NetVista™

N70 Thin Client Reference December 2001

To view or print the latest update, go to http://www.ibm.com/nc/pubs

SA23-2827-00

NetVista™

N70 Thin Client Reference December 2001

To view or print the latest update, go to http://www.ibm.com/nc/pubs

SA23-2827-00

Note

Before using this information and the product that it supports, be sure to read “Safety notices” on page v and “Notices” on page 57.

First Edition (December 2001)

Contents

Safety notices

Safety notices contain information that is related to using the IBM® NetVista thin client in a safe manner. These notices can be in the form of a danger, caution, or attention notice.

Danger notices

The following danger notices call attention to situations that are potentially lethal or extremely hazardous. These notices pertain throughout this book.

DANGER

To prevent a possible electrical shock during an electrical storm, do not connect or disconnect cables or station protectors for communications lines, display stations, printers, or telephones. (RSFTD003)

DANGER

To prevent a possible electrical shock from touching two surfaces with different electrical grounds, use one hand, when possible, to connect or disconnect signal cables. (RSFTD004)

DANGER

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the products that attach to the system. It is the customer's responsibility to ensure that the outlet is correctly wired and grounded to prevent an electrical shock. (RSFTD201)

DANGER

To prevent a possible electrical shock when installing the system, ensure that the power cords for all devices are unplugged before installing signal cables. (RSFTD202)

DANGER

To prevent a possible electrical shock when adding the device to a system, disconnect all power cords, if possible, from the existing system before connecting the signal cable to that device. (RSFTD205)

DANGER

To prevent a possible electrical shock, disconnect the power cord from the electrical outlet before opening the unit. (RSFTD215)

DANGER

To reduce the risk of electrical shock use only AC power sources approved by IBM. (RSFTD216)

Caution notices

A caution notice applies to a situation that is potentially hazardous to people because of some existing condition.

CAUTION:
The battery is a lithium battery. To avoid possible explosion, do not burn or charge the battery. Exchange only with the IBM-approved part. Discard the battery as instructed by local regulations. (RSFTC227)

Handling static-sensitive devices

When you handle components, take these precautions to avoid static electricity damage:

- Do *not* open static-protective packages until you are ready to install their contents.
- Limit your movements to avoid static electricity build-up around you.
- Handle components carefully, and never touch exposed circuitry.
- Prevent others from touching components.
- Place components on static-protective packages while performing hardware removal and installation procedures.
- Do not place components on metal surfaces.

About this book

IBM NetVista N70 Thin Client Reference (SA23-2827) provides information for the Type 8366 (Model Xxx) IBM NetVista N70 Thin Clients (hereafter referred to as *workstation* or *thin client*).

This publication contains information on hardware setup, software configuration and update, hardware problem resolution, hardware upgrade options, parts replacement, and ordering.

Who should read this book

The following should find the information in this publication helpful:

- The person who administers the workstation
- The hardware service, and the support organizations for the workstation

Information available on the World Wide Web

You can obtain the latest version of this information at the following uniform resource locator (URL):

`http://www.ibm.com/nc/pubs`

This is the same URL that is printed on the cover of this document.

Related information

The following publications ship with your hardware. Refer to these publications for information that relates to your workstation:

- See the *Quick Setup for IBM NetVista N70 Thin Client, Type 8366 (Model Xxx)* (SA23-2824) pamphlet for quick hardware setup information and software configuration information.
- See the *IBM License Agreement For Machine Code* (Z125-5468) before using the workstation.
- See *IBM NetVista Thin Client Safety Information* (SA41-4143) for important safety notices.
- See *IBM NetVista Thin Client Hardware Warranty - Type 8366* (SA23-2825) for important hardware warranty information.

How to send your comments

Your feedback is important in helping to provide the most accurate and high-quality information. You can submit comments about this, or other IBM information by mailing the readers' comment form, located at the end of this information.

- If you are mailing comments from a country other than the United States, you can give the form to the local IBM branch office or IBM representative for postage-paid mailing.
- If you prefer to send comments by FAX, use either of the following telephone numbers:
  - United States and Canada: 1-800-937-3430

  - Other countries: 1-507-253-5192
- If you prefer to send comments electronically, use the following network identification:
  - IBMMAIL, to IBMMAIL(USIB56RZ)
  - RCHCLERK@us.ibm.com

Be sure to include the following:

- The title, and order number of the information
- The page number or topic to which your comment applies

Understanding your NetVista Thin Client

IBM NetVista N70 thin client provides the usual thin-client benefits, such as a reduced total cost of ownership and the fast, flexible deployment of applications. N70 offers the graphics, audio, processing, and software support to take advantage of graphic-intensive and multimedia web applications. The thin clients come with a stealth black cover, A40 system boards and two I/O adapter slots plus Ethernet.

N70 description

The following describes the thin client software content for the NetVista N70:

- Based on Turbolinux Workstation 7
  - Linux kernel 2.4.5
- Browser
  - Netscape
- Linux ICA Client
- Java™ Run Time Environment (JRE)
- Emulators 3270/5250
  - Emulator function includes:
    - GUI keyboard remapping
    - Pop-up/pulldown keypads
    - Record/playback
    - Euro support
    - Color mapping
    - Online help
    - Screen print
- IBM Setup Utility for client configurations of:
  - Network
  - Applications
  - Monitor
  - Audio
  - Desktop
- Peer boot capability
- Separation of Servers capability
  - Boot server
  - Configuration profile server
  - Authentication server
  - Home server
- Creation of profile components including:
  - Desktop preferences
  - Window Manager
  - Emulators
  - ICA/ICA Remote application manager
  - Browser

  - Mouse settings
  - Printer setup
  - Seriald print
  - xterm
- Boot Servers Supported
  - Turbolinux 6.0.4, 6.5, 7.0
  - Red Hat 6.2, 7.1
  - SuSe 6.4, 7.2
  - Caldera 2.4, 3.1
  - Windows NT® 4.0, service pack 6, or newer
  - Windows® 2000, service pack 1, or newer
- Security and encryption
  - SSL in browser
  - ICA encryption

Optionally manage N70 thin clients via the Thin Client Manager Operations Utility Release 2 — a Java-based tool for central administration of IBM NetVista Thin Clients. Refer to "Appendix I. Thin Client Manager Operations Utility" on page 55 for more information.

N70 thin client

N70 thin clients also include a Setup Utility, and a Configuration Tool that provides the following:

- A streamlined configuration process
- An Independent Computing Architecture (ICA) client and ICA Remote Application Manager
- Separate utility programs for flash update service and operations management
- A desktop with a Launch Bar or one or more full-screen applications
- X-terminal session

The IBM NetVista Thin Client Manager Operations Utility is a management utility that you can use to manage your workstations. This utility runs on Windows 2000, Windows NT, and Linux workstations. You can install the Operations Utility on a server from a CD or by downloading the utility from the Web. For information on obtaining the CD or on downloading the utility, visit the following uniform resource locator (URL):

`http://techsupport.services.ibm.com/nc/nvista/nvista_exp.shtml`

Learning about the hardware

This section provides detailed hardware information about the IBM NetVista N70 thin client — Hardware Type 8366 (Model Xxx), hereafter referred to as N70 thin client.

Standard hardware

The standard N70 thin client hardware includes the following:

- Two SDRAM DIMM slots with the base model using 128 MB of random access memory (RAM) (see "Appendix A. Replacing hardware parts" on page 35).
- Integrated Intel video, shared memory
- Integrated Ethernet communication
- A 16-bit internal and external sound
- Riser card adapter for CompactFlash card
- Universal Serial Bus (USB) with two host connectors
- Two PCI adapter slots
- Two serial ports
- One parallel port
- Keyboard 9 pin DIN connectors
- Mouse

Refer to "Appendix D. Features of the N70 Thin Client" on page 45 for more information on the N70 features.

Hardware connectors

Your N70 thin client hardware includes standard connectors, standard pin, signal, and signal direction configurations. See "Appendix G. Connector pin information" on page 51 for details.

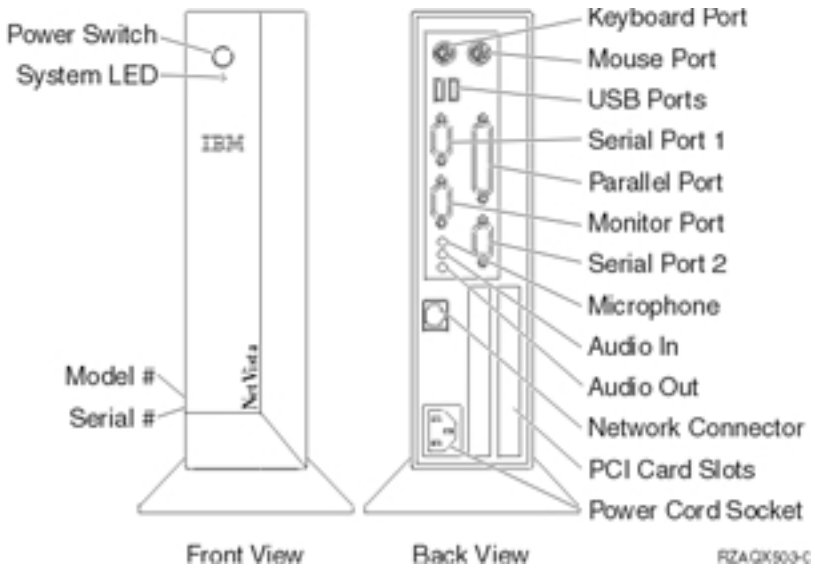


Figure 1. Hardware connectors

Communication hardware

Your N70 thin client includes an integrated Ethernet connection.

For a 10 Megabit (Mb) line speed operation, you need a category 3 or higher Unshielded Twisted Pair (UTP) type of cable. For a 100 Mb line speed operation, you need a category 5 UTP type of cable.

Connectivity Options

- Support available for customer installed token-ring card.
- Support available for customer installed wireless card.

Refer to "Appendix G. Connector pin information" on page 51 for communication cable specifications.

Monitor specifications

The N70 thin client functions with a basic video graphics adapter (VGA) class monitor that meets the Video Electronics Standards Association (VESA) standards of refresh rate and resolution.

Refer to "Appendix F. Monitor specifications" on page 49 for a list of resolutions and refresh rates that the N70 thin client can support. Your monitor may not support all resolutions and refresh rates.

Power consumption

The normal power consumption for the N70 thin client ranges from 24 to 35 Watts while running applications. During periods of inactivity, the system switches into the suspend state, and power consumption reduces to approximately 18 Watts. Once the system enters the soft-off state, power consumption reduces to approximately 10 Watts.

Display monitor power reduction occurs when you use the N70 thin client with a VESA DPMS Standard monitor.

Upgrading hardware features

You can perform the following hardware procedures:

- Install PCI adapter cards for PCI devices
- Install a CompactFlash card
- Connect USB devices

  If you plan to use peripheral USB devices with your N70 thin client, refer to the documentation for your peripheral USB devices for information.
- Upgrade your memory

  The N70 thin client has two random access memory (RAM) slots that accepts Synchronous Dynamic Random Access Memory (SDRAM) Dual Inline Memory Modules (DIMMs). The N70 thin client includes 128 MB of RAM, and supports memory expansions of up to 512 MB. You can expand the RAM of the N70 by installing 64, 128, or 256 MB DIMMs. “Appendix B. Hardware procedures” on page 39 provides information on how to exchange memory. Refer to “Appendix A. Replacing hardware parts” on page 35 for detailed memory specifications and how to order N70 thin client parts.

Setting up the hardware

The *Quick Setup for IBM NetVista N70 thin client, Type 8366* (SA23-2824) pamphlet, which ships with your hardware, provides the following information. This section goes into more detail for your convenience.

Read "Safety notices" on page v before you continue with these instructions.

Unpacking your hardware

Unpack your hardware. Contact your reseller, or IBM, if you do not have these standard parts:

1. Thin client logic unit
2. Support Base
3. Mouse
4. Keyboard
5. Power cable

Installing options:

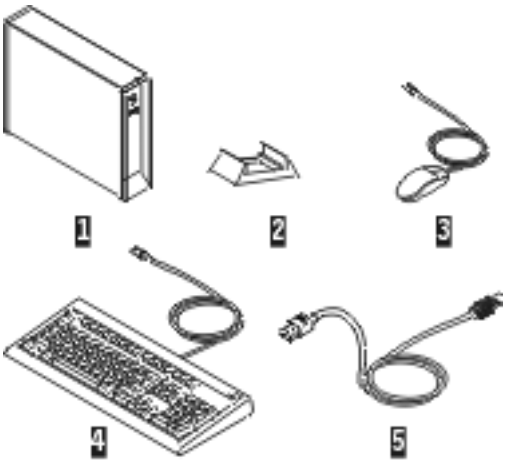
- If you have additional memory, or optional feature cards, see "Appendix B. Hardware procedures" on page 39 before continuing with the following setup procedures.
- For vertical placement of the thin client™, see "Installing the support base" on page 8.
- For horizontal placement of the hardware, continue with "Connecting your hardware" on page 8.

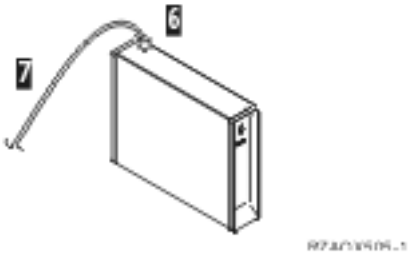
Security Option:

If you would like to restrict access to the logic unit the N70 thin client provides a locking device keyhole (cable lock). This keyhole is located on the top of the logic unit near the back of the machine 6 .

You can obtain a suitable locking cable (for example a Kensington Lock or similar device) that can be inserted through the holes and then secured to a suitable place 7 , such as a table or desk.

When in use the logic unit cannot be opened, preventing theft of internal components or removal from the place to which it is secured.





Installing the support base

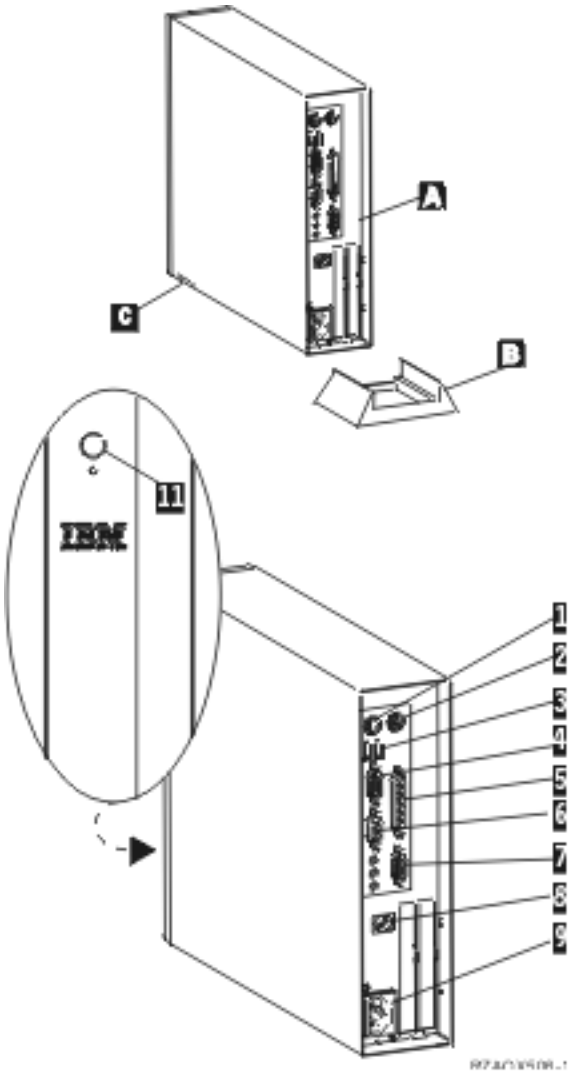
Snap the base **B** onto the bottom of the thin client **A**, in the locking slot **C** located near the front of the unit.

Connecting your hardware

Read "Safety notices" on page v before continuing.

1. Connect the devices listed below to the appropriate ports:
   - **1** Keyboard
   - **2** Mouse
   - **3** USB device (2)
   - **4** Serial device 1
   - **5** Parallel devices
   - **6** Monitor
   - **7** Serial device 2
   - **8** Network Connection

   Note: For connecting your microphone, headphone or speaker, refer to the "Hardware connectors" on page 3 diagram.
2. Tighten all device cable connections.
3. Connect the thin client power cable to the power socket **9**.
4. Plug all power cables into properly grounded working electrical outlets.
5. Turn on the monitor and all other external devices.
6. To power on your thin client, press the power button **11**.
7. Configure the system settings from the menu that appears on your screen. Refer to the server software information to verify the correct selection for your network.
   Note: The Operating System Server code must be installed on the boot server before the workstation can be used. If your thin client is unable to receive the Operating System code from the server, contact your network administrator.



Startup sequence

This is a typical startup sequence of events for the N70 thin client. If any of these events do not occur, see "Resolving hardware problems" on page 19.

1. The following devices show light-emitting diode (LED) indications:
   - Logic unit
   - Keyboard
   - Monitor[1]
   - Any USB devices[2]
2. The following internal hardware components initialize:
   - Memory
   - L1 cache
   - Video memory
   - Keyboard controller
3. The IBM NetVista thin client Configuration Program screen appears on the monitor in either of the following situations:
   - You start the NetVista thin client for the first time.
   - You previously reset the NetVista thin client to the factory-default property settings.

   The N70 thin client will reboot after settings are saved during the Configuration program step.

   Refer to "Using the Configuration Program to initially configure the workstation" on page 11 for information on using the Configuration Program menu.
4. The thin client Setup Utility appears.

   You can specify the interface through the Setup Utility. The interface can be either of the following:
   - An application you specify
   - A Start button with one or more applications

   Refer to "Using the Setup Utility to configure the workstation" on page 12 for more information on using the Setup Utility.

For information on how to remotely configure workstations, refer to "Managing your thin client remotely" on page 13.

1. Refer to the documentation for your monitor if there is no LED indication.
2. Refer to the documentation for your USB devices if there are no LED indications.

Configuring the N70 thin client

Before you can use the N70 thin client (also referred to as *workstation*), you need to configure your workstation. You use the Configuration Program to initially configure your system the first time it is started. You then can use the Setup Utility to further configure your workstation at any time.

Using the Configuration Program to initially configure the workstation

The first time you start the workstation, or if you reset it to factory defaults, the Configuration Program menu appears. You can use the Configuration Program to configure the workstation.

After the first use, to access the IBM NetVista Thin Client configuration program, press and hold **F1** when the screen starts scrolling with text messages. This is after the initial Power on Self Tests (POST) have been run.

Note: You do not need access to an external server to set up and configure the workstation.

The following menu is an example of the IBM NetVista Thin Client Configuration Program menu:

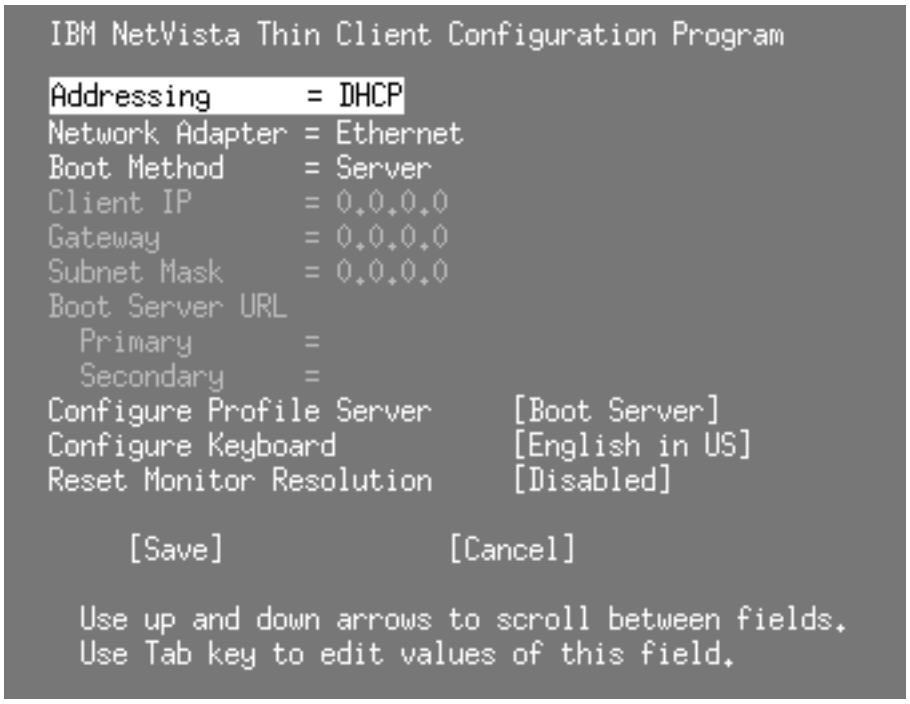


Figure 2. Example menu

The Configuration Program menu makes it easy to navigate through a workstations configuration process. Use the **Up** and **Down** arrows on the keyboard to move the highlighted bar through the available fields. Use **Tab** to edit the values of the field. There is a one line help text provided directly below the instruction line. Enter in the values to configure the workstations in the appropriate fields.

Instructions and other messages provide additional information. Some fields have templates to assist in providing the correct information or correct field format. The templates appear at the bottom of the screen. Error messages provide information if you need to complete a field or correct a value before continuing. Error messages also inform you if the entered data could be successfully used or not.

Fields that are greyed out on the Configuration Program menu are inactive. You must first change the **Addressing** field settings from DCHP to Static IP, then edit the values.

To exit from the Configuration Program menu, select **Save** to retain your settings. Your system will automatically reboot.

Using the Setup Utility to configure the workstation

The Setup Utility allows you to perform the following tasks:

- Specify your keyboard language settings
- Configure your Internet Protocol (IP) settings
- Configure your Desktop

The first time the workstation is started, you will use the initial Setup Utility wizard to configure the workstation. Follow the on-screen instructions to configure the workstation.

The Setup Utility allows you to configure the following applications on your workstation:

- Independent Computing Architecture (ICA) Client
- ICA Remote Application Manager
- Netscape Browser
- IBM 5250 and IBM 3270 emulators
- Custom applications of your choice

The Setup Utility provides two workstation Mode user interfaces:

1. A single application that starts automatically when you power on the workstation.
2. A Start button with one or more applications. These applications can start automatically, if desired.

Administrators can restrict access to the Setup Utility and BIOS Configuration/Setup Utility screen by using the Setup Utility to create an administrative password.

To access the Setup Utility anytime after the initial configuration, press and hold the following keys on the left side of the keyboard: **Shift + Ctrl + Alt**. Hold these keys down for several seconds until the Setup Utility starts.

You can place the Setup Utility icon on the start bar for simple, future access.

Managing your thin client remotely

You can use the IBM NetVista Thin Client Manager Operations Utility Release 2 (hereafter referred to as Operations Utility) to manage your N70 thin client remotely. It can manage both N70 thin client individuals and groups. Before you can use the Operations Utility to perform a task on a workstation, you need to install it on your server. For installation instructions, and general information on using the Operations Utility, see *IBM NetVista Thin Client Manager Operations Utility* (SA23–2813). This information is available on the World Wide Web at the following URL:

`http://www.ibm.com/nc/pubs`

Altering the flash image of a workstation

The NetVista N70 thin client is CompactFlash card ready. You can add a flashcard to the N70 and use one of the standard IDF files provided or create a custom flash image. You must install a CompactFlash card into the CompactFlash card riser adapter before downloading software to the CompactFlash card. For more information, see "Installing a customer CompactFlash card" on page 40.

The CompactFlash card installed must be large enough to hold the code being downloaded. A 32M flash card cannot be used with a 64M IDF. To allow flash image updates, the thin client with a flash card should have at least, approximately 32M more real memory installed then the size of the IDF file.

A N70 thin client, booted from a CompactFlash card can provide peer boot support to other N70 clients

IBM provides a default flash image for the N70 thin client. Customers can create their own flash images, adding and removing files from their flash image or images. The Image Description File (IDF) Builder and Software Description File (SDF) Creator Utility is used to modify the files in flash images.

The IDF Builder and SDF Creator Utility require that a NetVista workstation be booted from a server (network booted, not flash booted). The server must have the IBM NetVista Thin Client for Linux Product (or equivalent tool kit) installed.

Notes:

1. The IBM NetVista Thin Client for Linux Product is available at the following URL:

   `http://www.ibm.com/pc/support`
2. Once you install it, the IDF Builder and SDF Creator Utility will also be installed on your server.

To start the IDF Builder, follow these steps:

1. From a network booted workstation, enter the Setup Utility:
   - Press and hold the following keys on the left side of the keyboard: **Shift** + **Ctrl** + **Alt**.
   - Hold the keys down for several seconds until the Setup Utility starts.
2. If this workstation has a hardware password, enter it when requested.
3. From the Setup Utility, click **Management / IDF Builder**

Default N70 IDF files are available. IBM also provides other default IDF files. Because these default IDF files may be replaced in future updates of the IBM NetVista Thin Client for Linux product, they are not modifiable from the IDF Builder. If you wish to customize one of the default IDF files, you should use the **Save As** option to save the IDF as another file name. You can create new IDF files using the IDF Builder. Each IDF file contains a list of SDFs. You can add or remove SDFs from an IDF.

Notes:

1. Each SDF contains the list of files in the SDF (there is an SDF for the Base OS, an SDF for Navigator browser, and SDF for ICA 6.2, and so on).

2. You can start the SDF Creator from the IDF Builder.
3. The SDF Creator can modify an SDF or create a new SDF.
4. The SDF Creator determines the files within the SDF.
5. If an SDF is modified, each IDF using the modified SDF should be resaved.

For additional information on using the IDF Builder and the SDF Creator Utility, refer to the product help.

Altering the flash image of a workstation

There are two methods that you can use to alter the flash image of a workstation:

- "Performing a software update on a workstation" on page 16.
- "Recovering the flash image of a workstation" on page 17.

Notes:

1. When you perform a software *update* to the flash image of a workstation, you are only updating the software files. During the software flash update process, the workstation saves any configuration settings that you have made.
2. When you *recover* the flash image of a workstation, the recovery server reformats the CompactFlash card of the workstation, copying the recovery flash image to the workstation. Any configurations or user data that you have saved to the flash card are removed.

Performing a software update on a workstation

You should perform software updates on workstations only when a newer version of the software flash image exists or you want to add files to the flash card. Files which contain configuration information are not rewritten by the workstation when you perform a software update on a workstation. Configuration files can include Internet Protocol (IP) configuration settings, Netscape bookmarks, and Independent Computing Architecture (ICA) Client sessions that you have added.

You can perform a software update on a workstation using the following methods:

- Using the Thin Client Manager Operations Utility, see the Help Topic within the Operations Utility.
- "Using the Setup Utility to perform a software update on a workstation"

Performing a software update requires access to a server with the IBM NetVista Thin Client for Turbolinux Product (or equivalent tool kit) installed.

Using the Setup Utility to perform a software update on a workstation

You can use the Setup Utility to perform a software update on a workstation. Using the Setup Utility requires you to be at the workstation that you are updating and the workstation be server booted. To use the Setup Utility to perform a software update on a workstation, follow these steps:

1. From the workstation that you want to update, enter the Setup Utility:
   a. Press and hold the following keys on the left side of the keyboard: **Shift** + **Ctrl** + **Alt**.
   b. Hold the keys down for several seconds until the Setup Utility starts.
2. From the Setup Utility, click **Management / Flash Software Update**.

3. Specify the IP address of the server with the IBM NetVista Thin Client for Linux Product (or equivalent tool kit) installed.
4. Click **Continue**.
5. Select a mount point on the server and click **Continue**.
6. Select an IDF file to provide the software update and click **Continue**.
7. When a confirmation box appears, click **Continue**.

   Attention: After you click **Continue**, the server might take as long as 10 minutes to update the CompactFlash card. Do **not** power off the workstation while it reboots.

Recovering the flash image of a workstation

Flash recovery is used to **create** a new flash image or **recover** from a damaged flash image.

This process is also known as reflashing the workstation. When you create or recover the flash image of a workstation, the recovery server reformats the CompactFlash card, and copies the recovery flash image to the workstation. Any configurations that you have made to the workstation are removed.

You can recover the flash image of a workstation by using one of the following methods:

- "Using the Setup Utility to recover the flash image of a workstation" on page 17
- Using the Thin Client Managers Operations Utility, see the Help Text within the Operations Utility.

You need to specify the IDF flash file that you want to use in the process, regardless of the method that you choose.

Performing a flash recovery requires access to a server with the IBM NetVista Thin Client for Linux Product (or equivalent tool kit) installed.

Using the Setup Utility to recover the flash image of a workstation

You can use the Setup Utility to recover the CompactFlash image of a workstation.

Perform the following steps:

1. From the workstation that you want to recover, enter the Setup Utility:
   a. Press and hold the following keys on the left side of the keyboard: **Shift** + **Ctrl** + **Alt**.
   b. Hold the keys down for several seconds until the Setup Utility starts.
2. From the Setup Utility, click **Management / Flash Recovery**.
3. Specify the IP address of the server with the IBM NetVista Thin Client for Linux Product (or equivalent tool kit) installed.
4. Click **Continue**.
5. Select a mount point on the server and click **Continue**.
6. Select an IDF file to provide the recovery and click **Continue**.
7. When a confirmation box appears, click **Continue**.

   Attention: After you click **Continue**, the server might take as long as 10 minutes to recover the flash image. Do **not** power off the workstation while it reboots.

Resolving hardware problems

This section provides information on verifying and resolving hardware problems.

If you cannot identify a hardware problem, you can request technical service and support by contacting IBM. You need to provide the machine type, model, and serial number of your NetVista thin client.

You can obtain additional service and support information at the following URL:

`http://www.ibm.com/nc/support`

Notes:

1. If your NetVista thin client is under warranty or a maintenance contract, contact IBM Service and Support. Trained personnel are available to assist you with problem determination and deciding what action is necessary to fix the problem.
2. To resolve software errors, follow the instructions on the error message. For more information, contact IBM Service and Support.
3. Refer to the documentation for your monitor, PCI devices, serial devices, and USB devices for detailed information on resolving hardware problems that are associated with these devices.

Verifying hardware problems

Table 1 identifies possible hardware problem indications that can occur with the NetVista thin client during its startup sequence (see "Startup sequence" on page 9), or during normal operation.

Table 1. Hardware problem indications

Startup Checkpoints	Visible hardware failure	LED indications (system LED)	Audio beep sequences
Power on	X	X	X
Monitor initialization	X		
Keyboard initialization	X		
Welcome screen	X		

If you experience any hardware problem indications, you need to verify that an easily avoidable problem is not causing the hardware problem indication. Record any hardware problem indications and a description of the problem, and then proceed with the instructions below.

These instructions ensure that you start resolving any hardware problems by resetting the power to your hardware.

To determine the cause of NetVista thin client hardware problems, follow these steps to reset the power to your hardware:

__ 1. Power off the NetVista thin client.

__ 2. Unplug the power cable from the electrical outlet.

__ 3. Ensure that you properly connected all devices to the NetVista thin client. See “Connecting your hardware” on page 8 for more information.

__ 4. Plug the NetVista thin client power cable into a properly grounded, working electrical outlet.

__ 5. Power on the NetVista thin client.

__ 6. Wait for the IBM NetVista thin client screen to appear on your monitor.

__ 7. If the NetVista thin client indicates a hardware problem, record any problem indications and a description of the problem.

__ 8. Consult Table 2 with your hardware problem information.

Table 2. Hardware problem resolution information

Hardware problem indications	Where to find information
Visible hardware failure	“Visible hardware failure”
Audio beep sequences	“Audio beep sequences” on page 23
Post error codes	“POST error codes” on page 25
LED indications	“LED indications” on page 30
Network error codes	“Network error messages” on page 31

Visible hardware failure

You experience visible hardware failure during normal operation when a device that is attached to your logic unit fails to function properly. Visible hardware failure includes the following:

- A device that is attached to your logic unit fails to function at all.
  For example:
  - Your mouse cursor stops moving.
  - Your monitor displays a blank screen.
  - Characters do not display on your monitor when you type.
- A device that is attached to your logic unit does not function properly.
  For example:
  - Your monitor displays unreadable screens.
  - Your mouse cursor does not move smoothly.
  - Some keys on your keyboard do not respond correctly.

If your NetVista thin client hardware has a visible hardware failure, consult Table 3. Contact your technical support if these steps do not resolve the problem.

Table 3. Visible hardware failure

Symptom	What you should do
Logic Unit	

Table 3. Visible hardware failure (continued)

Symptom	What you should do
The system LED does not light up when you press the power button to power on the NetVista thin client.	1. Verify that you plugged the power cable into a working electrical outlet. **Note:** If the system LED does not work, substitute a properly working power cable for the defective cable. Repeat the previous step. See "Appendix A. Replacing hardware parts" on page 35 for more information. 2. Reset power to the NetVista thin client by pressing the power button. 3. If the system LED still does not work, you may need to replace the NetVista thin client logic unit/chassis assembly. See "Appendix A. Replacing hardware parts" on page 35 for more information on replacing a defective logic unit.
Logic Unit will not power-off	1. Follow the recovery action for any Audio Beep Sequence given. 2. Hold in the power button for 10 seconds. 3. Remove the power from the unit. 4. Logic Unit. See "Appendix A. Replacing hardware parts" on page 35 for more information on replacing a defective logic unit.
Wake-On-Lan	1. Check power supply and signal cable connections to network adapter. 2. Ensure that the operating system settings are set to enable Wake on LAN®. 3. Ensure Wake on LAN feature is enabled in BIOS Configuration/Setup Utility program (see "Appendix C. Using the BIOS Configuration/Setup Utility program" on page 43). 4. Ensure network administrator is using correct MAC address. 5. Ensure no interrupt or I/O address conflicts. 6. Network adapter (advise network administrator of new MAC address).
Monitor	

Table 3. Visible hardware failure (continued)

Symptom	What you should do
• The monitor displays a blank screen. • The monitor displays unreadable screens. • The monitor displays changing colors.	1. If the problem persists after you have verified the monitor cable connections, or after you have substituted a properly working monitor, refer to the documentation for your monitor for troubleshooting information. 2. If the IBM NetVista Thin Client Setup Utility was used to set a new monitor resolution and the monitor does not support that screen resolution, use the "Using the Configuration Program to initially configure the workstation" on page 11 to **Reset Monitor Resolution**.
Keyboard	
• The arrow keys do not respond when you press them. • Characters do not display on the monitor when you type.	1. Verify that you connected the keyboard cable properly to the NetVista thin client. 2. If the problem persists, the keyboard may be defective. • If possible, substitute a properly working keyboard, and repeat the previous steps. • See "Appendix A. Replacing hardware parts" on page 35 for more information on replacing a defective keyboard. 3. If the keyboard still does not work, you may need to replace the NetVista thin client logic unit/chassis assembly. See "Appendix A. Replacing hardware parts" on page 35 for more information on replacing a defective logic unit.
Mouse	
• The mouse cursor stops moving; the mouse does not function at all. • The mouse cursor does not move smoothly.	1. Verify that you connected the mouse cable properly to the NetVista thin client keyboard. 2. If the problem persists the mouse may be defective: • If possible, substitute a properly working device for a defective device. Repeat the previous steps. • Repeat the previous steps. See "Appendix A. Replacing hardware parts" on page 35 for more information. 3. If the mouse still does not work, you may need to replace the NetVista thin client logic unit. See "Appendix A. Replacing hardware parts" on page 35 for more information on replacing the defective logic unit.
Serial or parallel devices	

Table 3. Visible hardware failure (continued)

Symptom	What you should do
Serial or parallel port device failure (system board)	1. Check the External Device Self Test-OK? 2. External Devices 3. Cable 4. Logic Unit. See "Appendix A. Replacing hardware parts" on page 35 for more information on replacing a defective logic unit.
Serial or parallel port device failure (adapter port)	1. Check the External Device Self Test-OK? 2. External Devices 3. Cable 4. Alternate Adapter 5. Logic Unit. See "Appendix A. Replacing hardware parts" on page 35 for more information on replacing a defective logic unit.

Audio beep sequences

The NetVista thin client hardware utilizes both audio and visual alerts when reporting hardware problems. In the event of a hardware problem, the NetVista thin client emits audio beeps before your monitor initializes. After your monitor initializes, error codes and text messages appear on the screen.

Note: The N70 BIOS Configuration/Setup Utility Program is defaulted to come up quiet (no beep and no memory count and checkpoint code display) when no errors are detected by POST.

To enable beep and memory count and checkpoint code display when a successful POST occurs:

- Select Start Options in the Configuration/Setup Utility program (see "Appendix C. Using the BIOS Configuration/Setup Utility program" on page 43).
- Set Power-On Self-Test to Enhanced.

Audio beep sequences are constant, but the length of the pause between the beeps varies. Table 4 on page 24 defines the possible audio beep sequences that can occur when a hardware problem exists.

To verify that a NetVista thin client hardware problem exists, ensure that you complete the instructions in "Verifying hardware problems" on page 19.

If the NetVista thin client is not functioning properly, and it is emitting audio beep sequences, consult Table 4 on page 24. Contact your technical support if these steps do not resolve the problem.

Notes:

1. These beep sequences are in a numeric format which indicates the sequence of the audio output.
2. Audio beep sequences do not occur after the monitor initializes.

If the following beep codes occur, follow the recommended action. In the following index, **X** can represent any number.

Table 4. Audio beep sequences

Code	Action
1–1–3	1. Check the BIOS Configuration/Setup Utility Program (see "Appendix C. Using the BIOS Configuration/Setup Utility program" on page 43) 2. Logic Unit
1–1– 4	Logic Unit
1–2–X	Logic Unit
1–3–X	1. Memory Module 2. Logic Unit
1–4–4	1. Keyboard 2. Logic Unit
1–4–X	1. Memory Module 2. Logic Unit
2–1–1, 2–1–2	1. Check the BIOS Configuration/Setup Utility Program (see "Appendix C. Using the BIOS Configuration/Setup Utility program" on page 43) 2. Logic Unit
2–1–X	1. Memory Module 2. Logic Unit
2–2–2	1. Keyboard 2. Memory Module 3. Logic Unit
2–2–X	1. Memory Module 2. Logic Unit
2–3–X	1. Memory Module 2. Logic Unit
2–4–X	1. Check the BIOS Configuration/Setup Utility Program (see "Appendix C. Using the BIOS Configuration/Setup Utility program" on page 43) 2. Memory Module 3. Logic Unit
3–1–X	Logic Unit
3–2–X	1. Keyboard 2. Logic Unit
3–3–X	1. Display 2. Logic Unit
3–4–X	1. Display 2. Logic Unit

Table 4. Audio beep sequences (continued)

Code	Action
4	Logic Unit
All other beep code sequences	Logic Unit
One long and one short beep during POST. Base 640 KB memory error or shadow RAM error	1. Memory Module 2. Logic Unit Logic Unit
One long beep and two or three short beeps during POST	Logic Unit
Three short beeps during POST	1. Memory Module 2. Logic Unit
Continuous beep	Logic Unit
Repeating short beeps	1. Keyboard key stuck? 2. Keyboard Cable 3. Logic Unit

POST error codes

Each time you power-on the system, it performs a series of tests that check the operation of the system and some options. This series of tests is called the Power-On Self-Test, or POST.

POST does the following operations.

- Checks some basic system-board operations
- Checks the memory operation
- Starts the video operation

If the POST finishes without detecting any problems, a single beep sounds and the first screen of the operating system or application program appears.

Note: The N70 BIOS Configuration/Setup Utility Program is defaulted to come up quiet (no beep and no memory count and checkpoint code display) when no errors are detected by POST.

To enable beep and memory count and checkpoint code display when a successful POST occurs:

- Select Start Options in the Configuration/Setup Utility program (see "Appendix C. Using the BIOS Configuration/Setup Utility program" on page 43).
- Set Power-On Self-Test to Enhanced.

If the POST detects a problem, an error message appears on the screen. A single problem can cause several error messages to appear. When you correct the cause of the first error message, the other error messages probably will not appear on the screen the next time you turn on the system.

If the following error messages occur, follow the recommended action. In the following index, **X** can represent any number.

Table 5. POST error codes

POST Error Code	FRU/Action
10X	Logic Unit
110 Logic Unit memory parity error	1. Memory Module 2. Logic Unit
11X I/O channel parity error	1. Reseat adapters 2. Any adapter 3. Logic Unit
129 Internal cache test error	Logic Unit
151 Real Time clock failure	Logic Unit
161 Bad CMOS battery	1. Check the BIOS Configuration/Setup Utility Program (see "Appendix C. Using the BIOS Configuration/Setup Utility program" on page 43). 2. CMOS Backup Battery 3. Logic Unit
162 Configuration mismatch	1. Check the BIOS Configuration/Setup Utility Program (see "Appendix C. Using the BIOS Configuration/Setup Utility program" on page 43). 2. Had a device been added, removed, changed location? If so, suspect that device. 3. Power-on external devices first, then power-on computer. 4. CMOS Backup Battery on Logic Unit. 5. Logic Unit
163 Clock not updating or invalid time set	1. Time and Date set? 2. CMOS Backup Battery 3. Logic Unit
164 POST detected a base memory or extended memory size mismatch error or RIMM socket 3 is populated with a RIMM memory module	1. Check the BIOS Configuration/Setup Utility Program (see "Appendix C. Using the BIOS Configuration/Setup Utility program" on page 43). Check System Summary menu for memory size changes. 2. Memory Module
166 Boot Block Check Sum Error	Logic Unit
167 Microprocessor installed that is not supported by the current POST/BIOS	Logic Unit
168 Alert on LAN™ error	1. Check the BIOS Configuration/Setup Utility Program (see "Appendix C. Using the BIOS Configuration/Setup Utility program" on page 43). Check to see that Ethernet and Alert on LAN are enabled. 2. Logic Unit

Table 5. POST error codes (continued)

POST Error Code	FRU/Action
17X	1. Check the BIOS Configuration/Setup Utility Program (see "Appendix C. Using the BIOS Configuration/Setup Utility program" on page 43). 2. Logic Unit
183	Enter the administrator password.
186	Logic Unit
187	1. Check the BIOS Configuration/Setup Utility Program (see "Appendix C. Using the BIOS Configuration/Setup Utility program" on page 43). 2. Logic Unit
189	More than three password attempts were made to access the computer.
1XX Not listed above	Logic Unit
20X Memory data error	1. Memory Module 2. Logic Unit
225	Unsupported Memory
229 External cache test error	Logic Unit
262 POST detected a base memory or extended memory type error	Check the BIOS Configuration/Setup Utility Program (see "Appendix C. Using the BIOS Configuration/Setup Utility program" on page 43). Check System Summary menu for memory.
301	1. Keyboard 2. Keyboard Cable 3. Logic Unit
303 with an 8603 error	1. Mouse 2. Keyboard 3. Keyboard Cable 4. Logic Unit
303 with no 8603 error	1. Keyboard 2. Keyboard Cable 3. Logic Unit
3XX Not listed above	1. Keyboard 2. Keyboard Cable 3. Logic Unit
5XX	1. Video Adapter (if installed) 2. Logic Unit
7XX	1. Check the BIOS Configuration/Setup Utility Program (see "Appendix C. Using the BIOS Configuration/Setup Utility program" on page 43). 2. Logic Unit

Table 5. POST error codes (continued)

POST Error Code	FRU/Action
962	1. Check the BIOS Configuration/Setup Utility Program (see "Appendix C. Using the BIOS Configuration/Setup Utility program" on page 43). 2. Parallel Adapter (if installed) 3. Logic Unit
9XX	1. Printer 2. Logic Unit
1162	1. Check the BIOS Configuration/Setup Utility Program (see "Appendix C. Using the BIOS Configuration/Setup Utility program" on page 43). 2. Serial Adapter (if installed) 3. Logic Unit
11XX	1. Any Serial Device 2. Communication/Serial Device Cable 3. Logic Unit
12XX	1. Async Adapter 2. Any Serial Device 3. Communication/Serial Device Cable 4. Logic Unit
1402	Information only
1403	Information only
14XX Not listed above. Check printer before replacing Logic Unit	1. Printer (including configuration) 2. Logic Unit
18XX	1. Check the BIOS Configuration/Setup Utility Program (see "Appendix C. Using the BIOS Configuration/Setup Utility program" on page 43). Verify PCI/ISA configuration settings. 2. If necessary, set ISA adapters to "Not Available" to allow PCI adapters to properly configure. 3. Remove any suspect ISA adapters. 4. PCI Adapter
1962 Boot sequence error	1. Check the BIOS Configuration/Setup Utility Program (see "Appendix C. Using the BIOS Configuration/Setup Utility program" on page 43). 2. Logic Unit
24XX	1. Check cable connections. 2. Display 3. Logic Unit
46XX	1. Multiport/2 Adapter 2. Multiport/2 Interface Board 3. Memory Module

Table 5. POST error codes (continued)

POST Error Code	FRU/Action
5962 An IDE device (other than hard drive) configuration error	1. Check the BIOS Configuration/Setup Utility Program (see "Appendix C. Using the BIOS Configuration/Setup Utility program" on page 43). 2. Logic Unit
64XX	1. Network Adapter (if installed) 2. Logic Unit
74XX	1. Video Adapter (if installed) 2. Logic Unit
80XX	PCMCIA Adapter
8601, 8602	1. Pointing Device (Mouse) 2. Logic Unit
8603, 8604	1. Pointing Device (Mouse) 2. Logic Unit
86XX Not listed above	1. Mouse 2. Logic Unit
101XX	1. Verify correct Operating System Device Drivers. 2. Modem Adapter 3. Modem 4. Logic Unit
10453, 10459, 10473	Information Only
104XX	1. Hard Disk Drive (if installed) 2. Drive Cable 3. Logic Unit
106XX	1. Power-off computer, wait ten seconds, then power-on the computer. 2. Check cables 3. Ethernet Adapter 4. Logic Unit
121XX	1. Modem Adapter 2. Any serial device 3. Logic Unit
137XX	Logic Unit
149XX	1. External Display 2. Video Adapter (if installed) 3. Logic Unit
166XX	1. Token Ring Adapter 2. Logic Unit
2788X	External FRU (speaker, microphone)

Table 5. POST error codes (continued)

POST Error Code	FRU/Action
Any code not listed previously	1. Error code is most likely caused by an option added after initial configuration. Suspect any hardware or cable connection added to the logic unit. 2. Check the BIOS Configuration/Setup Utility Program, and look for any hardware conflicts or configuration change. 3. Call the next level of hardware support for any additional instructions. 4. Logic Unit. See "Appendix A. Replacing hardware parts" on page 35 for more information.

LED indications

The LED indicators of the following devices maintain a solid green color during normal operation:

- Logic Unit
- Monitor
- Keyboard (LED is solid green when Num Lock, Cap Lock and Scroll Lock is active)

The Ethernet network LED indicates a solid amber color during normal operation, and a flashing green color, during network activity.

The system LED quickly flashes from amber to green during a normal power-on.

To verify that a NetVista thin client hardware problem exists, ensure that you complete the instructions in "Verifying hardware problems" on page 19.

If the NetVista thin client LED indicators are not functioning properly consult Table 6. Contact your technical support if these steps do not resolve the problem. **[review table 6]**

Table 6. LED indications

Symptom	What you should do
System LED	
The system LED fails to function after power on.	1. Verify that you plugged the power cable into a working electrical outlet. 2. Press the power button to reset power to the NetVista thin client. 3. If the system LED does not work, the power cable may be defective. If possible, substitute a properly working power cable, and then repeat the steps. Contact IBM, to request a replacement part (see "Replacing parts for N70 thin clients" on page 35). 4. If the system LED still does not work, you may need to replace the NetVista thin client logic/chassis unit. Contact IBM, to request a replacement part (see "Replacing parts for N70 thin clients" on page 35).

Table 6. LED indications (continued)

Symptom	What you should do
A power interruption during a software update occurs. When you power on the NetVista thin client, the Ethernet network LED shows a solid green color and the monitor does not display any screens.	The software on the NetVista thin client may be damaged. Contact IBM Service and Support.
The Ethernet network LED shows a flashing amber color.	1. Press the power button to reset power to the NetVista thin client. 2. Check network cable connector 3. If the Ethernet network LED still shows a flashing amber color, you may need to replace the NetVista thin client logic/chassis unit. Contact IBM, to request a replacement part (see "Replacing parts for N70 thin clients" on page 35).
The system LED flashes amber once shortly after power off.	The NetVista thin client hardware automatically enables Wake-On-LAN (WOL). This is not an indication of a hardware problem.
Monitor LED	
The monitor LED fails to function after power on.	If the problem still persists after you verified the monitor cable connections, or after you substituted a properly working monitor, refer to the documentation for your monitor for more information.
The monitor LED shows a solid amber color, or a flashing amber color.	If the problem still persists after you verified the monitor cable connections, or after you substituted a properly working monitor, refer to the documentation for your monitor for more information.

Network error messages

The error messages listed in this section apply only to models with a pre-installed Ethernet adapter or riser card.

If a failure condition occurs after the Ethernet controller is initialized, an error message appears on the screen. The error messages that can occur are shown below. If you experience any error related to the Ethernet adapter, record the error message, and tell your network administrator about the problem.

RPL-related error messages

These error messages are specific to the Ethernet adapter and the RPL environment of your computer.

The two most common error messages are shown below:

- RPL-ROM-ERR:105 The integrated Ethernet failed the loopback test.

  Error 105 indicates that a power-on diagnostic test performed by the Ethernet module did not execute correctly. If this error message appears, you must have the computer serviced.
- RPL-ROM-ERR:107 Media test failed, check the cable.

Error 107 indicates that the cable from the LAN is not securely connected to the Ethernet port on your computer. Check the cable to ensure that it is properly connected.

Other error messages that might occur are shown in the following table.

Table 7. Ethernet error messages

RPL-ROM-ERR: 100 The Ethernet adapter cannot be found.
RPL-ROM-ERR: 101 The Ethernet adapter was unable to initialize.
RPL-ROM-ERR: 102 The Ethernet adapter could not be reset. 78 User Guide
RPL-ROM-ERR: 103 There are multiple Ethernet adapters in the system. Specify the correct serial number in NET.CFG.
RPL-ROM-ERR: 104 The Ethernet adapter EEPROM is faulty or not present.
RPL-ROM-ERR: 106 The Ethernet adapter is configured for Plug and Play in a non-Plug and Play system.
RPL-ROM-ERR: 110 The Ethernet adapter RAM failed the memory test.

DHCP-related error messages

Error messages related to DHCP and the Ethernet adapter are shown in the following table.

Table 8. DCHP-related error messages

E61: Service boot canceled.
E62: Cannot initialize controller.
E63: Cannot initialize controller.
E67: Cannot initialize controller.
E6d Cannot find BOOTP server.
E6e: Cannot start from downloaded image.
E71: Too many MTFTP packages.
M10: ARP canceled by keystroke.
M11: ARP timeout.
M20: Cannot copy memory.
M21: Cannot write to memory.
M22: Cannot write to memory.
M30: Cannot ARP TFTP address.
M31: TFTP canceled by keystroke.
M32: TFTP open timeout.
M33: Unknown TFTP opcode.
M34: TFTP read canceled by keystroke.
M35: TFTP timeout.
M38: Cannot open TFTP connection.
M39: Cannot read from TFTP connection
M40: BOOTP canceled by keystroke.
M40: DHCP canceled by keystroke.
M41: BOOTP timeout.

Table 8. DCHP-related error messages (continued)

M41: DHCP timeout.
M42: No client or server IP.
M43: No bootfile name.
M44: Cannot ARP redirected BOOTP server.
M6f: System is locked! Press Ctrl+Alt+Del to restart.
M90: Cannot initialize controller for multicast.
M91: MTFTP canceled by keystroke.
M92: MTFTP open timeout.
M93: Unknown MTFTP opcode.
M94: MTFTP read canceled by keystroke.
M95: MTFTP timeout.
M96: Cannot ARP MTFTP address.
M98: Cannot open MTFTP connection.
M99: Cannot read from MTFTP connection.
Txx: <message from TFTP error packet>

Note: An *x*value that follows an error code represents any alphanumeric character.

Appendix A. Replacing hardware parts

You can order IBM replacement parts for the thin client. Contact IBM or your reseller to order warranty parts and non-warranty parts. IBM provides warranty service without charge for parts during the warranty period on an exchange basis only.

To replace a logic unit, the customer must transfer features, such as memory DIMMs, customer CompactFlash cards, and any optional PCI adapter cards to the replacement assembly. If customers do not transfer their features, the replacement units cannot operate properly. See "Safety notices" on page v for information about handling Customer Replaceable Unit (CRU) parts.

IBM delivers CRUs to the customers for exchange, and customers return defective parts to IBM under the basic service offering. Customers should return all defective logic units **without** the cover set, customer CompactFlash cards, support base or memory DIMMs (see "Returning hardware parts" on page 37 for more information). For upgraded service offerings, a service representative delivers replacement parts, transfers features, and returns defective parts to IBM.

See "Resolving hardware problems" on page 19 to determine whether or not it is necessary to replace the thin client logic unit or any other parts.

Replacing parts for N70 thin clients

Use the following tables to determine the correct part number for replacement parts. Warranty service terms and conditions by country apply.

Table 9. Type 8364 thin client replacement parts

Description	Country	FRU P/N
Logic unit and associated parts		
Logic Unit/Chassis Assembly (includes internal power supply)	All Countries	22P1013
Note: The base Logic Unit comes with a factory installed CompactFlash card used for boot capabilities and should **not** be removed from the logic unit.		
Side Cover with bezel	All Countries	22P1014
Base (mounting stand)	All Countries	19K5569
Lithium Battery (3 Volt)	All Countries	33F8354
Memory **Note:** This thin client accepts 168 pin, 3.3 V, gold tab, unbuffered, non-parity, and 133MHz SDRAM DIMM memory.		
Memory (64 MB SDRAM DIMM)	All Countries	33L3072
Memory (128 MB SDRAM DIMM)	All Countries	33L3074
Memory (256 MB SDRAM DIMM)	All Countries	33I3076
Mouse		
Mouse (two button black)	All Countries	10L6149
Keyboards		
Keyboard	Belgian UK	37L0857

Table 9. Type 8364 thin client replacement parts (continued)

Description	Country	FRU P/N
Keyboard	Brazilian Portuguese	07L9450
Keyboard	Canadian French	37L0852
Keyboard	Danish	37L0860
Keyboard	French	37L0862
Keyboard	French Canadian	37L0910
Keyboard	Finnish	37L0877
Keyboard	German	37L0863
Keyboard	Italian	37L0868
Keyboard	Latin America (Spanish)	37L0853
Keyboard	Norwegian	37L0869
Keyboard	Spanish	37L0876
Keyboard	Swedish	37L0877
Keyboard	Swiss (French and German)	37L0878
Keyboard	Thailand	37L0887
Keyboard	UK English	37L0881
Keyboard	US English ISO9995	37L0883
Keyboard	US English	37L0851

Table 10. Detachable power cables

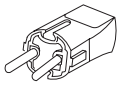
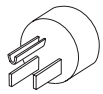
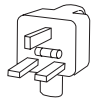
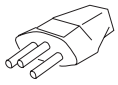
Voltage Selection	Plug	Receptacle	Country	FRU P/N
Detachable power cables				
250V			Argentina, Paraguay, Uruguay	36L880
250V			Australia, New Zealand	93F2365
250V			Abu Dhabi, Austria, Belgium, Bulgaria, Botswana, Egypt, Finland, France, Germany, Greece, Iceland, Indonesia, Korea (South), Lebanon, Luxembourg, Netherlands, Norway, Portugal, Saudi Arabia, Spain, Sudan, Sweden, Turkey, Yugoslavia	1339520

Table 10. Detachable power cables (continued)

Voltage Selection	Plug	Receptacle	Country	FRU P/N
125V			Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Puerto Rico, Saudi Arabia, Suriname, Trinidad, Taiwan, U.S.A	6952301
250V			Bahrain, Bermuda, Brunei, Channel Islands, Cyprus, Ghana, Hong Kong, India, Iraq, Ireland, Jordan, Kenya, Kuwait, Malawi, Malaysia, Nigeria, Oman, People's Republic of China, Qatar, Singapore, Tanzania, Uganda, United Arab Emirates (Dubai), United Kingdom, Zambia	14F0033
250V			Bangladesh, Burma, Pakistan, South Africa, Sri Lanka	14F0015
250V			Denmark	13F9997
250V			Israel	14F0087
250V			Chile, Ethiopia, Italy	14F0069
250V			Liechtenstein, Switzerland	14F0051

Returning hardware parts

You may not need to return all defective items to IBM. Always check the replacement part packaging for any instructions regarding the return of defective parts.

To return a defective part to IBM, pack the defective part in the packaging container of the replacement part.

Note: Customers must not ship features, such as memory DIMMs, customer CompactFlash cards, or PCI adapter cards with defective logic units that they are returning to IBM. It is not possible for IBM to return these features to customers.

If customers do not follow IBM shipping instructions, they may get charges for any damage to a defective part. IBM covers shipping costs on all warranted hardware and maintenance agreement hardware. Replacement parts become the customer's property in exchange for the defective parts, which become the property of IBM.

For information on ordering thin client parts, refer to "Replacing parts for N70 thin clients" on page 35.

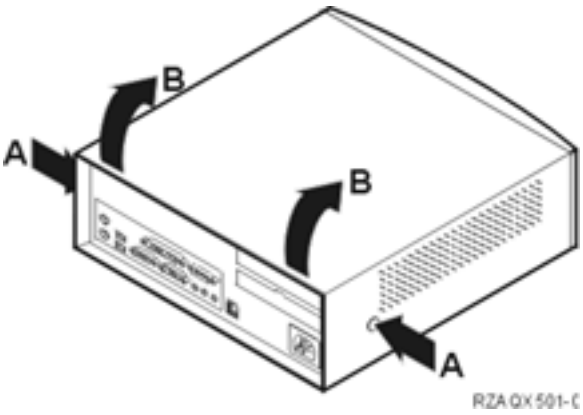
Appendix B. Hardware procedures

Removing side cover/bezel to install parts

Read Safety notices, and "Handling static-sensitive devices" on page vi before continuing.

1. Turn off the power supply.
2. Disconnect all cables from the thin client.
3. Carefully lay the logic unit down on its side with the power socket nearest the ground. Depress the rear two buttons **A**, to release the cover assembly lock mechanism. Lift the cover assembly up **B** and off.

   You are now ready to perform the installation procedures provided in this chapter.
4. Complete the procedure, "Reassembling the thin client" when you are finished installing components in the logic unit.



Reassembling the thin client

Read Safety notices, and "Handling static-sensitive devices" on page vi before continuing.

1. To reassemble the thin client, carefully replace the cover assembly on top of the logic unit.
2. Lower the cover slowly down until the latch is engaged.
3. Perform steps 1 through 5 of the procedure, "Connecting your hardware" on page 8.

Installing an optional PCI card

Complete the procedure, "Removing the side cover/bezel to install parts" on page 39 before performing the following Peripheral Component Interconnect (PCI) procedure.

1. Remove the PCI bracket **E** from the logic unit.
2. Loosen the screws to remove the PCI slot covers **F** .
3. Install the PCI card **C** down into both the PCI slot, and the PCI socket **D** .
4. Install PCI slot covers over any empty slots.
5. Replace the PCI bracket back over the Logic Unit.

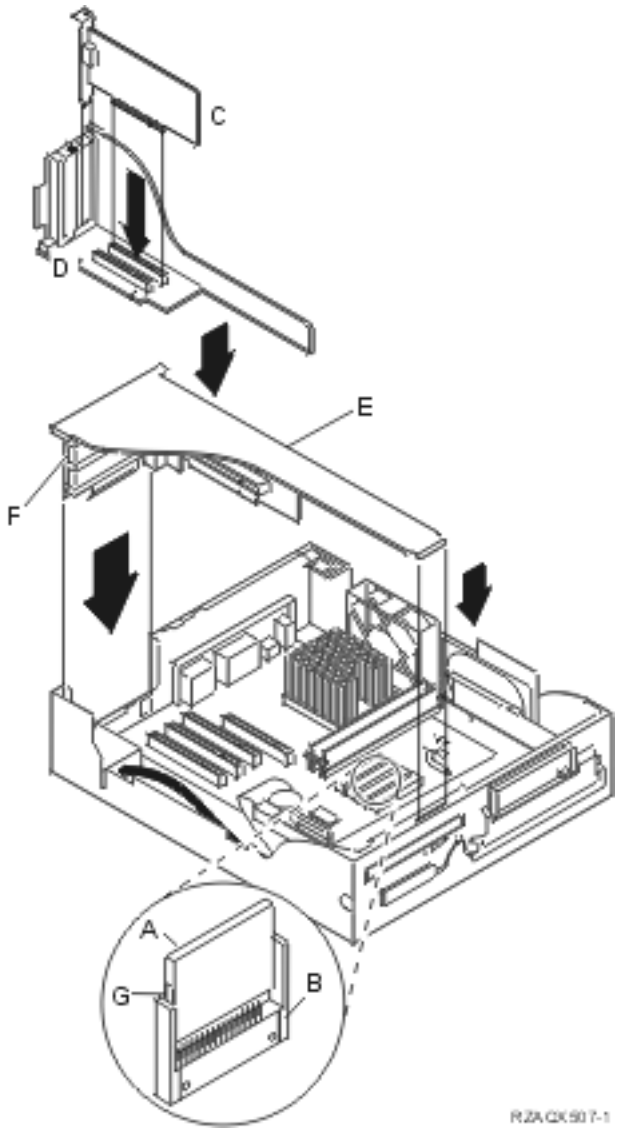
See "Reassembling the thin client" on page 39.

Installing a customer CompactFlash card

Read "Caution notices" on page vi, and "Removing the side cover/bezel to install parts" on page 39 before continuing.

Note: The base Logic Unit comes with a factory installed CompactFlash card used for boot capabilities. Do **not** remove this CompactFlash card from the logic unit.

1. Locate the CompactFlash card keyed slots on each side of the card **G** .
2. Match the keyed slots on the sides of the CompactFlash card **A** that you are installing to the inside of the connector **B** .
3. Install the CompactFlash card **A** into the empty connector **B** slot.
   Note: Do not force the card into the connector, as it will damage both the thin client, and the CompactFlash card.
4. See "Reassembling the thin client" on page 39.



Adding/removing memory

See "Resolving hardware problems" on page 19 to determine whether or not it is necessary to replace the logic unit, or any other parts. For information on ordering thin client hardware parts, refer to "Replacing parts for N70 thin clients" on page 35. Complete the procedure, "Removing the side cover/bezel to install parts" on page 39 before performing the following Dual Inline Memory Module (DIMM) procedures:

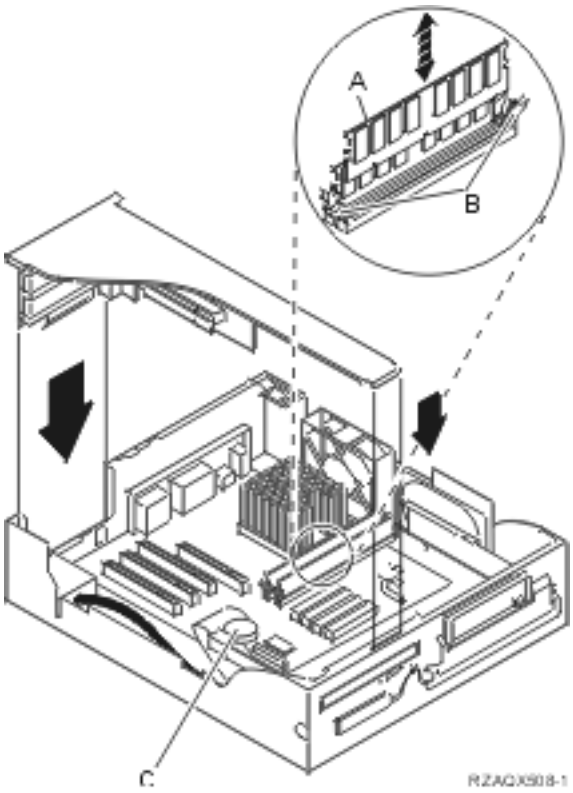
1. To remove a DIMM from the logic unit, press the two tabs **B** located at each end of the DIMM **A** out and down.
2. To install a DIMM into the logic unit, align the notches on the bottom of the DIMM **A** with the notched areas on the memory socket.
3. Press down firmly on the center of DIMM **A** until the memory socket tabs **B** flip up.
4. See "Reassembling the thin client" on page 39.

Exchanging the lithium battery

Read "Caution notices" on page vi, and see "Removing the side cover/bezel to install parts" on page 39 before continuing.
Note: All BIOS configuration settings will be lost when the backup battery is removed.

1. To remove the battery **C**, gently pull the metal lever on the side of the battery socket away from the battery.
2. Lift the battery out of the battery socket.
3. Dispose of the used battery according to your local regulations.
4. Install the new battery into the battery socket, with the "+" sign facing up. Snap it into place by applying pressure.
5. See "Reassembling the thin client" on page 39.

If you replace the system battery, you need to reset the system date and time.
Note: If you receive an error message on your screen after performing this procedure, see "Resolving hardware problems" on page 19.



Appendix C. Using the BIOS Configuration/Setup Utility program

You can use the BIOS Configuration/Setup Utility program to view and change the configuration settings of your computer.

Starting and using the BIOS Configuration/Setup Utility program

The BIOS Configuration/Setup Utility program might start automatically when POST detects that newly installed or removed hardware is not reflected in your current configuration.

To start the BIOS Configuration/Setup Utility program:

1. Press and hold down **F1** and turn on the computer. If your computer is already on when you start this procedure, you must shut down the Operating System, turn off the computer and wait for a few seconds until all in-use lights go off. Then restart the computer.

   Note: Do not use **Ctrl + Alt + Delete** to restart the computer.
2. If you have not set a password, the BIOS Configuration/Setup Utility program menu appears on the screen. If you have set a password, the BIOS Configuration/Setup Utility program menu will not appear until you type your password and press **Enter**.

Viewing and changing settings of the BIOS Configuration/Setup Utility program

The BIOS Configuration/Setup Utility program menu lists items that identify system configuration topics. You might see symbols next to configuration menu items.

Table 11. BIOS Configuration/Setup Utility program symbols

Symbols	Meaning
.	An additional menu or screen is available
*	A system resource conflict was detected. Resolve this conflict before exiting from the BIOS Configuration/Setup Utility program so that your computer will function properly.
[]	In the BIOS Configuration/Setup Utility program menus, the configuration information you can change is enclosed in brackets. You cannot change information that is not surrounded by brackets.
Horizontal triangle	A change to that item has been made in the system configuration or BIOS Configuration/Setup Utility program has detected an error and attempted to correct it.

Table 11. BIOS Configuration/Setup Utility program symbols (continued)

Symbols	Meaning
Three Vertical broken lines	A change to that item has been made in the system configuration or BIOS Configuration/Setup Utility program has detected an error and attempted to correct it. An additional menu item might follow a menu item with this symbol beside it.

You use the keyboard to navigate through the BIOS Configuration/Setup Utility Program menu. Active keys are displayed at the bottom of each screen.

Exiting from the BIOS Configuration/Setup Utility Program

When you finish viewing or changing settings, press **Esc** until you return to the BIOS Configuration/Setup Utility program menu. If you want to save changes or settings, select **Save Settings** before you exit. If you do not select Save Settings your settings will not be saved.

Recovering or Updating the BIOS

The NetVista thin client Web site provides a wide range of product and technical support information and solutions:

1. http://www.ibm.com/pc/support
2. Select **NetVista**
3. Select **NetVista thin client**

Appendix D. Features of the N70 Thin Client

Processor: 733 MHz Intel Celeron microprocessor with 128 KB L2 cache

Main Memory: 128 MB base RAM
- Integrated graphics uses main memory
- Two memory slots/512 MB max
  - One slot populated with 128 MB base memory
- Options available to add 64 MB, 128 MB, or 256 MB DIMMs
- 512 KB flash memory for system programs

Optional storage: CompactFlash via riser on IDE socket

Server boot options via local, remote, or CompactFlash (customer add-on option)

Input devices
- Two-button mouse
- 102–key keyboard

Stealth black exterior

Connectivity
- 10/100 Ethernet
- 4/16 Token Ring (option available)
- Wireless (option available)

Audio
- AC97 Audio
- Internal speaker
- Stereo headphone jack
- Mono microphone jack

Video
- 1600 x 1200 x 256 colors at 75 HZ
- 1280 x 1024 x 16M colors at 85 HZ

Power Supply: Integrated (with fan)

I/O Connectors
- Universal Serial Bus: Two host connectors
- Two serial ports
- One parallel port

PCI expansion slots (2)
- Can accommodate two 3/4–length cards

FCC Class A

Thermal class B

- System On- Extended Class B
- System Off- Class B

Acoustical category 3E (quiet office)

Appendix E. NetVista N70 thin client Specifications

Table 12. Specifications

Feature	Description
Size	Depth: 14.2 inches (360 mm) Height: 13.6 inches (345 mm) Width: 3.43 inches (87 mm)
Weight	Minimum configuration as shipped: 18 lbs (8.2 kg) Maximum configuration as shipped: 19 lbs (8.6 kg)
Heat Output	Approximate heat output in BTUs per hour: Minimum: 205 BTU/hr (60 W) Maximum: 375 BTU/hr (110 W)
Electrical Output	Sine-wave input (47 to 63 Hz) required Input Voltage range: Minimum: 90 V AC Maximum: 265 V AC Input kVA (approximately): Typical: 0.08 kVA (as shipped) Maximum: 0.16 kVA
Airflow	Approximately less than 0.25 cubic meters/minute (9 cubic feet/minute)
Acoustical Noise Emission Values	Average sound pressure levels: At operator position: 43 dB operating 38 dB idle At bystander position (1 meter): 37 dB operating 33 dB idle Declared (upper limit) sound power levels: 5.1 bels operating 4.8 bels idle

Appendix F. Monitor specifications

A basic video graphics adapter (VGA) class monitor that meets the VESA standards of refresh rate and resolution can function with the thin client. The thin client supports VESA Display Power Management Signaling (DPMS) and VESA Display Data Channel (DDC2B). A monitor that is attached to the thin client does not require either standard. You configure the resolution in each case at the client operating system (OS) level.

Your monitor may not support all resolutions and refresh rates.

Table 13. Monitor support: High color (16 bit) and 256 color (8 bit)

High color (16 bit) and 256 color (8 bit)	
Resolution (pixels)	**Refresh Rate (Hz)**
640x480	60, 70, 72, 75, 85
800x600	60, 70, 72, 75, 85
1024x768	60, 70, 72, 75, 85
1280x1024	60, 70, 72, 75, 85

Table 14. Monitor support: 256 color (8 bit)

256 color (8 bit)	
Resolution (pixels)	**Refresh Rate (Hz)**
1600x1200	60, 70, 72, 75

Appendix G. Connector pin information

The following tables define the connector pins that are used with the N70 thin client.

Table 15. Monitor Connector

Pin	Signal	Signal Direction
1	Red Video	Out
2	Green Video	Out
3	Blue Video	Out
4	Monitor Detect 2	In
5	Ground	– - -
6	Red Video Ground	- - -
7	Green Video Ground	- - -
8	Blue Video Ground	- - -
9	Not connected	- - -
10	Ground	- - -
11	Monitor Detect 0	In
12	Monitor Detect 1 / DDCSDA	In / Out
13	Horizontal Sync	Out
14	Vertical Sync	Out
15	Monitor Detect 3 / DDCSCL	In / Out
Connector shell	Protective Ground	- - -

Table 16. Keyboard and Mouse Connectors

Pin	Signal
1	Data
2	Reserved
3	Ground
4	+5V dc
5	Clock
6	Reserved

Table 17. Parallel Connector

Pin	Signal	Signal Direction
1	Strobe	In
2	Data 0	In
3	Data 1	In
4	Data 2	In
5	Data 3	In
6	Data 4	In
7	Data 5	In
8	Data 6	In
9	Data 7	In
10	ACKNLG	Out
11	BUSY	Out
12	PE	Out
13	SELECT	Out
14	AUTOFEEDXT	In
15	ERROR	Out

Table 17. Parallel Connector (continued)

Pin	Signal	Signal Direction
16	INIT	In
17	SELECTIN	In
18 - 25	Ground	- - -

Table 18. RJ-45 Twisted Pair Connector

Pin	Name	Function
1	TPOP	Transmit +
2	TPON	Transmit -
3	TPIP	Receive +
4/5	Not used	- - -
6	TPIN	Receive -
7/8	Not used	- - -

Table 19. USB connector

Pin #	Direction	Description
1	Power	Power (5V) for USB0
2	Bidir	Data positive for USB0
3	Bidir	Data negative for USB0
4	Power	Ground for USB0
5	Power	Power (5V) for USB1
6	Bidir	Data positive for USB1
7	Bidir	Data negative for USB1
8	Power	Ground for USB1

Table 20. Power supply connector

Pin #	Voltage+5V dc
1	+5V dc
2	+5V dc
3	+3.3V dc
4	+3.3V dc
5	+3.3V dc
6	+12V dc
7	Power Good
8	Ground
9	Ground
10	Ground
11	Ground
12	Ground
13	Ground
14	-12V dc

Appendix H. Workplace Environment

Workplace Preparation

- **Positioning the Monitor:** Choose a suitable place to position the monitor where it is not near fluorescent desk lighting or any equipment that produces magnetic fields that could cause interference. Ensure that the furniture or equipment can support the weight of the monitor. Allow at least 2 inches (50mm) ventilation space around the monitor and the logic unit/chassis assembly.
- **Height:** The monitor should be positioned so that the top of the screen is slightly below your eye level when you sit at your workstation.
- **Orientation:** Choose a position that gives the least reflection from lights and windows, usually at a right angle to any windows. The monitor should be positioned directly in front of you so that you do not have to twist your body.

Working Practices

- **Rest**: Take regular breaks. Vary your posture, and stand up and stretch occasionally as prolonged use of computer workstations can be tiring.
- **Back:** You should sit back in the chair and use the backrest.
- **Hands**: Use a light touch on the keyboard, keeping your hands and fingers relaxed. Allow a space in front of the keyboard to rest your wrists when not typing. Consider using a wristpad.
- **Eyesight:** Working with monitors, in common with any prolonged close work, can be visually demanding. Look away from the screen periodically and have your eyesight checked regularly.
- **Screen settings:** Set the screen brightness and contrast to a comfortable level. You may have to adjust this as the lighting changes during the day. Many application programs let you select color combinations which can help you to view in comfort.

Glare and lighting:

- Position the monitor to minimize glare and reflections from overhead lights, windows, and other light sources. Even reflected light from shiny surfaces can cause annoying reflections on your monitor screen. Place the monitor at right angles to windows and other light sources, when possible.
- Reduce overhead lighting, if necessary, by turning off lights or using lower wattage bulbs. If you install the monitor near a window, use curtains or blinds to block the sunlight.
- You might have to adjust the Brightness and Contrast controls on the monitor as the room lighting changes throughout the day. Where it is impossible to avoid reflections or to adjust the lighting, an antiglare filter placed over the screen might be helpful. However, these filters might affect the clarity of the image on the screen; try them only after you have exhausted other methods of reducing glare.
- Dust buildup compounds problems associated with glare. Remember to clean your monitor screen periodically using a soft cloth moistened with a nonabrasive liquid glass cleaner.

Air circulation :

- Your computer and monitor produce heat. The computer has a fan that pulls in fresh air and forces out hot air. The monitor lets hot air escape through vents. Blocking the air vents can cause overheating, which might result in a malfunction or damage.
- Place the computer and monitor so that nothing blocks the air vents; usually, 51 mm (2 in.) of air space is sufficient. Also, make sure the vented air is not blowing on someone else.

Electrical outlets and cable lengths :

- When arranging your workspace:
  - Avoid the use of extension cords.
  - When possible, plug the computer power cord directly into an electrical outlet
  - Keep power cords and cables neatly routed away from walkways and other areas where they might get kicked accidentally.

Appendix I. Thin Client Manager Operations Utility

You can optionally manage your N70 thin client using the Thin Client Manager (TCM) Operations Utility Release 2. TCM is a Java-based tool for central administration of IBM NetVista Thin Clients.

Description:

The following describes the TCM Operations Utility Release 2 content:

- Can manage NetVista Turbolinux and Turbolinux 7 Thin Clients and NetVista V2R1 Thin Clients (PTF 6, or later)
- Simple install, intuitive, user-friendly GUI
- Command line interface for automation of scripts
- Scalable to any size enterprises
- Servers supported:
  - Turbolinux 6.0
  - Red Hat Linux 6.2, 7.1
  - Microsoft® Windows NT Server 4.0
  - Microsoft Windows NT 4.0 Windows Terminal Server (WTS)
  - Microsoft Windows Workstation 4.0
  - Microsoft Windows 2000 Server
  - Microsoft Windows 2000 Advanced Server
  - Microsoft Windows 2000 Professional
- Operations include:
  - Software update
  - Shutdown or reboot
  - Wake on LAN
  - Advanced workstation configuration
  - Backup/restore
  - Change remote access authorization
  - Reset to factory defaults
  - Scheduling
  - Set inventory attributes
  - Resource reports
  - Broadcast messages
  - Host name resolution
  - Refresh workstation status
  - Setup Network Connections
- Manage assigning component profiles to groups
- Creating user/user groups as managed resources

Notices

This information has been developed for products and services that are offered in the U.S.A. IBM may not offer the products, services, or features that are discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications that cover subject matter that is described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

For license inquiries regarding double-byte character set (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing:

IBM World Trade Asia Corporation
Licensing
2-31 Roppongi 3-chome, Minato-ku
Tokyo 106, Japan

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

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and changes in both the products and the programs described in this publication at any time without notice.

References in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product, and use of those Web sites is at your own risk.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements, or other publicly available sources.

IBM has not tested those products and cannot confirm the accuracy of performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

If you are viewing this information softcopy, the photographs and color illustrations may not appear.

The drawings and specifications contained herein shall not be reproduced in whole or in part without the written permission of IBM.

IBM has prepared this publication for use by customer personnel for operating and planning for the specific machines indicated. IBM makes no representations that it is suitable for any other purpose.

Environmental Design

The environmental efforts that have gone into the design of this product signify IBM's commitment to improving the quality of its products and processes. Some of these accomplishments include the following:

- Elimination of the use of Class I ozone-depleting chemicals in the manufacturing process
- Reduction in manufacturing wastes
- Increased product energy efficiency

Normal power consumption for the thin client, while running applications, is approximately 18 Watts. For more information, contact an IBM account representative.

Product Recycling and Disposal

You can recycle components, such as structural parts and circuit cards, where recycling facilities exist. IBM does not currently collect and recycle used IBM products from customers in the United States other than those products that are involved in trade-in programs. Companies are available to disassemble, reuse, recycle, or dispose of electronic products. Contact an IBM account representative for more information.

This IBM thin client contains circuit boards with lead solder. Before you dispose of this unit, remove the circuit boards, and discard them according to local regulations or recycle them where facilities exist.

Trademarks

The following terms are trademarks of International Business Machines Corporation in the United States, or other countries, or both:

IBM
NetVista
Alert on LAN
Wake on LAN

Java, and all Java-based trademarks, and logos are trademarks, or registered trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

Celeron is a registered trademark of Intel Corporation.

Electronic Emission Notices

Federal Communications Commission (FCC) Statement

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

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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

Responsible Party:

International Business Machines Corporation
New Orchard Road
Armonk, NY 10504

Telephone: 1-919-543-2193

Industry Canada Compliance Statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

European Community Compliance Statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any

failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

Australia and New Zealand Class A Statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Glossary of abbreviations

A

AC. Alternating Current

ARP. Address Resolution Protocol

B

BIOS. Basic Input / Output System

BOM. Bill of Material

BOOTP. Bootstrap Protocol

C

CD. Compact Disc

CMOS. Complimentary Metal-Oxide Semiconductor

CRU. Customer-Replaceable Unit

D

DBCS. Double Byte Character Set

d.d.d.d. IP address format

DC. Direct Current

DDC. Display Data Channel

DDC2B. Display Data Channel (version 2B)

DHCP. Dynamic Host Configuration Protocol

DIMM. Dual In-line Memory Module

DPMS. Display Power Management Signaling

F

FAX. Facsimile

FCC. Federal Communications Commission

FTP. File Transfer Protocol

FRU. Field Replaceable Unit

G

GUI. Graphical User Interface

H

HTTP. Hypertext Transfer Protocol

Hz. Hertz or cycles per second

I

IBM. International Business Machines

ICA. Independent Computing Architecture

IDF. Image Description File

ISO. International Organization for Standardization

IP. Internet Protocol

I/O. Input/Output

J

JRE. Java Run-Time Environment

L

LA. Latin American

LAN. Local Area Network

LED. Light Emitting Diode

M

MAC. Medium Access Control

Mb. Megabit

MB. Megabyte

MHz. Megahertz

N

N70. IBM NetVista N70 Thin Client

NFS. Network File Server

O

OS. Operating System

P

PC. Personal Computer

PCI. Peripheral Component Interconnect

POST. Power On Self Test

R

RAM. Random Access Memory

ROM. Read Only Memory

S

SDF. Software Description File

SDRAM. Synchronous Dynamic Random Access Memory

T

TCM. Thin Client Manager

TCP/IP. Transmission Control Protocol / Internet Protocol

TFTP. Trivial File Transfer Protocol

TSE. Windows NT Server 4.0, Terminal Server Edition

U

UK. United Kingdom

URL. Uniform Resource Locator

US. United States

USB. Universal Serial Bus

UTP. Unshielded Twisted Pair

V

V. Volts

VESA. Video Electronics Standards Association

VGA. Video Graphics Array

W

W. Watts

WAN. Wide Area Network

WOL. Wake On LAN

WWW. World Wide Web

Index

T

U

V

W

Readers' Comments — We'd Like to Hear from You

NetVista™
N70 Thin Client
Reference
December 2001
To view or print the latest update, go to http://www.ibm.com/nc/pubs

Publication No. SA23-2827-00

Overall, how satisfied are you with the information in this book?

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Overall satisfaction	☐	☐	☐	☐	☐

How satisfied are you that the information in this book is:

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Accurate	☐	☐	☐	☐	☐
Complete	☐	☐	☐	☐	☐
Easy to find	☐	☐	☐	☐	☐
Easy to understand	☐	☐	☐	☐	☐
Well organized	☐	☐	☐	☐	☐
Applicable to your tasks	☐	☐	☐	☐	☐

Please tell us how we can improve this book:

Thank you for your responses. May we contact you? ☐ Yes ☐ No

When you send comments to IBM, you grant IBM a nonexclusive right to use or distribute your comments in any way it believes appropriate without incurring any obligation to you.

Name _____ Address _____

Company or Organization _____

Phone No. _____

Readers' Comments — We'd Like to Hear from You
SA23-2827-00

Cut or Fold
Along Line

Fold and Tape **Please do not staple** Fold and Tape

PLACE
POSTAGE
STAMP
HERE

IBM CORPORATION
ATTN DEPT 542 IDCLERK
3605 Highway 52 N
ROCHESTER MN
55901-7829

Fold and Tape **Please do not staple** Fold and Tape

SA23-2827-00

Cut or Fold
Along Line

SA23-2827-00