



# NEC



**INSTALLATION & MAINTENANCE GUIDE**

**INSTALLATIONS- UND WARTUNGSHANDBUCH**

**GUIDE D'INSTALLATION ET DE MAINTENANCE**

**取扱説明書**

**安装与维护指南**

# MD21GS-2MP





## WARNING



TO PREVENT FIRE OR SHOCK HAZARDS, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE. ALSO, DO NOT USE THIS UNIT'S POLARIZED PLUG WITH AN EXTENSION CORD RECEPTACLE OR OTHER OUTLETS UNLESS THE PRONGS CAN BE FULLY INSERTED. REFRAIN FROM OPENING THE CABINET AS THERE ARE HIGH VOLTAGE COMPONENTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



## CAUTION



**CAUTION:** TO REDUCE THE RISK OF ELECTRIC SHOCK, MAKE SURE POWER CORD IS UNPLUGGED FROM WALL SOCKET. TO FULLY DISENGAGE THE POWER TO THE UNIT, PLEASE DISCONNECT THE POWER CORD FROM THE AC OUTLET. DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



This symbol warns user that uninsulated voltage within the unit may have sufficient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any part inside this unit.

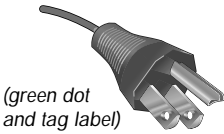
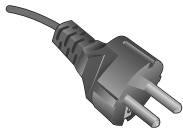

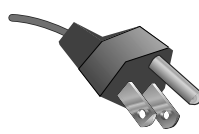


This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included. Therefore, it should be read carefully in order to avoid any problems.

### Power Cord Important Information

**CAUTION:** Please use the power cord provided with this display in accordance with the table below. If a power cord is not supplied with this equipment, please contact your supplier. For all other cases, please use a power cord that matches the AC voltage of the power outlet and has been approved by and complies with the safety standard of your particular country.

When you use this Display in North America, you should use a North America Hospital Grade power cord.

Plug Type	North America Hospital Grade	European Continental	Chinese	Japanese (for Japanese Market only)
Plug Shape	 (green dot and tag label)			
Country	U.S.A./Canada	EU (except U.K.)	China	Japan
Voltage	120	230	220	100

### Intended Use

The MD21GS-2MP grayscale display is intended to be used for displaying and viewing of digital images for diagnosis by trained physicians. To guarantee the display performance as specified, it must only be used in conjunction with NEC recommended display cards.

### European Customers



Unpacking, installation and calibration of this display should only be done by authorized and trained personnel. Any installation done by a non-authorized person is done under his own risk and we accept no responsibility in any device malfunctioning.



### Medical Imaging

The NEC MD21GS-2MP is designed for 2-megapixel (1200 x 1600) grayscale medical imaging. This display comes fully tuned with a setting for gamma correction that complies with the DICOM Part 14 Standard.

### Canadian Department of Communications Compliance Statement

DOC: This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

C-UL: Bears the C-UL Mark and is in compliance with Canadian Safety Regulations according to CAN/CSA C22.2 No. 601.1.

### FCC Information

- Use the attached specified cables with the MD21GS-2MP grayscale display so as not to interfere with radio and television reception.
  - Please use the supplied power cord or equivalent to ensure FCC compliance.
  - Please use the supplied shielded video signal cable, DVI-D to DVI-D cable.
 

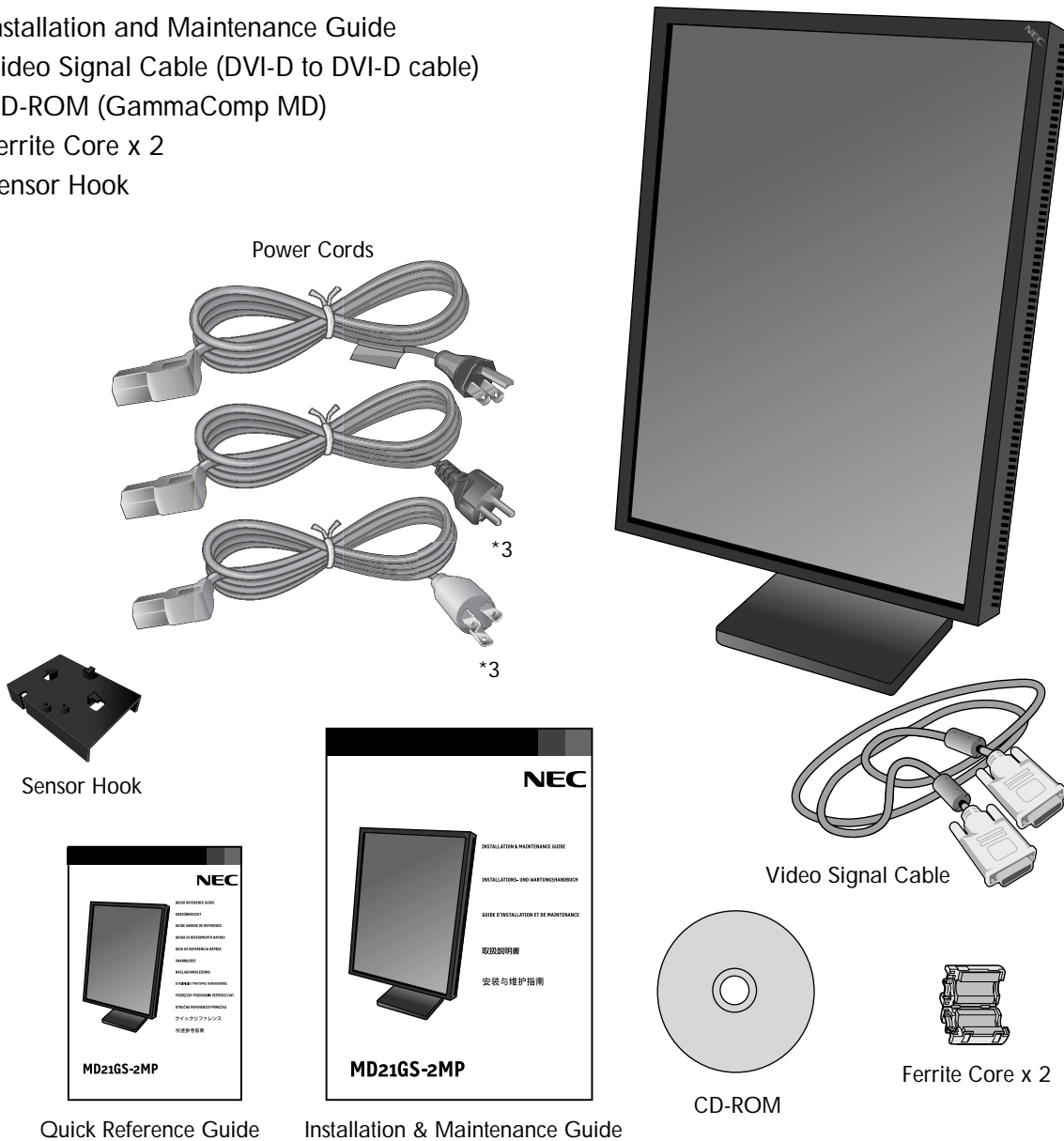
Use of other cables and adapters may cause interference with radio and television reception.
- This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful 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 your dealer or an experienced radio/TV technician for help.

If necessary, the user should contact the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet, prepared by the Federal Communications Commission, helpful: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, D.C., 20402, Stock No. 004-000-00345-4.

# Contents

Your new NEC Display display box\* should contain the following:

- MD21GS-2MP Display with tilt/swivel/pivot/height adjustable stand
- Power Cords (N.A. Hospital Grade, European Continental and Chinese)<sup>\*2</sup>
- Quick Reference Guide
- Installation and Maintenance Guide
- Video Signal Cable (DVI-D to DVI-D cable)
- CD-ROM (GammaComp MD)
- Ferrite Core x 2
- Sensor Hook



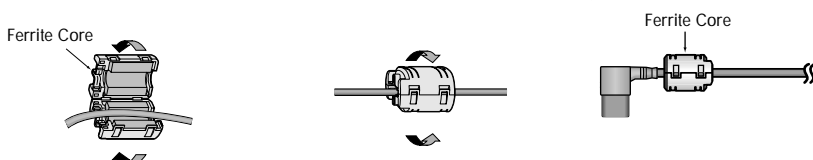
For complete display card instructions, please refer to the display card installation guide.  
 For GammaComp MD Quality Control Software, please refer to GammaComp MD User's Guide.

\* Remember to save your original box and packing material to transport or ship the display.

<sup>\*2</sup> For Japanese market model, only power cord for Japan is provided with this display.

<sup>\*3</sup> For Power Cord (European continental and Chinese type)

- 1** Open the ferrite core and damp it on the power cord.
- 2** Close the ferrite core.
- 3** Attach the Ferrite Core to the end of Power cord. Only AC-IN (connector) side of display.



# Quick Start

## Display Card\* Installation

1. Following your PC manufacturer's guidelines, open your computer to access the PCI, AGP or PCI E slot.
2. Place the display card into an available PCI, AGP or PCI E slot and secure all screws.
3. Replace the computer cover.

**NOTE:** For information on installing drivers, display modes in multimonitor mode, the setting the dip switches, please refer to the display card manufacturer's documentation.

\* A Display card is optional for the United States, it is included as a standard accessory for Europe.

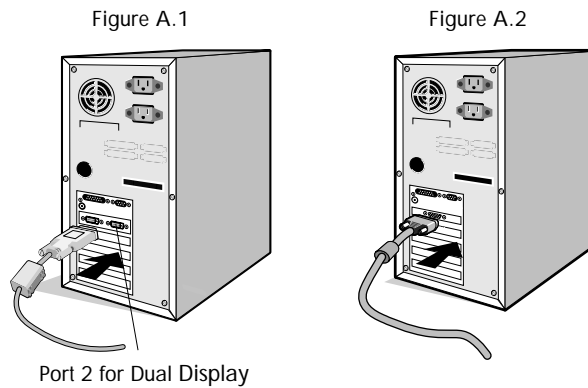
## Connecting the LCD to Your PC

Once the display card is successfully installed, follow these instructions to connect the display to your PC.

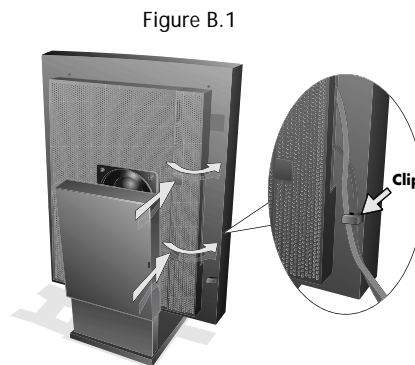
1. Shut down your computer and turn off the power.
2. **For the PC with DVI digital output:** Connect the DVI signal cable to the connector of the display card in your system (**Figure A.1**). Tighten all screws.

**For the PC with Analog output:** Connect the 15-pin mini D-SUB signal cable (not included) to the connector of the display card in your system (**Figure A.2**). Tighten all screws.

**NOTE:** For dual displays, plug a DVI-D cables into Port 1 and Port 2 of the display card (**Figure A.1**). For further information on display card installation, refer to the display card manual.

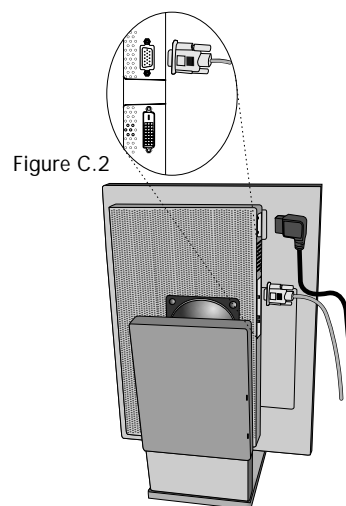
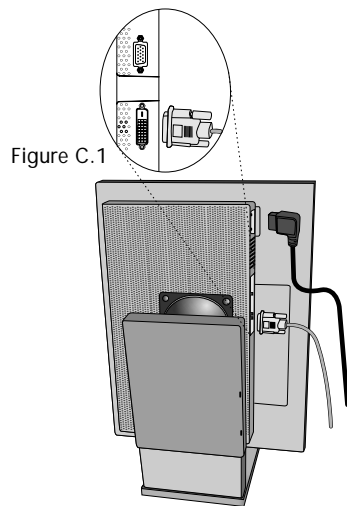


3. Remove the cable cover by pressing the two tabs to unlock. Lift the cover to remove (**Figure B.1**).

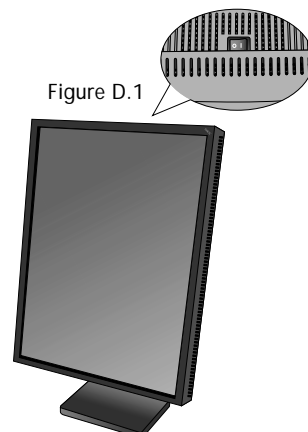


# Quick Start –continued

- For digital input:** Connect the DVI-D signal cable to the connector on the back of the display (**Figure C.1**).  
**For analog input:** Connect the 15-pin mini D-SUB signal cable (not included) to the connector on the back of the display (**Figure C.2**).  
**NOTE:** Incorrect cable connections may result in irregular operation, damage display quality/components of LCD module, and/or shorten the module life.
- Connect one end of the power cord to the AC inlet on the back of the display and the other end to the power outlet (**Figure C.1**). Replace the cable cover.  
**NOTE:** Refer to the Display Adjustment & Mounting section to check tilt, raise and lower display screen and screen rotation when you manage cables and power cord.  
**NOTE:** Please refer to the Power Cord Important Information section of this manual for proper selection of AC power cord.
- Collect cables and power cord and place them under the cable clip (**Figure B.1**).  
**NOTE: Release the cables from the clip before removing the cable cover.**

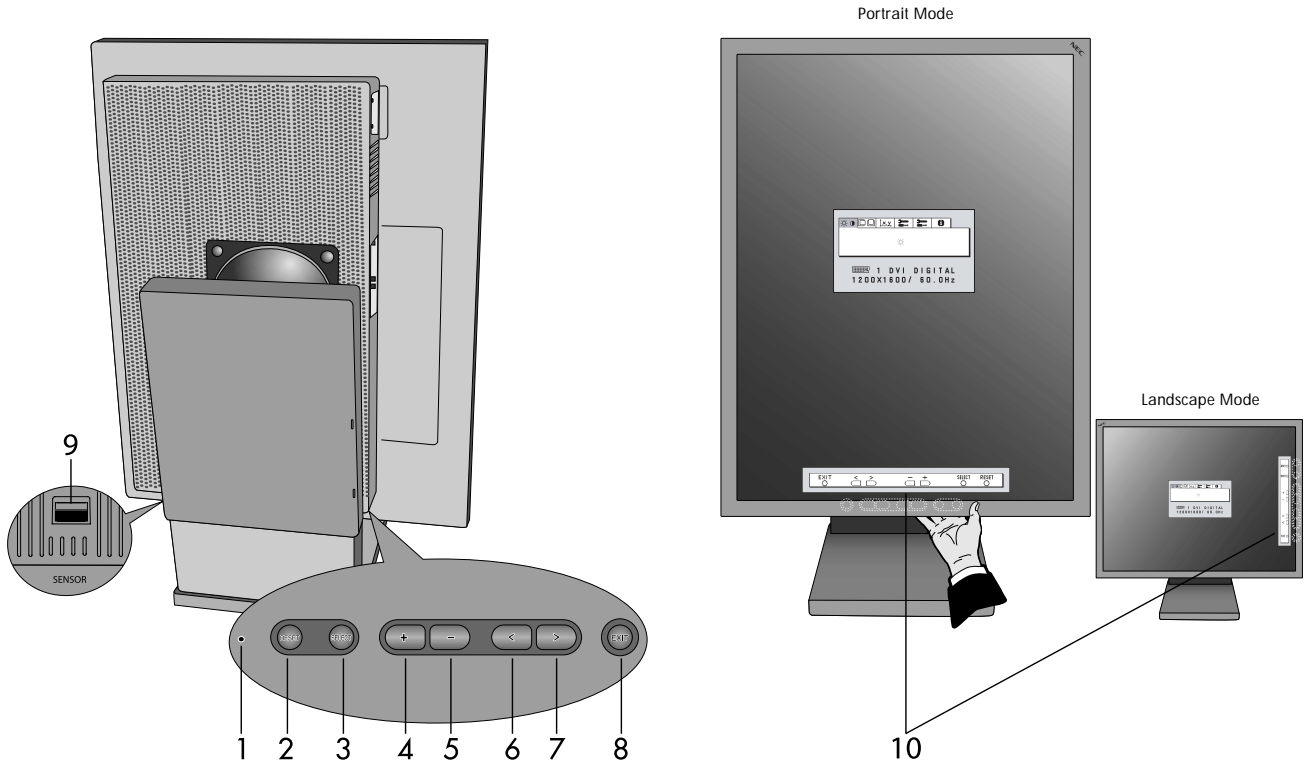


- Turn on the display with the power switch on the top (portrait) or left side (landscape) of the display (**Figure D.1**). Turn on the computer.  
**NOTE: DO NOT switch on/off repeatedly.**
- For further adjustments, please refer to the OSM section for a full description of OSM controls.  
**NOTE:** If you have any problems, refer to the Troubleshooting section.  
**NOTE:** External equipment intended for connection to signal input, signal output, or other connectors, must comply with the relevant IEC standard.



# User Controls

The On-Screen Manager (OSM) control buttons are located on the back of the display. To access the OSM menu, press any of the user control buttons (<, >, -, +).



- 1. LED** Indicates power on and signal condition. The LED can be turned on, off, or dimmed. Please refer to the Advanced OSM section/LED Brightness for further information.  
Green – signal is present and power is on  
Orange – no signal
  - 2. RESET** Resets the highlighted control menu to the factory setting.
  - 3. SELECT** Enters the OSM controls and OSM sub menu.  
Changes signal input.
  - 4/5. ADJUST -/+** Moves the bar left/right to increase or decrease the adjustment.
  - 6/7. CONTROL </>** Moves the highlighted area left/right to select control menus.  
Moves the highlighted area up/down to select one of the controls.
  - 8. EXIT** Exits the OSM Controls and OSM Main Menu.
  - 9. Sensor Port** For optional external sensor used for self calibration and copy calibration.
  - 10. On-Screen Key Guide** The key guide will automatically appear on the screen when any control button on the back is pressed. The key guide will change orientation along with the OSM.
- NOTE:** When **RESET** is pressed in the main and sub-menu, a warning window will appear allowing you to cancel the **RESET** function by pressing the EXIT button.

# Recommended Use

## Safety Precautions and Maintenance



FOR OPTIMUM PERFORMANCE, PLEASE NOTE THE FOLLOWING WHEN SETTING UP AND USING THE NEC DISPLAY:



- **DO NOT OPEN THE Display.** There are no user serviceable parts inside and opening or removing covers may expose you to dangerous shock hazards or other risks. Refer all servicing to qualified service personnel.
- Do not spill any liquids into the cabinet or use your display near water.
- Do not insert objects of any kind into the cabinet slots, as they may touch dangerous voltage points, which can be harmful or fatal or may cause electric shock, fire or equipment failure.
- Do not place any heavy objects on the power cord. Damage to the cord may cause shock or fire.
- Do not place this product on an unbalanced or unstable cart, stand or table because the display may fall, causing serious damage.
- Do not place any objects onto the display and do not use the display outdoors.
- The inside of the fluorescent tube located within the display contains mercury. Please follow the bylaws or rules of your municipality to dispose of the tube properly.
- Do not bend power cord.
- Do not use display in high temperature, humid, dusty, or oily areas.
- Do not cover vent on display.

Immediately unplug your display from the wall outlet and refer servicing to qualified service personnel under the following conditions:

- When the power supply cord or plug is damaged.
- If liquid has been spilled, or objects have fallen into the display.
- If the display has been exposed to rain or water.
- If the display has been dropped or the cabinet damaged.
- If the display does not operate normally by following operating instructions.
- If glass is broken, handle with care.
- If display or glass is broken, do not come in contact with the liquid crystal and handle with care.
  - Allow adequate ventilation around the display so that heat can properly dissipate. Do not block ventilated openings or place the display near a radiator or other heat sources. Do not put anything on top of display.
  - The power cable connector is the primary means of detaching the system from the power supply. The display should be installed close to a power outlet which is easily accessible.
  - Handle with care when transporting. Save packaging for transporting.



**CAUTION**

### Image Persistence

Please be aware that LCD Technology may experience a phenomenon known as Image Persistence. Image Persistence occurs when a residual or "ghost" image of a previous image remains visible on the screen. Unlike CRT monitors, LCD monitors' image persistence is not permanent, but constant images being displayed for a long period of time should be avoided. To alleviate image persistence, turn off the monitor for as long as the previous image was displayed. For example, if an image was on the monitor for one hour and a residual image remains, the monitor should be turned off for one hour to erase the image.

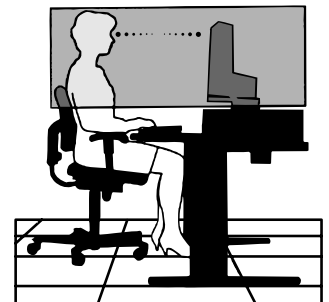
**NOTE:** As with all personal display devices, NEC-Mitsubishi Electronics Display recommends displaying moving images and using a moving screen saver at regular intervals whenever the screen is idle or turning off the monitor when not in use.



**CORRECT PLACEMENT AND ADJUSTMENT OF THE DISPLAY CAN REDUCE EYE, SHOULDER AND NECK FATIGUE. CHECK THE FOLLOWING WHEN YOU POSITION THE DISPLAY:**



- For optimum results during self and copy calibrations, allow 30 minutes for warm-up.
- Adjust the display height so that the top of the screen is at or slightly below eye level. Your eyes should look slightly downward when viewing the middle of the screen.
- Position your display no closer than 16 inches and no further away than 28 inches from your eyes. The optimal distance is 20 inches.
- Rest your eyes periodically by focusing on an object at least 20 feet away. Blink often.
- Position the display at a 90° angle to windows and other light sources to minimize glare and reflections. Adjust the display tilt so that ceiling lights do not reflect on your screen.
- Clean the display surface with a lint-free, non-abrasive cloth. Case of persistent dirt, wipe with cloth permeated by water, ethanol, isopropyl-alcohol completely. Avoid using any cleaning solution or glass cleaner (ex Acid, Alkali and Acetone).
- Adjust the display's brightness control to enhance readability.
- Position whatever you are looking at most of the time (the screen or reference material) directly in front of you to minimize turning your head while you are typing.
- Avoid displaying fixed patterns on the display for long periods of time to avoid image persistence (after-image effects).



### Ergonomics

To obtain the best possible ergonomics benefits, we recommend the following:

- Use the preset Size and Position controls with standard signals
- Use non-interlaced signals with a vertical refresh rate of 60Hz

### Cleaning the LCD Panel

- When the liquid crystal panel is stained with dust or dirt, please wipe with soft cloth gently.
- Please do not rub the LCD panel with hard material.
- Please do not apply pressure to the LCD surface.
- Please do not use OA cleaner it will cause deterioration or discolor on the LCD surface.

### Cleaning the Cabinet

- Unplug the power supply
- Gently wipe the cabinet with a soft cloth
- To clean the cabinet, dampen the cloth with a neutral detergent and water, wipe the cabinet and follow with a dry cloth.

**NOTE:** Many plastics are used on the surface of the cabinet. DO NOT clean with benzene, thinner, alkaline detergent, alcoholic system detergent, glass cleaner, wax, polish cleaner, soap powder, or insecticide. Do not touch rubber or vinyl to the cabinet for a long time. These types of fluids and fabrics can cause the paint to deteriorate, crack or peel.

# Specifications

Display Specifications		MD21GS-2MP Display	Notes
LCD Module	Diagonal: Viewable Image Size: Native Resolution (Pixel Count):	54 cm/21.3 inches 54 cm/21.3 inches 1200 x 1600 (Portrait) 1600 x 1200 (Landscape)	Active matrix; thin film transistor (TFT) liquid crystal display (LCD); 0.270mm dot pitch; 400 cd/m <sup>2</sup> calibrated white luminance; 700:1 contrast ratio, typical.
Input Signal	Video: Sync:	Digital Input: DVI Analog Input: ANALOG 0.7 Vp-p/75 Ohms Separate sync.TTL Level Horizontal sync. Positive/Negative Vertical sync. Positive/Negative Composite sync. Positive/Negative	VideoDot Clock 162MHz Max
Grayscale Tones	10 Bit: 8 Bit:	1024 (10bit) shades of gray from a pallet of 3061 (11.5bit) 256 (8bit) shades of gray from a pallet of 3061 (11.5 bit)	When used with an NEC recommended 10 bit display card When used with an NEC recommended 8 bit display card
Synchronization Range	Horizontal: Vertical:	31.5 kHz to 91.1 kHz 50 Hz to 85 Hz	Automatically Automatically
Viewing Angle	Left/Right: Up/Down:	±88° (CR > 10) ±88° (CR > 10)	
Image Formation Time		35 ms (Typ.)	
Active Display Area	Portrait: Horiz.: Vert.: Landscape: Horiz.: Vert.:	324 mm/12.8 inches 432 mm/17.1 inches 432 mm/17.1 inches 324 mm/12.8 inches	
Power Supply		AC 100-240V ~ 50/60Hz	
Current Rating		0.7 - 0.35 A	
Dimensions	Portrait: Landscape: Height Adjustment:	358.7 mm (W) x 514 - 560 mm (H) x 200 mm (D) 14.1 inches (W) x 20.2 - 22.0 inches (H) x 7.9 inches (D) 467 mm (W) x 460 - 506 mm (H) x 200 mm (D) 18.4 inches (W) x 18.1 - 19.9 inches (H) x 7.9 inches (D) 46 mm/1.8 inches (Landscape)	
Weight		11.7 kg/25.8 lbs	
Environmental Considerations	Operating Temperature: Humidity: Feet: Storage Temperature (in package): Humidity (in package): Feet (in package):	5°C to 40°C/41°F to 104°F 30% to 80% (without condensation) 0 to 10,000 Feet/0 to 3,048 m -20°C to 60°C/-4°F to 140°F 10% to 85% (without condensation) 0 to 40,000 Feet/0 to 12,192 m	

## UL-Classification

According to the type of protection against electric shock: CLASS I

According to the degree of protection against electric shock: No Patient connection

According to the degree of protection against ingress of water as detailed in the current edition of IEC529: No Protection

According to the method of sterilization or disinfection recommended by the manufacturer: Not Specified

According to the degree of safety of application in the presence of a FLAMMABLE AN AESTHETIC MIXTURE WITH AIR or a WITH OXYGEN OR NITROUS OXIDE: Not suitable

According to the mode of operation: Continuous operation



# References

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## ***North America and Canada***

### **NEC-Mitsubishi Monitor Customer Service & Support**

Customer Service and Technical Support:

(800) 632-4662

Fax: (800) 695-3044

Parts and Accessories/Macintosh

Cable Adapter:

(888) NEC-MITS [888-632-6487]

Warranty Information:

[www.necmitsubishi.com/warranty](http://www.necmitsubishi.com/warranty)

### **Online Technical Support**

[www.necmitsubishi.com/support](http://www.necmitsubishi.com/support)

### **Sales and Product Information**

Sales Information Line:

(888) NEC-MITS [888-632-6487]

Canadian Customers:

(866) 771-0266, Ext#: 4037

Government Sales:

(800) 284-6320

Government Sales email:

[gov@necmitsubishi.com](mailto:gov@necmitsubishi.com)

### **Electronic Channels**

World Wide Web:

[www.necmitsubishi.com](http://www.necmitsubishi.com)

Product Registration:

[www.necmitsubishi.com/productregistration](http://www.necmitsubishi.com/productregistration)

### **Drivers and Downloads**

[www.necmitsubishi.com/downloads](http://www.necmitsubishi.com/downloads)

## ***Europe***

### **Address**

NEC-Mitsubishi Electronics Display-Europe GmbH

Phone: +49(0)89 99699 - 0

Landshuter Allee 12 -14

D-80637 München

### **Electronic Channels**

World Wide Web:

[www.medical.nec-mitsubishi.com](http://www.medical.nec-mitsubishi.com)

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## **DECLARATION OF CONFORMITY**

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This device complies with Part 15 of 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.

<b>U.S. Responsible Party:</b>	<b>NEC-Mitsubishi Electronics Display of America, Inc.</b>
<b>Address:</b>	<b>500 Park Blvd, Suite 1100 Itasca, Illinois 60143</b>
<b>Tel. No.:</b>	<b>(630) 467-3000</b>

Type of Product:	Display Monitor
Equipment Classification:	Class B Peripheral
Model:	MD21GS-2MP-CB/MD21GS-2MP-BB



*We hereby declare that the equipment specified above  
conforms to the technical standards as specified in the FCC Rules.*

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### **Declaration of the Manufacturer**

We hereby certify that the grayscale monitor MD21GS-2MP-CB/MD21GS-2MP-BB are in compliance with Council Directive 93/42/EEC:

- EN 60601-1
- EN 60601-1-2
- EN 61000-3-2
- EN 61000-3-3

and marked with CE.

NEC-Mitsubishi Electronics Display-Europe GmbH  
Landshuter Allee 12-14, D-80637 Munich