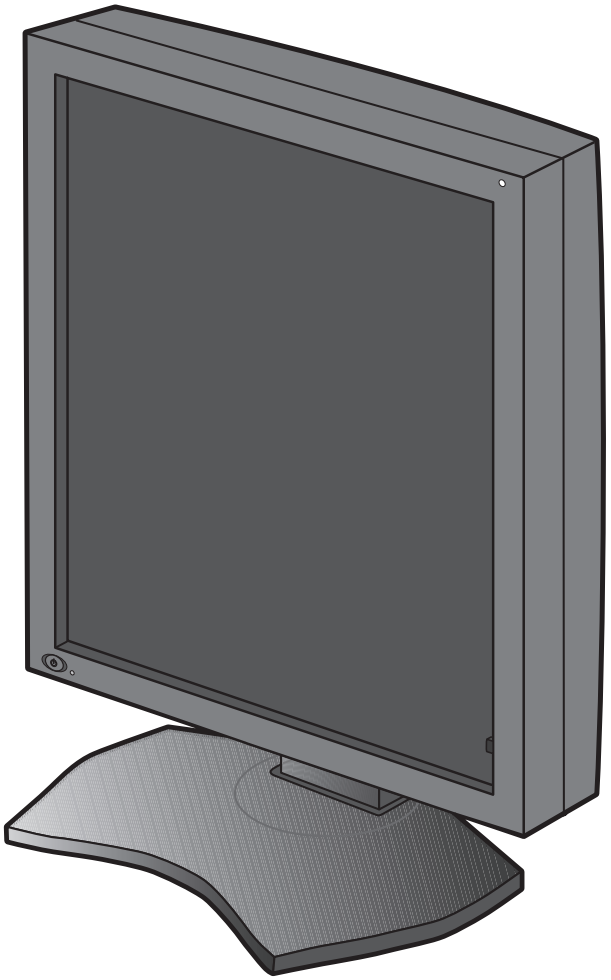
NEC



Installation & Maintenance Guide

MD212G3
MD211G5

Disclaimer

* Windows and MS-DOS are trademarks and/or registered trademarks of Microsoft Corporation in the United States and/or other countries.
* VESA is a trademark of the Video Electronics Standard Association.
* All other products and company names are trademarks of their respective owners.

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Symbol Information

	This symbol warns the 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.
CAUTION	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.
	Protective earth terminal marked.
	Stand by.
	AC Input.
	Main Power On.
	Main Power Off.

Authentication sign of Standard Inspection Bureau for U.S.A.
Complies with ANSI/AAMI ES60601-1:2005
CAN/CSA-C22.2 No. 60601-1:2008

CLASSIFIED c UL us
MEDICAL-GENERAL
MEDICAL EQUIPMENT
25KN
E350980

AS TO ELECTRICAL SHOCK, FIRE AND MECHANICAL HAZARDS ONLY IN ACCORDANCE WITH ANSI/AAMI ES60601-1(2005), CAN/CSA-C22.2 NO.60601-1(2008)

Windows is a registered trademark of Microsoft Corporation. NEC is a registered trademark of NEC Corporation.
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DisplayPort and DisplayPort Compliance Logo are trademarks owned by the Video Electronics Standards Association.

Registration Information

Declaration

Declaration of the Authorized Representative

Means of Conformity

Device Classification:	Class I, non-measuring function
Applicable Rules:	Annex IX, Rules 1.4 (Section 1) and 1.1 (Section 3)
Product Name:	MD212G3/MD211G5 21.3” Diagnostic Imaging LCD monitor
Model Number:	MD212G3/MD211G5
UMDNS Code:	16603

NEC Display Solutions Europe GmbH declares that the product listed is in conformity with the essential requirements and provisions of the Council Directive 93/42/EEC, including the amendments of the Council Directive 2007/47/EC, and conforms to the applicable clauses of the following standards:

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

NEC Display Solutions Europe GmbH
Landshuter Allee 12-14. 80637 Muenchen, Germany

FCC Information

1. Use the attached specified cables with this monitor so as not to interfere with radio and television reception.
   (1) Please use the supplied power cord or equivalent to ensure FCC compliance.
   (2) Please use the supplied shielded video signal cable.
   Use of other cables and adapters may cause interference with radio and television reception.
2. 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.

Declaration of Conformity

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.

U.S. Responsible Party:	**NEC Display Solutions of America, Inc.**
Address:	**500 Park Boulevard, Suite 1100** **Itasca, Illinois 60143**
Tel. No.:	**(630) 467-3000**
Type of Product:	Display Monitor
Equipment Classification:	Class B Peripheral
Model:	MD212G3/MD211G5

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

Classification

* Type of protection against electric shock: CLASS I equipment
* Degree of protection against electric shock: No applied part
* Degree of protection against ingress of water as detailed in the current edition of IEC529: IPX0 - No protection
* Method of sterilization or disinfection recommended by the manufacturer: Not Specified
* This device is not suitable for use in the presence of a flammable Anaesthetic Mixture with Air, Oxygen or Nitrous Oxide: No AP or APG category
* This device shall not be used in the vicinity of the patient, which is the space with surfaces likely to be contacted by the patient or an attendant who can touch the patient. This encloses a space within the room 1.83 m (6 feet) beyond the perimeter of the bed in its intended location, and extending vertically 2.29 m (7-1/ 2 feet) above the floor.
* Mode of operation: Continuous operation, maximum 16 hours/7 days

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.

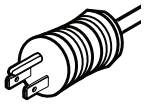
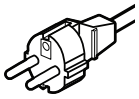
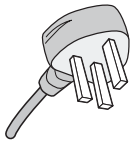
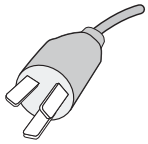
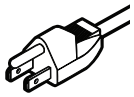
REFRAIN FROM OPENING THE CABINET AS THERE ARE HIGH VOLTAGE COMPONENTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

CAUTION

THIS APPARATUS MUST BE EARTHED BECAUSE OF CLASS I EQUIPMENT.
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 COVER). NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

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.

Country	U.S.A. / Canada	EU (except U.K.)	U.K.	Chinese	Japan
Plug Shape					
Voltage	120	230	230	220	100

NOTE: This product can only be serviced in the country where it was purchased.

Intended Use

The MD212G3/MD211G5 grayscale displays are intended to be used for displaying and viewing of digital images for diagnosis, including digital mammography, by trained physicians.

Caution: The MD212G3/MD211G5 grayscale displays cannot be used for a life-support system.
This device is designed as component of a final system which is in compliance to IEC 60601-1-1 requirements.

Contraindications: None known.

Safety Precautions

This device is designed for exclusive interconnection with IEC 60950-1 certified equipment outside of patient vicinity.

- Equipment connected to digital interfaces must comply with the respective IEC standards (e.g. IEC 60950-1 for data processing equipment and IEC 60601-1 for medical equipment).
- This device complies with IEC 60601-1-2. To minimize the interference from other equipment, a minimum 0.5 m distance shall be kept form other potential electromagnetic sources, such as a Cell Phone.
- To reduce the risk of electric shock, make sure that the 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 open the back cover. No user serviceable parts inside. Refer servicing to qualified service personnel. The AC outlet shall be readily available and accessible.

EMC Precaution

This product requires special EMC precautions and needs to be installed and used according to the following information.
Use the specified cable. Using other cables could increase emission or decrease immunity.
Do not place any RF communication equipment in the vicinity of this product. It could affect the performance of the product.
Any additional equipment connected to this product needs to comply with the requirements of IEC 60601-1-2.

North America Customers

Grounding reliability can only be achieved when the equipment is connected to an equivalent receptacle, marked “Hospital Only” or “Hospital Grade”. That signal input port need to be connected properly and that any unused signal input port shall not be accessible for the patient to contact in the patient area after the LCD is integrated into a medical system.
Federal law restricts this device to sale by or on the order of a licensed healthcare practitioner.

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. To secure full functionality of this display, only NEC approved display controller models for connection with the final system must be used.

Medical Imaging

MD212G3 is designed for 1536 x 2048, MD211G5 is designed for 2048 x 2560 medical imaging.

Recommended use

Safety Precautions and Maintenance

FOR OPTIMUM PERFORMANCE, PLEASE NOTE
THE FOLLOWING WHEN SETTING UP AND
USING THE LCD GRAYSCALE MONITOR:

WARNING: Do not modify this equipment without authorization of the manufacturer.

WARNING: To disconnect this product from the mains supply disconnect the mains plug from the socket outlet.

WARNING: To avoid risk of electric shock, this equipment must only be connected to a supply mains with protective earth.

WARNING: No modification of this equipment is allowed.

WARNING: For EMC details information, please contact the NEC local representative.

- **DO NOT OPEN THE MONITOR.** 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 monitor 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 a sloping or unstable cart, stand or table, as the monitor may fall, causing serious damage to the monitor.
- The power supply cord you use must have been approved by and comply with the safety standards of your country.
- In UK, use a BS-approved power cord with molded plug having a black (5A) fuse installed for use with this monitor.
- Do not place any objects onto the monitor and do not use the monitor outdoors.
- Do not bend, crimp or damage the power cord.
- Do not use monitor in high temperatured, humid, dusty, or oily areas.
- Do not cover vent on monitor.
- Vibration can damage the backlight. Do not install the monitor where it will be exposed to continual vibration.
- If the monitor's LCD panel is broken, do not come in contact with the liquid crystal and handle with care.
- To prevent damage to the LCD monitor caused by tipping over due to earthquakes or other shocks, make sure to install the monitor in a stable location and take measures to prevent falling.
- Please do not touch patient and this medical device at the same time.

Immediately turn off the power, unplug your monitor from the wall outlet and move to a safe location then refer servicing to qualified service personnel under the following conditions. If the monitor is used in this condition, the monitor may cause fall, fire and electric shock:

- If the monitor stand has been cracked or peeled.
- If the monitor has been wobbled.
- If the monitor emanates an unusual odor.
- When the power supply cord or plug is damaged.
- If liquid has been spilled, or objects have fallen into the monitor.
- If the monitor has been exposed to rain or water.
- If the monitor has been dropped or the cabinet is damaged.
- If the monitor does not operate normally by following operating instructions.

CAUTION

- Allow adequate ventilation around the monitor so that heat can properly dissipate. Do not block ventilated openings or place the monitor near a radiator or other heat sources. Do not put anything on top of monitor.
- The power cable connector is the primary means of detaching the system from the power supply. The monitor should be installed close to a power outlet which is easily accessible.
- Handle with care when transporting. Save packaging for transporting.
- Do not touch LCD panel surface while transporting, mounting and setting. Applying pressure on the LCD panel can cause serious damage.
- Carry the monitor by holding the top and the bottom of the monitor head with both hands.
- Do not carry holding only the stand.

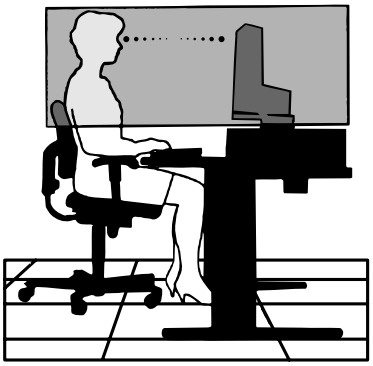
Image Persistence: Image persistence exists, when a residual or “ghost” image of a previous image remains visible on the screen. Unlike with CRT monitors, image persistence on LCD monitors is not permanent, but constant images being displayed for a long period of time should be avoided.

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 DISPLAY SOLUTIONS recommends using a moving screen saver at regular intervals whenever the screen is idle or turning off the monitor when not in use.

Maintenance: This display is factory calibrated for diagnostic imaging, in accordance with DICOM Part 14. To ensure constant visual quality over the life of the display, the recommended time interval to re-calibrate these models is 12 months.

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



- For optimum performance during normal operation, allow 20 minutes for the display to warm up. For re-calibration and DICOM conformance tests, please allow at least 60 minutes to achieve best results.
- Adjust the monitor 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 monitor no closer than 40 cm (15.75 inches) and no further away than 70 cm (27.56 inches) from your eyes. The optimal distance is 50 cm (19.69 inches).
- Rest your eyes periodically by focusing on an object at least 6 m (20 feet) away. Blink often.
- Position the monitor at a 90° angle to windows and other light sources to minimize glare and reflections. Adjust the monitor tilt so that ceiling lights do not reflect on your screen.
- 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.
- Avoid displaying fixed patterns on the monitor for long periods of time to avoid image persistence (after-image effects).
- Get regular eye checkups.

Cleaning the LCD Panel

- When the LCD is dusty, please gently wipe with a soft cloth.
- Please do not rub the LCD panel with hard or coarse material.
- Please do not apply pressure to the LCD surface.
- Please do not use OA cleaner as it will cause deterioration or discoloration on the LCD surface.

Cleaning the Cabinet

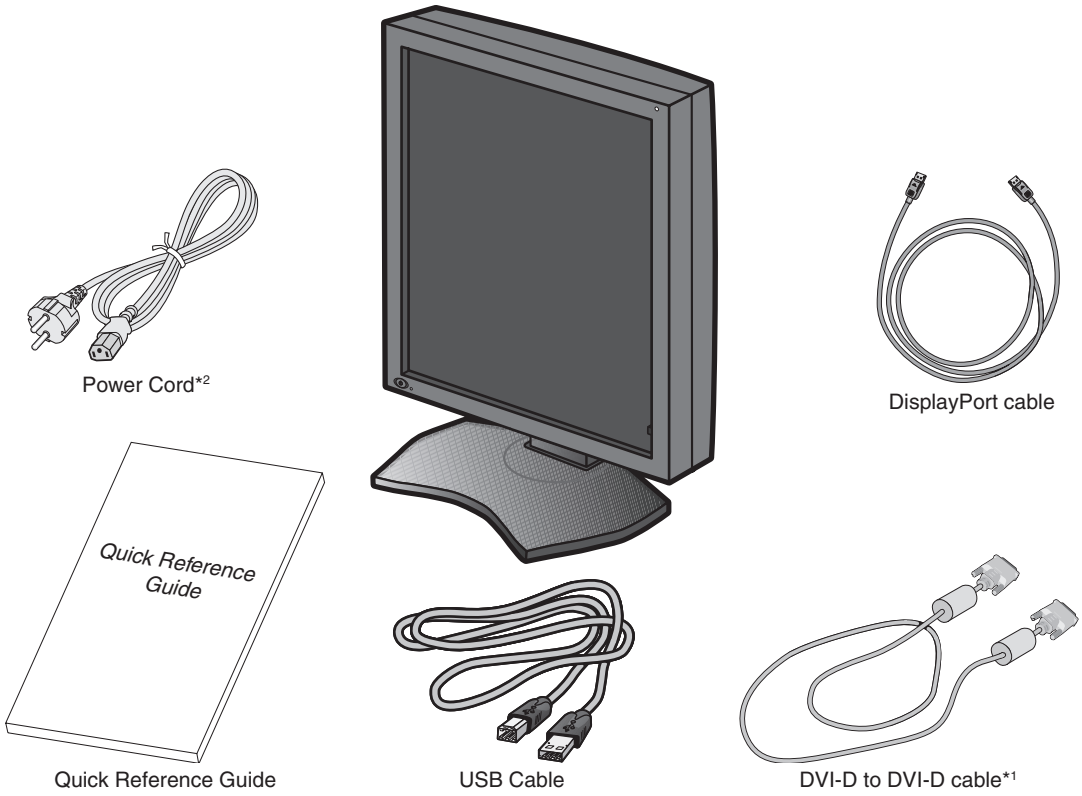
- Unplug the power supply cord from the wall outlet.
- Gently wipe the cabinet with a soft cloth.
- To clean the cabinet, dampen the cloth with a neutral detergent and water, wipe the cabinet and follow with a dry cloth.

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.

Contents

Your new NEC monitor box* should contain the following:

- MD212G3/MD211G5 monitor with tilt/swivel/pivot/height adjust stand
- Power Cord
- Video Signal Cable (DVI-D to DVI-D cable)*1
- Video Signal Cable (DisplayPort to DisplayPort cable)
- USB Cable
- Quick Reference Guide



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

*1 Dual link DVI cable.

*2 Type and number of power cords included will depend on the where the LCD monitor is to be shipped. When more than one power cord is included, 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.

Connecting the cables

To connect the LCD monitor to your system, please follow these instructions:

NOTE: Make sure to read “Recommended Use” before installation.
In order to display the maximum resolution, a display controller that can output a resolution of 1536 x 2048 for MD212G3 and 2048 x 2560 for MD211G5 is needed.

1. Turn off the computer.
2. **DVI connection:** Connect the DVI signal cable to the connector of the display controller in your system (**Figure A.1**). Tighten all screws.

   DisplayPort connection: Connect the DisplayPort cable to the connector of the display controller in your system (**Figure A.2**).

Figure A.1

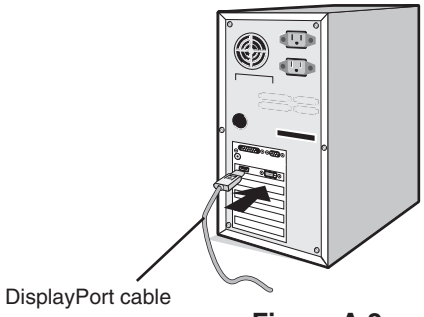


Figure A.2

NOTE:
1. Please use a DisplayPort cable with a DisplayPort logo.
2. When removing the DisplayPort cable, hold down the top button to release the lock.

3. Remove the cable cover (**Figure B**).

   To remove the cable cover, unlock the slide latch (1) on the cable cover (2) and slide the cover to the side to remove it.

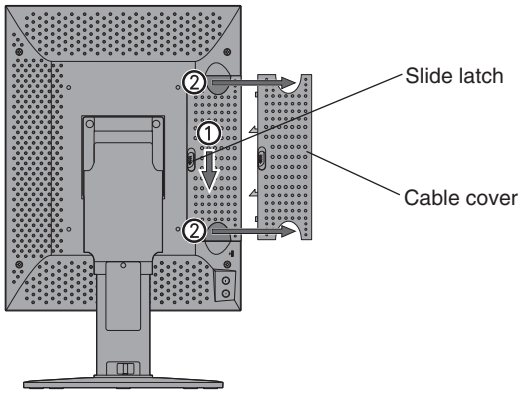


Figure B

4. Connect all cables to the appropriate connectors (**Figure C**).

NOTE:
1. Incorrect cable connections may result in irregular operation, damage display quality/components of LCD module and/or shorten the module’s life.
2. For re-calibration and display management, the USB cable shipped with the display must be connected with a USB 2.0 port of the computer as well. For connection details please refer to page 10.

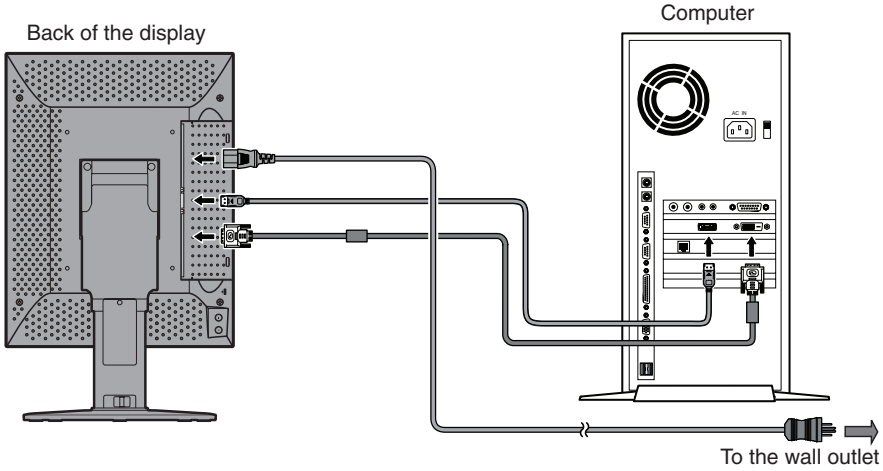


Figure C

5. To keep the cables neatly organized, place them into the cable management system that is built into the stand. Place the cables in the hooks firmly and evenly (**Figure D**).

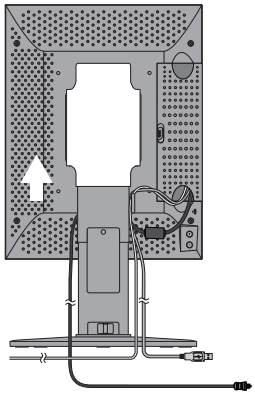


Figure D

6. Slide down the cable cover (**Figure E**).

7. Please check that you can still rotate, raise and lower the monitor screen, when you have installed the cables.

NOTE: Handle with care when raising, lowering, rotating or tilting the monitor screen.

8. Connect one end of the power cord to the AC inlet on the back side of the monitor and the other end to the power outlet.

NOTE: Please refer to the CAUTION section of this Installation & Maintenance Guide for proper selection of AC power cord.

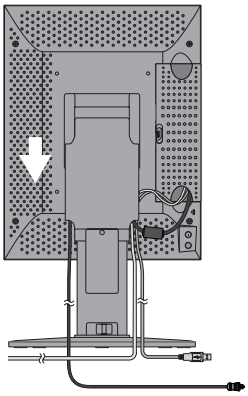


Figure E

9. Turn on the monitor with the front power switch (**Figure F**) and the computer.

NOTE: If you have any problems, please refer to the **Troubleshooting** section of this Installation & Maintenance Guide.

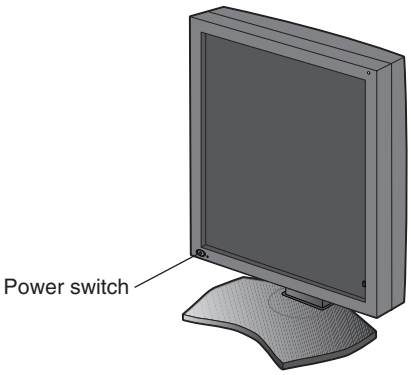
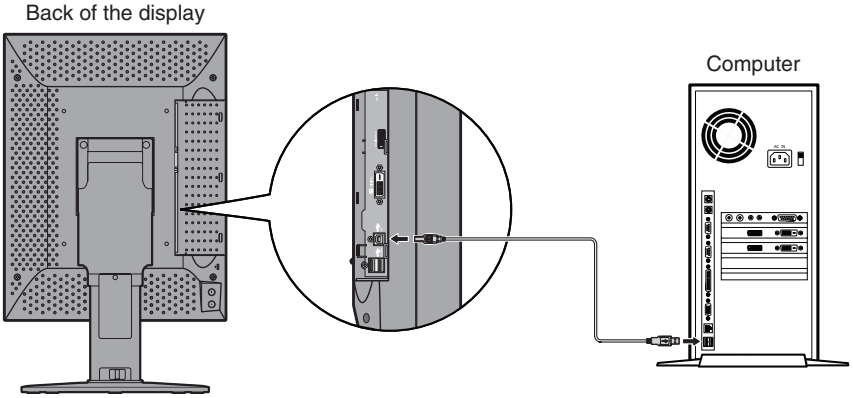


Figure F

When using a USB hub...

This display has a USB 2.0 compliant hub. By connecting the supplied USB cable to a USB 2.0 port of the computer or another USB 2.0 hub, USB devices can be connected to the display directly.

With the computer and the display turned on, connect the supplied USB cable between the display's USB upstream port and the computer's USB 2.0 downstream port.



IMPORTANT: Proper operation of all USB devices is not guaranteed. Depending on the computer, operating system, and/or peripheral devices used, the device may not work properly.

The supplied USB cable can also be used for the followings:

- To calibrate the display.
- To calibrate multiple displays in succession.

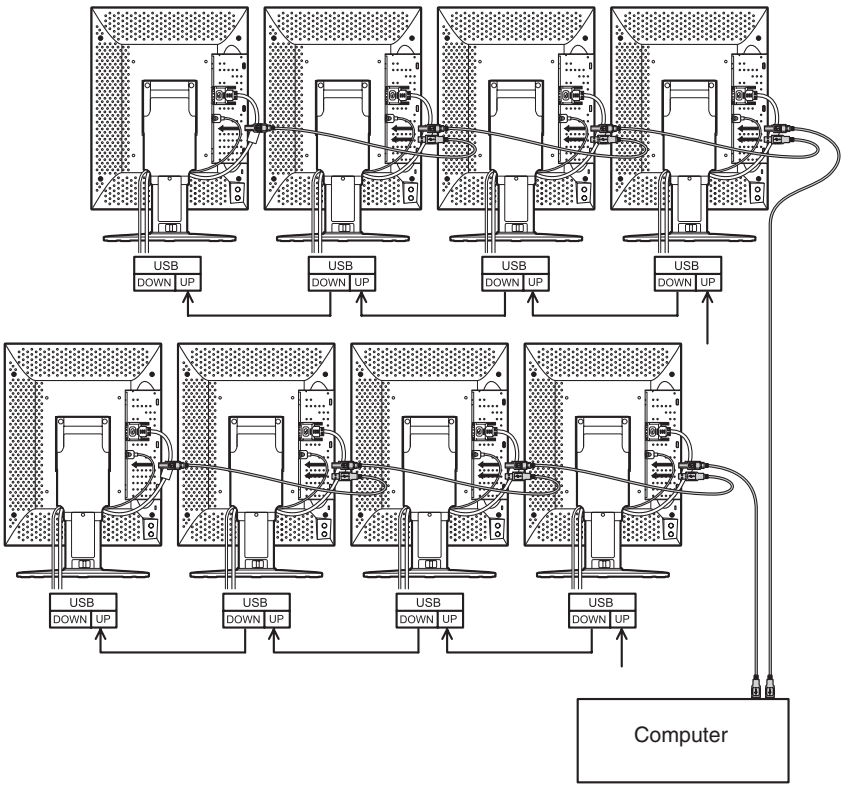
To calibrate the display

Connect the supplied USB cable between one of the display's USB upstream port and the computer's USB 2.0 downstream port. Regarding display calibration, please refer to the GammaCompMD QA user manual.

To calibrate multiple displays in succession

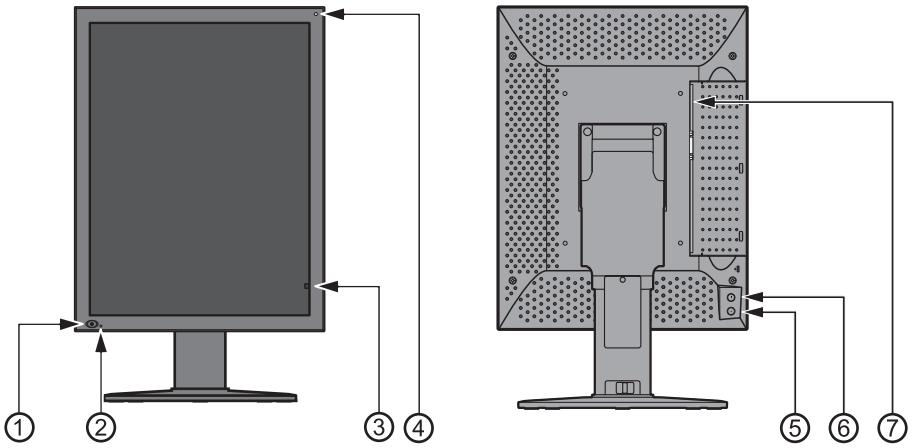
Up to 8 displays can be connected one after another in a daisy chain using USB cables.

1. Connect the supplied USB cable between the first display's USB upstream port and the computer's USB 2.0 port.
2. Connect a USB cable between the first display's USB downstream port and the second display's USB upstream port.
3. Repeat step 2 until all displays are connected one after another.



NOTE: Up to 5 sub monitors may be daisy-chained.

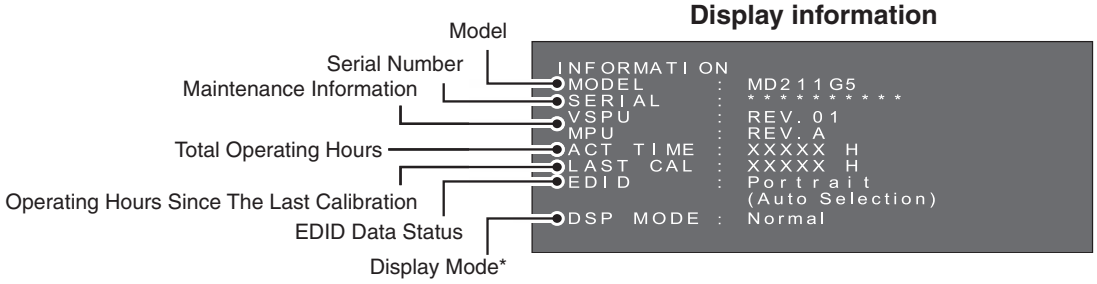
Controls



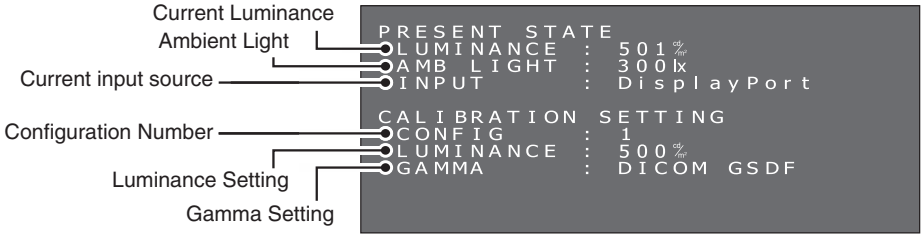
1 Power Switch	To turn the monitor on and off.
2 LED	Indicates that the power is on. Turns off automatically, when the luminance is stabilized.
3 Front Sensor	For luminance stabilization and calibration.
4 Ambient Light Sensor	Measures ambient light during calibration process.
5 + (plus) Button	To open the OSD menu (On Screen Display) 1st click – Display information 2nd click – Present operating state 3rd click – DICOM conformance test 4th click – OSD menu off (otherwise the OSD menu disappears in 15 sec.)
6 – (minus) Button	Same as + (plus) Button
7 Main power switch	Main power supply switch.

OSD (On Screen Display)

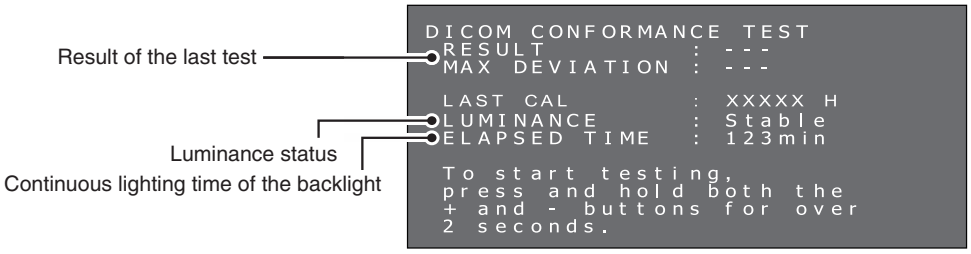
Display information



Present operating state



DICOM conformance test



*: MD211G5 only.

Specifications - MD212G3

Monitor Specifications	MD212G3	Notes
LCD panel color	Clear Base	
LCD	21.3-inch (54 cm), monochrome, TFT active matrix, anti-glare	
Pixel pitch (H x V)	0.212 x 0.212 mm	
Display area (H x V)	324.86 x 433.15 mm	
Pixel (H x V)	1536 x 2048	
Grayscale	256 steps of gray out of a palette of 12277 10-bit (1024) simultaneously displayable grayscale in DisplayPort input	
Backlight	Edge Light Type with white LED	
LCD Optical characteristics (typ.)	Viewing angle: 176° horizontal/vertical (contrast ratio ≥ 10:1) Contrast ratio: 1400:1 (Viewing angle perpendicular to LCD panel)	
Luminance	DICOM calibrated	400 cd/m^2 as factory default
	Maximum	600 cd/m^2 (1700 cd/m^2 typ. as LCD component)
Input sync signal	DVI 1.0 compliant, DisplayPort 1.1a compliant	
Available resolution	640 x 480 800 x 600 1024 x 768 1536 x 2048 (at Fv=30/60Hz) 2048 x 1536 (at Fv=30/60Hz)	
Input connectors	DVI 24-pin connector, DisplayPort connector	
Power Supply	AC 100-240 V ~ 50/60 Hz	
Current Rating	1.5 - 0.6 A	
USB Hub	USB Rev. 2.0 compliant, Self-powered USB upstream port (x1), USB downstream ports (x2)	
Ambient conditions Temperature: Humidity (no condensation): Air pressure:	Operating: 5 - 35°C, Transport / Storage: -20 - 60°C Operating: 20 - 80%, Transport / Storage: 10 - 85% Operating: 700 - 1060hPa, Transport / Storage: 266 - 1060hPa	
Dimensions & weight Net:	367.0 x 487.3/583.8 x 227.6 mm (W x H x D: Portrait) approx. 10.8 kg 14.4 x 19.2/23.0 x 9.0 inches (W x H x D: Portrait) approx. 23.8 lbs	
Safety certifications	ANSI/AAMI ES60601-1:2005, CAN/CSA-C22.2 No. 60601-1:08, FCC-B, CE-MDD, VCCI-B	

NOTE: Technical specifications are subject to change without notice.

Specifications - MD211G5

Monitor Specifications	MD211G5	Notes
LCD panel color	Clear Base	
LCD	21.3-inch (54 cm), monochrome, TFT active matrix, anti-glare	
Pixel pitch (H x V)	0.165 x 0.165 mm	
Display area (H x V)	337.9 x 422.4 mm	
Pixel (H x V)	2048 x 2560	
Grayscale	256 steps of gray out of a palette of 12277 10-bit (1024) simultaneously displayable grayscale in DisplayPort input 10-bit (1024) simultaneously displayable grayscale in packed pixel mode in DVI input	
Backlight	Edge Light Type with white LED	
LCD Optical characteristics (typ.)	Viewing angle: 176° horizontal/vertical (contrast ratio ≥ 50:1) Contrast ratio: 1200:1 (Viewing angle perpendicular to LCD panel)	
Luminance	DICOM calibrated	500 cd/m² as factory default
	Maximum	600 cd/m² (1200 cd/m² typ. as LCD component)
Input sync signal	DVI 1.0 compliant, DisplayPort 1.1a compliant	
Available resolution	640 x 480 800 x 600 1024 x 768 2048 x 2560 (at Fv=25/50Hz) 2560 x 2048 (at Fv=25/50Hz)	
Input connectors	DVI 24-pin connector, DisplayPort connector	
Power Supply	AC 100-240 V ~ 50/60 Hz	
Current Rating	1.5 - 0.6 A	
USB Hub	USB Rev. 2.0 compliant, Self-powered USB upstream port (x1), USB downstream ports (x2)	
Ambient conditions Temperature: Humidity (no condensation): Air pressure:	Operating: 5 - 35°C, Transport / Storage: -20 - 60°C Operating: 20 - 80%, Transport / Storage: 10 - 85% Operating: 700 - 1060hPa, Transport / Storage: 266 - 1060hPa	
Dimensions & weight Net:	390.0 x 487.8/584.0 x 227.6 mm (W x H x D: Portrait) approx. 11.8 kg 15.4 x 19.2/23.0 x 9.0 inches (W x H x D: Portrait) approx. 26.0 lbs	
Safety certifications	ANSI/AAMI ES60601-1:2005, CAN/CSA-C22.2 No. 60601-1:08, FCC-B, CE-MDD, VCCI-B	

NOTE: Technical specifications are subject to change without notice.

Troubleshooting

The display won't turn on! (The power indicator is off.)

- Make sure the display is connected to the power outlet.
- Check to see if the display is turned on.

The screen is not lit!

- Check if cables are connected correctly.
- Check if the computer is turned on.
- If the LED indicator is orange, the computer may be in energy saving mode. Press any key on the keyboard to wake up the computer.
- The input signal frequency or display resolution may not be appropriate for the display. Refer to the computer instruction manual and adjust the frequency and/or resolution.
- If the LED is red, this may be an error indication. Contact your supplier.

Images are not displayed properly!

- The display resolution may not be appropriate for the display. Refer to the computer instruction manual and adjust the resolution.

The refresh rate is set to 60 Hz (MD212G3 DVI Dual Link mode)/50 Hz (MD211G5 DVI Dual Link mode) and resolution loss (scan line gaps) occurs!

- This can happen when a DVI Single Link cable or a DisplayPort to DVI Single Link adapter is used.
  Use the supplied DVI Dual Link cable which supports both DVI Single Link and DVI Dual Link modes.
  MD212G3: Alternatively set the refresh rate in the operating system to 30 Hz.
  MD211G5: Alternatively set the refresh rate in the operating system to 25 Hz.

Additional Installation Information

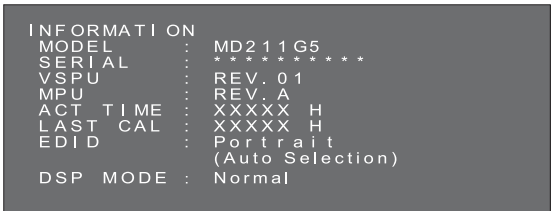
Advanced OSD menu

Several control functions are available by entering the advanced OSD menu. These control functions are additional OSD menu items, which are always accessible after opening the standard OSD menu.

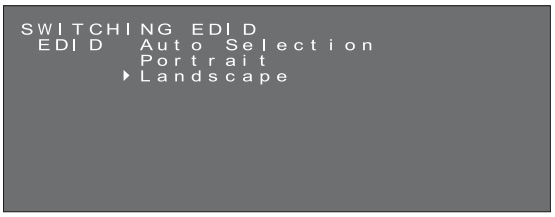
<table>
<tr><th>Control Function</th><th>Description</th></tr>
<tr><td>EDID</td><td>Change the picture format to be recognized by the operating system. The factory default is “(Auto Selection)”.
• Portrait format - MD212G3: 1536 x 2048 pixels.
- MD211G5: 2048 x 2560 pixels.
• Landscape format - MD212G3: 2048 x 1536 pixels.
- MD211G5: 2560 x 2048 pixels.</td></tr>
<tr><td>Display Mode (MD211G5 only)</td><td>Change the video signal input format
• Normal Mode [Factory Default]
The display accepts the video signal with either 25Hz refresh rate (DVI Single Link) or 50Hz refresh rate (DVI Dual Link), based on DVI 1.0 specifications.
• Packed Pixel Mode
The display accepts the video signal with 50Hz refresh rate in a special packed pixel data format (DVI Single Link). This requires the use of a customized driver for the display controller. Make sure that a customized driver is available for your specific display controller model. For the availability of a packed pixel driver, please contact your supplier.</td></tr>
<tr><td>Input Source</td><td>Change the input source
• DVI
• DisplayPort</td></tr>
<tr><td>Configuration</td><td>Change luminance and gamma correction factory presets. The factory presets are:
MD212G3:
<table>
<tr><th rowspan="2">Configuration</th><th colspan="3">Luminance (cd/m²)</th><th rowspan="2">Gamma</th><th rowspan="2">Remark</th></tr>
<tr><th>Maximum</th><th>Minimum</th><th>Ambient</th></tr>
<tr><td>1</td><td>400</td><td>0.6</td><td>0.0</td><td>DICOM</td><td>Default</td></tr>
<tr><td>2</td><td>400</td><td>1.0</td><td>0.0</td><td>DICOM</td><td></td></tr>
<tr><td>3</td><td>500</td><td>0.6</td><td>0.0</td><td>DICOM</td><td></td></tr>
</table>
MD211G5:
<table>
<tr><th rowspan="2">Configuration</th><th colspan="3">Luminance (cd/m²)</th><th rowspan="2">Gamma</th><th rowspan="2">Remark</th></tr>
<tr><th>Maximum</th><th>Minimum</th><th>Ambient</th></tr>
<tr><td>1</td><td>500</td><td>1.0</td><td>0.0</td><td>DICOM</td><td>Default</td></tr>
<tr><td>2</td><td>550</td><td>1.0</td><td>0.0</td><td>DICOM</td><td></td></tr>
<tr><td>3</td><td>400</td><td>1.0</td><td>0.0</td><td>DICOM</td><td></td></tr>
</table>
The configuration 1 parameter may be modified anytime by a new display calibration.
NOTE: Regarding display calibration, please refer to the GammaCompMD QA user manual.</td></tr>
<tr><td>DICOM conformance test</td><td>Perform a quick DICOM conformance test without software to check the display properties.</td></tr>
</table>

Changing the EDID settings (Portrait / Landscape)

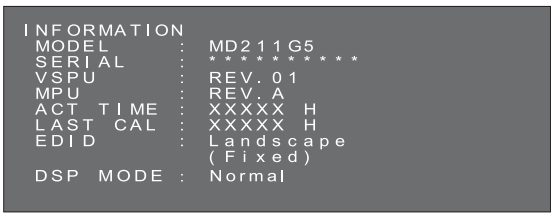
1. Click the (+) plus button or (-) minus button on the back side of the display once to open the “INFORMATION” OSD main menu. A menu opens on the screen, which looks similar to this picture.



2. Hold down the (+) plus button and the (-) minus button simultaneously for over 2 seconds.
   The “SWITCHING EDID” submenu opens on the screen. Select “Portrait” or “Landscape” by the (+) plus button or the (-) minus button.



3. After selecting your preferred EDID mode, hold down the (+) plus button and the (-) minus button simultaneously for over 2 seconds again. Then displayed (Information) OSD main menu and selected (Landscape) EDID data is displayed as (FIXED). Then confirm the EDID line (Portrait/Landscape) on the “INFORMATION” OSD main menu.



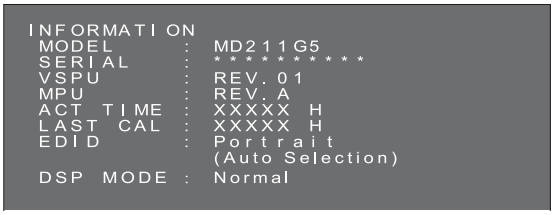
4. Click the (+) plus button or (-) minus button once to close the “INFORMATION” OSD main menu.

NOTE: When using the “Portrait” setting, the display controller does not need to rotate the image in the video ram. In most applications, this setting is preferable. However, if there is a need to rotate the image by the display controller, the “Landscape” setting may be preferable.

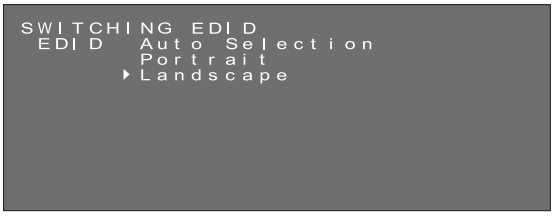
Changing the Display Mode between Normal and Packed Pixel (MD211G5 only)

NOTE: This function is only available for DVI-D connection.

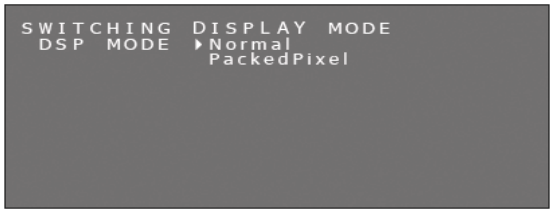
1. Click the (+) plus button or (-) minus button on the back side of the display once to open the “INFORMATION” OSD main menu. A menu opens on the screen, which looks similar to this picture.



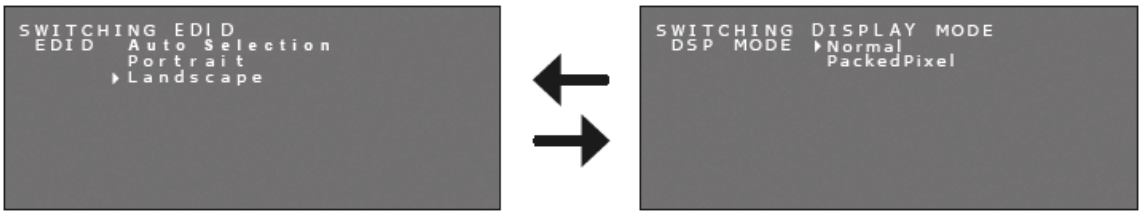
2. Hold down the (+) plus button and the (-) minus button simultaneously for over 2 seconds.
   The “SWITCHING EDID” submenu opens on the screen.



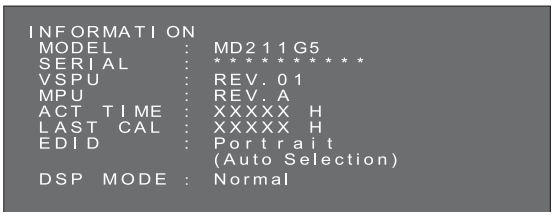
3. Press the power switch on the front of the monitor once to display the “SWITCHING DISPLAY MODE” submenu. Select “Normal” or “Packed Pixel” by the (+) plus button or the (-) minus button.



NOTE: By pressing the power switch , the OSD submenu information changes as below.



4. After selecting your preferred Display Mode, hold down the (+) plus button and the (-) minus button simultaneously for over 2 seconds again. Then confirm the DSP MODE line (Normal/PackedPixel) on the “INFORMATION” OSD main menu.



5. Click the (+) plus button or (-) minus button once to close the “INFORMATION” OSD.

Input source switching

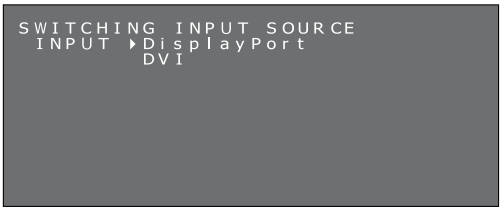
Please operate input source change following the procedure mentioned below.

1. The (+) / (-) buttons are located in the back side of the display. Press either button twice, and the “PRESENT STATE” OSD main menu appears.

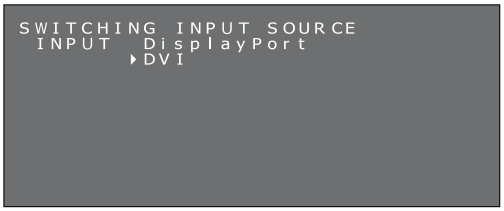
Present operating state

2. With the “PRESENT STATE” OSD main menu displayed, press and hold both the buttons for 2 seconds. The “SWITCHING INPUT SOURCE” submenu appears.
With the screens above displayed, select a input source using the (+) plus button or the (-) minus button.

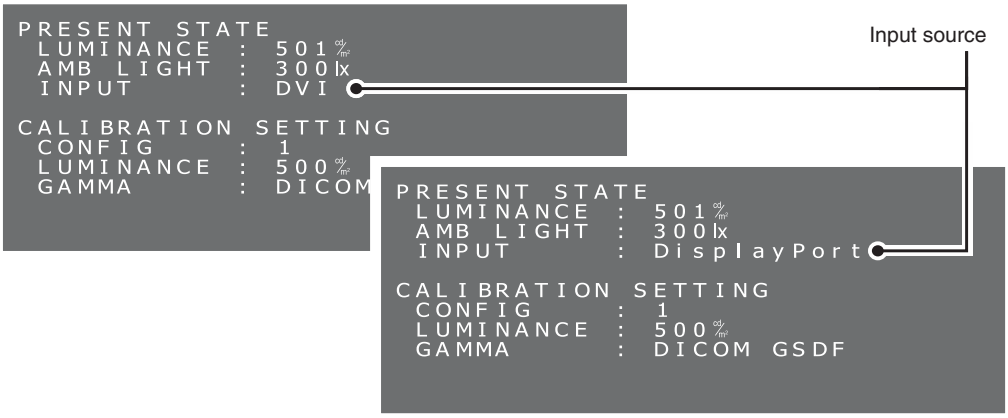
Select a DisplayPort



Select a DVI



3. Switching the input source, press and hold both the buttons for 2 seconds. And the “PRESENT STATE” OSD main menu with the selected input source appears.
   Current signal input source is confirmed on the INPUT description of “PRESENT STATE” OSD main menu.



Changing the configuration (Preset 1, 2, 3)

The NEC model MD212G3 is shipped with 3 factory preset configurations, as listed below.

Configuration	Luminance (cd/m²)			Gamma	Remark
	Maximum	Minimum	Ambient		
1	400	0.6	0.0	DICOM	[Factory Default]
2	400	1.0	0.0	DICOM	
3	500	0.6	0.0	DICOM	

The NEC model MD211G5 is shipped with 3 factory preset configurations, as listed below.

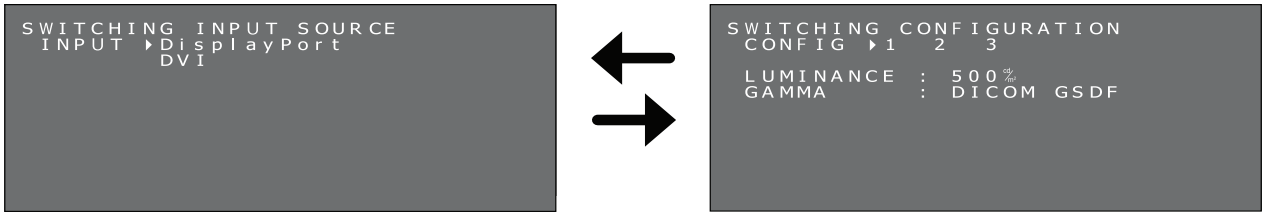
Configuration	Luminance (cd/m²)			Gamma	Remark
	Maximum	Minimum	Ambient		
1	500	1.0	0.0	DICOM	[Factory Default]
2	550	1.0	0.0	DICOM	
3	400	1.0	0.0	DICOM	

The configuration can be changed via an OSD menu. The configuration 1 parameters may be modified anytime by a new display calibration. Regarding display calibration, please refer to the *GammaCompMD QA user manual*.

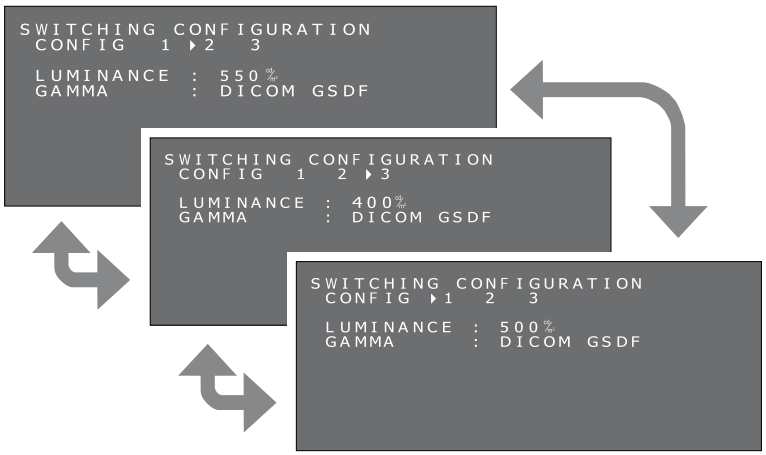
HINT: In order to apply a change of configuration, make sure to press and hold both (+) and (-) buttons for over 2 seconds after moving the cursor. Otherwise the OSD menu will disappear in 15 seconds and the configuration will not be changed.

1. Click the (+) plus button or (-) minus button on the back side of the display once to open the “PRESENT STATE” OSD main menu. A menu opens on the screen, which looks similar to this picture.

2. With the “PRESENT STATE” OSD main menu displayed, press and hold both the buttons for 2 seconds. The “SWITCHING CONFIGURATION” submenu appears.
   With the screens above displayed, press the power-switch quickly, the OSD submenu switches to “SWITCHING INPUT SOURCE” and “SWITCHING CONFIGURATION” in that order.



3. Select your desired configuration by the (+) plus button or the (-) minus button.



4. After selecting your preferred CONFIGURATION mode, hold down the (+) plus button and the (-) minus button simultaneously for over 2 seconds again. Then confirm any change of configuration in the “PRESENT STATE” OSD main menu.

5. Click the (+) plus button or (-) minus button once to close the “PRESENT STATE” OSD main menu.

Performing the DICOM conformance test

This function is available only when the display has been calibrated to DICOM GSDF.
Performing a DICOM conformance test ensures DICOM conformance of the display by measuring and checking the display properties.

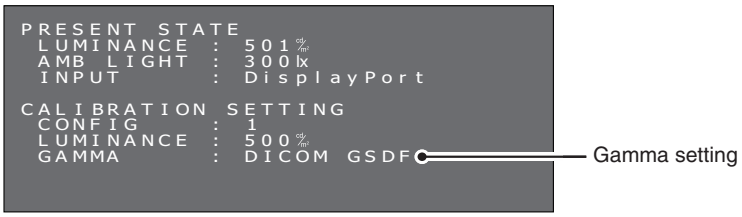
The DICOM conformance test is recommended to be performed after 60 minutes of continuous active backlight time of the LCD panel. If the test is performed within less than 60 minutes of active backlight time, the reported DICOM GDSF error value may be larger because the luminance was not yet stable enough.

HINT: If the power management setting of the computer is set to less than 60 minutes, either change the computer’s power management setting only for this test or try “OSD operation without signal input from computer” on page 21.

DICOM conformance test procedure:

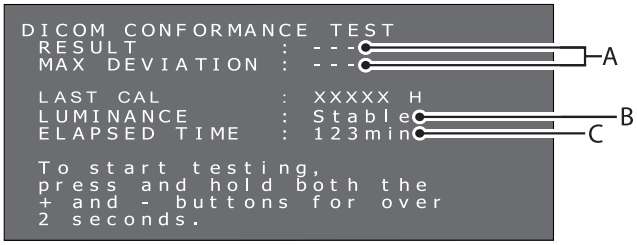
1. Checking the gamma setting
   The (+) / (-) buttons are located in the back side of the display. Press either button twice, and the “PRESENT STATE” OSD main menu appears.
   Make sure that GAMMA is set to “DICOM GSDF”.

Present operating state



2. DICOM conformance test submenu.
   Press either button again, and the DICOM conformance test submenu appears.
   Make sure at least 60 minutes of continuous lighting time of the backlight has elapsed.

DICOM conformance test



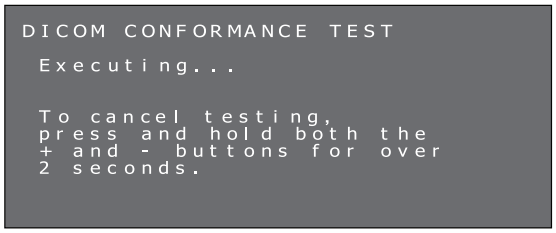
A. Result of the last test
(“---” indicates that the test has not been performed.)

B. Luminance status
Stable: Luminance is stable. (Recommended)
Unstable: Luminance is unstable.

C. Continuous lighting time of the backlight
Over 60 minutes (Recommended)
“Over 240 min” indicates more than 240 minutes has elapsed.

3. Performing the DICOM conformance test.
   Press and hold both the buttons for 2 seconds.
   The screen that shows the test is in execution appears.

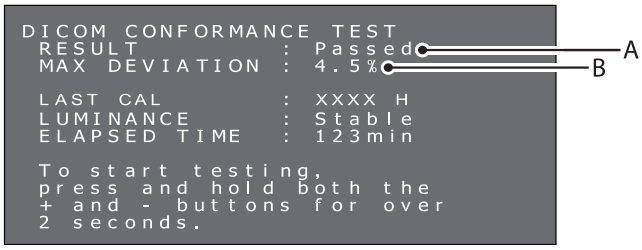
Screen that shows the test is in execution



Completing the test takes between 30 seconds to 1 minute.
To cancel the test, press and hold the both plus (+) and minus (-) buttons for over 2 seconds.

4. Showing the test results
   When the measurement is completed, the test results are shown.

Test results



A. Test results
Passed: Max. deviation (GSDF error) ≤ 10%, complies with AAPM TG18 guidelines for primary displays.

Failed: Max. deviation (GSDF error) > 10%, does not comply with AAPM TG18 guidelines for primary displays.

Canceled: Test has been canceled.

Passed(!), Failed(!)
When “Passed” or “Failed” is followed by “(!)”, the test has not been performed under the recommended condition (minimum 60 minutes of active backlight time) or the luminance is unstable.

B. Maximum deviation

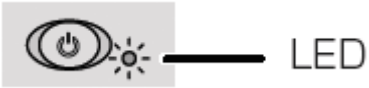
The test results are saved until the next test or calibration.
If the maximum deviation (GSDF error) result does not conform to the AAPM TG18 guidelines, even though the test has been performed under the recommended conditions, calibrate the display using an external calibration sensor, i.e. the NEC model MDSVSENSOR3. During calibration with an external sensor, the front sensor of the display will be re-adjusted as well.
Without the OSD operation for over 15 seconds, the OSD menu disappears automatically.

OSD operation without signal input from computer

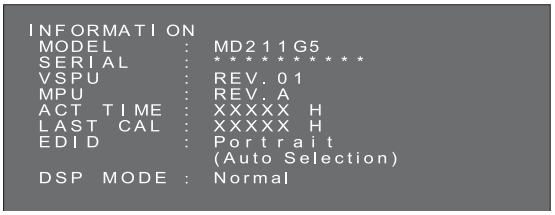
Without a signal input from the computer, normally a display goes into energy saving mode and cannot show the OSD menu. MD212G3 and MD211G5 can exit the energy saving mode temporarily and show the OSD menu in the normal operation mode. Therefore it is possible to change settings in the OSD or perform a DICOM conformance test without changing the computer's power management settings.

Follow the procedures below to show the OSD menus.

1. Confirm that the display is in the energy saving mode and the LED next to the power switch is lit orange. If the LED is off, please push the power switch to turn on the monitor.



2. Hold down the (+) plus button and the (-) minus button simultaneously for over 2 seconds.
   The "INFORMATION" OSD main menu opens on the screen. The LED color changes from orange to green.



3. Switch EDID, input source, configuration or DICOM conformance test, referring to this manual.
   Changing the EDID settings (see page 16)
   Changing the Display Mode* (see page 16)
   Input source switching (see page 17)
   Changing the configuration (see page 18)
   Performing the DICOM conformance test (see page 19)

4. If the display enters the energy saving mode during this operation, please start from the beginning again.

NOTE: The display being turned on to the normal operation mode by the operation as described above is only temporary. This mode is left after any of the following conditions are met:
1. 3 hours have passed.
2. The display power has been turned off.
3. A DICOM conformance test has been performed.

*: MD211G5 only.

Attaching a wall mount or multi-display mounting arm

The tilt and swivel stand, as shipped with the display, is interchangeable with commercially available wall mounts or multi-display mounting arms that:

- Come with a mount plate with 4 slotted screw holes at 100 mm x 100 mm and
- Can bear the total weight of the LCD panel (without the stand) and the cables connected to it.

NOTE: Use the original screws to use the LCD panel back on its original tilt stand.

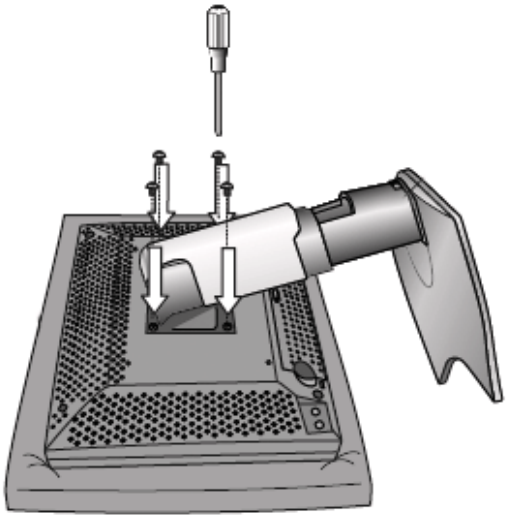
CAUTION

Choose the screw size carefully according to the mount plate thickness.
If the screws are too long, they could damage the internal parts. If they are too short, the connection becomes loose and the display could fall out.

Mounting plate thickness	Screw size
1.5-4.0mm	ISO M4x16

How to attach wall mounts or multi-display mounting arms

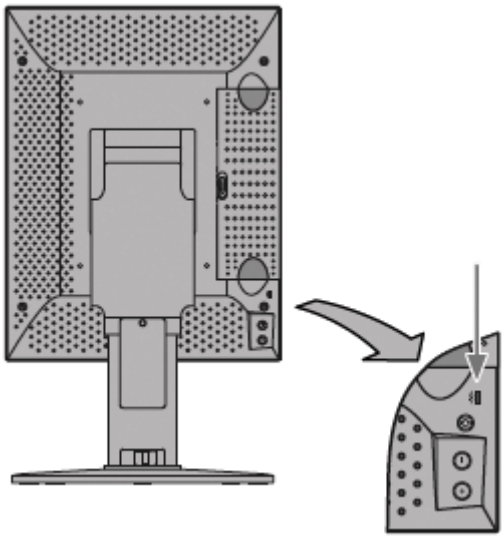
1. Place a soft cloth or cushioning material over a stable even surface.
2. Put the display face down on the soft cloth or cushioning material.
3. Remove 4 screws and detach the tilt and swivel stand shipped with the display.
4. Attach the wall mount or multi-display mounting arm according to the manufacturer's instructions.



Antitheft Security Slot

The display is equipped with the security slot for use with the MicroSaver Security Lock System by Kensington Technology Group. The MicroSaver locks are available at PC supply stores.

NOTE: Kensington is the registered trademark of Kensington Technology Group.



Manufacturer's Recycling and Energy Information

NEC DISPLAY SOLUTIONS is strongly committed to environmental protection and sees recycling as one of the company's top priorities in trying to minimize the burden placed on the environment. We are engaged in developing environmentally-friendly products, and always strive to help define and comply with the latest independent standards from agencies such as ISO (International Organisation for Standardization).

Disposing of your old NEC product

The aim of recycling is to gain an environmental benefit by means of re-use, upgrading, reconditioning or reclamation of material. Dedicated recycling sites ensure that environmentally harmful components are properly handled and securely disposed. To ensure the best recycling of our products, **NEC DISPLAY SOLUTIONS offers a variety of recycling procedures** and gives advice on how to handle the product in an environmentally sensitive way, once it has reached the end of its life.

All required information concerning the disposal of the product and country-specific information on recycling facilities can be found on our following websites:

http://www.nec-display-solutions.com (in Europe),

http://www.nec-display.com (in Japan) or

http://www.necdisplay.com (in USA).

Energy Saving

This monitor features an advanced energy saving capability.

Mode	Power consumption	LED colour
Normal Operation	Approx. 50 W (MD212G3) Approx. 80 W (MD211G5)	Green (then unlit when luminance is stabilized)
Energy Saving Mode	Less than 2 W	Orange
Off Mode	Less than 2 W	Unlit

WEEE Mark (European Directive 2012/19/EU)

Within the European Union

EU-wide legislation, as implemented in each Member State, requires that waste electrical and electronic products carrying the mark (left) must be disposed of separately from normal household waste. This includes monitors and electrical accessories, such as signal cables or power cords. When you need to dispose of your NEC display products, please follow the guidance of your local authority, or ask the shop where you purchased the product, or if applicable, follow any agreements made between yourself and NEC.

The mark on electrical and electronic products only applies to the current European Union Member States.

Outside the European Union

If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority so as to comply with the correct disposal method.

NEC

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