IBM NetMEDIA Storage Expansion Unit
Type 3551 Model 001

Hardware Maintenance Manual

September, 1998

Use this manual with the IBM Netfinity Server Hardware Maintenance Manual

We Want Your Comments!
(Please see page 23)
IBM NetMEDIA Storage Expansion Unit
Type 3551 Model 001

Hardware Maintenance Manual

September, 1998

Use this manual with the IBM Netfinity Server Hardware Maintenance Manual

We Want Your Comments! (Please see page 23)
Note
Before using this information and the product it supports, be sure to read the general information under “Notices” on page 27.

First Edition (September 1998)

The following paragraph does not apply to the United Kingdom or any country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION “AS IS” WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This publication could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time.

This publication was developed for products and services offered in the United States of America. IBM may not offer the products, services, or features discussed in this document in other countries, and the information is subject to change without notice. Consult your local IBM representative for information on the products, services, and features available in your area.

Requests for technical information about IBM products should be made to your IBM reseller or IBM marketing representative.

© Copyright International Business Machines Corporation 1998. All rights reserved.
Note to U.S. Government users–Documentation related to Restricted rights–Use, duplication, or disclosure is subject to restrictions set forth in GSA ADP Schedule Contract with IBM Corp.
About This Manual

This manual contains service information for the IBM NetMEDIA Storage Expansion Unit Type 3551.

This manual should be used with the Hardware Maintenance Manual for the system you are servicing.

Important

This manual is intended for trained servicers who are familiar with IBM PC Server products.

Important Safety Information

Be sure to read all caution and danger statements in this book before performing any of the instructions.

Leia todas as instruções de cuidado e perigo antes de executar qualquer operação.

注意和危险声明（简体中文）

重要事项：

本书中的所有注意和危险声明之前都有编号。该编号用于英语的注意或危险声明与 Safety Information 一书中可以找到的翻译版本的注意或危险声明进行交叉引用。

例如，如果一个注意声明以编号 1 开始，那么对该注意声明的翻译出现在 Safety Information 一书中的声明 1 中。

在按说明执行任何操作前，请务必阅读所有注意和危险声明。

注意及危险声明（中文）

重要資訊：

本书中所有「注意」及「危險」的聲明均以數字開始。此一數字是用來作為交互參考之用，英文「注意」或「危險」聲明可在「安全資訊」(Safety Information) 一書中找到相同內容的「注意」或「危險」聲明的譯文。

例如，有一「危險」聲明以數字 1 開始，則該「危險」聲明的譯文將出現在「安全資訊」(Safety Information) 一書的「聲明」1 中。

執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

Prenez connaissance de toutes les consignes de type Attention et
Danger avant de procéder aux opérations décrites par les instructions.
Use the IBM Personal computing solutions (BBS) or the World Wide Web (WWW) to download Diagnostic, BIOS Flash, and Device Driver files.

File download address is:


The IBM BBS can be reached at (919) 517-0001.

IBM Online Addresses:

The HMM manuals online address is:


The IBM Support Page is:

http://www.pc.ibm.com/support/

The IBM Personal computing solutions page is:

http://www.pc.ibm.com
## Related Publications

The following publications are available for IBM products. For more information, contact IBM or an IBM Authorized Dealer.

<table>
<thead>
<tr>
<th>For Information About</th>
<th>See Publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC Servers</td>
<td>IBM PC Servers Hardware Maintenance Manual (S30H-2501)</td>
</tr>
<tr>
<td>PS/2 Computers</td>
<td>IBM Personal System/2 Hardware Maintenance Manual (S52G-9971)</td>
</tr>
<tr>
<td>PS/ValuePoint Computers</td>
<td>IBM PS/ValuePoint Hardware Maintenance Service and Reference (S61G-1423)</td>
</tr>
<tr>
<td>Laptop, Notebook, Portable, and ThinkPad Computers</td>
<td>IBM Mobile Systems Hardware Maintenance Manual Volume 1 (S82G-1501)</td>
</tr>
<tr>
<td>ThinkPad Computers (ThinkPad 340, 355, 360, 370, 700, 701, 720, 750, 755)</td>
<td>IBM Mobile Systems Hardware Maintenance Manual Volume 2 (S82G-1502)</td>
</tr>
<tr>
<td>ThinkPad Computers (ThinkPad 365, 560, 760, SelectaDock)</td>
<td>IBM Mobile Systems Hardware Maintenance Manual Volume 3 (S82G-1503)</td>
</tr>
<tr>
<td>Monitors (Displays) (February 1993)</td>
<td>IBM PS/2 Display HMM Volume 1 (SA38-0053)</td>
</tr>
<tr>
<td>Monitors (December 1993)</td>
<td>IBM Color Monitor HMM Volume 2 (S71G-4197)</td>
</tr>
<tr>
<td>IBM Monitors (P/G Series) (July 1996)</td>
<td>IBM Monitor HMM Volume 3 (S52H-3679)</td>
</tr>
<tr>
<td>IBM 2248 Monitor (February 1996)</td>
<td>IBM Monitor HMM Volume 4 (S52H-3739)</td>
</tr>
<tr>
<td>Disk Array technology overview and using the IBM RAID Configuration Program</td>
<td>Configuring Your Disk Array booklet (S82G-1506)</td>
</tr>
<tr>
<td>Installation Planning for Personal System/2 computers</td>
<td>Personal System/2 Installation Planning and Beyond (G41G-2927)</td>
</tr>
<tr>
<td>Installation Planning for Advanced Personal System/2 Servers</td>
<td>Advanced PS/2 Servers Planning and Selection Guide (GG24-3927)</td>
</tr>
</tbody>
</table>
## Contents

About This Manual ................................ iii
Important Safety Information ........................ iv
Online Support ....................................... iv
Related Publications ................................. v

### NetMEDIA Storage Expansion Unit
- Features ........................................ 2
- Diagnostics and Test Information .............. 3
- Additional Service Information ................ 4
- Symptom-to-FRU Index ........................... 6
- Locations ........................................ 7
- Parts Listing ..................................... 13

### Related Service Information
- Safety Information ................................ 16
- Software/Hardware Mismatch Problems ........ 21
- Send Us Your Comments! ......................... 23
- Problem Determination Tips .................... 24
- Phone Numbers, U.S. and Canada .............. 25
- Notices ........................................... 27
NetMEDIA Storage Expansion Unit

Features .................................................. 2
Diagnostics and Test Information .................. 3
Additional Service Information ..................... 4
  Performing a Shutdown ................................. 4
  Turning the Power On ................................ 4
Specifications .......................................... 5
Symptom-to-FRU Index ................................. 6
Locations .................................................. 7
  Front Bezel .............................................. 7
  Front Panel and Indicator ............................ 7
  Filler Panel ............................................. 8
  Rear Panel .............................................. 8
  Top Service Panel and Cables ........................ 8
Drive Replacement ....................................... 9
Service Tray Removal .................................. 11
Slide Rails Installation ............................... 12
Parts Listing ............................................ 13
System .................................................... 14

© Copyright IBM Corp. 1998
Features

The following list summarizes the features of the Type 3551, Model 001 NetMEDIA Storage Expansion Unit:

- 3-U High chassis. (1.75-inches/U) (44.45 mm/U)
- Provides housing for 3.5-inch and 5.25-inch form factor, full-height and half-height, 8-bit or 16-bit SCSI devices.
- Accepts any combination of up to four (4) half-height or two (2) full-height tape drives.
- Designed to fit into a Netfinity NetBAY3 Stackable Enclosure or the Netfinity Rack Cabinet, or equivalent EIA standard 19-inch rack.
- Two independent power supplies and two cooling fans.
- Four internal Single-Ended SCSI 3 (68-pin) drive connectors.
- One external 68-pin (.8 mm) VHDCI connector to support connection to a single host SCSI adapter, and on-board termination.
Diagnostics and Test Information

Important

This manual is written with the assumption that you have model-specific training on all computers, or that you are familiar with the computers, functions, terminology, and service-related information provided in this manual and the appropriate IBM Netfinity Server Hardware Maintenance Manual.

The following is a list of references for the IBM NetMEDIA Storage Expansion Unit - Type 3551 Model 001.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive</td>
<td>See “Drive Replacement” on page 9.</td>
</tr>
<tr>
<td>Error Codes/Error Messages</td>
<td>Refer to the Symptom-to-FRU Index for the server that the Storage Expansion Unit you are servicing is connected to.</td>
</tr>
</tbody>
</table>
Additional Service Information

- “Performing a Shutdown”
- “Turning the Power On”

**Note**

There is a sequence to turning on and turning off the power units. Make sure you power-off and power-on the expansion unit in the sequence below.

**Performing a Shutdown**

To perform a shutdown:

1. Make sure all activity to the NetMEDIA Storage Expansion Unit has stopped. If applicable, logically disconnect from the host.
2. Looking at the front of the expansion unit, turn off the right power switch first, then turn off the left power switch.

**Turning the Power On**

Use this procedure to power-on the NetMEDIA Storage Expansion Unit.

1. Verify that all communication and power cables are plugged into the back of the Storage Expansion Unit.
2. Looking at the front of the expansion unit, turn on the left power switch first, then turn on the right power switch.
Specifications

Size
- With front bezel and side mounting flanges:
  - Depth: 501.9 mm (19.76 in.)
  - Height: 128.27 mm (5.05 in.)
  - Width: 482.60 mm (19.00 in.)

Weight
- NetMEDIA chassis only: 12 kg (26.5 lb)
- NetMEDIA chassis with rails: 14.5 kg (31.8 lb)

Electrical Input
- Auto Ranging 65 watt (112 watt peak) 47 to 60 Hz. sine wave input
  - AC Input (each): 100VAC - 250VAC at 4A-2A
  - DC Output Continuous (each): 5V at 5A, 12V at 3A
  - DC Output Peak (each): 5V at 8A, 12V at 6A

Environment
- Air temperature: -5° to 50° C (23° to 122° F)
- Altitude: -304 m to 15240 m (-1,000 ft. to 50,000 ft.)
- Humidity: 10% to 80%
Symptom-to-FRU Index

Use this index to find solutions to problems that have definite symptoms.

<table>
<thead>
<tr>
<th>Problem Indicator</th>
<th>FRU/Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front LED Off</td>
<td>1. Check power and power cord&lt;br&gt;2. Service Tray</td>
</tr>
<tr>
<td>Fan not turning (LED On)</td>
<td>1. Service Tray</td>
</tr>
<tr>
<td>Tape drive not functioning</td>
<td>1. Check server configuration&lt;br&gt;2. SCSI connector and cable&lt;br&gt;3. Power cable (internal)&lt;br&gt;4. Signal cable (internal)&lt;br&gt;5. Tape drive</td>
</tr>
</tbody>
</table>

**Note**

If you cannot find the problem using this Symptom-to-FRU Index, test the entire system. See the server documentation for more detailed information on testing and diagnostic tools.
Locations
- “Front Bezel”
- “Front Panel and Indicator”
- “Filler Panel” on page 8
- “Rear Panel” on page 8
- “Top Service Panel and Cables” on page 8
- “Drive Replacement” on page 9
- “Service Tray Removal” on page 11
- “Slide Rails Installation” on page 12

Front Bezel

To remove the front bezel:
1. Use the side handles and carefully pull the bezel off of the NetMEDIA chassis.
2. Snap the bezel onto the chassis to replace.

Front Panel and Indicator
Filler Panel

Net MEDIA Chassis

M3.5 Screw
(2 Places per Filler Panel)

Filler Panel

Rear Panel

SCSI I/O Connector
Cooling Fan
Power-On Switch

Service Tray Handle
A/C Power In

Top Service Panel and Cables

M3.5 Screws
(6 Places per Top Panel)

DC Power Cable
(2 per NetMEDIA Chassis, 4 Connectors Total)

Internal SCSI I/O Cable
(1 per NetMEDIA Chassis)

NetMEDIA Chassis
Drive Replacement

Drive Rail
(1 Pair Not Included)

M3 or #6-32 Phillips Pan Head Screw
(4 Places per Drive)

3.5" Drive
(Not Included)

Adapter Bracket
(1 Pair per Drive Bay)

Face Plate
(Must Be Flush With Drive When Attached)

NetMEDIA Storage Expansion Unit 9
To replace a drive:

1. Remove drive rails from the old drive and install on the new drive.
2. Connect the power and signal cable to the drive and insert the drive into the NetMEDIA chassis.
3. Secure the drive assembly with two M3.5 screws.
Service Tray Removal

To remove the Service Tray:

1. Remove the five screws that secure the service tray to the NetMEDIA chassis.
2. Using the service tray handle, carefully pull out the service tray.
3. To install the service tray, carefully slide the service tray into the NetMEDIA chassis and secure, using the same five screws.
Slide Rails Installation

1. Loosen the eight adjustment screws on both side rails and adjust to fit the rack.
2. Secure the slide rails to the rack cabinet using eight M6 screws and eight rack mounting nuts. Make sure both side rails are parallel and level to one another in the rack cabinet.
3. Tighten the eight rail adjustment screws.
4. Once the slide rails are secured to the rack, carefully slide the NetMEDIA chassis onto the slide rails.
5. Secure the NetMEDIA chassis with two M6 screws and two rack mounting nuts.
Parts Listing
### System

<table>
<thead>
<tr>
<th>Index</th>
<th>IBM NetMEDIA Storage Expansion Unit (Type 3551, Model 001)</th>
<th>FRU No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Base Enclosure</td>
<td>20L0556</td>
</tr>
<tr>
<td></td>
<td>Includes: drive rails, screws, nuts, and filler panels</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Front Bezel</td>
<td>03K8737</td>
</tr>
<tr>
<td>3</td>
<td>Service Tray (power supplies with fans)</td>
<td>28L1374</td>
</tr>
<tr>
<td>4</td>
<td>Cable Adapter Card</td>
<td>03K8751</td>
</tr>
<tr>
<td></td>
<td>Rack Mounting Rails with hardware</td>
<td>03K8753</td>
</tr>
</tbody>
</table>
Related Service Information

**Important**

The service procedures are designed to help you isolate problems. They are written with the assumption that you have model-specific training on all computers, or that are familiar with the computers, functions, terminology, and service information provided in this supplement and the PS/2 Hardware Maintenance Manual (part number 83G8990, form number S52G-9971-02).

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Information</td>
<td>16</td>
</tr>
<tr>
<td>General Safety</td>
<td>16</td>
</tr>
<tr>
<td>Electrical Safety</td>
<td>17</td>
</tr>
<tr>
<td>Safety Inspection Guide</td>
<td>18</td>
</tr>
<tr>
<td>Handling Electrostatic Discharge-Sensitive Devices</td>
<td>20</td>
</tr>
<tr>
<td>Grounding Requirements</td>
<td>20</td>
</tr>
<tr>
<td>Software/Hardware Mismatch Problems</td>
<td>21</td>
</tr>
<tr>
<td>Send Us Your Comments!</td>
<td>23</td>
</tr>
<tr>
<td>Problem Determination Tips</td>
<td>24</td>
</tr>
<tr>
<td>Phone Numbers, U.S. and Canada</td>
<td>25</td>
</tr>
<tr>
<td>Notices</td>
<td>27</td>
</tr>
<tr>
<td>Trademarks</td>
<td>27</td>
</tr>
</tbody>
</table>
Safety Information

The following section contains the safety information that you need to be familiar with before servicing the IBM Netfinity EXP15 Storage Expansion Unit.

General Safety

Follow these rules to ensure general safety:

- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object:
  1. Ensure you can stand safely without slipping.
  2. Distribute the weight of the object equally between your feet.
  3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
  4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. Do not attempt to lift any objects that weigh more than 16 kg (35 lb) or objects that you think are too heavy for you.
- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your tool case away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, approximately 8 centimeters (3 inches) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.

Remember: Metal objects are good electrical conductors.

- Wear safety glasses when you are: hammering, drilling, soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly before returning the machine to the customer.
**Electrical Safety**

Observe the following rules when working on electrical equipment.

---

**Important**

Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents.

Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

---

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
  - Performing a mechanical inspection
  - Working near power supplies
  - Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.
- If you need to work on a machine that has **exposed** electrical circuits, observe the following precautions:
  - Ensure that another person, familiar with the power-off controls, is near you.

  **Remember:** Another person must be there to switch off the power, if necessary.
  - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.

  **Remember:** There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.
  - When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
  - Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.
• Regularly inspect and maintain your electrical hand tools for safe operational condition.
• Do not use worn or broken tools and testers.
• *Never assume* that power has been disconnected from a circuit. First, *check* that it has been powered-off.
• Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
• Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
• Do not service the following parts *with the power on* when they are removed from their normal operating places in a machine:
  – Power supply units
  – Pumps
  – Blowers and fans
  – Motor generators
and similar units. (This practice ensures correct grounding of the units.)
• If an electrical accident occurs:
  – *Use caution; do not become a victim yourself.*
  – *Switch off power.*
  – *Send another person to get medical aid.*

**Safety Inspection Guide**

The intent of this inspection guide is to assist you in identifying potentially unsafe conditions on these products. Each machine, as it was designed and built, had required safety items installed to protect users and service personnel from injury. This guide addresses only those items. However, good judgment should be used to identify potential safety hazards due to attachment of non-IBM features or options not covered by this inspection guide.

If any unsafe conditions are present, you must determine how serious the apparent hazard could be and whether you can continue without first correcting the problem.

Consider these conditions and the safety hazards they present:
• Electrical hazards, especially primary power (primary voltage on the frame can cause serious or fatal electrical shock).
• Explosive hazards, such as a damaged CRT face or bulging capacitor
• Mechanical hazards, such as loose or missing hardware
The guide consists of a series of steps presented in a checklist. Begin the checks with the power off, and the power cord disconnected.

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Power-off the computer. Disconnect the power cord.
3. Check the power cord for:
   a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.
   b. The power cord should be the appropriate type as specified in the parts listings.
   c. Insulation must not be frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.
Handling Electrostatic Discharge-Sensitive Devices

Any computer part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD). ESD damage can occur when there is a difference in charge between objects. Protect against ESD damage by equalizing the charge so that the machine, the part, the work mat, and the person handling the part are all at the same charge.

Notes:

1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Make sure that the ESD protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

- Keep the parts in protective packages until they are inserted into the product.
- Avoid contact with other people.
- Wear a grounded wrist strap against your skin to eliminate static on your body.
- Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.
- Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.
- Select a grounding system, such as those listed below, to provide protection that meets the specific service requirement.

Note: The use of a grounding system is desirable but not required to protect against ESD damage.

- Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
- Use an ESD common ground or reference point when working on a double-insulated or battery-operated system. You can use coax or connector-outside shells on these systems.
- Use the round ground-prong of the AC plug on AC-operated computers.

Grounding Requirements

Electrical grounding of the computer is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.
Software/Hardware Mismatch Problems

If a failure appears to be the result of a defective FRU, but you don't find a problem, there might be a software and hardware mismatch. These problems might be intermittent, and they are usually difficult to diagnose.

If you are experiencing this type of problem, and the operating system is of the “direct driver” variety, which bypasses the BIOS interface, such as:

- AIX
- Netware
- SCO UNIX
- Some “windowing” interfaces
- Other Unix-based software

the most-likely cause of the problem is a mismatch between the software and the hardware.

The following information is provided to help you resolve these problems:

**Software Can Be Sensitive to the Hardware**

Direct-driver software is sensitive to variations in hardware design. The resulting incompatibilities are usually addressed with a revision (sometimes referred to as a patch), to the direct-driver software. Make certain the software is current and that all known revisions are installed. The IBM on-line bulletin board (sometimes referred to as PCPROD), and other software tools sources, such as Novell Netware, should be referenced by the software support personnel for any revisions provided by the appropriate software vendor.

The most-likely cause of these types of problems, when direct-driver software is involved, is the failure to obtain the latest revisions from the software vendor.

**Software Installation**

It is very important to follow the vendor's installation procedures. The software should not be migrated from another system, unless the installation instructions indicate that migration is supported (especially from a different model in the product line).

---

**Important**

Migrating adapters from slower systems to faster systems might cause problems. This is due to device-specific, system-specific, or time-dependent software code, that controls these devices.
Adapter and Software Compatibility

Hardware adapters for some operating systems must be approved by the software vendor to be compatible with that software. The approval is specific to the system, adapter E.C. level, and the software version. Contact the software vendor to confirm that system and adapter configuration is supported by their software level. The compatibility support is especially important for, (but not limited to), all LAN adapters and RIPL applications.

Software Failures After a Hardware Change

After the initial installation, any changes in the hardware configuration (addition or changes of adapters or features), might result in computer failures and require the reinstallation of the operating system or the software revisions.

Specific hardware configuration changes (such as memory address, interrupt level, or programmable option select), might result in a computer failure if the software has unique operating requirements.
Send Us Your Comments!

We want to know your opinion about this manual (part number 01K4880). Your input will help us to improve our publications.

Please photocopy this survey, complete it, and then fax it to IBM HMM Survey at 919-543-8167 (USA).

Name

Phone Number

1. Do you like this manual?
   □ Yes  □ No

2. What would you like to see added, changed, or deleted in this manual?

3. What is your service experience level?
   □ Less than five years
   □ More than five years

4. Which Servers do you service most?

Thanks in advance for your response!
Problem Determination Tips

Due to the variety of hardware and software combinations that can be encountered, use the following information to assist you in problem determination. If possible, have this information available when requesting assistance from Service Support and Engineering functions.

- Machine type and model
- Processor or hard disk upgrades
- Failure symptom
  - Do diagnostics fail?
  - What, when, where, single, or multiple systems?
  - Is the failure repeatable?
  - Has this configuration ever worked?
  - If it has been working, what changes were made prior to it failing?
  - Is this the original reported failure?
- Reference/Diagnostics Diskette Version
  - Type and version level
- Hardware configuration
  - Print (print screen) configuration currently in use
  - BIOS level
- Operating system software
  - Type and version level

Important

To eliminate confusion, identical systems are considered identical only if they:

1. Are the exact machine type and models
2. Have the same BIOS level
3. Have the same adapters/attachments in the same locations
4. Have the same address jumpers/terminators/cabling
5. Have the same software versions and levels
6. Have the same Reference/Diagnostics Diskette (version)
7. Have the same configuration options set in the system
8. Have the same setup for the operation system control files

Comparing the configuration and software set-up between “working and non-working” systems will often lead to problem resolution.
Phone Numbers, U.S. and Canada

Note
EMEA customers should contact their Dealer or IBM Service organization.

Before you place a call to the Support Center, refer to “Problem Determination Tips” on page 24.

Authorized Dealers or Servicers

<table>
<thead>
<tr>
<th>Number</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>919-517-0001</td>
<td>Bulletin Board Service - PC Company</td>
</tr>
<tr>
<td>800-528-7705</td>
<td>Bulletin Board Service - TSS Only</td>
</tr>
<tr>
<td>800-937-3737</td>
<td>IBM Business Partner Education</td>
</tr>
<tr>
<td>800-426-2472</td>
<td>IBM Customer Engineer Technical Support</td>
</tr>
<tr>
<td>800-IBM-DEAL</td>
<td>IBM Dealer Support Center</td>
</tr>
<tr>
<td>800-342-6672</td>
<td>IBM Direct Desktop Software Sales</td>
</tr>
<tr>
<td>303-924-4015</td>
<td>IBM Part Number ID and Look Up</td>
</tr>
<tr>
<td>800-426-7763</td>
<td>IBM PC HelpCenter</td>
</tr>
<tr>
<td>800-237-5511</td>
<td>IBM Software Defect Support (CSDs)</td>
</tr>
<tr>
<td>800-327-5711</td>
<td>IBM Software Ordering (Publications)</td>
</tr>
<tr>
<td>800-426-1484</td>
<td>IBM Supplies Technical Hotline</td>
</tr>
<tr>
<td>800-388-7080</td>
<td>IBM Warranty Parts Claims Center</td>
</tr>
</tbody>
</table>

U.S. Customers and Helpware Subscribers

<table>
<thead>
<tr>
<th>Number</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>919-517-0001</td>
<td>Bulletin Board Service - PC Company</td>
</tr>
<tr>
<td>800-426-8322</td>
<td>Customer Education Business Unit</td>
</tr>
<tr>
<td>800-999-0052</td>
<td>Customized Operational Services</td>
</tr>
<tr>
<td>800-237-4824</td>
<td>EduQuest (Educational Computers)</td>
</tr>
<tr>
<td>800-964-8523</td>
<td>End User HelpDesk Support</td>
</tr>
<tr>
<td>800-742-2493</td>
<td>IBM Anti-Virus Services</td>
</tr>
<tr>
<td>800-447-4700</td>
<td>IBM Authorized Dealer Referrals</td>
</tr>
<tr>
<td>800-426-2468</td>
<td>IBM Dealer Referral</td>
</tr>
<tr>
<td>800-426-3333</td>
<td>IBM Information Referral Service</td>
</tr>
<tr>
<td>800-IBM-SERV</td>
<td>IBM Service</td>
</tr>
<tr>
<td>800-772-2227</td>
<td>IBM PC HelpCenter and HelpDesk</td>
</tr>
<tr>
<td>800-426-7282</td>
<td>IBM Technical Manuals</td>
</tr>
<tr>
<td>800-426-9402</td>
<td>Multimedia Information Center (Ext. 150)</td>
</tr>
<tr>
<td>800-241-1620</td>
<td>Multimedia HelpCenter</td>
</tr>
<tr>
<td>800-342-6672</td>
<td>OS/2 Information Line</td>
</tr>
<tr>
<td>800-237-5511</td>
<td>OS/2 Support Services</td>
</tr>
<tr>
<td>800-284-5933</td>
<td>Prodigy</td>
</tr>
<tr>
<td>914-962-0310</td>
<td>Prodigy User Questions</td>
</tr>
<tr>
<td>800-547-1283</td>
<td>Technical Coordinator Program</td>
</tr>
<tr>
<td></td>
<td>SystemXtra for Personal Systems</td>
</tr>
<tr>
<td></td>
<td>LAN Automated Distribution/2</td>
</tr>
<tr>
<td></td>
<td>OS/2 Bulletin Board</td>
</tr>
<tr>
<td></td>
<td>OS/2 Application Assistance Center</td>
</tr>
<tr>
<td>800-551-2832</td>
<td>Technical Solutions Magazine</td>
</tr>
</tbody>
</table>

Related Service Information 25
<table>
<thead>
<tr>
<th>Number</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>800-661-PSMT</td>
<td>Business Partner Marketing Support</td>
</tr>
<tr>
<td>905-316-5556</td>
<td>Business Partner Marketing Support - Toronto</td>
</tr>
<tr>
<td>514-938-6048</td>
<td>Business Partner Marketing Support - French</td>
</tr>
<tr>
<td>800-465-4YOU</td>
<td>Customer Relations</td>
</tr>
<tr>
<td>800-IBM-SERV</td>
<td>Customer Service Dispatch</td>
</tr>
<tr>
<td>800-263-2769</td>
<td>Customer Service Parts</td>
</tr>
<tr>
<td>800-465-2222</td>
<td>Customer Support Center (ISC)</td>
</tr>
<tr>
<td>416-443-5701</td>
<td>Customer Service Repair Centre</td>
</tr>
<tr>
<td>800-505-1855</td>
<td>Dealer Support Group (DSG)</td>
</tr>
<tr>
<td>800-465-7999</td>
<td>HelpClub Registration / IBM Direct</td>
</tr>
<tr>
<td>800-465-3299</td>
<td>HelpFax</td>
</tr>
<tr>
<td>905-316-3299</td>
<td>HelpFax - Toronto</td>
</tr>
<tr>
<td>800-565-3344</td>
<td>HelpPC</td>
</tr>
<tr>
<td>905-513-3355</td>
<td>IBM Certification Administrator</td>
</tr>
<tr>
<td></td>
<td>Mail to: 50 Acadia Drive Markham, Ontario L3R 0B3</td>
</tr>
<tr>
<td>800-661-2131</td>
<td>IBM Education (A+ Course)</td>
</tr>
<tr>
<td>800-268-3100</td>
<td>IBM Information Network Support</td>
</tr>
<tr>
<td>800-387-8343</td>
<td>IBM PC Service Partners</td>
</tr>
<tr>
<td>800-487-7426</td>
<td>International Warranty Registration</td>
</tr>
<tr>
<td>800-663-7662</td>
<td>Lexmark Product Information</td>
</tr>
<tr>
<td>800-IBM-9990</td>
<td>PartnerLine</td>
</tr>
<tr>
<td>800-263-2769</td>
<td>Parts Orders, Exchange or Emergency</td>
</tr>
<tr>
<td>416-443-5808</td>
<td>Parts Regular Orders, Exchange</td>
</tr>
<tr>
<td></td>
<td>(Fax)</td>
</tr>
<tr>
<td>416-443-5755</td>
<td>Parts Orders, Inquiries</td>
</tr>
<tr>
<td>514-938-3022</td>
<td>PC Co Bulletin Board - Montreal</td>
</tr>
<tr>
<td>905-316-4255</td>
<td>PC Co Bulletin Board - Markham</td>
</tr>
<tr>
<td>604-664-6464</td>
<td>PC Co Bulletin Board - Vancouver</td>
</tr>
<tr>
<td>204-934-2735</td>
<td>PC Co Bulletin Board - Winnipeg</td>
</tr>
<tr>
<td>800-661-7768</td>
<td>PS Marketing Support (PSMT)</td>
</tr>
<tr>
<td>800-565-3344</td>
<td>PS/1 Warranty Customer Helpline</td>
</tr>
<tr>
<td>800-387-8483</td>
<td>PS/1 Warranty Service (DOAs)</td>
</tr>
<tr>
<td>800-465-1234</td>
<td>Publications Ordering</td>
</tr>
<tr>
<td>905-316-4148</td>
<td>Service Management Support</td>
</tr>
<tr>
<td>905-316-4100</td>
<td>Service Management Support</td>
</tr>
<tr>
<td></td>
<td>(Fax)</td>
</tr>
<tr>
<td>905-316-4150</td>
<td>Service (Warranty) Manager</td>
</tr>
<tr>
<td>905-316-4100</td>
<td>Service (Warranty) Manager</td>
</tr>
<tr>
<td></td>
<td>(Fax)</td>
</tr>
<tr>
<td>905-316-4872</td>
<td>Service Quality Programs</td>
</tr>
<tr>
<td>905-316-4100</td>
<td>Service Quality Programs</td>
</tr>
<tr>
<td></td>
<td>(Fax)</td>
</tr>
<tr>
<td>800-661-2131</td>
<td>Skill Dynamics (Education)</td>
</tr>
<tr>
<td>800-565-3344</td>
<td>ThinkPad EasyServe</td>
</tr>
<tr>
<td>416-443-5835</td>
<td>Warranty Claim Fulfillment</td>
</tr>
<tr>
<td></td>
<td>(Fax)</td>
</tr>
<tr>
<td>905-316-2445</td>
<td>Warranty Claim Reimbursement</td>
</tr>
<tr>
<td>905-316-3515</td>
<td>Warranty Claim Reimbursement</td>
</tr>
<tr>
<td></td>
<td>(Fax)</td>
</tr>
<tr>
<td>416-443-5778</td>
<td>Warranty Claim Parts Inquiry</td>
</tr>
<tr>
<td>800-505-1855</td>
<td>Warranty Provider Support Hotline</td>
</tr>
<tr>
<td>800-267-7472</td>
<td>Warranty Service, ThinkPad</td>
</tr>
</tbody>
</table>
Notices

References in this publication 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. Subject to IBM’s valid intellectual property or other legally protectable rights, any functionally equivalent product, program, or service 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.

Trademarks

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

<table>
<thead>
<tr>
<th>Term</th>
<th>Trademark</th>
</tr>
</thead>
<tbody>
<tr>
<td>HelpWare</td>
<td>IBM</td>
</tr>
<tr>
<td>NetBAY3</td>
<td>Netfinity</td>
</tr>
<tr>
<td>NetMEDIA</td>
<td>OS/2</td>
</tr>
<tr>
<td>PowerPC</td>
<td>ServeRAID</td>
</tr>
<tr>
<td>ThinkPad</td>
<td>ValuePoint</td>
</tr>
</tbody>
</table>

Other company, product, and service names may be trademarks or service marks of others.