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Contents

Where to Find Information

This online book supplements the *ThinkPad 600 User's Guide*. The following topics are covered. Click on the topic you want to read:

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

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

1. In the Windows 95 desktop, click on **Start** and move the cursor to **Settings** and **Control Panel**. Then double-click on **Control Panel** and **Date/Time**.
2. Set the current date and time.
3. 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 to automatically adjust the clock for daylight saving time, remove the check from the check box ( ).
4. Click on **OK**.

Power Cord Requirements

To use the AC Adapter outside the country where you purchased the 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.

The following tables show the part numbers for power cords.

For 2-pin power cords:

IBM Power Cord Part Number	Used in These Countries
13H5273	Japan

For 3-pin power cords:

> **Note**
>
> The grounded adapter is required for full MPRII compliance.

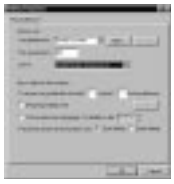
IBM Power Cord Part Number	Used in These Countries
76H3514	Australia, New Zealand
75H3516	Canada, Thailand, U.S.
76H3518	Europe
76H3520	Denmark
76H3522	India, South Africa
76H3524	United Kingdom
76H3526	Japan
76H3528	Switzerland
76H3530	Italy
76H3532	Israel
76H3535	Korea

Selecting the Country for the Internal ThinkPad Modem

To use the internal ThinkPad modem outside the country where you purchased the computer, you must change the country name.

1. In the Windows 95 desktop, click on **Start**, **Programs**, **ThinkPad Modem**, and then **Country Selection**.

   The following two windows appear:



2. In the **Dialing Properties** window, select the country where you are using the modem and click on **OK**.
3. In the **Modem Country Select** window, select the country where you are using the modem and click on **OK**.

Note

Check the IBM Web site for the latest information. When updates become available, they will posted on:

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

International Hardware Service Information

The ThinkPad computer comes with an International Warranty Service (IWS). The booklet *International Hardware Service Information* (which comes with the computer) contains telephone numbers for obtaining international technical support.

Note

The kind of support you can get differs according to the country you are visiting.

Chapter 2. Using Audio and Modem Features

Using the Audio Features

Your computer is equipped with the following:

A -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 software on your operating system. For example in Windows 95, 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 software.

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

A MIDI/joystick port on the docking station. To use a MIDI device, you should first connect your computer to the &dosk.; then connect an external MIDI device to the docking station. After docking your computer in the docking station, 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 or an integrated CD-ROM drive.

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

The 3D Sound Retrieval System (SRS) function compensates for flat, two-dimensional sound image limitations by reestablishing the necessary information that allows the human ear to hear in three dimensions.

Attention

Do not enter suspend or hibernation mode when you are using audio features. 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

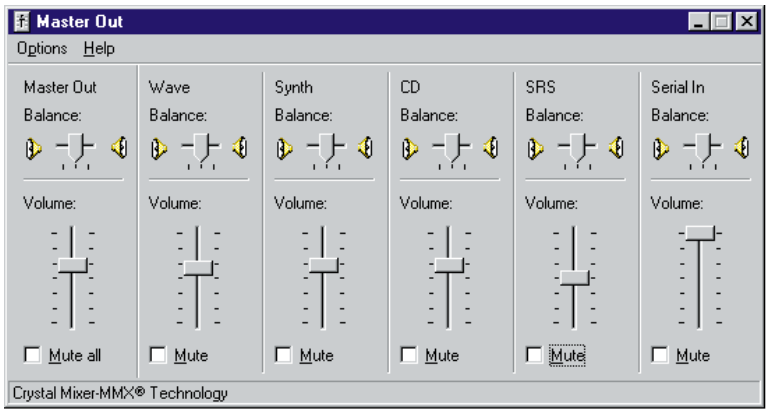
To use the SRS function, do the following:

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**, **Multimedia**, 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.

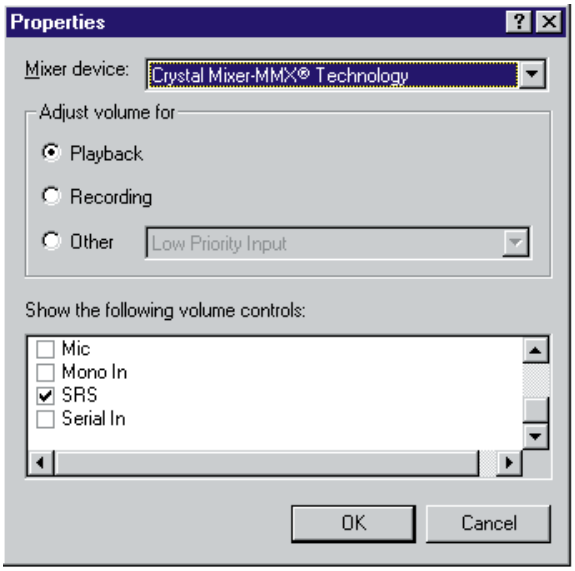
If the column is displayed and the check box is not checked, exit the window. You can use the SRS function; skip the remaining steps.

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.

Using the Modem Features

You can use the following functions with the ThinkPad Modem:

Data modem functions
- Asynchronous communications port interface (NS16550A UART compatible) operation
- ITU-T V.34 up to 33.6 Kbps data modem
- ITU-T V.32bis protocols with data rates of 4800, 7200, 9600, 12000, and 14000 bps
- ITU-T V.32 protocols with data rates of 4800, 9600 uncoded, and 9600 bps Trellis coded
- ITU-T V.21/V.22, V.22bis protocols with data rates from 300 bps to 2400 bps
- Hayes** AT command set compatibility
- Asynchronous error recovery protocol
- Microcom Network Protocol (MNP**) protocols
  - Error correction via MNP classes 1–4
  - Data compression via MNP class 5 and V.42bis
  - MNP class 5 for up to 2x data compression
- VoiceView (Windows 95 only)
- X2** protocol with data rates of 56 kbps (Windows 95 and Windows NT only)

Facsimile (fax) modem functions
- Class 1 fax modem
- Class 2 fax modem
- G3 transfers
- ITU-T T.4 & T.30 operations
- ITU-T V.27ter-2400/4800 bps send/receive
- ITU-T V.29-7200/9600 bps send/receive
- ITU-T V.17-14400 bps send/receive

You can use this ThinkPad modem only on a public-switched telephone network (PSTN). You cannot use a private branch exchange (PBX) or some other type of digital telephone extension line. If you connect the modem to a line other than PSTN, an error message appears, preventing you from using the line. If you are not sure which kind of phone line you are using, contact your telephone company.

Attention for Use Overseas

In many countries, you cannot use the ThinkPad modem function before obtaining approval from the proper authorities.

Your ThinkPad modem is a worldwide modem and can be used in any country where Postal Telegraph and Telephone (PTT) type approval has been obtained. If the country you want is not on the **Country Selection** listing, see **http://www.pc.ibm.com/thinkpad** on the Internet, and download the newest Country Selection list.

If you are a non-U.S. user, run the Country Selection program in the **ThinkPad Modem** folder after you complete the ThinkPad Modem installation. The "Country Selection" window enables you to change the country name to the country in which you are actually going to use the ThinkPad Modem telephony function in. Click on **ThinkPad Modem** in your operating system; then click on **Country Selection**. Confirm whether the selection matches the country name in the **Dialing Properties** listing (for Windows 95).

For more information on the use of the internal modem in a specific country, contact the IBM customer support center in that country. You can look up the phone number by referring to the International Service Information booklet that came with your computer.

DANGER


To avoid shock hazard, do not connect the cable to or disconnect the cable from the telephone outlet on the wall during electrical storms.

To use the ThinkPad modem, connect one end of the telephone cable to the modem port; then connect the other end to the telephone outlet on the wall.

For Windows 95 and Windows NT:

When you start Windows, the ThinkPad Modem automatically starts and is ready for use.

For OS/2:

To start the ThinkPad modem from OS/2, do the following:

1. Open the **Communications for OS/2** folder.
2. Double-click on the **Modem** icon.
3. Start your communication program.

Using the 56-Kbps Modem

To take advantage of your modem's 56-Kbps x2** technology, you must first make sure that your Internet service provider (ISP) supports a 56-Kbps modem protocol.

1. Contact your ISP and determine which 56-Kbps modem protocol they use.
2. Determine which 56-Kbps modem protocol your modem supports. To view your modem's supported protocol, do the following:
   a) Click on the **Start** button, and select **Programs** and **Modem** (or **Modem & Audio**).
   b) Click on **Modem**.
   c) Choose **Options** from the “Modem Status” window; then choose **Settings**.

      The available transfer speeds are displayed. The 56-Kbps protocol your modem supports is listed in parentheses following the 56-Kbps transfer setting.

      If no 56-Kbps transfer setting is listed, your modem's 56-Kbps technology is not currently enabled.

Your modem and your ISP must support the same 56-Kbps protocol, or your maximum connection speed will be limited to V.34 technology.

Significantly higher Internet modem connection speeds up to 56 Kbps require all-digital transmission connections from your ISP to the line card in the central office to which your phone line is connected. The actual rate of reception is limited by the quality of your telephone line, which may vary from location to location.

In the U.S., current FCC regulations limit the maximum speed for downstream communication to 53 Kbps. Even though your modem contains 56-Kbps technology, connect rate in the receive direction might be significantly less than 56 Kbps.

Currently, 56-Kbps capability is in the receive direction only (from the ISP to your local modem). The transmit or send direction (from your local modem to the ISP) uses V.34 technology.

Note: 56-Kbps transfer rates are not available in all locations or countries. You must check with your ISP to determine if your area is capable of 56-Kbps transfer rates.

Telephony Features

The ThinkPad modem, with the associated software, provides the following telephony features:

- Industry standard modem support up to 33.6 Kbps
- Industry standard fax support up to 14.4 Kbps
- Computer telephony function support
  - DTMF and pulse dialing
  - Detecting DTMF digits received from the phone line
  - Call progress monitoring
  - Auto-dialing feature
  - Telephony API (TAPI) support through Windows 95 Unimodem V (Windows 95 only)
- Telephone answering machine support (Windows 95 only)
  - Recording and playback of messages and greetings
  - Answering device with caller ID
  - Modem class 8 AT commands for TAPI calls
- Full-duplex speaker phone support (Windows 95 only)
  - Acoustic echo cancellation
- Other
  - DOS box operation for 33.6-Kbps data and 14.4-Kbps fax
  - System level and device level power management

Setting the RingCentral Application for New Zealand

The RingCentral** program allows you to set the number of rings for incoming messages before it answers the call.

You can set the value by selecting:

```
Options - Answering - Ring Options
```

from the RingCentral menu.

The values x and y in the following fields must be between 2 and 5:

```
Answer after x rings if there are new messages.
Answer after y rings if there are no new messages.
```

Caller ID Support

The “Answering devices with caller ID support” can be used only where the caller ID services is available, currently only in the U.S. and Canada.

Chapter 3. Protecting Your Computer

This chapter provides overall information about how to protect your computer from theft or unauthorized use. To protect your computer, you can use

- Passwords
- The Personalization Editor
- A mechanical Lock

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

Using Passwords

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.

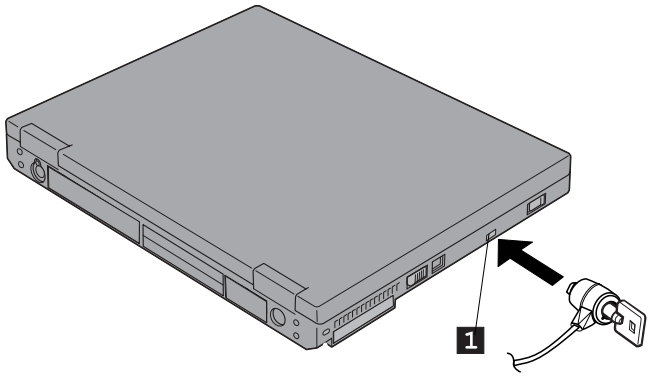
To set the Personalization Editor, refer to the *User's Reference*.

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

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 these function for battery operation.

Using the Battery Pack

This section describes how to charge your battery pack and display its status.

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

Before you charge the battery pack, ensure that its temperature is at least 10°C (50°F).
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.

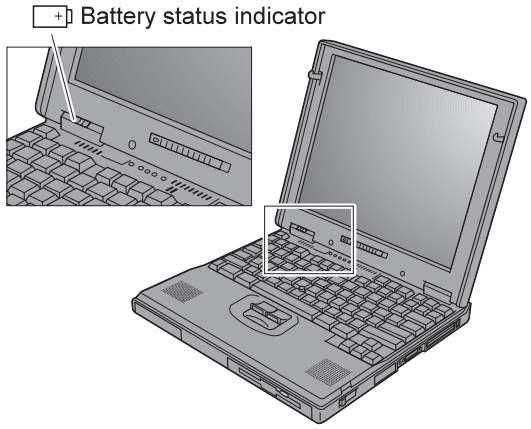
Monitoring the Battery Status

You can monitor the battery status through the battery status indicator and the Fuel-Gauge program.

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	The battery pack is not installed. The computer is turned off or is in suspend mode when the AC Adapter is not connected.

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 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.

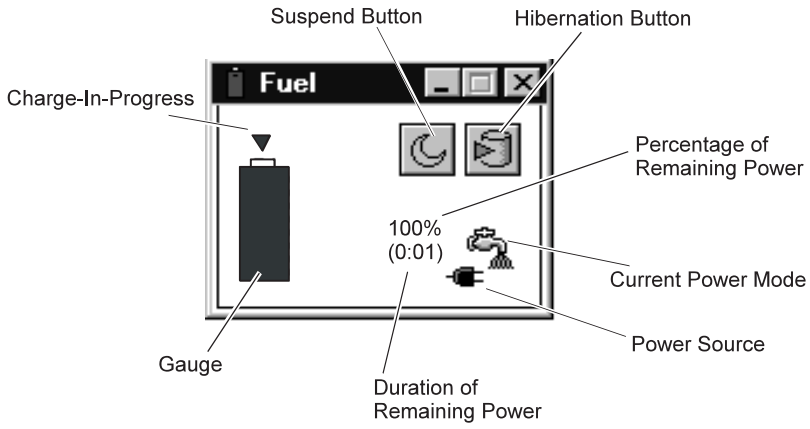
If you do not take corrective actions within about 30 seconds, the computer will enter suspend mode.

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

Using the Fuel-Gauge Program

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

To start the Fuel-Gauge program, click on the **Fuel-Gauge** icon in the ThinkPad Configuration window. The following window appears:



Notes

The “Current Power Mode” icon depends on the power mode.
The “Power Source” icon depends on the power source. (is for the AC Adapter and is for battery pack.)
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 the 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

Your ThinkPad computer has three power management modes to save the battery power. 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
In standby mode, 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 also enter this mode by pressing the **Fn**+**F3** keys.

To return to normal operation, press any key or move the TrackPoint.

Suspend Mode
In this 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
– Selecting the **Suspend** button () in the Fuel-Gauge program

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:

Windows 95:

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**.

Windows NT, Windows 3.11, 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

In this mode, your computer stops all tasks and stores all data in the hard disk; then it powers off. You should set your computer to this mode when 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.)

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.

You can set hibernation mode by doing any of the following:

- Pressing the **Fn**+**F12** keys.
- Selecting the **Hibernation** button () in the Fuel-Gauge program.

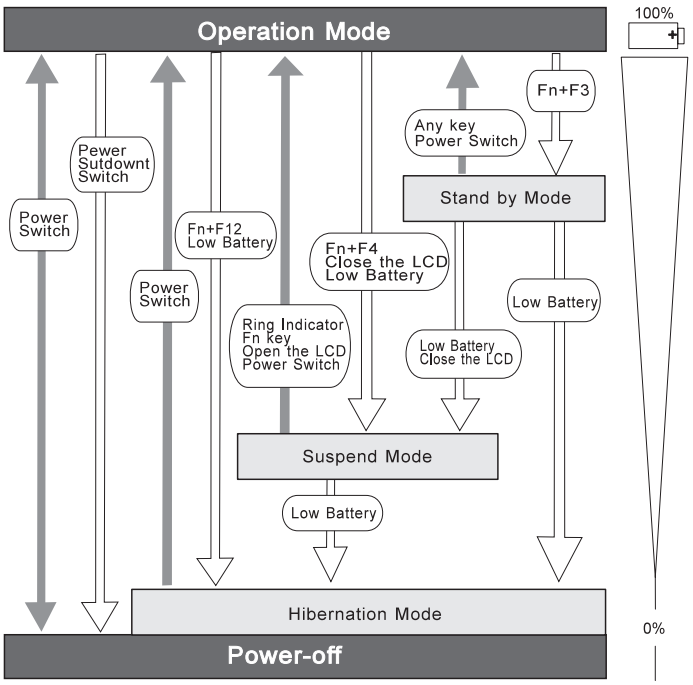
Notes

You cannot enter hibernation mode when you are using the communication network.
Hibernation mode might be terminated if you connect your computer to a docking station 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	On
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. Use the power management mode appropriate to your operation.

Setting the Suspend Timer

To set the suspend timer, do the following:

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 3.11, 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 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 3.11, 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 NT 4.0

Important

If you use Windows Version 3.11, ensure that Advanced Power Management (APM) is installed according to the instructions in page 34.

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 the computer is powered with ac power and is using one of the following IBM PC Cards, it enters *standby mode*:

- IBM 3270 Emulation Credit Card Adapter
- IBM Token-Ring 16/4 Credit Card Adapter

- IBM Credit Card Adapter for Ethernet
- IBM 5250 Emulation Credit Card Adapter

If other PC Cards are used and the computer enters suspend mode, all application programs stop. Communication also stops for communication PC Cards not in the preceding list. 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 resuming normal operation, 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.

If the computer is using one of the following IBM modem cards and detects an incoming call while in suspend mode, the computer automatically resumes normal operation:

- IBM 28.8/14.4 Data/FAX Modem
- IBM PCMCIA Data/FAX Modem
- IBM High Speed PCMCIA Data/FAX Modem
- IBM Microelectronics 2.4/9.6 Data/FAX Modem
- IBM Microelectronics 14.4/14.4 Data/FAX Modem
- IBM Wireless Modem for ARDIS
- IBM Wireless Modem for Mobitex
- IBM Wireless Modem for Cellular/CDPD

While a communication link is active, the 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:

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 3.11, 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 tasks while the hibernation file is being created.

The computer uses battery power to enter hibernation mode. Therefore, it reserves some battery power when 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, the computer turns power off to the PC Card when entering hibernation mode. When resuming normal operation, if the PC Card or computer does not operate, restart the application or computer.

If the computer is powered with ac power, it does not enter hibernation mode if it is using one of the following IBM PC Cards:

- IBM 28.8/14.4 Data/FAX Modem
- IBM PCMCIA Data/FAX Modem
- IBM High Speed PCMCIA Data/FAX Modem
- IBM 3270 Emulation Credit Card Adapter
- IBM Token-Ring 16/4 Credit Card Adapter
- IBM Credit Card Adapter for Ethernet
- IBM 5250 Emulation Credit Card Adapter
- IBM Microelectronics 2.4/9.6 Data/FAX Modem
- IBM Microelectronics 14.4/14.4 Data/FAX Modem
- IBM Wireless Modem for ARDIS
- IBM Wireless Modem for Mobitex
- IBM Wireless Modem for Cellular/CDPD

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

When you install an operating system, install it with Advanced Power Management (APM). Also install the ThinkPad Configuration program with the Utility Diskette to use power management mode.

Note

To install the software → Chapter 8, Installing Software

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 3.11, follow these instructions 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:       MagicGraph128XD 8  ×6   256 small font
   Mouse:         Microsoft, or IBM PS/2
```

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

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. If not, return to step 3.

```
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:       MagicGraph128XD 8  ×6   256 small font
   Mouse:         Microsoft, or IBM PS/2
```

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.

Using a PC Card

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 Card[1]
Custom Interface 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.

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 your computer to a SCSI device. 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 Card[2] (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. Some 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 video controller. The data is transferred with no buffering requirements, because it is transferred over 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 95 (OSR2): CardWorks** for Windows 95

Windows NT 4.0: CardWizard for Windows NT

Windows 3.11: CardWizard** for Windows 3.11

OS/2: PC Card Director

DOS: CardSoft** for DOS

To use PC Cards with your computer, you need to install the PC Card support software appropriate for the operating system installed in your computer.

To install the PC Card software → Chapter 8, Installing Software

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

	CardWorks (Windows 95)	**CardWizard (Windows NT 4.0)**	**CardWizard (Windows 3.11)**	**PC Card Director (OS/2)**	**CardSoft (DOS)**
16-bit PC Card	Supported	Supported	Supported	Supported	Supported
CardBus Card	Supported	N/A	N/A	N/A	N/A
ZV Card	Supported	N/A	Supported	N/A	N/A
Note: Windows 95 OSR2 (OEM Service Release Version 2)					

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:

Card Type	Suspend Request (Fn+F4)		Hibernation Request (Fn+F12)	
	AC Power	**Battery Power**	**AC Power**	**Battery Power**
Modem or Network	Supported	Supported	N/A	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:

CardWorks for Windows 95 OSR2 → Using a PC Card in Windows 95 (with CardWorks)

CardWizard for Windows NT → Using a PC Card in Windows NT (with CardWizard)

CardWizard for Windows 3.11 → Using a PC Card in Windows 3.11 (with CardWizard)

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

CardSoft for DOS → Using a PC Card in DOS (with CardSoft)

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 (OSR2).

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

Capability to check → Self-Check

If you have a problem, refer to this section.

PC Card information → PC Card Information

CardWorks provides various information about your PC Card.

Capability to stop → Stopping the PC Card

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

Help → Help

You can get help for most of the windows.

CardWorks provides two modes for using a PC Card:

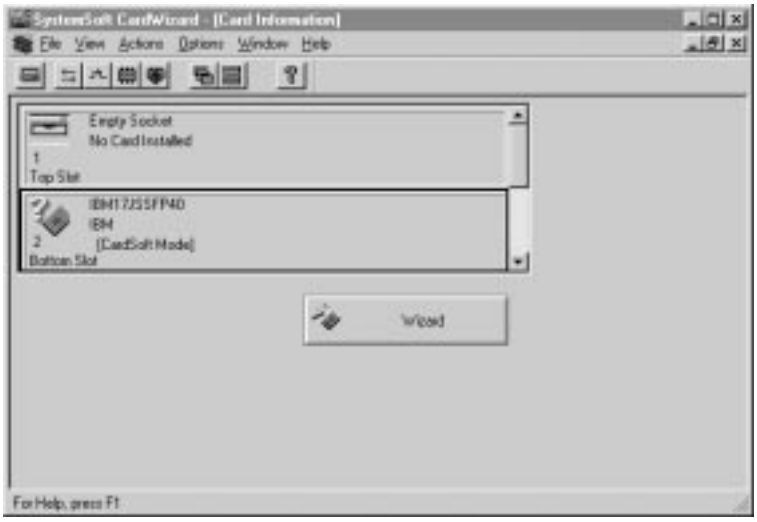
Plug and Play mode:
You can use the PC Card in this mode when the device driver of the card is supported by Windows 95.

CardSoft mode:
You can use the PC Card in this mode when the device driver of the PC Card is for Windows 3.11.

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:



The 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.

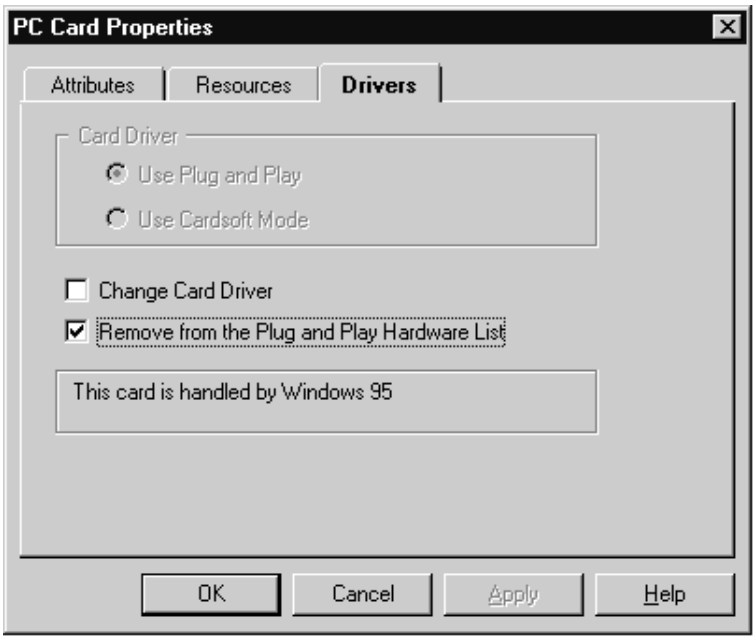
PC Card Information

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.
Write protect:	The write protect status—either enabled or disabled.
File system:	The file system used by the PC storage or hard disk card.
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 *not* 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.
```

If the stop fails, no message appears.

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:

Capability to check → Self-Check

If you have a problem, refer to this section.

PC Card information → PC Card Information

CardWorks provides various information about your PC Card.

Capability to stop → Stopping the PC Card

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

Help → Help

You can get help for most of the windows.

> **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, 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 Information

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. Select **Properties** from the "Actions" menu.
2. 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, click on the traffic light icon () on the taskbar, or 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

Your computer enters suspend mode if you:

- Leave the computer idle for a specified amount of time
- Press the hardware suspend button (for example, **Fn**+**F4**)
- Press a software suspend button within a power management application (for example, the **suspend** and **hibernation** button in the **Fuel** window)

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 Notifications: 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 3.11 (with CardWizard)

This section describes the PC Card support software for Windows 3.11 and how to format the PC Card.

CardWizard is the PC Card support software for Windows 3.11. It increases the usability of PC Cards.

CardWizard has following features:

Capability to check → Self-Check

If you have a problem, refer to this section.

Help → Help

You can get help for most of the windows.

To start CardWizard, do as follows:

1. Start Windows 3.1.
2. Double-click on **SystemSoft Tools** on the “Program Manager” panel.
3. Double-click on **CardWizard**.

   The CardWizard window appears.

You can see up-to-date information about the PC Card slots in your computer in the window.

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 are 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 3.11 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 3.11 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 object[3] 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`.

3 A *DOS object* might be a DOS program, Windows 3.11 program, DOS full-screen, DOS window, WIN-OS/2 full-screen, or a WIN-OS/2 window.

8. Set **MEM_EXCLUDE_REGIONS** as `CC -D3FFF`.

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

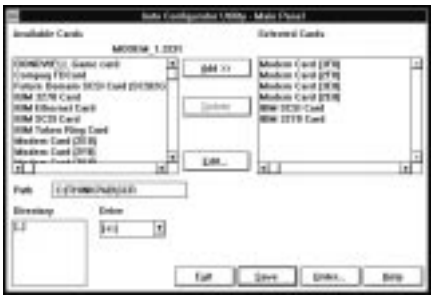
PC Card Director provides the *Auto Configurator*, a program for some PC Cards, so that you do not have to install the device driver supplied with it. When you install PC Card Director, a BASEDEV= statement such as the following is added to the CONFIG.SYS file.

```
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.

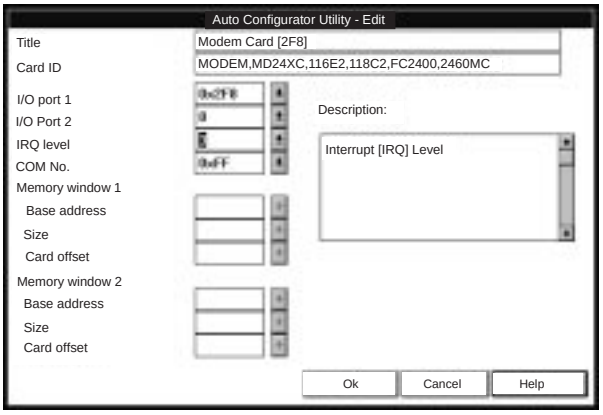
Changing the Resource Information for the PC Card

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 Chapter 8, Installing Software.

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 PCMCIA drivers.
Rule 2	The PCMCIA 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 OS/2 PCMCIA ATA Card Device Driver

The following are the parameters and their explanations of the OS/2 PCMCIA ATA card device driver 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 *is not* 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 PCMCIA 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 PCMCIA 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.

PCMCIA 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.

PCMCIA 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 PCMCIA ATA Card Mount Utility, install the PCMCIA Storage API device driver (PCMSSDIF.SYS) for OS/2.

Formatting PCMCIA 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 PCMCIA 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 PCMCIA ATA Card Mount utility to assign a drive letter to it.

PCMCIA Storage Card Device Manager

OS2PCARD.DMD is the device manager for the PCMCIA 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
```

OS/2 PCMCIA Storage API Device Driver

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

- 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. The 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 Intializing 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 ATAINT. 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:

   ```
   ATAINT 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 MTDDRV 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. Resolving System Resource Conflicts

This chapter describes the default system resources and how to share an IRQ between two devices.

Note: This chapter is only for Windows 95.

In most cases, your computer automatically assigns the system resources when you install a new device. For example, your computer assigns such resources as the *interrupt request* (IRQ) level and the *input/output (I/O)* ports when you install a PC Card modem. Other devices might need such system resources as *direct memory access (DMA)* and *memory*. The IRQ for each system resource can have a value of 0 to 15. That is, there are 16 values that can be assigned for IRQs.

Sometimes Windows 95 does not allocate the resources correctly, because the resource might already be allocated to another device. This is called a system resource ***conflict***, or ***contention***. In this case, you can free one IRQ by sharing an IRQ between two devices.

When doing this, you need to know about the system resources available and their IRQs.

This chapter describes how to solve resource conflicts by sharing an IRQ.

Sharing an IRQ between ThinkPad Modem Devices

The ThinkPad Modem function is supported by a digital signal processor (DSP) called IBM Advanced Communications Processor. The ThinkPad Modem usually uses two IRQs to handle the DSP interrupt and the modem interrupt. However, by sharing an IRQ between these two devices, you can free one IRQ so that you can use it for another device.

Notes:

1. Do not have your computer set in an IRQ-shared status when installing the ThinkPad Modem. If your computer is already in a sharing status, disable the status before you start the installation.
2. An IRQ can be shared only in Windows 95. You must disable the status before you start rebooting another operating system.

The default resources are as follows:

```
I/O 13 -13F
I/O 2F8-2FF
IRQ 3
IRQ 1
DMA 7
```

Attention

An IRQ can be shared only in Windows 95. If you have a multipartitioned hard disk drive or have multiple hard disk drives, and reboot another operating system or install another operating system, the CMOS status and the hardware settings might not remain consistent and the devices sharing an IRQ might become unusable. It is recommended that you use the system in its default IRQ status, unless you must have the IRQ shared—for example, because you are using multiple PC Cards and the docking station simultaneously.

To share an IRQ, do the following:

1 Click on **Start, Programs**, and **ThinkPad Configuration**.

2 Click on the **Internal Modem** icon.

3 Click on the **Device Manager** button.

4 Double-click on **IBM Digital Signal Processor**.

5 Double-click on **ThinkPad Digital Signal Processor**.

6 Put a check mark in the **Disable in this hardware profile** check box by clicking on it; then click on **OK**.

7 Double-click on **ThinkPad Digital Signal Processor**.

8. Click on the **Resources** tab.

9. Make sure the check mark is removed in the **Automatic Settings** check box.

10. Select **Basic Configuration 0005**.

    Make sure the list is as follows:

    ```
    I/O 13 -13F
    I/O 2F8-2FF
    IRQ 3
    DMA 7
    ```

11. Click on the **General** tab.

12. Remove the check mark in the **Disable in this hardware profile** check box by clicking on it; then click on **OK**.

13. Restart your computer.

To disable sharing an IRQ, do the following:

1. Click on **Start, Programs, ThinkPad,** and **ThinkPad Configuration**.

2. Click on the **Internal Modem** icon.

3. Click on the **Device manager** button.

4. Double-click on **IBM Digital Signal Processor**.

5. Double-click on **ThinkPad Digital Signal Processor**.

6. Click on the **Resources** tab.

7. Click on the **Automatic Settings** and remove the check mark.

8. Select **Basic Configuration 0001**.

9. Scroll the **Resource Settings** list box. Locate and double-click on the second IRQ 3 resource in the “Resource Type” column.

10. Specify 10 for **Value** and click on **OK**.

11 Make sure that there are no conflicting devices indicated in the **Conflicting Device** list.

Default IRQ Assignments

The following table shows the default system resource assigned for each IRQ:

IRQ Value	Assignment
0	Timer
1	Keyboard
2	Cascade
3	ThinkPad Modem
4	Infrared
5	Crystal audio
6	Diskette
7	Parallel port
8	Real-time clock
9	Not used
10	ThinkPad Modem
11	PCI
12	Auxiliary device
13	Math co-processor
14	Primary IDE
15	Secondary IDE

System Resources and IRQs

The following table shows the available system resources for your computer and the docking stations. The values in parentheses are alternate values that are selectable from the ThinkPad Configuration program or from an application program. The default values are highlighted.

System Resources	IRQ	I/O Address (Hex)	Memory Address (Hex)	DMA Channel
Audio Control base	None	**0538–053F**, 0D38–0D3F, 0E88–0E8F, or 0FF0–0FF7	None	None
CD-ROM and DVD drive in UltraslimBay	**15**, 14	**0170–0177**, **0376–0377**, 01F0–01F7, or 03F6–03F8	None	None
Diskette controller	6	03F0–03F7	None	2
Hard disk drive	14	01F0–01F7 and 03F6–03F7	None	None
IDE hard disk drive or the IDE CD-ROM drive in the docking station	0170–0177 and 0376–0377, 01E0–01E7 and 03E6–03E7, 01E8–01EF and 03EE–03EF, or 0168–016F and 036E–036F,	None	None	None
Infrared port	**4**, 3, or disabled	**03F8–03FF**, 02F8–02FF, 02E8–02EF, or 03E8–03EF	None	**0 and 3** or disabled
ISA adapter card (option card) in the docking station	(Refer to the manual shipped with the adapter card.)			
Joystick port	None	0201	None	None
Keyboard	1	0060 and 0064	None	None
Math co-processor exception	13	None	None	None
MIDI	5, 7, 10, 11, or **disabled**	**0330–0333**, 0310–0313, 0320–0323, or 0330–0332	None	None

System Resources	IRQ	I/O Address (Hex)	Memory Address (Hex)	DMA Channel
Modem (Refer to "Sharing an IRQ between ThinkPad Modem Devices" on page 83.)	**10**, 3, 4, 5, 7, 11, 15, disabled –or– **3**, 4,	**0130–013F**, 0350–035F, 0770–077F, or 0DB0–0DBF –or– **02F8–02FF**, 03F8–03FF, 03E8–03EF, or 02E8–02EF	None	**7**, 0, 1, or 6
Parallel port	**7**	**03BC–03BE** (and **07BC–07BE**)	None	0, 1, 3, or disabled
	7	0378–037F (and 0778–077A)		
	5	0278–027F (and 0678–067A)		
	Disabled	Disabled		
PC Card	(Dependent on the PC Card type)	(Dependent on the PC Card type)	(Dependent on the PC Card type)	None
PCI adapter card (option card) in the docking station	(Refer to the manual shipped with the adapter card.)			
PCMCIA controller	11	03E0–03E1	CC000–CCFFF and CD000–CEFFF	None
Real-time clock	8	0070–0071	None	None
SCSI controller in the docking station	(Automatically set by the system)	None	None	None
Serial port	**Disabled**	**Disabled**	None	None
	4	03F8–03FF		
	3	02F8–02FF		
	4	03E8–03EF		
	3	02E8–02EF		
Sound Blaster	None	**0220–0233**, 0240–0253, 0260–0273, or 0280–0293	None	**1**, 0, 6, or 7
Timer	0	0040–0043	None	None
TrackPoint or mouse	12	0060 and 0064	None	None

System Resources	IRQ	I/O Address (Hex)	Memory Address (Hex)	DMA Channel
Video controller	None	03BA, 03B4–03B5, 03C0–03CF, 03D4–03D5, 03DA,	A0000–BFFFF C0000–C9FFF	None
WSS codec base	**5**, 7, 9, 10, 11, 15	**0530–0537**, 0604–060B, 0E80–0E87, or 0F40–0F47	None	**0**, **1**, 3

Note:

The I/O addresses in parentheses are used also when ECP is enabled as the printer operating mode from the ThinkPad Configuration program.

When you enable ECP as the printer operating mode from the ThinkPad Configuration program, you must select one value from the four selections (including “disabled”).

When you use Windows 95 OSR2, do not assign this I/O addresses.

Chapter 7. Solving Computer Problems

Note

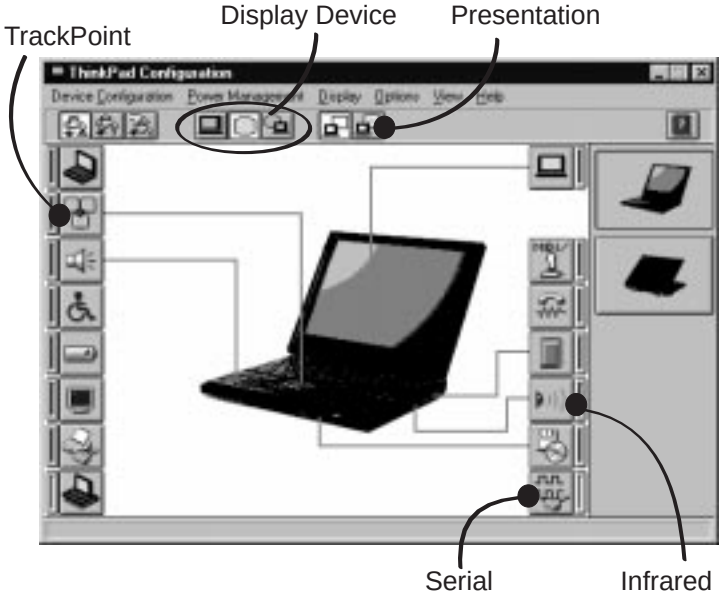
You should print the information in this chapter, so that in case you have a problem with your computer, you will have access to the information.

Frequently Asked Questions

This section addresses frequently asked questions.

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.

The ThinkPad Configuration program window appears:



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

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

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

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

1. Start the ThinkPad Configuration program.
2. Click on the **Disable Screen Blanking** button.

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

You can disable your computer's infrared port to free resources for another communication device, such as the serial 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.

Note: If you check your infrared port and it is already enabled, you can use it immediately without changing any settings.

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 system for your communication software if the other device appears to be working properly.

How do I use my serial port as a communication port?

You can disable your computer's serial port to free resources for another communication device, such as the infrared port. If it is disabled, you must enable it before you can use it again. To enable your serial port, 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.

Note: If you check your serial port and it is already enabled, you can use it immediately without changing any settings.

After your serial 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 cable or device attached to the serial port. 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**; then **Display**.
2. Click on the **Properties...** button. The “Display Properties” window appears.
3. Click on the **Settings** tab.
4. Click on **Advanced Properties**.
5. Click on **Monitor**.
6. Click on the **Change** button.
7. Select **Show All Devices**.
8. Select **Manufacturers and Models** in the next window.
9. Click on **OK**; then **Close**.
10. Set **Color palette** and **Desktop area** in the “Display Properties” windows.
11. Click on **OK**.

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**; then **Display**.
2. Click on the **Properties...** button. The “Display Properties” window appears.
3. Click on the **Settings** tab.

4. Click on **Advanced Properties**.
5. Click on **Monitor**.
6. Make sure that **Automatically Detect Plug and Play Monitors** is checked.
7. If the option is checked and your monitor is still not recognized after you restart the computer, click on the **Change** button.
8. Select the monitor type that you have attached and then click on **OK**.
9. Click on **Close**.
10. If you are prompted to restart your computer, click on **OK**.

How do 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 Advanced Power Management (APM), power modes, standby, suspend, and hibernation. See the Chapter 4, Using Your Computer with a Battery Pack, for more detailed information about power management features.

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

–Or–

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

See the Chapter 8, Installing Software, 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:

Print the software installation section of the Chapter 8, Installing Software.

Make backup diskettes of the device drivers and applications for your new operating system with the Diskette Factory. See the *User's Reference*.

Make a DOS system diskette that has the DOS FDISK.COM and FORMAT.COM utilities and the CD-ROM device driver for DOS.

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

See the *User's Reference*.

Hints, Tips, and Limitations

This section provides hints, tips, and limitations.

For Windows 95:

If you are using the Intel USB camera and the system resumes from suspend mode, the USB camera is disabled. To enable it, unplug it and plug it in again.

Your computer might not enter suspend mode or hibernation mode after the end of a timeout period that was specified in the ThinkPad Configuration program because of the CD-ROM drive property settings. If you want to use suspend mode and hibernation mode, change the properties of the CD-ROM drive as follows:

1. Click on **Start** and move the cursor to **Settings** and **Control Panel**. Then click on **Control Panel**.
2. Double-click on **System**.
3. Click on the **Device Manager** tab., and double-click on **CD-ROM**.
4. Click on the CD-ROM drive name under the **CD-ROM**; then click on the **Properties** button.
5. Click on the **Settings** tab and remove the check mark from the **Auto insert notification** check box in **Option** by clicking on it.
6. Click on **OK**, and restart the computer.

For OS/2 Warp:

If you have formatted the drive in HPFS which has more than 64 MB of memory, hibernation is not supported.

If the COM port does not work even if you have set it up correctly with the ThinkPad Configuration program, do as follows:

1. Open **System Setup**.
2. Select **Hardware Manager**.
3. Select a folder from the menu.
4. Select **Properties**.

5. In the default pull-down menu, select **No Hardware Detection**. If it has already been selected, change the setting.
6. Open the ThinkPad Configuration program.
7. Set the COM port as desired.
8. Restart the system.

For Windows NT:

For Windows NT 4.0, hibernation is not supported if the drive is formatted by NTFS.

For more information, refer to the following Web site:

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

Troubleshooting Guide

The following chart shows how to find or solve a problem.

When a beep sounds, a message appears, or a function-related problem occurs:

1 Find your symptom in the troubleshooting charts and try solving the problem.	→ Troubleshooting Charts
2 If you can't solve the problem, run a test and make sure the hardware and the device drivers are OK.	→ Testing Your Computer
3 Note the error code and have the computer serviced.	→ *User's Reference*

When you accidentally lose or damage software in your computer:

Recover it by using the either of Customization CD, the Recovery CD, or the Diskette Factory.	→ *User's Reference*

Troubleshooting Charts

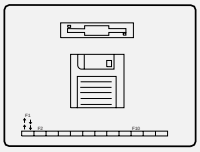
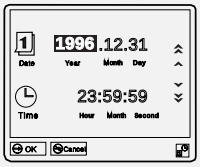
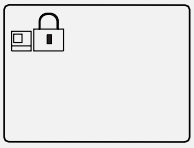
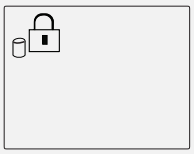
If your computer has an error, it often displays a message or an error code, or a beep sounds when you power it on. Go through the charts and look for your problem.

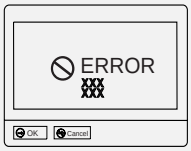
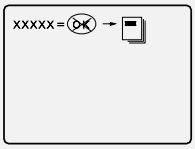
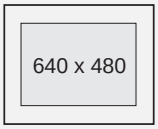
Error Codes or Messages

Note: In the charts, *x* can be any character.

Message	Action
I9990301 I9990302 I9990305 (Incorrect connection of the hard disk drive might cause these error codes to appear.)	Your computer can't find the startup drive. Do the following: 1. Turn off the computer. 2. Press and hold **F1**; then turn on the computer to start Easy-Setup. Hold **F1** until the Easy-Setup menu appears. 3. Select the **Start up** icon. 4. Select **Power-On** or **Network**. If you are unable to set the startup sequence, have the computer serviced. 5. Check the devices in the startup sequence box. Is the default drive listed in the startup sequence box? **Yes** Exit this window, and turn off the computer. **No** Select the **Reset** icon. 6. Is an operating system installed? **Yes** Go to step 8. **No** Install the operating system in your computer. 7. After you install the operating system, turn off the computer. 8. Turn on the computer. If the same message appears, have the computer serviced.
I99*xxxxx* (except the above I999030x errors)	Have the computer serviced.
111 (docking station error)	If you are using a port replicator or a docking station, disconnect it; then reconnect it. If you still have a problem, refer to the manual shipped with your port replicator or docking station.
16*x* or 17*x* (undefined date or configuration error)	Follow the instructions on the screen.
174 (device configuration error)	Make sure that the hard disk drive is connected correctly. If the problem persists, have the computer serviced.

Message	Action
184 (invalid password error)	The password entered is invalid. Turn off the computer and wait at least 5 seconds; then turn it on again and type the correct password.
190 (critical low-battery error)	The computer turned off, because the battery is low. Connect the AC Adapter to the computer and charge the battery pack, or replace the battery pack with a fully charged one.
192 (cooling fan error)	Have the computer serviced.
195 (hibernation error)	The system configuration differs between the time your computer entered hibernation mode and the time it exited this mode, and your computer cannot resume normal operation. Change the system configuration to what it was before your computer entered hibernation mode. If the memory size was changed, re-create the hibernation file.
196 (hibernation error)	The computer cannot read the hibernation file. Have the computer serviced.
225 (unsupported memory)	The installed DIMM is not supported. **Note:** The ThinkPad 600 computer supports SDRAM only. It does not support EDO DRAM.
2*xx* (memory error)	Make sure that the DIMM option is correctly installed.
30*x* (keyboard error)	Make sure that no object is placed on the keyboard or on the external keyboard, if you have one. Power off the computer and power off all attached devices. Power on the computer first; then power on the attached devices. If you still have a problem, do the following: If an external keyboard is connected, do the following: – Turn off the computer and disconnect the external keyboard; then turn on the computer. Make sure that your keyboard operation is correct. If it is, have the external keyboard serviced. – Make sure that the external keyboard is connected to the correct connector. Test the computer by selecting the **Start** icon in the Easy-Setup “Test” submenu. – If the computer stops during the test, have the computer serviced.

Message	Action
Diskette and **F1** prompts 	Make sure that the self-starting diskette is inserted correctly (with the label facing up and metal-shutter end first) in the diskette drive. If it is, press **F1**. If both prompts remain, have the computer serviced.
A 163 error appears and then the *Date and Time* window appears. 	Neither the date nor the time is set in the computer. Set the date and time by typing or clicking on ▲ or ▼ to set the values; then click on **OK**. When both the power-on password and supervisor password are set, do the following: 1. Power on the computer. The password prompt appears after the error code. 2. Type the supervisor password, not the power-on password. An error window appears. 3. Click on **OK** or press **Enter**. 4. Set the time and date on the next window; then press **Enter**. The system restarts.
The power-on password prompt 	A power-on password or supervisor password is set. Type the correct password and press **Enter** to use the computer (see the *User's Reference*). If the power-on password is not accepted, a supervisor password might have been set. Type the supervisor password and press **Enter**. If you still have a problem, have the computer serviced.
The hard disk password prompt 	A hard disk password is set. Type the correct password and press **Enter** to use the computer (see the *User's Reference*). If you still have a problem, have the computer serviced.
The “Test” submenu 	Select the **Start** icon and follow the instructions to test your system. If you cannot complete the test, have the computer serviced. If the test does not find the problem but the problem persists, search for the problem in the Troubleshooting Charts. If the test ends in an error, note the error code and have the computer serviced.

Message	Action
A POST error prompt 	An error was found during POST. Press **Enter**; then select **Start** from the "Test" submenu and run the test. If the test ends in an error, note the error code and have the computer serviced.
An error prompt 	Turn off the computer and start Easy-Setup; then select **Test** to test the computer. If the test ends in an error, note the error code and have the computer serviced. You can start the operating system by pressing **F1** instead, and ignore the error.
The DOS full-screen looks smaller. 	When you use a DOS application that supports only the 640x480 resolution (VGA mode), the screen image might look slightly distorted or might appear smaller than the display size. This is to maintain compatibility with other DOS applications. To expand the screen image to the same size as the actual screen, start the ThinkPad Configuration program and click on **LCD** (); then select the **Screen expansion** function. (The image might still look slightly distorted.) **Note:** You can use the **Fn**+**F8** keys to do the same thing.
A panel or message that is not listed.	Turn off the computer and start Easy-Setup; then select **Test** to test the computer. If the test ends in an error, note the error code and have the computer serviced. If you cannot start Easy-Setup, have the computer serviced.
xxxxx **KB OK** appears and the computer stops.	Have the computer serviced.

No Error Codes or Messages

Problem	Action
The screen is blank and you don't hear any beeps. **Note:** If you are not sure whether you heard any beeps, turn the computer off; then turn it on again, and listen again. If you are using an external monitor, see "External Monitor Problems" on page 124.	Make sure that: The battery pack is installed correctly. The AC Adapter is connected to the computer and the power cord is plugged into a working electrical outlet. The computer power is on. (Turn on the power switch again for confirmation.) If a power-on password is set, press any key to display the power-on password prompt, and then type the correct password and press **Enter** (see the *User's Reference*). If the power-on password does not appear, the brightness control might be set to minimum brightness. Adjust the brightness. If the screen still remains blank, have the computer serviced.
The screen is blank and you hear a continuous beep, or two or more beeps.	Have the computer serviced.
Only the cursor appears.	Reinstall your operating system and turn on the computer. If you still have a problem, have the computer serviced.

Input Problems

Problem	Action
The cursor does not move after the computer awakens from one of the power management modes.	Make sure you followed the instructions in the Installing Microsoft Windows Version 3.11 correctly when you installed Windows with the Advanced Power Management (APM) option.
All or some keys on the keyboard do not work.	If the problem occurred immediately after the computer returned from suspend mode, enter the power-on password if it is set. If an external keyboard is connected, the numeric keypad on your computer will not work. This is not a defect. If an external numeric keypad or a mouse is connected: 1. Turn off the computer. 2. Remove the external numeric keypad or the mouse. 3. Turn on the computer and try using the keyboard again. If the keyboard problem is solved, check the connection of the external numeric keypad, external keyboard, or mouse. If you still have a problem, have the computer serviced.
The cursor drifts when the computer is turned on or after it resumes normal operation.	The cursor might drift when you are not using the TrackPoint during normal operation. This is a normal characteristic of the TrackPoint and is not a defect. Cursor drifting might occur for several seconds under the following conditions: When the computer is turned on. When the computer resumes normal operation. When the TrackPoint is pressed for a long time. When the temperature changes.
The mouse or pointing device does not work.	Make sure that the mouse or pointing-device cable is securely connected to the computer. Try using the TrackPoint. If the TrackPoint works, the error might be due to the mouse. If your mouse is incompatible with the IBM PS/2 mouse, disable the TrackPoint using the ThinkPad Configuration program. **Note:** See the manual supplied with the mouse for more information.
The mouse buttons don't work.	Reinstall the Standard PS/2 Port Mouse driver; then reinstall the PS/2 TrackPoint driver.
The scrolling or Magnifying Glass function doesn't work.	See the General tab page in "Mouse Properties," and make sure that the PS/2 TrackPoint driver is loaded. **Note:** Refer to the README in the TrackPoint driver diskette for driver installation.

Problem	Action
A number appears when you type a letter.	The numeric lock function is on. To disable it, press and hold **Shift**; then press **NumLk**.
All or some keys on the external numeric keypad do not work.	Make sure that the external numeric keypad is correctly connected to the computer.
All or some keys on the external keyboard do not work.	To use an external keyboard, you need to attach the keyboard/mouse cable to the computer. Make sure that: The keyboard/mouse cable is correctly connected to the computer. The keyboard cable is connected to the correct side of the keyboard/mouse cable. If these items are correct, disconnect the keyboard/mouse cable from the computer and make sure that the operation of the system keyboard is correct. If the system keyboard works, have the keyboard/mouse cable or the external keyboard serviced.

Suspend or Hibernation Problems

Problem	Action
The computer enters suspend mode automatically.	The computer enters suspend mode automatically when the processor temperature reaches a certain level. This is not a defect.
Performance degrades when the computer gets hot during use.	The processor speed might decrease under the following conditions: Use in a hot environment High-powered processing that requires high-power consumption This is not a defect.
The computer enters suspend mode immediately after POST (the suspend LED turns on).	Make sure that: The battery pack is charged. The operating temperature is within the acceptable range. Refer to the *User's Reference*. If these items are correct, have the computer serviced.
Error 19 appears and the computer immediately turns off.	The battery pack power is getting low. Connect the AC Adapter to the computer, or replace the battery pack with a fully charged one.

Problem	Action
The computer does not return from suspend mode, or the suspend indicator stays on and the computer does not work.	The computer automatically enters suspend or hibernation mode when the battery power is exhausted. Do one of the following: Replace the battery pack with a fully charged one and then press **Fn**. Connect the AC Adapter to the computer; then press **Fn**.
The LCD is blank after resuming.	Check if an external monitor was connected before the computer entered suspend mode. **Do not disconnect the external monitor while the computer is in suspend mode or hibernation mode. If no external monitor is attached when the computer resumes, the LCD remains blank and output is not displayed. This restriction does not depend on the resolution value.**
Your computer does not enter suspend or hibernation mode.	Check if the suspend or hibernation mode is disabled. If you are using the AC Adapter and your computer is connected to a network, do the following: **For Windows 95:** 1. Start the ThinkPad Configuration program. 2. Click on **Power Management** (). 3. Click on the **Hibernation** tab. 4. Make sure that hibernation mode is enabled. **For Windows NT:** 1. Start the ThinkPad Configuration program. 2. Click on **Power Management** (). 3. Click on **Suspend/Resume Options** (). 4. Make sure that hibernation mode is enabled. 5. Click on **OK**.

Problem	Action

The computer does not enter suspend mode as set by the timer under Windows 95 or Windows NT.	**For Windows 95:**
	
	The Windows 95 generic CD-ROM driver accesses the internal CD-ROM drive every 3 seconds to check if a CD-ROM is inserted in the CD-ROM drive. This prevents your computer from entering suspend mode even after a timeout.
	
	To prevent this, do the following:
	
	1. Double-click on **My Computer**, **Control Panel**, and **System**.
	2. Click on the **Device Manager** tab.
	3. Click on the + mark of **CD-ROM**.
	4. Double-click on the CD-ROM drive name.
	5. Click on the **Setting** tab.
	6. Remove the check mark from **Auto insertion notification**.
	
	Windows 95 no longer detects the CD-ROM insertion automatically.
	
	For Windows NT:
	
	The computer does not enter suspend mode by the timer if you enable the CD-ROM AutoRun feature. To enable the Suspend Timer function in the registry, do the following:
	
	`HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Serveces\Cdrom\`
	
	`Autorun: ×1 → Autorun:`

Problem	Action
The computer does not enter hibernation mode with the **Fn**+**F12** key combination.	Enable hibernation mode as follows: **For Windows 95:** 1. Start the ThinkPad Configuration program. 2. Click on **Power Management** (). 3. Click on the **Hibernation** tab. 4. Click on **Enable Hibernation**. **Note:** If you have already created the hibernation file, this button is displayed in gray and you cannot click on it. 5. Click on **Create Now**. 6. Click on **OK**. The computer cannot enter hibernation mode when you are using one of the IBM communication PC Cards. To enter hibernation mode, stop the communication program, and then remove the PC Card or turn off power to the PC Card slot using the **Control Panel**. **For Windows NT:** **Note:** You must format your hard disk with the FAT format system to use hibernation mode in Windows NT. When you format your hard disk with NTFS, the Windows NT default format, you will not be able to use hibernation mode. 1. Start the ThinkPad Configuration program. 2. Click on **Power Management** (). 3. Click on **Suspend/Resume Options** (). 4. Click on **Enable Hibernation**. 5. Click on **OK**. The computer cannot enter hibernation mode when you are using one of the IBM communication PC Cards. To enter hibernation mode, stop the communication program, and then remove the PC Card or turn off power to the PC Card slot using the **Control Panel**.

LCD Problems

Problem	Action
The screen is unreadable or distorted.	Make sure that: The display driver is installed correctly by doing the following: 1. Click on **Start** and move the cursor to **Settings**, and **Control Panel**. 2. Click on **Display**. 3. Select the **Settings** tab. 4. (For Windows 95) Click on **Advanced Properties**. (For Windows NT) Click on **Display Type...**. The “Adapter/Driver Information” window appears. Make sure the display driver information in the window is correct. The refresh rate setting is set to your display resolution and color depth by doing the following: 1. Start the ThinkPad Configuration program. 2. Click on **LCD** (). 3. (For Windows 95) Click on **Properties...**. (For Windows NT) Click on **Advanced...**. 4. Make sure that the setting in the next window is correct. 5. Click on **OK**.
Incorrect characters appear on the screen.	Did you install the operating system or application program correctly? If they are installed and configured correctly, have the computer serviced.
The screen stays on even after you power off your computer.	Press the reset switch with the tip of a pen and turn off your computer; then turn it on again.
Missing, discolored, or bright dots appear on the screen every time you power on your computer (TFT display model.)	This a characteristic of the TFT technology. Your computer display contains multiple thin-film transistors (TFTs). A small number of missing, discolored, or bright dots on the screen might exist all the time.

An Indicator Problem

Problem	Action
The battery status indicator does not go on even though a battery pack is installed in the computer.	The over-current protection device inside the battery pack has been activated. Wait several hours and try again. If the indicator still does not go on, replace the battery pack or have the computer serviced.

Battery Problems

Problem	Action
The battery pack cannot be fully charged in 3 hours by the power-off charging method.	The battery pack might be over-discharged. Do the following: 1. Turn off the computer. 2. Make sure that the over-discharged battery pack is in the computer. 3. Connect the AC Adapter to the computer and let it charge. If the battery pack cannot be fully charged in 24 hours, use a new battery pack.
Your computer shuts down before the battery status indicator shows empty. ***–or–*** Your computer operates after the battery status indicator shows empty.	Repeat discharging and charging the battery pack at least three times.
The computer does not operate with a fully charged battery pack.	The over-current protective function in the battery pack might be activated. Turn off the computer for 1 minute to reset this function; then turn it back on again.

CD-ROM Drive Problems

Problem	Action
The CD-ROM does not work.	Make sure that: The computer power is turned on and a compact disc is in the CD-ROM drive. The CD-ROM drive tray is firmly closed. The device drivers are correctly installed.
You hear a noise from the CD-ROM drive when the CD-ROM is spinning.	The CD-ROM drive cover might be bent. Have the computer serviced.
The CD-ROM tray does not open even if you press the CD-ROM eject button.	Insert a pin into the CD-ROM emergency eject hole and eject the CD-ROM tray.
The compact disc cannot be read.	Make sure that: The compact disc is not dirty. If it is, clean it with a CD-ROM cleaner kit. The compact disc is not defective. If it is, try another compact disc. The compact disc is placed in the tray with the label side up. The compact disc format conforms with one of the following: – Music CD – CD-ROM or CD-ROM XA – Multisession photo CD – Video CD

Infrared Communication Problems

Problem	Action
Your computer cannot communicate with other devices using the infrared port.	Make sure that: The communication speeds are the same. The infrared ports are clean. No objects are between the computer and the communicating device. The distance and angle between your computer and the device is within the set range. The other computer is the same model as yours. You are not operating under direct sunlight. The infrared ports are directly facing each other. Communication is not impeded by the light from the computer's LCD. To avoid this, open the LCD to a wide angle. The communication application running on your computer is the same as that running on the other computer. Refer to the application manuals for more information. ThinkPad mode cannot be used if you are using a conventional communication application that uses the serial port and cable for data exchange. (In this case, the infrared port is a substitute for them.)
Incorrect data is sent between your computer and a communicating device.	Make sure that: The distance and angle between your computer and the device is within the set range. The communication speeds are the same. There are no other devices that radiate infrared rays, such as remote-controlled devices or wireless headphones, near your computer or the communicating device. You are not operating under direct sunlight. No fluorescent lamps are near your computer or the communicating device.
You cannot use DMA channels for both the parallel port and the infrared port.	If you enable ECP and choose DMA3 (default value) for the parallel port, you might see the panel asking if you want to disable DMA for the infrared port. Do the following to use DMA channels for both parallel and infrared port: 1. Click on **OK** to disable DMA for the infrared port. 2. Close a parallel port panel. 3. Click on the **Infrared device** button to open the infrared panel. 4. Choose DMA0 or DMA1 for infrared port on the panel. 5. If you see the panel prompting if you want to disable DMA for an audible device, click on **OK**.

Audio or Telephony Problems

Problem	Cause and Action
The volume of the WaveTable MidiSynth device cannot be controlled.	Use the **Serial-in** control in the volume control panel to control the volume.
The voice quality over the Voice-Over-Data communication is poor.	Due to limitations of the ThinkPad modem, the voice quality that is transmitted and received over the Voice-Over-Data communication is not as good as the normal telephone line. There might be momentary voice discontinuities, delays, or distortions.
Other problems.	Problems may be due to such other factors as: Incompatibility between the ThinkPad modem feature and other adapter cards in the docking station. To isolate this problem to a card or device, remove the adapter cards in the docking station one by one, and run the diagnostic test (see the Testing Your Computer). The telephone cable configuration is not correct for your application. The telephone cable is defective. The telephone is defective. The audio cable configuration is not correct for your application. The audio cable is defective. The audio equipment is defective.

A Universal Serial Bus (USB) Problem

Problem	Cause and Action
A device connected to the USB port does not work.	1. Make sure that the USB device is connected correctly. 2. Open the “Device Manager” window, and make sure that the USB device setup is correct, and that computer resource assignment and device driver installation are correct. **Note:** To open the “Device Manager” window, click on **Start** and move the cursor to **Settings** and **Control Panel**. Double-click on **System**. Then click on the **Device Manager** tab in the “System Properties” window. Refer to Testing Your Computer and run the diagnostic test for the USB port.

Modem Problems

Problem	Action
The internal modem does not work when you boot your computer from an operating system other than Windows 95.	The operating system may be sharing the same IRQ levels as your modem. The ThinkPad modem software might not work under these conditions. You must cancel the IRQ shared condition to use the modem. Refer to Chapter 6, “Resolving System Resource Conflicts” on page 83 to cancel the IRQ shared condition.

Problem	Action
Your modem application does not work with the ThinkPad modem.	Make sure that the internal modem port is enabled by opening the “Device Manager” window and running the **Modem Wizard** or by opening the ThinkPad Configuration program and doing as follows: 1. Click on **Start**. 2. Move the cursor to **Programs** and **ThinkPad**; then click on **ThinkPad Configuration**. 3. Click on **Internal Modem** (). 4. Select **Enable**. 5. Click on **OK**. **For Windows 95** If the modem does not work correctly, → Chapter 6, Resolving System Resource Conflicts , and correct the resource conflict. If the modem works correctly, specify the following modem settings by doing the following: 1. Double-click on **My Computer**, **Control Panel**, and **Modem**. The **OEM Mig 33.6 Data Fax VOD Modem** is highlighted. 2. Click on **Properties**, *not* **Dialing Properties**. 3. Click on the **Connection** tab. 4. If there is a check mark in the **Wait for dial tone before dialing** box, click and remove it. 5. Click on **Advanced**. 6. If there is a check mark in the **Use error control** box, click and remove it. 7. Add a check mark to the **Use flow control** by clicking on the box and make sure that **Hardware (RTS/CTS)** is selected. 8. Click on **OK** to close the window. 9. Click on **OK** and return to the “Modem Properties” window. 10. Click on **Dialing Properties** and fill in all boxes and click on either **Tone dialing** or **Pulse dialing**. **Note:** Most telephones today use tone dialing, where each button produces a different tone, instead of pulse dialing. 11. Click on **OK**. 12. Click on **Close** to close the window. 13. Close all active windows. Run your modem application again.

PC Card Problems

Problem	Action
The PC Card shows “Ready,” but it does not work correctly.	Make sure that: The system resources reserved for the PC Card do not conflict with other system devices. Refer to Chapter 6, Resolving System Resource Conflicts. The resources reserved for the PC Card match the settings in the application program. If you are using a modem card, check the COM number, I/O port address, and IRQ level. If you are using a network card, check the I/O port address, IRQ level, and memory window address. To check the resources assigned to the PC Card, click on **Status** in the Easy-Setup program.
A system resource conflict occurred when a PC Card was used.	Refer to Chapter 6, Resolving System Resource Conflicts.
The system cannot start from the PC Card.	To start from PC Card, do as follows: 1. Start the ThinkPad Configuration program. 2. Click on the **UltraBay** () button. 3. Remove the check mark from **Enable Hot/Warm Swapping of UltraBay** check box by clicking on it. 4. Click on **OK**. Make sure that the correct system resources are being used for the PC Card. **ATA:** IRQ 15 I/O 170–177h, 376h **Note:** Secondary IDE should be disabled. **RPL (Token Ring):** IRQ 9 Memory: D6000–DBFFFh I/O A20–A23h **RPL (Ethernet):** IRQ 5 Memory D2000–D7FFFh I/O 300–31Fh

Problem	Action
Your PC Card modem does not work	Make sure that the infrared port is disabled and the modem is set up correctly. You can disable the infrared port from the ThinkPad Configuration program or the “Device Manager” window. Open the ThinkPad Configuration program and do as follows: 1. Click on **Start**. 2. Move the cursor to **Programs** and **ThinkPad**; then click on **ThinkPad Configuration**. 3. Click on **Infrared** (). 4. Select **Disable**. 5. Click on **OK**. **For Windows 95:** To set up the modem, do the following: 1. Double-click on **My Computer**, **Control Panel**, and then **Modem**. The “Modem Properties” window appears. 2. Make sure the PC Card (PCMCIA) modem is in the window. 3. Click on **Properties**, *not* **Dialing Properties**. 4. Click on the **Connection** tab. 5. Remove the check mark in the **Wait for dial tone before dialing** box if it is checked. 6. Click on **Advanced**. 7. If there is a check mark in the **Use error control** box, click and remove it. 8. Add a check mark to the **Use flow control** by clicking on the box and make sure that the **Hardware (RTS/CTS)** is selected. 9. Close the window by clicking on **OK**. 10. Return to the “Modem Properties” window by clicking on **OK**. 11. Click on **Dialing Properties** in the “Modem Properties” window, and fill in all boxes. **Note:** Click on either **Tone dialing** or **Pulse dialing**. Most telephones today use tone dialing. 12. Click on **OK**. 13. Click on **Close** to close the window. 14. Close all active windows. Run your modem application again.

Problem	Action
You cannot use PC Cards other than IBM ones in the OS/2 Warp environment.	If you do not have the PC Card device driver for OS/2 but you have one for DOS, your PC Card may run in the VDM (Virtual DOS machine) environment. Refer to “Virtual Card Services” in Using a PC Card in OS/2 (with PC Card Director) for setting the VDM and the sample configuration files on the PCMCIA Installation Diskette for OS/2, Windows 95. If the PCMCIA Installation Diskette for OS/2, Windows 95 did not come with the computer, create it using the Diskette Factory program. See the *User's Reference*.
PC Card support software does not recognize your PC Card.	Make sure that: If the PC Card is not a modem, an ATA, a Flash, or an SRAM card, you have the proper client device driver for the card. In Windows 95, the PC Card must have an INF file associated with it. Your PC Card supports PCMCIA Release 2.0, 2.01, and 2.10. Refer to the manual that came with your PC Card. If your PC Card does not support those release of PCMCIA, you cannot use PC Card Director. Contact your PC Card supplier. Your PC Card is working by following the diagnostic instructions for your PC Card, if any.
The PC Card is recognized by PC Card support software, but the “Not Ready” or “Not Configured” message is shown.	Make sure that: The PC Card enabler is installed. Refer to the manuals supplied with your PC Card. If the PC Card is not a modem, an ATA, a Flash, or an SRAM card, you have the proper client device driver for the card. In Windows 95, the PC Card must have an INF file associated with it. The resources for the PC Card are correctly reserved. Refer to Chapter 6, Resolving System Resource Conflicts.

Docking Station Problems

Problem	Action
The IDE CD-ROM drive or the hard disk drive in the docking station does not work.	Make sure that the system resources of the secondary IDE device in the docking station do not conflict with the system resources of the other devices. Do the following: 1. Click on **Start**. 2. Move the cursor to **Programs** and **ThinkPad**; then click on **ThinkPad Configuration**. 3. Click on **Docking Station** () and put a check mark on **Enable IDE device in the docking station**. **Note:** Do not use IRQ 11 and 15 for the PCI device setting. 4. Click on **OK**.
The MIDI port of the docking station does not work.	To enable the MIDI port of a docking station, use the ThinkPad Configuration program. Make sure that the MIDI port is enabled by doing the following: 1. Start the ThinkPad Configuration program. 2. Click on **MIDI Port**. 3. Confirm that the MIDI port is enabled. If not, click on **Enable**; then click on **OK**. 4. Close the ThinkPad Configuration program and restart the computer. **Note:** When you restart the computer, you might need to install the MIDI device driver. Follow the instructions on the screen and install the device driver for your computer's operating system.

A Printer Problem

Problem	Action
The printer does not work.	Make sure that: The parallel port is enabled. 1. Start the ThinkPad Configuration program. 2. Click on **Parallel Port** (). 3. Select **Enable**. 4. Click on **OK**. The printer is turned on and ready to print. The printer signal cable is connected to the correct connector of your computer. If these items are correct and the printer still does not work, run the tests described in the printer manual. If the tests show that the printer is OK, have the computer serviced.

External Monitor Problems

Problem	Action
The external monitor is blank.	Do the following: 1. Connect the external monitor to another computer to make sure it works. 2. Reconnect the external monitor to your computer. 3. Start the ThinkPad Configuration program. 4. Click on **External Display** () or **LCD + External Display** () on the toolbar in the ThinkPad Configuration. If nothing appears on the external monitor, have the computer serviced.

Problem	Action
You cannot set a higher resolution than the present one on your external monitor.	Make sure that: The ThinkPad display driver is installed correctly by doing the following: 1. Click on **Start** and move the cursor to **Settings** and **Control Panel**. 2. Double-click on **Display**. 3. Select the **Settings** tab in the “Display Properties” window. 4. (For Windows 95) Click on **Advanced Properties**. (For Windows NT) Click on **Display Type...**. The “Adapter/Driver Information” window appears. Make sure that the ThinkPad display driver is installed. If you are not sure that the ThinkPad display driver is installed correctly, reinstall it. An appropriate display type or refresh rate is selected. 1. Start the ThinkPad Configuration program. 2. Click on **LCD** (). 3. (For Windows 95) Click on **Properties...**. (For Windows NT) Click on **Advanced...**. 4. Make sure the setting in the next window is correct. 5. Click on **OK** to close the window.
The screen is unreadable or distorted.	Make sure that: The ThinkPad display driver is installed correctly by doing the following: 1. Click on **Start** and move the cursor to **Settings** and **Control Panel**. 2. Double-click on **Control Panel** and then **Display**. 3. Select the **Settings** tab in the “Display Properties” window. 4. Click on **Advanced Properties**. The “Adapter/Driver Information” window appears. Make sure that the ThinkPad display driver is installed. The display is set correctly. 1. Start the ThinkPad Configuration program. 2. Click on **LCD** (). 3. (For Windows 95) Click on **Properties...**. (For Windows NT) Click on **Advanced...**. 4. Make sure the setting in the next window is correct. 5. Click on **OK** to close the window. If the settings are correct, run the tests described in the manual supplied with the external monitor. If the tests show that the external monitor is OK, have the computer serviced.
Wrong characters appear on the screen.	Did you install the operating system or application program with the correct procedure? If you did, have the external monitor serviced.

A Port Replicator Problem

Problem	Action
The computer hangs when you power on or resume operation.	Make sure that the computer is securely attached to the port replicator. If there is still a problem, have the port replicator serviced.

Other Option Problems

Problem	Action
An IBM option that you just installed does not work.	Make sure that: The option is designed for your computer. The option was installed following the instructions supplied with the option or *User's Reference*. Other installed options or cables are not loose. There is no I/O address or interrupt level (IRQ) DMA channel conflict. To see the system resource status, start the ThinkPad Configuration program and click on the respective device buttons. If the test program for the option did not find the problem, have the computer and option serviced.
An IBM option that used to work no longer works.	Make sure that: The option is securely connected to your computer. The option passes its own test. If the option came with its own test instructions, use those instructions to test the option. There is no system resource conflict (refer to Chapter 6, Resolving System Resource Conflicts). If these items are correct and the test program did not find the problem, have the computer and option serviced.

Problem	Action
The serial port does not work.	Make sure that the serial port is enabled by doing the following: **For Windows 95:** 1. Start the ThinkPad Configuration program. 2. Click on **Serial Port** (). 3. Select **Enable**. 4. Click on **Device Manager**. 5. Set up the port in the “Device Manager” window. 6. Click on **OK**. **For Windows NT:** 1. Start the ThinkPad Configuration program. 2. Click on **Serial Port** (). 3. Select **Enable**; then select **COM1**, **COM2**, **COM3**, or **COM4**. 4. Click on **OK**.

Software Problems

Problem	Action
An application does not run correctly.	Check the following to make sure that the problem is not being caused by the application: Your computer has the minimum required memory to run the application. Refer to the manuals supplied with the application. The application is designed to operate with your operating system. Other applications run correctly on your computer. The necessary device drivers are installed (→ Chapter 8, Installing Software). The application works OK when it is run on some other computer. If an error message appears when you are using the application program, refer to the manuals supplied with the application. If these items are correct and you still have a problem, contact your place of purchase or the service representative for help.
You cannot install OS/2 Warp.	See Chapter 8, Installing Software.

Other Problems

Problem	Cause or Action
The computer locks or does not accept any input.	Your computer might lock when it enters suspend mode during a communication operation. Disable the suspend timer when you are working on the network. When you turn on the computer with OS/2 Warp installed, make sure no compact disc (CD) is in the CD-ROM drive. If there is, remove the CD, turn off the computer, and turn it on again. To turn off the computer, press the reset switch using the tip of a ballpoint pen.
The computer does not turn off with the power switch.	If the suspend indicator is on and you are working under battery power, change the battery to a fully charged one or change your power source to ac power. If you still have a problem, press the reset switch using the tip of a ballpoint pen.
The computer does not start from a diskette.	Make sure that the startup sequence in Easy-Setup is set so that the computer starts up from the diskette drive (see the Easy-Setup section in the *User's Reference*).

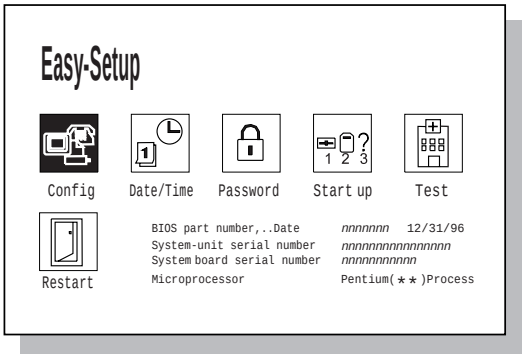
Problem	Cause or Action
Performance degrades when the computer gets hot during use.	The processor speed might decrease under the following conditions: Use in a hot environment High-powered processing that requires high-power consumption This is not a defect.
A memory shortage or memory error occurs.	**For DOS:** 1. Use the DOS command MEM/C to review your DOS memory usage occasionally. 2. Unload any unnecessary drivers from the CONFIG.SYS file. (For example, unload printer drivers if you do not use a printer.) 3. Reconfigure the UMB (upper memory block) using the DEVICEHIGH statement. 4. Use the multiple configuration setup for DOS (refer to the documents supplied with DOS). **For Windows 3.11:** 1. Try the same actions as described for DOS. 2. Unload any unnecessary programs from the WIN.INI file (for example, FUELWIN for ac operations.)

Testing Your Computer

If you still have a problem with your computer after using the Troubleshooting Charts, test the computer using the Easy-Setup **Test** function.

To test your computer, do the following:

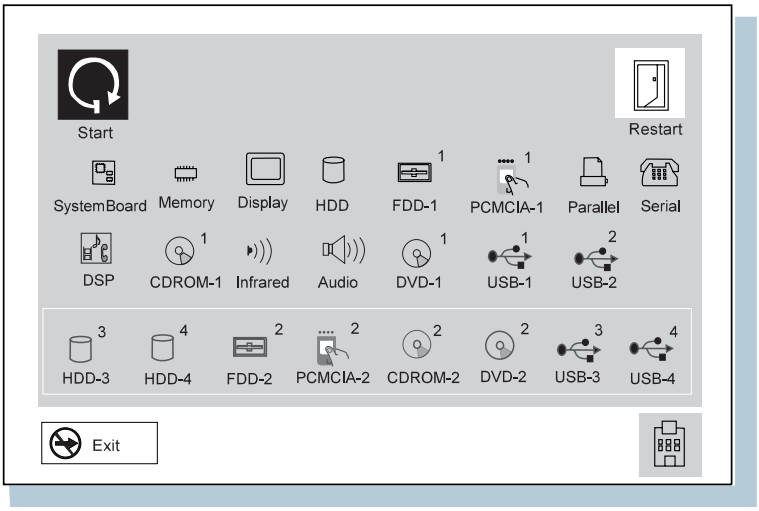
1. Press and hold **F1**; then turn on the computer to start Easy-Setup. Hold **F1** until the “Easy-Setup” menu appears:



You will hear a short beep. If you are not sure whether you heard a beep, press **Fn**+**PgUp** a few times to make the speaker volume loud. Turn off the computer and try again. If you still don't hear a beep, the speaker is not working. Have your computer serviced.

2 Select the **Test** icon; then select the **Start** icon or press **Enter**.

Note: Do not touch the keyboard or the pointing device during the test.



If you cannot go to the next menu, have the computer serviced.

If an X appears to the left of a device with an error code below it, make a note of the error code and have the computer serviced.

Recovering Lost or Damaged Software

This section describes how to recover lost or damaged software. The following table shows what is needed to recover your system.

Problem	Tools Provided	For More Information
Windows 95 and Windows NT users with a CD-ROM drive		
You need to recover a lost or damaged device driver.	Use the ThinkPad Installer on the ThinkPad Customization CD.	See the *User's Reference* for general information. The CD-ROM also contains online help for detailed instructions.
You need to recover (reinstall) a lost or damaged software application.	Use the Easy Application Installer on the ThinkPad Customization CD.	See the *User's Reference* for general information. The CD-ROM also contains online help for detailed instructions.
You need to recover your entire hard disk.	Use the ThinkPad Recovery CD.	See the *User's Reference* for general information.
Windows 95 or Windows NT users without a CD-ROM drive		
You need to recover a lost or damaged device driver.	Use the Diskette Factory on your hard disk drive.	See the *User's Reference* for general information about using Diskette Factory.
You need to recover (reinstall) a lost or damaged software application.	Use the Diskette Factory on your hard disk drive. **Note:** Some applications are not supported in Diskette Factory.	See the *User's Reference* for general information about using Diskette Factory.
You need to recover your entire hard disk drive.	Contact Microsoft for operating system installation diskettes. Go to the ThinkPad Web site to download latest hardware driver diskettes. Install them. —***Or***— Get your computer serviced by IBM. Some charge might apply.	See the Microsoft Windows booklet shipped with your computer to find out how to order Windows installation diskettes. —***Or***— See the *User's Reference* for more information.
OS/2 or Windows 3.1 users		

Problem	Tools Provided	For More Information
You need to recover a lost or damaged device driver.	Go to the ThinkPad Web site to download the latest hardware device driver diskettes. Install them.	See Chapter 8, Installing Software, for how to install the device driver.

Using the Diskette Factory

To recover a particular device driver or utility program, create the backup diskettes for it with the Diskette Factory; then reinstall it.

To create the backup diskettes, do the following:

1. Click on **Start**.
2. Move the cursor to **Programs** and **ThinkPad**; then click on **Diskette Factory**.
3. Click on the tab at the top corresponding to the operating system you are using.
4. Click on the diskette group for the backup copy that you want to make.

   Notes

   You can select more than one group by clicking while pressing **Ctrl**.
   The number of the diskettes required is shown beside the diskette group. You do not need to use a blank diskette; the Diskette Factory prompts you to reformat diskettes that are not blank.

5. Click on **Build**.
6. Follow the instructions on the screen.

   For detail on how to install software → Chapter 8, Installing Software .

Using the ThinkPad Customization CD

The ThinkPad Customization CD is provided for your installation convenience. If you need to reinstall a software application or a hardware device driver, put the ThinkPad Customization CD in your CD-ROM drive. The menu of the features appears automatically. The following features are included:

Software Select Installer (Windows 95 and Windows NT 4.0)
If you are using Windows 95 or Windows NT 4.0, click on this button to learn about and reinstall any of the ThinkPad software applications that you want. You will be guided through the installation process.

ThinkPad RTC Installer
Use this program to reinstall or create diskettes of any software application or hardware device driver. This is the fastest way to install a lot of applications and device drivers. This program is designed for the system administrator.

Online User's Guide
In case you do not have the online user's guide on your hard disk drive, you always have a copy on your ThinkPad Customization CD.

CD-ROM Help
This contains an overview of CD-ROM functions.

Using the Recovery CD

You can restore the contents of your hard disk to what it was at the time of purchase.

Attention

This recovery program deletes all personal data and your customized configuration settings. It resets your computer to most of the factory-shipped default values. Be sure to back up your personal files before you use this CD.

For more information about the Recovery CD, see the booklet provided with it.

Chapter 8. Installing Software

Note

This chapter provides procedures for installing an operating system and the necessary software. You should make a printout of the sections you will be using before you reinstall the operating system.

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.

Your computer supports the following operating systems:

Microsoft Windows 95 → Installing Software for Windows 95

Microsoft Windows NT Version 4.0 → Installing Software for Windows NT

Microsoft Windows 3.11 → Installing Software for Windows Version 3.11

IBM OS/2 Warp 4 → Installing Software for OS/2 Warp 4

DOS (PC-DOS 7.0) → Installing Software for DOS

Installing Software for Windows 95

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

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

Retail Release Version (OSR0)
Service Pack Version 1 (OSR1)
OEM Service Release Version 2 (OSR2)
OEM Service Release Version 2.1 (OSR2.1)

The OSR0 is an off-the-shelf version of Windows 95 and is available at any retail store. The OSR1 can be downloaded from the Microsoft Internet home page (`http://www.microsoft.com`). The OSR2.1 is available only as preloaded versions. Since your computer incorporates several new devices that were not available when these versions of Windows 95 were announced, take special precautions when installing or reinstalling these versions.

Your Version of Windows 95

You can check which version of Windows 95 you are using by clicking on **Start** and moving the cursor to **Settings** and **Control Panel**, and then double-clicking on **Control Panel** and **System**.

The following window appears:

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

4.00.950 means that it is Windows 95 OSR0.

4.00.950a means that it is Windows 95 OSR1.

4.00.950B means that it is Windows 95 OSR2 or 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 preloaded on the hard disk. You need to create at least the following device driver diskettes:

Device Driver	Diskette Name
ThinkPad Configuration program	Utility Diskette for Windows 95 and Utility Diskette for DOS, Personalization
Display driver	Video Features Diskette III for Windows 95
PC Card support software	CardWorks for Windows 95
Audio device driver	Audio Features Diskette for Windows 95
ThinkPad Modem software	ThinkPad Modem for Windows 95
TrackPoint driver	TrackPoint Driver Diskette for Windows 95/Windows NT

4. Install Windows 95 and the software.

Installing Microsoft Windows 95

Some new devices for the ThinkPad 600 computer are not supported by the Windows 95 Retail Release Version and the Service Pack Version 1. In addition, some new files must be incorporated at the time of installation.

Installing the Windows 95 OSR0 or the 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. Copy all the cabinet (.CAB) files and the installation programs from the \WIN95 directory of the Windows 95 CD-ROM to this directory.

   For example, enter at the DOS prompt:

   ```
   COPY src_cd:\WIN95\ .  tgt_drv:\tgt_dir
   ```

where `src_cd` is the drive letter of the CD-ROM drive (D, E,...), `tgt_drv` is the drive letter, and `tgt_dir` is the temporary directory that you made in step 3.

5. Insert the Windows 95 supplementary diskette into the diskette drive.

6. 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\ .  tgt_drv:\tgt_dir
   ```

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

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

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

9. If required, install the Service Pack Version 1, available from the Microsoft Internet home page.

10. If required, 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 the Windows 95 OSR2 or OSR2.1

If you don't have a CD-ROM of the Windows 95 OSR2.1, you can install it by restoring the original preloaded image from the Recovery CD. Refer to the *User's Reference*.

If you have a CD-ROM version of the Windows 95 OSR2 or 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. 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\ .  tgt_drv:\tgt_dir
   ```

   where `src_cd` is the drive letter of the CD-ROM drive (D, E,..), `tgt_drv` is the drive letter, and `tgt_dir` is the temporary directory that you made in step 3.

5. Insert the Windows 95 supplementary diskette into the diskette drive.

6. 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\ .  tgt_drv:\tgt_dir
   COPY A:\CARDBUS\ .  tgt_drv:\tgt_dir
   ```

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

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

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

9. Insert the Windows 95 supplementary diskette into the diskette drive.

10. Change the drive letter at the DOS prompt to `A` and run `\USBSUPP.EXE`

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, insert the Windows 95 supplementary diskette into the diskette drive.

14. From the DOS prompt, go to C:\WINDOWS\SYSTEM (or the SYSTEM subdirectory where Windows 95 is installed).

15. Rename the UNIMODEM and UNIMDM.TSP files by entering:

    ```
    REN UNIMODEM.VXD UNIMODEM.BAK

    REN UNIMDM.TSP UNIMDM.BAK
    ```

16. Copy the new file by entering COPY A:\UNIMODEM\ .

Installing the ThinkPad Configuration Program for Windows 95

> **Note**
>
> Only the Windows 95 OSR2 supports the ThinkPad Configuration program.

To install the ThinkPad Configuration program for Windows 95:

1. Start Windows 95.

2. Insert the ThinkPad Utility Diskette for Windows 95 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 to make the display driver change effective.

Installing the ThinkPad Display Driver for Windows 95

To install the ThinkPad display driver for Windows 95:

For the Windows 95 OSR0 or OSR1:

1. Start Windows 95.
2. Double-click on **My Computer** and **Control Panel**.
3. Double-click on **Display**; then click on the **Settings** tab.
4. Click on the **Advanced Properties** button.
5. Click on the **Change** button.
6. Select your display by clicking on it.
7. Click on **Have Disk...**.
8. Insert the ThinkPad Video Features Diskette III for Windows 95 into the diskette drive and click on **OK**.
9. Click on **NeoMagic MagicGraph 128XD +/XD**; 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**.

    If you have not specified the type of monitor you want to use, your new settings might not function correctly. When you are prompted to specify a monitor, select **Yes** if you want to use an external monitor or **No** if you do not want to use an external monitor.

    Follow the instructions on the screen.

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

For the OSR2:

1. Start Windows 95.

2. Double-click on **My Computer**, **Control Panel**, **Display**, and then click on the **Settings** tab.
3. Click on the **Advanced Properties** button.
4. Click on the **Adapter** tab; then click on **Change...**.
5. Click on **Have Disk...**; then click on **OK**.
6. Insert the ThinkPad Video Features Diskette III for Windows 95 into the diskette drive and click on **OK**.
7. Select **NeoMagic MagicGraph 128XD +/XD**; then click on **OK**.
8. Click on **Close**.
9. Select your screen parameters from the color palette, desktop area, and font size; then click on **Close**.
10. 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

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 Disk 1.
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:\UNINSTAL` 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 any diskette 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. After you restart your computer, you see the message “Windows 95 found an unknown device.” Insert the Audio Features Diskette for Windows 95 Disk 1, and follow the instructions on the screen.
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.

The MIDI serial port connector is available if the computer is attached to the docking station (option). The MIDI port capability is **disabled** as a default, so you need to **enable** the function with ThinkPad Configuration.

After you enable MIDI port capability, you are prompted to insert the manufacturer's diskette to install support software for the function. Insert the Audio Support Diskette for Windows 95 into the **A** drive.

Installing the ThinkPad Modem Software for Windows 95

The modem function of your computer is supported by a digital signal processor (DSP) called the IBM Advanced Communications Processor. You must install the ThinkPad Modem software for Windows 95 to use the modem function. The Wave Table MIDISynth function is available in the ThinkPad Modem software for Windows 95.

To install the ThinkPad Modem software for Windows 95:

1. Start Windows 95.
2. Insert the ThinkPad Modem for Windows 95 Disk 1 (SETUP.DSK) into the diskette drive.
3. Click on **Start**, and then **Run...**.
4. Type `A:\SETUP` and press **Enter**.

   The ThinkPad Modem setup program removes the previous driver if there is one, and prepares for the new registration. After you restart your computer, you see the message "Windows 95 found an unknown device." Insert the ThinkPad Modem Disk 1 for Windows 95 (SETUP.DSK), and follow the instructions on the screen.

   The ThinkPad Modem installation window appears and prompts you to enter the destination directory for the software. If the default directory is OK, press **Enter**. Otherwise, type a directory name and press **Enter**.

   Follow the instructions on the screen.

Note

You need to set the dialing properties when using the ThinkPad Modem functions. Click on **Control Panel**, **Modems**, and then the **Dialing Properties** button.

If you want to use the Wave Table MIDISynth function, open **Multimedia** in **Control Panel**, and select the **MIDI** tab. Then select **Wave Table MIDISynth Device** as a single instrument.

Note

The Wave Table MIDISynth function is supported only with Windows 95.

For IRQ-sharing information, refer to Sharing an IRQ between ThinkPad Modem Devices.

Installing the IBM TrackPoint Driver for Windows 95

The TrackPoint Driver Diskette for Windows 95/Windows NT contains the software support for the PS/2 TrackPoint on Windows 95 and Windows NT Versions 4.0. It is intended for use with the IBM PS/2 TrackPoint Version 4.0 or later. For earlier versions, no special software is needed.

Note

Read the README file in the diskette and make sure you install the latest version.

To install the TrackPoint driver for Windows 95:

1. Start Windows 95.
2. Insert the TrackPoint Driver Diskette for Windows 95/Windows NT into the diskette drive.
3. Click on **Start**.
4. Click on **Settings** and **Control Panel**.
5. Double-click on the **Mouse** icon.
6. Select 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. Select “PS/2 TrackPoint” from the list to the right.

11. Click on **OK**.

12. Click on **Close** in the “Mouse Properties” window.

13. Restart your computer to make the new settings effective.

Installing the CD-ROM Device Driver for Windows 95

This section describes how to disable the unnecessary DOS and Windows CD-ROM device drivers.

If you installed Windows 95 on a blank hard disk drive without DOS and Windows, Windows 95 has automatically installed a generic ATAPI CD-ROM device driver for your ThinkPad's CD-ROM drive. You do not need to do the following procedure.

If you installed Windows 95 in a computer on which DOS and Windows had been already installed, you need to disable the DOS and Windows CD-ROM device drivers to use the correct Windows 95 generic ATAPI CD-ROM device driver.

To disable the DOS and Windows CD-ROM device drivers:

1. Start Windows 95 and go to the MS-DOS command prompt.

2. Open the CONFIG.SYS file with your text editor; then find the following line:

   ```
   DEVICE=C:\xxxxxx\IBMTPCD.SYS /R
   ```

   Note

   xxxxxx is the subdirectory where you have installed the CD-ROM device driver. The default subdirectory for C:*xxxxxx* is C:\CDROM.

   If you cannot find the line, quit the file and go to step 4.

3. Comment out the line to change it as follows:

   ```
   REM DEVICE=C:\xxxxxx\IBMTPCD.SYS /R
   ```

   If the line is already commented out, quit the file and go to the next step.

4. Open the AUTOEXEC.BAT file; then find the following line:

   ```
   C:\xxxxxx\MSCDEX.EXE /D:TPCD  1 /M:15
   ```

   xxxxxx is the subdirectory where you have installed the CD-ROM device driver. If you cannot find the line, quit the file and go to step 6.

5. Comment out the line to change it as follows:

   ```
   REM C:\xxxxxx\MSCDEX.EXE /D:TPCD  1 /M:15
   ```

   If the line is already commented out, quit the file and go to the next step.

6. Exit the DOS command prompt; then reboot the system.

Installing Software for Windows NT

This section describes the installation procedures for Windows NT Workstation 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 preloaded on the hard disk. You need to create at least the following device driver diskettes:

Device Driver	**Diskette Name**
ThinkPad Configuration program	Utility Diskette for Windows NT
Display driver	Video Features Diskette III for Windows NT
PC Card support software	CardWizard for Windows NT
Audio device driver	Audio Features Diskette for Windows NT
ThinkPad Modem software	ThinkPad Modem for Windows NT
Infrared device driver	Infrared Features Diskette II
TrackPoint driver	TrackPoint Driver Diskette for Windows 95/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, read Installing IBM OS/2.

You can install Windows NT using the internal CD-ROM drive or an externally attached CD-ROM drive through the port replicator. However, if your computer does not have a CD-ROM drive, or if a

port replicator is not available, use one of the following two alternative ways to install Windows NT:

Using an external CD-ROM drive in a DOS environment.
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 compact disc in the external CD-ROM drive.
2. Go to the CD-ROM directory; then go to the `\I386` directory.

   For example, if your CD-ROM drive is drive 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.

Using 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** and **Run**.
3. Insert the Utility Diskette for Windows NT into the diskette drive.
4. Type `A:\SETUP` and press **Enter**.

Follow the instructions on the screen.

Installing the Display Driver for Windows NT

Install the video features to display various resolution and color depth configurations.

To install the video features for Windows NT:

1. Start Windows NT, and log on with the user ID authorized as an administrator.
2. Double-click on **My Computer**, **Control Panel**, and **Display**.
3. In the “Display Properties” window, click on the **Settings** tab; then click on **Display Type...**.
4. In the “Display Type” window, click on **Change**.
5. Click on **Have Disk...**.
6. Insert the Video Features Diskette III for Windows NT into the diskette drive; then click on **OK**.

   A selection list appears listing the display device.
7. From the display devices in the selection list, select **NeoMagic MagicGraph 128ZV+/XD** and click on **OK**.

   The message “You are about to install a third-party driver” appears on the screen.
8. Click on **Yes**; then follow the instructions on the screen.
9. 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:

10. Double-click on **My Computer**, **Control Panel**, and **Display**.
11. In the “Display Properties” window, click on the **Settings** tab.
12. Click on **List All Modes...**, and select the resolution, color depth, and refresh frequency, and click on **OK**.

13. Click on **Test** and make sure the selected mode is displayed correctly on the screen. Click on **OK** in the “Display Properties” window.

14. Click on **Apply** to make the change effective.

If you want to use an external monitor with the computer, go to Using the Display Driver for an External Monitor. If not, go to Installing the ThinkPad Configuration Program for Windows NT.

Using the Display Driver for an External Monitor

If you are attaching an external monitor to the computer, do the following.

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

   When the “OS Loader V4.00” window appears, prompting you to select the operating system, change the screen to CRT-only mode by pressing the **Fn**+**F7** key combination.

2. Log on to Windows NT.

   Windows NT starts on the CRT screen.

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

4. In the “Display Properties” window, click on the **Settings** tab.

5. Click on **List All Modes...**; then select the resolution, color depth, and refresh frequency.

6. Click on **Test** to make sure that the selected mode is displayed correctly on the monitor.

7. Click on **OK** or **Apply** to make the change effective.

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

1. If your system is connected to a network, log off before starting installation.
2. You *must* install the Windows NT Service Pack before you install CardWizard.

To install the PC Card support software for Windows NT, you *must* be logged on to Windows NT as administrator.

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

   Follow the instructions on the screen.

Installing the Audio Device Driver for Windows NT

To install the audio device driver for Windows NT:

1. Double-click on the **Multimedia** in the **Control panel**. The "Multimedia Properties" window appears.
2. Click on the **Devices** tab and then on the **Add** button.
3. Select **Unlisted** or **Updated Driver**.
4. Insert the Audio Features Diskette for Windows NT into the diskette drive. A window appears, prompting for the path of the drivers to be installed.
5. Enter `A:\`
   The audio driver is displayed on the window.
6. Select the audio driver and click on **OK**. When the installation program prompts you for existing files for new files, select "new."
7. Press **OK** in the "CrystalWare Configuration" panel. When the installation program prompts you, restart Windows NT to make the change effective.

Installing the ThinkPad Modem Software for Windows NT

To install the ThinkPad Modem software for Windows NT:

1. Start Windows NT and insert the ThinkPad Modem for Windows NT Disk 1 in the diskette drive.
2. Select **Run** from the **Start** menu.
3. Type `A:\SETUP` in the window.
4. Click on **OK** and follow the instructions on the screen.

Note.

Non-U.S. users must run the Country Selection program in the ThinkPad Modem window after the ThinkPad Modem installation is complete. Restart the computer after you run **Country Selection**.

If you want to configure the ThinkPad Modem: → Configuring the ThinkPad Modem for Windows NT

Configuring the ThinkPad Modem for Windows NT

After installing the ThinkPad Modem software, assign a communication port (COM port) for the ThinkPad Modem:

1. In Windows NT, select **Programs**, **ThinkPad**, and **ThinkPad Configuration.**
2. Click on **Modem**.
3. Specify the necessary settings in the window.
4. Click on **OK**.
5. Restart the computer to make the changes effective.

Next, add `ThinkPad Modem` in the Control Panel so that you can use communication applications that use the Unimodem facility of Windows NT, such as HyperTerminal or Dial-Up Networking:

1. In Windows NT, click on **Start**, select **Settings**; and then select **Control Panel**.
2. Double-click on the **Modems** icon.
3. Do the following:

   If you do not already have a modem installed, you immediately see the “Install New Modem” window.

   If you already have a modem installed, click on the **Add** button to open the “Install New Modem” window.

4. Click on **Next**.

   Windows NT searches for the modem.

   If successful, Windows NT reports that it has found a modem of type “ThinkPad Data Fax Modem.” If Windows NT fails to detect a modem, verify that your communication port was configured. Remember that the changes you make do not take effect until you restart Windows NT.

5. Click on the **Next** button and follow the instructions on the screen.

You should be able to use your ThinkPad Modem with all the modem communication applications supported by Windows NT.

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 Features Diskette II 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 Changing the 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.

Changing the 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. Select **Advanced...**; then select COM2 for COM Port. Make sure that “Enable” is selected for Infrared.
3. Shut down and restart your computer.

Infrared is configured as COM2 after you reboot your computer.

After you modify the registry key or value, restart the computer.

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 the 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, select **Remote Access Service** and click on **OK**.
4. In **Install New Modem setup**, select **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 IBM TrackPoint Driver for Windows NT

The TrackPoint Driver Diskette for Windows 95/Windows NT contains the software support for the PS/2 TrackPoint on Windows 95 and Windows NT Version 4.0. It is intended for use with the IBM PS/2 TrackPoint Version 4.0 or later.

> **Note**
>
> Read the README file in the diskette and make sure you install the latest version.

To install the TrackPoint driver for Windows NT:

1. Start Windows NT.
2. Insert the TrackPoint Driver Diskette for Windows 95/Windows NT into the diskette drive.
3. Click on **Start**.
4. Click on **Settings** and **Control Panel**.
5. Double-click on the **Mouse** icon.
6. Select 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. Select “PS/2 TrackPoint” from the list to the right.
11. Click on **OK**.
12. Click on **Close** in the “Mouse Properties” window.

13. Restart your computer to make the new settings effective.

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. Click on **Settings** and **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. Click on **OK** after confirming that the installation path is correct (usually it points to `A:\`).
12. Select **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 3.11

This section describes the installation procedures for Windows Version 3.11 and its device drivers.

Overall Procedure

1 Have the installation packages for DOS and Windows 3.11 in hand.

2 Back up your software and personal data files on the hard disk.

3 Go to the ThinkPad Web site and download the latest hardware driver diskettes. You need to create at least the following device driver diskettes:

Device Driver	Diskette Name
ThinkPad Configuration program	Utility Diskette for Windows 3.11 and Utility Diskette for DOS, Personalization
Display driver	Video Features Diskette III for Windows 3.11
PC Card support software	CardWizard for Windows 3.11
Audio device driver	Audio Features Diskette for Windows 3.11
ThinkPad Modem software	ThinkPad Modem for Windows 3.11
CD-ROM device driver	CD-ROM Driver Diskette

4 Install DOS and its device drivers. →Installing Software for DOS

Note

Do not install the CardSoft for DOS.

5 Install Windows 3.11 (with Advanced Power Management) and the device drivers diskettes.

Installing Microsoft Windows Version 3.11

Important

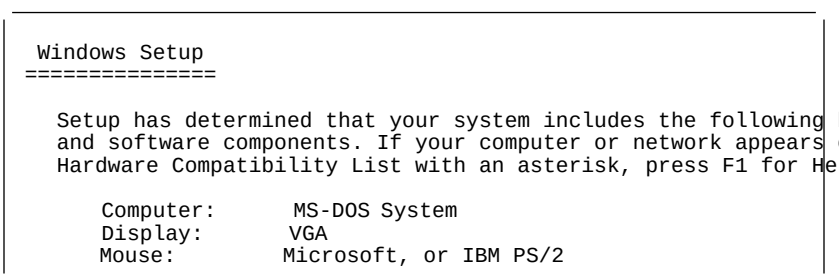
During installation, do the following for Windows to operate correctly:

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

Install Windows 3.11 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 Version 3.11 with Advanced Power Management (APM):

1. Install Windows Version 3.11 *with* the APM option:
   a. Start the installation as specified in the Windows manual.
   b. When the Windows Setup program asks you to select **Express Setup** or **Custom Setup**, type C for **Custom Setup**.
   c. Continue installing Windows Version 3.11 until the following window appears:



   d. Using the **Up Arrow** key, highlight **MS-DOS System** and press **Enter**.
   e. Select **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.

2. Make sure the **Display:** choice is set to **VGA**. (Do not change this choice.)

3. 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.

4. 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:

   `C:\WINDOWS\SMARTDRV.EXE`

   (change **WINDOWS** to **DOS**)

   `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 3.11

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 3.11:

1. Start Windows.
2. Select **File** from the “Program Manager” window; then select **Run...** from the pull-down menu.
3. Insert the Utility Diskette for Windows 3.11 into the diskette drive; then type `A:\INSTALLW` and press **Enter**.
4. Follow the instructions on the screen.

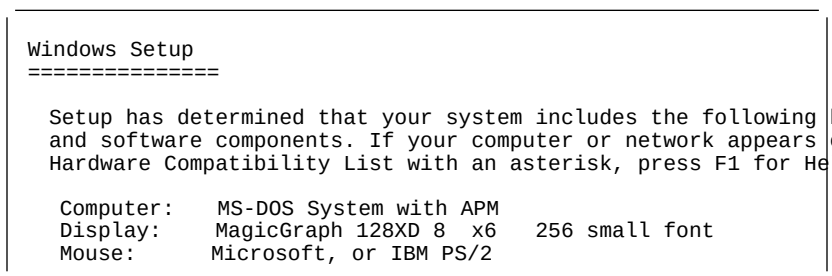
   Default choices are already selected in the “Installation Options” window.

Installing the ThinkPad Display Driver for Windows 3.11

Do the following to install the ThinkPad display driver for Windows 3.11 so that you can get a correct display setting and better performance:

1. Start DOS; then go to the WINDOWS subdirectory.
2. Type `SETUP` 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 III for Windows 3.11 into the diskette drive.
6. Type `A:` and press **Enter**.
7. Select your desired resolution 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.



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

Installing PC Card Support Software for Windows 3.11

To install the PC Card support software for Windows 3.11:

1 Start Windows.

2 Select **File** from the “Program Manager” window; then select **Run...** from the pull-down menu.

3 Insert the CardWizard for Windows 3.11 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 3.11

To install the audio device driver for Windows 3.11:

1 Start Windows.

2 Select **File** from the “Program Manager” window; then select **Run...** from the pull-down menu.

3. Insert the Audio Features Diskette for Windows 3.11 into the diskette drive of your computer; then type `A:\SETUP` and press **Enter**.

   Follow the instructions on the screen.

The MIDI serial port connector is available when the computer is attached to the SelectaDock. The MIDI port 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 ThinkPad Modem Software for Windows 3.11

The ThinkPad modem function is supported by a digital signal processor (DSP) called the IBM Advanced Communications Processor. You must install ThinkPad Modem software to set up the Advanced Communications Processor.

> **Attention**
>
> **Before you install the ThinkPad Modem software, close all open applications.**
>
> If you are going to reinstall the ThinkPad Modem software, you need to uninstall it first; then install it according to the following instructions.

To install the ThinkPad Modem software for Windows 3.11:

1. Start Windows.
2. Select **File** from the Program Manager window; then select **Run...** from the pull-down menu.
3. Insert the ThinkPad Modem for Windows 3.11 Diskette into the diskette drive; then type `A:\SETUP` and press **Enter**.
4. Follow the instructions on the screen.

   Default choices are already highlighted in the choice windows.

5 After the installation is complete, remove any diskette from the diskette drive and restart the computer.

Installing Software for OS/2 Warp 4

This section describes how to install OS/2 with DOS and Windows 3.11, as well as the OS/2 ThinkPad device drivers.

Overall Procedure

1. Have the DOS, Windows 3.11, and OS/2 installation packages in hand.
2. Back up your software and personal data files on the hard disk.
3. Go to the ThinkPad Web site and download the latest hardware driver diskettes. You need to create at least the following device driver diskettes:

Device Driver	Diskette Name
ThinkPad Configuration program	Utility Diskette for OS/2
Display driver	Video Features Diskette III for OS/2
PC Card support software	PC Card Director for OS/2
Audio device driver	Audio Features Diskette for OS/2
ThinkPad Modem software	ThinkPad Modem for OS/2
TrackPoint driver	TrackPoint Driver Diskette for OS/2
CD-ROM device driver	CD-ROM Driver Diskette

4. Install OS/2 and the software.

Installing IBM OS/2

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 3.11.

If you use the Dual Boot, go to next step.
If you use the Boot Manager, install the Boot Manager first. Then go to next step. (Refer to the OS/2 documentation for 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 3.11 → Installing the ThinkPad Configuration Program for Windows 3.11

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

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

Select **VGA** as the **Primary Display** in the “System Configuration” window.

Select **No Support Installed**, not **PCMCIA Feature**, in the “System Configuration” window.

(For using the CD-ROM drive:) Select **Non-Listed IDE CD-ROM or IDE CD-ROM** for the CD-ROM in the “System Configuration” window.

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. Select **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 Device 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.

Before Installation

Before you begin installing the display driver, set the display device mode to *LCD*: open the ThinkPad Configuration program and select the **LCD** ( ) icon, or at the command prompt, type `PS2 SC LCD` and press **Enter**.

To install the ThinkPad display device driver for OS/2:

1. Start OS/2.
2. Insert Video Features Diskette III 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. Select **Primary Display** on the display driver install panel and click on **OK**.

6. Select **NeoMagic MagicGraph 128/V/ZV/XD** on the primary display driver list panel and click on **OK**.

7. Make sure the source directory is A:\ and click on **Install**.

   Follow the instructions on the screen.

8. After the installation is complete, remove the diskette, shut down OS/2, and restart the computer.

Installing the PC Card Support Software for OS/2

To use the PC Cards, you need to install the following device drivers and software associated with PC Card when installing an operating system:

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) **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 ThinkPad Modem Software for OS/2

The modem function of your computer is supported by a digital signal processor (DSP) called the IBM Advanced Communications Processor. You must install the ThinkPad Modem software for OS/2 to use the modem function.

If you have multiple operating systems, you might need to install the ThinkPad Modem software for each operating system. For example, to enable OS/2 and Windows applications for ThinkPad Modem functions, install the ThinkPad Modem software for both OS/2 ***and*** Windows.

To install the ThinkPad Modem software for OS/2:

1. Start OS/2; then open the OS/2 screen command prompt.
2. Insert the ThinkPad Modem for OS/2 Diskette into the diskette drive; then type `A:\SETUP` and press **Enter**.

   The installation window appears on the screen.

3. Follow the instructions on the screen to complete the installation.

4. Restart OS/2 to make the ThinkPad Modem function effective.

   For detailed information about the installation, see the README file in the ThinkPad Modem for OS/2 Diskette.

Note

Non-U.S. users must run the **Country Selection** program in the ThinkPad Modem window after the ThinkPad Modem installation is complete. Restart the computer after you run **Country Selection**.

If You Use the WIN-OS/2 Environment

If you use the ThinkPad Modem functions in WIN-OS/2:

1. Install the ThinkPad Modem software for Windows in a full-screen WIN-OS/2 environment according to the procedure in Installing the ThinkPad Modem Software for Windows 3.11.

2. Check your **WIN-OS/2 Settings** and modify them as follows, referring to your OS/2 manuals:

WIN_RUN_MODE	3.1 Enhanced Compatibility
HW_TIMER	ON
INT_DURING_IO	ON
DOS_BACKGROUND_EXECUTION	ON

Installing the IBM TrackPoint Driver for OS/2

The TrackPoint Driver Diskette for OS/2 contains the software support for the PS/2 TrackPoint on OS/2 Warp 4. It is intended to be used with IBM PS/2 TrackPoint Version 4.0 or later.

Note

Read the README file in the diskette and make sure you install the latest version.

To install the TrackPoint driver for OS/2:

1. Start OS/2.
2. Insert the TrackPoint Driver Diskette for OS/2 into the diskette drive.
3. Go to the OS/2 command prompt and type `A:\INSTALL` Then 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. Restart your computer to make the new settings effective.

Installing the CD-ROM Device Driver for OS/2

Important

If you installed a CD-ROM device driver (**Non-Listed IDE CD-ROM** in the System Configuration window) when installing OS/2 Warp, you do not need to install the CD-ROM device driver. Go to Installing the ThinkPad Configuration Program for OS/2.

To install the CD-ROM device driver, have ready the diskette that came with OS/2 Warp.

1. Start OS/2; then open **OS/2 System**, **System Setup**, **Install/Remove**, and **Selective Install**.
2. Select **CD-ROM Device Support**.
3. Select **Non-listed IDE CD-ROM or IDE CD-ROM** and click on **OK**.
4. Click on **Next** in the “System Configuration” window.
5. Click on **Next** in the “OS/2 Setup and Configuration” window.
6. Select **Install**; then follow the instructions on the screen.

For more information about the software parameters in the CONFIG.SYS file, refer to the README file in the CD-ROM Diskette.

Installing Software for DOS

This section describes the installation procedures for DOS Version 7.0 and its 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. Go to the ThinkPad Web site and download the latest hardware drive diskettes. 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
CD-ROM device driver	CD-ROM Driver Diskette

4. Install DOS and the device driver diskettes.

Installing IBM PC DOS Version 7.0

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. Select **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 a docking station with your computer, you need to uninstall CardSoft for DOS first, and then reinstall it.
If you are going to use CardWizard for Windows 3.11, do not install CardSoft for DOS.

To install the PC Card support software for DOS:

1. Insert the CardSoft for DOS 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 (↓ or ↑) 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 into the diskette drive.
3. Type `A:\INSTALL` and press **Enter**.

Installing the CD-ROM Device Driver for DOS

To install the CD-ROM device driver for DOS:

1. Start DOS.
2. Insert the CD-ROM Driver Diskette into the diskette drive; then type `A:\UINSTALL` and press **Enter**.

3. Select **Install IBM ThinkPad CD-ROM Driver for DOS/Windows** in the “Installation Options” window; then follow the instructions on the screen.

4. After the installation is complete, remove any diskette from the diskette drive and restart the computer.

Hints and Tips

For details about software parameters related to the DOS CD-ROM device driver in the CONFIG.SYS file, go to Software Parameters in CONFIG.SYS.

Software Parameters in CONFIG.SYS

When the CD-ROM device driver is installed in your computer, the installation program (UINSTALL.EXE) automatically modifies the CONFIG.SYS file and AUTOEXEC.BAT file. The following are the parameters for the CD-ROM device driver for CONFIG.SYS:

```
DEVICE=[drive:][path]IBMTPCD.SYS /R [/C] [/S]
```

The CD-ROM device driver is IBMTPCD.SYS. Make sure this line is inserted after the EMM386 statement.

[/C]	Sets the cache size in the XMS memory. If this parameter is specified, the cache size in the XMS memory is 512 sectors. If it is not specified, the default is 0.
[/S]	Sets the power-saving mode to OFF. If you are using DOS with another operating system (for example, with OS/2 in dual boot), set the power-saving mode to OFF using this parameter.

Note

For the software parameter in the AUTOEXEC.BAT file, refer to the README in the CD-ROM Driver Diskette.

If you are using DOS SMARTDRV caches and planning to use a photo CD or multisession discs, you have to add the /U parameter to the SMARTDRV line in the AUTOEXEC.BAT file. This is because photo CDs or multisession discs are not compatible with the SMARTDRV caches.

To be able to play CD-i movies in Windows 3.11, do not cache the CD-ROM drive with SMARTDRV Version 5.0 or 5.1, which is supplied with PC DOS Version 7.0.

Appendix A. Using System Management

This chapter describes the system management features of your computer.

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 95, Windows NT, or OS/2 Warp 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

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 SelectaDock III system with IBM 100/10 EtherJet PCI Adapter with Wake on LAN or IBM Auto Wake Token Ring Adapter 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 (Lightwight Client Framework)

Remote program load (RPL)
Dynamic Host Configuration Protocol (DHCP)
Wake on LAN
Waking up from suspend mode and applications

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

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.

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

Desktop Management BIOS (DMI BIOS) Version 2.0

The basic input/output system (BIOS) of your computer supports an interface called 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.

DMI Service Provider

Information about the computing system and its components can be accessed using a DMI browser. DMI browsers are provided by all major LAN management packages (including NetFinity and Intel LANDesk).

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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.

Your computer contains the Intel LANDesk Client Manager installation program. If you want to use the DMI service provider, install Intel LANDesk Client Manager.

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 initiates 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 DHCP with an optional network adapter such as the IBM 100/10 EtherJet PCI Adapter with Wake on LAN or IBM Auto Wake Token Ring ISA Adapter. If you install an optional network adapter and want to use RPL or DHCP, the adapter must have built-in, Flash memory (Flash ROM) support for RPL or DHCP. (Refer to the documentation that comes with the optional adapter for more information.)

Dynamic Host Configuration Protocol (DHCP)

Dynamic Host Configuration Protocol (DHCP) enables a DHCP server on your intranet to assign an Internet protocol (IP) address to your computer so that a boot image can be remotely loaded. The DHCP server must support the BootP protocol on your intranet. DHCP can be used with network-management software, such as Intel LANDesk Configuration Manager.

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 NetFinity[5], many types of functions, such as data transfers, 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 in the SelectaDock III system that has a LAN card with the Wake on LAN function, you can use the Wake on LAN function. When installing the card, connect the wake-up signal line and the auxiliary power line between the LAN card and the SelectaDock III system. If you want to disable the Wake on LAN function of the docking system regardless of the settings in your computer, do not connect these two lines.

The Wake on LAN function is valid only when both your computer and SelectaDock III system are powered off.

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 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 95:

---

5 You can download LCCM from `http://www.pc.ibm.com/register`. NetFinity Service comes in Diskette Factory, but NetFinity Manager does *not*. To use the Wake on LAN function, you need to install NetFinity Manager or LCCM in the administrator's machine.

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.

System-Management Features Software

The key software and their functions that provides the system-management features of your computer are:

Desktop Management BIOS (DMI BIOS) Version 2.0

Desktop Management Interface (DMI) Version 1.1 defined by the Desktop Management Task Force (upgradable to Version 2.0)

Intel LANDesk Client Manager Version 3.1

Client Services for NetFinity

Client-side functions of LCCM except for:

- Setup-Over-LAN (CMOS update)
- Administrator's (supervisor) password over LAN

The following sections describe this software.

Desktop Management BIOS (DMI BIOS) Version 2.0

DMI BIOS in your computer is based on Desktop Management Interface BIOS (DMI BIOS) Specification Version 2.0.

Intel LANDesk Client Manager Version 3.1 (LDCM3.1)

Your computer contains the Intel LANDesk Client Manager installation program[6], which supports the DMI functions. Desktop Management Interface (DMI) Version 2.0 is supported with LCDM3.1.

This application provides self-help diagnostic tools, including a PC health meter that alerts you about potential problems, and hardware and software inventories. It automatically polls hardware to detect potential failure conditions, and it takes periodic snapshots of critical configuration files for change management and restoration.

---

6 The installation program is in `C:\LDCM3` . If you need to install Intel LANDesk Client Manager, run the `SETUP.EXE` program in this directory.

To install LCDM3.1, double-click on **System Manager** and follow the instruction on the screen.

Once LDCM is installed, your computer's hard disk drive is checked by the hard disk drive predictive failure analysis function. An alert is issued when LDCM detects any hard drive predictive failure.

Client Services for NetFinity

IBM NetFinity Manager and Client Services for Netfinity, a low-cost, highly flexible system management program, allow LAN administrators to easily view, initiate, and exploit management services for LAN-connected clients and servers.

Using the Client Services for NetFinity, the system administrator does not need to stop his or her task to watch and control the system, because it can be done remotely. If the Client Services for NetFinity runs in the background, the tasks running on your system do not need to be halted. The network administrator, at the same time, can monitor the network, so any problems can be avoided before they become severe. The remote workstation control function of the Client Services for NetFinity allows help desk personnel to remotely connect to a user's system and take control of the PC to diagnose and repair system problems.

The following client services are available. The hardware configuration of your computer and the selections you make during installation determine which services will be available:

Alert manager
Critical file monitor
Predictive failure analysis
Security manager
Serial control
Software inventory
System information
System monitor
System profile

The following remote network management functions are available for client computers with NetFinity Manager installed:

File transfer
Process manager
Remote session
Remote workstation control
Screen view

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

Note

NetFinity Service and Intel LANDesk Client Manager are preloaded in your computer. To use them, however, you need to set them up. You can set up one of the two programs, but not both, because it might cause system conflicts. If this happens, contact your system administrator.

LANClient Control Manager (LCCM) (Client-Side Functions)

IBM LANClient Control Manager (LCCM) is a new class of PC management software that is an easy-to-use, graphical tool for Windows NT Server that dramatically simplifies the setup, configuration, rollout, and ongoing lower-level management of networked IBM PCs. LCCM takes advantage of features implemented and integrated into supported IBM PCs (for example, IBM ThinkPad 385x, and IBM 300 GL) so that administrators can perform many tasks that previously required an end user or technical support representative to be at the computer. Organizations can use LCCM with supported IBM PCs to perform such tasks as:

Implementing central control of their PCs
Starting unattended PCs from a powered-off state
Collecting information about new PCs connected to the network
Formatting hard drives
Creating and managing operating images and user profiles
Distributing and installing the operating environments onto IBM PCs
Distributing software images to PCs to replace failed units
Scheduling various functions to occur after hours when the PC is unattended and not in production (such as running virus detection against a nonbooted hard drive)

Downloading of diagnostics

LCCM manages the PC and end-user profiles on the server and provides an easy way to ensure that clusters of IBM PCs have identical software configurations. Typical environments include help desk and call centers, educational classrooms, and many transaction-oriented environments found throughout many businesses worldwide.

Your computer with the SelectaDock III system supports the following LAN cards for the LCCM function:

IBM 100/10 EtherJet PCI Adapter with Wake on LAN
IBM Auto Wake Token Ring ISA Adapter

Note

For updated LAN cards, see the following Web site:

`http://www.pc.ibm.com/register`

You can obtain LCCM with no charge from the following Web site:

`http://www.pc.ibm.com/register`

Notes:

1. You must install LCCM in the server computer, not in the client computer.
2. If you are using the IBM 100/10 EtherJet PCI Adapter with Wake on LAN card, you must set the Remote Program Load ROM to use LCCM. For more details, see the manual for your LAN card.

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.

Note

This feature is valid only when a LAN adapter card with Wake on LAN is installed in the SelectaDock III system, 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 SelectaDock III system.

Note

When the Wake on LAN cables are connected to the SelectaDock III system 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 SelectaDock III 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. Double-click on the **CONFIG** icon.

   The “Configuration” window appears.
3. Double-click on the **Network** icon.

   The “Network” window appears.
4. Select either the **Enable** or the **Disable** button besides “Wake.”
5. Click on **OK**.

or

1. Go to the Easy-Setup menu.
2. Double-click on the **Startup** icon.

   The “Startup” window appears.
3. Double-click on the **Network** icon.

   The “Automatic Power On Startup Sequence” window appears.
4. Select either the **Enable** or the **Disable** button besides “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. Double-click on the **CONFIG** icon.

   The “Configuration” window appears.
2. Double-click on the **Network** icon.

   The “Network” window appears.
3. Double-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. Double-click on the **Startup** icon.

   The “Startup” window appears.

3. Double-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. Double-click on the **CONFIG** icon.

   The “Configuration” window appears.

2. Double-click on the **Network** icon.

   The “Network” window appears.

3. Select either the **Enable** or the **Disable** button besides “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.pc.ibm.com/register) or through the PC Company Bulletin Board Service in files that can be downloaded onto a diskette. Instructions for using the system programs updates will be available in a README file included in the downloaded files.

When a SelectaDock III system 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 B. Using PS2 Commands

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 OS/2 command prompts to set the features for your computer. When entering a command, enter it in the following syntax:

PS2 [*Parameter1*] [*Parameter2*] [*Parameter3*]

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 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.

The following is a list of commonly used PS2 commands. The list is organized as follows:

Description of the command

Parameter1	Parameter2	Parameter3

Power Management Commands

Set whether to enter suspend mode when the LCD is closed:

Cover	**E**nable | **D**isable	—

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 hard disk drive power management timer for the specified number of minutes (*xx*):

Note: This command is effective on the current power management mode set by the PM commands.

DISK	*xx*	[**AC** | **DC**]

Set the features for the ESS AudioDrive chip:

AUdio	**E**nable | **D**isable **ADD**ress **DMA** **IRQ** **SB**address	— **530** | **604** | **E80** | **F490** **0** | **1** | **3** **5** | **7** | **10** | **11** **220** | **240** | **260** | **280**

Set the features for the infrared port (`IR`):

IR	**E**nable | **D**isable **ADD**ress **DMA**	— **1** | **2** | **3** | **4** **0** | **1** | **3** | **D**isable

Create the hibernation file:

Note: Use this command before using other hibernation commands.

HFILE	**C** – **Z** | **DEL**ete	—

Enter hibernation mode when the power switch is pressed:

Note: Create the hibernation file using the `HFILE` command before using this command.

HSWITCH	**E**nable | **D**isable	

Set the timer to enter hibernation mode after the specified number of minutes (*xx*):

HTimer	*xx*	[**AC** | **DC**]

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	**S**uspend | **H**ibernation	—

Set the LCD off when there is no computer operation after the specified number of minutes (*xx*):

Note: This command is effective on the current power management mode set by the `PM` command.

LCd	*xx*	[**AC** | **DC**]

Set the resume timer:

Note: *yyyy* can be set from 1995 to 2093.

ON at	[yyyy/MM/DD] HH**:**MM**:**SS | **C**lear	—

Set the power management mode:

PMode	**H**igh | **A**uto | **C**ustom	[**AC** | **DC**]

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	*xx*	[**AC** | **DC**]

Resume normal operation when detecting an incoming call:

RI	**E**nable | **D**isable	—

Enter the RediSafe suspend mode:

SAfe	**E**nable | **D**isable	—

Set power on or off for the serial device attached to the serial port:

SErial	**ON** | **OF**f	—

Set the processor speed:
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 commands.

Parameter1	Parameter2	Parameter3	Parameter4
SPeed	**F**ixed | **A**uto	**MAX** | **M**edium | **S**low	[**AC** | **DC**]

Set the timer to enter hibernation mode from suspend mode after the specified number of minutes:

Parameter1	Parameter2	Parameter3
S2H	**30** | **60** | **90** | **D**isable	—

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	**S**uspend | **H**ibernation	—

Set the CD-ROM speed

Note: The default is Normal.

CDSPeed	**H**igh | **N**ormal | **S**ilent	—

Display Commands

Set the screen expansion:

HVEXPansion	**ON** | **OF**f	—

Set where to display information:

SCreen	**LCD** | **CRT** | **BOTH**	—

Alarm (Sound) Command

Set the computer to beep in certain conditions:

BEEP	**ON** | **OF**f	**A**larm | **S**ystem | **W**arn

System Setup Commands

Display the DMA channel assignments:

? DMA	—	—

Set the **Fn** key lock function:

FNSticky	**E**nable | **D**isable	—

Set the HVEXPansion command to on or off with the **Fn**+**F8** key combination:

F8	**E**nable | **D**isable	—

Display the interrupt level assignments:

? IRQ	—	—

Set the keyboard typematic speed:

KRate	**N**ormal | **F**ast	—

Set the joystick port:

JStick	**E**nable | **D**isable	—

Reserve the IRQ for PCI devices:

PCIIRQ	**D**isable	**3** | **4** | **5** | **7** | **9** | **10** | **11** | **15**

Set the features for the MIDI function:

MIDIport	**E**nable | **D**isable **ADD**ress **IRQ**	— **300** | **310** | **320** | **330** **5** | **7** | **9** | **10** | **11** | **15**

Set the features for the audio control function:

AUDIOCTRL	**E**nable | **D**isable **ADD**ress	— **530** | **D38** | **E88** | **FF0**

Set the features for the parallel port:

PARallel	**E**nable | **D**isable **ADD**ress **MO**de **DMA** **IRQ**	— **1** | **2** | **3** **U**ni | **Bi** | **EPP** | **ECP** **0** | **1** | **3** | **D**isable **E**nable | **D**isable

Set the features for the serial port:

SERA	**E**nable | **D**isable **ADD**ress	— **1** | **2** | **3** | **4**

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

PRESENtation	**E**nable | **D**isable	—

Set the startup screen when the computer power is turned on:

STARTup	**E**nable | **D**isable	—

Set the TrackPoint:

TPOint	**E**nable | **D**isable | **AUTOD**isable	—

Other Commands

Display the help menu:

? | **H**elp	—	—

Set the A: drive to the external diskette drive:

FDD	**E**xternal | **I**nternal	—

Enter hibernation mode:

Note: Create the hibernation file using the `HFILE` command before using this command.

HIBernation	—	—

Enter suspend mode:

OFF | **SUS**pend	—	—

Turn off the computer:

TURN	**OFF**	—

Set the brightness control of the LCD:

BRightness	**H**igh | **N**ormal	—

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Index

E

F

H

I

K

R

S

T

V

W