APPENDIX G :

<u>USER'S MANUAL</u>

T541 Flat Panel Monitor
User Guide

First Edition (June / 2002)

Note : For important information, refer to the Monitor Safety and Warranty manual that comes with this monitor.

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T541 Flat Panel Monitor User Guide

Contents

Setting up the monitor

System Hardware Requirements

This monitor requires a computer with a suitable on-board sub-system or Video Adapter card that can support XGA 1024 x 768, SVGA 800 x 600, or VGA 640 x 480 at 60Hz.

Handling Instructions

1. Do not support the monitor within the screen area. The Liquid Crystal Display is glass and can be damaged by rough handling or excessive pressure.
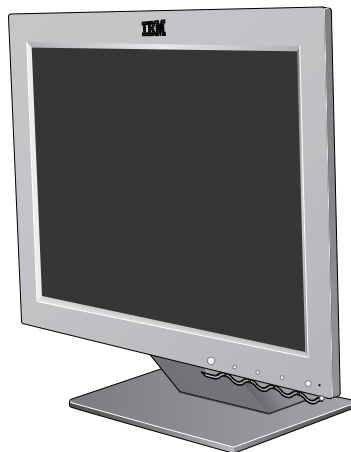
2. Before using your monitor for the first time, remove the clear protective film from the front of the screen.

Monitor Installation

Connecting your Monitor

1. Turn off your computer and all attached devices. Next, unplug the power cord(s) to your computer and all attached devices.
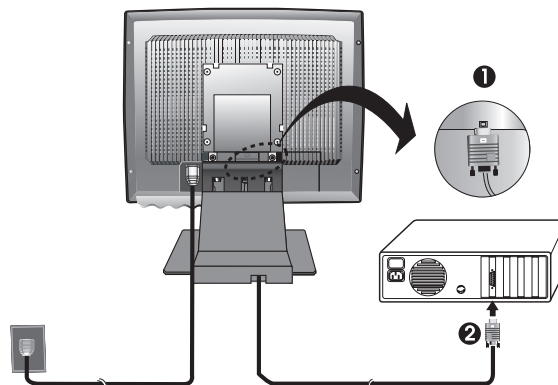
2. Connect the signal cable.
   The analog signal cable is already connected to your monitor.❶ The analog connector is the blue connector.
   ▪ When connecting the analog signal cable (Figure A)
     Connect the free end of the attached signal cable to the 15-pin Monitor port on the computer and tighten screws. ❷

(Figure A)

   ▪ If connecting a DVI-D digital signal cable (Figure B)
     Connect one end of the monitor signal cable to the white connector ❶ on the rear panel of the monitor. Connect the other end to the white connector ❷ on the rear panel of the computer and tighten the screws.

Cable not supplied (Optional)
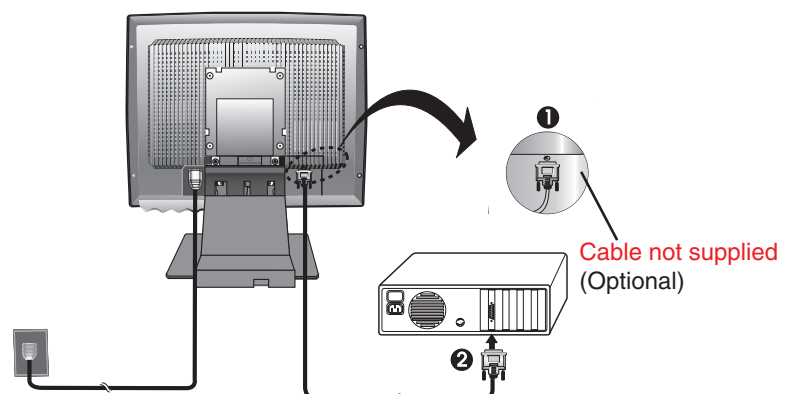
(Figure B)

3. Connect the power cord to the monitor and then plug the power cord into a properly grounded outlet. Next, reconnect the power cord(s) to your computer and all attached devices.

Switching on your Monitor

1. Switch on your monitor by pushing and releasing the power switch marked [⏻] at the front of the bezel.
   [To switch off your monitor, push and release the power switch again.]

2. Switch on your computer.

3. If you are using the analog connector, run AUTO SETUP by following the instructions in the *Auto Setup* section on page 8.

Monitor Driver Installation

Driver installation for Windows 95 or Windows 98

This section must be completed before continuing with the <u>*Windows95 or Windows98*</u> ***Auto Setup on page*** *9.*

i *On LCD monitors, unlike CRTs, a faster refresh rate does not improve display quality. IBM recommends using either 1024 x 768 at a refresh rate of 60Hz or 640 x 480 at a refresh rate of 60Hz.*

To use the Plug and Play feature in Microsoft® Windows® 95 or Windows 98, files should be loaded from the ***IBM Monitor CD***.

1. Turn off the computer and all attached devices.

2. Ensure that the monitor is connected correctly.

3. Turn on the monitor and then the system unit. Allow the system to boot into Windows95 or Windows98.

   Your computer's Plug and Play code may warn you that your system hardware has changed. This means that it has detected your new monitor for the first time.

4. Open the DISPLAY PROPERTIES window by clicking START, SETTINGS, CONTROL PANEL and then double - clicking on the DISPLAY icon.

5. Click the SETTINGS tab.

• ***In case of Windows 95 :***

6 - 1. Click the CHANGE DISPLAY TYPE button.

   2. Click the CHANGE MONITOR TYPE button.

• ***In case of Windows 98 :***

6 - 1. Click the ADVANCED button.

   2. Click the MONITOR tab.

   3. Open the UPGRADE DEVICE DRIVER WIZARD window by clicking on CHANGE button and then select the NEXT button.

   4. Click the "Display a list of the known drivers for this device so that I can choose a specific driver" and then select the NEXT button.

7. Insert the Setup CD into the CD driver: and click the HAVE DISK button.

8. Click OK.

9. Ensure that the CD drive letter is selected, and then select the 'Drivers' folder.

10. Choose **IBM T541** monitor and Click OK. The files will be copied from the CD to your hard disk drive.

11. Close all open windows and remove the CD.

12. Restart the system.

   The system will automatically select the maximum refresh rate and corresponding Color Matching Profiles.

Driver Installation for Windows 2000 or Windows Me

i *On LCD monitors, unlike CRTs, a faster refresh rate does not improve display quality. IBM recommends using either 1024 x 768 at a refresh rate of 60Hz or 640 x 480 at a refresh rate of 60Hz.*

To use the Plug and Play feature in Microsoft Windows 2000 or Microsoft Windows Millennium Edition(Me) files should be loaded from the **IBM Monitor CD**.

1. Turn off the computer and all attached devices.
2. Ensure that the monitor is connected correctly.
3. Turn on the monitor and then the system unit. Allow the system to boot into Windows 2000 or Windows Me.
4. Open the **DISPLAY PROPERTIES** window by clicking **START**, **SETTINGS**, **CONTROL PANEL** and then double-clicking the **DISPLAY** icon.
5. Click the **SETTINGS** tab.
6. Click the **ADVANCED** button.
7. Click the **MONITOR** tab.
8. Click the **PROPERTIES** button.
9. Click the **DRIVER** tab.
10. Open the **UPGRADE DEVICE DRIVER WIZARD** window by clicking on **UPDATE DRIVER** and then Click the **NEXT** button.
11. Select the "Display a list of the known drivers for this device so that I can choose a specific driver" and then Click the **NEXT** button.
12. Insert the Setup CD into the CD drive : and click the **HAVE DISK** button.
13. Click OK.
14. Ensure that the CD drive letter is selected, and then select the 'Drivers' folder.
15. Choose **IBM T541** monitor and Click OK. The files will be copied from the CD to your hard disk drive.
16. Close all open windows and remove the CD.
17. Restart the system.

    The system will automatically select the maximum refresh rate and corresponding Color Matching Profiles.

Driver Installation for Windows XP

This section must be completed before continuing with the <u>Windows XP</u> *Auto Setup on page 9.*

i On LCD monitors, unlike CRTs, a faster refresh rate does not improve display quality. IBM recommends using either 1024 x 768 at a refresh rate of 60Hz or 640 x 480 at a refresh rate of 60Hz.

To use the Plug and Play feature in Microsoft Windows XP files should be loaded from the **IBM Monitor CD**.

1. Turn off the computer and all attached devices.
2. Ensure that the monitor is connected correctly.
3. Turn on the monitor and then the system unit. Allow the system to boot into Windows XP.
4. Open the **DISPLAY PROPERTIES** window by clicking **START**, **SETTINGS**, **CONTROL PANEL** and then double-clicking the **DISPLAY** icon.
5. Click the **SETTINGS** tab.
6. Click the **ADVANCED** button.
7. Click the **MONITOR** tab.
8. Click the **PROPERTIES** button.
9. Click the **DRIVER** tab.
10. Open the **Hardware Update Wizard** window by clicking on **UPDATE DRIVER** and then Click the **NEXT** button.
11. Select the "Install from a list or Specific location(Advanced)" and then Click the **NEXT** button.
12. Insert the Setup CD into the CD drive : and click the **HAVE DISK** button.
13. Click OK.
14. Ensure that the CD drive letter is selected, and then select the 'Drivers' folder.
15. Choose **IBM T541** monitor and Click OK. The files will be copied from the CD to your hard disk drive.
16. Close all open windows and remove the CD.
17. Restart the system.

    The system will automatically select the maximum refresh rate and corresponding Color Matching Profiles.

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Image Setup for analog input

Auto Setup

**Before carrying out this section, it is very important that the correct monitor drivers have been installed.*(See pages 5 and 7)*

i The Setup Utility included on the setup CD displays a test pattern of dots. It does not replace or modify the display drivers.

i The Auto Setup instructions require the monitor to be warmed up for 15 minutes. This is not required for normal operation.

i If your computer does not run with the setup CD shipped with the monitor, refer to **Manual Setup** on page *11*.

i The AUTO SETUP process only applies to the current screen mode. When a new mode is selected, repeat this section to reset the monitor.

For digital input, image setup is not required.

When you first use your monitor, you must perform Auto Setup for analog input. If you are using digital input, continue with the instructions on page 12. This procedure sets up your monitor to process the video signals from your computer without image discoloration or smearing. After you perform Auto Setup, the settings are stored and used each time you turn on the monitor.

In order to optimize the displayed image a set-up utility is provided on the IBM Monitor CD. Operation of this utility is dependent on the operating system on your computer. You may choose to run AUTO SETUP for each operating system that you use. This means that if you sometimes use your monitor while running any version of Windows and sometimes also use it from within DOS (not a DOS window), you must run AUTO SETUP for both Windows and DOS. You may run versions of AUTO SETUP in any order.

Before you begin AUTO SETUP for your computer, make sure the computer video mode is set in the range of the supported screen resolution shown in the table on page 18.

You should perform AUTO SETUP for each screen mode you use.

AutoSetup for Windows 3.1, Windows 95, Windows 98, Windows 2000, Windows Me, Windows XP or Windows NT

i *If the monitor is in standby mode (STANDBY ON), it may automatically turn off while you are waiting for it to warm up.*

1. Turn on the monitor first; then the computer.

   If the message CHECK VIDEO CABLE is displayed, or if nothing is displayed, check:

   • that the video interface cable is not connected properly.
   • the correct video adapter card is not installed.

2. Wait approximately 15 minutes, until the monitor warms up.

3. Ensure that the icon bar and tool bar, if displayed are at the bottom of the screen.

4. Insert the CD labelled *'IBM Monitor CD'* into the CD drive.

i *The size and diversity of the dot pattern varies with the screen resolution.*

5. Check the operating system installed on your computer and follow the instructions from the table below.

Operating System	Step1	Step2	Step3
Windows 3.1	Open PROGRAM Manager	Select RUN	Type **'E:\TESTPAT'** and press ENTER
Windows 95			
Windows 98	Select START	Select RUN	
Windows 2000			
Windows Me			
Windows XP			
Microsoft Windows NT®4.0			

6. When the test pattern appears, press the Image Setup direct access button ← at the bottom of the monitor to run the image setup.

i *Position the mouse pointer at the bottom center of the screen. This allows AUTO SETUP to run properly*

7. To clear the Image Setup test pattern, press the ESC key on your keybord.

You have completed the monitor setup for Windows. If you use other operating systems, perform the appropriate AUTO SETUP for those systems and also see ***Adjusting the image settings in DOS*** on page 10.

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Adjusting the image settings in DOS

i *If the monitor is in standby mode (**STANDBY ON**), it may automatically turn off while you are waiting for it to warm up. If this happens, switch off the monitor and switch it on again after a few seconds.*

i *If you are using PC-DOS/V, change to U.S. mode by typing '**CHEV US**' and pressing **ENTER** at the command prompt.*
You must use when you run DOS Auto Setup.

i *The size and diversity of the dot pattern varies with the screen resolution.*
i *If the screen flickers, repeat the setup several times until the flicker is minimised, or adjust it manually by following refer to* ***Manual Setup*** *on page 11.*

1. Turn on the monitor first; then the computer.

    If the message CHECK VIDEO CABLE is displayed, or if nothing is displayed, check:
    • that the video interface cable is not connected properly.
    • the correct video adapter card is not installed.

2. Wait approximately 15 minutes, until the monitor warms up.
3. Insert the CD labelled 'IBM Monitor CD' into the CD drive.
4. Display the command prompt screen of the DOS full-screen display.
5. At the command prompt, type the CD drive letter**,** and press ENTER.
6. Type '**TESTPATD**' and press ENTER.
7. Select from the screen the number for the color or text mode you want to setup.
8. Select from the screen the number for the video mode you want to setup.
    You may repeat this process for as many of the color and video modes as you need.
9. When the test pattern appears, press the Image Setup direct access button ← at the bottom of the monitor to run the image setup.
10. To clear the Image Setup test pattern, press the ESC key on your keybord.
11. Type '**Exit**' at the command prompt to return to Windows.

If you use other operating systems, perform the appropriate Image Setup for those systems and also see
Image Setup Windows 3.1, Windows 95, Windows 98, Windows 2000, Windows Me, Window XP or Windows NT workstation **on page 9.**

Manually adjusting the image settings

Normally, you can complete the setup procedure using Image Setup, however, if your screen image is still distorted after you perform Image Setup or the setup CD does not run on your system, perform MANUAL SETUP.

1. Have your monitor turned on for about 15 minutes, until the monitor warms up.

2. Display the image you most frequently use on the screen.

3. Press the OSD Enter button ↵ at the botton of the monitor to display the initial OSD menu.

4. Use an Arrow button (← or →) to select the **IMAGE SET-UP** icon ⊠ and press the OSD Enter button ↵ to access the function.

5. Using an Arrow button (← or →), select MANUAL, press ← and then press → once to select COARSE. Left and right arrow adjustment indicators become illuminated (see page 16).

6. Use the Arrow buttons to manually adjust to correct (as much as possible) for jitter or noise in the image, then press ⊡► to save the changes.

7. Use an Arrow button to select FINE and press the ↵ button.

8. Use the Arrow buttons again to tune the image to your liking.

9. When finished, press the Exit button ⊡► four times to exit from the OSD.

You have completed the monitor setup.

Ergonomic Considerations

Workplace Preparation

Height

Position the monitor 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.

- Positon the monitor directly in front of you so that you do not have to twist your body to use it.

- Tilt the monitor to a comfortable viewing angle.

Working Practices

Rest

Take regular breaks. Vary your posture, stand up and stretch occasionally as prolonged use of computer workstations can be tiring.

Back

Sit back in your 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 these settings as the lighting changes during the day. Many application programs let you select color combinations which can help you to view in comfort. See the *User controls* section on page 14 for more information.

Adjusting the Monitor Position

i *With the IBM Flat Panel Monitor, you can adjust its position in various ways for maximum comfort.*

Viewing Angle
You can tilt the screen forward and backward as shown below.

(Figure A)

Caring for your Monitor

Be sure to turn off the power before you perform any maintenance on the monitor. Clean your monitor as follows:

• Gently wipe the covers and the screen with a soft cloth.

• Remove finger marks and grease with a damp cloth and mild detergent.

• Never use flammable cleaning materials to clean your IBM monitor or any other electrical apparatus.

Adjusting Your LCD Monitor

User controls

USER CONTROL FEATURES

Icon	Monitor controls
⏻	Switches the monitors on and off.
↵	Display main OSD menu and selects highlighted menu item.
← **and** →	Moved the cursor to highlight icons or make adjustments.
⎋	Exits from current OSD menu.

i *The image is already optimized for many display modes, however the user controls can be used to adjust the image to your liking.*

i *The settings are saved after adjustment and when exiting the OSD and will be effective thereafter.*

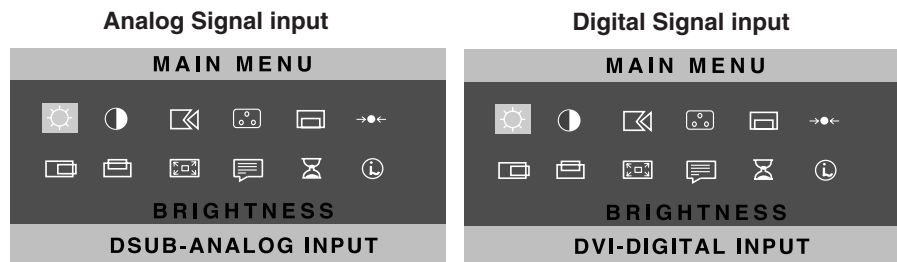| Icon	Direct Access Functions
☼ →	Bring up Brightness adjustment.
⬓ ←	Bring up auto image setup.
↵	**CONTROLS LOCK / UNLOCK** This feature allows you to secure the current control settings, while allowing the user to adjust Brightness or Contrast, so that they cannot be inadvertently changed. Push and hold the enter button[↵] for 10 seconds; the message "Controls Locked" appears. You can unlock the OSD controls at any time by pushing the enter button[↵] for 10 seconds; the message "Controls Unlocked" will appear.
1 ⇄ 2	Switch between input signals.

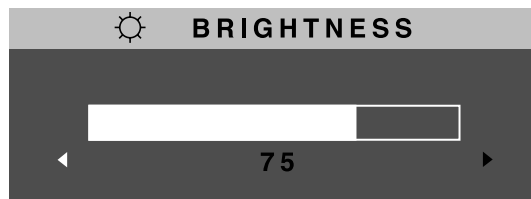# On-screen display (OSD) controls

The settings adjustable with the user controls are viewed through the On - Screen Display (OSD). Press the enter button [↵] to display the main OSD menu.

Initial appearance of OSD

main menu;

Analog Signal input

MAIN MENU

BRIGHTNESS

DSUB-ANALOG INPUT

Digital Signal input

MAIN MENU

BRIGHTNESS

DVI-DIGITAL INPUT

sub menu;

☼ BRIGHTNESS

◄   7 5   ►

OSD functions

OSD Icon	Description	sub-menu(s)	Control and Adjustments
☼ **BRIGHTNESS**	Adjusts brightness		← →
◑ **CONTRAST**	Adjusts contrast		← →
◁ **IMAGE SET-UP**	The IMAGE SET-UP function is used to adjust the level of noise in the video signal which causes horizontal lines or areas on the screen where the image appears to be unstable and jitters or shimmers. This can be done automatically or manually. • It is not applicable to digital input.	**AUTO**	If **AUTO** is selected the image will automatically adjust

OSD Icon	Description	Sub-menu(s)	Controls and Adjustments
IMAGE SET-UP CONT	If manual is selected, the user will go to the manual adjustment screen.	**MANUAL** • **Fine** • **Coarse**	To adjust the focus of the display. This item allows you to remove any horizontal noise and clear or sharpen the image of characters. **Fine** adjustments should be done after adjusting the **Coarse** .
COLOR	Select the COLOR MODE you find most comfortable or fine tune the colors using the USER COLOR MODE menu, if necessary.	**COLOR MODE**	**Preset 1** (Pink White) **Preset 2** (Normal White) **Preset 3** (Blue White)
		USER COLOR MODE- • Red • Green • Blue	 Increases or decreases redness Increases or decreases greenness Increases or decreases blueness
OSD Position	Changes the position of the OSD on the screen.	**H-POSITION**	← →
		V-POSITION	← →

OSD Icon	Description	Sub-menu(S)	Controls and Adjustments
→O← **RESET**	Reset should return all available functions (apart from language which should not change unless adjusted via the LANGUAGE menu) fo their factory presets.	• **YES** • **NO**	
▭ **H-POSITION**	Moves the screen left and right . • Is not availible with a digital input		
▭ **V-POSITION**	Moves the screen up and down. • Is not availible with a digital input		
▭ **OSD SIZE**	Changes the size of the OSD menu on the screen.	• **SMALL** • **MEDIUM** • **BIG**	
▭ **Language**	The language chosen affects only the language of the OSD. Select one of the five language to use for the OSD. It has no effect on any software running on the computer.	• **ENGLISH** • **FRANCAIS** • **DEUTSCH** • **ITALIANO** • **ESPANOL**	
⌛ **OSD TIME**	To select OSD display duration time. (5 - 60 seconds)		
ⓘ **Information**	Display model name, serial number, year of manufacture and microcode level. Display all preset modes stored in the monitor. Display all user modes stored in the monitor. The current display mode will be shown at the base of all information screens.	• **INFORMATION** • **PRESET MODES** • **USER MODES** Use the ← and → buttons to move between information screens.	

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Further Information

Display modes

The display mode the monitor uses is controlled by the computer. Therefore, you should refer to your computer documentation for details on how to change display modes.

The image size, position and shape may change when the display mode changes. This is normal and the image can be readjusted using AUTO SETUP and the monitor controls.

Unlike CRT monitors, which require a high refresh rate to minimize flicker, TFT technology is inherently flicker-free. If possible, configure your computer for 1024 x 768 addressability at 60Hz vertical refresh rate.

For the display modes listed below, the screen image has been optimized during manufacture.

Factory Set Display Modes

Addressabillty	Refresh Rate	Horizontal Frequency
640 x 480	60 Hz	31.5 kHz
640 x 480	66 Hz	35.0 kHz
640 x 480	75 Hz	37.5 kHz
640 x 350	70 Hz	31.5 kHz
720 x 400	70 Hz	31.5 kHz
800 x 600	56 Hz	35.2 kHz
800 x 600	60 Hz	37.9 kHz
800 x 600	72 Hz	48.1 kHz
800 x 600	75 Hz	46.9 kHz
832 x 624	75 Hz	49.7 kHz
1024 x 768 †	60 Hz	48.4 kHz
1024 x 768	70 Hz	56.5 kHz
1024 x 768	75 Hz	60.0 kHz

† Recommended

Note : VESA timings are as detailed in the VESA "Display Monitor Timing Specification". Version 1.0, Revision 0.8, Dated 09/17/98.

Power Management

To benefit from power management, the monitor must be used in conjunction with a computer that implements the Video Electronics Standards Association (VESA) Display Power Management Signaling (DPMS) Standard.

The power management feature is invoked when the computer recognizes that you have not used your mouse or keyboard for a user-definable period. There are several states as described in the table below.

As an ENERGY STAR 2000® Partner, **IBM** has determined that this product meets the ENERGY STAR 2000® guidelines for energy efficiency.

IBM recommends that you switch off your monitor at the end of each working day, or whenever you expect to leave it unused for long periods during the day.

State	Power Indicator	Screen	Restoring Operation	Compliance
On	Steady green	Normal		
Active off	Steady amber	Blank	Press a key or move the mouse.‡	ENERGY STAR 2000®

‡ There may be a slight delay before the picture reappears.

Troubleshooting

If you have a problem setting up or using your monitor, you may be able to solve it yourself. Before calling your retailer or IBM, try the suggested actions that are appropriate to your problem.

Problem	Possible Cause	Suggested Action	Reference
Screen is blank and power indicator is off.	No power to monitor.	• Ensure that the electrical outlet and the monitor are both switched on. • Check that the power cord is firmly plugged into the electrical outlet and the power supply unit. • If the power cord plug has a removalble fuse, replace it. • Try another power cord. • Try another electrical outlet. • Check the power connection at the back of the panel.	*Connecting your Monitor* section on page 3.
Screen is blank and power indicator is steady green.	Brightness and Contrast may be too low.	• Adjust brightness and contrast.	*User controls* section on page 14.
Screen is blank and power indicator is steady amber.	The monitor is in the Power Management Standby state.	• Press any key on the keyboard or move the mouse to restore operation. • Check the Power Management software on your computer. • Press the ⊡► to switch between analog and digital mode. If the panel is the wrong mode for the signal being provided, the monitor appears to go into sleep mode.	*Power Management* section on page 19.

Problem	Possible Cause	Suggested Action	Reference
Screen is blank and power indicator is flashing green every 0.5 second	Display mode of the computer is outside the range of the monitor	• Reconfigure key on the computer to use a supported display mode.	***Further Information*** section on page 18.
CHECK VIDEO CABLE message is shown and power indicator is steady amber.	The monitor is not receiving a video signal	• Check that the signal cabel is firmly connected to the computer. • Check that no pins are bent in the signal cable connector.	***Connecting your monitor*** section on page 3.
Image appears to be smeared	There are noises in the video signal	• Select IMAGE SET-UP menu in the OSD. Then select MANUAL to adjust FINE / COARSE settings.	***User Controls*** section on page 14.
Image appears to be discolored	The color setting may be incorrect.	• Adjust the Color settings.	***User Controls*** section on page 14.
A few dots are missing, discolored, or inappropriately lighted.	The LCD contains over 2,300,000 thin-film transistors (TFTs). A small number of missing, discolored, or lighted dots may be present on the screen, which is an intrinsic characteristic of the TFT LCD technology and is not an LCD defect.		

i *For image problems, you may want to run AUTO SETUP again before consulting to this section. In most cases, AUTO SETUP can fix the problems. See **Auto Setup for the computer** on page 8 for details.*

Specifications

This color monitor (Type-model 9512-Hxx) uses a 15-inch TFT LCD.

i *Power consumption figures are for the monitor and the power supply combined.*

Dimensions	Width: Depth: Height:	365.2 mm 202.7 mm 355.3 mm
Weight		4.3 kg (9.48 lbs)
Image	Viewable Image Size: Maximum Height: Maximum Width: Pixel Pitch:	15-inch (381.0 mm) 304.1 mm 228.1 mm 0.297 mm (H) x 0.297 mm (V)
Power Input	Supply Voltage: Rated Current:	100 - 240 Vac 60/50 ± 3Hz 0.6A
Power Consumption	Normal Operation: Active off: Off:	< 35 W < 3 W < 1 W
Video Input	Input Signal:	Analog-75 ohm 0.7V Digital-DVI 1.0
	Horiz. Addressability: Vert. Addressability: Clock Frequency:	1024 pixels (max) 768 lines (max) 80 MHz (Digital) 80 MHz(Analog)
Sync Input	Type	Analog - Separate, Composite, SOG Digital-DVI 1.0
Communications	VESA DDC:	2B, 2AB
Supported Display Modes	Standard modes : Horiz / Vert Freq:	IBM, VESA, MAC See Factory Set Display Modes on page 18. See Display Mode Ranges on page 23.

Environment	Temperature:
	   Operating:
	   Storage:
	   Shipping:
	Humidity:
	   Operating:
	   Storage:
	   Shipping:
		
		10 to 35° C
		- 20 to 60° C
		- 20 to 60° C
		
		10 to 80%
		5 to 95%
		5 to 95%

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Display Mode Ranges

Addressabillty	Refresh Rate / Range (+ / - 3%)	Horizontal Frequency / Range (+ / - 3%)
640 x 480	58.2 ~ 61.8 Hz	30.56 ~ 31.45 kHz
640 x 480	64.0 ~ 68.0 Hz	34.95 ~ 36.05 kHz
640 x 480	72.8 ~ 77.3 Hz	36.38 ~ 38.63 kHz
640 x 350	67.9 ~ 72.1 Hz	30.56 ~ 31.45 kHz
720 x 400	67.9 ~ 72.1 Hz	30.56 ~ 31.45 kHz
800 x 600	54.3 ~ 57.7 Hz	34.14 ~ 36.26 kHz
800 x 600	58.2 ~ 61.8 Hz	36.76 ~ 39.04 kHz
800 x 600	69.8 ~ 74.2 Hz	46.66 ~ 49.54 kHz
800 x 600	72.8 ~ 77.3 Hz	45.49 ~ 48.31 kHz
832 x 624	72.8 ~ 77.3 Hz	48.21 ~ 51.19 kHz
1024 x 768	58.2 ~ 61.8 Hz	46.95 ~ 49.85 kHz
1024 x 768	67.9 ~ 72.1 Hz	54.81 ~ 58.20 kHz
1024 x 768	72.8 ~ 77.3 Hz	58.20 ~ 61.80 kHz

Compliances

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.
• Increase the separation between the equipment and receiver.
• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
• Consult an IBM authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from IBM authorized dealers. 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.

Declaration of Conformity Trade name
Trade name: IBM Corporation
Model Nos.: 9512-HW0 and 9512-HB0
Responsible Party: LG Electronics USA Inc.
Address: 6133 North River Road Suite 1100 (Riverview Plaza) Rosemont, Illinois, 60018
Telephone No.: 847-692-4630 ext 329
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.

Power Cords
For your safety, IBM provides a power cord with a grounded attachment plug to use with this IBM product. To avoid electrical shock, always use the power cord and plug with a properly grounded power outlet.

IBM power cords used in the United States and Canada are listed by the Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).

For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.

For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.

For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.

IBM power cords for a specific country or region are usually available only in that country or region.

IBM power cord part number	Used in these countries or regions
13F9959	Antigua, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Island, Canada, Cayman Islands, Costa Rica, Columbia, Dominican Republic, Guam, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Japan, Mexico, Netherlands Antilliles, Nicaragua, Panama, Peru, Phillipines, Saudi Arabia, Thailand, Taiwan, United States, Venezuela
1838576	Antigua, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Island, Canada, Cayman Islands, Costa Rica, Columbia, Dominican Republic, Guam, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Japan, Mexico, Netherlands Antilliles, Nicaragua, Panama, Peru, Phillipines, Taiwan, United States, Venezuela
13F9978	Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaidjan, Belarus, Benin, Belgium, Bosnia, Burkina Faso, Burundi, Cameroon, Cambodia, Cape Verde, Central African Republic, Chad, Congo (Republic of), Comoros, Congo (Democratic Republic of), Cote D'Ivoire (Ivory Coast), Croatia, Czech Rep, Dahomey, Djibouti, Equatorial Guinea, Eqypt, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Gabon, Georgia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Korea (South), Kyrgyzstan, Laos, Latvia, Lebanaon, Lithuania, Luxemborg, Macedonia, Madagascar, Mali, Martinique, Mauritania, Mauritus, Mayotte, Moldavia, Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Nigeria, Norway, Poland, Portugal, Reunion, Romania, Russia, Rwanda, Sao Tome, Saudi Arabia, Senegal, Serbia, Slovakia, Solvenia, Somalia, Spain, Suriname, Sweden, Syria, Tajikistan, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, USSR (C.I.S.), Uzbekistan, Vanuatu, Vietnam, Wallia and Futuna, Yugoslavia, Zaire
13F9996	Denmark
14F0050	Lichtenstein, Switzerland
14F0086	Israel
14F0068	Chile, Italy, Libya
14F0014	Bangladesh, India, Lesotho, Maldives, Nambia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda
14F0032	Bahrain, Brunei, Botswana, Channel Islands, Cyprus, Dominica, Gambia, Ghana, Grenada, Guyana, Hong Kong, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Qatar, Seychelles, Saint Kitts & Nevis, Saint Lucia, Saint Vincent and the Grenadines, Sierra Leone, Singapore, Sudan, Tanzania, Trinidad & Tobago, United Arab Emirate (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe

IBM power cord part number	Used in these countries or regions
13F9939	Australia, Fiji, New Zealand, Papua New Guinea
02K0545	China
36L8879	Argentina, Paraguay, Uruguay

Industry Canada Class B emission compliance statement

This Class B digital apparatus complies with Canadian ICES-003.

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

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de classe B est conforme à la norme NMB-003 du Canada.

TCO Compliances Section

 Models 9512-HB0 comply with TCO '95 guidelines.

 Models 9512-HW0 comply with TCO '99 guidelines

Congratulations!
You have just purchased a TCO'95 or TCO'99 approved and labeled product! Your choice has provided you with a product developed for professional use. Your purchase has also contributed to reducing the burden on the environment and also to the further development of environmentally adapted electronics products.

Why do we have environmentally labeled computers?
In many countries, environmental labeling has become an established method for encouraging the adaptation of goods and services to the environment. With the growing manufacture and usage of electronic equipment throughout the world, there is a recognized concern for the materials and substances used by electronic products with regards to their eventual recycling and disposal. By proper selection of these materials and substances, the impact on the environment can be minimized.

There are also other characteristics of a computer, such as energy consumption levels, that are important from the viewpoints of both the work (internal) and natural (external) environments. Electronic equipment in offices is often left running continuously, resulting in unnecessary consumption of large amounts of energy and additional power generation. From the standpoint of carbon emissions alone, it is vital to save energy.

What does labeling involve?
This product meets the requirements for the TCO'95 or TCO'99 scheme which provides for international and environmental labeling of personal computers. The labeling scheme was developed as a joint effort by the TCO (The Swedish Confederation of Professional Employees), Svenska Naturskyddsforeningen (The Swedish Society for Nature Conservation) and Statens Energimyndighet (The Swedish National Energy Administration)
Approval requirements cover a wide range of issues: environment, ergonomics, emission of electric and magnetic fields, energy consumption and electrical safety.

Environmental criteria impose restrictions on the presence and use of heavy metals, brominated and chlorinated flame retardants, CFCs (freons) and chlorinated solvents, and other materials . The product must be prepared for recycling and the manufacturer is obliged to have an environmental policy which must be adhered to in each country where the company implements its operational policy.

Energy requirements include a demand that the computer and/or display, after a certain period of inactivity, shall reduce its power consumption to a lower level in one or more stages. The length of time to reactivate the computer shall be reasonable for the user.
Labeled products must meet strict environmental demands, for example, in respect of the reduction of electric and magnetic fields as well as physical and visual ergonomics.

Below you will find a brief summary of the environmental requirements met by this product. The complete environmental criteria document may be ordered from:

TCO Development
SE-114 94 STOCKHOLM, Sweden
Fax: +46 8 782 92 07
E-mail (Internet): development@tco.se
Current information regarding TCO'99 approved and labeled products may also be obtained via the Internet, using the address: http://www.tcodevelopment.com/

Environmental requirements
Flame retardants
Flame retardants are present in printed circuit boards, cables, wires, casings and housings. Their purpose is to prevent, or at least to delay the spread of fire. Up to 30% of the plastic in a computer casing can consist of flame retardant substances. Most flame retardants contain bromine or chlorine, and those flame retardants are chemically related to PCBs. Both the flame retardants containing bromine or chlorine and the PCBs are suspected of giving rise to health effects, including reproductive damage in fish-eating birds and mammals, due to the bio-accumulative* processes when not disposed of in accordance with strict standards for disposal.

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*Bio-accumulative is defined as substances which accumulate within living organisms.

The relevant TCO'99 demand requires that plastic components weighing more than 25 grams must not contain flame retardants with organically bound bromine or chlorine. Flame retardants are allowed in the printed circuit boards since no substitutes are available.

Cadmium**
Cadmium is present in rechargeable batteries and in the colour-generating layers of certain computer displays.
The relevant TCO'99 requirement states that batteries, the colour-generating layers of display screens and the electrical or electronics components must not contain any cadmium.

Mercury**
Mercury is sometimes found in batteries, relays and switches. The relevant TCO'99 requirement states that batteries may not contain any mercury. It also demands that mercury is not present in any of the electrical or electronics components associated with the labeled unit. There is however one exception. Mercury is, for the time being, permitted in the back light system of flat panel monitors as there today is no commercially available alternative. TCO aims on removing this exception when a mercury free alternative is available.

CFCs (freons)
The relevant TCO'99 requirement states that neither CFCs nor HCFCs may be used during the manufacture and assembly of the product or in its packaging. CFCs (freons) are sometimes used for washing printed circuit boards. CFCs break down ozone and thereby damage the ozone layer in the stratosphere, causing increased reception on earth of ultraviolet light. This restriction assures that further damage to the ozone layer form this type of equipment will be eliminated.
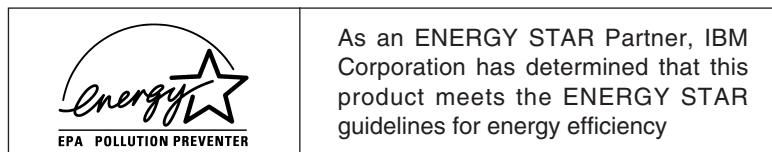
Lead**
Lead can be found in picture tubes, display screens, solders and capacitors. The relevant TCO'99 requirement permits the inclusion of lead since no replacement has yet been developed.
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**Lead, Cadmium and Mercury are heavy metals which are bio-accumulative.

Energy Star Compliances Section

| | As an ENERGY STAR Partner, IBM Corporation has determined that this product meets the ENERGY STAR guidelines for energy efficiency |

Congratulations!
You have just purchased an ENERGY STAR qualified product

What is an ENERGY STAR (R) qualified product?
The ENERGY STAR program is a voluntary partnership between the U.S. Environmental Protection Agency / Dept. of Energy and Partners to reduce pollution and save energy. An ENERGY STAR qualified product meets or exceeds the energy criteria defined in an MOU (Memorandum of Understanding) for that product category. As an ENERGY STAR Partner, IBM offers ENERGY STAR qualified computers, monitors and printers that meet the growing performance and networking needs of customers while reducing energy use, saving you money and improving the environment.

IBM is a recognized leader in providing energy efficient office products. In 1998 and 1999, IBM received the ENERGY STAR Computer Partner of the Year award in the office equipment category and in 2001, IBM received the first ENERGY STAR Excellence in Corporate Commitment award. ENERGY STAR products save you more -- look for the ENERGY STAR label and program information on IBM products, product literature, Web sites, packaging and promotional material.

ENERGY STAR (R)
Current criteria and information regarding the ENERGY STAR program can be found at
http://www.energystar.gov

MPRII

This product complies with Swedish National Council for Metrology (MPR) standards issued in December 1999 (MPRII) for very low frequency (VLF) and Extremely low frequency (ELF) emissions.

Electronic emission notices

Hinweise

Gemäß der Amtsblätter des BMPT Nm. 61Ú1991 und 6Ú1992 wird der Betreiber darauf aufmerksam gemächt, daß die von ihm mit diesem Gerät zusammengestellte Anlage auch den technischen Bestimmungen dieser Amtsblätter genügen muß.

Aus ergonomischen Gründen wird empfohlen, die Grundfarbe Blau nicht auf dunklem Untergrund zu verwenden (schlechte Erkennbarkeit, Augenbelastung bei zu geringem Zeichenkontrast).

Aus ergonomischen Gründen sollten nur Darstellungen auf dunklem Hintergrund bei Vertikalfrequenzen ab 60 Hz (ohne Zeilensprung) benutzt werden.

Die Konvergenz des Bildes kann sich auf Grund des Magnetfeldes am Ort der Aufstellung aus der Korrekten Grundeinstellung verändern. Zur Korrektur empfiehlt es sich deshalb, die Regler an der Frontseite für H STAT und V STAT so einzustellen, daß die getrennt sichtbaren Farblinien für Rot. Grün und Blau bei z.B. der Darstellung eines Buchstabens zur Deckung (Konvergenz) gelangen. Siehe hierzu auch die Erklärungen zu H STAT und V STAT.

European Union (EU) Statement

This product is in conformity with the protection requirements of the EU Council Directive 89/366/ECC on the approximation of the laws of the Member States relating to electromagnetic compatibility

IBM can not 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.

This product has been tested and found to comply with the limits for Class B Information Technology Equipment according to CISPR 22 Ú European Standard EN55024:1998. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication devices.

Properly shielded and grounded cables and connectors must be used in order to reduce the potential for causing interference to radio and TV communications and to other electrical or electronic equipment. Such cables and connectors are available from IBM authorised dealers.

In accordance with EN 55024:1998 1992, Performance Criterion A:, it should be noted that in the presence of certain electromagnetic fields, some screen jitter may be observed.

Spécifications de la CEE

Ce produit est conforme aux exigences de protection de la directive 89/ 336/ EEC du Conseil de l'UE sur le rapprochement des lois des États membres en matière de compatibilité électromagnétique.

IBM ne peut accepter aucune responsabilité pour le manquement aux exigences de protection résultant d'une modification non recommandée du produit, y compris l'installation de cartes autres que les cartes IBM.

Ce produit a été testé et il satisfait les conditions de l'équipement informatique de Classe B en vertu de CISPR22 / Standard européen EN55024:1998. Les conditions pour l'équipement de Classe B ont été définies en fonction d'un contexte résidentiel ordinaire afin de fournir une protection raisonnable contre l'interférence d'appareils de communication autorisés.

Des câbles blindés et correctment reliés à la terre doivent être utilisés pour réduire les risques d'interférence avec des communications radio et télévisées, ainsi qu'avec des équipements électriques ou électroniques. Ces câbles et connecteurs sont disponibles auprés de vos revendeurs IBM agréés.

Conformément à la norme EN 55024:1998 (Critére de Performance A), l'utilisateur doit être conscient du fait qu'en présence de certains champs électromagnétiques, l'image peut être instable.

Erklärung für die Europäische Union (EU)

Zulassungbescheinigunglaut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) vom 30. August 1995 (bzw. der EMC EG Richtlinie 89/336):

Dieses Gerät ist berechtigt in Übereinstimmungmit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.
Verantwortlich für die Konformitätserklärung nach Paragraph 5 des EMVG ist die:
IBM Deutschland Informationssysteme GmbH, 70548 Stuttgart.

Informationen in Hinsicht EMVG Paragraph 3 Abs. (2) 2:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024:1998 und EN55024:1998 Klasse B.

EN 55082 Hinweis:

"Wird dieses Gerät in einer industriellen Umgebung betrieben (wie in EN 55082:B festgetlegt), dann kann es dabei eventuell gestört werden. In solch einem FAll ist der Abstand bzw. die Abschirmungzu der industriellen Störquelle zu vergrößern."

Anmerkung:
Um die Einhaltung des EMVG sicherzustellen sind die Geräte, wie in den IBM Handbüchern angegeben, zu installieren und zu betreiben.

Declaración de la Unión Europea (UE)

Este producto satisface los requisitos de protección del Consejo de la UE, Directiva 89/ 336/ CEE en lo que a la le gislatura de los Estados Miembros sobre compatibilidad electroma gnética se refiere.

IBM no puede aceptar responsabilidad al guna si este producto deja de satisfacer dichos requisitos de protección como resultado de una modificación no recomendada del producto, inclu yendo el ajuste de tarjetas de opción que no sean IBM.

Este producto ha sido probado y satisface los límites para Equipos Informáticos Clase B de conformidad con el Estándar CISPR22 y el Estándar Europeo EN55024:1998. Los límites para los equipos de Clase B se han establecido para entornos residenciales típicos a fin de proporcionar una protección razonable contra las interferencias con dispositivos de comunicación licenciados.

Se deben utilizar concetores y cables debidamente protegidos y conectados a tierra a fin de reducir las posibilidades de que se produzcan interferencias con comunicaciones por radio o televisión y otros equipos eléctricos o electrónicos. Este tipo de cables y conectores pueden adquirirse en concesionarios autorizados de IBM.

De acuerdo con la norma EN 55024:1998, Performance Criterion A, habría que destacar que en presencia de determinados campos electroma gnéticos, podría observarse una marcada inestabilidad e la imagen.

Dichiarazione di conformità dell'Unione Europea (EU)

Questo prodotto è conforme alle normative di protezione ai sensi della Direttiva del Consi glio dell'Unione Europea 89/ 336/ CEE sull'armonizzazione le gislativa degli stati membri in materia di compatibilità elettromagnetica.

IBM non accetta responsabilità alcuna per la mancata conformità alle normative di protezione dovuta a modifiche non consi gliate al prodotto, compresa l'installazione di schede e componenti di marca diversa da IBM.

Le prove effettuate sul presente prodotto hanno accertato che esso rientra nei limiti stabiliti per 4
le le apparecchiature di informatica Classe B ai sensi del CISPR 22 / Norma Europea EN55024:1998. I limiti delle apparecchiature della Classe B sono stati stabiliti al fine di fornire ra gionevole protezione da interferenze mediante dispositivi di comunicazione in concessione in ambienti residenziali tipici.

Utilizzare cavi e connettori colle gati a terra per ridurre il rischio potenziale di interferenza delle comunicazioni radiotelevisive e di a; tri apparecchi elettrici o elettronici. I cavi sono disponibili presso i rivenditori IBM.

In accordo con quando previsto nel documento EN 55024:1998, Performance Criterion A, é importante sottolineare che in presenza di determinati campi elettroma gnetici é possibile che si verifichi un certo tremolio delle immagini.

Europeiska unionen (EU)

Denna produkt har testats och följer gränsvärdena för Klass B Information Technology Equipment enligt CISPR 22 Ú Europeisk standard EN55024:1998. Gränsvärden för Klass B-utrutning utgår frår vanliga bostadsområden för att ge ett rimligt skydd mot störningar i kommunikationsenheter.

Korrekt avskärmade och jordade kablar och kontakter måste användas för att minska risken för störningar i radio- och TV-kommunikationer och annan elektrisk utrustning. Sådana kablar och kontakter finns tillgängliga hos auktoriserade IBM-återförsäljare.

I enlighet med EN 55024:1998 1992, Performance Criterion A påpekas följande: I närheten av en del elektromagnetiska fält kan vissa bildstörningar uppstår på skärmen.

Deutsche EMV-Direktive (electromagnetische Verträglichkeit)

Dieses Gerät ist berechtigt in Übereinstimmung mit dem deutschen EMVG vom 9.Nov.92 das EG-Konformitätszeichen zu führen.
Der Aussteller der Konformitätserklärung ist die IBM UK, Greenock.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse B.

이 기기는 가정용으로 전자파 적합등록을 한 기기로서
주거지역에서는 물론 모든 지역에서 사용할 수 있습니다

VCCI Class B Notice (Japan Only)

This equipment complies with the limits for a Class B digital device (devices used in or adjacent to a residential environment) and conforms to the standards for information technology equipment that are set by the Voluntary Control Council for Interference for preventing radio frequency interference in residential areas.

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に
基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的
としていますが、この装置がラジオやテレビジョン受信機に近接して使用される
と、受信障害を引き起こすことがあります。
　取扱説明書に従って正しい取り扱いをして下さい。

Japanese statement of compliance for products less than or equal to 20 A per phase:

高調波ガイドライン適合品