NEC Technologies, Inc.

Professional Systems Division

GP-3000 Maintenance Manual

Table of Contents

Condensed Guide to Set-Up

(1) Set the projector at the proper distance for the screen size being used.

(2) If the screen size is different from the previous set-up, install the appropriate CRT spacers to match the screen size and projection angle (see section 3.1.4.).

(3) Position the angle of the R & B CRTs to match the screen size (see 3.1.5.).

(4) If the SI-5320 interface is **not** being used, set DIP switch 1, pin 7 on the projector to the short position. Press the reset button (see 2.3.).

(5) Set DIP switch 2, pin 3 and 4 on the projector for proper ceiling/floor and front/rear projection. Press the reset button (see 3.1.2.).

(6) Set polarity jumpers for proper horizontal and vertical scan direction.

(7) After turning the projector on and selecting an input, perform signal entry for the input if not already entered (see section 4.1.).

(8) Adjust lens focus. Start with the center focus adjustment (for best center focus) then adjust edge focus (see section 3.2.).

(9) Clear all convergence settings for static, dynamic and point for R, G and B (see 3.3.6.).

(10) Adjust the centering magnets on the R & B CRTs to overlay their respective test grids on the green grid. The overlay should be at the center of the screen. The G centering magnets do not normallly need to be changed (see 3.2.2.).

(11) Get out of the test mode and project the input source picture onto the screen. Adjust the V-height, V-hold, H-width and H- position.

(12) Adjust the electrical focus on the remote control. First adjust the center focus, then the edge focus. Store the settings, then select H/V balance and adjust (see section 3.2.4).

(13) With the green grid projected, adjust vertical linearity (VR4002) on the DEF PWB to achieve equal sized spacing of the grid lines in the vertical direction. This is only necessary if the projector is changed from ceiling to floor or vice versa.

(14) Adjust the convergence settings for green first (do not adjust G static). Get the convergence as close as possible using static and dynamic before turning to point adjustment. Store settings when finished (see section 3.3.).

(15) Adjust the R & B to match the green. Rely on static and dynamic. Store when done.

(16) To speed up convergence use the convergence copy function if possible (see section 3.3.7.).

Introduction

The majority of the "No Power" complaints for this projection display usually are caused by IMPROPER SET-UP rather than an actual power failure. With this thought in mind, examine the set-up procedure in detail until it is fully understood. Refer to the steps outlined on the following page for a quick overview of the set-up procedure.

Required Tools and Supplies

- Digital Multimeter
- NTSC Signal Generator or Quantum Data 801C Signal Generator
- Dual Trace Oscilloscope, 35 MHz Bandwidth
- Spare Parts Kit
- Phillips Screwdriver
- Metal Tipped Plastic Alignment Tool
- Diagonal Cutters
- Long Nose Pliers
- Small and Medium Sized Plastic Wire Ties

The GP-3000 projection display will self generate a test pattern, either dots or crosshatch, while a horizontal sync pulse is input. For initial problem determination, the NTSC signal is sufficient to provide a horizontal sync pulse. Simple interface can be obtained by attaching the generator's BNC output directly to the front panel of the GP-3000. The 801C Signal Generator can provide the 0.7Vp-p analog signal with separate horizontal and vertical sync pulses as well as composite video from its rear panel.

1. SPECIFICATIONS and LOCATION OF PARTS

1.1. Video Projector

Projection type:
- Refraction type
- Projector and screen are separate

Projection System:
- 3 lens and 3 CRTs in-line

Lens:
- Hybrid lenses multilayer coating
- f: 1.0

CRT:
- Improved 7 inch liquid cooling

High voltage:
- 34kV

Light output:
- 600 lumens (Small area peak high light brightness)

Contrast ratio:
- 20 (HDTV method)
- 50 (JIS method)

Resolution:
- CENTER: RGB 1000, VIDEO 600

Pixel:
- 1024 x 768 dots

Picture size:
- 60-300" diagonal

Convergence:
- Digital convergence (presetable 12 positions minimum)

Convergence limits:
- Less than 0.2% of V-height

Warm up time:
- 20 minutes

Set-up signal:
- Cross hatch, dot (coarse & fine)

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

Scanning frequency:

- Horizontal 15-55kHz, Vertical 38-100Hz

Retrace time:

- Horizontal 4.5 Us min, Vertical 450 Us min.

Sweep reversal:

- Available (Serviceman adjustment)

Power supply:

- AC 120V, 60 Hz (100-132V)

Power Consumption:

- 300W

Safety and regulatory:

- UL : Meet UL478
- FCC : Meet FCC Class A
- DHHS: Meet

Cabinet dimensions:

- 610(W) x 754(D) x 310(H)mm, 24(W) x 29-11/16(D) x 12-1/4 (H)inches

Weight:

- 60kg, 132 lbs

Remote control:

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

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 RGB-Gain (with SI-5320)
- V-height, H-width, H-position, V-hold
- Convergence control: Static, Dynamic, Point
- Focus control: Center, Edge, H/V Balance

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:

- Set-up remote control
- Remote cable 4m, 13ft
- Remote cable 16m, 52ft
- AC line cable
- Ceiling mounting kit
- Operators manual
- Picture Size Spacers

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

Input

- VIDEO 1:
  NTSC, PAL, SECAM, NTSC 4.43 (BNC) 1.0 Vp-p 75 ohms Positive with LOOP THRU
- VIDEO 2:
  Switchable: NTSC, PAL, SECAM, NTSC 4.43 (BNC) 1.0 Vp-p 75 ohms Positive
  S-VIDEO -- Y 1.0 Vp-p 75 ohms Positive -- C 0.28 Vp-p 75 ohms (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 75 Ohms Positive
  H/V sync 0.7-4.0 Vp-p 75 ohms Negative or Positive
  G. sync 0.3-0.6 Vp-p 75 ohms Negative
- AUDIO:
  0.4 Vrms 47 K ohms (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 K ohms (Phono) STEREO

Control:

- Intensity (TTL signal only)

Remote control:

- Power ON/OFF
- Input Signal select
- RGB - Gain
- Color, Tint, Sharpness

Serviceman control:

- Brightness, Contrast, Color, Tint, Sharpness (preset VIDEO only)

Text color:

- White, Red, Green, Blue, Yellow, Cyan, Magenta (RGB 1, TTL signal only)

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:

- UL : UL 478
- FCC : FCC Class A

Cabinet dimension:

- 430(W) x 350(D) x 91(H)mm, 16-15/16 x 13-13/16 x 3-5/8 inches

Weight:

- 6kg, 13.2 lb

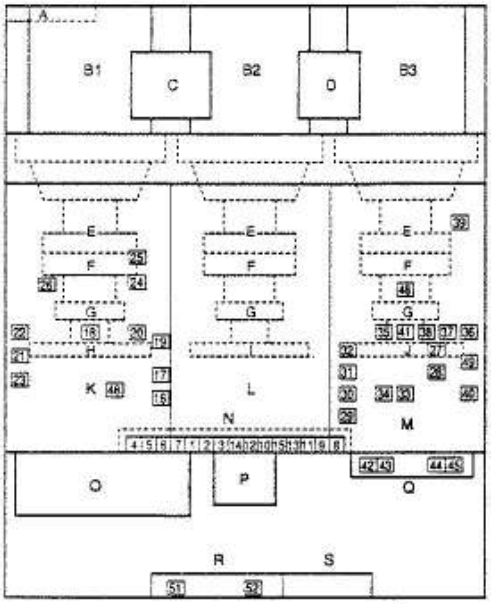
Supplied Accessories:

- 5 BNC coaxial cable 16m, 52 ft
- Control cable 16m, 52 ft
- AC line cable
- 9 pin-9 pin PC interface cable 1.8m, 6 ft
- 9 pin-15 pin PS/2 interface cable 1.8m, 6 ft
- Rack mount kit
- Operator's manual

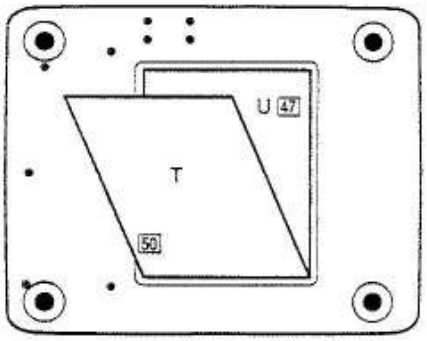
Specifications are subject to change without notice.

1.3. Location of Parts

TOP VIEW



BOTTOM VIEW



A	INPUT PWB	1	VR7101	B. BLANKING	N	27	VR4001	V. BLANKING	M
B1	BLUE CRT	2	VR7102	G. BLANKING		28	VR4002	V. LIN	
B2	GREEN CRT	3	VR7103	R. BLANKING		29	VR4003	V. OSC1 100Hz	
B3	RED CRT	4	VR7104	PEAK CLIP		30	VR4004	V. OSC2 38Hz	
C	PS DIV PWB	5	VR7105	B. DRIVE		31	VR4005	V. HEIGHT1 100Hz	
D	LINEAR COIL PWB	6	VR7106	G. DRIVE		32	VR4006	V. HEIGHT2 38Hz	
E	DEFLECTION YOKES	7	VR7107	R. DRIVE		33	VR4007	V. OSC3 60Hz	
	CENTERING MAGNETS	8	VR7108	SUB CONTRAST		34	VR4008	V. HEIGHT3 60Hz	
F	FOCUS MAGNETS	9	VR7109	BRIGHTNESS		35	VR4009	V. HEIGHT 60Hz	
G	C. P. C MAGNETS	10	VR7110	R. GAIN		36	VR5001	F/V	
H	B CRT PWB	11	VR7111	R. BIAS		37	VR5002	H. OSC1 15kHz	
I	G CRT PWB	12	VR7112	G. GAIN		38	VR5003	H. OSC2 55kHz	
J	R CRT PWB	13	VR7113	G. BIAS		39	VR5004	H. OUT PROTECTOR	
K	VIDEO PWB	14	VR7114	B. GAIN		40	VR5005	H. WIDTH	
L	CF DRIVE PWB	15	VR7115	B. BIAS		41	VR5006	VIDEO H. OSC	
M	DEF PWB	16	T7401	COMB FILTER	K	42	VR5501	HV ADJ	Q
N	GAIN CTL PWB	17	VR7401	COMB FILTER		43	VR5502	HV PROTECT (1)	
O	F. B. T PWBs	18	VR7402	SUB BRIGHTNESS		44	VR5503	HV PROTECT (2)	
P	SCREEN CONTROL UNIT	19	VR7403	SUB PICTURE		45	VR5504	FREQ ADJ	
Q	HV PWB	20	VR7404	WHITE PEAK		46	VR801	VIDEO AFC	K
R	DIP SW PWB	21	VR7405	H. BLANKING 1		47	VR8301	REFERENCE VOLTAGE	U
S	LED PWB	22	VR7406	V. BLANKING		48	S 4001	V. SYNC ADJUST	M
T	D-CONV PWB	23	VR7407	H. BLANKING 2		49	S 5001	H. OSC ADJUST	
U	SYSTEM PWB	24	VR7408	SUB COLOR		50	S 8501	DIP SWITCH	T
		25	VR7409	SUB TINT		51	S 9101	DIP SWITCH	R
		26	VR7410	SUB SHARPNESS		52	S 9102	DIP SWITCH	

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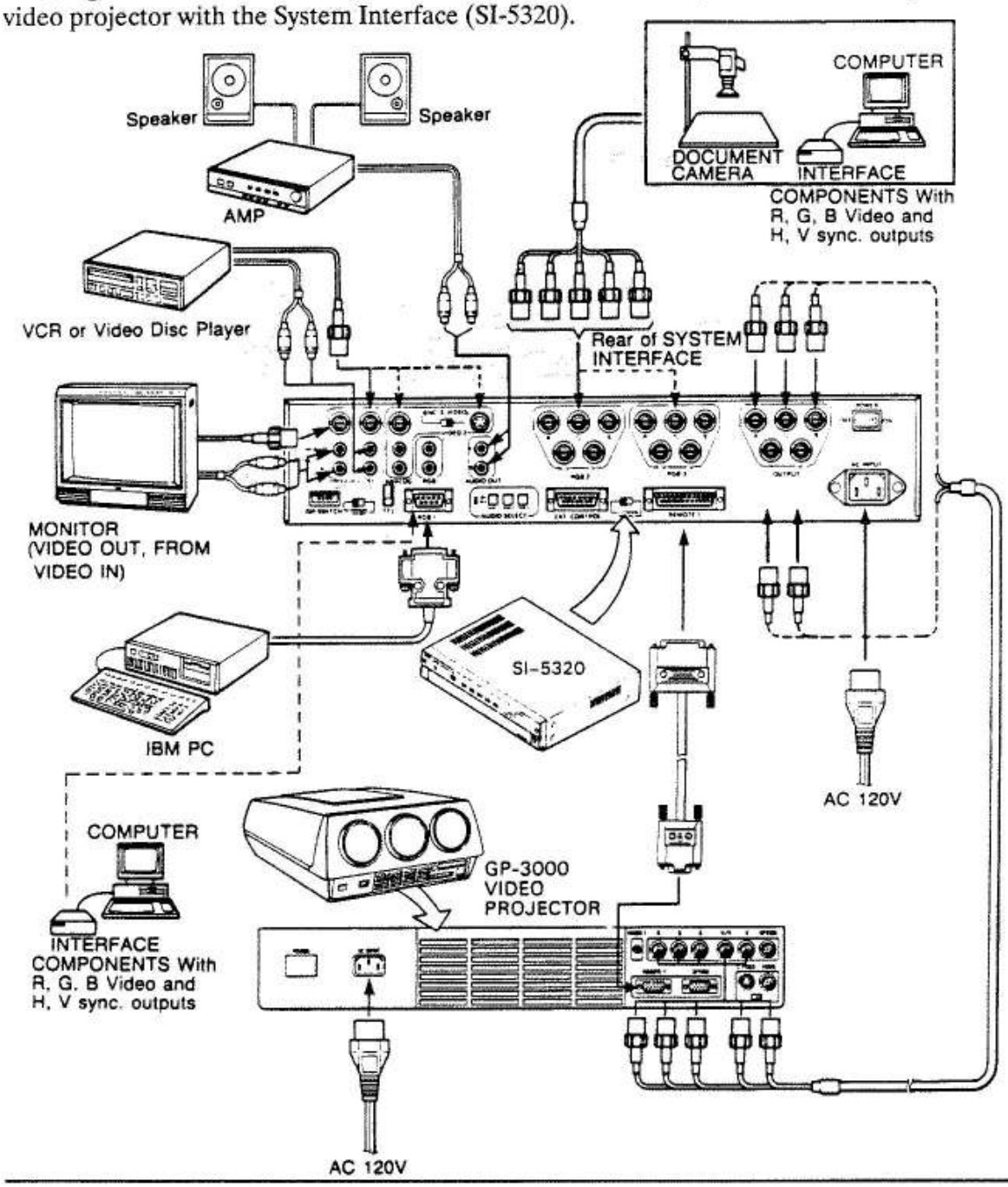
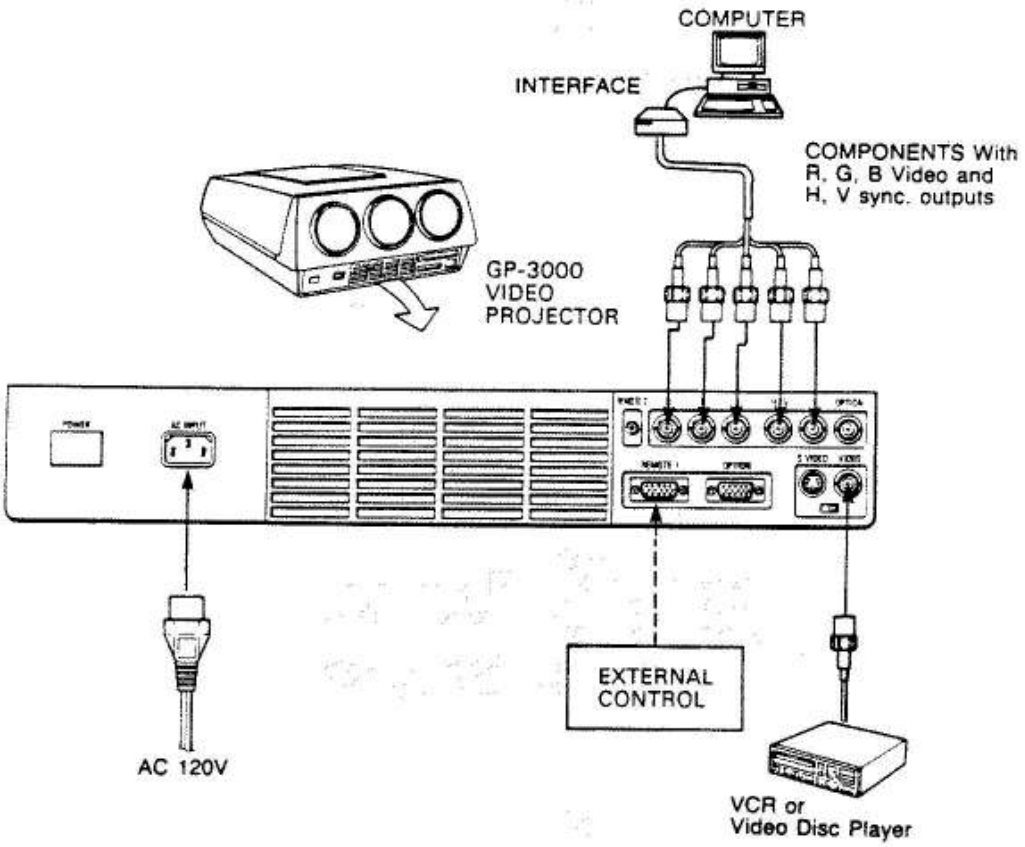
2. CONNECTIONS and CONTROLS

2.1. Connection Examples

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 (SI-5320) is not used.

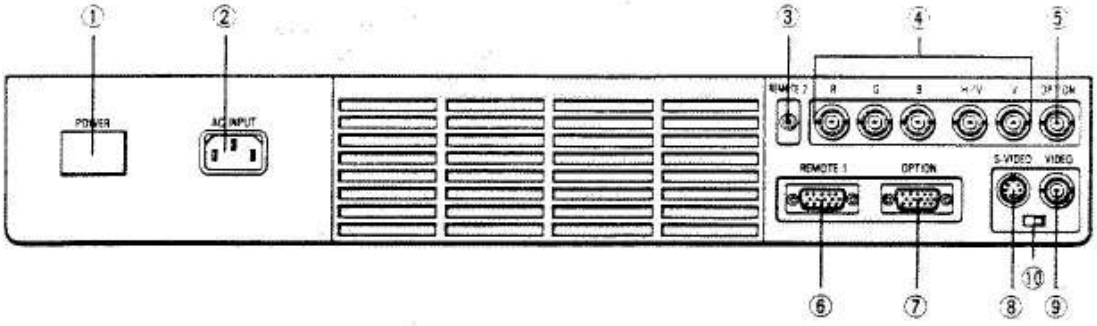


For direct connection of PC and VCR to projector

2.2. Location and Function Of Controls

2.2.1. GP-3000 Video Projector

Front Panel



1. POWER Button: Main power switch supplies 120V AC 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 output 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.

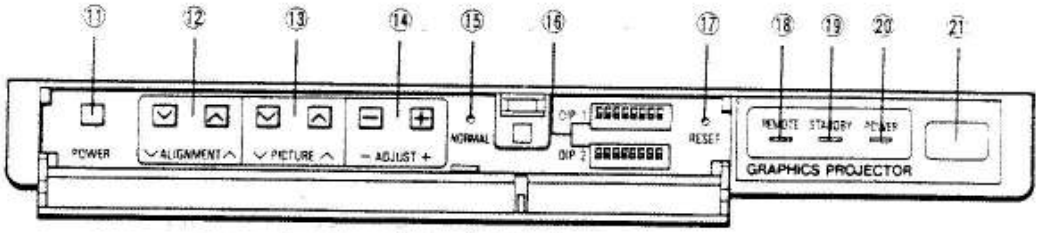
7. OPTION Input Terminal: This is a terminal for future system expansion.

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. (See "2.3. DIP Switch Functions")

17. RESET Button: Press to reset the projector after changing the DIP Switch settings.

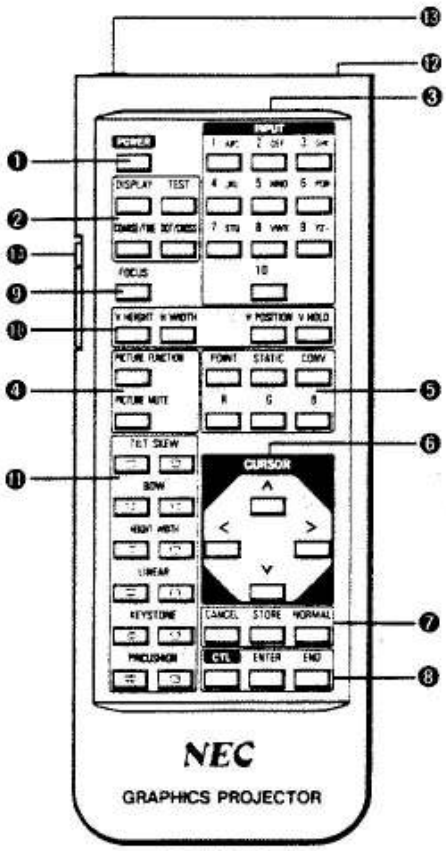
18. REMOTE Indicator: Flashes when the projector receives a signal from the remote control or when one of the buttons on the rear panel has been pressed.

19. STAND-BY Indicator: Lights up when the projector's main POWER Button (1) is pressed on.

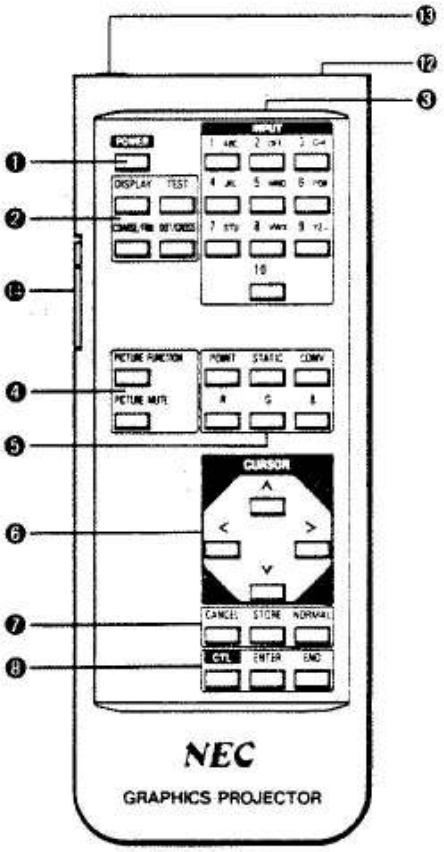
20. POWER Indicator: Lights up when the projector is in the stand-by mode and either the projector POWER button (11) is pressed or the remote control power key is pressed.

21. Infrared Light Receiver Section: Receives the signal from the supplied remote control when used in the wireless condition.

2.2.2. 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 crosshatch 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 switches from dot to crosshatch and vice versa.

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	

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:

BRIGHT - CONTRAST - COLOR - TINT - SHARPNESS - BRIGHT

PICTURE MUTE Key: When pressed, the image will disappear. When pressed once more, the image will again be displayed.

5. CONVERGENCE 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.

ENTER Key: This key is used for mode selection and for input of the on-screen 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 initiates the electrical focus adjustment control.

10. V HEIGHT Key: This key initiates the vertical height adjustment control.

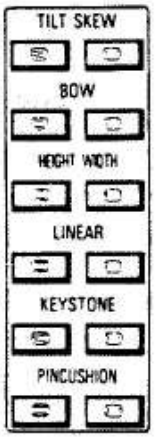
H WIDTH Key: This key initiates the horizontal width adjustment control.

H POSITION key: This key initiates the horizontal position height adjustment control.

V HOLD key: This key initiates 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, KEYSTONE BALANCE, PINCUSHION BALANCE.



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 EL panel 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 returns 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 + RGB -- To select the CRT to be adjusted.

CTL + CURSOR KEYS -- To adjust the point 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.

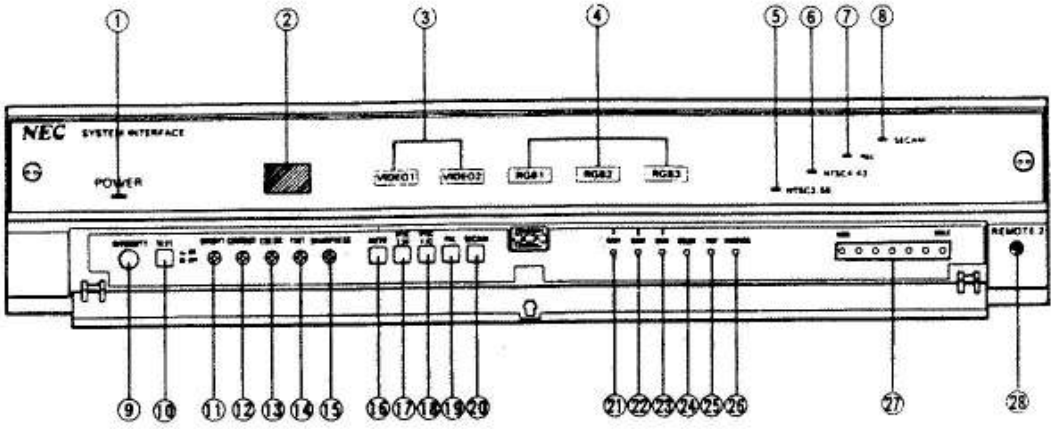
CTL + T/B PINCUSHION -- To adjust the convergence for top and bottom PINCUSHION balance.

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).

2.2.3. SI-5320 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.

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

5. NTSC 3.58 Indicator: Lights up when an NTSC 3.58 signal is received.

6. NTSC 4.43 Indicator: Lights up when an NTSC 4.43 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 text 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 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. (See section 2.3).

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

11. BRIGHT Control

12. CONTRAST Control

13. COLOR Control

14. TINT Control

15. SHARPNESS Control

16. AUTO Button: Press this button for automatic selection of NTSC 3.58, NTSC 4.43, PAL or SECAM signals connected to the VIDEO 1 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 buttons below (17-20).

17. NTSC 3.58 Button: Press when the NTSC 3.58 signal is weak and the AUTO select button does not operate correctly.

18. NTSC 4.43 Button: Press when the NTSC 4.43 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 the 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 the Sharpness adjustment is selected with the remote control or on back of the projector.

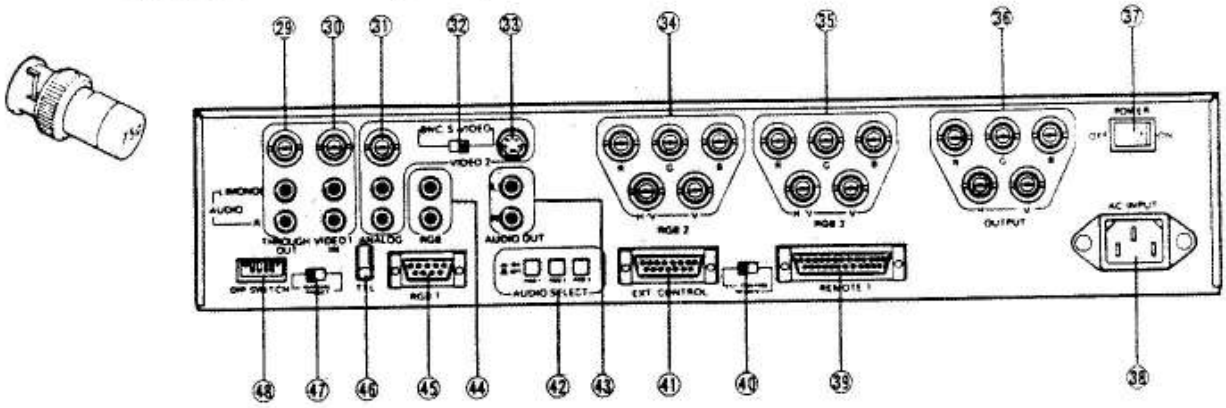
27. Level Indicator: Displays adjustment level.

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.

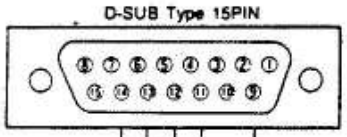
39. Remote 1 Terminal: Attach the connector plug from the supplied 15 pin to 25 pin remote cable and secure it with the 2 thumb screws. Install the 15 pin plug on the other side of the cable onto the projector in the same way.

40. EXT CONTROL/REMOTE Switch: When using an outside control source, 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:

NOTE: Please be aware that ON/OFF, input selection and PICTURE MUTE by the projector's remote control cannot be used at such times.

NOTE: Pins 9, 10, 11, 12, 13, 14 and 15 are ground.



FUNCTION / Pin No.	① and ⑨
POWER ON	SHORT
POWER OFF	OPEN

FUNCTION / Pin No.	③ and ⑪	④ and ⑫	⑤ and ⑬
VIDEO1	OPEN	OPEN	OPEN
VIDEO2	SHORT	OPEN	OPEN
RGB1	OPEN	OPEN	SHORT
RGB2	OPEN	SHORT	OPEN
RGB3	SHORT	SHORT	OPEN

FUNCTION / Pin No.	⑥ and ⑭
PICTURE MUTE ON	SHORT
PICTURE MUTE OFF	OPEN

42. AUDIO SELECT Button: This switch selects 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: Connect to an external audio amplifier.

44. RGB AUDIO IN Terminal: Connect 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. (See "4.2.3. 9 Pin RGB 1 Terminal.")

46. ANALOG/TTL Switch: Switch to match the output signal of the computer connected to RGB 1.

47. MANUAL/PRESET Switch: 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 below).

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 the following page.

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.

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 being used. Refer to the table on the following page for the setting of Nos. 2,3, and 4.

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

No.1: The RGB 1 mode for *PC/AT or *PS-2 is selected using this switch.

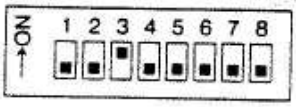
NOTE: When *IBM PC/AT or compatible equipment is connected to the RGB 1 terminal, set switch No. 1 to ON. When *IBM PS-2 or compatible equipment is connected to the RGB 1 terminal, set switch No. 1 to OFF.

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

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

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

Factory DIP switch settings for DIP switch on internal control PWB.



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.

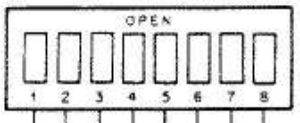
Nos. 4, 5, 6, 7, 8 -- These are service controls. Set them to OFF.

2.3. DIP Switch Functions (Rear of projector)

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.



PIN No.	OPEN	SHORT	FUNCTION
8	Disable	Enable	Auto Power ON mode
7	When connected to SI	PJ alone	System Interface used/not used
6	Automatic display	Manual display	On-screen display mode
5	Disable	Enable	Common control
4	Under normal operation, always keep in OPEN position		Service controls
3			
2			
1			

PJ is an abbreviation for projector

No. 6: This switch changes the on-screen display mode. When set to the OPEN side, 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 on the remote c.

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:

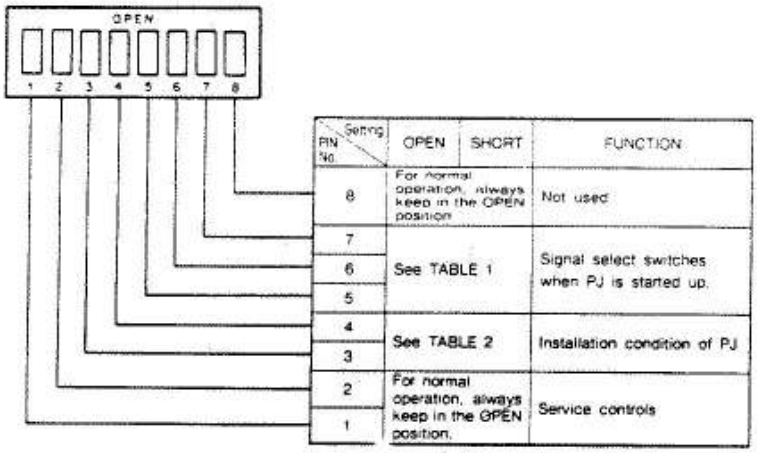
Situation 1 -- When the distortion and erroneous convergence apparent from the image projected on the screen are caused by the physical position between the screen and projector, regardless of the input signal itself. In the same way, when focusing problems stem more so from internal causes rather than 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 the 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



PIN No. / Setting	OPEN	SHORT	FUNCTION
8	For normal operation, always keep in the OPEN position		Not used
7	See TABLE 1		Signal select switches when PJ is started up.
6			
5			
4	See TABLE 2		Installation condition of PJ
3			
2	For normal operation, always keep in the OPEN position.		Service controls
1			

No. 8: Primarily for serviceman use only. 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.

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 and spacers may need to be changed.

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.

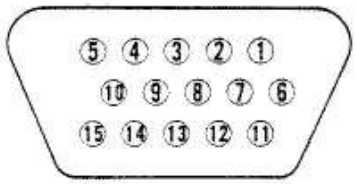
NOTE: Press the RESET button on the projector after setting DIP switches.

2.3.1. Factory Settings Of The DIP Switches

The following table shows the original factory settings of DIP Switches 1 and 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

2.4. 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: Data transmission when the System Interface is used.

3: Input signal selection

13: Input for external remote control data

4, 8 and 9: Normally set to OPEN

14: Use/non-use of external control

5: POWER ON/OFF

10: PICTURE MUTE ON/OFF

15: Ground

When the System Interface is used, connect it with the supplied remote cable (15-25 pin) to this terminal.

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

3. INSTALLATION, SET-UP and CONVERGENCE

3.1. Installation Procedure

When this video projector is shipped from the factory, it is preset for the System Interface used, ceiling suspended, 100 inch screen front projection, but the installation method (ceiling suspension or floor installation) and the screen size (60 inch - 300 inch) can be modified. See "3.1.2. Installation Method Change" for changing the installation method. When changing the screen size, see "3.1.3. Screen Size Change."

The drawing on the following page shows the relative positional relationship of the projector with the screen. When the projection distance changes +/-1% more than the displayed value, it may be necessary to re-adjust the position setting. The length, height and depth will determine the screen size to be used.

A	Distance between the lens and the screen
B	Distance between the top of the supplied ceiling mount backet and the screen center
C	Distance between the wall and the bolt
D	Distance between the desk top and the screen center
E	Distance between the ceiling and the top of the supplied ceiling mount backet

NOTE: When the screen size is changed, do not forget to adjust the focus.

Sizes not found between 60 and 300 inches are determined by the following proportional calculation formula.

NOTE: For screen sizes over 160" diagonal, the projector will need to be mounted with an adjustable suspension adapter at a minimum distance from the ceiling equal to E.

Units = inches S = screen size (diagonal)

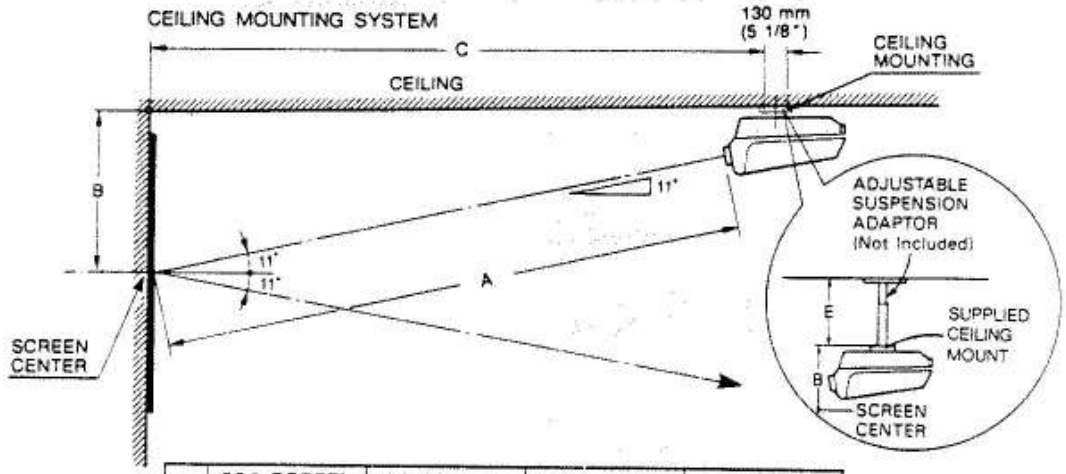
$$A = \left(\frac{S}{4.8} + 1\right) \times 5.315 + 7.345$$

$$B = 0.194 \times A + 11.22$$

$$C = 0.981 \times A + 7.913$$

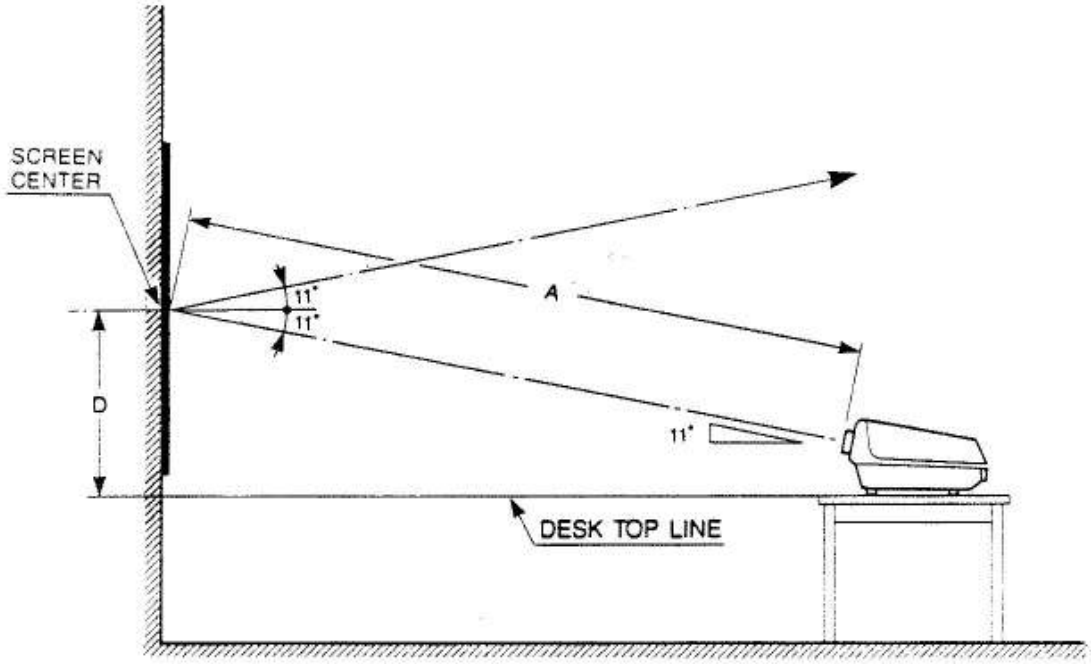
$$D = 0.194 \times A + 8.858$$

E = 1/2 Screen Height − B



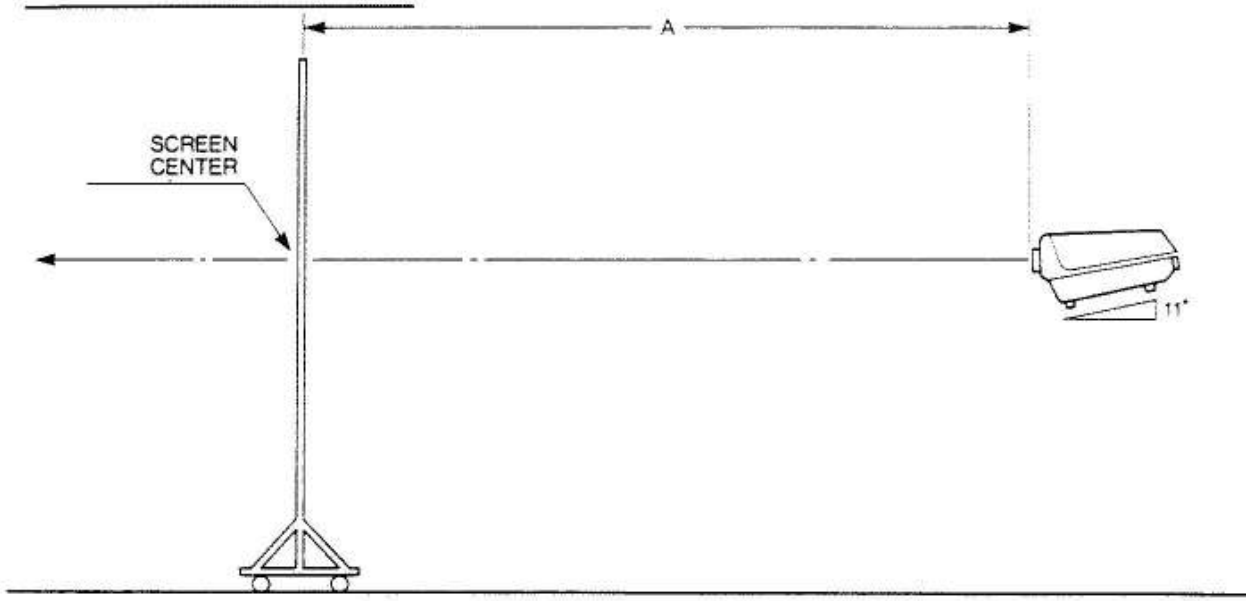
	60" SCREEN	100" SCREEN	200" SCREEN	300" SCREEN
A	79 1/8"	123 3/8"	234 1/8"	344 7/8"
B	26 3/8"	34 3/4"	55 7/8"	77"
C	87 15/16"	131 3/8"	240 1/8"	348 13/16"
E	–	–	At least 4 1/8"	At least 13"

Table Top System



	60" SCREEN	100" SCREEN	200" SCREEN	300" SCREEN
A	79 1/8"	123 3/8"	234 1/8"	344 7/8"
D	23 15/16"	32 3/8"	53 9/16"	74 11/16

Rear Projection System



	60" SCREEN	100" SCREEN	200" SCREEN	300" SCREEN
A	79 1/8"	123 3/8"	234 1/8"	344 7/8"

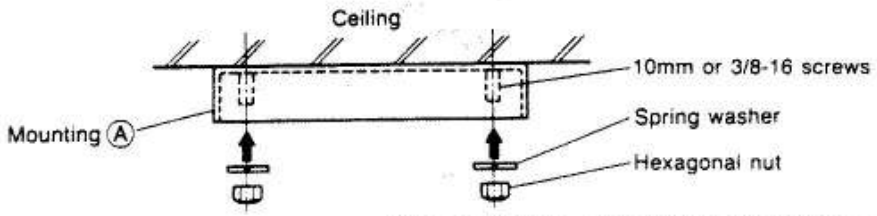
3.1.1. Ceiling Installation

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 (132 lbs.).

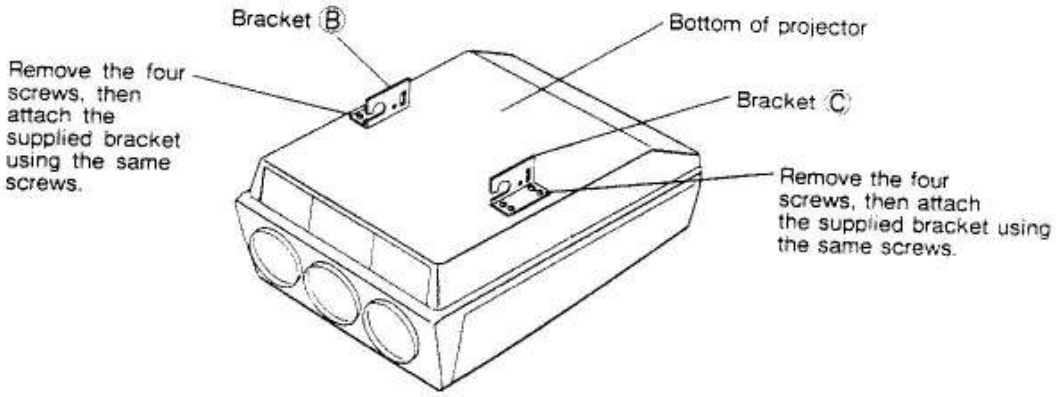
(1) Determine the relative relationship between the projector and the screen according to the screen size.

(2) Attach mounting A to the ceiling. Use four 10mm coarse thread screws (not included).

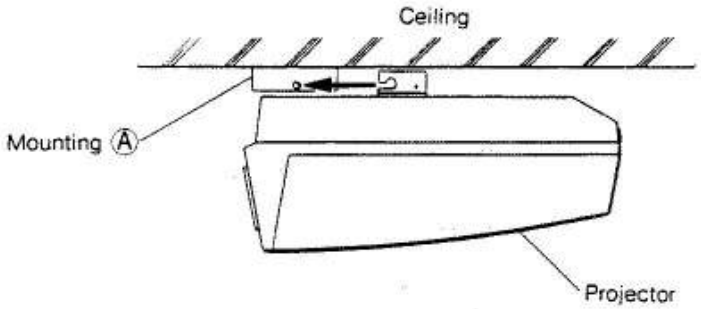


(When using a adjustable suspension adaptor.)

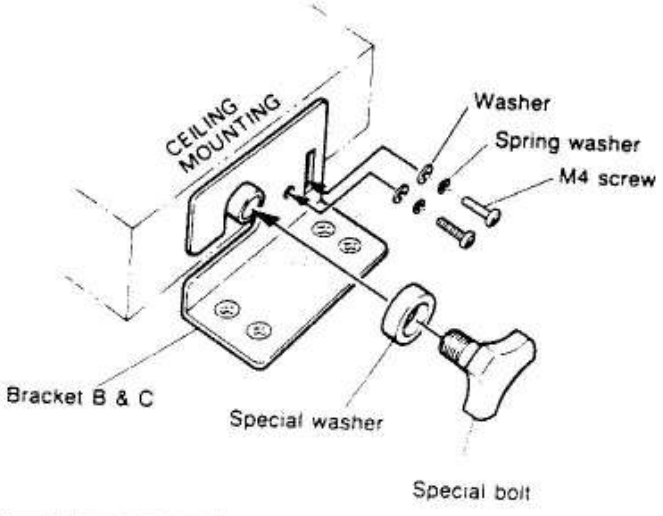
(3) Attach brackets B and C to the bottom of the projector.



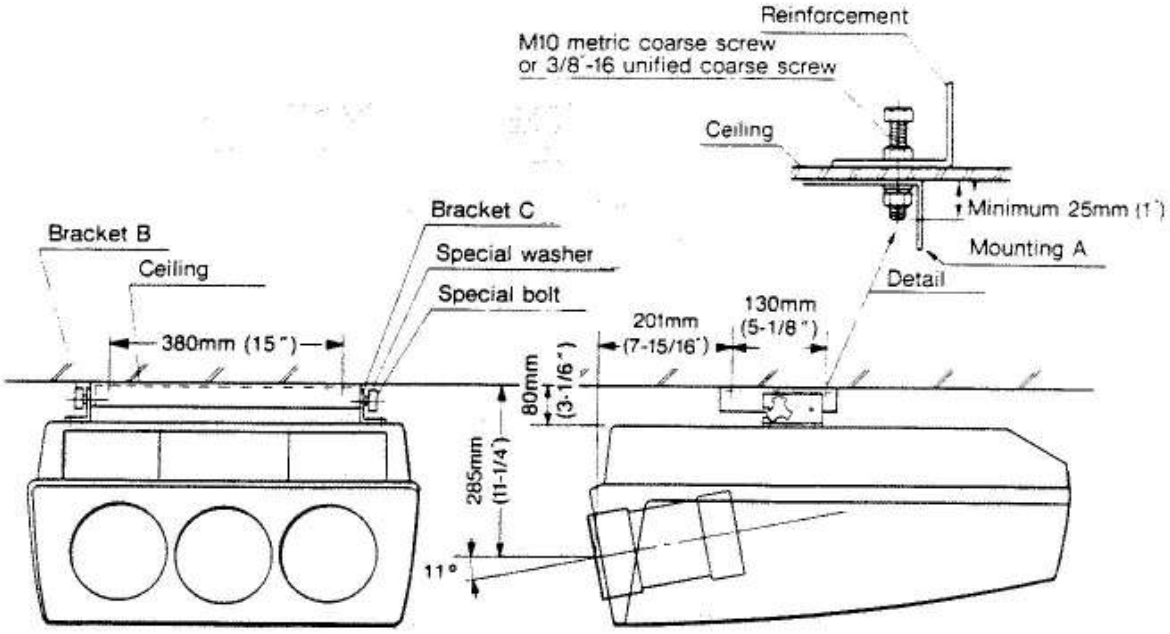
(4) Line up the projector brackets with the protruding section of mounting A and fit them in securely.



(5) Install the special bolt and the M4 screw as shown in the drawing below. If mounting for an 11 degree projection angle, that is, the bottom face of the projector is set parallel to the ceiling, attach two M4 screws to each B&C bracket as shown in the diagram below. If setting for other than an 11 degree projection angle, attach only one M4 screw to the outer slot of each B & C bracket.



(6) Projector attached to ceiling installation position.



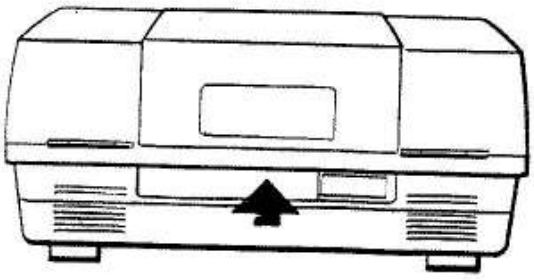
When changing from ceiling mounting to floor use, turn over the plate with the NEC trademark in the rear of the top cover. Push the catch from the inside and remove the plate. Install it in the opposite manner.

3.1.2. 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 projection. When the projector is used in this condition, it is not necessary to change the vertical polarity and pins No.3, 4 of DIP switch 2.

DIP Switch 2 Setting



The DIP switches are in the rear panel. Push and 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 after setting pins No. 4 and 3.

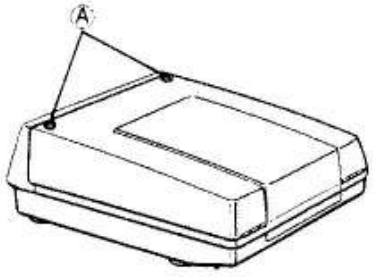
Polarity Change

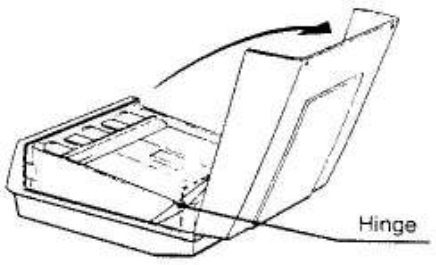
(1) Open Top Cover

(a) Make sure the power is OFF and remove the power cord from socket.

(b) Loosen the two (A) screws. However, leave the top cover attached.

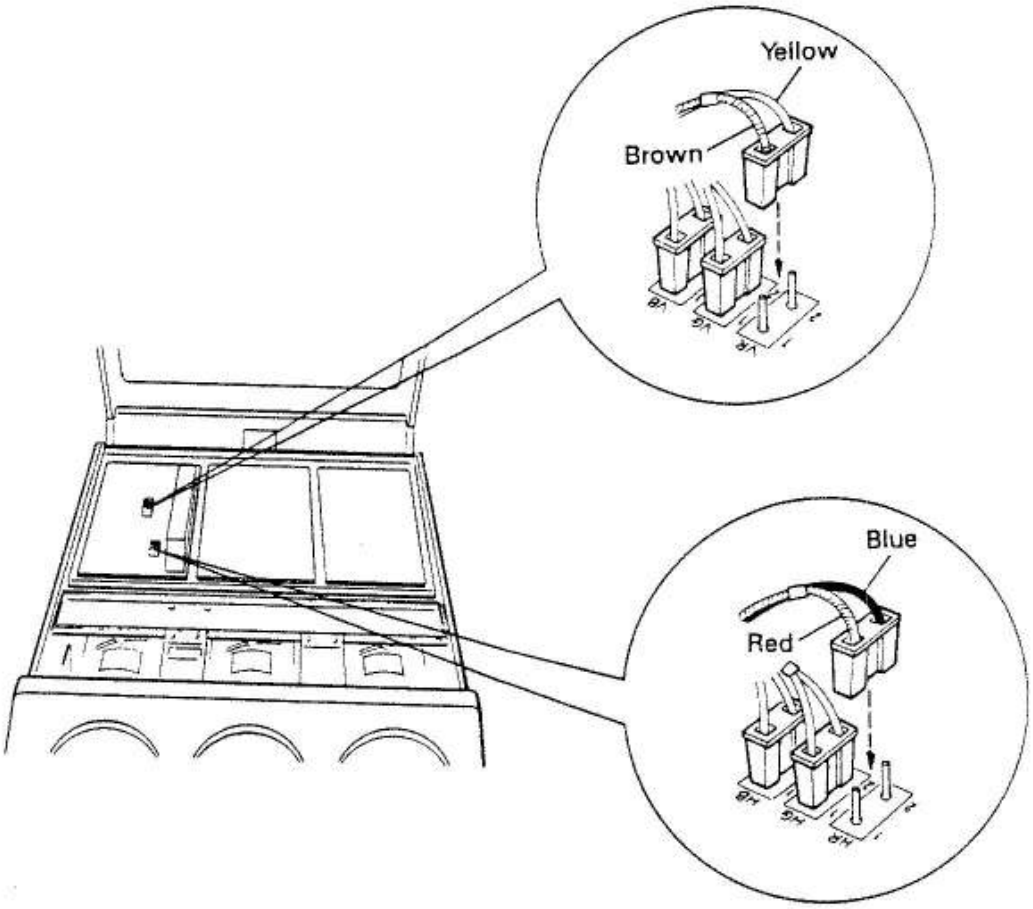
(c) Raise the top front of the projector, opening the cover until the hinges lock.





(2) Polarity Reversal

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



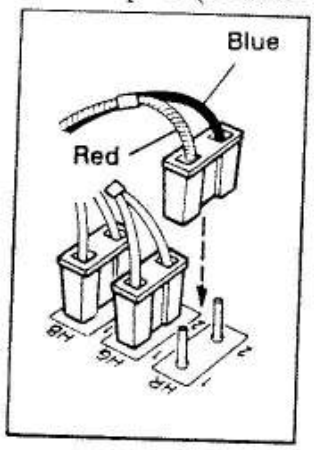
Polarity Table

Setting	Connector	HR, HG, HB		VR, VG, VB	
	Pin	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

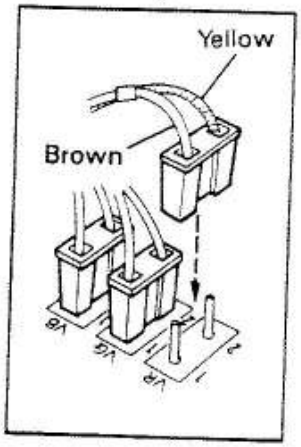
Correctly connect the three horizontal connectors and three vertical connectors as shown in the below drawings. In this case, be sure to connect the same set of pins. (In other words, do not confuse R, G and B).

Front ceiling
Rear floor



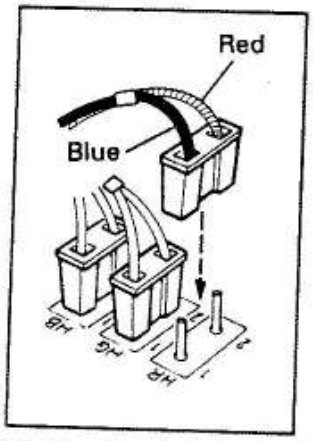
HORIZONTAL

Front ceiling
Rear ceiling

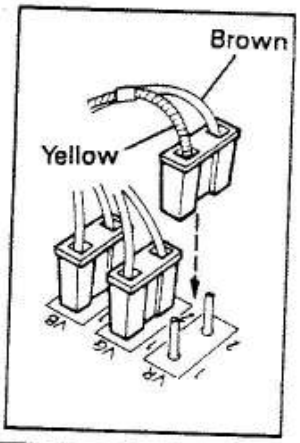


VERTICAL

Front floor
Rear ceiling



Front floor
Rear floor



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

NOTE: After changing vertical polarity, adjust vertical linearity. Clear digital correction, then adjust VR4002.

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.

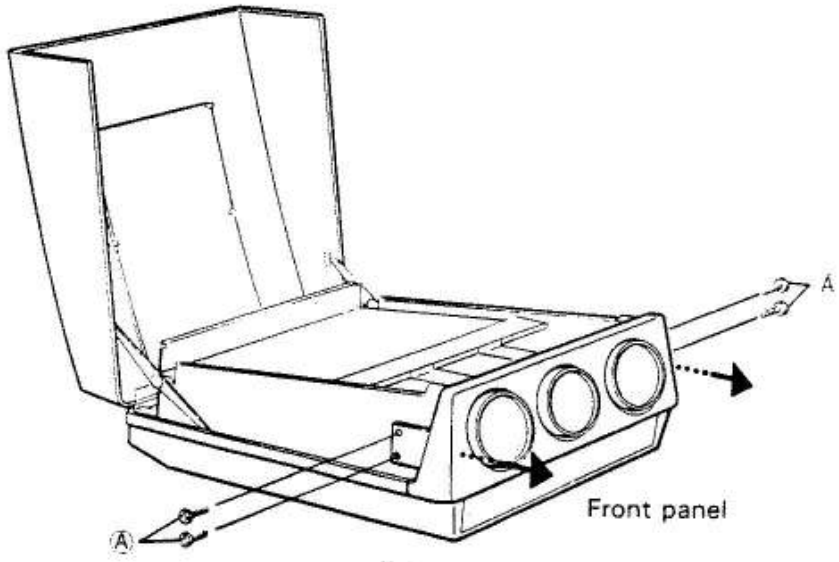
3.1.3. Screen Size Change

When the screen size is changed from 100 inches to 60 inches, 200 inches or 300 inches, proceed as follows:

Preparation:

(a) Check to make sure the power is OFF, then open the top cover.

(b) Remove the four A screws on both sides of the projector and remove the front panel.

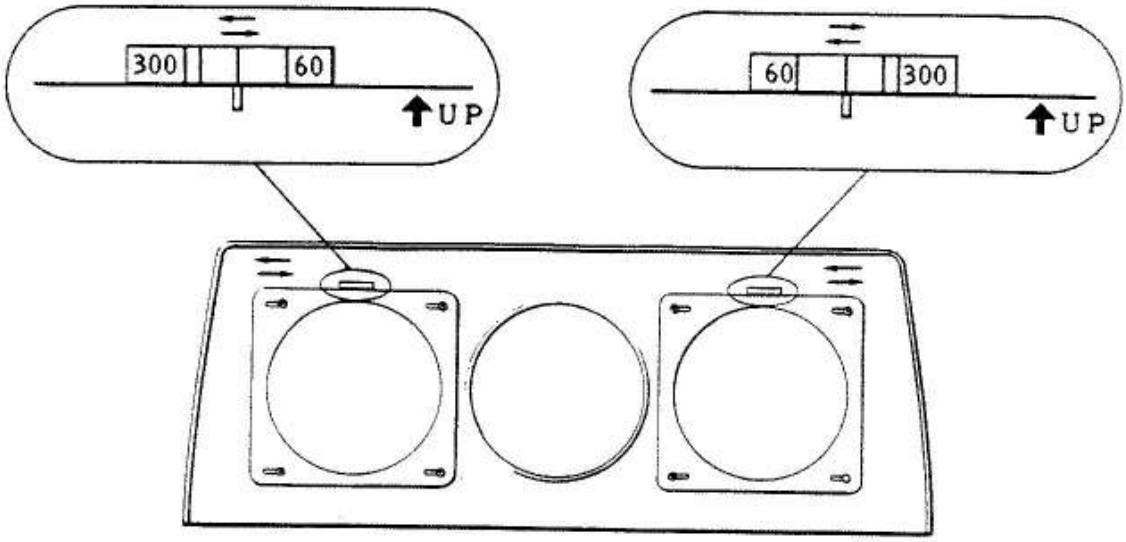


Changing the Position of Decorative Boards:

(a) Loosen the screws at the four points on the two left and right decorative boards located on the reverse side of the front panel.

(b) Slide the decorative boards to match the screen size.

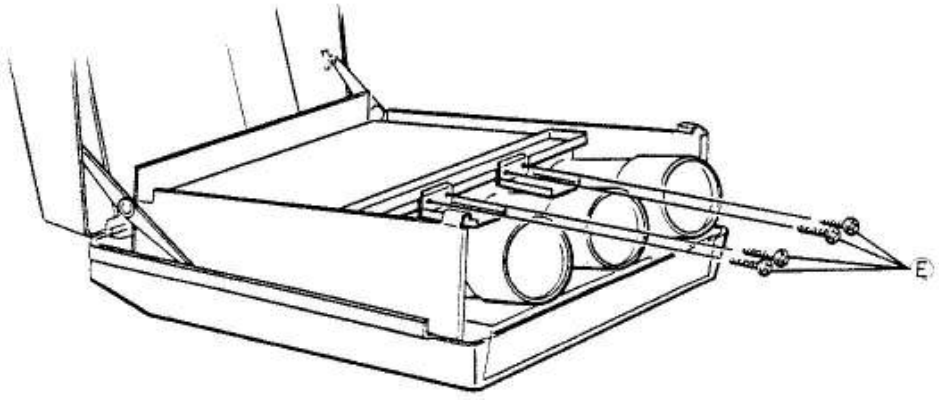
(c) Tighten the four screws.



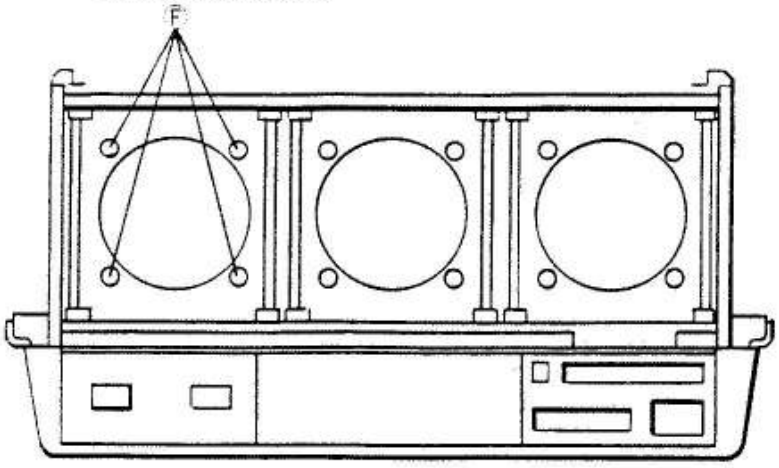
3.1.4. Spacer Installation

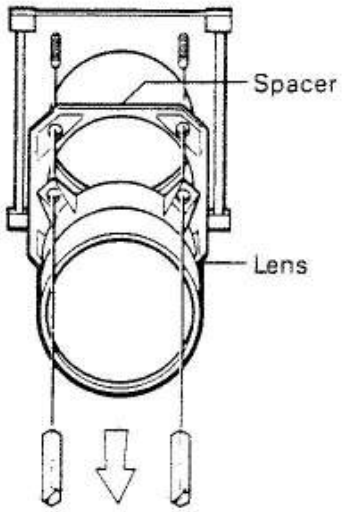
When changing from a 100 inch screen to a 60 inch, 200 inch or 300 inch screen, it will be necessary to change the CRT spacers according to the screen size and the projection angle to be used. To install the accessory spacers, proceed as follows:

(1) Remove the four E screws holding the two PWB mountings. (After opening the top cover and removing the front panel).

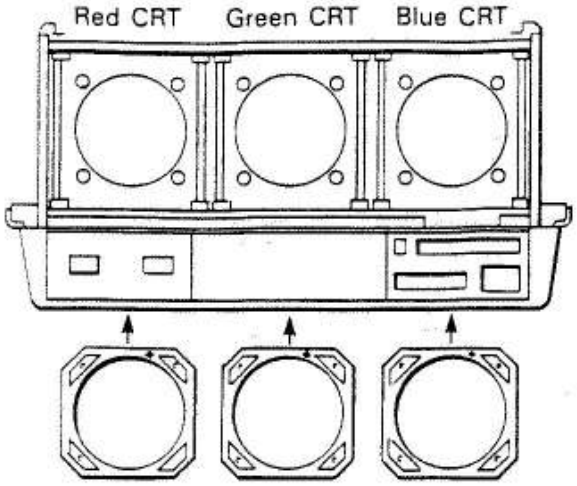


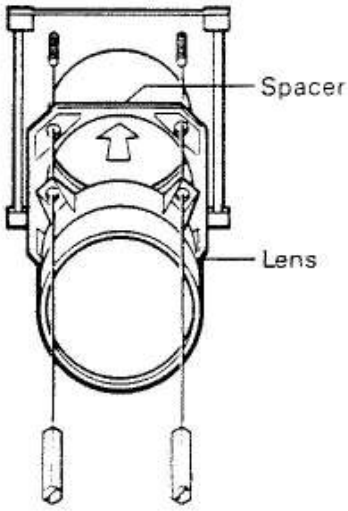
(2) Remove the four F nuts in the red, green and blue lenses, then remove the lenses themselves.





(3) Remove the inside spacer. Install the spacer matching the screen size and projection angle needed. Attach by setting the side with the arrow on top.



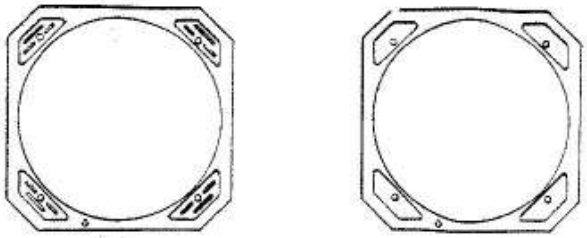


List Of Spacers For Angle Regulation

CRT / SCREEN SIZE and PROJECTION ANGLE	R	G	B	
60° 11°	A	D	A	ACCESSORY
100° 11°	B	E	B	NORMAL POSITION
200° or over 11°	C	F	C	ACCESSORY
60° 0°	G	I	G	ACCESSORY
100° 0°	H	I	H	ACCESSORY
200° or over 0°	I	I	I	ACCESSORY

Install the angle adjustment spacer corresponding to the screen size and projection angle as per the above list.

NOTE: For A, B, C, G and H, the reverse side corresponds to R or B.

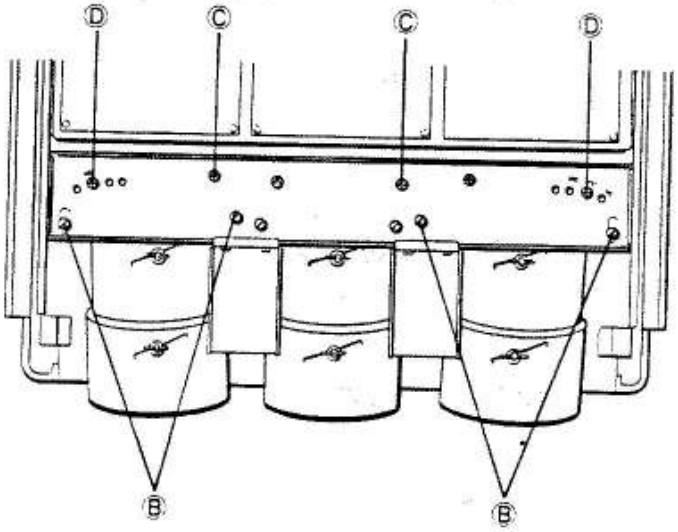


3.1.5. Adjusting CRT Angle

(1) Loosen the two B screws and one C screw on the CRT mounting for the red and blue CRTs.

(2) Remove screw D.

(3) Move the red and blue lens and match to the screen size holes that are carved into the CRT mounting, then tighten screws D, B and C.



NOTE: For a screen not described on the CRT mounting, refer to the table below. For instance, if setting for a 100 inch to 110 inch screen, changing the position of the decorative boards and adjusting the angles of the CRTs will not be necessary. However, when using the projector for rear projection, you must change the spacers for the angle.

SCREEN SIZE	60inch	100inch	200inch	300inch
RANGE OF SCREEN SIZE	54" ~ 66"	90" ~ 110"	180" ~ 220"	270" ~ 300"

3.2. Set-Up Procedure

3.2.1. Operation Procedure

The projector is adjusted for use with the System Interface, ceiling mounting, 100 inch screen, front projection at the factory. When changing the installation method and screen size, see section 3.1..

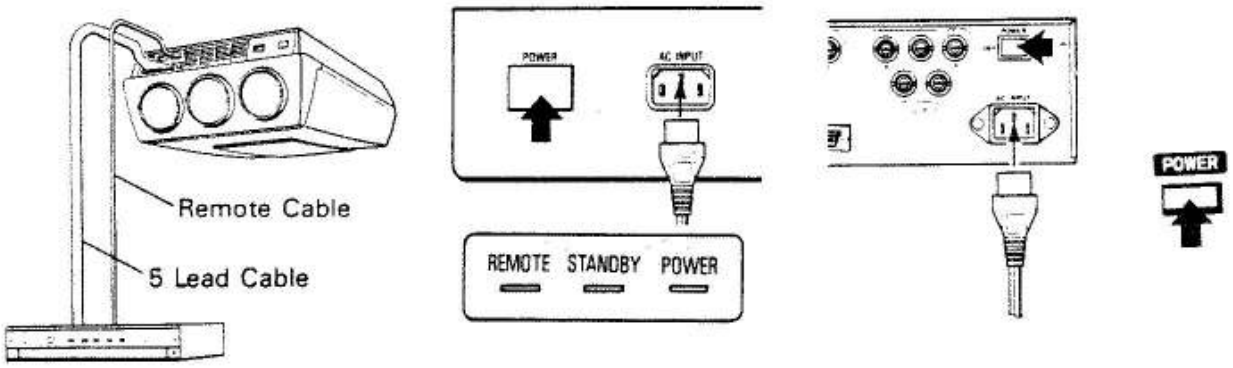
Preparation prior to operation

(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 System Interface).

(2) Connect the external equipment. (See "2.1. Connection Examples").

(3) Connect the power plug for the projector and System Interface to an AC 120V, 60 Hz socket.

Operation



(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 unit 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.

NOTE: 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.

NOTE: Flashing of the STAND-BY indicator on the projector means that the projector might not be connected with the System Interface correctly of the System Interface might not be turned ON. In that case, check the connection of the 15-25 pin remote cable and make sure the POWER indicator on the System Interface is lit in 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 2 and for RGB 1, 2 and 3 can be selected as follows:

INPUT 1 -- VIDEO 1

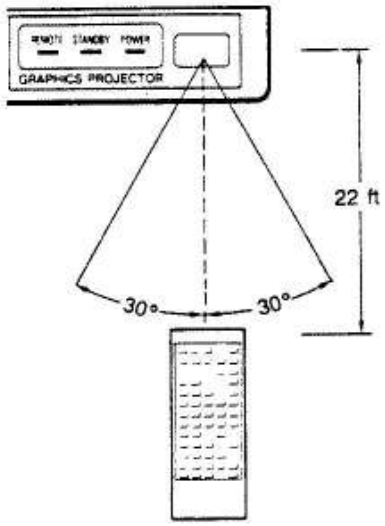
INPUT 2 -- VIDEO 2

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 "4.1. Input Signal Recording."



Precautions when Using Remote Control

(a) There are infrared light receiver windows and remote jacks 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.

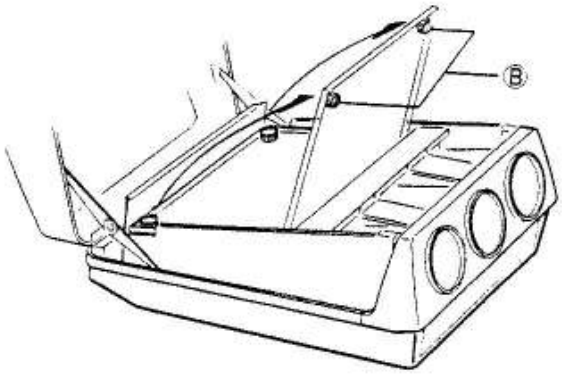
(c) Use the wireless remote control within ($d < 22'$, $\theta = \pm 30°$) the valid operating range (see figure above). When strong light strikes the infrared light receiver section or there are obstructions between the remote control and the infrared light receiver section it will not operate correctly.

3.2.2. Adjusting The Centering Magnets

(a) Cancel static convergence.

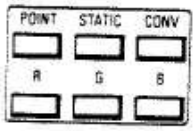
(b) Loosen the two B screws, then raise the upper chassis.

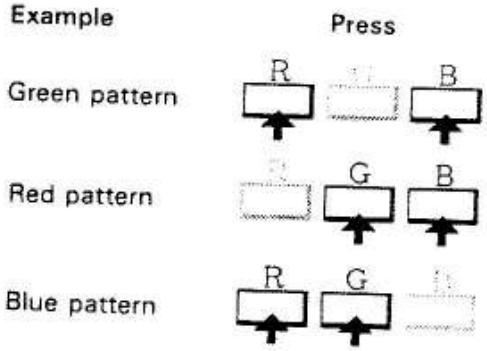
NOTE: B screws cannot be removed from the upper chassis.



(c) Press the TEST key.

A crosshatch 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 section 5.2.2. When the centering magnet has been substantially moved, the CPC magnet must be adjusted.

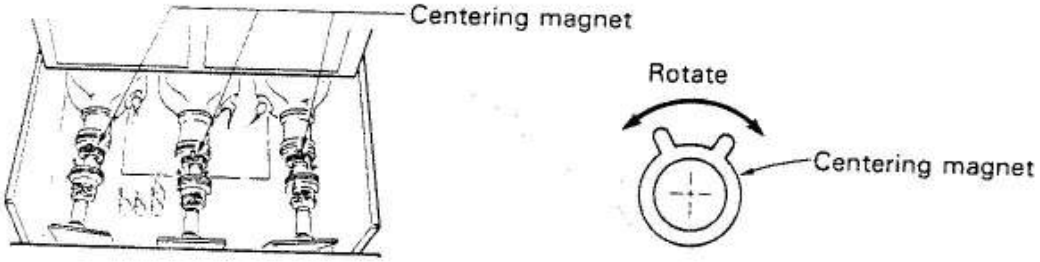
(d) Turn off the power. Attach the two B screws to the upper chassis.

3.2.3. Lens Focus Adjustment

(1) Turn the power ON.

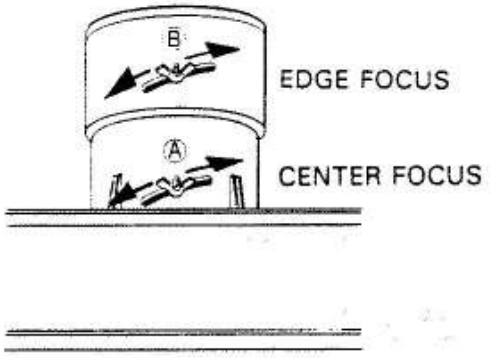
(2) Press the remote control TEST key and display the NTSC/Video 1 crosshatch pattern.

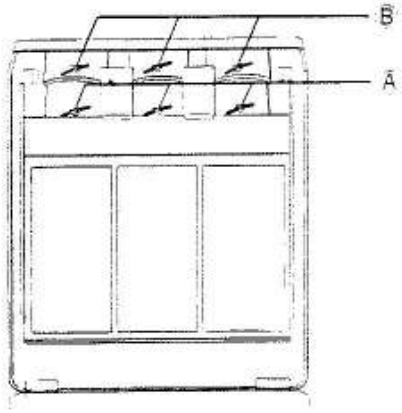
(3) Press the two R, G or B keys that you do not want to adjust, then only the CRT you want to adjust will be projected.



(4) Loosen wing nut A while each respective CRT is displayed, rotate the lens, then adjust the focus of the center section of the screen to its optimum focus. Tighten wing nut A. Likewise loosen wing nut B and adjust the edge 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 CRTs not being adjusted with a lens cap.

3.2.4. Electrical Focus Adjustment

(1) Select and press the signal you wish to adjust from INPUT keys 1-5 and project an image.

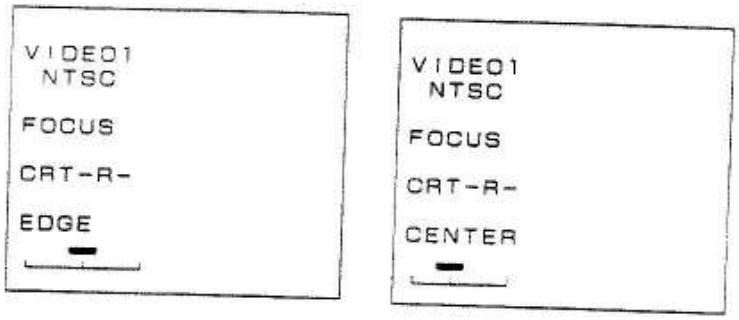
(2) Press the TEST key and display the crosshatch pattern.

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

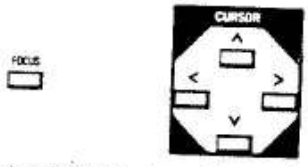
(3) Press the FOCUS key to initiate the FOCUS adjustment mode.

(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 keys. Two cursor keys move the level up and two keys 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.

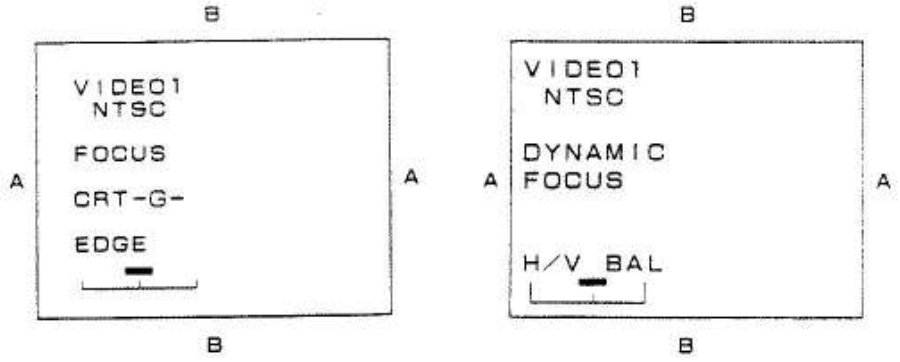
The following instructions are primarily for serviceman:

H/V Balance (Focus Control)

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

1. This adjustment is made of 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 the figure on the following page (left). 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 display above (right) will appear. Adjust the optimum V-height focus by pressing the cursor keys while watching the edge marked B in the figure.

4. Store this adjustment by pressing the STORE key twice. Return to step (3) in "3.2.4. Electrical Focus Adjustment."

NOTE: Make this adjustment for each individual input signal.

3.2.5. Alignment Adjustment

Start with VIDEO 1, NTSC, and proceed through each input individually.

(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.

(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.

NOTE: 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.

NOTE: The selection of the function to be adjusted can also be done using the ALIGNMENT up and down buttons on the projector's rear panel.

NOTE: Repeat these steps for each input.

3.3. Convergence Adjustment

Adjust distortions such as linearity, pincushion, etc., which cannot 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 CRTs.

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

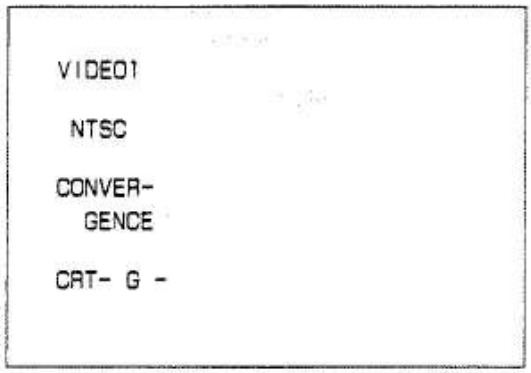
3.3.1. Adjustment of Geometric Distortion for Green

(1) Display the crosshatch pattern by pressing the TEST key.

(2) Set to the convergence adjustment mode by pressing the CONV key.

(3) Display the green pattern only by pressing the R key and the B key.

(4) When you press the G key while pressing the CTL key, a display as shown below will appear.



(5) Select one of the dynamic adjustments by pressing the appropriate key.

(6) Adjust the green crosshatch pattern by pressing the cursor keys.

NOTE: Refer to "3.3.4. Dynamic Adjustment" for each function.

3.3.2. Red and Blue Convergence Adjustment:

After adjusting the green geometric distortion, adjust the red and blue convergence.

(1) Display the crosshatch pattern by pressing the TEST key.

(2) Set to the convergence adjustment mode by pressing the CONV key.

(3) Display only the standard G-CRT and the CRT you wish to adjust by operating the R, G and B keys.

(4) Select the CRT to be adjusted by pressing the R or B key while pressing the CTL key.

(5) Perform the static adjustment (see 3.3.3.).

(6) Perform the dynamic adjustment (see 3.3.4.).

(7) Perform the point adjustment (see 3.3.5.).

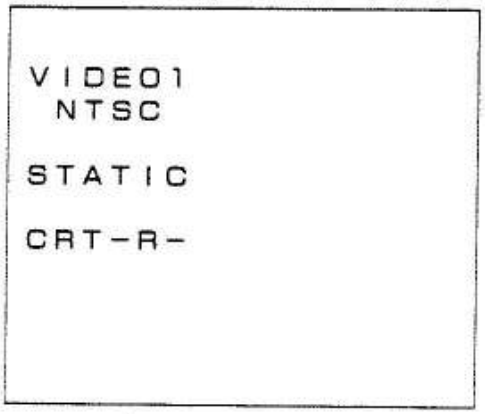
(8) After adjustment has been completed, store the adjustment data by pressing the STORE key twice.

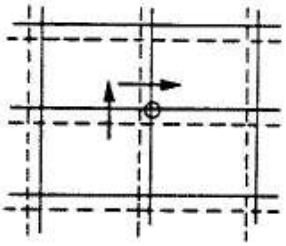
(9) Terminate the convergence adjustment mode by pressing the END key.

3.3.3. Static Adjustment

(1) While in the convergence adjustment mode, press the STATIC key. The display as shown in the figure below will appear.

(2) Perform the adjustment using the cursor keys such that the center of the screen is lined up, using the green pattern as a reference.





3.3.4. Dynamic Adjustment

(1) Set to the convergence adjustment mode, then select each dynamic function.

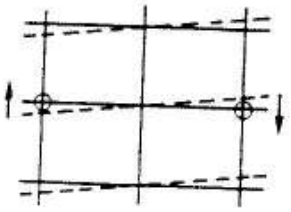
(2) Perform the adjustment using the cursor keys.

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

1. Dynamic TILT

Adjust Vertical to Center

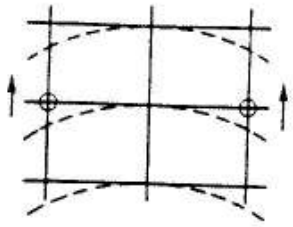
Adjust Horizontal Right/Left Side



2. Dynamic V BOW

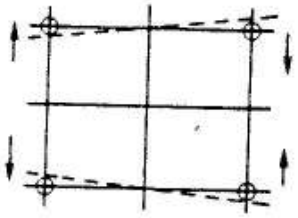
Adjust Vertical

Adjust Horizontal to Center



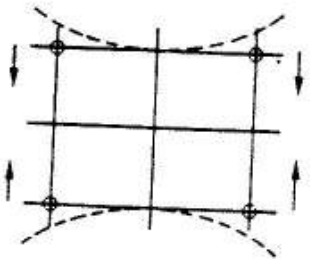
3. Dynamic V KEYSTONE

Adjust the 4 corners



6. Dynamic TOP PINCUSHION

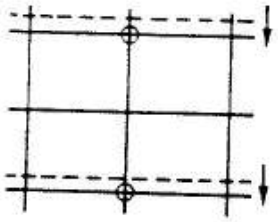
Adjust the top and bottom



4. Dynamic V LINEAR

Adjust Vertical Upper/Lower Side

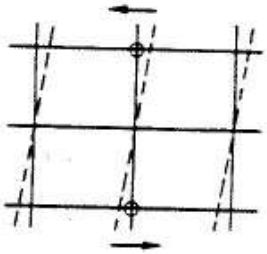
Adjust Horizontal to Center



7. Dynamic SKEW

Adjust Vertical Upper/Lower Side

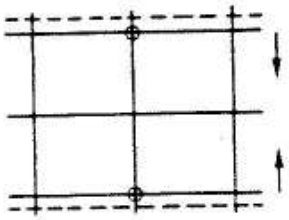
Adjust Horizontal to Center



5. Dynamic HEIGHT

Adjust Vertical Upper/Lower Side

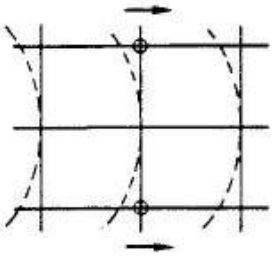
Adjust Horizontal to Center



8. Dynamic H BOW

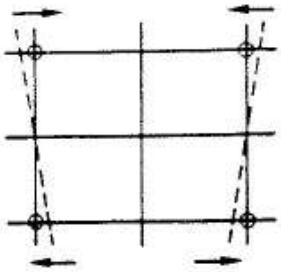
Adjust Vertical Upper/Lower Side

Adjust Horizontal to Center



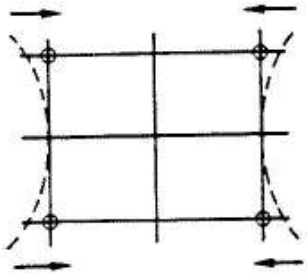
9. Dynamic H KEYSTONE

Adjust the 4 corners



12. Dynamic SIDE PINCUSHION

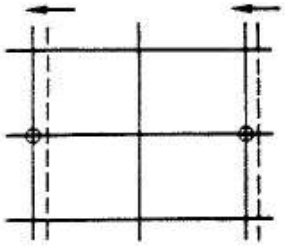
Adjust the sides



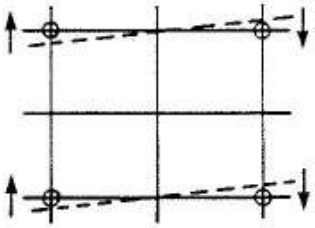
10. Dynamic H LINEAR

Adjust Vertical to Center

Adjust Horizontal Right/Left Side



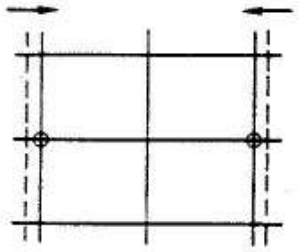
13. V KEYSTONE Balance



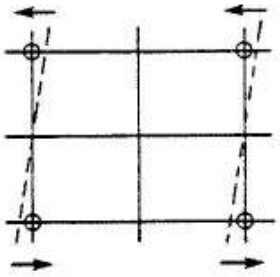
11. Dynamic WIDTH

Adjust Vertical to Center

Adjust Horizontal Right/Left Side

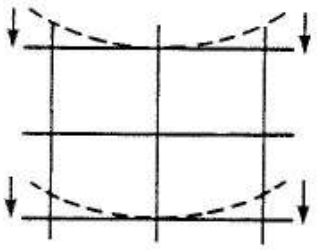


14. H KEYSTONE Balance

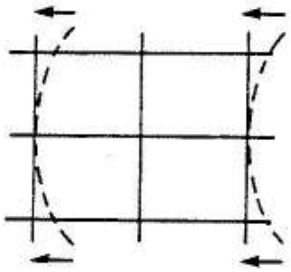


15. TOP/BOTTOM PINCUSHION Balance

Adjust the 4 corners



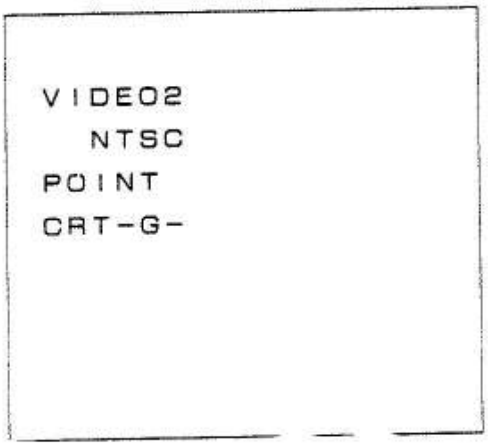
16. SIDE PINCUSHION Balance



3.3.5. Point Adjustment

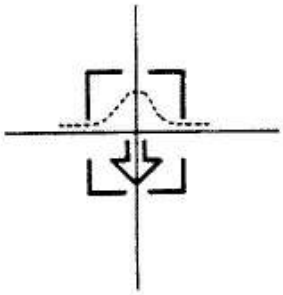
(1) Press the POINT key while in the convergence mode.

(2) The display, as in the figure below, and the cursor will appear.



(3) Move the cursor to the spot to be adjusted using the cursor keys.

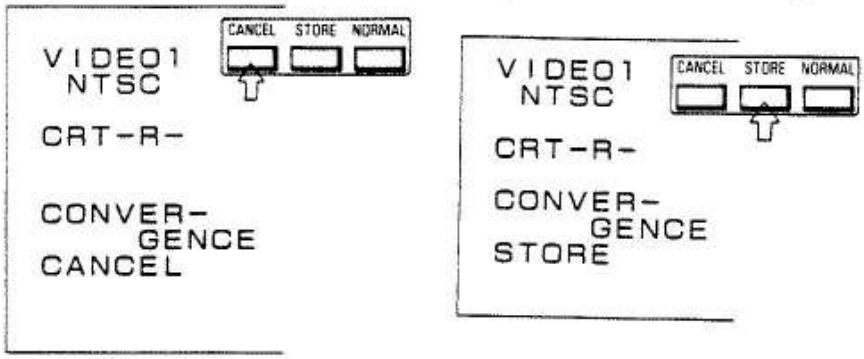
(4) Adjust the cursor position by pressing the cursor key and while pressing the CTL key at the same time.



3.3.6. 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) to free all possible memory space. Each input signal must be canceled 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.

All data cancel (When all the convergence data is to be canceled):



(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.

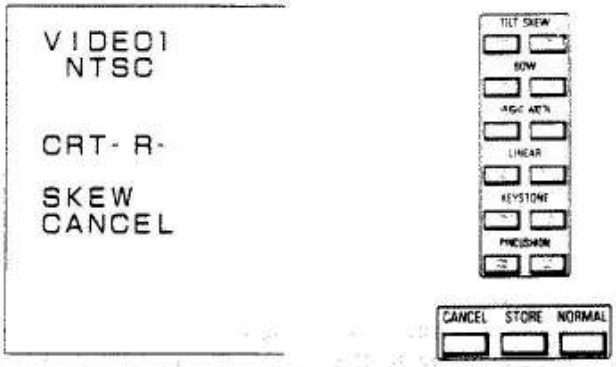
(3) Press the STORE key. The "STORE" on-screen display will appear.

(4) Press the STORE key once more. The on-screen display will disappear, then the canceled (clear) status will be stored.

NOTE: You can return to the status before pressing the cancel key at any time prior to executing instruction (3). To return to the status prior to cancellation, execute either of the following two instructions: Shut off power switch, or 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.

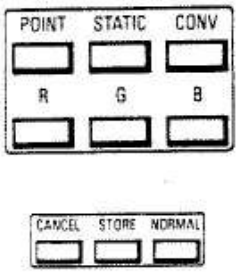
Dynamic cancel: (When dynamic convergence is to be canceled)

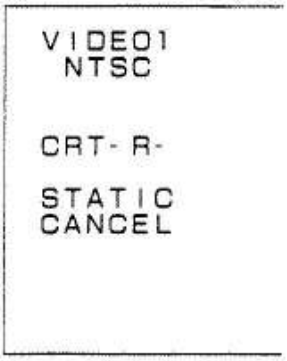


(1) Set to the adjustment mode by pressing the key for the item you wish to cancel from amongst the 12 dynamic adjustment keys.

(2) Perform the same operations as (1) to (5) of All Data Cancel.

Static Cancel: (When static convergence data is to be canceled)

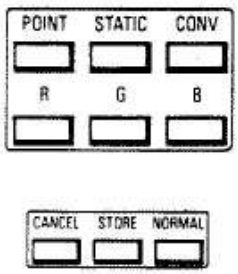


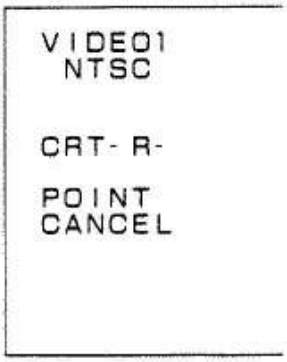


(1) Set to the STATIC mode by pressing the STATIC key.

(2) Perform the same operations as (1) to (5) of All Data Cancel.

Point cancel: (When point convergence data is to be canceled)





(1) Set to the point mode by pressing the POINT key

(2) Perform the same operations as (1) to (5) of All Data Cancel.

3.3.7. 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) Enter the Signal Entry screen under the INPUT LIST menu. Enter the SC, INPUT and SOURCE for the input signal you are adding (see 4.1.1 Input List Mode).

(2) Change to the image signal you want to adjust.

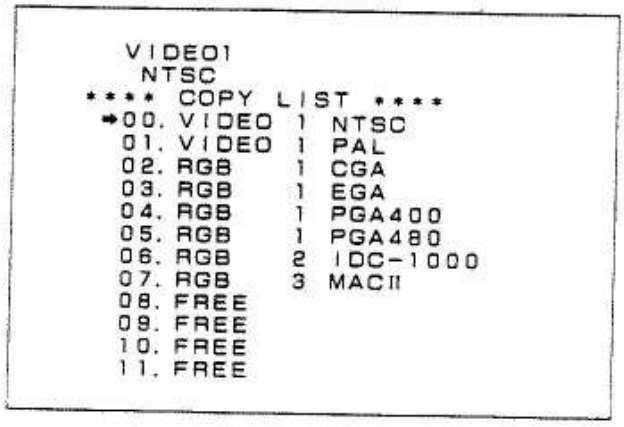
(3) Change to the test screen then display the copy screen by pressing the POINT key while pressing the CTL key. A list will be displayed on the screen with all of the signal names that have been recorded in the current INPUT LIST. Any non-recorded locations will be indicated with the characters "FREE." (See Below)

(4) Select the signal name to be copied by moving the prompt using the up and down cursor keys.

(5) When the ENTER key is pressed, the convergence adjustment data for the input signal indicated by the prompt 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.



3.3.8. Convergence Adjustment (2)

The re-adjustment of the CONVERGENCE ADJUSTMENT (see section 3.3) is required for every assigned signal.

(1) Set in VIDEO 1 mode and feed in NTSC signal.

(2) Set in VIDEO 2 mode and feed in PAL or SECAM signal and carry out the convergence adjustment.

(3) Set in RGB 1 mode and feed in a CGA signal (Signal 1).

(4) Set in RGB 1 mode and feed in an EGA signal (Signal 2).

(5) Set in RGB 1 mode and feed in a PGA (400 line) signal (Signal 3).

(6) Set in the RGB 1 mode and feed in a PGA (480 line) signal (Signal 4).

(7) Set in RGB 2 mode and feed in Signal 5.

(8) Set in RGB 3 mode and feed in a Signal 6. Carry out the adjustment.

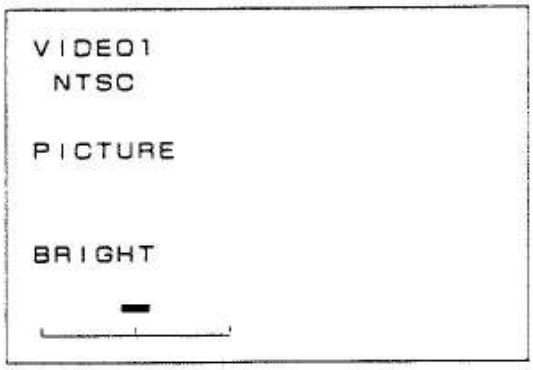
NOTE: The convergence data store must be carried out for each mode adjustment, not for each input.

3.4. 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.

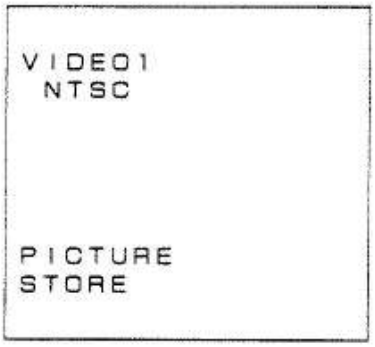
(2) The picture adjustment selected at that time and its level are displayed on the screen.



(3) Adjust the level using the ADJUST button on the back of the projector or the cursor keys on the remote control. When up or right are pressed the level increases; when down or left 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. "STORE" is displayed on the screen. Press the STORE key again. "STORE" will disappear. The picture adjustment level will be stored.



NOTE: 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.

4. THE INPUT SIGNAL

4.1. Input Signal Recording

4.1.1. 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 in the INPUT LIST, and at the same time obtains the various parameters pertaining to these signals. Always access this mode first to input the video signals for the first time so that you can record the video signals before making any adjustments.

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	VIDEO 1	NTSC	- - -
01	VIDEO 2	PAL	- - -
02	RGB1	EGA	- - -

(3) Press the END key to return to the MENU display. To record a signal the first time, select 2 with the cursor up/down key, then press the ENTER key.

INPUT LIST MODE

1. INPUT LIST DISPLAY

->2. SIGNAL ENTRY

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

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

Explanation of Screen Format

Each of the terms displayed on the screen of the figure below is as follows. In the example of Fig. 1-2, the NTSC signal has already been recorded.

"P1"-- 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.

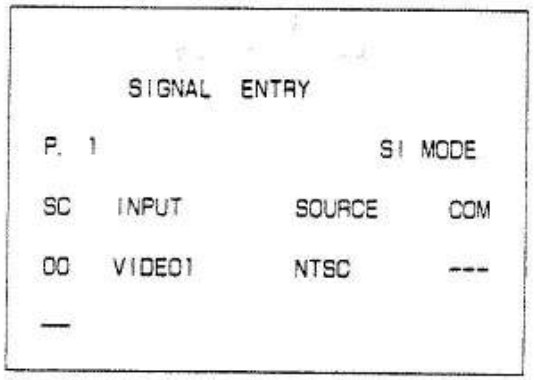
"SC"-- This area records the scan number. Scan numbers from 00 to 11 can be recorded. The scan number refers to the number allocated to the stored convergence data. Also, when you wish to input the same signal in VIDEO 1 and VIDEO 2, the same scan number can be recorded. You can also record more than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

"INPUT" -- This area indicates the input terminal of the signal to be recorded. It is automatically displayed when INPUT 1-5 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.

NOTE: Refer to p. 57 for combination recordings.



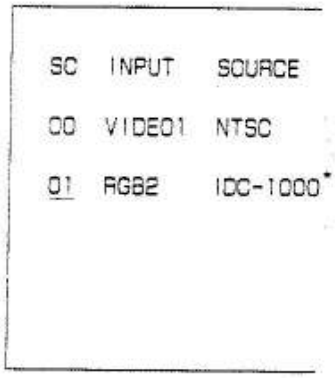
Selection and Cancellation of the Recording Line

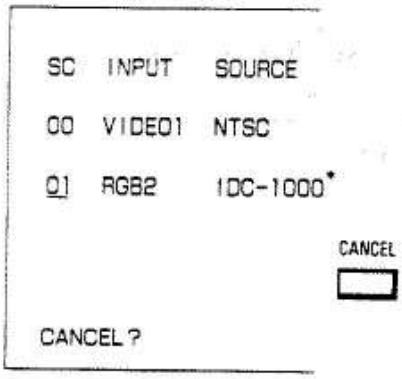
A two space underbar is displayed in the SC column as shown below. Move the underbar up and down using the up or down key on the remote control and select the line you wish to record. Then press ENTER.

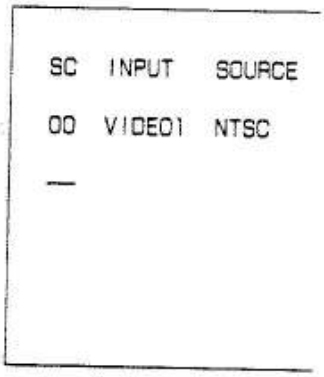
NOTE: You cannot select a line that has already been recorded, cancel it, then delete the recorded signal. The cancel operation is as follows:

(1) Move the underbar using the remote control up or down key to the position under the scan number to be canceled.

(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.







Recording of Scan Number

When a one digit underbar is displayed in the SC column as shown 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.

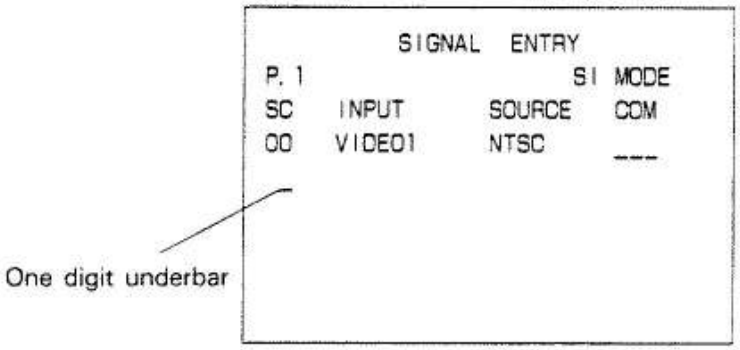
(1) Display the scan number by pressing the cursor up or down key. Pressing the up key selects the scan number as follows:

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

Pressing the down 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.



Scanning number

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

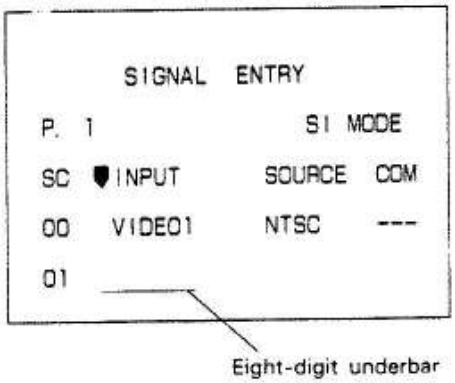
SIGNAL ENTRY

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

The example above 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 share the same data, this means that you can switch video signals without having to calculate convergence correction waveforms, 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.

Input Signal Terminal Recording



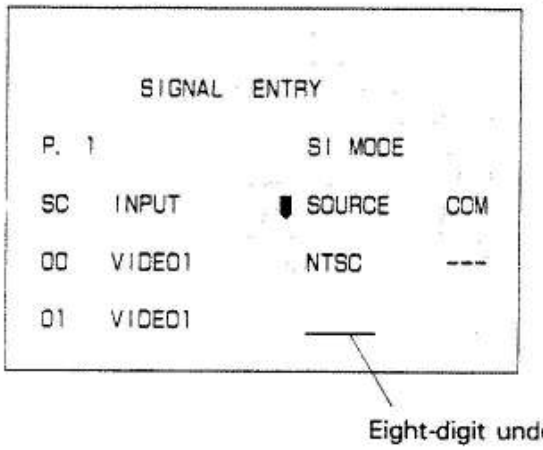
When the 8 digit underbar is displayed in the INPUT column as shown in the figure above, match it to the projector setting condition on the table below, then press the corresponding INPUT keys 1-5. The input recording is performed in this manner. For example: To select RGB 2, press INPUT 4 on the remote 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		

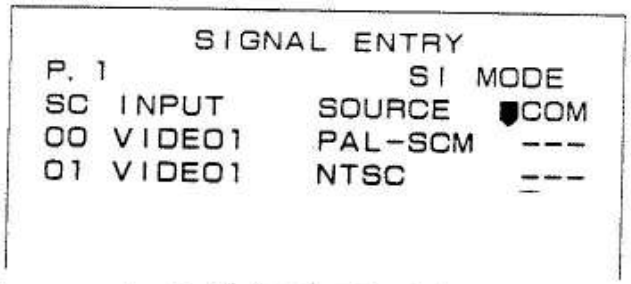
NOTE: After pressing the INPUT key, the vertical synchronization may be disturbed. If this happens, adjust it by using the V-HOLD key. Following V-HOLD adjustment, press the END key to return to the recording screen.

Recording 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 right or left key. For example: To select the letter A, press the INPUT 1 key once; to select the letter B, press it twice; to select the letter C, press it three times; pressing it four times will give a 1. When finished, press the ENTER key. After recording the source name, there will be a delay to input combinations.



Recording Combinations



Move the cursor (underline) using the right and left 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 canceled 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 different 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 video signals you can switch to by storing them into the 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. 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.

SIGNAL ENTRY

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 on the 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. The following example 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.

INPUT LIST

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 -

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

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 ENTER to return to the source screen.

INPUT LIST MODE

1. INPUT LIST

-> 2. SIGNAL ENTRY

Input Signal Recording at the Time of Factory Shipment

INPUT LIST

SC	INPUT	SOURCE	COM
00	VIDEO 1	NTSC	___
01	VIDEO 2	PAL	___
02	RGB 1	CGA	___
03	RGB 1	EGA	___
04	RGB 1	PGA400	___
05	RGB 1	PGA480	___
06	RGB 2	IDC-1000	___
07	RGB 3	MACII	___

MACII is Registered trademark of Apple Computer Inc.

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

4.2. Changing the RGB Input Signal

When the projector is shipped from the factory, RGB 1 is adjusted to accept *IBM PC/AT and RGB 2, 3 will accept RGB 2, 3 signal input (see GP-3000 Operator's Manual). To input a different signal, it is necessary to adjust in the following order.

4.2.1. Change RGB 2, 3 Input Signal

RGB2,3 Preset Signal: the RGB 2,3 inputs have been adjusted at the factory.

If different signals are used, follow the steps outlined below:

(1) Cancel the recorded signal. (See GP-3000 Operator's Manual).

(2) R GAIN, G GAIN, B GAIN:

a) Press the PICTURE FUNCTION key and the CTL key on the remote control 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.

(3) H POSITION (Phase Adjustment):

a) Press the H POSITION key on the remote control to display "H POSITION" on the screen.

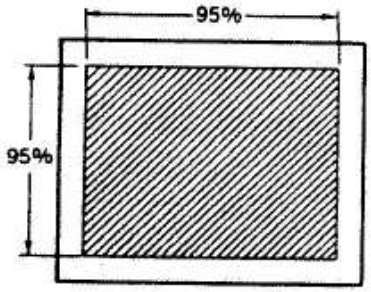
b) Press the remote control cursor keys to position the picture in the center of the screen.

(4) H WIDTH, V HEIGHT (Amplitude Adjustment):

a) Press the H WIDTH key on the remote control to display " H WIDTH" on the screen.

b) Press the remote control cursor keys to obtain a scan of 95% in proportion to the screen.

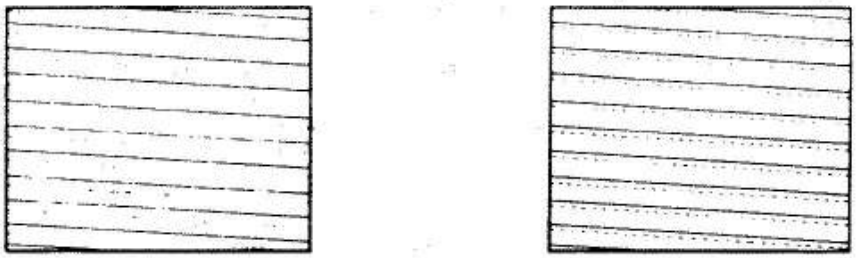
c) In the same manner, adjust the V HEIGHT.



(5) V HOLD (Vertical Sync Fine Adjustment)

a) Press the V HOLD key on the remote control to display "V HOLD" on the screen.

b) Press the remote control cursor keys to obtain a picture without pairing.



NOTE: Store the adjustment data in the memory by pressing the STORE key twice after the above adjustments have been completed.

(6) Convergence and Focus Adjustment

Carry out convergence and focus (See sections 3.2. and 3.3.).

4.2.2. Change RGB 1 Input

(1) Set No. 1 pin of DIP switch on the rear panel of the System Interface to OFF to select PS-2 mode.

(2) Connect the input signal. There are 4 modes for *IBM PS-2 as in the table below, therefore, carry out the adjustment for each mode. Adjust using the same procedures as in 4.2.1, steps 1-6 above.

Sync. Polarity		VGA Mode
H	V	
Positive	Negative	350 line
Negative	Positive	400 line
Negative	Negative	480 line
Posetive	Posetive	8514 A

4.2.3. 9 Pin RGB 1 Terminal

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

When selecting *IBM PC/AT

(1) Horizontal frequencies: Automatically scanning

15.85 khz *CGA mode

21.85 kHz *EGA mode

30.48 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 for 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.

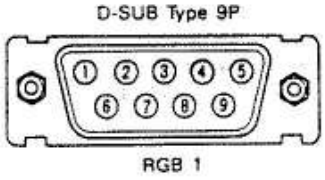
When selecting *IBM PS-2

The multi-sync function automatically adjusts itself to the 4 modes listed in the previous page.

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 is TTL.

9 Pin RGB Signal Composition

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



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

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)

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5. SERVICING PROCEDURES

5.1. Preliminary Settings

5.1.1. Standard Adjustment Condition

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

(1) Power Supply: AC 120V, 60Hz

(2) Warmed up for 20 minutes.

(3) INPUT SIGNALS:

VIDEO INPUT --

1. NTSC video signal, 1.0Vp-p, 75 ohms positive polarity
2. S-VIDEO signal:

   Y - 1.0 Vp-p, 75 ohms positive polarity

   C - 0.28Vp-p, 75 ohms burst level

RGB INPUT --

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

   H - 15kHz-55kHz

   V - 38Hz - 100Hz

(4) Unless otherwise specified, use 100" flat screen.

(5) Unless otherwise specified, all adjustments should be performed with the projector only.

(6) The system interface, SI-5320, to be used in adjustments should be pre-adjusted and operating normally.

5.1.2. Setting Of High Voltage

Set the VRs to the positions as follows:

Fully counter-clockwise --

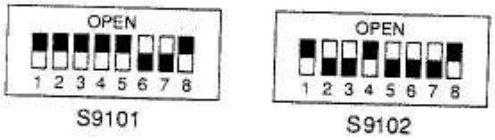
HV ADJ	(VR5501)
HV PROTECT (1)	(VR5502)
HV PROTECT (2)	(VR5503)

Fully clockwise --

FREQ ADJ	(VR5504)

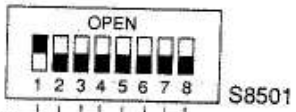
5.1.3. Setting Of DIP Switch PWB

Set the dip switches to the positions as illustrated below.



5.1.4. DIP Switch Setting Of D-CONV PWB

Set the dip switches to the positions as illustrated below.



No	OPEN	SHORT	FUNCTION
8	Always SHORT		NOT USED
7			
6			
5			
4			
3	0 data output	Outputs data set up in the factory	Output status when the convergence data is cancelled.
2	Always SHORT		Used inside the circuits on the PWB.
1	Always OPEN		Used inside the circuits on thePWB.

5.1.5. High Voltage & HV Protector Adjustment (HV PWB)

NOTE: The digital voltmeter to be used in this adjustment section should have the accuracy of +/-0.01V.

High Voltage Adjustment

(1) Connect a high voltage voltmeter to the HV CR unit.

(2) Adjust VR5501 (HV ADJ) to obtain 34.0 +/-0.1kV.

Frequency Adjustment

(1) Connect a digital voltmeter to the TPs as follows:

Positive polarity: TP5502 (CTL)

Negative polarity: TP5501 (GND)

(2) Adjust VR5504 (FREQ ADJ) so the voltmeter reads 11.0 +/-0.1V.

High Voltage Protector 2 Adjustment

(1) Connect a digital voltmeter to the limiter current check terminal (HV CURR).

(2) Adjust VR7108 (CONTRAST) on the GAIN CTL PWB and the VRs of the screen unit alternately to obtain the value of 1.2 + -0.1V.

(3) Connect the digital voltmeter to the TPs as follows:

Positive polarity: TP5503 (REF)

Negative polarity: TP5504 (HV-PROTECTOR 2)

(4) Adjust VR5503 (HV PROTECTOR 2) so the voltmeter reads 0.15 +/-0.01V.

(5) Seal the VR5503 with silicone rubber adhesive sealant.

(6) Measure and re-confirm the voltage obtained in item (4) is still 0.15 +/-0.01V.

High Voltage Protector 1 Adjustment

(1) Connect a digital voltmeter to the TPs as follows:

Positive polarity: TP5503 (REF)

Negative polarity: TP5505 (HV PROTECTOR 1)

(2) Adjust VR5502 (HV PROTECTOR 1) so the voltmeter reads 0.15 +/-0.01V.

(3) Seal the VR5502 with silicone rubber adhesive sealant.

(4) Measure and re-confirm the voltage obtained in item (2) is still 0.15 +/-0.01V.

5.1.6. Video Blanking Adjustment (VIDEO PWB)

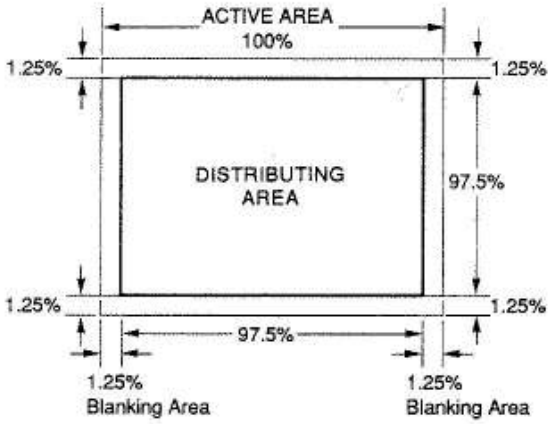
NOTE: Adjustment of this section is to be performed with the projector only.

(1) Feed in color bar signal.

(2) Adjust VR7407 to align the scale of 97.5% on the pattern to the right border of the screen.

(3) Adjust VR7405 to align the scale of 97.5% on the pattern to the left border of the screen.

(4) Adjust VR7406 to align the scale of 97.5% on the pattern to the top border of the screen.



Blanking Adjustment

5.1.7. Horizontal Oscillation Frequency Adjustment

(1) Set S5001 to the ADJ position.

(2) Switch to the VIDEO mode. Adjust the VR5006 (VIDEO H. OSC) to obtain the synchronized picture.

(3) Switch to the RGB mode. Feed in a signal 7, adjust the VR5002 (H. OSC (1)) to obtain the synchronized picture.

(4) Feed in a signal 11, adjust the VR5003 (H. OSC (2)) to obtain the synchronized picture.

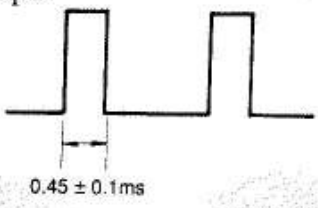
(5) Repeat the item 3) and 4) to obtain the synchronized picture both with a signal 7 and a signal 11.

(6) Set S5001 to the NORM position.

5.1.8. Vertical Blanking Pulse Width (DEF PWB)

(1) Connect an oscilloscope to TP4003.

(2) Adjust VR4001 (V BLK) so the blanking pulse width becomes 0.45 + -0.1 ms on the oscilloscope.



Vertical Blanking Pulse Width

5.2. Service Adjustments

5.2.1. Horizontal Position Adjustment

(1) Feed in video NTSC color bar signal.

(2) Set VR7108 (CONTRAST) control to minimum.

(3) Rotate G. SCREEN VR clockwise to display the back raster faintly.

(4) Rotate the VR7108 (CONTRAST) to display the color bar signal.

(5) Adjust the H. POSITION control on the remote control unit to position the pattern center with the center of raster.

(6) Press STORE key twice.

(7) Switch to the RGB mode, and apply the character signal which consists of 2000 "H" characters (Henceforth referred as H-character signal) with 31.5kHz H. sync frequency.

(8) Adjust the H. POSITION control so the H-character pattern is properly located in the raster.

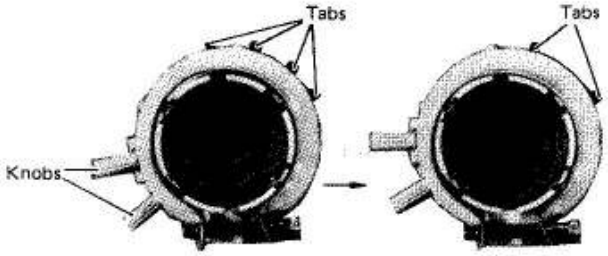
5.2.2. CPC (Conv. and Purity Control) Magnet Adjustment

Perform these adjustments only if needed.

(1) Check that the deflection yoke, focus magnet, and C.P.C. magnet of G CRT are precisely mounted on their assigned positions.

(2) Set the Centering and CPC magnets to zero magnetic field (see below).

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



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

Zero Magnetic Field

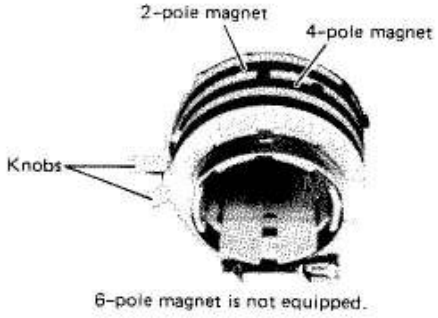
(3) Select built-in dot pattern test signal.

(4) Cover R and B CRTs to display only G CRT.

(5) Adjust the G. SCREEN VR to cut-off.

(6) Adjust the G. FOCUS control on the remote control unit so the flare appears around the spot as illustrated below:

(7) 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.



CPC Magnet

(8) Adjust the 4-pole magnet so the flare forms a circular shape.

(9) Adjust the G. FOCUS control n the remote control unit to make the flare disappear from the spot.

(10) In the same manner, adjust the R and B CRTs.

5.2.3. Centering Magnet Adjustment

(1) Press CANCEL key twice to cancel RGB static convergence.

(2) Adjust the focus wing nut on each CRT to obtain the optimum focus on the screen. (LENS FOCUS)

(3) Apply H-character signal, and change to the RGB mode.

(4) Cover R and B CRTs to display only G CRT.

(5) Adjust the centering magnet to position the pattern center with the screen center.

(6) If the pattern tilts horizontally or vertically, adjust the deflection yoke.

(7) Adjust the R and B CRTs in the same manner.

5.2.4. H Width, V. Height, And V. Hold Adjustments

(1) Feed in NTSC video color bar signal.

(2) Set H. WIDTH control to maximum with the remote controller and adjust VR5005 (H. WIDTH) to obtain 15% overscanning.

(3) Adjust H. WIDTH control to align the scale of 90% on the pattern to the screen borders of both sides.

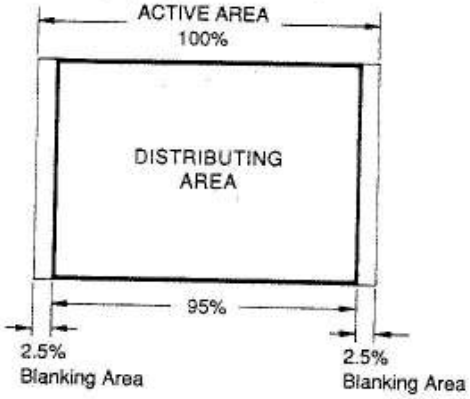
(4) Adjust V. HEIGHT control to obtain a pattern balanced with its within horizontal width.

(5) If a vertical rolling pairing occurs, adjust V. HOLD control.

(6) Change to the RGB mode, and apply H-character signal.

(7) Adjust the H.WIDTH control again to obtain 10% ratio of blanking area at both sides as in item (3).

(8) If a vertical rolling or pairing occurs, adjust the V.HOLD control again.



Overscan Adjustment

5.2.5. Vertical Linearity Adjustment

Perform these steps only if the vertical yoke plugs are reversed.

(1) Feed in NTSC crosshatch pattern signal, selecting the green test pattern.

(2) Cancel the green dynamic convergence.

(3) Adjust VR4002 (V.LIN) on DEF PWB for optimum performance.

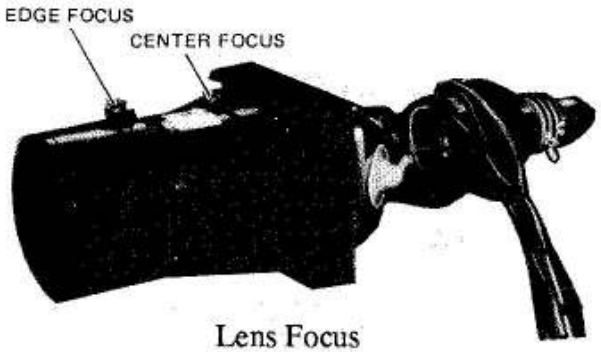
5.2.6. Optical Focus (Lens) Adjustment

(1) Change to the RGB mode

(2) Feed in H-character signal.

(3) Cover R and B CRTs to display only G CRT.

(4) Concentrate on the center of the pattern, and adjust the CENTER focus knob of the G CRT lens to obtain the best focus.



Lens Focus

(5) Next, adjust the EDGE focus knob of the G CRT to obtain the best focus observing the ambient area of the pattern.

(6) If the center focus deteriorates, repeat item (4).

(7) In the same manner, perform both CENTER and EDGE focus adjustments on the R and B CRTs.

5.2.7. Electric Focus Adjustment

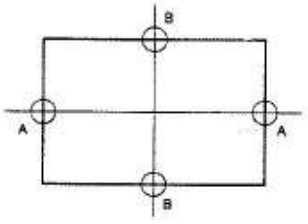
(1) Set No. 5 of S9101 on DIP SW PWB to SHORT side. Push RESET button to enter the common control mode.

(2) Feed in NTSC video crosshatch pattern signal.

(3) Cover R and B CRTs to display only G CRT.

(4) Concentrate on the center of the pattern by pressing the focus key in combination with the STATIC key, and adjust G. CENTER FOCUS control to obtain the best focus.

(5) Adjust G-DYNAMIC Focus referring to B. section. It is enough only to adjust G.CRT for H/V BALANCE adjustment.



H/V Balance

(6) Adjust H/V BALANCE referring to B section. It is enough only to adjust G CRT for H/V BALANCE adjustment.

(7) In case the center focus deteriorates, repeat item (3).

(8) In the same manner, perform the CENTER and EDGE FOCUS adjustment on the R and B CRTs.

(9) Set No. 5 of S9101 on DIP SW PWB to OPEN side. Push RESET button to enter the normal control mode.

(10) Change to the RGB mode, and apply H-character signal.

(11) Perform the CENTER and EDGE FOCUS adjustments for each R, G and B CRT as outlined in steps (2) to (8).

5.2.8. Tilt Phase Adjustment

(1) Confirm that DIP SW S9102 No. 2 is set to the SHORT side.

(2) Press TEST to display TEST screen.

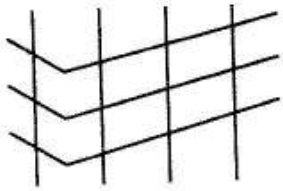
(3) Press CTL and CONV to display MENU screen as follows:

*****MENU*****

->1. TILT PHASE

2. CURSOR PHASE

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



Tilt Phase

(5) Adjust left or right 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.

5.2.9. Cursor Phase Adjustment

(1) Confirm that DIP SW S9102 No. 2 is set to the SHORT side.

(2) Press TEST to display TEST screen.

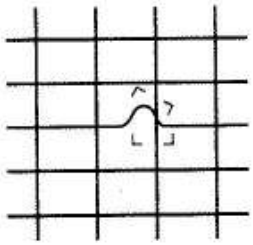
(3) Press CTL and CONV to display MENU screen as follows:

******MENU******

1. TILT PHASE

->2. CURSOR PHASE

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



Cursor Phase

(5) Adjust left or right 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.

5.2.10. White Balance Procedure

Gain Control PWB Setting:

Set the VRs to the positions as follows:

Mechanical Center --

SUB CONTRAST	(VR7108)
SUB BRIGHTNESS	(VR7109)
R. BLANKING	(VR7103)
G. BLANKING	(VR7102)
B. BLANKING	(VR7101)
R. GAIN	(VR7110)
G. GAIN	(VR7112)
B. GAIN	(VR7114)
R. BIAS	(VR7111)
G. BIAS	(VR7113)
B. BIAS	(VR7115)

Fully counterclockwise --

R. DRIVE	(VR7107)
G. DRIVE	(VR7106)
B. DRIVE	(VR7105)

Fully clockwise --

PEAK CLIP	(VR7104)

Setting Of Screen Unit VRs

Set the VRs on the SCREEN UNIT as follows:

Fully counterclockwise --

R. SCREEN VR

G. SCREEN VR

B. SCREEN VR

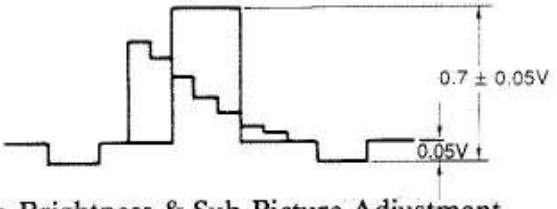
Sub Brightness and Sub Picture Adjustment

(1) Feed in color bar signal with the signal input level of 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 below.

(4) Adjust VR7403 (SUB PICTURE) so the amplitude is 0.7 +/-0.05Vp-p.



Sub-Brightness & Sub-Picture Adjustment

Signal Level Adjustment (GAIN CTL PWB)

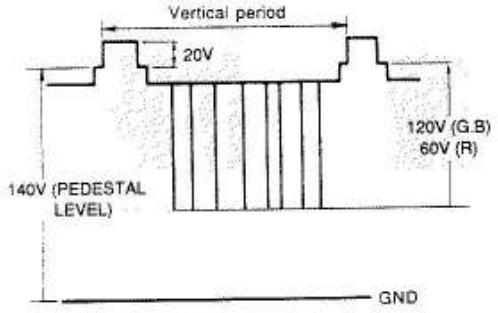
Setting of Blanking Margin

(1) Feed in cross signal.

(2) Connect an oscilloscope to the cathode of each R, G and B CRT PWB.

(3) Adjust VR7101 (B. BLANKING), VR7102 (G. BLANKING) and VR7103 (R. BLANKING) respectively to obtain a 20V blanking level for each CRT as illustrated below.

(4) Adjust VR7111 (R. BIAS), VR7113 (G. BIAS), and VR7115 (B. BIAS) respectively to obtain the pedestal level of 140V for each CRT.



Pedestal and White Peak Adjustment

Peak Clip Adjustment

(1) Connect the oscilloscope to the cathode of G CRT PWB.

(2) Feed in cross signal.

(3) Adjust VR7106 (G. DRIVE) so the vertical height of horizontal line becomes 130V on the oscilloscope.

(4) Adjust VR7104 (PEAK CLIP) to reduce 125V.

Drive Adjustment

(1) Connect an oscilloscope to the cathode of B CRT PWB and G CRT PWB respectively.

(2) Adjust VR7105 (B. DRIVE) and VR7106 (G. DRIVE) so the vertical height of horizontal line becomes 120V on B CRT PWB and G CRT PWB respectively.

(3) In the same manner, adjust VR7107 (R. DRIVE) so the vertical height of horizontal line becomes 60V at the cathode of R CRT PWB.

GAIN CTL PWB Adjustments

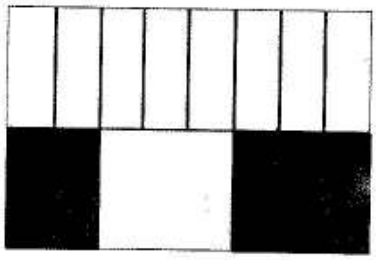
Cut-off and Drive Adjustment

(1) Feed in split screen NTSC color bar signal.

(2) Cover the red and blue CRTs. Adjust the G SCREEN VR so that the 4 green bars are fully and equally illuminated.

Repeat, covering the green and blue CRTs and adjusting so the 4 red bars are fully and equally illuminated.

Repeat, covering the green and red CRTs and adjusting so the 4 blue bars are fully and equally illuminated.



NTSC Split Screen Color Bar Signal

(3) Set CONTRAST to minimum with the remote controller.

(4) 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.)

(5) Set CONTRAST to maximum with the remote controller.

(6) Confirm the white balance is optimum. If not, adjust it with VR7107 (R.DRIVE) and VR7105 (B. DRIVE). (Do not rotate VR7106 (G. DRIVE) as it is the reference.

(7) Repeat items from (6) to (8) until the best white balance is obtained.

Brightness Tracking Adjustment

(1) Set BRIGHTNESS and CONTRAST to maximum with the remote controller.

(2) Check if the white balance is optimum. If not, adjust it with VR7110 (R.GAIN) or VR7114 (B. GAIN). Do not rotate VR7112 (G. GAIN) as it is reference.

(3) Set BRIGHTNESS to minimum with the remote controller.

(4) Check the white balance, and if it is out, adjust it with VR7111 (R. BIAS) or VR7115 (B. BIAS). (Do not rotate VR7113 (G. BIAS) as it is a reference.)

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

White Balance Confirmation

(1) Set BRIGHTNESS to center and CONTRAST to max. with remote.

(2) Check the white balance by varying CONTRAST and BRIGHTNESS alternately. If the white balance is off, perform the following procedures:

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

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 VR7402 (SUB BRIGHTNESS) on the VIDEO PWB.

(4) To increase or decrease the brightness level, perform fine adjustment by VR7108 (CONTRAST) on the GAIN CTL PWB.

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

Video AFC

(1) Connect a frequency counter to TP7407.

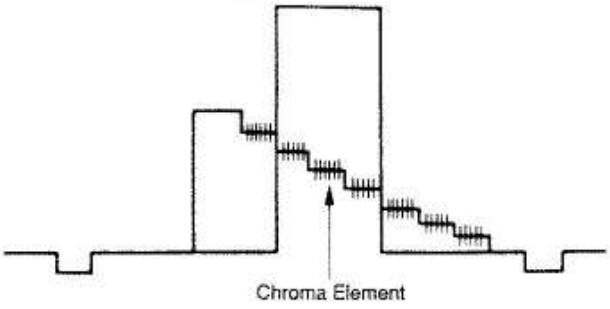
(2) Adjust VR801 to obtain 15.7 +/-0.1kHz.

Comb Filter Adjustment

(1) Feed in color bar signal. Make sure chroma element is on.

(2) Connect the oscilloscope to TP7402(Y).

(3) Adjust VR7401 and T7401 alternately so that the amplitude of the chroma element on the color bar signal becomes minimum.



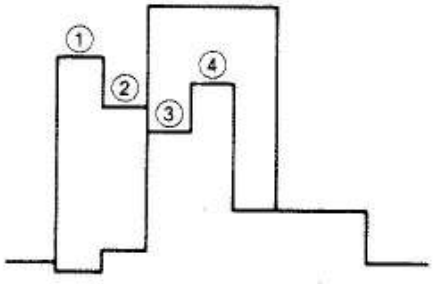
Waveform at TP7402

Color, Tint, and Sharpness Adjustment

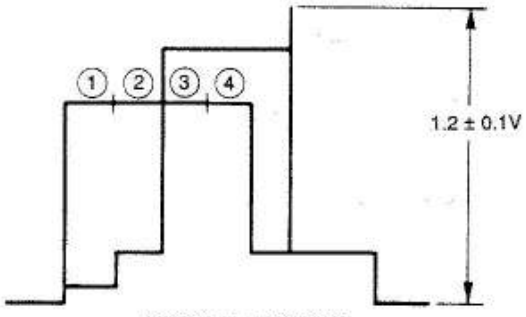
(1) Feed in color bar signal.

(2) Connect the oscilloscope to TP7404 (G).

(3) Adjust VR7408 (SUB COLOR) and VR7409 (SUB TINT) alternately to align the level of each column on the waveform as illustrated below.



BEFORE ADJUSTMENT



AFTER ADJUSTMENT

Waveform at TP7404 (G)

Confirmation Of Color, Tint, And Sharpness

(1) Feed in video color bar signal.

(2) If any abnormalities are found in color, tint, or sharpness, adjust it by VR7408 (SUB COLOR), VR7409 (SUB TINT), or VR7410 (SUB SHARPNESS) with eye confirmation.

5.2.11. Adjusting the VIDEO PWB

Set the VRs as described below.

Mechanical Center --

VR7407 (H.BLK 1)

VR7405 (H.BLK 2)

Fully Counterclockwise --

VR7404 (W.PEAK)

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

5.2.12. 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 (PGA 400) SIGNAL 4 (PGA 480)
RGB 2	SIGNAL 5 (IDC-1000)
RGB 3	SIGNAL 6 (MAC-II)

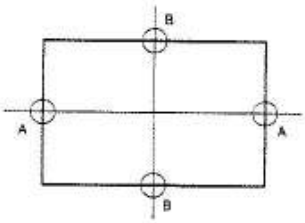
See also the Signal Table and Timing Chart

5.2.13. Electric Focus Adjustment (2)

(1) Apply one of the signals listed on the connection section to the system interface.

(2) Adjust the G. CENTER FOCUS by pressing the focus key in combination with the STATIC key on the remote controller to obtain the best focus on the screen concentrating on the center area.

(3) Adjust H/V BALANCE referring to B section. It is enough only to adjust G.CRT for H/V BALANCE adjustment.



H/V Balance

(4) Adjust the G.EDGE FOCUS by pressing the focus key in combination with the DYNAMIC key on the remote controller concentrating on the peripheral area.

5.2.14. H-Position, H-Width, V-Height, and V-Hold

Horizontal Position

(1) Center the pattern within the screen using the H.POSITION control on the remote controller.

Horizontal Width and Vertical Height

(1) Select the VIDEO 1 mode and apply NTSC color bar signal.

(2) Check that the 10% blanking of the horizontal width are obtained, and the vertical height is balanced with its horizontal width.

(3) Switch to the VIDEO 2 mode, and then apply PAL color bar signal.

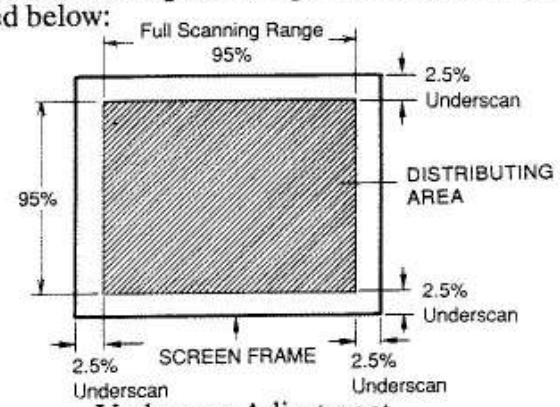
(4) Adjust the H. WIDTH control on the remote controller to obtain 10% blanking on the horizontal width, an adjust V.HEIGHT button to obtain the vertical height which is in proportion as its horizontal width.

(5) When in RGB 2 mode, apply H-character signal.

(6) Confirm the 10% blanking is obtained on both sides of the screen, and the vertical height is in proportion to its H. WIDTH

(7) When in RGB 1 and 3, apply H-character signal.

(8) Adjust the H. WIDTH and V. HEIGHT controls so both the horizontal width and vertical height of the pattern become 5% underscan as illustrated below:

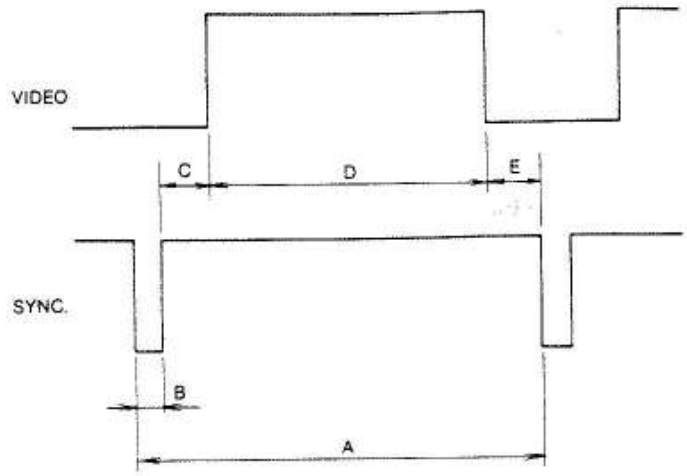


Underscan Adjustment

Vertical Hold

(1) If vertical rolling or pairing occurs, adjust V. HOLD control.

Timing Chart



Signal 1	RGB 1	IBM CGA
Signal 2		IBM EGA
Signal 3		IBM PGA 400 line mode
Signal 4		IBM PGA 480 line mode
Signal 5	RGB 2	IDC-1000
Signal 6	RGB 3	MAC II
Signal 7	15kHz	60Hz
Signal 8	25kHz	60Hz
Signal 9	35kHz	60Hz
Signal 10	45kHz	60Hz
Signal 11	55kHz	60Hz
Signal 12	15kHz	38Hz
Signal 13	15kHz	70Hz
Signal 14	15kHz	100Hz

Signal Table

		A	B	C	D	E
Signal 1	Hμs	63	4.2	7.2	45	6.6
	Vms	16.4	0.075	1.525	12.6	2.2
Signal 2	Hμs	45.5	4.9	1.6	39	0
	Vms	16.68	0.6	0.08	16	0
Signal 3	Hμs	33	4.5	2.8	25.6	0.1
	Vms	16.6	0.07	2.12	13.05	1.36
Signal 4	Hμs	33	4.5	2.8	25.6	0.1
	Vms	16.6	0.07	0.83	15.67	0.03
Signal 5	Hμs	31.78	2.76	1.60	26.29	1.13
	Vms	16.67	0.64	0.77	15.14	0.12
Signal 6	Hμs	28.57	2.12	3.17	21.16	2.12
	Vms	15.00	0.09	1.11	13.71	0.09
Signal 7	Hμs	66.7	9.1	5.7	51.7	0.2
	Vms	16.7	0.07	3.33	10.95	2.35
Signal 8	Hμs	40.0	5.5	3.4	31.0	0.1
	Vms	16.7	0.07	3.33	10.95	2.35
Signal 9	Hμs	28.6	3.9	2.4	22.2	0.1
	Vms	16.7	0.07	3.33	10.95	2.35
Signal 10	Hμs	22.2	3.0	1.9	17.2	0.1
	Vms	16.7	0.07	3.33	10.95	2.35
Signal 11	Hμs	18.2	2.5	1.6	14.1	0
	Vms	16.7	0.07	3.33	10.95	2.35
Signal 12	Hμs	66.7	9.1	5.7	51.7	0.2
	Vms	26.3	0.11	5.2	17.2	3.8
Signal 13	Hμs	66.7	9.1	5.7	51.7	0.2
	Vms	14.3	0.06	2.9	9.4	1.9
Signal 14	Hμs	66.7	9.1	5.7	51.7	0.2
	Vms	10.0	0.05	2.0	6.6	1.3

5.3. Supplementary Adjustments

NOTE: All the adjustments of this section are already completed at the factory. It is necessary to perform the adjustment only when replacing the entire circuit board assembly.

NOTE: Safety precautions call for powering down the unit before any adjustments or connections/disconnections are made.

5.3.1. Adjusting the DEF PWB

Setting of VRs and Switches --

(1) Rotate VR5004 fully counterclockwise. Place the other controls in their mechanical center positions.

(2) Set S4001 and S5001 to the ADJ position.

Vertical Oscillation Frequency and Amplitude Adjustment

(1) Disconnect the HV connector.

(2) Connect VR, VG and VB connectors to each CRT.

(3) Unplug the connector DC.

(4) Connect a frequency counter or an oscilloscope to TP4006.

(5) Adjust VR4007 (V.OSC 3) to obtain a vertical oscillation frequency of 60.0 +/-0.1 Hz.

(6) Connect the oscilloscope to TP4004, and adjust VR4008 (V.HEIGHT 3) to obtain a vertical sawtooth waveform less than 10mVp-p.

Waveform at TP4004

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

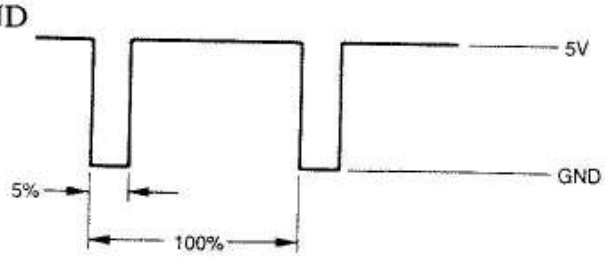
Waveform at TP4006

(8) Adjust VR4002 (V.LIN) to make the sawtooth waveform linear slope.

(9) Connect a signal generator to feed V.SYNC signal in HV connector as below.

HV 3 : Vertical sync signal

HV 4 : GND



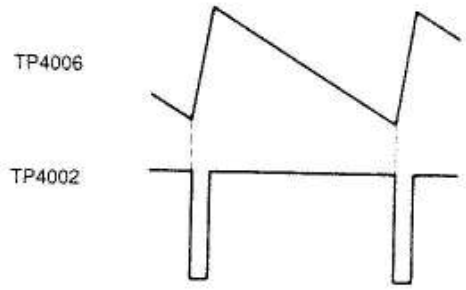
V Sync Signal

(10) Connect an oscilloscope to TP4001 and TP4006 respectively.

(11) Check that the following patterns are obtained on the oscilloscope.

(12) Feed in signal 12 (see the Signal Table at the end of 5.2.), and adjust VR4004 (V. OSC 2) to set the pattern within the synchronized drawing range.

(13) Feed in signal 14 (see the Signal Table at the end of 5.2.), and adjust VR4003 (V.OSC 1) to set the pattern within the synchronized drawing range.



V Sync Signal

(14) Repeat the above steps (10) to (14) to make the pattern within the synchronized drawing range with both 38 Hz and 100 Hz frequencies.

(15) Set S4001 to the "NORM" side.

(16) Connect the oscilloscope to TP4006.

(17) Adjust the VRs below to obtain 6.5 +/-0.1Vp-p sawtooth waveform on the oscilloscope while feeding their corresponding input signals.

VR4006 (V.HEIGHT 2) -- 38 Hz signal

VR4005 (V. HEIGHT 1) -- 100 Hz signal

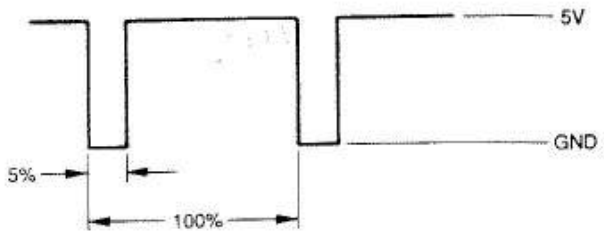
(18) If the value of 6.5 +/-0.1Vp-p cannot be obtained, repeat item (18).

Horizontal Oscillation Frequency

(1) Feed an 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 2.1 +/- 0.01V on the voltmeter with the H. sync signal of 15.75kHz.

(4) Connect a frequency counter to TP5004, and adjust VR5002 (H. OSC 1) with 15.75kHz H. Sync signal input to obtain 55.0 +/-0.2kHz with 55kHz H. sync signal input.

(6) Repeat item (4), (5) to obtain 55.0 +/-0.2kHz.

(7) Adjust VR5006 (VIDEO H. OSC) so a 15.75 +/-0.2kHz reading is obtained at TP5004 when removing the H. SYNC signal from HV connector.

(8) Set the S5001 to the "NORM" side.

Horizontal Width Adjustment

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

(2) Connect the following power supply to the PA connector as follows:

PA 1: 33.0 +/-0.1V

PA 3: GND

(3) Connect a voltmeter to TP5008, and adjust VR5005 (H.WIDTH) to obtain 1.8 +/-0.1V.

(4) Connect a digital voltmeter to the TPs as follows:

Positive polarity: TP5007

Negative polarity: TP5006

(5) Adjust VR5004 (H.OUT PROTECTOR) to obtain 1.0 +/-0.1V

5.3.2. Adjusting the SYSTEM PWB

Setting of Reference Voltage

(1) Setting of Jumper Lead. Connect pins 3 and 6 of J8201.

(2) Connect a voltmeter to pin 1 of BC connector.

(3) Adjust VR8301 to obtain a measurement of 0.0 +/-0.1 V on the voltmeter.

(4) Remove the jumper.

5.4. CRT and Lens Servicing

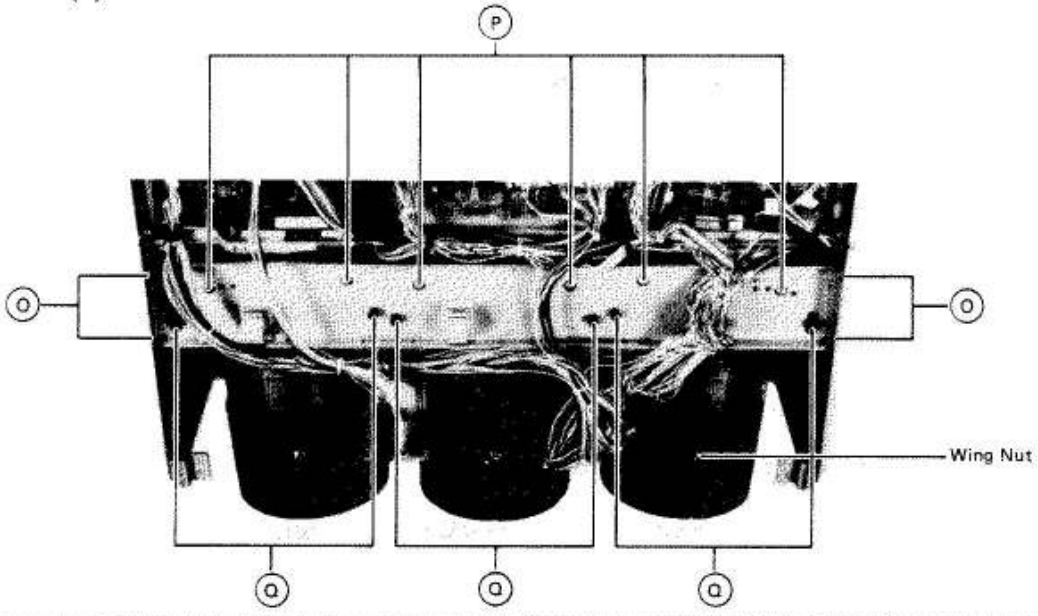
5.4.1. Replacing the CRT

NOTE: Use extreme care when replacing the CRT. Avoid scratching the CRT; scratches will degrade the reliability. Do not attempt to remove the anode lead from the CRT. The CRT is supplied with the anode lead permanently attached.

(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.

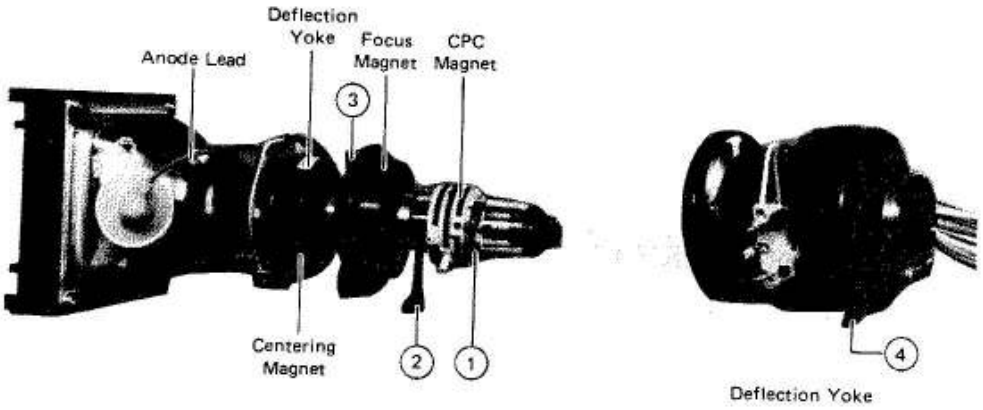
(3) Remove the CRT PWB from the end of the CRT neck.



(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 2 screws (K) which mount the chassis.

(9) Lift up the chassis and pull the anode lead through under the chassis.

(10) Lift up and pull out the CRT toward you.

(11) Reverse the procedure above to replace the CRT assembly.

5.4.2. Adjustments Following CRT Replacement

NOTE: When a CRT is replaced with a new one, readjustment for only that color may be necessary. In the case of the green CRT, green dynamic convergence should be adjusted according to the red CRT.

NOTE: Do not rotate the controls other than those associated with the CRT which was replaced unless required.

Raster Position Adjustment

(1) Unplug connector "C" on the CF DRIVE PWB. The convergence values will be set to zero.

(2) Display a crosshatch pattern.

(3) Cut-off the red and blue CRTs to display only green.

(4) While pushing the deflection yoke toward the CRT, rotate it so that the pattern on the screen is positioned horizontally.

(5) Tighten the deflection yoke set screw.

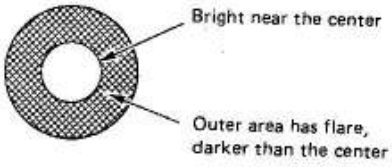
(6) Display the red and blue.

(7) Adjust the centering magnets (located on the rear of the ;yoke) of the green CRT so the green image is centered within the green CRT. Turn down the BRIGHTNESS in order to look into the CRT to center the image.

CPC Magnet Adjustments for FOCUS

(1) Display only the green CRT, the turn down the BRIGHTNESS with the remote control until the raster becomes dark.

(2) Adjust G. CENTER FOCUS with the remote control so the flare appears on the spot. The center should be bright (core) and the surrounding area has flare.



(3) Adjust the 2 pole magnet to a core appears in the center of the flare.

(4) Adjust the 4 pole magnet so the flare becomes a circular shape.

(5) Adjust G CENTER FOCUS with the remote so the flare disappears.

(6) Adjust the red and blue CRTs in the same manner.

Dynamic Convergence Adjustment

(1) Unplug connector "C" on the CF DRIVE PWB.

(2) Carry out Dynamic Convergence as outlined in 3.3.4.

5.4.3. Lens Cleaning Procedure

To minimize the possibility of damaging the optical coating or scratching exposed lens surfaces, we recommend you 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.

(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. 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 RECOMMENED
Solvents	Mild Liquid window cleaner	Direct spraying of any fluid. Aerosol
Cloth	Cotton Soft tissue	Dry cloth or tissue

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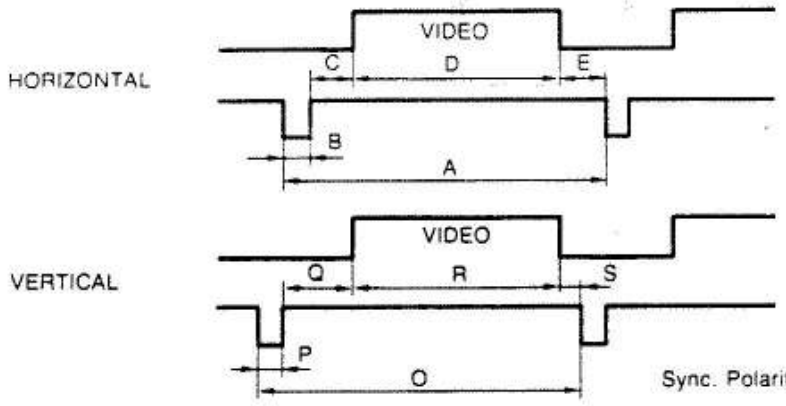
6. TIMING CHARTS and TROUBLESHOOTING

6.1. Timing Charts

Separate Sync



Sync. Polarity: Positive/Negative

	f_H	RGB 1 SIGNAL				RGB 2 SIGNAL	RGB 3 SIGNAL
		* IBM CGA	* IBM EGA	* IBM PGA 400Line MODE	* IBM PGA 480Line MODE	IDC-1000	** MAC II
Horizontal	A μs	63	45.5	33	33	31.78	28.57
	B μs	4.2	4.9	4.5	4.5	2.76	2.12
	C μs	7.2	1.6	2.8	2.8	1.6	3.17
	D μs	45	39	25.6	25.6	26.29	21.16
	E μs	6.6	0	0.1	0.1	1.13	2.12
Vertical	Oms	16.4	16.68	16.6	16.6	16.67	15
	Pms	0.076	0.6	0.07	0.07	0.64	0.09
	Qms	1.525	0.08	2.12	0.83	0.77	1.11
	Rms	12.6	16	13.05	15.67	15.14	13.71
	Sms	2.2	0	1.36	0.03	0.12	0.09

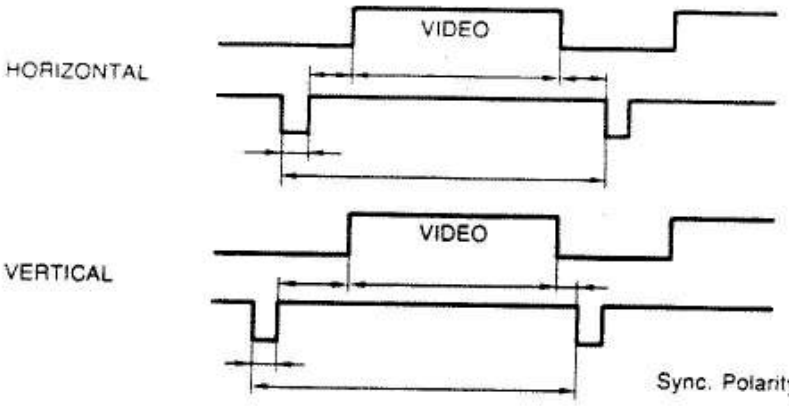
IBM PS/2 Timing Charts

	FH	350 Line MODE 31.47kHz	400 Line MODE 31.47kHz	480 Line MODE 31.47kHz	8514A MODE 35.52kHz
Horizontal	Aμs	31.8	31.8	31.8	28.2
	Bμs	3.8	3.8	3.8	3.9
	Cμs	1.6	1.6	1.6	1.3
	Dμs	26.1	26.1	26.1	22.8
	Sync polarity	+	−	−	+
Vertical	Oms	14.3	14.3	16.7	11.5
	Pms	0.06	0.06	0.06	0.11
	Qms	1.72	0.89	0.79	0.56/0.58*
	Rms	11.53	13.19	15.79	10.81
	Sms	0.99	0.16	0.06	0.02
	Sync polarity	−	+	−	+

* Interface

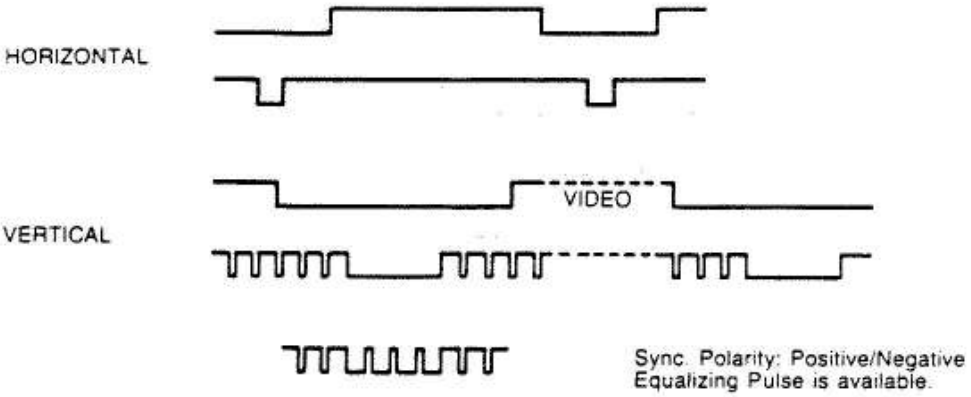
6.1.1. Timing Charts Examples

1) Separate Sync

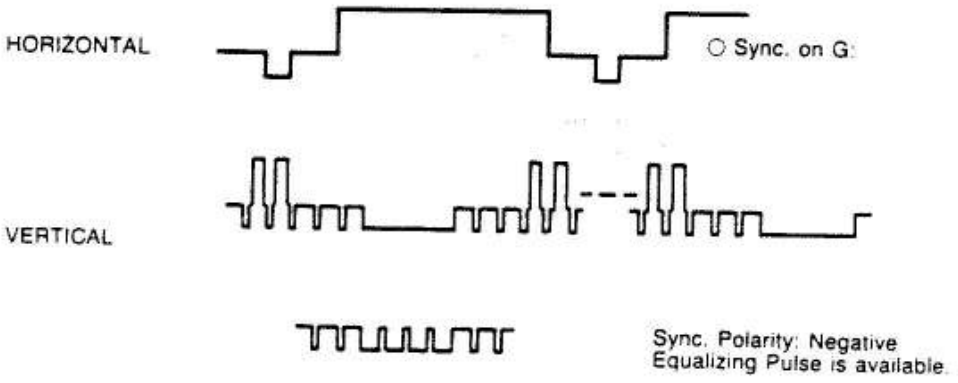


Sync. Polarity: Positive/Negative

2) Composite Sync



3) Composite Sync and Video (Sync on Green)



6.2. Troubleshooting Outline

Before attempting any servicing procedures to the GP-3000, 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 problem arise after a specific Video Device was added to the System?

Has the proper Setup Procedure been followed? i.e.,

Correct Distance between Screen and Projector?

Spacers correctly installed?

Centering Rings Adjusted?

Floor Front Projection?

Was the Electric VR4002 Adjusted BEFORE Digital Convergence was attempted?

If the SI-5320 (System Interface) is not connected, is the Standby Indicator flashing?

If the Standby Indicator is blinking, is the control cable from the SI- 5320 to the projector properly connected?

B. New Additions to an Existing System: What was just Added, or being adjusted when problem occurred?

Is it a 'Warm-up', i.e. a FUZZY picture that appears 'normal' after twenty minutes? Or,

Just the opposite, After Twenty-Thirty Minutes does the image fade away or maybe 'tear apart?'

C. **Once YOU'VE decided** to open the projector up to determine the cause use the following Troubleshooting Flowchart and Notes to expedite matters.

6.2.1. 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 output at the connectors on the PS DIV PWB? (Setting for VIDEO mode, no signal).

BASE Connectors:

Connector	Pin	Approx. Voltage
IA	(1)	40V
IB	(1)	8V
IB	(5)	8V
IC	(1)	180V
IC	(2)	110V
IC	(3)	15V
IC	(4)	-15V
IC	(5)	6.3V
ID	(1)	36V
ID	(2)	-36V

YES: Power relation normal.

NO: Remove connectors IE, IF and BASE connectors (IA, IB, IC and ID) from the PS DIV PWB and short connector IE. Apply the voltage which value is approx. 2.2V DC to IA pin 2. Check the voltage of BASE connectors. Confirm the correct voltages at the BASE connectors. Are the voltages correct?

NO: Defective PS unit. See Note 1 in "6.3 Troubleshooting Notes."

YES: Insert connectors IE, IF and BASE connectors to the PS DIV PWB. Cut off the high voltage to protect CRT. Remove connectors KA, KB from the HV PWB. Is STAND BY LED lit when MAIN POWER SW on PS unit is turned on?

NO: No power.

YES: Remove connectors PI, PM, PE from the PS DIV PWB and short pins PM 1, 2 of the PS DIV PWB. Confirm the correct voltages at the BASE connectors. Are the voltages correct?

YES: Defective SYSTEM PWB (see Note 2 of section 9.3), D_CONV PWB (see Note 3), or PS (see Note 1).

NO: Remove connector PC from the PS DIV PWB. Are the correct voltages present at the BASE connectors?

YES: Defective D-CONV FOCUS CIRCUIT of CF DRIVE PWB (see Note 4 in section 6.3).

NO: Remove connector PF from the PS DIV PWB. Are the correct voltages present at the BASE connectors?

YES: Defective STATIC CONV FOCUS CIRCUIT of CF DRIVE PWB (see Note 4 in section 6.3).

NO: Remove connector PH from the PS DIV PWB. Are the correct voltages present at the BASE connectors?

YES: Defective VIDEO PWB (see Note 5 in section 6.3).

NO: Remove connectors PR, PG, PB from the PS DIV PWB. Are the correct voltages present at the BASE connectors?

YES: Defective RGB CRT PWBs (see Note 6 in section 6.3).

NO: Remove connector PV from the PS DIV PWB. Are the correct voltages present at the BASE connectors?

YES: Defective GAIN CTL PWB (see Note 7 in section 6.3).

NO: Remove connector PA from the PS DIV PWB. Apply a voltage of approx. 2.2V DC and check the voltages at the BASE connectors. Are they correct?

YES: Defective horizontal deflection output circuit on DEF PWB (see Note 8 in section 6.3).

NO: Remove connector PD from the PS DIV PWB. Are the correct voltages present at the BASE connectors?

YES: Defective vertical deflection circuit or vertical deflection control circuit on DEF PWB (see Note 8 in section 6.3).

NO: Reconnect all the connectors to their original positions and remove connector PK from the PS DIV PWB. Are the correct voltages present at the BASE connectors?

YES: Defective HV PWB (see Note 9 in section 6.3).

NO: Confirm that the pattern on PS DIV PWB is not shorted.

6.2.2. No Power

Is the STAND-BY indicator always lit?

NO: Does the STAND-BY indicator blink off and on?

YES: Confirm that SI-5320 is connected correctly and DIP switches on SI-5320 CONTROL PWB are set correctly (see section 2.3).

NO: Defective SUB-CPU (IC8225) on SYSTEM PWB and the peripheral circuits (see Note 2 in section 6.3).

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

NO: Is the waveform in the following figure output at RS 1 pin on INPUT PWB when remote control unit is operated?

NO: Defective remote control unit (see Note 10 in section 6.3) and LED PWB (in case of infrared sensor remote unit) (see Note 11 in section 6.3).

YES: Is the voltage at PM 1 pin on SYSTEM PWB L level (approx. 0V)?

NO: Defective SUB-CPU (IC8225) of the SYSTEM PWB and the peripheral circuits (see Note 3 in section 6.3).

YES: Confirm the correct connectors PM, IE on the PS DIV PWB and PM on the SYSTEM PWB.

YES: The POWER is ON. Check other sections.

6.2.3. No High Voltage Output

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

Is the voltage at pin 1 of IC5501 on the HV PWB level L (approx. 0V)?

NO: Is the voltage at pin 1 of connector LP on the HV PWB level L (approx. 0V)?

YES: Confirm that the voltage of 180V line is not decreased

YES: Refer to Power Supply Trouble.

NO: Defective PS unit MUTE circuit (see Note 1 in section 6.3).

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 detection circuit (see Note 8 in section 6.3).

NO: Vertical amplitude too small or defective vertical deflection output circuit (see Note 8 in section 6.3).

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

YES: Defective horizontal deflection detection circuit (see Note 8 in section 6.3).

NO: Horizontal amplitude too small or defective horizontal deflection output circuit (see Note 8 in section 6.3).

NO: Defective high voltage cut off circuit (Q5013, Q5014) on the DEF PWB (see Note 8 in section 6.3).

YES: Is the high voltage drive pulse at pins 19 and 20 of IC5501 on HV PWB approx. 6.4Vp-p?

YES: Defective voltage output circuit (Q5503, 5504, 5505, etc.) (see Note 9 in section 9.3), or F.B.T. (see Note 11 in section 6.3).

NO: Defective high voltage control circuit (IC5501, HV PROTECTOR etc.) on HV PWB (see Note 9 in section 6.3).

6.2.4. 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 HV PWB high voltage control circuit (IC5501 etc.) (see Note 9).

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

NO: Is the ON SCREEN correctly displayed?

YES: Defective LEVEL CONTROL circuit in the SYSTEM PWB (see Note 2 in section 6.3).

NO: Defective SYSTEM PWB (see Note 2 in section 6.3).

YES: Set CONTRAST to maximum. Is the voltage at pin 14 of IC7101 on the GAIN CTL PWB approx. 10V?

NO: Defective LIMITER circuit on the GAIN CTL PWB (see Note 7).

YES: Is there a horizontal clamp pulse (approx. 5Vp-p) at pin 13 of IC7306 on the GAIN CTL PWB?

NO: Defective SYNC circuit (see Note 8 in section 6.3.).

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

NO: Defective LCA (IC8207) I/O (IC8217) peripheral circuit on the SYSTEM PWB (see Note 2 in section 6.3).

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

YES: Continue on next page with "YES."

NO: Is pin 6 of the connector TE on the GAIN CTL PWB level H (approx. 5V)?

YES: Defective BLANKING circuit on the GAIN CTL PWB (see Note 7 in section 6.3).

NO: Defective LCA (IC8207) I/O (IC8217) peripheral circuit on the SYSTEM PWB (see Note 2 in section 6.3).

YES: Is there a video signal input (approx. 0.7Vp-p) at pins 3, 7 and 11 of IC7101 on the GAIN CTL PWB?

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

YES: Defective video selector circuit (relay, etc.) on the GAIN CTL PWB (see Note 7 in section 6.3).

NO: Confirm input signal.

NO (Stand alone and set in VIDEO mode): Is there a 0.7Vp-p video signal input at pins 1, 3 and 5 of VO connector 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 5 in section 6.3).

NO: Confirm input signal.

YES: Is there a video signal (approx. 4.5Vp-p) at TP7101 and a video signal (approx. 7.5Vp-p) at TP7102 and TP7103 on the GAIN CTL PWB?

NO: Defective PRE-DRIVE circuit on the GAIN CTL PWB (see Note 7 in section 6.3).

YES: Is there a 70Vp-p video signal at TP7701 on the R-CRT PWB, a 120Vp-p video signal at TP7731 on the G-CRT PWB, and a 120Vp-p video signal at TP7761 on the B-CRT PWB?

NO: Defective CRT without picture (see Note 12 in section 6.3).

YES: Defective CRT PWB without picture (see Note 6 in section 6.3).

6.2.5. No Test Signal

Is the waveform at pin 2 of connector TE approx. 5Vp-p?

NO: Defective LCA (IC8207, IC8269) on the SYSTEM PWB and PLL circuit (see Note 2 in section 6.3).

YES: Is the signal waveform at emitter of Q7009 approx. 0.7Vp-p?

NO: Defective TEST signal circuit (IC7001, Q7008, Q7009, etc.) (see Note 2 in section 6.3).

YES: Is the voltage at pins 9, 10 and 11 of connector BC on the GAIN CTL PWB level H (approx. 5V)?

YES: Refer to "9.2.4. High Voltage Output but No Picture."

NO: Confirm the RGB MUTE signal from remote control unit. Also confirm the TEST signal is output. Is the voltage at pins 9, 10, and 11 of connector BC level H (approx. 5V)?

NO: Defective LCA (IC8207), I/O (IC8217) peripheral circuit on the SYSTEM PWB (see Note 2 in section 6.3).

6.2.6. 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 of approx. 6Vp-p?

YES: Is the convergence yoke correctly connected?

NO: Connect the convergence yoke correctly.

YES: Is the convergence yoke defective?

NO: Defective CF DRIVE PWB (see Note 4 in section 6.3).

YES: Defective convergence yoke (see Note 13 in section 6.3).

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

NO: Connect the DIP switch on the D-CONV PWB correctly.

YES: Is there a waveform at pins 1, 2, 3, 5, 12, 13 of IC 8591 and IC8592 on the D-CONV PWB approx. 6Vp-p?

YES: Defective D-CONV PWB and convergence output circuit (see Note 4 in section 6.3).

NO: Is there approx. 5Vp-p at the following pins: 1 through 4, 9 through 16, 23, and 24 of IC8538, IC8547, IC8557, IC8567, IC8577 and IC8587 on the D-CONV PWB?

NO: Defective D_CONV PWB (see Note 4 in section 6.3).

YES: Defective D-CONV PWB and output D/A converter (see Note 4 in section 6.3)

6.3. Troubleshooting Notes

NOTE 1

REPLACE the PS PWB (PWG 648A):

Part #79609381?

Verify proper voltage levels at the base connectors.

If voltage levels are as listed, reassemble unit. If not, continue troubleshooting.

NOTE 2

REPLACE the SYSTEM PWB (PWG 604):

Part #93R65M01

Verify Proper VR8301 Setting of 0.00 +/- 0.0 Vdc.

Verify Proper Digital Control Operation.

NOTE 3

REPLACE the D-CONV PWB (PWG 605):

Part #93R65B01

Verify Proper Digital Controls.

Perform the Digital Convergence Procedure, Sections 3.3.

NOTE 4

REPLACE the CF DRIVE PWB (PWG 602):

Part #93R65U01

Verify Proper Focus and Convergence Performance.

Perform the Digital Convergence Procedure, Sections 3.3.

NOTE 5

REPLACE the VIDEO PWB (PWG 596):

Part #93R6501

Perform the Video PWB Adjustments, Section 5.2.11.

NOTE 6

REPLACE the CRT PWB (PWG 599 R.G.B.)

Part #93R65C01

Perform the White Balance Procedure, Section 5.2.10.

NOTE 7

REPLACE the GAIN CTL PWB (PWG 597):

Part #93R65G01

Perform the White Balance Procedure, Section 5.2.10.

NOTE 8

REPLACE the DEF PWB (PWG 588):

Part #93R65E01

Perform the DEF PWB Control Setting, Section 5.3.1.

NOTE 9

REPLACE the HV PWB (PWG 595A):

Part #93R65H01

Verify Proper HV Operation.

NOTE 10

REPLACE the REMOTE CONTROL HAND UNIT (IR-3040):

Part #79609501

Verify Proper Remote Control Operation.

NOTE 11

REPLACE the FBT (T5503, T5504):

Part #47105313 T5503

Part #47105313 T5504

Verify Proper HV Operation.

NOTE 12

REPLACE the CRT (CRT R.G.B.):

Part #95R65631 CRT C7M142P22R SASSY (RED)

Part #95R65641 CRT C7M142P22G SASSY (GREEN)

Part #95R65651 CRT C7M142P22B SASSY (BLUE)

Perform the New CRT Assembly Procedure, Section 5.4.

Perform the White Balance Procedure, Section 5.2.10.

NOTE 13

REPLACE the DEFLECTION YOKE (DY):

Part #48009067 DY (RED)

Part #48009065 DY (GREEN)

Part #48009066 DY (BLUE)

Perform the New CRT Assembly Procedure, Section 5.4.

Perform Electric Focus Through Hand Unit.

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7. REPLACEMENT PARTS LISTING

PART NO.	SYMBOL NUMBER	DESCRIPTION
93R65B01	PWG 605	DIGITAL CONVERGENCE PWB
93R65C01	PWG 599R,G,B	CRT PWB
93R65E01	PWG 558	DEFLECTION PWB
93R65G01	PWG 597	GAIN CTL PWB
93R65H01A	PWG 595A	HIGH VOLTAGE PWB
93R65H01B	PWG 595B	FBT PWB
93R65H01C	PWG 595C	FBT PWB
79609381	PWG 648A and PWG 648B	PS UNIT PWB
93R65M01	PWG 604	SYSTEM PWB
93R65N01	PWG 603	INPUT PWB
93R65R01A	PWG 600A	CONTROL PWB
93R65R01B	PWG 600B	PS DIV PWB
93R65R01C	PWG 600C	LINEAR COIL PWB
93R65R01D	PWG 600D	LED PWB
93R65R01E	PWG 600E	DIP SW PWB
93R65U01	PWG 602	CONVERGENCE FOCUS DRIVE PWB
93R65V01	PWG 596	VIDEO PWB
95R65631	RED CRT	CRT C7M142P22R SASSY
95R65641	GREEN CRT	CRT C7M142P22G SASSY
95R65651	BLUE CRT	CRT C7M142P22B SASSY
48009067	DY-R	DEFLECTION YOKE (R)
48009065	DY-G	DEFLECTION YOKE (G)
48009065	DY-B	DEFLECTION YOKE (B)
49003001		CPC MAGNET
49101008		FOCUS MAGNET

PART NO.	SYMBOL NUMBER	DESCRIPTION
74922024		LENS HD-6CM
31700908	CF-FAN	FAN DC109P0812M603
37005029	VOLTAGE REGULATOR	IC uPC7905H
37011026	VOLTAGE REGULATOR	IC uPC7805H
47105313	T5503	F.B.T.
47105313	T5504	F.B.T.
12401981		CONTROL RING B
12402011		CONTROL RING E
12401971		CONTROL RING A
12401991		CONTROL RING C
12402001		CONTROL RING D
12402021		CONTROL RING F
12402211		CONTROL RING G
12402221		CONTROL RING H
12402231		CONTROL RING I
12850211		SPECIAL SCREW
12850221		SPECIAL WASHER
12503031		BRACKET A
12503041		BRACKET B
12503051		BRACKET C
70810722		POWER CORD UC-3 L3.0
73499216		REMOTE CONTROL CABLE 4 METER
73499217		REMOTE CONTROL CABLE 16 METER
79609501	IR-3040	SET-UP REMOTE CONTROL
79609511	UR-3020	USER REMOTE CONTROL
73499177		5 BNC COAXIAL VIDEO CABLE
73499218		CONTROL CABLE (D-SUB, 15-25P, 16m)

NEC GP-3000

A CONDENSED STEP-BY-STEP GUIDE TO SETUP

This guide is intended to assist in the set up and adjustment of an NEC GP-3000 GraphicSmart™ projector. The instructions below are written in a logical sequential order with several hints thrown in to help make the setup successful. This guide should be used in conjunction with the Operators Manual that comes with the projector. Please do not make any adjustments that are not listed in the Operators Manual. Refer all other adjustments and repairs to a qualified technician.

1) Set the projector at the proper distance for the screen size being used (Operators Manual, Pg. 24).

2) If the screen size is different from the previous setup, install the appropriate CRT spacers to match the screen size and projection angle (Pg. 32 & 33). Change position of lens bezel if needed (Pg. 31).

3) Position the angle of the R & B CRT's to match the screen size (Pg. 34).

4) If the SI-5320 interface is *not* being used, set DIP Switch 1, #7 on the projector to the "short" position. Press the "reset" button (Pg. 19).

5) Set DIP Switch 2, #3 and #4 on the projector for proper ceiling/floor & front/rear projection. Press the "reset" button (Pg. 20).

6) Set polarity jumpers for proper horizontal and vertical scan direction (Pg. 29 & 30).

7) After turning the projector "ON" and selecting an input, perform "Signal Entry" for the input, if not already entered (Pg. 51 - 59).

8) Adjust lens focus. Start with the Center focus adjustment (for best center focus) then adjust Edge focus (for best edge focus). See Pg. 39.

9) Clear all convergence settings for STATIC, DYNAMIC, and POINT for R, G, and B (Pg. 46 & 47).

10) Adjust the centering magnets on the R & B CRT's to overlay the Red and Blue test grid to the Green test grid. The overlay should be at the center of the screen (Pg. 38).

    NOTES:

    a) The centering magnets on the G CRT are set properly at the factory and do not normally need to be changed.

    b) Making a significant change in the centering magnets can

cause the focus to be affected, requiring CPC magnet adjustment. This adjustment is covered in the Service Manual, not the Operator's Manual. Do not attempt CPC magnet adjustments unless you are very familiar with the adjustment procedure.

11) Get out of the "test" mode and project the input source picture onto the screen. Adjust V-HEIGHT, H-WIDTH, H-POSITION, & V-HOLD then "Store" the settings (Pg. 41). (There is no vertical position adjustment other than physically tilting the projector using the adjustable feet or adjusting the tilt angle of the ceiling mounting bracket. Refer to the installation drawings on pages 24 - 27 for proper position and angle of the projector.)

12) Adjust the electrical focus on the remote control. First adjust the Center focus. Next adjust the Edge focus for best focus at the left and right edges. Store the settings. Finally, select H/V Balance by pressing the FOCUS button down while depressing the CTL button and adjust for best focus at the top and bottom edges. Now store the H/V Balance settings (Pg. 40).

13) With just the Green grid projected, adjust Vertical Linearity (V. LIN, VR-4002) on the DEF circuit board to achieve equal sized spacing of the grid lines in the vertical direction (from top to bottom). This adjustment is only needed if the projector is changed from ceiling to floor operation or vise versa (This adjustment is not in the Operators Manual and should only be adjusted by qualified people).

14) Adjust the convergence settings for Green first (*Do not adjust G STATIC*). Make the grid pattern as square as possible with no distortions of any kind. Don't forget to use Keystone Balance and Pincushion Balance if needed. Since Green is the reference make it look as good as possible before matching Red and Blue to it. When finished with Green don't forget to store it (Pg 42 - 46).

15) Adjust the Red and Blue convergence to match the Green grid. Get the convergence adjustment as close as possible using Static and Dynamic adjustments before using the Point convergence. Use Point convergence as a last resort to clean up the small errors in the corners and edges of the grid pattern. Using too much Point convergence over large areas of the grid will unnecessarily load up the memory and can also cause image distortions. Store the settings when finished (Pg. 42- 46).

16) To speed up the convergence proceedure for additional input sources try using the convergence copy proceedure explained on page 48 of the Operators Manual. A lot of time will be saved using this little trick because only minor convergence adjustments will be necessary for each additional input .

NEC Technologies, Inc.
CUSTOMER SERVICE DIVISION
1255 Michael Drive, Wood Dale, Illinois 60191-1094

NEC

TECHNICAL INFORMATION

BULLETIN

PRODUCT DIVISION:	MODEL:	ISSUE #
PSD	GP-3000	91-2-1S

SUBJECT: CORRECTION TO SERVICE AND MAINTENANCE MANUALS

DATE 2/28/91

SERIAL NO.: N/A

DESCRIPTION:

The following is a correction to both the GP-3000 Service Manual (page 62) and Maintenance Manual (page 92):

From: "Adjust VR8301 to obtain a measurement of 0.00VDC +/- 0.00VDC"
To: "Adjust VR8301 to obtain a measurement of -8.95VDC +/- 0.01VDC"

SPECIAL INSTRUCTIONS:

SHOULD YOU REQUIRE ANY ASSISTANCE WITH THIS TECHNICAL INFORMATION BULLETIN, PLEASE CONTACT YOUR REGIONAL SERVICE OFFICE. PLEASE HAVE YOUR ACCOUNT NUMBER AVAILABLE WHEN CALLING. ACCOUNT #_____

REF. #

NEC Technologies, Inc.
CUSTOMER SERVICE DIVISION
1255 Michael Drive, Wood Dale, Illinois 60191-1094

NEC

TECHNICAL INFORMATION

BULLETIN

PRODUCT DIVISION:	MODEL:	ISSUE #
PSD	GP3000/5000	91-3-15

SUBJECT: POOR SYNC ON GREEN PERFORMANCE DATE 3/15/91

SERIAL NO.: GP3000 - BEFORE 8700548
GP5000 - BEFORE 6620191

DESCRIPTION:

SYMPTOM:

Poor SYNC ON Green performance by either the GP3000 or GP5000. This problem is especially noticeable when displaying black text on a white background.

VERIFY that the following GAIN CTL PWB components have been changed:

1. R7019 33k ohms to 56k ohms
2. R7022 470 ohms to 1k ohms
3. R7024 1M ohms to 68k ohms
4. R7025 47k ohms to 3.3k ohms
5. R7049 1k ohms to 2.2k ohms
6. C7014 1 u to 10uF 16V. (Note: Polarity will be changed.)

Attach the positive side of the capacitor to the emitter of Q7016 and the negative side of the capacitor to the base of Q7005.

NOTE: If the above components have not be changed, replace the GAIN CTL PWB.

7. GP3000 ONLY: If all of the above components have been chaged, delete C7015 on the GAIN CTL PWB.
8. GP5000 ONLY:

If all of the above components have been changed:

a. Delete R7381 (56ohms) GAIN CTL PWB and add a jumper instead.

b. Add a 10uF 50V capacitor to connector PE pins 1 (positive) and 5 (negative) DEF PWB. attached schematic diagram.

c. Verify jumper from GAIN CTL PWB connector CI pin 2 to R7332 trace. See attached schematic diagram.

These changes will be incorporated into mass production as follows:

GP-3000: S/N: 7800548 and after

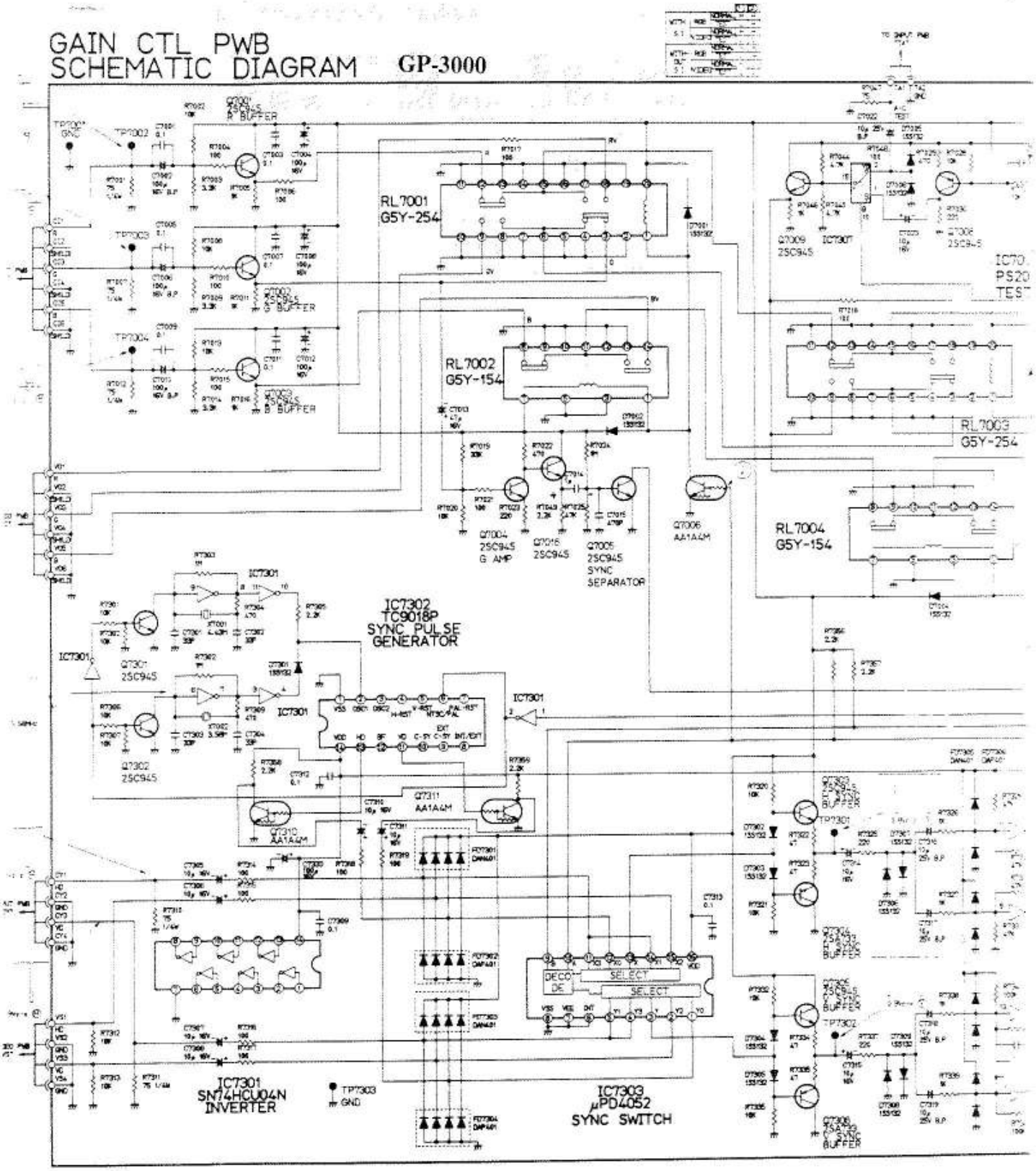
GP-5000: S/N: 6620191 and after

SPECIAL INSTRUCTIONS:

SHOULD YOU REQUIRE ANY ASSISTANCE WITH THIS TECHNICAL INFORMATION BULLETIN, PLEASE CONTACT YOUR REGIONAL SERVICE OFFICE. PLEASE HAVE YOUR ACCOUNT NUMBER AVAILABLE WHEN CALLING, ACCOUNT #_____

REF. #

GAIN CTL PWB SCHEMATIC DIAGRAM GP-3000



NEC Technologies, Inc.
CUSTOMER SERVICE DIVISION
1255 Michael Drive, Wood Dale, Illinois 60191-1094

NEC

TECHNICAL INFORMATION

BULLETIN

PRODUCT DIVISION:	MODEL: DP1200A/S, DP5200A/S GP3000, GP5000	ISSUE #
PSD		91-4-1S

SUBJECT: PARTS CHANGE NOTICE

DATE 4/9/91

SERIAL NO.: N/A

DESCRIPTION:

In order to assure complete compatibility between the Digital convergence and System PWBs used in the Graphic and Data projector products, NEC Technologies, Inc. will be offering the two PWBs as a matched set.

Pairing the two PWBs together will reduce the need for second repair calls because one version of either the System PWB or Digital Convergence PWB is incompatible with the other.

On the following page list the new part numbers for the "pair" of PWBs.

SPECIAL INSTRUCTIONS:

SHOULD YOU REQUIRE ANY ASSISTANCE WITH THIS TECHNICAL INFORMATION BULLETIN, PLEASE CONTACT YOUR REGIONAL SERVICE OFFICE. PLEASE HAVE YOUR ACCOUNT NUMBER AVAILABLE WHEN CALLING. ACCOUNT #_____

REF. #

Spare Parts Changes

Model	Description	Old P/N	New P/N
DP1200A			
	DIGITAL CONV PWB	93M98B01	
			93M98PAIR
	SYSTEM PWB	93M98M01	
DP1200S			
	DIGITAL CONV PWB	93Q29B01	
			93Q29PAIR
	SYSTEM PWB	93Q29M01	
DP5200A/S			
	DIGITAL CONV PWB	93P43B01	
			93P43PAIR
	SYSTEM PWB	93P43M02	
GP3000			
	DIGITAL CONV PWB	93R65B02	
			93R65PAIR
	SYSTEM PWB	93R65M02	
GP5000			
	DIGITAL CONV PWB	93S42B01	
			93S42PAIR
	SYSTEM PWB	93S42M01	

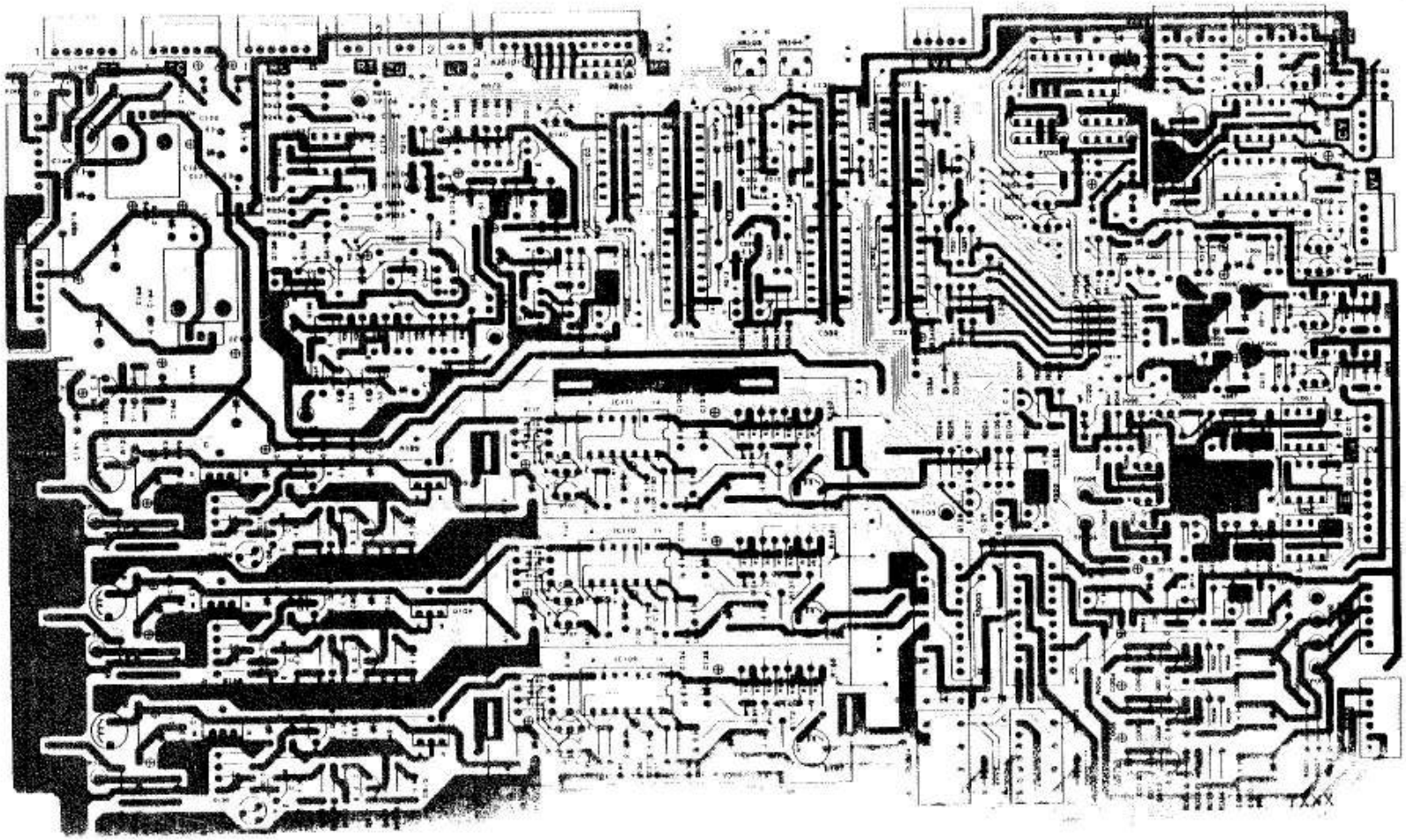
GP-5000

DEF PWB

GAIN CTL PWB
(PWG 609)

GP-5000

– Solder Side –



PART NO.	SYMBOL NUMBER	DESCRIPTION
74922024		LENS HD-6CM
31700908	CF-FAN	FAN DC109P0812M603
37005029	VOLTAGE REGULATOR	IC uPC7905H
37011026	VOLTAGE REGULATOR	IC uPC7805H
47105313	T5503	F.B.T.
47105313	T5504	F.B.T.
12401981		CONTROL RING B
12402011		CONTROL RING E
12401971		CONTROL RING A
12401991		CONTROL RING C
12402001		CONTROL RING D
12402021		CONTROL RING F
12402211		CONTROL RING G
12402221		CONTROL RING H
12402231		CONTROL RING I
12850211	2	SPECIAL SCREW ✓
12850221	2	SPECIAL WASHER ✓
12503031	1	BRACKET A ✓
12503041	1	BRACKET B ✓
12503051	1	BRACKET C ✓
70810722		POWER CORD UC-3 L3.0
73499216		REMOTE CONTROL CABLE 4 METER
73499217		REMOTE CONTROL CABLE 16 METER
79609501	IR-3040	1 SET-UP REMOTE CONTROL ✓
79609511	UR-3020	1 USER REMOTE CONTROL ✓
73499177		5 BNC COAXIAL VIDEO CABLE
73499218		CONTROL CABLE (D-SUB, 15-25P, 16m)

1 Operator & Set up Manual
1 Service Manual
4 Feet

7. REPLACEMENT PARTS LISTING

PART NO.	SYMBOL NUMBER	DESCRIPTION
93R65B01	PWG 605	DIGITAL CONVERGENCE PWB
93R65C01	PWG 599R,G,B	CRT PWB
93R65E01	PWG 558	DEFLECTION PWB
93R65G01	PWG 597	GAIN CTL PWB
93R65H01A	PWG 595A	HIGH VOLTAGE PWB
93R65H01B	PWG 595B	FBT PWB
93R65H01C	PWG 595C	FBT PWB
79609381	PWG 648A and PWG 648B	PS UNIT PWB
93R65M01	PWG 604	SYSTEM PWB
93R65N01	PWG 603	INPUT PWB
93R65R01A	PWG 600A	CONTROL PWB
93R65R01B	PWG 600B	PS DIV PWB
93R65R01C	PWG 600C	LINEAR COIL PWB
93R65R01D	PWG 600D	LED PWB
93R65R01E	PWG 600E	DIP SW PWB
93R65U01	PWG 602	CONVERGENCE FOCUS DRIVE PWB
93R65V01	PWG 596	VIDEO PWB
95R65631	RED CRT	CRT C7M142P22R SASSY
95R65641	GREEN CRT	CRT C7M142P22G SASSY
95R65651	BLUE CRT	CRT C7M142P22B SASSY
48009067	DY-R	DEFLECTION YOKE (R)
48009065	DY-G	DEFLECTION YOKE (G)
48009065	DY-B	DEFLECTION YOKE (B)
49003001		CPC MAGNET
49101008		FOCUS MAGNET