

# NEC

PART NO. 599910537

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# SERVICE MANUAL

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COLOR MONITOR **MultiSync<sup>®</sup> FE750+**

**MODELS FE750+ (A) / (B)**

NEC-MITSUBISHI ELECTRIC VISUAL SYSTEMS CORPORATION

200101  
08109432  
08109433



## WARNING

The SERVICE PERSONNEL should have the appropriate technical training, knowledge and experience necessary to:

- Be familiar with specialized test equipment, and
- Be careful to follow all safety procedures associated with high voltage CRT circuit designs to minimize danger to themselves and their coworkers.

To avoid electrical shocks, this equipment should be used with an appropriate power code and be connected only to a properly grounded AC outlet.

This equipment utilized a micro-gap power switch. Turn off the set by first pushing the front panel power switch. Next, remove the power cord from the AC outlet.

To prevent fire or shock hazards, do not expose this unit to rain or moisture.



This symbol warns the personnel that un-insulated voltage within the unit may have sufficient magnitude to cause electric shock.



This symbol alerts the personnel that important literature concerning the operation and maintenance of this unit has been included.

Therefore, it should be read carefully in order to avoid any problems.

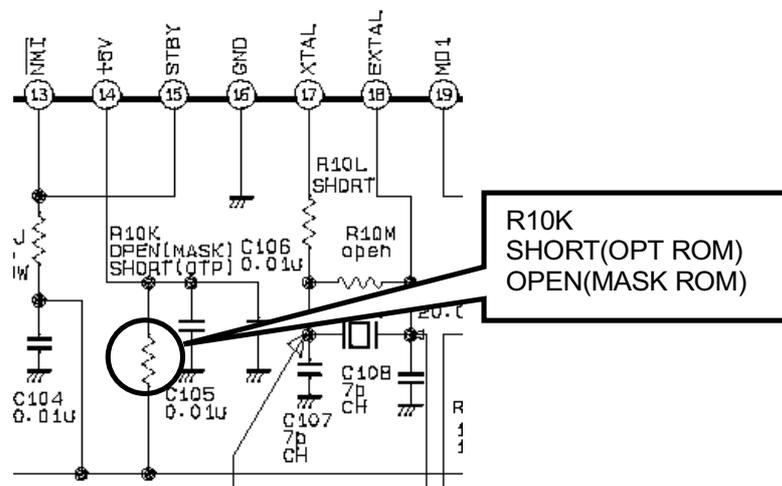
## NOTES

Two types of ICs are used for the MPU (IC100) that is mounted on the MAIN PWB ASSY of this model.

In case of MPU replacement, working procedures should conform to the table specified below.

The service part for the MPU (IC100) is the mask ROM (HD 6433577P20 A07) only. Therefore, when replacing the MPU of the OPT ROM, R10K should be deleted (opened).

Type of IC	MPU stamping	Circuit constant of R10K
OPT ROM (one time)	HD6473577P20	short
MASK ROM (mask)	HD6433577P20 A07	open





## PRODUCT SAFETY CAUTION

1. When parts replacement is required for servicing, always use the manufacturer's specified replacement.
2. Comply with all caution and safety-related notes on the product display chassis and picture tube.
3. When replacing the component, always be certain that all the components are put back in the place.
4. When servicing display monitor unit, it is required that the provided lead dress is used in the high voltage circuit area.
5. It is also recommended that shatter proof goggles are worn, when removing installing and handling the picture tube. People not equipped with the proper precautionary measures mentioned should keep the picture tube away from body while handling.
6. As for a connector, pick and extract housing with fingers properly since a disconnection and improper contacts may occur, when wires of the connector are led.
7. Use a proper screwdriver. If you use screwdriver that does not fit, you may damage the screws.
8. X-radiation precaution

This product contains critical electrical and mechanical parts essential for X-ray protection.

Normal anode voltage is 27.0 kV at zero beam picture tube current under AC 100-120V/220-240V input, and anode voltage must not exceed the voltages shown below under any operation condition.

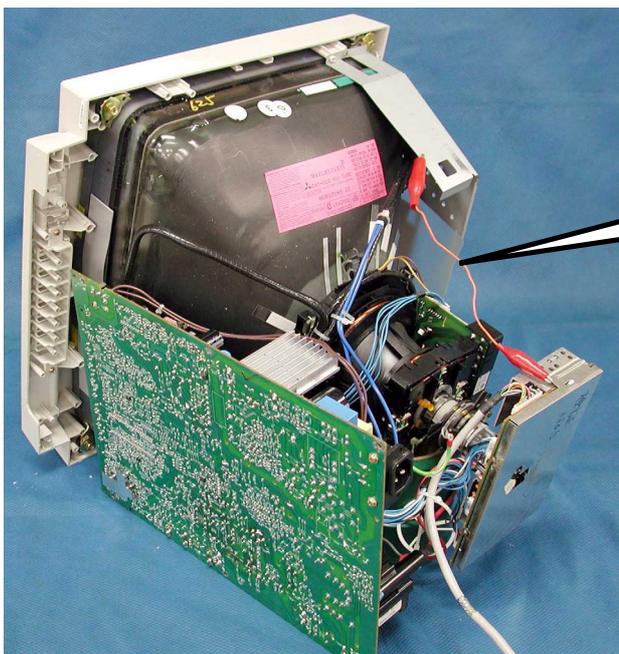
To measure anode voltage set brightness for very dim picture, and use a high impedance volt meter between chassis and anode lead and measure high voltage.

If high voltage exceeds the specifications on the chassis schematic diagram, take the necessary corrective action.

Table MAXIMUM ANODE VOLTAGE

beam current	at 0 mA	at 0.7 mA	at 1.4 mA
A/B/R	34.5 kV	32.5 kV	32.3 kV

9. When you degauss the set with an external degaussing coil, you must keep strictly item “ \* Notes about degaussing method ” of ADJUSTMENT PROCEDURES.
10. Refer to the photo shown below when turning on the main PWB ASSY. At that time, never fail to connect an earth wire for spark suppression (between CRT and MAIN PWB or CRT PWB).



An earth wire for spark suppression

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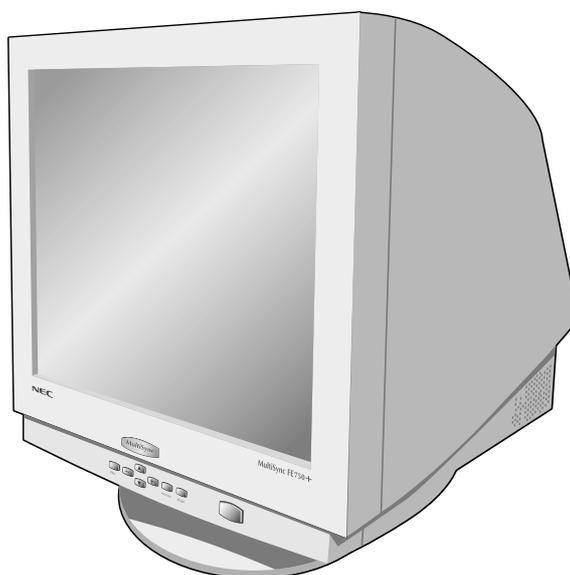
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# USER'S MANUAL

Only the point is mentioned

1. A Version

## NEC



USER'S MANUAL

MultiSync®  
**FE750+**™

To learn about other special offers, register your product online at [www.necmitsubishi.com/productregistration](http://www.necmitsubishi.com/productregistration)

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

	<b>CAUTION</b>	
<p><b>RISK OF ELECTRIC SHOCK • DO NOT OPEN</b></p>		
<p>CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.</p>		
	<p>This symbol warns user that uninsulated voltage within the unit may have sufficient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any part inside this unit.</p>	
	<p>This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included. Therefore, it should be read carefully in order to avoid any problems.</p>	

**Canadian Department of Communications Compliance Statement**

- DOC: This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.
- C-UL: Bears the C-UL Mark and is in compliance with Canadian Safety Regulations according to C.S.A. 22.2 #950.

**FCC Information**

1. Use the attached specified cables with the JC-17W41 color monitors so as not to interfere with radio and television reception.
  - (1) Please use the supplied power cable or equivalent to ensure FCC compliance.
  - (2) Shielded captive type signal cable.
    - Use of other cables and adapters may cause interference with radio and television reception.
2. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
  - Reorient or relocate the receiving antenna.
  - Increase the separation between the equipment and receiver.
  - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
  - Consult your dealer or an experienced radio/TV technician for help.

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

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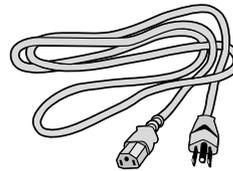
Your new NEC MultiSync® FE750+™ monitor box\* should contain the following:

- MultiSync FE750+ Monitor with tilt/swivel base
- Power Cord
- Captive Signal Cable
- User's Manual



User's Manual

Captive Signal Cable



Power Cord

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

## Quick Start

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To attach the MultiSync® FE750+™ monitor to your system, follow these instructions:

1. Turn off the power to your computer.
2. If necessary, install the display card into your system. For more information, refer to the display card manual.
3. For the PC: Connect the 15-pin mini D-SUB of the captive signal cable to the connector of the display card in your system (**Figure A.1**). Tighten all screws.  
For the Mac: Connect the MultiSync FE750+ Macintosh cable adapter (not included) to the monitor connector on the Macintosh (**Figure B.1**). Attach the 15-pin mini D-SUB end of the captive signal cable to the MultiSync FE750+ Macintosh cable adapter on the computer (**Figure B.1**). Tighten all screws.

**NOTE: To obtain the MultiSync FE750+ Macintosh cable adapter, call NEC-Mitsubishi Electronics Display of America, Inc. at (800) 820-1230.**

4. For download information on the Windows® 95/98/2000 INF file for your MultiSync monitor, refer to the **References** section of this User's Manual.
5. Connect one end of the power cord to the MultiSync FE750+ monitor and the other end to the power outlet (**Figure C.1**).
6. Turn on the monitor (**Figure D.1**) and the computer.

**NOTE:** If you have any problems, please refer to the **Troubleshooting** section of this User's Manual.

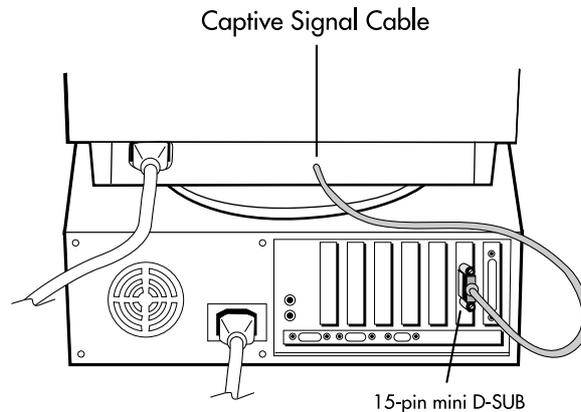


Figure A.1

## Quick Start *-continued*

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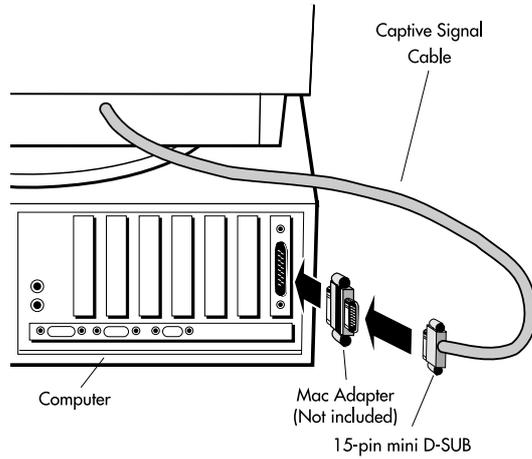


Figure B.1

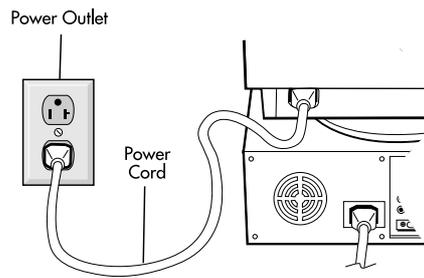


Figure C.1



Figure D.1

# Controls

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OSM™ (On-Screen Manager) control buttons on the front of the monitor function as follows:

	<b>Main Menu</b>	<b>Sub-Menu</b>
<b>EXIT</b>	Exits the OSM menu.	Exits to the OSM controls main menu.
<b>CONTROL</b> <b>▲/▼</b>	Moves the highlighted area up/down to select one of the controls.	Moves the highlighted area up/down to select one of the controls.
<b>CONTROL</b> <b>-/+</b>	Moves the highlighted area left/right to select one of the controls.	Moves the bar in the – or + direction to decrease or increase the adjustment.
<b>PROCEED</b>	Has no function.	Only executes control or enters sub, sub-menu.
<b>RESET</b>	Resets all the controls within the highlighted menu to the factory setting.	Resets the highlighted control to the factory setting.

**NOTE:** When **RESET** is pressed in the main and sub-menu, a warning window will appear allowing you to cancel the reset function.

When OSM controls are activated, icons are displayed at the top of the menu. If an arrow (➔) is displayed in a sub-menu, it indicates further choices are available. To enter a sub, sub-menu, press **PROCEED**.

## **Brightness/Contrast Controls**

**Brightness:** Adjusts the overall image and background screen brightness.

**Contrast:** Adjusts the image brightness in relation to the background.

**Degauss:** Eliminates the buildup of stray magnetic fields which alter the correct scan of the electron beams and affect the purity of the screen colors, focus and convergence. When activated, your screen image will jump and waver a bit as the screen is demagnetized.

**Caution: Please allow a minimum of 20 minutes to elapse between uses of the Degauss Control.**

## **Size and Position Controls**

**Left/Right:** Moves the image horizontally (left or right).

**Down/Up:** Moves the image vertically (up or down).

**Narrow/Wide:** Decreases or increases the horizontal size of the image.

**Short/Tall:** Decreases or increases the vertical size of the image.

## Controls –continued

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### **Color Control/AccuColor® Control System**

Color presets 1 through 5 selects the desired color setting. The bar is replaced by the color setting choice from 1 to 5. Each color setting is adjusted at the factory to the stated Kelvin. If a setting is adjusted, the name of the setting will change from Kelvin to Custom.

**Red, Green, Blue:** AccuColor Control System decreases or increases the monitor's red, green or blue color guns depending upon which is selected. The change in color will appear on screen and the direction (decrease or increase) will be shown by the bars.

**sRGB Mode:** sRGB mode provides the suitable color managed picture image. You can not change Red, Green and Blue colors individually.

### **Geometry Controls**

#### **Geometry Controls Menu**

The **Geometry** controls allow you to adjust the curvature or angle of the sides of your display.

**Sides In/Out (pincushion):** Decreases or increases the curvature of the sides either inward or outward.

**Sides Left/Right (pincushion balance):** Decreases or increases the curvature of the sides either to the left or right.

**Sides Tilt (parallelogram):** Decreases or increases the tilt of the sides either to the left or right.

**Sides Align (trapezoidal):** Decreases or increases the bottom of the screen to be the same as the top.

**Rotate (raster rotation):** Rotates the entire display clockwise or counterclockwise.

#### **Tools 1**

**Moiré Canceler:** Moiré is a wavy pattern which can sometimes appear on the screen. The pattern is repetitive and superimposed as rippled images. When running certain applications, the wavy pattern is more evident than in others. To reduce moiré, adjust the level by using -/+ CONTROL buttons.

**Basic Convergence:** Aligns all three colors (R,G,B) to form a single color (white). The purpose of this control is to ensure that a white line drawn on the screen is as crisp and clear as possible.

- Use the Horizontal control to adjust the alignment of the white lines in the up/down direction.
- Use the Vertical control to adjust the alignment of the white lines in the left/right direction.

**Corner Correction:** Allows you to adjust the geometry of the corners of your display — Top, Top Balance, Bottom or Bottom Balance.

**Auto Save:** The monitor automatically saves the last settings of the user controls. You can turn this Auto Save feature off by selecting this menu and changing the off position. When the off mode is selected, you will be prompted with the option to

## Controls –continued

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save or return to the previous setting once you select a different control. If the save is not confirmed, the setting will go back to previous setting when OSM turns off.

**Factory Preset:** Selecting Factory Preset allows you a reset most OSM™ control settings back to the factory settings. A warning statement will appear to confirm that you do want to reset ALL settings. Individual settings can be reset by highlighting the control to be reset and pressing the **RESET** button.

### **Tools 2**

**Language:** OSM controls menus are available in six languages.

**OSM Position:** You can choose where you would like the OSM controls menu to appear on your screen. Selecting OSM Position allows you to manually adjust the OSM controls menu position from among Center, Top left, Top right, Bottom left and Bottom right.

**OSM Turn Off:** The OSM controls menu will stay on as long as it is in use. In the OSM Turn Off sub-menu, you can select how long the monitor waits after the last touch of a button for the OSM controls menu to disappear. The preset choices are 10, 20, 30, 45, 60 and 120 seconds.

**OSM Lock Out:** This control completely locks out access to all OSM controls functions except Brightness and Contrast. When attempting to activate OSM controls while in the lock out mode, a screen will appear indicating that OSM controls are locked out. To activate the OSM Lock Out function, press **PROCEED**, then press **▲** and hold down simultaneously. To deactivate the OSM Lock Out, press **PROCEED**, then press **▲** and hold down simultaneously.

**IPM™ System Off Mode:** Enable: The IPM System works normally and all stages of energy savings are utilized.  
Disable: The Off Mode of the IPM System is not used.

**NOTE:** For standard systems and graphics boards, keep the factory setting at ENABLE.

**EdgeLock™ Control:** Operating your monitor at a non-standard timing may cause images to appear darker than normal or have color distortion. Use of the EdgeLock control will adjust images to their normal state.

### **Information**

**Display Mode:** Indicates the current mode and frequency setting of the monitor.

**Monitor Info:** Indicates the model and serial numbers of your monitor.

**Refresh Notifier:** A message will advise you if the refresh rate of the signal being applied to the monitor by the computer is too low. For further information, please refer to your display card or system manual.

# Recommended Use

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## Safety Precautions and Maintenance



FOR OPTIMUM PERFORMANCE, PLEASE NOTE THE FOLLOWING WHEN SETTING UP AND USING THE MULTISYNC® FE750+™ COLOR MONITOR:



- **DO NOT OPEN THE MONITOR.** There are no user serviceable parts inside and opening or removing covers may expose you to dangerous shock hazards or other risks. Refer all servicing to qualified service personnel.
- Do not spill any liquids into the cabinet or use your monitor near water.
- Do not insert objects of any kind into the cabinet slots, as they may touch dangerous voltage points, which can be harmful or fatal or may cause electric shock, fire or equipment failure.
- Do not place any heavy objects on the power cord. Damage to the cord may cause shock or fire.
- Do not place this product on a sloping or unstable cart, stand or table, as the monitor may fall, causing serious damage to the monitor.
- Keep the monitor away from high capacity transformers, electric motors and other devices such as external speakers or fans, which may create strong magnetic fields.
- If possible, position the monitor so that it is facing the east to minimize the effects of the earth's magnetic field.
- Changing the direction of the monitor while it is powered on may cause image discoloration. To correct this, turn the monitor off for 20 minutes before powering it back on.
- When operating the MultiSync FE750+ with its AC 220-240V worldwide power supply, use a power supply cord that matches the power supply voltage of the AC power outlet being used. The power supply cord you use must have been approved by and comply with the safety standards of your country. (Type H05VV-F should be used except in UK)
- In UK, use a BS-approved power cord with molded plug having a black (5A) fuse installed for use with this monitor. If a power cord is not supplied with this monitor, please contact your supplier.

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

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



**CAUTION**

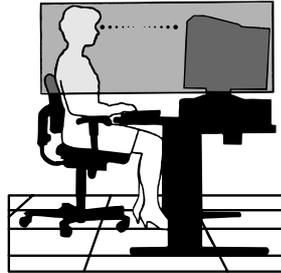
## Recommended Use –continued



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



- Adjust the monitor height so that the top of the screen is at or slightly below eye level. Your eyes should look slightly downward when viewing the middle of the screen.
- Position your monitor no closer than 12 inches and no further away than 28 inches from your eyes. The optimal distance is 24 inches.
- Rest your eyes periodically by focusing on an object at least 20 feet away. Blink often.
- Position the monitor at a 90° angle to windows and other light sources to minimize glare and reflections. Adjust the monitor tilt so that ceiling lights do not reflect on your screen.
- If reflected light makes it hard for you to see your screen, use an anti-glare filter.
- Clean your monitor regularly. Use a lint-free, non-abrasive cloth and a non-alcohol, neutral, non-abrasive cleaning solution or glass cleaner to minimize dust.
- Adjust the monitor's brightness and contrast controls to enhance readability.
- Use a document holder placed close to the screen.
- Position whatever you are looking at most of the time (the screen or reference material) directly in front of you to minimize turning your head while you are typing.
- Get regular eye checkups.



### Ergonomics

To realize the maximum ergonomics benefits, we recommend the following:

- Adjust the Brightness until the background raster disappears
- Do not position the Contrast control to its maximum setting
- Use the preset Size and Position controls with standard signals
- Use the preset Color Setting and Sides Left/Right controls
- Use non-interlaced signals with a vertical refresh rate between 75-120Hz
- Do not use primary color blue on a dark background, as it is difficult to see and may produce eye fatigue due to insufficient contrast

*For more detailed information on setting up a healthy work environment, call NEC-Mitsubishi Electronics Display at (800) 820-1230, NEC FastFacts™ information at (630) 467-4363 and request document #900108 or write the American National Standard for Human Factors Engineering of Visual Display Terminal Workstations – ANSI-HFS Standard No. 100-1988 – The Human Factors Society, Inc. P.O. Box 1369, Santa Monica, California 90406.*

# Specifications

Monitor Specifications	MultiSync® FE750+™ Monitor	Notes
Picture Tube Viewable Image Size:	Diagonal: 17 inch 16 inch Radius: 50,000 mm	90° deflection, 0.25 mm grille pitch, medium short persistence phosphor, aperture grille CRT, multi-layered, anti-static screen coating, dark-tint screen and OptiClear® screen.
Input Signal	Video: Sync: ANALOG 0.7 Vp-p/75 Ohms Separate sync. TTL Level Horizontal sync. Positive/Negative Vertical sync. Positive/Negative Composite sync. (Positive/Negative) (TTL Level)	
Display Colors	Analog input: Unlimited number of Colors	Depends on display card used.
Synchronization Range	Horizontal: 31 kHz to 96 kHz Vertical: 55 Hz to 160 Hz	Automatically Automatically
Resolutions Supported Resolution based on horizontal and vertical frequencies only	640 x 480 @ 60 to 160 Hz 800 x 600 @ 55 to 146 Hz 832 x 624 @ 55 to 141 Hz 1024 x 768 @ 55 to 116 Hz 1152 x 870 @ 55 to 103 Hz 1280 x 1024 @ 55 to 89 Hz ..... 1600 x 1200 @ 55 to 76 Hz	Some systems may not support all modes listed.  NEC-Mitsubishi Electronics Display cites recommended resolution at 85 Hz for optimal display performance.
Active Display Area (Factory Setting)	Horizontal: 315 mm/12.4 inches Vertical: 236 mm/9.3 inches	Dependent upon signal timing used, and does not include border area.
Active Display Area (Full Scan)	325 mm/12.8 inches 244 mm/9.6 inches	Dependent upon signal timing used, and does not include border area.
Power Supply	AC 100-120 V/220-240 V, 50/60 Hz	
Current Rating	1.3A @ 100-120 V, 0.6 A@ 220-240 V	
Dimensions	399 mm (W) x 413 mm (H) x 415 mm (D) 15.7 inches (W) x 16.3 inches (H) x 16.4 inches (D)	
Weight	19.0 kg 41.9 lbs	
Environmental Considerations	Operating Temperature: +10°C to +35°C / +50°F to +95°F Humidity: 30% to 80% Feet: 0 to 10,000 Feet Storage Temperature: -20°C to +60°C / -4°F to +140°F Humidity: 10% to 90% Feet: 0 to 45,000 Feet	

NOTE: Technical specifications are subject to change without notice.

## Features

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**Flat Aperture Grille CRT:** Delivers an unparalleled viewing experience with a virtually flat image, eliminating distortion and reducing glare so that what you see on-screen is what you get on your printed output. The striped phosphor alignment of the CRT delivers superior vertical definition with improved brightness for more uniform image contrast.

**OptiClear® Screen Surface:** Reduces reflection and glare and increases contrast without sacrificing focus level, clarity or brightness. Along with the flat square technology CRT, a high contrast screen with 0.25 mm grille pitch delivers crisp, clean text and graphics.

**Dual Dynamic Beam Focus:** Provides precise, continuous focus adjustments of the electron beams and optimum image quality, even to the far edges of the screen.

**AccuColor® Control System:** Allows you to change between five color settings on your display to match your personal preference.

**OSM™ (On-Screen Manager) Controls:** Allows you to quickly and easily adjust all elements of your screen image via simple to use on-screen menus.

**ErgoDesign® Features:** Enhances human ergonomics to improve the working environment, protect the health of the user and save money. Examples include OSM controls for quick and easy image adjustments, tilt/swivel base for preferred angle of vision and compliance with MPRII guidelines for lower emissions.

**Plug and Play:** The Microsoft® solution with the Windows®95/98/2000 operating system facilitates setup and installation by allowing the monitor to send its capabilities (such as screen size and resolutions supported) directly to your computer, automatically optimizing display performance.

**IPM™ (Intelligent Power Manager) System:** Provides innovative power-saving methods that allow the monitor to shift to a lower power consumption level when on but not in use, saving two-thirds of your monitor energy costs, reducing emissions and lowering the air conditioning costs of the workplace.

**Reduced Magnetic Field™ Technology:** Reduces magnetic and alternating electric field emissions and static electricity, addressing ergonomic concerns regarding potential risks from extended computer monitor use.

**Multiple Frequency Technology:** Automatically adjusts monitor to the display card's scanning frequency, thus displaying the resolution required.

**FullScan™ Capability:** Allows you to use the entire screen area in most resolutions, significantly expanding image size.

OSM Display Screen Copyright 2000 by  
NEC-Mitsubishi Electronics Display of America, Inc.

# Troubleshooting

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## **No picture**

- Display card should be completely seated in its slot.
- Power Button and computer power switch should be in the ON position.
- Signal cable should be completely connected to display card/computer.
- Check connector for bent or pushed-in pins.

## **Image is scrolling or unstable**

- Signal cable should be completely attached to the computer.
- Check pin assignments and signal timings of the monitor and your display card with respect to recommended timings and pin assignments.
- If the Macintosh cable adapter is used, check for proper connection or make sure the display card is Macintosh compatible and that the card is properly seated in the computer.

## **LED on monitor is not lit** (*no green, orange color can be seen*)

- Power Switch should be in the ON position and power cord should be connected.

## **Picture is fuzzy or color looks blotchy**

- Adjust Brightness and Contrast Controls.
- Access the Degauss Control through OSM™ controls. Activate the Degauss Control.  
CAUTION: A minimum interval of 20 minutes should elapse before the Degauss Control is used a second time when not switching between modes.

## **Picture bounces or a wavy pattern is present in the picture**

- Move electrical devices that may be causing electrical interference away from the monitor.
- See inside cover of User's Manual for FCC information.

## **Edges of the display image are not square**

- Use the OSM Geometry Controls to straighten the edges.
- If possible, position the front of the monitor facing east.

## **Display image is not centered, too small, or too large**

- Use the OSM Size and Position Controls to adjust the image.

## **Thin lines appear on your screen**

- Thin lines are normal for an aperture grille CRT and are not a malfunction. These are shadows from the damper wires used to stabilize the aperture grille and are most noticeable when the screen's background is light (usually white).

## **Black vertical lines are visible on the screen**

- Thin vertical black lines on one or both sides of the screen. This minor condition is caused by grille element overlap which can occur during shipping.
- Position an open white window over the affected area of the screen and maximize the brightness and contrast controls. This will cause localized heating of the overlap which will clear in a few minutes. Be sure to readjust the brightness and contrast controls back to the normal viewing level after this procedure.

## References

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- **BBS** **(978) 742-8706**  
 NEC-Mitsubishi Electronics Display Remote Bulletin Board System is an electronic service accessible with your system and a modem. Communication parameters are: 300/1200/2400/9600/14.4k/28.8k/33.6k bps, no parity, 8-data bits, 1 stop bit
- **Customer Service/ Technical Support** **(800) 632-4662**  
**Fax** **(978) 742-7049**
- **Electronic Channels:**  
 Internet e-mail: [tech-support@necmitsubishi.com](mailto:tech-support@necmitsubishi.com)  
 Internet ftp site: <ftp.necmitsubishi.com>  
 World Wide Web: <http://www.necmitsubishi.com>  
 Product Registration: <http://www.necmitsubishi.com/productregistration>  
 European Operations: <http://www.nec-monitors.com>  
 Windows® 95/98/2000 INF File: <http://support.necmitsubishi.com/software.htm>  
 then download the file NECMSINF.ZIP
- **FastFacts™ Information** **(630) 467-4363**  

INFORMATION	DESCRIPTION	DOCUMENT #
Glossary	Definition of terms related to functions, features and installation of the MultiSync® monitor	900203
More Information	Names and addresses of other groups involved in standards and features of the MultiSync monitor	900204
Macintosh Connection	Detailed information on connecting the MultiSync monitor to a Macintosh	153006
Healthy Work Environment	Detailed information on setting up a healthy work environment	900108
- **Literature & Sales Info** **(800) NEC-INFO [(800) 632-4636]**
- **MultiSync Fulfillment** **(800) 820-1230**  
 [For software & accessories]
- **TeleSales** **(800) 284-4484**

## Limited Warranty

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NEC-Mitsubishi Electronics Display of America, Inc. (hereinafter "NMD-A") warrants this Product to be free from defects in material and workmanship and, subject to the conditions set forth below, agrees to repair or replace (at NMD-A's sole option) any part of the enclosed unit which proves defective for a period of three (3) years from the date of first consumer purchase. Spare parts are warranted for ninety (90) days. Replacement parts or unit may be new or refurbished and will meet specifications of the original parts or unit.

This warranty gives you specific legal rights and you may also have other rights, which vary from state to state. This warranty is limited to the original purchaser of the Product and is not transferable. This warranty covers only NMD-A-supplied components. Service required as a result of third party components is not covered under this warranty. In order to be covered under this warranty, the Product must have been purchased in the U.S.A. or Canada by the original purchaser. This warranty only covers Product distribution in the U.S.A. or Canada by NMD-A. No warranty service is provided outside of the U.S.A. or Canada. Proof of Purchase will be required by NMD-A to substantiate date of purchase. Such proof of purchase must be an original bill of sale or receipt containing name and address of seller, purchaser, and the serial number of the product.

It shall be your obligation and expense to have the Product shipped, freight prepaid, or delivered to the authorized reseller from whom it was purchased or other facility authorized by NMD-A to render the services provided hereunder in either the original package or a similar package affording an equal degree of protection. All Products returned to NMD-A for service MUST have prior approval, which may be obtained by calling 1-800-632-4662. The Product shall not have been previously altered, repaired, or serviced by anyone other than a service facility authorized by NMD-A to render such service, the serial number of the product shall not have been altered or removed. In order to be covered by this warranty the Product shall not have been subjected to displaying of fixed images for long periods of time resulting in image persistence (afterimage effects), accident, misuse or abuse or operated contrary to the instructions contained in the User's Manual. Any such conditions will void this warranty.

NMD-A SHALL NOT BE LIABLE FOR DIRECT, INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR OTHER TYPES OF DAMAGES RESULTING FROM THE USE OF ANY NMD-A PRODUCT OTHER THAN THE LIABILITY STATED ABOVE. THESE WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SOME STATES DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES OR THE LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES SO THE ABOVE EXCLUSIONS OR LIMITATIONS MAY NOT APPLY TO YOU.

This Product is warranted in accordance with the terms of this limited warranty. Consumers are cautioned that Product performance is affected by system configuration, software, the application, customer data, and operator control of the system, among other factors. While NMD-A Products are considered to be compatible with many systems, specific functional implementation by the customers of the Product may vary. Therefore, suitability of a Product for a specific purpose or application must be determined by consumer and is not warranted by NMD-A.

For the name of your nearest authorized NEC-Mitsubishi Electronics Display of America service facility, contact NEC-Mitsubishi Electronics Display of America at 1-800-632-4662.

## TCO'99

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Congratulations! You have just purchased a TCO'99 approved and labeled product! Your choice has provided you with a product developed for professional use. Your purchase has also contributed to reducing the burden on the environment and also to the further development of environmentally adapted electronics products.



### **Why do we have environmentally labelled computers?**

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

There are also other characteristics of a computer, such as energy consumption levels, that are important from the viewpoints of both the work (Internal) and natural (external) environments. Since all methods of conventional electricity generation have a negative effect on the environment (acidic and climate-influencing emissions, radioactive waste, etc.), it is vital to conserve energy. Electronics equipment in offices consume an enormous amount of energy since they are often left running continuously.

### **What does labelling involve?**

This product meets the requirements for the TCO'99 scheme which provides for international and environmental labelling of personal computers. The labelling scheme was developed as a joint effort by the TCO (The Swedish Confederation of Professional Employees), Svenska Naturskyddsforeningen (The Swedish Society for Nature Conservation) and Statens Energimyndighet (The Swedish National Energy Administration).

The requirements cover a wide range of issues: environment, ergonomics, usability, emission of electrical and magnetic fields, energy consumption and electrical and fire safety.

The environmental demands concern restrictions on the presence and use of heavy metals, brominated and chlorinated flame retardants, CFCs (freons) and chlorinated solvents, among other things. The product must be prepared for recycling and the manufacturer is obliged to have an environmental plan which must be adhered to in each country where the company implements its operational policy. The energy requirements include a demand that the computer and/or display, after a certain period of inactivity, shall reduce its power consumption to a lower level in one or more stages. The length of time to reactivate the computer shall be reasonable for the user.

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

### **Environmental Requirements**

#### **Flame retardants**

Flame retardants are present in printed circuit boards, cables, wires, casings and housings. In turn, they delay the spread of fire. Up to thirty percent of the plastic in a computer casing can consist of flame retardant substances. Most flame retardants contain bromine or chloride and these are related to another group of environmental toxins, PCBs, which are suspected to give rise to severe health effects, including reproductive damage in fish-eating birds and mammals, due to the bio-

## TCO'99 –continued

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accumulative\* processes. Flame retardants have been found in human blood and researchers fear that disturbances in foetus development may occur.

TCO'99 demand requires that plastic components weighing more than 25 grams must not contain flame retardants with organically bound chlorine and bromine. Flame retardants are allowed in the printed circuit boards since no substitutes are available.

### **Lead\*\***

Lead can be found in picture tubes, display screens, solders and capacitors. Lead damages the nervous system and in higher doses, causes lead poisoning.

TCO'99 requirement permits the inclusion of lead since no replacement has yet been developed.

### **Cadmium\*\***

Cadmium is present in rechargeable batteries and in the colourgenerating layers of certain computer displays. Cadmium damages the nervous system and is toxic in high doses.

TCO'99 requirement states that batteries, the colourgenerating layers of display screens and the electrical or electronics components must not contain any cadmium.

### **Mercury\*\***

Mercury is sometimes found in batteries, relays and switches, Mercury damages the nervous system and is toxic in high doses.

TCO'99 requirement states that batteries may not contain any Mercury. It also demands that no mercury is present in any of the electrical or electronics components associated with the display unit.

### **CFCs (freons)**

CFCs (freons) are sometimes used for washing printed circuit boards. CFCs break down ozone and thereby damage the ozone layer in the stratosphere, causing increased reception on Earth of ultraviolet light with consequent increased risks of skin cancer (malignant melanoma).

The relevant TCO'99 requirement; Neither CFCs nor HCFCs may be used during the manufacturing and assembly of the product or its packaging.

\*Bio-accumulative is defined as substances which accumulate within living organisms.

\*\*Lead, Cadmium and Mercury are heavy metals which are Bio-accumulative.

To obtain complete information on the environmental criteria document, order from:

TCO Development Unit  
SE-114 94 Stockholm  
SWEDEN  
FAX Number: +46 8 782 92 07  
E-mail (Internet): [development@tco.se](mailto:development@tco.se)

You may also obtain current information on TCO'99 approved and labelled products by visiting their website at: <http://www.tco-info.com/>

## NEC Flat Enterprises Series

### PROPRIETARY NOTICE AND LIABILITY DISCLAIMER

The information disclosed in this document, including all designs and related materials, is the valuable property of NEC-Mitsubishi Electronics Display and/or its licensors, as appropriate, reserve all patent, copyright and other proprietary rights to this document, including all design, manufacturing, reproduction, use and sales rights thereto, except to the extent said rights are expressly granted to others.

The NEC-Mitsubishi Electronics Display product(s) discussed in this document are warranted in accordance with the terms of the Limited Warranty Statement accompanying each product. However, actual performance of each such product is dependent upon factors such as system configuration, customer data and operator control. Since implementation by customers of each product may vary, the suitability of specific product configurations and applications must be determined by the customer and is not warranted by NEC-Mitsubishi Electronics Display.

To allow for design and specification improvements, the information in this document is subject to change at any time without notice. Reproduction of this document or portions thereof without prior approval of NEC-Mitsubishi Electronics Display is prohibited.

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### DECLARATION OF CONFORMITY

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This device complies with Part 15 of FCC Rules. Operation is subject to the following two conditions. (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

<b>U.S. Responsible Party:</b>	<b>NEC-Mitsubishi Electronics Display of America, Inc.</b>
<b>Address:</b>	<b>1250 N. Arlington Heights Road Itasca, Illinois 60143</b>
<b>Tel. No.:</b>	<b>(630) 467-3000</b>

Type of Product: Computer Monitor  
Equipment Classification: Class B Peripheral  
Models: JC-17W41



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

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Windows is a registered trademark of Microsoft Corporation. NEC is a registered trademark of NEC Corporation. ENERGY STAR is a U.S. registered trademark. All other brands and product names are trademarks or registered trademarks of their respective owners.

As an ENERGY STAR® Partner, NEC-Mitsubishi Electronics Display of America, Inc. has determined that this product meets the ENERGY STAR guidelines for energy efficiency. The ENERGY STAR emblem does not represent EPA endorsement of any product or service.

# NEC

Part No. 7A811041  
Printed in U.S.A.

2. B Version

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# ***MultiSync FE750+***

User's Manual

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# **NEC**

# Declaration

English

## Declaration of the Manufacturer

We hereby certify that the color monitor  
MultiSync FE750+ (JC-17W41) is in compliance with

Council Directive 73/23/EEC:

- EN 60950

Council Directive 89/336/EEC:

- EN 55022
- EN 61000-3-2
- EN 61000-3-3
- EN 55024
- (IEC-61000-4-2)
- (IEC-61000-4-3)
- (IEC-61000-4-4)
- (IEC-61000-4-5)
- (IEC-61000-4-6)
- (IEC-61000-4-8)
- (IEC-61000-4-11)

and marked with



NEC-Mitsubishi Electric Visual Systems Corporation  
686-1, NISHIOI OI-MACHI  
ASHIGARAKAMI-GUN  
KANAGAWA 258-8533, JAPAN

English-1

# Safety Instruction

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

<b>CAUTION</b>		
<b>RISK OF ELECTRIC SHOCK • DO NOT OPEN</b>		
	<p>TO REDUCE THE RISK OF ELECTRIC SHOCK, MAKE SURE POWER CORD IS UNPLUGGED FROM WALL SOCKET. TO FULLY DISENGAGE THE POWER TO THE UNIT, PLEASE DISCONNECT THE POWER CORD FROM THE AC OUTLET. DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.</p>	
	<p>This symbol warns user that uninsulated voltage within the unit may have sufficient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any part inside this unit.</p>	
	<p>This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included. Therefore, it should be read carefully in order to avoid any problems.</p>	

ENERGY STAR® is a U.S. registered trademark. All other brands and product names are trademarks or registered trademarks of their respective owners.

As an ENERGY STAR Partner, NEC-Mitsubishi has determined that this product meets the ENERGY STAR guidelines for energy efficiency.

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**English-2**

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

There are also other characteristics of a computer, such as energy consumption levels, that are important from the viewpoints of both the work (internal) and natural (external) environments. Since all methods of electricity generation have a negative effect on the environment (e.g. acidic and climate-influencing emissions, radioactive waste), it is vital to save energy. Electronics equipment in offices is often left running continuously and thereby consumes a lot of energy.

## **What does labelling involve?**

This product meets the requirements for the TCO'99 scheme which provides for international and environmental labelling of personal computers. The labelling scheme was developed as a joint effort by the TCO (The Swedish Confederation of Professional Employees), Svenska Naturskyddsforeningen (The Swedish Society for Nature Conservation) and Statens Energimyndighet (The Swedish National Energy Administration).

Approval requirements cover a wide range of issues: environment, ergonomics, usability, emission of electric and magnetic fields, energy consumption and electrical and fire safety.

The environmental demands impose restrictions on the presence and use of heavy metals, brominated and chlorinated flame retardants, CFCs (freons) and chlorinated solvents, among other things. The product must be prepared for recycling and the manufacturer is obliged to have an environmental policy which must be adhered to in each country where the company implements its operational policy.

The energy requirements include a demand that the computer and/or display, after a certain period of inactivity, shall reduce its power consumption to a lower level in one or more stages. The length of time to reactivate the computer shall be reasonable for the user.

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

Below you will find a brief summary of the environmental requirements met by this product. The complete environmental criteria document may be ordered from:

**TCO Development**

SE-114 94 Stockholm, Sweden

Fax: +46 8 782 92 07

Email (Internet): [development@tco.se](mailto:development@tco.se)

Current information regarding TCO'99 approved and labelled products may also be obtained via the Internet, using the address:

<http://www.tco-info.com/>

## **Environmental requirements**

### **Flame retardants**

Flame retardants are present in printed circuit boards, cables, wires, casings and housings. Their purpose is to prevent, or at least to delay the spread of fire. Up to 30% of the plastic in a computer casing can consist of flame retardant substances. Most flame retardants contain bromine or chloride, and those flame retardants are chemically related to another group of environmental toxins, PCBs. Both the flame retardants containing bromine or chloride and the PCBs are suspected of giving rise to severe health effects, including reproductive damage in fish-eating birds and mammals, due to the bio-accumulative\* processes. Flame retardants have been found in human blood and researchers fear that disturbances in foetus development may occur.

**English-4**

The relevant TCO'99 demand requires that plastic components weighing more than 25 grams must not contain flame retardants with organically bound bromine or chlorine. Flame retardants are allowed in the printed circuit boards since no substitutes are available.

### **Cadmium\*\***

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Mercury is sometimes found in batteries, relays and switches. It damages the nervous system and is toxic in high doses. The relevant TCO'99 requirement states that batteries may not contain any Mercury. It also demands that no mercury is present in any of the electrical or electronics components associated with the labelled unit.

### **CFCs (freons)**

The relevant TCO'99 requirement states that neither CFCs nor HCFCs may be used during the manufacturing and assembly of the product. CFCs (freons) are sometimes used for washing printed circuit boards. CFCs break down ozone and thereby damage the ozone layer in the stratosphere, causing increased reception on Earth of ultraviolet light with e. g. increased risks of skin cancer (malignant melanoma) as a consequence.

### **Lead\*\***

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

\*Bio-accumulative is defined as substances which accumulate within living organisms.

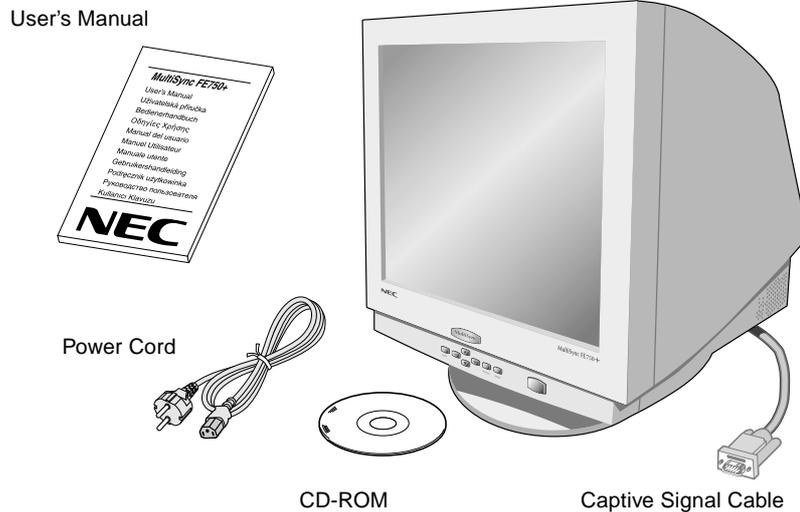
\*\*Lead, Cadmium and Mercury are heavy metals which are Bio-accumulative.

# Contents

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Your new MultiSync FE750+ monitor box\* should contain the following:

- MultiSync FE750+ Monitor with tilt/swivel base
- Power cord
- Captive Signal Cable
- User's Manual
- CD-ROM:  
Includes complete User's Manual in PDF format and Windows related files (Inf file and color profile). To see the complete User's Manual, Acrobat Reader 4.0 must be installed at your PC.



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

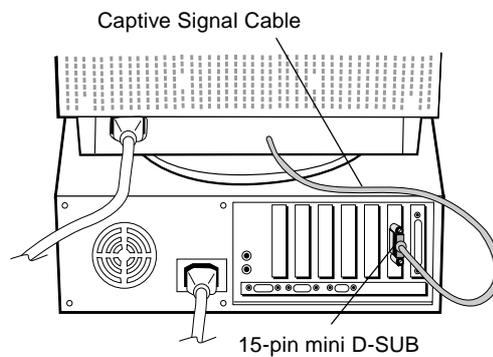
English-6

# Quick Start

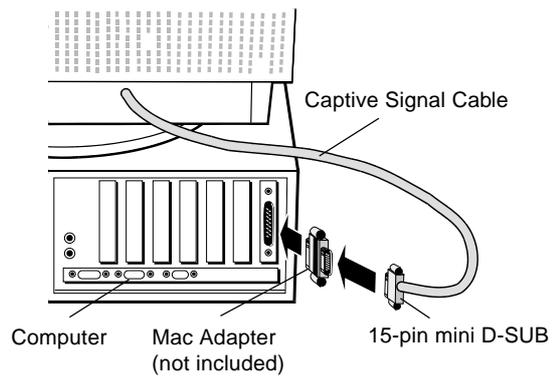
To attach the MultiSync FE750+ monitor to your system, follow these instructions:

1. Turn off the power to your computer.
2. If necessary, install the display card into your system. For more information, refer to the display card manual.
3. **For the PC:** Connect the 15-pin mini D-SUB of the captive signal cable to the connector of the display card in your system (**Figure A.1**). Tighten all screws.  
**For the Mac:** Connect the Macintosh cable adapter (not included) to the monitor connector on the Macintosh (**Figure B.1**). Attach the 15-pin mini D-SUB end of the captive signal cable to the Macintosh cable adapter on the computer (**Figure B.1**). Tighten all screws.
4. The Windows® 95/98/2000 INF file for your MultiSync monitor can be found on the CD-ROM, delivered with the monitor.
5. Connect one end of the power cord to the MultiSync FE750+ monitor and the other end to the power outlet (**Figure C.1**).
6. Turn on the monitor (**Figure D.1**) and the computer.

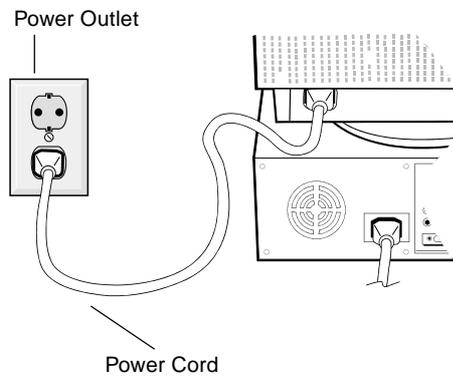
**NOTE:** If you have any problems, please refer to the **Troubleshooting** section of this User's Manual.



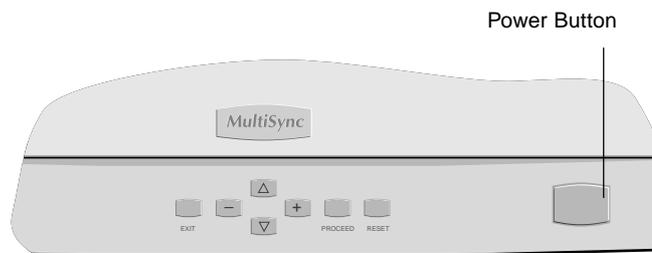
**Figure A.1**



**Figure B.1**



**Figure C.1**



**Figure D.1**

**English-8**

# Controls

OSM (On-Screen Manager) control buttons on the front of the monitor function as follows:

	Main Menu	Sub-Menu
<b>EXIT</b>	Exits the OSM menu.	Exits to the OSM main menu.
<b>CONTROL ▲/▼</b>	Moves the highlighted area up/down to select one of the controls.	Moves the highlighted area up/down to select one of the controls.
<b>CONTROL -/+</b>	Moves highlighted area left/right to select one of the controls.	Moves the bar in the - or + direction to decrease or increase the adjustment.
<b>PROCEED</b>	Has no function.	Only executes control or enters sub-menu.
<b>RESET</b>	Resets all the controls within the highlighted menu to the factory setting.	Resets the highlighted control to the factory setting.

**NOTE:** When **RESET** is pressed in the main and sub-menu, a warning window will appear allowing you to cancel the reset function.

When OSM controls are activated, icons are displayed at the top of the menu. If an arrow (→) is displayed in a sub-menu, it indicates further choices are available. To enter a sub-menu, press **PROCEED**.

## **Brightness/Contrast Controls**

**Brightness:** Adjusts the overall image and background screen brightness.

**Contrast:** Adjusts the image brightness in relation to the background.

**Degauss:** Eliminates the build-up of stray magnetic fields which alter the correct scan of the electron beams and affect the purity of the screen colours, focus, and convergence. When activated, your screen image will jump and waver a bit as the screen is demagnetised.

**Caution:** Please allow a minimum of 20 minutes to elapse between uses of the Degauss function.

## **Size and Position Controls**

**Left/Right:** Moves the image horizontally (left or right).

**Down/Up:** Moves the image vertically (up or down).

**Narrow/Wide:** Decreases or increases the horizontal size of the image.

**Short/Tall:** Decreases or increases the vertical size of the image.

## **Color Control/Color Control System**

Color presets 1 through 5 selects the desired color setting. The bar is replaced by the color setting choice from 1 to 5. Each color setting is adjusted at the factory to the stated Kelvin. If a setting is adjusted, the name of the setting will change from Kelvin to Custom.

**Red, Green, Blue:** AccuColor Control System decreases or increases the monitor's red, green or blue color guns depending upon which is selected. The change in color will appear on screen and the direction (decrease or increase) will be shown by the bars.

**sRGB Mode:** sRGB mode provides the suitable color managed picture image. You can not change Contrast, Brightness, Red, Green and Blue colors individually.

## **Geometry Controls**

### **Geometry Controls Menu**

The **Geometry** controls allow you to adjust the curvature or angle of the sides of your display.

**Sides In/Out (pincushion):** Decreases or increases the curvature of the sides either inward or outward.

**Sides Left/Right (pincushion balance):** Decreases or increases the curvature of the sides either to the left or right.

**Sides Tilt (parallelogram):** Decreases or increases the tilt of the sides either to the left or right.

**Sides Align (trapezoidal):** Decreases or increases the bottom of the screen to be the same as the top.

**Rotate (raster rotation):** Rotates the entire display clockwise or counterclockwise.

## Tools 1

**Moiré Canceler:** Moiré is a wavy pattern which can sometimes appear on the screen. The pattern is repetitive and superimposed as rippled images. When running certain applications, the wavy pattern is more evident than in others. To reduce moiré, adjust the level by using –/+ control buttons.

**Basic Convergence:** Aligns all three colors (R,G,B) to form a single color (white). The purpose of this control is to ensure that a white line drawn on the screen is as crisp and clear as possible.

- Use the Horizontal control to adjust the alignment of the white lines in the up/down direction.
- Use the Vertical control to adjust the alignment of the white lines in the left/ right direction.

**Corner Correction:** Allows you to adjust the geometry of the corners of your display – Top, Top Balance, Bottom or Bottom Balance.

**Auto Save:** The monitor automatically saves the last settings of the user controls. You can turn this Auto Save feature off by selecting this menu and changing the off position. When the off mode is selected, you will be prompted with the option to save or return to the previous setting once you select a different control. If the save is not confirmed, the setting will go back to the previous setting when OSM is turned off.

**Factory Preset:** Selecting Factory Preset allows you a reset most OSM control settings back to the factory settings. A warning statement will appear to confirm that you do want to reset ALL settings. Individual settings can be reset by high-lighting the control to be reset and pressing the **RESET** button.

## Tools 2

**Language:** OSM controls menus are available in six languages.

**OSM Position:** You can choose where you would like the OSM controls menu to appear on your screen. Selecting OSM Position allows you to manually adjust the OSM controls menu position from among Center, Top left, Top right, Bottom left and Bottom right.

**OSM Turn Off:** The OSM controls menu will stay on as long as it is in use. In the OSM Turn Off sub-menu, you can select how long the monitor waits after the last touch of a button for the OSM controls menu to disappear. The preset choices are 10, 20, 30, 45, 60 and 120 seconds.

**OSM Lock Out:** This control completely locks out access to all OSM controls functions except Brightness and Contrast. When attempting to activate OSM controls while in the lock out mode, a screen will appear indicating that OSM controls are locked out. To activate the OSM Lock Out function, press PROCEED, then press ▲ and hold down simultaneously. To deactivate the OSM Lock Out, press PROCEED, then press ▲ and hold down simultaneously.

**IPM System Off Mode:**

Enable: The IPM System works normally and all stages of energy savings are utilized.

Disable: The Off Mode of the IPM System is not used.

**NOTE:** For standard systems and graphics boards, keep the factory setting at ENABLE.

**EdgeLock Control:** Operating your monitor at a non-standard timing may cause images to appear darker than normal or have color distortion. Use of the EdgeLock control will adjust images to their normal state.

**Information**

**Display Mode:** Indicates the current mode and frequency setting of the monitor.

**Monitor Info:** Indicates the model and serial numbers of your monitor.

**Refresh Notifier:** A message will advise you if the refresh rate of the signal being applied to the monitor by the computer is too low. For further information, please refer to your display card or system manual.

# Recommended use

## Safety Precautions and Maintenance:



FOR OPTIMUM PERFORMANCE, PLEASE NOTE THE FOLLOWING WHEN SETTING UP AND USING THE MULTISYNC FE750+ COLOR MONITOR:



- **DO NOT OPEN THE MONITOR.** There are no user serviceable parts inside and opening or removing covers may expose you to dangerous shock hazards or other risks. Refer all servicing to qualified service personnel.
- Do not spill any liquids into the cabinet or use your monitor near water.
- Do not insert objects of any kind into the cabinet slots, as they may touch dangerous voltage points, which can be harmful or fatal or may cause electric shock, fire or equipment failure.
- Do not place any heavy objects on the power cord. Damage to the cord may cause shock or fire.
- Do not place this product on a sloping or unstable cart, stand or table, as the monitor may fall, causing serious damage to the monitor.
- Keep the monitor away from high capacity transformers, electric motors and other devices such as external speakers or fans, which may create strong magnetic fields.
- If possible, position the monitor so that it is facing the east to minimize the effects of the earth's magnetic field.
- Changing the direction of the monitor while it is powered on may cause image discoloration. To correct this, turn the monitor off for 20 minutes before powering it back on.
- When operating the MultiSync FE750+ with its AC 100-120/220-240V worldwide power supply, use a power supply cord that matches the power supply voltage of the AC power outlet being used. The power supply cord you use must have been approved by and comply with the safety standards of your country. (Type H05VV-F should be used except in UK)
- In UK, use a BS-approved power cord with molded plug having a black (5A) fuse installed for use with this monitor. If a power cord is not supplied with this monitor, please contact your supplier.

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

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



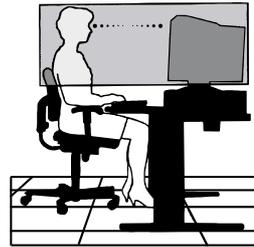
- Allow adequate ventilation around the monitor so that heat can properly dissipate. Do not block ventilated openings or place the monitor near a radiator or other heat sources. Do not put anything on top of monitor.
- The power cable connector is the primary means of detaching the system from the power supply. The monitor should be installed close to a power outlet which is easily accessible.
- Handle with care when transporting. Save packaging for transporting.



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



- Adjust the monitor height so that the top of the screen is at or slightly below eye level. Your eyes should look slightly downward when viewing the middle of the screen.
- Position your monitor no closer than 16 inches and no further away than 24 inches from your eyes. The optimal distance is 20 inches.
- Rest your eyes periodically by focusing on an object at least 20 feet away. Blink often.
- Position the monitor at a 90° angle to windows and other light sources to minimize glare and reflections. Adjust the monitor tilt so that ceiling lights do not reflect on your screen.
- If reflected light makes it hard for you to see your screen, use an anti-glare filter.
- Clean your monitor regularly. Use a lint-free, non-abrasive cloth and a non-alcohol, neutral, non-abrasive cleaning solution or glass cleaner to minimize dust.
- Adjust the monitor's brightness and contrast controls to enhance readability.
- Use a document holder placed close to the screen.
- Position whatever you are looking at most of the time (the screen or reference material) directly in front of you to minimize turning your head while you are typing.
- Get regular eye checkups.



### **Ergonomics**

To realize the maximum ergonomics benefits, we recommend the following:

- Adjust the Brightness until the background raster disappears
- Do not position the Contrast control to its maximum setting
- Use the preset Size and Position controls with standard signals
- Use the preset Color Setting and Sides Left/Right controls
- Use non-interlaced signals with a vertical refresh rate between 75-120Hz
- Do not use primary color blue on a dark background, as it is difficult to see and may produce eye fatigue due to insufficient contrast

### **English-14**

# Specifications

Monitor Specifications	MultiSync FE750+	Notes
Picture Tube Viewable Image Size:	Diagonal: 43 cm/17 inch 41 cm/16 inch	90° deflection, 0.25 mm grill pitch, medium short persistence phosphor, aperture grille CRT, multi-layered, anti-static screen coating, dark-tint screen and OptiClear screen.
Input Signal	Video: Sync:	ANALOG 0.7 Vp-p/75 Ohms Separate sync. TTL Level Horizontal sync. (Positive/Negative; TTL Level) Vertical sync. (Positive/Negative; TTL Level) Composite sync. (Positive/Negative; TTL Level)
Display Colours	Analog input:	Unlimited number of Colours Depends on display card used.
Synchronization Range	Horizontal: Vertical:	31 kHz to 96 kHz 55 Hz to 160 Hz Automatically Automatically
Resolutions Supported Resolution based on horizontal and vertical frequencies only		640 x 480 @ 60 to 160 Hz 800 x 600 @ 55 to 146 Hz 832 x 624 @ 55 to 141 Hz 1024 x 768 @ 55 to 116 Hz..... 1152 x 870 @ 55 to 103 Hz 1280 x 1024 @ 55 to 89 Hz 1600 x 1200 @ 55 to 76 Hz Some systems may not support all modes listed. NEC-Mitsubishi Electronics Display cites recommended resolution at 85 Hz for optimal display performance.
Active Display Area (Factory setting)	Horizontal: Vertical:	315 mm/12.4 inches 236 mm/9.3 inches Dependent upon signal timing used, and does not include border area.
Active Display Area (Full scan)		325 mm/12.8 inches 244 mm/9.6 inches Dependent upon signal timing used, and does not include border area.
Power Supply		AC 100-120/220-240 V @ 50/60 Hz
Current Rating		1.3 A @ 100-120 V, 0.6 A @ 220-240 V
Dimensions		399(W) x 413(H) x 415(D) mm
Weight		19.0 kg
Environmental Considerations		
Operating Temperature:		10 °C to +35 °C
Humidity:		30% to 80%
Altitude:		0 to 3000 m
Storage Temperature:		-20 °C to +60 °C
Humidity:		10% to 90%
Altitude:		0 to 13500 m

**NOTE:** Technical specifications are subject to change without notice.

# Features

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**Flat Aperture Grille CRT:** Delivers an unparalleled viewing experience with a virtually flat image, eliminating distortion and reducing glare so that what you see on-screen is what you get on your printed output. The striped phosphor alignment of the CRT delivers superior vertical definition with improved bright-ness for more uniform image contrast.

**OptiClear Screen Surface:** Reduces reflection and glare and increases contrast without sacrificing focus level, clarity or brightness. Along with the flat square technology CRT, a high contrast screen with 0.25 mm grille pitch delivers crisp, clean text and graphics.

**Dual Dynamic Beam Focus:** Provides precise, continuous focus adjustments of the electron beams and optimum image quality, even to the far edges of the screen.

**Color Control System:** Allows you to change between five color settings on your display to match your personal preference.

**OSM (On-Screen Manager) Controls:** Allows you to quickly and easily adjust all elements of your screen image via simple to use on-screen menus.

**ErgoDesign Features:** Enhances human ergonomics to improve the working environment, protect the health of the user and save money. Examples include OSM controls for quick and easy image adjustments, tilt/swivel base for pre-ferred angle of vision and compliance with MPRII guidelines for lower emissions.

**Plug and Play:** The Microsoft® solution with the Windows® 95/98/2000 operating system facilitates setup and installation by allowing the monitor to send its capabilities (such as screen size and resolutions supported) directly to your computer, automatically optimizing display performance.

**IPM (Intelligent Power Manager) System:** Provides innovative power-saving methods that allow the monitor to shift to a lower power consumption level when on but not in use, saving two-thirds of your monitor energy costs, reducing emissions and lowering the air conditioning costs of the workplace.

English-16

**Reduced Magnetic Field Technology:** Reduces magnetic and alternating electric field emissions and static electricity, addressing ergonomic concerns regarding potential risks from extended computer monitor use.

**Multiple Frequency Technology:** Automatically adjusts monitor to the display card's scanning frequency, thus displaying the resolution required.

**FullScan Capability:** Allows you to use the entire screen area in most resolutions, significantly expanding image size.

# Troubleshooting

---

## **No picture**

- Display card should be completely seated in its slot.
- Power Button and computer power switch should be in the ON position.
- Signal cable should be completely connected to display card/ computer.
- Check connector for bent or pushed-in pins.

## **Image is scrolling or unstable**

- Signal cable should be completely attached to the computer.
- Check pin assignments and signal timings of the monitor and your display card with respect to recommended timings and pin assignments.
- If the Macintosh cable adapter is used, check for proper connection or make sure the display card is Macintosh compatible and that the card is properly seated in the computer.

## **LED on monitor is not lit (no green or orange color can be seen)**

- Power Switch should be in the ON position and power cord should be connected.

## **Picture is fuzzy or color looks blotchy**

- Adjust Brightness and Contrast Controls.
- Access the Degauss Control through OSM controls. Activate the Degauss Control.

**CAUTION:** A minimum interval of 20 minutes should elapse before the Degauss Control is used a second time when not switching between modes.

## **Picture bounces or a wavy pattern is present in the picture**

- Move electrical devices that may be causing electrical interference away from the monitor.

## **Edges of the display image are not square**

- Use the OSM Geometry Controls to straighten the edges.
- If possible, position the front of the monitor facing east.

## **Display image is not centered, too small, or too large**

- Use the OSM Size and Position Controls to adjust the image.

**English-18**

**Thin horizontal lines appear on your screen**

- Thin horizontal lines are normal for an aperture grille CRT and are not a malfunction. These are shadows from the damper wires used to stabilize the aperture grille and are most noticeable when the screen's background is light (usually white).

**Black vertical lines are visible on the screen**

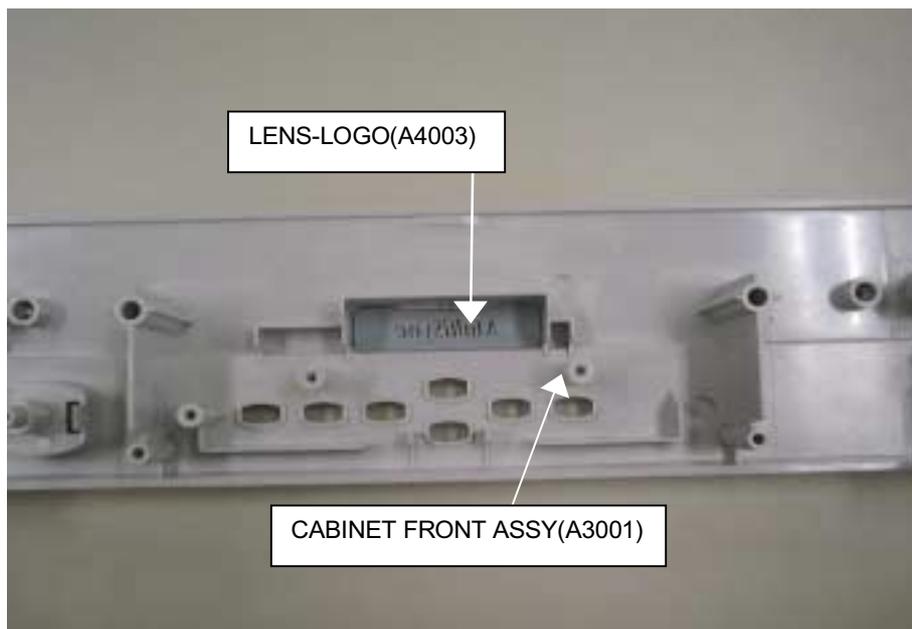
- Thin vertical black lines on one or both sides of the screen. This minor condition is caused by grille element overlap which can occur during shipping.
- Position an open white window over the affected area of the screen and maximize the brightness and contrast controls. This will cause localized heating of the overlap which will clear in a few minutes. Be sure to readjust the brightness and contrast controls back to the normal viewing level after this procedure.



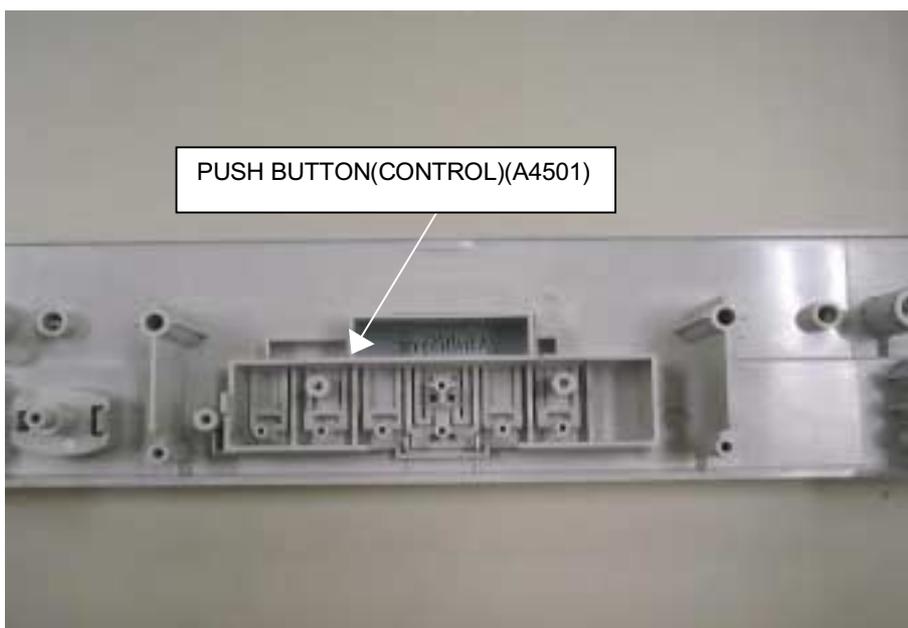
# ASSEMBLY

- Before you disassemble the set, turn off power and pull out the power plug.
- Use the appropriate screwdrivers that first the screws. If you use screwdriver that does not fit, you may break the screws.
- Disassembly is the opposite process of assembly.
- Carefully discharge the CRT anode potential by grounding to coating dag before removing Anode Cap.

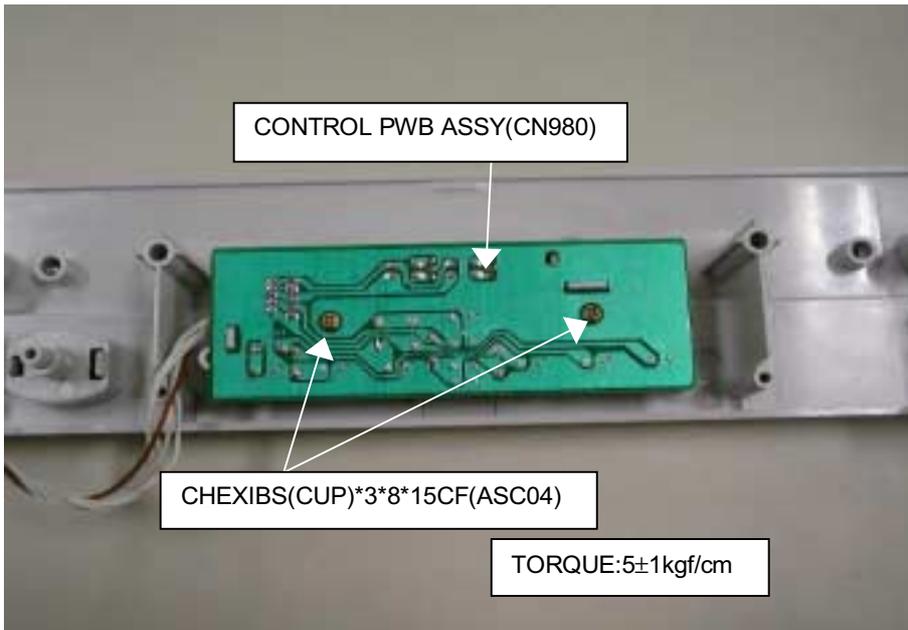
1. Put LENZ-LOGO on the CABINET FRONT ASSY.



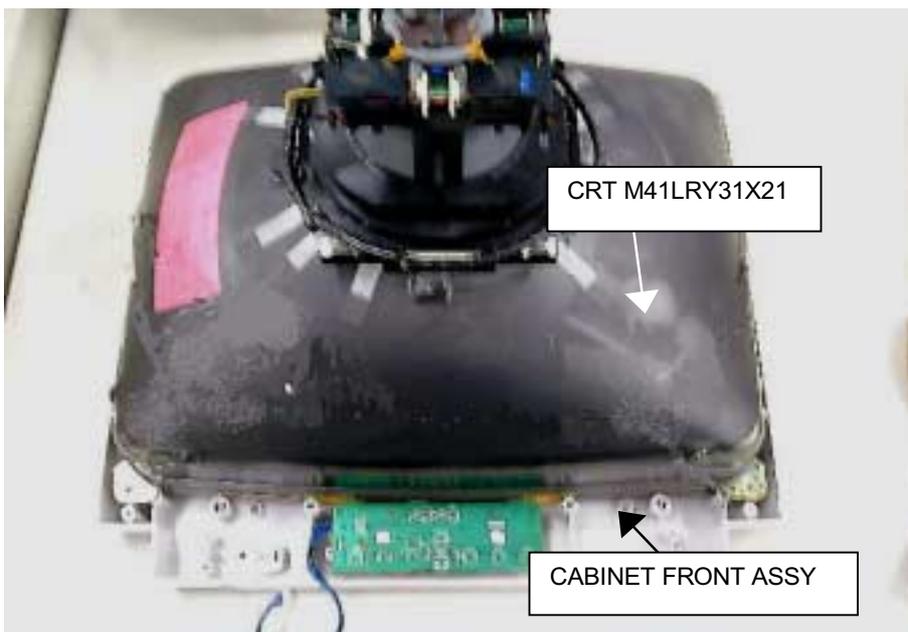
2. Put PUSH BUTTON(CONTROL) on the CABINET FRONT ASSY.



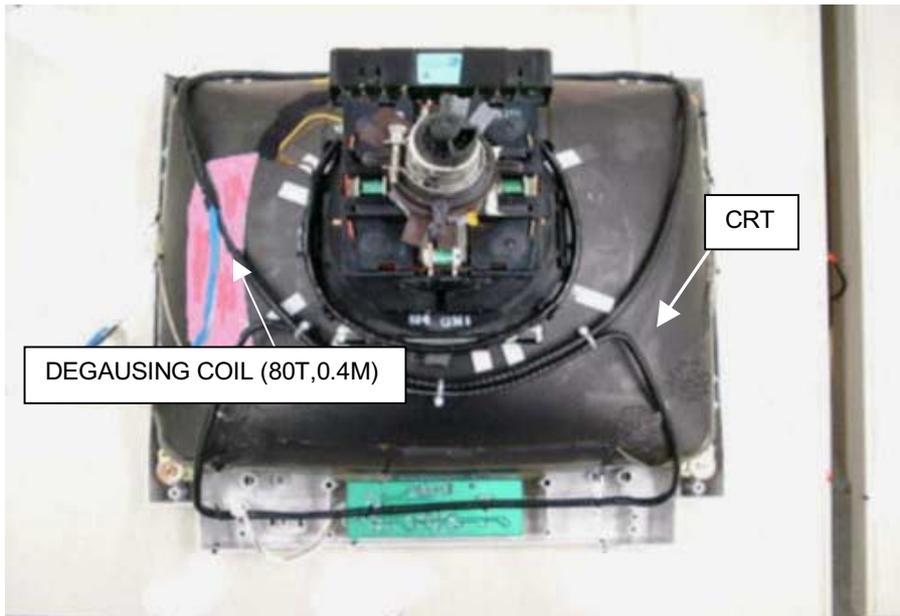
3. Put and screw CONTROL PWB ASSY on the CABINET FRONT ASSY.



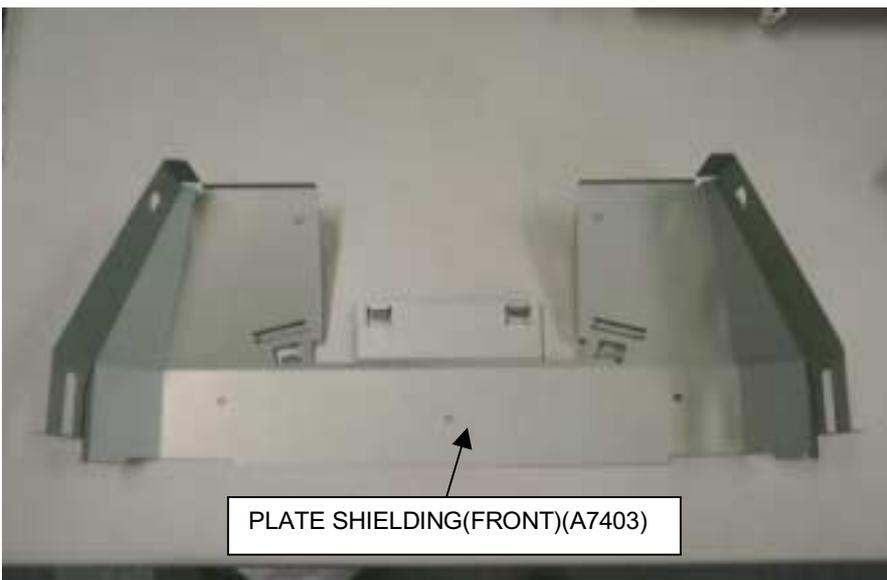
4. Mount the CRT to the CABINET FRONT ASSY.



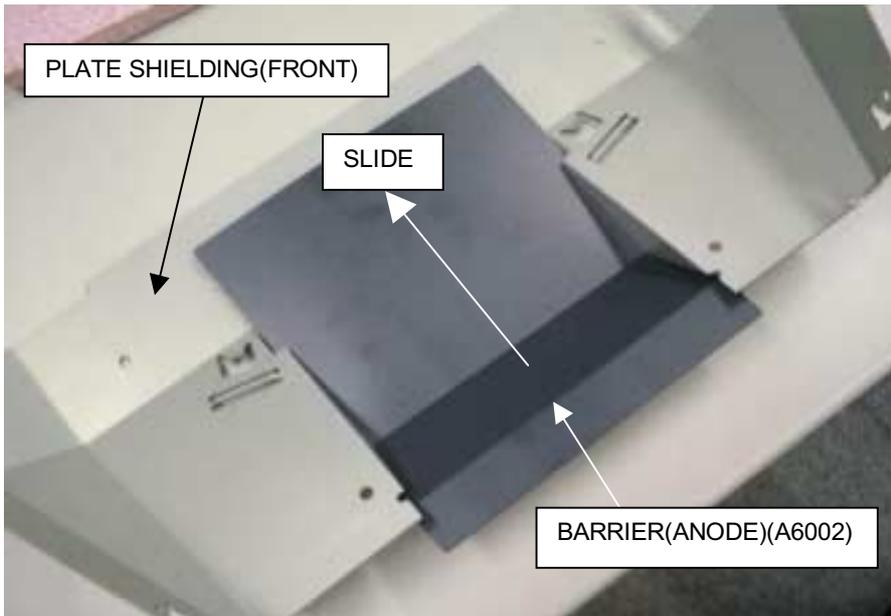
5. Mount the DEGAUSING COIL to the CRT.



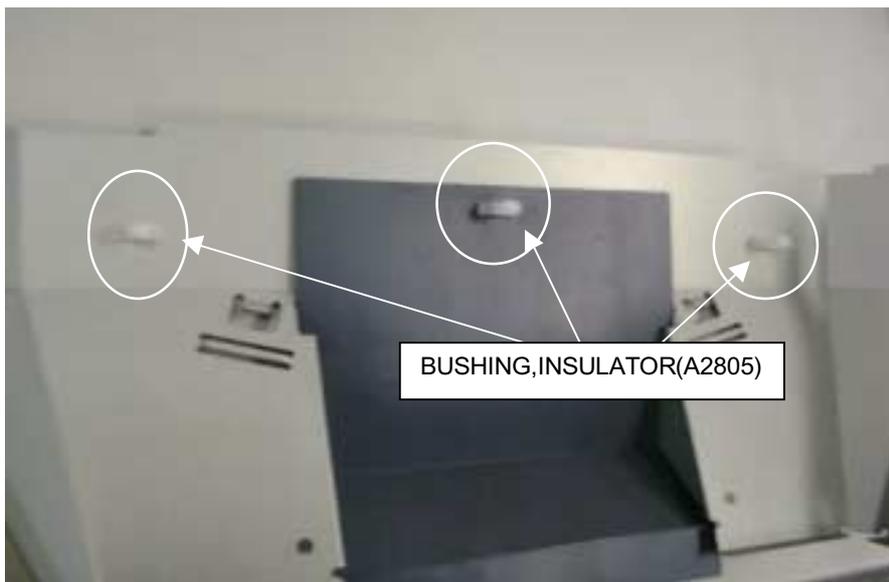
6. Put the PLATE SHIELDING(FRONT) on the desk.



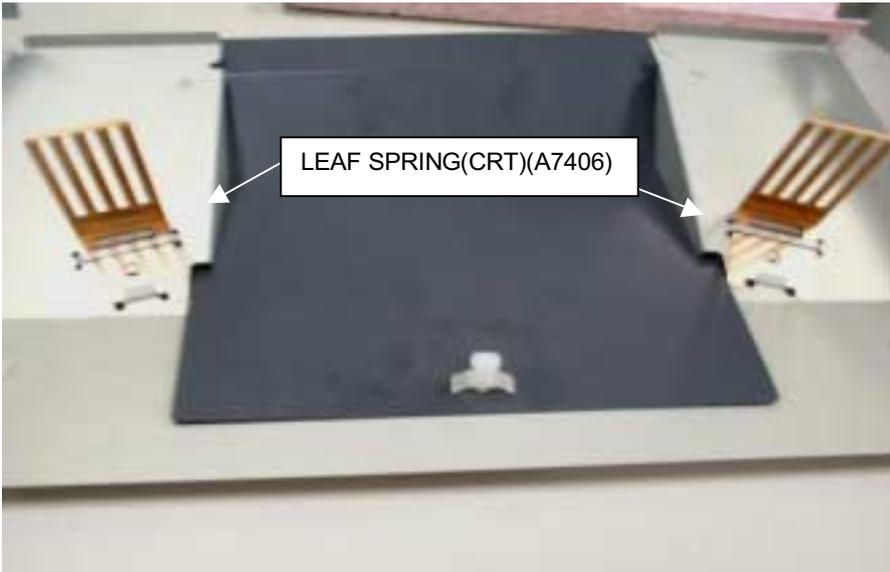
7. Mount and slide the BARRIER(TOP) to the PLATE SHIELDING(FRONT).



8. Put in the CLAMPER to the PLATE SHIELDING(FRONT).(3point)



9. Put and slide the LEAF SPRING(TOP) to the PLATE SHIELDING(FRONT).(2point)

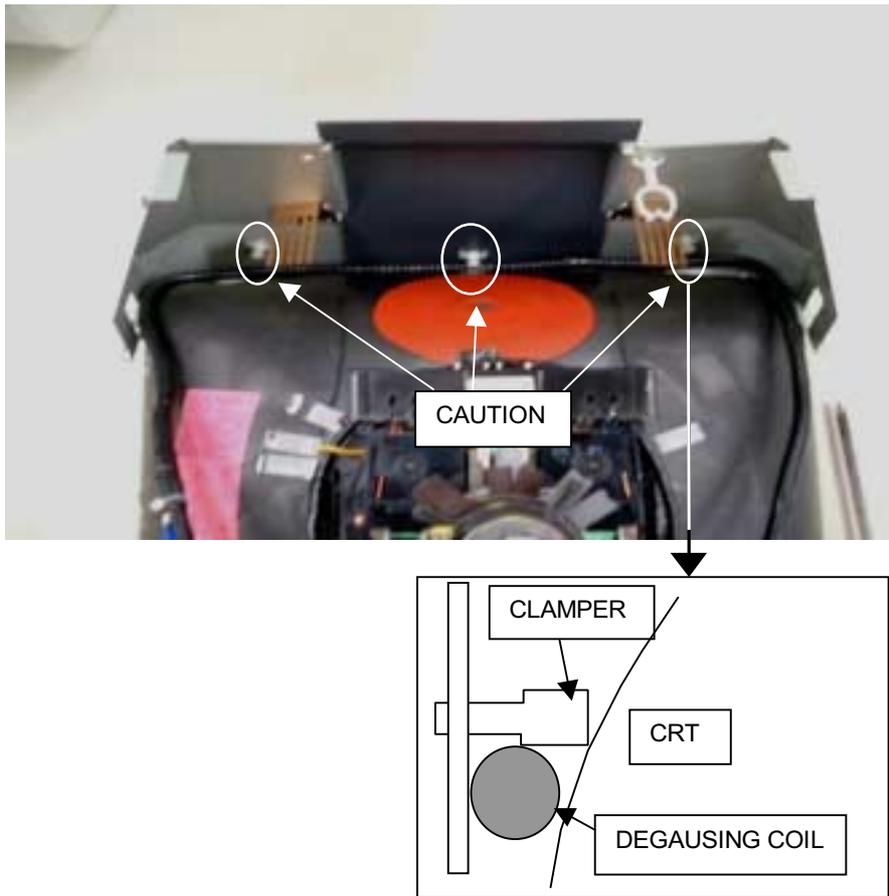


10. Put in the CLAMPER,WIRE to the PLATE SHIELDING(FRONT).(1point)

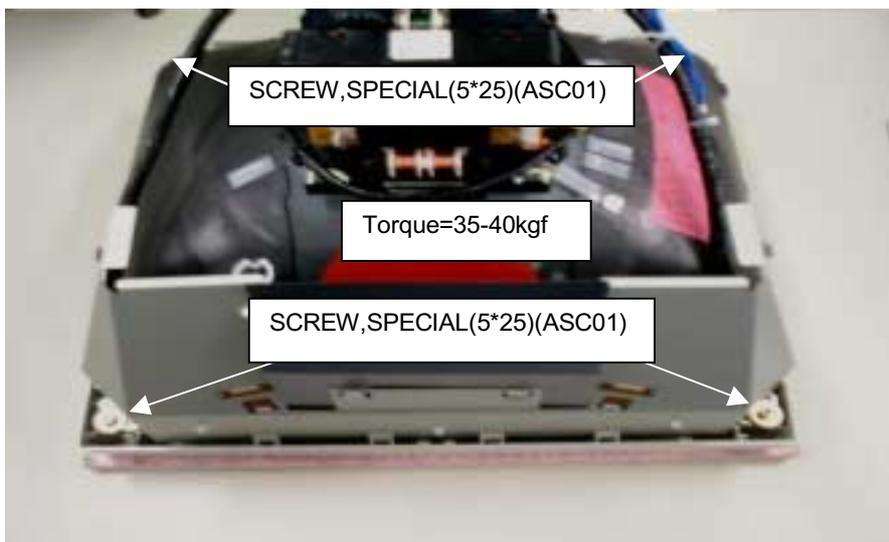


11. Mount the PLATE SHIELDING(FRONT) to the CRT.

Caution: Put the PLATE SHIELDING(FRONT)'s BUSHING on the DEGAUSING COIL.



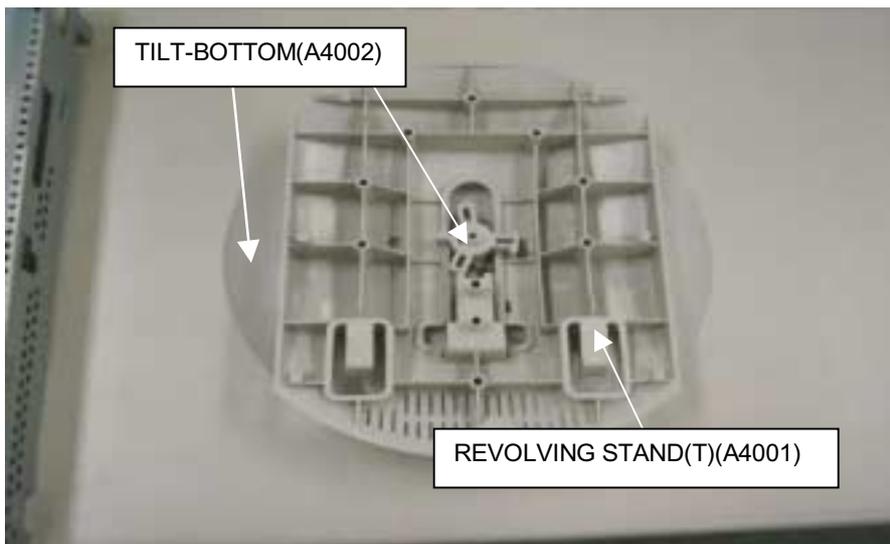
12. Screw the CABINET FRONT ASSY to the PLATE SHIELDING(FRONT).(2point) And screw the CABINET FRONT ASSY to the CRT.(2point)



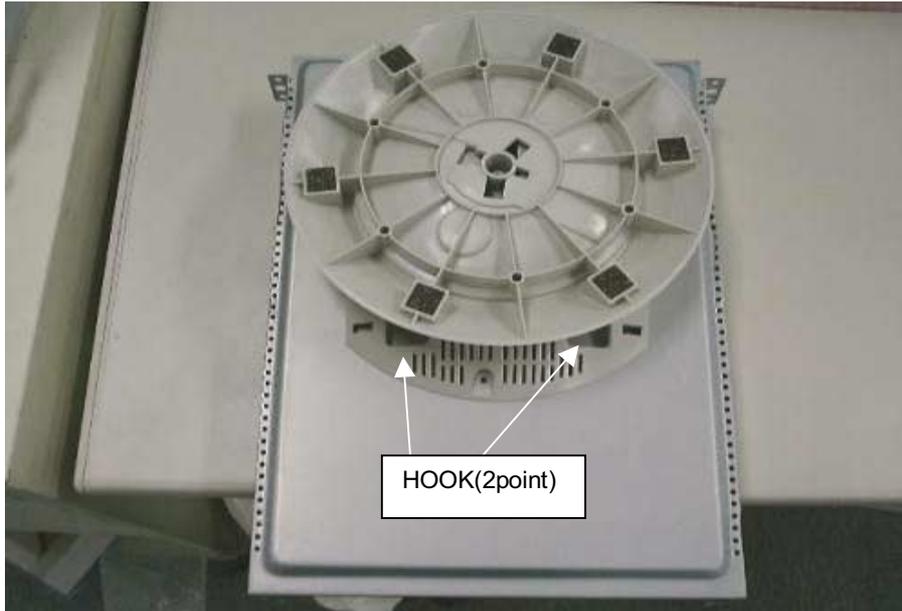
13. Put SKD MAIN/CRT PWB ASSY on the desk.



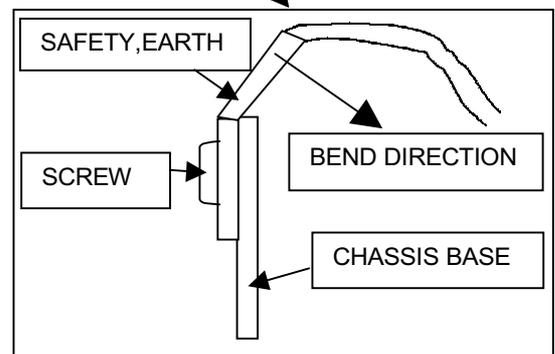
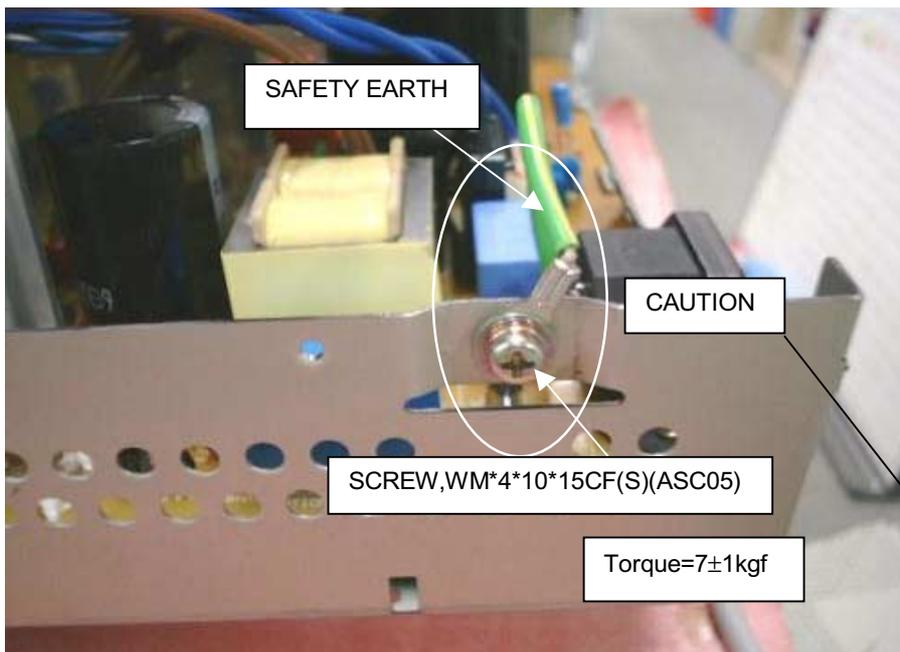
14. Put and Mount the REVOLVING STAND(T) on the TILT-BOTTOM.



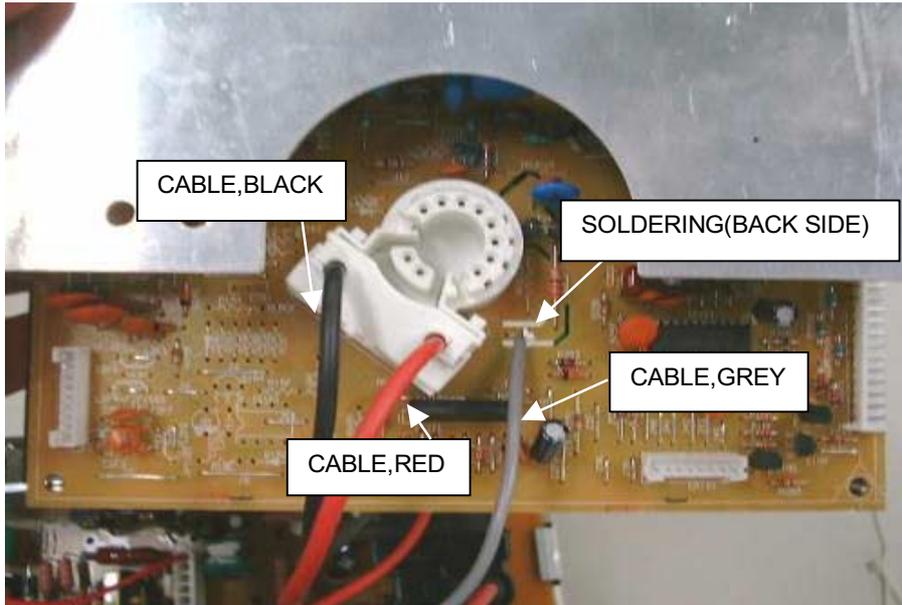
15. Mount the REVOLVING STAND ASSY to the MAIN/CRT PWB ASSY.



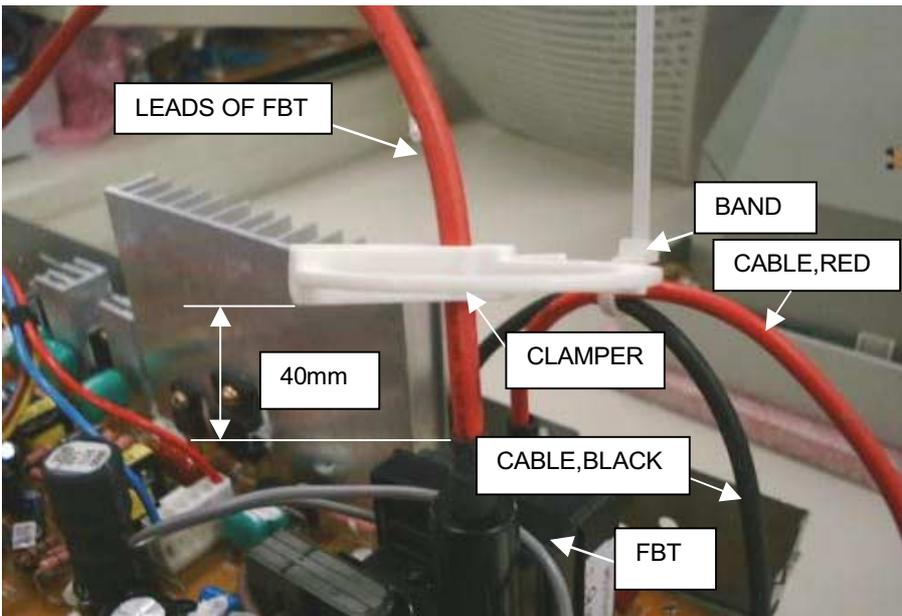
16. Screw the safety earth terminal to the CHASSIS BASE.



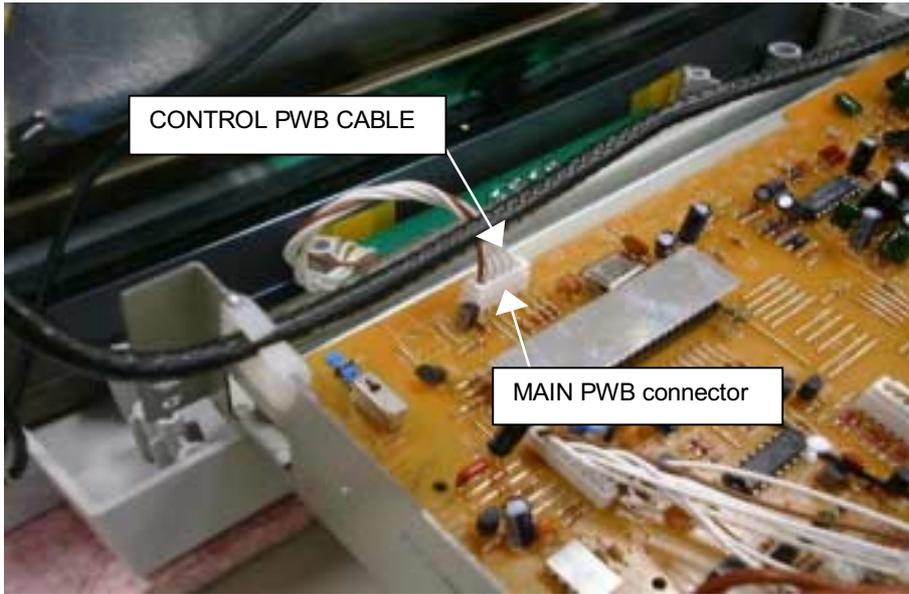
17. Put in the CABLE,RED and the CABLE,BLACK in the CRT SOCKET.  
Put in and soldering(back side) the CABLE,GRAY in the CRT PWB.



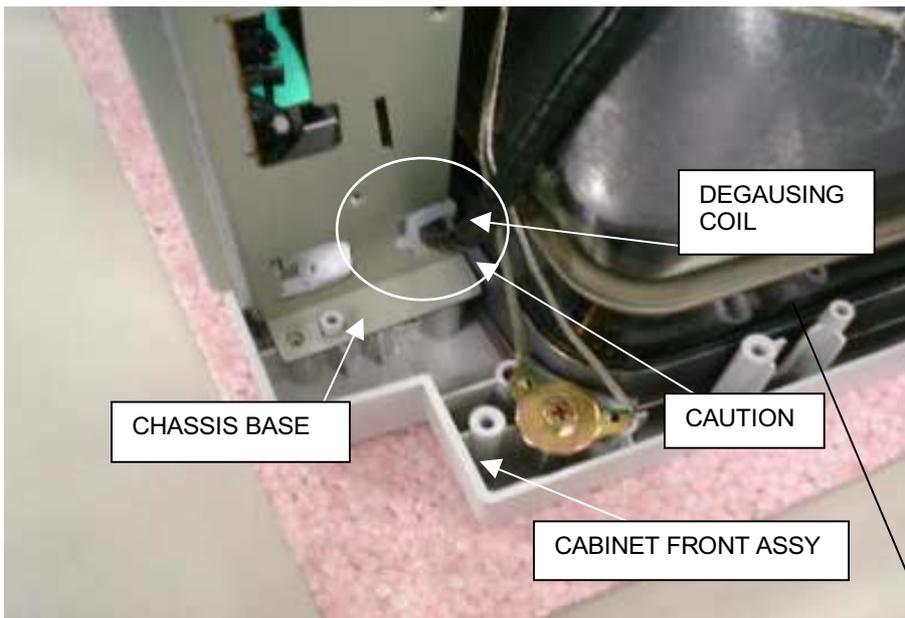
18. Tie the CABLE,BLACK and CABLE,RED to the BAND with the CLAMPER.



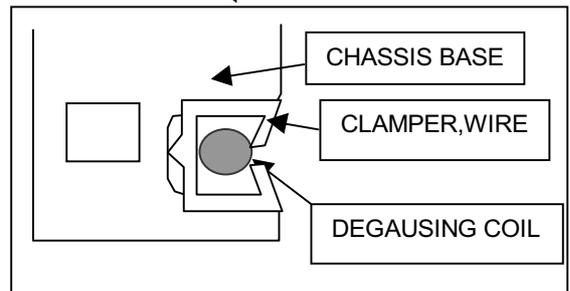
19. Connect CONTROL PWB ASSY cable on the MAIN PWB ASSY.



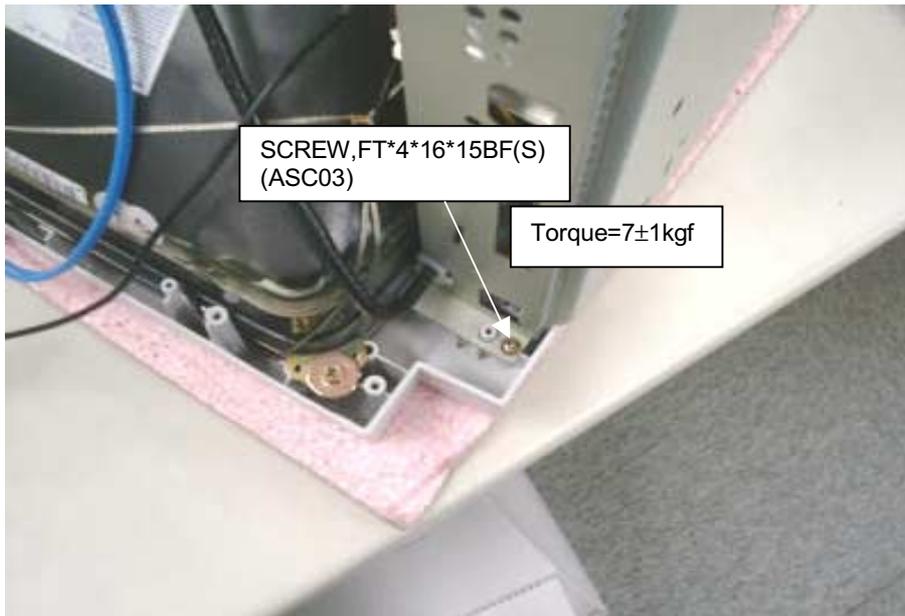
20. Mount and screw CHASSIS BASE on the CABINET FRONT ASSY.



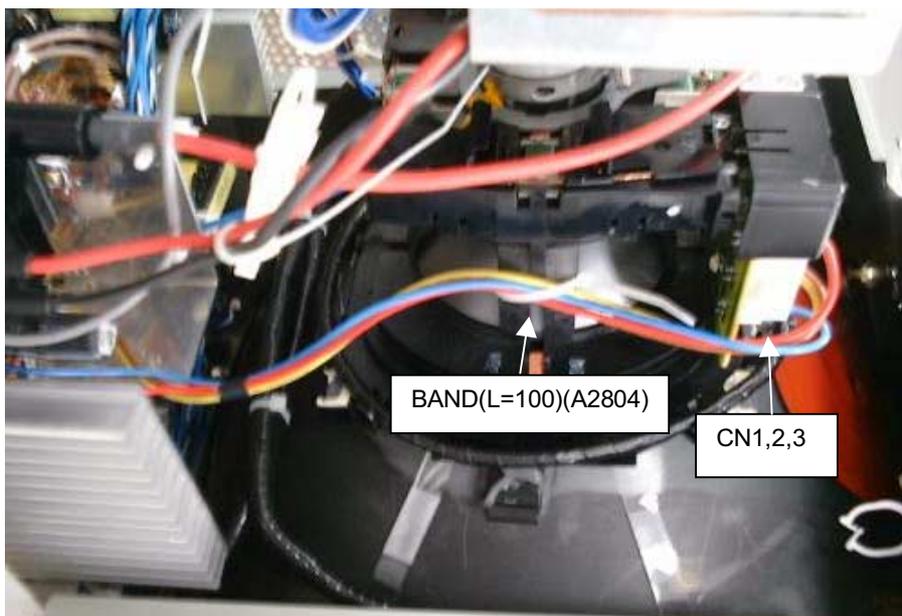
Caution: DEGAUSING COIL put in the CLAMPER,WIRE.



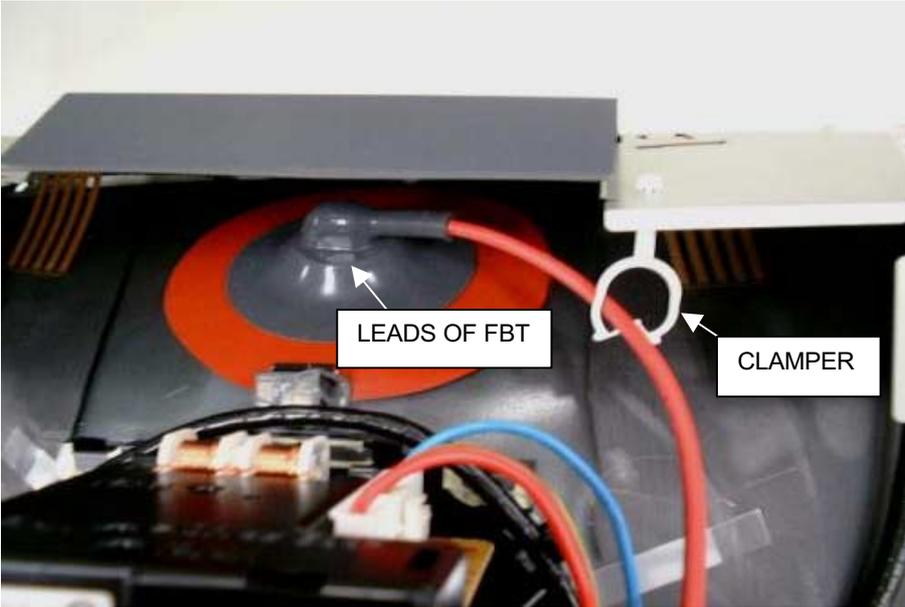
21. Mount and screw CHASSIS BASE on the CABINET FRONT ASSY.



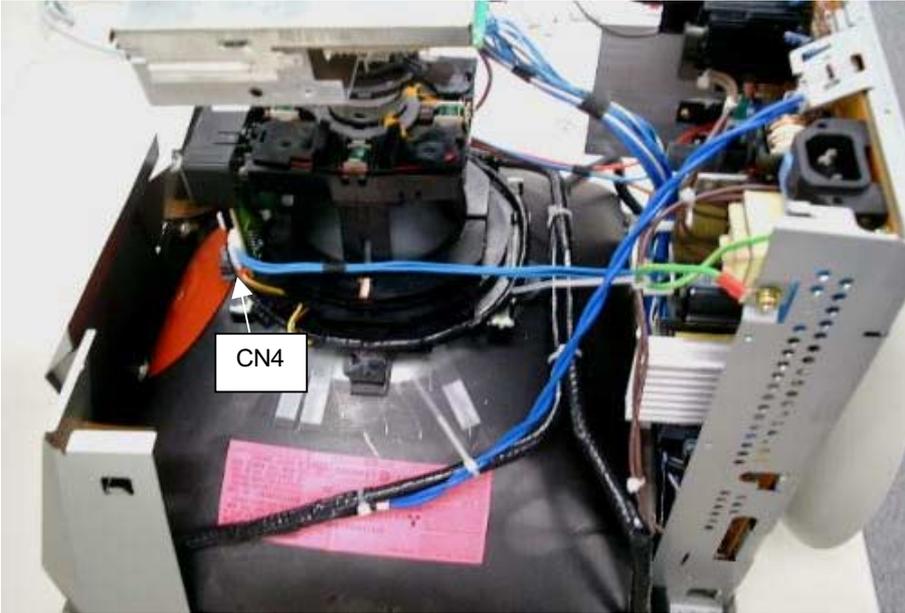
22. Connect CN1, 2, 3 on the CRT.  
Tie the CN1,2,3 to the BAND with the CRT's hook.



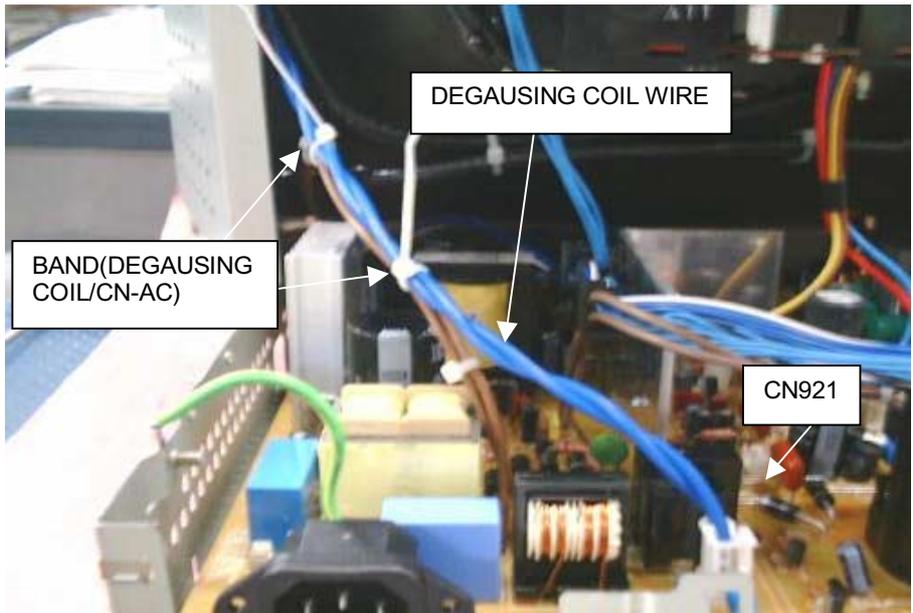
23. Put the leads of FBT on the CRT. Put in the leads of FBT in the CLAMPER.



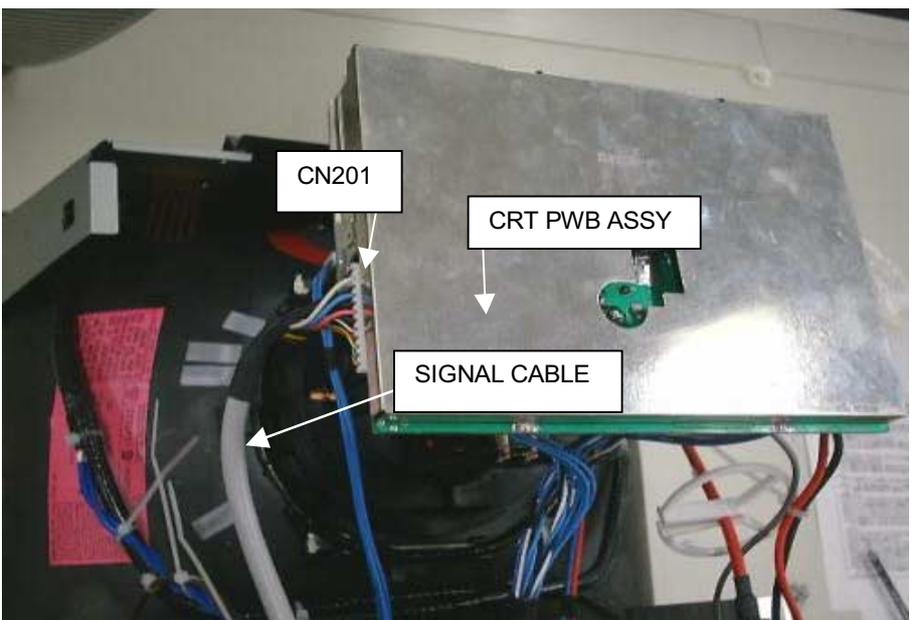
24. Connect CN4 on the CRT.



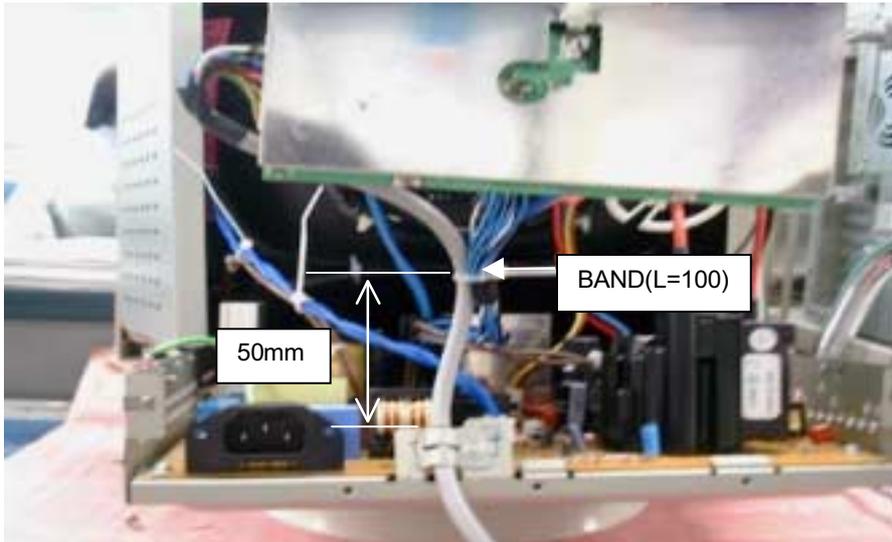
25. Tie DEGAUSING COIL WIRE and CN-AC CABLE with BAND(2point).



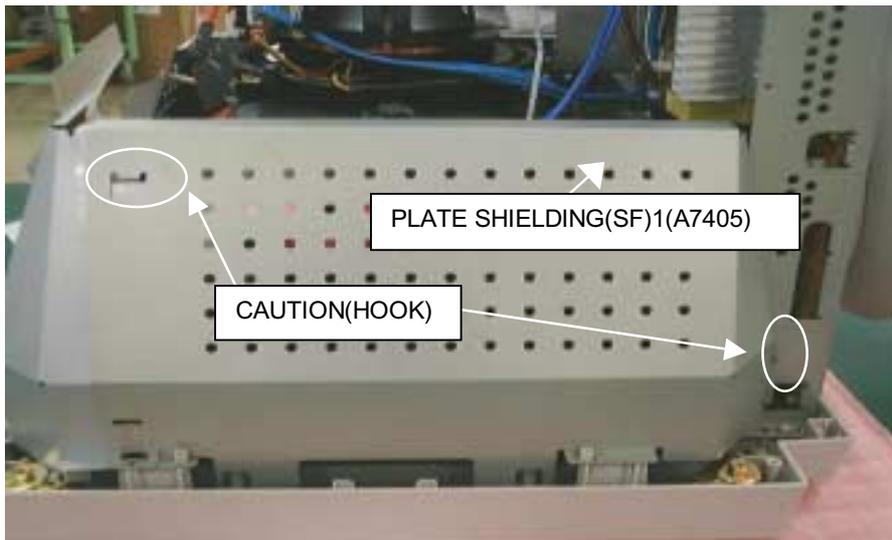
26. Put in the CRT PWB on the CRT.  
Put in the SIGNAL cable in the CRT PWB.



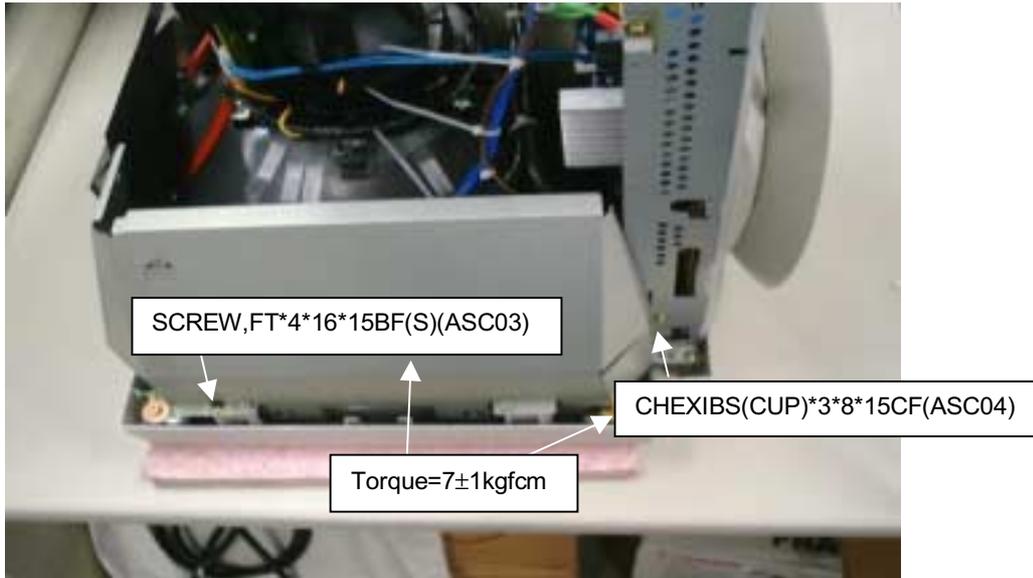
27. Tie SIGNAL CABLE and CN101,102,901 wire with BAND.(1point)



28. Put and screw the PLATE SHIELDING (SF1) to the CABINET FRONT ASSY.(2point)  
Caution: PLATE SHIELDING(SF1) hook area put in the PLATE SHIELDING(FRONT) and CHASSIS BASE.(2point)

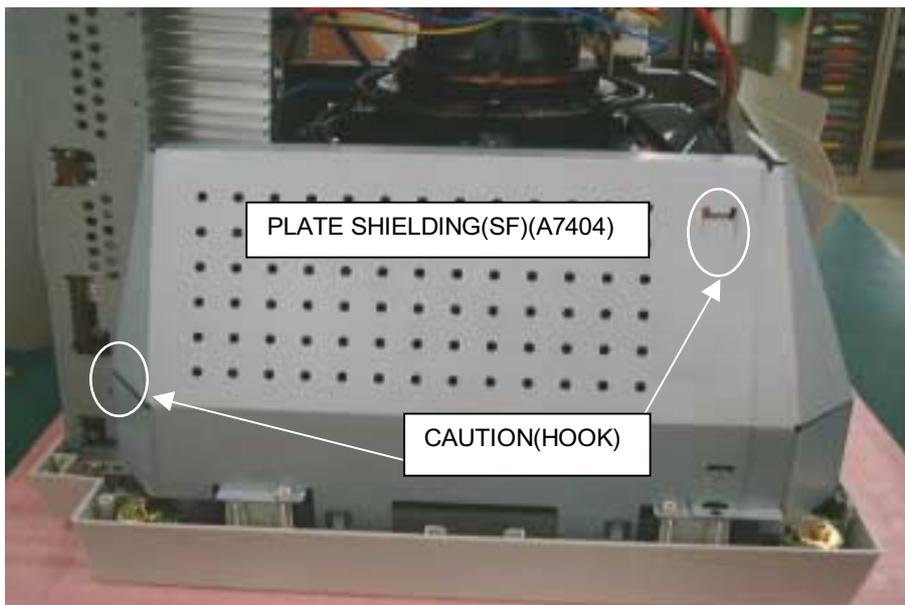


29. Put and screw the PLATE SHIELDING(SF1) to the CABINET FRONT ASSY.(2point)

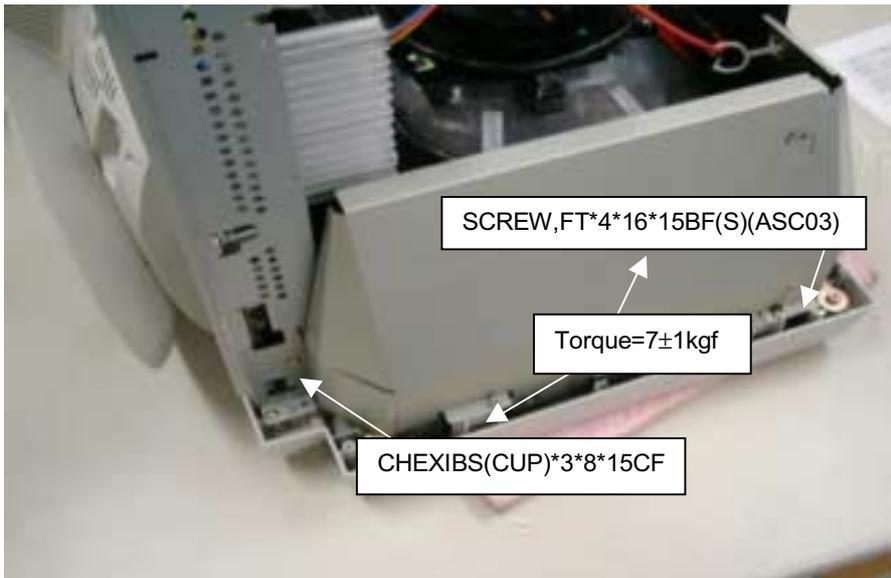


30. Put and screw the PLATE SHIELDING (SF) to the CABINET FRONT ASSY.(2point)

Caution: PLATE SHIELDING(SF) hook area put in the PLATE SHIELDING(FRONT) and CHASSIS BASE.(2point)



31. Put and screw the PLATE SHIELDING (SF) to the CABINET FRONT ASSY.(2point)

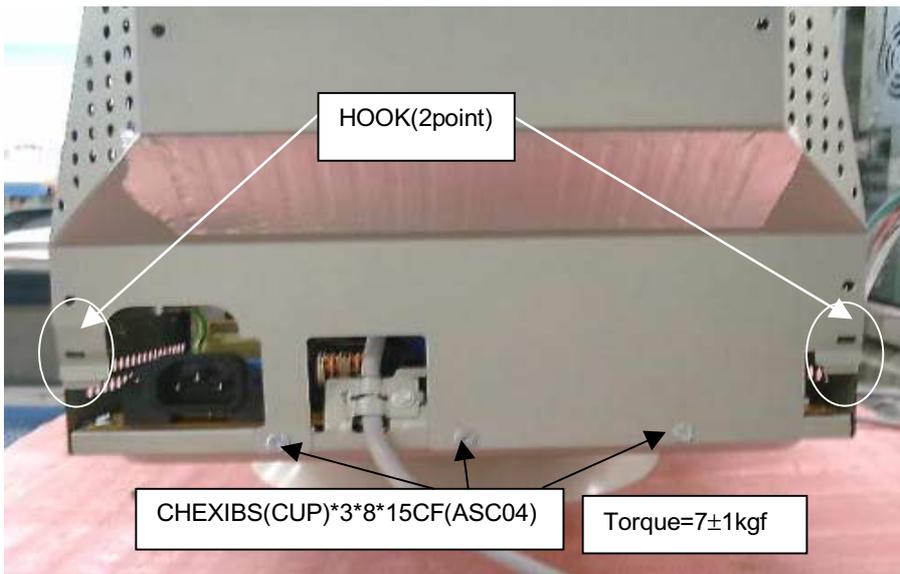


32. Put on the PLATE SHIELDING ASSY on the desk.  
Put on the LEAF SPRING on the PLATE SHIELDING ASSY.

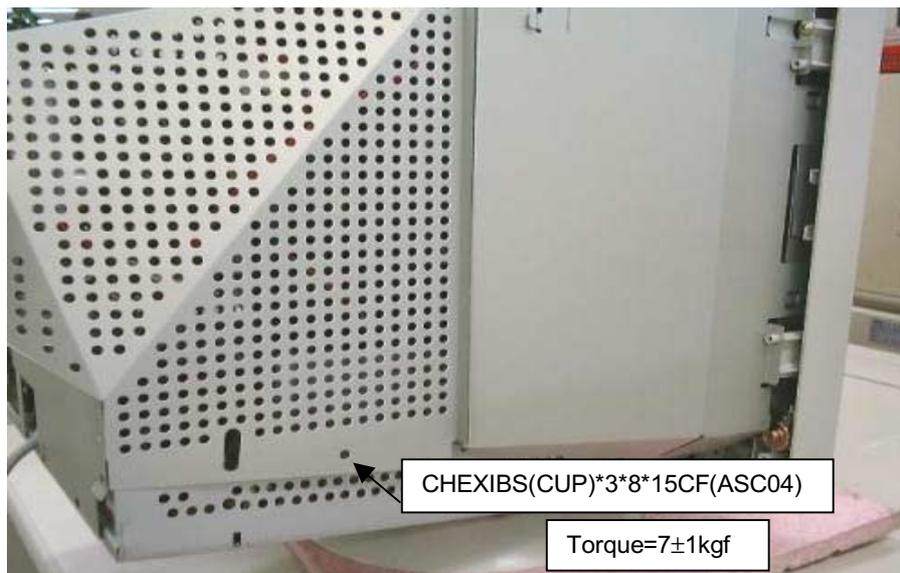


33. Put in and screw PLATE SHIELDING ASSY on the CHASSIS BASE.(5point)

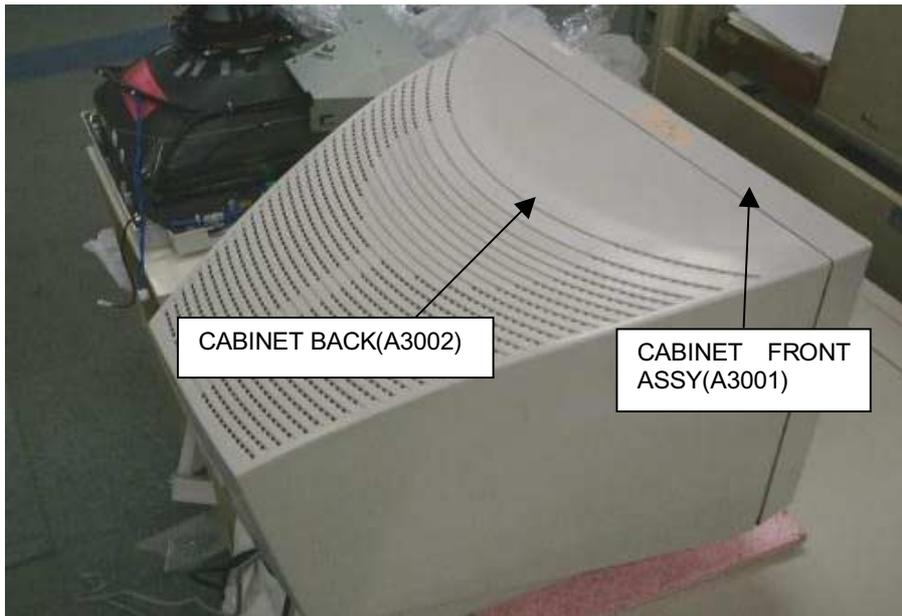
Caution: PLATE SHIELDING ASSY hook area put in the CHASSIS BASE.(2point)



34. Put and screw PLATE SHIELDING ASSY on the CHASSIS BASE.(5point)



35. Put and screw CABINET BACK on the CABINET FRONT ASSY.(2point)



36. Put and screw CABINET BACK on the CABINET FRONT ASSY.(2point)



# ADJUSTMENT PROCEDURES

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## I. SCOPE OF APPLICABILITY

The following adjustment specifications are applicable to adjustment of the model FE750+ (A) (B) (R) 17 inch color display.

Sets subject to adjustment are to be assembled in accordance with the work layouts.

In this document, we state these sets like the followings instead of model name.

MODEL NAME : FE750+

MODEL NUMBER : JC-17W41

In this document, we omit the first 5 or 6 characters in the model name and only state the version code or the version code and CRT code.

" A " or " A version " : mainly for U.S.A and Canada in northern hemisphere. { A }

" B " or " B version " : mainly for European countries in northern hemisphere. { B }

" R " or " R version " : mainly for Australia in southern hemisphere. { R }

## II. STANDARD ADJUSTMENT CONDITIONS

### 1. Power Supply Voltage

A /B/R version : AC 120V  $\pm$  5% 60Hz  
or AC 220V  $\pm$  5% 50Hz

### 2. Aging

The adjustment shall be made after more than 30 minutes of heat run Self Test Mode. (Refer to section 7-5-3)

### 3. Signals

Video : Analog 0.7  $\pm$  0.01 Vp-p Positive polarity (75  $\Omega$   $\pm$  1%, terminated)

Sync. : TTL Level (High level : more than 2.4V, Low level : less than 0.8V)

H/V Separate Positive : Negative Polarity

or

H/V Composite Positive : Negative Polarity

### 4. Magnetic Field Conditions During Adjustment

Unless otherwise specified, set the magnetic field to the following.

Magnetic field	Vertical	Horizontal
A version	40 $\pm$ 1uT	0 or 30 $\pm$ 1uT
B version	40 $\pm$ 1uT	0 or 30 $\pm$ 1uT
R version	-40 $\pm$ 1uT	0 or 30 $\pm$ 1uT

Degauss the entire unit with an external degaussing coil before beginning the adjustment procedure.

\* Notes about degaussing method

Follow the degaussing procedure below. (To prevent intertwinement of aperture grille.)

In case receiving vertical frequency is same with external degaussing coil frequency change vertical frequency to prevent set magnetizing.

- 1) Use cylinder -shaped degaussing coil. Do not use ring degaussing coil except degaussing chassis.
- 2) In order to remove a magnetization from top sides, base shield and chassis, degauss each side. Do not switch off the degaussing coil abruptly.

Move the degaussing coil slowly when degaussing.

Note: If switch off the degaussing coil near the set, the set is magnetized.

- 3) To degauss panel surface

When switch on the degaussing coil, keep distance between panel surface and degaussing coil to more than 50cm.

Move the degaussing coil vertically near the panel surface.

Keep distance of panel surface and degaussing coil to more than 15mm.

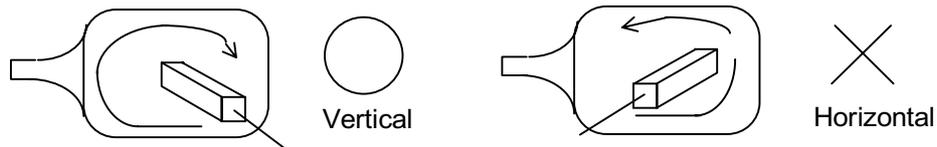


Fig. 4-1

- 4) Degaussing method of CRT surface

Starting from edge of CRT, move the degaussing coil toward CRT center in circular motion, spending 6 to 7 seconds. (about 4 or 5 rounds)

- 5) After sufficiently degaussing the CRT, move degaussing slowly away from the panel surface while rotating from corner to center, taking more than 3 seconds.

Turn off SW more than 1m away from the CRT.

Degauss again if the unit is magnetized.

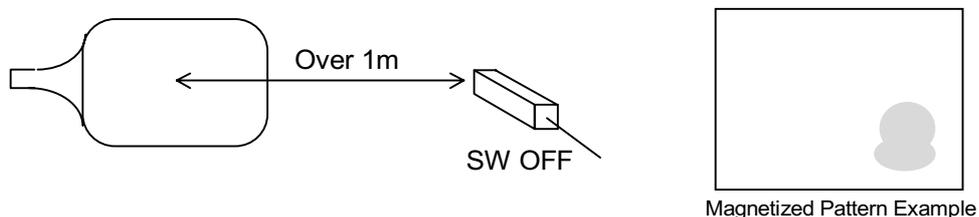


Fig. 4-2

- 6) When aperture grille get entangled while degaussing, receive the signal of 1dot alternate pattern and degauss again. If aperture grille remain entangled, Put vibration from side.

## 5. Signal Generator

LVG-1603 is recommended for signal generator.

Use calibrated signal generators. However, use VG-819 in focus regulation.

Note) Adjustment timings are on timing tables and are not programmed timing.

## 6. Color Analyzer, Convergence Meter, Landing Meter

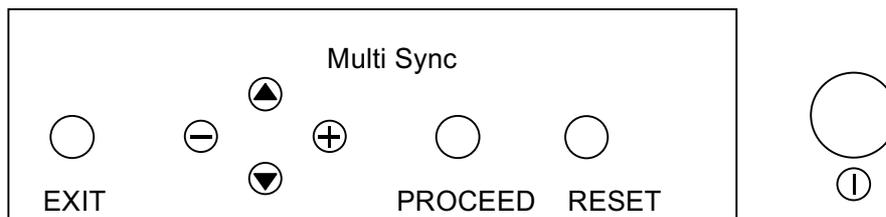
The color analyzer should be CA-100 (made by MINOLTA) or compatible.

The convergence meter should be CC-100 (made by MINOLTA) or compatible.

The Landing meter should be KLD-01 (made by KAMAYA) or compatible.

## 7. OSM MENU

### 7-1. FRONT PANEL



### 7-2. ADJUST MENU

This model is adjusted through On Screen Display by operating the front panel switch.

On Screen Display menu is divided into the following 2 types( 1) and 2)).

- 1) MENU (USER) : Menu containing items that can be operated by user.
- 2) MENU (SERVICE) : Menu that is hidden from user.

Hereafter, they will be called MENU (U),MENU(S).

The menu can be displayed when the Signal input to the Display unit.

### 7-3. FACTORY MODE

This model has function that is named "FACTORY MODE"

Adjust preset data in this mode.

Reset function is disable.

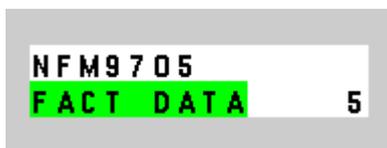
Set the factory mode to the ON condition before adjustment.  
Set the factory mode to OFF (User Mode) after completing.

### 7-4. FACTORY MODE SETTING

#### 7-4-1. FACTORY MODE : OFF → ON

- 1) Power on pressing "EXIT".
- 2) After screen image is appear, press "-", "+", "▲" or "▼".

Then the following menu is displayed.



- 3) Adjust data 255.
- 4) Adjust data 5.

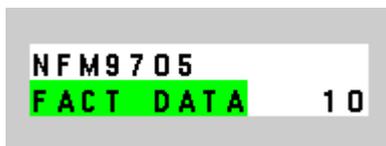
5) Press "PROCEED", then enter to factory mode.

And the following menu is displayed.



#### 7-4-2. FACTORY MODE ON → OFF

1) Open the following menu.



2) Adjust data 10.

3) Press "PROCEED", then escape from FACTORY MODE.

#### 7-5. Displaying the OSM.

7-5-1. MENU (U) : Press one SW of "-", "+", "▲", "▼" or "PROCEED" once.

7-5-2. MENU (S) : Press one SW of "-", "+", "▲", "▼" or "PROCEED" once.

7-5-3. Self Test : Open (MENU(S), TAG 6) "IPM" menu and set this function OFF.

#### 7-6. How to turn off OSM MENU

\* To close the Menu

Press "EXIT" switch while MENU(U) or MENU(S) is displayed

While TAG is highlighted	:	1 time.
ITEM is highlighted	:	2 times.
entering SUB MENU	:	3 times.

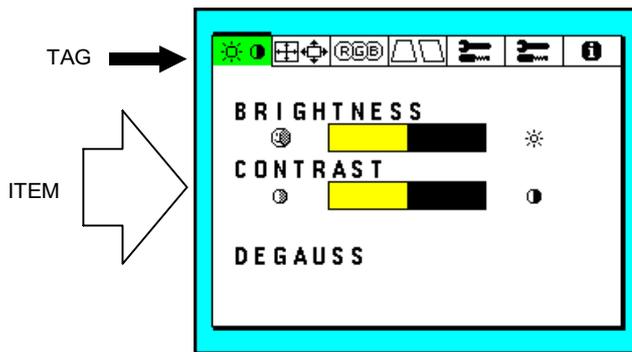
\* To close MENU temporarily.

Press "RESET" once, while MENU (S) is being displayed.

Press "RESET" once more, MENU (S) is displayed again.

### 7-7. To change Group / ITEM / SUB MENU

- TAG to TAG : Push "-" SW or "+" SW.
- TAG to Item : Push "▲" SW or "▼" SW once.
- Item to Sub Menu : Push "PROCEED" SW once.
- Item to Item : Push "▲" SW or "▼" SW.
- Sub Menu to Item : Push "EXIT" SW once.
- Item to TAG : When bottom item is selected, push "▲" SW.  
When top item is selected, push "▼" SW.



### 7-8. To change Data values

Data values are changed by pressing "-" or "+" switch.

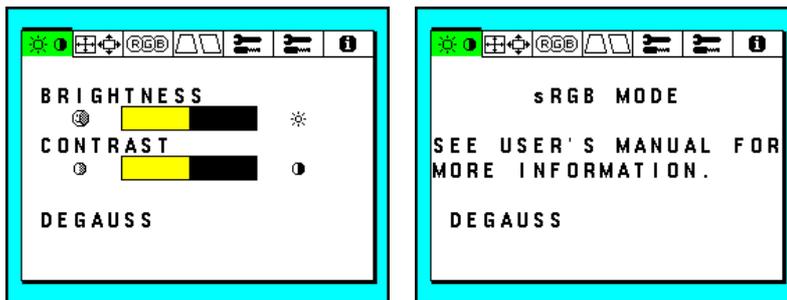
### 7-9. To save Data Value.

Data values are saved into EEPROM, when "-" or "+" is released.

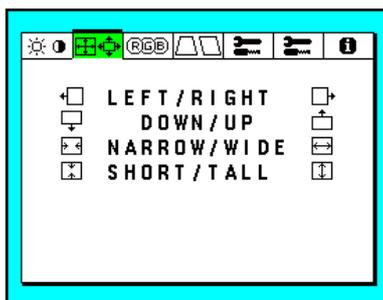
### 7-10. Structure of OSM MENU

#### 7-10-1. OSM MENU (U)

TAG 1) BRIGHTNESS / CONTRAST / DEGAUSS

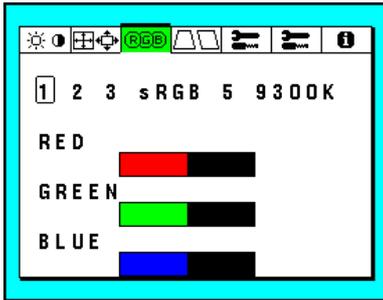


TAG 2) SIZE & POSITION

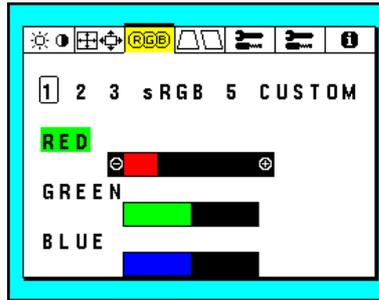


TAG 3) COLOR CONTROL

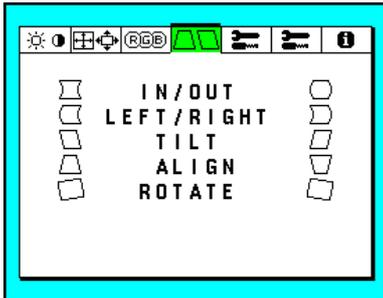
3-1) COLOR SELECT



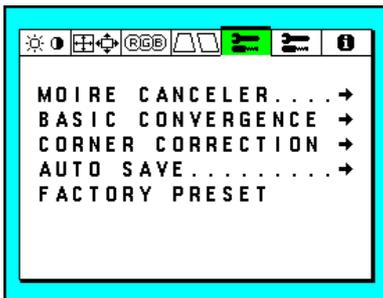
3-2) CUSTOM ADJUST



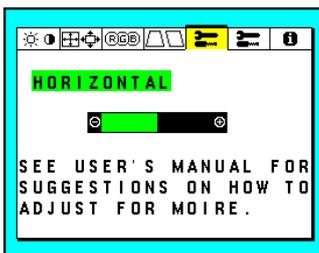
TAG 4) GEOMETRY



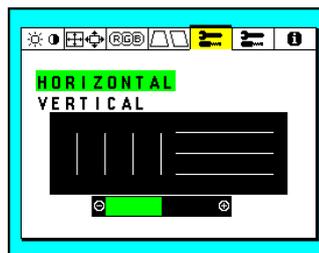
TAG 5) TOOL1



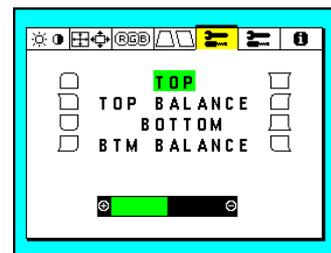
5-1) MOIRE CANCELER



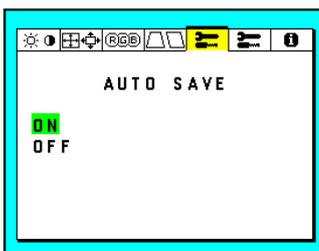
5-2) BASIC CONVERGENCE



5-3) CORNER CORRECTION



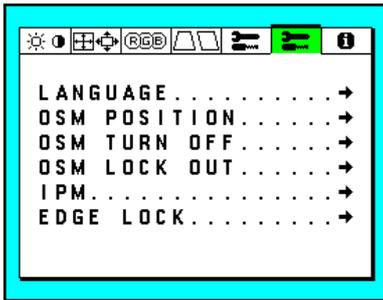
5-4) AUTO SAVE



5-5) FACTORY PREST



TAG 6) TOOL2



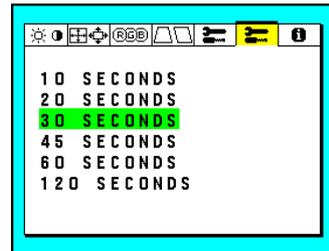
6-1) LANGUAGE



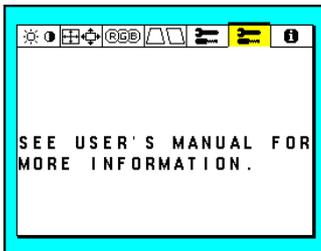
6-2) OSM POSITION



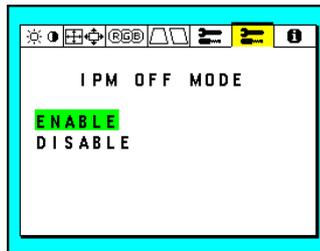
6-3) OSM TURN OFF



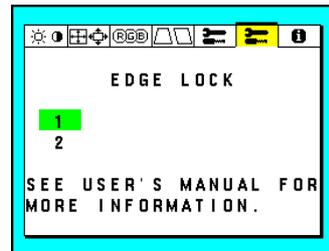
6-4) OSM LOCK OUT



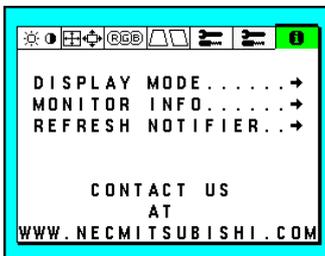
6-5) IPM



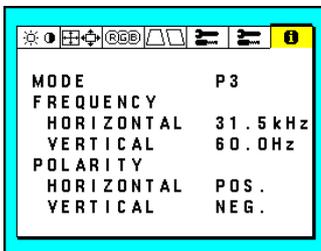
6-6) EDGE LOCK



TAG 7) INFORMATION



7-1) DISPLAY MODE



7-2) MONITOR INFO

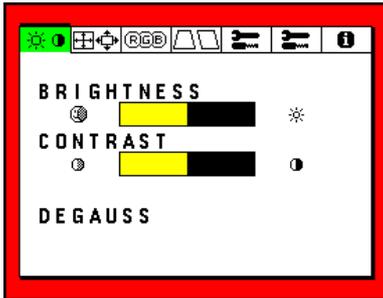


7-3) REFRESH NOTIFIER

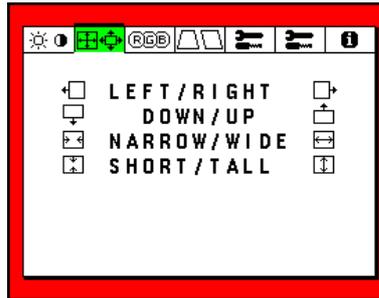


## 7-10-2. OSM MENU (S)

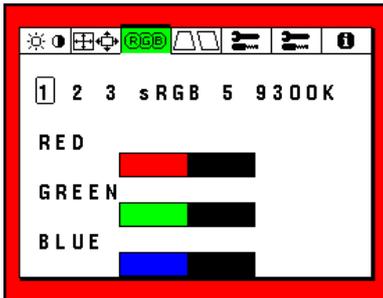
TAG 1)



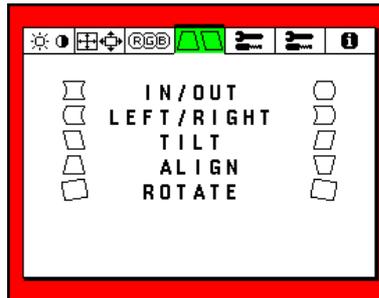
TAG 2)



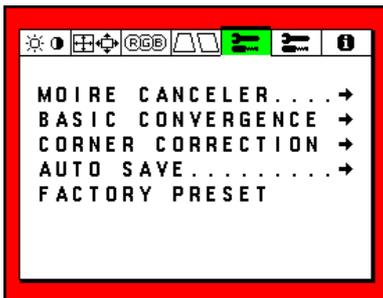
TAG 3)



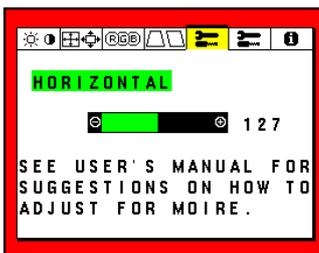
TAG 4)



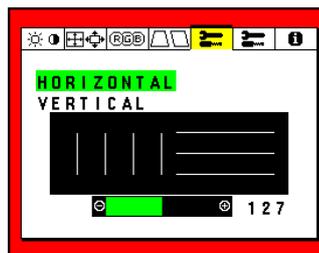
TAG 5)



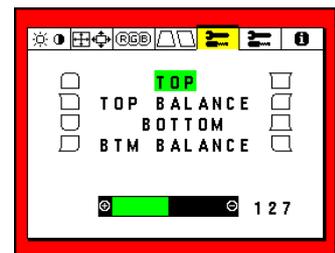
TAG 5-1)



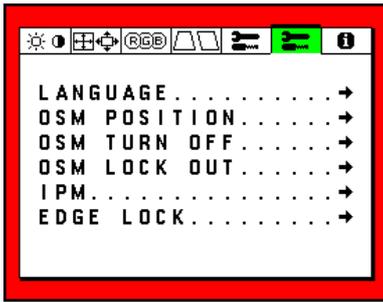
TAG 5-2)



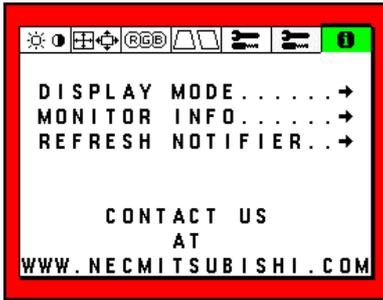
TAG 5-3)



TAG 6)



TAG 7-1)



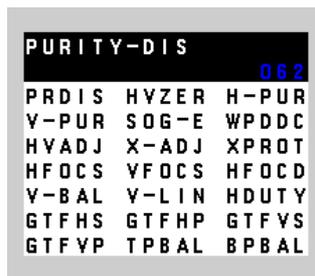
TAG 7-2)



TAG 8)



TAG 9)



## ADJUSTMENT ITEMS

### [A] Pre-Adjustment

1. High-Voltage Adjustment **SAFETY** (When circuit board energizing is examined.)
2. Screen-Voltage Adjustment

### [B] VR Initial Settings

1. Control Setting

### [C] Main Adjustment

1. Vertical Linearity Adjustment
2. Horizontal Raster Position Adjustment
3. Deflection Distortion Adjustment
  - 3-1. Horizontal / Vertical Size Rough Adjustment
  - 3-2. Picture Tilt Adjustment
  - 3-3. Side Pincushion Balance Adjustment
  - 3-4. Side Pincushion Adjustment
  - 3-5. Trapezoid distortion Adjustment
  - 3-6. Parallelogram Distortion Adjustment
  - 3-7. Corner Distortion Adjustment
    - 3-7-1. Top Corner Distortion Adjustment
    - 3-7-2. Bottom Corner Distortion Adjustment
    - 3-7-3. Top Corner Balance Adjustment
    - 3-7-4. Bottom Corner Balance Adjustment
  - 3-8. Overall Distortion Adjustment
4. Preset Picture Size and Position Adjustment
5. Video Amplitude Adjustment
  - 5-1. Settings
  - 5-2. Cut Off Adjustment
  - 5-3. Color Preset Adjustment
  - 5-4. ABL Adjustment
  - 5-5. sRGB Adjustment
  - 5-6. Contrast preset
6. Focus Adjustment
  - 6-1. Focus VR Adjustment
  - 6-2. V-FOCUS Adjustment
7. Convergence Adjustment

### [D] Reference

1. List of Signals
2. Signal timing Charts
3. Position of Connectors and Test point for Adjustment and Inspection

**SAFETY** : This MARK is important adjustment item for products safety.

\*A. Adjustment of Section 1 and section 2 shall be done at the time of inspection to flow electricity in PWB.

## [A] Pre-Adjustment

### 1. High-Voltage Adjustment

SAFETY

Signal 3 (VGA480), Frame Pattern

Initial Setting

SCREEN VR: Raster Just cut off

This adjustment is made when circuit board energizing is examined.

- 1) Receive signal 3(VGA480), Frame Pattern
- 2) Open Menu (S), TAG9) "HV-ADJ" and adjust that high-voltage is the following by "+", "-" button  
25.0kV  $\pm$  0.3kV

### 2. Screen-Voltage Adjustment

Signal 3 (VGA480), Frame Pattern

- 1) Receive Signal 3 (VGA480), Frame Pattern
- 2) Open Menu (S), TAG8)and set the values of the following.  
BRIGHT-CENT : A00h  
R-BIAS-H (9300K) : 80h  
G-BIAS-H (9300K) : 80h  
B-BIAS-H (9300K) : 80h
- 3) Adjust SCREEN VR slowly so that Screen voltage is the following.  
704V  $\pm$  2V

## [B] VR Initial Settings

### 1. Control Setting

Before adjusting, set the position of control as follows.

FBT FOCUS F1 : Mechanical center

FOCUS F2 : Mechanical center

VR581 : Mechanical center

## [C] Main Adjustment

\*Close OSM menu before the set turn the power off.

\*Turn the monitor back on and confirm that the adjustment values / contrast / white balance / distortion values are the same before the Menu was closed.

When "FPM/OFF" SW is pushed by the condition which OSM is displayed,

OSM Menu will disappear. If " →, ←, ↑, ↓ " SW is pushed once more, OSM displays.

Previous setting

1) FOCUS VR setting

Signal 3 (VGA480), Crosshatch

Display OSM menu and adjust FOCUS F1 VR and F2 VR to be able to recognize characters.

2) Rough Adjustment before warm up

Signal 19 (1600\*1200@75)

a. Rough adjustment of horizontal raster position

1) Receive following signal , All Black.

Signal 19 (1600\*1200@75)

2) Make sure to set the position of control as follows.

VR581 (on the MAIN PWB) : Mechanical center

3) Open Menu (S),TAG2 "NARROW / WIDE", adjust "+", "-" SW so that the horizontal raster size is the followings,

a :  $315 \pm 5.0\text{mm}$

4) Adjust VR581 so that the distance between the bezel and raster edge is as follows.

$|X_{\text{Left}} - X_{\text{Right}}| \leq 3.0 \text{ mm}$

b. Initial DATA Writing

Before aging, Initial data must be written in EEPROM by using a data file

" CN980\_1.eep".

But, High Voltage data (address 0x00aa to 0x00ae) must not be changed.

## 1. Vertical Linearity Adjustment

Signal 22 (V.RASTER) Inverted Crosshatch

Signal 1 (VGA350) Inverted Crosshatch

- 1) Open Menu (S),TAG2 "SHORT / TALL" "DOWN / UP", and adjust "+", "-" SW so that the vertical size and position becomes the following. (Refer to Fig. 2-1.)

$X : 236 \pm 3.0\text{mm}$

$| Y_{\text{top}} - Y_{\text{bottom}} | \leq 1.0 \text{ mm}$

- 2) Open Menu (S),TAG9 "V-BAL", and adjust "+", "-" SW so that the size of top square and bottom square on the screen equal vertically.
- 3) Open Menu (S),TAG9 "V-LIN", and adjust "+", "-" SW so that the size of top square and center square on the screen equal vertically.
- 4) Make sure that the linearity of top, center and bottom on the screen are  $\pm 3\%$  or less.
- 5) Receive Signal 1.
- 6) Repeat 1) to 5) until meet the spec.

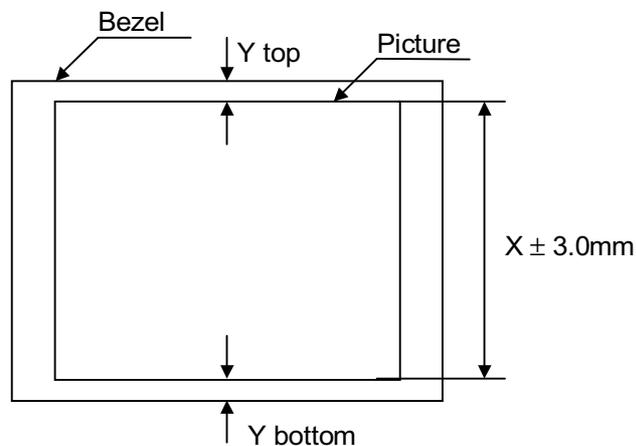


Fig. 1-1 Vertical Raster Size

- 7) Calculate values of another signal data using above data and write memory.

## 2. Horizontal Raster Position Adjustment

Signal: 19 (1600\*1200@75) All Black

- 1) Receive signal the following Signal 19, All Black.
- 2) Open Menu (S), TAG8 "BTRAS", push "+" SW, until horizontal raster appear.
- 3) Make sure to set the position of control as follows.

VR581 (on the MAIN PWB) : Mechanical center.

- 4) Open Menu (S), TAG2 "NARROW /WIDE", adjust "+", "-" SW so that the horizontal raster size is the followings,

$a : 315 \pm 5.0\text{mm}$

- 5) Adjust VR581 so that the distance between the bezel and raster edge is as follows.

$| X_{\text{Left}} - X_{\text{Right}} | \leq 2.0 \text{ mm}$

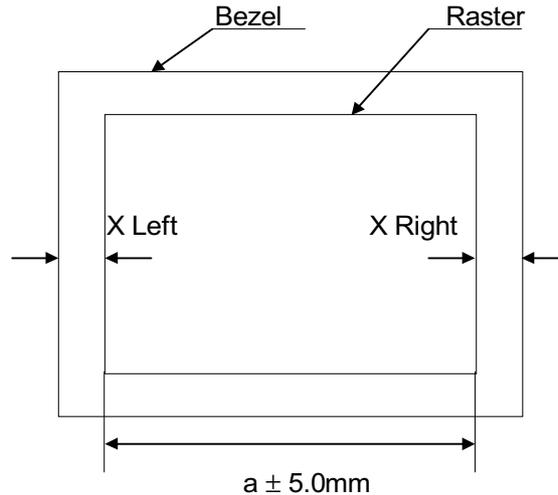


Fig. 2-1 Horizontal Raster Centering

### 3. Deflection Distortion Adjustment

Signal 11 (800\*600@85Hz)

Signal 20 (1280\*1024@85Hz)

Refer to Table 4) in next section.

Environment : Adjustment Magnetic Field by three dimension magnetic field system.

Degauss the monitor using an external degaussing coil. (See item II-4)

\* Hide the OSM menu when confirm the distortion.

When adjustment is finished, close menu to store the data values.

\*After 3-1 section and 3-2 section are adjusted, redo adjusts 3-3 section to 3-8 section in the case of the manual adjustment.

When distortion left at the top-bottom corner, the adjusted of 3-9 section is done, and 3-10 section is confirmed at the end.

#### 3-1. Horizontal / Vertical Size Rough Adjustment

1) Receive the following signals, All White.

Signal 11 (800\*600@85Hz)

Signal 20 (1280\*1024@85Hz)

2) Open Menu (S),TAG2) "LEFT / RIGHT", "DOWN / UP", "NARROW / WIDE" and "SHORT / TALL" and adjust the screen size to the following values.

Horizontal Size: 315 mm ± 5.0 mm

Vertical Size: 236 mm ± 5.0 mm

Horizontal Picture Position: | Xleft - XRight | ≤ 3.0 mm

Vertical Picture Position: | XTop - XBottom | ≤ 3.0 mm

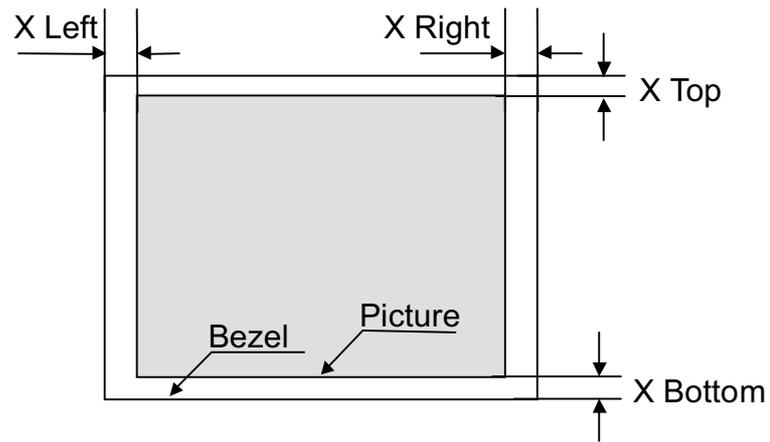


Fig. 3-1 Screen Size Rough Adjustment

### 3-2. Picture Tilt Adjustment

- 1) Receive signal 20 (1280\*1024@85Hz), Crosshatch Pattern
- 2) Open Menu (S),TAG4) "ROTATE" and make sure that initial value of adjustment data is "43h".
- 3) Degauss the monitor using an external degaussing coil. (See item II-4)
- 4) Open Menu (S),TAG4) "ROTATE" and make sure that the picture is tilted as follows by "+", "-" SW.
  - "-" SW: counterclockwise
  - "+" SW: clockwise
  - The count of OSM : 20h ~ 60h
- 5) Adjust "+", "-" SW so that the picture tilt meets the following standards.
  - The maximum correction is  $\pm 1.0\text{mm}$ .
  - $X \leq \pm 1.0 \text{ mm}$
- 6) Push "EXIT" SW.

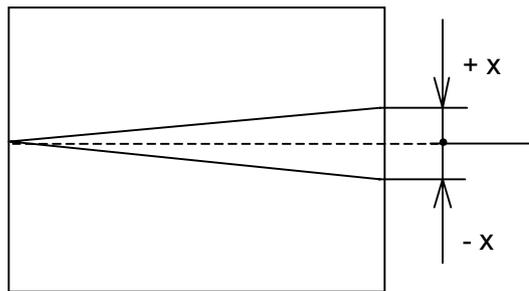


Fig. 3-2 Picture Tilt

### 3-3. Side Pincushion Balance Adjustment

1) Receive the following signals, All White.

Signal 20 (1280\*1024@85Hz)

2) Open Menu (S),TAG4) "LEFT / RIGHT".

Adjust "+", "-" SW so that the difference of XSL and XSR is equal ( maximum 1.0 mm).

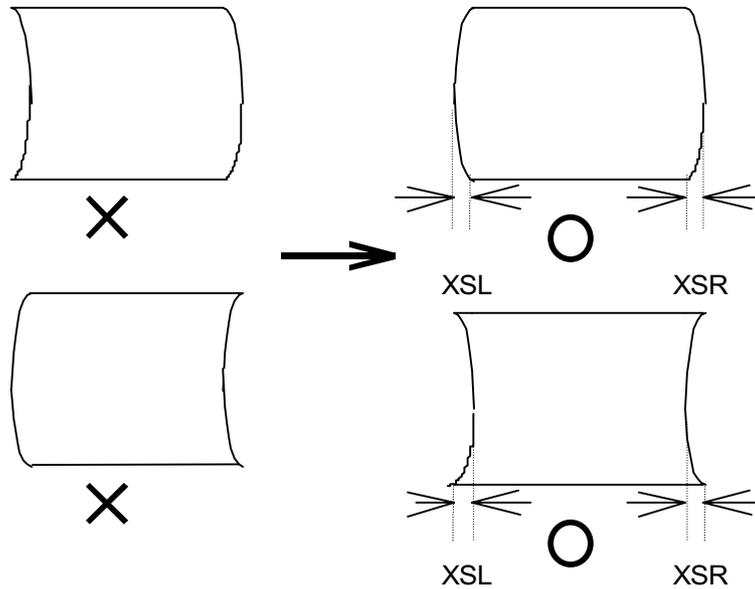


Fig. 3-3 Side Pincushion Balance

### 3-4. Side Pincushion Adjustment

1) Receive the following signals, All White.

Signal 11 (800\*600@85Hz)

Signal 20 (1280\*1024@85Hz)

2) Open Menu (S),TAG4) "IN / OUT".

Adjust "+", "-" SW so that the side pincushion distortion is small ( maximum  $\pm 0.5$  mm).

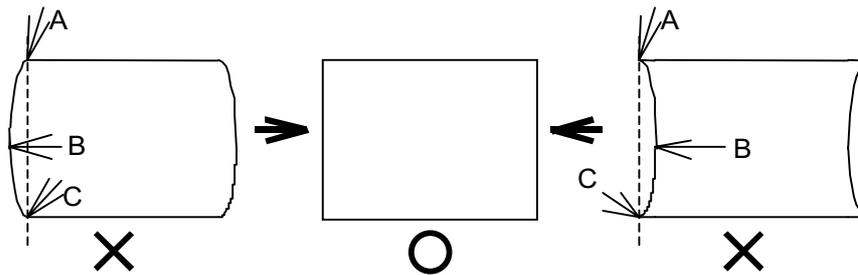


Fig. 3-4 Side Pincushion

### 3-5. Trapezoid distortion Adjustment

1) Receive the following signals, All White.

Signal 11 (800\*600@85Hz)

Signal 20 (1280\*1024@85Hz)

2) Open Menu (S),TAG4 "ALIGN".

Adjust "+", "-" SW so that the Trapezoid Distortion is equal to  $X_{top}$  and  $X_{btm}$ .

(  $| X_{top} - X_{btm} | \leq 1.0 \text{ mm}$  )

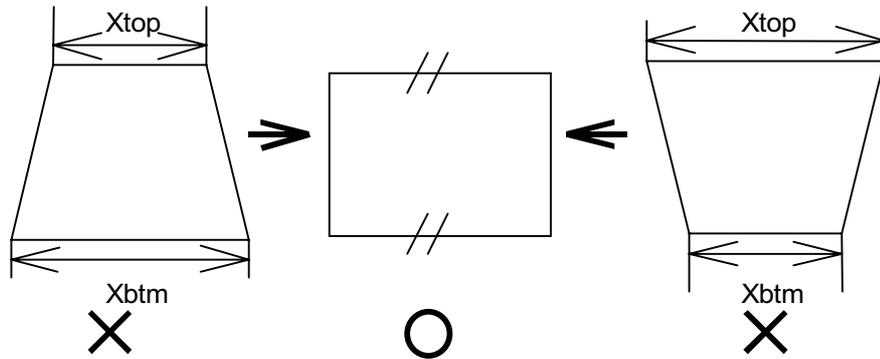


Fig. 3-5 Trapezoid Distortion

### 3-6. Parallelogram Distortion Adjustment

1) Receive the following signals, Crosshatch Pattern.

Signal 20 (1280\*1024@85Hz)

2) Open Menu (S),TAG4 "TILT". Adjust "+", "-" SW so that the vertical line and horizontal line at the screen's center fall at right angles. (maximum  $90^\circ \pm 0.5^\circ$ )

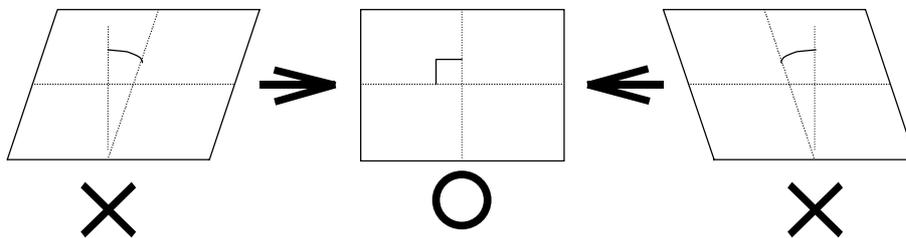


Fig. 3-6 Parallelogram Distortion

If Trapezoid Distortion is out of specification, repeat adjustment step 5-3.

It implements this adjustment in case of the following Undulation distortion.

Undulation is a directional difference of tilt at AB and DE.

Following figures (I) and (II) are example.

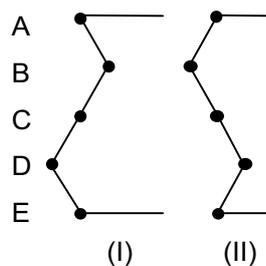


Fig. 3-7 Vertical S-wave Distortion Definition

### 3-7. Corner Distortion Adjustment

Signal 11 (800\*600@85Hz)

Signal 20 (1280\*1024@85Hz)

Do this integrate when distortion is adjust in the top or the bottom after the integrate to 3-6 sections.

#### 3-7-1. Top Corner Distortion Adjustment

- 1) Open Menu (S), TAG5) "CORNER CORRECTION" - "TOP" . Adjust "+", "-" SW so that the top corner forms a right angle. (maximum  $\pm 1.0$  mm)

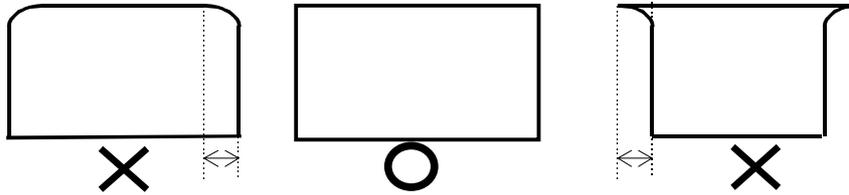


Fig. 3-8 Top Corner Distortion

#### 3-7-2. Bottom Corner Distortion Adjustment

- 1) Open Menu(S),TAG5) "CORNER CORRECTION" – "BOTTOM". Adjust "+", "-" SW so that the bottom corner forms a right angle. (maximum  $\pm 1.0$  mm)

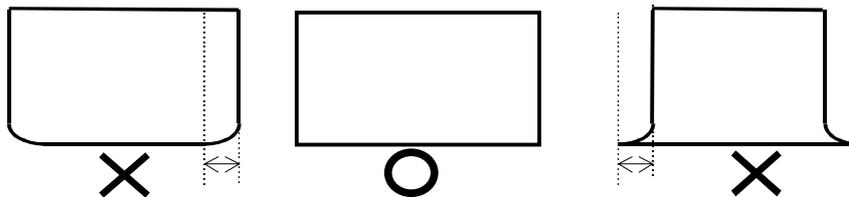


Fig. 3-9 Bottom Corner Distortion

#### 3-7-3. Top Corner Balance Adjustment

- 1) Open Menu(S), TAG5) "CORNER CORRECTION" – "TOP BALANCE". Adjust "+", "-" SW so that the top corner forms a right angle. (maximum  $\pm 1.0$  mm)

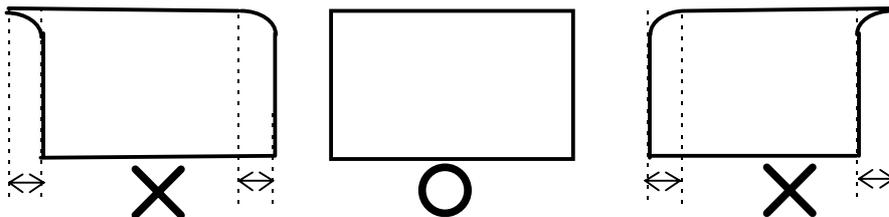


Fig. 3-10 Top Corner Balance

### 3-7-4. Bottom Corner Balance Adjustment

- 1) Open Menu (S), TAG5) "CORNER CORRECTION" – "BTM BALANCE". Adjust "+", "-" SW so that the bottom corner forms a right angle. (maximum  $\pm 1.0$  mm)

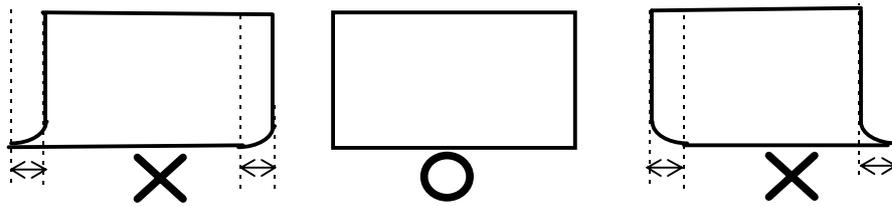


Fig. 3-11 Bottom Corner Balance

### 3-8. Overall Distortion Adjustment

Signal 11 (800\*600@85Hz) All White

Signal 20 (1280\*1024@85Hz) All White

- 1) Confirm that adjustment on steps 3-2 to 3-7 meets the specifications.
- 2) If undulating, re-adjustment each distortion adjustment.

Undulation is a directional difference of tilt at either AC and CE or both.

Following figures (I) and (II) are example. AB and BC, CD and DE are the direction of tilt. Undulated correction is the same direction of tilt at AB and BC, CD and DE.

Following figures (III) and (IV) are example. In this state, each adjustment standard must be met.

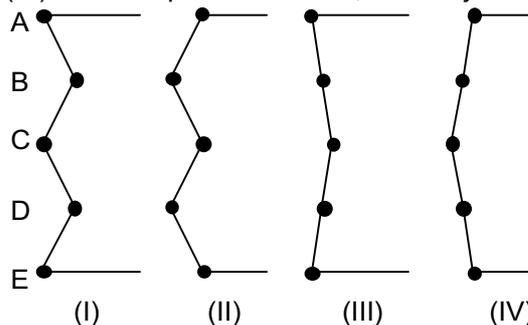


Fig. 3-12 Undulated Definition

- 3) For another signals, distortion data are calculated from above the adjustment value and the data are written into EEPROM.

## 4. Preset Picture Size and Position Adjustment

Signal :11 (800\*600@85Hz)

20 (1280\*1024@85Hz)

(Refer to Table 4)

Video : All White

- 1) Receive signal 11 (800\*600@85Hz).
- 2) Open Menu (S), TAG2) "LEFT / RIGHT", "DOWN / UP", "NARROW / WIDE" and "SHORT / TALL".
- 3) Adjust the picture size and position as listed below by "+", "-" SW.

Picture Size H :  $315 \pm 2.0$  mm

V :  $236 \pm 2.0$  mm

Picture Position H :  $|X_{Left} - X_{Right}| \leq 1.0$  mm

V :  $|X_{Top} - X_{Bottom}| \leq 1.0$  mm

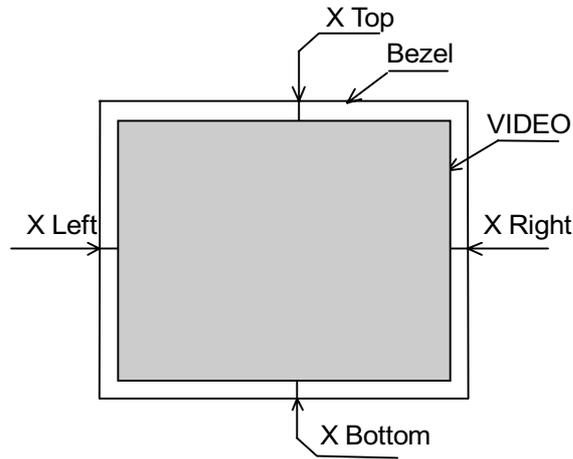


Fig. 4-1 Picture Position

4) For the signals below, picture size and position are calculated from above the adjustment data and the data are written into EEPROM.

Specification :

For user signals

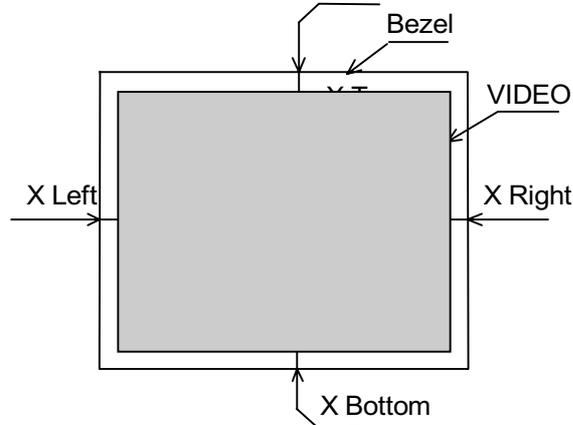
The picture must be in Bezel.

Picture Size H:  $305 \pm 20$  mm

V:  $224 \pm 20$  mm

Picture Position H:  $| X_{\text{Left}} - X_{\text{Right}} | \leq 20$  mm

V :  $| X_{\text{Top}} - X_{\text{Bottom}} | \leq 20$  mm



\*Adjust all of signal listed below.

\*If the picture size does not reach to bezel, input "MAX" data.

Table 4)

In Distortion adjustment and Size/Position adjustment, Make memorize adjust data to EEPROM, as follows.

Preset Signal :

Signal No.11 / 20 : Write adjust data that is defined in actual adjustment.

Other preset signal : Write adjust data either that is defined in actual adjustment or that is calculated with result of signal 11 / 20 adjustment data.

User Signal (Ref. 1-11 / 1-6) : Write adjust data either that is defined in actual adjustment or that is calculated with result of signal 11 / 20 adjustment data.

Reference signal : Write suitable fixed data or calculated with result of signal 11 / 20 adjustment data.

Table 4-1)

Preset Signal :

11	(VESA 800*600@85Hz)	20	(VESA1280*1024@85Hz)
2	(VGA400)	3	(VGA480)
4	(MAC 640*480)	9	(VESA 640*480@85Hz)
7	(VESA 640*480@75Hz)	8	(VESA 800*600@75Hz)
10	(MAC 832*624)	13	(VESA 1024*768@75Hz)
15	(VESA 1024*768@85Hz)	14	(MAC 1152*870)
17	(VESA 1280*1024@75Hz)	19	(VESA 1600*1200@75Hz)

User Signal :

1	(VGA350)	5	(VESA 350@85Hz)
6	(VESA 400@85Hz)	12	(VESA 1024*768@70Hz)
16	(VESA 1280*1024@70Hz)	18	(VESA 1600*1200@65Hz)

Reference Signal :

105	(XGA(8514A))	103	(VESA 800*600@60Hz)
107	(1024*768@60Hz)	126	(XGA2 1024*768)
127	(MAC (1024*768))	114	(VESA 1280*1024@60Hz)
116	(VESA 1600*1200@60Hz)	128	(MAC 1280*960)
121	(VESA 1600*1200@70Hz)		

## 5.Video Amplitude Adjustment

Signal 20 (1280\*1024@85Hz), All Black

Signal 23 (1280\*1024@85Hz(Window))

### 5-1. Settings

NOTE:

\*Before adjustment, confirm that the video signal of generator is as follows.

Video : Analog 0.7Vp-p  $\pm$  0.01V p-p (terminated 75 ohms  $\pm$  1 %)

\*Perform "5. Video Amplitude Adjustment", After "4.Preset Picture Size and Position Adjustment"

\*Degauss the monitor using an external degaussing coil.(See II -4)

\*Open Menu(S) Group7) and make sure that the following values.

CONTRAST	: ffh
BRIGHT MAX H	: 0dh
BRIGHT MAX L	: 4dh
BRIGHT CENTER H	: 0ah
BRIGHT CENTER L	: 00h
BRIGHTNESS	: 80h (50%)
R-BIAS-H (9300K)	: 80h
G-BIAS-H (9300K)	: 80h
B-BIAS-H (9300K)	: 80h
R-BIAS-M (6500K)	: 80h
G-BIAS-M (6500K)	: 80h
B-BIAS-M (6500K)	: 80h
R-BIAS-L (5000K)	: 80h
G-BIAS-L (5000K)	: 80h
B-BIAS-L (5000K)	: 80h
R-GAIN-H (9300K)	: 36h
G-GAIN-H (9300K)	: 36h
B-GAIN-H (9300K)	: 36h
R-GAIN-M (6500K)	: 36h
G-GAIN-M (6500K)	: 36h
B-GAIN-M (6500K)	: 26h
R-GAIN-L (5000K)	: 56h
G-GAIN-L (5000K)	: 36h
B-GAIN-L (5000K)	: 16h

## 5-2. Cut Off Adjustment

- 1) Receive the following signal, All Black.

Signal 20 (1280\*1024@85Hz) Frame Pattern

- 2) Connect the DVM with a high voltage probe to TP-SC on the CRT PWB and adjust SCREEN VR to the following value.

$700 \pm 5$  Vdc

(Use a high voltmeter whose maximum voltage is more than 1.5kV and input resistance is more than 1000 M $\Omega$ .)

(Use color analyzer CA-100 or compatible.)

- 3) Bright center rough adjustment.

Open Menu (S), TAG8) "BRIGHT-CENT" and adjust "Y" by "+", "-" button so that its color analyzer indicated value is the following.

BRIGHT-CENT : 0.25~0.65 cd/m<sup>2</sup>

If the value of "BRIGHT-CENT" reaches "BRIGHT-MAX reference value", it makes the adjustment of "BRIGHT-MAX" the following value.

BRIGHT-MAX :  $3.00 \pm 0.2$  cd/m<sup>2</sup>

And make the adjustment of "BRIGHT-CENT" again.

- 4) Open Menu (S), TAG8) "R-BIAS-H", "B-BIAS-H" and adjust "x, y" by "+", "-" button so that its color analyzer indicated value is the following.

$x = 0.283 \pm 0.015$ ,  $y = 0.297 \pm 0.015$  (color temperature : 9300K)

- 5) Open Menu (S), TAG8) "R-BIAS-M", "G-BIAS-M", "B-BIAS-M" and set to the same value of "R-BIAS-H", "G-BIAS-H", "B-BIAS-H"

- 6) Open Menu (S), TAG8) "BRIGHT-CENT" and adjust "Y" by "+", "-" button so that its color analyzer indicated value is the following.

BRIGHT-CENT : 0.2~0.4cd/m<sup>2</sup>

- 7) Open Menu (S), TAG8) "BRIGHT-MAX" and adjust "Y" by "+", "-" button so that its color analyzer indicated value is the following.

BRIGHT-MAX :  $4.0 \pm 0.5$ cd/ m<sup>2</sup>

- 8) When the indicated value of "x, y" is over, repeat steps 4) to 7).

- 9) Open Menu (S), TAG8) "R-BIAS-M", "B-BIAS-M" and adjust "x, y" by "+", "-" button so that its color analyzer indicated value is the following.

$x = 0.313 \pm 0.015$ ,  $y = 0.329 \pm 0.015$  (color temperature : 6500K)

- 10) Open Menu (S), TAG8) "R-BIAS-L", "G-BIAS-L", "B-BIAS-L" and set to the same value of "R-BIAS-H", "G-BIAS-H", "B-BIAS-H".

- 11) Open Menu (S), TAG8) "R-BIAS-L", "B-BIAS-L" and adjust "x, y" by "+", "-" button so that its color analyzer indicated value is the following.

$x = 0.345 \pm 0.015$ ,  $y = 0.359 \pm 0.015$  (color temperature : 5000K)

### 5-3 Color Preset Adjustment

#### (A) GAIN-H Adjustment (9300K)

- 1) Receive the following signal. And it makes the "GREEN WINDOW" output of the signal generator.

Signal 23 (1280\*1024@85Hz(Window))

- 2) Open Menu (S),TAG8) "G-GAIN-H" and adjust "Y" by "+", "-" button so that its color analyzer indicated value is the following.

G-GN1 :  $100 \pm 3 \text{ cd/m}^2$

- 3) Receive the following signal. And it makes the "WHITE WINDOW" output of the signal generator.

Signal 23 (1280\*1024@85Hz(Window))

- 4) Open Menu (S),TAG8) "R-GAIN-H","B-GAIN-H","G-GAIN-H" and adjust "x, y," by "+", "-" button so that its color analyzer indicated value is the following.

$x = 0.283 \pm 0.010$ ,  $y = 0.297 \pm 0.010$ ,  $Y=145 \pm 10 \text{ cd/m}^2$  (color temperature : 9300K)

#### (B) GAIN-MAX Adjustment

- 1) Open Menu (S), TAG8) "R-GAIN-MAX", "G-GAIN-MAX", "B-GAIN-MAX" .

- 2) Select the MAX. value from "R-GAIN-H", "G-GAIN-H", "B-GAIN-H" and set to the MAX. value into "R-GAIN-MAX", "G-GAIN-MAX", "B-GAIN-MAX".

#### (C) GAIN-M Adjustment (6500K)

- 1) Open Menu (S),TAG8) "R-GAIN-M", "G-GAIN-M", "B-GAIN-M" and set to the same value of "R-GAIN-H", "G-GAIN-H", "B-GAIN-H".

- 2) Receive the following signal. And it makes the "WHITE WINDOW" output of the signal generator.

Signal 23 (1280\*1024@85Hz(Window))

- 3) Open Menu (S),TAG8) "G-GAIN-M", "B-GAIN-M" and adjust "x, y," by "+", "-" button so that its color analyzer indicated value is the following.

$x = 0.313 \pm 0.010$ ,  $y = 0.329 \pm 0.010$ ,

(Luminance  $Y=130 \pm 10 \text{ cd/m}^2$  (color temperature : 6500K):Reference value for Adjustment.)

Note : Do not change "R-GAIN-M" that adjusted the color preset in (C)-1).

#### (D) GAIN-L Adjustment (5000K)

- 1) Open Menu (S), TAG8) "R-GAIN-L", "G-GAIN-L", "B-GAIN-L" and set to the same value of "R-GAIN-H", "G-GAIN-H", "B-GAIN-H".

- 2) Receive the following signal. And it makes the "WHITE WINDOW" output of the signal generator.

Signal 23 (1280\*1024@85Hz(Window))

- 3) Open Menu (S), TAG8) "G-GAIN-L", "B-GAIN-L" and adjust "x, y," by "+", "-" button so that its color analyzer indicated value is the following.

$x = 0.345 \pm 0.010$ ,  $y = 0.359 \pm 0.010$ ,

(Luminance  $Y=113 \pm 10 \text{ cd/m}^2$  (color temperature : 5000K):Reference value for Adjustment.)

Note : Do not change "R-GAIN-L" that adjusted the color preset in (D)-1).

#### 5-4 ABL Adjustment

BRIGHTNESS      CENTER: 80h(50%)

- 1) Make sure that the value of "CONTRAST" becomes MAX.
- 2) Receive the following signal. And it makes the "ALL WHITE" output of the signal generator.  
Signal 20 (1280\*1024@85Hz)
- 3) Open Menu (S), TAG8 "ABL" and adjust "Y" by "+", "-" button so that its color analyzer indicated value is the following.

ABLAJ :  $110 \pm 5$  cd/m<sup>2</sup>

#### 5-5 sRGB Adjustment (Automatic Adjustment only)

CONTRAST      MAX.

BRIGHTNESS      CENTER : 80h(50%)

- 1) Receive the following signal.  
Signal 23 (1280\*1024@85Hz(Window))
- 2) Select the following "ADDR"  
ADDR : 0x010e (CONT\_OFFSET)
- 3) Adjust the following value on the color analyzer.  
Luminance Y =  $85 \pm 5$  cd/m<sup>2</sup> (color temperature : 6500K)

#### 5-6 Contrast preset (B/Rver. Only)

CONTRAST      MAX.

BRIGHTNESS      PRESET : 67h(40%)

- 1) Receive the following signal.  
Signal 23 (1280\*1024@85Hz(Window))
- 2) Select the following "ADDR"  
ADDR : 0x0020(RESET\_CONTRAST)
- 3) Adjust the following value on the color analyzer.  
Luminance Y =  $110 \pm 5$  cd/m<sup>2</sup> (color temperature : 9300K)

## 6. Focus Adjustment

Signal 20 (1280\*1024@85Hz) “☐” character  
PC Excel Focus Inspection Pattern “1280x1024@85”

\*1 : PC Excel Focus Inspection Pattern

Video Card : Millennium II (matrox)

Application : Excel (Microsoft)

Font : Arial

Font Size : 8

Character : ##&&%%\$\$##

Set the OSM to the following.

BRIGHT : Preset.

CONTRAST : Max.

\*Perform this focus adjustment, after maximum horizontal amplitude adjustment, maximum vertical amplitude adjustment and video adjustment are completed.

### 6-1.Focus VR adjustment

1) Receive Excel of PC (Focus check pattern) by the following resolution.

1280\*1024@85Hz

2) Open Menu (S), TAG9) "VFOCS" and adjust the value is the following by "+", "-" button.

VFOCS 40

3) Open Menu (U), TAG2) and adjust "LEFT / RIGHT", "DOWN / UP", "NARROW / WIDE" and "SHORT / TALL" and adjust the picture size and position as listed below by "+", "-" SW.

Picture Size H :  $315 \pm 3.0$  mm

V :  $236 \pm 3.0$  mm

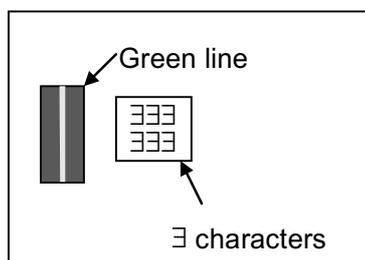
Picture Position H :  $|X_{Left} - X_{Right}| \leq 3.0$  mm

V :  $|X_{Top} - X_{Bottom}| \leq 3.0$  mm

4) Adjust VR F1 of FBT (Upper side VR) for the left side Green vertical line to become fine.(Fig.6-1)

5) Adjust VR F2 of FBT (Lower side VR) for the ☐ characters located on left side to become fine.(Fig.6-1)

Make sure that the horizontal line of EXCEL not become double line and characters are fine on all area.



Excel of PC

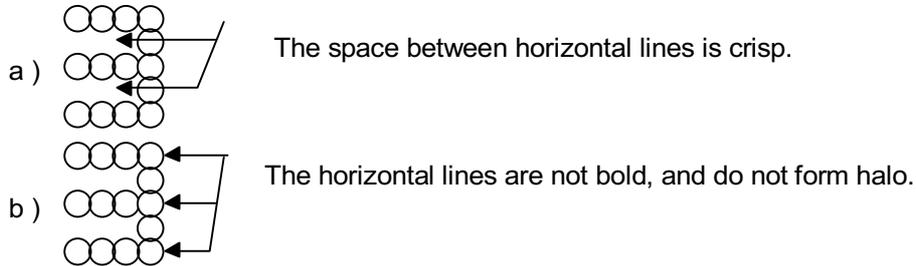
Fig. 6-1

6) Receive the following signal, “ㄋ” character.

20 (1280\*1024@85Hz)

7) Open MENU(U), TAG2 “LEFT / RIGHT”, “NARROW / WIDE”, “DOWN / UP” and “SHORT / TALL” adjust picture size to MAX in bezel.

8) Make sure that the horizontal lines of “ㄋ” character are crisp as possible in the Whole screen by the following color. Green and White



9) When “ㄋ” character do not confirm specification, adjust again 4), 5).

\*In case the set can not adjust as specifications, perform V-FOCUS adjustment.(6-2)

### 6-2.V-FOCUS adjustment

1) Receive Excel of PC (Focus check pattern) by the following resolution.

1280\*1024@85

2) Open (Menu (S), TAG9) "VFOCS"

Compare (5) with (3), in case (3) is wider than (5), increase the counter of “VFOCS” in case (3) is narrower than (5), decrease the counter of "VFOCS".

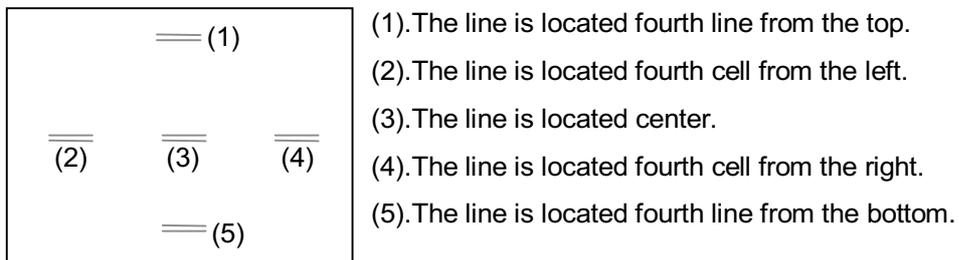


Fig. 6-2 Excel of PC (Focus check pattern)

3) After Focus OSM counter adjustment, adjust again 6-1 4), 5).

## 7. Convergence Adjustment

Signal 15 (1024\*768@85Hz) Cross Hatch Pattern

\*Adjustment Magnetic Field by three dimension magnetic field system.

\*Set a Convergence Meter: S.P.(SPRIT PITCH): 0.25mm

\*Open Menu (S), TAG 5) and make sure that the following values.

HORIZ-CONVERGENCE : 80h(50%)

VERT-CONVERGENCE : 80h(50%)

- 1) Receive the following signal, Cross Hatch Pattern and set the H / V interval of Cross Hatch Pattern to the following.

15 (1024\*768@85Hz)

H interval : 62 dots V interval: 61 dots

- 2) Open Menu (S),TAG2) and adjust screen size and position as the following.

Picture Size H :  $315 \pm 3.0$  mm

V :  $236 \pm 3.0$  mm

Picture Position H :  $|X_{Left} - X_{Right}| \leq 3.0$  mm

V :  $|X_{Top} - X_{Bottom}| \leq 3.0$  mm

- 3) Measure convergence and make sure the following specification.

A, B, R ver.  $|x| \leq 0.33$ mm,  $|y| \leq 0.33$ mm

If it dose not apply convergence spec, adjust convergence as the followings.

Note : There are limit OSM adjustment as the following.

Menu (S), TAG5)"BASIC CONVERGENCE"

HORIZ-CONVERGENCE : 40h(25%) ~ C0h(75%)

VERT-CONVERGENCE : 40h(25%) ~ C0h(75%)

While measuring convergence, hide OSM with "PROCEED" SW.

- 4) Measure convergence at screen picture.

If it is 0.21mm or greater, adjust 4-pole and 6-pole magnet on CPM to get 0.21mm or less.

- 5) Open Menu (S),TAG5) "HORIZ-CONVERGENCE", "VERT-CONVERGENCE" and adjust so that convergence of G,H,I point (Fig. 7-1) is the minimum.

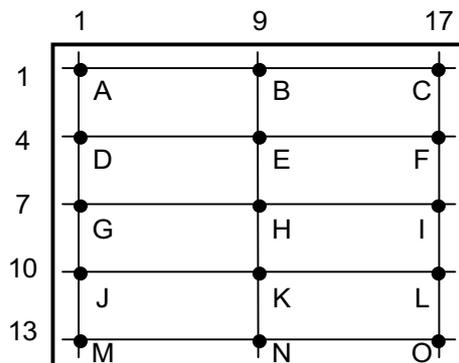
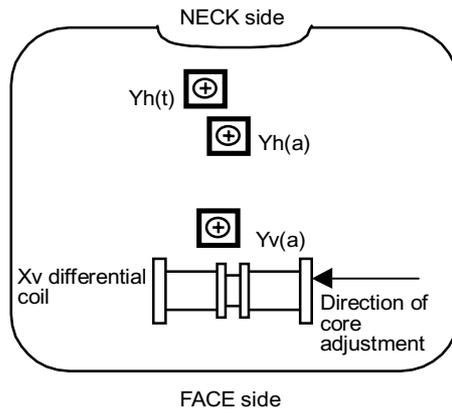


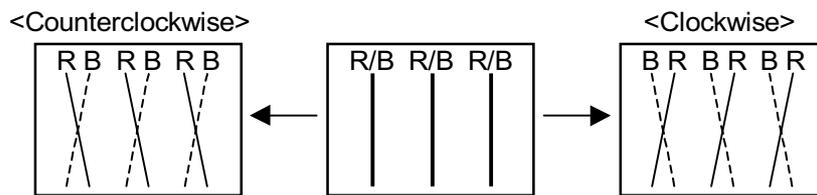
Fig. 7-1 convergence adjust point

Operation of the NF41 U (M41LRY21X21) adjustment VR

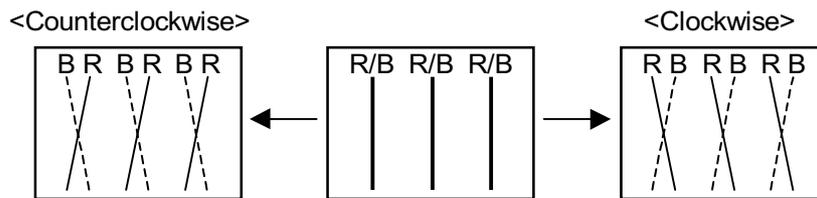


\*As seen from the FACE side

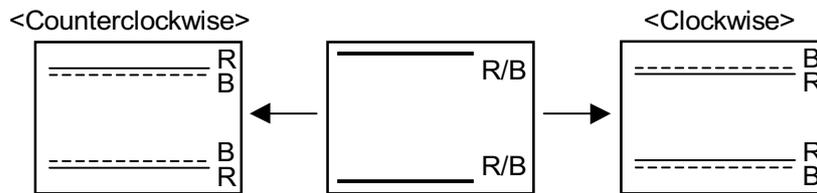
Yh (tilt) - VR



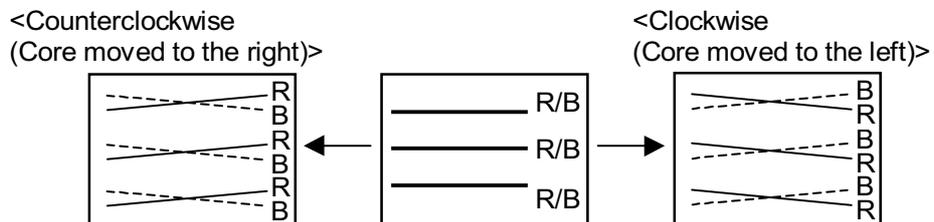
Yh (amp) - VR



Yv (amp) - VR



Xv correction differential coil



## [D] Reference

### 1. List of Signals

#### 1-1. All signals

NO	Signal Name	Video Signal	SYNC POLARITY (H/V)
1	VGA 350	Video Signal 0.7V	H/V Separate P/N
2	VGA 400	Video Signal 0.7V	H/V Separate N/P
3	VGA 480	Video Signal 0.7V	H/V Separate N/N
4	MAC 640*480	Video Signal 0.7V	Composite Sync Signal N/N
5	VESA 350@85Hz	Video Signal 0.7V	H/V Separate P/N
6	VESA 400@85Hz	Video Signal 0.7V	H/V Separate N/P
7	VESA 640*480@75Hz	Video Signal 0.7V	H/V Separate N/N
8	VESA 800*600@75Hz	Video Signal 0.7V	H/V Separate P/P
9	VESA 640*480@85Hz	Video Signal 0.7V	H/V Separate N/N
10	MAC 832*624	Video Signal 0.7V	Composite Sync Signal N/N
11	VESA 800*600@85Hz	Video Signal 0.7V	H/V Separate P/P
12	VESA 1024*768@70Hz	Video Signal 0.7V	H/V Separate N/N
13	VESA 1024*768@75Hz	Video Signal 0.7V	H/V Separate P/P
14	MAC 1152*870	Video Signal 0.7V	Composite Sync Signal N/N
15	VESA 1024*768@85Hz	Video Signal 0.7V	H/V Separate P/P
16	VESA 1280*1024@70Hz	Video Signal 0.7V	Composite Sync Signal P/P
17	VESA 1280*1024@75Hz	Video Signal 0.7V	H/V Separate P/P
18	VESA 1600*1200@65Hz	Video Signal 0.7V	H/V Separate P/P
19	VESA 1600*1200@75Hz	Video Signal 0.7V	H/V Separate P/P
20	VESA 1280*1024@85Hz	Video Signal 0.7V	H/V Separate P/P
21	96.0KHz/160Hz A=68%	Video Signal 0.7V	H/V Separate P/P
22	V.RASTER	Video Signal 0.7V	H/V Separate P/P
23	1280*1024@85Hz(Window)	Video Signal 0.7V	H/V Separate P/P
24	EDID	Video Signal 0.7V	H/V Separate N/N
25	VGA480 (1/2)	Video Signal 0.7V	H/V Separate N/N
26	MAC1152*870(N/N+SOG)	Video Signal 0.7V	Composite Sync Signal N/N
27	1280*960@85Hz	Video Signal 0.7V	H/V Separate P/P

NO	Signal Name	Video Signal	SYNC POLARITY (H/V)
101	PC98 640*400@70Hz R	Video Signal 0.7V	H/V Separate P/P
102	VESA 800*600@56Hz	Video Signal 0.7V	H/V Separate P/P
103	VESA 800*600@60Hz	Video Signal 0.7V	H/V Separate P/P
104	VESA 640*480@75Hz R	Video Signal 0.7V	H/V Separate P/P
105	XGA(8514A)	Video Signal 0.7V	H/V Separate P/P
106	1024*768@56Hz	Video Signal 0.7V	H/V Separate N/N
107	1024*768@60Hz	Video Signal 0.7V	H/V Separate N/N
108	GTF640*480@100 (N/N)	Video Signal 0.7V	H/V Separate N/N
109	800*600@80Hz	Video Signal 0.7V	H/V Separate P/P
110	640*480@100Hz	Video Signal 0.7V	H/V Separate N/N
111	1024*768@70Hz	Video Signal 0.7V	H/V Separate N/N
112	1024*768@72Hz	Video Signal 0.7V	H/V Separate P/P
113	GTF640*480@120Hz (N/N)	Video Signal 0.7V	H/V Separate N/N
114	VESA1280*1024@60Hz	Video Signal 0.7V	H/V Separate P/P
115	640*480@120Hz	Video Signal 0.7V	H/V Separate N/N
116	VESA 1600*1200@60Hz	Video Signal 0.7V	H/V Separate P/P
117	800*600@120Hz	Video Signal 0.7V	H/V Separate N/N
118	VESA 1792*1344@60Hz (N/N)	Video Signal 0.7V	H/V Separate N/N
119	1280*960@85Hz	Video Signal 0.7V	H/V Separate P/P
120	640*480@160Hz	Video Signal 0.7V	H/V Separate N/N
121	VESA 1600*1200@70Hz	Video Signal 0.7V	H/V Separate P/P
122	VESA 1920*1440@60Hz (N/N)	Video Signal 0.7V	H/V Separate N/N
123	1024*768@120Hz	Video Signal 0.7V	H/V Separate P/P
124	VESA 1792*1344@75Hz (N/N)	Video Signal 0.7V	H/V Separate N/N
125	1280*1024@100Hz	Video Signal 0.7V	H/V Separate P/P
126	XGA2 1024*768	Video Signal 0.7V	
127	MAC 1024*768	Video Signal 0.7V	
128	MAC 1280*960	Video Signal 0.7V	

\*The crosshatch pattern shall have 17 vertical lines and 13 horizontal lines.

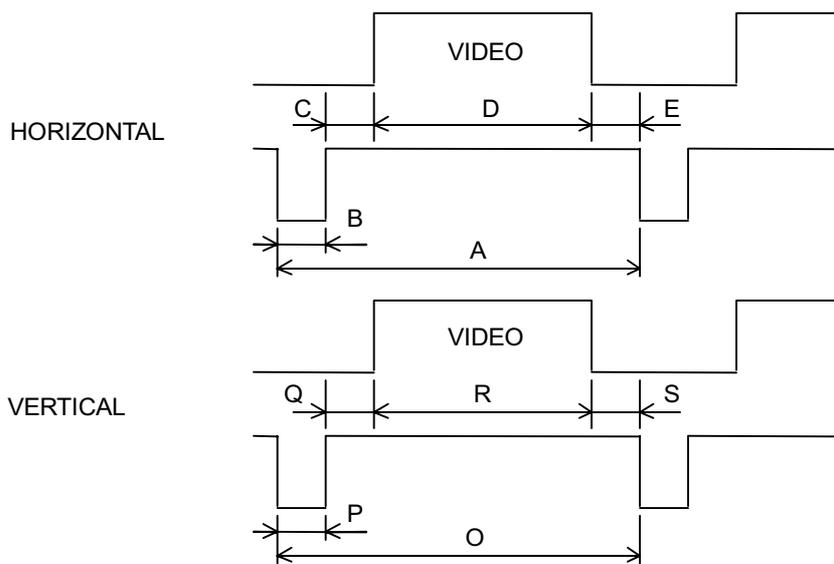
\*In case set receive the Signal that H sync polarity is "Neg." and V sync polarity is "Posi.", "SIZE" and "POSITION" change from preset size.

## 1-2. Preset / user signal number

	No.	Signal Name	Signal No.
Preset	1	VGA 400	2
	2	VGA 480	3
	3	VESA 640*480@85Hz	9
	4	MAC 640*480	4
	5	VESA 800*600@85Hz	11
	6	VESA 1024*768@75Hz	13
	7	VESA 1024*768@85Hz	15
	8	MAC 1152*870	14
	9	VESA 1280*1024@75Hz	17
	10	VESA 1280*1024@85Hz	20
	11	VESA 640*480@75Hz	7
	12	VESA 1600*1200@75Hz	19
	13	VESA 800*600@75Hz	8
	14	MAC 832*624	10
User (Ref.1 – 6)	1	VGA 350	1
	2	VESA 350@85Hz	5
	3	VESA 400@85Hz	6
	4	VESA 1024*768@70Hz	12
	5	VESA 1280*1024@70Hz	16
	6	VESA 1600*1200@65Hz	18
Ref (7 – 15)	7	XGA(8514A)	105
	8	VESA 800*600@60Hz	103
	9	1024*768@60Hz	107
	10	XGA2 1024*768	126
	11	MAC (1024*768)	127
	12	VESA1280*1024@60Hz	114
	13	VESA 1600*1200@60Hz	116
	14	MAC 1280*960	128
	15	VESA 1600*1200@70Hz	121

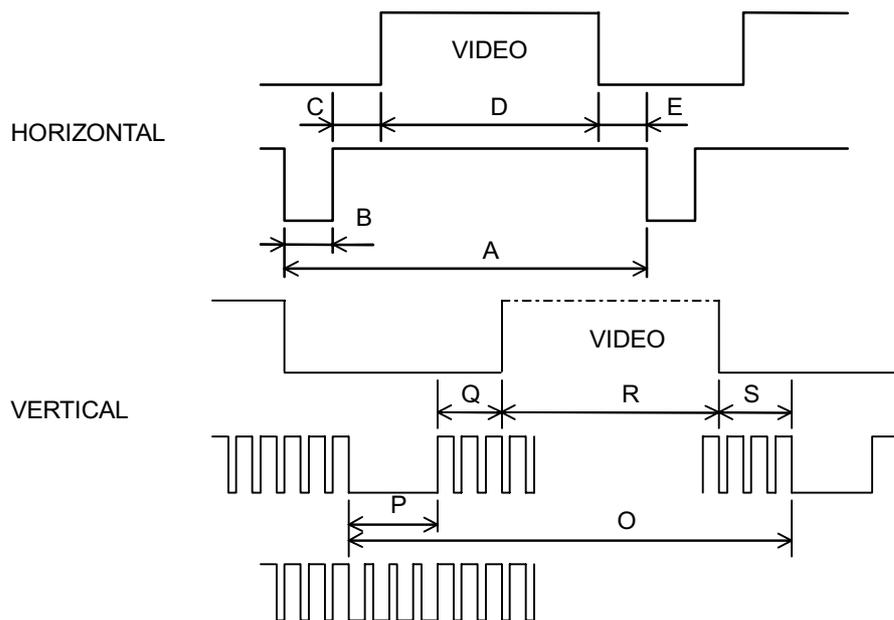
## 2. Signal Timing Charts

### SEPARATE SYNC



Sync Polarity : Positive/Negative

### COMPOSITE SYNC



Sync Polarity : Positive/Negative

## Adjustment / Inspection Signal (1)

PROGRAM No.	1	2	3	4
SIGNAL NAME	VGA350	VGA400	VGA480	MAC 640*480
RESOLUTION	720*350	720*400	640*480	640*480
DOT CLOCK (MHz)	28.322	28.322	25.175	30.24
fh (kHz)	31.47	31.47	31.47	35.00
fv (Hz)	70.09	70.09	59.94	66.67
H CELL SIZE (DOT)	9	9	8	8
TOTAL (DOT)	900	900	800	864
(CHR)	100	100	100	108
(us)	31.78	31.78	31.78	28.57
DISP (DOT)	720	720	640	640
(CHR)	80	80	80	80
(us)	25.42	25.42	25.42	21.16
FRONT (DOT)	18	18	16	64
(us)	0.64	0.64	0.64	2.12
SYNC PULSE (DOT)	108	108	96	64
(us)	3.81	3.81	3.81	2.12
BACK (DOT)	54	54	48	96
(us)	1.91	1.91	1.91	3.17
V CELL SIZE (H)	14	16	16	16
TOTAL (H)	449	449	525	525
(ms)	14.268	14.268	16.683	15.000
DISP (H)	350	400	480	480
(CHR)	25	25	30	30
(ms)	11.122	12.711	15.253	13.714
FRONT (H)	37	12	10	3
(ms)	1.176	0.381	0.318	0.086
SYNC PULSE (H)	2	2	2	3
(ms)	0.064	0.064	0.064	0.086
BACK (H)	60	35	33	39
(ms)	1.907	1.112	1.049	1.114
INTERLACE	NON	NON	NON	NON
POLARITY (H/V)	POS/NEG	NEG/POS	NEG/NEG	NEG/NEG
COMPOSITE SYNC	-	-	-	YES
COMPOSITE VIDEO	-	-	-	-
CHARACTER FONT	7*9	7*9	7*9	7*9
SERRATION	OFF	OFF	OFF	ON
EQP	OFF	OFF	OFF	OFF

## Adjustment / Inspection Signal (2)

PROGRAM No.	5	6	7	8
SIGNAL NAME	VESA 350 @85Hz	VESA 400 @85Hz	VESA 640*480 @75Hz	VESA 800*600 @75Hz
RESOLUTION	640*350	640*400	640*480	800*600
DOT CLOCK (MHz)	31.5	31.500	31.5	49.5
fh (kHz)	37.86	37.861	37.5	46.875
fv (Hz)	85.08	85.080	75.00	75.00
H CELL SIZE (DOT)	8	8	8	8
TOTAL (DOT)	832	832	840	1056
(CHR)	104	104	105	132
(us)	26.413	26.413	26.67	21.33
DISP (DOT)	640	640	640	800
(CHR)	80	80	80	100
(us)	20.32	20.317	20.32	16.162
FRONT (DOT)	32	32	16	16
(us)	1.016	1.016	0.51	0.323
SYNC PULSE (DOT)	64	64	64	80
(us)	2.032	2.032	2.03	1.616
BACK (DOT)	96	96	120	160
(us)	3.048	3.048	3.81	3.232
V CELL SIZE (H)	14	16	16	15
TOTAL (H)	445	445	500	625
(ms)	11.754	11.754	13.333	13.333
DISP (H)	350	400	480	600
(CHR)	25	25	30	40
(ms)	9.244	10.565	12.800	12.800
FRONT (H)	32	1	1	1
(ms)	0.845	0.026	0.027	0.021
SYNC PULSE (H)	3	3	3	3
(ms)	0.079	0.079	0.080	0.064
BACK (H)	60	41	16	21
(ms)	1.585	1.083	0.427	0.448
INTERLACE	NON	NON	NON	NON
POLARITY (H/V)	POS/NEG	NEG/POS	NEG/NEG	POS/POS
COMPOSITE SYNC	-	-	-	-
COMPOSITE VIDEO	-	-	-	-
CHARACTER FONT	7*9	7*9	7*9	7*9
SERRATION	OFF	OFF	OFF	OFF
EQP	OFF	OFF	OFF	OFF

## Adjustment / Inspection Signal (3)

PROGRAM No.	9	10	11	12
SIGNAL NAME	VESA 640*480 @85Hz	MAC 832*624	VESA 800*600 @85Hz	VESA 1024*768 @70Hz
RESOLUTION	640*480	832*624	800*600	1024*768
DOT CLOCK (MHz)	36	57.283	56.25	75.00
fh (kHz)	43.27	49.72	53.67	56.476
fv (Hz)	85.01	74.55	85	70.069
H CELL SIZE (DOT)	8	8	8	8
TOTAL (DOT)	832	1152	1048	1328
(CHR)	104	144	131	166
(us)	23.11	20.11	18.63	17.707
DISP (DOT)	640	832	800	1024
(CHR)	80	104	100	128
(us)	17.78	14.52	14.22	13.653
FRONT (DOT)	56	32	32	24
(us)	1.56	0.56	0.57	0.32
SYNC PULSE (DOT)	56	64	64	136
(us)	1.56	1.12	1.14	1.813
BACK (DOT)	80	224	152	144
(us)	2.22	3.91	2.70	1.92
V CELL SIZE (H)	16	16	15	16
TOTAL (H)	509	667	631	806
(ms)	11.764	13.414	11.756	14.272
DISP (H)	480	624	600	768
(CHR)	30	39	40	48
(ms)	11.093	12.549	11.179	13.599
FRONT (H)	1	1	1	3
(ms)	0.023	0.020	0.019	0.053
SYNC PULSE (H)	3	3	3	6
(ms)	0.069	0.060	0.056	0.106
BACK (H)	25	39	27	29
(ms)	0.578	0.784	0.503	0.513
INTERLACE	NON	NON	NON	NON
POLARITY (H/V)	NEG/NEG	NEG/NEG	POS/POS	NEG/NEG
COMPOSITE SYNC	-	Yes	-	-
COMPOSITE VIDEO	-	-	-	-
CHARACTER FONT	7*9	7*9	7*9	7*9
SERRATION	OFF	ON	OFF	OFF
EQP	OFF	OFF	OFF	OFF