StudioWorks 221U Monitor

User's Guide
Benutzerhandbuch
Manuel d'utilisation
Guida Utente
Gula del Usuario

Notice

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Introduction

Thank you for purchasing a high resolution monitor. It will give you high resolution performance and convenient reliable operation in a variety of video operating modes.

Features

- The monitor is a 21 inches (20 inches viewable) intelligent, microprocessor based monitor compatible with most analog RGB (Red, Green, Blue) display standards, including IBM PC®, PS/2®, Apple®, Macintosh®, Centris®, Quadra®, and Macintosh II family.
- USB (Universal Serial Bus) ports at the back of the monitor are prepared for the USB cable and hub. You can easily and flexibly connect USB-designed devices-such as a mouse, keyboard or printer- to the monitor for true Plug and Play function.
- The monitor provides crisp text and vivid color graphics with VGA, SVGA, XGA, and VESA Ergonomic modes (non-interlaced), and most Macintosh compatible color video cards when used with the appropriate adaptor. The monitor's wide compatibility makes it possible to upgrade video cards or software without purchasing a new monitor.
- Digitally controlled auto-scanning is done with the micro-processor for horizontal scan frequencies between 30 and 115kHz, and vertical scan frequencies between 50-200Hz. The microprocessor-based intelligence allows the monitor to operate in each frequency mode with the precision of a fixed frequency monitor.
- The microprocessor-based digital controls allow you to adjust conveniently a variety of image controls by using the OSD (On Screen Display).
- This monitor is capable of producing a maximum horizontal resolution of 1600 dots and a maximum vertical resolution of 1200 lines. It is well suited for CAD work and sophisticated windowing environments.
- For low cost of monitor operation, this monitor is certified as meeting the EPA Energy Star requirements, and utilizes the VESA Display Power Management Signalling (DPMS) protocol for power saving during non-use periods.

Monitor Registration

The model and serial numbers are found on the rear of this unit. These numbers are unique to this unit and not available to others. You should record requested information here and retain this guide as a permanent record of your purchase. Staple your receipt here.

Date of Purchase : _____
Dealer Purchased From : _____
Dealer Address : _____
Dealer Phone No. : _____
Model No. : _____
Serial No. : _____

Important Precautions

This unit has been engineered and manufactured to assure your personal safety, but improper use can result in potential electrical shock or fire hazard. In order not to defeat the safeguards incorporated in this monitor, observe the following basic rules for its installation, use, and servicing. Also follow all warnings and instructions marked directly on your monitor.

On Safety

Use only the power cord supplied with the unit. In case you use another power cord, make sure that it is certified by the applicable national standards if not being provided by the supplier. If the power cable is faulty in any way, please contact the manufacturer or the nearest authorized repair service provider for a replacement.

Operate the monitor only from a power source indicated in the specifications of this manual or listed on the monitor. If you are not sure what type of power supply you have in your home, consult with your dealer.

Overloaded AC outlets and extension cords are dangerous. So are frayed power cords and broken plugs. They may result in a shock or fire hazard. Call your service technician for replacement.

Do not Open the Monitor

- There are no user serviceable components inside.
- There are Dangerous High Voltages inside, even when the power is OFF.
- Contact your dealer if the monitor is not operating properly.

To Avoid Personal Injury :

- Do not place the monitor on a sloping shelf unless properly secured.
- Use only a stand recommended by the manufacturer.
- Do not try to roll a stand with small casters across thresholds or deep pile carpets.

To Prevent Fire or Hazards:

- Always turn the monitor OFF if you leave the room for more than a short period of time. Never leave the monitor ON when leaving the house.
- Keep children from dropping or pushing objects into the monitor's cabinet openings. Some internal parts carry hazardous voltages.

Important Precautions

- Do not add accessories that have not been designed for this monitor.
- During a lightning storm or when the monitor is to be left unattended for an extended period of time, unplug it from the wall outlet.
- Do not bring magnetic devices such as magnets or motors near the picture tube.

On Installation

Do not allow anything to rest upon or roll over the power cord, and do not place the monitor where the power cord is subject to damage.

Do not use this monitor near water such as near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool.

Monitors are provided with ventilation openings in the cabinet to allow the release of heat generated during operation. If these openings are blocked, built-up heat can cause failures which may result in a fire hazard. Therefore, NEVER:

- Block the bottom ventilation slots by placing the monitor on a bed, sofa, rug, etc.
- Place the monitor in a built-in enclosure unless proper ventilation is provided.
- Cover the openings with cloth or other material.
- Place the monitor near or over a radiator or heat source.

On Cleaning

- Unplug the monitor before cleaning the face of the picture tube.
- Use a slightly damp (not wet) cloth. Do not use an aerosol directly on the picture tube because overspray may cause electrical shock.

On Repacking

- Do not throw away the carton and packing materials. They make an ideal container in which to transport the unit. When shipping the unit to another location, repack it in its original material.

Connecting the Monitor

To set up the monitor, ensure that the power is turned off to the monitor, computer system, and other attached devices, then follow these steps:

Connection to any IBM VGA PC compatible system

1. Place the monitor in a convenient, well-ventilated location near your computer.
2. Connect the signal cable (15 pin D-sub or 13W3C*) to the video outlet on your computer and to the video outlet on the rear of your monitor. Tighten the thumbscrews on the plug.
3. Connect one end of the AC power cord to the power connector on the back of the monitor and the other end to a properly grounded AC outlet that is easily accessible and close to the monitor.
4. Power ON the PC, then the monitor.
5. If you see the NO SIGNAL message, check the signal cable and connectors.
6. After using the system, power OFF the monitor, then the PC.

* A **13W3C signal cable** used for CAD works or Workstation is not supplied with the monitor. For more information or to purchase, please contact your dealer. Use only a LG Electronics' cable since cable from other companies may cause problems due to different connector pin structures.

Connecting the Monitor

Connecting to an Apple Macintosh PC

Figure shows the connection to an Apple Macintosh, using a separately purchased adapter. Contact your dealer for more information.

1. Place the monitor in a convenient, well-ventilated location near your computer.
2. Connect one end of the signal cable (15 pin D-sub or 13W3C*) to the video outlet on the rear of your monitor. Connect the other end of the monitor signal cable to the rear panel of Macintosh Computer through a Macintosh adapter and then tighten screws.
3. Connect one end of the AC power cord to the power connector on the back of the monitor and the other end to a properly grounded AC outlet that is easily accessible and close to the monitor.
4. Power ON the PC, then the monitor.
5. If you see the NO SIGNAL message, check the signal cable and connectors.
6. After using the system, power OFF the monitor, then the PC.

* A **13W3C signal cable** used for CAD works or Workstation is not supplied with the monitor. For more information or to purchase, please contact your dealer. Use only a LG Electronics' cable since cable from other companies may cause problems due to different connector pin structures.

Making use of USB (Universal Serial Bus) Feature

USB (Universal Serial Bus) is an innovation in connecting your different desktop peripherals conveniently to your computer. By using the USB, you will be able to connect your mouse, keyboard, printer, and other peripherals to your monitor instead of having to connect them to your computer. This will give you greater flexibility in setting up your system. USB allows you to connect chain up to 120 devices on a single USB port, and you can "hot" plug (attach them while the computer is running) or unplug them while maintaining Plug and Plug auto detection and configuration. This monitor has an integrated self-powered USB hub, allowing up to 4 other USB devices to be attached it.

USB connection

1. Connect the upstream port of the monitor to the downstream port of the USB compliant PC or another hub using the USB cable (Computer must have a USB port).
2. Connect the USB compliant peripherals to the downstream ports of the monitor.

Making use of USB (Universal Serial Bus) Feature

NOTE

- To activate the USB hub function, the monitor must be connected to a USB compliant PC(OS) or another hub with the USB cable(enclosed).
- When connecting the USB cable, check that the shape of the connector at the cable side matches the shape at the connecting side.
- When the monitor is not plugged into an electric socket, the peripherals connected to the downstream ports will not operate.
- Even if the monitor is in a power saving mode, USB compliant devices will function when they are connected the USB ports(both the upstream and downstream) of the monitor.

USB specifications

USB standard	Rev. 1.0 complied self-powered hub
Downstream power supply	500mA for each (MAX)
Communication speed	12 Mbps (full), 1.5 Mbps (low)
	1 Upstream port 4 Downstream ports

Making use of USB (Universal Serial Bus) Feature

USB-Monitor Software function

As an added advantage, the monitor can be controlled from a computer with a mouse or keyboard. Making adjustments to the image size, position, screen color and operating parameters of the monitor is easy with the USB-Monitor software (please refer to the supplied disk).

NOTE
- USB-Monitor software function is supported Windows 98 and higher.

To access the USB-Monitor software function:

1. Click the right button of the mouse, then select the Properties.

   The Display Properties windows appears, as shown in the figure.

Properties

2. Click the USB-Monitor.

   You can select and adjust the Control Options (General, Color and Advanced).

3. When you are finished the making changes, click the Save.

   To reset the image without applying changes, click the Default.

   Degauss removes magnetic field buildup that can be affect color purity and convergence.

Display Properties

4. To close the window, click OK.

Location and Function of Controls

Front View

Rear View

Note : Turn on the monitor using the ON/OFF switch on the rear of the monitor. This switch cuts off the power supply to the monitor.

Control Panel Function

Front Panel Controls

This item automatically optimizes the picture to surrounding conditions and settings. This will enable you to enjoy the most suitable picture according to the surroundings.

Used to adjust the brightness of the screen.

Adjust the display to the contrast desired.

This indicator lights up green when the monitor operates normally. If the monitor is in DPM (Energy Saving) mode (stand-by/ suspend/ power off), this indicator color changes to amber.

Use these buttons for selecting an OSD icon to be adjusted.

Use this button to start/enter and exit from the On Screen Display (OSD). If there is no OSD on the screen, One click(press) of this button will show the Main Menu.

Use these buttons for adjusting the level of the selected item.

Use this button to turn the monitor on or off.

Note : Avoid covering the sensor on the front of the monitor with an object, a filter, or a post-it note or the operation of the **DIGITAL EYE** may be disturbed.

On Screen Display (OSD) Control Adjustment

Making adjustments to the image size, position and operating parameters of the monitor are quick and easy with the On Screen Display Control system.

NOTE

- Allow the monitor to stabilize for at least 30 minutes before making image adjustment.

To make adjustments in the On Screen Display, follow these steps:

1. Pressing the OSD button activates the monitor's on screen menu. This menu contains the monitor's various adjustment features.
2. You can select a feature using the buttons.

MENU 1

When the "NEXT MENU" icon highlighted, press the OSD button.

MENU 2

3. When the icon you want becomes highlighted, Use the Buttons to adjust the item to the desired level.
4. Exit the OSD by Pressing the OSD Button.

On Screen Display(OSD) Selection and Adjustment

You were introduced to the procedure of selection and adjusting an item using the OSD system.

Listed below are the icons, icon names, and icon descriptions of the items that are shown on the Menu.

Used to adjust the brightness of the screen.

Adjust the display to the contrast desired.

To move picture image left and right.
- Moves the screen image left.
- Moves the screen image right.

To adjust image width.
- Decreases the size of the screen image.
- Increases the size of the screen image.

To move image up and down.
- Moves the screen image down.
- Moves the screen image up.

On Screen Display(OSD) Selection and Adjustment

To adjust image height.

- Decreases the size of the screen image.
- Increases the size of the screen image.

To correct the bowing in and out of the image.

- Curves the image's edges inwards.
- Curves the image's edges outwards.

To correct geometric distortion.

- Makes the screen image narrower at the top.
- Moves the screen image wider at the top.

To correct the balance of both sides bowling.

- Curvature of the sides to the right.
- Curvature of the sides to the left.

This control adjusts for a skewing of the screen image.

- Tilts the screen image rightward.
- Tilts the screen image leftward.

To correct image rotation.

- Tilts the screen image left.
- Tilts the screen image right.

To manually demagnetize the screen which may show some image or color incorrectly.

On Screen Display(OSD) Selection and Adjustment

To select 13W3C or D Sub.

When the monitor is connected with a D-sub cable, selecting the 13W3C option will automatically switch it to DPM OFF status as the screen disappears. Turn on the monitor again by pressing the Power button so that it returns to the original signal. If the monitor is connected with a 13W3C cable instead, selecting “D Sub” will cause the same results as the preceding case.

If the monitor is operating in a factory preset mode, this control will reset the image to the factory preset mode. If the monitor is operating in a user mode, this control has no effect.

This item is for the automatic adjustment of the screen position and size.
If the results are unsatisfactory, adjust the image position and size manually.

To select the next menu, press the OSD button.

On Screen Display(OSD) Selection and Adjustment

OSD Adjust	Description
Exit	To disappear of the OSD on the screen.
Clamp	In case of input SOG(Sync On Green) Video Signal, the back raster will appear the green. Then, to select the SOG(Sync On Green) in the clamp, will take you back to the original back raster.
OSD Control	This item gives access to 3 elements : Timer, Horizontal position and Vertical position. Press the ◀ ▶ buttons to select the desired item to change.
	TIMER will be controled OSD display time from 5 second to 120 second. To correct OSD image's Horizontal position and Vertical position.
	HORI. : To move image left and right. **VERT.** : To move image down and up.

On Screen Display(OSD) Selection and Adjustment

OSD Adjust		Description
Language		To choose the language in which the control names are displayed. OSD Menus are available in five language : **English, German, French, Spanish and Italian.**
Corner Top		To correct the irregular distortion ( ) of the displayed image.
Corner Bottom		To correct the irregular distortion ( ) of the displayed image.
H Convergence		This item allows you to adjust the horizontal convergence. The horizontal convergence control adjust the alignment of the red and blue horizontal fields.
V Convergence		This item allows you to adjust the vertical convergence. The vertical convergence control adjust the alignment of the red and blue vertical fields.
Purity		Use to adjust the overall purity of the image if the color appears uneven.

On Screen Display(OSD) Selection and Adjustment

OSD Adjust	Description
Moire	This item allows you to reduce the moire. It is normally **OFF**. If you want to adjust it, select **ON** using the **+** button. When you are done, press the **OSD** button once to return to **MOIRE** menu to make another selection.
	NOTE: The screen image may shake slightly while the moire reduction function is **ON**. Switching the **OFF** will improve image stability and clarity at the expense of slightly greater moire.
Video Input Level	This item is used to select the monitor's input signal level. The normal level used for most PC's is 0.7V. When the screen suddenly gets brightened or blurry, please select 1.0V and try again.
Color Control	**9300K** To appear the display's color temperature. Slightly bluish white.
	6550K To appear the display's color temperature. Slightly reddish white.
	USER To set your own color levels. Allow for specific adjustments to Red, Green and Blue (R/G/B).
	CURVE Temperature range is from 6000K to 9950K. So, user easily color set without adjustment Red, Green and Blue (R/G/B).

On Screen Display(OSD) Selection and Adjustment

This item allows you to automatically adjust the Bright and Color of the screen image. After turning on the **Auto Bright**/**Auto Color** function of **Digital Eye**, it may take about 7 seconds for it to detect the surrounding environment. Adjustment will begin afterwards and may take up to 90 seconds depending on the environment. During the adjustment, the adjustment may not be visually detected.

AUTO BRIGHT : It automatically adjusts the brightness level to an optimum level suitable for the surrounding illumination as well as current picture setting. For optimum viewing, try selecting this function after adjusting the brightness and the contrast to an appropriate level.

AUTO COLOR : Automatically adjusts to the optimum color balance based on the surrounding lighting.

Note : When the functions of the Digital Eye is turned on, an additional manual adjustment of Brightness, Contrast, or Color will allow the monitor to memorize all manual adjustments, turning off the functions of the Digital Eye.

This item gives access to 3 elements : Mode, Absence and DDC function.

MODE
To inform users of preset and user mode data.

ABSENCE
This message indicates the monitor is **ON PROCESSING** even through you are away for some time due to another matter.

DDC
To select the DDC function (ON/OFF).

To return to the previous menu, press the **OSD** button.

Energy Saving Design

This monitor complies with the EPA's Energy Star program, which is a program designed to have manufacturers of computer equipment build circuitry into their products to reduce power consumption during time of non-use.

This monitor also goes into its energy saving mode if you exceed the monitor's operating limits, such as the maximum resolution of 1600x1200 or the frequency refresh rates of 30-115kHz horizontal or 50-200Hz vertical. When this monitor is used with a Green or EPA Energy Star PC, or a PC with a screen blanking software following the VESA Display Power Management Signalling (DPMS) protocol, this monitor can conserve significant energy by reducing power consumption during periods of non-use. When the PC goes into the energy saving mode, the monitor will go into a suspended operation state, indicated by the Power LED light changing from a green color to an amber color. After an extended period in the suspended mode, the monitor will then enter a semi-OFF mode to conserve more energy. In the semi-OFF mode or DPMS OFF mode as we call it in our specifications, the Power LED will still show an amber color. When you awaken your PC by hitting a key or moving the mouse, the monitor will also awaken to its normal operating mode, indicated by the green Power LED light. By following these conventions, the power consumption can be reduced to the following levels:

Power Consumption

Mode	Hori. Sync	Verti. Sync	Video	Power Consumption	LED Color
Normal(Max.)	On	On	Normal	≤ 160W(180W)	Green
Stand-by	Off	On	Off	≤ 15W(30W)	Amber
Suspend	On	Off	Off	≤ 15W(30W)	Amber
Off	Off	Off	Off	≤ 5W(20W)	Amber

* ( ) : with USB

Low Radiation Compliance (MPR II) and DDC (Display Data Channel)

Low Radiation Compliance (MPR II)

This monitor meets one of the strictest guidelines available today for low radiation emissions, offering the user extra shielding and an antistatic screen coating. These guidelines, set forth by a government agency in Sweden, limit the amount of emission allowed in the Extremely Low Frequency (ELF) and Very Low Frequency (VLF) electromagnetic range.

DDC (Display Data Channel)

DDC is a communication channel over which the monitor automatically informs the host system (PC) about its capabilities. This monitor has two DDC function; DDC1, DDC2B and DDC2Bi. DDC1 and DDC2B carry out uni-directional communication between the PC and the monitor. Under these situations, the PC sends display data to the monitor but not commands to control the monitor settings.

DDC2Bi has the function of bi-directional communication. For example, the PC can fetch screen data from monitor and adjust the screen with the PC keyboard.

NOTE

- PC must support DDC functions to do this.
- If your monitor is displaying a mono chrome image or the wrong resolution, select the DDC OFF function.

Video Memory Modes

The monitor has 37 memory locations for display modes, 12 of which are factory preset to popular video modes.

Display Modes (Resolution)

1	VESA	720 x 400	31.469	70
2	VESA	640 x 480	31.469	60
3	VESA	640 x 480	43.269	85
4	VESA	800 x 600	53.674	85
5	VESA	1024 x 768	60.023	75
6	VESA	1280 x 1024	63.974	60
7	VESA	1024 x 768	68.677	85
8	VESA	1280 x 960	85.938	85
9	VESA	1280 x 1024	91.146	85
10	VESA	1600 x 1200	93.750	75
11	VESA	1600 x 1200	106.25	85
12	VESA	1600 x 1200	112.50	90

User Modes

- Modes 13-37 are empty and can accept new video data. If the monitor detects a new video mode that has not been present before or is not one of the preset modes, it stores the new mode automatically in one of the empty modes starting with mode 13.

  If you use up the 25 blank modes and still have more new video modes, the monitor replaces the information in the user modes starting with mode 13.

Recalling Display Modes

- When your monitor detects a mode it has seen before, it automatically recalls the image settings you may have made the last time you used that mode.

  You may, however, manually force a recall of each of the 12 preset modes by pressing the Recall button. All preset modes are automatically recalled as the monitor senses the incoming signal.

  The ability to recall the preset modes is dependent on the signal coming from your PC's video card or system. If this signal does not match any of the factory modes, the monitor automatically sets itself to display the image.

Troubleshooting

Check the following before calling for service.

NO SIGNAL message.

- The signal cable is not connected.

OUT OF FREQUENCY message appears.

- The frequency of the sync input is outside the operating range of the monitor.

  * Horizontal Frequency: 30-115kHz
  * Vertical Frequency: 50-200Hz

  Use the graphics board's utility software to change the frequency setting (Refer to the manual for graphics board).

The power LED is illuminated amber.

- Display power management mode.
- These is no sync signal.
- The signal cable is not fastened securely.
- Check the computer power and graphics adapter configuration.

The image on the SCREEN is not centered, or too small, or not a rectangle shape.

- Image adjustment not been done yet in the current operating mode. Use the SELECT and ADJUST buttons to set the image to your liking.

The monitor doesn't enter the power saving off mode (Amber).

- Computer video signal is not VESA DPMS standard. Either the PC or the video controller card is not using the VESA DPMS power management function.

An abnormal picture is displayed on the screen. For example, the upper part of the picture may be missing or dark.

- If using certain non-VESA Standard video card, an abnormal picture may be displayed. Try setting it to one of the factory preset modes, or selecting to a resolution and refresh rate within the specification limits of the monitor.

NOTE

- If the power indicator(LED) light is blinking amber, may result in abnomal condition of the monitor.
- Then press a power ON/OFF button on the front panel control and call your service technician for more information.

Service

Unplug the monitor from the wall outlet and refer servicing to qualified service personnel when :

- The power cord or plug is damaged or frayed.
- Liquid has been spilled into the monitor.
- The monitor has been exposed to rain or water.
- The monitor does not operate normally following the operating instructions. Adjust only those controls that are covered in the operating instructions. An improper adjustment of other controls may result in damage and often requires extensive work by a qualified technician to restore the monitor to normal operation.
- The monitor has been dropped or the cabinet has been damaged.
- The monitor exhibits a distinct change in performance.
- Snapping or popping from the monitor is continuous or frequent while the monitor is operating. It is normal for some monitors to make occasional sounds when being turned on or off, or when changing video modes.

Do not attempt to service the monitor yourself, as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

Specifications

Sync Signal Types

1	Separate Sync.	H. Sync.	V. Sync.
2	Composite Sync.	H/V. Sync.	N.C
3	Sync. On Green	N.C.	N.C

(N.C : No Connection)

Signal Connector Pin Assignment

15pin VGA Connector

1	Red	9	N.C.
2	Green	10	Ground
3	Blue	11	Ground
4	N.C.	12	SDA
5	Self-Test	13	H. Sync.
6	Red Ground	14	V. Sync.
7	Green Ground	15	SCL
8	Blue Ground		

13W3C Connector

1	N.C.
2	SCL
3	Self-Test
4	N.C.
5	H. Sync.
6	N.C.
7	SDA
8	N.C.
9	V. Sync.
10	GND

Specifications

Picture Tube	21 inch (20 inches viewable) FST	
	90 degree deflection,	
	0.26mm dot pitch, Non-glare, Dark face	
	ARAS(Anti-Reflective Anti-Static) coating	
Sync Input	Horizontal Freq.	30 - 115kHz (Automatic)
	Vertical Freq.	50 - 200Hz (Automatic)
	Input Form	Separate TTL, Positive/Negative Composite TTL, Positive/Negative SOG (Sync On Green)
	Signal Input	15 pin D-Sub Connector / 13W3C Connector
Video Input	Input Form	Separate, RGB Analog, 0.7Vp-p/75 ohm, Positive
	Resolution(max)	1600 x 1200 @90Hz
Dimensions (with tilt/swivel stand)	Width	49.80 Cm / 19.6 inches
	Height	51.00 Cm / 20.1 inches
	Depth	51.20 Cm / 20.2 inches
Power Input	AC 100-120/200-240V 50/60Hz 2.5/1.2A	
Weight	Net	30.0 kg (66.1 lbs)
Environmental Conditions	Operating Condition Temperature Humidity	 10 ˚C to 35 ˚C 10 % to 90 % non-Condensing
	Storage Condition Temperature Humidity	 0˚C to 60˚C 5 % to 90 % non-Condensing

NOTE

- Information in this document is subject to change without notice and does not represent a commitment on the part of LG Electronics Inc.

Communications Regulation Information

FCC Compliance Statement

This equipment has been tested and found to comply within the limits of 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 on and off), the user is encouraged to try to correct the interference by using one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the user's (or your) authority to operate the equipment. Only peripherals (digital input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this monitor. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.
Only shielded signal cables may be used with this System.

Canadian DOC Notice

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.
Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

CE Conformity Notice

CE

Products with the "CE" Marking comply with the EMC Directive(89/336/EEC) and LOW VOLTAGE Directive (73/23/EEC) issued by the Commission of the European Community.
Compiance with these directives implies conformity to the following European Norms :

- EN 55022 ; Radio Frequency Interference
- EN 50082-1:1992 ; Electromagnetic Immunity
- EN 60555-2 ; Power Line Harmonics
- EN 60555-3 ; Voltage Fluctuations
- EN 60950 ; Product Safety

Environmental Labelling of Personal Computers

Congratulations!

You have just purchased a TCO'99 approved and labelled 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.

This product meets the requirements for the TCO'99 scheme which provides for an international environmental and quality labelling of personal computers. The labelling scheme was developed as a joint effort by the TCO (The Swedish Confederation of Professional Employees), Svenska Naturskyddsforeningen (The Swedish Society for Nature Conservation), Statens Energimyndighet (The Swedish National Energy Administration) and SEMKO AB.
The requirements cover a wide range of issues: environment, ergonomics, usability, reduction of electric and magnetic fields, energy consumption and electrical safety.

Why do we have environmentally labelled computers?

In many countries, environmental labelling has become an established method for encouraging the adaptation of goods and services to the environment. The main problem, as far as computers and other electronics equipment are concerned, is that environmentally harmful substances are used both in the products and during their manufacture. Since it is not so far possible to satisfactorily recycle the majority of electronics equipment, most of these potentially damaging substances sooner or later enter nature.

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. Since all methods of electricity generation have a negative effect on the environment (e.g. acidic and climate-influencing emissions, radioactive waste), it is vital to save energy. Electronics equipment in offices is often left running continuously and thereby consumes a lot of energy.

Environmental Labelling of Personal Computers

What does labelling involve?

The environmental demands impose restrictions on the presence and use of heavy metals, brominated and chlorinated flame retardants, CFCs (freons) and chlorinated solvents, among other things. 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.

The 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.

Labelled products must meet strict environmental demands, for example, in respect of the reduction of electric and magnetic fields, physical and visual ergonomics and good usability.

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
Email (Internet): development@tco.se
Current information regarding TCO'99 approved and labelled products may also be obtained via the Internet, using the address: http://www.tco-info.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 chloride, and those flame retardants are chemically related to another group of environmental toxins, PCBs. Both the flame retardants containing bromine or chloride and the PCBs are suspected of giving rise to severe health effects, including reproductive damage in fish-eating birds and mammals, due to the bio-accumulative* processes. Flame retardants have been found in human blood and researchers fear that disturbances in foetus development may occur.

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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. Cadmium damages the nervous system and is toxic in high doses. 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. It damages the nervous system and is toxic in high doses. 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 labelled 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. 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 with e.g. increased risks of skin cancer (malignant melanoma) as a consequence.

Lead**
Lead can be found in picture tubes, display screens, solders and capacitors. Lead damages the nervous system and in higher doses, causes lead poisoning. The relevant TCO'99 requirement permits the inclusion of lead since no replacement has yet been developed.

*** Bio-accumulative is defined as substances which accumulate within living organisms**
**** Lead, Cadmium and Mercury are heavy metals which are Bio-accumulative.**