tighten them. The screwdriver is supplied with the 7133.



12. Attention:

- The two bayonet connectors of a Fibre-Optic Extender are of different lengths. Ensure that each fiber optic cable is connected between the shorter (Receive) connector of one Fibre-Optic Extender and the longer (Transmit) connector of the other Fibre-Optic Extender.
- Before connecting fiber optic cables and devices, ensure that the end faces of the cables are clean.

Connect the fiber optic cables to each Fibre-Optic Extender.



Note: The fiber optic cables have:

- An inner connector with an alignment lug that engages a slot in the connector of the Fibre-Optic Extender

- An outer, bayonet (push-and-twist) connector that locks the cable to the Fibre-Optic Extender.

To connect a fiber optic cable:

- a. Push it into the connector of the Fibre-Optic Extender. As you push the cable, use a twisting motion to ensure that the alignment lug engages the slot in the connector of the Fibre-Optic Extender
- b. Fasten the bayonet connector in the normal way.

If you cannot fasten the bayonet connector, disconnect the cable, and try again.

13. Ensure that all fiber optic cables and SSA cables, if present, are correctly connected.

14. Attention: Excessive movement at connections in a fiber optic link might cause link errors.

Ensure that the fiber optic cables are held tightly by cable ties to prevent strain and movement at the Fibre-Optic Extenders.

15. If not already done, put the wrap cable and adapter assembly into its plastic bag, and put the bag into a safe place that is as close to the Fibre-Optic Extender as possible.

16. If you have not yet connected the other end of the fiber optic cables, go to step 17.

If you have connected both ends of the fiber optic cables, go to step 18.

17. If you are connecting the other end of the fiber optic cables to a using system, go to step 3.

If you are connecting the other end of the fiber optic cables to a 7133, return to step 10.

18. If you are also connecting the 7133 to SSA cables, but have not done so yet, go to "Connecting SSA Cables" in topic 7.1. Otherwise, go to Chapter 8, "Turning On and Testing the 7133" in topic 8.0.

8.0 Chapter 8. Turning On and Testing the 7133

This chapter describes how to connect the 7133 to mainline electrical power and how to test that the subsystem is ready to work with your system.

Subtopics

8.1 Connecting the 7133 to the Power Source

8.2 Testing the Subsystem

8.1 Connecting the 7133 to the Power Source

For Models 500 and 600, go to step 1 in topic 8.1.2. For Models 010 and 020, start at step 1 below.

Subtopics

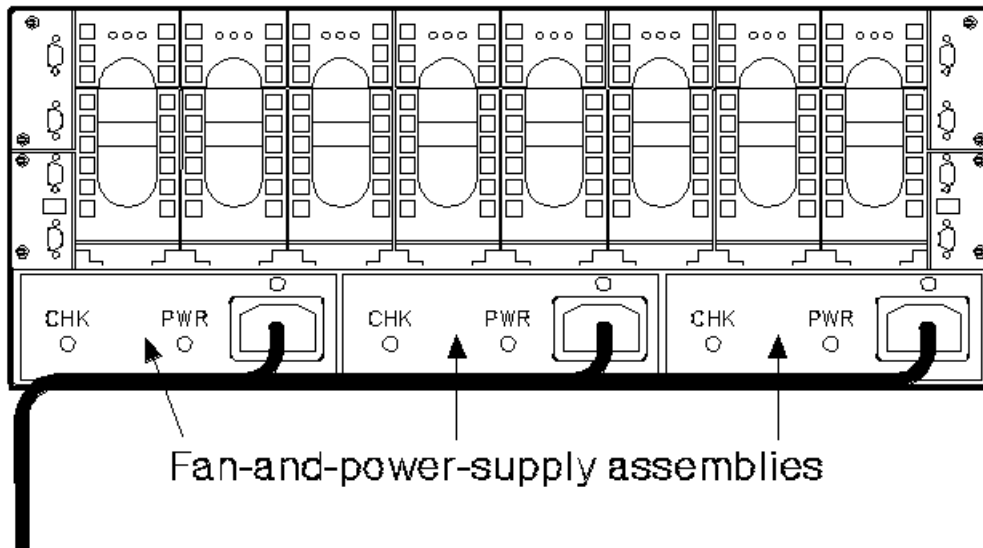
8.1.1 Models 010 and 020

8.1.2 Models 500 and 600

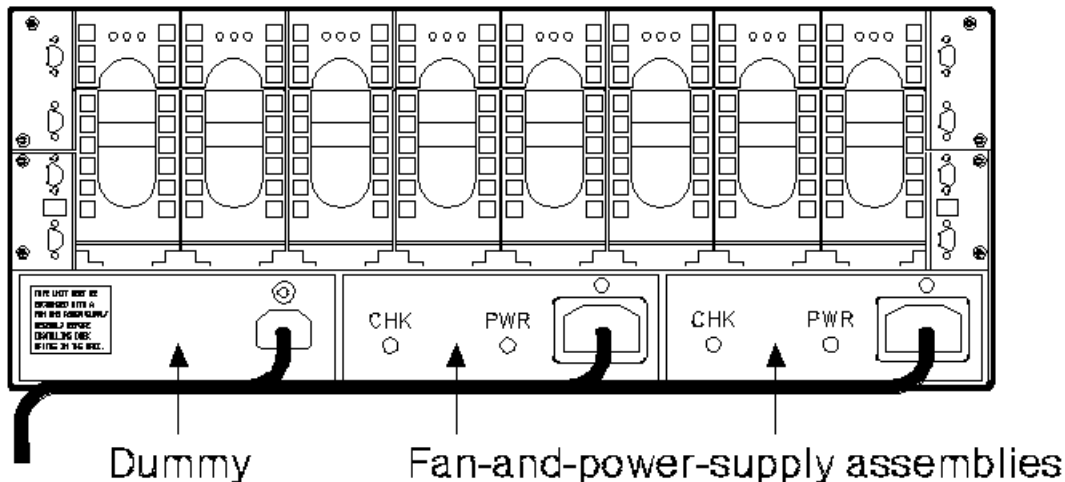
8.1.1 Models 010 and 020

1. Observe the back of the 7133.

- If the 7133 has three fan-and-power-supply assemblies, connect one plug of the three-way power cable to each fan-and-power-supply assembly.

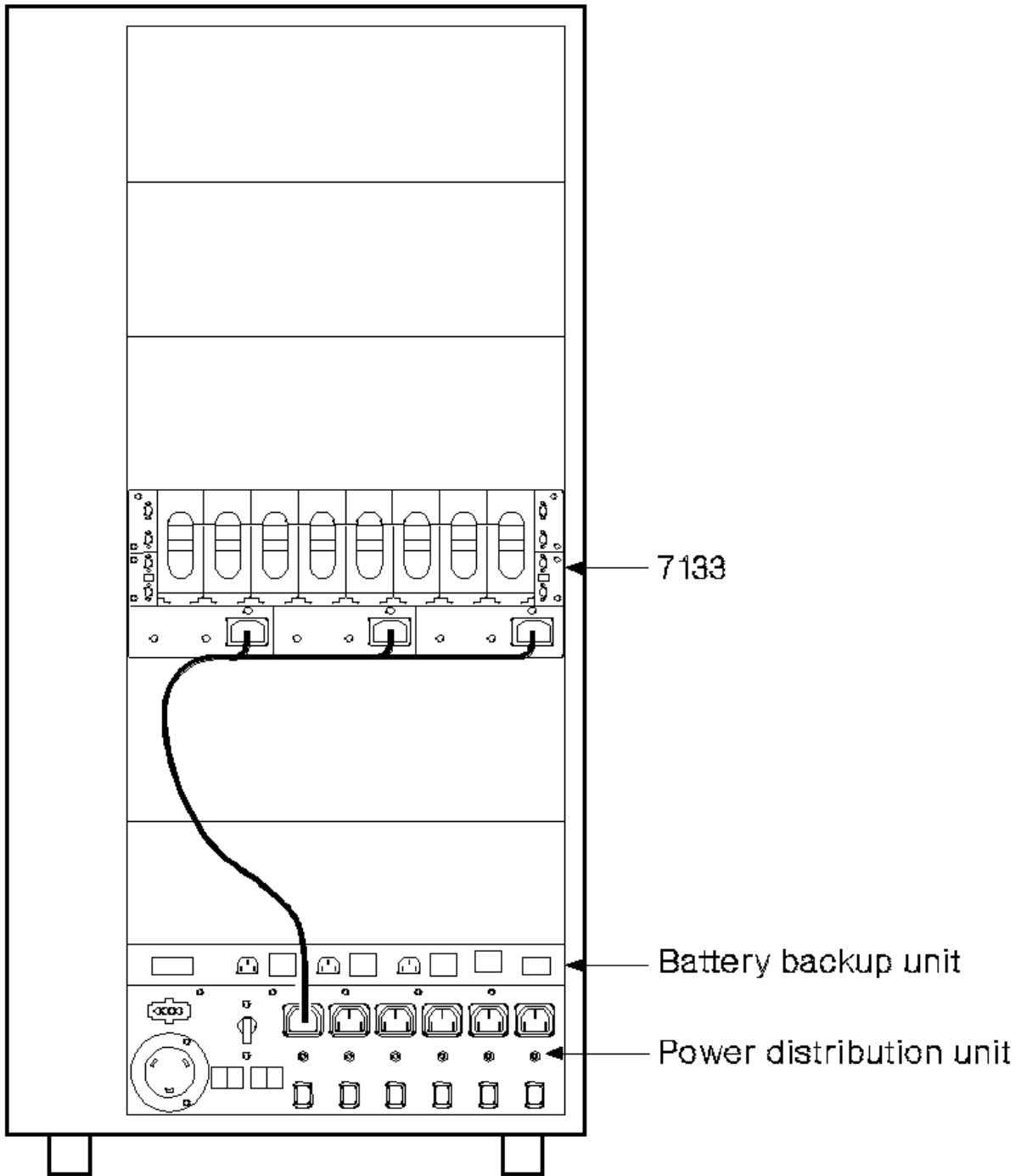


- If the 7133 has two fan-and-power-supply assemblies and a dummy fan-and-power-supply assembly:
 - a. Connect one plug of the three-way power cable to each fan-and-power-supply assembly.
 - b. Insert the remaining plug into the hole in the dummy fan-and-power-supply assembly.



2. Plug the other end of the power cable into the power distribution unit or battery backup unit at the back of the rack. (In the diagram, the power cable is shown plugged into the power distribution unit.)

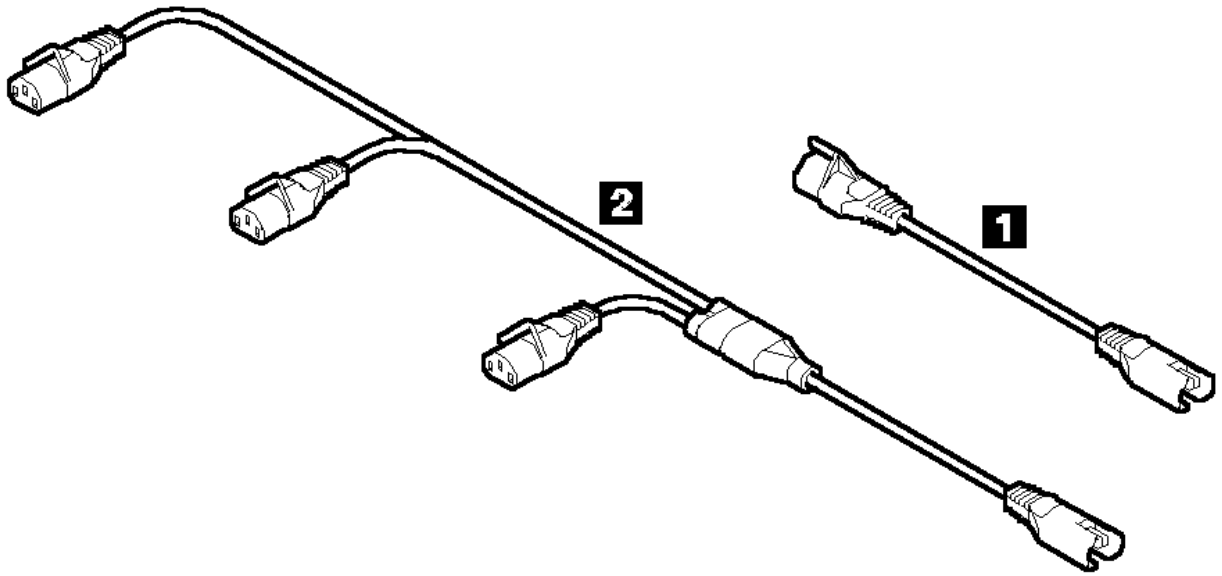
Note: The battery backup unit might not be present. If it is present, use it only if required by the subsystem configuration.



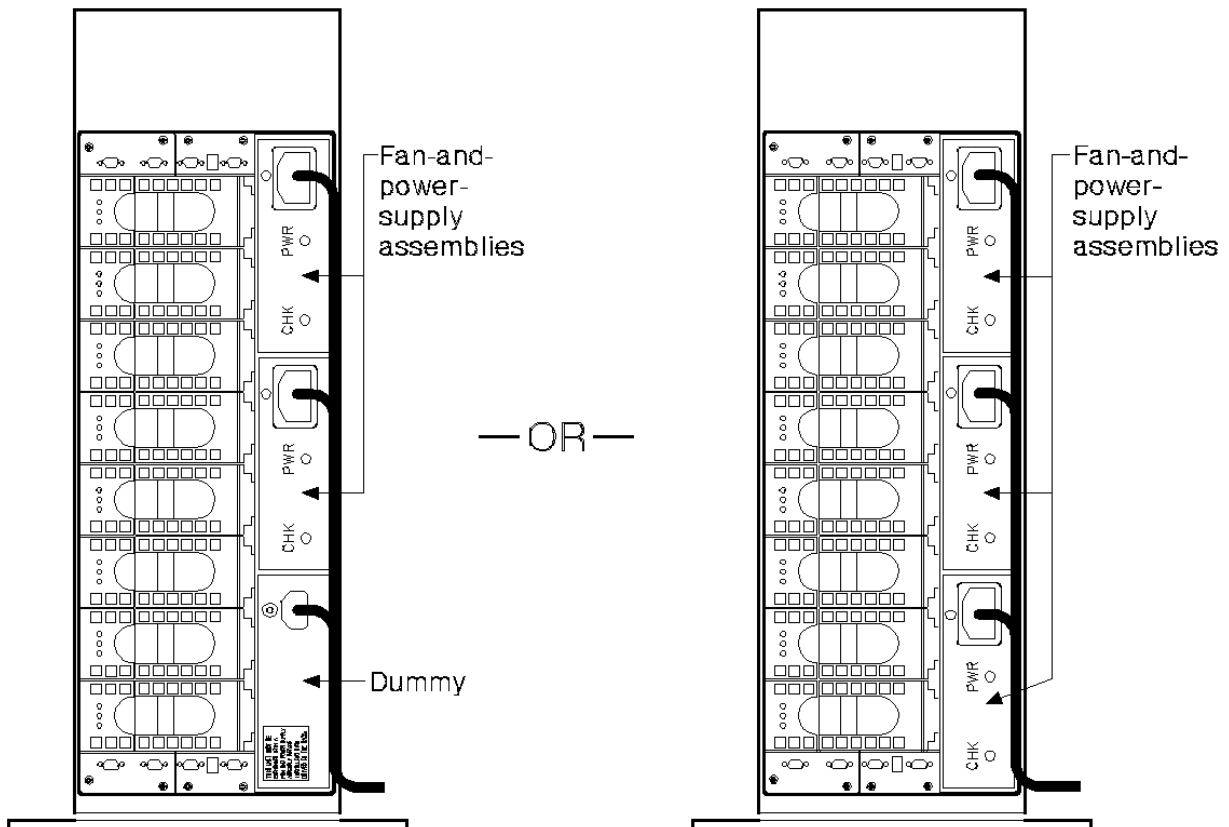
3. Go to "Testing the Subsystem" in topic 8.2.

8.1.2 Models 500 and 600

1. The 7133 is supplied with a power cable and plug 1 that is suitable for your country, and a three-way converter cable 2. Connect the three-way converter cable to the power cable to make a three-way power cable.



2. Observe the back of the 7133.



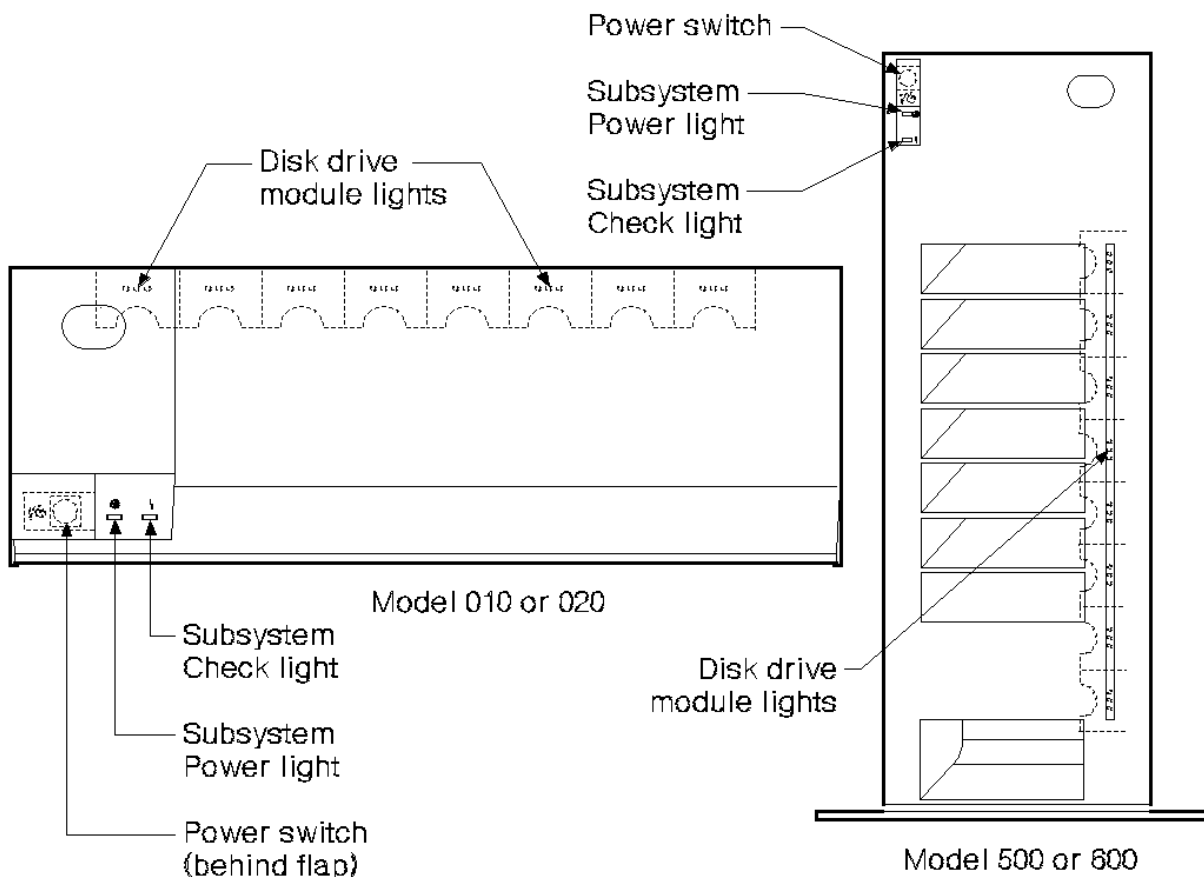
- If the 7133 has two fan-and-power-supply assemblies and a dummy fan-and-power-supply assembly:
 - a. Connect one plug of the three-way power cable to each fan-and-power-supply assembly.
 - b. Insert the remaining plug into the hole in the dummy fan-and-power-supply assembly.
 - If the 7133 has three fan-and-power-supply assemblies, connect one plug of the three-way power cable to each fan-and-power-supply assembly.
3. Plug the power cable into the mainline electrical power outlet. If the power outlet has a switch, turn it on.
 4. Go to "Testing the Subsystem" in topic 8.2.

8.2 Testing the Subsystem

1. For Models 010 and 020, if the power to the rack is turned off, turn it on.
2. If the power to the using system is turned off, turn it on.
3. If the Subsystem Power light is on, and the Subsystem Check light is off, go to step 6.

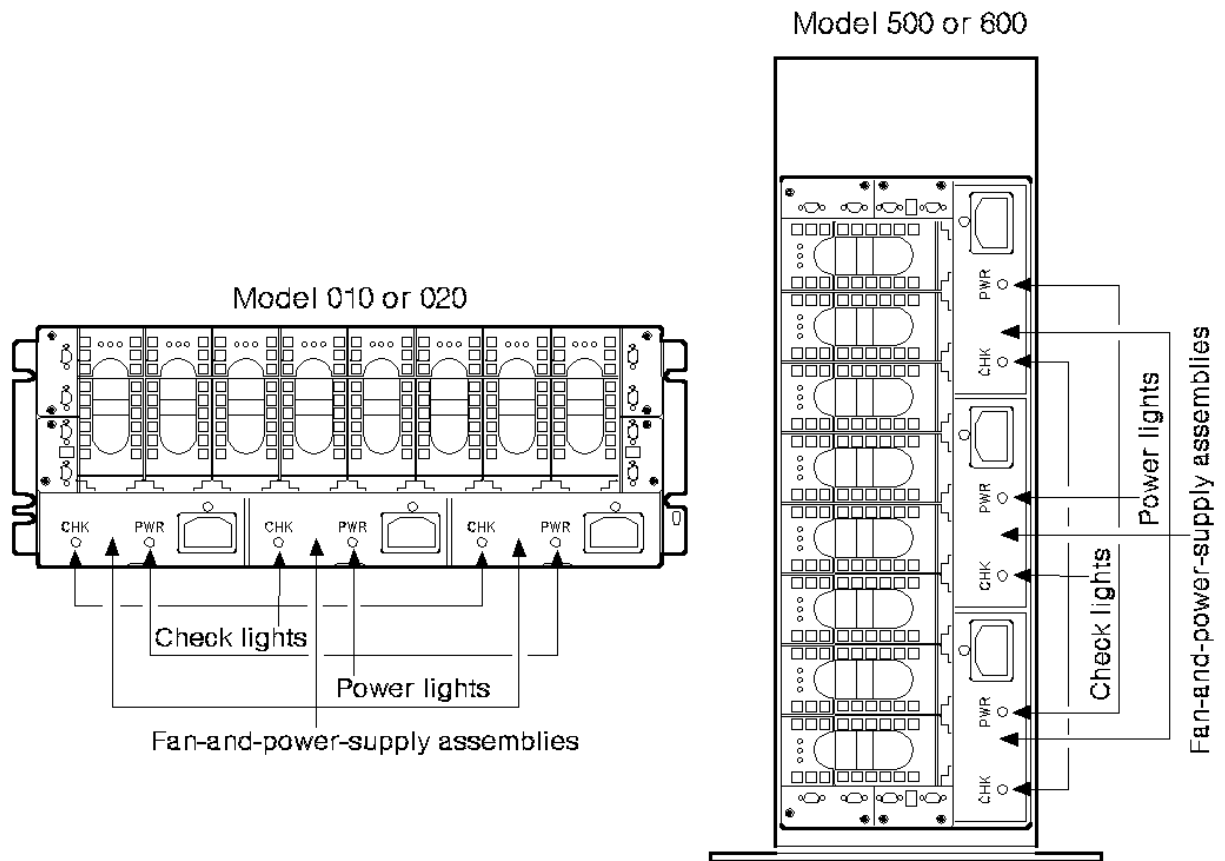
If the Subsystem Power light is not on, go to step 4.

If the Subsystem Check light is on, go to "MAP 2010: 7133 - START" in the *7133 for PC Servers: Hardware Maintenance Manual Supplement* if you are qualified technically to do so. Otherwise, call for service.



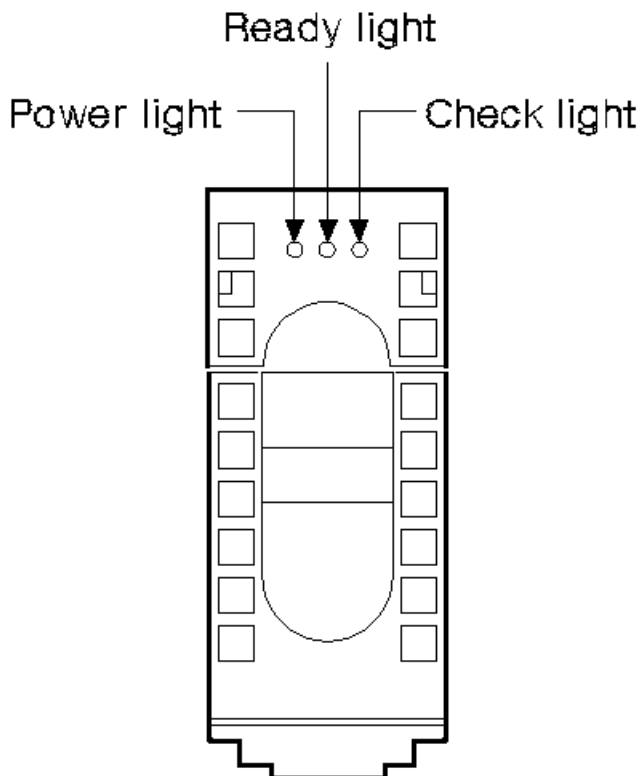
4. On Models 010 and 500, press the 7133 power switch, and hold it pressed for two seconds.
On Models 020 and 600, press and release the 7133 power switch.
5. If the Subsystem Power light still does not come on, or the Subsystem Check light comes on, or both, go to "MAP 2010: 7133 - START" in the *7133 for PC Servers: Hardware Maintenance Manual Supplement* if you are qualified technically to do so. Otherwise, call for service.
6. Observe the back of the 7133. If the fan-and-power-supply assembly Power lights come on, and the Check lights remain off, go to step 7.

If all the fan-and-power-supply assembly Power lights do not come on, or any of the Check lights come on, or both, go to "MAP 2010: 7133 - START" in the *7133 for PC Servers: Hardware Maintenance Manual Supplement* if you are qualified technically to do so. Otherwise, call for service.



7. The SSA adapter automatically configures the SSA loop when power is supplied to the disk drive modules. This configuration might take a few minutes to complete. When the lights of all the disk drive modules are on continuously (not flashing), configuration is complete.

When the configuration is complete, observe the 7133, and check whether all the disk drive module Power lights and Ready lights are on and all the disk drive module Check lights are off.



If any Power light or Ready light fails to come on, or any Check light fails to go out, go to "MAP 2010: 7133 - START" in the *7133 for PC Servers: Hardware Maintenance Manual Supplement* if you are qualified technically to do so. Otherwise, call for service.

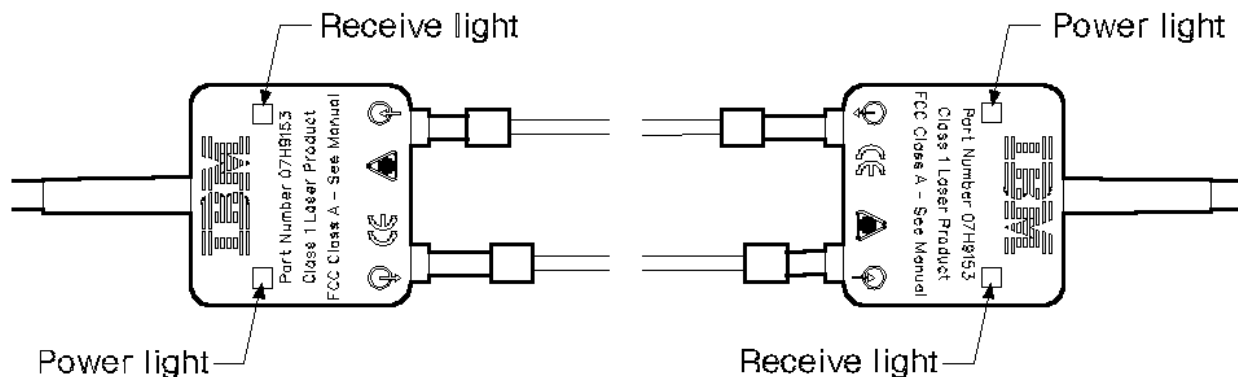
When all the Power lights and Ready lights are on, and all the Check lights are off, go to step 8

8. For Models 010 and 020:

- If the 7133 has an early type of front cover, install the cover. Ensure that the pins on the cover are correctly aligned with the clips on the frame of the 7133. Press both ends and the center of the lower edge of the cover until the cover clicks into position.
- If the 7133 has a late type of front cover, close the cover.

9. If the 7133 has the SSA Fibre-Optic Extender feature, go to step 10. Otherwise, go to step 11.

10. Ensure that the Power light and the Receive light of every Fibre-Optic Extender are on.



If all the lights are on, go to step 11.

If any light is off, go to "MAP 2330: 7133-Fibre-Optic Extender" in the *7133 for PC Servers: Hardware Maintenance Manual Supplement*, if you are qualified technically to do so. Otherwise, call for service.

11. For Models 500 and 600, close the back door of the 7133 unit, and lock it with the key provided, if required.

- 12.** Use the Disk Service Aid on the installed SSA adapters to verify that the configuration of the disk drive modules on the SSA loops is as required. "Identifying a Disk Drive Module" in topic 1.2 describes how to do this.

If the Disk Service Aid shows that no disk drive modules have been configured on the SSA adapter, check that your cabling is correct (the rules for valid SSA loops are given in topic 7.0). If the Disk Service Aid still does not show the configuration that you require, call for service.

- 13.** If the 7133 is going to be used as an SSA RAID subsystem, go to the *SSA RAID Adapter for PC Servers: Installation and User's Guide* for information about how to configure RAID arrays.

9.0 Chapter 9. Example Configurations

This chapter shows some example configurations for the 7133.

For Models 010 and 500, go to "Example Configurations for Models 010 and 500" in topic 9.1.

For Models 020 and 600, go to "Example Configurations for Models 020 and 600" in topic 9.2.

Subtopics

9.1 Example Configurations for Models 010 and 500

9.2 Example Configurations for Models 020 and 600

9.3 SSA Cables

7133 for PC Servers User's Handbook
Example Configurations for Models 010 and 500

9.1 Example Configurations for Models 010 and 500

The diagrams in this section show some example configurations for the 7133 Models 010 and 500. All the configurations that are shown here are the **simplest** and provide the best ease of use. If performance or availability are particularly important to the customer, however, **more complex cabling might provide a better solution**; consult your marketing representative for more details.

For example configurations for Models 020 and 600, see "Example Configurations for Models 020 and 600" in topic 9.2.

Subtopics

9.1.1 Simplest Configuration for Models 010 and 500

9.1.2 Larger Configurations for Models 010 and 500

9.1.3 Largest Configurations with One 7133 Model 010 or Model 500

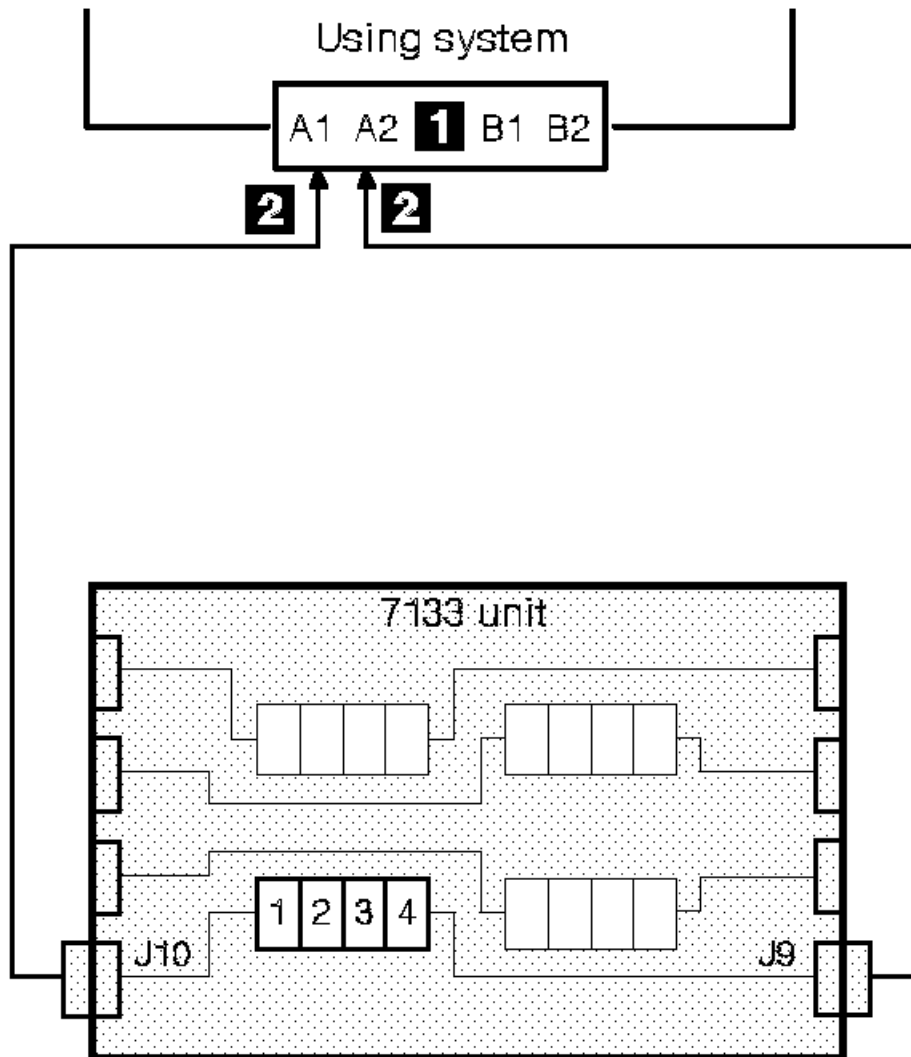
9.1.4 Multiple-Unit Configurations for Models 010 and 500

9.1.5 Multiple Subsystems for Models 010 and 500

9.1.1 Simplest Configuration for Models 010 and 500

A 7133 Model 010 or Model 500 that is in base configuration includes four disk drive modules. These modules are installed in the left-hand four slots at the front of the 7133. The other 12 disk drive slots contain dummy disk drive modules. The disk drive modules are linked in groups of four. Each group of four modules is linked to two external SSA connectors.

In the simplest configuration, the SSA loop is completed by connecting these two SSA connectors to one of the two pairs of connectors on an SSA adapter card in the using system:



When a Model 010 or Model 500 is in this configuration:

- The two fan-and-power supply assemblies in the 7133 provide redundant power and cooling to the disk drive modules.
- No improvement in performance is gained if the disk drive modules are moved to other slots and connected in more than one loop. If the modules are moved to other slots, they might no longer have the protection of redundant power and cooling.

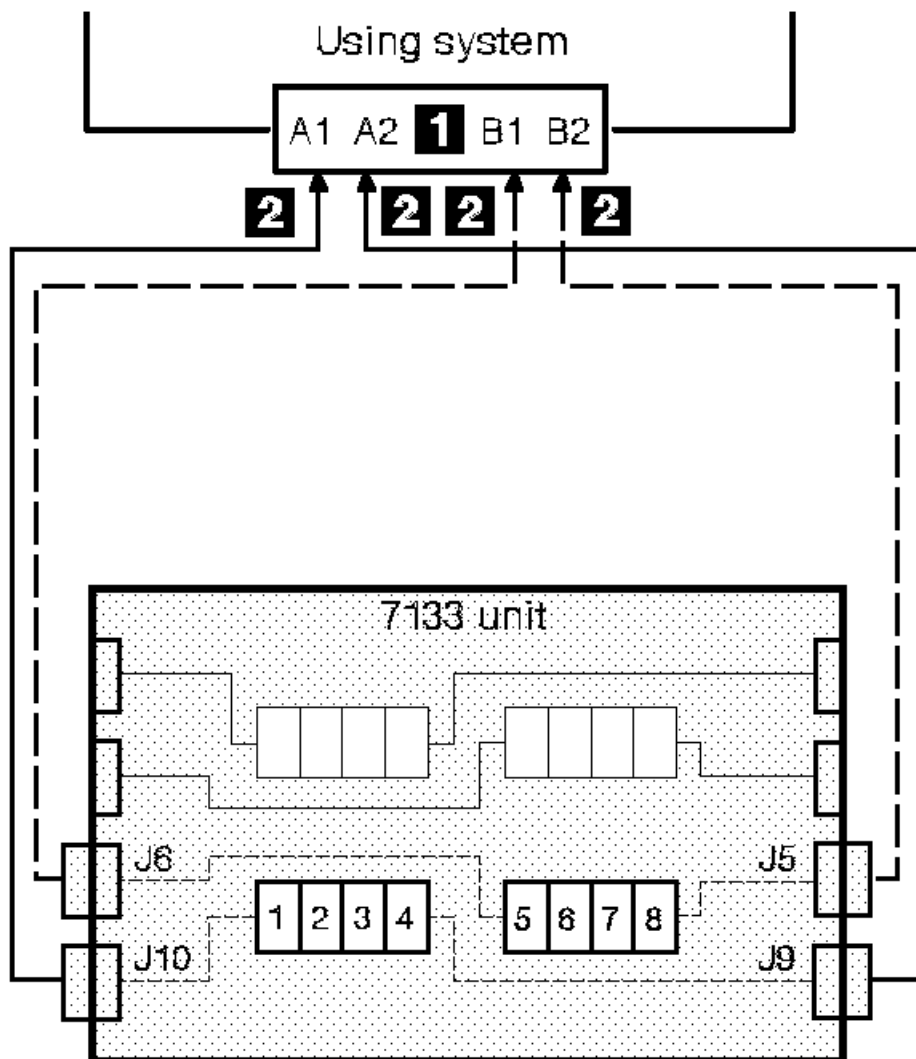
The cables are described in "SSA Cables" in topic 9.3.

The internal connections of Model 010 are shown in "Model 010 Internal Connections" in topic 10.1. The internal connections of Model 500 are shown in "Model 500 Internal Connections" in topic 10.3.

The rules for SSA loops are described in topic 7.0.

9.1.2 Larger Configurations for Models 010 and 500

Four more disk drive modules can be added to the base configuration in one loop. For a balanced subsystem, however, it is recommended that the two groups of four disk drive modules be connected in two separate loops, each of which is connected to a separate pair of connectors on the SSA adapter.



For this configuration of Models 010 and 500, three fan-and-power supply assemblies must be present in the 7133 if redundant power and cooling for all the disk drive modules is required.

No improvement in performance is gained if the disk drive modules are moved to other slots and connected in more than two loops by way of an additional SSA adapter.

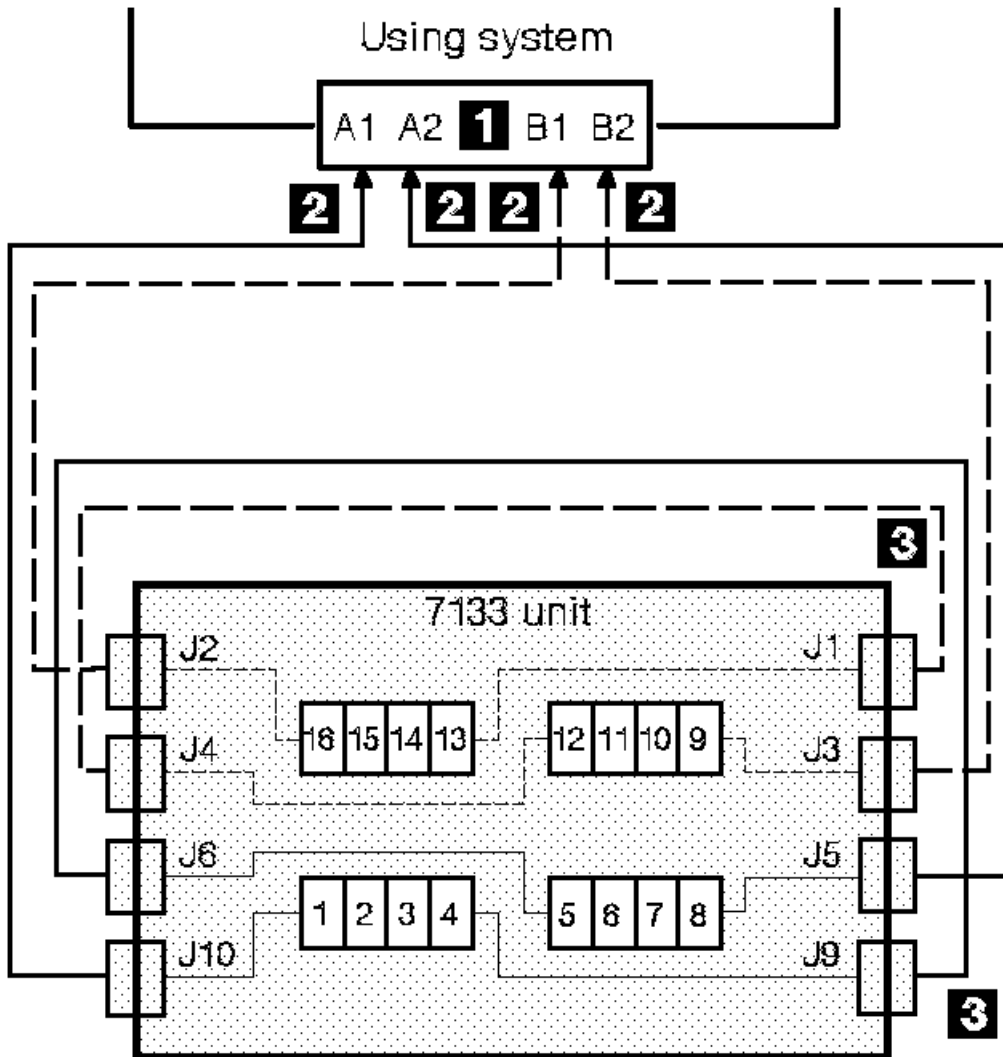
The cables are described in "SSA Cables" in topic 9.3.

The internal connections of Model 010 are shown in "Model 010 Internal Connections" in topic 10.1. The internal connections of Model 500 are shown in "Model 500 Internal Connections" in topic 10.3.

The rules for SSA loops are described in topic 7.0.

9.1.3 Largest Configurations with One 7133 Model 010 or Model 500

All 16 disk drive modules in a full 7133 can be connected in one loop. For a balanced subsystem, however, it is recommended that two groups of eight disk drive modules be connected in two separate loops, each of which is connected to a separate pair of connectors on the SSA adapter.



For this configuration of Models 010 and 500, three fan-and-power supply assemblies must be present in the 7133.

The cables are described in "SSA Cables" in topic 9.3.

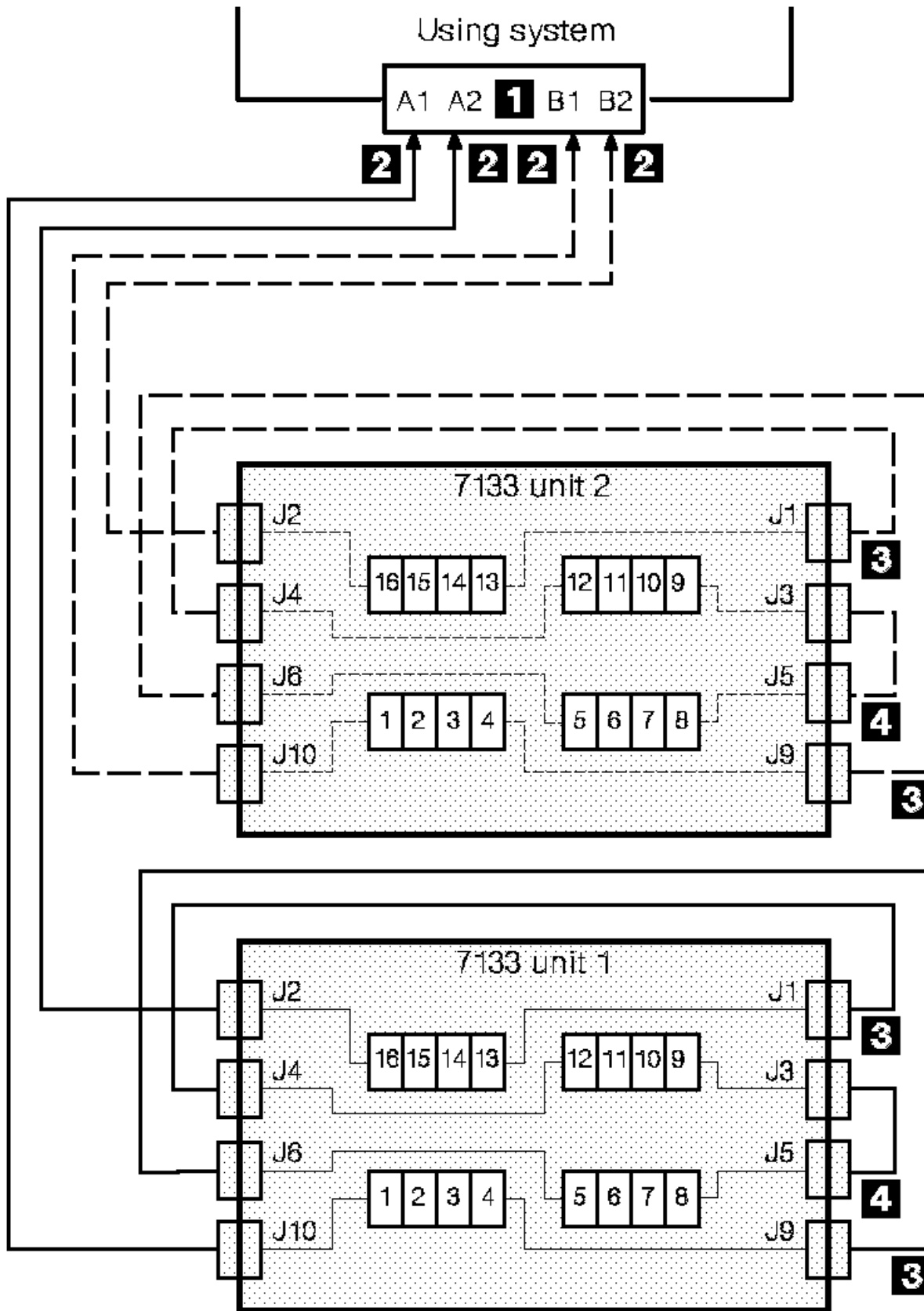
The internal connections of Model 010 are shown in "Model 010 Internal Connections" in topic 10.1. The internal connections of Model 500 are shown in "Model 500 Internal Connections" in topic 10.3.

The rules for SSA loops are described in topic 7.0.

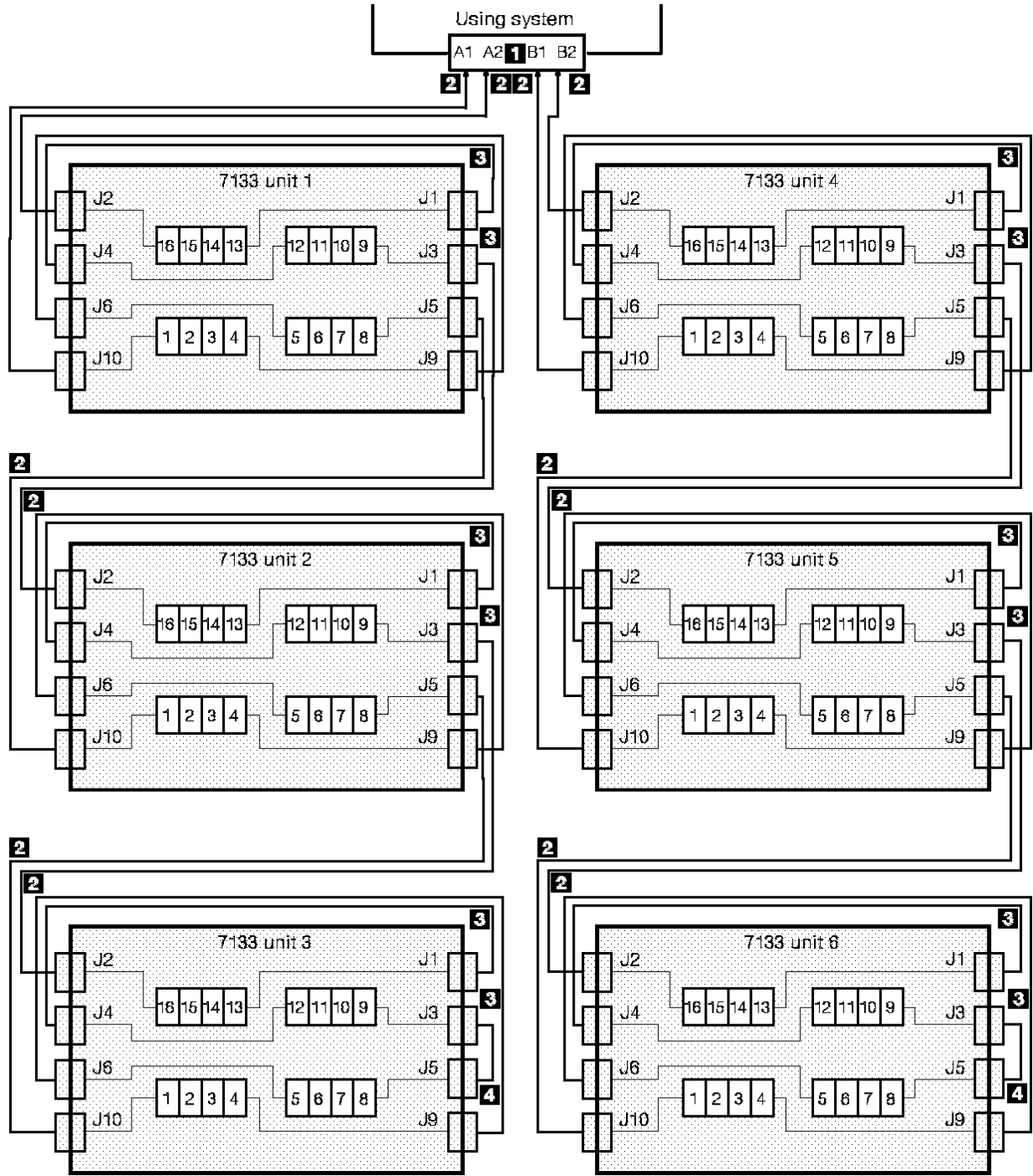
9.1.4 Multiple-Unit Configurations for Models 010 and 500

An SSA subsystem can include disk drive modules that are installed in more than one 7133.

In larger subsystems, unless the work load of the system has special requirements, best performance is obtained if you connect equal numbers of disk drive modules to the loops that are available. In the following example, 32 disk drive modules are connected to an SSA adapter. They can all be connected in one loop, but for better performance and better serviceability, it is recommended that the disk drive modules be connected in two loops, each of which is connected to a separate pair of connectors on the SSA adapter.



This example shows 96 disk drive modules, in six 7133s, connected to one adapter card.



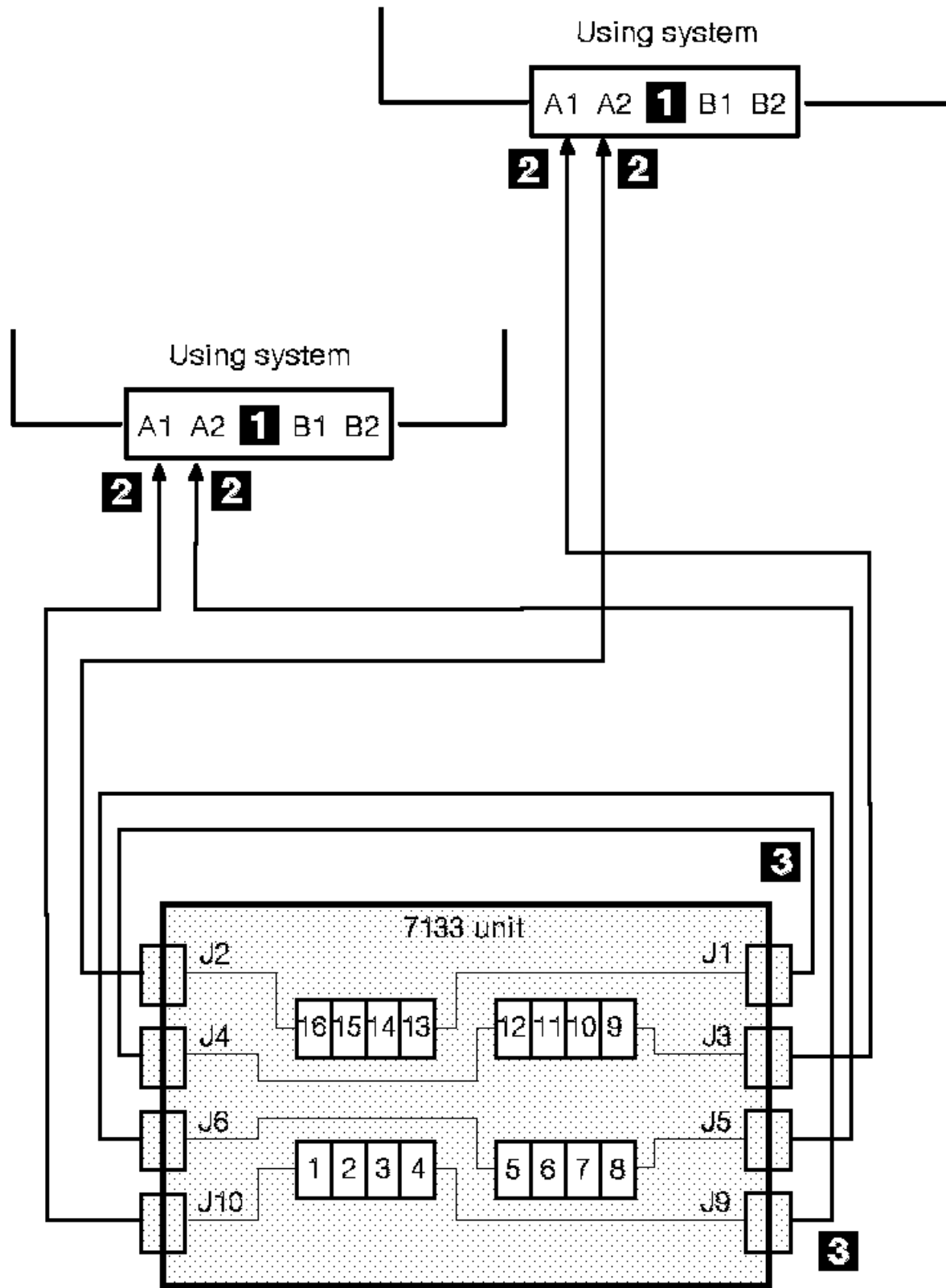
The cables are described in "SSA Cables" in topic 9.3.

The internal connections of Model 010 are shown in "Model 010 Internal Connections" in topic 10.1. The internal connections of Model 500 are shown in "Model 500 Internal Connections" in topic 10.3.

The rules for SSA loops are described in topic 7.0.

9.1.5 Multiple Subsystems for Models 010 and 500

One 7133 can contain the disk drive modules for more than one logical subsystem. The example shows disk drive modules 1 through 8 connected to a using system, and disk drive modules 9 through 16 connected to a different using system.



The cables are described in "SSA Cables" in topic 9.3.

The internal connections of Model 010 are shown in "Model 010 Internal Connections" in topic 10.1. The internal connections of Model 500 are shown in "Model 500 Internal Connections" in topic 10.3.

The rules for SSA loops are described in topic 7.0.

7133 for PC Servers User's Handbook
Example Configurations for Models 020 and 600

9.2 Example Configurations for Models 020 and 600

The diagrams in this section show some example configurations for the 7133 Models 020 and 600. All the configurations that are shown here are the **simplest** and provide the best ease of use. If performance or availability are particularly important to the customer, however, **more complex cabling might provide a better solution**; consult your marketing representative for more details.

For example configurations for Models 010 and 500, see "Example Configurations for Models 010 and 500" in topic 9.1.

Subtopics

9.2.1 Simplest Configuration for Models 020 and 600

9.2.2 Larger Configurations for Models 020 and 600

9.2.3 Largest Configurations with One 7133 Model 020 or Model 600

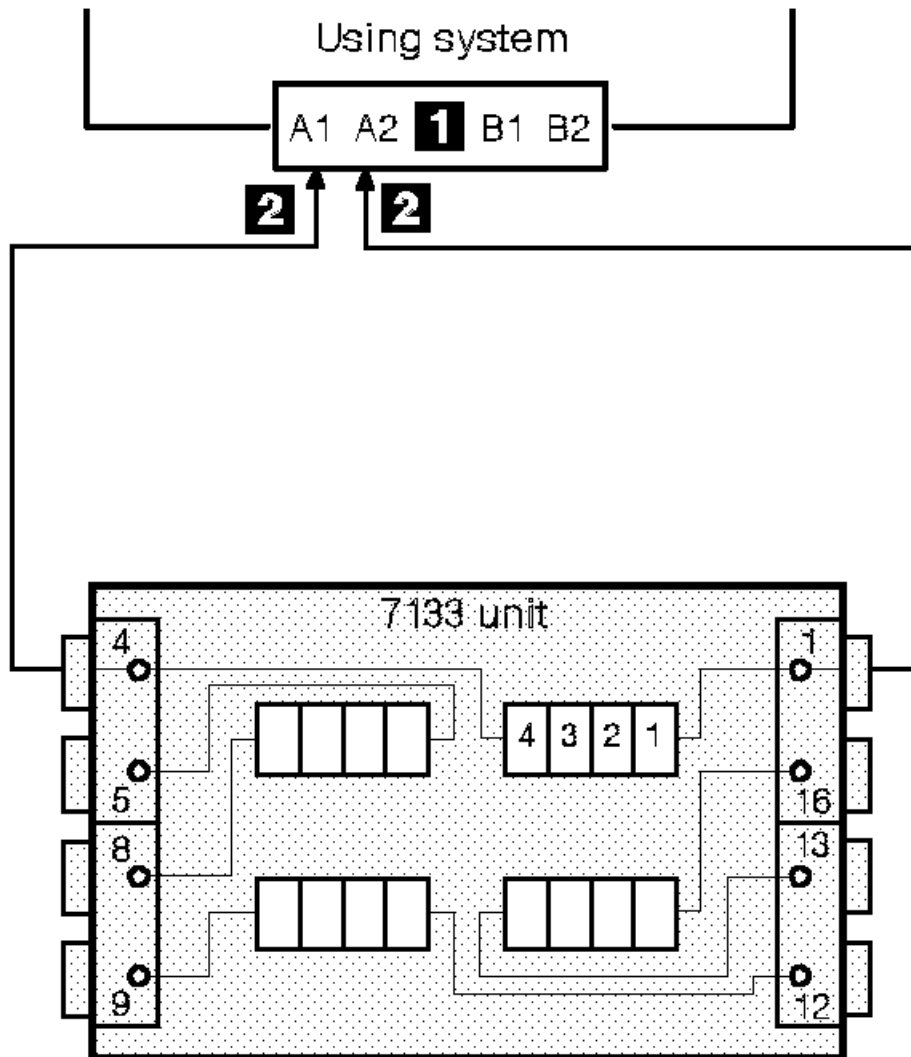
9.2.4 Multiple-Unit Configurations for Models 020 and 600

9.2.5 Multiple Subsystems for Models 020 and 600

9.2.1 Simplest Configuration for Models 020 and 600

A 7133 Model 020 or Model 600 that is in base configuration includes four disk drive modules. These modules are installed in the left-hand four slots at the front of the 7133. The other 12 disk drive slots contain dummy disk drive modules. The disk drive modules are linked in groups of four. Each group of four modules is linked to two external SSA connectors.

In the simplest configuration, the SSA loop is completed by connecting these two SSA connectors to one of the two pairs of connectors on an SSA adapter card in the using system:



Models 020 and 600 always have three fan-and-power supply assemblies, which provide redundant power and cooling to all the disk drive modules.

No improvement in performance is gained if the disk drive modules are moved to other slots and connected in more than one loop.

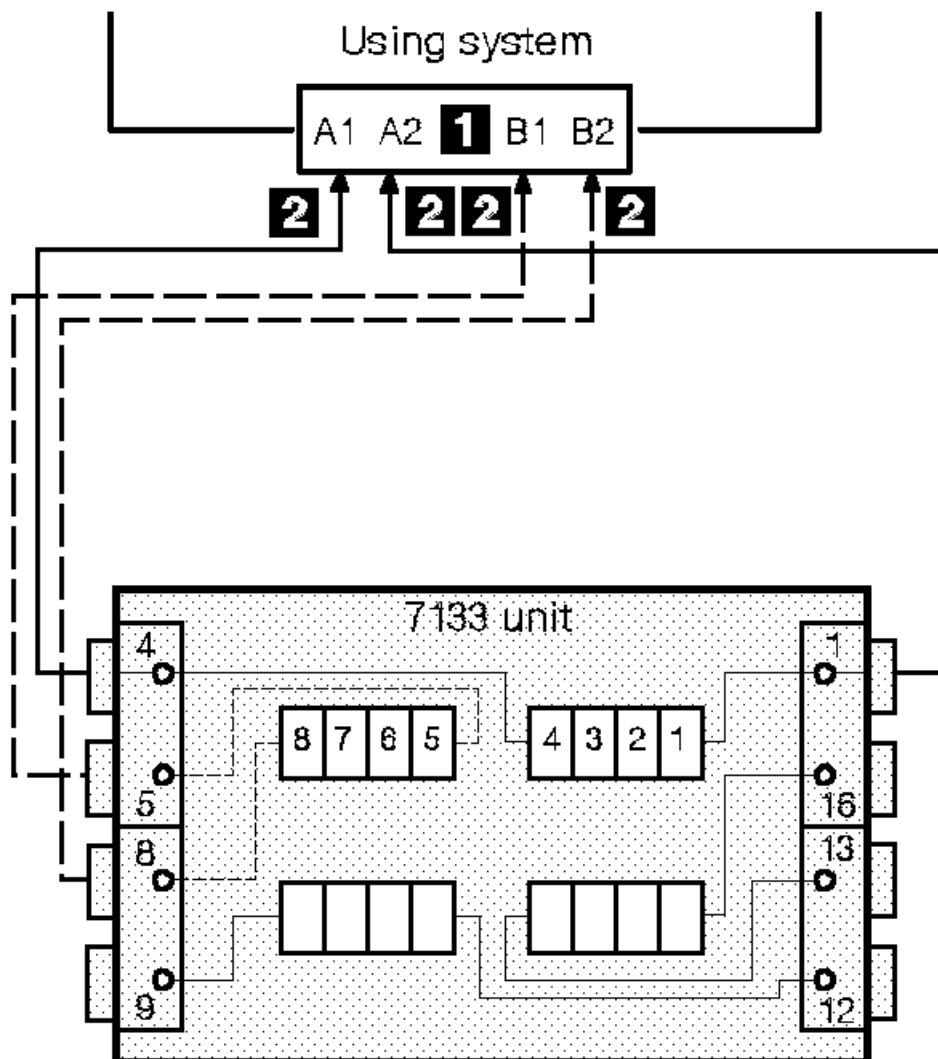
The cables are described in "SSA Cables" in topic 9.3.

The internal connections of Model 020 are shown in "Model 020 Internal Connections" in topic 10.2. The internal connections of Model 600 are shown in "Model 600 Internal Connections" in topic 10.4.

The rules for SSA loops are described in topic 7.0.

9.2.2 Larger Configurations for Models 020 and 600

Four more disk drive modules can be added to the base configuration in one loop. For a balanced subsystem, however, it is recommended that the two groups of disk drive modules be connected in two separate loops, each of which is connected to a separate pair of connectors on the SSA adapter.



Models 020 and 600 always have three fan-and-power supply assemblies, which provide redundant power and cooling to all the disk drive modules.

No improvement in performance is gained if the disk drive modules are moved to other slots and connected in more than two loops by way of an additional SSA adapter.

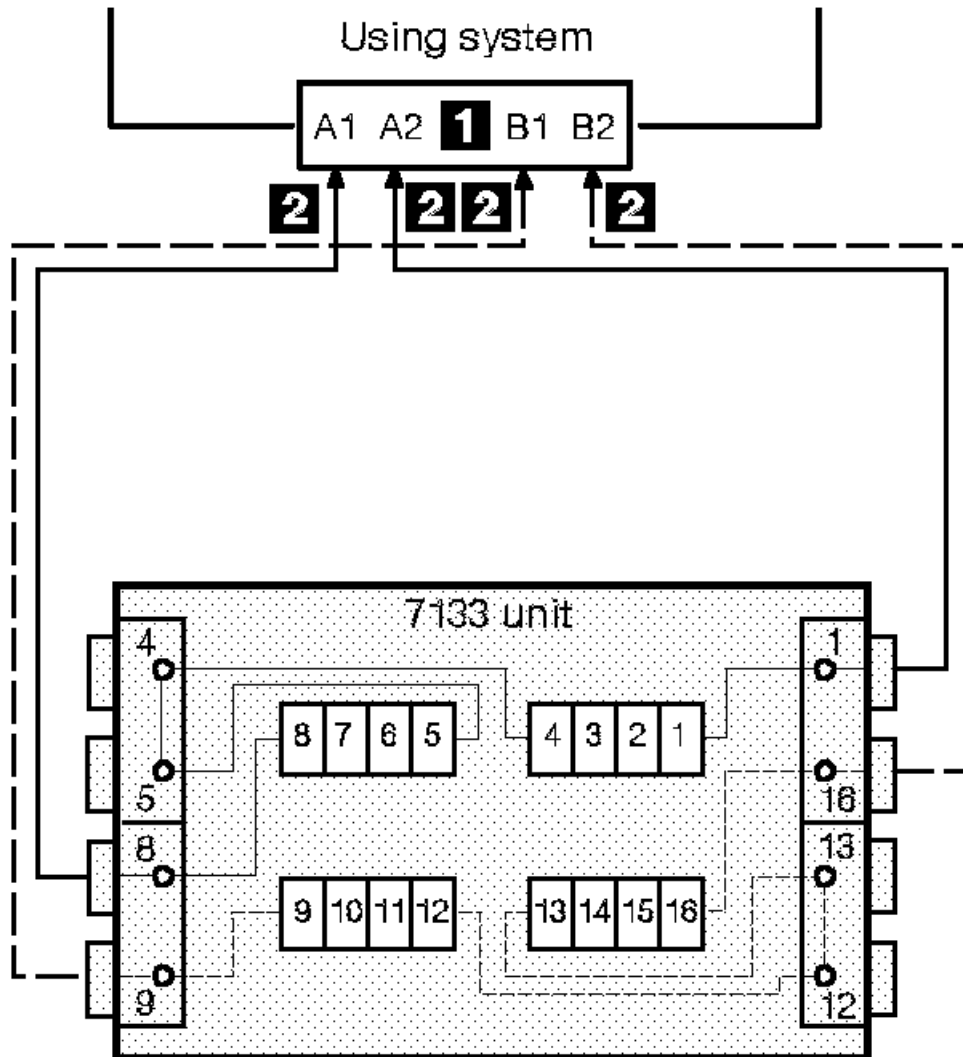
The cables are described in "SSA Cables" in topic 9.3.

The internal connections of Model 020 are shown in "Model 020 Internal Connections" in topic 10.2. The internal connections of Model 600 are shown in "Model 600 Internal Connections" in topic 10.4.

The rules for SSA loops are described in topic 7.0.

9.2.3 Largest Configurations with One 7133 Model 020 or Model 600

All 16 disk drive modules in a full 7133 can be connected in one loop. For a balanced subsystem, however, it is recommended that two groups of eight disk drive modules be connected in two separate loops, each of which is connected to a separate pair of connectors on the SSA adapter.



Models 020 and 600 always have three fan-and-power supply assemblies, which provide redundant power and cooling to all the disk drive modules.

The cables are described in "SSA Cables" in topic 9.3.

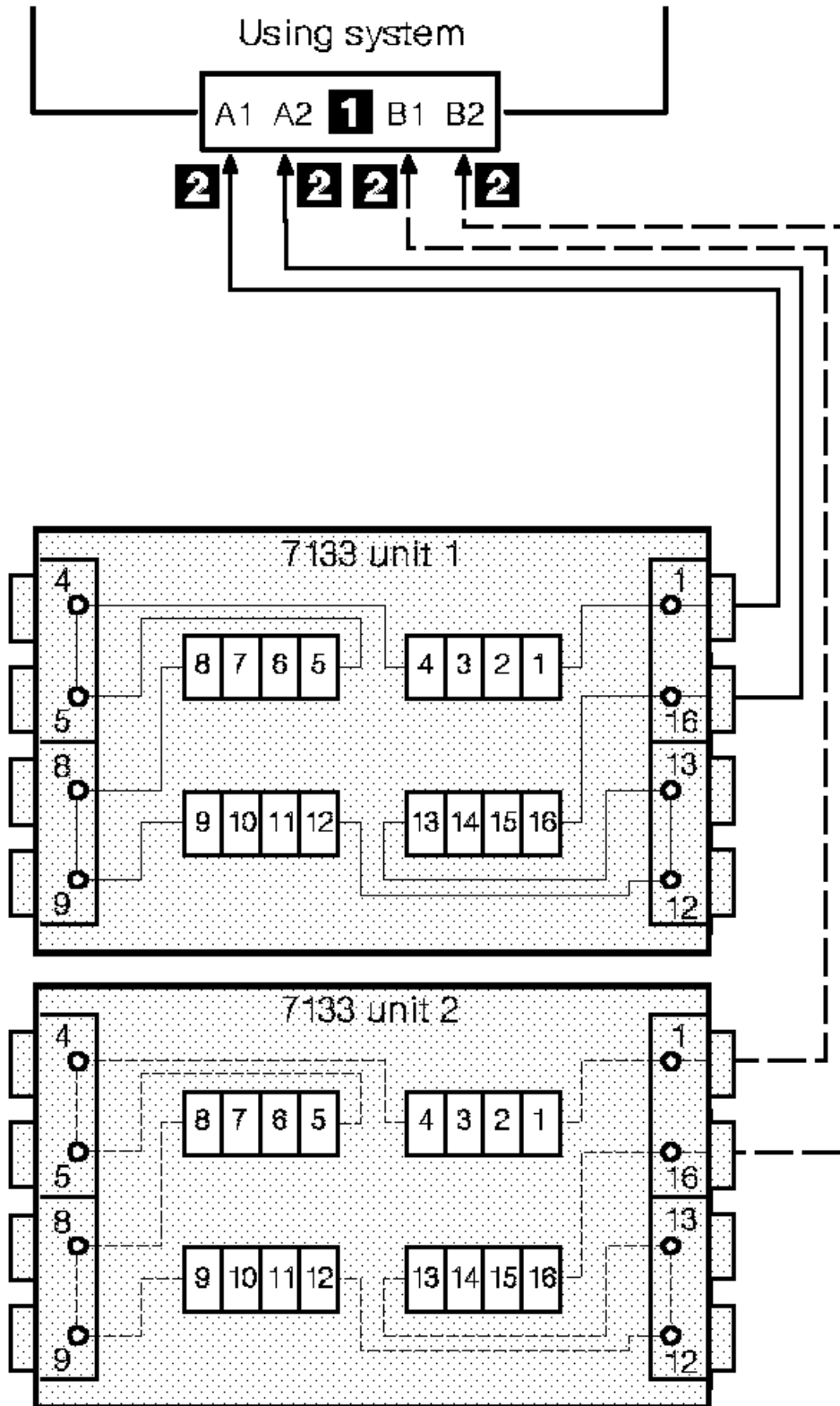
The internal connections of Model 020 are shown in "Model 020 Internal Connections" in topic 10.2. The internal connections of Model 600 are shown in "Model 600 Internal Connections" in topic 10.4.

The rules for SSA loops are described in topic 7.0.

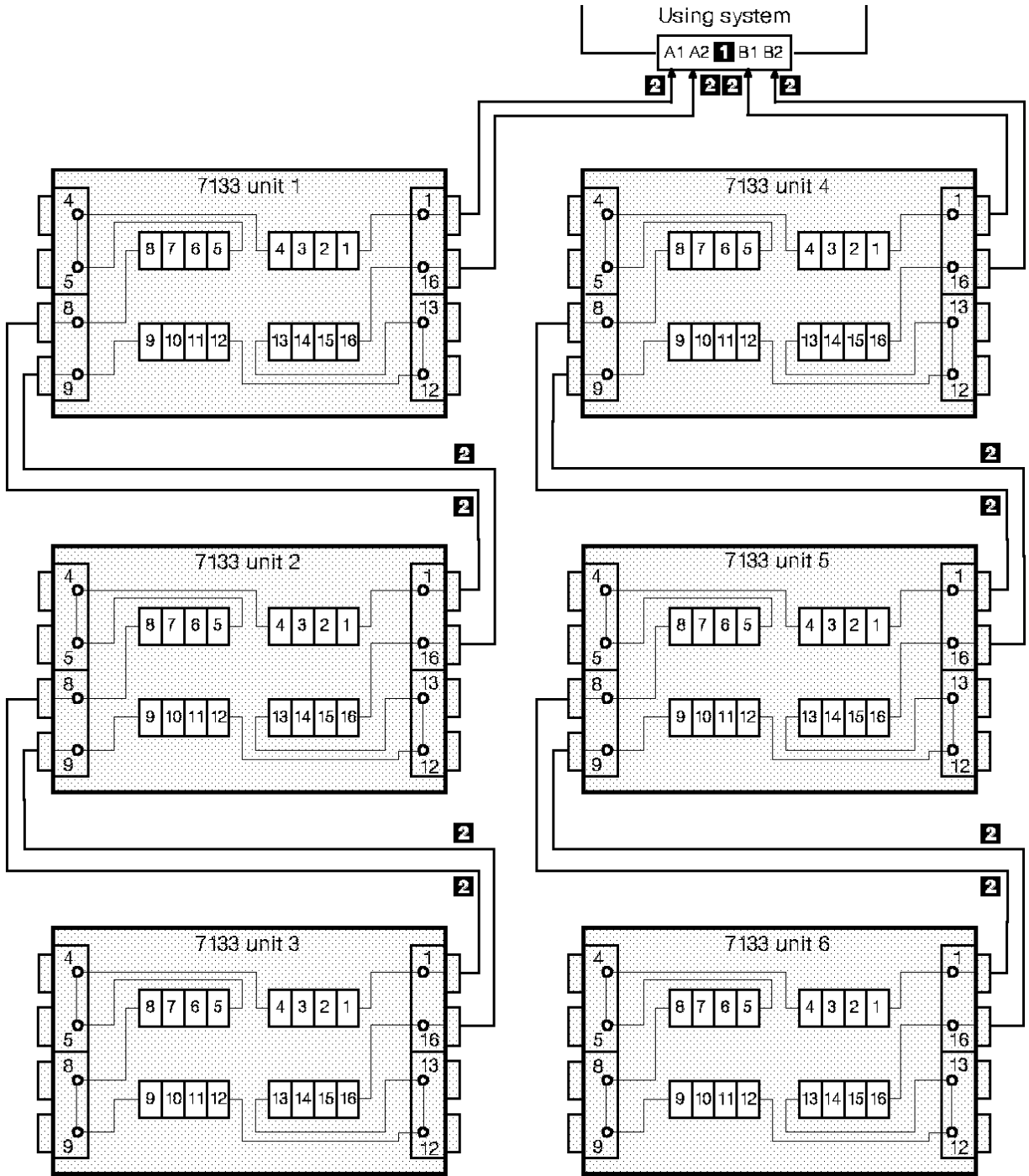
9.2.4 Multiple-Unit Configurations for Models 020 and 600

An SSA subsystem can include disk drive modules that are installed in more than one 7133.

In larger subsystems, unless the work load of the system has special requirements, best performance is obtained if you connect equal numbers of disk drive modules to the loops that are available. In the following example, 32 disk drive modules are connected to an SSA adapter. They can all be connected in one loop, but for better performance and better serviceability, it is recommended that the disk drive modules be connected in two loops, each of which is connected to a separate pair of connectors on the SSA adapter.



The following example shows 96 disk drive modules, in six 7133s, connected to one adapter card.



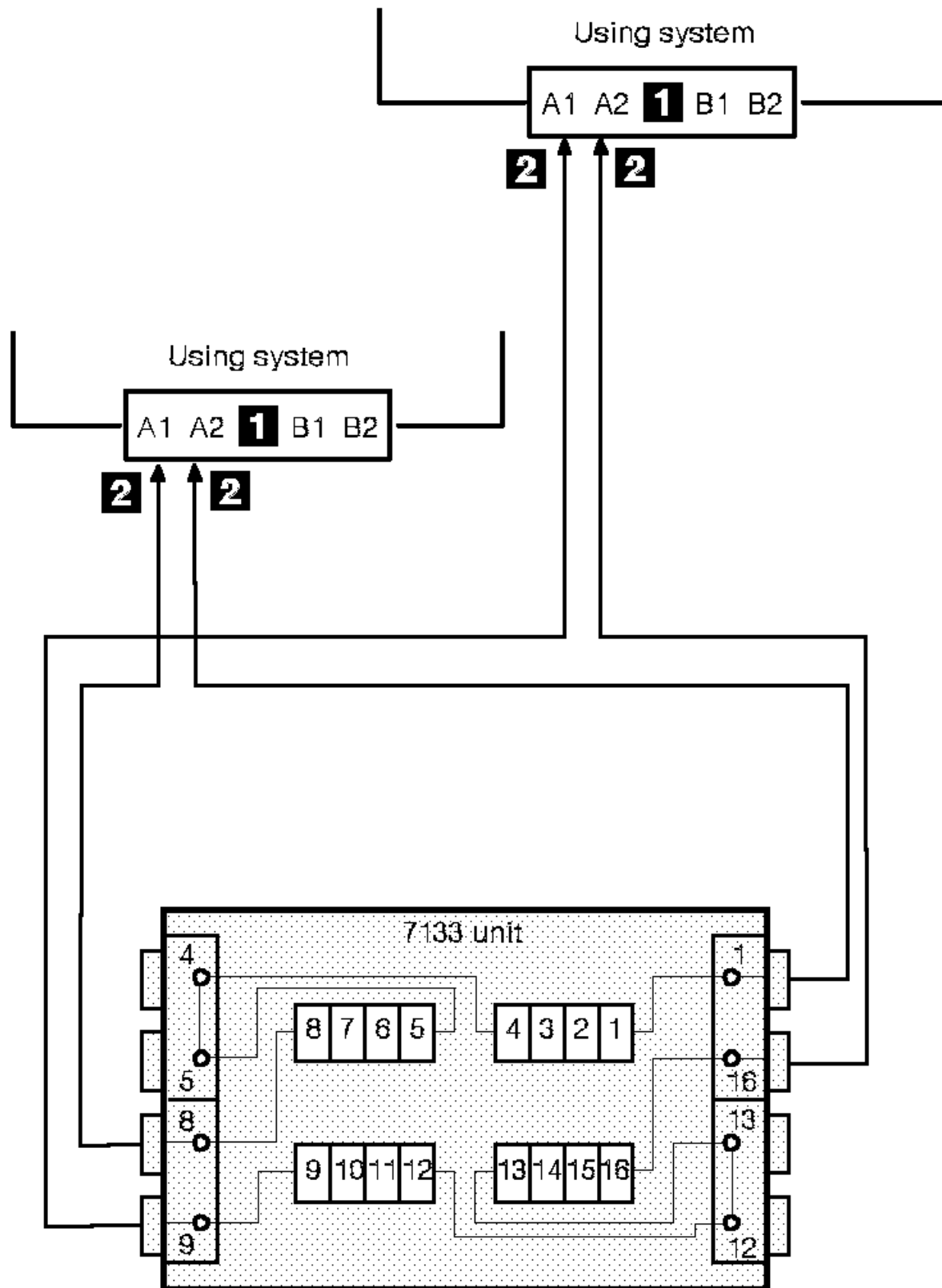
The cables are described in "SSA Cables" in topic 9.3.

The internal connections of Model 020 are shown in "Model 020 Internal Connections" in topic 10.2. The internal connections of Model 600 are shown in "Model 600 Internal Connections" in topic 10.4.

The rules for SSA loops are described in topic 7.0.

9.2.5 Multiple Subsystems for Models 020 and 600

One 7133 can contain the disk drive modules for more than one logical subsystem. The example shows disk drive modules 1 through 8 connected to a using system, and disk drive modules 9 through 16 connected to a different using system.



The cables are described in "SSA Cables" in topic 9.3.

7133 for PC Servers User's Handbook
Multiple Subsystems for Models 020 and 600

The internal connections of Model 020 are shown in "Model 020 Internal Connections" in topic 10.2. The internal connections of Model 600 are shown in "Model 600 Internal Connections" in topic 10.4.

The rules for SSA loops are described in topic 7.0.

9.3 SSA Cables

This section gives details of the adapters and cables that are shown in the configuration diagrams. In Table 1, the item number is the number by which a particular cable is identified in the diagrams.

Table 1. Description of SSA Cables			
Item	Description	Part	Length
1	SSA Adapter	-	
2	SSA copper cable	07H8985	1.0 m (3.3 ft)
		32H1465	2.5 m (8.2 ft)
		88G6404	5.0 m (16.4 ft)
		32H1466	10 m (32.8 ft)
		88G6406	25 m (82.0 ft)
3	SSA copper cable	07H8985	1.0 m (3.3 ft)
		32H1465	2.5 m (8.2 ft)
		88G6404	5.0 m (16.4 ft)
4	SSA copper cable	07H9163	0.18 m (0.6 ft)

Note: A ferrite ring is present on some cables.

10.0 Chapter 10. Internal Connections

This chapter describes the SSA connections within the various models of 7133, and how to change the jumpers on bypass cards.

The connecting of disk drive modules in the correct sequence is important for the operation and maintenance of the subsystem; it enables operators and service representatives to identify disk drive modules more easily.

Subtopics

10.1 Model 010 Internal Connections

10.2 Model 020 Internal Connections

10.3 Model 500 Internal Connections

10.4 Model 600 Internal Connections

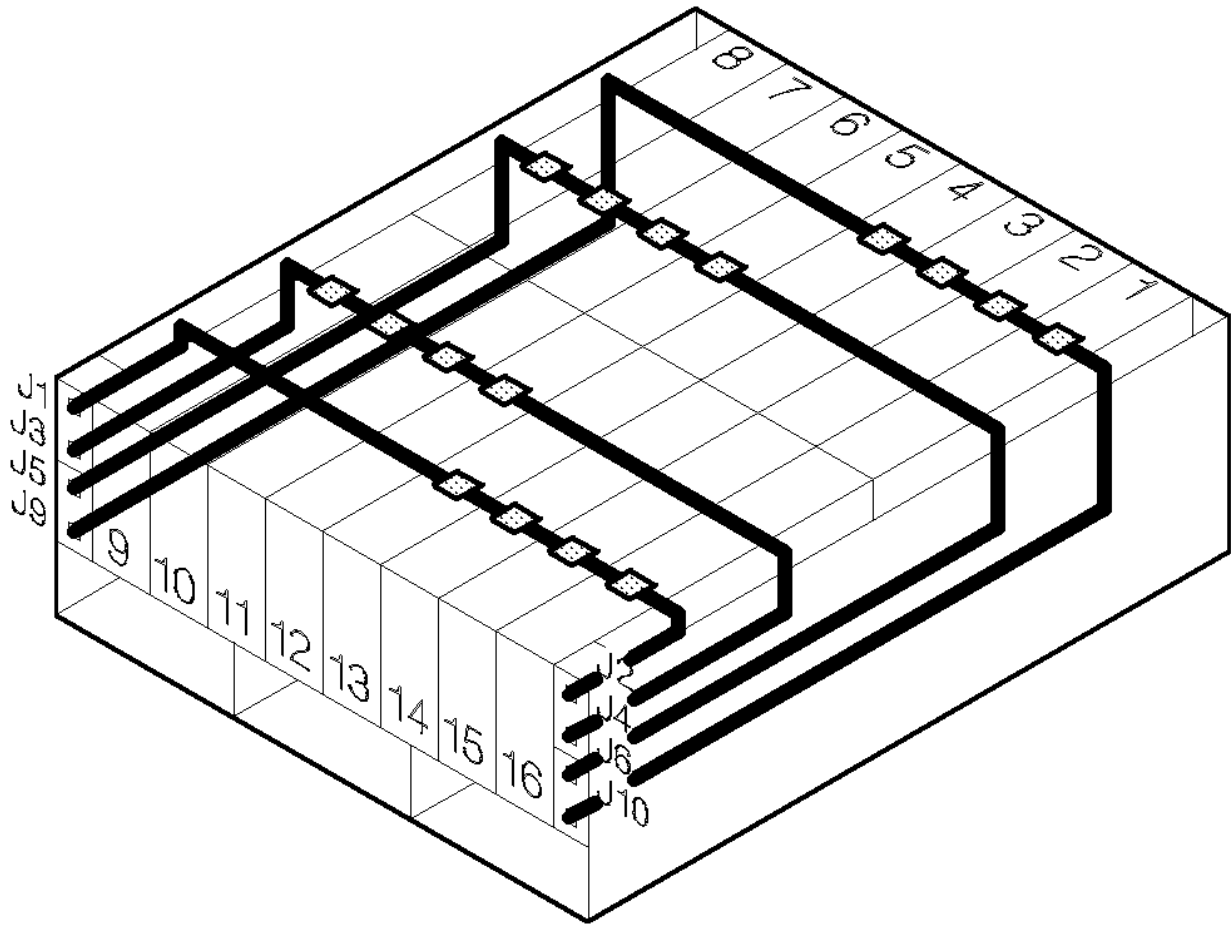
10.5 Bypass Cards

10.6 Changing the Jumpers on a Bypass Card

10.1 Model 010 Internal Connections

In Model 010, the SSA connectors are related to the disk drive modules as follows:

Connectors	Disk Drive Modules
J1 and J2	Back disk drive modules 13 through 16
J3 and J4	Back disk drive modules 9 through 12
J5 and J6	Front disk drive modules 5 through 8
J9 and J10	Front disk drive modules 1 through 4

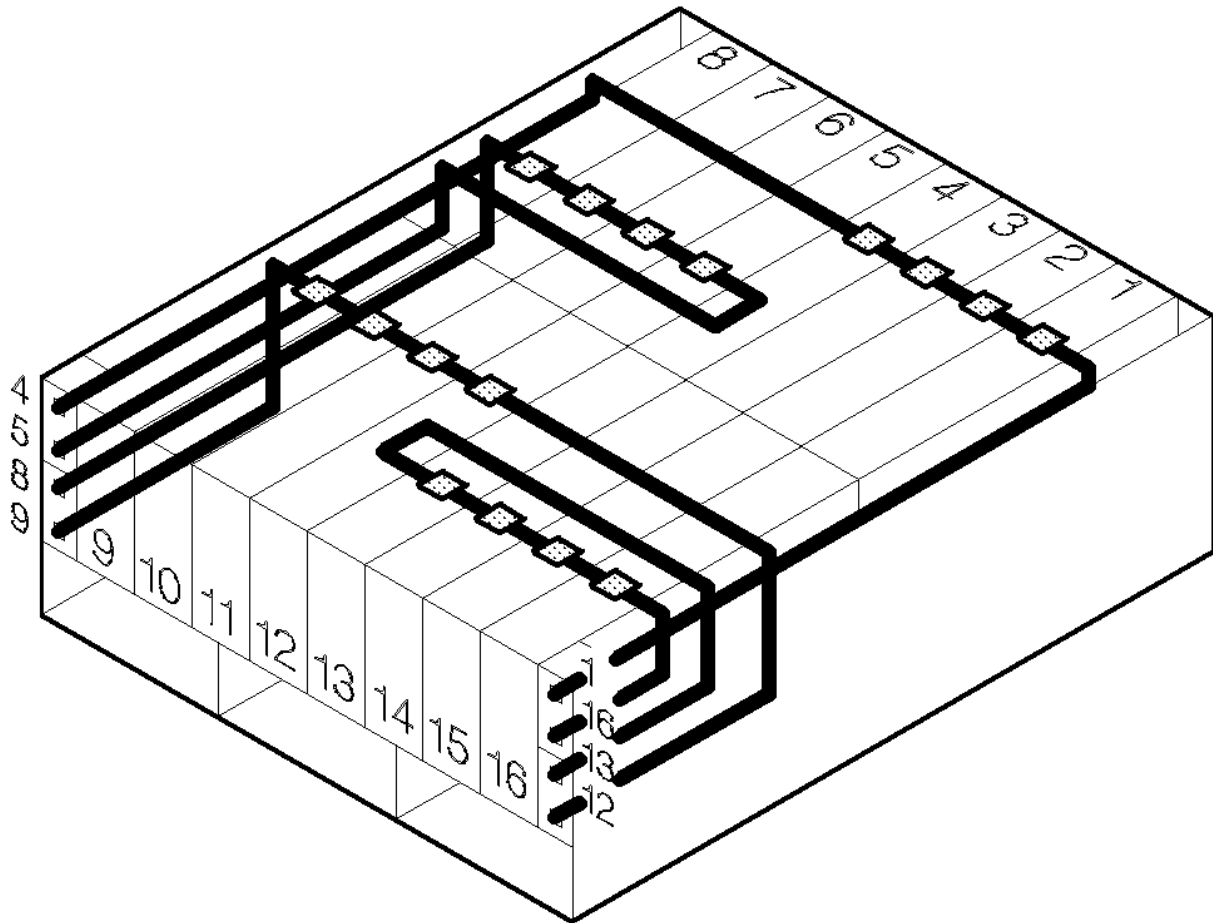


Examples of configurations are given in "Example Configurations for Models 010 and 500" in topic 9.1.

10.2 Model 020 Internal Connections

In Model 020, the SSA connectors are related to the disk drive modules as follows:

Connectors	Disk Drive Modules
1 and 4	Front disk drive modules 1 through 4
5 and 8	Front disk drive modules 5 through 8
9 and 12	Back disk drive modules 9 through 12
13 and 16	Back disk drive modules 13 through 16

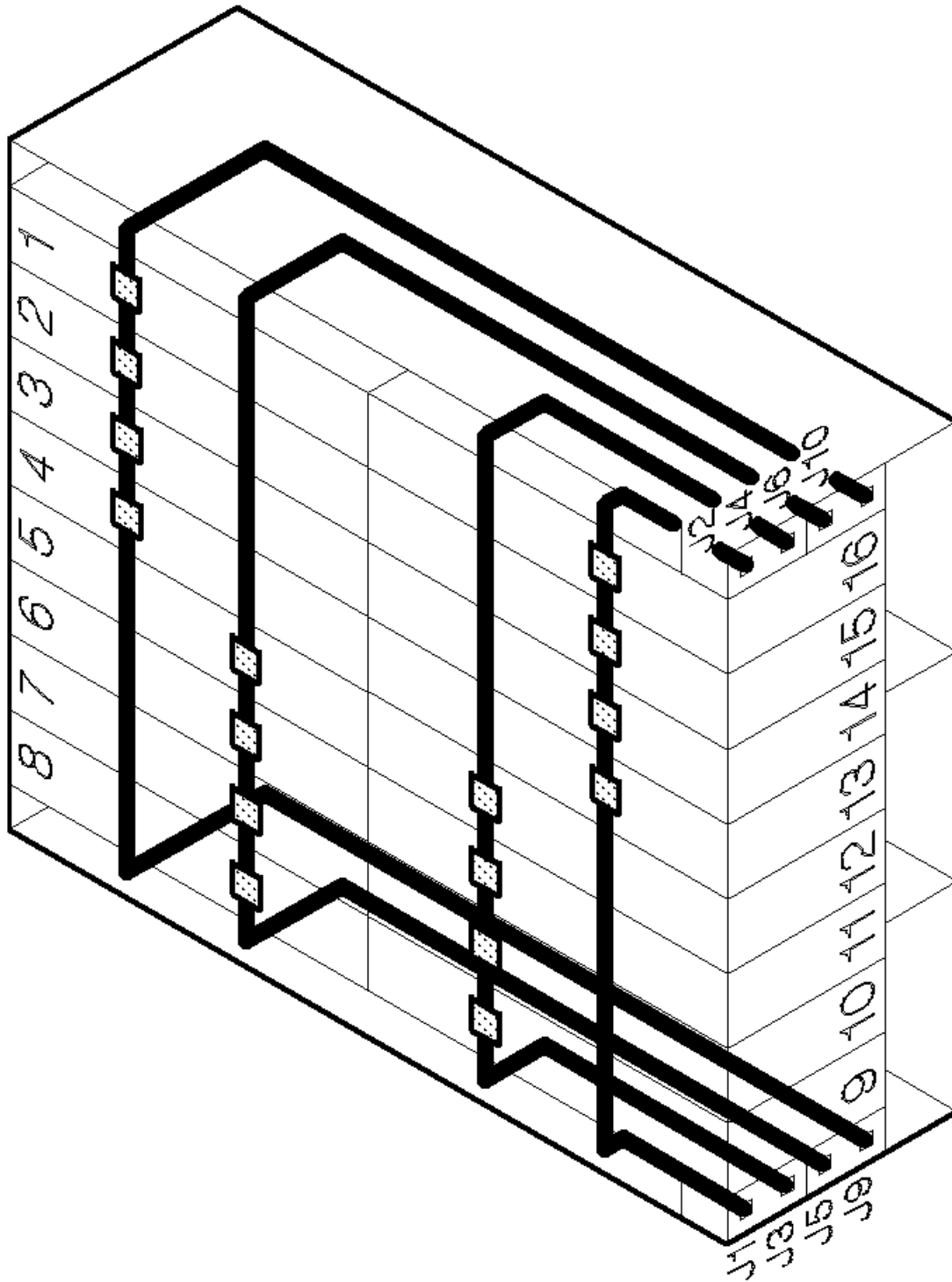


Examples of configurations are given in "Example Configurations for Models 020 and 600" in topic 9.2.

10.3 Model 500 Internal Connections

In Model 500, the SSA connectors are related to the disk drive modules as follows:

Connectors	Disk Drive Modules
J1 and J2	Back disk drive modules 13 through 16
J3 and J4	Back disk drive modules 9 through 12
J5 and J6	Front disk drive modules 5 through 8
J9 and J10	Front disk drive modules 1 through 4

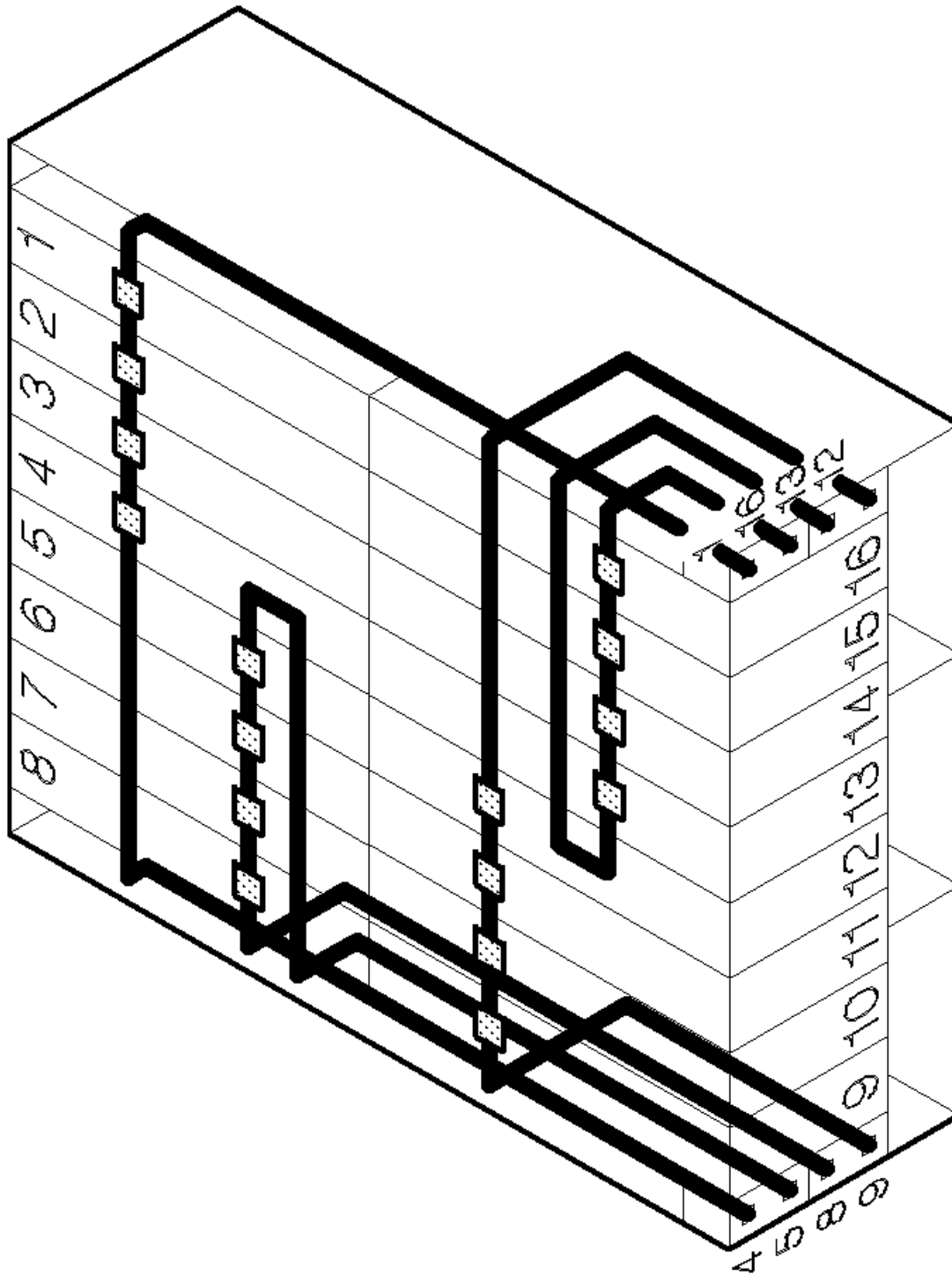


Examples of configurations are given in "Example Configurations for Models 010 and 500" in topic 9.1.

10.4 Model 600 Internal Connections

In Model 600, the SSA connectors are related to the disk drive modules as follows:

Connectors	Disk Drive Modules
1 and 4	Front disk drive modules 1 through 4
5 and 8	Front disk drive modules 5 through 8
9 and 12	Back disk drive modules 9 through 12
13 and 16	Back disk drive modules 13 through 16



Examples of configurations are given in "Example Configurations for Models 020 and 600" in topic 9.2.

10.5 Bypass Cards

Each pair of external SSA connectors of a 7133 Model 020 or 600 is mounted on an SSA bypass card that links the backplanes within the 7133 to the external SSA cables.

An SSA bypass card monitors both its external connectors. If it detects that either of its connectors is connected to a powered-on SSA adapter or device, it connects the internal SSA links to the external connectors; the card is said to be in **inline mode**.

But, if the bypass card detects that neither of its connectors is connected to a powered-on SSA adapter or device, an electronic switch on the card connects the internal SSA links together and disconnects them from the external connectors; the card is said to be in **bypass mode**. So, when there are no external connections made to a 7133 Model 020 or 600 unit, all 16 disk drive slots in the unit are connected in one internal SSA loop.

On each SSA bypass card is a pair of jumpers. If these jumpers are swapped, the bypass function is disabled; that is, the internal SSA links are always connected directly to the external connectors. This is **forced inline mode**.

Forced Inline mode is used to disable the switching ability of selected bypass cards in particular types of subsystem configuration. The types of configuration that might require Forced Inline mode are those in which:

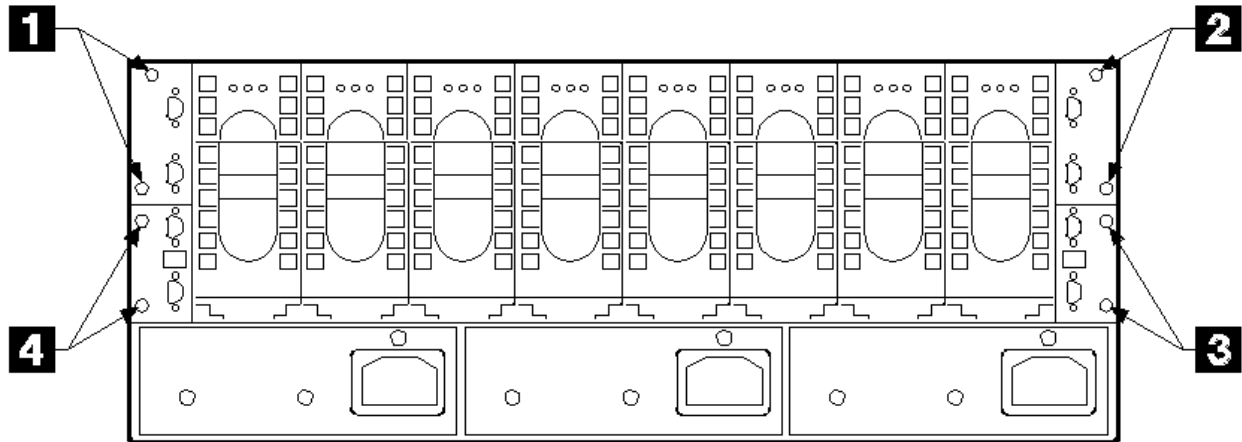
- Two 7133 Models 020 or 600 are connected to each other. In this type of configuration, Forced Inline mode removes the risk that a fault condition might break the connection between the two 7133s. A typical configuration of this type is shown in topic 9.2.4.
- The disk drive modules in one 7133 Model 020 or 600 are not all connected to the same SSA loop. In this type of configuration, Forced Inline mode removes the risk that a fault condition might cause the disk drive modules of different loops to be connected to each other.

Lights on each bypass card show which mode it is in. For more information about these lights, see the *7133 for PC Servers: Hardware Maintenance Manual Supplement*.

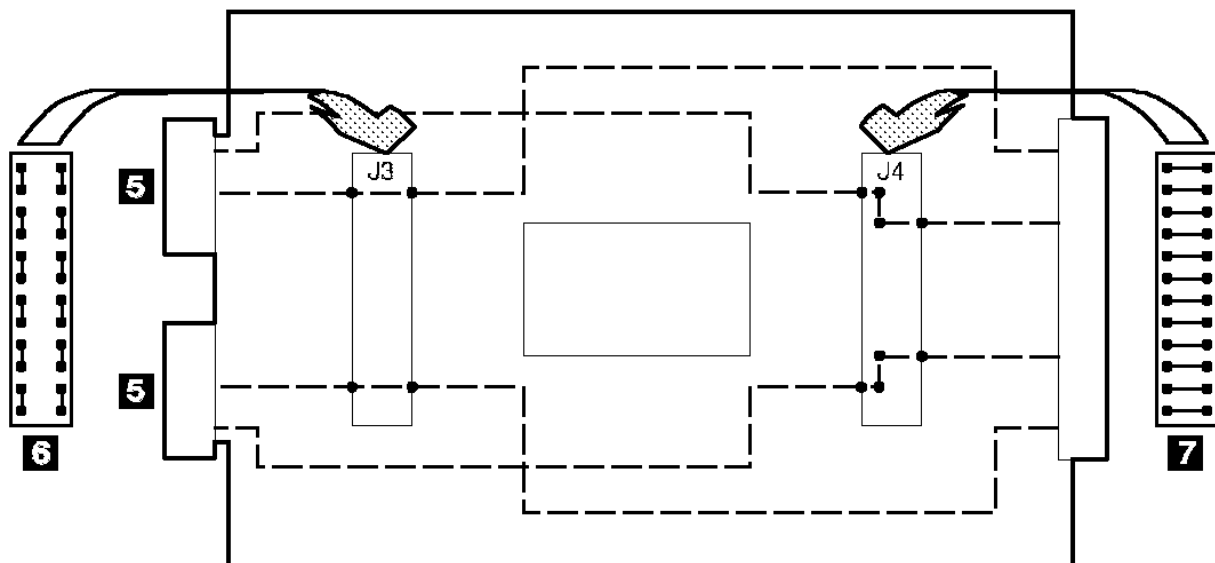
10.6 Changing the Jumpers on a Bypass Card

This section describes how to change the mode of a bypass card.

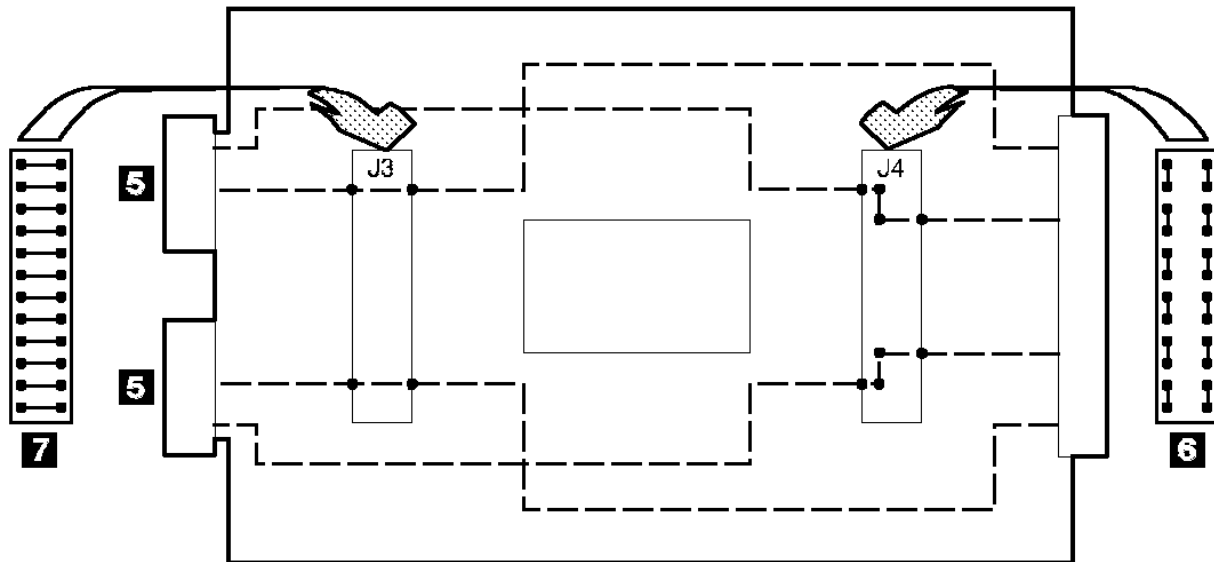
1. If external SSA cables or Fibre-Optic Extenders are already connected to the 7133, note their positions, then disconnect them. To prevent damage to the SSA connector screws, ensure that you use the special screwdriver (SSA tool, part 32H7059) to unscrew them. The screwdriver is supplied with the 7133.
2. Unscrew the captive screws 1, 2, 3, or 4 on the card that you are going to remove.



3. Pull out the card, and lay it down with its electronic components upward and its SSA connectors 5 to your left.



4. In this diagram, the card is jumpered for Bypass mode. Observe the two jumpers 6 and 7. The jumper 6 that has links between neighboring pins along its length is plugged into connector J3. The jumper 7 that has links between neighboring pins across its width is plugged into connector J4.
5. Unplug the jumpers from their connectors.
6. Plug jumper 6 into connector J4.
7. Plug jumper 7 into connector J3.



8. The card is now jumpered for Forced Inline mode.

If, at a later date, the card is required to be in Bypass mode again, return the jumpers to the original positions.

9. Reinstall the bypass cards, and tighten their screws.

10. If you removed any SSA cables or Fibre-Optic Extenders at the start of this procedure, reinstall them.

Note: When you reinstall the external SSA cables, ensure that you use the special screwdriver (SSA tool, part 32H7059) to tighten the SSA connector screws.

11. Return to the installation instructions.

7133 for PC Servers User's Handbook
Appendix A. Product Warranties and Notices

A.0 Appendix A. Product Warranties and Notices

International Business Machines Corporation

Armonk, New York, 10504

Subtopics

A.1 Statement of Limited Warranty

A.2 Notices

A.3 Trademarks

A.4 Communications Statements

A.1 Statement of Limited Warranty

The warranties provided by IBM in this Statement of Limited Warranty apply only to Machines you originally purchase for your use, and not for resale, from IBM or an IBM authorized reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. Machines are subject to these terms only if purchased in the United States or Puerto Rico, or Canada, and located in the country of purchase. If you have any questions, contact IBM or your reseller.

```
+-----+
|
| Machine: 7133 SSA Disk Subsystem
|
| Warranty Period*: One year
|
| *Elements and accessories are warranted for three months. Contact
| your place of purchase for warranty service information.
|
+-----+
```

Subtopics

- A.1.1 Production Status
- A.1.2 The IBM Warranty
- A.1.3 Warranty Service
- A.1.4 Extent of Warranty
- A.1.5 Limitation of Liability

A.1.1 Production Status

Each Machine is manufactured from new parts, or new and serviceable used parts (which perform like new parts). In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's warranty terms apply.

A.1.2 The IBM Warranty

IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications. IBM calculates the expiration of the warranty period from the Machine's Date of Installation. The date on your receipt is the Date of Installation, unless IBM or your reseller informs you otherwise.

During the warranty period, IBM or your reseller will provide warranty service under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine. IBM or your reseller will specify the type of service.

For a feature, conversion, or upgrade, IBM or your reseller may require that the Machine on which it is installed be 1) the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. Some of these transactions (called "Net-Priced" transactions) may include additional parts and associated replacement parts that are provided on an exchange basis. All removed parts become the property of IBM and must be returned to IBM.

Replacement parts assume the remaining warranty of the parts they replace.

If a Machine does not function as warranted during the warranty period, IBM or your reseller will repair or replace it (with a Machine that is at least functionally equivalent) without charge. If IBM or your reseller is unable to do so, you may return it to your place of purchase and your money will be refunded.

If you transfer a Machine to another user, warranty service is available to that user for the remainder of the warranty period. You should give your proof of purchase and this Statement to that user.

A.1.3 Warranty Service

To obtain warranty service for the Machine, you should contact your reseller or call IBM. In the United States, call IBM at **1-800-772-2227**. In Canada, call IBM at **1-800-565-3344**. You may be required to present proof of purchase.

Depending on the Machine, the service may be 1) a "Repair" service at your location (called "On-site") or at one of IBM's or a reseller's service locations (called "Carry-in") or 2) an "Exchange" service, either On-site or Carry-in.

When a type of service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced.

It is your responsibility to:

1. obtain authorization from the owner (for example, your lessor) to have IBM or your reseller service a Machine that you do not own;
2. where applicable, before service is provided --
 - a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provide,
 - b. secure all programs, data, and funds contained in a Machine,
 - c. inform IBM or your reseller of changes in a Machine's location, and
 - d. for a Machine with exchange service, remove all features, parts, options, alterations, and attachments not under warranty service. Also, the Machine must be free of any legal obligations or restrictions that prevent its exchange; and
3. be responsible for loss of, or damage to, a Machine in transit when you are responsible for the transportation charges.

A.1.4 Extent of Warranty

IBM does not warrant uninterrupted or error-free operation of a Machine.

Misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible may void the warranties.

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In Canada, warranties include both warranties and conditions.

Some jurisdictions do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

A.1.5 Limitation of Liability

Circumstances may arise where, because of a default on IBM's part (including fundamental breach) or other liability (including negligence and misrepresentation), you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages, IBM is liable only for:

1. bodily injury (including death), and damage to real property and tangible personal property; and
2. the amount of any other actual loss or damage, up to the greater of \$100,000 or the charge for the Machine that is the subject of the claim.

Under no circumstances is IBM liable for any of the following:

1. third-party claims against you for losses or damages (other than those under the first item listed above);
2. loss of, or damage to, your records or data; or
3. economic consequential damages (including lost profits or savings) or incidental damages, even if IBM is informed of their possibility.

Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from jurisdiction to jurisdiction.

A.2 Notices

References in this book to IBM products, programs, or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any of the intellectual property rights of IBM may be used instead of the IBM product, program, or service. The evaluation and verification of operation in conjunction with other products, except those expressly designated by IBM, are the responsibility of the user.

Any examples of parameters or definitions are for guidance only. Some details may differ from the requirements in your environment. Contact your IBM representative if you need further assistance.

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A.3 Trademarks

The following terms are trademarks of IBM Corporation in the United States or other countries or both:

IBM

OS/2

NetWare is a trademark of Novell, Incorporated.

Microsoft and Windows are trademarks or registered trademarks of Microsoft Corporation.

A.4 Communications Statements

The following statements apply to this product. The statements for other products intended for use with this product appear in their accompanying manuals.

Subtopics

- A.4.1 Federal Communications Commission (FCC) Statement
- A.4.2 VCCI Statement
- A.4.3 International Electrotechnical Commission (IEC) Statement
- A.4.4 Avis de conformité aux normes de l'Industrie Canada
- A.4.5 Industry Canada Compliance Statement
- A.4.6 United Kingdom Telecommunications Requirements
- A.4.7 EC Council Directive
- A.4.8 Radio Protection for Germany

A.4.1 Federal Communications Commission (FCC) Statement

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

Properly shielded and grounded cables and connectors (part numbers 07H9163, 07H8985, 32H1465, 88G6404, 32H1466, or 88G6406, or their equivalents) must be used in order to meet FCC emission limits. Neither the provider nor the manufacturer is responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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

電波障害自主規制 届出装置の記述

この装置は、第一種情報装置（商工業地域において使用されるべき情報装置）で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（VCCI）基準に適合しております。

従って、住宅地域またはその隣接した地域で使用すると、ラジオ、テレビジョン受信機等に受信障害を与えることがあります。

取扱説明書に従って正しい取り扱いをしてください。

A.4.2 VCCI Statement

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

```
+-----+  
| This equipment is Type 1 Data Processing Equipment and is intended for |  
| use in commercial and industrial areas. When used in a residential |  
| area, or areas of proximity, radio and TV reception may be subject to |  
| radio interference. VCCI-1. |  
+-----+
```

A.4.3 International Electrotechnical Commission (IEC) Statement

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

A.4.4 Avis de conformité aux normes de l'Industrie Canada

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

A.4.5 Industry Canada Compliance Statement

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

7133 for PC Servers User's Handbook
United Kingdom Telecommunications Requirements

A.4.6 United Kingdom Telecommunications Requirements

This apparatus is manufactured to the International Safety Standard EN60950 and as such is approved in the U.K. under approval number NS/G/1234/J/100003 for indirect connection to public telecommunications systems in the United Kingdom.

A.4.7 *EC Council Directive*

This product is in conformity with the requirements of the following EC directives:

- Council Directive 73/23/EEC on the harmonization of the laws of the Member States relating to electrical equipment designed for use within certain voltage limits.
- Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

Neither the provider or the manufacturer can accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of option cards not supplied by the manufacturer.

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

Properly shielded and grounded cables and connectors (part numbers 07H9163, 07H8985, 88G6403, 88G6404, 31H7962, or 88G6406, or their equivalents) must be used in order to reduce the potential for causing interference to radio and TV communications and to other electrical or electronic equipment. Such cables and connectors are available from the provider or manufacturer. Neither the provider or manufacturer can accept responsibility for any interference caused by using other than recommended cables and connectors.

A.4.8 Radio Protection for Germany

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

Der Aussteller der Konformitätserklärung ist die IBM Germany.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse B.