NEC

MODEL GP-3000

GRAPHICS PROJECTOR

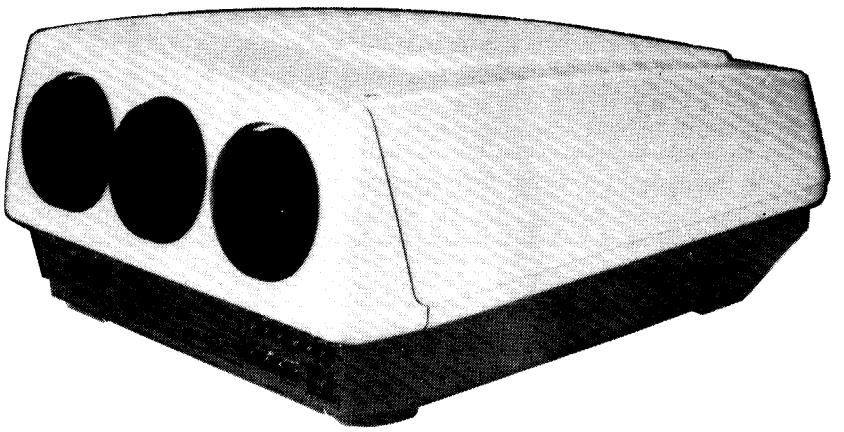
SERVICE MANUAL

PART NO. 399910659

Better Service

Better Reputation

Better Profit



SAFETY CAUTION:
Before servicing this chassis, it is important that the service technician read and follow the "Safety Precautions" and "Product Safety Notice" in this Service Manual.
* For continued X-radiation protection, replace picture tube with original type or NEC approved equivalent type.

WARNING:
SHOCK HAZARD - Use an isolation transformer when servicing.

NEC Corporation

TOKYO, JAPAN

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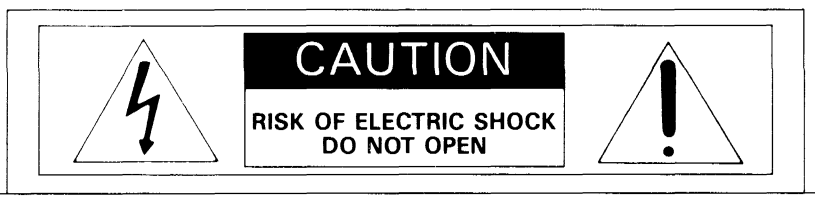
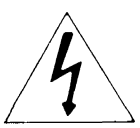


CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



This symbol warns the user that uninsulated voltage within the unit may have sufficient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any part inside of this unit.

This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included.
Therefore, it should be read carefully in order to avoid any problems.

ATTENTION: POUR EVITER LES RISQUES D'ELECTROCUTION, NE PAS ENLEVER LE COUVERCLE (OU LE DOS). AUCUN DES ELEMENTS INTERNES NE DOIT ETRE REPARE PAR L'UTILISATEUR. NE CONFIER L'ENTRETIEN QU'A UN PERSONNEL QUALIFIE.

L'éclair fléché dans un triangle équilatéral est destiné à avertir l'utilisateur de la présence, dans l'appareil, d'une zone non-isolée soumise à une haute tension dont l'intensité est suffisante pour constituer un risque d'électrocution.

Le point d'exclamation dans un triangle équilatéral est destiné à attirer l'attention de l'utilisateur sur la présence d'informations de fonctionnement et d'entretien importantes dans la brochure accompagnant l'appareil.

SAFETY PRECAUTIONS

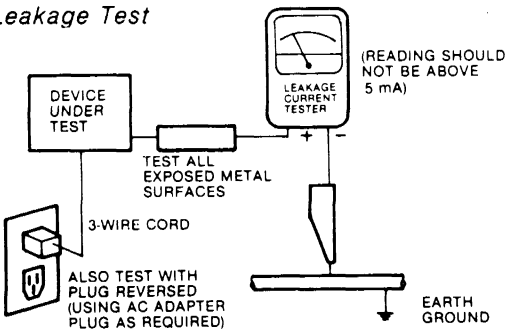
1. **Before returning an instrument to the customer**, always make a safety check of the entire instrument, including, but not limited to, the following items:

   a. Be sure that no built-in protective devices are defective and/or have been defeated during servicing. (1) Protective shields are provided on this chassis to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience. (2) When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including but not limited to, nonmetallic control knobs, insulating fishpapers, adjustment and compartment covers/shields, and isolation resistor/capacitor networks **Do not operate this instrument or permit it to be operated without all protective devices correctly installed and functioning.**

   b. Be sure that there are no cabinet openings through which an adult or child might be able to insert their fingers and contact a hazardous voltage. Such openings include, but are not limited to, (1) spacing between the picture tube and the cabinet mask, (2) excessively wide cabinet ventilation slots, and (3) an improperly fitted and/or incorrectly secured cabinet back cover.

   d. **Leakage Current Hot Check** - With the instrument completely reassembled, plug the AC line cord directly into a 120V AC outlet. (Do not use an isolation transformer during this test.) Use a leakage current tester or a metering system that complies with American National Standards Institute (ANSI) *C101.1 Leakage Current for Appliances* and Underwriters Laboratories (UL) *478*. With the instrument AC switch first in the ON position and then in the OFF position, measure from a known earth ground (metal waterpipe, conduit, etc) to all exposed metal parts of the instrument (antennas, handle bracket, metal cabinet, screwheads, metallic overlays, control shafts, etc.), especially any exposed metal parts that offer an electrical return path to the chassis. Any current measured must not exceed 5 milliamp. Reverse the instrument power cord plug in the outlet and repeat test. ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE INSTRUMENT TO THE CUSTOMER.

AC Leakage Test



   d. **X-Radiation and High-Voltage Limits** - Because the picture tube is the primary potential source of X-radiation video projector, it is specially constructed to prohibit X-radiation emissions. For continued X-radiation protection, the replacement picture tube must be the same type as the original. Also, because the picture tube shields and mounting hardware perform an X-radiation protection function, they must be correctly in place. High voltage must be measured each time servicing is performed that involves B+, horizontal deflection or high voltage. Correct operation of the X-radiation protection circuits also must be reconfirmed each time they are serviced. (X-radiation protection circuits also may be called "Horizontal disable" or "Hold-down.") Read and apply the high-voltage limits and, if the chassis is so equipped, the X-radiation protection circuit specifications given on instrument labels and in the *Product Safety & X-radiation Warning* note on the service data chassis schematic.
   High voltage is maintained within specified limits by close-tolerance safety-related components/adjustments in the high-voltage circuit. If high voltage exceeds specified limits, check each component specified on the chassis schematic and take corrective action. (Refer to "SERVICE ADJUSTMENT"))

2. Read and comply with all caution and safety-related notes on or inside the receiver cabinet, on the receiver chassis, or on the picture tube.

3. **Design Alteration Warning** - Do not alter or add to the mechanical or electrical design of this Video Projector. Design alterations and additions, including, but not limited to, circuit modifications and the addition of items such as auxiliary audio and/or video output connections, might alter the safety characteristics of this receiver and create a hazard to the user. Any design alterations or additions will void the manufacturer's warranty and will make you, the servicer, responsible for personal injury or property damage resulting therefrom.

4. **Picture Tube Implosion Protection Warning** - The picture tube in this receiver employs integral implosion protection. For continued implosion protection, replace the picture tube only with one of the same type number. Do *not* remove, install, or otherwise handle the picture tube in any manner without first putting on shatterproof goggles equipped with side shields. People not so equipped must be kept safely away while picture tubes are handled. Keep the picture tube away from your body. Do not handle the picture tube by its neck. Some "TVs CRT" picture tubes are equipped with a permanently attached deflection yoke; because of potential hazard, do not try to remove such "permanently attached" yokes from the picture tube.

5. **Hot Chassis Warning - a**. Some TV receiver chassis are electrically connected directly to one conductor of the AC power cord and may be safely serviced without an isolation transformer only if the AC power plug is inserted so that the chassis is connected to the *ground* side of the AC power source. To confirm that the AC power plug is inserted correctly, with an AC voltmeter measure between the chassis and a known earth ground. If a voltage reading in excess of 1.0V is obtained, remove and reinsert the AC power plug in the opposite polarity and again measure the voltage potential between the chassis and a known earth ground. **b**. Some TV receiver chassis normally have 85V AC (RMS), between chassis and earth ground regardless of the AC plug polarity. These chassis can be safely serviced only with an isolation transformer inserted in the power line between the receiver and the AC power source, for both personnel and test equipment protection. **c**. Some TV receiver chassis has a secondary ground system in addition to the main chassis ground. This secondary ground system is not isolated from the AC power line. The two ground systems are electrically separated by insulating material that must not be defeated or altered.

6. Observe original lead dress. Take extra care to assure correct lead dress in the following areas: **a**. near sharp edges, **b**. near thermally hot parts - be sure that leads and components do not touch thermally hot parts, **c**. the AC supply, **d**. high voltage, and **e**. antenna wiring. Always inspect in all areas for pinched, out-of-place, or frayed wiring. Do not change spacing between components, and between components and the printed-circuit board. Check AC power cord for damage.

7. Components, parts, and/or wiring that appear to have overheated or are otherwise damaged should be replaced with components, parts, or wiring that meet original specifications. Additionally, determine the cause of overheating and/or damage and, if necessary, take corrective action to remove any potential safety hazard.

8. **PRODUCT SAFETY NOTICE** - Many TV electrical and mechanical parts have special safety-related characteristics some of which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage etc. Parts that have special safety characteristics are identified in this service data by shading with a ⚠ mark on schematics and by shading or a ⚠ mark in the parts list. Use of a substitute replacement part that does not have the same safety characteristics as the recommended replacement part in this service data parts list might create shock, fire, and/or other hazards.

PRECAUTIONS DE SECURITE

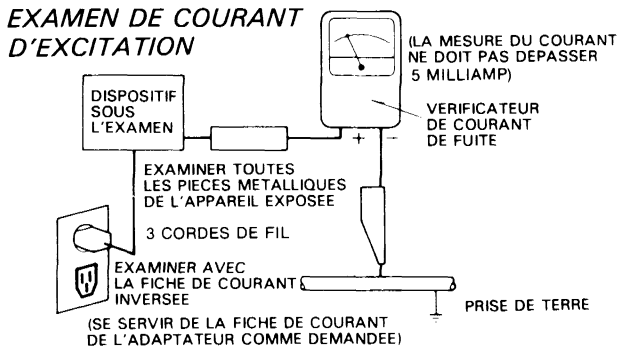
1. **Avant de remettre un appareil à un client**, faire toujours d'abord un examen de sécurité de l'appareil en entier comprenant, mais ne s'y limitant pas les points cités ci-dessous:

   a. Vérifier qu'aucun des dispositifs de protection ne soit défectueux ou n'ait été endommagé pendant les travaux.

   (1) Les volets protecteurs sur ce châssis ont été montés pour protéger aussi bien le technicien que le client. Remplacer correctement tous les volets protecteurs manquants, aussi bien que ceux qui ont pu être enlevés pour la commodité des travaux. (2) Quard vous remettez le châssis ou d'autres assemblages ensemble dans le coffret, vérifier qu'ont été remis à leur place tous les dispositifs de protection, comprenant mais ne s'y limitant point, les boutons de contrôle non-métalliques, les feuilles d'isolation, les couverture/volets de l'ajustement et du compartiment, et l'isolation des réseaux résistance/condensateur. **Ne pas travailler sur cet appareil ni permettre qu'y soit effectué un travail sans que tous les dispositifs de protection n'y soient correctement installés fonctionnants.**

   b. Bien vérifier qu'il n'y ait aucune ouverture sur le coffret qui ne puisse permettre à un adulte ou à un enfant d'y faire pénétrer ses doigts et attraper une décharge électrique.
   De telles ouvertures comprendraient sans pour autant s'y limiter (1) l'espace entre le tube à images et le coffret de l'appareil, (2) les espaces excessivement ouvers pour la ventilation et (3) la couverture arrière du coffret improprement fixée ou incorrectement protegée.

   c. **Vérification de courant de fuite**
   L'appareil ayant été complètement réassemblé, brancher-le à une prise de courant de 120V. (Ne pas se servir d'un transformateur d'isolation pendant ce test). Se servir d'un vérificateur de courant d'excitation ou d'un système de mesure conforme aux normes ANSI (AMERICAN National Standards Institute) C101.1 Leakage Current for Appliances et U.L (Underwriters Laboratories) 478. Le bouton de l'appareil en position "Marche" et ensuite en position "Arrêt", mesurer à partir d'une prise de terre (métallique tuyauterie, conduite, etc...) à toutes les pièces métalliques de l'appareil exposées (antennes, poignet métalliques, coffret métallique, tête de svis, surfaces métalliques, traits de contrôle, etc.) surtout à toutes les pièces métalliques exposées qui peuvent reconduire le courant au châssis. En aucun cas, la mesure du courant ne doit dépasser 0,5 milliamp. Inverser la fiche de courant del'appareil dans la prise et répéter le test. **Tout mesurage ne s'arrêtant pas aux limites spécifiées ici comporte un risque de décharge électrique dangereux, qui doit être éliminé, avant que l'appareil no soit remis au client.**



   d. **Limitation des rayons-X et de la haute-tension**
   Comme le tube à images est la source potentielle première des émissions des rayons-X dans les téléviseurs en état solide, il est particulièrement conçu pour ne pas laisser échapper les émissions des rayons-X.
   Pour une protection continue contre les émissions des rayons-X, le tube à images remplacé doit être du même type que l'original. Et aussi, parce que le couvert du tube à images et le hardware de montage ont une fonction de protection contre les rayons-X, ils doivent être correctement mis en place.
   La haute tension doit être mesurée chaque fois que l'entretien s'occupe du B+, de la déviation horizontale ou de la haute tension. Il faudra aussi s'assurer du bon fonctionnement des circuits de protections anti-Rayons-X chaque fois qu'ils seront amenés en entretien. (les circuits de protections anti-Rayons-X pourront aussi bien être appelés, "horizontal disable" ou "hold-down".) Lire et appliquer les limitations de haute tension, et si le châssis en est equipé, les spécifications de protections contre les rayons-X données dans les notices d'appareil, ou bien dans le texte "Product Safety & X-radiation Warning" sur le schéma d'entretien du châssis.
   La haute tension est maintenue dans les limites spécifiées,par la capacité de tolérance et de sécurité des composants et des ajustements dans le circuit de haute tension. Si la haute tension dépasse les limites spécifiées, contrôler et réparer chaque composant relatif sur le schéma du châssis. (Voir "SERVICE ADJUSTMENTS")

2. **Lire et réspecter** toutes les mises en garde et notes de sécurité à l'intérieur ou à l'extérieur du cofret du récepteur, sur le châssis du récepteur ou sur le tube à images.

3. **Mise en garde contre la modification du dessin**
Ne pas modifier ni ajouter à la piéce méchanique ou électrique du modèle. Des modifications ou additions, comportant, mais ne s'y limitant pas, des modifications des circuits et l'addition d'éléments tels que des auxilliairs audio et/ou des branchements pour la prise de vidéo, pourrait éprouver la sécurité de ce récepteur et créer un risque pour l'utilisateur. Tout changement ou addition accomplie annulera la garantie du fabricant et va rendre votre service d'entretien, responsable des dommages corporels ou de biens en résultant.

4. **Mise en garde contre l'implosion du tube à images**
Le tube à images dans ce récepteur marche avec une protection contre une implosion totale. Pour une protection continue contre l'implosion ne remplacer le tube à images que par un autre type du même numéro. Ne pas enlever, installer, ou tenir, le tube à images quelque soit le prétexte sans au préalable porter des lunettes de protections comportant des couverts latéraux. L'on n'etant pas ainsi équipé doit être tenu éloigné pendant qu'est manipulé le tube à images. Maintenir le tube à images éloigné de votre corps. Ne pas manipuler le tube à images par son goulot. Certains tubes à images "in-line" sont équipés avec des Jougs de déviations rattachés en permanence, à cause d'un danger potentiel, ne jamais essayer d'enlever ces "Jougs" rattachés en permanence au tube à images.

5. **Mise en garde contre le châssis sous tension**
   a. Certains châssis de récepteur TV sont électriquement reliés à un conducteur du fil de courant et ainsi peuvent ne comporter aucun risque sans un transformateur d'isolation seulement si la prise de courant est branchée, de manière que le châssis est relié à la prise de terre de la source de courant. Pour s'assurer que la prise de courant est correctement insérée, relever les mesures avec un voltmètre de courant entre le châssis et un point de prise de terre bien connu. Si le voltage indiqué est supérieur à 1,0V, débrancher et reinsérer la prise de courant dans la polarité contraire et une fois de plus remesurer le voltage potentiel entre le châssis et la prise de terre.

   b. Certains châssis de réceptur ont habituellement 85V (RMS) entre le châssis et la prise de terre, en fonction de la polarité de la prise de courant. Ces châssis peuvent ne comporter aucun risque seulement avec un transformateur d'isolation inséré dans la ligne de puissance située entre le récepteur et la source d'électricité, cela pour la protection aussi bien du personnel que du matériel de vérification.

   c. Certains châssis de téléviseurs ont un système secondaire de masse en addition avec le système principal de masse du châssis. Ce système secondaire de masse n'est pas isolé du courant électrique. Les deux systèmes sont électiquement séparés par du matériel d'isolation qu'on vérifiera bien qu'il ne soit ni altéré ni défectueux.

6. Vérifier la couverture originale en plomb. Accorder la plus grande attention à la couverture de plomb notamment aux endroits ci-dessous indiqués.
   a. près des bords aigus
   b. près des parties très chaudes
   Vérifier que les composants et les plombs ne touchent pas les parties très chaudes telles que:
   c. l'alimentation du courant
   d. la haute tension
   e. les fils de l'antenne
   Pousser l'inspection, à tous les endroits, à la recherche des cordes pincées, déplacées ou effilochées. Ne pas changer l'écartement entre composants, et entre composants et le tableau de circuit imprimé. Vérifier que le fil de conduite électrique est en bon état.

7. Les composants, parts (pièces) et/ou fils qui ont été trouvés surchauffés devraient être remplacés avec les composants, pièces et fils s'y reliant avec d'autre qui ont les mêmes spécifications que les originales. De plus, rechercher la cause du surchauffement et/ou des dommages et si nécessaire, prendre les mesures propres pour prévenir tout risque potentiel.

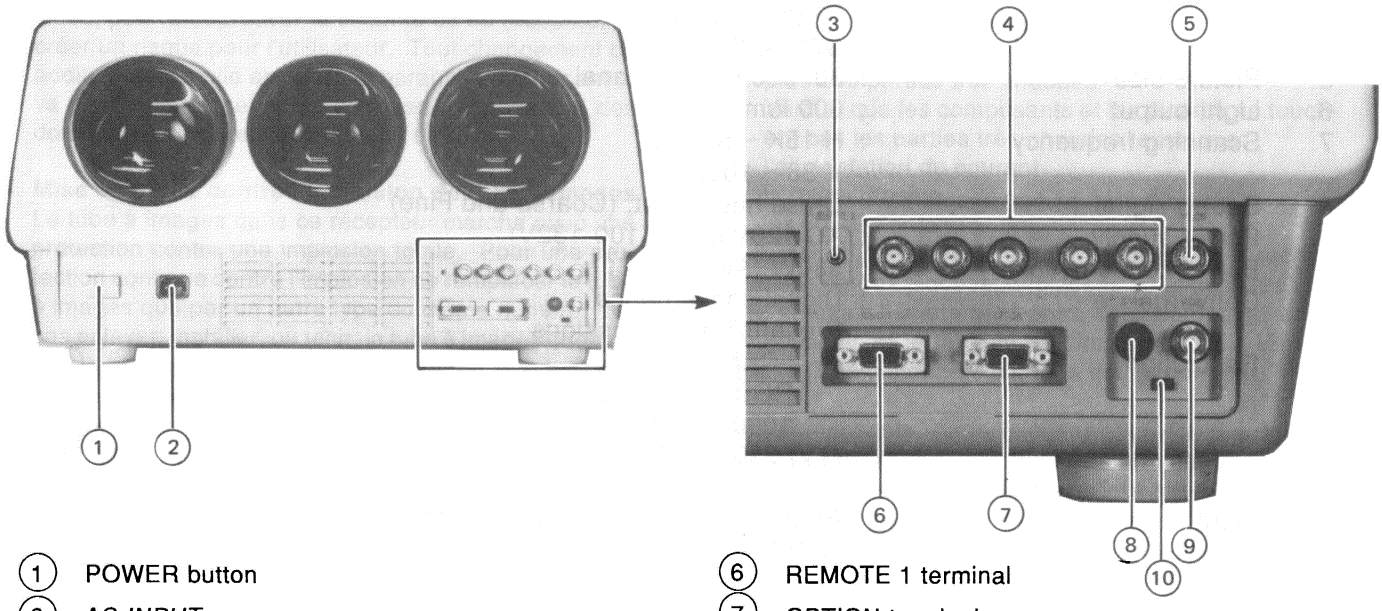
8. **Note sur la sûreté de l'appareil**
Beaucoup de pièces de téléviseurs, qu'elles soient électriques ou mécaniques, ont des dispositions de sécurité qui ne sont pas toujours évidentes d'une simple inspection visuelle et la protection qu'elles donnent nécessairement ne pourront être pas obtenues par les remplaçants avec des composants aux voltages ou watts plus élévés.
Les pièces qui ont des caractéristiques particulières de sécurité sont identifiées avec un trait ⚠ marqué sur les schémas et sont ombragés ou comportent un trait ⚠ sur la liste des pièces. L'utilisation d'unproduit substitutif qui n'aurait pas les mêmes caractéristiqus comme il est recommandé dans ces données d'entretien pourrait provoquer une décharge électrique, un feu, et/ou d'autres dangers.

SPECIFICATIONS

1.	Projection type	: Refraction type separated
2.	Projection system	: 3 lens and 3 CRTs in-line
3.	Lens	: Hybrid lenses multilayer coating F 1.0
4.	CRT	: Improved 7 inch liquid cooled C7M142P22 R C7M142P22 G C7M142P22 B
5.	Picture size	: 60~300 inch diagonal
6.	Light-output	: 600 lumens
7.	Scanning frequency	: H 15K ~ 55kHz V 38 ~ 100Hz
8.	Set-up signal	: Cross hatch, Dot, (Coarse and Fine)
9.	Power supply	: AC 120V 60Hz (100-132V)
10.	Power consumption	: 330W (Average)
11.	Convergence	: Digital convergence Presettable 12 positions
12.	Resolution	: CENTER RGB VIDEO 1000 600 (TV) 950 560
13.	Input	: RGB: 0.7Vp-p, 75Ω, Positive (BNC) H. V SYNC: 0.7~4.0Vp-p, 75Ω, Negative or Positive (BNC) G. SYNC: 0.3~0.6Vp-p, 75Ω Negative NTSC: VIDEO; 1.0Vp-p, 75Ω, Positive or Negative (Switchable) S-VIDEO; Y 1.0Vp-p, 75Ω, Positive C 0.28Vp-p, 75Ω (Burst level)
14.	Cabinet dimension (W x D x H)	: 24 x 29•11/16 x 12•1/4 (inch) 610 x 754 x 310 (mm)
15.	Weight	: 132 lbs, 60kg
16.	Remote Control Unit	: User remote control: UR-3020 Set-up remote control: IR-3040 (Wired/Wireless compatible type)
17.	Factory Settings	: Ceiling front display

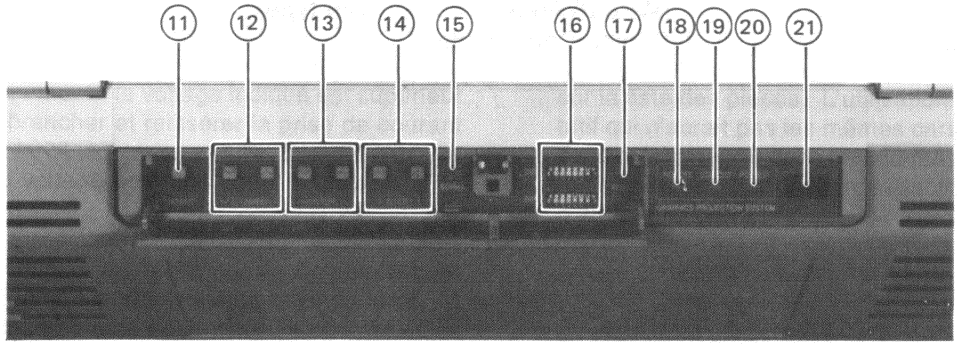
LOCATION OF CONTROLS

• Front Panel



(1) POWER button
(2) AC INPUT
(3) REMOTE 2 jack
(4) R, G, B, H/V, V terminals (BNC type)
(5) OPTION terminal (BNC type)
(6) REMOTE 1 terminal
(7) OPTION terminal
(8) S-VIDEO terminal
(9) VIDEO terminal (BNC type)
(10) S-VIDEO/VIDEO select switch

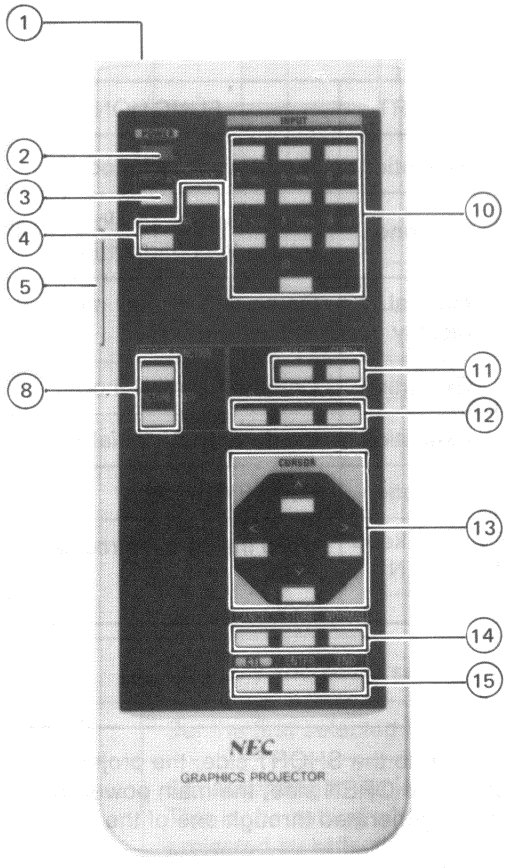
• Rear Panel



(11) POWER button
(12) ALIGNMENT ∨/∧ button
(13) PICTURE ∨/∧ button
(14) ADJUST –/+ button
(15) NORMAL switch
(16) DIP switch 1, 2
(17) RESET switch
(18) REMOTE indicator
(19) STANDBY indicator
(20) POWER indicator
(21) Infrared sensor window

REMOTE CONTROL FUNCTIONS

USER REMOTE CONTROL

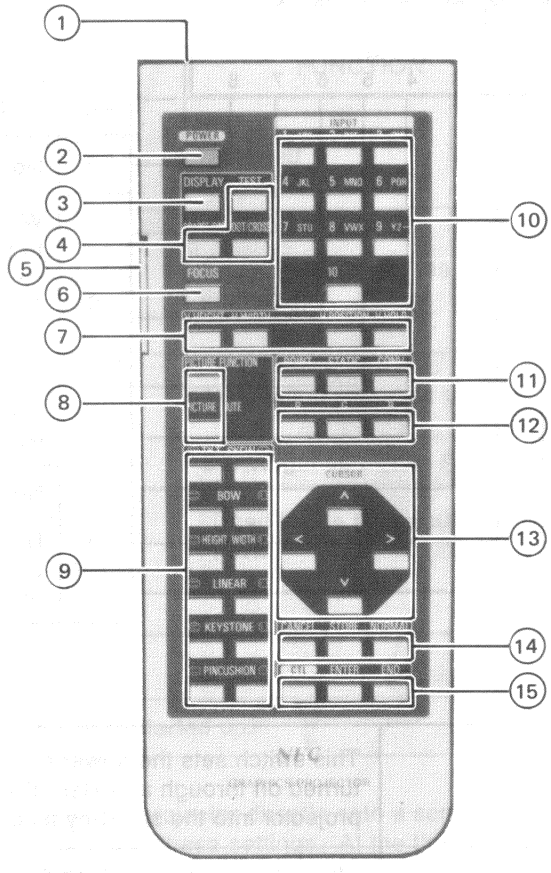


(UR-3020: 79609511)

This remote control unit can be used as a wireless remote control unit by detaching the connected wire.

1. REMOTE CONTROL JACK
2. POWER
3. DISPLAY
4. TEST
5. BACK LIGHT SWITCH
6. FOCUS
7. ALIGNMENT CONTROL
8. PICTURE FUNCTION/PICTURE MUTE
9. DYNAMIC CONVERGENCE

SET-UP REMOTE CONTROL

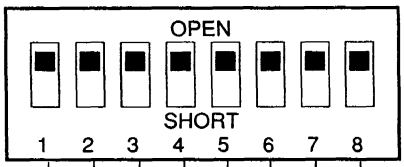


(IR-3040: 79609501)

10. INPUT 1~10 keys
11. CONVERGENCE SELECT
12. CRT SELECT
13. CURSOR
    - ∧/>: INCREASE
    - ∨/<: DECREASE
14. ADJUSTMENT CANCEL/STORE/NORMAL
15. CONTROL

DIP SWITCHES

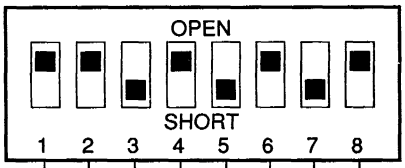
DIP Switch 1



No.	OPEN	SHORT	FUNCTION
8	Non-execution	Execution	Auto Power ON mode
7	When connected to SI	PJ alone	Switch for stand-alone/System Interface configuration
6	Automatic display	Manual display	On-screen display mode
5	Non-execution	Execution	Common control mode
4	Non-execution	Execution	Inside E^2ROM Initialize mode
3	Non-execution	Execution	Used PWB check
2	Under normal operation, keep these switches in the OPEN position.		Used inside the circuits on the PWB.
1			

No.8	This switch sets the power on mode. When switched to the SHORT side, the projector can now be turned on through an external source. When set to the OPEN side, the main power switch sets the projector into the stand-by mode where power up is generated through one of the hand units.
No. 7	When the system interface is used, switch to the OPEN side.
No. 6	Changes the on-screen display mode. At the OPEN side, the on-screen display appears when the remote control is pressed will go out in about 5 seconds. At the SHORT side, it will be displayed when any key other than the remote control input key is pressed. In either case, the on-screen display can be turned ON or OFF by pressing the DISPLAY key.
No. 5	Because of the many input combinations which must all be independently and precisely adjusted there are two modes to perform this. Once convergence is set, it may be necessary to adjust all the image signals. When set to SHORT side, common adjustment of the static convergence and center focus is possible for independent adjustment keep switch set to OPEN.
No. 4	Set to the SHORT side to initialize E^2ROM (IC8213, IC8214) on SYSTEM PWB. Use this switch when the stored data has been erased accidentally or all the data needs to be rewritten. For normal use set to the OPEN side.
No. 3	Set to the SHORT side to examine the operation status of each PWB Assy. Under normal operation SYSTEM PWB and D-CONV PWB check the operation status of the other. If of them is faulty, both of them stop the operation. Since SYSTEM PWB can be operated alone by setting this switch to the SHORT side, the faults of each PWB Assy can be diagnosed. For normal operation set to the OPEN side.
Nos. 2, 1	For normal use they should always be set to the OPEN side.

DIP Switch 2



No.	OPEN	SHORT	FUNCTION
8	Under normal operation, keep these switches in the OPEN position.		Not used
7	See TABLE 1		Signal select switches when PJ started up.
6			
5			
4	See TABLE 2		Installation condition of PJ
3			
2	Non-execution	Execution	Convergence Phase Adjustment
1	Under the normal operation, keep these switches in the OPEN position.		Used inside the circuits on the PWB.

No. 8	Normally should be set to OPEN side.
Nos. 7, 6, 5	Set the first selected input signal, when the projector is started up.
Nos. 4, 3	Set according to projector installation method. This is the setting 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. At the time of factory shipment, it is set for "ceiling/front projection." Moreover, when the installation method is changed, change the polarity and the spacers.
No. 2	Set to SHORT side when convergence phase adjustment is performed. Under normal operation, set the switch to OPEN side (when convergence phase adjustment is not performed.)
No. 1	Normally should be set to OPEN side.

TABLE 1

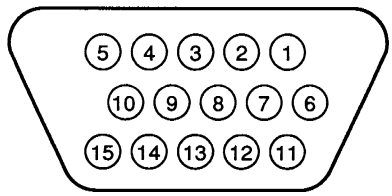
5	6	7	When SI-5320 Used	When Projector Only
0	0	0	VIDEO 1	VIDEO
1	0	0	VIDEO 2	RGB
0	1	0	RGB 1	Not used
1	1	0	RGB 2	Not used
0	0	1	RGB 3	Not used
1	0	1	Not used	Not used
0	1	1	Not used	Not used
1	1	1	Not used	Not used

1: OPEN 0: SHORT

TABLE 2

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

REMOTE 1 Terminal



PIN ASSIGNMENT

When the terminal is connected to the System Interface and when it is connected to an external control, it is a combination terminal that can be used both ways.

PIN NO.	DESCRIPTION
1, 2, 6, 7, 11, 12	Data transmission lines when the System Interface is used.
3	Changeover of input signal
13	Input external remote control data
4, 8, 9	Use in GP inside. Normally set to OPEN.
14	Use/non-use of external control
5	POWER ON/OFF
10	PICTURE MUTE ON/OFF
15	External ground

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

"SHORT" means the connection with pin 15.

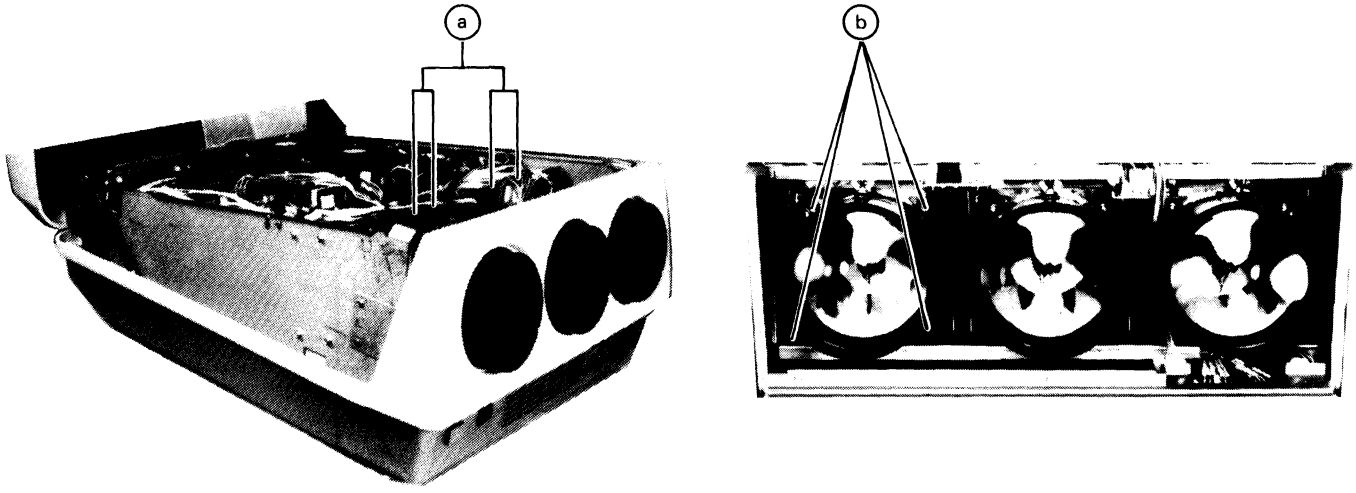
POWER and PICTURE MUTE keys on the remote will not function when in the external mode. Pin 13 is the external remote signal terminal. The projector can be controlled by the same composite signal from the external controller. Only the input of pin 13 can always operate the projector regardless of pin 14 setting.

SPACER INSTALLATION

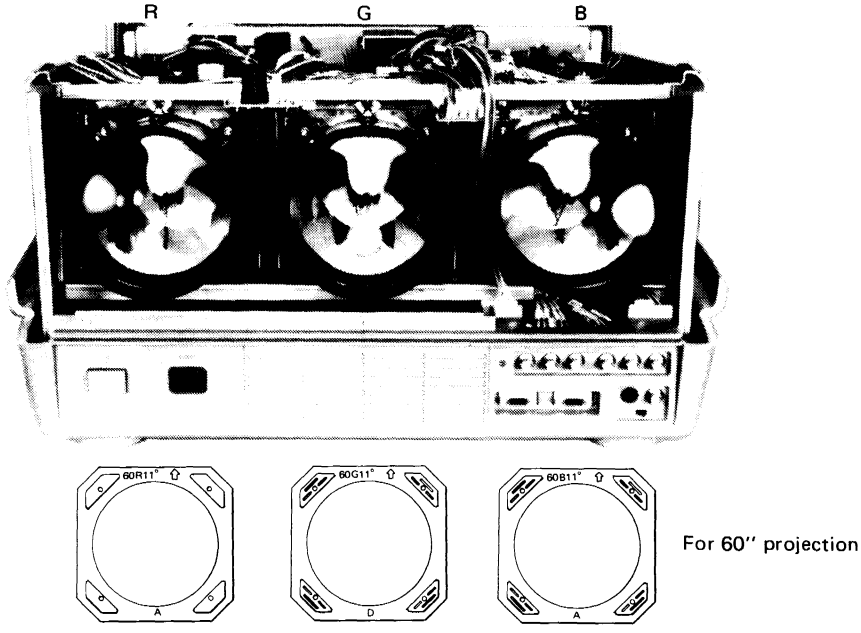
If changing from a 100" screen to a 60", 200" or 300" screen, it will be necessary to change the CRT spacers according to the screen size and the projection angle to be used.
First remove the front of the projector.
To install the accessory spacers, proceed as follows:

(1) Remove the four screws ⓐ holding the two PWB mountings.

(2) Remove the four nuts ⓑ in the red, green and blue lenses and take out the lenses.



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



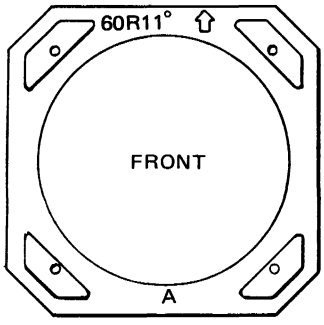
For 60" projection

LIST OF SPACERS FOR ANGLE REGULATION

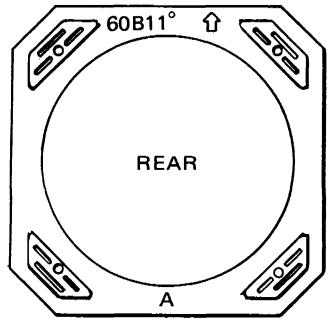
CRT / SCREEN SIZE and PROJECTION ANGLE	R	G	B	
60" 11°	A	D	A	ACCESSORY
100" 11°	B	E	B	NORMAL POSITION
200" or over 11°	C	F	C	ACCESSORY
60" 0°	G	I	G	ACCESSORY
100" 0°	H	I	H	ACCESSORY
200" or over 0°	I	I	I	ACCESSORY

Install the angle adjustment spacer corresponding to the screen size and projection angle as the left.

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



For Red CRT



For Blue CRT

CENTERING MAGNET ADJUSTMENT

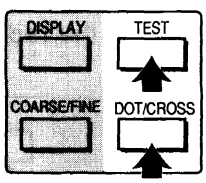
(1) Press CANCEL key twice to cancel RGB static convergence.
(2) Adjust the focus wing nut on each CRT to obtain the optimum focus on the screen. (LENS FOCUS)
(3) Apply H-character signal, and change to the RGB mode.
(4) Cover R and B CRTs to display only G CRT.
(5) Adjust the centering magnet (on page 36) to position the pattern center with the screen center.
(6) If the pattern tilts horizontally or vertically, adjust the deflection yoke.
(7) Adjsut the R and B CRTs in the same manner.

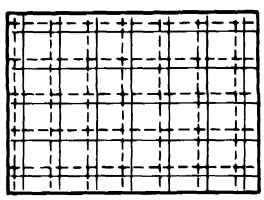
CONVERGENCE ADJUSTMENT

(1) GEOMETRICAL DISTORTION ADJUSTMENT

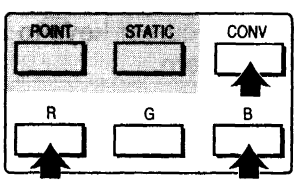
As GREEN is used as a reference color, it is necessary to correct the green pattern before carrying out STATIC convergence.

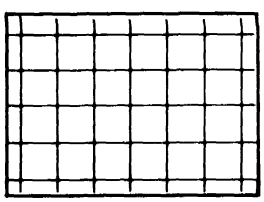
GREEN ADJUSTMENT





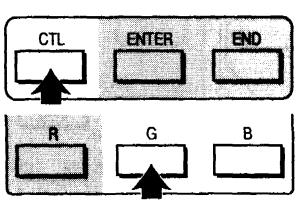
① Display the test pattern by pressing the TEST key. Select the crosshatch pattern by pressing the DOT/CROSS key.

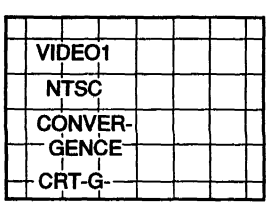




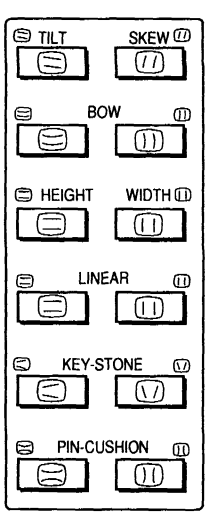
GREEN ONLY

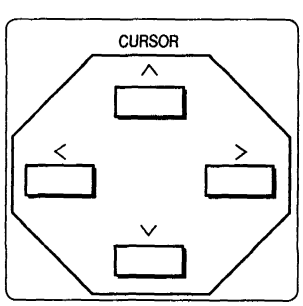
② Set to convergence adjustment mode by pressing the CONV key.
Display the green pattern only by pressing the R key and the B key.





③ Press the G key while pressing the CTL key, display on the screen as shown on the left.

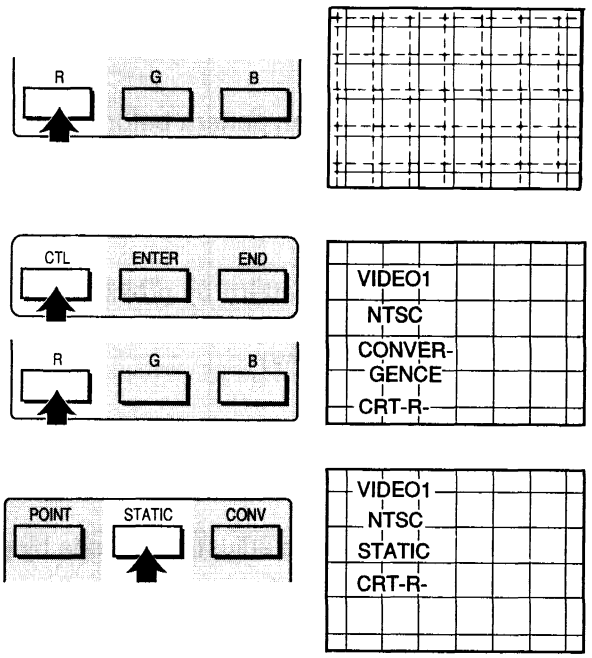




∧/> button: Level increment
∨/< button: Level decrement

④ Select one of each Dynamic Adjustment function key.
Adjust the green crosshatch pattern by pressing the cursor keys ∨, ∧,< and >.

(2) STATIC CONVERGENCE



a) RED CONVERGENCE

① Press the R key. The red CRT which has been in the cut off condition will be displayed along with the green.

② Press the R key while pressing the CTL key, display on the screen as shown on the left. Then press R key to select the red adjustment mode. "R" will appear.

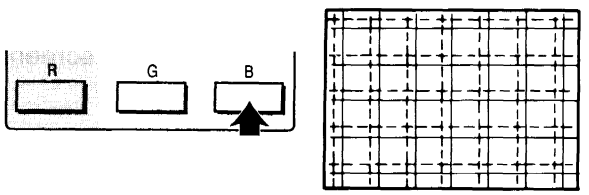
③ Thereafter press STATIC key so the "STATIC" will appear at the left center of the screen. Adjust the static convergence of the red pattern with pressing one of the cursor keys to align to the reference green pattern.

b) BLUE CONVERGENCE

In the same manner as explained in RED CONVERGENCE, adjust the pattern to align the blue CRT i.e. press B key while pressing CTL key. Press STATIC and adjust the blue pattern with the cursor keys.

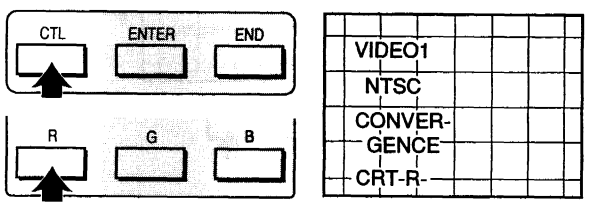
(3) DYNAMIC CONVERGENCE

This adjustment is to be performed only after the static convergence and the GREEN convergence adjustments were completed.

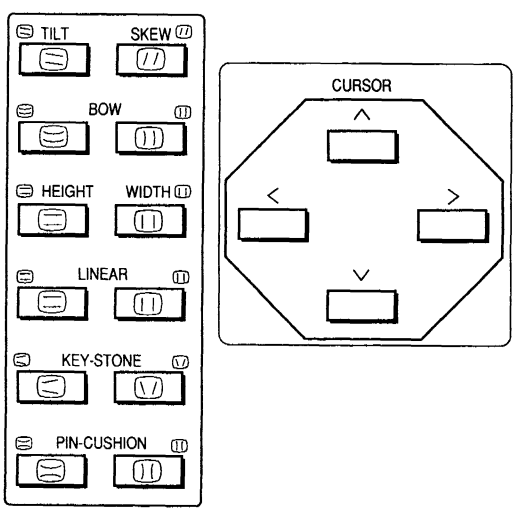


a) RED CONVERGENCE

① With the test pattern displayed, press the "B" key. The B CRT will enter the cut-off state.



② Press the "CTL" and "R" keys in succession to select the red adjustment. "R" will be displayed.



③ Press one of the 12 adjustment keys in conjunction with one of the cursor keys to align the red pattern to the green.

b) BLUE CONVERGENCE

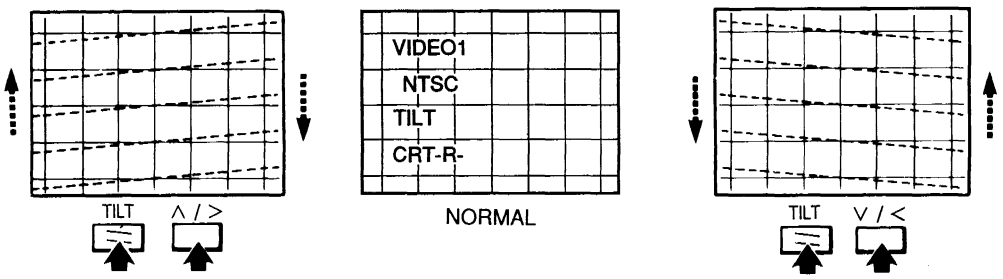
In the same manner as explained in RED CONVERGENCE, adjust the pattern to align the blue CRT i.e. press the B key while pressing the CTL key. Press one of the 12 adjustment keys in conjunction with the cursor keys.

FUNCTION OF CONVERGENCE ADJUSTMENT KEYS

Note: The following key functions refer to a front, floor type setting.

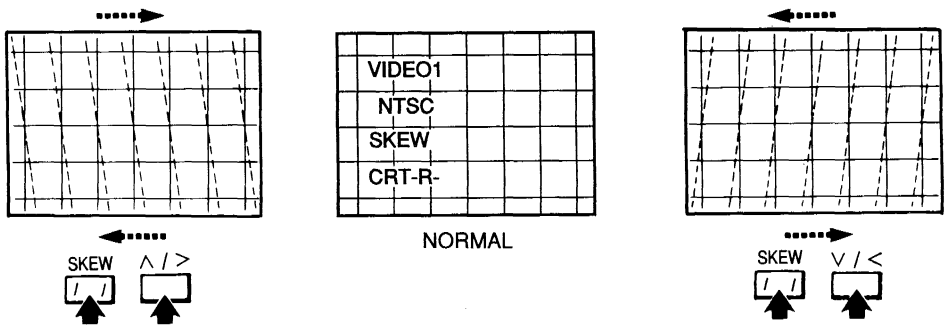
1) TILT KEY

After pressing this key, press one of the cursor keys to adjust the pattern. "TILT" will be displayed on the left side of the screen.



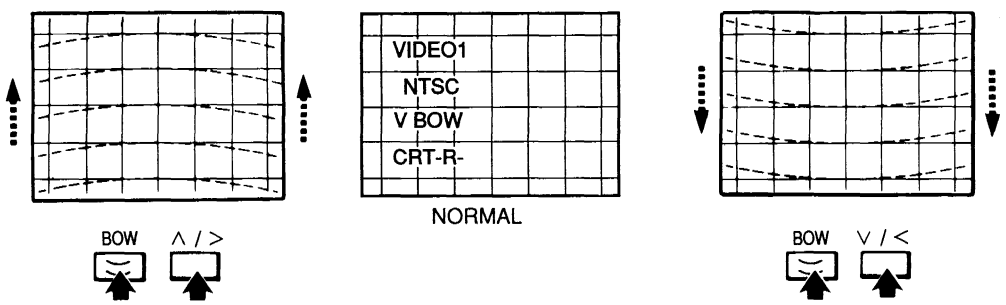
2) SKEW KEY

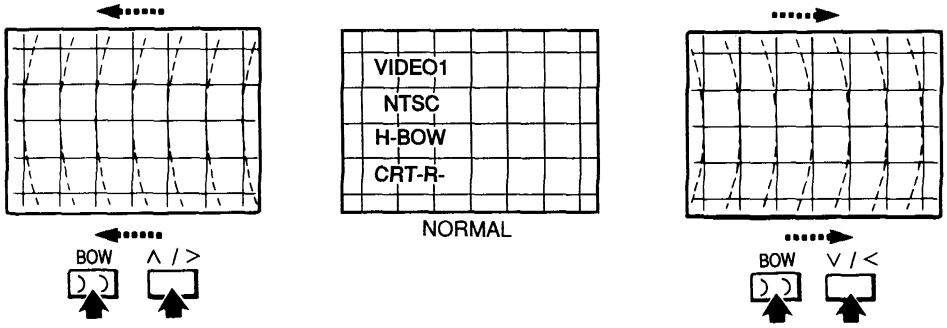
After pressing this key, press one of the cursor keys. "SKEW" will be displayed on the left side of the screen.



3) BOW KEYS

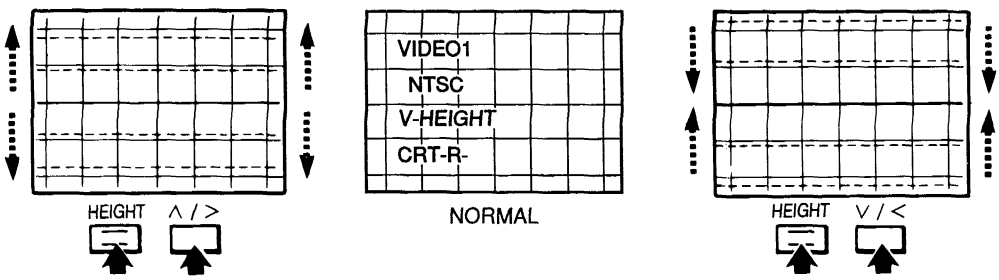
After pressing these keys, press one of the cursor keys. "BOW" wiil be displayed on the left side of the screen.





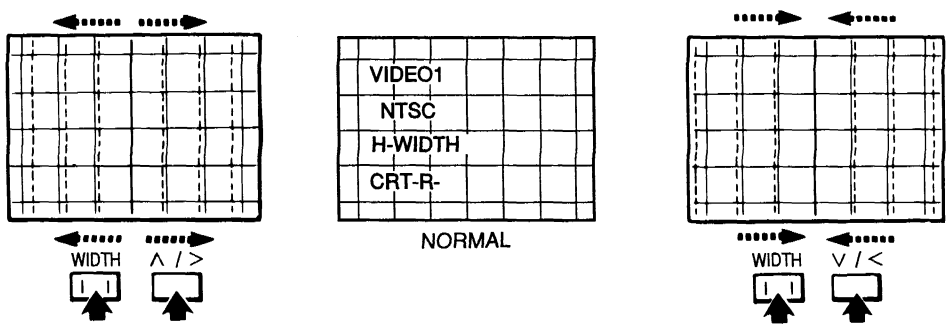
4) HEIGHT KEY

After pressing this key, press one of the cursor keys to adjust the vertical amplitude of the pattern. "HEIGHT" will be displayed on the left side of the screen.



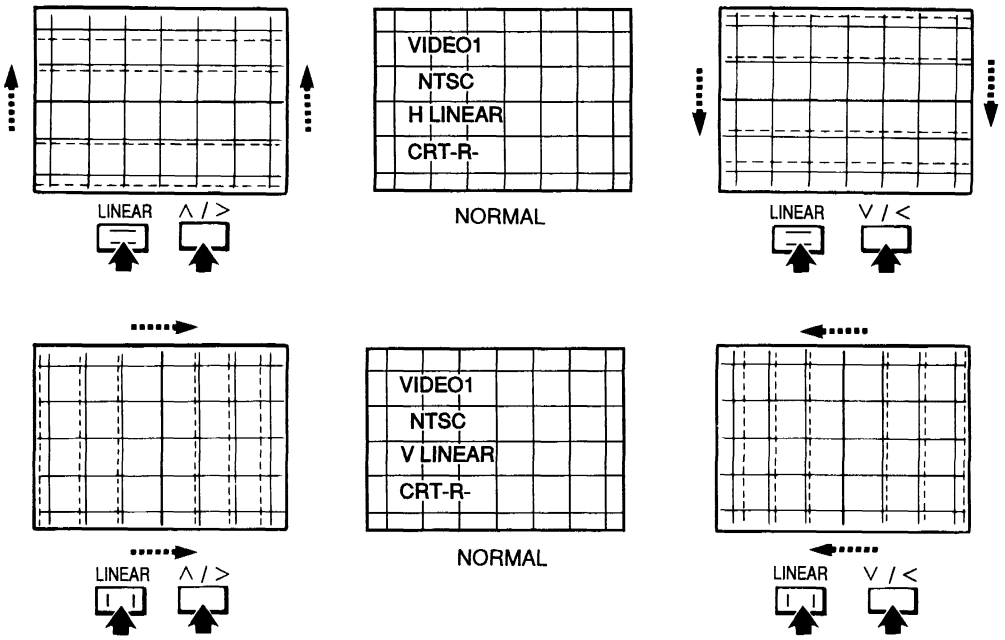
5) WIDTH KEY

After pressing this key, press one of the cursor keys to adjust the pattern width. "WIDTH" will be displayed on the left side of the screen.



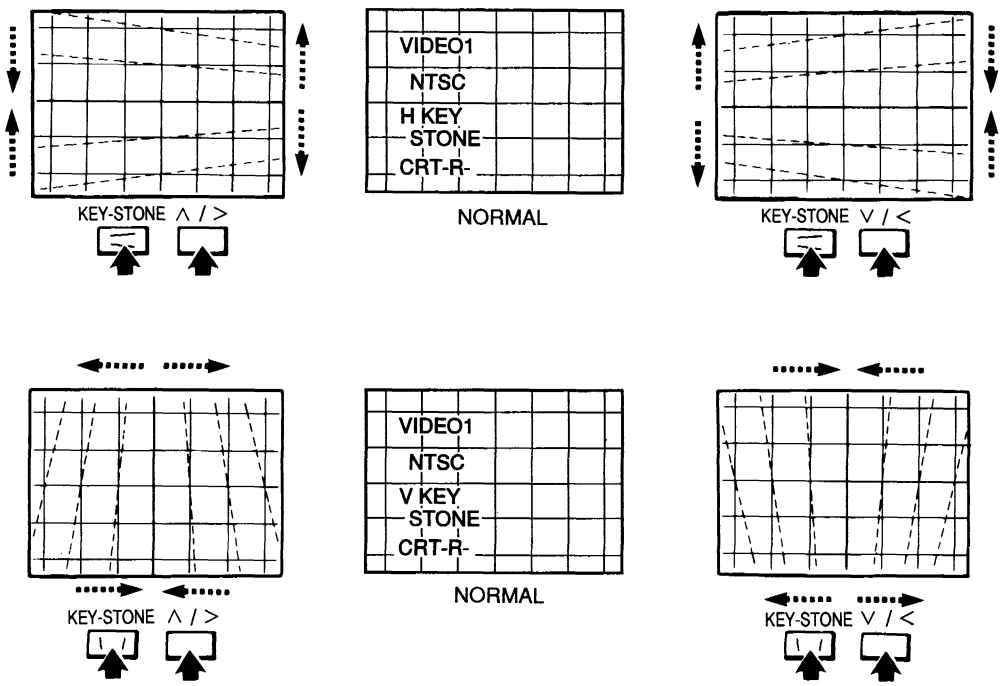
6) LINEAR KEYS

After pressing these keys, press one of the cursor keys to adjust the linearity of the pattern. "LINEAR" will be displayed on the left side of the screen.



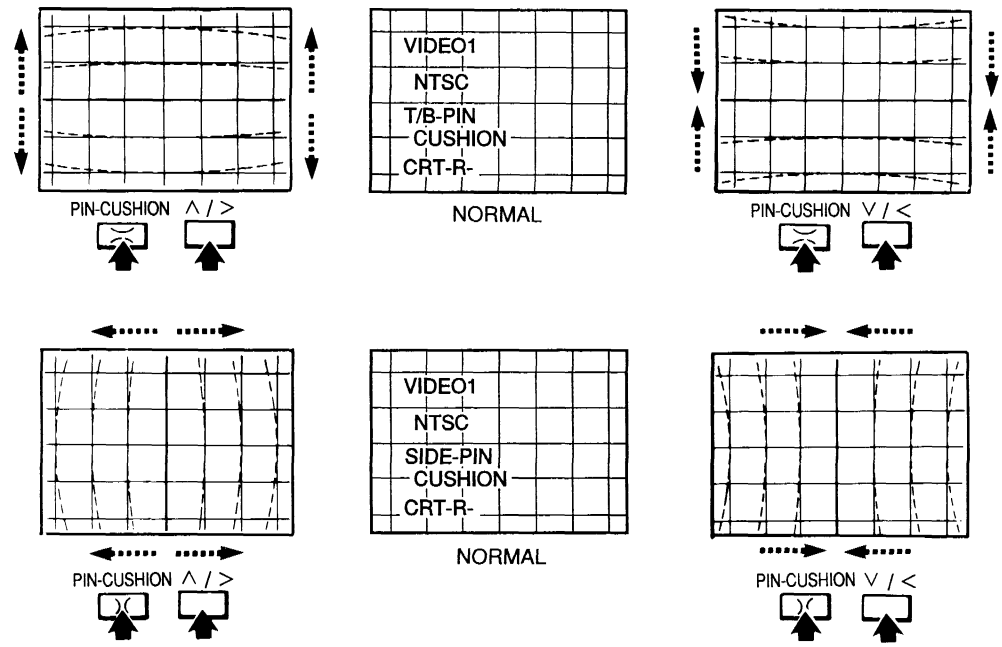
7) KEY-STONE KEYS

After pressing these keys, press one of the cursor keys to correct the pattern's key stone distortion. "KEY STONE" will be displayed on the left side of the screen.



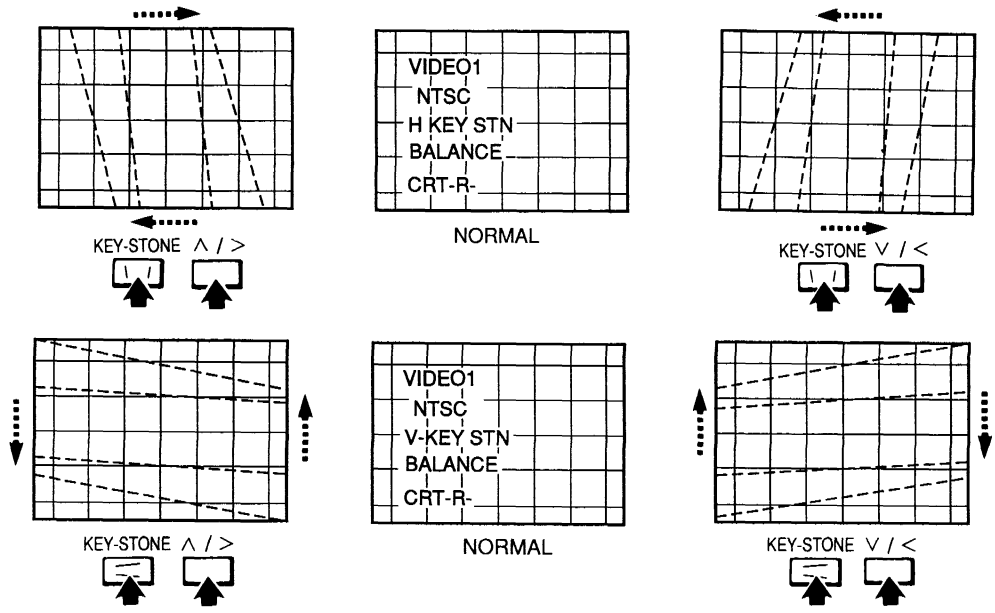
8) PIN CUSHION KEYS

After pressing these keys, press one of the cursor keys to correct the pattern pin cushion distortion. "T/B" and "SIDE" will be displayed on the left side of the screen.



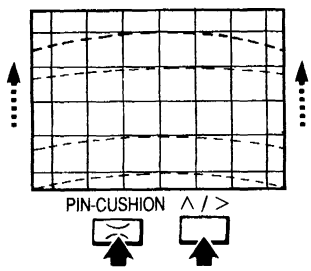
9) KEYSTONE BALANCE

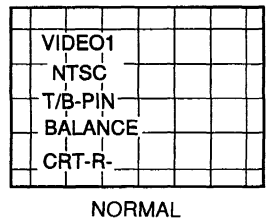
Press the keystone key while pressing the CTL key with one of the cursor keys to correct the pattern's keystone balance "KEY STN BALANCE" will be displayed on the left side of the screen.



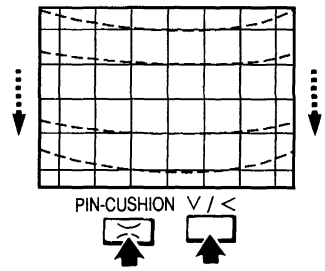
10) TOP/BOTTOM PIN CUSHION BALANCE

Press the Pin cushion key while pressing the CTL key with one of the cursor keys to correct the pattern's top/bottom pin cushion balance "T/B-PIN BALANCE" will be displayed on the left side of the screen.



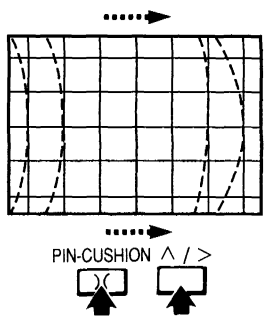


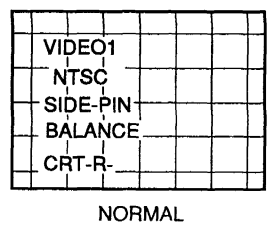
NORMAL



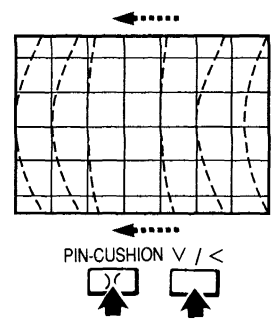
11) SIDE PINCUSHION BALANCE

Press the Pin cushion key while pressing the CTL key with one of the cursor keys to correct the pattern's side pin cushion balance "SIDE-PIN BALANCE" will be displayed on the left side of the screen.



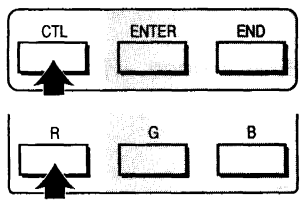


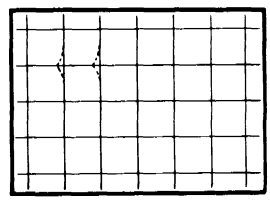
NORMAL



(4) POINT CONVERGENCE

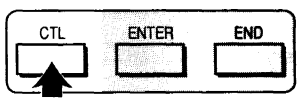
If the crosshatch pattern is converged enough after Dynamic Convergence is completed, Point Convergence will not be necessary. If this is the case carry out "CONVERGENCE MEMORY" to store the setting.

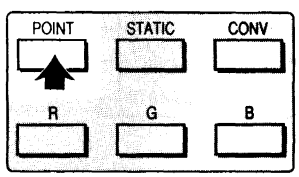


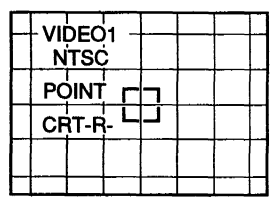


a) RED CONVERGENCE

① Press the "R" key while pressing "CTL" key to select the red adjustment mode.

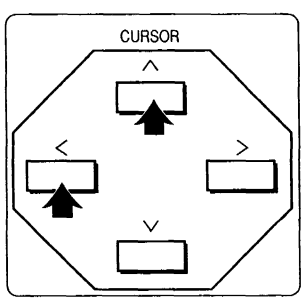


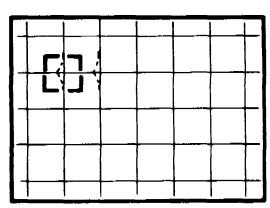




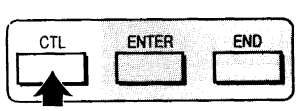
② Press the "POINT" key.
A CURSOR will be displayed at the center of the screen and "POINT" will appear.

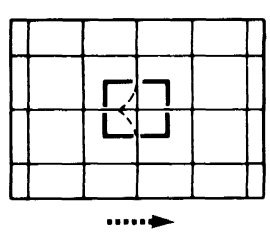
> **Note:** The cursor will not be displayed in the area where the on-screen displays are indicated.





③ Press the cursor keys to move the cursor to the position where the correction is necessary.





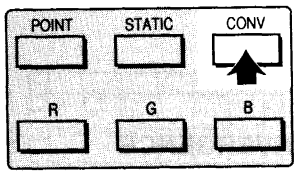
④ Press "CTL" key, and then adjust the point distortion with pressing the cursor keys.

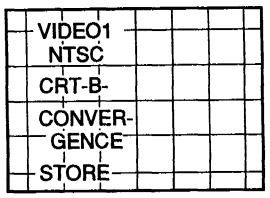
b) BLUE CONVERGENCE

In the same manner as explained in RED CONVERGENCE, perform an adjustment on blue. Press "CTL", "B" keys then the "POINT" key. Move the cursor to the adjustment point with the cursor keys.

(5) CONVERGENCE MEMORY

After convergence has been completed it is necessary to store the setting in the memory.





(Example)

① With the test pattern displayed, press the "CONV" key.

② Press the STORE key once. The confirmation message will be displayed on the screen as illustrated on the left.

③ Press the STORE key once again to store the data in the memory, the message will disappear.

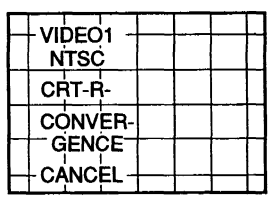
④ Press the END key.

(6) CONVERGENCE CANCEL FUNCTIONS

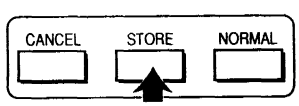
The cancel function reallocates memory for the new convergence data. Perform a cancel function when changing the installation position, using a different screen size, or changing the signal source so that a drastic convergence adjustment is required. The cancel function must be carried out on each individual R. G. and B. display.
Individual R. G. or B. convergence data can be alternately canceled.

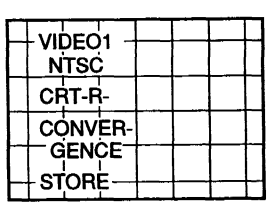
Select the signal and the CRT to be canceled. Display TEST pattern and press CONV key before proceeding to the following adjustments.

(A) ALL DATA CANCEL



(1) Press the CANCEL" key so the "CANCEL" on-screen will appear as shown on the left.
(2) Press the "CANCEL" key once more so the "CANCEL" display will disappear. The convergence data will enter the floating condition.

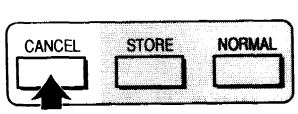


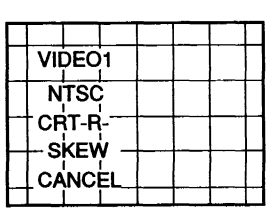


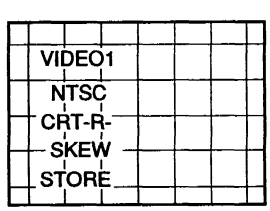
(3) Press the "STORE" key, and the "STORE" on-screen display will appear as shown on the left.
(4) Press the "STORE" key once more so the on-screen display will disappear. The canceled condition (cleared condition) will be stored.

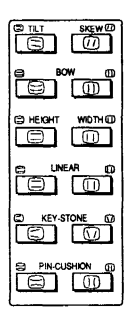
Note: To return to the condition when the "CANCEL" key is not pressed (i.e. default condition), turn off the MAIN switch or keep pressing "CTL" key and press "CANCEL" key twice simaltaneously in succession before the second time pressing of the "STORE" key.

(B) DYNAMIC CANCEL



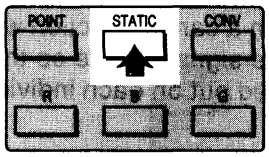


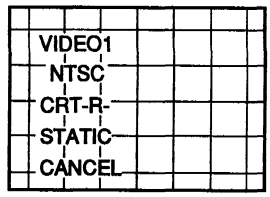




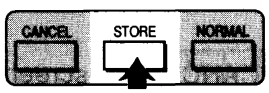
(1) Press one of the 12 DYNAMIC CONVERGENCE adjustment keys to be canceled.
(2) Press the "CANCEL" key so the "CANCEL" on-screen will appear as illustrated on the left.
(3) Press the "CANCEL" key once more so the "CANCEL" display will disappear, and the dynamic convergence data will enter the floating condition.
(4) Press the "STORE" key, then the "STORE" on-screen display will appear as illustrated on the left.
(5) Press the "STORE" key once more, so the on-screen display will disappear. The canceled condition (cleared condition) will be stored.
(6) To return to the default condition, perform the note in the ALL DATA CANCEL adjustment.

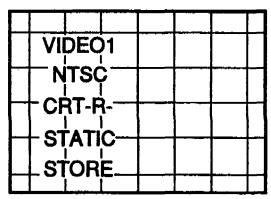
(C) STATIC CANCEL





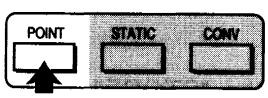
(1) Press the "STATIC" key to select the static convergence mode.
(2) Press the "CANCEL" key, the "CANCEL" on-screen will appear as illustrated on the left.
(3) Press the "CANCEL" key once more so the "CANCEL" display will disappear. The static convergence data will enter the floating condition.

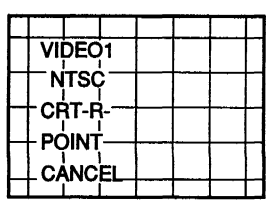




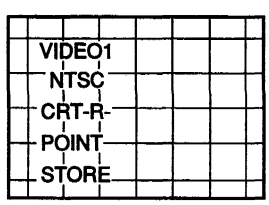
(4) Press the "STORE" key, and the "STORE" on-screen will appear as illustrated on the left.
(5) Press the "STORE" key once more so the on-screen display will disappear. The canceled condition (cleared condition) will be stored.
(6) To return to the default condition, perform the note in the ALL DATA CANCEL adjustment.

(D) POINT CANCEL





(1) Press the "POINT" key to select the point convergence mode.
(2) Press the "CANCEL" key, and the "CANCEL" on-screen will appear as illustrated on the left.
(3) Press the "CANCEL" key once more so the "CANCEL" display will disappar.
The point convergence data will enter the floating condition.

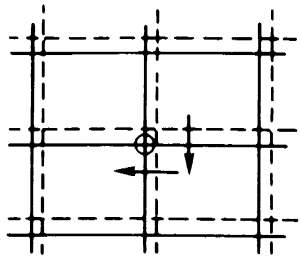


(4) Press the "STORE" key, and the "STORE" on-screen will appear as illustrated on the left.
(5) Press the "STORE" key once more so the on-screen display will disappear. The canceled condition (cleared condition) will be stored.
(6) To return to the default condition, perform the note in the ALL DATA CANCEL adjustment.

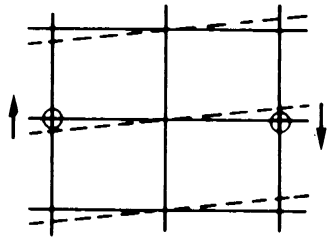
(7) CONVERGENCE ALIGNMENT SEQUENCE

For optimum results carry out adjustments in the order as shown below. If only partial convergence is necessary, adjustment of selected keys may suffice. In the following explanation Red and Blue (dot-line) are converged in Green.
In each convergence step adjust misconvergence so as to obtain symmetry about the horizontal and/or vertical axis.

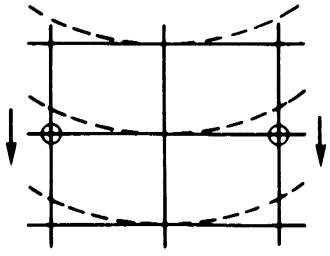
1. **Static CONVERGENCE**
   Adjustment Point
   H. V. Center



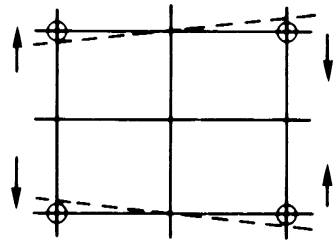
2. **Dynamic TILT**
   Adjust Vertical to Center
   Adjust Horizontal Right/Left Side



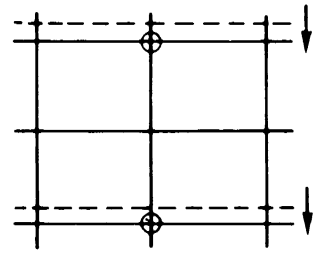
3. **Dynamic V. BOW**
   Adjust Vertical to Center
   Adjust Horizontal Right/Left Side



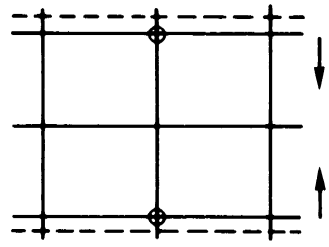
4. **Dynamic V. KEYSTONE**
   Adjust the 4 corners



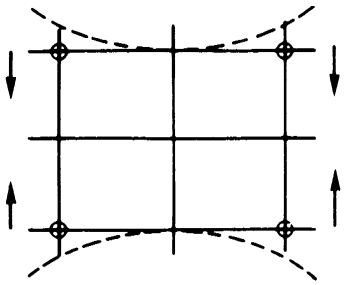
5. **Dynamic V. LINEAR**
   Adjust Vertical Upper/Lower Side
   Adjust Horizontal to Center



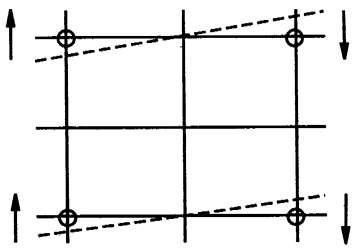
6. **Dynamic HEIGHT**
   Adjust Vertical Upper/Lower Side
   Adjust Horizontal to Center



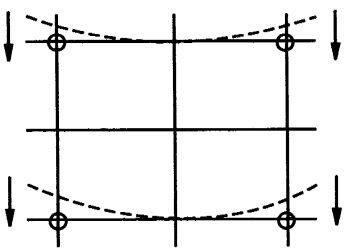
7. Dynamic TOP/BOTTOM PINCUSHION
Adjust the 4 corners



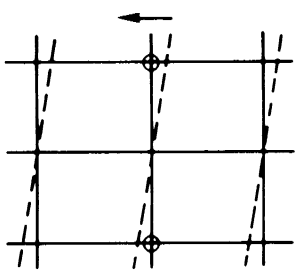
8. V-Keystone Balance
Adjust the 4 corners



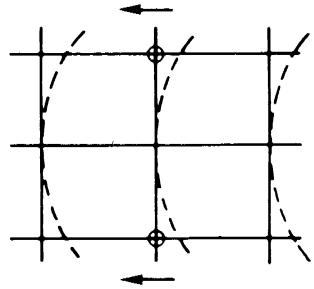
9. Top/Bottom Pin cushion Balance
Adjust the 4 corners



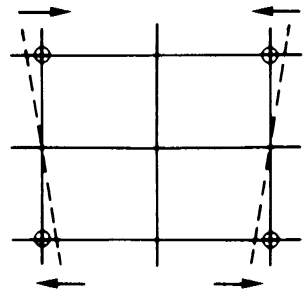
10. Dynamic SKEW
Adjust Vertical Upper/Lower Side
Adjust Horizontal to Center



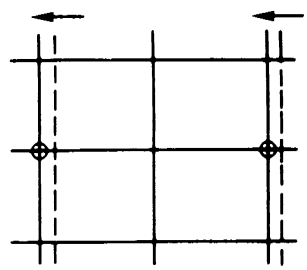
11. Dynamic H. BOW
Adjust Vertical Upper/Lower Side
Adjust Horizontal to Center



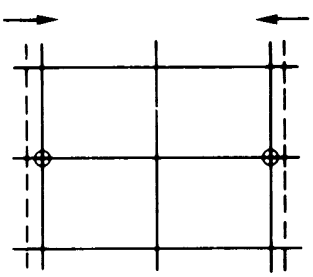
12. Dynamic H. KEYSTONE
Adjust the 4 corners



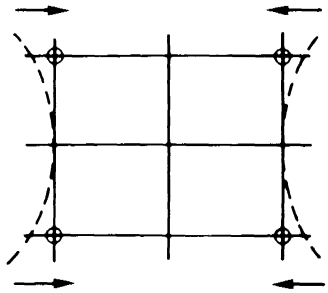
13. Dynamic H. LINEAR
Adjust Vertical to Center
Adjust Horizontal Right and Left sides



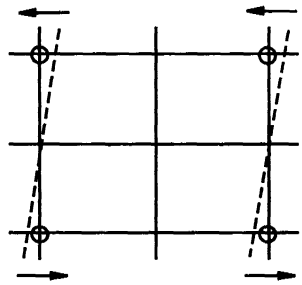
14. Dynamic WIDTH
Adjust Vertical to Center
Adjust Horizontal Right and Left sides



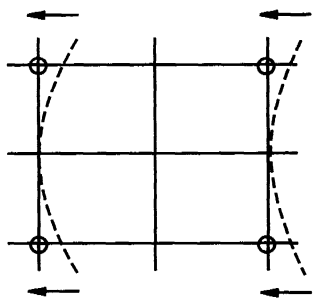
15. Dynamic SIDE. PINCUSHION
Adjust the 4 corners



16. H-Keystone Balance
Adjust the 4 corners



17. Side Pin cushion Balance
Adjust the 4 corners



18. Point CONVERGENCE
Adjust any Control Point