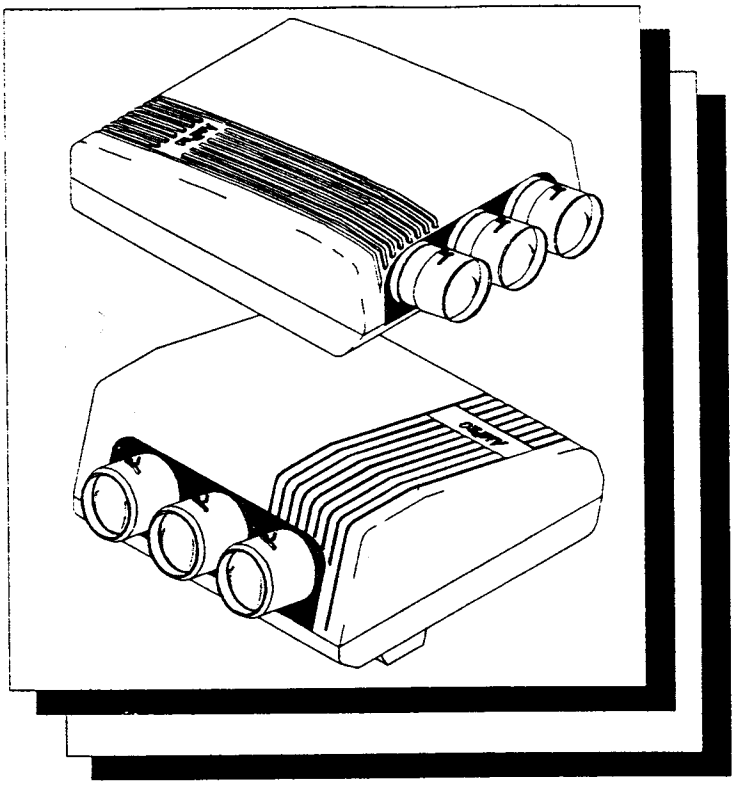
AMPRO CORPORATION

AMPRO 3600 / 4600 Operation Manual

Model 69581 Series / 69582 Series / HD Series

June 1995 / Revision A / AMPRO P/N 71128



MADE IN THE U.S.A.

PLEASE FOLLOW ALL NOTES AND WARNINGS.

BEFORE Operating this Video/Computer Graphics Display System, please read this manual carefully and completely. This manual will provide you with a full understanding of the many functions and special features, and the necessary instructions for adjustments and operation of this equipment.

NOTE Data presented in this manual has been carefully reviewed for accuracy and reliability; however, no responsibility is assumed for inaccuracies. The information contained in this manual is subject to change without prior notice.

IMPORTANT The procedures outlined in the Supplement Sections of this manual are intended to be used and performed by only qualified service/installation personnel. do not attempt to make any internal changes if you are not familiar with this system and the standard safety precautions associated with electrical or electronic equipment.

WARNING This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAUTION Shielded interconnect cables must be employed with this equipment to insure compliance with the pertinent RF emission limits governing this device.

SYSTEM'S RECORD

Model Number	
Serial Number	
Dealer	
Dealer's Address	
Purchased Date	
Principal User	

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IMPORTANT!

THE PROCEDURES OUTLINED IN THE SUPPLEMENT SECTIONS OF THIS MANUAL ARE INTENDED TO BE USED AND PERFORMED ONLY BY QUALIFIED SERVICE/INSTALLATION PERSONNEL. DO NOT ATTEMPT TO MAKE ANY INTERNAL CHANGES IF YOU ARE NOT FAMILIAR WITH THIS SYSTEM AND THE STANDARD SAFETY PRECAUTIONS ASSOCIATED WITH ELECTRICAL OR ELECTRONIC EQUIPMENT.

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Section 1

Introduction / Features / Specifications

The AMPRO 4600 Series of Computer Data/Graphics display systems offers superior resolution of 2000 X 2500 RGB lines. It includes three 9" (22.8 cm) magnetically focused CRTs, liquid-cooled / liquid coupled and the AMPRO 3600 Series of Computer Data/Graphics displays systems utilizes 8" (17.8 cm) liquid-cooled CRTs which provide resolution capability of 1600 X 1280 RGB lines. Both systems incorporate "Scheimpflug" focal plane adjustment which allows precise edge-to-edge resolution. Some of the features incorporated in the AMPRO 3600 and AMPRO 4600 are listed below.

1.1 ..... Features:

1.1.1 ..... Auto-lock:

The auto-lock feature is the ability to automatically lock the horizontal and vertical circuits to the input sync signals. This capability is invaluable in any system where more than one signal will be utilized.

1.1.2 .....Remote Control:

The remote control is extremely user friendly, for all AMPRO Computer Data/Graphics display systems. The microprocessor used in the system allows a vast array of information to be controlled by the remote control. Within the standard remote control is a large 4 X 20 character LCD read-out which gives the operating and diagnostics status of the unit. Additionally, both the LCD read-out and Remote Keypad have backlighting as standard. The remote control is available in three versions: a full function hard-wired with an LCD read-out, a infrared TECHNICIAN, and an infrared EXECUTIVE with On/Off/Standby and eight channel selection only.

1.1.3 ..... System Diagnostic:

The system constantly monitors all major voltages and signals (57 separate diagnostic messages) and provides a plain English operational status on a large 4 x 20 LCD backlit display located on the standard hard-wired remote control.

1.1.4 .....On-Screen Display (OSD):

The AMPRO 3600/4600 Series of display systems provide the ability to display the system status on-screen. This on-screen display emulates or is a LCD read-out repeater, meaning what is displayed on the remote control LCD read-out can be displayed on-screen. This feature can be enabled or disabled by the user with a simple system code.

1.1.5 .....RS232C:

The AMPRO Series Computer Data/Graphics display systems offers full duplex, bi-directional RS232C communications and networking capability. The systems can be controlled from the remote control, a computer terminal or through a third party control system using RS232C. Systems can be looped through so that multiple systems can be addressed individually or globally (as one) and controlled by one central source.

1.1.6 .....System Auto On/Off Operation:

The AMPRO 3600/4600 display systems have an internal timer which is capable of turning the system on and /or off at a predetermined time. Additionally, the timer may be programmed to operate in either a 5 or 7 day occurrence.

1.1.7 . . . . . Overdrive:

This features allows the user to increase the image brightness by ≈ 25% more lumens. This feature is useful for the occasional times when the circumstances, i.e., ambient lighting conditions, requires a brighter image. Overdrive may be temporarily evoked or permanently assigned to a channel location.

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! Overdrive feature is not available on the HD Series of Display Systems.

1.1.8 . . . . . .Store/Recall:

The AMPRO series of Computer Data/Graphics display systems can automatically store and recall (< 1 second switching time) each of the image raster alignment, phasing settings, picture settings, mode of operation and all registration settings via the remote control for ANALOG RGB, and VIDEO inputs. Any combination of up to **50** ANALOG RGB and VIDEO inputs may be stored in memory locations designated as "CHANNELS" and recalled by the remote control. Channel status may be displayed on screen by using an internal code command to display the setup status of all 50 channels, such as channel validation, horizontal and vertical setup frequencies, channel name and more. See Section 7 and Appendix C.

1.1.8.1 . . . . . .Channel Auto-Search Mode (ASM):

The Auto-Search Mode (ASM) of operation is a toggle function which allows the system to operate in an auto channel selection mode. As the incoming video signal, i.e., RGB, changes horizontal and/or vertical rates the system will automatically detect the change and re-configure the display parameters to optimize the displayed image.

1.1.9 . . . . . .Lenses:

AMPRO 3600: incorporates f/1.0 high resolution, 10 lp/mm full field @ >50% MTF, reflective coated hybrid lenses, which can be used for screen sizes from 48 in. (1.2m) to 240 in. (6.1m) picture widths. **AMPRO 4600:** has as standard the f/1.1 high resolution (12 lp/mm full field @ >50% MTF), reflective coated, optically-coupled lenses (HD-10GT17), which can be used with screen sizes from 75 in. (1.9m) to 107in. (2.7m) picture width. Optional lenses are available which include screen width capabilities ranging from screen widths as small as 43.0in. (1.2m) up to 241.0in. (6.1m)

1.1.10 . . . . . .Internal Help Screens:

The firmware incorporated into the AMPRO system allows the user the capability of using the internal help system for instruction on the step-by-step setup, alignment, registration, operation and special features of the AmPro Computer Data/Graphics display systems.

1.1.11 . . . . . .Temperature Sensing:

The AMPRO 3600/4600 constantly monitors the systems' internal temperature at two separate points, one for the chassis temperature and the second for the low voltage power supply The temperature readings may be accessed by entering 26 [CODE]. If the internal temperature exceeds the maximum limit of 158° F (70° C), then the system will automatically shut down and display "OVER TEMPERATURE" on the remote control LCD read-out. The over temperature condition may be a result of ambient room temperature condition, possible failure of the cooling fans (3 each) or dirty/clogged fan filter media.

1.1.12 . . . . Digital Registration:

The AMPRO systems electronic alignment and registration is totally controlled by remote control. The firmware incorporated in the AMPRO Computer Data/Graphics display systems permits either a controlled (guided) or random static and dynamic registration of the system. An internal HELP MENU guides the first time user through a step-by-step procedure. All registration settings are channel sensitive, meaning that each individual source may be precisely aligned to its particular parameters and stored in a designated location.

1.1.12.1 . . . . . .Automatic Convergence Scaling (A.C.S.):

"A.C.S", Automatic Convergence Scaling provides the Display System with the ability to calculate registration settings of a new source based upon existing previously setup and validated channels settings. The command interprets between the closest lower "validated" channel and the closest higher "validated" channel. The "A.C.S." greatly reduces setup time for new sources. Refer to Section 7 (CODEs) and Section 8 for additional information on A.C.S.

1.1.12.2 . . . . . .Intensity Mapping (OPTIONAL):

Intensity mapping allows the contrast and color balance of the top, bottom, left, right and all four quadrants (corners) of the projected image to be adjusted individually. Intensity mapping is useful to overcome possible shading of the image when using curve or high gain screens, which may cause "hot spots" or when overlaying multiple projected images.

1.1.13 . . . . . .User Adjustable Color Temperatures:

Remote user adjustable color temperature with factory pre-set(s) of 3600°K, 6500°K, 9300°K and user custom settings available. User custom setting allows user variation of the red, green and blue sub-bright and gain controls for an infinite range of color temperature settings. Color temperature is saved as a channel parameter.

1.1.14 . . . . . .Gamma Correction (OPTIONAL):

This optional feature electronically compensates for differences in beam current vs. light output differences between the red, green and blue CRT phosphors. Provides accurate grayscale tracking at all image brightness settings.

1.2 . . . . . .Optional Inputs:

1.2.1 . . . . . Quad Video Decoder / S-Video - 1 and Quad Video Decoder / S-Video - 2 :

The AMPRO 3600/4600 have the capability to include one or two Quad Video Decoder modules. These *optional modules* have a built in capability which automatically senses and decodes any of the four international standards of video information that is applied to the composite video input. The auto select capability can be manually overridden, if desired, via the remote control. Another feature of the Quad Standard Module is the S-Video input. Selection between the Composite Video input and the S-Video input is accomplished via the remote control.

1.2.2 . . . . . .Analog RGB - 2 and Analog RGB - 3:

The AMPRO 3600/4600 systems have the provision to include two additional Analog RGB/S modules. The second Analog RGB2 and third Analog RGB3 modules enable you to switch between three separate Analog RGB sources (3 or 4 wire operation) via the remote control.

! The AMPRO 3600/4600 Systems can accommodate a total of three input modules, the standard RGB and any combination of the optional modules listed above.

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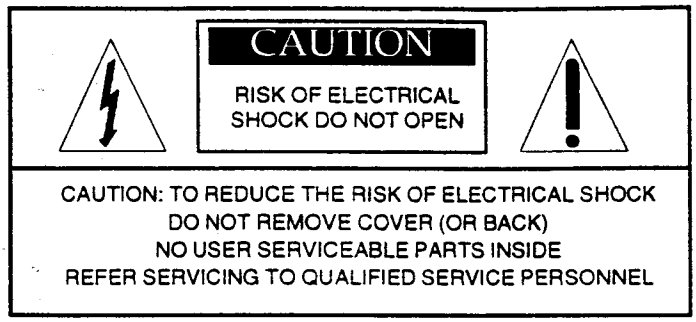
1.3 . . . . . Specification Chart:

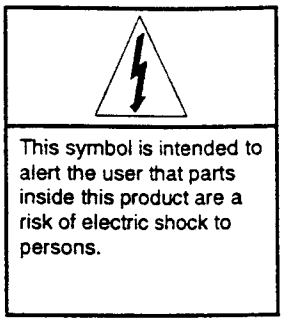
SPECIFICATIONS		AMPRO 3600	AMPRO 4600
CRTs:		8" magnetically focused, liquid-cooled CRTs with focal plane adjustments.	9" magnetically focused liquid-cooled/coupled CRTs with focal plane adjustments.
Resolution:	RGB	1600 x 1280 lines	2500 x 2000 lines
	Video	650 lines	
	MTF	Modulation depth > 15% in horiz. and vert. resolution at 1280 x 1024 (3600) and 2500 x 2000 (4600)	
Light Output (ANSI lumens):		220	270
Screen Size:		4ft. (1.2m) to 20ft. (6.1m) picture width	4ft. (1.2m) to 20ft. (6.1m) picture width (see lens specification)
Scan Frequencies:	Horizontal	15kHz - 105kHz	
	Vertical	40 - 150Hz	
Bandwidth:		< 100 MHz	
Minimum Retrace:	Horizontal	<2.8µS	
	Vertical	400µS	
Inputs: (module)	Standard	Analog RGB1	
	Optional	(1) Quad Video Decoder w/S-Video1, (2) Quad Video Decoder w/S-Video2 (3) Analog RGB2, (4) Analog RGB3	
Remote Control:	Standard	Hardwired with 25ft. (7.6m) cable with back-lit LCD read-out and Keypad.	
	Optional	Infrared Executive or Technician Remote Control Kits	
Remote Control Operates:		Image Quality adjustments, raster alignment, on/off, stand-by, blanking, test patterns, and all static and dynamic registration. Store and recall (< 1 second switching time) of all settings (50 channels) of any one of the mode of operations. Optional 8 channel RS232C switcher.	
Special Features:		Bi-directional RS232C Communications and networking, digital registration, Automatic Convergence Scaling (linearity interpolation) of new sources, Channel Auto-Search mode, Automatic timer operation (auto-on/off) with user selected 5 or 7 day operation. User selectable "OVERDRIVE" mode; enables the temporary use of increase light output when the environment requires it. Fifty-seven diagnostic message. On-screen status display (user controllable).	
Power Source:		110 (90 to 130) Vac / 220 (185 to 240) Vac 50/60Hz	
Maximum Power:		800 watts (1800 BTUs)	
Weight/Ship Wt.:		120/163 lb. (54/74 kg)	180/240 lb. (82/109 kg.)
Operating Ambient Temp.:		+32°F to 97°F (0°C to 36°C)	
Operating Ambient Humidity:		20% to 80% (Non-condensing)	
Model / Lens Specification:		69581	69582 (4600 w/HD-10GT17) (standard)
		69581HD (HDTV version)	69582.10L (4600 w/HD-10L Lenses)
			69582.10 (4600 w/HD-10 Lenses)
			69582.26 (4600 w/HD-10GT26 Lenses)
			69582HD (4600-HDTV Series)

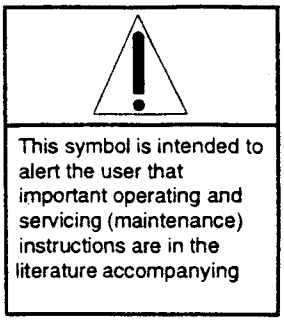
TABLE 1-1

Section 2

Warnings and Precautions







2.1 ..... X-Radiation:

During the operation of any solid state Data/Graphics display system, the picture tube is a primary source of x-radiation. The projection tubes in the AMPRO 3600 and AMPRO 4600 incorporate leaded glass to safeguard against the leakage of x-rays. AmPro projectors comply with all U.S. Department of Health and Human Services rules governing the emission of x-radiation. **FOR CONTINUED X-RADIATION PROTECTION THE USER SHOULD NEVER ATTEMPT TO REPLACE THE PROJECTION TUBES OR OTHER ELECTRONIC COMPONENTS.** Instead, all service to the system should be performed by a qualified service technician.

NOTE

X-RAY SHIELD
DO NOT REMOVE

"WARNING"
COMPONENTS FOR X-RAY SAFETY ARE CONTAINED IN THIS POWER SUPPLY RETURN COMPLETE HIGH VOLTAGE MODULES TO FACTORY FOR REPLACEMENT AND CONTINUED SAFETY

THE DEFLECTION YOKES MUST BE FIRMLY AGAINST THE BELL OF THE CRT TO PREVENT X-RADIATION.

"WARNING"
BACKWARD MOVEMENT OF THE YOKE RESULTS IN PICTURE DEGRADATION AND LOSS OF RADIATION PROTECTION

2.2 ..... High Voltage:

The projection display system contains high voltage derived from supplies capable of delivering **LETHAL** quantities of energy. To avoid serious personal injury, only a qualified technician should service and adjust the internal modules within the unit. There are no user serviceable parts in the AmPro system. All internal servicing must be performed by a qualified technician.

HIGH VOLTAGE

THIS UNIT OPERATES AT 36KV

2.3 . . . . . Exposure to Rain or Moisture:

To reduce FIRE or SHOCK HAZARD, never expose the system to rain or moisture. If this happens inadvertently, do not use the system until it has been inspected and/or serviced by a qualified technician.

2.4 .....Projection Tubes:

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The projection tubes inside the system enclose a high vacuum. Care must be taken to ensure that the system is not dropped or otherwise subject to violent blows.

! ATTEMPTS TO ALTER THE SEALED FACTORY-SET INTERNAL CONTROLS OR TO CHANGE OTHER SETTINGS NOT SPECIFICALLY DISCUSSED IN THIS MANUAL CAN LEAD TO PERMANENT DAMAGE TO THE PROJECTION SYSTEM AND VOID THE WARRANTY.

2.5 .....A.C. Line / Electrical Grounding of Equipment:


The AMPRO projection systems are configured for 115V or 220V operation and supplied with one of four standard power cords, as specified at the time the system is ordered. To change configurations, refer to Section 5. For your safety and proper operation, the system **MUST** be connected to a properly wired and grounded outlet. An improperly grounded system can place **HAZARDOUS VOLTAGES** on accessible metal parts of the system chassis and voids the Warranty due to potential damage to the system.

! FOR INTERNAL ADJUSTMENTS OR SERVICE REFER TO QUALIFIED PERSONNEL. THE POWER CORD PROTECTIVE GROUNDING CONDUCTOR MUST BE CONNECTED TO EARTH GROUND. FOR CONTINUED SAFETY AND PROTECTION REPLACE FUSE WITH SPECIFIED TYPE.

2.6 . . . . . CRT Phosphor Life Criteria:

The phosphor coating on the face of the CRT has a given useful life and will provide satisfactory performance under normal usage. Since the phosphor efficiency decreases throughout its use at a rate which is a function of the beam intensity, the useful life of the CRT is determined by the application and the usage at high intensities.

Consequently, the continuous use at high brightness, and in particular prolonged use of a fixed pattern at high intensity, will adversely affect the useful life of the CRT. Continuous or repetitive use with a high-intensity fixed pattern will ultimately result in the "*etching*" of that pattern into the phosphor as a result of accelerated degradation in the area of the pattern. In the case of fixed pattern applications, the life is optimized by repositioning the pattern from time to time or by limiting the brightness when not in active use.

2.7 .....Ceiling Mount Precaution:

In a ceiling-mount application, the strength and rigidity of the ceiling are very important. The location should be carefully checked before hand to determine that the installation will safely support the weight of the system.

! AMPRO Corporation IS NOT RESPONSIBLE FOR INJURY OR DAMAGE CAUSED BY AN IMPROPERLY INSTALLED SYSTEM.

2.8 . . . . . Electrostatic Discharge "ESD"

CAUTION
ELECTROSTATIC
SENSITIVE
DEVICES

For the technician, static electricity does not present a real hazard; but a simple nuisance, an annoying minor shock on those cold, dry days. Although your reaction to this jolt may become the real hazard, if you happen to be in a precarious position, such as atop a ladder. However, for most of the components used in today's electronics, static electricity can zap and destroy some semiconductors, particularly MOSFET and CMOS ICs.

Use the following procedures when trouble-shooting, repairing and handling electronic printed circuit boards.

- Before handling these devices, the user or the equipment should momentarily contact a metal object at electrical ground potential so that any static charges will be removed.
- Soldering-iron tips should be electrically grounded before soldering any wire or metal objects that are directly or indirectly connected to the device.
- The same electrical ground potential should be applied to any lead-shorting and device shrouding materials and to the device case when possible.
- Use properly grounded conductive table tops, floor mats, and chairs.
- Provide personnel grounding to the extent that grounding wrist straps and heel protectors are used to achieve the required electrical ground.
- In the handling for assembly into printed circuit boards, transportation of parts and PCBs, storage, assemblies into the systems and package of MOSFET and CMOS devices, use electrically conductive bags or packages.
- **ALL PCBs** returned to the factory must be packaged in electrically conductive bags or packages. Contact the factory if proper packaging is not available or reuse the bag (packing) received with the the replacement assembly.

! When using conductive materials, clothing, straps, grounding leads to avoid static discharge, be particularly careful to prevent electrical shock from conventional sources as the extensive use of conductive material increases the possibility of shock.

NOTES:

Section 3

Limited Warranty

AMPRO Corporation warrants this product to be free from defects in material and workmanship under normal use, subject to the limitations provided below.

3.1 ..... Warranty Period:

For the first twelve (12) months after the date of installation, but limited to a maximum of 15 months from date of shipment from the factory, AMPRO Corporation will repair or replace any defective part, exclusive of the CRT for degradation of the phosphor coating, without charge for labor or parts. Replacement parts will be covered by this limited warranty for the remainder of the warranty period. This Limited Warranty applies only to parts supplied or designed by AMPRO Corporation.

3.2 ..... Date Of Installation:

To establish the date of installation, the AMPRO Corporation Certificate of Registration should be completed, signed and returned to AMPRO Corporation, postmarked no later than thirty (30) days from the date of installation. If the AMPRO Corporation Certificate of Registration is not returned within such time, AMPRO Corporation will use the date that the system was shipped from the factory as the date of installation.

3.3 .....Original Purchaser:

This Limited Warranty is limited to the original purchaser (end user) of this product from either AMPRO Corporation or AMPRO Corporation authorized dealer, distributor or agent.

3.4 ..... Warranty Service:

For servicing under this Limited Warranty, this product must be presented to AMPRO Corporation, an authorized AmPro Corporation service center or the authorized AMPRO Corporation selling dealer.

3.5 .....Shipping:

Prior to shipping this product or any sub-assembly to AMPRO Corporation, a Return Authorization Number must be obtained from the AMPRO Corporation Customer Service Department. The product must be shipped in the manufacturer's original shipping carton or other AMPRO Corporation approved packaging. All freight and shipping charges to AMPRO Corporation must be prepaid by the purchaser. Damage resulting from abuse in shipment of this product is not covered by this Limited Warranty. AMPRO Corporation approved shipping cartons are available from AMPRO Corporation for a nominal charge.

3.6 .....Environmental Damage:

This Limited Warranty does not cover damage or repairs that are necessary due to floods, winds, fires, lightning, accidents, corrosive atmosphere, excessive exposure to water (moisture) or heat, or any other conditions beyond the control of AMPRO Corporation.

3.7 .....Serial Number Defacement:

This Limited Warranty is void for the product if the serial number has been changed, removed or defaced.

3.8 . . . . . Misuse:

This Limited Warranty does not cover repairs that are necessary due to:

- incorrect installation;
- voltage conditions, blown fuses, open circuit breakers or any other inadequacy or interruption of properly grounded electrical service;
- misapplication, abuse, improper servicing, or any other improper operation, including mis-adjustments of any control;
- defects in or caused by associated equipment; or
- repair and/or modification of a sub-assembly performed by other than AMPRO Corporation factory personnel.

Normal maintenance as outlined in the installation and servicing instructions of this Operator's Manual will be the responsibility of the purchaser.

AMPRO CORPORATION MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, IN CONNECTION WITH THIS PRODUCT EXCEPT AS HEREINABOVE PROVIDED. IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ARISING FROM A COURSE OF DEALING OR USAGE OF TRADE ARE SPECIFICALLY EXCLUDED. SHOULD THIS PRODUCT PROVE TO BE DEFECTIVE IN MATERIAL OR WORKMANSHIP, THE PURCHASER'S SOLE REMEDY SHALL BE SUCH REPAIR OR REPLACEMENT AS HEREINABOVE EXPRESSLY PROVIDED AND UNDER NO CIRCUMSTANCES SHALL AMPRO CORPORATION BE LIABLE FOR ANY LOSS, OR DAMAGE, DIRECT, INCIDENTAL OR CONSEQUENTIAL, INCLUDING LOSS, OR LOSS OF PROFITS OR BUSINESS OPPORTUNITIES, RESULTING FROM DEALER OR DISTRIBUTOR INSTALLATION OR SERVICES.

Some states do not allow the exclusion of incidental or consequential damages, so the above limitation may not apply to you. This Limited Warranty gives you specific legal rights, and you may also have other rights which may vary from state to state or country. NO other person is authorized to assume for AMPRO Corporation any additional obligations beyond those provided herein.

Section 4

System Applications and Screens

4.1 ..... System 1/Basic Configuration:

This system is the most versatile large screen data/graphic display system in that it enables a large number of people to view.

USED FOR

- ☐ CLASSROOMS
- ☐ CONFERENCE ROOMS
- ☐ PRIVATE USE

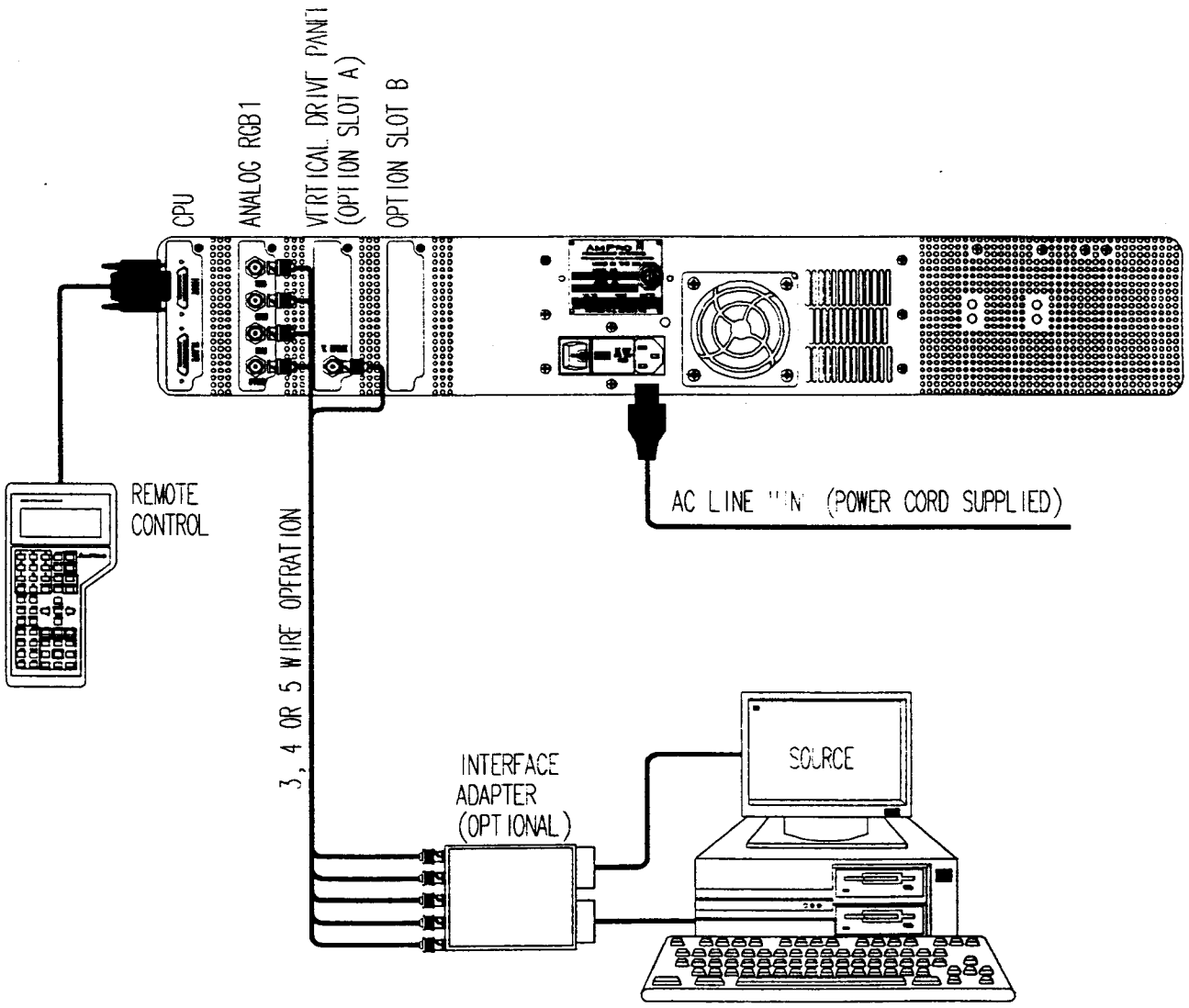


FIGURE 4-1. BASIC SYSTEM CONFIGURATION.

4.2 . . . . . System 2/Optional Configuration 1:

This system is configured to bring together video and computer graphics and technical presentations for business. Its high resolution and versatility to accept various types of personal computers and workstations make it ideal for conferences, training and diversified graphics/data/video services.

USED IN

- ☐ CONFERENCE ROOMS
- ☐ TRAINING AREAS
- ☐ INFORMATION DISPLAYS

4

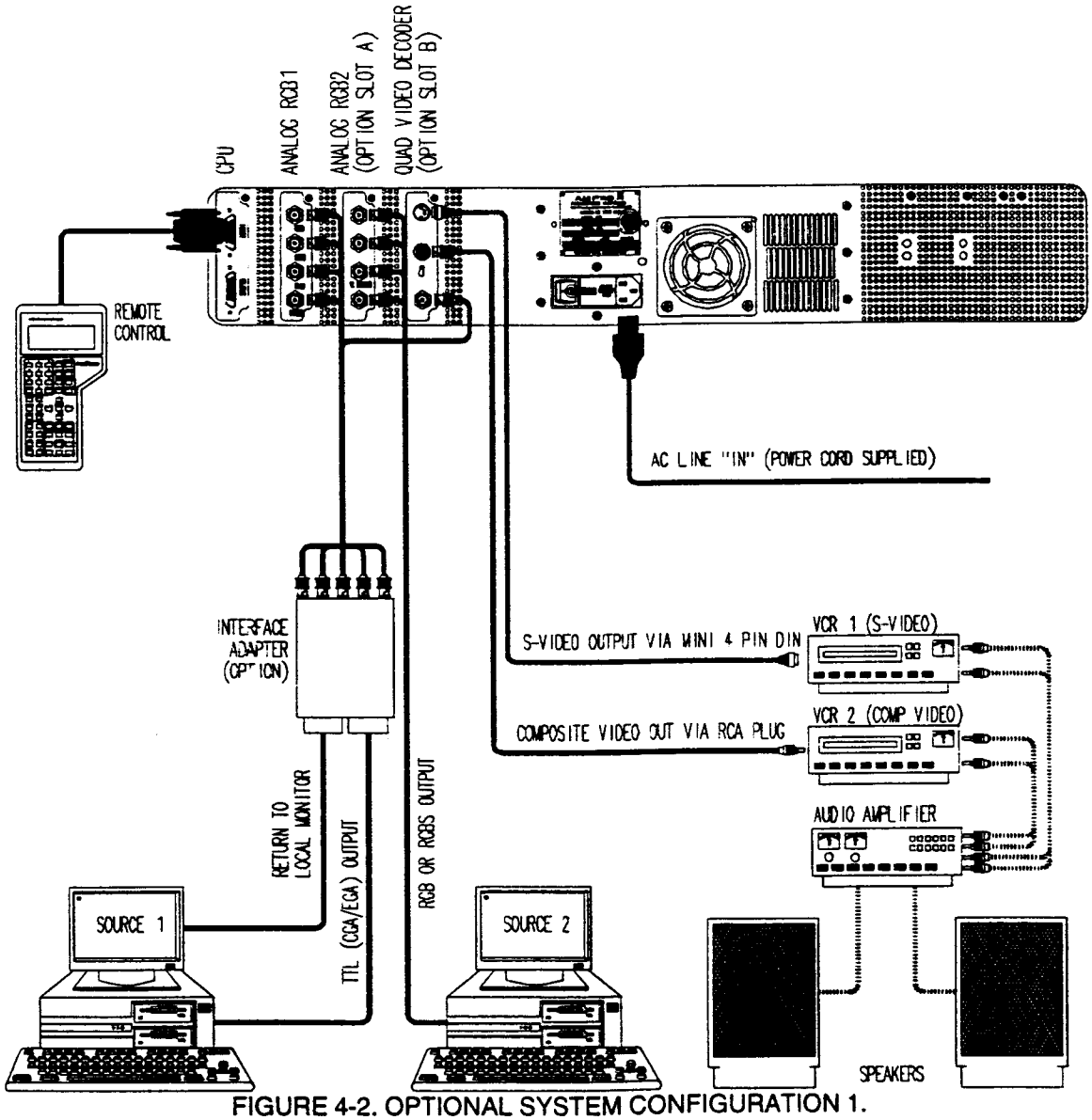


FIGURE 4-2. OPTIONAL SYSTEM CONFIGURATION 1.

Configuration: (1) Analog RGB1 module (standard), (2) Analog RGB2 module (optional), and (3) Quad Video Decoder 1 w/S-Video (optional).

4.3 . . . . . System 3/Optional Configuration 2:

This system is ideal for a wide range of educational activities as an effective teaching aid.

USED IN

- ☐ CLASSROOMS
- ☐ AUDITORIUMS
- ☐ LECTURE HALLS

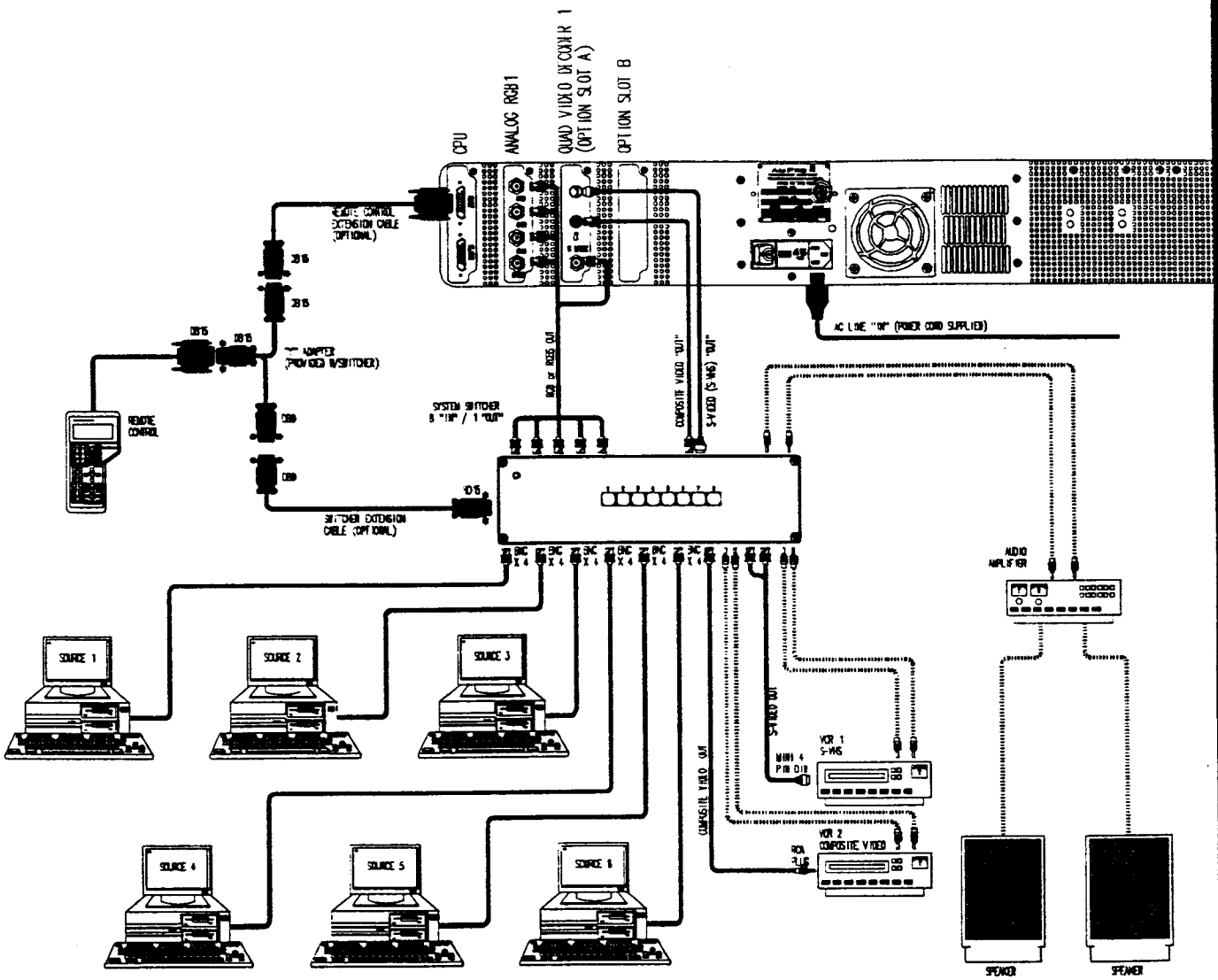


FIGURE 4-3. OPTIONAL SYSTEM CONFIGURATION 2.

Configuration: (1) Analog RGB1 module (standard), (2) Quad Video Decoder 1 w/S-Video (optional), and (3) High Definition Switcher [eight "in" and one "out"]. AmPro 4600 and switcher are controlled via a single remote control.

4.4 . . . . . Screens:

4.4.1 . . . . . .Screen Size:

The screen size will depend upon several factors such as room size, audience size and location, material being presented, and brightness requirements. Generally speaking, to resolve given detail on the screen, a larger audience will require a larger screen size since on average they will be further away. For comfortable viewing, it should not be assumed that everyone has perfect 20/20 eyesight. For a given brightness, a larger screen size will require some combination of a brighter projector and a screen with more gain.

As a general guideline, the minimum audience viewing distance from the screen should be two times the diagonal dimension of the screen and the maximum should be eight for video and five for detailed graphics.

4.4.2 . . . . . .Front Screens: (Figure 4-4)

There are a variety of front screens available, ranging from low-gain painted white walls to very high gain rigid curved screens. The most significant screen characteristic is the "gain", which is a measure of how bright the image will appear to an observer in the ideal viewing location compared to how bright it would appear with a simple "pure white" screen. A screen with gain of more than one will selectively reflect light toward the viewing audience and less to the sides, top and bottom.

Why not use the screen with the maximum gain and therefore maximum brightness? The more gain a screen has, the less view point it has from the sides, and if a flat screen has too much gain, the corners will become dimmer compared to the center (i.e. increased vignetting). In video projectors utilizing three tube-lens combinations, there may be some "color shift" present with a high gain screen. In this case, the viewers seated to the left side of the projector will see the image as slightly tinted to the color of the tube on the right side of the projector, and vice versa. Also, if a high gain flat screen is "wavy" (not stretched flat), viewers may see brightness changes and loss of resolution throughout theses waves. Certain high gain screens may also exhibit a fine pattern of lenticules (tiny embossed "lenses" that control the direction of light distribution) that nearby viewers may see as a "dirtiness" on the screen.

Some high gain screens enhance performance by utilizing different horizontal and vertical gain patterns. This characteristic takes advantage of the common audience viewing pattern of being spread over narrow vertical and relatively wide horizontal angles from the screen. The light "saved" by limited vertical spread angle is then sent to the audience in the form of higher gain.

In addition to brightness, the other significant advantage of high gain screens is their ability to reject ambient light to reduce washout and increase contrast. This feature is best taken advantage of by insuring that ambient light, both controlled and stray, falls on the screen primarily from well off the sides - it will then be largely directed to the far opposite side and have minimal effect on the viewing audience.

Following are the major front screen categories and some comments:

4.4.2.1 . . . . . .Matte White Screens:

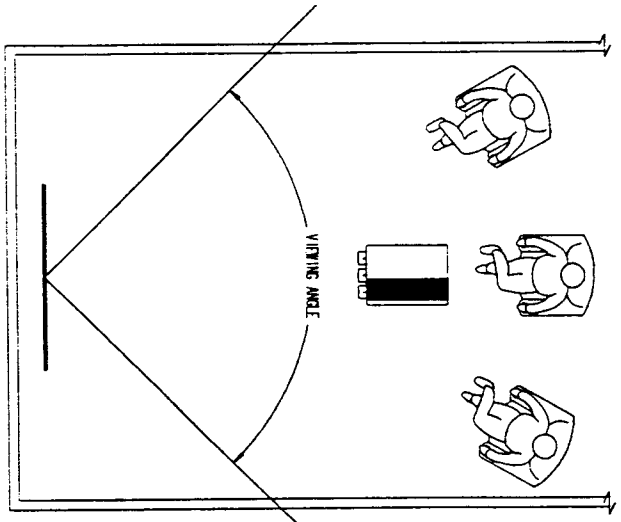
This is a basic screen with essentially a gain of one. There is no apparent loss of brightness or resolution and no color shift when viewing from any angle, and there is little or no pattern in the screen. Stray room light falling on the screen from any angle will be reflected to the audience, so controlled room light is most important with this screen type. A flat wall painted with a bright white, flat (no gloss) paint can effectively be used as a matte white screen that will "disappear" when the projector is turned off. This type of screen is best used when the purest image is desired and the room lights can be controlled.

4.4.2.2 . . . . Glass Beaded Screens:

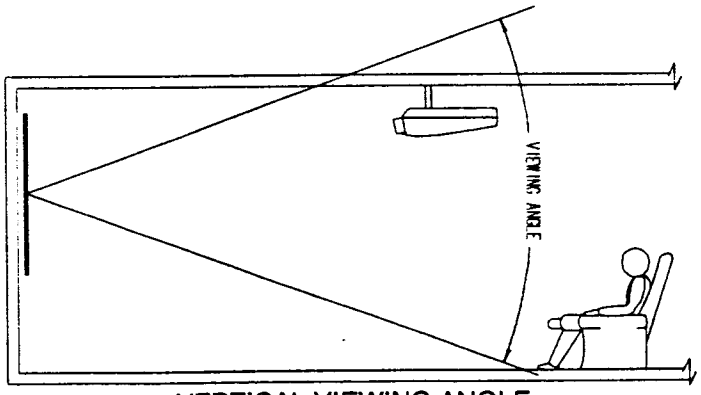
A glass beaded screen typically has a gain of about two, and is "retro-reflective", meaning most of the light is reflected back toward the source independent of the angle of the screen. This screen type is best viewed when the audience is located behind the projector, and is thus ideal for floor mounted projectors located "in the audience". This screen would not be recommended for projectors mounted on ceilings high above the audience. Room light sources should be avoided in the audience area as light falling on the screen from this direction will have the greatest "wash- out" effect on the projected image.

4.4.2.3 . . . . . .High Gain Flat Screens:

This screen will typically have gains of from 1.5 to 4, and is probably the most common type of flat screen used today. This screen gives maximum brightness to the screen side opposite that of the projector. For example, if the projector is 10 degrees above the screen normal, the best viewing will be 10 degrees below the normal. Therefore, they are usually best suited for ceiling-mounted applications since with the projector above the screen center the best viewing will be below the screen center (assuming the screen is vertical). If necessary, the entire screen can be tilted in order to "direct" the optimum viewing (peak brightness) at the audience.



HORIZONTAL VIEWING ANGLE



VERTICAL VIEWING ANGLE

FIGURE 4-4.

VIEWING ANGLES OF LOW OR MODERATE GAIN SCREENS.

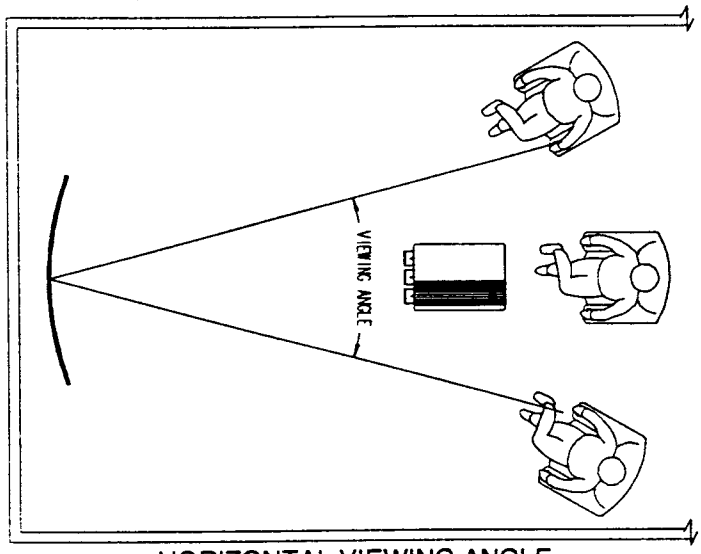
4.4.2.4 . . . . Curved High Gain Screens: (Figure 4-5)

Curved high gain screens generally yield gains of 7 to 10 which makes them most useful in front screen applications where there is high ambient light. The high gain characteristic of these screens makes them also very good at avoiding washout and loss of contrast due to light sources from the sides. When installed the curved screens are angled in order to "aim" the maximum brightness toward the viewing audience.

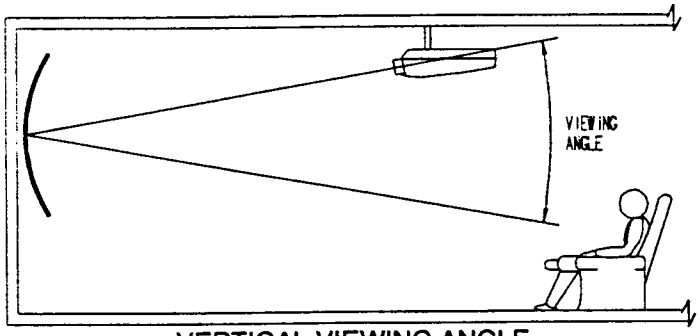
These exceptionally high gain screens are curved in order to achieve maximum corner brightness for the viewing audience. If these screen were flat, much of the light going to the screen corners would be directed away from the audience and an unacceptable relative corner dimness would be apparent. These screens are rigid in order to maintain the necessary curvature and to ensure that the surface is smooth since any "waves" or other surface irregularities would be objectionable.

Curved screens are probably the least attractive aesthetically of the various screen types, particularly when not being used for display purposes. This characteristic is worse for ceiling mount applications for which the screen must be angled away from the wall at the bottom. This problem can be overcome by building the curved screen into a cabinet or recessing it into a wall.

Flat screens, on the other hand, are available in pull down or motorized versions so they can be easily retracted when not in use. However, they should not be used for high resolution graphics due to the fact that they do not maintain a flat surface which creates distortions.



HORIZONTAL VIEWING ANGLE



VERTICAL VIEWING ANGLE

FIGURE 4-5.

VIEWING ANGLES OF CURVE OR HIGH GAIN SCREENS.

4.4.3 . . . . . Rear Screens:

4.4.3.1 . . . . . .Coated Screens:

There are also a variety of rear screens available. By their very nature, rear screens tend to be high gain since most light tends to go on a straight line from the projector through the screen, so that usually the brightest area of the screen will be that part in line from the viewer to the projector. The basic function of rear screens is to control the spread of the light, both left-right and up-down.

The simplest rear screens are simple sheets of diffusing material, usually coated glass or acrylic panels installed with the coating on the outside, on which the image is formed and the light is spread in all directions. If this spreading of light is limited, the screen will be high gain and the viewers will see a "hot spot" in the part of the image that lies between them and the projector, and the corners of the image are likely to be relatively dim. For these reasons generally a gain of 1.5 to 2.0 is available in such screens.

4.4.3.2 . . . . . .Fresnel Lenses, Vertical Lenticular And Black Stripe:

Rear screen performance and gain of 3.0 to 5.5 can be achieved by adding a "fresnel" lens element directly behind the diffusing element. A "fresnel lens" is essentially a "flattened" lens that resembles a large record with a series of circular grooves. In a rear application the function of this lens is to turn the light arriving off axis (not in the screen center) toward the viewers so that the brightness uniformity will be better maintained from the center to the edge of the image.

In order to further improve rear screen performance, vertical "lenticular lenses" are added to the front surface in order to spread the light over a wider horizontal angle while not affecting the vertical angle. This results in a desired narrow vertical and a wide horizontal viewing angle to match typical audience patterns. However, the elevation of the screen in relation to the audience becomes critical such that the top and bottom of the image are viewed within the ±7-10 degrees narrow vertical viewing angle.

A last improvement for rear screens lies in the addition of black stripes to the outer surface. These stripes are strategically located so they don't block any exiting light, but do absorb room ambient light to result in a darker screen and increased contrast.

For high resolution displays where small font characters and individual pixels must be displayed, attention must be paid to the "pitch" of the stripe elements. Ideally, the spacing between screen stripes must be small compared to the pixel size. If the spacing is the same or greater that a pixel size, viewers near the screen may be distracted by an apparent loss of resolution.

4.4.4 . . . . . .Location Of Screen And Lighting:

Due to the many possible combinations of screens and room sizes and shapes, the screen location in most installations will be unique. The two most important elements, however, are delivering the best projected image to the viewing audience and controlling any other sources of light. Thus, the screen ideally will be located so as to provide unobstructed central viewing for as much of the audience as possible, while keeping all sources of room light from washing out the image. Fluorescent lighting should always be avoided as it is extremely detrimental. Controlled, recessed lighting away from the screen is preferred.

4.5 . . . . . Screen Placement:

The optimal viewing would be in a darken room. However, compromises must be made. In order to make the best compromises, the following should be considered. Refer to Figure 4-6

- ☐ Determine the desired image and screen size when considering the total room area and the size of the text material to be presented.
- ☐ Select a screen type suited for the application and the ambient lighting conditions.
- ☐ Determine the screen location
- ☐ Determine the range from which the screen will be viewed when selecting the screen size.
- ☐ Keep the sources of ambient light as far apart as possible from the display system and off the screen area.
- ☐ Where there are windows, drape all windows near the projector to avoid any light source between the projector and screen.
- ☐ Seat the nearest viewer no closer than to the rear of the projection unit.
- ☐ Avoid fluorescent lighting. Use controlled recessed incandescent lighting for optimum lighting condition results.

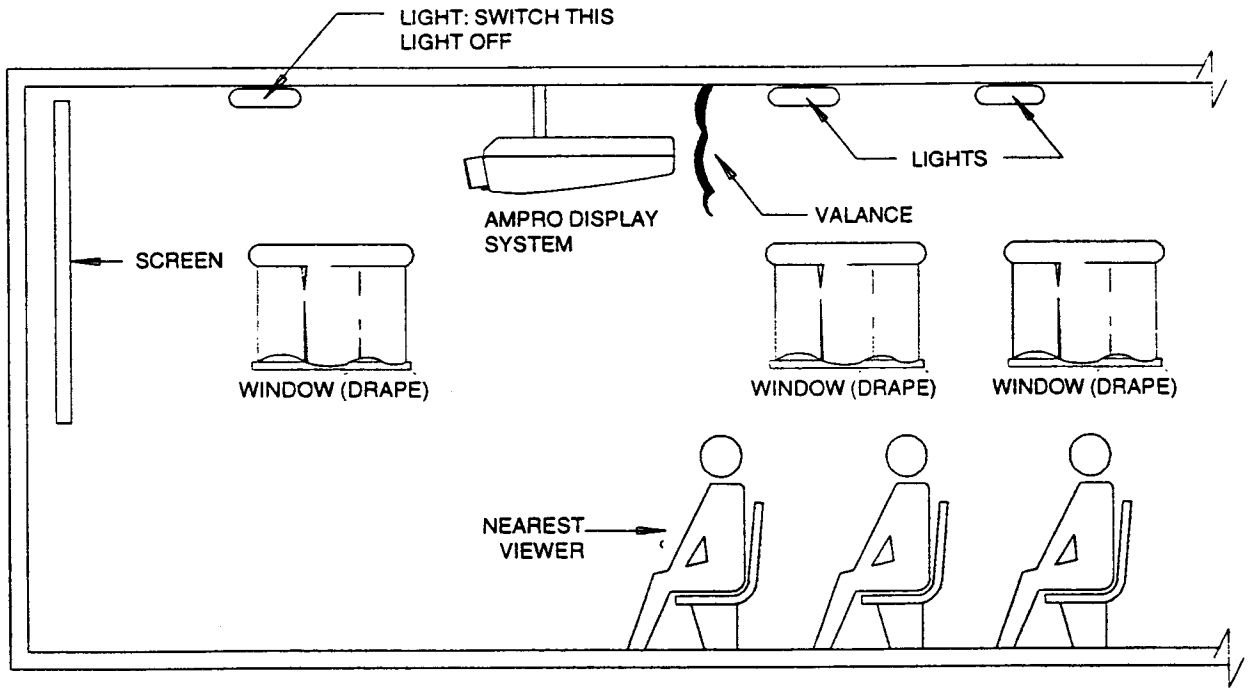


FIGURE 4-6. EXAMPLE: ROOM CONFIGURATION.

Section 5

Changing Parameters and Installation Guidelines

5.1 .....Before Installation:

5.1.1 .....Shipping Carton Contents:

- Save the shipping carton ,surrounding foam inserts and lens covers.
- NOTE: Original carton and foam inserts must be used for shipping. It is specifically designed to minimize potential damage during shipment.
- An optional shipping / carrying case is available for mobile applications.

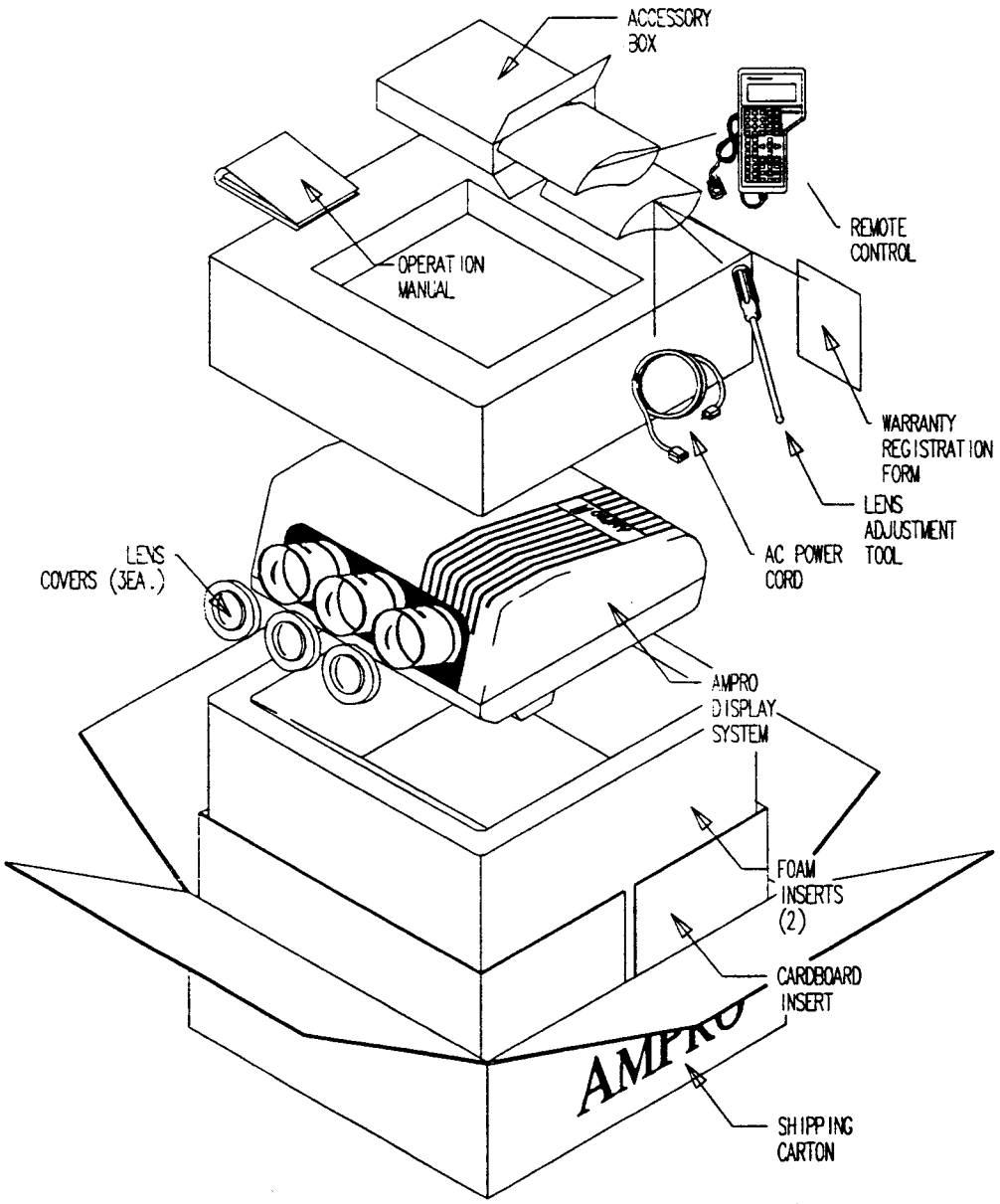


FIGURE 5-1.SHIPPING CARTON AND CONTENTS.

5.2 . . . . . General:

The AMPRO system is factory preset to project a 60 in.(1524 mm) x 80 in.(2032 mm) image, at a throw distance of approximately 9 feet (2.7m) when ceiling mounted 10° above the center line of screen.

The system may be re-configured for all front and rear screen applications. Supplement 1 provides the required information on how to change the configuration for your particular needs.

Please consult with your selling dealer, or his authorized representative, concerning the initial installation, set-up and registration of the system. Discuss any non-standard installation with your dealer, prior to the actual installation, to determine the feasibility. Determine the following requirements:

- ☐ Computer Data/Graphics projection system location and lighting.
- ☐ Screen size, type, and location, projection configuration, i.e.; front/floor mount etc.
- ☐ Operating A.C. line voltage. The system is set for 115V line operation, unless otherwise noted. Refer to Section 5.7 for changing A.C. line voltage.

5

5.2.1 . . . . . .Selection Of Type Of Installation:

A good understanding of the installation goals and pre- planning are crucial to a successful implementation of large screen display systems. A well thought out solution will generally satisfy all present and near term needs and result in a satisfied installation. Since there are several types of custom video projection displays possible, a number of factors must be considered in order to determine the best installation for a particular application.

What is the application? Of prime importance are the reasons for the installation. A high profile, showcase room will be treated differently than a training room for technicians. If highly detailed information will be projected, it's important that the audience isn't too far away compared to the screen size. If notes will be taken, adequate lighting must be provided. If the application is near-term only, major structural alterations should not be considered.

Will the room be used for other applications? Frequently this is the case, and in these instances ideally the projector and screen should disappear or blend unobtrusively into the surroundings.

During the application, where will the focus be? On the speaker? On the projected image? How much light is necessary for the viewers? Will there be audio also? Will there be other "projectors" (slide, overhead, film, etc.) used? What other likely future applications might be accommodated in the room?

The answers to these and other similar questions form the foundation of a video projection display installation. They will be instrumental in deciding on a number of elements that must be considered. Below are discussions and related comments concerning several of the basic aspects of video projection systems.

5.2.2 . . . . . .Front Or Rear Projection:

Front Projection: In front projection the projector is on the "audience side" of the screen. Advantages of front projection include greater simplicity in installation, easier retrofit into existing rooms, greater flexibility in screen size, less net space required (particularly for ceiling mounts), less permanent alterations to a room, and greater potential resolution. The disadvantages of front screen projection include poorer net contrast ratio due to greater sensitivity to room light and less cosmetic appeal.

Rear Projection: In rear projection, the projector projects the image from the far side of the screen toward the audience. Advantages of rear projection include better room esthetics, better contrast ratio, insensitivity to room light, the ability to walk in front of the screen without casting "shadows", and the possibility of using the screen as an "electronic blackboard". Disadvantages include increased installation complexity (frequently including mirrors), the loss of room area, somewhat poorer resolution, and smaller maximum practical screen size.

5.2.3 . . . . . System Installation:

Well thought out and proper video projection system design and installation will avoid several potential problems that could limit system effectiveness. Below are discussions of a number of the more important aspects of video projector installation that should be considered during the design and installation phases.

The area in the immediate vicinity of the projector can be crucial to a systems performance. This area, along with the details of the projector mount, must insure proper ventilation and air flow to the projector. The ventilation openings must be kept clear and an adequate supply of reasonably cool air is necessary. Additionally, in order to install, adjust and make necessary repairs, there must be provisions for access to all projector areas as well as service loops in the connecting cables. The installation of any projector should provide for the possibility of projector replacement, and therefore be installed such that the entire projector can be readily removed and replaced.

It is also important to realize that CRT based projection tubes are sensitive to the stray magnetic fields that are associated with transformers, motors, HVAC equipment, and major AC power runs. If a projector is located close to such a source of fields, there is a good chance that there will be interference in the projected image. This interference seen will be a "beat" between the power line rate (60Hz.) and the vertical scan rate of the video source, and generally appears as regular waves, wiggles or "hum" flowing through the image.

Since most CRT projection systems are microprocessor controlled, it is good practice to install surge protectors on the AC line in those areas where electrical storms are prevalent.

5.3 . . . . . Initial System Test:

Once the system has been removed from the packaging and placed on a secure surface, perform the following initial system test prior to attempting any changes or installation of the system.

Check for the proper main AC configuration, connect the RS232 hard-wired remote control to the CPU port labeled "HOST".

There is a main power rocker switch on the rear panel, just above the power cord, see Section 6, Figure 6-1, if required. When this switch is "OFF," an "O" can be observed. Turn the switch to the "ON" position. When this switch is turned ON, the LCD on the hard-wired remote should display the message, " AMPRO 3600" or "AMPRO 4600", depending on your particular system.

The next step is to press the **[POWER]** button on the remote control. When this button is pressed, a sequence of events should occur:

- "INITIALIZING" will be displayed on the LCD. This will take approximately 1 minute.
- The RED LED above the fan on the rear panel should light up and the fans should start running.
- The LCD will then display the mode of operation that the system was in when it was de-energized.

Ensure that there is an active source applied to the system and the system is switched to that particular source.

If the above events occur as listed, proceed with the installation of your system. Refer to Supplement 1 to perform any Sweep Configuration changes and Section 5, to perform the necessary mounting requirements for your application.

If for some reason the events do not occur as listed above, proceed to Section 10 for aid in determining the cause.

5.4 . . . . . Changing Picture Size:

To change picture size, the system must be moved closer to the screen for smaller projected images and further from the screen for larger images. When the projected distance is changed, two things happen to the projected image. The first is that the image de-focuses and the second is that the red, green and blue images separate on the horizontal plane. To determine where the system must be mounted for a given size screen, refer to section 5.8. To re-focus the projected image and to register the three images, refer to Supplement 2 (LENS FOCUSING AND POSITIONING).

5.5 . . . . . Changing Deflection Angle:

Since it is optional to floor or ceiling mount the system, provisions have been designed into the system for off-angle (in the vertical plane) projection. Since off-angle projection produces a different throw distance from the system to the top and the bottom of the screen, typically some top and bottom de-focusing will occur. The lenses have an built-in adjustments to compensate for this de-focusing. Refer to Supplement 2 (LENS FOCUSING AND POSITIONING.)

The second effect that occurs when the deflection angle is changed from on-axis is known as keystone effect. This effect is observed as a trapezoid shaped image. This condition can be corrected, within a specified range (±15°), by the deflection and registration controls via the remote control. This is an adjustment that should be made during your initial set-up and registration.

5.6 . . . . . .Mounting / Sweep Configurations:

5.6.1 . . . . . .Front Table / Ceiling Mounting:

Front projection provides the brightest image, but the screen is more sensitive to direct ambient light. High image light gain is available with front screens but with a compromise in resolution and viewing angle. Refer to Section 4. The built-in 10° vertical lens offset places the system approximately at the top (or bottom) edge of the screen as to minimize interference with the viewing audience.

- **Factory Configuration:** Front/ ceiling mounting of the system moves the unit out of the path of the audience. When the AmPro system is ceiling mounted, it will be inverted from the Floor/Table mounting. Since the system has been setup at the factory for front/ceiling installation, **NO horizontal** or **vertical** sweep deviation from the factory preset conditions are necessary.
- Front/ table mounting requires that the **horizontal** and **vertical** sweeps be **reversed** from the factory configuration.

5.6.2 . . . . . .Rear Table / Ceiling Mounting:

Rear projection permits higher ambient lighting and physically removes the system from the viewing area. However, it requires either a large area behind the screen or the use of a folded image with a first (front) surface mirror. With rear projection there is some inherent reduction in image brightness. It is recommended that you consult with your dealer or the company if you contemplate a folded image rear screen application.

- Rear/table mounting requires only the **vertical** sweep being reversed from factory preset condition.
- Rear ceiling mounting requires only the **horizontal** sweep being reversed from the factory preset condition.

! FOR INSTALLATION AND SERVICING PERSONNEL; REFER TO SUPPLEMENT 1 (LOCATED IN THE REAR POCKET OF THIS MANUAL), FOR INFORMATION ON RE-CONFIGURING THE HORIZONTAL AND/OR VERTICAL SWEEP.

5.7 . . . . . Changing A.C. LIne Operation (115V - 230V):

Unless specified at the time ordered, all AMPRO systems are shipped from the factory configured for 115 Volt, 50/60 Hz operation with a standard US power cord. To change the system so that you can apply a different line voltage, perform the following steps and refer to Figure 5-2.

- ☐ STEP 1. Remove the power cord from the back of the unit.
- ☐ STEP 2. Using a small flat bladed screwdriver, gently pry open the panel and pop it out to access the fuses and voltage select card.
- ☐ STEP 3. The voltage select card will indicate the present voltage selected. If it is not the desired voltage, slide the card straight out to the right , rotate it and slide it back so that it reads the correct voltage.
- ☐ STEP 4. Replace the fuse(s) with the proper size (5mm x 20mm) and correct rating for the voltage selected. (10 Amp Slo-blo for 115Vac and 5 Amp Slo-blo for 230Vac). NOTE: When replacing fuse/voltage selection assembly, ensure arrows line up.
- ☐ STEP 5. Ensure that the correct power plug is installed for the respective country.
- ☐ STEP 6. Plug the proper ac power cord back into the rear of the system.

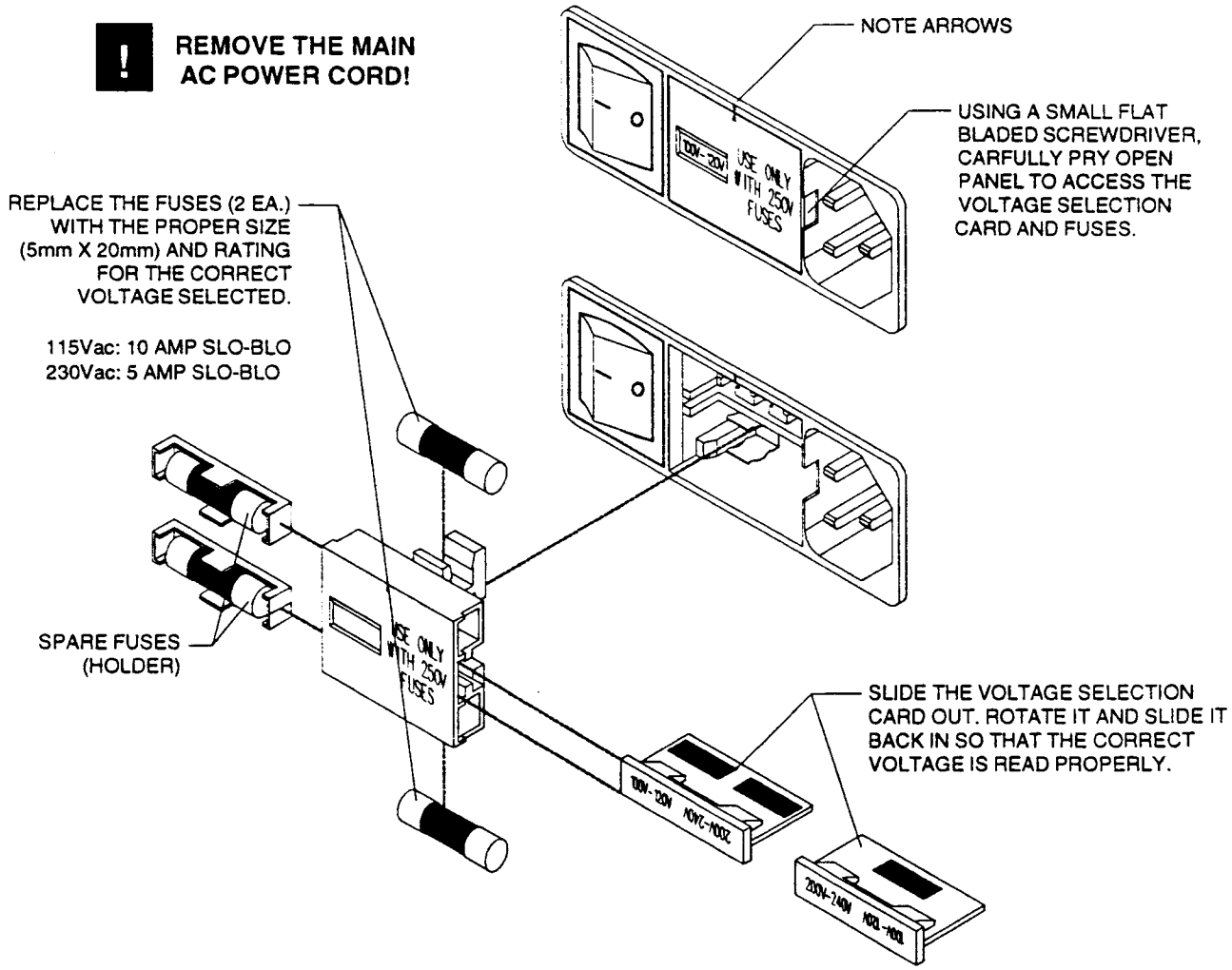


FIGURE 5-2. MAIN FUSE(S) AND LINE VOLTAGE CHANGE.

5.8 .....AMPRO 3600 Installation Guidelines:

5.8.1 .....AMPRO 3600 Dimensions:

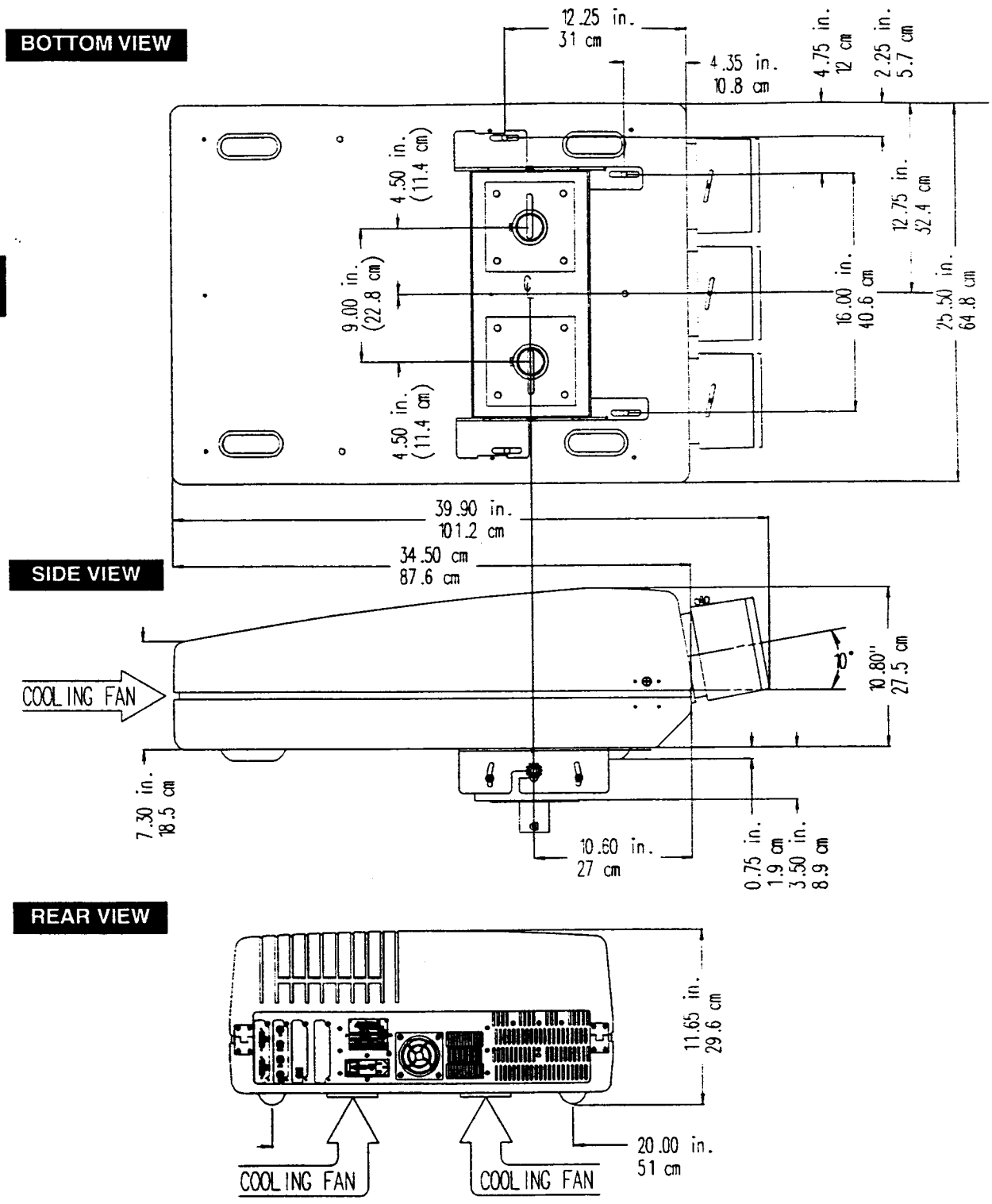


FIGURE 5-3. AMPRO 3600 CASE DIMENSIONS.

5.8.2 . . . . . AMPRO 3600 Ceiling Mount Parts List:

3600 CEILING MOUNT P/N 69512			
ITEM	DESCRIPTION	P/N	QTY.
1	BASE PLATE	62466	1
2	L/R MOUNTING BRACKETS	69408	2
3	PIPE FLANGE (COUPLER)	62467	4
4	2" IMC RIGID PLUMBING PIPE (NOT INCLUDED)	N/A	2
5	5/16-18 X 1" HEX BOLT	52126	6
6	3/8 X 7/8 X .10 THK WASHER	53085	6
7	9/16 X 1-3/8 X .25 THK WASHER	53086	2
8	1/4 X 1/2 X .06 FLAT WASHER	53068	4
9	1/4-20 X 1/2 HEX BOLT	52143	8
10	5/16 SPLIT LOCK WASHER	53088	4
11	3/8-16 X 1" HEX BOLT STEEL	52218	12
12	7/16 X 1" X .09 THK WASHER	53087	24
13	3/8 SPLIT LOCK WASHER	53067	12
14	3/8 HEX NUT STEEL	54030	12

WARNING

For proper installation, the ceiling for mounting the AMPRO 3600 Series must be capable of supporting at least 575 lbs. (261 kg). If it cannot, the ceiling must be reinforced. Improper installation may result in serious personal injury.

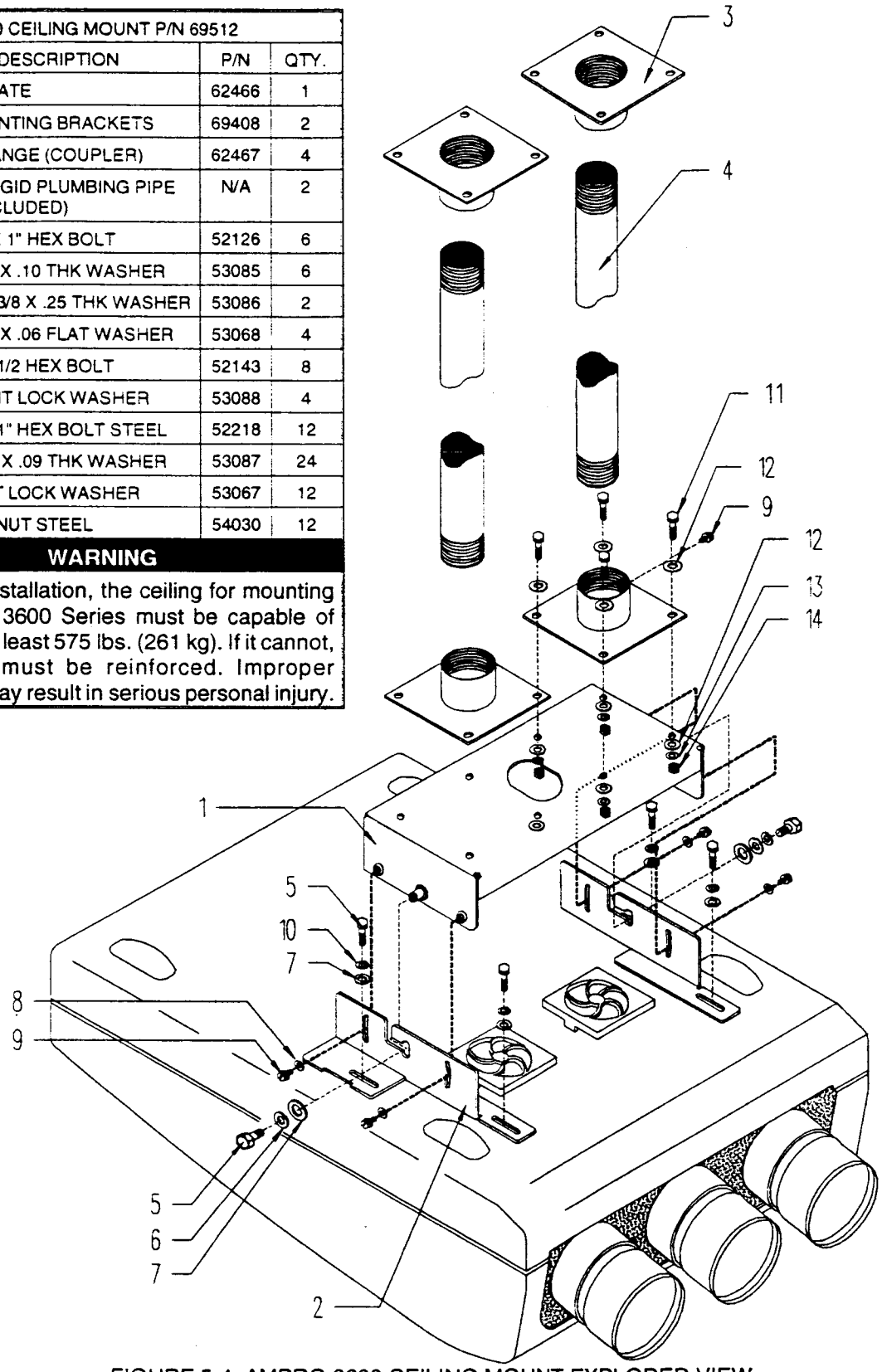
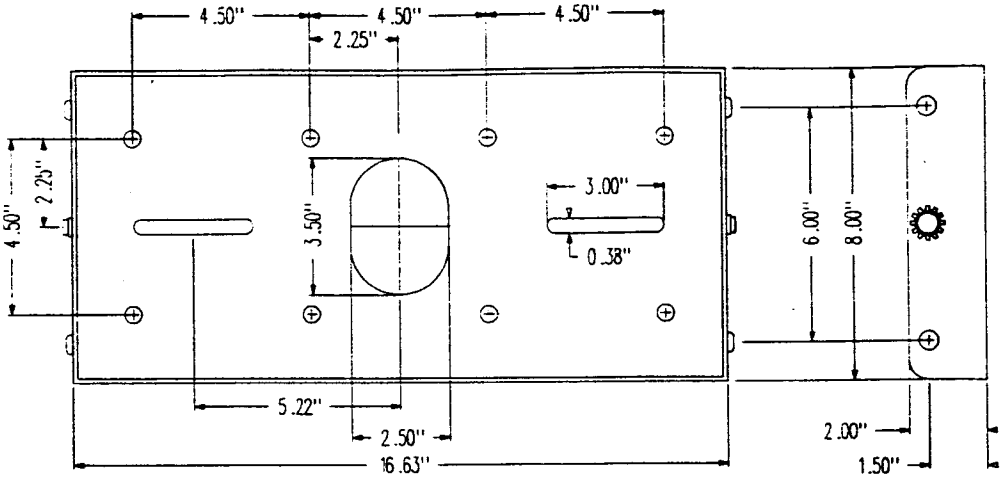


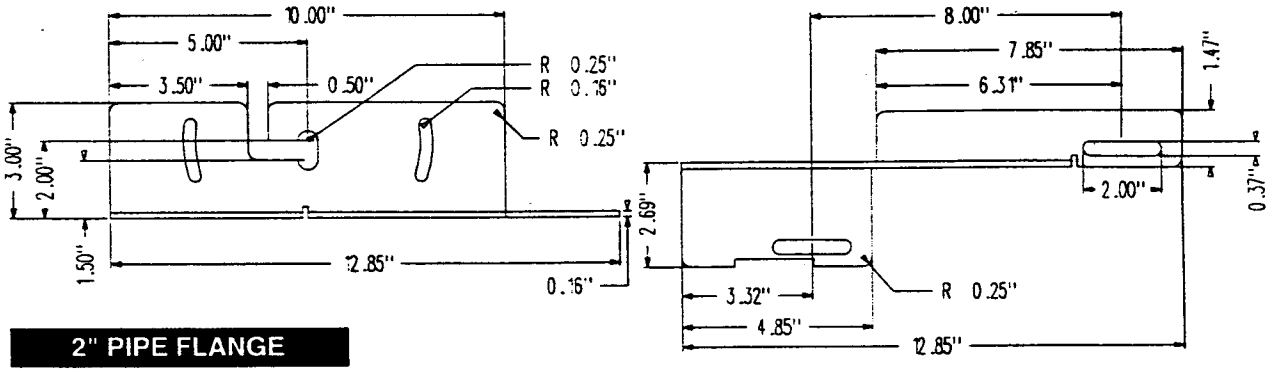
FIGURE 5-4. AMPRO 3600 CEILING MOUNT EXPLODED VIEW.

5.8.3 . . . . . AMPRO 3600 Ceiling Mount Dimensions:

BASE PLATE



MOUNTING BRACKETS



2" PIPE FLANGE

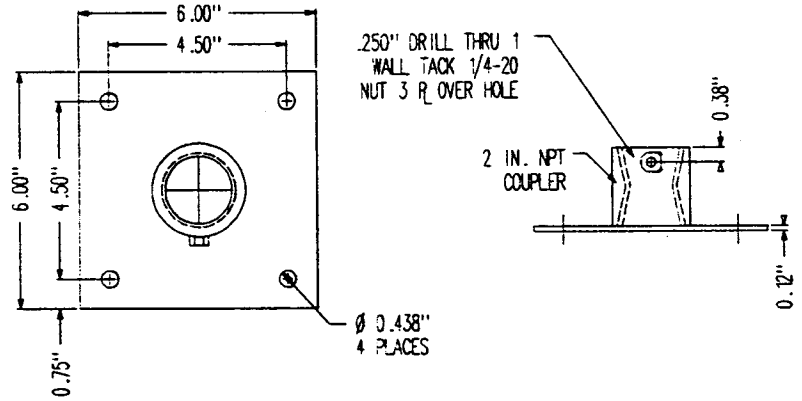


FIGURE 5-5. AMPRO 3600 CEILING MOUNT DIMENSIONS.

5.8.4 . . . . . AMPRO 3600 Installation Guidelines:

The 3600 Series projectors have been designed as high resolution devices which are compatible with many video/computer sources, including standard 4:3, data and graphic output from most computers as well as IDTV (scan doubled video) and HDTV 16:9. The following installation data is based on a 4:3 aspect ratio, and a projection axis of 10° (standard projection axis).

! Due to different aspect ratios and/or the difference between "active write time (video information)" verses "available write time (raster time)" and your particular projection screen size, it may not always be possible to fill the entire projection screen with your image(s).

5.8.5 . . . . . .Definitions (AMPRO 3600):

☐ **A**, refers to the mounting distance, ("throw distance") required.

¤ **NOTE 1:** For table mount configuration, The "throw distance" is measured from the screen surface to the front of the system.

¤ **NOTE 2:** For ceiling mount configuration, The "throw distance" is measured from the screen surface to the ceiling mount pipe placement (system's center line of gravity).

☐ **B**, refers to the distance measured from the floor to the screen center, or for ceiling mount, B refers to the distance from the screen center to the ceiling.

☐ **C**, refers to the required table height for floor mounting or for ceiling mount configuration the required pipe length. Note for ceiling mount applications, dimension C allows for 0.75in. (19mm) top and bottom for pipe insertion.

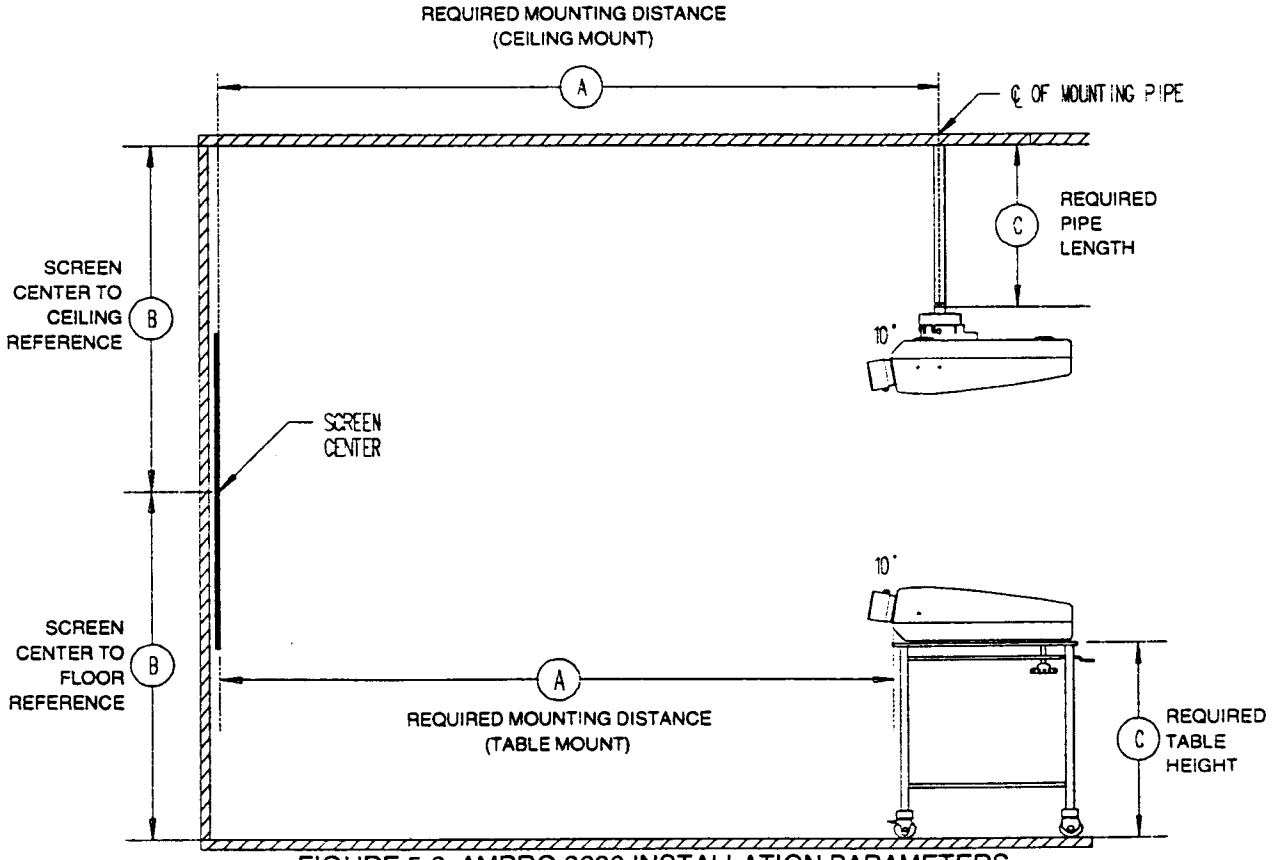
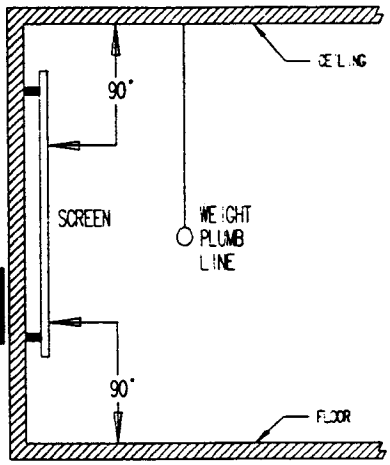


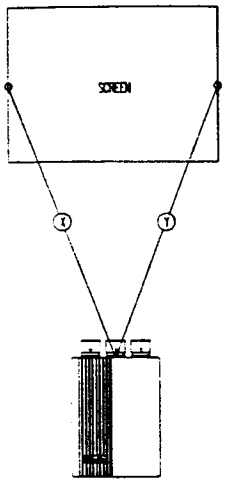
FIGURE 5-6. AMPRO 3600 INSTALLATION PARAMETERS.

5.8.6 . . . . . System Placement:

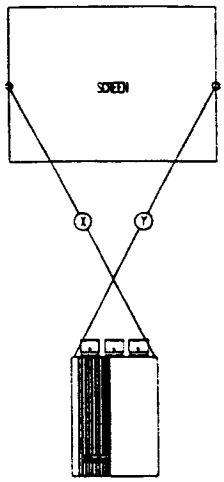
ENSURE THE SCREEN IS INSTALLED AT A 90° ANGLE RELATIVE TO THE CEILING AND FLOOR.



ENSURE THE SYSTEM IS CENTERED ON THE SCREEN. DIMENSIONS X AND Y SHOULD BE EQUAL IN LENGTH.



ENSURE THE SYSTEM IS PARALLEL TO THE SCREEN. DIMENSIONS X AND Y SHOULD BE EQUAL IN LENGTH.

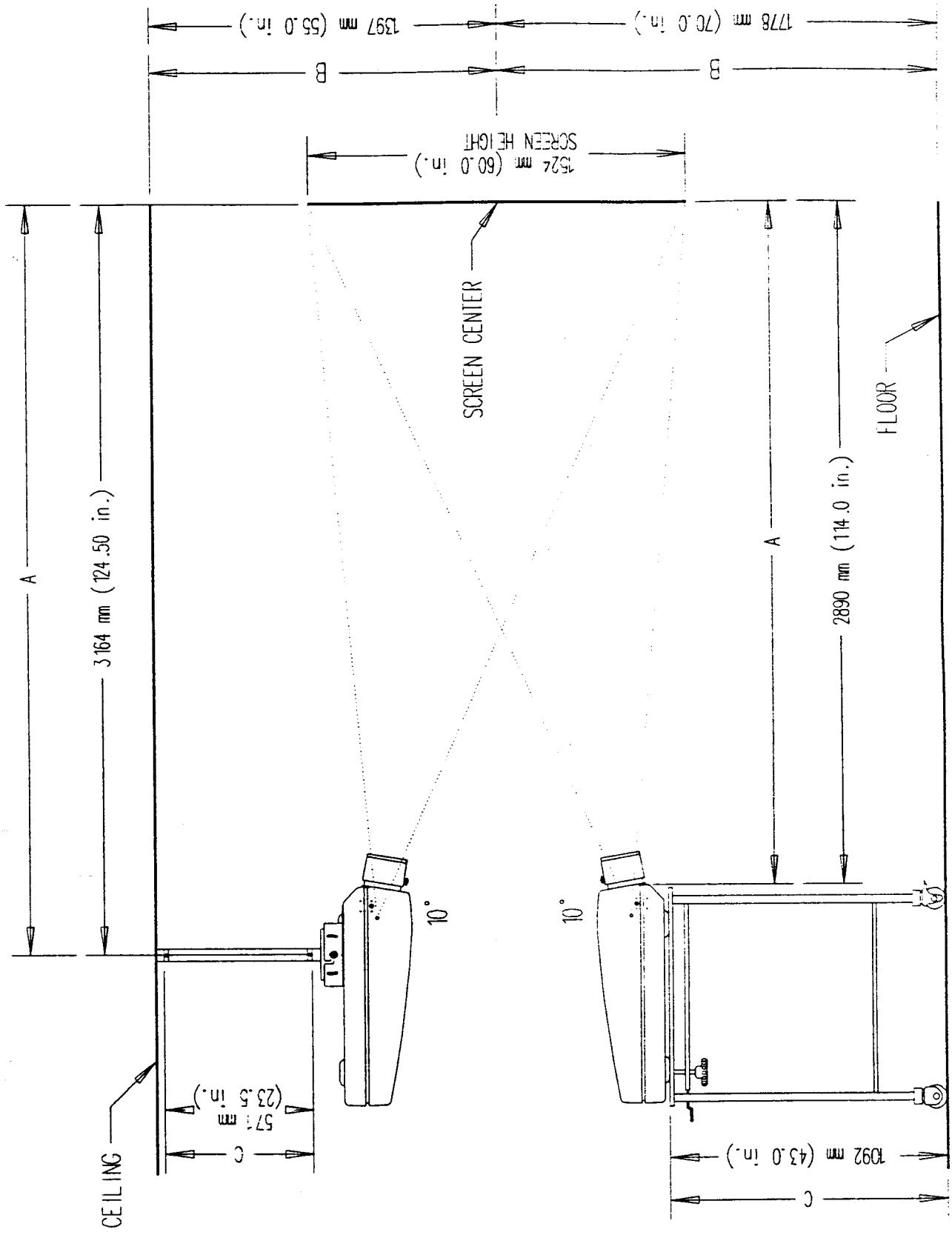


5.8.7 .....AMPRO 3600: Installation Data:

SPECIFICATIONS	
MODEL NUMBER: 69581 / 69581HD	
MAGNIFICATION: 9.5X to 52X	
SCREEN WIDTHS: 1.0m (42 in.) to 5.9m (233 in.)	
RESOLUTION: 10 lp/mm / Air coupled	
TABLE MOUNT CONFIGURATIONS	
MILLIMETERS	INCHES
Amm = 1.26 X SWmm + 333mm	Ain = 1.26 X SWin. + 13.0in.
Bmm = Distance from screen center to floor in millimeters.	Bin = Distance from screen center to floor in inches.
Cmm = Bmm - [0.222 X SWmm] - 235mm	Cin = Bin. - [0.222 X SWin.] - 9.25in.
CEILING MOUNT CONFIGURATIONS	
MILLIMETERS	INCHES
Amm = 1.26 X SWmm + 602mm	Ain = 1.26 X SWin. + 23.75in.
Bmm = Distance from screen center to ceiling in millimeters.	Bin = Distance from screen center to ceiling in inches.
Cmm = Bmm - [0.222 X SWmm] - 374mm	Cin = Bin - [0.222 X SWin.] - 14.75in.
NOTE: SW refers to Screen Width	

MOUNTING DISTANCE TABLE					
SCREEN WIDTH		MOUNTING DISTANCE			
		TABLE		CEILING	
mm	in	mm	in	mm	in
1219	48	1771	69.75	2138	84.00
1524	60	2253	88.75	2522	99.50
1829	72	2638	104.00	2907	114.5
2032	80	2893	114.00	3162	124.50
2134	84	3022	119.00	3291	129.50
2438	96	3405	134.00	3674	144.75
2743	108	3789	149.00	4058	159.75
3048	120	4173	164.50	4442	175.00
3353	132	4558	179.50	4827	190.00
3658	144	4942	194.50	5211	205.00
3962	156	5325	209.75	5594	220.25
4267	168	5709	224.75	5978	235.50
4572	180	6094	240.00	6363	250.50
4877	192	6478	255.00	6747	265.75
5182	204	6862	270.00	7131	280.75
5486	216	7245	285.25	7514	296.00
THE MOUNTING DISTANCE IS BASED ON AN ASPECT RATIO OF 4:3, 10° OFF-AXIS.					

5.8.7.1 . . . . Installation Example: (60in. (1524mm)(H) x 80in. (2032mm) (W)):



INSTALLATION NOTES:

5.9 .....AMPRO 4600 Installation Guidelines:

5.9.1 .....AMPRO 4600 Dimensions:

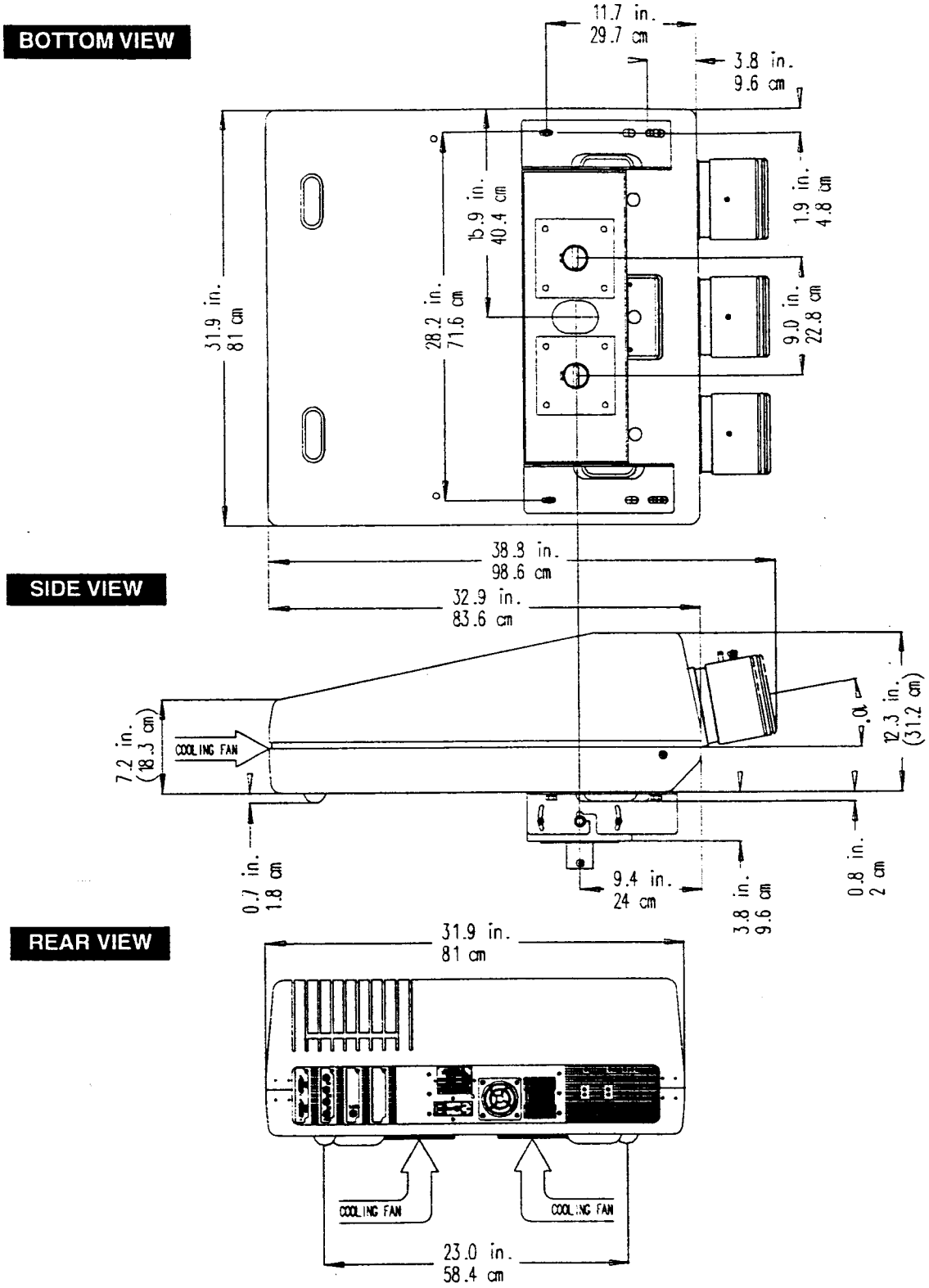


FIGURE 5-7. AMPRO 4600 CASE DIMENSIONS.

5.9.2 . . . . . AMPRO 4600 Ceiling Mount Parts List:

4600 CEILING MOUNT P/N 69362			
ITEM	DESCRIPTION	P/N	QTY.
1	BASE PLATE	N/A	1
2	L/R MOUNTING BRACKETS	N/A	2
3	PIPE FLANGE (COUPLER)	62467	4
4	2" IMC RIGID PLUMBING PIPE (NOT INCLUDED)	N/A	2
5	5/16-18 X 1" HEX BOLT	52126	6
6	3/8 X 7/8 X .10 THK WASHER	53085	6
7	9/16 X 1-3/8 X .25 THK WASHER	53086	2
8	1/4 X 1/2 X .06 FLAT WASHER	53068	4
9	1/4-20 X 1/2 HEX BOLT	52143	8
10	5/16 SPLIT LOCK WASHER	53088	4
11	3/8-16 X 1" HEX BOLT STEEL	52218	12
12	7/16 X 1" X .09 THK WASHER	53087	24
13	3/8 SPLIT LOCK WASHER	53067	12
14	3/8 HEX NUT STEEL	54030	12

WARNING

For proper installation, the ceiling for mounting the AMPRO 4600 Series must be capable of supporting at least 1200 lbs. (544 kg). If it cannot, the ceiling must be reinforced. Improper installation may result in serious personal injury.

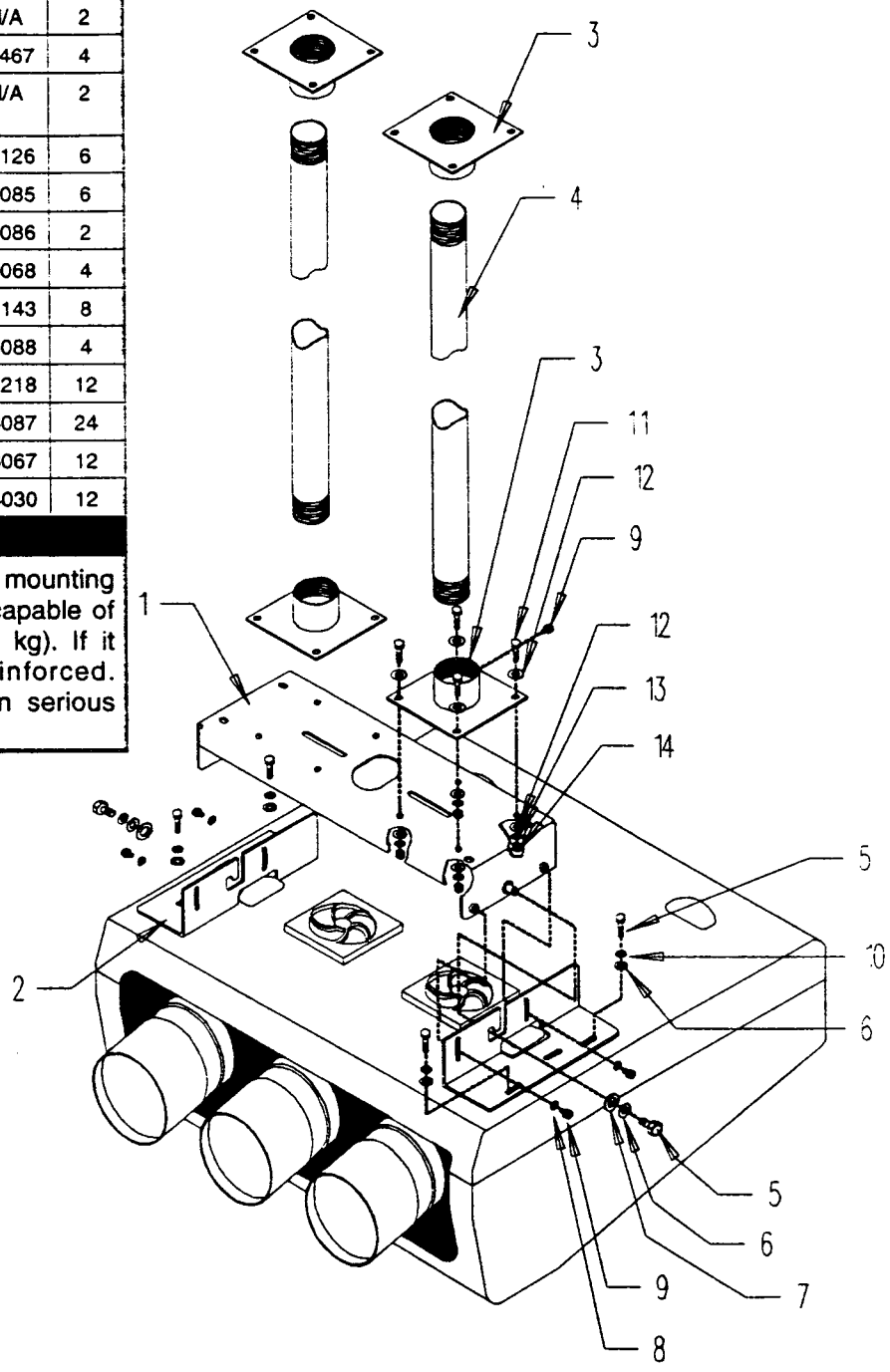


FIGURE 5-8. AMPRO 4600 CEILING MOUNT EXPLODED VIEW.

5.9.3 . . . . . AMPRO 4600 Ceiling Mount Dimension:

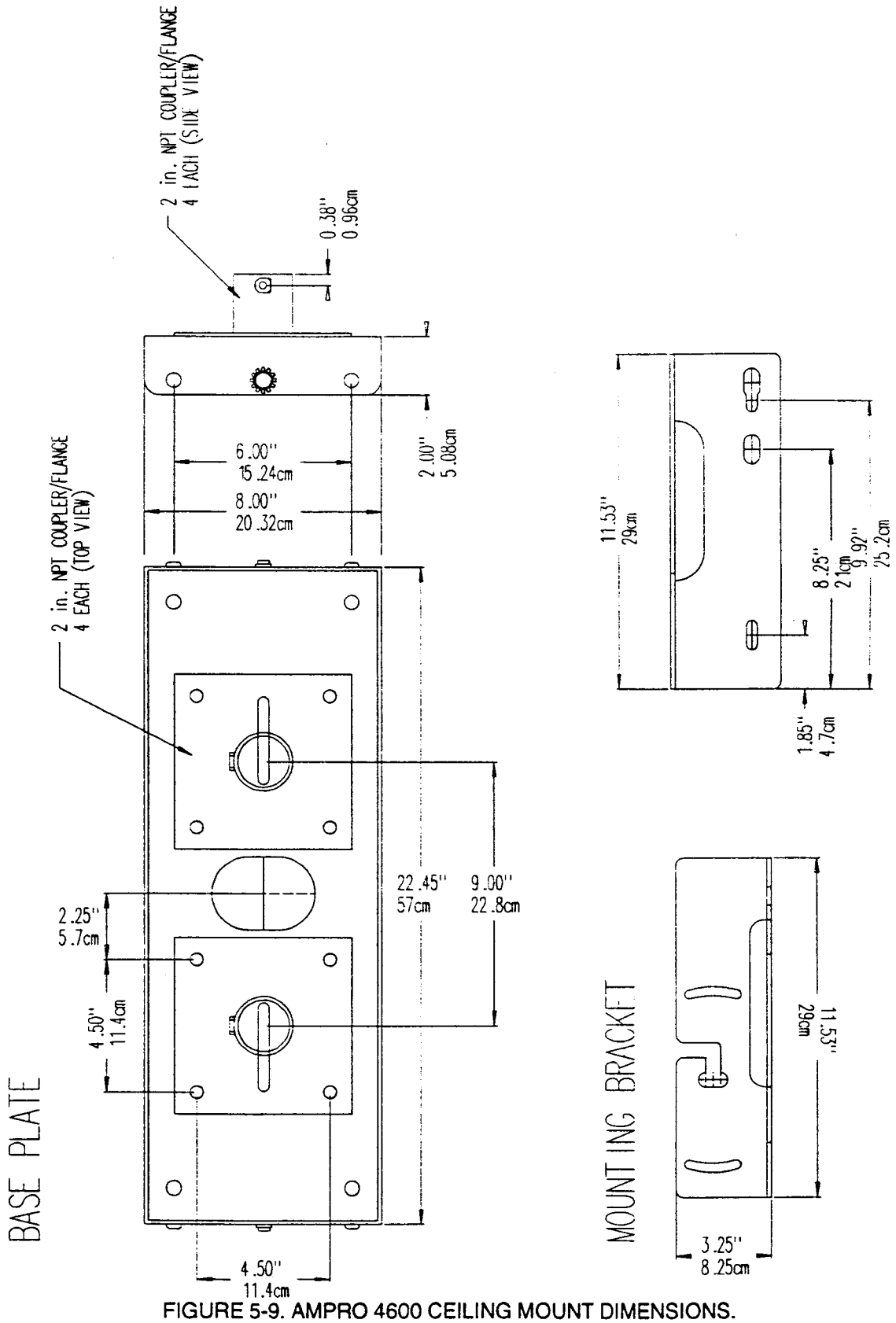


FIGURE 5-9. AMPRO 4600 CEILING MOUNT DIMENSIONS.

5.9.4 . . . . . AMPRO 4600 Installation Guidelines:

The 4600 Series projectors have been designed as high resolution devices which are compatible with many video/computer sources, including standard 4:3, data and graphic output from most computers as well as IDTV (scan doubled video) and HDTV 16:9. The following installation data is based on a 4:3 aspect ratio and a projection angle of 10°.

! Due to different aspect ratios and/or the difference between "active video time (video information)" verses "available video time (raster)" and your particular projection screen size, it may not always be possible to fill the entire projection screen with your image(s).

5.9.5 . . . . . .Definitions (AMPRO 4600):

5

- ☐ **A**, refers to the mounting distance, ("throw distance") required.
- ¤ NOTE 1: For table mount configuration, The "throw distance" is measured from the screen surface to the front of the system.
- ¤ NOTE 2: For ceiling mount configuration, The "throw distance" is measured from the screen surface to the ceiling mount pipe placement (system's center line of gravity).
- ☐ **B**, refers to the distance measured from the floor to the screen center, or for ceiling mount, B refers to the distance from the screen center to the ceiling.
- ☐ **C**, refers to the required table height for floor mounting or for ceiling mount configuration the required pipe length. NOTE: For ceiling mount applications, dimension C allows for .75 in. (19 mm) top and bottom for pipe insertion.

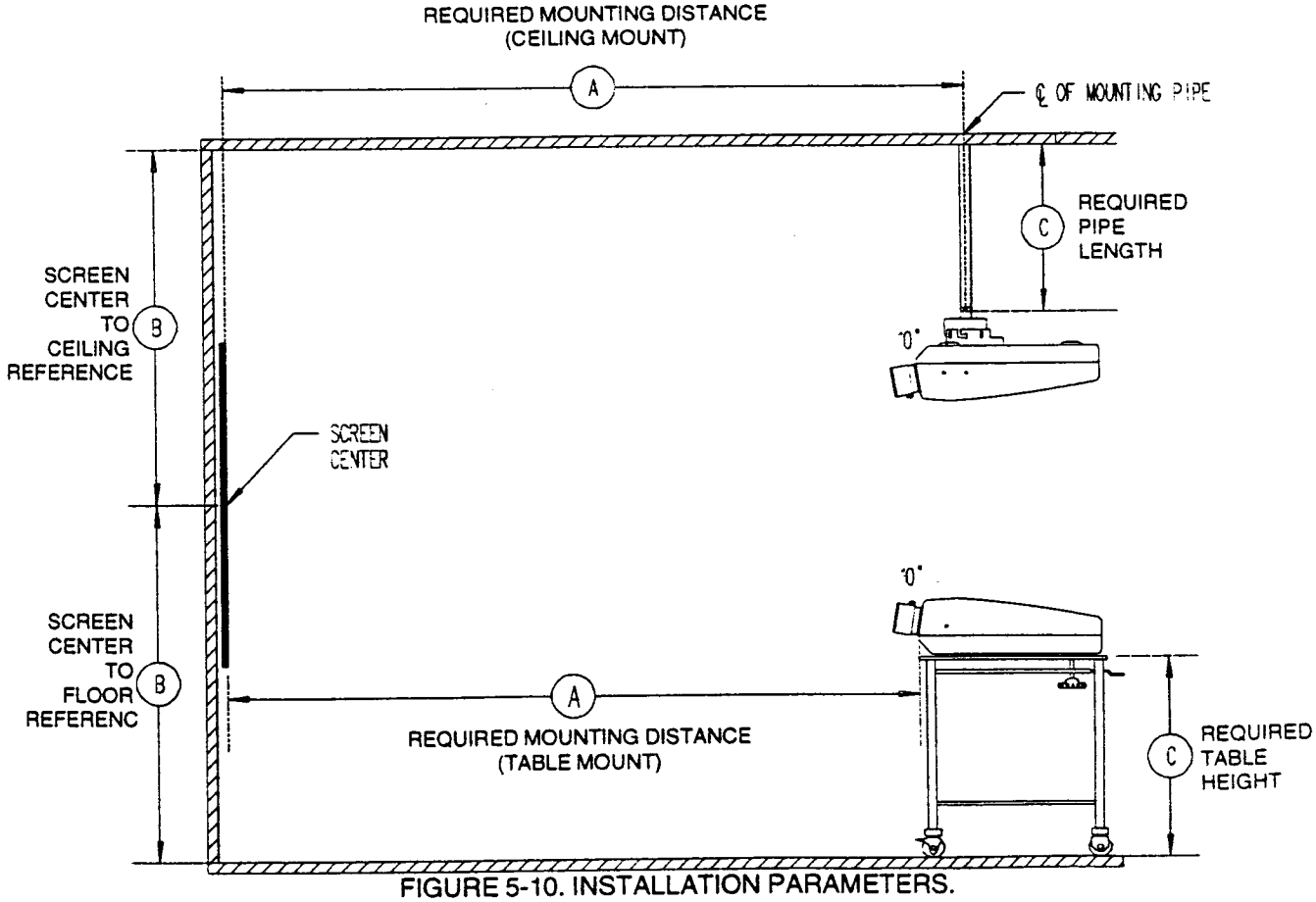


FIGURE 5-10. INSTALLATION PARAMETERS.

5.9.6 . . . . . AMPRO 4600: HD-10L Installation Guidelines:

SPECIFICATIONS	
Model Number: 69582.10L	
Magnification: 9X to 11X , **Screen Widths:** 1.2m (46.0in.) to 1.5m (60.0in.)	
TABLE MOUNT CONFIGURATIONS	
MILLIMETERS	INCHES
Amm = 1.46 X SWmm + 163mm	Ain = 1.46 X SWin. + 6.5in.
Bmm = Distance from screen center to floor in millimeters.	Bin = Distance from screen center to floor in inches.
Cmm = Bmm - [0.257 X SWmm] - 214mm	Cin = Bin. - [0.257 X SWin.] - 8.5in.
CEILING MOUNT CONFIGURATIONS	
MILLIMETERS	INCHES
Amm = 1.46 X SWmm + 402mm	Ain = 1.46 X SWin. + 15.75in.
Bmm = Distance from screen center to ceiling in millimeters.	Bin = Distance from screen center to ceiling in inches.
Cmm = Bmm - [0.257 X SWmm] - 360mm	Cin = Bin - [0.257 X SWin.] - 14.0in.
NOTE: SW refers to Screen Width	

MOUNTING DISTANCE TABLE					
SCREEN WIDTH		MOUNTING DISTANCE			
		TABLE		CEILING	
mm	in	mm	in	mm	in
1270	50	2017	79.50	2256	89.00
1524	60	2383	93.75	2617	103.00

5.9.6.1 . . . . . .HD10L Installation Example: 45.0in.(1143mm)(H) x 60.0in (1524mm)(W):

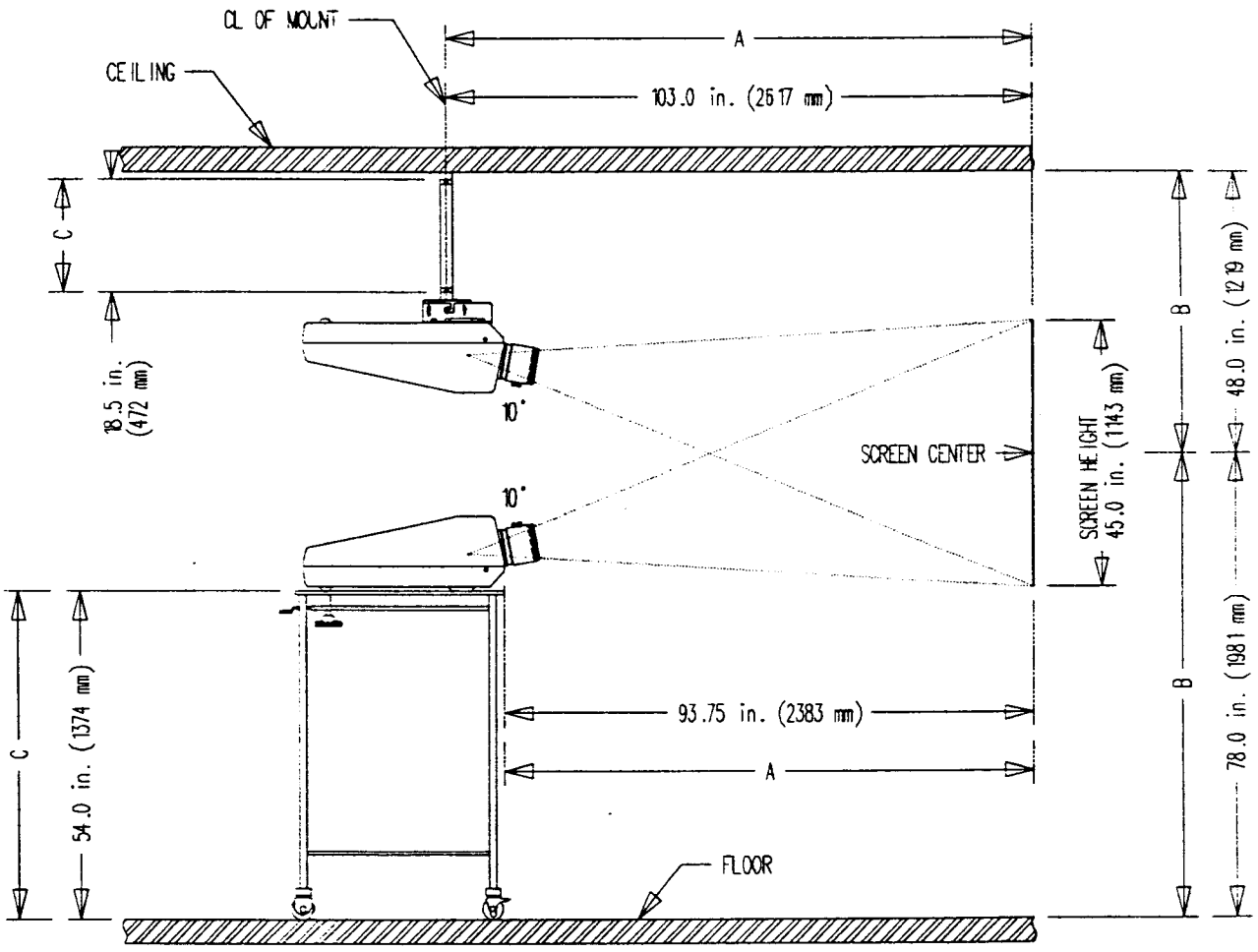


FIGURE 5-11. HD-10L INSTALLATION EXAMPLE.

5.9.7. . . . . AMPRO 4600: HD-10 /GT17/GT26 Installation Guidelines:

SPECIFICATIONS	
Magnification: Model 69582 (HD-10GT17): 14X to 20X, optimum @ 16X, **Screen Widths:** 72in. (1.8m) to 102in (2.6m)	
Magnification: Model 69582.10 (HD-10): 14X to 45X, **Screen Widths:** 72in. (1.8m) to 230in. (5.8m)	
Magnification: Model 69582.26 (HD-10GT26): 21X to 30X, optimum @ 26X **Screen Widths:** 107in. (2.7m) to 154in. (3.9m)	
TABLE MOUNT CONFIGURATIONS	
MILLIMETERS	INCHES
Amm = 1.366 x SWmm + 230mm	Ain = 1.366 x SWin. + 9.0in.
Bmm = Distance from screen center to floor in millimeters.	Bin = Distance from screen center to floor in inches.
Cmm = Bmm - [0.241 x SWmm] - 226mm	Cin = Bin. - [0.241 x SWin.] - 9.0in.
CEILING MOUNT CONFIGURATIONS	
MILLIMETERS	INCHES
Amm = 1.366 x SWmm + 470mm	Ain = 1.366 x SWin. + 18.5in.
Bmm = Distance from screen center to ceiling in millimeters.	Bin = Distance from screen center to ceiling in inches.
Cmm = Bmm - [0.241 x SWmm] - 372mm	Cin = Bin - [0.241 x SWin.] - 14.6in.

MOUNTING DISTANCE TABLE

SCREEN WIDTH (SW)		MOUNTING DISTANCE			
		TABLE		CEILING	
mm	in	mm	in	mm	in
[1,2]2032	80	3006	118.50	3246	127.75
[1,2]2438	96	3560	140.00	3800	149.75
[1,3]3048	120	4394	173.00	4634	182.50
[1,3]3353	132	4810	189.50	5050	199.00
[1,3]3658	144	5227	205.75	5467	215.25
[1]3962	156	5642	222.00	5882	231.50
[1]4267	168	6059	238.50	6299	248.00
[1]4572	180	6475	255.00	6715	264.50
[1]4877	192	6892	271.50	7132	280.75

[1]INDICATES HD-10 APPLICATIONS / [2]INDICATES HD-10GT17 APPLICATIONS / [3]INDICATES HD-10GT26 APPLICATIONS

5.9.7.1 . . . . . .HD10/GT17 Installation Example : 60.0in. (1524mm)(H) x 80.0in. (2032mm)(W):

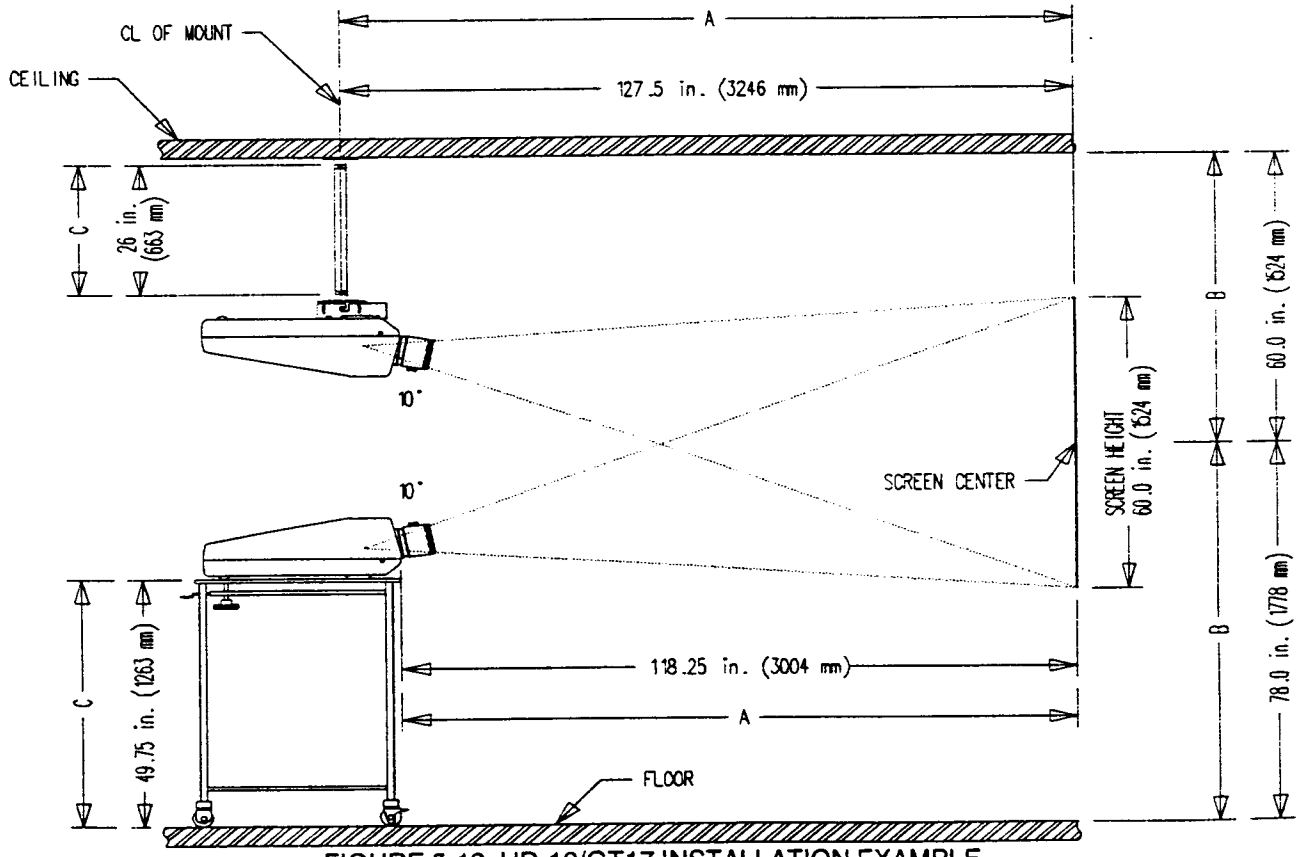


FIGURE 5-12. HD-10/GT17 INSTALLATION EXAMPLE.

Section 6

Rear Panel Connections

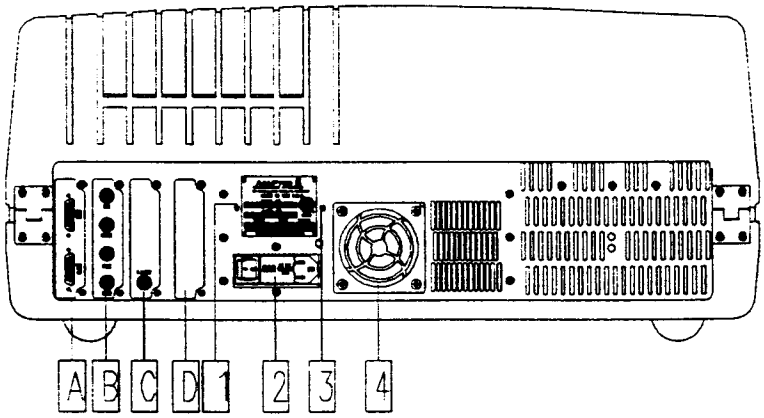
6.1 ..... General:

This section of the manual will familiarize you with the connections, controls and parameters available for operation of your system. It should be all you need to operate your system once it has been installed and set up (focused and registered).

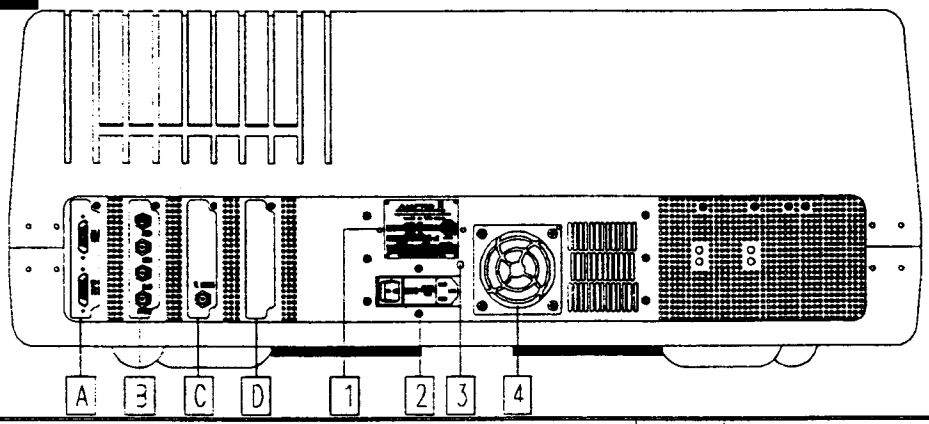
The way in which your system operates will, in some ways, depend on the application. This means, for instance, that a system installed with direct signal inputs will not operate exactly the same as a system with a special options such as an RGB/VIDEO Switcher. If your installation has special options, refer to the technical data furnished with the options for additional information.

6.2 ..... Rear Panel Layout:

AMPRO 3600



AMPRO 4600



SLOT	MODULE		ITEM	DESCRIPTION
	STANDARD	OPTIONAL		
A	CPU	NONE	1	SERIAL / MODEL NUMBER
B	ANALOG RGB1	NONE	2	MAIN AC LINE/FUSE
C	VERTICAL DRIVE PANEL	RGB[2] OR QVD[2]	3	RUNNING INDICATOR (LED)
D	BLANK	RGB[3] OR QVD[1]	4	REAR FAN

FIGURE 6-1. REAR PANEL ILLUSTRATION / CONFIGURATION.

6.3 . . . . . Input Signals:

6.3.1 . . . . . .CPU Module (Slot A):

RS232C Communication: All RS232C communication both to and from the projector is processed by the CPU via the "HOST" and "SLAVE" ports located at the rear panel. Serial data arriving at the projector from the remote control or alternative external RS232C control system enters the CPU for processing through the "HOST" port and is simultaneously echoed through buffers to the "SLAVE" port for additional projectors or RS232C controlled accessories. Please refer to Section 9 for additional information about the projector's RS232C control and communications.

Storage Of Channel Data: One of the functions performed by the CPU is channel storage and recalling. The CPU uses battery backed up memory for storing the adjustment values for each of the 50 channel locations. These values are automatically recalled each and every time a channel location has been selected.

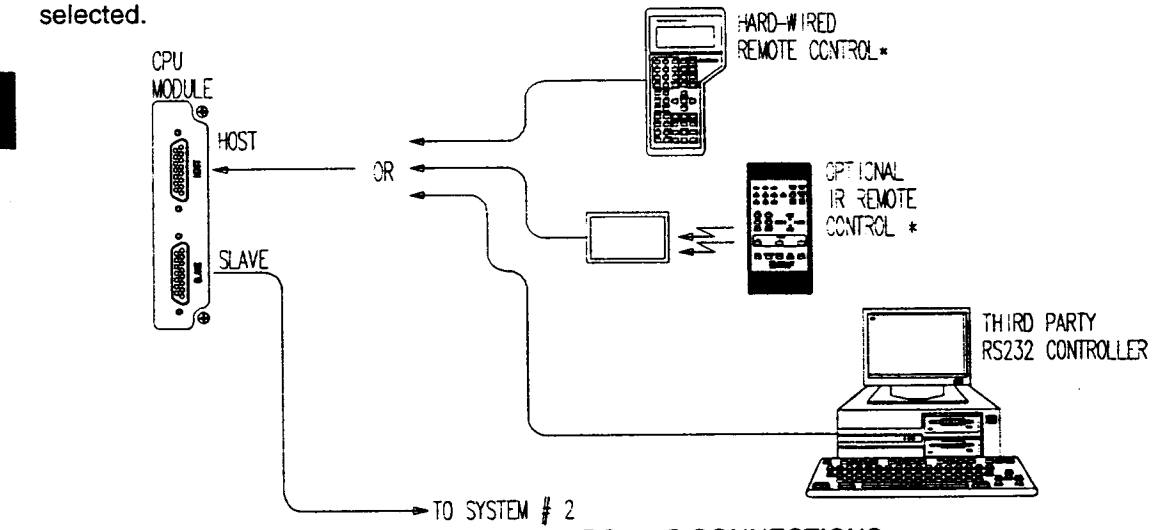


FIGURE 6-2. RS232C CONNECTIONS.

* The standard hard-wired remote control and the optional IR remote control may be simutaneously connected via the "Y" adapter. See Figure 6-3.

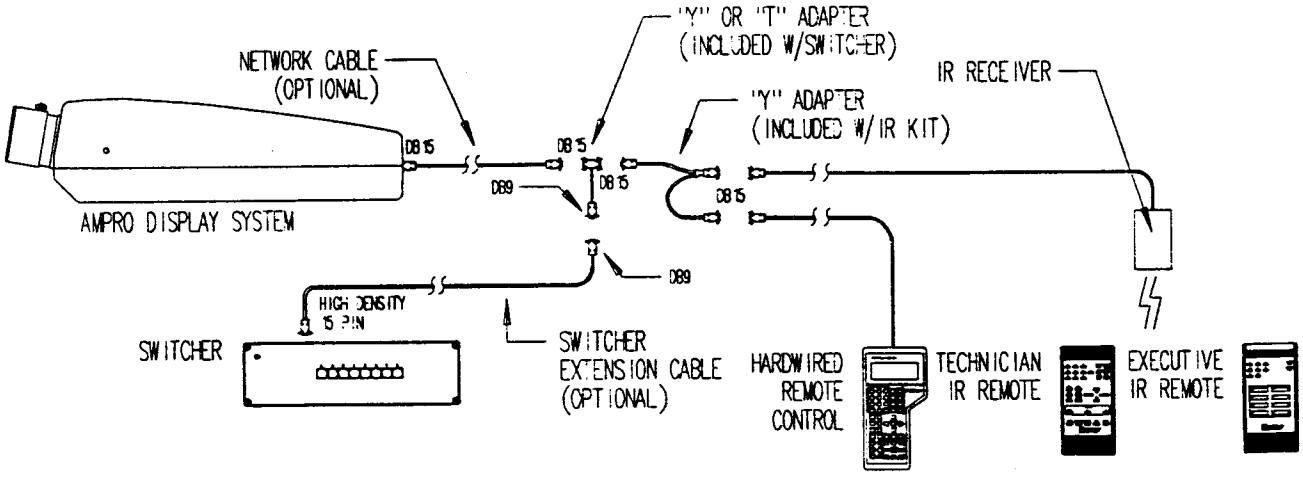


FIGURE 6-3. RS232C COMMUNICATION EXAMPLE.

6.3.2 . . . . . RGB1 Module / RGB Analog Input (Slot B):

The Analog RGB sources are connected to the RGB1 module via BNC connectors. There are connectors for Red, Green, Blue video input signals, plus separate connectors for Composite / Horizontal Sync. A connector is provided for separate Vertical Sync and is located on the Vertical Drive panel, which is right next to the Analog RGB1 module.

The Analog RGB1 input falls into three major categories, three- wire, (sync on green), four-wire (composite sync), and five-wire (separate horizontal and vertical sync). The AMPRO Display System will automatically configure itself properly for any one of the above conditions, including sync input and polarity.

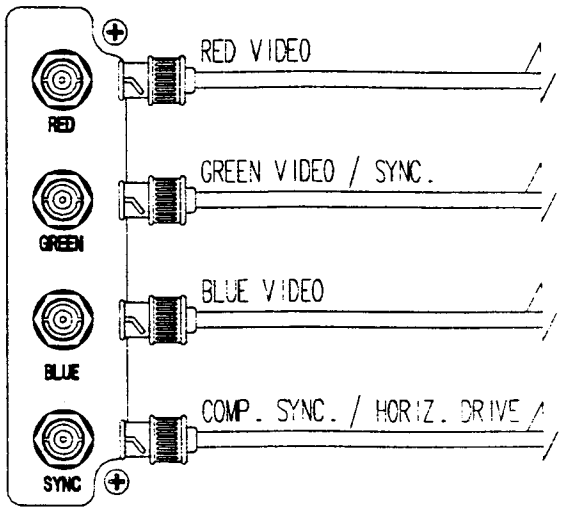


FIGURE 6-4.

A optional Analog RGB2 and RGB3 module are available and can be installed into Slot C and Slot D respectfully . The second and third Analog RGB inputs can only be used with three or four - wire RGB sources. Additionally, if both universal slots are being used as RGB inputs, the Analog RGB1 will operate only in the 3 or 4 wire RGB mode of operation. If 5-wire operation is required while both universal slots are being used, a sync combiner will be required. Refer to Section 7 to access the RGB1 and optional RGB2 and RGB3 source modules.

RGB SIGNAL SPECIFICATIONS	
VIDEO:	RS-170 COMPATIBLE, 0.7vp-p ~ 5vp-p, 75 Ω TERMINATED
SYNC:	COMPOSITE H/V, SEPARATE H/V, OR SYNC ON GREEN; AUTO DETECT, 0.3vp-p ~ TTL LEVELS, 75 Ω TERMINATED. SELECTABLE SYNC TIP OR BACK-PORCH CLAMPING

6.3.2.1 . . . . . .RGB Brightness Clamping:

The Analog RGB1, RGB2 and the RGB3 have the ability to toggle the black level clamp point from "back-porch" to "sync- tip" by entering 48 **[CODE]**, and may be preset into a channel location. Typically "back-porch" clamping is used and is the factory default settings for all channel locations. Refer to Section 7 for additional information on this and other codes.

6.3.2.2 . . . . . RGB Level Adjustments:

The typical operator controls that affect the Analog RGB1, RGB2 and the RGB3 levels are brightness **[BRIGHT]** and contrast **[CONT]** controls via the remote control and are usually set to the desired light output.

Color Balance: The AMPRO 3600 and 4600 have the capability to set the individual color levels for the Red, Green and Blue inputs for all three Analog RGB input modules and may be set and selected on a channel-to-channel basis for a custom or desired color balance setting of the particular input, or if so desired, select one of the internal color temperatures, i.e., 9300°K, 6500°K or 3600°K. Refer to Appendix B for the procedure on setting and selecting the desired color balance.

6.3.3 . . . . . Optional source Module Configurations:

6.3.3.1 . . . . . Slot C :

Standard Configuration: If no optional source modules are to be used with the AMPRO 3600/4600 a Vertical Drive Panel is provided and is used in combination with the Analog RGB1 module for the 5-wire RGB operations.

Optional Configuration 1: The Vertical Drive Panel may be removed and the optional Analog RGB2 module may be installed in its place. The Vertical Drive Panel may then be reinstalled into the Slot D position to maintain the 5-wire capability of the Analog RGB1 module.

Optional Configuration 2: If the optional Quad Video Decoder 1 (QVD1) is installed in the Slot D location then Slot C may be used as an additional Quad Video input and is designated as Quad Video Decoder 2 (QVD2). Refer to Section 6.3.4 for additional information.

Source Selection: Regardless of the module installed in the Slot C position, source selection (module selection) is accomplished by pressing the **[SOURCE]** button on the remote control until the appropriate mode is displayed on the LCD read-out, i.e. RGB2 or VIDEO2 . Refer to Section 7 for additional information on source selection.

6.3.3.2 . . . . . .Slot D:

Standard Configuration: Blank Panel.

Optional Configuration 1: Slot D may be used for the optional Quad Video Decoder 1 (QVD1) module if Slot C is being used for the Analog RGB2 module. With the QVD1installed in Slot D , then the vertical drive panel is no longer required. The QVD1 module contains an input for the Vertical Drive. Refer to section 6.3.4 for information regarding the operation of the Quad Video Decoders.

Optional Configuration 2: With the optional Analog RGB2 installed in the Slot C position, Slot D may be used for the Analog RGB3 mode of operation. With both of the optional Analog RGB2 and RGB3 modules installed the system can only operate with 3 or 4-wire RGsB/S operations.

Source Selection: Regardless of the module being used in the Slot D position, source selection (module selection) is accomplished by pressing the **[SOURCE]** button on the remote control until the appropriate mode is displayed on the LCD read-out, i.e. VIDEO1 or RGB3. Refer to Section 7 for additional information on using the **[SOURCE]** button and source selection.

6.3.4 . . . . . Quad Video Decoder Module 1 & 2 Description:

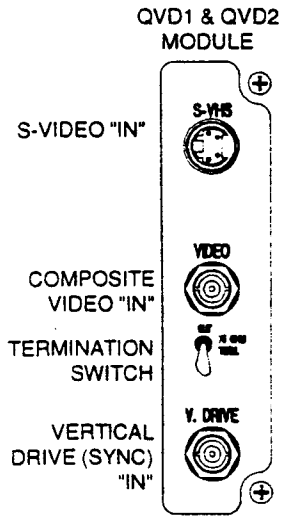


FIGURE 6-5.

6.3.4.1 . . . . . .Input 1: Composite Video Input:

The composite video input(s) will automatically decode any of the quad standards. The four standards are NTSC 3.58, NTSC 4.43, PAL and SECAM. The Quad Video Decoder 1 (QVD1) and Quad Video Decoder (QVD2) is selected by pressing the **[SOURCE]** key until either VIDEO1 or VIDEO2 is displayed on the LCD read-out. The automatic selection process may be overridden via the remote control by pressing the **[SOURCE]** key until VIDEO1 or VIDEO2 is displayed on the LCD, then enter the appropriate numeric key (*see Section 7*) and press **[SOURCE]** a second time. Refer to Section 7 for additional information on selecting either the VIDEO1 or VIDEO2 source.

The composite video input for either of the the QVD modules is a standard BNC connector with loop through capability. To loop a signal through the system, install a BNC "T" connector to the Video "IN" BNC, switch the termination switch located beneath the Video "IN" BNC from "IN" (down) to "OUT" (up) and connect to any 75 Ω terminated load. If the loop through is not being used, the termination switch must remain in the "IN" position or loss of the picture quality will occur. Refer to Figure 6-5.

6.3.4.2 . . . . . .Input 2: S-Video Input:

The S-Video input for either the QVD1 or QVD2 module, utilizes a mini "D" 4 pin connector which is the standard for this input. The connector and plug are keyed to ensure proper connection. The switching between the S-Video and the composite video input is accomplished by the remote control. Refer to Figure 6-6 for the pin-out /description for the female (rear panel) S-Video connector and Figure 6-5 for location.

PIN	DESCRIPTION
1	GROUND
2	GROUND
3	"Y" (1vp-p)
4	"C" (0.285 vp-p)

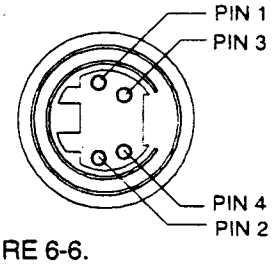


FIGURE 6-6.

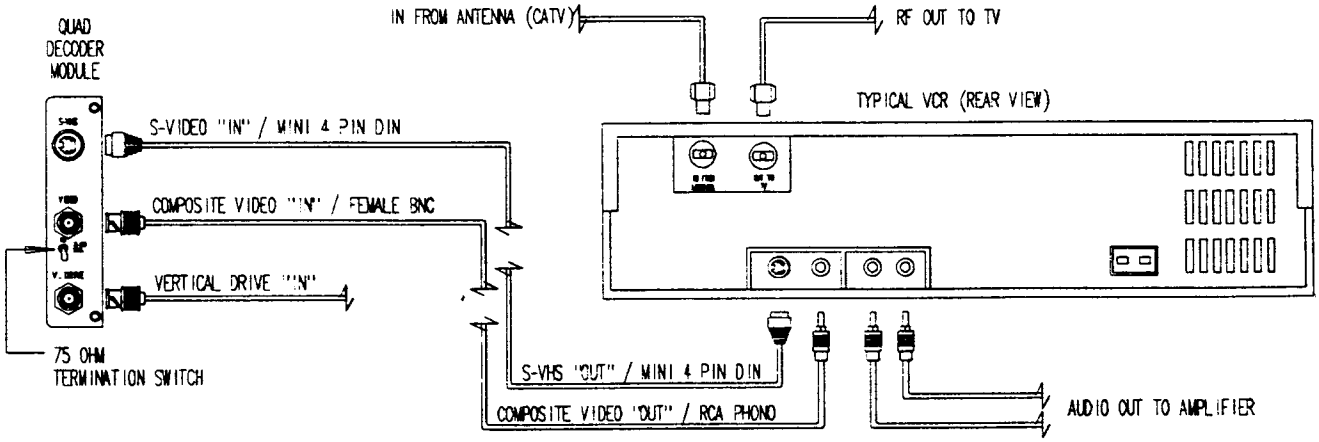


FIGURE 6-7. TYPICAL COMP. VIDEO/S-VIDEO HOOKUP.

6.3.4.3 . . . . . .Vertical Drive Input:

This connector is used with an RGB analog input in Slot B that requires a separate vertical sync input (i.e., five - wire RGB). Refer to Figure 6-5 for location information. If both the QVD1 or QVD2 modules are installed at the same time, only one active Vertical Drive may be applied to either of the two modules. If the Quad Video Decoder 1 or 2 module or the Analog RGB2 module is not being utilized, a module with the VERTICAL DRIVE input is provided.

NOTES:

Section 7
Remote Control Functions

7.1 .....The Remote Control:

This Section will familiarize you with the remote control operation for both the standard and any optional operations that may be incorporated in your system, and the many features that are available. Please read completely to avoid any confusion on how the digital remote control operates.

The Hard-Wired Remote Control unit incorporates a 4 X 20 LCD read-out which indicates the operation and diagnostic status of the system. The hard wired remote comes standard with a cable length of 25 ft.(7.6 m), which can be extended in increments of 50 ft. (15.2 m) or 100 ft. (30.5 m).

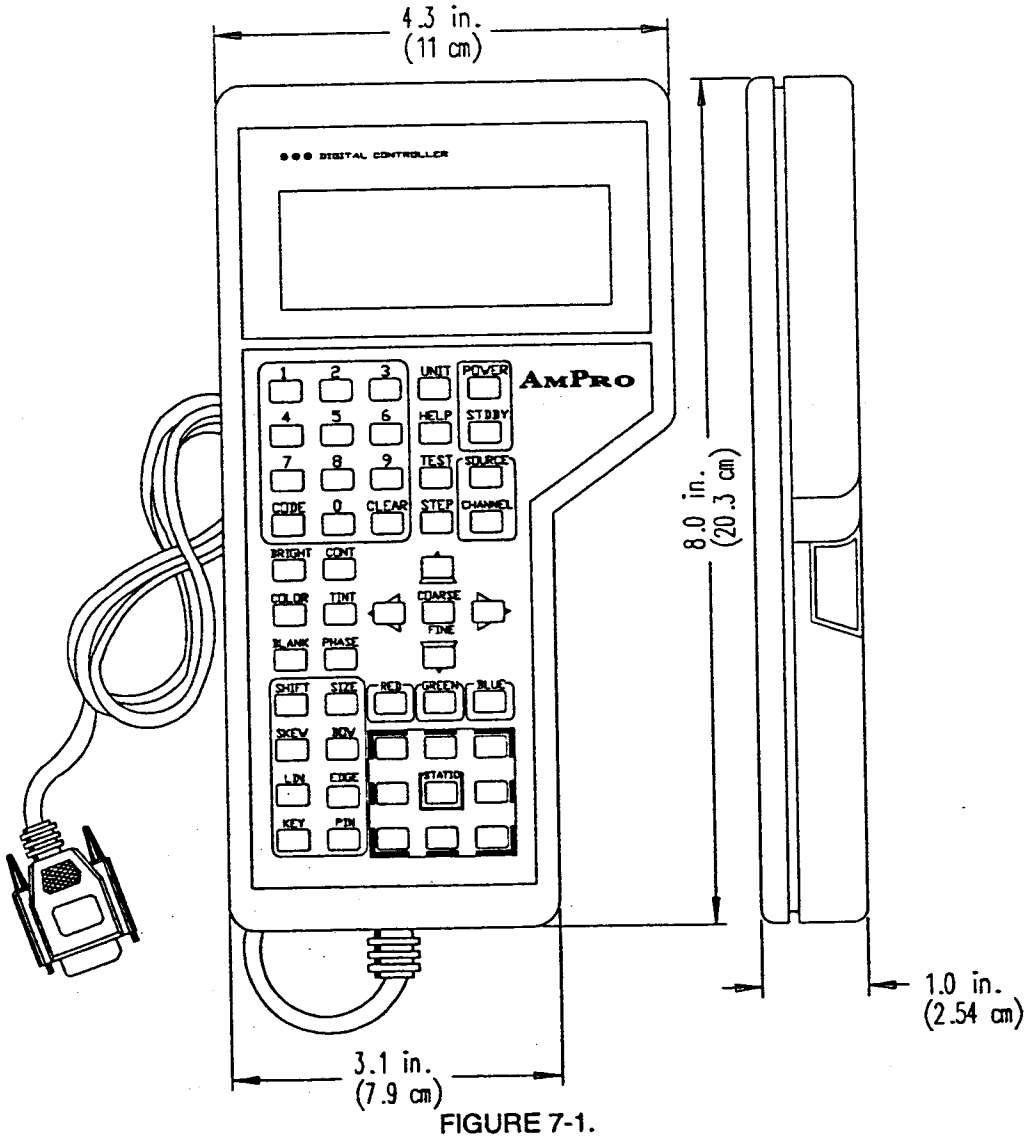


FIGURE 7-1.

HARD-WIRED REMOTE CONTROL DIMENSIONS

7

FOLD OUT TO VIEW THE REMOTE CONTROL KEYPAD DIAGRAM, KEYPAD SUMMARY AND INDEX.

7.2 . . . . . Remote Control Functions:

7.2.1. . . . . .POWER:

FUNCTION: Toggles projector "ON"and "OFF."

- OPERATION 1: Once the system has been installed and the main rocker switch on the rear panel is "ON", you are ready for system turn "ON." The **[POWER]** button toggles the projector "ON "and "OFF." In the "OFF" mode with the main rocker switch "ON," the LCD will display the Model number of the projector. When the **[POWER]** button is pressed the system will turn "ON" and the display will indicated the last mode of operation that the system was in when it was de- energized.

7.2.2. . . . . .STDBY (STANDBY):

FUNCTION: Toggles image "ON" and "OFF."

- OPERATION 1: The system provides the user with the capability of removing the projected image from the screen without changing any of the image settings or cooling down the system. The operator need only to press the **[STDBY]** button on the remote control to remove the image. The image is restored to the screen by pressing the **[STDBY]**key a second time.

7.2.3. . . . . .CHANNEL:

FUNCTION: Selects channel number. See Codes page 7-10 for CHANNEL related code commands.

DEFINITION OF A CHANNEL: A Channel refers to a location within battery backed-up memory in which data such as mode of operation, all image quality and convergence adjustments are established as a group. The data within the channel is defined and set by the operator/end-user for a particular external video source or sources. The objective of establishing and using channels is to provide a smooth and simple transition between multiple external video inputs that have varying operating parameters such as, black level, contrast, size, phase, blank and mode of operation.

STORING DATA: To store data such as brightness, contrast, phasing, blanking, height, width ,mode of operation, static and dynamic focus, all image quality adjustments, color temperature and all registration settings for a dedicated channel location, select a channel number and set the parameters for the particular source. Once completed all settings will have been automatically stored. Refer to example below.

☐ STEP 1. Select a channel number e.g., **[1]** then press **[CHANNEL]** .

☐ STEP 2. Set the following parameters: brightness, contrast, phasing, blanking, height, width, mode of operation, color temperature and *ALL* registration settings.

☐ STEP 3: Continue with Steps 1 and 2 to preset all other sources into other channels.

! To determine a particular channel number for an active source, simply press the **[CHANNEL]** button and the Remote LCD will indicated the channel number.

7.2.4. . . . . UNIT:

FUNCTION: Assign/select one or multiple projector operation.

- OPERATION 1: In this mode of operation, up to 256 projectors may be networked together and controlled via either the hard-wired remote control or a computer terminal or a third-party RS232C control system. Perform the following to select an individual unit in a multiple system operation.

☐ STEP 1. Select unit's number "n", where "n" equals desired unit number.

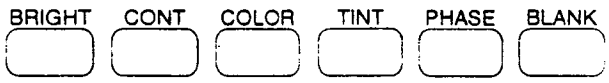
☐ STEP 2. Press the **[UNIT]** button.

! It is not required to perform steps 1 and 2 for a single unit configuration. Refer to Section 9 for more information regarding the RS232C operation.

! It is possible to address all the projectors at the same time by entering number 256 on the numeric keypad then pressing **[UNIT]** on the remote keypad. This global command will remain in effect until one of the projectors is individually selected. The LCD will display "GLOBAL LISTEN".

7

7.2.5-10. . . . . Image Quality Adjustments:



FUNCTION: Control image quality

- OPERATION 1: There are six buttons on the remote control that control image quality and may be stored within a *Channel*. The six buttons are described below.

- OPERATION 2: There are two methods of setting the image controls; (1): enter a percentage from 0 to 100 using the numeric keypad, then pressing the desired function, i.e., **[7] [5] [BRIGHT]**. (2): select the desired function then use the [↑] and [↓] arrow keys. NOTE: Use the [↑], [↓], [←] and [→] arrow keys for the **[BLANK]** function.

7.2.5. . . . . .BRIGHT (BRIGHTNESS):

Operates when in Video, all Analog RGB modes, HELP mode and TEST modes. Adjust the brightness level until the black portions of a projected image are black, but detail in shaded areas is not lost.

7.2.5.1 . . . . . .Sub-Brite Operation:

The AMPRO 3600 and 4600 provide the capability to set the sub-brite level for the individual colors. This function should be performed by an authorized installation or service technician at the time of installation. Please refer to Appendix B for information on selecting and setting of the sub-brite function.

7.2.5.2 . . . . . .Overdrive (TEMPORARY MODE):

Overdrive mode of operation provides ≈ 25% more lumens for the occasional use when the situation requires a brighter picture. The Overdrive mode will automatically increase the image brightness and automatically compensate for the image height, image width and focus. To temporarily toggle "overdrive" on and off, press a hold the **[BRIGHT]** key. If enabled temporarily, the overdrive mode will be automatically disabled when a different channel or mode of operation is selected or when the system is powered off.

If a channel has been designated as "overdrive" (see CODES), then pressing and holding the **[BRIGHT]** key will temporarily disable the "overdrive" mode. Again, if a different channel or mode is selected or the system is powered down, then the designated "overdrive" channel will be enabled.

7.2.6. . . . . CONT (CONTRAST):

Operates when in Video, all Analog RGB modes, HELP mode and TEST modes. The contrast button will change the amount of image intensity. If image defocusing or loss of detail occurs, decrease either contrast or brightness, or both.

7.2.6.1. . . . . .Sub-Contrast Operation:

Like the Sub-brite function, the AMPRO 3600 and 4600 provide the capability of setting the sub-contrast or signal drive levels for the individual colors for custom color balances, or if desired, one of the three preset color temperatures may be selected. Refer to Appendix B for additional information.

7.2.7. . . . . .COLOR:

Operates when in Video only. The color button controls the color intensity of the video image. If the image appears TOO PALE or weak, increase the color level, and if the image appears FLUSHED or TOO BRIGHT, decrease the color level.

7.2.8. . . . . .TINT :

Operates when in NTSC video modes only. The tint button controls the hue of the video image. If facial tones or objects appear TOO GREEN, increase the tint setting. If facial tones appear TOO PURPLE, decrease the tint level.

7.2.9. . . . . .PHASE:

Operates in all modes of operations. One problem frequently encountered is improper horizontal and vertical framing of the projected image on the raster. This is seen as characters lost on either the right, left and/or top, bottom edge of the image due to variations in video timings in computers. The AMPRO system, via the remote control, allows the image to moved either **left** or **right**, **up** or **down** to correct for this variation.

7.2.10 . . . . . .BLANK:

FUNCTION: Selects blanking operation.

Use the blanking function in case the wanted (active) video is cutoff or to eliminate unwanted (non-active) video information. See PHASE for additional information.

- BLANKING: Select an EDGE, then **[BLANK]** to perform the following blanking operations:
  - ☐ LEFT and/or RIGHT: Press **[LEFT EDGE]** or **[RIGHT EDGE]** control, then **[BLANK]** to select horizontal blanking which is adjusted by the [←] and [→] arrows.
  - ☐ TOP and/or BOTTOM: Press **[TOP EDGE]** or **[BOTTOM EDGE]** control, then **[BLANK]** to select vertical blanking which is adjusted by the [↑] and [↓] arrows.

7.2.11. . . . . .DETAIL: [6] [8] [CODE]

! You must enter 68 **[CODE]** to activate the detail function.

Operates when in Video only. The detail button controls the sharpness of the picture in the video modes only. If the image appears soft, increase the detail. If the image appears grainy, decrease the detail setting. The desired setting of detail is as high as allowed without the image appearing grainy.

7.2.12. . . . . HELP:

FUNCTION: Enters the HELP program at main menu page.

- OPERATION 1: Enters internal help mode at the main menu selections.

- OPERATION 2: Entering selection number of main menu will advance to the first page of the selected subject. Use [←] and [→] arrows to turn the pages, [↑] arrow to bring you back to the index page, and the [↓] arrow to exit the HELP mode. These are shown at the bottom of the help screens for reference.

! Image Quality adjustments cannot be entered while a MENU is on screen. Once a MENU is active and the LCD displays "SELECT SUBJECT" , you may only select a subject or exit.

! If while in the help mode and other than a menu is being displayed, and one of the image quality buttons is pressed. e.g. **[BRIGHT]**, then the arrow keys are reassigned to that function. You may now use the up and down arrows to adjust the brightness level.

7 ! Upon completion of making image quality adjustments , the **[CLEAR]** button must be pressed to allow the arrow keys to resume the functionality in the help mode.

7.2.13. . . . . .TEST:

FUNCTION: Toggles into last selected test mode of operation.

! Image Quality adjustments (except phasing) may be adjusted while in the TEST mode of operation.

- OPERATION 1: To enter a particular test mode, perform the following;

[1] [TEST]: selects 15kHz internal test frequency of operation.

[2] [TEST]: selects 31.25kHz internal test frequency of operation.

[3] [TEST]: selects 62.5kHz internal test frequency of operation.

[4] [TEST]: selects internal test pattern operation at the operating frequency (*genlocked*) of the input that was running when TEST was selected, i.e. Video, RGB, etc..

[STEP] Cycles through the available test patterns. Available test patterns; **(1)**, Crosshatch 1 (dense crosshatch), **(2)** Crosshatch 2 (normal), **(3)** Crosshair, or **(4)** Dots.

7.2.14. . . . . .STEP BUTTON:

FUNCTION: Advances sequence of events.

- Operation 1: In the TEST mode , **[STEP]** will sequence to next available test pattern.

- Operation 2: In the Guided Registration programs, **[STEP]** will advance to the next step of alignment.

7.2.15. . . . . SOURCE

FUNCTION: Select desired mode of operation. [RGB, or one of the optional modes; RGB2, RGB3, VIDEO 1, VIDEO 2].

! The **[SOURCE]** command will only select the mode (modules) available, meaning if you only have the standard RGB module then this will be the only mode that can be selected or that is displayed on the LCD read-out. Refer to Supplement 5 for information on installing optional modules.

- OPERATION 1: Press the **[SOURCE]** key until the desired mode of operation is displayed on the LCD read-out or on-screen.

- OPERATION 2: RGB / RGB2 / RGB3 - HDTV MODE (OPTIONAL):

The Analog RGB or RGB2 or RGB3 module (input) may be used as the input for your HDTV source. The HDTV mode of operation may be setup within any one of the 50 available channel locations. To setup the HDTV mode perform the following.

☐ STEP 1: To select the HDTV mode of operation perform the following; 1) enter the channel you want HDTV to be stored, 2) press **[SOURCE]** and select **[RGB]** or **[RGB2]** or **[RGB3]** as your source input, and 3) enter 91 **[CODE]** to activate the HDTV function.

☐ STEP 2: Ensure the channel you have designated for HDTV operation has been setup for "back-porch" black level clamping. To toggle the clamp point use 48 **[CODE]**.

! To disable the HDTV function, enter 90 **[CODE]**.

- OPERATION 3: VIDEO 1 and VIDEO 2 MODES (OPTIONAL):

- To enter either VIDEO 1 or VIDEO 2 *auto mode of operation* simply press the **[SOURCE]** key until the appropriate mode is displayed on the LCD read-out. To override the auto selection process and manually select a particular video mode, press **[SOURCE]** to select the VIDEO 1 or VIDEO 2 mode, as above, then using the numeric keypad, enter the appropriate number (see table below), and press **[SOURCE]** a second time.

VIDEO 1 OR VIDEO 2 MANUAL MODE SELECTION			
PRESS			OPERATION / MODE
[SOURCE]	**[1]**	**[SOURCE]**	QUAD AUTO (AUTO-SELECT - COMPOSITE)
[SOURCE]	**[2]**	**[SOURCE]**	PAL (COMPOSITE)
[SOURCE]	**[3]**	**[SOURCE]**	SECAM (COMPOSITE)
[SOURCE]	**[4]**	**[SOURCE]**	NTSC 4.43 (COMPOSITE)
[SOURCE]	**[5]**	**[SOURCE]**	NTSC 3.58 (COMPOSITE)
[SOURCE]	**[6]**	**[SOURCE]**	S-VIDEO (AUTO-SELECT)
[SOURCE]	**[7]**	**[SOURCE]**	S-VIDEO (PAL)
[SOURCE]	**[8]**	**[SOURCE]**	S-VIDEO (SECAM)
[SOURCE]	**[9]**	**[SOURCE]**	S-VIDEO (NTSC 4.43)
[SOURCE]	**[10]**	**[SOURCE]**	S-VIDEO (NTSC 3.58)

! Remember, the first [SOURCE] command will select either VIDEO 1 or VIDEO 2 mode.

7.2.16 . . . . CODE:

FUNCTION: This command will activate the system's special internal commands.

- OPERATION 1: Use the numeric keypad to enter the desired command, then press **[CODE]** to activate the command. NOTE: The LCD read-out (or OSD) will prompt you to enter setting, i.e., ACC = "nn", where "nn" refers to the corresponding entry listed in the following tables.

CODE	FUNCTION	LCD READ-OUT : OPERATION
10	DISPLAY DAY/TIME[1]	DAY / 00:00 : Displays Day and time
11	SET TIME[1] OF DAY	ENTER TIME: Enter H:M: (Hour:Min.)
12	ENABLE TIMER	TIMER ENABLE : Enables the timer function
13	DISABLE TIMER	TIMER DISABLE : Disable the timer function
14	DISPLAY "ON" TIME[1]	TIME 00:00 : Displays the time set for auto-on operation.
15	SET TIMER "ON" TIME[1]	00:00 : Enter "auto-on" time
16	DISPLAY "OFF" TIME	TIME 00:00 : Displays the time set for auto-off operation
17	SET TIMER "OFF" TIME[1]	00:00 : Enter "auto-off" time
18	SET DATE (DAY)	IS TODAY MONDAY: Use the UP arrow to scroll through the days of the week and press **[CODE]** to select proper day.
19	SELECT 5 OR 7 DAY OPERATION (TOGGLE)	TIMER SETTINGS 5 DAYS SETTING (7 DAYS SETTING): Use the UP arrow to toggle between the two day setting modes and press **[CODE]** to select.
20	CHANNEL WRITE-PROTECT (TOGGLE)	CHANNEL WRITE PROTECT ON or OFF: Protects a channel from changes being made to channel of pre-set adjustments.
21	ACTIVATE "A.C.S." **A**utomatic **C**onvergence **S**caling	LCD PROMPT: ACTIVATE ACS ARE YOU SURE? Press **[CODE]** for *YES*, any other key for *NO*. Automatically searches through the pre-set "validated" channel table and copies the channel that matches the active channel signal parameters within ± 30Hz-Horizontal and ± 3Hz.-Vertical. First, uses the horizontal frequency to search for the appropriate pre-set "validated" channel to copy from, in the event that two or more channels contain the same horizontal frequency information, then "ACS" will then look at the vertical frequency to make it's final choice for the best channel. If there are no pre-set channels that match, then "ACS" will translate between the closest frequencies (H & V) directly below and above the presently active channel's frequency to setup the channel's convergence. In the event that there are no validated channels lower or higher or no validated channels then the new channel, A.C.S. will respond with "NO VALIDATED DATA". Copies all channel data, excluding mode of operation. NOTE 1: This command will only choose channels that have been "validated" by 24 CODE. Refer to Section 8 for additional information on A.C.S.
22	COPY CHANNEL "TO"[2]	COPY CHANNEL TO (ENTER 1-50): Copies the active channel settings into the desired channel location.
23	COPY CHANNEL "FROM"[2]	COPY CHANNEL FROM (ENTER 1-50): Copies channel settings from the selected channel into the active channel.

[1]The internal TIMER operates in the 24 hour clock mode, i.e. 2.00 P.M. is entered as 14:00.Please refer to Appendix A for additional information on setting and operating the internal timer functions.

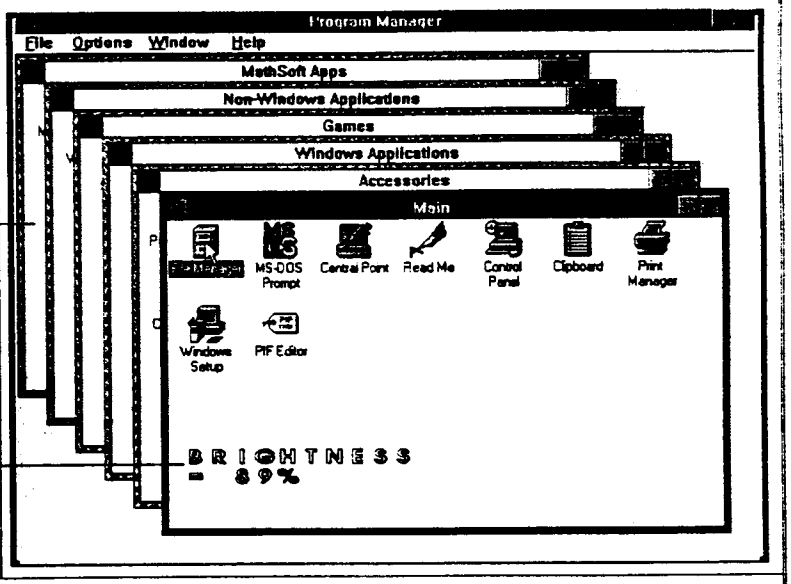
[2] When using 22 and 23 code, and an single digit channel number is entered, **[CODE]** must be pressed to active the command or enter a single digit entry as, i.e., 01, 02, 03, etc.....

7.2.16 .....CODE: (continued)

CODE	FUNCTION	LCD READ-OUT : OPERATION
24	VALIDATE CHANNEL (TOGGLE) NOTE: IF CHANNEL HAS BEEN PREVIOUSLY "VALIDATED", THEN 24 [CODE] "INVALIDATES" CHANNEL	CHANNEL VALIDATED / CHANNEL INVALIDATED: This command is used to confirm that a channel has been set and adjusted. Once validated, this command writes the channel's horizontal and vertical frequency into a "look-up" table for the A.C.S. command (21 CODE) and A.S.M. (see below) to use. If a channel has not been validated, it can not be used with the A.C.S. or A.S.M. command. NOTE; 24 CODE additionally activates the channel write-protect command - 20 CODE.
25	TEST CHANNEL FOR VALIDATION	Displays the frequency validated (stored) within the selected channel location. **NOTE**; if the channel has not been validated a "NOT VALIDATED" message will be displayed on the LCD.
26	DISPLAY SYSTEM / CHANNEL STATUS INFORMATION PAGES	Once activated, the system will display four (4) informational pages which include data on channel setup, timer enabled / disabled, internal temperature, etc.. Refer to Appendix C for additional information.
27	CHANNEL AUTO-SEARCH MODE (A.S.M.) (TOGGLE)	AUTO SEARCH ON: This command allows the system to constantly monitor the incoming signal for changes. If a change is detected, such as the horizontal and/or vertical frequency, the system uses the table of validated channels and automatically re-configures the channel parameters for the best possible display. Helpful when changing between video modes (VGA - SVGA) from a signal source. Works in all modes of operation.
28	COPY CHANNEL "ALL"	LCD PROMPT: COPY CHAN ALL ARE YOU SURE?: Press **[CODE]** for *YES* or any other key for *NO*. Copies the active channel into ALL 50 channel locations.
29	CLEAR ACTIVE CHANNEL	LCD PROMPT: CLEAR CHAN ARE YOU SURE?: Press **[CODE]** for *YES* or any other key for *NO*. Clears or nulls all settings of the active channel location.
30	DISPLAY DIAGNOSTICS	ENABLES ERROR DIAGNOSTICS: Display all appropriate error messages or simply "SYSTEM OK".
31	DISPLAY "TOT"	Displays the "Total Operating Time" in, DAYS:HOURS:MINUTES
32	DISPLAY CRT TIME	Displays the CRTs total elapsed time in, DAYS:HOURS:MINUTES
33	DISPLAY ORIENTATION	Displays the projection mode, i.e., Floor Mount / Front Projection
34	DISPLAY BOARD STATUS	Displays the available input modules installed.
35	DISPLAY ROM REVISION AND SERIAL NUMBER	Displays the current revision level of the operating system and the serial number of the system..
36	DISPLAY FREQUENCY COUNTER	Displays the horizontal scan rate and vertical period of the incoming signal for the active channel.
37	ENABLE EXECUTIVE MODE	EXEC MODE ON: This command allows the user to limit the operation of the system to; Power, Standby, and 8 channel selections.
39	DISPLAY INTERNAL TEMPERATURE	"xxx F": Displays the internal temperature of two separate internal areas. On the first line of the read-out is displayed the system temperature and on the second line of the read-out, the power supply temperature.
40	ADJUST RVS	Activates the Red Static Vertical Shift operation. RVS must be performed with registration "off". See 55 CODE.

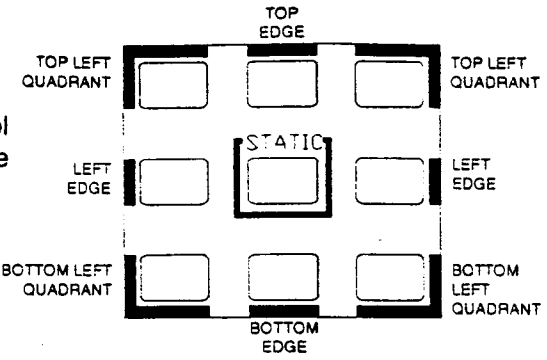
7.2.16 . . . . CODE: (continued)

CODE	FUNCTION	LCD READ-OUT : OPERATION
41	ADJUST BVS	Activates the Blue Static Vertical Shift operation. BVS must be performed with registration "off". See 55 CODE.
42	ADJUST LCD BACK LIGHT	LCD PROMPT: ENTER LITE LEVEL: Enter 0 (off) through 4 (max.).
43	TEST REMOTE CONTROL	Test/verify remote control LCD operation.
44	READ SWITCHES	Reads/displays settings of the baud rate and address switches.
45	DISABLE REGISTRATION KEYS	KEYS DISABLED: This command allows the user to lock-out the convergence keys which will prevent adjustments from being made by unauthorized personnel.
46	ENABLE REGISTRATION KEYS	KEYS ENABLED: Activates keys placed inactive by 45 CODE.
47	ENABLE GUIDED REGISTRATION	Enters the complete guided registration mode of operation. Use CODE to exit at any time.
48	TOGGLE BLACK LEVEL CLAMP POINT	Toggle the black level clamp point from "back-porch" to "sync-tip" mode of operation on a channel- by-channel basis. System will default to "back-porch" clamping.
49	TOGGLE MONOCHROME MODE	MONOCHROME MODE or COLOR RESTORED: Enables the user to turn the color level on or off (Video Mode Only).
50	N-S PINCUSHION	Enable N-S Pincusion; special registration function. See Section 8.
54	ENABLE ON-SCREEN DISPLAY (OSD)	Enables the on-screen display, which emulates the LCD read-out. Provides on screen status of all remote control functions. See 56 CODE.
!	Depending on the active function, the OSD window will appear at the top or bottom of the image.	
!	When the keypad is idle, the OSD will remain active (on screen) for ≈ 3 seconds.	
!	Horizontal scan rates of > 95kHz, the character size of the OSD will increase.	
55	TOGGLE REGISTRATION ON/OFF	REGISTRATION ON or REGISTRATION OFF: Turns registration off when performing the mechanical (STATIC) alignments and turn registration on when performing the dynamic alignment functions.
56	DISABLE OSD	Disable the OSD function. See 54 CODE.



The AMPRO 3600/4600 employs full convergence capability, which includes (as standard) total convergence control of the green image or also known as "Convergence on Green". The remainder of this section will highlight the use and functionality of the registration controls. Refer to Section 8 for for exact keystrokes, proper test pattern, image motion and sequence.

7.2.20. . . . . .EDGES AND QUADRANTS:



- OPERATION 1: Selects a particular registration control location for master or individual Red, Green or Blue image adjustments.

7.2.21 . . . . . STATIC:

FUNCTION: Enables all static operations.

! Before activating static registration functions disable registration with 55 **[CODE]** and perform the following static functions

STATIC KEYSTONE and PINCUSHION OPERATION:

☐ **E-W Keystone:** Press **[STATIC]**, **[KEY]**, then use the [←]and [→] arrows to adjust.

☐ **E-W Pincushion:** Press **[STATIC]**, **[PIN]**, then use the [←]and [→] arrows to adjust.

GREEN OPERATION:

☐ **Static Horizontal Shift:** With Registration "OFF", press **[STATIC]**, **[SHIFT]** , **[GREEN]** and use the [←] and [→] arrow keys to adjust. Adjustments will simultaneously effect the Red and Blue images.

☐ **Static Vertical Shift:** Green only. Press **[STATIC]**, **[SHIFT]**and use the [↑]and [↓] arrow keys and adjust the image until it is centered on the screen. DO NOT OVER SCAN THE FACE OF THE CRT.

☐ **Size:** Green only. Press **[STATIC]**, **[SIZE]**and use the [↑]and [↓] arrow keys and adjust for the master vertical size. Use the [←]and [→] arrow keys and adjust for the master horizontal size.

☐ **Linearity:** Green only. Press **[STATIC]**, **[LIN]**and use the [↑]and [↓] arrow keys and adjust until the squares from top to bottom of a crosshatch pattern are equal in height.

RED and BLUE STATIC SHIFT OPERATIONS:

☐ **Red Static Shift:** With Registration "OFF" , press **[STATIC]**, **[SHIFT]**, **[RED]**, or 40 **[CODE]** and use the [↑]and [↓] arrow keys to adjust.

☐ **Blue Static Shift:** With Registration "OFF" , press **[STATIC]** ,**[SHIFT]**, **[BLUE]**, or 41 **[CODE]** and use the [↑]and [↓] arrow keys to adjust.

! After completing the static shift functions, enter 55 **[CODE]**, registration "on".

7.2.22 . . . . COARSE / FINE:

FUNCTION: Toggles between fine or course stepping action of the registration/sub controls functions.

- ☐ Allows the user to increase or decrease the adjustment speed of the registration and sub controls functions, which include sub brightness and contrast for each individual color.
- ☐ While the coarse mode is helpful when extensive or large corrections are required, the fine mode is best used when small corrections are required. The LCD read-out will indicate either FINE or COURSE adjustment mode.

7.2.23 . . . . . .RED :

FUNCTION: Selects RED Registration or Red cutoff.

- ☐ Press **[RED]** and select the desired registration function and appropriate area key.
- ☐ Toggles the RED CRT ON/OFF. Press and hold the **[RED]** key for ≈ 3 seconds until the RED is toggled on or off.
- ☐ If STATIC function was previously selected then the **[RED]** button additionally exits the STATIC mode and enables DYNAMIC registration mode of operation for Red.

7.2.24 . . . . . .GREEN:

FUNCTION: Selects Master and/or Green Registration or Green cutoff.

- ☐ Press **[GREEN]** and select the desired registration function and appropriate area key.
- ☐ Toggles the GREEN CRT ON/OFF. Press and hold the **[GREEN]** key for ≈ 3 seconds until the GREEN is toggled on or off.
- ☐ If STATIC function was previously selected then the **[GREEN]** button additionally exits the STATIC mode and enables DYNAMIC registration mode of operation for Green.

7.2.25. . . . . .BLUE:

FUNCTION: Selects BLUE Registration or Blue cutoff.

- ☐ Press **[BLUE]** and select the desired registration function and appropriate area key.
- ☐ Toggles the BLUE CRT ON/OFF. Press and hold the **[BLUE]** key for ≈ 3 seconds until the BLUE is toggled on or off.
- ☐ If STATIC function was previously selected then the **[BLUE]** button additionally exits the STATIC mode and enables DYNAMIC registration mode of operation for Blue.

7.2.26. .....SHIFT:

FUNCTION: Selects shift operations and highlights a center pattern on the screen where active.

! See **STATIC** functions for Master Shift, Red Vertical Shift (RVS) and Blue Vertical Shift (BVS) per section 7.2.22 for proper setting prior to proceeding with the remainder of this section.

SHIFT OPERATION:

☐ Press **[RED]**, **[GREEN]** or **[BLUE]**, then **[SHIFT]** to select the particular color and SHIFT operation.

☐ **Vertical Shifts:** Use the [↑] and [↓] arrows to adjust for the Vertical Shifts.

☐ **Horizontal Shifts:** Use the [←]and [→] arrows to adjust for the Horizontal Shifts.

! Green Horizontal Shift effects only the green image.

7.2.27. .....SKEW:

FUNCTION: Selects skew operations and highlights the center axis of the screen where active.

MASTER HORIZONTAL SKEW OPERATION:

☐ Press **[SKEW]**, then **[GREEN]** and any registration zone (quadrant/edge) key other than the LEFT/RIGHT edge key. Use the [↑] or [↓] arrow keys to adjust.

INDIVIDUAL SKEW OPERATION:

☐ **Horizontal Skew** : Select **[SKEW]**, **[RED]**, **[GREEN**[1]**]** or **[BLUE]**, then **[LEFT]** or **[RIGHT] [EDGE]** and adjust the horizontal skew using [↑] or [↓] arrow key.

☐ [1]**Vertical Skew:** Select **[SKEW]**, **[RED]**, **[GREEN] or [BLUE]** and adjust the vertical skew using [←] or [→] arrow key.

7.2.28. ..... BOW:

FUNCTION: Selects the bow operation and highlights the center of the screen where active.

MASTER HORIZONTAL BOW:

☐ Press **[BOW]**, then **[GREEN]**, then any registration zone (quadrant/edge) other than the LEFT/RIGHT edge keys. Use the [↑] and [↓] arrows to adjust.

INDIVIDUAL BOW OPERATION:

☐ **Horizontal Bow:** Select **[BOW]**, **[LEFT EDGE]** or **[RIGHT EDGE]** , **[RED]**, **[GREEN]** or **[BLUE]** and adjust the using [↑] and [↓] arrow key.

☐ [1]**Vertical Bow:** Select **[BOW]**, **[RED]**, **[GREEN]** or **[BLUE]** and adjust the vertical bow using [←] or [→] arrow key.

! [1]Pressing the left or right arrow key will automatically select the VERTICAL SKEW and BOW operation which moves and highlights the center axis of the projected image.

7.2.29. . . . . KEY:

FUNCTION: Selects keystone (trapezium) operation.

KEYSTONE OPERATION:

☐ **Static Keystone:** (Registration "OFF") Pressing **[STATIC]**, then **[KEY]** will select the static keystone operation for Master (GREEN) which provides adjustment of the total image. Use the [←] or [→] arrow keys to adjust.

☐ **Keystone Edges:** Pressing **[GREEN]**, an EDGE control, then **[KEY]** will select the master keystone operation for the selected TOP or BOTTOM edge, adjusted by the [↑] and [↓] arrow keys, or LEFT or RIGHT edge control, which is adjusted by the [←] or [→] arrow keys. Highlights the selected edge of the image.

☐ **Keystone Quadrants:** Pressing **[RED]**, **[GREEN]** or **[BLUE]**, a QUADRANT control then **[KEY]** will select the color and keystone operation for the selected TOP LEFT, TOP RIGHT, BOTTOM LEFT or BOTTOM RIGHT quadrant of the projected image and highlight the selected quadrant. Utilize the [↑] and [↓] arrow keys to adjust for the vertical keystones and the [←] or [→] arrow keys to adjust for the horizontal keystones.

7

! Red and Blue operate on QUADRANTS. If an EDGE is selected for RED or BLUE key, the display will prompt, [SELECT QUADRANT].

7.2.30. . . . . .PIN:

FUNCTION: Selects pincushion operation.

PINCUSHION OPERATION:

☐ **Static Pincushion:** (Registration "OFF") Pressing **[STATIC]**, then **[GREEN]** will select static pincushion operation for Master (Green) which provides adjustment of the total image. Use the [←] and [→] arrow keys to adjust.

! The quadrant and edge controls are inactive in the static mode of operation.

☐ **Pincushion Edges:** Pressing **[GREEN]**, an EDGE control, then **[PIN]** will select master pincushion operation for the selected TOP, BOTTOM, LEFT or RIGHT edge of the projected image and highlight the selected edge of the image. Use the [↑] and [↓] arrows for the TOP/BOTTOM pincushions and the [←] and [→] arrows for the LEFT/RIGHT pincushions

☐ **Pincushion Quadrants:** Pressing **[RED]**, **[GREEN]** or **[BLUE]** a QUADRANT control, then **[PIN]** will select color and pincushion operation for the selected TOP LEFT, TOP RIGHT, BOTTOM LEFT or BOTTOM RIGHT and highlight the selected quadrant. Use the [↑] and [↓] arrows adjust the horizontal pincushions and use the [←] and [→] arrows adjust the vertical pincushions.

7.2.31. . . . . SIZE:

FUNCTION: Selects the height and width operations.

MASTER SIZE OPERATION:

☐ Press **[STATIC]**, then **[SIZE]** to perform the master size operations. Use the [←] and [→] to adjust the image width and the [↑] and [↓] to adjust the image height.

EDGE SIZE OPERATION:

☐ Press **[RED]**, **[GREEN]** or **[BLUE]**, **[SIZE]**, then an EDGE control to perform individual edge size operations.

☐ **Width:** After selecting a *color* and **[SIZE]**, select **[LEFT]** or **[RIGHT]**edge and use the [←] and [→] arrow keys to perform the edge size operation for the selected color and edge.

☐ **Height:** After selecting a *color* and **[SIZE]** select **[TOP]** or **[BOTTOM]** edge and use the [↑] and [↓] arrow keys to perform the edge size operation for the selected color and edge.

7.2.32. . . . . .LIN:

FUNCTION: Selects vertical and horizontal linearity operations.

MASTER LINEARITY:

☐ Pressing **[STATIC]**, then **[LIN]** will select Master Vertical linearity operation. Use the [↑] or [↓] arrows to adjust.

! Master linearity will highlight the entire image and ignore quadrant and edge controls
Master horizontal linearity has been preset at the factory and is not adjustable with the remote control.

LINEARITY (EDGES):

☐ Pressing **[RED]**, **[GREEN]** or **[RED]**, then **[LIN]**, then an EDGE control will select individual edge linearity operations.

☐ After selecting a *color* and **[LIN]**, press **[LEFT]** or **[RIGHT]** to select LEFT or RIGHT edge and adjust horizontal linearity by using the [←] or [→] arrow.

☐ After selecting a *color* and **[LIN]**, press **[TOP]** or **[BOTTOM]** to select TOP or BOTTOM edge and adjust vertical linearity by using the [↑] and [↓] arrows.

7.2.33. . . . . .EDGE:

FUNCTION: Selects edge linearity operations.

☐ Press **[RED]**, **[GREEN]** or **[BLUE]**, **[EDGE]** then **[LEFT EDGE]** or **[RIGHT EDGE]** control.

! The EDGE function effects only the OUTER RIGHT or OUTER LEFT edges of image.

☐ **Horizontal Edge Linearity:** After selecting a *color* and **[EDGE]**, select **[LEFT EDGE]** or **[RIGHT EDGE]** edge to select Horizontal Linearity operation and use the [←] and [→] arrow keys to adjust.

NOTES:

Section 8

Internal Help Menus

Registration Procedures

8.1 .....Internal Help Menus:

Incorporated in the AMPRO display systems are several on-board help menus. The internal menus are provided to inform and guide you through the operation and setup of the system. To enable the internal help programs simply press the **[HELP]** button and select the topic of your choice. Shown below is the main menu and selections with a brief description of each.

8.1.1 .....Main Index Menu:

The index menu is provided to select a particular chapter/subject. The main menu contains the following subjects. Refer to Figure 8-1.

8.1.2 .....How To Use The Help System:(SELECTION 1):

AMPRO PROJECTION SYSTEMS
525 JOHN RODES BOULEVARD
MELBOURNE, FLORIDA 32934 U.S.A.
PHONE: (407) 254-3000 FAX: (407) 253-3001

MAIN MENU

(1).....HOW TO USE THE HELP SYSTEM

(2).....SYSTEM SETUP MENU

(3).....NUMERIC CODE SUMMARY

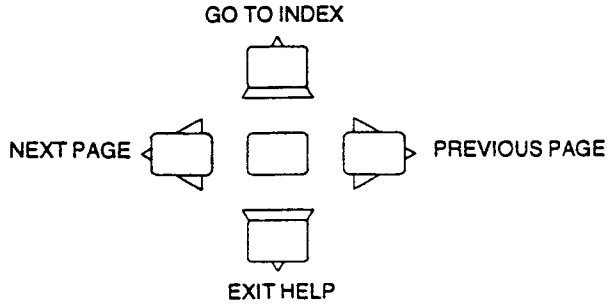
(4).....MAGNETIC FOCUS INSTRUCTIONS

(5).....HELP SCREEN ADJUSTMENT PAGE

V EXIT HELP PRESS 1 THROUGH 5 TO SELECT

FIGURE 8-1. HELP SYSTEM MAIN MENU.

This selection will give you the basic instruction on how to use the internal help system. The active keys in the Help program (*except for the Complete Guided Setup program*)are:



8.1.3 . . . . . System Setup Menu (SELECTION 2):

This selection brings up a menu for the selections on various registration operations. While in this sub-menu select one of the following topics. See Figure 8-2.

☐ 1. GUIDED SETUP PROGRAM(S) WITH INSTRUCTIONS: Enables the guided setup program with prerequisite instructions prior to entering the selection of the various setup programs .

☐ 2. GUIDED SETUP PROGRAMS WITHOUT INSTRUCTIONS: This selection will bypass the prerequisite instructions and bring you directly to the selection of the various setup programs.

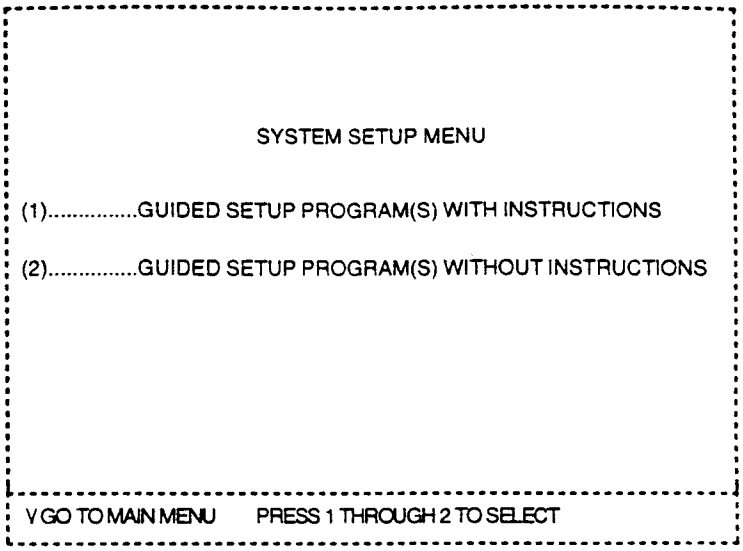


FIGURE 8-2. SYSTEM SETUP MENU.

8

8.1.4 . . . . . .Numeric Code Summary: (SELECTION 3):

This selection from the main menu will provide two screens for a quick reference of the internal code commands.

8.1.5 . . . . . .Magnetic Focus Instructions: (SELECTION 4):

This selection again from the main menu will provide on screen instruction for performing the STATIC and DYNAMIC magnetic focus controls.

8.1.6 . . . . . .Help Screen Adjustment Page: (SELECTION 5):

The help screen(s) text are given an individual channel location. Actual channel selection (channel number) is done automatically as soon as the **[HELP]** button is pressed. Since the help screens are placed within a phantom channel (*a channel that cannot be directly accessed*) and for this reason it may become necessary to perform the image quality and geometry adjustments. All adjustments can be made using the random setup method.

! You may copy a previously setup channel operating at the same frequency (≈ 19kHz) into the help channel for a quicker setup.

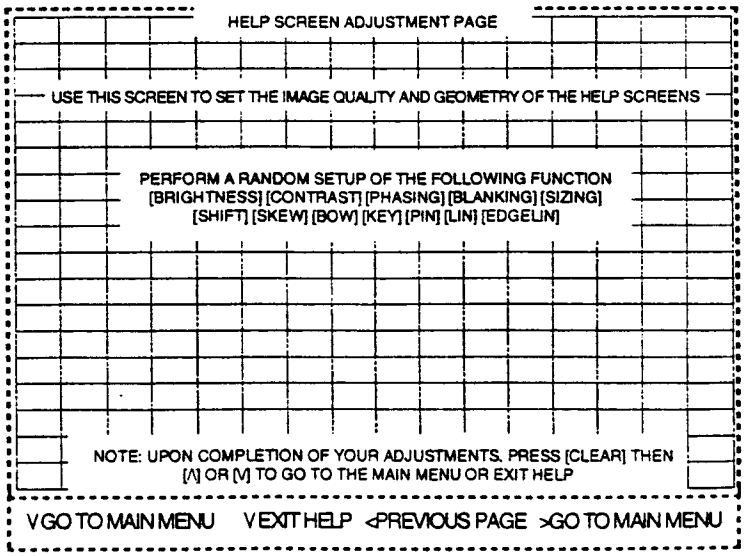
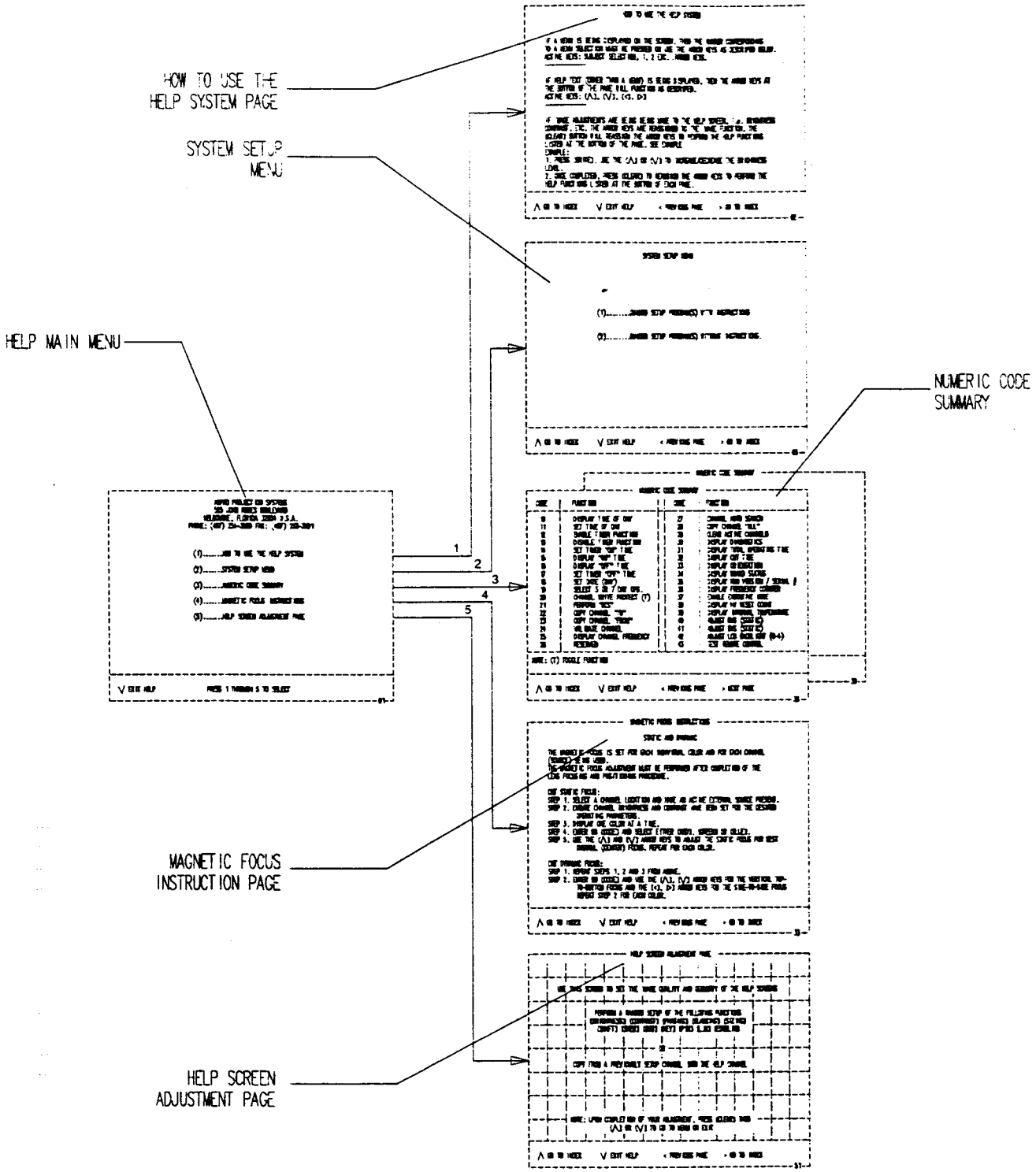
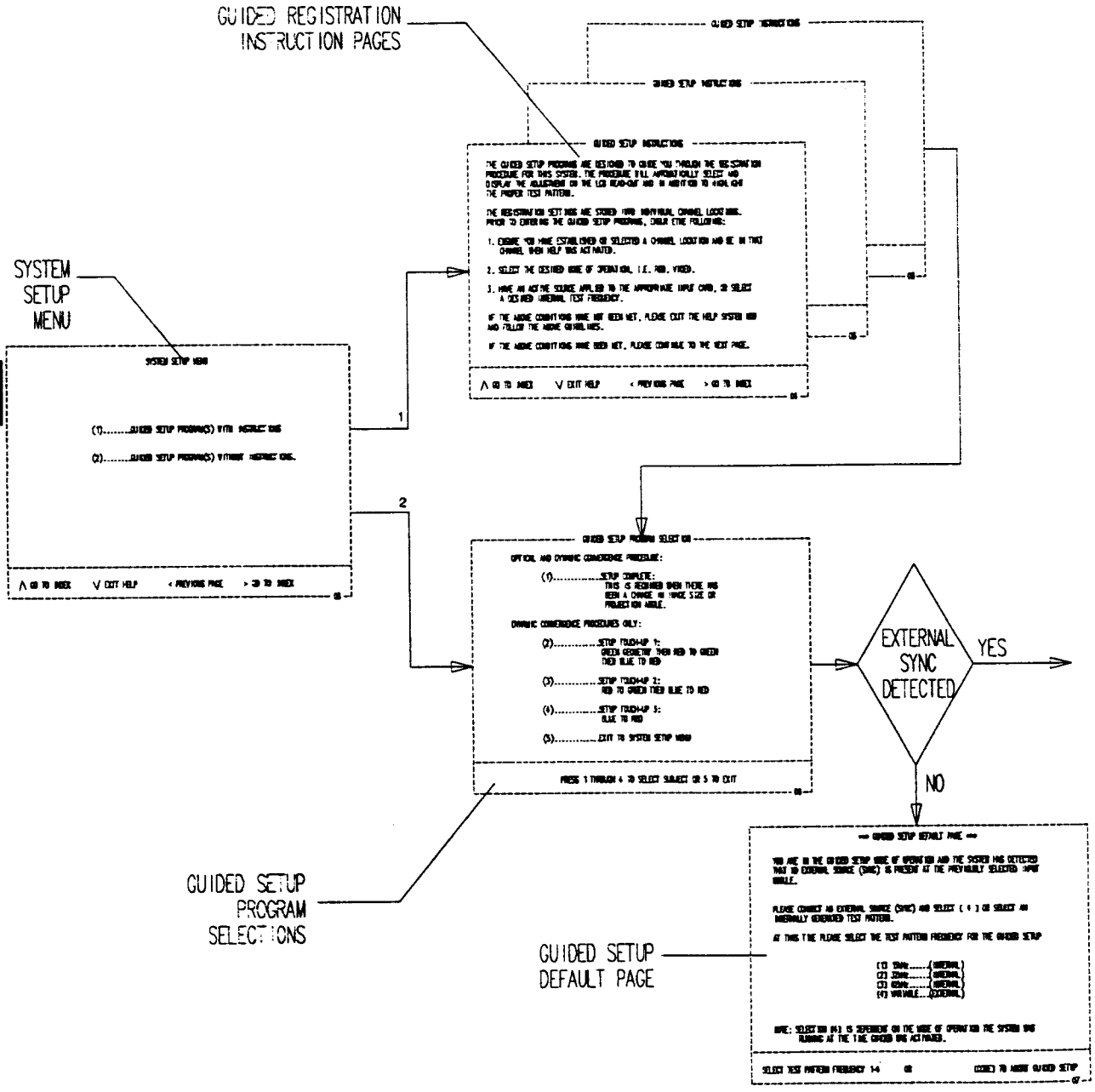


FIGURE 8-3. SYSTEM SETUP MENU.

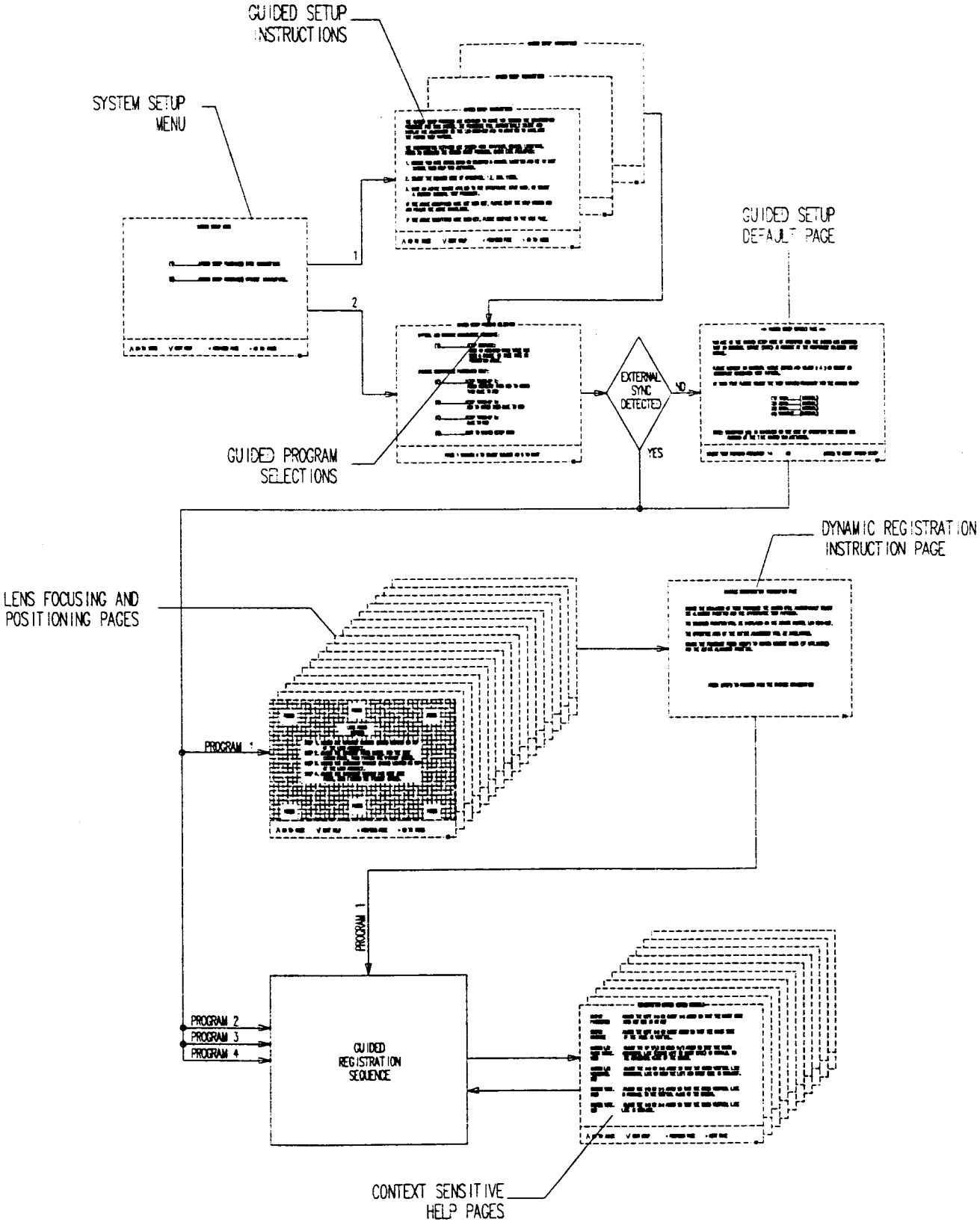
8.1.7 . . . . . Internal Help System Flow Chart 1: MAIN MENU SELECTIONS



8.1.8 . . . . . Internal Help System Flow Chart 2: SYSTEM SETUP MENU



8.1.9 . . . . . Internal Help System Flow Chart 3: GUIDED SETUP PROGRAMS



8.2. .....Registration As A Channel Parameter:

All registration functions are handled as individual channel parameters. This will allow you to precisely set each individual source for optimum registration. To perform a random setup of a new, or modify an existing channel location, the following conditions must exist prior to building or changing parameters of a channel.

- STEP 1. Select the channel you wish to adjust, i.e., **[1] [CHANNEL]**, **[2] [CHANNEL]**, etc.
- STEP 2. For building a new channel, select the appropriate mode of operation, i.e., RGB, VIDEO etc.
- STEP 3. If the channel had been previously built and write-protected, enter **[20] [CODE]** to toggle the write- protect "OFF" , this will allow you to make the adjustments you want to make.
- STEP 4. Select the test function method, i.e. Internal Test/Internal Sync or Internal Test/External Sync or an independent test pattern externally generated applied to the appropriate card (slot).
- STEP 5. Perform the necessary changes or setup as outlined in Sections 8.4.1.1 and 8.4.1.2, or use one of the copy channel commands, or the "A.C.S." command, refer to Section 7.

! Channel settings such as brightness, contrast, detail, tint, color and phasing will have to be made while the active source is being displayed.

8

8.2.1 .....Factory Aligned Channel Settings:

To provide a quick start with your registration alignment and channel settings, several Video/RGB formats have been pre-aligned at the factory. All pre-aligned channels are based on a 60in.(H) x 80in. (W) screen size and have been validated and write-protected (24 [CODE]). You can use these pre-aligned channels with the various copy channel commands, such as "PERFORM A.C.S." or the copy "TO" and "FROM" commands. See Section 7 for more information on CODES.

CHANNEL	CHANNEL PARAMETER	CHANNEL	CHANNEL PARAMETER	CHANNEL	CHANNEL PARAMETER	CHANNEL	CHANNEL PARAMETER
1 - 39	RGB (31.5kHz)	42	Optional Inputs*	45	RGB(31.5kHz)	48	RGB (64kHz)
40	Optional Inputs*	43	Video (15kHz)	46	RGB(36.5kHz)	49	RGB (72kHz)
41	Optional Inputs*	44	RGB (15kHz)	47	RGB (56kHz)	50	RGB (93kHz)

8.2.2 .....Automatic Convergence Scaling (A.C.S.):

A.C.S. provides the display system with the ability to calculate registration settings for a new channel setup by interpolating between existing data of higher "validated channels"[1] and lower validated channels.

A.C.S. first scans the table of validated channels for matching horizontal and vertical frequencies of the new source. If a match exist, A.C.S. will copy the matched channel data into the new channel location. If no matches exist, then A.C.S. uses the horizontal frequency of validated channels directly lower and higher than the new or present channel to interpolate the new setup data. In the event that the table of validated channels contains more than one validated channel with the same horizontal frequency, A.C.S. will then reference the vertical frequency of the new source against the vertical frequency of the validated channels to decide on the best channel to use. If no matches or higher/lower validated channels exist, A.C.S. will display "NO VALIDATED DATA. See flow chart opposite page.

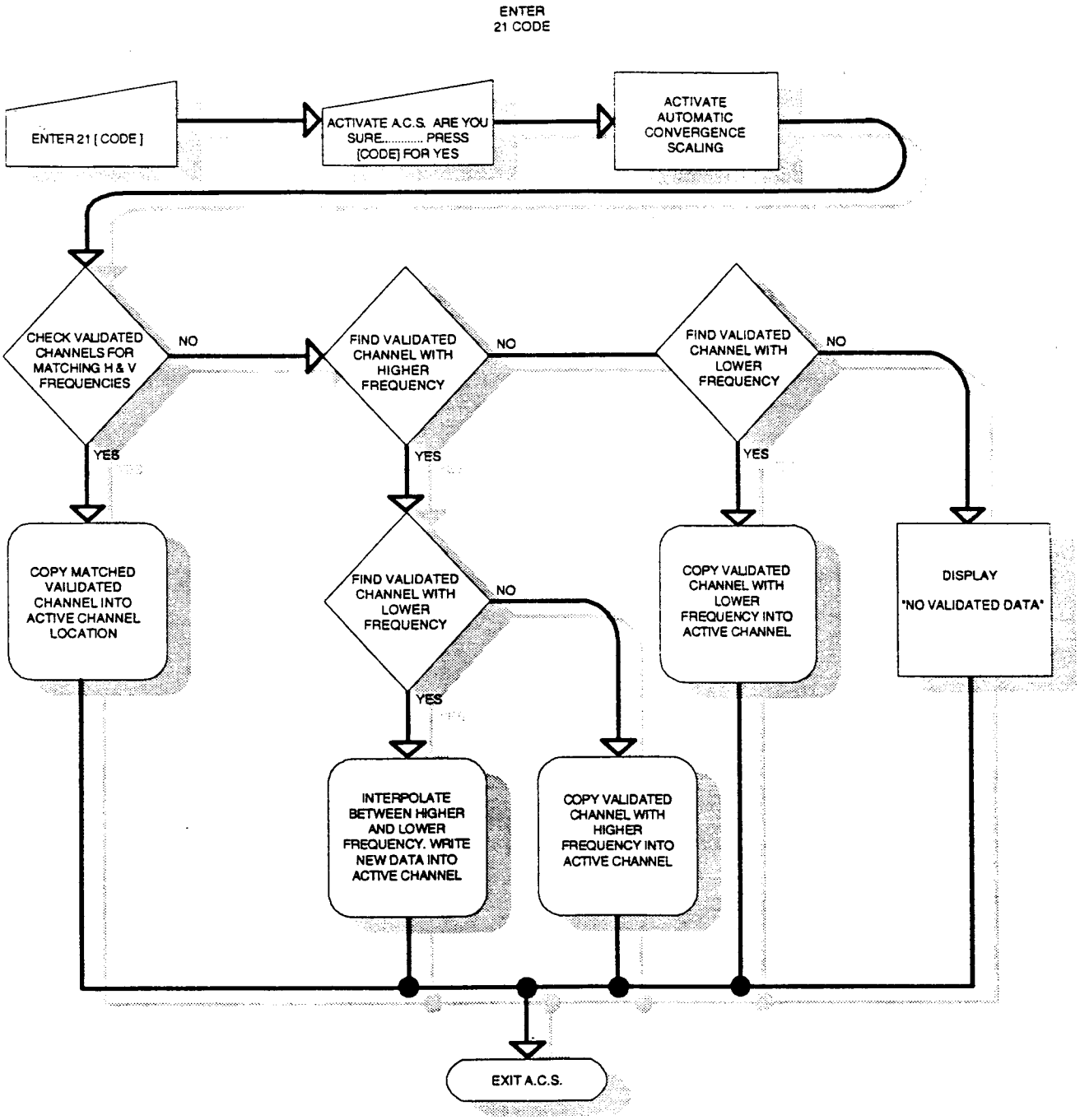
! NOTE: The greater the number of validated channels, the more accurate A.C.S. will work.

[1]Validated Channels; are channels that has been previously setup and saved by using **24 [CODE]**

8.2.2 . . . . . Automatic Convergence Scaling (A.C.S.): (CONTINUED)

To use the A.C.S., establish (select) a new channel location, including mode of operation, connect your source to the appropriate input module, and enter the A.C.S. command **21 [CODE]**. Once the translation is completed, you may be required to fine tune the registration by performing a random or guided setup.

8.2.2.1 . . . . . .Automatic Convergence Scaling Logic Flow Chart:



8.3 . . . . . Registration Procedures:

The registration of the system can be divided into four stages in the following order;

- ☐ **STAGE 1**: Focus and positioning of the lenses.
- ☐ **STAGE 2**: Sizing and optimizing the geometry of the GREEN image.

! All adjustments being made to the Green image will simultaneous effect the Red and Blue images.

- ☐ **STAGE 3**: Align the RED image to exactly overlay the GREEN image.
- ☐ **STAGE 4**: Align the BLUE image to exactly overlay the RED image.

8.4 . . . . . .Registration Preface:

This section of the manual is sequenced in such a way as to optimize the registration operation of this system. The information provided in the registration sequence block will indicate the registration sequence number, function identification, proper function selection (keystrokes), provides the required test pattern and appropriate adjustment keys. Please refer to example below:

8

! This section of the manual makes the assumption that the system has been installed and positioned properly in accordance with the guidelines set forth by the end-user. Additionally, perform the lens focusing and positioning prior to making any registration settings.

! If Horizontal and/or Vertical Sweep reversal has been performed, it may be necessary (or easier) to reset the registration functions by performing a "null channel" using command....29 [**CODE**].

! **REMEMBER !** Switch between course and fine adjustment mode using the **[COARSE / FINE]** button.

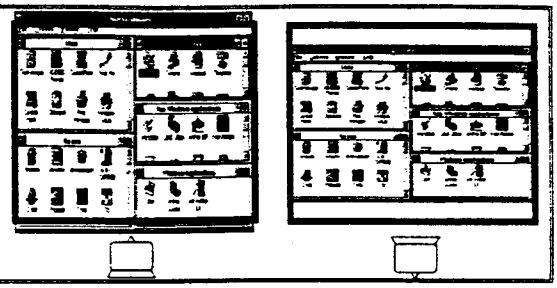
STEP 29. BOTTOM LEFT VERTICAL KEYSTONE	
Use the UP or DOWN arrow keys and adjust until the bottom horizontal line in the lower left quadrant is straight and overlays the reference color.	
REMOTE CONTROL KEYSTROKES:	
RED BLUE KEY	

*TEST PATTERN SHOWN MAY VARY DEPENDING UPON THE SPECIFIC ADJUSTMENT FUNCTION, REQUIREMENTS AND OPTIONS INSTALLED.

8.4.1 . . . . . Registration Procedure/Sequence:

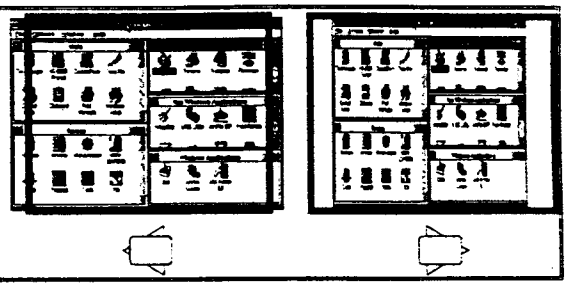
8.4.1.1 . . . . . .Master (GREEN) Image Adjustments:

STEP 1. MASTER VERTICAL SIZE:
Use the UP or DOWN arrow keys and adjust until the proper height is achieved. DO NOT OVER-SCAN THE FACE OF THE CRT.
REMOTE CONTROL KEYSTROKES:
STATIC [ ] **SIZE** [ ]

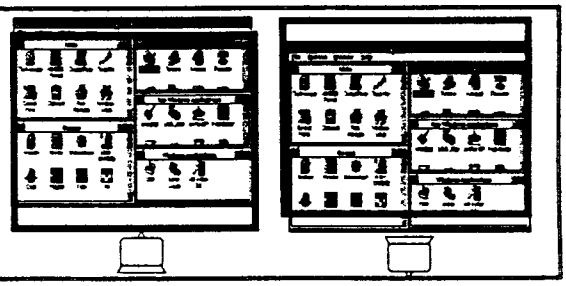


▫ NOTE: BLACK BORDER REPRESENTS SCREEN.

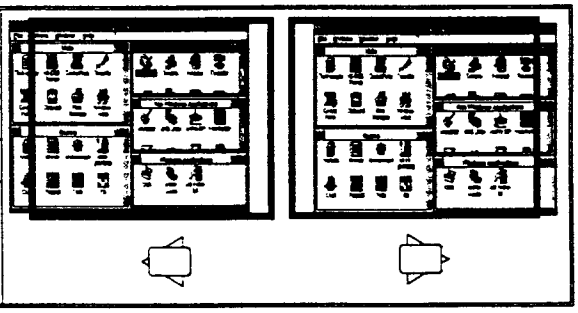
STEP 2. MASTER HORIZONTAL SIZE:
Use the LEFT or RIGHT arrow keys and adjust until the proper width is achieved. DO NOT OVER-SCAN THE FACE OF THE CRT.
REMOTE CONTROL KEYSTROKES:
STATIC [ ] **SIZE** [ ]



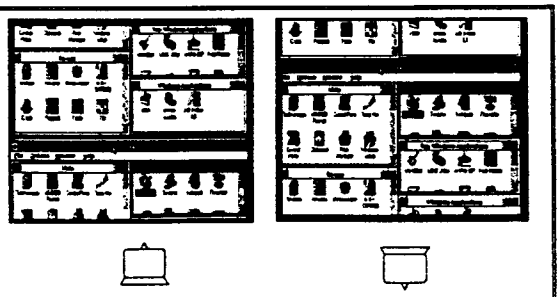
STEP 3. MASTER VERTICAL SHIFT:
Use the UP or DOWN arrow keys and adjust the image until it is centered on the screen. Do not over-scan the face of the CRT.
REMOTE CONTROL KEYSTROKES:
STATIC [ ] **SHIFT** [ ]



STEP 4. MASTER HORIZONTAL SHIFT
Use the LEFT and RIGHT arrow keys and adjust until the image is centered on the screen left to right. DO NOT OVERSCAN THE FACE OF THE CRT
REMOTE CONTROL KEYSTROKES:
STATIC [ ] **SHIFT** [ ]



STEP 5. VERTICAL PHASE[1]
Set the top blanking to minimum and bottom blanking to maximum. Using the UP and DOWN arrow keys, adjust until the image is centered within the screen area or until no top/bottom wrap-around occurs.
REMOTE CONTROL KEYSTROKES:
PHASE [ ]



[1] IF YOU ARE UTILIZING A COMPUTER INTERFACE AND IF AVAILABLE, VERIFY THE VERTICAL POSITIONING SETTING.

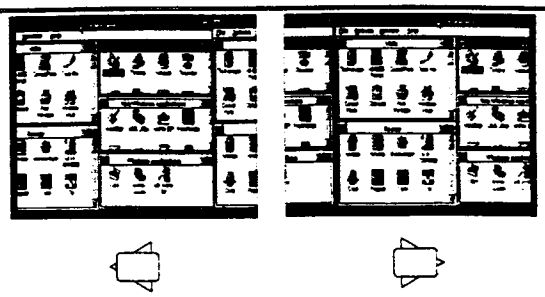
8.4.1.1 . . . . Master (GREEN) Image Adjustments: (CONTINUED)

STEP 6. HORIZONTAL PHASE[1]

Set right blanking to maximum and left blanking to minimum. Using the LEFT and RIGHT arrow keys, adjust until the external video is centered within the screen area left to right or until no wrap-around occurs.

REMOTE CONTROL KEYSTROKES:

PHASE



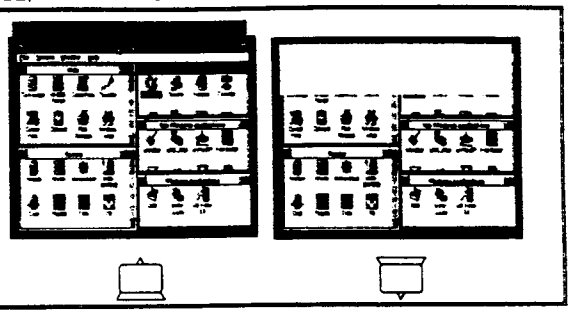
[1]IF YOU ARE UTILIZING A COMPUTER INTERFACE AND IF AVAILABLE, VERIFY THE VERTICAL POSITIONING SETTING.

STEP 7 TOP BLANKING

Using the UP and DOWN arrow keys, adjust the top blanking until all of the video picture is visible or until unwanted raster or noise is removed from the top of the projected image.

REMOTE CONTROL KEYSTROKES:

BLANK



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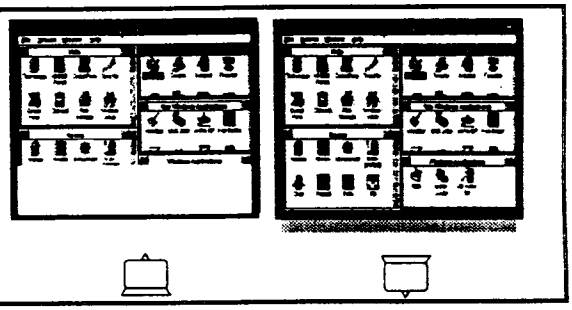
STEP 8. BOTTOM BLANKING

Using the UP and DOWN arrow keys, adjust the bottom blanking until all of the video image is visible or until any unwanted raster or noise is removed from the bottom of the image.

REMOTE CONTROL KEYSTROKES:

BLANK

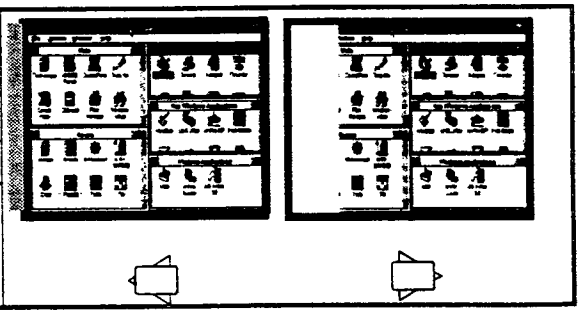


STEP 9. LEFT BLANKING

Use the Left and RIGHT arrow keys and adjust the left blanking until all of the video image is visible or until any unwanted raster or noise is removed.

REMOTE CONTROL KEYSTROKES:

BLANK

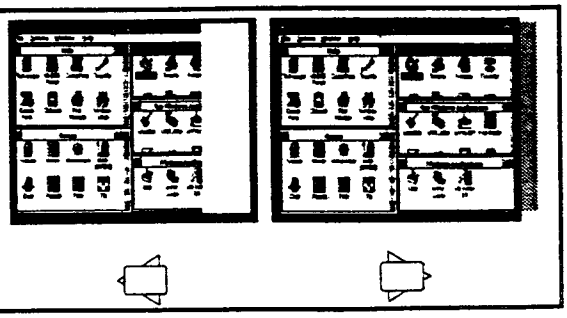


STEP 10. RIGHT BLANKING

Using the LEFT and RIGHT arrow keys, adjust the right blanking until of of the video image is visible or until any unwanted raster or noise is removed.

REMOTE CONTROL KEYSTROKES:

BLANK



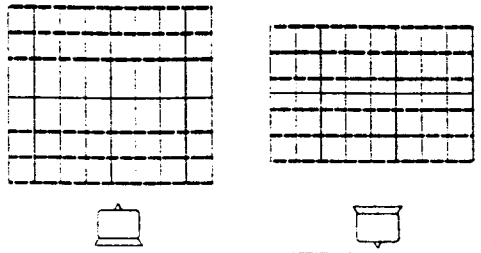
8.4.1.1 . . . . Master (GREEN) Image Adjustments: (CONTINUED)

STEP 11. MASTER VERTICAL LINEARITY (Registration "OFF")

Use the UP or DOWN arrow keys and adjust until the squares are equal in height from top to bottom of the test pattern.

REMOTE CONTROL KEYSTROKES:

STATIC **LIN**



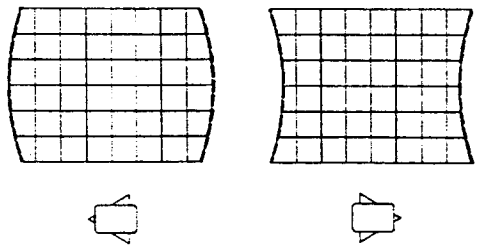
- REPEAT STEPS 3 AND 4 TC RE-CENTER YOUR VIDEO IMAGE.

STEP 12. MASTER STATIC E-W PINCUSHION (Registration "OFF")

Use the LEFT or RIGHT arrow keys and adjust the right edge until it does not bow in or out.

REMOTE CONTROL KEYSTROKES:

STATIC **PIN**

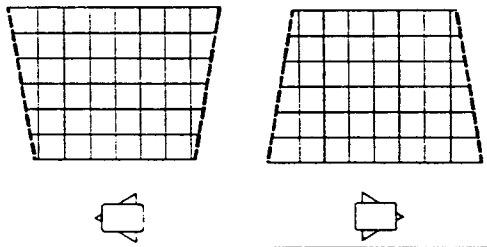


STEP 13. MASTER STATIC E-W KEYSTONE: (Registration "OFF")

Use the LEFT or RIGHT arrow keys and adjust the right edge of the image is parallel with the vertical plane of the screen.

REMOTE CONTROL KEYSTROKES:

STATIC **KEY**

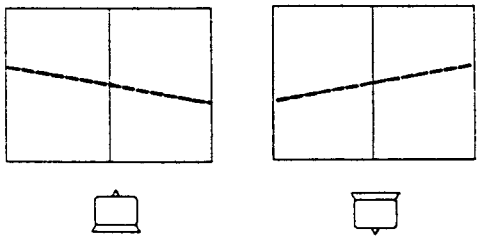


*STEP 14. MASTER HORIZONTAL SKEW:

Use the UP or DOWN arrow keys and adjust the green horizontal center line until it is parallel to the horizontal plane of the screen.

REMOTE CONTROL KEYSTROKES:

GREEN **SKEW**

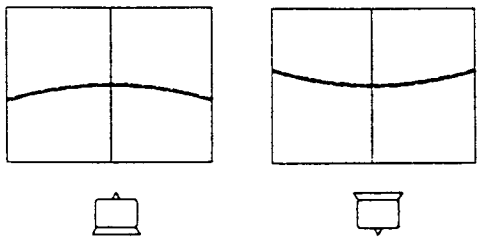


*STEP 15. MASTER HORIZONTAL BOW:

Use the UP or DOWN arrow keys and adjust the green horizontal center line until it is straight.

REMOTE CONTROL KEYSTROKES:

GREEN **BOW**



*WHEN ADJUSTING THE MASTER HORIZONTAL SKEW AND BOW, IT MAY BECOME NECESSARY TO SELECT ANY AREA KEY OTHER THAN LEFT OR RIGHT EDGE TO ENSURE MASTER OPERATION OF THESE FUNCTION.

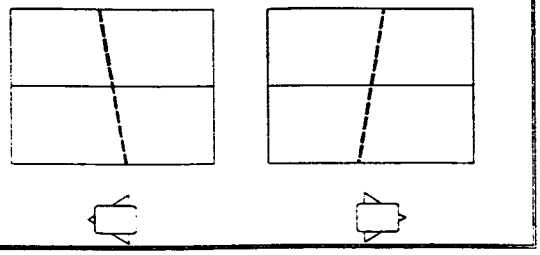
8.4.1.1 . . . . Master (GREEN) Image Adjustments: (CONTINUED)

STEP 16. MASTER VERTICAL SKEW:

Use the LEFT or RIGHT arrow keys and adjust until the center vertical line is parallel to the vertical plane of the screen.

REMOTE CONTROL KEYSTROKES:

GREEN SKEW

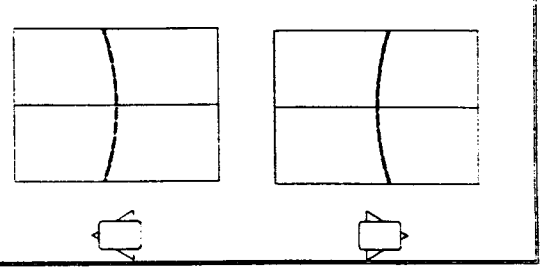


STEP 17. MASTER VERTICAL BOW

Use the LEFT or RIGHT arrow keys until the center vertical is straight and does not bow left or right.

REMOTE CONTROL KEYSTROKES:

GREEN BOW



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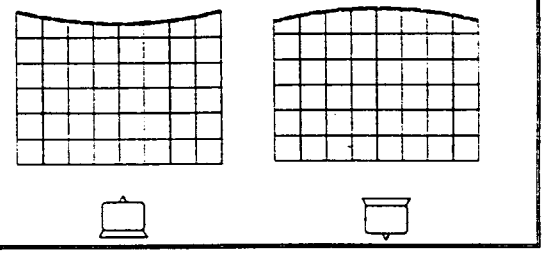
STEP 18. MASTER TOP PINCUSHION

Use the UP or DOWN arrow keys and adjust until the top horizontal line does not bow up or down.

REMOTE CONTROL KEYSTROKES:

GREEN PIN

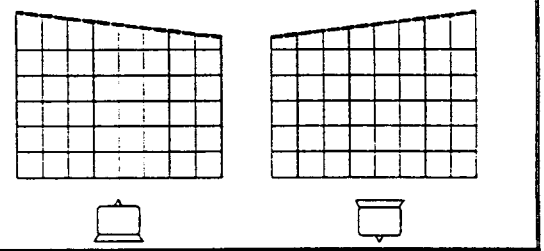


STEP 19. MASTER TOP KEYSTONE:

Use the UP or DOWN arrow keys and adjust until the top horizontal line is parallel with the top edge of the screen.

REMOTE CONTROL KEYSTROKES:

GREEN KEY

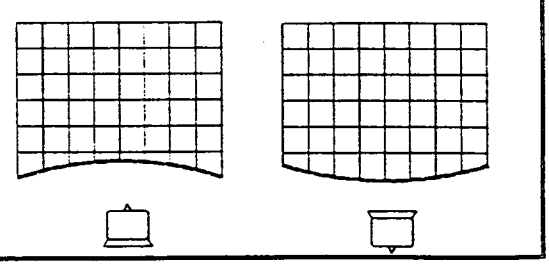


STEP 20. MASTER BOTTOM PINCUSHION:

Use the UP or DOWN arrow keys and adjust the bottom horizontal line until it does not bow up or down.

REMOTE CONTROL KEYSTROKES:

GREEN PIN



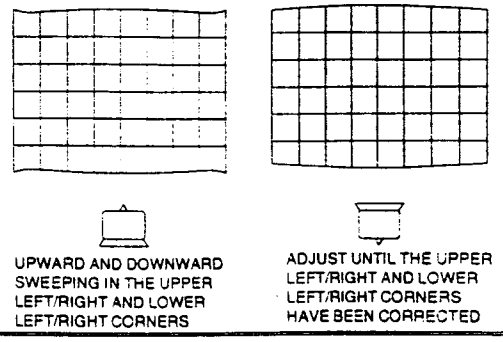
8.4.1.1 . . . . Master (GREEN) Image Adjustments: (CONTINUED)

STEP 21. N-S PINCUSHION (SPECIAL) ENTER 50 [CODE]

Observe the upper left/right and lower left/right corners. Using the UP and DOWN arrow keys, adjust until the corners of the image appear to be straight and flat or produces a geometrical pincushion, then readjust the master top and bottom pincushion to straighten the top and bottom edges.

REMOTE CONTROL KEYSTROKES:

5 0 CODE

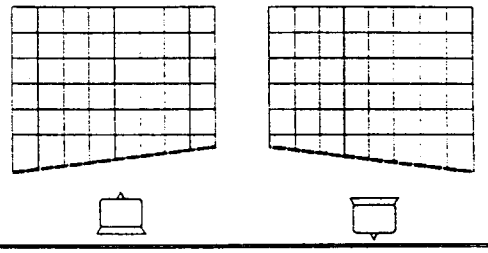


STEP 22. MASTER BOTTOM KEYSTONE

Use the UP or DOWN arrow keys and adjust the bottom horizontal line until it is parallel to the bottom horizontal edge of the screen.

REMOTE CONTROL KEYSTROKES:

GREEN KEY

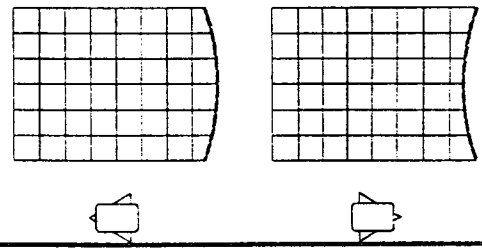


STEP 23. MASTER RIGHT PINCUSHION:

Use the LEFT or RIGHT arrow keys and adjust until the right edge of the image does not bow in or out.

REMOTE CONTROL KEYSTROKES:

GREEN PIN

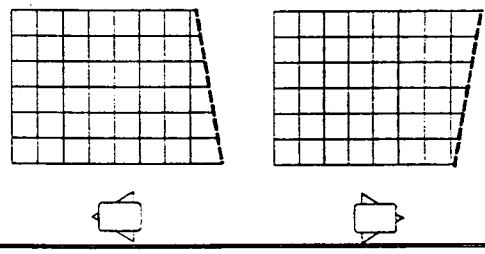


STEP 24. MASTER RIGHT KEYSTONE:

Use the LEFT or RIGHT arrow keys and adjust the right outermost vertical line until it is parallel to the vertical edge of the screen.

REMOTE CONTROL KEYSTROKES:

GREEN KEY

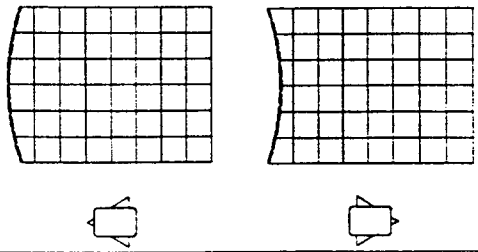


STEP 25. MASTER LEFT PINCUSHION:

Use the LEFT or RIGHT arrow keys and adjust the left edge of the image until it does not bow in or out.

REMOTE CONTROL KEYSTROKES:

GREEN PIN



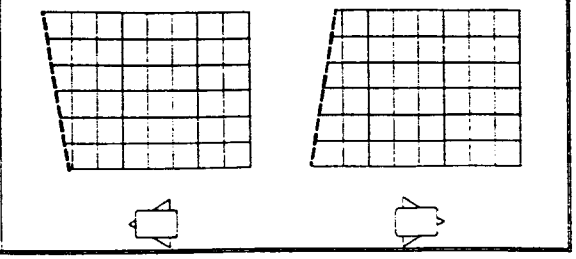
8.4.1.1 . . . . Master (GREEN) Image Adjustments: (CONTINUED)

STEP 26. MASTER LEFT KEYSTONE:

Use the LEFT or RIGHT arrow keys and adjust the left outermost vertical line until it is parallel to the vertical edge of the screen

REMOTE CONTROL KEYSTROKES:

GREEN KEY

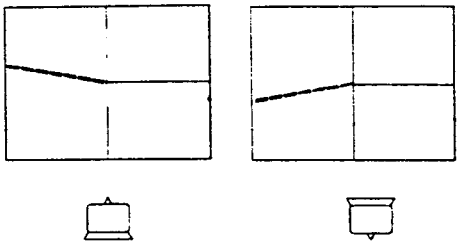


STEP 27. MASTER LEFT HORIZONTAL SKEW

Use the UP and DOWN arrow keys and adjust until the center horizontal line on the left edge is parallel to the screen or until the desired effect is achieved.

REMOTE CONTROL KEYSTROKES:

GREEN SKEW



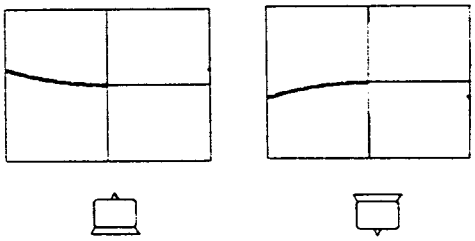
8

STEP 28. MASTER LEFT BOW

Use the UP and DOWN arrow keys and adjust until the center horizontal line on the left edge is straight or until the desired effect is achieved.

REMOTE CONTROL KEYSTROKES:

GREEN BOW



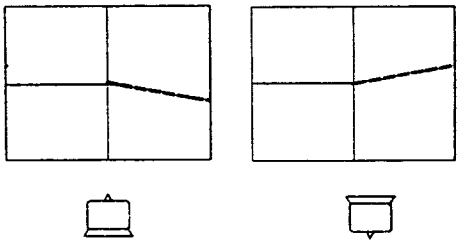
- REPEAT STEPS 27 AND 28 TO OPTIMIZE THE LEFT HORIZONTAL CENTER LINE.

STEP 29. MASTER RIGHT SKEW

Use the UP and DOWN arrow keys and adjust until the center horizontal line on the right edge is parallel to the screen or until the desired effect is achieved.

REMOTE CONTROL KEYSTROKES:

GREEN SKEW

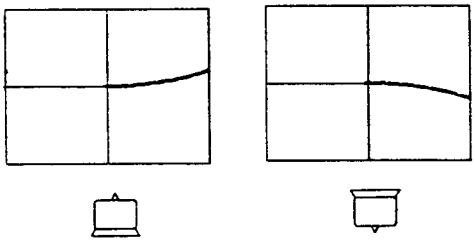


STEP 30. MASTER RIGHT BOW

Use the UP and DOWN arrow keys and adjust until the center horizontal line on the right edge is straight or until the desired effect is achieved.

REMOTE CONTROL KEYSTROKES:

GREEN BOW



- REPEAT STEPS 29 AND 30 TO OPTIMIZE THE RIGHT HORIZONTAL CENTER LINE.

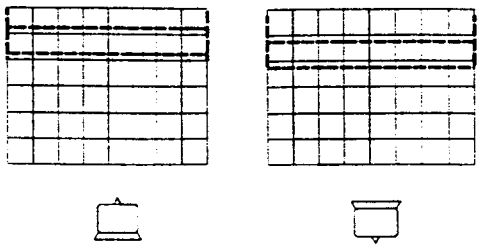
8.4.1.1 .....MASTER (GREEN) IMAGE ADJUSTMENTS (CONTINUED):

STEP 31. MASTER TOP VERTICAL HEIGHT:

Use the UP or DOWN arrow keys and adjust until the squares at the inner 2/3 of the top half are equal in height to the inner 2/3 of the bottom half or until the desired effect is achieved.

REMOTE CONTROL KEYSTROKES:

GREEN SIZE

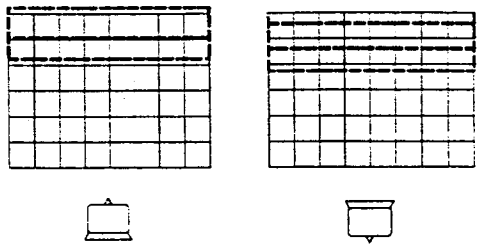


STEP 32. MASTER TOP VERTICAL LINEARITY:

Use the UP and DOWN arrow keys and adjust until the outer most squares at the top edge are equal in height to the squares at the bottom edge or until the desired effect is achieved.

REMOTE CONTROL KEYSTROKES:

GREEN LIN



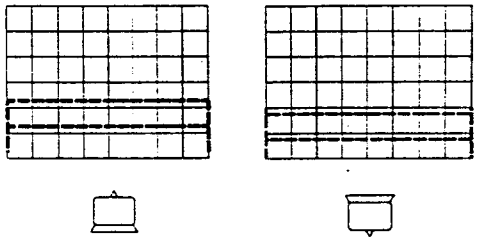
- REPEAT STEPS 31 AND 32 TO OPTIMIZE THE TOP EDGE.

STEP 33. MASTER BOTTOM VERTICAL HEIGHT:

Use the UP and DOWN arrow keys and adjust until the squares at the inner 2/3 of the bottom half are equal in height to the squares at the inner 2/3 of the top half or until the desired effect is achieved.

REMOTE CONTROL KEYSTROKES:

GREEN SIZE

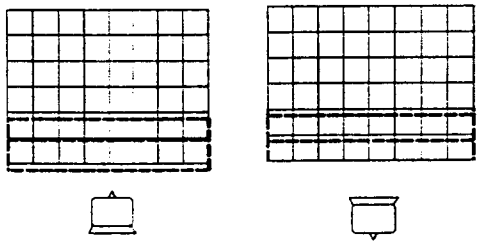


STEP 34. MASTER BOTTOM VERTICAL LINEARITY:

Use the UP and DOWN arrow keys and adjust until the outer squares on the bootom edge are equal in height to the squares at the outer top half or until the desired effect is achieved.

REMOTE CONTROL KEYSTROKES:

GREEN LIN



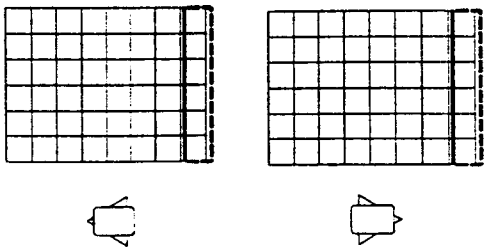
- REPEAT STEPS 33 AND 34 TO OPTIMIZE THE BOTTOM EDGE.

STEP 35. MASTER RIGHT HORIZONTAL EDGE LINEARITY:

Use the LEFT and RIGHT arrow keys and adjust until the outermost squares on the right edge are equal in width to the squares from center to right. **SEE STEPS 36 AND 37.**

REMOTE CONTROL KEYSTROKES:

GREEN EDGE



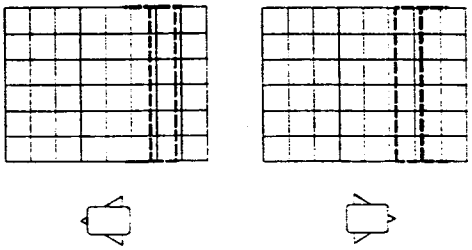
8.4.1.1 . . . . MASTER (GREEN) IMAGE ADJUSTMENTS (CONTINUED):

STEP 36. MASTER RIGHT HORIZONTAL WIDTH:

Use the LEFT or RIGHT arrow keys and adjsut the right inner 2/3 until the squares from center to right are equal in width or until the desired effect is achieved. **SEE STEPS 35 AND 37.**

REMOTE CONTROL KEYSTROKES:

GREEN **SIZE**

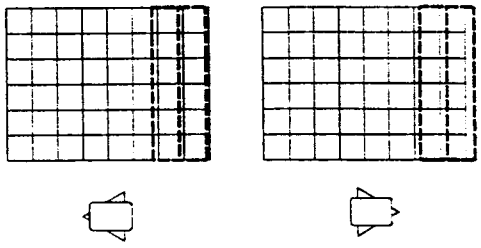


STEP 37. MASTER RIGHT HORIZONTAL LINEARITY:

Use the LEFT and RIGHT arrow keys and adjust until the squares on the right edge from center to right are eqaul in width or until the desired effect is achieved. **SEE STEP 35 AND 36.**

REMOTE CONTROL KEYSTROKES:

GREEN **LIN**



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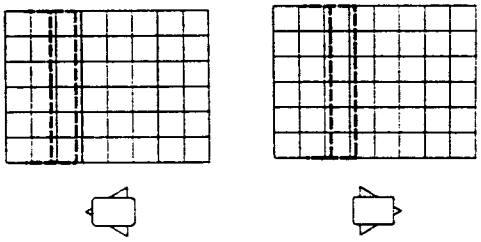
- REPEAT STEPS 35, 36 AND 37 TO OPTIMIZE THE RIGHT EDGE.

STEP 38. MASTER LEFT HORIZONTAL WIDTH:

Use the LEFT or RIGHT arrow keys and adjust the left inner 2/3 until the squares from center to left are equal in width or until the desired effect is achieved. **SEE STEPS 39 AND 40.**

REMOTE CONTROL KEYSTROKES:

GREEN **SIZE**

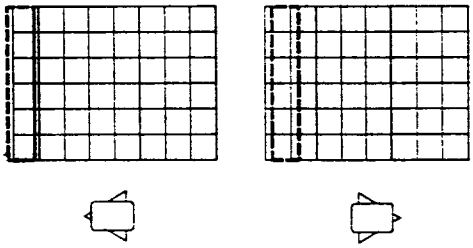


STEP 39. MASTER LEFT HORIZONTAL EDGE LINEARITY:

Use the LEFT and RIGHT arrow keys and adjust until the outermost squares on the left edge are equal in width to the squares from center to left. **SEE STEPS 38 AND 40.**

REMOTE CONTROL KEYSTROKES:

GREEN **EDGE**

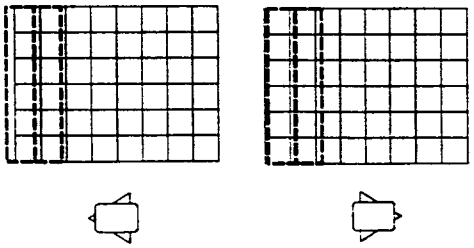


STEP 40. MASTER LEFT HORIZONTAL LINEARITY:

Use the LEFT and RIGHT arrow keys and adjust until the squares on the left edge from center to left are eqaul in width or until the desired effect is achieved. **SEE STEP 38 AND 39.**

REMOTE CONTROL KEYSTROKES:

GREEN **LIN**



- REPEAT STEPS 38, 39 AND 40 TO OPTIMIZE THE LEFT EDGE.

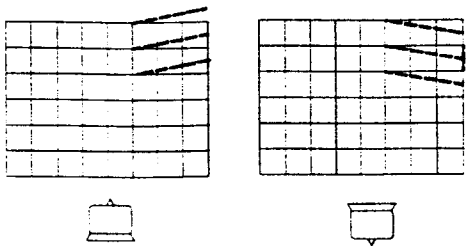
8.4.1.1 . . . . MASTER (GREEN) IMAGE ADJUSTMENTS (CONTINUED):

STEP 41. MASTER TOP RIGHT VERTICAL KEYSTONE:

Use the UP and DOWN arrow keys and adjsut until the top horizontal line in the upper right quadrant is straight. **SEE STEP 42.**

REMOTE CONTROL KEYSTROKES:

GREEN **KEY**

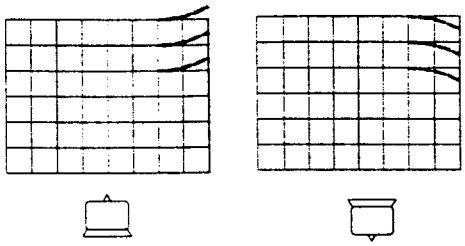


STEP 42. MASTER TOP RIGHT VERTICAL PINCUSHION:

Use the UP and DOWN arrow keys and adjust until the top horizontal line in the upper right quardant does not bow up or down. **SEE STEP 41.**

REMOTE CONTROL KEYSTROKES:

GREEN **PIN**

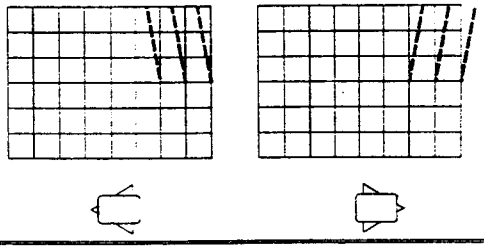


STEP 43. MASTER TOP RIGHT HORIZONTAL KEYSTONE:

Use the LEFT and RIGHT arrow keys and adjust until the outermost vertical line in the upper right quardant is straight and does not tilt in or out. **SEE STEP 44.**

REMOTE CONTROL KEYSTROKES:

GREEN **KEY**

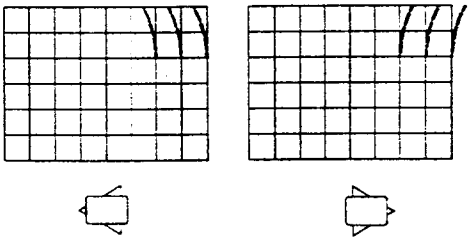


STEP 44. MASTER TOP RIGHT HORIZONTAL PINCUSHION:

Use the LEFT and RIGHT arrow keysd and adjust until the outermost vertical line in the upper right quadrant does not bow in or out. **SEE STEP 43.**

REMOTE CONTROL KEYSTROKES:

GREEN **PIN**



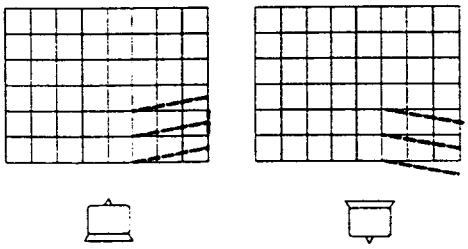
- REPEAT STEPS 41, 42, 43 AND 44 TO OPTIMIZE THE UPPER RIGHT QUADRANT.

STEP 45. MASTER BOTTOM RIGHT VERTICAL KEYSTONE:

Use the UP and DOWN arrow keys and adjust until the bottom horizontal line in the lower right quadrant is straight. **SEE STEP 46.**

REMOTE CONTROL KEYSTROKES:

GREEN **KEY**



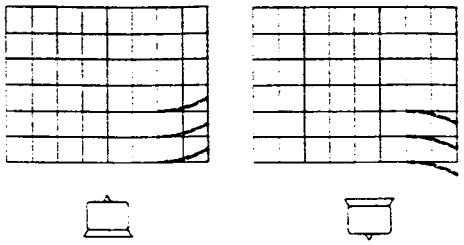
8.4.1.1 . . . . MASTER (GREEN) IMAGE ADJUSTMENTS (CONTINUED):

STEP 46. MASTER BOTTOM RIGHT VERTICAL PINCUSHION:

Use the UP and DOWN arrow keys and adjust until the bottom horizontal line in the lower right quardant does not bow up or down. **SEE STEP 45.**

REMOTE CONTROL KEYSTROKES:

GREEN **PIN**

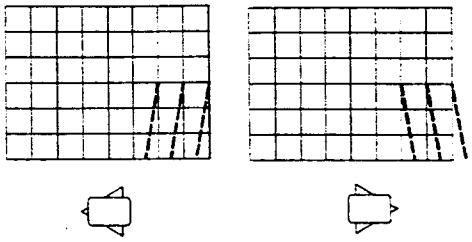


STEP 47. MASTER BOTTOM RIGHT HORIZONTAL KEYSTONE:

Use the LEFT and RIGHT arrow keys and adjust until the outermost vertical line in the lower right quardant is straight and does not tilt in or out. **SEE STEP 48.**

REMOTE CONTROL KEYSTROKES:

GREEN **KEY**



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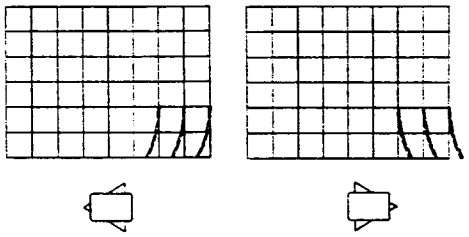
STEP 48. MASTER BOTTOM RIGHT HORIZONTAL PINCUSHION:

Use the LEFT and RIGHT arrow keys and adjust until the outermost vertical line in the lower right quadrant does not bow in or out. **SEE STEP 47.**

REMOTE CONTROL KEYSTROKES:

GREEN **PIN**



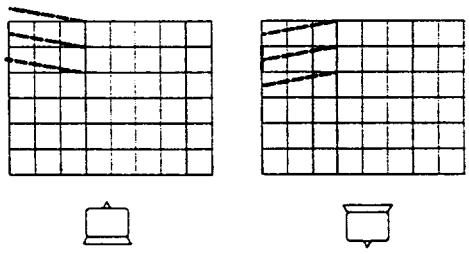
- REPEAT STEPS 45, 46, 47 AND 48 TO OPTIMIZE THE LOWER RIGHT QUARDANT.

STEP 49. MASTER TOP LEFT VERTICAL KEYSTONE:

Use the UP and DOWN arrow keys and adjust until the top horizontal line in the top left quadrant is straight. **SEE STEP 50.**

REMOTE CONTROL KEYSTROKES:

GREEN **KEY**

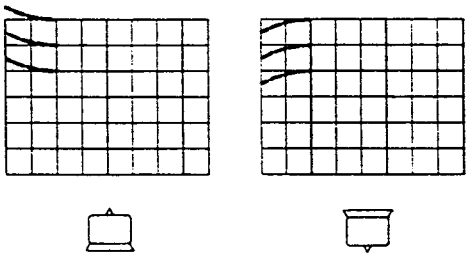


STEP 50. MASTER TOP LEFT VERTICAL PINCUSHION:

Use the UP and DOWN arrow keys and adjust until the top horizontal line in the upper left quardant does not bow up or down. **SEE STEP 49.**

REMOTE CONTROL KEYSTROKES:

GREEN **PIN**



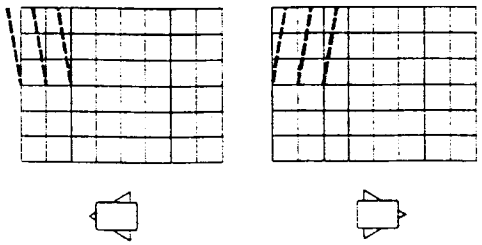
8.4.1.1 . . . . MASTER (GREEN) IMAGE ADJUSTMENTS (CONTINUED):

STEP 51. MASTER TOP LEFT HORIZONTAL KEYSTONE:

Use the LEFT and RIGHT arrow keys and adjust until the outermost vertical line in the upper left quardant is straight and does not tilt in or out. **SEE STEP 52.**

REMOTE CONTROL KEYSTROKES:

GREEN KEY

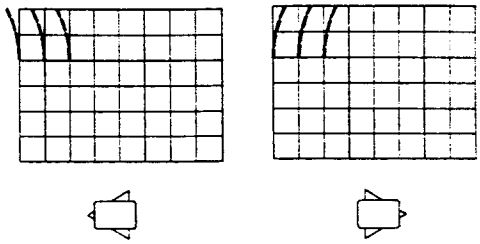


STEP 52. MASTER TOP LEFT HORIZONTAL PINCUSHION:

Use the LEFT and RIGHT arrow keys and adjust until the outermost vertical line in the upper left quadrant does not bow in or out. **SEE STEP 51.**

REMOTE CONTROL KEYSTROKES:

GREEN PIN



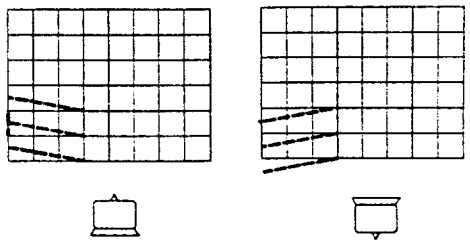
- REPEAT STEPS 49, 50, 51 AND 52 TO OPTIMIZE THE UPPER LEFT QUADRANT.

STEP 53. MASTER BOTTOM LEFT VERTICAL KEYSTONE:

Use the UP and DOWN arrow keys and adjust until the bottom horizontal line in the lower left quadrant is straight and does not tilt up or down. **SEE STEP 54.**

REMOTE CONTROL KEYSTROKES:

GREEN KEY

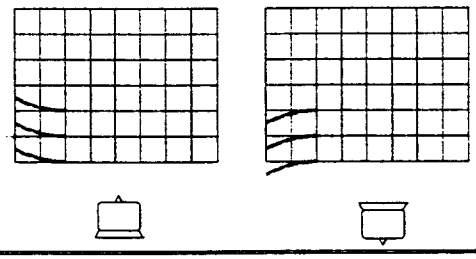


STEP 54. MASTER BOTTOM LEFT VERTICAL PINCUSHION:

Use the UP and DOWN arrow keys and adjust until the bottom horizontal line in the lower left quardant does not bow up or down. **SEE STEP 53.**

REMOTE CONTROL KEYSTROKES:

GREEN PIN

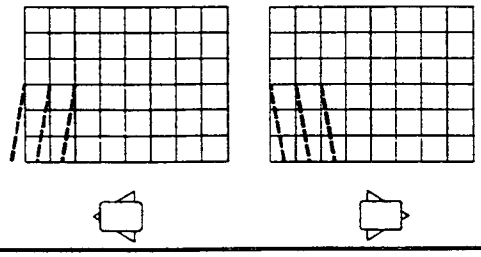


STEP 55. MASTER BOTTOM LEFT HORIZONTAL KEYSTONE:

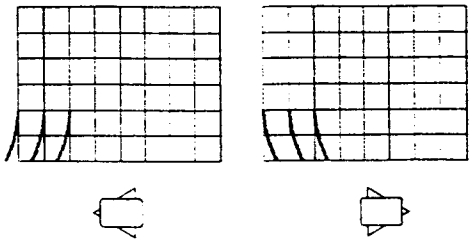
Use the LEFT and RIGHT arrow keys and adjust until the outermost vertical line in the lower left quardant is straight and does not tilt in or out. **SEE STEP 56.**

REMOTE CONTROL KEYSTROKES:

GREEN KEY



8.4.1.1 . . . . MASTER (GREEN) IMAGE ADJUSTMENTS (CONTINUED):

STEP 56. MASTER BOTTOM LEFT HORIZONTAL PINCUSHION:	
Use the LEFT and RIGHT arrow keys and adjust until the outermost vertical line in the lower left quadrant does not bow in or out. **SEE STEP 55.**	
REMOTE CONTROL KEYSTROKES:	
GREEN PIN	

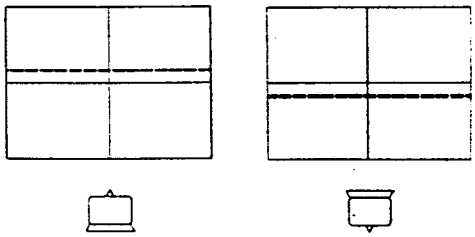
- REPEAT STEPS 53, 54, 55 AND 56 TO OPTIMIZE THE LOWER LEFT QUADRANT.

END OF MASTER (GREEN) ADJUSTMENTS

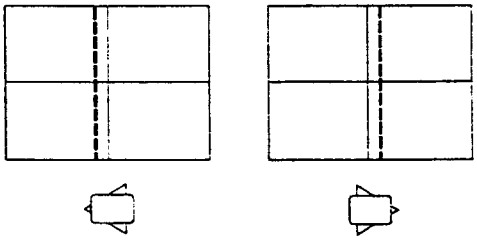
8.4.1.2 . . . . . .RED AND BLUE IMAGE ADJUSTMENTS:

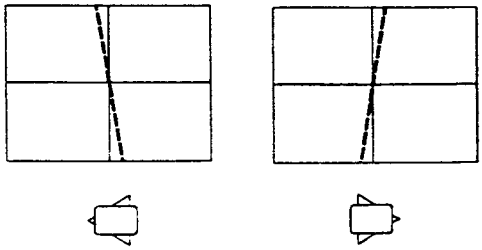
! The adjustments outlined in this section are indentical for the red and blue image control. Perform the Red - to - Green alignment then the Blue - to - Red alignment.

8

STEP 1. VERTICAL SHIFT:	
Use the UP and DOWN arrow keys and adjust until the center horizontal line exactly overlays the center horizontal line in the reference color. Concentrating on where the horizontal and vertical lines intersect.	
REMOTE CONTROL KEYSTROKES:	
RED BLUE SHIFT	

! ENSURE THAT THE RED AND BLUE STATIC SHIFT OPERATIONS HAVE BEEN PERFORMED PRIOR TO EXECUTING THE DYNAMIC SHIFT FUNCTIONS.

STEP 2. HORIZONTAL SHIFT:	
Use the LEFT or RIGHT arrow keys and adjust until the center vertical line exactly overlays the center vertical line in the reference color. Concentrating on where the horizontal and vertical lines intersect.	
REMOTE CONTROL KEYSTROKES:	
RED BLUE SHIFT	

STEP 3. VERTICAL SKEW:	
Use the LEFT or RIGHT arrow keys and adjust until the center vertical line overlays the center vertical line in the reference color. **SEE STEP 4.**	
REMOTE CONTROL KEYSTROKES:	
RED BLUE SKEW	

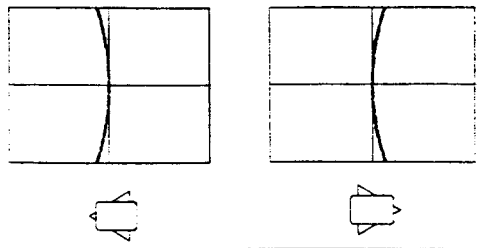
8.4.1.2 . . . . RED AND BLUE IMAGE ADJUSTMENTS (CONTINUED):

STEP 4. VERTICAL BOW:

Use the LEFT or RIGHT arrow keys and adjust until the center vertical line is straight and overlays the center vertical line in the reference color. **SEE STEP 3.**

REMOTE CONTROL KEYSTROKES:

RED
BLUE
BOW



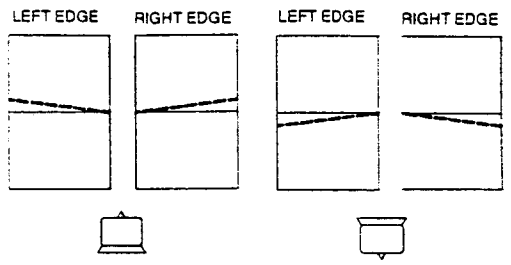
- REPEAT STEPS 3 AND 4 TO OPTIMIZE THE CENTER VERTICAL LINE.

STEP 5. HORIZONTAL SKEW: (LEFT AND RIGHT EDGES)

Use the UP or DOWN arrow keys and adjust until the center horizontal line on the left and right edges overlays the center horizontal line of the reference color. **SEE STEP 6.**

REMOTE CONTROL KEYSTROKES:

RED
BLUE
SKEW

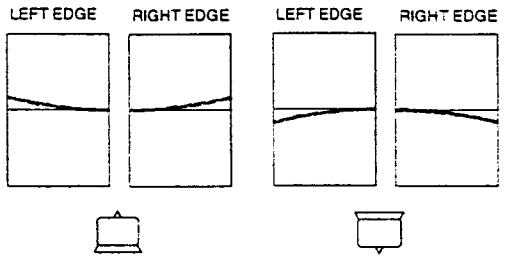


STEP 6. HORIZONTAL BOW: (LEFT AND RIGHT EDGES)

Use the UP or DOWN arrow keys and adjust until the center horizontal line for both the left and right edges is straight. **SEE STEP 5.**

REMOTE CONTROL KEYSTROKES:

RED
BLUE
BOW



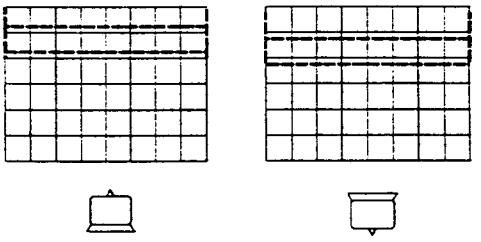
- REPEAT STEPS 5 AND 6 TO OPTIMIZE THE LEFT AND RIGHT EDGES OF THE RED AND BLUE IMAGES.

STEP 7. TOP VERTICAL HEIGHT:

Use the UP or DOWN arrow keys and adjust until the inner 2/3 of the top half overlays the top inner 2/3 of the refernec color. **SEE STEP 8.**

REMOTE CONTROL KEYSTROKES:

RED
BLUE
SIZE

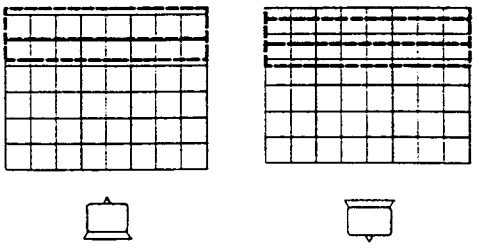


STEP 8. TOP VERTICAL LINEARITY:

Use the UP or DOWN arrow keys and adjust the top edge until it overlays the top edge of the reference color. **SEE STEP 7.**

REMOTE CONTROL KEYSTROKES:

RED
BLUE
LIN



- REPEAT STEPS 7 AND 8 TO OPTIMIZE THE TOP CENTER AND TOP EDGE OF THE PROJECTED IMAGE.

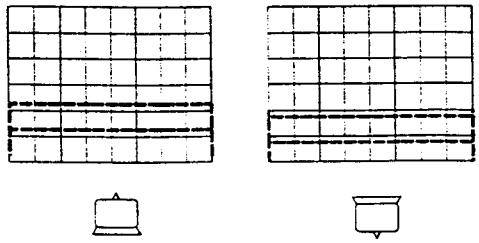
8.4.1.2 . . . . RED AND BLUE IMAGE ADJUSTMENTS (CONTINUED):

STEP 9. BOTTOM VERTICAL HEIGHT:

Use the UP or DOWN arrow keys and adjust until the inner 2/3 of the bottom half overlays the inner 2/3 of the bottom half of the reference color.

REMOTE CONTROL KEYSTROKES:

RED / BLUE SIZE

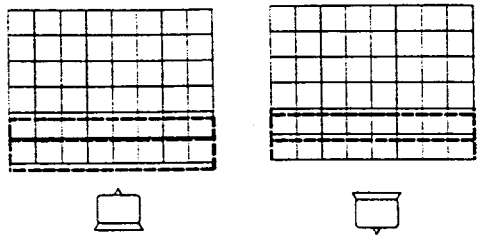


STEP 10. BOTTOM VERTICAL LINEARITY:

Use the UP or DOWN arrow keys and adjust the bottom edge until it overlays the bottom edge of the reference color.

REMOTE CONTROL KEYSTROKES:

RED / BLUE LIN



- REPEAT STEPS 9 AND 10 TO OPTIMIZE THE BOTTOM CENTER AND BOTTOM EDGE OF THE PROJECTED IMAGE.

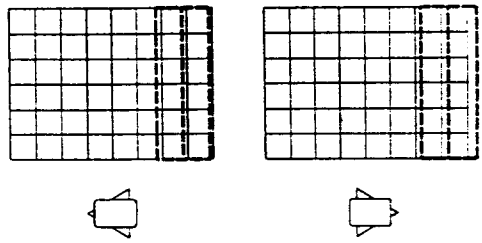
8

STEP 11. RIGHT HORIZONTAL LINEARITY:

Use the LEFT or RIGHT arrow keys and adjust the right edge until it overlays the right edge of the reference color.

REMOTE CONTROL KEYSTROKES:

RED / BLUE LIN

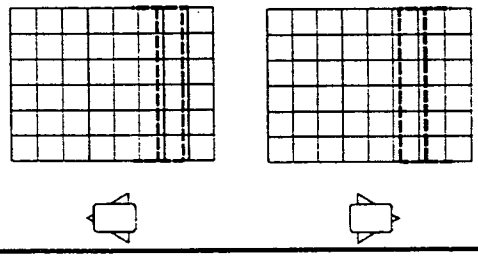


STEP 12. RIGHT WIDTH:

Use the LEFT or RIGHT arrow keys and adjust the right inner 2/3 until it overlays the right inner 2/3 of the reference color.

REMOTE CONTROL KEYSTROKES:

RED / BLUE SIZE

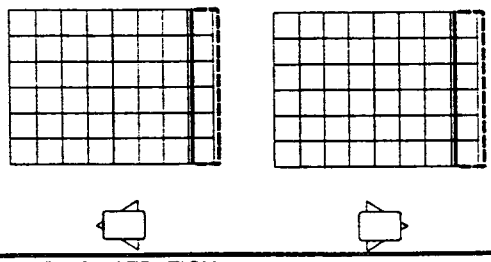


STEP 13. RIGHT HORIZONTAL EDGE LINEARITY:

Use the LEFT or RIGHT arrow keys and adjust the right inner 2/3 until it overlays the right inner 2/3 of the reference color.

REMOTE CONTROL KEYSTROKES:

RED / BLUE EDGE



- REPEAT STEPS 11,12 AND 13 TO OPTIMIZE THE RIGHT CENTER/EDGE REGISTRATION.

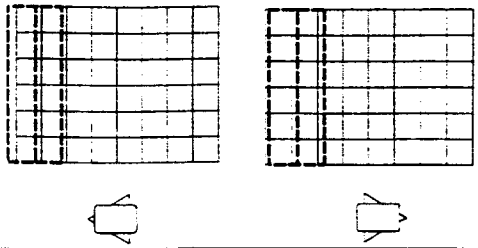
8.4.1.2 . . . . RED AND BLUE IMAGE ADJUSTMENTS (CONTINUED):

STEP 14. LEFT HORIZONTAL LINEARITY:

Use the LEFT or RIGHT arrow keys and adjust until the left edge overlays the left edge of the reference color.

REMOTE CONTROL KEYSTROKES:

RED / BLUE → LIN → ▌

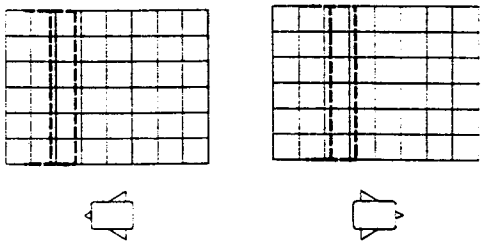


STEP 15. LEFT HORIZONTAL WIDTH:

Use the LEFT or RIGHT arrow keys and adjust until the left inner 2/3 overlays the left inner 2/3 of the reference color.

REMOTE CONTROL KEYSTROKES:

RED / BLUE → SIZE → ▌

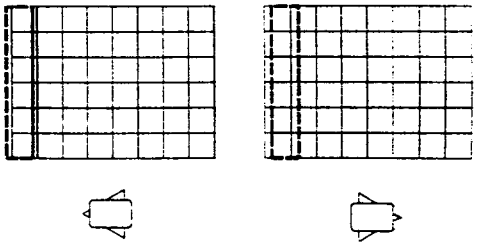


STEP 16. LEFT HORIZONTAL EDGE LINEARITY:

Use the LEFT or RIGHT arrow keys and adjust the outer most left edge until it overlays the outer most left edge of the reference color.

REMOTE CONTROL KEYSTROKES:

RED / BLUE → EDGE → ▌



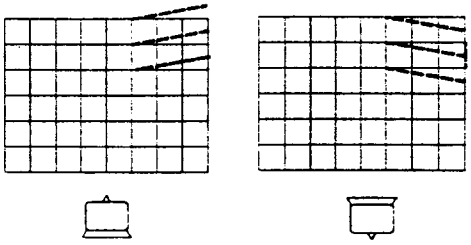
- REPEAT STEPS 14, 15 AND 16 TO OPTIMIZE THE LEFT CENTER/EDGE REGISTRATION.

STEP 17. TOP RIGHT VERTICAL KEYSTONE:

Use the UP or DOWN arrow keys and adjust until the top horizontal line in the upper right quadrant is straight and overlays the reference color. **SEE STEP 18.**

REMOTE CONTROL KEYSTROKES:

RED / BLUE → KEY → ▛

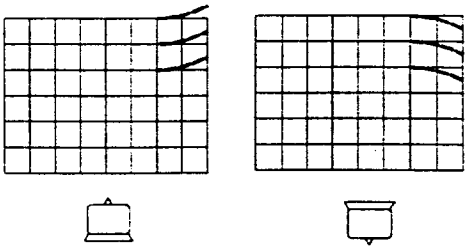


STEP 18. TOP RIGHT VERTICAL PINCUSHION:

Use the UP or DOWN arrow keys and adjust Until the outermost vertical line in the upper right quadrant is straight and overlays the reference color. **SEE STEP 17.**

REMOTE CONTROL KEYSTROKES:

RED / BLUE → PIN → ▛



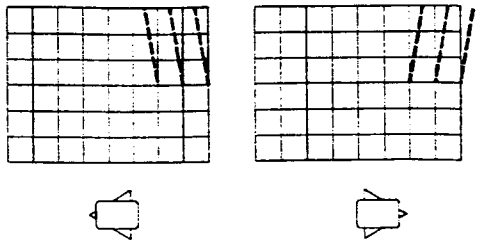
8.4.1.2 .....RED and BLUE Image Adjustments (CONTINUED):

STEP 19. TOP RIGHT HORIZONTAL KEYSTONE:

Use the LEFT or RIGHT arrow keys and adjust until the outermost vertical line in the upper right quadrant is straight and overlays the reference color.

REMOTE CONTROL KEYSTROKES:

RED / BLUE KEY

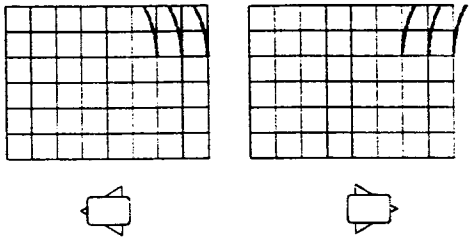


STEP 20. TOP RIGHT HORIZONTAL PINCUSHION:

Use the LEFT or RIGHT arrow keys and adjust until the outermost vertical line in the upper right quadrant is straight and overlays the reference color.

REMOTE CONTROL KEYSTROKES:

RED / BLUE PIN



8

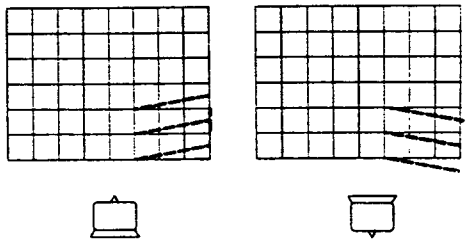
- REPEAT STEPS 17, 18, 19 AND 20 TO OPTIMIZE THE UPPER RIGHT QUADRANT.

STEP 21. BOTTOM RIGHT VERTICAL KEYSTONE:

Use the UP or DOWN arrow keys and adjust until the bottom horizontal line in the lower right quadrant is straight and overlays the reference color.

REMOTE CONTROL KEYSTROKES:

RED / BLUE KEY

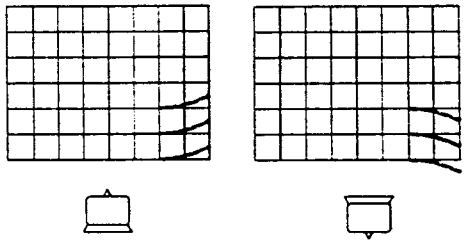


STEP 22. BOTTOM RIGHT VERTICAL PINCUSHION:

Use the UP or DOWN arrow keys and adjust until the bottom horizontal line in the lower right quadrant is straight and overlays the reference color.

REMOTE CONTROL KEYSTROKES:

RED / BLUE PIN

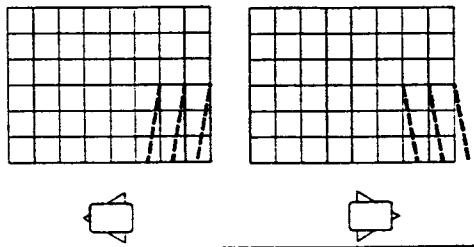


STEP 23. BOTTOM RIGHT HORIZONTAL KEYSTONE:

Use the LEFT or RIGHT arrow keys and adjust until the right outermost vertical line is straight and overlays the reference color.

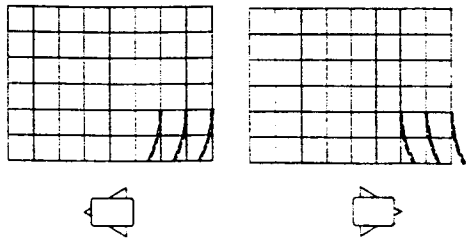
REMOTE CONTROL KEYSTROKES:

RED / BLUE KEY



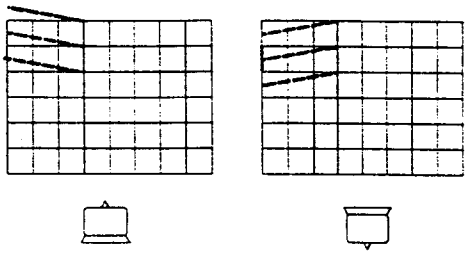
8.4.1.2 . . . . RED And BLUE Image Adjustments (CONTINUED):

STEP 24. BOTTOM RIGHT HORIZONTAL PINCUSHION:
Use the LEFT or RIGHT arrow keys and adjust until the right outermost vertical line is straight and overlays the reference color.
REMOTE CONTROL KEYSTROKES:
RED, BLUE, PIN

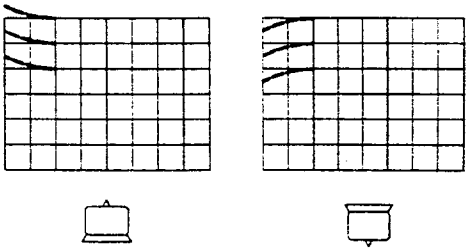


- REPEAT STEPS 21,22,23 AND 24 TO OPTIMIZE THE LOWER RIGHT QUADRANT.

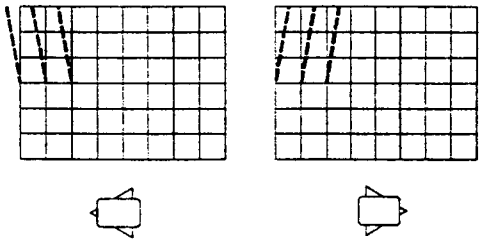
STEP 25. TOP LEFT VERTICAL KEYSTONE:
Use the UP or DOWN arrow keys and adjust until the top horizontal line in the upper left quadrant is straight and overlays the reference color.
REMOTE CONTROL KEYSTROKES:
RED, BLUE, KEY



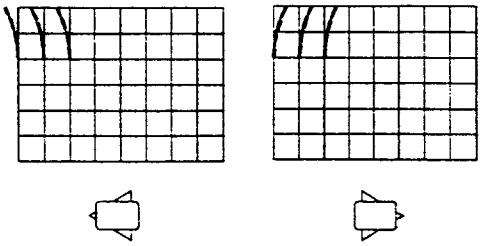
STEP 26. TOP LEFT VERTICAL PINCUSHION:
Use the UP or DOWN arrow keys and adjust until the top horizontal line in the upper left quadrant is straight and overlays the reference color.
REMOTE CONTROL KEYSTROKES:
RED, BLUE, PIN



STEP 27. TOP LEFT HORIZONTAL KEYSTONE:
Use the LEFT or RIGHT arrow keys and adjust until the left outermost vertical line in the upper left quadrant is straight and overlays the reference color.
REMOTE CONTROL KEYSTROKES:
RED, BLUE, KEY



STEP 28. TOP LEFT HORIZONTAL PINCUSHION:
Use the LEFT or RIGHT arrow keys and adjust until the outermost vertical line in the upper left quadrant is straight and overlays the reference color.
REMOTE CONTROL KEYSTROKES:
RED, BLUE, PIN



- REPEAT STEPS 25, 26, 27 AND 28 TO OPTIMIZE THE UPPER LEFT QUADRANT.

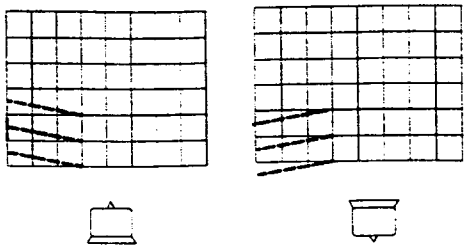
8.4.1.2 . . . . RED and BLUE Image Adjustments (CONTINUED):

STEP 29. BOTTOM LEFT VERTICAL KEYSTONE.

Use the UP or DOWN arrow keys and adjust until the bottom horizontal line in the lower left quadrant is straight and overlays the reference color.

REMOTE CONTROL KEYSTROKES:

RED / BLUE + KEY

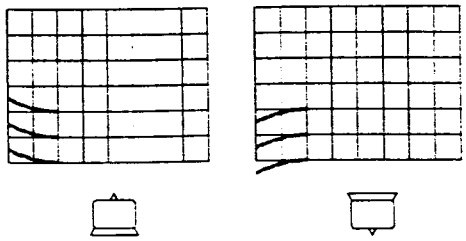


STEP 30. BOTTOM LEFT VERTICAL PINCUSHION:

Use the UP or DOWN arrow keys and adjust until the bottom horizontal line in the lower left quadrant is straight and overlays the reference color.

REMOTE CONTROL KEYSTROKES:

RED / BLUE + PIN

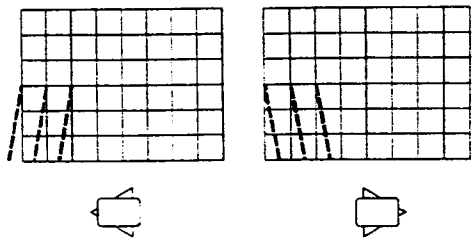


STEP 31. BOTTOM LEFT HORIZONTAL KEYSTONE:

Use the LEFT or RIGHT arrow keys and adjust until the outermost vertical line in the lower left quadrant is straight and overlays the reference color.

REMOTE CONTROL KEYSTROKES:

RED / BLUE + KEY

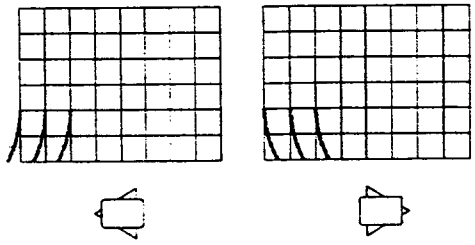


STEP 32. BOTTOM LEFT HORIZONTAL PINCUSHION:

Use the LEFT or RIGHT arrow keys and adjust until the outermost vertical line in the lower left quadrant is straight and overlays the reference color.

REMOTE CONTROL KEYSTROKES:

RED / BLUE + PIN



- REPEAT STEPS 29, 30, 31 AND 32 TO OPTIMIZE THE LOWER LEFT QUADRANT.

8.4.2 . . . . . .Post-Registration Settings:

- STEP 1: As mentioned previously, the image quality adjustments such as, brightness, contrast, blanking, phasing and if applicable, color, tint and detail must be set while displaying the active video for optimal results.

- STEP 2. Upon completion of adjusting your new, or modifying a previous channel, enter 24 [CODE] to validate and write-protect your channel. Continue with procedure to align and validate all channels.

Section 9
RS- 232C Interface Data

9.1 .....General:

The AMPRO 3600/4600 Series Display Systems, features duplex RS232C communication network capability. The projectors can be controlled from a remote, a computer or a third party controller using RS-232C and ASCII characters. Display systems can be looped together so that multiple display systems and switchers can be addressed and controlled by one central source. Refer to Figure 9-1 for network configuration example.

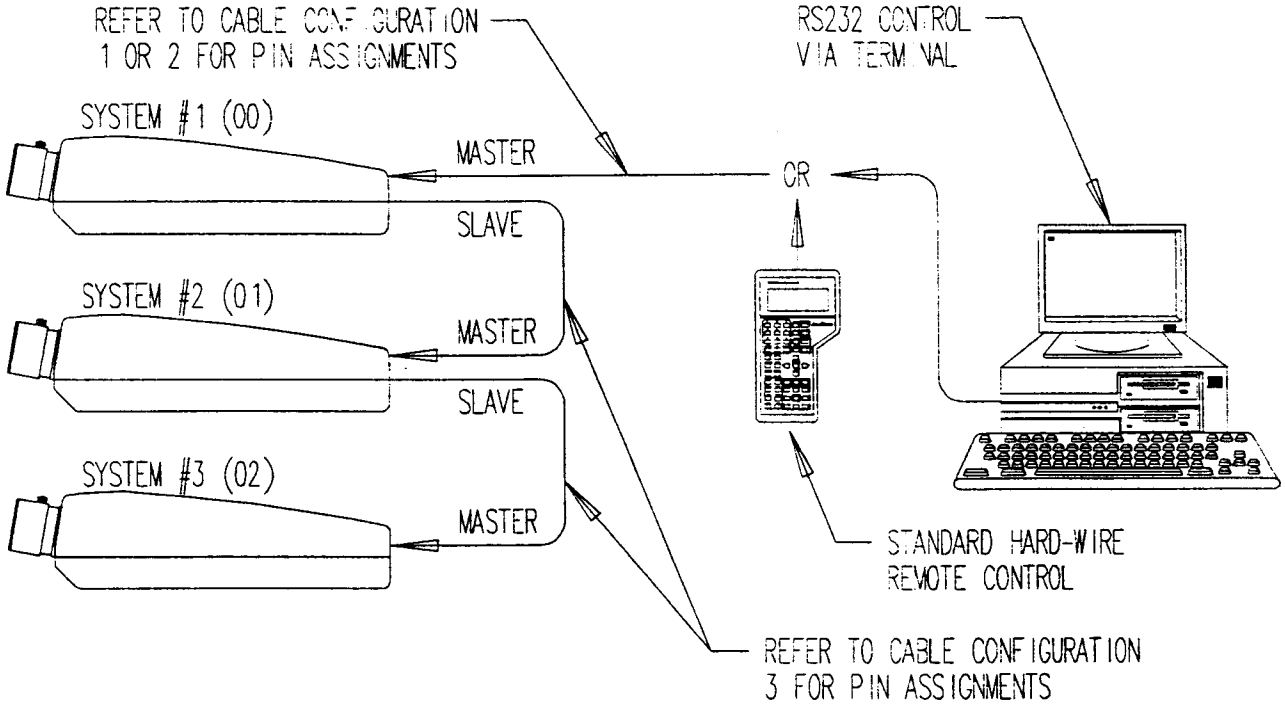


FIGURE 9-1. MULTIPLE SYSTEM CONTROL CONFIGURATION.

9.2 .....Hexadecimal Switch Configurations:

The system has two hexadecimal rotary switches (SW1 and SW2) and an 8 switch DIP(SW3) located on the CPU module. These switches are used to establish the individual system address and operating baud rate.

9.2.1 .....Remote Control Baud Rate:

The baud rate of the standard hard-wired remote control may be set to match that of operating baud rates of external RS232 terminals.

! **FOR INSTALLATION/SERVICE PERSONNEL ONLY!** Please refer to Supplement 3 of this manual for the exact location and instructions on setting the systems' address and baud rate and changing the baud rate of the remote control.

9.3 . . . . . Host/Slave Port and RS-232C Cable Pin Assignments:

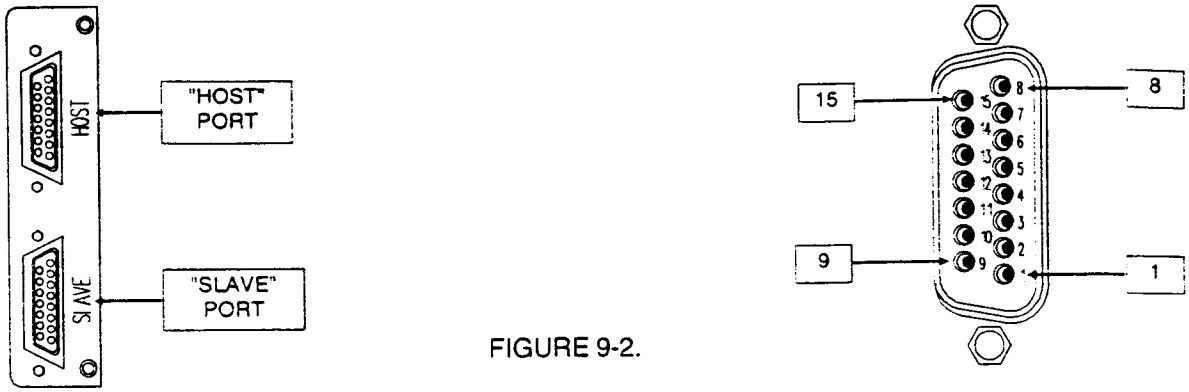


FIGURE 9-2.

PIN	HOST	SLAVE	PIN	HOST	SLAVE
1	GND	GND	9	N/C	N/C
2	TXD	RXD	10	N/C	N/C
3	RXD	TXD	11	Vraw	N/C
4	RTS	CTS	12	Vraw	N/C
5	CTS	RTS	13	N/C	N/C
6	DTR	N/C	14	N/C	N/C
7	GND	GND	15	DSR	DSR
8	DCD	DCD			

TABLE 9-1

9

9.3.1 . . . . . Cable Configuration 1: Host to Projector:

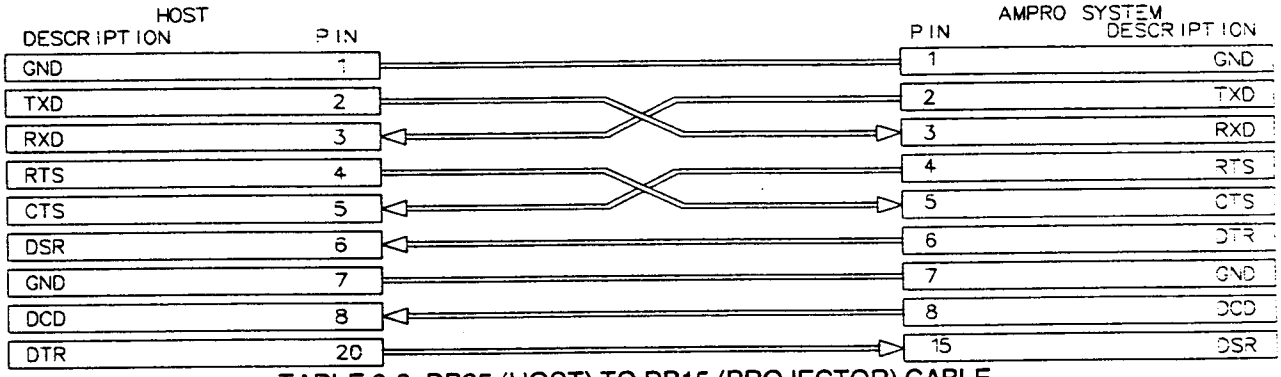


TABLE 9-2. DB25 (HOST) TO DB15 (PROJECTOR) CABLE.

9.3.2 . . . . . .Cable Configuration 2: IBM® PC to Projector:

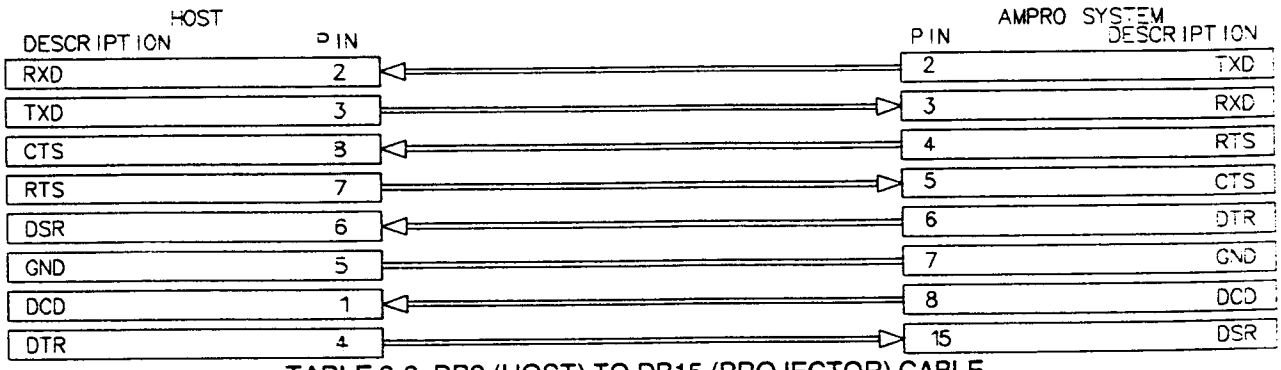


TABLE 9-3. DB9 (HOST) TO DB15 (PROJECTOR) CABLE.

9.3.3 . . . . . Cable Configuration 3: Projector to Projector

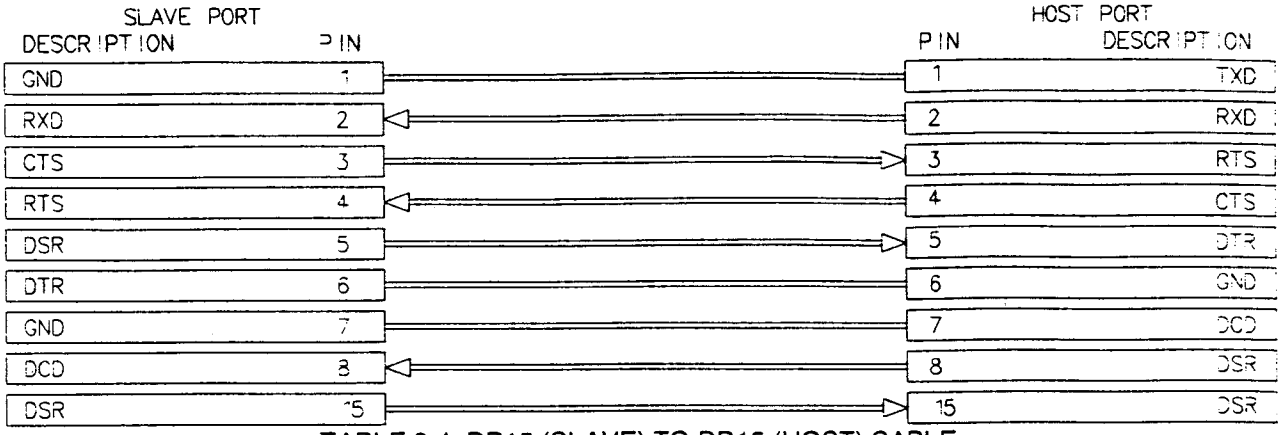


TABLE 9-4. DB15 (SLAVE) TO DB15 (HOST) CABLE.

9.3.4 . . . . . .Alternative 3-Wire Cable Configuration:

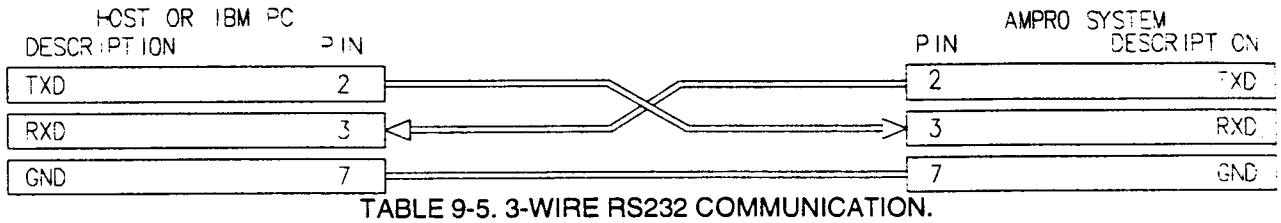


TABLE 9-5. 3-WIRE RS232 COMMUNICATION.

9.4 . . . . . RS-232C Operation:

9.4.1 . . . . . .Protocol:

The AMPRO 3600/4600 Series utilizes the standard RS232C communication format; 8 Data Bits, No Parity, 1 Stop Bit

9.4.2 . . . . . Mode Selection Commands:

COMMAND	FUNCTION	COMMAND	FUNCTION
A	Source command	V	QVD[2] or RGB[2] mode select command
@	Analog RGB mode select command	R	Test mode select command
T	QVD[1] or RGB[3] mode select command	$	Help mode select command

9.4.3 . . . . . Adjustment Mode Commands:

COMMAND	FUNCTION	COMMAND	FUNCTION
B	Brightness adjust mode command	P	Contrast adjust mode command
C	Color adjust mode command	+	Up arrow command
D	Detail adjust mode command	<	Left arrow command
E	Phase adjust mode command	-	Down arrow command
H	Tint adjust mode command	>	Right arrow command

The adjustment mode commands have two types of operation. The first uses the arrow keys to increment or decrement the adjustment which has been selected previously by one of the above keys. For example, if you wish to increase the brightness level, transmit a B, then transmit + until you have the desired brightness level. **NOTE:** When one of the adjustment mode select commands is received, the system responds by transmitting the present level of the desired adjustment.

9.4.3 . . . . . Adjustment Mode Commands: (CONTINUED)

The second mode of operation allows you to set the level of the desired adjustment directly by transmitting an integer value in the range 0 - 100 followed by the appropriate adjustment character. For example, to set the tint level to a 75% level, you would transmit **75H**.

9.4.4 . . . . . .Toggle Commands:

COMMAND	FUNCTION
c	Cutoff command. This command is used in conjunction with one of the color keys e.g. **cd**, Cutoff Red CRT. To restore the Red CRT transmit **cd** a second time. Use **ce** for green and **cf** for blue cutoff commands.
K	Registration ON/OFF command. With registration on, the first **K** will turn registration "OFF" and the second **K** will turn registration "ON."
O	Power ON/OFF command. If the system is "OFF": the first **O** will turn the system "ON" and the second **O** will turn the system "OFF."
Q	Channel protect command. This allows the user to protect the settings stored in a particular channel location. Refer to Section 8, page 8-3, for information on setting channel parameters.
S	Standby On/Off. This command can toggle the projected image on and/or off.
X	RED CUTOFF command. This command is similar to the previous command cd. The first **X** will turn the RED CRT "OFF", presuming it was on, and the second **X** will turn the RED CRT "ON."
Y	GREEN CUTOFF command. This is similar to using the **ce** command. Use the **Y** character to toggle the GREEN CRT "ON and OFF."
Z	BLUE CUTOFF command. This command is the same as using the **cf** command. Toggle the BLUE CRT "ON and OFF" using the **Z** character.
?	Display diagnostic status. This command is used to display the diagnostic capability of the system. Transmit the **?** character a second time to disable the diagnostic display.

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9.4.5 . . . . . .Numeric Commands:

COMMAND	FUNCTION
!	CHANNEL command. This command is preceded by an individual channel location number. Refer to Section 7, Section 3, Page 7-5 for additional information on recalling channels.
#	CODE command. This command is preceded by an specific code. Refer to Section 7, page 7-10, for code identification and operation, e.g. to display the ROM revision, transmit **35#**.
=	UNIT command. This command is used to address an individual unit number or use command **256=** to address all systems in a network . Refer to Section 7, page 7-6 for additional information and operation.

9.4.6 . . . . . .Network Commands:

COMMAND	FUNCTION
:	Global listen command. Causes all projectors in a network to listen and respond to commands at the same time. This mode of operation continues until another projector is selected to listen, or until a global un-listen command is received. When in the global mode, only the projector with address "01" (switch settings "00") will respond with messages.
;	Global un-listen command. All projectors are commanded to not respond until a unit number has been selected or a global listen command is given.

9.4.7 .....Explicit Commands:

COMMAND	FUNCTION
(	STANDBY "ON" command. This character is used to place the system into a standby mode of operation.
)	STANDBY "OFF" command. This character is used in conjunction with the STANDBY "ON" command).
[	POWER "ON" command. This command will enable you to turn "ON" the system.
]	POWER "OFF" command. This command is used in conjunction with the POWER "ON" command [.
^	Auto-Search mode OFF. This character allows the user to turn channel auto-search mode "OFF". Useful with third party controllers, such as switchers.
_ (underscore)	Auto-Search mode ON. This character allows the user to turn channel auto-search mode "ON" Useful with third party controllers, such as switchers.
{	Channel write protect OFF. This command allows the user to turn the channel write protect mode off. Useful with third party controllers, such as switchers.
}	Channel write protect ON. This command allows the user to turn the channel write protect mode off. Useful with third party controllers, such as switchers.

9.4.8 .....Registration Commands:

The registration commands listed in RS-232C Command table, page 9-6, are used in the same manner as outlined in Section 7. The lower case letters from "**a**" through "**w**" are assigned for registration commands.

The adjustment method is performed by using the +, -, < or > characters, e.g. to adjust the right edge linearity of the red image transmit "**dms**", then adjust by transmitting "<" or ">" characters (dms<) or (dms>).

! When using the registration commands, the system will respond with the selected area of adjustment, selected color and selected function.

9.4.9 .....Miscellaneous Commands:

COMMAND	FUNCTION
L	Display ROM revision level and date of the operating system and system's serial number.
N	Next test pattern command. This command is used in conjunction with the "**R**" command.
U	Display active unit number. See [UNIT] command.
\n	CLEAR command (LINEFEED). This character emulates the CLEAR key on the remote control.

9.5 . . . . . RS-232C Commands Table :

ASCII	COMMAND	REMOTE KEY
A	SOURCE SELECT	[SOURCE]
B	BRIGHTNESS	[BRIGHT]
C	COLOR	[COLOR]
D	DETAIL	68 [CODE]
E	PHASE	[PHASE]
F	RED SHIFT	[RED] [SHIFT]
G	BLUE SHIFT	[BLUE] [SHIFT]
H	TINT	[TINT]
I	BLUE STATIC VERTICAL SHIFT	40 [CODE]
J	RED STATIC VERTICAL SHIFT	41 [CODE]
K	REGISTRATION ON/OFF (toggle)	55 [CODE]
L	DISPLAY ROM REVISION & S/N	35 [CODE]
M	MONOCHROME MODE (toggle)	49 [CODE]
N	NEXT TEST PATTERN	[STEP]
O	POWER ON/OFF (toggle)	[POWER]
P	CONTRAST	[CONT]
Q	CHANNEL WRITE-PROTECT (toggle)	20 [CODE]
R	TEST MODE	[TEST]
S	STANDBY (toggle)	[STDBY]
T	QVD1 or RGB3	[SOURCE]
U	DISPLAY ACTIVE UNIT	[UNIT]
V	QVD2 or RGB2	[SOURCE]
W	NOT USED	NOT USED
X	RED CUTOFF (toggle)	*HOLD* [RED]
Y	GREEN CUTOFF (toggle)	*HOLD* [GREEN]
Z	BLUE CUTOFF (toggle)	*HOLD* [BLUE]
a	STATIC	[STATIC]
b	COARSE or FINE ADJUST MODE	[COARSE/FINE]
c	CUTOFF	HOLD + *COLOR*
d	RED	[RED]
e	GREEN	[GREEN]
f	BLUE	[BLUE]
g	SHIFT	[SHIFT]
h	SKEW	[SKEW]
i	BOW	[BOW]
j	KEYSTONE	[KEY]
k	PINCUSHION	[PIN]
l	SIZE	[SIZE]
m	EDGE LINEARITY	[EDGE]
n	LINEARITY	[LIN]
o	BLANKING	[BLANK]
p	TOP EDGE	

ASCII	COMMAND	REMOTE KEY
q	BOTTOM EDGE	
r	LEFT EDGE	
s	RIGHT EDGE	
t	TOP LEFT QUADRANT	
u	TOP RIGHT QUADRANT	
v	BOTTOM LEFT QUADRANT	
w	BOTTOM RIGHT QUADRANT	
x	VOLUME (RETRO ONLY)	N/A
y	BASS (RETRO ONLY)	N/A
z	TREBLE (RETRO ONLY)	N/A
\n	CLEAR	[CLEAR]
@	RGB MODE	[SOURCE]
!	CHANNEL	[CHANNEL]
#	CODE	[CODE]
$	HELP	[HELP]
(	STANDBY "ON"	N/A
)	STANDBY "OFF"	N/A
+	UP ARROW	
-	DOWN ARROW	
<	LEFT ARROW	
>	RIGHT ARROW	
:	GLOBAL LISTEN	256 [UNIT]
;	GLOBAL UN-LISTEN	[UNIT]
=	UNIT	[UNIT]
?	DISPLAY DIAGNOSTIC (toggle)	30 [CODE]
[	POWER "ON"	N/A
]	POWER "OFF"	N/A
~	AUDIO MUTE OFF (RETRO ONLY)	N/A
|	TOGGLE MUTE (RETRO ONLY)	N/A
^	AUTO-SEARCH OFF	N/A
_	AUTOSEARCH ON (under-score)	N/A
{	WRITE PROTECT OFF	N/A
}	WRITE PROTECT ON	N/A

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Section 10

Preventative Maintenance and System Trouble Shooting

10.1 .....Preventative Maintenance:

- 1. Avoid direct sunlight, moisture, heat and improper mounting.
- 2. Provide sufficient ventilation to the rear and bottom two fans to avoid overheating of internal components.
- 3. Clean and maintain the three fans , one on the rear panel and two on the bottom side, to avoid restriction of air flow and overheating of the system.

! Filters are provided for all three fan locations, 2 each bottom fans and 1 each rear panel fan. Refer to section 10.2 for removing and cleaning of the filter media inserts.

- 4. Adjust your cleaning schedule according to your particular environment.
- 5. The Data/Graphic Display System may be kept in good condition by wiping it with a clean, soft, dry cloth. See section 10.3 for special lens care and cleaning.
- 6. For general safety, the system should be cleaned internally only by an authorized AMPRO Corporation service technician.
- 7. Do not place magnetic equipment near the system.

10.1.1 ..... Precautions:

- 1. Secure service any time the Data/Graphics display system is damaged or fails. An obvious change in performance may also indicate a need for service.
- 2. Do not attempt to service this system yourself by opening or removing covers that may expose you to dangerous voltages or other hazards. Refer all servicing to qualified service personnel.
- 3. Remove the power plug from the wall socket when the Data/Graphics Display System is not functioning properly.

10.2 ..... Fan Filters Removal and Cleaning:

The two filters on the bottom of the system are reusable and are provided to maintain a clean environment within the system. Please check the filters periodically and adjust your cleaning periods accordingly. In areas of heavy dust, smoke, or other environmental contaminants, the system will require more frequent cleaning periods, i.e. weekly, biweekly, monthly, etc. To remove and clean the filter media, follow the steps listed below.

- STEP 1. Remove the filter retainer by pulling the sides with the catch apart, then remove the filter media from between the retainer and the guard. Refer to Figure 10-1.
- STEP 2. Clean the filter media by shaking or blowing or washing. If washed, ensure the filter media is completely dry prior to reinserting. Repeat for each filter.
- STEP 3. Place the filter media between the filter guard and the retainer. Push the retainer until the catches lock in place.

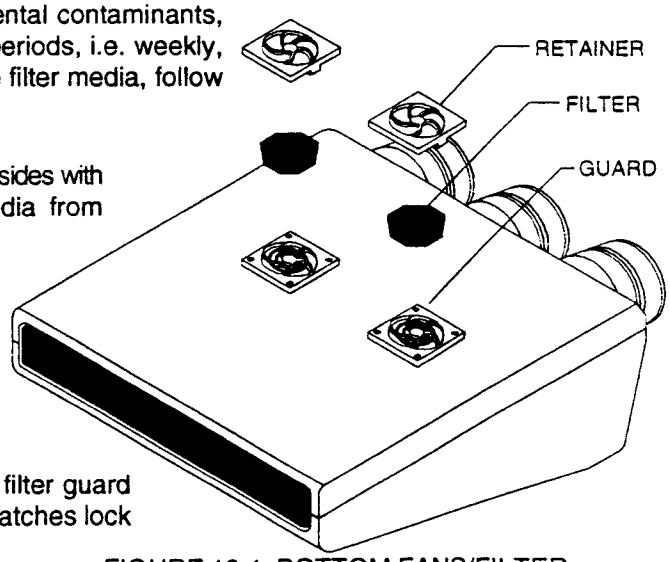

FIGURE 10-1. BOTTOM FANS/FILTER.

10.2.1 . . . . Rear Panel Filter Removal:

Like the two bottom fans, the filter for the rear panel fan is reusable and is provided to maintain a clean environment within the system. To remove and clean the filter media, follow the steps listed below.

- STEP 1. Remove the filter retainer by gently pulling it out of the filter housing.
- STEP 2. Remove the filter media from between the retainer and guard.
- STEP 3. Clean the filter media by shaking, or washing. If washed, ensure the filter media is completely dry prior to reinserting the filter media.

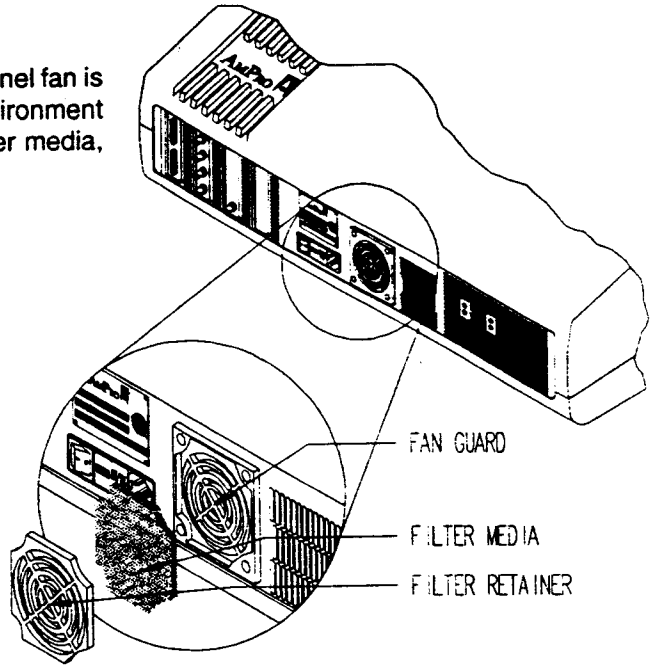

FIGURE 10-2. REAR FAN FILTER. (4600 SHOWN).

10.3 .....Lens Care And Cleaning:

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When your Data/Graphics Display System is not being used for prolong periods of time, please cover the lenses with the lens covers provided with the system.

To minimize the possibility of damage to the optical coating or scratching the exposed lens surface, we recommend you first 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.

10.3.1 .....Lens Cleaning:

- 1. Do not spray any type of 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 (e.g. Windex, Easy Off or Glass Plus). Do not use an aerosol. Other cleaning agents, such as laboratory grade acetone or ethyl-ether (70% - 30%) may also be used. If you are not sure of the cleaning agent, experiment with a small area of the lens first.
- 4. Use a lens tissue, a soft cotton cloth, or any soft facial tissue.
- 5. When using a window cleaner, moisten the tissue or cloth and lightly wipe the surface. Then dry with a new tissue.
- 6. When using acetone or ethyl-ether mixture, proceed as follows:

Fold the tissue or cloth several times to form a pad. Soak the folded end of the pad in the acetone. Starting at the diameter opposite to you immediately wipe the coated lens, with very little pressure, toward you in a straight line equal to the evaporation rate. This is important to prevent streaking and spotting. Start your wiping at one side of the lens and, with successive wipes, move to the other side. Turn the pad over for each wipe, then inside out. Do not make more than one wipe per clean area of pad. Be careful of the painted edge of the lens, since acetone will soften it.

10.4 . . . . . Trouble Shooting:

SYMPTOM	POSSIBLE CAUSE	SOLUTION
The unit is connected to an active AC outlet, the rocker switch is in the "on" position, but there is no LCD read-out.	Faulty line cord	Replace line cord
	Open main fuse	Check and replace fuse
	Wrong voltage selected	Check and/or select proper voltage and main fuse.
	Hard-wired remote control not connected.	Connect remote control to "HOST" port.
	Faulty Remote control or cable.	If available, try another remote control/cable.
No LCD read-out on remote control, but LCD back light functions properly.	Units' address switches are not set properly.	Refer to Supplement 3 for switch(es) configurations.
	Baud Rate switch not properly set.	Refer to Supplement 3 for switch configuration.
The LCD indicates the model number, but the system does not turn on when the [POWER] button is depressed.	Remote control may be faulty.	If available, try another remote control.
	If an extended cable is being used.	Remove the extension cable from the system.
The projector is "on", no error messages are displayed,but no image is being display.	Lens covers are still installed.	Remove lens covers
	Unit is is the standby mode.	Depress the standby key.
	Wrong mode of operation is selected.	Select the proper mode of operation.
	Source is not turned on.	Enable source.
	Contrast and/or brightness levels are set too low.	Increase the contrast and brightness levels.
	Blanking is not set properly.	Enable blanking and adjust the top,bottom,left and right blanking.
	Enable systems' error diagnostic	Enter 30 **[CODE]** and view the LCD read-out and record any error messages.

TABLE 10-1

10.5 . . . . . Error Messages:

The AMPRO 3600/4600 systems provide two sets of diagnostics messages which are displayed on the LCD read-out located on the standard hard-wired remote control to provide information about the projector mode and operational status.

One set of error messages that may be displayed are mode status error messages. Mode status error messages indicate a wrong function has been selected for the current mode of operation or the selected function can not be entered. An example of a mode status error message is as follows. When a particular channel number has been selected and an attempt to adjust brightness is made, an error message "WRITE PROTECTED" is displayed. This error message refers to a particular channel location and that the parameters of this channel have been established and placed inactive to avoid unwanted adjustments. Refer to section 10.5.1, tables 10-2A, 10-2B and 10-2C for additional mode status error messages.

The second set of error messages provided are operational status messages. This type of message provides information about the projector in case of a malfunction for either a voltage or wave form error.

When the system is connected to an active A.C. source and the rocker switch on the rear panel is turned on, the LCD will display " AMPRO 3600" or " AMPRO 4600" (depending on your particular system). When the **[POWER]** button on the remote control is pressed, the system's LCD read-out will display "INITIALIZING," then display the last mode of operation used when the system was de-energized, if there are no malfunctions.

If there is a malfunction of the equipment the system will display an error message. An example of the sequence of messages you would get if the - 20V rail was missing is as follows. After the power button on the remote control is pressed, the first read-out would be "INITIALIZING" then "-20 VOLTS LO". This error process continues to cycle through all error messages applicable.

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If for some reason the system has been turned on, the desired mode of operation has been selected and the appropriate source is active; however, no image is being projected and there are no diagnostic error messages being displayed on the LCD, use the enable diagnostics command **30 [CODE]**. Refer to section 10.5.2 for additional operational status error messages.

10.5.1 .....Mode Status Error Messages:

ERROR MESSAGE	POSSIBLE CAUSE	SOLUTION
ACCESS DENIED	The system is in the factory mode and a password entry has been tried.	Turn SW3-3 "off" and enter 44 [CODE] to read switches and exit factory mode of operation.
AUTO RESTART	System has momentarily loss A.C. line voltage or system was de-energized by main rocker switch.	System should power up as normal.
AUTO SEARCH ON	The system has been placed into the "channel auto-search" mode.	Enter 27 [CODE] to toggle the "auto-search" mode off. Refer to Section 7 for more information.
BAD NUMERIC CODE	Numeric code outside of range entered.	Enter numeric code within range. Refer to Section 7
BAD VIDEO MODE	Video mode of operation outside of range entered.	Refer to Section 7 for desired mode of operation.

TABLE 10-2A

10.5.1 . . . . Mode Status Error Messages:

ERROR MESSAGE	POSSIBLE CAUSE	SOLUTION
CASE OVER TEMP	The interior of the system has reached its maximum operating temperature.	Check fan operation, check fan filters, verify ambient room temperature.
CHECK FAN FILTER	The system's temperature sensors have indicated a possible clogged fan filter or an inoperative fan.	Turn the system "off" and check fan filters, replace or clean as needed. Check fan operation, ensure fans are operating.
CHOOSE EDGE	Wrong area of adjustment selected for desired function.	Refer to Section 7, desired function.
DYNAMIC FUNCTION	Wrong operation for selected function.	Refer to Section 7, desired function.
EPROM INSTALLED	A new EPROM has been installed in the system.	Normal "installation" message.
ENTER PASSWORD	SW3 (switch 3) is in the "on" position placing the system into the factory mode.	Turn SW3-3 to the "off" position and enter 44 [CODE] to read and update switches and exit the factory mode.
ERROR "# " AT "# " (I^2C ERROR)	Communication failure between internal modules.	Contact a service technician
ERROR CODE 1000	In-compatibility between internal modules has occurred.	Call factory
ERROR CODE 1001	In-compatibility between internal modules has occurred.	Call factory
ERROR CODE 1002	In-compatibility between internal modules has occurred.	Call factory
HI BEAM CURRENT	CRT protection mode of operation.	Toggle main power rocker switch OFF/ON. Restart system. If continuous, contact a service technician.
HVPS RESTART	Momentary protection from high voltage arcing occurred.	If continuous, contact a service technician.
HVPS SHUTDOWN	Loss of high voltage has occurred.	Contact a service technician.
INVALID	Unrecognized command.	Retry command or check command.
INVALID CHANNEL	Channel number outside of range (1-50) entered.	Enter channel number within given range.
INVALID TEST	Test number outside of range entered.	Refer to section 7.2.12.
INVALID TIME	Time outside of range entered.	Enter time within range (24 hour clock)
INVALID VALUE	Value outside of range (0-100) entered.	Enter value between 0-100.

TABLE 10-2B

10.5.1 . . . . Mode Status Error Messages: (CONTINUED)

ERROR MESSAGE	POSSIBLE CAUSE	SOLUTION
KEYS DISABLED	Registration adjustments are being attempted with "lock-out" feature activated.	To enable registration keys, enter 46 [CODE].
MEMORY FAILURE	Loss of data occurred.	Re-enter all settings, channel numbers, registration settings, etc.
MUST BE IN NTSC	Function entered operates in the NTSC modes only.	Refer to Section 7.
MUST BE IN RGB	Function entered pertains to the RGB mode of operation only.	Enter RGB and retry function.
MUST BE IN VIDEO	Function entered operates in the Video modes of operation only.	Refer to section 7
NETWORK DISABLED	Unit number other than 1 has been entered, with the network capability disabled.	Refer to Supplement 3.
NO VALIDATED CHANNEL	The A.C.S command has been entered and no "validated" channels were found.	Refer to Section 7 for additional information on the "Auto Convergence Scaling" mode.
NO VALIDATED DATA	A.C.S. has been activated and no validated channels were found.	Refer to Section 8.
NOT INSTALLED	Optional mode selected with no optional module installed.	Refer to Section 1
OPEN INTERLOCK	Missing or loose module / connector.	Verify or re-seat all modules / connectors.
OVER FREQUENCY	Source selected outside of specified frequency range.	Refer Section 1, Table 1-1.
RED OR BLUE ONLY	Wrong area of adjustment selected for desired color.	Refer to Section 7, desired function.
RIGHT OR LEFT ONLY	Wrong area of adjustment selected for desired function.	Refer to Section 7, desired function.
SELECT QUADRANT	Wrong area of adjustment selected for desired function.	Refer to Section 7, desired function.
SMPS OVER TEMP	The interior of the SMPS box has reached its maximum operating temperature.	Check rear panel fan operation, check rear panel fan filters for cleanness, verify ambient room temperature.
SYSTEM TEMP HIGH	The system has detected the internal operating temperature has reach a critical condition.	Check fan(s) operation, fan filters for cleanness. Verify ambient room temperature.
WRITE PROTECTED	Attempts to adjust predetermined parameters are being made to a channel location.	Refer to Section 7
WRONG DIRECTION	Wrong adjustment arrow selected for desired function	Refer to Section 7 , desired function.

TABLE 10-2C

10.5.2 . . . . Operational Status Error Messages:

If any of the following error messages are displayed, contact your selling dealer or the factory for assistance.

OPERATIONAL ERROR MESSAGES		
HIGH OR LOW VOLTAGE ERROR MESSAGES		
-9	+9	-20
+20	-25	+25
+40	+190	GRID 2
HIGH VOLTAGE		

WAVE FORM ERROR MESSAGES	
"NO H SYNC" (NO HORIZONTAL SYNC)	"NO H RESET" (NO HORIZONTAL RESET PULSE)
"NO V SYNC" (NO VERTICAL SYNC)	"NO V RESET" (NO VERTICAL RESET PULSE)
"H SWEEP FAIL" (HORIZONTAL SWEEP FAIL)	"G1 FAIL LOW" (GRID 1 VOLTAGE LOW)
"V SWEEP FAIL" (VERTICAL SWEEP FAIL)	NO INPUT (CHECK SOURCE)
"NO HORIZ CLAMP" (HORIZONTAL CLAMP)	

10.6 . . . . . Servicing Policy:

Repair of the AMPRO modular designed systems shall be accomplished exclusively through a factory sub-assembly module exchange program. Servicing by a AMPRO Corporation Service Center or by an AMPRO Corporation selling dealer, is limited to failure diagnostics, registration alignment, and replacement of CRT assemblies, lenses, and sub-assembly modules.

No material and/or labor credit will be granted for an exchange sub-assembly, if it has been repaired, reworked or modified. The warranty is voided if a repair, rework and/or modification of a sub-assembly module is performed other than by AMPRO Corporation.

To return a sub-assembly module for exchange a Return Authorization number (RA number) must be obtained from the AMPRO Corporation Customer Service Department. To obtain an RA number for exchange of a sub-assembly module it will be necessary to have the particular symptom(s) and the three following basic requirements of the system available for the Customer Service Representative;

- ☐ MODEL
- ☐ MODEL NUMBER
- ☐ SERIAL NUMBER

! If the above requirements are not met, then a delay in processing your repair request will occur.

NOTES:

Appendix A

Internal Timer Operation

The internal timer is capable of turning the projection system "on" and/or "off" at a predetermined time according to your particular requirements. The internal timer operation is based on the 24 hour clock format and either a 5 or 7 day occurrence. If no internal timer operation is desired, the timer may be totally disabled. The three modes of operation are explained below.

To use this special feature, you must first verify the setting of the internal clock for the appropriate time according to your particular time zone.

The internal clock is factory pre-set for Eastern Time (ET.).

A1.0 .....Display Time of Day:

- STEP 1. Using the numeric keypad, enter **[10] [CODE]** to verify the time of day.
- If incorrect, refer to the set time of day procedure.
- If the time of day is correct, please refer to the desired mode of operation and perform the steps listed.

A1.1 .....Set Time Of Day / Day / 5 or 7 Day Operation:

- **Set Time Of Day:** Enter **[11] [CODE]**. At the LCD prompt, enter Hour : Min, i.e., 2:00 p.m. will be entered as 14:00.
- **Set Day:** If required, set the day of the week by entering **[18] [CODE]**. LCD. prompt, IS TODAY MONDAY, use the UP arrow key to scroll through the days of the week and press **[CODE]** to select proper day.
- **Select 5 Or 7 Day Operation:** Enter **[19] [CODE]**. At the LCD prompt, use the UP arrow to toggle between 5 or 7 day operation, press **[CODE]** to select.

A2.0 .....Timer Modes of Operation:

A2.1 .....Auto "ON" Operation:

- STEP 1. Set timer "on" time. Enter **[15] [CODE]** and at the LCD prompt, enter desired time, i.e., for a turn-on time of 8:00a.m., enter 08:00.
- STEP 2. Set timer "off" time. Enter **[17] [CODE]** and at the LCD prompt, enter 0000 or simply press the [CLEAR] button to reset the display to 00:00.
- STEP 3. Enable timer operation. Enter **[12] [CODE]**.

A2.2 .....Auto "OFF" Operation:

- STEP 1. Set timer "on" time. Enter **[15] [CODE]**. At the LCD prompt, enter 0000 or press **[CLEAR]** to reset the display to 00:00.
- STEP 2. Set timer "off" time. Enter **[17] [CODE]** and at the LCD prompt, enter desired time. i.e., for a turn off time of 5:00 p.m., enter 1700 (17:00).
- STEP 3. Enable timer operation. Enter **[12] [CODE]**.

A2.3 . . . . . Auto "ON/OFF" Operation.

- STEP 1. Set timer "on" time. Enter **[15] [CODE]** and at the LCD prompt, enter desired turn on time, i.e. 8:00 a.m. is entered as 0800.
- STEP 2. Set timer "off" time. Enter **[17] [CODE]** and at the LCD prompt, enter desired "off" time, i.e., 5:00 p.m. is entered as 1700.
- STEP 3. Enable timer operation. Enter **[12] [CODE]**.

A2.4 . . . . . .Verifying Your Settings:

- STEP 1. Display time/day. Enter **[10] [CODE]**.
- STEP 2. Display timer "on" time. Enter **[14] [CODE]**.
- STEP 3. Display timer "off" time. Enter **[16] [CODE]**.

> OR <

- Enter **[26] [CODE]**, display system / channel status information page.

A2.5 . . . . . .Notes:

! To disable the timer operation, enter **[13] [CODE]**.

! Be sure to leave the main ac power switch located on the rear panel in the "ON" position.

A2.6 . . . . . .Timer Quick Reference Table:

A

CODE	FUNCTION
10	DISPLAY TIME/DAY
11	SET TIME OF DAY
12	ENABLE TIMER OPERATION
13	DISABLE TIMER OPERATION
14	DISPLAY "ON" TIME
15	SET TIMER "ON" TIME
16	DISPLAY "OFF" TIME
17	SET TIMER "OFF" TIME
18	SET DAY
19	TOGGLE 5 OR 7 DAY OPERATION

Appendix B

Channel Color Balance

The AMPRO 3600/4600 provides the capability to pre-set the color balance for each external source being used. The black and white levels may be controlled by the remote control and pre-set into individual channel locations.

Along with the capability to pre-set custom color temperatures, the AMPRO 3600/4600 has three factory pre-set color temperature values, 9300°K, 6500°K and 3600°K. These factory pre-sets may be used with anyone of your external sources providing they are at the 1vp-p. (700mvp-p) signal level. Additionally, the factory pre-sets may be modified to conform to your requirements.

! The control of the contrast (signal level) is restricted to attenuating signal level and provides no signal gain capability.

! This procedure makes the assumption that the AMPRO system has been properly installed and correctly aligned.

Perform the following steps to setup and save color temperatures

B1.1 .....Pre-adjustment Requirements:

- INPUT: Desired external source (displaying multiple colors or grayscale pattern).
- CLAMPING: Set to or select Back-porch clamping (48 [CODE]).
- CHANNEL: Any channel setup for your particular source, i.e., mode of operation, convergence, etc..
- REMOTE SETTINGS: Set brightness [BRIGHT] and contrast [CONT] to desired operating level.

B2.0 .....Adjustment Procedure:

This procedure is based on a visual acceptance of the black and white levels. As mentioned previously the level controls are provided to balance and/or attenuate any signal level above 1Vp-p (700mvp- p), and are factory pre-set for unity drive (1v "in" / 1v "out").

- STEP 1. Perform a visual evaluation of the displayed image.
- EXAMPLE: If the black level of the displayed image appears to be red in color, adjust the Red brightness by entering **95 [CODE]** (Enable Sub-Brite), then select **[RED]**. Use the up and down arrow keys to increase or decrease the Red black level. NOTE: To select a different color, simply press the desired color button. Perform this process for each color until desired results are achieved.
- STEP 2. To set or reset the master brightness while in the Sub- Brite mode, simply press **[BRIGHT]**, and again using the up/down arrow keys increase or decrease the master brightness level.
- STEP 3. As with the black level adjust, the individual contrast levels are set using a similar method, enter **94 [CODE]** (Enable Sub-Contrast), select the desired color and use the up/down arrows to adjust.
- STEP 4. Adjust the individual contrast levels for desired white or color levels without causing the de-focusing of the adjusted color or the entire displayed image.
- STEP 5. To adjust master contrast while in the Sub-Contrast mode, press the **[CONT]** button and adjust using the up/down arrow keys.

Continue with the above steps until a visually acceptable color balance is achieved.

B3.0 . . . . . Using The Factory Presets:

There are three commonly used settings that have been factory pre-set and may be accessed without losing any previously set custom or user defined color balance.

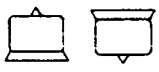
! The factory presets are based on input signals of 1vp-p (700mvp- p) and effect only the contrast level of the signal.

- STEP 1. Enter the channel you wish to adjust and have an active source applied to appropriate module.
- STEP 2. With the image being displayed, enter **96 [CODE]** (Select Color Temperature). Once activated, the channel location will be automatically set to the 9300°K settings and the previous channel values will be moved into the "USERS COLOR TEMP" selection.
- STEP 3. Use the up/down arrow keys to scroll through the available selections. NOTE: Every time you scroll through the listings of the available values the channel will be updated to that value.
- STEP 4. With the desired value being displayed in the LCD read- out, press the **[CODE]** button to select.

! Once the **[CODE]** button has been pressed and the user defined value was not the value selected (the value currently being displayed in the LCD read-out), any user defined or custom channel settings will be lost.

B4.0 . . . . . .Color Temperature Command(s) Summary

B

COMMAND	FUNCTION
48 [CODE]	TOGGLES BLACK LEVEL CLAMP POINT FROM BACK-PORCH TO SYNC-TIP
94 [CODE]	ENABLE SUB-CONTRAST MODE
95 [CODE]	ENABLE SUB-BRITE (BRIGHTNESS) MODE
96 [CODE]	ENABLE COLOR TEMPERATURE SELECTION
[CODE]	SELECTS DESIRED COLOR TEMPERATURE
[RED], [GREEN], [BLUE]	SELECTs COLOR TO BE ADJUSTED
[BRIGHT]	SELECTS MASTER BRIGHTNESS CONTROL
[CONT]	SELECTS MASTER CONTRAST CONTROL
	INCREASE/DECREASE SELECTED FUNCTION, SCROLL THROUGH AVAILABLE COLOR TEMPERATURES.

Appendix C

System / Channel Status Pages

C1.0 . . . . . .General:

The internal system status pages are accessed by entering [26] [CODE] and contain four (4) informational pages, which indicate the operational status and condition of the various system features. The four internal pages are described below. NOTE: To move between status pages use the UP, DOWN, LEFT and RIGHT arrow keys. See legend at bottom of information pages.

C1.1 . . . . . .Current Channel Information:

The first status page consist of current channel information. This page will indicate all of the configuration parameters associated with the current (active) channel. The active channel being the channel the system was in when 26 CODE was initiated. Refer to Figure C-1.

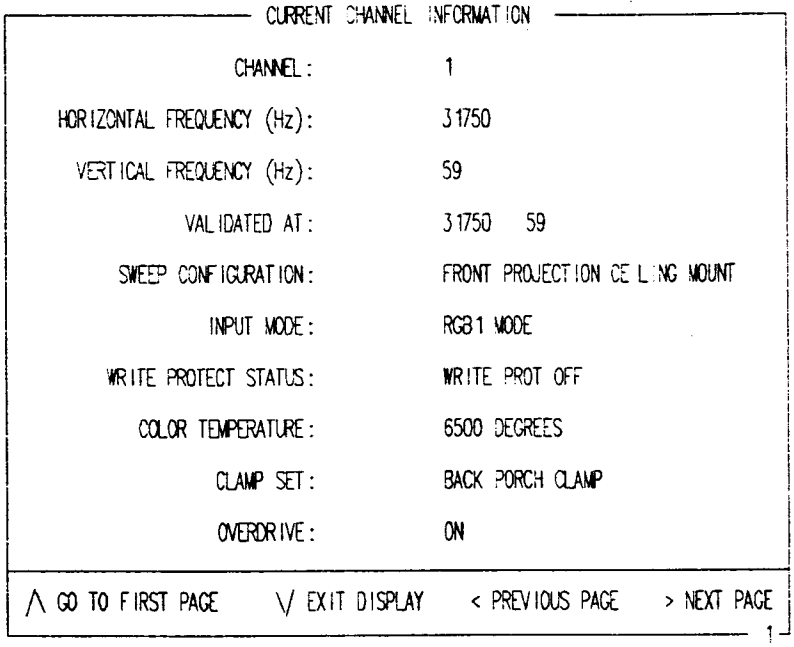


FIGURE C-1. STATUS PAGE 1. CURRENT CHANNEL DATA.

REFERENCE	DESCRIPTION	REFERENCE CODE (KEY)
CHANNEL	Indicates the active channel number.	[CHANNEL]
HORIZONTAL FREQUENCY (Hz)	Display the horizontal frequency of the incoming signal for the active channel.	36
VERTICAL FREQUENCY (Hz)	Displays the vertical frequency of the incoming signal for the active channel.	36
VALIDATED AT	Indicates the horizontal and vertical frequencies that have been validated (stored) for the active channel. If not validated, then "NOT VALIDATED" will be indicated.	25
SWEEP CONFIGURATION	Displays the projection mode, i.e. FRONT PROJECTION CEILING MOUNTED.	33
INPUT MODE	Indicates the mode of operation for above channel location.	[CHANNEL]
WRITE PROTECT STATUS	Indicates whether channel write-protect is on or off. The write-protect features prevents changes from being made to a previously established channel location.	20
COLOR TEMPERATURE	Displays the current color temperature for the active channel. Select from either 3600°K, 6500°K, 9300°K or user's custom setup.	96
CLAMP SET	Signifies whether back porch or sync tip black level clamp is selected	48
OVERDRIVE	Indicates whether "overdrive" mode is on or off.	86/85

C.1.2 . . . . . Channel Validation Status:

The second page of the system/channel status page(s) is the "CHANNEL VALIDATION STATUS". This page provides a quick reference whether a channel is validated or not validated.

There are two methods to validate a channel;

1.) Enter **24 [CODE]** at the end of your setup and alignment.

2.) Perform a complete guided setup in which at the end of the guided setup sequence, the system will automatically "VALIDATE" the channel.

Once a channel is validated, the horizontal and vertical frequencies are written into a "look-up" or channel reference table. The look-up table provides reference setups for the A.C.S. command to use. Additionally, the "AUTO-SEARCH" mode utilizes the same "look-up" table to perform it's routine.

Channel location that indicate the horizontal scan rate / vertical frame rate, e.g. 31250 / 60 are VALIDATED channels. Channels that are not validate will be left blank with no indication. Although, a channel that is not validated does not indicated whether the channel is in use or not. Refer to Figure C-2.

! An "OD" succeeding the horizontal and vertical scan rates indicates that the channel is designated as an "overdrive" channel and overdrive mode is "ON".

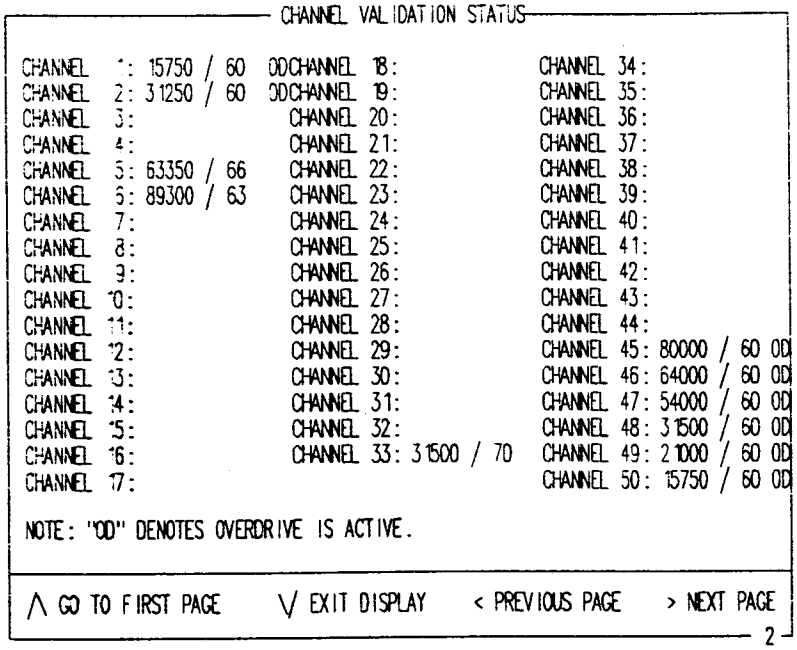


FIGURE C-2. STATUS PAGE 2. CHANNEL(S) VALIDATION

C

C1.3 . . . . . Unit Information Page:

The third status page consist of general unit information, which include system identification, firmware revision level, communication baud rate and available source input modules. Refer to Figure C-3 for additional information.

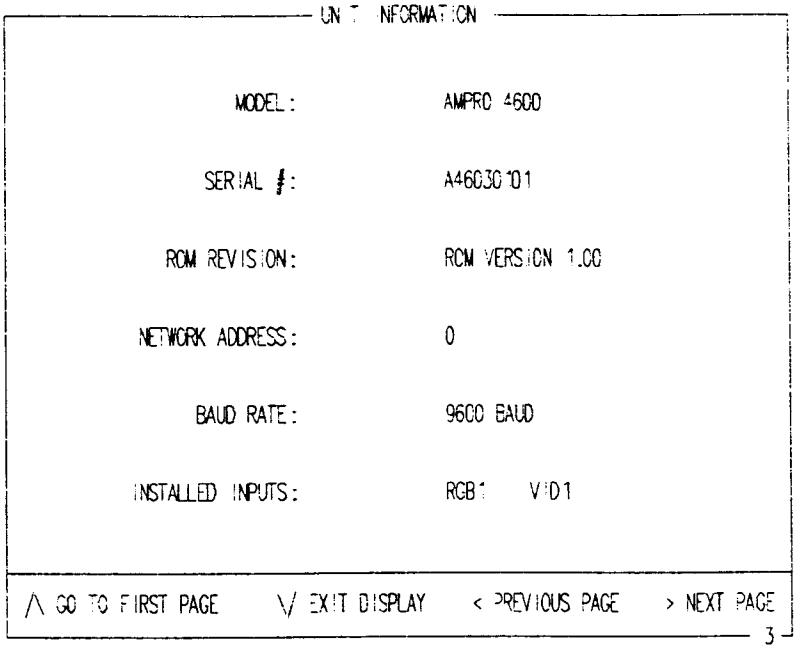


FIGURE C-3. STATUS PAGE 3, UNIT INFORMATION.

REFERENCE	DESCRIPTION	REFERENCE CODE (KEY)
MODEL	Refers to the model (make) of the AMPRO display system	N/A
SERIAL #	Refers to the serial number of this particular AMPRO display system.	35
ROM REVISION	Indicates the current revision level of the CPU operating system.	35
NETWORK ADDRESS	Indicates the Unit address number. Network Address 0 indicates UNIT # 1	44
BAUD RATE	Display the communication baud rate the system is set at.	44
INSTALLED INPUTS	This will indicate the available standard and optional input modules.	34

C1.4 . . . . . System Status Page

The fourth and final status page indicates the operating condition, internal temperature and the status for the special features of the display system. See Figure C-4.

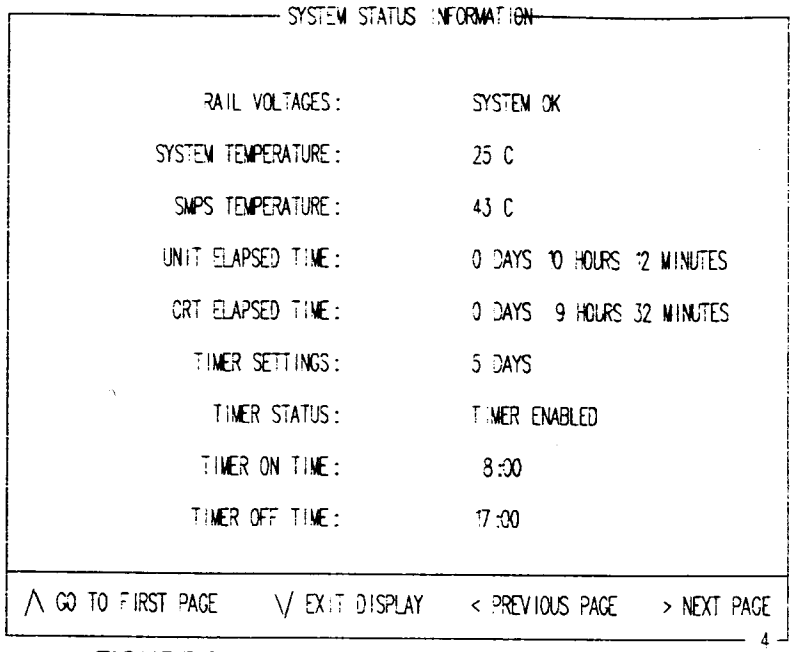


FIGURE C-4. STATUS PAGE 4, SYSTEM STATUS

REFERENCE	DESCRIPTION	REFERENCE CODE (KEY)
RAIL VOLTAGES	This will indicate the operational status of the system. If no failure is detected, the response will be simply "SYSTEM OK". If an error is detected the message will read "ERROR FOUND CHECK 30 CODE.	30
SYSTEM TEMPERATURE	Displays the housing temperature in degrees Celsius (°C)	39
SMPS TEMPERATURE	Displays the low voltage power supply (SMPS) internal operating temperature. NOTE: SMPS maximum temperature limitation of (70 °C). Please contact the factory in SMPS temperature exceeds 70°C (158 °F).	39
UNIT ELAPSED TIME	Display the total operating system "on" time in DAYS:HOURS:MINUTES	31
CRT ELAPSED TIME	Displays the total operating CRT "on" time in DAYS:HOURS:MINUTES	32
TIMER SETTINGS	Indicates whether the 5 or 7 day operation has been selected for the internal timer setup.	19
TIMER STATUS	Indicates whether the internal timer is enabled or disabled	12 / 13
TIMER ON TIME	Indicates the desired time set for auto-on operation.	14
TIMER OFF TIME	Indicates the desired time set for auto-off operation.	16
Fahrenheit Conversion	°F = 1.8 x °C + 32	

C

Appendix D

Intensity Mapping

Intensity mapping provides the ability to increase or decrease the contrast/color level over the entire image or just portions of the projected image presenting an "even field" of white from the center to the edges of the image. Intensity mapping is useful to overcome possible shading of the image, when using curve, high gain screens causing "hot spots" and overlaying of multiple projected images.

Intensity mapping allows the contrast and color balance of the top, bottom, left, right and all four corners of the projected image to be adjusted individually. The center of the image serves as a reference point for the surrounding zones and can only be adjusted with the master contrast control. As with the other adjustments on the Ampro systems, intensity mapping is designated within a channel location. Each channel may have unique intensity mapping settings. Use the following procedure to perform intensity mapping adjustments for the active channel.

! The following procedure makes the assumption that the system has been completely and correctly installed , aligned and an acceptable grayscale has been achieved.

☐ PATTERN REQUIRED: White field at the desired frequency.

☐ TEST EQUIPMENT: Light meter /photometer i.e., Tektronix® J16 photometer , Photo Research® PR650 SpectraColorimeter™ or equivalent.

D1.0 . . . . . .Procedure:

- STEP 1. Divide the white field pattern into 9 zones. Refer to Figure D-1. Note the area selection keys and the affected zone.
- STEP 2. Select desired mode of operation with a white field input.
- STEP 3. Using the remote control set brightness to 75% and contrast to 65%

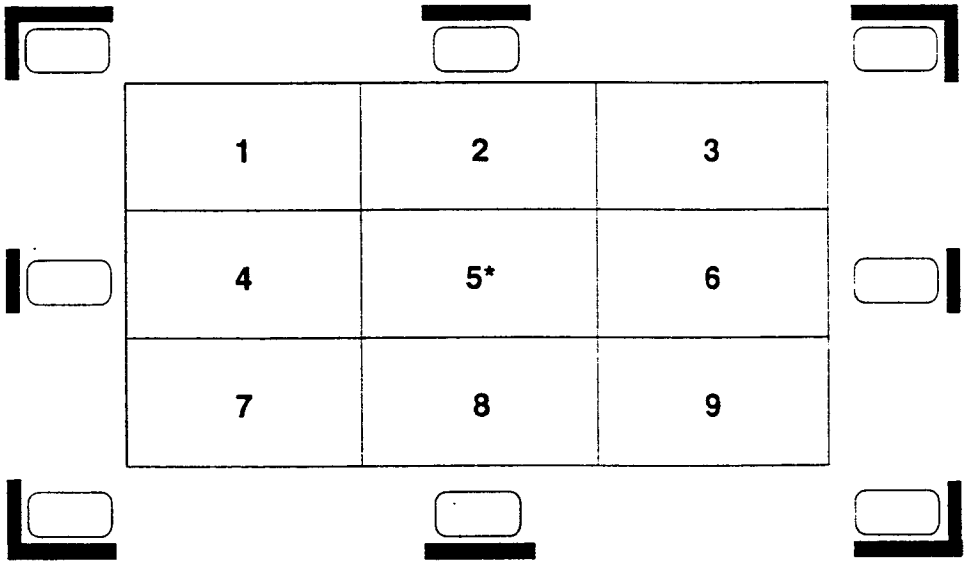


FIGURE D-1.

☐ *** ZONE 5 (CENTER OF IMAGE) SERVES AS A REFERENCE POINT FOR THE SURROUNDING ZONES AND CAN ONLY BE ADJUSTED BY THE MASTER CONTRAST CONTROL.**

D1.0 . . . . . Procedure: (CONTINUED)

- STEP 4. Turn the Red and Blue CRTs "OFF".
- STEP 5. GREEN ONLY! Measure and record the readings of each zone indicated in Figure D-1.
- STEP 6. Set zone 5 (Figure D-1) to the lowest reading (recorded above), with the **[CONT]** button.
- STEP 7. Enter 92 **[CODE]** , to enable intensity mapping operation.
- STEP 8. Select **[GREEN]**, then select an EDGE and use the [↑] and [↓] down arrow keys to adjust zone 2, 4, 6, and 8 light levels to equal the light level of zone 5.
- STEP 9. Once the edges have been set, select and adjust the QUADRANTS for zones 1, 3 , 7 and 9 to equal that of zone 5 as in Step 8.
- STEP 10. RED ONLY then BLUE ONLY . Measure the light level of zone 5 of the red and set all other zones of the red image to equal zone 5. Repeat the process for the blue image.

¤ Start your adjustments with the edge controls for zones 2, 4, 6 and 8, as the settings of these edges will affect the light level of the quadrants (corners), i.e., the setting of zone 2 will affect the levels of zone 1 and zone 3 and always finish your adjustments with the quadrant controls for zones 1, 3, 7, and 9.

D1.1 . . . . . .Notes:

- Enter 92 **[CODE]** to enable intensity mapping adjustment for the active channel. If any other adjustment other than Master brightness and contrast is made , 92 **[CODE]** will have to be re-entered.
- Pressing the **[GREEN]** (MASTER) button will select simultaneous adjustment of RED, GREEN and BLUE intensity. Press the **[RED]** or **[BLUE]** button to select individual adjustment of the RED or BLUE intensity.
- Use the edge and quadrant keys to select the desired side or corner of the projected image to be adjusted. Always start your adjustments with the edge controls and finish with the quadrant controls.
- Use the Up or Down arrow key to increase or decrease the level of the selected intensity mapping adjustment.
- Enter 93 **[CODE]** to null the process or reset (set to 50%)the settings for the intensity mapping
- Use the following template to record your readings.

R= G= B=	R= G= B=	R= G= B=
R= G= B=	R= G= B=	R= G= B=
R= G= B=	R= G= B=	R= G= B=

Appendix E

AMPRO Infrared Remote Controls

E1.0 .....AMPRO Series Infrared Remote Controls / Features:

E1.1 ..... Technician Infrared Remote Kit: P/N 69092

The AMPRO Technician Infrared Remote Transmitter is a small, push-button unit powered with a 9 volt battery supply. The transmitter can be utilized at distances within fifty feet (15.2 m) by simply pointing the unit at the infrared receiver and depressing the desired function key. Included with the Technician IR Transmitter, is the IR Receiver, and a "Y" adapter, which permits interfacing the Infrared Receiver with the display system and the standard hard-wired remote control.. Some of the functions include the image quality adjustments, store/recall of channels, control one or multiple units and, by pressing the **[HELP]** key, enabling the Guided Setup mode of operation.

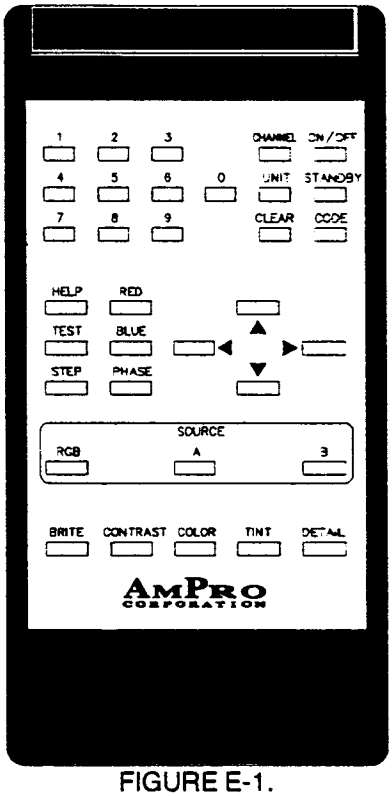


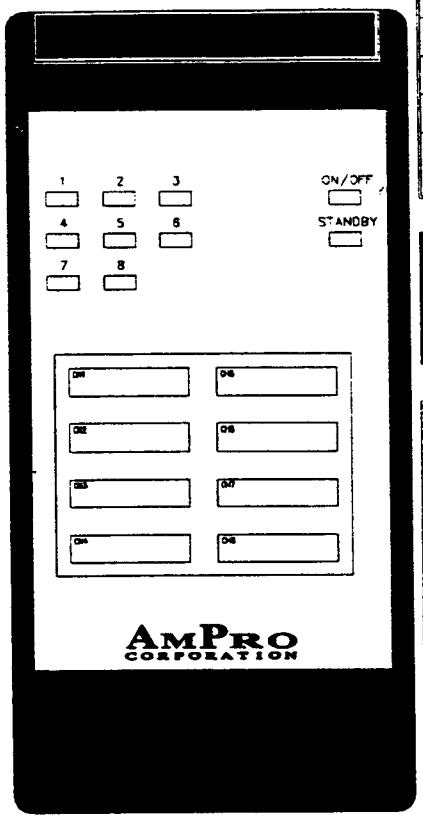
FIGURE E-1.

BUTTON	DESCRIPTION	BUTTON	DESCRIPTION
ON/OFF	Toggles power on/off	TEST	Toggles in/out of test mode
STANDBY	Toggles picture on/off	STEP	Advances test pattern selection or while in HELP, advances pages/function
CODE	Inputs internal code functions.	PHASE	Enable H&V phase function
CLEAR	Removes an incorrect entry.	RGB	Select RGB1 mode or 62kHz test mode
CHANNEL	Inputs selected channel #.	A	Selects option 1 mode or 32kHz test mode
UNIT	Inputs selected unit #.	B	Selects option 2 mode or 15.75kHz test mode
ARROWS	Adjust image quality/ registration.	BRITE	Enables brightness function for adjustment
KEYPAD	Used for inputting channel / unit numbers, percentage values.	CONTRAST	Enables contrast function for adjustment
RED	Enables Red shift functions	COLOR	Enable color function for adjustment
HELP	Enters HELP mode	TINT	Enables tint (hue) function for adjustment
BLUE	Enables Blue shift function	DETAIL	Enables detail (sharpness) function for adjustment

TECHNICIAN IR TRANSMITTER/RECEIVER SPECIFICATIONS	
RANGE	50 ft. (15.2m) @ ± 25° off axis (X axis) 20 ft. (6.1m) @ ± 80° off axis (X axis). See Figure 5-4
RECEIVER CABLE	6 ft. (1.82m) (standard) 12 conductor-shielded, PVC jacket, 15 pin "DB" connector with thumbscrew fasteners.
POWER	9 volt battery in transmitter: Duracell® MN 1604 B or equivalent.
REMOTE FUNCTION KEYS	Power On/Off, Standby, Code, Channel, Unit, Clear, Help (Guided Setup), Test, Step, Red, Blue, Phase, RGB, A- Option Input 1, B-Option Input 2, Brightness, Contrast, Color, Tint, Detail, a numeric keypad and the UP, Down, Left, Right arrow keys.
WEIGHT TRANSMITTER	8oz.
RECEIVER	4oz.
SIZE TRANSMITTER	6.0" (15.2 cm) x 1.3" (3.3cm) x 3.0" (7.6cm)
RECEIVER	4.56" (11.6cm) x 1.06" (2.7cm) x 0.9" (2.3cm)

E1.2 . . . . . Executive Infrared Remote Kit : P/N 69124

The AMPRO Executive Infrared Remote kit transmitter can be used up to 50ft. (15.2m) and has available the following controls; On/Off, Standby and 8 channel selections. Refer to Figure E-2 for the name, location and a brief description of the controls on this remote transmitter. Included with the Executive IR Transmitter, is the IR Receiver, and a "Y" adapter, which permits interfacing the Infrared Receiver with the display system and the standard hard- wired remote control..



BUTTON	DESCRIPTION
ON/OFF	Toggles power on/off
STANDBY	Toggles picture on/off
1 - 8	Used for the eight channel selection
LABEL	Adhesive label has pencil/pen printable area to record dedicated channel locations and description.

! TO USE THE EXECUTIVE IR TRANSMITTER WITH THE AMPRO DISPLAY SYSTEM, THE DISPLAY SYSTEM AND/OR OPTIONAL 8 CHANNEL SWITCHER MUST BE PLACED INTO THE EXECUTIVE MODE OF OPERATION USING **37 [CODE].**

EXECUTIVE IR TRANSMITTER/RECEIVER SPECIFICATIONS	
RANGE	50 ft. (15.2m) @ ± 25° off axis (X axis), 20 ft. (6.1m) @ ± 80° off axis (X axis). See Figure 5-4.
RECEIVER CABLE	6 ft. (1.82m) (standard) 12 conductor-shielded, PVC jacket, 15 pin "DB" connector with thumbscrew fasteners.
POWER	9 volt battery in transmitter: Duracell® MN 1604 B or equivalent.
REMOTE FUNCTION KEYS	Power On/Off, Standby, 8 Channel selections.
WEIGHT TRANSMITTER	8oz.
RECEIVER	4oz.
SIZE TRANSMITTER	6.0" (15.2 cm) x 1.3" (3.3cm) x 3.0" (7.6cm)
RECEIVER	4.56" (11.6cm) x 1.06" (2.7cm) x 0.9" (2.3cm)

E

FIGURE E-2.

E2.0 . . . . . .Infrared Receiver:

The AMPRO Infrared Receiver is a compact and portable unit with a contemporary and decorative case design. The receiver may be used with various optional lengths of up to 100 ft. (30.4 m) of 12 conductor-shielded cable with a PVC jacket. Power to the receiver is supplied from the projection system via a 15 pin "DB" connector with thumb screw fasteners. The IR Receiver is included with either the Technician or Executive IR Remote kits.

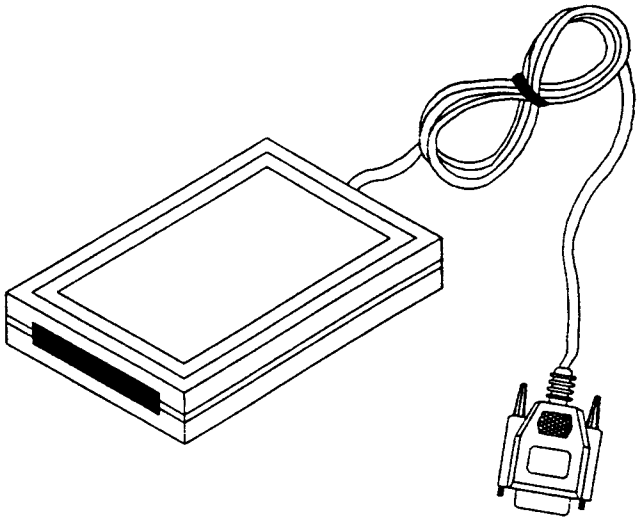


FIGURE E-3.

E2.1 . . . . . Receiver Installation:

E2.1.1 . . . . . Installation Parameters:

For direct control of one or more display systems and/or switchers simply plug the standard 6ft. (1.8m) cable into the "HOST" port of the master system being controlled. For proper receiver installation/mounting configurations and other options refer to Section E2.2.

When using the Infrared Remote Transmitter/Receiver, ensure you are within the effective operating area. The remote control unit will not function properly if strong light strikes the sensor window or if there are obstacles between the remote control transmitter and receiver. Refer to Figure E-4

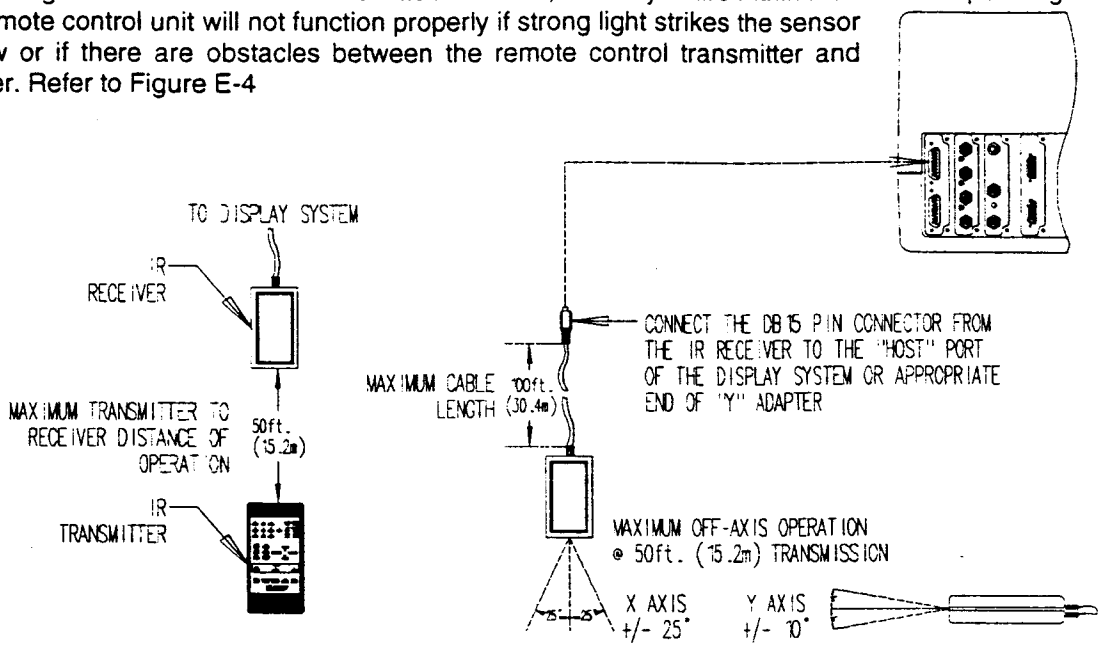


FIGURE E-4.

E2.2.2 . . . . . .IR Receiver Optional Installation / Mounting Examples:

The IR Receiver may be installed in various ways. However, one basic consideration that must be followed is that the IR Receiver sensor window be shielded from any external light source, in particular, fluorescent lighting, as this type of lighting will interfere with the operation of your system.

Remote control of the AMPRO is achieved by interfacing the remote controls with the display system via a "Y" adapter supplied with the infrared receiver. Additionally, the optional RS232 switcher may be connected by a 6ft. (1.8m) "Y" adapter supplied with the RS232C system switcher, which will operate with either the standard hard-wired remote control or one of two IR remote control kits.

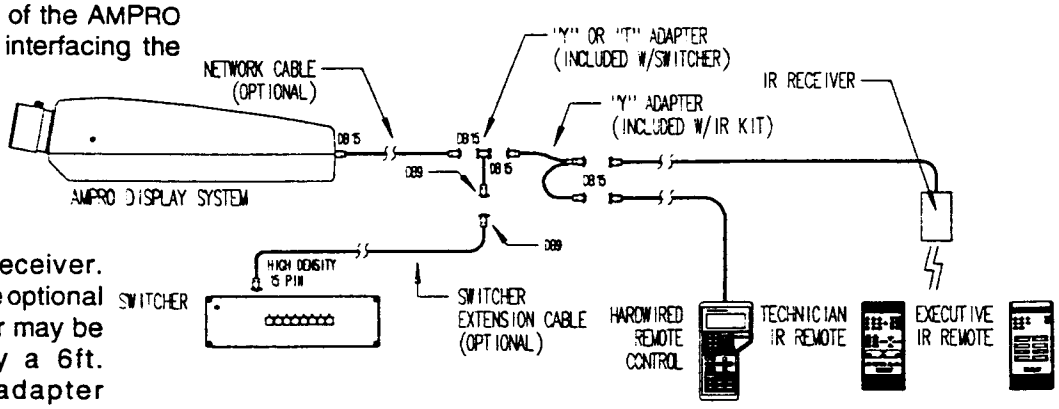


FIGURE E-5.

E2.2.3 . . . . IR Receiver Installation Example 1 (Ceiling Mount):

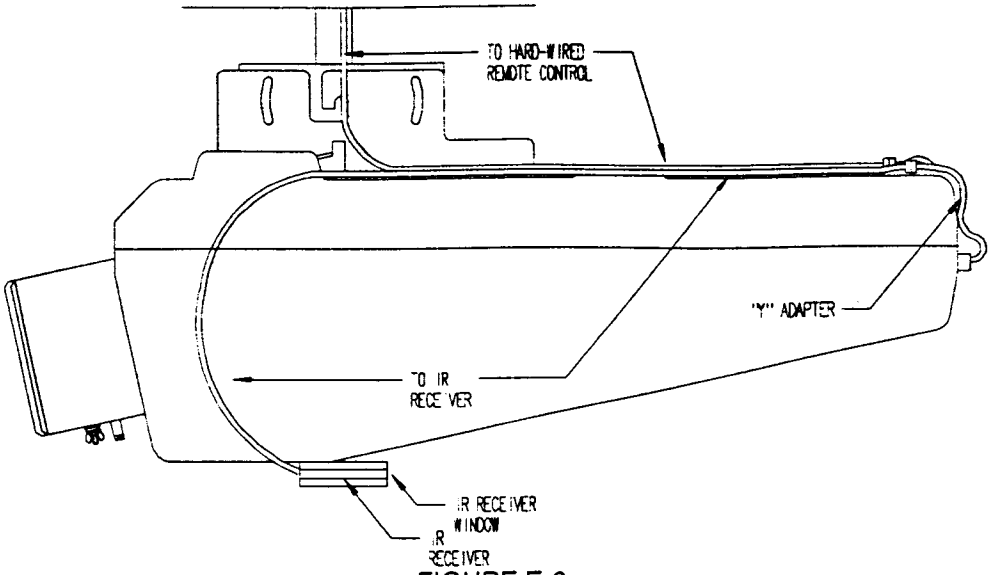


FIGURE E-6.

Ceiling mount configuration showing IR Receiver and hard-wired Remote Control connections.

E2.2.4 . . . . . IR Receiver Installation Example 2 (Rear Screen):

Figure E-7 illustrates one method of using both the IR receiver and hard-wired remote in a rear screen application with the use of the "Y" adapter and the optional RS232 wallplate.

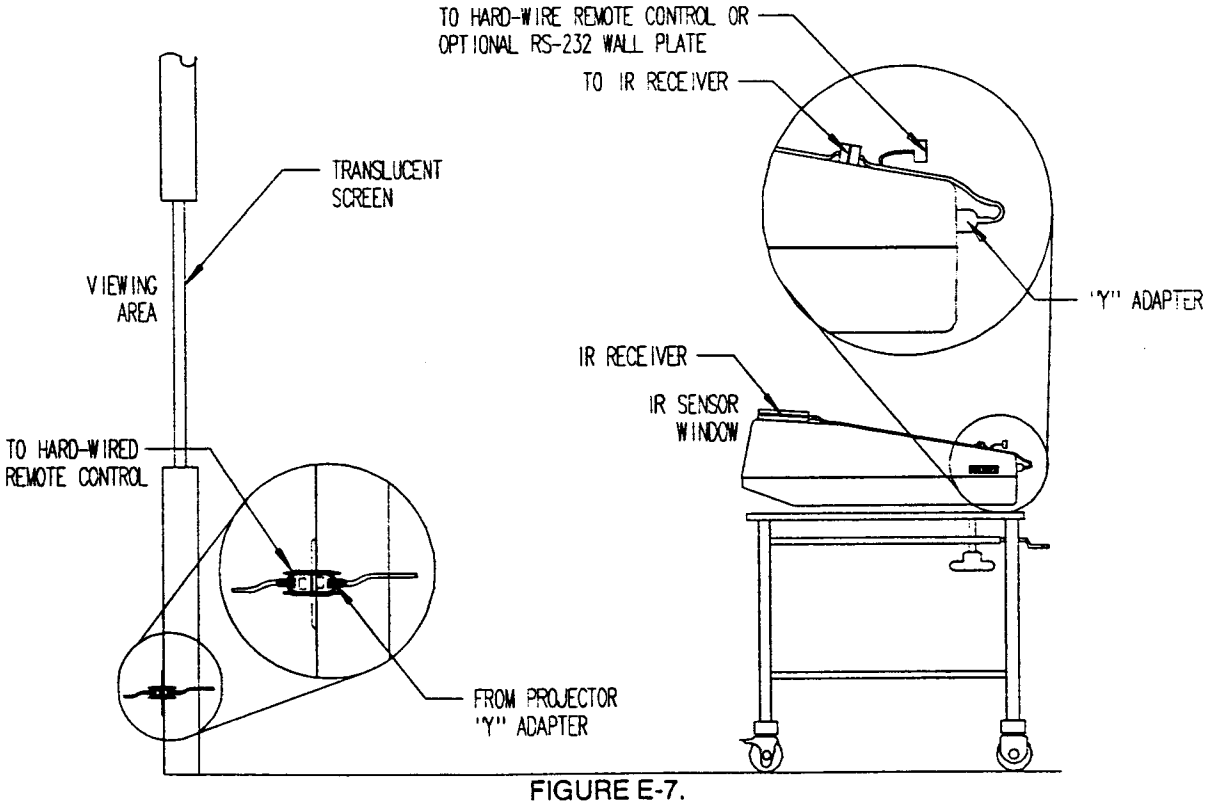


FIGURE E-7.

Rear screen application using the IR Remote "Y" adapter and the optional RS-232C wall plate.

E2.2.5 . . . . IR Receiver "Y" Adapter:

! To maintain proper operation when using the "Y" adapter, both the IR receiver and the hard-wired remote control must always be connected.

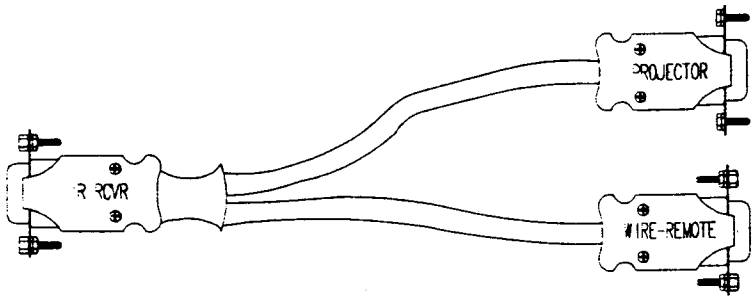


FIGURE E-8.

"Y" adapter is included with either the Technician or Executive IR kits.

E3.0 . . . . . .Transmitter Battery Replacement:

As previously mentioned the transmitter operates using a single 9 volt battery. If the range of operation has decreased replace the battery following the procedure listed below. Refer to Figure E-9.

- STEP 1. Turn the transmitter over.
- STEP 2. Locate the battery compartment cover and slide this cover to the right.
- STEP 3. Remove the old battery and discard.
- STEP 4. Replace with a new battery: Duracell MN 1604 B or equivalent.
- STEP 5. Replace the battery compartment cover

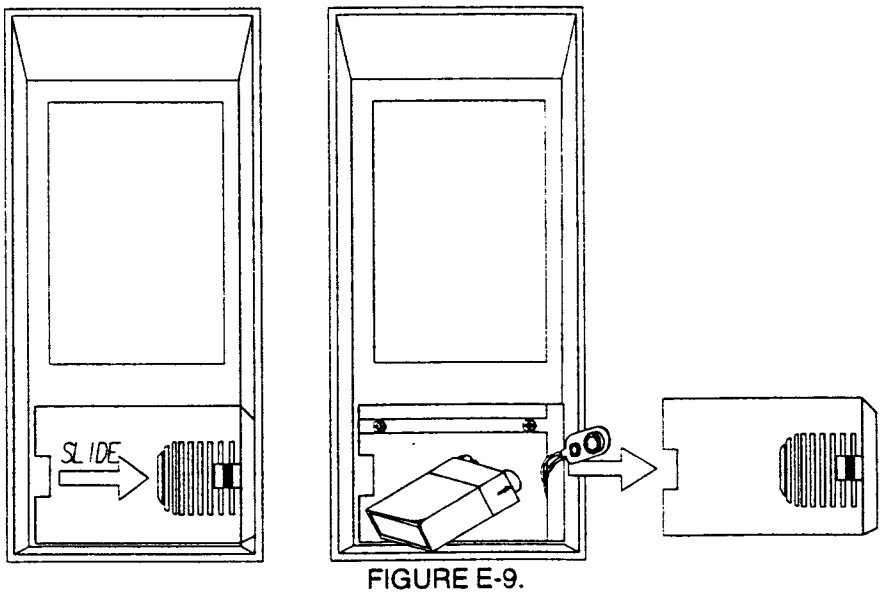


FIGURE E-9.
Battery location/replacement.

NOTES:

Appendix F

Accessories

ACCESSORY	P/N	DESCRIPTION
Switcher and Cables	69301	250 MHz, 8-channel, universal table or rack mount switcher with separate or composite sync inputs, audio follow with RGB, video or S-Video, and 12" (31cm) RS-232 communication cable with 5' (152cm) extension for compatibility with all projectors manufactured by AMPRO (except 1200s and 1100s - P/Ns 69318, 69317, 69410 and 69424). Factory preset at 110V or 220V.
	69355	50' (15.5m) RS-232 extension communication cable for switcher
Distribution Amplifiers	69365	1-input, 2-output, 220 MHz analog distribution amp. with RGsB, RGBS and RGB H&V sync
	69366	1-input, 3-output, 180 MHz analog distribution amp. with RGsB, RGBS sync
	69367	1-input, 4-output, 300 MHz analog distribution amp. with RGsB, RGBS sync
Ceiling Mounts	69512	3600 dual pipe mount with 2" pipe flange adaptor plates.69513
	69513	3600 dual pole mount with telescoping adjustment from 12' (31 cm) to 46" (120 cm)
	69362	4600 dual pipe mount with 2" pipe flange adaptor plates.
	69363	4600 dual pole mount with telescoping adjustment from 12' (31 cm) to 46" (120 cm)
Carrying Case	69441	3600 ruggedized case.
Remote Controls and Cables	69124	Executive 8-channel select on/off/standby infrared hand-held remote transmitter and receiver with 6' (1.8m) cable
	69092	Technician infrared hand-held remote and receiver with 6' (1.8m) cable
	69125	50' (15.5m) RS-232 extension cable for infrared receiver and wired hand-held remote
	69126	100' (31m) version of above
Coaxial Cables	69135	50' (15.5m) RGBS high resolution cable with BNC connectors
	69307	50' (15.5m) RGB H&V high resolution cable with BNC connectors
Manuals	71128	3600/4600 Operation Manual
	71129	3600/4600 Service Manual
Special Options	69211	NTSC/PAL line doubler with composite video, S-Video and RGB inputs, IR remote
	69286	Intensity Mapping (**Must be installed at time of purchase**)
	69180	50' (15.5m) RS232C cable for networking
Input Options	69448	RGBs input for 3600/4600
	69409	Quad Video/S-Video Decoder for 3600/4600

NOTES:

F

Supplement 1

Sweep Reversal Procedures

WARNING

*** NOTICE***

THE PROCEDURES OUTLINED IN THIS SUPPLEMENT ARE INTENDED TO BE USED AND PERFORMED ONLY BY QUALIFIED SERVICE/INSTALLATION PERSONNEL. DO NOT ATTEMPT TO MAKE ANY INTERNAL CHANGES IF YOU ARE NOT FAMILIAR WITH THIS SYSTEM AND THE STANDARD SAFETY PRECAUTIONS ASSOCIATED WITH ELECTRICAL OR ELECTRONIC EQUIPMENT.

S1.1 .....Accessing The Yoke Interface Board:

- STEP 1. Open the top cover. The top cover may be lifted by (1): turning 2 ea. 1/4 turn fasteners located on both sides of the bottom cover towards the front of the system. (2): pull and lock the hinges located on both sides of the top towards the rear of the system. See Figure S1-1.

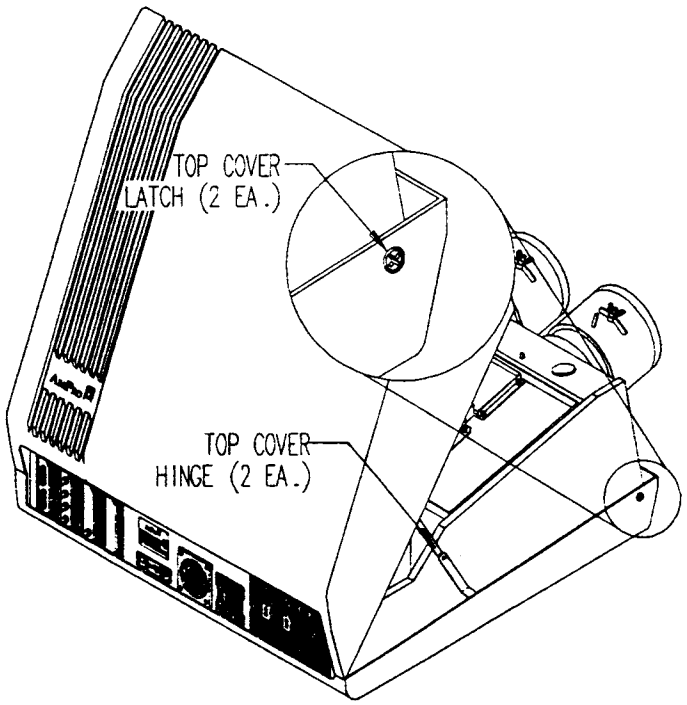


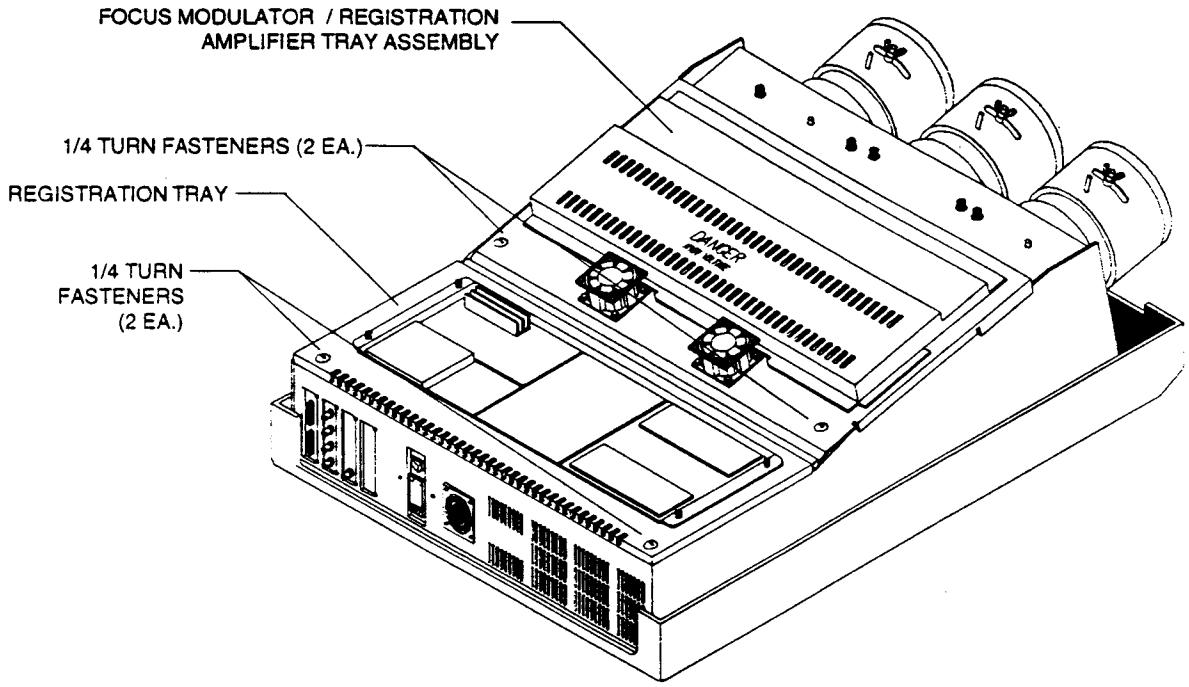
FIGURE S1-1. OPENING THE TOP COVER.

(AMPRO 4600 SHOWN)

S1.2 . . . . . Accessing The Sweep Reverse Card(s):

- STEP 1. Unlock and tilt up the registration tray and focus modulator/registration amplifier tray assembly. See Figure S1-2.

AMPRO 3600



AMPRO 4600

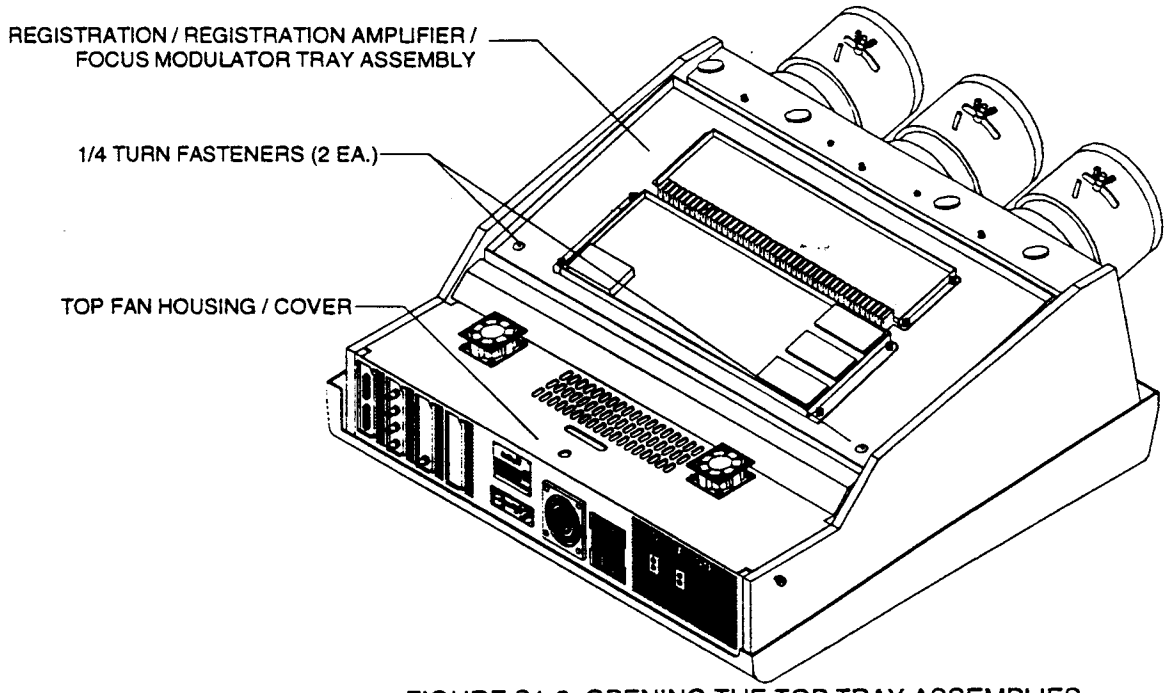


FIGURE S1-2. OPENING THE TOP TRAY ASSEMBLIES.

S1

S1.3 . . . . . Sweep Reversal Procedures:

WARNING

DO NOT SERVICE THE HORIZONTAL OR VERTICAL SWEEPS WHILE THE SYSTEM IS ENERGIZED. IF THE SWEEP CARD(S) ARE REMOVED WHILE THE SYSTEM IS ENERGIZED, HIGH VOLTAGE SHOCK WILL RESULT AND THE SYSTEM WILL BE DAMAGED.

S1.3.1 . . . . . Horizontal Sweep Reversal Procedure:

TO REVERSE THE HORIZONTAL SWEEP / REGISTRATION, DE-ENERGIZE THE SYSTEM AND DISCONNECT THE POWER CORD.

- STEP 1. Horizontal sweep and registration reversal is accomplished by reversing the configuration of the horizontal sweep/registration reverse card located on the Yoke Interface board.
- STEP 2. Note the position of the "O" and "X" located on the reversal card, see Illustration below. Pull the horizontal sweep/registration reverse card out, turn it end-for-end (180°) and plug it back in. See Figure S1- 3. Note; the sweep reverse card connector is keyed between pins 4 and 5.

! Recheck the raster centering. If re-adjustment is required, refer to Chapter 7, Master **STATIC** shift operations.

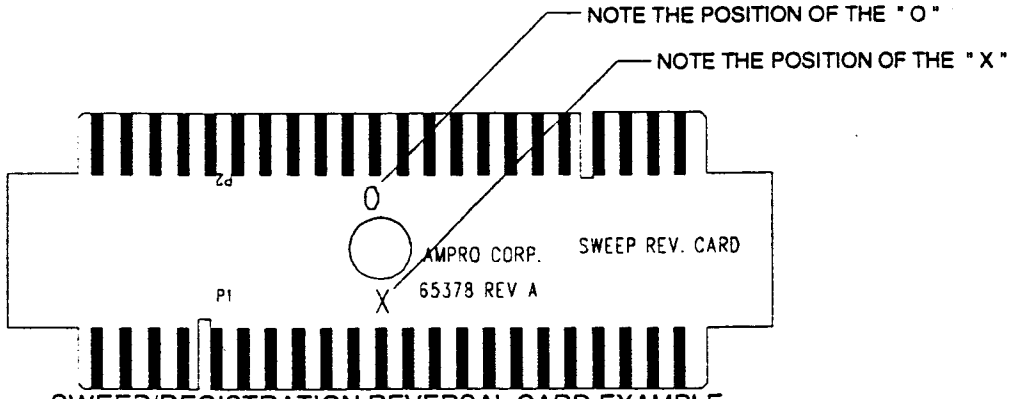
! If necessary, refer to Section S1.3.2 for the Vertical Sweep reversal procedure.

- STEP 3. If Vertical sweep reversal is not required, lower and lock the registration trays and then lower and lock the top cover into place.

S1.3.2 . . . . . .Vertical Sweep Reversal Procedure:

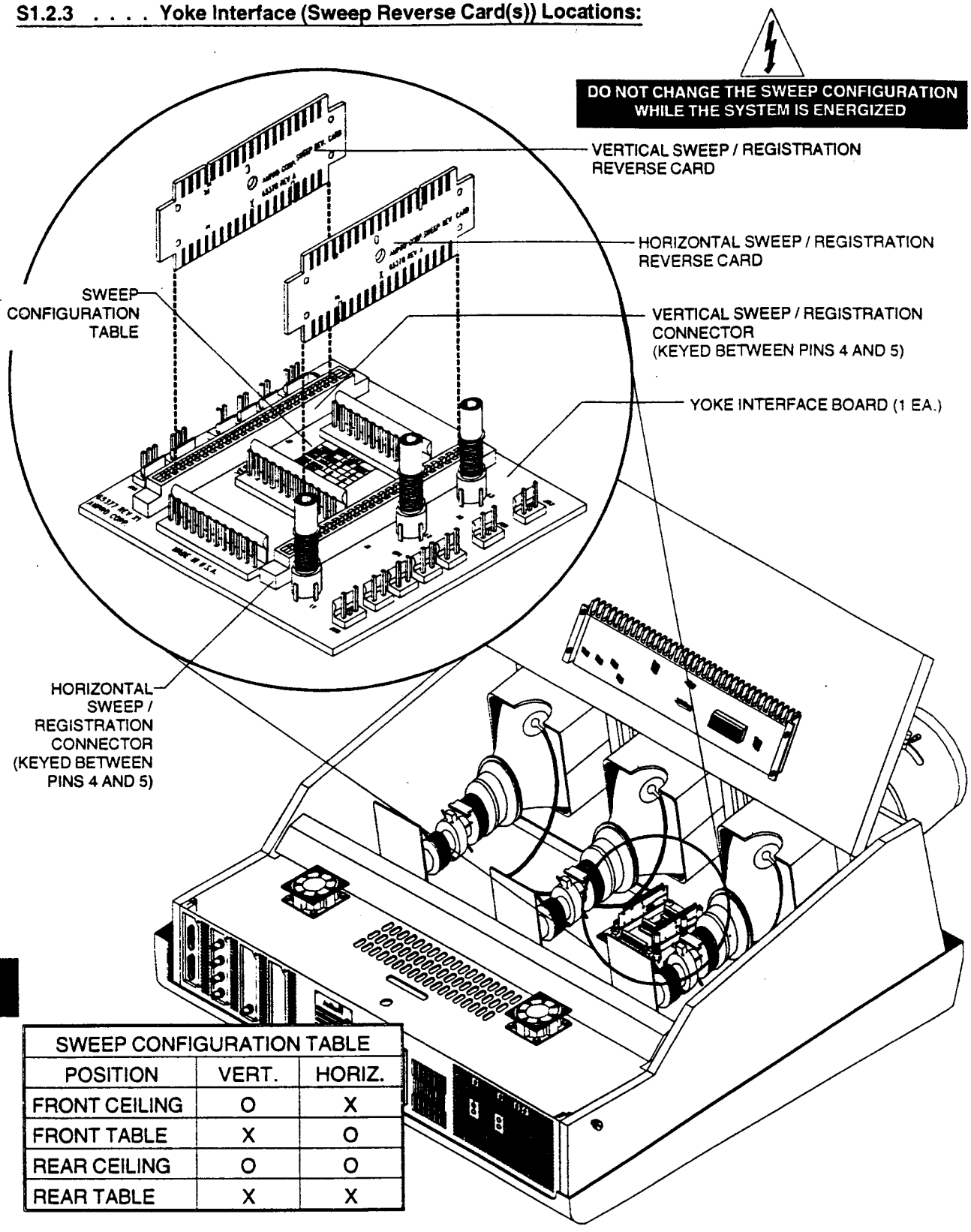
TO REVERSE THE VERTICAL SWEEP / REGISTRATION, DE-ENERGIZE THE SYSTEM AND DISCONNECT THE POWER CORD.

- STEP 1. Vertical sweep and registration reversal is accomplished by reversing the configuration of the Vertical sweep/registration card located on the Yoke Interface board.
- STEP 2. Note the position of the "O" and "X" located on the reversal card, see Illustration below. Pull the vertical sweep/registration card out, turn it end-for-end (180°) and plug it back in. Refer to Figure S1-3. Note: the sweep reverse card connector is keyed between pins 4 and 5.



SWEEP/REGISTRATION REVERSAL CARD EXAMPLE.

S1.2.3 . . . . Yoke Interface (Sweep Reverse Card(s)) Locations:



S1

SWEEP CONFIGURATION TABLE		
POSITION	VERT.	HORIZ.
FRONT CEILING	O	X
FRONT TABLE	X	O
REAR CEILING	O	O
REAR TABLE	X	X

FIGURE S1-3. SWEEP / REGISTRATION REVERSE CARD(S).
(AMPRO 4600 SHOWN)

Supplement 2

Lens Focusing and Positioning

S2.1 .....Getting Started:

In order to focus and position the lenses it will be necessary to unlock and tilt-up the top cover, which is secured with two ¼ turn fasteners located on the front of the bottom cover.

- STEP 1. To unlock simply turn the fasteners ¼ turn counterclockwise with a phillips blade screwdriver.
- STEP 2. Lift the top cover upward and lock into place using the two locking hinges located on both sides.
- STEP 3. Once the top cover has been lifted and locked, the lenses will be exposed.

! The tool required to focus and position the lenses is provided and located within the accessory box.

S2.1.1 .....Required Test Patterns / Using The Help Programs:

To focus and position the lenses you will use the crosshatch and crosshair test patterns or utilize the internal Help System and screens. See Section 8 for more information on the Help System.

If you are not using the internal help system perform the following steps .

- Each lens should be focused individually.
- Press and hold (approximately 3 seconds) the **[GREEN]**, **[RED]**and **[BLUE]** buttons to cutoff the images not being focused.
- Use the **[TEST]** and **[STEP]** buttons for selecting the internal test patterns and frequency (see Section 7, section 7.2.12.). Turn registration "OFF" using 55 **[CODE]** .

< OR >

Enter the Internal Help System for a step-by-step instruction, perform the following:

- Press the **[HELP]** button, then
- Enter SYSTEM SETUP MENU, subject 2, then;
- Select either one of the Guided Setup Programs (1 or 2). NOTE: In either case the programs will automatically turn Registration "OFF."

Once your unit has been installed for your particular requirements, you are now ready to perform the first stage of alignment, lens focusing and positioning.

S2.2 .....Lens Types:

There are several different types of lenses that may be used on your display system. The lenses used on the AMPRO 3600/4600 are determined by the magnification factor in which the system will be used. The lens may be identified by the label located on the top of each lens assembly.

S2.2.1 .....3600 Lens Type / Specifications:

LENS	SPECIFICATIONS
HD-8B	f/number 1.15 ± 2% @ infinity: Magnification Factor: 9.5X to 52X, Screen Widths: 42 in. (1.1m) to 233 in. (5.9m), Resolution: 10 lp/mm, air-coupled.

S2.2.2 .....4600 Lens Type / Specifications:

LENS	SPECIFICATIONS
HD-10L	f/number: f/1.15 ± 2%, Magnification factor: 9X to 11X, 43.0in. (1.1m) to 53.0in. (1.3m) picture width. Resolution: 10 lp/mm full field @ >50% MTF.
HD-10	f/number: 1.15 ± 7% @ infinity, Magnification range: 14X to 45X, 67.0in. (1.7m) to 216.0in (5.5m) picture width. Resolution: 10 lp/mm @ >50% MTF.
HD-10GT17	f/number: 1.15 ± 7% @ infinity, Magnification range: 14X to 20X, 67.0in. (1.7m) to 96.0in (2.4m) picture width, optimum at 16X, 77.0in (1.9m) picture width. Resolution: 12 lp/mm @ >50% MTF.
HD-10GT26	f/number: 1.15 ± 7% @ infinity, Magnification range: 21X to 30X, 100.0in. (2.5m) to 145.0in (3.7m) picture width, optimum at 26X, 125.0in. (3.2m) picture width. Resolution: 12 lp/mm @ >50% MTF.

Regardless, of the type of lens being used, the focus procedure remains the same.

S2.3 ..... Focus Procedure/Lenses:

When using the dual adjustment type lenses, adjust the primary and secondary focus adjustment for the best focus as outlined in Table S2-1, Step 1 for your particular configuration. You may be required to go back and forth between the two adjustments.

- STEP 1. Loosen the rearmost wingnut (knob) located on the top of the lens.
- STEP 2. Using the wingnut (knob), rotate the focus barrel until the center of the projected image appears to be in focus. Tighten the wingnut (knob).
- STEP 3. Following the same method described in Step 2, repeat for the outermost focus barrel until the outer edges of the projected image appear to be in focus.....Repeat for each lens.

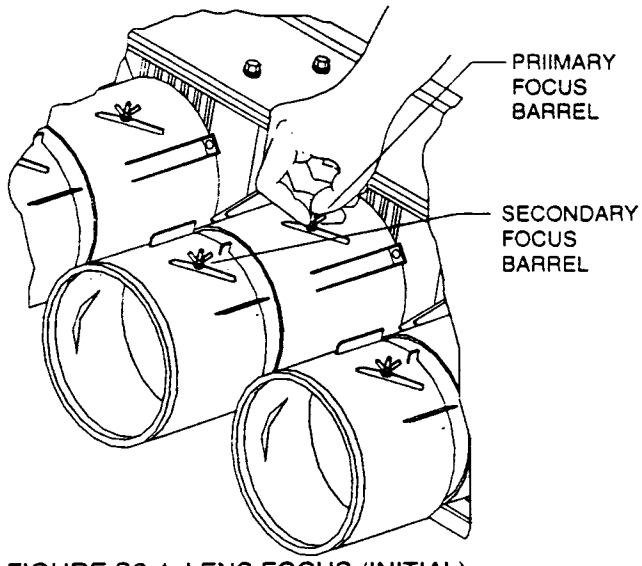


FIGURE S2-1. LENS FOCUS (INITIAL).

S2

S2.4 . . . . . Initial CRT Focus Procedure:

! Prior to performing the mechanical lens adjustment, ensure that the CRT magnetic focus has been pre-set to approximately 50% for the STATIC adjustments and 77% for the dynamic adjustments. Perform the following Steps.

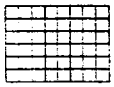
- STEP 1. STATIC FOCUS: Enter **[98] [CODE]**, select one color at a time and using the [RED], [GREEN] or [BLUE] BUTTONS. Using the UP or DOWN arrow keys adjust the static focus for 50% of its range for each color.

- STEP 2. DYNAMIC FOCUS: Enter **[99] [CODE]**, then select a color. Using the LEFT and RIGHT arrow keys adjust the horizontal (left-to-right) dynamic focus for 77% and using the UP and DOWN arrow keys adjust the vertical (top-to-bottom) dynamic focus for 77% for each color.

Once the above procedure has been performed, you may proceed to the lens focusing and positioning procedure.

S2.5 . . . . . .Lens Focus and Positioning:

! The following procedure is outlined for a **FRONT/CEILING MOUNT INSTALLATION.** Reference is as viewed from the front of the unit. Refer to TABLE S2-1 page S2-6 for procedures on other installation configurations.

¤ CROSSHATCH PATTERN REQUIRED. 

- STEP 1. Tighten all three lens adjustments, then turn counterclockwise 1½ of a turn. Refer to Figure S2-2.

- STEP 2. Adjust the primary and secondary lens barrel until the lower right corner of the projected image is focused.

- STEP 3. Repeat step 1 and 2 for each color.

- STEP 4. **GREEN ONLY !** Adjust the lower right lens adjustment until the upper right corner of the image is focused. See Figure S2-2. Repeat lens focus procedure if necessary at this time.

- STEP 5. **GREEN ONLY !** Adjust the upper left lens adjustment for side to side focus. See Figure S2-2

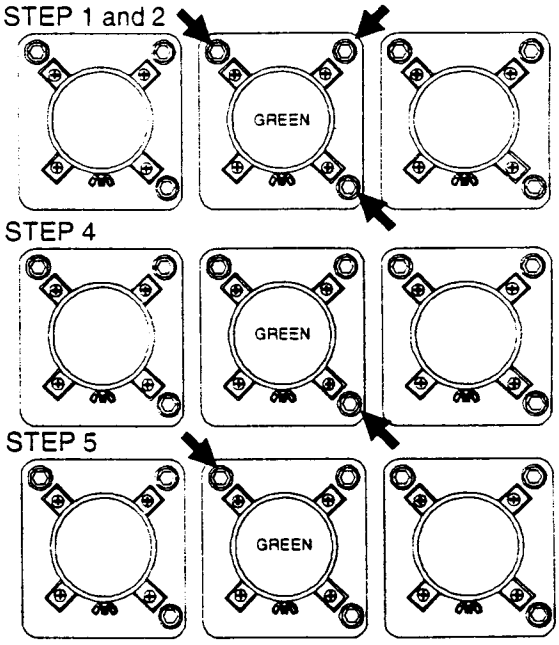


FIGURE S2-2.

S2.5 . . . . . Lens Focus and Positioning (CONTINUED):

¤ CROSSHAIR PATTERN REQUIRED.

- STEP 6. RED to GREEN lens positioning. **3600:** loosen the 3/16 lens positioning hex head screw, **4600:** loosen the two lens positioning knobs, located directly behind the RED LENS/CRT assembly. See Figure S2-3.
- STEP 7. Carefully pivot the RED LENS/CRT assembly until the center vertical line in the RED image exactly overlays the center vertical line in the GREEN image.
- STEP 8. Once the lens is in the proper position tighten the 3/16 lens positioning hex head screw or knob.

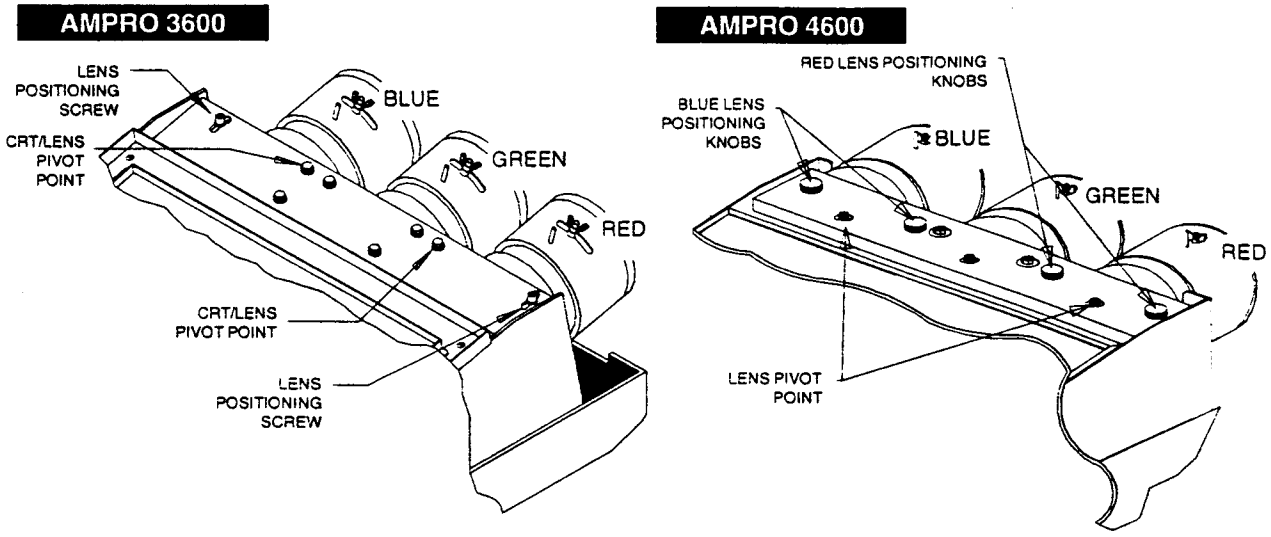


FIGURE 2-3. LENS PIVOT / POSITIONING.

- STEP 9. With Registration "off" and using the crosshatch pattern, perform the STATIC Red and Blue shift operations as required until the center horizontal line of the selected color overlays the center horizontal line of the reference color. Use the following CODES to perform the STATIC shift operations.

¤ 40 CODE-Red Vertical Shift (STATIC) AND 41 CODE -Blue Vertical Shift (STATIC).

- CROSSHATCH PATTERN REQUIRED.
- STEP 10. **RED ONLY !** Adjust the lower right lens adjustment until the upper right corner of the image is focused. See Figure S2-4.
- STEP 11. **RED ONLY !** Adjust the upper left lens adjustment for side to side focus. See Figure S2-4.
- STEP 12. Re-focus and pivot the lens as required.
- NOTE: Perform the Static Red and Blue Shift operations as often as necessary.

! REPEAT STEPS 6 THROUGH 12 FOR **BLUE** TO **RED** ALIGNMENT.

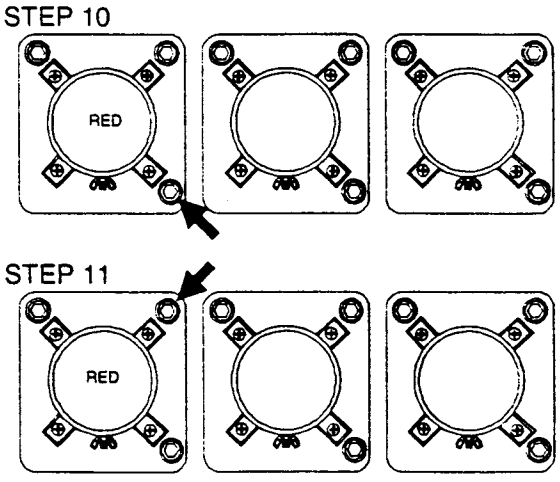


FIGURE S2-4.

S2

S2.6 . . . . . Magnetic CRT Focus Procedure:

To best achieve a precise CRT focus, the AMPRO 3600/4600 incorporate magnetically focused CRTs which are controlled and set by the remote control. Each channel (source) may have independent focusing settings.

The magnetic focus is set for each individual color and for each channel location or source being used. Perform the following Steps to optimize the CRT focus.

S2.6.1 . . . . . .CRT Static Focus:

- STEP 1. Select a channel location, i.e., **[1] [CHANNEL]**. **ENSURE** channel brightness and contrast have been set to the desired operating levels.
- STEP 2. Cutoff two of the three colors.
- STEP 3. Displaying the external source, enter **[98] [CODE]** and select the color to be adjusted.
- STEP 4. Use the UP and DOWN arrow keys to adjust the static focus for best overall (primarily center) focus. REPEAT.....Steps 3 through 5 for each color.

S2.6.2 . . . . . .CRT Dynamic Focus:

Like the static focus, the dynamic focus is set for each individual color on a channel-to-channel basis. Additionally, the dynamic focus provides both horizontal (side-to-side) and vertical (top-to-bottom) focusing capabilities.

- STEP 1. Perform Steps 1 and 2 from above.
- STEP 2. Enter **[99] [CODE]**, select the color under adjustment, and use the UP and DOWN arrow keys for the vertical (top-to-bottom) dynamic focus and use the LEFT and RIGHT arrow keys for the horizontal (side-to-side) dynamic focus. REPEAT.....Step 2 for each color.

Repeat both the Static and Dynamic focus procedures as often as necessary to optimize the projected image.

S2.7 . . . . . Lens Focus / Adjustment Reference Table:

The following table will indicate the relationship in mounting configurations and lens focus adjustments. Using the following table, "look up" your particular installation. Note the adjustment locations indicated and follow procedure outlined in section S2.5.

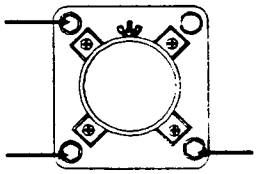
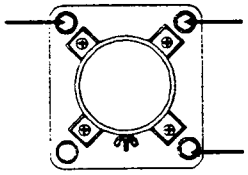
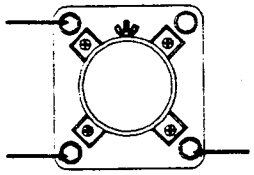
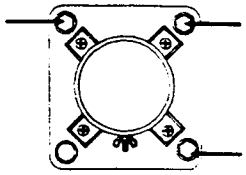
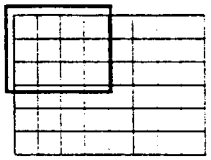
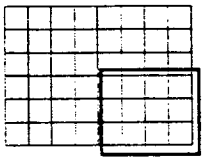
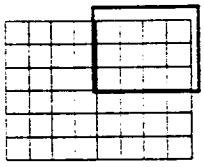
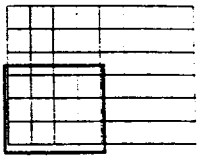
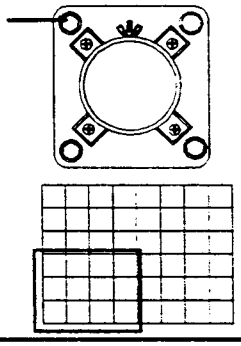
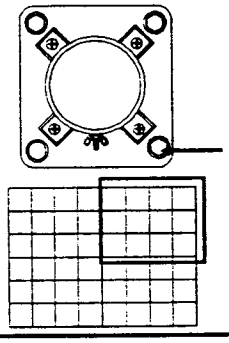
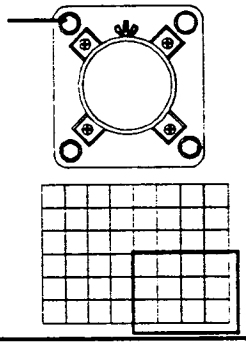
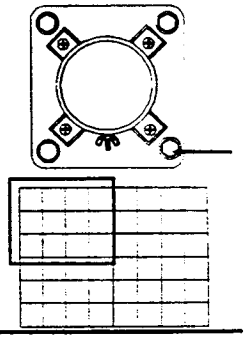
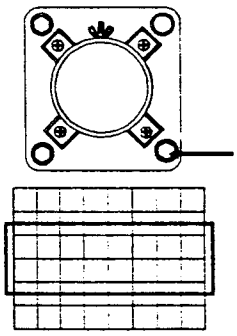
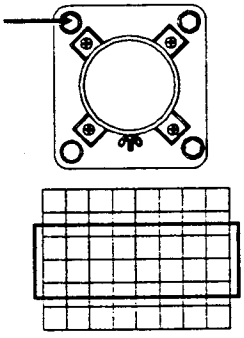
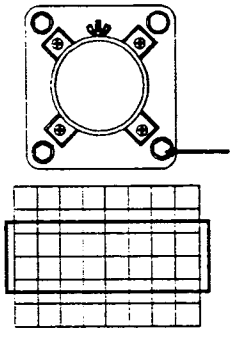
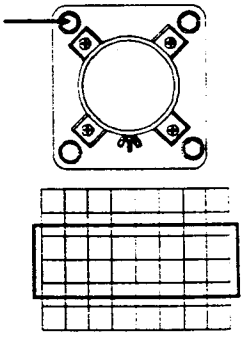
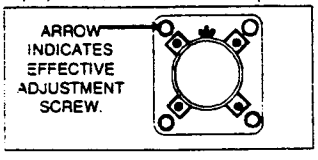
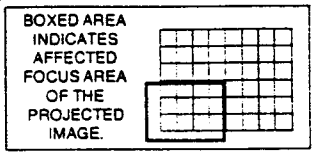
STEP	FRONT/TABLE	FRONT/CEILING	REAR/TABLE[1]	REAR/CEILING[1]
1. Tighten ALL three lens adjustments. Then turn (CCW) 3/4 of a turn.				
2. Adjust lens focus barrel(s) until the indicated corner of the projected image is optimized				
3. Adjust indicated screw to optimize corner focus of figure shown below.				
4. Adjust indicated screw to optimize focus from side to side of figure shown below.				

TABLE S2-1. LENS FOCUS/ADJUSTMENT REFERENCE TABLE.

NOTES:

1. [1]Rear screen reference of affected focus area is as viewed from the adjustment point; from the rear of the screen area.
2. Repeat above steps for all three colors.
3. Refer to section S2.5, Steps 6, 7, and 8 for LENS/CRT positioning.





S2

Supplement 3

AMPRO 3600/4600 Series Baud Rate And Address Switches

S3.1 .....Hexadecimal Switch Locations:

The system has two hexadecimal rotary switches and an 8 position DIPswitch located on the CPU module, (Figure S3-1), and are accessed by lifting the top cover and the top fan housing/cover. The switches are marked SW1, SW2 and SW3. The two rotary switches closest to the rear panel (SW1 and SW2) are used to assign the individual projector number to each unit installed within a network of projectors. Refer to Table S3-2 for setting SW1 and SW2. The third switch from the rear panel is SW3 (DIP). Position 7 and 8 will determine the communication baud rate, while position 2 will enable or disable the handshaking. See Table S3-1 for baud rate information.

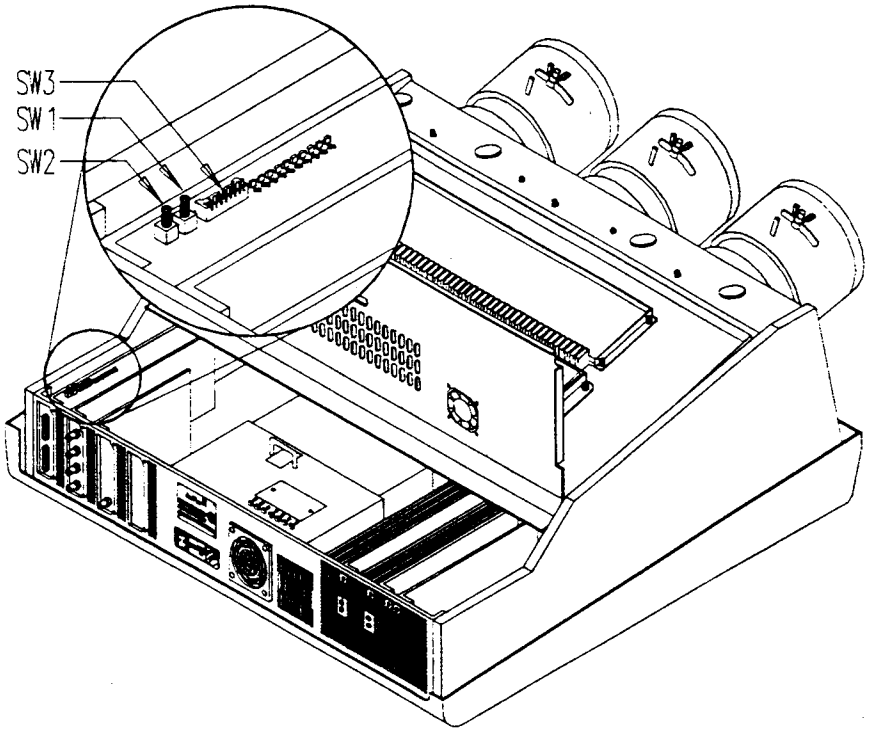


FIGURE S3-1. SW1, SW2 AND SW3 LOCATIONS.
(AMPRO 4600 SHOWN)

S3.1.1 .....Baud Rate Switches SW3-7 and SW3-8 Configuration:

The table below shows the projector (CPU) baud rate switch settings for a variety of baud rates. Under normal conditions (default), the remote control and CPU should always be set to communicate at 9600 baud. However, limitations of the overall RS232C network, i.e., slower devices connected to the network or lengthy cabling, may require that the baud rate of the CPU and remote control be reduced.

The top cover and the top fan housing/cover of the 4600 display system or the Registration Tray assembly of the 3600, must be lifted to access the multi-purpose 8 position DIP switch SW3. SW3 position 7 and 8 will select the operating baud rate while SW3 position 2 will select either handshaking enable or disable, see Figure S3-1. If the baud rate for the 3600/4600 display system has been changed, please refer to Section S3.1.2 for information on changing the remote control baud rate to match that of the CPU.

SYSTEM (CPU) BAUD RATES		
BAUD	SW3-7	SW3-8
9600	OFF	OFF
4800	OFF	ON
2400	ON	OFF
1200	ON	ON

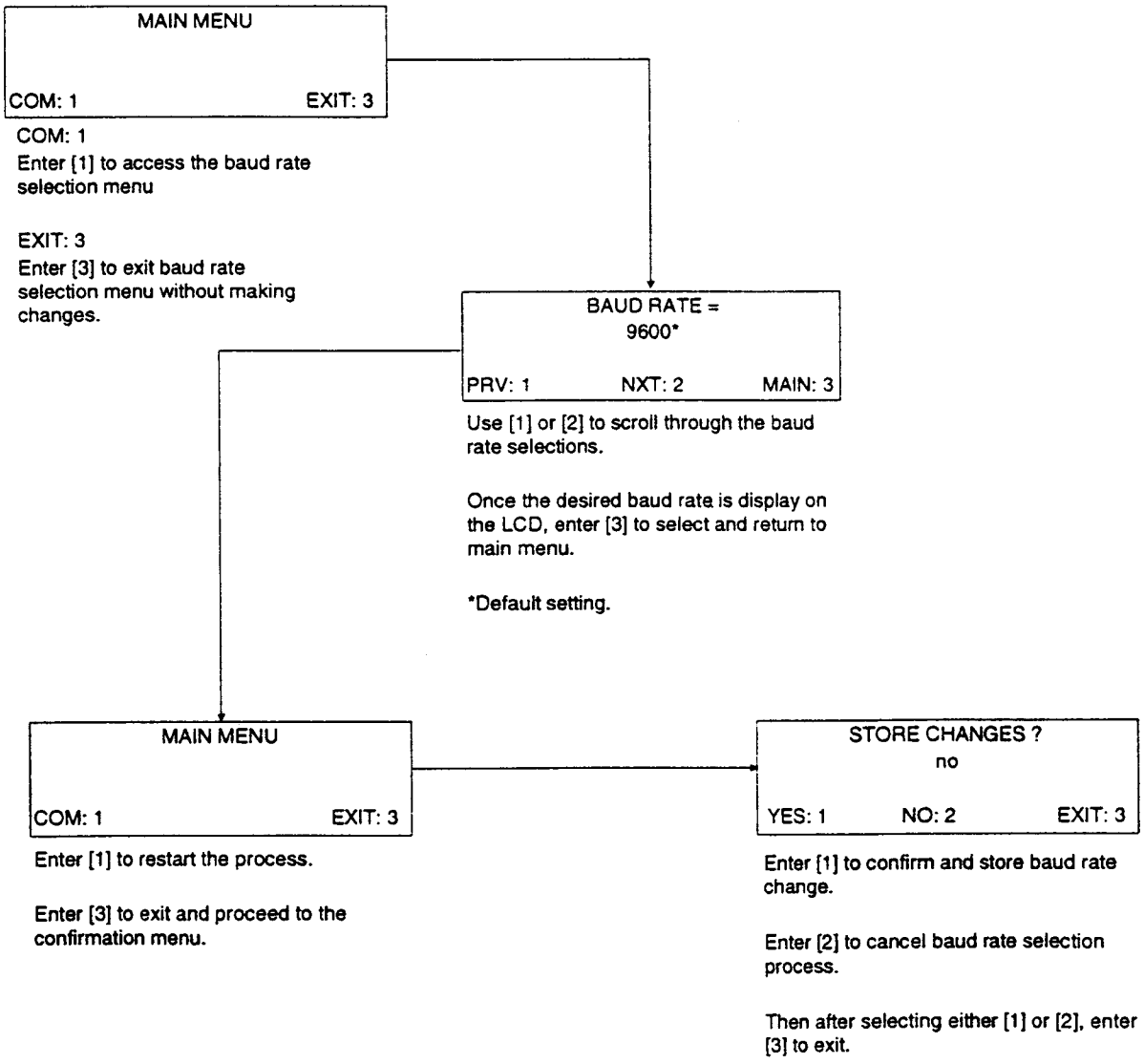
TABLE S3-1. SYSTEM BAUD RATE SELECTIONS.

S3.1.2 . . . . Remote Control Baud Rate Selection:

To change the operating baud rate of the remote control perform the following;

- STEP 1. Apply AC power to the system, toggle the rear panel rocker switch to "on". It is NOT necessary to energize the display system at this time.
- STEP 2. Enter 808 [CODE]. This will activate the remote control baud rate selection menu(s) which are displayed on the LCD read-out. See below.
- STEP 3. Upon completion of the procedure, toggle the rocker switch (rear panel) to the "off" position and refer to Section S3.1.1 to change the baud rate of the system (CPU).

! To reset the remote control to the factory presets, enter 808 then press the [**KEY**] button.



S3

S3.2 . . . . . Address Switches SW1 and SW2:

As mentioned previously, SW1 (LSB) and SW2 (MSB) will select the Display System's particular address or unit number, which is a requirement whether using one or multiple systems. In a singular configuration or a multiple system network, the first unit switches must be set at 0(SW1) and 0(SW2). Refer to Table S3-3 for multiple system operation numbering.

Table S3-2 indicates a 20 unit numbering sequence out of a maximum of 256 systems. Refer to a Decimal-to-Hexadecimal conversion chart for higher hexadecimal equivalents.

To determine the presently active unit, simply press the **[UNIT]** button.

NETWORKING ON/OFF; On the CPU module, ensure DIP switch SW3, position 1 is set to the "on" position when networking multiple systems, otherwise SW3-1 should be left in the "off" position.

UNIT NUMBER	POSITION		UNIT NUMBER	POSITION		UNIT NUMBER	POSITION		UNIT NUMBER	POSITION	
	SW1	SW2		SW1	SW2		SW1	SW2		SW1	SW2
1	0	0	6	0	5	11	0	A	16	0	F
2	0	1	7	0	6	12	0	B	17	1	0
3	0	2	8	0	7	13	0	C	18	1	1
4	0	3	9	0	8	14	0	D	19	1	2
5	0	4	10	0	9	15	0	E	20	1	3

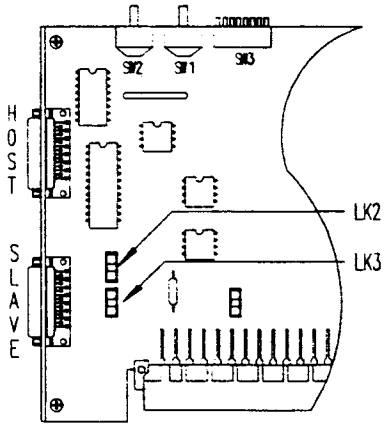
TABLE S3-2

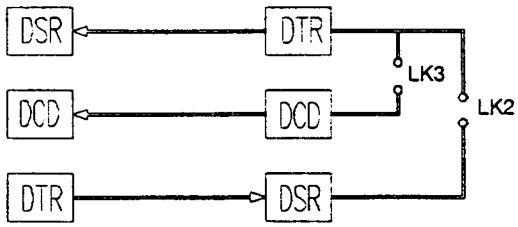
S3.3 . . . . . Handshaking:

Located on the CPU module are two jumpers labeled LK2 and LK3. These jumpers are used for simulating the DTR - DSR handshaking signal. When using one system or in a multiple system configuration, LK2 and LK3 are installed in the individual unit or in the last unit of the network. See Figure S3-2 for location of LK2 and LK3.

One example of using LK2 and LK3 in a network is to ensure the integrity of the cabling between systems. With LK2/LK3 installed in the last system of the network and no handshake response is reflected to the host unit, this is seen as a cabling fault within the network.

Refer to your particular host unit requirements for the proper LK2/LK3 configuration.





LK1 AND LK2 EQUIVALENT CIRCUIT.

FIGURE S3-2.
JUMPERS LK2 AND LK3 LOCATION (CPU MODULE)

NOTES:

Supplement 4

Internal LED Error Indicators

WARNING

S4.1 .....SMPS Low Voltage Indicators:

The DC outputs of the switch mode power supply are fused and indicated by the LEDs located on the upper cover of the module. Additionally, these voltages are monitored by the CPU's diagnostics routine and may be addressed by entering **[30] [CODE]**. See Figure S4-1. NOTE: All LEDs are normally "ON".

S4.2 .....CPU LED Error Indicators:

Located on the CPU module is a row of ten mini LEDs (CR35 through CR44) which indicate any CPU related problems, such as, failure of the internal I^2C or external RS232 communications. CR43 and CR44 will indicate standby voltage conditions. With the main ac applied, CR43 and CR44 should always be illuminated. Refer to Figure S4-1 for the operating condition of the remaining LEDs.

! To access the error indicators, unlock and tilt-up the top cover and the **3600:** Registration Tray assembly, **4600:** rear fan(s) housing/cover.

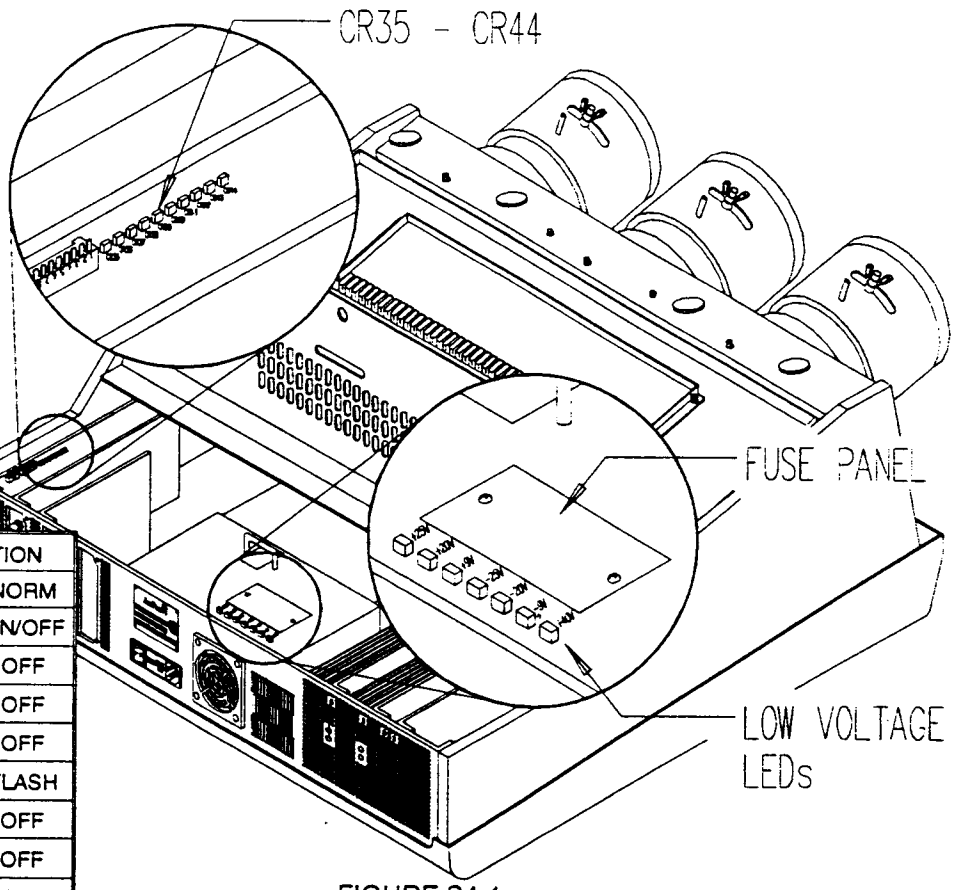


FIGURE S4-1.

CR35 - CR44 DESCRIPTION		
CR	FUNCTION	NORM
35	REGISTRATION	ON/OFF
36	RS232 HALT	OFF
37	RS232 FAULT	OFF
38	I^2C FAULT	OFF
39	I^2C BUSY	FLASH
40	UNUSED	OFF
41	UNUSED	OFF
42	UNUSED	OFF
43	+5V ALWAYS	ON
44	+12V ALWAYS	ON

NOTES:

Supplement 5

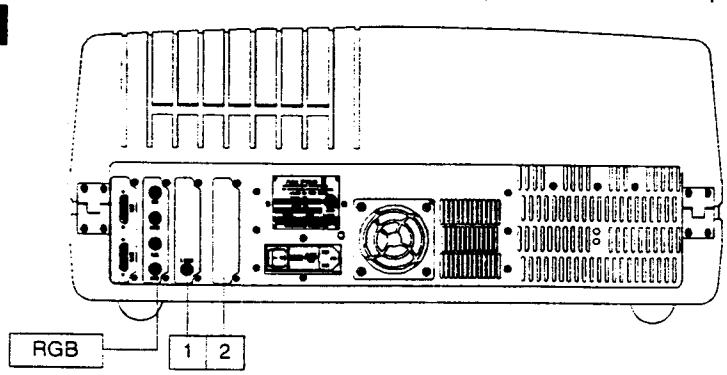
Optional Module(s) Installation

S5.1 . . . . . .Installation Procedure:

! For the following installation procedure, de-energize the system and remove the main power cord. To access the internal modules, unlock and tilt-up the top cover and on the **3600:** Registration Tray assembly, **4600:** rear fan(s) housing/cover.

- STEP 1. Please refer to Figure S5-1 for the proper optional module slot position.

AMPRO 3600



AMPRO 4600

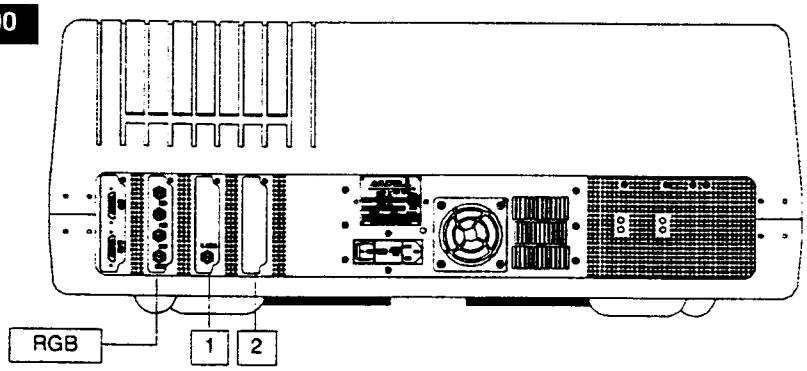


FIGURE S5-1.

MODULE CONFIGURATION		
SLOT	STANDARD	OPTIONAL
1	VERTICAL DRIVE PANEL	ANALOG RGB2 OR QUAD VIDEO DECODER 2 (QVD^2)
2	BLANK PANEL	ANALOG RGB3 OR QUAD VIDEO DECODER 1 (QVD^1)

- STEP 2. Remove the existing module (panel) from the desired module position by removing the two 4- 40 phillips head screws and lift out that particular module (panel).
- STEP 3. With the appropriate slot empty, insert the desired optional module and secure with the two 4-40 screws.

S5.1 . . . . . Installation Procedure:(CONTINUED)

- STEP 4. Locate DIP switch SW3 on the CPU module. Change SW3-6 to the "ON" position, replace the power cord and energize the system. Refer to Figure S5-2.
- STEP 5. Once the system has been energized, use the numeric keypad and enter 70, then press the **[CODE]** button.
- STEP 6. Upon entering the **70 [CODE]** the LCD read-out will display the system's current module configuration . Using the **UP** and **DOWN** arrow keys, scroll through the listings until the LCD displays the new module configuration, then press **[CODE]** to select. See Table below. NOTE: Table indicates module / LCD sequencing.

3600/4600 SLOT CONFIGURATION			
LCD READ-OUT	RGB SLOT	SLOT 1	SLOT 2
	*RGB	V. DRIVE PANEL	< >
	RGB	RGB 2	< >
	RGB	< >	VIDEO 1
	RGB	RGB 2	VIDEO 1
	RGB	RGB 2	RGB 3
	RGB	VIDEO 2	VIDEO 1
*STANDARD CONFIGURATION: V. DRIVE PANEL DOES NOT APPEAR ON LCD READ-OUT.			
< > DENOTES BLANK OR UNUSED PANEL			

! All 50 channel locations will be automatically reset to operate in the Analog RGB1 mode of operation. Channel reassignment will be required.

- STEP 7. Return SW3-6 (CPU module) to the "OFF" position and enter 44 **[CODE]** (READ SWITCHES).
- STEP 8. To verify your installation enter 34 **[CODE]** and view the LCD read-out.

! Refer to Sections 6 and 7 for the operation and selection of the various modes of operation.

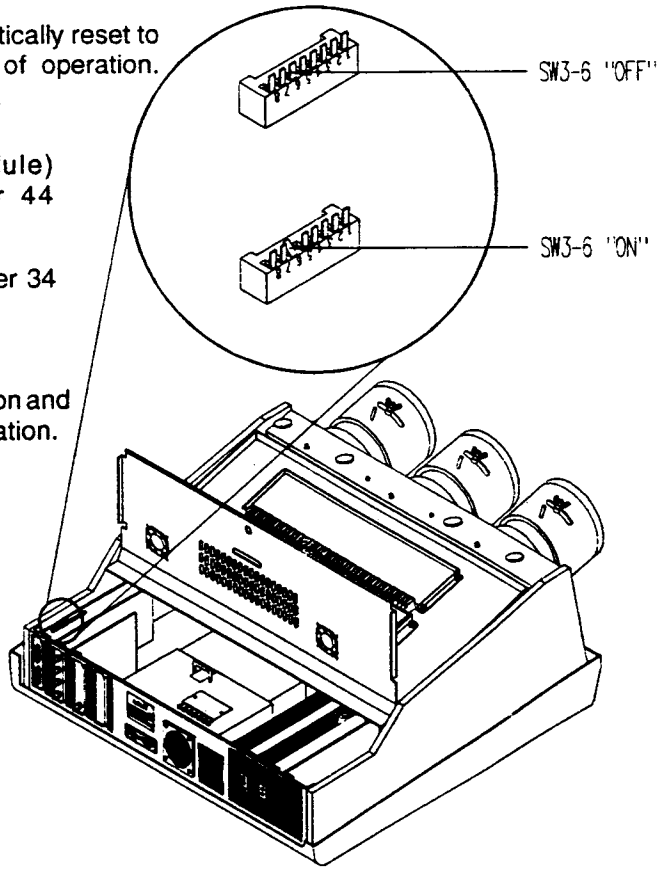


FIGURE 5-2. SW3-6 LOCATION / CONFIGURATION.
(AMPRO 4600 SHOWN)

S5