

IBM Netfinity Server Options

S09N-1004-00

**IBM Netfinity Internal Tape Drives**

**Hardware Maintenance Manual**

**April 1999**

**Use this manual with the  
Netfinity Server Hardware  
Maintenance Manual**

**We Want Your Comments!  
(Please see page 20)**



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**Note**

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 24.

**First Edition (May 1999)**

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## About This Book

This manual contains problem solving and maintenance information on using the following tape drives:

- 4/8 GB<sup>1</sup> TR4 SCSI Tape Drive
- 4/8 GB TR4 IDE Tape Drive
- 10/20 GB TR5 IDE Tape Drive
- 10/20 GB NS20 SCSI Tape Drive
- 4/10 GB 4 mm DDS/2 SCSI Tape Drive
- 12/24 GB 4 mm DDS/3 SCSI Tape Drive
- 20/40 GB 8 mm Mammoth SCSI Tape Drive
- 20/40 GB DLT SCSI Tape Drive
- 35/70 GB DLT SCSI Tape Drive

## Online Support

Use the World Wide Web (WWW) or the IBM PC Company BBS to download Diagnostic, BIOS Flash, and Device Driver files.

File download address is:

<http://www.us.pc.ibm.com/files.html>

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

## IBM Online Addresses:

The HMM manuals online address is:

<http://www.us.pc.ibm.com/cdt/hmm.html>

The IBM PC Company Support Page is:

<http://www.us.ibm.com/support/index.html>

The IBM PC Company Home Page is:

<http://www.pc.ibm.com>

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<sup>1</sup> GB equals approximately 1 000 000 000 bytes.



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## Solving problems

Tape drive problems can be caused by hardware, software, or user error. You might be able to use the information in this section to solve problems yourself, or gather helpful information you can pass on to a service technician.

## Obtaining information about your system

There are a variety of hardware and software combinations that can occur when you use tape drives. Obtain the following information about your hardware and software, and, if possible, have it available when requesting assistance from Service Support and Engineering:

- Machine model and type
- Processor or hard disk upgrades
- Possible reasons for failure symptoms such as:
  - Do the diagnostics fail?
  - Is the failure repeatable?
  - Has the configuration ever worked? If yes, what have you changed in the configuration?
- Hardware configuration (print the screen copy) and BIOS level
- Operating system software version and updates
- Application software version and updates

## Applying BIOS updates and firmware revisions

Apply the latest BIOS updates and SCSI adapter or IDE controller firmware revisions to address problems with the configuration or use of a tape drive.

ATAPI tape drives are usually configured as a Master on a secondary IDE controller. The primary hard disk drive is usually configured as a Master and the CD-ROM drive as a Slave on the primary IDE controller. These configurations provide the optimum performance for backup operations.

ATAPI tape drives are normally shown as Sequential Access Devices in the BIOS information. However, some BIOS might recognize tape drives as CD-ROM drives. If the BIOS information does not display the tape drive, be sure that you have correctly placed the configuration jumpers on the tape drive, and that any applicable tape drive firmware updates have been installed.

Information about SCSI tape drives is displayed at POST after restarting the system. Verify that the SCSI ID, LUN and switch settings for the tape drive are correct in the POST display.

## Using your operating system to verify tape drive installation

You can use your operating system to verify the installation of a tape drive.

### Using Windows 98 or Windows 95 to identify the controller and installed tape drives:

If you are using Microsoft® Windows® 98 or Windows 95, you can use the following steps to identify hard disk controllers in the system:

1. Select **Settings**.
2. Click **Control Panel**.
3. Double-click **System**.
4. Click the **Device Manager** tab.
5. Double-click **Hard disk controllers** to identify the hard disk controllers in the system.

If you are using Windows 98 or Windows 95, you can use the following steps to identify installed tape drives in the system:

1. Select **Settings**.
2. Click **Control Panel**.
3. Double-click **System**.
4. Click the **Device Manager** tab.
5. Double-click **Tape drives** to identify the tape drives in the system.

### Using Windows NT to identify the controller and installed tape drives:

If you are using Windows NT®, you can use the following steps to verify that the controller has started in the system:

1. Select **Settings**.
2. Click **Control Panel**.
3. Double-click **SCSI Adapters**.
4. Click the **Drivers** tab.
5. Double-click **Controller**.

If you are using Windows NT, you can use the following steps to identify installed tape drives in the system:

1. Select **Settings**.
2. Click **Control Panel**.
3. Double-click **SCSI Adapters**.
4. Click the **Device** tab.
5. Double-click **Controller**.

### Using OS/2 to identify installed tape drives:

If you are using OS/2®, you can use the following steps to identify installed tape drives in the system:

1. Start Netfinity® Service Manager.
2. Click **System information**.

3. If you have installed a SCSI tape drive, click **SCSI Subsystem**. If you have installed an IDE tape drive, click **IDE Subsystem**.

### Using Novell to identify installed tape drives

**Note**

If you are using a HAM driver, be sure that the NWASPI.CDM file is being loaded so that the tape device will be recognized by the application software.

If you are using Novell, identify installed tape drives in the system by typing `list devices` or `load monitor.nlm` at a console prompt.

### Using SCO Open Server to identify the tape

**drive:** If you are using SCO Open Server, identify installed tape drives in the system by typing `tape status` at a command prompt.

### Using operating systems to determine tape drive settings

If you are using Windows 98 or Windows 95, use the following steps to determine the drive settings:

1. Select **Settings**.
2. Click **Control Panel**.
3. Double-click **System**.
4. Double-click **Tape Devices** to view tape drives in the system.
5. Select a displayed tape drive.
6. Click the **Properties** button.
7. Click the **Resources** tab to view tape drive settings.

If you are using Windows NT, use the following steps to determine the drive settings:

1. Select **Settings**.
2. Click **Control Panel**.
3. Double-click **System**.
4. Double-click **SCSI adapters** to view tape drives in the system.
5. Select a displayed tape drive.
6. Click the **Properties** button.
7. Click the **Resources** tab to view tape drive settings.

### Using specific tape drive information to solve problems

This section provides information for solving problems with specific tape drives.

### TR 4 tape drive

**Part numbers**

06H9716 or 06H9720

**FRU numbers**

**SCSI:** 06H9721, 02K1129, or 28L1599

**IDE:** 07H0504, 02K3397, or 10L6039

**Product specifications**

- Internal SCSI or IDE
- Up to 0.5 MB/sec (1.8 GB/hr) native
- Up to 1 MB/sec (3.6 GB/hr) with software compression

**Performing a reset**

No optional reset is offered on this device. The system unit must be power cycled.

**Cartridges**

The following cartridges are available:

- Imation TR4 data cartridge
- IBM 16G8576 (5-pack) cleaning cartridge
- IBM 16G8583 (single) cleaning cartridge

**Force ejection**

Wait until the drive activity light is OFF; then pull the tape cartridge straight out.

**If the Indicator Light is amber and flashing:**

1. Write-enable the tape cartridge.
2. Check the hardware and software configuration.
3. Close all applications.
4. Clean the drive and use new tape.
5. Verify that you are using the latest firmware level.
6. Replace the drive.

**TR 5 tape drive****Drive part number**

20L0549

**Drive FRU number**

28L1632

**Product specifications**

- Internal IDE
- Up to 1 MB/sec (3.6 GB/hr) native
- Up to 2 MB/sec (7.2 GB/hr) with hardware compression

**Performing a reset**

No optional reset is offered on this device. The system unit must be power cycled.

**Cartridges**

The following cartridges are available:

- Imation NS20 data cartridge
- IBM 16G8576 (5-pack) cleaning cartridge
- IBM 16G8583 (single) cleaning cartridge

**Force ejection**

Wait until the drive activity light is OFF; then pull the tape cartridge straight out.

**If the Indicator Light is amber and flashing:**

1. Write-enable the tape cartridge.
2. Check the hardware and software configuration.
3. Close all applications.
4. Clean the drive and use new tape.
5. Verify that you are using the latest firmware level.
6. Replace the drive.

**NS20 10/20 GB tape drive****Drive part number**

01K1319

**Drive FRU number**

10L6061

**Product specifications**

- SCSI
- Up to 1 MB/sec (3.6 GB/hr) native
- Up to 1 MB/sec (7.2 GB/hr) with hardware compression

**Performing a reset**

No optional reset is offered on this device. The system unit must be power cycled.

**Cartridges**

The following cartridges are available:

- Imation NS20 data cartridge
- IBM 16G8576 (5-pack) cleaning cartridge
- IBM 16G8583 (single) cleaning cartridge

**Force ejection**

Wait until the drive activity light is OFF; then pull the tape cartridge straight out.

**If the Indicator Light is amber and flashing:**

1. Write-enable the tape cartridge.
2. Check the hardware and software configuration.
3. Close all applications.
4. Clean the drive and use new tape.
5. Verify that you are using the latest firmware level.
6. Replace the drive.

**DDS/3 12/24 GB 4 mm tape drive****Drive part number**

01K1282

**Drive FRU numbers**

02K1150 or 28L1652

**Product specifications**

- SCSI
- Up to 1 MB/sec (3.6 GB/hr) native

- Up to 2 MB/sec (7.2 GB/hr) with hardware compression

#### **Performing a reset**

No optional reset is offered on this device. The system unit must be power cycled.

#### **Cartridges**

The following cartridges are available:

- PN 59H3090 cleaning cartridge
- PN 59H3465 (5-pack) data cartridge

#### **Force ejection**

Press the **Unload** button.

**Note:** The time between the pressing of the button and the eject might be several seconds; do not turn off the tape drive while waiting to eject.

#### **Indicator lights**

If the left green light is steady, the cartridge is inserted and ready to use.

If the left green light is flashing, the tape drive needs cleaning, or needs to be replaced.

If the right amber light is steady, the drive is ready or writing to tape.

If the right amber light is flashing, a hardware fault has occurred.

## **20/40 GB Mammoth 8 mm tape drive**

#### **Drive part number**

01K1325

#### **Drive FRU numbers**

76H0487, 10L6099, or 28L1654

#### **Product specifications**

- Up to 3 MB/sec (1.8 GB/hr) native
- Up to 6 MB/sec (3.6 GB/hr) with hardware data compression
- Data transfer rate 6 megabytes/sec
- 2:1 compression ratio
- 40 GB storage in compressed mode (170 m cartridge)

#### **Configurations**

- Wide
- Supports fast synchronous mode
- Internal
- External when installed in an IBM 3510 SCSI Enclosure.

#### **Front panel control**

##### **Unload** button

- Push/release causes drive to eject media
- Push/hold causes drive to reset

#### **Performing a reset**

Hold down the **Unload** button for more than 10 seconds.

## Cartridges

The following cartridges are available:

- IBM 59H2678 (5-pack) data cartridge
- IBM 59H2898 (single) cleaning cartridge

## Force ejection

Press the **Unload** button.

### Note

The time between the pressing of the button and the eject might be several seconds; do not turn off the tape drive while waiting to eject.

## Indicator light

The primary indicator light is the top LED. When the LED is solid amber, cleaning is required. The Clean Soon message will display on the LCD.

## Conditions that require cleaning

- 72 hours of tape tension time
- After a severe write/read error condition occurs
- Switching from MP to AME media

A Must Clean message will display on the LCD. AME tapes will not be accepted until cleaning completes.

- Spent cartridge will keep light on until cleaning completes.

## Interpreting error messages on the LCD

The error log stores primary and secondary error codes associated with a failure when such codes are available. In addition, these error codes will be displayed on the drive LCD if the drive has an error and the LCD is a display mode that reports the last three errors. Some of these error codes include a short description that might help identify the root cause of the problem.

## 20/40 GB DLT tape drive

### Drive part number

01K1320

### Drive FRU numbers

10L6066 or 28L1653

### Product specifications

- Up to 1.5 MB/sec (5.4 GB/hr) native
- Up to 3 MB/sec (10.8 GB/hr) with hardware compression

### Performing a reset

## Cartridges

The following cartridges are available:

- IBM 59H3040 (single) data cartridge
- IBM 59H3092 (single) clean cartridge

### Force ejection

1. Press the **Unload** button.
2. The yellow **tape in use** indicator blinks as tape rewinds.
3. When the green indicator is lit, and the beep sounds, pull the cartridge insert/release handle to eject the cartridge.

### Indicator lights

- If the **Cleaning Tape** indicator (yellow) is lit, clean the tape drive.
- If all indicators on the left side, or all the indicators on the right side, blink, the tape drive might require service. Try resetting the power drive to the tape drive, and if the problem continues, the tape drive must be serviced.

### Troubleshooting detached leaders

To troubleshoot detached leaders:

1. Inspect for broken or unseated misaligned cartridge leader.
2. Check cartridge for broken reel lock especially if the cartridge has been dropped. Reel locks can be seen through the holes (match your cartridge against a known good cartridge). Shake to detect any loose parts. Do not use the cartridge if there is a broken reel lock or loose parts.
3. Check the drive floor spring for correct type.

Using a loader version floor spring in a tabletop configuration will lead to unbuckling problems. The floor spring is beneath the floor plate at the rear of the receiver, and can be seen when the cartridge is removed.

The loader floor spring is blue and the tabletop floor spring is silver.

4. Avoid rapid insertion of the cartridge.
5. Check for a broken or damaged take-up leader. The mushroom-shaped end must not be bent or visibly cut.
6. Check that the operator did not manually override the interposer to remove the cartridge when it was not fully rewound. For example, make sure that excessive force was not used to open the handle when the green "operate handle" LED was not on.
7. Be sure not to dislodge the take-up leader by inserting a finger or other object into the receiver.
8. If a cartridge does not eject, check to see if the buckling mechanism spring is broken.
9. Check to see if the buckling mechanism arm is damaged.
10. Check to see if a motor, such as Motor A (Supply), failed because it had a seizure caused by a foreign object in the mechanism. A foreign object in the mechanism could rip the leaders apart.



**Note**

Warranty restrictions prohibit anyone but specially-trained service personnel from replacing detached leader on the 20/40 GB or 35/70 GB DLT tape drives. Leader detachment issues are detailed during appropriate service training.

**Firmware update**

Firmware updates can be made directly from a tape cartridge that has the appropriate firmware image file. You can order these tape cartridges from IBM. You can also implement a firmware update using a DOS-based drive maintenance software application that is bundled in self-extracting DOS bootable image files that include the latest firmware revision from IBM electronic sites including the World Wide Web, ftp, and dial-in sites.

**35/70 GB tape drive****Drive part numbers**

- 04K0149 (Internal)
- 01K1174 (External - W/D)

**Drive FRU numbers**

- 00K7898, 10L6049, or 28L1655

**Product specifications**

- Up to 5 MB/sec (18 GB/hr) native
- Up to 10 MB/sec (36 GB/hr) with hardware compression

**Performing a reset****Cartridges**

The following cartridges are available:

- IBM 59H3040 (single) data cartridge
- IBM 59H3092 (single) clean cartridge

**Force ejection**

1. Press the **Unload** button.
2. The yellow **tape in use** indicator blinks as tape rewinds.
3. When the green indicator is lit, and the beep sounds, pull the cartridge insert/release handle to eject the cartridge.

**Indicator lights**

- If the **Cleaning Tape** indicator (yellow) is lit, clean the tape drive.
- If all indicators on the left side, or all the indicators on the right side, blink, the tape drive might require service. Try resetting the power drive to the tape drive, and if the problem continues, the tape drive must be serviced.

## Troubleshooting detached leaders

To troubleshoot detached leaders:

1. Inspect for broken or unseated misaligned cartridge leader.
2. Check cartridge for broken reel lock especially if the cartridge has been dropped. Reel locks can be seen through the holes (match your cartridge against a known good cartridge). Shake to detect any loose parts. Do not use the cartridge if there is a broken reel lock or loose parts.
3. Check the drive floor spring for correct type.

Using a loader version floor spring in a tabletop configuration will lead to unbuckling problems. The floor spring is beneath the floor plate at the rear of the receiver, and can be seen when the cartridge is removed.

The loader floor spring is blue and the tabletop floor spring is silver.

4. Avoid rapid insertion of the cartridge.
5. Check for a broken or damaged take-up leader  
The mushroom-shaped end must not be bent or visibly cut.
6. Check that the operator did not manually override the interposer to remove the cartridge when it was not fully rewound. For example, make sure that excessive force was not used to open the handle when the green "operate handle" LED was not on.
7. Be sure not to dislodge the take-up leader by inserting a finger or other object into the receiver.
8. If a cartridge does not eject, check to see if the buckling mechanism spring is broken.
9. Check to see if the buckling mechanism arm is damaged.
10. Check to see if a motor, such as Motor A (Supply), failed because it had a seizure caused by a foreign object in the mechanism. A foreign object in the mechanism could rip the leaders apart.

### Note

Warranty restrictions prohibit anyone but specially-trained service personnel from replacing detached leader on the 20/40 GB or 35/70 GB DLT tape drives. Leader detachment issues are detailed during appropriate service training.

## Firmware update

Firmware updates can be made directly from a tape cartridge that has the appropriate firmware image file. You can order these tape cartridges from IBM. You can also implement a firmware update using a DOS-based drive maintenance software application that is bundled in self-extracting DOS bootable image files that include

the latest firmware revision from IBM electronic sites including the World Wide Web, ftp, and dial-in sites.

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## Cleaning and maintaining your tape drive

Dirty tape drives can cause many problems, from frequent error messages (a solid amber tape drive LED or text messages from the backup application) to clean the drive to outright drive failures. To determine tape drive problems in a server, check the following areas that might make tape drives dirty:

- Cycle life of cleaning cartridges
- Environment
- Frequency of cleaning
- Frequency and duration of use

You can find software configuration relative to the “Server Proven” Matrices on the IBM Web site at <http://www.ibm.com/pc/us/compat/index.html>

Use the following checklist for preventive maintenance and cleaning:

- Routinely clean the tape drive with an approved (dry type) cleaning cartridge.
- Replace data cartridges after a year.
- Clean the tape drive when the cleaning (amber) LED is on.
- Clean the tape drive after using a new media cartridge.
- Clean the tape drive after every 24 hours of tape motion.
- Clean the TBU regularly and be sure the cycle life of the cleaning cartridge is good.
- If the disturbance light (lightning bolt) is solid, clean the TBU once.
- If the disturbance light is flashing, clean the TBU four times.

---

## Recognizing soft errors

Soft errors are normally considered events rather than errors. No data is lost when soft errors occur. For a write, the data is rewritten. For a read, retries are performed.

Listed below are some of the variables that create soft errors:

- Media dropouts
- Temperature of media (not acclimated)
- System bus activity
- Applications
- Head wear
- Contamination

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## Troubleshooting tape drive and SCSI problems

This section provides information on troubleshooting tape drive and SCSI problems.

A non-hard disk device attached to a SCSI or IDE controller will not function without a device driver. IDE real-mode drivers are called ATAPI. SCSI real-mode drivers are called ASPI. Windows 98, Windows 95, Windows NT, and OS/2 provide native 16/32-bit protected mode SCSI/IDE drivers to support all devices.

Most SCSI tape drives and CD-ROM drives are 8-bit devices and need special settings to work in the newer, faster 16/32-bit SCSI/RAID controllers in servers.

If you incur intermittent backup problems or "SCSI Time-out Errors" when you use the tape unit, the "Maximum Sync Transfer Rate" might be set higher than the unit can handle. The "Maximum Sync Transfer Rate" parameter is found under "SCSI Device Configuration" in **SCSI Select**. Set the Maximum Sync Transfer Rate to its lowest setting for the SCSI ID for the tape drive (5 for non-ultra adapters and 10 for ultra adapters).

The autoloader is a multi-LUN device. New Adaptec controllers have a selection under "Advanced Configuration Options" to disable multi-LUN support. This selection must be enabled for the autoloader whether the BIOS is enabled or disabled.

For optimum performance, set tape drive IDs to lowest priority. However, the tape drive ID must be higher than a CD-ROM drive ID. Hard drives must have a higher ID than tape drives and CD-ROM drives. The IDs for tape drives and CD-ROM drives are usually set at 5 or 6 on Adaptec controllers. Be sure that the Reverse BIOS scan is not enabled on controllers that allow it or the tape unit will be seen as a boot device at ID 6.

The 4/10 4 mm Tape Drive has a disturbance light that appears as a lightning bolt on the drive. The disturbance light will come on automatically to request cleaning or to show a drive malfunction.

If devices are not displaying during a SCSI scan:

- Check that the device at the end of the chain is the only device terminated.
- Check that a Fast Wide (16-bit) cable is not terminated by a Fast (8-bit) device with a 16/8-bit converter, such as a CD-ROM drive. The Fast Wide cable must be terminated by a Fast Wide device. Be sure that the 16/8-bit converter has not been placed on backwards. You must use the converters for attaching Fast devices only to a Fast Wide cable.

Fast Wide devices require Fast Wide cables and controllers.

- Check that SCSI IDs are not conflicting between devices on the chain. For example, device chains with attached hot swap backplanes have ID 6 only available for non-hot swap device, except for the 704 Server which uses ID 6 for the backplane. Any other attached device will conflict with a backplane position on that chain. Be sure to assign hot swap drives the ID equivalent to their bay position minus one.
- Always assign SCSI ID 7 to the host adapter. No ID higher than 7 is supported even if the controller allows it.
- If a hard drive does not have AUTO START enabled by jumpers, you must have the Adaptec controller send a "Start Unit Command." To send this command:
  1. Go to SCSI Select.
  2. Select "Configure/View Host Adapter Settings."
  3. Select "SCSI Device Configuration."
  4. Set the "Send Start Unit Command" to "yes" under the SCSI ID for the drive.

Even if an Autostart jumper is placed on a drive, you can still set the "Send Start Unit Command" to "yes." However, do not set multiple drives to Autostart or they will drain the power supply when they all try to start at once.

- All connectors on a single Adaptec controller are not multichannel. SCSI IDs 0–6 are available only to devices attached to one internal or external chain, and IDs will conflict between chains on the same controller.
- Only two cables can be attached to the Adaptec controller's internal or external connectors.
- Remove any TERM POWER jumpers on an devices on the chains. Use these jumpers only on older controllers.

## Diagnostic tools

All new Netfinity servers include a Tape Diagnostic module in the system (PC Doctor) diagnostic menu.

Potential error codes from the tape diagnostic are:

- 264-198 Test aborted
- 264-251 ASPI Device Driver Failure
- 264-252 Presence Test Failure
- 264-253 Tape Load/Mount Failure
- 264-254 Tape Ejection Failure
- 264-255 Self-Test Failure
- 264-256 R/W Self-Test Failure

You can also find more detail in the PC Doctor error log.

## Troubleshooting TBU intermittent problems

To troubleshoot TBU intermittent problems:

- Be sure you are using the latest firmware (4MMDAT4/5) (TIP H013309) for the TBU.
- Be sure the data being backed up is compressed only once (TIP H162989).
- Check that the TBU SCSI ID is set to 5 or 6. If the TBU is set to SCSI ID 6, be sure to disable "Reverse BIOS scan" on an OEM controller such as Adaptec.
- Set the "Max Sync Transfer Rate" to the lowest rate available (5 or 10) for the TBU SCSI ID.
- Disable "Initiate Wide Negotiation" for the TBU SCSI ID or for any other 8-bit device.
- Use 16-bit active termination only if 8-bit devices (CD-ROM drives, TBUs) are attached to 16-bit SCSI controllers such as F/W, U/W and U/U.
- Check the host adapter termination.
- If only internal devices are used, you not need to use a physical active termination as long as the last device on the chain is 16-bit and auto-terminated. However, if you add an external device, you might need to physically terminate the internal chain for the controller to recognize all the devices.
- Try moving the 8-bit device or devices to the controller's 8-bit port, if available, and connect with another 50-pin cable.

## Terminating the host adapter

To set the LOW/HIGH termination for the host adapter, use the following table:

| Devices attached to:                | LOW | HIGH |
|-------------------------------------|-----|------|
| 68-pin internal only                | ON  | ON   |
| 68-pin external only                | ON  | ON   |
| 68-pin internal and 68-pin external | OFF | OFF  |
| 50-pin internal only                | ON  | ON   |
| 50-pin internal and 68-pin internal | OFF | ON   |
| 50-pin internal and 68-pin external | OFF | ON   |

To set termination on host adapters which allow only Enable/Disable Termination, use the following table:

| Devices are attached to: | Termination |
|--------------------------|-------------|
| Internal connector only  | Enable      |
| External connector only  | Enable      |



|                                  |          |
|----------------------------------|----------|
| Internal and external connectors | Disabled |
|----------------------------------|----------|

### Using single-ended or differential termination

Tape libraries have a minimum of two SCSI IDs, one for the autoloader unit and one for each tape drive unit installed. Depending on the type of SCSI controller, the SCSI termination can be single-ended or differential.

**Single-ended (normal) SCSI:** In single-ended SCSI, there is one wire that carries each signal across the chain. SCSI-1 uses passive termination and SCSI-2 uses active termination. You must use active termination if the chain speed is  $\geq 10$  Mbps (the speed for ULTRA and RAID SCSI). If the chain speed is  $\leq 10$  Mbps, active termination is not required.

**Differential SCSI:** Two pairs of wires carry signals across the chain. One pair of wires carries the same type of signal carried by the single-ended SCSI. The other pair carries the signal's logical inversion. The receiver takes the difference of the pair of signals, making the receiver less susceptible to noise and able to use greater cable length.

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## Obtaining tape drive firmware updates

You can obtain some tape drive firmware updates from the following IBM Web sites:

- <http://www.pc.ibm.com/us/files.html> (IBM PCCo. Files Library on the Internet)
- <http://w3.pc.ibm.com/files> (IBM PCCo. Intranet BBS Web site)
- <ftp://ftp.pc.ibm.com> (IBM PCCo. FTP wite on the Internet)

The following firmware updates are found on these Web sites:

- 4MMDAT4.EXE for 4/10 GB 4 mm DAT revision 4BKC (for Archive with switches) (TIP H013309)
- 4MMDAT5.EXE for 4/10 GB 4 mm DAT revision 5AJ (for Conner, Seagate with jumpers) (TIP H013309)

**Note**

If the DAT tape drive is attached to a RAID controller, you can request a firmware update cartridge by calling the IBM PC HelpCenter at 1-800-772-2227.

- 1224V727.EXE for 12/24 GB 4 mm DAT (TIP H001587)
- 2040V38Z.EXE for 20/40 8 mm SCSI tape drive revision 38Z
- TR4V535.EXE for IBM TR4 Tape Drives revision 5.35
- DLT.EXE (DOS) for DLT4000/DLT7000 tape drives, revision 72 (TIP H165409)
- DLTWIN.EXE (WIN) for DLT4000/DLT7000 tape drives, revision 72 (TIP H165409)

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## Ordering parts and tools

You can order the following parts and tools from IBM:

- FRU#8191149 Media Kit for DDS2 drives (includes media, diagnostic and cleaning tapes)
- FRU#21F8762 Diagnostic tape (included in FRU#8191149)
- FRU#21F8758 Data cartridge (included in FRU#8191149)
- FRU#59H3465 Data cartridge for DDS3 drives
- FRU#21F8575 Data cartridge for 8 mm drives
- FRU#59H2678 Data cartridge for 8 mm 20 GB drives only
- FRU#59H3040 Data cartridge for DLT drives
- FRU#21F8763 Cleaning tape for DDS2 drives (included in FRU#8191149)
- FRU#59H3090 Cleaning tape for DDS3 drives
- FRU#59H3092 Cleaning tape for DLT drives
- FRU#59H2898 Cleaning tape for AME 8 mm 20 GB drives only
- FRU#16G8467 Cleaning cartridge for 8 mm drives
- FRU#16G8583 Cleaning cartridge for TR-X drives
- FRU#92F0322 16-bit active terminator (68-pin female)
- FRU#61G2448 8-bit active terminator (50-pin)
- FRU#92F0142 8-bit in-line terminator (50-pin)
- FRU#92F0432 16-bit active terminator (68-pin)
- FRU#82G3626 SCSI cable three drops (50-pin)
- FRU#12J5669 SCSI cable four drops (68-pin)
- FRU#06H6440 SCSI cable seven drops (68-pin)
- FRU#92F0324 68-pin to 50-pin converter without termination

You can order IBM-logoed data and cleaning cartridges by calling one of the following phone numbers:

- US/Canada/Puerto Rico: 1-888-IBM-MEDIA
- Center American: +1-305-539-3470
- Mexico: 525-726-6203
- South America: 305-599-0375
- Spain: 900 983131
- Italy: 1678 78349
- France: 0590 5871
- Germany: 0130 818 005
- Sweden: 0207 94270
- Norway: 800 11389
- Denmark: 800 15534
- Finland: 08001 13110
- UK: 0800 968679
- EMEA: +31 433 502 756
- Japan: 03-3808-8486

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## Send Us Your Comments!

We want to know your opinion about this manual (part number 09N1004). 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!**

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## 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.

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## 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 21.

### Authorized Dealers or Servicers

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

### U.S. Customers and Helpware Subscribers

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

## IBM Canada Customer and Servicer Support

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

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