

## Adjustment procedure

### 2.4 Standard setting state

Unless particularly designated, adjust with the state given in this section.

#### 2.4.1 Power voltage

Model	Assembly	Aging	Adjustment	Remarks
All models	AC100V 60Hz	AC264V 60Hz	AC220V 60Hz	

#### 2.4.2 Adjustment magnetic field

Model	Adjustment magnetic field	Remarks
All models	HORIZ. 0mT VERT. 0.04mT	Northern hemisphere
	HORIZ. 0mT VERT. 0.mT	Equator
	HORIZ. 0mT VERT. -0.04mT	Southern hemisphere

#### 2.4.3 Signal cable

Unless particularly designated, use a D-SUB 15-PIN signal cable.

\*When executing DDC IIBi communication, use SIGNAL B side unless particularly designated.

### 2.5 Preparatory inspections

- (1) The assembly must be correctly assembled.
- (2) There must be no cracks or remarkable contamination on the PWB.
- (3) There must be no remarkable lifting or inclination of the parts on the PWB, and the parts must not be touching.
- (4) The connectors must be securely inserted without crimping faults.
- (5) The CRT socket, anode cap and focus lead must be securely mounted.
- (6) The lead wires must not be pressed against the edges of the board.
- (7) The lead wires must not touch the high temperature parts such as the R-METAL, R-CEMENT or TR with FIN.
- (8) The board must not be bent, remarkably contaminated or scratched.
- (9) The CRT has no scratch or chipping.
- (10) Each potentiometer must turn smoothly.
- (11) Always set each potentiometer to the following positions before turning the power ON.

Potentiometer default settings

PWB name	IC sources	Name (symbol)	Default adjustment position	Remarks
PWB-MAIN	VR5A1	H-POSI	Center	
		FOCUS1	Center	FBT
		FOCUS2	Center	FBT
		SCREEN	Completely counterclockwise	FBT

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### 2.6 Initializing the adjustment data in the EEPROM

- (1) Turn the monitor power ON to confirm that the aging raster appears.
- (2) Initialize the EEPROM with serial communication. Use the designated file shown below, and initialize the adjustment data in the EEPROM. Refer to section 3.7.3 OSD display (factory mode) for details on the default values.
- (3) Turn the monitor power OFF.

Adjustment data initialization file name

Model	Rating label	Date of revision	Remarks
1	H_OWN1**.DAT		

The initial data regarding the horizontal linearity is as shown below.

Frequency	LIN	CS7	CS6	CS5	CS4	CS3	CS2	CS1
30.0 -- 34.0	0	1	1	1	1	1	1	1
34.0 -- 36.5	0	0	1	1	1	1	0	1
36.5 -- 39.0	0	0	0	0	1	1	0	1
39.0 -- 45.0	0	0	1	1	0	1	1	0
45.0 -- 47.5	0	0	1	1	1	0	1	0
47.5 -- 49.0	1	0	1	1	1	0	1	0
49.0 -- 52.0	1	1	1	1	1	1	0	0
52.0 -- 55.0	1	1	1	1	1	1	0	0
55.0 -- 59.0	1	1	1	0	1	1	0	0
59.0 -- 61.0	1	0	0	0	1	1	0	0
61.0 -- 63.0	1	0	0	0	1	1	0	0
63.0 -- 66.0	1	1	0	1	0	1	0	0
66.0 -- 70.0	1	1	0	1	1	0	0	0
70.0 -- 73.0	1	1	0	1	1	0	0	0
73.0 -- 76.0	1	0	0	1	1	0	0	0
76.0 -- 78.5	1	1	1	0	1	0	0	0
78.5 -- 81.5	1	1	0	0	1	0	0	0
81.5 -- 83.0	1	1	0	0	1	0	0	0
83.0 -- 86.5	1	0	1	1	0	0	0	0
86.5 -- 89.0	1	1	0	1	0	0	0	0
89.0 -- 92.0	1	1	0	1	0	0	0	0
92.0 -- 94.0	1	0	0	1	0	0	0	0
94.0 -- 97.0	1	1	1	0	0	0	0	0
97.0 -- 104.0	1	1	1	0	0	0	0	0
104.0 -- 108.0	1	1	0	0	0	0	0	0
108.0 -- 111.0	1	1	0	0	0	0	0	0
110.0 -- 113.5	1	1	0	0	0	0	0	0
113.5 -- 116.0	1	1	0	0	0	0	0	0
116.0 -- 121.0	1	0	0	0	0	0	0	0
AP-21 (68k/75)	1	1	1	1	1	0	0	0
VESA 80k/75	1	1	1	0	1	0	0	0

The above is I/O expander IC102 output

※1 When CS or LIN-COIL is ON, the corresponding bit is "1".  
When OFF, the corresponding bit is "0".

## 2.7 Names of each monitor part

### 2.7.1 Configuration of front control panel

- a: Power switch
- b: Power lamp
- c: Connector select button (OSD OFF)
- d: Adjustment item select button
- e: Adjustment button

\* OSD OFF functions only when the OSD is displayed.

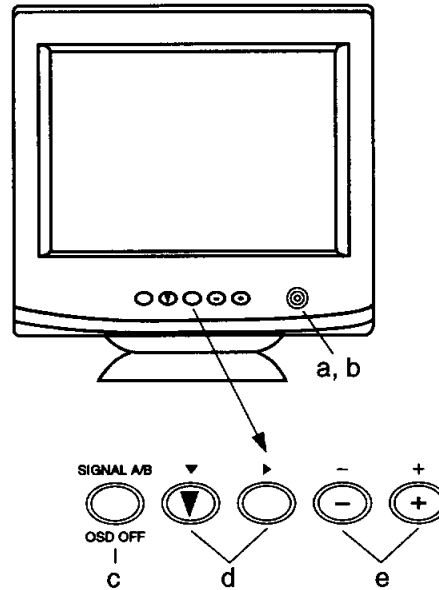


Fig. 1 Front control panel

### 2.7.2 Configuration of rear input connector

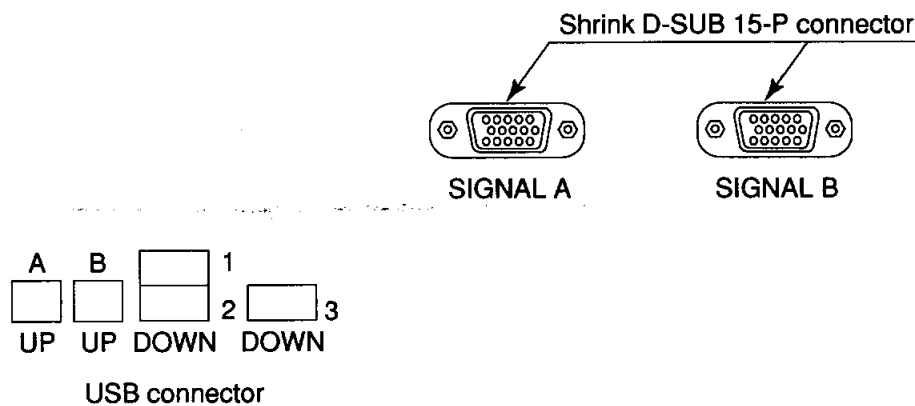


Fig. 2 Rear input connector

## Adjustment procedure

### 2.7.3 OSD display matrix

#### 2.7.3.1 User mode

Adjustment items	Setting contents	Default setting	Setting classification	
			By timings	Common
OSD group 1				
CONTRAST	0~100%	100%		○
BRIGHT	0~100%	50%		○
COLOR NO.	COLOR No. 1,2,3	COLOR NO.1	○	
R-GAIN 1,2,3	0~100%			○
G-GAIN 1,2,3	0~100%			○
B-GAIN 1,2,3	0~100%			○
COLOR TEMPERATURE 1,2,3	5000K~9300K	COLOR 1:9300K, 2:6500K, 3:5000K		○
COLOR RESET 1,2,3	PROCEED			
OSD group 2				
H-SIZE	0~100%		○	
H-PHASE	0~100%		○	
V-SIZE	0~100%		○	
V-POSITION	0~100%	50%	○	
PIN-CUSHION	0~100%		○	
KEystone	0~100%		○	
TOP-PIN	0~100%		○	
BOTTOM-PIN	0~100%		○	
PIN-BALANCE	0~100%		○	
KEY-BALANCE	0~100%		○	
VERT-LIN-BALANCE	0~100%		○	
VERT-LIN	0~100%		○	
ROTATION	0~100%	CENTER		
ZOOM	0~100%		○	
GEOMETRY-RESET	PROCEED			
				○
OSD group 3				
FINE PICTURE MODE	Normal/Text/Graphic	NORMAL	○	
H-CONVERGENCE	0~100%	CENTER		○
V-CONVERGENCE	0~100%	CENTER		○
CORNER PURITY(TL)	0~100%	CENTER		○
CORNER PURITY(TR)	0~100%	CENTER		○
CORNER PURITY(BL)	0~100%	CENTER		○
CORNER PURITY(BR)	0~100%	CENTER		○
MOIRE CANCEL ON/OFF	OFF / ON	OFF	○	
MOIRE CANCEL LEVEL	0~100%	0%	○	
CLAMP PULSE POSITION	FRONT / BACK	BACK	○	
VIDEO LEVEL	1.0V / 0.7V	0.7V	○	
OSD group 4				
DEGAUSS	PROCEED	ON		○
POWER-SAVE	OFF / ON	OFF		○
CONTROL LOCK	OFF / ON	(OSD position is the center of the picture)		○
OSD POSITION	<-- / -->			
ALL RESET	PROCEED			
GTF AUTO ADJUST	PROCEED			
DIAGNOSIS		ENG		○
LANGUAGE	ENG/ESP/ITA/GER/FRA/JAP			

\* CENTER=the factory setting value returning by pressing +, - buttons simultaneously.

## Adjustment procedure

### 2.7.3.2 Factory mode

(1) Factory mode 1 (The same section as the user mode)

Adjustment items	Setting contents	Default setting	Setting classification	
			By timings	Common
OSD group 1				
CONTRAST	0~254	254		○
BRIGHT	0~254	127		○
COLOR NO.	COLOR No. 1,2,3	COLOR NO.1	○	
R-GAIN 1,2,3	0~254			○
G-GAIN 1,2,3	0~254			○
B-GAIN 1,2,3	0~254			○
COLOR TEMPERATURE 1,2,3	0~86	COLOR1:86, 2:30, 3:0		○
COLOR RESET 1,2,3	PROCEED			
OSD group 2				
H-SIZE	0~(depend on +B adjustment)		○	
H-PHASE	0~254		○	
H-POSITION	0~254		○	
V-SIZE	0~254		○	
V-POSITION	0~254		○	
PINCUSHION	0~254		○	
KEystone	0~254		○	
PIN-CENTER	0~254		○	
TOP-PIN	0~254		○	
BOTTOM-PIN	0~254		○	
S-CURVE	0~254	127	○	
PIN-BALANCE	0~254		○	
KEY-BALANCE	0~254		○	
TOP-BALANCE	0~254		○	
BOTTOM-BALANCE	0~254		○	
V-LIN	0~254		○	
ROTATION	0~254	127		○
ZOOM	0~(depend on +B adjustment)		○	
GEOMETRY-RESET	PROCEED			
OSD group 3				
FINE PICTURE MODE	Normal/Text/Graphic	Normal	○	
H-CONVERGENCE	0~254	127		○
V-CONVERGENCE	0~254	127		○
CORNER PURITY(TL)	0~254	127		○
CORNER PURITY(TR)	0~254	127		○
CORNER PURITY(BL)	0~254	127		○
CORNER PURITY(BR)	0~254	127		○
MOIRE CANCEL ON/OFF	OFF / ON	OFF	○	
MOIRE CANCEL LEVEL	0~127	0	○	
CLAMP PULSE POSITION	FRONT / BACK	BACK	○	
VIDEO LEVEL	1.0V / 0.7V	0.7V	○	
OSD group 4				
DEGAUSS	PROCEED			
POWER-SAVE	OFF / ON	OFF		○
CONTROL LOCK	OFF / ON	OFF		○
OSD POSITION	<-- / -->	(OSD is the center of picture)		○
ALL RESET	PROCEED			
GTF AUTO ADJUST	PROCEED			
DIAGNOSIS				
LANGUAGE	ENG/ESP/ITA/GER/FRA/JAP	ENG		○



## 2.8 Adjustment

### 2.8.1 How to select the factory adjustment (FACTORY) mode

#### 2.8.1.1 Selecting with automatic adjustment device (Selecting with communication)

Using the communication command (DDC2Bi), issue the command from the automatic adjustment device to the monitor, and set the factory adjustment mode flag in the EEPROM to "01h" ("00h" for user mode).

(Refer to the A/B chassis automatic adjustment communication specifications (Protocol of DDC2Bi Enhanced) for details.)

#### 2.8.1.2 Selecting with front panel switches

- (1) Turn the power ON while holding down the CONNECTOR SELECT button.
- (2) After step (1), release the button after one to two seconds.
- (3) Confirm that 00 is displayed for the counter on the OSD display, and set to 225 with the (-) ADJUST button.
- (4) Set to 05 with the (+) ADJUST button.
- (5) When the adjustment item select button (RIGHT side) is pressed, the factory mode will be entered.

This factory adjustment mode is entered with the above steps.

\*The factory adjustment mode remains valid even after the power is turned OFF.

Note that steps (3) to (4) must be carried out within ten seconds. If ten seconds are exceeded, the mode will return to the user mode.

#### <Returning to the user mode from the factory mode>

- (1) OSD (for factory, user select) is displayed with the group selection.
- (2) Set the counter value to 010 with the (-) (+) ADJUST buttons.
- (3) When the adjustment item select button (RIGHT side) is pressed, the mode will return to the user mode.

### 2.8.2 Adjustments before aging

Status indicator	Adjustment item	Adjustment mode/set	Input signal pattern
	Before aging		The only the sync. signal of No. 12 : 106.25K / 85Hz

#### 2.8.2.1 Adjusting the high voltage and high voltage protector

Status indicator	Adjustment item	Adjustment mode/set	Input signal pattern
	High voltage and high voltage protector		The only the sync. signal of No. 12 : 106.25K / 85Hz

- (1) Turn the monitor power OFF, and connect a high voltage meter to the CRT anode. Then, turn the monitor power ON.
- (2) Select the "GO TO FACTORY MODE" on the OSD and set to 250 with the ADJUST button (-) and then press the adjustment item select button (RIGHT side).
- (3) Select HVAD (HV-ADJUST), and adjust high voltage to 27.0kV±0.5kV.
- (4) Select HVTP (HV-TEMP), and adjust high voltage to 30.5kV±0.3kV.
- (5) Select XPRO (XRAY-PROTECT), and turn the screen VR completely counterclockwise and set to the data the high voltage protector circuit operating with the ADJUST button (-).
- (6) Set the power of the monitor OFF to ON. Turn the screen VR so that OSD is found and select the HV-ADJUST-TEMP on the OSD.
- (7) Turn the screen VR completely counterclockwise and build up the high voltage with the

## ----- General adjustment -----

ADJUST button (+) to confirm that the high voltage protector circuit operates with  $30.5\text{kV} \pm 0.3\text{kV}$ .

Note) You can also adjust while turning the screen VR completely counterclockwise.

### <HVAD, HVTP and XPRO data>

#### (1) HVAD data

The data got by adjusting the high voltage are stored in IC106 so that the setting value does not change even if powering OFF or ON.

#### (2) HVTP data

Increase HVTP data and temporarily set the high voltage value to X ray protector operation voltage to set X ray protector operation point. When powering OFF/ON, the value same as HVAD is output.

#### (3) XPRO data

The data got when adjusting X ray protector operation point are stored in IC106 so that the setting value does not change even if powering OFF or ON.

### <How to reset the high voltage adjustment data>

When adjusting the high voltage and X ray protector, it is possible to reset the items for the high voltage adjustment when executing the following setting operation.

When the XPRO setting value is more or less than the high voltage adjusted with HVAD, X ray protector operates as soon as powering ON. In this case, operate the following to reset the HVAD and XPRO data.

- (1) Power ON the switch while pressing the ADJUST button (-) and (+).  
Continue to press after powering ON.
- (2) Approx. 30 seconds after, release only the (-) button.  
Continue to press the (+) button 5 seconds moreover.
- (3) Confirm that LED change over from GREEN to AMBER.
- (4) Power OFF the switch.

OSD data after reset

HVAD	HVTP	PRO
0	0	254

### 2.8.2.2 SCREEN voltage adjustment

Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	SCREEN voltage		The only the sync. signal of No. 12 : 106.25K / 85Hz

- (1) Connect a high voltage meter to the TP-SC terminal on the CRT PWB.
- (2) Set to  $700\text{V} \pm 5\text{V}$  with the FBT picture potentiometer.

### 2.8.2.3

Adjust the focus pack "FOCUS 1, 2" so that both edges of the picture are clear.  
that the high voltage protector operates.

### 2.8.2.4 Shock test

Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Shock test		The color bar pattern signal of No. 12 : 106.25K / 85Hz

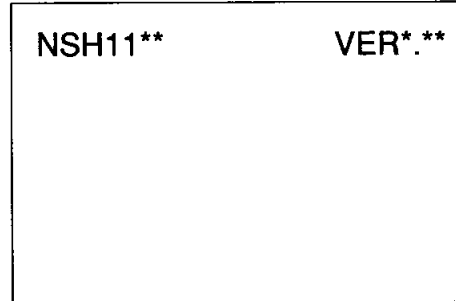
- (1) Display the "color bar" from the signal generator A.
- (2) Confirm that there is no abnormality in the image when shock is applied on the monitor.



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### 2.8.2.5 Preadjustment before aging

- (1) Display a "full white" from the signal generator A.
- (2) Confirm that the R, G and B channel images are output.
- (3) Confirm that the H-CENT, picture position, picture size, PCC and balance can be controlled, and approximately adjust.
- (4) Confirm that the OSD power management is turned OFF.
- (5) Enter the factory mode (aging mode) beforehand.
- (6) Disconnect the signal and confirm that the following display appears on the OSD. Then, adjust the picture to the specified luminance value before ITC adjustment using BRIGHT adjustment, and carry out heat run for 30 minutes or more.



### 2.8.2.6 Adjusting the landing (ITC/4 corner purity adjustment)

Status Indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	landing		No. 12 : 106.25K / 85Hz
			Full green

- (1) Display the timing No. 12 (1600 x 1200, 106.25K/85) and full green.
- (2) Turn the monitor power OFF, and degauss with the hand demagnetizer.
- (3) Select TL with the SELECT button.
- (4) Using the ADJUST button and measuring instrument, adjust so that the landing value at the upper left corner is the "specified landing value".  
At this time, confirm that the adjustment value is within the range of 86 to 170.  
(Specify the working range limit for ITC here.)  
The value indicated in the designs is to be used for the "specified landing value".
- (5) Adjust the TF/BL/BR in the same manner.
- (6) Display the timing No. 12 (1600 x 1200, 106.25K/85) and full white.

The luminance before ITC adjustment shall be the "specified luminance value before ITC adjustment."

The value indicated in the designs is to be used for the "specified luminance value before ITC adjustment".

### 2.8.3 Adjustments after aging

#### 2.8.3.1 +B adjustment

Input the sync. signal of the following timings to adjust the picture width to 395±4mm.

Timing No1	Timing	OSD adjustment item
A	30.0kHz	+B-L
12	106.25kHz	+B-H

## General adjustment

### 2.8.4 Adjusting the picture size, position and distortion (using automatic adjustment device)

Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Picture size, position, distortion	Factory	No. 12 : 106.25K / 85Hz
			Crosshatch with frame

The manual adjustment methods are explained below. The adjustments are executed in the factory adjustment (factory) mode.

Adjust the picture size to the value indicated in the list of adjustment values.

Adjust the distortion to the value indicated in the picture performance inspection item.

#### 2.8.4.1 Adjusting the picture inclination

Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Picture inclination	Factory	No. 12 : 106.25K / 85Hz
			Crosshatch with frame

Set the OSD to ROTATION, and using the (-) (+) ADJUST buttons, set the raster inclination to be horizontal to the CRT face surface.

#### 2.8.4.2 Adjusting the back raster position

Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Back raster position	Factory	No. 12 : 106.25K / 85Hz
			Only the sync. signal input

- (1) Set BRT to 100% to show the back raster. (When using the automatic adjustment device, set RGB-BIAS to MAX also.)
- (2) Input each adjustment timing, and set the OSD display to H-POSI. Using the (-) (+) ADJUST buttons, adjust the horizontal back raster position to the center of the bezel.

At this time, the raster width will be  $IL1-L2 \leq 0.5\text{mm}$ .

#### 2.8.4.3 Adjusting the left/right distortion, picture width, picture position (H-PHASE) and vertical linearity (all modes)

Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Left/right distortion, picture width, picture size, V-LIN.		No. 12 : 106.25K / 85Hz
			Crosshatch with frame

- (1) Set V-POSI of the user mode to 50%.

<Setting in the factory mode for the following steps>

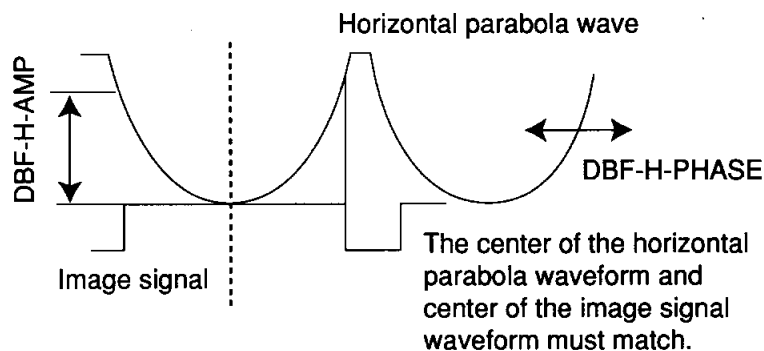
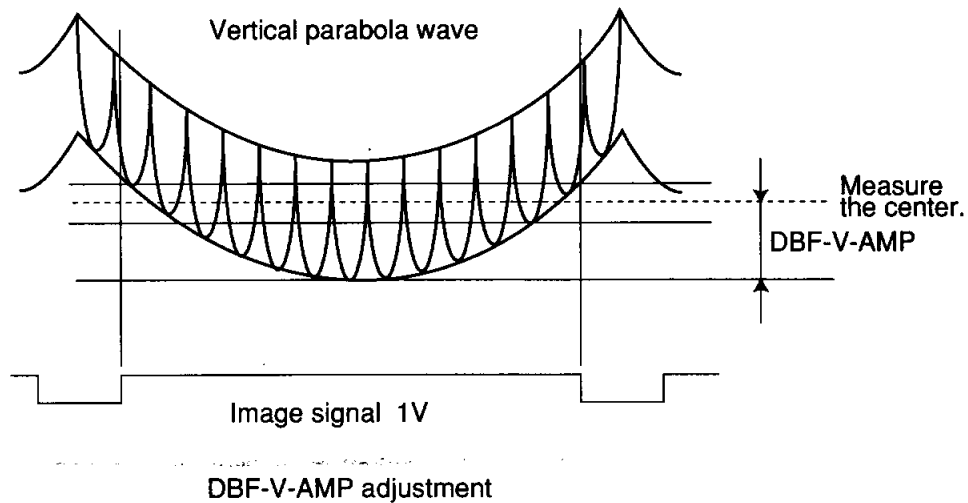
- (2) Adjust the vertical size to approx. 295mm, and the vertical position to the approximate center.
- (3) Select V-LIN and V-LIN-BAL with the OSD, and adjust so that the vertical linearity is equal at the very top of the picture, at the very bottom of the picture, and at the center of the picture.
- (4) Select V-SIZE and V-POSI with the OSD, and adjust the vertical width and vertical position to the specified values using the ADJUST buttons.
- (5) Select PCC-AMP, PCC-PHASE, PCC-CENTER, TOP-PCC, and BOTTOM-PCC with the OSD, and adjust the vertical line at both side of the picture to the straight line using the ADJUST buttons.

## General adjustment

- (6) If the left and right distortions differ, select PIN-BALANCE, KEY-BALANCE, TOP-BALANCE and BOTTOM-BALANCE with the OSD, and adjust so that the distortions are visually balanced.
  - (7) Select H-PHASE with the OSD, and adjust the horizontal raster position to the center of the picture using the ADJUST buttons.
  - (8) Select H-SIZE with the OSD, and adjust the horizontal raster width to the value given in the adjustment list using the ADJUST buttons.
- \* Note that the picture position and distortion must be within the ranges given in the picture performance inspection items.

### 2.8.4.4 Adjusting the DBF amplitude and phase

- (1) Connect the oscilloscope to the AG601 of PWB-MAIN and to one of the signal outputs for the signal sources full R, G, B (VIDEO).
- (2) Set the OSD to the select picture of DBF-H-AMP, and using the (-) (+) ADJUST buttons adjust the horizontal parabola wave amplitude (image area) to the value given in the list of adjustment values.
- (3) Set the OSD to the select picture of DBF-H-PHASE, and using the (-) (+) ADJUST buttons adjust the horizontal parabola wave phase as shown below in respect to the image signal.
- (4) Set the OSD to the DBF-V-AMP (X2-L) select picture, and using the (-) (+) ADJUST buttons adjust the vertical parabola wave amplitude (image area) to the value given in the list of adjustment values.



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### 2.8.5 Adjusting the cut off (using the automatic adjustment device)

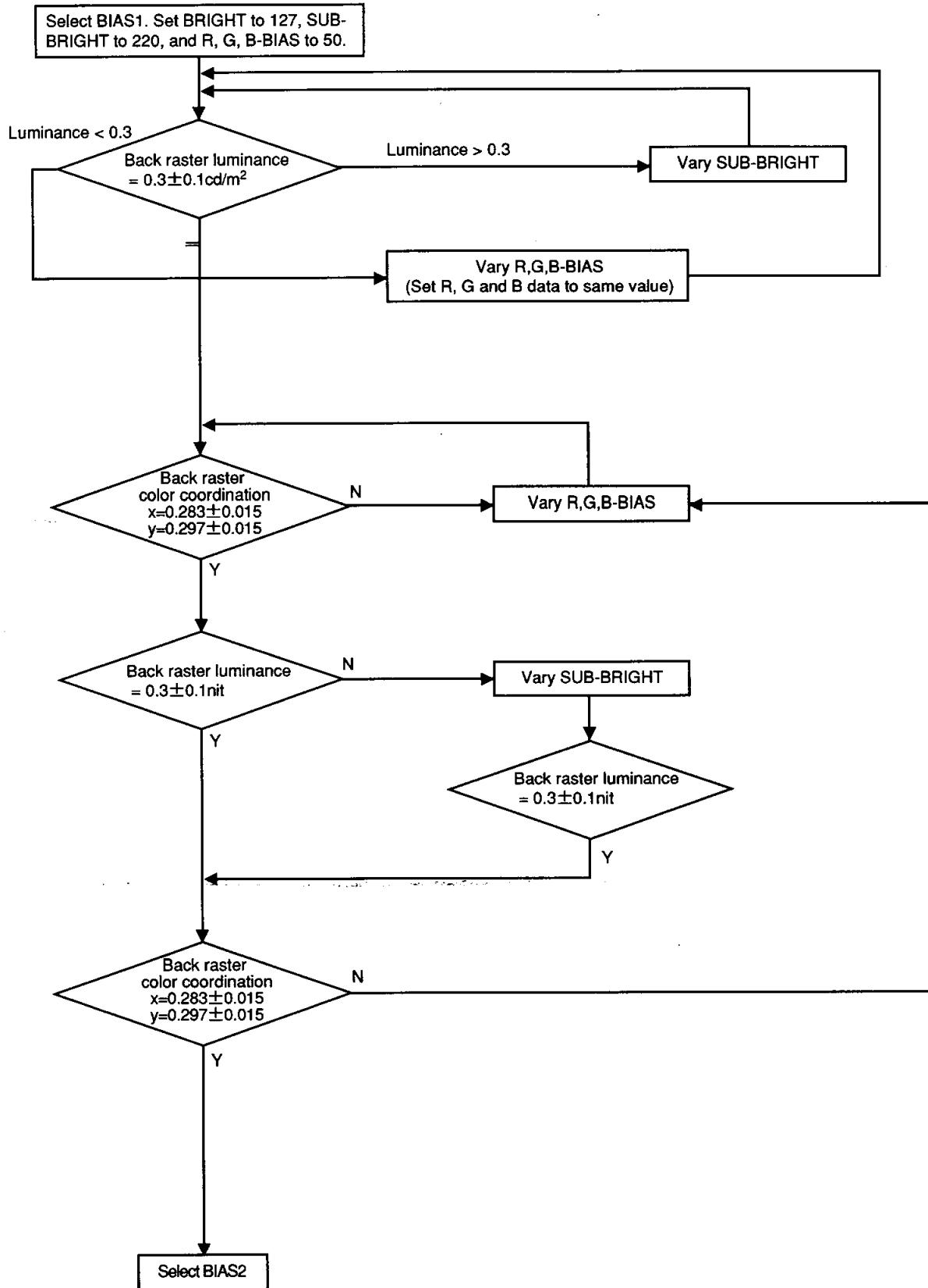
Status indicator	Adjustment item	Adjustment mode/set	Input signal/system
	Cut off	Factory	No. 12 : 106.25K / 85Hz

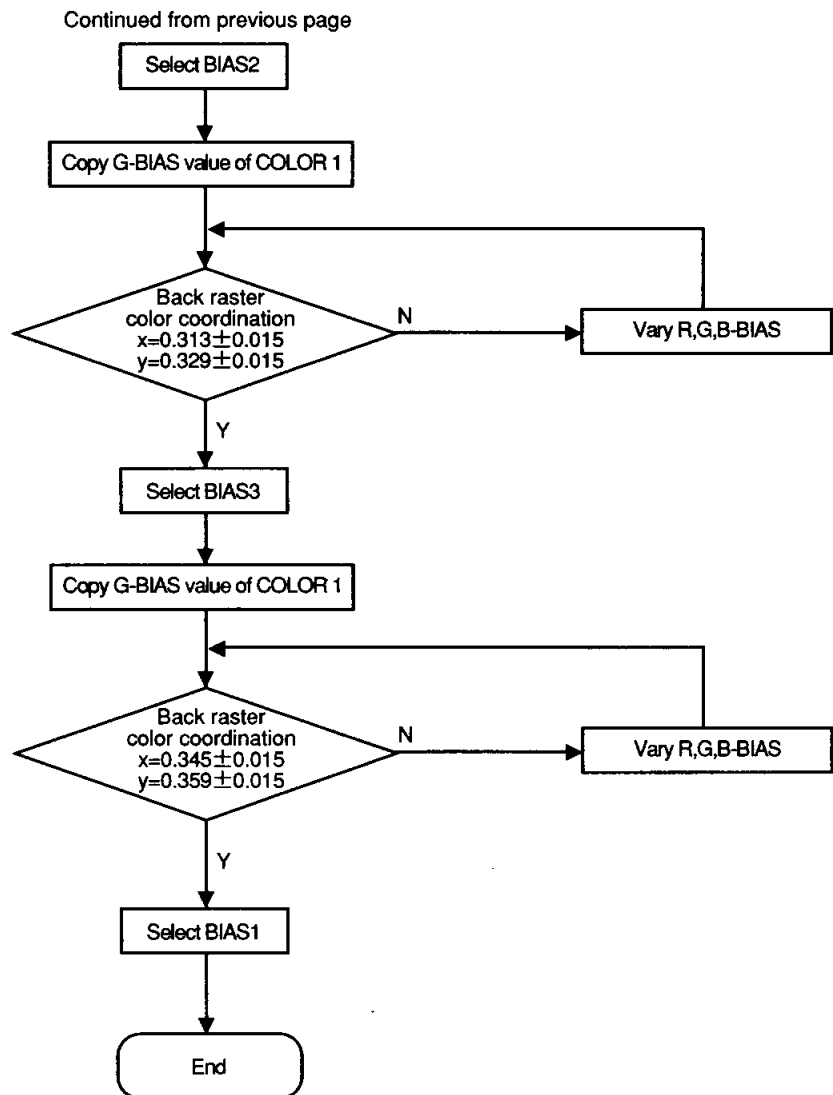
- (1) Input the timing No. 12 from the signal source. (R, G, B OFF)
- (2) Select BIAS1, and set BRIGHT to 127, SUB-BRIGHT to 220, and the R, G, B-BIAS to 50.
- (3) Adjust the back raster luminance to  $0.3 \pm 0.1 \text{ cd/m}^2$ .
  - (a) If  $0.3 \text{ cd/m}^2$  or more, change SUB-BRIGHT to adjust.
  - (b) If less than  $0.3 \text{ cd/m}^2$ , change R, G, B-BIAS to adjust.
 The R, G, B-BIAS data must be the same values at this time.
- (4) Using two colors except for the basic colors, adjust the color coordination to the following values.
- (5) Change SUB-BRIGHT, and adjust the back raster luminance to  $0.3 \pm 0.1 \text{ cd/m}^2$ .  
If adjustments with just SUB-BRIGHT are not possible, change BRIGHT and adjust.
- (6) If the back raster color coordination is deviated from the following values, repeat steps (4) and (5).  
(If the back raster cannot disappear, set BRIGHT to min., and set to the point where the back raster is eliminated with SUB-BRIGHT. Next, change BRIGHT, and adjust the back raster luminance to  $0.3 \pm 0.05 \text{ cd/m}^2$ , and then adjust again from step (3).)
- (7) Copy COLOR 1 G-BIAS, to the COLOR 2, 3 G-BIAS.
- (8) Select BIAS 2, and change the BIAS data for the R and B colors (G-BIAS is fixed). Adjust the back raster color coordination to the following table.
- (9) Select BIAS 3, and change the BIAS data for the R and B colors (G-BIAS is fixed). Adjust the back raster color coordination to the following table.

Model	Confirmation item		COLOR 1	COLOR 2	COLOR 3
All models	Color coordination	x	$0.283 \pm 0.015$	$0.313 \pm 0.015$	$0.345 \pm 0.015$
		y	$0.297 \pm 0.015$	$0.329 \pm 0.015$	$0.359 \pm 0.015$

\*The flow chart is provided on the next page.

## Cutoff adjustment procedures





## General adjustment

### 2.8.6 Adjusting the RGB drive signal

#### 2.8.6.1 Adjusting the R, G, B drive signal (Adjustment of COLOR 1)

Status Indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	R, G, B drive signal	Factory	No. 12 : 106.25K / 85Hz
			WINDOW picture

- (1) Input the following adjustment timing at the signal source.  
WINDOW picture (Input amplitude = 0.7Vp-p)

Model group	Adjustment timing
All model	Timing No. 12 (1600 x 1200 106.25K/85)

- (2) Select CONTRAST with the OSD, and set to MAX with (+) ADJUST button.  
 (3) Select BRIGHT with the OSD, and set the data to 127 with the (-) (+) ADJUST buttons.  
 (4) Set the signal generator A output to the WINDOW pattern (approx. 80mm square at center of CRT picture), and input only "GREEN".  
 (5) Set the COLOR 1 G with the OSD, and adjust the luminance to the following value with the ADJUST button.  
 (6) Input BLUE, RED and GREEN, appropriately select the COLOR 1 B and R, and adjust the color coordination to the following value with the ADJUST button.  
 (7) Set CONTRAST to 25cd/m<sup>2</sup> with the OSD to confirm that the change in color coordination is within  $\pm 0.015$  for both x and y.  
 \*Adjust COLOR 2 and 3 to the following values with the same method.

(Note) After adjusting COLOR, always set to COLOR 1.

(The COLOR preset will be set to the default COLOR 1 with this step.)

Model group	COLOR		1	2	3	Remarks
All models	G-WINDOW luminance		(76.0)	(67.0)	(56.0)	(Reference value)
	W-WINDOW color coordination	x	0.283	0.313	0.345	$\pm 0.005$
		y	0.297	0.329	0.359	$\pm 0.005$
	Full white luminance(cd/m <sup>2</sup> )		105 or more	92 or more	77 or more	

#### 2.8.6.2 Adjusting ABL

Status Indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	ABL	Factory	No. 12 : 106.25K / 85Hz
			Full white

- (1) Set the OSD ABL to 254.  
 (2) Input timing No. 12 at the signal source.  
 (Full white picture input amplitude = 0.7Vp-p)  
 (3) Set contrast to MAX, bright to MAX, and select ABL-ADJUST with OSD. Adjust to 115cd/m<sup>2</sup>±5 with COLOR 1.  
 The picture size must be approximately the H width given in the list of adjustment values at this time.

## 2.8.7 Adjusting the Purity

Status Indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Purity	Factory	Check 4 : 85Hz
			RED crosshatch reverse

- (1) Input the check 4 timing: 1600 x 1200/85Hz at the signal source to confirm that the RED crosshatch is displayed in reverse.
- (2) Set the chamber adjustment magnetic field to the northern hemisphere magnetic field (HORIZ. = 0mT, VERT. = +0.04mT).
- (3) After carefully degaussing the monitor with 100V handy-demagnetizer, demagnetize with a demagnetizer.
- (4) Set the monitor to the factory mode from the front, select H-Purity, and press the ENTER button once.

With this, the calibration of the horizontal (tube axis) and vertical (two way) geomagnetism sensor will be carried out by the MPU.

Confirm that the current that flows to HCANCEL-Coil at this time is within 0±5mA.

If not within 0±5mA, select H-Purity, and adjust to within 0±5mA.

- (5) Fully scan the picture size with the normal mode to confirm the below effective magnetic field allowance. (Carry out the 45-degree rotation check only for the tube axis direction magnetic field.)

- (a) Effective magnetic field (Magnetic field for adjustment magnetic field) ←
- |  |                                       |
|--|---------------------------------------|
| (1) BH: +0.04mT                        | (2) BH: -0.04mT                       |
| (3) BV: +0.035mT (Northern hemisphere) | (4) BV: -0.04mT (Northern hemisphere) |
| (5) BV: +0.04mT (Southern hemisphere)  | (6) BV: -0.04mT (Southern hemisphere) |
| (Equator)                              | (Equator)                             |
- (b) Demagnetize with a demagnetizer.
- (c) Judgment

Repeat the effective magnetic field four times in the following order.

- (1) (2) (3) (4) ... (Northern hemisphere)  
 (1) (2) (5) (6) ... (Southern hemisphere)  
 (Equator)

\* Repeat (a) to (e) four times for each effective magnetic field.

\*\* When another color is hit while checking the 45-degree rotation of the tube axis direction magnetic field, if the level is not a problem in use of the normal mode Corner Purity, the level will be OK.

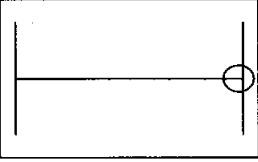
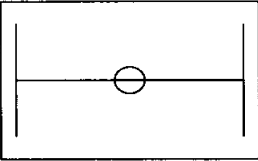
\*\*\* Before checking the vertical magnetic field, set the effective magnetic field, and then carry out manual degaussing on OSD once.

- (6) After confirming the effective magnetic field allowance in step (5), return to the adjustment (reference) magnetic field. After carefully degaussing the monitor with 100V handy-demagnetizer, confirm that the current flowing to the HCANCEL-Coil is within 0±5mA. If not within 0±5mA, adjust again from step (4).
- (7) Set the chamber adjustment magnetic field to the Southern hemisphere magnetic field (HORIZ. = 0mT, VERT. = -0.04mT).
- (8) After carefully degaussing the monitor with 100V handy-demagnetizer, degauss with a demagnetizer.
- (9) Repeat steps (5) and (6).
- (10) Set the chamber adjustment magnetic field to the Equator magnetic field (HORIZ. = 0mT, VERT. = 0mT).
- (11) After carefully degaussing the monitor with 100V handy-demagnetizer, degauss with a demagnetizer.
- (12) Repeat steps (5) and (6).



### 2.8.8 Adjusting the focus

Status Indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Focus		No. 12 : 106.25K / 85Hz
			H character, crosshatch

	Normal or reverse display	Point to align with
Vertical line	Reverse display	 <p>FOCUS JUST at center of right side vertical line (circle section).</p>
Horizontal line	Normal display	 <p>FOCUS JUST at center of screen (circle section).</p>

#### <Adjusting the static focus>

Status Indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Static focus		No. 12 : 106.25K / 85Hz
			H character, crosshatch

For steps (1) and (2), use the timing No. 12 (1600 x 1200 106.25K/85) H character pattern and crosshatch pattern.

For step (3), use all preset timing H character patterns and crosshatch patterns.

- Display a white crosshatch pattern, and adjust the focus following section "2.8.8 Adjusting the focus".
- If the DBF voltage is insufficient or excessive, select DBF H AMP (X2-L)/DBF H AMP (X2-R) and DBF V AMP from the OSD, and readjust with the ADJUST button. Then repeat step (1), and adjust so that the following judgement conditions are satisfied.
- For all of the other preset timings, if the DBF voltage is insufficient or excessive, select DBF H AMP (X2-L)/DBF H AMP (X2-R) and DBF V AMP from the OSD, and readjust with the ADJUST button.

\*Adjustment voltage max value:

DBF-H-AMP	H width: 393mm:	430V
	H width: 369mm:	400V
DBF-V-AMP	V width: 295mm:	190V

## General adjustment

The focus is judged as follows.

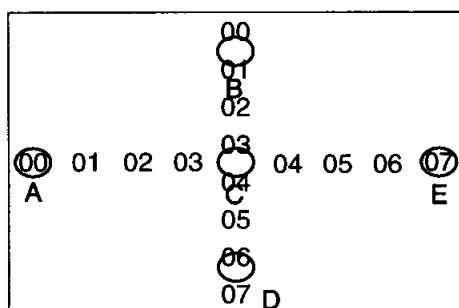
Timing	Judgment pattern (Note 1) (Note 2)
Normal display (All preset)	Crosshatch pattern
Reverse display Resolution: $\leq 1600 \times 1200$ Resolution: $\geq 1600 \times 1200$	Judge with pattern A Judge with pattern B

(Note 1) Pattern A: Font 7 X 9, Cell 10 X 11, e character

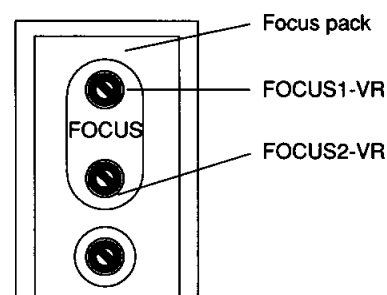
(Note 2) Pattern B: Font 7 X 9, Cell 10 X 11, H character

Core: Judge the ratio of the halo (total area 1:1).

To judge the reverse display, do not carry out a relative evaluation with the other point on the screen. Instead, judge whether the e (H) character can be read at that point.



Focus attention point



Focus pack

### 2.8.9 Adjusting the convergence

#### 2.8.9.1 Adjusting with ITC

Before adjusting the center mis-convergence and axial mis-convergence, carry out sufficient full white aging (100cd/m<sup>2</sup> or more, for one hour or more). Then, adjust with the following timing.

Timing: No. 12 (1600 x 1200 106.25K/85) crosshatch pattern

Confirm that the following DDCC default setting is as shown in the table.

Section 2.7.3.2 (1) Factory mode 1 in section 2.7.3 OSD display matrix

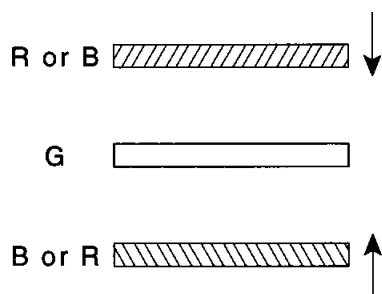
H-CONVERGENCE, V-CONVERGENCE,

Section 2.7.3.2 (2) Factory mode 2 in section 2.7.3 OSD display matrix

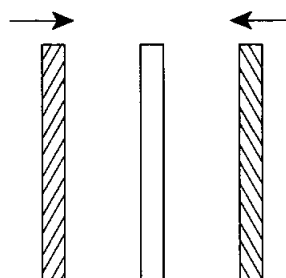
All of FACT01

Adjust the horizontal and vertical convergence to the optimum setting with the CRT CP ring, etc.

(Refer to following drawings.)

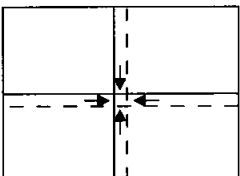
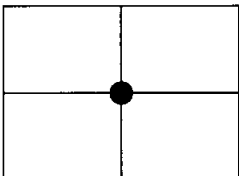
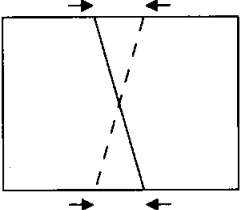
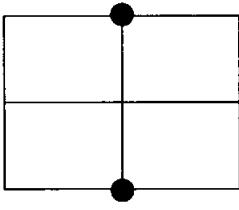
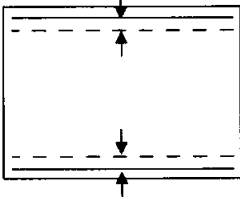
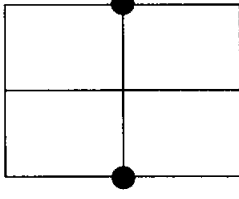
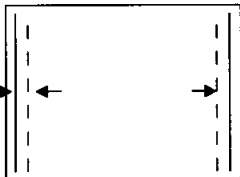
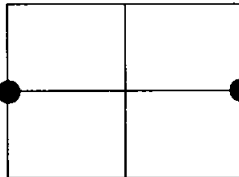
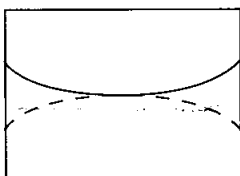
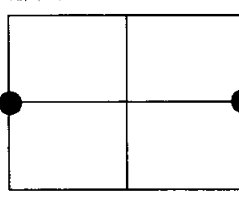
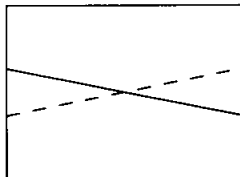


Vertical convergence



Horizontal convergence

Adjusting the center miss convergence and axial miss convergence

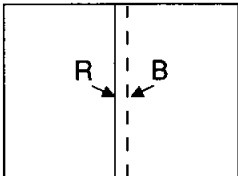
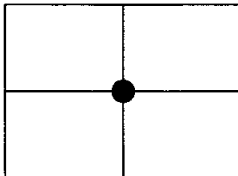
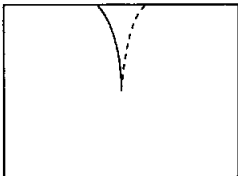
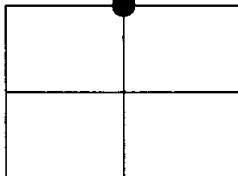
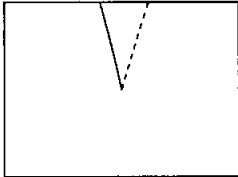
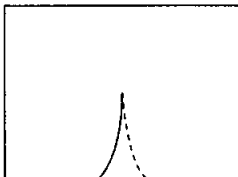
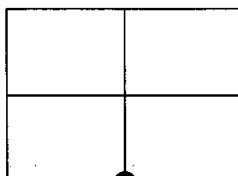
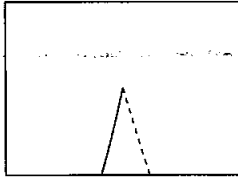
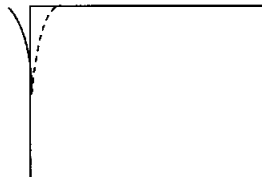
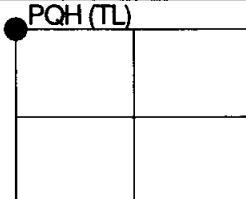
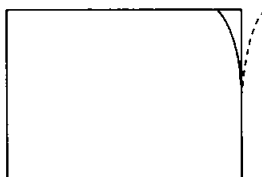
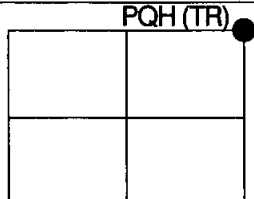
Adjustment item name	Problem	Adjustment point	Adjustment procedure
H-STATIC V-STATIC			Adjust to $\pm 0.01\text{mm}$ or less with CP-ASSY 4P.
YH axial deviation			Adjust so that TOP+BOTTOM are $\pm 0.01\text{mm}$ or less with YH volume.
YV axial deviation			Adjust so that TOP-BOTTOM is $\pm 0.01\text{mm}$ or less with YV volume.
XH axial deviation			Adjust so that TOP+BOTTOM is $\pm 0.01\text{mm}$ or less with XH slider.
XV characteristics			Only when XV (B-Bow) is $\pm 0.01\text{mm}$ or more, adjust so that LEFT-RIGHT is $\pm 0.01\text{mm}$ or less with the interlock of B-Bow 4P and CP-ASSY 4P.
XV axial deviation			Adjust so that LEFT+RIGHT is $\pm 0.1\text{mm}$ or less with XV differential.

## General adjustment

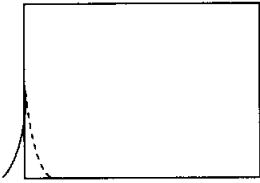
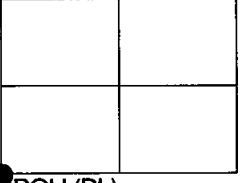
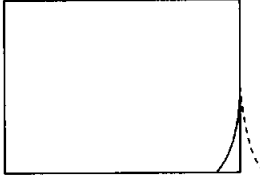

### 2.8.9.2 Adjusting DDCP (using automatic adjustment device)

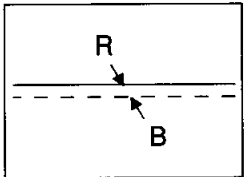
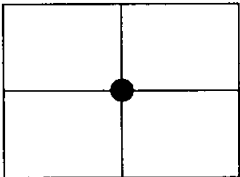
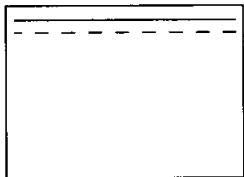
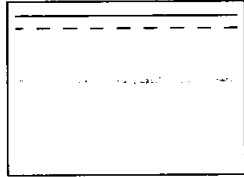
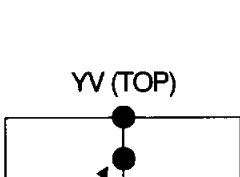
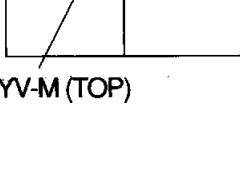
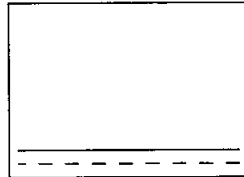

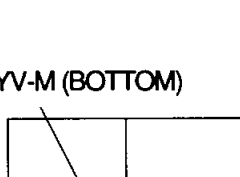
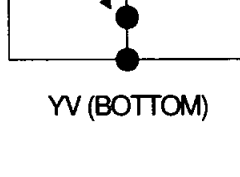
The method for carrying out the automatic adjustment manually is explained below.

- (1) Input the timing No. 12 (1600 x 1200 106.2K/85) crosshatch pattern.
- (2) Enter the factory mode.
- (3) Adjust in the following order. (It is assumed that the center and axial mis-convergence on the previous page have already been adjusted.)

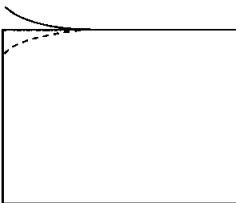
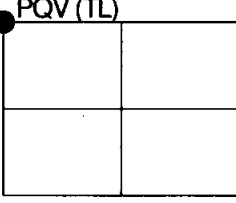
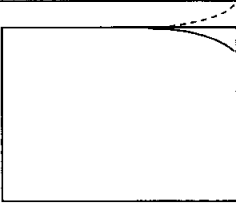
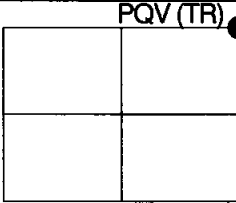
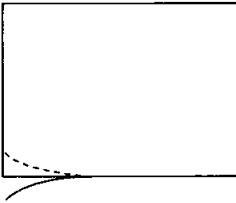
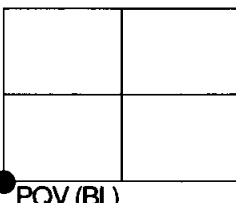
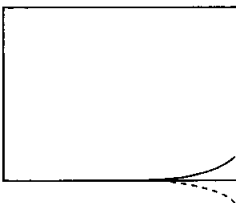
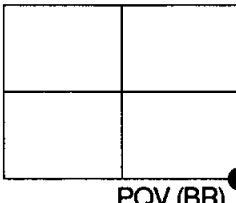
Adjustment order	Adjustment item name	Problem	Adjustment point	Adjustment procedure
<b>4H-COIL</b>				
1	HORIZ-CONVERGENCE			Adjust to 0.05mm or less. (Adjustment target is 0mm.)
2	YH-TT		 YH (Top)	Adjust to 0.05mm or less. (Adjustment target is 0mm.)
	YH-JT			
3	YH-TB		 YH (Bottom)	Adjust to 0.05mm or less. (Adjustment target is 0mm.)
	YY-JB			
4	4HTL		 PQH (TL)	Adjust to 0.3mm or less.
5	4HTR		 PQH (TR)	Adjust to 0.3mm or less.

# General adjustment

Adjustment order	Adjustment item name	Problem	Adjustment point	Adjustment procedure
<b>4H-COIL</b>				
6	4HBL			Adjust to 0.3mm or less.
7	4HBR			Adjust to 0.3mm or less.

Adjustment order	Adjustment item name	Problem	Adjustment point	Adjustment procedure
<b>4V-COIL</b>				
1	VERT-CONVERGENCE			Adjust to 0.05mm or less. (Adjustment target is 0mm.)
2	YV-TT YV-JT	 	 	Adjust YV (TOP) to 0.05mm or less with balance adjustment of YV-TT and YV-JT. (Adjustment target is 0mm.)  (Note) The operating amount at YV-M (TOP) when moving YV-TT and YV-JT. YV-TT < YV-JT
3	YV-TB YV-JB	 	 	Adjust YV (BOTTOM) to 0.05mm or less with balance adjustment of YV-TB and YV-JB. (Adjustment target is 0mm.)  (Note) The operating amount at YV-M (BOTTOM) when moving YV-TB and YV-JB. YV-TB < YV-JB

## General adjustment

Adjustment order	Adjustment item name	Problem	Adjustment point	Adjustment procedure
4V-COIL				
4	4VTL			Adjust to 0.3mm or less.
5	4VTR			Adjust to 0.3mm or less.
6	4VBL			Adjust to 0.3mm or less.
7	4VBR			Adjust to 0.3mm or less.

- \* Specify the adjustment value range of the following adjustment items in general DDCP adjustment.

Adjustment items	Adjustment value range (Factory mode))
H-CONVERGENCE	77~177 (OSD display value=DAC output value)
V-CONVERGENCE	77~177 (OSD display value=DAC output value)

## 2.8.10 Default settings (With factory mode)

Status indicator	Adjustment item	Adjustment mode/set	Input Signal pattern
	Default settings	Factory mode	Each adjustment timing
			Crosshatch

- (1) Set the default values as shown in the table (user mode) given in the OSD display (Table of section 2.7.3-(1).)  
If the setting class is an item for each timing, carry out for each adjustment timing except the item of default setting "CENTER".
- (2) Return to the user mode with the front panel or automatic adjustment device.
- (3) Execute ALL RESET to confirm that each OSD setting is as shown in the table (user mode) given in the OSD display (section 2.7.3(1)).  
The default setting CENTER is the factory adjustment value called when the (-) (+) ADJUST buttons are pressed simultaneously in the normal mode.  
Only CONTRAST will be set to 100% when the (-) (+) ADJUST buttons are pressed simultaneously in the normal mode.
- (4) After setting the default values, turn the power switch OFF.

## Adjustment procedure

### 2.9 Inspections (In normal mode)

Status Indicator	Adjustment item	Adjustment mode/set	Input signal pattern
	Inspections	Normal mode	

#### 2.9.1 Electrical performance

Inspect the electrical performance by setting contrast to MAX and bright to center (press the (-) (+) ADJUST buttons simultaneously).

##### 2.9.1.1 Withstand voltage

There must be no abnormality when 1500VAC is applied for two seconds between both ends of the AC input terminal and chassis, and between the DG coil terminal and chassis.

##### 2.9.1.2 Grounding conductivity check

Check that the resistance value is 100mΩ or less when 25A is passed between the AC input terminal grounding GND and chassis GND.

##### 2.9.1.3 Degaussing coil operation

Confirm that when OSD DEGAUSS is executed, the picture vibrates and then stops.

##### 2.9.1.4 POWER SAVE function operation (Set the AC power input to 230V)

Model	Confirmation timing
All model	Timing No. 12 (1600 x 1200 106.25K/85)

Use the full white pattern without R, G, B signals.

Select POWER-SAVE from the OSD, and set the POWER-SAVE function ON.

(Note) For the USB, do not connect a pseudo-USB load. Instead measure the following power consumption.

##### (1) POWER SAVE ON

- (a) Confirm that when any SYNC (H, V, H&V) is removed, the system waits for approx. five seconds, displays POWER SAVE for approx. three seconds, and then the picture darkens.

Also confirm that the power LED changes to orange and the power consumption is as follows.

Power consumption	5W or less
-------------------	------------

- (b) Confirm that when SYNC is input again, the high voltage is recovered, and the picture appears in approx. three seconds.

##### 2.9.1.5 Confirming the MOIRE-CLEAR function

Status Indicator	Adjustment item	Adjustment mode/set	Input signal pattern
	MOIRE-CLEAR		No. 10 : 91.1K / 85Hz

Input timing No. 10 (1280 x 1024 91.1K/85.0), and turn the MOIRE-CLEAR function ON. Confirm that the picture vibrates in the horizontal direction.



## Adjustment procedure

### 2.9.1.6 Confirming the CORNER-PURITY function

Model	Confirmation timing
All model	Timing No. 12 (1600 x 1200 106.25K/85)

Input a (full white display), and press the (-)(+) ADJUST buttons to change the CORNER PURITY (TR/TL/BR/BL). Confirm that the color coordination around the picture changes.

### 2.9.1.7 Focus, picture performance (Timing No. 12 (1600 x 1200 @ 85Hz))

Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Focus, picture performance		No. 12 : 85Hz

The picture must be evenly bright with the "e" character normal and reverse displays.

### 2.9.1.8 Mis-convergence

After heat running for 20 minutes or more, the mis-convergence amount in the horizontal and vertical directions when the set is faced to the East or West must be below the following values.

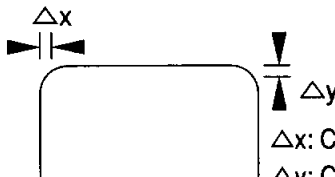

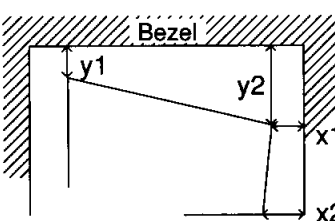

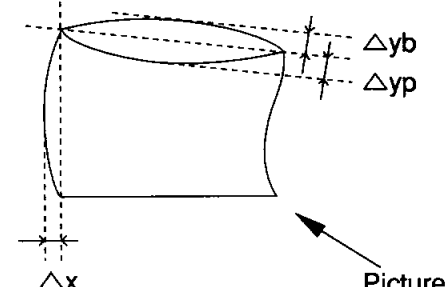

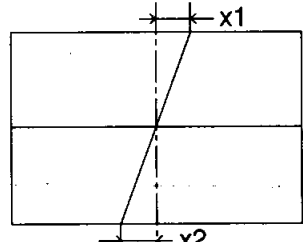

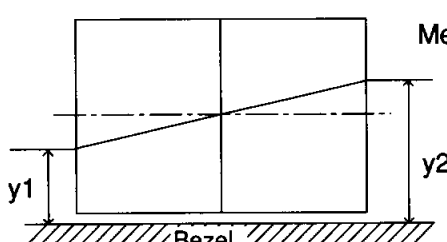

The mis-convergence amount is the value between the two colors of R, G and B separated the most in the horizontal (X) and vertical (Y) directions when a 17 vertical line x 13 horizontal line crosshatch is displayed.

Zone	Mis-convergence amount				
	All models				
Center	0.2mm or less				
A	0.3mm or less				
B	0.4mm or less				
Measurement timing (Timing No.)	12				

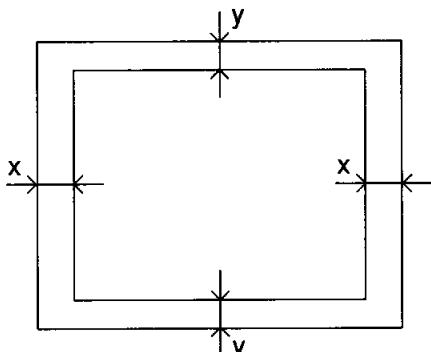
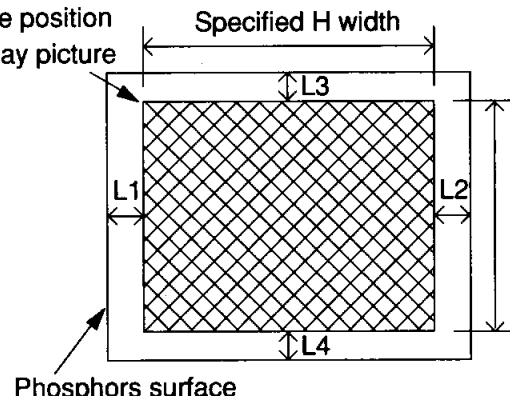




## Adjustment procedure

No.	Item	Judgement reference value	Input signal
4.	Line curve (crosshatch pattern outer contour)  $\Delta x$ : Curve within 50mm range (horizontal) $\Delta y$ : Curve within 50mm range (vertical)	$\Delta x \leq 1.0\text{mm}$ $\Delta y \leq 1.0\text{mm}$	Crosshatch pattern 
5.	Horizontal trapezoid (top/bottom), vertical trapezoid (left/right)  <ul style="list-style-type: none"> <li><math>\Delta y =  y1 - y2 </math></li> <li><math>\Delta x =  x1 - x2 </math></li> <li>Control with the above right value for each the top, bottom, left and right.</li> </ul>	$\Delta y \leq 2.0\text{mm}$ $\Delta x \leq 1.8\text{mm}$	
6.	Top/bottom pin and barrel, left/right pin and barrel  <p style="text-align: right;">Picture</p>	(Provisional standards) $\Delta yb \leq 1.0\text{mm}$ $\Delta yp \leq 1.5\text{mm}$ $\Delta x \leq 1.0\text{mm}$	
7.	Parallelogram distortion  <p>Measure the larger of x1 and x2.</p>	$x \leq 0.8\text{mm}$	
8.	Inclination  <p>Measure <math>\Delta y =  y1 - y2 </math>.</p>	$\Delta y \leq 2.0\text{mm}$	

## Adjustment procedure

No.	Item	Judgement reference value	Input signal
9.	Distortion Must be within the following frame. ※ (Note, excluding ROTATION) 	$y \leq 2.0\text{mm}$ $x \leq 2.0\text{mm}$	Crosshatch pattern
10.	Picture position Display picture 	$ L1-L2  \leq 3.0\text{mm}$ $ L3-L4  \leq 3.0\text{mm}$	Full white

### 2.9.1.10 Linearity

Measure the linearity with a 17 horizontal line x 13 vertical line crosshatch.

Horizontal linearity : fH=30-40kHz whole : 15% or less, adjacent : 7% or less

fH=40-60kHz whole : 12% or less, adjacent : 7% or less

fH=60-121kHz whole : 10% or less, adjacent : 7% or less

Vertical linearity : whole : 10% or less, adjacent : 7% or less

Calculation expression :  $(X_{\text{max}} \times X_{\text{min}}) / X_{\text{max}} \times 100\%$

\* If any doubts arise about the judgment, judge with the horizontal/vertical width tolerance of  $\pm 3\text{mm}$ , picture position:  $|L1-L2| \leq 3.0\text{mm}$  and  $|L3-L4| \leq 3.0\text{mm}$ .

### 2.9.1.11 Picture default

Refer to NF51 picture default detection standard.

## Adjustment value list

### 2.9.1.12 Adjustment value list

The horizontal width, vertical width and DBF-H amplitude must be within the following ranges.

Timing	Horizontal width (mm)			Vertical width (mm)			DBF-H amplitude (V)		DBF-V amplitude (V)	
No.	Adj.value			Adj.value			Standard adj.value	Max adj.value	Standard adj.value	Max adj.value
1										
2	393±5			295±4			370±10	430	145±10	190
3										
4										
5										
6	393±5			295±4			370±10	430	145±10	190
7	393±5			295±4			370±10	430	145±10	190
8	393±5			295±4			370±10	430	145±10	190
9	369±5			295±4			370±10	430	145±10	190
10	369±5			295±4			370±10	430	145±10	190
11	393±5			295±4			370±10	430	145±10	190
12	393±5			295±4			370±10	430	145±10	190
13										
14										
15	393±5			295±4			370±10	430	145±10	190
16										
17										
18										
19	393±5			295±4			370±10	430	145±10	190
20										
21										
22										
23										
24										
25	393±5			295±4			370±10	430	145±10	190
26										
27										
28	393±5			295±4			370±10	430	145±10	190

Standard adjustment value: in case of determining DBF voltage

Maximum adjustment value: the value impossible to set the maximum of DBF voltage

## Adjustment procedure

### 2.9.1.13 Confirming CLAMP PULSE POSITION

Confirm to satisfy the following standard when inputting the optional timing.

Timing : Check1 (35k/66), full white

Criterion: Back raster must be changed.

### 2.9.1.14 Checking the functions during Sync on Green and Composite Sync input

Status indicator	Adjustment item	Adjustment mode/set	Input signal pattern
	Checking the functions during Sync on Green and Composite Sync input		Check 1 : 35K / 66Hz, Check 2 : 35K / 66Hz
			Full white

[Sync on Green]

Timing: Check 1 (35K/66), full white

[Composite Sync]

Timing: Check 2 (35K/66), full white

In the normal mode, input the above timing into any connector of D-SUBx2 input to confirm that the operation is normal.

### 2.9.1.15 Confirming the D-SUBx2 input (Timing No. 12 1600 x 1200 @85Hz)

Status indicator	Adjustment item	Adjustment mode/set	Input signal pattern
	Confirming the D-SUBx2 input		No. 12 : 85Hz

Confirm the input select function for both D-SUBx2 with the following procedure.

Confirm one of the following with an independent stage.

- (1) After connecting D-SUB, press the front button (D-SUBx2) and confirm that after the picture darkens it returns to the normal state.
- (2) After connecting BNC, press the front button (D-SUBx2) and confirm that after the picture darkens it returns to the normal state.

### 2.9.1.16 Confirming the reset operation

Model	Confirmation timing
All model	Timing No. 12 (1600 x 1200 106.25K/85)

Carry out the following confirmation in the NORMAL MODE.

After varying the H-SIZE data somewhat, press the (-)(+) ADJUST buttons simultaneously to confirm that the data returns to the original value.

### 2.9.1.17 Confirming the full white luminance

Status indicator	Adjustment item	Adjustment mode/set	Input signal pattern
	Confirming the full white luminance		No. 12 : 85Hz
			Full white

Timing No. 12 (1600 x 1200 106.25K/85), input amplitude = 0.7Vp-p

Confirm that the full white luminance is the following value.

Full white luminance (cd/m <sup>2</sup> )				
Model	COLOR 1	COLOR 2	COLOR 3	Remarks
All models	105 or more	92 or more	77 or more	

## Adjustment procedure

### 2.9.1.18 Confirming CONVERGENCE compensation function

Confirm that CONVERGENCE changes by varying H-CONVERGENCE and V-CONVERGENCE.

### 2.9.1.19 Confirming ROTATION compensation function

Confirm that the picture rotates by changing ROTATION.

### 2.9.1.20 Luminance/color coordination uniformity

Status Indicator	Adjustment item	Adjustment mode/set	Input specification
	Luminance/color coordination uniformity		No. 12 : 106.25K / 85Hz

The luminance ratio between the center and periphery must be 80% or more with timing No. 12 (1600 x 1200 @85Hz) COLOR 1.

The color coordination difference between the center and periphery must be  $\Delta x, y < \pm 0.012$  at COLOR 1/2/3.

### 2.9.1.21 Confirming the full white color coordination

Confirm that the color coordination at the center of the full white is within the following range at the drive signal adjustment timing.

Model	Confirmation item		COLOR 1	COLOR 2	COLOR 3
All models	Color coordination	x	$0.283 \pm 0.007$	$0.313 \pm 0.007$	$0.345 \pm 0.007$
		y	$0.297 \pm 0.007$	$0.329 \pm 0.007$	$0.359 \pm 0.007$

※ OSD color coordination confirmation  $X=0.283 \pm 0.04$   $Y=0.297 \pm 0.05$   
(Confirm at the white section of the OSD.)

### 2.9.1.22 Confirming the color tracking

Status Indicator	Adjustment item	Adjustment mode/set	Input specification
	Confirming the color tracking		No. 12 : 106.25K / 85Hz
			Full white

Confirm with timing No. 12 (1600 x 1200 @85Hz).

Measure the color coordination at the center of the picture using a full white pattern (input amplitude = 0.7Vp-p).

- Confirm that the color coordination change is within the  $\pm 0.015$  range when the CONTRAST is set to 25cd/m<sup>2</sup> with the OSD.
- Confirm that the color coordination change is within the  $\pm 0.015$  range when the input amplitude is set to 0.22Vp-p at the signal source.

### 2.9.1.23 CRT installation position

CRT installation position tolerance      Within  $\pm 3$ mm in vertical direction      Within  $\pm 2.5$ mm in horizontal direction  
Inclination: Within  $\pm 2.5$ mm at bezel reference

### 2.9.1.24 Confirming FPM operation

Confirm with Timing No. 12 and COLOR 1.

Confirm that the relation of the window luminance with the back raster luminance in each mode is as follows.

## Adjustment procedure

	Normal	Text	Graphic
Window luminance	Standard	Low	Standard
Back raster luminance	Standard	Low	Low

※ Confirm that the color is not saturated when Graphic mode.

### 2.9.1.25 Confirming the geomagnetism tolerance (Timing No. 12: 1600 x 1200 106.25K/85)

Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Confirming the geomagnetism tolerance		No. 12 : 106.25K / 85Hz

There must be no apparent color unevenness with each single color when the magnetic field is changed with the following procedure. The display picture size is 393mm x 295mm.

1. Northern hemisphere magnetic field : Horizontal magnetic field ( $B_H$ ) :  $0 \pm 0.04\text{mT}$   
Vertical magnetic field ( $B_V$ ) :  $+0.04 \pm 0.035\text{mT} / -0.04\text{mT}$
2. Southern hemisphere magnetic field : Horizontal magnetic field ( $B_H$ ) :  $0 \pm 0.04\text{mT}$   
Vertical magnetic field ( $B_V$ ) :  $-0.04 \pm 0.04\text{mT}$
3. Equator magnetic field : Horizontal magnetic field ( $B_H$ ) :  $0 \pm 0.04\text{mT}$   
Vertical magnetic field ( $B_V$ ) :  $0 \pm 0.04\text{mT}$

#### <Confirmation procedure>

Completely demagnetize the entire unit including the monitor plates, CRT, funnel section, along the DG coil and face surface with handy-demagnetizer (100V) at the magnetic fields for  $B_H = 0\text{G}$  and  $B_V = \text{destination}$ . Then, change  $B_H$  and  $B_V$  to the above values, and demagnetize again. Then, visually confirm.

Note that when changing  $B_V$ , set to the effective magnetic field, and then carry out manual degaussing on the OSD once before confirming.

### 2.9.1.26 Confirming the cancel function operation

Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Confirming the cancel function operation		No. 12 : 106.25K / 85Hz

- (1) Confirm that the following cancel function operates correctly when the tube axial magnetic field ( $B_H$ ) is moved  $0.04\text{mT}$  in the + direction or - direction.
- (2) Confirm that the cancel function operates correctly when the vertical magnetic field ( $B_V$ ) is moved by the following value in the + direction or - direction.

Note that when changing  $B_V$ , set to the effective magnetic field, and then carry out manual degaussing on the OSD once before confirming.

1. Northern hemisphere magnetic field :  $+0.035\text{mT} / -0.04\text{mT}$
2. Southern hemisphere magnetic field :  $\pm 0.04\text{mT}$
3. Equator magnetic field :  $\pm 0.04\text{mT}$

### 2.9.1.27 Confirming the grill vibration

Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Confirming the grill vibration		No. 12 : 106.25K / 85Hz
			Full white



## Adjustment procedure

- (1) Tap the top of the monitor with a rubber hammer.  
(Strength equivalent to shock test.)
- (2) Observe from a position 60cm away from the tube surface.
- (3) If the vibration continues for 10 seconds or more, judge as line out.
- (4) For the set judged as line out, after carry out normal aging (30 minutes or more), apply an impact on the center of the tube surface with an impact hammer. Impact strength: 0.35Nm
- (5) Observe from a position 60cm away from the tube surface.
- (6) If the vibration continues for 9.5 seconds or more, replace the CRT. If the vibration is within 9.5 seconds, return to the line.

### 2.9.1.28 Confirming the USB hub

<Confirming the function control>

User the PC installed the monitor control function.

- (1) Open the application of control function.
- (2) Connect the upstream connector and the PC with USB cable.
- (3) Confirm that the control function recognizes the monitor.
- (4) disconnect the USB cable.

### 2.9.1.29 Others

- (1) When the PUSH button is pressed, the changes must be smooth, and there must be no abnormalities such as noise.
- (2) Synchronization must not flow when the power switch is turned ON and OFF.
- (3) Confirm that the POWER LED is lit.

## Adjustment procedure

### 2.10 Checking the DDC function (using automatic adjustment device)

This writing operation is carried out in combination with the PC.

Confirm that the PC internal clock is correctly set when preparing for this work.

#### 2.10.1 Writing/checking the DDC and EDID data (Confirm with both input of SIGNAL A and B.)

- (1) Following the PC picture displays, select the target model. (This step is carried out only once when the device is started up or the model is changed.)
- (2) Turn the monitor power ON.
- (3) Following the PC picture displays, write the data into the EEPROM.  
The data contents shall be those designated in the table of section 2.10.3 on the next page.
- (4) Following the PC picture displays, check the DDC function.
- (5) There may be an error of four weeks for the manufacturing week and year information.

[Hexadecimal conversion]

Read the following serial No. with the barcode system, and set the serial No. with the following conversion.

Model	Serial No.
All models	Mitsubishi serial No.
	Customer serial No.

Low-order 5 digits of S/N → Hexadecimal conversion → Store data in order from low-order byte  
6th and higher digit of S/N → Set as 0 (Follow VESA Standards)

(Example) 512002978 → 00000BA2 →

MPU side Address(H)	E2PROM side Address(H)	Data(H)
B6C	C0	A2
B6D	0D	0B
B6E	0E	00
B6F	0F	00

[ASCII conversion] (All models)

Read the Mitsubishi serial No. with the barcode system, and set the serial No. with the following conversion.

Low-order 5 digits of S/N → ASCII code conversion → Store data in order from low-order byte  
(Example) 512A02978 (To MONITOR DESCRIPTOR #4)

↓  
35 31 32 41 30 32 39 37 38

MPU		
Control side	E2PROM side	
Address (H)	Address (H)	Data (H)
BD1	71	35
BD2	72	31
BD3	73	32
BD4	74	41
BD5	75	30
BD6	76	32
BD7	77	39
BD8	78	37
BD9	79	38
BDA	7A	0A ← Indicates end of S/N data
BDB	7B	20 ← Indicates blank
BDC	7C	20 ← Indicates blank
BDD	7D	20 ← Indicates blank

} Fixed data  
(Set according to No.  
of S/N digits)

## Adjustment procedure

### 2.10.2 Setting the serial No.

Store the serial No. into the following address in the EEPROM with the following procedure.

[UNICODE conversion] (All models)

Read the Mitsubishi serial No. with the barcode system, and set the serial No. with the following conversion.

S/N → UNICODE conversion → Store data in order from low-order byte  
(To STRING DESCRIPTOR)

(Example) 512A02978

↓  
0035 0031 0032 0041 0030 0032 0039 0037 0038  
↓

Head address; 0F60h

Offset address from head address	Setting data
00	35
01	00
02	31
03	00
04	32
05	00
06	41
07	00
08	30
09	00
0A	32
0B	00
0C	39
0D	00
0E	37
0F	00
10	38
11	00
12	20 ; Insert the space "0020" when there is a blank
13	00

## Adjustment procedure

### 2.10.3 DDC write data contents

The contents of DDC write data must be as follows.

#### -- EDID DATA DUMP TEXT --

Vendor Name: MEL  
Product Code LSB (HEX): 0  
Product Code MSB (HEX): 43  
Product Code (DEC): 17392  
(Microsoft INF ID: MEL43F0)  
Serial Number: \*\*  
Week of Manuf: WW  
Year of Manuf: YY

EDID Version: 1  
EDID Revision: 1  
Extension Flag: 0

Input Singal: ANALOG  
Setup: NO  
Sync on Green: YES  
Composite Sync: YES  
Separate Sync: YES  
V Sync Serration: NO  
V Signal Level: 0.700V/0.300V (1V p-p)

Max Image Size H (cm): 40  
Max Image Size V (cm): 30  
DPMS Stand By: YES  
DPMS Suspend: YES  
DPMS Active Off: YES  
GTF Support: YES  
Display Type: RGB Color

Gamma: 2.20  
Red x: 0.625  
Red y: 0.340  
Green x: 0.290  
Green y: 0.605  
Blue x: 0.150  
Blue y: 0.070  
White x: 0.283  
White y: 0.297

#### Established Timings:

720x400@70  
720x400@88  
640x480@60  
640x480@67  
640x480@72  
640x480@75  
800x600@56  
800x600@60  
800x600@72  
800x600@75  
832x624@75  
1024x768@87  
1024x768@60  
1024x768@70  
1024x768@75  
1152x870@75  
1280x1024@75

Standard Timing #1:  
Horizontal Active Pixels: 1600  
Aspect Ratio: 4:3  
Refresh Rate: 85

Standard Timing #2:  
Horizontal Active Pixels: 1600  
Aspect Ratio: 4:3  
Refresh Rate: 75

Standard Timing #3:  
Horizontal Active Pixels: 1280  
Aspect Ratio: 5:4  
Refresh Rate: 85

Standard Timing #4:  
Horizontal Active Pixels: 1280  
Aspect Ratio: 5:4  
Refresh Rate: 75

Standard Timing #5:  
Horizontal Active Pixels: 1024  
Aspect Ratio: 4:3  
Refresh Rate: 85

Standard Timing #6:  
Horizontal Active Pixels: 1152  
Aspect Ratio: 4:3  
Refresh Rate: 75

Standard Timing #7:  
Horizontal Active Pixels: 800  
Aspect Ratio: 4:3  
Refresh Rate: 85

Standard Timing #8:  
Horizontal Active Pixels: 640  
Aspect Ratio: 4:3  
Refresh Rate: 60

#### Detailed Timing (block #1):

Pixel Clock: 299.50  
Horizontal Active: 1600  
Horizontal Blanking: 560  
Vertical Active: 1200  
Vertical Blanking: 50  
(Horizontal Frequency: 106.25kHz)  
(Vertical Frequency: 85.0Hz)  
Horizontal Sync Offset: 64  
Horizontal Sync Width: 192  
Vertical Sync Offset: 1  
Vertical Sync Width: 3  
Horizontal Border: 0  
Vertical Border: 0  
Horizontal Image Size: 393  
Vertical Image Size: 295  
Interlaced: NO  
Image: Normal Display  
Sync: Digital Separate  
Bit 1: ON  
Bit 2: ON

Monitor Range Limits (block #2):  
Minimum Vertical Rate: 50 Hz  
Maximum Vertical Rate: 160 Hz  
Minimum Horizontal Rate: 30 kHz  
Maximum Horizontal Rate: 108 kHz  
Maximum Pixel Clock: 240 MHz  
GTF Data: 00 0a 20 20 20 20 20

Monitor Name (block #3): NSH1117U

Monitor Serial Number (block #4): ##

#### EDID DATA DUMP HEX

```
00 ff ff ff ff ff ff 00
34 ac f0 43 ** ** ** **
WW YY 01 01 0e 28 1e 78
e9 04 88 a0 57 4a 9b 26
12 48 4c ff ff 80 a9 59
a9 4f 81 99 81 8f 61 59
71 4f 45 59 31 40 a6 59
40 30 62 b0 32 40 40 c0
13 00 89 27 11 00 00 1e
00 00 00 fd 00 32 a0 1e
6c 18 00 0a 20 20 20 20
20 20 00 00 00 fc 00 4e
53 48 31 31 31 37 4b 0a
20 20 20 20 00 00 00 ff
00 ## ## ## ## ## ## ##
## ## 0a 20 20 20 00 SS
```

\*\* : serial number 1  
WW : manufacture week  
YY : manufacture year  
NN : serial number 2  
SS : check sam

## **2.11 Default inspection**

### **2.11.1 Default setting of switches**

Confirm that the following switch is set as follows.

- (1) Power switch: OFF

### **2.11.2 Default setting of OSD**

Confirm that each OSD setting is as shown in the OSD display (section 3.7.3) table (user mode/factory mode).

If the setting class is an item for each timing, carry out for each adjustment timing.

- \* CENTER is the factory adjustment value called when the (-) (+) ADJUST buttons are pressed simultaneously in the normal mode.
- \* Only CONTRAST will be set to MAX when the (-) (+) ADJUST buttons are pressed simultaneously in the normal mode.

### **2.11.3 Checking the labels**

Confirm that the "SERVICEMAN WARNING", "rating label", "manufacturing date stamp", "SERIAL NO. label", and "set sub-No.", etc., are attached to the specified position, and have been checked.

### **2.11.4 Packaging**

- (1) There must be no remarkable contamination, tearing or scratches, etc.
- (2) The model name must be accurately displayed.
- (3) The SERIAL NO. must be attached. (Must be the same No. as the set.)
- (4) The package must be accurately sealed.

## Adjustment procedure

### 2.12 Degaussing with handy-demagnetizer

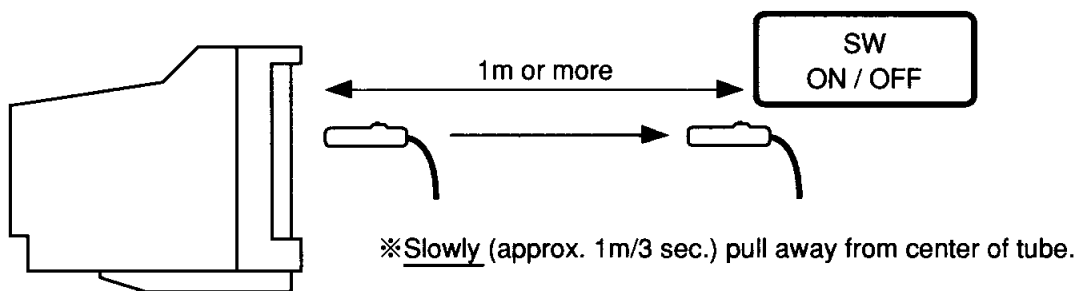
#### 2.12.1 General precautions

- (1) Carry this procedure out with the monitor power ON.
- (2) When degaussing with handy-demagnetizer, the demagnetizer power must be turned ON and OFF at a position at least 1m away from CRT tube.
- (3) Use a bar type demagnetizer instead of a ring type.  
Carefully and slowly (1m/3 sec.) demagnetize the CRT tube and bezel side surface.  
When separating the degaussing coil at the end, separate as slow as possible with the following procedure.  
If separated quickly, stripes could remain at the picture corners.

#### 2.12.2 How to hold and use the handy-demagnetizer

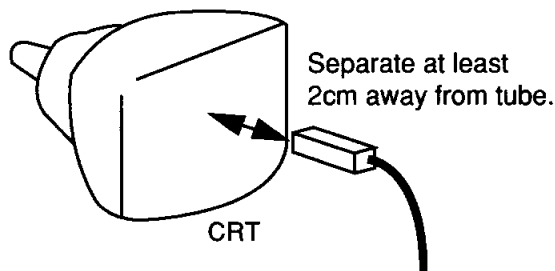
- (1) Approach the demagnetizer as carefully and slowly (approx. 1m/3 sec.) as possible, and move around the bezel side periphery two to three times.
- (2) Next, gradually (approx. 1m/3 sec.) move to the CRT tube side, and move around the CRT tube four to five times with the following procedure.
- (3) Finally, leave the CRT tube as slowly (approx. 1m/3 sec.) as possible, and turn the handy-

Looking from side of set

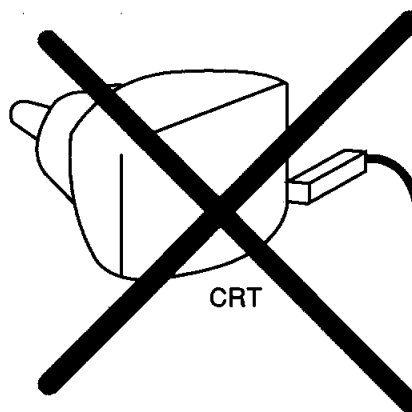


<Holding the hand degaussing unit>

Face the hand degaussing unit so that the longitudinal direction is vertical in respect to the CRT.



Do not hold the hand degaussing unit so that the longitudinal direction is parallel in respect to the CRT.

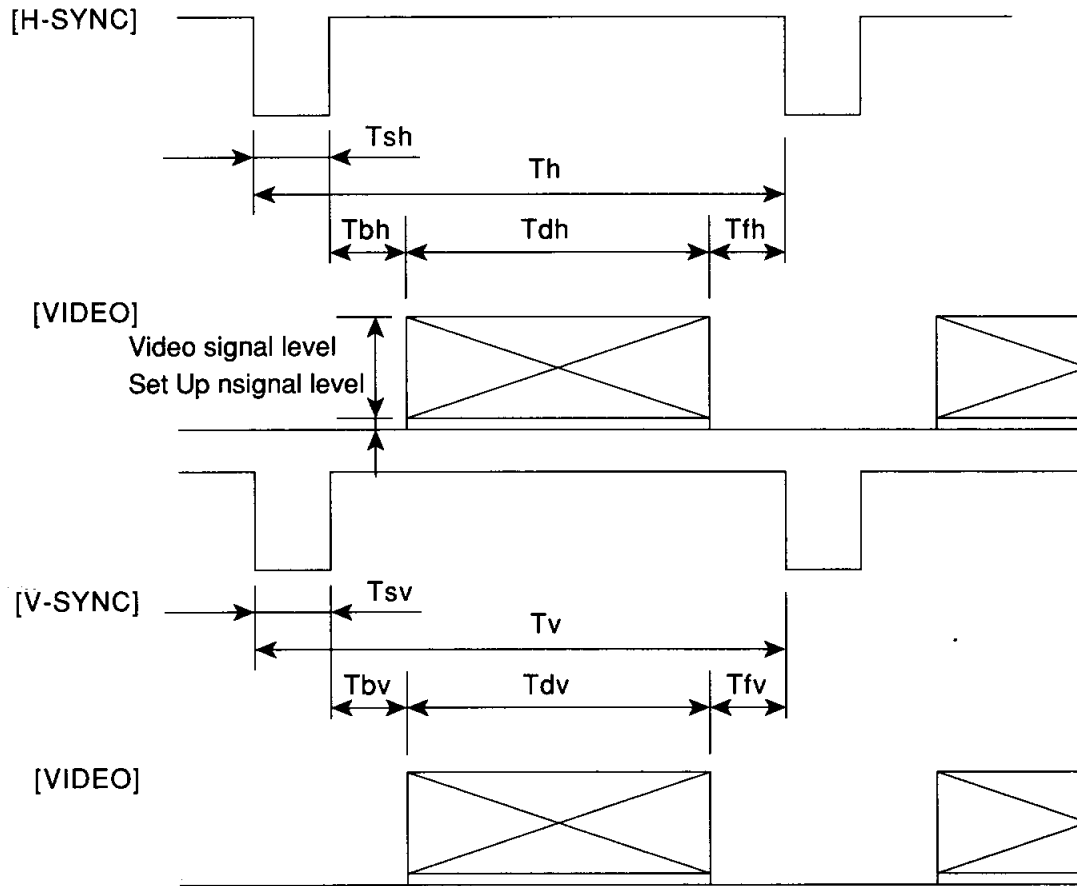


demagnetizer unit switch OFF at a position 1 to 1.5m away.

#### 2.13 Caution

Do not input the user timing before factory adjustments.  
(The automatic tracking of the FOCUS could be adversely affected.)

## 2.14 Timing chart



※Refer to after the next page for the preset timing details.



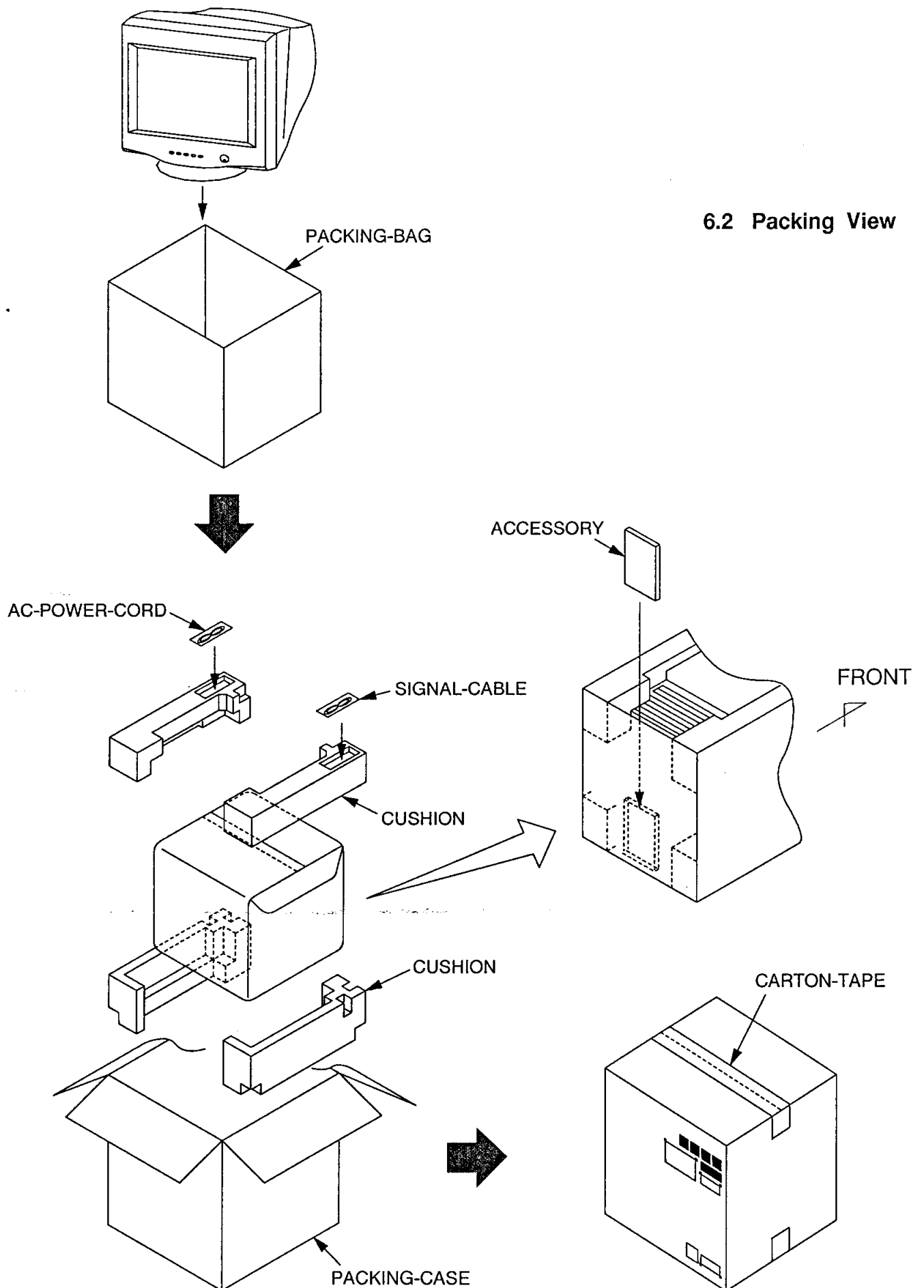


# Adjustement timing

NO	Fh (kHz)	Clock (MHz)	Th (μSEC) (dot)	Tsh (μSEC) (dot)	Tth (μSEC) (dot)	Tbh (μSEC) (dot)	Tdh (μSEC) (dot)	Utili- zation	H re- trace s-f-b	Fv (Hz)	Tv (mSEC) (line)	Tsv (mSEC) (line)	Ttv (mSEC) (line)	Tbv (mSEC) (line)	Tdv (mSEC) (line)	V re- trace	Hs	Vs	VIDEO level (V)	set up level (V)	Serra- tion Group 1 Group 2 Group 3	Remarks
1	31.470	25.175	31.778 (800)	3.813 (96)	0.636 (16)	1.907 (48)	25.422 (640)	80.00	6.356	70.090	14.268 (449)	0.064 (2)	0.382 (12)	1.111 (35)	12.711 (400)	1.175	—	+	0.7	—	—	(640*400)70Hz
2	31.470	25.175	31.778 (800)	3.813 (96)	0.636 (16)	1.907 (48)	25.422 (640)	80.00	6.356	59.940	16.683 (525)	0.064 (2)	0.318 (10)	1.048 (33)	15.253 (480)	1.112	—	—	0.7	—	—	VGA(640*480)60Hz
3	37.500	31.500	26.667 (840)	2.032 (64)	0.508 (16)	2.317 (120)	20.317 (640)	76.19	6.350	75.000	13.333 (500)	0.080 (3)	0.027 (1)	0.426 (16)	12.800 (480)	0.506	—	—	0.7	—	—	VESA(640*480)75Hz
4	43.269	36.000	23.111 (832)	1.556 (56)	0.556 (16)	2.222 (80)	17.778 (640)	76.92	5.334	85.008	11.764 (509)	0.089 (3)	0.023 (1)	0.578 (25)	11.093 (480)	0.647	—	—	0.7	—	—	VESA(640*480)85Hz
5	46.875	49.500	21.333 (1056)	1.616 (80)	0.323 (16)	3.232 (160)	16.162 (800)	75.76	5.171	75.000	13.333 (625)	0.064 (3)	0.021 (1)	0.448 (21)	12.800 (600)	0.512	+	+	0.7	—	—	VESA(800*600)75Hz
6	53.674	56.250	18.631 (1048)	1.138 (64)	0.569 (32)	2.702 (152)	14.222 (800)	76.34	4.409	85.061	11.756 (631)	0.056 (3)	0.019 (1)	0.503 (27)	11.179 (600)	0.559	+	+	0.7	—	—	VESA(800*600)85Hz
7	60.020	78.750	16.661 (1312)	1.219 (96)	0.203 (16)	2.235 (176)	13.004 (1024)	78.05	3.657	75.029	13.328 (808)	0.050 (3)	0.017 (1)	0.466 (36)	12.795 (768)	0.516	+	+	0.7	—	—	VESA(1024*768)75Hz
8	68.677	94.500	14.561 (1376)	1.016 (96)	0.508 (48)	2.201 (208)	10.836 (1024)	74.42	3.725	84.997	11.765 (808)	0.044 (3)	0.015 (1)	0.524 (36)	11.183 (768)	0.568	+	+	0.7	—	—	VESA(1024*768)85Hz
9	79.976	135.000	12.504 (1688)	1.067 (144)	0.119 (16)	1.837 (248)	9.481 (1280)	75.82	3.023	75.025	13.329 (1066)	0.038 (3)	0.013 (1)	0.475 (38)	12.804 (1024)	0.513	+	+	0.7	—	—	VESA(1280*1024)75Hz
10	91.146	157.500	10.971 (1728)	1.016 (160)	0.406 (64)	1.422 (224)	8.127 (1280)	74.08	2.844	85.027	13.333 (1072)	0.033 (3)	0.011 (1)	0.483 (44)	11.234 (1024)	0.516	+	+	0.7	—	—	VESA(1280*1024)85Hz
11	93.750	202.500	10.667 (2160)	0.948 (192)	0.316 (64)	1.501 (304)	7.901 (1600)	74.07	2.765	75.000	13.333 (1250)	0.032 (3)	0.011 (1)	0.491 (46)	12.800 (1200)	0.523	+	+	0.7	—	—	VESA(1600*1200)75Hz
12	106.250	229.500	9.412 (2560)	0.837 (224)	0.279 (128)	1.325 (352)	6.972 (1856)	74.08	2.441	85.000	11.765 (1500)	0.028 (3)	0.009 (1)	0.433 (56)	11.294 (1440)	0.461	+	+	0.7	—	—	VESA(1600*1200)85Hz
13	106.270	261.000	9.411 (2566)	0.828 (224)	0.368 (96)	1.349 (352)	6.866 (1792)	72.96	2.545	74.997	13.334 (1417)	0.028 (3)	0.009 (1)	0.438 (69)	12.647 (1344)	0.677	+	+	0.7	—	—	VESA(1792*1344)75Hz
14	112.500	288.000	8.889 (2840)	0.778 (216)	0.444 (144)	1.222 (352)	6.444 (1856)	72.49	2.444	75.000	13.333 (1500)	0.027 (3)	0.009 (1)	0.924 (104)	12.373 (1392)	0.951	+	+	0.7	—	—	VESA(1856*1392)75Hz
15	112.500	297.000	8.889 (2840)	0.754 (224)	0.485 (144)	1.185 (352)	6.465 (1920)	72.73	2.424	75.000	13.333 (1500)	0.027 (3)	0.009 (1)	0.498 (56)	12.800 (1440)	0.525	+	+	0.7	—	—	VESA(1920*1440)75Hz
16	35.00	30.240	28.571 (864)	2.116 (64)	2.116 (64)	3.175 (96)	21.164 (640)	74.08	7.407	66.67	15.000 (525)	0.086 (3)	0.086 (3)	1.114 (39)	13.714 (480)	1.2	—	—	0.7	—	—	APPLET(640*480)
17	49.710	57.270	20.115 (1152)	1.118 (64)	0.559 (32)	3.910 (224)	14.528 (832)	72.22	5.587	74.530	13.417 (667)	0.060 (3)	0.020 (1)	0.785 (39)	12.552 (624)	0.845	—	—	0.7	—	—	APPLET(832*624)
18	60.240	80.000	16.800 (1328)	1.200 (96)	0.400 (32)	2.200 (176)	12.800 (1024)	77.11	3.800	74.930	13.346 (804)	0.050 (3)	0.049 (3)	0.498 (30)	12.749 (768)	0.548	—	—	0.7	—	—	APPLET(1024*768)
19	68.680	100.000	14.560 (1456)	1.280 (128)	0.320 (32)	1.440 (144)	11.520 (1152)	79.12	3.040	75.060	13.322 (915)	0.044 (3)	0.043 (3)	0.568 (39)	12.667 (870)	0.612	—	—	0.7	—	—	APPLET(1152*870)
20	100.200	219.638	9.980 (2192)	0.801 (176)	0.546 (120)	1.348 (296)	7.285 (1600)	73.00	2.695	75.000	13.333 (1336)	0.033 (3)	0.01 (1)	0.519 (52)	12.774 (1280)	0.549	—	—	0.7	—	—	GTF(1600*1280)75Hz
21	107.200	234.982	9.328 (2192)	0.749 (176)	0.511 (120)	1.260 (296)	6.809 (1600)	73.00	2.520	80.000	12.5 (1340)	0.028 (3)	0.009 (1)	0.522 (56)	11.94 (1280)	0.55	—	—	0.7	—	—	GTF(1600*1280)80Hz
22	114.240	252.242	8.754 (2208)	0.698 (176)	0.507 (120)	1.205 (304)	6.343 (1800)	72.46	2.410	85.000	11.765 (1417)	0.026 (3)	0.009 (1)	0.525 (60)	11.204 (1280)	0.551	—	—	0.7	—	—	GTF(1600*1280)85Hz
23	105.675	261.229	9.463 (2472)	0.766 (200)	0.521 (136)	1.286 (336)	6.891 (1800)	72.82	2.573	75.000	13.333 (1409)	0.028 (3)	0.009 (1)	0.52 (55)	12.775 (1350)	0.548	—	—	0.7	—	—	GTF(1800*1350)75Hz
24	113.040	279.435	8.846 (2472)	0.716 (200)	0.487 (136)	1.202 (336)	6.442 (1800)	72.82	2.405	80.000	12.5 (1413)	0.027 (3)	0.009 (1)	0.522 (59)	11.943 (1350)	0.549	—	—	0.7	—	—	GTF(1800*1350)80Hz
25	120.445	299.667	8.303 (2498)	0.667 (200)	0.481 (144)	1.148 (344)	6.007 (1800)	72.35	2.296	85.000	11.765 (1417)	0.025 (3)	0.008 (1)	0.523 (63)	11.208 (1350)	0.548	—	—	0.7	—	—	GTF(1800*1350)85Hz
26	112.725	278.656	8.871 (2472)	0.718 (200)	0.488 (136)	1.206 (336)	6.460 (1800)	72.82	2.412	75.000	13.333 (1503)	0.027 (3)	0.009 (1)	0.523 (59)	12.774 (1440)	0.55	—	—	0.7	—	—	GTF(1800*1440)75Hz
27	120.560	299.953	8.295 (2488)	0.667 (200)	0.480 (144)	1.147 (344)	6.001 (1800)	72.34	2.294	80.000	12.5 (1507)	0.025 (3)	0.008 (1)	0.523 (63)	11.944 (1440)	0.548	—	—	0.7	—	—	GTF(1800*1440)80Hz
28	80.530	105.656	12.418 (1312)	1.060 (112)	0.303 (32)	1.836 (144)	9.692 (1024)	78.05	2.726	100.000	10.0 (80)	0.037 (3)	0.012 (1)	0.410 (33)	9.537 (768)	0.463	—	—	0.7	—	—	ELSA(1024*768)100Hz

Mark ○ : Factory adjustment  
 Mark □ : Factory adjustment [Though they are presets, it does not apply to the specification of the picture distortion. The sync. signals are reference to the above. (It is possible to reset with the above timings.)]  
 Mark ▲ : Initial data. [So long as initial data, the sync. signals are reference to Hs: + and Vs: -. However, it is necessary to adjust only the H-SIZE, H-PHASE, DBF-H-AMP, DBF-H-PHASE in factory mode.  
 The numbers after the marks are the number of preset.

## 6.2 Packing View





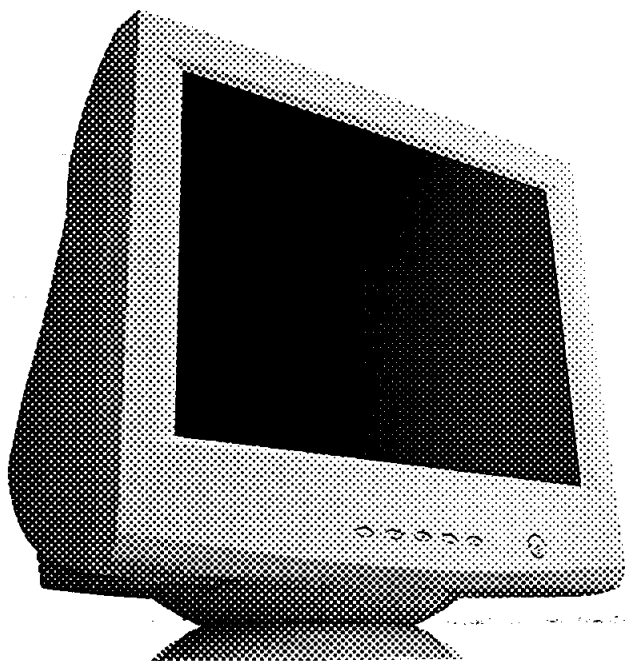
AUTO-SCANNING WITH DIGITAL CONTROL  
COLOR DISPLAY MONITOR

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## Diamond Plus 200

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MODEL **NSH1117STTKW**  
USER'S GUIDE



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

SERIAL No.

The serial number is located on the rear cover of the monitor.

Internet Home Page: <http://www.mitsubishi-display.com/>

Supplying Windows® 95/98 INF File download service, new product information, etc.

## CAUTION

The power cord provided with this monitor is designed for safety and must be used with a properly grounded outlet to avoid possible electrical shock.

Do not remove the monitor cabinet as this can expose you to very high voltages and other hazards.

### MANUFACTURER DECLARATION FOR CE-MARKING:

We, Mitsubishi Electric Corp., declare under our sole responsibility, that this product is in conformity with the following standards:

EN60950  
EN55022 Class B  
EN50082-1  
EN61000-3-2  
EN61000-3-3

following the provisions of:

73/23/EEC Low Voltage Directive  
89/336/EEC EMC Directive

### WARNING!

This product is not designed for use in life support devices and Mitsubishi Electric corporation makes no representations to the contrary. Life support devices are those devices which are used to measure, diagnose, or evaluate the tissue, systems or functions of the human body; or other devices employed to support or sustain life or good health.

### Trademark

IBM, PC, PS/2, PS/V, Personal System/2 are registered trademarks of International Business Machines Corp.

Apple Macintosh is a registered trademark of Apple Computer, Inc.  
Quadra is a trademark of Apple Computer, Inc.

UNIX is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company Limited.

ENERGY STAR is a U.S. registered mark.

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## **RADIO INTERFERENCE REGULATIONS STATEMENT FOR U.S.A.**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

THIS PRODUCT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS WITH SIGNAL CABLE SC-B104. USE IT TO REDUCE THE POSSIBILITY OF CAUSING INTERFERENCE TO RADIO, TELEVISION, AND OTHER ELECTRIC DEVICES. NO USER SERVICEABLE PARTS INSIDE. DO NOT ATTEMPT TO MODIFY THIS EQUIPMENT. IF MODIFIED, YOUR AUTHORITY TO OPERATE THIS EQUIPMENT MIGHT BE VOIDED BY FCC.

### **Declaration of Conformity - United States only**

Product Name: 22 in. (55cm) Color Display Monitor  
Type: NSH1117STTKW  
Brand Name: MITSUBISHI

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

For questions regarding this declaration, contact:

Mitsubishi Electronics America, Inc.  
5665 Plaza Drive, P.O. Box 6007,  
Cypress, California 90630-0007

or, call

714-220-2500

To identify this product, refer to the model number found on the product.

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

### **高調波ガイドライン適合品**

この装置は、情報処理装置等電波障害自主規制協議会(VCCI)の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをしてください。



### **Congratulations!**

You have just purchased a TCO'99 approved and labelled 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 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.

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\*\***

Cadmium is present in rechargeable batteries and in the colour-generating layers of certain computer displays. Cadmium damages the nervous system and is toxic in high doses. The relevant TCO'99 requirement states that batteries, the colour-generating 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. 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 mercury is not 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 manufacture 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.

# 1

Congratulations on your purchase of the high resolution color monitor. We designed this monitor to provide you with years of reliable trouble-free operation.

This guide tells you how to connect, adjust and care for your monitor. This guide also provides technical specifications and instructions for troubleshooting any basic problems you may experience with your monitor.

## 1.1 Features

This monitor is a 55cm/22" (51cm/20" Diagonal Viewable Image) intelligent, microprocessor-based monitor compatible with most analog RGB (Red, Green, Blue) display standards.

It provides crisp text and vivid color graphics with both PC and Macintosh platforms.

- The monitor's wide auto-scanning compatibility range makes it possible to upgrade video cards or software without purchasing a new monitor.
- Digitally controlled auto-scanning is done using an internal microprocessor, for horizontal scan frequencies between 30kHz and 108kHz, and vertical scan frequencies between 50Hz and 160Hz. The microprocessor-based intelligence allows the monitor to operate in each frequency mode with the precision of a fixed frequency monitor.
- The monitor contains resident memory for pre-programmed screen display standards and is also capable of storing additional user adjustment parameters.
- The monitor is capable of producing a non-interlaced maximum addressable resolution format of 1800 dots x 1440 lines. This display is well suited for windowing environments.
- Because of the analog signal inputs, the monitor can display an unlimited palette of colors that can be manually adjusted to suit your specific needs.
- The monitor has a power management function according to VESA™-DPMS™-standard. To save energy, the monitor must be connected to a system compliant with the VESA™-DPMS™-standard. (Refer to your computer and/or video card instructions for proper operation.)
- To ensure ease of installation and ongoing use, the monitor features On Screen Display (OSD) of all monitor set-up and adjustment functions.
- For use in a variety of applications, the monitor complies with UL 1950, CSA C22.2 No.950 and EN60950 for safety, FCC Class-B, VCCI Class-B and EN55022 Class-B for EMI, MPR-II, ISO 9241-3, ISO9241-7 and ISO9241-8 for ergonomics. The monitor also complies with TCO'99 guideline for environmental safe use.
- The world's standard DIAMONDTRON NF CRT upgraded and pure picture images.
- The monitor complies with Video Electronics Standards Association (VESA™) DDC™1/2B(EDID) specification. If your computer is Plug & Play compliant setup will be done automatically.
- Fine 0.24mm aperture grille pitch/Maximum addressable resolution of 1800 x 1440.

## 1.2 Internal Preset Memory Capability

To minimize adjustment needs, the factory has preset popular display standards into the monitor, as shown in Table 1. If any of these display standards are detected, the picture size and position are automatically adjusted. All of the factory presets may be overwritten by adjusting the user controls. This monitor is capable of automatically storing up to 15 additional display standards. The new display information must differ from any of the existing display standards by at least 1kHz for the horizontal scan frequency or 1Hz for the vertical scan frequency or the sync signal polarities must be different.

Table 1. Memory Buffer Factory Presets

PRESET TIMING	Fh(kHz)	Fv (Hz)	Polarity	
			H	V
640 x 480 N.I.	31.5	60.0	-	-
800 x 600 N.I.	53.7	85.1	+	+
1024 x 768 N.I.	60.0	75.0	+	+
1024 x 768 N.I.	68.7	85.0	+	+
1152 x 870 N.I.	68.7	75.1	-	-
1280 x 1024 N.I.	80.0	75.0	+	+
1280 x 1024 N.I.	91.1	85.0	+	+
1600 x 1200 N.I.	93.8	75.0	+	+
1600 x 1200 N.I.	106.3	85.0	+	+

## 1.3 Power Management Function

The monitor has a power management function which reduces the power consumption of the monitor when not in use.

Power saving mode is invoked by a VESA DPMS-compliant computer. Check your computer's manual for setting this function.

Mode	Power	Power-On Indicator
Normal	140 W	Green
Power Saving Mode	≤ 5 W	Amber

## 1.4 DDC

The monitor includes the VESA DDC<sup>TM</sup>1 and DDC<sup>TM</sup>2B feature. DDC (Display Data Channel) is a communication channel over which the monitor automatically informs the computer system about its capabilities (e.g. each supported resolution with its corresponding timing). DDC is routed through previously unused pins of the 15-pin VGA connector.

The system will "Plug and Play" if both monitor and computer implement the DDC protocol.

## 1.5 Location Considerations

When setting up and using the monitor, keep the following in mind:

- For optimum viewing, avoid placing the monitor against a bright background or where sunlight or other light sources may reflect on the display area of the monitor. Place the monitor just below eye level.
- Place the monitor away from strong magnetic or electromagnetic fields, such as high capacity transformers, electric motors, large current power lines, steel pillars, etc....  
Magnetism can cause distortion in the picture and/or color purity.
- Avoid covering the slots or openings of the monitor. Allow adequate ventilation around the monitor so the heat from the monitor can properly dissipate. Avoid putting the monitor into any enclosure that does not have adequate ventilation.
- Avoid exposing the monitor to rain, excessive moisture, or dust, as this can cause a fire or shock hazard.
- Avoid placing the monitor, or any other heavy object, on the power cord. Damage to the power cord can cause a fire or electrical shock.
- When transporting the monitor, handle it with care.

## 1.6 Cleaning Your Monitor

When cleaning the monitor, please follow these guidelines:

- Always unplug the monitor before cleaning.
- Wipe the screen and cabinet front and sides with a soft unspoil cloth to prevent causing imperfections.
- If the screen requires more than dusting, apply water or neutral detergent to a soft cloth to clean the monitor screen.

### CAUTION

- Do not use benzene, thinner or any volatile substances to clean the unit as the finish may be permanently marked.
- Never leave the monitor in contact with rubber or vinyl for an extended time period.
- Do not spray directly on the screen as cleaner may drip into the monitor and damage the circuitry.
- Never use an abrasive cleaner on the screen surface as this will damage the anti-reflection coating.



## 1.7 Unpacking

After you unpack the box you should have all of the items indicated in Figure 1. Save the box and packing materials in case you transport the monitor. Complete and mail in warranty card.

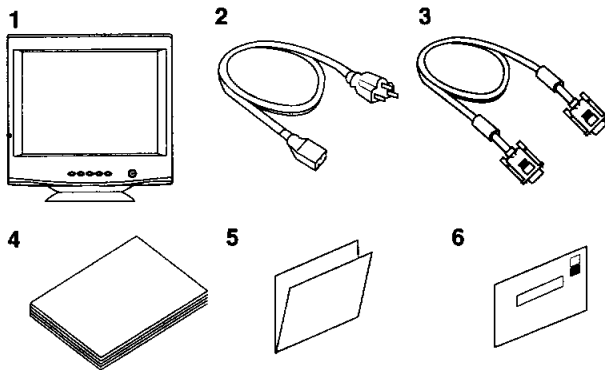


Figure 1

- |                         |                                    |
|-------------------------|------------------------------------|
| 1. Color Monitor        | 4. User's Guide<br>(this document) |
| 2. AC Power Cord        | 5. Warranty-Card                   |
| 3. Signal Cable SC-B104 | 6. Questionnaire-Card              |

## 1.8 Tilt/Swivel Base

The monitor comes with a tilt/swivel base. This enables you to position the monitor at the best angle and tilt for maximum viewing comfort.

### Screen Position Adjustment

Adjust the tilt and rotation of the monitor by placing your hands at opposite sides of the case. You can adjust the monitor 90 degrees right or left, 10 degrees up or 5 degrees down, as shown below.

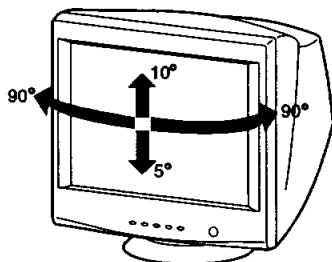


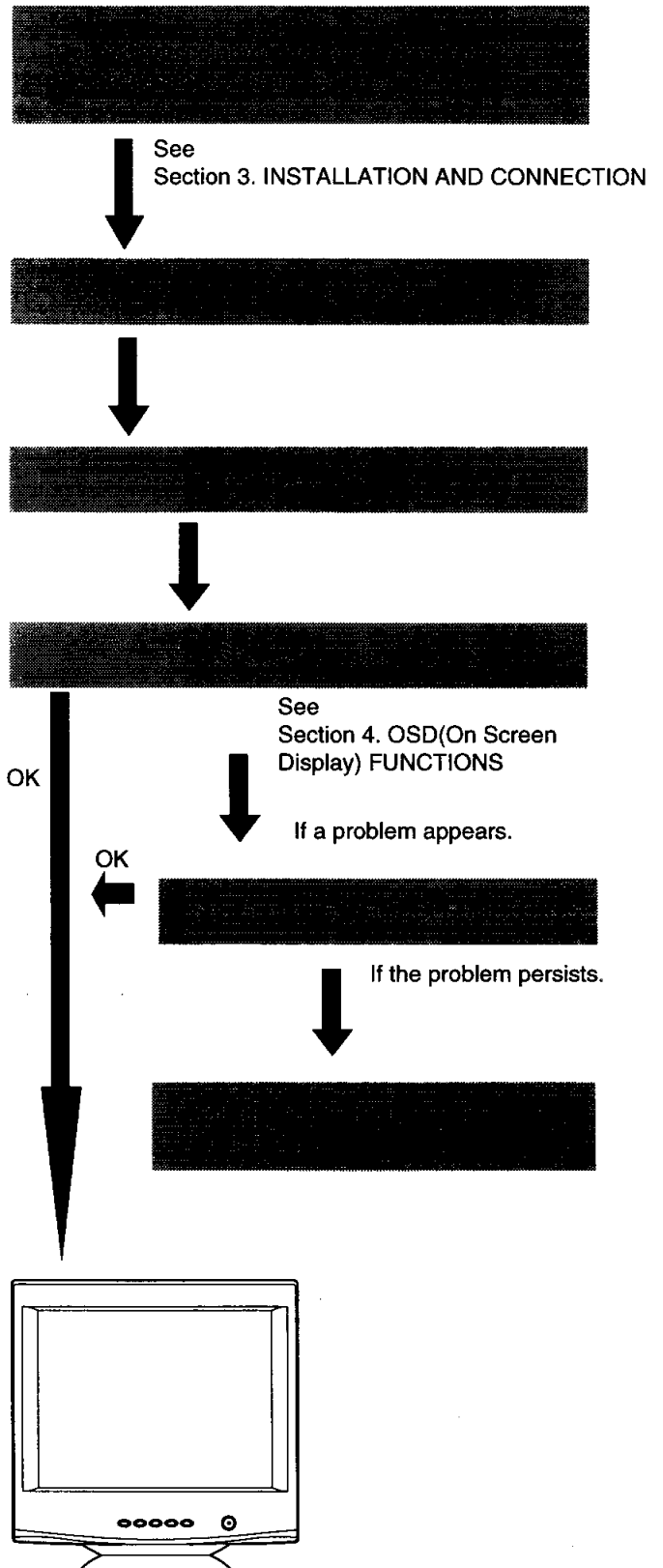
Figure 2

### CAUTION

Keep your fingers away from the pivot area of the tilt/swivel base.

## 1.9 Quick Operation Chart

To summarize the steps in connecting your computer with the color monitor and setting the necessary controls and switches, refer to the chart below.



# 2

## 2.1 Control Names

See Figures 3 and 4 for the location of the user controls, indicator and connectors.

Each part is identified by number and is described individually.

### FRONT

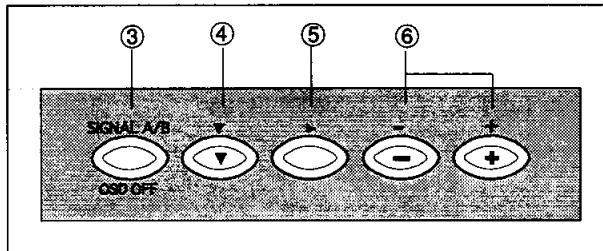
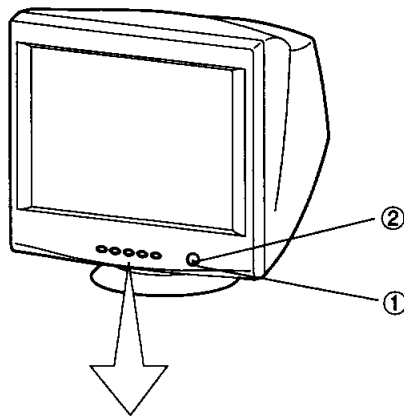


Figure 3

### REAR

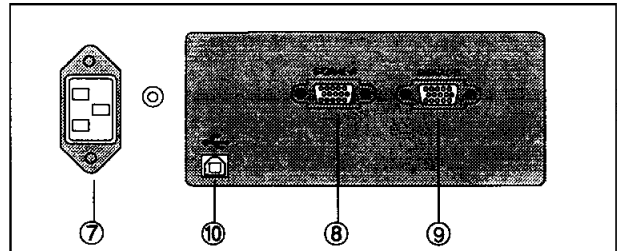
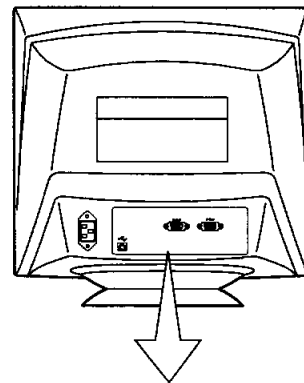


Figure 4

## 2.2 Function

1. **POWER SWITCH:** A push-on / push-off switch for AC power.
2. **POWER-ON INDICATOR:** This indicator illuminates green when AC power is on, and illuminates amber when the monitor is in the power management modes.
3. **INPUT CONNECTOR SELECT/OSD OFF BUTTON:**
  - Without OSD screen, push to select the signal input connector, SIGNAL A or B.
  - With OSD screen, push to turn the OSD screen off.

### NOTE

If only one input is used, the monitor will select it automatically.

4. **DOWN BUTTON:** Push to select group icon.
5. **ITEM SELECT BUTTON:** Push to select the item icon.
6. **FUNCTION ADJUST BUTTONS:** Push the adjust buttons to adjust the image on the screen.

### 7. AC POWER CONNECTOR

### 8. SIGNAL INPUT CONNECTOR (SIGNAL A):DB9-15P

### 9. SIGNAL INPUT CONNECTOR (SIGNAL B):DB9-15P

### 10. UPSTREAM PORT: To connect to a USB equipped computer for Monitor Control Function.

# 3

On the back of the monitor three plug-in connections are provided: AC power connector for the AC input, and two DB9-15P connectors for video signal input.

## 3.1 AC Power Connection

One end of the AC power cord is connected to the AC power connector on the back of the monitor. The other end is plugged into a properly grounded three-prong AC outlet. The monitor's auto-sensing power supply can automatically detect 100-120V AC or 220-240V AC and 50 or 60Hz.

## 3.2 Signal Cable Connection

The DB9-15P(VGA) connector is provided for compatible analog RGB outputs from your computer. Apple Macintosh computers can also be interfaced with using the optional Mitsubishi Macintosh adapter AD-A205.

### 3.2.1 Connecting to Any IBM VGA Compatible System

Figure 5 shows the SC-B104 cable connection to the Video Graphics Array (VGA) port in an IBM Personal System/2® series, or any VGA compatible system.

1. Power off, both the monitor and the computer.
2. Connect the one end of the SC-B104 cable to the DB9-15P connector on the VGA controller card.
3. Connect the other end of the SC-B104 cable to the DB9-15P receptacle on the back of the monitor.
4. Power on the monitor, then the computer.
5. After using the system, power off the monitor, then the computer.

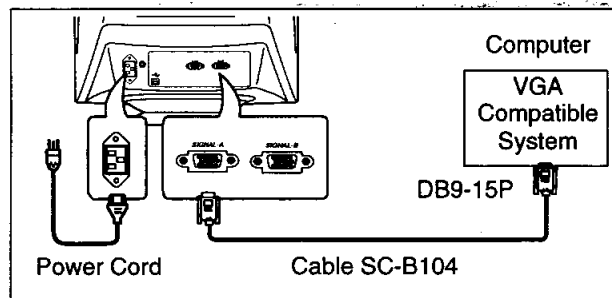


Figure 5

### CAUTION

The socket-outlet shall be installed near the equipment and shall be easily accessible. During servicing, disconnect the plug from the socket-outlet.  
Même si le moniteur est mis hors tension il reste toujours alimenté. La prise secteur devrait ainsi être facilement accessible en cas d'urgence.

## 3.2.2 Connecting to An Apple Macintosh Computer

Figure 6 shows the SC-B104 cable and AD-A205 Adapter(option) to the video port in an Apple Macintosh.

For Macintosh Adapter AD-A205, contact your dealer.

1. Power off, both the monitor and the computer.
2. Set the DIP switches of Macintosh Adapter according to the setting chart.  
(See Section 7.3 Optional Macintosh Adapter AD-A205 Settings)
3. Connect the 15-pin (DB-15P) end of the AD-A205 Adapter to the straight 15-pin connector on the Macintosh video port on the computer or on the video board.
4. Connect the sub-miniature 15-pin (DB9-15P) end of the AD-A205 Adapter to the SC-B104 cable.
5. Connect the other end of the SC-B104 cable to the DB9-15P receptacle on the back of the monitor.
6. Power on the monitor, then the Macintosh.
7. After using the system, power off the monitor, then the Macintosh.

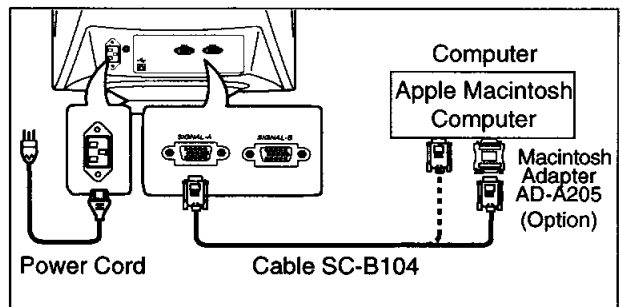


Figure 6

### NOTE

- For the Apple Macintosh Computers having a VGA compatible port, steps 2 through 4 are not necessary. Connect the end of the signal cable to the port directly.
- In case of Apple Macintosh G3 series, use "Control Panel" of "Apple Menu" when selecting a resolution. If select the resolution from "Control Bar", no screen may be displayed and the computer may freeze.

## 3.2.3 Connecting to two computers

Figure 7 shows the connection to two computers

Refer to clause 3.2.1 or 3.2.2 for the connection procedure.

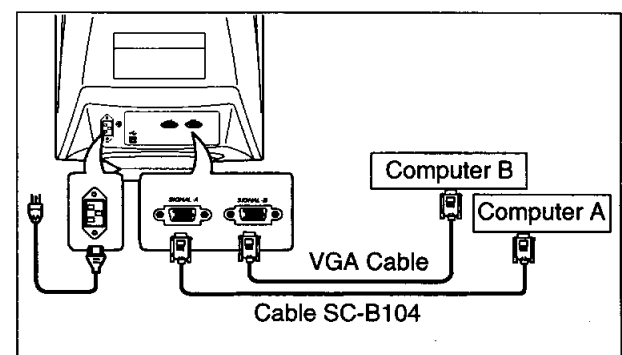
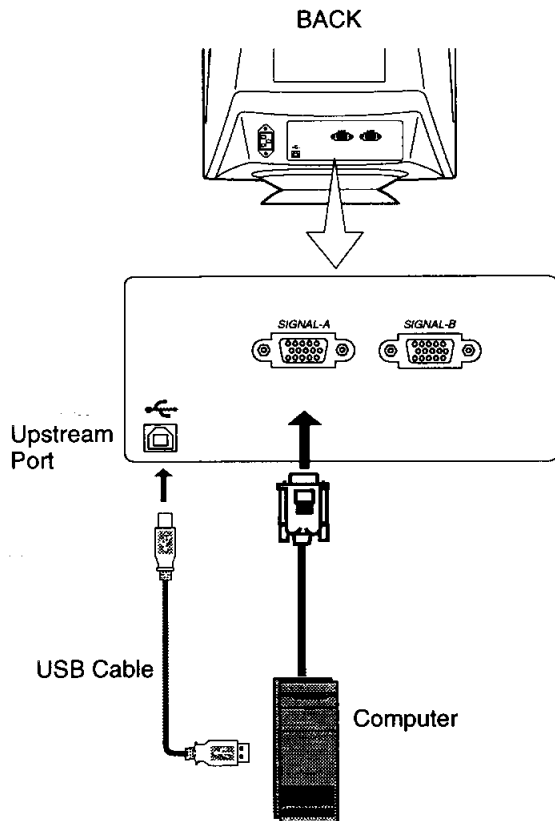


Figure 7

### 3.3 Installation of USB Function

1. Power on the display monitor and then the computer.
2. Enumerate the Mitsubishi Monitor Function using the following procedure.

- (1) Insert Windows® 98 CD-ROM into your computer.
- (2) Connect the computer and the display monitor with an USB cable.



#### NOTE

The computer is required to have Windows® 98 installed and USB functions.

- (3) Then, Figure 8 will appear.

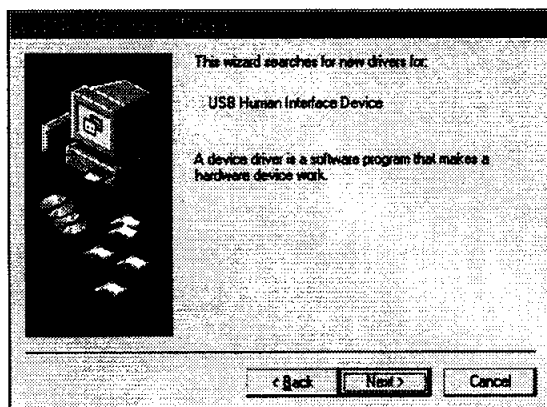


Figure 8

- (4) Click "Next" on Figure 8 and Figure 9 will appear.

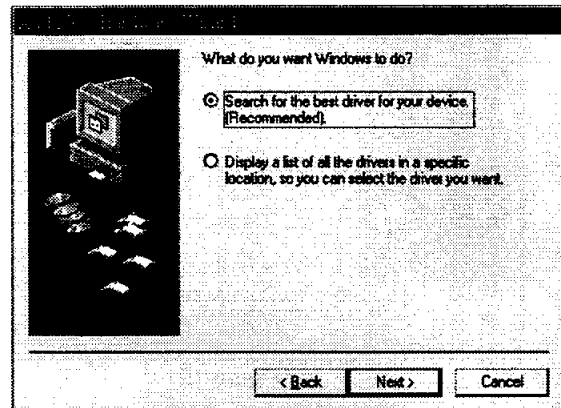


Figure 9

- (5) Click "Next" on Figure 9 and Figure 10 will appear.

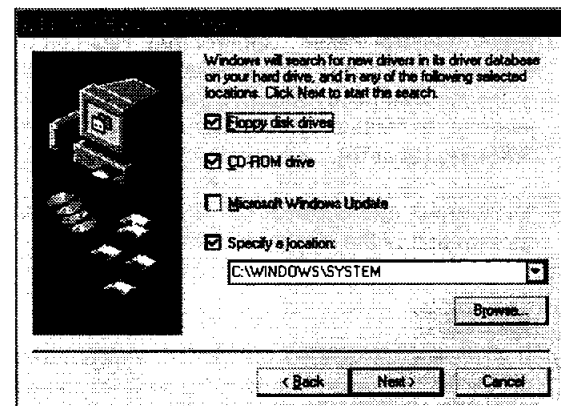


Figure 10

- (6) Click "CD-ROM Drive(C)", and click "Next". Figure 11 will appear.

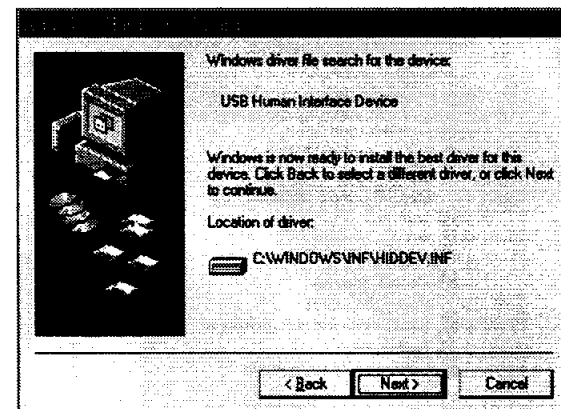


Figure 11

- (7) Click "Next" on Figure 11 and Figure 12 will appear. Click "Finish" on Figure 12 to complete Enumeration of Mitsubishi Monitor Function.

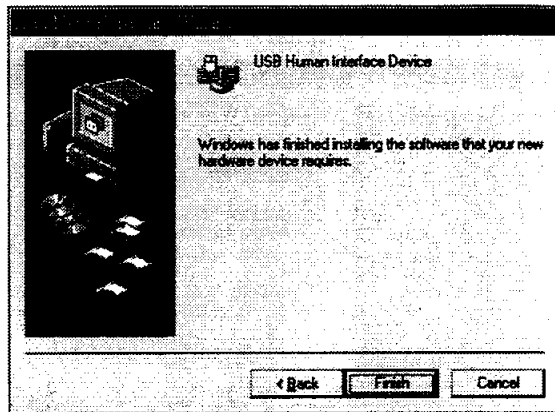


Figure 12

You can confirm that Enumeration of Mitsubishi Monitor Function is successful with the following method.

- Open "Device Manager" tab in "System" property under "Control Panel". Confirm that "HID-compliant Device" and "USB Human Interface Device" are listed in "Human Interface Device". If you can't confirm it, re-enumerate "Mitsubishi Monitor Function" again by following (a) or (b).
- (a) Disconnect and connect the USB cable to the upstream port of the display monitor.
- (b) Cycle power of the display monitor off then on.

**NOTE**

If the mark ① appears with "HID-Compliant Device" and/or "USB Human Interface Device", the enumeration was unsuccessful. Select "HID-Compliant Device" and/or "USB Human Interface Device marked with ① mark and click "Remove" and "Refresh". After that, the enumeration is automatically started.

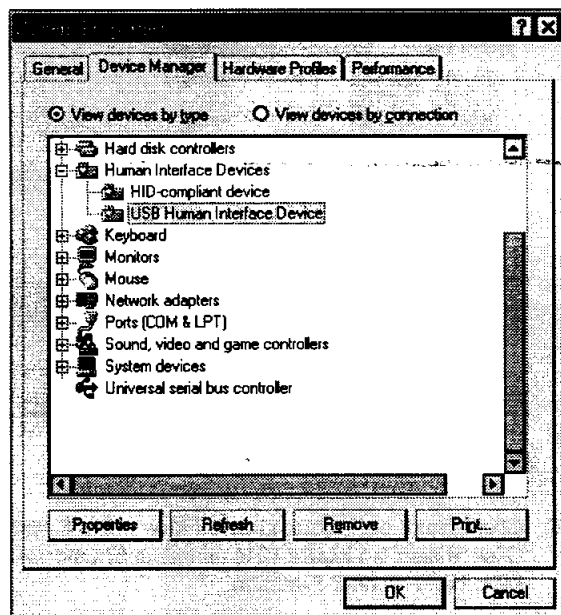


Figure 13

- (8) USB Monitor Control will be available when installing "USB Monitor Control Software" into the computer. The "USB Monitor Control Software" can be downloaded from Mitsubishi Internet Home Page:  
<http://www.mitsubishi-display.com/>

**NOTE**

The following should be observed in order to use the USB function reliably:

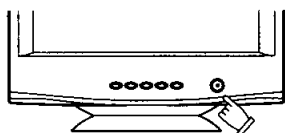
- Make sure the connection is made firmly and correctly.
- Close all Windows program before changing the Upstream port or disconnecting USB cable.

# 4

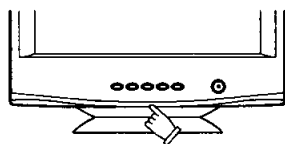
## 4.1 How to adjust the screen

The monitor has an OSD(On Screen Display) function. The following procedure shows how to adjust the screen using the OSD function.

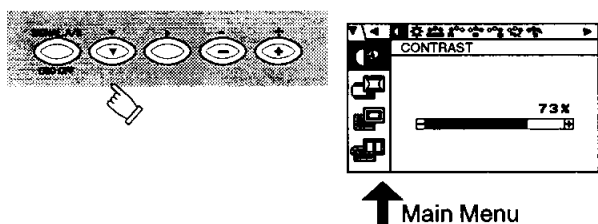
(1) Turn on the monitor.



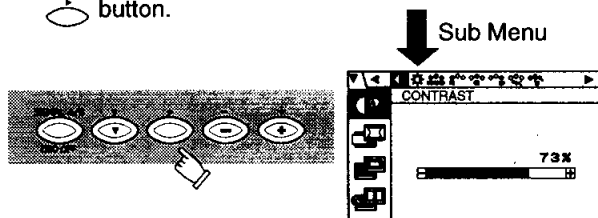
(2) Press button to display the OSD screen.



(3) Select the group icon on Main Menu by pressing .



(4) Select the item icon on Sub Menu by pressing button.

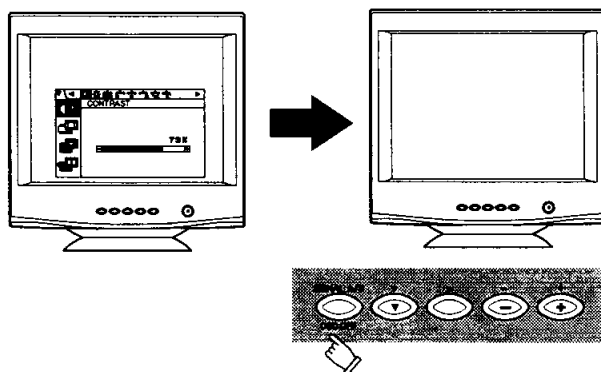


(5) Adjust by pressing or button.



(6) If you don't press any button for about 12 seconds, the OSD screen will disappear.

The OSD can be turned off quickly by pressing button.





### NOTE

When pressing both and buttons simultaneously, moving direction of item selection becomes reverse.

## 4.2 Adjustment Items




























X: Available

Items	Function	A	B	C	D
CONTRAST	Adjusts the contrast level.		X	X	X
BRIGHT	Adjusts the black level of the screen		X	X	X
COLOR NO	Select the desired color from Color 1, Color 2, and Color 3 presets.			X	
R-GAIN	Adjusts the red-color balances for the selected color.		X	X	X
G-GAIN	Adjusts the green-color balances for the selected color.		X	X	X
B-GAIN	Adjusts the blue-color balances for the selected color.		X	X	X
COLOR TEMPERATURE	Adjusts the color temperature of the image on the screen.		X	X	X
COLOR RESET	Restores the each color gain and color temperature to the factory preset.	-	-	-	-
HORIZ-SIZE	Adjusts the horizontal size of the image on the screen.	X	X	X	
HORIZ-PHASE	Adjusts the horizontal position of the image on the screen.	X	X	X	
VERT-SIZE	Adjusts the vertical size of the image on the screen.	X	X	X	
VERT-POSITION	Adjusts the vertical position of the image on the screen.	X	X	X	
PINCUSHION	Straightens the left and right sides of the image on the screen.	X	X	X	
KEystone	Adjusts the parallelism of the left and right sides of the image on the screen.	X	X	X	
TOP-PIN	Adjusts the pincushioning at the top corners of the screen.	X	X	X	
BOTTOM-PIN	Adjusts the pincushioning at the bottom corners of the screen.	X	X	X	
PIN-BALANCE	Adjusts the curvature of the left and right sides of the image on the screen.	X	X	X	
KEY-BALANCE	Adjusts the vertical slant or tilt of the screen image.	X	X	X	
VERT-LIN-BALANCE	Centers the linearity of the vertical axis of the screen.	X	X	X	
VERT-LIN	Adjusts the linearity of the vertical axis of the screen.	X	X	X	
ROTATION	Adjusts the rotation of the image on the screen.		X	X	X
ZOOM	Zooms the screen to all sides.	X	X	X	
GEOMETRY RESET	Restores to the factory preset level.(See "NOTE" below.)	-	-	-	-
FINE PICTURE MODE	Selects the status which provides the most pleasing image.			X	
HORIZ-CONVERGENCE	Adjusts the horizontal alignment of the red, green and blue beams.		X	X	X
VERT-CONVERGENCE	Adjusts the vertical alignment of the red, green and blue beams.		X	X	X
CORNER PURITY (TL)	Adjusts the purity of the top-left corners of the screen.		X	X	X
CORNER PURITY (TR)	Adjusts the purity of the top-right corners of the screen.		X	X	X
CORNER PURITY (BL)	Adjusts the purity of the bottom-left corners of the screen.		X	X	X
CORNER PURITY (BR)	Adjusts the purity of the bottom-right corners of the screen.		X	X	X
MOIRE CANCEL	When setting to ON, the moire level on the screen can decreased by the MOIRE CANCEL LEVEL.			X	
MOIRE CANCEL LEVEL	Adjusts the moire level on the screen.		X	X	
CLAMP PULSE POSITION	Uses this function to eliminate excessive green or white background that may occur when both Sync-On-Green and external sync signals are applied to the monitor.			X	
VIDEO LEVEL	Selects video level 1.0V or 0.7V. (0.7V Standard)			X	
DEGAUSS	Eliminates possible color shading or impurity.	-	-	-	-
POWER SAVE	When setting to ON, the power consumption of the monitor will be reduced when not in use if your computer is set for power management.			X	X
CONTROL LOCK	Locks the OSD function except for "BRIGHT" and "CONTRAST".				X
OSD POSITION	Moves the OSD screen position.			X	X
ALL RESET	Restores all items to the factory preset level.(See "NOTE" below.)	-	-	-	-
GTF AUTO ADJUST	Adjusts the screen size and distortion automatically.	-	-	-	-
DIAGNOSIS	Indicates the current scanning frequency, factory or user preset timing number, and signal input connector.	-	-	-	-
LANGUAGE	Selects the language used on OSD screen.				X
























- Press "GEOMETRY RESET" to restore to the factory preset level.
- Press  and  buttons together, to restore to the factory preset level.
- Press "ALL RESET" to restore to the factory preset level.
- Set data does not change by the change of the signal timing.

### NOTE

If a non-Factory Preset timing is used, "GEOMETRY RESET" and "ALL RESET" do not work.

Group Icon	Item Icon	Item	Press the Minus Button 	Press the Plus Button 
		CONTRAST	To decrease the contrast.	To increase the contrast.
		BRIGHT	To decrease the brightness.	To increase the brightness.
		COLOR NO	To select color 1, color 2, color 3.	
		R-GAIN	To decrease red color level of the color mode selected by "COLOR NO".	To increase red color level of the color mode selected by "COLOR NO".
		G-GAIN	To decrease green color level of the color mode selected by "COLOR NO".	To increase green color level of the color mode selected by "COLOR NO".
		B-GAIN	To decrease blue color level of the color mode selected by "COLOR NO".	To increase blue color level of the color mode selected by "COLOR NO".
		COLOR TEMPERATURE	To decrease the color temperature of the color mode selected by "COLOR NO".	To increase the color temperature of the color mode selected by "COLOR NO".
		COLOR RESET	_____	To restore the color-gain and color temperature of the color mode selected by "COLOR NO" to the factory preset.
		HORIZ-SIZE	To narrow the width of the image on the screen.	To expand the width of the image on the screen.
		HORIZ-PHASE	To move the image on the screen to the left.	To move the image on the screen to the right.
		VERT-SIZE	To narrow the height of the image on the screen.	To expand the height of the image on the screen.
		VERT-POSITION	To move the image down.	To move the image up.
		PINCUSHION	To collapse the center of the image.	To expand the center of the image.
		KEystone	To decrease the width at the top of the screen image and to increase the width at the bottom.	To increase the width at the top of the screen image and to decrease the width at the bottom.
		TOP-PIN	To expand the width of the screen image near the corners of top.	To narrow the width of the screen image near the corners of top.
		BOTTOM-PIN	To expand the width of the screen image near the corners of bottom.	To narrow the width of the screen image near the corners of bottom.
		PIN-BALANCE	To move the top and bottom of the screen image to the right.	To move the top and bottom of the screen image to the left.
		KEY-BALANCE	To make the screen slant to the left.	To make the screen slant to the right.
		VERT-LIN-BALANCE	To vertically expand the bottom of the screen and compress the top.	To vertically compress the bottom of the screen and expand the top.
		VERT-LIN	To vertically compress the center of the screen and expand the top and bottom.	To vertically expand the center of the screen and compress the top and bottom.
		ROTATION	To rotate the image counterclockwise.	To rotate the image clockwise.
		ZOOM	To narrow the screen to all sides.	To expand the screen to all sides.
		GEOMETRY RESET	_____	To restore to factory preset level.



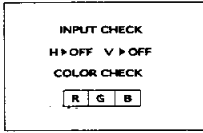
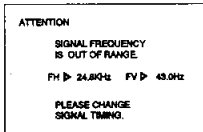
Group Icon	Item Icon	Item	Press the Minus Button 	Press the Plus Button 
		FINE PICTURE MODE	To select the status which provides the most pleasing image.	
		HORIZ-CONVERGENCE	To adjust the horizontal beam alignment on the full screen area.	
		VERT-CONVERGENCE	To adjust the vertical beam alignment on the full screen area.	
		CORNER PURITY(TL)	To adjust the purity condition on the top-left corner.	
		CORNER PURITY(TR)	To adjust the purity condition on the top-right corner.	
		CORNER PURITY(BL)	To adjust the purity condition on the bottom-left corner.	
		CORNER PURITY(BR)	To adjust the purity condition on the bottom-right corner.	
		MOIRE CANCEL	To select the Moire Cancel mode off.	To select the Moire Cancel mode on.
		MOIRE CANCEL LEVEL	To decrease the level of the moire-clear wave.	
		CLAMP PULSE POSITION	To eliminate an excessive green or white-back ground that may occur when both Sync-On-Green and external sync signals are applied to the monitor. To clamp the video signal at the front of the H-Sync pulse.	To clamp the video signal at the back of the H-Sync pulse. If you connect to an older Macintosh, you may need to press plus button.
		VIDEO LEVEL	To select 1.0V of video input.	To select 0.7V of video input.
		DEGAUSS	_____	To eliminate possible color shading or impurity due to magnetic effects.
		POWER-SAVE	To select the constant power consumption mode.	To select the power-save mode. (Your computer must be set for power management.)
		CONTROL LOCK	To unlock the OSD function.	To lock the OSD function except for "BRIGHT" and "CONTRAST".
		OSD POSITION	To move the OSD screen position in a counter clockwise direction.	To move the OSD screen position in a clockwise direction.
		ALL RESET	_____	To restore all items to the factory preset.
		GTF AUTO ADJUST	_____	To adjust screen size, position and distortions automatically.
		DIAGNOSIS	To show the current scanning frequency, Preset No., and signal input connection.	
		LANGUAGE	To choose the language used on OSD. ENG.....English, FRA.....French, ESP.....Spanish, ITA.....Italian, GER.....German, JPN.....Japanese	

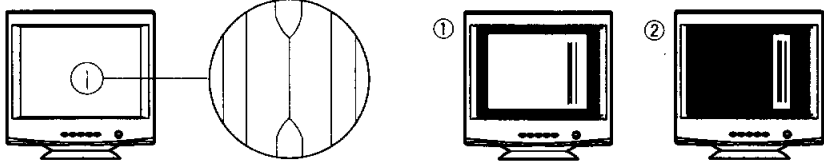
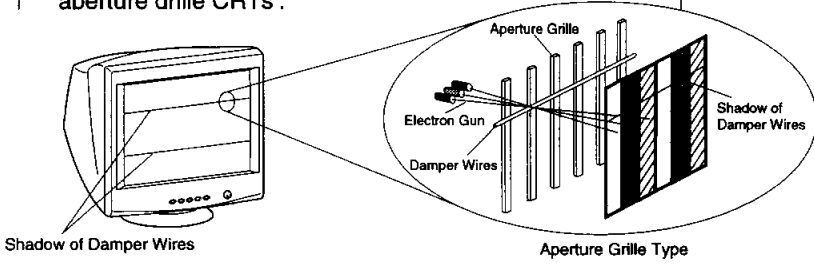
#### NOTE

**CONTROL LOCK:** This is to lock the OSD function to keep the OSD screen image you set.  
Press plus button to lock the OSD function. You can adjust only "BRIGHT" and "CONTRAST" at the condition.  
Press minus button to unlock the locked condition.

**GTF:** This function is available when the computer has the GTF™ function according to the VESA®GTF™ standard.

Before calling your Authorized Product Support, please check that the items below are properly connected or set. In case of using a non-standard signal, please check the pin assignments and the signal timing of your computer with the specification outlined in Section 6. SPECIFICATIONS and Section 7. APPENDIX.

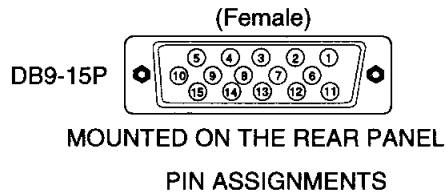
PROBLEM		ITEMS TO CHECK	LOCATION
No picture	LED On (Green)	<ul style="list-style-type: none"> <li>Contrast and brightness controls.</li> </ul>	<ul style="list-style-type: none"> <li>Front</li> </ul>
	LED Off	<ul style="list-style-type: none"> <li>Power switch.</li> <li>AC power cord disconnected.</li> </ul>	<ul style="list-style-type: none"> <li>Front</li> <li>Rear</li> </ul>
	LED On (Amber)	<ul style="list-style-type: none"> <li>Signal cable disconnected.</li> <li>Computer power switch.</li> <li>Power management function is active.</li> </ul>	<ul style="list-style-type: none"> <li>Rear</li> <li>Computer</li> <li>Press any key on the keyboard or move the mouse.</li> </ul>
The following message appeared 		<ul style="list-style-type: none"> <li>Signal cable disconnected.</li> <li>Computer power switch.</li> <li>Power management function is active.</li> </ul>	<ul style="list-style-type: none"> <li>Rear</li> <li>Computer</li> <li>Press any key on the keyboard or move the mouse.</li> </ul>
The following message appeared 		<ul style="list-style-type: none"> <li>Input signal frequency range is too high or too low for the monitor to synchronize with.</li> </ul>	<ul style="list-style-type: none"> <li>Check the specification of graphics adapter</li> </ul>
Abnormal picture	Display is missing, center shifts, or too small or too large of a display size	<ul style="list-style-type: none"> <li>Do "GEOMETRY-RESET" or "ALL RESET" for a standard signal.</li> <li>Adjust HORIZ-SIZE, VERT-SIZE, HORIZ-PHASE, and VERT-POSITION with non-standard signals.</li> <li>Monitor may not be able to get full-screen image depend on signal. In this case, please select other resolution, or other vertical refresh timing.</li> <li>Make sure you wait a few seconds after adjusting the size of the image before changing or disconnecting the signal.</li> </ul>	<ul style="list-style-type: none"> <li>Front (OSD)</li> <li>Front (OSD)</li> </ul>
	Display is dark or too bright	<ul style="list-style-type: none"> <li>"VIDEO LEVEL" is not at the appropriate position for your graphics adapter output. (0.7v or 1.0Vp-p).</li> </ul>	<ul style="list-style-type: none"> <li>Front (OSD)</li> </ul>

PROBLEM	ITEMS TO CHECK	LOCATION
<p>Abnormal Picture</p> <p>Black vertical lines are visible on the screen.</p>	<ul style="list-style-type: none"> <li>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.</li> </ul> <p>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 levels after this procedure.</p> 	<ul style="list-style-type: none"> <li>—</li> </ul>
<p>Two fine horizontal lines are visible on the screen.</p>	<ul style="list-style-type: none"> <li>The 2 very faint thin lines across the screen are normal. They are caused by the aperture grille stabilization filaments (Damper Wires) which are required for all aperture grille CRTs.</li> </ul> 	<ul style="list-style-type: none"> <li>—</li> </ul>
<p>A buzzing sound when power on.</p>	<ul style="list-style-type: none"> <li>A brief vibration or hum sound that is heard just after power up is normal. This is caused by the automatic degaussing function. This sound will be heard each time the monitor is powered up from a cold start and each time the manual degauss button is used.</li> </ul>	<ul style="list-style-type: none"> <li>—</li> </ul>

CRT	Size	55cm/22"(51cm/20" Diagonal Viewable Image)
	Mask type	Aperture grille
	Gun	In-line
	Deflection angle	90°
	Phosphors	Red, Green, Blue EBU (medium short persistence)
	Aperture grille pitch	0.24mm
	Phosphor pitch	0.25mm
	Face Plate	Anti-glare, Anti-reflection and Anti-static coating
	Focusing method	Dynamic Beam Forming (DBF)
INPUT SIGNAL	Video	0.7Vp-p analog RGB
	Sync	Sync. on Green or separate H, V sync., or Composite sync
SIGNAL INTERFACE	Input Connectors	DB9-15P x 2
	Input Impedance	75Ω (video), 2.2kΩ (sync.)
SCANNING FREQUENCY	Horizontal	30 - 108kHz
	Vertical	50 - 160Hz
RESOLUTION (HxV)	1800 dots x 1440 lines Non-Interlaced maximum addressable resolution format at 72Hz	
WARM-UP TIME	30 minutes to reach optimum performance level	
BRIGHTNESS	100cd/m², standard full white video signal at 9300K (+ 8MPCD)	
BLANKING TIME	Horizontal	≥ 2.3 μsec (typ.)
	Vertical	≥ 450 μsec (typ.)
DISPLAY SIZE	393mm x 295mm(typ.)	ratio 4:3
COLOR	5000K-9300K	
POWER SOURCE	AC100-120/220-240V±10% 50/60Hz 140W (typ.)	
OPERATING ENVIRONMENT	Temperature	5 - 35°C
	Humidity	10 - 90%RH (without condensation)
DIMENSIONS	(W)19.7inch x (H)19.7inch x (D)19.0inch / (W) 500mm x (H) 500mm x (D) 482mm	
WEIGHT	Approx. 29.5kg (65 lbs.)	
TILT/SWIVEL BASE	Tilt Angle	-5° - +10°
	Swivel Angle	±90°
REGULATIONS	Safety	UL1950 (UL), CSA C22.2 No.950 (C-UL) EN60950 (TÜV-GS)
	EMC	FCC Class-B, DOC Class-B EN55022 Class-B, VCCI Class-B EN50082-1, EN61000-3-2, EN61000-3-3
	X-Ray	DHHS, HWC, Röv vom 8.1, 1987
	Other	CE-Marking, MPR-II/TCO'91 ISO9241-3, ISO9241-7, ISO9241-8 (TÜV-GS) TCO '99 International ENERGY STAR Program Guidelines for the Suppression of Harmonics in Appliances and General-Use Equipment

# 7

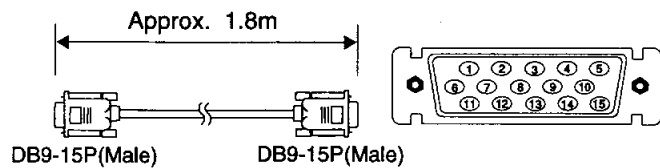
## 7.1 Monitor Signal Input Connector (DB9-15P)



Pin No.	Signal
1	RED VIDEO
2	GREEN VIDEO or COMPOSITE SYNC with GREEN VIDEO
3	BLUE VIDEO
4	GROUND
5	DDC GROUND
6	RED GROUND
7	GREEN GROUND
8	BLUE GROUND
9	NC
10	SYNC GROUND
11	GROUND
12	SDA
13	HORIZONTAL SYNC or COMPOSITE SYNC
14	VERTICAL SYNC(VCLK)
15	SCL

DDC ..... DISPLAY DATA CHANNEL  
SDA ..... SERIAL DATA  
SCL ..... SERIAL CLOCK  
NC ..... NO-CONNECTION

## 7.2 SC-B104 Signal Cable



Pin No.	Signal
1	RED
2	GREEN
3	BLUE
4	GROUND
5	DDC GROUND
6	RED GROUND
7	GREEN GROUND
8	BLUE GROUND
9	NC
10	SYNC GROUND
11	GROUND
12	SDA
13	HORIZONTAL SYNC
14	VERTICAL SYNC(VCLK)
15	SCL

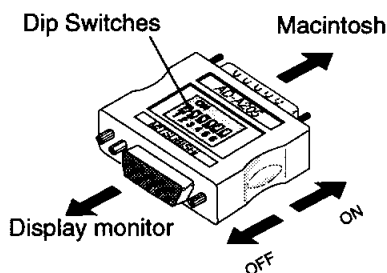
DDC ..... DISPLAY DATA CHANNEL  
SDA ..... SERIAL DATA  
SCL ..... SERIAL CLOCK  
NC ..... NO-CONNECTION

## 7.3 Optional Macintosh Adapter AD-A205 Settings

The AD-A205 Macintosh Adapter(option) allows you to take an advantage of the built in video capabilities of your Macintosh computer with the monitor.

- (1) Set the dip switches of the adapter, before connect to the computer.

- (2) Set the dip switches according to the following chart. By using the following chart, you can choose a main resolution, quickly.  
If you wish to operate by other resolution, refer to next page; "AD-A205 Mac Adapter Setting Chart"



Apple Macintosh	Switch ON	Switch Setting
Macintosh IIsi, IIfx, IIfx, IIfx, LC, LC II	1,2	
Macintosh LC III, LC475, LC630	2,4	
Macintosh Quadra 610, 650, 700, 800, 840AV, 900, 950 Macintosh Centris 610, 650, 660AV	1,2,3,4	
Performa 6260, 6310, 6410, 6420 Power Macintosh 6100, 6100AV, 6200, 6300 Power Macintosh 7100AV, 7200, 7300, 7500, 7600 Power Macintosh 8100, 8100AV, 8500, 8600 Power Macintosh 9500, 9600 Workgroup Server 7350, 8150, 9150, 9650	1,2,6	
Power Macintosh 4400, G3	3,4	

- (3) "AD-A205 Mac Adapter Setting Chart" shows all available modes for Macintosh systems and all possible combinations with the monitor.
- We recommend that you use the monitor with a preset timing. (See Section 1.2 Internal Preset Memory Capability)
- (4) Please refer to the instruction book of your computer about the resolution setting.  
Resolution may not be changed on some computers.

## <Optional Macintosh AD-A205 Adapter Setting Chart>

● Set the dip switch "ON" as shown below. (Example: "1,2" )

RESOLUTION	Macintosh					Performa		Power Macintosh											
	Ilisi Ilci	Ilvi Ilvx	LC LCII	LCIII LC475	LC630 Quadra 700 900	Quadra 610 650 800 950 Centris 610 650	Quadra 840AV Centris 660AV	6260 6310	6410 6420	Workgroup Server 8150 9150	8100 VRAM Video Card (DB-15)	6200 6300	7200	4400	7300 7500 7600 8500 8600 Workgroup Server 7350	9500	9600/233 Workgroup Server 9650	9600/300 9600/350	G3
640 x480@60Hz		3,4	3,4	3,4	3,4	3,4	3,4	1,2,6	1,2,6	3,4	3,4	1,2,6	3,4	3,4	3,4	3,4	3,4	3,4	3,4
640 x480@67Hz	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2,6	1,2,6	1,2,6	1,2,6	1,2,6	1,2,6	3,4	1,2,6	1,2,6	1,2,6	1,2,6	3,4
640 x480@72Hz														3,4	3,4				3,4
640 x480@75Hz														3,4	3,4				3,4
640 x480@85Hz								1,2,6	1,2,6										3,4
800 x600@60Hz								1,2,6	1,2,6										3,4
800 x600@72Hz								1,2,6	1,2,6		3,4			3,4	3,4	3,4	3,4	3,4	3,4
800 x600@75Hz													3,4	3,4	3,4	3,4	3,4	3,4	3,4
800 x600@85Hz																			3,4
832 x624@75Hz										1,2,6	1,2,6	1,2,6	1,2,6	3,4	1,2,6	1,2,6	1,2,6	1,2,6	3,4
1024 x768@60Hz									1,2,6		3,4		3,4	3,4	3,4	3,4	3,4	3,4	3,4
1024 x768@70Hz											3,4			3,4		3,4		3,4	3,4
1024 x768@72Hz									1,2,6				3,4	3,4	3,4	3,4	3,4	3,4	3,4
1024 x768@75Hz											1,2,6								3,4
1024 x768@85Hz											1,2,6								3,4
1152 x870@75Hz											1,2,6								3,4
1280 x960@60Hz																			3,4
1280 x960@75Hz														3,4	1,2,6	3,4	1,2,6	1,2,6	3,4
1280 x960@85Hz																			3,4
1280 x1024@60Hz																3,4			3,4
1280 x1024@75Hz														3,4	1,2,6	1,2,6	1,2,6	1,2,6	3,4
1280 x1024@85Hz																			3,4
1600 x1200@60Hz																			3,4
1600 x1200@65Hz																			3,4
1600 x1200@67Hz																			3,4
1600 x1200@70Hz																			3,4
1600 x1200@75Hz																			3,4

1. The resolution does not change with the computer powered on when you set the dip switches.  
Be sure to power off the computer when you set the dip switches.
2. Set the dip switches by a pointed article like a pencil or ball point pen to touch end of the switch groove.

CP871C165A70



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