

AUTO - SCANNING WITH DIGITAL CONTROL LCD COLOR MEDICAL MONITOR

RadiForce ES150

Operation Manual



For future reference, record the serial number of your display monitor in the space below :

Serial Number

The serial number is located on the back of the monitor

back of the monitor

WARNING

The title "WARNING" is used to inform the users of possible causes that could inflict the injury, death, or property damage to the patients.

CAUTION

The title "CAUTION" is used to inform the users of possible causes that could inflict the patients although it might not severe enough to cause deaths.

NOTE

The title "NOTE" is used to inform the users of items that are of importance in terms of installation, operation, or maintenance of the Equipment although the failure does not inflict the bodily harm to the patients.

EIZO NANAOCORPORATION.2010

All other trademarks are the property of their reference owners.

This document is subject to change without notice.

EIZO provides this information as reference only. Reference to other vendor's products does not imply any recommendation or endorsement.

Revision Control

Date	Description
Rev.D 091310	Document number

TABLE OF CONTENTS

Product Description and Intended Use.....	3
Warnings and Cautions.....	4
Symbol Explanations.....	7
EU Declaration of Conformity for Medical Applications.....	8
Safety Precaution.....	9
Cleaning Your Monitor.....	9
Power Management Function.....	10
Preset Modes.....	11
DDC.....	12
Installation.....	12
Connecting the Power Cord.....	13
Component / RGB / RGBS Connection Instruction.....	14
User Controls.....	15
OSD Screen Basic Section.....	16
OSD Function Description.....	19
Troubleshooting.....	20
Specification of (ES150).....	21
Classification.....	22
Electromagnetic Compatibility.....	23
Dimension Drawing (mm).....	26
Connectors.....	27
Description of Warranty.....	28

Product Description and Intended Use

Please check the following items are present when you unpack the box, and save the packing materials in case you will need to ship or transport the monitor in future.

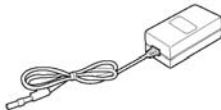
- ES150 LCD Monitor and two video cable (1) DVI-A to HD15 VGA cable* (1) DVI-D cable* (1) BNC to RCA adapter (1) DVI-A to BNC Female cable*



- AC Power cord ***

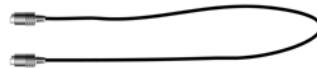


- AC-Adapter



CAUTION
 ⚠ Model No : MW160KA1203F52
 Part No: PS-52141204201A

- Composite Video BNC Jack Cable and Super Video Cable



- User Manual



*Might be optional item. check with local representative

**Touchscreen Data Cable and Floppy Disk (Touchscreen driver) optional

***Might vary pending on region standard

Warnings and Cautions

Please read this manual and follow its instructions carefully. The words warning, caution, and note carry special meanings and should be carefully reviewed:

Warning



The personal safety of the patient or physician may be involved. Disregarding this information could result in injury to the patient or physician.

Caution

Special service procedures or precautions must be followed to avoid damaging the instrument.

Note

Special information to make maintenance easier or important information more clear.



An exclamation mark within a triangle is intended to alert the user to the presence of important operating and maintenance instructions in the literature accompanying the product.



A lightning bolt within a triangle is intended to warn of the presence of hazardous voltage. Refer all service to authorized personnel.

Warning



TO AVOID POTENTIAL SERIOUS INJURY TO THE USER AND THE PATIENT AND/OR DAMAGE TO THIS DEVICE, THE USER MUST :

Warranty is void if any of these warnings are disregarded.

EIZO Nanao Corporation accepts full responsibility for the effects on safety, reliability, and performance of the equipment only if:

- Re-adjustments, modifications, and/or repairs are carried out exclusively by EIZO Nanao Corporation.
- The electrical installation of the relevant operating room complies with the applicable IEC and CE requirements.

Warning

Federal law (United States of America) restricts this device to use by, or on order of a physician.

The EIZO Nanao Corporation ES150 monitor has been tested under UL 60601-1 standard and UL listed for Medical application.

EIZO Nanao Corporation reserves the right to make improvements in the product(s) described herein. Product(s), therefore, may not agree in detail to the published design or specifications. All specifications are subject to change without notice. Please contact EIZO Nanao Corporation directly or phone your local EIZO Nanao Corporation sales representative or agent for information on changes and new products.

Warnings

1. Read the operating manual thoroughly and be familiar with its contents prior to using this equipment.
2. Carefully unpack the unit and check if any damage occurred during shipment.
3. Should any solid object or liquid fall into the panel, unplug the unit and have it checked by qualified personnel before operating it any further.
4. Unplug the unit if it is not to be used for an extended period of time. To disconnect the cord, pull it out by the plug. Never pull the cord itself.
5. Be a qualified physician, having complete knowledge of the use of this equipment.
6. Test this equipment prior to a medical procedure. This monitor was fully tested at the factory before shipment.
7. Avoid removing covers on control unit to avoid electric shock.
8. Attempt no internal repairs or adjustments not specifically detailed in this operating manual.
9. Pay close attention to the care, cleaning instructions in this manual. A deviation may cause damage (refer to the Cleaning section).
10. DO NOT STERILIZE MONITOR.
11. Read the entire instruction manual before assembling or connecting the camera.
12. Do not place the monitor or any other heavy object on the power cord. Damage to the cable can cause fire or electric shock.
13. Monitor with power supply is suitable for use in patient environment.
14. DO NOT stack more than 8 boxes high

This equipment has been tested and found to comply with the limits for medical devices in IEC 601-1-2:2003. These limits are designed to provide reasonable protection against harmful interference in a typical medical 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 other devices in the vicinity. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to other devices, 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 device.
- Increase the separation between the equipment.
- Connect the equipment into an outlet on a circuit different from that to which the other device(s) are connected.
- Consult the manufacturer or field service technician for help.

NOTICES TO USER

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC WARNING

This equipment generates or uses radio frequency energy. Changes or modifications to this equipment may cause harmful interference unless the modifications are expressly approved in the instruction manual. The user could lose the authority to operate this equipment if an unauthorized change or modification is made.

Cautions

1. The AC Adapter must be plugged into a Grounded power outlet.
2. Use only the proprietary ES150 power supply for the ES150 monitor. Make a proper connection by ensuring that the shrink tubing completely secures the connection between the DC power cord and the extension cord.
3. Turn power off when unit is not in use.
4. Never operate the unit right after having transported from a cold location directly to a warm location.
5. Do not expose the monitor to moisture or directly apply liquid cleaners directly to the screen. Spray the cleaning solution into a soft cloth and clean gently.
6. Handle the monitor with care. Do not strike or scratch the screen.
7. Do not block the monitor cooling vents. The monitor is cooled by natural convection and has no fan.
8. Do not force the monitor past 28 degrees of vertical when adjusting the screen position. (For monitors equipped with stands only.)
9. Remove the power module and connection when transporting the unit.
10. Save the original carton and associated packing material. They will be useful should you have to transport or ship the unit.
11. Allow adequate air circulation to prevent internal heat buildup.
12. Do not place the unit on surfaces (rugs, blankets, etc.) or near materials (curtains, draperies) that may block the ventilation slots.
13. Do not install the unit near sunlight, excessive dust, mechanical vibration or shock.
14. The unit is designed for operation in a horizontal position. Never operate the unit in a vertical position.
15. Keep the unit away from equipment with strong magnets (i.e. a large loudspeaker.)
16. Do not expose the monitor to moisture or excessive dust.
17. Equipment with SIP/SOP connectors should either comply with IEC 60601-1 and/or IEC 60601-1-1 harmonized national standard or the combination should be evaluated. Do not touch the patient with signal input or output connectors.
18. Use only a hospital grade power supply cord.
19. This equipment generates, uses, and can radiate radio frequency energy. If not installed correctly and or not used in accordance with these instructions, it may cause harmful interference with other devices. This may be determined by turning the equipment off and on. The user is encouraged to try to correct the interference through one or more of the following measures:
 - Reorient or relocate the receiving device.
 - Increase the separation distance between the equipment.
 - Connect the equipment to an outlet on a circuit different from that to which the other device(s) are connected.
 - Consult the manufacturer or field service technician for help.
20. Grounding reliability can only be achieved when the equipment is connected to an equipment receptacle labeled "Hospital Only" or "Hospital Grade."

Note To connect to an international power supply, use a an attachment plug appropriate for the power outlet.

Note Refer to the "Electromagnetic Compatibility" (EMC) section of this manual to ensure EMC. The ES150 must be installed and operated according to the EMC information provided in this manual.

Symbol Definitions



Dangerous: High Voltage



Direct Current

SN

Serial Number



Top - Bottom



Fragile



Do not get wet



Consult accompanying documents.



Indicates proof of conformity to applicable European Economic Community Council directives and to harmonized standards published in the official journal of the European Communities.



Indicates protective earth ground.



For indoor use only.



51LJ
Medical Equipment
E215822

Medical Equipment is in accordance with UL 60601-1 and CAN/CSA C22.2 No. 601.1 in regards to electric shock, fire hazards, and mechanical hazards.



Tested to comply with FCC Class B standards.



DC power control switch



Authorized Representative in Europe

EU Declaration of Conformity for Medical Applications



A Declaration of Conformity has been filed for this product. A sample of this document may be found in the addendum which accompanied this manual. For a copy of the Declaration of Conformity document, please contact EIZO Nanao Corporation. and request for ES150 DOC.


Prepare for Unpack

Before you unpack your monitor, prepare a suitable workspace. You need a stable and level surface near a grounded wall outlet in an area which is relatively free of glare from sunlight or other sources of bright light. The monitor is cooled by natural convection (it has no fan). For optimum performance, do not block the cooling vents.

While unpacking the monitor, inspect it and other package contents for shipping damage that could cause a fire or shock hazard. Immediately report any shipping damage to the carrier or transportation company and contact customer service for monitor in the future or in case of return.

After you unpack the monitor, make sure the following items are included

- Monitor with video cable
 - AC adapter with cable
-  CAUTION: AC Adapter must be plugged into Grounded a power outlet
-  CAUTION : AC adapter
Model No: MW160KA1203F52
Part No: PS-52141204201A
- Touchscreen cable if monitor has touchscreen option
 - This operations manual

 Note: Your system provider may offer alternative cords or cables depending on the installation requirement and local geography issues.

SAFETY PRECAUTION

- Avoid placing the monitor, or any other heavy object, on the power cord to prevent fire or electrical shock from damage to the power cord.
- Do not expose the monitor to rain, excessive moisture, or dust to avoid fire or shock hazard.
- Do not cover the slots or openings of the monitor for proper heat dissipation. Always put the monitor in a place where there is adequate ventilation.
- Avoid placing the monitor against a bright background or where sunlight or other light sources may reflect on the area of the monitor. Place the monitor just below eye level.
- Handle with care when transporting the monitor.
- Refrain from giving the shock or scratch to the screen, as screen is fragile.

CLEANING YOUR MONITOR

No specific liquid or chemical necessary when cleaning this LCD monitor. However, we suggest to clean the monitor with non-abrasive cloths and cleaning solutions used in hospitals to clean similar equipment. We recommend using 70% Isopropyl alcohol for the screen surface and warm water and a mild detergent for all other surfaces. Other acceptable cleaning agents are listed below:

- 70% isopropyl alcohol
- 6% aqueous ammonia
- Cidex (2.4% glutaraldehyde solution)
- Sodium Hypochlorite (bleach) 10%
- "Green soap" USP
- 0.5% Chlorhexidine in 70% isopropyl alcohol
- Ovation
- Formula 409
- Fantastic
- Wex Cide

To clean the screen, do not spray liquid cleaners directly on to the unit. Stand away from the monitor and spray cleaning solution onto a cloth. Without applying excessive pressure, clean the screen with the slightly dampened rag.

POWER MANAGEMENT FUNCTION

The monitor is equipped with the power management function which automatically reduce the power consumption when not in use in three power level modes.

- **Stand-by Mode**

The monitor goes into stand-by mode when the horizontal sync signal is off for about 10 seconds. In this mode, the screen goes off and the power LED blinks for 1 seconds On and 1 second Off. The screen is displayed after the horizontal sync signal is restored.

- **Suspend Mode**

The monitor goes into suspend mode when the vertical sync signal is off for about 10 seconds. The power consumption during this is less than 8 W. In this mode, the screen goes off and the power LED blinks for 1 seconds On and 1 second Off. The screen is displayed after the vertical sync signal is restored.

- **Off Mode**

The monitor goes into power-off mode when the vertical and horizontal sync signals are off for about 10 seconds. In this mode, the screen goes off and the power LED blinks for 1 seconds On and 1 second Off. The screen is displayed after the vertical and horizontal sync signals are restored.

Power Management System

The ES150 Medical Monitor power management proposal. Provides four phases of power-saving modes by detecting the horizontal sync signal as shown in the table blow.

Mode	DC Input Power (monitor only)	AC Input power (Incl. AC adapter)	LED Status
On	38 W max.	60 W max.	Steady Green
Standby	6.0 W max.	7.5 W max.	Blinking Green
Suspend	6.0 W max.	7.5 W max.	Blinking Green
Off	6.0 W max.	7.5 W max.	Blinking Green

When the monitor is power saving mode or detects an incorrect timing, the screen will be blank and power LED indicator will blink.

PRESET MODES

Mode	Resolution (H x V)	H. Freq. (KHz)	V. Freq. (Hz)
1	640 x 350	31.5	70
2	640 x 350	37.9	85
3	640 x 400	37.9	85
4	720 x 350	31.5	70
5	720 x 400	37.9	85
6	640 x 480	31.5	60
7	640 x 480	37.9	72
8	640 x 480	37.5	75
9	640 x 480	43.3	85
10	800 x 600	35.1	56
11	800 x 600	37.9	60
12	800 x 600	48.1	72
13	800 x 600	46.9	75
14	800 x 600	53.7	85
15	1024 x 768	35.5	43
16	1024 x 768	48.4	60
17	1024 x 768	56.5	70
18	1024 x 768	60	75
19	1024 x 768	68.7	85
20	1152 x 864	67.5	75
21	1280 x 960	60	60
22	1280x1024	63.9	60
23	1280x1024	79	75

*Best resolution 1024 x 768, 60 Hz

DDC

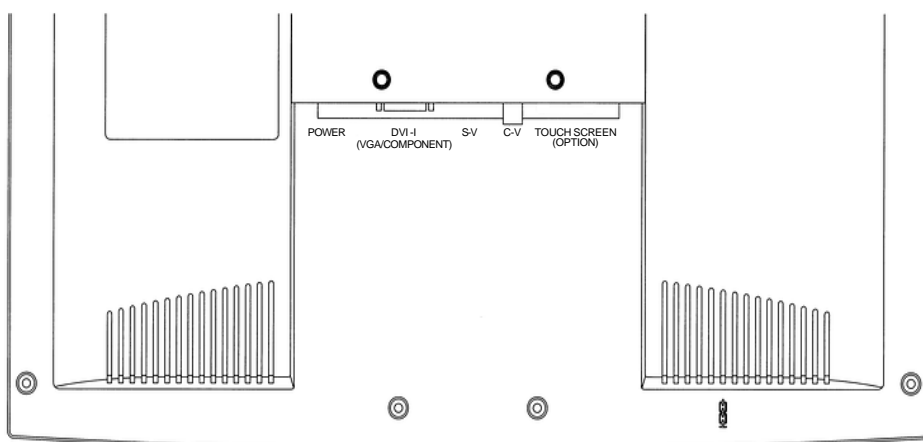
To make your installation easier, the monitor is able to Plug and Play with your system if your system also supports DDC protocol. The DDC (Display Data Channel) is a communication protocol through which the monitor automatically informs the host system about its capabilities, for example, supported resolutions and corresponding timing. The monitor supports DDC1 and DDC2B standard.

INSTALLATION

To install the monitor to your host system, please follow the steps as given below:

Steps

1. Use the supplied video cable (DVI, DVI-A->VGA, S-Video, C-Video, DVI-A->BNC Female) then connect to the host system accordingly.
2. Connect the DC power to the DC power connector on the monitor.
3. Connect one end of AC power cord into the AC Adapter and the other end to AC power outlet.
4. Then turn the host system on and then the monitor.
5. If the monitor still does not function properly, please refer to the troubleshooting section to diagnose the problem.



CONNECTING the POWER CORD

* Check first to make sure that the power cord you use is the correct type required for your area.

* This monitor has an universal AC adapter that allows operation in either AC 100 - 240 V ac voltage area. No user-adjustment is required.

* Plug one end of the power cord to the AC adapter, plug another end to a proper AC outlet.

The cord set should have the appropriate safety approvals for the country in which the equipment will be installed and marked HAR.

For 120 volt Applications, use only UL Listed deachable power cord with NEMA configuration 5-15P type (parallel blades) plug cap. For 240 volt applications use only UL Listed Detachable power supply cord with NEMA configuration 6-15P type (tandem blades) plug cap.

Component / RGB / RGBS CONNECTION INSTRUCTION

For Component (YPbPr) Connection

1. Connect DVI-A to BNC Female cable onto the monitor via DVI port.
2. Connect BNC (YPbPr) cables from the video source to the DVI-A to BNC Female cable. Red (Pr) connect to Red BNC, Green (Y) connect to Green BNC, and Blue (Pb) connect to Blue BNC.
3. The video source should have components output on the video equipment for components (YPbPr) video out.
4. To select component mode in the monitor, push "Select" button on the monitor until it reach "Component / RGB" input or can select in the OSD by Push "Up Arrow" button then the OSD Menu will pop-up, Push "Up Arrow" or "Down Arrow" button to select "Input Source Select" then push select button to enter Input Source Select Menu, Push "Up Arrow" or "Down Arrow" button to select "Component / RGB" then push select button.

For RGB Connection

1. Connect DVI-A to BNC Female cable onto the monitor via DVI port.
2. Connect BNC (RGB) cables from the video source to the DVI-A to BNC Female cable. Red (R) connect to Red BNC, Green (G) connect to Green BNC, and Blue (B) connect to Blue BNC.
3. The video source should have RGB output on the video equipment for RGB video out.
4. To select RGB mode in the monitor, push "Select" button on the monitor until it reach "Component / RGB" input or can select in the OSD by Push "Up Arrow" button then the OSD Menu will pop-up, Push "Up Arrow" or "Down Arrow" button to select "Input Source Select" then push select button to enter Input Source Select Menu, Push "Up Arrow" or "Down Arrow" button to select "Component/RGB" then push select button.

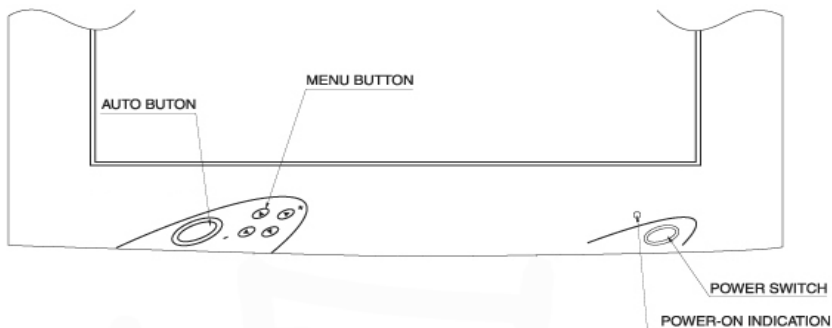
For RGBSync Connection

1. Connect DVI-A to BNC Female cable onto the monitor via DVI port.
2. Connect BNC (RGB) cables from the video source to the DVI-A to BNC Female cable. Red (R) connect to Red BNC, Green (G) connect to Green BNC, Blue (B) connect to Blue BNC and SYNC (V) connect to White BNC.
3. The video source should have RGBSync output on the video equipment for RGBS video out.
4. To select RGBSync mode in the monitor, push "Select" button on the monitor until it reach "Component / RGB" input or can select in the OSD by Push "Up Arrow" button then the OSD Menu will pop-up, Push "Up Arrow" or "Down Arrow" button to select "Input Source Select" then push select button to enter Input Source Select Menu, Push "Up Arrow" or "Down Arrow" button to select "Component / RGB" then push select button.

USER CONTROLS

Front Panel Controls

1. Power LED : Lights up to indicate the power is turned ON.
2. Power Switch : To turn ON or OFF the power.
3. + : To increase the value of the parameter in the OSD you have selected for adjustment.
 : To increase the contrast directly when OSD menu is not activated.
 : To move upward in the OSD menu.
 : Execute a function of selected item.
4. - : To decrease the value of the parameter in the OSD you have selected for adjustment.
 : To decrease the brightness directly when OSD menu is not activated.
 : To move downward in the OSD menu.
5. Menu : To enter OSD.
6. Select : Enter a sub menu or select a menu item.
 If video display option is adopted, switch PC display to Video display and vice versa by one touch when OSD menu is not activated.
7. Auto Button : One touch Auto adjust or Exit OSD menu.



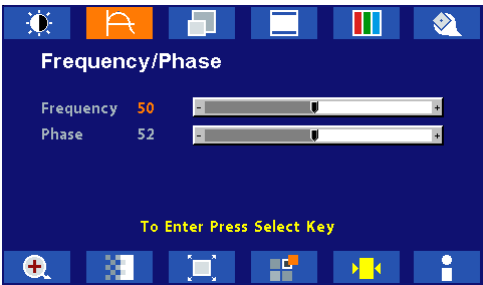
Standard OSD Operation

1. Press "**Menu**" button to activate the OSD.
2. Use "+" or "-" button to move through the menu.
 The parameter will be highlighted when selected.
3. Then use "**Select**" button to enter the sub menu.
 Choice the sub menu different options with "**Select**" button.
3. Then use "+" or "-" to increase or decrease the value of the parameter, or make selection between different options.
4. To quit the OSD screen at any time during the operation, press "**Auto**" button.
 If no keys are pressed for a time period, the OSD automatically disappears.

OSD Screen Basic Section



Brightness / Contrast *



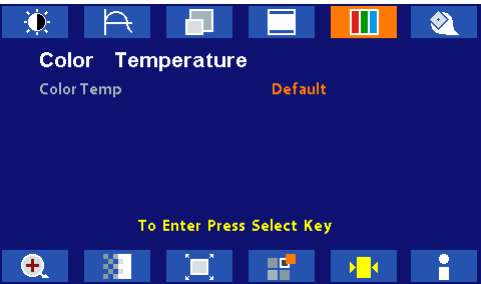
Frequency / Phase * (#1)



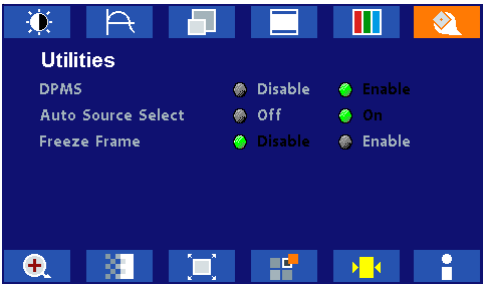
Position *



OSD Control *



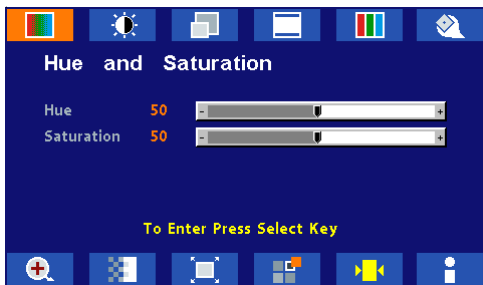
Color Temperature *



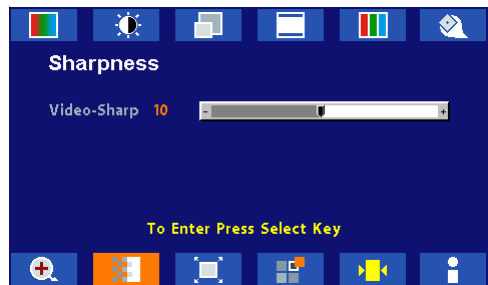
Utilities *

#1 Only available when you using the (VGA) or (Component / RGB) connection
* Follow the Standard OSD Operation.Use “-” or “+” button to adjust

OSD Screen Basic Section



Hue and Saturation * (#2)



Sharpness * (#2)



Zoom *



Input Source Select *



Scale Mode * (#3)



Scale Mode * (#4)

#2 Only available when you using the (C-Video) or (S-Video) connection

#3 Only available when you using the (VGA) or (DVI) connection

#4 Only available when you using the (C-Video), (S-Video) or (Component/RGB) connection

* Follow the Standard OSD Operation. Use “-” or “+” button to adjust

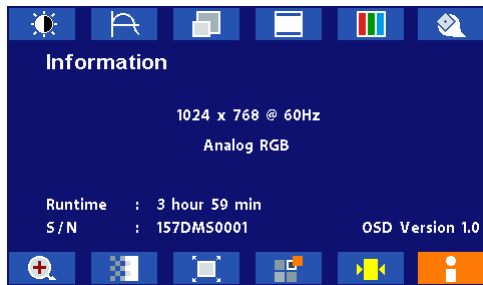
OSD Screen Basic Section



Auto Adjust / Factory Reset * (#5)



Factory Reset * (#6)



Information (#7)

#5 Only available when you using the (VGA) connection

#6 Only available when you using the (DVI), (C-Video), (S-Video) or (Component/RGB) connection

#7 Different video input may have different information

* Follow the Standard OSD Operation. Use "-" or "+" button to adjust

OSD Function Description

Item	Function Description
Brightness	To increase or decrease the brightness.
Contrast	To increase or decrease the contrast.
Hue	To increase or decrease the hue level. (#1)
Saturation	To increase or decrease the saturation level. (#1)
Frequency	To adjust frequency (dot clock). (#2)
Phase	To adjust phase (clock-phase). (#2)
Horizontal	To move the screen left or right.
Vertical	To move the screen upward or downward.
OSD Hor Pos	To move OSD menu left or right.
OSD Ver Pos	To move OSD menu upward or downward.
OSD Background	Choose between Opaque or Translucent.
User Timeout	Set OSD screen appearing time.
Key Lock	Enable Key Lock function, (Press & hold "Menu + Right" key during 5 seconds for disable).
Color Temp	Choose between Default, D65, D93, System 1, System 2, System 3 or System 4 color temp.
Red	Balance Red.
Green	Balance Green.
Blue	Balance Blue.
Gamma	Choose Gamma adjustment with range of 2.4, S0, RadioGraph, 1.8, 1.9, 2.0, 2.1, 2.2, 2.3.
DPMS	Enable or Disable DPMS.
Auto Source Select	Enable or Disable auto source selection
Freeze Frame	Enable or Disable freeze frame.
Zoom	Enable zoom-in function.
Sharpness	To increase or decrease the video sharpness. (#1)
Scale Mode	Choose video scale mode between fill screen, aspect ratio, or one to one. (#3)
Scale Mode	Choose video scale mode between normal, one to one or wide. (#4)
Input Source Select	Choose input source between Analog RGB, Digital RGB, Composite video, Super video or Component / RGB.
Auto Adjust	The Auto-Adjust will automatically adjust V - position, H - position, Clock-Phase, and Contrast, the whole process takes about 5 seconds. (Please use the test pattern file in the attached LCD monitor utility disk for Auto Adjust). (#5)
Recall Factory Default	Set to factory default.
Information	Display information on resolution, refresh rate, and input mode.

(#1) Only available when you using the (C-Video), (S-Video) connection

(#2) Only available when you using the (VGA) or (Component / RGB) connection

(#3) Only available when you using the (VGA) or (DVI) connection

(#4) Only available when you using the (C-Video), (S-Video) or (Component / RGB) connection

(#5) Only available when you using the (VGA) connection

TROUBLESHOOTING

Before sending your LCD monitor for servicing, please check the troubleshooting list below to see if you can self-diagnose the problem.



Problems	Current Status	Remedy
No Picture	LED ON	<ul style="list-style-type: none"> Using OSD, adjust brightness and contrast to maximum or reset to their default settings.
	LED OFF	<ul style="list-style-type: none"> Check the power switch.
		<ul style="list-style-type: none"> Check if AC power cord is properly connected to the AC adapter.
	LED Blinking	<ul style="list-style-type: none"> Check if video signal cable is properly connected at the back of monitor.
		<ul style="list-style-type: none"> Check if the power to computer system is ON.
Abnormal Picture	Unstable Picture	<ul style="list-style-type: none"> Check if the specification of graphics adapter and monitor is in compliance which may be causing the input signal frequency mismatch.
	Display is missing, center shift, or too small or too large in display size	<ul style="list-style-type: none"> Using Auto Setup button, if still display abnormal picture then adjust CLOCK, CLOCK-PHASE, H-POSITION and V-POSITION with non-standard signals.
		<ul style="list-style-type: none"> Using OSD, in case of missing full-screen image, please select other resolution in your Operating System (Windows 95/98, NT) or other vertical refresh timing.
		<ul style="list-style-type: none"> Must wait for a few seconds after adjusting the size of the image before changing or disconnecting the signal or powering OFF the monitor.

SPECIFICATION

AMM15TK3	
LCD Panel	38cm/15-inch Color TFT Pane
Type	Active Matrix
Resolution	1024 dots x 768 lines (Recommended)
Pixel Pitch	0.297mm
Display Color	16 million colors
Response Time	25ms (Typ.)
Color Filter	RGB vertical stripe type
Face Finishing	Anti-Glare Hard Coated
Viewing Angle	170°H 170°V (CR>=10)
Video	0.7Vp-p analog RGB & TMDS (PanelLink) Digital 165 MHz x1
Input Signal	
Sync	2.5~5.0Vp-p separated sync
Input Impedance (Analog)	Video - 75 Ohm Sync - 1k Ohm
Digital	3 channel TMDS receiver, single pixel 24 bit MSB-aligned
Scanning Frequency	
Horizontal	31.47~79.8kHz
Vertical	50~85Hz
Display Size	
H x V	12" x 9" (304mm x 228mm)
Brightness, Contrast Ratio, Gray Scales	
Brightness	350 cd/m2 (Typ.)
Contrast Ratio	600:1 (Typ.)
Signal Input Connector	
Video	Digital/Analog DVI-I, C-Video, S-Video, Component(YPbPr)*, RGB*, RGBSync*
Touchscreen	RS-232 DB-9 (Optional)
Temperature Environment	
Operating Temperature	50° ~ 104°F (10° - 40°C)
Storage Temperature	-4° ~ 140°F (-20° - 60°C)
Operating Humidity	30 ~ 75%RH (without condensation)
Operating Atmospheric Pressure	700 ~ 1060 hPa
Power Source	
Display Monitor	DC 12V
AC-Adapter	AC100~240V 27W +/-10% (Without option, Normal Operation)
Regulations	
Safety, EMI & Environmental	UL60601-1, EN60601-1, EN60601-1-2, CE, FCC, CB, VCCI, CCC, RoHS
Cabinet	
Free Mount	15.7inch (W) x 12.6inch (H) x2.5inch (D) 399mm (W) x 320mm (H) x 64mm (D)
Weight	
Free Mount	7.5 lbs (3.4Kg) Standard

* Require use of DVI-A to 5 BNC Adapter Cable

** All contents are subject to change without notice.

	: Direct Current
 <p>MEDICAL EQUIPMENT WITH RESPECT TO ELECTRIC SHOCK, FIRE AND MECHANICAL HAZARDS ONLY IN ACCORDANCE WITH UL 2601-1, AND CAN/CSA C22.2 NO. 601.1</p>	: UL approval mark according to the safety standard for Medical equipment

This monitor is intended for use in Health Care Facilities model ES150

Equipment is not suitable for use in the presence of flammable anesthetic mixture with air or with oxygen or nitrous oxide.

No user serviceable parts inside, ask qualified personnel when accessing inside.

For disposal of waste product, follow the requirement of local code.

Electrical input rating: 12V DC 3.5A

Classification

Type of protection against electric shock: Class I Equipment.

Degree of protection against the ingress of water: IPX1 compliance.

Mode of operation: Continuous

This monitor has been tested to comply with IEC/EN 60601-1, IEC/EN60601-1-2 and is certified by UL to medical standard UL60601-1(UL/cUL Mark).

Because many medical offices are located in residential areas, this monitor, in addition to the medical requirements, has also been tested and found to comply with the limits for FCC Class B computing devices in a typically configured system. It is the system integrator or configurer's responsibility to test and ensure that the entire system complies with applicable EMC laws.

Environmental conditions for transport and storage:

- Temperature range within -4° to 140° F (-20° to 60° C)
- Relative humidity range within 10% to 90%
- Atmospheric pressure range within 500 to 1060 hPa.

Electromagnetic Compatibility

Like other electrical medical equipment, the ES150 requires special precautions to ensure electromagnetic compatibility with other electrical medical devices. To ensure electromagnetic compatibility (EMC), the ES150 must be installed and operated according to the EMC information provided in this manual.

Note The ES150 has been designed and tested to comply with IEC 60601-1-2:2001 requirements for EMC with other devices.



Caution Portable and mobile RF communications equipment may affect the normal function of the ES150.




Warning *Do not use cables or accessories other than those provided with the ES150, as this may result in increased electromagnetic emissions or decreased immunity to such emissions.*



Warning *If the ES150 is used adjacent to or stacked with other equipment, observe and verify normal operation of the ES150 in the configuration in which it will be used prior to using it in a surgical procedure. Consult the tables below for guidance in placing the ES150.*

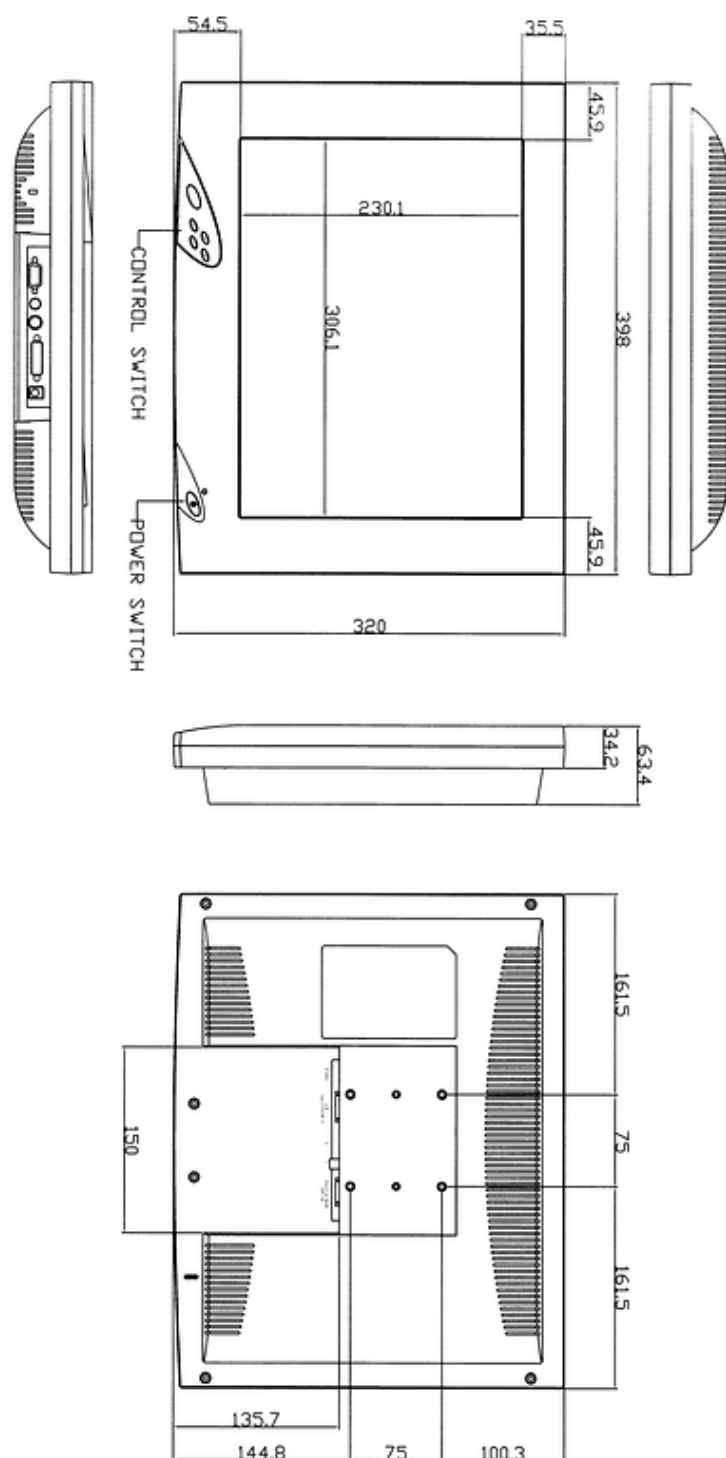
Guidance and Manufacturer's Declaration: Electromagnetic Emissions		
AMM15TK3 is intended for use in the electromagnetic environment specified below. The customer or the user of AMM15TK3 should ensure that it is used in such an environment.		
RF emissions CISPR 11	Group 1	AMM15TK3 uses RF energy only for its internal function; therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	AMM15TK3 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 IEC61000-3-2	Class A	
Voltage Fluctuations/flicker emissions IEC61000-3-3	Complies	

24 User's Guide

Guidance and Manufacturer's Declaration: Electromagnetic Immunity			
AMM15TK3 is intended for use in the electromagnetic environment specified below. The customer or the user of AMM15TK3 should ensure that it is used in such an environment.			
Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic
Electrostatic Discharge (ESD) IEC61000-4-2	±6kV contact ±8kV air	±2,4,6kV contact ±2,4,8kV 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 IEC61000-4-4	±2kV for power supply lines ±1kV for input/output lines	±2kV line to ground ±1kV line to line	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC61000-4-5	±1kV differential mode ±2kV common mode	±0.5, 1kV differential mode ±0.5, 1, 2kV common mode	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 IEC61000-4-11	<5% Ut (>95% dip in Ut) for 0.5 cycle 40% Ut (60% dip in Ut) for 5 cycles 70% Ut (30% dip in Ut) for 25 cycles <5% Ut (>95% dip in Ut) for 5 sec.	<5% Ut (>95% dip in Ut) for 0.5 cycle 40% Ut (60% dip in Ut) for 5 cycles 70% Ut (30% dip in Ut) for 25 cycles <5% Ut (>95% dip in Ut) for 5 sec.	Mains power quality should be that of a typical commercial or hospital environment. If the user of AMM15TK3 requires continued operation during power mains interruptions, it is recommended that AMM15TK3 be powered from an uninterruptible power supply or a battery.
Power frequency (50/60Hz) magnetic field IEC 61000-4-8	3 A/m	N/A	Power-frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Conducted RF IEC61000-4-6 Radiated RF IEC 61000-4-3	3 Vrms 150 KHz to 80 MHz 3 V/m 80MHz to 2.5 GHz	3V 3 V/m	<p>Portable and mobile RF communications equipment should be used no closer to any part of the AMM15TK3 system, including its cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.</p> <p>Recommended Separation Distance</p> $d = 1.17 \sqrt{P}$ <p>d=1.17√P 80MHz to 800MHz d=2.33√P 800MHz to 2.5GHz</p> <p>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).</p> <p>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).</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
NOTE 1: At 80MHz and 800MHz, 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.			
NOTE 3: Ut is the a.c. mains voltage prior to application of the test level.			
(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 AMM15TK3 system is used exceeds the applicable RF compliance level above, the AMM15TK3 system should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the AMM15TK3 unit.			
(b) Over the frequency range 150kHz to 80MHz, field strengths should be less than 3 V/m.			

Recommended Separation Distances Between Portable and Mobile RF Communications Equipment and the AMM15TK3 System			
<p>The AMM15TK3 system is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The user of the AMM15TK3 system can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the AMM15TK3 system as recommended below, according to the maximum output power of the communications equipment.</p>			
Rated maximum output power (W) of transmitter	Separation distance (m) according to frequency of transmitter		
	150kHz to 80MHz $d=1.17\sqrt{P}$	80MHz to 800MHz $d=1.17\sqrt{P}$	800MHz to 2.5GHz $d=2.33\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.37	0.37	0.74
1	1.17	1.17	2.33
10	3.70	3.70	7.37
100	11.70	11.70	23.30
<p>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.</p>			
<p>NOTE 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.</p>			
<p>NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.</p>			

Dimension Drawing (mm)



Connectors

DC Input

Connector Jack Power Input

The SCD-014-1-A (SHIUA CHYUAN) or equivalent.

Pin Description
1 +12V DC
2 GND

Video Input

24 pin DVI-I connector.

DDWG or equivalent connector.

Pin	Signal Assignment	Pin	Signal Assignment	Pin	Signal Assignment
1	T.M.D.S. Data2-	9	T.M.D.S. Data1-	17	T.M.D.S. Data0-
2	T.M.D.S. Data2+	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	T.M.D.S. Data4-	12	T.M.D.S. Data3-	20	T.M.D.S. Data5-
5	T.M.D.S. Data4+	13	T.M.D.S. Data3+	22	T.M.D.S. Data5+
6	DDC Clock	14	+5V Power	22	T.M.D.S. Clock Shield
7	DDC Data	15	Ground (for +5V)	23	T.M.D.S. Clock+
8	Analog Vertical Sync	16	Hot Plug Detect	24	T.M.D.S. Clock-
C1	Analog Red	C2	Analog Green	C3	Analog Blue
C4	Analog Horizontal Sync	C5	Analog GND Return (analog R,GB)		

Description of Warranty

Exclusive Distributor

EIZO NANA O CORPORATION

153 Shimokashiwano, Hakusan-City, Ishikawa, Japan 924-8566

Tel: +81-76-277-6794

Fax: +81-76-277-6796

Web Page : <http://www.radiforce.com>



Authorized Representative in Europe and Exclusive Distributor

EIZO GmbH, Display Technologies

Siemensallee 84,

D-76187 Karlsruhe, Germany

Tel: +49 721 20321 0

Fax: +49 721 20321 474

Web Page : <http://www.eizo.eu>

Exclusive Distributor

EIZO NANA O TECHNOLOGIES INC.

5710 Warland Drive, Cypress, CA 90630, USA

Tel: 1-562-431-5011

Fax: 1-562-431-4811

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