User's Manual

RadiForce® MX191

Color LCD Monitor

Important

Please read PRECAUTIONS, this User's Manual and Setup Manual (separate volume) carefully to familiarize yourself with safe and effective usage.

- Please read the Setup Manual (separate volume)
- The latest User's Manual is available for download from our site: **http://www.radiforce.com**

EIZO®

Product specification may vary with sales areas.
Confirm the specification in the manual written in language of the region of purchase.

- It shall be assured that the final system is in compliance to IEC60601-1-1 requirement.
- Power supplied equipment can emit electromagnetic waves, that could influence, limit or result in malfunction of the monitor.
  Install the equipment in a controlled environment, where such effects are avoided.
- This is a monitor intended for use in a medical image system. It does not support the display of mammography images for diagnosis.

Notice for this monitor

This product is suited to clinical review. It does not support the display of mammography images for diagnosis.

This product has been adjusted specifically for use in the region to which it was originally shipped. If the product is used outside the region, it may not operate as specified in the specifications.

This product may not be covered by warranty for uses other than those described in this manual.

The specifications noted in this manual are only applicable for power cords and signal cables specified by us.

Use optional products manufactured or specified by us with this product.

As it takes about 30 minutes for the performance of electrical parts to stabilize, adjust the monitor 30 minutes or more after the monitor power has been turned on.

In order to suppress the luminosity change by long-term use and to maintain the stable luminosity, use of a monitor in lower brightness is recommended.

When the screen image is changed after displaying the same image for extended periods of time, an afterimage may appear. Use the screen saver or timer to avoid displaying the same image for extended periods of time.

Periodic cleaning is recommended to keep the monitor looking new and to prolong its operation lifetime. (Refer to “Cleaning” on the next page.)

The screen may have defective pixels. These pixels may appear as slightly light or dark area on the screen. This is due to the characteristics of the panel itself, and not the product.

The backlight of the LCD panel has a fixed life span. When the screen becomes dark or begins to flicker, please contact your dealer.

Do not press on the panel or edge of the frame strongly, as this may result in the display malfunction, such as the interference patterns, etc. If pressure is continually applied to the LCD panel, it may deteriorate or damage your LCD panel. (If the pressure marks remain on the LCD panel, leave the monitor with a white or black screen. The symptom may disappear.)

Do not scratch or press on the panel with any sharp objects, such as a pencil or pen as this may result in damage to the panel. Do not attempt to brush with tissues as this may scratch the LCD panel.

When the monitor is cold and brought into a room or the room temperature goes up quickly, dew condensation may occur inside and outside the monitor. In that case, do not turn the monitor on and wait until dew condensation disappears, otherwise it may cause some damages to the monitor.

Cleaning

Attention

- Never use any solvents or chemicals, such as thinner, benzene, wax, alcohol, disinfectant, and abrasive cleaner, which may damage the cabinet or LCD panel.

NOTE

- Optional ScreenCleaner is recommended for cleaning the panel surface.

LCD Panel

- Clean the LCD panel with a soft cloth such as cotton cloth or lens cleaning paper.
- Remove persistent stains gently with a cloth dampened with a little water, and then clean the LCD panel again with a dry cloth for better finishing.

Cabinet

- Clean the cabinet with a soft cloth dampened with a little mild detergent.

To use the monitor comfortably

- An excessively dark or bright screen may affect your eyes. Adjust the brightness of the monitor according to the environmental conditions.
- Staring at the monitor for a long time tires your eyes. Take a 10-minute rest every hour.

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Chapter 1 Features and Overview

Thank you very much for choosing an EIZO color LCD monitor.

1-1 Features

- Over drive circuit for clear motion pictures
- Dual-input system (DVI-D, D-sub)
  3-1 “Connecting Two PCs to the Monitor” (page 24)
- Auto EcoView
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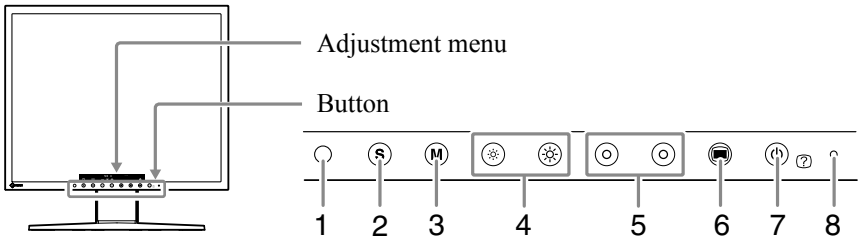
- CAL Switch function for selecting an optimal calibration mode
- The quality control software "RadiCS LE" (for Windows) used to calibrate the monitor is included
  Refer to the EIZO LCD Utility Disk
- Adjustment menu to execute the target function by simple operation.
  1-3 “Basic operation of Adjustment menu and the icon list” (page 8)
- The utility software "ScreenManager Pro for Medical" (for Windows) to control the monitor from a PC with mouse/keyboard is included
  Refer to the EIZO LCD Utility Disk
- HDCP (High-bandwidth Digital Content Protection)

NOTE

- The stand of the unit can be replaced with an arm (or another stand). (Refer to “5-1 Attaching an Arm” on page 28.)

1-2 Buttons and Indicators



1. Sensor (Auto EcoView)
2. (S) button
3. (M) button
4. (☼)(☼) buttons
5. (O) button
6. (▣) button
7. (⏻) button
8. Power indicator

Indicator status	Operation status
Blue	The screen is displayed (Power on)
Orange	Power saving (Power on)
Off	Power off

NOTE

- While the screen is displayed, the power indicator that is lighting blue can be turned off (see "Setting Power Indicator ON/OFF" on page 22).

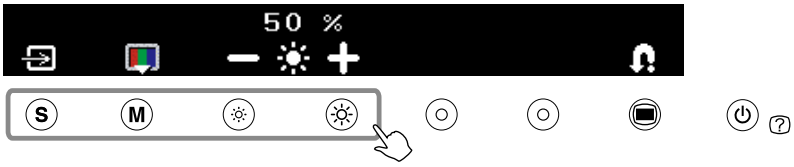
1-3 Basic operation of Adjustment menu and the icon list

Basic operation of Adjustment menu

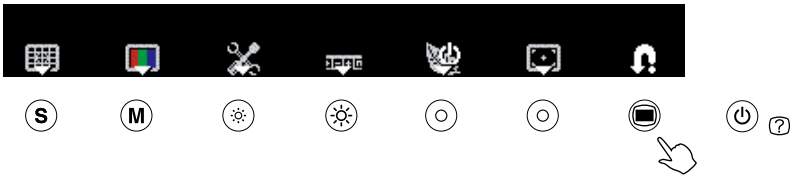
Displaying the adjustment menu

Pressing the function button to change the setting or pressing ▣ allows you to display the adjustment menu.

When pressing the input signal selection, mode or brightness control



When pressing the menu button



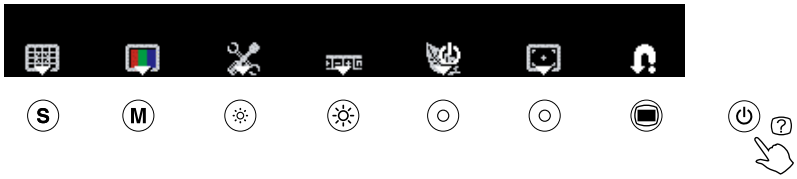
Modifying the setting

The operation methods differ depending on the icons.

Example	Operation method
	As for the icons displayed with the +/- marks, selecting + allows you to increase the setting value or selecting - to decrease it.
	Selecting the icon displayed with ▽ mark allows you to show the next menu.
	The Enable/Disable setting is toggled by selecting the icon. X is displayed when the function is invalid.

Displaying the function name

(1) Press ⏻ while the adjustment menu appears.



(2) The function name appears.

Storing the setting/Exiting the adjustment menu

After completing the setting, selecting ⏎ allows you to store the setting. Selecting ⏎ repeatedly allows you to close the adjustment menu.

NOTE

- The adjustment menu automatically finishes when no input operation occurs in 45 seconds.

Adjustment menu icon list

Icon	Function	Overview
	—	Determines the setting. Selecting the icon repeatedly allows you to close the adjustment menu.
	Analog	
	AutoSize	Flickering, screen position, and screen size are adjusted automatically. Returns to the pre-adjusted status. Determines the adjustment.
	AutoRange	Every color gradation (0 to 255) can be displayed by adjusting the signal output level. Returns to the pre-adjusted status. Determines the adjustment.
	Manual	Performs advanced adjustment when the automatic adjustment fails. The adjustments for clock, phase and position proceed in this order.
	Clock	Eliminates vertical bars.
	Phase	Removes flickering or blurring.
	Position	Correct screen position with ← → ↓ ↑.
	Color	
	Color Menu	Independent setting and saving of color adjustment are available for each CAL Switch mode.
DICOM	Mode*	Selects the best display mode easily according to monitor's application. Each time you press the button, the mode is switched.
	Brightness	Adjusts the screen brightness. Adjustable range: 0 to 100%
	Contrast	Adjusts the contrast. Adjustable range: 0 to 100%
	Gain	Determines the mixing rate of red, green and blue, and adjust the color tone. Adjustable range: 0 to 100% Allows you to determine the mixing rate of red. Allows you to determine the mixing rate of green. Allows you to determine the mixing rate of blue.
	Advanced	Adjusts each function of hue and saturation.

Icon	Function	Overview
	Hue	Adjusts the hue. If you set the hue to a high value, the image turns greenish. If low, the image turns purplish. Adjustable range: -100 to 100
	Saturation	Adjusts the color saturation. Adjustable range: -100 to 100
	Temperature	Adjusts the color temperature. The gain preset values are set for each color temperature setting value. Adjustable range: Native, 6500K-15000K (specified by every 500K unit, including 9300K), User (at gain adjustment)
	Gamma	Adjusts the gamma value. Adjustable range: 1.8, 2.0, 2.2
	Tool	
	Info1	Displays the input signal status (analog/digital), resolution, H/V frequency.
	Info2	Displays the model name, usage time and serial number.
1↔2	Input Signal	Sets to detect the input signal automatically. The Enable/Disable setting is toggled by selecting the icon.
	Reset	Resets the adjustment values to the factory settings. **Attention** • After resetting, you cannot undo the operation. All : Resets all adjustments to the default settings (factory settings). Color (DICOM*) : Only the adjustment values in the current CAL Switch mode will revert to the default settings (factory settings).

* Current CAL Switch mode is displayed.

Icon	Function	Overview
	Settings	
	Language	Selects a language for the adjustment menu or displaying message. The language setting is toggled by selecting the icon.
	PowerSave	
	Auto EcoView	The sensor on the front side of the monitor detects the environmental brightness to adjust the screen brightness automatically and comfortably by using the Auto EcoView function. The Enable/ Disable setting is toggled by selecting the icon.
	Power LED	Sets the power indicator (blue) ON/ OFF in the monitor ON condition. The On/Off setting is toggled by selecting the icon.
	Off Timer	Turns off the monitor automatically after a specified time has passed. This function serves to protect the monitor from after-images caused when the same image is left displayed for a long time. Use this function when an image is displayed throughout the day. Adjustable range: Off, 1 to 23h
	Screen	
	Sharpness	Emphasizes the outline of the image by emphasizing the color difference between the pixels composing the image and to improve a sense of quality and materiality. Contrarily, this function allows you to show the image smoothly by blurring the outline of the image.

Chapter 2 Settings and Adjustments

2-1 Utility Disk

An “EIZO LCD Utility Disk” (CD-ROM) is supplied with the monitor. The following table shows the disk contents and the overview of the application software programs.

● Disk contents and software overview

The disk includes application software programs for adjustment, and User’s Manual. Refer to “Readme.txt” file on the disk for software startup procedures or file access procedures.

Item	Overview
A “Readme.txt” file	
RadiCS LE (for Windows)	RadiCS LE is quality control software used to calibrate the monitor and manage the calibration history. (A PC must be connected to the monitor with the supplied USB cable.) Refer to the description later.
ScreenManager Pro for Medical (for Windows)	A utility software program to control monitor adjustments from a PC using its mouse and keyboard. (A PC must be connected to the monitor with the supplied USB cable.) Refer to the description later.
User’s Manual of this monitor (PDF file)	

● To use RadiCS LE or ScreenManager Pro for Medical

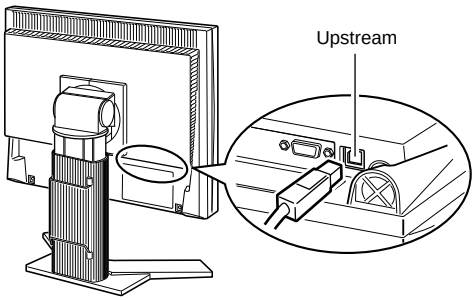
Refer to the corresponding User's Manual on the CD-ROM disk in order to install and use the software.

When using this software, you will need to connect a PC to the monitor with the supplied USB cable.

[Connection]

(1) Connect the USB port (downstream) of a USB compatible PC (or other USB hub) and the monitor’s USB port (upstream) with the supplied USB cable.

(2) The USB function is set up automatically upon connection of the USB cable.



2-2 Screen Adjustment

Digital Input

When digital signals are input, images are displayed correctly based on the preset data of the monitor. When performing the advanced adjustment, see “2-3 Color Adjustment” (page 15) and its subsequence pages.

Analog Input

The monitor screen adjustment is used to suppress flickering of the screen or adjust screen position and screen size correctly according to the PC to be used.
To use the monitor comfortably, adjust the screen when the monitor is set up for the first time or when the settings of the PC in use are updated. No adjustment is required when the image appears correctly.

The auto adjust function works in the following cases:

- **When a signal is input into the monitor for the first time**
- **When the resolution or Vertical/Horizontal Frequency of input signals is changed**

Attention

- Wait 30 minutes or more from monitor power on before starting adjustments.
- Auto adjust function does not work for the images under the resolution of 800 × 600 (SVGA).

[Adjustment Procedure]

1 Perform the AutoSize adjustment.

- **To adjust flickering, screen position, and screen size automatically [AutoSize]**

  (1) Press  .
  The adjustment menu appears.
  (2) Select  (Analog).
  (3) Select  (AutoSize).
  Flickering, screen position, and screen size are adjusted automatically.
  (4) After confirming the screen message, select  (OK).
  If you select  (Undo), the monitor returns to the pre-adjusted status.

If the screen is not displayed correctly even after adjusting in step 1 above, perform the adjustments according to the procedures on the following pages. When the screen is displayed correctly, go to step 5 “To adjust color gradation automatically [AutoRange]”.

Attention

- This function works correctly when an image is fully displayed over the Windows or Macintosh display area. It does not work properly when an image is displayed only on a part of the screen (command prompt window, for example) or when a black background (wallpaper, etc.) is in use.
- This function does not work correctly with some graphics boards.
- “Auto in Progress” appears on the screen during auto adjustment.

2 Prepare the display pattern for the analog display adjustment.

Download the “Screen adjustment pattern files” from our site:
http://www.radiforce.com

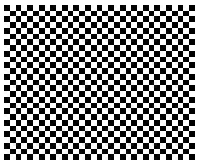
NOTE

- For details and instructions on opening the “Screen adjustment pattern files”, refer to the “Readme.txt” file.

3 Perform the AutoSize adjustment again with the analog screen adjustment pattern displayed.

- **To adjust flickering, screen position, and screen size automatically [AutoSize]**

  (1) Display Pattern 1 of the screen adjustment pattern files in full screen on the monitor.



  (2) Press ▣.
  The adjustment menu appears.

  (3) Select (Analog).

  (4) Select (AutoSize).
  Flickering, screen position, and screen size are adjusted automatically.

  (5) After confirming the screen message, select (OK).
  If you select (Undo), the monitor returns to the pre-adjusted status.

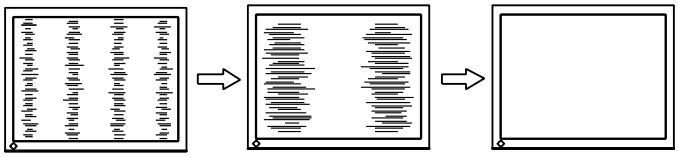
If the screen is not displayed correctly even after adjusting in step 3 above, perform the adjustments according to the procedures on the following pages. When the screen is displayed correctly, go to step 5 "To adjust color gradation automatically [AutoRange]".

4 Perform advanced adjustments by using (Manual) in the adjustment menu.

Select (Manual) to adjust the clock, phase and position, in this order.

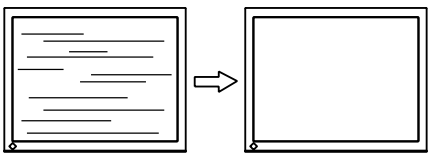
- **To eliminate vertical bars [Clock]**

  (1) Adjust the clock with − or + of (Clock) to eliminate vertical bars.



- **To remove flickering or blurring [Phase]**

  (1) Adjust the phase with − or + of (Phase) to remove flickering or blurring.



NOTE

- Press the control button slowly so as not to miss the adjustment point.
- When blurring, flickering or bars appear on the screen after adjustment, proceed to [Phase] to remove flickering or blurring.

Attention

- Flickering or blurring may not be eliminated depending on your PC or graphics board.

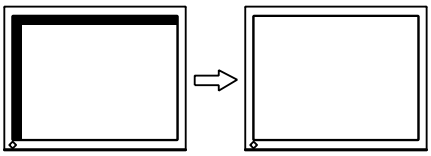
- **To correct screen position [Position]**

(1) Select (Position).

(2) Adjust the position with (Left) / (Right) / (Down) / (Up) to display the image properly in the display area of the monitor.

(3) Select .

The adjustment is completed.

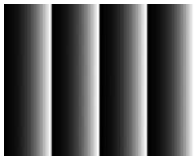


5 Adjust the color gradation.

- **To adjust color gradation automatically [AutoRange]**

Every color gradation (0 to 255) can be displayed by adjusting the signal output level.

(1) Display Pattern 2 in full screen on the monitor using the screen adjustment pattern files.



(2) Press .

The adjustment menu appears.

(3) Select (Analog).

(4) Select (AutoRange).

Color gradation is adjusted automatically.

(5) After confirming the screen message, select (OK).

If you select (Undo), the monitor returns to the pre-adjusted status.

(6) Close the Pattern 2.

NOTE

- Since the number of pixels and the pixel positions are fixed on the LCD monitor, only one position is provided to display images correctly. The position adjustment is made to shift an image to the correct position.
- When vertical bars appear on the screen after adjustment, go back to "To eliminate vertical bars [Clock]". (Clock → Phase → Position)

2-3 Color Adjustment

● To select the display mode (CAL Switch mode)

CAL Switch allows you to select the best display mode easily according to the monitor's application.

CAL Switch mode

Mode	Purpose
DICOM (DICOM-CL)	DICOM-CL mode. Available for setting tailored to X-ray film color (clear base).
TXT (TXT)	Text mode. Suitable for displaying texts for word processing or spreadsheets.
CUS (CUS)	Custom mode. Available for the color settings according to your preference.
CAL (CAL)	CAL mode. Displays the screen adjusted by calibration software.

(1) Press (M).
The adjustment menu appears.

(2) Press (M) again while the adjustment menu is displayed.
Each time you press the button, the mode is switched.

(3) Select .
The mode selected is set.

NOTE

- You can also select the CAL Switch mode by pressing and select (Color).
- "ScreenManager Pro for Medical" allows you to select the CAL Switch mode automatically according to the application used.
  (Refer to "Chapter 3 Auto CAL Switch" on the User's Manual for "ScreenManager Pro for Medical".)

To perform advanced adjustments

Independent setting and saving of color adjustment are available for each CAL Switch mode.

Adjustment items in each mode

According to the CAL Switch mode selected, the adjustable function differs.

√: Adjustment available –: Invalid for adjustment

Icon	Function	CAL Switch mode			
		DICOM-CL	TXT	CUS	CAL
	Brightness	–	√	√	–
	Contrast	–	√	√	–
	Gamma	–	√	√	–
	Temperature	–	√	√	–
	Gain	–	–	√	–
	Saturation	–	–	√	–
	Hue	–	–	√	–

* If you adjust the calibration in this mode using the calibration kit exclusive for to this monitor (RadiCS LE as an accessory shown on page 33), only Brightness and Reset is adjustable.

To adjust the brightness [Brightness]

The screen brightness is adjusted by changing the brightness of the backlight (Light source from the LCD back panel).

Adjustable range: 0 to 100%

(1) Press .
The adjustment menu appears.

(2) Select (Color).

(3) Adjust the brightness with or of (Brightness).

(4) Select .
The adjustment is completed.

Attention

- Wait 30 minutes or more from monitor power on before starting the color adjustment.
- Perform (AutoRange) first when adjusting color for analog input signals.
  (Refer to “To adjust color gradation automatically” on page 14).
- The same image may be seen in different colors on multiple monitors due to their monitor-specific characteristics. Make fine color adjustment visually when matching colors on multiple monitors.

NOTE

- The values shown in “%” or “K” are available only as reference.

NOTE

- You can also adjust the brightness by pressing or without displaying the adjustment menu.

To adjust the contrast [Contrast]

The luminance of the screen is adjusted by varying the video signal level.

Adjustable range: 0 to 100%

(1) Press ◉.
The adjustment menu appears.
(2) Select (Color).
(3) Adjust the contrast with − or + of ◑ (Contrast).
(4) Select ↩.
The adjustment is completed.

NOTE

- You can also adjust the contrast by pressing Ⓜ while the adjustment menu is not displayed, and press − or + of ◑ (Contrast).
- In the contrast of 50%, every color gradation is displayed.
- When adjusting the monitor, it is recommended to perform the brightness adjustment which may not lose the gradation characteristics, prior to the contrast adjustment. Perform the contrast adjustment in the following cases.
  – When you feel the image is dark even if the brightness is set to 100%.
  – When you feel the black level of the screen is bright (Set the brightness down and the contrast to higher than 50%).

To adjust the gamma value [Gamma]

The gamma value can be adjusted. The luminance of the monitor varies depending on the input signal, however, the variation rate is not proportional to the input signal. To keep the balance between the input signal and the luminance of the monitor is called as “Gamma correction”.

Adjustable range: 1.8, 2.0, 2.2

(1) Press ◉.
The adjustment menu appears.
(2) Select (Color).
(3) Select (Color Menu).
(4) Adjust the gamma value with − or + of (Gamma).
(5) Select ↩.
The adjustment is completed.

NOTE

- You cannot adjust the value if the icon is not displayed, depending on the CAL Switch mode selected. (See “Adjustment items in each mode” on page 16.)

To adjust the color temperature [Temperature]

The color temperature can be adjusted. The color temperature is normally used to express the hue of “White” and/or “Black” by a numerical value. The value is expressed in degrees “K” (Kelvin).

In the same way as the flame temperature, the image on the monitor is displayed reddish if the color temperature is low and is bluish if the color temperature is high. The gain preset values are set for each color temperature setting value.

6500K	The white color image is displayed in warm white like paper white. The temperature is suitable to display photographs or video images.
9300K	The white color image is displayed slightly bluish white.

Adjustable range: Native, 6500K-15000K (specified by every 500K unit, including 9300K), User (at gain adjustment)

(1) Press .
The adjustment menu appears.
(2) Select (Color).
(3) Select (Color Menu).
(4) Adjust the color temperature with or of (Temperature).
(5) Select .
The adjustment is completed.

NOTE

- You cannot adjust the value if the icon is not displayed, depending on the CAL Switch mode selected. (See “Adjustment items in each mode” on page 16.)
- [Gain] allows you to perform more advanced adjustment (See “To adjust the gain value” on page 18).
- If you set to [Native], the image is displayed in the preset color of the monitor (Gain: 100% for each RGB).
- When changing the gain value, the color temperature adjusting range is changed to “User”.

To adjust the gain value [Gain]

Each luminance of red/green/blue composing the color is called “Gain”. The gain adjustment may change the color tone of the “White” (when the max input signal for each color is obtained)

Adjustable range: 0 to 100%

(1) Press .
The adjustment menu appears.
(2) Select (Color).
(3) Select (Color Menu).
(4) Select (Gain).
(5) Adjust the respective value of (Red)/ (Green)/ (Blue) with or .
(6) Select .
The adjustment is completed.

NOTE

- You cannot adjust the value if the icon is not displayed, depending on the CAL Switch mode selected. (See “Adjustment items in each mode” on page 16.)
- The gain value may change depending on the value of the color temperature.
- When changing the gain value, the color temperature adjusting range is changed to “User”.

To adjust the color saturation [Saturation]

This function allows you to adjust the saturation of the color on the monitor.

Adjustable range: -100 to 100

(1) Press .
The adjustment menu appears.
(2) Select (Color).
(3) Select (Color Menu).
(4) Select (Advanced).
(5) Adjust the saturation with or of (Saturation).
(6) Select .
The adjustment is completed.

Attention

- This function does not enable to display every color gradation.

NOTE

- You cannot adjust the value if the icon is not displayed, depending on the CAL Switch mode selected. (See “Adjustment items in each mode” on page 16.)
- Setting the minimum (-100) turns the image to a monochrome screen.

To adjust the hue [Hue]

This function allows you to adjust the hue. If you set the hue to a high value, the image turns greenish. If low, the image turns purplish.

Adjustable range: -100 to 100

(1) Press .
The adjustment menu appears.
(2) Select (Color).
(3) Select (Color Menu).
(4) Select (Advanced).
(5) Adjust the hue with or of (Hue).
(6) Select .
The adjustment is completed.

Attention

- This function does not enable to display every color gradation.

NOTE

- You cannot adjust the value if the icon is not displayed, depending on the CAL Switch mode selected. (See “Adjustment items in each mode” on page 16.)

2-4 Adjusting Sharpness [Sharpness]

This function allows you to emphasize the outline of the image by emphasizing the color difference between the pixels composing the image and to improve a sense of quality and materiality. Contrarily, this function allows you to show the image smoothly by blurring the outline of the image.

Adjustable range: -3 to 3

(1) Press .
The adjustment menu appears.

(2) Select (Screen).

(3) Adjust the sharpness with or of (Sharpness).

(4) Select .
The adjustment is completed.

2-5 Setting Enable/Disable for the automatic brightness adjustment function [Auto EcoView]

The sensor on the front side of the monitor detects the environmental brightness to adjust the screen brightness automatically and comfortably by using the Auto EcoView function.

(1) Press .
The adjustment menu appears.

(2) Select (PowerSave).

(3) The Enable/Disable setting is toggled by selecting (Auto EcoView).

	Enable
	Disable

(4) Select .
The mode selected is set.

Attention

- This function is not available in the DICOM-CL and CAL modes.

2-6 Turning off the monitor automatically [Off Timer]

This function allows the monitor to automatically turn off after a specified time has passed. This function serves to protect the monitor from after-images caused when the same image is left displayed for a long time. Use this function when an image is displayed throughout the day.

Adjustable range: Off, 1 to 23h

(1) Press .
The adjustment menu appears.

(2) Select (PowerSave).

(3) Set a monitor OFF time with or of (Off Timer).
Select “Off” to set Off timer setting to “Off”.

(4) Select .
The Off timer setting is completed.

(5) “Power will shut off in a minute” appears on the display if it becomes one minute before the setting time.
If you select (Extend), the off timer function works 90 minutes later.

2-7 Locking Buttons [Key Lock] [Menu Lock]

This function allows you to lock the operation buttons to prevent changing the adjusted/set status.

Key Lock : Locks the buttons other than the Power button.

Menu Lock : Locks the buttons other than the Power, Input signal selection and Mode buttons.

(1) Press ⏻ to turn off the monitor.

(2) Press ⏻ holding M down to turn on the monitor.
The adjustment menu appears.

(3) Each time you press ☼, the mode is switched.

	Unlock
	Menu Lock
	Key Lock

(4) Select  .
The mode selected is set.

2-8 Displaying Monitor Infomation [Info1] [Info2]

This function allows you to display the input signal status, current resolution and model name.

Info1 : Displays the input signal status (analog/digital), resolution, H/V frequency

Info2 : Displays the model name, usage time and serial number.

(1) Press ▣.
The adjustment menu appears.

(2) Select  (Tool).

(3) Select  (Info1) or  (Info2).

(4) Select  .
The menu is closed.

Attention

- The key lock function may activate when calibration is performed with the calibration kit.

2-9 Setting Power Indicator ON/OFF [Power LED]

This function allows you to set the power indicator (blue) ON/OFF in the monitor ON condition.

(1) Press ◉.
The adjustment menu appears.

(2) Select (PowerSave).

(3) The On/Off setting is toggled by selecting (Power LED).

	On
	Off

(4) Select .
The mode selected is set.

2-10 Setting Language [Language]

This function allows you to select a language for the adjustment menu or displaying message.

Selectable languages

English/German/French/Spanish/Italian/Swedish/Simplified Chinese/Traditional Chinese/Japanese

(1) Press ◉.
The adjustment menu appears.

(2) Select (Settings).

(3) The language setting is toggled by selecting (Language).

	English
	German
	French
	Spanish
	Italian
	Swedish
	Simplified Chinese
	Traditional Chinese
	Japanese

(4) Select .
The language selected is set.

2-11 Displaying EIZO logo

The EIZO logo appears on the display when turning on the monitor. This function allows you to display, or not, the EIZO logo.

(1) Press ⏻ to turn off the monitor.

(2) Press ⏻ holding S down to turn on the monitor.
The EIZO logo display setting is toggled by performing the operation in step 2.

NOTE

- The logo appears with the default setting.

2-12 Resuming the Default Setting [Reset]

There are two types of Reset. One is to reset the color adjustment only to the default settings, and the other is to reset all the settings to the default settings.

Attention

- After resetting, you cannot undo the operation.

• To reset color adjustment values

Only the adjustment values in the current CAL Switch mode will revert to the default settings (factory settings).

(1) Press .
The adjustment menu appears.

(2) Select (Tool).

(3) Select (Reset).
If you will not perform the reset operation, select .

(4) Select (Color (DICOM*)).
The color adjustment values revert to the default settings.

* Current CAL Switch mode is displayed.

• To reset all adjustments to the factory default settings

Reset all adjustments to the factory default settings.

(1) Press .
The adjustment menu appears.

(2) Select (Tool).

(3) Select (Reset).
If you will not perform the reset operation, select .

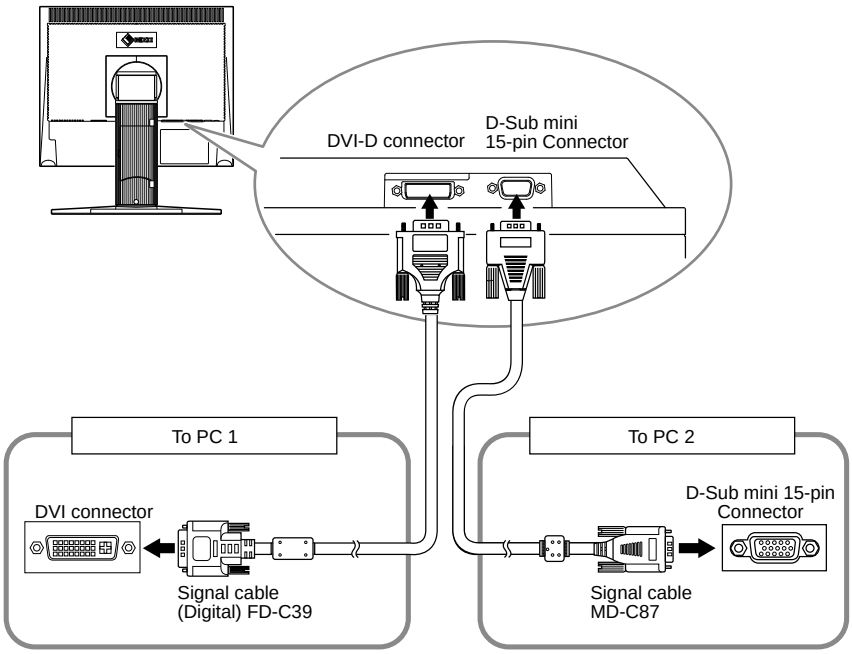
(4) Select (All).
All setting values revert to the default settings.

Chapter 3 Connecting Cables

3-1 Connecting Two PCs to the Monitor

Two PCs can be connected to the monitor through the DVI-D and the D-Sub mini 15 pin connector on the back of the monitor.

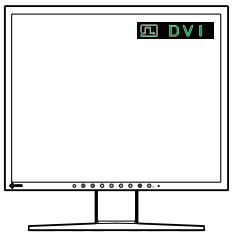
Connection examples



- **To switch the input signal**

The input signal switches each time (S) is pressed.

When the signal is switched, the active input port name appears at the top right corner of the screen.



● Setting auto-selection of the input signal [Input Signal]

Enable : When either PC is turned off or enters the power-saving mode, the monitor automatically displays signals of another PC.

Disable : The monitor does not detect the PC's signals automatically. Switch an input signal with (S).

(1) Press (■).
The adjustment menu appears.

(2) Select (Tool).

(3) The Enable/Disable setting is toggled by selecting (Input Signal).

	Enable
	Disable

(4) Select .
The mode selected is set.

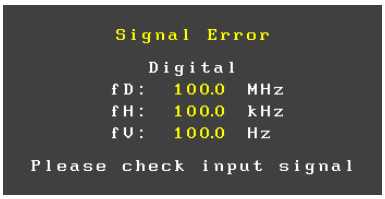
NOTE

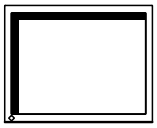
- When "Enable" is selected for [Input Signal], the monitor's power-saving function works only when the two PCs are in the power-saving mode.

Chapter 4 Troubleshooting

If a problem still remains after applying the suggested remedies, contact your local dealer.

- No-picture problems → See No.1 - No.2.
- Imaging problems (digital input) → See No.3 - No.9.
- Imaging problems (analog input) → See No.3 - No.12.
- Other problems → See No.13 - No.14.
- USB problems → See No.15.

Problems	Possible cause and remedy
1. No picture • Power indicator does not light.	• Check whether the power cord is connected correctly. If the problem persists, turn off the monitor, and then turn it on again a few minutes later. • Press ⏻.
• Power indicator is lighting blue.	• Set each adjusting value in [Brightness], [Contrast] and [Gain] to higher level. (see page 16, 17, 18)
• Power indicator is lighting orange.	• Switch the input signal with Ⓢ. • Operate the mouse or keyboard. • Check whether the PC is turned on.
2. The message below appears.	This message appears when the signal is not input correctly even when the monitor functions properly.
• This message appears when no signal is input. 	• The message shown left may appear, because some PCs do not output the signal soon after power-on. • Check whether the PC is turned on. • Check whether the signal cable is connected properly. • Switch the input signal with Ⓢ.
• The message shows that the input signal is out of the specified frequency range. (Such signal frequency is displayed in yellow.) Example: 	• Check whether the signal setting of your PC matches the resolution and the vertical frequency settings for the monitor. (See “Compatible Resolutions/Frequencies” on the cover back of the Setup Manual.) • Reboot the PC. • Select an appropriate display mode using the graphics board’s utility. Refer to the manual of the graphics board for details. fD : Dot Clock (Displayed only when the digital signal inputs) fH : Horizontal Frequency fV : Vertical Frequency
3. The screen is too bright or too dark.	• Adjust using [Brightness] or [Contrast]. (The LCD monitor backlight has a fixed life span. When the screen becomes dark or begins to flicker, contact your local dealer.)
4. Characters are blurred.	• Check whether the signal setting of your PC matches the resolution and the vertical frequency settings for the monitor. (See “Compatible Resolutions/Frequencies” on the cover back of the Setup Manual.) • Adjust using [Sharpness]. (see page 20)
5. Afterimages appear.	• Use a screen saver or off timer function for a long-time image display. • Afterimages are particular to LCD monitors. Avoid displaying the same image for a long time.
6. Green/red/blue/white dots or defective dots remain on the screen.	• This is due to LCD panel characteristics and is not a failure.

Problems	Possible cause and remedy
7. Interference patterns or pressure marks remain on the screen.	• Leave the monitor with a white or black screen. The symptom may disappear.
8. The outline of the letters are colored.	• If the [Sharpness] setting is set to a high level, the characters displayed on the monitor may be colored.
9. Noise appears on the screen.	• When entering the signals of HDCP system, the normal images may not be displayed immediately.
10. Display position is incorrect. 	• Adjust image position so that it is displayed properly within the display area using [Position]. (See page 14) • If the problem persists, use the graphics board's utility if available to change the display position.
11. Vertical bars appear on the screen or a part of the image is flickering. 	• Adjust using [Clock]. (see page 13)
12. Whole screen is flickering or blurring. 	• Adjust using [Phase]. (see page 13)
13. The adjustment menu does not appear.	• Check whether the operation lock function works. (see page 21)
14. The auto adjust function does not work correctly.	• This function does not work when digital signal is input. • This function is intended for use on the Macintosh and on AT-compatible PC running Windows. It may not work properly in either of the following cases. It does not work properly when an image is displayed only on a part of the screen (command prompt window, for example) or when a black background (wallpaper, etc.) is in use. • This function does not work correctly with some graphics boards.
15. The monitor connected with the USB cable is not detected.	• Check whether the USB cable is connected correctly. • Please perform the following to check the status. - Reboot the PC. • Check whether the PC and OS are USB compliant. (For USB compliance of the respective devices, consult their manufacturers.) • Check the PC's BIOS setting for USB when using Windows. (Refer to the manual of the PC for details.)

Chapter 5 Reference

5-1 Attaching an Arm

The stand can be removed and replaced with an arm (or another stand) to be attached to the monitor. Use an arm or stand of EIZO option.

[Attaching]

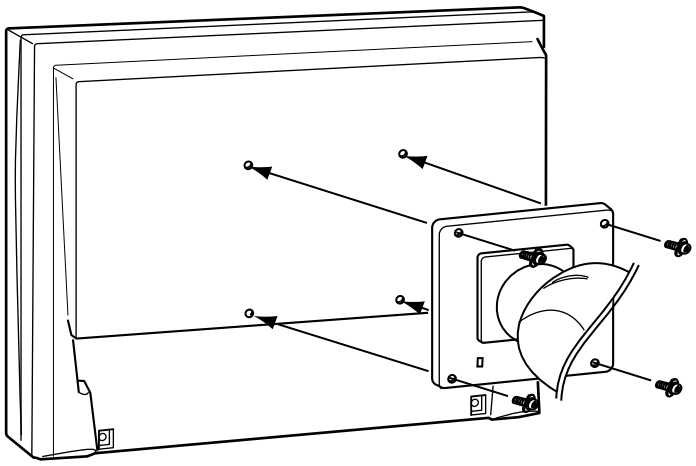
1 **Lay the LCD monitor on a soft cloth spread over on a stable surface with the panel surface facing down.**

2 **Remove the stand. (Prepare a screwdriver.)**

Unscrew the four screws securing the unit and the stand with the screwdriver.

3 **Attach the monitor to the arm or stand.**

Secure the monitor to the arm or stand using the screws specified in the user's manual of the arm or stand.



Attention

- When attaching an arm or stand, follow the instructions of their user's manual.
- When using another manufacturer's arm or stand, confirm the following in advance and select one conforming to the VESA standard. Use the M4 × 12 mm screws supplied with this monitor.
  - Clearance between the screw holes: 100 mm × 100 mm
  - Thickness of plate: 2.6 mm
  - Strong enough to support weight of the monitor unit (except the stand) and attachments such as cables.
- When using an arm or stand, attach it to meet the following tilt angles of the monitor.
  - Up 45 degrees, down 45 degrees (horizontal display, and vertical display rotated 90 degrees clockwise)
- Connect the cables after attaching an arm or a stand.
- Since the monitor and arm are so heavy, dropping them may result in injury or equipment damage.

5-2 Power Saving Mode

■ Analog input

This monitor complies with the VESA DPMS standard.

[Power Saving System]

PC		Monitor	Power Indicator
Operating		Operating	Blue
Power saving	STAND-BY SUSPENDED OFF	Power saving	Orange

[Resumption Procedure]

- Operate the mouse or keyboard to resume the normal screen.

■ Digital input

This monitor complies with the DVI DMPM standard.

[Power Saving System]

The monitor enters the power saving mode in five seconds in connection with the PC setting.

PC	Monitor	Power Indicator
Operating	Operating	Blue
Power saving	Power saving	Orange

[Resumption Procedure]

- Operate the mouse or keyboard to resume the normal screen.

Attention

- Unplugging the power cord completely shuts off power supply to the monitor.

5-3 Specifications

LCD Panel	Size	19-inch (480 mm) TFT color LCD with
	Surface treatment	anti-glare
	Surface hardness	3H
	Viewing angle	Horizontal 178°, Vertical 178° (CR:10 or more)
	Dot Pitch	0.294mm
	Response Time	Approx. 20ms
Horizontal Scan Frequency	Analog	24.8-80kHz
	Digital	31-64kHz
Vertical Scan Frequency	Analog	50-75Hz
	Digital	59-61Hz (VGA TEXT: 69-71Hz)
Resolution		1280 dots × 1024 lines
Max. Dot Clock	Analog	135MHz
	Digital	108MHz
Max. Display Color		Approx. 16.77 million colors
Display Area (H × V)		376.3mm × 301.0mm
Power Supply		100-120 VAC ±10%, 50/60Hz 0.7-0.6A 200-240 VAC ±10%, 50/60Hz 0.4-0.35A
Power Consumption	Screen Display On	43W or less
	Power saving mode	0.8W or less (for single signal input without USB)
	Power button Off	0.7W or less (Without USB)
Input Signal Connector		DVI-D connector (Applicable to HDCP), D-Sub mini 15-pin
Analog Input Signal (Sync)		Separate, TTL, positive/ negative
Analog Input Signal (Video)		Analog, Positive (0.7Vp-p/75Ω)
Digital Signal Transmission System		TMDS (Single Link)
Video Signal Memory		Analog signal: 26 (preset: 21)
Plug & Play		VESA DDC 2B / EDID structure 1.3
Dimensions (Width) × (Height) × (Depth)	Main unit	405 mm (15.9 inch) × 406.5 - 506.5 mm (16.0 - 19.9 inch) × 205 mm (8.1 inch)
	Main unit (without stand)	405 mm (15.9 inch) × 334 mm (13.1 inch) × 61.5 mm (2.4 inch)
Mass	Main unit	7.2 kg (15.9 lbs.)
	Main unit (without stand)	5.2 kg (11.5 lbs.)
Movable range		Tilt: 30° Up, 0° Down Swivel: 35° Right, 35° Left Adjustable height: 100 mm (3.9 inch) Rotation: 90° (clockwise)
Environmental Conditions	Temperature	Operating temperature: 0 °C - 35 °C (32 °F - 95 °F) Storage temperature: -20 °C - 60 °C (-4 °F - 140 °F)
	Humidity	Operating: 20% - 80% (no condensation) Storage: 10% - 80% (no condensation)
	Pressure	Operating: 700 to 1060 hPa. Storage: 200 to 1060 hPa.

USB	Standard	USB Specification Revision 2.0
	Port	Upstream port × 1

Main default settings (factory settings)

CAL Switch Mode : The default display mode setting is DICOM mode.

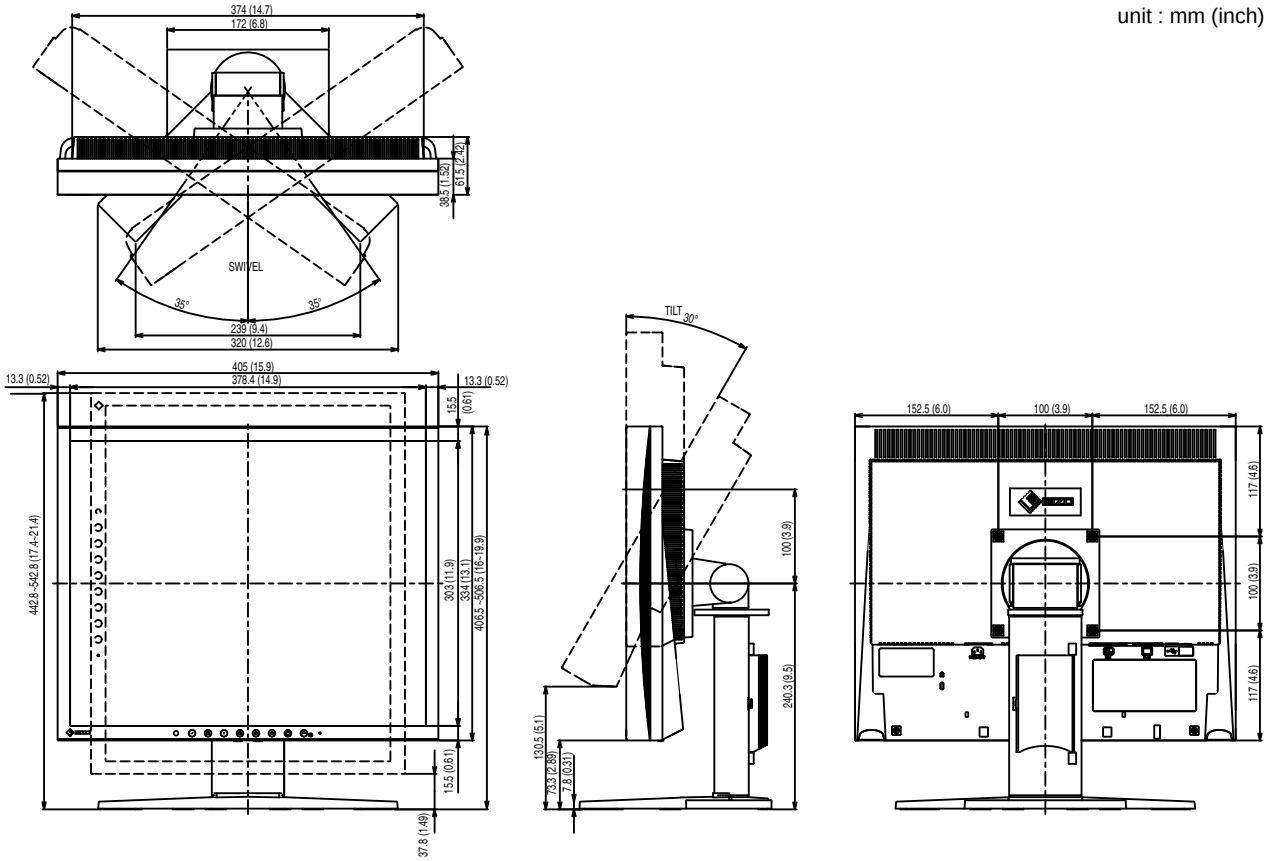
	Brightness	Color Temperature	Gamma
Custom	approx. 300 cd/m^2 (100 %)	Native	2.2
Text	approx. 100 cd/m^2 (40 %)	7500K	2.2
DICOM-CL	170 cd/m^2	7500K	DICOM setting
CAL	170 cd/m^2	7500K	DICOM setting

others

Auto EcoView	Disable
Off Timer	Disable
Input Signal	Disable
Language	English
Sharpness	0

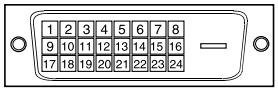
Outside Dimensions

unit : mm (inch)



Connector Pin Assignment

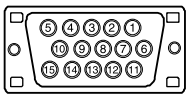
• DVI-D connector



Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	T.M.D.S. Data 2-	9	T.M.D.S. Data1-	17	T.M.D.S. Data0-
2	T.M.D.S. Data 2+	10	T.M.D.S. Data1+	18	T.M.D.S. Data0+
3	T.M.D.S. Data2/4 Shield	11	T.M.D.S. Data1/3 Shield	19	T.M.D.S. Data0/5 Shield
4	NC*	12	NC*	20	NC*
5	NC*	13	NC*	21	NC*
6	DDC Clock (SCL)	14	+5V Power	22	T.M.D.S. Clock shield
7	DDC Data (SDA)	15	Ground (return for +5V, Hsync, and Vsync)	23	T.M.D.S. Clock+
8	NC*	16	Hot Plug Detect	24	T.M.D.S. Clock-

(NC*: No Connection)

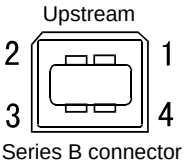
• D-Sub mini 15-pin connector



Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	Red video	6	Red video ground	11	Ground
2	Green video	7	Green video ground	12	Data (SDA)
3	Blue video	8	Blue video ground	13	H. Sync
4	Ground	9	NC*	14	V. Sync
5	NC*	10	Ground	15	Clock (SCL)

(NC*: No Connection)

• USB port



Series B connector

Contact No.	Signal	Remarks
1	VCC	Cable power
2	– Data	Serial data
3	+ Data	Serial data
4	Ground	Cable ground

Option List

Panel Protector	EIZO “FP-702”
Arm, Stand	EIZO “LS-H71-D” : Height Adjustable Stand EIZO “LS-H72-D” : Height Adjustable Stand EIZO “LS-A70-D” : Height Adjustable Stand EIZO “LS-HM1-D” : Dual Height Adjustable Stand EIZO “LA-120-D” : LCD Monitor Flexible Arm EIZO “LA-130-D” : LCD Monitor Flexible Arm EIZO “LA-131-D” : LCD Monitor Flexible Arm EIZO “LA-010-W-BK” : Wall Mount Arm for LCD Monitor EIZO “LA-011-W” : Wall Mount Arm for LCD Monitor EIZO “LA-012-W” : Wall Mount Arm for LCD Monitor EIZO “LA-030-W” : Wall Mount Arm for LCD Monitor
Calibration Kit	EIZO “RadiCS UX1” Ver.3.4.1 or later EIZO “Clip-On Swing Sensor G1” EIZO “Clip-On Swing Sensor G2”
Network QC Management Software	EIZO “RadiNET Pro” Ver.3.4.1 or later
Cleaning Kit	EIZO “ScreenCleaner”

Refer to Web site of EIZO NANAO CORPORATION for the latest information about supported graphics card (http://www.radiforce.com).

5-4 Glossary

Clock

The analog input monitor needs to reproduce a clock of the same frequency as the dot clock of the graphics system in use, when the analog input signal is converted to a digital signal for image display.
This is called clock adjustment. If the clock pulse is not set correctly, some vertical bars appear on the screen.

DICOM (Digital Imaging and Communication in Medicine)

DICOM is a standard for digital imaging and communication for medical use developed by American College of Radiology and National Electric Manufacturers Association.

DVI (Digital Visual Interface)

DVI is a digital interface standard. DVI allows direct transmission of the PC's digital data without loss.
This adopts the TMDS transmission system and DVI connectors. There are two types of DVI connectors. One is a DVI-D connector for digital signal input only. The other is a DVI-I connector for both digital and analog signal inputs.

DVI DMPM (DVI Digital Monitor Power Management)

DVI DMPM is a digital interface power-saving function. The "Monitor ON (operating mode)" and "Active Off (power-saving mode)" are indispensable for DVI DMPM as the monitor's power mode.

Gain

This is used to adjust each color parameter for red, green and blue. An LCD monitor displays the color by the light passing through the panel color filter. Red, green and blue are the three primary colors. All the colors on the screen are displayed by combining these three colors. The color tone can be changed by adjusting the light intensity (volume) passing through each color's filter.

Gamma

Generally, the monitor brightness varies nonlinearly with the input signal level, which is called "Gamma Characteristic". A small gamma value produces a low-contrast image, while a large gamma value produces a high-contrast image.

HDCP (High-bandwidth Digital Contents Protection)

Digital signal coding system developed to copy-protect the digital contents, such as video, music, etc. This helps to transmit the digital contents safely by coding the digital contents sent via DVI terminal on the output side and decoding them on the input side.
Any digital contents cannot be reproduced if both of the equipments on the output and input sides are not applicable to HDCP system.

Phase

Phase means the sampling timing to convert the analog input signal to a digital signal. Phase adjustment is made to adjust the timing. It is recommended that phase adjustment be made after the clock is adjusted correctly.

Range Adjustment

Range adjustment controls the signal output levels to display every color gradation. It is recommended that range adjustment be made before color adjustment.

Resolution

The LCD panel consists of numerous pixels of specified size, which are illuminated to form images. This monitor consists of 1280 horizontal pixels and 1024 vertical pixels. At a resolution of 1280 x 1024, all pixels are illuminated as a full screen (1:1).

Temperature

Color temperature is a method to measure the white color tone, generally indicated in degrees Kelvin. The screen becomes reddish at a low temperature, and bluish at a high temperature, like the flame temperature.

5000K: Slightly reddish white

6500K: Warm white like paper white

9300K: Slightly bluish white

TMDS (Transition Minimized Differential Signaling)

A signal transmission system for digital interface.

VESA DPMS (Video Electronics Standards Association - Display Power Management Signaling)

VESA provides the standardization of signals from PC (graphics board) for power saving of PC monitors. DPMS defines the signal status between PC and monitor.

5-5 Preset Timing

The following table shows factory preset video timing (for analog signal only).

Mode	Dot clock		Frequency Horizontal: kHz Vertical: Hz	Polarity
VGA 640×480@60Hz	25.2 MHz	Horizontal	31.47	Negative
		Vertical	59.94	Negative
VGA 720×400@70Hz	28.3 MHz	Horizontal	31.47	Negative
		Vertical	70.09	Positive
VESA 640×480@72Hz	31.5 MHz	Horizontal	37.86	Negative
		Vertical	72.81	Negative
VESA 640×480@75Hz	31.5 MHz	Horizontal	37.50	Negative
		Vertical	75.00	Negative
VESA 800×600@56Hz	36.0 MHz	Horizontal	35.16	Positive
		Vertical	56.25	Positive
VESA 800×600@60Hz	40.0 MHz	Horizontal	37.88	Positive
		Vertical	60.32	Positive
VESA 800×600@72Hz	50.0 MHz	Horizontal	48.08	Positive
		Vertical	72.19	Positive
VESA 800×600@75Hz	49.5 MHz	Horizontal	46.88	Positive
		Vertical	75.00	Positive
VESA 1024×768@60Hz	65.0 MHz	Horizontal	48.36	Negative
		Vertical	60.00	Negative
VESA 1024×768@70Hz	75.0 MHz	Horizontal	56.48	Negative
		Vertical	70.07	Negative
VESA 1024×768@75Hz	78.8 MHz	Horizontal	60.02	Positive
		Vertical	75.03	Positive
VESA 1152×864@75Hz	108.0 MHz	Horizontal	67.50	Positive
		Vertical	75.00	Positive
VESA 1280×960@60Hz	108.0 MHz	Horizontal	60.00	Positive
		Vertical	60.00	Positive
VESA 1280×1024@60Hz	108.0 MHz	Horizontal	63.98	Positive
		Vertical	60.02	Positive
VESA 1280×1024@75Hz	135.0 MHz	Horizontal	79.98	Positive
		Vertical	75.03	Positive
PC-9801 640 × 400@56Hz	21.1 MHz	Horizontal	24.83	Negative
		Vertical	56.42	Negative
PC-9821 AP2 640 × 400 @70Hz	25.2 MHz	Horizontal	31.48	Negative
		Vertical	70.10	Negative

Attention

- Display position may be deviated depending on the PC connected, which may require screen adjustment using Adjustment menu.
- If a signal other than those listed in the table is input, adjust the screen using the Adjustment menu. However, screen display may still be incorrect even after the adjustment.
- When interlace signals are used, the screen cannot be displayed correctly even after screen adjustment using the Adjustment menu.

For U.S.A. , Canada, etc. (rated 100-120 Vac) Only

FCC Declaration of Conformity

We, the Responsible Party	EIZO NANAO TECHNOLOGIES INC.
	5710 Warland Drive, Cypress, CA 90630
	Phone: (562) 431-5011
declare that the product	Trade name: EIZO
	Model: RadiForce MX191

is in conformity with Part 15 of the FCC Rules. Operation of this product 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.

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 the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note

Use the attached specified cable below or EIZO signal cable with this monitor so as to keep interference within the limits of a Class B digital device.

- AC Cord
- Shielded Signal Cable (Enclosed)

Canadian Notice

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de le classe B est comforme à la norme NMB-003 du Canada.

EMC Information

Essential performance of RadiForce series is to display images and operate functions normally.

⚠ CAUTION

The RadiForce series requires special precautions regarding EMC and need to be installed, put into service and used according to the following information.

Do not use any cables other than the cables that provided or specified by us.
Using other cables may cause the increase of emission or decrease of immunity.

Do not put any portable and mobile RF communications equipment close to the RadiForce series. Doing so may affect the RadiForce series.

The RadiForce series should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, the equipment or system should be observed to verify normal operation in the configuration in which it will be used.

Anyone who connects additional equipment to the signal input part or signal output parts, configuring a medical system, is responsible that the system complies with the requirements of EN60601-1-2.

Guidance and manufacturer's declaration - electromagnetic emissions		
The RadiForce series is intended for use in the electromagnetic environment specified below. The customer or the user of the RadiForce series should assure that it is used in such an environment.		
Emission test	**Compliance**	**Electromagnetic environment - guidance**
RF emissions CISPR11/EN55011	Group 1	The RadiForce series uses RF energy only for its internal function. Therefore, its RF emission are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR11/EN55011	Class B	The RadiForce series is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC/EN61000-3-2	Class D	
Voltage fluctuations / flicker emissions IEC/EN61000-3-3	Complies	

Guidance and manufacturer's declaration - electromagnetic immunity			
The RadiForce series is intended for use in the electromagnetic environment specified below. The customer or the user of the RadiForce series should assure that it is used in such an environment.			
Immunity test	**IEC/EN60601 test level**	**Compliance level**	**Electromagnetic environment - guidance**
Electrostatic discharge (ESD) IEC/EN61000-4-2	±6kV contact ±8kV air	±6kV contact ±8kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient / burst IEC/EN61000-4-4	±2kV for power supply lines ±1kV for input/output lines	±2kV for power supply lines ±1kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC/EN61000-4-5	±1kV line(s) to line(s) ±2kV line(s) to earth	±1kV line(s) to line(s) ±2kV line(s) to earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC/EN61000-4-11	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5sec	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the RadiForce series requires continued operation during power mains interruptions, it is recommended that the RadiForce series be powered from an uninterruptible power supply or a battery.
Power frequency (50/60Hz) magnetic field IEC/EN61000-4-8	3A/m	3A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE U_T is the a.c. mains voltage prior to application of the test level.			

Guidance and manufacturer's declaration - electromagnetic immunity			
The RadiForce series is intended for use in the electromagnetic environment specified below. The customer or the user of the RadiForce series should assure that it is used in such an environment.			
Immunity test	**IEC/EN60601 test level**	**Compliance level**	**Electromagnetic environment - guidance**
Conducted RF IEC/EN61000-4-6 Radiated RF IEC/EN61000-4-3	3Vrms 150kHz to 80MHz 3V/m 80MHz to 2.5GHz	3Vrms 3V/m	Portable and mobile RF communications equipment should be used no closer to any part of the RadiForce series, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended Separation distance $d = 1.2 \sqrt{P}$ $d = 1.2 \sqrt{P}$, 80MHz to 800MHz $d = 2.3 \sqrt{P}$, 800MHz to 2.5GHz Where "P" is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and "d" is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey[a], should be less than the compliance level in each frequency range[b]. Interference may occur in the vicinity of equipment marked with the following symbol. 
NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies. NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the RadiForce series is used exceeds the applicable RF compliance level above, the RadiForce series should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the RadiForce series. [b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.			

Recommended separation distances between portable and mobile RF communications equipment and the RadiForce Series

The RadiForce series is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the RadiForce series can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the RadiForce series as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter	Separation distance according to frequency of transmitter m		
W	150kHz to 80MHz $d = 1.2 \sqrt{P}$	80MHz to 800MHz $d = 1.2 \sqrt{P}$	800MHz to 2.5GHz $d = 2.3 \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance "d" in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where "P" is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

Cable length		
Power Cord :	Accessary	2.0m
Signal Cable (FD-C39) :	Accessary	2.0m
Signal Cable (MD-C87) :	Accessary	1.8m
USB Cable (MD-C93) :	Accessary	1.8m

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