

TECHNICAL MANUAL (Ver.2.0)

MULTI PROJECTION UNIT
RM-V2550U
RM-V2550E

PROJECTION SCREEN KIT
RM-V2550S

MULTI VIDEO PROCESSOR
RM-V3104S

PROJECTION STAND
RMA-V5020



Caution

This symbol refers to a hazard or unsafe practice which can result in personal injury or property damage.

Notes:

- Pioneer will accept no responsibilities for damages resulting from problems with parts other than those supplied by Pioneer.
- Performance shall be guaranteed solely when assembly and adjustment is performed as prescribed in this technical manual.
- For improvement purposes, the specifications and design described in this technical manual are subject to change without notice.

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WARNING

- prevent injuries and physical damages, always read and observe this manual and all labels on the system before assembly, construction, and adjustments.
- Do not use the system outdoors to prevent fire hazards and electric shocks caused by water entering the system.
- To prevent injuries, take note of the sharp edges of this system.
- When performing setup work at high places, to prevent the falling down of the system and damages caused by falling objects, set the Keep Out area.
- To prevent fire hazards and electric shocks, do not place foreign objects in the system nor remodel it.
- To prevent fire hazards, observe the following using environment.
Temperature : 5 to 35 °C
Humidity : 20 to 80%
- Perform ventilation with the fan etc. and observe the operating environment conditions even after completing assembly.
- Never install the system tilted.

CHAPTER 1. FEATURES

1. FEATURES OF THE MULTI PROJECTION UNIT

(hereinafter referred to as the "MPJ")

- Thin, space-saving design (75 cm deep), and installable flush against the wall (when stacked in two levels in a 4-screen configuration, etc.)
- Split structure for easy carrying and assembly
The structure is split by screen, making it easy to carry and assemble the system.
- Excellent features with a reasonable price
- Can be stacked in up to three levels
- Under 1.9 meters high when stacked in two levels, allowing installation in stores with low ceilings
- Improved adjustment procedures
 - Uniform, simplified ABL level adjustment using ABL control voltage indication.
 - Lists of main deviation and white balance adjustment values can be displayed when performing adjustments with the remote control unit, making it simple to check adjustment values and compare with other screens.
- Ultra-small gap between screens (approximately 4 mm)
The gap between screens is only about 4 mm wide, making for easy viewing and greatly reducing loss of picture and character information.
- Usable in bright places
High screen brightness (420 ft-L), allowing use in lobbies exposed to external light and bright offices.
- Gap-less screen system possible
Improved stability of picture display position over time.
* Contact Pioneer for information about gap-less screen systems.
- Full of functions for providing high picture quality with enlarged images and a strong sense of picture uniformity
 - Though the peripheral brightness is sufficient for multi-screen images, a "multi" function is also included for activating a peripheral light compensation circuit and achieving enlarged pictures with even more uniform brightness. There is also a function for achieving the optimum contour compensation level with enlarged images, thereby providing natural, high quality enlarged pictures.
 - An auto white balance function and ABL (Auto Brightness Limiter) linking function suppress differences in colors and brightness on the different screens.
- Convergence memory function
Up to three sets of adjustment data in addition to the standard factory default settings can be stored in the memory.
- "Color mode selection function" for convenient camera reshooting
The MPJ is equipped with a "color mode selection function" allowing the selection of two white balance data settings. When used for example in a broadcast station's studio for reshooting, the colors will be unnatural if a camera suited to the brightness in the studio is used, but if one color temperature is set to 4500°K, natural colors can be reproduced at the touch of a button.
- On-screen display function
Adjustment values and various settings can be displayed on the screen.

FEATURES

- **External control function**
The MPJ is equipped with an RS-232C external control terminal. This makes it possible to use a computer to perform the various adjustments, and provides possibilities for various types of visual presentations. Transfer of control signals to the individual multi projection units is possible in daisy chain format by connecting the combination terminals using interconnection control cables (DIN 6-pin connectors, included). No complicated connections are necessary. The multi projection units can be assigned ID numbers and still be adjusted individually after the system is expanded.
- **Dual NTSC/PAL compatibility**
The individual multi projection units display high quality pictures with either NTSC or PAL inputs.
- **Wired remote control unit (RU-V107, sold separately) available for adjustments**
The wired remote control unit can be used for adjusting the convergence, white balance and other settings while watching the picture from the front when setting up the multi picture system.

2. FEATURES OF THE MULTI VIDEO PROCESSOR (hereinafter referred to as the "MVP")

- Multi video processor for 4-screen enlarged images
- Compact, space-saving design
- Adjustment remote control unit/computer relay function considering system installation
- Expandable through the addition of an option board (one)

3. FEATURES OF THE PROJECTION STAND (hereinafter referred to as the "Stand")

- EIAJ rack mount function
- Casters for easy moving
- Built-in adjuster for level adjustment

CHAPTER 2. GENERAL SPECIFICATIONS

1. SPECIFICATIONS OF THE DIFFERENT UNITS

(1) Multi Projection Unit (RM-V2550U, RM-V2550E)

TV format	NTSC/PAL, automatic switching (fixed mode available)	AC outlet (Max. 8A, AC 100V to 120V) for RM-V2550U	1
Projection tubes	7" CRT x 3	AC outlet (Max. 550W/AC 220V to 240V) for RM-V2550E	1
Horizontal resolution	800 TV lines (with video input)	External dimensions	1030.8 (W) x 1115.5 (H) x 750 (D) mm (including screen unit)
Brightness (at white peak)	420 ft-L (50")	Weight	87 kg (including screen unit)
Practical angle of vision	150° horizontal, 60° vertical	Accessories	
Input signal:		(RM-V2550U's cabinet unit, RM-V2550E)	
Video input		Power cord	1 *4
..... Standard input level (75-ohm load) 1 Vp-p	Input terminal: BNC connector x 1	Control cable	1
Y/C isolated inputs		Used to control multiple multi projection units.	
..... Standard input level (75-ohm load)	Brightness (Y) signal 1 Vp-p	Hexagonal bolt w/ washer (M8x65)	2
Color (C) signal ...	286 mVp-p (burst signal, NTSC)	Hexagonal bolt w/ washer (M8x45)	3
	300 mVp-p (burst signal, PAL)	Hexagonal nut (M8)	5
	Input terminals: BNC connectors (one each for Y and C)	Light shield (black)	4
RGB input	Analog R.G.B signals	(RM-V2550U's screen unit, RM-V2550S)	
RGB-1: D-Sub 9-pin terminal x 1 *2		Hook fitting (left)	1
RGB-2: BNC connector x 5 *2		Hook fitting (right)	1
R: Red input, 0.7 Vp-p ±2 dB, 75-ohm terminal, positive polarity		Screen frame fastener	1
G/G on SYNC: Green input, 0.7 Vp-p ±2 dB, 75-ohm terminal, positive polarity		Cross-recessed tap tight screw (wood screw, nominal diameter 4, length 18)	2
Green input with synchronization, 1.0 Vp-p±2 dB, 75-ohm terminal, positive polarity		(nominal diameter 4, length 8)	18
B: Blue input, 0.7 Vp-p ±2 dB, 75-ohm terminal, positive polarity		Cross-recessed small screw (M6x10)	1
HD/SYNC: Horizontal synchronization input, 0.3 to 4 Vp-p, 75-ohm terminal, negative polarity		Cross-recessed tap tight screw with metal washer (nominal diameter 4, length 12)	1
Composite synchronization input, 0.3 to 4 Vp-p, 75-ohm terminal, negative polarity			
VD: Vertical synchronization input, 0.3 to 4 Vp-p, 75-ohm terminal, negative polarity			
Synchronizing signal frequency: Standard NTSC or PAL frequency			
EXT control: BNC connector			
Remote input: Mini-jack			
Auto input: 6-pin DIN connector			
Output signal:			
Video output Standard level (75-ohm load) 1 Vp-p	Outputs input signals from input terminals		
Remote output	6-pin DIN connector		
Computer control:			
Method	RS-232C (D-SUB 25-pin)		
Speed	1200, 2400, 4800, 9600, 19200 bps *1		
Power supply voltage			
for RM-V2550U	AC 100V to 120V, 50/60 Hz		
for RM-V2550E	AC 220V to 240V, 50/60 Hz		
Normal power consumption			
for RM-V2550U	approx. 360VA *3		
for RM-V2550E	approx. 240W *3		
Maximum power consumption			
for RM-V2550U	400VA		
for RM-V2550E	275W		

*1 The RS-232C baud rate is set at 4800 bps upon shipment from the factory. The setting can be changed by remote control or from a computer.

*2 Only RGB-1 or RGB-2 can be used (selected by switch).

*3 NTSC color bar signal input and other adjustment data as set upon shipment from the factory.

*4 Since the power cord is not attached for RM-V2550E, use the appropriate power cable (product conforming to Safety Standards) for the country in which the product is used. As this product must be grounded for safety reasons, the three-core power cable (with ground) must be used. For your reference, the electrical specifications of the power cable are provided below.

U.K.

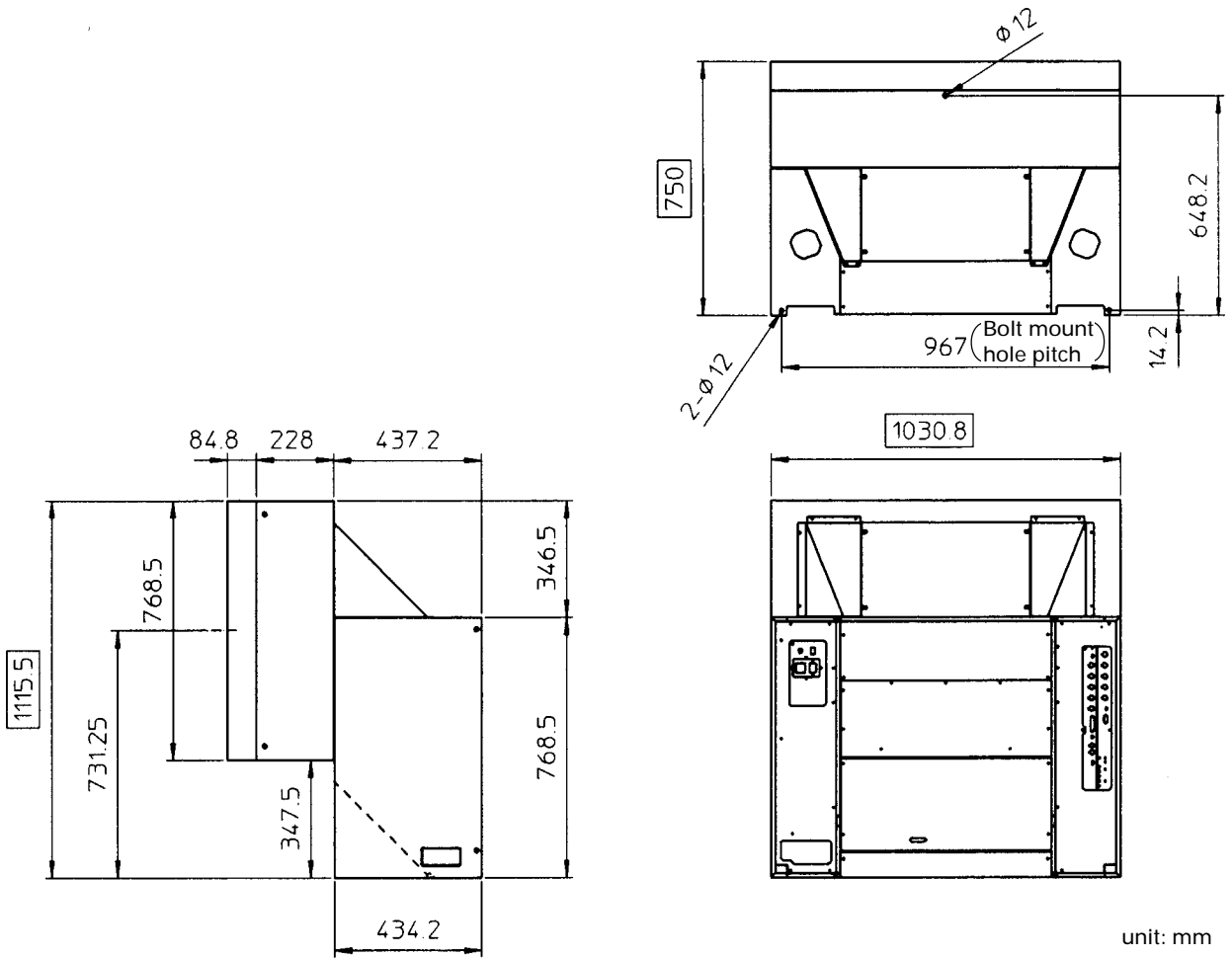
Cord	Cross-sectional area 3 x 1.0 mm ² (According to CEE 13)
Connector ..	10A 250V - (According to EN60320 Sheet C13)
Plug	UK13 Amp Plug with rated 13 Amp fuse (According to BS1363)

Europe

Cord	Cross-sectional area 3 x 1.0 mm ² (According to CEE 13)
Connector ..	10A 250V - (According to EN60320 Sheet C13)
Plug	10/16A 250V - (According to CEE7;IV)

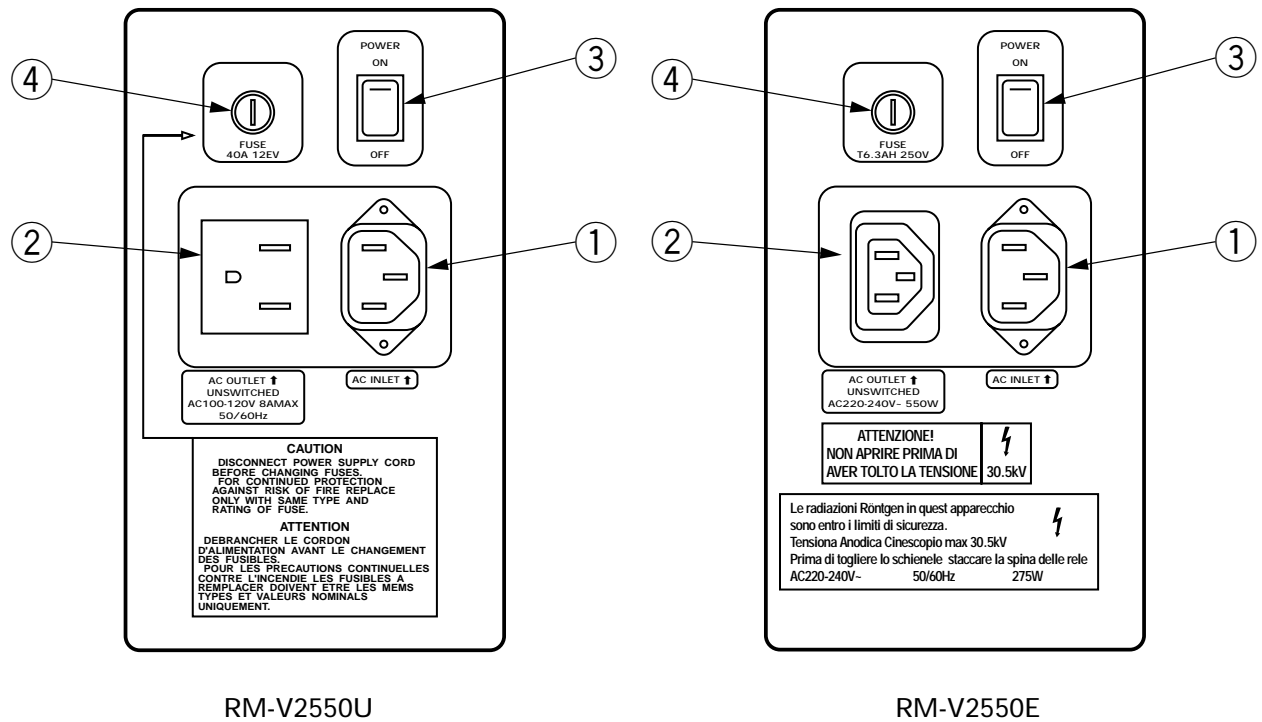
Dimensions

<With screen mounted>



[Fig. 2-1-1]

Power Supply Panel

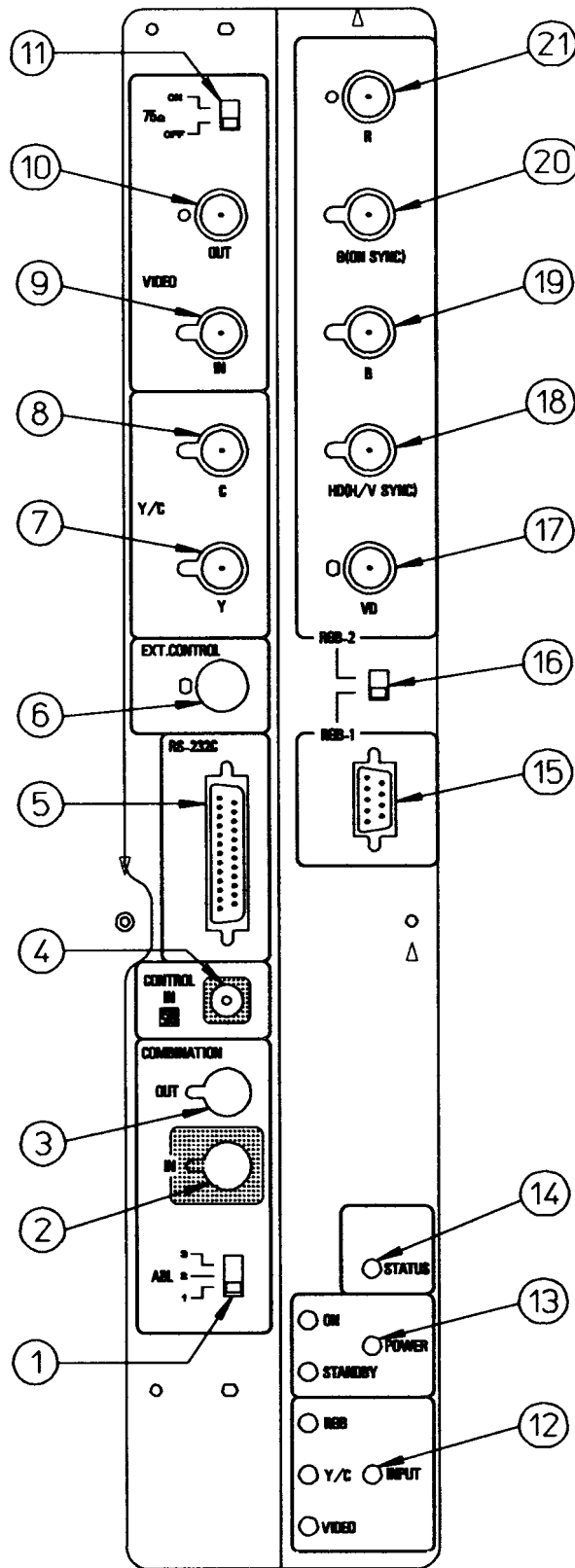


[Fig. 2-1-2]

No.	Name	Type	Function
①	AC inlet		Connect the power cord here.
②	AC outlet		Connect other multi projection units here. Not linked to main power switch. (*1)
③	Main power switch	Seesaw switch	Turns the power supply to the set on and off. When on, the set is set to the mode stored in the last memory (standby or power on).
④	Fuse holder		The fuse is in here. Only service personnel should touch this.

NOTE) 1. Refer to "(13) Power supply ③ connection".

Control Panel



[Fig. 2-1-3]

No.	Name	Type	Function
①	ABL linking switch	Slide switch	When ABL linking is on, the ABL linking control voltage's control quantity can be switched
②	Linked input terminal	DIN 6-pin	ABL, remote control signal and RS-232C signal input terminal
③	Linked output terminal	DIN 6-pin	ABL, remote control signal and RS-232C signal output terminal
④	Remote control connector	Mini jack	Jack for connecting adjustment remote control unit (sold separately)
⑤	RS-232C port	D-sub 25-pin (female)	RS-232C communications connector
⑥	Control input terminal	BNC connector	Video input and Y/C input external switching control signal input terminal
⑦	Y (brightness) input terminal	BNC connector	Brightness signal input terminal
⑧	C (color) input terminal	BNC connector	Color signal input terminal
⑨	Video input terminal	BNC connector	Video signal input terminal
⑩	Video output terminal	BNC connector	Video input terminal ⑨ through out terminal
⑪	Terminating switch	Slide switch	Turn on to terminate video input terminal ⑨ at 75 ohm
⑫	Input selector switch	Tact switch	Video input, Y/C input, RGB input selector switch. At the VIDEO position, switching between the video input and Y/C input is possible with the external control signal ⑥.
⑬	POWER switch	Tact switch	When power off: STANDBY (red LED) lights When power on: ON (green LED) lights
⑭	STATUS indicator switch	Tact switch	Switch for displaying the total power on time (*), switch settings, etc., on the screen
⑮	RGB input terminal	D-sub 9-pin (male)	RGB signal input terminal
⑯	RBG input selector switch	Slide switch	Switch for selecting the RGB signal input terminal format
⑰	RGB input terminal (vertical synchronization)	BNC connector	RGB signal vertical synchronization input terminal
⑱	RGB input terminal (horizontal synchronization /composite synchronization)	BNC connector	RGB signal horizontal synchronization and composite synchronization (for only input signal H/V synchronization) input terminal
⑲	RGB input terminal (B)	BNC connector	RGB signal B input terminal
⑳	RBG input terminal (G/G on Sync)	BNC connector	RGB signal G or G on Sync input terminal
㉑	RBG input terminal (R)	BNC connector	RGB signal R input terminal

- Turn the power off with the POWER switch ⑬ on the set, through RS-232C control or with the wired remote control unit (sold separately). (If the power supply is interrupted with the main power switch or if the power cable is disconnected from the outlet, the switch settings in ⑭ above, the TV system and the convergence memory settings will not be stored in the last memory.)

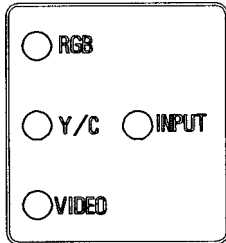
Thus, for permanent installations, to start up and stop the entire system by turning the AC power on and off, the power must first be turned off as described above in order to store the settings in the last memory. (Refer to "Chapter 4, 2 (5) Last memory of adjustment data and settings ".)

* Total power on time

Only counted when power is set to ON.

Control Panel Mode Switches

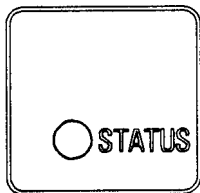
● INPUT SELECT switch



- The input switches each time the switch is pressed.

Position	Function
VIDEO	<p>Selects the VIDEO input terminal. When selected, the VIDEO LED lights. This position is also used for switching the input between VIDEO and Y/C by inputting a control signal to the EXT. CONTROL terminal.</p> <p>< EXT. CONTROL ></p> <p>The input switches between VIDEO and Y/C when a control signal is input to the EXT. CONTROL terminal (BNC). In this case, the VIDEO LED remains lit, regardless of which input is selected.</p> <p>Control signal Open : VIDEO Low : Y/C</p> <p>When the control input terminal is open (normal mode), the open mode is set and the VIDEO input signal is selected.</p>
Y/C	<p>The Y/C input terminal is selected. When selected, the Y/C LED lights.</p>
RGB	<p>The RGB input terminal is selected. When selected, the RGB LED lights.</p>

● STATUS indicator switch



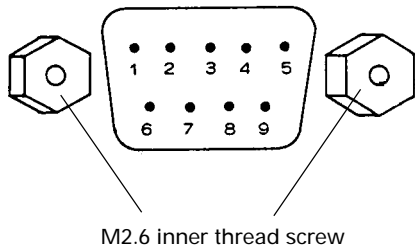
- The display of the various settings turns on and off when the switch is pressed.

Display example)

1.HOUR	1000 H
2.INPUT	VIDEO
3.MULTI	ON
4.COLOR MODE	1
5.COMBI.	ON
6.VIDEO MODE	ON
7.BAUD RATE	4800BPS
8.TV SYSTEM	AUTO/NTS
9.CONV. DATA	MEMO-1

- 1: Indicates the total power on time. (Only counted when power is set to ON.)
- 2: Indicates the selected input.
- 3: Indicates the MULTI ON/OFF mode.
- 4: Indicates the COLOR MODE 1/2 mode.
- 5: Indicates the COMBINATION ON/OFF mode.
- 6: Indicates the picture muting on/off mode when the input function is switched.
- 7: Indicates the transfer speed for computer control.
- 8: Indicates the TV system mode.
- 9: Indicates the memory area status for the selected convergence data.

[RGB-1 terminal]



Analog RGB : 0.7 Vp-p (75 ohm)
 Synchronizing signal : 0.3 Vp-p to 4 Vp-p (75 ohm)
 Connection terminal : 9-pin D SUB (male)

Pin layout

1 : R	6 : GND
2 : G/G on Sync	7 : VD
3 : B	8 : NC
4 : Signal GND	9 : NC
5 : HD/Sync	

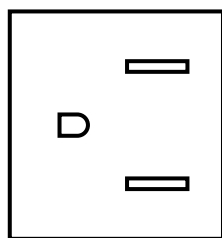
[VIDEO input]

The video output terminal outputs the signal input to the input terminal (through out). When connecting other devices, terminate the other device at 75 ohm and set the unit's 75-ohm terminating switch to "OFF " (open). When not connecting other devices, always set the terminating switch to "ON".

Power outlet ⚠

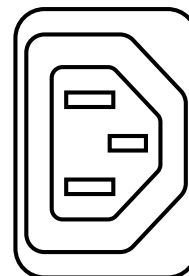
- Power outlet (unswitched)
 - RM-V2550U MAX. 8A/AC 100V to 120V
 - RM-V2550E MAX. 550W/AC 220V to 240V

This outlet is for adding multi projection units. Do not use it for other purposes.
- Power outlet power consumption
 - Up to two other multi projection units can be connected after one multi projection unit.



AC OUTLET ↑
 UNSWITCHED
 AC100-120V 8A MAX
 50/60Hz

RM-V2550U



AC OUTLET ↑
 UNSWITCHED
 AC220-240V- 550W

RM-V2550E

(2) Multi Video Processor (RMD-V3104U)

Input signal

Input video signal (NTSC)

1 set BNC connector

(One set of RGB inputs can be added by adding an optional variable scan board.)

① Composite video signal 1.0 V (p-p)
(75-ohm terminated)

② Isolated Y/C signal
Y (with synchronization) 1.0 V (p-p) (75 ohm)
C 0.286 V (p-p) (75 ohm)

* Signal format ① or ② selectable

③ Optional RGB input signal
RGB signal 0.7 V (p-p) (75 ohm)
H.V TTL level
C SYNC 0.3 to 4 V (p-p), negative logic
Green (G on Sync) 1.0 V (p-p) (75 ohm)
SYNC section 0.3 V (p-p)

SYNC order of priority

H.V > C SYNC > Green (G on Sync)

RS-232C control input 25-pin D-sub

Output signal

Output video signal

4 sets BNC

① Composite video signal 1.0 V (p-p) (75-ohm)

② Isolated Y/C signal
Y (with synchronization) 1.0 V (p-p) (75 ohm)
C 0.286 V (p-p) (75 ohm)

* Simultaneous output of ① and ②

③ RGB signal
Green (Sync on Green) 1.0 V (p-p)
SYNC section 0.3 V (p-p)
Blue 0.7 V (p-p)
Red 0.7 V (p-p)

Others

Power supply AC 100V (50/60 Hz)

Power consumption 100 W

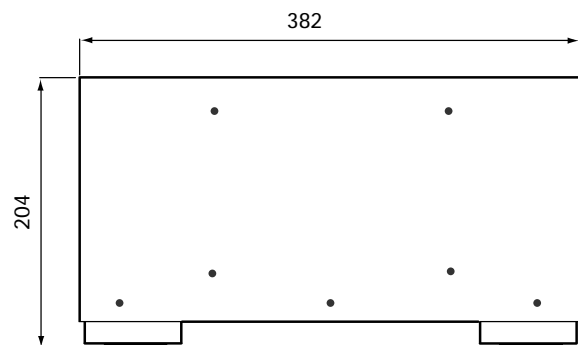
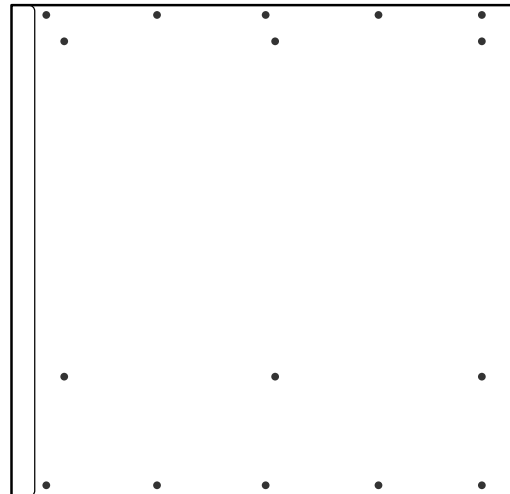
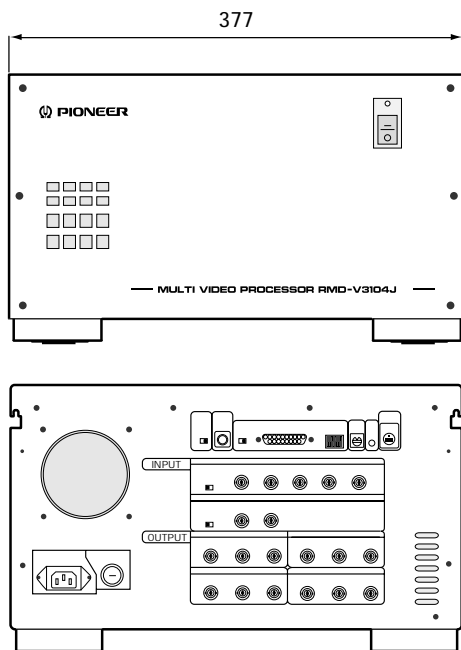
Operating temperature/humidity range 5 to 35°C
85% or less (without condensation)

External dimensions

..... 377 (W) x 382 (D) x 204 (H) (mm)

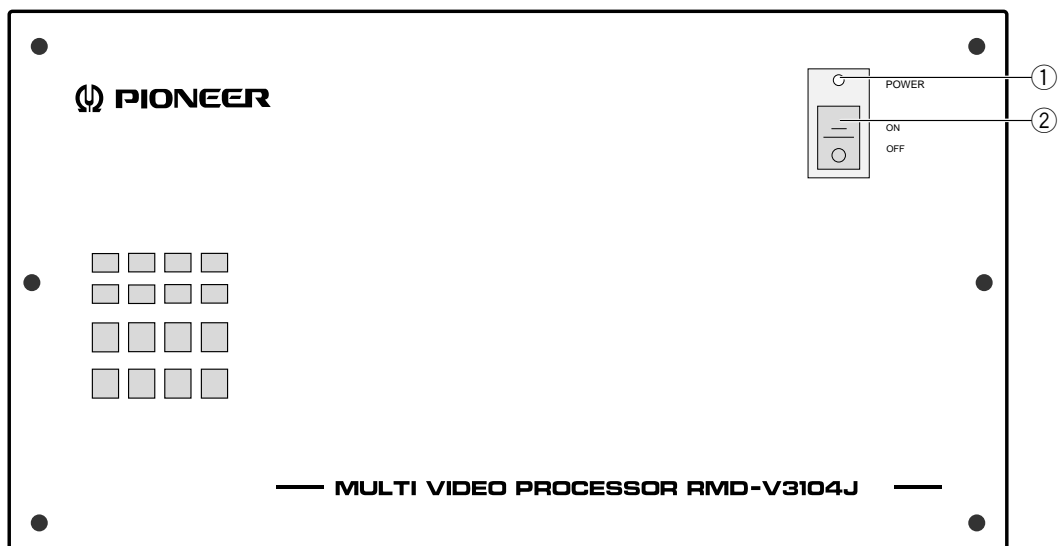
Weight 12.0 kg

External Dimensions



Unit: mm

Front Panel



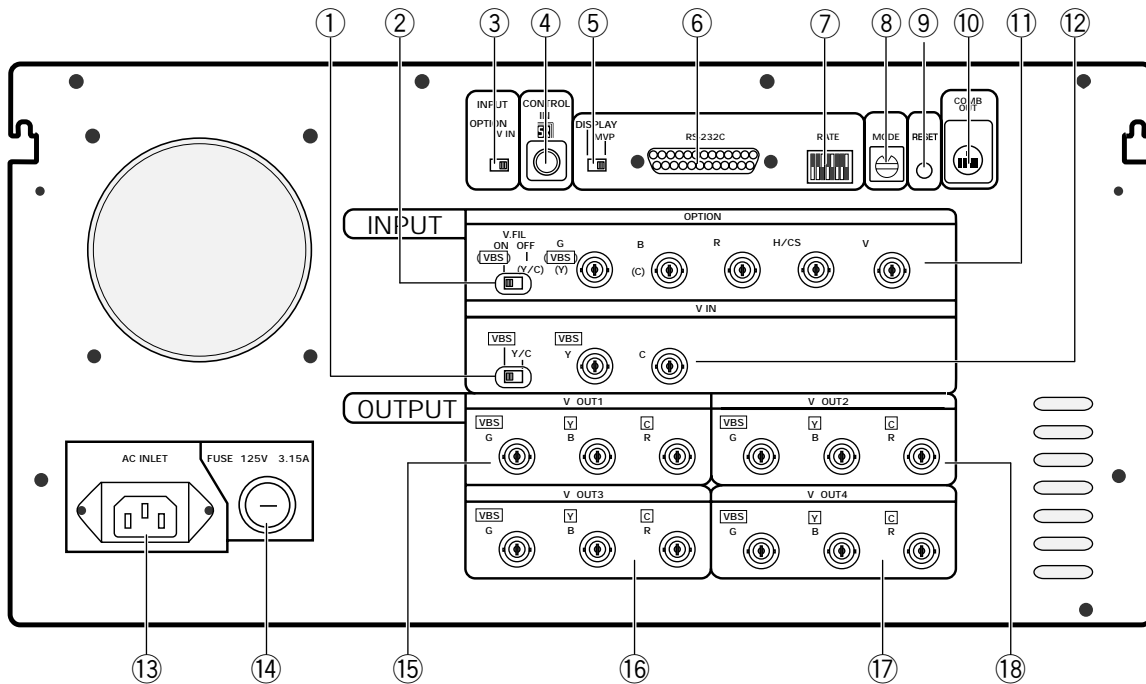
① POWER indicator

Lights when the power is ON.

② POWER switch

Press to switch the power ON/OFF.

Rear Panel



① **VBS/ Y/C switch**

Selects whether the VBS (video signal) or Y/C signals are input to the V IN (Video) input. The factory preset is VBS (video signal).

② **V.FIL (Vertical interpolation filter) ON/OFF switch**

When the optional variable scan board (RMD-V3020) is installed, use this switch to switch the vertical interpolation filter ON/OFF. Set this switch to ON if the top and bottom of the computer screen image cannot be accommodated entirely by the screen. The factory preset is set to ON.

③ **INPUT switch**

Selects whether the V IN (Video) or OPTION input is enlarged into 4 screens. The factory preset is set to V IN.
 * Always press the reset button after changing the position of this switch.

④ **Remote control input connector**

Connects the display's remote control unit. (Adjustment or changes to the settings of the unit cannot be accomplished with the remote control unit.)

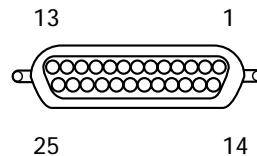
⑤ **RS-232C switch**

When performing adjustments from a computer, use this switch to switch between this unit (MVP) and display (DISPLAY).

⑥ **RS-232C connector**

Connects RS-232C cable.

< RS-232C connector diagram >
 RS-232C pin layout

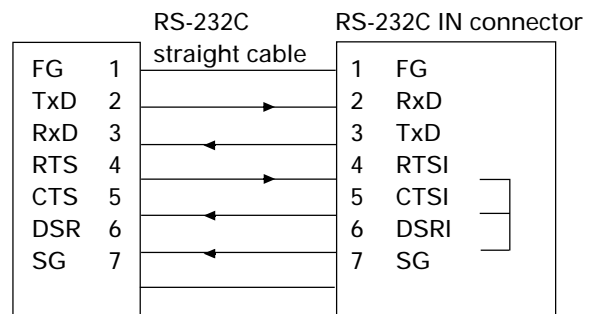


< RS-232C connection diagram >

Use an RS-232C straight cable for connection.

<External computer>

<MVP unit>



* Pins 4, 5 and 6 are internally shorted.

• Pins which are not shown in the diagram are not used.

Signal name

- FG Frame Ground
- TxD Transmitted Data
- RxD Received Data
- RTS Request to Send
- CTS Cleat to Send
- DSR Data Set Ready
- SG Signal Ground

⑦ Baud rate switch

Selects the baud rate for the RS-232C.
Baud rate switch (8-bit DIP switch)

Functions of bits : Factory preset values

Switch No.	Function	ON	OFF
1	Parity	Yes	No
2	Parity polarity	Even	Odd
3	Character bits	8 bits	7 bits
4	Stop bits	2 bits	1 bit
5	Baud rate setting	See table below.	
6			
7	Reserved		
8	Reserved		

(Note)

SW7 should always be set to OFF.
SW8 should always be set to ON.

Baud rates available with SWs 5 and 6

SW①-5	SW①-6	Baud rate (bps)
ON	ON	19200
OFF	ON	9600
ON	OFF	4800
OFF	OFF	2400

⑧ MODE switch

Selects the video output mode.

MODE switch details

SW No. *1	Output Mode Details			
	Frequency mode	Output mode	Standard/ double speed *2	Middle cut recovery mode *3
0	NTSC	VBS,AY/C	Standard	OFF
1		RGB		
2				
8	NTSC	VBS,AY/C	Standard	ON
9		RGB		
A				

*1
The factory preset is "8".

*2
Standard..... Horizontal frequency 15.734 kHz
Double speed Horizontal frequency 31.468 kHz
(A multi-scan monitor such as the RMD-V4000V or RMD-V5000V is required to view video that is produced by double speed signals.)

*3
When viewing video that contains rapid movement, there are times when the upper 2 screens do not follow uniformly with the lower 2 screens. This phenomenon is called "middle cutting" and can be alleviated by setting the middle cut recovery mode to ON.

⑨ Reset button

Press this button to reset the system. After the button is pressed, the system enters the manual mode. In manual mode, this unit can be controlled using the rear panel switches, without using a computer.

When the reset button is pressed, this unit functions in the modes selected by the rear panel switches.

⑩ COMB cable connector

Connects the interlock cable (cord with 6P mini-DIN plugs) provided with the display.

⑪ OPTION video input connectors

These input connectors are used when an option board is installed.

When the RMD-V3020 variable scan board is used, their functions operate as shown below.

- G Input terminal for the G signal of RGB separate signals.
- B Input terminal for the B signal of RGB separate signals.
- R Input terminal for the R signal of RGB separate signals.
- H/CS Input terminal for the H sync or C SYNC signal.
- V V sync input terminal.

- As the NEC PC-9800®, IBM PC and DOS/V (VGA) computers use H/V separate sync signals, their sync signals should be connected to both the H/CS and V connectors. H and CS use a common connector.
- Macintosh® computers use the CS sync signal, which should be connected to the H/CS connector.

⑫ V IN (video) input connectors

These connectors receive video data (V IN signal images).

Apply V IN (Video) input signals to these connectors.

- VBS/Y .. Input terminal for the composite video signal or the Y signal of Y/C separate signals.
- C Input terminal for the C signal of Y/C separate signals.

⑬ AC INLET

Connects the power cord to the unit.

⑭ FUSE

Use only a fuse with the specified capacity.

⑮~⑱ V OUT connectors 1 to 4

These video output connectors output enlarged video image signals for the 4 screens.

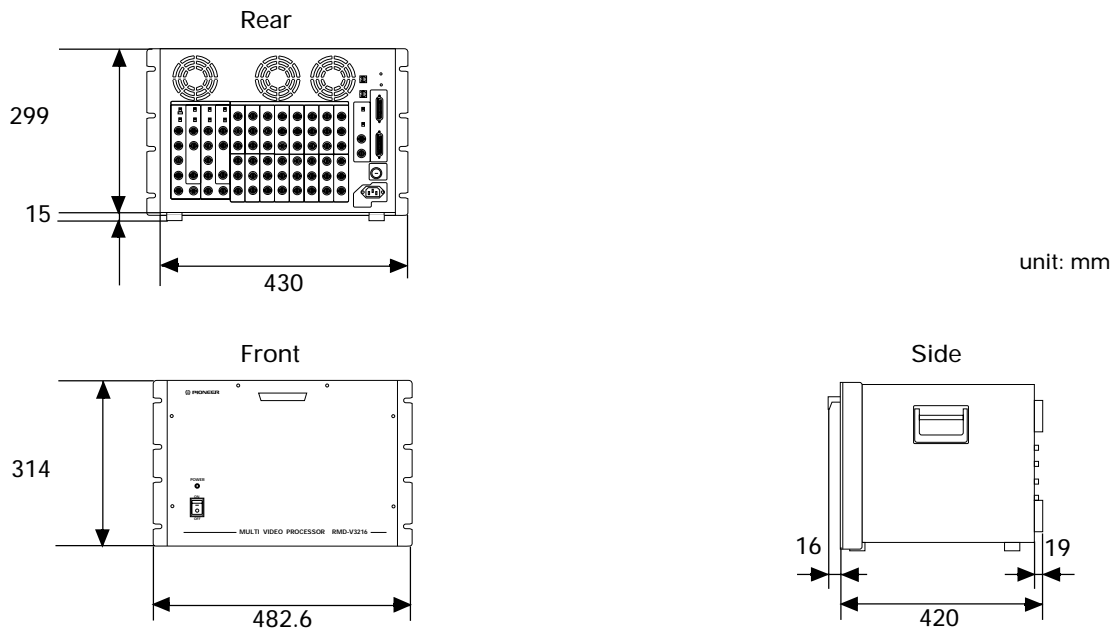
- VBS/G.. Output terminal of the composite video signal or the G signal of RGB separate signals. (Also outputs the G On Sync signal while it outputs the G signal.)
- Y/B Output terminal of the Y signal or the B signal of RGB separate signals.
- C/R Output terminal of the C signal or the R signal of RGB separate signals.

The correspondence between these outputs and a 4 displays is shown below.

V OUT1	V OUT2
V OUT3	V OUT4

4 displays (front view)

(3) Multi Video Processor (RMD-V3216/V3109)



[Fig. 2-1-4]

General Specifications of the Multi Video Processor (RMD-V3216/V3109)

Input signal

Input video signal (up to 4 sets can be added)
2 sets (RMD-V3216) or 1 set (RMD-V3109)

..... BNC connector
① Composite video signal 1.0 Vp-p
(75-ohm terminated)

② Isolated Y/C signal
Y (with synchronization) 1.0 Vp-p (75 ohm)
C burst level 0.286 Vp-p (75 ohm)

* Signal format ① or ② selectable
* Input ① only equipped with terminating switch, through out

Input reference synchronizing signal ... BNC connector

① Composite synchronizing signal
..... 0.286 to 4.0 Vp-p

② Composite video signal
Image level 0 to 0.714 Vp-p (75 ohm)
Sync. Level 0.286 Vp-p (75 ohm)

* Equipped with terminating switch, through out

RS-232C control input 25-pin D-sub

Output signal

Output video signal
16 sets (RMD-V3216) or 9 sets (RMD-V3109)
..... BNC connector

① Composite video signal 1.0 Vp-p (75-ohm)

② Isolated Y/C signal
Y (with synchronization) 1.0 Vp-p (75 ohm)
C (with burst) burst level .. 0.286 Vp-p (75 ohm)

* Simultaneous output of ① and ②

③ RGB signal

Green (G on Sync) 1.0 Vp-p

SYNC section 0.3 Vp-p

Blue 0.7 Vp-p

Input reference synchronizing signal BNC connector TTL level

(or input reference synchronizing signal through out)

Others

Power supply AC 100 to 120 V (50/60 Hz)

Power consumption
..... (RMD-V3216, RMD-V3109)
350 W, 700 VA

Operating temperature/humidity range ... 5 to 35°C
85% or less (without condensation)

External dimensions (RMD-V3216, RMD-V3109)
..... 482.6 (W) x 420 (D) x 314 (H) (mm)
(not including handle)

Weight

RMD-V3216 22.5 kg

RMD-V3109 22.0 kg

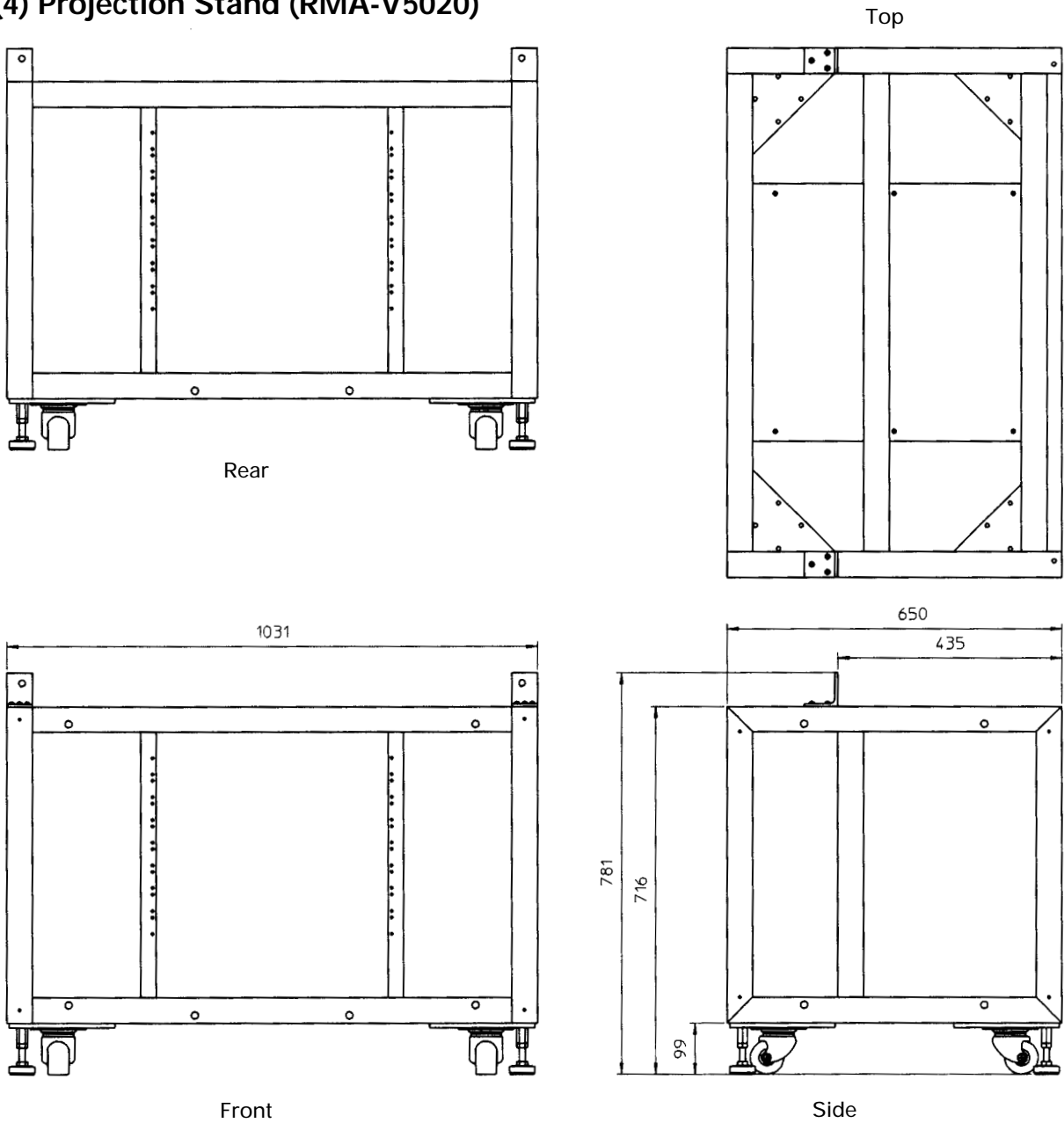
Accessories

Rack mount screw M5 8

Rack mount washer 8

* Up to 3 units of the RM-V2550U can be stacked.
4x4 (16-screen) configurations are not possible.

(4) Projection Stand (RMA-V5020)



[Fig. 2-1-5]

unit: mm

Specifications

- External dimensions (max.) 1031 (W) x 781 (H) x 650 (D) mm
(For 100-inch 4-screen systems, system height is 2600 mm)
- Weight 51.5 kg

Accessories

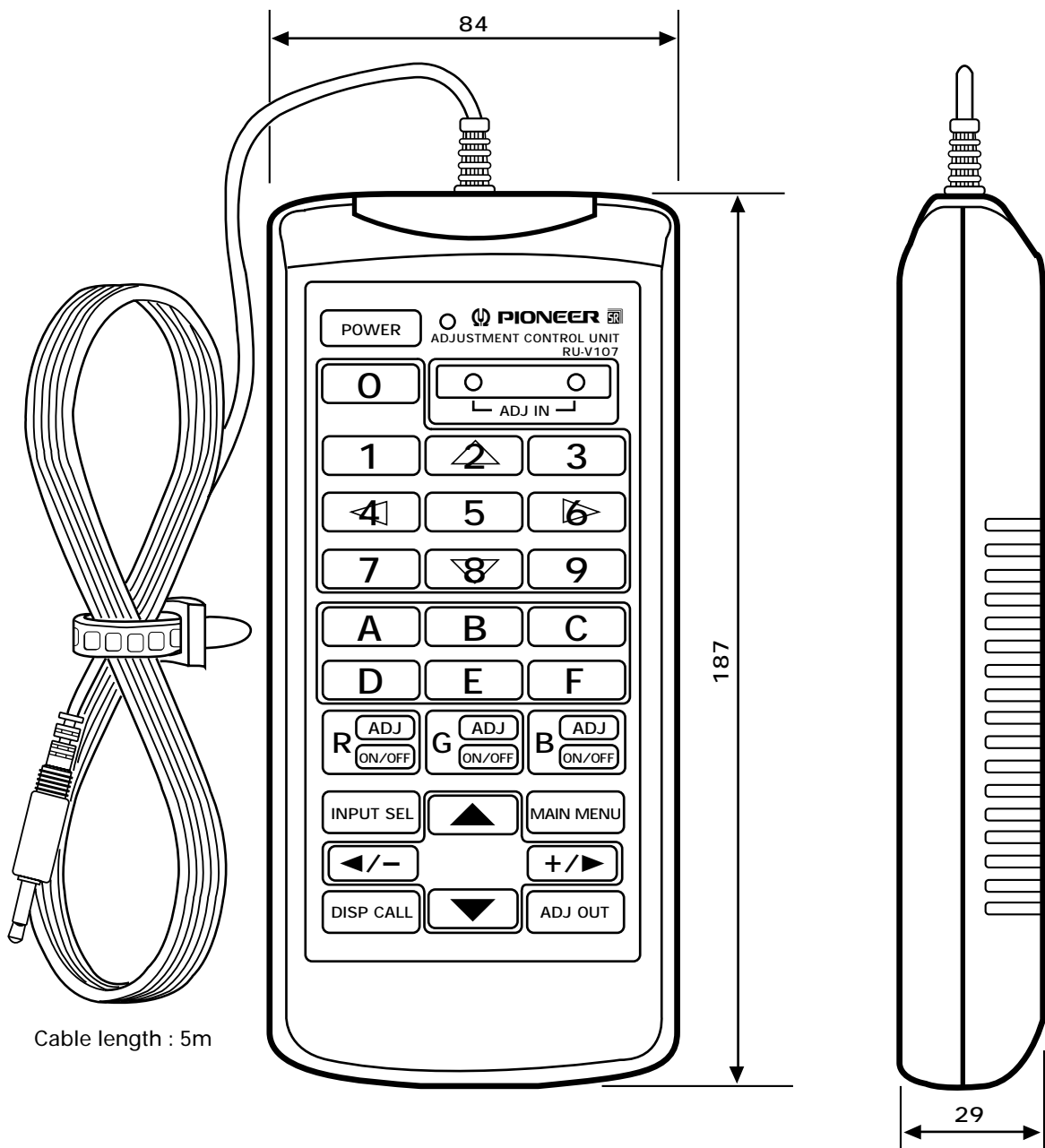
- Main unit mount bolt M8x30 2
- Main unit mount bolt M8x60 2
- Side coupling bolt M10x120 4
- Side coupling washer (for M10 bolt) 8
- Side coupling nut (for M10 bolt) 4

Package dimensions 1165 (W) x 800 (H) x 840 (D) mm

Package weight 63 kg

(5) Adjustment Control Unit (RU-V107) Option

unit: mm



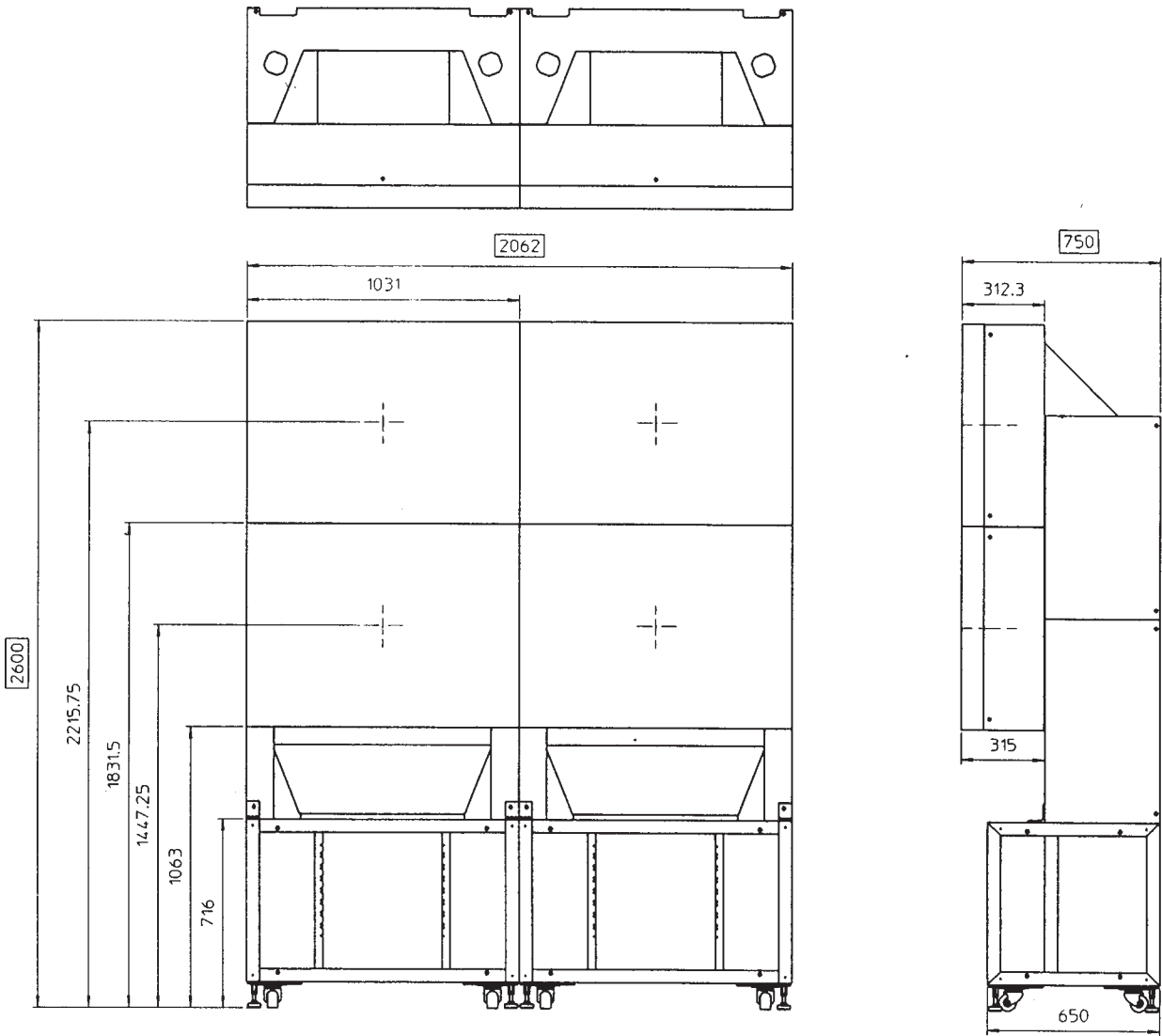
[Fig. 2-1-6]

Accessories

AA dry battery (IEC R6P)	2
Cable (5m)	3

2. Diagram of system dimensions

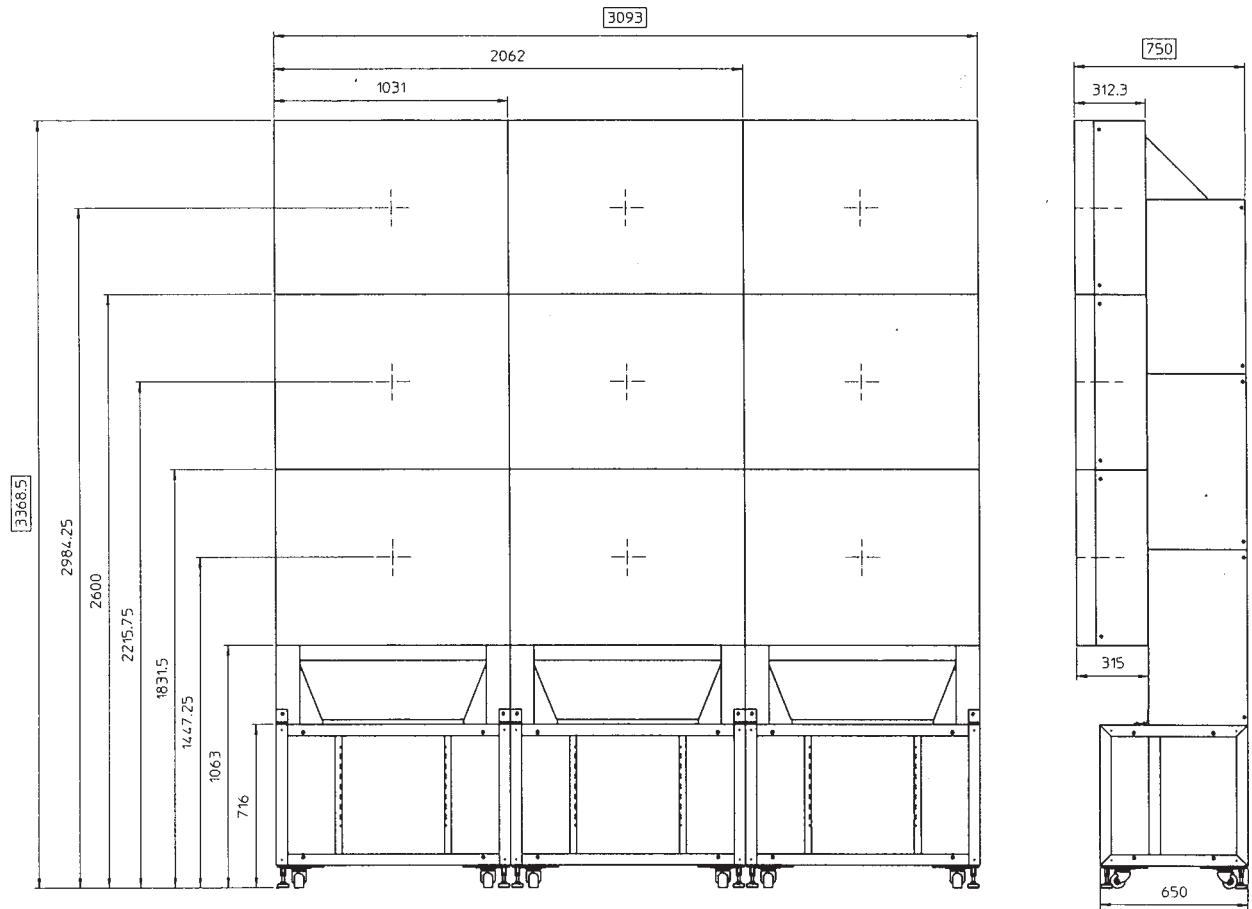
(1) 2 x 2 (100 inch)



unit: mm

[Fig. 2-1-7]

(2) 3 x 3 (150 inch)



unit: mm

[Fig. 2-1-8]

CHAPTER 3. INSTALLATION AND ASSEMBLY

1. INSTALLATION CONDITIONS

(1) Weight-tolerant

The ground must be flat and horizontal. It should be able to bear the weight of the system.

For wooden floors, if the part receiving the weight of the system lies at the center between the reinforcement beams below the floor, the floor may become deformed or may curve inwards. In such cases, lay a more than 12 mm thick board below the system to distribute the weight of the system on the floor.

For concrete floors, it may not be possible to install the system horizontally due to the roughness of the floor. In such cases, do the same as above.

(2) Ceiling height

- Reserve a headroom of at least about 10 cm (4 inches) between the top of the system and the ceiling. If an air conditioner outlet or illumination lamp is located above the system, use special care to prevent troubles due to dust, temperature, humidity and dew condensation. In case the system is covered by interior furnishings, be sure to take measures to ventilate. Floor leveler ends to pool above the top of the system. Otherwise troubles may result.

(3) Front space

- Finger and hand prints form easily on the face of the screen. Therefore make sure viewers cannot touch it directly.
Leave workspace in front for replacing the screen.

(4) Rear space

- The system can be installed up against the wall when the projection units are stacked in two stages. When they are stacked in three stages, reserve a rear clearance of at least 5 cm (2 inches). However, remember that a space of at least 50 cm (20 inches) is required in the maintenance operation and install the system by taking later maintenance in consideration.

(5) Stacking stages

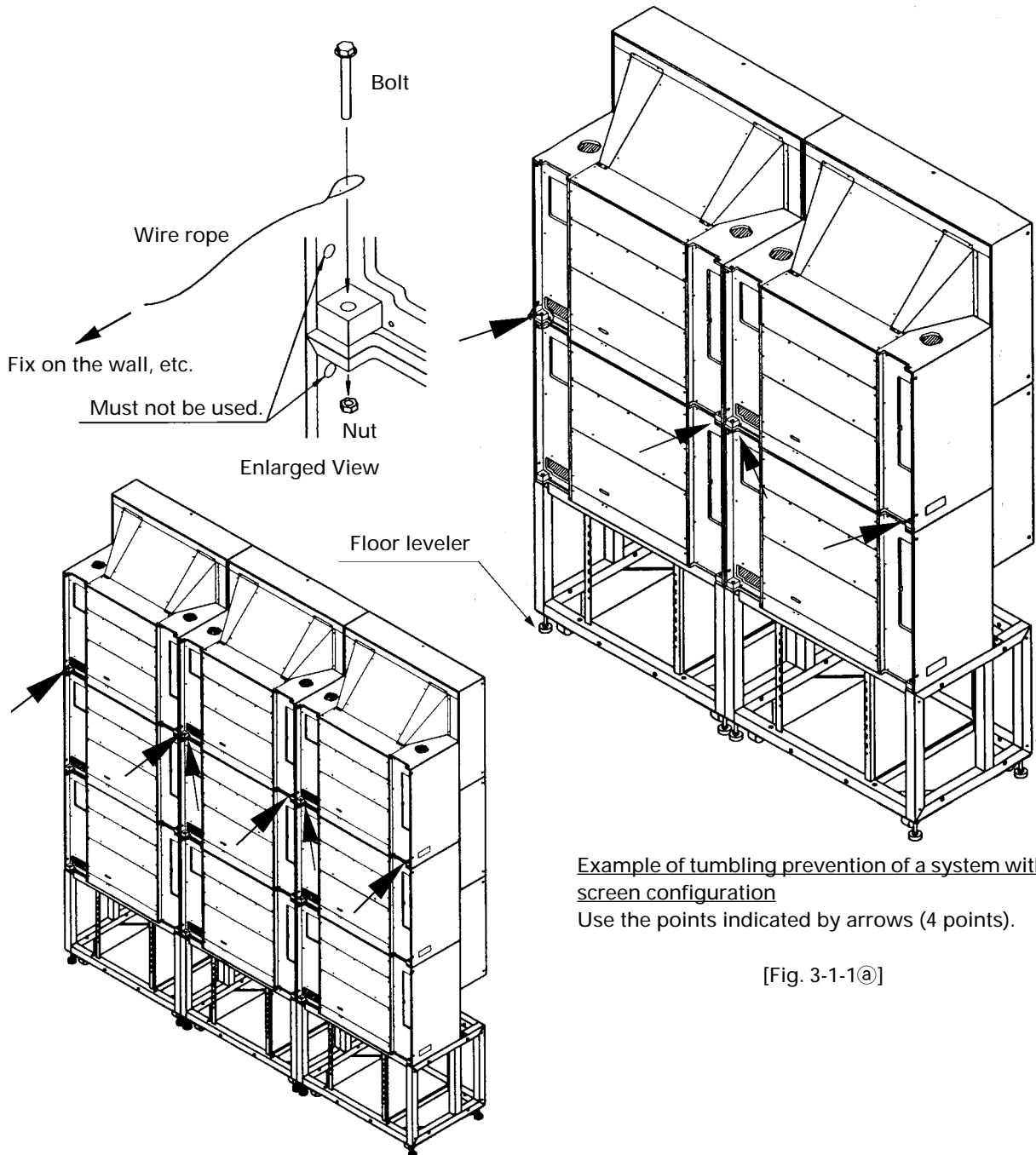
- The projection units can be stacked in up to three stages.



- They cannot be stacked in four stages or more.
Otherwise troubles may result in relation with the cabinet strength or stagnation of heat.

(6) Work for prevention of tumbling down

- To prevent the system from tumbling down after installation, be sure to lower the floor levelers (when the stand is used).
For further prevention, be sure to fix the system using wire ropes. If the wall or ceiling is not strong enough to support the wires or if no surface can be used to fix the wire ends, fix the system on the floor using anchors. Also be sure to use wires or other tools that are strong enough.
NOTE) Always attach wires to the holes indicated in the following illustration. Do not use other holes, for they are not strong enough and their surroundings may be damaged.
- The method of fixing the system on the floor or wall is variable depending on the floor or wall material. Always refer the fixing operation to an installation work specialist or your dealer.



Example of tumbling prevention of a system with 4-screen configuration
Use the points indicated by arrows (4 points).

[Fig. 3-1-1Ⓐ]

Wire rope attaching points for tumbling prevention of a system with 9-screen configuration
Use the points indicated by arrows (6 points).

[Fig. 3-1-1Ⓑ]

(7) Heat value calculation

- In the calculation, assume that the maximum power consumption per multi-projection unit is 300 W by reserving a certain headroom. As most of the consumed power becomes heat, the power consumption can be regarded to be proportional with the calorific value.

① Conversion into calorific value (kcal/h)

$$[W] \times 0.86 = [\text{kcal/h}]$$

Calorific value per multi-projection unit

$$300 \times 0.86 = 258 \text{ (kcal/h)}$$

② Conversion into British thermal unit

$$[W] \times 3.41 = [\text{B.t.u./h}]$$

Calorific value per multi-projection unit

$$300 \times 3.41 = 1023 \text{ (B.t.u./h)}$$

Projection units	Calorie (kcal/h)	British (B.t.u./h)
1 screen	258	1023
4 screens	1032	4092
9 screens	2322	9207

(8) Temperature and humidity conditions

- Closely observe the following conditions on the temperature and humidity of the location of installation.
 - (1) Operating temperature : 5 to 35 degC (No condensation)
 - (2) Operating humidity : 20 % to 80 %
 - (3) Storing temperature : -10 to 45 degC
- The lenticular sheet will stretch and consequently the center of the screen will rise if the humidity is relatively high. In this case, the focus may slightly change and therefore readjustments in the installing conditions of the location must be performed when your system arrives.
- Avoid wetting the system at all times. Due to the shape of the product, it is easily affected by external conditions. Especially to be avoided is wetting the MPJ and screen. Thorough water-proof measures must be taken when installing them in locations where there is a high level of moisture in the air such as near air-conditioning vents and water sprays.
 - * Take note that in new buildings, moisture is frequently produced from the concrete and the humidity level subsequently rises.
- Electrical equipment such as this system should not be installed in high humidity environments. Follow the precautions below when high humidity is expected.
 - Never install the MPJ and screen in locations that do not meet their respective specifications.
 - Ground the units.
 - Ensure that there is no condensation.
 - Install the units where no one can touch them.
 - Ensure that water droplets do not fall onto the units.

(9) Condensation

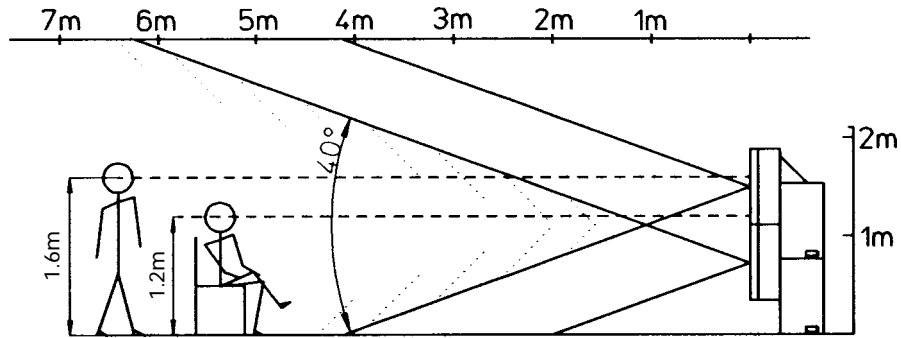
One problem that occurs in the winter season is "Condensation". When the temperature of the room in which this system is installed rises suddenly, condensation occurs on the screen and lens, thereby the system cannot display its best performance. In such cases, turn off the power once, leave the system off for one hour, and turn on the power again. Increasing the room temperature gradually is another method.

(10) Visual field angles, visible range

- Uniform images can be obtained by installing the system in any of the ranges shown below.

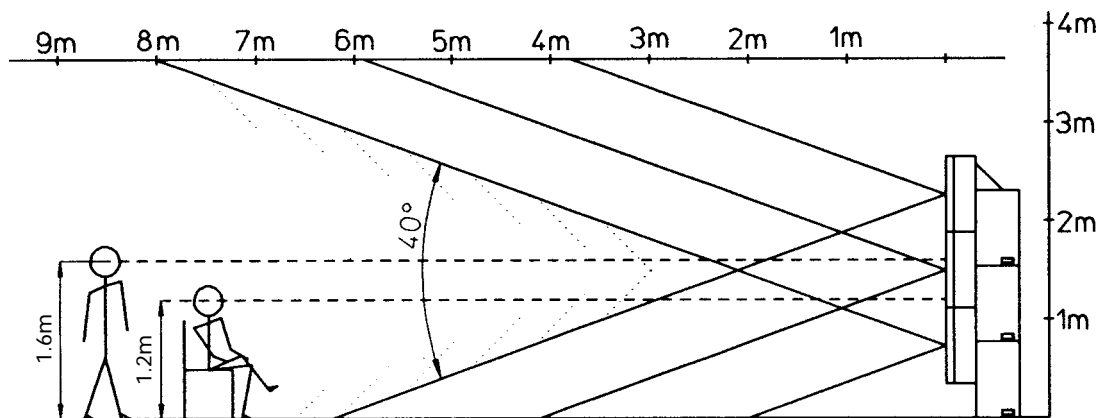
Vertical field angle

- 2-stage configuration



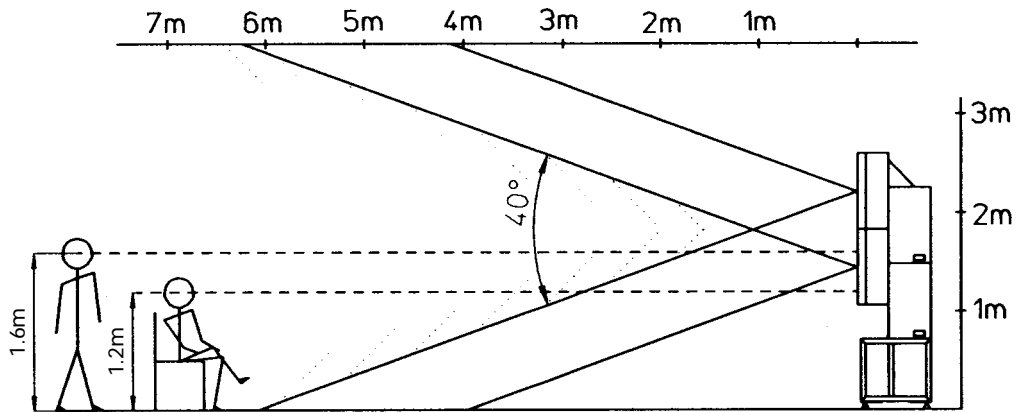
[Fig. 3-1-2]

- 3-stage configuration



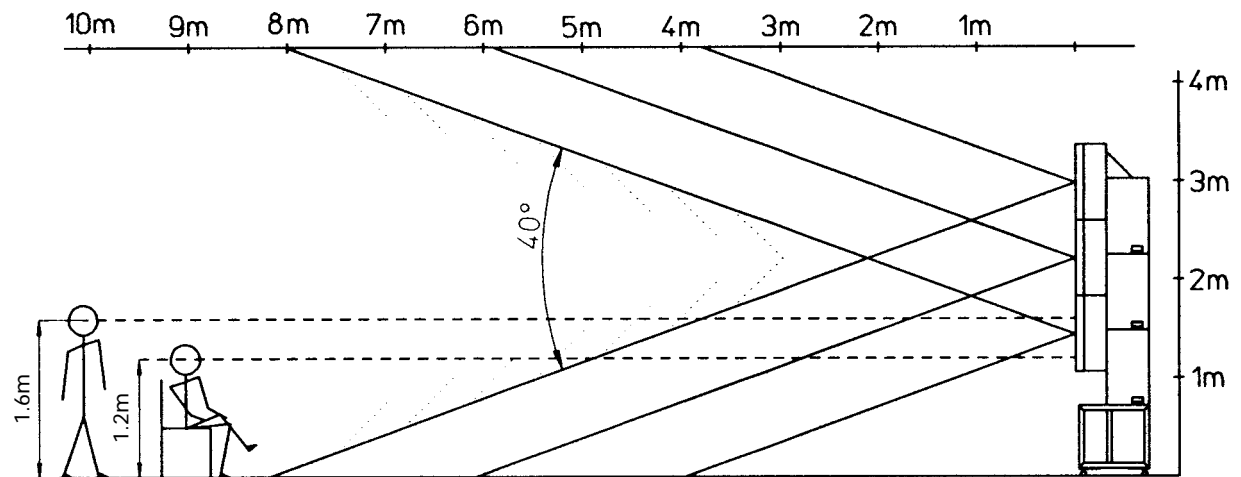
[Fig. 3-1-3]

● 2-stage configuration using stands (RMA-V5020)



[Fig. 3-1-4]

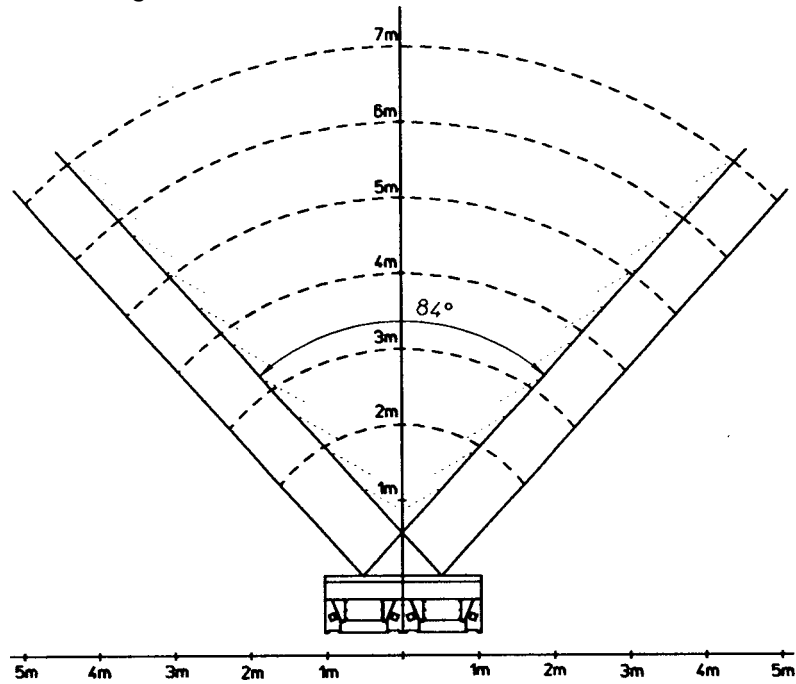
● 3-stage configuration using stands (RMA-V5020)



[Fig. 3-1-5]

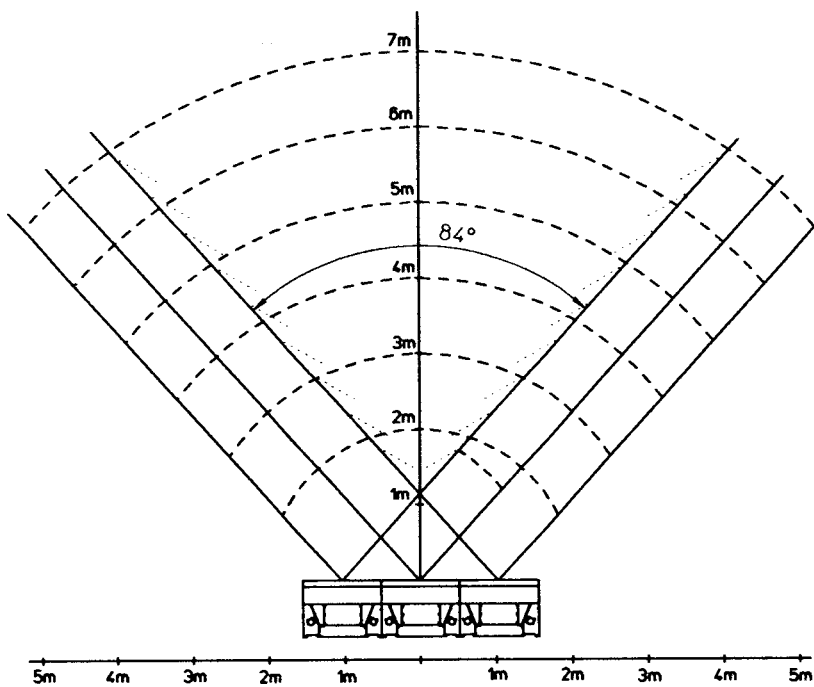
Horizontal field angle

- 2 horizontal screen configuration



[Fig. 3-1-6]

- 3 horizontal screen configuration



[Fig. 3-1-7]

(11) Lighting

- Projection screens do not reflect external light like the CRT, but the screens and their base materials may still cause reflection if strong light of a spotlight, etc. is directly incident to them. In such a case, prevent the illumination lighting from hitting the screen surfaces directly.
- Glass plates for safety protection purpose may sometimes have to be attached on the screen surfaces depending on their installation location. In this case, examine the installation positions carefully so that the front glass plates do not reflect the external light.
- As the actual intended images of the system may not be obtained in very bright locations, consider the position of lighting and direction of sunlight when installing the system. Especially when the system is exposed to direct light (sunlight, etc.) from behind, the light may be reflected on the screen. Avoid such installations.
- Take note that in bright places, images may appear dark even when the luminance has been increased. In addition, increasing the luminance and contrast more than required may affect the life of the system (especially the CRT).

(12) Effects of earth magnetism

- Due to effects of earth magnetism, the position of the image displayed will differ according to the installed direction. Difference is about several mm in the up/down/left/right directions, but the degree of change varies according to the strength of the earth magnetism of each area. Misconvergence may also occur due to slight rotations.
Thus, when performing adjustments before moving the set to the place where it is to be installed, do so in the same direction as the direction of installation, then readjust in the final position of installation.
- Normally perform adjustments in the final position of installation.
- The system is not only affected by earth magnetism but by the following magnetisms generated by various items in its surrounding as well.
 - Steel frame of building
 - Power cables on the floor
 - Large speaker systems
 - Special equipment (Those generating magnetic force)
 - Metallic installation table, frames, etc.

(13) Power supply ⚠

① Power supply voltage

The guaranteed voltage of this system is $\pm 10\%$ of the rated voltage.

But if the impedance of the power wires is high, the voltage waveform will become distorted and show the same symptoms as when voltage drops abnormally. As the following must be noted even if the voltage is within the allowable range, check the power wiring again.

- The voltage drop from the switchboard to this system is great.
- The voltage changes greatly when the power of the system is turned on and off (Roughly 5% of the rated voltage)

② Power supply capacity

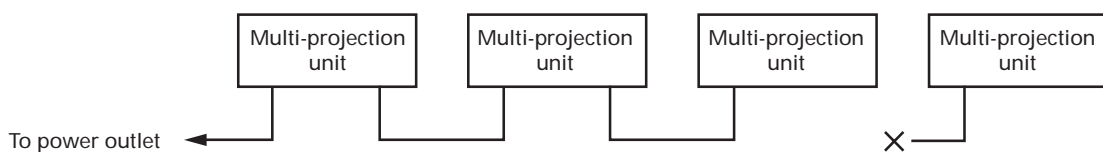
When calculating the capacity, assume that the maximum power consumption per multi-projection unit is 400 VA by reserving a certain headroom.

Multi-projection units	Power capacity	Current capacity			
		RM-V2550U		RM-V2550E	
		100 V	120V	220V	240V
1 screen	400 VA	4 A	3.3 A	1.8 A	1.7 A
4 screens	1600 VA	16 A	13.3 A	7.3 A	6.7 A
9 screens	3600 VA	36 A	30.0 A	16.4 A	15 A

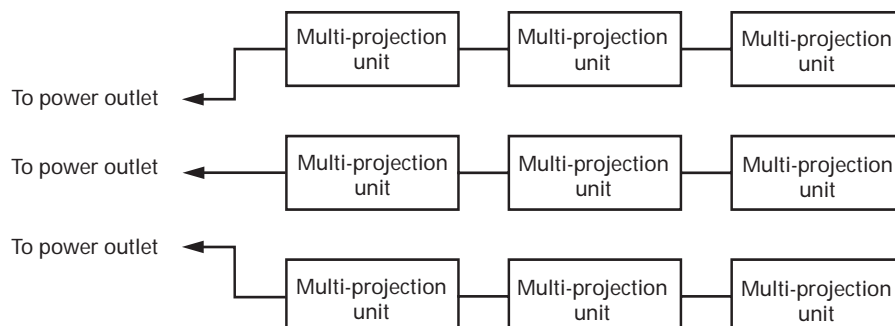
The current increases as the voltage drops. Design the power supply by reserving a headroom by referring to the connection description in ③ below. When a single power line (same power distribution panel) is used to power another system, be careful not to exceeds the power distribution capacity by taking the power consumption of the other system in consideration.

③ Connection

- Each multi-projection unit has an AC OUTLET connector, which can accept the connection of up to 2 multi-projection units in addition to the first multi-projection unit. Do not connect other equipment than multi-projection units to the AC OUTLET.



- Connect the system components so that their current consumption does not exceed the current capacity of the power distribution panel. Always reserve a headroom when designing the system.



④ 3-pin plug

The power cord of the system has a 3-pin plug. This design aims at preventing electric shock due to leaked current. Be always sure to connect the power plug into a 3-pole power outlet.

⑤ Ground-fault circuit interrupter

The system incorporates a power line filter for noise prevention and leaked current of 0.5 mA flows per multi-projection unit. If your power supply system uses a ground-fault circuit interrupter, check its sensitive current and make sure that it is above the total current leakage of the system.

Also count in the current leakage of other equipment than the video output equipment assuming that the leaked current of each piece of equipment is 0.5 mA.

To prevent voltage dropping, current waveform degradation and noise induction in the middle of the circuit, always supply power directly from the power distribution panel.

It is extremely dangerous to supply power from existing wall outlets, etc.

Install the system near the outlet for connecting the units of the system as much as possible.

Set the current capacity slightly greater-about more than 25% of the total consumption power.

(14) Cables used

Use a coaxial cable for the external input cable. Normally use a 3C-2V for less than 15m long. Use 5C-2V for greater lengths. Adjust the length of the cables. The distance between the transmission system and MPJ should be as short as possible. When the distance is great, consider the thickness of the cable and electrical compensation carefully.

The limit is as shown when using the cables to connect the transmission final output terminal and the system.

3C-2V: 15m

5C-2V: 30m

To use a longer cable, the VIDEO signal must be corrected.

NOTE) To install the system up against the wall, use L-shaped BNC conversion adapters.

(15) Semi-outdoor installation

This system is basically designed for use indoors. When the system is installed in semi-outdoor locations, the following problems may occur. Take the following measures before using the system.

- Waterproof and rustproof measures
- Temperature difference and humidity difference
- Light on the screen (So that it is not exposed to direct sunlight.)
- Wind containing salt

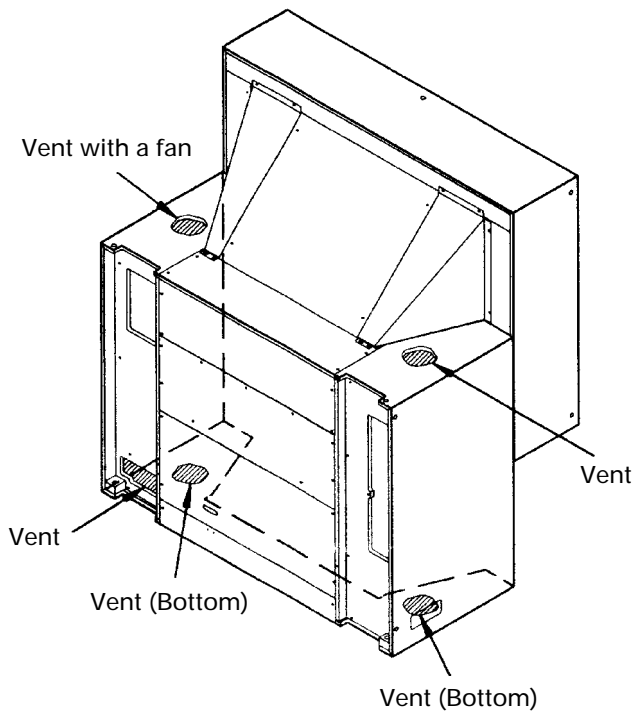
(16) Caution for use of user-prepared parts

We basically recommend that the user uses the projection stands manufactured and recommended by us. However, if you want to prepare them by yourself, use care in the following point.

- Install the stands so that the system is maintained level. Be sure to calculate the floor strength and take sufficient measures to prevent the system from tumbling down. When not using a Pioneer-recommended stand, Pioneer will accept no responsibility for accidents or damage due to improper installation or mounting or to natural disasters.

(17) Ventilation

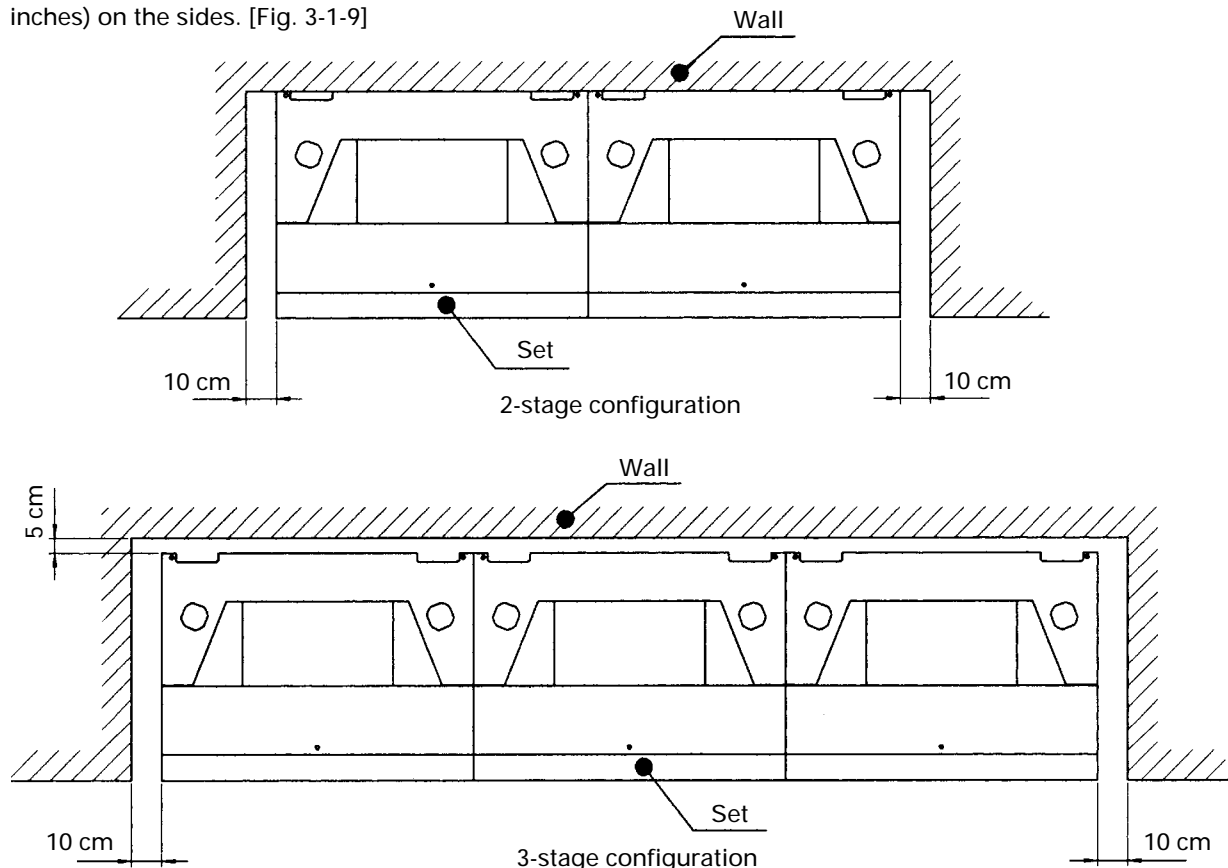
To prevent the rise in the internal temperature, the system is equipped with a vent and a vent with a fan on the top panel and vents on the bottom and rear panels. [Fig. 3-1-8]



[Fig. 3-1-8]

Be careful not block these vents. Otherwise heat will be stagnated inside the system and may result in a fire hazard.

When the system is used in a 2-stage configuration or is installed up against the wall, reserve spaces of at least 10 cm (4 inches) to the left and right sides of the system. When it is used in a 3-stage configuration, also make sure that there is a clearance of at least 5cm (2 inches) between the rear panel and wall and at least 10 cm (4 inches) on the sides. [Fig. 3-1-9]



[Fig. 3-1-9]

2. INSTALLATION AND ASSEMBLY

(1) Confirmation

- ① **Decide the position for installing the system according to the installation conditions in Chapter 3.**

Check items

- [1] Dimensions of installing position, space at the back, distance to the ceiling
- [2] Floor flatness, strength, roughness
- [3] Position of power supply
- [4] Installing location
 - Necessity for special measures for floor or wall (reinforcement covers, sheets, planks, etc.), route by which set is to be moved in and out, width of route, availability of elevator, size and weight restrictions of elevator, air-conditioning air currents, etc.
- [5] Position, specifications, and structure of a transmission equipment, and image type
- [6] Model number of equipment used, and their quantity (perform according to list).
 - Check if there is enough equipment for each unit
 - * These procedures must be performed by only one person.

(2) Unpacking

① Packaging specifications

- | | | |
|------------------------------------|----------------------------------|---------|
| [1] RM-V2550U's screen, RM-V2550S | : 1149(W) x 174(H) x 903(D) mm | 17.5 kg |
| [2] RM-V2550U's cabinet, RM-V2550E | : 1130(W) x 1309 (H) x 825(D) mm | 88 kg |

② Unpacking tips

- [1] Begin with unpacking the largest carton. place smaller cartons in the vacant carton of the larger items, and dispose of the packing material while unpacking the cartons.
 After unpacking, arrange the items in order of assembly to facilitate the later assembly operation.
 Move the vacant cartons to another place so that they do not come in the way of assembly, and reserve as wide a space as possible for the assembly.
 * By placing opened cartons upside down, they can easily be distinguished from non-opened cartons.
 Manage the accessories, warranty cards, etc. so as not to lose them.
- [2] The cabinet is designed with a structure that is easy to tumble down. It should be unpacked in as close as possible location to the system installation position.
 The under-carton can be used to prevent the cabinet from tumbling down because will not tumble down in that location. After unpacking the cabinet from the under-carton, immediately place the cabinet on the stand (when a stand is used) and fix using bolts.

③ RM-V2550U's cabinet and RM-V2550E unpacking procedure [Fig. 3-2-1]

[1] Remove the upper carton and place it upside down.

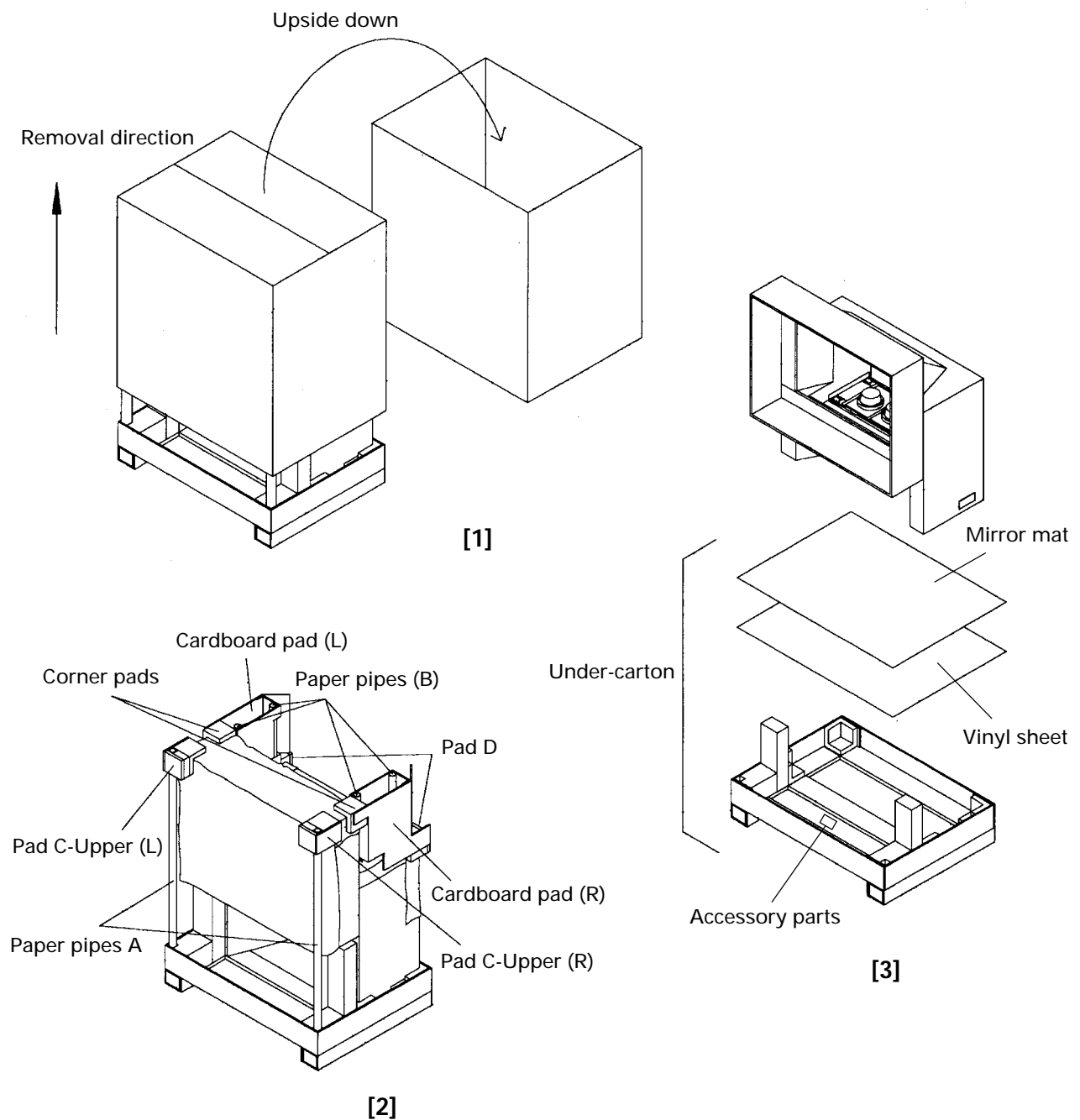
[2] Remove the pads C - Upper (L) (R), paper pipes A (x 2), corner pads (x 2), paper pads B (x 4), cardboard pads (L) (R), pads D (x 2) and mirror mats (front x 1, rear x 2), and put them in the upper carton.

[3] Take the cabinet out of the under-carton.

NOTE) 1. The accessories are attached on the under-carton.

NOTE) 2. After taking out the cabinet, place it on the stand or set and fix using bolts.

(Do not leave the cabinet standing alone. Otherwise it may tumble down when someone touches it.)



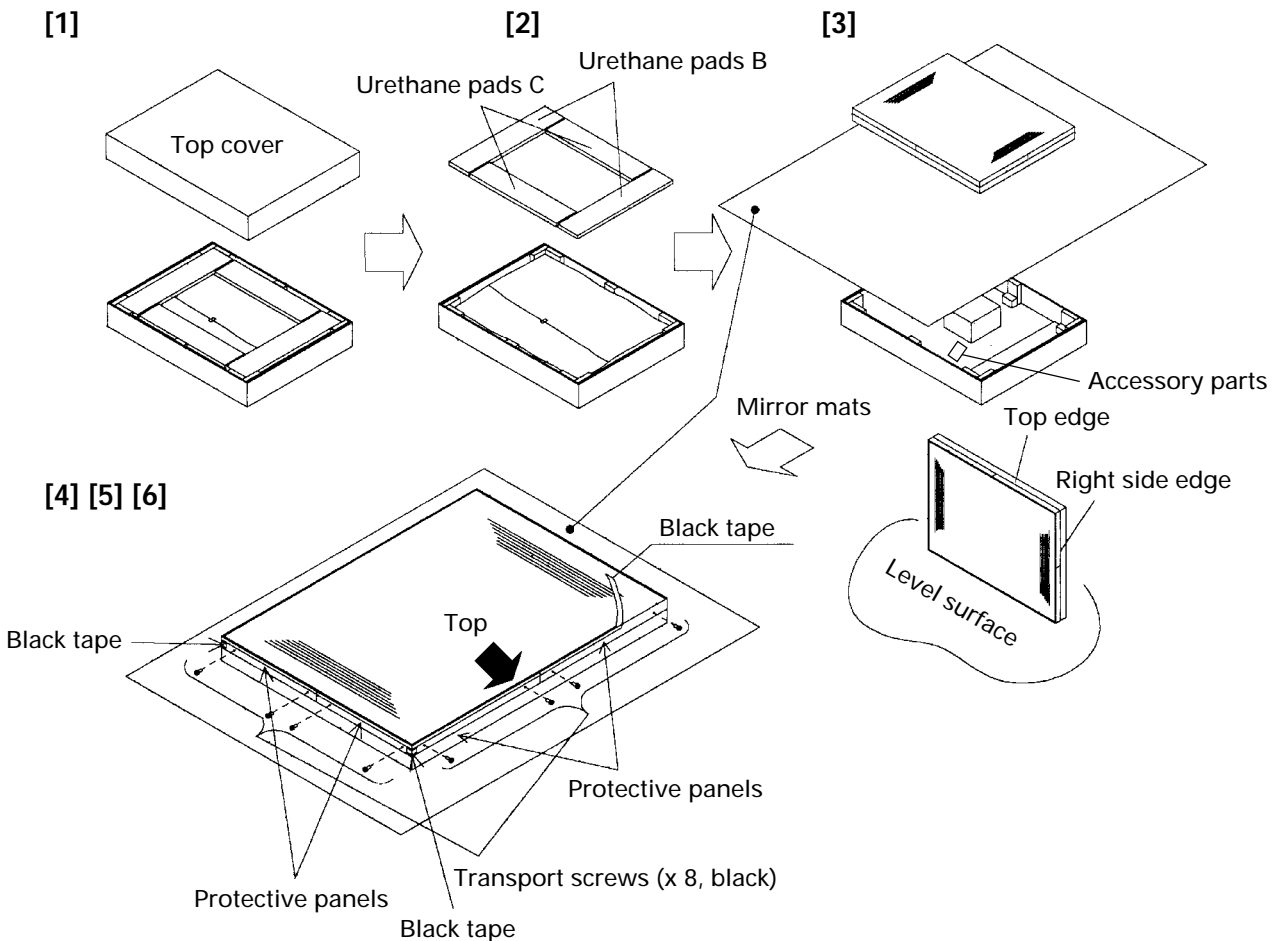
[Fig. 3-2-1]

④ **RM-V2550U's screen unit and RM-V2550S unpacking procedure [Fig. 3-2-2]**

NOTE) 1. After removing the top cover protecting the screen surface, be specially careful not to damage or stain it.

NOTE) 2. The accessories are attached on the under-carton.

- [1] Remove the top cover.
- [2] Peel off the pieces of tape attached to urethane pads B (x 2) and urethane pads C (x 2) by cutting them using a cutting knife from outside the under-carton, and remove urethane pads B (x 2) and urethane pads C (x 2).
- [3] Peel of the piece of tape from the mirror mat, remove the screen unit and place it standing on a level surface.
- [4] Fold the mirror mat which has been wrapped around the screen kit into two, place the folded mat on a level surface and lay down the screen kit on it paying attention not to apply impact.
- [5] Gently peel off the pieces of black tape attached on the four edges of the screen, then peel of the pieces of black tape attached on the two ends of the right side.
 - * Peel off slowly and cautiously so as not to damage the reticular sheet.
- [6] Remove the 8 transport screws (black) and 4 protection panels.
 - * The protective panels are attached using transport screws. Retain the removed panels if you expect to need them in the future. When installing the system, do not remove the screen kit protection panel at the outmost location.
 - The shorter protective panels are necessary for use in connecting the left and right of the topmost screen kit when installing the system. For details, please read the system assembly procedure.
- [7] When unpacking the multiple kits first, store them in a separate location to prevent damage and cover them with a sheet to protect them from dust.

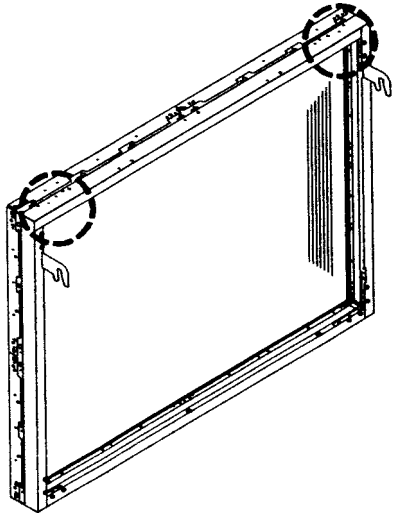


[Fig. 3-2-2]


(3) Carrying the units after opening packaging

① Screen

To carry the screen unit after opening the packaging, hold them by the parts shown in the figure, and lift and move them.



(Lifted by one or two persons)

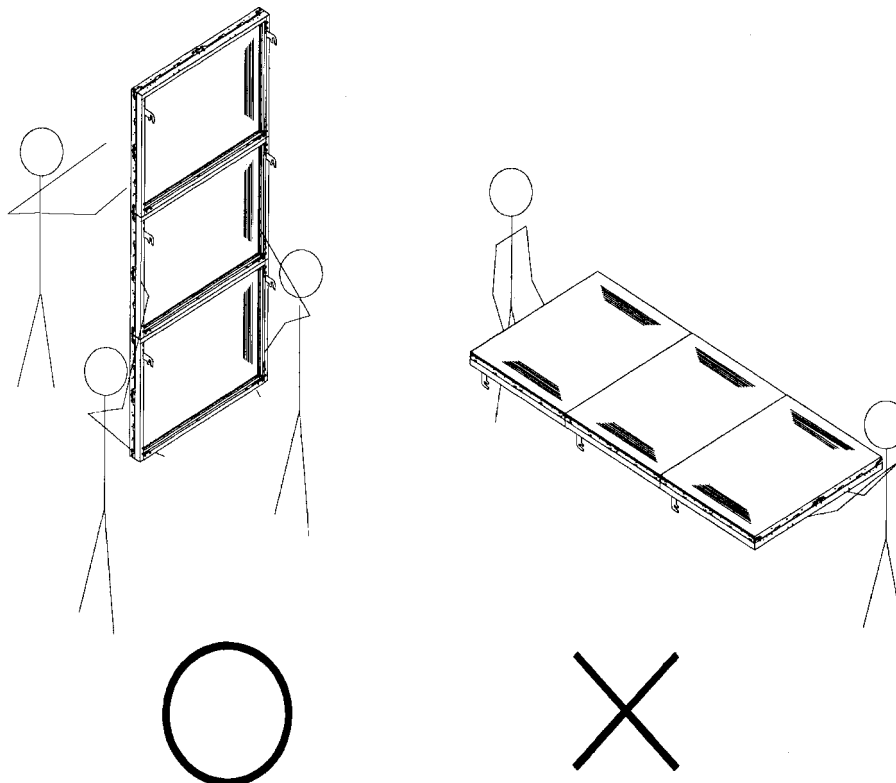
Hold the parts indicated by 

[Fig. 3-2-3]

- Never drag the system along the floor when moving the units.
- The lenticular sheet damages very easily as it is very thin. Therefore move it gently and do not apply excessive shock or vibration to it.
- As the panels supporting the screen are very thin and deform easily, be careful that they do not hit or get hooked onto surrounding objects when moving them.

Caution after assembly of screen frames (2 or 3 stages)

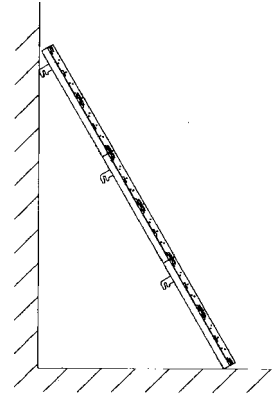
- The screen frame ass'y must always be carried in the vertically standing condition by more than one person. (It is recommended that a 3-stage screen frame ass'y is carried by 3 persons.)
Never hold it horizontally, for this may cause a screen to drop out of the frame.



[Fig. 3-2-4]

INSTALLATION AND ASSEMBLY

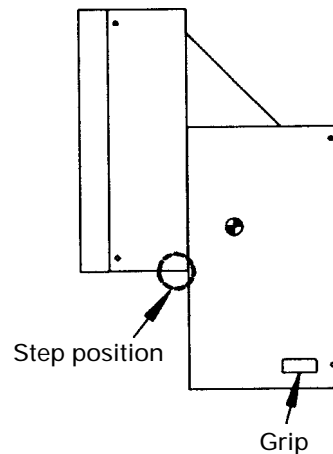
- Do not stand the screen frame ass'y in the 2-stage or 3-stage configuration against a wall. The ass'y should be mounted on the cabinet as soon as it has been assembled.



[Fig. 3-2-5]

② Cabinet

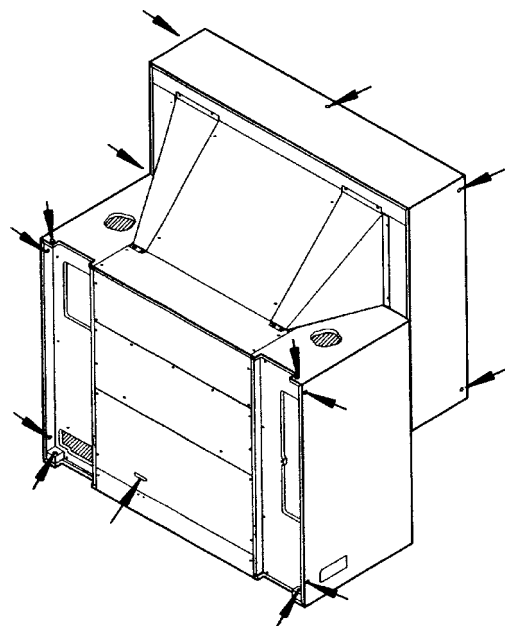
- The cabinet must always be carried by being lifted up more than one person. Never attempt to move the cabinet by sliding it on the floor.
- When carrying the cabinet, each person should hold it by the grip and the step position on the front. Also make sure that the center of gravity is located on the rear side during carrying. [Fig. 3-2-6]



[Fig. 3-2-6]

⚠ WARNING

- Never attempt to lift or suspend the cabinet by hooking the holes on it with a crane, etc. This is extremely dangerous because these holes are not strong enough to withstand the crane carriage. Should an accident occurs as a result of an attempt to carry the cabinet with a crane, we cannot assume liabilities for resulting damages. [Fig. 3-2-7]



⚠ Never hang the cabinet by the holes indicated by arrows.

[Fig. 3-2-7]

3. PRECAUTIONS FOR TRANSPORTATION

Always place them upright. If they are stacked on their sides or backs, vibration and shock may cause damage or fire hazards.

■ Caution for transportation of cabinet

- The cabinet is sensible against falling, impact and vibration. Be careful not to place a heavy object on it or drop it during transportation.

■ Caution for transportation of screen units

- * The screen units have been designed for permanent installation and hardly repackaged and re-transported. The following description is given for reference for the rare case in which they have to be re-transported.
- Pack it properly according to the packaging specifications [Fig.3-2-2]. Also check the following conditions.
 - [1] The protection panel has been properly attached by the transportation screws (eight).
 - * Use the protection screws provided with the unit.
 - [2] The protection tapes are pasted to the four corners of the protection panels.
 - * Paste the protection tape on the protection panel.
 - * Use a relatively weak tape about 20 mm to 30 mm in width.

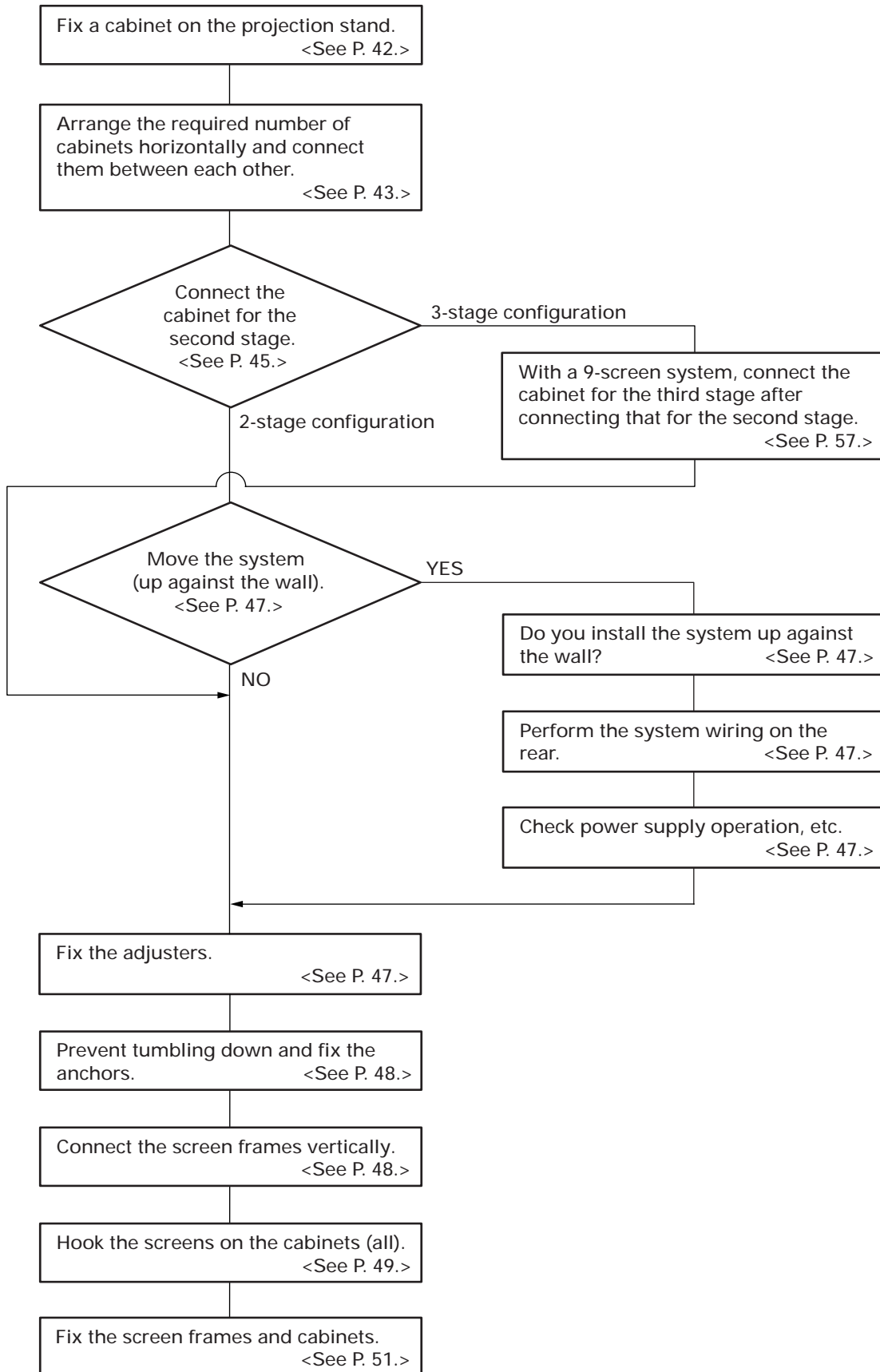
<Recommended Tape>
Name : Acetate cloth adhesive tape (25 mm width)
- When transporting or storing the units in the packaged state, always face them up.
- The number of units that can be stacked in storage is 20.
- As the screen is at the top, be careful not to step, and place heavy objects on this top side, nor hit it with sharp objects.

<NOTE>

- *Be sure to set the screen unit right-side up. Of the sides on which the screw heads are exposed (the sides with the shipping screws), the longer side is the top.*
- *Check that the shipping screws, protective panel and black tape have been removed before mounting the screen unit on the system. (When installing the system, do not remove the protective panel located on the outermost edge.)*
- *When stacking screen units, use gloves and perform operations with at least two people to prevent accidents.*
- *To prevent damage to the lenticular sheet, be as careful as possible when mounting the screen unit so as not to subject it to excessive shocks and vibrations.*
- *When the screen units are stacked, the head of the panel fixing screws and 12 mm holes will engage. When stacking the upper screen unit, make sure that it does not brush the lower screen unit as it has panel screws projecting out.*

4. ASSEMBLING THE SYSTEM

(1) System assembly flowchart



(2) Assembling the system

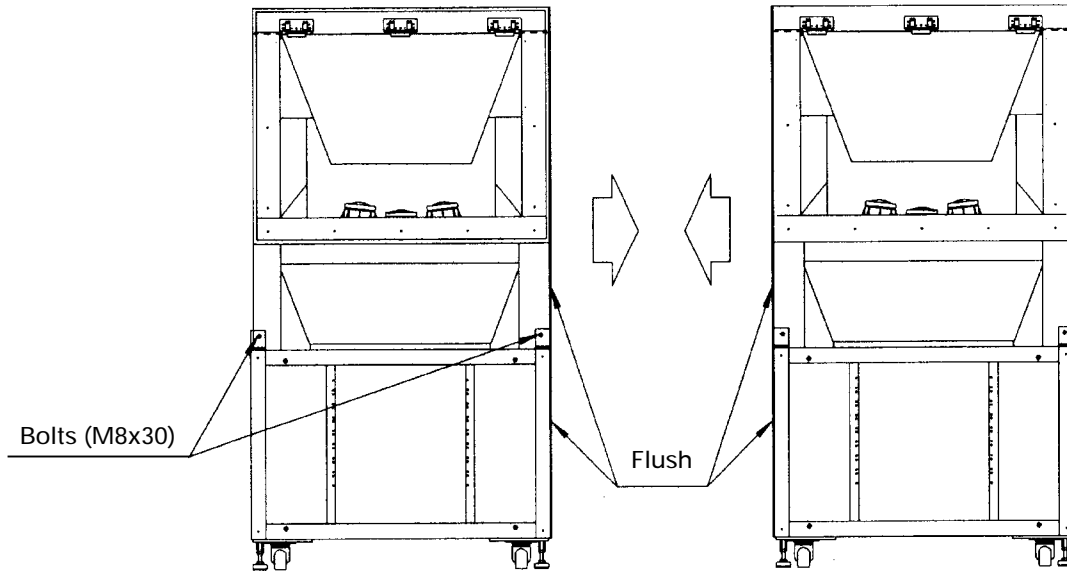
- Install the screen unit after stacking the cabinets.
- Required assembly tools Minimum number of operators (4-screen: 3 persons. 9-screen: 4 persons)
 - No.+2 screwdriver
 - Stepladder or similar type of support (size selected according to number of stages and installing height)
 - Double-ended wrenches (13) x 2
 - Spanners (17, 19) x 2 each
- * Box wrenches may be unusable in certain positions.
- The main installation methods possible are as follows.
The assembly procedures for ①, ② and ③ below will be given in the subsequent pages.

- | | | | |
|---|-----------------------------|---|-------------------|
| { | Using stands (RMA-V5020/WL) | { | 4-screen (100") ① |
| { | Without using stand ③ | } | 9-screen (150") ② |

① 4-screen system assembly (using the RMA-V5020/WL)

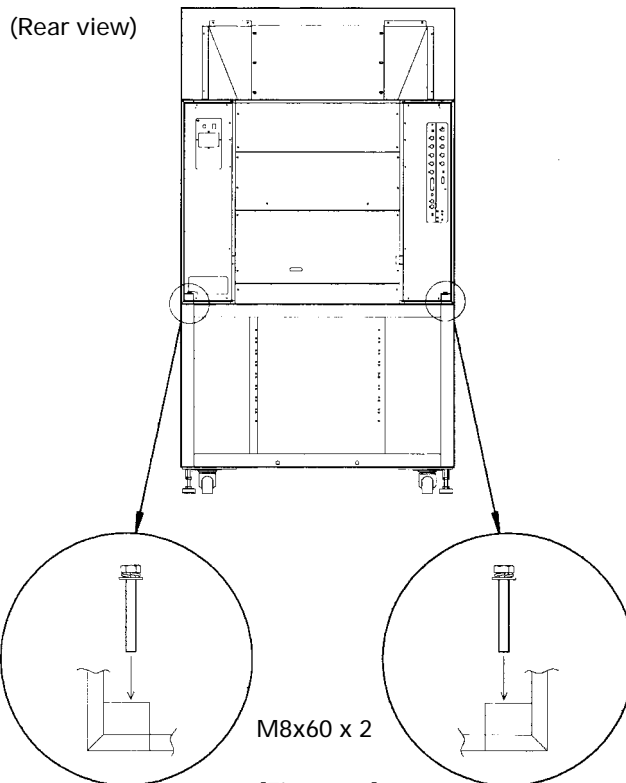
Installing the cabinets

- [1] Place the cabinet on each stand. (2 cabinets)
NOTE) Always carry each cabinet with more than one person.
- [2] Adjust the positioning of the cabinets.
 Align the front and rear with respect to the L-shaped brackets on the stand.
 Align the left and right so as to make flush the side surfaces of the cabinet and stand on the side which comes in contact with the other pair of cabinet and stand.



[Fig. 3-4-1]

- [3] Fix the cabinets using bolts.
 Front: M8x30 x 2 (provided with each stand)
 Rear: M8x60 x 2 (provided with each stand)

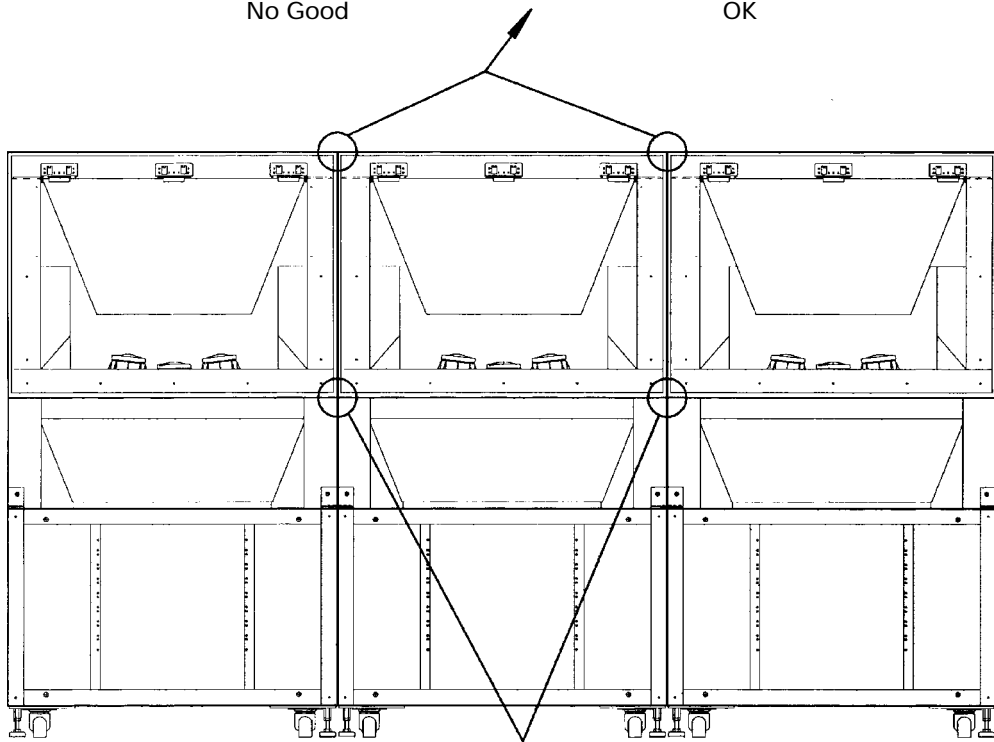
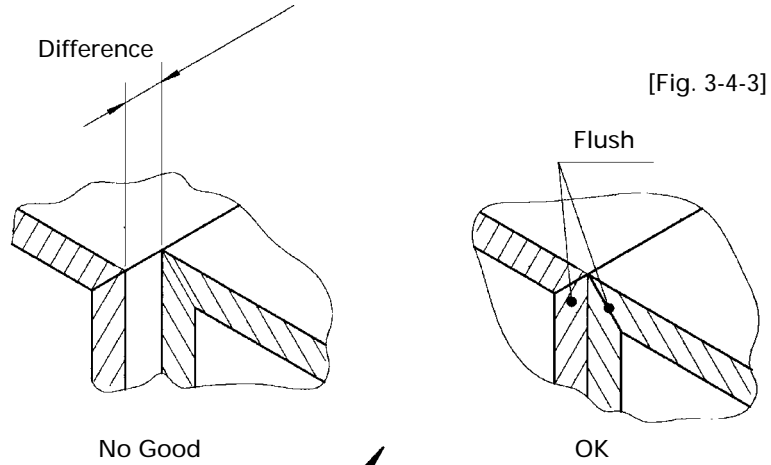


[Fig. 3-4-2]

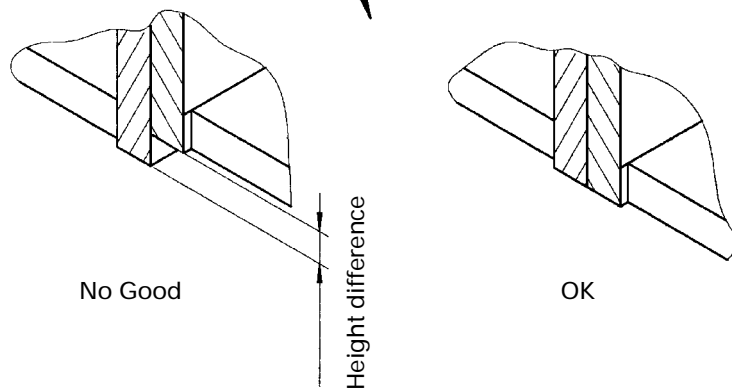
[4] Align the left and right cabinets. If the following conditions are not satisfied, adjust using the adjusters on the stands.

(Front/rear): Line up the wood surfaces of the front of the left and right cabinets. [Fig. 3-4-3]

(Top/bottom): Align the height of the bottom plates on the front of the left and right cabinets. [Fig. 3-4-4]



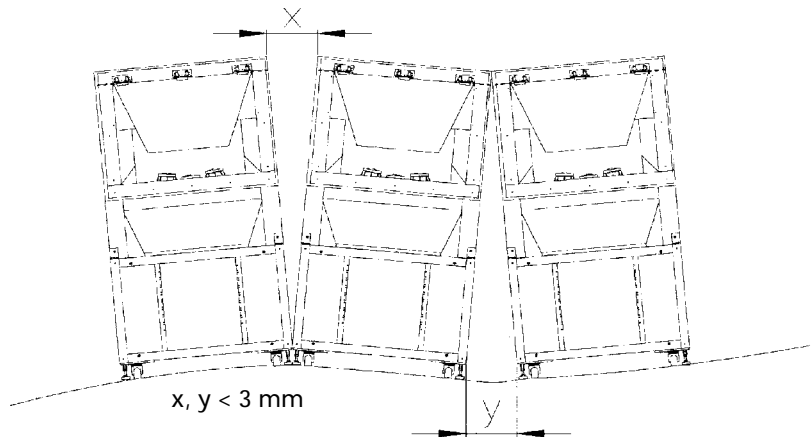
NOTE) The illustration shows the assembled view of a 9-screen system.



[Fig. 3-4-4]

INSTALLATION AND ASSEMBLY

(Inclination): Reduce any clearance between the left and right cabinets to below 3 mm. (Keep the gap as close as possible to 0 mm.) [Fig. 3-4-5]



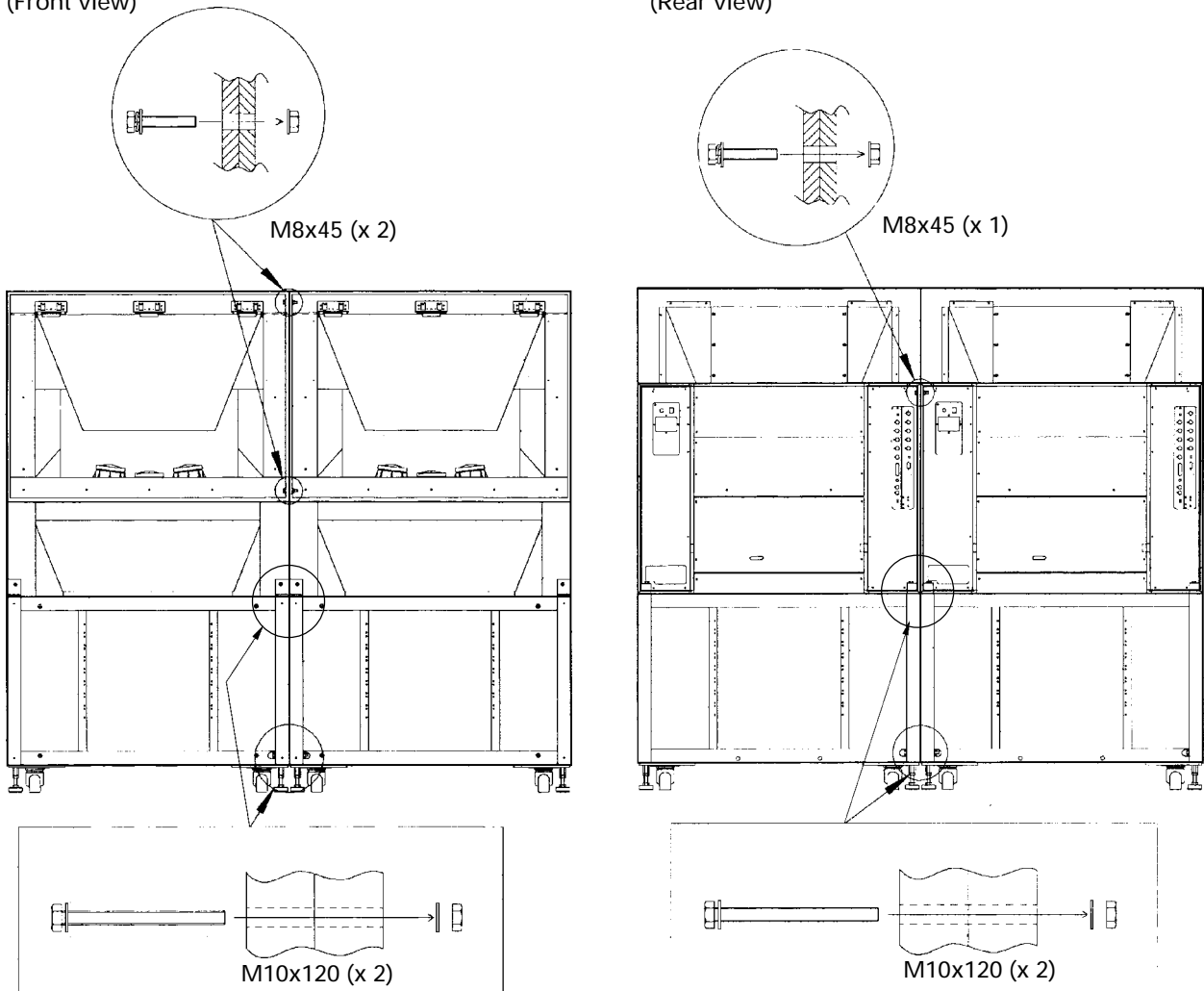
[Fig. 3-4-5]

[5] Fix the left and right cabinets and stands using bolts. [Fig. 3-4-6]

- | | | |
|----------|---|--|
| Cabinets | { | Front M8x45 x 2 (provided with each cabinet) |
| | | Rear M8x45 x 1 (provided with each cabinet) |
| Stands | { | Front M10x120 x 2 (provided with each stand) |
| | | Rear M10x120 x 2 (provided with each stand) |

(Front view)

(Rear view)



[Fig. 3-4-6]

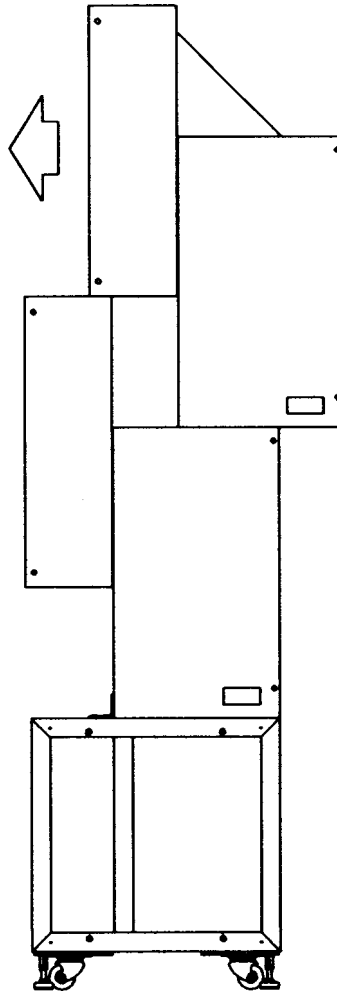
[6] Place the cabinet of the second stage on that of the first stage. [Fig. 3-4-7]

NOTE) 1. To prevent hazard, never mount on a cabinet.

NOTE) 2. Always carry each cabinet with more than one person.

(When using a stand for the RM-V5020 etc, please carry out the work with at least three persons.)

(If three persons are available, two of them should carry each cabinet from both sides and the third person should support the rear where the center of gravity comes.)

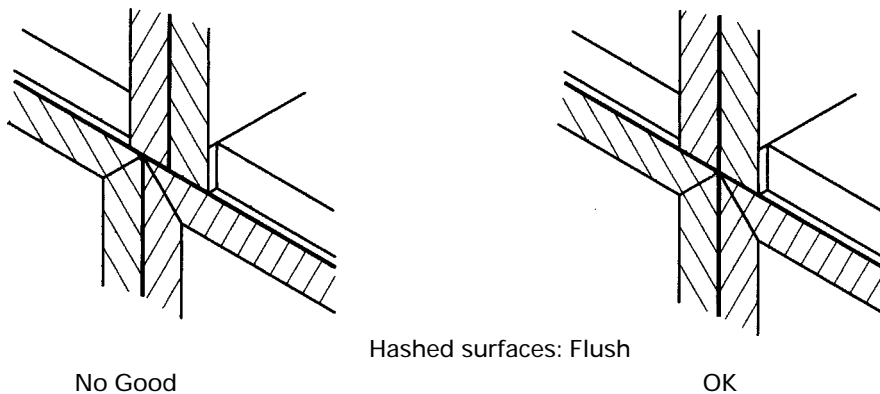


[Fig. 3-4-7]

[7] Adjust the positioning of the four cabinets. [Fig. 3-4-8]

(Front/rear) Line up the wood surfaces of the front of the cabinets.

(Left/right) Form a cross on the center point where the 4 screens meet.



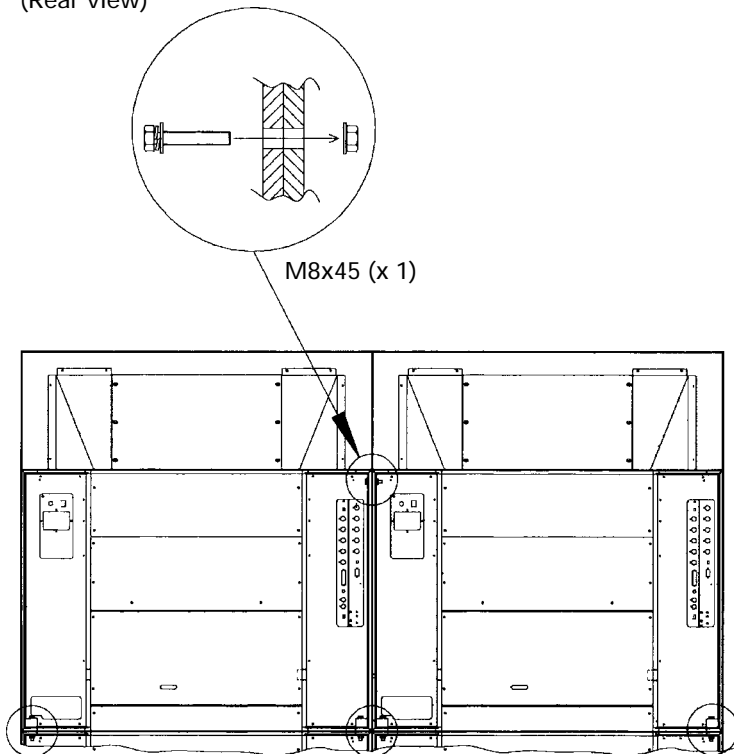
[Fig. 3-4-8]

INSTALLATION AND ASSEMBLY

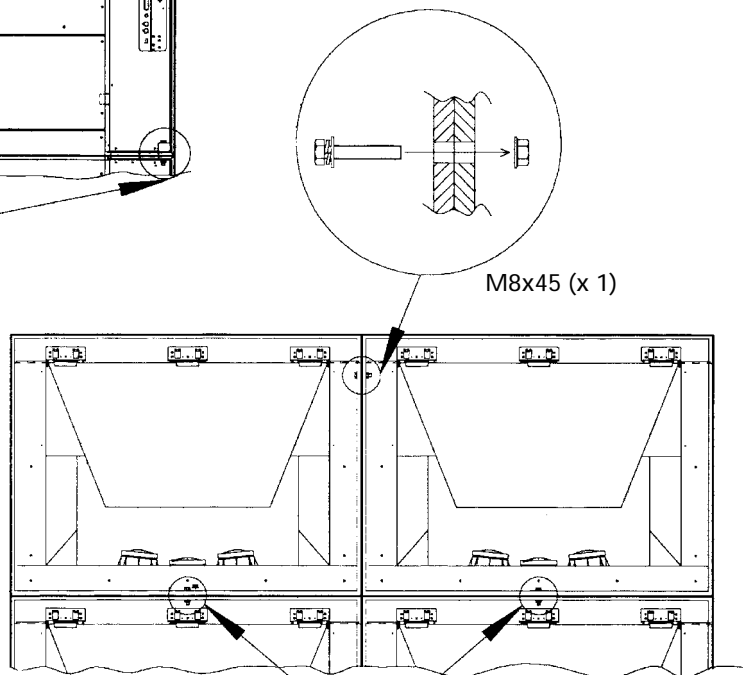
[8] Fix the connections between cabinets using bolts. [Fig. 3-4-9]

- Front M8x45 x 3 (provided with cabinets)
- Rear M8x60 x 4 (provided with cabinets)
- M8x45 x 1 (provided with cabinets)

(Rear view)

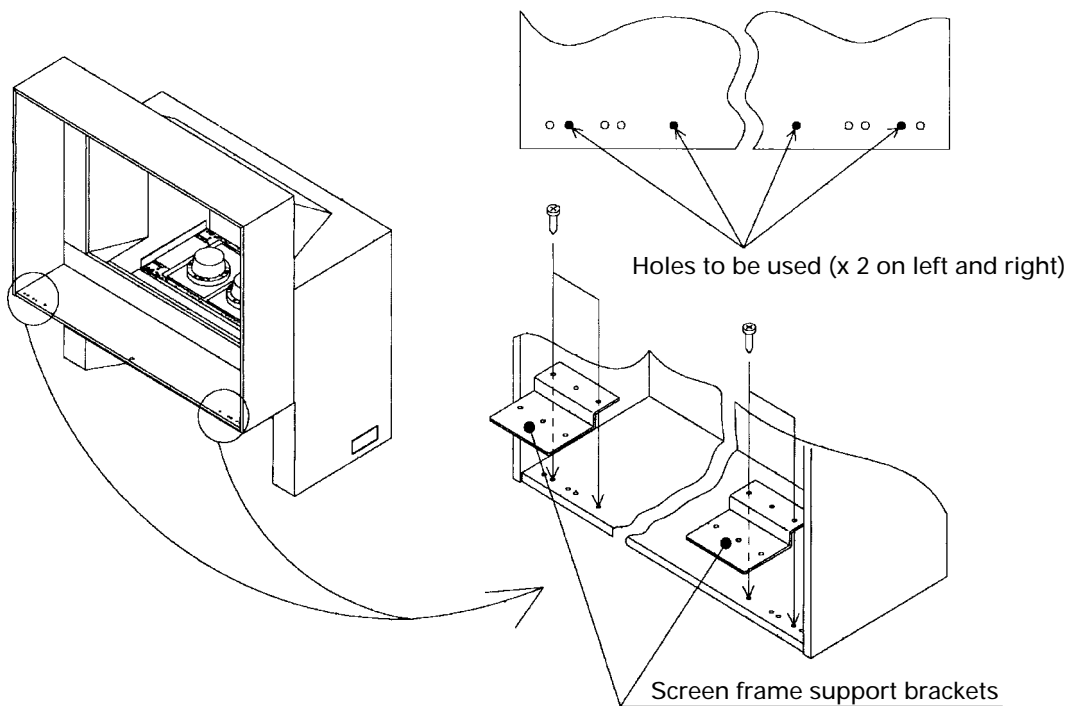


(Front view)



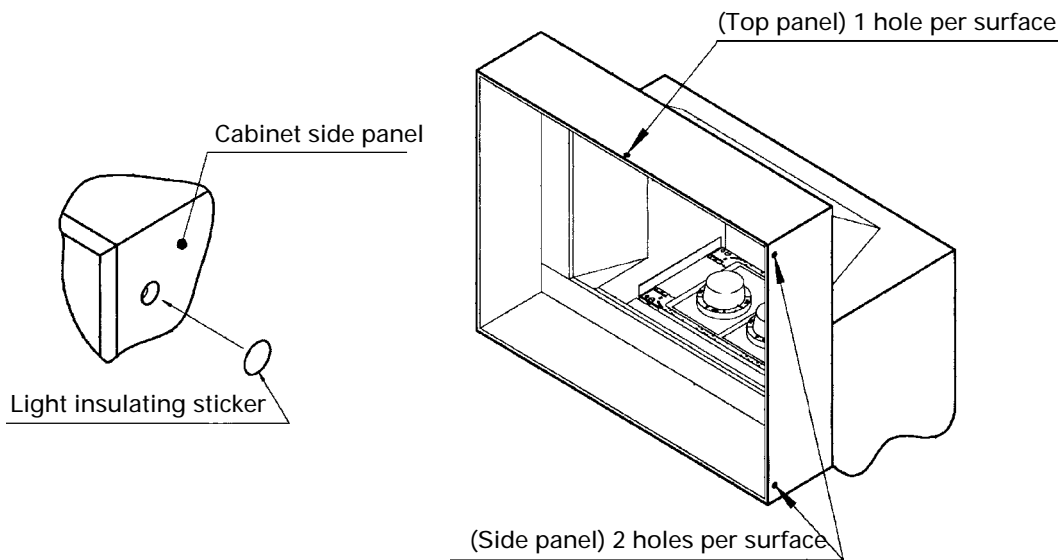
[Fig. 3-4-9]

- [9] Attach the screen frame support brackets onto the bottoms of the cabinets using screws. [Fig. 3-4-10]
 Screen frame support brackets x 4 (provided with screen frames)
 Screws (4 dia. x 16) x 8 (provided with screen frames)



[Fig. 3-4-10]

- [10] Block the holes on the cabinets (on the surfaces that become the outer panels of the system) using light insulating stickers. [Fig. 3-4-11]
 Light insulating stickers x 10 (provided with cabinets)



[Fig. 3-4-11]

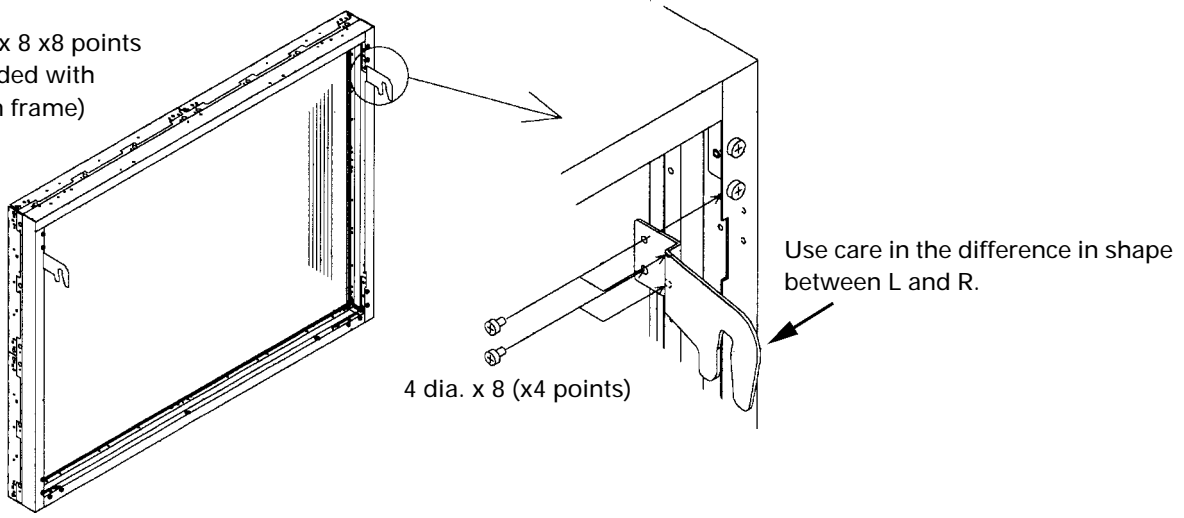
■ Procedure when the system is installed up against the rear wall

- [11] When the system is to be installed up against the rear wall, perform the procedure till step [10] above while the system is apart from the rear wall, then complete the rear wiring.
 [12] Check the operations including those of the power supply.
 [13] After ensuring that there is no problem in operation, release the adjusters of the stands temporarily and approach the entire system to the wall by moving it slowly and cautiously.
 [14] After moving the system to the installation location, secure the adjusters of the stands.

Installing the screen frame ass'ies

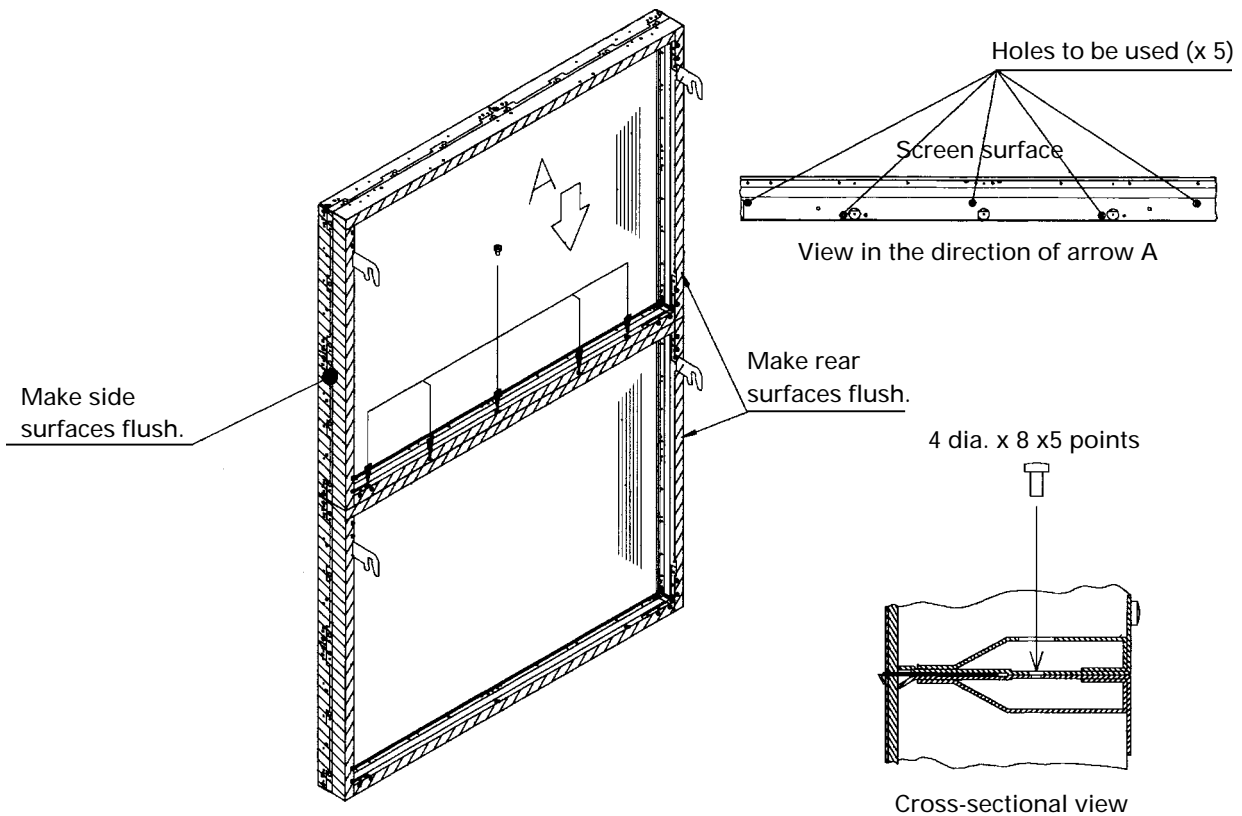
- [1] Attach hooking brackets (L) (R) onto all of the screen frames to be used. [Fig. 3-4-12]
 NOTE) Be sure to stand the screen frames vertically during work.

4 dia. x 8 x8 points
 (provided with
 screen frame)



[Fig. 3-4-12]

- [2] Connect the screen frames vertically to form screen frame ass'ies. [Fig. 3-4-13]
 Adjust their positioning before attaching using screws.
 NOTE) 1. Be sure to stand the screen frames vertically during work. [See the description under "(3) Carrying the units after opening packaging".]
 NOTE) 2. As the points where screws are attached are dented, use a magnetized screwdriver.
 NOTE) 3. Front/rear positioning: Make the rear surfaces flush.
 Left/right positioning: Adjust so that the side edge where the left and right screen frame ass'ies meet is on a same plane.



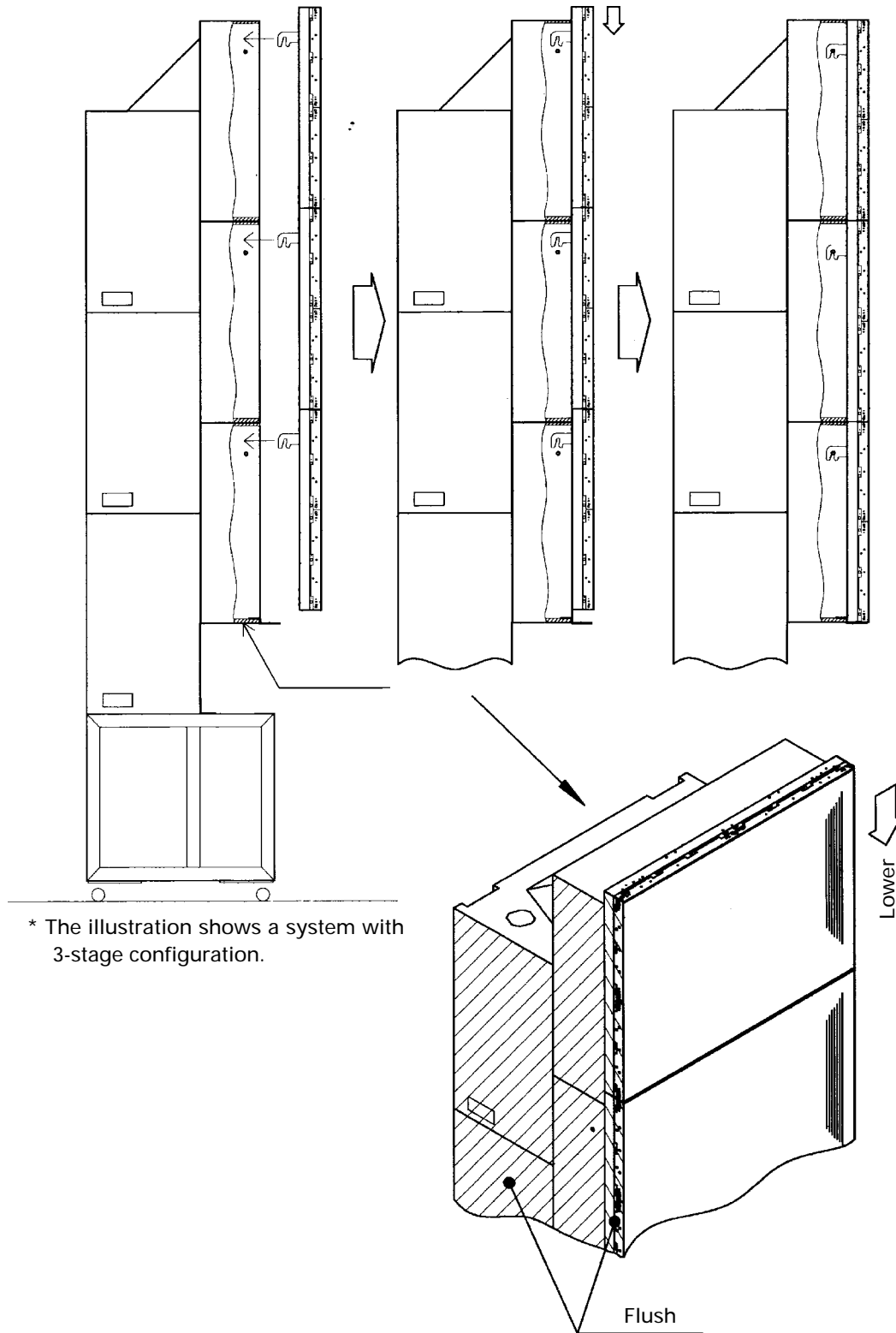
[Fig. 3-4-13]

[3] First mount one row of screen units linked vertically to the cabinet. [Fig. 3-4-14]

NOTE) 1. Attach the screen frame ass'y perpendicularly to the cabinet.

NOTE) 2. When attaching, hook the hooking brackets, previously attached to the screen frame ass'y, with the bolts on the inner sides of the cabinet.

NOTE) 3. This work must always be carried out by more than one person. When attaching 3 screen frames carry out the work with at least three persons.

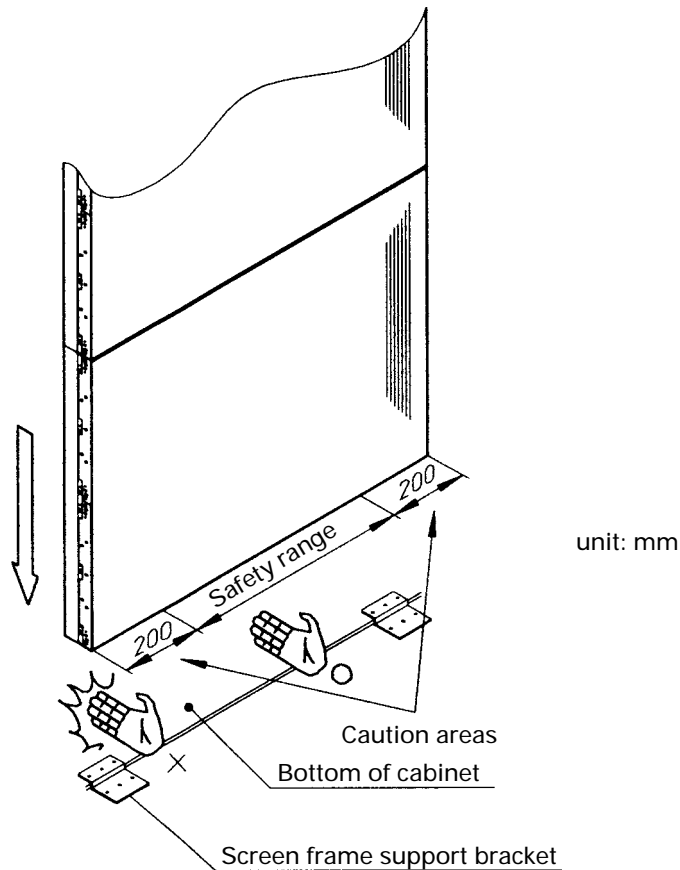


* The illustration shows a system with 3-stage configuration.

[Fig. 3-4-14]

INSTALLATION AND ASSEMBLY

- NOTE) 4. When lowering the screen frame ass'y in the end of this step, hold it by the points shown below so as not to get your fingers (hands) crushed by metallic parts. [Fig. 3-4-15]
- NOTE) 5. Adjust the left/right positioning with respect to the center where the 4 screens meet. When adjusting the left and right positioning, do not push the screen frame ass'y laterally with a strong force, but the screen frame ass'y should be lifted slightly by 2 persons. If lateral force is applied to the screen frame ass'y while it is in the lowest position, the screens (reticular sheets) may drop out.
- NOTE) 6. Adjust the top/down positioning by lowering the screen frame ass'y until it comes in contact with the screen frame support brackets below it.



- NOTE) As the screen frame ass'y approaches the bottom while it is lowered, be sure to hold it by points within the safety range shown in the illustration. If you hold it by the caution areas at less than 200 mm from each end, you may get your fingers (hands) crushed by it.

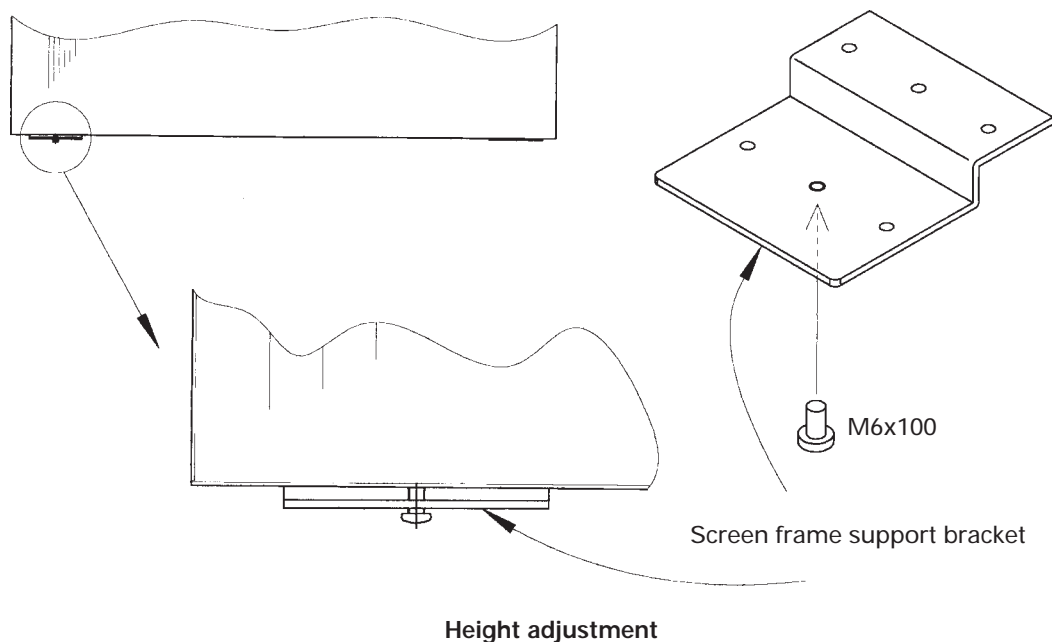
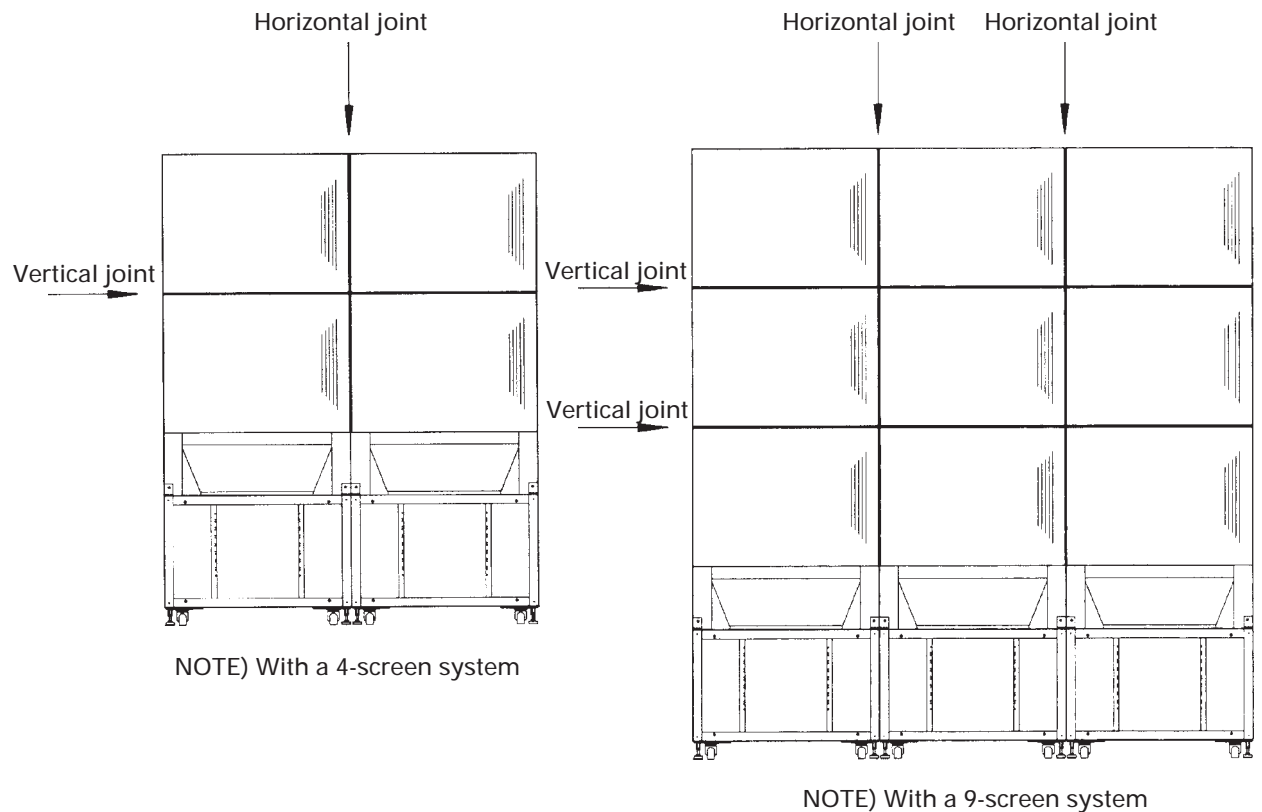
[Fig. 3-4-15]

[4] Attach the other screen frame ass'y to the other cabinet in the same way as above.

[5] Adjust the positioning. [Fig. 3-4-16]

NOTE) 1. With the vertical joint, remove any clearance between horizontally adjacent screens.
(However, variance in parts may cause clearance up to about 2 mm.)

NOTE) 2. With the horizontal joints, make the formed lines straight.
If the horizontal joint is not straight after step [4], adjust the left and right heights by attaching a height adjustment screw (M6x100, provided with each screen frame) to a screen frame support bracket and turning it with a screwdriver.



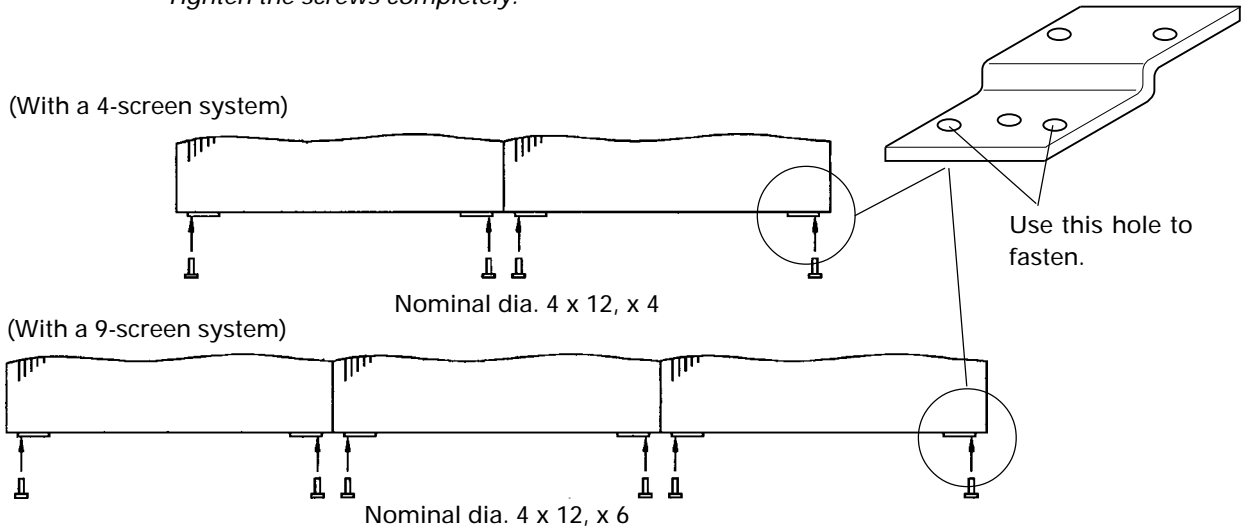
[Fig. 3-4-16]

INSTALLATION AND ASSEMBLY

- [6] Fix the screen frames (of the lower stage). [Fig. 3-4-17]
 Screws: 4 dia. x 12 x 4 (provided with each screen frame)

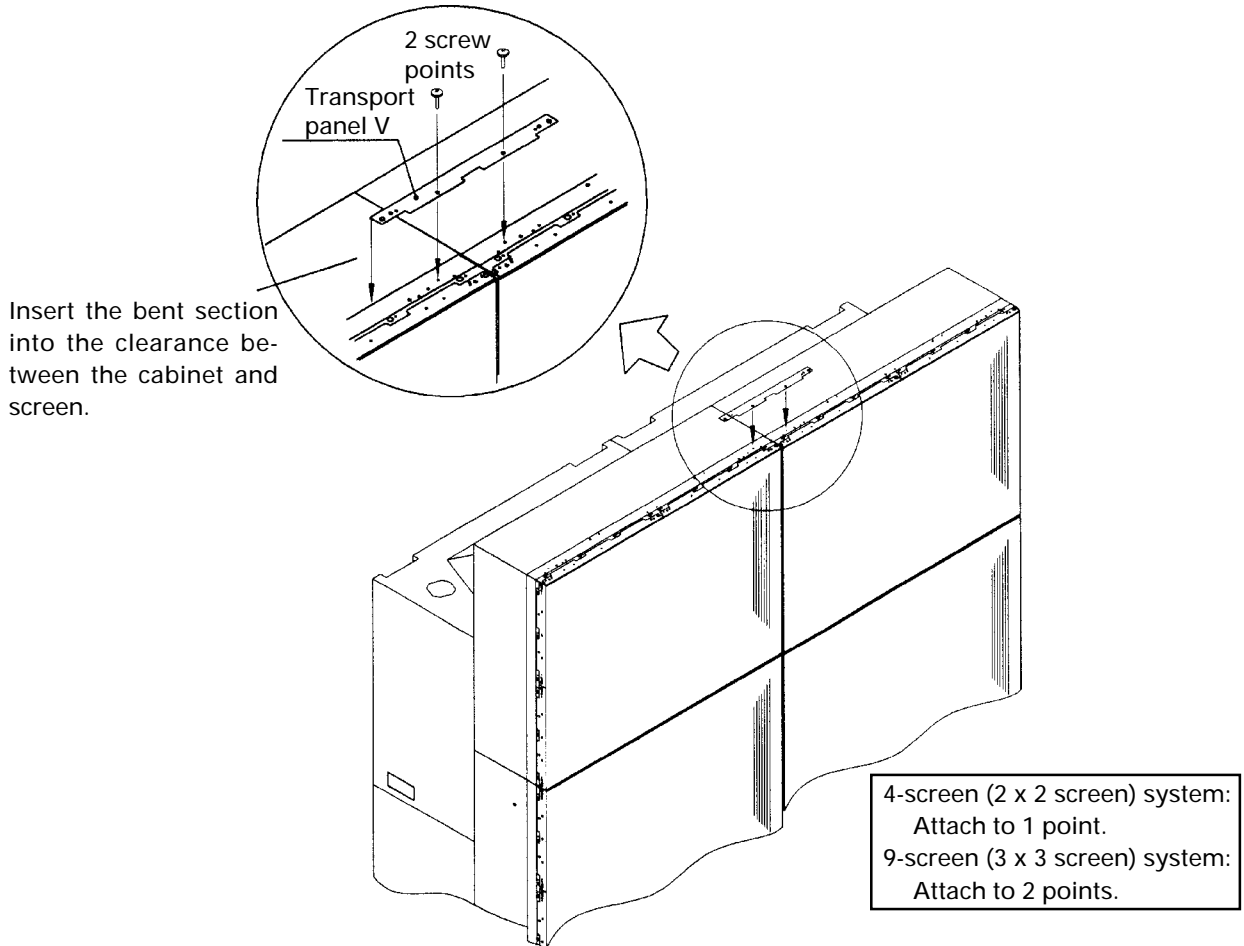
NOTE) Screw tightening method

1. If the screen frame assembly is not flush against the screen frame fastener :
 Do not tighten completely. Fasten by 2 or 3 threads.
2. If a screen frame ass'y is in close contact with the screen frame support bracket:
 Tighten the screws completely.



[Fig. 3-4-17]

- [7] Fix the screen frames (of the upper stage). [Fig. 3-4-18]
 Use previously removed transport panel V.
 Screws: 4 dia. x 8 x 2 (provided with each screen frame)



[Fig. 3-4-18]

② 9-screen system assembly (using the RMA-V5020/WL)

— For the caution and notes, refer to the description under the description of the 4-screen system assembly.—

- [1] Place the cabinet on each stand. (3 cabinets)

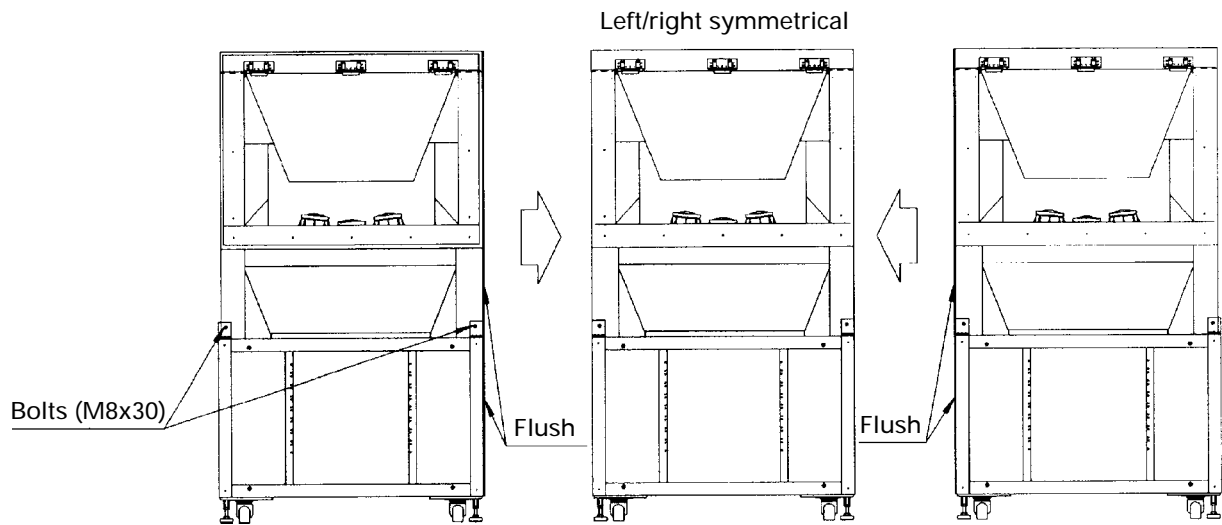
NOTE) Always carry each cabinet with more than one person.

- [2] Adjust the positioning of the cabinets. [Fig. 3-4-19]

Align the front and rear of each cabinet/stand with respect to the L-shaped brackets on the stand.

Align the left and right of each cabinet/stand so as to make flush the side surfaces of the cabinet/stand on the side which comes in contact with another cabinet/stand pair.

Place the central cabinet/stand in a symmetrical position with respect to the other pairs of cabinet/stand.



[Fig. 3-4-19]

- [3] Fix the cabinets using bolts. [Fig. 3-4-2]

Front: M8x30 x 2 (provided with each stand)

Rear: M8x60 x 2 (provided with each stand)

- [4] Align the left and right cabinets. If the following conditions are not satisfied, adjust using the adjusters on the stands.

(Front/rear): Line up the wood surfaces of the front of the left and right cabinets. [Fig. 3-4-3]

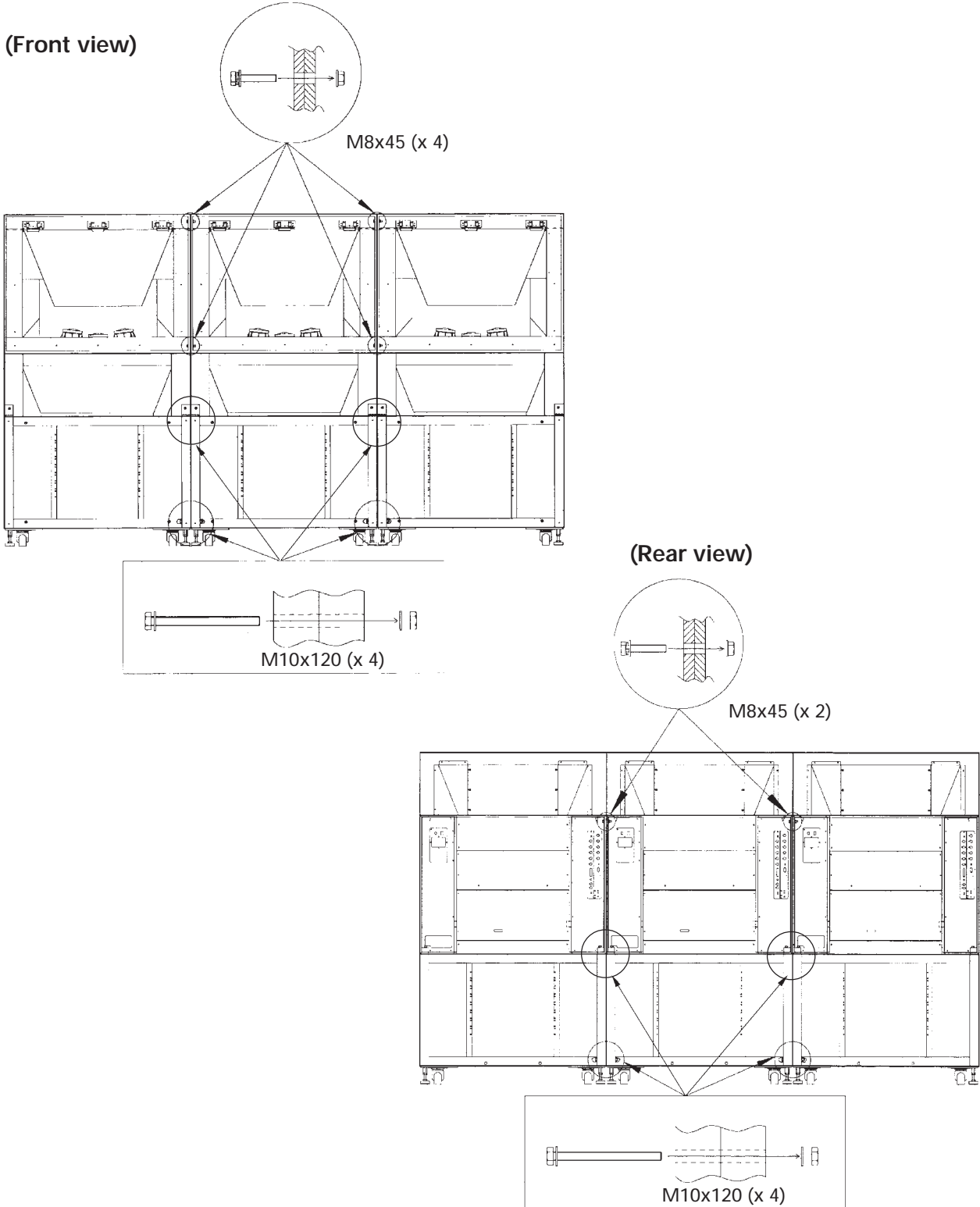
(Top/bottom): Align the height of the bottom plates on the front of the left and right cabinets. [Fig. 3-4-4]

(Inclination): Reduce any clearance between the left and right cabinets to below 3 mm. [Fig. 3-4-5]

INSTALLATION AND ASSEMBLY

[5] Fix the cabinets and stands using bolts. [Fig. 3-4-20]

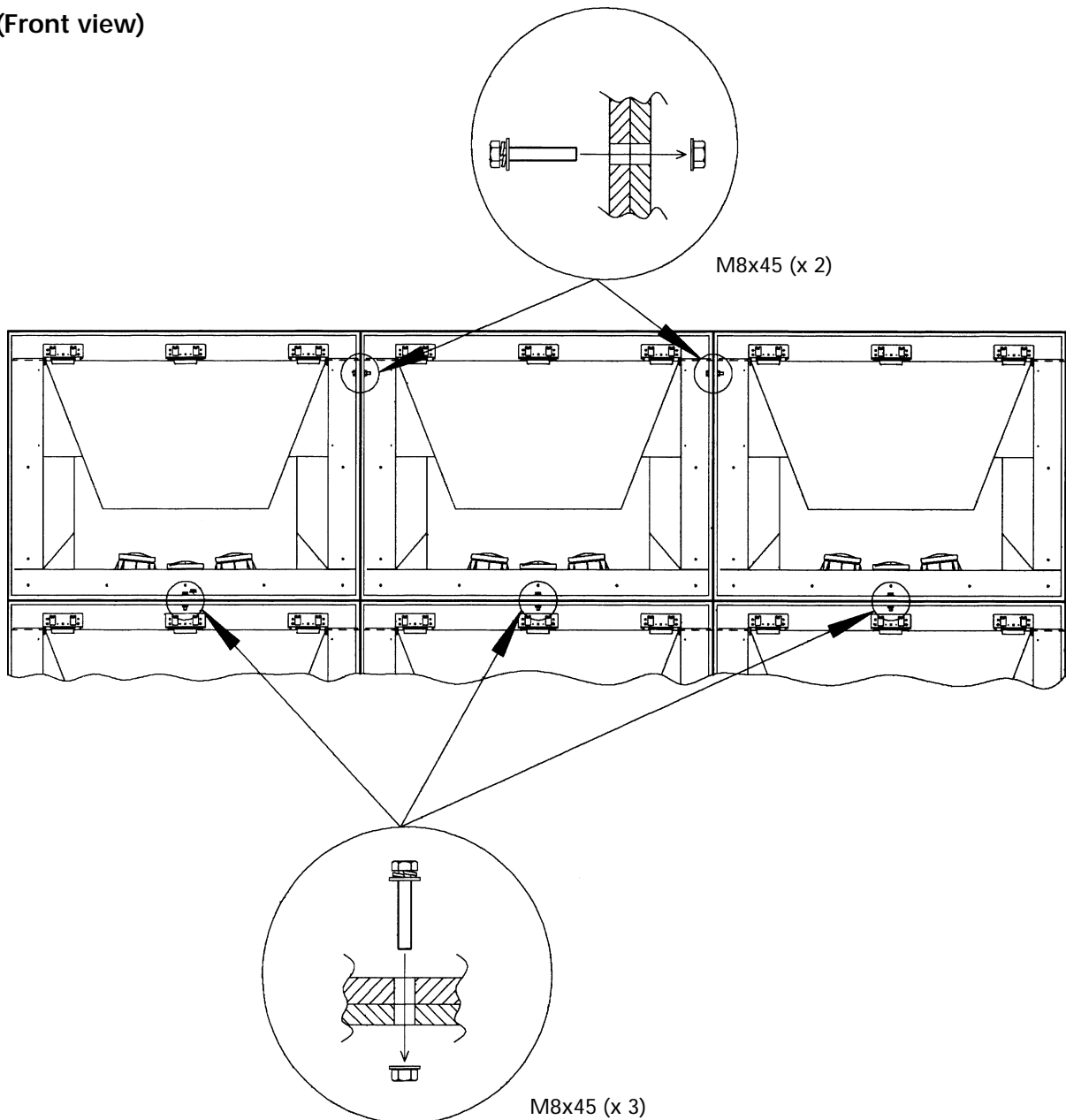
- Cabinets { Front M8x45 x 4 (provided with each cabinet)
- { Rear M8x45 x 2 (provided with each cabinet)
- Stands { Front M10x120 x 4 (provided with each stand)
- { Rear M10x120 x 4 (provided with each stand)



[Fig. 3-4-20]

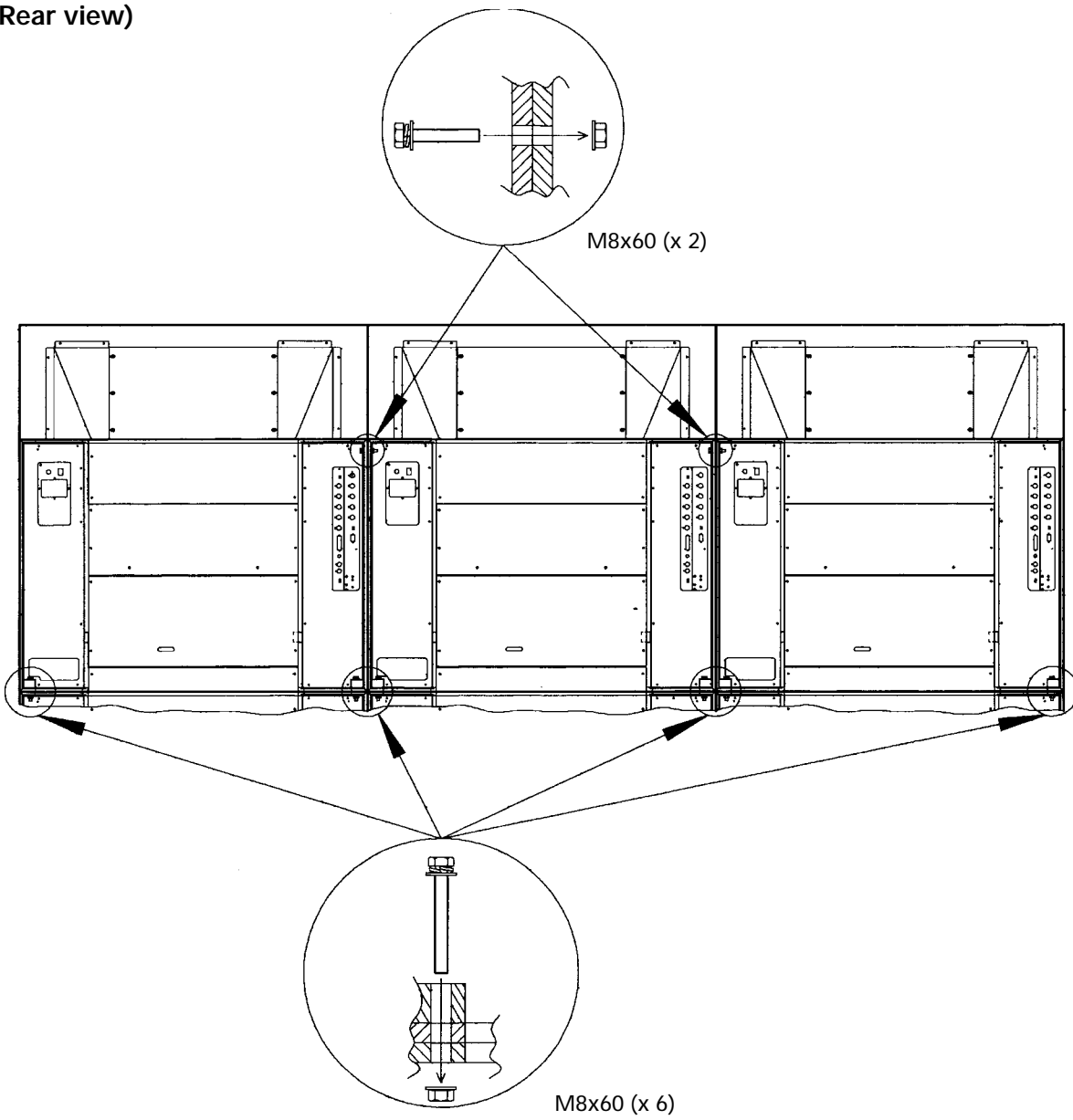
- [6] Place the cabinet of the second stage on that of the first stage. [Fig. 3-4-7]
 NOTE) 1. To prevent hazard, never mount on a cabinet.
 NOTE) 2. Always carry each cabinet with more than one person. (If three persons are available, two of them should carry each cabinet from both sides and the third person should support the rear where the center of gravity comes.)
- [7] Adjust the positioning of the cabinets. [Fig. 3-4-8]
 (Front/rear) Line up the wood surfaces of the front of the cabinets.
 (Left/right) Form a cross on the center point where the 4 screens meet.
- [8] Fix the connections between cabinets using bolts. [Fig. 3-4-21]
 Front M8x45 x 5 (provided with cabinets)
 Rear M8x60 x 8 (provided with cabinets)

(Front view)



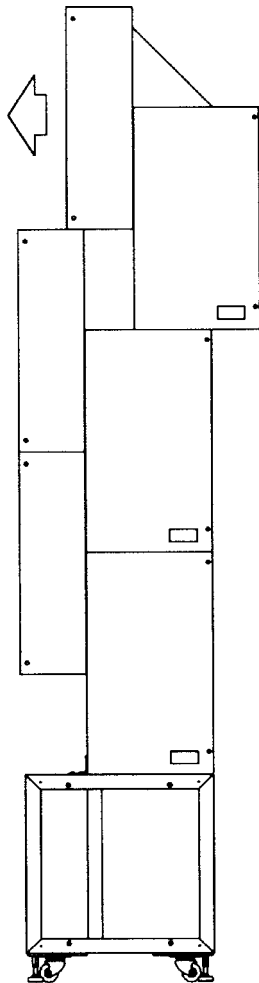
[Fig. 3-4-21]

(Rear view)



[Fig. 3-4-21]

[9] Place the cabinet of the third stage on that of the second stage. [Fig. 3-4-22]



NOTE) To prevent hazard, never mount on a cabinet.

NOTE) Place the cabinet from the center position.

[Fig. 3-4-22]

[10] Adjust the positioning of the cabinets. [Fig. 3-4-8]

(Front/rear) Line up the wood surfaces of the front of the cabinets.

(Left/right) Form a cross on the center point where the 4 screens meet.

[11] Fix the connections between cabinets using bolts. [Fig. 3-4-21]

Front M8x45 x 5 (provided with cabinets)

Rear M8x60 x 8 (provided with cabinets)

[12] Attach the screen frame support brackets onto the bottoms of the cabinets using screws. [Fig. 3-4-10]

Screen frame support brackets x 6 (provided with screen frames)

Screws (4 dia. x 16) x 12 (provided with screen frames)

[13] Block the holes on the cabinets using light insulating stickers. [Fig. 3-4-11]

Light insulating stickers x 15 (provided with cabinets)

Installing the screen frame ass'ies

[1] Attach hooking brackets (L) (R) onto all of the screen frames to be used. [Fig. 3-4-12]

NOTE) Be sure to stand the screen frames vertically during work.

[2] Connect three screen frames vertically to form screen frame ass'ies. [Fig. 3-4-23]

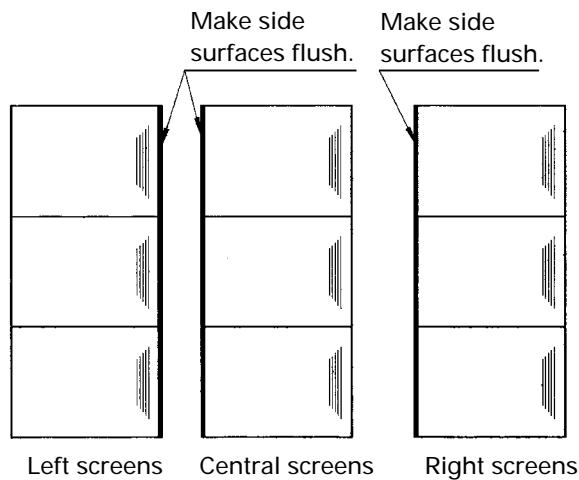
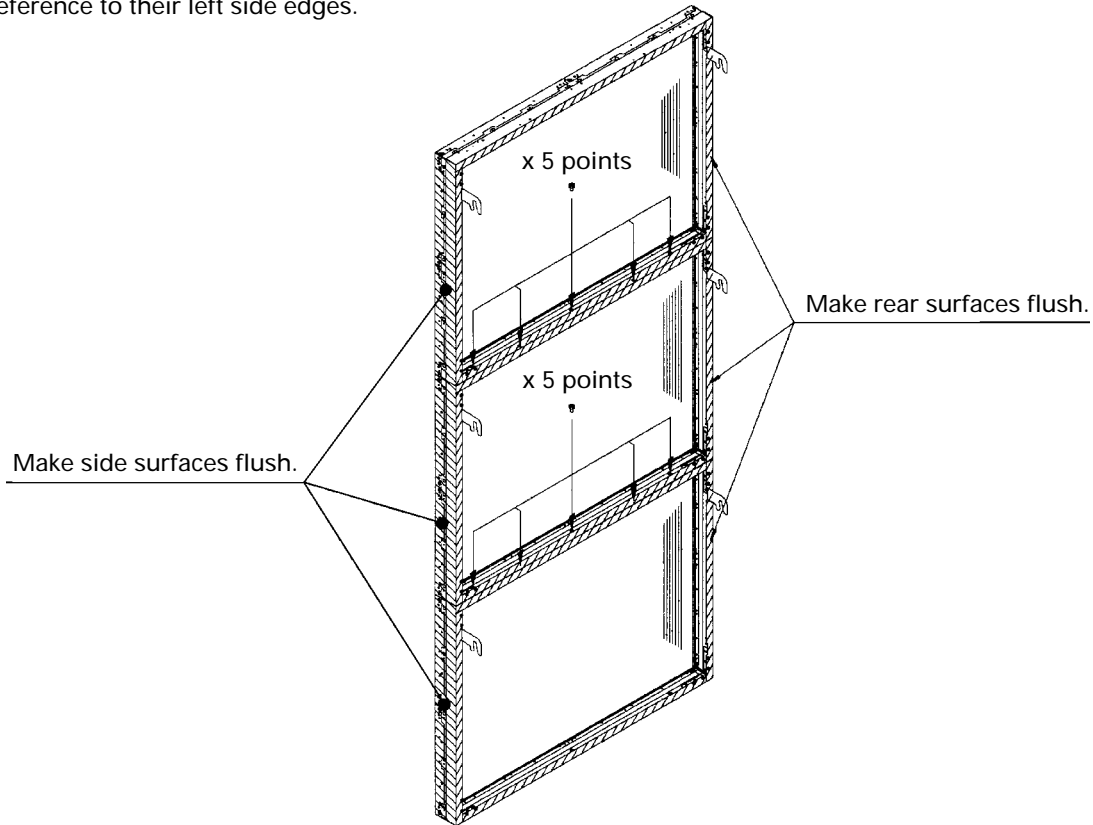
Adjust their positioning before attaching using screws.

● **Front/rear positioning:**

Make the rear surfaces flush.

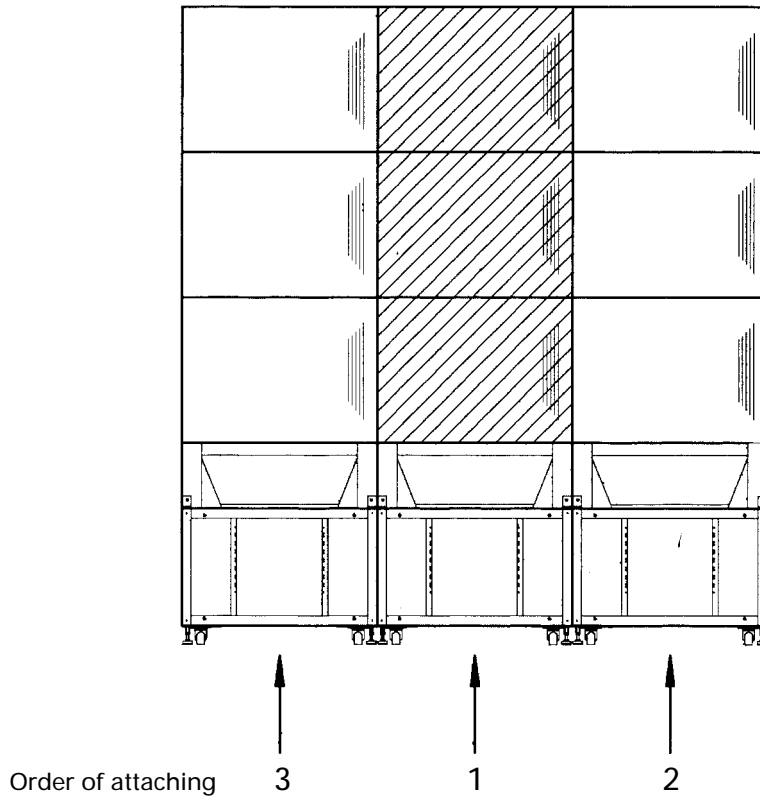
● **Left/right positioning:**

Align the left vertically-connected screens with reference to their right side edges, the central vertically-connected screens with reference to their left side edges, and the right vertically-connected screens with reference to their left side edges.



[Fig. 3-4-23]

- [3] Attach the central 3 screen frame ass'y to the center cabinet. [Fig. 3-4-24]
- [4] Attach the other screen frame ass'ies to the other cabinets in the same way as above.



[Fig. 3-4-24]

- [5] Adjust the positioning. [Fig. 3-4-16]
 - NOTE) 1. With the vertical joints, remove any clearance between horizontally adjacent screens.
(Note however that there may be gaps of up to 2 mm due to differences in the sizes of parts.)*
 - NOTE) 2. With the horizontal joints, make the formed lines straight.
If the horizontal joint is not straight after step [4], adjust the left and right heights by attaching a height adjustment screw (M6x10, provided with each screen frame) to a screen frame support bracket and turning it with a screwdriver.*
- [6] Fix the screen frames (of the lower stage).
 - Screws: 4 dia. x 12 x 6 (provided with each screen frame)
- [7] Fix the screen frames (of the upper stage).
 - Transport panel V x 2
 - Screws: 4 dia. x 8 x 4 (provided with each screen frame)

③ Installation without using stands (Direct floor installation)

For installation of this system, we basically recommend the use of our recommended stands or other stands equipped with adjusters and casters.

Nevertheless, if you should install the system directly on the floor, use the following caution in installation.

- [1] If the floor is flat, the cabinets cannot be joined well and may be deformed after joining.
To prevent this, be sure to install the cabinets on a flat, level floor. (See Chapter 3, 1(1).)
- [2] The installation procedures are identical to those described under ① or ②.
- [3] Be sure to take measures against tumbling down of the system. (See Chapter 3, 1(6).)
- [4] Take the maintenance space that is required on the rear in consideration during installation.

(3) Fixation using anchors

Use care in the following points when fixing the stands (RMA-V5020) onto the floor using anchors.

① Number of anchors

(With a 9-screen system having 3 stages of screens on each stand)

Fix each anchor using at least 2 anchors on each of the front and rear.

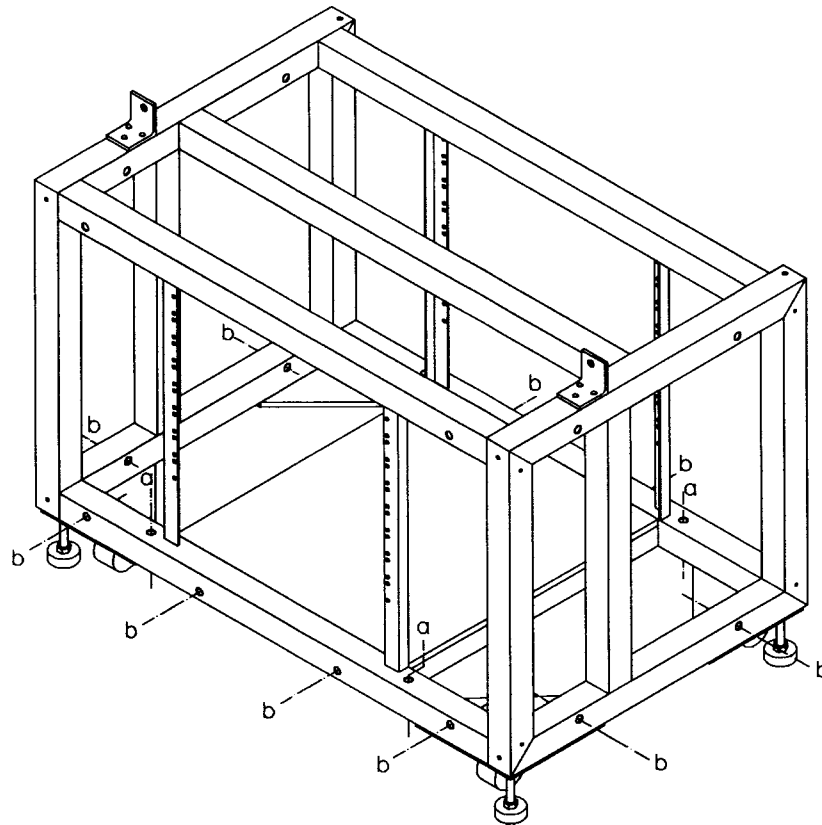
(With a 4-screen system having 2 stages of screens on each stand)

Fix each anchor using at least an anchor on each of the front and rear.

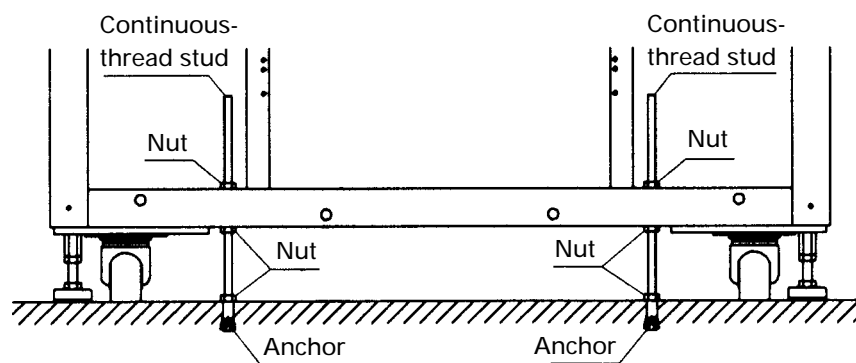
② Anchor fixing positions & method

The anchors can be fixed in the following two ways.

a. Fixing using continuous-thread studs

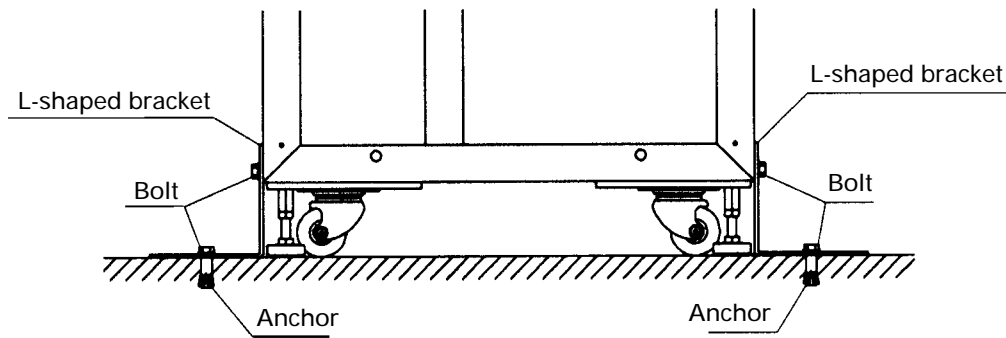


[Fig. 3-4-25]



[Fig. 3-4-26]

b. Fixing using L-shaped brackets



[Fig. 3-4-27]

③ **Anchor bolt diameter**

With both methods a and b in 2, use bolts with diameters of M10 or more.

④ **L-shaped bracket thickness**

The L-shaped brackets used with method b in 2 should be made of sheet iron with thickness of 4 mm or more.

⑤ **Effective anchor thread length**

The anchors and anchor bolts should have an effective thread length of 6.5 mm or more.

NOTE:

- Be sure to check the installation strength after anchor fixation. Otherwise the floor may fall out due to mistake in installation mistake or defect in concrete material.
- For detailed dimensions and strength of the anchors, refer to their product catalogue, etc.



Pioneer will accept no responsibility for accidents or damage resulting from anchors or insufficient anchor installation strength.

(4) Connections (for 4 screen system)

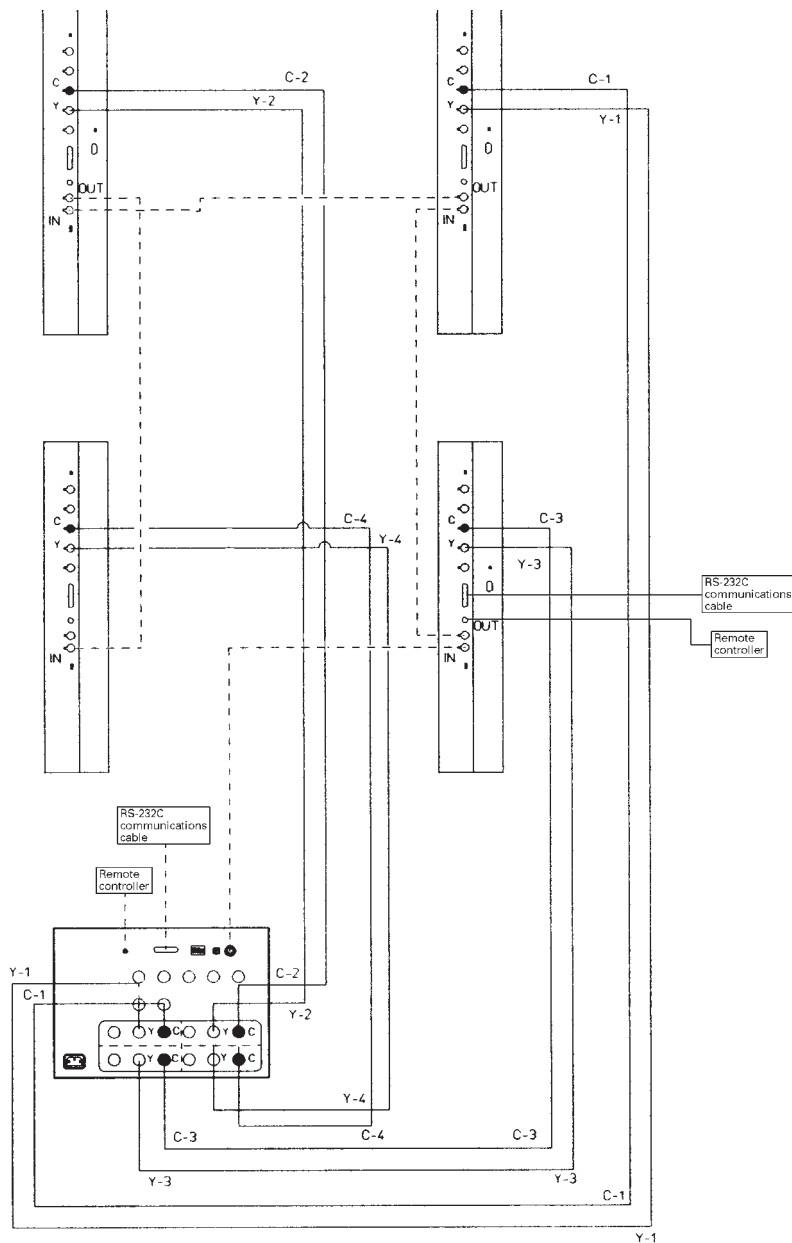
Accessories

- Interlock cables 6-pin mini-DIN cord

Connect the provided cables as shown in Fig. 3-4-28.
After connection, clamp cables using cable clamps.

NOTE

When you want to connect the RS-232C communications connector and remote controller from the leftmost position seen from the rear of the system, invert the IN/OUT connections of the interlock cables (6-pin mini-DIN cord). (The following illustration shows an example in which they are connected from the rightmost position.)

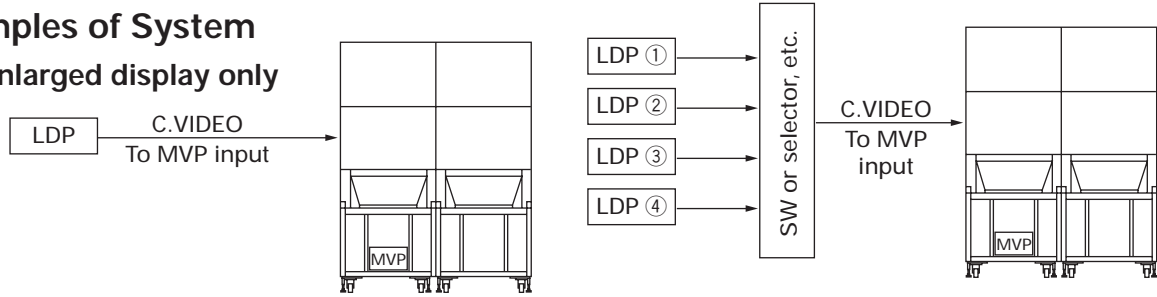


- - - The broken lines are for when the RS-232C cable and remote control unit are relayed through the MVP.
- The double solid lines are for when there is no relay.

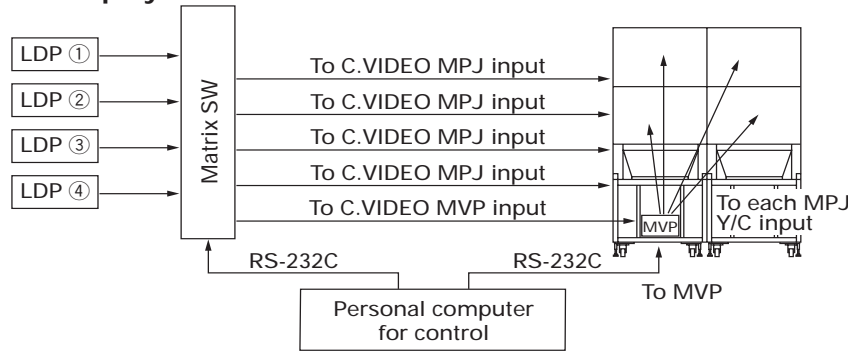
[Fig. 3-4-28]

Examples of System

(1) Enlarged display only



(2) Multi display



Switching of Displays

- Enlarged display
 - ① Select the signal displayed by the matrix SW, and send the signal line to the MVP.
 - ② Set the MPJ input to Y/C.
- Multi display
 - ① Select the signal displayed by the matrix SW, and send the signal line of the MPJ.
 - ② Set the MPJ input to C. VIDEO.

5. SPECIAL INSTALLATION

(1) Wall inset

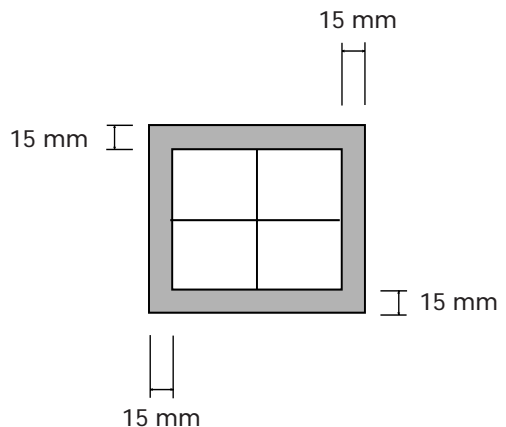
- See the descriptions in (2), (4) and (15) under "1. Installation conditions".

(2) Diagonal installation

- This system cannot be placed facing upwards or downwards and diagonally. Always place it horizontally.

(3) Architrave processing

- When enclosing the screen with a frame, etc., add 15 mm to the dimensions of the assembled screen at the top, bottom, left, and right. [Fig. 3-4-29]
- * Perform framing constructions after assembling the screen.
- If light leaks from the rear space after constructions, place a blind plate over the rear.



(4) Upside down installation

- Not possible

(5) Hanging from ceiling

- Not possible

[Fig. 3-4-29]

CHAPTER 4. ADJUSTMENTS

1. ADJUSTMENT PREPARATIONS

(1) Wiring

① For the power supply

- For the power supply, up to three units can be connected in a series using the multi projection units' AC outlets. Use different external power outlets for each set of three units.
- The multi projection unit's AC plug is a 3-pin plug with a ground pin. When connecting the power supply, be sure to connect the ground pin to the ground in order to prevent electric shocks.

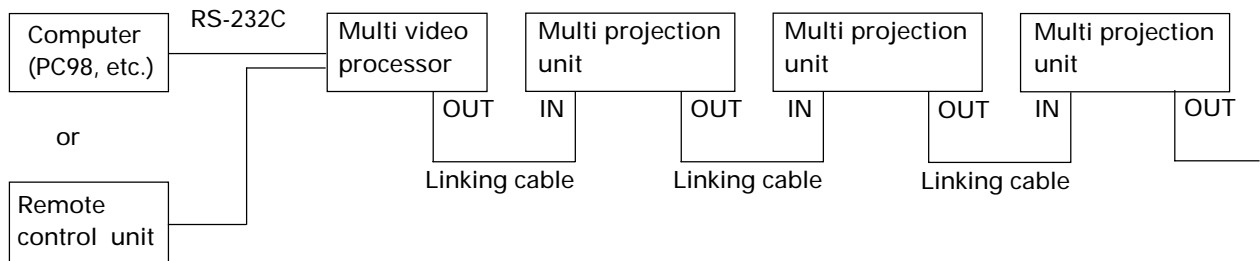
② Connection of signal cables

- Use coaxial cables. In general use 3C-2V cables for lengths of up to 15 meters, 5C-2V cables for lengths of up to 30 meters. Keep the distance between the signal transmitter and multi projection unit to a minimum.

③ Connection of ABL linking cables

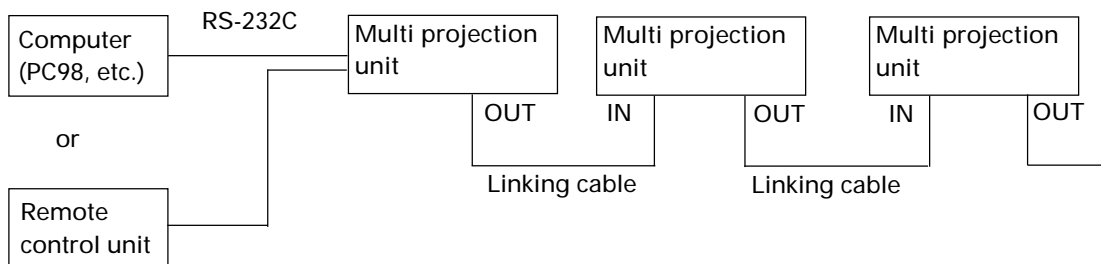
- Control signals (RS-232C and remote control signals) can be sent to all units by connecting the ABL linking cables in cascade form.

When connecting via the MVP



Only the cables included with the MPJ are provided as linking cables for connecting the MVP and MPJ. When extending the connection distance, keep to within 20 meters.

When not connecting the MVP



(Generally about 16 multi projection units can be adjusted with the remote control unit.)

(2) Processing of wires

- When installing for long periods of time (such as for permanent installations rather than short-term events), use wires of the appropriate length considering the overall routing of the wiring.
- Make sure that the connection terminals are not subject to direct loads or forces. For short-term installation the wires can be bound together by string, etc., but for long-term installations they should be properly bound.

(3) Aging

- After turning on the power, input the 100% white signal or moving images, and perform aging until multi projection unit stabilizes (about 1 hour). If adjustments are performed without aging, as it takes time until Multi projection unit will warm up and stabilize, convergence and white balance will become incorrect.

(4) Adjustment signals

- Use the composite video signal for adjustments created in the multi video processor. When converters not creating the signals for adjustment are used, supply the signals for adjustment from equivalent signal sources (signal generator, LD player, etc.)

◎Generally required signals

Adjustment	Signal Name
• Screen center adjustment Screen size adjustment	Monoscope
• Convergence adjustment	Crosshatch Tilted crosshatch
• White balance adjustment	White signal (Can be linearly varied between 0% and 100%) Or 10 step
• Linear white adjustment	Crosshatch
• Total adjustment (Color, tint, etc.)	Moving image (scenery, faces) Color-bar, etc.

(5) Equipment required for adjustments

The following are required for the adjustments performed during the set-up of MPJ.

Equipment	Role	Required Function	Recommended Model	Remarks
Personal Computer	For adjusting	RS232C communication function		
Adjusting remote control	For adjusting		Pioneer RU-V107	Prepare a Personal Computer or this remote control for adjustment.
Signal generator	For generating white balance and color tint adjusting signals	Gray scale White (% variable)		Especially white (% variable) is important.
Adjusting LD	Total image quality adjustment	High definition image Picture of beauty Various adjustment signals	LD demonstration 2 (Not for sale)	Perform color, or final and overall adjustments with the actual images.
LD player	For playing adjusting LD	With still function	Pioneer LD-V4400	
Cable	For connecting RS-232C	D-Sub 25-pin (male) straight cable		The length differs according to the place adjustment is performed at, but prepare at least 10 m.
	For connecting video			
Adjusting LD	For generating signals for adjusting size, convergence	Monoscope Crosshatch	Test disc GGT 1072	Use for adjusting screen size and center.

2. BEFORE ADJUSTMENTS

(1) Convergence adjustment memory

The MPJ incorporates four convergence adjustment memories. These can broadly be divided into the adjustable memory (Memories 1 to 3) and dedicated memory for reading adjustment values set at shipment (FACTORY).

Input Signal \ Memory Area	Memory Area			FACTORY
	1	2	3	
NTSC	○	○	○	◎
PAL	○	○	○	◎

○ : Enable to select.

◎ : Disable to select. Only possible to read out to the memory area enable to select.

The following adjustment data are input to each memory area at shipment.

MEMO-1 : For NTSC signals

MEMO-2 : For PAL signals

MEMO-3 : For NTSC signals (Same data as MEMO-1) --- for RM-V2550U
 : For PAL signals (Same data as MEMO-2) ---- for RM-V2550U

FACTORY: For NTSC signals (Same data as MEMO-1) --- for RM-V2550U
 : For PAL signals (Same data as MEMO-2) ---- for RM-V2550U

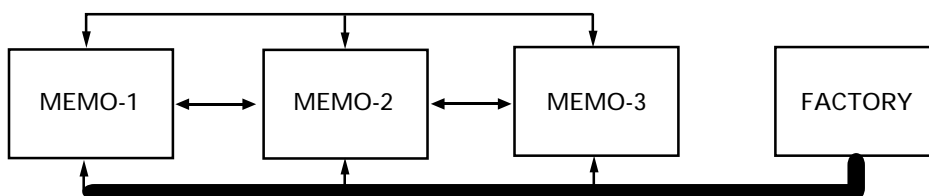
For some input signals, NTSC and PAL are selected automatically.

When a NTSC signal is input : MEMO-1

When a PAL signal is input : MEMO-2

Copying the convergence memory

The convergence memory can be copied by the remote control unit or PC. (See figure below.)



When data is copied, the memory into which the data is copied will lose its original data. (For example, when data is copied from MEMO-1 to MEMO-2, MEMO-2 will become the memory for the NTSC signal, and lose the PAL signal.)

When the data has been copied into the selected convergence memory area, this can be known by the display [COPY END] on the screen. In that case, the data of the convergence has been changed into new data. If the data is not the same, the convergence will change as well.

Example : When MEMO-1 is selected

MEMO-1 → Copy to other memories : Completed when [COPY END] is displayed on the screen.

MEMO-1 ← Copy to other memories : Completed when [COPY END] is displayed on the screen and at the same time convergence deviates.

Condition : MEMO-1 data ≠ MEMO-2 data

(2) TV system

The TV system determines the control of the whole unit (convergence, OSD display select, video system select, deflection) according to the signal input.

Set it according to the signal input.

When TV SYSTEM is set to AUTO

- The mode is automatically set to NTSC or PAL according to the input signal (NTSC/PAL).

When the TV SYSTEM is set to NTSC

- The mode is set to NTSC regardless of the input signal.

When the TV SYSTEM is set to PAL

- The mode is set to PAL regardless of the input signal.

[Precaution to use]

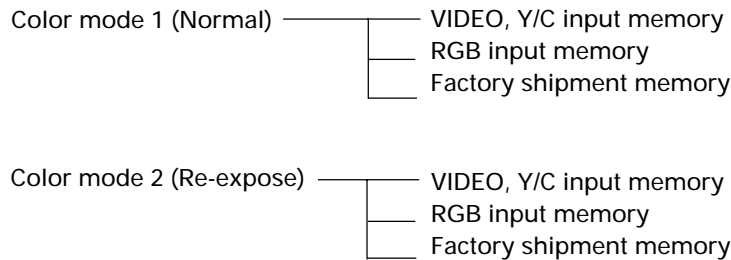
Normally, the TV SYSTEM is set to AUTO. If the signals cannot be differentiated between NTSC and PAL (or they are differentiated incorrectly : VCR signal repeatedly dubbed or part of CATV converter, etc.), the TV SYSTEM is set to NTSC or PAL according to the input signal.

When the input signal is NTSC or PAL, and the TV SYSTEM is set to NTSC or PAL, it can enable the input to be switched smoothly (little screen noises), and prevent signals from being differentiated incorrectly due to signal disturbances and cuts.

In some cases, even if the same TV format is used, more than two types of convergence data will be required. (For example, when there are signal phase differences for every input source, etc.) In such cases, use two types of memories. Switch them using the personal computer.

(3) White balance adjustment memory

ADJUSTMENTS has altogether six white balance adjustment memories.



Four memories can be actually adjusted except the factory shipment memory. The factory shipment memory contains the normal white balance adjustment data and re-expose white balance adjustment data.

When set to color mode 1 by computer command, etc., the white balance data can be switched synchronously when the input is switched. The same is true for color mode 2. In addition, if it is necessary to change between color modes 1 and 2 for the same input function or for the VIDEO and Y/C input modes, connect a computer and switch between the modes as necessary by computer command (CM1 and CM2).

(4) Combined use of remote control and personal computer

Although it is possible to connect both the remote control (RU-V107) and Personal Computer, adjustments cannot be performed using both at the same time.

Remote control, Personal Computer commands and rear panel switches operated the latest are given priority. When the adjustment mode is set by the Personal Computer while adjusting with the remote control, the adjustment mode will be set by the Personal Computer, disabling adjustments to be performed using the remote control. If the adjustment mode is set by the remote control using adjustments by the Personal Computer, adjustments by the Personal Computer will be disabled. Furthermore, if the rear panel switches are operated when the adjustment mode is set by the remote control or Personal Computer, the adjustment mode is exited and the rear panel switches operations are started.

(5) Memory of adjustment data and settings

When adjustments are ended in the adjustment mode such as convergence, white balance, etc., always exit the adjustment mode (AJN for Personal Computer, ADJ OUT key for remote control). If the power is turned off (AC OFF) without exiting the adjustment mode, a part of the adjustment data will not be preserved in the memory. The input function, MULTI ON/OFF (peripheral light amount switching), COLOR MODE 1/2 (white balance switching), COMBINATION ON/OFF (ABL link switching), VIDEO MUTE ON/OFF (VIDEO MUTE of input switching), baud rate setting, TV SYSTEM setting, and convergence memory state setting will be preserved in the memory only when the power is turned off using the remote control, command of a Personal Computer (POF) or the rear panel tact switch, and finish the adjustment mode (when you set each data in the adjustment mode.) (The last data will not be memorized when the main power switch is turned ON/OFF or when the AC power is turned ON/OFF using the external switch.)

When starting or stopping the system by AC ON/OFF in an installation condition for demonstration, use this method to preserve the conditions in the memory first and confirm the initial condition by AC ON/OFF.

The following phenomena may occur when discharge occurs.

Example :During performance in which inputs are switched using the personal computer (VIDEO RGB)
When discharge occurs, RGB is switched to VIDEO.

This phenomenon occurs because at the same time discharge occurs, the INPUT set is initialized in the previous memorized state (in this example, it is the VIDEO input). Therefore pay careful attention when using the memory.

(6) Assigning ID numbers

ID numbers are numbers which identify the different multi projection units in a system consisting of multiple multi projection units (4-screen systems, 9-screen systems, etc.). When the ABL linking cables are connected and ID numbers are assigned, commands can be sent to specific multi projection units and the remote control unit can be used to operate a specific multi projection unit.

In addition, the ID numbers assigned to the different multi projection units can be used to change the time until each unit is turned on. This can be used to avoid harmful effects such as the circuit breaker being blown due to a large in-rush current.

<Function for turning the power on at different times using the ID numbers>

If the power of the entire cube system is turned ON/OFF with a main breaker, because the cubes connected to the same power supply will be simultaneously turned on when the power is turned on, a large in-rush current may be generated.

Such problems can be prevented by using the ID numbers assigned to the different sets to change the times when the units' power actually turns on as described below, thereby lowering the probability of the power of the different units turning on simultaneously and thus preventing such problems.

* Wait Time setting

This function uses the ID numbers assigned to the individual sets, dividing the ID numbers into four groups (I to IV) and setting the time from which the microprocessor recognizes the power on command until the power assembly's AC relay is actually turned on for the different sets within the different groups in the order of the ID numbers, with the formula: $\boxed{\text{ID no. within group} \times 40 \text{ msec}}$ ID Converted into decimal system Wait Time.

	ID		Order of the ID numbers	WaitTime
I	00	→	0	0x40= 0msec
	01	→	1	1x40= 40msec
	:		:	:
	3E	→	62	62x40= 2480msec
	3F	→	63	63x40= 2520msec
II	40	→	64	0x40= 0msec
	:		:	:
	7F	→	127	63x40= 2520msec
III	80	→	128	0x40= 0msec
	:		:	:
	BF	→	191	63x40= 2520msec
IV	C0	→	192	0x40= 0msec
	:		:	:
	FF	→	255	63x40= 2520msec
	-- (Not set)			0msec

Wait Time is the same for groups II to IV as for group I.

ADJUSTMENTS

<NOTES>

- As can be seen from the above, unless within one system ID numbers from the same group are assigned, the wait times may overlap, defeating the purpose of this function. Be sure to assign ID numbers from within the same group.

However, if the ID numbers are set carefully within a certain range in such a way that the wait times do not overlap, this function can be used without problems even when ID numbers from different groups are assigned.

(For example, if ID numbers between 10 and 4F are assigned to units within the system, the wait times will not overlap.)

- In addition to the wait time function, some time is required for the routine when the power is turned on normally (approx. 1 msec), so the time until the power actually turns on is:

Wait time + Approx. 1 sec

* Direct computer commands for switching the function for turning the power on at different times using the ID numbers on and off

This function can be enabled and disabled with the following direct commands (in the AJY mode) from the external computer.

DPY (Delayed Power On Yes): Delayed power on function enabled

DPN (Delayed Power On No): Delayed power on function disabled

By default (initial settings), this function is enabled.

The on-screen display when this command is set is as shown below.

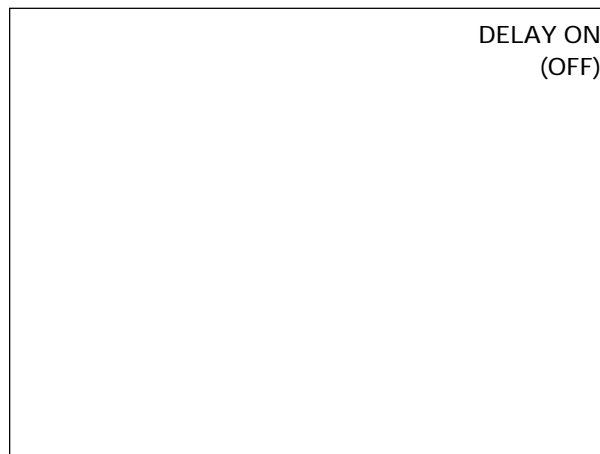


Fig. 2 On-screen display for delayed power on function status (on or off)

The set's current status (whether or not the function is on or off) can be checked by sending the "GST" direct command from an external computer. (For details, refer to page 115.)

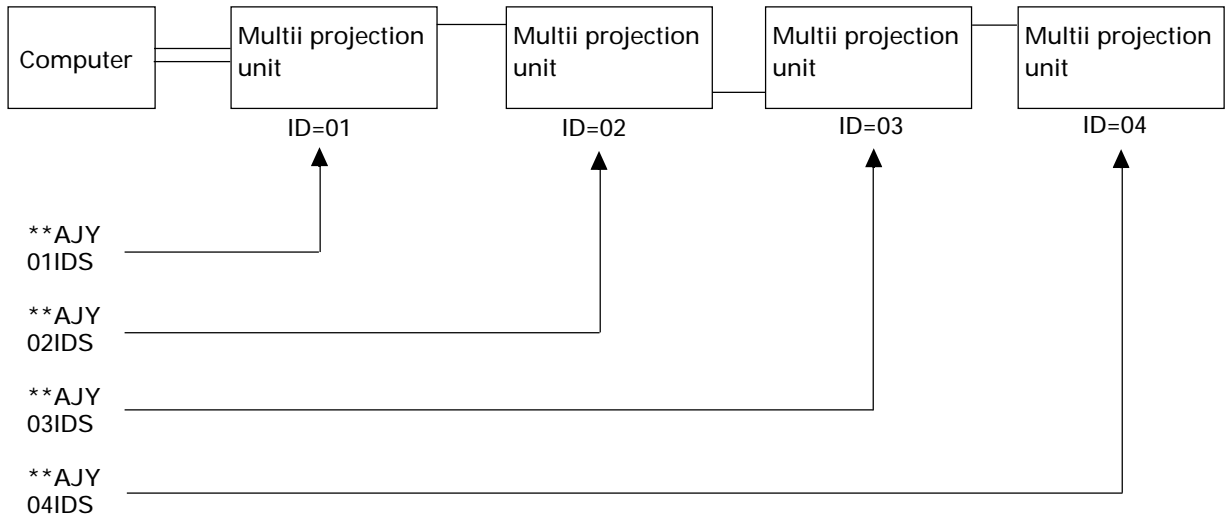
<Assigning IDs from a computer>

Command: IDC (ID Clear) Clear assigned ID

IDS (ID Set) Assign ID

The IDS command is only valid when no ID is assigned, and is value from the unit closest to the computer (remote control unit).

Example: With a 4-screen system (when assigning ID numbers for the first time from a computer)



ID numbers can be assigned to all the units by sending commands in this order. However, the ABL linking cables must also be connected as shown above.





The characters that can be used for ID numbers are numbers 0 to 9, letters A to F (not case sensitive) and *. The * (asterisk) can be used as follows:

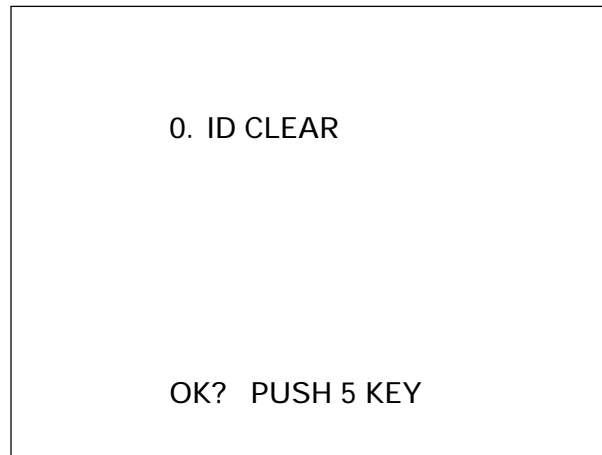
**IDC : Clears all the ID numbers assigned to the units.



*0AJY : Sets the adjustment mode only for units with "0" as the second digit.





3*IN1 : Sets the input function to VIDEO only for units with "3" as the first digit.


<Assigning IDs from the remote control unit>

- [1] Use the  key to start up all the screens in the adjustment mode.
- [2] The main menu is displayed. Press the  key to select "1. ID SET/CLEAR/SELECT".
- [3] Check that the ID indicator at the top left of the screen reads "—", then press the  key to select "1. ID SET".
If ID numbers are already assigned, press the  key to select "0. ID CLEAR" from the main menu.



When this is done, the ID clear verification display appears as shown in the diagram. Now press the  key to return to " Enter adjustment mode", then assign the ID number.









- [4] The ID input standby mode is set. Use keys  to  and  to  to input the ID numbers.
- [5] To adjust multiple screen multi projection units, return to "[1] Enter adjustment mode", then assign the ID number for the next multi projection unit.

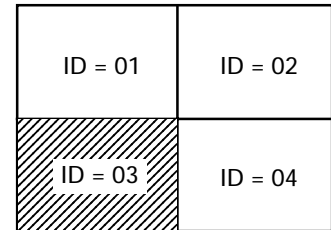
NOTE) To return to the main menu display after assigning the IDs for all the screens, operate the  key.




<Selecting ID numbers from the remote control unit>

Use this function to select the screen to be adjusted from the remote control unit.

Example: To select the screen at the lower left in the diagram at the right (ID = 03):

- [1] Use the  key to set all the screens to the adjustment mode.
- [2] Use the  key to select "1. ID SET/CLEAR/SELECT".
- [3] Use the  key to select "2. ID SELECT".
- [4] Press the  and  keys (ID = 03).
- [5] The main menu display appears on the screen at the lower left only, and the other screens are in the standby mode (only the ,  and  keys will work).



- To return to the main menu screen after selecting the screen using the ID number, operate the  key. The ID select mode is held. It is also possible to return to the main menu screen by operating the  key. In this case, however, the ID select mode is canceled, so start over from step [1]. To select another screen, use the  key to return to the main menu screen, then change the ID number in step (4) above.

NOTE) If you specify the wrong ID number

Repeat steps [1] to [5] above. In addition, a non-existent ID number can be input (for example, "33" in the above case), but in this case all the screens are set to the standby mode.

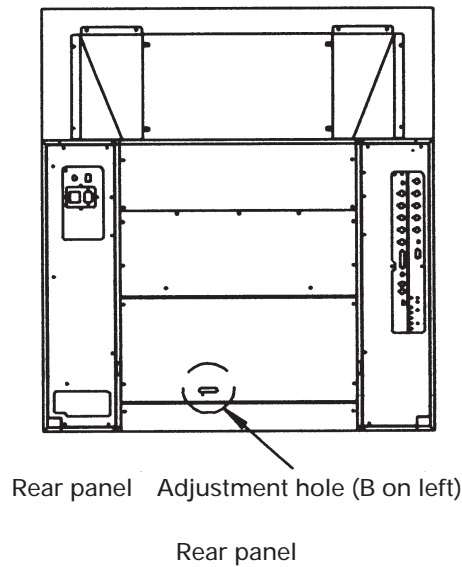
<Cautions on assigning ID numbers with the remote control unit or computer >

If a unit's ID number has been cleared, it is no longer possible to communicate with the units connected by ABL linking cables after that unit. When the "**IDC" command is issued at the diagram on the previous page, only the first unit can be controlled. Control of the second unit is enabled by issuing the "01IDS" command. Control of units connected subsequently is enabled by assigning ID numbers in the same way.

(7) Focus adjustment

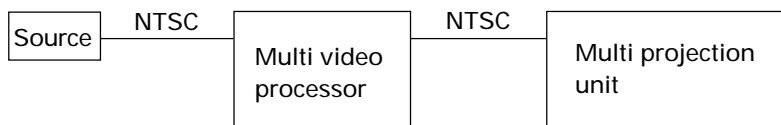
*NOTE) Focus VR has already been adjusted when this unit is shipped from the factory.
Ask our servicemen if the Focus VR needs to be adjusted.*

Adjustment	Input Signal	Adjusting Point	Adjusting Method
Focus adjustment	Cross hatch	Focus control (VR1) of lens assembly attached to the replaced CRT assembly and the focus variable resistor	<ul style="list-style-type: none"> • Move the lens assembly left and right and optimize the focus. • Rotate the focus VR and optimize the focus. • Adjust the lens assembly and focus VR repeatedly. <p><i>NOTE 1: Perform the adjustment below again only after adjusting the blue focus. Turn the blue focus VR counterclockwise and set so that the blue is slightly thick but does not stick out (about 10 to 12 mm for cross hatch outermost vertical lines of 40 inches, about 13 to 15 mm for 50-inch lines). Generally the focus VR should be turned by about 10 degrees.</i></p> <p><i>NOTE 2: The adjustment can be performed without removing the rear panel by inserting a screwdriver into the hole in the rear panel. The blue (B) hole is marked. (See the diagram below.)</i></p>



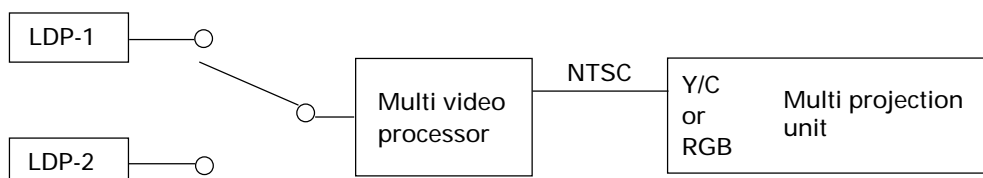
3. GENERAL EXAMPLES OF MULTI PROJECTION PRESENTATIONS

(1) Switching between enlarged/individual display on the multi video processor



TV SYSTEM) AUTO
Convergence data required for presentation) 1 set

(2) Switching the sources input to the multi video processor



* There is a phase difference between LDP-1 and LDP-2.

* There is only one set of frame data.

TV SYSTEM) AUTO
Convergence data required for presentation) 2 sets

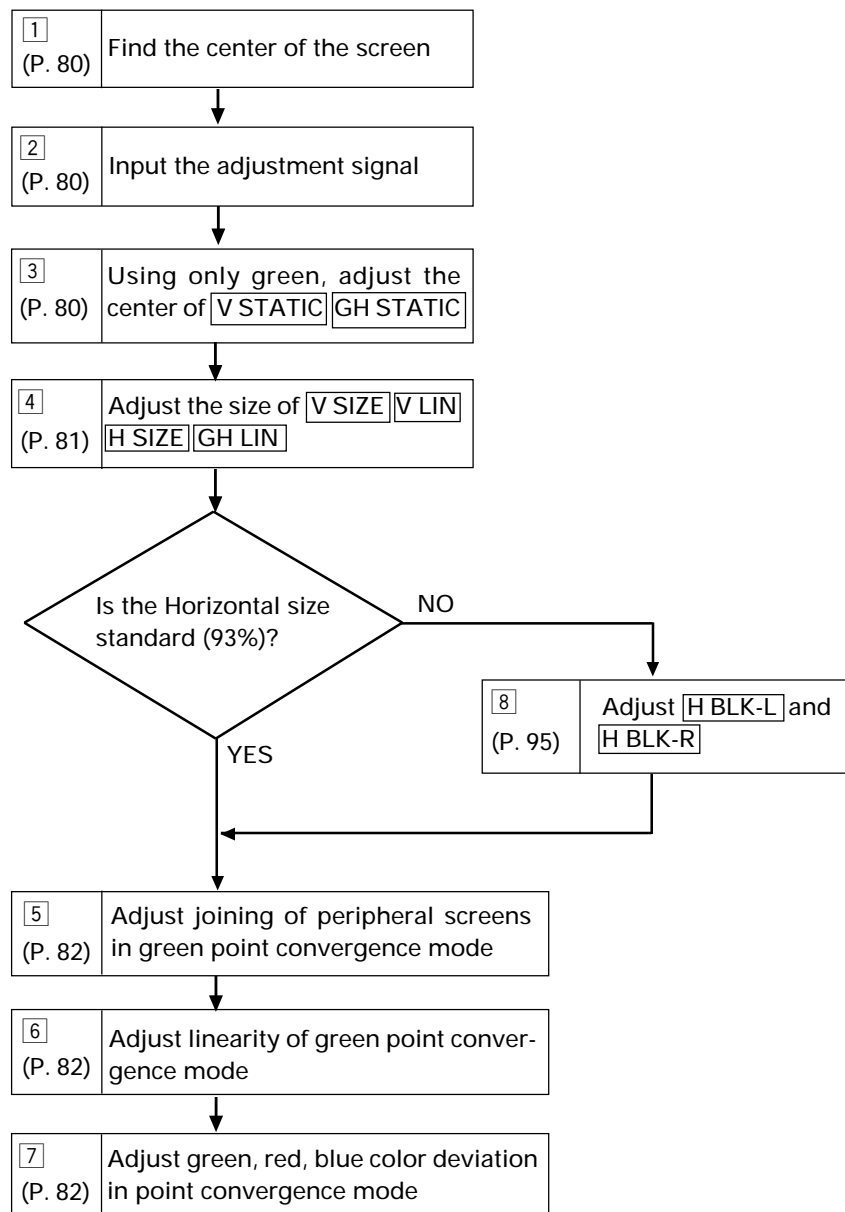
* For example, LDP-1 adjusted by MEMORY-1, LDP-2 adjusted by MEMORY-3, data switching by external control when LDP switched

4. SCREEN ADJUSTMENTS

(1) Adjustment flowchart

The following shows the order for performing the adjustments generally required in the setup of this system. For details, see the descriptions on the next page and later.

- ① Give ID (Refer to page 71 to 75)
↓
- ② Adjust the size of each screen
↓
- ③ Adjust the convergence of each screen
↓
- ④ Adjust the joining of the screens
(Adjust the MVP. Refer to "MVP Manual" in Chapter 7 (page 140).)
↓
- ⑤ Check that there is no information missing and color deviation on the moving image.
If information is missing or color has deviated, return to ② and readjust.
↓
- ⑥ Adjust the white balance of each screen.
↓
- ⑦ Adjust the ABL level
↓
- ⑧ Check the ABL level and white balance using the video actually transmitted.
If there is deviation, return to ⑥ and readjust
↓
- ⑨ Adjust the color tone using the video actually transmitted.
↓
- ⑩ Recheck ⑥ to ⑧

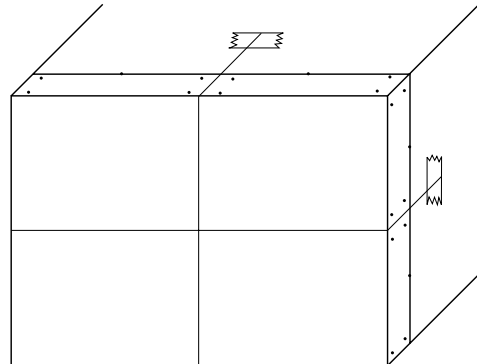
(2) Convergence adjustment flowchart

(3) Convergence adjustment contents

The □ numbers correspond to the numbers in the flow-chart.

1 Measurement of screen center

The center can be found easily by pasting threads in the spaces of the protection panels at the screen frame.



2 Adjustment signal input

For adjusting size Frame size picture(EX.LD Test disc GGT1072, FRAME No. 5941), Monoscope, etc.

For screen joining, linearity, color adjustment. Use adjustment signals such as , cross-hatch, etc. (EX. LD Test disc GGT1072, FRAME No. 7081, etc.)

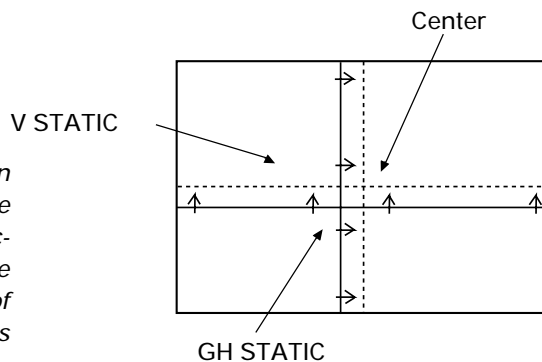
(Note)

For the particulars about the FRAME No., etc. of LD Test disc GGT1072, refer to the disc manual differently.

3 Center adjustment

Set to only green and adjust the center with **V STATIC** **GH STATIC**.

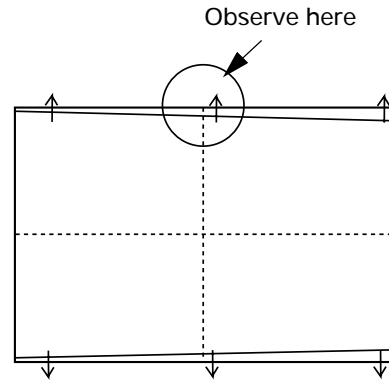
Note) Please to not move the center more than 2.5cm from the initial setting (128) in the upward, downward or left and right directions. If the center needs to be moved more than this, this could cause malfunctioning of the multi projection unit or harmful effects from magnetism.



4 V SIZE, V LIN, H SIZE Adjustment**① V SIZE adjustment**

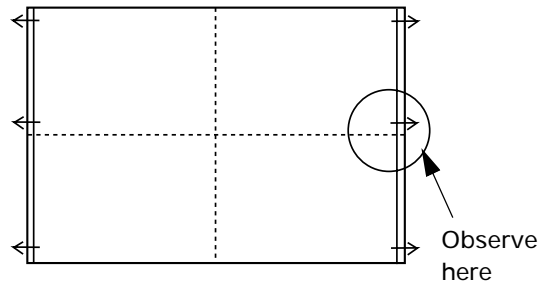
Set to only green, observe the **top part of the screen**, and adjust the data amount in the vertical direction using **V SIZE**.

Do not observe the bottom part of the screen.

**② H SIZE adjustment**

Set to only green, observe the **right side of the screen**, and adjust the data amount in the horizontal direction using **H SIZE**.

Do not observe the left side of the screen.

**③ V SIZE, V LINEARITY, H SIZE, GH LINEARITY adjustment**

Those familiar with the convergence adjustment can adjust the **bottom part of the screen** in addition to the **top part of the screen** using **V SIZE** and **V LINEARITY**. Also it can adjust the **left side of the screen** in addition to the **right side of the screen** using **H SIZE** and **GH LINEARITY**.

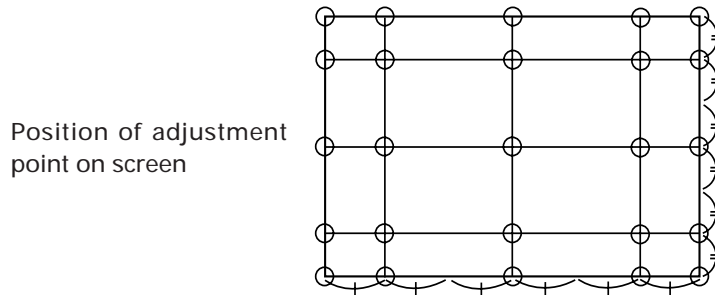
Reference information

To adjust the NTSC input for horizontal 93% and vertical 92%, use the frame size screen of the LD test disc GGT1072 (frame No. 5941).

- Horizontal : Adjust so that the sixth 92.5% line from the inside can be seen completely.
- Vertical : Adjust so that the sixth 92.5% line from the inside can be seen only slightly.

ADJUSTMENTS

5, 6, 7, Point convergence adjustment



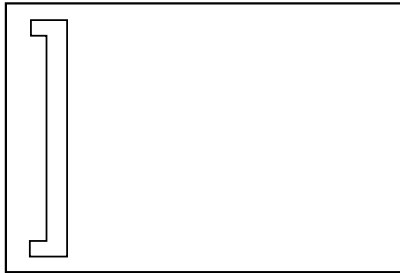
- © In point convergence adjustment, the 25 points set on the screen can be adjusted individually.
In addition, the area (total ten areas of five lines and ranks) of the four sides of the screen can be adjusted.

Notes

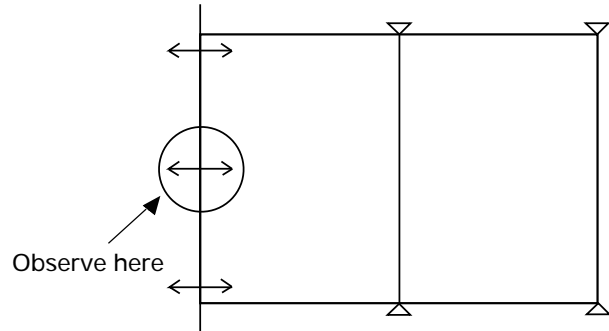
- The adjusting points set by the circuit are fixed at the positions shown in the figure. In some cases, the OSD display may deviate. But the actual adjusting points are as shown in the figure.
- Deviation between two adjusting points will naturally be corrected when the deviation of each point is corrected.

Movement of screen by point convergence adjustment

OSD display

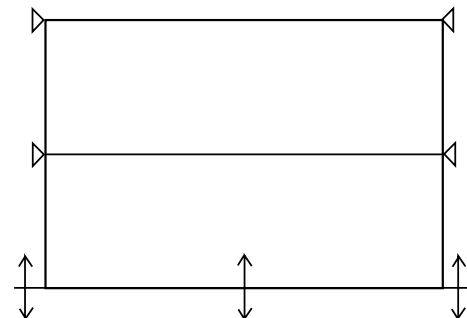
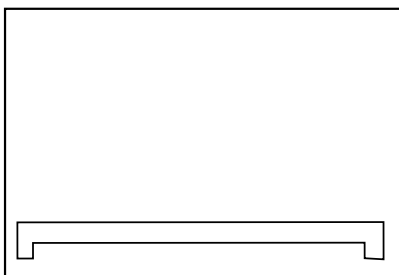
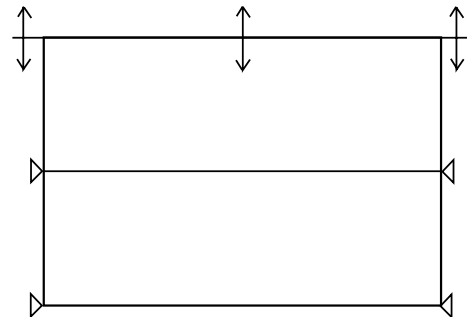
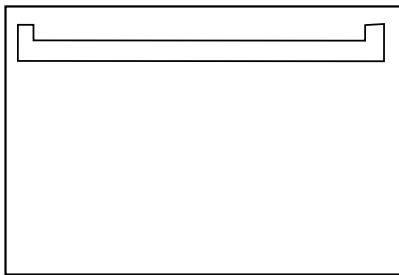
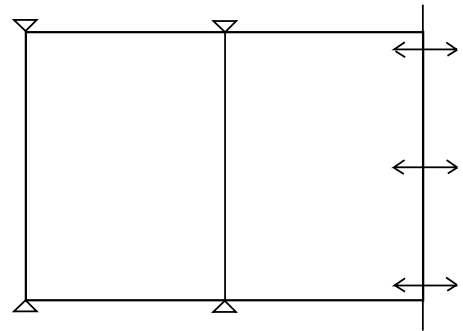
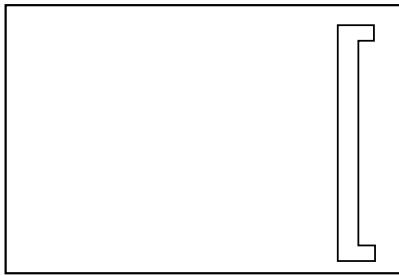


Movement of screen

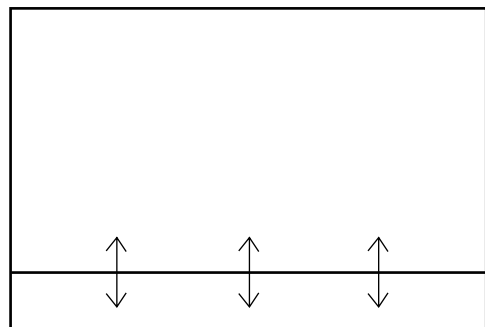
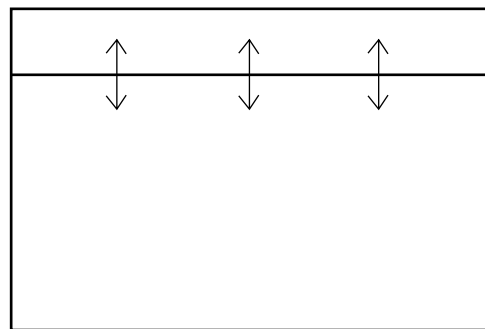
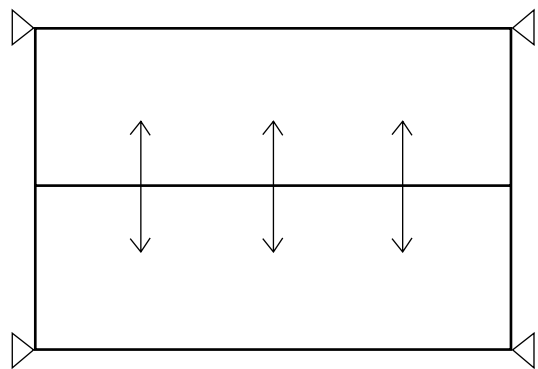
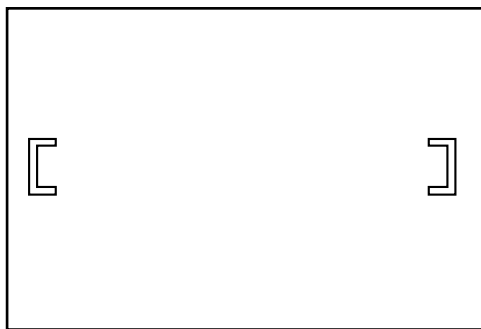
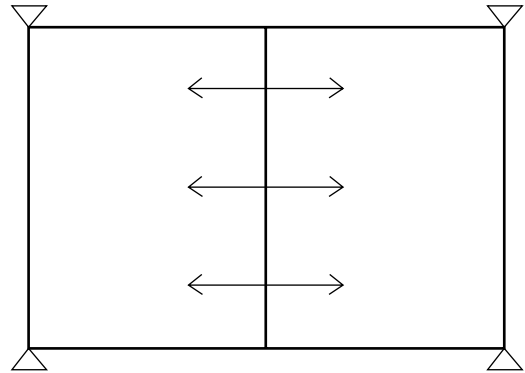
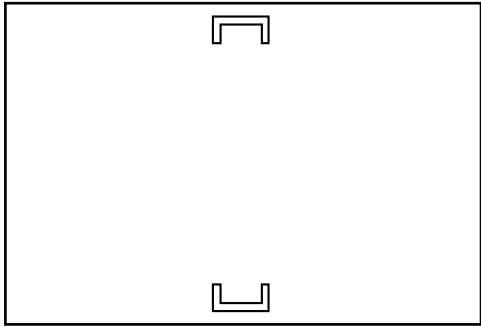


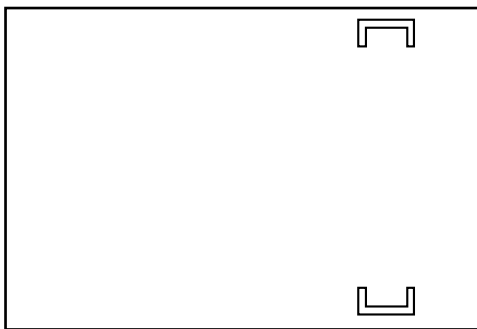
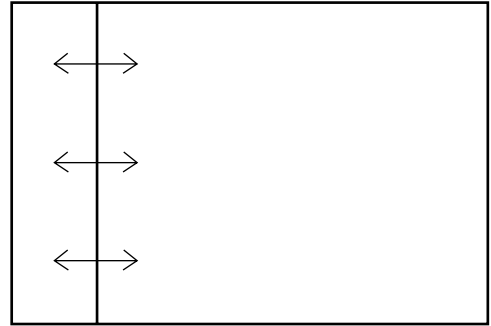
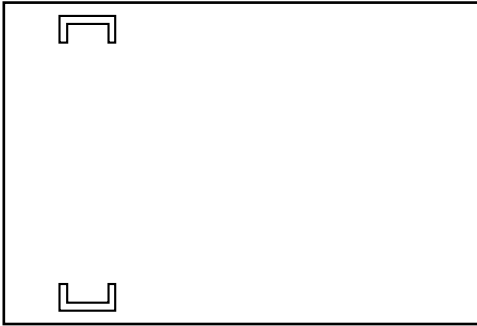
Use especially when adjusting the horizontal size of the left side of the screen.

In addition, there are nine other area adjustments. It is a convenience to adjust deviation of circumference screens.



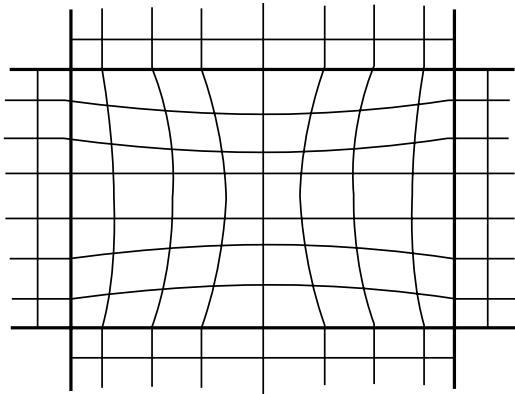
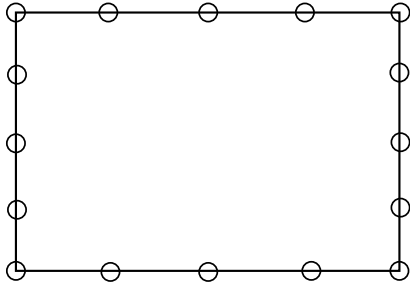
ADJUSTMENTS



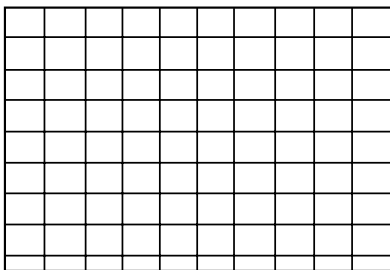


ADJUSTMENTS

In adjustment step 5, observe the external part of the screen, adjust the 16 adjusting points there, taking note of linearity in the peripheral area such as joining with other screens, crosshatch, etc. (Ignore the distortion inside the screen.)



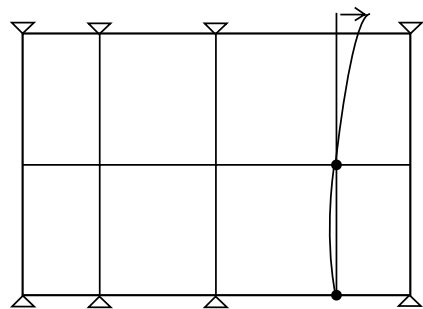
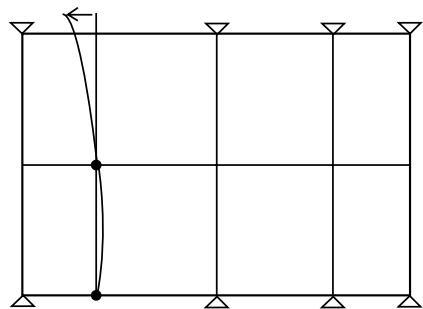
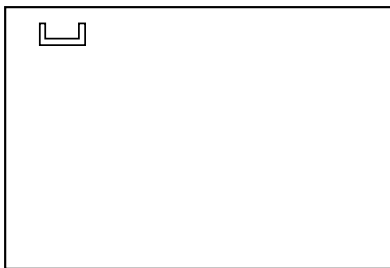
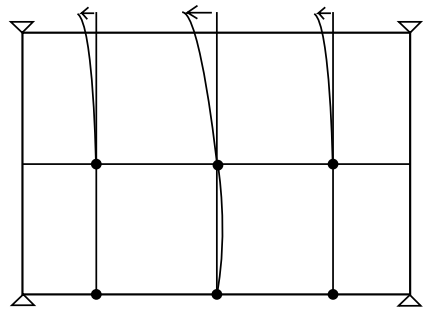
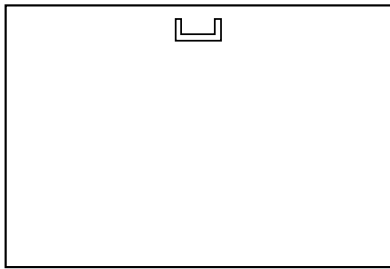
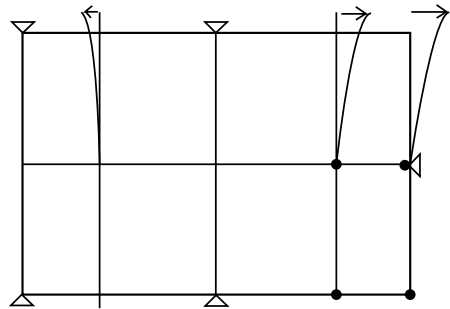
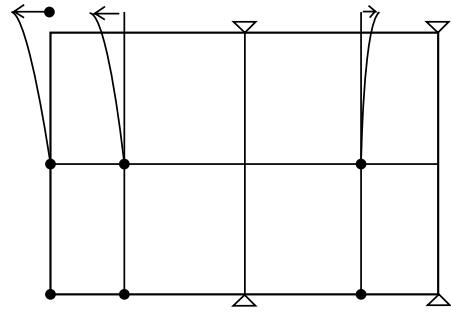
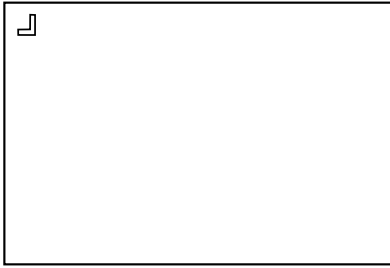
In adjustment step 6, adjust the inside of the screen and produce linearity.

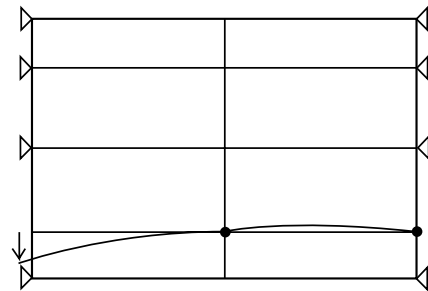
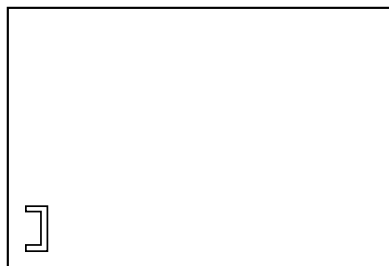
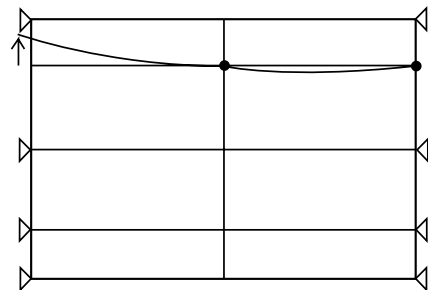
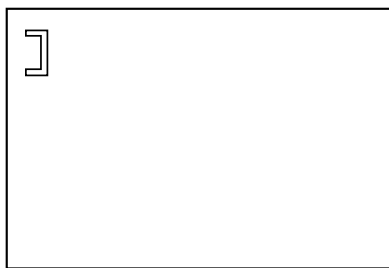
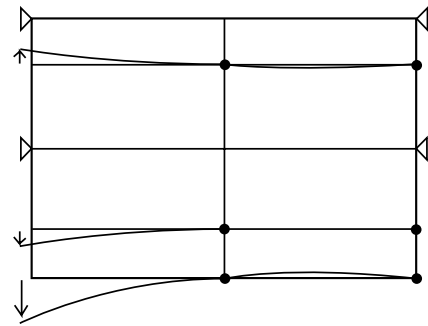
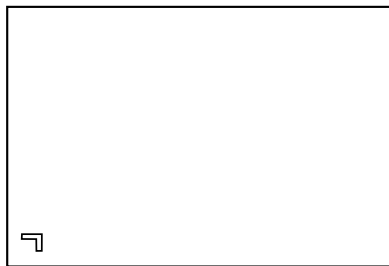
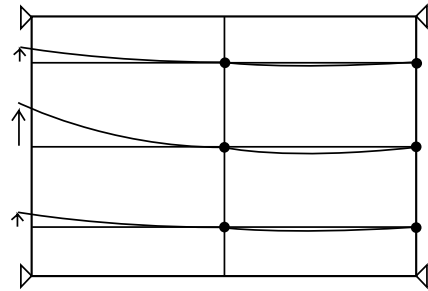
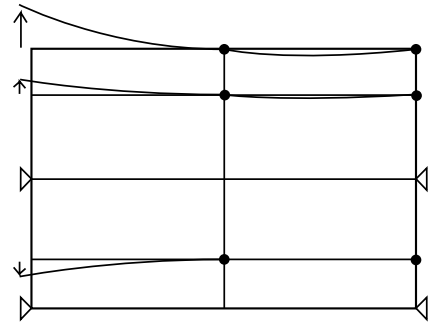
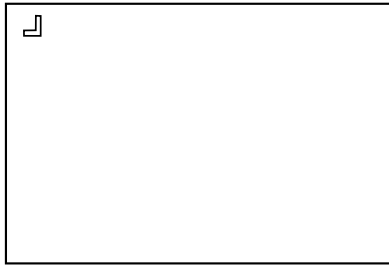


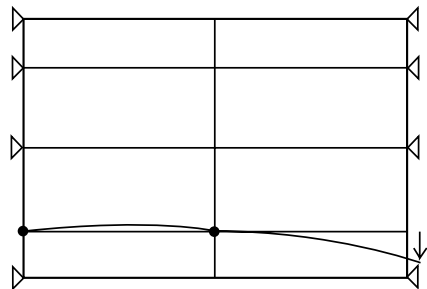
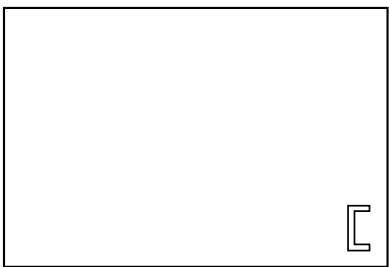
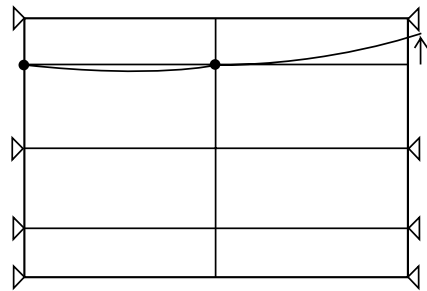
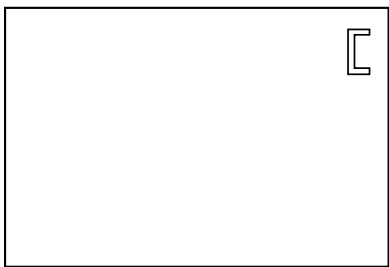
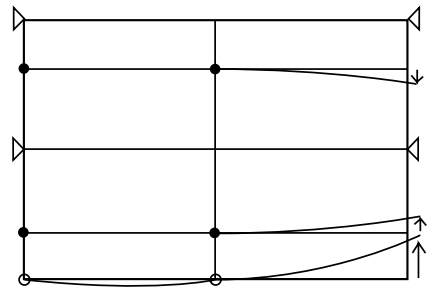
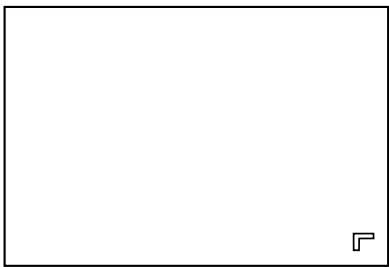
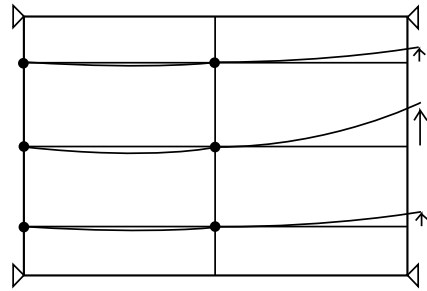
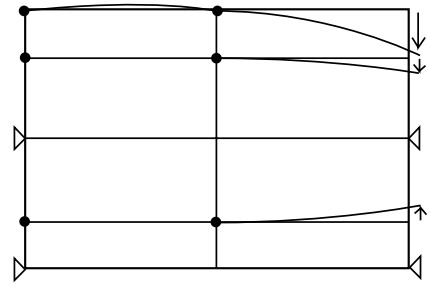
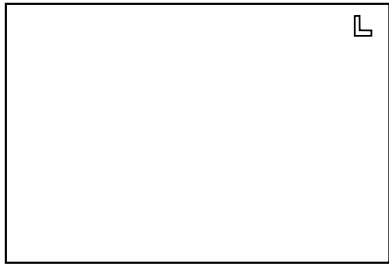
The following are examples of adjusting points in point convergence adjustments and their movements on the screen.

Displayed OSD

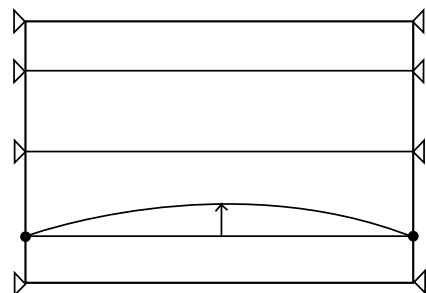
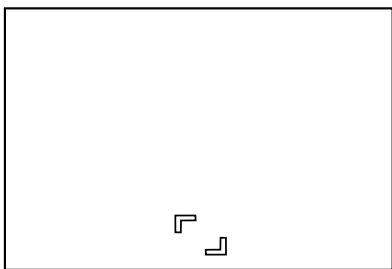
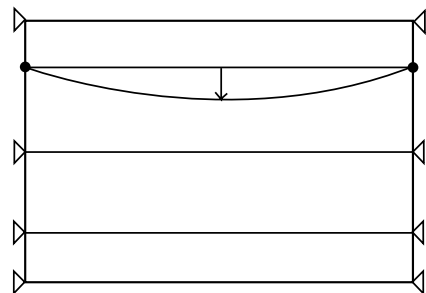
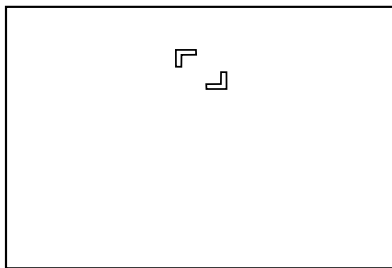
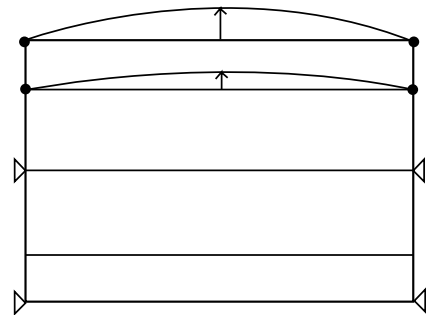
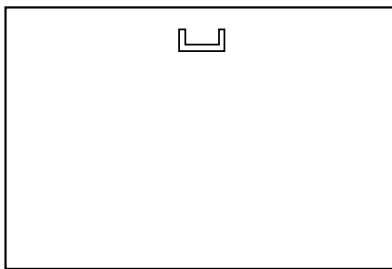
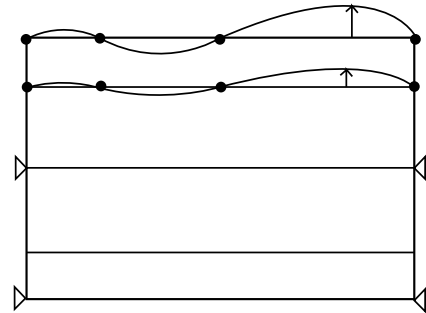
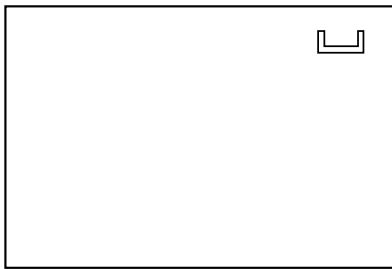
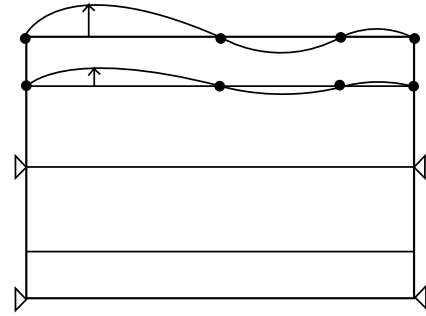
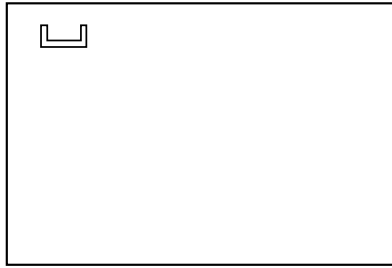
Movement on screen

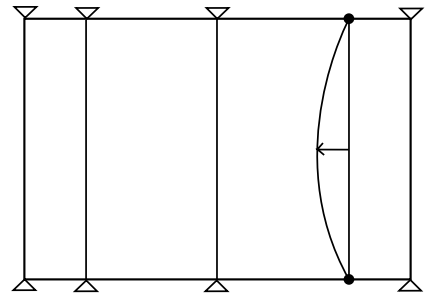
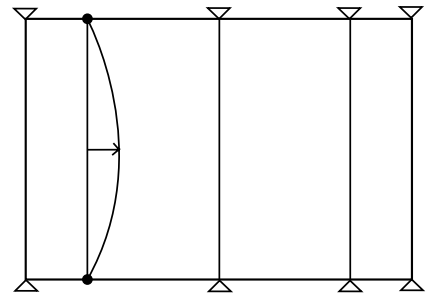
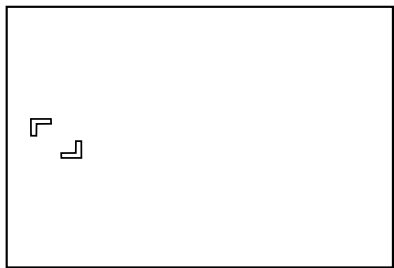
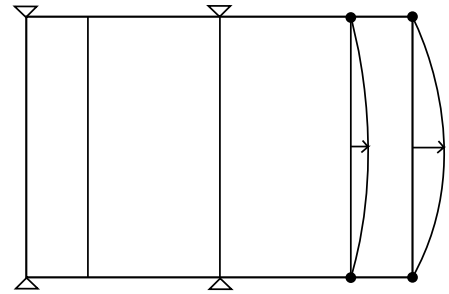
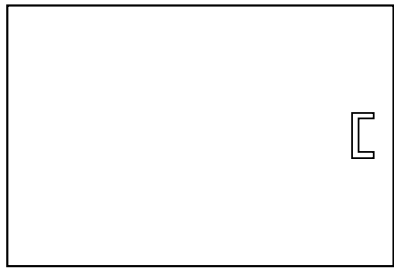
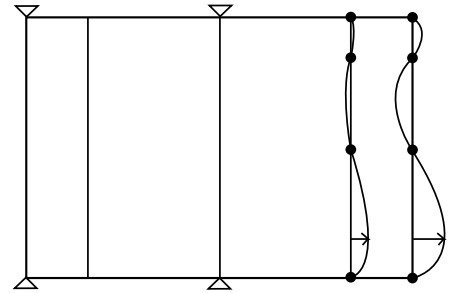
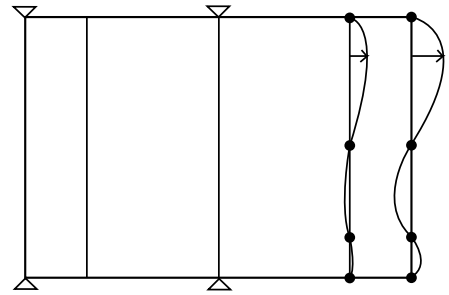
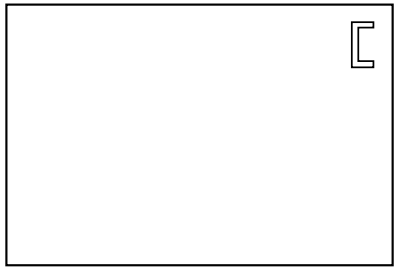






ADJUSTMENTS

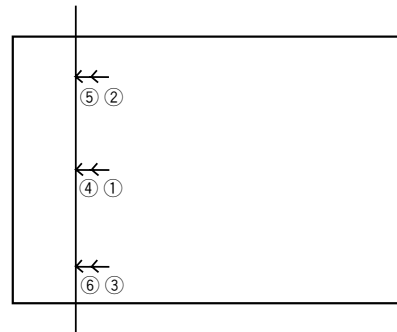
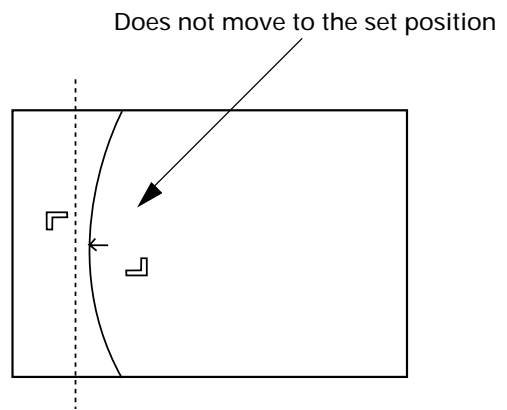




ADJUSTMENTS

Note

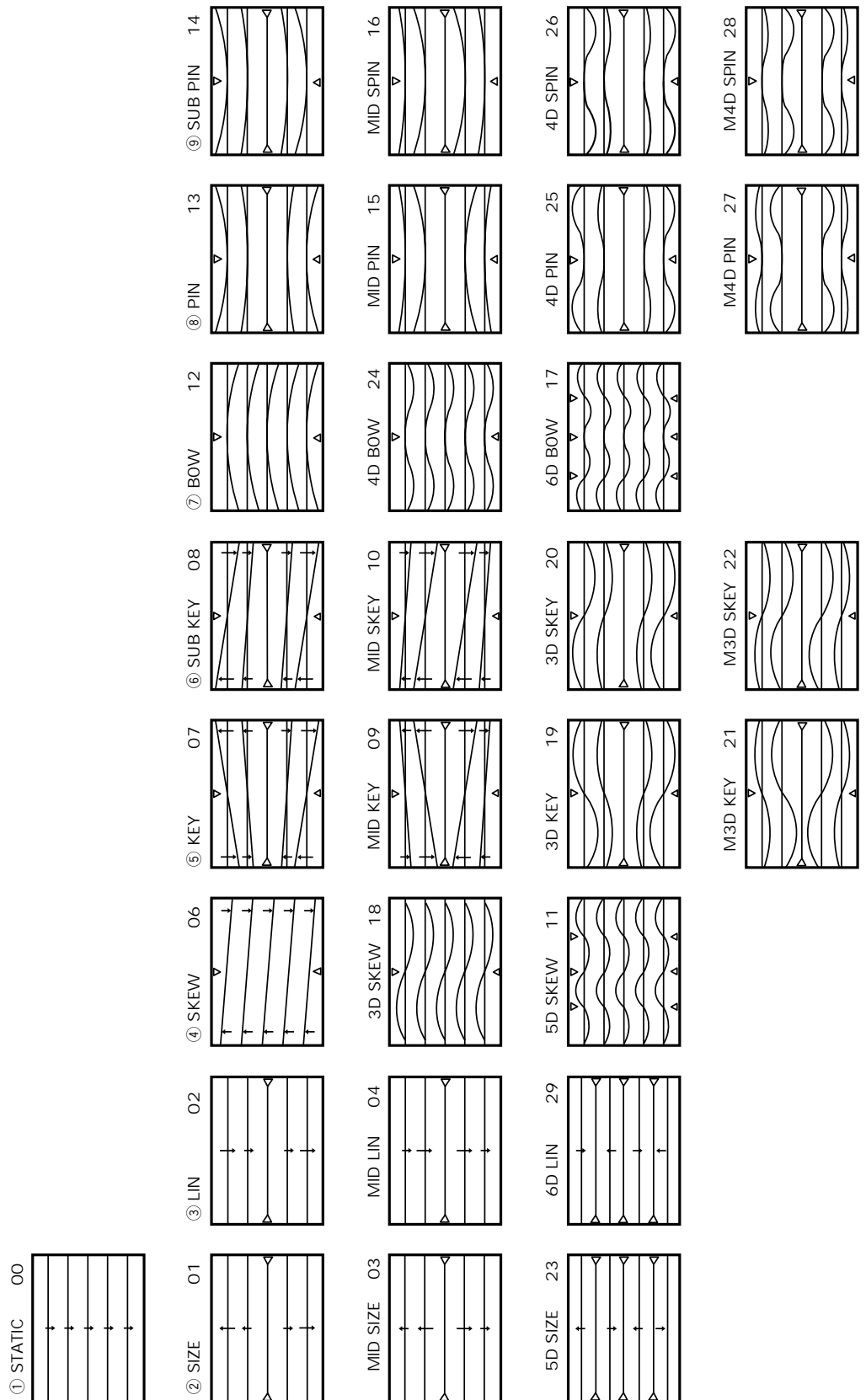
If only one point is moved greatly in the point convergence mode, it may not move in areas smaller than the desired adjusting area. In this case, adjust while moving the other points slowly.



5' Dynamic convergence

In addition to the point convergence mode, conventional convergence adjustments can also be performed.

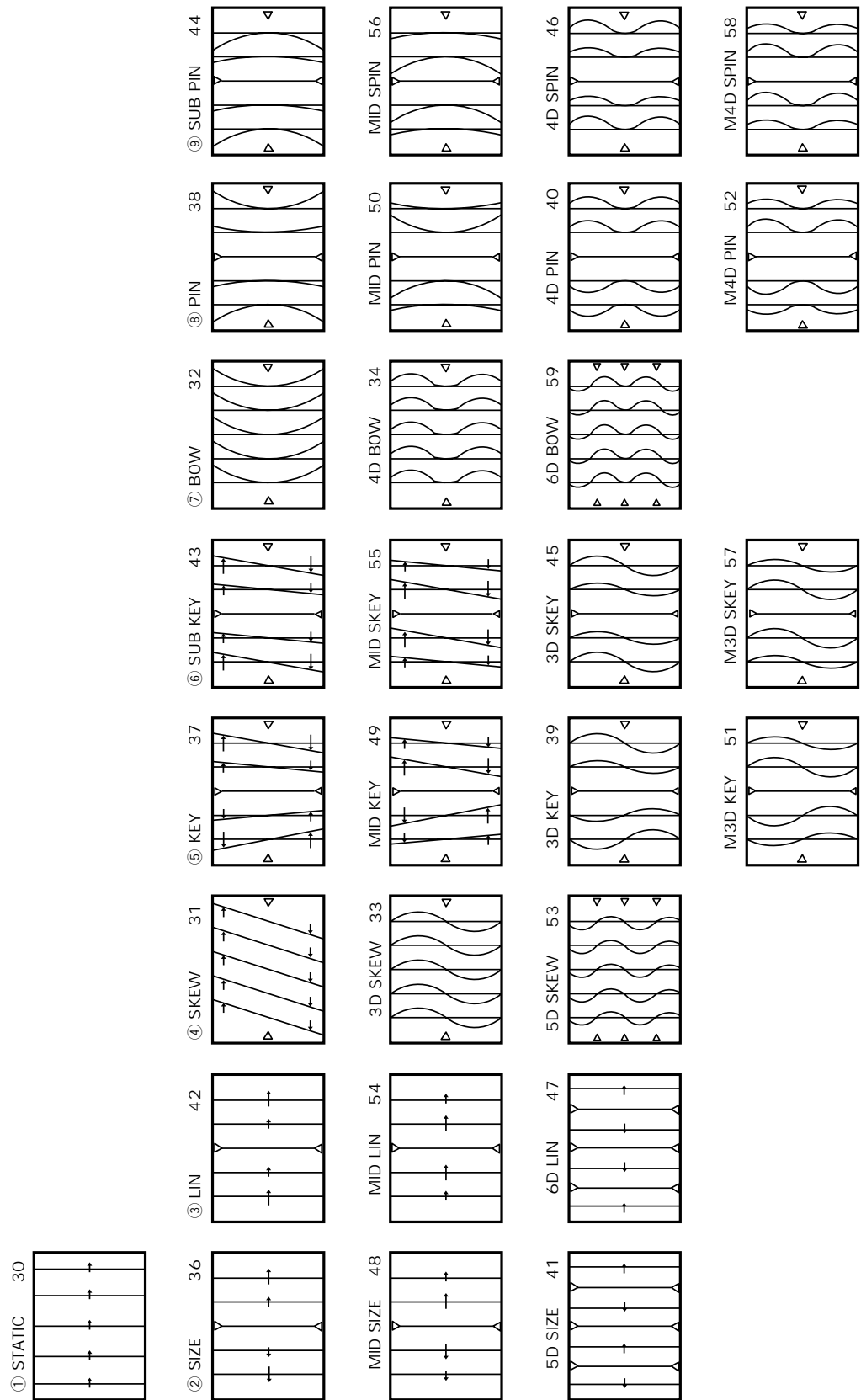
V • Convergence adjustment



ADJUSTMENTS

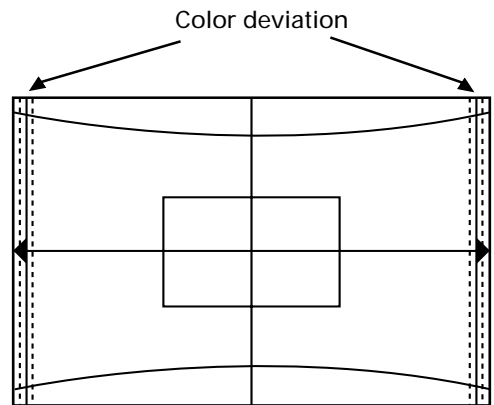
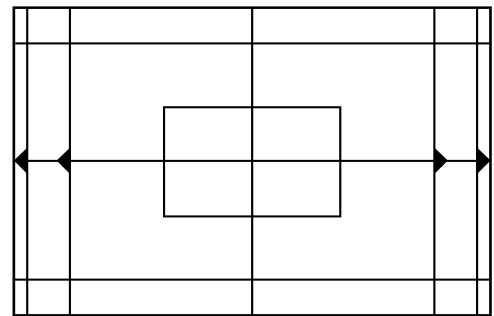
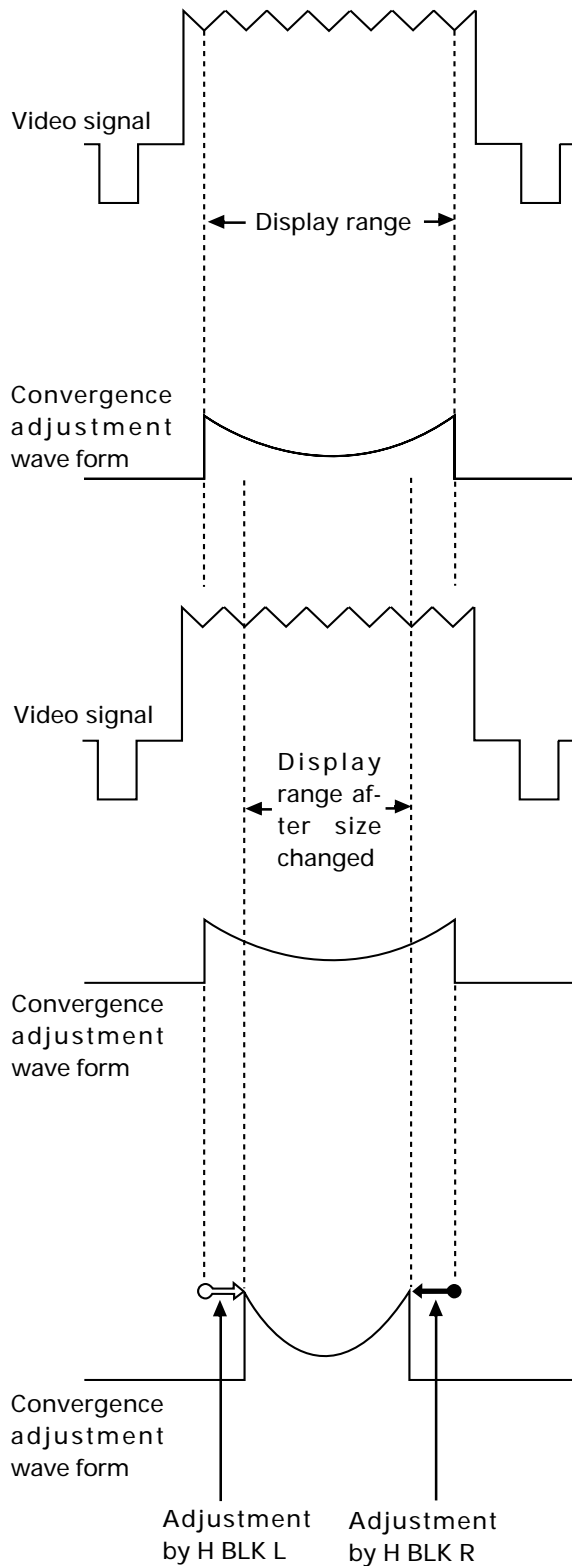
5' Dynamic convergence

H • Convergence adjustment



8 H BLK L and H BLK R adjustments

H BLK L and H BLK R adjustments are performed to obtain the optimum convergence adjustment wave form when the display range changes due to changes in the H SIZE.



When size is increased with H BLK L and H BLK R not adjusted.

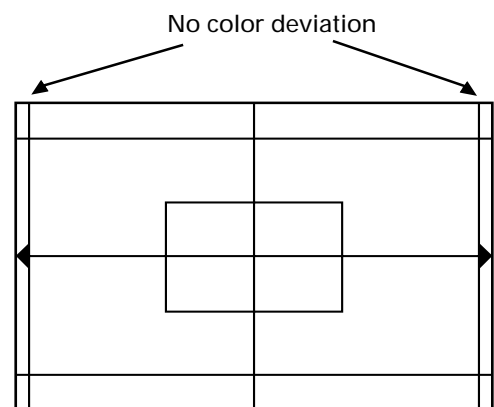
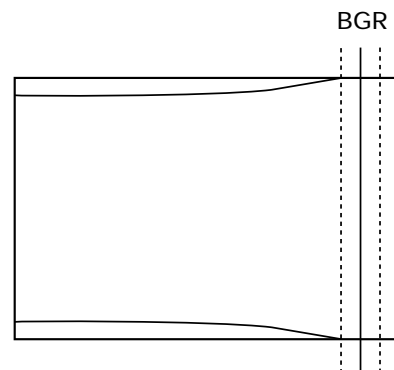
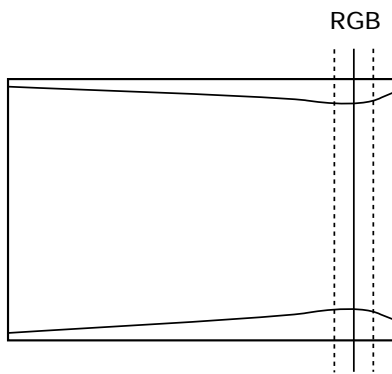
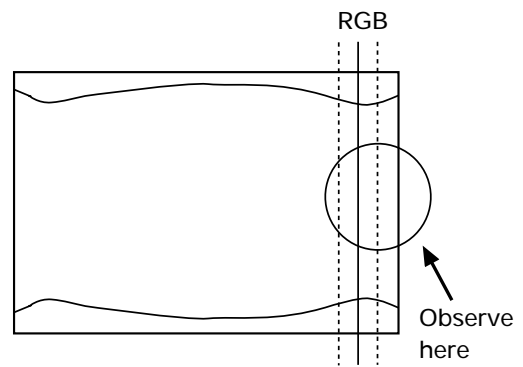


Image after H BLK L and H BLK R has been adjusted.

ADJUSTMENTS

H BLK R adjustment

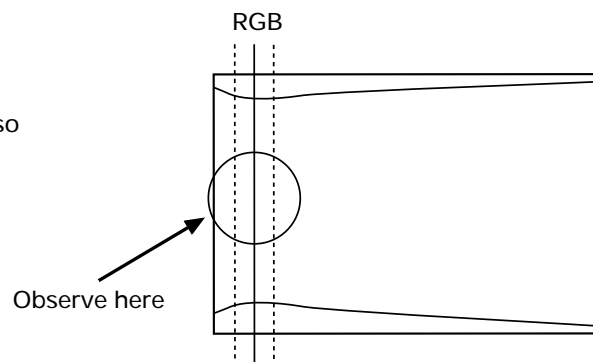
Output all three colors R, G, B, observe the **right side of the screen**, and adjust with **H BLK R** so that the color stops deviating.



When **H BLK R** adjustment is not properly performed

H BLK L adjustment

Output all three colors R, G, B, observe the **left side of the screen**, and adjust with **H BLK L** so that the color stops deviating.

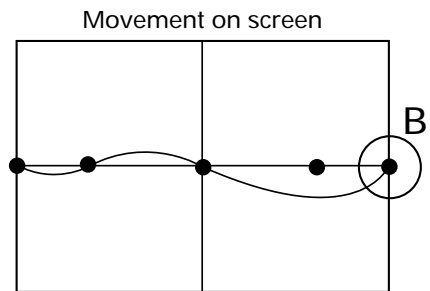
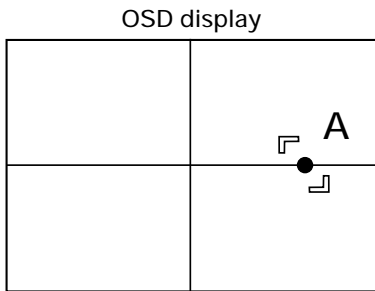


Note

There are points at which the screen does not move even through the **H BLK L** value changes. This is not a malfunction.

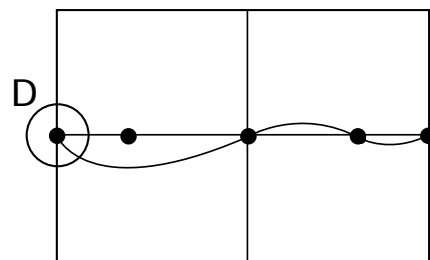
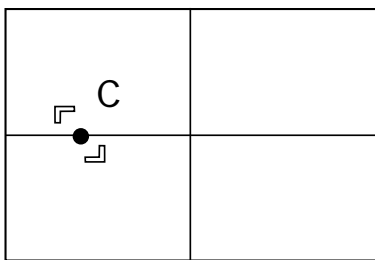
Confirming the optimum H BLK L, H BLK R values

Optimum H BLK R value



When point A is lowered by point convergence, point B should not move.

Confirming the Optimum H BLK L Value



When point C is lowered by point convergence, point D should not move.

(Note)

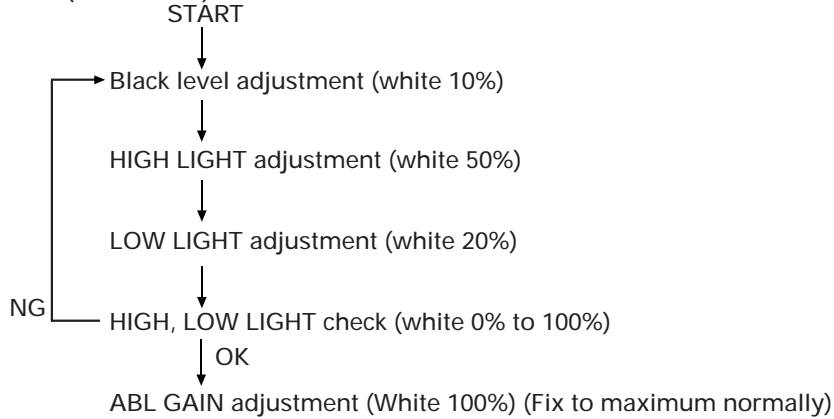
Convergence can be adjusted even if the optimum values are slightly different from the above optimum values during adjustments.

But, if the screen changes markedly, re-adjust H BLK L or H BLK R, and adjust the convergence.

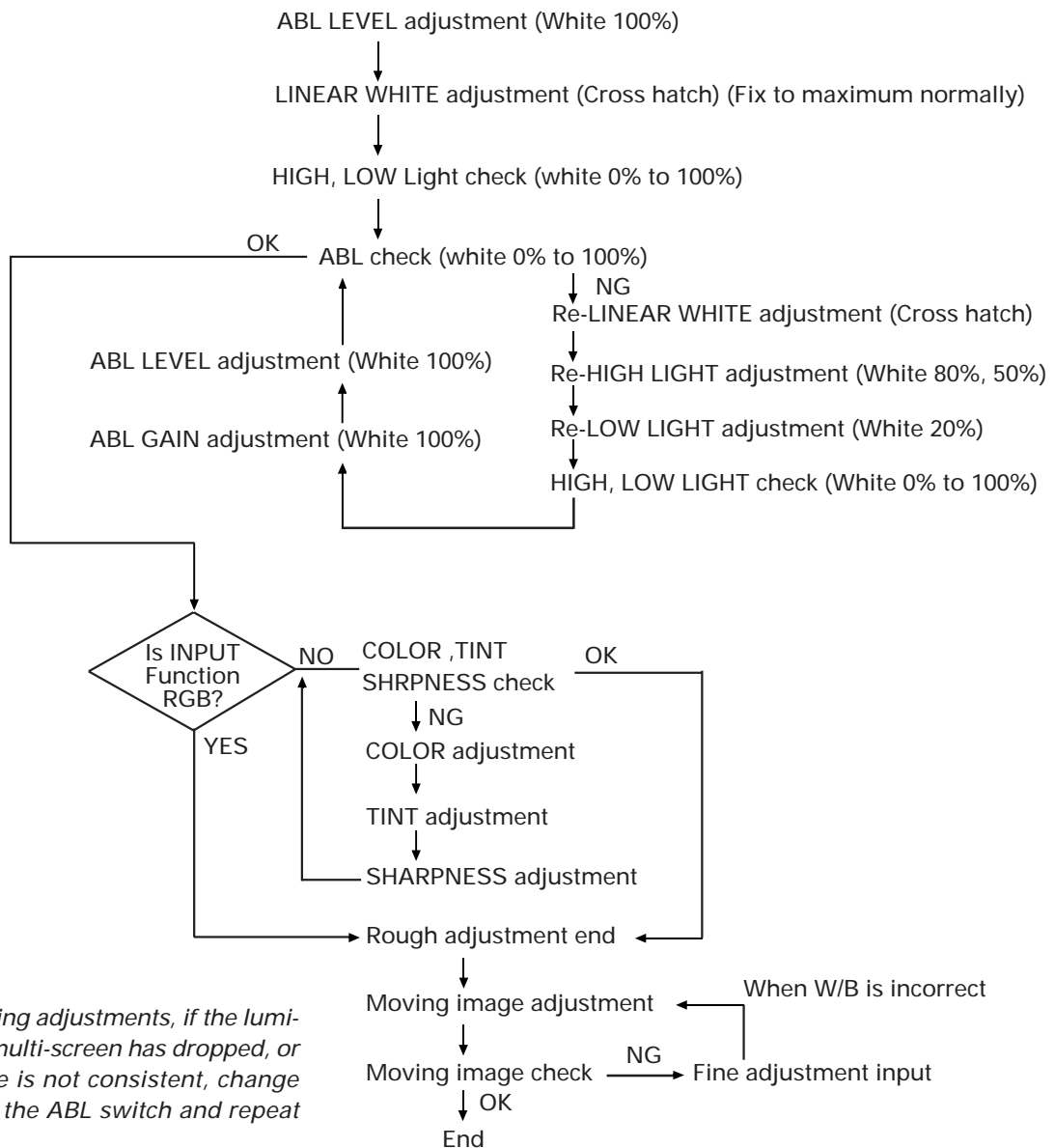
(4) White balance adjustment flowchart

- When adjusting the multi projection unit Initial setting
Multi on
ABL switching setting (Refer to page 99 (5) White balance adjustment)

① White balance adjustment (COMBI OFF)



② ABL link and LINEAR WHITE flesh color adjustment (COMBI ON)



(Note)
After completing adjustments, if the luminance of the multi-screen has dropped, or the luminance is not consistent, change the setting of the ABL switch and repeat from step ② .

(5) White balance adjustment

① Before adjusting white balance

Adjusting the white balance means to adjust the color tone. This adjustment is necessary for the screen to become white when the white signal is input, and black when the black signal is input. In the actual adjustment, the bias and gain of the CRTs for the three colors (R, G, and B) are adjusted so that the screen becomes the same color tone.

Before performing the white balance adjustment, complete the convergence adjustment first. If not performed properly especially where the screens join each other, the colors of the screens may not join. When performing the adjustment, take into account the position and height of the sets, height of the eyes of those viewing the screens, and distance to the screens. There are two types of screen white balance data-video, Y/C input and RGB input. The data is switched when the screens are switched. For RGB input, COLOR, TINT*, and SHARPNESS cannot be adjusted. When the ABL is OFF, ABL LEVEL cannot be adjusted.

(Note) * In the PAL signal, TINT cannot be adjusted even in the video or Y/C input .

② ABL switch setting

In ABL setting, when the luminance of units completely match the unit which ABL voltage is controlled the most and luminance is lowest, the luminance of the whole multi-screen becomes low.

The ABL switch is able to switch the amount of ABL control voltage when ABL is on.

This switch has three modes-ABL1, ABL2, and ABL3.

	ABL1	ABL2	ABL3
Amount of voltage of other units adjusted to the unit whose ABL voltage is controlled the most	Small	←————→	Much
Luminance inconsistency on multi-screen	Much	←————→	Small
Luminance of whole multi-screen	High	←————→	Low

◎Recommended Usage of Modes

ABL1	ABL2	ABL3
When importance is placed on luminance level of whole multi-screen rather than consistency of luminance of multi-screen (Outdoor, large amount of multi-screens, etc.)	←————→	When importance is placed on consistency of luminance of multi-screen rather than luminance level of whole multi-screen (No gap, small amount of multi-screens, etc.)

At shipment, the ABL switch will be set to ABL3.

ADJUSTMENTS

③ Adjustment flow

- [1] Perform the adjustment using the full white (variable by %) signal generator.
- [2] Perform the COLOR, TINT, and SHARPNESS adjustments.
- [3] Note down or memorize in the PC memory the data after the rough adjustment.
- [4] Check the joining of the screens using the animated images.
- [5] If the screens are not joined properly, adjust. (Check with animated images.)
- [6] If not joined properly, return to the data in (2) and perform the adjustment again.

④ Initial settings

CONTRAST	128
BRIGHTNESS	128
ABL GAIN	MAX (255)
ABL LEVEL	128
LINEAR WHITE	MAX (255)

R,G,B,HIGH LIGHT
R,G,B,LOW LIGHT
*SHARPNESS
*TINT
*COLOR

Data at shipment

* Must be set only for VIDEO and Y/C input.
TINT adjustment cannot be performed for PAL inputs

- CONTRAST, ABL LEVEL, ABL GAIN adjustment values considerably affect the ABL operation.
Fix the initial value for ordinary use.
- Perform the W/B adjustment in the order of R/G/B HIGH LIGHT and R/G/B LOW LIGHT. (Fix the CONTRAST and BRIGHTNESS.)
Change the HIGH LIGHT luminance using G HIGH LIGHT and the LOW LIGHT luminance using G LOW LIGHT.
- Basically, fix the CONTRAST level to 128, if the ABL function feature well.

⑤ Rough adjustments

(1) Black level adjustment

Signal:White 10%

Adjust R LOW, G LOW, and B LOW to the point where the CRT starts lighting up.

(2) HI LIGHT adjustment

Signal:White 50%

Adjust R HI, G HI, and B HI so that the CRT becomes white. First, adjust so that the brightness of R, G, and B becomes the same, and while maintaining that brightness, balance R, G, and B, and adjust so that the CRT becomes white.

(3) LOW LIGHT adjustment

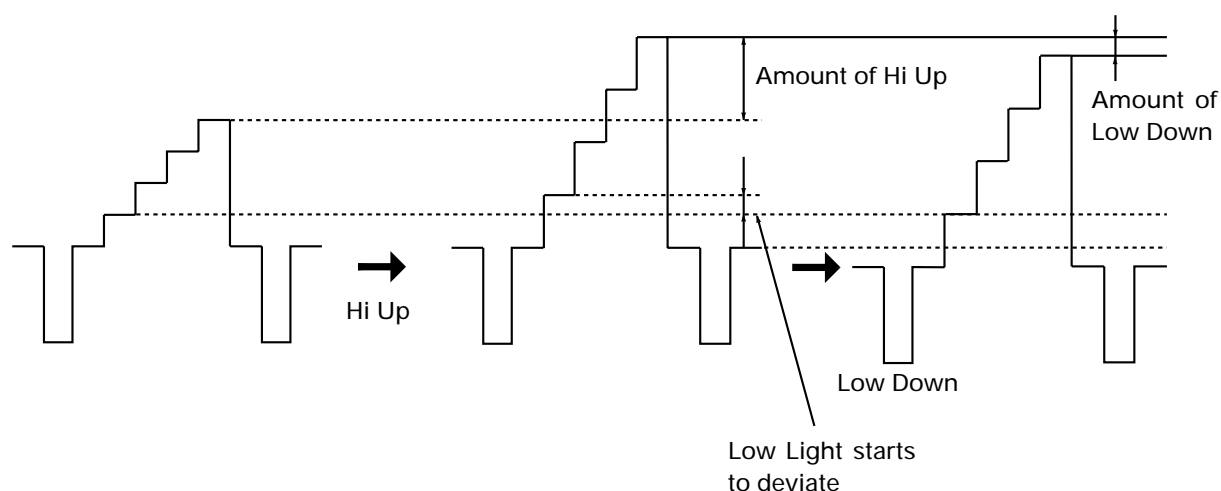
Signal:White 20%

Adjust R LOW, G LOW, and B LOW so that the CRT becomes gray.

(4) Convergence adjustment

Signal:White 50%, 20%

Repeat (2) to (3) and converge the light. If the HI LIGHT of R, G, and B is moved, their LOW LIGHT will change greatly. Therefore, pay special attention to the value of the LOW LIGHT.

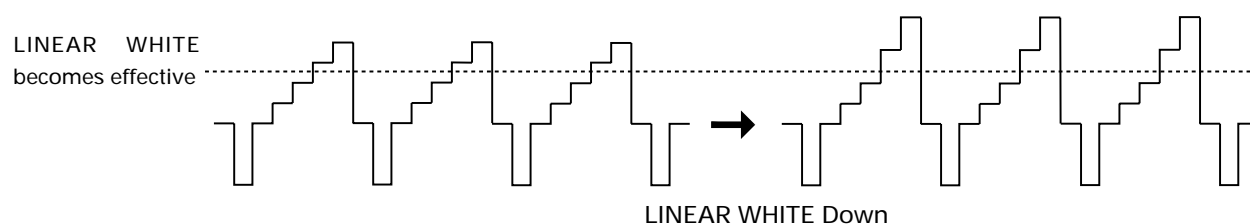


⑥ LINEAR WHITE adjustment

When white peak signals such as WINDOW are input, due to the characteristics of the Blue CRT, there is a tendency for the peak to become yellow compared to other colors. The linear white adjustment is performed to correct this tendency.

Blue becomes weak when data is set to UP and strong when set to DOWN. If Linear White is added excessively, the ABL voltage becomes unbalanced and the medium luminance of blue may be erased, etc.

Also make sure that the blue is not blur when MULTI ON is set because the top left and bottom left of the screen are affected first.



⑦ **ABL GAIN adjustment (White 100%)**

The ABL GAIN adjustment adjusts the white 100% luminance of a unit to other units after low luminance and medium luminance have been adjusted.

Normally, when white 100% is input, ABL is imposed and the current is controlled so that the current flowing in the CRT does not exceed a certain level. Even if the current flowing in the CRT of each unit is the same, the difference in the characteristics of each CRT will cause their luminance to become inconsistent. The ABL GAIN adjustment converges this inconsistency. It adjusts the ABL current flowing virtually.

In white 100% inputs, as the ABL works efficiently, the luminance drops, when the ABL GAIN of a unit with high luminance is decreased, use this adjustment to adjust its luminance to the other units.

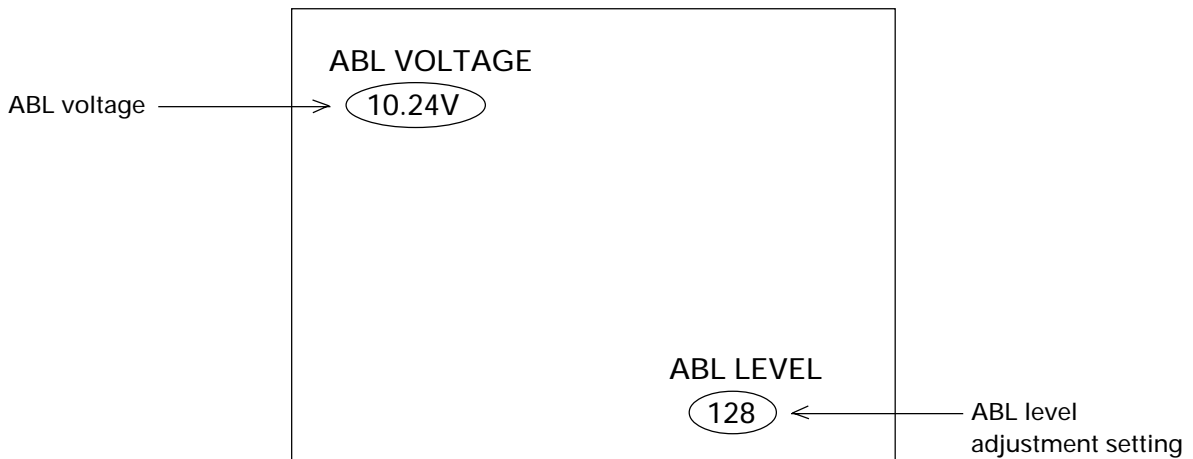
Turn off the ABL in the adjustment.

Normally set the ABL GAIN to maximum.

⑧ **ABL level adjustment (white 100%)**

The ABL level adjustment is used to suppress the differences in the ABL control voltage of the different MPJs when ABL linking is on.

- [1] Check that all the linking cables for the MPJ system to be adjusted are connected.
- [2] Input 100% white pictures to all screens.
- [3] Set all the MPJs to "COMBI (ABL linking) ON".
- [4] Set all the ABL level adjustment settings to 128.
- [5] Check all the ABL voltages. (The ABL voltage is displayed when ABL LEVEL is selected.)
- [6] Select the MPJ with the highest voltage and try adjusting the ABL level to the voltage of the MPJ with the lowest voltage.
- [7] If [6] is possible, select the voltage of the MPJ with the lowest voltage as the system's ABL voltage, and adjust the other MPJs to that voltage.
If [6] is not possible, select the voltage when the ABL level of the MPJ with the highest voltage is set to "MIN" as the system's ABL voltage, and adjust the ABL level of the other MPJs to that voltage.
- [8] Switch between "COMBI ON" and "COMBI OFF" while changing the white balance between 0 and 100% (for both the system and the individual MPJs) and check to make sure that the ABL effect is not unnatural.



⑨ Adjustment using moving images

The adjustment using images adjusts the overall joining of the screens by loading discs used by users (for actual performance) and discs always used for adjustments. View the overall screen and adjust the screen with the greatest difference to the other screens. The specific method is; at first, focus on the brightness, make the brightness the same, and correct the differences in R, G, and B. Pay the attention that changing the HI LIGHT value affects the balance of the LOW LIGHT considerably. Strictly speaking, as W/B deviation cannot be checked using moving images and W/B cannot be corrected just by performing fine adjustments, check using rough adjustments.

If the DEMONSTRATION-II LD can be used, correct the following points.

[1] Dark images (Almost black image:FRAME No. 32300 to 33200)

Check that the brightness of the screens appears the same.

Check that black is not blur or emphasized.

[2] Bright images (Almost white image:FRAME NO. 7400 to 8100)

Focus on where the brightness is the same, especially the white peak, and check in the same way as for dark images in [1].

[3] Skin color images (FRAME NO. 26900)

Check if the skin color of a face image is the same as in the other screens.

[4] Colored images (FRAME NO.19100)

Use when performing adjustments during VIDEO input or Y/C input. Adjust so that the colors of vegetables, fruits, etc. are of the same brightness and same depth.

If consistency cannot be adjusted with animated images, re-input the rough adjustment data and re-adjust.

- * View the moving images. If a screen is darker than the others due to excessive ABL, increase the contrast and decrease the R, G, B High Light so that ABL is suppressed.

[5] White peak images (FRAME NO.08272)

Readjust the Linear White adjustment, if the whiteness on the white peak screen differed on each screen.

⑩ Confirm the moving images

View the moving images. If W/B is incorrect, set to rough adjustment. If the luminance of the multi-screen is dark or inconsistent, set the ABL switch.

⑪ Precautions

1 Avoid adjusting with images with high tube reflection (FRAME NO. 13590)

If only one spot is bright in a very dark image, the screen will look bright due to the spot.

2 Precautions on screen hue

If the hue of the screens is green or yellow, images will not be displayed clearly. The white parts of bright images especially will appear yellow. These images can be made clear by adjusting so that they appear slightly bluish.

However, if made bluish excessively, brightness may appear insufficient due to the CRT characteristics.

3 Color adjustment (White balance)

(a) Effects of brightness

- Take note of dark images which have some high luminance parts.
- The reflected light overlap with surrounding dark parts at the face of the CRT and surface of projection lens, and luminance and hue become different from the adjoining screen.

(b) Differences caused by visual points

- Although the joined parts of multiple screens are improved by peripheral light amount correction, the image may not be natural at some points. (Adjustment of vertical direction using the installation table)
- Due to the layout of the red, green, and blue CRTs, when the screens are viewed diagonally, they may appear reddish or bluish (Color shift).
- For multiple screens, as the angles of the left and right screens are different to a viewer, they may appear to have different colors.
- Before adjustments, check the user's visual point, and adjust at that point.

(c)

- Because the white balance is adjusted using high light (drive) and low light (cutoff), the red, green, and blue may not be balanced at the mid-range of luminance. In this case, adjust R, G, B, LOW LIGHT or R, G, B, HIGH LIGHT at the mid-range, and make the balance of these colors consistent from low luminance to high luminance.

(6) External control by MPJ RS-232C

As MPJ is equipped with a RS-232C port, various controls and, white balance and convergence adjustments can be performed by an external computer.

By programming software ,it is possible not only to adjust White Balance,Convergence but to save and control the adjustment data of each source.

① Interface

[1] Connector

D-sub 25-pin

[2] Pin assignment

PIN No.	Symbo;	Signal Name
1	FG	Frame Ground
2	RXD	Received Data
3	TXD	Transmitted Data
5	CTS	Clear To Send
7	GND	Signal Ground

[3] Baud rate

4800 bps (1200, 2400, 9600, 19200 bps can also be selected)

[4] Data format

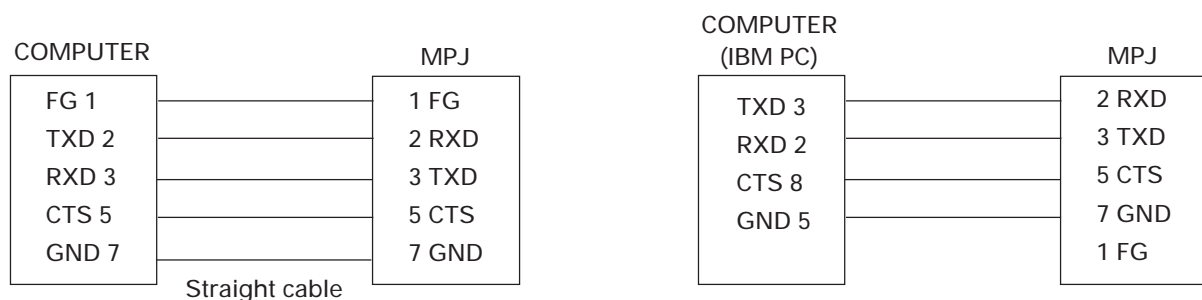
Start:1-bit

Data:8-bit

Parity:0 (No parity)

Stop:1-bit

[5] Connection

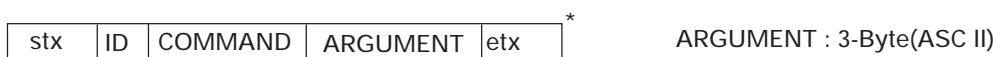


[6] Protocol

MPJ from computer

ID : 2-Byte(ASC II)COMMAND : 3-Byte(ASC II)

stx=02h etx=03h



(Note)

When performing external control of the MVP using RS-232C, connect a RS-232C cable to the rear panel of the MVP, and refer to the steps in "Chapter 7. (page 141) Connection with MVP external computer" and onwards.

ADJUSTMENTS

② RS-232C commands table

	Com-mand	Name	Normal Valid	Number Direct	UP/DW Command	Function
A	ABL	ABL LEVEL	X	○	○	ABL operation link level adjustment (Note 1)
	AJN	ADJUST NO	X	X	X	Adjustment mode exit
	AJY	ADJUST YES	○	X	X	Adjustment mode start-up
	AOF	ALL OFF	○	X	X	R,G,B all color off
	AON	ALL ON	○	X	X	R,G,B all color on
	ABG	ABL GAIN	X	○	○	ABL gain adjustment
B	B00	BLUE 00	X	○	○	Adjusts BV STATIC
	B01	BLUE 01	X	○	○	Adjusts BV SIZE
	B02	BLUE 02	X	○	○	Adjusts BV LINEARITY
	B03	BLUE 03	X	○	○	Adjusts MID SIZE
	B04	BLUE 04	X	○	○	Adjusts MID LIN
	B06	BLUE 06	X	○	○	Adjusts BV SKEW
	B07	BLUE 07	X	○	○	Adjusts BV KEY
	B08	BLUE 08	X	○	○	Adjusts BV SUB KEY
	B09	BLUE 09	X	○	○	Adjusts BV MID KEY
	B10	BLUE 10	X	○	○	Adjusts BV MID S-KEY
	B11	BLUE 11	X	○	○	Adjusts BV 5D SKEW
	B12	BLUE 12	X	○	○	Adjusts BV BOW
	B13	BLUE 13	X	○	○	Adjusts BV PIN
	B14	BLUE 14	X	○	○	Adjusts BV SUB PIN
	B15	BLUE 15	X	○	○	Adjusts BV MID PIN
	B16	BLUE 16	X	○	○	Adjusts BV MID S-PIN
	B17	BLUE 17	X	○	○	Adjusts BV 6D BOW
	B18	BLUE 18	X	○	○	Adjusts BV 3D SKEW
	B19	BLUE 19	X	○	○	Adjusts BV 3D KEY
	B20	BLUE 20	X	○	○	Adjusts BV 3D SUB KEY
	B21	BLUE 21	X	○	○	Adjusts BV MID 3D KEY
	B22	BLUE 22	X	○	○	Adjusts BV MID 3D S-KEY
	B23	BLUE 23	X	○	○	Adjusts BV 5D SIZE
	B24	BLUE 24	X	○	○	Adjusts BV 4D BOW
	B25	BLUE 25	X	○	○	Adjusts BV 4D PIN
	B26	BLUE 26	X	○	○	Adjusts BV 4D SUB PIN
	B27	BLUE 27	X	○	○	Adjusts BV MID 4D PIN
	B28	BLUE 28	X	○	○	Adjusts BV MID 4D S-PIN
	B29	BLUE 29	X	○	○	Adjusts BV 6D LIN
	B30	BLUE 30	X	○	○	Adjusts BH STATIC
	B31	BLUE 31	X	○	○	Adjusts BH SKEW
	B32	BLUE 32	X	○	○	Adjusts BH BOW
	B33	BLUE 33	X	○	○	Adjusts BH 3D SKEW
	B34	BLUE 34	X	○	○	Adjusts BH 4D BOW
	B36	BLUE 36	X	○	○	Adjusts BH SIZE
	B37	BLUE 37	X	○	○	Adjusts BH KEY
	B38	BLUE 38	X	○	○	Adjusts BH PIN

ADJUSTMENTS

Com-mand	Name	Normal Valid	Number Direct	UP/DW Command	Function
B39	BLUE 39	X	○	○	Adjusts BH 3D KEY
B40	BLUE 40	X	○	○	Adjusts BH 4D PIN
B41	BLUE 41	X	○	○	Adjusts BH 5D SIZE
B42	BLUE 42	X	○	○	Adjusts BH LINEARITY
B43	BLUE 43	X	○	○	Adjusts BH SUB KEY
B44	BLUE 44	X	○	○	Adjusts BH SUB PIN
B45	BLUE 45	X	○	○	Adjusts BH 3D S-KEY
B46	BLUE 46	X	○	○	Adjusts BH 4D S-PIN
B47	BLUE 47	X	○	○	Adjusts BH 6D LIN
B48	BLUE 48	X	○	○	Adjusts BH MID SIZE
B49	BLUE 49	X	○	○	Adjusts BH MID KEY
B50	BLUE 50	X	○	○	Adjusts BH MID PIN
B51	BLUE 51	X	○	○	Adjusts BH MID 3D KEY
B52	BLUE 52	X	○	○	Adjusts BH MID 4D PIN
B53	BLUE 53	X	○	○	Adjusts BH 5D SKEW
B54	BLUE 54	X	○	○	Adjusts BH MID LIN
B55	BLUE 55	X	○	○	Adjusts BH MID SUB KEY
B56	BLUE 56	X	○	○	Adjusts BH MID SUB PIN
B57	BLUE 57	X	○	○	Adjusts BH MID 3D S-KEY
B58	BLUE 58	X	○	○	Adjusts BH MID 4D S-PIN
B59	BLUE 59	X	○	○	Adjusts BH 6D BOW
B61	P-CONV. ADJ 61	X	X	(Note 2)	Adjusts BLUE point convergence
B62	P-CONV. ADJ 62	X	X	(Note 2)	Adjusts BLUE point convergence
B63	P-CONV. ADJ 63	X	X	(Note 2)	Adjusts BLUE point convergence
B64	P-CONV. ADJ 64	X	X	(Note 2)	Adjusts BLUE point convergence
B65	P-CONV. ADJ 65	X	X	(Note 2)	Adjusts BLUE point convergence
B71	P-CONV. ADJ 71	X	X	(Note 2)	Adjusts BLUE point convergence
B72	P-CONV. ADJ 72	X	X	(Note 2)	Adjusts BLUE point convergence
B73	P-CONV. ADJ 73	X	X	(Note 2)	Adjusts BLUE point convergence
B74	P-CONV. ADJ 74	X	X	(Note 2)	Adjusts BLUE point convergence
B75	P-CONV. ADJ 75	X	X	(Note 2)	Adjusts BLUE point convergence
B81	P-CONV. ADJ 81	X	X	(Note 2)	Adjusts BLUE point convergence
B82	P-CONV. ADJ 82	X	X	(Note 2)	Adjusts BLUE point convergence
B83	P-CONV. ADJ 83	X	X	(Note 2)	Adjusts BLUE point convergence
B84	P-CONV. ADJ 84	X	X	(Note 2)	Adjusts BLUE point convergence
B85	P-CONV. ADJ 85	X	X	(Note 2)	Adjusts BLUE point convergence
B91	P-CONV. ADJ 91	X	X	(Note 2)	Adjusts BLUE point convergence
B92	P-CONV. ADJ 92	X	X	(Note 2)	Adjusts BLUE point convergence
B93	P-CONV. ADJ 93	X	X	(Note 2)	Adjusts BLUE point convergence
B94	P-CONV. ADJ 94	X	X	(Note 2)	Adjusts BLUE point convergence
B95	P-CONV. ADJ 95	X	X	(Note 2)	Adjusts BLUE point convergence
BA1	P-CONV. ADJ A1	X	X	(Note 2)	Adjusts BLUE point convergence
BA2	P-CONV. ADJ A2	X	X	(Note 2)	Adjusts BLUE point convergence
BA3	P-CONV. ADJ A3	X	X	(Note 2)	Adjusts BLUE point convergence
BA4	P-CONV. ADJ A4	X	X	(Note 2)	Adjusts BLUE point convergence
BA5	P-CONV. ADJ A5	X	X	(Note 2)	Adjusts BLUE point convergence
BP1	P-CONV. ADJ P1	X	X	(Note 2)	Adjusts BLUE point convergence

ADJUSTMENTS

	Com-mand	Name	Normal Valid	Number Direct	UP/DW Command	Function
B	BP2	P-CONV. ADJ P2	X	X	(Note 2)	Adjusts BLUE point convergence
	BP3	P-CONV. ADJ P3	X	X	(Note 2)	Adjusts BLUE point convergence
	BP4	P-CONV. ADJ P4	X	X	(Note 2)	Adjusts BLUE point convergence
	BP5	P-CONV. ADJ P5	X	X	(Note 2)	Adjusts BLUE point convergence
	BP6	P-CONV. ADJ P6	X	X	(Note 2)	Adjusts BLUE point convergence
	BP7	P-CONV. ADJ P7	X	X	(Note 2)	Adjusts BLUE point convergence
	BP8	P-CONV. ADJ P8	X	X	(Note 2)	Adjusts BLUE point convergence
	BP9	P-CONV. ADJ P9	X	X	(Note 2)	Adjusts BLUE point convergence
	BP0	P-CONV. ADJ P0	X	X	(Note 2)	Adjusts BLUE point convergence
	BR1	BAUD RATE 1	X	X	X	Sets RS-232C baud rate to 1200 BPS
	BR2	BAUD RATE 2	X	X	X	Sets RS-232C baud rate to 2400 BPS
	BR3	BAUD RATE 3	X	X	X	Sets RS-232C baud rate to 4800 BPS
	BR4	BAUD RATE 4	X	X	X	Sets RS-232C baud rate to 9600 BPS
	BR5	BAUD RATE 5	X	X	X	Sets RS-232C baud rate to 19200 BPS
	BHI	BLUE HIGH LIGHT	X	○	○	Adjusts BLUE HIGH-LIGHT
	BLW	BLUE LOW LIGHT	X	○	○	Adjusts BLUE LOW-LIGHT
	BOF	BLUE OFF	X	X	X	Turns OFF BLUE
	BON	BLUE ON	X	X	X	Turns ON BLUE
	BRT	BRIGHTNESS	X	○	○	Adjusts BRIGHTNESS
	C	CBN	COMBINATION NO	○	X	X
CBY		COMBINATION YES	○	X	X	Turns ON ABL operation link
CM1		COLOR MODE 1	○	X	X	Sets white balance data to color mode 1
CM2		COLOR MODE 2	○	X	X	Sets white balance data to color mode 2
CNT		CONTRAST	X	○	○	Adjusts CONTRAST
COL		COLOR	X	○	○	Adjusts COLOR (Note 3)
COF		COLOR OFF	X	X	X	Turns OFF COLOR (Note 3)
CON		COLOR ON	X	X	X	Turns ON COLOR (Note 3)
C12		CONV. DATA COPY 1→2	X	X	X	Copy Convergence data MEMO-1 to 2
C13		CONV. DATA COPY 1→3	X	X	X	Copy Convergence data MEMO-1 to 3
C21		CONV. DATA COPY 2→1	X	X	X	Copy Convergence data MEMO-2 to 1
C23		CONV. DATA COPY 2→3	X	X	X	Copy Convergence data MEMO-2 to 3
C31		CONV. DATA COPY 3→1	X	X	X	Copy Convergence data MEMO-3 to 1
C32		CONV. DATA COPY 3→2	X	X	X	Copy Convergence data MEMO-3 to 2
D	DOF	DISPLAY OFF	X	X	X	Turns OFF OSD display
	DW0	DOWN 10	X	X	X	Decreases adjusting value by 10
	DWn	DOWN n	X	X	X	Decreases adjusting value by n
	DWF	DOWN FULL	X	X	X	Minimizes adjusting value
	DIY	OSD DISP. YES	X	X	X	Enables OSD display
	DIN	OSD DISP. NO	X	X	X	Disables OSD display
	DPN	DELAYED POWER ON NO	X	X	X	Function for turning the power on at different times using the ID numbers off
	DPY	DELAYED POWER ON YES	X	X	X	Function for turning the power on at different times using the ID numbers on
	G	G00 G59	GREEN 00 GREEN 59	X	○	○

ADJUSTMENTS

	Com- mand	Name	Normal Valid	Number Direct	UP/DW Command	Function
G	G61	P-CONV. ADJ 61	X	○	○	GREEN point convergence adjustment (Same as BLUE)
	GP0	P-CONV. ADJ P0				
	GHI	GREEN HIGH-LIGHT	X	○	○	Adjusts GREEN HIGH-LIGHT
	GLW	GREEN LOW-LIGHT	X	○	○	Adjusts GREEN LOW-LIGHT
	GON	GREEN ON	X	X	X	Turns ON GREEN
	GOF	GREEN OFF	X	X	X	Turns OFF GREEN
	GGH	GET GH CONV DATA	X	X	X	Calls GH convergence adjusting data (For each mode)
	GGV	GET GV CONV DATA	X	X	X	Calls GV convergence adjusting data (For each mode)
	GRH	GET RH CONV DATA	X	X	X	Calls RH convergence adjusting data (For each mode)
	GRV	GET RV CONV DATA	X	X	X	Calls RV convergence adjusting data (For each mode)
	GBH	GET BH CONV DATA	X	X	X	Calls BH convergence adjusting data (For each mode)
	GBV	GET BV CONV DATA	X	X	X	Calls BV convergence adjusting data (For each mode)
	GDD	GET DEF DATA	X	X	X	Calls the main deflection adjusting data for each mode
	GWB	GET W/B DATA	X	X	X	Calls the white balance adjusting data for each mode
	GUS	GET CNV SEL DATA	X	X	X	Calls the current state of the convergence data
	GST	GET STATUS DATA	X	X	X	Calls the various setting states
	GVO	GET ABL VOLTAGE	X	X	X	Recalls ABL control voltage
H	HPI	H PIN	X	○	○	Adjusts H deflection PIN
	HSI	H SIZE	X	○	○	Adjusts H deflection SIZE
	HBL	H BLK-L	X	○	○	BLK width adjustment for forming conver- gence correction waveform (Left)
	HBR	H BLK-R	X	○	○	BLK width adjustment for forming conver- gence correction waveform (Right)
I	IDS	ID SET	X	X	X	Sets ID
	IDC	ID CLEAR	X	X	X	Clears ID
	IN1	INPUT 1	○	X	X	Selects video input
	IN2	INPUT 2	○	X	X	Selects Y/C input
	IN3	INPUT 3	○	X	X	Selects RGB input
L	LOR	LIGHT ONLY RED	X	X	X	Displays only RED
	LOG	LIGHT ONLY GREEN	X	X	X	Displays only GREEN
	LOB	LIGHT ONLY BLUE	X	X	X	Displays only BLUE
	LWT	LINEAR WHITE	X	○	○	Adjusts LINEAR WHITE
M	MLY	MULTI YES	○	X	X	Turns ON peripheral light amount correction
	MLN	MULTI NO	○	X	X	Turns OFF peripheral light amount correction
N	NTS	TV SYSTEM NTSC	○	X	X	Sets TV SYSTEM to NTSC (Note 4)

ADJUSTMENTS

	Com- mand	Name	Normal Valid	Number Direct	UP/DW Command	Function
P	PON	POWER ON	○	X	X	Turns ON power
	POF	POWER OFF	○	X	X	Turns OFF power
	POC	POWER ON(MUTE)	○	X	X	Turns ON power with the convergence DAC muted
	PAL	TV SYSTEM PAL	○	X	X	Sets TV SYSTEM to PAL (Note 4)
R	R00	RED 00	X	○	○	RED convergence adjustment (Same as BLUE)
	R59	RED 59				
	R61	P-CONV. ADJ 61	X	○	○	RED point convergence adjustment (Same as BLUE)
	RP0	P-CONV. ADJ P0				
	RHI	RED HIGH LIGHT	X	○	○	RED HIGH-LIGHT adjustment
	RLW	RED LOW LIGHT	X	○	○	RED LOW-LIGHT adjustment
	RON	RED ON	X	X	X	Turns ON RED
	ROF	RED OFF	X	X	X	Turns OFF RED
R	RYN	RELAY NO	X	X	X	Turns combination relay off (Note 7)
	RYY	RELAY YES	X	X	X	Turns combination relay on (Note 7)
S	SHP	SHARPNESS	X	○	○	Adjusts SHARPNESS (Note 6)
	STD	STD W/B DATA	X	X	X	Re-writes white balance adjusting data in factory memory
	STC	STD CONV DATA	X	X	X	Re-writes convergence adjusting data in factory memory
	SW1	SWITCH MENU 1	X	X	X	Displays various settings in OSD
T	TNT	TINT	X	○	○	Adjusts TINT (Note 5)
	TS1	TEST CROSS 1	X	X	X	Displays test cross
	TVA	TV SYSTEM AUTO	○	X	X	Sets TV SYSTEM mode to auto mode
U	UP0	UP 10	X	X	X	Increases adjusting value by 10
	UPn	UP n	X	X	X	Increases adjusting value by n
	UPF	UP FULL	X	X	X	Maximizes adjusting value
	US1	USER 1	○	X	X	Switches convergence adjusting data to user 1 (Note 4)
	US2	USER 2	○	X	X	Switches convergence adjusting data to user 2 (Note 4)
	US3	USER 3	○	X	X	Switches convergence adjusting data to user 3 (Note 4)
V	VSI	V SIZE	X	○	○	Adjusts V deflection SIZE
	VLI	V LINEARITY	X	○	○	Adjusts V deflection LIN
	VST	V STATIC	X	○	○	Adjusts V deflection STATIC
	VMS	V MID SIZE	X	○	○	Adjusts V deflection MID SIZE
	VML	V MID LINEARITY	X	○	○	Adjusts V deflection MID LIN
	VMY	VIDEO MUTE ON	X	X	X	Sets video mute to ON when the input function switches
	VMN	VIDEO MUTE OFF	X	X	X	Sets video mute to OFF when the input function switches

Note 1 : The ABL command is valid only in the ABL combination ON (CBY) state.
The ABL level setting and the ABL voltage for the individual units are displayed on the on-screen display.

Note 2 : The UP/DOWN commands that can be used for the point convergence adjustment are as follow.

Move up→UP1
Move down→DW1
Move to right→RI1
Move to left→LE1

Adjustment of each area use the commands as follow.

File area adjustment RI1 and LE1 are available.

Command name : RP□, GP□, BP□ (□ ; 2, 4, 6, 8, 0)

Line area adjustment UP1 and DW1 are available.

Command name : RP□, GP□, BP□ (□ ; 1, 3, 5, 7, 9)

Note 3 : The COL, CON, and COF commands are not valid during RGB input.

Note 4 : The TV SYSTEM selection command and convergence adjustment data memory area selection command can be set separately for when the input function is set to VIDEO or Y/C and when it is set to RGB.

Note 5 : The TNT commands are not valid during RGB input. Neither valid during PAL input besides RGB.

Note 6 : The SHP commands are not valid during RGB input.

Note 7 : Turns the combination on/off relay (RY1000) on and off.
The ABL voltage for that individual set can be found by reading the ABL control voltage with the RYN status. (Refer to GVO: page 114.)
The ABL voltage for the entire connected cube system (the cube with the lowest voltage in the system) can be found by reading the ABL control voltage with the RYY status. (Refer to GVO: page 114.)

<Meanings of the command table>

- Normal valid
Command which can be used only when the adjustment mode is set using a command.
○; Receive a command regardless of AJY/AJN
X; Receive a command AJY
- Number direct
Command which can directly be specified as the adjusting value when added with 000 to 255.
○; The value provided is a direct command. (Example : For CNT070, the contrast is set to 70.)
X; Not a Numeral direct command. (Example : For IN1128, only IN1 is executed.)
- UP/DW command
A command which manipulates the adjustment value for the value UPn/ DWn (n is an arbitrary number between 0 to 9 and F) provided after the command.

③ List of GET commands

What are GET commands?

- Commands which output adjustment data, etc. from MPJ microprocessor to the PC.
- The adjustment data is output for every mode.
 - Example 1) When <GGH> command is set when CONV.DATA MEMO-1 is selected, the GREEN horizontal convergence data of MEMO-1 will be get. In the same way, when <GGH> command is set when CONV.DATA MEMO 2 to 3 are selected, the GREEN horizontal convergence data of MEMO-2 to 3 will be get.
 - Example 2) When <GWB> command is set when COLOR MODE =1 and at the same time, INPUT=RGB, the W/B DATA for COLOR MODE=1 and INPUT=RGB will be get.
- Only valid for one ID. (Invalid for ID=**, 1*, *1, etc.)
- The adjustment data, etc. is output in ASCII codes.

(Note) < > indicates the command name.

- [1] <GRH> (GET RH CONV.DATA) — RED horizontal convergence data is output.
 <GGH> (GET GH CONV.DATA) — GREEN horizontal convergence data is output.
 <GBH> (GET BH CONV.DATA) — BLUE horizontal convergence data is output.

Format : Output in the following order.

- | | |
|-------------------------|--------------------------|
| ① STX (02H) | |
| ② <□30>/□H STATIC | adjustment data (3 BYTE) |
| ③ <□31>/□H SKEW | adjustment data (3 BYTE) |
| ④ <□32>/□H BOW | adjustment data (3 BYTE) |
| ⑤ <□36>/□H SIZE | adjustment data (3 BYTE) |
| ⑥ <□42>/□H LINEARITY | adjustment data (3 BYTE) |
| ⑦ <□37>/□H KEY | adjustment data (3 BYTE) |
| ⑧ <□43>/□H SUB KEY | adjustment data (3 BYTE) |
| ⑨ <□38>/□H PIN | adjustment data (3 BYTE) |
| ⑩ <□44>/□H SUB PIN | adjustment data (3 BYTE) |
| ⑪ <□33>/□H 3D SKEW | adjustment data (3 BYTE) |
| ⑫ <□34>/□H 4D BOW | adjustment data (3 BYTE) |
| ⑬ <□53>/□H 5D SKEW | adjustment data (3 BYTE) |
| ⑭ <□59>/□H 6D BOW | adjustment data (3 BYTE) |
| ⑮ <□48>/□H MID SIZE | adjustment data (3 BYTE) |
| ⑯ <□54>/□H MID LIN | adjustment data (3 BYTE) |
| ⑰ <□41>/□H 5D SIZE | adjustment data (3 BYTE) |
| ⑱ <□47>/□H 6D LIN | adjustment data (3 BYTE) |
| ⑲ <□39>/□H 3D KEY | adjustment data (3 BYTE) |
| ⑳ <□45>/□H 3D S-KEY | adjustment data (3 BYTE) |
| ㉑ <□40>/□H 4D PIN | adjustment data (3 BYTE) |
| ㉒ <□46>/□H 4D S-PIN | adjustment data (3 BYTE) |
| ㉓ <□49>/□H MID KEY | adjustment data (3 BYTE) |
| ㉔ <□55>/□H MID S-KEY | adjustment data (3 BYTE) |
| ㉕ <□50>/□H MID PIN | adjustment data (3 BYTE) |
| ㉖ <□56>/□H MID S-PIN | adjustment data (3 BYTE) |
| ㉗ <□51>/□H MID 3D KEY | adjustment data (3 BYTE) |
| ㉘ <□57>/□H MID 3D S-KEY | adjustment data (3 BYTE) |
| ㉙ <□52>/□H MID 4D PIN | adjustment data (3 BYTE) |
| ㉚ <□58>/□H MID 4D S-PIN | adjustment data (3 BYTE) |
| ㉛ ETX (03H) | |

(Note) □ : R or G or B

- [2]<GRV> (GET RV CONV.DATA) — RED horizontal convergence data is output.
 <GGV> (GET GV CONV.DATA) — GREEN horizontal convergence data is output.
 <GBV> (GET BV CONV.DATA) — BLUE horizontal convergence data is output.

Format : Output in the following order.

①	STX (02H)		
②	<□00>/□V STATIC	adjustment data	(3 BYTE)
③	<□06>/□V SKEW	adjustment data	(3 BYTE)
④	<□12>/□V BOW	adjustment data	(3 BYTE)
⑤	<□01>/□V SIZE	adjustment data	(3 BYTE)
⑥	<□02>/□V LINEARITY	adjustment data	(3 BYTE)
⑦	<□07>/□V KEY	adjustment data	(3 BYTE)
⑧	<□08>/□V SUB KEY	adjustment data	(3 BYTE)
⑨	<□13>/□V PIN	adjustment data	(3 BYTE)
⑩	<□14>/□V SUB PIN	adjustment data	(3 BYTE)
⑪	<□18>/□V 3D SKEW	adjustment data	(3 BYTE)
⑫	<□24>/□V 4D BOW	adjustment data	(3 BYTE)
⑬	<□11>/□V 5D SKEW	adjustment data	(3 BYTE)
⑭	<□17>/□V 6D BOW	adjustment data	(3 BYTE)
⑮	<□03>/□V MID SIZE	adjustment data	(3 BYTE)
⑯	<□04>/□V MID LIN	adjustment data	(3 BYTE)
⑰	<□23>/□V 5D SIZE	adjustment data	(3 BYTE)
⑱	<□29>/□V 6D LIN	adjustment data	(3 BYTE)
⑲	<□19>/□V 3D KEY	adjustment data	(3 BYTE)
⑳	<□20>/□V 3D S-KEY	adjustment data	(3 BYTE)
㉑	<□25>/□V 4D PIN	adjustment data	(3 BYTE)
㉒	<□26>/□V 4D S-PIN	adjustment data	(3 BYTE)
㉓	<□09>/□V MID KEY	adjustment data	(3 BYTE)
㉔	<□10>/□V MID S-KEY	adjustment data	(3 BYTE)
㉕	<□15>/□V MID PIN	adjustment data	(3 BYTE)
㉖	<□16>/□V MID S-PIN	adjustment data	(3 BYTE)
㉗	<□21>/□V MID 3D KEY	adjustment data	(3 BYTE)
㉘	<□22>/□V MID 3D S-KEY	adjustment data	(3 BYTE)
㉙	<□27>/□V MID 4D PIN	adjustment data	(3 BYTE)
㉚	<□28>/□V MID 4D S-PIN	adjustment data	(3 BYTE)
㉛	ETX (03H)		

(Note) □: R or G or B

- [3]<GDD> (GET DEFLECTION DATA) — Deflection adjusting data is output.

Format : Output in the following order.

①	STX (02 H)		
②	<HSI>/ H SIZE	adjustment data	(3 BYTE)
③	<VST>/ V STATIC	adjustment data	(3 BYTE)
④	<VSI>/ V SIZE	adjustment data	(3 BYTE)
⑤	<VLI>/ V LINEARITY	adjustment data	(3 BYTE)
⑥	<VMS>/ V MID SIZE	adjustment data	(3 BYTE)
⑦	<VML>/ H MID LINEARITY	adjustment data	(3 BYTE)
⑧	<HBL>/ H BLK-L	adjustment data	(3 BYTE)
⑨	<HBR>/ H BLK-R	adjustment data	(3 BYTE)
⑩	<HPI>/ H PIN	adjustment data	(3 BYTE)
⑪	ETX (03 H)		

ADJUSTMENTS

[4] <GWB> (GET W/B DATA) — White balance adjustment data is output.

Format : Output in the following order.

①	STX (02H)		
②	<LWT>/ LINEAR WHITE	adjustment data	(3 BYTE)
③	<CNT>/CONTRAST	adjustment data	(3 BYTE)
④	<BRT>/BRIGHTNESS	adjustment data	(3 BYTE)
⑤	<COL>/COLOR	adjustment data	(3 BYTE) (Note 1)
⑥	<TNT>/TINT	adjustment data	(3 BYTE) (Note 1) and (Note 3)
⑦	<BLW>/BLUE LOW-LIGHT	adjustment data	(3 BYTE)
⑧	<GLW>/GREEN LOW-LIGHT	adjustment data	(3 BYTE)
⑨	<RLW>/RED LOW-LIGHT	adjustment data	(3 BYTE)
⑩	<BHI>/BLUE HIGH-LIGHT	adjustment data	(3 BYTE)
⑪	<GHI>/GREEN HIGH-LIGHT	adjustment data	(3 BYTE)
⑫	<RHI>/RED HIGH-LIGHT	adjustment data	(3 BYTE)
⑬	<SHP>/SHARPNESS	adjustment data	(3 BYTE) (Note 1) and (Note 5)
⑭	<ABL>/ABL LEVEL	adjustment data	(3 BYTE) (Note 4)
⑮	<ABG>/ABL GAIN	adjustment data	(3 BYTE) (Note 2)
⑯	ETX (03H)		

(Note 1) Dummy when INPUT=RGB

(Note 2) No dependent on mode. (Has one data.)

(Note 3) Dummy when PAL signal is input. (INPUT=VIDEO or Y/C)

(Note 4) Dummy when COMBINATION=OFF (Data is output when COMBINATION=ON)

(Note 5) SHARPNESS data for OFF is output when MULTI=OFF, and SHARPNESS data for ON is output when MULTI=ON.

[5] GVO (GET ABL VOLTAGE) — The ABL voltage is converted within the range of 0 to 5V, identified in 256 steps and output. (3 BYTE)

[6] <GUS> (GET CONV. USER DATA) — Deflection and convergence data memory area setting state is output.

①	STX (02H)		
②	Memory area selected when INPUT=VIDEO or Y/C & input signal=NTSC. Example)US 1:Indicates CONV.MEMO-1 is selected.		(3 BYTE)
③	Memory area selected when INPUT=VIDEO or Y/C & input signal=PAL (Or other than NTSC, containing no signals). Example)US 2:Indicates CONV.MEMO-2 is selected.		(3 BYTE)
④	Memory area selected when INPUT=RGB & input signal=NTSC. Example)US 1:Indicates CONV.MEMO-1 is selected.		(3 BYTE)
⑤	Memory area selected when INPUT=RGB & input signal=PAL (Or other than NTSC, containing no signals). Example)US 2:Indicates CONV.MEMO-2 is selected.		(3 BYTE)
⑥	IETX (03H)		

[7] <GST> (GET STATUS) — Various setting states are output.

- ① STX (02H)
- ② Version of microcomputer software (5 BYTE)
Example)V1.00:Indicates VERSION 1.00.
- ③ Input function state (3 BYTE)-Output in command name.
Example)IN1:Indicates VIDEO input.
- ④ MULTI state (3 BYTE)-Output in command name.
Example)MLY:Indicates MULTI=ON.
- ⑤ COLOR MODE state (3 BYTE)-Output in command name.
Example)CM1:Indicates COLOR MODE=1.
- ⑥ COMBINATION state (3 BYTE)-Output in command name.
Example)CMY:Indicates COMBINATION=ON.
- ⑦ TV SYSTEM MODE state (3 BYTE)-Output in command name. **(Note 1)**
Example)TVA:Indicates TV SYSTEM=AUTO.
- ⑧ Indicates the input discriminating result of TV SYSTEM=AUTO **(Note 2)**
Example)NTS:Input discriminating result indicates NTSC.
- ⑨ Deflection and convergence data memory area state (3 BYTE) **(Note 1)**
US1:Indicates that CONV.MEMO-1 is selected.
US2:Indicates that CONV.MEMO-2 is selected.
US3:Indicates that CONV.MEMO-3 is selected.
- ⑩ OSD display, enable/disable setting state (3 BYTE)-Output in command name.
Example)DIY:Indicates OSD display enabled.
- ⑪ Setting of function for turning the power on at different times using the ID numbers (on or off, 3 bytes)
DPY: Indicates that the function for turning the power on at different times using the ID numbers is on.
DPN: Indicates that the function for turning the power on at different times using the ID numbers is off.
- ⑫ ETX (03H)

(Note 1) When INPUT=VIDEO or Y/C, the VIDEO or Y/C input setting is output.
When INPUT=RGB, the RGB input setting is output.

(Note 2) If it does not TV SYSTEM=AUTO, mode will output the same state of ⑦ TV SYSTEM.

ADJUSTMENTS

④ PRECAUTIONS

- [1] The adjusted data is backed up by the AJN command.
After adjustments, always perform AJN. AJN will also exit the screen adjustment display.
- [2] Contents of the INPUT FUNCTION, MULTI ON/OFF, COMBINATION ON/OFF, COLOR MODE 1/2, TV SYSTEM, CONV.MEMORY are memorized only when the power is turned OFF using the remote control, POF command, or the TACT switch on the rear panel, and finish the adjustment mode (if you were set each data in the adjustment mode).
(They will not be memorized by AC ON/OFF.)
When starting up/stopping the system by AC ON/OFF under the long term installation conditions, memorize the contents before executing AC ON/OFF.
- [3] There is a limit to the RS-232C communication buffer in the MPJ. If too many commands are sent at once, it will not operate properly.
- [4] The RS-232C command execution time.
When sending RS-232C command, send the next command after minimum 500m sec.
Especially, the following commands need more than 500msec.
- | | |
|---|--------|
| a) The assigned command of the POINT CONVERGENCE ADJUST POINT | 1.5sec |
| b) IN1Å3 (Input switching) | 1sec |
| c) TVA,NTS,PAL (TV system setting) | 1sec |
- If the next commands are sent before these time, they may not be received. Care when making programs like the direction.
- [5] Exiting the personal computer adjustment mode
The personal computer adjustment mode is automatically exited when the following steps are performed.
- When the rear panel switch is set.
 - When the power is turned OFF.
 - When the input signal is switched, the cable is disconnected, or the mode is switched: NTSC ↔ PAL.
(However, in some cases, switching between PAL and no-signal may not exit the mode.)

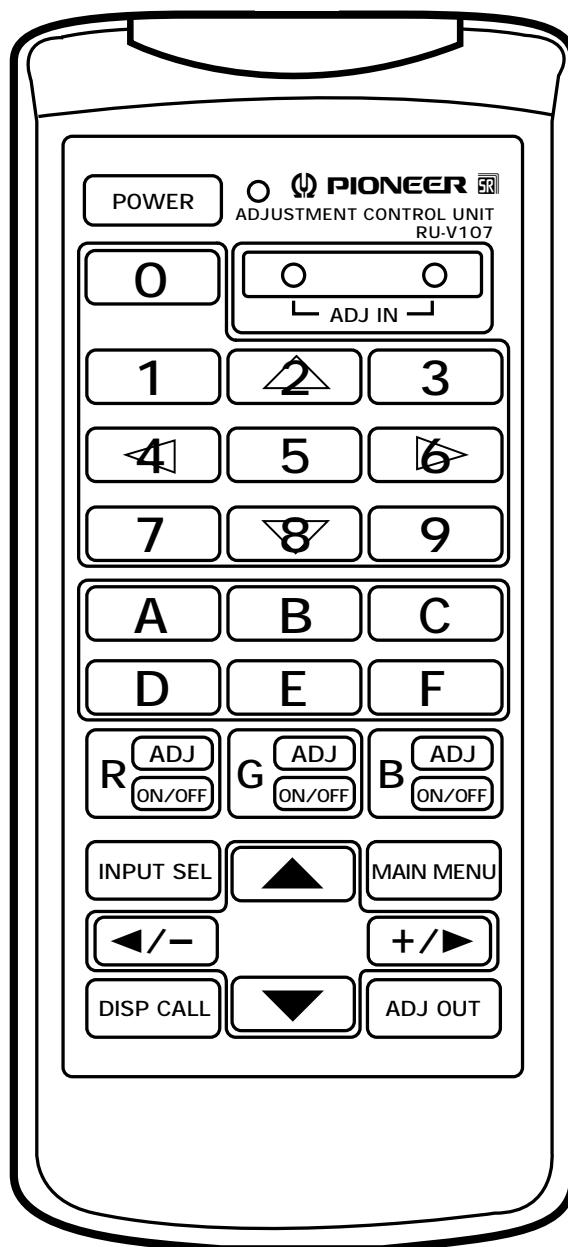
To continue adjustments, set the re-adjustment mode again.

(7) Adjustments by remote control

MPJ adjustments can be performed using the remote control unit (RU-V107) besides the computer and software.

All adjustments are performed only using the remote control unit.

① Remote control unit functions.



ADJUSTMENTS

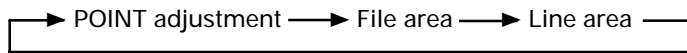
1) 

- Turns on/off the power of the unit.

2) 


<Adjustment Mode>

- Selects ID CLEAR in the ID SET/CLEAR/SELECT MODE. Also selects "0" for ID SET and ID SELECT.
- Selects V STATIC in the DEFLECTION ADJUST MODE.
- Selects ABL GAIN in the WHITE BALANCE ADJUST MODE.
- Cyclically selects the adjustment items in the POINT CONVER ADJUST MODE in the following order.



3, 4) 

- Starts up the adjustment mode when the two buttons are pressed simultaneously.

5) 

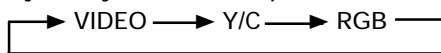
<Adjustment Mode>

- Selects 1 (ID SET/SELECT/CLEAR MODE) of the main menu of the adjustment mode.
- Sets ID SET in the ID SET/CLEAR/SELECT MODE. Also selects "1" for ID SET and ID SELECT.
- Selects STATIC in the CONVERGENCE ADJUST MODE.
- Selects CONTRAST in the WHITE BALANCE ADJUST MODE.
- Returns the CONVERGENCE ADJUST DATA to the factory set data in the MEMORY READ/COPY MODE.
- Select the pattern (1→2) for copying the convergence data between memories in the MEMORY READ/COPY MODE.

6) 

<Adjustment Mode>


- Selects 2 (OPERATION MODE) of the main menu of the adjustment mode.
- Sets ID SELECT in the ID SET/CLEAR/SELECT MODE. Also selects "2" for ID SET and ID SELECT.
- Cyclically selects the input function in the OPERATION MODE in the following order.



- Selects the V SIZE in the DEFLECTION ADJUST MODE.
- Cyclically selects the item to be adjusted in the CONVERGENCE ADJUST MODE in the following order.



- Moves the point to be adjusted up in the POINT CONVER ADJUST MODE.
- Selects BRIGHTNESS in the WHITE BALANCE ADJUST MODE.
- Returns the WHITE BALANCE ADJUST DATA to the factory set data in the MEMORY READ/COPY MODE.
- Select the pattern (1→3) for copying the convergence data between memories in the MEMORY READ/COPY MODE.

7) 

<Adjustment Mode>

- Selects 3 (DEFLECTION ADJUST MODE) of the main menu of the adjustment mode.
- Selects "3" for ID SET and ID SELECT in the ID SET/CLEAR/SELECT MODE.
- Cyclically switches MULTI ON/OFF in the OPERATION MODE.
- Selects V MID SIZE in the DEFLECTION ADJUST MODE.
- Cyclically selects the item to be adjusted in the CONVERGENCE ADJUST MODE in the following order.



- Selects COLOR in the WHITE BALANCE ADJUST MODE(,only invalid for RGB input).
- Reset the various setting value in the MEMORY READ/COPY MODE.
- Select the pattern (2→1) for copying the convergence data between memories in the MEMORY READ/COPY MODE.

8) 4

<Adjustment Mode>

- Selects 4 (CONVERGENCE ADJUST MODE) of the main menu of the adjustment mode.
- Selects "4" for ID SET and ID SELECT in the ID SET/CLEAR/SELECT MODE.
- Cyclically switches COLOR MODE 1/2 in the OPERATION MODE.
- Cyclically selects the item to be adjusted in the CONVERGENCE ADJUST MODE in the following order.

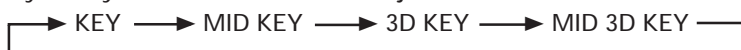


- Moves the point to be adjusted to the left in the POINT CONVER ADJUST MODE.
- Selects TINT in the WHITE BALANCE ADJUST MODE(,only invalid for RGB and PAL signal input).
- Select the pattern (2→3) for copying the convergence data between memories in the MEMORY READ/COPY MODE.

9) 5

<Adjustment Mode>

- Selects 5 (POINT CONVERGENCE ADJUST MODE) of the main menu of the adjustment mode.
- Selects "5" for ID SET and ID SELECT in the ID SET/CLEAR/SELECT MODE, or clear the ID number in the ID clear mode.
- Cyclically switches COMBINATION ON/OFF in the OPERATION MODE.
- Selects H SIZE in the DEFLECTION ADJUST MODE.
- Cyclically selects the item to be adjusted in the CONVERGENCE ADJUST MODE in the following order.

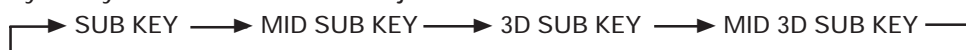


- Selects SHARPNESS in the WHITE BALANCE ADJUST MODE(,only invalid for RGB input).
- Select the pattern (3→1) for copying the convergence data between memories in the MEMORY READ/COPY MODE.

10) 6

<Adjustment Mode>

- Selects 6 (WHITE BALANCE ADJUST MODE) of the main menu of the adjustment mode.
- Selects "6" for ID SET and ID SELECT in the ID SET/CLEAR/SELECT MODE.
- Cyclically switches VIDEO MUTE ON/OFF in the OPERATION MODE.
- Selects V LINEARITY in the DEFLECTION ADJUST MODE.
- Cyclically selects the item to be adjusted in the CONVERGENCE ADJUST MODE in the following order.

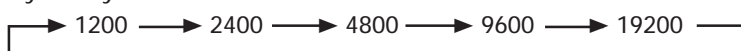


- Moves the point to be adjusted to the right in the POINT CONVER ADJUST MODE.
- Selects LINEAR WHITE in the WHITE BALANCE ADJUST MODE.
- Select the pattern (3→2) for copying the convergence data between memories in the MEMORY READ/COPY MODE.

11) 7

<Adjustment Mode>

- Selects 7 (MEMORY READ MODE) of the main menu of the adjustment mode.
- Selects "7" for ID SET and ID SELECT in the ID SET/CLEAR/SELECT MODE.
- Cyclically selects the RS-232C baud rate in the OPERATION MODE in the following order.



- Selects H BLK-L in the DEFLECTION ADJUST MODE.
- Cyclically selects the item to be adjusted in the CONVERGENCE ADJUST MODE in the following order.



- Selects RED HIGHLIGHT in the WHITE BALANCE ADJUST MODE.

ADJUSTMENTS

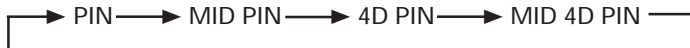
12) **8**

<Adjustment Mode>

- Selects "8" for ID SET and ID SELECT in the ID SET/CLEAR/SELECT MODE.
- Cyclically selects TV SYSTEM in the OPERATION MODE in the following order.



- Cyclically selects the item to be adjusted in the CONVERGENCE ADJUST MODE in the following order.

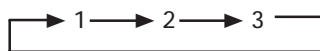


- Moves the point to be adjusted down in the POINT CONVER ADJUST MODE.
- Selects GREEN HIGH-LIGHT in the WHITE BALANCE ADJUST MODE.
- Selects H BLK-R in the DEFLECTION ADJUST MODE.

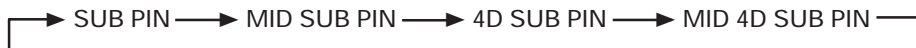
13) **9**

<Adjustment Mode>

- Selects "9" for ID SET and ID SELECT in the ID SET/CLEAR/SELECT MODE.
- Cyclically selects TV SYSTEM in the OPERATION MODE in the following order.



- Selects V MID LINEARITY in the DEFLECTION ADJUST MODE.
- Cyclically selects the item to be adjusted in the CONVERGENCE ADJUST MODE in the following order.



- Selects BLUE HIGH-LIGHT in the WHITE BALANCE ADJUST MODE.

14) **A**

<Adjustment Mode>

- Selects "A" for ID SET and ID SELECT in the ID SET/CLEAR/SELECT MODE.
- Subtracts 10 from the current CONTRAST adjusting value in the DEFLECTION ADJUST MODE, CONVERGENCE ADJUST MODE, and POINT CONVER ADJUST MODE. (Returns to the original adjusting value when the adjustment mode is exited.)
- Selects RED LOW-LIGHT in the WHITE BALANCE ADJUST MODE.

15) **B**

<Adjustment Mode>

- Selects "B" for ID SET and ID SELECT in the ID SET/CLEAR/SELECT MODE.
- Selects H PIN in the DEFLECTION ADJUST MODE.
- Selects GREEN LOW-LIGHT in the WHITE BALANCE ADJUST MODE.

16) **C**









<Adjustment Mode>

- Selects "C" for ID SET and ID SELECT in the ID SET/CLEAR/SELECT MODE.
- Adds 10 to the current CONTRAST adjusting value in the DEFLECTION ADJUST MODE, CONVERGENCE ADJUST MODE, and POINT CONVER ADJUST MODE. (Returns to the original adjusting value when the adjustment mode is exited.)
- Selects BLUE LOW-LIGHT in the WHITE BALANCE ADJUST MODE.

17) **D**

<Adjustment Mode>

- Selects "D" for ID SET and ID SELECT in the ID SET/CLEAR/SELECT MODE.
- Selects GH LINEARITY in the DEFLECTION ADJUST MODE.
(Note: This adjustment item is the same as GH LINEARITY in the convergence ADJUST MODE.)
- Selects ABL LEVEL in the WHITE BALANCE ADJUST MODE. (It is validity at COMBINATION=ON.)

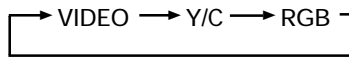
- 18) 
 <Adjustment Mode>
 • Selects "E" for ID SET and ID SELECT in the ID SET/CLEAR/SELECT MODE.
- 19) 
 <Adjustment Mode>
 • Selects "F" for ID SET and ID SELECT in the ID SET/CLEAR/SELECT MODE.
- 20) 
 <Adjustment Mode>
 • Cyclically switches the adjusting color and direction between RH and RV in the CONVERGENCE ADJUST MODE.
 • Selects the adjusting color RED in the POINT CONVER ADJUST MODE.
- 21) 
 <Adjustment Mode>
 • Cyclically switches the adjusting color and direction between GH and GV in the CONVERGENCE ADJUST MODE.
 • Selects the adjusting color GREEN in the POINT CONVER ADJUST MODE.
- 22) 
 <Adjustment Mode>
 • Cyclically switches the adjusting color and direction between BH and BV in the CONVERGENCE ADJUST MODE.
 • Selects the adjusting color BLUE in the POINT CONVER ADJUST MODE.
- 23) 
 <Adjustment Mode>
 • Cyclically switches RED ON/OFF in the DEFLECTION ADJUST MODE, CONVERGENCE ADJUST MODE, POINT CONVER ADJUST MODE and WHITE BALANCE ADJUST MODE.
 <Normal Mode>
 • Sets the input function to VIDEO.
- 24) 
 <Adjustment Mode>
 • Cyclically switches GREEN ON/OFF in the DEFLECTION ADJUST MODE, CONVERGENCE ADJUST MODE, POINT CONVER ADJUST MODE and WHITE BALANCE ADJUST MODE.
 <Normal Mode>
 • Sets the input function to Y/C.
- 25) 
 <Adjustment Mode>
 • Cyclically switches BLUE ON/OFF in the DEFLECTION ADJUST MODE, CONVERGENCE ADJUST MODE, POINT CONVER ADJUST MODE and WHITE BALANCE ADJUST MODE.
 <Normal Mode>
 • Sets the input function to RGB.

ADJUSTMENTS

26) 

<Normal Mode>

- Cyclically switches the input function in the following order.



27) 

<Adjustment Mode>

- Moves the convergence up in the POINT CONVER ADJUST MODE.

28) 

<Adjustment Mode>

- Returns the main menu of the adjustment mode.

29) 

<Adjustment Mode>

- Decreases the adjusting value.
- Moves the convergence to the left in the POINT CONVER ADJUST MODE.

30) 

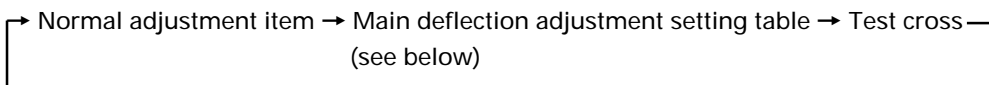
<Adjustment Mode>

- Increases the adjusting value.
- Moves the convergence to the right in the POINT CONVER ADJUST MODE.

31) DISP CALL

<Adjustment Mode>

- In the deflection adjust mode, switches cyclically, as follows:



Main deflection adjustment setting table

0. V STATIC	128 (G128)
2. V SIZE	128 (G128)
3. V M SIZE	128 (G128)
5. H SIZE	128 (G128)
6. V LI	128 (G128)
7. H BLK-L	128 - - -
8. H BLK-R	128 - - -
9. V M LIN	128 (G128)
B. H PIN	128 (G128)
D. GH LIN	128 (G128)

Convergence green adjustment settings corresponding to the various main deflection adjustments

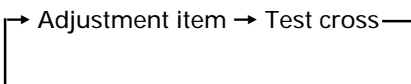
Remote control unit key number

Main deflection adjustment setting

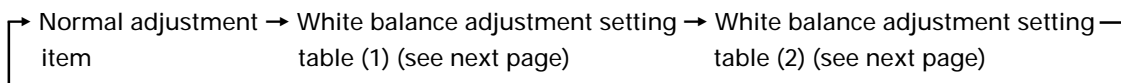
This item (convergence GH LINEARITY) alone can be selected and adjusted directly from this menu. Other convergence data (adjustment items within (G***)) cannot be selected directly from this menu.

- NOTES)**
- The set operates as follows when the above is displayed:
 - No key is pressed → Adjustment mode is canceled after about 180 seconds.
 - "MAIN MENU" or "ADJ IN" pressed → Main menu reappears.
 - "ADJ OUT" pressed → Adjustment mode is canceled.
 - Any key from "0" to "D" pressed → Main deflection adjustment mode corresponding to that key is set.
 - The adjustment settings cannot be changed when the above adjustment settings are displayed.

- In the convergence adjust mode, the test cross is turned on.



- In the white balance adjust mode, switches in the following cycle:



White balance adjustment setting table (1)

7. R HIGH	[]	128
8. G HIGH	[]	128
9. B HIGH	[]	128
A. R LOW	[]	128
B. G LOW	[]	128
C. B LOW	[]	128
1. CONT	[]	128
2. BRIGHT	[]	128

Remote control unit key number

Bar graph display position

For details, see next page.

List of numerical values (example)

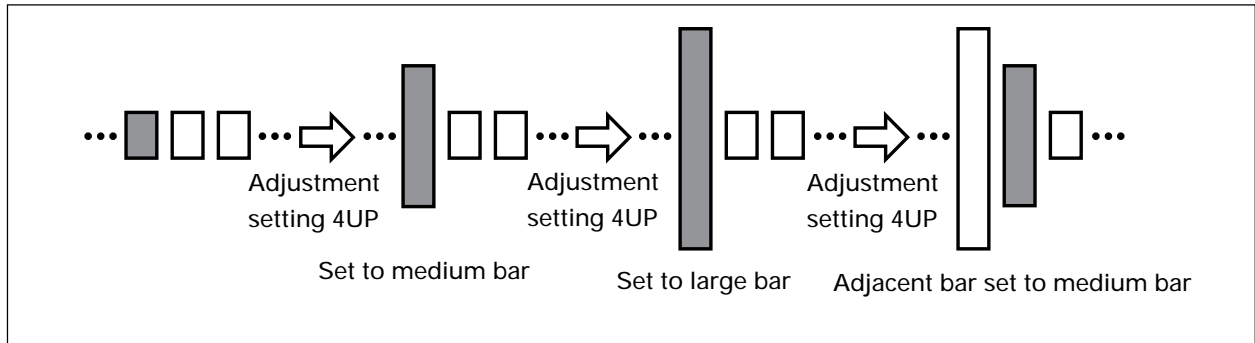
White balance adjustment setting table (2)

3. COLOR	[]	128
4. TINT	[]	128
5. SHARP	[]	128
6. LIN WHT	[]	128
<ABL>		
0. -GAIN	[]	128
D. -LEVEL	[]	128

Remote control unit key number

RGB input mode
[---]
Not displayed
(For PAL input, same as above for TINT only)

COMBI OFF
[---]
Not displayed



NOTES) ● The set operates as follows when the above is displayed:

- No key is pressed → Adjustment mode is canceled after about 180 seconds.
- "MAIN MENU" or "ADJ IN" pressed → Main menu reappears.
- "ADJ OUT" pressed → Adjustment mode is canceled.
- Any key from "0" to "D" pressed → W/B adjustment mode corresponding to that key is set.
- The adjustment settings cannot be changed when the above adjustment settings are displayed.

<Normal Mode>

- Status display turns on and off cyclically.

32)

<Adjustment Mode>

- Moves the convergence down in the POINT CONVER ADJUST MODE.

33)

<Adjustment Mode>


- Exits the adjustment mode.

34) LED for Confirming Transmission

② Performing adjustments

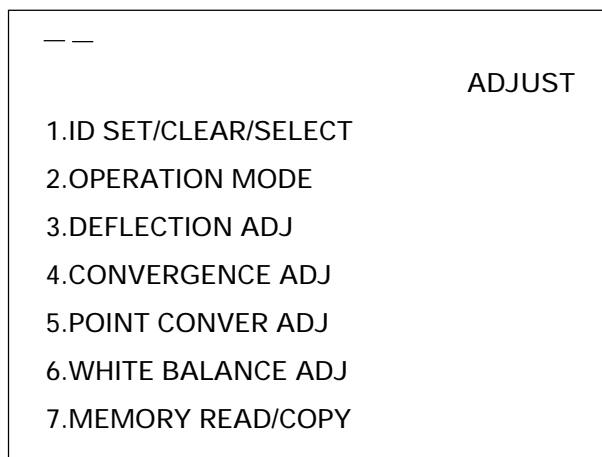
1) Entering and exiting the adjustment mode

Turn on the power switch and press the two  keys of the remote control together. The adjustment mode will be set.

To exit this mode, press the  key of the remote control. The normal screen will return.

2) Using the adjustment mode

The following main menu will be displayed when the adjustment mode is entered.



● Main Menu

1) ID SET/CLEAR/SELECT mode

Used for selecting, setting and clearing the ID.

2) OPERATION mode

Switches the setting such as input selection, ABL linkage ON/OFF, etc.

3) DEFLECTION ADJ mode

Adjusts the main deflection size, etc. (But all three colors RGB at once except GH LINEARITY.)

4) CONVERGENCE ADJ mode

Adjusts the convergence. (R, G, and B can be adjusted individually.)

5) POINT CONVER ADJ mode

Adjusts the convergence by point and zone convergence. (R,G,and B can be adjusted individually.)

6) WHITE BALANCE ADJ mode












Adjusts the white balance, color.

7) MEMORY READ/COPY mode





Adjusts the current value (both convergence and white balance) to the value set at shipment, and copy the convergence data between the memories.

③ Adjustment examples

[1] Setting the ID

- 1) Enter the adjustment mode by  key.
- 2) The main menu will be displayed. Press the  key to select [1. ID SET/CLEAR/SELECT].
- 3) Check that the ID display at the top left of the screen is [- -]. Press the  key to select [1. ID SET].
When an ID has already been provided, delete the ID as follows and perform from step 1).
 - a) Press the  key to set the adjustment mode. The main menu will be displayed.
 - b) Press the  key and select [1. ID SET/CLEAR/SELECT].
 - c) Press the  key after pressing the  key to clear the ID number.
- 4) The ID input standby state will be set. Use the  to  and  to  keys to input the ID.
- 5) If several units are used, return to step 1) and set the ID of the next unit.

[2] Entering the adjustment mode of certain units only.

- 1) Enter the adjustment mode.
- 2) Check that all the screens display the adjustment mode. Press the  key to select [1. ID SET/CLEAR/SELECT] of the main menu.
- 3) Another menu will be displayed. Press the  key to select [2. ID SELECT].
- 4) Input the ID of the unit to be adjusted.
- 5) Only the unit corresponding to the ID input will display the main menu. All other units will be in the standby state.
- 6) Perform the usual adjustments.
- 7) a) To continue adjusting the screen for which ID has been selected
Press the  key to return to the main menu.
- b) Ending the adjustment mode
Press the  key and return to the NORMAL OPERATION MODE. Note)
- c) Adjusting another unit
Repeat the mentioned operation 1) to 7).

(Note) Even if a certain unit has timed-out and is shifting to the normal mode, be sure to perform one of the following steps a) or b) or c). If not, the unit for which ID SELECT has not been performed will remain in the standby state.

Example) When the ID=13 screen in the right figure is selected and left for more than 180 seconds without performing any operation:


Bottom left screen : Normal mode

Other screens : Standby state of the remote control adjustment mode.


To exit from these states, perform the following.

ID=21	


a) To continue adjustment

Press the  key to set all screens into the remote control adjustment mode, and perform adjustments.

b) To end adjustments

Press the  key and exit from the remote control adjustment mode of screens in the standby state.

c) To turn OFF the power

Press the  key to turn OFF the power of all screens (STANDBY state).

ADJUSTMENTS

[3] Adjusting the H SIZE

- 1) Enter the adjustment mode.
- 2) Press the **3** key to select [3. DEFLECTION ADJ].
- 3) Press the **5** key to select [H SIZE]. Then use the **←/−** and **+/▶** keys to adjust the H SIZE.

The following can be adjusted using similar methods.

0 key : V STATIC	7 key : H BLK-L
2 key : V SIZE	8 key : H BLK-R
3 key : V MID SIZE	9 key : V MID LINEARITY
5 key : H SIZE	B key : H PIN
6 key : V LINEARITY	D key : GH LINEARITY (is the same as GH LINEARITY in "4. CONVERGENCE ADJ".)

[4] Adjusting the green horizontal size (GH SIZE)

- 1) Enter the adjustment mode.
- 2) Press the **4** key to select [4. CONVERGENCE ADJ].
- 3) Press the **G^(ADJ)** key until the OSD display becomes [GH].

The following can be adjusted in the same way.

R^(ADJ) key : RH ↔ RV

B^(ADJ) key : BH ↔ BV

- 4) Press the **2** key until the OSD display becomes [SIZE].

Then use the **←/−** and **+/▶** keys to adjust the GH SIZE.

The following can be adjusted in the same way.

1 key : STATIC

2 key : **▶** SIZE **→** MID SIZE **→** 5D SIZE **▶**

3 key : **▶** LINEARITY **→** MID LINEARITY **→** 6D LINEARITY **▶**

4 key : **▶** SKEW **→** 3D SKEW **→** 5D SKEW **▶**

5 key : **▶** KEY **→** MID KEY **→** 3D KEY **→** MID 3D KEY **▶**

6 key : **▶** SUB KEY **→** MID SUB KEY **→** 3D SUB KEY **→** MID 3D SUB KEY **▶**

7 key : **▶** BOW **→** 4D BOW **→** 6D BOW **▶**

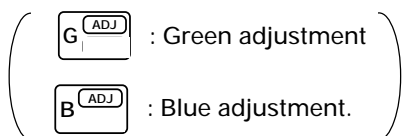
8 key : **▶** PIN **→** MID PIN **→** 4D PIN **→** MID 4D PIN **▶**

9 key : **▶** SUB PIN **→** MID SUB PIN **→** 4D SUB PIN **→** MID 4D SUB PIN **▶**

[5] Adjusting the red point convergence

- 1) Enter the adjustment mode.
- 2) Press the **5** key to select [5. POINT CONVER ADJ].
- 3) Press the **R^{ADJ}** key so that only the blue of the screen is erased.

The following can be selected in the same way.



- 4) Use the **2**, **4**, **6** and **8** keys to move the OSD display to the point to be adjusted on the screen, and use the **▲**, **▼**, **◀/−** and **+/▶** keys to adjust the convergence of that point.
- 5) Pressing the **0** key will select the area adjustment and point adjustment cyclically.

[6] Adjusting the red high light

- 1) Set the adjustment mode.
- 2) Press the **6** key to select [6. WHITE BALANCE ADJ].
- 3) Press the **7** key to select [R HIGH]. And use the **◀/−** and **+/▶** keys to adjust the red high light.

The following can be adjusted in the same way.

0 key: ABL GAIN	7 key: R HIGH
1 key: CONTRAST	8 key: G HIGH
2 key: BRIGHT	9 key: B HIGH
3 key: COLOR (Note 1)	A key: R LOW
4 key: TINT (Note 2)	B key: G LOW
5 key: SHARPNESS (Note 1)	C key: B LOW
6 key: LINEAR WHITE	D key: ABL LEVEL (Note 3)

(Note 1) It is invalid for RGB input.

(Note 2) It is invalid for RGB and PAL input.

(Note 3) It is valid only at COMBINATION = ON.

[7] Turning on the peripheral light amount correction (MULTI)




- 1) Enter the adjustment mode.
- 2) Press the **2** key to select [2. OPERATION MODE].
- 3) Press the **3** key to turn on/off the peripheral light amount correction (MULTI).

The following can be performed in the same way.





2 key: Input selection (▶ VIDEO → Y/C → RGB ┘)
3 key: Peripheral light amount correction (ON ↔ OFF)
4 key: Color mode (1 ↔ 2)
5 key: COMBINATION (ON ↔ OFF)
6 key: VIDEO MUTE (ON ↔ OFF)
7 key: Baud rate selection (▶ 1200BPS → 2400BPS → 4800BPS → 9600BPS → 19200BPS ┘)
8 key: TV system selection (▶ AUTO → NTSC → PAL ┘)
9 key: Convergence memory selection area switching

ADJUSTMENTS



[8] To return the convergence and white balance adjustment data to that at shipment:

- 1) Set the adjustment mode.
- 2) Press the  key.
Select [7. MEMORY READ/COPY].
- 3) Select the number from the SUB MENU.
 key : The convergence and deflection adjustment data will return to that at shipment.
 key : The white balance adjustment data will return to that at shipment.

[9] To copy the convergence adjustment data between memories:








- 1) Set the adjustment mode.
- 2) Press the  key.
Select [7. MEMORY READ/COPY].
- 3) Press the  key of the SUB MENU.
Select [4. CONV. MEMORY COPY].
- 4) Select the copy pattern (keys 1 to 6).
- 5) If the copy pattern number is correct, press the  key within 5 seconds. (If not, the copy pattern will be displayed again.)
If the copy pattern number is wrong, press the  key and repeat from step 2 again.

[10] Resetting the setting

- 1) Set the adjustment mode.
- 2) Press the  key.
Select [7. MEMORY READ/COPY].
- 3) Press the  key of the SUB MENU.
As a result, the following settings will be set.
 - MULTI (Peripheral light amount correction)=ON
 - Baud rate=4800 bps
 - COLOR MODE=1
 - TV SYSTEM=AUTO
 - VIDEO MUTE=OFF
 - COMBINATION=OFF
 - Convergence memory
 - NTSC input (VIDEO, Y/C, RGB)=MEMO-1
 - PAL input (VIDEO, Y/C, RGB)=MEMO-2





The adjustments using the above settings can be performed very easily.

Example : When the baud rate of each MPJ is set to 2400 bps as they are not same.

- ① Press the  key. (To set the adjustment mode).
- ② Press the  key (To select [7. MEMORY READ/COPY].)
- ③ Press the  key (As the SUB MENU is selected, 4800 bps will be selected automatically.)
 - To set the baud rate to 4800 bps, proceed onto step 7.
- ④ Press the  key. (Returns to the main menu).
- ⑤ Press the  key (Select [2. OPERATION MODE]).
- ⑥ Press the  key (As the baud rate changes cyclically, 2400 bps is selected.)
- ⑦ Press the  key to select a baud rate.

The adjustment is completed.

④ Precautions upon use (Adjustment control unit)

- Always release the adjustment mode with  button and turn off the power with the  button after adjustments and settings. All adjusted values and settings will be memorized.
- The remote control adjustment mode will automatically be exited in the following.
 1. When no operations are performed for about 180 seconds.
 2. When the rear panel switch is pressed
 3. When the power is turned off
 4. When the input signal is switched, the cable is disconnected, or the mode is switched : NTSC \longleftrightarrow PAL.
(However, in some cases, switching between PAL and no-signal may not exit the mode.)
- One MPJ cannot be adjusted using the remote control unit and personal computer simultaneously. If using the remote control unit after the personal computer adjustment mode has been started up, start up the remote control unit adjustment mode or turn off the power once.
- When operating several MPJ simultaneously, do not press the buttons quickly and continuously as some MPJ may not synchronize with the other MPJ.
- MPJ not assigned an ID cannot be operated using the remote control unit. To exit this state, perform one of the following.
 1. Start up the remote control adjustment mode using the  button.
 2. Exit the remote control adjustment mode using the  button.
 3. Turn off the power.
- The remote control signal is output to the next MPJ via the link terminal only when a certain ID is set to the MPJ. When operating several MPJ, set this ID to all the MPJ. Only MPJ connected with the link cable located after the MPJ to which the remote control unit is connected can be operated.
- Handle the wire carefully.

Warning for Use of Dry Batteries

- Using dry batteries incorrectly will result in battery liquid leakage, damage, etc. Take note of the following. (Also refer to precautions provided for dry batteries.)
 - Load the \oplus and \ominus sides of the batteries correctly as shown on the battery case.
 - Do not use old and new batteries together.
 - Batteries of the same shape may have different voltages.
Do not use different batteries together.
 - When not using the unit for a long period of time (one month), remove the batteries to prevent battery liquid leakage.
If leakage occurs, wipe the liquid thoroughly and load new batteries.
 - Do not charge, short-circuit, disassemble, nor throw into fire the dry batteries provided.

CHAPTER 5. OPERATION AND MAINTENANCE

1. MAINTENANCE

(1) Re-adjustments after 3 months

Even if the RM-V2550U is adjusted adequately at the time of installation, adjustment values may start to deviate with time. These values will not change when adjustments are performed the second time. The appropriate time for performing re-adjustments is 3 months after installation. It is recommended that these adjustments be taken into consideration when the unit is installed.

(2) Periodic maintenance

For the unit to display its best performance stably for a long period of time, it is recommended that periodic maintenance be performed. There are mainly two types of periodic maintenance.

- **Cleaning**

Although this depends considerably on the environment used in, the CRT lens surface, screens, etc. are cleaned mainly.

- **Re-adjustments**

Re-adjustments must be performed if required.

Pioneer recommends that contracts on periodic maintenance be signed.

(3) Replacement of parts

Replacement and addition of parts are as follows and are to be performed by Pioneer service personnel.

Request for these services when required.

- ① **CRT**

The luminance decreases as the unit is used as with other visual equipment. How much it decreases depends on the images displayed and the using conditions. As an approximate, the decrease is about half for 10000 hours. Although this 10000 hours (four years with eight hours of use every day) is a rough approximate for replacing the CRT, decide according to the state of the unit.

- ② **Screen**

If a screen needs to be replaced due to scratches, etc., purchase a service parts screen.

2. CAUTIONS DURING PRESENTATIONS

- When the power is turned off from the remote control unit or using the tact switch on the rear panel, the input function, MULTI ON/OFF (peripheral brightness selection), VIDEO MUTE ON/OFF, COMBI ON/OFF (ABL linking selection), COLOR MODE 1/2 (white balance selection), TV system selection and convergence memory status are only stored in the last memory if the adjustment mode has been canceled (when the conditions have been set in the adjustment mode). (The settings are not stored in the last memory when the AC power is turned on and off.)

When the entire system is started up or stopped by turning the AC power on and off for permanent installations, store the settings in the last memory using the above operation before turning the AC power on and off.

- The main methods for muting the picture during presentations are described in [1] to [3] below.

[1] Setting by external computer command

Example: To mute the picture of the unit with ID number 11

11 A OF → 11 IN ○
 (picture muted) (input switching/picture mute canceled)
 ○ : 1 → To set the input function to VIDEO
 2 → To set the input function to Y/C
 3 → To set the input function to RGB

[2] Setting by remote control unit or computer

VIDEO MUTE ON: Picture is muted for about 0.4 to 0.5 seconds only each time the input function (VIDEO, Y/C and RGB) is switched.

VIDEO MUTE OFF: Picture is not muted even when the input function is switched.

[3] Setting when switching between NTSC and PAL signal by computer

The picture may be disturbed momentarily due to the time required to switch the TV system. If the picture is heavily disturbed, mute it using the procedure described below.

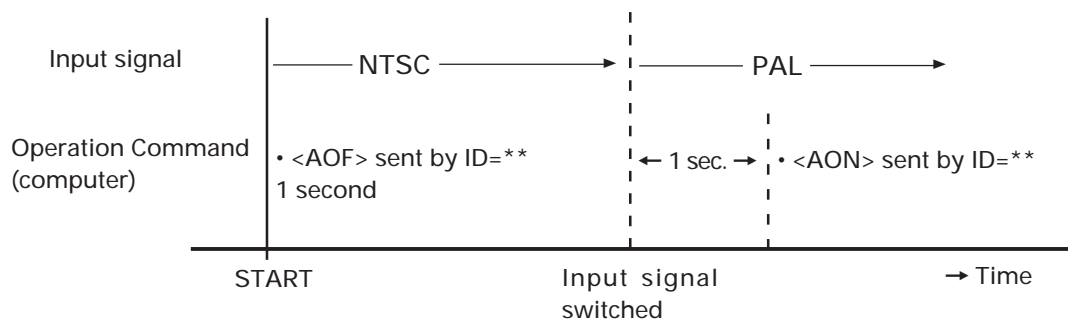
Example: Muting the picture when switching from NTSC to PAL

Initial value: TV SYSTEM = AUTO (For details, refer to Chapter 4, "(2) TV system" (page 69).)

NTSC signal input: CONV.MEMO-1

PAL signal input: CONV.MEMO-2

Convergence: Already adjusted



Input function: Fixed

However, when switched to PAL signal, <AON> sent after over 1 second has passed.

3. SERVICING SYSTEM

The following describes the servicing system for this system.

- [1] Repairs will be provided free of charge for a period of one year for natural problems.
- [2] For systems sold or installed directly by Pioneer, the Pioneer service outlet will provide primary repairs. Requests for service will be accepted by telephone call between **9:30** and **18:00** weekdays. (For service at other times and on weekends and holidays, contact your salesperson.)
- [3] Pioneer has a system of registration for servicing of this system. The system must be registered with the Pioneer Service Division, regardless of whether it was purchased at an agency or directly from Pioneer. Servicing may not be offered for systems that are not registered. (For details, contact the person responsible at Pioneer.)
- [4] Pioneer will offer no guarantees or servicing for products purchased domestically which are used in foreign countries.

4. CAUTIONS ON ASSEMBLY AND MAINTENANCE

- Clean the net of the MPJ's fan air intake and exhaust holes periodically to prevent clogging.



- Working in high places is extremely dangerous. If tools or other objects fall they could damage the equipment or even cause injury. Be extremely carefully when working in high places.
- Repairing the wooden cabinet
This model uses a wooden cabinet. If the cabinet requires repairs due to visible scratches or chipping, Pioneer recommends using a commercially available wood repair product (filler, touchup pen, etc.).

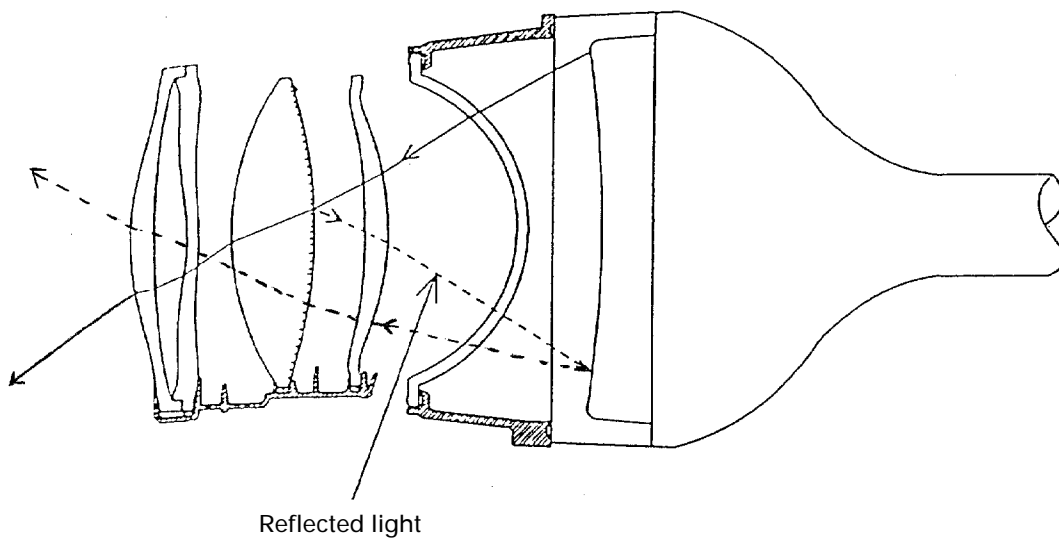
CHAPTER 6. PRECAUTIONS

1. PRECAUTIONS ON FUNCTION AND PERFORMANCE OF SYSTEM

- The picture may turn to disorder temporarily due to power discharge inside the CRT tube, but it will recover automatically after a few seconds. In the new CRT, the very slight amount of impurities remaining inside (in vacuum) may occasionally evaporate when hit with electron beam. However, this will not occur after the CRT has been used for 100 to 200 hours.
- When the power remains off for some time, it may indicate that a fault has occurred inside. (malfunction of parts). Turn off the main power switch of the MPJ, and after several seconds, turn it on again. If the power goes off again, it indicates a fault. If it works normally, it indicates abnormal operations due to external factor and will not affect operations thereafter.
- If the screen color and brightness is abnormal or the switches do not function, turn off the main power switch once and turn it on again several seconds later.
- When the one image (still image and caption) is displayed for a long period of time, the image will stick onto the screen and cannot be removed. As this is inevitable due to the projection system, it must be resolved through software contents, displaying method, system structure, etc.
- When switching between the VIDEO and Y/C input using the EXT-CONTROL terminal for different TV formats, the image will be disturbed for several seconds when they are switched automatically even if TV SYSTEM is set to AUTO.
Example) Image is disturbed. Image is not disturbed.
 VIDEO input (NTSC) → Y/C input (PAL) VIDEO input (NTSC) → Y/C input (NTSC)
- When the following signals are input, the image may be distorted.
 - VCR signal which repeats copying.
 - VCR signal with copy-guard.
 - Scrambled CATV signal.
 - Signal other than NTSC/PAL standard signal
 - Signals whose sync signal and video signal phases are considerably different.
(In some cases the centers of H and V cannot adjusted. If adjustments can be performed using the expansion equipment, etc., use it.)
 - Signal with extremely narrow feedback period
- If the power is repeatedly turned on and off by disconnecting the power cord, the count of the hour meter may be incorrect. The hour meter serves as a reference for how long the unit has been used, and the operation is not affected by the count error.

2. NOT MALFUNCTION

- In some cases, the screen from appear bluish when seen from the left and slightly reddish when seen from the right. This phenomenon called color shift is inevitable due to the structure of the projection system in which the R G, B tubes are lined up and light is projected from the rear.
- When bright images are displayed in the dark, the light reflected on the lens will shine in the darkness slightly. This phenomenon called tube-inside reflection is inevitable due to the structure of the projection whose CRT light has been expanded using the lens. [Fig. 6-1.]



[Fig.6-1]

3. CHECKING THE ADJUSTMENTS

1. Preparation for adjustments

- ① Connect the power supply as well as the input signal cables and ABL interlock cables (control cables).
- ② Arrange the connected cables neatly.
- ③ After completing ① and ② above, turn power ON and leave the system for about an hour for aging.
- ④ Prepare the signals required for the adjustments.

2. Before adjustments (Setup of conditions) P.68

- ① Select the remote control adjustments or PC adjustments.
- ② Check the TV system setups.
Check the convergence memory and white balance memory for use in the adjustments.
- ③ Check the STATUS.
Check the MULTI ON/OFF, COMBINATION ON/OFF, ABL interlock switch setup (one of 3 positions) and other status.
- ④ Store the current setups using the last memory function.

3. ID assignment P.71


- ① Assign an ID to each MPJ by observing the caution and notes on page 71 to 75.

ID=01	ID=02
ID=03	ID=04

4. Screen adjustments

- ① Adjust the size of each screen. P.81
- ② Adjust the convergence of each screen. P.82
- ③ Adjust the connection between screens. P.140
- ④ Adjust the W/B of each screen. P.98
- ⑤ Adjust the ABL level. P.102
- ⑥ Adjust the colors using the image to be transmitted. P.103
- ⑦ Perform overall check by observing the entire image. P.103

4. CAUTION AND NOTES ON THE MPF INSTALLATION

No	Item	Ref. Page
1	The system has been designed exclusively for permanent installation. The wood cabinets cannot stand the heavy-duty rental use.	
2	Stacking of screens <ul style="list-style-type: none"> ● The screens can be stacked in up to 3 stages. 	(P.24)
3	Installation location <ul style="list-style-type: none"> ● The system should be installed on a level surface or the stands should be provided with the adjustment mechanisms. 	(P.32)
4	Installation work <ul style="list-style-type: none"> ● Do not mount on the cabinets during installation. Otherwise they may tumble down or be deformed. 	(P.45)
5	Installation caution <ul style="list-style-type: none"> ● As the system has been designed with slimmer depth than the previous models, it tend to tumble down more easily than them. Be sure to take countermeasures against tumbling down. 	(P.25)
6	Servicing space <ul style="list-style-type: none"> ● The screens, mirrors and lenses can be cleaned from the front side but the electrical assemblies should be accessed from the rear when replacing them. 	(P.24)
7	Installation up against the rear wall (2 stages) <ul style="list-style-type: none"> ● The above consideration on the servicing space is important. ● Use L-shaped BNC connectors. ● Headroom should be reserved at the top and left/right in consideration of the rise in internal temperature. 	(P.24, 33)
8	 <ul style="list-style-type: none"> ● Work at a high position is always accompanied with danger. If you drop a tool, it may not only damage the equipment but injure other persons in worst case. Be very careful in conducting work at a high position. 	

5. NOTE IN USE OF THE OPTIONAL JOINT-LESS SCREENS

- The areas corresponding to the joints may flicker even during use of joint-less screens. The ending and starting of scanning at the connecting areas at the top and bottom of screen is out of sync, resulting in brightness differences at the connecting areas of the top and bottom of the screen. This flickers because the human eye pursues the changes in brightness. This symptom is observed with joint-less screens and more noticeable when the screens are viewed from a distant place. When screens with joints are used, the scanning timing error between the two vertically adjacent screens is less noticeable because the eye motion following the scanning is interrupted at the joint. On the other hand, with joint-less screens, the scanning timing error is noticeable because the eyes can follow it more easily thanks to the absence of the joint. The reason why it is more noticeable at a distance is because the eyes can view the overall view of the screens and follow the overall motion more easily.

6. TROUBLESHOOTING

Check once again before assuming the set is malfunctioning. The problem may be due to inadequate maintenance, erroneous operation, etc.

If the problem persists after the following checks have been made, contact a dealer.

Symptom/Equipment	Possible Causes	Treatment
Power cannot be turned on./All	<ul style="list-style-type: none"> ● The power cord is unplugged. ● The power switch is set to OFF. 	<ul style="list-style-type: none"> ● Insert the power plug completely into the outlet. ● Press the power switch to ON.
Video is not displayed./All	<ul style="list-style-type: none"> ● The video input cable is unplugged from the video input. ● The video cable is plugged into a wrong jack. ● The cable is disconnected or otherwise defective. 	<ul style="list-style-type: none"> ● Insert the cable properly into the jack. ● Connect the cable properly. ● Use another cable that is not defective.
Video is not displayed. /Multi-video processor	<ul style="list-style-type: none"> ● The option board is inserted incompletely. ● The INPUT switch is set improperly. ● The MODE switch is set improperly. ● The demonstration pattern is set erroneously. 	<ul style="list-style-type: none"> ● Re-insert the option board properly. ● Set the INPUT switch properly and press the reset button. ● Set the MODE switch properly and press the reset button. ● Set it properly. (See the caution on the demonstration pattern setting on page 157.)
The joints are glossy /Multi-projection units	<ul style="list-style-type: none"> ● The joints reflect external light. 	<ul style="list-style-type: none"> ● Adjust the position, etc. of the light source.

Notes on the input signal

The video may not be displayed normally if any of the following signals is input.

- VCR signal obtained after repeated dubbing (copies).
- VCR or DVD signal containing copy guard signal.
- Other signal than the standard NTSC signal.

Notes on the input images

1. Colored characters or characters on color background may be hard to read due to color blur. (When displaying characters, it is recommended to use those without colors or display them on a background without colors.)
2. When the image contains areas with fine lines, the horizontal lines may become hard to view due to flickering.

Note on genlocking

The system does not incorporate the genlocking function. This means that the signal output from the system is not synchronized with the signal input to it.

Note on screen burns

When the system has displayed a still image, residual images (screen burns) may remain on the screens.

CHAPTER 7. MVP MANUAL

1. INTRODUCTION

The multi video processor (hereafter referred to as MVP below) is equipped with a serial interface conforming to RS-232C standards which can be connected to computers.

This manual is required when connecting the MVP to the external computer and controlling adjustments and performance.

This manual describes the methods of using the RS-232C interface, command protocols, and basic functions and commands of the MVP.

2. CONNECTION WITH MVP EXTERNAL COMPUTER

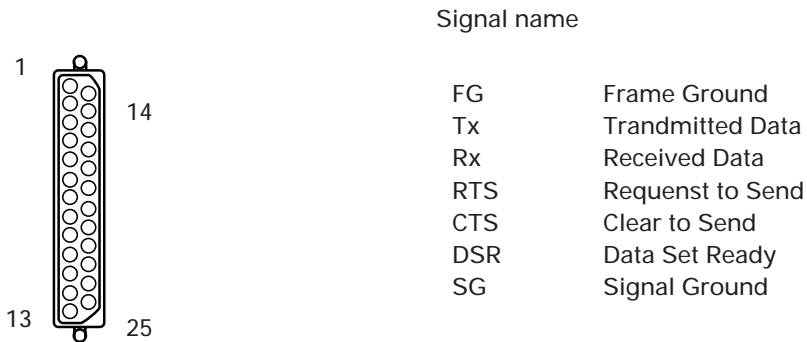
- Refer to Chapter 4.(P.105) "External Control by MPJ RS-232C" for how to adjust the MPJ.
- Use a RS-232C straight cable.
- Refer to the following diagram for connections.

- MVP RS-232C Settings

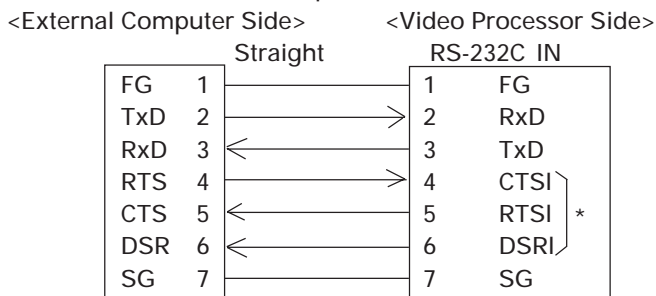
Baud rate : 2400, 4800, 9600, 19200
 Bit number : 7, 8
 Parity : NON, ODD, EVEN
 Stop bit : 1, 2
 : Setting at shipment

This setting can be changed using the DIP switches on the panel.
 Refer to "Chapter 2.(P.19) MVP panel ⑦ Baud rate switch".

<MVP RS-232C Pin Layout>



Connection with External Computer



* Pins 4, 5 and 6 are short-circuited inside.
 Pins not shown in the diagram are NC.

3. INSTRUCTIONS FOR USING A COMPUTER AS A TERMINAL

<When the IBM-PC/AT is used>

- Use commercially available communications software.
- Use PC-DOS internal commands (TYPE, COPY, etc.)
Pay attention to use because only one-way transmission of data is possible in this case.

<With the PC-9800 series>

- Use commercially available communications software (CCT 98, etc.)
- Use the MS-DOS commands (TYPE, COPY, etc.)
Pay attention to use because only one-way transmission of data is possible in this case.

<Example of a program GW-BASIC>

```

100 OPEN "COM1:9600, N, 7, 1" AS#1
110 ON COM1 GOSUB * RCV
120 COM1 ON
130 * LOOP
140     A$=INKEY$:IF A$="" THEN * LOOP
150     PRINT#1,A$;
160     GOTO * LOOP
170 * RCV
180     IF LOC(1)<>0 THEN PRINT INPUT$(LOC(1),#1);
190 RETURN
    
```

<Communication mode settings in use of CCT98>

Set the CCT98 communication mode before executing the MVP commands.
After starting up CCT98,

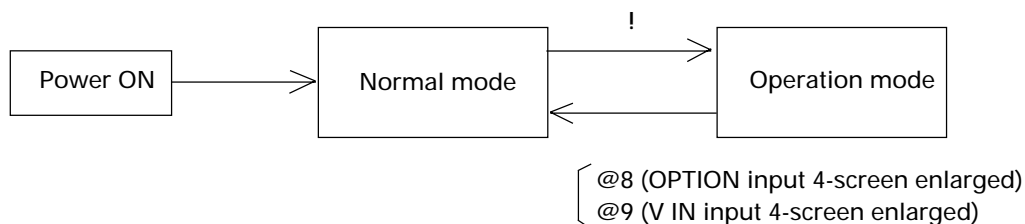
..... Enter the parameter setting mode.
Set the following items as follows.

Communication speed	2400	<input type="text" value="4800"/>	9600	19200	} Selectable
Character length	7 bits	<input type="text" value="8 bits"/>			
Stop bit	<input type="text" value="1 bit"/>	2 bits			} Fixed
Parity bit	<input type="text" value="None"/>	ODD	EVEN		
Character code	NEC				
Transmission carriage return code	CR				
Reception carriage return code	CR				
SI/SO control	None				
X control	None				
<input type="text" value=""/> MVP setting at shipment				

- * Problems may occur in signal transfer at 2400 bps when adjusting the optional variable scan board.
- * Refer to the CCT98 manual for how to use the CCT98.

4. OPERATING MODES

1. Normal mode : This mode is set when the power and reset switches are pressed.
This makes the panel switch effective and sets the performance mode according to the switch settings.
2. Operation mode : Mode which enables MVP from the external computer.
This mode is set when the ! command is transmitted after connecting the computer.
The normal mode can be set according to the command used.



3. Manual mode : Mode in which the panel switches are effective.
Both the 1 and 2 modes are set to this mode normally.
4. Remote mode : Mode in which the panel switch functions can be controlled from the computer in the optional mode.
During this time, the panel switch state will be ignored.
Take note that switch settings and operations will not correspond in this mode.
This mode can be changed to the manual mode according to the commands.
For details, refer to the RMT and MNL commands.

5. Adjustment Mode

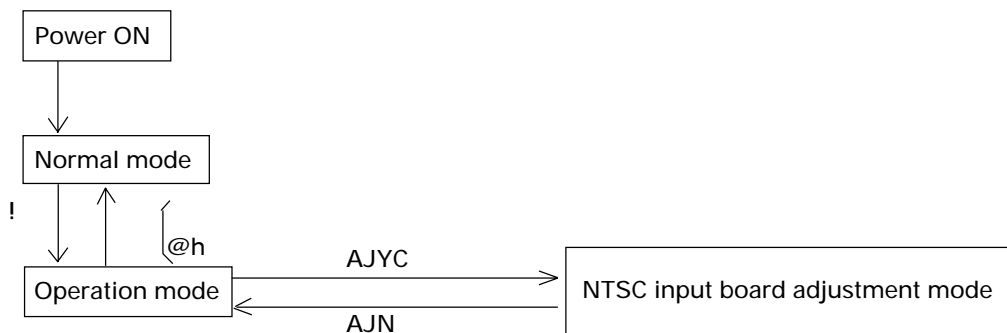
● NTSC Input Board Adjustment Mode:

Mode in which the adjustment commands of the NTSC input board can be executed.
 (Adjustment items of the output board can be executed when desired)
 To end the adjustment mode, input AJN.

Operation mode

AJYC Enables the NTSC input board to be adjusted.

AJN Adjustment mode end



● Variable scan board adjustment mode:

This is the mode for enabling communications with the optional variable scan board.
 In this mode only the variable scan board adjustment commands are accepted. The switches on the front panel will also not function.
 Note that the image output will be disturbed in particular when the Mode switch is operated. Set the switch properly after the communications mode is exited.

In the operation mode:

- : A Mode for communications (adjustment) with the variable scan board set.
- : Variable scan board adjustment mode exited.

5. MVP VIDEO OUTPUT MODES

- The video output formats set by the mode switches are as shown in the following table.
(At shipment, the mode switch value is set to "8".)

Mode switch No.	Bus format	Output format	Sync signal frequency	Dropout reduction function
0	NTSC	VBS, Y/C	Standard speed	OFF
1		RGB		
2			Double speed	
3	Reserved			
4				
5				
6				
7				
8	NTSC	VBS, Y/C	Standard speed	ON
9		RGB		
A			Double speed	
B	Reserved			
C				
D				
E				
F				

- Bus format : NTSC NTSC digital signal transmission method.
- Output format : VBS (VIDEO signal), Can be switched between Y/C and RGB.
However, VBS and Y/C can only be used for the standard speeds.
- Sync signal frequency : Standard speed Horizontal 15.734 kHz, vertical 59.94 Hz interlace
: Double speed Horizontal speed 31.469 kHz, vertical 59.94 Hz non-inter-lace
- Dropout reduction function: Function for alleviating dropout due to the scanning line structure particular to multi vision systems

NOTE:

With the RMD-V2550U, only standard speed input is possible. Double speed signals can not be displayed.

6. ADJUSTMENT FUNCTIONS

MVP enables the input and output boards to be adjusted and set by connecting the external computer. The following are items which can be set.

(1) MVP settings

- For adjusting the picture frame (output image position) (Coarse adjustments: Refer to &P, &Q command, fine adjustment: &G command), and correcting the joinings of the magnified screen.

(2) NTSC input board setting

- Bright adjustment (Refer to BRT command)
- Color correction (Refer to COL command)
- Tint adjustment (Refer to TNT command)

(3) Variable scan board settings

- For adjusting the screen display position (Refer to HPS, VPS, HWN, VWN, HWD, VWD commands)
Sets the variable scan board position to the correct position on the screen.
- Tracking adjustment (Refer to TRK command)
For correcting lateral vibration of displayed characters, shaking, and tracking noises.
- Full dot number adjustment (Refer to HFD command)
For correcting vertical bit lines of displayed characters and pictures with high resolution.
(Normally, the full dot number need not be changed.)
- Blanking frame bright adjustment (Refer to BKL command)
For setting the luminance level of the blanking frame for decreasing burning when there are blanking frames in the surrounding area.
Take note that of the effective display range of the PC screen and blanking frame position are not accurate, this adjustment will on the contrary have negative effects.
- Vertical filter conversion rate setting (Refer to LCV command)
For correcting the aspect ratio, etc.
However, the vertical resolution deteriorates according to the compensation rate.
- RGB gain adjustment (Refer to RGN, GGN, and BGN commands)
- R-Y, B-Y clamp level adjustment (Refer to RLV, BLV commands)
- Contrast adjustment (Refer to CNT command)
- Bright adjustment (Refer to BRT command)

7. PICTURE FRAME ADJUSTMENT PROCEDURES

Adjust the MVP picture frame as follows.

- (1) **Connect the RS-232C cable to the MVP panel.**
(Refer to (P.141) "Connection with MVP external computer".)
- (2) **Initialize the picture frame data in RAM.**
ex. &L0 (Refer to &L command.)
- (3) **Set to the magnified screen to be adjusted.**
ex. M11C22 (Refer to the M command, @ command.)
(@9)
- (4) **Perform coarse adjustment of the picture frame.**
ex. &P21 ++-- (Refer to the &P command.)
- (5) **Perform fine adjustment of the picture frame.**
ex. &G0 LLRU (Refer to the &G command.)
- (6) **Repeat steps (4) and (5) for every position on the screen.**
- (7) **Save the adjustment data in the EEPROM.**
ex. &W1 (Refer to the &W command.)

1. Command reference

(1) To shift to the operation mode [! command]

Input: !

Explanation: By executing this command when the power is on, various commands can be executed.

(2) To set different screens for adjusting convergence [DFFC command]

Input: DFFC

Explanation: • By executing this command, the V IN input image will be displayed on a single 1x1 display.
• Use the crosshatch, etc. for V IN input images.
• For convergence adjustment, refer to the MPJ's adjustment items.

(Returning to 4-screen enlarged display)

- The V IN input image is set to 4-screen enlarged display by @9. (For the @ commands, refer to page 148.)

(3) To set the system back to 4-screen magnification [@ command]

Input: @h [↵] (h=8 or 9)

Explanation: • For setting the system back to 4-screen magnification after convergence adjustment, etc.
 • Used also when the normal 4-screen magnification output cannot be obtained due to incorrect operations, etc.

@8 [↵] (Sets 4-screen magnification of the OPTION input)

@9 [↵] (Sets the 4-screen magnification of the V IN input)

NOTE) An input board must be added in order to display the image of the OPTION input. (Option)

2. Adjusting the picture frame

(1) To perform fine adjustment of the picture frame [&G command]

Input: &Gh [↵]

Explanation: • Performs fine adjustments of the picture frame of the screen specified by the parameter h value.
 h : VOUT output No. (0 to 3)

The parameter h value is as shown in the following figure when viewed from the front.

0	1
2	3

- Picture frame fine adjustment command. If the picture frame moves considerable, first perform coarse adjustments of the picture frame using the &P2 command and &Q2 command. (Refer to page 149.)

When &Gh is executed, the following is shown on the computer display.

&G3[↵] (Bottom right screen of 4-screen)

+F -F: The horizontal and vertical adjustment values are output at the +F and -F positions.

 : Input the following commands after [] .

 0 : To reset the picture frame fine adjustment data

 L : To move the screen to the left

 R : To move the screen to the right

 U : To move the screen up

 D : To move the screen down

 [↵] : Ends the adjustment mode

- **Note:** For details of the picture frame adjustment procedure, refer to "Picture Frame Adjustment Procedure".
- **Note:** To end the adjustment, be sure to input [↵].
 If [↵] is not input, commands input thereafter may not be executed.
- **Note:** If the power is cut in this state, the new screen start position data will not be saved. To save the data, execute &W1 [↵]. (Refer to the &W command.)

(2) To perform coarse adjustments of the picture frame [&P2, &Q2 commands]

Input: &P2d₂h₁h₂h₃, &Q2d₂h₁h₂h₃

Explanation: &P2 command: Horizontal direction

&Q2 command: Vertical direction

d₂: Screen position (1 to 2)

h₁h₂h₃: crew start position data (&P2:000 to 1C5, &Q2:000 to 20A)

Although the data is an absolute value, the relative value with the current data can also be specified.

- Input: &P2d₂ +, &P2d₂ -
&Q2d₂ +, &Q2d₂ -

d₂ : Screen position (1 to 2)

+ : Left direction (horizontal), and up direction (vertical) looking at the screen.

- : Right direction (horizontal), and down direction (vertical) looking at the screen.

: Adjustment mode end

&P2d₂

*** : Input the current value at ***

+--+

&P2d₂

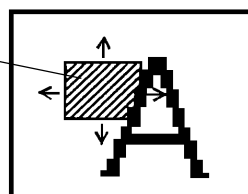
RES : RES is the initial value

&P2d₂

100 : Input the value after checking the current value

- The screen start position is the position of the screen actually displayed in respect to the magnified image.

Position displayed on the screen



Magnified image

- This command is used for the coarse adjustment of the picture frame when the adjustment range is exceeded with the &G command.
- The data shift amount is greater than the &G command.
- Execute &W0 to initialize. (Refer to &W command.)
- **Note:** For details of the picture frame adjustment procedure, refer to "Picture Frame Adjustment Procedure".
- **Note:** To end the adjustment, be sure to input .
If is not input, commands input thereafter may not be executed.
- **Note:** If the power is cut in this state, the new screen start position data will not be saved. To save the data, execute &W1 . (Refer to the &W command.)

(3) To store the picture frame data [&W command]

Input : &W0, &W1

Explanation : &W0 : Sets the saved values to the settings at shipment.
(Load data using the &L command.)

&W1 : Saves the value adjusted.

- The parameters saved by the &W command are as follows.
 - Picture frame data (Data changed by the &G command.)
 - Screen start position data (Data changed by the &P2 command and &Q2 command.)

• **Note** : *When this command is executed, the setting will be saved even if the power is turned off.
Therefore, all precious settings will be erased.*

(4) To load the picture frame data [&L command]

Input : &L0, &L1

Explanation : &L0 : Loads the picture frame data set at shipment on the RAM.

&L1 : Loads the picture frame data saved at the end on the RAM. (Data when power is turned on)

- The parameters loaded by the &L command are as follows.
 - Picture frame data (Data changed by the &G command.)
 - Screen start position data (Data changed by the &P2 command and &Q2 command.)
- Use this command to reference the adjustment data temporarily.

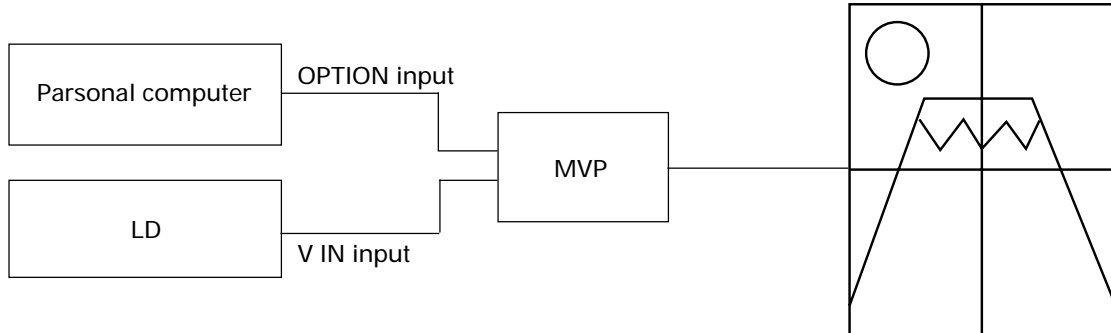
3. To switch the image input [IFF command]

Input: IFFa 

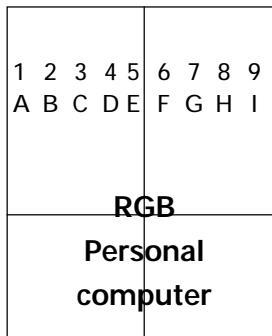
Explanation: Switches between the V IN input 4-screen enlarged display and the OPTION input 4-screen enlarged display.

- a: Image input (A or C)
- A: OPTION input image display
- C: V IN input image display

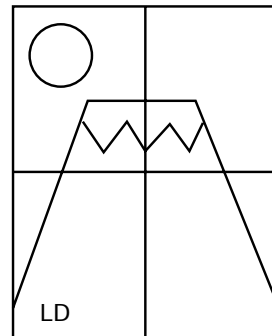
Example)



IFFA 



IFFC 



- * Refer to the @ command (page 148) if the normal 4-screen magnification cannot be set due to incorrect operations.
- * An input board must be added in order to display the image of the OPTION input. (Option)

4. To indicate the current MVP state [SYS command]

Input: SYS

Explanation: The current MVP state is shown when SYS is input.

(Example)

RMD-V3000 Series PROGRAM Ver. 1.00A

ID 0 _____ This is displayed continuously.

MODE 8

DEMO 8

GEN LOCK INTERNAL

MANUAL MODE

L2 INPUT : V.SCAN BOARD

L3 INPUT : NO BOARD

L4 INPUT : NTSC BOARD STANDARD MODE VBS

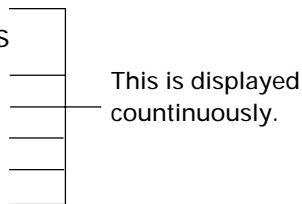
L5 INPUT : NO BOARD

L6 OUTPUT : 4 OUT BOARD

L7 OUTPUT : NO BOARD

L8 OUTPUT : NO BOARD

L9 OUTPUT : NO BOARD



(Contents)

RMD-V3000 Series PROGRAM Ver. 1.00A *1

ID 0 *2

MODE 8 *3

DEMO 8 *4

GEN LOCK INTERNAL *5

MANUAL MODE *6

*7 L2 INPUT : V.SCAN BOARD *8

L3 INPUT : NO BOARD

L4 INPUT : NTSC BOARD

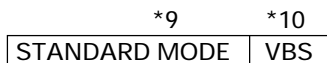
L5 INPUT : NO BOARD

L6 OUTPUT : 4 OUT BOARD *11

L7 OUTPUT : NO BOARD

L8 OUTPUT : NO BOARD

L9 OUTPUT : NO BOARD



*1 : Program version information

*2 : ID No. selection switch setting

*3 : Mode switch setting

*4 : Input video switch setting

(8 : 4-screen magnification by optional RGB input board)

(9 : 4-screen magnification by NTSC input board)

*5 : GEN LOCK internal and external displays

GEN LOCK INTERNAL: Internal synchronization (normally fixed at internal synchronization)

*6 : Display of remote and manual states

REMOTE MODE : Remote state
MANUAL MODE : Manual state

*7 : Slot number

*8 : Type of input board

NTSC BOARD : NTSC input board
V.SCAN BOARD : Variable scan board (option)
NO BOARD : No input board is incorporated

*9 : NTSC input board state

STANDARD MODE : When standard NTSC signal is input
NO STANDARD MODE : When non-standard NTSC signal is input

*10: Display of VBS/Y/C select switch state

VBS : Composite video signal input (Indicates V FIL.ON for the V.SCAN BOARD)
Y/C : Y/C separation signal input (Indicates V FIL.OFF for the V.SCAN BOARD)

*11: Type of output board

4 OUT BOARD : 4 output board
NO BOARD : No output board is incorporated

5. To perform NTSC input board picture quality adjustment

(1) To set the adjustment mode [AJYC command]

(2) To exit the adjustment mode [AJN command]

Input: AJYC , AJN

Explanation: AJYC command : Sets the NTSC input board to the adjustment mode.


AJN command : Exits the adjustment mode.

- When adjusting the NTSC input board, the adjustment command will be ignored if AJYC is not executed.
- * To set the optional variable scan board to the adjustment mode:
: Use the :A command. (Refer to page 156 and on.)

(3) Bright compensation [BRT command]Input: BRTd 


Explanation: Corrects the brightness of the NTSC input board.

d : Compensation value 0 to F *



BRTd  : Displays the current value and moves to the sub command mode

- To execute this command, it is necessary to set the adjustment mode by AJYC. (Refer to the AJYC command.)

- The changed value will be memorized the last.

(Example) BRT3  Sets the bright level to 3.



* Sub command mode of BRT command

The sub command mode is set by BRT .(Example) BRT3 *


* indicates the current value.

Input + and - at the  cursor position.Always input  (CR) to end.**(4) Color compensation [COL command]**Input: COLd₁d₂d₃ 



Explanation: Corrects the color of the NTSC input board.

d₁d₂d₃ : Compensation value 0 to 255COL?  : Help displayCOL  : Displays the current value and moves to the sub command mode

- To execute this command, it is necessary to set the adjustment mode by AJYC. (Refer to the AJYC command.)

- If data input is skipped, the sub command input mode is set after the data is displayed.

COL sub command mode

The COL sub command mode is set by COL .(Example) COL ***


*** indicates the current value.

Input the following sub command at the  cursor position.Always input  (CR) to end.0 to 255  : Ends the sub command mode after a number has been input.

+, - : Increases/decreases the data by one step.

UP1 to 9, 0 : Increases the current data by 1 to 10 steps.

DW1 to 9, 0 : Decreases the current data by 1 to 10 steps.

RES : Defaults the adjustment value (factory setting).

 : Ends the sub command input mode.

- The changed value will be memorized the last.

(Example) COL  UP0  : Increases the color compensation value by 10 steps.

(5) Tint adjustment [TNT command]

Input : TNTd₁d₂d₃ [↵]

Explanation : Corrects the tint of the NTSC input board.

d₁d₂d₃ : Compensation value 0 to 255

TNT? [↵] : Help display

TNT [↵] : Displays the current value and moves to the sub command mode

- To execute this command, it is necessary to set the adjustment mode by AJYC. (Refer to the AJYC command.)
- If data input is skipped, the sub command input mode is set after the data is displayed. The sub command mode is the same as with the COL command.
- The changed value is memorized the last.

(Example) TNT [↵] Indicates the current tint value.

128

[↵]

6. Controls the panel switch function

(1) To set the manual mode [MNL command]

(2) To set the remote mode [RMT command]

Input : MNL [↵], RMT [↵]

Explanation : • Manual mode : Makes the following switch functions effective.

- ① Variable scan board filter on/off switch
- ② VBS/Y/C select switch
- ③ MODE switch (The RESET button is required.)

The manual mode is set at POWER ON (or RESET button).

- Remote mode : Mode in which the above switching setting are selected via the RS-232C line. In this case, the above switch states are ignored.

The settings which can be switched by the remote mode are as follows.

- Optional RGB board FILTER ON/OFF switching
Refer to the DSY and DSN commands (RMD-V3020)
- V IN (Composite video/YC separate) switching
Refer to the CIC and YIC commands.
- V OUT output format (MODE) switching
Refer to NT, NTR, NTD commands.

(3) To select composite video input [CIC command]

Input : CIC [↵]

Explanation : • Select the composite video input of NTSC input board.

- This command is executed in the remote mode.
It is ignored in the manual mode. (Refer to the RMT command.)

(4) To select YC separation input [YIC command]

Input : YIC [↵]

Explanation : • Selects the Y/C separation input of the NTSC input board.

- This command is executed in the remote mode.
It is ignored in the manual mode. (Refer to the RMT command.)

(5) To set the output to the NTSC mode [NT command]

(6) To set the output to standard RGB mode [NTR command]

(7) To set the output to the double-speed RGB mode [NTD command]

Input : NT , NTR , NTD

Explanation : • NT : Sets the NTSC input mode.

H : 15.734 kHz

V : 59.94 Hz

Composite video, Y/C output

• NTR : Sets the standard speed RGB mode.

H : 15.734 kHz

V : 59.94 Hz

• NTD : Sets the double-speed RGB mode.

H : 31.469 kHz

V : 59.94 Hz

• This command is executed in the remote mode.

It is ignored in the manual mode. (Refer to the RMT command.)

(NOTE)

With the RMD-V2550U, only standard speed input is possible.

(8) Optional variable scan board adjustment mode settings [:A command]

Input : A

Explanation: • Used when adjusting the optional variable scan board (RMD-V3020).

• To exit the adjustment mode, omit the parameters and input :.

• For details on adjustments, refer to "VS Board Command Reference" on the following pages.

8. DEMO PATTERN SETTINGS AND CAUTIONS

The MVP does not have an RMD-V3216 type DEMO switch, but 2x2 enlarged screen automatic display is possible by reading the input selector switch (OPTION/V IN) when the power is turned on and executing the command corresponding to that setting.

Because of this, upon shipment from the factory command examples for displaying the MVP 2x2 enlarged screens have been written into the demonstration switch No. 8 and No. 9 areas, which were user program areas on the RMD-V3216.

Switch No. 8 contains the command example for displaying 2x2 enlarged screens for the OPTION input picture (A input).

Switch No. 9 contains the command example for displaying 2x2 enlarged screens for the V IN input picture (C input).

2x2 enlarged screens may not be displayed if the contents of demo No. 8 and demo No. 9 are replaced. If this happens, reset the factory defaults.

The commands written into the set upon shipment from the factory and the procedure for writing the commands are described below.

```
!           : Start the command interpreter and input the following commands.
&NO011     : Matrix screen number setting ..... Set VOUT1 matrix coordinate to 11.
&NO121     : Matrix screen number setting ..... Set VOUT2 matrix coordinate to 21.
&NO212     : Matrix screen number setting ..... Set VOUT3 matrix coordinate to 12.
&NO322     : Matrix screen number setting ..... Set VOUT4 matrix coordinate to 22.
[8         : Write in the command example for 2x2 enlargement of the A input to demonstration switch No.
           8.
W3
M11A22
]
[9         : Write in the command example for 2x2 enlargement of the C input to demonstration switch No. 9.
W3
M11C12
]
```

End.

The RM-V1000NU's internal MVP assembly (AWU1014-) uses slots A and B, but this set uses slots A and C.


Note that because of this the M command setting is different.

9. INSTALLING AND REMOVING BOARDS

For your safety

- Be sure to turn the power off before installing and removing boards.

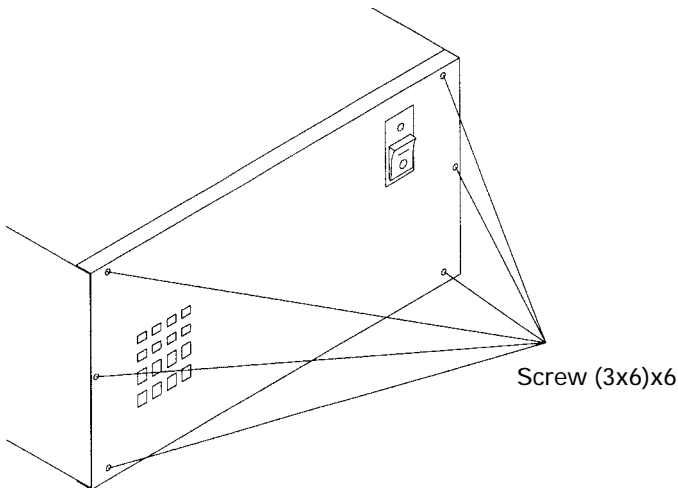
<Installation procedure>

- ① Remove the screws from the front panel, then open the front panel. (Fig. A)
 - ② Insert the board gently along the rails.
Refer to the board layout for the positions for inserting the boards.
 - ③ Press the  part of the white plastic part strongly with a finger and insert the board fully to the back. (Fig. C)
- * The board may not go fully to the back if pressed on the metal part.
- ④ Fasten with the flanged screws (3x6). (Fig. C)
 - ⑤ Set the front panel back in place.

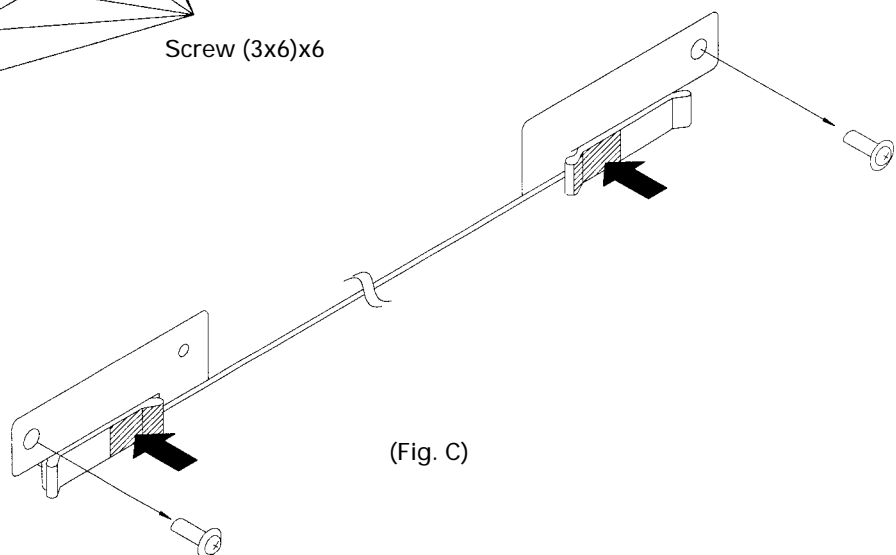
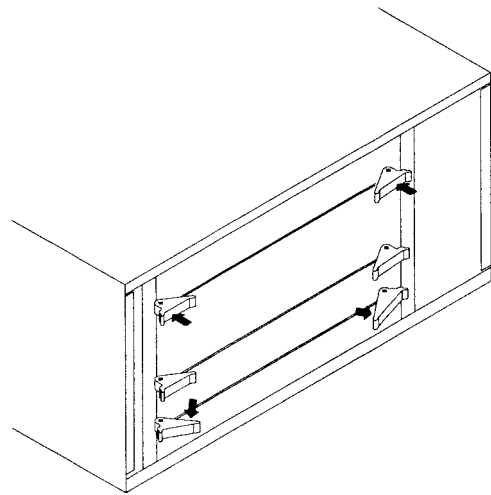
<Removal procedure>

- ① Remove the front panel.
- ② Remove the screws fastening the board to the removed. (Fig. C)
- ③ Lift the ejectors indicated with white arrows. (Fig. B)
- ④ Gently draw out the board along the rails.
- ⑤ Set the front panel back in place.

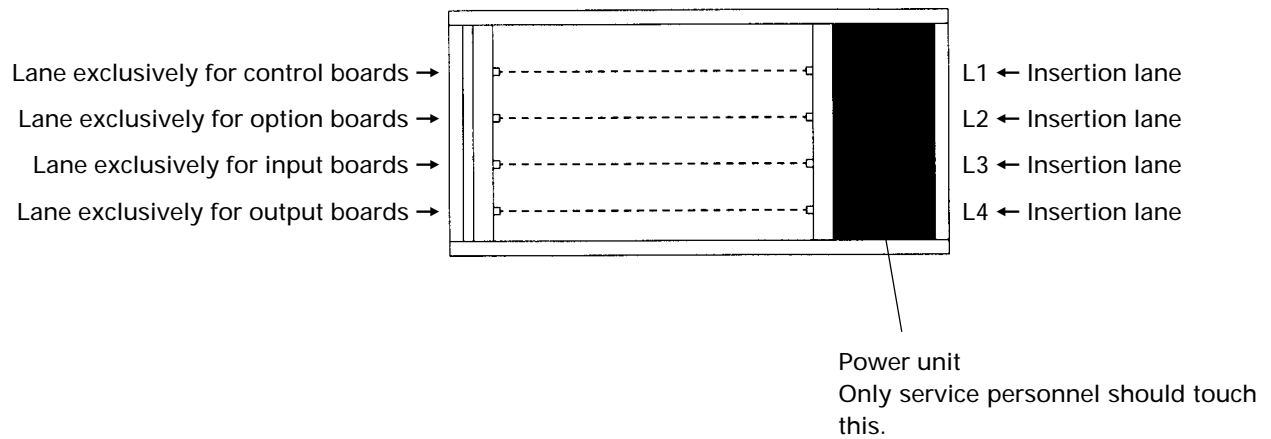
(Fig. A)



(Fig. B)



(Fig. C)

<Board layout>**<Relationship between board insertion lanes and rear panel connectors>**

Board insertion lane Rear panel connector (refer to the diagram of the rear panel on page 18)

L2 ↔ OPTION

L3 ↔ V IN

L4 ↔ V OUT

The board insertion lanes and rear panel connectors are paired as shown above.

10. RMD-V3020 COMMAND REFERENCE

(1) Outline of the RMD-V3020

- Introduction

The RMD-V3020 is an input board (hereafter referred to as VS board) which supports variable scanning for inputting images of computer (hereafter referred to as PC) to the MVP.

Horizontal frequency : 24 kHz to 35 kHz

Vertical frequency : 55 Hz to 72 Hz

Dot clock : Up to 35 MHz

Signal : Non-interlace signal (The HDTV, 15 kHz RGB signal will not be displayed because it is interlaced.)

- Basic functions

With the VS board, standard PC signal information is preset in the memory. When the PC signal is input to the MVP, the images are automatically output in the best state through this board after the model has been discriminated. (For details of the preset models, refer to the M commands of the VS board described later.) Although non-preset models must also be adjusted using general data, images can be output temporarily and these models are compatible with recent PCs, accelerator boards with various resolutions. (Refer to Mode 99 described later.)

Automatic detection cannot be performed but a user-presetable area for 31 models is provided. This enables the data of unknown models to be registered and used in the same way as preset model data.

- Precautions in use

In some cases, problems may occur when communication is carried out with the MVP at 2400 bps in the adjustment of the VS board, etc.

- VS board adjustment mode

In the communication state with the MVP, the VS board adjustment mode can be set by inputting :A.

(2) VS board command rules

0. Symbols

- aaa : Command consisting of 3 alphabet letters
- ddd : Basic commands : Decimals between 0 to 255 consisting of 1 to 3 digits. Can start with 0.
Exceptional commands : Depends on each command.
- xxx : Special data. UP0 to UP9, UPF, DW0 to DW9, DWF, RES.
- hh : 2-character hexadecimal between 00 and FF.

1. Basic commands

- Executed commands
 - aaa : Executes and ends.
ARS, DSN, DSX, DSY, FZN, FZY
- Displayed commands
 - aaa : Displays and ends.
FRQ, TBL, STS, VER
- Numerical commands
 - aaa : Displays and sets sub command state.
 - aaadd : Performs immediate settings, displays, and sets sub command state.
 - aaaxxx : Performs special settings, displays, and sets sub command state.
TRK, RGN, GGN, BGN, CNT, RLV, BLV, BRT, BKL, HPS, VPS, HWN, VWN, HWD, VWD, HFD
- Sub commands
 - ddd : Performs immediate settings, and displays.
 - xxx : Performs special settings, and displays.
 - + : Performs UP1 special settings and updates display.
 - : Performs DW1 special settings and updates display.
 - : : Ends sub command state.

Other commands can be input even if the sub command state has not been ended. In this time, the sub command input mode will be canceled automatically.

- Errors

When aaa contains an error, the "COMMAND ERROR" state is set and the current value is displayed. When ddd contains characters other than 0 to 9, or is outside the 0 to 255 range, the "DATA ERROR" state is set and the current value is displayed. When xxx contains an error, the "DATA ERROR" state is set and the current value is displayed.

When an error occurs in the sub command state, the "SUB COMMAND ERROR" state is set and the current value is displayed.

2. Exceptional commands

- Model data commands

- TBL : Displays the current model data table.
- TBLhh : Displays the hh model data table.
- M : Displays the current model number.
- Mhh : Sets the hh model number.
- Fhh : Sets the hh model number data to the initial value.

When the hh model data does not exist, "***NO DATA***" is displayed. When hh contains characters other than 0 to 9, a to f, and A to F, "DATA ERROR" is set.

- Frequency commands

- HFQ : Displays the current model determination H frequency.
- HFQRES : Sets the current model determination H frequency to the initial value, and displays it.
- HFQddd.ddd : Changes and displays the current model determination H frequency. (Take note of the decimal point.)
- VFQ : Displays the current model determination V frequency.
- VFQRES : Sets the current model determination V frequency to the initial value, and displays it.
- VFQddd.ddd : Changes and displays the current model determination V frequency. (Take note of the decimal point.)

In the case of frequency commands, both the integer and decimal of ddd.ddd must be decimal 3 digit numbers. Numbers between 000.000 to 999.999 can be input.

When d is a character other than 09, when the number of digits is wrong, or the decimal point is at the wrong place, "DATA ERROR" is set, and the current model determination frequency is displayed.

- Line conversion command

- LCV : Displays the current model line conversion rate.
- LCVRES : Sets the current model line conversion rate to the initial value, and displays it.
- LCVdddd : Changes and displays the current model line conversion rate

In the case of line conversion commands, dddd must be a decimal 4 digit number, and the first two digits must be 0015 and the last two must be above 00 and below the first two digits. If d is a character other than 09, or the number of digits is wrong, "DATA ERROR" is set, and the current line number conversion rate is displayed.

Both 0000 and 0101 are not convertible.

- Line number command

- VLN : Displays the current model determination line number.
- VLNRES : Initializes and displays the current model determination line number.
- VLNddd : Changes and displays the current model determination line number.

In the case of the line number command, ddd must be a decimal 3 digit number. Numbers between 000 and 999 can be input.

When d is a character other than 09, or when the number of digits is wrong, "DATA ERROR" is set, and the current line number is displayed.

(3) Tracking adjustment [TRK command]

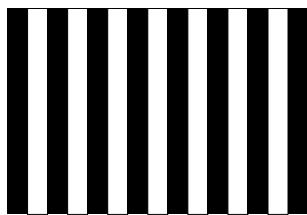
Input : TRKd₁d₂d₃

Explanation: • d₁d₂d₃ : Compensation data 0 to 254

- Eliminates lateral vibration of displayed characters, shaking, and noises.



- A vertical line pattern in which the black and white lines change every dot as shown below is the ideal for adjustments.



(4) Contrast adjustment [CNT command]

Input : CNTd₁d₂d₃

Explanation: • d₁d₂d₃ : Compensation data 0 to 254

- Use this command to adjust the contrast.
- Use this command to adjust so that the contrast of the images produced by the MVP matches the contrast of the actual images of the computer.
- Tracking may deviate in some cases when CNT adjustment is performed after TRK adjustment. After adjusting CNT, adjust TRK.

(5) R, G, B gain adjustment [RGN, GGN, BGN commands]

Input : RGNd₁d₂d₃, GGNd₁d₂d₃, BGNd₁d₂d₃

Explanation: • d₁d₂d₃ : Compensation data 0 to 254

- GGN : Green gain adjustment
- RGN : Red gain adjustment
- BGN : Blue gain adjustment
- Use this command to adjust so that the white balance of the images produced by the MVP matches the white balance of the actual images of the computer.
- Tracking may deviate in some cases when gain adjustment is performed after TRK adjustment. After adjusting gain, adjust TRK.

(6) Brightness adjustment [BRT command]

Input : BRTd₁d₂d₃

Explanation: • d₁d₂d₃ : Compensation data 0 to 254

- Use this command to adjust the brightness.
- Use this command to adjust so that the brightness of the images produced by the MVP matches the brightness of the actual images of the computer.
- Tracking may deviate in some cases when brightness adjustment is performed after TRK adjustment. After adjusting brightness, adjust TRK.

(7) B, R clamp adjustment [BLV, RLV commands]

Input : BLVd₁d₂d₃, RLVd₁d₂d₃

Explanation : • d₁d₂d₃ : Compensation data 0 to 254

- BLV : Adjusts the B clamp level.
- RLV : Adjusts the R clamp level.
- Use this command to adjust so that the white balance of the low light side of the images produced by the MVP matches that of the actual images of the computer.
- Tracking may deviate in some cases when clamp level adjustment is performed after TRK adjustment. After adjusting the clamp level, adjust TRK.

(8) Blanking window level adjustment [BLK command]

Input : BLKd₁d₂d₃

Explanation : • d₁d₂d₃ : Compensation data 0 to 254

- Adjusts the bright level of the blanking window.
- Use to adjust the VS board picture frame and prevent burning.
- Adjust the blanking window position and width using HWN, HWD, VWN, and VWD.

(9) Horizontal, vertical direction screen display position adjustment [HPS, VPS commands]

Input : HPSd₁d₂d₃, VPSd₁d₂d₃

Explanation : • d₁d₂d₃ : Compensation data 0 to 254

- HPS : Moves the screen horizontally.
- VPS : Moves the screen vertically.

However, the blanking window does not move and only the screen inside the window moves. The moving range of the screen is not limited to the blanking window.

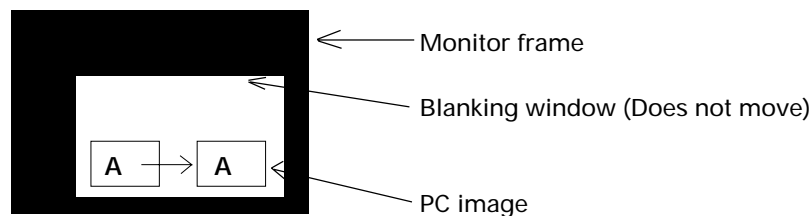


Figure: Example of HPS Command Execution

(Note)

HPS, HWN, and HWD are commands to change reading and writing timings of the image memory, and are mutually correlated. For this reason, Each of these three commands has a limited value without varying the 0 to 255 range.

VPS, VWN, and VWD are also the same.

When the above command become the limited values, the image blinks three times.

(10) Horizontal, vertical blanking window position adjustment

[HWN, VWN commands]

Input : HWNd₁d₂d₃, VWNd₁d₂d₃

Explanation : • d₁d₂d₃ : Compensation data 0 to 254

- HWN : Adjusts the H blanking window position.
 - VWN : Adjusts the V blanking window position.
- However, the picture inside the blanking window also moves.

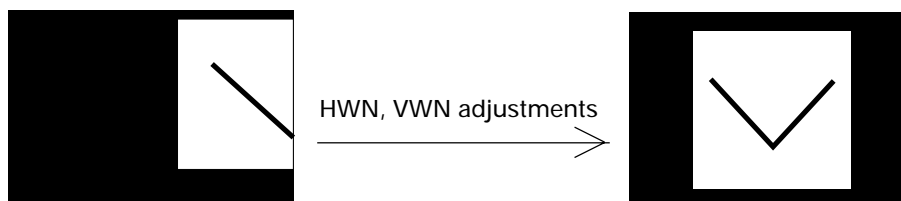


Figure: Example of HWN, VWN Command Adjustment

(Note)

HPS, HWN, and HWD are commands to change reading and writing timings of the image memory, and are mutually correlated. For this reason, Each of these three commands has a limited value without varying the 0 to 255 range.

VPS, VWN, and VWD are also the same.

When the above command become the limited values, the image blinks three times.

(11) Horizontal, vertical blanking window width adjustment

[HWD, VWD commands]

Input : HWDd₁d₂d₃, VWDd₁d₂d₃

Explanation : • d₁d₂d₃ : Compensation data 0 to 254

- The pedestal of the video signal is masked by blanking which can adjust the bright level.
- HWD : Adjusts the H blanking window width.
- VWD : Adjusts the V blanking window width.

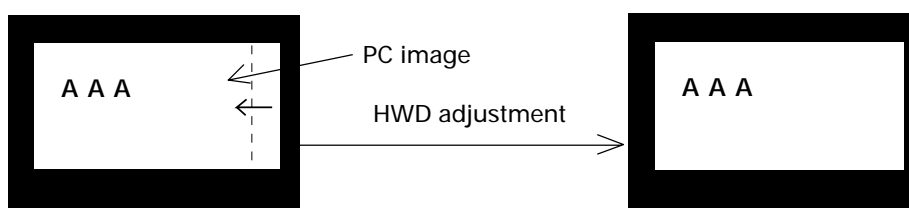


Figure: Example of HWD Execution

(Note)

HPS, HWN, and HWD are commands to change reading and writing timings of the image memory, and are mutually correlated. For this reason, Each of these three commands has a limited value without varying the 0 to 255 range.

VPS, VWN, and VWD are also the same.

When the above command become the limited values, the image blinks three times.

(12) Full dot number compensation [HFD command]

Input : HFDddd

Explanation : • d₁d₂d₃: Compensation data 0 to 254

- Corrects the preset sampling clock.
- Vertical bit lines can be erased by executing the HFD command.
- The HFD and HPS data are correlated and have limited values.

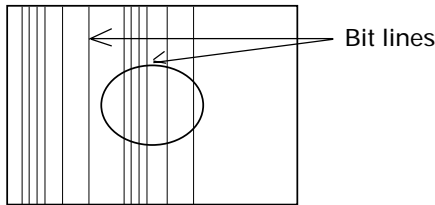


Figure: Bit Lines which can be Erased by HFD Execution

(13) Freeze frame Y:ON N:OFF [FZY, FZN commands]

Input : FZY, FZN

Explanation : • Continuously outputs the image the moment the FZY is executed. This is canceled by FZN.

- Whether the state is FZY or FZN can be determined by executing the STS command.
- Do not perform position adjustments in the FZY state.

(14) Vertical filter ON/OFF [DSY, DSN, DSX commands]

Input : DSY, DSN, DSX

Explanation : • Converts the vertical line number so that the computer images can be displayed fully on the monitor.

- The conversion rate preset by the LCV command can be changed. (Refer to LCV command.)
- Whether the state is DSY or DSN can be determined by executing the STS command.

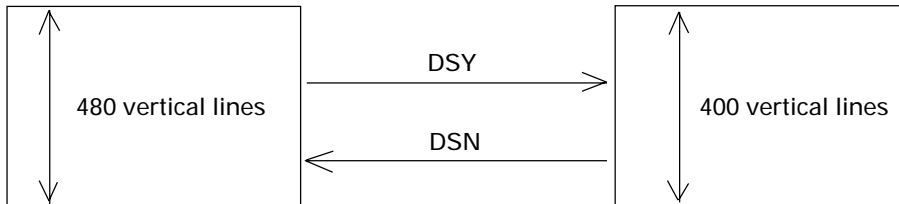


Figure: Example of DSY and DSN Executions (MAC 6-5 Conversion Example)

- The DSX is a command which makes the V.FIL switch on the rear of the MVP effective.

(15) Vertical compression filter conversion rate input [LCV command]

Input : LCVd₁d₂d₃d₄

Explanation : • d₁d₂=00 to 15 (Add 0 before all numbers below 9) Vertical direction rate before conversion

- d₃d₄=00 to 15 (Add 0 before all numbers below 9) Vertical direction rate after conversion

Due to the use of a compression filter, the condition is d₁d₂ > d₃d₄.

Both LCV0000 and LCV0101 are not convertible.

- Directly changes the vertical filter conversion rate of the data table of the model using the VS board currently.
- When the conversion rate is changed for DSY, the image compressed by the new conversion rate will be output.

(Example)

: LCV0605 Set 6→5 conversion

(16) Program ROM version display [VER command]

Input : VER

Explanation : • Indicates the version of the program ROM mounted in the current VS board.

(Example)

: VER
PROGRAM VERSION=BXY1004-X VX.XX 199X.XX.XX

(17) To indicate the current function setting [STS command]

Input : STS

Explanation : • Displays the model data No., selected state (auto or forced), vertical filter ON, OFF, and freeze ON, OFF selected by the VS board currently.

(Example)

: STS
STATUS=DSY, FZN
MODEL NO.=09 AUTO
: STS
STATUS=DSY, FZN
MODEL NO.=03 FIXED

Autolocks to PC9801 with the left display, indicates vertical filter ON, freeze OFF.

Forcible locks the Macintosh with the left display, indicates vertical filter ON, freeze OFF.

(18) To select preset model [M command]Input : Mh₁h₂

Explanation : • Refer to "VS Board Model Selection" described later for the VS board model selection.

- Forcible locks the model data preset.

Model data No.

h₁ h₂

0 0 Discriminates the model.

0 1 VGA (640 x 480)

0 2 IBM-PC (EGA emulation)

0 3 Macintosh 13-inch monitor mode (Standard)

0 4 Macintosh 13-inch monitor mode (RasterOps type)

0 5 Macintosh 13-inch monitor mode (Power Mac)

0 6 FM-R50

0 7 IBM Think Pad 230C

0 8 X68000

0 9 NEC PC9801 (640 x 400 mode)

1 0

| } Unused area (Do not specify using the M command.)

2 7

2 8

| } User preset area (Use only with the M command.)

5 8

9 9

Models other than above.

This model data can be locked only using the M command.

The data range which can be preset by the user is 28 to 58. 28 to 58 contains the VGA data (same as 01) at shipment.

Refer to Mode 99 mentioned later for details of model No. 99.

(19) Model fresh [F command]Input : Fh₁h₂

Explanation : • Sets back to the model data preset at shipment.

Model data No.

h ₁	h ₂	
0	0	Auto
0	1	VGA (640 x 480)
0	2	IBM-PC (EGA emulation)
0	3	Macintosh 13-inch monitor mode (Standard)
0	4	Macintosh 13-inch monitor mode (RasterOps type)
0	5	Macintosh 13-inch monitor mode (Power Mac)
0	6	FM-R50
0	7	IBM Think Pad 230C
0	8	X68000
0	9	NEC PC9801 (640 x 400 mode)
1	0	Unused area (Do not specify using the M command.)
2	7	
2	8	User preset area
5	8	
9	9	Models other than above.

This model data can be locked only using the M command.

The data range which can be preset by the user is 28 to 58. 28 to 58 contains the VGA data (same as 01) at shipment.

Refer to Mode 99 mentioned later for details of model No. 99.

(20) Measurement data display [FRQ command]

Input : FRQ

Explanation : • Displays the horizontal frequency, vertical frequency, and full line number of the personal computer connected to the MVP currently. Use as reference when inputting the data of models whose details are unknown.

(Example)

: FRQ

fH=24 kHz, fV=56.4 Hz, 1V=440 LINE.

(21) Model table reference [TBL command]

Input : TBLh₁h₂

Explanation : hh model data No. (Refer to the M command for the model data No.)

- Displays the data table of the model data h₁h₂ model.

When h₁h₂ is omitted, displays the data table of the model connected to the VS board currently.

(Example)

: TBL

MODEL NO.=09 AUTO (Indicated autolocked to PC98.)

ADDR	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
C140	09	⊙	48	30	08	48	01	45	06	40	38	20	FF	FF	FF	FF
C150	FF	05	64	32	04	40	00	30	04	00	11	FF	FF	FF	FF	FF
C160	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
C170	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF

The address of ⊙ is:

C140 (Left number) +1 (Top number)=C141 address.

This address is considered as the hexadecimal address conforming to C140.

The relative addresses on the table are as follows. (Not model data.)

ADDR	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
	10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F
	20	21	22	23	24	25	26	27	28	29	2A	2B	2C	2D	2E	2F
	30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	3E	3F

The relative address and data are as follows.
However, relative addresses 20 to 3F are the system reservation range.

Relative ADDR	Data Contents	Relative ADDR	Data Contents
00	Model data No.	10	Reservation
01	Horizontal frequency	11	Vertical frequency
02	NNN.NNN kHz	12	NNN.NNN kHz
03	(BCD 6 digits) Note 1	13	(BCD 6 digits)
04	Total horizontal dots	14	Total vertical line number
05	(BCD 4 digits)	15	(BCD 4 digits)
06	Horizontal effective start position	16	Vertical effective start position
07	(BCD 4 digits)	17	(BCD 4 digits)
08	Horizontal effective dot number	18	Vertical effective line number
09	(BCD 4 digits)	19	(BCD 4 digits)
0A	Clamp head	1A	Line conversion rate Note 4
0B	Clamp period	1B	Reservation
0C	Gain upper limit	1C	
0D	Clamp upper limit	1D	
0E	Sync method Note 2	1E	
0F	Sync polarity Note 3	1F	Reservation

Note 1 : For example, taking the PC98 table on the previous page as an example, as the relative addresses 01, 02, and 03 contain data 02, 48, and 30, the PC98 horizontal frequency setting value is 24.83 kHz.

Note 2 : FF when the method is not limited.

Note 3 : FF when the polarity is not limited.

Note 4 : If the relative address data is:

65 : Indicates 6-5 conversion

A7 : Indicates 10-7 conversion.

(22) Horizontal frequency input [HFQ command]

Input : HFQd₁d₂d₃.d₄d₅d₆

Explanation : • Directly changes the horizontal frequency of the model data table used for the VS board currently.

- Input the frequency using 6-digit decimal numbers. When data input is omitted, the horizontal frequency on the current model data table is displayed.
- Refer to “Using Methods of HFQ, VFQ, VLN” described later on the using methods.

(Example)

HFQ035.123 ←————— Input 35.123 kHz

(Take note to input 0 at first.)

Although numbers outside the horizontal frequency specification range (24.0 kHz to 35.0 kHz) range of this board can be input, they cannot be used as preset data.

(23) Vertical frequency input [VFQ command]Input : VFQd₁d₂d₃.d₄d₅d₆

Explanation : • Directly changes the horizontal frequency of the model data table used for the VS board currently.

- Input the frequency using 6-digit decimal numbers. When data input is omitted, the vertical frequency on the current model data table is displayed.
Although numbers outside the vertical specification range (55.0 kHz to 72.0 kHz) range of this board can be input, they cannot be used as preset data.
- Refer to "Using Methods of HFQ, VFQ, VLN" described later on the using methods.

(Example)

VFQ060.123 ←————— Input 60.123 kHz

(Take note to input 0 at first.)

(24) Vertical full-line input [VLN command]Input : VLNd₁d₂d₃

Explanation : • 3-digit decimal numbers between 000 to 999 can be input for ddd.

- Directly changes the vertical full line number of the model data table used for the VS board currently.
- Refer to "Using Methods of HFQ, VFQ, VLN" described later on the using methods.

(25) All reset [ARS command]

Input : ARS

Explanation : • Sets back the adjustment data, etc. memorized by the VS board to the shipment values.

- As all the data registered by the user are set back to the initial values, use this command carefully.

11. MODE 99

The VS board contains preset data for autolocking 9 computer main models at shipment.

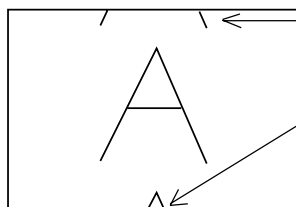
However, looking at the recent PC market is taken into consideration, it is not possible to incorporate preset data in all models due to the diversification of manufacturers, models, and graphic mode, etc.

For this reason, the variable scan board has been forcibly locked to the mode called model data 99 for personal computers without preset data in order to output the personal computer screen to the monitor.

Consequently, it can deal with many of the 24 kHz to 35 kHz personal computers (the upper limit for the dot clock is 35 MHz).

However, this model No. 99 has several restrictions in order to deal with numerous personal computers.

- When the HFD command to change the sampling clock exceeds 35 MHz, the image may become blur. Use 99 without moving HFD as much as possible.
- At the point the personal computer locked to model No. 99, dusts may appear at the top and bottom as shown in the figure.



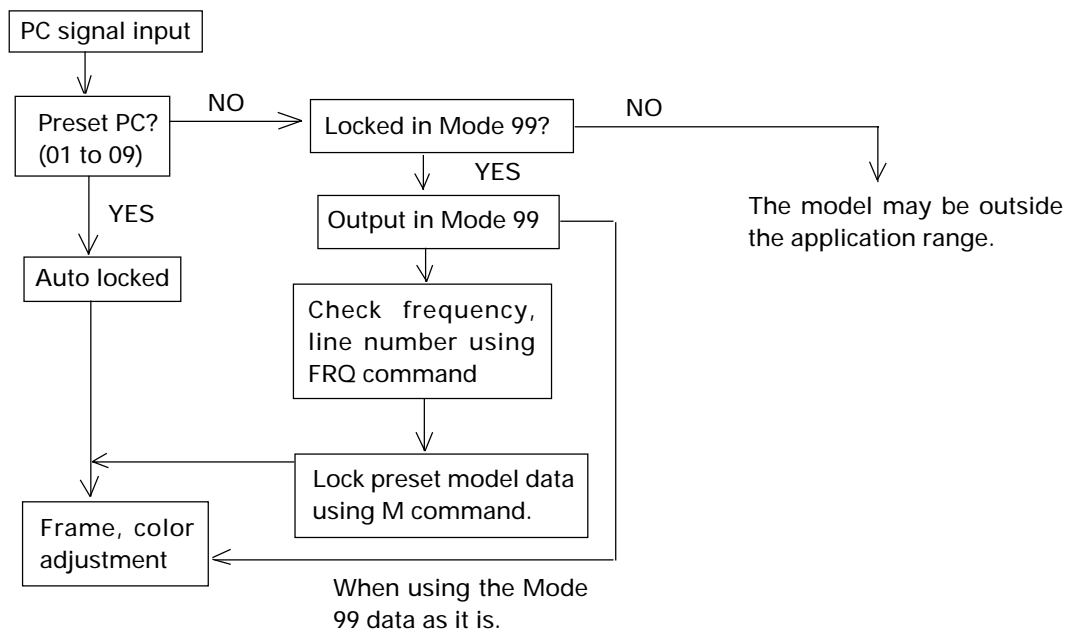
Dusts appearing at the top and bottom.

In such cases, use the VWM, VPS and VWD commands to mask the dirt.

- The RGB board is the upper limit at which the dot clock 35 MHz ensures performance. The following is a simple calculation method of the dot clock.

$$\text{Dot clock (Hz)} = \text{Effective dot number} \times \text{Horizontal frequency (Hz)} \times 1.35$$
- Use Mode 99 to output images temporarily. When used, it is recommended that the user preset area (No. 28 to 58) be changed and used after checking the frequency, etc. using FRQ command.
- The G on Sync model is not locked in the Mode 99.

12. VS BOARD MODEL SELECTION



Description

With the VS board, first the input PC frequency and full line number are measured. Next, if there are preset models which have three matching measuring data, it is determined that these models are connected and they are set into the autolock state.

In the autolock state, 01 AUTO is displayed by the STS command.

If there exists no preset model data corresponding to the measuring data, all models are autolocked to Mode 99. (Refer to "MODE 99".)

Take note that there are DOS/V personal computers which have 640 effective dot number and 480 effective line number but a different full line number (526 or 524) from the standard VGA 525. In this case, their models are autolocked to Mode 99.

As the frequency is close to the VGA, when the VS board is forcible locked to the VGA by M01 and data is output, the image frame, etc. will be optimum. In this way, the M command is used when using the preset data as substitute data.

13. USING METHODS OF HFQ, VFQ, VLN

There is a need to autolock unpreset models without using the Mode 99 according to the state in which the VS board is used.

The procedure is as follows.

1. Input a PC without the preset data.
2. Autolock to 99.
3. Check the frequency and full line number using the FRQ command.
4. Forcible lock using the M command to the model with a similar frequency.
5. Input the checked data using HFQ, VFQ, and VLN.
6. Execute M00 and check that it has been auto locked.

Unpreset models can also be autolocked using the above procedure. To set back the original state, use the F command.

