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VistaGRAPHX™ 5000 User's Manual

ELECTROHOME

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NOTE: Due to constant research, all information in this manual is subject to change without notice

Section 1

Introduction

1.1 The Projector

VistaGRAPHX 5000 is a professional-quality DMD™ projector that uses Digital Light Processing™ (DLP™) technology from Texas Instruments to achieve high-brightness multimedia and video projection. It is ideal for use in large audience venues in which there may be high levels of ambient light, such as in auditoriums and lecture halls. The *VistaGRAPHX 5000* is compatible with standard international video formats and can interface with IBM-compatible PCs, Macintosh® computers, and workstations. Features include:

- ◊ 1024 X 768 pixels resolution
- ◊ over 4500 ANSI lumens, contrast ratio of 250:1 ANSI, 400:1 full field
- ◊ interchangeable lenses for diagonal screen sizes up to 40 feet
- ◊ NTSC, PAL and SECAM compatible *(requires optional decoder)*
- ◊ displays input from PCs, VCRs, laser-disc players, video cameras, etc.
- ◊ intuitive on-screen menus for setup and control
- ◊ built-in and infrared (IR) remote keypads
- ◊ controller and switcher compatibility
- ◊ keypad selectable input switching
- ◊ RS-232 input with loop-through for networking multiple projectors
- ◊ RS-422 input for long distance control
- ◊ 5-language capability
- ◊ modular design for ease of servicing

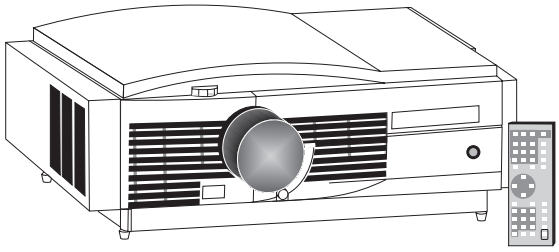

Figure 1-1.1. VistaGRAPHX 5000

How it Works ➤ *VistaGRAPHX 5000* accepts data/graphics and video input signals for projection onto flat or curved front or rear projection screens. High brightness light is generated by an internal 1000 watt CERMAX® Xenon lamp. This light is modulated by three DMD (digital micromirror device) panels which each provide digitized red, green, or blue color information. Light from the "ON" pixels of each panel is reflected, converged and then projected to the screen through a single front lens, where the pixels are all superimposed to create a sharp full-color image.

Construction ➤ The projector body is comprised of aluminum panels with an ABS front bezel. Covers can be removed as necessary for quick replacement of the lamp or filter.

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The projector's modular internal design provides for ease-of-service and minimal down-time.

1.2 Components

When you receive the *VistaGRAPHX 5000* your dealer will have already unpacked it, inspected it, and prepared it for use. Included with the standard projector is an IR Remote Keypad, a line cord (power cord), a *VistaGRAPHX 5000 User's Manual* and a Warranty Registration Card. Make sure you have all these items. Immediately fill out the warranty registration card and mail it directly to Electrohome.

*NOTE: **VistaGRAPHX 5000** does not include a video decoder module (optional). This manual assumes that the video decoder option has been installed in the projector.*

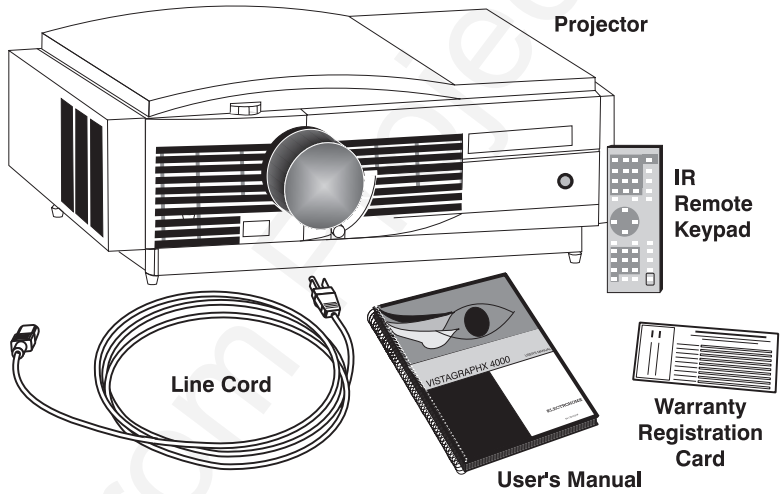

Figure 1.2. VistaGRAPHX 5000 System Components

1.3 Purchase Record and Servicing

Whether the projector is under warranty or the warranty has expired, Electrohome's extensive factory and dealer service network is always available. Electrohome service technicians are fully trained to quickly diagnose and correct projector malfunctions. Complete service manuals and updates are available to service technicians for all new projector models manufactured by Electrohome.

If you have a problem with your projector and require assistance, contact the authorized Electrohome dealer from which the projector was purchased. In many cases, servicing can be performed on site. Fill out the information below for your records.

Purchase Record

Dealer:	
Dealer Phone Number:	
Projector Serial Number:	
Purchase Date:	
Installation Date:	

NOTE: The projector serial number is on the projector's identification label located near the center on the rear panel of the projector.

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Section 2

Installation & Setup

This section explains how to install and set up the projector. If you are familiar with the projector and want to quickly set it up for temporary use, follow the Quick Setup instructions. For a complete setup, follow the instructions and guides covered in the remaining subsections.

NOTES: 1) The lens for the projector is not mounted when shipped from the factory. For instructions on how to install or replace a lens, refer to 4.5, Replacing the Lens. 2) This manual assumes the video decoder is installed.

2.1 Quick Setup

Follow these 6 steps for quick setup of the projector.

STEP 1 ➤ Position the Projector

Set the projector at the proper throw distance (projector-to-screen distance) and vertical position. See *2.3, Projector Position and Mounting.* Make sure that the projector is level from side-to-side (see *2.7, Leveling*).

STEP 2 ➤ Connect a Source

Locate the input panels at the rear of the projector. The upper right panel accepts an RGB input (via BNC connectors). The lower left panel accepts a composite video and S-video input. Connect a source to the appropriate panel.

STEP 3 ➤ Connect the Line Cord

Plug the special notched AC line cord (power cord) into the AC power socket at the left rear of the projector. This cord is rated at 15 amps rather than the 8-10 amps in other typical cords. Input power required is 180 VAC to 264 VAC.

WARNING:
Use only the special notched AC line cord. Do not attempt operation if the AC supply is not within the specified voltage and power range.

STEP 4 ➤ Turn the Projector ON

Using either the IR remote or built-in keypad, press [POWER] and hold for a second to turn the projector on. Let the projector warm up for five minutes. The Power LED should glow a steady green.

STEP 5 ➤ Select a Source

Using either the IR remote or built-in keypad, press [DAT 1] (or [Input1]), [VID 1] (or [Input3]) or [VID 2] (or [Input4]) to select and display the image for the source you have connected in Step 2. By default, an incoming image will resize to fill as much as possible of all available pixels (1024 x 768) while maintaining original aspect ratio.

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STEP 6 ➤ Make Necessary Display Adjustments

With the input image displayed, rotate the lens barrel to increase or decrease image size (applies to zoom lenses only). Next, rotate the focus adjustment knob (next to the lens barrel) to achieve best focus. Then rotate the nearby Vertical Offset knob to achieve the best overall image position, focus and brightness without distorting the geometry of the image. Press MENU to refine other display adjustments, press Chan to select a different source/channel. See 3.5, *Using Inputs and Channels.*

2.2 Installation Considerations

Although *VistaGRAPHX 5000* delivers a high brightness quality output, the final display quality could be compromised if the projector is not properly installed. This subsection discusses issues you should consider before proceeding with a final installation. Even if you do not intend to use *VistaGRAPHX 5000* in a fixed and permanent installation, this subsection will help you to better understand what may be done to enhance display performance.

Installation Type ➤

Choose the installation type which suits your needs: front or rear screen, floor mount or inverted mount.

Front Screen, Floor Mount Installation

ADVANTAGES	CONSIDERATIONS
• Easy to set up • Can be moved or changed quickly • Easy to access	• Shares floor space with audience

Front Screen, Inverted Mount (ceiling) Installation

ADVANTAGES	CONSIDERATIONS
• Does not take up audience space • Projector is unobtrusive • Projector cannot be accidentally moved	• Installation is more permanent • It is more difficult to access the projector

Rear Screen, Floor Mount Installation

ADVANTAGES	CONSIDERATIONS
• Projector is completely hidden • Projector is easily accessed • Usually good ambient light rejection	• Requires separate room

Rear Screen, Inverted Mount (ceiling) Installation

ADVANTAGES	CONSIDERATIONS
• Projector is completely hidden • Usually good ambient light rejection	• Requires separate room • Installation cost is usually higher

Rear Screen, Floor Mount with Mirror

ADVANTAGES	CONSIDERATIONS
• Projector is completely hidden • Usually good ambient light rejection • Requires less space behind screen than other rear screen installations	• Requires separate room. • Installation cost is usually higher

Screen Type ➤

Screen type is important when designing a projection system. Inexperienced users or installers should always consult their dealer when deciding on screen type. The following guidelines explain the differences between screen types.

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Front Screen Installations

There are two basic screen types: flat and curved. The choice between a flat screen or a curved screen is dependent on audience viewing angle and screen gain. There is always a trade-off between viewing angle and gain. Viewing angles for both screen types are illustrated in Figure 2-1 and Figure 2-2 (plan views).

Flat screens offer a gain of about 1 with a viewing angle just less than 180°. Incident light reflects equally in all directions so the audience can see the display from various angles. Because of the lower gain, flat screens are more effective when ambient lighting is reduced.

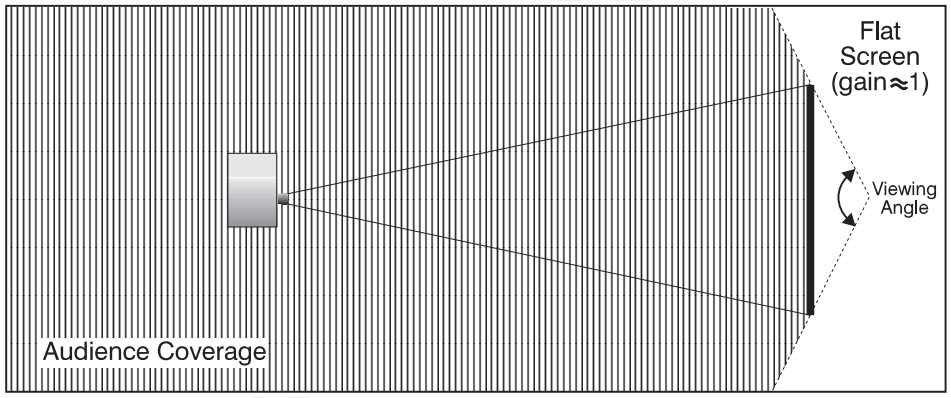

Figure 2-1. Audience Coverage with Flat Screen

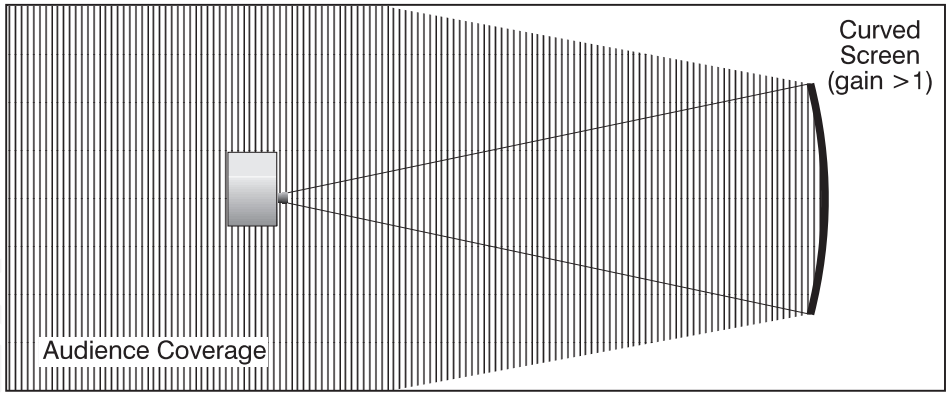

Figure 2-2. Audience Coverage with Curved Screen

Curved screens have gains larger than 1 (due in part to the screen material) and viewing angles much less than 180°. Most curved screens have different horizontal and vertical viewing angles. Incident light does not reflect equally in all directions. The reflected light concentrates in a conical volume or "viewing cone". Audiences within the viewing cone see a brighter image than that from an equal area on a flat screen. Audiences outside the viewing cone see a dimmer image.

NOTE: VistaGRAPHX 5000 lenses are designed primarily for use with flat screens. However, its depth-of-field range allows the lens to be focused on curved screens as well. Focus remains sharp in the corners, however there may be significant pincushion distortion, primarily at the top of the screen.

Rear Screen Installations

There are two basic types of rear screens: diffused and optical. A diffused screen has a surface which spreads the light striking it. Purely diffused screens have a gain of less than 1. The main advantage of the diffused screen is its wide viewing angle, similar to that of a flat screen for front screen projection. Optical screens take light from the projector and redirect it to increase the light intensity at the front of the screen. This reduces it in other areas. A viewing cone, similar to that of a curved front screen installation, is created.

To summarize, optical screens are better suited for brightly lit rooms where the audience is situated within the viewing cone. Diffused screens are best suited when a wide viewing angle is required but there is low ambient room lighting.

Screen Size ➤ Screen size may be from 5 to 40 feet diagonal, depending on the lens you are using. For instance, a 1:1 lens produces a 6-30 foot image size, whereas a 4-7:1 zoom lens produces a 10-40 foot image size. Choose a screen size which is appropriate for your lens and application. Keep in mind that if the projector will be used to display text information, the image size must allow the audience to recognize all text clearly. The eye usually sees a letter clearly if eye-to-text distance is less than 150 times the height of the letter. Small text located too far from the eye may be illegible at a distance despite the image being projected sharply and clearly on the screen.

To fill a screen with an image, the aspect ratio of the screen should be equal to the aspect ratio of the image. The aspect ratio of an image is expressed as the ratio of its width to its height. Standard video from a VCR has a 4:3 or 1.33:1 aspect ratio. For example, to display a VCR output with a 4:3 aspect ratio onto a 10 foot (3m) high screen, the width of the screen must be at least 13.3 feet (4m).

Note: Screen size is often specified as diagonal size. Screens specified by diagonal size have aspect ratios of 4:3. Screens with other aspect ratios are not typically specified by diagonal size.

Room Lighting ➤ The high brightness output of *VistaGRAPHX 5000* is well suited for locations where ambient lighting is less than optimum for projection; however, it is desirable that the projector be operated in an ideal projection room environment. For temporary installations where the room may not be designed for projection, there are many simple things which can be done to avoid problems caused by unwanted light.

Visiting a movie theater can give you an idea of what makes a good projection environment. Walls, floors and furnishings are dark and matte finished. A projection room should not have white reflective ceilings or non-directional lighting such as fluorescent lights. The white ceiling spreads light, making the room appear brighter. Keep lighting and reflections to a minimum.

If it is not possible to eliminate fluorescent lights, consider using parabolic reflectors ("egg crates") to direct light down to the floor. Incandescent spot lighting is a better way to obtain illumination. Light dimmers or rheostats allow you to further control the lighting.

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Outside windows are undesirable in any projection room. A small crack between curtains on a sunny day can wash out a projected image. If you do have windows, make sure that window coverings are opaque and overlapping — some window coverings are designed to provide up to 100 percent blockage of outside light. Ideally, the material should have a matte finish.

To minimize the effects caused by unwanted light from door and aisle ways, carefully choose the position of your projector and screen. Figure 2-3 shows an installation where poor screen placement allows too much unwanted light to enter the screen. In Figure 2-4, the screen and the projector are positioned so that unwanted light is minimized.

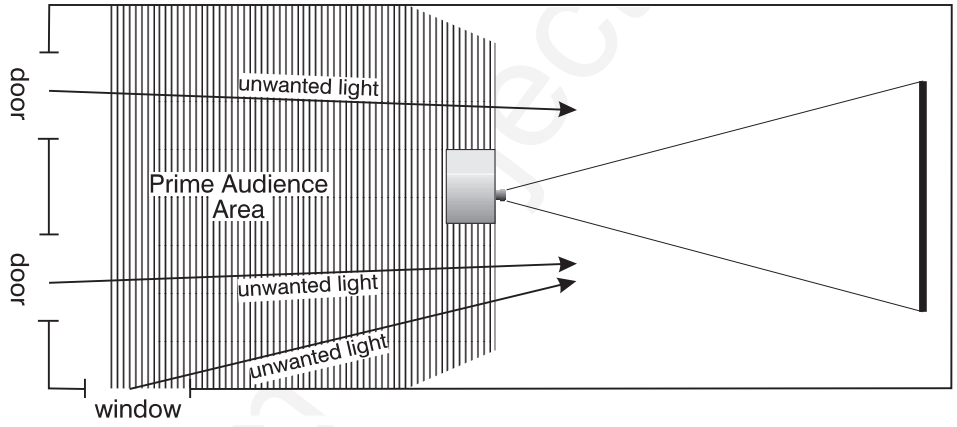

Figure 2-3. Poor Screen Placement

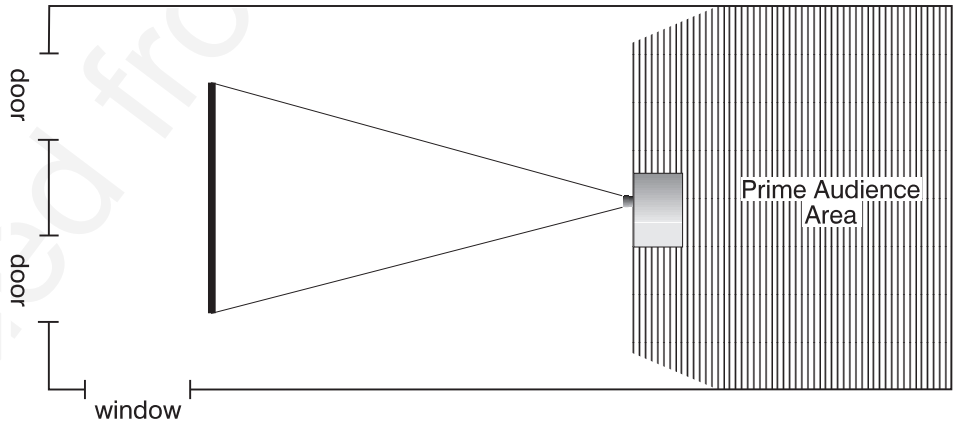

Figure 2-4. Better Screen Placement

Even with all lighting removed it is still possible that room reflections within the room can degrade the image. Light from the projection screen should be absorbed by the ceilings, walls and floors so that it will not be reflected back to the screen. Again, reflective surfaces should be kept to a minimum.

Other Considerations ➤

Here are some other considerations and tips which can help you improve your installation:

- Ventilation is an important factor when preparing a projection room. The ambient temperature should be kept constant and below 35°C (95°F). Keep

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the projector away from heating and/or air conditioning vents. Changes in temperature can cause drifts in the projector circuitry which may affect performance.

- Keep the projector away from devices which radiate electromagnetic energy such as motors and transformers. Common sources of these are slide projectors, speakers, power amplifiers, elevators, etc.
- For rear screen applications, less space is required if a mirror is used to fold the optical path.
- Choose the right screen size for the application:
  - ◊ As screen size increases, magnification increases which reduces brightness. Select a screen size which is appropriate for the venue, but not larger than that required.
  - ◊ Installing a large screen in a small room is similar to watching television close up; too large a screen can overpower a room. A good rule of thumb is to be no closer than 1.5 times the width of the screen.
  - ◊ Larger screens require greater attention to lighting conditions.
- When laying out the projection room, consider positioning the projector and screen in a manner which will achieve maximum audience coverage and space efficiency. For example, placing the screen along the larger wall in a rectangular room will reduce audience coverage. Figure 2-5 shows two examples of how audience coverage is maximized.

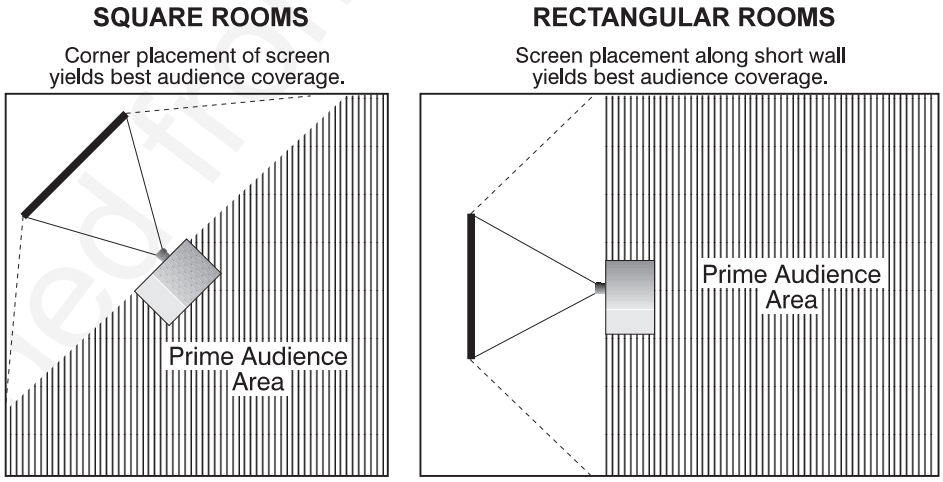

Figure 2-5. Screen Locations for Maximum Audience Coverage

2.3 Projector Position and Mounting

Installation type, screen type, and lighting all affect where the projector is positioned. In addition, both throw distance (the distance between the projector and screen) and vertical position (the height of the projector in relation to the screen) must be determined for every new installation. Both depend on the screen size and projector lens type you are using. Make sure that the room can accommodate the required position of the projector for the chosen screen size.

Throw Distance ➤

Throw distance is the distance between the projector's front feet and the screen. It is measured perpendicular to the lens surface and screen surface. As you move the projector farther from the screen, the image becomes larger.

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Throw distance is roughly equal to the horizontal width of the screen multiplied by the type of lens you are using (for example, if using a 3.9:1 lens, throw distance should be approximately 3.9 x the screen width). Once you know your screen size, you can closely estimate how far away the projector should be, as shown in Table 2-1. ***Always refer to Appendix E for permanent installations***.

Table 2-1. Approximate Throw Distances

Lens Type	Approximate Throw Distance
0.8:1	0.8 x screen width
1:1	1 x screen width
2.3:1	2.3 x screen width
3.9:1	3.9 x screen width
5.5:1	5.5 x screen width
1.2 - 2.3:1	from 1.2 to 2.3 x screen width
2.5 - 4:1	from 2.5 to 4 x screen width
2.3 - 5.5:1	from 2.3 to 5.5 x screen width
4 - 7:1	from 4 to 7 x screen width

NOTE: See Table 2-2 for original VistaPro lens models equivalents

NOTES: 1) While throw distance is measured perpendicular to the screen and projector, this measurement is not necessarily parallel to the floor—both projector and screen may be inclined together. 2) It is good practice to simulate the setup with the projector fully warmed-up to determine the actual throw distance required. 3) Always refer to Appendix E for permanent installations.

Vertical Position ➤

The vertical position of the projector in relation to the screen also depends on the size of the screen and the lens type. Correct vertical position helps ensure that the image will be rectangular in shape rather than keystoned (having non-parallel sides) and that image quality remains at its best.

Vertical position can be manually offset—that is, the image can be moved up—using the vertical adjustment knob on the front of the projector. The range of adjustment depends on the lens type you are using (Table 2-2). In addition, refer to Figure 2-6 to see more clearly how the pixel offset ranges affect the placement of your image in relation to the vertical location of the projector.

Table 2-2. Vertical Offsets, in Pixels

Lens Type	Max. Recommended Vertical Offsets (in Pixels)
0.8:1	+384
1:1 *(VistaPro 1.2:1)*	+150
2.3:1 *(VistaPro 3:1)*	+325
3.9:1 *(VistaPro 5:1)*	+250
5.5:1 *(VistaPro 7:1)*	+150
1.2 - 2.3:1 *(VistaPro 1.5-3:1)*	+80
1.5 - 2.5:1	+384
2.5 - 4:1	+384
2.3 - 5.5:1 *(VistaPro 3-7:1)*	+125
4 - 7:1	+384

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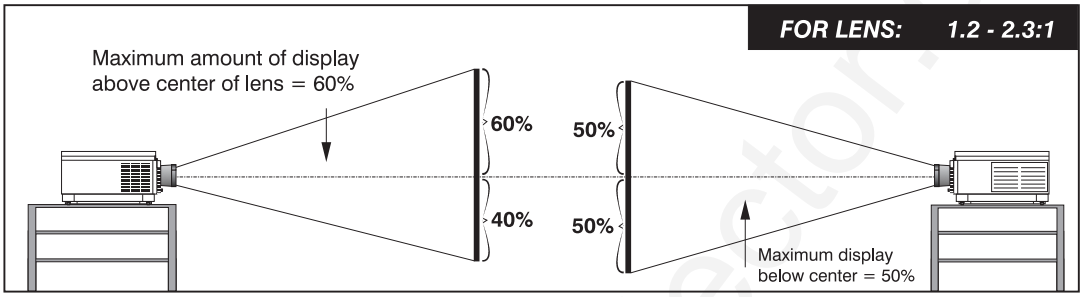
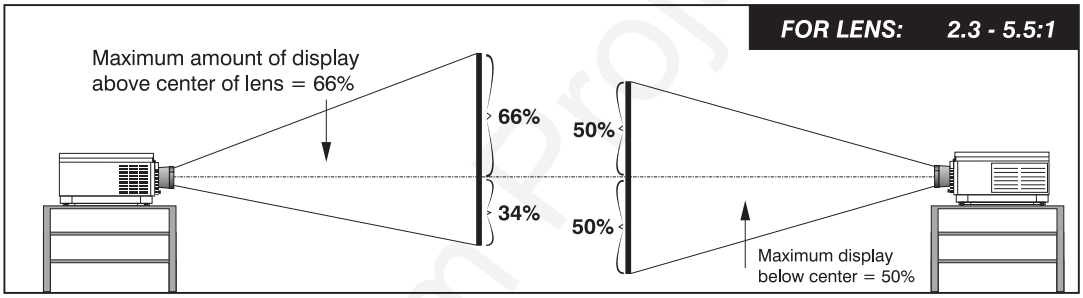
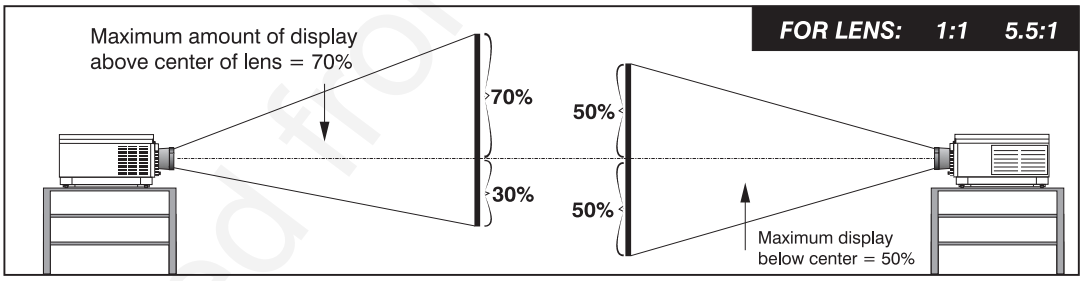
NOTES: 1) If you cannot move the image enough for your installation, or if the image becomes keystoned or exhibits uneven brightness, the projector is probably too high or low in relation to the screen. 2) Recommended offset ranges can be exceeded, however this may affect image focus and/or brightness.







NOTES FOR ALL LENSES:
Maximum optical performance is produced at zero offset (i.e., with the projector at the center of the screen) — geometry, focus and light output will all be optimized.

For inverted projectors, invert the illustrations.

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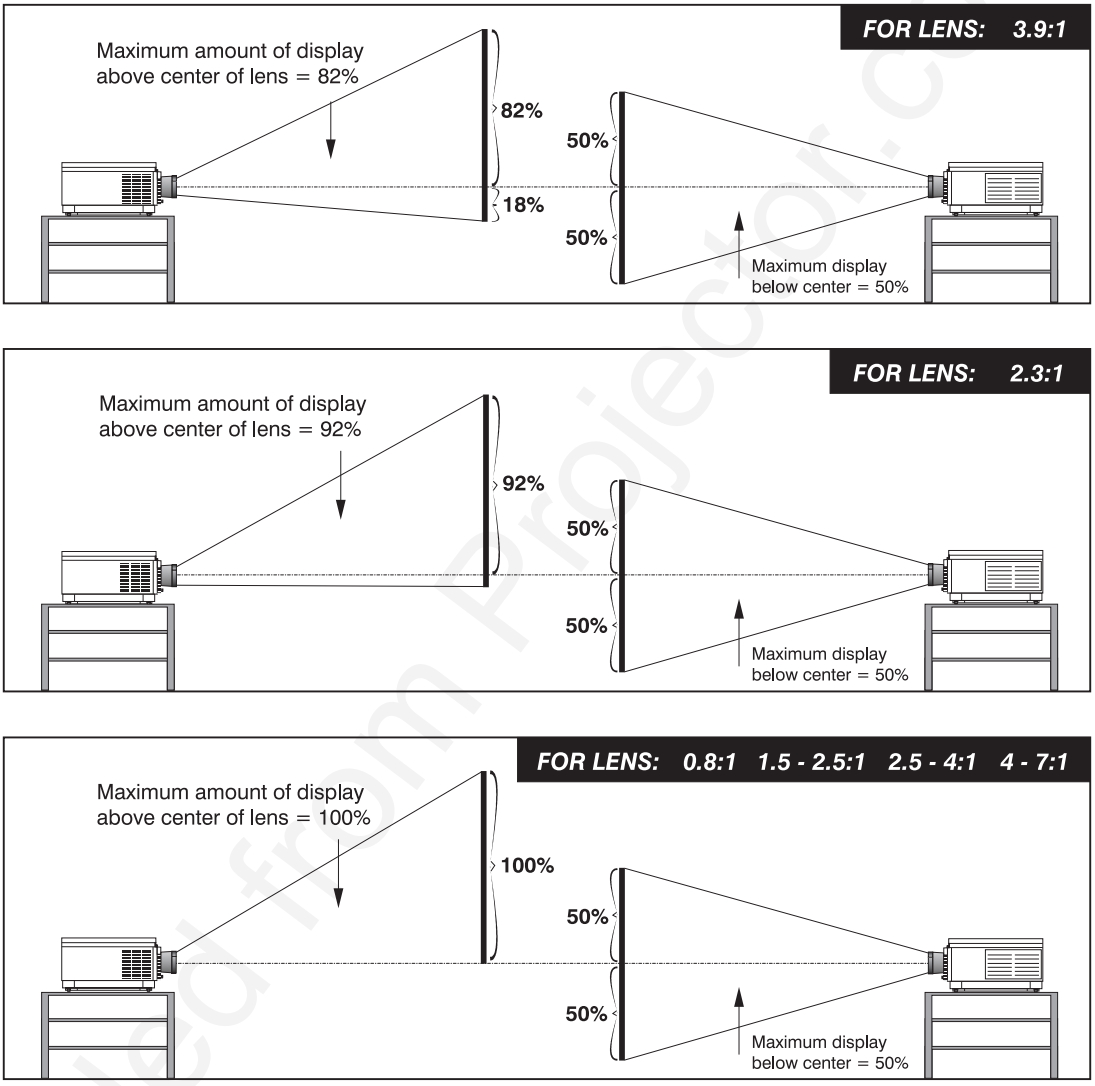

Figure 2-6. Vertical Offset Ranges

Mounting ➤ For typical front or rear floor mounts, mount the projector on a secure table or cart. Take care with a mobile cart—avoid sudden stops, excessive force and uneven surfaces that may cause the projector and cart combination to overturn.

The table or cart should be reasonably level. Fine adjustments to the projector level can be made by adjusting the height of the projector legs; refer to *2.7, Leveling* for details.

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Special Mounting

Note that *VistaGRAPHX 5000* can be rotated and mounted at any vertical angle- i.e., you can tilt the projector forwards or backwards as much as desired for your application. The side-to-side tilt, however must not exceed 45° (see Figure 2-7). This limit ensures that the arc lamp in the projector operates properly and safely.

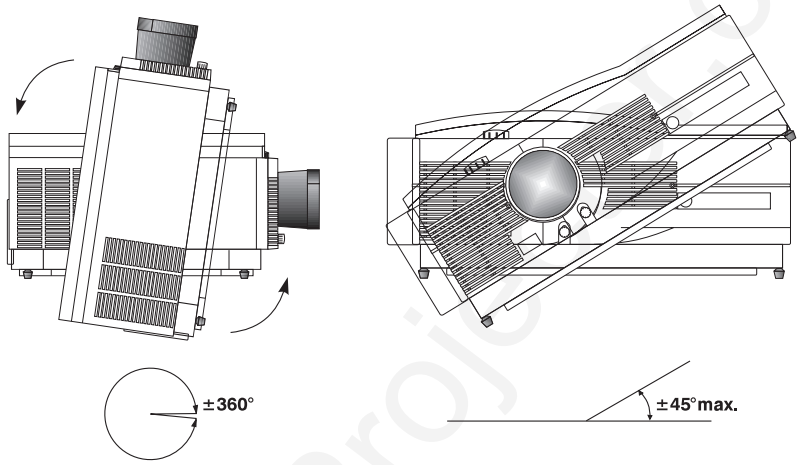

Figure 2-7. Vertical and Horizontal Tilt Ranges

If the projector is to be inverted, a ceiling mount fixture is required. Electrohome provides a ceiling mount kit for assembly and installation by a dealer/installer. For more information, contact your dealer or Electrohome.

Folded Optics ➤ In rear screen applications where space behind the projector is limited, a mirror may be used to fold the optical path. See Figure 2-8. The position of the projector and mirror must be accurately set. If considering this type of installation, call your dealer for assistance.

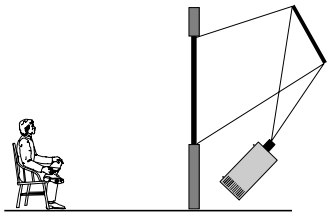

Figure 2-8. Folded Optics

2.4 Source Connections

The rear panel of the projector has two standard input panels to which you may connect a variety of sources. The upper right panel (INPUT 1) accepts an RGB input from an external RGB source with audio follow-through. The lower left panel (if video decoder module is installed) accepts composite video (INPUT 3) or S-video (INPUT 4) and audio from devices such as video tape or disk players. There are also several optional interfaces available for connecting other sources (INPUT 2). Such an option installs in the upper left panel. See Figure 2-9.

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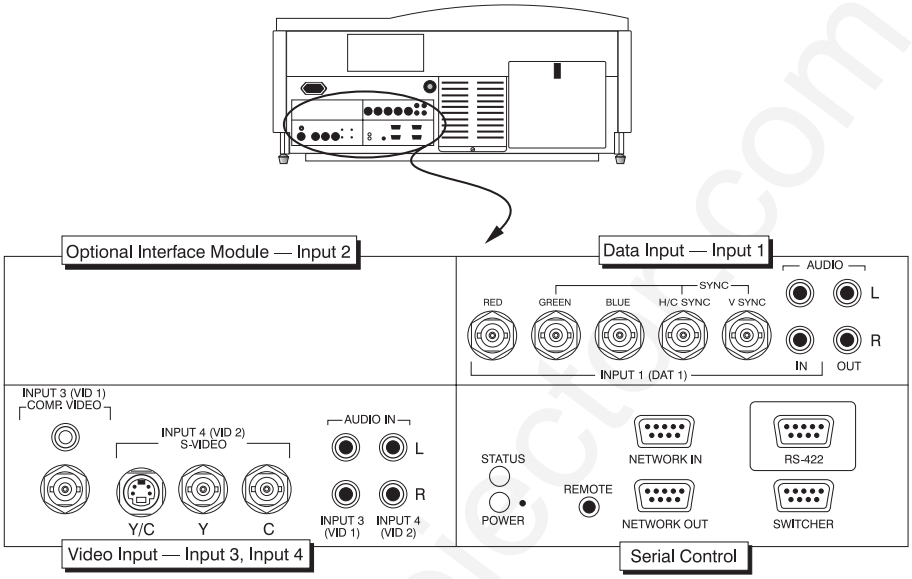

Figure 2-9. VistaGRAPHX 5000 Back Panel

RGB Input ➤ The RGB input (INPUT 1) includes BNC type connectors for connection to a variety of RGB sources. Such sources include VGA, SVGA, XGA, Mac, PowerMac, DEC, Sun, SGI and others. *VistaGRAPHX 5000* supports multiple sync types: sync-on-green for data, composite, and separate H & V.

NOTE: Depending on the source, you may need a custom adapter cable that has BNC connectors at the projector end and different type of connector at the other (such as a 15-pin "D" connector for computer sources). Contact your dealer or Electrohome.

Connect the sync BNC input(s) first. Then connect the red, green and blue source outputs to the RED, GREEN, and BLUE inputs on the panel. If the source uses sync-on-green, only the red, green, and blue connections are required. If the source provides a composite sync output, connect it to the H/C SYNC input. If the source provides separate horizontal and vertical sync outputs, connect horizontal sync to the H/C SYNC input and connect vertical sync to the V SYNC input. See Figure 2-10.

Connect YUV (component) video as follows:

***Y** to "**Green**"*
***U** (also called B-minus-Y) to "**Blue**"*
***V** (also called R-minus-Y) to "**Red**"*

*NOTE: **VistaGRAPHX 5000** does not automatically recognize a YUV signal. When using YUV video, you must specify this signal type within the **Image Settings** menu so that the projector can distinguish between this signal and other RGB sources. See **3.6, Adjusting the Image**.*

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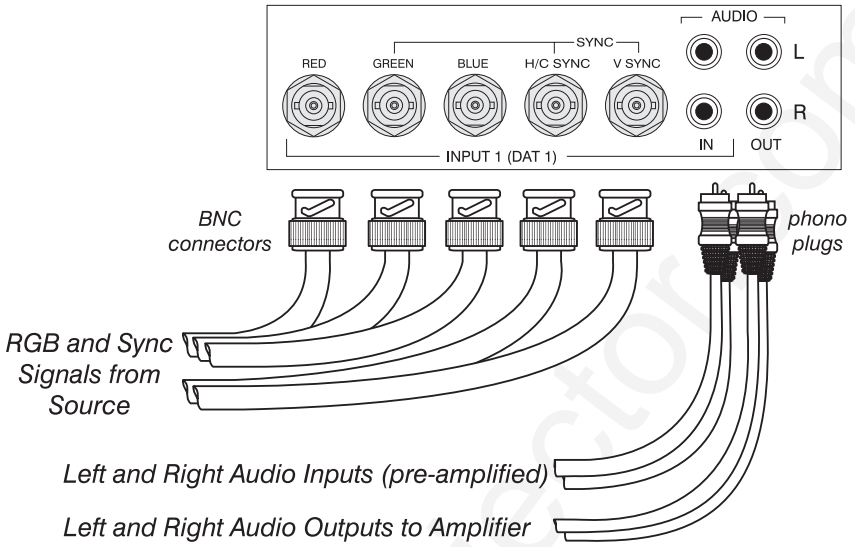

Figure 2-10. RGB Inputs

To control audio levels in an audio/visual system, connect pre-amplified (line level) audio inputs to the left and right channel audio inputs on the INPUT 1 panel. Then connect the audio outputs to external audio amplification equipment for sound output. All audio connection cables require standard RCA type phono plugs.

Composite Video and S-Video Input

➤ The Composite/S-Video input provides simultaneous connection of both a composite video source (INPUT 3) and an S-Video source (INPUT 4).

If connecting a S-Video source, use either the 4-pin mini DIN connector ***or*** the Y and C BNC connectors (luminance and chrominance) — do not use both as input. If connecting a composite video source, use the Composite BNC connector ***or*** the RCA phono jack — do not use both as input. See Figure 2-11.

*NOTE: If using the loop-through feature for composite or S-Video input, see "Video Termination" in **3.7, Adjusting and Checking System Parameters**.*

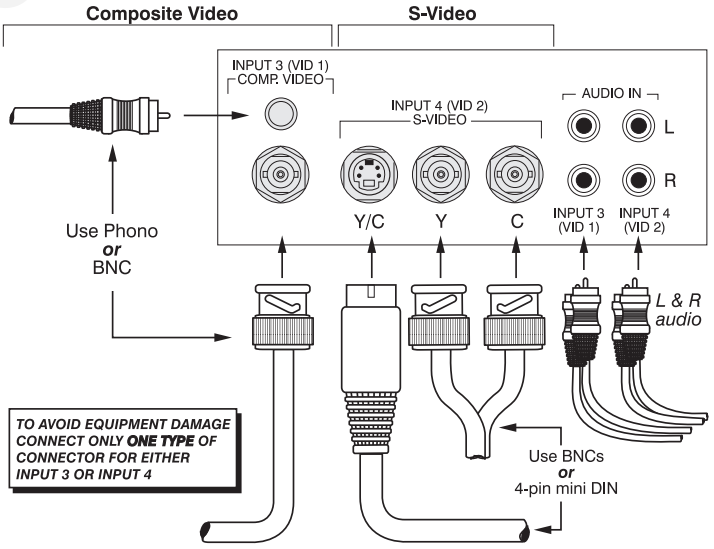

Figure 2-11. Composite and S-Video Inputs

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If you want to use an extra video source in addition to the video source(s) connected at Input 3 and/or Input 4, connect either a Composite or S-Video source to Input 1 as shown in Figure 2-12.

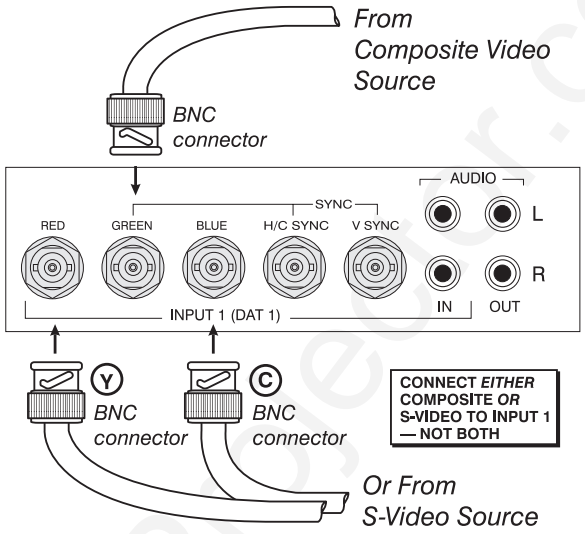

Figure 2-12. Connecting a Video Source to Input 1.

Other inputs ➤ Optional interface modules allow you to increase the total number of inputs and to accommodate other signal types. These modules may be installed in the upper left section of the control panel on the rear of the *VistaGRAPHX 5000* (Input 2). They are:

- RGB Input Module
- RGB Loop Thru Module
- Composite/S-Video Module
- HDTV Input Module
- PC Analog Input Module

NOTES: ***1)*** *Installation of optional interfaces must be done by qualified service personnel only — contact your dealer or Electrohome.* ***2)*** *See* ***Appendix F, Optional Input Modules*** *for a brief description of each interface.*

2.5 Power Connection

Plug the special notched AC line cord (power cord) into the line input socket located at the left rear of the projector (Figure 2-13). Plug the three-prong end of the line cord in a grounded AC outlet. Input voltage to the projector must be between 180 and 264 VAC, 50 or 60 Hz. The power source must be capable of supplying 1500 watts of power to the projector.

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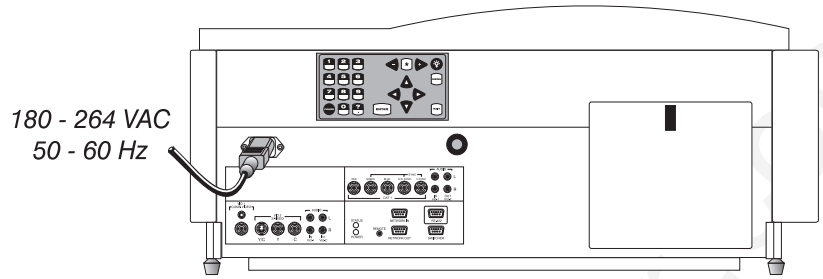


Figure 2-13. Power Connection

WARNING:
Do not attempt operation if the AC input is not within the specified input range.

Caution: *Once the projector is turned off, the lamp cooling fans will continue to run for approximately five minutes to ensure that the projector and lamp have sufficiently cooled, at which point the fans will automatically shut off. To avoid damaging the projector, never unplug the line cord while the lamp cooling fans are running. Do not unplug the projector in order to power down.*

2.6 Operating Orientation

VistaGRAPHX 5000 is set up at the factory for use in a front screen, floor mount orientation. If the installation is ceiling mount or rear screen, you may notice that displayed images are upside down and/or reversed. To correct, you must change the image orientation from within the *Preferences* menu (you may prefer to do this before physically installing the projector). See *Section 3, Operation* for further information.

In the *Preferences* menu, highlight and select the "Image Orientation" pull-down list. From a front screen floor mount installation, select from Rear, Inverted Rear, Front or Inverted Front according to your intended installation:

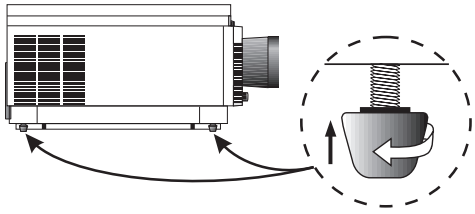
Select "Rear" and check that the display looks like this. → Rear / Inverted Rear / Front / Inverted Front

Select "Inverted Rear" and check that the display looks like this. → Inverted Front / Front / Inverted Rear / Rear

Select "Inverted Front" and check that the display looks like this. → Rear / Inverted Rear / Front / Inverted Front

2.7 Leveling

For most installations, the lens surface of the *VistaGRAPHX 5000* projector must be parallel to the screen to prevent keystoning. To make small corrections to the projector's level, rotate each leg as necessary to raise or lower.



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2.8 Zoom, Focus & Vertical Offset

Once the *VistaGRAPHX 5000* is properly set up and projecting an image on screen, you are ready to make quick manual display adjustments.

Zoom ➤ If you are using a zoom lens, turn the outer shell of the lens barrel to decrease or increase the size of the image at the current throw distance. *Note: Do not touch the lens surface as it can be easily damaged*.

Focus ➤ Turn the Focus adjustment knob (next to lens barrel) until you obtain the best overall image clarity.

Vertical Offset ➤ *VistaGRAPHX 5000* includes a Vertical Offset adjustment knob to provide vertical image shifting (raising and lowering) without causing keystone distortion. Proper adjustment can also maximize display brightness. Turn the knob until you achieve the best overall brightness without causing a distortion in picture geometry.

For further display adjustments through keypad commands and on-screen menus, refer to *Section 3, Operation*.

2.9 Serial Port Connections

Use serial communication ports when controlling *VistaGRAPHX 5000* with a personal computer having a serial interface or when using the projector with a *Marquee* switcher. *VistaGRAPHX 5000* serial ports are located on the lower right portion of the projector's rear control panel as shown in Figure 2-14.

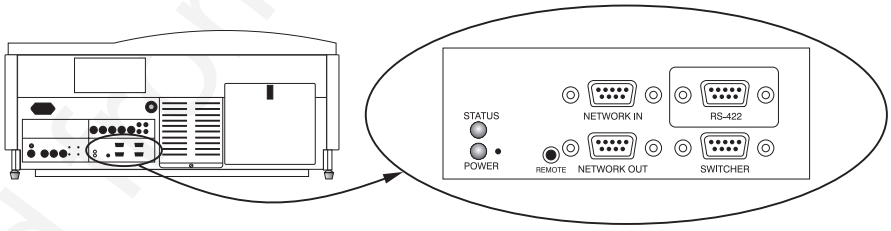

Figure 2-14. Serial Port Connections — RS-232 and RS-422

*NOTES: **1)** All **VistaGRAPHX 5000** serial connections require a 9-pin D connector. Refer to Appendix D for complete cable wiring requirements. **2)** The "NETWORK OUT" port is provided for networking applications only — see "If using multiple projectors", below.*

If using a computer ➤ ***The RS-232 Port***

You may wish to use a computer rather than a keypad for controlling the projector and for performing other special functions. From most computers, connect an RS-232 serial communication cable between the computer and the projector serial port labeled "NETWORK IN" (Figure 2-15). Then set the projector baud rate to match that of the computer. Changing the baud rate is described in *3.7, Adjusting and Checking System Parameters*.

*NOTE: In rare instances, some computers can provide **RS-422** serial communications (generally through a plug-in adapter or external converter). See **The RS-422 Port,** below.*

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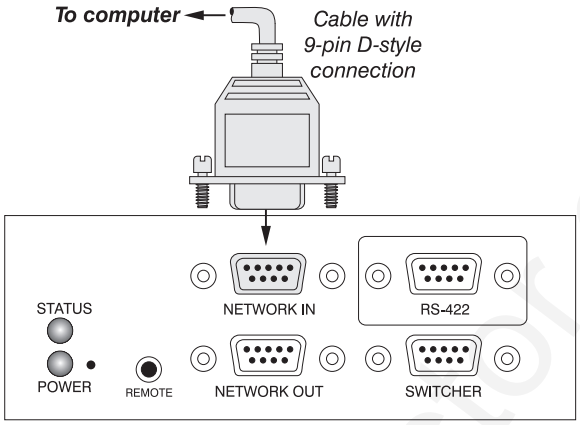

Figure 2-15. RS-232 Serial Port Connection to a Computer

Note: PC software is required for computer control. Contact your dealer or Electrohome for details.

The RS-422 Port

In rare instances, some computers can provide **RS-422** serial communications (generally through a plug-in adapter or external converter) rather than the typical RS-232 found on most computers. RS-422 communications occur at a higher voltage level than RS-232 and are especially useful for distances greater than 600 feet. The projector's RS-422 port is permanently set at 9600 baud.

If you wish to control the projector with a computer having RS-422 capability, connect the computer to the projector's RS-422 port instead of the port labeled "NETWORK IN". Again, use RS-422 **only** if you are certain that your computer has RS-422 capability (consult your documentation). See Figure 2-16.

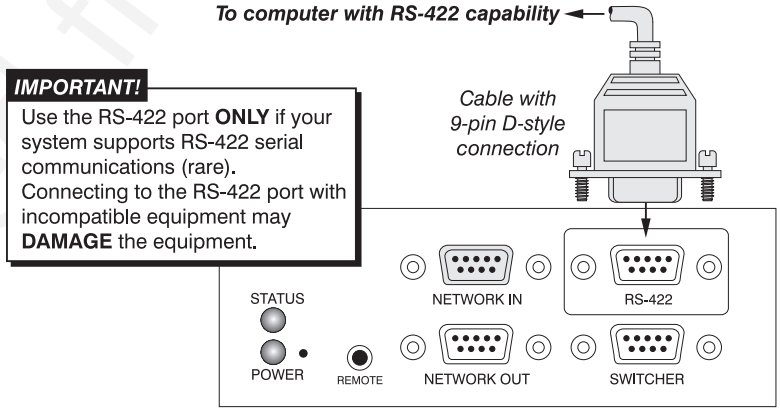

Figure 2-16. RS-422 Serial Port Connection to a Computer

WARNING

Never use the RS-422 port unless you are using a computer with RS-422 capability. The higher voltage level of this signal could damage incompatible equipment.

If using a switcher ➤ You may wish to use one or more external *Marquee* switchers or third-party switchers in order to significantly increase the number of sources you can use. Connect an RS-232 serial communication cable between the switcher and the

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projector serial port labeled "SWITCHER" (Figure 2-17). This port is permanently set at 9600 baud.

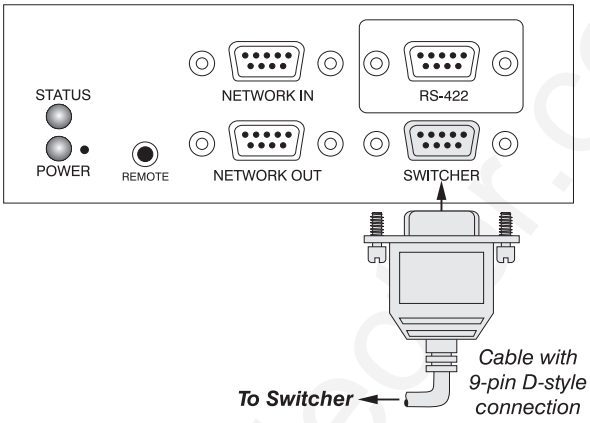

Figure 2-17. RS-232 Serial Port Connection to a Switcher

If using multiple projectors ➤ To control multiple projectors with a computer/controller, chain the projectors together by connecting the "NETWORK OUT" connector of the first projector (already connected to the computer/controller) to the "NETWORK IN" connector of the next projector in the chain (Figure 2-18).

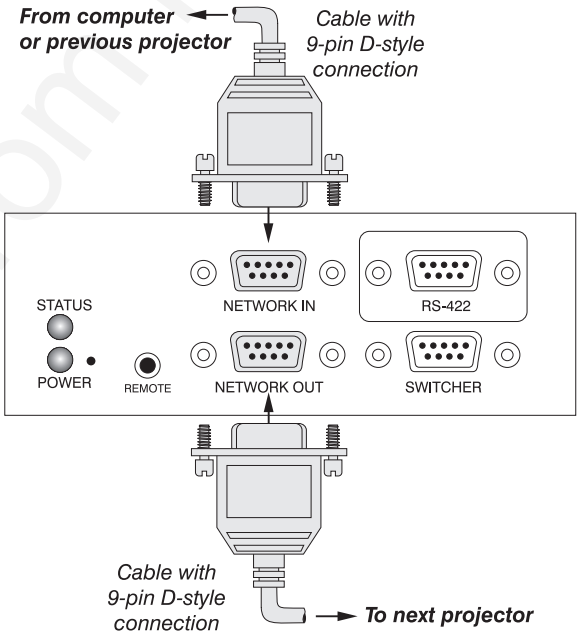

Figure 2-18. Adding Another Projector

Continue connecting projectors in this way to the last projector in the chain, so that only the last projector has an empty "NETWORK OUT" connector. See Figure 2-19.

Communication parameters such as baud rate must be set to match the particular controlling device—refer to the documentation that came with the controlling device in order to determine the proper baud rate. See *3.7, Adjusting and Checking System Parameters* if you need help changing the projector baud rate from its default of 9600.

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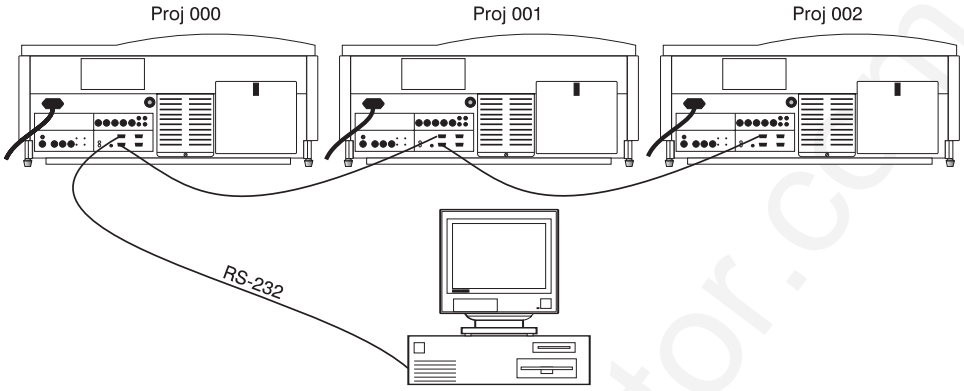

Figure 2-19. Three Networked or "Chained" Projectors

Notes: ***1)*** *To avoid damage, connect only properly wired RS-232 serial communication cables. See Appendix D for details.* ***2)*** *It is recommended that each communication cable be no more than 25 feet in length.*

Projector Number ➤ Each projector can be assigned a unique 3-digit projector number (for example, 001). These numbers are particularly useful when you are working with multiple linked projectors, enabling you to direct commands to a certain projector rather than broadcast to all projectors. For complete information on how to assign projector numbers, see *3.7, Adjusting and Checking System Parameters.*

2.10 Keypad Protocols

At manufacture every keypad is assigned a default protocol, which is simply a collection of settings that determine how the keypad operates. Once assigned, this protocol remains in effect until it is changed — that is, the keypad will operate as it currently does until you change its protocol.

Protocols are most useful for multiple-projector applications. For example, you might want to change a keypad protocol if you are working with two projectors and two remote keypads in the same room and need to control each projector independently (Figure 2-20). When Keypad 1 has a different protocol than Keypad 2, each keypad communicates *only* with the projector having a matching protocol. Or, if you have a network of two or more projectors connected together via RS-232 serial ports, you may want only certain projectors to respond to a wired keypad.

NOTE: Matching the protocol on the projector to that of a keypad is done through a setting in the VistaGRAPHX 5000 ***Preferences*** *menu. See* ***3.7, Adjusting and Checking System Parameters*** *for further information on how to change the projector's infrared sensor (rear and front) protocol.*

A protocol for either type of remote keypad — IR or wired — can be changed through software commands entered on the keypad. A new protocol set through software commands remains in effect until the keypad batteries are removed and replaced (if an IR remote), or until the keypad is unplugged (if a wired remote). A remote can also be changed manually — you can "hard-wire" new jumper settings inside the keypad so that they remain in effect until you change the hard-wiring. Note that a hard-wired protocol can be temporarily overridden by the

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software protocol change, effective until the keypad is unplugged and plugged in again (if a wired remote) or until a battery is removed (if an IR remote).

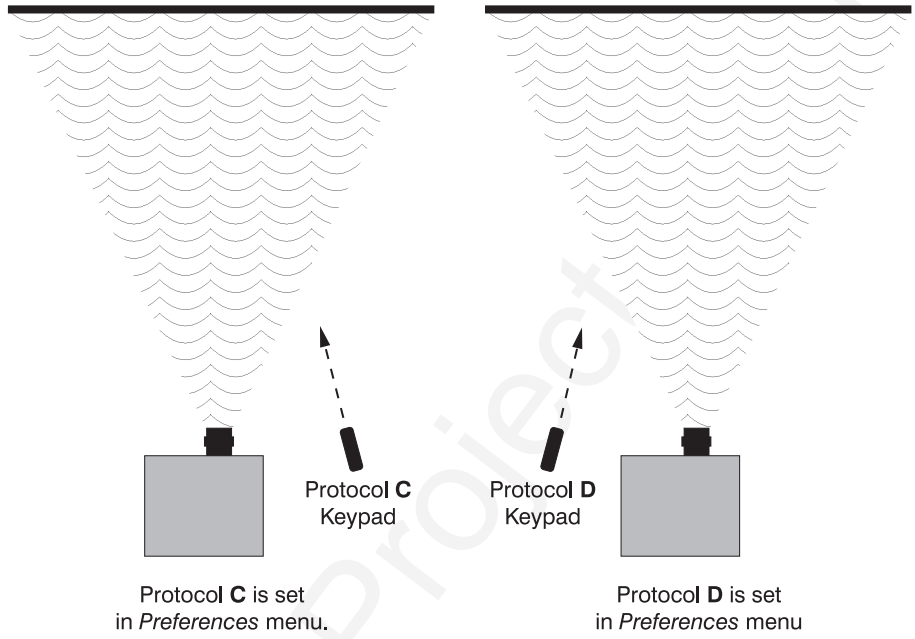

Figure 2-20. Independent Keypads and Projectors

Remote Keypad Protocol — IR OR WIRED KEYPAD —

➤ The *VistaGRAPHX 5000* standard IR remote keypad or the optional wired remote can be set to one of two different protocols — "C" or "D". To hard-wire a protocol to "C" or "D" in either remote, follow Steps 1 through 5.

Step 1

Unplug the keypad from the projector (applies to wired remote only).

Step 2

Unlatch and open the empty battery compartment on the back of the keypad as shown in Figure 2-21.

NOTE: A wired keypad will open as shown, but there will be a cable passing through the battery compartment cover.

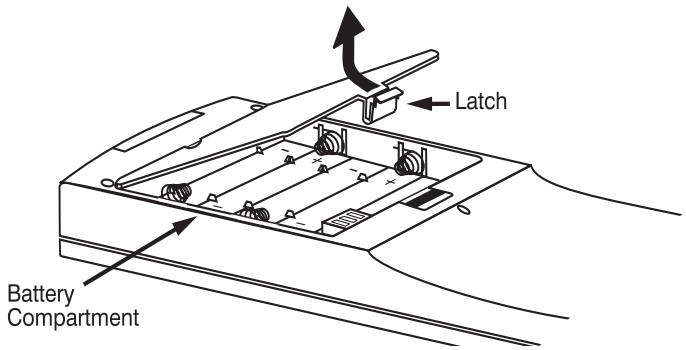

Figure 2-21. Opening the Keypad

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Step 3

Find the 4 jumpers located along the latching side of the battery compartment. These jumpers set the keypad protocol and other settings so that the keypad functions in a certain manner.

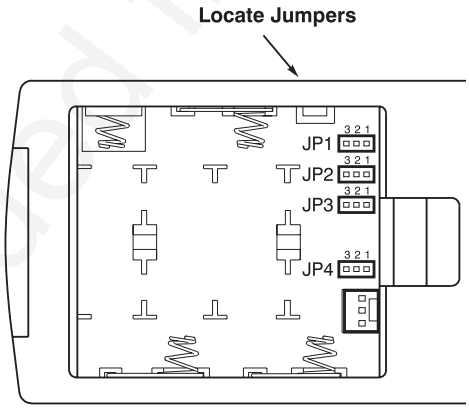
Step 4: Set the Jumpers

Set the jumpers as shown in Figure 2-22. Take care to refer to the correct part of the drawing — IR or wired (optional). Use tweezers or needle-nose pliers to remove and replace each jumper as necessary.

- **J1** jumper: For either remote, set between pins 1 and 2 to set as Protocol "C". Set between pins 2 and 3 to set as Protocol "D".
- **J2** jumper: For either remote, set between pins 2 and 3 as shown; otherwise, the projector will not respond correctly to keypad commands.
- **J3** jumper: For the IR remote, make sure that the jumper is set between pins 2 and 3 as shown. For the wired remote, make sure that the jumper is set between pins 1 and 2 as shown.
- **J4** jumper: For the IR remote, make sure that the jumper is set between pins 1 and 2 as shown. For the wired remote, make sure that the jumper is set between pins 2 and 3 as shown.

Step 5

Replace battery compartment cover. Plug into projector (wired keypad only) and test.



IR Remote Keypad:

JP1	3 2 1 = PROTOCOL **C** *-or-* 3 2 1 = PROTOCOL **D**
JP2	3 2 1 (ALWAYS)
JP3	3 2 1 ENABLE IR
JP4	3 2 1 IR KEYPAD

Wired Keypad:

JP1	3 2 1 = PROTOCOL **C** *-or-* 3 2 1 = PROTOCOL **D**
JP2	3 2 1 (ALWAYS)
JP3	3 2 1 DISABLE IR
JP4	3 2 1 WIRED KEYPAD

Figure 2-22. Locating and Setting the Jumpers

NOTE: Although they are similar, a VistaGRAPHX 5000 wired keypad cannot be converted into an IR remote keypad, nor vise versa.

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SHORTCUT METHOD:

You can also issue software protocol settings through the keypad. These software commands will be lost when the keypad is either unplugged or when a battery is removed — the keypad will revert back to the hard-wired jumper settings (see above) until you enter the software commands again.

Press Input1 Color Pixel Position 1 = Protocol "**C**"

Press Input1 Color Pixel Position 2 = Protocol "**D**"

NOTE: If you change any keypad to a new protocol and the projector stops responding, the projector may be set to a conflicting protocol. Use the projector's built-in keypad to access the ***Preferences*** *menu. Under "Front IR Keypad" or "Back IR Keypad" or "Wired Keypad", select the protocol that matches the new protocol of the keypad at hand. The projector should now respond properly.*

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Section 3

Operation

3.1 Overview

This section explains how to use the *VistaGRAPHX 5000* projector once it has been installed. Please read through these pages before using the projector for the first time. An understanding of *VistaGRAPHX 5000* features and how to access them will help you to take full advantage of the capabilities of the projector within minutes. Organization of this section is as follows:

3.1 Overview ..... pg. 3-1
3.2 Projector Basics ..... pg. 3-1
3.3 Using the Keypads ..... pg. 3-3
3.4 Navigating the Menus ..... pg. 3-11
3.5 Using Inputs and Channels ..... pg. 3-16
3.6 Adjusting the Image ..... pg. 3-21
3.7 Adjusting and Checking System Parameters .. pg. 3-32
3.8 Using Multiple Projectors ..... pg. 3-37
3.9 Error Conditions ..... pg. 3-38

NOTE: Installation involves locating the projector and adjusting it for use at that location. If you have not yet installed the projector, refer to ***Section 2, Installation and Setup****.*

3.2 Projector Basics

Most *VistaGRAPHX 5000* functions and adjustments are entered through keypad commands that either control the projector directly or activate a system of intuitive menus. Variations in settings can be defined and retained in the projector's internal memory as a custom *channel,* with up to 99 different channels possible. Zoom (optional), focusing and vertical offset are manually adjusted. Main projector components are identified and explained below:

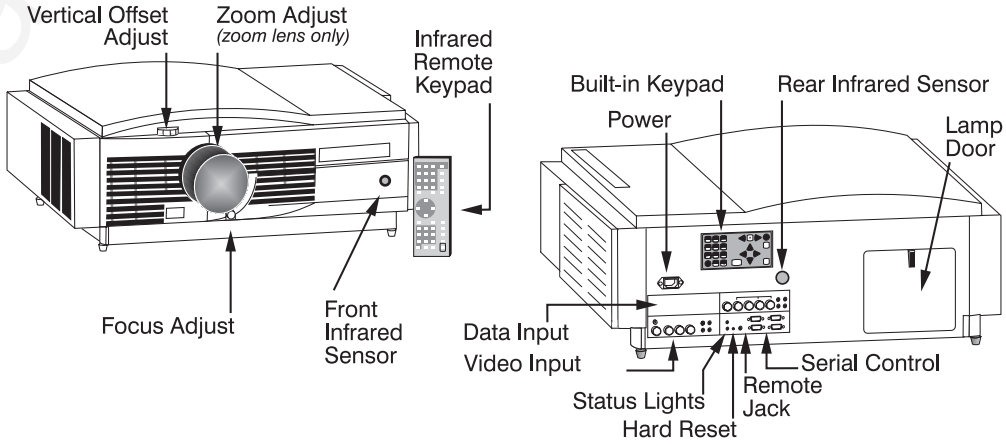

Figure 3-1. Projector Components

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Components ➤

INFRARED SENSORS - The infrared (IR) sensors on the front and rear of the projector receive infrared signals from an IR keypad for remote control of the projector. For proper operation make sure that these sensors are not blocked.

ZOOM ADJUST - The lens barrel of a zoom lens (optional) rotates to adjust the size of the image at the current throw distance (projector-to-screen distance). Note that minimum and maximum image sizes depend in part on the specific zoom lens installed *(see Section 5, Specifications).*

FOCUS ADJUST - The focus knob adjusts the sharpness of the image at the current throw distance.

VERTICAL OFFSET ADJUST - The vertical lens adjustment knob adjusts the vertical position of the image in relation to the projector lens. See *Section 2, Installation and Setup* for details.

COMPOSITE/S-VIDEO INPUT - Accepts a composite video and S-Video signal from devices such as VCRs.

RGB INPUT - Accepts RGB and sync signals from devices such as computers.

SERIAL INTERFACE (WITH LOOP THROUGH) - Allows one or more projectors to be remotely controlled by a computer or controller, and provides a communications connection for *Marquee* and third-party (Extron) signal switchers.

AC LINE CORD INPUT - Accepts ***only*** a special notched AC line cord as supplied with projector. See power requirements in *Section 5, Specifications*.

WARNING:
Use only the special notched AC line cord. Do not attempt operation if the AC supply is not within the specified voltage and power range.

INFRARED REMOTE KEYPAD - Keypad for controlling the projector from a distance.

BUILT-IN KEYPAD - Alternative location for entering commands.

REMOTE JACK - Accepts a wired remote keypad for remote control of the projector.

HARD RESET - Emergency access for powering down the projector in the event of a system failure. Insert pen point or small screwdriver.

STATUS LEDS - Two LEDs (light emitting diodes) located to the right of the Video Input Panel indicate "Status" (top) and "Power" (bottom). During normal operation, the "Power" light is steady green and the "Status" light flashes green each time a key is pressed or when the projector receives a serial command. Use the illustration shown here as a guide.

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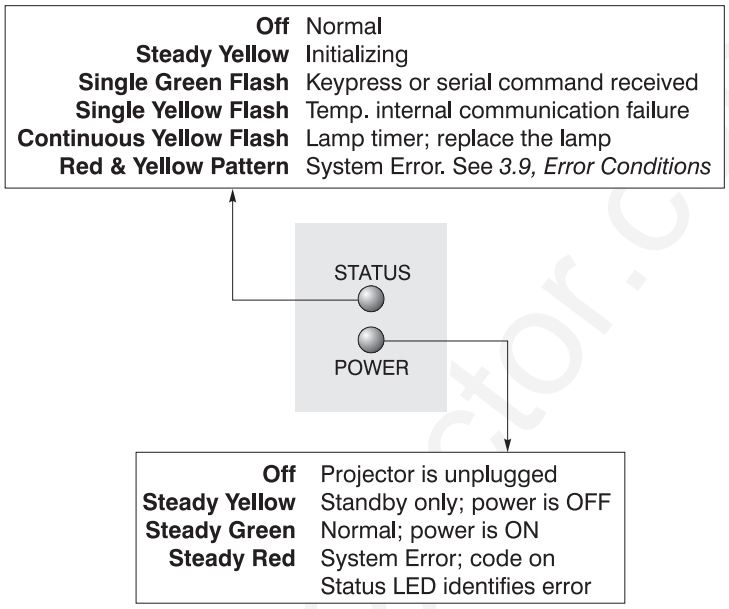

NOTE: A steady red power light accompanied by a coded pattern of red and yellow flashes from the status light indicates an internal system error. Should the problem persist, contact a qualified service technician through your dealer or at Electrohome.

3.3 Using the Keypads

You may use any of three different keypads to control the projector: the IR remote, the built-in, or the wired remote (optional). You may find one keypad more appropriate than another, depending on your specific installation and application.

On each keypad, some keys cause a direct action (such as POWER to turn the projector on or off). Other keys activate on-screen menus and other windows from which you can make choices and changes. On the built-in keypad, keys labeled with both a direct function as well as a number (such as SRC and 3) default to their direct function (in this case SRC) unless numeric entry is expected and required to complete a specific command — there is no separate function key for enabling direct vs. numerical entry on this keypad.

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Built-in Keypad ➤ The built-in keypad is located on the back panel of the projector. See Figure 3-2.

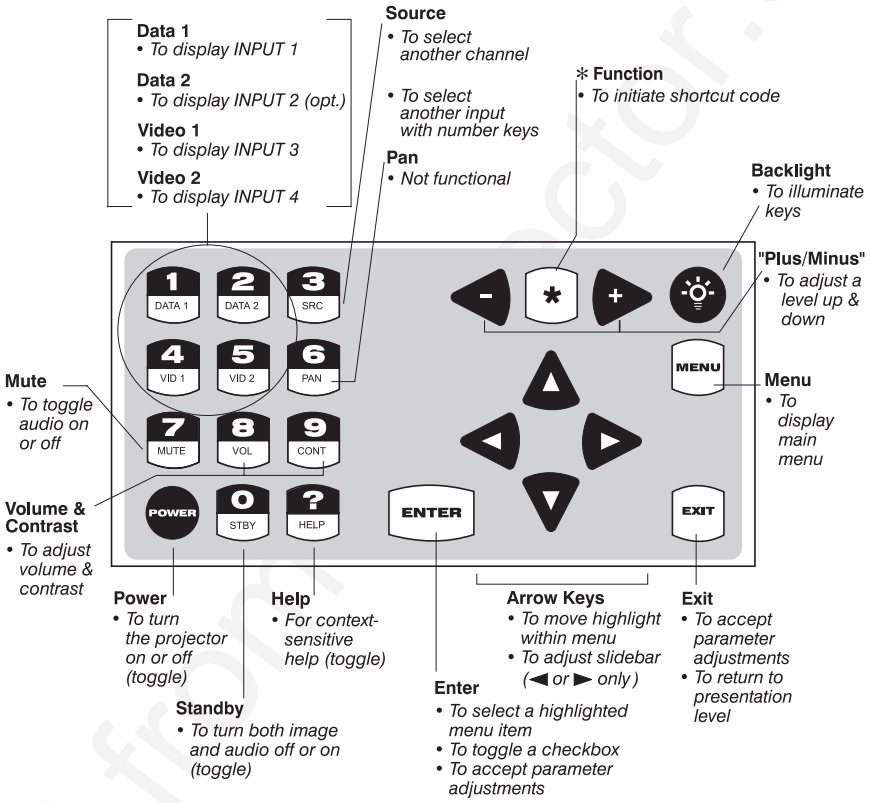

Figure 3-2. Built-in Keypad

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IR Remote Keypad ➤

The IR Remote Keypad is the most commonly used keypad. It controls the projector by way of wireless communications from a battery-powered infrared (IR) transmitter. Use the IR remote keypad the same way you would use a remote keypad supplied with a TV or VCR. When making key presses, point the keypad either toward the screen or toward the front or rear of the projector.

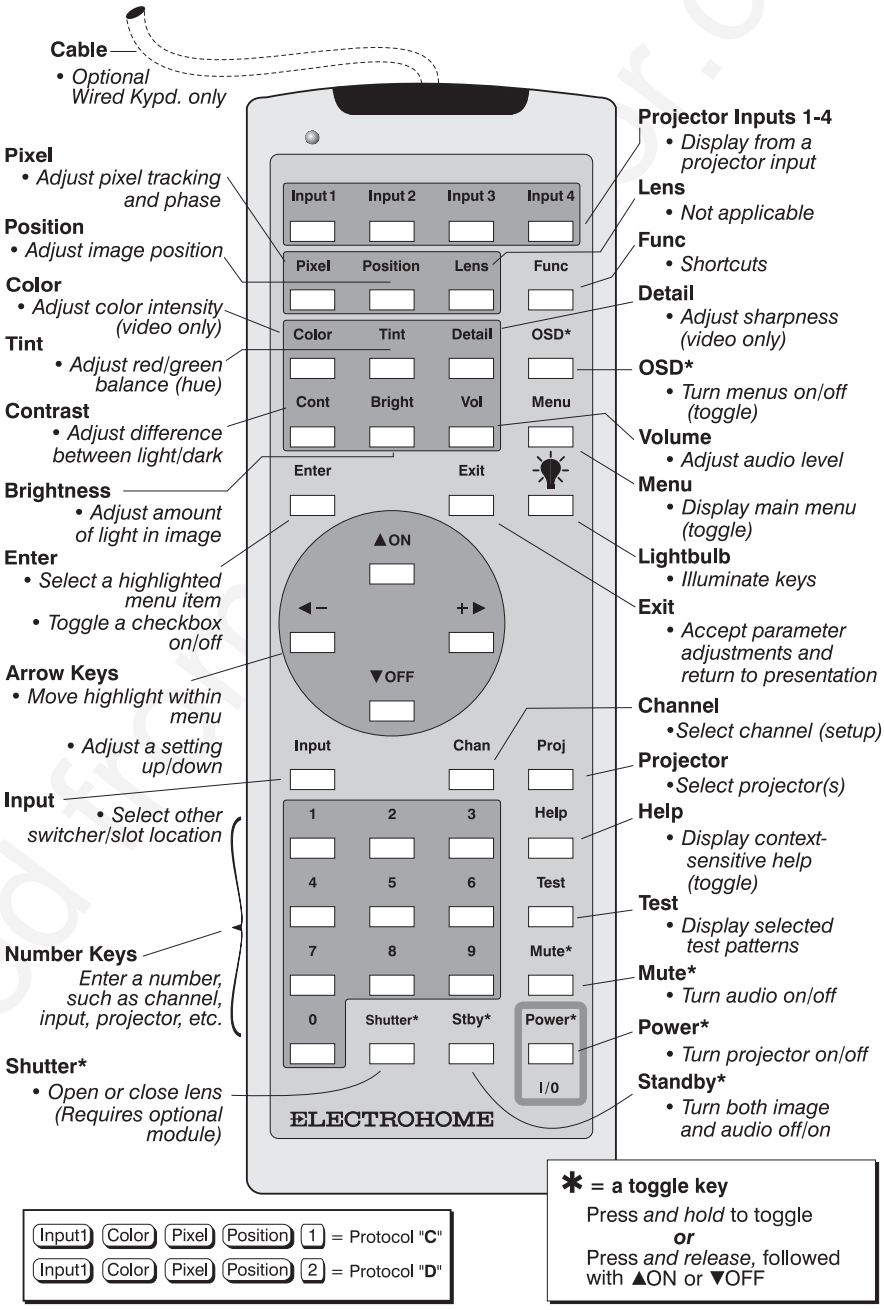

Figure 3-3. IR (infrared) or Wired Remote Keypad

Wired Remote Keypad —OPTIONAL— ➤

The optional wired remote keypad connects to the projector's remote jack via a 25 ft extension cable. It is recommended when:

- the location of the keypad in relation to the projector or screen prohibits IR Remote Keypad operation.

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- the lighting conditions are unsuitable for proper IR transmission
- you are controlling multiple projectors in the same room and need to control each by its own remote keypad.

NOTE: This keypad is identical in appearance and key function to the IR remote keypad that is standard with the projector. See Figure 3.3

Guide to Keypads ➤

Keep in mind the following guidelines:

1) Press keys one-at-a-time; there are no simultaneous key presses required.
2) For any key having an "*" (such as Power*) hold the key for a second or two in order to toggle the function with a single key press. For other keys (or to use a "*" key in conjunction with ▲ON or ▼OFF), a momentary press similar to a mouse click is sufficient.
3) Press the "lightbulb key" for approximately one second to temporarily illuminate the backlight for the keys without sending any other command.
4) ◄–, +►, ▲ON , and ▼OFF repeat their "arrow" actions when held down. For other keys, release and press again to repeat an action.
5) If you press a key while the projector is busy with another action, such as during a power-up, the key press may not take effect.

When you turn on the projector it begins operating at *presentation level*, such as an image from the most recently used source signal. The projector temporarily leaves presentation level whenever you use the keypad to work with control settings, display menus, or on-line help. For example, pressing Menu after startup displays the main menu — presentation level is no longer active, although the image continues to be displayed in the background. Press Menu again (or Exit) to return to presentation level.

Remote Keypad Functions ➤

All keypad keys/functions are explained below. Note that certain keys and functions are not available using the built-in keypad.

Power* Power ON/OFF

Press and hold for a second or two to turn the projector on or off with a single key press. Or press Power* followed immediately by ▲ON or ▼OFF if you want to guarantee the correct toggle (useful if you are unsure of the present status).

*NOTES: **1)** Whenever the projector is turned off, the lamp cooling fans remain on for about five minutes to cool the lamp sufficiently. **Do not unplug the projector unless the lamp cooling fans have shut off**. **2)** It is a good idea to avoid turning a projector back on until it has been off for at least five minutes. Hot re-strikes of the lamp may reduce lamp life.*

Input1 Input 1 (Dat 1)

Press Input1 to select the input connected to **INPUT 1** on the projector (data input). This is the same as entering Input 0 1 .

Input2 Input 2 (Dat 2)

Press Input2 to select the input connected to **INPUT 2** on the projector (an optional interface). This is the same as entering Input 0 2 .

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Input3 *Input 3 (Vid 1)*

Press Input3 to select the input connected to **INPUT 3** on the projector (composite video). This is the same as entering Input 0 3 .

Input4 *Input 4 (Vid 2)*

Press Input4 to select the input connected to **INPUT 4** on the projector (S-Video). This is the same as entering Input 0 4 .

Input *Input*

Press Input n n when you want to display from a specific source location, such as a switcher connected serially to the projector's switcher port. The first digit represents the switcher number (usually 1-9, or "0" for one of the four inputs on the projector), the second digit represents the slot number (1-9). For example:

Input 1 2 = display data from switcher 1, slot 2.

NOTES: 1) Although you don't need to use the input key unless a switcher is connected to the projector, you can also use Input *to access the four input "slots" on the projector itself: use* 0 *as the first digit (representing the projector as the switcher), then* 1, 2, 3 , *or* 4 *as the second digit (the desired input slot number).* 0 *in combination with higher numbers is an invalid entry. 2) See* ***3.5, Using Channels and Inputs*** *for a detailed explanation of inputs.*

Chan *Channel ("Src" on built-in keypad)*

Press Chan to select a *channel* representing a specific source setup defined and stored in projector memory. Once you enter a channel number, the display will automatically update according to the setup parameters defined for that channel.

NOTE: Precise Chan *key behavior depends on which* ***Channel Selection*** *option (from within the* ***Preferences*** *menu) you have chosen for the* Chan *key. For example, you can choose to see a scrollable list of channels when you press* Chan*, or you may prefer to enter a one- or two-digit number channel number. To set up the* Chan *key, see* ***Preferences*** *later in this section.*

Stby* *Standby*

Press Stby* and hold for a second or two to blank the display and mute the audio output while keeping the projector in a warmed-up and ready state. Or quickly press and release Stby* and follow immediately by ▲ON or ▼OFF if you want to guarantee the correct toggle (useful if you are unsure of the present status). Note that all electronics remain ON in standby mode, even though lamp power reduces to a minimum and the image turns to black. To leave standby press and hold Stby* again (or use Stby* ▼OFF). Or simply press Exit.

Menu *Menu*

Press Menu to display the main menu. A list of seven numbered options and icons appears for access to specific functions, such as *Channel List* or *Size / Position*. Press Menu again (or Exit) to return to presentation level.

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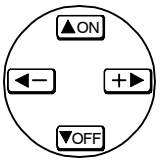
Enter

Press Enter to select a highlighted item, toggle a checkbox (checked vs. unchecked), finish with a double slidebar, or accept a parameter adjustment and return to the previous menu or image.

Exit

Press Exit to save most parameter adjustments and return to presentation level.

*NOTE: Exit does **not** save changes within text editing boxes or pull-down lists.*



Arrow Keys

Use the ▲ON or ▼OFF keys to navigate within a menu or pull-down list or to increase or decrease the value in the second (bottom) slidebar of a double slidebar. Use ◄– or +► to change all other slidebar values — hold as desired for continuous scrolling. Also use ◄– or +► to jump between "pages" in a long pull-down list.

▲ON *or* ▼OFF

Use ▲ON or ▼OFF in conjunction with certain *toggle* keys—those labeled with an asterisk—to ensure a toggle *only* in the desired direction. When turning the projector on, for instance, you may be too far from the projector to know whether it is really off or if it is just in standby. If you press Power* and simply hold it for a second or two in hopes of turning the projector *on*, the projector will turn *off* if the projector is actually already on. Instead, to avoid the risk of toggling in the wrong direction, quickly press *and release* the function key you wish to toggle (in this case Power*). Then immediately (within 2 seconds) press either ▲ON or ▼OFF as desired. The specific toggle will occur.

Toggle keys are labeled with an asterisk on the keypad. They are listed below:

- Shutter* + ▲ON = close the shutter (dowser)
  Shutter* + ▼OFF = open the shutter (dowser)
- Stby* + ▲ON = put the projector in standby mode
  Stby* + ▼OFF = leave standby
- Power* + ▲ON = turn the projector on
  Power* + ▼OFF = turn the projector off
- Mute* + ▲ON = turn the audio on
  Mute* + ▼OFF = turn the audio off
- OSD* + ▲ON = turn the menu system on
  OSD* + ▼OFF = turn the menu system off

Color

Press Color to adjust the color saturation level, or the amount of color in a video image. Lower settings produce less saturated colors — a setting of "0" produces a black and white image, for example. If the color level is too high, colors will be overpowering and unrealistic. Use ◄– and +► until the desired color saturation level is displayed.

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Tint

Press Tint to adjust the red/green color hue for true color reproduction of NTSC video signals. For best results, adjust tint while displaying a proper test pattern — otherwise, it is recommended that tint remain at its default setting. Use ◄– and +► until the desired tint is displayed.

Detail

Press Detail to adjust the sharpness of a video image. Use ◄– and +► until the display is as sharp as desired, keeping in mind that any level of detail above 50% will also introduce some level of noise in the image. Set below 50% to filter the signal and remove noise from a noisy source.

Contrast

Press Cont to increase or decrease the difference between light and dark areas of your image. Use ◄– and +► until you reach the desired level of contrast, making sure that the whites remain bright but not distorted or tinted.

Brightness

Press Bright to increase or decrease the amount of perceived light in the image so that black just changes to very dark gray. Use ◄– and +► until you reach the desired level. See *3.6, Adjusting the Image (Image Settings* subsection).

Volume

Press Vol to control the audio level. Use ◄– and +► until you reach the desired volume.

Projector

Press Proj to display an editable box indicating which projector is currently listening to the keypad. The number that appears will match what has been defined in the *Preferences* menu.

To use a certain projector, enter the 3-digit number assigned to the projector you want to use, or use ◄– and +► to scroll. Press Enter to select. Press Exit to cancel.

To broadcast to multiple projectors, press Proj and then Func ***without*** entering a projector number (if you are using the built-in keypad, this broadcast command is ✻ 7 7 ✻). Keypad commands will then go to all projectors present.

NOTES: 1) The "Broadcast Keys" option in the Preferences menu must be selected for only ***one*** *projector in a serial network. The keypad in use must be OFF (disabled) for the remaining projectors. See* ***2.10. Keypad Protocols****, and* ***3.7, Adjusting and Checking System Parameters.***

Pixel

Press Pixel to access the pixel tracking and pixel phase double slidebar. Use ◄– and +► to increase or decrease the frequency of the pixel sampling clock to correct the proportion of the image. Use ▲ON and ▼OFF to increase or decrease pixel phase so that any shimmer disappears and the image is stable throughout. See *3.6, Adjusting the Image (Image Size / Position* subsection).

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Position

Press Position to move the image up, down, right, or left using the double slidebar. Use ◄– and +► to move the image left or right, use ▲ON and ▼OFF to move the image up or down.

Lens

This function requires a Multi-Control Module and does not apply to this projector.

Shutter

Press and hold Shutter* for a second or two to toggle the mechanical lens shutter (dowser) closed or open with a single key press. Or quickly press and release Shutter* and follow immediately with ▲ON or ▼OFF if you want to guarantee the correct toggle (useful if you are unsure of the present status). Close the shutter whenever you want to mute all display yet maintain access to all projector functions. Open the shutter to regain the display.

NOTES: 1) Like standby, closing the shutter automatically reduces internal light to a minimum so that heat doesn't build up inside the projector. 2) The status of the shutter is shown in the LCD window on the rear panel of the projector.

Mute

Press and hold Mute* for a second or two to toggle the audio on or off with a single key press. Or quickly press and release Mute* and follow immediately with ▲ON or ▼OFF if you want to guarantee the correct toggle (useful if you are unsure of the present status).

Function Key (* on built-in keypad)

From presentation level, press Func followed by a 2-digit number to access any of the projector's resident test patterns. For example, Func 8 4 will display a 128-step grayscale pattern, or Func 8 0 will display a scrollable list of test patterns. A list of test common pattern codes appears on the back of the IR remote keypad and in the *Service* subsection later in this manual.

You can also use Func followed by a special 2-digit number to directly access certain options in the *Size / Position* or *Image Settings* menus — this will enable a second method for adjusting the option immediately, without going through the menu system. For example, to toggle the VCR option: press Func 5 0; to stop an *ILS*™ adjustment: press Func 5 3. See the back of the keypad.

To broadcast to all projectors in a network, press PROJ Func (if you are using the built-in keypad, this broadcast command is * 7 7 *).

NOTES: 1) Once Func is pressed in presentation level, the projector will not respond to non-numeric entry until 2 digits have been entered or until 5 seconds of inactivity have elapsed. 2) Certain engineering codes will freeze an image or display an unfamiliar menu or image. Should you accidentally select one of these special codes after pressing Func, press Exit to cancel the function and return to presentation level.

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OSD (On-screen display)

Press and hold OSD* for a second or two to toggle menus and test patterns on or off (i.e., visible or invisible). Or press OSD* followed immediately by ▲ON or ▼OFF to guarantee the correct toggle direction (useful if you are unsure of the present status). Note that invisible menus are fully functional.

NOTES: 1) With OSD on, you can still mute menus, error messages, slidebars, etc. with the appropriate setting in the Preferences menu. 2) The status of the OSD key is displayed in the LCD window on the rear panel of the projector.*

Help

Press Help for detailed information about any current menu and highlight. Press Help again to exit. From presentation level, press Help to access the *General Help* menu consisting of *Using Help, Projector Setup, Keypad, Channel Selection* and *Status LEDs.* Press Exit to leave *General Help* and return to presentation level.

Test

Press Test to display one of five selected test patterns. Press Test again to display the next pattern in this sequence, and so on. Test will exit after the fifth pattern, or press Exit at any time to remove the current test pattern from the screen.

*NOTE: For a complete list of all test patterns, including those accessed through the Func key, see **Service** later in this section.*

Keypad operating settings (protocols)

The remote keypad and the optional wired keypad both store keypad operating settings (called *protocols*) in memory. In some advanced applications, such as when you want to use two separate keypads to control two projectors independently, you may want to override the original protocol (called "C") set at manufacture for one of the keypads. See section *2.10, Keypad Protocols* for complete instructions on changing protocol.

3.4 Navigating the Menus

Many of the controls for the projector are accessed from within the *VistaGRAPHX 5000* menu system. There are seven groups of functions in all, each selectable from the main menu as shown in Figure 3-4. Press Menu to access the main menu. *Size / Position, Image Settings, Channel List, Communications, Preferences, Status* (primarily read-only), and *Service* (password protected) menu icons appear:

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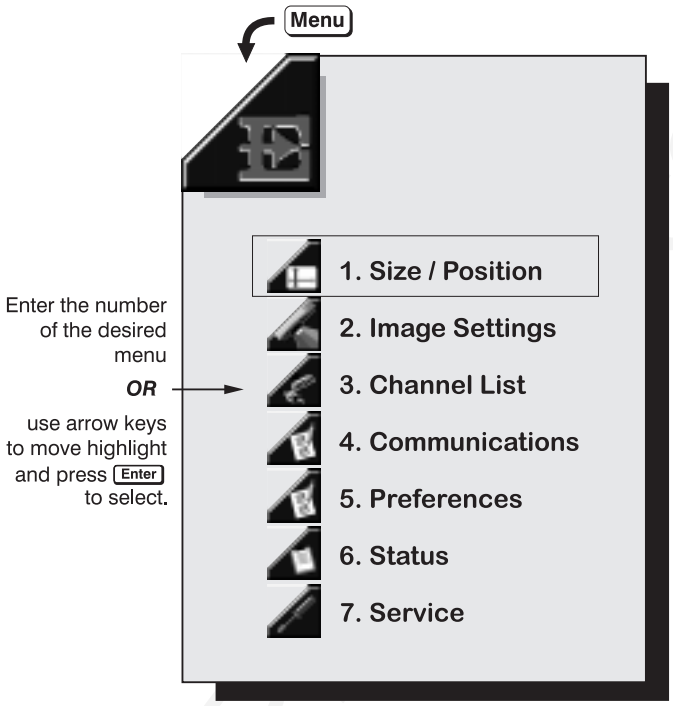

Figure 3-4. VistaGRAPHX 5000 Main Menu

A triangular icon in the main menu represents each of the *VistaGRAPHX 5000* function menus. On the keypad, either enter the number of the menu you wish to access, or use the arrow keys to highlight the desired icon and press ENTER. The function menu you selected will then appear.

Once you have a function menu on screen, navigate in a similar manner—enter a menu option number for any numbered option, or use the arrow keys to move the highlight and press ENTER. Items that are unavailable, locked out or which do not pertain to the current action appear dimmed and cannot be selected. If there is no signal present, all source-dependent adjustments are disabled. Also note that after 15 minutes of inactivity, the projector returns to presentation level.

When finished with a function menu, do one of the following:

- Press EXIT to accept any changes made and return to your image.
- Press MENU to accept any changes made and return to the main menu.

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On-line Help ➤

If at any time you are uncertain about a menu or option, press HELP to display detailed information about the current menu or any highlighted item. A scroll bar will be available on the right-hand side of a help window if there is additional text — use the arrow keys to scroll (Figure 3-5). Press HELP again to exit.

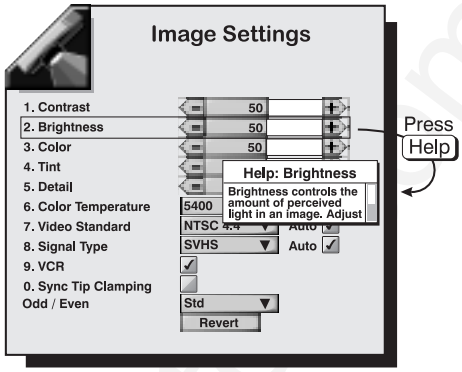

Figure 3-5. Context-sensitive Help.

NOTES: 1) While Help is displayed, the arrow keys still operate any current slidebar or pull-down list in view, such as "Brightness" or "Color Temperature".

If you are at presentation level, press HELP to access *General Help* information. Press EXIT to return to presentation level.

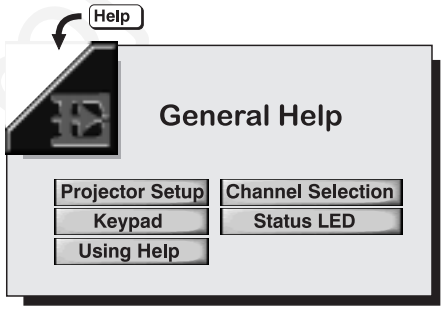

Figure 3-6. General Help (from Presentation Level)

Time-outs ➤

Whenever the projector is not at presentation level, such as when there is a slidebar, menu, message or test pattern displayed, you have limited time in which to make a keypad entry before the projector returns to presentation level. These time-outs vary depending on the current display, as shown in the following chart:

TIME-OUTS	
Display	**Time-out**
Slidebar (from pres.)	5 seconds
Slidebar (from menu)	15 minutes
Lamp Timer Msg.	30 seconds
Source entry	5 seconds
Direct control entry	5 seconds
Other	15 minutes

Using slidebars and other controls ➤

Most of the seven function menus allow you to edit parameters through slidebars, checkboxes, and pull-down lists. To select a slidebar, toggle a checkbox status, or view a pull-down list, do one of the following from a function menu:

- Enter the menu option number corresponding to the setting you wish to change (for example press 5 to select Left Blanking).
- Or move the highlight to the desired parameter and press ENTER .
- Or move the highlight and press ◄– or +► (for slidebars).

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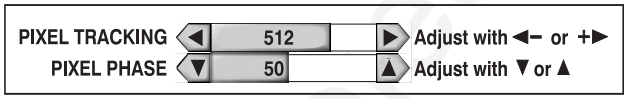
- Or bypass the menus entirely and use the Func key to access a parameter immediately during your presentation (*note: applies to certain options only*).

Once selected, change the setting as desired (see below) and press Enter to save and return to the current function menu.

SLIDEBARS - The current level for a given menu parameter such as brightness, contrast, etc., is displayed in the center of the slidebar. This number usually expresses a percentage, or it may have units associated with it (such as pixels, degrees Kelvin, etc.). Press the ◄– or +► keys to adjust a level up or down. For double slidebars, such as pixel tracking/pixel phase, press Enter to adjust the second slidebar setting (see below). As you increase or decrease the level, both the value and the size of the bar change accordingly. For fast adjustments, hold down the desired arrow key. Press EXIT to accept your changes.



"DIRECT" SLIDEBARS - For the quickest adjustments, you can go directly to a slidebar without using the menu system. For example, simply press CONT to immediately display the same contrast slidebar accessed with the "Contrast" option in the *Image Settings* menu. Direct slidebars are listed below:

LIST OF DIRECT SLIDEBARS	
Volume	VOL
Horizontal/Vertical Position	Position
Pixel Tracking or Phase	Pixel
Top Blanking	Func 0 6
Bottom Blanking	Func 0 7
Left Blanking	Func 0 8
Right Blanking	Func 0 9
Contrast	Cont
Brightness	Bright
Color	Color
Tint	Tint
Detail	DETAIL

Use arrow keys to adjust any of these direct slidebars. Press Enter or Exit to save.

NOTES: 1) You can still adjust a direct slidebar as usual if the menu display is turned off (see OSD or* ***Preferences*** *menu) — the slidebar just won't be visible. 2) A direct slidebar disappears if it is not used within 5 seconds.*

Saving Adjustments - When you have finished with a slidebar, do one of the following:

- Press Enter to return to the previous level
- Press Exit to return to your presentation

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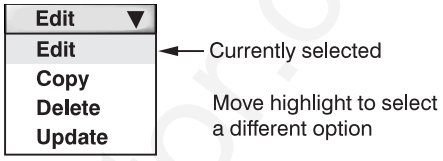
☑ **CHECKBOX -** Conditions listed next to a checkbox are present if the checkbox contains a checkmark. Press Enter to toggle checkmark on and off, or press +► to check and ◄– to uncheck. For any menu checkbox options that are numbered, such as the VCR option, enter the number of the option to toggle the checkbox.

Edit ▼ **Pull-down List -** Highlight and press Enter to pull down a list of options (or enter the menu option number, if present). Use the ▲ON or ▼OFF keys to navigate up and down within the list or to scroll a large list. Press Enter to choose an option.



NOTES: 1) Press ◄– or +► to jump between pages in a long pull-down list. 2) Press Exit while in a pull-down list to cancel any change.

Editing Text ➤ To enter or edit text (such as a channel name), highlight the desired parameter and press Enter to bring up an edit window. Current text is highlighted and displayed at the top of the menu, with selectable characters for editing displayed in a large white box, and other buttons at the bottom. Navigate between all with the arrow keys as usual.

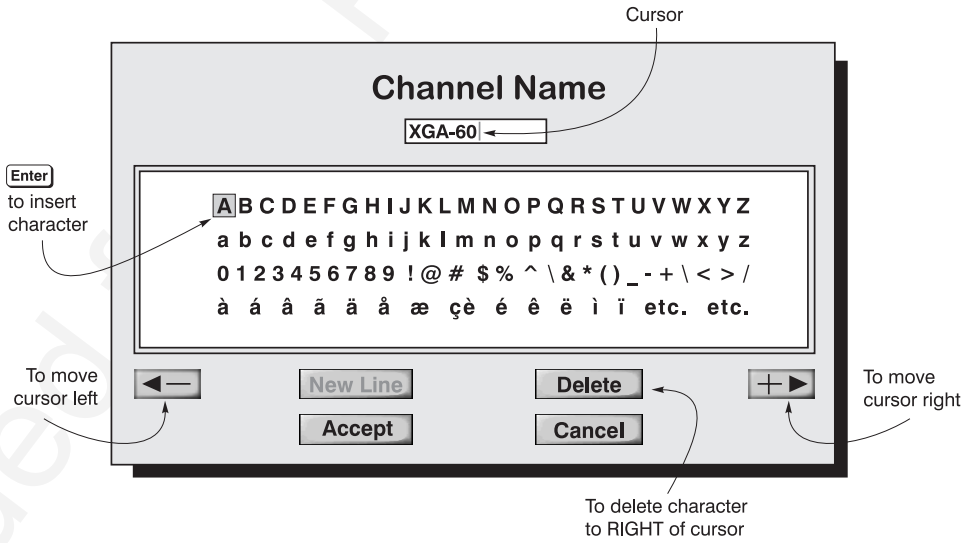


Figure 3-7. Editing Text, Such as "Channel Name"

NOTE: Entering a character while the current text is highlighted replaces all of the text. Make sure you want to discard the original text before beginning, or press Exit to cancel at any time.

To Edit Text - In the large character box, use the arrow keys to move from character to character. Press Enter on keypad to select and insert the character in the text box at the top of the screen. The blinking vertical line indicates the insertion point for the text. Select the on-screen ◄– or +► buttons to move the cursor left or right as necessary (highlight and press Enter).

To Delete Text - Select the on-screen "Delete" button to delete the character to the right of the insertion marker.

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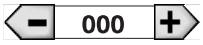
To Accept New Text - Highlight the on-screen "Accept" button and press Enter on the keypad.

To Cancel Text Editing - Highlight the on-screen "Cancel" button and press Enter on the keypad. The "Cancel" button ignores new edits and removes the edit window. Or press Exit at any time.

NOTE: The "New Line" button is not available. Text must fit on one line.

Editing Numerical Values ➤



Enter numbers directly from the keypad in order to edit numbers representing projectors, sources (channels), switchers or slots.

NOTES: 1) Once you enter the first digit, it replaces all old digits. 2) If you press any non-numbered key, the number entered up to that point is accepted and updated as the new value. 3) Press Exit to cancel editing.

3.5 Using Inputs and Channels

*NOTE: See **Section 2, Installation and Setup**, for a full explanation of how to connect sources to the VistaGRAPHX 5000.*

VistaGRAPHX 5000 stores and automatically recalls up to 99 different channels for a variety of inputs. This memory feature allows you to define and conveniently use a wide variety of customized setups rather than having to repeatedly re-configure the projector for different presentations.

Do I Select an Input or a Channel? ➤

INPUT - An input simply describes a physical location for an incoming signal connection. These connections are always either on the projector itself (one of the four inputs at the back of the projector) or on any switcher connected to the projector's switcher port. Input describes the source signal according to two criteria only — to which *switcher* it is connected and to which *slot* it is connected — and is represented by a 2-digit number entered on the keypad. The first digit specifies the switcher (0-9), the second specifies the slot (1-9). Note that the projector is always considered "switcher #0".

EXAMPLES:

Input 1 3 = use source connected to switcher #1, slot #3

Input 0 1 = use source connected to the projector, slot #1 (i.e., Input1)

You can switch to an input in either one of two ways. Pressing the appropriate direct key — Input1, Input2, Input3, or Input4 — is a quick and seamless way to display from one of the four inputs at the back of the projector (select Dat1, Dat2, Vid1 or Vid3 if you are using the built-in keypad). Or, if your projector has a switcher connected to it at the **SWITCHER** port, press the general Input key and enter the 2-digit number representing the switcher and slot location for the desired signal (note there is no on-screen feedback).

Regardless of which method you use to select a source/input, the image will be displayed according to the following:

If it is the first time you have used the source/input (or if you used the input but did not adjust anything), the projector will recognize the input signal based on its frequencies and polarities, and will automatically display the image according to

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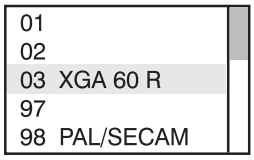
default settings for such a signal. The image will resize as large as possible while maintaining its original aspect ratio.

If you used the source once before and changed a display parameter such as focus, contrast, etc., then a channel was created and still exists in projector memory (see below). Using an Input key will automatically recall this channel and update the display accordingly.

If more than one channel exists for the input, the image will be displayed according to the setup parameters for the first channel in the channel list.

CHANNEL - A channel is a collection of measurements and settings that tailor a display to your specific needs. Since source types and applications vary greatly, you will likely want to adjust and define a wide variety of parameters, such as brightness, contrast, tint, etc., in order to customize and maximize the display coming from that source. For example, the display settings you choose for a VCR source may be very different from those you choose for a high resolution computer source, or one signal may vary from another used earlier through the same input location. Once you have adjusted a display parameter, such as zoom, focus, or pixel tracking, all current settings are collectively stored in the projector's memory as a unique 2-digit channel, such as 9 9. You can have numerous distinct channels to select for the same input, any of which can be used by using the Chan key on the keypad.

*NOTE: The precise function of the Chan key is flexible and depends on how you have defined it from within the **Preferences** menu (see **Preferences** later in this section). Shown at right is an example of a channel list from Chan.*



In order to use channels (Chan on the keypad), you must first create them. See below.

Creating a New Channel — AUTOMATIC —

➤ To use a new source with *VistaGRAPHX 5000*, a new channel must be added to your system so that the projector will respond properly to input from that source in the future. A new channel can be created automatically, which is the easiest, or you can use the "New" button in the *Channel List* menu.

A channel is automatically created when an input signal is sent to the projector for display and you then change a parameter (such as adjusting brightness, etc.). The "channel#" assigned to an automatically created channel will be the highest available number from 99 down. Note that automatic channels do *not* appear by default in any channel list that may appear whenever you press Chan — you must first enter a checkmark for the "In Menu" option in the *Channel List* menu for each automatic channel that you want to list.

Creating a New Channel — USING "NEW"—

➤ You can also define a channel from within the *Channel List* menu accessed from the *Main* menu. This procedure is as follows:

STEP 1 From the presentation level press Menu to display the main menu. To display the *Channel List* menu, press 3, or move the highlight to the *Channel List* icon and press Enter.

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The *Channel List* (Figure 3-8) displays a table of all defined channels and how they are connected to the projector. The numbers in the far left column represent each channel number defined so far, automatic or not. Other columns list details pertaining to each channel setup, such as its name, switcher number, slot location and other information.

The last two columns in the *Channel List* menu list the frequencies and polarity (“ + ” or “ - “) detected for each channel signal. If neither symbol is present, there is no sync.

Use the scroll bar to see and work with any additional channels not visible in the table.

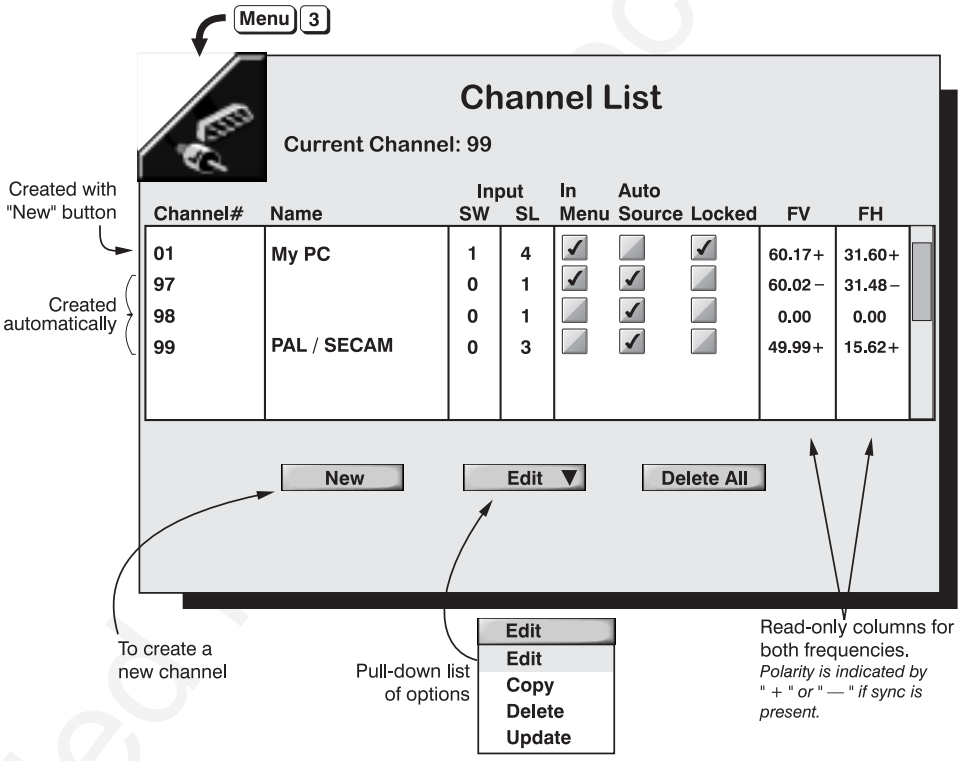


Figure 3-8. Channel List Menu

STEP 2 Beneath the *Channel List* window, select the "New" button, which will store the current signal as a channel with the following defaults assigned:

- **channel number** = the lowest unassigned number (up to 99).
- **switcher (SW) number** = 0 (represents the projector itself). Or, if the input source is connected to a switcher, the default will be the lowest switcher number available (from 1-9).
- **slot (SL)** = 1 (Input1), 2 (Input2), 3 (Input3), or 4 (Input4) for projector inputs, or current slot number (1-9) if the source is connected to a switcher.
- **InMenu** = checked. The source will then appear in the channel list whenever Chan key is pressed.
- **AutoSource** = checked. The projector will be able to automatically find this channel on power up if the input signal matches.

- **Locked** = unchecked. Settings for the channel can be changed.

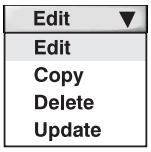
If you define a new channel without a signal present, the projector memory remains uninitialized until you "Update" the setup with an actual signal. See *Updating a Channel* below.

STEP 3 Repeat Steps 1 and 2 for each remaining new channel you wish to add. Press Menu or Exit on the keypad to accept all new channels defined.

Editing a Channel ➤ You can edit the setup information assigned to a channel. For example, you can enter text for the channel name (such as "VHS#1" or "My PC"), or you can change the switcher number, slot number, etc. pertaining to a specific source.

STEP 1 From the presentation level press MENU to bring up the main menu. Enter 3 or move the highlight to the *Channel List* icon and press ENTER to call up the *Channel List* menu.

STEP 2 Highlight and select the center button at the bottom of the screen. From the pull-down list, select "Edit". This will turn this button into an "Edit" button until you select a different option — "Copy", "Delete", or "Update" — from the list.



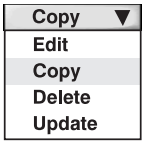
STEP 3 Using the arrow keys, return to the setup window above the "Edit" button and select the desired channel. Edit as necessary to accurately reflect your source connections:

- **Channel#:** Enter any new valid number from 1-99. If the number you choose has already been assigned, a message box will appear upon exiting the channel window. Either cancel and enter a different number or overwrite the old channel.
- **Channel Name**: Enter a maximum of 16 lowercase characters and/or 12 uppercase characters to describe your channel (see ***Editing Text***, above).
- **Switcher#:** Enter "0" if the signal is physically connected to the projector itself. Enter 1-9 if the signal is physically connected to a switcher.
- **Slot#:** Enter 1-9 for a specific slot on a switcher or 1-4 for a connection to the projector itself.
- **Checkboxes:** Toggle any checkboxes as desired for the channel.

Repeat for each channel you wish to edit. Press MENU or EXIT (using keypad) to accept all editing.

*NOTES: 1) For quicker access to "Edit" mode, press * * at any time.*
2) While in the pull-down Edit list, press − to switch to Delete mode, or + to switch to Copy mode. See below.

Copying a Channel ➤ Highlight and select the center button at the bottom of the screen. From the pull-down list, select "Copy". This will turn this button into a "Copy" button until you select a different



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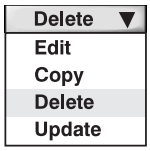
option — "Edit", "Delete", or "Update" — from the list.

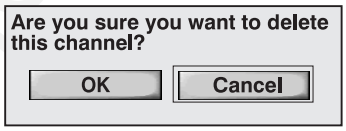
Using the arrow keys, return to the setup window above the "Copy" button and select a channel you wish to copy. The new channel will be defined with the same settings from this setup and will be assigned the lowest available number — the original setup remains intact.

NOTES: 1) For quicker access to "copy" mode, press [+] at any time. 2) Press [+] [ENTER] to copy the currently highlighted channel. 3) While in the Copy pull-down list, press [-] to switch to Delete mode, or [*] to switch to Edit mode.

Deleting a Channel ➤

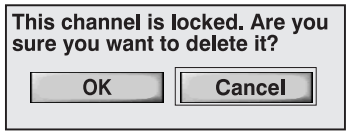


To delete a particular channel, select the center button at the bottom of the screen and select "Delete" from the pull-down list. Use the arrow keys to return to the setup window above the delete button. Highlight the channel you want to delete and press [ENTER] on the keypad. If the channel is unlocked, a confirmation box will appear to ensure that you really want to delete the channel (select "OK" or "Cancel"). If the channel is locked, a confirmation box will appear to remind you that the channel is currently locked and to ask if you are sure you want to delete it ("OK" or "Cancel").



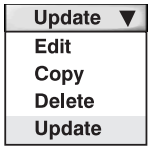
NOTES: 1) For quicker access to "delete" mode, press [-].
2) Press [-] [ENTER] to delete the currently highlighted channel. 3) While in the Delete pull-down list, press [+] to switch to Copy mode or [*] to switch to Edit mode.

To delete *all* channels, select the on-screen "Delete All" button and press [ENTER] on keypad. A confirmation box will appear to ensure that you really want to delete all channels (select "OK", "Unlocked Only", or "Cancel"). Select "OK" *only* if you really want to delete all channels, regardless of whether they are locked or not.



NOTE: You cannot delete the current channel with "Delete" or "Delete All".

Updating a Channel ➤



Highlight and select the center button at the bottom of the screen. From the pull-down list, select "Update". This will turn this button into an "Update" button until you select a different option — "Edit", "Copy", or "Delete" — from the list.

Using the arrow keys, return to the main channel listings above the "Update" button and select the channel you wish to update. The setup will change to reflect any new settings, recognizing the horizontal and vertical scan frequencies and recording them in the last two columns.

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3.6 Adjusting the Image

All options for image adjustments can be accessed through two menus: *Size / Position* (Menu 1) and *Image Settings* (Menu 2), both of which are listed in the *Main* menu. While in either of these two menus, you can change settings affecting the image from the current channel by working with the appropriate slidebars, checkboxes and pull-down lists. Exit will always return to presentation level and accept any changes you may have made within a menu.

From presentation level, you can access any of the first ten individual options on these menus by pressing Menu followed by the appropriate two-digit number representing their location in the menu system. For example, press Menu 2 6 to quickly access the color temperature option in the *Image Settings* menu.

Note that for certain options, you may prefer to use Func from presentation level to go directly to a particular option rather than traveling through the menu system at all (*note: this is not available for all options*). For example, press Func 0 8 to access the left blanking slidebar immediately.

In addition, numerous "direct keys" such as Position, Pixel, Cont, etc. access their respective slidebars immediately. Press any of these keys to adjust the corresponding slidebar during your presentation. For example, press Color to move the image. Press Exit to return to your presentation.

NOTE: 1) To hide the "direct" slidebars only, make sure the Display Slidebars option in the ***Preferences*** *menu is OFF. 2) To hide the entire menu system from view, toggle the on-screen display OFF: press and hold the OSD* key.*

Image Size and Position ➤

Select any of the following slidebars or pull-down lists to alter your image. Refer to *"Using Slidebars and Other Controls"* (earlier in this section) if you need help in selecting options and accepting changes. Changes made to the *Size / Position* menu will be saved when you exit the menu (press Exit or Menu).

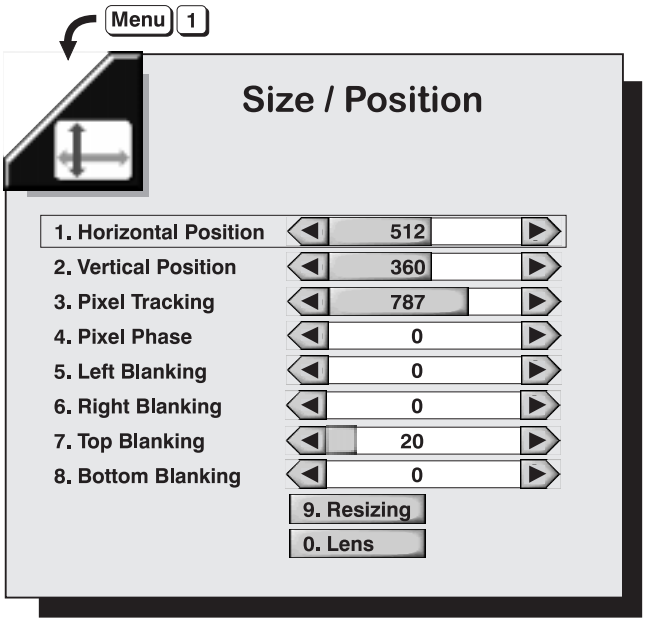

Figure 3-9. Size / Position Menu

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Horizontal Position

(SHORT CUT: Func 0 2 from presentation level. Or use Position key and adjust the top slidebar.)

Moves picture right and left.

NOTE: The number on the slidebar represents where the approximate center of the image lies in relation to the total number of pixels available horizontally and varies widely according to the signal. Watch the image while adjusting.

Vertical Position

(SHORT CUT: Func 0 3 from presentation level. Or use Position key and adjust the bottom slidebar.)

Moves picture up and down.

NOTE: The number on the slidebar represents where the approximate center of the image lies in relation to the total number of lines available vertically and varies widely according to the signal. Watch the image while adjusting.

Pixel Tracking

(SHORT CUT: Func 0 4 from presentation level. Or use Pixel key and adjust the top slidebar.)

Pixel tracking adjusts the frequency of the pixel sampling clock, indicated by the number of pixels per line, so that all pixels generated by a particular source are sampled. Proper pixel tracking ensures that the image is of the correct proportion and not stretched or compressed from left-to-right.

NOTE: By default, the projector samples at the correct frequency for a given source. For best results, it is recommended that this default not be overridden.

Pixel tracking is adjusted most effectively using a good test pattern, such as a smooth gray image made up of a clear pattern of tiny black and white dots, or a similar graphic image. Steady flickering or several soft vertical stripes or bands across the entire image indicates poor pixel tracking. Adjust the slidebar up or down until the stripes broaden to the point where one large stripe fills the image.

Pixel Phase

(SHORT CUT: Func 0 5 from presentation level. Or use Pixel key and adjust the bottom slidebar.)

Pixel phase adjusts the phase of the pixel sampling clock relative to the incoming signal. It is used primarily for adjusting RGB inputs.

NOTE: Adjust pixel phase after pixel tracking is properly set.

Adjust pixel phase when the image (usually from an RGB source) shows shimmer or “noise”. Pixel phase adjustment is done most effectively from within a proper test pattern, such as a smooth gray image made up of a clear pattern of tiny black and white dots, or a similar graphic image. Adjust until the image is stable and each dot is clearly defined. Using the numbers on the slidebar as a

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guide, you will notice that you can actually stabilize the image at more than one point—i.e., you may find that the image appearance at "11" is the same as the image appearance at "38", thus you can select either setting.

Left, Right, Top or Bottom Blanking

(SHORT CUT: Func 0 6, 7, 8, or 9 from presentation level.)

Blanks (turns to black) the top, bottom, left, or right edge of the image so that any unwanted information is hidden.

Resizing ➤

(SHORT CUT: * 0 1 from presentation level.)

Resizing generates a separate submenu of controls as described below.

When to Use Resizing

Resizing allows you to increase or decrease the size of your image. You can control the horizontal and vertical sizes independently to change the aspect ratio of an image, and you can move the image to a specific area of the screen. Use resizing in order to match your image precisely to the specific screen size and aspect ratio (proportion) needed in your application.

How to Access & Adjust Resizing

The three sets of horizontal/vertical resizing controls plus a “Presets” option reside in their own *Resizing* submenu (Figure 3-10). Access this submenu through the “**Resizing**” pull-down list in the *Size / Position* menu.

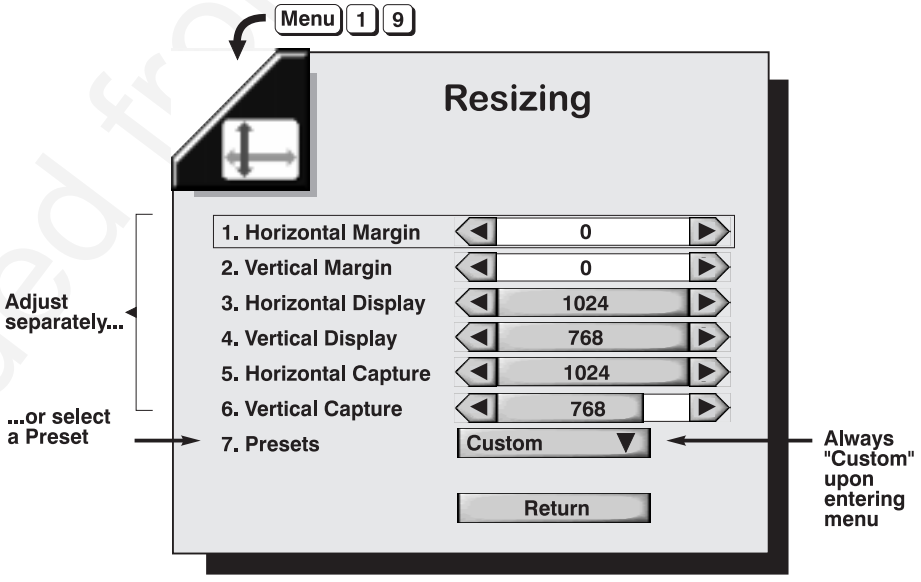

Figure 3-10. Resizing Menu

The first six controls in the resizing menu are described below, followed by a typical step-by-step manual resizing procedure. To adjust the first six options, use the ◄ or ► keys to decrease or increase. Press Enter to accept the changes and return to the *Resizing* submenu (or Exit to return to presentation level).

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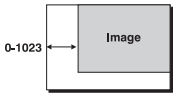
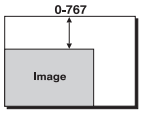
Horizontal Margin



Moves the image left or right, essentially by displacing it with the left margin amount you specify. When moved as far as possible to either side, the image aligns with the edge without loss or wrapping to the opposite side. Note that the margin is limited by the size of the image set in Horizontal Display, below.

Range: 0-1023 pixels

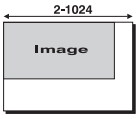
Vertical Margin



Moves the image up or down, essentially by displacing it with the top margin amount you specify. When adjusted as far as possible up or down, the image aligns with the edge without loss or wrapping to the opposite edge. Note that the margin is limited by the size of the image set in Vertical Display, below.

Range: 0-767 lines

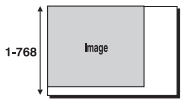
Horizontal Display



Stretches or compresses the image horizontally. The value you choose for this setting determines how many pixels are used across the display. Note that only even-numbered values can be specified and that the horizontal display setting cannot be more than twice the horizontal capture setting.

Range: 2-1024 pixels

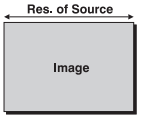
Vertical Display



Stretches or compresses the image vertically. The value you choose for this setting determines how many lines from top to bottom are used for displaying the image.

Range: 1-768 lines

Horizontal Capture

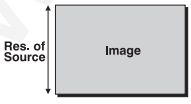


Determines what portion of the image is displayed horizontally, much like a zoom function. The horizontal capture setting represents the number of active pixels present across the image—i.e., this value should match the horizontal resolution of your current source in normal situations where you want to see the entire image. Horizontal Capture adjustments are most useful for tweaking default settings. The higher the setting, the smaller the image. Note that the horizontal capture setting cannot be less than half of the Horizontal Display setting.

NOTE: The adjustment increments represent individual pixels, however the image changes at 16-pixel increments only.

Ranges: 160-1024 for graphics; 3-864 for video.

Vertical Capture



Determines what portion of the image is displayed vertically, much like a zoom function. The vertical capture setting represents the number of active lines present from top to bottom—i.e., this value should match the vertical resolution of your current source in normal situations where you want to see the entire image. Vertical Capture adjustments are most useful for tweaking default

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settings. The higher the setting, the smaller the image. For interlaced video images, this value should be half the resolution of the source signal.

Range: 80-1024 lines for graphics; 224-240 lines for NTSC video; 224-288 lines for PAL video.

Typical Resizing Procedure

USING MARGIN, DISPLAY AND CAPTURE

STEP 1

Set both Horizontal Margin and Vertical Margin to “0”. The image will “start” in the upper left corner.

NOTE: If both margins are set to "0" and the image is still too far to the right and/or too low, you may have to return to the Size / Position menu and change the main Horizontal Position and Vertical Position.

STEP 2

Set Horizontal Capture and Vertical Capture. These values should match the resolution of your current source in non-zoom situations, such as 1024 (H) x 768 (V). Set so that all of the image is displayed exactly within the display window.

STEP 3

Adjust both Horizontal and Vertical Display so that the image is sized in each direction as desired for your application (for example, you may want to maintain aspect ratio).

NOTE: If the Horizontal Display setting appears to stop prematurely at too low a setting, it is possible that the current Horizontal Capture setting is too low and is interfering. If so, increase the Horizontal Capture first.

STEP 4

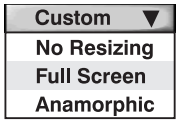
If necessary, re-adjust Horizontal Margin and/or Vertical Margin until the image is placed exactly where you want it.

STEP 5

Repeat Steps 3 and 4 until you are satisfied with both the size and placement of the image. If necessary, double-check your main Horizontal Position and Vertical Position settings in the *Size / Position* menu.

Presets

From the *Resizing* menu, use “Presets” to quickly display an image in its native resolution (including anamorphic) or to automatically resize an image to fill the screen. Capture and/or Display values will, in turn, automatically change as necessary without your having to set them manually.



= display in native resolution
= resize image to 1024 x 768
= retain 16:9 aspect ratio

- **DEFAULT SETTING —** By default, the “Full Screen” option is in effect — 4:3 images will automatically resize to fill the 1024 x 768 screen, regardless of their original resolution. Anamorphic “wide-

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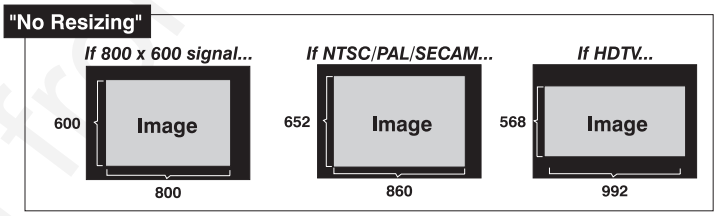
screen" images (16:9) will not fill the screen by default, however they will automatically resize to a slightly smaller 4:3 image (850 x 652).

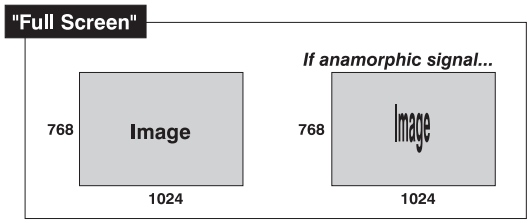
- **WHEN "CUSTOM" APPEARS —** The "Custom" descriptor for the Preset option appears upon entering the *Resizing* menu, even if one of the three presets is currently in effect. "Custom" temporarily disappears only as you select a preset option, and returns whenever you re-enter the Resizing menu or manually adjust one of the Horizontal/Vertical parameters in the Resizing menu.

- **WHEN TO SELECT "CUSTOM" —** Custom as a preset selection functions chiefly as an "escape" or "exit". For example, if you are in the preset pull-down list and decide that you don't want to select a preset after all, select "Custom" to escape back to the Resizing menu without changing the image.

- **SELECT "NO RESIZING"** to display the image in its native resolution rather than resizing the image to use all available pixels in the projector (1024 x 768). All Capture and Display values will change accordingly. For example, for a source with a native resolution of 800 x 600, "no resizing" will cause the image to be centered within a black border — in addition, the Horizontal values for both Capture and Display will change to 800 and Vertical values will change to 600. "No Resizing" is generally not useful for anamorphic sources.



- **SELECT "FULL SCREEN"** (default) to center and display your image as large as possible while maintaining its original aspect ratio. A graphic image will resize from its native resolution (or from current Display values, if they have been adjusted previously) to use all pixels (1024 x 768), so that there are no borders or margins. In addition, both Display values will change to their maximums. Full-screen video images will resize to fill the screen vertically. A non-HDTV anamorphic image (originally 16:9) will be stretched vertically. With the exception of HDTV (16:9), the "Full Screen" setting results in a 4:3 display.



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If desired, you can display a *portion* of your image "full screen" (like a zoom): reduce the Capture values as desired, so that less of your image will appear, then select "full screen".

- **SELECT "ANAMORPHIC"** to display an entire "wide-screen" (anamorphic) image in its native 16:9 aspect ratio. The image will fill the screen from left-to-right, but will not use all vertical pixels available (top and bottom will be black). In addition, the Display values will change to reflect the 16:9 ratio — the Horizontal value will be 1024 and the Vertical value will be 582. If you do *not* choose the anamorphic option when a non-HDTV anamorphic (wide-screen) image is present, the image will be vertically stretched into a 4:3 image.

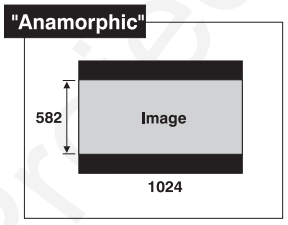

Image Settings ➤ Select any of the following options to alter your image. Refer to *"Using Slidebars and Other Controls"* (above) if you need help in selecting options and accepting changes. Changes made to the *Image Settings* menu will be saved when you exit the menu (press Exit).

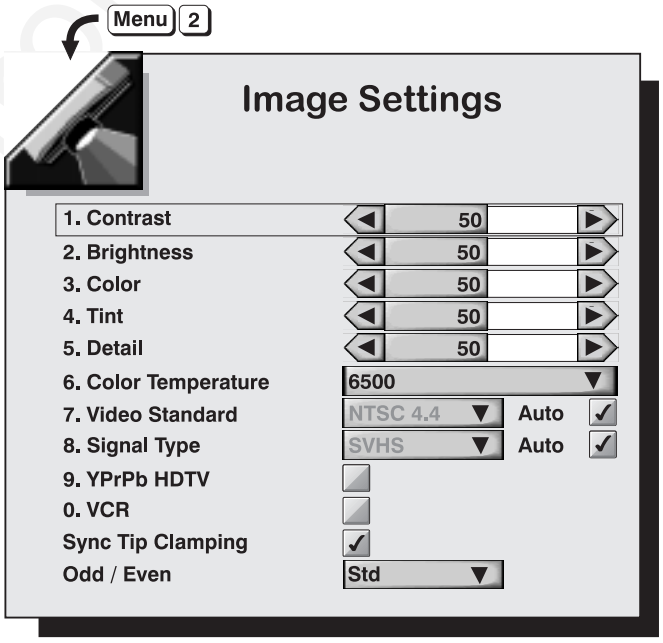

Figure 3-11. Image Settings Menu

Contrast

(SHORT CUT: Func 2 2 from presentation level. Or use CONT key.)

Increases or decreases the perceived difference between light and dark areas of your image (0-100). If contrast is set too high, the light parts of the image lose

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detail and clarity. If set too low, the light areas will not be as bright as they could be and it may be difficult to distinguish between foreground and background information. Adjust so that whites remain bright but not distorted or tinted.

*NOTES: **1)** For best results, adjust brightness before contrast. **2)** If environment lighting changes, it may be necessary to re-adjust both options.*

Brightness

(SHORT CUT: Func 1 1 from presentation level. Or use Bright key.)

Increases or decreases the amount of perceived light in the dark part of the image (0-100). If video or data is displayed with a black background, adjust until the background just changes from black to very dark gray.

Color

(SHORT CUT: Func 3 3 from presentation level. Or use Color key.)

Adjusts color saturation level, or the amount of color in a video image. For example, setting Color to "0" produces a black and white image. If Color is set too high, the color levels in the picture will be over-powering and unrealistic. Use ◄– or +► until the desired color saturation level is displayed.

Tint

(SHORT CUT: Func 4 4 from presentation level. Or use Tint key.)

Adjusts color hue to obtain true color reproduction of NTSC video signals. Use ◄– or +► until the you reach optimum balance of red-to-green in your image. It is best to adjust tint while displaying a proper test pattern — otherwise, it is recommended that tint remain at its default setting.

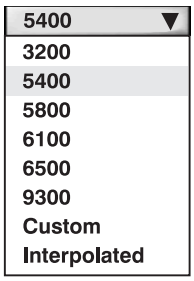
Detail

(SHORT CUT: Func 5 5 from presentation level.)

Adjusts the sharpness of the video image. Use ◄– or +► until the display is as sharp as possible, keeping in mind that any level of detail above 50% will increase the level of detail as well as introduce some level of noise in the image. Set below 50% to filter the signal and remove noise from a noisy source. Keep at 50% to apply no detail.

Color Temperature

Applies either a preset color temperature (3200, 5400, 5800, 6100, 6500, 9300) or a Custom or Interpolated color temperature to the image. All are measured in degrees Kelvin and represent the "coloration" (reddish or bluish) of the whites displayed by the projector — the lower the temperature, the more reddish the whites, the higher the temperature, the more bluish the whites. Use the following as a guide for most applications:



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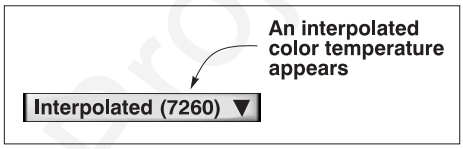
Color Temperature (K)	Typical Application
3200	theatre
5400	film and film-to-video transfers
5800	
6100	for peak lumens from 1.6 kW lamp
6500	most video and computers
9300	some computers with a bluish setting

INTERPOLATED COLOR TEMPERATURE - In specialized applications, such as when you are matching adjacent displays with numerous sources, you may find that you need a specific color temperature that lies somewhere between one preset color temperature and another. In this case, select the *Interpolated* option and use the slidebar to adjust the temperature as desired in increments of 10°K. This new temperature, which is interpolated from the neighboring presets, can be used with any source and appears as shown when it is in effect:



CUSTOM COLOR TEMPERATURE - If you need a specific color temperature for the current source only, select the *Custom* option. This will produce a separate *Custom Color Temperature* sub-menu in which you can customize 3 drives and 3 blacklevels to create a new temperature for the current source as described below:

1) Make sure the projector is warmed up. In the *Image Settings* menu, set the main projector brightness to 50 and contrast to 60. Display the "grayscale 10" test pattern (use the Test key).
2) In the *Color Temperature* pull-down list, select *Custom*.
3) In the *Custom Color Temperature* sub-menu, select "Default". From the list, choose the preset color temperature which most closely resembles the new color temperature desired. For example, if you want a slightly higher (more bluish) temperature than 6500°, select 6500° as a starting point.

   NOTE: The "default" temperature option you begin with automatically changes to "custom" as soon as you begin adjusting— you will not lose the preset. If you make a mistake and want to start over, select "default" again to reset.

4) The 3 drives and 3 blacklevels for the default temperature you selected are shown in the menu. Note that the blacklevels are likely all set to 30, and drives are 73 or less. ***Always leave the blacklevels at 30, and always keep at least one drive at 73.***

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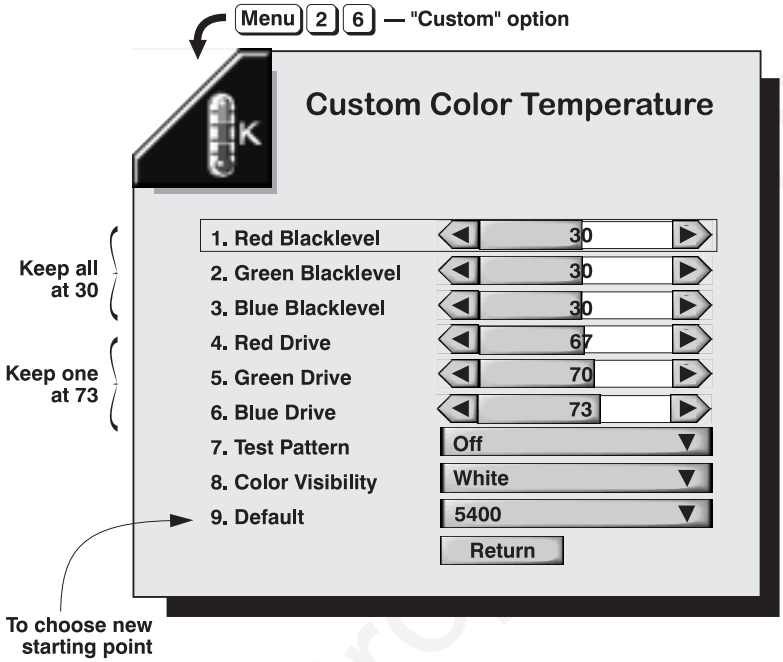


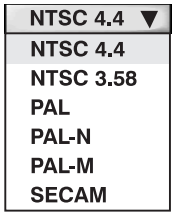
Figure 3-12. Creating a Custom Color Temperature

To adjust, ***increase*** the drive level for a color that appears too weak in the test pattern (i.e., one that is less than 73). Try not to ***reduce*** a drive, as low settings can reduce overall projector brightness. Also keep in mind that setting a drive level over 73 will limit the number of discernible grays and produce an uneven color temperature across the grayscale.

NOTES: 1) Always try to achieve the desired effect by first increasing the drive level for the color judged to be weak. If the drive level for that color is already at 73, then decrease the contrast level for one or more of the other colors. 2) If you want to adjust each color individually, you can connect only one signal cable — red, green or blue — at a time.

5) When the grayscale appears as you want, select *Return*. You can now use this temperature with the current source.

Video Standard



If "Auto" is checked, the projector will automatically detect the video standard present and display this standard in the adjacent box. If "Auto" is unchecked, press ENTER at the adjacent pull-down list to view or select a different video standard from a complete list available to the projector. Selecting a specific standard forces the projector to process the signal according to this standard. Re-check the "Auto" checkbox to return to automatic detection of the standard.

NOTE: This option should remain set at auto for all instances EXCEPT: 1) a poor quality input signal or 2) a black-and-white video signal. In order to detect and display such signals, uncheck "Auto" and specify the relevant standard.

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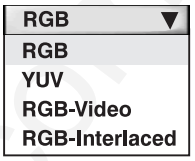
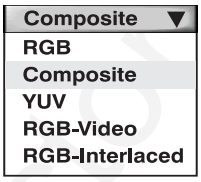
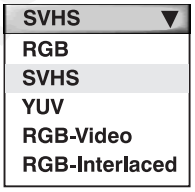
Signal Type



If "Auto" is checked, the projector will automatically detect the type of signal present (unless it is RGB-Video or YUV) and will display the signal type to the left in the adjacent box. If "Auto" is unchecked, press ENTER at the adjacent pull-down list to view or select a different signal type from a complete list available to the projector. Re-check the "Auto" checkbox whenever you want to return to automatic detection of the signal type.



Menu appearance if Composite Video is connected to Dat 1 (Input 1)



Menu appearance if S-Video is connected to Dat 1 (Input 1)

NOTES: 1) RGB-Video (which requires a third-party decoder) and YUV signals cannot be automatically recognized — if you use either of these sources, you must select the corresponding signal type from the list. 2) It is recommended that this option remain set at auto for other signal types. 3) If you are using the VDI optional interface, Signal Type will be "auto" and the option list disabled.

YPrPb HDTV

Enter a checkmark only if your HDTV source is labeled "YPrPb". This will apply the correct colors needed for this standard. For all other sources — including RGB HDTV — delete the checkmark. If you are not sure of the source, judge by eye for the most accurate colors. By default, the checkmark is present for any type of HDTV source and deleted for all other sources.

Note: Requires HDTV Input Module (available as an option). Contact your dealer or Electrohome.

VCR

(SHORT CUT KEY: Func 5 0 from presentation level.)

This option determines to what degree the projector tolerates signal disturbances. Enter a checkmark only if the NTSC 3.58 image generated from your VCR source appears noisy or unstable, or if the image has a very high level of detail. For best results, leave blank.

Sync Tip Clamping

This option can brighten the image produced from certain high resolution, high frequency graphic sources. Enter a checkmark if the image appears unusually dim, if there are horizontal streaks across the image, or if there is significant color drift. Delete the checkmark if the image is either sufficiently bright or overly bright.

NOTE: Does not apply to video sources or any RGB source with sync information on the video (e.g., sync-on-green).

Odd / Even

Use this control to smooth out any circles and/or diagonals appearing jagged due to missing or misaligned lines from some interlaced video signals. Choose the option which produces the smoothest effect.

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3.7 Adjusting and Checking System Parameters

The last four *VistaGRAPHX 5000* function menus display or alter overall system parameters.

Communications ➤

Use the checkboxes and pull-down lists in this menu to alter communications to and from the projector. Refer to the *"Using Slidebars and Other Controls"* subsection if you need help. Changes made to the *Communications* menu will be saved when you exit the menu (press Exit.)

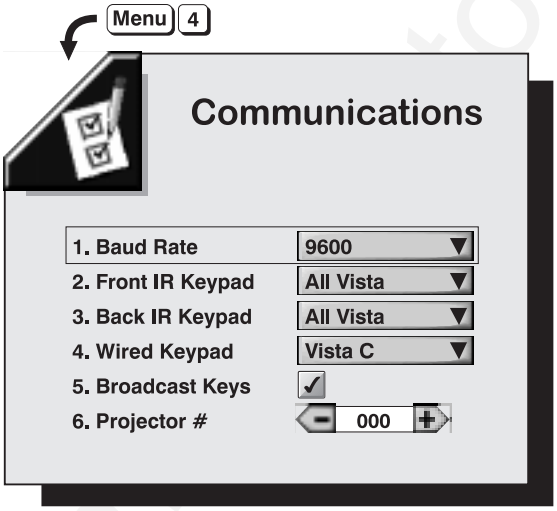
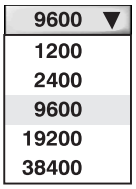


Figure 3-13. Communications Menu

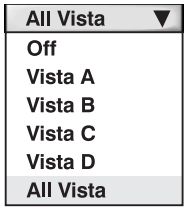
Baud Rate



This setting determines the speed of communications when you are controlling the projector with an external device such as a computer or another projector via an RS-232 or RS-422 port. The projector baud rate must be set to match the baud rate of the controlling device (default = 9600). If you are unsure about what baud rate to assign, refer to the documentation for the controlling device.

NOTES: ***1)*** *The baud rate setting does not affect the switcher port, which remains at 9600.* ***2)*** *See* ***2.9, Serial Port Connections*** *and* ***Appendix D*** *for more information about cable connections between devices.*

Front IR Keypad / *Back IR Keypad*



An IR remote keypad is either a Protocol "C" keypad (the original setting at manufacture) or a Protocol "D" keypad. Either protocol may or may not be recognized by the two sensors on the projector (front and back), depending on what option you choose here. If the two sensors are both on, they will recognize the same protocol (either Vista C or Vista D) — changing an option for one sensor automatically changes the other to match. If you want only one sensor to respond to a particular protocol (either Vista C or Vista D), disable the other sensor by setting its protocol to OFF.

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IMPORTANT
You can disable the current IR keypad. Keep at "All Vista" until you are sure of the current keypad protocol.

NOTE: VistaGRAPHX 5000 keypads are set at manufacture to "Protocol C". See ***2.10, Keypad Protocols*** *for information about setting keypad protocols.*

Wired Keypad

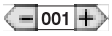
A wired keypad is either a "Protocol C" keypad (the original setting at manufacture) or a "Protocol D" keypad. You can prohibit the projector from responding to a particular protocol, or you can ensure that the projector responds to either protocol. You can also prevent the projector from responding to the keypad by selecting OFF.

NOTE: VistaGRAPHX 5000 Keypads are set at manufacture to "Protocol C". Please see ***2.10, Keypad Protocols*** *for information about setting keypad protocols.*

Broadcast Keys

Check if you want keypad commands sent to one projector to be relayed to all projectors in a network. The * 7 7 command on the built-in keypad (or PROJ on the remote) will still allow you to control a specific projector.

Projector Number



Enter a three-digit number (such as "000") to assign a number to the projector currently in use. Numerical identity for projectors is required whenever you want to communicate with a single projector within a multiple-projector application (see PROJ key, above).

For more information about controlling multiple projectors, see *Section 3.8.*

Preferences ➤ Use the checkboxes and pull-down lists in this menu to alter how the projector responds to commands and displays parameters. Refer to the *"Using Slidebars and Other Controls"* subsection if you need help. Changes made to the *Preferences* menu will be saved when you exit the menu (press Exit.)

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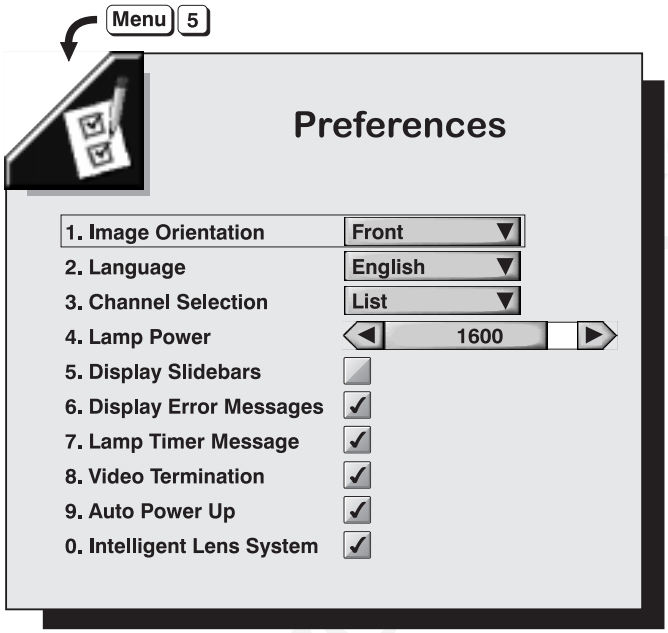
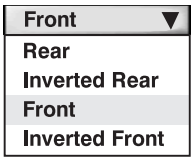


Figure 3-14. Preferences Menu

Image Orientation

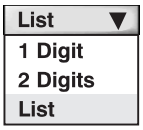


Choose from Front, Rear, Inverted Front, Inverted Rear according to your installation. If the setting is incorrect, the image will be reversed and/or upside down. See ***2.6, Operating Orientation*** for an illustrated explanation.

Language

Choose to display menu text in English, French, German, Italian or Spanish.

Source/Channel Selection



Choose how you want to select sources/channels from the Chan key. Choices are 1-digit entry, 2-digit entry, or a scrollable list of sources/channels (note that each source to be included in the list must also be tagged in the "In Menu" checkbox in the *Channel List menu*).

Lamp Power

This option does not apply to this projector and is disabled.

Display Slidebars

If checked, will allow direct slidebars to be superimposed over the current image when an adjustable parameter is selected. These slidebars include volume, contrast, brightness, position, pixel tracking and phase, and others. If unchecked, direct slidebars (or any from shortcut codes) will be invisible during adjustment.

Display Error Messages

If checked, on-screen messages will notify you of errors as they occur. See *3.9, Error Messages*.

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Lamp Timer Message

If checked, will display a lamp timer message when the lamp in the projector has exceeded its life span (typically 1000 hours, or as defined in the *Service* menu). The lamp timer message will time-out (disappear from screen) after 30 seconds.

NOTE: For maximum lamp performance and safety, it is recommended that display of this message remain enabled — enter a checkmark in the checkbox.

Video Termination

Check this option to terminate the video input (75 Ω). The input should be terminated unless the signal loops through (continues) to another projector or display device, in which case the last projector in the chain should be terminated.

Auto Power up

If checked, the projector will automatically power up after a power failure. Note that unsaved display adjustments may still be lost.

Intelligent Lens System™

This option requires a motorized lens (for zoom/focus/offset) and does not apply to the *VistaGRAPHX 5000* projector.

Status ➤ This primarily read-only menu (Figure 3-15 and Figure 3-16) consists of four separate read-only menus plus a text editing box used for entering the serial number of a new lamp. The four menus list a variety of details about the standard and optional components currently in use on the projector. Refer to these menus for information about hardware and software versions installed, number of lamp hours logged, and projector model and serial number. In addition, the *Status* Menu identifies the current channel, switcher, slot and frequencies present. Call up the *Status* menu whenever you install a new lamp assembly.

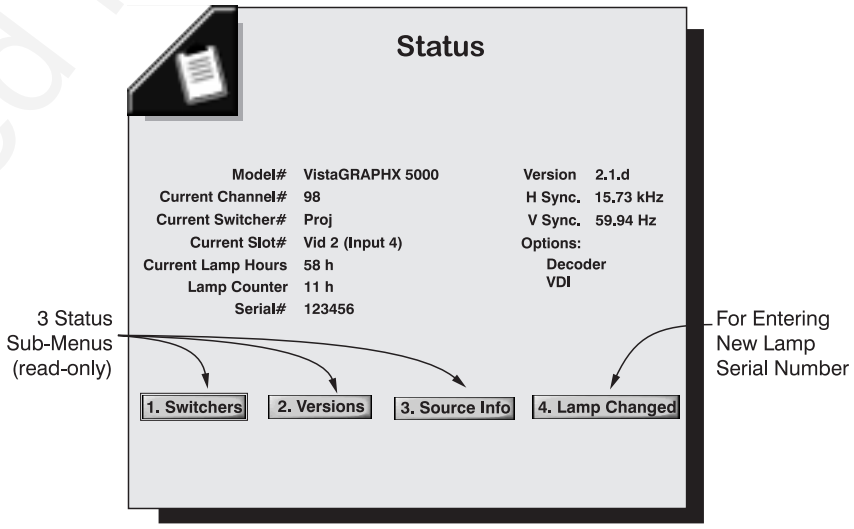

Figure 3-15. Main Status Menu (example)

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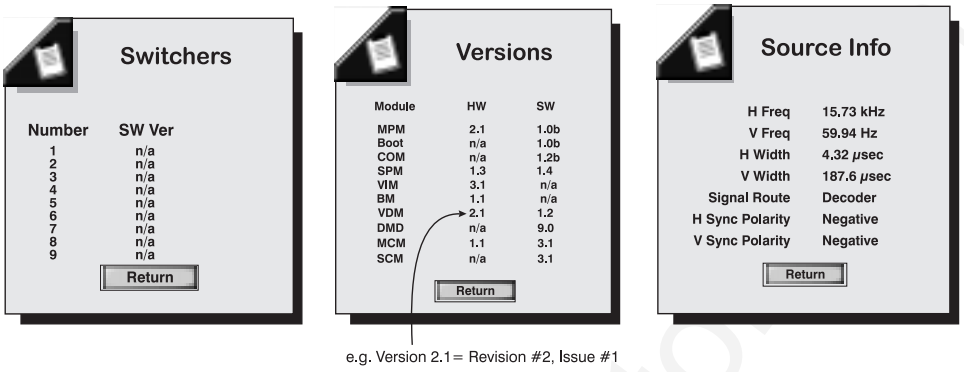


Figure 3-16. Status Sub-menus (example)

Lamp Changed

When you install a new lamp assembly, select the "Lamp Changed" button on the main *Status* menu to record the serial number of the new lamp. Using the arrow keys to navigate, press Enter on the keypad to select each number or character needed for the serial number (Figure 3-17). When done, select the "Accept" button to record the new number. If you need help with this window, see the *Editing Text* subsection earlier in this section.

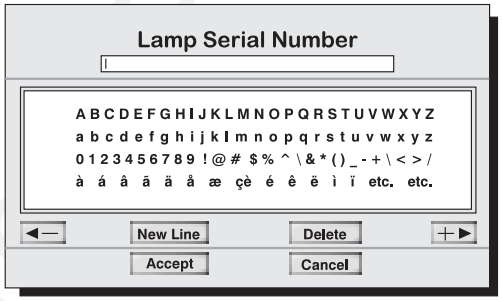


Figure 3-17. Entering a New Lamp Serial Number

Recording the serial number of the new lamp automatically resets the lamp timer to "0" to reflect the number of hours the lamp has been used. The timer will now begin logging each hour of use for the new lamp, recording the current level in the main *Status* menu. See *4.4, Replacing the Lamp and Filter* for complete instructions on installing a new lamp assembly.

WARNING

If you enter a serial number and select the "Accept" button WITHOUT having installed a new lamp, the timer will incorrectly return to "0" and will therefore no longer be accurate. The old lamp may expire without warning.

NOTE: Once entered, the new lamp serial number is also automatically added to the "Lamp History" list of lamp serial numbers in the Service menu (password-protected).

Service ➤ The *Service* menu is password-protected and can be used by qualified service personnel only. However, test patterns from the *Service* menu can be accessed through the keypad shortcuts shown below. Press Exit to return to your presentation.

Func Command	Test Pattern
Func 80	List of test patterns
Func 81	User Image
Func 82	***Cross***
Func 83	Checker
Func 84	Grey Scale 128
Func 85	***Grey Scale 10***
Func 86	***Color Bars***
Func 87	***Black***
Func 88	90% Black
Func 89	80% Black
Func 90	70% Black
Func 91	60% Black
Func 92	50% Black
Func 93	40% Black
Func 94	30% Black
Func 95	20% Black
Func 96	10% Black
Func 97	***White***

*NOTES: Patterns appearing in **Bold** in this list can also be accessed with the Test key.*

3.8 Using Multiple Projectors

When working with multiple projectors, you may want to use the RS-232 ports to chain the projectors together in a network that you control from either a keypad or a computer/controller (*see 2.9, Serial Port Connections*). Or you may prefer that each projector stands alone, in which case you will probably use a single IR remote keypad. In either case, you can switch back and forth between broadcasting to all projectors or controlling each projector individually.

Assigning a "Projector#" ➤

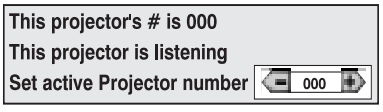
Make sure you have assigned a unique projector number to each projector present on the network — this number will be required in order get the exclusive attention of an individual projector. To assign a projector number:

Press MENU and select the *Preferences* icon. In the *Preferences* menu, scroll down to "Projector#" and enter a three-digit number (000 to 999) to identify the current projector. Press ENTER to accept the entry and return to the main menu.

Repeat for each projector, using a unique three-digit number for each. Once every projector has its own number, you can begin to control the network.

Controlling One Projector ➤

If you are using an IR remote, press PROJ to display an editable window. Enter the three-digit number you have assigned to the projector you wish to control. All keypad commands will then affect this projector exclusively until you press PROJ again and enter a different number, or until you switch to broadcast mode (below).



If you are using a wired remote keypad (optional) in a network of projectors, make sure that the projector to which the keypad is connected has its “Broadcast Keys” option checked. Press PROJ to bring up the editable box. Enter the three-digit number assigned to the projector you want to control — keypad commands will now affect only the desired

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projector until you press PROJ again and enter a different number, or until you switch to broadcast mode (below).

NOTE: If you are using a computer or controller to issue commands, use the correct RS-232 software command to gain control of a single projector.

Broadcasting to All Projectors ➤ On the IR remote or wired keypad, press PROJ to display the projector box. Press Func *without* entering a number — the keypad commands will now affect all projectors.

Make certain that only one projector has its "Broadcast Keys" option selected (checked) — the remaining projectors should have the option unchecked and their keypads disabled (do this in *Communications* menu). The "Broadcast Keys" projector will then relay keypad commands to the others. If using a wired remote, make sure to select the “Broadcast Keys” option for the projector to which it is connected.

NOTE: If you are using a computer or controller to issue commands, use the correct RS-232 software command to broadcast.

3.9 Error Conditions

If you would like to be notified on-screen of error conditions, turn on this option from within the *Preferences* menu (enter a checkmark in the “Display Error Messages” box). Should a user error message ever appear, press the ENTER key to confirm the message and eliminate the message box. A system error must be resolved in order to eliminate its message box.

User Errors ➤

Invalid User Entry

Any entry not recognized by *VistaGRAPHX 5000* will call up this message as well as a brief description and suggestions for solving the problem, even if the “Display Error Messages” box in *Preferences* menu is unchecked (turned off). Press ENTER to confirm the message and eliminate the message box.

System Errors ➤

No Signal

The message *"No signal present: check the source or connections to the projector"* is displayed when there is no signal on the selected input. This means that both HSYNC and VSYNC are inactive and the screen background is black.

Bad Sync

The message *"Bad Sync"* followed by a short description of the problem is displayed when HSYNC or VSYNC are active but the signal cannot be displayed. Such a condition occurs when only one of the two signals is present, or when either signal is unstable or of the wrong frequency.

NOTE: "Bad Sync" or "No Signal" errors must be resolved in order to eliminate the error message. In the meantime, press MENU to use the menu system (other functions remain operational).

Status LEDs

If the "Status" LED on the back of the projector repeatedly flashes a pattern of yellow and red light while the "Power" LED glows a continuous red, you have encountered a possible system error requiring the attention of a qualified service technician. Contact your dealer or Electrohome if the problem persists.

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The specific pattern of flashing indicates the 2-digit type code identifying the type of problem detected — the number of yellow flashes represents the first digit and the number of red flashes indicates the second. For example, a pattern of "yellow-yellow-red-red-red" is "Code 23". These codes include:

Code	Description	Code	Description
11	General Fault	31	Unknown hardware failure
12	Software bug	32	MPM, VIM, or SPM faulty
13	CRC error in code	33	SPM, VIM, or VDM faulty
21	MPM self test failed	34	MPM or DMD faulty
23	SPM self test failed	35	I2C error
24	VDM self test failed	36	DMD lamp is overheating
25	VIM self test failed	41	RTC chip failure
26	DMD self test failed	42	RTC verify failure
27	DMD lamp has failed	61	COM software bug

Hard Reset

If the projector does not respond to anything and appears to have inexplicably failed, gently push a very small screwdriver or pen point into the "Hard Reset" hole just to the right of the power LED on the back panel of the projector. This action will switch the projector off (note that the power LED turns to yellow to indicate "standby mode"). Then push Power* to turn the projector back on. Previously unsaved settings will be lost.

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Section 4

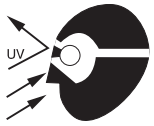
Maintenance

4.1 Warnings and Guidelines

VistaGRAPHX 5000 is CSA approved and is designed for safe and reliable operation. However, safe operation cannot be assured by design alone; installers, maintainers, and users must maintain a safe operating environment for the system. Please read through and understand the following warnings and guidelines promoting safe usage of the projector.

WARNING
Never look directly into the projector lens.
The high brightness of this projector
could cause permanent eye damage.

WARNING
For protection from ultraviolet radiation,
keep all projector shielding intact during operation.



Labels and Markings ➤ Observe and follow all warnings and instructions marked on the projector.

The exclamation point within the equilateral triangle alerts the user to important operating and maintenance (servicing) instructions in the literature accompanying the projector.

The lightning flash and arrowhead symbol within the equilateral triangle alerts the user to uninsulated "dangerous voltage" within the projector's enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

Projector Location ➤ Operate the projector in an environment which meets the operating range specifications in *Section 5, Specifications.* Do not operate the projector close to water, such as near a swimming pool.

Do not place the projector on an unstable cart, stand or table. If the projector is to be ceiling mounted, only use an Electrohome-approved ceiling mount fixture.

A projector and cart combination should be used with care. Sudden stops, excessive force, and uneven surfaces may cause the projector and cart combination to overturn.

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Lamp and Filter Replacement

➤ Do not operate the Xenon lamp for more than 1000 hours; risk of the lamp shattering increases as a result of changes in the quartz glass. Also, operation beyond 1000 hours significantly reduces output brightness.

WARNING

Never attempt to remove the lamp directly after use. The lamp is under great pressure when hot and may explode, causing personal injury and/or property damage. Allow to cool completely and handle by the plastic housing only.

The arc lamp operates at a very high temperature and pressure. Failure to allow the lamp to sufficiently cool prior to handling could result in an explosion causing personal injury and/or property damage. After turning the projector off it is important that you wait at least five minutes before unplugging it. This provides enough time for the internal lamp cooling fans to cool the lamp and to automatically shut off. Cool completely before handling.

Replace the rear filter every 1000 hours or sooner. If this filter is not replaced, air flow may become restricted and cause the projector to overheat.

See ***4.4, Replacing the Lamp and Filter*** for the complete replacement procedure.

WARNING

Only use filters supplied by Electrohome.

Power Cord and Attachments

➤ Only use attachments or accessories recommended by Electrohome. Use of others may result in the risk of fire, shock or personal injury.

WARNING

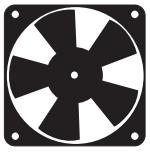
Use only the special notched AC power cord. Do not attempt operation if the AC supply is not within the specified voltage and power range.

Do not allow anything to rest on the power cord. Locate the projector where the cord cannot be abused by persons walking on it or objects rolling over it.

Operate the projector at the specified voltage. Do not overload power outlets and extension cords as this can result in fire or shock hazards.

The projector is equipped with a three wire plug having a third (grounding) pin. This is a safety feature. If you are unable to insert the plug into the outlet, contact an electrician to have the outlet replaced. Do not defeat the safety purpose of the grounding-type plug.

Ventilation



Before unplugging the power cord, make sure the internal lamp cooling fans have shut off. The fans automatically shut off when the projector has adequately cooled down.

Slots and openings in the projector provide ventilation. To ensure reliable operation of the projector and to prevent overheating, these openings must never be blocked or covered. The projector should never be

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placed near or over a radiator or heat register. The projector should not be placed in an enclosure unless proper ventilation is provided.

Do not push objects of any kind into the projector through the ventilation openings. They may touch dangerous voltages or short-out components resulting in a fire or shock hazard. Do not spill liquids of any kind into the projector. Should an accidental spill occur, immediately unplug the projector and have it serviced by a qualified service technician.

Servicing

If any of the following conditions exist, unplug the projector from the power outlet and refer service to qualified service personnel.

- The power cord has been damaged.
- The internal cooling fans do not come on when the projector is first turned on.
- Liquid has been spilled into the projector.
- The projector has been exposed to excessive moisture.
- The projector does not operate normally.
- The projector has been dropped or the case has been damaged.
- Projector performance has deteriorated.

Do not attempt to service the projector yourself. All servicing must be performed by a qualified Electrohome service technician. If replacement parts are required, it is important that only Electrohome-approved parts are used. Other parts may result in fire, electric shock or risk of personal injury.

4.2 Cleaning

Clean the projector when required. Before cleaning, always unplug the projector from the power outlet.

Lens ➤ To avoid the risk of scratching the lens, only clean the lens if absolutely required. A small amount of dust on the lens will have very little effect on picture quality. If the lens must be cleaned, use a DRY soft cotton cloth. Rub gently in a circular motion.

Lamp ➤ It is important to never touch the sapphire (glass) surface of the lamp, as the oil imprint will seriously degrade lamp performance. However, should you accidentally touch the surface of the lamp, clean gently with a lint-free cloth moistened with isopropyl alcohol.

Case ➤ Clean the case with a soft dampened cloth. Use a mild commercial cleaner. Do not use liquid or aerosol cleaners.

4.3 Replacing Keypad Batteries

The IR Remote Keypad uses four AA size, 1.5V batteries (preferably aklaline). To install new batteries, open the battery compartment at the back side of the keypad by pulling on the raised portion of the cover as shown (Figure 4.1)

Remove the old batteries and properly discard. Place the new batteries in the compartment, orienting the positive/negative of each battery according to the labels in the compartment. When batteries are in place, replace the cover by inserting its bottom edge first and snapping the top into place. Do not force.

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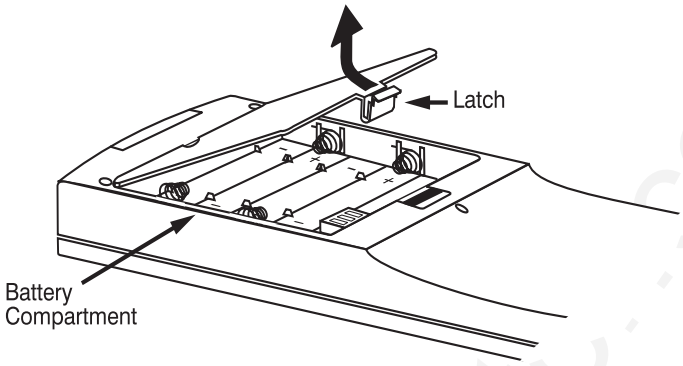

Figure 4.1. Battery Replacement, IR Remote Keypad

4.4 Replacing the Lamp and Filter

The high brightness of *VistaPro 5000* is provided by a 1 kilowatt Xenon lamp permanently assembled in a sturdy polymer housing. When the lamp approaches 1000 hours of usage this lamp module should be replaced. To determine how many hours the lamp has been used, press MENU and go to the *Status* menu. "Current Lamp Hours" indicates the number of hours logged on the lamp.

Contact your dealer or Electrohome for a "*VistaPro 2000* Lamp Assembly and Filter Replacement Kit". You can specify either a new or refurbished lamp module, both of which contain a new lamp bulb.

NOTE: As the lamp nears 1000 hours of use, a lamp timer message can appear on screen to warn that the lamp is in need of replacement. To make sure that this warning appears, enter a checkmark in the Lamp Timer Message checkbox on the ***Preferences*** *menu.*

WARNING

Never attempt to remove the lamp when it is hot. The lamp is under great pressure when hot and may explode, causing personal injury and/or property damage. Allow to cool completely and handle by the plastic housing only.

STEP 1 ➤ Turn off the projector

Once you have turned off the projector, allow the cooling fans to automatically turn off before continuing with Step 2. This will take about five minutes.

STEP 2 ➤ Unplug the projector

When the cooling fans have turned off, unplug the projector. Allow additional time for the lamp to cool completely.

STEP 3 ➤ Remove both lamp doors

The lamp lies behind two doors on the far right of the projector's back panel. First remove the outer lamp door cover by lifting up on the black latch (Figure 4.1).

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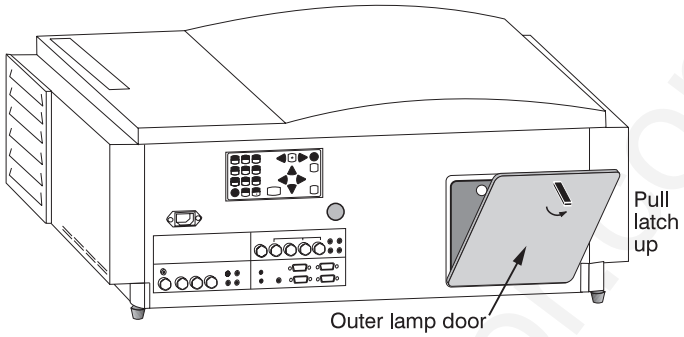

Figure 4.1 Remove Outer Lamp Door

Then unlatch the inner lamp door by unscrewing the thumbscrews near the top edge. Lift up and pull the door straight out from the projector (Figure 4.2).

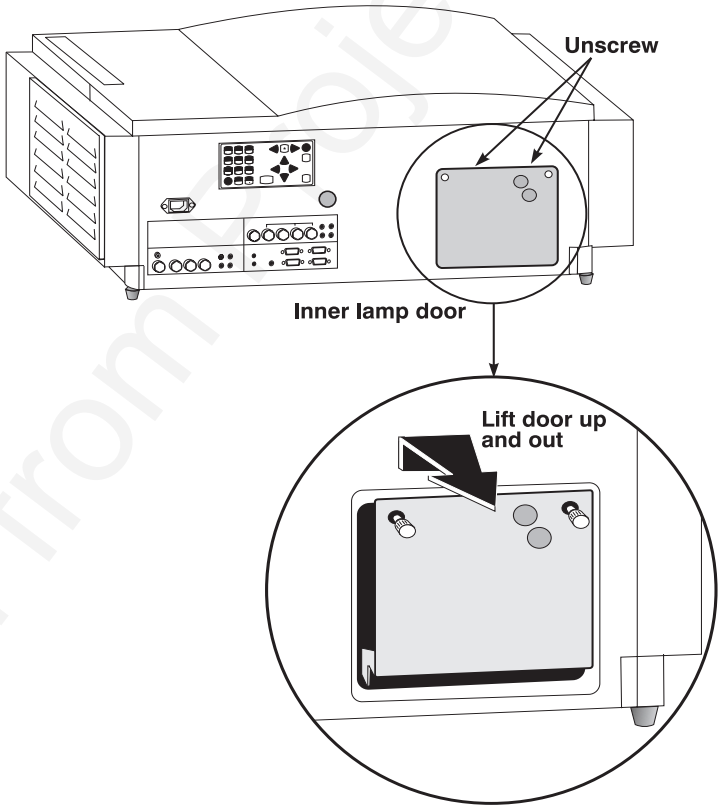

Figure 4.2. Remove Inner Lamp Door

STEP 4 ➤ Remove the lamp retaining bracket

The lamp module is held in place by a horizontal retaining bracket in front of the lamp module. Unscrew the 2 screws on the left edge of the bracket and slide the bracket left to free it from its slot on the right of the lamp compartment (Figure 4.3). Remove completely and set aside.

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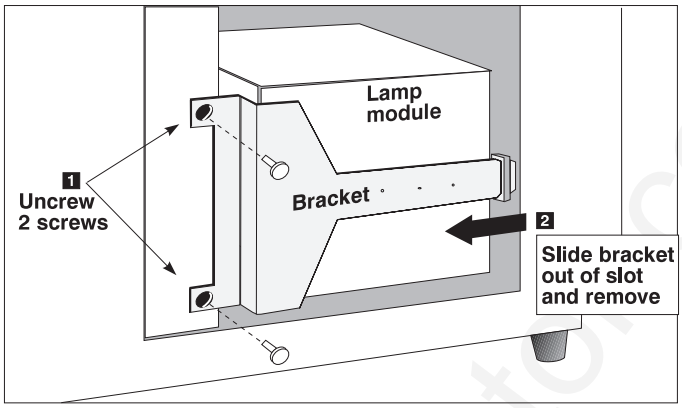

Figure 4.3. Remove lamp retaining bracket

STEP 5 ➤ Remove the old lamp module

Grasp the handle of the lamp assembly and pull forward slightly. Then move the module to the left as far as possible and pull straight out of the projector (Figure 4.4). Pull firmly while keeping your grip level so that the module does not tilt.

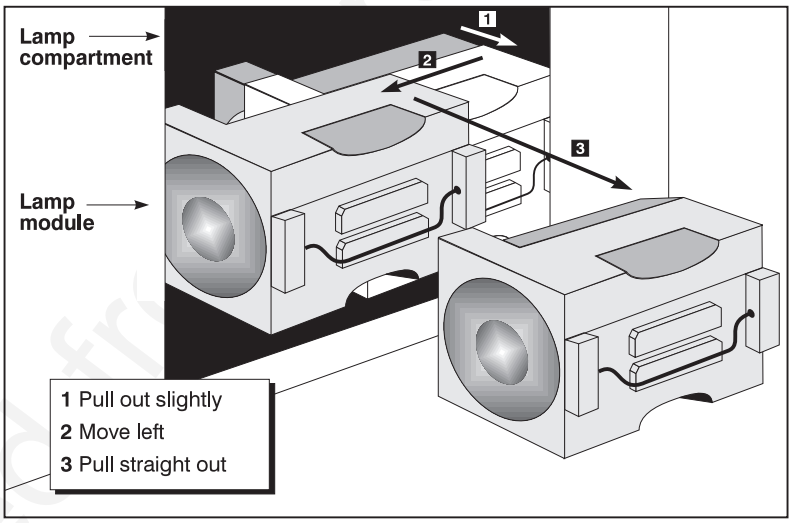

Figure 4.4. Remove old lamp module

WARNING

To reduce the danger from possible explosion, always direct the surface of the lamp away from you. Handle by the plastic housing only.

STEP 6 ➤ Return or safely dispose of the old lamp module

Place the old lamp module in the new lamp box and send it to your nearest Electrohome service depot (see back cover of this manual). Electrohome will pay the shipping costs.

NOTE: Your voluntary participation in this recycling program is strongly encouraged, and helps ensure that Electrohome can continue to offer economical replacement lamps.

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Or, if you prefer, you can dispose of the old lamp as described below:

1. For safe disposal, first relieve the pressure within the lamp module by opening the lamp gas valve and allowing the Xenon gas to escape. This valve lies beneath a small plastic seal protruding from the right end the lamp (i.e., the end opposite the glass surface). To open the valve:

2. Place the lamp module on a stable worksurface, with the glass lens surface facing left as shown in Figure 4.6.

3. Locate the plastic seal protruding from the ***right*** side of the module—the side opposite the lens (Figure 4.5). Remove this seal to expose the valve screw underneath.

4. ***SLOWLY*** tighten the valve screw until the lamp module begins to hiss, signifying that the lamp seal is broken and the Xenon gas is escaping. Note that although this gas is not harmful to the atmosphere, always direct this surface of the module away from you and others.

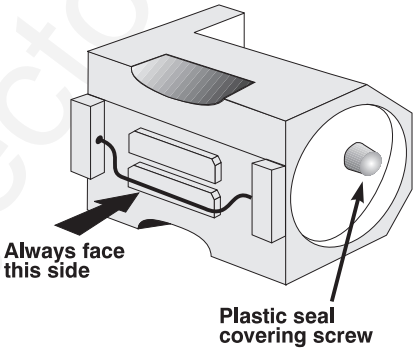

Figure 4.5. Lamp valve

5. Wait for the hissing to subside, which may take up to 20 seconds or more.

6. Dispose of lamp with regular trash. Keep in mind that the integral lamp timer contains a small amount of mercury—this mercury must be treated as hazardous waste if discarded in volume.

STEP 7 ➤ Insert the new lamp module

Hold the new lamp module with the wire handle facing you (the two brass nuts will be on the opposing side). Make sure that the glass lens surface is on your ***left*** — otherwise the unit will be upside down. See Figure 4.6

Ensure that the small plastic seal is intact on the right side of the module (described in Step 6, above**) — DO NOT REMOVE THIS SEAL**.

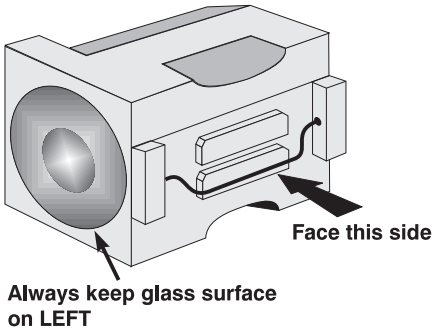

Figure 4.6. Lamp orientation

WARNING

Take care not to touch the exposed surface of the lamp itself — this could impair lamp performance and shorten lamp life.

Carefully align the lamp module with the left side of the empty lamp compartment. Push the module straight into the lamp area as far back as possible.

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Then slide to right and push completely in (Figure 4.7). Push slowly but firmly to ensure that the module is securely in place and is as far back as possible.

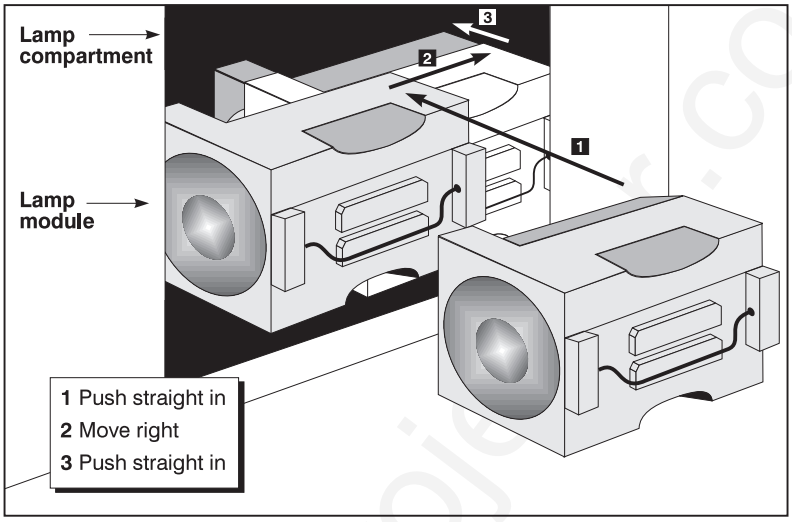


Figure 4.7. Insert new lamp module

STEP 8 ➤ Replace lamp retaining bracket

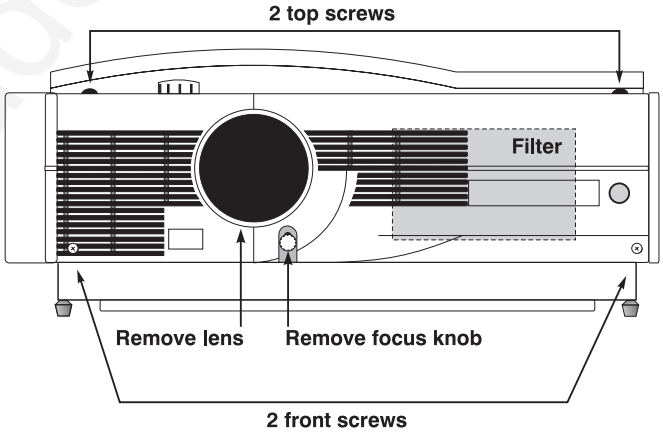
Insert the narrow end of the bracket into the slot on the right side of the lamp compartment and push firmly to the right. Secure with two screws along the left edge of the bracket.

STEP 9 ➤ Replace both lamp doors

Once the new lamp module is properly installed, replace the inner lamp door. Insert the tabbed bottom edge first, then swing the top up and tighten the 2 screws. Replace the outer door by aligning the bottom edge and swinging the door up into place. Pull the top latch of the door down.

STEP 10 ➤ Replace front and side filters

It is a good idea to replace both filters whenever the lamp is replaced (or more frequently if the operating environment is very dusty).



FRONT FILTER: The front filter lies to the right of the lens behind the front plastic cover (bezel). To replace, remove the lens and focus knob and unscrew the 4 screws on the front bezel. Pull out the old filter and replace with the new. Replace the bezel and secure all screws.

SIDE FILTER: The side filter lies behind the protruding grill on the right side panel of the projector near the rear (Figure 4.8). Unscrew the 2 screws from the

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bottom flange of the grill and remove the grill and filter. Pull out the old filter and replace with the new. Replace grill, tabbed end first, and secure with screws.

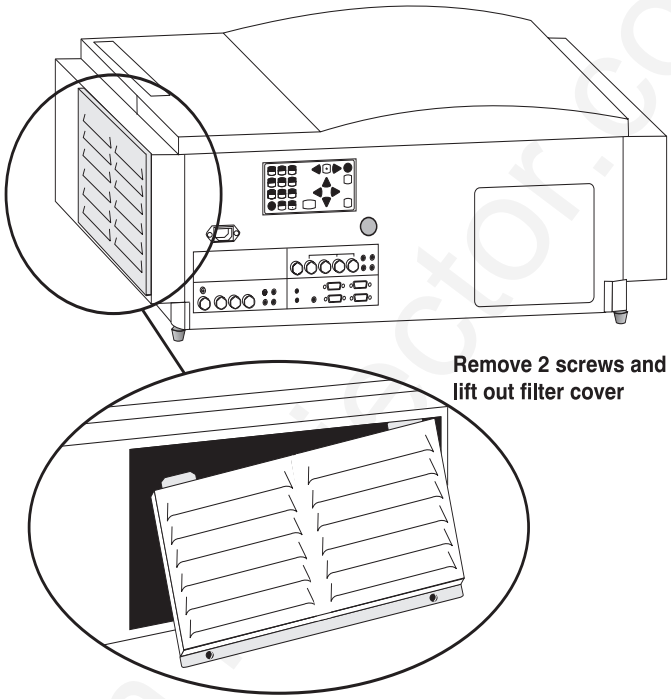

Figure 4.8. Remove side grill to access filter

STEP 11 ➤ Power up the projector

Plug in the projector and press POWER to turn it on. Allow the projector to warm up for about five minutes.

STEP 12 ➤ Reset the lamp timer

In the *Status* menu, call up the "Lamp Changed" text box and enter the new lamp serial number (see *Section 3, Operation* if you need help entering text). Once the serial number is entered, the lamp timer will automatically reset to "0" hours and begin to log time.

WARNING

If you neglect to enter a serial number, the lamp timer will not reset to "0" and will therefore be inaccurate. The lamp lifetime may then prematurely expire.

NOTE: Once entered, the new lamp serial number is also automatically added to the "Lamp History" list in the Service menu (password-protected). Lamp life data is required for warranty claims.

4.5 Replacing the Lens

A variety of *VistaGRAPHX 5000* lenses are available to accommodate different throw distances and specific types of installations. Contact your dealer or Electrohome for more information.

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STEP 1 ➤ Before removing or installing a lens, turn off the projector and allow to cool for five minutes before unplugging. Make sure that the lens cap is on.

WARNING
Always unplug the projector and allow to cool before removing or installing a lens.

WARNING
Make sure the lens cap is on before removing or installing a lens assembly.

STEP 2 ➤ Grasp the lens assembly near the point where it enters the projector and slowly unscrew (counter-clockwise) until the assembly is free from the projector. Use both hands and take care not to touch the lens surface, which is easily damaged. Set aside.

STEP 3 ➤ Make sure the new lens is protected by the lens cap. Install the new lens in the projector by carefully screwing the assembly into the projector just until snug. If the lens assembly seems difficult to turn, it may be cross-threaded. Carefully remove and try again. Use both hands and do not force or over-tighten.

STEP 4 ➤ Remove lens cap and reposition the projector closer to or further from the screen as necessary for the screen and new lens type. For example, if using a 1.2:1 lens, throw distance should be roughly equal to 1.2 x the screen width. Adjust vertical offset as necessary so that display is rectangular.

4.6 Troubleshooting

If the projector is not operating properly, note the symptoms of the problem and use the following guide to assist you. If you cannot resolve the problem yourself, contact your dealer for assistance.

Symptom ➤ ***The power cord will not fit into the power socket...***

CAUSE / REMEDY:

1. A standard power cord is inadequate for the power requirements of the projector and will not fit into the projector's power socket. Use only the notched power cord that came with the projector.

Symptom ➤ ***The projector will not turn on when [POWER] is pressed...***

CAUSE / REMEDY:

1. Make sure that [POWER] is held down for approximately one second.
2. Are both LEDs OFF on at the back of the projector? Check that the power cord is properly connected at the both the wall outlet and the projector.
3. Does the green "Status" LED flash with each key press? If not, the projector is not receiving the keypad's IR signals. Ensure the keypad is directed at either the front or rear of the projector, or at the screen. Also make sure that the path between the IR keypad and the projector (or screen) is not blocked.
4. The batteries in the IR remote keypad may be weak. Refer to *4.3, Replacing Keypad Batteries* for instructions.
5. The IR keypad may have been disabled by a change in protocol. See *2.10, Keypad Protocols* and *3.6, Adjusting and Checking System Parameters.*
6. Use the [POWER] key on the built-in keypad to turn the projector on.

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Symptom ➤ The projector is on but there is no display of source input...

CAUSE / REMEDY:

1. Is an active source connected properly? Check the cable connections. Is that source selected? Press DAT 1, DAT 2, VID 1, or VID 2 to select a source. Or use SRC to switch to other sources. See *2.4, Source Connections* and *3.5, Using Inputs and Channels*.
2. The room lighting may be too bright. Lower the intensity of the room lighting. Reduce light reflections as much as possible.
3. Increase contrast and/or brightness of image.
4. The projector may be too far from the screen. Move the projector closer to the screen.
5. Is the "Status" LED flashing a pattern of yellow and red lights while the "Power" LED is steady red? This pattern indicates an internal system error. If the problem persists contact a qualified Electrohome service technician.
6. Was the lens cover accidentally left on? Remove lens cover.

Symptom ➤ The projector does not respond to the infrared remote keypad...

CAUSE / REMEDY:

1. Does the green "Status" LED flash each time a key is pressed? If not, the projector is not receiving the keypad's IR signals. Ensure the keypad is pointed either at the front or rear of the projector, or at the screen.
2. The viewing path between the IR keypad and the projector (or screen) may be blocked. Ensure there is a clear line-of-sight between the keypad and the projector (or screen).
3. The batteries in the IR remote keypad may be weak. Refer to *4.3, Replacing Keypad Batteries* for instructions on how to replace the batteries.
4. There may be unusual lighting conditions in the room affecting IR keypad operation. Determine if such conditions exist and correct.
5. The IR keypad may have been disabled for use with this projector(s). See *2.10, Keypad Protocols* and *3.7, Adjusting and Checking System Parameters*.

Symptom ➤ The power is on but the lamp is not...

CAUSE / REMEDY:

1. The projector probably became overheated. Allow to cool and make sure that nothing blocks projector vents. Do not operate in environments warmer than 35°C (95°F).
2. The lamp may have reached the end of its 1000-hour life. Replace the lamp assembly as described in *4.4, Replacing the Lamp and Filter*.

Symptom ➤ The display is jittery or unstable...

CAUSE / REMEDY:

1. If the display is jittery or if it disappears and reappears erratically, check that the source is properly connected and that its signal is of adequate quality for detection. For example, the projector scans the default input DAT 1 for a signal to display. If a poor quality or improperly connected source is connected, the projector will briefly and repeatedly attempt to display an image. If no source is connected, the "No signal present" error message appears over a blank display. Correct the source connection.
2. The horizontal or vertical scan frequency of the input signal may be out of range of the projector. Refer to *Section 5, Specifications* for scan frequency ranges.

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3. Sync signal may be inadequate. Correct the source problem.
4. The input signal type may conflict with the input module. Install the correct module to match that of the source.
5. Pixel tracking and phase may need adjustment.

Symptom ➤ The display is faint...

CAUSE / REMEDY:

1. Brightness and/or contrast may be set too low. Increase the brightness and/or contrast settings.
2. The projection room may be too bright. Lower the intensity of projection room lighting and reduce light reflections as much as possible.
3. The projector may be too far from the screen. Move the projector closer.
4. The location of the audience with respect to the screen may not be ideal. Make sure the audience is within the viewing angle set by the projector and screen position, and the screen type.
5. The source may be double terminated. Ensure the source is terminated only once.
6. The source (if non-video) may need sync tip clamping. Enter a check in the "Sync Tip Clamping" box found in the *Image Settings* menu.

Symptom ➤ The display is reversed or upside down...

CAUSE / REMEDY:

1. The projector's image orientation is not set correctly for the current installation. Refer to *2.6, Operating Orientation*, to set the projector's image orientation to match your installation.

Symptom ➤ The upper portion of the display is waving, tearing or jittering...

CAUSE / REMEDY:

1. This sometimes occurs when the source is a VCR or video signal. If you are using a VCR, enter a checkmark in the "VCR" checkbox within the *Image Settings* menu.

Symptom ➤ Portions of the display are cut off or wrap to the opposite edge...

CAUSE / REMEDY:

1. Reduce top, bottom, left or right blanking from within the *Size / Position* menu.
2. Horizontal/vertical placement may need adjustment. Adjust until entire image is visible and centered.

Symptom ➤ The display appears compressed or stretched

CAUSE / REMEDY:

1. The frequency of the pixel sampling clock is incorrect for the current source. Adjust pixel tracking up or down.

Symptom ➤ Display quality appears to drift from good to bad, bad to good...

CAUSE / REMEDY:

1. The operating temperature of the projector may not be constant. Watch that the projector is not located too close to heating/air conditioning vents.
2. The source input signal may be of low quality.
3. The horizontal or vertical frequency of the input may have changed at the source end.

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Symptom ➤ The display has suddenly frozen, or an unknown menu has appeared…

CAUSE / REMEDY:

1. You may have accidentally entered a special engineering code using the ✻ key with certain numbers. Press EXIT to cancel the function and return to presentation level.
2. If the screen blacks out, it is possible that excessive voltage noise on the AC or ground input has interrupted the projector's ability to lock on to a signal. Turn the projector off, wait for the lamp fans to stop and unplug. Plug in again and power up as usual.

Symptom ➤ The display is not sharp or "clean"...

CAUSE / REMEDY:

1. Display adjustment may be required. Rotate the focus knob to adjust for best focus, then adjust brightness, contrast and detail.
2. Is a BNC T-connector being used? Use a distribution amplifier to boost signal levels.
3. Is the video input signal properly terminated? Set in *Preferences* menu.
4. The screen size may be too large. As screen size increases, magnification increases, reducing brightness.
5. The source input signal may be of low quality.

Symptom ➤ Colors in the display are inaccurate...

CAUSE / REMEDY:

1. The color, tint and/or color temperature settings may require adjustment from within the *Image Settings* menu.

Symptom ➤ The display is not rectangular...

CAUSE / REMEDY:

1. Is the vertical offset adjusted correctly for the current throw distance? Use the vertical offset knob on the front of the projector and see *2.8, Zoom, Focus and Vertical Offset* for minor adjustments.
2. Is the projector lens surface parallel to the screen? See *2.7, Leveling.*

Symptom ➤ The display is "noisy"...

CAUSE / REMEDY:

1. Display adjustment may be required. Adjust pixel tracking and phase.
2. The video input may not be terminated. Make sure the video input is terminated (75 Ω). If it is the last connection in a loop-through chain, the video input should be terminated at the last projector only.
3. The signal cables carrying the input signal may be of poor quality. Use only good quality signal cables. Electrohome cables are recommended.
4. The distance between the input source device and the projector may be too great. If the distance between the input source device and the projector is greater than 25 feet, signal amplification/conditioning may be required.
5. The input signal may be of poor quality.
6. If the source is a VCR or off-air broadcast, detail may be set too high.

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Section 5

Specifications

5.1 Specifications
VistaGRAPHX 5000

NOTE: Due to constant research, specifications are subject to change without notice.

Display ➤

Resolution

Pixel format (H x V)	1024 X 768
Maximum digitizing sample rate	80 MHz

Brightness

Over 4500 ANSI lumens full usable brightness per industry standard measurement methods

Contrast Ratio

250:1 ANSI, 400:1 full field

Gray Scale

Gray scale resolution	8 bits

Color Temperature

Range of Adjustment	3200 K to 10000 K

Projection Lenses

Lens Type (Throw Ratio)	Diagonal Screen Size	Vertical Offset* (in Pixels)	Max. Geometric Distortion
0.8:1	5-25’	+384	0.5%
1:1 *(VistaPro 1.2:1)*	6-30’	+150	0.5%
2.3:1 *(VistaPro 3:1)*	6-30’	+325	0.5%
3.9:1 *(VistaPro 5:1)*	9.6-36’	+250	0.5%
5.5:1 *(VistaPro 7:1)*	9.6-36’	+150	0.5%
1.2 - 2.3:1 *(VistaPro 1.5-3:1)*	9.6-36’	+80	2%
1.5 - 2.5:1	6-40’	+384	2%
2.5 - 4:1	6-40’	+384	2%
2.3 - 5.5:1 *(VistaPro 3-7:1)*	9.6-36’	+125	2%
4 - 7:1	10-40’	+384	2%

* Recommended maximums can be exceeded, however image quality is affected

Inputs ➤

Number of inputs	2 RGBHV (second input via plug-in module) 2 Video (standard on N. American model only)

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RGB Input

Horizontal frequency range	15 - 100 kHz *
Vertical frequency range **	45 -120 Hz
Pixel clock rate	10 - 80 MHz
Signal format	Analog RGB
Input level	$0.5V_{p-p}$ - $1.4V_{p-p}$
DC offset	± 5V
Impedance	75 ohms
Return loss (VSWR)	1.2

**Display quality may be limited by pixel sampling rate when at the higher end of the frequency range.*
***H and V frequencies of the input source and of the DMDs may not be the same. If using a back porch clamp, the back porch needs to be at least 1.1 µsec.*

Video Input (optional)

Signal formats	Composite (CVBS), S-Video (Y/C)
Video standards	NTSC, PAL, & SECAM
Input level, Composite	1.0 V_{p-p} ± 3db (including sync tip)
Input level, S-Video, Luminance (Y)	1.0 V_{p-p} ± 3db (including sync tip)
Input level, S-Video, Chrominance (C)	630 mV_{p-p} nominal (burst)
DC offset	± 5V
Impedance	75 ohms
Return loss (VSWR)	1.2

Sync

Input levels	$0.5V_{p-p}$ - $5.0V_{p-p}$ (±5V offset)
Impedance	75 ohms
Type	Sync-on-green, Composite, Separate H and V
Polarity	Positive or negative
Duty cycles	0.10% - 20% vertical 3% - 20% horizontal

Wired Control Input (optional)

Control type	1/8" mini stereo jack
Input level	High 2.0V min., Low 0.7V max.

Serial Input (RS-232 and RS-422)

Number of connectors	3 for RS-232 (1 network in, 1 network out, 1 for switcher control) 1 for RS-422
Connector type	9 pin D

Power Requirements ➤

Voltage range (auto switching)	180 - 264 VAC
Line frequency	50 - 60 Hz nominal
Inrush current	90 amps @ 264 VAC
Operating current	9 amps @ 180 VAC
Power consumption	1500 watts maximum

Lamp ➤

Type	Xenon short arc
Power	1000 watts
Operating angle	any vertical angle, ±45° horizontal
Rated life	1000 hours to half intensity

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IR Control ➤

Typical range with fresh batteries	200', line-of-sight
IR carrier frequency (subcarrier modulated)	336 kHz
Number of batteries	4
Battery type	AA 1.5 V (Alkaline cells)
Battery life	1 year shelf, 1 month continuous use
Backlight	LED array

Size & Weight ➤

Size (product only, W x L x H)	33.9" (86 cm) x 22.7" (57.7 cm) x 11.8" (30 cm)
Size of shipping box (W x L x H)	35.7" (91.5 cm) x 37.6" (96.5 cm) x 25.7" (66 cm)
Weight of product, no lens	102 lb. (47 kg)
Shipping weight	160 lb. (73 kg)

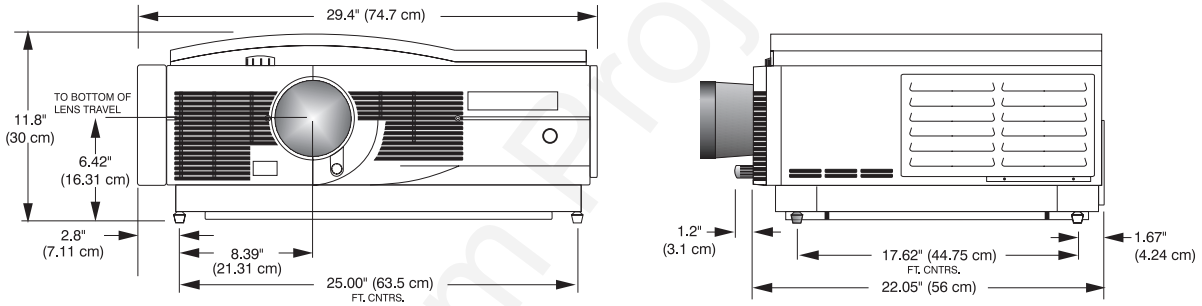

Figure 5.1. VistaGRAPHX 5000 Dimensions

Safety ➤ C.S.A. C22.2.950 (M94) approved to U.L. 1950 by NRTL (Semko) EN60950

EMI ➤ 47CFR 2&15 (FCC) Class A - U.S. - Conducted and Radiated Emissions Stds.
CRC 1374 (DOC) Class A - Canadian - Conducted and Radiated Emissions Stds.
Emissions per EN50081-1. Immunity per EN50082-1.

Operating Environment ➤

Temperature	0°C to 35°C (32°F to 95°F)
Humidity (non-condensing)	20% to 80%
Altitude	0 - 3000 meters

Standard Accessories ➤

IR Remote Keypad (includes batteries)
Line cord (power cord)
VistaGRAPHX 5000 User's Manual
Warranty card

Optional Accessories ➤

Video Decoder Module	*Marquee* Signal Switcher
Ceiling Mount Hardware	RGB Input Module
Alternate Throw Lens	RGB Loop-Through Module
Wired Remote Keypad	Composite/S-Video Module
2-way Controller	HDTV Input Module
Projector Stacker	PC Analog Input Module
Replacement 5000 Lamp	

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Appendix A

Glossary

This appendix defines the specific terms used in this manual as they apply to *VistaGRAPHX 5000*. Also included are other general terms commonly used in the projection industry.

Active Line Time ➤ The time, inside one horizontal scan line, during which video is generated.

Ambient Light Rejection ➤ The ability of a screen to reflect ambient light in a direction away from the "line of best viewing". Curved screens usually have good ambient light rejection. Flat screens usually have less ambient light rejection.

Analog Video ➤ The video output of most computers and video tape machines. Analog video can generate a large number of colors.

Aspect Ratio ➤ The ratio of the width of an image to its height, such as the 4:3 aspect ratio common in video output.

Auto Source ➤ The ability of the projector to automatically recognize and synchronize to the horizontal and vertical scan frequencies of an input signal.

Bandwidth ➤ The frequency range of the projector's video amplifier.

Baud Rate ➤ The speed at which serial communications travel from their origin. The *VistaGRAPHX 5000* default baud rate of 9600 can be changed to match a controlling device.

Blanking Time ➤ The time inside one scan line during which video is not generated. The blanking time of the input signal must be equal to or greater than the retrace time of the projector.

Brightness ➤ In projection, brightness usually describes the amount of light emitted from a surface such as a screen. It is measured in foot-lamberts or candelas per square meter.

Candela or Candle ➤ Unit of measure for measuring intensity of light.

Channel ➤ A collection of measurements stored by the projector for a given source and/or projector, including frequencies, pulse width, polarity, syncs, channel number and location, user-adjustable display settings, etc. Channels enable the projector to automatically recognize and properly display input from a variety of sources.

Channel Number ➤ A number that uniquely identifies a specific channel retained in projector memory (up to 99 channels maximum).

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Checkbox ➤ A menu item that indicates whether an option is currently in effect (checked) or not (unchecked).

Color Shift ➤ A change in the tint of a white field across an image.

Color Temperature ➤ The coloration (reddish, white, bluish, greenish, etc.) of white in an image, measured using the Kelvin (K) temperature scale. Higher temperatures output more light.

Component Video ➤ See *YUV Video*.

Composite Video ➤ The output of video tape players and some computers, characterized by synchronization, luminance and color signals combined on one output cable.

Contrast (ratio) ➤ The degree of difference between the lightest and darkest areas of the image.

Convergence ➤ The alignment of the red, green, and blue elements of a projected image.

Curved Screen ➤ A projection screen which is slightly concave for improved screen gain. Curved screens usually have screen gains which are greater than 1 but viewing angles much less than 180°.

DMD™ ➤ Digital Micromirror Devices™ used in the *VistaGRAPHX 5000* for processing red, green, and blue color data.

Decoder ➤ An optional device in the *VistaGRAPHX 5000* that converts NTSC 3.58, NTSC 4.4, PAL, PAL-N, PAL-M, or SECAM to RGB video.

Detail ➤ The sharpness of a display from a video source.

Diffused Screen ➤ A type of rear-projection screen which spreads the light striking it. Screen gain is less than 1 but audience viewing angles are increased.

Display Setting ➤ An adjustment that affects the display of an image. Such display settings include contrast, brightness, tint, blanking, focus, etc.

Flicker ➤ A very rapid variation in image brightness caused by a frame rate that is too slow. (See *Interlace*.)

Frame Rate ➤ The frequency at which complete images are generated. For non-interlaced signals, the frame rate is identical to the vertical frequency. For interlaced signals, the frame rate is one half of vertical frequency.

Foot-candle ➤ The intensity of visible light per square foot.

Foot-lambert ➤ The luminance (brightness) which results from one foot-candle of illumination falling on a perfectly diffuse surface.

Gain or Screen Gain ➤ The ability of a screen to direct incident light to an audience. A flat matte white wall has a gain of approximately 1. Screens with gain less than 1 attenuate incident light; screens with gain more than 1 direct more incident light to the audience but have a narrow viewing angle. For example: An image reflecting off a 10 gain screen appears 10 times brighter than it would if reflected off a matte white wall. Curved screens usually have larger gain than flat screens.

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Help Screen ➤ A display of help information on the projection screen.

Horizontal Frequency ➤ The frequency at which scan lines are generated, which varies amongst sources. Also called horizontal scan rate or line rate.

Hot Spot ➤ A circular area of a screen where the image appears brighter than elsewhere on the screen. The hot spot always appears along the line of sight and "moves" with the line of sight. High gain screens and rear screens designed for slide or movie projection usually have a hot spot.

Input ➤ A physical connection route for a source (input) signal.

Input Signal ➤ Signal sent from a source to the projector.

Interface ➤ A device that accepts an input signal for display by the projector.

Interlace ➤ A method used by video tape players and some computers to double the vertical resolution without increasing the horizontal line rate. If the resulting frame rate is too low, the image may flicker depending on the image content.

Keypad ➤ A small push-button device which allows the user to control projector settings and operation. There are three different *VistaGRAPHX 5000* keypads: built-in, IR remote, and wired remote (optional). For more information, refer to *3.3, Using the Keypads.*

Keystone ➤ A distortion of the image which occurs when the top and bottom borders of the image are of different lengths. Side borders slant in or out, producing a keystone shaped image.

Linearity ➤ The reproduction of the horizontal and vertical size of characters and/or shapes over the entire screen.

Line of Best Viewing ➤ When light from a projector is incident on a screen, the light reflects from the screen such that the angle of reflection equals the angle of incidence. The Line of Best Viewing is along the line of reflection.

Loopthrough (Loopthru) ➤ The method of feeding a series of high impedance inputs from a single video source with a coaxial transmission line in such a manner that the line is terminated with its characteristic impedance at the last input on the line.

Lumen ➤ The amount of visible light emitted by a light source is measured in lumens.

Lux ➤ The amount of visible light per square meter incident on a surface.
1 lux = 1 lumen/square meter = 0.093 foot-candles

Menu ➤ A list of selectable options displayed on the screen.

NTSC Video ➤ A video output format of some video tape and disk players. There are two types of NTSC (National Television Standards Committee) video: NTSC 3.58 and NTSC 4.43. NTSC 3.58 is used primarily in North America and Japan. NTSC 4.43 is less commonly used.

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Optical Screen ➤ A type of rear-projection screen which re-directs light through the screen to increase image brightness in front of the screen. Screen gain is usually greater than 1 but audience viewing angles are reduced.

PAL Video ➤ PAL (Phase Alternating Line) video is a 50 Hz standard with 768 x 576 resolution. It is found on some video tape and disk players (used primarily in Europe, China and some South American and African countries).

Pincushion ➤ A distortion of the image which occurs when the borders are concave or convex.

Pixel (picture element) ➤ The smallest discernible element of data from a computer-generated image.

Pixel Phase ➤ The phase of the pixel sampling clock relative to incoming data.

Pixel Tracking ➤ The frequency of the pixel sampling clock, indicated by the number of pixels per line.

Presentation Level ➤ The projector is at presentation level when an image from a source is displayed without the presence of a slidebar, menu, pull-down list, or error message. For example, if a help page is displayed, the projector is not at presentation level.

Projector-to-Screen Distance ➤ The distance between the projector's front feet and the screen. Also called "Throw Distance".

Protocol ➤ The type of code format utilized by remote keypad(s). For any keypad, the default protocol from manufacture is Protocol A. By using two different protocols, two projectors may be used side by side while being controlled independently by their remote IR keypads.

Pull-down List ➤ A selectable menu item that unfolds into a list of options pertaining to a given parameter.

Rear Screen ➤ A translucent panel for screen projection. Incident light travels through the incident surface of a rear screen and forms an image on the other surface.

Resizing ➤ The ability to manipulate through software commands the physical size, placement and/or aspect ratio of an image.

Resolution (lens) ➤ The maximum number of alternate white and black horizontal lines that can be distinguished on a screen when a photographic target is placed between the lens and a light source, and illuminated by that light source.

Resolution (projector) ➤ The maximum number of pixels that the projector can display horizontally and vertically across an image.

Retrace Time (Horizontal) ➤ The minimum time required for a CRT projector to move the position of the scanning spot from the right edge to the left edge.

Rise Time ➤ The time required by the video amplifier of the projector to increase its output from 10% to 90% of the maximum value.

RGB Video ➤ The video output (analog or digital) of most computers. Analog RGB video can have 3, 4, or 5 wires — one each for red, green, and blue, and either none, one or

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two for sync. For three-wire RGB, the green wire usually provides sync. (See TTL Video).

RS-232 ➤ A common asynchronous data transmission standard recommended by the Electronics Industries Association (EIA). Also called serial communication.

RS-422 ➤ A relatively rare asynchronous data transmission standard in which balanced voltage is specified. RS-422 is used for exceptionally long distances only.

S-Video ➤ The output from certain video tape players and video equipment. S-Video separates sync and luminance from color information, typically producing a higher quality display than composite video.

Scan Frequency ➤ The horizontal or vertical frequency at which images are generated.

Scan Line ➤ One horizontal line on the display.

SECAM ➤ A video output format of some video tape and disk players (used primarily in France). SECAM (Sequential Couleur á Mémoire) signals are similar in resolution and frequency to PAL signals. The primary difference between the two standards is in the way color information is encoded.

Slidebar ➤ A slidebar is a graphical display of an adjustable setting. The numerical setting usually represents a percentage.

Source ➤ The device, such as a computer or VCR, connected to the projector for display. A source is identified as DAT 1 , DAT 2 , VID 1 or VID 2 , or as other user-defined numbers. Sources have corresponding channels recognized by the projector.

Source Number ➤ See *Channel Number*.

Source Setup ➤ See *Channel*.

Spot Size ➤ The diameter of the smallest dot that can be generated by a CRT projector. *VistaGRAPHX 5000* has a fixed spot (pixel) size.

Switcher ➤ A signal selector that can be connected to a projector for the purpose of adding more sources.

Sync ➤ This term refers to the part of the video signal that is used to stabilize the picture. Sync can occur in three forms:

1) "Composite sync": the horizontal and vertical components are together on one cable.
2) "Sync-on-green": the sync is part of the green video.
3) "Separate sync" or "H.SYNC and V.SYNC": the horizontal and vertical components of the sync are on two separate cables.

Sync Width ➤ The duration of each sync pulse generated by a computer. The sync width is part of the blanking time.

TTL Video ➤ A type of RGB video with digital characteristics.

Terminated ➤ A wire connecting a single video source to a display device, such as a projector, must be terminated by a resistance (usually 75Ω for video).

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Throw Distance ➤ The distance between the front feet of the projector and the screen. Also called "Projector-to-Screen Distance".

Tint ➤ Balance of red-to-green necessary for realistic representation of NTSC signals.

Variable Scan ➤ The ability of a projector to synchronize to inputs with frequencies within a specified range.

Vertical Frequency ➤ The frequency at which images are generated. Vertical frequencies vary amongst sources. Also called vertical scan rate.

Vertical Offset ➤ The difference between the vertical height of the projector lens and the vertical height of the display.

Video ➤ The signal that is used by display devices (such as projectors) to generate an image. This term also refers to the output of video tape/disk players and computers.

Video Decoder ➤ A device that converts NTSC 3.58, NTSC 4.4, PAL, PAL-N, PAL-M or SECAM to RGB video. This device is optional on all *VistaGRAPHX 5000* projectors.

Video Standard ➤ A specific type of video signal, such as NTSC, PAL, SECAM. *VistaGRAPHX 5000* can automatically recognize and display the standard and display accordingly.

Viewing Angle ➤ Screens do not reflect equally in all directions. Most light is reflected in a conical volume centered around the "line of best viewing". Maximum brightness is perceived if you are within the viewing cone defined by the horizontal and vertical viewing angles.

White Balance ➤ The color temperature of white used by the projector.

White Field ➤ The area of an image that is white only. For example, a full white field is an image that is white everywhere. A 10% white field is a white area (usually rectangular) that occupies 10% of the image; the remaining 90% is black.

YCrCb ➤ See YUV video.

YPrPb ➤ See YUV video.

YUV Video ➤ A high-end signal suitable for broadcast. YUV video (also called component video) by-passes the *VistaGRAPHX 5000* video decoder.

Zoom ➤ The adjustment of image size through the use of a zoom lens.

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Appendix B

Keypad Reference

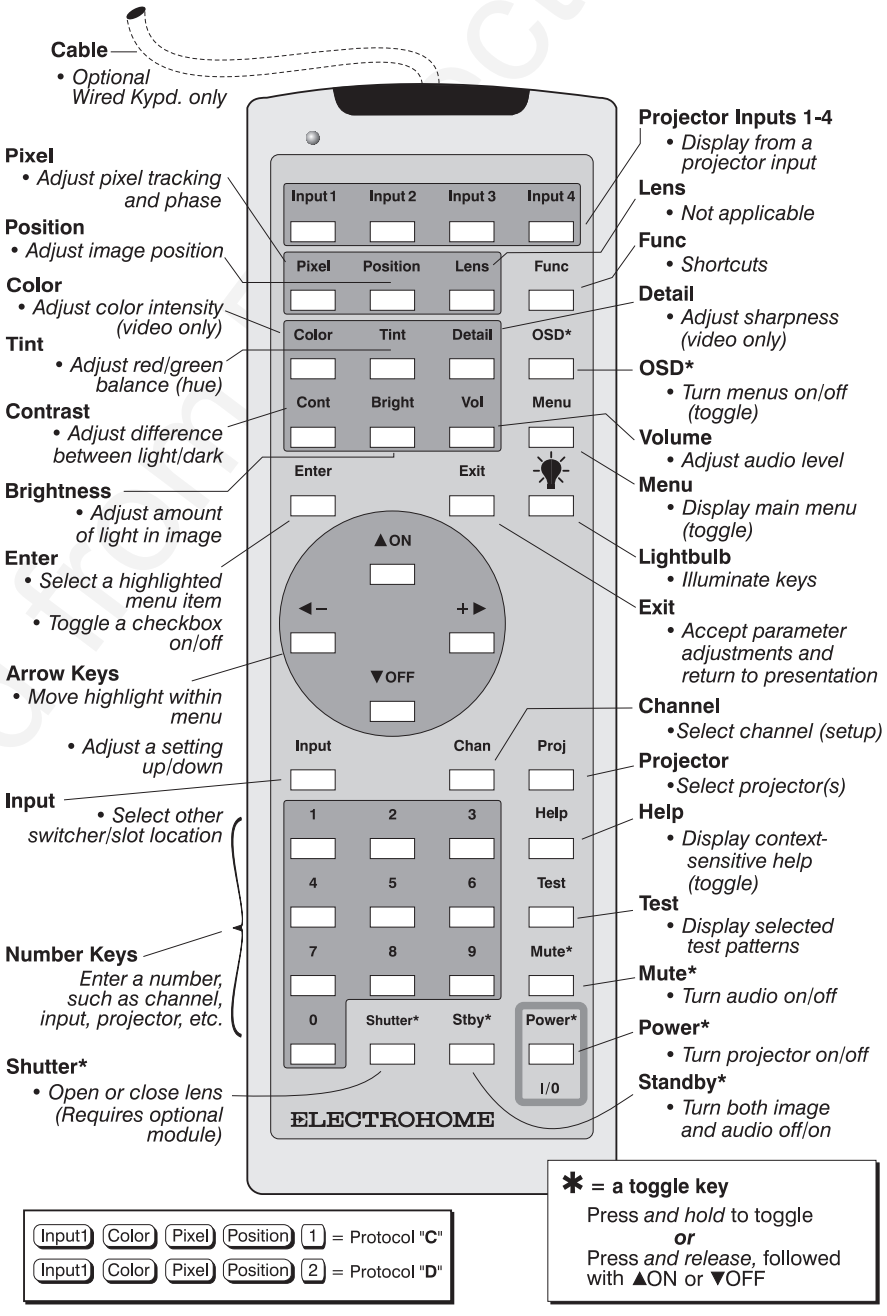

Figure B.1. IR (Infrared) Remote Keypad or Opt. Wired Keypad

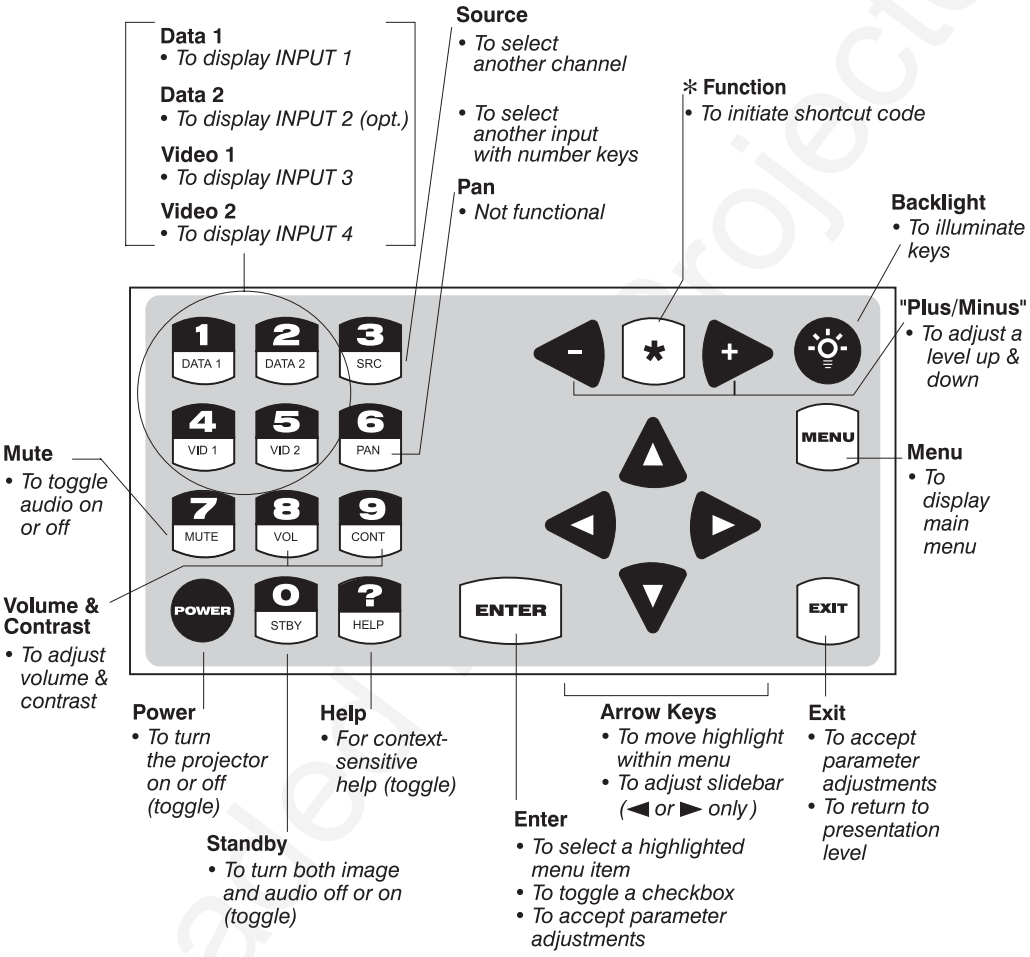

Figure B-2. Built-in Keypad

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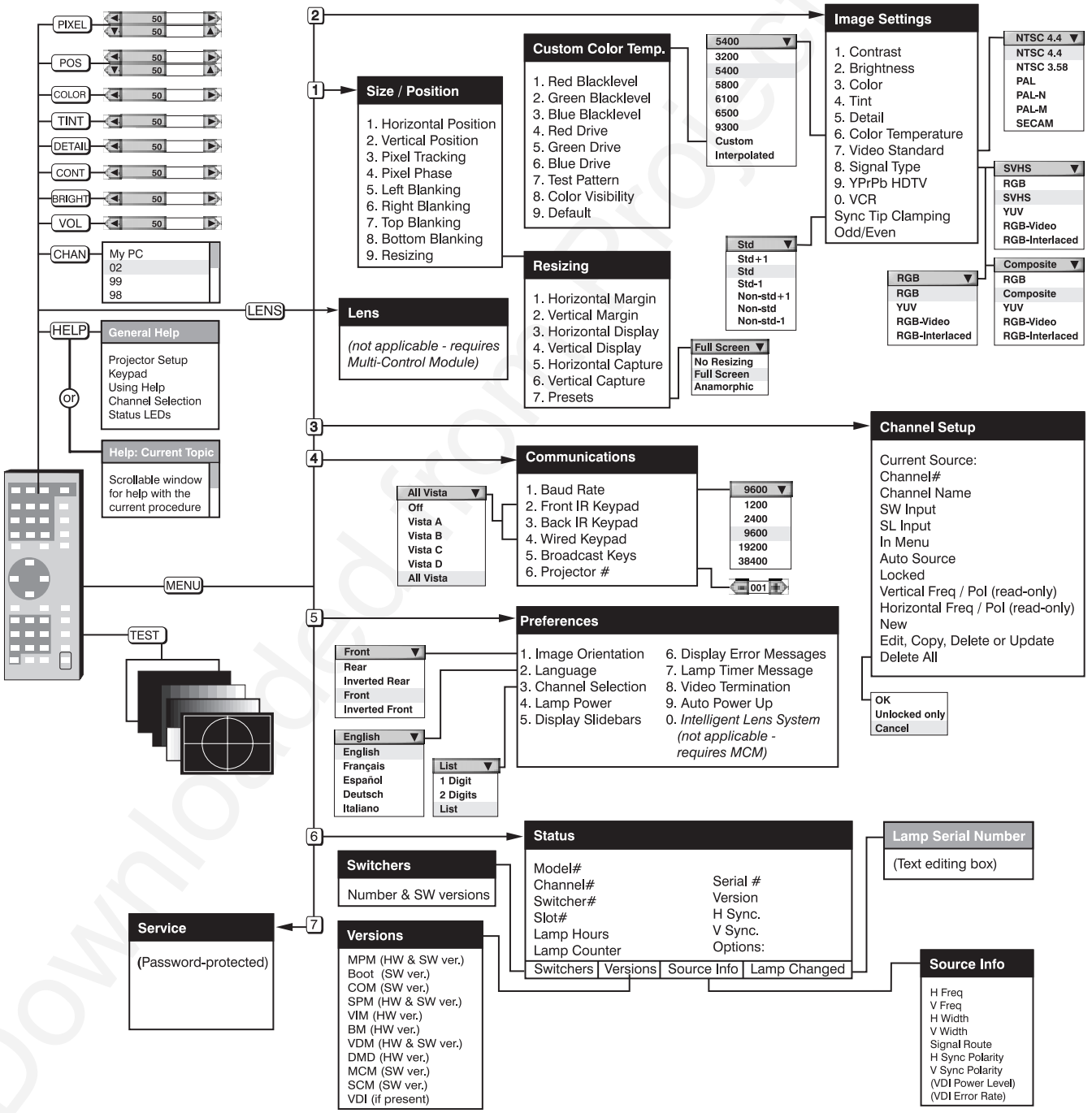
Appendix C

Menu Tree



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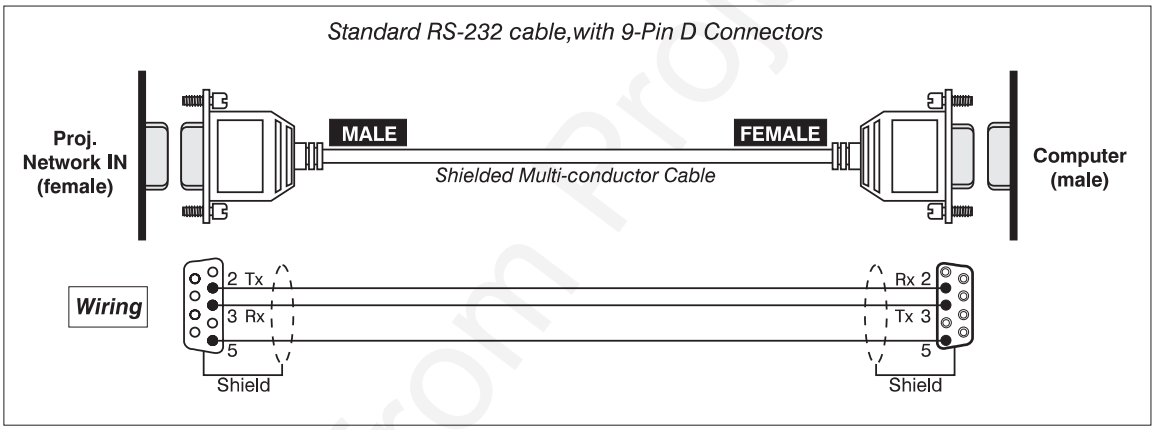
Appendix D

Serial Communication Cables

When connecting the *VistaGRAPHX* to either a computer, another *VistaGRAPHX* projector or a Marquee Signal Switcher, use a standard RS-232 serial communication cable. Cable details are provided below:

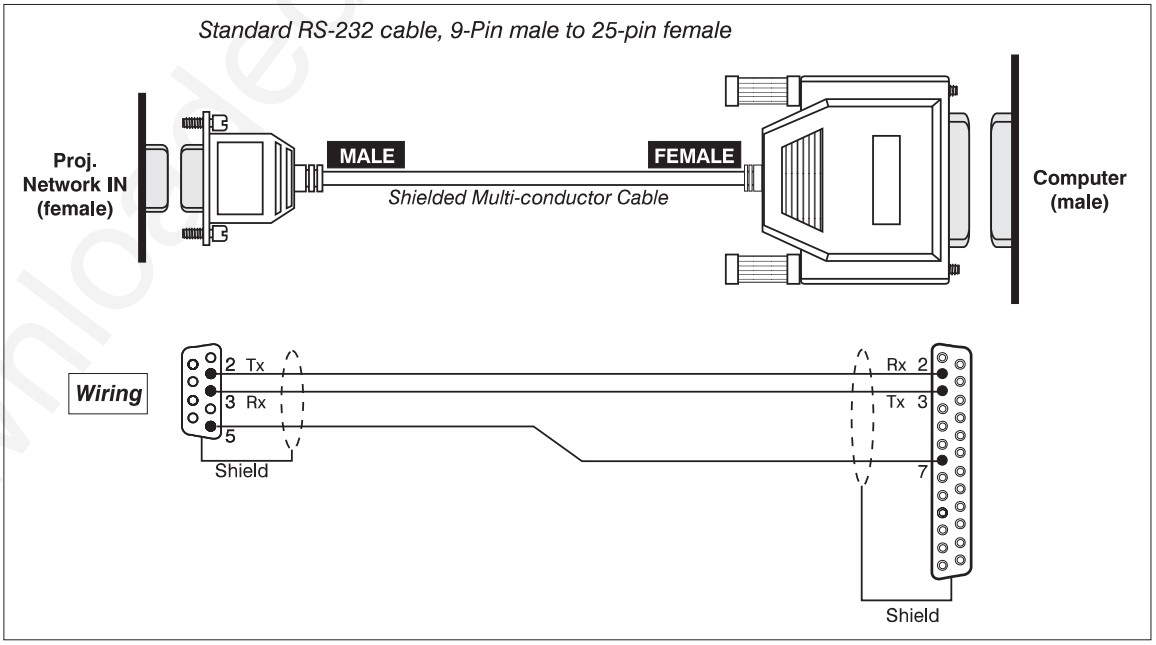
❑ *From projector to computer*

For computers having a 9-pin "AT" type serial port



❑ *From projector to computer*

For computers having a 25-pin serial port



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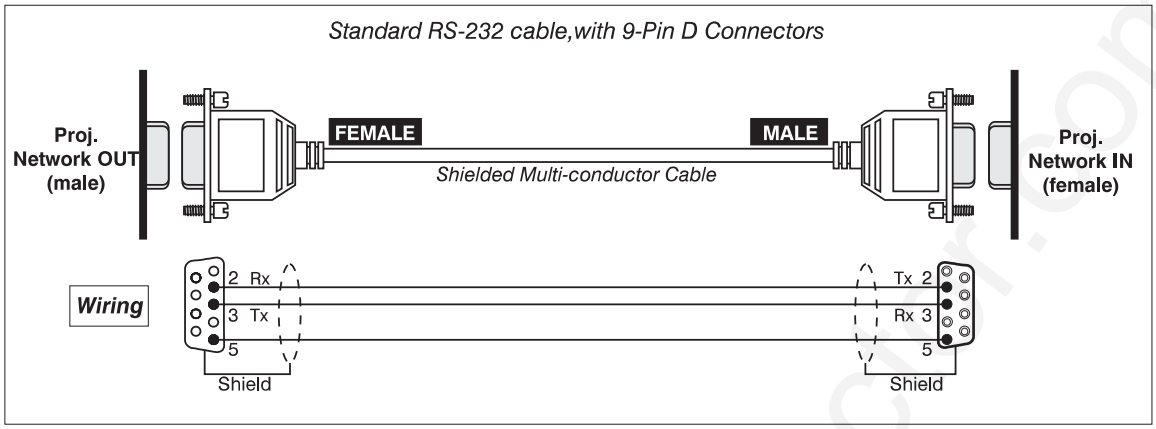
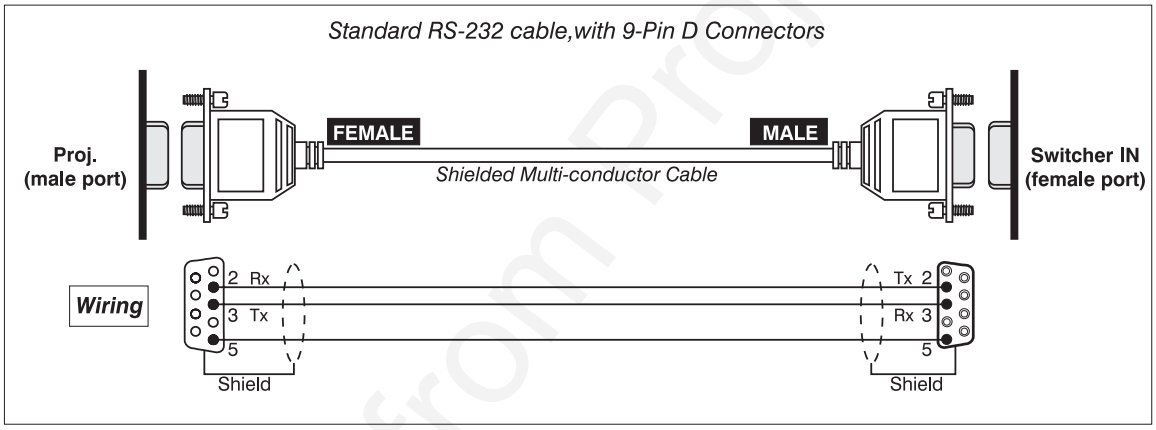
❑ *From projector to projector*

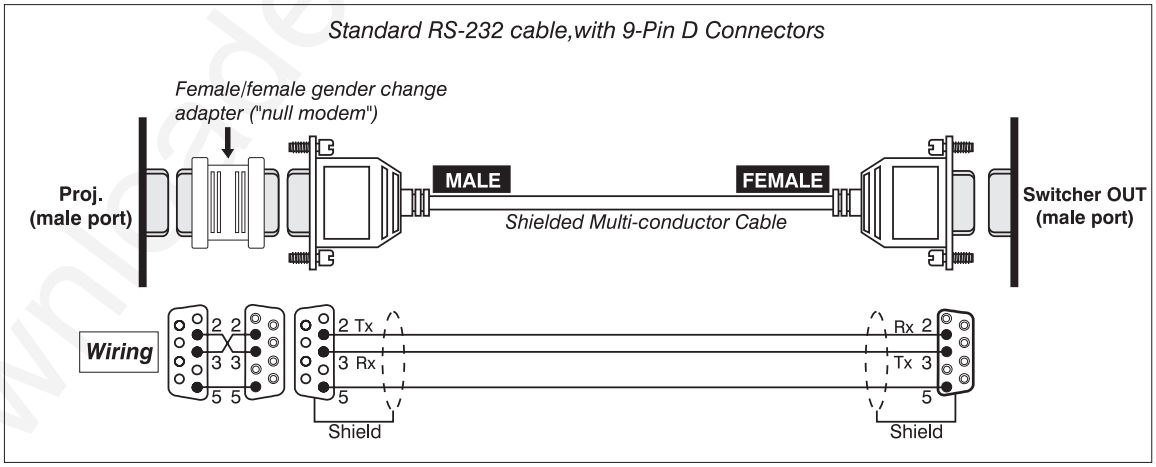


❑ *From projector to switcher, new installation*



❑ *From projector to switcher, in existing Marquee installation*

For adding a VistaPro or VistaGRAPHX projector to an existing installation in which the switcher OUT port is used (such as with Marquee projectors), add a gender-changing adapter at the projector port as shown:



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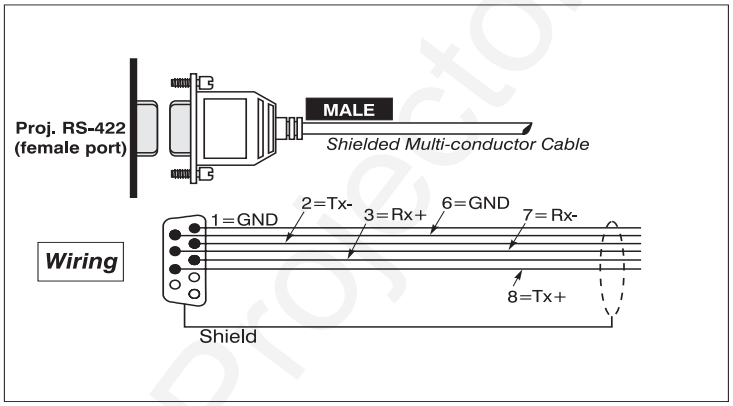
When connecting *VistaGRAPHX 5000* to a computer that has an RS-422 serial interface, refer to the following wiring information.

WARNING

Never use the RS-422 port unless you are using a computer with RS-422 capability. The higher voltage level of this signal could damage incompatible equipment.

❑ ***From projector to RS-422 compatible computer***



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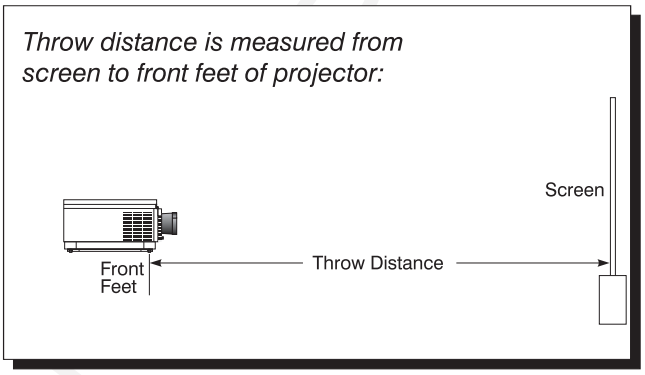
Appendix E

Throw Distance Charts

Always consult this Appendix when planning a projector installation. See *2.3, Projector Position and Mounting* for additional information.

Calculating Throw Distance

The correct throw distance for an installation depends on the screen size and projector lens type present — the larger the image, the greater the distance you must allow between the projector and screen. Once you know the screen size and lens type present, you can calculate the throw distance required in an installation by using the appropriate formula as found in this appendix.



Note that throw distance is measured perpendicular to the projector front feet and the screen but not necessarily parallel to the floor — i.e., the projector and screen may both be inclined.

Pre-calculated throw distances for the complete range of lens types and screen sizes appear in the charts and graphs on the following pages. Refer to these examples to quickly determine the proper throw distance for your installation.

NOTE: The variable operating ranges for zoom lenses appear in graphs only. Formulae and charts do not apply.

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0.8:1 Fixed Focal Lens

0.8:1 Formula

TD = (0.794 x W') + 0.74

(W' = ↔ *horizontal screen width in feet)*

↔ Screen Width [ft]	Throw Distance [ft]
4	3.92
4.5	4.32
5	4.72
5.5	5.11
6	5.51
6.5	5.91
7	6.31
7.5	6.70
8	7.10
8.5	7.50
9	7.89
9.5	8.29
10	8.69
10.5	9.09
11	9.48
11.5	9.88
12	10.28
12.5	10.68
13	11.07
13.5	11.47
14	11.87
14.5	12.26
15	12.66
15.5	13.06
16	13.46
16.5	13.85
17	14.25
17.5	14.65
18	15.05
18.5	15.44
19	15.84
19.5	16.24
20	16.63

Diagonal size ↗ **= 5-25 feet**

Image size range can be exceeded with some focus degradation

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1:1 Fixed Focal Lens

(VistaPro 1.2:1)

1:1 Formula

TD = (1.01 x W') + 0.40

(W' = ↔ *horizontal screen width in feet)*

↔ Screen Width [ft]	Throw Distance [ft]
5	5.47
5.5	5.98
6	6.48
6.5	6.99
7	7.50
7.5	8.00
8	8.51
8.5	9.02
9	9.52
9.5	10.03
10	10.54
10.5	11.04
11	11.55
11.5	12.06
12	12.56
12.5	13.07
13	13.58
13.5	14.08
14	14.59
14.5	15.10
15	15.60
15.5	16.11
16	16.62
16.5	17.12
17	17.63
17.5	18.14
18	18.64
18.5	19.15
19	19.66
19.5	20.16
20	20.67
20.5	21.18
21	21.68
21.5	22.19
22	22.70
22.5	23.20
23	23.71
23.5	24.22
24	24.72

Diagonal size ↗ **= 6-30 feet**

Image size range can be exceeded with some focus degradation

2.3:1 Fixed Focal Lens

(VistaPro 3:1)

2.3:1 Formula

TD = (2.35 x W') + 0.40

(W' = ↔ *horizontal screen width in feet)*

↔ Screen Width [ft]	Throw Distance [ft]
5	12.16
5.5	13.34
6	14.52
6.5	15.69
7	16.87
7.5	18.04
8	19.22
8.5	20.40
9	21.57
9.5	22.75
10	23.92
10.5	25.10
11	26.28
11.5	27.45
12	28.63
12.5	29.80
13	30.98
13.5	32.16
14	33.33
14.5	34.51
15	35.68
15.5	36.86
16	38.04
16.5	39.21
17	40.39
17.5	41.56
18	42.74
18.5	43.92
19	45.09
19.5	46.27
20	47.44
20.5	48.62
21	49.80
21.5	50.97
22	52.15
22.5	53.32
23	54.50
23.5	55.68
24	56.85

Diagonal size ↗ **= 6-30 feet**

Image size range can be exceeded with some focus degradation

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3.9:1 Fixed Focal Lens

(VistaPro 5:1)

3.9:1 Formula

TD = (3.97 x W') - 0.31

(W' = ↔ *horizontal screen width in feet)*

↔ Screen Width [ft]	Throw Distance [ft]
7.5	29.47
8	31.45
8.5	33.44
9	35.42
9.5	37.41
10	39.39
10.5	41.38
11	43.36
11.5	45.35
12	47.33
12.5	49.32
13	51.30
13.5	53.28
14	55.27
14.5	57.25
15	59.24
15.5	61.22
16	63.21
16.5	65.19
17	67.18
17.5	69.16
18	71.15
18.5	73.13
19	75.12
19.5	77.10
20	79.09
20.5	81.07
21	83.06
21.5	85.04
22	87.03
22.5	89.01
23	91.00
23.5	92.98
24	94.97
24.5	96.95
25	98.94
25.5	100.92
26	102.91
26.5	104.89
27	106.88
27.5	108.86
28	110.85
28.5	112.83
29	114.82

Diagonal size ↗ **= 9.6-36 feet**

Image size range can be exceeded with some focus degradation

5.5:1 Fixed Focal Lens

(VistaPro 7:1)

5.5:1 Formula

TD = (5.50 x W') + 0.36

(W' = ↔ *horizontal screen width in feet)*

↔ Screen Width [ft]	Throw Distance [ft]
7.5	41.61
8	44.36
8.5	47.11
9	49.86
9.5	52.61
10	55.36
10.5	58.11
11	60.86
11.5	63.61
12	66.36
12.5	69.11
13	71.86
13.5	74.61
14	77.36
14.5	80.11
15	82.86
15.5	85.61
16	88.36
16.5	91.11
17	93.86
17.5	96.61
18	99.36
18.5	102.11
19	104.86
19.5	107.61
20	110.36
20.5	113.11
21	115.86
21.5	118.61
22	121.36
22.5	124.11
23	126.86
23.5	129.61
24	132.36
24.5	135.11
25	137.86
25.5	140.61
26	143.36
26.5	146.11
27	148.86
27.5	151.61
28	154.36
28.5	157.11
29	159.86

Diagonal size ↗ **= 9.6-36 feet**

Image size range can be exceeded with some focus degradation

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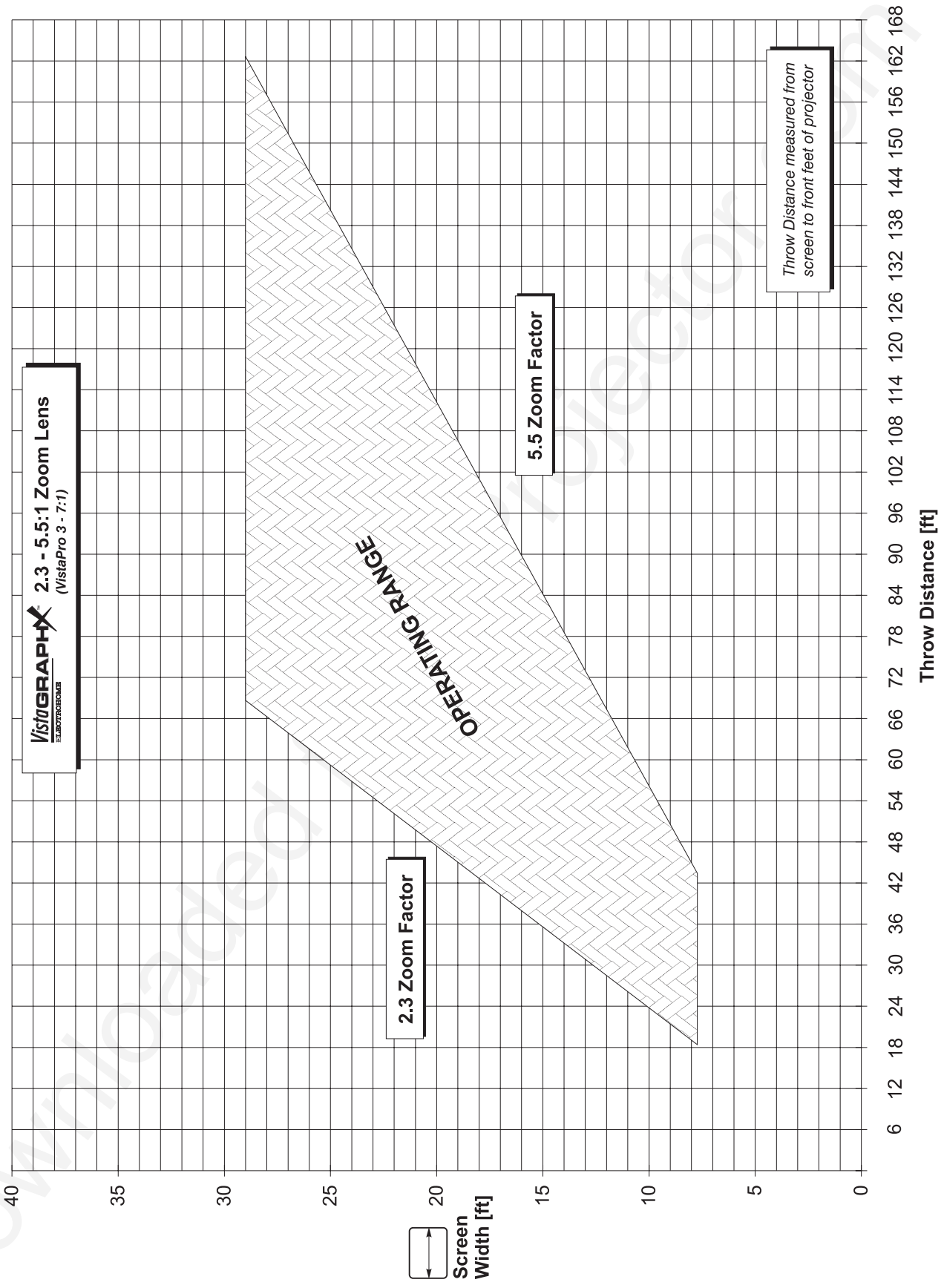

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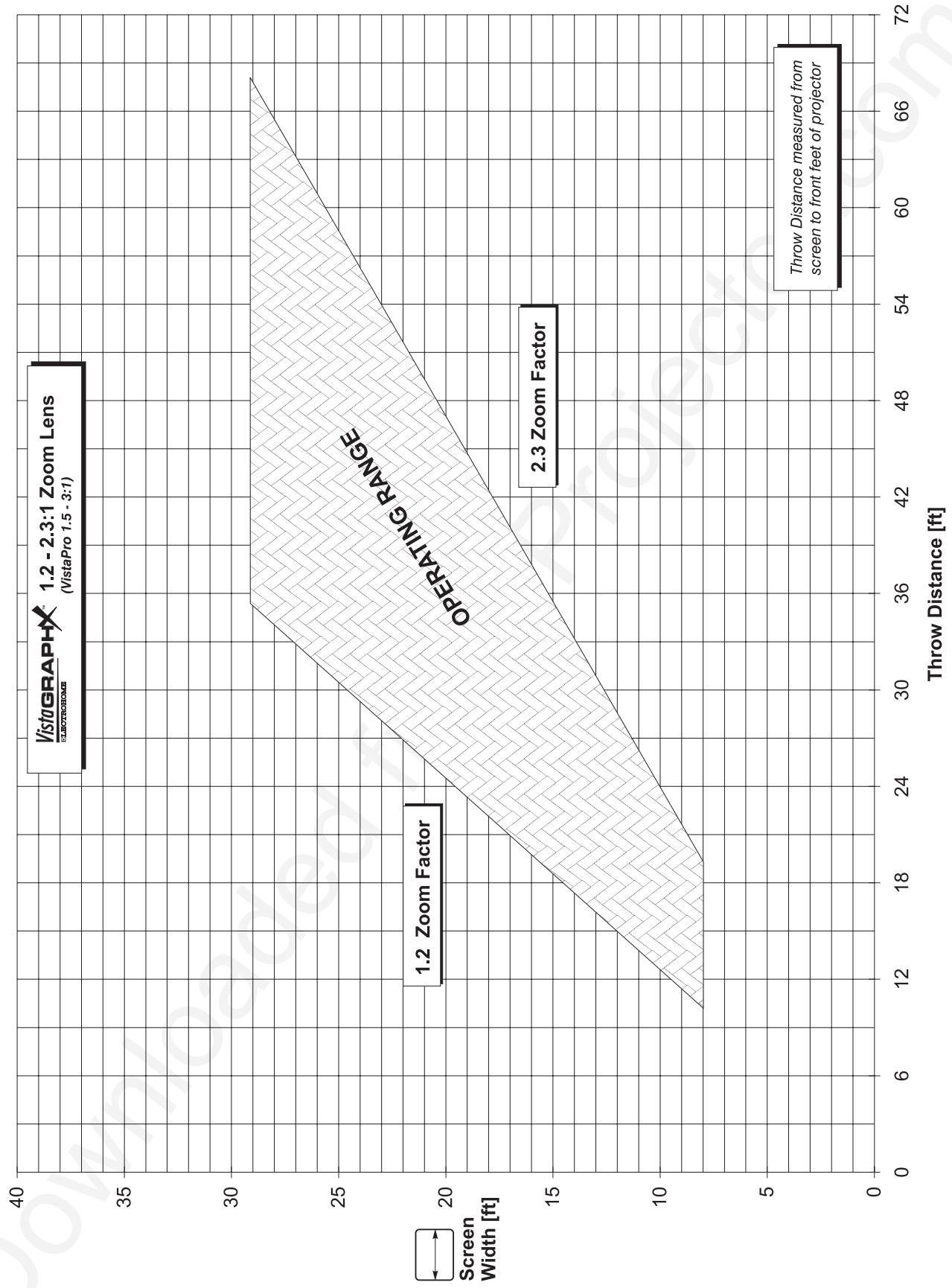

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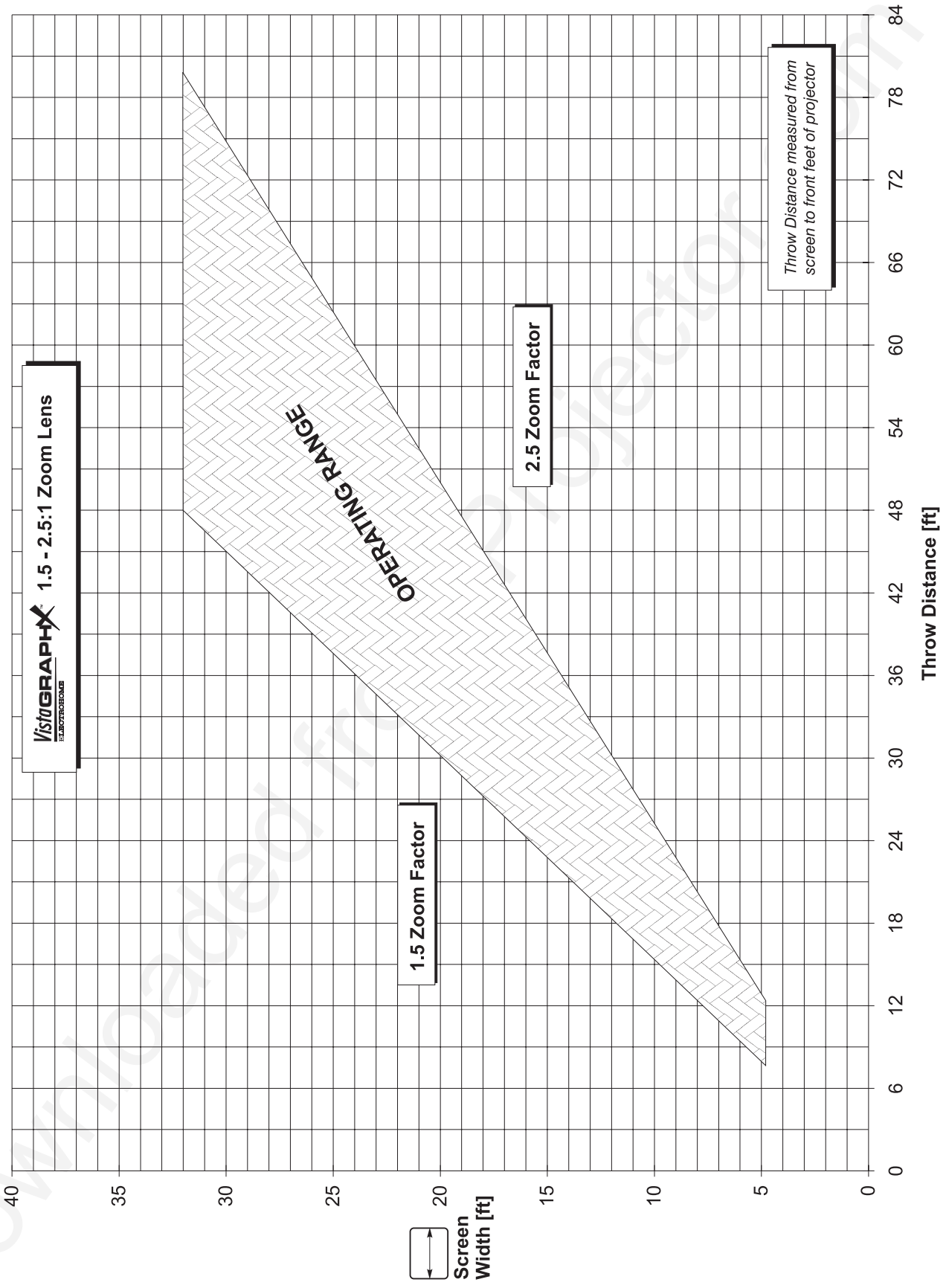

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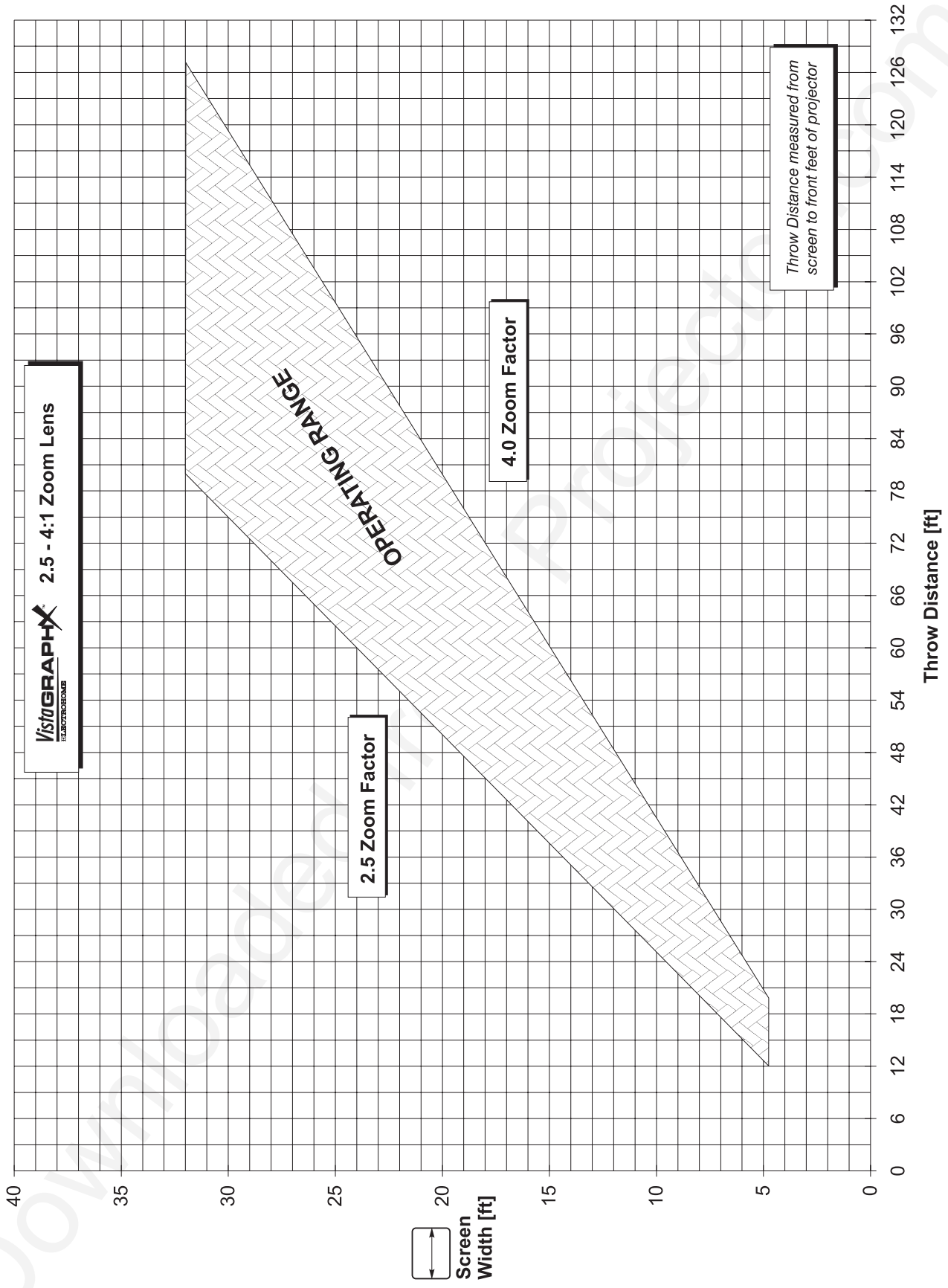

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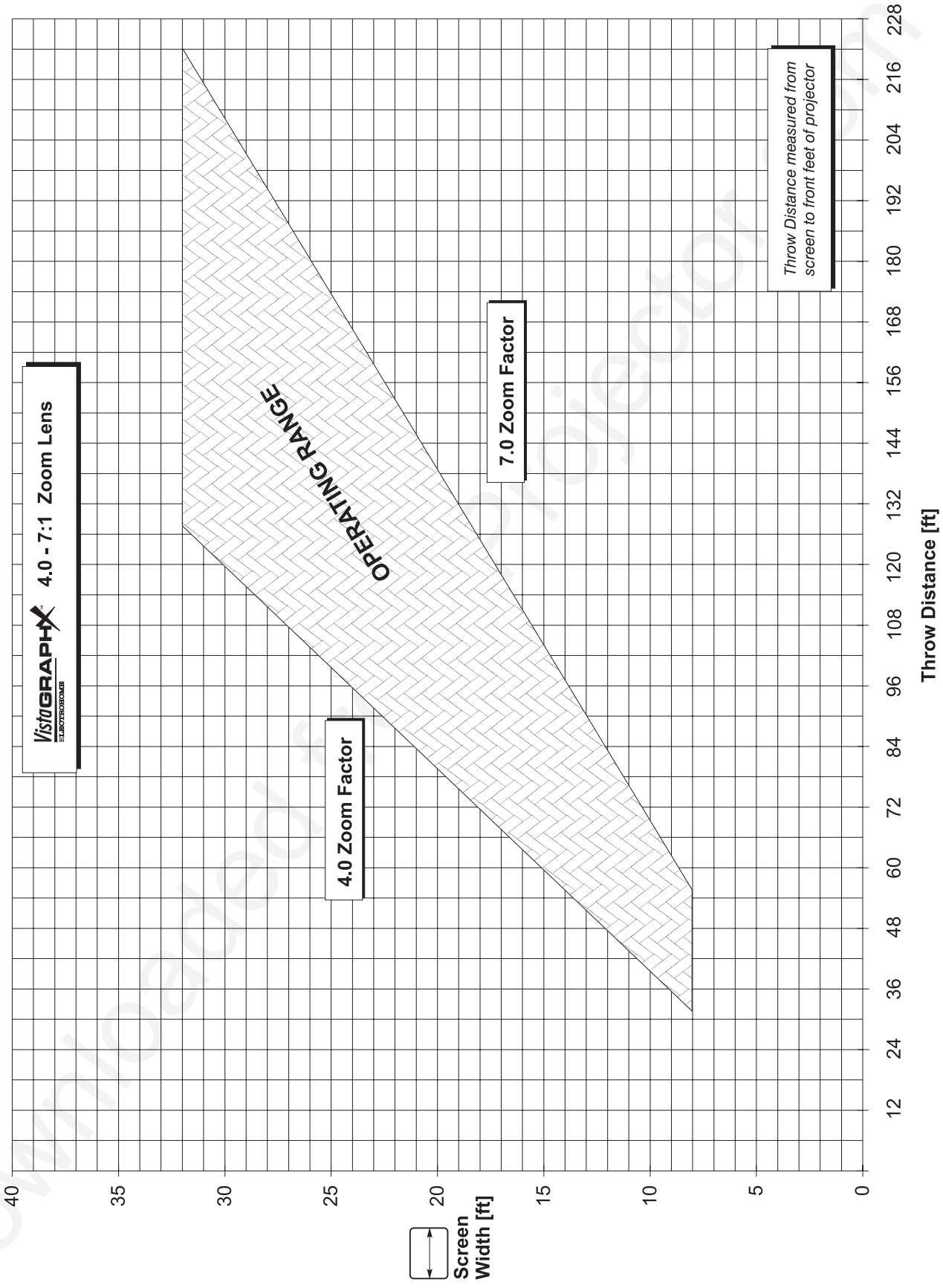

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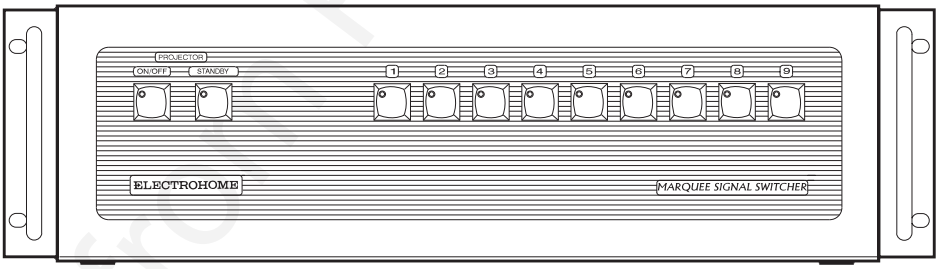
Appendix F

Optional Input Modules

There are many optional input modules and accessories available for the *VistaGRAPHX 5000*. Contact your dealer or Electrohome for a complete and up-to-date listing.

Marquee Signal Switcher 38-801050-xx

➤ The *Marquee* Signal Switcher is a rack-mountable signal selector which can extend the number of selectable inputs by the *VistaGRAPHX 5000*. Connected to the projector RGB interface (INPUT 1), each switcher adds 8 more sources to the system. Other switchers can be connected to the first, with each input selectable through a keypad. Switcher inputs can also be selected by pressing the appropriate front panel push-button.

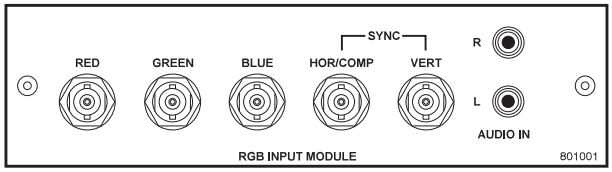


Features

- ◊ can be used with *VistaGRAPHX 5000* and other projectors
- ◊ simple push-button control
- ◊ easy to see, illuminated indicators
- ◊ 9 expansion slots for interface modules
- ◊ RS-232 serial interface
- ◊ input for a wired remote keypad
- ◊ universal power input
- ◊ up to 9 switchers can be ganged together for use with the *VistaGRAPHX 5000*

RGB500 Input Module 38-801001-xx

➤ The RGB Input Module may be installed in a *VistaGRAPHX 5000* projector, a *Marquee* signal switcher, or a *Marquee* Case/Power Supply. The module receives analog RGB input signals from computers or other RGB source devices.



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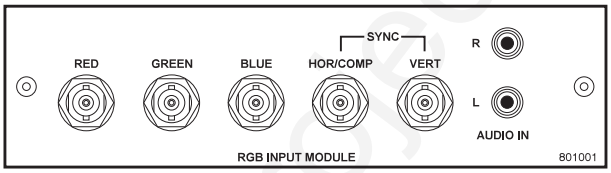
Features

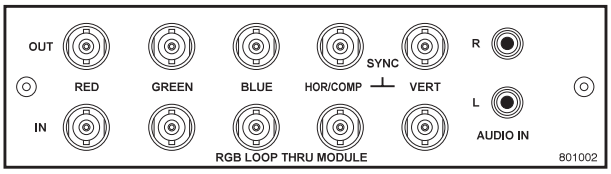
- ◊ accepts 3, 4, or 5 wire RGB video (sync-on-green, composite sync, or separate horizontal and vertical sync), up to 500 MHz bandwidth
- ◊ BNC connectors for RGB signal inputs
- ◊ RCA connectors for left and right channel audio inputs

RGB400BA Input Module 38-801033-xx ➤ The RGB400 Buffered Amplifier Input Module may be installed in a Marquee signal switcher or Marquee Case/Power Supply. Connect three-, four-, or five-wire RGB video signals of up to 400 MHz bandwidth, signals typically produced by high-resolution computer or workstations. The buffering capability of the module enables the incoming signal to be sent to a remote destination. Inputs are 75Ω terminated.



- ◊ accepts 3, 4, or 5 wire RGB video (sync-on-green, composite sync, or separate horizontal and vertical sync)
- ◊ BNC connectors for RGB signal inputs
- ◊ Buffered signals to a remote destination
- ◊ RCA connectors for left and right channel audio inputs

RGB400 Active Loop-Thru Input Module 38-801002-xx ➤ The RGB400 ALT Input Module may be installed in a *VistaGRAPHX 5000* projector, *Marquee* signal switcher, or *Marquee* Case/Power Supply. The module receives analog RGB input signals from computers or other RGB source devices. Video inputs are 75Ω terminated. Video outputs are provided for buffered loop-through to another display device.



Features

- ◊ accepts 3, 4, or 5 wire RGB video (sync-on-green, composite sync, or separate horizontal and vertical sync)
- ◊ BNC connectors for RGB signal inputs
- ◊ RCA connectors for left and right channel audio inputs
- ◊ buffered loop-through video outputs

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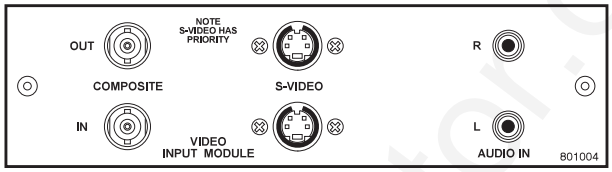
Composite / S-Video Input Module 38-801004-xx

➤ The Composite/S-Video Input Module may be installed in a *VistaGRAPHX 5000* projector, a *Marquee* signal switcher or a *Marquee* Case/Power Supply. The module receives composite video or S-video input signals from tape or disk players. Video inputs are 75Ω terminated. Video outputs are provided for buffered loop-through to another display device.



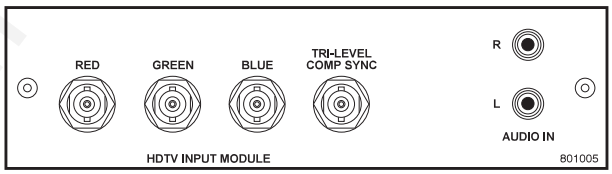
Features

- ◊ BNC connectors for composite RGB signals
- ◊ 4-pin mini-DIN connectors for S-Video signals
- ◊ RCA connectors for left and right channel audio inputs
- ◊ buffered loop-through video outputs

*NOTE: This interface is not a decoder. Proper display of NTSC, PAL, OR SECAM signals requires that the **VistaGRAPHX 5000** includes a multi-standard decoder.*

HDTV Input Module 38-801005-xx

➤ The HDTV Input Module may be installed in a *VistaGRAPHX 5000* projector, *Marquee* signal switcher, or *Marquee* Case/Power Supply. The module receives HDTV analog RGB input signals with tri-level sync.



Features

- ◊ accepts RGB video with tri-level composite sync
- ◊ BNC connectors for RGB signal inputs
- ◊ RCA connectors for left and right channel audio inputs

PC Analog Input Module 38-801006-xx

➤ The PC Analog Input Module may be installed in a *VistaGRAPHX 5000* projector, *Marquee* signal switcher, or *Marquee* Case/Power Supply. The module receives analog RGB input signals from IBM PC compatibles or Macintosh computers. Video inputs are 75Ω terminated. Video outputs are provided for buffered loop-through to another display device.

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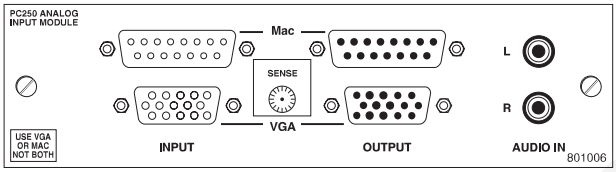


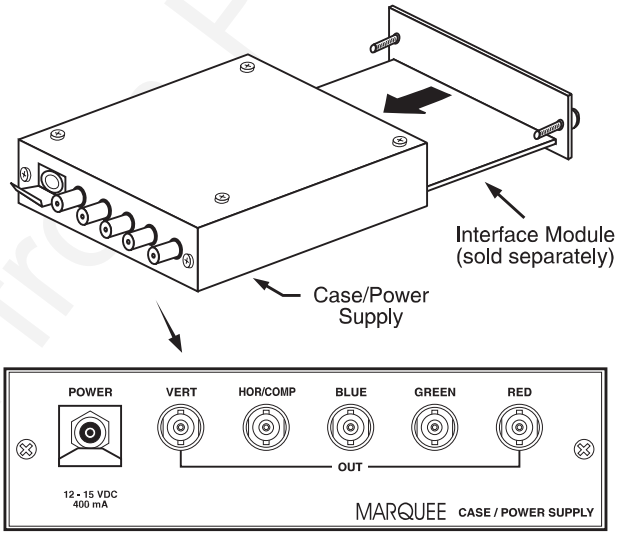
Features

- ◊ accepts VGA or MAC RGB video
- ◊ 15 pin D connectors for video
- ◊ RCA connectors for left and right channel audio inputs
- ◊ active loop-through video outputs

*NOTE: **1)** This interface does not accept VGA and MAC signals simultaneously.*
***2)** Trademarks are the rights of their respective owners.*

Marquee Case/Power Supply 38-801023-xx 38-801026-xx

➤ The *Marquee* Case/Power Supply enables you to use specific input modules as stand-alone interfaces. Two modules are available: one for use with 120 volt line voltage (38-801023-XX), and the other for use with 220 volt line voltage (38-801026-XX). Both models include a 15 Vdc, 500 mA AC adapter.



Features

- ◊ easy installation — no tools required
- ◊ can be used with the following *VistaGRAPHX 5000* input modules: RGB Input, RGB Loop-Thru, Composite/S-Video, HDTV, and PC Analog
- ◊ retaining clip to secure AC adapter
- ◊ non-slip feet
- ◊ supplied with 110 or 220 volt AC adapter

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