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Finding Information in this Online User's Guide

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[Power Cord Requirements](#)

[Using the Audio Features](#)

[Using Passwords](#)

[Using the Battery Pack](#)

[Using a PC Card](#)

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Chapter 1. Using Your Computer Outside Your Home Count


This chapter provides necessary information if you are using the computer outside the country where you purchased it.

Changing the Date and Time 2
Power Cord Requirements 3

Changing the Date and Time

You need to change the date and time settings if you go to a different time zone.

- 1** In the Windows 98 desktop, click on **Start** and move the cursor to **Settings** and then click on **Control Panel**.
- 2** Double-click on **Date/Time**
- 3** Set the current date and time.
- 4** Click on the **Time Zone** tab.

Click on , and select the region closest to your location from the list. Press **Enter**.

Note: If you do *not* want the clock to be automatically adjusted for daylight saving time, remove the check mark from the check box.

- 5** Click on **OK**.

Power Cord Requirements

To use the AC Adapter outside the country where you purchased your computer, you need an ac power cord that is certified for the country you are visiting. You can purchase one through an IBM authorized reseller or IBM marketing representative in that country.

Attention

The use of an improper power cord might cause severe damage to your computer.

For 2-pin power cords:

| IBM Power Cord Part Number | Used in These Countries |
|----------------------------|--|
| 13H5264 | Bahamas, Barbados, Bermuda, Bolivia, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Korea (South), Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Thailand, Trinidad (West Indies), United States of America, Venezuela |
| 13H5267 | Abu Dhabi, Albania, Antigua, Bahrain, Brunei, Dubai, Fiji, India, Ireland, Kenya, Kuwait, Macao, Malaysia, Nigeria, Oman, People's Republic of China (including Hong Kong), Qatar, Singapore, United Kingdom |
| 13H5270 | Austria, Bosnia-Herzegovina, Belgium, Bulgaria, Chile, Croatia, Czech Republic, Denmark, Egypt, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Israel, Italy, Macedonia, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Yugoslavia |
| 13H5273 | Japan |
| 13H5276 | Argentina, Australia, New Zealand, Papua New Guinea, Paraguay, Uruguay |
| 13H5279 | Bangladesh, Pakistan, South Africa, Sri Lanka |

For 3-pin power cords:

| IBM Power Cord Part Number | Used in These Countries |
|-----------------------------------|---|
| 76H3514 | Argentina, Australia, New Zealand, Papua New Guinea, Paraguay, People's Republic of China (other than Hong Kong), Uruguay |
| 76H3516 | Aruba, Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Curacao, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Thailand, Trinidad (West Indies), United States of America, Venezuela |
| 76H3518 | Austria, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Egypt, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Macao, Macedonia, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey, Yugoslavia |
| 76H3520 | Denmark |
| 76H3522 | Bangladesh, Myanmar, Pakistan, South Africa, Sri Lanka |
| 76H3524 | Abu Dhabi, Albania, Antigua, Bahrain, Brunei, Dubai, Fiji, Hong Kong, India, Ireland, Kenya, Kuwait, Malaysia, Nigeria, Oman, Qatar, Singapore, United Kingdom |
| 76H3528 | Switzerland, Liechtenstein |
| 76H3530 | Chile, Ethiopia, Italy, Libya |
| 76H3532 | Israel |
| 76H3535 | Korea |

Chapter 2. Using the Audio Features

This chapter provides necessary information if you are using the various features of your ThinkPad computer.

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| Using the 3D Sound Retrieval System (SRS) Function | 7 |

Using the Audio Features

Your computer is equipped with the following:

A 1/2-inch (3.5-mm) diameter external stereo line-in or monaural microphone/line-in jack.

Note: To use the input jack for an external stereo line-in device, you need to disable the microphone function with the software on your operating system. For example in Windows 98, you can disable the function by putting a check mark in the check box of **Mute** for MIC in the "Master Out" window. To use the jack for a manual microphone, disable the line-in function with the software.

A 1/2-inch (3.5-mm) diameter stereo headphone or an external-powered speaker jack.

A MIDI/joystick port on the enhanced port replicator. To use a MIDI device, you should first connect your computer to the enhanced port replicator; then connect an external MIDI device to the replicator. After docking your computer in the replicator, you should enable this port using the ThinkPad Configuration program.

Your computer also has an audio chip that enables you to enjoy various multimedia audio features. This audio chip provides the following features:

Recording and playing back of PCM and WAV files in 8-bit or 16-bit format.

Sampling of various rates from 8 KHz to 44 KHz for the WAV file.

Playback of MIDI files through an FM synthesizer.

Recording from various sound sources, such as an integrated microphone, an external microphone, or an audio device attached to a line-in jack.

DOS game compatibility. You should select Sound Blaster Pro** for the audio adapter in the sound setup of the game.

A 3D Sound Retrieval System (SRS) function, compensating for flat, two-dimensional sound image limitations by reestablishing


the necessary information that allows the human ear to hear in three dimensions.

Attention

You should stop playing audio before entering suspend or hibernation mode. You need to turn off any automatic timers that put the computer into suspend or hibernation mode. If the computer enters suspend or hibernation mode, data from a running audio program will be lost.

Using the 3D Sound Retrieval System (SRS) Function

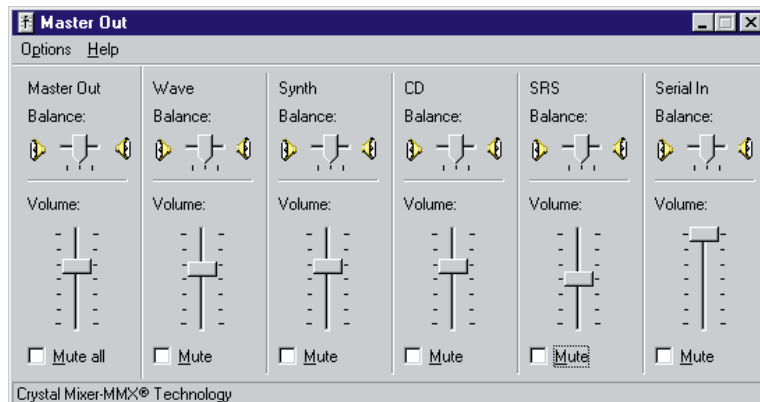
To use the SRS function, do the following:

- 1 Double-click on the small speaker icon () at the bottom right of the Windows desktop.

or

Click on the **Start** button, and then select **Programs**, **Accessories**, **Entertainment**, and **Volume Control**.

The “Master Out” window appears:



- 2 Make sure that the **SRS Balance** column is displayed and the **Mute** check box is unchecked.

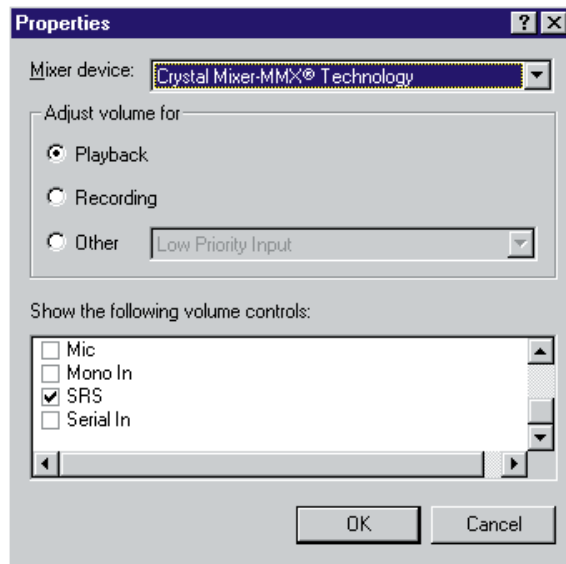
If the column is displayed and the check box is not checked, exit the window. You can use the SRS function; skip the remaining steps.

If the column is not displayed, go to the next step.

3 Select **Options** on the upper left corner of the window.

4 Select **Properties**.

The “Properties” window appears:



5 Put a check mark on **SRS** and press **OK**.

You return to the “Master Out” window.

6 Make sure that there is no check mark in the **Mute** check box in the **SRS Balance** column.

7 Exit the “Master Out” window.

Now you can use the SRS function.

Chapter 3. Protecting Your Computer

This chapter provides overall information about how to protect your ThinkPad computer.

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Using Passwords

To protect your computer from theft or unauthorized use, you can use:

- Passwords
- The Personalization Editor
- A mechanical Lock

For more details, see the *User's Reference*.

The password-setting feature prevents your computer from being used by others. Once you set a password, a prompt appears on the screen each time you turn on the computer. You must enter your password at the prompt. You will not be able to use the computer unless you type the correct password. You can set the following passwords on your computer:

The **power-on password** protects your computer from being used by unauthorized persons.

The **hard disk password** protects the data on your hard disk from being accessed by unauthorized persons.

The **supervisor password** protects the system information stored in Easy-Setup so that without knowing the password, nobody can change the configuration of the computer.

To use the password, refer to the *User's Reference*.

Using the Personalization Editor

With the Personalization Editor, you can display such personal information as your name and address on the screen each time you power on your computer. This feature helps you to identify your computer when identical computers are being used in your location, or to deter theft.

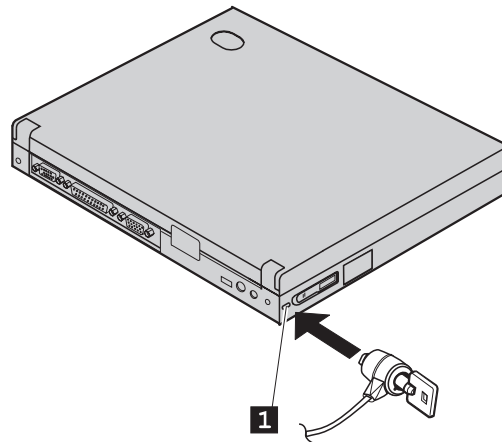
To set the Personalization Editor, refer to the *User's Reference*.

Using Mechanical Locks

You can attach a mechanical lock to your computer, to prevent it from being removed without your permission.

To attach a lock, do the following:

Attach a mechanical lock to the keyhole 1 on the left side of the computer; then secure the chain on the lock to a secure stationary object.



Note: You are responsible for evaluating, selecting, and implementing the locking devices and security features. IBM makes no comments, judgments, or warranties about the function, quality, or performance of locking devices and security features.

Chapter 4. Using Your Computer with a Battery Pack

This chapter provides necessary information if you are using a battery pack.

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Using the Battery Pack

If you use your ThinkPad computer with the battery pack, you need to conserve the power for long operation. The ThinkPad computer is provided with power management for saving battery power, and it always indicates the battery status. This chapter describes the functions for battery operation.

Charging the Battery Pack

You can charge the battery pack when the AC Adapter is connected to the computer and the battery pack is installed. You need to charge the battery pack in any of the following conditions:

- When you purchase a new battery pack
- If the battery status indicator starts blinking
- If the battery pack has not been used for a long time

Notes:

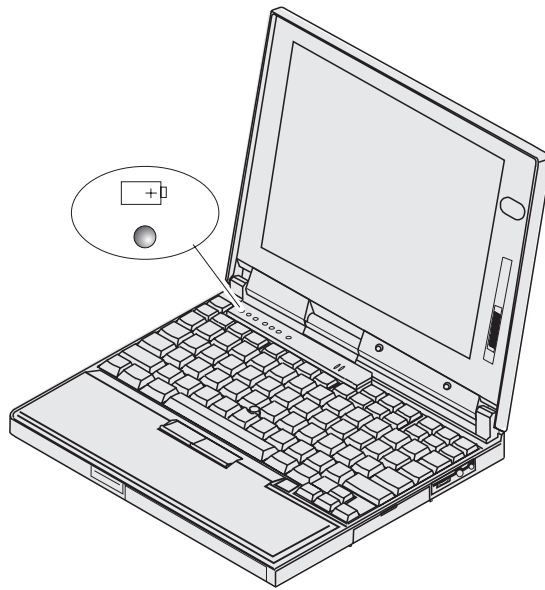
1. Before you charge the battery pack, ensure that its temperature is at least 10°C (50°F).
2. If the battery pack has not been used for a long time, it will not be fully charged with only a single charging. You will have to completely discharge it; then recharge it three to six times to maximize battery operating time.

Monitoring the Battery Status

Using the Battery Status Indicator

The battery status indicator shows the current status of the battery pack (only when the battery is installed).

Compare the battery status indicator with the following table to determine the condition of your battery:



| Status | Condition |
|-----------------|---|
| Green | Enough power remains for operation. |
| Orange | The battery pack is being charged. |
| Blinking orange | The battery pack needs charging. If the indicator starts blinking orange, the computer beeps three times. |
| Off | <p>The battery pack is not installed.</p> <p>The computer is turned off or is in suspend mode when the AC Adapter is not connected.</p> |

Attention

You should take corrective actions when the battery status indicator is *blinking orange*, and your computer sounds three consecutive beeps. (If your computer enters suspend mode because of a low-battery condition, data in memory might be lost.)

Immediately connect the AC Adapter to the computer.

Then take either of the following actions:

To continue your work with the AC Adapter, press the **Fn** key.

or:

To continue your work with a fully charged battery pack, do the following:

1. Replace the battery pack with a fully charged one. (See the *User's Reference*.)
2. Press the **Fn** key.
3. Disconnect the AC Adapter from the computer.

If you do not take corrective actions within about 30 seconds, the computer will enter suspend mode.

Do not leave the computer in this condition for an extended time. Data in memory will be lost.

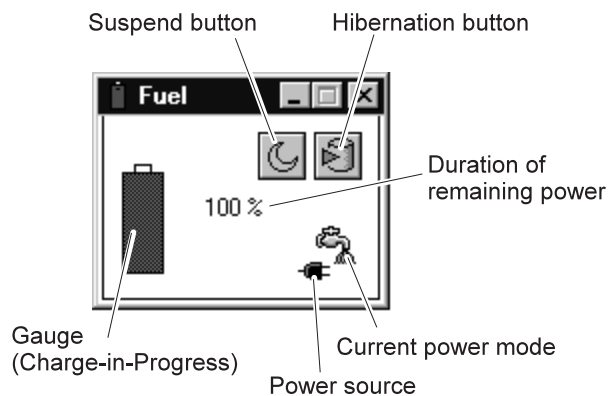
Using the Fuel-Gauge Program

You can display the battery status and power mode (High Performance, Automatic, or Customized) by using the Fuel-Gauge program. You also can select suspend or hibernation mode.



To start the Fuel-Gauge program, do as follows:


1. Click on **Start** move the cursor to **Program** and then click on **ThinkPad**.
2. Double-click on the **Fuel-Gauge** icon in the ThinkPad Configuration window.

The following window appears:



Notes:

1. The "Current Power Mode" icon depends on the power mode.
2. The "Power Source" icon depends on the power source. ( is for the AC Adapter and  is for battery pack.)
3. The "Duration of Remaining Power" does not appear when the AC Adapter is connected.

You can minimize the window to an icon by clicking on the icon () at the top of the window. You can toggle between the Fuel-Gauge window and its icon by pressing the **Fn+F2** key combination.

Saving Battery Power

Your battery pack should be useful for approximately 3 years, or 300 charge-discharge cycles. The number of years or charge-discharge cycles might vary depending on how efficiently you use your computer. This section describes the following:

- How to use the power management modes
- How to use other battery-saving methods

Using the Power Management Modes

You can use your computer under battery power for a considerable length of time by using these power management modes:

Attention

Do not enter suspend or hibernation mode when your computer is doing any of the following:

- Playing or recording audio
- Playing a movie
- Playing a game
- Running any other multimedia application

Stop these applications before entering suspend or hibernation mode.

Standby Mode

For Windows 98 Users:

The LCD and external monitor turn off. Also the audio is muted. If no application program is running in the background, the hard disk spindle stops.

For Windows 95 Users:

The LCD turns off. Also, if a power-saving monitor (Energy Star Monitor) is in use when the computer enters standby mode, the computer activates the monitor's low-power mode.

You can **enter standby mode** by:

- Pressing the **Fn+F3** keys.


You can **return to normal operation** by:

- Pressing any key or moving the TrackPoint.

Suspend Mode

Your computer stops all tasks and stores all data in memory.

You can **enter suspend mode** by:

- Pressing the **Fn+F4** keys.
- Closing the cover.
If you put a check mark in the **Will not suspend even if LCD is closed** check box in the “Power Management Properties” window, the computer does not enter suspend mode when the LCD is closed. Only the LCD turns off.
- Selecting the **Suspend** button () in the Fuel-Gauge program.

Your computer automatically enters suspend mode when:

- the preset timeout is reached.
For Windows 98 users: You can set the **System standby timer** in the “Power Management Properties” window.
For Windows 95 users: You can set the **Suspend Timer** in the “Power Properties” window.
- battery is low.
If you put a check mark in the **Hibernate when battery becomes low** check box in the “Power Management Properties” window, the computer enters hibernation mode when the battery is low.

You can **return to normal operation** by:

- Pressing the **Fn** key.
- Opening the LCD.
- Turning the power switch on.

Your computer automatically returns to normal operation when:

- the preset timeout for the resume timer is reached.
For Windows 98 users: the **Scheduled Tasks** setting has priority over the **resume on timer** setting in the “Power Management Properties” window.


For Windows 95 users: You can set the timeout with the **resume on timer** specification in the “Power Properties” window.

RediSafe



To prevent loss of data during suspend mode when the battery is critically low, your ThinkPad computer has a **RediSafe** function. Once you set this function, the hibernation file is activated each time the computer enters suspend mode, and is ready to enter hibernation mode from suspend mode whenever the battery is low.

Set **RediSafe** as following:

From Windows 95 or Windows 98:

1. Start the ThinkPad Configuration program.
2. Click on the **Power Management** button (.
3. Select the **Hibernation** tab.
4. Enable hibernation mode if it is disabled.
 - a) Click on the **Enable Hibernation..** button.
 - b) Click on **Create Now**; then **Close**.
5. Select **RediSafe**.
6. Click on **OK**.

From Windows NT, Windows 3.1, or OS/2:

1. Start the ThinkPad Configuration program.
2. Click on the **Power Management** button (.
3. Select the **Suspend/Hibernation/Resume Options** button (.
4. Enable hibernation mode if it is disabled.
 - a) Click on the **Enable Hibernation..** button.
 - b) Click on **OK**.
5. Select **RediSafe**.
6. Click on **OK**.


Hibernation Mode

Your computer stops all tasks and stores all data in the hard disk; then it powers off. Set your computer to this mode if you

want to maintain the present operating condition until the next day, for instance.

To use this mode, you have to create a hibernation file with the ThinkPad Configuration program. (See Enabling Hibernation Mode.)

You can **enter hibernation mode** by:

- Pressing the **Fn+F12** keys.
- Selecting the **Hibernation** button () in the Fuel-Gauge program.
- Turning the power switch off.
You can enable this option by putting a check mark in the **Hibernate by power switch** check box in the **Hibernation** subwindow of the “Power Management Properties” window.

Your computer automatically enter hibernation mode when:

- The preset timeout is reached. (Windows 95 user only)
If you add a check mark in the **Hibernate by timer** check box in the **Hibernation** subwindow and set **Suspend timer** in the **Power Mode** subwindow, your computer enters hibernation mode when it reaches timeout.
- the battery is low.
If you put a check mark in the **Hibernate when battery becomes low** check box, your computer enters hibernation mode when the battery is low.

You can **return the normal operation** by turning the power on.



For Windows NT users:

You cannot create a hibernation file in a Windows NT system that uses the NTFS file format, the Windows NT default. If you want to use hibernation mode, you should reinstall Windows NT with the FAT file format.

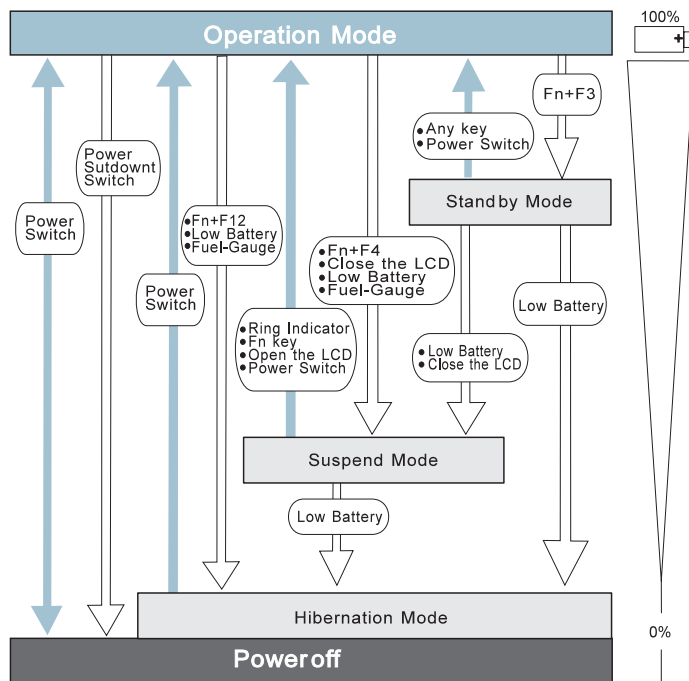
Notes:

1. Windows 95 users cannot enter hibernation mode when you are using the communication network.
2. Hibernation mode might end if you connect your computer to a port replicator or if you use a particular PC Card.

The following table shows how the indicator behaves in each power management mode:

| Current Status | Indicator | |
|--|--|--|
| |  Suspend Mode |  Power-On |
| Normal operation or standby mode | Off | Green |
| Suspend mode | Green | Off |
| Entering or resuming from suspend mode | Blinking green | Green |
| Power off or hibernation mode | Off | Off |

The following figure shows the relationship between different power management modes, how to switch between them, and battery power consumption:




Customizing Power Management

This section describes how to customize power management so that you are using the power management mode appropriate to your operation.


Setting the Suspend Timer

To set the suspend timer, do the following:

For Windows 98:

- 1 Start the ThinkPad Configuration program.
- 2 Click on the **Power Management** () button.
The “Power Management Properties” window appears.
- 3 Select the **Power Schemes** tab.
The “Power Schemes” window appears.
- 4 Set the length of time for the suspend timer at **System standby timers** under **Settings for Portable/Laptop power scheme**.
Note: You can also set the **LCD off timers** and **Hard disk off timers**.
- 5 Click on **OK**.

For Windows 95:


- 1 Start the ThinkPad Configuration program.
- 2 Click on the **Power Management** () button.
The “Power Properties” window appears.
- 3 Select the **Power Mode** tab.
The “Power Mode” window appears.
- 4 Select **Customized**.


The bottom gray portion is displayed in black, and you can specify the timeout value in minutes in the **Suspend Timer** box.

5 Click on **OK**.

For Windows NT, Windows 3.1, or OS/2:

1 Start the ThinkPad Configuration program.

2 Click on the **Power Management** () button.
Three buttons appear on the right.

3 Click on the **Power Mode Settings** () button.
The “Power Mode Settings” window appears.


4 Specify the timeout value in minutes in the **Suspend Timer** box.

5 Click on **OK**.



Enabling Hibernation Mode

To enable hibernation mode, do the following:

For Windows 98 and Windows 95:

- 1** Start the ThinkPad Configuration program.
- 2** Click on the **Power Management** () button.
The “Power Properties” window appears.
- 3** Select the **Hibernation** tab.
The “Hibernation” subwindow appears.
- 4** Click on **Enable Hibernation**. (If you have already created a hibernation file, this button appears in gray and you cannot click on it.)
The “Enable Hibernation” subwindow appears.
- 5** Click on **Create Now**.
- 6** Click on **Close**; then **OK**.

For Windows NT, Windows 3.1, or OS/2:

- 1** Start the ThinkPad Configuration program.
- 2** Click on the **Power Management** () button.
- 3** Click on the **Suspend/Resume Options** () button.
The “Suspend/Resume Options” window appears.
- 4** Click on the **Enable Hibernation..** button.
- 5** Click on **OK**.

Considerations When Using a Power Management Mode

When you use a power management mode, you need to consider a few points, especially if you are using the network.

Considerations for Suspend Mode

Consider the following before using suspend mode:

The computer can enter suspend mode when used with the following operating systems:

- DOS Version 7.0
- OS/2 Warp Version 4
- Microsoft Windows Version 3.11 with DOS Version 7.0
- Microsoft Windows 95
- Microsoft Windows 98
- Microsoft Windows NT Version 4.0

Important

If you use Windows 3.1, ensure that Advanced Power Management (APM) is installed according to the instructions in “Notes for Reinstalling or Installing the Operating System” on page 29.

Attached devices, such as a printer or serial device, stop running when the computer enters suspend mode. When you resume normal operation, the output might differ from what you expect, because the device might be reset or lose its configuration settings.

Sometimes you might want to use the computer with the LCD closed—for example, when an external monitor and keyboard are used. In such a case, turn on the computer with the LCD closed, or use the ThinkPad Configuration program to set the computer not to enter suspend mode when the LCD is closed.

If the computer resumes normal operation by reaching the ThinkPad Configuration timer setting or because of an incoming call, only a blank screen is displayed. To display a power-on password prompt, press any key or move your pointing device.

If you are using some communication cards and the computer is powered with ac power, your computer enters standby mode rather than suspend mode.

If you are using other PC Cards and the computer enters suspend mode, all application programs stop. For some PC Cards, power to the PC Cards might also turn off.

If the computer is powered with battery power, the computer turns power off to the PC Card, and communication stops for communication PC Cards, so the duration of suspend mode is longer.

If communication for a PC Card is not reestablished after normal operation resumes, remove and then reinstall the PC Card before restarting the system or application program. For other kinds of PC Cards, if the PC Card or computer does not operate, restart the application or computer.

Even if you are using a communication card with a ring-resume function, some cards cannot detect an incoming call.


While a communication link is active, the computer does not enter suspend mode.

If you put a check mark in the **Disable in the hardware profile** check box under the **Device usage** of the **General** tab in the **Advanced Power Management Support** area of the "System Properties" window, your computer does not enter suspend mode.

Note:

You must set the **Resume on incoming call** option in the ThinkPad Configuration program so the computer automatically resumes normal operation.

For Windows 95 and Windows 98:

1. Click on the **Battery** () button.
2. Click on the **Suspend/Resume options** tab.
3. Select the **Resume on incoming call** option.

For Windows NT, Windows 3.1, or OS/2:

1. Click on the **Battery** () button.
2. Click on the **Suspend/Hibernation/Resume options** () button; then select the **Resume on incoming call** option.

For DOS: Enter PS2 RI E

Considerations for Hibernation Mode

Consider the following before using hibernation mode:

Do not run any other tasks while the hibernation file is being created.

The computer uses battery power to enter hibernation mode. Therefore, it reserves some battery power if it is set to enter hibernation mode when a low-battery condition occurs. This can cause the battery operating time to be shorter than the time publicly stated.

Do not add or remove memory during hibernation mode. If you do, the computer resumes from hibernation mode without recognizing the changed memory size. To ensure that the computer recognizes the correct memory size, shut down; then restart your operating system.

If the computer is powered with battery power, it turns power off to the PC Card when entering hibernation mode. When normal operation resumes, if the PC Card or computer does not operate, restart the application or computer.

If you are using some communication cards and your computer is powered with ac power, the computer does not enter hibernation mode. This prevents possible problems from occurring with communication application programs after the computer returns to normal operation.

Note: If the communication links are still not reestablished, remove and then reinstall the PC Card before restarting the system or application program.

Notes for Reinstalling or Installing the Operating System

Install your operating system with Advanced Power Management (APM), and install the ThinkPad Configuration program with the Utility Diskette to use power management mode.

Note: To install the software → Installing a New Operating System and Its Device Drivers .

If you are using Windows 95 or OS/2, APM is automatically installed in your computer.

If you are using DOS, APM is automatically installed in your computer. To verify that the computer has installed APM correctly, type `power` at the command prompt and press **Enter**. If a screen similar to the following appears, APM is successfully installed.

```
Power Management Status
-----
Setting = ADV: REG
CPU: idle 32% of time.

AC Line Status : OFFLINE

Battery status : High
```

If not, add the following line to your CONFIG.SYS file, using a text editor such as the DOS Editor:

```
DEVICE=C:\DOS\POWER.EXE
```

If you are using Windows 3.1, do the following to check and install APM for Windows:

1 Start the computer.

Make sure that the current directory is Windows (usually `C:\WINDOWS>`).

2 Type `SETUP` at the command prompt and press **Enter**.

The following appears:

```
Windows Setup
=====

If your computer or network appears on the Hardware Compatibility List
with an asterisk next to it, press F1 before continuing.

System Information
Computer:      MS-DOS System
Display:      NeoMagic MagicGraph 128XD 8  x6  256 small font
Mouse:        Microsoft, or IBM PS/2
```

Note: If **MS-DOS System with APM** appears for the item **Computer:**, APM is already installed. Press **F3** to exit the setup. Otherwise, go on to step 3.

3 Using the Arrow keys, position the highlighted cursor over **MS-DOS System** and press **Enter**.

- 4 Position the highlighted cursor over **MS-DOS System with APM** and press **Enter**.
- 5 Verify that the item **Computer** has changed to **MS-DOS System with APM** on the screen.

```
Windows Setup
=====

If your computer or network appears on the Hardware Compatibility List
with an asterisk next to it, press F1 before continuing.


System Information
Computer:      MS-DOS System with APM
Display:      NeoMagic MagicGraph 128XD 8  x6  256 small font
Mouse:        Microsoft, or IBM PS/2
```

If not, return to step 3.

- 6 Press **Enter** to install APM.
- 7 Restart the system to make APM effective.

Using Other Battery-Saving Methods

Another battery-saving method is to decrease the LCD brightness. You can use the ThinkPad Configuration program to decrease the

brightness of the LCD by clicking on the **LCD** () button and selecting **Normal** for **Brightness (battery operation)** in the window that appears.

Chapter 5. Using Your Computer with a PC Card

This chapter provides necessary information if you are using the computer with a PC Card.

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Using a PC Card

This chapter explains PC Card functions and interfaces. It describes PC Card support software and explains how to use your PC Card in the operating system that you have installed.

A PC Card enables you to send and receive faxes, communicate through a network, store data, and use other functions. PC Cards can be distinguished by their functions:

- Storage cards
- Modem cards
- Network cards
- SCSI cards
- Other PC Cards

A PC Card is also distinguished by the interface that supports it. Before you use a PC Card, you need to make sure that your computer supports it.

- 16-bit PC Card
- CardBus Card¹
- Custom Interface Card

PC Card Types

Storage Cards

An **Advanced Technology Attach (ATA) card** functions as a hard disk with the Integrated Drive Electronics (IDE) interface. You can transfer data between devices by inserting a card in a PC Card slot just as you would with a diskette in a diskette drive. There are two types of ATA card:

- The **ATA hard disk card** has a large capacity; you can use the card as you would an external hard disk.
- The **ATA Flash disk card** acts as a memory card; you can use the card to back up your data.

¹ CardBus allows PC Cards and your computer to use 32-bit busmastering and to operate at speeds up to 33 MHz.

A **memory card** is used to read or write moderate amounts of data. There are three types of memory card:

- A **static-random-access-memory (SRAM) card** backs up computer memory. The card has its own battery.
- A **read-only-memory (ROM) card** is used for reading data only.
- A **Flash memory card** is a writeable and readable card. No battery is needed.

Modem Cards

A **fax modem card** is used for communication through a telephone line; ac power is not needed. You can use this card to access the PC network or the Internet, or to send a fax.

Network Cards

A **LAN/Network card** physically connects PCs in a LAN or Network. The following LAN-or-Network cards are available:

- An **Ethernet card** is for constructing a small area network.
- A **TokenRing card** is for constructing a global area network.
- An **IBM 3270 card** and an **IBM 5250 card** are also available.

An **integrated services digital network (ISDN) card** is used to connect your computer to the ISDN network.

SCSI Cards

A **small computer system interface (SCSI) card** connects a SCSI device to your computer. For example, it enables you to use a SCSI disk drive that cannot fit in a small notebook PC.

Other PC Cards

A **sound card** enables your computer to play music and other sounds. It typically has an audio and a MIDI in/out connector.

A **video capture card** captures signals from video devices, enabling you to use the data in your computer.

There are also multi-function PC Cards, such as the Combo Card and the Multi Function Card.

PC Card Interface

16-Bit PC Cards

Most PC Cards are 16-bit PC Cards (PCMCIA 2.0 or 2.1), providing ISA device performance.

CardBus Cards

The CardBus Card is connected as a PCI device and provides higher performance than the 16-bit PC Card.

Custom Interface Cards

The Zoomed Video Card² (ZV Card) is currently the only custom interface card available. The Zoomed Video port interface provides the connection for the ZV Card. The ZV Card enables you to write video data directly to an input port of the graphics controller. The following video-related cards are considered ZV Cards:

- Video capture card
- MPEG card

The ZV Card cannot be used without a PC Card device driver and a display device driver.

² Zoomed Video (ZV) is a connection between a PC Card and your computer that allows the card to write video data directly to the graphics controller. The data is transferred with no buffering requirements, because it is transferred over a ZV port rather than the system bus.

Attention

When you use PC Cards, be aware of the following restrictions:

Although you can insert or remove some PC Cards without turning off the computer (refer to the instructions that came with the PC Card), you *cannot* remove or install PC Cards during suspend or hibernation mode.

Before removing storage PC Cards from the PC Card slot, **you must power off** the computer. Otherwise, data in the PC Card might be corrupted or lost.

Note: According to the operating system, you can stop the PC Card with the PC Card support software and remove it without powering off the computer. (See the PC Card support software section of the each operating system to see how to stop the PC Card.)

PC Card Support Software

ThinkPad PC Card support software enables you to use a PC Card as soon as you insert it into the ThinkPad computer.

Each operating system has its own ThinkPad PC Card support software, as follows:

Windows 98: You can use the PC Card without the PC Card support software; the PC Card support function is included within the operating system.

Windows 95 (OSR2.1): CardWorks for Windows 95.

Windows NT 4.0: CardWizard for Windows NT.

Windows 3.1: CardWizard for Windows 3.1.

OS/2: PC Card Director.

DOS: CardSoft for DOS.

If you reinstall the operating system, you need to install the PC Card support software appropriate for the operating system to use a PC Card.

To install the PC Card software → Installing a New Operating System and Its Device Drivers .

The following table shows the PC Card supported by the different PC Cards support software:

| | CardWorks (Windows 95) | CardWizard (Windows NT 4.0) | CardWizard (Windows 3.1) | PC Card Director (OS/2) | CardSoft (DOS) | Windows 98 |
|--|---------------------------------------|--|---|--|---------------------------|-----------------------|
| 16-bit PC Card | Supported | Supported | Supported | Supported | Supported | Supported |
| CardBus Card | Supported | Not supported | Not supported | Not supported | Not supported | Supported |
| ZV Card | Supported | Not Supported | Supported | Not Supported | Not Supported | Note |
| Note: Windows NT does not support the SDRAM card. Check the following Microsoft Web site: http://www.microsoft.com | | | | | | |

When you insert the PC Card into your ThinkPad computer:

The PC Card support software detects the card and reads the information about it.

The PC Card support software searches for the corresponding card service device driver.

The device driver requests the PC Card support software to allocate such system resources as memory space, I/O port, and IRQ. If these resources are available, the support software recognizes the PC Card and you can use it.

If there is a resource conflict, you need to change either the resources or the system configuration:

Either:

- **Change the requested resources of the PC Card:** You can allocate the available resources by using each operating system or PC Card support software function.

Or:

- **Change the system configuration:** You can change the system configuration with your operating system or with the ThinkPad Configuration program.

Note: If the PC Card device driver is the PC Card point enabler, you cannot use the PC Card with ThinkPad PC Card support software. Check with the card vendor whether the device driver is a client device driver or a point enabler.

Power Management

Depending on the function of the PC Card, changing from one power management mode to another might cause your ThinkPad computer to hang. PC Card support software prevents this occurrence through special handling during power state transition:

The following table approximately indicates the supported power management function depending on the type of PC Card. Make sure that your PC Card supports the function.

| Card Type | Suspend Request (Fn+F4) | | Hibernation Request (Fn+F12) | |
|-------------------------|-------------------------|---------------|------------------------------|---------------|
| | ac Power | Battery Power | ac Power | Battery Power |
| Modem or Network | Supported | Supported | Not Supported | Supported |
| Other | Supported | Supported | Supported | Supported |

Note: Standby mode is always accepted.

For more information about the PC Card support software, go to the appropriate section according to the following table:

| |
|---|
| <p>Using a PC Card in Windows 95 (with CardWorks)</p> <p>Using a PC Card in Windows NT (with CardWizard)</p> <p>Using a PC Card in Windows 3.1 (with CardWizard)</p> <p>Using a PC Card in OS/2 (with PC Card Director)</p> <p>Using a PC Card in DOS (with CardSoft)</p> |
|---|

Using a PC Card in Windows 95 (with CardWorks)

You can make your PC Card easy to use with the PC Card support software called CardWorks. It is supported only by the Windows 95 OEM Service Release Version 2.1 (OSR2.1).

CardWorks minimizes user intervention in configuring many PC Cards. CardWorks with CardWizard provides the following:

Self-Check

If you have a problem, refer to this section.

PC Card Properties

CardWorks provides various information about your PC Card.

Stopping the PC Card

If you remove the PC Card from your computer, sometimes you need to stop the PC Card.

Help

You can get help for most of the windows.

CardWorks provides two modes for using a PC Card:

Plug and Play mode:

You can use the PC Card in this mode when the device driver of the card is supported by Windows 95.

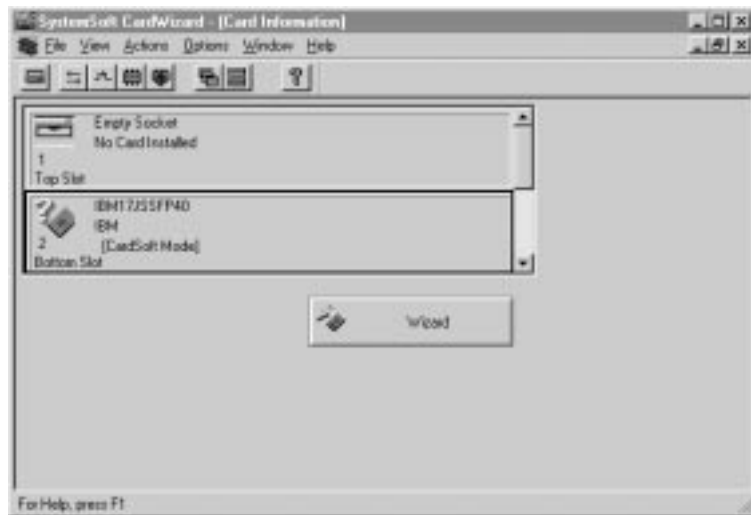
CardSoft mode:

You can use the PC Card in this mode when the device driver of the PC Card is for Windows 3.1.

To start CardWizard, do as follows:

- 1** Click on **Start**.
- 2** Move the cursor to **Programs** and **CardWorks**. Then click on **CardWizard**.

The CardWizard window appears:



This information panel displays up-to-date information about the PC Cards and PC Card slots being used in your computer.

It also displays up to three lines of card information, which it reads directly from the card:

- The first line shows the card name.
- The second line shows the manufacturer.
- The third line shows the card's function or type.

Self-Check

CardWorks has a self-check function that solves such problems as incorrect or missing PC Card device drivers, system resource conflicts (IRQ, memory, or I/O ports), and unconfigured PC Cards, as well as memory conflicts.

If there are any problems, click on **Wizard**. Each time you click on the **Wizard** button, a series of self-checks is run to assure that all necessary components are installed and working properly. CardWizard then analyzes the computer to verify that there are resources available for PC Card configuration.

Even if CardWizard cannot automatically solve a problem, it can pinpoint the problem exactly so that you or a technical support engineer can fix the problem more easily.

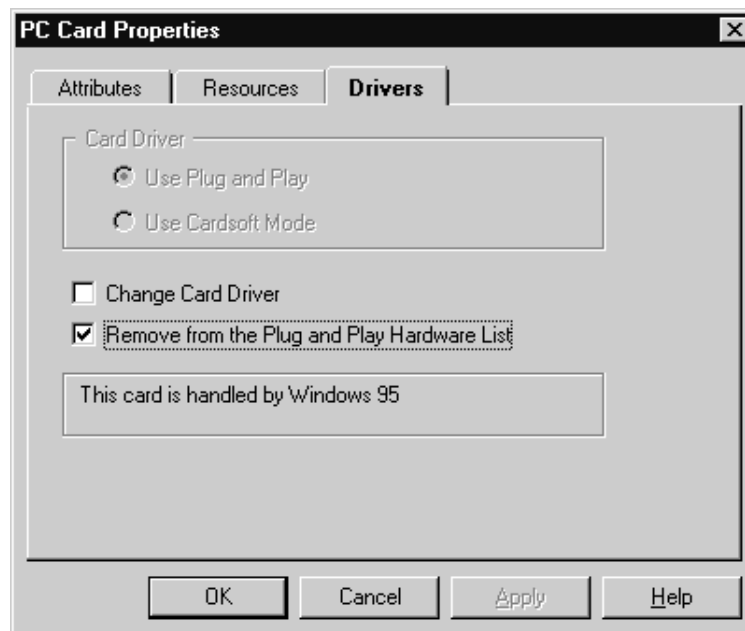
PC Card Properties

You can see the attributes, resources, drivers, and memory card utilities that are loaded for PC Card support in the “PC Card Properties” window.

To open the “PC Card Properties” window of the PC Card that you are using, do the following:

- 1 Select the PC Card in the CardWizard window by clicking on it.
- 2 Click on **View** in the menu bar of the window.
- 3 Click on **Properties..** in the pop-up menu.

The “PC Card Properties” window appears:



The window provides the following information:

Attributes

Resources
Drivers

Attributes

Note: The following information appears depending on the type of PC Card:

| | |
|----------------|---|
| Slot | The slot number and assigned name for the slot. (You can change the slot name by selecting slot management from the options menu.) |
| Card | The type of this PC Card. |
| Manufacturer | The manufacturer of the PC Card. |
| Size | The storage capacity of the PC Card. |
| Drive | The drive letter. |
| Battery status | The charge status of the SRAM Card battery. :row, |
| Write protect | The write protect status—either enabled or disabled. |
| File system | The file system used by the PC storage. |
| Port | The communication port used by this PC modem card. |

Resources

Note: Some resource information is not relevant to all types of PC Cards. These nonrelevant resources are displayed as “Not Applicable.”

| | |
|--------------|--|
| IRQ | The interrupt request being used. |
| I/O | The starting and ending addresses of the input/output range for the PC Card. |
| DMA | The DMA channel used. |
| Memory range | The range of physical memory. |

Drivers

Note: CardWizard determines the type of device driver being used. It also displays whether the card is configured by Windows 95 or by CardWorks.

| | |
|--------------|--|
| Card driver: | Indicates whether Plug-and-Play mode or CardSoft mode is used in configuring the PC Card. This field is enabled only if the Change card driver box is checked. You should <i>not</i> change drivers if your card has been identified and configured successfully. |
|--------------|--|

Change card driver:

If this item is enabled (checked), you can select either Plug and Play (if available) or the CardWorks device drivers.

Remove from the Plug-and-Play hardware list:

If this item is enabled (checked), you can delete the Plug-and-Play device driver assigned to a card. This applies only if the card is handled by Windows 95 (Plug-and-Play mode). Later, when you reinsert the same PC Card, CardWorks configures the card as if it were the first insertion.

Memory Card Utility:

This item appears only if you insert an SRAM card or a Flash memory card. You can format the SRAM card or Flash memory card as follows:

Note: You can also format these card from the file system with the DOS FORMAT command.

1. Open the "PC Card Properties" window.
2. Select the **Memory Card Utility** tab.
3. Enter a **Volume Label** (if desired).
4. Click on **Format Drive/Partition**.
5. Click on **Start**.

This procedure enables you to completely erase an SRAM/Flash memory card, especially a brand-new card. Make sure to save the data on the card before erasing it.

Stopping the PC Card

If you are removing a PC Card, you must first stop it. The system might freeze or data might be lost if a PC Card is removed before it is stopped.

Note: You can stop only one card at a time. After invoking stop, you cannot stop another card until the first stop has either completed or failed.

You can stop a card as follows:

1 Click on the right button on the CardWizard window.

A pop-up menu appears.

Note: The stop option appears in gray if you are in CardSoft mode or if the card is already stopped.

2 Click on **Stop**. The following message appears:

The card has been stopped. You can safely remove the card.

Help

If you press **F1** or select the **Help** button, a glossary of terms and an index of Help items are made available.

Using a PC Card in Windows NT (with CardWizard)

You can make your PC Card easy to use with the PC Card support software called CardWizard.

CardWizard minimizes user intervention in configuring many PC Cards. CardWizard provides the following:

Self-Check

If you have a problem, refer to this section.

PC Card Properties

CardWorks provides various information about your PC Card.

Stopping the PC Card

If you remove the PC Card from your computer, sometimes you need to stop the PC Card.

Help

You can get help for most of the windows.

This section concludes with information about using ATA PC Card and power management support.

Note: Multifunction PC Cards are not supported in CardWizard for Windows NT.

To start the CardWizard for Windows NT, do as follows:

- 1** Start Windows NT 4.0.
- 2** Click on **Start**.
- 3** Select **Programs**.
- 4** Click on **CardWizard for Windows NT**.

The menu bar for the CardWizard window includes **File**, **View**, **Actions**, **Options**, and **Help** options. Each option provides CardWizard functions to perform actions with cards, modify user-selected options, and obtain help.

Quick Launch

Once you have installed CardWizard for Windows NT, you can start it by clicking on the **CardWizard** icon. The **CardWizard** menu appears on the taskbar, to the left of the **CardWizard** icon. Click on the menu once with the left mouse button to start the Wizard application.

Another way to start CardWizard for Windows NT is to double-click on the system tray icon with the left mouse button.

Self-Check

If you have a problem configuring your PC Card, select the **Wizard** button in the “CardWizard for Windows NT” window.

Each time you click on the **Wizard** button, a series of self-checks is run to assure that all necessary components are installed and working properly. CardWizard then analyzes the computer to verify that there are resources available for PC Card configuration.

Click on this button to fix most PC Card problems. Even if CardWizard cannot automatically solve a problem, it can pinpoint the problem exactly so that you or a technical support engineer can fix the problem more easily.

PC Card Properties

You can see the attributes, resources, drivers, and memory card utilities that are loaded for PC Card support in the “PC Card Properties” window.

To open the “PC Card Properties” window, do the following:

- 1** Open the **CardWizard**.
- 2** Select **Properties** from the “Actions” menu.
- 3** From the “Card Information” panel:
 - a** Press the right mouse button while the cursor is on an inserted card icon.

b Click on **Properties**.

The “Properties” windows provide information about the attributes and drivers associated with the selected PC Card.

Attributes

| | |
|--------------|---|
| Slot | The slot number and assigned name for the slot. |
| Card | The type of this PC Card. |
| Manufacturer | The manufacturer of the PC Card. |
| IRQ | The interrupt request being used (if relevant). |
| Port | The I/O address associated with a communication port (if relevant). |
| DOS Device: | The communication port used by this device (if relevant). |

Name

When you select device drivers, the following information is displayed:

| | |
|---------|---|
| Driver | The full path to the driver for this PC Card. |
| Version | The version for the current driver. |

Stopping the PC Card

If you are removing a PC Card, you must first stop it. The system might freeze or data might be lost if a PC Card is removed before it is stopped.

Note: You can stop only one card at a time. After invoking stop, you cannot stop another card until the first stop is either completed or fails.

To stop a card, select **Stop** from the “Actions” menu.

Power to the slot is turned off when a card is “stopped.” You can remove ATA cards. To prevent loss of data and other unpredictable machine behavior, make sure the stop operation is complete before you remove the cards.

Help

If you press **F1** or select the **Help** button, you can get help for most of the windows. A glossary of terms and an index of Help items are also available.

Using ATA PC Cards

This section describes how to initialize and use removable storage cards, such as ATA hard disk and ATA Flash disk cards.

An ATA PC Card can be used like most storage devices. Your new ATA card needs to be formatted just as any hard disk does.

Format the ATA Card as follows:

- 1** Start Windows NT 4.0.
- 2** Click on **Start**.
- 3** Click on **Programs**.
- 4** Click on **Administrator Tools (Common)**.
- 5** Click on **Disk Administrator**.
- 6** Select a drive that you want to format.
- 7** Click on **Tool**.
- 8** Click on **Format**.

Power Management Support

CardWizard for Windows NT provides support for power management. Power management is a function to conserve the battery life of your computer. Battery power is conserved when your computer enters suspend mode. Then, many devices are powered off and others run at lower power consumption levels. When operation is resumed (when the computer exits from suspend mode), the computer returns to the state it was before it entered suspend mode. Programs and data that were in use before suspend mode began are restored.

Suspend Mode Support

With CardWizard, you can use PC Card devices over a suspend-resume cycle. The PC Card Controller and the cards are powered off when your computer enters suspend mode. However, each card type is handled differently to prevent data loss or machine crash through the suspend-resume event. For example, all files

must be closed on an ATA disk. LAN cards cannot avoid the risk of crashing the system when resuming. CardWizard identifies each card type and might present a dialog of instructions to avoid these potential problems. In some cases CardWizard might stop the suspend event altogether. You are expected to follow the instructions given before entering suspend mode.

There is also a *critical suspend*, where your computer is automatically suspended by the system when the battery life is about to expire. In this case, your computer might not be able to fully restore the state it was in before it entered suspend mode. When resuming from critical suspend, CardWizard analyzes the cards that were being used before the critical suspend and instructs you to save data or prevent problems such as a system crash. The instructions might recommend that you reboot your system.

Suspend Notification

You might receive messages when you attempt to suspend your computer with the following cards:

Network or SCSI cards. You tried to suspend while there is a network or SCSI card in use. Shut down your system instead of suspending it.

ATA cards. You tried to suspend before you closed all files and folders on the ATA card. Close all files and folders, and then try the suspend.

Using a PC Card in Windows 3.1 (with CardWizard)

This section describes the PC Card support software for Windows 3.1 and how to format the PC Card.

CardWizard is the PC Card support software for Windows 3.1. It increases the usability of PC Cards.

CardWizard has following features:

Self-Check

If you have a problem, refer to this section.

Help

You can get help for most of the windows.

This section concludes with information on formatting PC Cards.

To start CardWizard, do as follows:

- 1** Start Windows 3.1.
- 2** Double-click on **SystemSoft Tools** in the "Program Manager" window.
- 3** Double-click on **CardWizard**.

The CardWizard window appears.

You can see up-to-date information about your computer's PC Card slots.

The first line shows the card name.

The second line shows the manufacturer.

The third line shows the card's function or type.

If you have a multifunction card installed, you will see up to two functions at a time. You can scroll to see available functions if more than one function is activated on your card. Functions are labeled by slot number followed by function number. For example:

1-2 means slot 1, function number 2.

2-1 means slot 2, function number 1.

Self-Check

CardWorks has a self-check function that solves such problems as incorrect or missing PC Card device drivers, system resource conflicts (IRQ, memory, or I/O ports), and unconfigured PC Cards, as well as memory conflicts.

If there are any problems, click on the **Wizard** button, which is in the bottom right-hand corner of the window. Each time you click on the **Wizard** button, a series of self-checks is run to assure that all necessary components are installed and working properly. CardWizard then analyzes the computer to verify that there are resources available for PC Card configuration. There are four possibilities:

Card Configured: On the left, CardWizard displays a graphical representation of the card and any available card manufacturer information. On the right, CardWizard displays all system resources that the card is using.

Card Not Configured: On the left, CardWizard shows a question mark and any available card manufacturer information. On the right, CardWizard displays a message suggesting that you click on the **Wizard** button to correct the problem.

Card Not Recognized: On the left, CardWizard shows a question mark and any available card manufacturer information. On the right, CardWizard displays a message asking you to click on the **Wizard** button to select the type of card you have inserted.

No Card Inserted: CardWizard displays a picture of an empty slot.

Even if CardWizard cannot automatically solve a problem, it can pinpoint the problem exactly so that you or a technical support engineer can fix the problem more easily.

Help

CardWizard provides extensive online help. Help is available for almost all windows (when you press **F1** or the **Help** button).

For most menu items (when you press **F1** while the menu item is selected), you can get an extensive list of CardWizard topics.

Formatting PC Cards

This section describes how to initialize and use removable storage cards, such as ATA hard disk drive, ATA Flash disk, Flash memory (non-ATA type), and SRAM cards. It summarizes the formatting requirements and options for removable storage cards.

Note: Before initializing removable storage cards for use, you must exit Windows 3.1 and enter DOS.

Formatting the ATA Card

You need to format ATA cards before you can use them. To format the card, you need to run the ATAINIT command from the DOS prompt. Then you need to use the standard DOS FORMAT command.

See Using the ATA Hard Disk or ATA Flash Disk Cards.

Formatting a Flash Disk Card (MCFORMAT)

You can configure and manage a (non-ATA) Flash memory card with the MCFORMAT command. MCFORMAT enables you to perform the following actions easily:

- Create and format a new partition
- Format an existing partition
- Erase a partition
- Display partition information

MCFORMAT is a DOS command, so you must exit Windows 3.1 before using it.

MCFORMAT can be used to create and format FTL partitions on a Flash memory card or PC DOS partitions on an SRAM card.

To create and format a new partition on a Flash memory card or an SRAM card:

- 1** Go to the CardWizard directory and type:

```
MCFORMAT
```

2 Press **Enter**.

3 Follow the instructions on the screen.

Formatting an SRAM Card

Before using an SRAM card, you have to format it using the DOS FORMAT command. Do the following:

1 Type the following:

```
FORMAT drive_letter:
```

(drive_letter is the actual drive letter.)

2 Press **Enter**.

For more instructions on using FORMAT, see your DOS user's guide.

Memory Card Partitions and Drive Letters

MTDDRV assigns drive letters to each partition on a memory card to allow each partition to be accessed as if it were another hard disk drive.

You can display the drive letters it reserves at system boot or by entering the following at the DOS prompt from within the directory containing the CardWizard files:

```
MTDDRV /?
```

If the first available letter is F, MTDDRV reserves drive letter F for your first PC Card slot and letter G for your second PC Card slot. These drive letters are reserved whether you are actually using them for memory card partitions or not.

Note: The situation described in this example could create a problem if you are connected to a network, especially if you are mapped to numerous network drives. The system might run out of drive letters to assign before all your network drives have been properly mapped. The drive letters that MTDDRV reserves might cause all other drive letters to be reassigned (excluding drive letters for local hard disks or ATA cards).

For example, if you have a network drive that is normally drive F and you install MTDDRV, the network drive will no longer be assigned drive letter F on your system. As a result, you might have to modify the drive letters in any network batch files that you use. For example, if you have a network batch file that loads your network login files from drive F and MTDDRV has reserved drive letters F and G for memory card partitions, you must change the drive letter in your network batch file to H (the next available letter).

Using a PC Card in OS/2 (with PC Card Director)

This section describes how to use the PC Card in OS/2.

The PC Card slots of the computer and the port replicator do not support the following PC Cards:

- Integral Peripherals Model 1841PA (40 MB)
- IBM 105-MB PCMCIA hard disk drive (P/N 74G8694)
- 8-bit or 16-bit slave DMA PC Cards

Ask IBM or an IBM authorized dealer for more information about the different types of PC Cards.

You can use a DOS object³ in the OS/2 environment. OS/2 Virtual Card Services provides a Card Services interface and enables you to use the DOS PC Card device driver for the DOS object.

Note: Even when a PC Card is enabled with a DOS object, the device driver or the application program might not work, or their performance might not be what you expect.

To use Virtual Card Services with a DOS object, do the following:

- 1** Move the mouse pointer to the DOS object icon; then click the right mouse button.
- 2** Click on **Properties**.
- 3** Click on the **Session** tab.
- 4** Click on **DOS (WIN-OS/2) Properties**.
- 5** Click on **All DOS (DOS and WIN-OS/2) Settings**.
- 6** Set **PCMCIA_CARD_SERVICES** as On.
- 7** Set **PCMCIA_RELEASE_LEVEL** as 2.1
- 8** Set **MEM_EXCLUDE_REGIONS** as CC -D3FFF

³ A *DOS object* might be a DOS program, Windows 3.1 program, DOS full-screen, DOS window, WIN-OS/2 full-screen, or WIN-OS/2 window.

- 9 Specify the PC Card device driver name at the **DOS_DEVICE** prompt.

PC Card Director is the PC Card support software for OS/2. It makes using PC Cards with your computer easier in the following ways:

You can use the PC Card when you insert it in a PC Card slot.

You can display what type of PC Card is in your computer.

You can register an application program for a particular PC Card and start the program automatically when the card is inserted.

Notes:

If your PC Card is not supported by PC Card Director, you must install the driver that came with your card. To see the supported PC Cards by PC Card Director, click on the **Supported PC Cards** icon in the "PC Card Director" window. Even if your PC Card is not listed, try using it with PC Card Director.

The card driver must be compatible with the PCMCIA Card Services PC Card Standard (1995) or the PCMCIA Card Services Standard Release 2.1. Follow the instructions in your PC Card manual to install the driver.

To start PC Card Director, double-click on the **PC Card Director** folder; then double-click on the **PC Card Director** icon.

Stopping the PC Card

PC Card Director has a stop function for removing the PC Card safely. Stop the PC Card as follows:

- 1 Open **PC Card Director**.
- 2 Click on the **Control Power** icon.
- 3 Select from the card list the storage PC Card you want to remove.
- 4 Click on **Off**.

- 5 Make sure the card status is off; then remove the storage PC Card.

Using the Auto Configurator Utility


You can delete or change a registered PC Card with the **Auto Configurator Utility**. You can find the **Auto Configurator Utility** icon in the “PC Card Director” window.

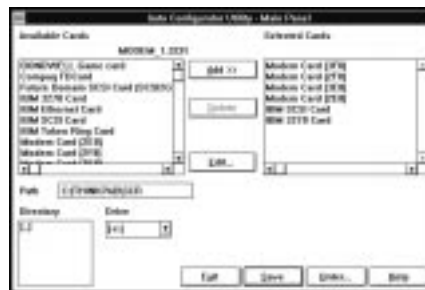
This section describes this utility.

Note: PC Card Director provides the *Auto Configurator*, a program for some PC Cards, so that you do not have to install the device driver supplied with it. When you install PC Card Director, a `BASEDEV=` statement such as the following is added to the `CONFIG.SYS` file.

```
BASEDEV=AUTODRV2.SYS
```

Registering a PC Card in Auto Configurator

- 1 Double-click on the **Auto Configurator Utility** () icon from the “PC Card Director” window.
- 2 Select a card from the **Available Cards** list in the “Auto Configurator Utility” window.



Select the card for which you want to assign the resources first. For example, if you want to assign COM3 (rather than COM2) to a modem card, select the setting for COM3 first.

The names in the left list box (**Available Cards**) can be registered. The names in the right list box (**Selected Cards**) are already registered in Auto Configurator.

3 Click on the **Add>>** button.

4 Click on the **Save** button.

When a PC Card is installed, Auto Configurator starts from the top of the list to assign the resources to the card.

Deleting a Registered Card

1 Double-click on the **Auto Configurator Utility** icon in the “PC Card Director” window.

2 Select the PC Card you want to delete from **Selected Cards** in the “Auto Configurator Utility” window.

3 Click on the **Delete** button.

4 Click on the **Save** button.

Changing the Registered Order for PC Cards

To change the order of the registered PC Cards, do the following:

1 Double-click on the **Auto Configurator Utility** icon from the “PC Card Director” window.

2 Click on the **Order...** button in the “Auto Configurator Utility” window. The following window appears:



3 Do as follows to change the order of the PC Cards in the list:

When moving a card toward the bottom:

a Select the PC Card you want to move.

b Click on the **Down** button.

Every time you click on the **Down** button, the PC Card is moved toward the bottom of the list.

When moving a card toward the top:

- a** Select the PC Card you want to move.
- b** Click on the **Up** button.

Every time you click on the **Up** button, the PC Card is moved toward the top of the list.

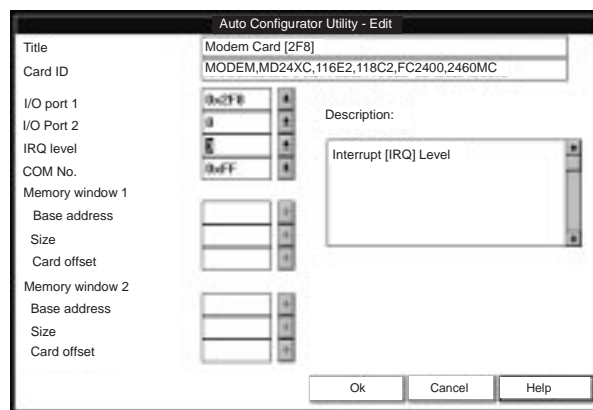
- 4** Click on the **OK** button to save the changes.

The changes are saved. To cancel the changes, click on the **Cancel** button.

Changing the Resource Information for the PC Card

- 1** Double-click on the **Auto Configurator Utility** icon in the “PC Card Director” window.
- 2** Select the PC Card you want to change from the left list box in the “Auto Configurator Utility” window.
- 3** Click on the **Edit...** button.

The following window appears:



Note: The current resource information is set as the default and appears in the input field of each item. The number that can be set is displayed in the pull-down list box.

- 4** You can change the following registered information for the PC Card. The items that can be changed differ depending on the PC Card.

- Card ID
- I/O port address
- IRQ level
- COM number of the serial port
- Memory window address
- Memory window size
- Card offset address

- 5** Click on the **OK** button, and save the changes.

To cancel the changes, click on the **Cancel** button.

Updating the CONFIG.SYS File

For PC Card Director to work correctly, the PC Card device drivers must be registered in the CONFIG.SYS file. These drivers are automatically registered in the CONFIG.SYS file when you install PC Card Director following the instructions in *Installing a New Operating System and Its Device Drivers*.

The following section describes the standard rules for each driver registered in the CONFIG.SYS file for your reference.

Registered Drivers and Standard Rules

The following is a sample of a CONFIG.SYS file:

```

:
BASEDEV=PCMCIA.SYS          --> Card Services
BASEDEV=IBM2SS14.SYS       --> Socket Services
BASEDEV=AUTODRV2.SYS       --> Auto Configurator
DEVICE=C:\THINKPAD\VPCMCIA.SYS --> Virtual Card Services
:
DEVICE=C:\THINKPAD\xxxxxxx.SYS --> Storage card device driver
:
REM PC_Card_Client_Device_Driver
:
DEVICE=C:\THINKPAD\$\ICPMOS2.SYS --> Power Management Support driver
```

| | |
|---------------|--|
| Rule 1 | Card Services and Socket Services must be listed before any other PC Card drivers. |
| Rule 2 | The PC Card Power Management Support driver must be listed after all drivers, at the end of the CONFIG.SYS file. |
| Rule 3 | When using storage cards, the device drivers must be installed according to the card type. |

Example of using only an ATA card:

```

:
BASEDEV=PCM2ATA.ADD /!DM --> ATA card device driver
DEVICE=C:\THINKPAD\PCMSSDIF.SYS --> Storage API device driver
:
BASEDEV=OS2PCARD.DMD --> Storage Card Device Manager

```

Example of using an ATA card and an SRAM card:

```

:
BASEDEV=PCM2ATA.ADD /!DM --> ATA card device driver
DEVICE=C:\THINKPAD\PCMSSDIF.SYS --> Storage API device driver
DEVICE=C:\THINKPAD\PCM2SRAM.SYS --> SRAM card device driver
BASEDEV=OS2PCARD.DMD --> Storage Card Device Manager

```

Example of using an ATA card and a Flash card:

```

:
BASEDEV=PCM2ATA.ADD /!DM --> ATA card device driver
DEVICE=C:\THINKPAD\FLSH2MTD.SYS --> Flash Card Memory Technology driver
DEVICE=C:\THINKPAD\PCMSSDIF.SYS --> Storage API device driver
DEVICE=C:\THINKPAD\PCM2FLSH.SYS --> Flash card device driver
:
BASEDEV=OS2PCARD.DMD --> Storage Card Device Manager

```

Example of using an ATA card, an SRAM card, and a Flash card:

```

:
BASEDEV=PCM2ATA.ADD /!DM --> ATA card device driver
DEVICE=C:\THINKPAD\FLSH2MTD.SYS --> Flash Card Memory Technology driver
DEVICE=C:\THINKPAD\PCMSSDIF.SYS --> Storage API device driver
DEVICE=C:\THINKPAD\PCM2SRAM.SYS --> SRAM card device driver
DEVICE=C:\THINKPAD\PCM2FLSH.SYS --> Flash card device driver
:
BASEDEV=OS2PCARD.DMD --> Storage Card Device Manager

```

| | |
|---------------|---|
| Rule 4 | The Storage Card Device Manager (OS2PCARD.DMD) must be added after the Power Management Support driver (\$ICPMOS2.SYS) in the CONFIG.SYS file. If you do not have the Power Management Support driver, the Storage Card Device Manager must be added at the end of the CONFIG.SYS file. |
|---------------|---|

Parameters for the ATA Card Device Driver for OS/2

The following are the parameters and their explanations of the ATA card device driver for OS/2 statement in the CONFIG.SYS file:

```
BASEDEV=PCM2ATA.ADD [/S:n] [/P:hhhh] [/EXIRQ:n]  
[/NOBEEP] [/B] [/STBTIME:n] [/MDRV:n] [!/DM]
```

| | |
|-------------------|---|
| /S:n | Specifies the number of PC Card slots. /S:1 shows that there is only one PC Card slot. If this parameter is not set, the number of PC Card slots is set to 2. |
| /P:hhhh | Specifies the lower limit for the I/O address of the ATA card. The device driver assigns the next usable I/O address from this lower limit to the card. If this parameter is not set, the device driver looks for a usable address and assigns it to the card. |
| /EXIRQ:n | Specifies the IRQ level that <i>is not</i> assigned to the card. You can set more than one IRQ level. |
| /NOBEEP | Specifies not to beep when a storage card is installed. If this parameter is not set, you will hear a beep every time a storage card is installed into the PC Card slot. |
| /B | Specifies that OS/2 has started from an ATA card. If this parameter is set, there will be no redundancy in assigning the logical drive to the slot where OS/2 was booted. It depends on the ATA card whether you can start OS/2 from it. |
| /STBTIME:n | Specifies the time (from 1 to 21 minutes) until entering standby mode. If the ATA card is not accessed for the time specified by this parameter, the ATA card enters standby mode (only when your ATA card supports standby mode). If this parameter is not specified, standby mode for the ATA card is disabled. |
| /MDRV:n | Specifies the number of extra drives that can be used in addition to the number of PC Card slots available for the PC Card storage devices. If this parameter is not specified, no extra drive is given to the device driver. The extra drives can be activated by the ATA Card Mount utility. |
| /!DM | Specifies not to use OS2DASD.DMD as the device manager. If this parameter is set, OS2PCARD.DMD is used instead. |

Storage Card Device Driver

ATA cards, SRAM cards, and Flash cards are PCMCIA storage cards. This section describes the device drivers for these storage cards, available in PC Card Director.

Storage Card Device Driver for OS/2

The device drivers for each type of storage cards are:

PCM2ATA.ADD for ATA cards
PCM2SRAM.SYS for SRAM cards
PCM2FLSH.SYS for Flash cards

Any PC Card installed in the slot is recognized by its device driver, so regardless of its type, you can access the card by the drive name assigned to the slot.

Notes:

Install PCM2ATA.ADD for all storage cards, even if you are using SRAM or Flash cards.

If using the ATA Card Mount Utility, install the PC Card storage API device driver (PCMSSDIF.SYS) for OS/2.

Formatting Storage Cards before Use

You need to format new PCMCIA storage cards before using them. For Flash cards, run the Flash Format Utility (FFORMAT2.EXE); then format the Flash card. For ATA cards and SRAM cards, there is no need to run any programs before formatting the card.

To format the card, use the FORMAT.COM program by choosing the drive icon.

Using ATA Cards with Multiple Partitions

The device driver assigns a drive letter only to the active (bootable) partition of the ATA card if it holds multiple partitions. For other primary partitions or logical drives in an extended partition, use the ATA Card Mount utility to assign a drive letter to it.

Storage Card Device Manager

OS2PCARD.DMD is the device manager for the storage card. Specify the `!/DM` parameter in the PCM2ATA.ADD line, so that OS2PCARD.DMD is used instead of OS2DASD.DMD. If you do not specify `!/DM`, PCM2ATA.ADD uses the OS/2 standard Storage Card Device Manager (OS2DASD.DMD); however, under some conditions the format is not correct when you use OS2DASD.DMD.

The following is a line from the CONFIG.SYS file that describes the Storage Card Device Manager:

```
BASEDEV=OS2PCARD.DMD
```

PC Card Storage API Device Driver for OS/2

This device driver provides a communication function between PC Card Director or the mount utility and the ATA card device driver for OS/2. As a result, a utility in the upper layer can get the drive letter or partition information for the storage card.

The following is a line from the CONFIG.SYS file that describes the Storage API device driver:

```
DEVICE=[drive:][directory]PCMSSDIF.SYS
```

Flash Card Memory Technology Driver

This driver is used to read and write to a Flash card. It is used by the OS2 Flash card driver (PCM2FLSH.SYS).

The following is a line from the CONFIG.SYS file that describes the Flash Card Memory Technology driver:

```
DEVICE =[drive:] [directory] FLSH2MTD.SYS
        --> Memory Technology driver
DEVICE =[drive:] [directory] PCM2FLSH.SYS
        --> Storage card device driver
```

Checking the Allocated Resources for the PC Card

If the resources for the PC Cards are not correctly allocated, you will see error messages. You can check which resources for the PC Card were not correctly allocated by using PC Card Director. To check the resources that could not be allocated, click on the **Status** button in the PC Card Director program.

The following are some reasons why the resources could not be correctly allocated, and corresponding actions you should take to solve the problem.

Problems

- The resource was already reserved by another device.
- Configuration files were not set up correctly.

Actions

To change the resource settings for the PC Card or other devices, you can do one of the following:

Refer to the system manual or utility program and check which device is using the resources that you want to use for the PC Card. Then change the settings for the device by using, for example, the setup programs. For more information, refer to the manuals supplied with your computer.

If your PC Card is enabled by a PC Card enabler, you can change the resources assigned to the PC Card by changing the parameters in the PC Card enabler, or you can change the settings in the configuration file of the PC Card. For more information, refer to the manuals supplied with your PC Card.

If you are using Auto Configurator to enable your PC Card, you can change the resources assigned to the PC Card by using the Auto Configurator. Make sure the resource is not used by other devices and can be used by the PC Card and its application program. For more information, see Using the Auto Configurator Utility.

If you are using modem cards, you should know that some modem cards use serial port COM1 or COM2 and do not have the setup information for COM3 and COM4. These modem cards cannot be enabled when other devices are using COM1 and COM2. (For example, as a default, COM1 is used by the infrared device and COM2 is used by the ThinkPad Modem.) Error messages are displayed to tell you that the I/O port address 3F8 or 2F8, or IRQ level 3 or 4, were not allocated.

If this is the case, use the ThinkPad Setup Utility in the ThinkPad Configuration program to disable the devices using COM1 or COM2; then restart the system.

Avoiding PC Card Resource Conflicts

PC Card Director checks the resources for most devices used by the system to avoid resource conflicts, but it does not recognize all option devices used. Especially if you are using the enhanced port replicator, there is a possibility that the I/O port address or IRQ level might conflict with the PC Card.

Check the status of the PC Card by using PC Card Director. When the PC Card is set to "Ready," the resources used for that PC Card are displayed. Refer to the manuals supplied with the system or option adapters to check that the resources for the devices in the system or for the option adapters do not conflict with the resources for the IRQ level, I/O port address, or memory window of the PC Card. If you are using OS/2 Warp, you can check the assigned system resources using RMVIEW.EXE.

If there is a conflict:

If you are using OS/2 Warp, use RESERVE.SYS to register those resources in OS/2.

To set RESERVE.SYS, refer to the manuals or online help for OS/2 Warp, or refer to the README file of PC Card Director.

If you are using Auto Configurator, change the enabling order or resource information using the Auto Configurator Utility.

➔ Using the Auto Configurator Utility .

Change the parameter for the PC Card enabler. Refer to the manuals supplied with the PC Card.

If you are using network cards, change the resource information for the PC Card stated in the PROTOCOL.INI or NET.CFG file.

To change the configuration file for the network cards, refer to the manuals or README files of the PC Cards or network drivers.

Using a PC Card in DOS (with CardSoft)

This section describes CardSoft for DOS and how to use it.

CardSoft enables you to use your PC Cards in the DOS environment. It increases the usability of PC Cards by simplifying their installation and configuration.

CardSoft provides some DOS commands. You can see the following information on the PC Card with these commands:

PC Card type

The resources assigned to the current PC Card

Any resource conflict with the current PC Card

The drive letter of the storage or memory card

Whether the PC Card is turned on or off

CardSoft information

This section describes how to use the CardSoft commands as well as the Configuration utility to help you configure and manage PC Cards on your system.

Note: These commands are active in the directory where CardSoft resides.

CARDINFO

CARDINFO scans the PC Card slots on your computer and shows information about them. It also shows any warnings or error messages that might have occurred when CardSoft configured these cards.

You use CARDINFO command if:

You need to know the types of cards that are currently inserted in your PC Card slots.

You need to know the I/O ports, IRQs, and memory areas that are being used by your PC Card. This information might be needed if you are installing other components on your system.

You need to know if there is a conflict between the new component and a PC Card is use—that is, if the new component and a PC Card are trying to use the same resource, such as an

IRQ interrupt. If this happens, either the PC Card or the new component must be reconfigured for other resources to be used.

You want to turn off (or turn on) power to a PC Card slot that contains the PC Card.

You want to display manufacturer and product information about your PC Cards.

You need to know the drive letter for your ATA hard disk or ATA Flash disk card.

You need to know the latest error that occurred for an inserted card.

Running CARDINFO

To run CARDINFO, type the commands with one of the following commands and press **Enter**:

| | |
|-------------|---|
| CARDINFO | Displays the card information. Information similar to the following is displayed: Slot 1 Function : Manufacturer = TDK Product Name = DF2814 DATA/FAX MODEM Device Type = Modem (COM 3) Slot 2 Function Manufacturer = IBM Product Name = IBM17JSSFP Device Type = ATA Disk Device Type = F: Slot 3 Function Slot 3 is empty Slot 4 Function Slot 4 is empty |
| CARDINFO /V | Displays more extensive information about the PC Card slots in your computer. |
| CARDINFO /C | Provides the following additional Card Services information: Card Service release number |

Vendor revision number
Number of slots
Number of functions per slot
Vendor copyright information

CARDINFO /OFF[:S ,F] Turns off power to all PC Card slots.

Note: S is the parameter that specifies the slot. You can turn off the power to only the specified slot with this parameter.
F is the parameter that specifies the function. You can turn off the power to only the specified function with this parameter.

CARDINFO /ON[:S ,F] Turns on power to all PC Card slots.

Note: S is the parameter that specifies the slot. You can turn on power to only the specified slot with this parameter.
F is the parameter that specifies the function. You can turn on power to only the specified function with this parameter.

CARDINFO /? Displays information about CARDINFO switches.

Using the Configuration Utility

The Configuration utility (CONFIG.EXE) modifies the CARDID.INI and CSALLOC.INI files. You need to run this utility if you are having difficulty using the PC Card, or if you are customizing your system. Whenever you finish using this utility, restart your system so that your changes take effect.

The Configuration utility can be used for the following purposes:

Setting or changing the IRQs and COM port assignment order for your fax/modem cards.

Setting or changing the I/O port address, IRQ, and memory areas that your network cards will use.

Selecting the address (primary, secondary, or any) that your ATA cards will be using to communicate with the system.

Selecting the type of video display (color, monochrome, or LCD).

Online Help

Online help is available for many of the Configuration utility fields. To access online help for a particular field, position the cursor in the field (or highlight the field) and then press **F1** (or click on the **Help** button, if it is available).

Running the Configuration Utility

From the DOS prompt (C:\), type `CONFIG` and press **Enter**.

The following menus are available from this window:

File

- Edit Configuration
- Save Configuration
- Exit

Utility

- Resource Allocation

Display

- Color
- Monochrome
- LCD

To access a pull-down menu, click the left mouse button on the menu name, or press **Alt+the highlighted letter** in the menu name. For example, to access the "File" menu, click on the word **File** or press **Alt+F**. When the pull-down menu appears, select a menu item by:

Clicking on it.

Pressing the **Down arrow** key to highlight the item and then press **Enter**.

Pressing a key that corresponds to the highlighted letter.

Using Storage PC Cards

This section describes how to use the storage cards.

Using the ATA Hard Disk or ATA Flash Disk Cards

For you to use ATA hard disk or ATA Flash disk cards on your system, your CONFIG.SYS file must contain the following line. The standard device drivers are always required:

```
DEVICEHIGH=C:\CARDSOFT\ATADRV.EXE
DEVICEHIGH=C:\CARDSOFT\MTDDRV.EXE
```

Formatting or Initializing a Card

Attention

Make sure you are using the correct drive letter when formatting or initializing your ATA card, because any information on the specified drive is erased.

Formatting an ATA Card

To format an ATA card:

- 1 Type the following command

```
FORMAT drive_letter /U
```

Note: `drive_letter` is the drive letter assigned to the card. For example, if the card has been assigned to drive D, type `format D: /U`

- 2 Press **Enter**.

Initializing an ATA Card

To initialize an ATA card, run the ATAINIT command from the DOS prompt, and then use the standard DOS format command to format the ATA card.

Note: ATAINIT works only with ATA cards that are supported by the ATADRV driver. If you cannot use your ATA card, it might be an unsupported card. Check with the manuals that came with the card.

ATAINIT.EXE is a disk-partitioning utility that must be used to initialize any ATA cards supported by ATADRV. When a new ATA card is inserted into a PC Card slot, you need to initialize the card by using ATAINIT. ATAINIT finds the physical parameters (number of sectors, cylinders, and so on) to use, and then initializes the card. To initialize the card, do as follows:

- 1 Type the following command:

```
ATAINIT drive_letter:
```

Note: `drive_letter` is the actual drive letter. For example, if your ATA card has been assigned drive letter D, you should type: `ATAINIT D:`

- 2 Press **Enter** to accept the displayed information. If you want to specify a drive parameter, type `P` and press **Enter**. Then follow the instructions in the window.

Using Memory Cards

For you to use memory cards on your system, your CONFIG.SYS file must contain the following lines (in addition to the standard drivers that are always required):

```
DEVICEHIGH=C:\CARDSOFT\MTSRAM.EXE  
DEVICEHIGH=C:\CARDSOFT\MTDDRV.EXE
```

Drive Letters

You need to know which drive letter to use to access the memory card.

Note: Drive letters are shared by memory and Flash memory cards. If you insert a memory card in slot 1, it will be assigned drive E; if you insert a Flash memory card in slot 2, it will use drive F.

If you remove the memory card from slot 1, and insert a second Flash memory card in slot 1, it will be assigned drive E, because that is the drive letter assigned to slot 1 for memory and Flash memory cards.

Type the following and press **Enter**:

```
MTDDRV /?
```


Information similar to the following is displayed:

```
Drive E is partition number    for slot number  1.  
Drive F is partition number    for slot number  2.  
Drive G is partition number    for slot number  3.  
Drive H is partition number    for slot number  4.
```

This example shows a system with four PC Card slots, configured for one partition per card. You can use the memory card in your first PC Card slot (slot 1 in this example) as drive letter E.

The number of drive letters listed depends on the number of PC Card slots in your computer, and whether MTDDRIV is configured for multiple partitions.

Formatting Memory Cards

Attention

Make sure you are using the correct drive letter when formatting a memory card, because any information on the specified drive is erased. Refer to the previous section if you need to know which drive letter to use.

To format your memory card, type the following and press **Enter**:

```
FORMAT drive_letter:
```

(drive_letter is the actual drive letter.)

For more instructions on using FORMAT, see your DOS user's guide.

Chapter 6. Frequently Asked Questions

Frequently Asked Questions

This section addresses frequently asked questions. Go to the page indicated in the following chart and do the specified action.

| Questions | Page |
|--|-------------|
| How can I stop the screen from blanking? | 79 |
| How can I set the infrared port? | 79 |
| How can I set the serial connector? | 80 |
| How can I switch the TrackPoint and mouse? | 81 |
| How can I set the display resolution? | 81 |
| How can I set the external monitor? | 82 |
| How can I maximize battery life? | 83 |
| How can I install the operation system? | 83 |
| How can I use the Recovery CD? | 84 |

To solve the problems discussed in this section, you need to use the ThinkPad Configuration program. To start the ThinkPad Configuration program, find the ThinkPad icon on the taskbar; then double-click on the icon.

Note: You can also open the ThinkPad Configuration program as follows:

1. Click on **Start**.
2. Move the cursor to **Programs** and **ThinkPad**; then click on **ThinkPad Configuration**.

My screen keeps blanking when I do not want it to. How can I stop this?

You can disable any system timers, such as the LCD turnoff timer or the system standby timer, with the ThinkPad Configuration program.

- 1** Start the ThinkPad Configuration program.
- 2** Click on the **Power Management** button; then click on the **Power Schemes** tab.

You can disable the system timers by selecting **never** rather than a specific time.

How can I use my infrared port as a communication port?

If the infrared port is disabled, you must enable it before you can use it again. To enable your infrared port, do as follows:

- 1** Save your work and quit any program you are using.
- 2** Start the ThinkPad Configuration program.
- 3** Click on the **Infrared** button.
- 4** Click on **Enable**.

A “Warning” might appear that the hardware resource is being used by another communication device.

- 5** Click on **Disable Device**.

Another “Warning” window prompts you to restart your computer.

- 6** Click on **OK**. The computer restarts.

Notes:

1. If you check your infrared port and it is already enabled, you can use it immediately without changing any settings.
2. You can disable your computer's serial connector to free resources for another communication device, such as the infrared port.

After your infrared port is enabled, you can use it as a communication port. If it does not work properly, you might have a problem with your communication software or the device that you are trying to communicate with. Check the online help for your communication software if the other device appears to be working properly.

How can I use my serial connector as a communication port?

If the serial connector is disabled, you must enable it before you can use it again. To enable your serial connector, do as follows:

- 1** Save your work and any program you are using.
- 2** Start the ThinkPad Configuration program.
- 3** Click on the **Serial Port** button.
- 4** Click on **Enable**.

A "Warning" might appear that the hardware resource is being used by another communication device.

- 5** Click on **Disable Device**.

Another "Warning" window prompts you to restart your computer.

- 6** Click on **OK**. The computer restarts.

Notes:

1. If you check your serial connector and it is already enabled, you can use it immediately without changing any settings.
2. You can disable your computer's infrared port to free resources for another communication device, such as the serial connector.

After your serial connector is enabled, you can use it as a communication port. If it does not work properly, you might have a problem with the communication software application or the cable or device attached to the serial connector. Check the online help system for your communication software if the cable and attached device appear to be working properly.

How can I use an external mouse when I am at my desk, but then use the TrackPoint when I am away from my desk?

The TrackPoint has an “auto disable” setting that disables it when you power on or restart the computer with an external mouse attached. When you want to enable the TrackPoint, remove the external mouse; then restart the computer.

Note: You can set up the TrackPoint manually with the ThinkPad Configuration program as follows:

- 1** Start the ThinkPad Configuration program.
- 2** Click on the **TrackPoint** button.
- 3** Select **enable**, **disable**, or **auto disable**.
- 4** Click on **OK**.

Why do I not get the highest possible resolution out of my external monitor when I am using the LCD and external monitor at the same time?

You can set any resolution for either the ThinkPad LCD or the external monitor. When you use both at the same time, the resolution of both is the same. If you set a higher resolution for the ThinkPad LCD, you can see only part of the screen at a time. You can see other parts by moving the image with the TrackPoint or other pointing device. You can change the display output type to the LCD, external monitor, or both with the **Display Device** buttons of the ThinkPad Configuration program or with **Fn+F7**.

You can set up the external monitor as follows:

- 1** Double-click on **My Computer**, **Control Panel**, and then **Display**.

The “Display Properties” window appears.

- 2** Click on the **Settings** tab.
- 3** Click on the **Advanced...** button.
- 4** Click on the **Monitor** tab.
- 5** Click on the **Change...** button.

The “Update Device Driver Wizard” window appears.

- 6** Follow the instructions on the screen by selecting **Display a list of all the drivers in a specific location, so you can select the driver you want;** and then **Show all hardware.**
- 7** Select **Manufacturers** and **Models** for your monitor.
- 8** Click on **OK** to close the “Advanced Property” window.
- 9** Set **Color** and **Screen area** in the “Display Properties” window.
- 10** Click on the **OK** button.

How can I set up the external monitor if the Windows plug-and-play feature does not detect it?

Do as follows:

- 1** Double-click on **My Computer, Control Panel,** and then **Display.**

The “Display Properties” window appears.

- 2** Click on the **Settings** tab.
- 3** Click on the **Advanced...** button.
- 4** Click on the **Monitor** tab.
- 5** Make sure that **Automatically detect Plug & Play monitors** is checked.
- 6** If the option is checked and your monitor is still not recognized after you restart the computer, click on the **Change...** button. The “Update Device Driver Wizard” window appears.
- 7** Check if the display driver information in the window is correct. If necessary, install the display driver.
- 8** Click on the **Close** button.

How can I maximize battery life?

To maximize battery life, do the following:

Use the battery until the charge is completely depleted (until the battery and power LEDs flash in unison).

Recharge the battery completely before using (the battery is fully charged when the AC Adapter is plugged in and the battery LED is green).

For a new battery or a battery that you have not used recently:

1. Use the battery until the charge is completely depleted (until the battery and power LEDs flash in unison).
2. Recharge completely before using (the battery is fully charged when the AC Adapter is plugged in and the battery LED is green).
3. Repeat these steps three times.

Always use power management features such as power modes, standby, suspend, and hibernation.

For more detailed information about power management features → Using the Power Management Modes .

How can I load a different operating system on my computer?

–Or–

Where can I get ThinkPad device drivers for this operating system?

See “Installing a New Operating System and Its Device Drivers” on page 87 for information on installing a new operating system and device drivers. You can get the ThinkPad device drivers by using the Diskette Factory. Before installing a new operating system, do the following:

1. Print the software installation section of this *Online User's Guide*.
2. Make backup diskettes of the device drivers and applications for your new operating system with the Diskette Factory. For more information → *User's Reference*.
3. Make a DOS system diskette that has the DOS FDISK.COM and FORMAT.COM utilities and the CD-ROM device driver for DOS.

How can I use the Recovery CD to reload my factory-installed ThinkPad operating system and applications?

→ *User's Reference*.

Chapter 7. Installing Software

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Installing a New Operating System and Its Device Drivers

If you want to install a new operating system in your computer, you need to install the ThinkPad device drivers for it at the same time.

This chapter describes how to install a supported operating system and corresponding device driver. You should make a printout of the sections you will be using before you reinstall the operating system. Go to appropriate section depending on the operating system you are using.

Installing Software for Windows 98

Installing Software for Windows 95

Installing Software for Windows NT

Installing Software for Windows Version 3.1

Installing Software for OS/2 Warp 4

Installing Software for PC-DOS 7.0 or MS-DOS 6.2

Installing Software for Windows 98

This section describes the installation procedures for Windows 98 and its software for your computer.

Overall Procedure

- 1** Have the Windows 98 installation package at hand.
- 2** Back up your software and personal data files on the hard disk.
- 3** Create the Windows 98 Startup Disk from the preloaded Windows 98 as follows:
 - a)** Double-click on **Add/Remove Program** in the Control Panel.
 - b)** Click on the **Startup Disk** tab.
 - c)** Follow the instruction on the screen.
- 4** Create the installation diskettes of the device drivers using the Diskette Factory program. You need to create at least the following device driver diskettes:

| Device Driver | Diskette Name |
|--------------------------------|---|
| ThinkPad Configuration program | Utility Diskette for Windows 98 Utility Diskette for DOS, Personalization Utility Data Diskette III |
| Display driver | Video Features Diskette (NM2160) for Windows 95/98 |
| Audio device driver | Audio Features Diskette for Windows 95/98 |
| TrackPoint driver | TrackPoint Driver Diskette II for Win98/95/NT |

- 5** Install Windows 98 and the software.

Note: To use the external CD-ROM or DVD drive to install Windows 98, set up the drive under the DOS environment.

- 1.** Install IBM PC DOS 7.0 or MS-DOS 6.2 → Installing Software for PC-DOS 7.0 or MS-DOS 6.2 .
- 2.** Install the CD-ROM or DVD device driver by following the manual that was shipped with your CD-ROM or DVD drive.

Installing Microsoft Windows 98

You can install Windows 98 by restoring the original preloaded image from the Recovery CD. Refer to the *User's Reference* for how to use the Recovery CD.

Depending on the optional applications you install with Windows 98, your required disk space varies. The following information applies to installing only Windows 98 in your computer:

Full install on a FAT 16 drive:

About 225 MB disk space is required. Depending on your system configuration and the options you select, the required space ranges from 165 MB to 355 MB.

Full install on a FAT 32 drive:

About 175 MB disk space is required. Depending on your system configuration and the options you select, the required space ranges from 140 MB to 225 MB.

If you are installing Windows 98 on a drive other than the C drive, more than 25 MB is required on the C drive.

- 1 Install the Windows 98 CD-ROM into the CD-ROM drive.
- 2 Search for SETUP.EXE in the CD-ROM, and run the SETUP.EXE. Enter the following:

```
src_cd:\tgt_dir\SETUP.EXE
```

where `src_cd` is the drive letter of the CD-ROM drive (D, E...) and `tgt_dir` is the directory that SETUP.EXE is in.

For more information, refer to the SETUP.TXT in the Windows 98 CD-ROM.

Installing the ThinkPad Configuration Program for Windows 98

To install the ThinkPad Configuration program for Windows 98:

- 1 Start Windows 98.
- 2 Insert the Utility Diskette for Windows 98 into the diskette drive.
- 3 Click on **Start**.

4 Click on **Run...**

5 Type **A:\SETUP** and click on **OK**.

Follow the instructions on the screen. After the installation is finished, restart the system.

Installing the Display Driver for Windows 98

To install the ThinkPad display driver for Windows 98:

1 Start Windows 98.

2 Click on **Start**.

3 Move the cursor to **Settings**; then click on **Control Panel**.

4 Double-click on **Display**; then click on the **Settings** tab.

5 Click on the **Advanced...** button.

6 Click on the **Adapter** tab.

7 Click on the **Change...** button.

The "Update Device Driver Wizard" runs.

8 Click on **Next**.

9 Select "Search for a better driver than the one your device is using now. (Recommended)" by clicking on it. Then click on **Next**.

10 Put a check mark in the **Floppy disk drives** check box by clicking on it.

11 Insert the Video Features Diskette (NM2160) for Windows 95/98 into the diskette drive, and click on **Next**.

12 When a message appears that Windows has found **NeoMagic MagicGraph 128XD**, click on **Next**.

13 Click on **Finish**.

- 14** Remove the Video Features Diskette (NM2160) for Windows 95/98 from the diskette drive, and click on **Yes** to reboot the computer.
- 15** Click on **Start**.
- 16** Move the cursor to **Settings**; then click on **Control Panel**.
- 17** Double-click on **Display**
- 18** Set the Colors and Screen area in the “Display Properties.”

Installing the Audio Device Driver for Windows 98

To install the audio support software for Windows 98:

- 1** Start Windows 98.
- 2** Insert the Audio Features Diskette for Windows 95/98 into the diskette drive.
- 3** Click on **Start**.
- 4** Click on **Run....**
- 5** Type `A:\SETUP`
- 6** Click on the **Uninstall Crystal Drivers** button.
- 7** When you are prompted to restart the computer, remove the Audio Features Diskette for Windows 95/98 from the diskette drive and restart the computer.

The setup program removes the previous driver if there is one, and prepares for the new registration.
- 8** When the computer prompts you to install the manufacturer's diskette during the startup of Windows 98, reinsert the Audio Features Diskette for Windows 95/98 into the diskette drive.

Follow the instructions on the screen.

Note: The MIDI connector is available if the computer is attached to the enhanced port replicator (option). The MIDI connector capability is disabled as a default, so you need to enable the function with the ThinkPad Configuration program.

Installing the IBM TrackPoint Driver for Windows 98

The TrackPoint Driver Diskette II for Win98/95/NT is intended for use with the IBM PS/2 TrackPoint Version 4.0 or later.

To install the TrackPoint driver for Windows 98:

- 1** Start Windows 98.
- 2** Insert the TrackPoint Driver Diskette II for Win98/95/NT into the diskette drive.
- 3** Click on **Start**.
- 4** Move the cursor to **Settings**; then click on **Control Panel**.
- 5** Double-click on the **System** icon.
- 6** Click on the **Device Manager** tab at the top of the “System Properties” window.
- 7** Double-click on **Mouse**.
- 8** Double-click on either **PS/2 Compatible Mouse Port** or **PS/2 TrackPoint** whichever choice appears in the list.
- 9** Click on the **Driver** tab.
- 10** Click on the **Update Driver...** button.
The “Update Device Driver Wizard” runs.
- 11** Click on **Next**.
- 12** Click on **Display a list of all the drivers in a specific location**.
- 13** Click on **Next**.
- 14** Click on **Have Disk**.
- 15** Make sure that the source drive is **A:** and click on **OK**.
- 16** Click on **PS/2 TrackPoint** in the list.
- 17** Click on **Next**.

- 18** If the "Update Driver Wizard" window appears, click on **Yes**.
- 19** Click on **Next**.
- 20** Click on **Finish** in the "Update Driver Wizard" window.
- 21** Remove the TrackPoint Driver Diskette II for Win98/95/NT from the diskette drive, and restart your computer to make the new settings effective.

Installing Software for Windows 95

This section describes the installation procedures for Windows 95 and its software for your computer.

The following versions of Windows 95 are available for your computer:

- Service Pack Version 1 (OSR1)
- OEM Service Release Version 2.1 (OSR2.1)

OSR1 can be downloaded from the Microsoft Internet home page (<http://www.microsoft.com>).

Your Version of Windows 95

You can check which version of Windows 95 you are using as follows:

1. Click on **Start**, move the cursor to **Settings**, and then click on **Control Panel**.
2. Double-click on **System**.

The following window appears:



You can check the version in this window. Read the numbers under "System."

4.00.950a means that it is Windows 95 OSR1.

4.00.950B means that it is Windows 95 OSR2.1.

Overall Procedure

- 1 Have the Windows 95 installation package in hand.
- 2 Back up your software and personal data files on the hard disk.
- 3 Create the installation diskettes of the device drivers using the Diskette Factory program. You need to create at least the following device driver diskettes:

| Device Driver | Diskette Name |
|--------------------------------|--|
| ThinkPad Configuration program | Utility Diskette for Windows 95/98 Utility Diskette for DOS, Personalization Utility Data Diskette III |
| Display driver | Video Features Diskette (NM2160) for Windows 95/98 |
| PC Card support software | CardWorks for Windows 95 |
| Audio device driver | Audio Features Diskette for Windows 95 |
| TrackPoint driver | TrackPoint Driver Diskette II for Win98/95/NT |

Note: The ThinkPad Configuration program and PC Card support software (CardWizard) are not supported by Windows 95 OSR1.

4 Install Windows 95 and the software.

Note: To use the CD-ROM drive to install Windows 95, create the DOS boot diskette that enables to use the CD-ROM drive then boot the system with the diskette.

Installing Microsoft Windows 95

Some new files must be incorporated at the time of installation.

Installing Windows 95 OSR1

- 1** Create a Windows 95 supplementary diskette using the Diskette Factory program (refer to the User's Reference).
- 2** Make sure there is enough space in the hard disk to store the cabinet files and the installation programs (the required space might vary depending on the national language supported by your version of Windows 95).
- 3** Make a temporary directory.
For example, enter at the DOS prompt:

```
MD c:\win95
```
- 4** Insert the Windows 95 CD-ROM into the CD-ROM drive.

- 5** Copy all the cabinet (.CAB) files and the installation programs from the \WIN95 directory of the Windows 95 CD-ROM to the temporary directory.

For example, enter at the DOS prompt:

```
COPY src_cd:\WIN95\ . . c:\win95
```

where *src_cd* is the drive letter of the CD-ROM drive (D, E,...), *c* is the drive letter of your hard disk drive, and *win95* is the temporary directory that you made in 3 on page 96.

- 6** Insert the Windows 95 supplementary diskette you created in step 1 on page 96 into the diskette drive.
- 7** Copy the updated files from the Windows 95 supplementary diskette to the temporary directory.

For example, enter at the DOS prompt:

```
COPY A:\OSR INF\ . . c:\win95
```

where *c* is the drive letter, and *win95* is the temporary directory that you made in step 3 on page 98.

- 8** Install the operating system by entering `SETUP.EXE` at the temporary directory prompt.
- 9** Refer to the Windows 95 documentation and the instructions that appear on the screen to complete the installation.
- 10** If required, install the Service Pack Version 1, available from the Microsoft Internet home page.
- 11** Remove all the files in the temporary directory and then remove the directory itself after you complete the installation, to free the space on the hard disk.

Installing Windows 95 OSR2.1

If you have a CD-ROM version of the Windows 95 OSR2.1, do the following:

- 1** Create a Windows 95 supplementary diskette using the Diskette Factory program (refer to the User's Reference).

2 Make sure there is enough space in the hard disk to store the cabinet files and the installation programs (the required space might vary depending on the language supported by your version of Windows 95).

3 Make a temporary directory.

For example, enter at the DOS prompt:

```
MD c:\win95
```

4 Insert the Windows 95 CD-ROM into the CD-ROM drive.

5 Copy all the cabinet (.CAB) files and the installation programs from the \WIN95 directory of the Windows 95 CD-ROM disk to the temporary directory.

For example, enter at the DOS prompt:

```
COPY src_cd:\WIN95\ . c:\win95
```

where `src_cd` is the drive letter of the CD-ROM drive (D, E,...), `c` is the drive letter of your hard disk drive, and `win95` is the temporary directory that you made in step 3.

6 Insert the Windows 95 supplementary diskette you created in step 1 on page 97 into the diskette drive.

7 Copy the updated files in the Windows 95 supplementary diskette to the temporary directory.

For example, enter the following at the DOS prompt:

```
COPY A:\OSR2INF\ . . c:\win95  
COPY A:\CARDBUS\ . c:\win95
```

where `c` is the drive letter, and `win95` is the temporary directory that you made in step 3.

8 Install the operating system by entering `SETUP.EXE` at the temporary directory prompt.

9 Refer to the Windows 95 documentation and the instructions that appear on the screen to complete the installation.

10 Change the current drive letter to the CD-ROM drive letter, and run `\USBSUPP.EXE` in the `\OTHERS` directory of the CD-ROM.

- 11** Change the drive letter at the DOS prompt to **A**, and run
`\QFE444\PCCARDUP.EXE`
- 12** Reboot the system.
- 13** To replace the Unimodem drivers to support the Intel Video Phone application, from the DOS prompt, go to
`C:\WINDOWS\SYSTEM` (or the `SYSTEM` subdirectory where Windows 95 is installed).
- 14** Rename the `UNIMODEM.VXD` and `UNIMDM.TSP` files by entering:

```
REN UNIMODEM.VXD UNIMODEM.BAK
REN UNIMDM.TSP UNIMDM.BAK
```
- 15** Copy the new files by entering `COPY A:\UNIMODEM\ .`
- 16** Refer to the documentation shipped with this version to finish the installation.

Installing the ThinkPad Configuration Program for Windows 95

Note: Windows 95 OSR1 does not support the ThinkPad Configuration program.

To install the ThinkPad Configuration program for Windows 95:

- 1** Start Windows 95.
- 2** Insert the Utility Diskette for Windows 95/98 into the diskette drive.
- 3** Click on **Start**.
- 4** Click on **Run...**
- 5** Type `A:\SETUP` and click on **OK**.
Follow the instructions on the screen. After installation has finished, restart the system.

Installing the Display Driver for Windows 95

To install the display driver for Windows 95:

For Windows 95 OSR1:

- 1** Start Windows 95.
- 2** Click on **Start**.
- 3** Move the cursor to **Settings**; then click on **Control Panel**.
- 4** Double-click on **Display**; then click on the **Settings** tab.
- 5** Click on the **Change Display Type...** button.
The “Change Display Type” window appears.
- 6** Click on **Change...** under “Adapter Type.”
- 7** Click on **Have Disk...**
- 8** Insert the Video Features Diskette (NM2160) for Windows 95/98 into the diskette drive, and click on **OK**.
- 9** Click on **NeoMagic MagicGraph 128XD**; then click on **OK**.
- 10** Click on **Close**.

- 11** Select your screen parameters from the color palette, desktop area, and font size; then click on **Close**.

- 12** Specified the type of monitor as follows.

(If you do not specify the type of monitor you want to use, your new settings might not function correctly.)

- a)** Open the “Display Properties” window.
- b)** Click on the **Settings** tab.
- c)** Click on **Change Display Type...**
- d)** Click on the **Change...** button under **Monitor Type**.
- e)** Click on **Show all devices**.
- f)** Specify **Manufacturers** and **Models** in the next window.

For example,

If you are using the LCD:

Manufacturers: (Standard monitor types)

Models: Laptop Display Panel (800x600)

If you are using the external monitor:

Manufacturers: (Standard monitor types)

Models: Plug and Play Monitor (VESA DOC)

g) Click on **OK**.

h) Click on **Close**.

i) Click on **OK**.

13 Follow the instructions on the screen.

Windows 95 prompts you to restart Windows 95 to make the display driver change effective.

For Windows 95 OSR2.1:

1 Start Windows 95.

2 Click on **Start**.

3 Move the cursor to **Settings**; then click on **Control Panel**.

4 Double-click on **Display**; then click on the **Settings** tab.

5 Click on the **Advanced Properties** button.

6 Click on the **Adapter** tab; then click on **Change...**

7 Click on **Have Disk...**; then click on **OK**.

8 Insert the Video Features Diskette (NM2160) for Windows 95/98 into the diskette drive, and click on **OK**.

9 Click on **NeoMagic MagicGraph 128XD**; then click on **OK**.

10 Click on **Close**.

11 Select your screen parameters from the color palette, desktop area, and font size; then click on **Close**.

- 12** Specify the type of monitor as follows. (If you do not specify the type of monitor you want to use, your new settings might not function correctly.)
- a)** Open the “Display Properties” window.
 - b)** Click on the **Settings** tab.
 - c)** Click on **Advanced Properties** button.
 - d)** In the “Advanced Display Properties” window, click on the **Monitor** tab.
 - e)** Click on the **Change...** button.
 - f)** Click on **Show all devices**.
 - g)** Specify **Manufacturers** and **Models** in the next window.

For example,

If you are using the LCD:

Manufacturers: (Standard monitor types)

Models: Laptop Display Panel (800x600)

If you are using the external monitor:

Manufacturers: (Standard monitor types)

Models: Plug and Play Monitor

- h)** Click on **OK**.
- i)** Click on **Close**.
- j)** Click on **OK**.

- 13** Follow the instructions on the screen.

Windows 95 prompts you to restart Windows 95 to make the display driver change effective.

Installing PC Card Support Software for Windows 95

Notes: .

Windows 95 OSR1 does not support the PC Card support software.

If you are going to use a enhanced port replicator with your computer, you need to uninstall CardWizard first,

dock your computer to the enhanced port replicator, and then reinstall it.

Remove any PC Cards from the computer.

1. Push the PC Card eject button; the eject button pops out.
2. Push the button again; the PC Card pops out.

To install the PC Card support software for Windows 95:

- 1 Start Windows 95.
- 2 Remove any PC Cards from the computer.
Note: Push the PC Card eject button; the eject button pops out. Push the button again; the PC Card pops out.
- 3 Insert the CardWorks for Windows 95 Diskette into the diskette drive.
- 4 Click on **Start**.
- 5 Click on **Run...**
- 6 Make sure the window shows `A:\SETUP`; then click on **OK**.
Follow the instructions on the screen.

Installing the Audio Device Driver for Windows 95

To install the audio support software for Windows 95:

- 1 Start Windows 95.
- 2 Insert the Audio Features Diskette for Windows 95 into the diskette drive.
- 3 Click on **Start**.
- 4 Click on **Run...**
- 5 Type `A:\SETUP` and click on **Uninstall Crystal Drivers**.
- 6 Click on **Shut Down**.
Follow the instructions on the screen.

- 7 When you are prompted to restart the computer, remove the Audio Features Diskette for Windows 95 from the diskette drive and restart the computer.

The setup program removes the previous driver if there is one, and prepares for the new registration.

- 8 When the computer prompts you to install the manufacturer's diskette during the startup of Windows 95, insert the Audio Features Diskette for Windows 95 into the diskette drive.

Follow the instructions on the screen.

Note: The MIDI connector is available if the computer is attached to the enhanced port replicator (option). The MIDI connector capability is disabled as a default, so you need to enable the function with the ThinkPad Configuration program.

Installing the IBM TrackPoint Driver for Windows 95

The TrackPoint Driver Diskette II for Win98/95/NT is intended for use with the IBM PS/2 TrackPoint Version 4.0 or later.

To install the TrackPoint driver for Windows 95:

- 1 Start Windows 95.
- 2 Insert the TrackPoint Driver Diskette II for Win98/95/NT into the diskette drive.
- 3 Click on **Start**.
- 4 Move the cursor to **Settings**; then click on **Control Panel**.
- 5 Double-click on the **Mouse** icon.
- 6 Click on the **General** tab at the top of the "Mouse Properties" window.
- 7 Click on **Change**.
- 8 Click on **Have Disk**.
- 9 Make sure that the source drive is **A:** and click on **OK**.
- 10 Click on **PS/2 TrackPoint** in the list.

- 11** Click on **OK**.
- 12** Click on **Close** in the “Mouse Properties” window.
- 13** Remove the TrackPoint Driver Diskette II for Win98/95/NT from the diskette drive, and restart your computer to make the new settings effective.

Installing Software for Windows NT

This section describes the installation procedures for Windows NT Version 4.0 and its device drivers.

Overall Procedure

- 1** Have the Windows NT installation package in hand.
- 2** Back up your software and personal data files on the hard disk.
- 3** Create the installation diskettes of the device drivers using the Diskette Factory program. You need to create at least the following device driver diskettes:

| Device Driver | Diskette Name |
|--------------------------------|---|
| ThinkPad Configuration program | Utility Diskette for Windows NT Utility Diskette for DOS, Personalization Utility Data Diskette III |
| Display driver | Video Features Diskette (NM2160) for Windows NT 4.0 |
| PC Card support software | CardWizard for Windows NT |
| Audio device driver | Audio Features Diskette for Windows NT |
| TrackPoint driver | TrackPoint Driver Diskette II for Win98/95/NT |
| Infrared device driver | Infrared Driver Diskette for Windows NT |
| IDE driver | IDE Driver Diskette |

- 4** Install Windows NT and the device drivers.

Installing Microsoft Windows NT

Before installing Windows NT, do the following:

Read the Windows NT installation guide.

If you plan to use OS/2 Warp with Windows NT, you need to use the OS/2 Warp Boot Manager. For more information
➔ [Installing IBM OS/2 Warp](#) .

To install Windows NT using an external CD-ROM drive, do the following:

If you have an external CD-ROM drive that connects under a DOS environment, you can install Windows NT in DOS.

- 1** Insert the Windows NT CD-ROM into the external CD-ROM drive.
- 2** Go to the CD-ROM drive; then go to the `\I386` directory.
For example, if your CD-ROM drive letter is D, go to `D:\I386`
- 3** At the command prompt, type `WINNT`; then press **Enter**.
For example, `D:\I386>WINNT`
Follow the instructions on the screen.

If your computer does not have a CD-ROM drive, use a network server, you can install Windows NT on multiple computers by first copying the Windows NT master source files to a shared drive on a network server. After connecting your computer to a network, such as with the DOS LAN requester, you can install the files from the network server to your computer at the DOS command prompt.

For more information, refer to the Windows NT installation guide.

Installing the ThinkPad Configuration Program for Windows NT

To install the ThinkPad Configuration program for Windows NT:

- 1** Start Windows NT, and log on with the user ID authorized as an administrator.
- 2** Click on **Start**.
- 3** Click on **Run..**
- 4** Insert the Utility Diskette for Windows NT into the diskette drive.
- 5** Type `A:\SETUP` and press **Enter**.
Follow the instructions on the screen.

Installing the Display Driver for Windows NT

To install the display driver for Windows NT:

- 1** Start Windows NT, and log on with the user ID authorized as an administrator.
- 2** Click on **Start**.
- 3** Move the cursor to **Settings**; then click on **Control Panel**
- 4** Double-click on **Display**.
- 5** In the "Display Properties" window, click on the **Settings** tab; then click on **Display Type....**
- 6** In the "Adapter Type" window, click on **Change**.
- 7** Click on **Have Disk....**
- 8** Insert the Video Features Diskette (NM2160) for Windows NT 4.0 into the diskette drive; then click on **OK**.
A selection list appears.
- 9** From the display devices in the selection list, click on **NeoMagic MagicGraph 128 Family**, and click on **OK**.
The message "You are about to install a third-party driver" appears on the screen.
- 10** Click on **Yes**.
- 11** Click on **OK**.
- 12** Click on **Close**.
- 13** Click on **Close**.
- 14** Restart Windows NT to make the change effective.
After you restart Windows NT, the display resolution is set to 640x480 with 256 colors as a default. If necessary, change the resolution and refresh rate as follows:
- 15** When the "Invalid Display Settings" message appears, click on **OK**.

- 16** The “Display Properties” window appears. Select your screen parameters from the color palette, desktop area, and refresh frequency.
- 17** Click on **Test** and make sure the selected mode is displayed correctly on the screen.
- 18** Click on **OK** in the “Display Properties” window.

Hints

If you are installing the ThinkPad Configuration program for Windows NT, you can switch between display output types—external display only, LCD only, or both—using the ThinkPad Configuration program.

If you are using Windows NT, you can create different video mode configuration profiles, such as one for the LCD mode and another one for the External Display mode. For more details about the hardware profile settings, read the Windows NT user's guide.

Installing PC Card Support Software for Windows NT

Important

If you are going to use an enhanced port replicator with your computer, do the following.

- 1.** If your system is connected to a network, log off before starting the installation.
- 2.** You need to uninstall PC Card support software (CardWizard).
- 3.** Dock your computer to the enhanced port replicator.
- 4.** If you want to install the Windows NT Service Pack, install it before you install the PC Card support software.
- 5.** Reinstall the PC Card support software.

- 1** Start Windows NT, and log on with the user ID authorized as an administrator.

- 2** Remove any PC Cards that are in the slot.
- 3** Insert the CardWizard for Windows NT Diskette into the diskette drive.
- 4** Be sure to read the README file before you start installation. Apply any relevant information from that file.
- 5** Click on **Start**.
- 6** Click on **Run**.
- 7** Type `A:\SETUP` and click on **OK**.
- 8** Follow the instructions on the screen.

Installing the Audio Device Driver for Windows NT

To install the audio device driver for Windows NT:

- 1** Start Windows NT, and log on with the user ID authorized as an administrator.
- 2** Insert the Audio Features Diskette for Windows NT into the diskette drive.
- 3** Click on **Start**.
- 4** Move the cursor to **Settings**; then click on **Control Panel**.
- 5** Double-click on **Multimedia**.
The "Multimedia Properties" window appears.
- 6** Click on the **Devices** tab and then on the **Add** button.
- 7** Click on **Unlisted** or **Updated Driver**.
A window appears, prompting for the path of the drivers to be installed.
- 8** Enter `A:\`
The audio driver is displayed on the window.
- 9** Click on the audio driver and click on **OK**. When the installation program prompts you for existing files or new files, click on **new**.

- 10** Press **OK** in the “CrystalWare Configuration” panel. When the installation program prompts you, restart Windows NT to make the change effective.

Installing the IBM TrackPoint Driver for Windows NT

The TrackPoint Driver Diskette II for Win98/95/NT is intended for use with the IBM PS/2 TrackPoint Version 4.0 or later.

To install the TrackPoint driver for Windows NT:

- 1** Start Windows NT.
- 2** Insert the TrackPoint Driver Diskette II for Win98/95/NT into the diskette drive.
- 3** Click on **Start**.
- 4** Move the cursor to **Settings**; then click on **Control Panel**.
- 5** Double-click on the **Mouse** icon.
- 6** Click on the **General** tab at the top of the “Mouse Properties” window.
- 7** Click on **Change**.
- 8** Click on **Have Disk**.
- 9** Click on **OK**.
- 10** Click on **PS/2 TrackPoint** in the list.
- 11** Click on **OK**.
- 12** Click on **Close** in the “Mouse Properties” window.
- 13** Remove the TrackPoint Driver Diskette II for Win98/95/NT from the diskette drive, and restart your computer to make the new settings effective.

Installing the Infrared Device Driver for Windows NT

You can use infrared features using Windows NT dial-up networking. The Windows NT infrared device driver provides you IrDA 1.0

compliant functions, enabling infrared communication up to 115 Kbps.

To install the infrared device driver for Windows NT:

- 1** Start Windows NT, and log on with the user ID authorized as an administrator.
- 2** Click on **Start** and **Run**.
- 3** Insert the Infrared Driver Diskette for Windows NT into the diskette drive.
- 4** Type `A:\INSTALL` and press **Enter**.
Follow the instructions on the screen.
- 5** Restart the computer.

After the installation, COM 1, IRQ 4, and I/O address X'3F8' are assigned for the infrared port.

To enable the infrared port as COM 1, use the ThinkPad Configuration program.

You have finished the entire procedure.

If you want to change the COM port for the infrared communication, go on to Assigning a COM Port for the Infrared Port.

If you want to configure the infrared port for dial-up networking, go on to Configuring the Infrared Port for Dial-Up Networking.

Assigning a COM Port for the Infrared Port

Setting COM 1: If you want to assign a COM port other than the default value (COM 1), you need to run the ThinkPad Configuration program.

Setting COM 2:

- 1** Click on the **Infrared Port** icon in the ThinkPad Configuration program.

- 2 Click on **Advanced...**; then click on COM2 for "COM Port."
Make sure that **Enable** is selected for "Infrared."
- 3 Shut down and restart your computer.

After you modify the registry key or value, restart the computer. The infrared port is configured as COM2.

Configuring the Infrared Port for Dial-Up Networking

To use dial-up networking with the infrared port, you need to configure the null-modem setting in the "Windows NT RAS setup" window.

To set up infrared communication for dial-up networking:

- 1 Double-click on **Network** in the **Control Panel**.
- 2 Click on the **Services** tab; then click on **Add...**
- 3 If you have not installed Remote Access Service, click on **Remote Access Service**, and click on **OK**.
- 4 In "Install New Modem Setup," click on **Dial-Up Networking Serial Cable between 2 PCs**, and follow the instructions on the screen.
- 5 Make sure this serial cable COM port is already assigned for your infrared port.
- 6 Restart the computer when the RAS setup is completed.

You can connect your computer to the RAS server using the infrared port if your RAS server is also configured for using an infrared device.

Installing the IDE Driver for Windows NT

Install the ThinkPad PIIX4 IDE driver as follows:

- 1 Start Windows NT and log on with the user ID authorized as an administrator.
- 2 Insert the IDE Driver Diskette into the diskette drive.

- 3** Click on **Start**.
- 4** Move the cursor to **Settings**; then click on **Control Panel**.
- 5** Double-click on **SCSI Adapters**.
- 6** Click on the **Drivers** tab.
- 7** If **Intel PIIX PCI Bus Master IDE Controller** is listed, remove it.
- 8** If **IDE CD-ROM (Atapi 1.2)/Dual Channel PCI IDE** is listed, remove it.
- 9** Click on **Add**.
- 10** Click on **Have Disk...**
- 11** Conform that the installation path is correct (usually it points to **A:**), and click on **OK**
- 12** Click on **ThinkPad PIIX4 IDE Driver**; then click on **OK**.
- 13** If you are prompted to restart your computer, remove the diskette from the diskette drive and click on **Yes**.

Installing Software for Windows Version 3.1

This section describes the installation procedures for Windows 3.1 and its device drivers.

Overall Procedure

- 1** Have the installation packages for DOS and Windows 3.1 in hand.
- 2** Back up your software and personal data files on the hard disk.
- 3** Create the installation diskettes of the device drivers using the Diskette Factory program. You need to create at least the following device driver diskettes:

| Device Driver | Diskette Name |
|--------------------------------|--|
| ThinkPad Configuration program | Utility Diskette for Windows 3.1 Utility Diskette for DOS, Personalization Utility Data Diskette III |
| Display driver | Video Features Diskette (NM2160) for Windows 3.1 |
| PC Card support software | CardWizard for Windows 3.1 |
| Audio device driver | Audio Features Diskette for DOS/Windows 3.1 |
| Infrared device driver | Infrared Features Diskette II |

- 4** Install DOS and its device drivers. → Installing Software for PC-DOS 7.0 or MS-DOS 6.2

Note

Do not install the PC Card support software (CardSoft) for DOS.

- 5** Install Windows 3.1 (with Advanced Power Management) and the device driver diskettes.

Installing Microsoft Windows Version 3.1

Important

During installation, do the following so that Windows can operate correctly:

When the Windows Setup program asks you to select either **Express Setup** or **Custom Setup**, select **C** for **Custom Setup**.

Install Windows 3.1 with the default VGA display driver that came with Windows. After you complete the installation of Windows, install the ThinkPad display driver.

Do the following to install Windows 3.1.

- 1** Start the installation as specified in the Windows manual.
- 2** When the Windows Setup program asks you to select **Express Setup** or **Custom Setup**, type **C** for **Custom Setup**.
- 3** Continue installing Windows 3.1 until the following window appears:

```
Windows Setup
=====

Setup has determined that your system includes the following hardware
and software components. If your computer or network appears on the
Hardware Compatibility List with an asterisk, press F1 for Help.

    Computer:      MS-DOS System
    Display:       VGA
    Mouse:         Microsoft, or IBM PS/2
```

- 4** Using the **Up Arrow** key, highlight **MS-DOS System** and press **Enter**.
- 5** Click on **MS-DOS System with APM** from the list and press **Enter**.

Verify that **Computer** has changed to **MS-DOS System with APM**. If the item has not changed, return to step 1d.

- 6** Make sure the **Display:** choice is set to **VGA**. (Do not change this choice.)
- 7** When you have completed the installation of Windows, edit the AUTOEXEC.BAT file so that the computer will use the correct mouse driver:
 - a** At the DOS command prompt (usually C:\>), type
E:\AUTOEXEC.BAT and press **Enter**.
 - b** Find the line: C:\WINDOWS\MOUSE.COM /Y
 - c** Change it to: C:\DOS\MOUSE.COM /Y
 - d** Find the line that includes SHARE.EXE and delete that line.
 - e** Save the file and restart the computer.
- 8** After installing Windows, you should check the creation date of the following drivers in the DOS subdirectory, the Windows subdirectory, and the CDROM subdirectory:

EMM386.EXE (loaded by CONFIG.SYS)
HIMEM.SYS (loaded by CONFIG.SYS)
SMARTDRV.EXE (loaded by AUTOEXEC.BAT)
MSCDEX.EXE (loaded by AUTOEXEC.BAT)

Then use the newest program among the ones for the DOS, Windows, and CDROM directories for each drivers.

You can easily use the newer one by changing the subdirectory name in the CONFIG.SYS or AUTOEXEC.BAT. For example, if the ones in DOS were the newest, you would change:

C:\WINDOWS\SMARTDRV.EXE

to:

C:\DOS\SMARTDRV.EXE

If you start Windows from the DOS prompt, do not close the LCD while the program is loading; if you do, the computer will stop running.

Installing the ThinkPad Configuration Program for Windows 3.1

If you are going to use Windows, install the ThinkPad Configuration program for DOS first. → Installing the ThinkPad Configuration Program for DOS.

Then do the following to install the ThinkPad Configuration program for Windows 3.1:

- 1 Start Windows.
- 2 Click on **File** from the “Program Manager” window; then click on **Run...** from the pull-down menu.
- 3 Insert the Utility Diskette for Windows 3.1 into the diskette drive; then type `A:\INSTALLW` and press **Enter**.
- 4 Follow the instructions on the screen.
Default choices are already selected in the “Installation Options” window.

Installing the Display Driver for Windows 3.1

Do the following to install the display driver for Windows 3.1 so that you can get a correct display setting and better performance:

- 1 Start DOS; then go to the WINDOWS subdirectory.
- 2 Type `SETUP` and press **Enter** to start the Windows setup program.
- 3 Using the **Up Arrow** key, highlight **Display** and press **Enter**.
- 4 Select **Other (Requires disk...)** from the list.
- 5 Insert the Video Features Diskette (NM2160) for Windows 3.1 into the diskette drive.
- 6 Type `A:` and press **Enter**.
- 7 Select your desired resolution, color depth, and font from the menu, and press **Enter**.

Verify that **Display** has changed to your desired resolution type (an example is shown in the following window). If the item has not changed, return to step 3.

```
Windows Setup
=====

Setup has determined that your system includes the following hardware
and software components. If your computer or network appears on the
Hardware Compatibility List with an asterisk, press F1 for Help.

Computer:   MS-DOS System with APM
Display:    NeoMagic MagicGraph 128XD 8  x6  256 small font
Mouse:      Microsoft, or IBM PS/2
```

8 Press **Enter** to continue the installation.

Installing PC Card Support Software for Windows 3.1

If you are going to use an enhanced port replicator with your computer, you need to uninstall the PC Card support software (CardWizard) first, dock your computer to the enhanced port replicator, and then reinstall it.

To install the PC Card support software for Windows 3.1:

- 1** Start Windows.
- 2** Click on **File** from the “Program Manager” window; then click on **Run...** from the pull-down menu.
- 3** Insert the CardWizard for Windows 3.1 Diskette into the diskette drive.
- 4** Type `A:\SETUP` in the “Run” window that appears on the screen.
- 5** Click on **OK**.

Follow the instructions on the screen.

Installing the Audio Device Driver for Windows 3.1

To install the audio device driver for Windows 3.1:

- 1** Start Windows 3.1.

- 2** Click on **File** from the “Program Manager” window; then click on **Run...** from the pull-down menu.
- 3** Insert the Audio Features Diskette for DOS/Windows 3.1 into the diskette drive of your computer; then type `A:\SETUP` and press **Enter**.

Follow the instructions on the screen.

The MIDI connector is available if the computer is attached to the enhanced port replicator. The MIDI connector capability is disabled as a default, so you need to enable the function in the ThinkPad Configuration program.

You need to install **MPU401 Support Software** from the Windows 3.1 installation disk. Select and install the **Roland MPU401** device driver in the control panel.

Installing the Infrared Device Driver for Windows 3.1

The infrared device driver supports networking with such software as IBM Internet Connection for Windows, Windows for Workgroups 3.1, or Netware DOS client. This driver is included in the Infrared Features Diskette II and is installed as an NDIS2-compliant network adapter driver or as an ODI-compliant network adapter driver when you install the respective networking software.

Refer to the respective networking software publication for installation procedures. The README file on the Infrared Features Diskette II contains additional information.

Installing Software for OS/2 Warp 4

This section describes how to install OS/2 with DOS and Windows 3.1, as well as the OS/2 ThinkPad device drivers.

Overall Procedure

- 1** Have the DOS, Windows 3.1, and OS/2 installation packages in hand.
- 2** Back up your software and personal data files on the hard disk.
- 3** Create the installation diskettes of the device drivers using the Diskette Factory program. You need to create at least the following device driver diskettes:

| Device Driver | Diskette Name |
|--------------------------------|---|
| ThinkPad Configuration program | Utility Diskette for OS/2 Utility Diskette for DOS, Personalization Utility Data Diskette III |
| Display driver | Video Features Diskette (NM2160) for OS/2 |
| PC Card support software | PC Card Director for OS/2 |
| Audio device driver | Audio Features Diskette for OS/2 |
| TrackPoint driver | TrackPoint Driver Diskette II for OS/2 |
| Infrared device driver | Infrared Features Diskette II |

- 4** Install OS/2 and the software.

Installing IBM OS/2 Warp

Preparing for the Installation of OS/2

- 1** Create OS/2 Warp Version 4 Install Diskette 1 & Diskette 2 Update and OS/2 Warp Version 4 Install Diskette 2 Update using the Diskette Factory Program (refer to the *User's Reference*).
- 2** Install OS/2 Warp Version 4 from the installation diskettes or CD-ROM.

- 3** When you are prompted to insert Disk 1, use the new diskettes created in step 1.
- 4** When you are prompted to insert Disk 2, use the new diskettes created in step 1.
- 5** Go to the next section to install OS/2 Warp Version 4.

Installing OS/2 Warp

Your installation of OS/2 depends on whether you use the *Dual Boot* or the *Boot Manager* for switching between OS/2 and DOS/Windows 3.1.

If you use the Dual Boot, go to the next step.

If you use the Boot Manager, install the Boot Manager first. Then go to the next step. (Refer to the OS/2 documentation for information on installing Boot Manager.)

- 1** Install DOS, Windows, and the ThinkPad Configuration program before installing OS/2.

Notes:

- a) To install the ThinkPad Configuration for DOS → Installing the ThinkPad Configuration Program for DOS .
- b) To install the ThinkPad Configuration for Windows 3.1 → Installing the ThinkPad Configuration Program for Windows 3.1 .

- 2** Install OS/2 by referring to the OS/2 documentation.

Pay attention to the following when you install OS/2:

In the "System Configuration" window, click on **VGA** as the **Primary Display**.

In the "System Configuration" window, click on **No Support Installed** at **PCMCIA Feature**.

(For using the CD-ROM drive:) In the "System Configuration" window, click on **Non-Listed IDE CD-ROM or IDE CD-ROM**.

After OS/2 has been successfully installed, restart the computer.

Installing the ThinkPad Configuration Program for OS/2

To install the ThinkPad Configuration program for OS/2:

- 1** Start OS/2; then insert the Utility Diskette for OS/2 into the diskette drive.
- 2** Install the ThinkPad System Management device driver:
 - a** Open **OS/2 System, System Setup**, and then **Install/Remove**.
 - b** Click on **Device Driver Install** and click on the **Install...** button.
 - c** Click on **ThinkPad System Management Device Driver**; then click on **OK**.
- 3** Open the OS/2 screen command prompt.
- 4** Type `A:\INSTALL2` and press **Enter**.
Follow the instructions on the screen.

Installing the Display Driver for OS/2

The display driver enables you to use various screen resolutions and colors for the LCD and external monitor. The display driver also takes advantage of the computer's video capability.

To install the ThinkPad display driver for OS/2:

- 1** Start OS/2.
- 2** Insert the Video Features Diskette (NM2160) for OS/2 into the diskette drive:
- 3** Open the OS/2 full screen or OS/2 window and go to the A: prompt.
- 4** Type `SETUP X` (X=boot drive) and press **Enter**.
- 5** Click on **Primary Display** on the display driver install window, and click on **OK**.
- 6** Click on **List additional display drivers....**

- 7** Make sure the source directory is `A:\`, and click on **OK**.
- 8** Make sure the **NeoMagic MagicGraph 128/V/ZV/XD** is displayed on the primary display driver list, and click on **OK**.
- 9** Make sure the source directory is `A:\`, and click on **Install**.
Follow the instructions on the screen.
- 10** Remove the diskette from the diskette drive, and restart the computer.
- 11** Set the resolution and color depth in the ThinkPad Configuration program.
- 12** Shut down OS/2, and restart the computer.

Installing the PC Card Support Software for OS/2

To use PC Cards, you need to install the following device drivers and software associated with PC Cards:

PC Card support program (PC Card Director):

- Card Services device driver
- Socket Services device driver
- PC Card Power Management device driver
- PC Card Director utility

PC Card client device drivers (only when PC Card Director does not support the PC Card)

To install the PC Card support software for OS/2:

- 1** Start OS/2; then open the OS/2 full-screen command prompt.
- 2** Insert the PC Card Director for OS/2 Diskette into the diskette drive; then type `A:\PCMINST2` and press **Enter**.
Follow the instructions on the screen.
- 3** Click on **OK** when you have completed the installation.
- 4** Close all applications, remove the diskette from the diskette drive, and restart the computer.

Installing the Audio Device Driver for OS/2

To install the audio device driver for OS/2:

- 1** Start OS/2.
- 2** Insert the Audio Features Diskette for OS/2 into the diskette drive.
- 3** Open the OS/2 command prompt and type `MINSTALL`; then press **Enter**.
- 4** Select the source drive as `A:` (the drive name for the diskette drive of your computer).

The installation program shows **Crystal Audio** (Pre-Selected) and **IBM OPL3 FM MIDI Synthesis** (Pre-Selected).

A check mark appears next to the selected items.

- 5** Click on **Install**; then follow the instructions on the screen.
- 6** When you have completed the installation, restart the computer.

Installing the IBM TrackPoint Driver for OS/2

The TrackPoint Driver Diskette II for OS/2 is intended to be used with IBM PS/2 TrackPoint Version 4.0 or later.

To install the TrackPoint driver for OS/2:

- 1** Start OS/2.
- 2** Insert the TrackPoint Driver Diskette II for OS/2 into the diskette drive.
- 3** Go to the OS/2 command prompt. Type `A:\INSTALL` and press **Enter**.
Follow the instructions on the screen.
- 4** If you are prompted for a location to install the files, select the drive where OS/2 is installed.

- 5** Remove the TrackPoint Driver Diskette II for OS/2 from the diskette drive, and restart your computer to make the new settings effective.

Installing the Infrared Device Driver for OS/2

To install the infrared device driver for OS/2:

- 1** Start OS/2.
- 2** Go to the OS/2 command prompt and install the Infrared Features Diskette II into the diskette drive.
- 3** Type as follows and press **Enter**.

```
A:\INSTALL2 /S:A:\ /T:x:tat_dir /B:y
```

where *x* is the target drive, *tgt_dir* is the target directory, and *y* is the boot drive where CONFIG.SYS resides.

Installing Software for PC-DOS 7.0 or MS-DOS 6.2

This section describes the installation procedures for PC-DOS Version 7.0 or MS-DOS Version 6.2 and their device drivers.

Overall Procedure

- 1** Have the DOS installation package in hand.
- 2** Back up your software and personal data files on the hard disk.
- 3** Create the installation diskettes of the device drivers using the Diskette Factory program. You need to create at least the following device driver diskettes:

| Device Driver | Diskette Name |
|--------------------------------|---|
| ThinkPad Configuration program | Utility Diskette for DOS, Personalization |
| PC Card support software | CardSoft for DOS |
| Audio device driver | Audio Features Diskette for DOS/Windows 3.1 |

- 4** Install DOS and the device driver diskettes.

Installing IBM PC DOS Version 7.0 or MS-DOS Version 6.2

To install DOS, follow the instructions in the DOS installation manuals.

Installing the ThinkPad Configuration Program for DOS

To install the ThinkPad Configuration program:

- 1** Start DOS.
- 2** Insert the Utility Diskette for DOS, Personalization into the diskette drive; then type `A:\UINSTALL` and press **Enter**.
- 3** Press **Enter**.
- 4** Click on **Install DOS ThinkPad Configuration** in the "Installation Options" window; then follow the instructions on the screen.

Installing PC Card Support Software for DOS

Notes:

If you are going to use an enhanced port replicator with your computer, you need to uninstall CardSoft for DOS first, dock your computer to the enhanced port replicator, and then reinstall it.

If you are going to use the PC Card support software for Windows 3.1 (CardWizard), do not install that for DOS (CardSoft).

To install the PC Card support software for DOS:

- 1** Insert the CardWizard for Windows 3.1 Diskette into the diskette drive.
- 2** At the DOS command prompt, type `A:\INSTALL` and press **Enter**.
The installation window appears.
- 3** Follow the instructions on the screen.
During installation, use the **Arrow** keys to highlight your selection; then press **Enter**.
- 4** After the installation is complete, remove any diskette from the diskette drive and restart the computer.

Installing the Audio Device Driver for DOS

To install the audio device driver:

- 1** Start DOS.
- 2** Insert the Audio Features Diskette for DOS/Windows 3.1 into the diskette drive.
- 3** Type `A:\INSTALL` and press **Enter**.

Chapter 8. Using System Management

This chapter describes the system management features of your computer.

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Using System Management

Note: This chapter is intended primarily for network administrators.

Your computer is designed for manageability, so that you can redirect more of your resources to better meet your business objectives. This manageability, or “Total Cost of Ownership” (TCO), enables you or your network administrator to remotely power on your computer, format the hard disk drive, install the software of your choice (for example, Windows 98, Windows 95, or Windows NT with user and system-management applications), and have the computer start up and function the same as an ordinary desktop PC. Once the computer is configured and operational, you achieve ongoing management through software and manageability features already integrated into the client system and on the network.

This chapter describes:

- The system management features of your computer
- How to set up the system management features

Intel WfM1.1a full support

Your computer support not only *required* functions of the (Wired for Management (WfM) 1.1a but also *recommended* functions of the WfM1.1a.

Those functions are:

- Instrumentation (*required function*)
- Remote new system setup (*recommended function*)
- Remote Wake on LAN (*recommended function*)
- Power management–ACOI compliance (*required function*)

System-Management Features

This section describes the system-management features provided by your computer.

Your computer has features that make it possible for a network administrator to manage and control it remotely over a network from

a management console when it is connected to the Port Replicator with Advanced EtherJet feature installed.

These features are:

- Desktop Management Interface (DMI)
 - Desktop Management BIOS (DMI BIOS) Version 2.0
 - Desktop Management Interface (DMI) Version 2.0 defined by the Desktop Management Task Force
 - Tivoli LCF (Lightweight Client Framework)
- Remote program load (RPL)
- PreBoot eXecution Environment (PXE)
- Wake on LAN
- Waking up from suspend mode

The following sections describe more about the functions and the software that provides these functions.

Your computer supports the DMI function using the Desktop Management BIOS (DMI BIOS), Tivoli LCF, explained in the following sections.

Desktop Management Interface (DMI)

Desktop Management Interface (DMI)⁴ is an interface for managing computers in a network. Using DMI, a system administrator can easily do an inventory of all the software and hardware of the computers on a network. DMI can be used to remotely track many types of information about networked computers, including serial numbers, memory attributes, product-specific characteristics of installed devices, and operating system configuration information.

Desktop Management BIOS (DMI BIOS) Version 2.0

The basic input/output system (BIOS) of your computer supports an interface called the Desktop Management BIOS (DMI BIOS). The DMI BIOS provides some of the hardware component information. It is the responsibility of the BIOS to supply this database with information about itself and the devices on the system board. The

DMI BIOS Specification documents the standards for accessing this BIOS information.

Tivoli LCF (Lightweight Client Framework)

To install Tivoli LCF, double-click on **System Management** and follow the instructions on the screen.

Remote Program Load (RPL)

The remote program load (RPL) enables a network administrator to remotely control your computer. RPL enables your computer to start directly from a server over a LAN that has been configured for RPL. Network-management software, such as IBM LANClient Control Manager (LCCM), is required to take advantage of RPL.

If you use RPL with LCCM software, you can use the *Hybrid RPL* feature. With Hybrid RPL you install hybrid images (or files) on the hard disk. Each time the computer starts from the network, LCCM recognizes your computer as a Hybrid RPL client, and a *bootstrap* program is downloaded to your computer. This bootstrap program is small and helps prevent network congestion. Working from the hybrid images, the bootstrap program starts the startup process from the hard disk drive of your computer. One of the advantages of Hybrid RPL is that the network load associated with standard RPL is avoided.

Note: You can use RPL or PXE (sometimes it is called DHCP) with the Port Replicator with Advanced EtherJet feature, the option of the ThinkPad computer. If your computer is attached to the Port Replicator with Advanced EtherJet feature and you want to use RPL or PXE, you need to set up PXE or RPL by using a Advanced EtherJet Feature flash utility diskette that is supplied with the Port Replicator with Advanced EtherJet feature.

⁴ DMI is a standard defined by the Desktop Management Task Force (DMTF) for gathering information about the hardware and software in your computer so that network administrators can remotely monitor and control it.

Preboot eXecution Environment (PXE)

Preboot eXecution Environment (PXE) technology enhanced the PC manageability by having the capability to boot (load an operating system, or other executable image) from a server. Your computer supports the PC functions that PXE requires. For example, your computer can be boot from the PXE server if your computer is attached to ThinkPad Port Replicator with Advanced EtherJet feature.

Wake on LAN

Wake on LAN can be used by a network administrator to turn on your computer from a management console. When Wake on LAN is used with such network management software as LANClient Control Manager (LCCM) and NetFinity⁵, many types of functions, such as data transfer, software updates, and Flash (POST/BIOS) updates can be performed remotely without remote attendance. This updating can be done after hours and on weekends, which saves time and increases productivity. Users are not interrupted during normal working hours, and LAN traffic is kept to a minimum.

If you dock your computer to the Port Replicator with Advanced EtherJet feature that has a LAN card with the Wake on LAN function, you can use the Wake on LAN function.

The Wake on LAN function is valid only when both your computer and Port Replicator with Advanced EtherJet feature are powered off and APM mode is used.

If your computer is powered on by the Wake on LAN function, the **Automatic Power On Startup Sequence** is used. For more information, see Automatic Power-On Startup Sequence.

Waking Up from Suspend Mode

If your computer is connected to a telephone line and **Resume on incoming call** has been selected, your computer will resume from

⁵ You can download LCCM from <http://www.ibm.com/thinkpad>. NetFinity Service comes in Diskette Factory, but NetFinity Manager does *not*. To use the Wake on LAN function, you need to install the system management software, such as NetFinity Manager or LCCM in the administrator's machine.

suspend mode when there is an incoming (telephone) call. The system administrator can resume operation on your computer and communicate remotely through a modem.

To enable your computer to wake up from suspend mode, do the following from Windows 98 or Windows 95:

- 1** Double-click on **Programs, ThinkPad Configuration, Power Management**, and then **Resume option**.
- 2** Put a check mark in the **Resume on incoming** check box.

Universal Management Agent

Your computer supports IBM Universal Management Agent (UMA). The Universal Management consists of three main components:

Universal Management Agent—a common client management agent based on LANDesk Client Manager and NetFinity Manager services technologies. Tivoli-ready, UMA natively integrates into other management applications (like Microsoft's SMS and Intel's LANDesk Management Suite) that will run on IBM desktops, mobile systems and servers, as well as other manufacturer's PCs. The UMA is a network-management program that is controlled from the network administrator's console or a peer workstation on the network. UMA provides the necessary software to take advantage of the network-management features built into ThinkPad product.

Converting PFA alerts by SMART drives into useful responses, such as e-mail messages, alphanumeric and numeric pages, screen messages, automated backup routines, audio messages, or the execution of some other program.

- Alert on LAN, which offers additional system inventory and security solutions.

Netfinity Manager—a management console to collect information and manage individual clients or groups of clients via the Universal Management Agent.

Universal Management Plug-Ins—applications or solutions that provide additional management capabilities throughout the life cycle of networked system hardware with the goal of reducing TCO.

Setting Up System-Management Features

This section describes how to configure the network interface in your computer. You can change the settings of system-management features in Easy-Setup. Easy-Setup contains the following functions:

- Enabling or disabling Wake on LAN
- Automatic power-on startup sequence
- Enabling or disabling Flash (POST/BIOS) update from the network

If administrator's (supervisor) password is set, but you did not specify it when you started Easy-Setup, you cannot use these functions.

Enabling or Disabling Wake on LAN

This setting is used to enable or disable the Wake on LAN feature, which enables your computer to be powered on remotely by a network administrator from a management console. Remote network-management software, such as LCCM and NetFinity, must be used to support Wake on LAN.

Notes:

1. This feature is valid only when a LAN adapter card with Wake on LAN is installed in the enhanced port replicator, and its signal line and auxiliary power line are connected to the adapter. The enable or disable setting in your computer is independent of what is set for the enhanced port replicator.
2. When the Wake on LAN cables are connected to the enhanced port replicator correctly and the Wake on LAN function of your computer is "disabled" in Easy-Setup, the switch is turned on for your computer when the server sends a "wake" signal to it. Your computer's POST (Power On Self Test) recognizes the Wake on LAN status of your computer and turns the switch off a few seconds after it was turned on. This is not an error; however, the network administrator should not set Wake on LAN for LAN cards of the enhanced port replicator systems connected to ThinkPad computers that are Wake on LAN disabled.

Setting Up in Easy-Setup

You can enable or disable Wake on LAN from the Easy-Setup menu. When Wake on LAN is enabled, the network administrator can power

on remote machines connected on a LAN using remote network-management software. Disable the function when your computer is not under system management of the network administrator.

To set this function, do either of the following:

- 1** Go to the Easy-Setup menu.
- 2** Click on the **CONFIG** icon.
The “Configuration” window appears.
- 3** Click on the **Network** icon.
The “Network” window appears.
- 4** Select either the **Enable** or the **Disable** button beside “Wake.”
- 5** Click on **OK**.

or

- 1** Go to the Easy-Setup menu.
- 2** Click on the **Startup** icon.
The “Startup” window appears.
- 3** Click on the **Network** icon.
The “Automatic Power On Startup Sequence” window appears.
- 4** Select either the **Enable** or the **Disable** button beside “Wake.”
- 5** Click on **OK**.

Setting Up for NetFinity Service

If you have NetFinity Service 5.0 installed in the network and wish to use the Wake on LAN function, do the following:

For Windows 95 systems:

Add the following line in the AUTOEXEC.BAT file in the root directory of the boot drive:

```
SET NFWAKEONLAN=YES
```

For Windows NT systems:

- 1** Log on to the system with administrator privilege.
- 2** Click on **Control Panel, System**, and click on the **Environment** tab.
- 3** Click on one of the system variables.
- 4** Change the variable name to “NFWAKEONLAN” and value to “YES,” and click on the **Set** button.
- 5** To save the new settings, click on **OK**.
- 6** Restart the system.

Automatic Power-On Startup Sequence

The Automatic Power-On Startup Sequence settings determine the order in which devices in or attached to your computer will start when your computer is turned on remotely.

To define a sequence:

- 1** Click on the **CONFIG** icon.
The “Configuration” window appears.
- 2** Click on the **Network** icon.
The “Network” window appears.
- 3** Click on the **Startup** icon.
The “Automatic Power On Startup Sequence” window appears.
- 4** Define a sequence by clicking on the devices in the order you want them to start.
The devices you choose appear in boxes 1 to 4.
- 5** Click on **OK**.

or

1 Go to the Easy-Setup menu.

2 Click on the **Startup** icon.

The “Startup” window appears.

3 Click on the **Network** icon.

The “Automatic Power on Startup Sequence” window appears.

4 Define a sequence by clicking on the devices in the order you want them to start.

The devices you choose appear in boxes 1 to 4.

5 Click on **OK**.

Note: If you want to change the settings, click on **Reset** and make the settings again.

Enabling or Disabling a Flash (POST/BIOS) Update from the Network

When a Flash (POST/BIOS) update from the network is enabled, the system programs in your computer can be updated remotely by a network administrator from a management console. The following requirements must be met, however:

Update Flash from Network must also be enabled. (See the following steps.)

Your computer must be started over the LAN.

Your computer must be engaged in a remote program load.

Network-management software is required in the remote administrator's computer.

To enable or disable the Flash (POST/BIOS) update from Network setting, do the following:

1. Click on the **CONFIG** icon.

The “Configuration” window appears.

2. Click on the **Network** icon.

The “Network” window appears.

3. Select either the **Enable** or the **Disable** button beside “Flash.”

4. Click on **OK**.

System Programs

System programs are the basic layer of software built into every IBM computer. They include the power-on self test (POST), the basic input/output system (BIOS) code, and the Configuration/Setup Utility program. POST is a set of tests and procedures performed every time you turn on your computer. The BIOS is a layer of software that translates instructions from other layers of software into electrical signals that the computer hardware can understand.

In the past, the system programs were stored in a read-only memory (ROM) module on the system board. Generally, the contents of ROM modules cannot be modified after they have been originally programmed. However, a type of nonvolatile memory referred to as electrically erasable programmable ROM (EEPROM) can be reprogrammed while it is in the computer and has replaced the ROM module on the system board in ThinkPad computers. System programs are stored in a type of EEPROM module referred to as Flash memory. The contents of Flash memory can be easily updated with an update (Flash) diskette. The process of updating system programs is often referred to as “flashing the BIOS.”

As part of the continuing work to improve quality, IBM might make changes and enhancements to the system programs. When updates are released, they will be available on the World Wide Web (<http://www.ibm.com/thinkpad>). Instructions for using the system programs updates will be available in a README file included in the downloaded files.

If an enhanced port replicator installed with IBM 100/10 EtherJet PCI Adapter with Wake on LAN or IBM Auto Wake Token Ring ISA Adapter is connected with your computer, the system programs also can be updated remotely when the computer is unattended.

Appendix A. Using PS2 Commands

Using PS2 Command

This section describes PS commands in general. Depending on the features of your computer, some commands might not apply. Please note that the PS2 commands are subject to change without notice. If you enter a command written in this section and receive an error, type `PS2 ?` and refer to the online help menu.

You can enter the following PS2 command options from the DOS and DOS command prompts on Windows 3.1, Windows NT, Windows 95, Windows 98, and OS/2. to set the features for your computer. When entering a command, enter it in the following syntax:

```
PS2 [Parameter1] [Parameter2] [Parameter3]
```

Note: The following PS2 commands do not supported by Windows 98.

| | | | |
|---------------------|---------------|--------------|----------------|
| PRESENTation | HTimer | POwer | DSIK |
| LCd | ON | Timer | DEFAULT |

Syntax Rules

Refer to these notes when you enter a command.

| Syntax | Rule |
|--------------------|--|
| | Select one of the options on either side of the vertical bar (). |
| Highlighted | Enter the exact highlighted letters in either uppercase or lowercase. |
| UPPERCASE | Enter any value within the specified range for the following: XX: 0–20 HH: 0–23 MM: 0–59 SS: 0–59 Note: The MM (minutes) and SS (seconds) parameters are optional. The default values are 0. |
| lowercase | Command elements in lowercase are optional. For example, entering PS2 SE OF and PS2 SErIal Off gives the same results. |

PS2 Command

The following is a list of commonly used PS2 commands. The description have the following format:

Description of the command

| | | |
|------------|------------|------------|
| Parameter1 | Parameter2 | Parameter3 |
|------------|------------|------------|

—Or—

| | | | |
|------------|------------|------------|------------|
| Parameter1 | Parameter2 | Parameter3 | Parameter4 |
|------------|------------|------------|------------|

Alarm (Sound) Command

Set the computer to beep in certain conditions:

| | | |
|-------------|-----------------|------------------------------|
| BEEP | ON OFF | Alarm System Warn |
|-------------|-----------------|------------------------------|

Audio Features Commands

Set the features for the ESS AudioDrive chip:

| | | |
|--------------|-------------------------|---------------------------------|
| AUdio | Enable Disable | — |
| | ADDRESS | 530 604 E80 F490 |
| | DMA | 0 1 3 |
| | IRQ | 5 7 9 10 11 15 |
| | SBaddress | 220 240 260 280 |

Set the features for the audio control function:

| | | |
|------------------|-------------------------|------------------------------|
| AUDIOCTRL | Enable Disable | — |
| | ADDRESS | 530 D38 E88 FF0 |

CD-ROM Speed

Set the CD-ROM speed

Note: The default is Normal.

| | | |
|----------------|-------------------------------|---|
| CDSPeed | High Normal Silent | — |
|----------------|-------------------------------|---|

Configuration Commands

Display the interrupt level assignments:

| | | |
|--------------|---|---|
| ? IRQ | — | — |
|--------------|---|---|

Reserve the IRQ for PCI devices:

| | | |
|---------------|----------------|---|
| PCIIRQ | Disable | 3 4 5 7 9 10 11 15 |
|---------------|----------------|---|

Set the startup screen when the computer is powered on:

| | | |
|----------------|-------------------------|---|
| STARTup | Enable Disable | — |
|----------------|-------------------------|---|

Set the A: drive to the external diskette drive:

| | | |
|------------|---------------------|---|
| FDD | External Internal | — |
|------------|---------------------|---|

Display the DMA channel assignments:

| | | |
|--------------|---|---|
| ? DMA | — | — |
|--------------|---|---|

CPU Speed

Set the processor speed:

AC: Specifies CPU speed when the AC Adapter is connected.

DC: Specifies CPU speed when using battery power.

Note: If the **AC** or **DC** option is not specified, this command is effective on the current power management mode set by the **PM** commands.

| | | | |
|--------------|--------------|----------------------------|---------------------------|
| SPeed | Fixed Auto | MAX Medium Slow | [AC DC] |
|--------------|--------------|----------------------------|---------------------------|

Display Commands

Set the screen expansion:

| | | |
|--------------------|------------------------|---|
| HVEXPansion | ON OFF | — |
|--------------------|------------------------|---|

Disable the screen blanking function, and the standby and suspend timers:

| | | |
|---------------------|------------------|---|
| PRESENTation | Enable Disable | — |
|---------------------|------------------|---|

Set the brightness control of the LCD:

| | | |
|-------------------|---------------|---|
| BRightness | High Normal | — |
|-------------------|---------------|---|

Set where to display information:

| | | |
|---------------|---------------------------------------|---|
| SCreen | LCD CRT BOTH | — |
|---------------|---------------------------------------|---|

Infrared Features Command

Set the features for the infrared port (IR):

| | | |
|-------------------|------------------|-----------------------------------|
| IR | Enable Disable | — |
| ADDRESS | | 1 2 3 4 |
| DMA IRQ | | 0 1 3 Disable 3 4 5 7 |
| COMADDRESS | | 3F8 2F8 3E8 2E8 |

Joystick Connector Command

Set the joystick connector:

| | | |
|---------------|------------------|---|
| JStick | Enable Disable | — |
|---------------|------------------|---|

Keyboard Function Commands

Set the **Fn** key lock function:

| | | |
|-----------------|------------------|---|
| FNSticky | Enable Disable | — |
|-----------------|------------------|---|

Set the **HVEXPansion** command to on or off with the **Fn+F8** key combination:

| | | |
|-----------|------------------|---|
| F8 | Enable Disable | — |
|-----------|------------------|---|

Set the keyboard typematic speed:

| | | |
|--------------|---------------|---|
| KRate | Normal Fast | — |
|--------------|---------------|---|

Set the TrackPoint:

| | | |
|---------------|-----------------------------------|---|
| TPOint | Enable Disable AUTODisable | — |
|---------------|-----------------------------------|---|

MIDI Function Command

Set the features for the MIDI function:

| | | |
|-----------------|------------------|--------------------------|
| MIDIport | Enable Disable | — |
| ADDRESS | | 300 310 320 330 |
| IRQ | | 5 7 9 10 11 15 |

Parallel Connector Command

Set the features for the parallel connector:

| | | |
|------------------|---|--|
| PAR allel | Enable Disable AD dress MO de DMA IRQ | — 1 2 3 Uni Bi EPP ECP 0 1 3 Disable Enable Disable |
|------------------|---|--|

Power Management Commands

Enter hibernation mode:

Note: Create the hibernation file using the `HFILE` command before using this command.

| | | |
|---------------------|---|---|
| HIB ernation | — | — |
|---------------------|---|---|

Enter the RediSafe suspend mode:

| | | |
|--------------|------------------|---|
| SA fe | Enable Disable | — |
|--------------|------------------|---|

Enter hibernation mode when the power switch is pressed:

Note: Create the hibernation file using the `HFILE` command before using this command.

| | | |
|----------------|------------------|--|
| HSWITCH | Enable Disable | |
|----------------|------------------|--|

Enter suspend mode:

| | | |
|-----------------------|---|---|
| OFF SUS pend | — | — |
|-----------------------|---|---|

Set whether to enter suspend mode when the LCD is closed:

| | | |
|--------------|------------------|---|
| Cover | Enable Disable | — |
|--------------|------------------|---|

Create the hibernation file:

Note: Use this command before using other hibernation commands.

| | | |
|--------------|-----------------------|---|
| HFILE | C – Z DElete | — |
|--------------|-----------------------|---|

Set the timer to enter hibernation mode after the specified number of minutes (*xx*):

AC: Specifies battery mode when the AC Adapter is connected.

DC: Specifies ac mode when using battery power.

| | | |
|---------------|-----------|------------------|
| HTimer | <i>xx</i> | [AC DC] |
|---------------|-----------|------------------|

Set the timer to enter hibernation mode from suspend mode after the specified number of minutes:

| | | |
|------------|-------------------------------|---|
| S2H | 30 60 90 Disable | — |
|------------|-------------------------------|---|

Set the timer to enter suspend mode after the specified number of minutes (*xx*):

AC: Specifies battery mode when the AC Adapter is connected.

DC: Specifies ac mode when using battery power.

Note: If the AC or DC option is not specified, this command is effective on the current power management mode set by the `PM` command.

| | | |
|--------------|-----------|------------------|
| POwer | <i>xx</i> | [AC DC] |
|--------------|-----------|------------------|

Set the hard disk drive power management timer for the specified number of minutes (*xx*):

AC: Specifies battery mode when the AC Adapter is connected.

DC: Specifies ac mode when using battery power.

Note: This command is effective on the current power management mode set by the `PM` commands.

| | | |
|-------------|-----------|-----------|
| DISK | <i>xx</i> | [AC DC] |
|-------------|-----------|-----------|

Set the LCD off timer for the specified number of minutes (*xx*):
AC: Specifies battery mode when the AC Adapter is connected.
DC: Specifies ac mode when using battery power.

Note: This command is effective on the current power management mode set by the `PM` command.

| | | |
|------------|-----------|-----------|
| LCd | <i>xx</i> | [AC DC] |
|------------|-----------|-----------|

Set the resume timer:

Note: *yyyy* can be set from 1995 to 2093.

| | | |
|-----------|--|---|
| ON | [<i>yyyy/MM/DD</i>] HH:MM:SS Clear | — |
|-----------|--|---|

Set the power management mode to enter by the automatic power-saving timer:

Note: Create the hibernation file using the `HFILE` command before using the `TI H` command.

| | | |
|--------------|-----------------------|---|
| Timer | Suspend Hibernation | — |
|--------------|-----------------------|---|

Set the power management mode:

AC: Specifies battery mode when the AC Adapter is connected.
DC: Specifies ac mode when using battery power.

| | | |
|--------------|----------------------|-----------|
| PMode | High Auto Custom | [AC DC] |
|--------------|----------------------|-----------|

Set `POwer`, `LCd`, `DISK`, `SPeed`, and `STandby` to their original values:

Note: This command is effective on the current power management mode set by the `PM` command.

| | | |
|----------------|---|---|
| DEFAULT | — | — |
|----------------|---|---|

Set the power management mode to enter when a low-battery condition occurs:

AC: Specifies battery mode when the AC Adapter is connected.

DC: Specifies ac mode when using battery power:

Note: Create the hibernation file using the `HFILE` command before using the `LB H` command.

| | | |
|-----------------|------------------------------|---|
| LBattery | Suspend Hibernation | — |
|-----------------|------------------------------|---|

Resume normal operation when detecting an incoming call:

| | | |
|-----------|-------------------------|---|
| RI | Enable Disable | — |
|-----------|-------------------------|---|

Serial Connector Commands

Set the features for the serial connector:

| | | |
|-------------|-------------------------------------|--------------------|
| SERA | Enable Disable ADDRESS | — 1 2 3 4 |
|-------------|-------------------------------------|--------------------|

Set power on or off for the serial device attached to the serial connector:

| | | |
|---------------|-----------------|---|
| SErial | ON OFF | — |
|---------------|-----------------|---|

Other Commands

Display the help menu:

| | | |
|-----------------|---|---|
| ? Help | — | — |
|-----------------|---|---|

Power off the computer:

| | | |
|-------------|------------|---|
| TURN | OFF | — |
|-------------|------------|---|

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First Edition (July 1998)

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| Operating System/2 | Ultimotion |
| OS/2 | WIN-OS/2 |
| PC Card Director | |

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