

**NEC Technologies, Inc.**

**Professional Systems Division**

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**GP-5000 Maintenance Manual**

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### **Required Tools and Supplies**

- Digital Multimeter
- NTSC Signal Generator or Quantum Data 801C Signal Generator
- Dual Trace Oscilloscope, 50 MHz Bandwidth
- Spare Parts Kit
- Phillips Screwdriver
- Metal Tipped Plastic Alignment Tool
- Diagonal Cutters
- Long Nose Pliers
- Small and Medium Sized Plastic Wire Ties

## Condensed Guide to Set-Up

1. Location of Screen and Projector
  - Calculate the Throw Distance
2. Configuration of the Projector and System Interface
  - Deflection Configuration
  - DIP Switch Settings, Projector and System Interface
3. Connection for Power and Video Sources (Broadcast, Tape Player, Computer, etc.)
4. Turn ON
5. Select an Entry with an incoming Signal
6. Lens Focus (Use Test Pattern with reduced Brightness and Contrast)
7. If the picture size has been changed, check the Centering and the C.P.C. Magnets, adjust if necessary.
8. H and V Size Adjustment
9. Electronic Focus and Storage
  - Center
  - Edge
  - H/V Balance (If necessary, adjust Edge Focus again after H/V Balance)
10. Convergence Adjustment and Storage (Use Test Pattern with reduced Brightness and Contrast)
  - Convergence Copy
  - Tilt and Phase Adjustment (If necessary)
  - Static
  - Dynamic
  - Point
11. Gray Scale, Color, Tint, Brightness, and Contrast Adjustments (Store all adjustments performed through the Remote Control)

# **1. SPECIFICATIONS and LOCATION of PARTS**

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## **1.1. Video Projector**

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### **Projection type**

- Refraction type
- Projector and screen are separated.

### **Projection system**

- 3 lenses and 3 CRTs in-line

### **Lens**

- Hybrid lenses multilayer coating
- F: 1.1

### **CRT**

- Improved 9 inch liquid cooling and optical coupled
- C9M202P22R, G, B

### **High voltage**

- 34kV

### **Light output**

- 650 lumens (small area peak high light brightness)

### **Contrast ratio**

- 30 (HDTV method)
- 50 (JIS method)

### **Resolution**

- CENTER : RGB (1100), VIDEO (600)

### **Pixel resolution**

- 1280x1024 dots

### **Picture size**

- 100-150" diagonal

### **Convergence**

- Digital convergence (Presetable 12 positions)

### **Convergence limits**

- less than 0.2% of V-height

### **Warm-up time**

- 10 min

### **Set-up signal**

- Cross hatch, dot (coarse & fine)

### **Input**

- RGB signal 0.7 Vp-p 75 ohms positive (BNC)
- H,V sync 0.7 - 4.0 Vp-p 75 ohms
- Negative or Positive (BNC)
- G.sync 0.3-0.6 Vp-p 75ohms Negative
- NTSC VIDEO 1.0 Vp-p 75 ohms Positive (Switchable)
- NTSC S-VIDEO Y 1.0 Vp-p 75 ohms Positive, C 0.28 Vp-p 75 ohms (Burst level)

### **Scanning frequency**

- H 15-75 kHz, V 38-100 Hz

### **Retrace time**

- H 2.5 uS min (15-31 kHz:4.5uS, 31-75 kHz: 2.5uS), V 450 uS min

### **Sweep reversal**

- Available (Serviceman adjustment)

### **Power supply**

- AC 120V 60 HZ (108-132V)

### **Power consumption**

- 500W

### **Safety and regulatory**

- UL: Meet UL 1950
- FCC: Meet FCC Class A
- DHHS: Meet

### **Cabinet dimensions**

- 720 (W) x 1000 (D) x 320 (H) mm, 28-3/8 (W) x 30-3/8 (D) x 12-5/8 (H) inches (not including feet)

### **Weight**

- 95 kg, 209.5 lbs,

### **Remote control**

- Wired application
- Wireless (Operating distance 7m 23, ft.)

### **Remote control function**

- Power ON/OFF
- Picture mute
- Input signal select
- Test signal select
- On screen display ON/OFF
- Picture function control
- Brightness, Contrast, Color, Tint, Sharpness R.G.B.-Gain (With System Interface)
- V-height
- H-width
- H-position
- V-hold
- Convergence control : Static, Dynamic, Point
- Focus control : Center, Edge, H/V Balance
- Video Out mode : Normal mode, Graphics mode

### **Main control function**

- Picture function control
- Brightness, Contrast, Color, Tint, Sharpness
- Alignment function control
- V-height, H-width, H-position, V-hold

### **Remote control hand unit**

- User remote control UR-3020
- Set-up remote control IR-3040

### **Supplied accessories**

- User remote control
- Set-up remote control
- Remote cable 4m, 13ft.
- Remote cable 16m, 52 ft.
- AC line cable
- Ceiling Mounting kit
- Input labels
- Operators manual

### **External control**

- Power ON/Off
- Input signal select
- Picture mute

### **Environmental**

- Temperature: 0 to 40 degrees C
- Humidity: 0 to 90% non-condensing
- Storage: -10 to 50 degrees C



## 1.2. SYSTEM INTERFACE

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### Input

- VIDEO 1 : NTSC, PAL, SECAM, NTSC 4.43 (BNC) 1.0Vp-p 75 ohm Positive with LOOP THRU
- VIDEO 2 :  
NTSC, PAL, SECAM, NTSC 4.43 (BNC) 1.0 Vp-p 75 ohm Positive or (Switchable)  
S-VIDEO Y 1.0 Vp-p 75 ohm Positive, C 0.28 Vp-p 75 ohm (Burst level)
- RGB 1: \*CGA, \*EGA, \*PGA, \*VGA, \*8514a Adapter 9-pin D
- RGB 2, RGB 3:  
RGB signal (BNC) 0.7 -1.5 Vp-p ohm Positive  
H.V sync 0.7 - 4.0 Vp-p 75 ohm Negative or Positive  
G. sync 0.3 - 0.6 Vp-p 75 ohms Negative
- AUDIO  
0.4 Vrms 47 kohms (phono) STEREO  
2 Channels for VIDEO 1, VIDEO 2  
1 channel for RGB (Selectable)

### Output

- RGB signal 0.7 Vp-p 75 ohms Positive (BNC)  
H.V. sync 1.0 Vp-p 75 ohms Negative (BNC)  
AUDIO 0.4 Vrms 1 kohm (Phono) STEREO

### Control: INTENSITY (TTL, RGB ONLY)

- Remote control  
Power ON/OFF  
Input signal select  
RGB - Gain  
Color, Tint, Sharpness, Brightness, Contrast
- Serviceman control  
Brightness, Contrast, Color, Tint, Sharpness (Preset VIDEO only)

### Text color

- White, Red, Green, Blue, Yellow, Cyan, Magenta (TTL, RGB)

### Indicator

- Power indicator
- Signal select indicator (VIDEO 1, VIDEO 2, RGB 1, RGB 2 RGB 3)
- Video system indicator (NTSC, PAL, SECAM, NTSC, 4.43)
- Function indicator (RGB - Gain, Color Tint, Sharpness)
- Control level indicator

**EXTERNAL control**

- Power ON/OFF
- Input Signal select
- Picture mute

**Power consumption**

- 30W

**Safety and regulatory**

- Meet UL 478
- Meet FCC Class

**Cabinet dimension**

- 430(W) x 350 (D) x 84 (H) mm, 16-15/16 x 13-13/16 x 3-5/16 inches

**Weight**

- 6 kg, 13.2 lb

**Supplied accessories**

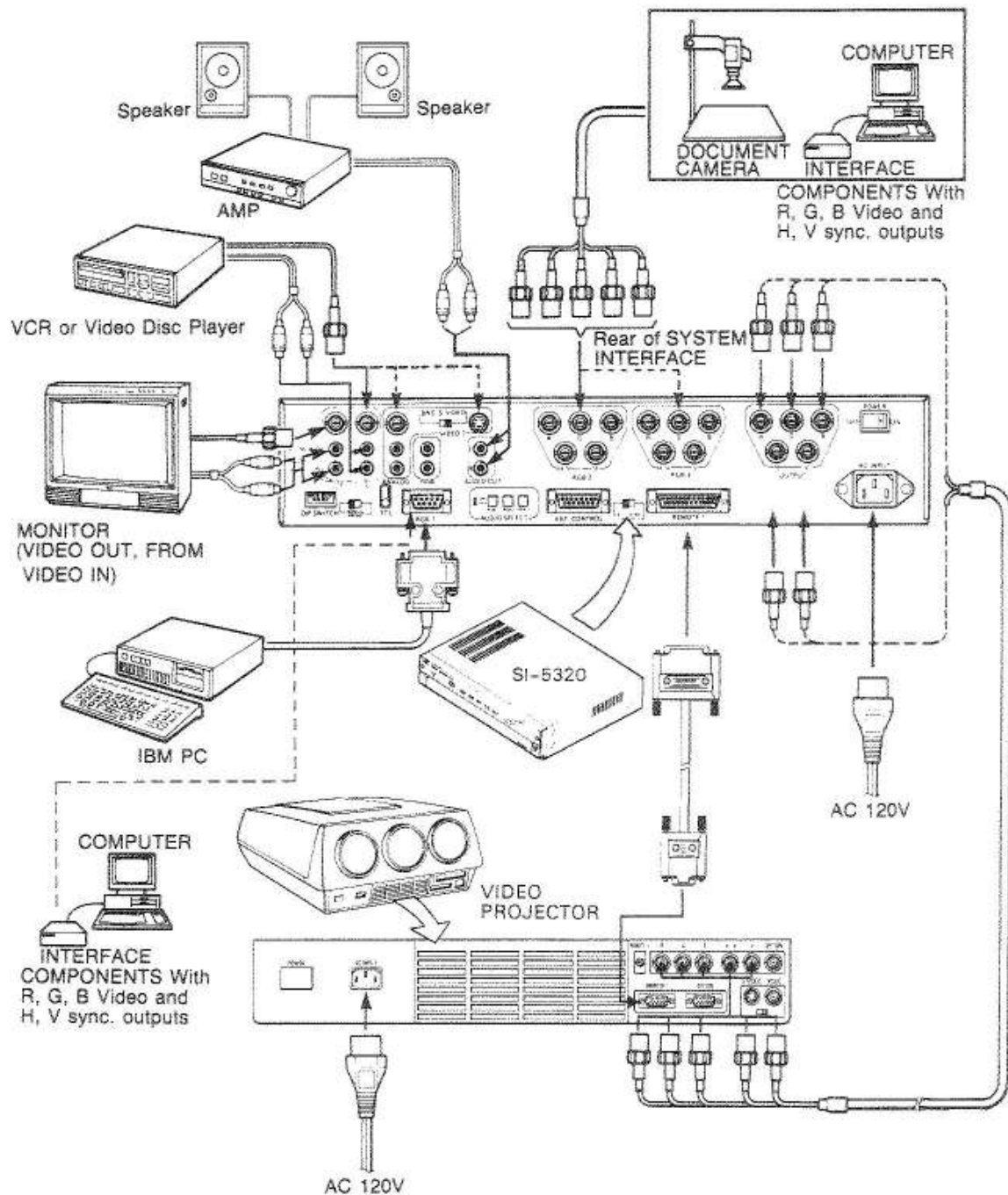
- Coaxial cable 16m, 52'6"
- Control cable 16m, 52'6"
- AC line cable
- 9 pin-9 pin PC interface cable 1.8 m, 6 ft.
- 9 pin - 15 pin PS/2 interface cable 1.8m, 6 ft
- Rack mount kit
- Operators manual

Specifications are subject to change without notice.

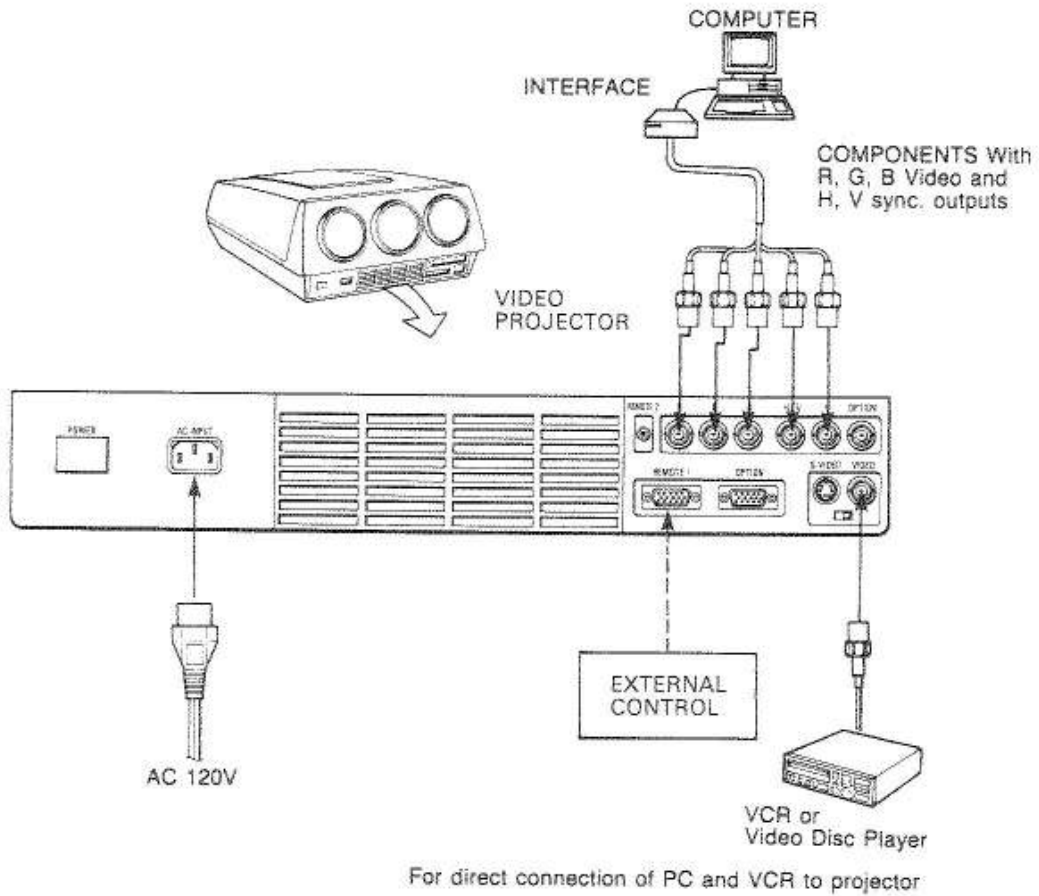
## 2. CONNECTIONS and CONTROLS

### 2.1. CONNECTION EXAMPLE

The diagram below shows examples of the various connections possible when using the video projector with the System Interface (SI-5320).



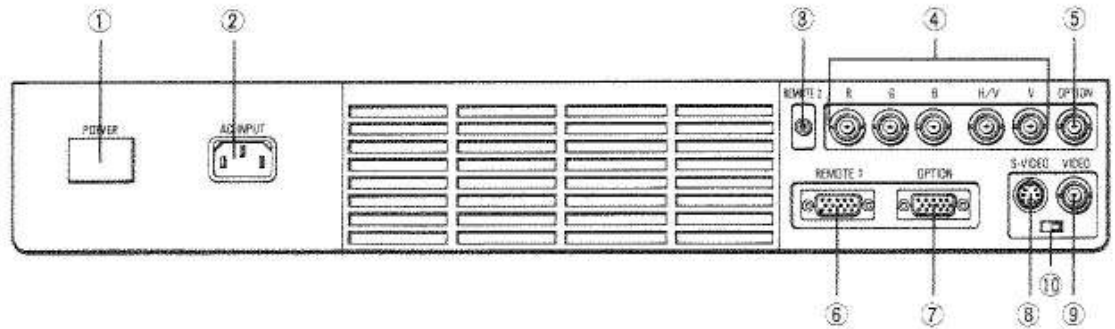
The diagram below shows examples of connections to the projector when the System Interface is not used.



## 2.2. LOCATION and FUNCTION OF CONTROLS (Video Projector)

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### Front Panel



#### (1) POWER Button

This main power switch supplies 120V AC power to the projector

#### (2) AC INPUT

Connect the supplied power cord here.

#### (3) REMOTE 2 Jack

When the supplied remote control is used in the wired condition, connect the supplied remote cable here.

#### (4) R, G, B, H/V, V Input Terminal (BNC type)

When the System Interface (SI-5320) is used the 5 set coaxial cable attached to the System Interface R, G, B, H and V out put is connected to these input terminals on the projector. Also when the projector is used alone (no System Interface) the RGB output from a computer can be connected to these input terminals. If using a component with a combined Horizontal and Vertical sync output, connect it to the H/V terminal.

#### (5) OPTION Input Terminal (BNC type)

This terminal is for future system expansion.

#### (6) REMOTE 1 Terminal

This connector allows external control of the projector from either the System Interface (SI-5320) or from an external control device. When the System Interface is used, it is connected to the REMOTE 1 terminal on the back of the System Interface.

#### (7) OPTION Input Terminal

This terminal is for future system expansion.

**(8) S-VIDEO Input Terminal**

When the projector is used alone, video equipment with a S-Video output can be connected to this terminal.

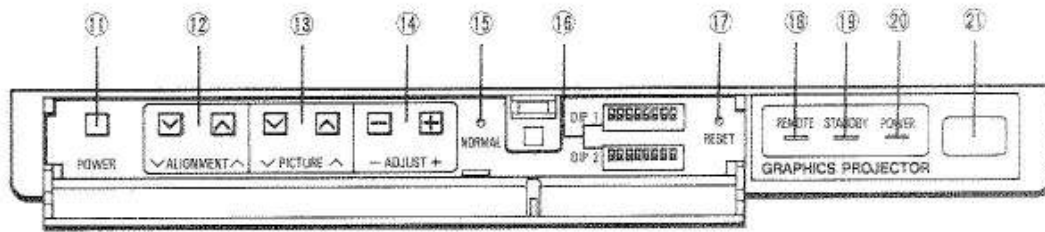
**(9) VIDEO Input Terminal (BNC type)**

When the projector is used alone, video equipment such as a VCR, VDP, camera, etc. can be connected to this terminal.

**(10) S-VIDEO/VIDEO Select Switch**

This switch selects either the S-Video input or the Video input terminal.

## Rear Panel



### (11) POWER Button

When the projector is in the Stand-by mode (Main Power switch on, stand-by indicator lit) press this button to turn the projector on. When pressed again, it will return the projector to the stand-by mode.

### (12) ALIGNMENT Up/Down Buttons

V-HEIGHT, H-WIDTH, H-POSITION, and V-HOLD can be selected by pressing these buttons. The on-screen display will change each time one of these buttons is pressed.

### (13) PICTURE Up/Down Buttons

BRIGHT, CONTRAST, COLOR TINT and SHARPNESS can be selected by pressing these buttons. The on-screen display will change each time one of these buttons is pressed.

### (14) ADJUST +/-Buttons

These buttons adjust the level of the ALIGNMENT or PICTURE control selected. The level increases when (+) is pressed and decreases when (-) is pressed.

### (15) NORMAL Button

This button returns the level of the ALIGNMENT control selected, or all PICTURE controls, back to the original factory preset levels.

### (16) DIP Switch 1, 2

These DIP switches set each operating mode of the projector

### (17) RESET Button

Press to reset the projector after changing the DIP Switch settings.

### (18) REMOTE Indicator

Flashes when the projector receives a signal from the remote control or when one of the buttons on the rear panel has been pressed.

**(19) STAND-BY Indicator**

Lights up when the projector's main POWER Button (1) is pressed on.

**(20) POWER Indicator**

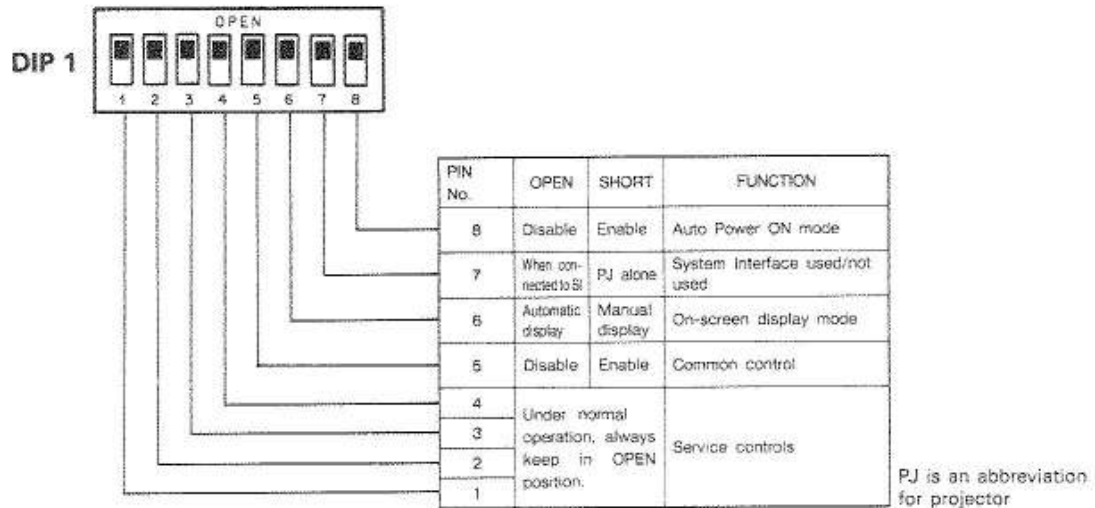
Lights up when the projector is in the Stand-by mode and either the projector POWER Button (11) is pressed or the remote control power key is pressed.

**(21) Infrared Light Receiver Section**

Receives the signal from the supplied remote control when used in the wireless condition.



## 2.2.1 DIP SWITCH FUNCTIONS



### DIP Switch 1 No. 8

This switch sets the auto power on mode. It is activated by setting this switch to SHORT. The auto power on mode is a convenient way for the user to start up the projector without pressing the power button on the projector or the remote control. For example, this mode would be used when the user desires to turn the projector on and off through a switched AC outlet. When this switch is set to OPEN, the projector is turned on and off by pressing either the power button on the remote control or on the back of the projector. In both of the above conditions, the MAIN power switch on the front of the projector must be in the stand-by mode to operate.

### No. 7

Switch to the SHORT side when the projector is being used alone. When being used with the System Interface (SI-5320), switch to the OPEN side.

### No. 6

This switch changes the on-screen display appears when the remote control keys are pressed. The display will stay on for about 5 seconds. When set to the SHORT side, the on-screen display will not appear when switching between sources. However, it will appear when any of the other function keys are used and will stay on-screen until the DISPLAY key is pressed. In either the OPEN or SHORT position, the on-screen display can be turned ON or OFF by pressing the DISPLAY key.

## No. 5

### *Common Control Mode*

Set pin number 5 on DIP switch 1 to the SHORT side to activate the COMMON CONTROL MODE. All adjustment commands input from the remote control and rear panel will now affect each of the video signals (max. 24) simultaneously. There are three situations that pin No. 5 can be used. They are as follows:

#### *Situation 1.*

When the distortion and erroneous convergence apparent from the image projected on the screen are caused by the physical position between the screen and the projector, regardless of the input signal itself. In the same way, when focusing problems stem more so from internal causes rather than the individual input signal. The common control mode is used by first either canceling or normalizing all adjustment data and then activating the common control mode. This will allow you to attend to a single input signal and adjust focus, alignment, picture and convergence (except point convergence) which, once completed, can be stored in memory. This will eliminate the distortion and convergence errors seen commonly in all of the signals. Thus, you are left with a minimum of individual signals for fine adjusting. Set pin number 5 on DIP switch 1 to the OPEN side and disable the common control mode so that you can make the necessary fine adjustments.

#### *Situation 2.*

Over an extended period of use, the projector will be subject to both internal and external effects that will put the optimum adjustment out of line. This type of disorder will commonly affect all of the signals, and thus can be corrected conveniently with the common control mode.

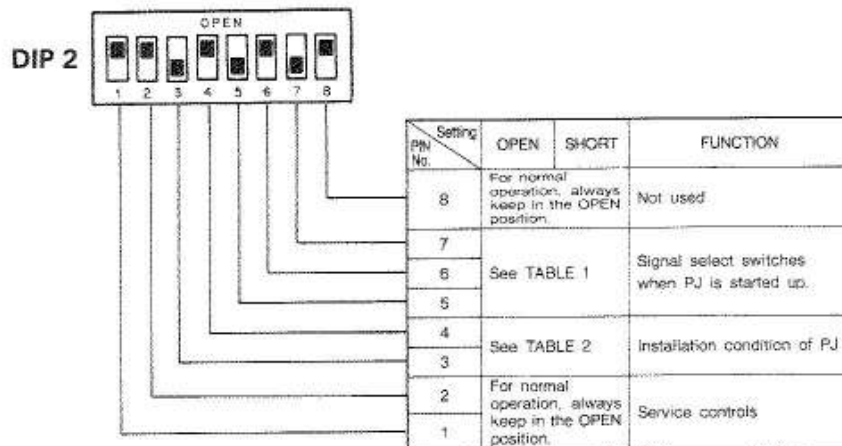
#### *Situation 3.*

If you have used the common control mode to adjust the signals, a newly added signal will not require the rough adjustment usually necessary. This will cut down adjustment time and require only fine adjustments.

### **Nos. 4, 3, 2 and 1**

Primarily for serviceman use only. They should normally be set to the OPEN position.

## DIP Switch 2



### No. 8

Not used. It should normally be set to the OPEN position.

### Nos. 7, 6 and 5

Sets the input signal selected when the projector is started up.

TABLE 1

5	6	7	When SI-5320 Used	When Projector Only
0	0	0	VIDEO 1	VIDEO
1	0	0	VIDEO 2	RGB
0	1	0	RGB 1	Not used
1	1	0	RGB 2	Not used
0	0	1	RGB 3	Not used
1	0	1	Not used	Not used
0	1	1	Not used	Not used
1	1	1	Not used	Not used

0=SHORT  
1=OPEN

### Nos. 4 and 3

Set according to projector installation method. These settings are for when the image is projected from the projector directly onto a screen. When projected by reflecting on a mirror, etc., it is not limited to these settings. It is preset at the factory for "ceiling mounting/front projection". Also, when the installation method is changed, the polarity may need to be changed.

TABLE 2

3	4	Installation Method
0	0	Ceiling/Rear projection
0	1	Ceiling/Front projection
1	0	Floor/Rear projection
1	1	Floor/Front projection

0=SHORT  
1=OPEN

### Nos. 2 and 1

Primarily for serviceman use only. They should normally be set to the OPEN position.

Before prolonged installation/troubleshooting is started, set DIP SW1-6 (for Manual ON Screen Display) and DIP SW2 (Tilt and Cursor Phase Adjustment Mode), and reset the projector. It is easier to service the projector when the two DIP switches are in their "short" positions.

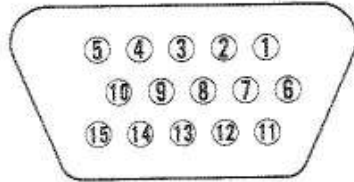
**NOTE:** Press the RESET button on the projector or turn off the POWER after setting DIP switches.

### 2.2.2 FACTORY SETTINGS OF THE DIP SWITCHES

The following table shows the original factory settings of DIP Switch 1 and DIP Switch 2.

	PIN no.	Setting	Remark
DIP SW1	1	OPEN	Service controls
	2	OPEN	
	3	OPEN	
	4	OPEN	
	5	OPEN	Common control mode : Disabled
	6	OPEN	Automatic on-screen display
	7	OPEN	System Interface used
	8	OPEN	Auto Power ON mode : Disabled
DIP SW2	1	OPEN	Service controls
	2	OPEN	
	3	SHORT	Ceiling mounting
	4	OPEN	Front projection
	5	SHORT	The input signal selected when the projector is started up : RGB1
	6	OPEN	
	7	SHORT	
	8	OPEN	Not used

### 2.2.3 REMOTE 1 Terminal



The REMOTE 1 Terminal is used for either connecting the System Interface (SI-5320) or an external control device.

- 1, 2, 6, 7, 11, and 12 : Sending and receiving data when the System Interface is used.
- 3 : Input signal selection
- 13 : Input for external remote control data
- 4, 7, and 9 : Normally set to OPEN.
- 14 : Use/non-use of external control
- 5 : POWER ON/OFF
- 10 : PICTURE MUTE ON/OFF
- 15 : Ground

#### NOTES:

1. When the System Interface is used, connect it with the supplied control cable (15-25 pin) to this terminal.
2. If you are upgrading your projector from an NEC DP-1200, the existing 5-lead coaxial cable and the 25-pin controller cable with the following modifications can be used. You must construct the following 25 D-sub female to a 15-pin mini D-sub male cable.

PIN No.	SHORT / OPEN	FUNCTION
⑭	SHORT OPEN	External control mode ON External control mode OFF
⑤	SHORT OPEN	POWER ON POWER OFF
⑩	SHORT OPEN	PICTURE MUTE ON PICTURE MUTE OFF
③	SHORT OPEN	VIDEO RGB

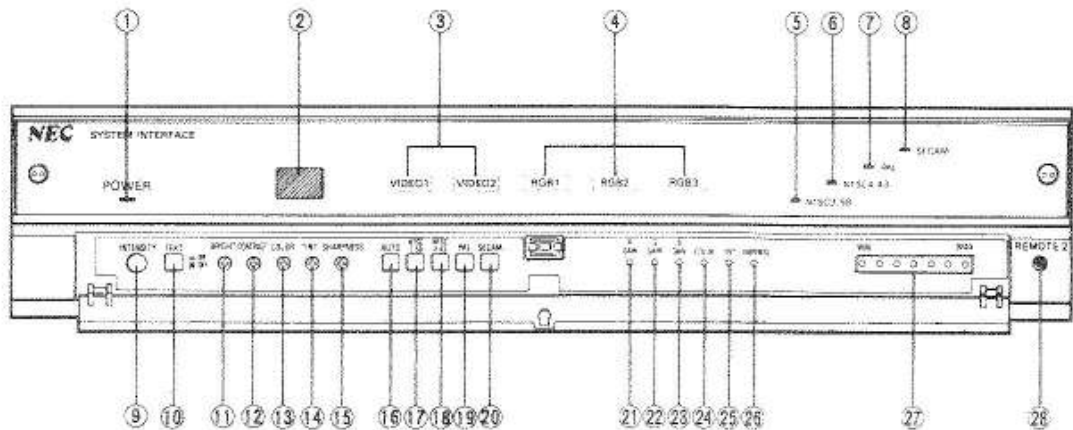
"SHORT" means to connect with pin 15

When in the external control mode, the POWER, INPUT and PICTURE MUTE keys on the remote control will not function.

Pin 13 is the external remote signal terminal. The projector can be controlled by the same composite signal from the external controller.

## 2.3. CONTROL POSITION AND FUNCTIONS (System Interface)

### Front Panel



#### (1) POWER Indicator

Lights green when the set is started up and lights red when the set is stand by.

#### (2) Infrared Receiver Section

Receives the signal from the wireless remote control.

#### (3) VIDEO 1, VIDEO 2 Indicator

The selected signal lights up: VIDEO 1 or VIDEO 2

#### (4) RGB1, RGB 2, RGB 3 Indicator

The selected signal lights up: RGB 1, RGB 2, or RGB 3.

#### (5) NTSC3.58 Indicator

Lights up when an NTSC3.58 signal is received.

#### (6) NTSC4.43 Indicator

Lights up when an NTSC4.43 signal is received.

#### (7) PAL Indicator

Lights up when a PAL Signal is received.

#### (8) SECAM Indicator

Lights up when a SECAM signal is received.



**(9) INTENSITY Control**

When a TTL signal is received at RGB 1, the intensity of the image is adjusted by turning this knob.

**(10)TEXT Button**

This switch controls the test mode, when a TTL signal is received at RGB 1. When this switch is ON (depressed), the display screen is displayed in the color selected by the dip switch No. 2, 3 or 4 on the back of the system interface, regardless of the software program used. When this switch is OFF, the color of the software program is displayed.

**(11) BRIGHT Control**

**(12) CONTRAST Control**

**(13) COLOR Control**

**(14) TINT Control**

**(15) SHARPNESS Control**

**Items (11) - (15) are serviceman controls.  
They are preset at the factory and should  
not require any further adjustments.**

**(16) AUTO Button**

Press this button for automatic selection of NTSC3.58, NTSC4.43, PAL or SECAM signals connected to the VIDEO 1 (in) or VIDEO 2 terminal on the rear panel.

**NOTE: When Search and Fast Forward are used on a VCR or video disk player with poor picture quality, select the signal to be input using the below (17) to (20).**

**(17) NTSC3.58 Button**

Press when the NTSC3.58 signal is weak and the AUTO select button does not operate correctly.

**(18) NTSC4.43 Button**

Press when the NTSC4.43 signal is weak and the AUTO select button does not operate correctly.

**(19) PAL Button**

Press when the PAL signal is weak and the AUTO select button does not operate correctly.

**(20) SECAM Button**

Press when the SECAM signal is weak and the AUTO select button does not operate correctly.

**(21) R.GAIN Indicator**

Lights up when the R Gain adjustment is selected with remote control.

**(22) G.GAIN Indicator**

Lights up when the G Gain adjustment is selected with the remote control.

**(23) B. GAIN Indicator**

Lights up when the B Gain adjustment is selected with the remote control.

**(24) COLOR Indicator**

Lights up when the Color adjustment is selected with the remote control or on back of the projector.

**(25) TINT Indicator**

Lights up when the Tint adjustment is selected with the remote control or on back of the projector.

**(26) SHARPNESS Indicator**

Lights up when then Sharpness adjustment is selected with the remote control or on back of the projector.

**(27) Level Indicator**

Displays adjustment level.

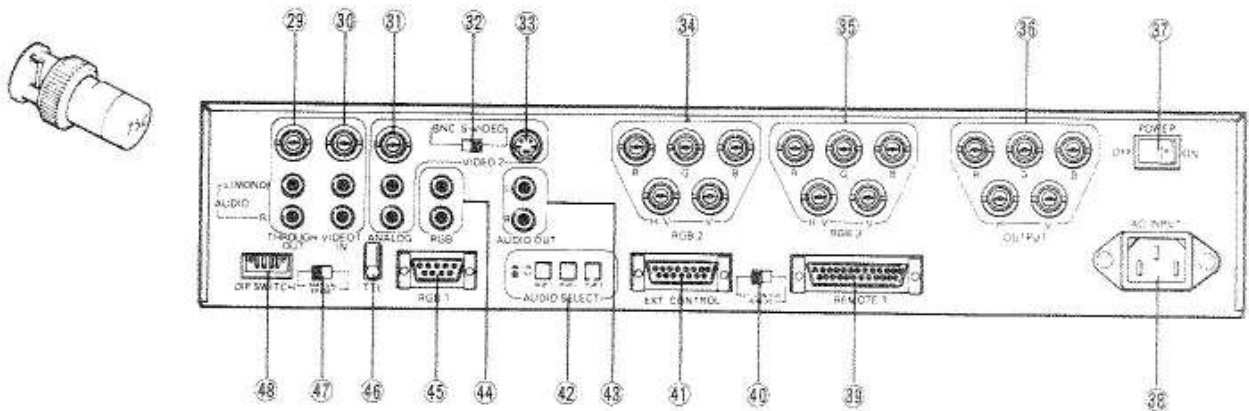
**(28) REMOTE 2 Jack**

The wired remote control plug is connected to this jack.

## Rear Panel

### 75 ohm terminator plug

Connect to VIDEO 1 (OUT)



#### (29) VIDEO 1 (OUT) Terminal

(BNC Type)

An external monitor is connected to this terminal to output the VIDEO 1 (IN) signal. If it is not connected be sure to insert the 75 ohm terminator plug.

#### (30) VIDEO 1 (IN) Terminal

(BNC Type)

External video equipment is connected to this terminal. When the equipment is connected, be sure to insert the 75 ohm terminator plug to the VIDEO 1 (OUT) terminal (29) or connect an outside monitor.

#### (31) VIDEO 2 Terminal (BNC Type)

External video equipment is connected to this terminal.

#### (32) BNC/S-VIDEO Switch

Set to BNC when VIDEO 2 input is connected to the BNC terminal (31). Set to S-VIDEO when VIDEO 2 input is connected to S-VIDEO connector (33).

#### (33) VIDEO 2 Terminal (S-VIDEO Type)

Connect external video equipment with S-VIDEO output to this terminal.

#### (34) RGB 2 Terminal (BNC Type)

This is an Analog RGB input terminal. External equipment with R, G, B, H and V output are connected to these terminals. Connect the RGB connection cable to the correct corresponding terminal. If using equipment with a combined Horizontal and Vertical sync output, connect it to the H/V terminal. Connect the horizontal sync signal to H/V and the vertical sync signal to the V terminal, when HV separate sync equipment is used.

**(35) RGB 3 Terminal (BNC Type)**

This is an analog RGB input terminal. It should be connected the same as RGB 2 (34).

**(36) OUTPUT Terminal (BNC Type)**

These terminals are connected to the R, G, B, H and V input terminals of the projector with the supplied RGB cable. Verify that the R, G, B, H and V terminals of the projector are connected to the corresponding R, G, B, H and V terminals of the System Interface.

**(37) POWER Switch**

This is the main power switch for the System Interface

**(38) AC Input**

The supplied power cord is connected to this terminal

**(39) REMOTE 1 Terminal**

Attach the connector plug from the supplied 15 pin to 25 pin remote cable and secure it with the 2 screws. Install the 15 pin plug on the other side of the cable onto the projector in the same way.

**(40) EXT CONTROL/REMOTE Switch**

When an outside control is used, this switch should be set to the EXT CONTROL side. When the supplied remote control for the projector is used, Set to the REMOTE side. Turn the POWER switch OFF when setting this switch.

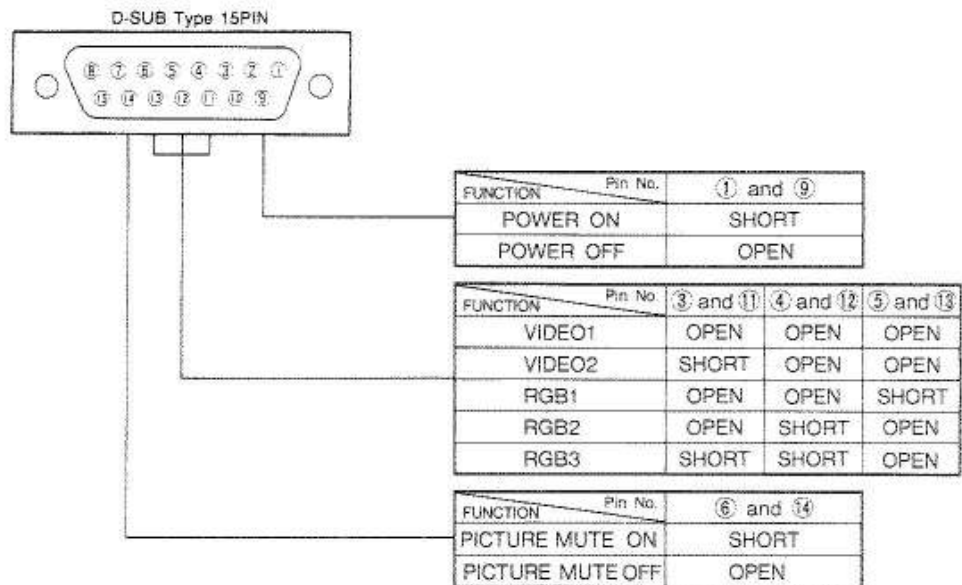
**(41) EXT CONTROL Terminal**

This terminal is used, when power ON/OFF, input selection and PICTURE MUTE are operated externally (by external control). Select either external control or remote control by setting the EXT/REMOTE Switch (40) in the correct position. The connection of each terminal is as follows:

**NOTES:**

1. Please be aware that ON/OFF, input selection and PICTURE MUTE by the projector's remote control cannot be used at such times.
2. Pins 9, 10, 11, 12, 13, 14 and 15 are ground.

## Pin Assignment for EXT CONTROL Terminal



### (42) AUDIO SELECT Button

This is the switch for selecting the audio signal connected to the RGB AUDIO IN (44). When the RGB 1 Button is pressed and switched to RGB 1, the RGB AUDIO IN (44) audio signal is output to AUDIO OUT (43). When OFF, nothing is output. RGB 2 and RGB 3 are also operated in this manner.

### (43) AUDIO OUT Terminal

Connects to an external audio amplifier.

### (44) RGB AUDIO IN Terminal

Connects to the audio output from an RGB source when audio is desired with either RGB 1, 2 or 3.

### (45) RGB 1 Terminal

This is a 9 pin TTL or Analog RGB input terminal. It is compatible with the \*IBM PC, \*PC/XT, \*PC/AT, \*PS-2 or other IBM compatible computers.

### (46) ANALOG/TTL Switch

Switch to match the output signal of the computer connected to RGB 1.

### (47) MANUAL/PRESET Switch (TTL, RGB Only)

When set to PRESET, the automatic sync function works in the \*IBM mode and adjusts itself to the scanning frequency and color requirements of the IBM compatible graphics adapter being used. When this switch is set to MANUAL, select the number of colors (8/16/64) required for the computer by using the dip switches 5 and 6. (See Table 1)

**(48) DIP Switches Nos. 5 and 6**

When computers are used that do not provide compatibility with \*IBM, the maximum 64 color mode can be set by using dip switches Nos. 5 and 6 as shown on Table 1 at the left.

**NOTE:** These switches must be correctly set in relation to the computer signal being used. Refer to the computer operators manual for information on how many colors the adapter can display.

**Table 1**

COLOR MODE	DIP SWITCH	
	No.5	No.6
8 colors	ON	OFF
16 colors	ON	ON
64 colors	OFF	ON
UNUSED	OFF	OFF

**Nos. 2, 3 and 4**

When the TEXT button (10) is turned ON, the color selected on dip switches 2,3 and 4 will be displayed regardless of the software used. Refer to Table 2 at the left for the setting of Nos. 2, 3 and 4.

**NOTE:** This function is valid only in the RGB 1 and TTL modes.

**Table 2**

TEXT COLOR	DIP SWITCH		
	No.2	No.3	No.4
	R	G	B
RED	OFF	ON	ON
GREEN	ON	OFF	ON
BLUE	ON	ON	OFF
YELLOW	OFF	OFF	ON
CYAN	ON	OFF	OFF
MAGENTA	OFF	ON	OFF
WHITE	OFF	OFF	OFF

**No. 1**

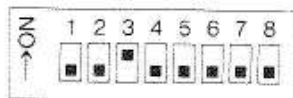
The RGB 1 mode can be selected for \*PC/AT or \*PS-2 using this switch. (See table 3).

**NOTE:** When \*IBM PC/AT or compatible equipment is connected to the RGB 1 terminal, set switch No. 1 to ON. When \*IBM PS-2 or VGA compatible equipment is connected to the RGB 1 terminal, set switch No. 1 to OFF.

**Table 3**

PC/PS-2 SELECTION	
IBM SELECT	No.1
IBM PC/AT	ON
PS-2	OFF

This illustrates the DIP switch setting at the time of factory shipment.



**No. 1**

When No. 1 is in the ON position with the main power ON, the adjustment data returns to the initial condition.

**No. 2**

Not used

**No. 3**

Set to ON when using with Projector

Set to OFF when using the System Interface alone.

**Nos. 4, 5, 6, 7**

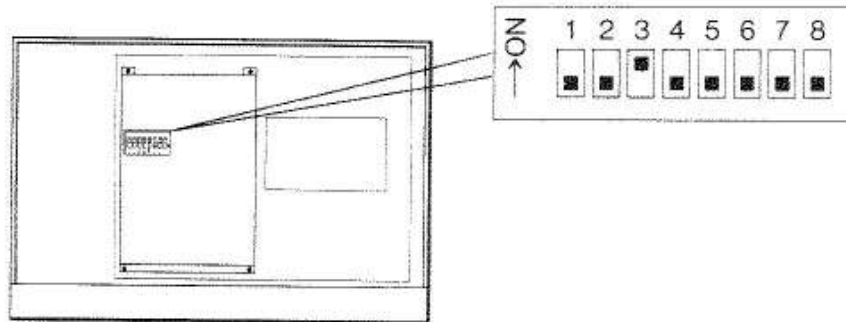
These are service controls

**No. 8**

Set them to OFF constantly.

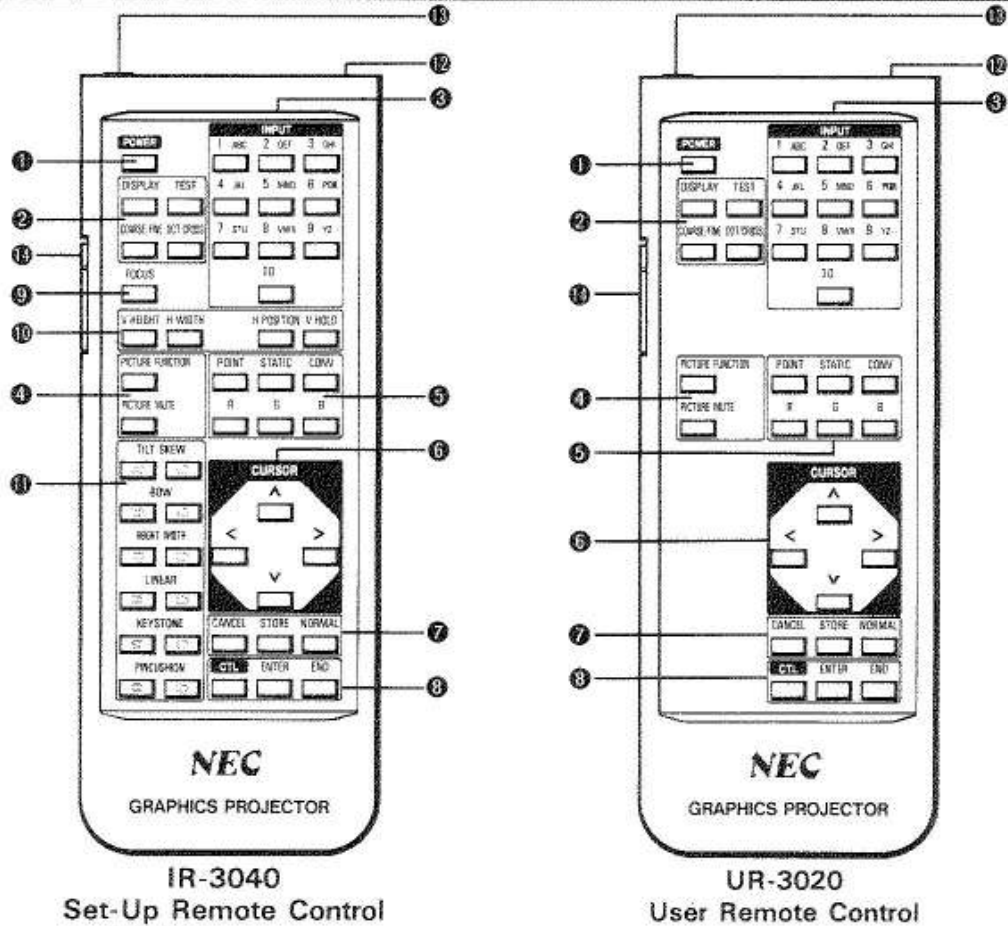
PIN No.	ON	OFF	Setting at the time of Factory shipment
1	Initialize	Normal condition	OFF
2	Not used		OFF
3	When used with Projector	When used alone	ON
4,5,6,7,8	Service controls		OFF

### Internal control PWB





## 2.4. FUNCTIONS OF REMOTE CONTROLS



**IR-3040**  
Set-Up Remote Control

**UR-3020**  
User Remote Control

### 1. POWER Key

When the projector is in the stand-by mode and this key is pressed, the power goes on. When pressed again, the projector will return to the stand-by mode.

### 2. DISPLAY Key

Turns the on-screen display ON/OFF

### TEST Key

Displays the adjustment pattern when pressed. When pressed again returns to the source screen.

### COARSE/FINE Key

When pressed, the adjustment pattern will change from Coarse to Fine. You can more accurately adjust convergence in either the dot or cross hatch pattern when the Fine pattern is selected. When pressed again, it will return to the Coarse pattern.

### DOT/CROSS Key

Each time this key is pressed, the pattern toggles between dot and crosshatch.

### 3. INPUT 1-10 Keys

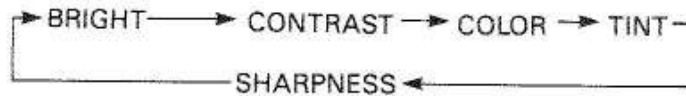
Selects either the input signal to be used or the recording function of the on-screen characters. The input terminals corresponding to these keys are as follows:

When SI-5320 used	When projector alone used
INPUT 1 ..... VIDEO 1	INPUT 1 ..... VIDEO
INPUT 2 ..... VIDEO 2	INPUT 2 ..... RGB
INPUT 3 ..... RGB 1	
INPUT 4 ..... RGB 2	
INPUT 5 ..... RGB 3	

Put the supplied INPUT labels on the keys if required.

### 4. PICTURE FUNCTION Key

The picture adjustment mode can be selected by pressing this key. Each time the key is pressed the on-screen display will change as follows:



### PICTURE MUTE Key

When pressed, the image will disappear. When pressed once more, the image will again be displayed.

### 5. CONV. Key

When pressed, this key initiates the convergence adjustment mode.

#### STATIC Key

When in the convergence adjustment mode, pressing this key will allow static convergence adjustments.

#### POINT Key

When in the convergence adjustment mode, pressing this key will allow point convergence adjustments.

#### R, G and B keys

Turns the corresponding CRT beam ON and OFF. When pressed with the CTL key, the CRT to be adjusted during convergence and focus adjustments is selected.

## 6. CURSOR Keys

Used for increasing and decreasing control levels, cursor movement and convergence adjustments.

## 7. CANCEL Key

Used to cancel stored convergence adjustments and to delete input signals in the Input Entry mode.

## STORE Key

Stores the condition of each control level and stores convergence adjustments (correction data).

## NORMAL key

This key returns the condition of each control level to its original factory preset level. Or, when pressed with the CTL key, the control levels return to their most recently stored level.

**NOTE: The CANCEL, STORE and NORMAL keys must be pressed twice in order to perform their function.**

## 8. CTL Key

This key is pressed and held down while using other keys, similar to a shift key on a typewriter.

**Note: Refer to CTL and Fn key combinations on the following page.**

## ENTER Key

This key is used for mode selection and for inputting the onscreen characters in the Input Entry mode.

## END Key

This key will end the adjustment mode and return the user to the image being displayed.

## 9. FOCUS Key

This key will initiate the electrical focus adjustment control.

## 10. V HEIGHT Key

This key will initiate the vertical height adjustment control.

## H WIDTH Key

This key will initiate the horizontal width adjustment control

## H POSITION Key

This key will initiate the horizontal position adjustment control

## V HOLD Key

This key will initiate the vertical hold adjustment control

## 11. Dynamic Adjustment Function Keys

When in the convergence adjustment mode, these keys select the dynamic convergence control to be adjusted: TILT, SKEW, V-BOW, H-BOW, HEIGHT, WIDTH, H-LINEAR, V-LINEAR, H-KEYSTONE, V-KEYSTONE, SIDE PINCUSHION, TOP/BOTTOM PINCUSHION.

## 12. Remote Control Jack

Insert the remote cable connector here to use the hand unit as a wired remote control.

## 13. Infrared Transmitter

Outputs infrared signals when the remote control keys are pressed.

## 14. Back Light Switch

Turns the back light ON or OFF.

## Two Touch Keys

The Cancel, Store and Normal keys must be pressed twice in order to perform their function.

When pressed once, the confirmation message appears on the screen. When pressed the second time the message disappears and the function is executed.

**NOTE:** The LOAD function is not executed by pressing one key, but rather by pressing the CTL key and the NORMAL key (or CANCEL key in the convergence cancel operation).

The LOAD function allows you to return the control levels to their most recently stored level.

### To perform the LOAD function:

Press the NORMAL key while pressing the CTL key to display "LOAD" on the screen, press them again. LOAD has been performed.

The CTL key is pressed simultaneously with other keys:

- **CTL + ENTER** : To enter the ENTRY mode for input signal recording
- **CTL + NORMAL** : To return the control level to the previously stored set level.
- **CTL + R,G,B** : To select the CRT to be adjusted
- **CTL + v, ^, >, <** : To adjust the convergence at the cursor position
- **CTL + CANCEL** : To stop the convergence cancel operation and return to the status prior to cancellation. The "LOAD" message will appear on the left bottom of the screen.
- **CTL + POINT** : To copy stored convergence information from one input to another.
- **CTL + FOCUS** : To adjust the focus balance horizontally and vertically.
- **CTL + V KEYSTONE** : To adjust the convergence for Vertical KEYSTONE balance.
- **CTL + H KEYSTONE** : To adjust the convergence for Horizontal KEYSTONE balance.
- **CTL + T/B PINCUSHION** : To adjust the convergence for top and bottom PINCUSHION balance.
- **CTL + SIDE PINCUSHION** : To adjust the convergence for side PINCUSHION balance.
- **CTL + PICTURE FUNCTION** : To adjust the GAIN Control. Since the R, G and B GAIN are set at the optimal condition at the time of shipment, adjustment is normally not necessary.
- **CTL + DISPLAY** : To toggle between NORMAL MODE for a brighter picture and the GRAPHICS MODE for a high resolution picture such as CAD/CAM signals.

## 2.4.1 INPUT SIGNAL ENTRY MODE METHOD

### Signal Entry

This projector uses a microprocessor to automatically read and distinguish several video signals input at the same time. These signals are then used to make optimum adjustments for focus, convergence, alignment, etc.

Various parameters must be recorded into the micro-processor beforehand to ensure the video signals are read correctly and adjusted to optimum quality.

The SIGNAL ENTRY MODE records these video signals. Always access this mode first whenever inputting video signals for the first time so that you can record the video signals before making any adjustments.

#### 1. Input List Mode

(1) Display the MENU while the SOURCE display is showing by pressing the CTL and ENTER keys simultaneously.

#### INPUT LIST MODE

- ⇒ 1. INPUT LIST DISPLAY
- 2. SIGNAL ENTRY

(2) If you only want to review the INPUT LIST, select 1 with the cursor up/down keys, then press the ENTER key. Signals cannot be recorded at this display.

#### INPUT LIST

SC	INPUT	SOURCE	COM
00	VIDEO1	NTSC	- - -
01	VIDEO2	PAL	- - -
02	RGB1	EGA	- - -

(3) Press the END key to return to the MENU display.

#### INPUT LIST MODE

- 1. INPUT LIST DISPLAY
- 2. SIGNAL ENTRY

To record a signal for the first time, select 2 with the cursor up/down key, then press the ENTER key. Use procedures in steps 2-8.

(4) Press the END key to return to the MENU display.

(5) Press the END key once more to terminate the INPUT LIST MODE.

## 2. Explanation of Screen Format

Each of the terms displayed on the screen of figure below is as follows: In the example of the figure below, the NTSC signal has already been recorded.

### "P.1"

The number of screen pages is displayed from P.1 to P.2. 12 signals can be recorded on each page for a possible total of 24.

### "SC"

This area records the scan number. Scan numbers from 00 to 11 can be recorded. The scan number refers to the number allocated to the stored convergence data. Also, when you wish to input the same signal in VIDEO 1 and VIDEO 2, the same scan number can be recorded. You can also record more than one RGB 2, 3 signal.

### "INPUT"

This area indicates the input terminal of the signal to be recorded. It is automatically displayed when INPUT-5 is used.

### "SOURCE"

This area records the source name of the input signal.

### "COM"

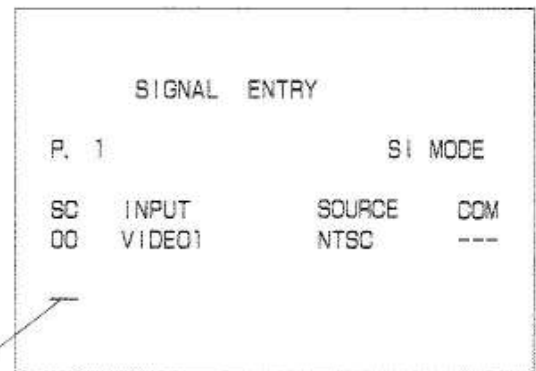
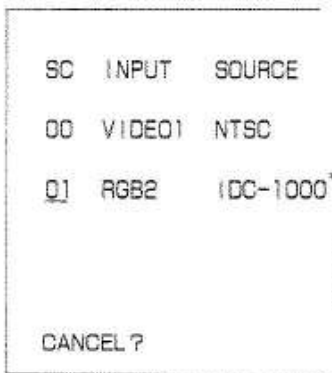
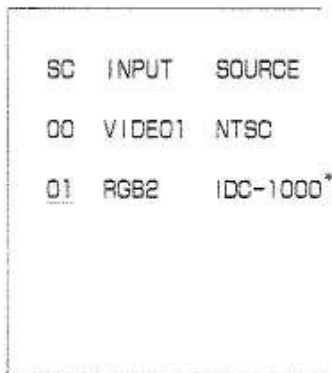
This area records the combination of input signals. This function is to reduce the number of times required to re-calculate these corrective waveforms when switching video signals.

### 3. Selection and Cancellation of the Recording Line

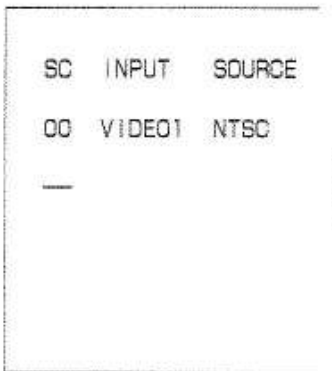
A two space underbar is displayed in SC column as shown in figure below. Move the underbar up and down using the up or down key on the remote control and select the line you wish to record. Then press ENTER.

**NOTE:** You cannot select a line that has already been recorded. When you wish to use a line that has already been recorded, cancel it, then delete the recorded signal. The cancel operation is as follows.

- (1) Move the underbar using the remote control up or down key to the position under the scan number to be cancelled.
- (2) Press the CANCEL key. The "CANCEL?" message will appear on the lower left corner of the screen. Press the CANCEL key again. The "CANCEL?" message will disappear and the cancel function will have been executed.



Two digit underbar



#### 4. Recording of Scan Number

When a one digit underbar is displayed in the SC Column as shown in the figure below, select the scan number from 00 to 11 that you wish to record by using the up or down key on the remote control. Record it by pressing the ENTER key. When the scan number has been recorded an 8 digit underbar will be displayed in the INPUT column.

(1) Display the scan number by pressing the cursor up or down key.

Pressing the v key selects the scan number as follows:

00--11--10--09-----03--02--01--00

Pressing the ^ key selects the scan number as follows:

00--01--02--03-----09--10--11--00

(2) Press the ENTER key to record the scan number.

SIGNAL ENTRY			
P. 1		SI	MODE
SC	INPUT	SOURCE	COM
00	VIDEO1	NTSC	---

One digit underbar

#### Scanning Number

The number in the SC column on the left side of the list indicates the SCANNING NUMBER. SCANNING NUMBERS range from 00 to 11 and represent the memory where the convergence data is stored. Since up to 24 different video signals can be recorded, several signals can use the same scanning number to enable convergence data sharing.

SIGNAL ENTRY			
SC	INPUT	SOURCE	COM
00	VIDEO1	NTSC1	- - -
01	VIDEO2	PAL	- - -
00	VIDEO2	NTSC2	- - -
02	RGB2	PC1	- - -
03	RGB2	PC2	- - -
03	RGB3	PC3	- - -



The previous example shows scanning number 00 being used for both inputs VIDEO 1 and VIDEO 2 so that they can receive NTSC signals. PC2 of RGB2 and PC3 of RGB3 also use the same scanning number, 03.

The NTSC signal is a standardized video signal. This means you can share convergence correction data because the H-width and V height frequencies, as well as the display amplitude are all regulated. Personal computers, on the other hand, do not have common standards for output video signals. Sharing convergence correction data would thus require similar H-width, V-height, and display amplitudes. The advantages in sharing convergence correction data are that you can use the storage area efficiently and cut down on adjustment time. For devices that both share the same data, this means that you can switch video signals without having to calculate convergence correction waveforms, thus making the switch instantaneous. This also means that the H-width and V-height for convergence and alignment cannot be adjusted individually. Nevertheless, focus, picture, and alignment adjustments can be made individually to achieve the optimum adjustment.

### 5. Recording of the Input Signal Terminal

SIGNAL ENTRY			
P. 1		SI MODE	
SC	INPUT	SOURCE	COM
00	VIDEO1	NTSC	---
01	_____		

Eight-digit underbar

When the 8 digit underbar is displayed in the INPUT column as shown in the figure below, match it to the projector setting condition on the below Table, then press the corresponding INPUT keys 1-5. The input recording is performed in this manner. For example: To select RGB 2, press INPUT 4 on the remote control. After input recording has been completed, the name of the input terminal will be displayed in the INPUT column. Also, an 8 digit underbar will be displayed in the SOURCE column.

When SI Connected		When Projector Only	
INPUT 1	VIDEO-1	INPUT 1	VIDEO
INPUT 2	VIDEO-2	INPUT 2	RGB
INPUT 3	RGB-1		
INPUT 4	RGB-2		
INPUT 5	RGB-3		

**NOTE:** After pressing the INPUT key, the vertical synchronization may be disturbed. If this happens, adjust it by using the V-HOLD key. Following V-HOLD adjustment, press the END key to return to the recording screen.

## 6. Recording of the User Source Name

When the ENTER key is pressed, the underbar in the SOURCE column will change to a single digit input the source name by selecting one character at a time with the INPUT keys 1-9 and moving the cursor with the > or < key. For example: To select the letter A, press the INPUT 1 key once, to select the letter B, press it twice and to select the letter C, press it three times. When finished, press the ENTER key. After recording source name, there will be a delay for inputting combinations.

SIGNAL ENTRY			
P. 1		SI	MODE
SC	INPUT	█ SOURCE	COM
00	VIDEO1	NTSC	---
01	VIDEO1		

Eight-digit underbar

## 7. Recording of Combinations

SIGNAL ENTRY			
P. 1		SI	MODE
SC	INPUT	SOURCE	█ COM
00	VIDEO1	PAL-SCM	---
01	VIDEO1	NTSC	---

Move the cursor (underline) using the right arrow and left arrow keys. When the ENTER key is pressed, the number 1, 2 or 3 will be displayed and recorded. Display the priority sequence 1, 2 and 3. To cancel a combination, move the cursor to the position to be cancelled and press the CANCEL key once.

Video signal switching takes a certain amount of time to accomplish due to the task of re-outputting adjustment data and re-calculating convergence correction waveforms. This device has an increased memory capacity that allows you to store several difference convergence correction waveforms at the same time, therefore reducing the number of times required to re-calculate these corrective waveforms when switching video signals. Two functions have also been provided to take advantage of this hardware.

### 1) History function

The history function keeps track of the video signals you can switch to by storing them into output memory, arranged according to how often that signal is used. Video signals for most personal computers will usually require only four scans of data. Under normal switching requirements, the history function should be all you need for smooth switching.

### 2) Combination function

Some personal computers have several video signal outputs per one machine and may be running software that switches these signals quite often. (Such as the various modes of VGA). If you are using this kind of personal computer as your signal source, the history function should suffice. However, if you want to connect two or more computers to the System Interface, the history function may not work properly.

Instead you can use the combination function to specify a combination of video signal data, and store that combination in memory.

SC	INPUT	SOURCE	COM
00	VIDEO1	NTSC1	- - -
01	VIDEO2	PAL	- - -
00	VIDEO2	NTSC2	- - -
02	RGB1	CGA	1 - -
03	RGB1	EGA	1 - -
04	RGB2	VGA1	- 2 -
05	RGB2	VGA2	- 2 -
06	RGB2	VGA3	- 2 -

The previous example shows how the combination function is used with the RGB1 and RGB2 signals. The figures displayed in the COM column on the right side indicate the order of priority. Under this condition, when the signals are switched to RGB1 CGA, the corrective waveforms for RGB1 EGA are also calculated and stored in memory to prepare for a fast signal switch. Whenever either VGA1, VGA2, or VGA3 of RGB2 is selected, the remaining two signals are also calculated and stored in memory.

Combinations can be specified more than once to a single signal. This example below shows two specifications for RGB1 VGA1. Whenever RGB1 VGA1 is selected, the combination of CGA and EGA (which are higher in priority) are also stored in memory.

SC	INPUT	SOURCE	COM
00	VIDEO1	NTSC1	- - -
01	VIDEO2	PAL	- - -
00	VIDEO2	NTSC2	- - -
02	RGB1	CGA	1 - -
03	RGB1	EGA	1 - -
04	RGB1	VGA1	1 2 -
05	RGB1	VGA2	- 2 -
06	RGB1	VGA3	- 2 -

Combinations can be registered up to three times. Keep this number to a minimum, however, as too many specifications may hinder the effectiveness of the combination.

#### 8. Completion of Signal Recording

Press the **END** key to complete the recording. To record another input, return to step 3. To terminate this mode, press the **END** key again. Select 2. **SIGNAL ENTRY** from the on-screen menu and press **END** to return to the source screen.



#### INPUT LIST MODE

- 1. INPUT LIST
- ➔ 2. SIGNAL ENTRY



After entering a new signal into the **INPUT LIST**, carry out the Focus and Convergence adjustments for that signal.

#### 9. Input Signal Recording at the Time of Factory Shipment

INPUT LIST			
SC	INPUT	SOURCE	COM
00	VIDEO1	NTSC1	---
00	VIDEO2	NTSC2	---
01	VIDEO1	PAL/SCM1	---
01	VIDEO2	PAL/SCM2	---
02	RGB1	CGA	---
03	RGB1	EGA	---
04	RGB1	VGA350	---
05	RGB1	VGA400	---
06	RGB1	VGA480	---
07	RGB2	PRO1280	---
08	RGB3	IDC-1000	---

\* **PRO1280** is a registered trademark of Number Nine Computer Corporation.

The input signals are recorded at the factory as shown in the figure above.

If any of the above inputs needs to be eliminated in order to make room for a new signal, carry out the **INPUT LIST CANCEL** function.

**NOTE:** The projector can store convergence settings for up to 12 different input signals.

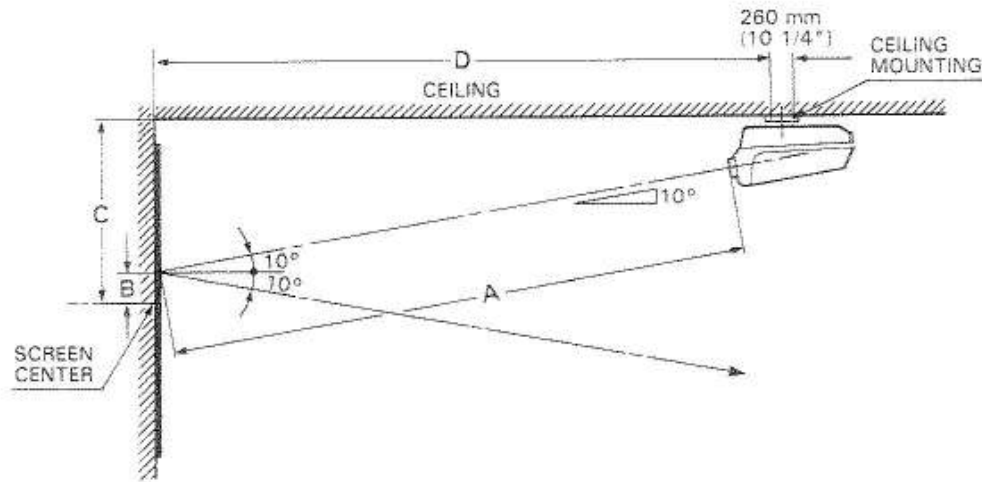
### 3. INSTALLATION AND OPERATION PROCEDURES

When this projector is shipped from the factory, it is preset for the System Interface used, ceiling suspended, 100 inch screen, front projection, 10 degree projection angle but the installation method (ceiling suspension or floor installation) and the screen size (100-150") can be modified.

**\*Installation Drawing for 100, 120 and 150 inch screens (diagonal)**

The drawing on the following page shows the relative positional relationship of the projector with the screen. Decide the A,B,C,D, and E according to the screen to be used.

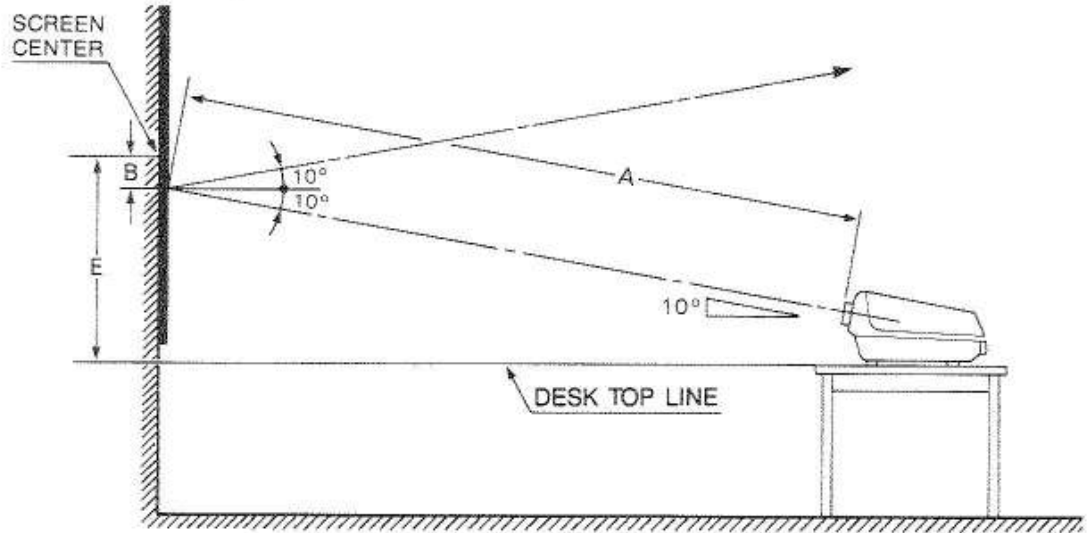
**(A) Ceiling Mounting System**



	100" screen	120" screen	150" screen
A	3037 mm 119-9/16"	3593 mm 141-1/2"	4428 mm 174-5/16"
B	83 mm 3-5/16"	100 mm 3-15/16"	125 mm 4-15/16"
C	906 mm 35-11/16"	1020 mm 40-3/16"	1190 mm 46-7/8"
D	3251 mm 128"	3799 mm 149-9/16"	4622 mm 181-15/16"

A	DISTANCE BETWEEN THE LENS AND THE SCREEN
B	DISTANCE BETWEEN THE AXIAL POINT AND THE SCREEN CENTER
C	DISTANCE BETWEEN THE CEILING AND THE SCREEN CENTER
D	DISTANCE BETWEEN THE WALL AND THE BOLT

**(B) Table Top System**



	100" screen	120" screen	150" screen
A	3037 mm 119-9/16"	3593 mm 141-1/2"	4428 mm 174-5/16"
B	83 mm 3-5/16"	100 mm 3-15/16"	125 mm 4-15/16"
E	846 mm 33-5/16"	960 mm 37-13/16"	1130 mm 44-1/2"

A	DISTANCE BETWEEN THE LENS AND THE SCREEN
B	DISTANCE BETWEEN THE AXIAL POINT AND THE SCREEN CENTER
E	DISTANCE BETWEEN THE DESK TOP FACE AND THE SCREEN CENTER

**(C) Setting Distance Calculations for 100" - 150" Screens**

Sizes not found between 100 and 150 inches are determined by the following formulas. S = Screen size (diagonal: inches)

Units = mm

$$A = [(S/6) + 1] \times 167 + 86.2$$

$$B = (S/6) \times 5$$

$$C = (0.0174 \times a) + 295 + B$$

$$D = (0.985 \times A) + 260$$

$$E = (0.174 \times A) + 235 + B$$

Units = inches

$$A = [(S/6) + 1] \times 6.575 + 3.394$$

$$B = S/6 \times 0.197$$

$$C = (0.174 \times A + 11.614 + B$$

$$D = (0.985 \times A) + 10.236$$

$$E = (0.174 \times A) + 9.252 + B$$

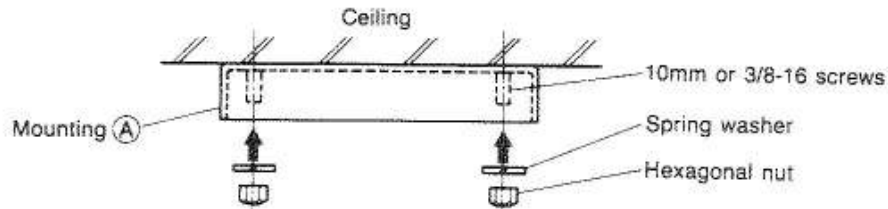
**NOTE:** When the screen size is changed, do not forget to adjust the centering rings, focus, and convergence.

## 3.1. CEILING INSTALLATION

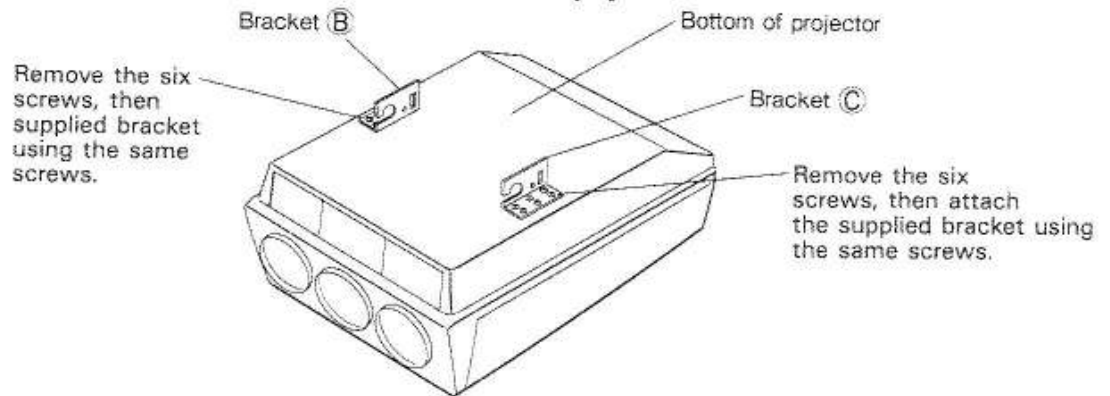
To assure safety, when a ceiling bracket is installed, be sure to use the supplied ceiling mounting kit.

**NOTE:** The ceiling must have sufficient strength to support the projector weight (95 kg, 209.5 lbs.).

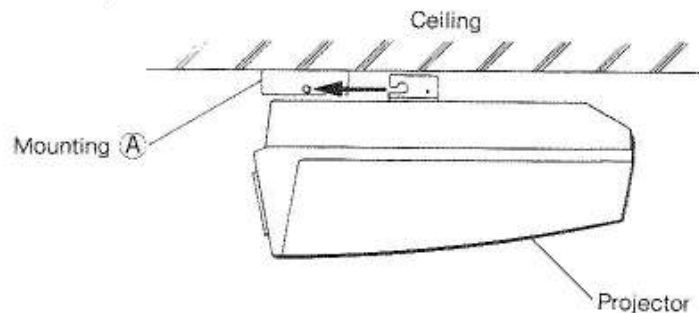
- (1) Determine the relative relationship between the projector and the screen according to the screen size.
- (2) Attach mounting (A) to the ceiling. Use six 10 mm coarse thread screws (not included).



- (3) Attach brackets (B) and (C) to the bottom of the projector

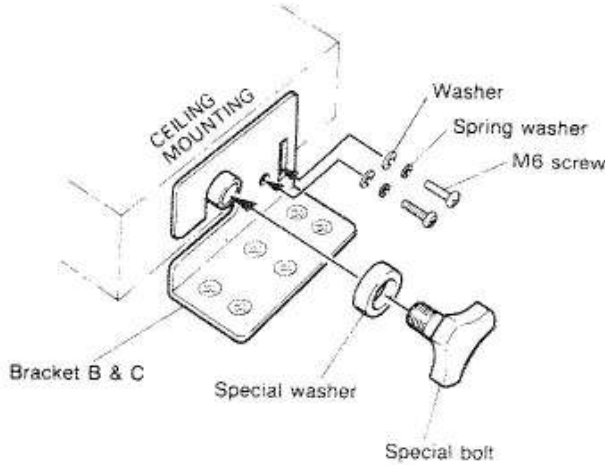


- (4) Line up the projector brackets with the protruding section of mounting (A) and fit them in securely.

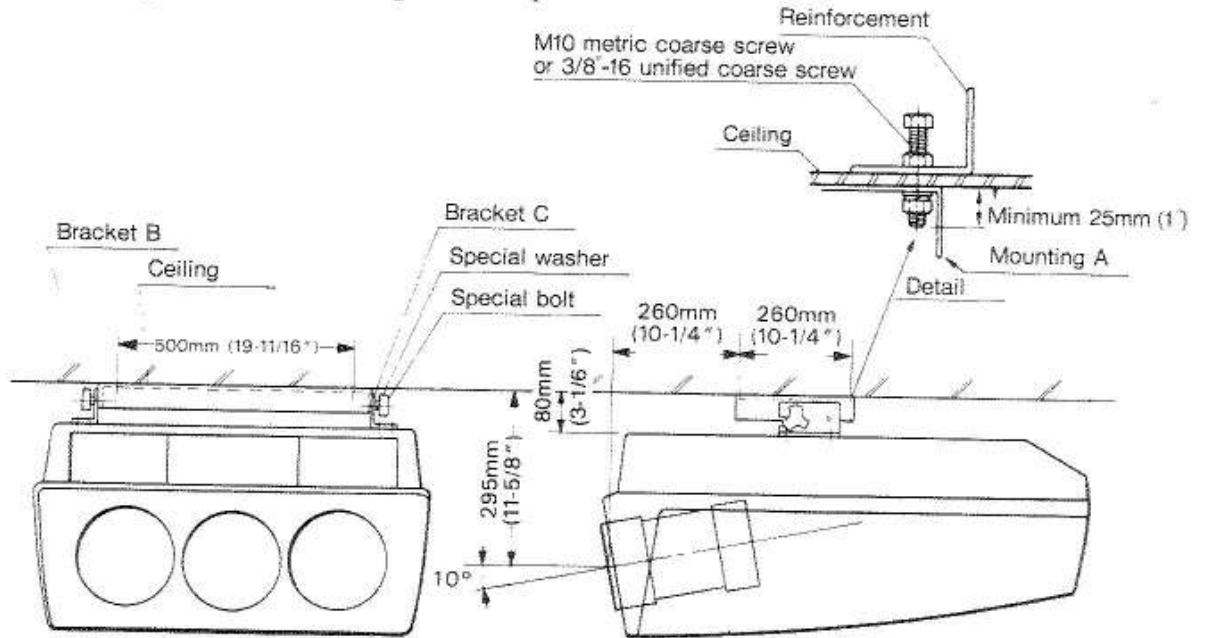


(5) Install the special bolt and the M6 screw as shown in the below drawing. If mounting for a 10 degree projection angle, that is the bottom face of the projector is set parallel to the ceiling, attach two M6 screws to each B&C bracket as shown in the diagram below. If setting for other than a 10 degrees projection angle, attach only one M6 screw to the outer slot of each B & C bracket.

**NOTE:** The washer and spring washer will not be free from M6 screw.



(6) Projector attached to ceiling installation position.



When changing from ceiling mounting to floor use, turn over the plate with the NEC trademark in the rear of the top cover. Push the catch from the inside and remove the plate. Install it in the opposite manner.

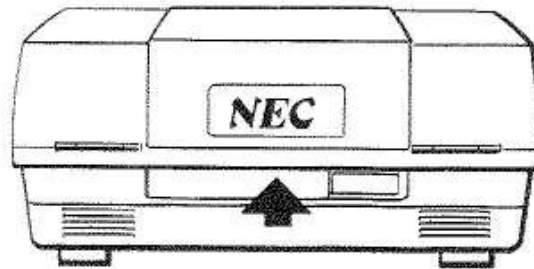


## 3.2. INSTALLATION METHOD CHANGE

When the projector installation is changed from ceiling mounted type to floor type or from floor type to ceiling mounted type, pin No. 3, 4 of DIP switch 2, and the horizontal and vertical polarity must be changed.

**NOTE:** The projector is preset at the factory for 100 inch, ceiling mounting and front projector. When the projector is used in this condition, it is not necessary to change the polarity and pin No. 3, 4 of DIP switch 2.

### (1) DIP Switch 2 Setting



The DIP Switches are in the rear panel. Push open the control cover on the back of the projector.

#### Nos. 4 and 3

Set according to projector installation method.

3	4	Installation Method
0	0	Ceiling/Rear projection
0	1	Ceiling/Front projection
1	0	Floor/Rear projection
1	1	Floor/Front projection

0=SHORT  
1=OPEN

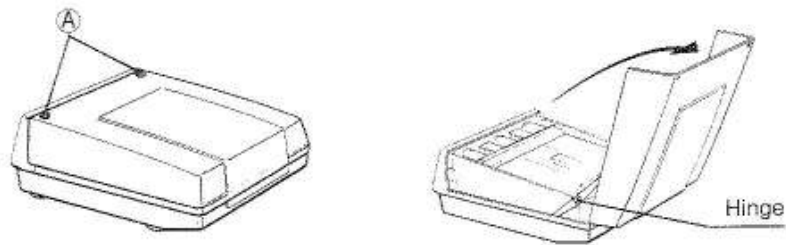
These settings are for when the image is projected from the projector directly onto a screen. when projected by reflecting on a mirror, etc. it is not limited to these settings. It is preset at the factory for ceiling mounting/front projection.

**NOTE:** Press the RESET button on the projector or turn off POWER after setting Nos. 4 and 3 pins.

## (2) Polarity Change

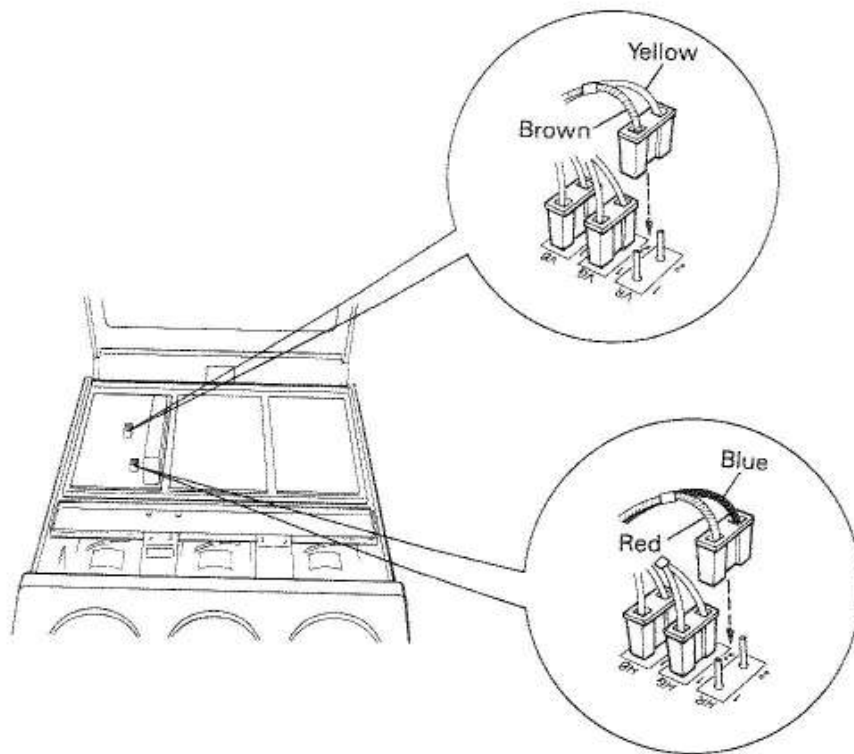
### 1) Opening Top Cover

- (a) Check to make sure the power is OFF and remove the power cord from the socket.
- (b) Loosen the two (A) screws. However, leave the top cover attached.
- (c) Raise the top front of the projector, then open the top cover until the hinges lock.



### 2) Polarity Reversal

The below drawing shows the position for the horizontal and vertical polarity connectors inside the projector.



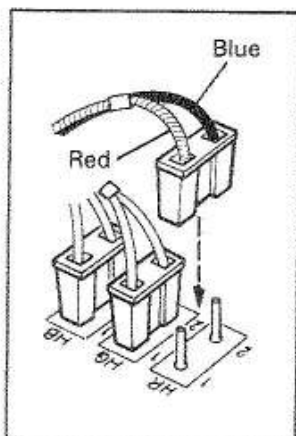
## Polarity Table

Setting	Connector	HR, HG, HB		VR, VG, VB	
		① Lead	② Lead	① Lead	② Lead
Front	Ceiling	Red	Blue	Brown	Yellow
Front	Floor	Blue	Red	Yellow	Brown
Rear	Ceiling	Blue	Red	Brown	Yellow
Rear	Floor	Red	Blue	Yellow	Brown

### Modification of Each Connector

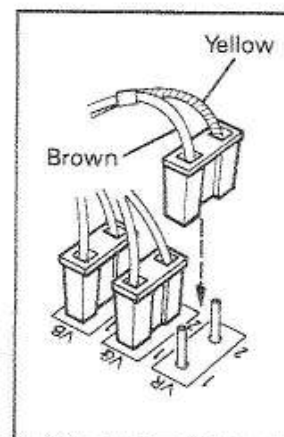
Correctly connect the three horizontal connectors and three vertical connectors as shown in the below drawings. (In this case, be sure to connect the same set of pins. (In other words, do not confuse R, G, and B).)

Front ceiling  
Rear floor



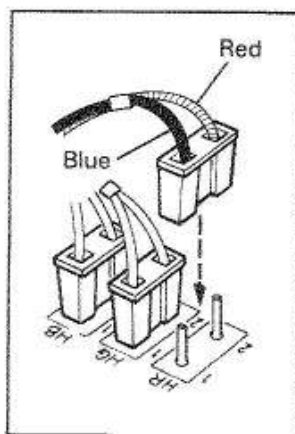
HORIZONTAL

Front ceiling  
Rear ceiling

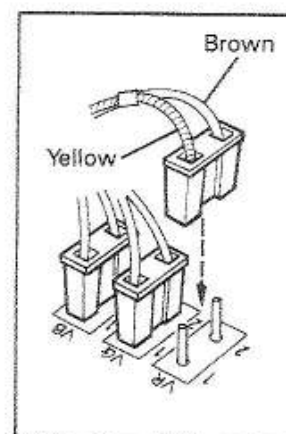


VERTICAL

Front floor  
Rear ceiling



Front floor  
Rear floor

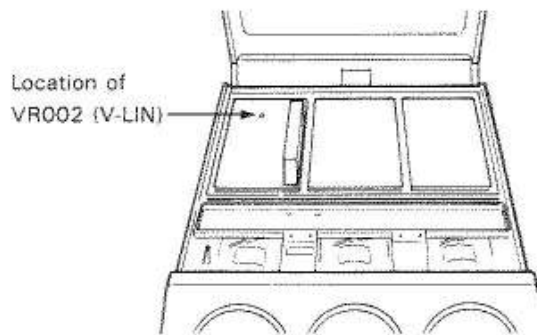


**NOTE:** Leads 1 and 2 are printed on the circuit board next to the corresponding pins.

### (3) Vertical Linearity Adjustment

**NOTE:** Perform these steps whenever the vertical polarity plugs are changed.

- 1) In Video 1-NTSC, bring up the crosshatch test pattern and turn off the red and blue beams by pressing the R and B keys.
- 2) Select the green CRT by pressing the G key while holding the CTL key. Press the CONV key and press the CANCEL key twice to cancel the convergence settings for green.
- 3) Adjust VR4002 (V-LIN) on the DEF PWB (see diagram on the bottom). Adjust so that the squares at the top of the test pattern are equal in size to the ones at the bottom.



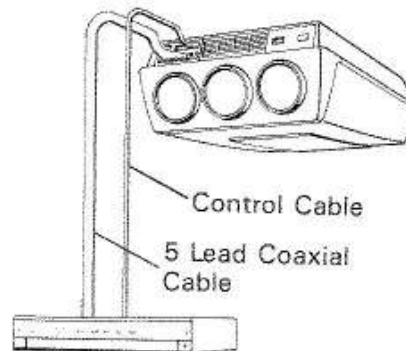
When changing from ceiling mounting to floor use, and vice-versa, turn over the plate with the NEC trademark in the rear of the top cover. Push the catch from the inside and remove the plate. Install it in the opposite manner.

### 3.3. OPERATION PROCEDURE

---

The projector is adjusted for use with the System Interface, ceiling mounting, 100 inch screen, front projection at the factory.

#### Preparation Prior to Operation



- (1) The System Interface is connected with the video projector by means of a control cable and a 5 lead coaxial cable. (both included with the System Interface)
- (2) Connect the external equipment.
- (3) Connect the power plug for the projector and System Interface to an AC 120V, 60Hz socket.

#### Operating Procedure

- (1) Turn on the external equipment power.
- (2) Turn the POWER switch on the back of the System Interface ON. The POWER indicator on the System Interface will light in red.
- (3) Turn ON by pressing the POWER button (main power switch) on the front of the projector. The STAND-BY indicator will light up (When pin No. 8 of dip switch 1 is on the Open side.)

**NOTE:** When pin No. 8 of DIP switch 1 is on the Short side and the POWER button on the front of the projector is turned ON, the projector will start up.

- (4) Press the POWER button on the back panel of the projector or the POWER key on the remote control. The projector REMOTE indicator and POWER indicator will light up and the POWER indicator on the System Interface will light in green.

#### NOTES:

1. When the No. 8 pin of DIP Switch 1 is on the Short side it is not necessary to press the POWER button on the back of the projector or on the remote control.
2. Flashing of the STAND-BY indicator on the projector means that the projector might not be connected with the System Interface correctly or the System Interface might not be turned ON. In that case, check the connection of the 15-25 pin control cable and make sure the POWER indicator on the System Interface is lit red.

- (5) The image is projected on the screen.
- (6) Select the desired input terminal, from among the INPUT keys 1-5 of the remote control. The corresponding indicator on the System Interface will light up and the input signal image selected will be projected on the screen.

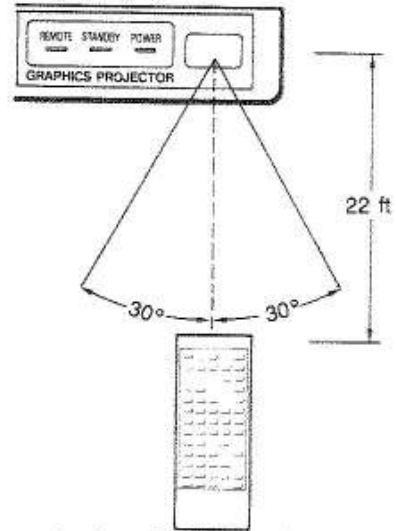
When INPUT keys 1-5 are pressed, the input terminals for VIDEO 1 and VIDEO 2 and for RGB 1, 2 and 3 can be selected as follows:

INPUT 1.....	VIDEO 1
INPUT 2.....	VIDEO 2
INPUT 3.....	RGB 1
INPUT 4.....	RGB 2
INPUT 5.....	RGB 3

**NOTE:** If the NO INPUT, CHECK INPUT LIST messages appear on the screen, first perform "Input signal recording".

(Put the supplied INPUT labels on the INPUT keys if required.)

**Precautions when Using Remote Control**



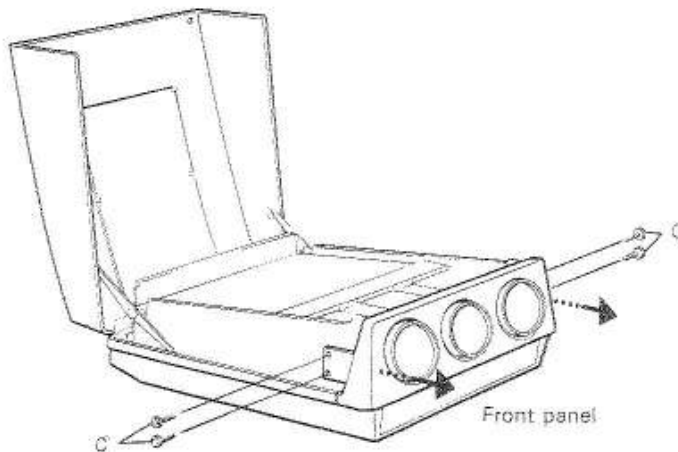
- (a) There are infrared light receiver sections and remote hacks on both the projector and System Interface. Either can be used at the same time.
- (b) When the remote control is used with the remote cable, it is connected to the REMOTE 2 jack on the front of the System Interface or the front of the projector.
- (c) Use the wireless remote control within the valid operating range. When strong light strikes the infrared light receiver section or there are obstructions between the remote control and the infrared light receiver section it will not operate correctly.

## 3.4. FOCUS ADJUSTMENTS

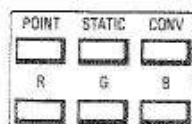
### 3.4.1 LENS FOCUS ADJUSTMENT

#### Preparation

- (a) Check to make sure the power is OFF, then open the top cover.
- (b) Remove the four C screws on both sides of the projector and remove the front panel.

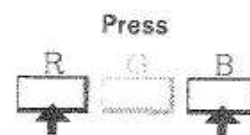


- (1) Turn the power ON.
- (2) Press the remote control TEST key and display the crosshatch pattern.
- (3) Press the two R, G or B keys that you don't want to adjust, then only the CRT you want to adjust will be projected.

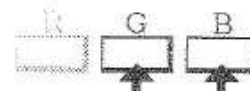


#### Example

Green pattern



Red pattern



Blue pattern



(4) Loosen wing nut A while each respective CRT is displayed, rotate the lens back and forth until the focus of the center section of the screen reaches its optimum focus. Tighten wing nut A. Likewise loosen wing nut B and adjust the peripheral area of the screen. Tighten wing nut B. Again loosen wing nut A and adjust the focus of the center. Tighten wing nut A after the adjustment has been completed.

**NOTE:** Do not overtighten the wing nuts.



**NOTE:** To focus the image more precisely, adjust the focus in the most detailed display area within the input being used (test pattern off). At this time the individual CRT cannot be cut off, so cover the CRT's not being adjusted with a lens cap.



### 3.4.2 ELECTRICAL FOCUS ADJUSTMENT

- (1) Select and press the signal you wish to adjust from INPUT keys 1-5 and project an image.
- (2) Press the TEST key and display the crosshatch pattern.

**NOTE:** You can also adjust electric focus on the normal screen.

- (3) Press the FOCUS key to initiate the FOCUS adjustment mode.
- (4) Select the CRT you wish to adjust by pressing either the R, G or B key while pressing the CTL key. When you wish to delete a signal other than the CRT you want to adjust, you can turn each CRT beam ON/OFF by pressing the R, G and B keys.
- (5) Select the CENTER or EDGE adjustment by pressing the FOCUS key. Each time the FOCUS key is pressed the CENTER and EDGE adjustments are alternately selected.
- (6) Adjust the optimum focus by pressing the cursor key <, >, ^ and v. The cursor keys ^ and > move the level up. v and < move the level down.
- (7) When you change the CRT to be adjusted, repeat steps (4)-(6).
- (8) Once the adjustment of the focus has been completed, press the STORE key. "STORE" appears on the screen. Press the STORE key once more to complete the store procedure.
- (9) Terminate the FOCUS adjustment mode by pressing the END key.

**NOTE:** For CENTER adjustment, adjust by watching the center of the screen. For EDGE adjustment, adjust by watching the 4 corners of the screen.

The following instructions are primarily for serviceman.

#### H/V Balance (Focus Control)

The H/V balance controls the H-width and V-height focal balance to an optimum setting whenever an input signal changes.

- (1) This adjustment is made on a green CRT display. With the test pattern on screen, press the R and B keys to display the Green CRT only.
- (2) Press the FOCUS key to initiate the FOCUS adjustment mode. Select the EDGE adjustment to adjust the optimum H-width focus with the cursor keys while watching the edge marked A in Fig. 1. Be sure the Green CRT is selected by pressing the CTL and G keys.
- (3) Press the CTL key and hold it down while you press the FOCUS key. The following display Fig. 2 will appear.

Adjust the optimum V-height focus by pressing the cursor keys <, >, ^, and v while watching the edge marked B in the following figure.

- (4) Store this adjustment by pressing the STORE key twice.

Repeat steps (3) - (9) above.

**NOTE:** Make this adjustment for each individual input signal.

### 3.4.3 C. P. C (Convergence and Purity Control) MAGNET

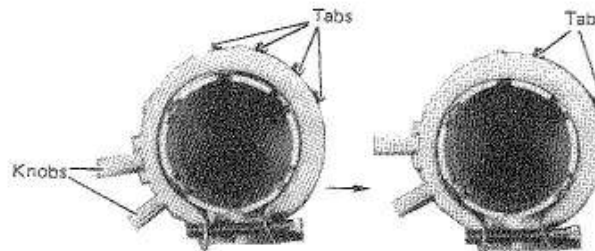
**NOTE:** This procedure should be performed in the event of LENS and remote control failure to correct focus.

- (1) Set S7101 on GAIN CTL PWB to off position.
- (2) Check that the deflection yoke, focus magnet, and C. P. C magnet of each R, G and B CRT are precisely mounted on their assigned positions.
- (3) Set the CENTERING and P. C magnets to zero magnetic field as shown below.

#### ZERO MAGNETIC FIELD



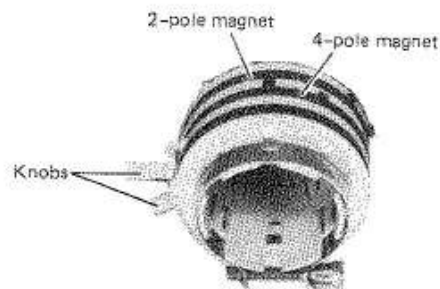
Two tabs should be lined up in 180°,  
CENTERING MAGNET



Two tabs should be aligned together for each magnet.  
C.P.C MAGNET

- (4) Select built-in dot pattern test signal.
- (5) Cover R and B CRTs to display only G CRT.
- (6) Adjust the G. SCREEN VR to darken the back raster.
- (7) Adjust G. FOCUS on the remote control unit so the flare appears around the spot as illustrated below:

#### C. P. C MAGNET ADJUSTMENT



6-pole magnet is not equipped.

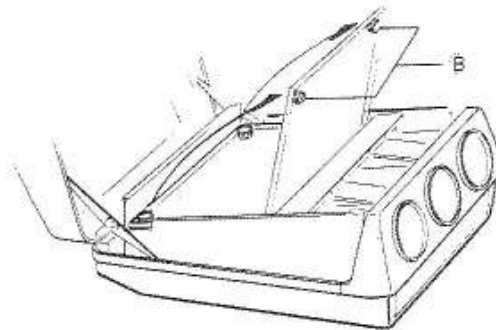
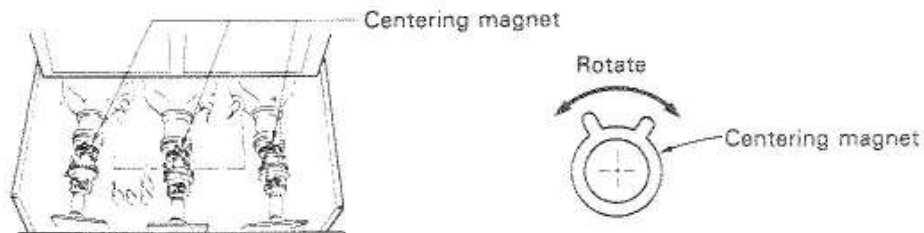
- (8) Adjust the 2 pole magnet to produce a core at the center of the flare. Rotating the knob changes the angle between tabs. Sliding the knob moves tabs together.

- (9) Adjust the 4-pole magnet so the flare forms a circular shape.
- (10) Adjust the G. FOCUS on the remote control unit to make the flare disappear from the spot.
- (11) In the same manner, adjust the R and B CRTs.
- (12) Turn S7101 on.

#### 3.4.4 ADJUSTING THE CENTERING MAGNETS

**NOTE:** The Centering Magnets should only be adjusted if the screen size is changed.

- (a) Cancel static convergence.
- (b) Loosen the two B screws, then raise the upper chassis.

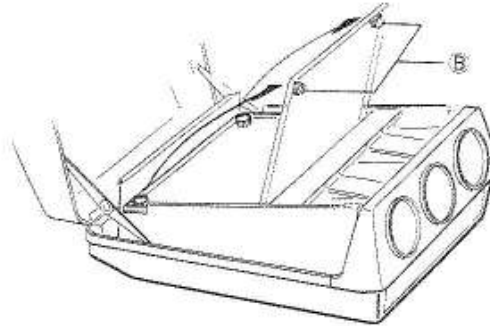


- (c) Press the TEST key.

A cross hatch pattern will be projected. Turn off the red or blue CRT by pressing the R or B key on the remote control. Adjust the R or B centering magnet being projected and match it to the pattern corresponding to green. Project the R or B CRT, which was turned off in advance by the same method, then turn off the remaining CRT and adjust to the corresponding green pattern.

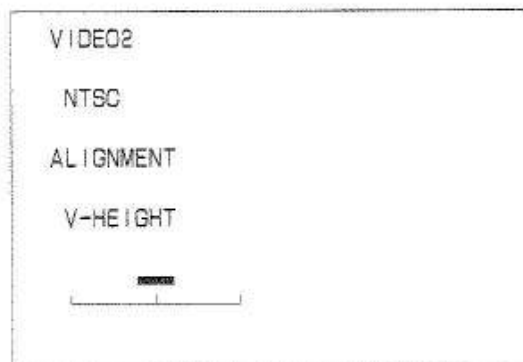
**NOTE:** If focus cannot be optimally adjusted, adjust the C.P.C. magnet, referring to the service manual. When the centering magnet has been substantially moved, the C.P.C. magnet must be adjusted.

(d) Turn off the power. Install the two B screws, attach the upper chassis.



### 3.4.5 ALIGNMENT ADJUSTMENT

- (1) Select the signal to be adjusted using the INPUT keys 1-5 and project an image.
- (2) Select the function to be adjusted by pressing one of the keys V-HEIGHT, H-WIDTH, H-POSITION and V-HOLD.
- (3) Adjust to the optimum level by pressing the cursor keys, ^ and V. When > and ^ are pressed the level increases, when < and V are pressed the level decreases.



- (4) When adjusting the remaining functions, repeat from step (2).

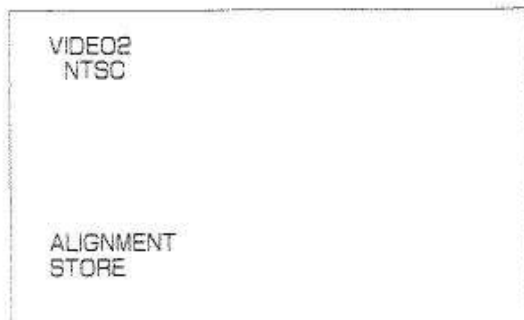
(5) When adjustment is completed, press the STORE key. "STORE:" appears on the screen. Press the STORE key once more to complete the store procedure.

(6) Terminate the ALIGNMENT adjustment mode by pressing the END key.

**NOTES:**

1. When the test pattern is displayed only V-HEIGHT and H-WIDTH operate. When the ALIGNMENT has been adjusted, the EDGE focus may change slightly. AT such times the focus should again be adjusted.

2. The selection of the function to be adjusted can also be done using the ALIGNMENT up and down buttons in the projector rear panel.



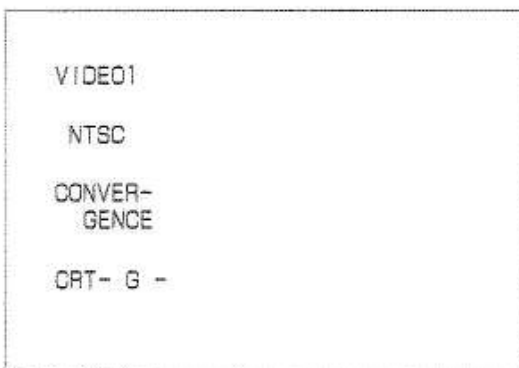
### 3.4.6 CONVERGENCE ADJUSTMENT

Adjust distortions such as linearity, pincushion, etc. which can not be corrected during ALIGNMENT adjustment. The green pattern is made the standard and thus you should first correct each green pattern distortion. Then correct the convergence of the other CRT's.

**NOTE:** Make sure that the image of the signal you want to adjust appears on the screen.

#### (1) Adjustment of Geometric Distortion for Green

- a. Display the crosshatch pattern by pressing the TEST key.
- b. Set to the convergence adjustment mode by pressing the CONV key.
- c. Display the green pattern only by pressing the R key and the B key.
- d. If you press the G key while pressing the CTL key, a display as shown below will appear.



- e. Press to select one of the dynamic adjustment function keys.
- f. Adjust the green crosshatch pattern by pressing the cursor keys V, ^, < and > .

### (2) Red and Blue Convergence Adjustment

After having adjusted the geometric distortion for green, adjust the convergence for red and blue.

- a. Display the crosshatch pattern by pressing the **TEST** key.
- b. Set to the convergence adjustment mode by pressing the **CONV** key.
- c. Display only the standard G-CRT and the CRT you wish to adjust by operating the R, G and B keys.
- d. Select the CRT to be adjusted by pressing the R. or B key while pressing the CRT key.
- e. Perform the static adjustment.
- f. Perform the dynamic adjustment.
- g. Perform the point adjustment.
- h. After adjustment has been completed, store the adjustment data by pressing the **STORE** key twice.
- i. Terminate the convergence adjustment mode by pressing the **END** key.

### (3) Static Adjustment

- a. While in the convergence adjustment mode, press the **STATIC** key. A display as shown in the figure below will appear.



- b. Perform the adjustment using the cursor keys <, ^, v and > such that the center of the screen is lined up, using the green pattern as a reference.
- c. Press the **STORE** key twice to store the adjustment.

#### 4) Dynamic Adjustment

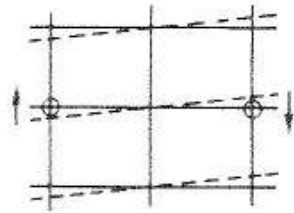
- a. Set to the convergence adjustment mode, then select each dynamic function.
- b. Perform the adjustment using the cursor keys <, ^, v and >.
- c. Press the STORE key twice to store the adjustment.

**NOTE:** To adjust the convergence for **KEYSTONE** or **PINCUSHION BALANCE**, press the **KEYSTONE** keys or **PINCUSHION** keys while pressing the **CTL** key.

**1. Dynamic TILT**

Adjust Vertical to Center

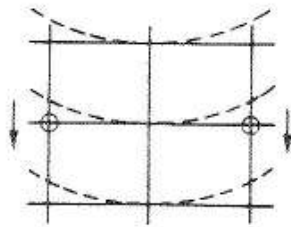
Adjust Horizontal Right/Left Side



**2. Dynamic V BOW**

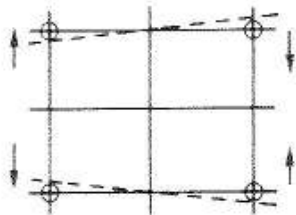
Adjust Vertical to Center

Adjust Horizontal Right/Left Side



**3. Dynamic V KEYSTONE**

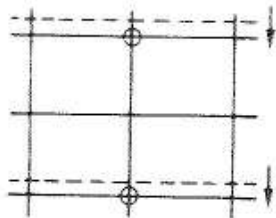
Adjust the 4 corners



**4. Dynamic V LINEAR**

V Upper/Lower Side

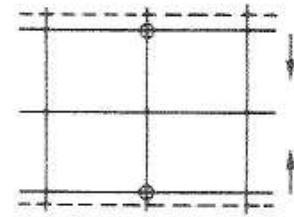
H Center



**5. Dynamic HEIGHT**

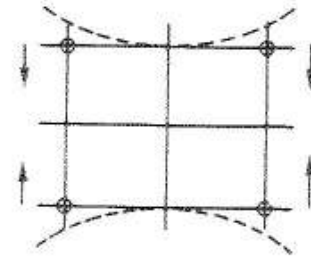
Adjust Vertical Upper/Lower Side

Adjust Horizontal to Center



**6. Dynamic TOP/BOTTOM PINCUSHION**

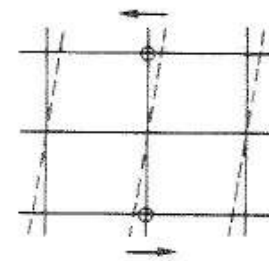
Adjust the 4 corners



**7. Dynamic SKEW**

Adjust Vertical Upper/Lower Side

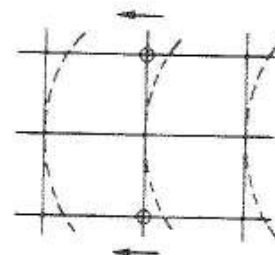
Adjust Horizontal to Center



**8. Dynamic H BOW**

V Upper/Lower Side

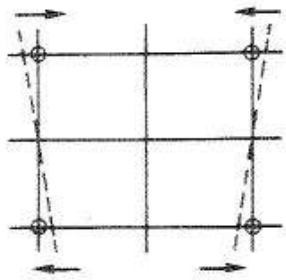
H Center





9. Dynamic H KEYSTONE

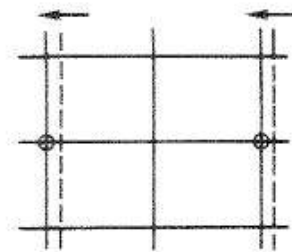
Adjust the 4 corners



10. Dynamic H LINEAR

V Center

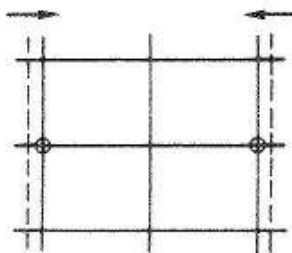
H Right, Left Side



11. Dynamic WIDTH

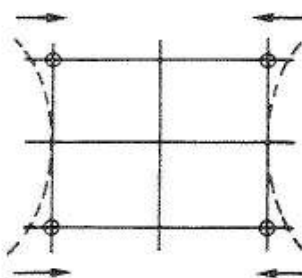
V Center

H Right, Left Side

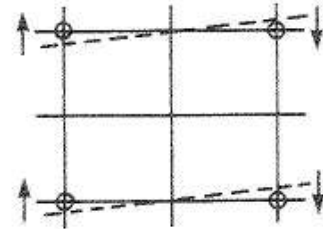


12. Dynamic SIDE PINCUSHION

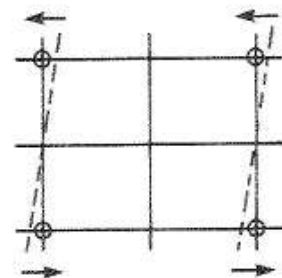
Adjust the 4 corners



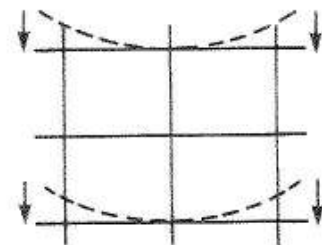
13. V KEYSTONE BALANCE



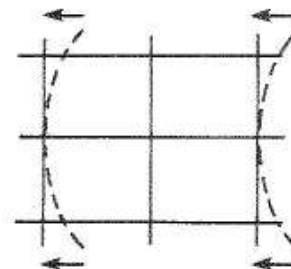
14. H KEYSTONE BALANCE



15. TOP/BOTTOM PINCUSHION BALANCE

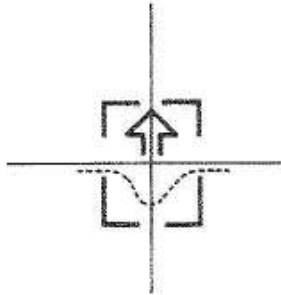


16. SIDE PINCUSHION BALANCE



### (5) Point Adjustment

- a. Press the **POINT** key while in the convergence mode.
- b. A display, as the one in the below figure, and the cursor will appear.
- c. Move the cursor to the spot to be adjusted using the cursor keys **<**, **^**, **>** and **v** while pressing the **CTL** key at the same time.
- e. Press the **STORE** key twice to store the adjustment.



### 3.4.7 CONVERGENCE CANCEL FUNCTION

When the projector position must be changed, the screen size changed, the connection signal changed or the convergence substantially changed, cancel the convergence adjustment (to uncorrected condition) so that the convergence will not be over-corrected. Each input signal must be cancelled for each respective R, G and B CRT. After changing over to the signal you wish to cancel, display the test pattern by pressing the **TEST** key and select the CRT to be adjusted by pressing the **R**, **G** or **B** key while pressing the **CTL** key. Perform the below operation by pressing the **CONV** key.

#### A. All data cancel (When all the convergence data is to be cancelled).

- (1) Press the **CANCEL** key.

The "CANCEL" on-screen display will appear.

- (2) Press the **CANCEL** key once more.

The "CANCEL" display will disappear and the convergence data will go into the floating condition.

- (3) Press the **STORE** key.

The "STORE" on-screen display will appear.

- (4) Press the **STORE** key once more.

The on-screen display will disappear, then the cancelled (clear) status will be stored.

**NOTES:** You can return to the status before pressing the cancel key at any time prior to executing instruction (3). If you execute either of the following two instructions, it will return to the status prior to cancellation.

- 1) Shut off power switch
- 2) Press the **CANCEL** key twice while pressing the **CTL** key. "LOAD" will appear on the screen.
- (5) Repeat steps (1)-(4) for each R, G and B CRT.

**B. Dynamic cancel (When dynamic convergence data is to be cancelled)**

- (1) Set to the adjustment mode by pressing the key for the item you wish to cancel from among the 12 dynamic adjustment keys.
- (2) Perform the same operations as (1) to (5) of part A.

```
VIDEO1
NTSC

CRT- R-
SKEW
CANCEL
```

**C. Static Cancel (When static convergence data is to be cancelled)**

- (1) Set to the **STATIC** mode by pressing the **STATIC** key.
- (2) Perform the same operations as (1) to (5) of part A.

```
VIDEO1
NTSC

CRT- R-
STATIC
CANCEL
```

**D. Point cancel (When point convergence data is to be cancelled)**

- (1) Set to the point mode by pressing the **POINT** key.
- (2) Perform the same operations as (1) to (5) of part A.

```
VIDEO1
NTSC

CRT- R-
POINT
CANCEL
```

### 3.4.8 CONVERGENCE DATA COPY

If you have two or more input devices with similar signals (such as a VCR and a Video camera) you only need to completely adjust the convergence for the first input. Once it has been adjusted and stored, you can copy the convergence adjustments from the first input to any other similar input signal. To do this, follow the procedure outlined below.

- (1) Change to the image signal you want to adjust.
- (2) Add this new signal to the Input List.
- (3) Change to the test screen then display the copy screen by pressing the POINT key while pressing the CTL key.

A list will be displayed on the screen with all of the signal names that have been recorded in the current INPUT LIST. Any non-recorded locations will be indicated with the characters "FREE." (See below)

- (4) Select the signal name to be copied by moving the cursor- using the cursor keys ^ and v. Select the signal that most closely resembles the characteristics of the signal you are coping to. (I.E. similar frequency and resolution)
- (5) When the ENTER key is pressed, the convergence adjustment data for the input signal indicated by - is copied and output. It will then automatically return to the convergence adjustment mode. When FREE has been selected, the screen will not change.
- (6) Complete the convergence adjustments at this point.

**NOTE:** To stop this mode, press the END key.

```
VIDEO1
NTSC
**** COPY LIST ****
->00. VIDEO1  NTSC1
  00. VIDEO2  NTSC2
  01. VIDEO1  PAL/SOM1
  01. VIDEO2  PAL/SOM2
  02. RGB1    CGA
  03. RGB1    EGA
  04. RGB1    VGA350
  05. RGB1    VGA400
  06. RGB1    VGA480
  07. RGB2    PRO1280
  08. RGB3    IDC-1000
```

### 3.4.9 PICTURE ADJUSTMENT

BRIGHT, CONTRAST, COLOR, TINT and SHARPNESS can be adjusted for each input. Store the set values after adjustment.

- (1) Select the picture adjustment mode using the PICTURE UP or DOWN buttons on the back of the projector or PICTURE FUNCTION key on the remote control.
- (2) The picture adjustment selected at that time and its level are displayed on the screen. (See below)
- (3) Adjust the level using the ADJUST button on the back of the projector or the cursor keys on the remote control. When ^ and > are pressed the level increases; when v and < are pressed the level decreases.

**NOTE:** COLOR, TINT and SHARPNESS do not operate in the RGB mode. COLOR and SHARPNESS can be controlled only when NTSC, SECAM and PAL signals have been input. Also, TINT can be controlled only when NTSC is input.

- (4) Press the STORE key on the remote control.
  - a. "STORE" is displayed on the screen.
  - b. Press the STORE key again. "STORE" will disappear.
  - c. The picture adjustment level will be stored.

#### NOTES:

1. Individually adjust the respective VIDEO 1, 2 and RGB 1,2 and 3 signals. After having adjusted the picture, to return to the stored level (LOAD), press the CTL key while pressing the NORMAL key twice. To return the picture adjustments to their factory preset levels, press the NORMAL key twice.
2. When the DISPLAY key is pressed with the CTL key, you can select either the NORMAL MODE for a brighter picture or the GRAPHICS MODE for a high resolution picture. Press the STORE key twice to store the adjustment.

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## 4. SERVICE PROCEDURES

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### 4.1. STANDARD ADJUSTMENT CONDITION

---

The projector should be in the following condition for all adjustments.

- Power supply: AC 120V, 60Hz
- Warmed up for 20 minutes.
- INPUT SIGNALS:

#### (I) VIDEO INPUT

1. NTSC Video Signal, 1.0Vp-p, 75 ohms positive polarity
2. S-VIDEO Signal: Y: 1.0Vp-p, 75 ohms positive polarity,  
C: 0.28Vp-p, 75 ohms burst level

#### (II) RGB INPUT

1. Video Signal, 0.7Vp-p, 75 ohms, positive polarity
2. Sync signal, 1.0Vp-p, 75 ohms, negative/positive polarity
3. Deflection frequency

H: 15Hz-75kHz

V: 38Hz-100Hz

- Unless otherwise specified, use 100" flat screen.
- Unless otherwise specified, all adjustments should be performed with the projector only.
- The system interface, SI-5320, to be used in adjustments should be preadjusted and operating normally.
- Unless otherwise specified, set the following digital controls as shown below.

Bright	}	Center
Color		
Tint		
Sharpness		

Contrast....Maximum

- While pressing the CTI key, press the DISPLAY key to select either the GRAPHICS mode for lower light output or the NORMAL mode for higher light output. Unless otherwise specified, set the mode as shown below.

Video 1,2	Normal mode
RGB 1, 2	Graphics mode
RGB 3	Normal mode
S7101	Push

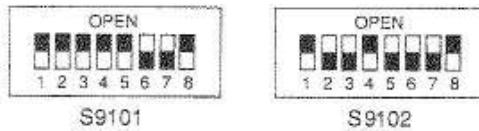
#### 4.1.1 DIP SWITCH SETTINGS

Set the dip switches to the positions as illustrated below to set the projector on the following conditions:

- Normal control mode
- On-screen manual mode
- Projector STAND-ALONE mode
- Auto power on mode

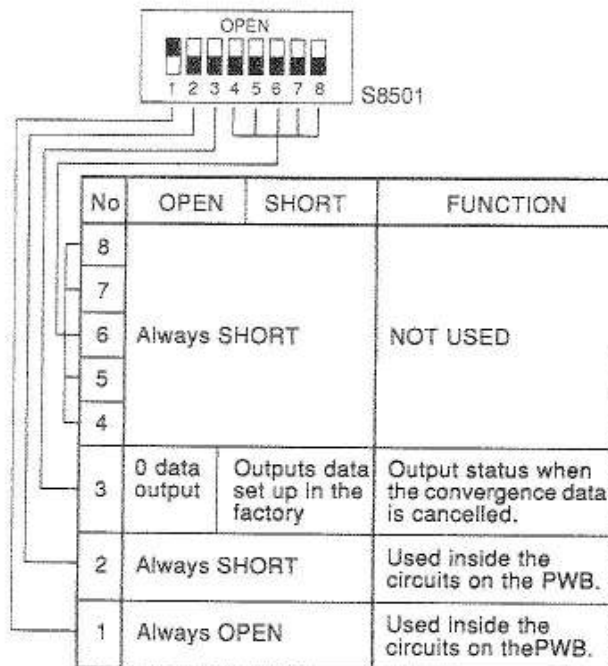
#### Ceiling Mounted/Front Projection

The input signal selected when the projector is started up: VIDEO



#### 4.1.2 D-CONV PWB DIP SWITCH SETTINGS

Set the dip switches to the positions as illustrated below.





## 4.2. SERVICE ADJUSTMENTS

### 4.2.1 SYSTEM INTERFACE CONNECTION

- (1) Turn the power off.
- (2) Connect the system interface, SI-5320 to the projector.
- (3) Feed the following signals into the system interface.

INPUT TERMINAL	INPUT SIGNALS
VIDEO 1	NTSC
VIDEO 2	PAL
RGB 1	SIGNAL 1 (CGA) SIGNAL 2 (EGA) SIGNAL 3 (VGA 350) SIGNAL 4 (VGA 400) SIGNAL 18 (VGA 480)
RGB 2	SIGNAL 15 (PRO1280)
RGB 3	SIGNAL 5 (IDC-1000)

- (4) Set No. 7 of S9101 on DIP SW PWB to OPEN position.

Set the POWER keys of the projector and the system interface to ON position.

- (5) Confirm that the STANDBY LED is lit.

- (6) If the STANDBY LED goes on and off repeatedly, confirm that the control cable between the controller and the projector is properly connected.

When feeding in Signal 1 or Signal 2 into RGB 1, set the switches as follows;

ANALOG/TTL SW.....TTL

No. 1 of DIP SW.....IBM PC/AT

When feeding in Signal 3, Signal 4 or Signal 15 into RGB 1, set the switches as follows;

ANALOG/TTL SW.....ANALOG

No. 1 of DIP SW.....IBM PS/2/VGA

## 9 PIN RGB 1 TERMINAL

Switching pin No. 1 of the DIP switch selects either \*IBM PC/AT or PS-2 for RGB 1.

### (1) When selecting \*IBM PC/AT

#### 1. Horizontal frequencies: automatically scanning

15-20 kHz \*CGA mode

20-26 kHz \*EGA mode

over 26 kHz \*PGA 480 mode

You can adjust the Bright, Contrast, R,G,B GAIN, H POSITION, H WIDTH, V HEIGHT, V HOLD, focus and convergence for these 3 modes.

#### 2. ANALOG/TTL Switching

The ANALOG/TTL switch selects either TTL or ANALOG of the computer

#### 3. Color Mode (When the MANUAL/PRESET switch is PRESET.)

V Negative 64 colors

V Positive 16 colors

#### 4. Connecting \*IBM PC, \*PC/XT and \*PC/AT

Select the IBM mode by setting the MANUAL/PRESET switch to PRESET. This terminal adjusts itself to the scanning frequencies for 3 modes (\*CGA, \*EGA and \*PGA480 mode), \*PGA480/400, and color requirements of the IBM compatible computer to be used.

### (2) When selecting \*IBM PS-2

The multi-sync function automatically adjusts itself to the 4 modes as Table 4 above.

When using non-IBM computers, set the MANUAL/PRESET switch to MANUAL and select the number of colors by setting pins 5 and 6 of DIP switch when the input signal of the computer being used is TTL.

9 Pin RGB Signal Composition

9 pin Interface Cable's Pin Assignments and Signal Levels for 9 Pin RGB

Table 1 pin assignment of IBM graphics adapter



IBM Adapters Pin Assignment	Color Graphics TTL 16 Colors	Enhanced Graphics TTL 64/16 Colors	Professional Graphics Analog	Video Graphics Analog
1	Ground	Ground	*RED	▲ RED
2	Ground	Secondary RED	*GREEN	▲ GREEN
3	RED	Primary RED	*BLUE	▲ BLUE
4	GREEN	Primary GREEN	Composite Sync.	Horizontal Sync.
5	BLUE	Primary BLUE	Mode Control	Vertical Sync.
6	Intensity	Secondary GREEN/Intensity	RED Ground	RED Ground
7	Non-Connection	Secondary BLUE	Green Ground	GREEN Ground
8	Horizontal Sync.	Horizontal Sync.	BLUE Ground	BLUE Ground
9	Vertical Sync.	Vertical Sync.	Ground	Ground

Table 2 pin assignment of other computers

Signal Pin Assignment	TTL			ANALOG		
	8 Colors	16 Colors	64 Colors	Separate Sync.	Composite Sync.	Sync. on Green
1	Ground			▲RED		
2	—		Secondary RED	▲GREEN		GREEN ○H/V Sync.
3	RED		Primary RED	▲BLUE		
4	GREEN		Primary GREEN	H. Sync.	H/V Sync.	—
5	BLUE		Primary BLUE	V. Sync.	—	
6	—	Intensity	Secondary GREEN	Ground		
7	—		Secondary BLUE			
8	H. Sync./H/V Sync.					
9	V. Sync.					

“—” means GROUND or NON-CONNECTION

**SIGNAL LEVEL**

All signal levels, except for those listed below, are TTL.

“\*” means 0.6 Vp-p (VIDEO)

“○” means 0.7 Vp-p (VIDEO), 0.3 Vp-p (SYNC.)

“▲” means 0.7 Vp-p (VIDEO)

1. R GAIN, G GAIN, B GAIN (Only when connected to System Interface)

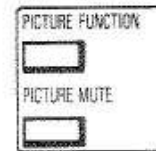
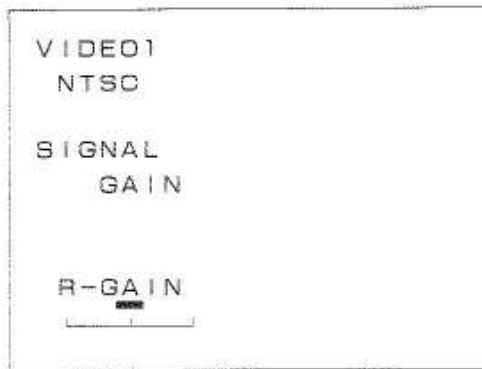
a) Press the PICTURE FUNCTION key while pressing the CTL key to select the desired color gain and light R,G, or B GAIN indicator on the System Interface. The "R, G or B GAIN" message will be displayed on the screen.

**NOTE:** You must have a picture displayed on the screen - not the test pattern.

b) Connect an oscilloscope to selected color TEST point R-GAIN (TP607), G-GAIN (TP608), and B-GAIN (TP609).

c) Adjust the remote control cursor keys to obtain a value of 1.4Vp-p on the oscilloscope.

**NOTE:** Since the R, G and B GAIN are set at the optimal condition at the time of shipment, adjustment is normally unnecessary.



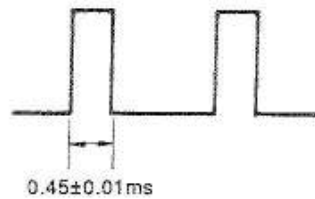
#### 4.2.2 HIGH VOLTAGE (HV UNIT PWB)

##### NOTES:

1. Perform this procedure only when the HV UNIT PWB is replaced.
2. The digital voltmeter should have the accuracy of  $+0.01V$ .
  - (1) Connect a high voltage voltmeter to the HV R unit.
  - (2) Adjust VR1 (HV ADJ) to obtain  $34.0 + 0.1kV$ .
  - (3) After adjustment, seal VR1 by pouring in silicone rubber.

#### 4.2.3 VERTICAL BLANKING PULSE WIDTH (DEF PWB)

- (1) Feed in signal 15, and switch to the RGB mode.
- (2) Connect an oscilloscope to TP4003.
- (3) Adjust VR4001 (V. BLK) so the blanking pulse width becomes  $0.45 \pm 0.01ms$ .



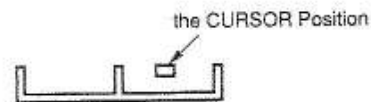
#### 4.2.4 HORIZONTAL OSCILLATION FREQUENCY (DEF PWB)

- (1) Set S5001 to the ADJ position.
- (2) Switch to the VIDEO mode and feed in color bar signal.  
Adjust the VR5006 (VIDEO H.OSC) to obtain the synchronized picture.
- (3) Connect a frequency counter or an oscilloscope to TP5004.
- (4) Switch to the RGB mode.  
Feed in signal 7 (on page 63) and adjust the VR5002 (H.OSC (1)) to obtain  $15.0 \pm 0.2\text{kHz}$ .
- (5) Feed in signal 17 and adjust the VR5003 (H.OSC (2)) to obtain  $75.0 \pm 0.3\text{kHz}$ .
- (6) Repeat the item (4) and (5) to obtain the frequency both with signal 7 and signal 17.
- (7) Set S5001 to the NORM position.

#### 4.2.5 H. WIDTH, V. HEIGHT, and V. HOLD

- (1) Feed in NTSC video crosshatch pattern signal.
- (2) Set H. WIDTH and V. HEIGHT on the remote control unit to the position as shown in the following figure

#### H. WIDTH AND V. HEIGHT DISPLAYS



- (3) Adjust VR5005 (H. WIDTH) on DEF PWB to align the scale of 90% on the pattern to the screen borders of both sides.
- (4) Adjust VR4009 (V. HEIGHT) on DEF PWB to align the scale of 90% on the pattern to the screen borders of top and bottom.
- (5) If a vertical rolling or pairing occurs, adjust V. HOLD on the remote control unit.
- (6) Change to RGB 1 mode, and apply the signals shown below and perform steps (7) to (9) respectively.

INPUT SIGNALS	
Signal 1	IBM CGA
Signal 2	IBM EGA
Signal 5	IDC1000
Signal 15	PRO1280

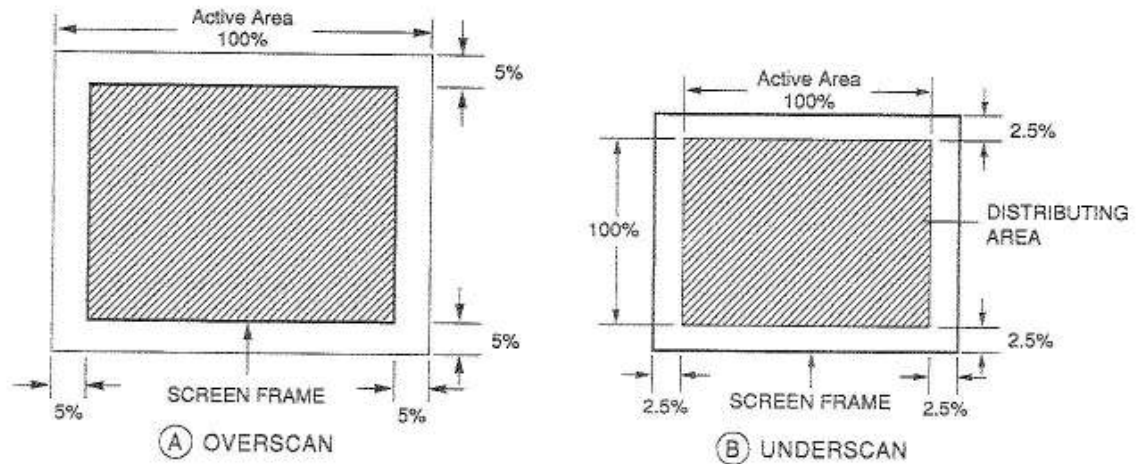
(7) Adjust H. WIDTH again to obtain 5% underscan for Signal 1, Signal 2 and Signal 15, and to obtain 10% overscan for Signal 5 as shown below.

(8) Adjust V. HEIGHT on the remote control unit to obtain a pattern balanced with its horizontal width.

(9) If a vertical rolling or pairing occurs, adjust V. HOLD on the remote control unit.

(10) Adjust V. HEIGHT to obtain a pattern balanced with its horizontal width.

(11) If a vertical rolling or pairing occurs, adjust V. HOLD again.



#### 4.2.6 VERTICAL LINEARITY

**NOTE:** Perform this procedure anytime after the vertical yoke plugs are reversed.

- (1) Feed in NTSC video sync signal.
- (2) Produce TEST pattern and perform a green DYNAMIC CONVERGENCE cancel to clear uncertain customer digital memory.
- (3) Adjust VR4002 (V. LIN) on DEF PWB for optimum V. linearity performance.



#### 4.2.7 DEF PWB ADJUSTMENT

##### (A) Setting of VRs and Switches

- (1) Rotate VR5004 (H. OUT PROTECTOR) fully counterclockwise. Place the other controls in their mechanical center positions.
- (2) Set LS4001 and S5001 to the ADJ position.

##### (B) Vertical Oscillation Frequency and Vertical Height

- (1) Disconnect the AC CONNECTOR ON THE HV unit.
- (2) Connect the vertical deflection yoke to the VR, VG and VB connectors.
- (3) Unplug the connectors DC, PA and LP.
- (4) Connect a frequency counter to TP4006.
- (5) Adjust VR4007 (V. OSC 3) to obtain a vertical oscillation frequency of  $60.0 \pm 0.1$  Hz.
- (6) Connect the oscilloscope to TP4004, and adjust VR4008 (V. HEIGHT 3) to obtain a vertical sawtooth waveform less than  $10\text{mVp-p}$ .

##### WAVEFORM AT TP4004



- (7) Connect the oscilloscope to TP4006, and adjust VR4009 (V. HEIGHT) so the sawtooth waveform becomes  $6.5 \pm 0.1$  Vp-p.

##### WAVEFORM AT TP4006

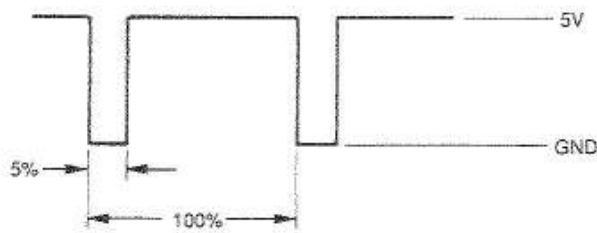


- (8) Adjust VR4002 (V. LIN) to make the sawtooth waveform linear slope.
- (9) Feed in V sync signal in HV connector as below.

HV 3: Vertical sync signal

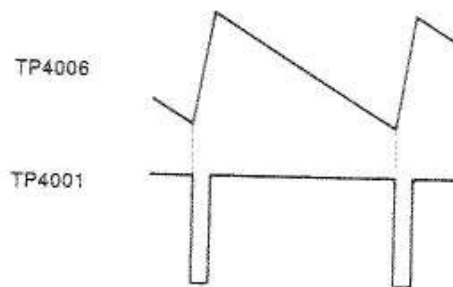
HV 4: GND

## V. SYNC SIGNAL



- (10) Connect an oscilloscope to TP4001 and TP4006 respectively.
- (11) Feed in a 38 Hz V. sync signal, and adjust VR4004 (V. OSC 2) to obtain the synchronized waveforms.
- (12) Feed in a 100 Hz V. sync signal, and adjust VR4003 (V. OSC 1) to obtain the synchronized waveforms.
- (13) Check that the waveforms in the following figure are obtained at the synchronized condition.

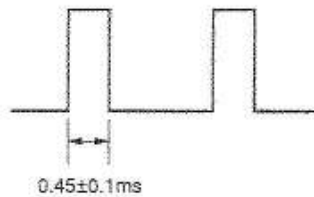
### WAVEFORMS AT TP4001 AND TP4006



- (14) Repeat the above steps (10) to (13) to obtain the synchronized waveforms with both 38 Hz and 100 Hz.
- (15) Set S4001 to the NORM position.
- (16) Connect the oscilloscope to TP4006.
- (17) Adjust the VRs below to obtain  $7.0 \pm 0.1$  Vp-p sawtooth waveform while feeding their corresponding input signals
  - VR4006 (V. HEIGHT 2) : 38 Hz signal
  - VR4005 (V. HEIGHT 1) : 100 Hz signal
- (18) If the value of  $7.0 \pm 0.1$  Vp-p can not be obtained, repeat item (17).

**(C) Vertical Blanking Pulse**

- (1) Feed in a signal 15, and switch to the RGB mode.
- (2) Connect an oscilloscope to TP4003.
- (3) Adjust VR4001 (V. BLK) so the blanking pulse width becomes  $0.45 \pm 0.1\text{ms}$  on the oscilloscope.



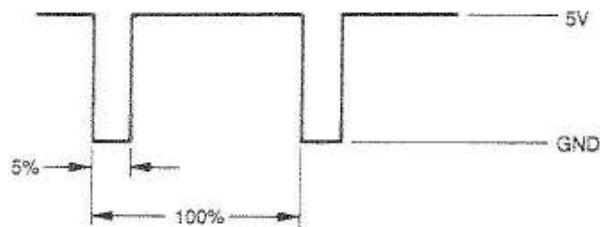
**(D) Horizontal Oscillation Frequency**

- (1) Feed a H. sync signal into HV connector as follows:

HV 1 : Horizontal sync signal

HV 2 : GND

**H. SYNC SIGNAL**



- (2) Connect a voltmeter to TP5003.
- (3) Adjust VR5001 (F/V) to obtain  $2.0 \pm 0.01\text{V}$  with the H. sync signal of 15kHz.
- (4) Connect a frequency counter or the oscilloscope to TP5004, and adjust VR 5002 (H. OSC 1) with 15.0kHz H. sync signal input to obtain  $15.0 \pm 0.2\text{kHz}$ .
- (5) Connecting the frequency counter or the oscilloscope as it is, adjust VR5003 (H. OSC 2) to obtain  $75.0 \pm 0.2\text{kHz}$  with 75kHz H. sync signal input.
- (6) Repeat items (4) and (5) to obtain  $15.0 \pm 0.2\text{kHz}$  and  $75.0 \pm 0.2\text{kHz}$ .

(7) Adjust VR5006 (VIDEO H. OSC) so a  $15.75 \pm 0.2\text{kHz}$  is obtained at TP5004 when removing the H. sync signal from HV connector (Connect a jumper lead between TP4002 and TP5002).

(8) Set S5001 to NORM position.

(9) Relay operation confirmation.

Connect the DEF PWB and the LINEAR COIL PWB with LC and LI connectors, and change H. sync signal from 15kHz to 75kHz continuously.

1 Linear coil switch

Confirm the relay on LINEAR COIL PWB switches within a horizontal frequency range of 19kHz to 20kHz.

2 Resonance capacitor change

Confirm RL5001 on DEF PWB switches within a horizontal frequency range of 29kHz to 30kHz.

(E) Horizontal Width

(1) Horizontal drive voltage adjustment

Connect a digital voltmeter between TP5015 and ground, and input H. sync signal in RGB mode.

Connect a jumper lead between DC1 terminal and ground, and adjust VR5201 (H. DRIVE) to obtain the values below.

Frequency	VOLTAGE AT TP5015
15.75 kHz	$31.0 \pm 0.5\text{V}$
24.83 kHz	$31.0 \pm 0.5\text{V}$
31.5 kHz	$26.0 \pm 0.5\text{V}$
48.0 kHz	$22.6 \pm 0.5\text{V}$
64.0 kHz	$16.4 \pm 0.5\text{V}$

(2) Connect the horizontal deflection yokes to HR, HG, and HB connectors, and the LINEAR COIL PWB to the LC connector.

(3) Connect a voltmeter to TP5008, and adjust VR5005 (H. WIDTH) to obtain  $1.2 \pm 0.1\text{V}$ .

#### 4.2.8 OPTICAL (LENS) FOCUS

Refer to Section 3.4.1.

#### 4.2.9 ELECTRIC FOCUS (1)

Refer to Section 3.4.2.

#### 4.2.10 TILT PHASE

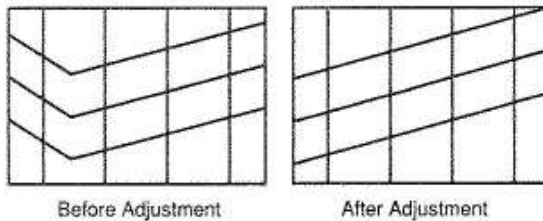
- (1) Confirm that No. 2 of S9102 (DIP SW2) is set to the SHORT position.
- (2) Press **TEST** to display TEST pattern.
- (3) Press **CTL** and **CONV** to display MENU screen as following.

\*\*\* MENU \*\*\*

- ⇒ 1. TILT PHASE  
2. CURSOR PHASE

- (4) Position the cursor to 1. TILT PHASE by pressing **^** or **v** and press **ENTER** to display the picture including TILT component on G-CRT alone.

#### TILT PHASE



- (5) Adjust **or** to equalize the distortion on both sides of the screen.
- (6) Press **STORE** twice to store the status after the adjustment.
- (7) Press **END** to return to MENU screen.
- (8) Press **END** once again to return to the normal mode.
- (9) After this procedure perform the normal convergence adjustment.

#### 4.2.11 CURSOR PHASE

- (1) Confirm that No. 2 of S9102 (DIP SW2) is set to the SHORT position.
- (2) Press TEST to display TEST pattern.
- (3) Press CTL and CONV to display MENU screen as following.

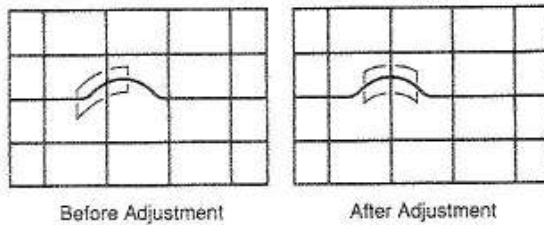
\*\*\* MENU \*\*\*

1. TILT PHASE

⇒ 2. CURSOR PHASE

- (4) Position the cursor to 2. CURSOR PHASE by pressing ^ or v and press ENTER to display the picture including POINT component on G-CRT alone.

#### CURSOR PHASE



- (5) Adjust > or < to locate the vertical line of the center of the cursor with the peak of POINT component as indicated in the figure.
- (6) Press STORE twice to store the status after the adjustment.
- (7) Press END to return to MENU screen.
- (8) Press END once again to return to the normal mode.
- (9) After this procedure perform the normal convergence adjustment.

#### 4.2.12 CONVERGENCE (1)

Refer to Section 3.4.6.

#### 4.2.13 HORIZONTAL POSITION, HORIZONTAL WIDTH, VERTICAL HEIGHT, and VERTICAL HOLD ADJUSTMENT (2) (REMOTE CONTROL UNIT)

Refer to Section 3.4.5.

#### 4.2.14 SYSTEM PWB ADJUSTMENT

**NOTE:** Perform this procedure only when replacing the SYSTEM PWB.

##### (A) Setting of Reference Voltage

- (1) Connect a voltmeter to pin 16 of AE connector.
- (2) Adjust VR8301 (REFERENCE VOLTAGE) to obtain  $-8.95 \pm 0.01V$ .

##### (B) PLL Coil

- (1) Feed a signal into pins 1 and 3 of DP connector as follows;

Pin 1 of DP connector

Horizontal frequency :  $18.00 \pm 0.02kHz$

Pulse width : 1.5 - 3.5 usec

TTL level, Positive polarity

Pin 3 of DP connector

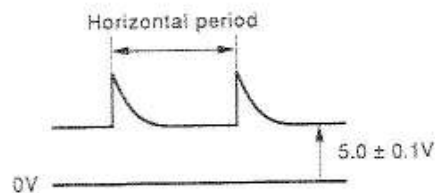
Vertical frequency : 38 - 100 Hz

Pulse width : more than 10H. periods

TTL level, Positive polarity

- (2) Connect an oscilloscope to pin 7 to IC8263.

- (3) Adjust L8201 to obtain  $5.0 \pm 0.1V$  as illustrated below.



(4) Feed a sign into pins 1 and 3 of DP connector as follows;

Pin 1 of DP connector

Horizontal frequency :  $25.50 \pm 0.02\text{kHz}$

Pulse width : 1.5 - 3.5 sec

TTL level, Positive polarity

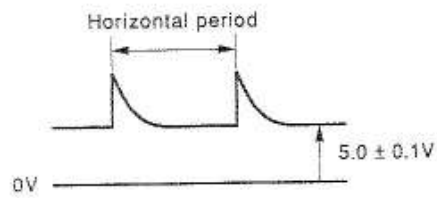
Pin 3 of DP connector

Vertical frequency : 38-100 Hz

Pulse width : more than 10H periods

TTL level, Positive polarity

(5) Adjust L8202 to obtain  $5.0 \pm 0.1\text{V}$  as illustrated below.





## 4.3. WHITE BALANCE ADJUSTMENT

---

### 4.3.1 GAIN CTL PWB SETTINGS

Set the VRs to the positions as follows;

SUB CONTRAST (VR7104)	Mechanical Center
SUB BRIGHT (VR7103)	"
S7101	Push

### 4.3.2 DEF PWB SETTINGS

Set the VRs to the positions as follows;

R CONTRAST (VR7100)	Mechanical Center
G CONTRAST (VR7101)	"
B CONTRAST (VR7102)	"

### 4.3.3 R.G.B. VIDEO OUT PWBs SETTING STAND-ALONE mode

Set the VRs to the positions as follows;

R BRIGHT BIAS (VR3031)	Mechanical Center
G BRIGHT BIAS (VR3032)	"
B BRIGHT BIAS (VR3033)	"
R BRIGHT GAIN (VR3021)	"
G BRIGHT GAIN (VR3022)	"
B BRIGHT GAIN (VR3023)	"
R PEAK CLIP (VR3051)	Fully Clockwise
G PEAK CLIP (VR3052)	"
B PEAK CLIP (VR3053)	"

### 4.3.4 SCREEN VRs SETTINGS

Set the VRs on the SCREEN UNIT as follows;

R. SCREEN VR	Fully Counterclockwise
G. SCREEN VR	"
B. SCREEN VR	"

#### 4.3.5 VIDEO PWB ADJUSTMENT

##### (A) Initial setting of VRs

Set the VRs as described below.

VR7407 (H. BLK1)	Mechanical Center
VR7405 (H. BLK2)	"
VR7404 (W. PEAK)	Fully Counterclockwise

Disconnect the connector VC or normalize the picture with the remote controller.

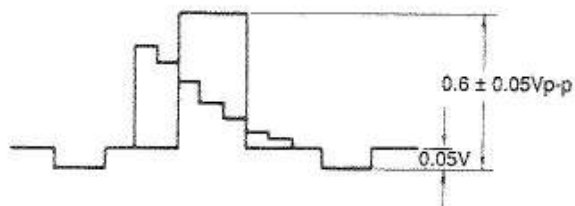
##### (B) VIDEO AFC

- (1) Connect a frequency counter or an oscilloscope to TP7407.
- (2) Adjust VR801 (SYNC HIC) to obtain  $15.7 \pm 0.1\text{kHz}$ .

##### (C) Sub Brightness and Sub Picture

- (1) Feed in NTSC split screen color bar signal (1.0Vp-p) and cut-off the chroma component.
- (2) Connect an oscilloscope to TP7404.
- (3) Adjust VR7402 (SUB BRIGHTNESS) so the set-up level is 0.05 V as shown in Fig. 17.
- (4) Adjust VR7403 (SUB PICTURE) so the amplitude is  $0.6 \pm 0.05\text{Vp-p}$ .

##### SUB-BRIGHTNESS and SUB-PICTURE ADJUSTMENT

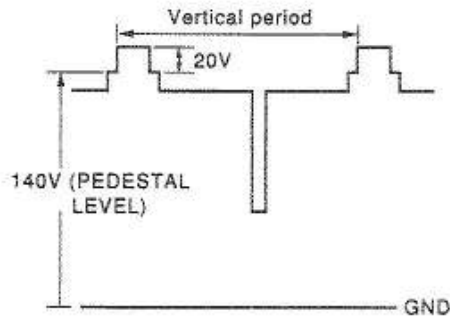


#### 4.3.6 SIGNAL LEVEL

##### (A) VIDEO mode Blanking Margin setting procedure

- (1) Feed in crosshatch pattern signal.
- (2) Connect an oscilloscope to the cathode of each R, G and B CRT on VIDEO CRT PWB.
- (3) Adjust VR3011 (R. BLANKING), VR3012 (G. BLANKING) and VR3013 (B. BLANKING) to obtain 20V blanking level for each CRT as illustrated below.
- (4) Adjust VR3031 (R. BRIGHT BIAS), VR3032 (G. BRIGHT BIAS) and VR3033 (B. BRIGHT BIAS) to obtain 140 V pedestal level respectively as illustrated below.

##### BLANKING AND PEDESTAL

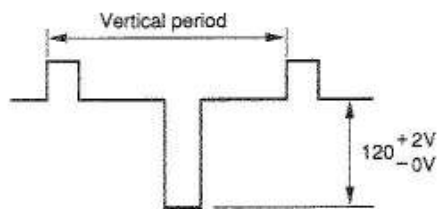


##### (B) Peak Clip

- (1) Press PICTURE MUTE and PICTURE FUNCTION on remote control unit to display only on-screen signal.
- (2) Connect the oscilloscope to the cathode of G. CRT on VIDEO CRT PWB and adjust VR3052 (G. PEAK CLIP) on G. VIDEO OUT PWB so the amplitude of on-screen waveform becomes 120 as shown in Fig. 19.
- (4) Connect the oscilloscope to the cathode of B. CRT on VIDEO CRT PWB and adjust VR3053 (B. PEAK CLIP) on B. VIDEO OUT PWB so the amplitude of on-screen waveform becomes 120V as shown in the figure below.

**NOTE:** If the level of on-screen signal is less than 120V, adjust VR7100, VR7101, and VR7102 on DEF PWB to obtain 130V respectively.

##### ON-SCREEN SIGNAL LEVEL



**(C) RGB mode Blanking Margin setting procedure**

- (1) Switch to RGB mode, and feed in CGA signal (signal 1).

**INPUT SIGNAL LEVEL**

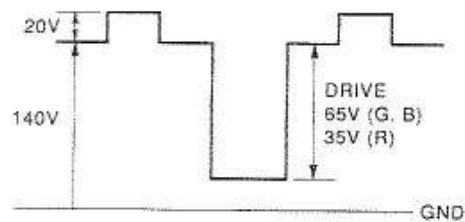


- (2) Connect the oscilloscope to the cathode of each R, G, and B CRT on VIDEO CRT PWB.
- (3) Press CTL and DISPLAY keys on remote control unit to select the GRAPHICS mode.
- (4) Adjust VR3041 (R. SUB BLANKING), VR3042 (G. SUB BLANKING) and VR3043 (B. SUB BLANKING) so R, G and B blanking level are 20V on the oscilloscope respectively as shown in Fig. 18.

**(D) Drive Adjustment for GRAPHICS mode**

- (1) Feed in CGA signal (signal 1).
- (2) Connect an oscilloscope to the cathode of R, G and B CRT on VIDEO CRT PWB respectively.
- (3) Adjust VR7100 (R. CONTRAST), VR7101 (G. CONTRAST) and VR7102 (B. CONTRAST) so the waveform becomes 35V on R VIDEO CRT PWB and 65V on G and B VIDEO CRT PWBs respectively.

**WAVEFORM AT THE CATHODE OF R, G AND B CRT**



**(E) Drive Adjustment for NORMAL mode**

- (1) Switch to NORMAL mode and input NTSC cross pattern signal.
- (2) Connect the oscilloscope to the cathode of G and B CRT on VIDEO CRT PWB.
- (3) Adjust VR7403 (SUB PICTURE) on VIDEO PWB so the amplitude of horizontal line becomes 120Vp-p.

### 4.3.7 GAIN CTL PWB ADJUSTMENT

#### 1. Cut-off and Drive Adjustment

- (1) Select Video input.
- (2) Feed in NTSC split screen color bar signal.
- (3) Cover R and B CRTs to display only G CRT.
- (4) Adjust the G SCREEN VR so that the black portion becomes completely black.
- (5) Remove the covers from R and B CRTs.
- (6) Set CONTRAST to minimum with the remote control unit.
- (7) Observe the gray scale which is located at the center of the color bar, and adjust R. and B SCREEN VRs alternately to obtain the optimum white balance.

**Do not rotate the G SCREEN VR as it is the reference.**

- (7) Set CONTRAST to maximum with the remote control unit.
- (8) Confirm the white balance is optimum. If not, adjust VR7100 (R. DRIVE) and VR7102 (B. DRIVE). Do not rotate VR7101 (G. DRIVE) as it is the reference.
- (9) Repeat items from (6) to (8) until the best white balance is obtained.

#### 2. Brightness Tracking Adjustment

- (1) Set BRIGHTNESS and CONTRAST to maximum with the remote control unit.
- (2) Check if the white balance is optimum. If not, adjust VR3021 (R. BRIGHT GAIN) or VR3023 (B. BRIGHT GAIN).

**Do not rotate VR3022 (G. BRIGHT GAIN) as it is reference.**

- (3) Set BRIGHTNESS to minimum with the remote control unit.
- (4) Check the white balance, and if it is out, adjust VR3031 (R. BRIGHT BIAS) or VR3033 (B. BRIGHT BIAS).

**Do not rotate VR3032 (G. BRIGHT BIAS) as it is reference.**

- (5) Set BRIGHTNESS to maximum with the remote control unit and repeat the items from (2) to (4) until the best white balance is obtained.

#### 3. White Balance Confirmation

- (1) Set BRIGHTNESS to center, and CONTRAST to maximum with the remote control unit.
- (2) Check the white balance by varying CONTRAST and BRIGHTNESS alternately. If the white balance is off, perform the following procedures.

[a] If the white balance is not obtained when varying CONTRAST, repeat the cut-off and drive adjustment.

[b] If the white balance is not obtained when varying BRIGHTNESS, repeat the brightness tracking adjustment.

- (3) To increase or decrease the black level, perform fine adjustment by VR7103 (SUB BRIGHTNESS) on GAIN CTL PWB.
- (4) To increase or decrease the brightness level, perform fine adjustment by VR7104 (SUB CONTRAST) on GAIN CTL PWB.

**NOTE:** The items (3) and (4) are not necessary in the ordinary adjustment.

**4. The On-Screen Display White Balance**

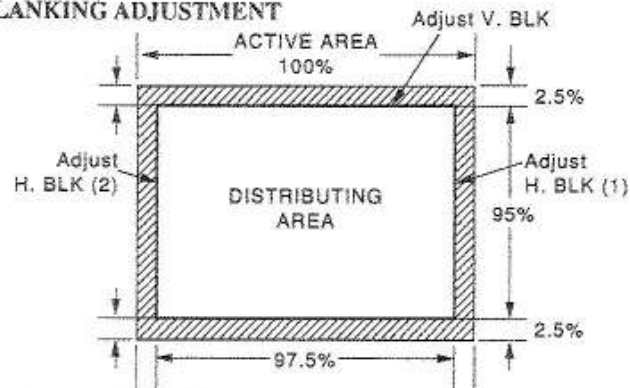
- (1) Apply the on-screen signal.
- (2) Confirm the on-screen display white balance is normal.
- (3) If not, adjust the on-screen display white balance with VR7105 (WHITE BALANCE RED) and VR7106 (WHITE BALANCE BLUE) on GAIN CTL PWB.

## 4.4. VIDEO ADJUSTMENTS

### 4.4.1 VIDEO BLANKING ADJUSTMENT (VIDEO PWB) at PJ STAND-ALONE mode

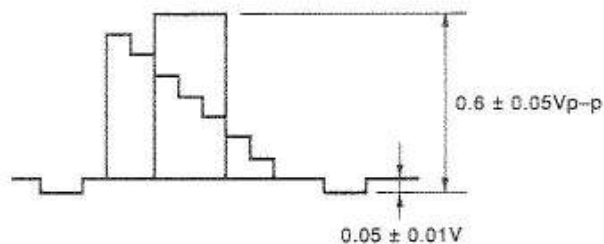
- (1) Feed in split screen color bar signal with the signal input level of 1.0Vp-p and cut off the chroma component.
- (2) Adjust VR7404 (H. BLK (1)) to align the right blanking area as shown below.
- (3) Adjust VR7405 (H. BLK (2)) to align the left blanking area as shown below.
- (4) Adjust VR7406 (V. BLK) to align the top blanking area as shown below.

#### BLANKING ADJUSTMENT



- (5) Connect the oscilloscope to TP7404, and adjust VR7402 (SUB BRIGHT) and VR7403 (SUB PICTURE) on VIDEO PWB to obtain the waveform as shown below.

#### WAVEFORM AT TP7404

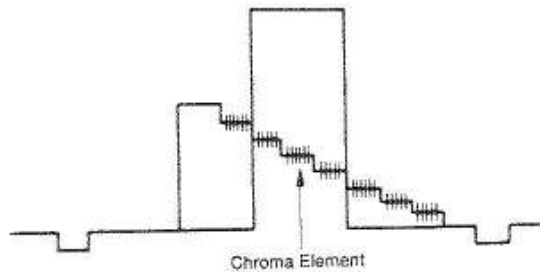


- (6) Adjust VR7404 (WHITE PEAK) so the amplitude of white peak waveform just starts to decrease.

#### 4.4.2 COMB FILTER

- (1) Feed in split screen color bar signal.
- (2) Connect the oscilloscope to TP7402.
- (3) Adjust VR7401 (COMB FILTER) and T7401 on VIDEO PWB alternately so that the amplitude of the chroma element on the color bar signal becomes minimum.

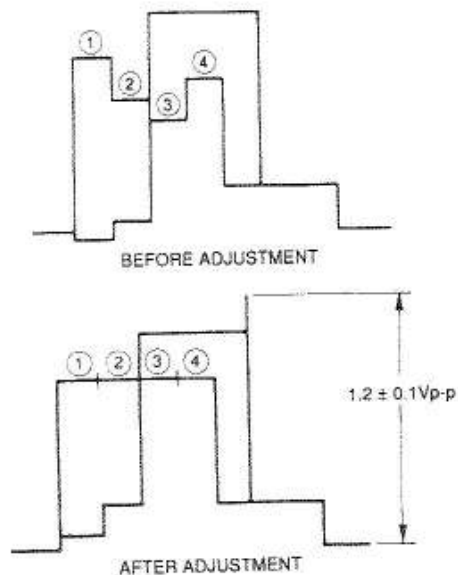
#### WAVEFORM AT TP7402



#### 4.4.3 COLOR, TINT and SHARPNESS

- (1) Feed in split screen color bar signal.
- (2) Connect the oscilloscope to TP7404 (G) on VIDEO PWB.
- (3) Adjust VR7408 (SUB COLOR) and VR7409 (SUB TINT) alternately to align the level of each column on the waveform as illustrated below.
- (4) Adjust VR7410 (SUB SHARPNESS) on VIDEO PWB to obtain  $1.2 \pm 0.1V_{p-p}$  as shown below.

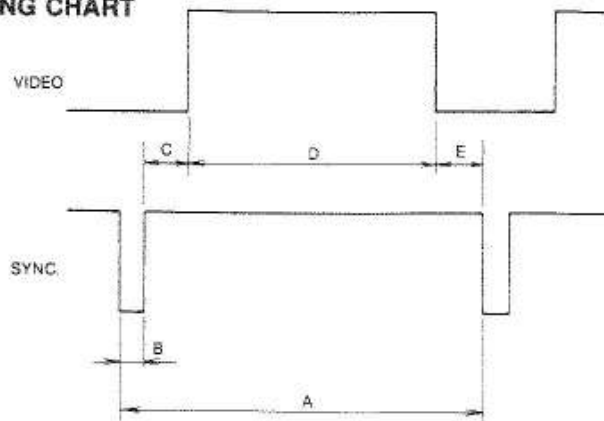
#### WAVEFORM AT TP7404 (G)





#### 4.4.4 ADJUSTMENT SIGNALS

#### TIMING CHART



Signal 1	} RGB 1	} IBM CGA
Signal 2		
Signal 3		
Signal 4		
Signal 5	} RGB 3	} IBM EGA
Signal 6		
Signal 7		
Signal 8		
Signal 9	15kHz	60Hz
Signal 10	25kHz	60Hz
Signal 11	35kHz	60Hz
Signal 12	45kHz	60Hz
Signal 13	55kHz	60Hz
Signal 14	15kHz	38Hz
Signal 15	15kHz	70Hz
Signal 16	15kHz	100Hz
Signal 17	RGB 2	PRO 1280
Signal 18	64kHz	60Hz
	75kHz	60Hz
	RGB 1	IBM VGA 480 line mode

#### SIGNAL TABLE

		A	B	C	D	E
Signal 1	H $\mu$ s	63	4.2	7.2	45	6.6
	V $m$ s	16.4	0.075	1.525	12.6	2.2
Signal 2	H $\mu$ s	45.5	4.9	1.6	39	0
	V $m$ s	16.68	0.6	0.08	16	0
Signal 3	H $\mu$ s	31.8	3.8	1.6	26.1	0.3
	V $m$ s	14.3	0.06	1.72	11.53	0.99
Signal 4	H $\mu$ s	31.8	3.8	1.6	26.1	0.3
	V $m$ s	14.3	0.06	0.89	13.19	0.16
Signal 5	H $\mu$ s	31.78	2.76	1.60	26.29	1.13
	V $m$ s	16.67	0.64	0.77	15.14	0.12
Signal 6	H $\mu$ s	28.57	2.12	3.17	21.16	2.12
	V $m$ s	15.00	0.09	1.11	13.71	0.09
Signal 7	H $\mu$ s	66.7	9.1	5.7	51.7	0.2
	V $m$ s	16.7	0.07	3.33	10.95	2.35
Signal 8	H $\mu$ s	40.0	5.5	3.4	31.0	0.1
	V $m$ s	16.7	0.07	3.33	10.95	2.35
Signal 9	H $\mu$ s	28.6	3.9	2.4	22.2	0.1
	V $m$ s	16.7	0.07	3.33	10.95	2.35
Signal 10	H $\mu$ s	22.2	3.0	1.9	17.2	0.1
	V $m$ s	16.7	0.07	3.33	10.95	2.35
Signal 11	H $\mu$ s	18.2	2.5	1.6	14.1	0
	V $m$ s	16.7	0.07	3.33	10.95	2.35
Signal 12	H $\mu$ s	66.7	9.1	5.7	51.7	0.2
	V $m$ s	26.3	0.11	5.2	17.2	3.8
Signal 13	H $\mu$ s	66.7	9.1	5.7	51.7	0.2
	V $m$ s	14.3	0.06	2.9	9.4	1.9
Signal 14	H $\mu$ s	66.7	9.1	5.7	51.7	0.2
	V $m$ s	10.0	0.05	2.0	6.6	1.3
Signal 15	H $\mu$ s	15.55	0.97	2.25	11.96	0.37
	V $m$ s	16.57	0.05	0.5	15.93	0.09
Signal 16	H $\mu$ s	15.62	1.76	2.04	11.8	
	V $m$ s	16.67	0.23	0.34	16.0	
Signal 17	H $\mu$ s	13.34	0.83	1.93	10.25	0.33
	V $m$ s	16.57	0.05	0.5	15.93	0.09
Signal 18	H $\mu$ s	31.8	3.8	1.6	26.1	0.3
	V $m$ s	16.7	0.06	0.79	15.79	0.06

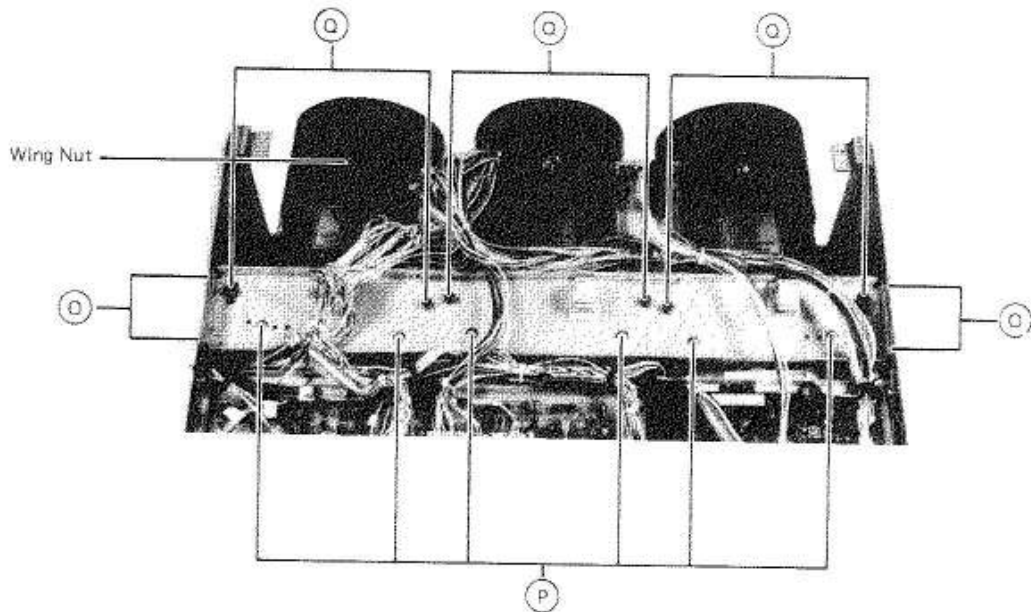
## 4.5. CRT REPLACEMENT PROCEDURE

### Cautions:

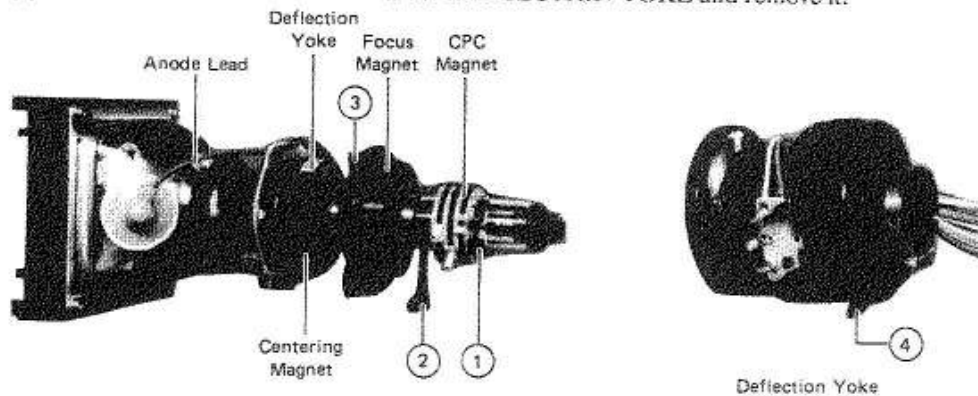
- (1) Use extreme care when replacing the CRT. Avoid scratching the CRT; scratches will degrade its reliability.
- (2) Do not attempt to remove the anode lead from the CRT. The CRT is supplied with the anode lead permanently attached.

### 4.5.1 CRT Removal

- (1) Remove the 4 side screws O and the 6 top screws P.
- (2) Remove the 2 shafts Q which fix the CRT to be replaced.
- (3) Remove the CRT PWB from the end of the CRT neck.

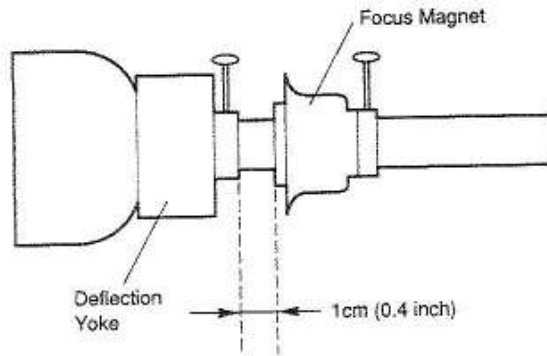


- (4) Loosen the Screw 1 which mounts the CPC magnet and remove it.
- (5) Loosen the screw 2 and ring 3 which mount the FOCUS magnet and remove it.
- (6) Loosen the screw 4 which mounts the DEFLECTION YOKE and remove it.



- (7) Unplug the anode lead from the High Voltage unit.
- (8) Remove the 4 screws H which mount the chassis.
- (10) Lift up and pull out the CRT toward you.

**NOTE:** In the case of BLUE CRT ASSY, the focus magnet must be positioned 1cm (0.4 inch) from the deflection yoke as shown below.



In the case of RED and GREEN CRT ASSY, the focus magnet must make contact with the deflection yoke. (no space)

## 4.6. LENS CLEANING PROCEDURE

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To minimize the possibility of damaging the optical coating or scratching exposed lens surfaces, we recommend you to try to remove any material from the lens by blowing it off with deionized air or lightly brushing it with a soft, camel's hair brush.

### 4.6.1 Multilayer Coating Lenses

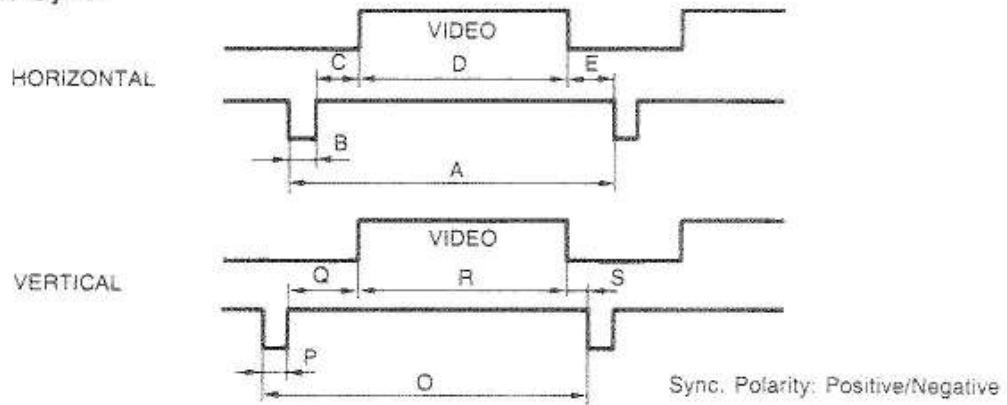
- (1) DO NOT spray any fluid directly on the lens surface.
- (2) DO NOT use any dry material to clean the surface (dry rag, tissue, etc.).
- (3) Use a commercial liquid window cleaner (such as Windex or Glass Plus). DO NOT use any aerosol. Other cleaning agents, such as laboratory grade acetone or ethyl ether - ethyl alcohol (70-30) may also be used.
- (4) Use a soft cotton cloth (cotton diapers laundered several times to remove sizing) or any soft facial tissue.
- (5) When using window cleaner, moisten the cloth or tissue and lightly wipe the surface. Then lightly dry with a new tissue.

	RECOMMENDED	NOT RECOMMENDED
Solvents	Mild Liquid window cleaner	Direct spraying of any fluid. Aerosol
Cloth	Cotton Soft tissue	Dry cloth or tissue

## 5. Timing Charts and Troubleshooting

### 5.1. TIMING CHARTS

Separate Sync.

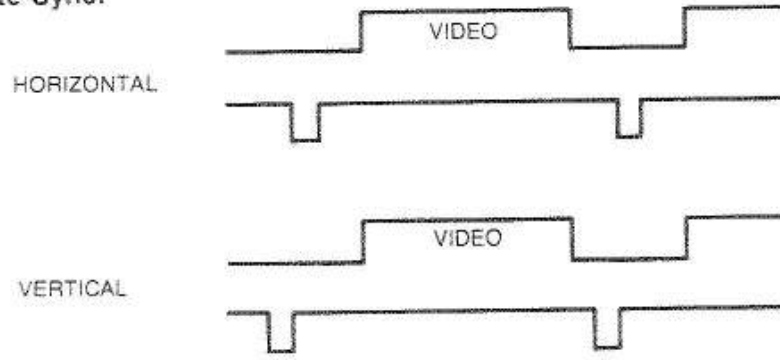


#### PRESET TIMING

		RGB 1 SIGNAL					RGB 2 SIGNAL PRO1280	RGB 3 SIGNAL IDC1000
		* IBM CGA	* IBM EGA	* VGA 350	* VGA 400	* VGA 480		
Horizontal	A $\mu$ s	63	45.5	31.8	31.8	31.8	15.55	31.78
	B $\mu$ s	4.2	4.9	3.8	3.8	3.8	0.97	2.76
	C $\mu$ s	7.2	1.6	1.6	1.6	1.6	2.25	1.6
	D $\mu$ s	45	39	26.1	26.1	26.1	11.96	26.29
	E $\mu$ s	6.6	0	0.3	0.3	0.3	0.37	1.13
Vertical	Oms	16.4	16.68	14.3	14.3	16.7	16.56	16.67
	Pms	0.076	0.6	0.06	0.06	0.06	0.05	0.64
	Qms	1.525	0.08	1.72	0.89	0.79	0.50	0.77
	Rms	12.6	16	11.53	13.19	15.79	15.92	15.14
	Sms	2.2	0	0.99	0.16	0.06	0.09	0.12

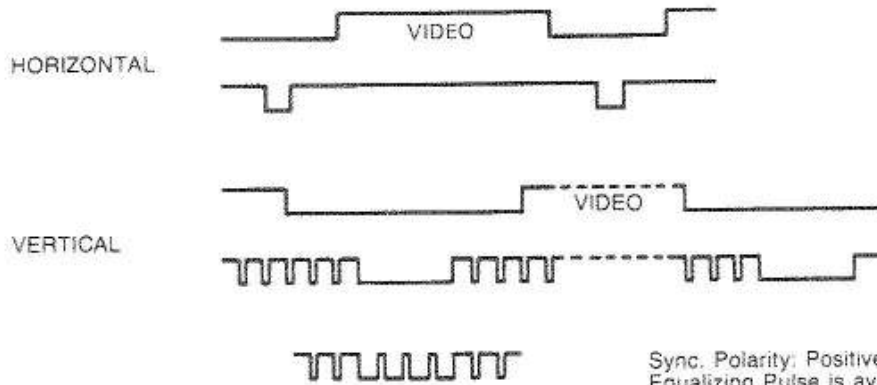
### 5.1.1 TIMING CHART EXAMPLES

#### Separate Sync.



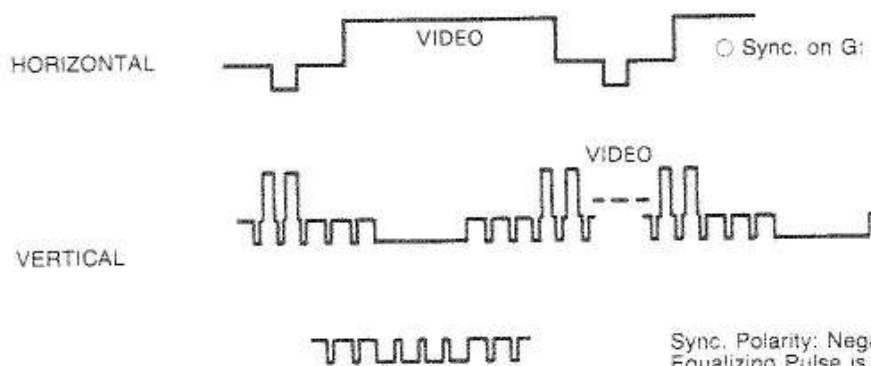
Sync. Polarity: Positive/Negative

#### Composite Sync.



Sync. Polarity: Positive/Negative  
Equalizing Pulse is available.

#### Composite Sync. & Video (Sync. on Green)



Sync. Polarity: Negative  
Equalizing Pulse is available.

## 5.2. TROUBLESHOOTING OUTLINE

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Before attempting any servicing procedures on the GP-5000, try to narrow down the customer's problem by answering the following questions:

- A. First time installations: Was everything interfaced at the same time? Or,**
- Did the problem arise after a specific video device was added to the system?
  - Has the proper SETUP procedure been followed?
  - Correct distance between the screen and projector?
  - Centering Rings Adjusted?
  - Floor front projection?
  - Was the electric VR4002 adjusted BEFORE digital convergence was attempted?
  - If the system interface is not connected, is the STANDBY indicator flashing?
  - If the STANDBY indicator is flashing, is the control cable from the system interface to the projector properly connected?
- B. New additions to an existing system:**
- What was just added, or being adjusted when the problem occurred?
  - Is it a "warm-up", i.e. a FUZZY picture that appears "normal" after twenty minutes? Or,
  - Just the opposite, after twenty to thirty minutes, does the image fade away, or maybe "tears apart"?
- C. Once you've decided to open the projector up to determine the cause of the problem, use the following Troubleshooting Flowchart and Notes to expedite servicing.**

### 5.2.1 Power Supply Trouble

Power related problems will result in no picture, no high voltage output, or no deflection, etc. Due to a breakdown at the PS unit or a power line short on one of the PWBs, the overcurrent protector circuit will operate or the output voltage will fall, causing abnormal operation. Therefore, when trouble occurs, first check all the power related sections to determine where the problem might be before going on to check other sections.

Are the following voltages being outputted at the connectors on the PS DIV PWB? (Setting for Video mode, no signal)

#### Base Connectors:

Connector	Pin	Approximate Voltage
IA	1	34V
IB	1,2	7.5V
IB	5	7.5V
IC	1	180V
IC	2	140V
IC	3	15V
IC	4	-15V
IC	5	6.3V
IG	1	120V
ID	1	50V
ID	2	-50V
ID	5	35V

**Note:** Remove connector AC or connectors LO and LP on the H.V. unit before checking the voltages at connectors IA, IB, IC, ID, and IG.

**A.** No voltage (approximately 34V) is output at pin 1 of connector IA.

Remove connector IA on the PS DIV PWB and supply a voltage of approximately 1.5VDC to pin 2 of connector IA.

Confirm the correct voltage (approximately 34V) at terminal 1 of connector IA.

**NO:** Defective PS Unit. See Note 2.

**YES:** Defective Horizontal Output Circuit on the DEF PWB. See Note 3.



**B. No voltage (approximately 7.5V) is output at pins 1 and 2 of IB on the PS DIV PWB.**

**Remove connectors IB and IL on the PS DIV PWB, and short pins 1 and 2 of IL.**

**Confirm the correct voltage (approximately 7.5V) at terminals 1 and 2 of IB on the PS DIV PWB.**

**YES:** Defective SYSTEM PWB (See Note 5.) or D-CONV PWB (See Note 4.).

**NO:** Confirm F6601 on PS UNIT PWB A

**YES:** Defective F6601. See Note 1.

**NO:** Defective PS UNIT. See Note 2.

**C. No voltage (approximately 7.5V) is output at pin 5 of connector IB.**

**Remove connectors IB and IL on the PS DIV PWB, and short pins 1 and 2 of IL.**

**Confirm the correct voltage (approximately 7.5V) at terminal 5 of connector IB.**

**YES:** Defective SYSTEM PWB. See Note 5.

**NO:** Confirm the correct voltage (approximately 7.5V) at pins 1 and 2 of IB.

**YES:** Defective PS UNIT. See Note 2.

**NO:** Confirm F6601 on PS UNIT PWB A.

**YES:** Defective F6601. See Note 1.

**NO:** Defective PS UNIT. See Note 2.

**D. No voltage (approximately 180V, 140V) is output at pins 1 and 2 of IC on the PS DIV PWB, respectively.**

**Remove only pin 1 of connector IC and reset the POWER SW using the remote control unit.**

**Confirm the correct voltage (approximately 180V) at terminal 1 of connector IC.**

**YES:** Defective R, G, B VIDEO OUT PWBs. See Note 6.

**NO:** Confirm the correct voltage (approximately 140V) at terminal 2 of connector IC.

**NO:** Confirm F6602 and F6603 on the PS UNIT PWB B.

**YES:** Defective F6602 or F6603. See Note 2.

**NO:** Defective PS UNIT. See Note 2.

**YES:** Confirm F6602 on PS UNIT PWB B.

**NO:** Defective R, G, B VIDEO OUT PWBs (See Note 6.) or CF DRIVE PWB (See Note 7.).

**YES:** See Note 2.

**YES:** No problem.

**NO:** Defective R, G, B VIDEO OUT PWBs. See Note 6.

E. No voltage (approximately 15V, -15V) is output at pins 3 and 4 on the PS DIV PWB.

Remove connector PF on the PS DIV PWB and confirm the correct voltages (approximately 15V, -15V) at terminals 3 and 4 of connector IC.

YES: Defective CF DRIVE PWB. See Note 7.

NO: Remove connector PE on the PS DIV PWB and confirm the correct voltages (approximately 15V, -15V) at terminals 3 and 4 of connector IC.

YES: Defective SYSTEM PWB (See Note 5.) or D-CONV PWB (See Note 4.).

NO: Remove connector PH on the PS DIV PWB and confirm the correct voltages at terminals 3 and 4 of IC.

YES: Defective VIDEO PWB. See Note 8.

NO: Remove connector PV on the PS DIV PWB and confirm the correct voltages at terminals 3 and 4 of connector IC.

YES: Remove connector PR on the GAIN CTL PWB and confirm the correct voltages at terminals 3 and 4 of connector IC.

NO: Defective GAIN CTL PWB. See Note 9.

YES: Defective R, G, B VIDEO OUT PWBs. See Note 6.

NO: Remove connector PD on the PS DIV PWB and confirm the correct voltages at terminals 3 and 4 of IC.

YES: Defective DEF PWB. See Note 3.

NO: Confirm the correct voltage (approximately 120V) at terminal 1 of connector IG.

YES: Defective PS UNIT. See Note 2.

NO: Defective V Deflection circuit on DEF PWB (See Note 3.) or PS UNIT (See Note 2.).

**F. No voltage (approximately 6.3V) is output at pin 5 of connector IC.**

Remove only pin 5 of connector IC on the PS-DIV PWB and confirm the correct voltage (approximately 6.3V) at terminal 5 of connector IC.

**YES:** Defective CRT (See Note 15.) or R, G, B CRT PWBs. See Note 10.

**NO:** Confirm the correct voltages (approximately 7.5V) at terminals 1, 2 and 5 of connector IB.

**YES:** Defective IC6605 or Q6608 on PS UNIT PWB B. See Note 2.

**NO:** Confirm F6601 on PS UNIT PWB A

**NO:** Defective PS UNIT. See Note 2.

**YES:** Replace F6601. See Note 1.

**YES:** Problem resolved.

**NO:** Defective SYSTEM PWB (See Note 5.) or D-CONV PWB (See Note 4.).

**G. No voltage (approximately 120V) is output at pin 1 of connector IG.**

Remove connector IG on the PS DIV PWB and confirm the correct voltage (approximately 120V) at terminal 1 of connector IG.

**NO:** Defective PS UNIT. See Note 2.

**YES:** Defective V Deflection Output circuit on the DEF PWB. See Note 3.

**H. No voltage (approximately 50V, -50V) is output at pins 1 and 2 of connector ID respectively.**

Remove connector ID on the PS DIV PWB and confirm the correct voltages (approximately 50V, -50V) at terminals 1 and 2 of ID.

**NO:** Defective PS UNIT. See Note 2.

**YES:** Defective CF DRIVE PWB. See Note 7.

**I. No voltage (approximately 35V) is output at pin 5 of connector ID.**

Remove connector PD on the PS DIV PWB and confirm the correct voltage (approximately 35V) at terminal 5 of connector ID.

**YES:** Defective Horizontal Deflection Output circuit or Horizontal Drive circuit on the DEF PWB. See Note 3.

**NO:** Remove connector PR on the GAIN CTL PWB and confirm the correct voltage at pin 5 of connector ID.

**NO:** Defective PS UNIT. See Note 2.

**YES:** Defective R, G, B VIDEO OUT PWBs. See Note 6.

### 5.2.2 No Power

Is the STAND-BY indicator always lit?

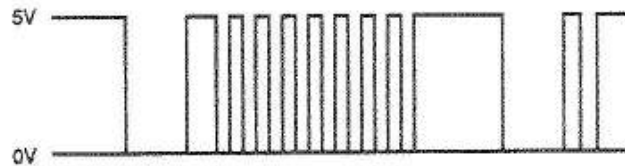
**NO:** Does the STAND-BY indicator blink ON and OFF?

**YES:** Confirm that the SYSTEM INTERFACE is connected and the DIP switches on the SYSTEM INTERFACE CONTROL PWB are set correctly.

**NO:** Defective SUB-CPU (IC8225) on the SYSTEM PWB and the peripheral circuits. See Note 5.

**YES:** Is the POWER indicator ON from the remote control unit?

**NO:** Is the waveform in the following figure outputted at pin 1 of RS (located on the INPUT PWB) when the remote control unit is operated?



**NO:** Defective remote control unit (See Note 11.) and LED PWB Note 12.), in case of infrared sensor remote unit.

**YES:** Is the voltage at pin 1 of PM on the SYSTEM PWB L level approximately 0V?

**NO:** Defective SUB-CPU (IC8225) of the SYSTEM PWB and circuits. See Note 5.

**YES:** Confirm the correct connectors on the PS DIV PWB the SYSTEM PWB (PM).

**YES:** The POWER is ON. Check other sections.

### 5.2.3 No High voltage Output

The function to cut off high voltage output is provided with this projector to protect the CRT when horizontal and vertical deflections are not output. Note that high voltage output is also cutoff when the high voltage is abnormally increased.

#### Section 1

Is the voltage at pin 1 of connector LP on the HV UNIT LEVEL L (under 2V)?

**YES:** Is the voltage at pin 1 of connector IC on the PS DIV PWB approximately 180V?

**YES:** Confirm that the voltage is LEVEL L at pin 1 of connector LO on the HV UNIT.

**YES:** To Section 2.

**NO:** Defective PS UNIT MUTE circuit. See Note 2.

**NO:** Refer to Section 5.2.1. (Power supply Trouble)

**NO:** Is Vertical Deflection Detection LED (D5020) or Horizontal Deflection Detection LED (D5023) on DEF PWB lit?

**YES:** (D5020 is lit.) Is the vertical sawtooth waveform at TP4006 over 4.0Vp-p?

**YES:** Defective Vertical Deflection circuit. See Note 3.

**NO:** Vertical amplitude too small or defective Vertical Deflection Output circuit. See Note 3.

**YES:** (D5023 is lit.) Is the horizontal sawtooth waveform at TP5005 over 1.5Vp-p?

**YES:** Defective Horizontal Deflection Detection circuit. See Note 3.

**NO:** Horizontal amplitude too small or defective Horizontal Deflection Output circuit. See Note 3.

## Section 2

### Is AC input voltage supplied at connector AC on HV UNIT PWB?

**NO:** Supply AC input voltage.

**YES:** Confirm the Fuse (F1) on HV UNIT PWB.

**NO:** Defective Fuse (F1). See Note 13.

**YES:** Is the voltage approximately 320V between A and B (See Note 13.) on HV UNIT PWB?

**NO:** Defective R2, RC1, L1, or L2. See Note 14.

**YES:** Is the voltage at pin 12 of IC2 12V?

**NO:** Defective Q7, T1, IC1 or their peripheral circuits.  
(See Note 14.)

**YES:** Is the voltage at the anode of D29 under 2V?

**NO:** Defective IC2 or Drive circuit. See Note 14.

**YES:** Set POWER SW with remote control unit as follows:  
ON and confirm the ABL output voltage at pin 2  
of connector LP.

**NO:** After a 10 second interval, set the POWER SW to  
confirm the ABL output voltage.

**NO:** Defective HV UNIT PWB. See Note 14.

**YES:** Defective High Voltage circuit or  
UNIT PWB. See Note 14.

**YES:** Is the ABL output voltage at pin 2 of connector  
under 3V?

**NO:** Defective ABL circuit or High Voltage  
PWB. See Note 14.

**YES:** Defective High Voltage circuit, Feedback  
circuit (IC3 etc.) or Over Current circuit (IC5, etc.)  
on HV UNIT PWB. (See Note 14.)

## 5.2.4 High Voltage Output but No Picture

Is there a picture at R, G, or B CRT?

**NO:** Is the voltage at pin 5 of connector BK on the GAIN CTL PWB over 10V?

**NO:** Defective ABL circuit on HV UNIT (See Note 14.) or ABL circuit on DEF PWB, IC5201 (See Note 3.).

**YES:** Does the voltage at connector BC on the GAIN CTL PWB change from -3V to +3V when the CONTRAST control is turned from MAX to MIN?

**NO:** Is the "ON SCREEN" correctly displayed?

**NO:** Defective SYSTEM PWB. See Note 5.

**YES:** Defective LEVEL CONTROL circuit on the SYSTEM PWB. See Note 5.

**YES:** Set CONTRAST to MAX. Is the voltage at pin 4 of IC7109, IC7110, and IC7111 on the GAIN CTL PWB approximately 6V?

**NO:** Defective Limiter circuit on the GAIN CTL PWB. (Q7133/7134/7135 etc.)

**YES:** Is there a horizontal clamp pulse (approx. 5Vp-p) at pin 4 of IC7306 on the GAIN CTL PWB?

**NO:** Defective SYNC circuit. See Note 9.

**YES:** Is the voltage at pins 9, 10, and 11 of connector BC on the GAIN CTL PWB approximately 5V?

**NO:** Defective LCA (IC8207), I/O (IC8217) peripheral circuit on the SYSTEM PWB. See Note 5.

**YES:** Is there a 12Vp-p blanking pulse synchronized with deflection signal at TP7104?

**YES:** Is there a 5Vp-p blanking pulse at TP7006?

**NO:** Is pin 6 of connector TE on the GAIN CTL PWB LEVEL H approximately 5V?  
See Note 9.

**NO:** Defective LCA (IC8207), peripheral circuit, or SYSTEM PWB. See Note 5.

**YES:** Defective Blanking circuit on the GAIN CTL PWB (See Note 9.) or DEF PWB (See Note 3.).

**YES:** Is there a video signal input (approximately 0.7Vp-p) at pins 1 of IC7109, IC7110, and IC7111 on the GAIN CTL PWB?

**NO:** (Used SI-5320 or RGB Mode) Is there a 0.7Vp-p video signal inputted at TP7002, TP7003, and TP7004 on the GAIN CTL PWB?

**YES:** Defective Video Selector circuit (relay etc.) on the GAIN CTL PWB. See Note 9.

**NO:** Confirm input signal.

In case the Projector is used alone, set in Video Mode.

Is there a 0.7Vp-p video signal input at pins 1, 3, and 5 of connector VO on the GAIN CTL PWB?

NO: Is there a 1.0Vp-p video signal input at pin 1 of VI (Video Mode) or pin 3 of VI (S-VIDEO Mode) on the VIDEO PWB?

YES: Defective VIDEO PWB. See Note 8.

NO: Confirm input signal.

YES: Is there a video signal (approximately 0.4Vp-p) at TP7100 and a video signal (approximately 0.7Vp-p) at TP7101 and TP7102 on the GAIN CTL PWB?

NO: Defective PRE DRIVE circuit on the GAIN CTL PWB.  
(See Note 9.)

YES: Is there a 70Vp-p video signal at TP3701 on the R CRT PWB, 120Vp-p video signal at TP2701 on the G CRT PWB, and a 120Vp-p video signal at TP1701 on the B CRT PWB?

YES: Defective CRT PWB without picture.

NO: Is there a 20Vp-p blanking level pulse (set up level) at TP1701, TP2701, and TP3701 on the CRT PWB?

NO: Turn VR301 on the VIDEO OUT PWB.  
(See Note 6.)

NO: Defective Blanking circuit, Q306, Q307, Q308 or Q309 on the VIDEO OUT PWB.  
(See Note 6.)

YES: Is there a 70Vp-p video signal at TP3701 on the R CRT PWB, and a 120Vp-p video signal at TP1701 on the B CRT PWB?

YES: Defective CRT (See Note 15.),  
screen VR (See Note 17.),  
G1 circuit of CRT (See Note 15.), or  
Heater circuit of CRT (See Note 15).

NO: Defective PRE-DRIVE circuit  
on the GAIN CTL PWB, RV, GV,  
or BV connector. (See Note 9.)



### 5.2.5 No Test Signal

Is the signal waveform at pin 2 of connector TE approximately 5Vp-p?

**NO:** Defective LCA (IC8207, IC8269) on the SYSTEM PWB and PLL circuit.  
See Note 5.

**YES:** Is the signal waveform at the emitter of Q7009 approximately 0.7Vp-p?

**NO:** Defective Test Signal circuit (IC7001, Q7008, Q7009, etc.)  
See Note 9.

**YES:** Is the voltage at pins 9, 10, and 11 of connector BC on the  
GAIN CTL PWB Level H approximately 5V?

**YES:** Refer to Section 5.2.4 "High Voltage Output but No Picture.

**NO:** Confirm that the RGB Mute signal from the remote  
control unit. Is the voltage at pins 9, 10, and 11 of  
connector BC approximately 5V? And, confirm the  
Test signal is output.

**NO:** Defective LCA (IC8207), I/O (IC8217) peripheral  
circuit on the SYSTEM PWB. See Note 5.

### 5.2.6 No Convergence Operation

Confirm the convergence adjustment according to the owner's manual.

Is there a waveform at TP8001/8002/8003/8004/8005/8006 on the CF DRIVE PWB approximately 6Vp-p?

**YES:** Is the Convergence Yoke connected correctly?

**NO:** Connect the Convergence Yolk correctly.

**YES:** Is the Convergence Yolk defective?

**NO:** Defective CF DRIVE PWB. See Note 7.

**YES:** Defective Convergence Yoke (Deflection Yoke). See Note 16.

**NO:** Is the DIP switch (S8501) on the D-CONV PWB in its normal setting.

**NO:** Set the DIP switch on the D-CONV PWB correctly.  
See Note 4.

**YES:** Is there a waveform at pins 1, 2, 3, 5, 12, and 13 of IC8591  
and IC8592 on the D-CONV PWB approximately 6Vp-p?

**YES:** Defective D-CONV PWB and Convergence Output circuit.  
See Note 4.

**NO:** Is there approximately 5Vp-p at the following pins:

1-4, 9-16, 23, and 24 of IC8547, IC8538, IC8557, IC8567,  
IC8577 and IC8587 on the D-CONV PWB?

**NO:** Defective D-CONV PWB. See Note 4.

**YES:** Defective D-CONV PWB and Output D/A Converter.  
See Note 4.

### 5.2.7 No Horizontal Deflection (D5023 is lit)

Check Q5007 on the DEF PWB

**NO:** Defective Q5007. See Note 3.

**YES:** Confirm the waveform (approximately 2Vp-p) at pin 8 of TP5901 on the DEF PWB. See Note 3.

**YES:** Confirm the voltage (approximately 35V) at TP5009 and the voltage (approximately 1.5V) at TP5008 on the DEF PWB.

**YES:** Defective Deflection Yoke. See Note 16.

**NO:** Defective PS UNIT (See Note 2.), IC5010 on the DEF PWB or its peripheral circuits (See Note 3.).

**NO:** Confirm the waveform (approximately 10Vp-p) at TP5004 on the DEF PWB. See Note 3.

**NO:** Defective IC4001 or its peripheral circuit on the DEF PWB. See Note 3.

**YES:** Confirm the voltage at TP 5015 on the DEF PWB.

**NO:** Defective IC5202, Q5209 or their peripheral circuit on the DEF PWB. See Note 3.

**YES:** Defective H PRE DRIVE circuit or H DRIVE circuit on the DEF PWB. See Note 3.

## 5.3. Troubleshooting Notes

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### NOTE 1

Replace Fuse 6601

P/N: 79T03960 5A 125V SSFR5AN1F005

Verify proper operation. If unit shuts down a second time, replace PS UNIT. Refer to Note 2.

### NOTE 2

Replace the PS UNIT (PWGs 739 and 740)

P/N: 79640091

Verify proper voltage levels. If voltages are correct, reassemble Projector. If not, continue troubleshooting to find cause of problem.

### NOTE 3

Replace the DEF PWB (PWG 601)

P/N: 93S42E01

Perform the DEF PWB Control Setting. Verify proper white color tracking. If not correct, perform the White Balance Procedure.

### NOTE 4

Replace the D CONV PWB (PWG 605)

P/N: 93S42B01

Verify proper digital controls. Perform Electric CRT Focus and Digital Convergence Procedures.

### NOTE 5

Replace the SYSTEM PWB (PWG 604)

P/N: 93S42M01

Verify proper VR8301 setting of -8.95 +/- 0.01 VDC. Verify proper digital control operation. Perform Electric CRT Focus and Digital Convergence Procedures.

### NOTE 6

Replace the VIDEO OUT PWB (PWG 610, 693, 694)

P/N: 93S42D01 Red VIDEO OUT PWB ASSY

P/N: 93S42S01 Green VIDEO OUT PWB ASSY

P/N: 93S42T01 Blue VIDEO OUT PWB ASSY

Replace defective component. Perform the White Balance Procedure.

**NOTE 7**

Replace the CF DRIVE PWB (PWG 602)

P/N: 93S42U01

Verify proper CRT focus and digital convergence operation.

Perform Electric CRT Focus and Digital Convergence Procedures.

**NOTE 8**

Replace the VIDEO PWB (PWG 596)

P/N: 93R65V01

Perform the VIDEO PWB Adjustments.

**NOTE 9**

Replace the GAIN CTL PWB (PWG 609)

P/N: 93S42G01

Verify proper white color tracking. If not correct, perform the White Balance Procedure.

**NOTE 10**

Replace the CRT PWB (PWG 615R, G, B)

P/N: 93S42C01

Verify proper white color tracking. If not correct, perform the White Balance Procedure.

**NOTE 11**

Replace the Remote Control Unit

P/N: 79609501 IR-3040 Set Up Remote

P/N: 79609511 UR-3020 User Remote

Verify proper remote control operation.

**NOTE 12**

Replace the LED PWB (PWG 682D)

P/N: 93D42R01D

Verify the proper wireless remote control operation.

**NOTE 13**

Replace HV UNIT FUSE F1

P/N: 79T04002 8A 125V

Verify proper HV operation. Verify 320 VDC from R19 (plus side, lead nearest side wall) and R18 (negative side, lead nearest T2) on the HV UNIT. If fuse opens a second time, see Note 14.

**NOTE 14**

Replace the HV UNIT (PWG 741)

P/N: 79640081

Verify proper HV operation. Verify 320 VDC from R19 (plus side, lead nearest side wall) and R18 (negative side, lead nearest T2) on the HV UNIT. If voltage level is correct, reassemble unit. If problem still exists, continue troubleshooting.

**NOTE 15**

Replace the CRT (R, G, B)

P/N: 5535753R CRT-C9M202P22R SASSY (RED)

P/N: 5535754G CRT-C9M202P22G SASSY (GREEN)

P/N: 5535755B CRT-C9M202P22B SASSY (BLUE)

Perform the New CRT Assembly Procedure. Perform the White Balance Procedure.

**NOTE 16**

Replace the Deflection Yoke (DY)

P/N: 48009079 DY-RED

P/N: 48009077 DY-GREEN

P/N: 48009078 DY-BLUE

Perform the New CRT Assembly Procedure.

**NOTE 17**

Replace the screen VR Control Unit

P/N: 39603311

Perform the White Balance Procedure.

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## 6. REPLACEMENT PARTS LISTING

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P/N	SYMBOL	DESCRIPTION
93S42B01	PWG 605	DIGITAL CONVERGENCE PWB
93S42C01R,G,B	PWG 615R,G,B	R,G,B CRT PWB
93S42D01	PWG 610	RED VIDEO OUT PWB ASSY
93S42S01	PWG 693	GREEN VIDEO OUT PWB ASSY
93S42T01	PWG 694	BLUE VIDEO OUT PWB ASSY
93S42E01	PWG 601	DEFFLECTION PWB
93S42G01	PWG 609	GAIN CONTROL PWB
79640081	PWG 741	HV UNIT
79640091	PWG 739 & 740	PS UNIT
93S42M01	PWG 604	SYSTEM PWB
93S42N01	PWG 603	INPUT PWB
93S42R01A	PWG 682A	CONTROL PWB
93S42R01B	PWG 682B	PS DIV PWB
93S42R01C	PWG 682C	LINEAR COIL PWB
93S42R01D	PWG 682D	LED PWB
93S42R01E	PWG 682E	DIP SW PWB
93S42U01	PWG 602	CONVERGENCE FOCUS DRIVE PWB
93R65V01	PWG 596	VIDEO PWB
5535753R	RED CRT	CRT-C9M202P22R SASSY
5535754G	GREEN CRT	CRT-C9M202P22G SASSY
5535755B	BLUE CRT	CRT-C9M022P22B SASSY
48009079	DY-R	DEFLECTION YOKE (R)
48009077	DY-G	DEFLECTION YOKE (G)
48009078	DY-B	DEFLECTION YOKE (B)
49003001		CPC MAGNET
49101021		FOCUS MAGNET
74922025		LENS HD-10CM
31700908	CF-FAN	FAN DC 109P0812M603
31700891	F-B,G,R	FAN (12V DC)

**Parts List (cont.)**

<b>P/N</b>	<b>SYMBOL</b>	<b>DESCRIPTION</b>
31700931	FAN-E	FAN(12V DC)
37005029	VOLTAGE REGULATOR	ICuPC7905H
37005012	VOLTAGE REGULATOR	ICuPC7805H
70810728		POWER CORD
73499216		REMOTE CONTROL CABLE 4 METER
73499217		REMOTE CONTROL CABLE 16 METER
79609501	IR-3040	SET UP REMOTE
79609511	UR-3020	USER REMOTE
73499177		5 BNC COAXIAL VIDEO CABLE
73499218		CONTROL CABLE (D-SUB, 15-25P, 16m)
79T03960	5A 125V	SSFRAN1F005 PS UNIT Fuse F1
79T04002	8A 125V	HV UNIT Fuse F1
396603311		VR Screen G1BIAS Control