

2. Adjustment procedure

2.1 Measuring instruments

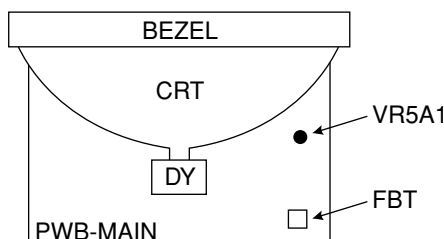
- (1) Signal generator A: Astro Design VG-812 or equivalent
- (2) Signal generator B: Astro Design VG-829 or equivalent
- (3) DC voltmeter: 150V 0.5 Class or digital voltmeter
- (4) High voltage meter: 0.5 Class that can measure 40KV
- (5) Luminance meter: Minolta color analyzer CA-100 or equivalent
- (6) AC voltmeter: 150V/300V 0.5 Class
- (7) Oscilloscope: Scope with band of 100MHz or more
- (8) Landing measuring device: Felmo product
- (9) Double scale: For width and distortion measurement
- (10) Withstand voltage meter: Kikusui Model TOS8650 or equivalent
- (11) Grounding conductivity measuring instrument: CLARE U.K. product
- (12) Convergence meter: MINOLTA CC-100

2.2 Preparatory inspections

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



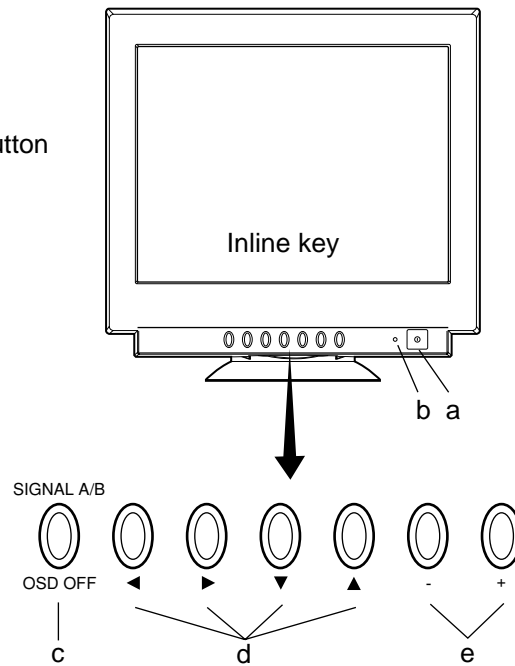
* look at inside of the monitor from upper side.

2.3 Names of each monitor part

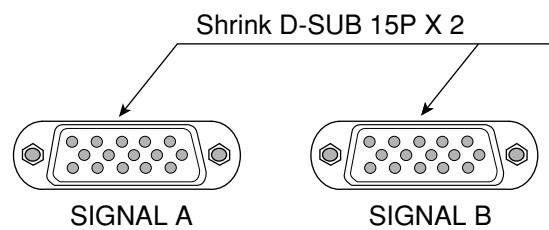
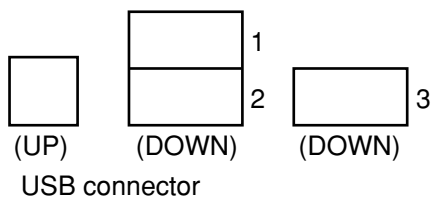
2.3.1 Configuration of front control panel

- a : Power Switch
- b : Power-ON Indicator
- c : Input Connector Select / OSD OFF Button
- d : Item Select Button
- e : Function Adjustment Button

*OSD OFF Button Functions when OSD picture is displayed on the screen.



2.3.2 Configuration of rear input connector



2.3.3 OSD display matrix

2.3.3.1 User mode

Adjustment items	Setting contents	Default setting	Setting classification	
			By timings	Common
OSD group USER 1				
CONTRAST	0 ~ 100%	100%		
BRIGHT	0 ~ 100%	50%		
COLOR	COLOR NO.1,2,3,sRGB	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,sRGB	5000K ~ 9300K	COLOR1 : 9300K		
FINE PICTURE MODE	GRAPHIC/TEXT/NORMAL	NORMAL		
FACTORY PRESET	PROCEED			
OSD group USER 2				
AUTO SIZE ADJUST	PROCEED			
HORIZ-SIZE	0 ~ 100%			
HORIZ-POSITION	0 ~ 100%			
VERT-SIZE	0 ~ 100%			
VERT-POSITION	0 ~ 100%	50%		
ROTATION	0 ~ 100%	CENTER		
GTF AUTO ADJUST	PROCEED			
FACTORY PRESET	PROCEED			
OSD group USER 3				
PINCUSHION	0 ~ 100%			
PIN-BALANCE	0 ~ 100%			
KEystone	0 ~ 100%			
KEY-BALANCE	0 ~ 100%			
TOP-PIN	0 ~ 100%			
TOP-BALANCE	0 ~ 100%			
BOTTOM-PIN	0 ~ 100%			
BOTTOM-BALANCE	0 ~ 100%			
VERT-LIN	0 ~ 100%			
VERT-LIN-BALANCE	0 ~ 100%			
FACTORY PRESET	PROCEED			
OSD group USER 4				
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 LEVEL	0 ~ 100%	0		
CLAMP PULSE POSITION	FRONT / BACK	BACK		
FACTORY PRESET	PROCEED			
OSD group USER 5				
HORIZ-CONVERGENCE	0 ~ 100%	CENTER		
VERT-CONVERGENCE	0 ~ 100%	CENTER		
FACTORY PRESET	PROCEED			
OSD group USER 6				
DEGAUSS	PROCEED			
INPUT	SIGNAL A/B			
POWER SAVE	OFF / ON	ON		
CONTROL LOCK	OFF / ON	OFF		
OSD POSITION	<- / +>	(OSD is at the center of picture)		
OSD TURN OFF	5SEC ~ 120SEC	45SEC		
DIAGNOSIS				
LANGUAGE	ENG/GER/FRA/ESP/ITA/JPN	ENG		
AUTO SAVE	OFF / ON	ON		
ALL RESET	PROCEED			
FACTORY PRESET	PROCEED			

*) CENTER : The factory setting value returning by pressing (+) (-) buttons simultaneously.

2.3.3.2 Factory mode

Adjustment items	setting contents	Default setting	setting classification	
			By timings	Common
OSD group USER 1				
CONTRAST	0 ~ 254	254		
BRIGHT	0 ~ 254	127		
COLOR	COLOR NO.1,2,3,sRGB	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,sRGB	5000K ~ 9300K	COLOR1 : 9300K		
FINE PICTURE MODE	GRAPHIC/TEXT/NORMAL	NORMAL		
COLOR CALIBRATION	PROCEED			
FACTORY PRESET	PROCEED			
OSD group USER 2				
AUTO SIZE ADJUST	PROCEED			
HORIZ-SIZE	0 ~ (depend on +B adjustment)			
HORIZ-POSITION	0 ~ 254			
VERT-SIZE	0 ~ 254			
VERT-POSITION (PF)	0 ~ 254			
ROTATION	0 ~ 254			
GTF AUTO ADJUST	PROCEED			
FACTORY PRESET	PROCEED			
OSD group USER 3				
PCC-CENTER	0 ~ 254			
PCC-SINE	0 ~ 254			
PINCUSHION	0 ~ 254			
PIN-BALANCE	0 ~ 254			
KEystone	0 ~ 254			
KEY-BALANCE	0 ~ 254			
TOP-PIN	0 ~ 254			
TOP-BALANCE	0 ~ 254			
BOTTOM-PIN	0 ~ 254			
BOTTOM-BALANCE	0 ~ 254			
VERT-LIN	0 ~ 254			
VERT-LIN-BALANCE	0 ~ 254			
FACTORY PRESET	PROCEED			
OSD group USER 4				
CORNER PURITY (TL)	0 ~ 254			
CORNER PURITY (TR)	0 ~ 254			
CORNER PURITY (BL)	0 ~ 254			
CORNER PURITY (BR)	0 ~ 254			
MOIRE CANCEL LEVEL	0 ~ 127	0		
CLAMP PULSE POSITION	FRONT / BACK	BACK		
FACTORY PRESET	PROCEED			
OSD group USER 5				
HORIZ-CONVERGENCE	0 ~ 254			
VERT-CONVERGENCE	0 ~ 254			
FACTORY PRESET	PROCEED			
OSD group USER 6				
DEGAUSS	PROCEED			
INPUT	SIGNAL A/B			
POWER SAVE	OFF / ON	ON		
CONTROL LOCK	OFF / ON	OFF		
OSD POSITION	<- / +>	(OSD is at the center of picture)		
OSD TURN OFF	0 ~ 23	08		
DIAGNOSIS				
LANGUAGE	ENG/GER/FRA/ESP/ITA/JPN	ENG		
DVI EDID SELECT	DVI-DIGITAL / DVI-ANALOG	DVI-ANALOG		
AUTO SAVE	OFF / ON	ON		
ALL RESET	PROCEED			
FACTORY PRESET	PROCEED			

Adjustment items	setting contents	Default setting	setting classification	
			By timings	Common
FACT 1				
PURITY/CPURITYOFF(CP P OFF)	0 (OFF) / 1 (ON)	1 (ON)		
PURITY OFF(P-OFF)	0 (OFF) / 1 (ON)	1 (ON)		
YHTT	0 ~ 254	127		
YHTB	0 ~ 254	127		
YHJT	0 ~ 254	127		
YHJB	0 ~ 254	127		
XH-L	0 ~ 254	127		
XH-R	0 ~ 254	127		
PQH-TL	0 ~ 254	127		
PQH-TR	0 ~ 254	127		
PQH-BL	0 ~ 254	127		
PQH-BR	0 ~ 254	127		
S3H-TL	0 ~ 254	127		
S3H-TR	0 ~ 254	127		
S3H-BL	0 ~ 254	127		
S3H-BR	0 ~ 254	127		
YVTT	0 ~ 254	127		
YVTB	0 ~ 254	127		
YVJT	0 ~ 254	127		
YVJB	0 ~ 254	127		
XV-L	0 ~ 254	127		
XV-R	0 ~ 254	127		
PQV-TL	0 ~ 254	127		
PQV-TR	0 ~ 254	127		
PQV-BL	0 ~ 254	127		
PQV-BR	0 ~ 254	127		
S3V-TL	0 ~ 254	127		
S3V-TR	0 ~ 254	127		
S3V-BL	0 ~ 254	127		
S3V-BR	0 ~ 254	127		
DBF-H-AMP	0 ~ 254			
DBF-H-PHS	0 ~ 100			
DBF-V-AMP	0 ~ 127			
R BIAS 1	0 ~ 254	30		
G BIAS 1	0 ~ 254	30		
B BIAS 1	0 ~ 254	30		
R BIAS 2	0 ~ 254	30		
G BIAS 2	0 ~ 254	30		
B BIAS 2	0 ~ 254	30		
R BIAS 3	0 ~ 254	30		
G BIAS 3	0 ~ 254	30		
B BIAS 3	0 ~ 254	30		
SUB-BRIGHT	0 ~ 480	380		
ABL	0 ~ 254	200		
HEATER-OFF (HEATER)	0 ~ 254			
B-LOW (BLO)	0 ~ 254			
B-HIGH (B HI)	0 ~ 254			
WP DDC	0 (OFF) / 1 (ON)	0 (OFF)		
FACT 2				
HV-ADJ				
XPRO-CALIBRATE				
XPRO-TEST 28, 31				
XPRO LEVEL				

2.4 Adjustment

2.4.1 How to select the factory adjustment (FACTORY) mode

2.4.1.1 Selecting with front panel switches

- (1) Turn the power ON while holding down Input Connector Select / OSD OFF button.
- (2) After step (1), release the button after one to two seconds.
- (3) Confirm that 00 is displayed for the counter on OSD display, and set to 225 with (-) button.
- (4) Set to 05 with (+) button.
- (5) When Input Connector Select / OSD OFF button 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 (-) (+) buttons.
- (3) When Input Connector Select / OSD OFF button (RIGHT side) is pressed, the mode will return to the user mode.

2.4.2 Adjustments before aging

Especially without any designation in each adjustment, full white signal of timing No. 12 (106.25k/85, 1600 x 1200) is input.

2.4.2.1 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 (106.25kHz / 85Hz, 1600x1200)

(Timing No. 12 (106.25kHz / 85Hz, 1600 X 1200) SYNC signal is only input-NO Video signal)

- (1) Turn the monitor power OFF and connect a high voltage indicator to the anode of CRT before turning the monitor power ON.
- (2) Select 「GO TO FACTORY MODE」 on OSD and set to 250 using (-) button before pushing the Input Connector Select / OSD OFF button.
- (3) Select HVADJ on OSD to adjust the high voltage to $27.0\text{kV} \pm 0.3\text{kV}$.
- (4) Turn XPRO TEST31 ON with OSD, and make sure that the high voltage reaches to $30.8\text{kV} \pm 0.7\text{kV}$.

Note) Adjustment (3) and (4) should be made with the screen VR turned all the way down counter-clockwise.

2.4.2.2 SCREEN voltage / FOCUS adjustment

(Input the timing No.12 (106.25kHz / 85Hz, 1600 X 1200) crosshatch signal)

- (1) Connect a high voltage meter to the TP-SC terminal on the CRT PWB.
- (2) Set to 700V \pm 5V with the FBT picture potentiometer.
- (3) Adjust the focus pack "FOCUS 1, 2" so that both edges of the picture are clear.

2.4.2.3 Shock test

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

2.4.2.4 Preadjustment before aging

- (1) Display a "full white".
- (2) Confirm that the R, G and B channel images are output.
- (3) Confirm that H-POSI (VR), picture position, picture size, PCC and balance can be controlled, and approximately adjust.
- (4) Confirm that 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 OSD. Then, adjust the picture luminance using BRIGHT adjustment, and carry out heat run for 60 minutes or more.

Note) Disable power save mode to make test pattern display.



2.4.2.5 Adjusting the landing (ITC/4 corner purity adjustment)

Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	landing		No. 12:106.25K / 85Hz, 1600x1200
			Full green

- (1) Input the timing No. 12 (106.25kHz/85Hz, 1600 x 1200) full green signal.
- (2) Turn OFF the monitor power to carry out hand degaussing.
- (3) Select TL on OSD.
- (4) Adjust to the best landing condition using the ADJUST button. Here, make sure that the adjusted value is within the range of OSD display = 57 to 197.
- (5) Carry out similar adjustment for TR/BL/BR.
- (6) Input timing No.12 (106.25kHz / 85Hz, 1600 x 1200) full white signal, and confirm the picture.

Note) When the substitute is replaced at the time of repair, set TL/TR/BL/BR to the values before replacement before carrying out adjustment.

2.4.3 Adjustments after aging

2.4.3.1 +B adjustment

Input the sync. signal of the following timings to adjust the picture width to 396 \pm 4mm.

Timing No.	H-frequency	OSD adjustment item
A	30.0kHz	+B-L
12	106.25kHz	+B-H

2.4.4 Adjusting the picture size, position and distortion

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. (Refer to 2.5.1.10 Adjustment value list.)

Adjust the distortion to the value indicated in the picture performance inspection item. (Refer to 2.5.1.8 Picture distortion.)

(Horizontal Coarse adjustment is made at VR5A1 on Main-PWB (FBT side) .)

2.4.4.1 Adjusting the picture inclination

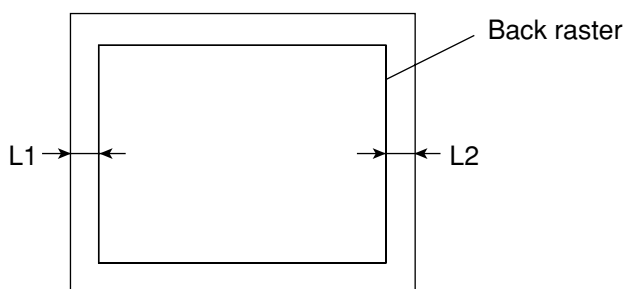
Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Picture inclination	Factory	No. 12:106.25K / 85Hz, 1600x1200
			Crosshatch with frame

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

2.4.4.2 Adjusting the back raster position

Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Back raster position	Factory	No. 25:85Hz, 1800x1350
			Only the sync. signal input

- (1) Set BRT to 100% to show the back raster.



- (2) Adjust the horizontal back raster position to the center of the bezel using H-POSI (VR5A1). At this time, the raster width will be $|L1-L2| \leq 2.0\text{mm}$.

2.4.4.3 Adjusting the left/right distortion, picture width, picture position (HORIZ-POSITION) and vertical linearity (all preset)

- (1) Set VERT-POSITION of the user mode to 50%.

<Setting in the factory mode for the following steps>

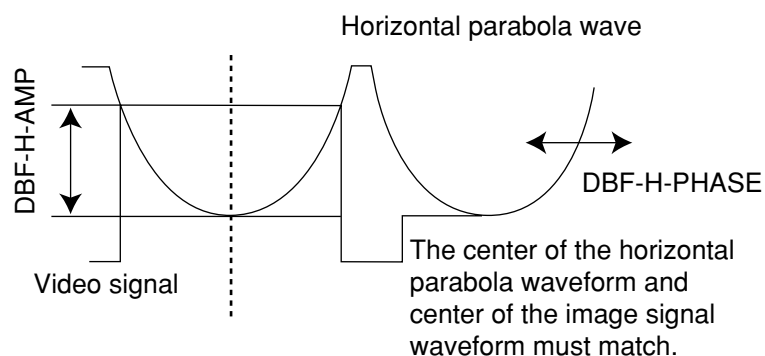
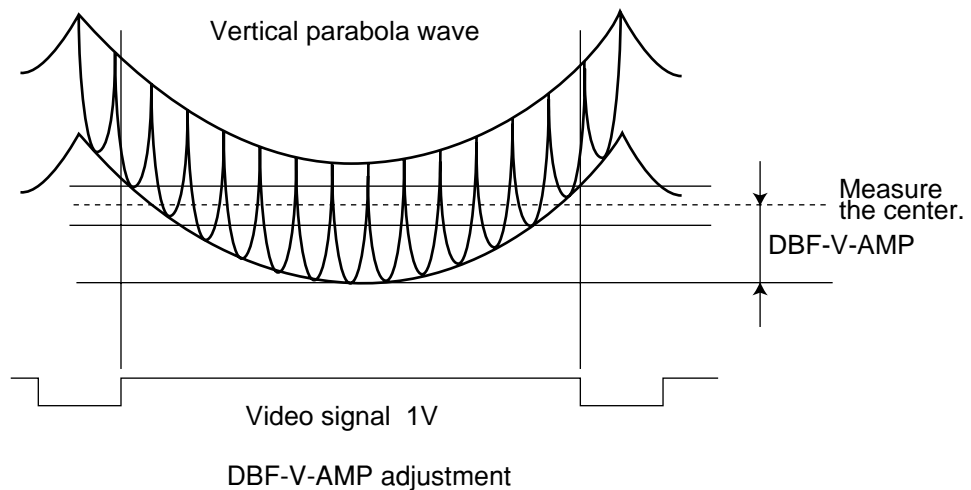
- (2) Adjust the vertical size to approx. 297mm, and the vertical position to the approximate center.
- (3) Select VERT-LIN and VERT-LIN-BALANCE with OSD, and adjust so that the vertical linearity is equal at the very top of the picture, at the very bottom of the picture, and at the center of the picture.
- (4) Select VERT-SIZE and VERT-POSITION (PF) with OSD, and adjust the vertical width and vertical position to set the specified values using (-) (+) buttons.
- (5) Select PINCUSHION, HORIZ-PHAZE, PCC-CENTER, TOP-PIN, and BOTTOM-PIN with OSD, and adjust the vertical line at both side of the picture to the straight line using (-) (+) buttons.

- (6) If the left and right distortions differ, select PIN-BALANCE, KEYSTONE, TOP-BALANCE and BOTTOM-BALANCE with OSD, and adjust so that the distortions are visually balanced.
 - (7) Select HORIZ-PHASE with OSD, and adjust the horizontal raster position to the center of the picture using (-) (+) buttons.
 - (8) Select HORIZ-SIZE with OSD, and adjust the horizontal raster width to the value given in the adjustment list using (-) (+) buttons. (Refer to 2.5.1.10 Adjustment value list.)
- * Note (1) PCC-SINE, PIN-BALANCE and PCC-CENTER are used only for touch up, and they are adjustable.
- * Note (2) The picture position and distortion must be within the ranges given in the picture performance inspection items. (Refer to 2.5.1.8 Picture distortion.)

2.4.4.4 Adjusting the DBF amplitude and phase

- (1) Connect the oscilloscope to the lead of TP-DBF (R7A2 (AG703 side)) on PWB-MAIN and to one of the signal outputs for the signal sources full R, G, B (VIDEO).
- (2) Set OSD to the select picture of DBF-H-AMP, and using (-) (+) buttons adjust the horizontal parabola wave amplitude (Video area) to the value given in the list of adjustment values. (Refer to 2.5.1.10 Adjustment value list.)
- (3) Set OSD to the select picture of DBF-H-PHASE, and using (-) (+) buttons adjust the horizontal parabola wave phase as shown below in respect to the image signal.
- (4) Set OSD to the select picture of DBF-V-AMP select picture, and using (-) (+) buttons adjust the vertical parabola wave amplitude (video area) to the value given in the list of adjustment values. (Refer to 2.5.1.10 Adjustment value list.)

Note) For adjusting amplitude, adjust the center value of the voltage between left and right corresponding to video signal.



2.4.5 Adjusting the cut off

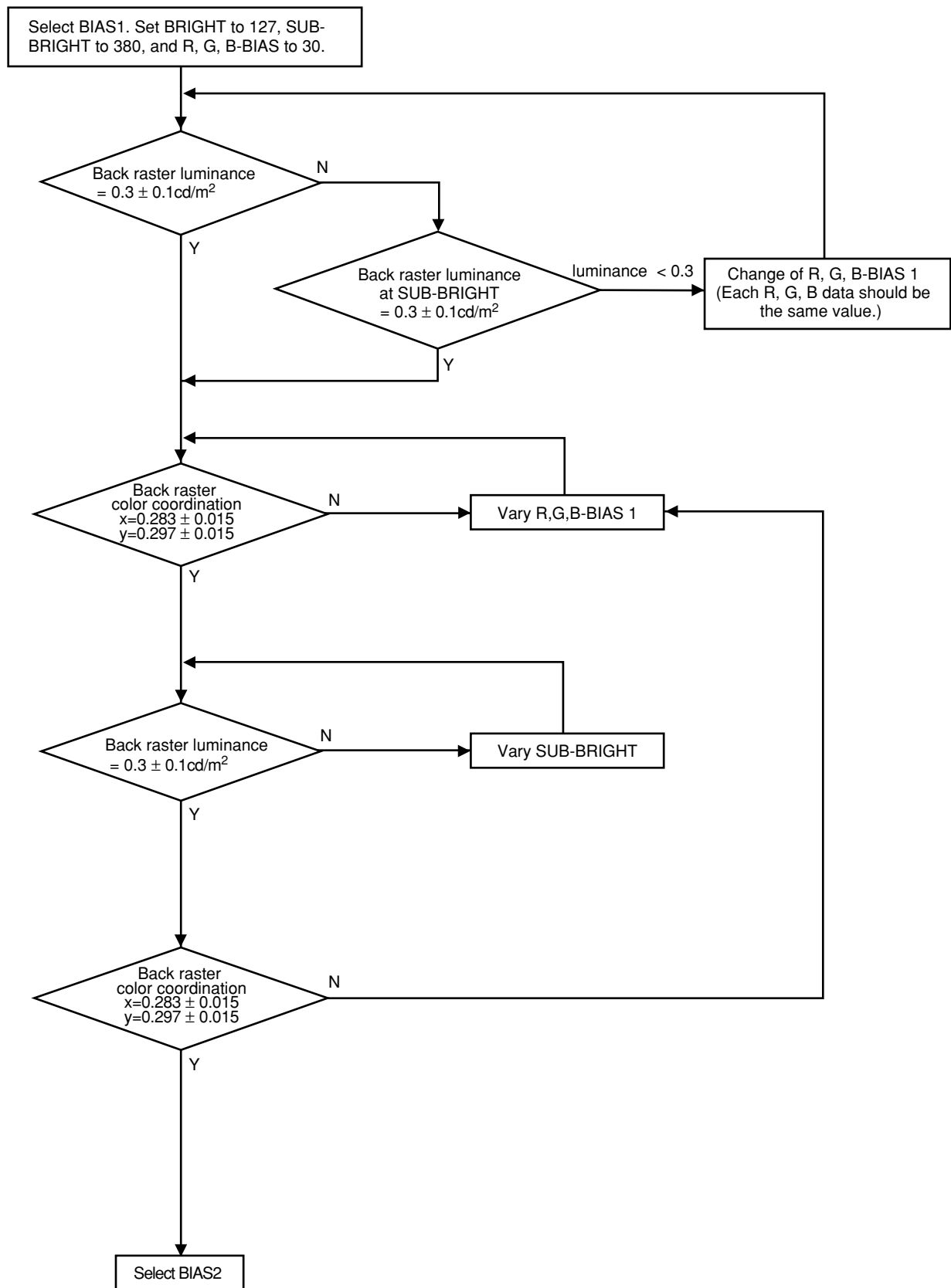
Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Cut off	Factory	No. 12:106.25K / 85Hz, 1600x1200

- (1) Input the timing No. 12 (106.25kHz/85Hz, 1600x1200) from the signal generator. (R, G, B OFF)
- (2) Select BIAS1, and set BRIGHT to 127, SUB-BRIGHT to 380, and R, G, B-BIAS to 30.
- (3) Adjust the back raster luminance to $0.3 \pm 0.1 \text{ cd/m}^2$ with SUB-BRIGHT.
When the back raster luminance is less than 0.3 cd/m^2 even after SUB-BRIGHT was changed, change R, G, B-BIAS to adjust.
The R, G, B-BIAS data must be the same 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 $0.3 \pm 0.1 \text{ cd/m}^2$.
- (6) If the back raster color coordination is deviated from the following values, repeat steps (4) and (5).
- (7) Set G-BIAS datas of COLOR 2 and 3 to the same value as the one of COLOR1.
- (8) Select BIAS 2, and change the BIAS data for the R and B colors (G-BIAS2 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-BIAS3 is fixed). Adjust the back raster color coordination to the following table.

Condirmation item		COLOR 1	COLOR 2	COLOR 3
Color coordination	x	0.283 ± 0.015	0.313 ± 0.015	0.345 ± 0.015
	y	0.297 ± 0.015	0.329 ± 0.015	0.359 ± 0.015

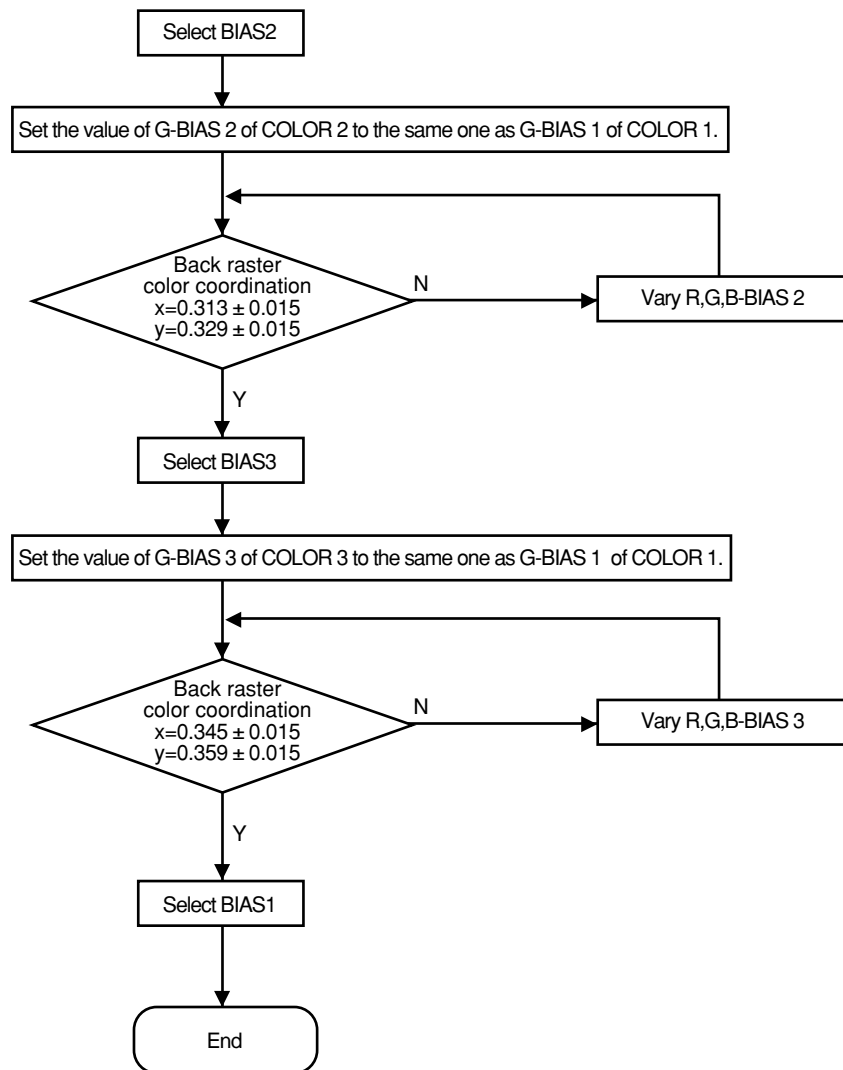
*The flow chart is provided on the next page.

Cutoff adjustment procedure



Continued on next page

Continued from previous page



2.4.6 Adjusting the RGB drive signal and X-Pro

2.4.6.1 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, 1600x1200
			WINDOW picture

- (1) Input the timing No.12.
WINDOW picture (Input amplitude = 0.7Vp-p)
- (2) Select CONTRAST with OSD, and set to MAX with (+) button.
- (3) Select BRIGHT with OSD, and set the data to 127 with (-) (+) buttons.
- (4) Set the WINDOW pattern (approx. 80mm square at center of CRT picture), and input only "GREEN".
- (5) Set the COLOR 1 G with OSD, and adjust the luminance to the following value with (-) (+) buttons.
- (6) Input BLUE, RED and GREEN, appropriately select the COLOR 1 B and R, and adjust the color coordination to the following value with (-) (+) buttons.
- (7) Set CONTRAST to 25cd/m² with OSD to confirm that the change in color coordination is within ± 0.015 for both x and y.
*Adjust COLOR 2 and 3 to the following values with the same method.
If COLOR 2 and 3 are contented with the following value, they can be adjusted with presumptioni respectively.

The values of G-WINDOW luminance are reference.

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

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

COLOR		1	2	3	Remarks
G-WINDOW luminance		(76.0)	(67.0)	(56.0)	(Reference value)
W-WINDOW color coordination	x	0.283	0.313	0.345	± 0.005
	y	0.297	0.329	0.359	± 0.005
Full white luminance (cd/m ²)		105 or more	92 or more	77 or more	

2.4.6.2 Adjusting ABL

Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	ABL	Factory	No. 12:106.25K / 85Hz, 1600x1200
			Full white

- (1) Set OSD ABL to 254.
- (2) Input timing No. 12 (106.25kHz/85Hz, 1600x1200).
(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/m² ± 5 with COLOR 1.
The picture size must be approximately the H width given in the list of adjustment values at this time. (Refer to 2.5.1.10 Adjustment value list.)

2.4.6.3 Adjustment of X-Pro (Timing No. A 30k/70Hz Full white)

- (1) Select XPRO-CALIBRATE by ▼ button and press (+) button.
(When (+) button is pressed, microcomputer automatically sets the protector.)
- (2) Confirm that OK is indicated on OSD.

2.4.6.4 Confirmation for operation of X-Pro (Timing No. 12 106.25kHz / 85Hz, 1600 x 1200)

- (1) Select XPRO-TEST 28 mode by ▼ button and press (+) button.
- (2) Confirm that OK is indicated on OSD without entering power save state.
- (3) Change to full white of timing No. A, select XPRO-TEST 31 mode by ▼ button, and press (+) button.
- (4) Confirm that X-Pro operates and enters into the self-diagnosis mode (Power-On Indicator flacker: color orange for a second, OFF a second, color orange for 4 seconds, OFF 1 second, and repeat).

2.4.7 Adjusting the Purity

Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Purity	Factory	Check 4 : 85Hz, 1600x1200
			GREEN crosshatch reverse

- (1) Input check 4 timing (85Hz, 1600 x 1200) to confirm that the GREEN crosshatch is displayed in reverse.
- (2) Set the chamber adjustment magnetic field to the southern hemisphere magnetic field (HORIZ. = 0mT, VERT. = -0.04mT).
(Degauss by handy-demagnetizer with monitor set degauss operation.)
- (3) Set the monitor to the factory mode with front buttons, select CP P OFF, and press Input Connector Select / OSD OFF button once.
With this, the calibration of the horizontal (tube axis) one way geomagnetism sensor will be carried out by the MPU. ("H/V MAG CAL" is displayed.)

2.4.8 Adjusting the focus

(1) Adjustment of vertical line (F1-VR adjustment)

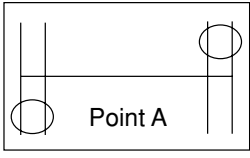
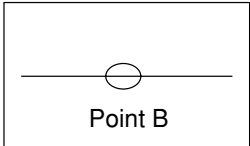
Focus Just at the point A (circled) with full green color displayed.

If Core : Halo of the both vertical lines with full red color displayed $\geq 1 : 1$, adjust to the less than $1 : 1$.

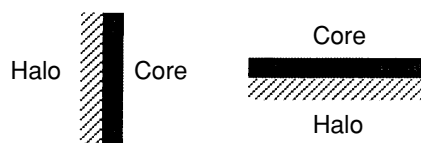
(2) Adjustment of horizontal line (F2-VR adjustment)

Focus Just at the point B (circled, at center of screen) with full white.

(3) If the vertical line is not fully focused, repeat operation (1) and (2) to readjust.

	Display	Point to align with
Vertical line	Crosshatch (or H character) Revers Full green	 <p>Adjustment of vertical line (F1-VR adjustment) Focus Just at the point A (circled) with full green color displayed. If Core : Halo of the both vertical lines with full red color displayed $\geq 1 : 1$, adjust to the less than $1 : 1$.</p>
Horizontal line	Crosshatch Normal Full white	 <p>Focus Just at center of screen. Peripheral halo should be within $1 : 1.5$.</p>

*Ratio of Core : Halo



Vertical line : Less than $1 : 1$ at both side of picture

Horizontal line : Center = $1 : 0$
Less than $1 : 1.5$ at top and bottom of the picture.

<Adjusting the static focus>

Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Static focus		No. 12:106.25K/85Hz, 1600x1200
			H character, crosshatch

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

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

- (1) Display a white crosshatch pattern, and adjust the focus according to "2.4.8 Adjusting focus".
- (2) If the DBF voltage is insufficient or excessive, select DBF H AMP and DBF V AMP from OSD, and readjust with (-) (+) buttons. Then repeat step (1), and adjust so that the following judgement conditions are satisfied.
- (3) For all of the other preset timings, if the DBF voltage is insufficient or excessive, select DBF H AMP and DBF V AMP from OSD, and readjust with (-) (+) buttons.
- (4) Make sure that there is no abnormality with the timing No.9 (80kHz/75Hz, 1280 X 1024) crosshatch (reverse).

*Adjustment voltage max value:

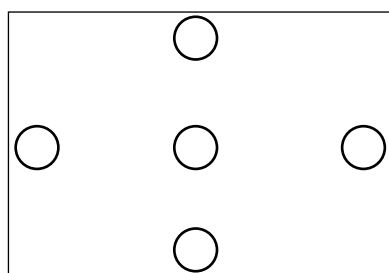
DBF-H-AMP H width: 393~396mm: 430V
H width: 369~371mm: 400V
DBF-V-AMP V width: 295~297mm: 190V

The focus is judged as follows.

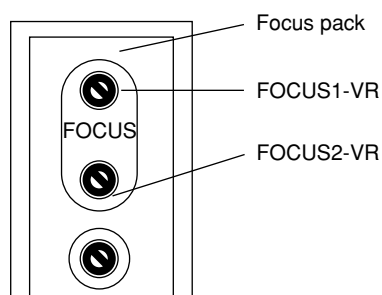
Timing	Judgment pattern (Note 1) (Note 2)
Normal display (All preset)	Crosshatch pattern
Reverse display Resolution: $\leq 1600 \times 1200$ Resolution: $\geq 1600 \times 1200$	Judge with pattern A Judge with pattern B

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

(Note 2) Focus judgement: Crosshatch pattern should be used for normal display judgement
Core: Judge the ratio of the halo (Center 1:1) and (both side, less than 1:1.5).
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



2.4.9 Adjusting the convergence

2.4.9.1 Adjusting with ITC

Before adjusting the center mis-convergence and axial mis-convergence, carry out sufficient full white aging (100cd/m² or more, for one hour or more). Then, adjust with the following timing.

Timing: No. 12 (106.25kHz/85Hz, 1600 x 1200) crosshatch pattern

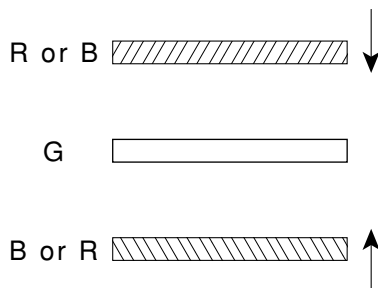
Confirm that the following DDCC default setting is as shown in the table.

HORIZ-CONVERGENCE : 127, VERT-CONVERGENCE : 127

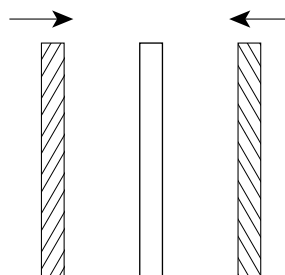
Factory mode in section 2.3.3.2 OSD display matrix

FACT1 YHTT~S3V BR

Adjust the horizontal and vertical convergence to the optimum setting with CRT CP ring, etc.
(Refer to following drawings.)



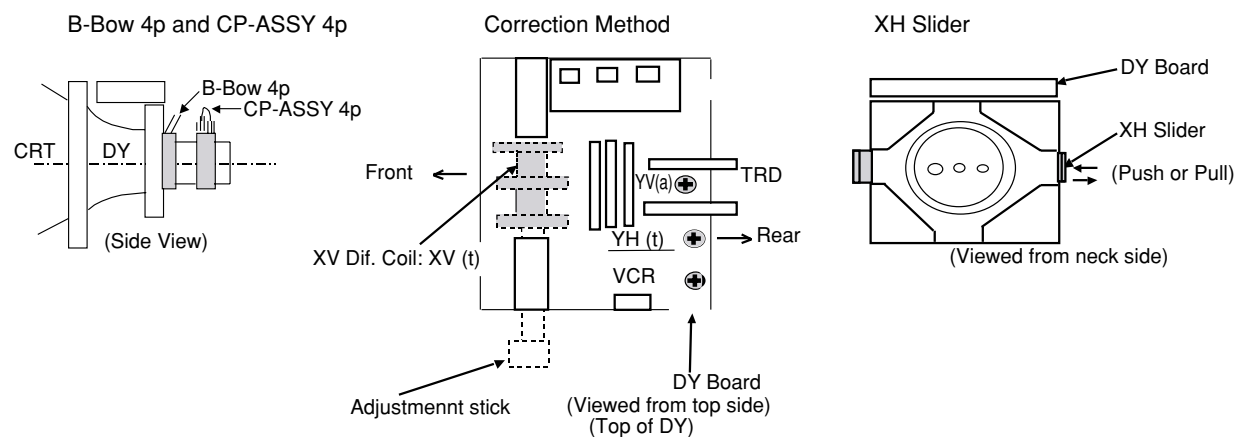
Vertical convergence



Horizontal convergence

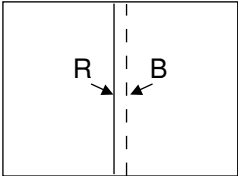
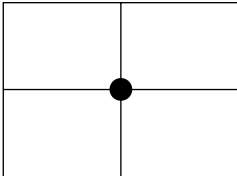
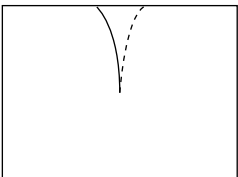
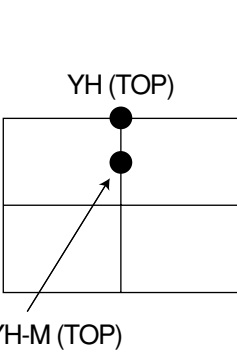
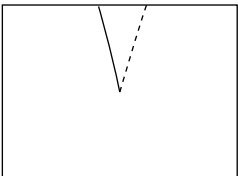
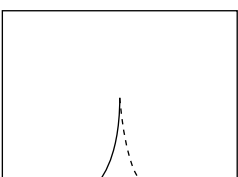
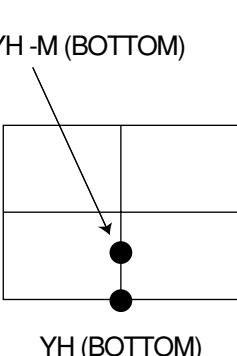
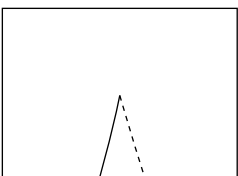
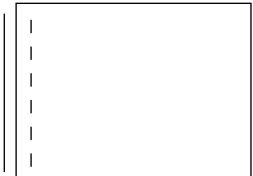


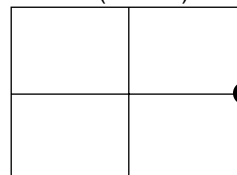
Adjusting the center misconvergence and axial misconvergence

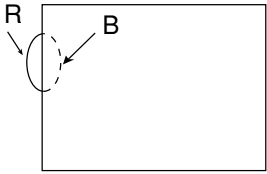
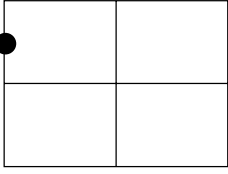

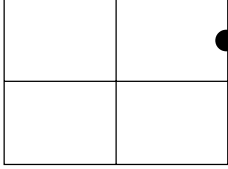
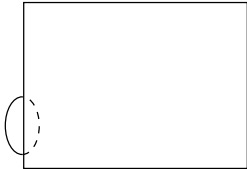
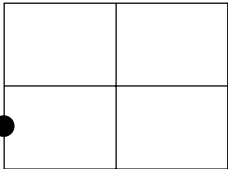

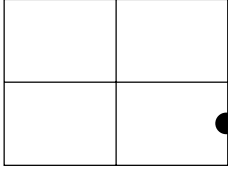
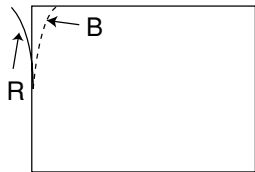
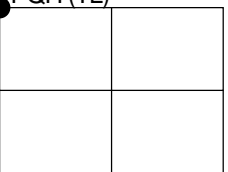

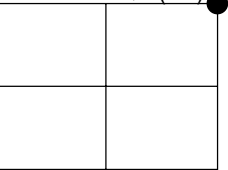
Adjustment item name	Problem	Adjustment point	Adjustment procedure
H-STATIC V-STATIC			Adjust to ± 0.1 mm or less with CP-ASSY 4P.
YH axial deviation			Adjust so that TOP+BOTTOM are ± 0.1 mm or less with YH volume.
YV axial deviation			Adjust so that TOP-BOTTOM is ± 0.1 mm or less with YV volume.
XH axial deviation			Adjust so that LEFT-RIGHT is ± 0.1 mm or less with XH slider.
XV characteristics			Only when XV (B-Bow) is ± 0.15 mm or more, adjust so that LEFT-RIGHT is ± 0.15 mm or less with the interlock of B-Bow 4P and CP-ASSY 4P.
XV axial deviation			Adjust so that LEFT+RIGHT is ± 0.15 mm or less with XV differential coil.


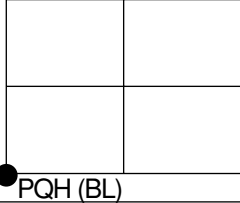
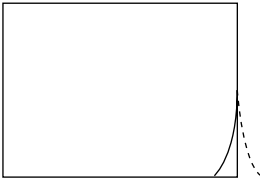
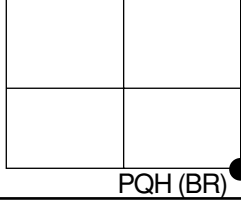


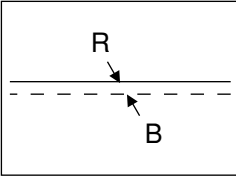
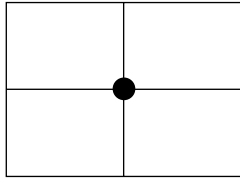
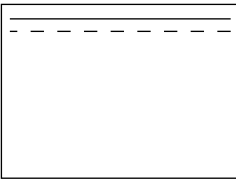
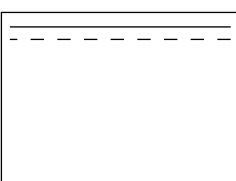
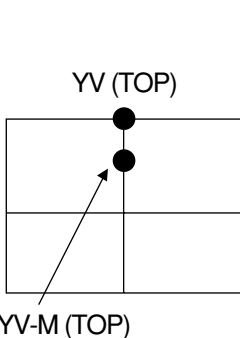
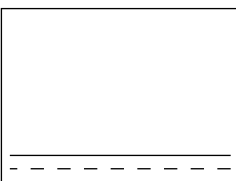
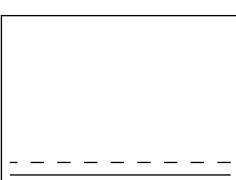
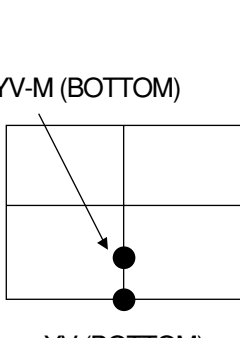
2.4.9.2 Adjusting DDCP

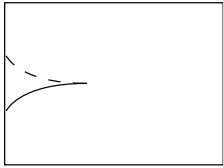
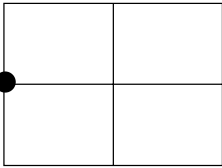
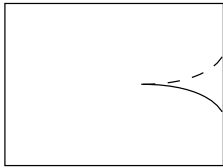
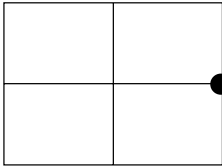
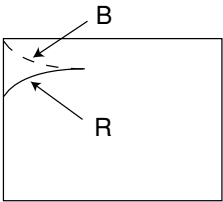
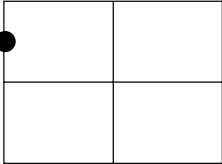
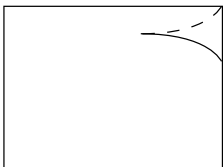
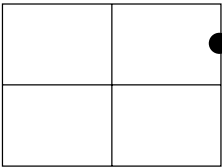
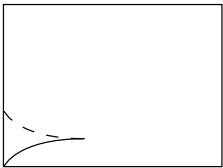
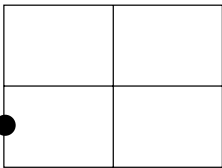
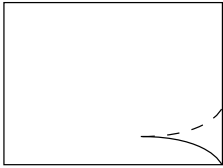
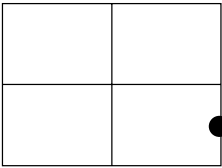
- (1) Input timing No. 12 (106.25kHz/85Hz, 1600 x 1200) crosshatch pattern.
- (2) Enter the factory mode.
- (3) Adjust in the following order. (It is assumed that the center and axial misconvergence on the previous page have already been adjusted.)

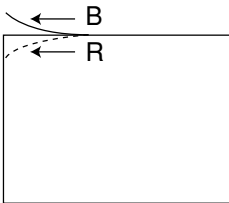
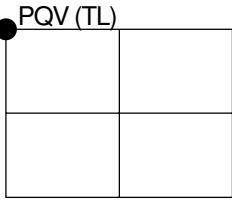
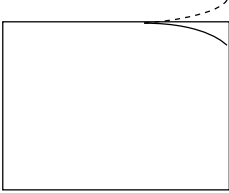
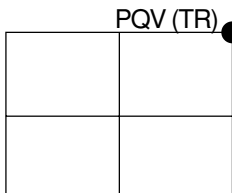
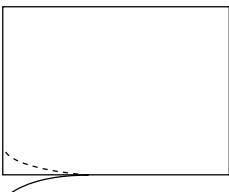
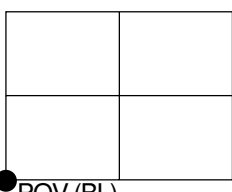
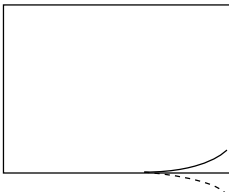
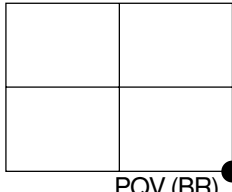
Adjustment order	Adjustment item name	Problem	Adjustment point	Adjustment procedure
4H-COIL				
1	HORIZ-CONVERGENCE			Adjust to 0.05mm or less. (Adjustment target is 0mm.)
2	YH-TT		 YH (TOP) YH-M (TOP)	Adjust YH (TOP) to 0.05mm or less with the balance adjustment of YH-TT and YH-JT. (Adjustment target is 0mm.) (NOTE) The operating amount at YH-M(TOP) when moving YH-TT and YH-JT : YH-TT < YH-JT
	YH-JT			
3	YH-TB		 YH-M (BOTTOM) YH (BOTTOM)	Adjust YH (BOTTOM) to 0.05mm or less with the balance adjustment of YH-TB and YH-JB. (Adjustment target is 0mm.) (NOTE) The operating amount at YH (BOTTOM) when moving YH-TB and YH-JB : YH-TB < YH-JB
	YH-JB			
4	XH-L		 XH(LEFT)	Adjust to 0.1mm or less.
5	XH-R		 XH(RIGHT)	Adjust to 0.1mm or less.

Adjustment order	Adjustment item name	Problem	Adjustment point	Adjustment procedure
4H-COIL				
6	S3H-TL		<p>S3H(TL)</p> 	Adjust to 0.3mm or less.
7	S3H-TR		<p>S3H(TR)</p> 	Adjust to 0.3mm or less.
8	S3H-BL		<p>S3H(BL)</p> 	Adjust to 0.3mm or less.
9	S3H-BR		<p>S3H(BR)</p> 	Adjust to 0.3mm or less.
10	PQH-TL		<p>PQH (TL)</p> 	Adjust to 0.3mm or less.
11	PQH-TR		<p>PQH (TR)</p> 	Adjust to 0.3mm or less.

Adjustment order	Adjustment item name	Problem	Adjustment point	Adjustment procedure
4H-COIL				
12	PQH-BL			Adjust to 0.3mm or less.
13	PQH-BR			Adjust to 0.3mm or less.

Adjustment order	Adjustment item name	Problem	Adjustment point	Adjustment procedure
4V-COIL				
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

Adjustment order	Adjustment item name	Problem	Adjustment point	Adjustment procedure
4V-COIL				
4	XV-L		<p>XV(Left)</p> 	Adjust to 0.1mm or less.
5	XV-R		<p>XV(Right)</p> 	Adjust to 0.1mm or less.
6	S3V-TL		<p>S3V(TL)</p> 	Adjust to 0.3mm or less.
7	S3V-TR		<p>S3V(TR)</p> 	Adjust to 0.3mm or less.
8	S3V-BL		<p>S3V(BL)</p> 	Adjust to 0.3mm or less.
9	S3V-BR		<p>S3V(BR)</p> 	Adjust to 0.3mm or less.

Adjustment order	Adjustment item name	Problem	Adjustment point	Adjustment procedure
4V-COIL				
10	PQV-TL			Adjust to 0.3mm or less.
11	PQV-TR			Adjust to 0.3mm or less.
12	PQV-BL			Adjust to 0.3mm or less.
13	PQV-BR			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))
HORIZ-CONVERGENCE	73~181 (OSD display value=DAC output value)
VERT-CONVERGENCE	73~181 (OSD display value=DAC output value)

2.4.10 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 OSD display (Refer to 2.3.3.1 User mode).
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.
- (3) Execute ALL RESET to confirm that each OSD setting is as shown in the table (user mode) given in OSD display (Refer to 2.3.3.1 User mode).
The default setting CENTER is the factory adjustment value called when the (-) (+) buttons are pressed simultaneously in the normal mode.
Only CONTRAST will be set to 100% when (-) (+) buttons are pressed simultaneously in the normal mode.
- (4) After setting the default values, turn the power switch OFF.

2.5 Inspections (In normal mode)

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

2.5.1 Electrical performance

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

2.5.1.1 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.

Cut-off current should be 20mA.

2.5.1.2 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.

2.5.1.3 Degaussing coil operation

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

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

Confirmation timing
Timing No. 12 (106.25kHz / 85Hz, 1600x1200)

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

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

(1) POWER SAVE ON

(a) Confirm that when SYNC (H&V) is removed, the picture dark ens after approx. 5 seconds passed.

Also confirm that Power-On Indicator changes to orange and the power consumption is as follows.

Power consumption	3W or less
-------------------	------------

(b) Confirm that when SYNC (H&V) is input again, the high voltage is recovered, and the picture appears in approx. five seconds.

2.5.1.5 Confirming the CORNER-PURITY function

Confirmation timing
Timing No. 12 (106.25kHz / 85Hz, 1600x1200)

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

2.5.1.6 Focus, picture performance (Timing No. 12 106.25kHz / 85Hz, 1600 x 1200)

Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Focus, picture performance		No.12 : 106.25kHz/85Hz, 1600x1200

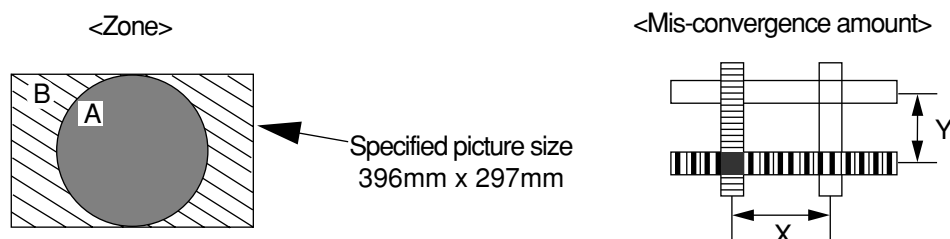
The picture must be evenly bright with the "e" character normal and reverse displays.

2.5.1.7 Misconvergence

After heat running for 20 minutes or more, the mis-convergence amount in the horizontal and vertical directions 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 9 vertical line x 9 horizontal line crosshatch is displayed.

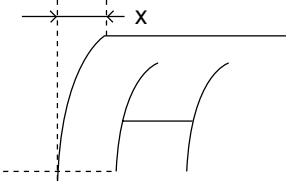
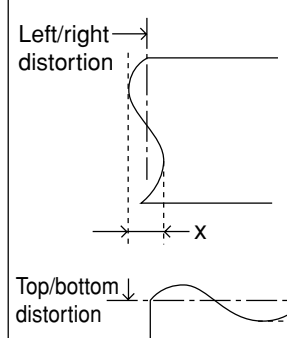
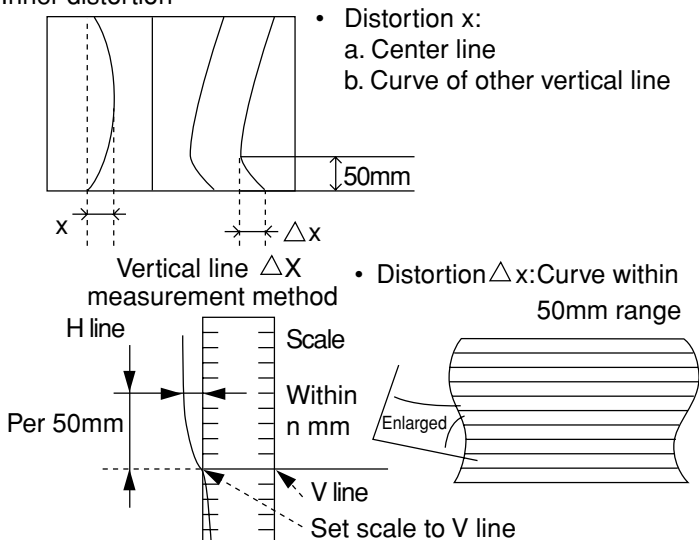
Zone	Mis-convergence amount				
A	0.25mm or less				
B	0.35mm or less				
Measurement timing (Timing No.)	12				

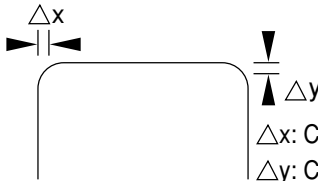
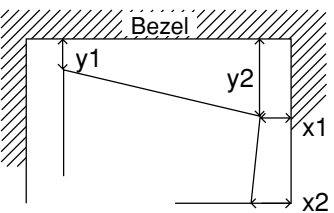
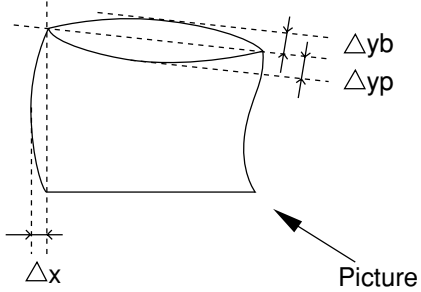
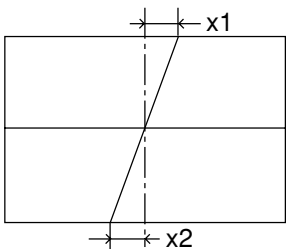
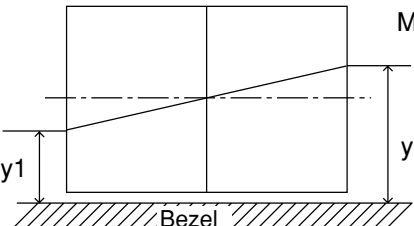


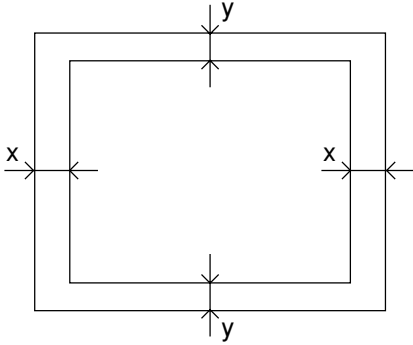
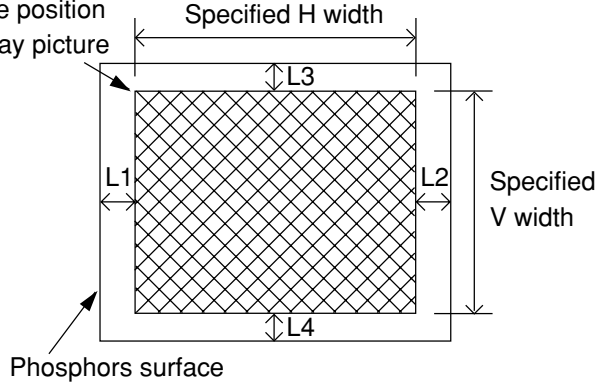
2.5.1.8 Picture distortion

When the picture distortion is measured, each distortion of the preset timing must be less than the following values.

<Picture performance inspection items> Inspect the following items for the picture distortion.

No.	Item	Judgement reference value	Input signal
1.	<p>4-corner section distortion</p> <p>Inspect the distortion at the four corners.</p> <ul style="list-style-type: none"> Signal, H character with frame (both normal/reverse) Distortion x: Distortion in the range of one H character height. Judge with the white display G. (Judge the distortion amount with a fluorescent material stripe.) 	$x \leq 1\text{pitch}$ $(=0.3\text{mm})$	H character with frame (both normal/reverse)
2.	<p>4-edge distortion</p> <p>When S-character or seagull type high frequency distortion is visible, check with the following method.</p>  <ul style="list-style-type: none"> Distortion x of S-character, seagull distortion, etc.: Distortion excluding normal pin, barrel or trapezoid. Note: There must be no seagull distortion. Distortion y: High frequency distortion excluding trapezoid. 	$x \leq 0.9\text{mm}$ * Note $y \leq 1.0\text{mm}$	Crosshatch pattern
3.	<p>Inner distortion</p>  <ul style="list-style-type: none"> Distortion x: a. Center line b. Curve of other vertical line Distortion Δx: Curve within 50mm range <p>Vertical line Δx measurement method</p> <p>H line</p> <p>Per 50mm</p> <p>Scale</p> <p>Within n mm</p> <p>V line</p> <p>Set scale to V line</p> <p>Enlarged</p>	$a. x \leq 1.0\text{mm}$ $b. x \leq 1.5\text{mm}$ (*) (*) Present No. 1 (31.5kHz, 60Hz) is: $a. x \leq 1.5\text{mm}$ $b. x \leq 2.0\text{mm}$ Δx When $F_h < 61\text{kHz}$, total area : less than 0.9mm. When $F_h \geq 61\text{kHz}$, center : less than 0.6mm, peripheral : less than 0.9mm.	

No.	Item	Judgement reference value	Input signal
4.	Line curve (crosshatch pattern outer contour)  <p> Δx: Curve within 50mm range (horizontal) Δy: Curve within 50mm range (vertical) </p>	$\Delta x \leq 1.0\text{mm}$ $\Delta y \leq 1.0\text{mm}$	Crosshatch pattern
5.	Horizontal trapezoid (top/bottom), vertical trapezoid (left/right)  <ul style="list-style-type: none"> $\Delta y = y1 - y2$ $\Delta x = x1 - x2$ Control with the above right value for each the top, bottom, left and right. 	$\Delta y \leq 2.0\text{mm}$ $\Delta x \leq 1.8\text{mm}$	
6.	Top/bottom pin and barrel, left/right pin and barrel 	$\Delta yb \leq 1.3\text{mm}$ $\Delta yp \leq 1.5\text{mm}$ $\Delta x \leq 1.0\text{mm}$	
7.	Parallelogram distortion  <p>Measure the larger of x1 and x2.</p>	$x \leq 0.8\text{mm}$	
8.	Inclination  <p>Measure $\Delta y = y1 - y2$.</p>	$\Delta y \leq 2.0\text{mm}$	

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 5.0\text{mm}$ $ L3-L4 \leq 3.0\text{mm}$	Full white

2.5.1.9 Linearity

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

Horizontal linearity : $30 \leq fH < 40\text{kHz}$ whole : 15% or less, adjacent : 7% or less

$40 \leq fH < 60\text{kHz}$ whole : 12% or less, adjacent : 7% or less

$60 \leq fH \leq 130\text{kHz}$ whole : 10% or less, adjacent : 7% or less

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

Calculation expression : $(X_{\text{max}} - X_{\text{min}}) / ((X_{\text{max}} + X_{\text{min}}) / 2) \times 100(\%)$

* 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 $|L3 - L4| \leq 3.0\text{mm}$.

2.5.1.10 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 (H)		DBF-V amplitude (V)	
No.	Adj. value	Adj. value	Standard Adj. value	Max. Adj. value	Standard Adj. value	Max. Adj. value
1						
2	396 ± 5	297 ± 4	370 ± 10	430	150 ± 5	190
3						
4						
5	396 ± 5	297 ± 4	370 ± 10	430	150 ± 5	190
6						
7	396 ± 5	297 ± 4	370 ± 10	430	150 ± 5	190
8	396 ± 5	297 ± 4	370 ± 10	430	150 ± 5	190
9	371 ± 5	297 ± 4	340 ± 10	400	150 ± 5	190
10	371 ± 5	297 ± 4	340 ± 10	400	150 ± 5	190
11	396 ± 5	297 ± 4	370 ± 10	430	150 ± 5	190
12	396 ± 5	297 ± 4	370 ± 10	430	150 ± 5	190
13						
14						
15	396 ± 5	297 ± 4	370 ± 10	430	150 ± 5	190
16						
17						
18						
19						
20						
21						
22						
23						
24						
25	396 ± 5	297 ± 4	370 ± 10	430	150 ± 5	190
26						
27						
28						

Standard adjustment value: in case of determining DBF voltage

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

2.5.1.11 Confirming CLAMP PULSE POSITION, SYNC ON GREEN

When an optional timing is input, confirm that the screen should meet with the judgement criteria below.

Timing : Check 1 (35kHz / 66Hz), full white.

Judgement criteria : Back raster color coordination should vary.

2.5.1.12 Checking the functions during 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 2 : 35kHz / 66Hz
			Full white

[Composite Sync]

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

In the normal mode, input the above timing to confirm that the operation is normal.

2.5.1.13 Confirming the full white luminance

Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Confirming the full white luminance		No.12: 106.25kHz / 85Hz 1600x1200
			Full white

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

Confirm that the full white luminance is the following value.

COLOR 1	COLOR 2	COLOR 3
105 or more	92 or more	77 or more

2.5.1.14 Confirming CONVERGENCE compensation function

Confirm that CONVERGENCE changes by varying HORIZ-CONVERGENCE and VERT-CONVERGENCE.

2.5.1.15 Confirming ROTATION compensation function

Confirm that the picture rotates by changing ROTATION.

Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Lluminance/color coordination uniformity		No.12: 106.25kHz / 85Hz 1600x1200

2.5.1.16 Luminance/color coordination uniformity

The luminance ratio between the center and periphery must be 80% or more with timing No. 12 (106.25kHz/85Hz, 1600 x 1200) COLOR 1.

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

2.5.1.17 Confirming the full white color coordination

Confirm that the color coordination at the center of the full white is within the following range at timing No.12 (106.25kHz/85Hz, 1600 x 1200).

Condirmation item		COLOR 1	COLOR 2	COLOR 3
Color coordination	x	0.283 ± 0.007	0.313 ± 0.007	0.345 ± 0.007
	y	0.297 ± 0.007	0.329 ± 0.007	0.359 ± 0.007

* Confirmation of OSD coodination

X=0.283±0.04, Y=0.297±0.05 (Confirm at white colored area in OSD)

2.5.1.18 Confirming the color tracking

Status indicator	Adjustment item	Adjustment mode/set	Input signal/pattern
	Confirming color tracking		No.12 : 106.25kHz/85Hz
			Full White

Confirm with timing No. 12 (106.25kHz/85Hz, 1600 x 1200).

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 ± 0.015 range when the CONTRAST is set to 25cd/m² with the OSD.

2.5.1.19 CRT installation position

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

2.5.1.20 Confirming FPM operation

Confirm with the timing No. 12 (106.25kHz/85Hz, 1600 x 1200) and COLOR 1.

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

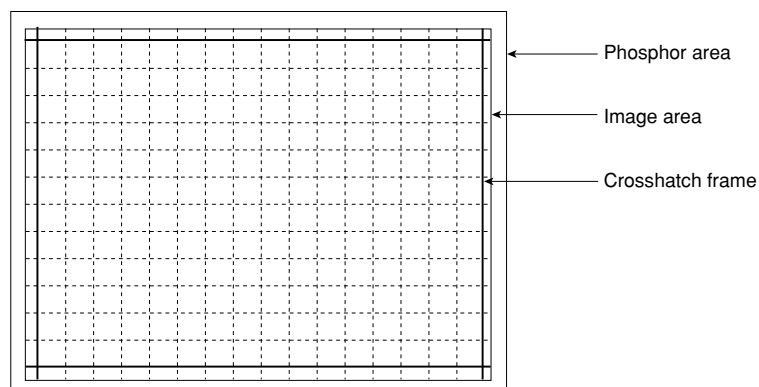
	Normal	Text	Graphic
Window luminance	Standard	Low	Standard
Back raster luminance	Standard	Low	Low

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

2.5.1.21 Confirming Auto size operation

(Timing No.6 (80Hz VESA 800 X 600))

- (1) Select Auto size function with OSD in user mode, and press (+) button.
- (2) Confirm that Auto size function operates and the crosshatch frame should be within phosphor area.



2.5.1.22 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 Power-On Indicator is lit.

2.5.1.23 Confirming USB

Confirming USB hub

- (1) Connect upstream connector to PC with USB cable.
- (2) Connect USB device to downstream connector 1, and confirm the operation.
- (3) Connect USB device to downstream connector 2, and confirm the operation.
- (4) Connect USB device to downstream connector 3, and confirm the operation.
- (5) Disconnect USB cable.

2.6 DDC write data contents

The contents of DDC write data must be as follows.

EDID DATA for DDC (NSZ2107)

ADR (H)	DATA															
E80-E8F	00	ff	ff	ff	ff	ff	ff	ff	00	34	ac	11	45	**	**	**
E90-E9F	WW	YY	01	02	0e	28	1e	78	e9	9c	68	a0	57	4a	9b	26
EA0-EAF	12	48	4c	ff	ff	80	31	59	d	4f	a9	59	a9	4f	81	99
EB0-EBF	e1	4f	61	59	45	59	0f	75	08	b0	72	46	43	50	90	c8
EC0-ECF	13	00	8c	29	11	00	00	18	00	00	00	fd	00	32	a0	1e
ED0-EDF	79	24	00	0a	20	20	20	20	20	20	00	00	00	fc	00	4e
EE0-EEF	53	5a	32	31	30	37	55	0a	20	20	20	20	00	00	00	ff
EF0-EFF	00	##	##	##	##	##	##	##	##	##	0a	20	20	20	00	ss

WW : Week of Manuf.

YY : Year of Manuf.

** : Serial Number (HEX)

: Serial Number (ASCII)

SS : Check SUM

Manuf Code: MEL

Product Code LSB (HEX): 11

Product Code MSB (HEX): 45

Product Code (DEC): 17681

(Microsoft INF ID: MEL4511)

Serial Number (DEC): **

Serial Number (HEX): **

Week of Manuf: WW

Year of Manuf: YY

EDID Version: 1

EDID Revision: 2

Extension Flag: 0

Video:

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: 40cm

Max Image Size V: 30cm

DPMS Stand By: YES

DPMS Suspend: YES

DPMS Active Off: YES

GTF Support: YES

Standard Default Color Space: NO

Preferred Timing Mode: NO

Display Type: RGB Color

Color:

Gamma: 2.20

Red x: 0.627

Red y: 0.341

Green x: 0.292

Green y: 0.605

Blue x: 0.149

Blue y: 0.072

White x: 0.283

White y: 0.297

Established Timings:

720x400 @70 Hz

720x400 @88 Hz

640x480 @60 Hz

640x480 @67 Hz

640x480 @72 Hz

640x480 @75 Hz

800x600 @56 Hz

800x600 @60 Hz

800x600 @72 Hz

800x600 @75 Hz

832x624 @75 Hz

1024x768 @87 Hz (I)

1024x768 @60 Hz

1024x768 @70 Hz

1024x768 @75 Hz

1152x870 @75 Hz

1280x1024 @75 Hz

Standard Timing #1:

Horizontal Active Pixels: 640

Aspect Ratio: 4:3

(480 active lines)

Refresh Rate: 85Hz

Standard Timing #2:

Horizontal Active Pixels: 1920

Aspect Ratio: 4:3

(1440 active lines)

Refresh Rate: 75Hz

Standard Timing #3:

Horizontal Active Pixels: 1600

Aspect Ratio: 4:3

(1200 active lines)

Refresh Rate: 85Hz

Standard Timing #4:

Horizontal Active Pixels: 1600

Aspect Ratio: 4:3

(1200 active lines)

Refresh Rate: 75Hz

Standard Timing #5:

Horizontal Active Pixels: 1280

Aspect Ratio: 5:4

(1024 active lines)

Refresh Rate: 85Hz

Standard Timing #6:

Horizontal Active Pixels: 2048

Aspect Ratio: 4:3

(1536 active lines)

Refresh Rate: 75Hz

Standard Timing #7:

Horizontal Active Pixels: 1024

Aspect Ratio: 4:3

(768 active lines)

Refresh Rate: 85Hz

Standard Timing #8:

Horizontal Active Pixels: 800

Aspect Ratio: 4:3

(600 active lines)

Refresh Rate: 85Hz

Detailed Timing (block #1):

Pixel Clock: 229.67 MHz

Horizontal Active: 1800 pixels

Horizontal Blanking: 688 pixels

Vertical Active: 1350 lines

Vertical Blanking: 67 lines

(Horizontal Frequency: 120.45 kHz)

(Vertical Frequency: 85.0 Hz)

Horizontal Sync Offset: 144 pixels

Horizontal Sync Width: 200 pixels

Vertical Sync Offset: 1 line

Vertical Sync Width: 3 lines

Horizontal Border: 0 pixel

Vertical Border: 0 pixel

Horizontal Image Size: 396 mm

Vertical Image Size: 297 mm

Interlaced: NO

Image: Normal Display

Sync: Digital Separate

Bit 1: OFF

Bit 2: OFF

Monitor Range Limits (block #2):

Minimum Vertical Rate: 50 Hz

Maximum Vertical Rate: 160 Hz

Minimum Horizontal Rate: 30 kHz

Maximum Horizontal Rate: 121 kHz

Maximum Pixel Clock: 360 MHz

GTF Data: 00 0a 20 20 20 20 20 20

Monitor Name (block #3): NSZ2107U

Monitor Serial Number (block #4): #####

EDID EDITOR V1.40 (000621)

(C) Mitsubishi Electric 1995-2000

2.7 Self-diagnosis shipment setting

The shipment settings for self-diagnosis data area (region) are given below.

ADR	Default Setting (H)	Function
6A	——	
6B	——	
6C	——	Operation horizontal frequency 1 (frequency indicated in the latest period)
6D	——	Operation vertical frequency 1 (frequency indicated in the latest period)
6E	——	Operation horizontal frequency 2 (frequency indicated in the secondary latest period)
6F	——	Operation vertical frequency 2 (frequency indicated in the secondary latest period)
70	——	Operation horizontal frequency 3 (frequency indicated in the third latest period)
71	——	Operation vertical frequency 3 (frequency indicated in the third latest period)
72	00	Short-circuit rate at User mode
73	00	X-PRO rate at User mode
74	00	Beam Pro rate at User mode
76	00	High voltage fail safe operation rate at User mode
77	00	High voltage, X-PRO data EEPROM reading error rate at User mode
78	——	Short-circuit rate at Factory mode
79	——	X-PRO rate at Factory mode
7A	——	Beam Pro rate at Factory mode
7C	——	High voltage fail safe operation rate at Factory mode
7D	——	High voltage, X-PRO data EEPROM reading error rate at Factory mode
A0	00	Lower byte of operating time (including POWER SAVE)
A1	00	Upper byte of operating time (including POWER SAVE)
A2	——	——
A3	00	Lower byte of Heater ON time (excluding POWER SAVE)
A4	00	Upper byte of Heater ON time (excluding POWER SAVE)

2.8 Default inspection

2.8.1 Default setting of switches

Confirm that the following switch is set as follows.

- (1) Power switch: OFF

2.8.2 Default setting of OSD

Confirm that each OSD setting is as shown in OSD display (section 2.3.3) 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 (-) (+) buttons are pressed simultaneously in the normal mode.

Only CONTRAST will be set to MAX 100% when (-) (+) buttons are pressed simultaneously in the normal mode.

2.8.3 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.

2.8.4 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.

2.9 Degaussing with handy-demagnetizer

2.9.1 General precautions

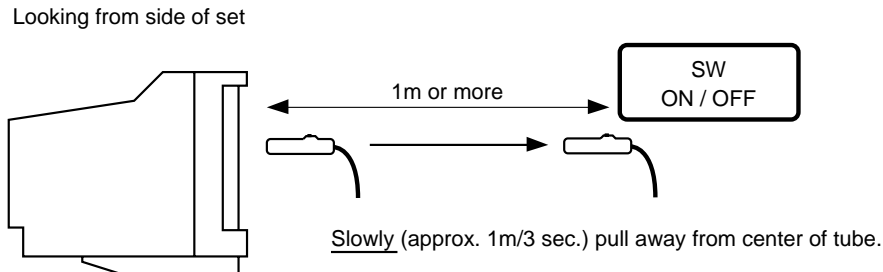
- (1) Carry this procedure out with the monitor power ON.
- (2) When degaussing with handy-demagnetizer, the demagnetizer power must be turned ON and OFF at a position at least 1m away from CRT tube.
- (3) Use a bar type demagnetizer instead of a ring type.
Carefully and slowly (1m/3 sec.) demagnetize 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.

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

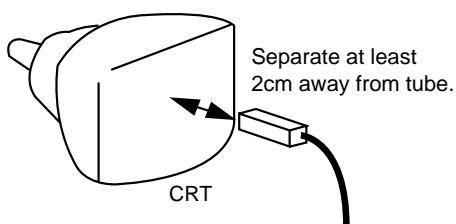
(NOTE): The monitor should be degaussed as whichever following conditions.

- (1) Degauss by handy demagnetizer in off condition.
- (2) Degauss by handy demagnetizer in power management condition.
- (3) Degauss by handy demagnetizer with monitor set degauss operation.

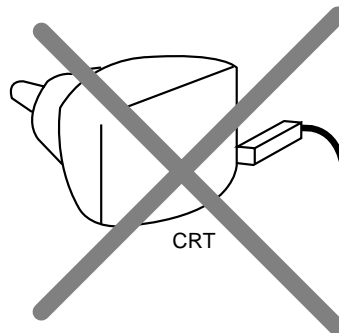


<Holding the hand degaussing unit>

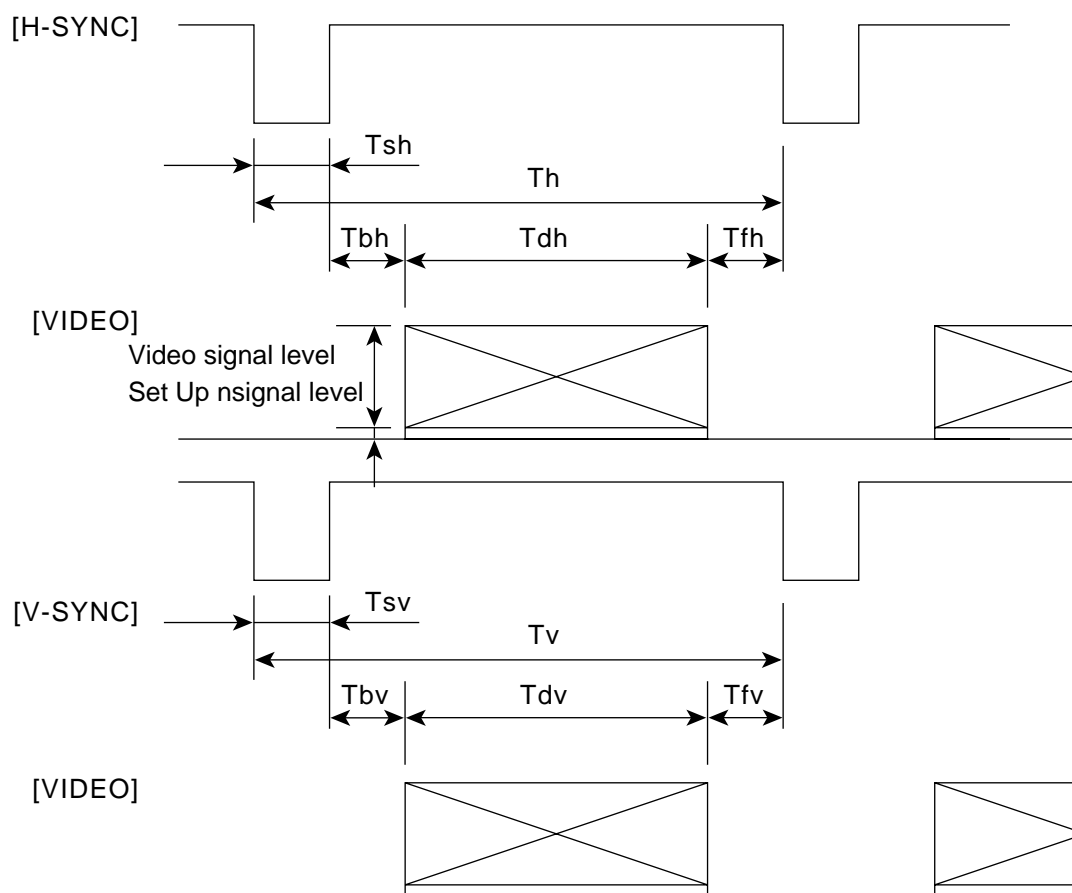
Face the hand degaussing unit so that the longitudinal direction is vertical in respect to the CRT.



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



2.10 Timing chart



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

[illegible]

NO	Fh (kHz)	Clock (MHz)	Th (μSEC)	Tsh (μSEC)	Tfh (μSEC)	Tbh (μSEC)	Tdh (μSEC)	Utili- zation	H re- trace s+f+b	Fv (Hz)	Tv (mSEC)	Tsv (mSEC)	Tfv (mSEC)	Tbv (mSEC)	Tdv (mSEC)	V re- trace	Hs	Vs	VIDEO level (V)	set up level (V)	Serra- tion (V)	Group				Remarks
			(dot)	(dot)	(dot)	(dot)	(dot)																			
1	31.469	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	31.469	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	-	-	○1				VGA(640*480)60Hz
3	37.500	31.500	26.667 (840)	2.032 (64)	0.508 (16)	3.810 (120)	20.317 (640)	76.19	6.350	75.000	13.333 (500)	0.080 (3)	0.027 (1)	0.427 (16)	12.800 (480)	0.506	-	-	0.7	-	-					VESA(640*480)75Hz
4	43.269	36.000	23.111 (832)	1.556 (56)	1.556 (56)	2.222 (80)	17.778 (640)	76.92	5.334	85.008	11.764 (509)	0.069 (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	-	-	○2				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	60.023	78.750	16.660 (1312)	1.219 (96)	0.203 (16)	2.235 (176)	13.003 (1024)	78.05	3.657	75.029	13.328 (800)	0.050 (3)	0.017 (1)	0.466 (28)	12.795 (768)	0.516	+	+	0.7	-	-	○3				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	-	-	○4				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 (1)	0.013 (1)	0.475 (38)	12.804 (1024)	0.513	+	+	0.7	-	-	○5				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	11.761 (1072)	0.033 (3)	0.011 (1)	0.483 (44)	11.235 (1024)	0.516	+	+	0.7	-	-	○6				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	-	-	○7				VESA(1600*1200)75Hz
12	106.250	229.500	9.412 (2160)	0.837 (192)	0.279 (64)	1.325 (304)	6.972 (1600)	74.08	2.441	85.000	11.765 (1250)	0.028 (3)	0.009 (1)	0.433 (46)	11.294 (1200)	0.461	+	+	0.7	-	-	○8				VESA(1600*1200)85Hz
13	106.270	261.000	9.41 (2456)	0.828 (216)	0.368 (96)	1.349 (352)	6.866 (1792)	72.96	2.545	74.997	13.334 (1417)	0.028 (3)	0.009 (1)	0.649 (69)	12.647 (1344)	0.677	-	+	0.7	-	-					VESA(1792*1344)75Hz
14	112.500	288.000	8.889 (2560)	0.778 (224)	0.444 (128)	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 (2640)	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	-	-	○9				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	-	-					APPLE13(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	-	-					APPLE16(832*624)
18	60.240	80.000	16.600 (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	-	-					APPLE19(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	-	-					APPLE21(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)	0.03 (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 (128)	1.205 (304)	6.343 (1600)	72.46	2.410	85.000	11.765 (1344)	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 (2488)	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	-	-	○10				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)	1.363 (144)	9.692 (1024)	78.05	2.726	100.000	10.0 (805)	0.037 (3)	0.012 (1)	0.410 (33)	9.537 (768)	0.463	-	-	0.7	-	-					ELSA(1024*768)100Hz
29	128.64	364.308	7.774	0.615	0.461	1.076	5.622	72.3	2.152	80.000	12.5	0.023	0.008	0.528	11.940	0.551	-	-	0.7	-	-					GTF(2048*1536)80Hz

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.