TECHNICAL MANUAL (Ver.2.0)

MULTI PROJECTION SYSTEM

RM-V1000NU

⚠ Caution

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

Notes:
- *Pioneer will not be liable for any loss caused by defects of the parts supplied other than by Pioneer.*
- *An damage during shipping will be compensated for only in the case where Pioneer's specific packing materials for shipping are used.*
- *The guarantee of performance is applicable only when the assembly and adjustment described in this technical manual and the adjustment described by the system manual of RM-V2000 have been carried out.*

- *Specifications and design subject to possible modification without notice, due to improvements.*

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The Art of Entertainment

PIONEER RM-V1000NU MANUAL.

This Acrobat (IE: a PDF file) version of the Pioneer RM-V1000NU manual was made from the original digital document and scanning an existing manual. Because of this, there are many less then perfect pages and hand written comments.

As Pioneer is constantly working towards providing the best possible documentation for our products, there may be an improved version of this document available. Please contact your Pioneer representative for additional information.

Josh Kairoff
Pioneer New Media Technology.
October 27, 1997.

CONTENTS

WARNING ⚠

3/٢٤/٩٧

· To 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 OF RM-V1000NU

1. FEATURES OF SYSTEM

● Large screen with little reflection.
The new tinted screen improves the screen contrast and vertical angle of view. Since reflection of external light has also been reduced, viewers feel no visual discomfort even in brightly lit event halls and showrooms.

● Use in bright places
Realizing a high-luminance of 420ft-L for the screen brightness, it can be used adequately in lobbies and open spaces with external light.

● Ultra-thin mullion (approx. 4mm) when combined.
Joint width of about 4 mm even when joined. Thinner and more easy-to-view than before, the problem of missing images and characters has been resolved to a large extent.

● Improvement of adjusting method
　• The convergence adjusting system has been changed form analog to digital. By adopting the 25-point adjusting method (point convergence), adjustment is now even more easy and precise.
　• By adding the linear white circuit, the white balance can be adjusted more precisely.

● Equipped with function to set high picture quality of magnified images and maximum sense of oneness of the screens.
　• Although peripheral light is given adequate luminance to construct the multi-screen, the multi switch is loaded to realize a huge screen with more consistent brightness by the peripheral light compensation circuit. It is also equipped with a function which performs contour correction during enlargement of images to provide natural and high quality enlarged images.
　• The incorporated auto white balance function and ABL (auto brightness limiter) link function control inconsistencies of color and brightness between the screens.

● Wired remote control (RU-V107/Optional) for adjustments.
When setting the multi image system, adjustments of convergence, white balance, etc. can be performed using the wired remote control unit while watching the images on the screen.

● Space-saving slim design with depth of 93 cm.

● Built-in 1-input 4-screen magnification multi video processor.
Built-in multi video processor allows 100-inch magnification screen with one system.
Optional 24 to 35 kHz variable scan board RMD-V3020 can be mounted.

● Split-up design enables the unit to be carried and assembled easily.
3-part separate structure composed of unit R, unit L, and screen allows the unit to be carried easily.

● Reasonable price while providing outstanding features

● Convergence memory
Apart from the standard values set at shipment, up to 3 kinds of data can be memorized for the adjusting value.

● Convenient "color mode selection switch" for camera-reexposure.
A convenient "color mode selection switch" which can set two types of white balance data is provided. For example, when using the system as a monitor for reexposing in broadcast station studios, etc., images exposed using the camera according to the lighting of the studio will come out with unnatural colors. By setting the temperature of one color to 4500°K, natural color reproductions can be realized by one-touch operation.

● On-screen function
In addition to adjusting values, various data to set up conditions, can be displayed on the screen.

● External control function
Equipped with RS-232C external control terminal. Adjustments can be carried out using a personal computer. Various image display function is available. Transmission of control signals to each multi projection unit can be carried out by a daisy chain connected by a control cable (DIN6pin/accessory) for linking the combination terminal. No need for complicated connections. By providing IDs to each multi projection unit, each multi projection unit can be adjusted individually even after the system has been started up.

● Each multi projection unit displays clear and high picture quality images for both NTSC and PAL inputs.

Note:

The built-in multi video processor can be used only for NTSC inputs. It can be made usable for PAL inputs if options are added. For more information, contact Pioneer.

CHAPTER 2. GENERAL SPECIFICATIONS

## 1.   SPECIFICATIONS OF PRODUCT

(1)   General Unit Specifications

Power supply voltage ..... AC100V to 120V, 50/60Hz
Maximum Consumption power 1740VA
   Right unit (including multi video processor)
940VA
   Left unit (no multi video processor) 800VA
External dimensions
   .... 2073 (W)x2065 (H)x938 (D) mm
Weight .... 403 kg (Total)
   Unit R .... 177 kg
   Unit L .... 170 kg
   Screen (x 4)... 14 kg
Accessories
   Mickey bolts .... x 8

Coaxial cable with connector
(no long discrimination tube) .... x 2
Coaxial cable with connector
(with long discrimination tube (orange)) .... x 2
Coaxial cable with connector
(no short discrimination tube) .... x 2
Coaxial cable with connector
(with long discrimination tube (orange)) .... x 2
Cable clamp (For connecting coaxial cable
with connector) .... x 6
Cord with 6P mini DIN .... x 3
Power cord .... x 2
Cable clip .... x 2
Screw .... x 2
Hexagonal bolt .... x 3
Flat washer .... x 3
Spring washer .... x 3
Logo sticker .... x 1
Scrivet (For screen) .... x 28
Screw (For front panel:Spare)......................... x 8
Shield .... x 2
Shield S .... x 1
Scrivet (For shield) .... x 6

* Amplifier speaker (Not incorporated)

Dimensions

① Multi projection system
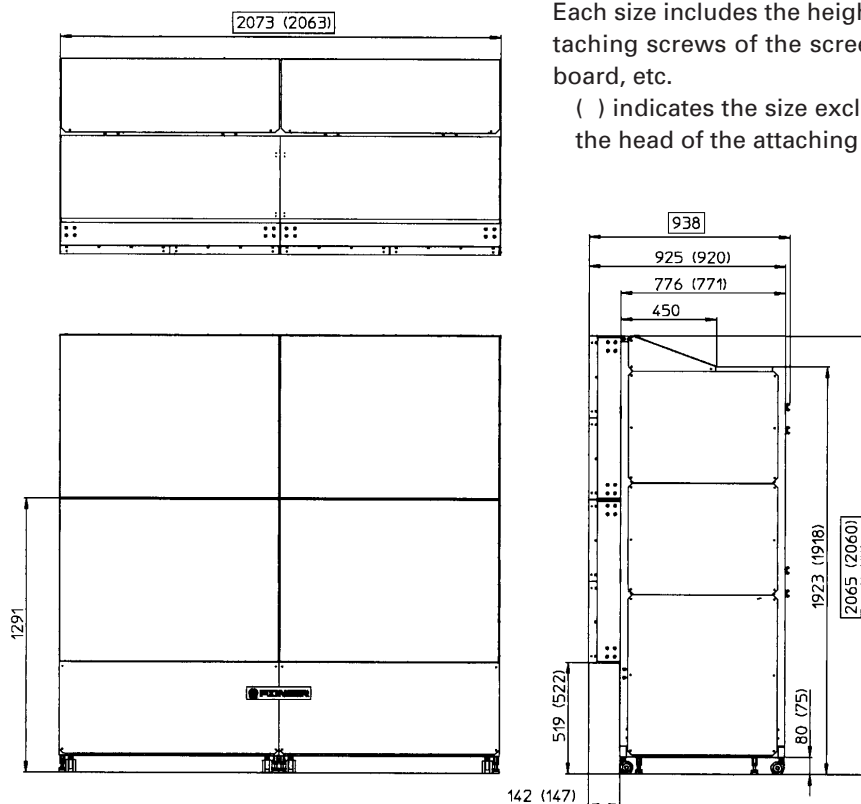
Each size includes the height of the head of attaching screws of the screen and ornamental board, etc.
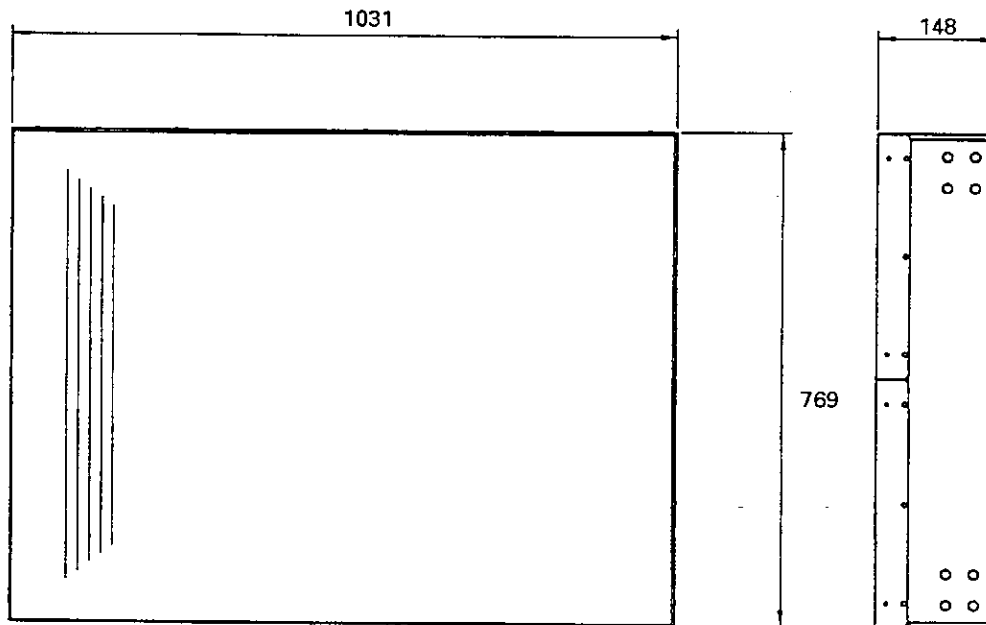   ( ) indicates the size excluding the height of the head of the attaching screws.

(Fig.2-1)   unit : mm

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② **Projection Screen**   **Product Weight : 14.0kg**

(Fig.2-2)   Unit:mm

(2) Multi Projection Unit (referred to MPJ below) (Unit Screen Specifications)

TV format .... NTSC, PAL automatic selection
(Each mode provided) *1
Projection tube 7-inch CRTx3
Horizontal resolution 800 TV lines (In video input mode)
Luminance (For white peak) 420ft-L
Practical visible .... angle Horizontal direction 150 deg
Vertical direction 60 deg
Input signals:
Video input; Standard input level (75 ohm load) 1 V(p-p)
Input terminal: BNC connectorx1
Y/C separation input; Standard input level (75 ohm load)
Luminance (Y) signal 1 V(p-p) (With sync signal)
Color (C) signal: 286 mV(p-p) (Burst signal <NTSC>)
300 mV(p-p) (Burst signal <PAL>)
Input terminal: BNC connector (Y and Cx1 each)
RGB input .... Analog R, G, B signals
RGB-1 : D-Sub 9-PIN connectorx1 *2
RGB-2 : BNC connectorx5 *2
R:Red input .... 0.7 V(p-p)±2dB,
terminated at 75 ohm, positive polarity
G/G SYNC:Green input .... 0.7 V(p-p)±2dB,
terminated at 75 ohm, positive polarity
Green input with SYNC .... 0.7 V(p-p)±2dB,
terminated at 75 ohm, positive polarity
B:Blue input .... 0.7 V(p-p)±2dB,
terminated at 75 ohm, positive polarity
SYNC/HD:Composite sync input .. 0.3V(p-p) to 4V(p-p),
terminated at 75 ohm, negative polarity

Horizontal sync input: .... 0.3V(p-p) to 4V(p-p),
terminated at 75 ohm, negative polarity
VD:Vertical sync input: ....,..... 0.3V(p-p) to 4 V(p-p),
terminated at 75 ohm, negative polarity
Sync. signal frequency: Frequency is in accordance with
NTSC or PAL.
EXT control:BNC connector
Remote input:Mini jack
Linked input:6PIN DIN connector
Output signal
Video output ...... Standard level (75 ohm load) 1 V(p-p)
Outputs input signal from input terminal
Remote output .... 6PIN DIN connector
MPJ Computer control:
Method .... RS-232C (D-SUB 25PIN)
Speed .... 1200, 2400, 4800, 9600, 19200 bps *3

*1 The built-in multi video processor can be used
only for NTSC inputs. It can be made usable for
PAL inputs if options are added. For more infor-
mation, contact Pioneer.

*2 Either RGB1 or 2 is used by switch selection.

*3 The RS-232C baud rate is set to 4800bps before
shipment. The baud rate is controlled by Re-
mote control unit or a personal computer.

Power Supply Panel
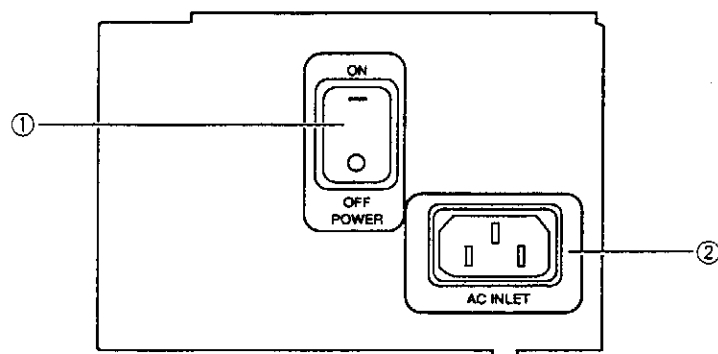
(Fig. 2-3)

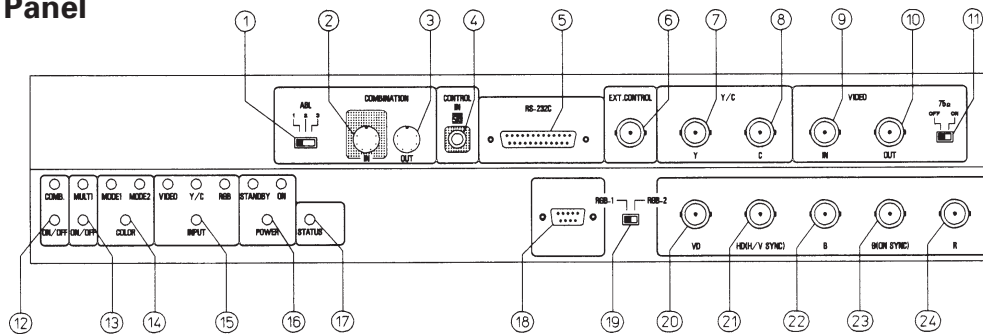| No.	Name	Type	Function
①	Main power switch	See-saw switch	Turns ON/OFF all power supplies to unit R or L.
②	AC inlet		Connects AC power cord.

Note 1) Refer to "CHAPTER 3 (P.20) 1.(12) Power Supply ② Capacity and Connection".

● To turn off the power, use the POWER switch - of the unit, the RS-232C control, or wired remote control (optional). (When the power is turned off using the main power switch of unit L or R or the power supply cable is pulled out of the outlet, the last data set of switches ② to ⑮ next page, TV system data and convergence memory data will not be memorized.)
Consequently, to start and stop the whole system by turning ON/OFF the AC power with the equipments already set, it is necessary to first turn OFF the power by the control by RS-232C, wired remote control unit, control panel, and POWER switch, and memorize the each last set data.
(Refer to "2. (5) Memory of adjustment data and settings" in Chapter 4 (page 38).)

Control Panel

(Fig. 2-4)

No.	Name	Type	Function
①	ABL link switch	Slide switch	Used for switching the control level of the ABL link control voltage when ABL link is ON.
②	Linked input terminal	DIN 6PIN	Input terminal of ABL signal, remote control signal and RS-232C signal
③	Linked output terminal	DIN 6PIN	Output terminal of ABL signal, remote control signal, and RS-232C signal
④	Remote control connection terminal	Mini jack	Connected to adjusting remote control (optional)
⑤	RS-232C port	D-sub 25 PIN (Female)	RS-232C communication connector (For MPJ control)
⑥	Control input terminal	BNC connector	Video input and Y/C input external switching control signal input terminal (Normal(video signal input) : Open Select Y/C input : Low(0V)
⑦	Y (Luminance) input terminal	BNC connector	Luminance 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	TERMINATE switch	Slide switch	Turns on when terminates the video input terminal ⑨ at 75 ohm
⑫	COMBINATION switch	Tact switch	Turns on when linked to ABL
⑬	MULTI switch	Tact switch	Turns on when used on multi screen
⑭	COLOR MODE switch	Tact switch	Switches the color temperature. 1:Normal use. 2:Re-exposure
⑮	INPUT switch	Tact switch	Switches VIDEO input, Y/C input, RGB input. Switches VIDEO input and Y/C input with the external control signal ⑥ at VIDEO position
⑯	POWER switch	Tact switch	Power OFF : STANDBY (Red LED) lights up Power ON : ON (Green LED) lights up
⑰	STATUS switch	Tact switch	Accumulated duty time * (P.11): Switch which displays setting states of each switch on the screen.
⑱	RGB input terminal	D-sub 9PIN (Male)	RGB signal input terminal
⑲	RGB input select switch	Slide switch	Switches RGB signal input terminal type
⑳	RGB input terminal (Vertical sync)	BNC connector	RGB signal vertical sync input terminal
㉑	RGB input terminal (Horizontal sync/composite sync)	BNC connector	RGB signal horizontal sync and composite sync (Only for input signal H/V sync) input terminal
㉒	RGB input terminal (B)	BNC connector	RGB signal B input terminal
㉓	RGB input terminal (G/composite sync)	BNC connector	RGB signal G and composite sync (Input signal G on sync) input terminal
㉔	RGB input terminal (R)	BNC connector	RGB signal R input terminal

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CONTROL PANEL MODE Switches

●COMBINATION switch
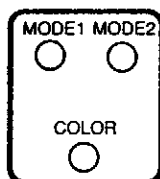
Position	Function
OFF	ABL link is off
ON	ABL link is on

● Turns on or off each time it is pressed. The LED lights up when turned on.

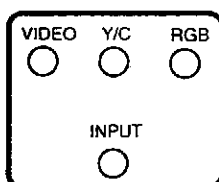### ●MULTI switch

Position	Function
OFF	Changes to a picture quality suitable for single screen
ON	Changes to a picture quality suitable for multiple screens

● Turns on or off each time it is pressed. The LED lights up when turned on.

●COLOR MODE switch

| Position	Function
MODE1	Sets the normal use color temperature. MODE1 LED lights up when selected.
MODE2	Sets the re-expose color temperature. MODE2 LED lights up when selected.

● Sets to MODE1/MODE2 each time it is pressed.

●INPUT SELECT switch

● The input switches each time this switch is pressed.

| Position	Function
VIDEO	The VIDEO input terminal is selected. When selected, the VIDEO LED lights up. When switching to VIDEO or Y/C input by inputting the control signal to the EXT.CONTROL terminal, select this position. <EXT. CONTROL> The VIDEO or Y/C input is selected when the control signal is input to the EXT.CONTROL terminal (BNC). In this case, the VIDEO LED remains lit. Control signals High:VIDEO Low:Y/C The High state is set when the control input terminal is released (normal state). The VIDEO input signal will be selected.
Y/C	The Y/C input terminal is selected. When selected, the Y/C LED lights up.
RGB	The RGB input terminal is selected. When selected, the RGB LED lights up.

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●STATUS switch

STATUS
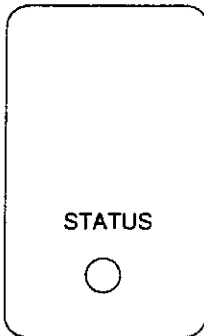
● The display changes cyclically each time it is pressed. The settings can be checked.

Display Example)

1.HOUR	10000 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. Displays the accumulated duty time. (It only counts during the power ON.)
2. Displays the input state. Note)
3. Displays the MULTI ON/OFF state.
4. Displays the COLOR MODE 1/2 state.
5. Displays the COMBINATION ON/OFF state.
6. Shows the muting ON/OFF state of the image when the input function is switched.
7. Displays the communication speed in computer control.
8. Displays the TV SYSTEM state.
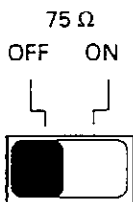9. Displays the memory area of the convergence selected.

[RGB-1 Pin Layout]

M2.6 inner thread screw
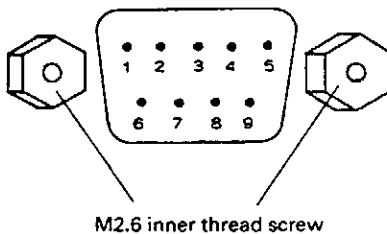
Analog RGB	: 0.7V(p-p) (75ohm)
Sync signal	: 0.3V(p-p) to 4V(p-p) (75ohm)
Connector	: 9-PIN D SUB Connector (Male)

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

[VIDEO Input Pin Termination Switch]

75 Ω
OFF   ON

The video output terminal is the input through-out terminal. When connecting to other units, terminate the terminal of the unit to be connected at 75 ohm, and turn off the 75 ohm TERMINATE switch of the main unit. When not connecting other units, always turn on this switch.

(3) Multi Video Processor (Referred to MVP below)

Input signal

Input video signal (NTSC) **Note 1**

    1-line .... BNC terminal

(One RGB input system can be added with addition of optional RGB board)

    ① Composite video signal

        .... 1.0 V(p-p) (75ohm terminated)

    ② Y/C separation signal

        Y (With sync) .... 1.0 V(p-p) (75ohm)

        C burst level .... 0.286 V(p-p) (75ohm)

    * ① or ② signal format can be selected

    ③ Optional RGB input signal

        RGB signal .... 0.7 V(p-p)(75ohm)

        H.V .... TTL level

        C SYNC .... 0.3-4 V(p-p) (Negative logic)

        Green (Sync on Green) ... 1.0 V(p-p) (75ohm)

        SYNC .... 0.3 V(p-p)

    SYNC priority order

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

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

Output signal

Output video signal

    4-line .... BNC terminal

    ① Composite sync signal ..... 1.0 V(p-p) (75ohm)

    ② Y/C separation signal

        Y (With sync) .... 1.0 V(p-p) (75ohm)

        C (With burst) Burst level

        .... 0.286 V(p-p) (75ohm)

    * ① and ② signal formats are output simultaneously.

    ③ RGB signal

        Green (Sync on Green) .... 1.0 V(p-p)

        SYNC .... 0.3 V(p-p)

        B.R .... 0.7 V(p-p)

Note 1: *The built-in multi video processor can be made usable for RGB and PAL inputs if options are added. For more information, contact Pioneer.*

MVP Panel
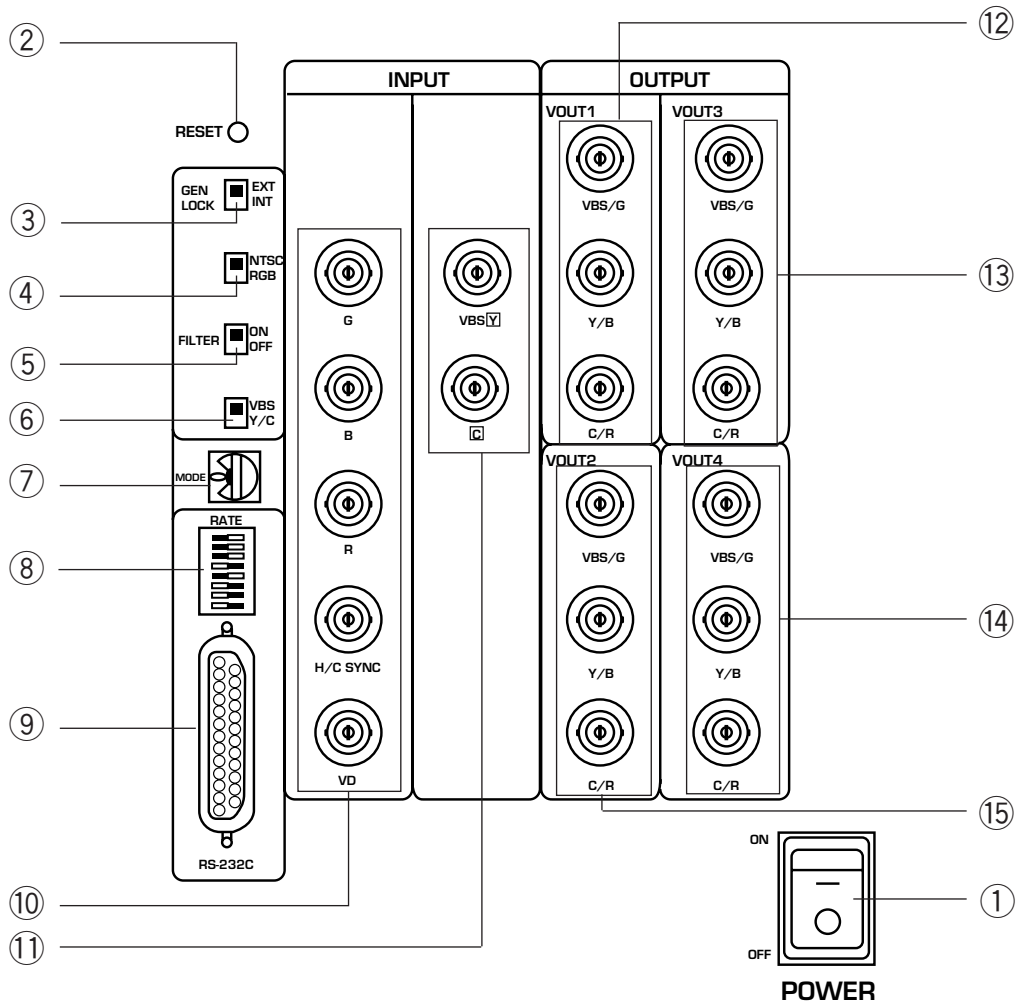
① **POWER switch (Power)**

Used to turn on/off the MVP power.

② **Reset button**

System reset button. When this switch is pressed, the system sets into the manual mode and operates in the modes of the switches set on the panel.

③ **EXT/INT switch**

Normally, this is set to the INT side so that the MVP operates in the free-run mode for video inputs.

Leave it at the INT side unless when using the MVP for special uses such as locking the MVP to the video input.

④ **NTSC/RGB switch**

Select whether to set the NTSC input or RGB input to 4-screen magnification.

It is set to the NTSC side at shipment.

* When switching the switch, press the reset button after switching.
* The RGB input is an option.

⑤ **RGB input vertical filter on/off switch**

Vertical filter on/off switch of optional RGB inputs. If the top and bottom of the RGB input image do not fit inside the output screen, turn on this switch.

At shipment, it is set to off.

⑥ **VIDEO/YC switch**

Switch to set whether to input VIDEO or YC into

⑦ **MODE switch**

Used to select the video output mode.

Output Mode Switch Contents

Switch No. *2	Output Mode			
	Frequency Mode	Output Mode	Standard Speed/ Double Speed *1	Trunk Piece Mitigation Mode
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				

*1
Standard speed horizontal frequency 15.734 kHz
Double speed horizontal frequency 31.468 kHz

*2
The switch is set to 8 at shipment.
Normally, use in the range from 8 to A.
Press the reset button when switching the mode.

⑧ **Baud rate switch**

Used to select the RS-232C (For controlling MVP) baud rate.
Baud rate selection switch (8 BIT DIP)
Functions of bit [ ] .... Value at shipment

Switch No.	Switch function	ON	OFF
1	Parity yes/no	Yes	No
2	Parity polarity	EVEN	ODD
3	Character bit	8 BIT	7BIT
4	Stop bit	2BIT	1BIT
5	Baud rate setting	See table below	
6			
7	RESERVED	Always use at off.	
8	RESERVED	Always use at on.	

Baud rate set by switches No. 5 and 6.

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

* At shipment, 3, 5, and 8 are ON.

⑨ **RS-232C connector**

For controlling MVP

⑩ **RGB video input terminal (Optional)**

Optional RGB input terminal.
G .... G signal input terminal of RGB separation signal
B .... B signal input terminal of RGB separation signal
R .... R signal input terminal of RGB separation signal
H/C SYNC ...... H sync or C SYNC input terminal
V .... V sync input terminal

⑪ **NTSC video input terminal**

NTSC input terminal
VBS .. Y signal input terminal of composite video or Y/C separation signal
C .... C input terminal of Y/C separation signal

⑫ to ⑮ **Video output terminals 1 to 4**

4-screen magnification video output.
VBS/G .... G signal input terminal of composite video or RGB separation signal (Outputs G on SYNC during G signal output).
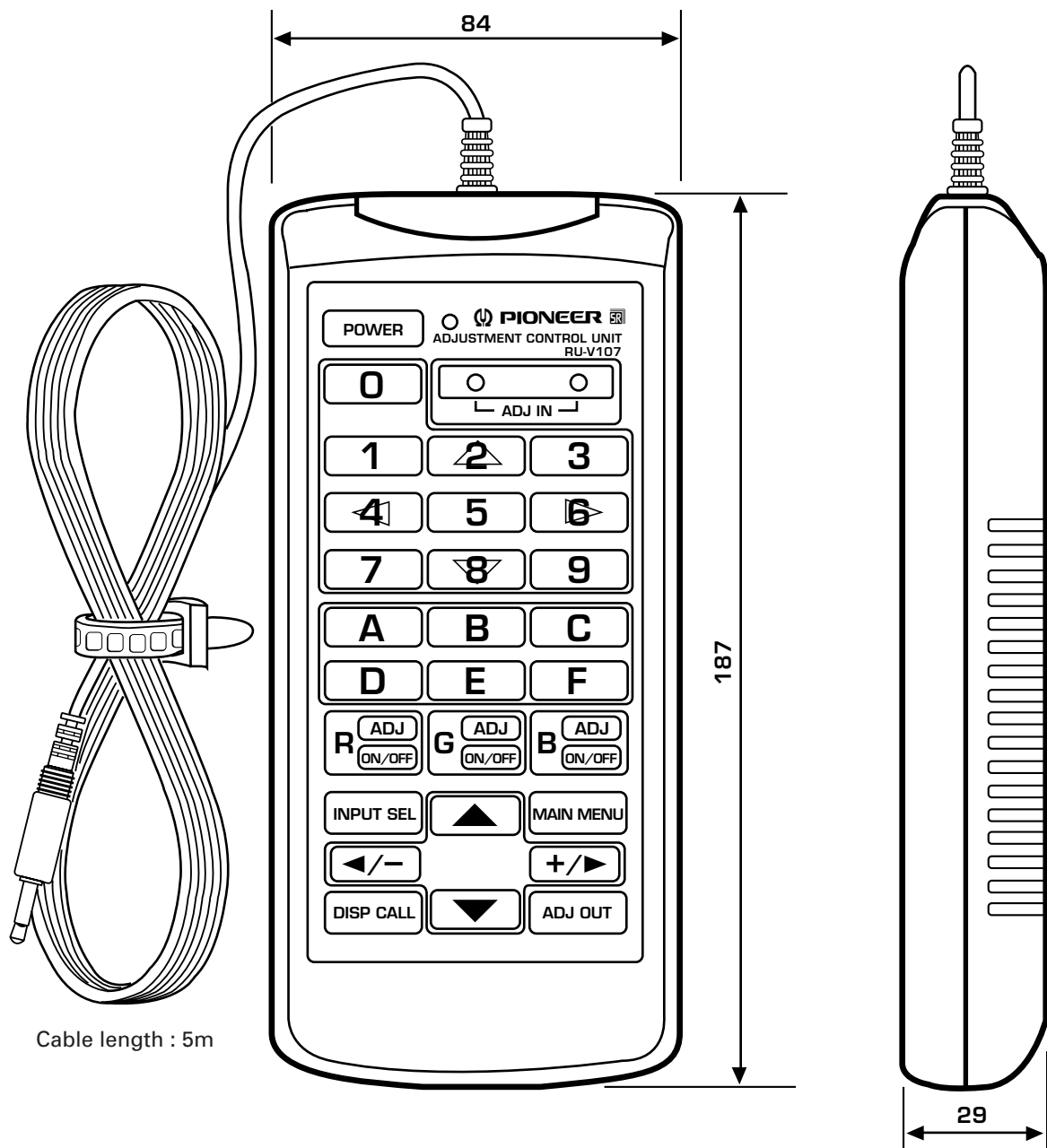Y/B .... Y signal output terminal of Y/C separation signal or B signal output terminal of RGB separation signal.
C/R .... C signal output terminal of Y/C separation signal or R signal output terminal of RGB separation signal.

The signals correspond as follows.

V OUT Screen 1	V OUT Screen 2
V OUT Screen 3	V OUT Screen 4

(Front View)

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

(Fig.2-7)

Accessories

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.
After installation, adjust and secure with the floor leveler.

Floor leveler
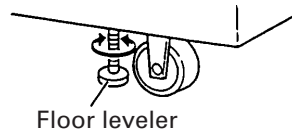
(2) Height to ceiling

● Leave about 30 cm between the top of the system and ceiling. Take note that if there are air-conditioner vents or lights at the top, problems caused by dusts, temperature, humidity, and water drop may result. If adequate space cannot be provided on the left and right sides, and at the back of the system, and the system is be installed directly onto the wall, heat can only be discharged from the top. In such cases, be sure to provide vents for discharging heat. Also observe the temperature and humidity conditions in (7).

(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

● At least 5 cm of space is required at the back of the system. However, leave more than 1 m at the back as working space for the maintenance of the MPJ and MVP.

(5) Installation work for securing system

● After installation, always lower the floor levelers to prevent the system from turning over.
This system is also provided with holes to hook wires for preventing it from turning over. To prevent the system from turning over, it is recommended that it be secured to the floor or wall.
● The method of securing to floors and walls differ according to their materials. Always have a construction specialist or Pioneer dealer perform the procedure for you.
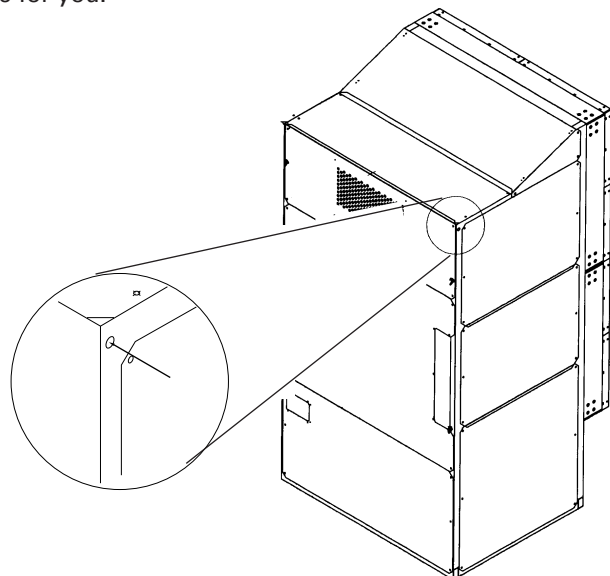
(6) Installation work for mounting on rack

● Blocking the front and back will cause heat to accumulate, which may result in malfunctions.
● Use a rack which can bear the weight of the system.
● Take measures to ensure that the system does not turn over. Always have experienced technicians or your dealer implement these measures.
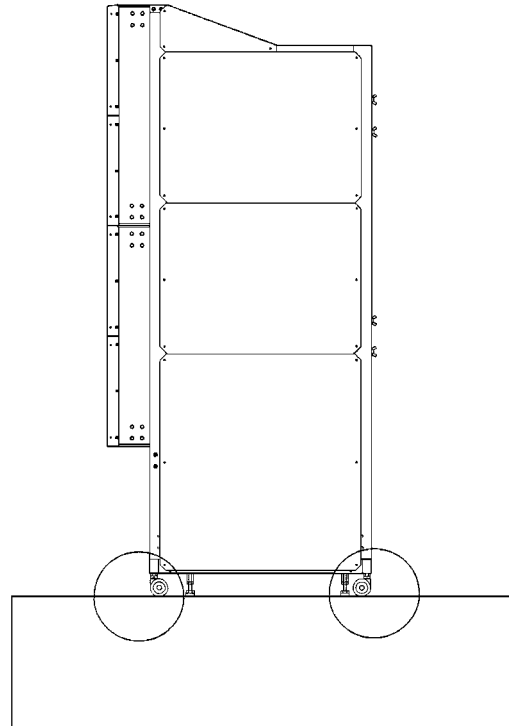
(7) Temperature and Humidity Conditions

● 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 generally 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.

(8) 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.
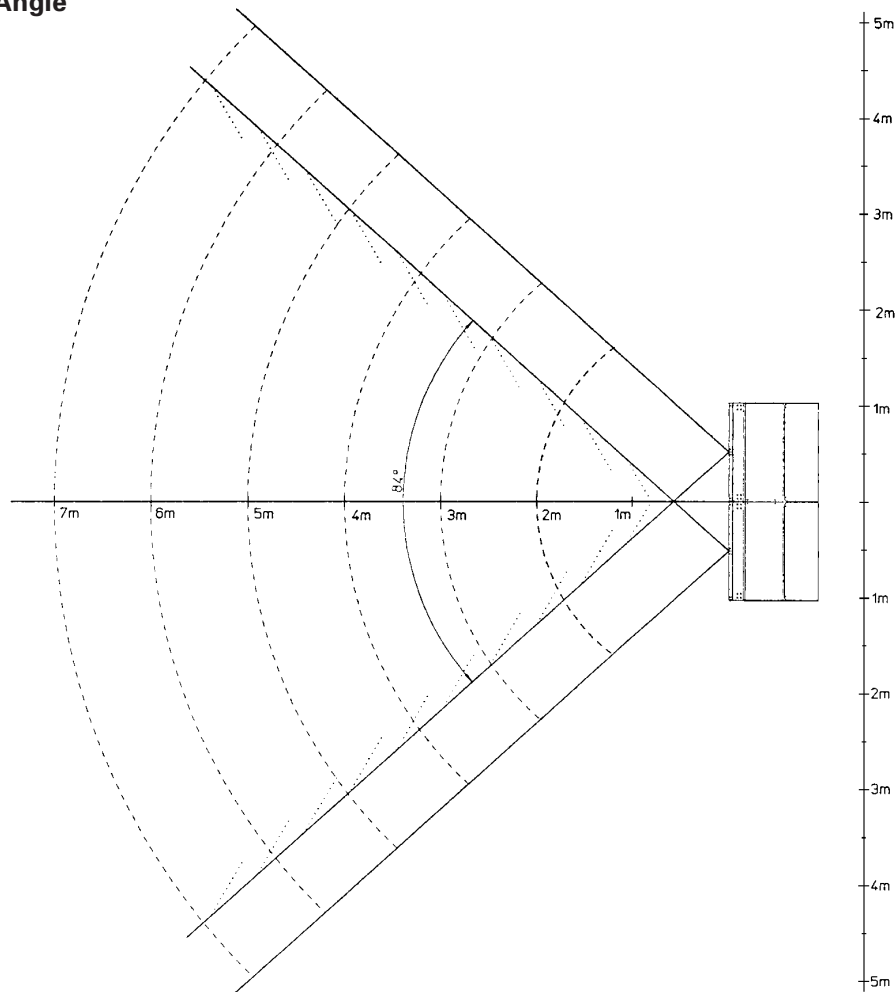
(9) Angle of view and appropriate view range

Vertical Visible Angle
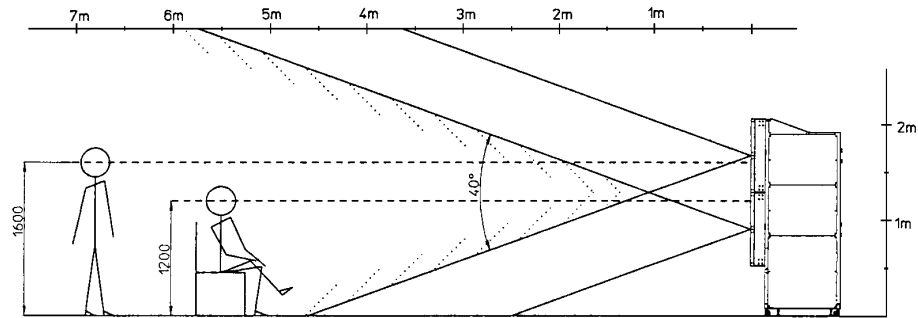
(Fig.3-1)

Horizontal Visible Angle

(Fig.3-2)

(10) Lighting

● Although reflection by external light as seen on CRTs will not occur with this projection screen, reflection may result when strong light such as spot light is directed at the screen. Therefore, make sure that the screens are not exposed to direct spotlight.

● For certain installation location conditions, a glass sheet may have to be attached to the screen surface. In this case, as there will be reflection by external light, consider the installation position, etc. carefully.

● 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).

(11) 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.

Therefore, when performing adjustments before bringing the system into the installing location. Perform the adjustments in the same direction and angle as installation, perform adjustments again at the final location decided.

● If the system is used at a fixed position, adjust it at the final position used.

● 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.

(12) Power Supply ⚠

① Power supply voltage

The guaranteed voltage of this system is ±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 capacity and connection

This system is provided with one AC INLET each for units R and L. Referring to the current capacity below, connect a switchboard with sufficient capacity for the left and right lines separately (the current increases when the voltage drops).

When connecting the same line (same switchboard) to other devices, take note of the power consumption of the other devices and make sure that the capacity of the switchboard is not exceeded.

	Power Capacity	Current Capacity	
		100 V	120 V
Unit R (including MVP)	940 VA	9.4 A	7.8 A
Unit L (no MVP)	800 VA	8.0 A	6.7 A

③ Outlet Plug

The power supply cable of this system is provided with a outlet plug with grounding (2E) to prevent electric hazards caused by current leakage.

Be sure to connect the plug to the outlet with grounding (2E).

④ Leak Breaker

The system is incorporated with the power line filter to reduce noise. For this reason, a leaked current of 2.0 mA may flow through unit R (including MVP) and 1.0 mA through unit L (no MVP). If a current leakage breaker is provided, check that the sensitivity current is above the total current leakage of the system.

Also calculate each unit such as image transmission unit, etc. as 0.5 mA.

Be sure to connect directly to the power supply on the cabinet panel to prevent voltage drop, deformation of the current waveform, and noise inductance.

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.

(13) 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.

(14) 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

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
  Need for protection for the floor, walls, etc. (support covers, sheets, cover boards, etc.), width of the areas and paths used for moving the system in and out, if elevators are used, its size and weight limit, 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) Opening the Packaging

① **Packaging specifications**

[1] Projection Screen Kit (×4)   : 1126(W) × 230(H) × 879(D)mm 20.2kg
[2] Unit(×2)   : 2225(W) × 1200(H) × 1105(D)
            Unit R :   310kg
            Unit L :   303kg

② **Opening the packaging**

Open from the big ones first and put the small packagings inside the empty big packagings. Also dispose or store the packagings.
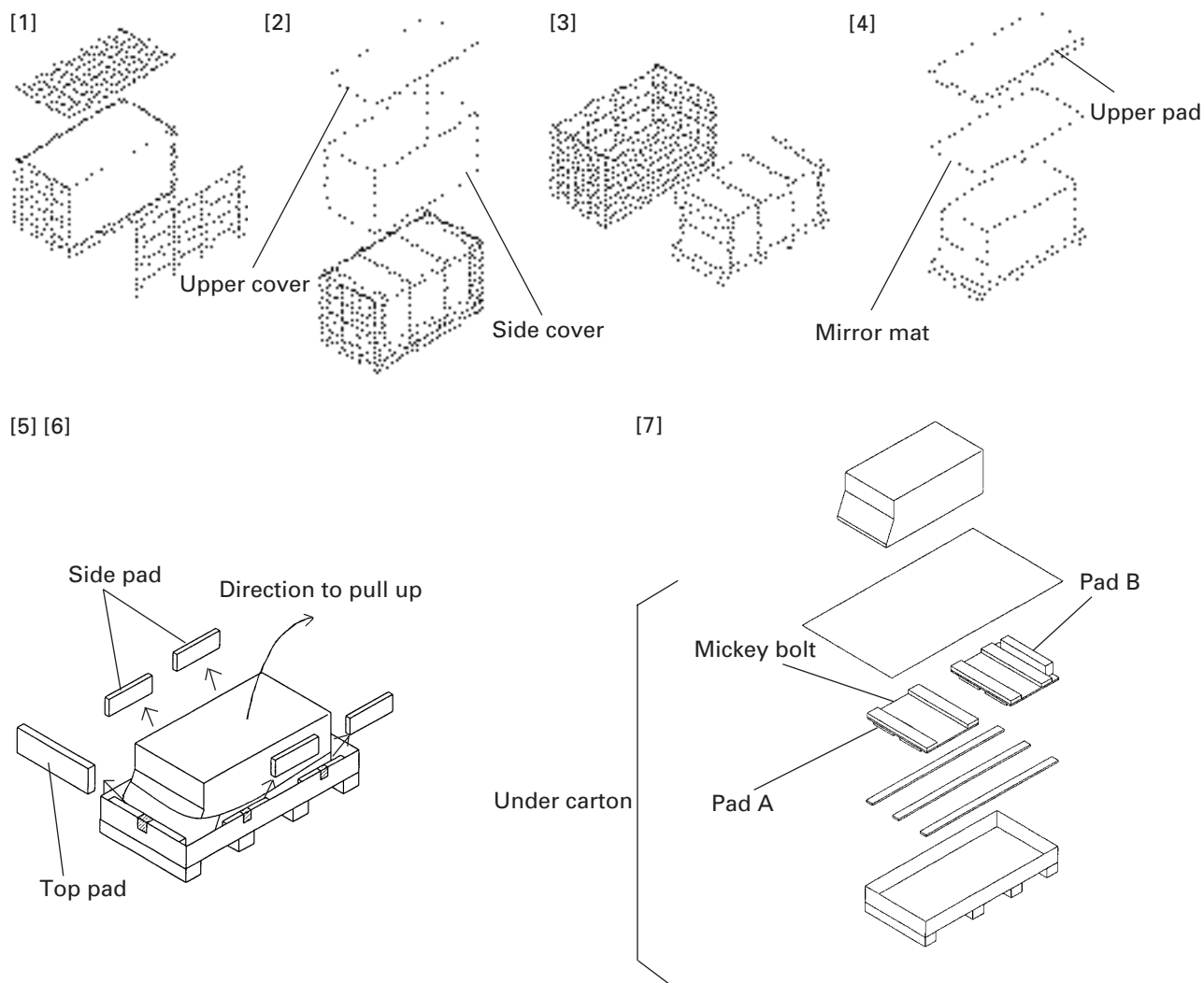Do not mix up the opened items with those still in the packaging.
Move the empty packagings somewhere else so that they will not come in the way. Next, obtain an assembly space that is as wide as possible.
* Turn down the opened packagings upside down to differentiate them from those not opened.
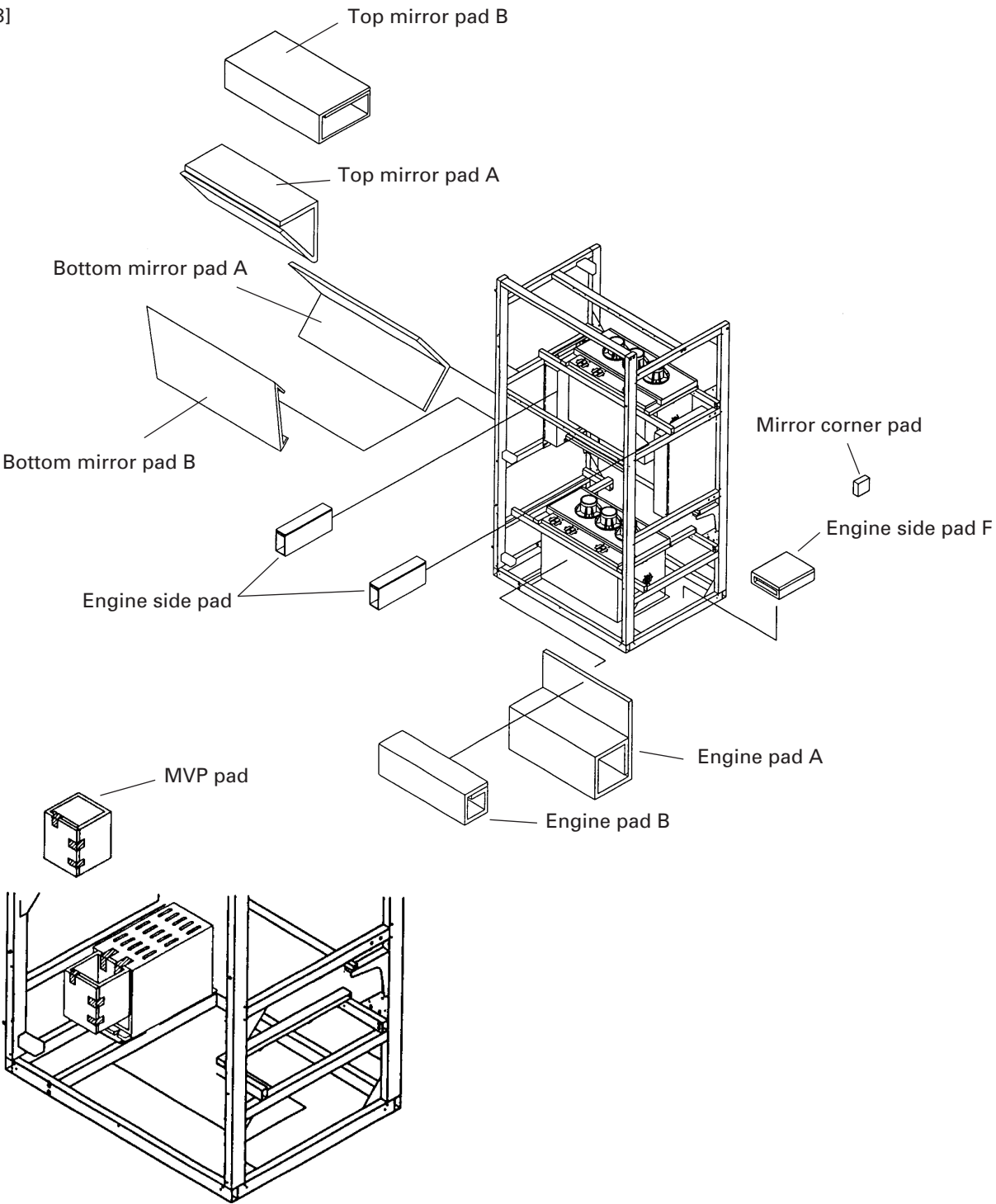 Do not lose accessories, the warranty card, etc.

③ **Unpacking**

[1] Remove the top and side (the longer side) wood frames one by one.

[2] Remove the upper cover and side cover.

[3] Remove the unit from the frames.

[4] Remove the upper pad and mirror mat.

[5] Remove side pad, and top pad covering the unit.
    Remove the tapes for transportation protection. (Six in each unit)

[6] While paying attention to the top and bottom of the unit, place the unit upright together with the under carton. (This should be done by more than 3 persons.)

[7] Remove the under carton.

[8] Remove the engine pads A and B, engine side pad, engine side pad F, bottom mirror pads A and B, top mirror pads A and B, mirror mat (3 each at the top and bottom), MVP pad, lens protector paper, and CRT cover. (Remove engine pads A and B using a cutter knife, etc.)

[9] Attach the Mickey bolt to pad A and the shield to top mirror pad A, and the other accessories to bottom mirror pad B.

[1]   [2]   [3]   [4]

Upper cover
Side cover
Upper pad
Mirror mat

[5] [6]   [7]

Side pad
Direction to pull up
Top pad

Under carton
Mickey bolt
Pad A
Pad B

(Fig.3-3-1)

[8]

Top mirror pad B

Top mirror pad A

Bottom mirror pad A

Bottom mirror pad B

Mirror corner pad

Engine side pad F

Engine side pad

Engine pad A

Engine pad B

MVP pad

(Fig.3-3-2)

④ **Projection Screen**

* Projection screen is double-packaged to maintain its performance. After removing the middle cover protecting its screen, make sure the screen does not get scratched or dirty.

[1] Remove the top cover.

[2] Remove the band securing the middle cover and remove the middle cover.

[3] Gently peel off the black tape pasted at the four sides of the screen.
    * Be careful not to damage the lenticular sheet.

[4] Take out the screen unit from the box and stand it on a flat floor, paying attention to its top and bottom.

[5] Remove the eight screws for transportation (gold), four protection panels and white sheet at the back of the screen.
    * The protection panel is attached with the transportation screws. Keep the removed panel if required. When storing the system, do not remove the outermost protection panel.

[6] When opening the packagings of several units first, after opening them, place them in a different place to protect them from damage, and place a sheet over them to protect them from dusts.
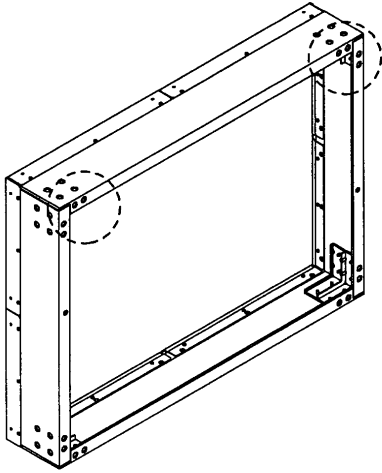
[1]

Top cover

[2]

Middle cover

Band

[3]

Black tape

[4]

Top

Right side

Flat floor

Transportation screws (Eight : Gold)

Protection panel

[5]

White sheet
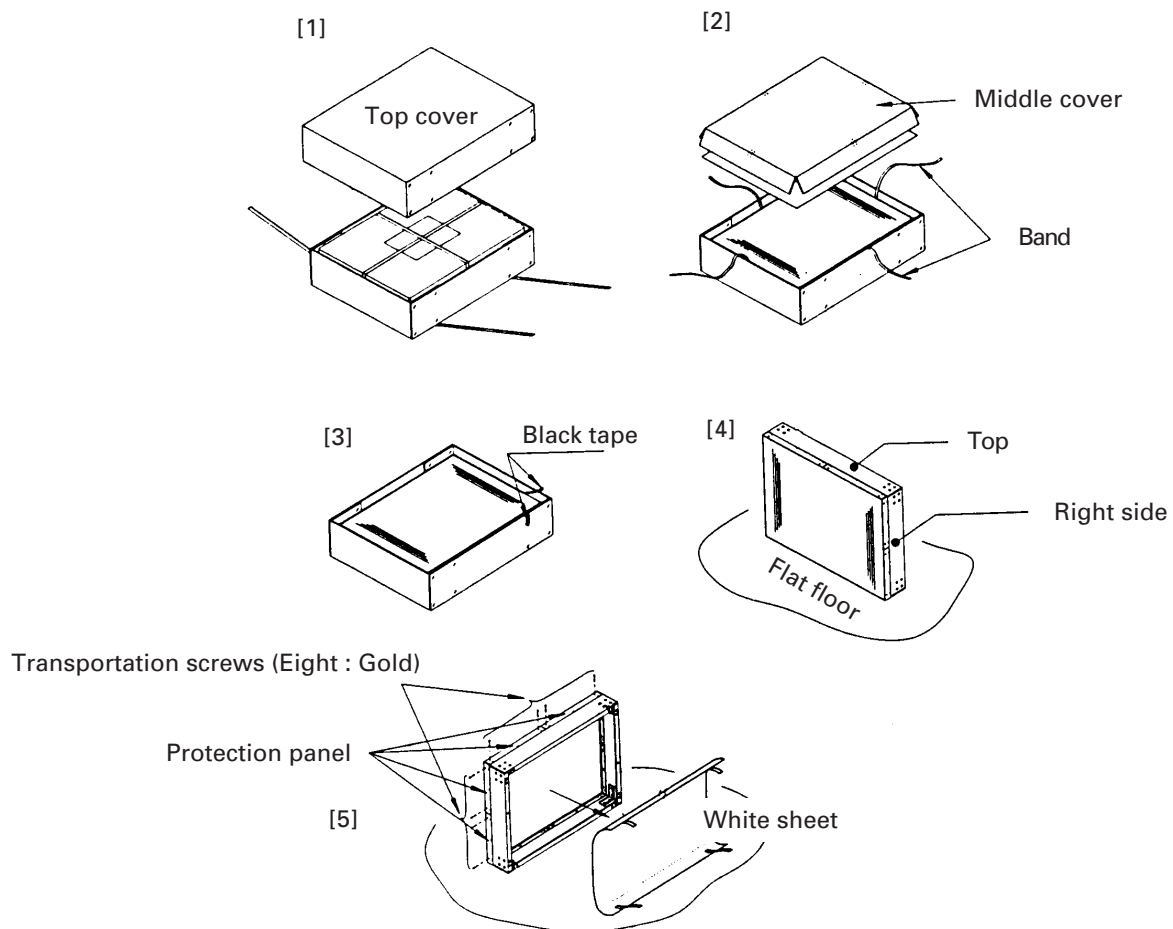
(Fig.3-4)

(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. 3-5)

● 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.

② **Unit**

● When moving the unit, push the frame (square) without pushing the rear panel. Never push to the front or back.
● Do not move the system on casters on rough places such as tiles and bricks.
● Do not move the system after installation.
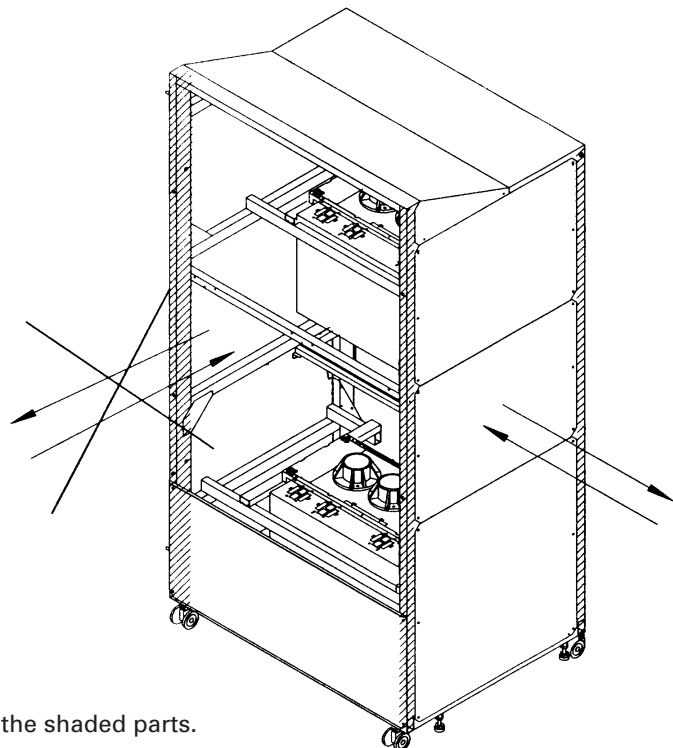
▨ Hold the shaded parts.

3. PRECAUTIONS FOR TRANSPORTATION

Do not stack the units on their sides or backs when transporting them.
Always place them upright. If they are stacked on their sides or backs, vibration and shock may cause damage or fire hazards.

■ Precautions on transportation of unit
● Because it damages easily when dropped, exposed to shock or vibrations, be careful not to place heavy objects on the unit nor drop it in transportations.
● Always place the unit on its side, never upright, in transportation.
● Do not place objects on the unit when storing it due to the simple packing.

■ Precautions on transportation of projection screen
* As Projection screen must always be installed, it will not need to be re-packed and transported. Packaging instructions are provided for your reference just in case it has to be transported again.

● Pack it properly according to the packaging specifications (Fig.3-6). Also check the following conditions.
　[1] The protection panel has been properly attached by the transportation screws (eight).
　　* Use the protection screws (gold) provided with the unit.
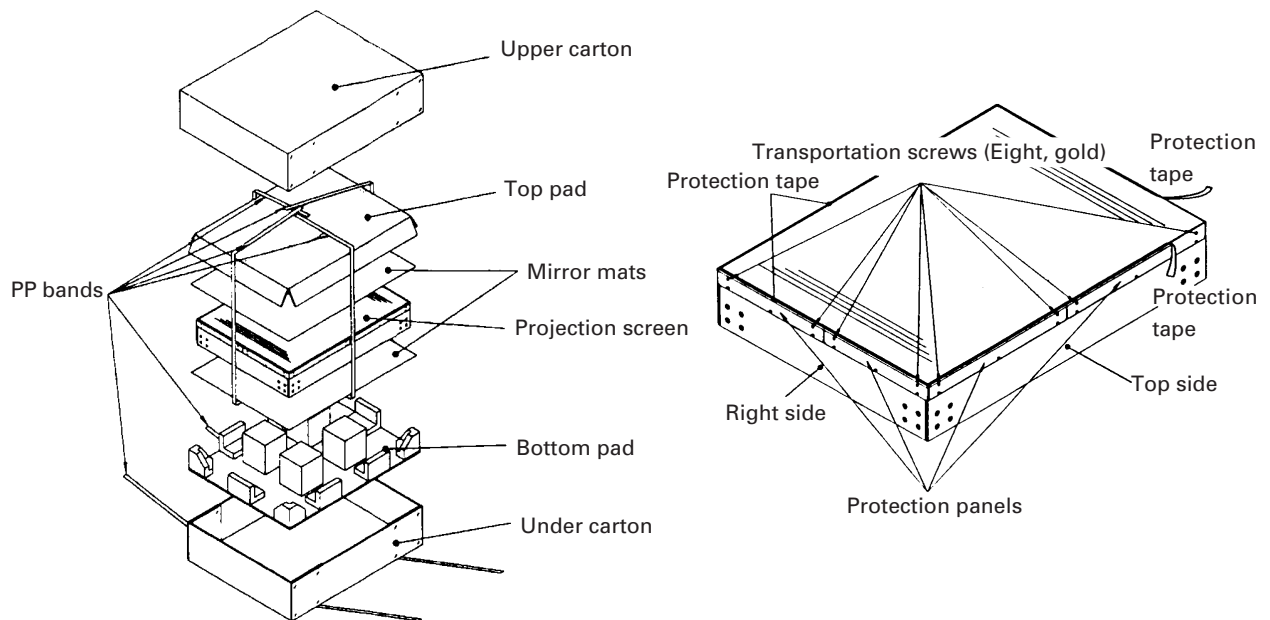　[2] The protection tapes are pasted to the four corners of the protection panels.
　　* Paste the protection tape on the protection panel.
　　* Use a relatively weak tape about 20 mm to 30 mm in width.
　　<Recommended Tape>
　　Name　　　　:Acetate cloth adhesive tape (25 mm width)

(Fig.3-6)

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● 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 16.
● 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>
● *Do not mistake the top and bottom of the screen unit. The side with the longer screw projecting out (side with transportation screw) is the top and the side with the 8 mm hole is the bottom.*
● *Before mounting the screen unit to this system, check that the transportation screw, protection panel, and black tape have been removed. (Do not remove the protection panel on the outer-most side when installing the system.)*
● *Also tighten the Mickey bolts used for connecting the unit and screen unit together using your hand. Tighten as firmly as possible.*
● *Put on gloves when stacking the screen units for protection and perform in twos.*
● *To prevent the lenticular sheet from damage, mount the screen unit gently and do not subject it to vibration and shock.*
● *When the screen units are stacked, the head of the panel fixing screws and 8 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) Assembling the system

[1] Before moving the system to where it is to be installed, insert three Mickey bolts into the main unit.

[2] Secure the shield and the shield S to unit L with the scrivet (six parts).

[3] Move units R and L to the place where the system is to be installed.
Move the units closely together, adjust so that the levels of their frames are equal using the floor leveler, and adjust the guide pins in front and back to the holes. (Four) Pay attention to the sides of the upper panel.

[4] Tighten units R and L using the hexagonal bolts (two in front and one at the back) containing the spring washers and washers.

[5] Mount one screen at a time from the bottom.
Place the screen on the front panel, and then while one person holds the screen in front so that it does not turn over, another person attaches the Mickey bolts from the back. (two parts)

[6] The screen should be mounted by two persons as above.

[7] Attach the scrivets at the left side (12 parts) and bottom side (16 parts) of the screen.

[8] Paste the logo sticker on the front panel.

[1] [2] [3]

[4] [5] [6] [7] [8]

(Fig.3-7)

29
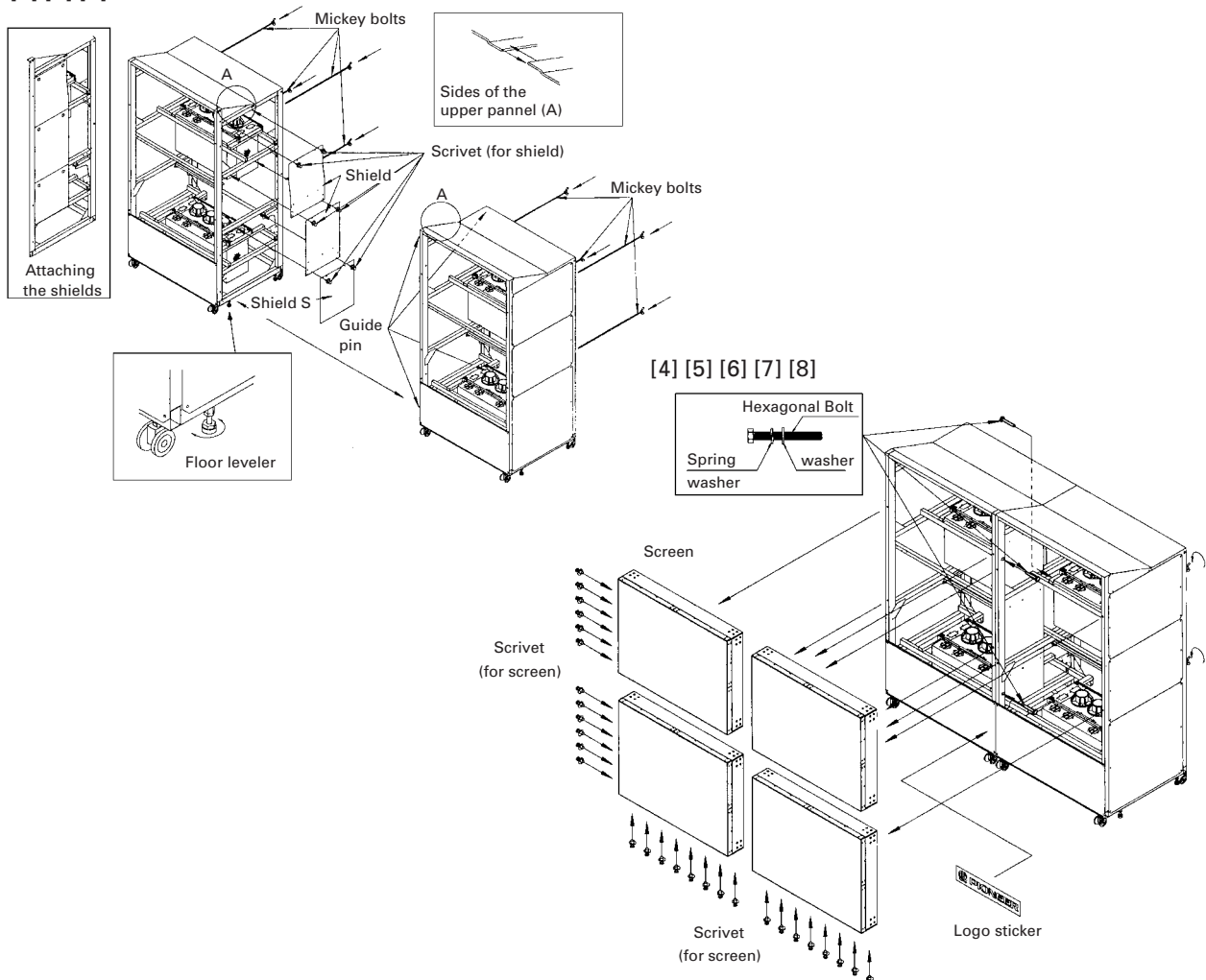
(2) Inserting the Option Board (MVP)

[1] Remove the rear cover C (R) and rear cover C (L). (Six screws for each)

[2] Remove the UL cover A. (Six screws)

[3] Remove the UL cover C. (Two screws)

[4] Disconnect the MVP power cord.

[5] Disconnect the connector and remove the power supply. (Three screws)

[6] Remove the four screws in front of the MVP.
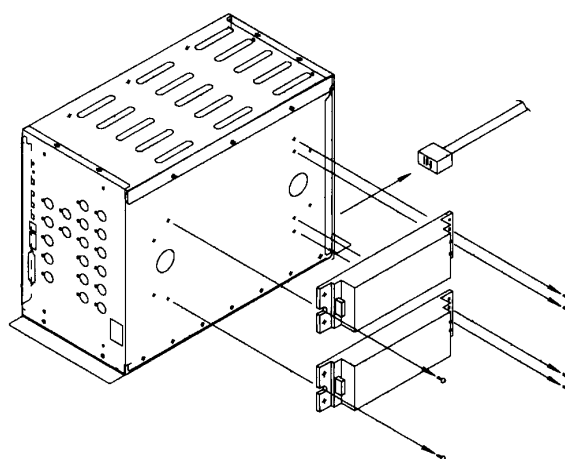
[7] Tilt the MVP slightly, and pull it out.

[1]

Rear cover C (R)

Rear cover C (L)

[4] [5]

[2] [3] [6] [7]

UL cover C

Pull in this direction

UL cover A
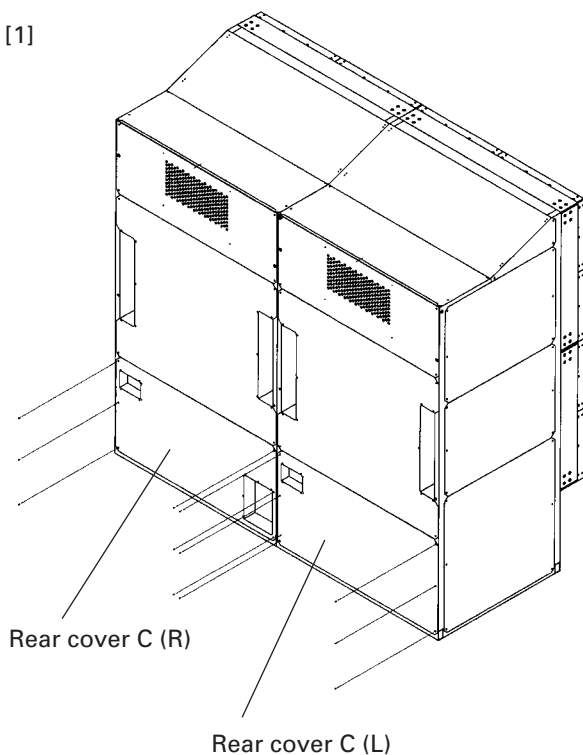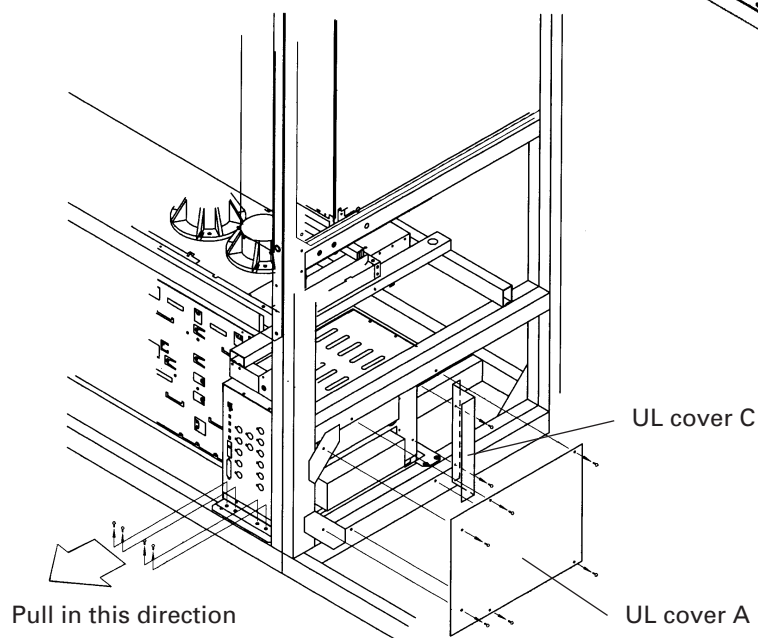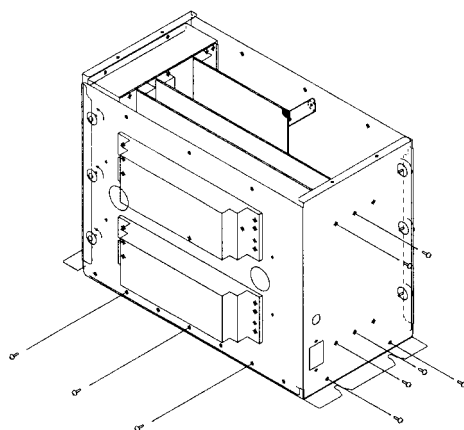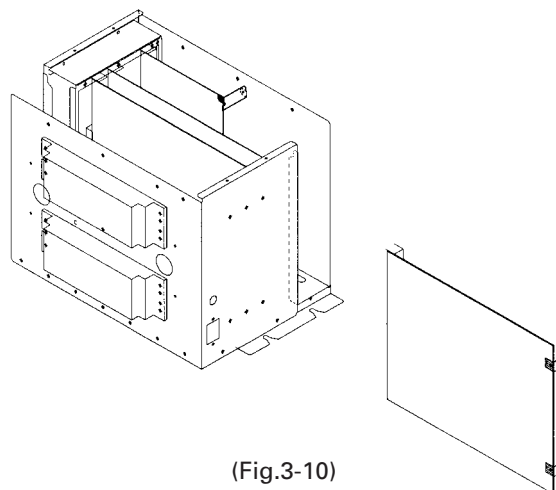
[8] Remove the bonnet. (Fig. 3-8)
    10 screws
[9] Remove the rear cover. (Fig. 3-9)
    9 screws
    Loosen the six screws (ABA-283).
[10] Push in the optional board completely inside the second rail from the right. (Fig. 3-10)
[11] Attach the rear cover. (Fig. 3-11)
    11 screws
    Tighten the six screws (ABA-283)
[12] Attach the bonnet. (Fig. 3-12)
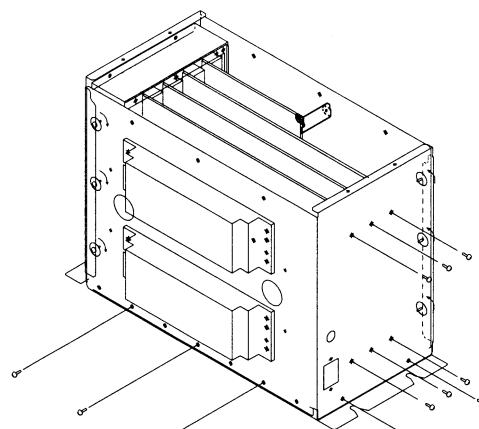   10 screws
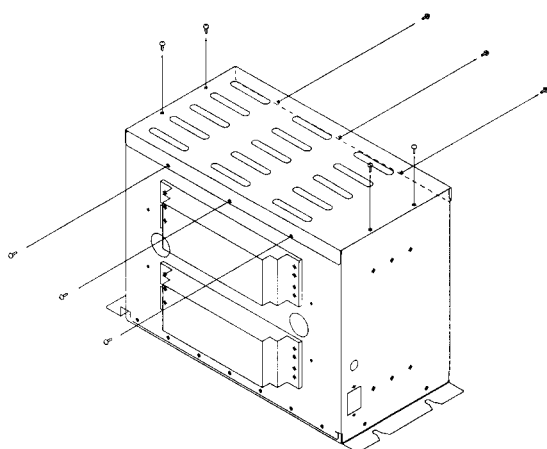
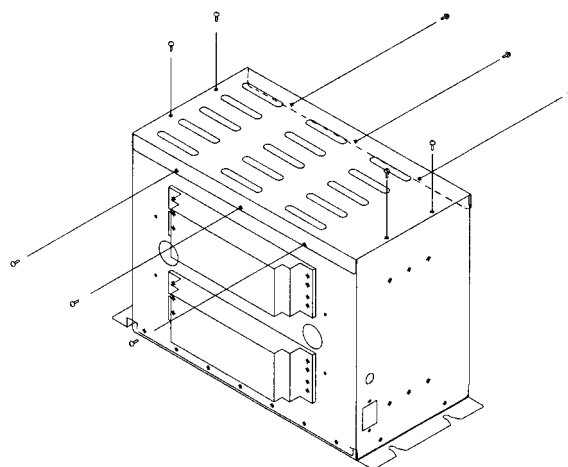(Fig.3-10)

(Fig.3-8)

(Fig.3-11)

(Fig.3-9)

(Note)

To prevent damages of the optional board resulting from static electricity, touch the bonnet, etc. before touching the board to remove static electricity in the body.

(Fig.3-12)

(3) Connection

Accessories

● Coaxial cable

Linking cable (Cord with 6P mini DIN)

Black

Orange

260

130

A   B   C   D   E   F

Black   Orange
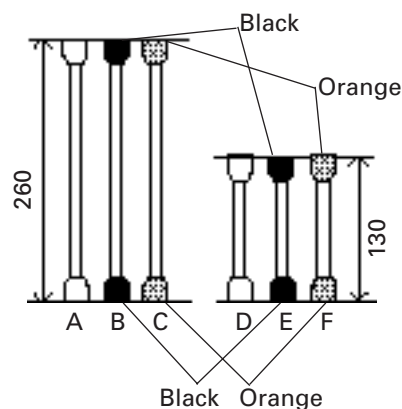
● Linked cable 6P mini DIN cord

Connect as shown in Fig. 3-13 using the cable provided.
After connecting, secure with a cable clamp. (Fig. 3-14).

(Note)
When connecting the RS-232C communica-tion connector and remote control unit from the leftmost (as seen from the back), con-nect IN and OUT linking cables (cords with 6P mini DIN) the other way around.

Remote control unit

RS-232C communication connector
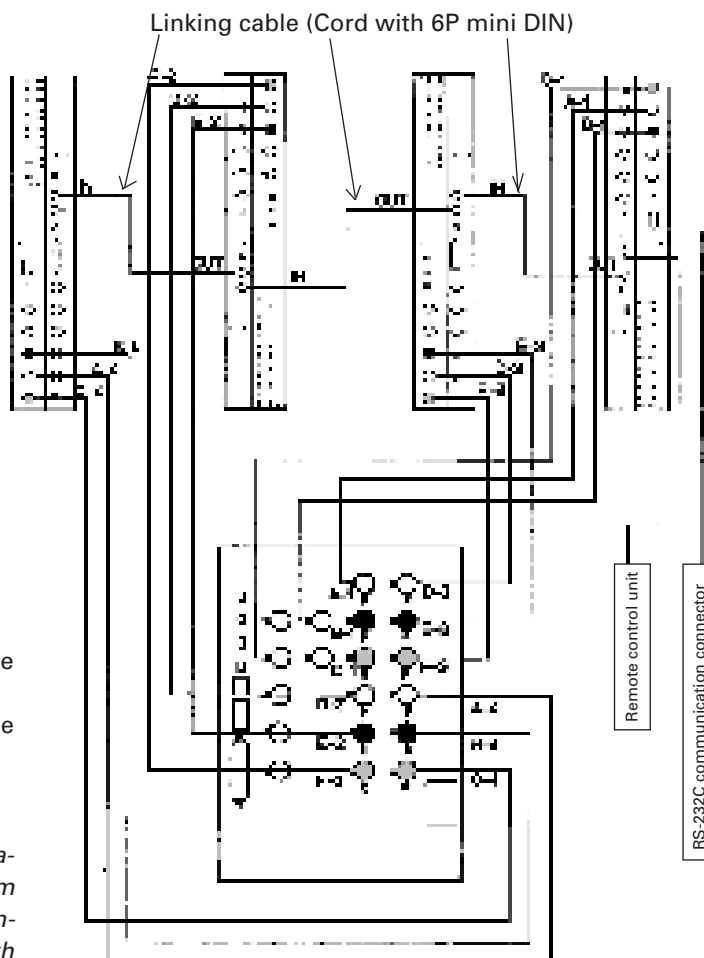
(Fig.3-13)

(Fig.3-14)   ■ Cable clamp

Examples of System

(1) Enlarged display only

LDP → C.VIDEO To MVP input → RM-V1000NU/ RM-V1000NA

LDP ① →
LDP ② → SW or selector, etc. → C.VIDEO To MVP input → RM-V1000NU/ RM-V1000NA
LDP ③ →
LDP ④ →

(2) Multi display

LDP ① →
LDP ② → Matrix SW
LDP ③ →
LDP ④ →

To C. VIDEO MPJ input →
To C. VIDEO MPJ input →
To C. VIDEO MPJ input →
To C. VIDEO MPJ input →
To C. VIDEO MVP input → MVP → To each MPJ RGB input

To MPJ

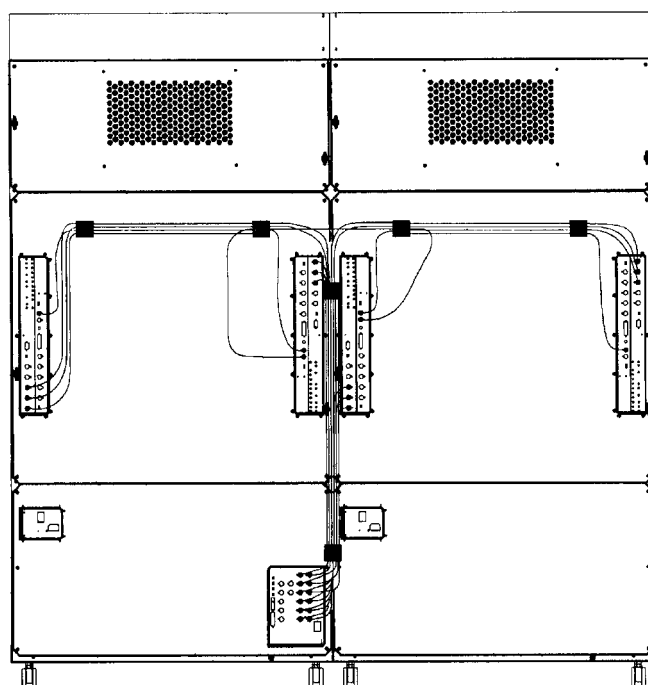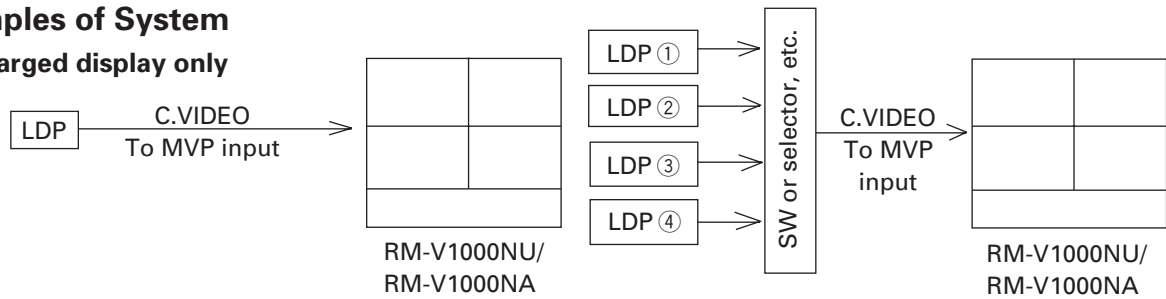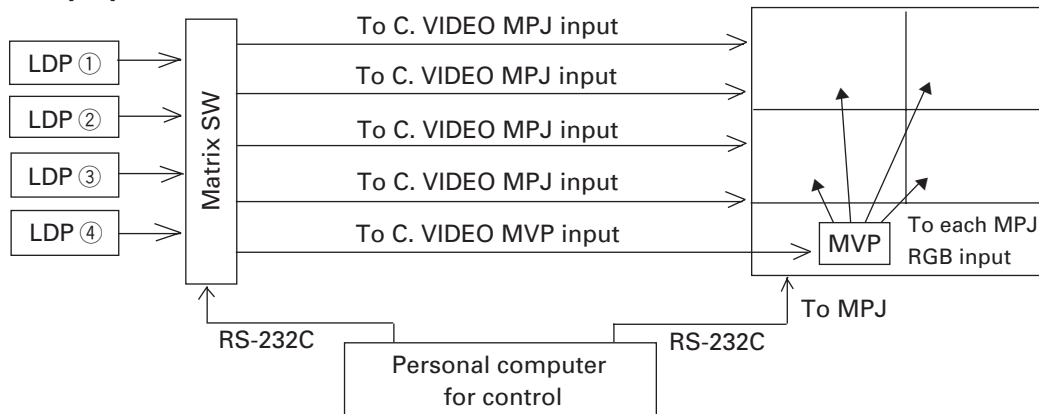RS-232C — Personal computer for control — RS-232C

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 RGB.

● 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

● When fixing the screen into the wall, leave space at the top, bottom, left and right sides for attaching and removing the screen.

(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.3-15)

* 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

15 mm

15 mm

15 mm

15 mm
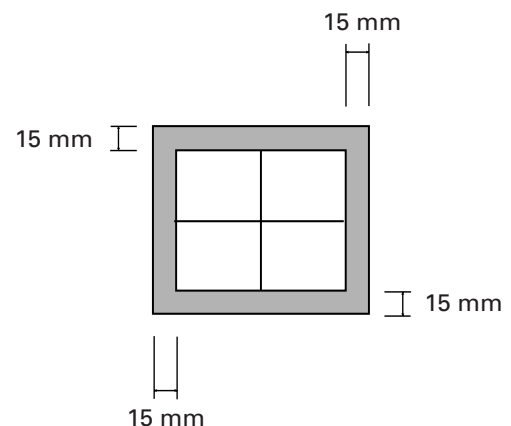
(Fig. 3-15)

CHAPTER 4. ADJUSTMENTS

1. ADJUSTMENT PREPARATIONS

(1) Wiring

① **Connection of Power Supply**
- Refer to "Chapter 3. (P.20) 1. (12) Power Supply" for details of the power supply.
- The power supply cable of this system is provided with a outlet plug with grounding (2E).
  To prevent electrical hazards, be sure to connect the power supply cable so that the ground pin connects the ground.

② **Connection of signal cable and ABL link cable**
- Refer to "Chapter 3. (P21,32) 1. (13) Cables used, 4 (3) Connection" on how to connect the signal cable.

(2) Wiring Handling
- To prevent weight or force from being applied directly to the connection terminal, use the cable clamp provided.

(3) Aging
- After turning on the power, input the 100% white signal or moving images, and perform aging until MPJ 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 Screen size adjustment	Monoscope
• Convergence adjust- ment	Crosshatch Tilted crosshatch
• White balance adjust- ment	White signal (Can be linearly varied between 0% and 100%) Or window 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. (Cannot replace with LD, etc.) Use signal generators of this class at the least.
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).

Memory Area / Input Signal	1	2	3	FACTORY
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-V1000NA
　　　　　 : For PAL signals (Same data as MEMO-2) ---- for RM-V1000NU
　FACTORY: For NTSC signals (Same data as MEMO-1) --- for RM-V1000NA
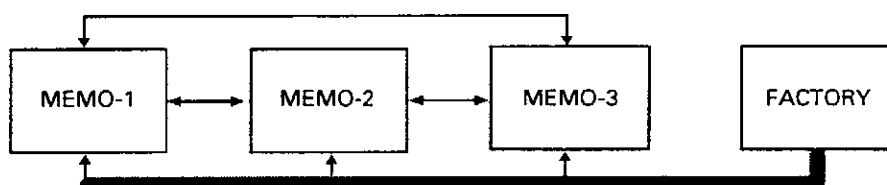　　　　　 : For PAL signals (Same data as MEMO-2) ---- for RM-V1000NU

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 becomes 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 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.

(Note)
The built-in multi video processor can be used only for NTSC inputs. It can be made usable for PAL inputs if options are added. For more information, contact Pioneer.

(3) White Balance Adjustment Memory

ADJUSTMENTS has altogether six white balance adjustment memories.

```
Color mode 1 (Normal) ————┬——— VIDEO, Y/C input memory
                          ├——— RGB input memory
                          └——— Factory shipment memory


Color mode 2 (Re-expose) ——┬——— VIDEO, Y/C input memory
                           ├——— RGB input memory
                           └——— Factory shipment memory
```
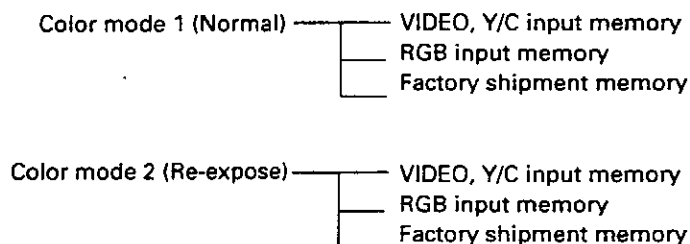
Four memories can be actually adjusted except the factory shipment memory. The factory shipment memory contains the normal white balance adjustment data and re-expose white balance adjustment data.

By setting to color mode 1 using the rear panel switch, etc., the white balance adjustment data can be switched by synchronizing with input switching. This is the same for color mode 2. If it is necessary to change color mode 1 and 2 in the same input function or VIDEO , Y/C input, connect the PC and switch each time by command(CM1,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 of unit R or unit L 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) Giving IDs

IDs are used to differentiate the MPJs. When the units are given IDs, by connecting the ABL link cable, commands can be transmitted by specifying the ID, and it is possible to operate only MPJ corresponding to that ID by remote control operations.

(Note) *The following IDs are provided at shipment.*

Screen 1 ID=11	Screen 2 ID=12
Screen 3 ID=13	Screen 4 ID=14

Unit L   Unit R

<Giving IDs using Personal Computer>
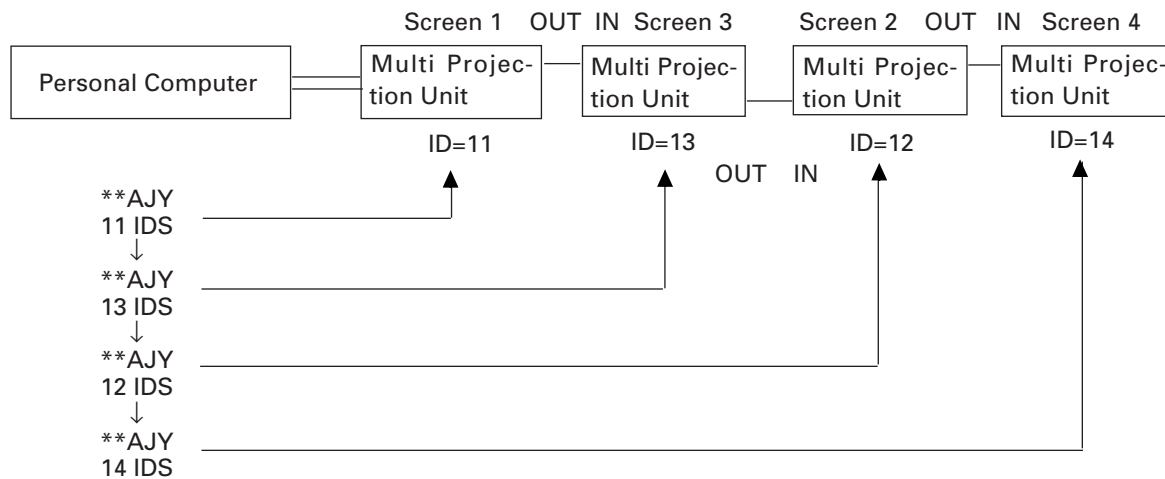 Commands: IDC (IDC CLEAR)   ;Clears the ID given
                IDS (ID SET)   ;Gives an ID
                The IDS is valid only when no ID has been given. It will be valid from MPJ nearest to the personal computer (remote control).

(Example)
  4 screens (When providing IDs again using the personal computer after clearing all IDs set at shipment.)

Screen 1   OUT IN Screen 3   Screen 2   OUT IN Screen 4

Personal Computer	Multi Projection Unit	Multi Projection Unit	Multi Projection Unit	Multi Projection Unit
	ID=11	ID=13	ID=12	ID=14

OUT   IN

**AJY
11 IDS
↓
**AJY
13 IDS
↓
**AJY
12 IDS
↓
**AJY
14 IDS

By sending commands in this order, IDs can be given to each MPJ (connect ABL link cables as above example).

The characters that can be used for the IDs are 0 to 9 and A to F, and * (capital and small letters are not differentiated).
The * can be used in the following way.
   ** IDC   :Clears IDs given to all units
   *1AJY   :Only MPJ which have IDs whose 2nd digit is 1 enter the adjustment mode.
   2* IN1   :The input function of only MPJ which have IDs whose 1st digit is 2 is set to VIDEO.

Using the Remote Control>
[1] Press the [⊙—⊙ ADJ IN] key to set the whole screen into the adjustment mode.
[2] The main menu will be displayed. Press the [1] key.
Select "1. ID SET/CLEAR/SELECT"
[3] Check that the ID display at the top left of the screen is "– –" and press the [1] key.
Select "1.ID SET".
If an ID has already been given, press the [0] key, select "0. ID CLEAR" of the main menu, return to "[1] Enter the adjustment mode." and give the ID.
[4] As the ID input standby state is set, press the [0] to [9], [A] to [F] keys, and input the ID.
[5] To use the multi-screen MPJ, return to "[1] Enter the adjustment mode." and given an ID to the next MPJ.
(Note) *To return the whole screen to the main menu after giving IDs to the whole screen, press the* [⊙—⊙ ADJ IN] *key.*

<Selecting the ID Using the Remote Control>
Select the screen to be adjusted using the remote control.
(Example) Select the ID at the bottom left side of the screen (ID=13) as shown in the figure on the right.
[1] Set all screens to the adjustment mode using the [⊙—⊙ ADJ IN] key .
[2] Select [1. ID SET/CLEAR/SELECT using the [1] key.
[3] Select [2. ID SELECT] using the [2] key.
[4] Press the [2] and [1] keys (ID=13).
[5] Only the bottom left side of the screen shows the main menu. The other screens will set into the standby state ([POWER] , [⊙—⊙ ADJ IN] , [ADJ OUT] keys only are accepted).

ID = 11	ID = 12
ID = 13	ID = 14

At shipment

● To return to the main menu after completing ID SELECT, press the [MAIN MENU] key to keep the ID SELECT state. Pressing the [⊙—⊙ ADJ IN] key will also return to the main menu, but it also clear the ID SELECT state, making it necessary to repeat from step [1] again.
To select other screens, press the [MAIN MENU] key to return to the main menu, and change the ID number set at step [4] above.

(Note) : When the wrong ID has been specified
Repeat the above steps [1] to [5]. Perform the same steps when an inappropriate ID (Example : ID=33, etc. in the above screen) has been input. In this case, all screens will set into the standby state.

<Precautions for Giving IDs using the Remote Control and Personal Computer>
Communication cannot be performed with units connected using the ABL link cable, after units whose IDs have been cleared. When the command "** IDC" shown in the figure on the previous page is performed, only the first unit can be controlled. Using the command "11 IDS" will enable the 2nd unit and onwards to be controlled.
When IDs are set as this, the unit connected next can be controlled.

(7) Focus Adjustment

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	• 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. **Note 1 :** *Perform the following adjustment again only when the blue focus has been adjusted.* *Rotate the blue focus VR in the counter clockwise direction and enlarge the blue color vertically until it barely projects out of its area.* *(The outer most vertical lines of the crosshatch are 13 to 15 mm.)* *Rotate the focus VR by about 10 deg (approximate for your reference).*

(Note) Ask our servicemen if the Focus VR needs to be adjusted.

Focus Adjustment Method

(1) Remove the two screws of the MPJ. (Fig.4-1)
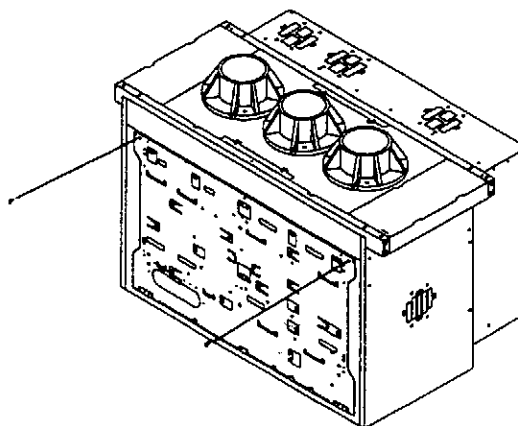
(Fig. 4-1)

(2) Open the board chassis and adjust the focus control.
(Fig.4-2)

Focus control
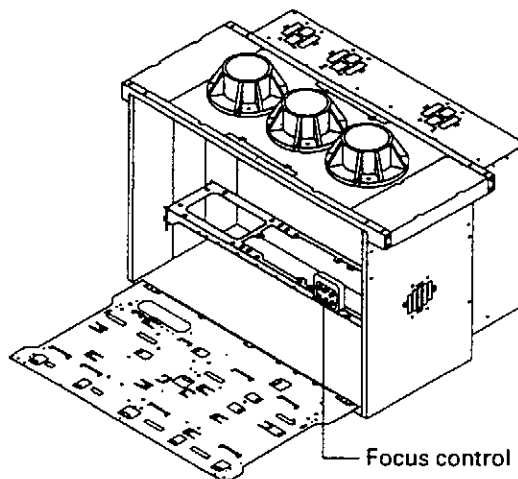
(Fig. 4-2)

3. 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
↓
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 "Appendix (MVP Manual)" in Chapter 7 (page 103).)
↓
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

| 1 (P. 44) | Find the center of the screen |

↓

| 2 (P. 44) | Input the adjustment signal |

↓

| 3 (P. 44) | Using only green, adjust the center of V STATIC GH STATIC |

↓

| 4 (P. 45) | Adjust the size of V SIZE V LIN H SIZE GH LIN |

↓

Is the Horizontal size standard (93%)?

NO →

| 8 (P. 59) | Adjust H BLK-L and H BLK-R |

YES ↓

| 5 (P. 46) | Adjust joining of peripheral screens in green point convergence mode |

↓

| 6 (P. 46) | Adjust linearity of green point convergence mode |

↓

| 7 (P. 46) | Adjust green, red, blue color deviation in point convergence mode |

(3) Convergence Adjustment Contents

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.

The □ numbers correspond to the numbers in the flow-chart.
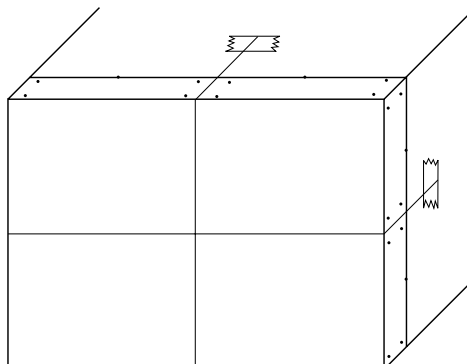
2 Adjustment signal input

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 .

44
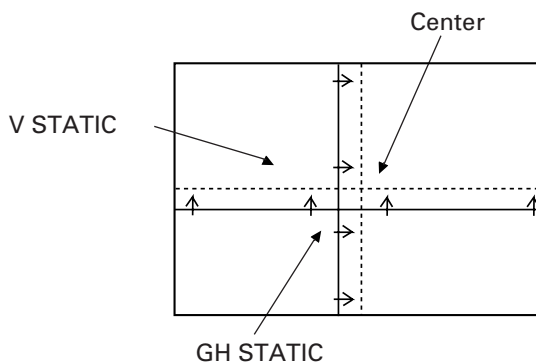
④ **V SIZE, V LIN, H SIZE Adjustment**

① V SIZE adjustment

Observe here

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.
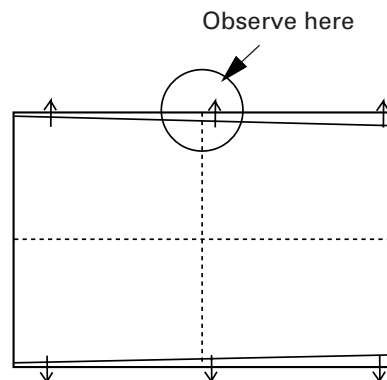
② H SIZE adjustment

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.

Observe here
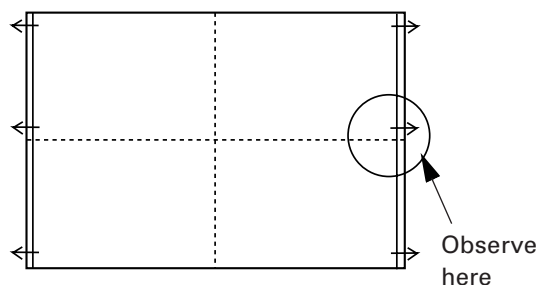
③ V SIZE, V LINEARITY, H SIZE, GH LINEARITY adjustment

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.

⑤, ⑥, ⑦, Point convergence adjustment

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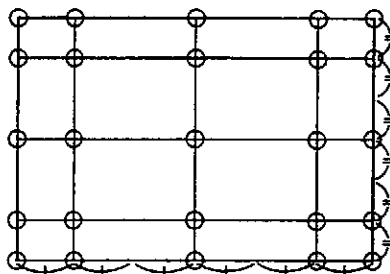
◎ In point convergence adjustment, the 25 points set on the screen can be adjusted individually.
In addition, the area (total ten areas of five lines and ranks) of the four sides of the screen can be adjusted.

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
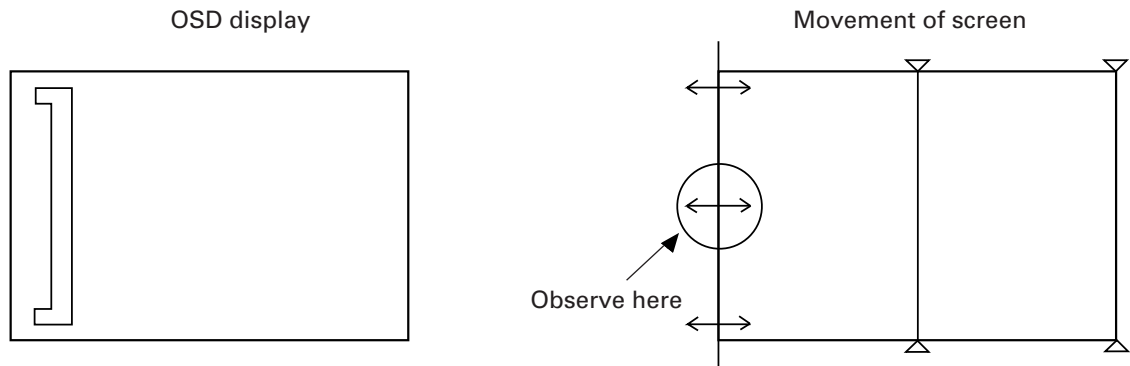
Observe here

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.
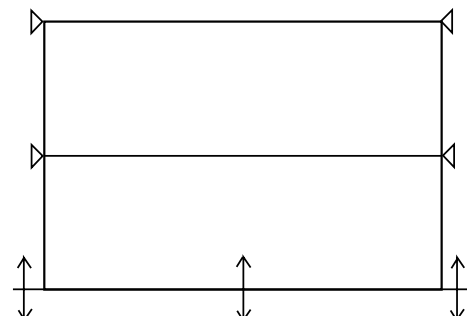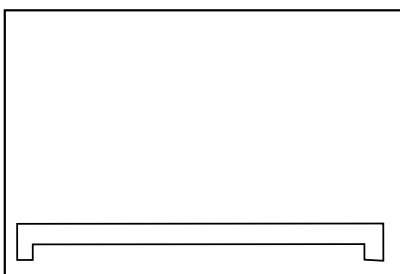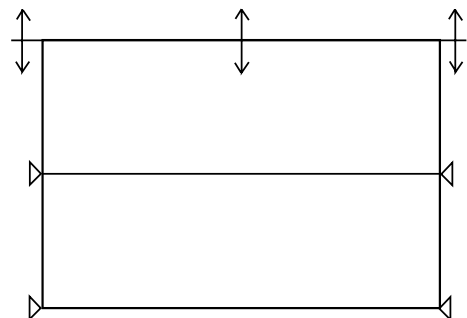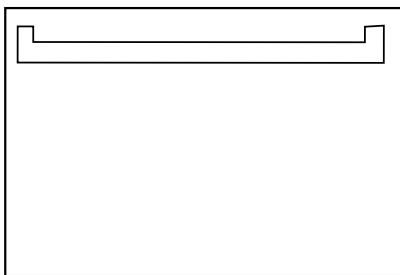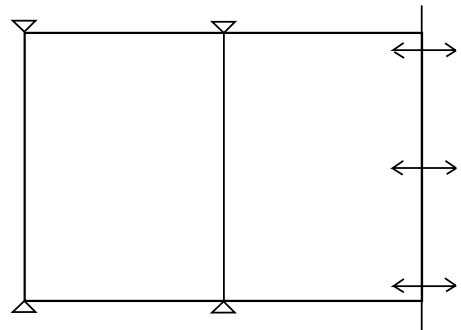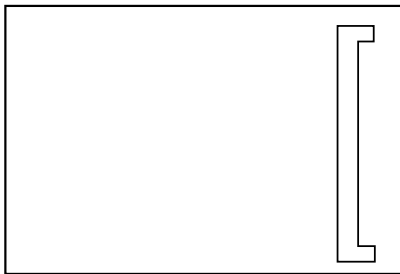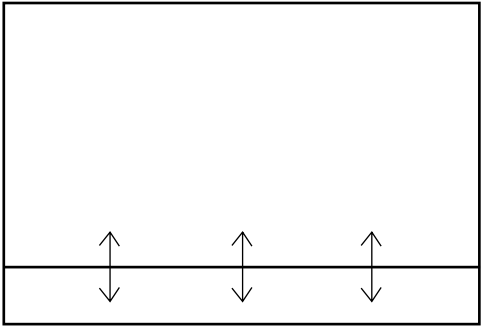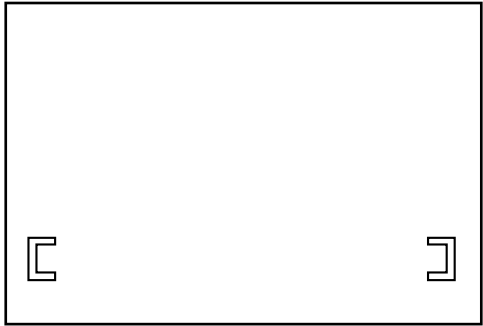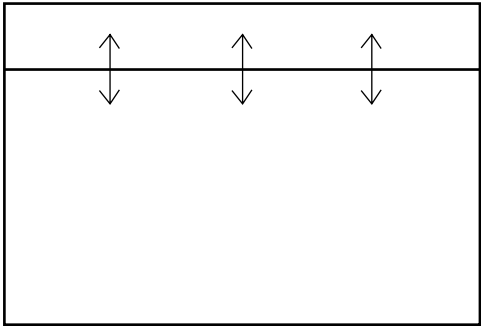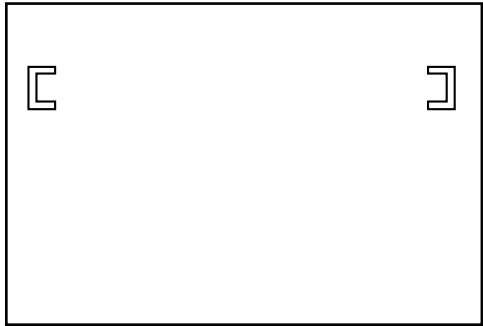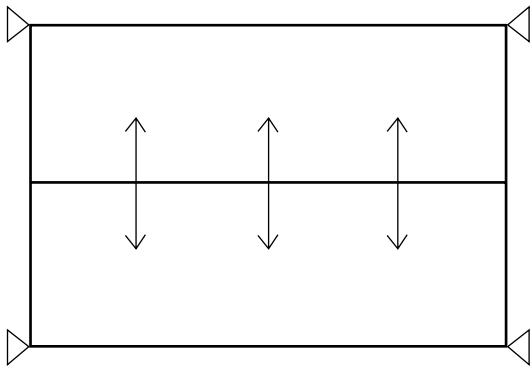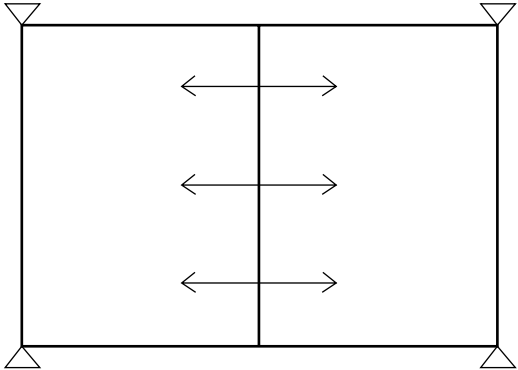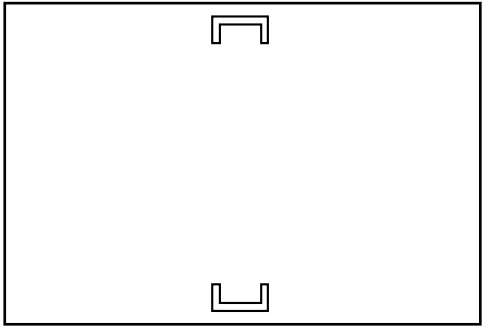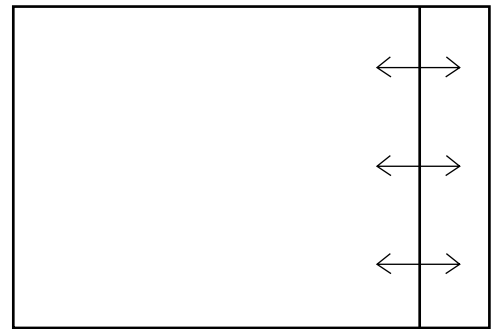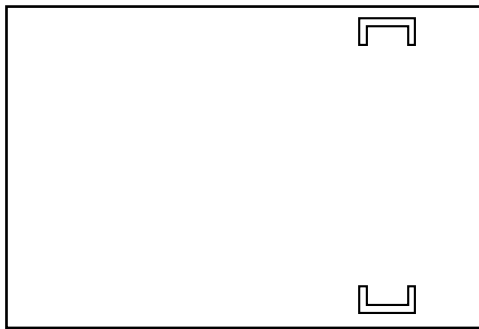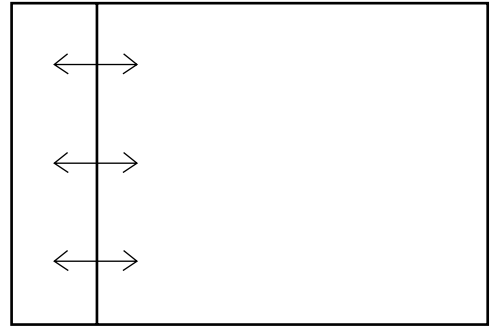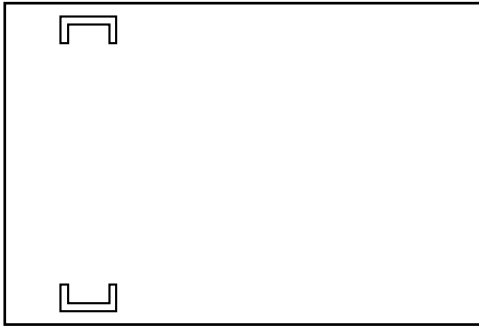
In $\boxed{\text{adjustment step } \boxed{5}}$, observe the external part of the screen, adjust the 16 adjusting points there, taking note of linearity in the peripheral area such as joining with other screens, crosshatch, etc.
(Ignore the distortion inside the screen.)
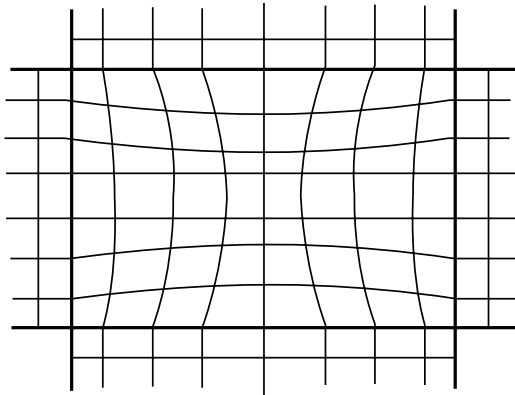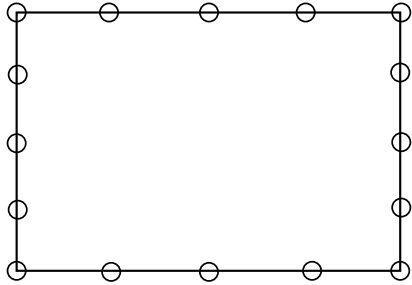
In $\boxed{\text{adjustment step } \boxed{6}}$, adjust the inside of the screen and produce linearity.
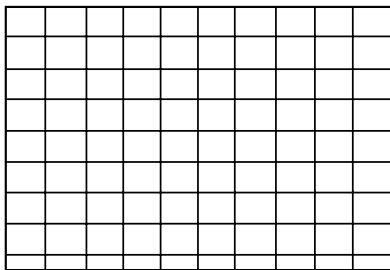
The following are examples of adjusting points in point convergence adjustments and their movements on the screen.

Displayed OSD

Movement on screen
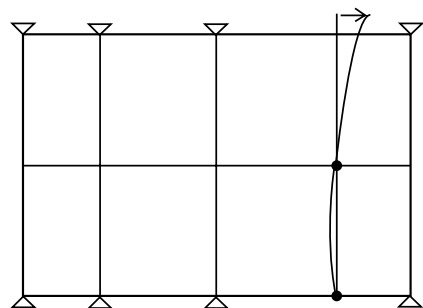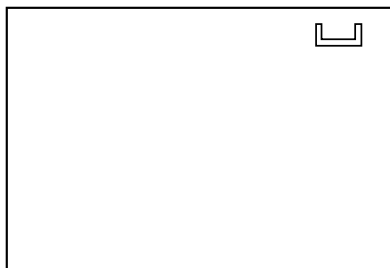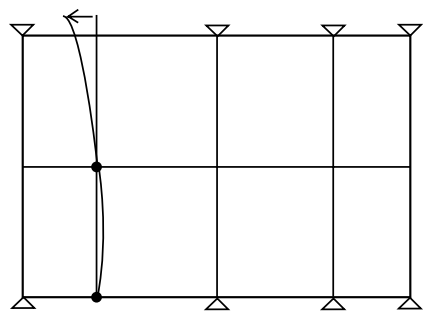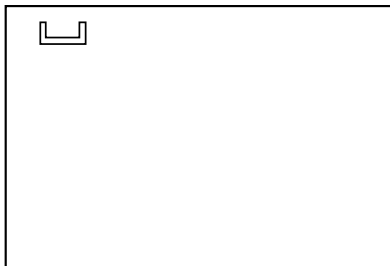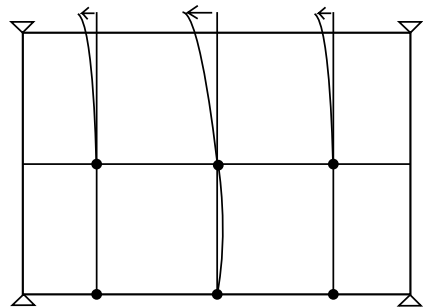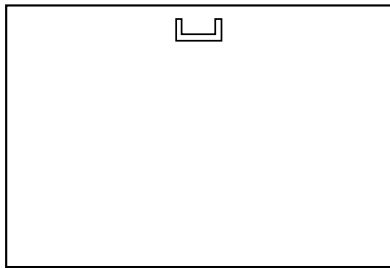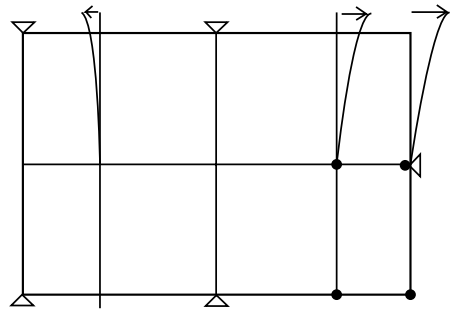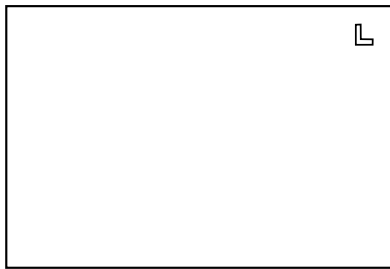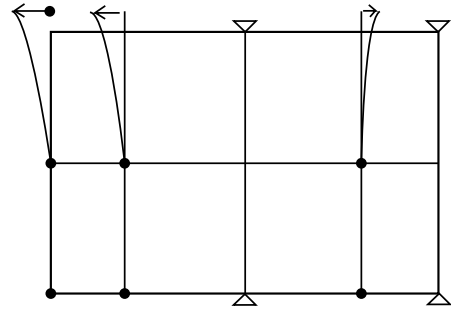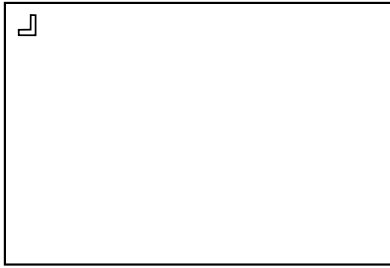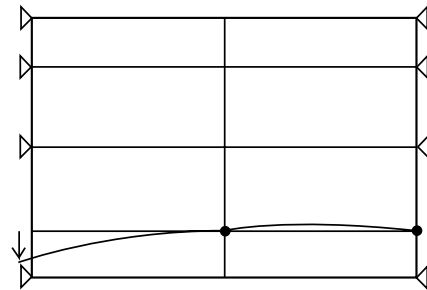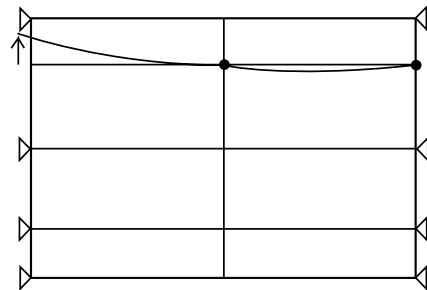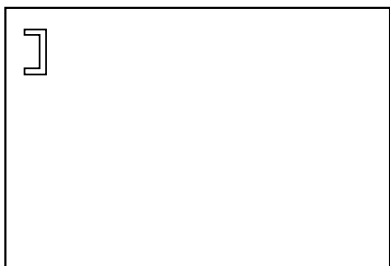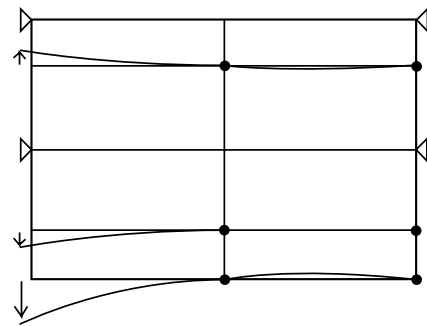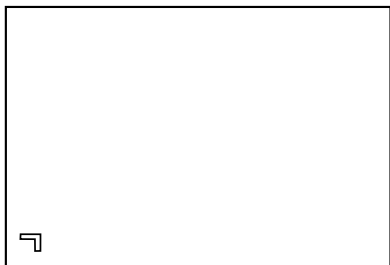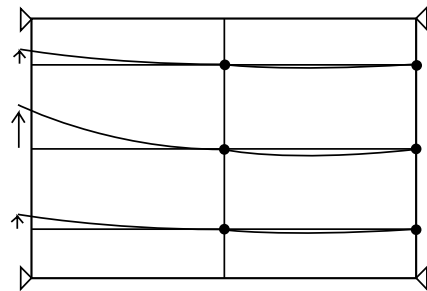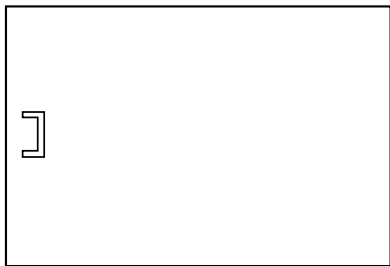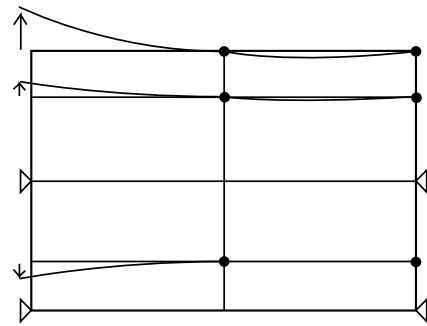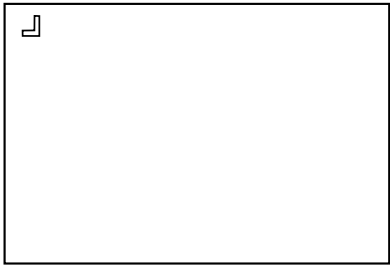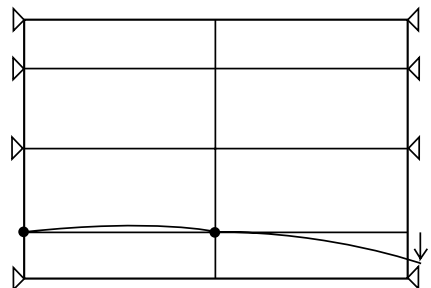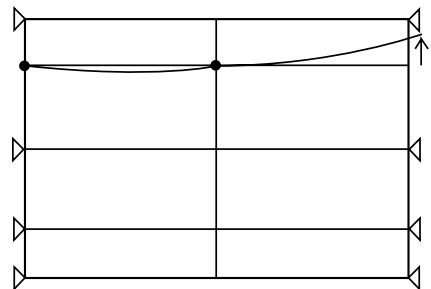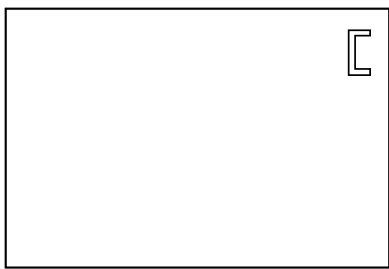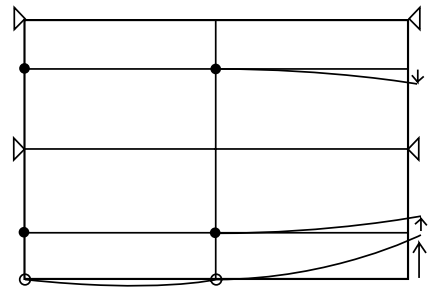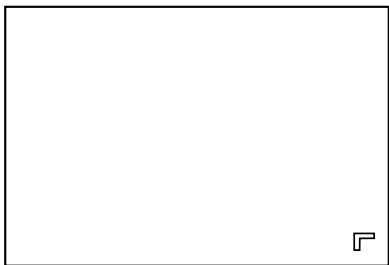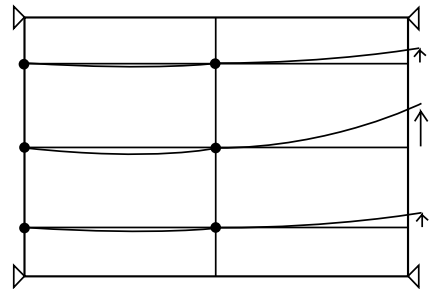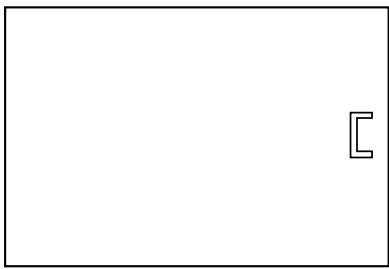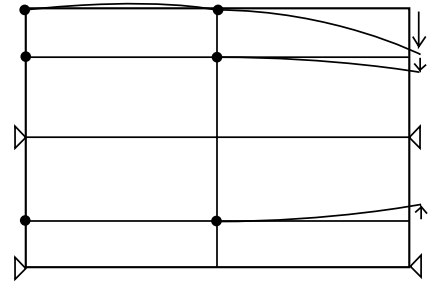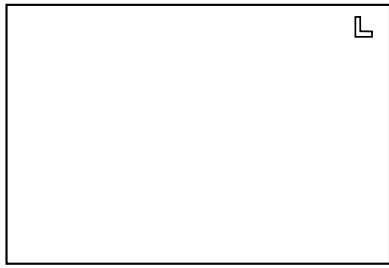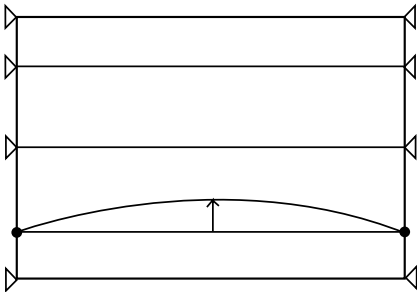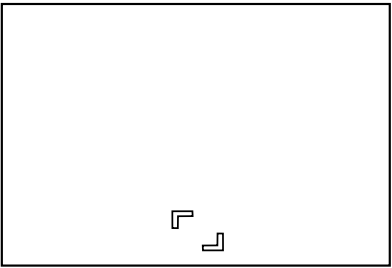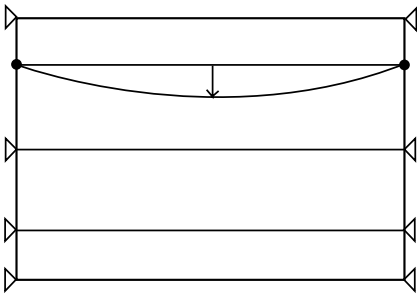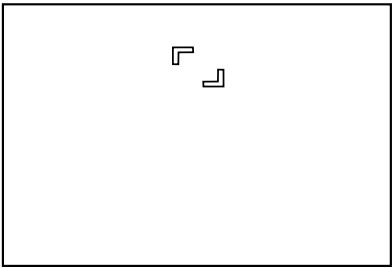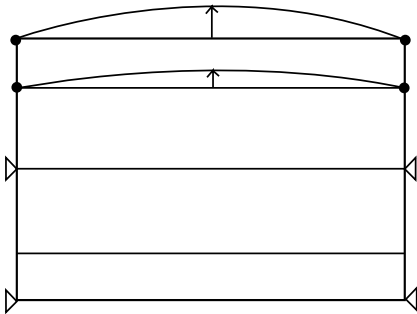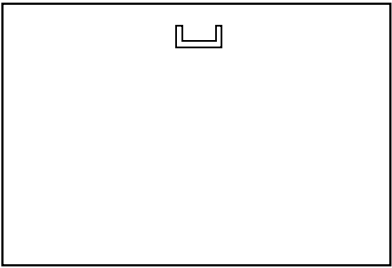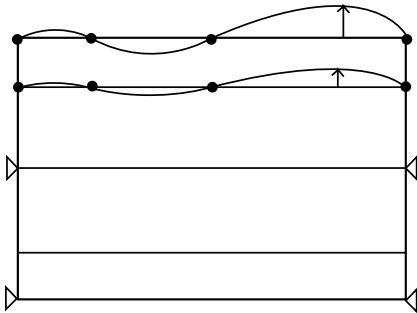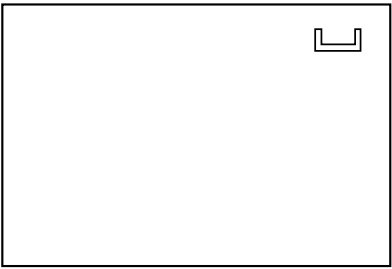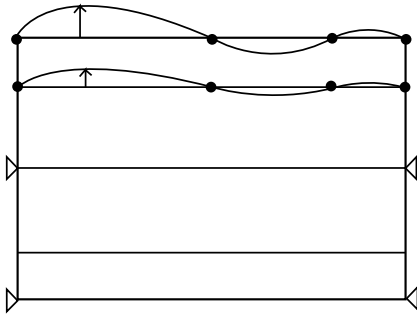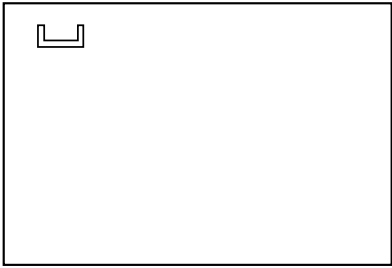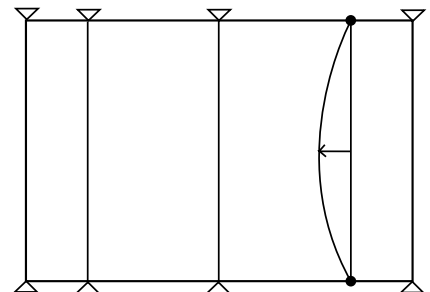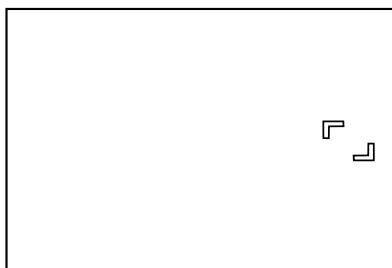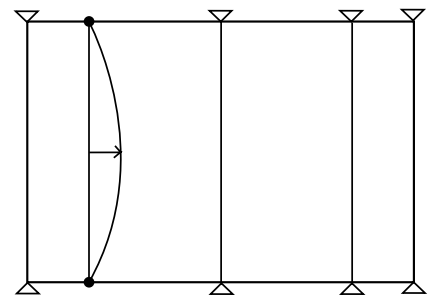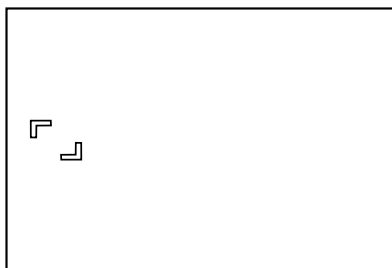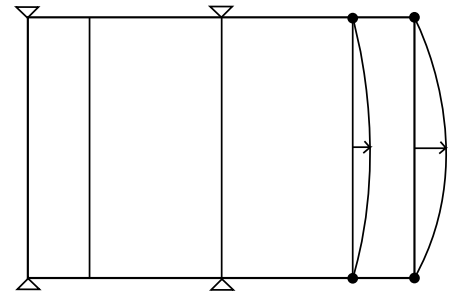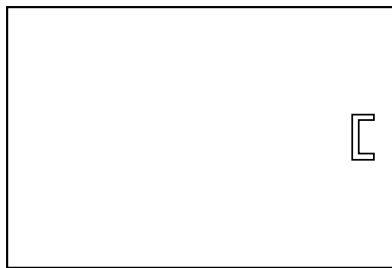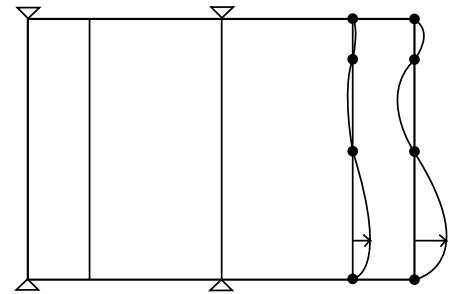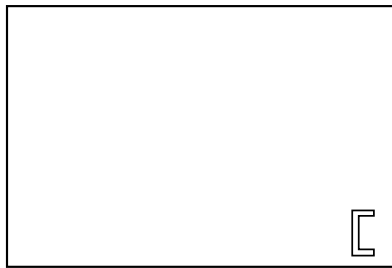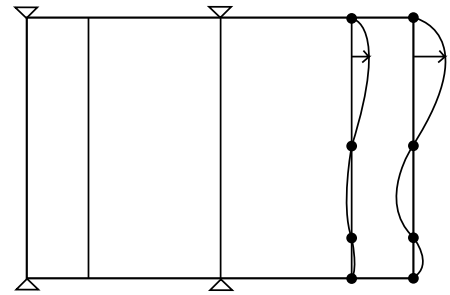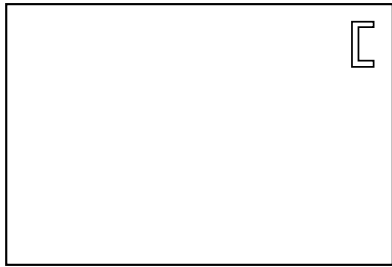
*** Note ***

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.

Does not move to the set position
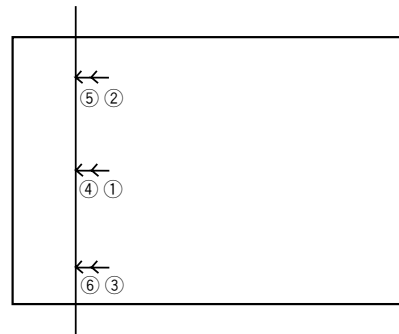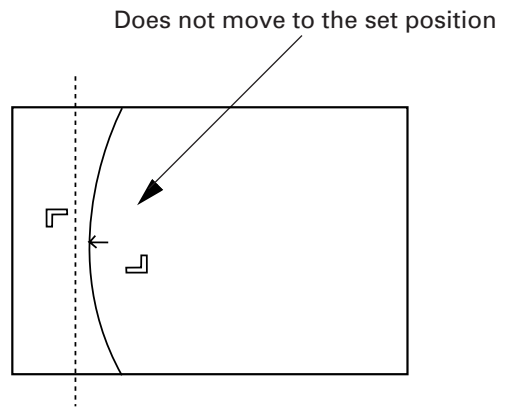
5' Dynamic convergence

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

V • Convergence adjustment
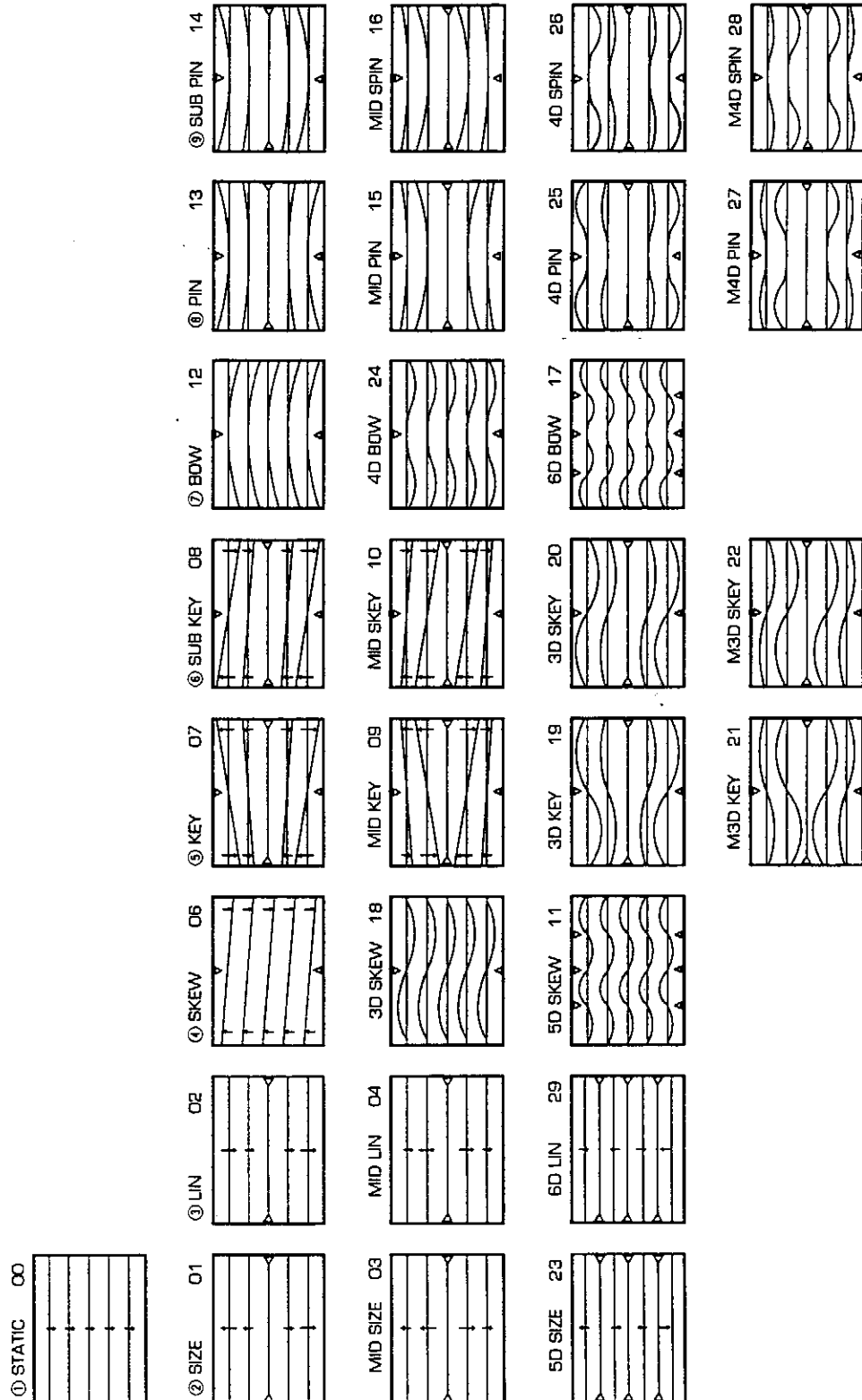
5' Dynamic convergence

H • Convergence adjustment
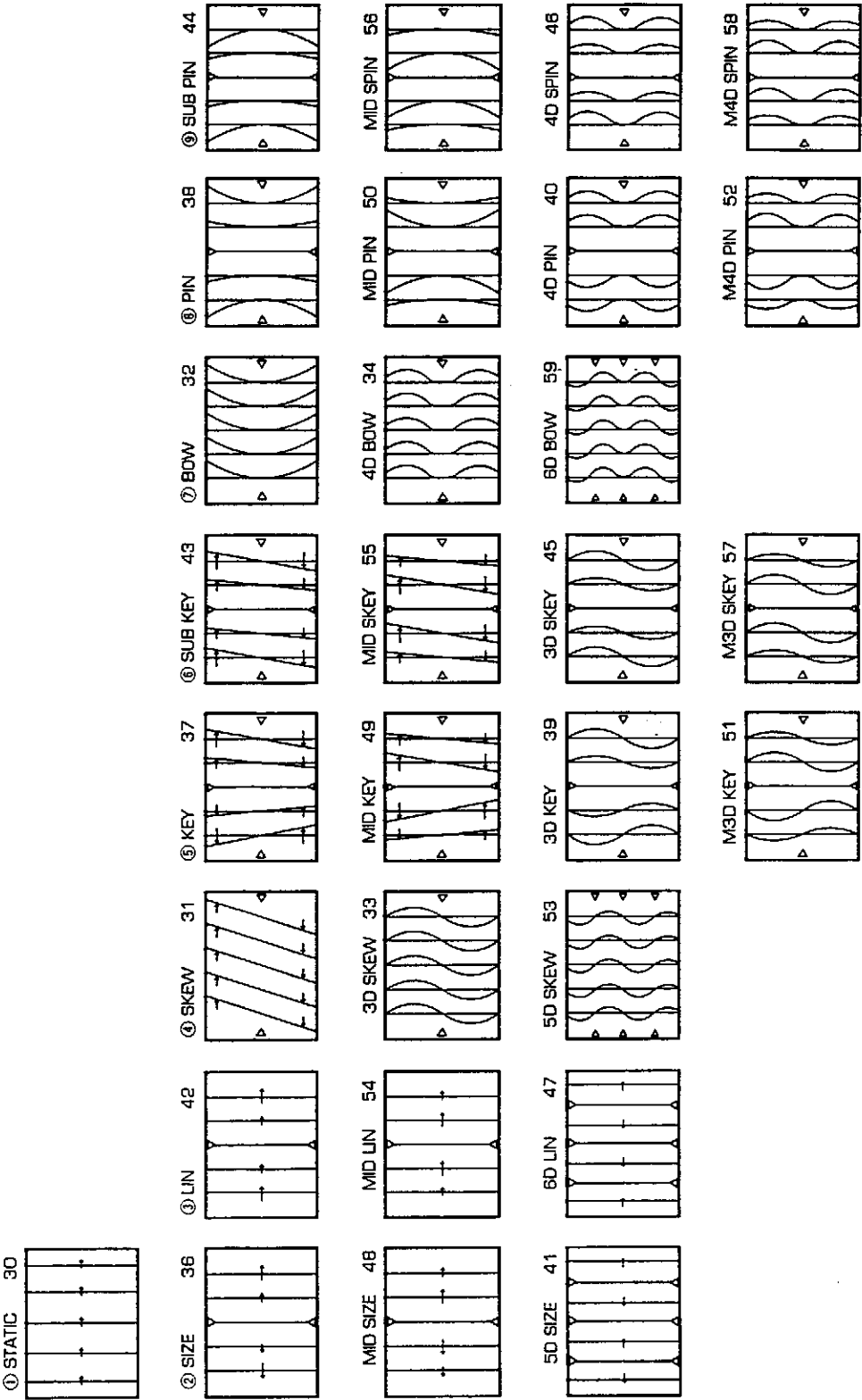
8 **H BLK L and H BLK R Adjustments**

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.

Video signal

Display range

Convergence adjustment wave form

Video signal

Display range after size changed

Convergence adjustment wave form

Convergence adjustment wave form

Adjustment by H BLK L   Adjustment by H BLK R

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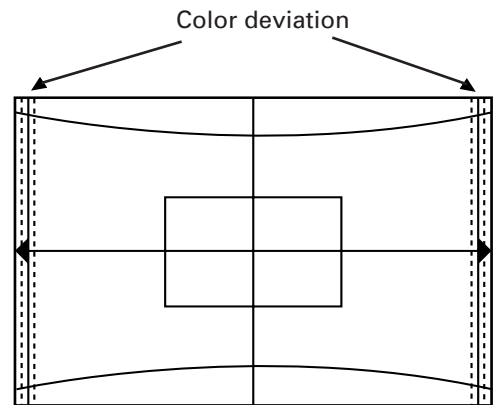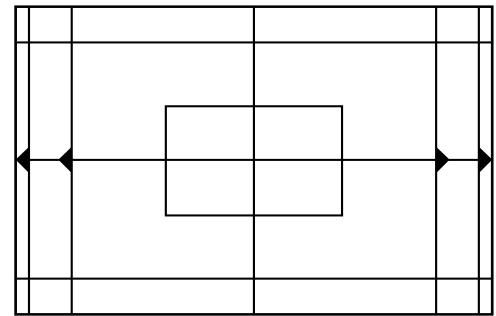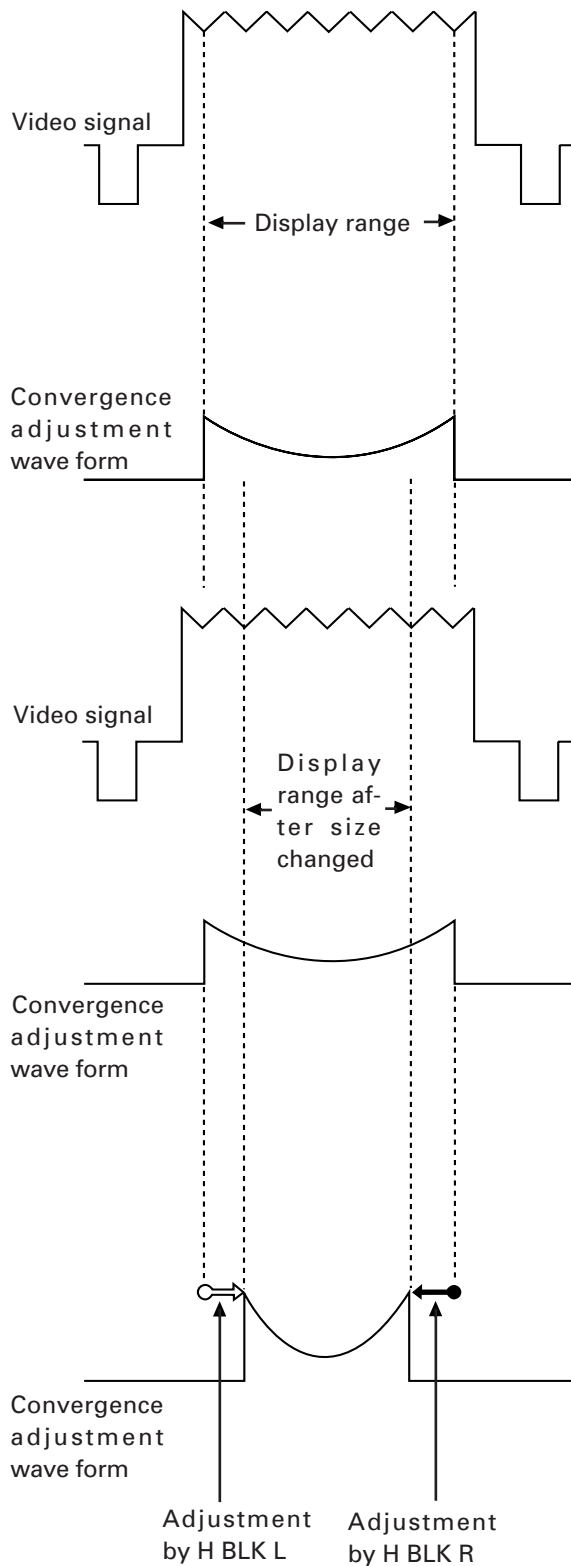
When size is increased with H BLK L and H BLK R not adjusted.

No color deviation
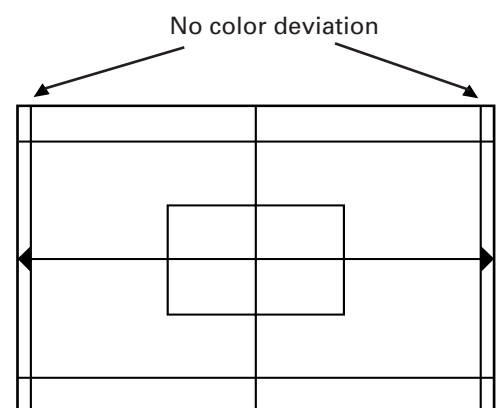
Image after H BLK L and H BLK R has been adjusted.

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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.

RGB

Observe
here

RGB

BGR
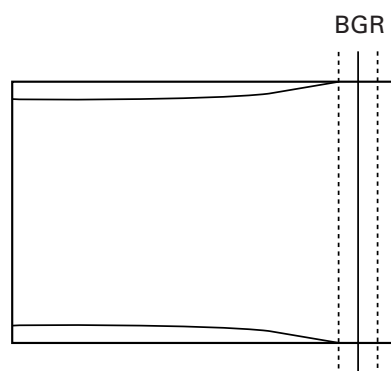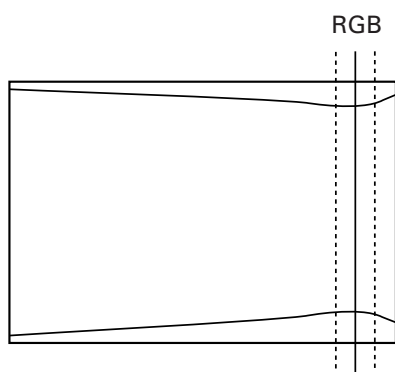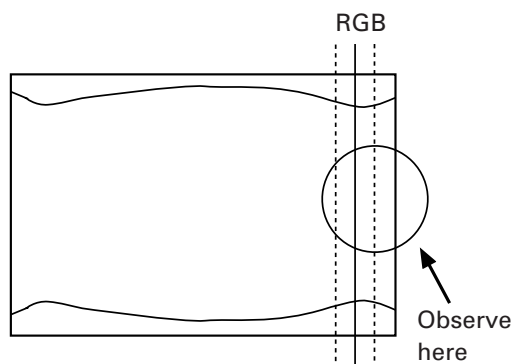
When H BLK R adjustment is not properly performed

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.

RGB

Observe here
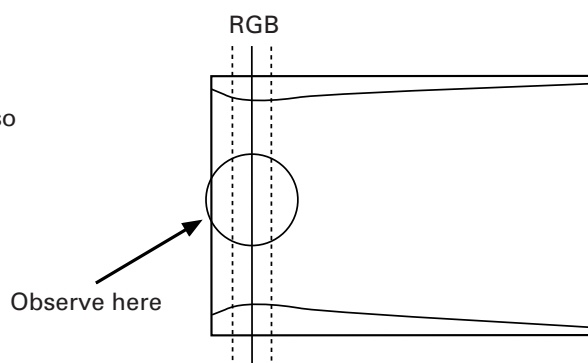
Note

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

OSD display   Movement on screen
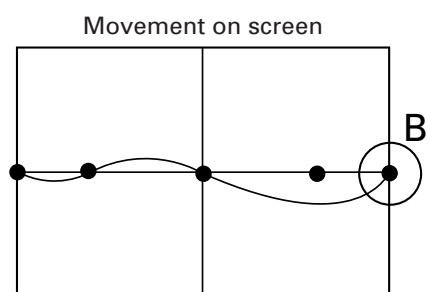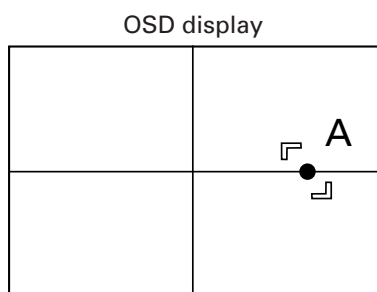
When point A is lowered by point convergence, point B should not move.

Confirming the Optimum H BLK L Value
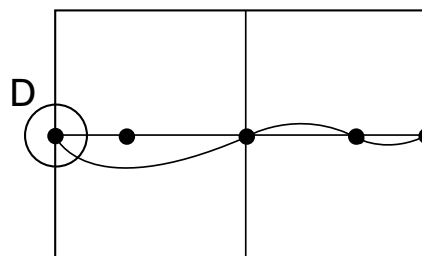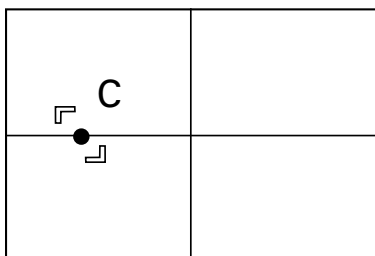
When point C is lowered by point convergence, point D should not move.

(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 (P.63) (5) White Balance Adjustment)

① White Balance Adjustment (COMBI OFF)

START

↓

→ Black level adjustment (white 10%)

↓

HIGH LIGHT adjustment (white 50%)

↓

LOW LIGHT adjustment (white 20%)

↓

NG └── HIGH, LOW LIGHT check (white 0% to 100%)

↓ OK

ABL GAIN adjustment (White 100%) (Fix to maximum normally)
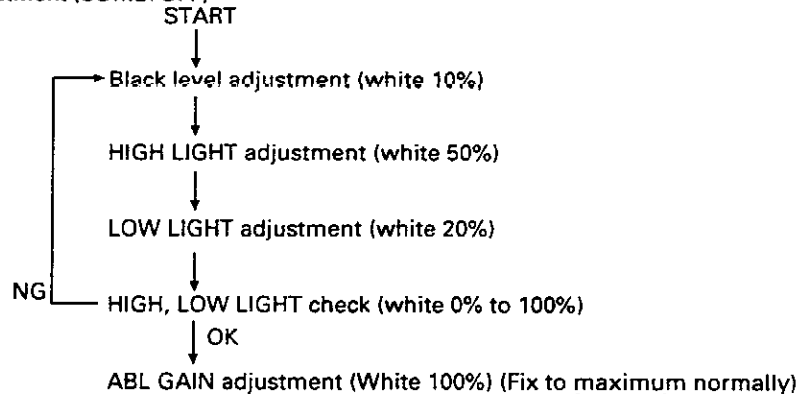
② ABL link and LINEAR WHITE flesh color adjustment (COMBI ON)

ABL LEVEL adjustment (White 100%)

↓

LINEAR WHITE adjustment (Cross hatch) (Fix to maximum normally)

↓

HIGH, LOW Light check (white 0% to 100%)

↓

OK ── ABL check (white 0% to 100%)

↓ NG

Re-LINEAR WHITE adjustment (Cross hatch)

ABL LEVEL adjustment (White 100%)   Re-HIGH LIGHT adjustment (White 80%, 50%)

ABL GAIN adjustment (White 100%)   Re-LOW LIGHT adjustment (White 20%)

HIGH, LOW LIGHT check (White 0% to 100%)

Is INPUT Function RGB?

NO   COLOR ,TINT   OK
      SHRPNESS check
      ↓ NG
YES   COLOR adjustment
      ↓
      TINT adjustment
      ↓
      SHARPNESS adjustment

→ Rough adjustment end

↓

Moving image adjustment ← When W/B is incorrect

↓

Moving image check ── NG → Fine adjustment input

↓ OK

End

(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 .
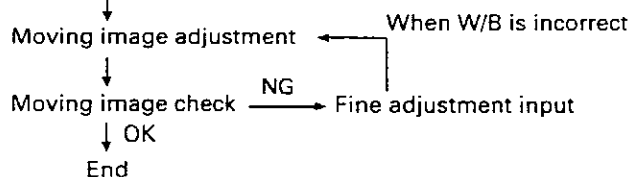
(5) White Balance Adjustment

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		
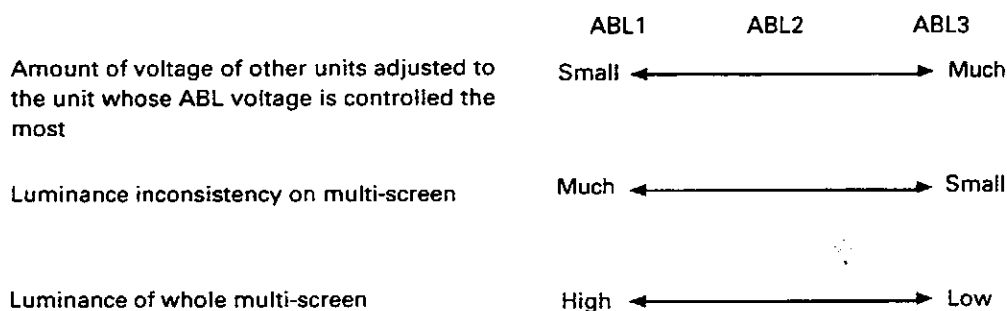
○Recommended Usage of Modes

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.

③ Adjustment Flow

Single screen

[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	Differs according to the auto W/B.
ABL GAIN	MAX (255)
ABL LEVEL	128
LINEAR WHITE	Differs according to factory adjustments

R,G,B,HIGH LIGHT
R,G,B,LOW LIGHT
*SHARPNESS   Data at shipment
*TINT
*COLOR

> *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.

Hi UP

Amount of Hi UP

Amount of Low DOWN

Low Down

Low Light starts to deviate
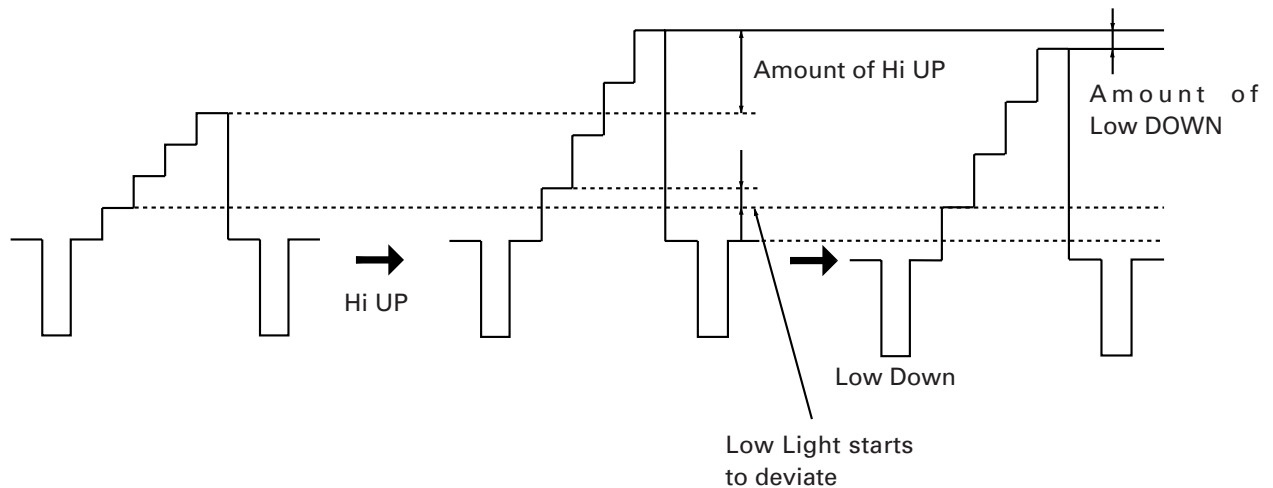
⑥ LINEAR WHITE adjustment

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.

LINEAR WHITE
becomes effective

LINEAR WHITE Down
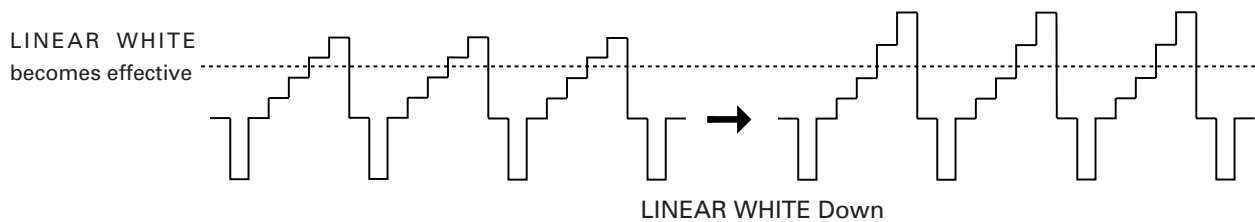
⑦ ABL GAIN adjustment (White 100%)

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 controls the inconsistency of the ABL control voltage of each MPJ when ABL is on.

[1] Set the ABL of all MPJ to ON.
[2] Turn on and off the ABL of each unit to change the luminance.
[3] For MPJ whose luminance becomes dark when ABL is ON, turn UP the ABL level and set to the point where the luminance stops changing by turning on and off the ABL.
[4] For MPJ whose luminance does not change, turn DOWN the ABL level to the point just before the luminance becomes dark.
[5] Perform steps (2) to (4) for all the MPJ, change white from 0 to 100% and check that the ABL does not work abnormally.

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 radiation (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

(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 105) Connecting the external computer of the MVP" and onwards.

[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

COMPUTER _0325   MPJ

FG 1	1 FG
TXD 2	2 RXD
RXD 3	3 TXD
CTS 5	5 CTS
GND 7	7 GND

Straight cable

COMPUTER _039
(IBM PC)   MPJ

TXD 3	2 RXD
RXD 2	3 TXD
CTS 8	5 CTS
GND 5	7 GND
	1 FG
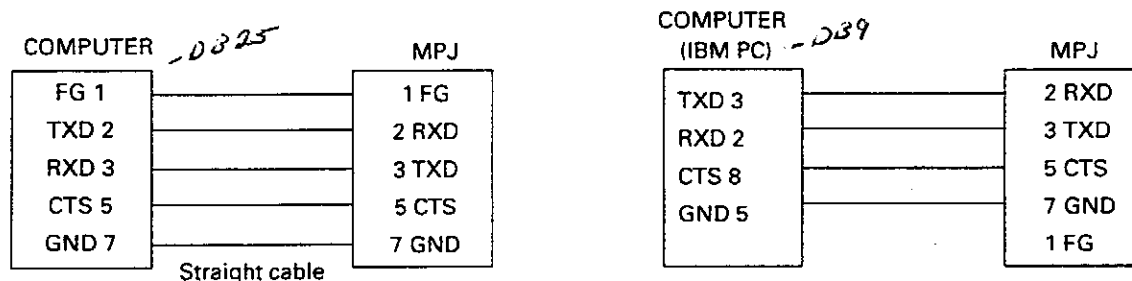
[6]Protocol
  MPJ from computer

| stx | ID | COMMAND | etx |

ID : 2-Byte(ASC II)COMMAND : 3-Byte(ASC II)
stx=02h etx=03h

| stx | ID | COMMAND | COMMAND | COMMAND | etx |

Up to 3 commands possible

| stx | ID | COMMAND | ARGUMENT | etx |

ARGUMENT : 3-Byte(ASC II)
        Note : * In case of the numeral direct command

② RS-232C Commands Table

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

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

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

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

	Com-mand	Name	Normal Valid	Number Direct	UP/DW Command	Function
N	NTS	TV SYSTEM NTSC	O	X	X	Sets TV SYSTEM to NTSC (Note 4)
P	PON	POWER ON	O	X	X	Turns ON power
	POF	POWER OFF	O	X	X	Turns OFF power
	POC	POWER ON(MUTE)	O	X	X	Turns ON power with the convergence DAC muted
	PAL	TV SYSTEM PAL	O	X	X	Sets TV SYSTEM to PAL (Note 4)
R	R00 I R59	RED 00 I RED 59	X	O	O	RED convergence adjustment (Same as BLUE)
	R61 I RP0	P-CONV. ADJ 61 I P-CONV. ADJ P0	X	O	O	RED point convergence adjustment (Same as BLUE)
	RHI	RED HIGH LIGHT	X	O	O	RED HIGH-LIGHT adjustment
	RLW	RED LOW LIGHT	X	O	O	RED LOW-LIGHT adjustment
	RON	RED ON	X	X	X	Turns ON RED
	ROF	RED OFF	X	X	X	Turns OFF RED
S	SHP	SHARPNESS	X	O	O	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	O	O	Adjusts TINT (Note 5)
	TS1	TEST CROSS 1	X	X	X	Displays test cross (Pattern 1)
	TVA	TV SYSTEM AUTO	O	X	X	Sets TV SYSTEM mode to auto mode (Note 4)
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	O	X	X	Switches convergence adjusting data to user 1 (Note 4)
	US2	USER 2	O	X	X	Switches convergence adjusting data to user 2 (Note 4)
	US3	USER 3	O	X	X	Switches convergence adjusting data to user 3 (Note 4)

	Command	Name	Normal Valid	Number Direct	UP/DW Command	Function
V	VSI	V SIZE	○	×	×	Adjusts V deflection SIZE
	VLI	V LINEARITY	○	×	×	Adjusts V deflection LIN
	VST	V STATIC	○	×	×	Adjusts V deflection STATIC
	VMS	V MID SIZE	○	×	×	Adjusts V deflection MID SIZE
	VML	V MID LINEARITY	○	×	×	Adjusts V deflection MID LIN
	VMY	VIDEO MUTE ON	×	×	×	Sets video mute to ON when the input function switches
	VMN	VIDEO MUTE OFF	×	×	×	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.*

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.*

Note6 : *The SHP commands are not valid during RGB input.*

<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
    ×; 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.)
    ×; 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.

①STX (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<□44>/□H	5D SIZE	adjustment data	(3 BYTE)
⑱<□47>/□H	6D LIN	adjustment data	(3 BYTE)
⑲<□44>/□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)
㉛ETX (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.

 ①STX (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)
 ㉛ETX (03H)

(Note) □ : R or G or B

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

Format : Output in the following order.

 ①STX (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)
 ⑪ETX (03 H)

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

Format : Output in the following order.
    ①STX (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)*
    ⑯ETX (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] <GUS> (GET CONV. USER DATA)=Deflection and convergence data memory area setting state is output.

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

[6] <GST> (GET STATUS)-Various setting states are output.

       ①STX (02H)
       ②Version of microcomputer software   (5 BYTE)
           Example)V1.00:Indicates VERSION 1.00.
       ③Input function state   (3 BYTE)-Output in command name.
           Example)IN1:Indicates VIDEO input.
       ④MULTI state   (3 BYTE)-Output in command name.
           Example)MLY:Indicates MULTI=ON.
       ⑤COLOR MODE state   (3 BYTE)-Output in command name.
           Example)CM1:Indicates COLOR MODE=1.
       ⑥COMBINATION state   (3 BYTE)-Output in command name.
           Example)CMY:Indicates COMBINATION=ON.
       ⑦TV SYSTEM MODE state   (3 BYTE)-Output in command name. *(Note 1)*
           Example)TVA:Indicates TV SYSTEM=AUTO.
       ⑧Indicates the input discriminating result of TV SYSTEM=AUTO   *(Note 2)*
           Example)NTS:Input discriminating result indicates NTSC.
       ⑨Deflection 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.
       ⑩OSD display, enable/disable setting state (3 BYTE)-Output in command name.
           Example)DIY:Indicates OSD display enabled.
       ⑪ETX (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.*

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 excecution 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) IN1~3 (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.
a) When the rear panel switch is set.
b) When the power is turned OFF.
c) 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 (RU-V107) besides the computer and software.
All adjustments are performed only using the remote control.

① Remote control functions.
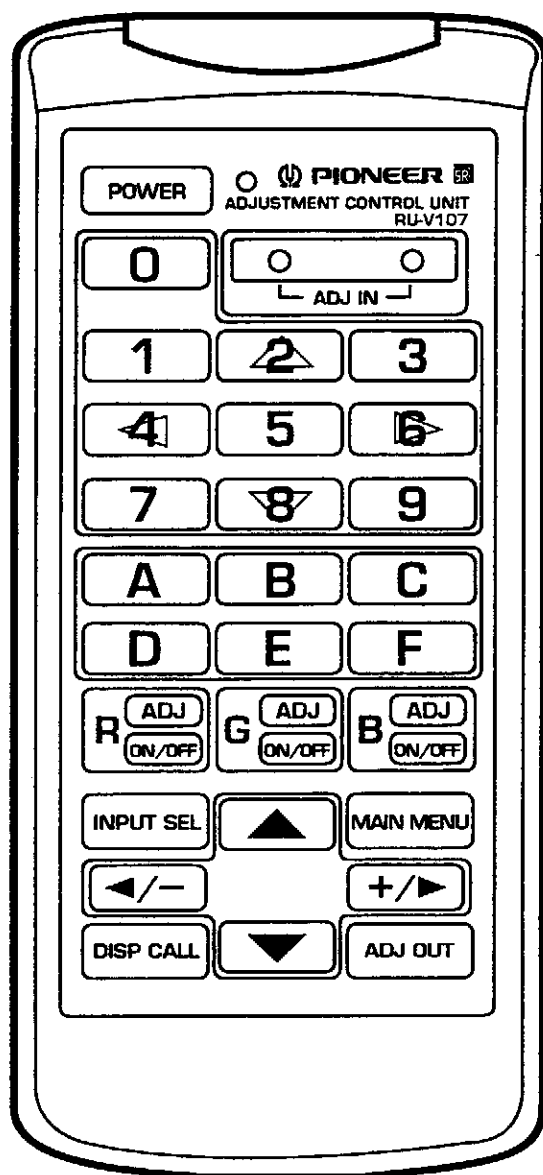
1) [POWER]
 • Turns on/off the power of the unit.

2) [0]
 <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.
   ┌─► POINT adjustment ──► File area ──────► Line area ┐

3, 4) [○══○]
 • Starts up the adjustment mode when the two buttons are pressed simultaneously.

5) [1]
 <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.

   ┌─► VIDEO ──► Y/C ──► RGB ┐
   └──────────────────────────┘

 • 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.
   ┌─► SIZE ──► MID SIZE ──► 5D SIZE ┐
   └──────────────────────────────────┘

 • 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) [3]
 <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.
   ┌─► LINEARITY ──► MID LINEARITY ──► 6D LINEAR ┐
   └──┘

 • 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) [◀]

<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.

    ┌→ SKEW →→ 3D SKEW →→ 5D SKEW →┐
    └───────────────────────────────┘

• 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.
• 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.

    ┌→ KEY →→ MID KEY →→ 3D KEY →→ MID 3D KEY ┐
    └───┘

• 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.

    ┌→ SUB KEY →→ MID SUB KEY →→ 3D SUB KEY →→ MID 3D SUB KEY ┐
    └───┘

• 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.

    ┌→ 1200 →→ 2400 →→ 4800 →→ 9600 →→ 19200 ┐
    └──┘

• 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.

    ┌→ BOW →→ 4D BOW →→ 6D BOW ┐
    └───────────────────────────┘

• Selects RED HIGHLIGHT in the WHITE BALANCE ADJUST MODE.

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.

  ┌─→ AUTO ─→ NTSC ─→ PAL ─┐
  └─────────────────────────┘

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

  ┌─→ PIN ─→ MID PIN ─→ 4D PIN ─→ MID 4D PIN ─┐
  └──┘

- 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.

  ┌─→ 1 ─→ 2 ─→ 3 ─┐
  └─────────────────┘

- 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.

  ┌─→ SUB PIN ─→ MID SUB PIN ─→ 4D SUB PIN ─→ MID 4D SUB PIN ─┐
  └──┘

- 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) ⬜ E ⬜

<Adjustment Mode>
• Selects "E" for ID SET and ID SELECT in the ID SET/CLEAR/SELECT MODE.

19) ⬜ F ⬜

<Adjustment Mode>
• Selects "F" for ID SET and ID SELECT in the ID SET/CLEAR/SELECT MODE.

20) R(ADJ)

<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) G(ADJ)

<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) B(ADJ)

<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) R(ON/OFF)

<Adjustment Mode>
• Cyclically switches RED ON/OFF in the DEFLECTION ADJUST MODE, CONVERGENCE ADJUST MODE, and POINT CONVER ADJUST MODE.
<Normal Mode>
• Sets the input function to VIDEO.

24) G(ON/OFF)

<Adjustment Mode>
• Cyclically switches GREEN ON/OFF in the DEFLECTION ADJUST MODE, CONVERGENCE ADJUST MODE, and POINT CONVER ADJUST MODE.
<Normal Mode>
• Sets the input function to Y/C.

25) B(ON/OFF)

<Adjustment Mode>
• Cyclically switches BLUE ON/OFF in the DEFLECTION ADJUST MODE, CONVERGENCE ADJUST MODE, and POINT CONVER ADJUST MODE.
<Normal Mode>
• Sets the input function to RGB.

26) [INPUT SEL]

<Normal Mode>
• Cyclically switches the input function in the following order.

┌─► VIDEO ─► Y/C ─► RGB ┐
└─────────────────────────┘
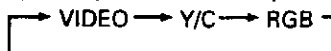
27) [▲]

<Adjustment Mode>
• Moves the convergence up in the POINT CONVER ADJUST MODE.

28) [MAIN MENU]

<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>
• Turns on the test cross mark in the DEFLECTION ADJUST MODE, and CONVERGENCE ADJUST MODE.
<Normal Mode>
• Cyclically switches the status display in the ON/OFF.

32) [▼]

<Adjustment Mode>
• Moves the convergence down in the POINT CONVER ADJUST MODE.

33) [ADJ OUT]

<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 $\boxed{\circ \quad \circ}$ keys of the remote control together. The adjustment mode will be set.

To exit this mode, press the $\boxed{\text{ADJ OUT}}$ 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.

```
— —
                              ADJUST
    1.ID SET/CLEAR/SELECT
    2.OPERATION MODE
    3.DEFLECTION ADJ
    4.CONVERGENCE ADJ
    5.POINT CONVER ADJ
    6.WHITE BALANCE ADJ
    7.MEMORY READ/COPY
```
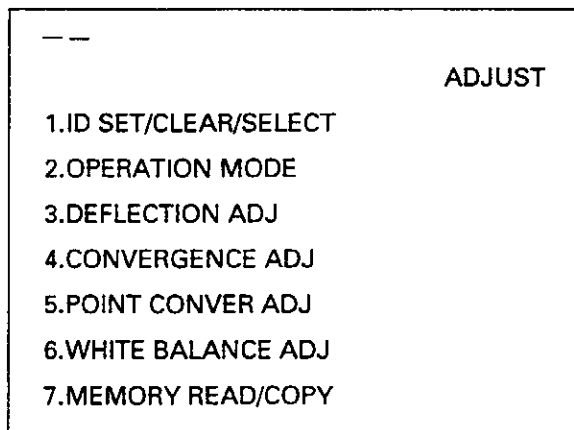
● Main Menu

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 [ADJ IN] key.

2) The main menu will be displayed. Press the [1] key to select [1. ID SET/CLEAR/SELECT].

3) Check that the ID display at the top left of the screen is [– –]. Press the [1] 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 [ADJ IN] key to set the adjustment mode. The main menu will be displayed.

   b) Press the [1] key and select [1. ID SET/CLEAR/SELECT].

   c) Press the [0] key to delete the ID.

4) The ID input standby state will be set. Use the [0] to [9] and [A] to [F] 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 [1] key to select [1. ID SET/CLEAR/SELECT] of the main menu.

3) Another menu will be displayed. Press the [2] 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 [MAIN MENU] key to return to the main menu.

   b) Ending the adjustment mode

   Press the [ADJ OUT] 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.

a) To continue adjustment
   Press the [ADJ IN] key to set all screens into the remote control adjustment mode, and perform adjustments.

b) To end adjustments
   Press the [ADJ OUT] key and exit from the remote control adjustment mode of screens in the standby state.

c) To turn OFF the power
   Press the [POWER] key to turn OFF the power of all screens (STANDBY state).

[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.

$$\left(\begin{array}{l} \boxed{G_{ON/OFF}} : \text{Green adjustment} \\ \\ \boxed{B_{ON/OFF}} : \text{Blue adjustment.} \end{array}\right)$$

   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

[8] To return the convergence and white balance adjustment data to that at shipment:
    1) Set the adjustment mode.
    2) Press the [7] key.
        Select [7. MEMORY READ/COPY].
    3) Select the number from the SUB MENU.
        [1] key : The convergence and deflection adjustment data will return to that at shipment.
        [2] 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 [7] key.
        Select [7. MEMORY READ/COPY].
    3) Press the [4] 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 [0] key within 5 seconds. (If not, the copy pattern will be displayed again.)
       If the copy pattern number is wrong, press the [MAIN MENU] key and repeat from step 2 again.

[10] Resetting the setting
    1) Set the adjustment mode.
    2) Press the [7] key.
        Select [7. MEMORY READ/COPY].

    3) Press the [3] 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 [ADJ IN] key. (To set the adjustment mode).

        ② Press the [7] key (To select [7. MEMORY READ/COPY].)

        ③ Press the [3] 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 [6] key. (Returns to the main menu).

        ⑤ Press the [2] key (Select [2. OPERATION MODE]).

        ⑥ Press the [7] key (As the baud rate changes cyclically, 2400 bps is selected.)

        ⑦ Press the [ADJ OUT] key to select a baud rate.

    The adjustment is completed.

④ **Precautions Upon Use (Adjustment Control Unit)**

• Always release the adjustment mode with ⌊ADJ OUT⌋ button and turn off the power with the ⌊POWER⌋ 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 ⟷ 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 ⌊ADJ IN⌋ button.
   2. Exit the remote control adjustment mode using the ⌊ADJ OUT⌋ 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 follow-
   ing. (Also refer to precautions provided for dry batteries.)
• Load the ⊕ and ⊖ 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. OPERATIONS · MAINTENANCE

1. MAINTENANCE

(1) Re-adjustments After 3 months

Even if the RM-V1000N 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.

■ **Replacement of MPJ**

Replacing the Top MPJ

[1] Remove rear cover A (four screws) and rear cover B (eight screws). (Fig. 5-1)

[2] Remove the mirror stay A (four screws) and remove the mirror. (Fig. 5-2)
Handle the mirror with extreme care.

[3] Remove the engine support stay B (four screws) (Fig. 5-3) and remove the MPJ stopper (four screws) (Fig. 5-4)

[4] Remove the styling of the wire connecting the mini signal section and lower the MPJ by more than 2 persons.
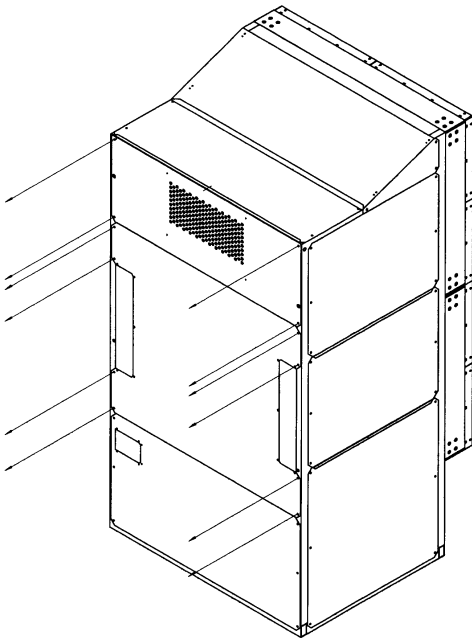
(Fig.5-1)
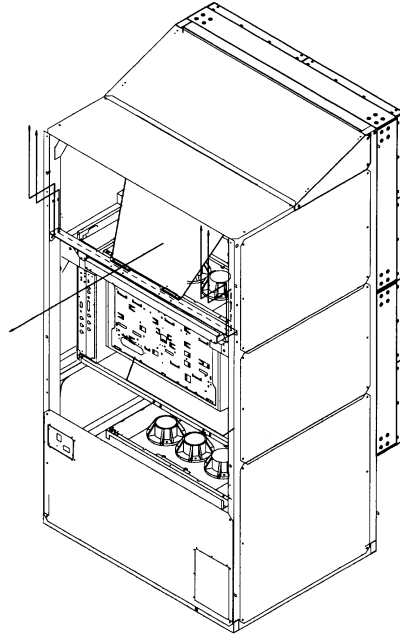
(Fig.5-2)
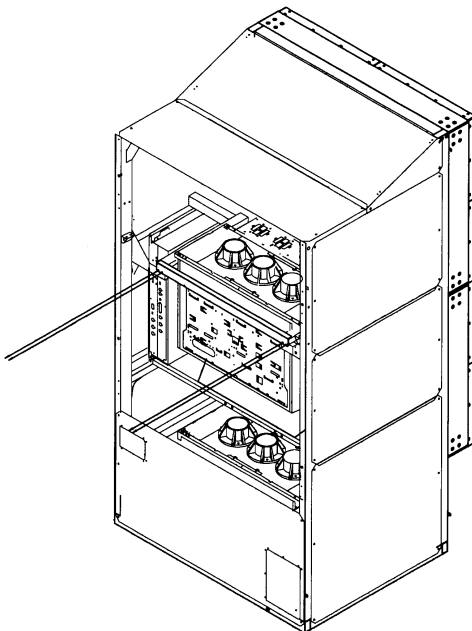
(Fig.5-3)
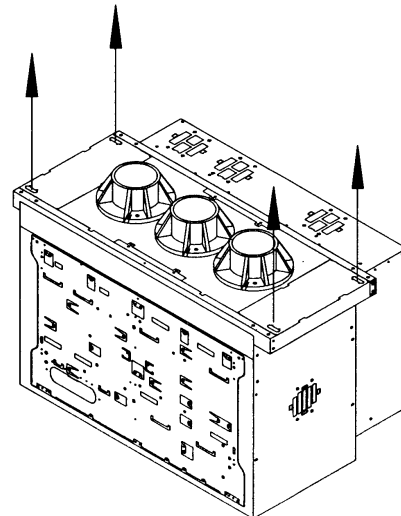
(Fig.5-4)

Replacing the Bottom MPU

[1] Remove the rear cover B (eight screws) and rear cover C (six screws). (Fig. 5-5)
[2] Remove the mirror stay A (four screws) and engine support stay B (six screws) (Fig. 5-6) and remove the MPJ stopper (four screws) (Fig. 5-7).
[3] Remove the styling of the wire connecting the mini signal section and lower the MPJ by more than 2 persons.

Removing the Mini Signal Section

[1] Remove the bonnet (three screws). (Fig. 5-8)
[2] Remove the screws (four screws) while holding the mini signal section and pull it out (Fig. 5-9). Use a screwdriver of less than 15 cm.
Handle the wires with extreme care.

(Fig.5-5)

(Fig.5-6)

Mirror stay A

Engine support stay B
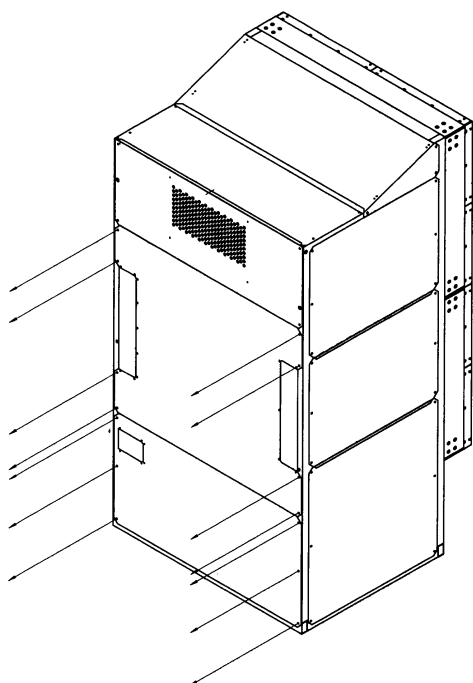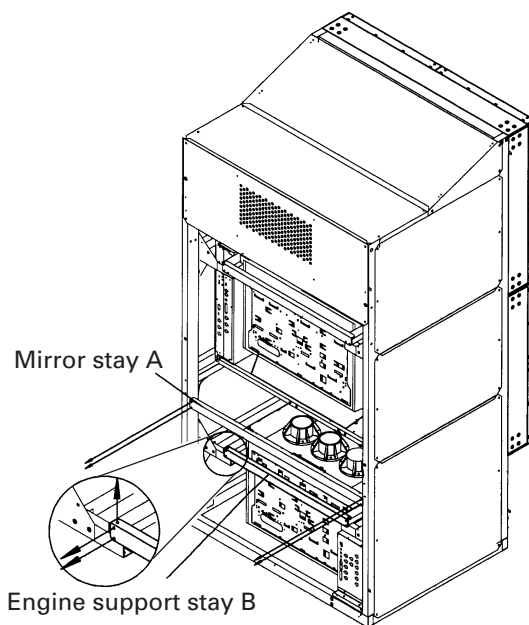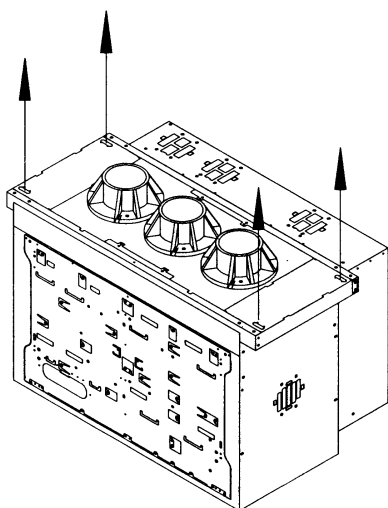
(Fig.5-7)
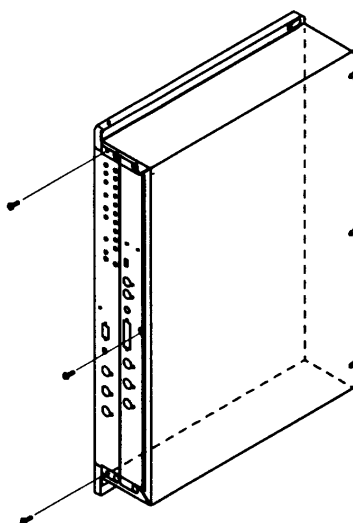
(Fig.5-8)
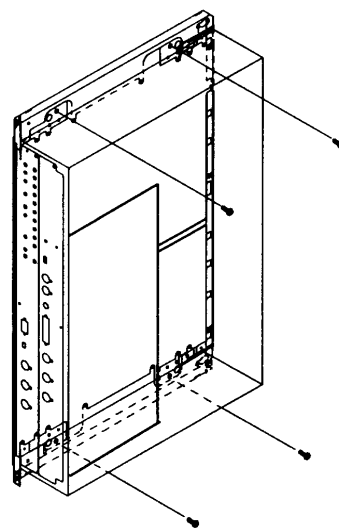
(Fig.5-9)

■ Replacement of MVP

[1] Remove rear covers C (R) and (L). (6 screws)

[2] Remove the UL cover A. (6 screws)

[3] Remove the UL cover C. (2 screws)

[4] Disconnect the MVP power cord.

[5] Disconnect the connectors and remove the power supply. (3 screws)

[6] Remove the four screws in front of the MVP.

[7] Tilt the MVP slightly, and pull it out.

[1]

Rear cover C (R)

Rear cover C (L)

[4] [5]

[2] [3] [6] [7]

UL cover C

UL cover A

Pull in this direction
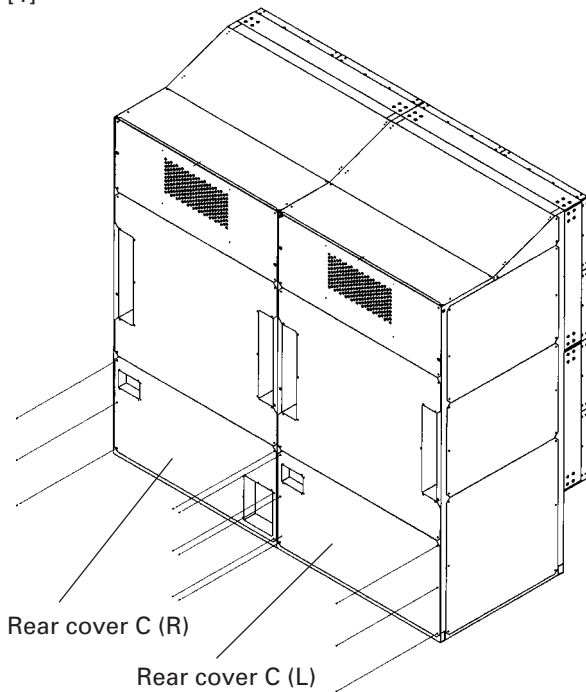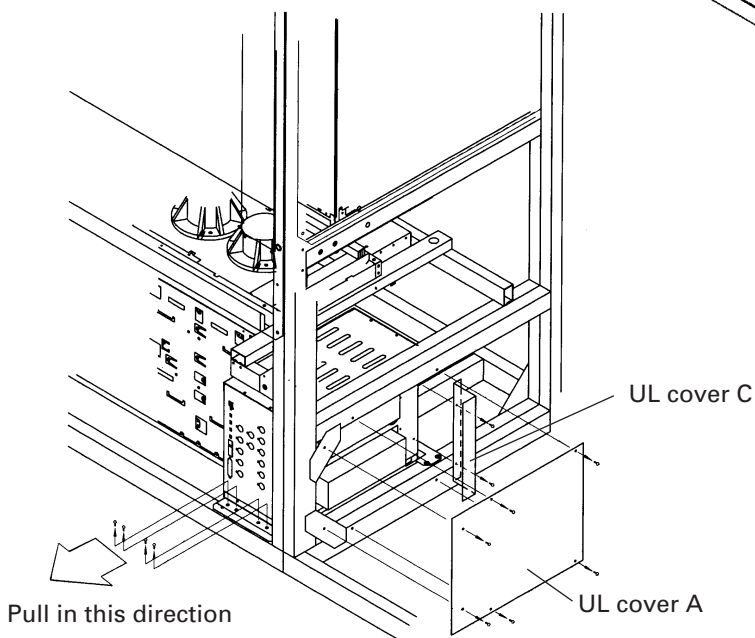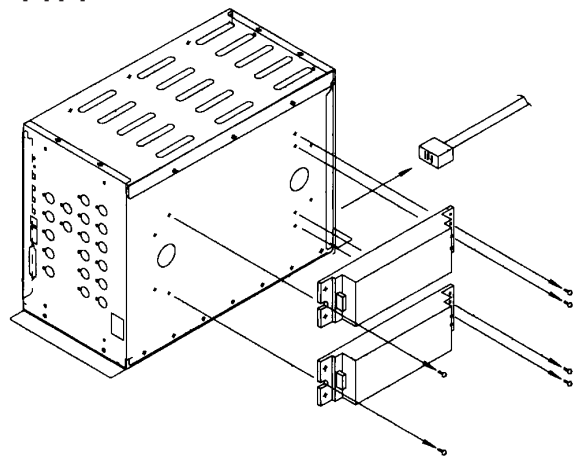
■ Replacing the Screen

[1] Remove the panels at the top and right side of the screen unit to be replaced. (Remove 12 screws.)
The panels are made of polycarbonate. Adhesive double coated tapes are pasted to the frames. To remove the panel, pull it out carefully in the horizontal direction as much as possible and it will not deform.

[2] Peel off the black vinyl tape at the edges. The top and right sides of the screen will become free. Remove the screen by pulling in the top right direction. (fig. 5-10)
* The left side and bottom of the screen is fixed to the panel by adhesive double coated tape. The lenticular sheet can be removed relatively easily. The fresnel lens is fixed firmly and will not come off by just pulling in the top right direction. To remove, while pulling in the top right direction, remove it by opening it as if opening a door. (Fig. 5-11)

Position according to this part
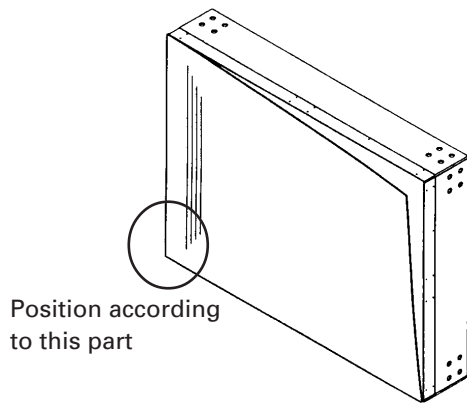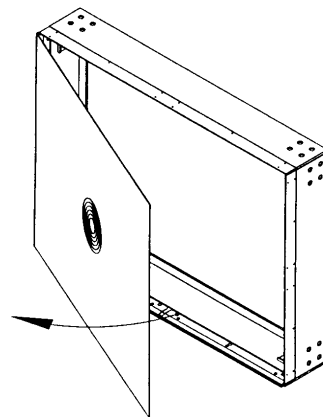
(Fig. 5-10)

(Fig. 5-11)

[3] Re-paste the adhesive double coated tape on the panel. It can be peeled off easily by scratching it with your finger backwards. Then paste a new adhesive double coated tape according to the figure.

Approx. 10cm

Approx. 10cm

Approx. 5cm

Approx. 5cm
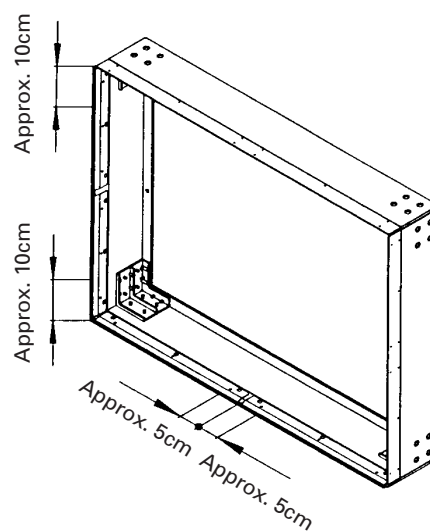
(Fig. 5-12)

[4] Attach a new screen. While paying attention to the front and back, attach the fresnel lens.
(Flat side : The shiny side is for the unit side.)

[5] In the same way, attach the lenticular sheet while paying attention to the front and back.
(The shiny side is for the fresnel lens side.)
  * When attaching the screen, past the adhesive double coated tape properly by rubbing the tape with your finger with force. When attaching the screen, position to the bottom left part of the screen (○ part in Fig. 5-10), and attach each panel properly.

[6] Paste a black vinyl tape around the edge of the screen. It can be pasted easily by placing the screen frame on its side. As shown in Fig. 5-13, paste the vinyl tape slightly protruding out on the edges of each screen and cut off the protruding parts. Be careful not to scratch the lenticular sheet at this time.

[7] After peeling off all the adhesive double coated tape remaining on the back of the panel or the frame, paste the above adhesive double coated tape to the frame side. Make sure not to paste over the black vinyl tape.

[8] Peel off the released paper of the adhesive double coated tape and paste the panel along the tapped holes. Tighten the 12 screws.

[9] Finally, check that the screen will not come off from its front and back.
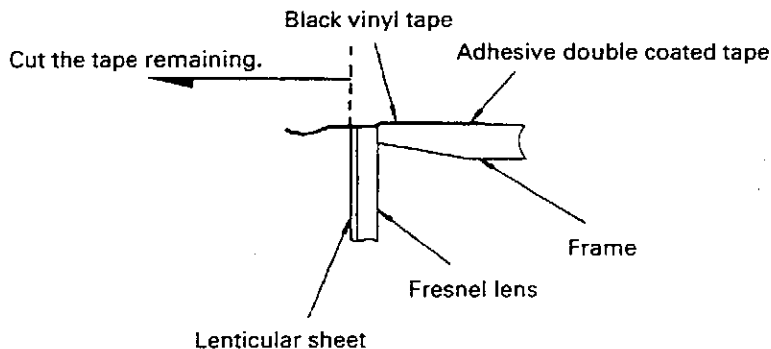
(Fig. 5-13)

2. PRECAUTIONS FOR PLAYING

● The input function, MULTI ON/OFF (peripheral light amount selection), VIDEO MUTE ON/OFF, COMBINATION ON/OFF (ABL link selection), COLOR MODE 1/2 (white balance selection), TV system selection, and convergence memory state will be recorded in the memory only if the power is turned off using the remote control or tact SW on the rear panel and finish the adjustment mode (if you were set each data in the adjustment mode). (They will not be recorded in the memory if the power is turned off using AC ON/OFF.)
When starting or stopping the system by AC ON/OFF under setup conditions for a demonstration, perform the above operations beforehand, record the above in the memory, and then perform AC ON/OFF.

● To mute the image during performance, perform the following steps [1] to [3].

[1] Using an external Personal Computer commands
Example) When muting an image of the unit with ID = 11:
　　　11 A OF　　→　　11 INO
(Image mute)(Input selection & Image must released)
　　O :　1 → For VIDEO input
　　　　　or
　　　　2→ For Y/C input
　　　　　or
　　　　3→ For RGB input

[2] Set the remote control unit or personal computer
VIDEO MUTE ON : Mutes the screen for several ten milli-seconds when switching the input function (VIDEO, Y/C, RGB).
VIDEO MUTE OFF : Will not mute the screen even when the input function is switched.

[3] Settings when the signal is switched between NTSC and PAL using the personal computer
The image may be disturbed momentarily due to the time required for switching the TV format. If the disturbance is great, mute the screen as follows.
Example) Mute the screen when switching from NTSC to PAL.
Initial settings :　TV SYSTEM=AUTO (For details, refer to Chapter 4.(P.37) 2.(2) TV System.)
　　　　　　　　When NTSC signal is input : CONV. MEMO-1
　　　　　　　　When PAL signal is input : CONV. MEMO-2
　　　　　　　　Convergence : Adjusted
　　　　　　　　Input function : Fixed

```
INPUT SIGNAL            ├──── NTSC ──────────→ ├──────── PAL ────────→

OPERATION COMMAND       • Transmits <AOF> at ID = * *  ← 1 sec. → • Transmits <AON> at ID = * *
(Personal computer)

                        START                 Switching of           → Time
                                              input signal
```
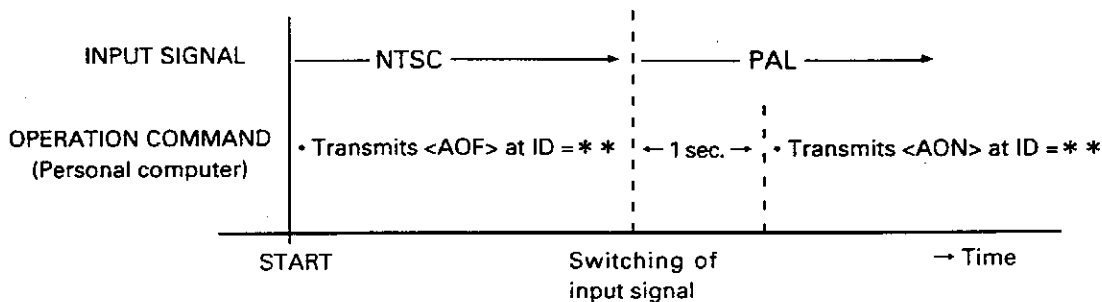
But, <AON> is transmitted more than one second after the PAL signal has been switched.

(Note)
The built-in multi video processor can be used only for NTSC inputs. It can be made usable for PAL inputs if options are added. For more information, contact Pioneer.

3. PRECAUTIONS FOR ASSEMBLING AND MAINTENANCE

● Periodically clean the vent nets of the fan of MPJ to prevent it from clogging.

● In assemblies and maintenance, the service person must move in the cabinet. The following are precautions for this procedure.

[1] Do not place load on the screen.

(In the procedure, always place weight on the cabinet.)

[2] Be careful not to hit your head when moving the unit.

[3] Do not touch the lens.

[4] As changing the position of MPJ will change the convergence, do not touch MPJ.

⚠ Work carried out at high places is extremely hazardous. If tools, etc. are dropped, it will cause not only damage to the equipment but also injuries to men as well. Therefore work carefully.

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.)

Reflected light
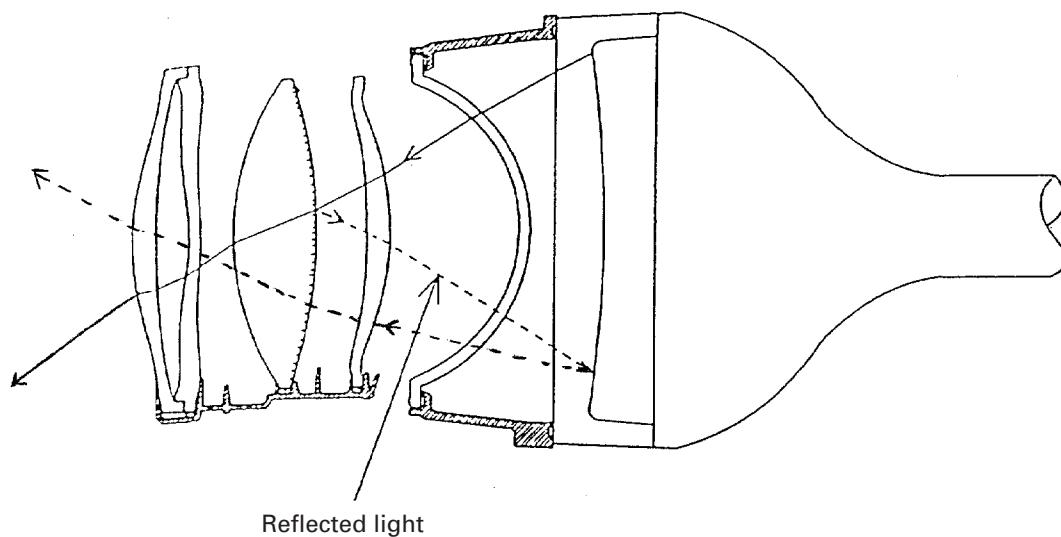
(fig.6-1)

CHAPTER 7. APPENDIX (MVP manual)

CONTENTS

* Not applicable to this system. MPJ inputs can only be set to the standard speed.

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.

CONNECTION WITH MVP EXTERNAL COMPUTER

- Refer to Chapter 4.(P.69) "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.14) MVP panel ⑧ Baud rate switch".

<MVP RS-232C Pin Layout>
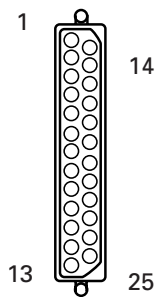
Signal name

FG	Frame Ground
Tx (D, I, O)	Trandmitted Data
Rx (D, I, O)	Received Data
RTS (I, O)	Requenst to Send
CTS (I, O)	Clear to Send
DSR (I, O)	Data Set Ready
SG	Signal Ground

Connection with External Computer

    <External Computer Side>   <Video Processor Side>
                Straight   RS-232C IN

FG	1		1	FG
TxD	2	→	2	RxI
RxD	3	←	3	TxI
RTS	4	→	4	CTSI
CTS	5	←	5	RTSI ⎫ *
DSR	6	←	6	DSRI ⎭
SG	7		7	SG
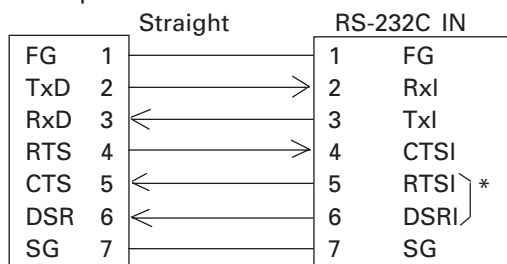
* Pins 5 and 6 are short-circuited inside.
  Pins not shown in the diagram are NC.

TERMINATING THE PERSONAL COMPUTER

<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.

<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
```

<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.

<Communication Mode Settings in Use of CCT98>

Set the CCT98 communication mode before executing the MVP commands.
After starting up CCT98,
|F6|...................... Enter the parameter setting mode.
          Set the following items as follows.

Communication speed	2400	**4800**	9600	19200
Character length	7 bits	**8 bits**		
Stop bit	**1 bit**	2 bits		
Parity bit	**None**	ODD	EVEN	
Character code	NEC			
Transmission carriage return code	CR			
Reception carriage return code	CR			
SI/SO control	None			
X control	None			

— Selectable (Character code, Transmission carriage return code, Reception carriage return code)

|_____| .... MVP setting at shipment — Fixed (SI/SO control, X control)

* In the adjustment of the optional RGB board, problems may occur in 2400 bps communication.
* Refer to the CCT98 manual for how to use the CCT98.

OPERATION MODE

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.

```
                                          !
  ┌───────────┐      ┌───────────┐  ───────────▶  ┌───────────┐
  │ Power ON  │ ───▶ │Normal mode│                │Operation mode│
  └───────────┘      └───────────┘  ◀───────────  └───────────┘
                           │
                           └ @h
```
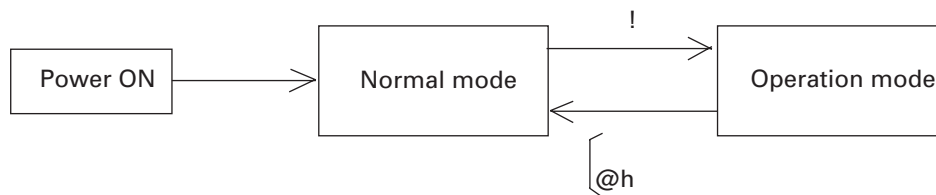
h=8 (4 screen magnification by optional RGB input)
h=9 (4 screen magnification of NTSC input)

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
      AJYB Enables the NTSC input board to be adjusted.
      AJN   Adjustment mode end

```
┌──────────┐
│ Power ON │
└────┬─────┘
     │
     ▼
┌──────────────┐
│ Normal mode  │
└──────────────┘
  !  │   ▲  ▲
     │   │  │ @h
     ▼   │  │
┌──────────────────┐      AJYB      ┌───────────────────────────────────┐
│ Operation mode   │───────────────▶│ NTSC input board adjustment mode  │
│                  │◀───────────────│                                   │
└──────────────────┘      AJN       └───────────────────────────────────┘
```
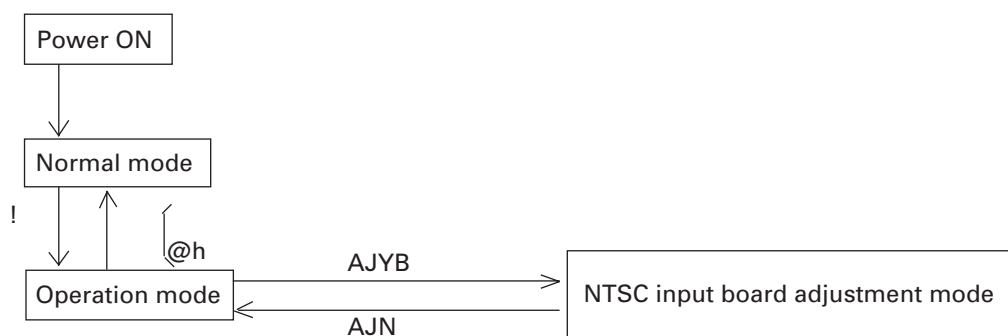
  ● Option RGB board adjustment mode:
      Mode which enables communication with the optional RGB board (RMD-V3020).
      In this mode, only the RGB board adjustment command is accepted. The operations of
      each switch on the front panel are not accepted.
      In particular, when Mode switches are operated, the video output will be disrupted. Set
      the switches properly after ending the communication mode.

      Operation mode
       :A Sets into the communication (adjustment) mode with the RGB board.
       : Ends the RGB board adjustment mode.

VIDEO OUTPUT MODE OF MVP

● 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	Trunk piece mitigation mode
0	NTSC	VBS, Y/C	Standard speed	OFF
1		RGB		
2			Double speed	
3				
4				
5		Reserved		
6				
7				
8	NTSC	VBS, Y/C	Standard speed	ON
9		RGB		
A			Double speed	
B				
C				
D		Reserved		
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-interlace

● Trunk piece mitigation mode : It is the function that mitigates the trunk piece phenomenon by multiple visions
                                          unique scanning line structure. There is a difference in an effect by the magnifi-
                                          cation ratio and it is more effective as smaller of the magnification ratio. Yet, it
                                          does not work in vertical magnification ratio X1.

(Note)
MPJ inputs can only be set to the standard speed. Double-speed playback cannot be performed.

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) Option RGB board (When optional board RMD-V3020 is used)
- 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)

PICTURE FRAME ADJUSTMENT PROCEDURE

Adjust the MVP picture frame as follows.

(1) Connect the RS-232C cable to the MVP panel.

(Refer to (P.105) "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. M11B22 ⏎ (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.)

COMMAND REFERENCE

To Shift to the Operation Mode [! command]

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

To Set Different Screens for Adjusting Convergence [DFFB command]

Input: DFFB⏎
Explanation: • By executing this command, the NTSC input image will be displayed on a single 1x1 display.
                      • Use the crosshatch, etc. for NTSC input images.
                      • For details of the convergence adjustment, refer to the MPJ adjustment manual.

(To return the 4-screen magnified display)
                      • The NTSC input image will be 4-screen magnified displayed with the input of 9⏎.
                        (Refer to @ command (P.112))

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 optional RGB input)

  @9 ↵ .... (Sets the 4-screen magnification of the NTSC input)

Picture Frame Adjustment

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 113.)

  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.)

To Perform Coarse Adjustments of the Picture Frame [&P2, &Q2 commands]

Input: &P2$d_2h_1h_2h_3$, &Q2$d_2h_1h_2h_3$ ⏎

Explanation: &P2 command: Horizontal direction

                     &Q2 command: Vertical direction

                           d_2 : Screen position (1 to 2)

                       $h_1h_2h_3$: 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: &P2d_2 ⏎ + ⏎ , &P2d_2 ⏎ – ⏎

          &Q2d_2 ⏎ + ⏎ , &Q2d_2 ⏎ – ⏎

         d_2 : 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

&P2d_2 ⏎
***   : Input the current value at ***
+–+–⏎

&P2d_2 ⏎
***
RES ⏎   : RES is the initial value

&P2d_2 ⏎
***
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
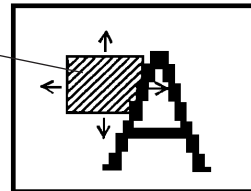
Magnified image

- 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.)

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.

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.

To Switch the Image Input [IFF command]

Input: IFFa ⏎

Explanation: Switches to display by NTSC input 4-screen magnification or 4-screen magnification by the optional RGB input.

                    a : Video input (A or B)

                        A   : Optional RGB input board

                        B   : NTSC input board

Example)
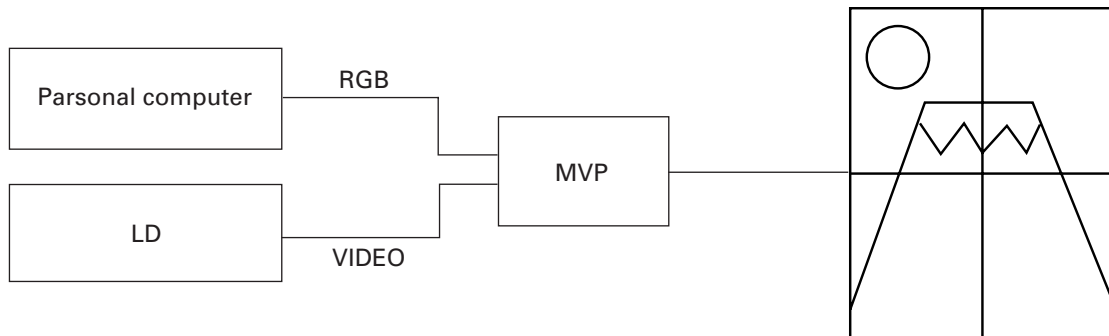
IFFA ⏎
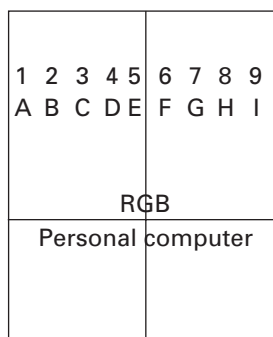
IFFB ⏎
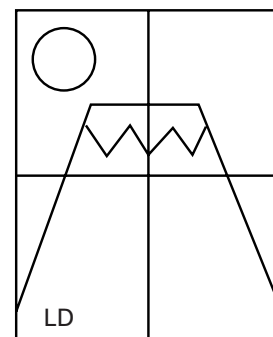
• Refer to the @ command (page 112) if the normal 4-screen magnification cannnot be set due to incorrect operations.

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	Y/C	
L3 INPUT	:	NTSC BOARD	STANDARD MODE VBS	
L4 INPUT	:	NO BOARD	Y/C ─┐	
L5 INPUT	:	NO BOARD	Y/C │	
L6 OUTPUT	:	4 OUT BOARD	├── This is displayed countinuously.
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   *8   *10

*7   L2 INPUT   :   V.SCAN BOARD   Y/C   *9   *10

L3 INPUT	:	NTSC BOARD	STANDARD MODE	VBS
L4 INPUT	:	NO BOARD	Y/C	
L5 INPUT	:	NO BOARD	Y/C	
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 sync

GEN LOCK EXTERNAL : External sync

*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   : Optional RGB input board

        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

To Perform NTSC Input Board Picture Quality Adjustment

To Set the Adjustment Mode [AJYB command]

To Exit the Adjustment Mode [AJN command]

Input: AJYB ⏎, AJN ⏎

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

               AJN command   : Exists the adjustment mode.

• When adjusting the NTSC input board, the adjustment command will be ignored if AJYB is not executed.

• To set the optional RGB board to the adjustment mode, use the :A command. (Refer to pages 121 and on-wards.)

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 AJYB. (Refer to the AJYB 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.

Color Compensation [COL command]

Input: COLd$_1$d$_2$d$_3$ ↵
Explanation: Corrects the color of the NTSC input board.

       d$_1$d$_2$d$_3$: Compensation value 0 to 255

       COL? ↵   : Help display

       COL ↵   : Displays the current value and moves to the sub command mode

• To execute this command, it is necessary to set the adjustment mode by AJYB. (Refer to the AJYB 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.

Tint Adjustment [TNT command]

Input :   TNTd$_1$d$_2$d$_3$⏎

Explanation: Corrects the tint of the NTSC input board.

    d$_1$d$_2$d$_3$: 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 AJYB. (Refer to the AJYB 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

         ⏎

Controls the Panel Switch Function

To Set the Manual Mode [MNL command]
To Set the Remote Mode [RMT command]

Input :   MNL ⏎, RMT ⏎

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

       ① GEN LOCK INT/EXT switch

       ② Optional RGB board FILTER ON/OFF switch

       ③ VBS/ Y/C select switch

       ④ 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.

       • External sync, internal sync switching

        Refer to the EXT and INT commands

       • 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 CIB and YIB commands.

       • V OUT output format (MODE) switching

        Refer to NT, NTR, NTD commands.

To Set Internal Sync [INT command]

Input : INT ⏎

Explanation :• Forcibly sets internal sync.
   • This command is executed in the remote mode.
     It is ignored in the manual mode. (Refer to the RMT command.)

To Set External Sync [EXT command]

Input : EXT ⏎

Explanation :• Forcibly sets external sync.
     However, if the GEN LOCK able signal is not input to the GEN LOCK IN (reference input) terminal,
     external sync will not be set.
   • This command is executed in the remote mode.
     It is ignored in the manual mode. (Refer to the RMT command.)

To Select Composite Video Input [CIB command]

Input : CIB ⏎

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.)

To Select YC Separation Input [YIB command]

Input : YIB ⏎

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.)

To Set the Output to the NTSC Mode [NT command]

To Set the Output to Standard RGB Mode [NTR command]

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)

This multi projection unit can be inputted at normal speed.

Optional RGB Board Adjustment Mode Setting [:A command]

Input :   :A ⏎

Explanation : • Used to adjust the optional RGB board (RMD-V3020).

      • To end the adjustment mode, omit the parameter and input :⏎.

      • For details of adjustments, refer to "RMD-V3020 Command Reference" on the following pages.

RMD-V3020 COMMAND REFERENCE

Outline of 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.

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 hexadecimals 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.

aaaddd : 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.

Tracking Adjustment [TRK command]

Input :   TRK$d_1d_2d_3$

Explanation: • $d_1d_2d_3$: 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.
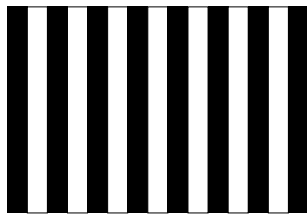
Contrast Adjustment [CNT command]

Input :   CNT$d_1d_2d_3$

Explanation: • $d_1d_2d_3$: 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.

R, G, B Gain Adjustment [RGN, GGN, BGN commands]

Input :   RGN$d_1d_2d_3$, GGN$d_1d_2d_3$, BGN$d_1d_2d_3$

Explanation: • $d_1d_2d_3$: 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.

Bright Adjustment [BRT command]

Input :   BRT$d_1d_2d_3$

Explanation :• $d_1d_2d_3$: Compensation data 0 to 254

• Use this command to adjust the bright.

• Use this command to adjust so that the bright of the images produced by the MVP matches the bright of the actual images of the computer.

• Tracking may deviate in some cases when bright adjustment is performed after TRK adjustment. After adjusting bright, adjust TRK.

B, R Clamp Adjustment [BLV, RLV commands]

Input : BLVd$_1$d$_2$d$_3$, RLVd$_1$d$_2$d$_3$

Explanation :• d$_1$d$_2$d$_3$: 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.

Blanking Window Level Adjustment [BLK command]

Input : BLKd$_1$d$_2$d$_3$

Explanation :• d$_1$d$_2$d$_3$: 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.

Horizontal, Vertical Direction Screen Display Position Adjustment [HPS, VPS commands]

Input : HPSd$_1$d$_2$d$_3$, VPSd$_1$d$_2$d$_3$

Explanation :• d$_1$d$_2$d$_3$: 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.
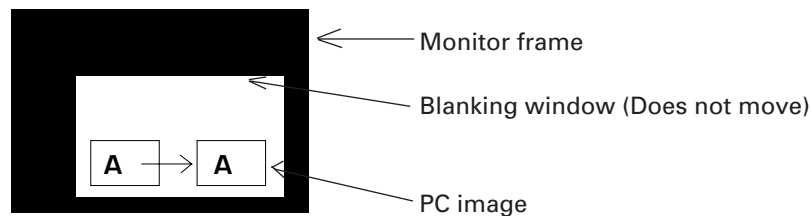
Figure: Example of HPS Command Execution

(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.

Horizontal, Vertical Blanking Window Position Adjustment [HWN, VWN commands]

Input : HWN$d_1d_2d_3$, VWN$d_1d_2d_3$

Explanation :
- $d_1d_2d_3$: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.

HWN, VWN adjustments
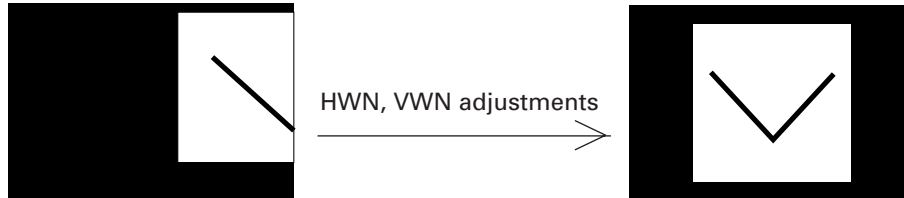
Figure: Example of HWN, VWN Command Adjustment

(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.

Horizontal, Vertical Blanking Window Width Adjustment [HWD, VWD commands]

Input : HWD$d_1d_2d_3$, VWD$d_1d_2d_3$

Explanation :
- $d_1d_2d_3$: 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.

PC image

HWD adjustment
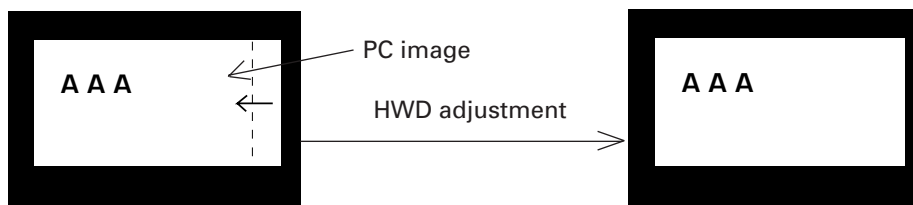
Figure: Example of HWD Execution

(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.

Full Dot Number Compensation [HFD command]

Input : HFDddd

Explanation : • $d_1d_2d_3$: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.
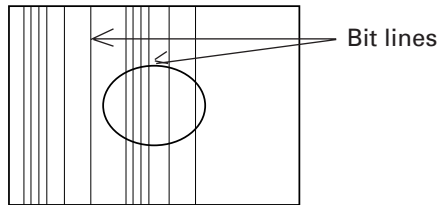
Bit lines

Figure: Bit Lines which can be Erased by HFD Execution

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.

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.

480 vertical lines   DSY →   400 vertical lines
                      ← DSN
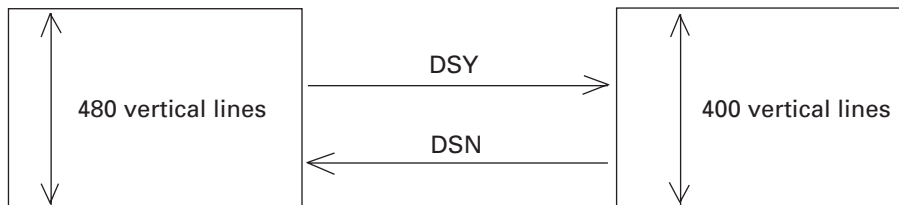
Figure: Example of DSY and DSN Executions (MAC 6-5 Conversion Example)

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

Vertical Compression Filter Conversion Rate Input [LCV command]

Input : LCV$d_1d_2d_3d_4$

Explanation :• d_1d_2=00 to 15 (Add 0 before all numbers below 9) Vertical direction rate before conversion
   • d_3d_4=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 $d_1d_2 > d_3d_4$.
   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

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

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   Autolocks to PC9801 with the left display, indicates vertical
      STATUS=DSY, FZN   filter ON, freeze OFF.
      MODEL NO.=09 AUTO

      : STS   Forcible locks the Macintosh with the left display, indicates
      STATUS=DSY, FZN   vertical filter ON, freeze OFF.
      MODEL NO.=03 FIXED

To Select Preset Model [M command]

Input : Mh_1h_2

Explanation : • Refer to "VS Board Model Selection" described later for the VS board model selection.

• Forcible locks the model data preset.

Model data No.

h_1	h_2	
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.

Model Fresh [F command]

Input : Fh_1h_2

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.

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.

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	
0C	Gain upper limit	1C	Reservation
0D	Clamp upper limit	1D	
0E	Sync method **_Note 2_**	1E	PLL gain
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.

Horizontal Frequency Input [HFQ command]

Input : HFQ$d_1d_2d_3.d_4d_5d_6$

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.

Vertical Frequency Input [VFQ command]

Input : VFQ$d_1d_2d_3.d_4d_5d_6$

Explanation :• Directly changes the horizontal frequency of the model data table used for the VS 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 $\longleftarrow$ ——————————————— Input 60.123 kHz

(Take note to input 0 at first.)

Vertical Full-line Input [VLN command]

Input : VLN$d_1d_2d_3$

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.

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.

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 this case, mask the dusts using VWN, VPS, and VWD.
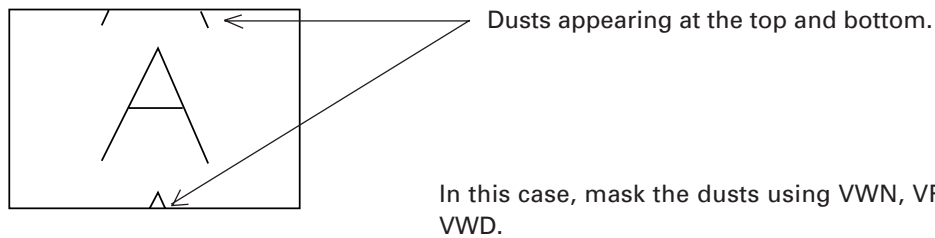
- The RGB board is the upper limit at which the dot clock 35 MHz ensures performance.
  The following is a simple calculation method of the dot clock.
  Dot clock (Hz)=Effective dot number x Horizontal frequency (Hz) x 1.35
- Use Mode 99 to output images temporarily. When used, it is recommended that 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.

VS BOARD MODEL SELECTION

```
┌─────────────────┐
│ PC signal input │
└─────────────────┘
         │
         ▼                NO
┌─────────────────┐  ──────────►  ┌──────────────────┐      NO
│ Preset PC?      │               │ Locked in Mode 99? │ ──────────┐
│ (01 to 09)      │               └──────────────────┘           │
└─────────────────┘                        │                      │
         │ YES                              │ YES                  ▼
         │                         ┌──────────────────┐   The model may be outside
         ▼                         │ Output in Mode 99 │   the application range.
┌─────────────────┐               └──────────────────┘
│ Auto locked     │                        │
└─────────────────┘                        ▼
         │                       ┌──────────────────┐
         │                       │ Check frequency, │
         │                       │ line number using │
         │                       │ FRQ command       │
         │                       └──────────────────┘
         │                                │
         │                                ▼
         │                       ┌──────────────────┐
         │  ◄────────────────────│ Lock preset model data │
         │                       │ using M command.  │
         ▼                       └──────────────────┘
┌─────────────────┐
│ Frame, color    │ ◄──────────
│ adjustment      │
└─────────────────┘        When using the Mode
                           99 data as it is.
```
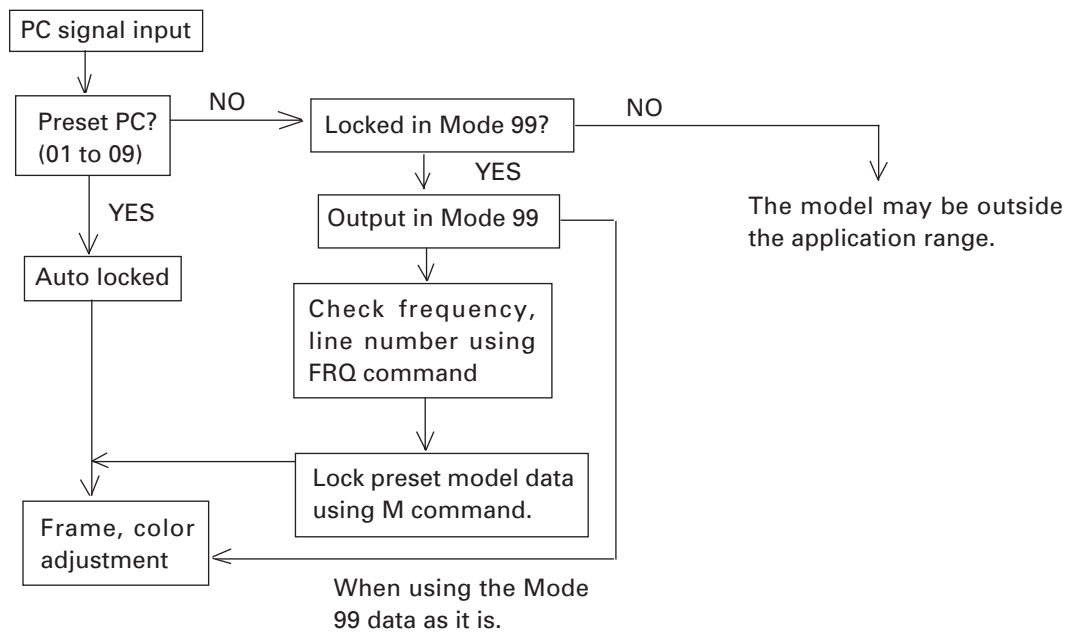
Description
With the VS board, first the input PC frequency and full line number are measured. Next, if there are preset models which have three matching measuring data, it is determined that these models are connected and they are set into the autolock state.
In the autolock state, 01 AUTO is displayed 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.

USING METHODS OF HFQ, VFQ, VLN

There is a need to autolock unpreset models without using the Mode 99 accoridng 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.

SELECTING THE SYNC SIGNAL

When adjusting the VS board, care must be taken regarding the relation of the priority order of the sync signal.

Order of selecting the sync signal
The priority order for selecting the sync signal of the VS board is

Separate sync > composite sync > Green on sync.

However, if the sync signal of a certain method is selected once according to the connection and power ON/OFF order, even if sync signals with a higher priority order than that sync signal are connected later, sync selection will not be switched.

In this case, however, the priority order will be selected again when the power of the converter is turned on again.

Frame for Sync Signal
The horizontal frame values are saved according to the sync signal currently selected.
For this reason, the horizontal frame may deviate according to the type of sync signal even with the same computer.

(Example)
When models with both the composite sync and green on sync are connected (Frequently with Macintosh)
① Connect cables G, B, R, and CS in this order with the power of the input personal computer and converter on. — — — — — — — ≫ The green on sync is selected.
② After connecting the cable with the power of the input personal computer on, turn on the power of the converter. — — — — — — ≫ The composite sync will be selected.

When frame adjustment is carried out in the ① state, ② state is set when the power is turned on the next time, meaning that the frame deviates.

It is necessary to set state ② at all times so that the same sync signal is selected during both adjustments and use.

<CUBE Adjustment>

1. Preparations

① Connect the power supply, and connect the cable for input signals and ABL link cable (control cable).
② Place the connected cables neatly.
③ After completing the above ① and ②, turn on the power and perform aging for one hour.
④ Prepare the signals required for adjustments.

2. Before Starting Adjustments (Set Conditions) ....P. 36

① Set whether to perform the adjustments using the remote control or personal computer.
② Check the TV SYSTEM setting.
  Check the convergence memory and white balance memory used for the adjustments.
③ Check and set the STATUS.
  MULTI ON/OFF, COMBINATION ON/OFF, ABL link switch settings (3-levels).
④ Recording the settings in the memory.

3. Setting ID ....P. 39

① Set the ID to each CUBE.
  (Note) The following IDs are provided at shipment.

ID=11	ID=12
ID=13	ID=14

4. Adjusting The Screen

① Adjust the size of each screen. .... P. 45
② Adjust the convergence of each screen. .... P. 46
③ Adjust the link of each screen. .... P. 103
④ Adjust the W/B of each screen. .... P. 62
⑤ Adjust the ABL level. .... P. 66
⑥ Adjust the color using the image to be transmitted. .... P. 67
⑦ Check the whole screen.

RM-V1000NA
SETUP
MANUAL

January, 24, 1997
Pioneer New Media Technologies, Inc.

Table of Contents

1. GENERAL SPECIFICATIONS

1-1. General Specifications of RM-V1000NA

Power voltage	AC100-120V, 50/60Hz
Maximum Power Consumption	1740VA
Unit R (Includes MVP)	940VA
Unit L	800VA
Dimensions	2073(W)×2065(H)×938(D)
	(See fig 1-1 for more details)
Weight	403Kg
Unit R	177Kg
Unit L	170Kg
Screens(×4)	14Kg
Accessories	
Butterfly bolt	×8
BNC cable (Long)	×2
BNC cable (Long Orange)	×2
BNC cable (Short)	×2
BNC cable (Short Orange)	×2
Cable clamper for BNC	×6
6P mini Din cord	×3
AC power cord	×2
Cable clip	×2
Screw	×2
Hex bolt	×3
Flat washer	×3
Spring washer	×3
Logo sticker	×1
Rivet (for screens)	×28
Screw (for front panel, extra)	×8
Shading plate	×2
Shading plate S	×1
Rivet (for Shading plate)	×6

Power Supply Panel (see fig 1-2)

No.	Name	Type of WS	Function
①	Main power SW	See-saw switch	Turns on and off the power supplied to R or L unit (R and L unit have each Main power SW)
②	AC inlet	--	Connects AC power cord

Note) Refer to page 5 Connection with a power supply.

To turn off the power, use the Main power switch on the R and L unit, the RS-232C control, or wired remote control (optional).
If power is turned off by the main power switch on the R and L unit or by disconnecting the power cable from the outlet, the settings of the (12)~(15) switches on the control panel, the state of the TV system and convergence memory will not be recorded in a memory. Consequently, when starting up or stopping the whole system by AC ON/OFF in setup conditions for a demonstration, it is necessary to turn off the power using the power switch

on the control panel, RS-232 or remote controller in order to record each setting in the memory.

CONTROL PANEL
Same as the RM-V2400NA/V2500NA, refer to the Technical Manual Ver 1.0.

1-2. General Specifications of MVP

INPUT SIGNAL
Input signal format (NTSC)
　　　　　1 video input　　　　　　　　　　　BNC terminal
A RGB input board (optional) can be installed in the other slot.
A PAL input board (optional) can be installed in the other slot.

① Composite video signal　　　　　　　　1.0 V(p-p) (75 Ω terminate)

② Y/C separate signal
　　　　　Y with sync　　　　　　　　　　1.0 V(p-p) (75 Ω)
　　　　　C burst level　　　　　　　　　0.286 V(p-p) (75 Ω)
Either ① or ② signal form can be selected.

③ Optional RGB input signal
　　　　　RGB signal　　　　　　　　　　0.7 V (p-p) (75 Ω)
　　　　　H.V.　　　　　　　　　　　　　TTL level
　　　　　C.Sync　　　　　　　　　　　　0.3~4 V (p-p) (75 Ω)
　　　　　Green (Sync on Green)　　　　　1.0 V (p-p) (75 Ω)
　　　　　SYNC　　　　　　　　　　　　0.3 V (p-p)
Priority of Sync is:
　　　　　H.V.> C. Sync > Green (Sync on Green)

RS-232C control input　　　　　　　　　25 pin D-SUB

OUTPUT SIGNAL
Output video signal
　　　　　4 output　　　　　　　　　　　BNC terminal

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

② Y/C separate signal
　　　　　Y(with sync)　　　　　　　　　1.0 V (p-p) (75 Ω)
　　　　　C (with burst)Burst level　　　　0.286 V (p-p) (75 Ω)
Both ① and ② signals are output at the same time.

③ RGB signal
　　　　　Green (Sync on Green)　　　　　1.0 V (p-p)
　　　　　SYNC　　　　　　　　　　　　0.3 V (p-p)
　　　　　B.R.　　　　　　　　　　　　　0.7 V (p-p)

3

MVP PANEL (see fig 1-3)

① Power SW

   Turns power ON/OFF for MVP

② Reset button (push type sw)

   This switch is used for system reset. The system is changed to Manual mode
   once the reset button is pressed and it works according to the setting of
   switches on the control panel.

③ EXT/INT SW

   The INT mode is a mode in which the internal SYNC is used as the reference
   signal and the EXT mode is a mode in which the reference signal of equipment
   is used. The factory default is INT mode, set INT mode in normal operation.

④ NTSC/RGB SW

   Select input signal either NTSC or RGB signal. The factory default is NTSC.
   The Reset button must be pressed after the setting of NTSC/RGB SW is
   changed.
   The RGB signal can be input only when the optional RGB board is installed.

⑤ RGB Vertical Filter ON/OFF SW

   The factory default of this SW is OFF.
   Set filter ON mode if vertical screen size is too large to display image when an
   optional RGB board is installed.

⑥ VIDEO/YC SW

   Select NTSC input signal format either VIDEO (composite) or YC signal input.
   The factory default is VIDEO input.

⑦ Mode SW

   Select video output mode.

SW # *2	Output mode			
	Frequency Mode	Output Format	Standard Speed /Double Speed*1	Lacked image Correction Mode
0	NTSC	VBS, Y/C		OFF
1			Standard	
2		RGB	Double	
3	RESERVED (Not Used)			
4				
5				
6				
7				
8	NTSC	VBS, Y/C		ON
9			Standard	
A		RGB	Double	
B	RESERVED (Not Used)			
C				
D				
E				
F				

4

*1
Standard speed..... Horizontal frequency is 15.734 kHz
Double speed....... Horizontal frequency is 31.468 kHz

*2
The factory default is 8. In normal use, 8~A setting is recommended.
The reset button must be pressed once the setting is changed.

Note) The Multi projection display supports only standard speed signal. Double speed
signal will not be displayed on this system.

⑧Baud rate SW (8 bit dip)
      The function is the same as the RMD-V3216/V3109.
      The factory default is SW 3, 5 and 8 are ON. That means Character bit is 8 bit,
      Baud rate is 4800.

⑨RS-232 IN Terminal
      RS-232 input terminal for MVP control.

⑩RGB video input terminal (Optional)
      G...............G signal input of RGB signal
      B...............B signal input of RGB signal
      R...............R signal input of RGB signal
      H/C SYNC... Input terminal of H sync or C SYNC
      V...............V sync input terminal

⑪NTSC video input terminal
      VBS........Input terminal for either composite or Y signal
      C...........Input terminal for C signal of Y/C signal.

⑫~⑮Video output terminal
      The terminals output 4X magnified image.
      VSB/G......Either composite signal or G of RGB signal is output from the
      terminal.(G on SYNC signal is output when G signal is selected)
      Y/B..........Either Y of Y/C signal or B of RGB signal is output.
      C/R..........Either C of Y/C signal or R of RGB signal is output.

Video output terminals and displays are matching as bellows:

VOUT 1 Display 1	VOUT 2 Display 2
VOUT 3 Display 3	VOUT 4 Display 4

(This illustration is a Front of View of the RM-V1000NA)

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2. SETUP AND MAINTENANCE CONDITIONS

2-1. Space and Environmental conditions

(1) Floor preparations

The floor must have a flat surface and be in a horizontal condition, and it must be strong enough to support the weight of the RM-V1000NA. If the floor is a wooden type and there are some distortions or waves in the surface, a compressed board of more than 12 mm thickness should be placed between the floor and the RM-V1000NA so that the weight of the system will be distributed evenly across the floor. In the case of a rough concrete floor, the same procedure should be applied.

Use the Floor Leveler to make the unit in stable condition as the base of the leveler should fit snugly against the floor once the unit has been placed in designated location.

(2) Height of the ceiling

More than 30 cm space is required between the top panel of the system and the ceiling. If air ducts of air conditioners or spot lights are placed over the display, dust, temperature, humidity and dew may cause problems.

(3) Front space

As the surface of the screen, picks up finger prints and stains easily, some protection to prevent viewers from touching with the screen is necessary.

To replace damaged screen, some of open space should be kept at the front of the screen.

(4) Back space

At least 5 cm of space is required between the back panel and the wall in operation.

To maintain the MPJ or MVP, more than 1m space is necessary.

(5) To prevent falling

The "Floor leveler" must be adjusted and fit snugly on the floor when set up.

This system has a couple of holes at the back top portion, it is recommended that wires be fixed to the wall or the floor to prevent falling.(See fig 2-1)

(6) Setting on a table

The table must have enough strength to support the weight of the system.

Make sure that the system will never fall off from the table or base.

(7) Environmental conditions

The following temperature and humidity condition must be maintained to ensure optimum performance by this product.

①Operating temperature	5~35 °C	
②Operating humidity	20~80%	
③Storage temperature	-10~45 °C	

The other conditions are the same as the current MPJ and screen system, please refer to Technical manual of them.

2-2. Connection with a Power Supply

①AC power voltage

The system is designed to work properly at standard AC power voltage within ± 10% tolerance.

If impedance of AC power cord is high, AC wave has distortion and voltage becomes low. Following conditions make voltage lower even if a primary power supply voltage is within the specifications.

- Voltage drop is big between the primary power supply and AC power input of the system.

- Voltage change is big when the system is turned ON/OFF.(Voltage change must be less than 5% of standard voltage)

②Power consumption and connection

The system has an AC inlet on each R and L unit. The R and L unit should be connected separately with the primary AC power supply which has enough current capacity against power consumption as described bellow.

	Power consumption	Current consumption at 100V	Current consumption at 120V
Unit R (Includes MVP)	940 VA	9.4 A	7.8 A
Unit L (No MVP)	800 VA	8.0 A	6.7 A

③AC plug

A three prong type AC cord is bundled with the system, use the three prong type AC code to prevent electrical shock due to current leaking.

④Current leaking breaker

The system has power line filters in it in order to lower the line noise, therefore, maximum 2.0 mA current for unit R (includes MVP) and 1.0 mA current for unit L will leak from the system. Make sure that the sensibility of leaking breaker in the primary power supply is not lower than the total leaking current of the system.

If the others equipment are connected with the same primary power supply, 0.5 mA per one unit should be added to the total leaking current of the system in calculation.

Do not connect to pre-installed wall AC outlet or it may cause problems.

The primary power supply must have current capacity **more than 25%** of power consumption of the system.

2-3. Outdoor setting

Basically, this system is designed only for indoor use, not for outdoor use.

Following items may cause problems on the system at outdoor use even if ceiling is placed above it.

- Water (rain), Dust

- Temperature difference, Humidity difference

- Direct light against screen (especially, direct sun light causes problem)

- See breeze

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3. UNPACKING PROCEDURE

3-1. Check items
①Decide setup location based on following items
       [1] Size of setting location, back space, height of the ceiling
       [2] Horizontal, strength and flatness of the floor
       [3] Distance to the primary AC power supply outlet

3-2. Unpacking
①Packaging condition
       [1] Projection screen kit (×4):   1126(W)×230(H)×879(D)mm 20.2Kg

       [2] Unit (×2):   2140(W)×980(H)×1100(D)mm
           Unit R: 200Kg
           Unit L: 193Kg

② Flow of unpacking
Unpack large boxes first then small boxes, and cushions from the small boxes should be kept in the big boxes.

③Unpacking procedure for the Units (See fig 3-1 and 3-2)
       [1] Remove the upper pad and the air cap.

       [2] Remove the air cap round the unit, side pads and top pad.

       [3] Stand the unit on the floor with the under carton. (At least three persons are required to stand it)

       [4] Remove the under carton part (pad A, pad B and some accessories).

       [5] Remove the engine pad A and B, engine side pad, lower engine side pad, lower mirror pad A and B, upper mirror pad A and B, mirror mat (×3), MVP pad, lens protect paper and CRT cover.

       [6] Butterfly bolts are attached on pad A, shading plates are attached on upper mirror pad A and the other accessories are attached on lower mirror pad B. Keep the accessories for assembling the system.

④Projection Screen
* Projection screen part is double-packaged to maintain its performance. After removing the middle cover protecting its screen, make sure the screen is not scratched or dirty.

       [1] Remove the top cover

       [2] Remove the band securing the middle cover and remove the middle cover.

       [3] Gently peel off the black tape pasted at the four sides of the screen. Be careful not to damage the lenticular sheet.

       [4] Take out the screen unit from the box and stand it on a flat floor, paying attention to its top and bottom.

[5] Remove the eight screws for transportation (gold), four protection panels, white sheet at the back of the screen, and the bag containing accessories attached to the top of the frame.
* The protection panel is attached with the transportation screws. keep the removed panel if required. When storing the system, do not remove the outermost protection panel.

[6] When opening the packaging of several units first, place them in a different place to protect them from damage after opening them, and put a sheet over them to protect them from dust.

3-1. Carrying the units after opening packaging

①Screen (See fig 3-3)
     Refer to Technical manual ver 1.0 or 2.0.

②Unit (See fig 3-4)
     • Do not push the rear panels, push the frame part to move the unit. Do not move front-back direction, move the unit only left-right direction.

     • Do not use the rollers if floor surface is not flat, for example, tile and brick floor.

     • Basically, it is recommended not to move the unit after it is set-upped.

4. ASSEMBLING THE SYSTEM

4-1. Assembling the system (See fig 4-1)

[1] Install butterfly bolts in the units from the back of the unit before carrying to set-up location.

[2] Attach the shading plates and shading plate S to the right side of the L unit by using the rivets (6)

[3] Carry the units to the set-up location
Put the L unit and the R unit next each other so that they touch. Adjust the floor leveler so that the frames are horizontal and the guide pins are aligned with the holes. Make sure the upper panels match properly.

[4] Fix the unit R and L with three Hex bolts that have a spring washer and a flat washer.(Two Hex bolts with washers in the front, one Hex bolt with washers in the back)

[5] Attach lower screen panels
One person holds a screen unit at the front of the unit, another person screws the Butterfly bolts from the back of the unit.

[6] Attach higher screen panels
Repeat procedure [5]

[7] Put rivets for the screens
Attach 12 rivets on the left side of the screen, 16 rivets at the bottom of the screws of the screen.

[8] Paste a logo sticker on the front panel if you want.

4-2. Connecting cables

Connect bundled cables between MPJ and MVP as shown in fig 4-2, then fix the cables with cable clampers as shown in fig 4-3.

(Note) If an RS-232C controller and remote controller are connected at the left side of the unit (rear view), the polarity of the IN and OUT connection of the control cable (6P mini DIN) should be changed.

PIONEER CUBE SYSTEM
TECHNICAL MANUAL
(Additional version)

· Before Cube adjustment

· Convergence adjustment

· Hi-scan signal adjustment

· White balance adjustment

This manual has been made for the purpose of explain more detail of adjustment procedure that is difficult to understand with the technical manual for the installation. This manual will be used with the technical manual for the RM-V4000V. The basic point of view is the same as the RM-V2400N.

1996 September

SHIZUOKA   PLANT

System Engineering Department

Before Cube adjustment

1. It is important to set the Cube with a mechanic surely.
   ① Screw on after placing the Cube unit on the right position.
   ② Attach the slide table part and the base of the frame.
   ③ Make sure no installation gap between the screens.

2. Before a multi-screen adjustment, make sure the condition of the adjustment on the menu display if the setting of all screens are same.
   SW position of the rear panel for each display should be same condition.

3. The adjustment in the field is to take out the difference of each screen mainly.
   · At the factory, a central position and a screen size have been adjusted by using the Monoscope signal, adjustment condition will be changed when different signal is used for it in the field.
   → When there is no require of the image size specially, check the whole tendency and adjust the size of the average majority.
   ··· The know-how to complete the adjustment in the short time is not moving the size as much as possible because the miss-convergence comes out when moving.
   · The display has been adjusted White balance by using the Window signal at the factory, try to take out the color balance error of each display mainly after a decision of target of average white balance.

4. In case changing various data at the adjustment causes bad adjustment condition, it is better to try adjustment again after resetting the data to the factory standard .

   In the case of the protection works at turning on a power due to odd data setting while convergence adjustment, heal with the following operation:
   Leave the unit about 10 seconds with "STAND-BY" (Red LED lights up) mode, then turn OFF/ON the main power SW in order to reset the protection circuit. Next, turn ON the power by issuing a "POC" command by a computer, or turn the power ON by the remote controller within 3

seconds after entering the adjust mode while the unit is in STAND-BY mode. In this case, actual setting of convergence will not be changed though the convergence data on the on-screen-display changes since convergence output is muted internally. Correct the incorrect data which was set by mistake or reset to the factory default data. The mute function is released and convergence adjustment can be started again after normal power OFF/ON cycle.

Convergence adjustment

1. Center position adjustment

> POINT
> The difference of "PHASE" and "STATIC" adjustment

As the way of moving a display position, each of the deflection and the convergence has the function of "PHASE" and "STATIC".
· "P H A S E" ··· Any miss-convergence will not come out since it only changes the timing of the video signal in the position.
· "S T A T I C" ··· The miss-convergence of R, G, B comes out due to movement of the projected position of the CRT beam, and re-adjustment of the convergence is necessary. The "STATIC" function causes more DC voltage against the output amplifiers to move the beam and the amplifiers' load may be increased. To fix a data value on "128" beforehand is an ideal. Adjust within 10 mm on the screen is recommended when using "STATIC" of the convergence.
⇒ Adjust the center position with "PHASE" to the utmost.

According to the whole tendency, if the individual screens with the size 95% of the left, 90% of the right are many, it is better to unify to the size of majority. It becomes the same size 95% of the left, 90% of the right with the expanded multi-image. After this adjustment, the phase shift function of MVP (Multi-Video-Processor) can correct simply either side or center without changing the convergence.

Some of the RM-V4000V can not be adjusted "V PHASE" when "multi" function is ON because of the difference of firmware revision. In this case, the center position should be adjusted by the phase adjustment of the MVP before the Cube's adjustment. "V STATIC" of the deflection can be used to move the vertical position If it's impossible to move by the MVP, and do not use "GV STATIC" of the convergence as much as possible.

2. Size adjustment

```
— POINT ————————————————————————————————
The difference of the deflection adjustment and the convergence
adjustment
```

· Two types of the size control are available. One is the deflection adjustment that can control three (RGB) colors simultaneously, and the other is the convergence adjustment that can control the three colors separately. However, the output amplifiers for the convergence adjustment do not have enough room, therefore, the image may have some distortion or power protection may work when a lot of size factors are added at the convergence adjustment.

⇒ It is recommended that set "GH SIZE" and "GV SIZE" of the convergence within 128±10 range, then picture size should be adjusted by the deflection "V SIZE" mainly.

· The size of all individual images must be equal for the length and the width. The screen size that is adjusted in the individual screens becomes the enlarged picture size finally.

· The miss-convergence occurs when changing an image size, in this case, adjust it by using "H.BLK_L" and "H.BLK_R" command in the deflection adjustment mode.

⇒ Refer to the technical manual P73.

3. The adjustment of the high scan signal

(Refer to the technical manual P56 for the memory allocation)

When a high frequency signal is fed, some distortion of the image appear on the display because the data which has been stored at factory is adjusted with standard NTSC signal.

```
┌──── POINT ─────────────────────────────────┐
│  Adjust by using the command "H.BLK_L" and "H.BLK_R"  │
└─────────────────────────────────────────────┘
```

① When high horizontal frequency signal is fed, the image may be distorted to bend the horizontal line since the blanking width is not proper for the convergence adjustment. It is the same distortion which appears when size is changed.

⇒ Refer to the technical manual P73~ and adjust the horizontal line to fix straight.

② When a different frequency signal is fed, the linearity of the deflection changes too. After the adjustment ①, adjust the pitches of each line of the cross hatching signal to be equal.

⇒ At first, adjust for the pitch of the each lines to be equal as the monochromatic green by the point convergence adjustment.

③ Check the value of "GH SIZE" after the adjustment ②. (A lot of value of the convergence data may be changed since combination of various kind of waves are used at the point convergence adjustment)

⇒ Reset the original size by using "H SIZE" after resetting "GH SIZE" to "128".

④ Adjust the color deviation of R and B (convergence for R and B signal)

4. The adjustment procedure of the point convergence

① Adjust the center portion of the screen.

② Adjust the center cross-line by the point convergence.

③ Find out the biggest part of the color deviation, and make the difference small as much as possible. If the adjustment point is moved widely, the convergence may change not only the adjustment point but around it. (Refer to the technical manual.)

④ Adjust one by one from outside to inside of display.
Check outside once again if there is a difference after finished adjustment at inside of the display.

High scan signal adjustment

1. The RGB input accepts the following frequency signals:
   Horizontal : 1 5 K H z ～ 3 5 K H z (Automatic)
   Vertical : 5 0 H z ～ 1 5 0 H z   (Automatic)
   VGA mode is applied for the RM-V4000V. (refer to Figure 1)

2. Especially becoming a high scan frequency, the rate of the blanking width is increased. The non-display period must be at least **6.3** μ **sec.** for the horizontal and **1.3 m sec.** for the vertical interval. All picture image can not be displayed and hard to reject picture distortion when blanking interval periods are short.

3. When horizontal frequency is high and the display area is wide (= blanking period is short), a vertical streak may be seen on the left side of the screen. To solve it, adjust "STATIC" of convergence to move left side for RGB signals (Max. is 10 mm), then adjust "PHASE" of deflection to move right side. In this case, miss-convergence may occur due to the adjustment of the "STATIC".

4. The convergence amplifiers will have more load than normal condition in the convergence adjustment mode when a high scan signal is fed. Once miss-adjustment occurs, it may results more high load against the amplifiers and the protection circuit may turn the cube OFF, even if convergence can be adjusted similarly on the screen.

5. The defective symptoms due to an overload of convergence are follows:
   • Power Down (the power supply P.D. or the convergence P.D.)
   • The vertical direction scan of the top portion of the screen is disordered.
   • The vertical line shakes with the cross hatching signal.
   • The brightness of the image changes during the convergence adjustment.
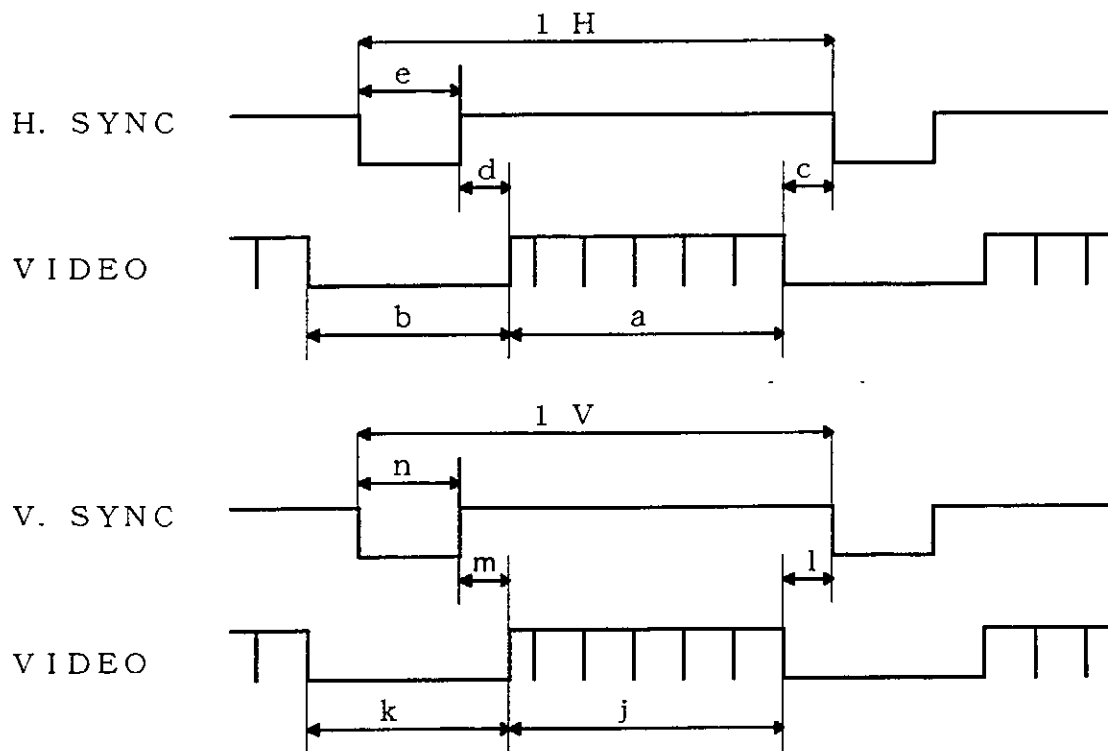
Display dot			640＊350	640＊400	640＊480	640＊480
Clock frequency [MHz]			25. 175			30. 240
H	Frequency [kHz]		31. 469			35. 0
	Scan time [μS]	1H	31. 778			28. 57
	Display [μS]	a	25. 422			21. 16
	Non-display [μS]	b	6. 356			7. 41
	Front porch	c	0. 636			2. 12
	Back porch	d	1. 907			3. 17
	H. SYNC	e	3. 713			2. 12
V	Frequency [Hz]		70. 08	70. 08	59. 94	66. 67
	Scan time [mS]	1V	14. 268	14. 268	16. 683	15. 0
	Display [mS]	j	11. 123	12. 711	15. 254	13. 7
	Non-display [mS]	k	3. 145	1. 557	1. 429	1. 3
	Front porch	l	1. 176	0. 381	0. 381	0. 086
	Back porch	m	1. 906	1. 112	1. 048	1. 11
	V. SYNC	n	0. 064	0. 064	0. 064	0. 086

(Figure 1) Example of signal timing

White balance adjustment

1. White balance adjustment

   As the difference with the RM-V2000 series model, the "Green Low" and the "Green High" adjustment are additional. By this, in case of the white balance adjustment for the RM-V4000V series model, the contrast and brightness for each display should be set to the same value. The ABL adjustment takes difficulty if the contrast and brightness value is different on each display.

2. The adjustment of the low light and the high light effect respectively as a brightness adjustment function to the signal of low and high level. But, they influence a mutual brightness each other. Even if the middle level is well balanced, the brightness doesn't match with the others screen in the point of the ABL operation level or the light starting the shine when the balance is collapsing for the low and the high adjustment.

3. ABL adjustment

   ABL (Auto Brightness Limit) is the circuit which limits a beam current automatically to protect that the brightness of the monitor TV (Cube) becomes high too much to destroy the CRT. It detects a beam current level on the 2nd side of the FBT, it lowers a contrast and a brightness and makes not to rise above a certain level.

4. ABL-GAIN adjustment

   "ABL-GAIN" reduces the difference of each ABL operating point when putting together the multi screen Cube. ABL works to limit the light when the total anode current which flows through the CRT of the RGB becomes 1.4 mA.

   In case, A, B are two pieces of Cube like the Figure-2, ABL works at the point of ① in the light when the luminous efficiency of the set of A is bad even if both CRT begin to shine at the same time. On the other hand, as for B, ABL works at the point of ② which is lighter than A unit.

   "ABL_GAIN" increases the ABL current in appearance by the control of the microprocessor and ABL works early timing. By decreasing the value of "ABL_GAIN" (default is MAX.) for B unit, the ABL current is increased in

appearance then ABL works at the light which is the same brightness point as A unit. In this case, the whole image becomes dark because the "ABL_GAIN" means to uniform the light Cube to the dark one. This adjustment is required when old and new CRT are installed in a wall and there is a difference of substantial lighting ability among these units.
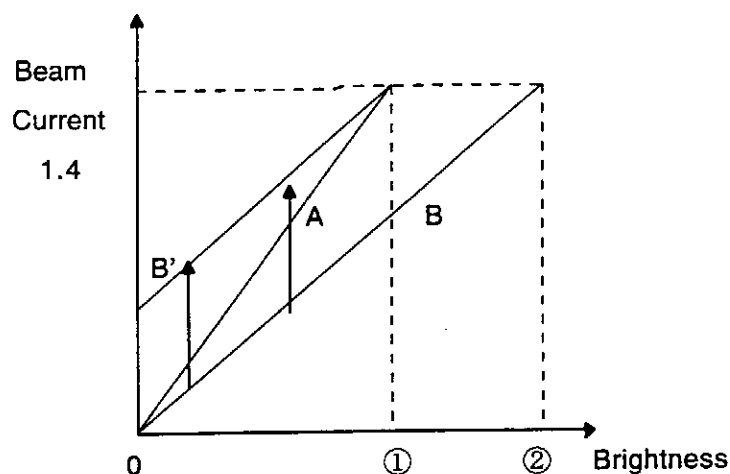

Figure-2

5. ABL-LEVEL adjustment

"ABL-LEVEL" works only when combination is ON and link cables are connected. It reduces the difference of each Cube's brightness in case of ABL operation. The ABL combination is the function to work ABL of all connected Cube uniformly. However, the change of the brightness will not be the same condition by only connecting the cables if the operating point on each cube is different. "ABL_LEVEL" reduces a difference with the ABL variation of each Cube when connected. The microprocessor controls the contrast and the brightness level when the combination is ON. The "ABL_LEVEL" should be adjusted not to produce a brightness change at combination mode ON/OFF cycle with condition of 100% white signal is fed. Adjustment can be done only when the combination mode is ON. The "ABL combination ratio" SW (For only US model) also effective only when the combination mode is ON.

Before adjusting "ABL_GAIN","ABL_LEVEL", the R, G, B LOW, and HIGH adjustment must be done.