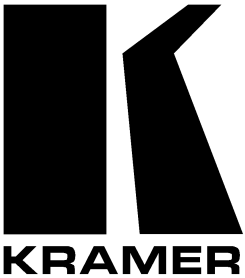
Kramer Electronics, Ltd.



PRELIMINARY USER MANUAL

Models:

VP-719xl, ***Presentation Switcher / Scaler***

VP-720xl, ***Presentation Switcher / Scaler***

VP-723xl, ***Presentation Switcher / Scaler***

VP-724xl, ***Presentation Switcher / Scaler***

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1 Introduction

Welcome to Kramer Electronics (since 1981): a world of unique, creative and affordable solutions to the infinite range of problems that confront the video, audio and presentation professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 350-plus different models now appear in 8 Groups[1], which are clearly defined by function. Congratulations on purchasing your Kramer **VP-719xl/ VP-720xl/VP-723xl/VP-724xl** *Presentation Switcher / Scaler*, which is ideal for the following typical applications:

- Projection systems in conference rooms, boardrooms, auditoriums, hotels and churches
- Production studios, rental and staging
- Any application where high quality conversion and switching of multiple and different video signals to graphical data signals is required for projection purposes

The package includes the following items:

- **VP-719xl/VP-720xl/VP-723xl/VP-724xl** *Presentation Switcher / Scaler*
- Power cord[2]
- Infra-red remote control transmitter
- Null-modem adapter
- This user manual[3]

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high performance high resolution cables[4]

1 GROUP 1: Distribution Amplifiers; GROUP 2: Video and Audio Switchers, Matrix Switchers and Controllers; GROUP 3: Video, Audio, VGA/XGA Processors; GROUP 4: Interfaces and Sync Processors; GROUP 5: Twisted Pair Interfaces; GROUP 6: Accessories and Rack Adapters; GROUP 7: Scan Converters and Scalers; and GROUP 8: Cables and Connectors

2 We recommend that you use only the power cord that is supplied with this machine

3 Download up-to-date Kramer user manuals from our Web site at http://www.kramerelectronics.com

4 The complete list of Kramer cables is on our Web site at http://www.kramerelectronics.com

3 Overview

The **VP-719xl/VP-720xl/VP-723xl/VP-724xl** is a *Presentation Switcher / Scaler* designed for a wide variety of presentation and multimedia applications. It is a true multi-standard video to RGBHV (pixel) scaler and a seamless presentation switcher. It converts video, s-Video, component video, VGA-through-UXGA and DVI signals to a range of user-selectable VESA and HDTV pixel rates, as well as some other special resolutions. Using the Presentation Switcher / Scaler, you can select any one of the inputs and scale that input to the output at the set resolution.

The Presentation Switchers / Scalers support the following user-selectable pixel rates:

- VGA (640x480)
- SVGA (800x600)
- XGA (1024x768)
- SXGA (1280x1024)
- UXGA (1600x1200)
- 852x1024i
- 1024x1024i
- 1366x768
- 1365x1024
- 1280x720
- 720x483
- 852x480
- 480p[1]
- 720p[1]
- 1080i[1]
- 1400x1050
- 1280x768*[2]
- User Define[3]

Each Presentation Switcher / Scaler:

- Digitally reprocesses the signal to correct mastering errors, and regenerates the video at a higher line and pixel rate format, providing native-resolution video for LCD, DLP and Plasma displays
- Up- and down-scales any graphics resolution to any other resolution[4]
- Incorporates a unique graphics-scaling engine with image enhancement algorithms, which are built into the firmware
- Is specifically designed to improve video quality by reducing chroma noise
- Scales and zooms (to up to 400% of the original size)
- Includes a built-in power amplifier of 10Watts, ample to fill a presentation room. Audio volume can be easily and rapidly controlled via the front panel buttons

1 Available only on the VP-723xl and VP-724xl machines

2 This is not a standard VESA resolution and its parameters vary from manufacturer to manufacturer. Therefore, use this resolution with caution. It is also possible to use the parameters of this resolution in combination with the User Defined resolution. There is also an RS-232 command for this resolution

3 Recommended for advanced users only – non-standard settings may not be recognized by the display device

4 For example, scaling a VGA input to an UXGA output, or an SXGA input to an SVGA output

- Switches the audio channels in audio-follow-video mode
- Includes an OSD (On-Screen Display) – for making adjustments – that can be located anywhere on the screen, and can be doubled in size
  For example, the OSD can be used to deactivate the source prompt, choose the color of the blank screen, and choose from three seamless switching image transition speeds
- Includes seven[1] multi-functional INPUT SELECTOR buttons that can cycle between selecting a source, freezing that source, or deactivating that source (and displaying a blank screen), if programmed to do so[2]
- Includes a BLANK button, a MUTE button; a FREEZE button; a RESET TO VGA button (to hardware-reset the output resolution); and a PANEL LOCK button
- Has two HD15F outputs, that can be used as graphics, or HDTV[3] outputs
- Incorporates full ProcAmp[4] for video correction and enhancement
- Offers high quality de-interlacing 3:2/2:2 pulldown[5]
- Can provide non-linear scaling for 4:3, 16:9 transformation[6]
- Supports firmware upgrade via RS-232
- Includes non-volatile memory that retains the last setting, after switching the power off and then on again
- Includes a built-in Picture-in-Picture (PIP) inserter (not available on the **VP-719xl**)

Control your Presentation Switcher / Scaler:

- From the front panel buttons
- Remotely from the infra-red remote control transmitter
- Remotely via RS-232

Achieving the best performance means:

- Connecting only good quality connection cables, thus avoiding interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Avoiding interference from neighboring electrical appliances and positioning the Presentation Switcher/Scaler away from moisture, excessive sunlight and dust

1 Eight on the VP-724xl

2 See section 7.5.9

3 For VP-723xl and VP-724xl

4 Processing amplification enables adjustment of different video and audio signal parameters

5 Accommodates the frame-rate of a converted movie (24 frames per second) to video frequencies (25 frames per second (PAL); 30 frames per second (NTSC)

6 See section 7.4.1

4 Your Presentation Switcher / Scaler

This section defines each of the Presentation Switcher / Scaler machines:

- Figure 1 and Figure 2 illustrate the **VP-719xl** *Presentation Switcher / Scaler*
- Figure 3 and Figure 4 illustrate the **VP-720xl** *Presentation Switcher / Scaler*
- Figure 5 and Figure 6 illustrate the **VP-723xl** *Presentation Switcher / Scaler*
- Figure 7 and Figure 8 illustrate the **VP-724xl** *Presentation Switcher / Scaler*

Table 1 and Table 2 define the *Presentation Switcher / Scaler* machines[1].

1 Some items, which appear in the table, do not appear in the illustrations since they are not included in that specific machine

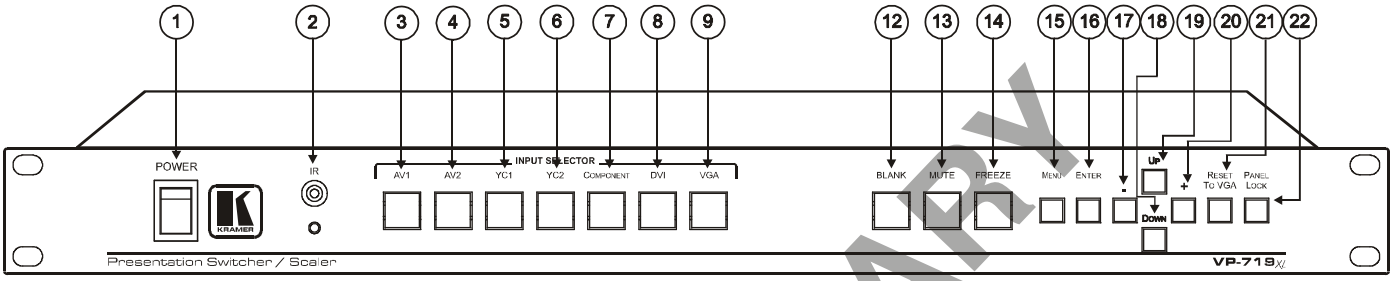

Figure 1: VP-719xl Presentation Switcher / Scaler Front Panel[1]

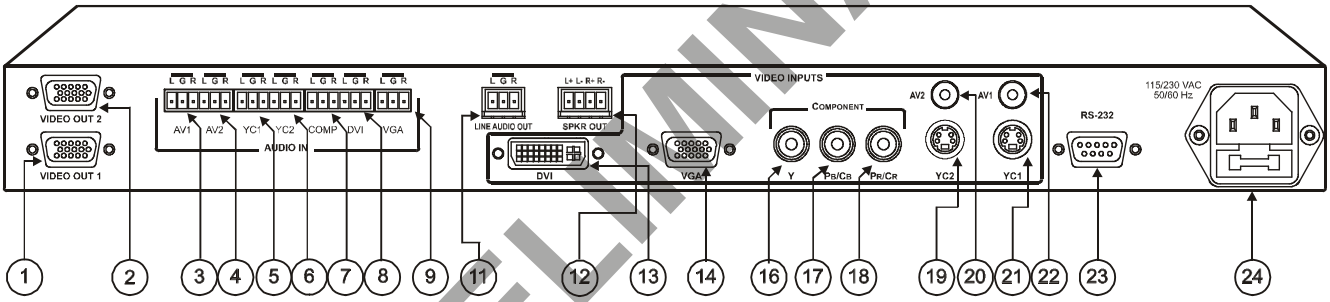

Figure 2: VP-719xl Presentation Switcher / Scaler Rear Panel[2]

1 Items 10 and 11, which appear in Table 1 are not included in this machine

2 Items 10 and 15, which appear in Table 2 are not included in this machine

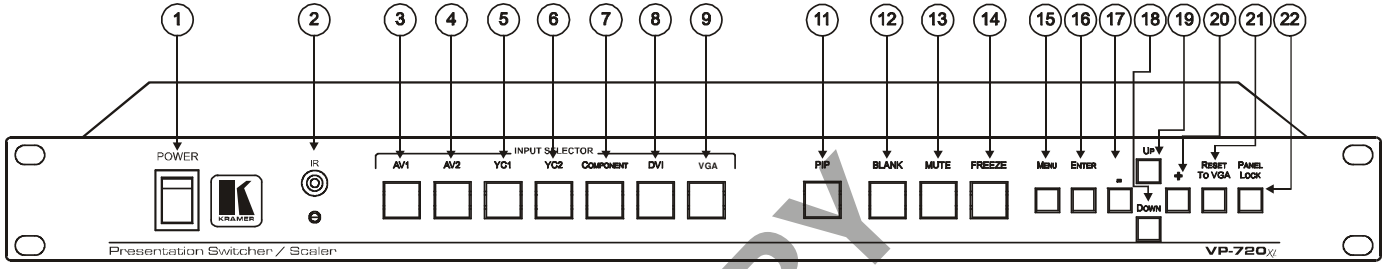

Figure 3: VP-720xl Presentation Switcher / Scaler Front Panel[1]

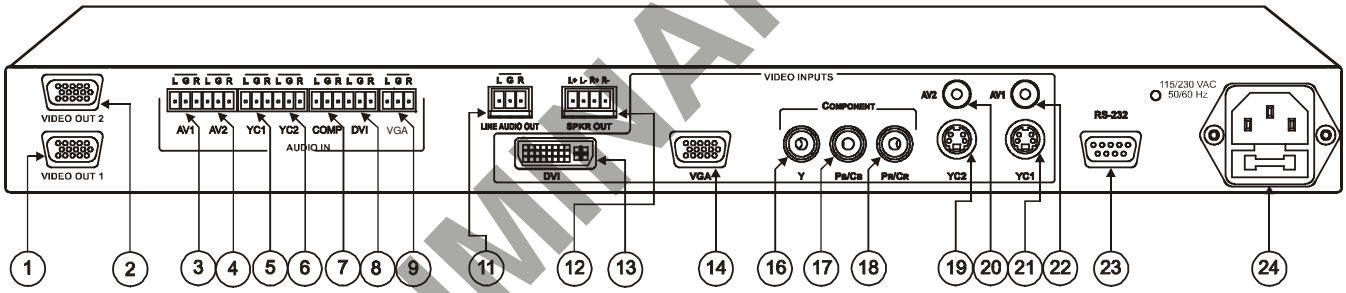

Figure 4: VP-720xl Presentation Switcher / Scaler Rear Panel[2]

1 Item 10, which appears in Table 1 is not included in this machine

2 Items 10 and 15, which appear in Table 2 are not included in this machine

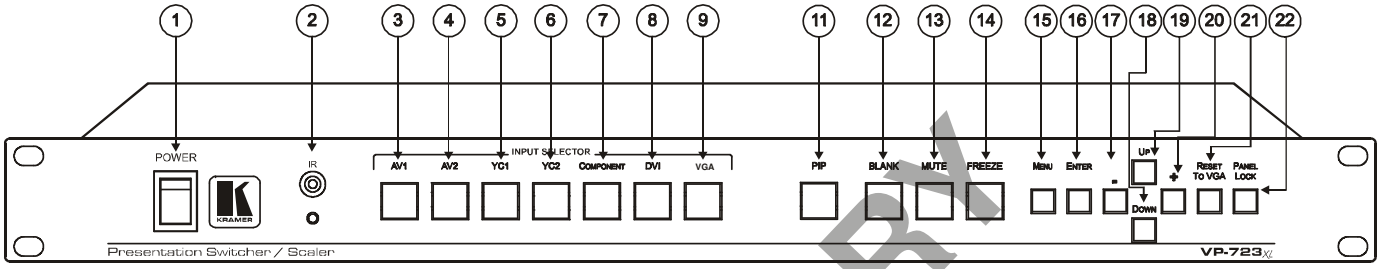

Figure 5: VP-723xl Presentation Switcher / Scaler Front Panel[1]

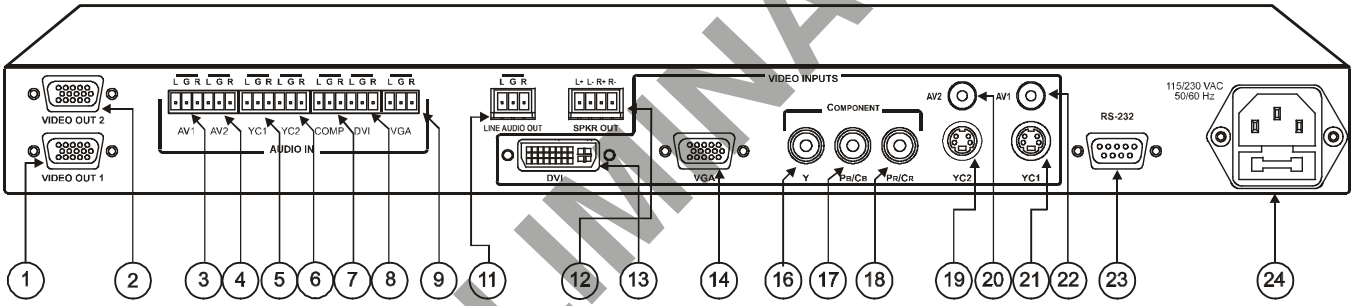

Figure 6: VP-723xl Presentation Switcher / Scaler Rear Panel[2]

1 Item 10, which appears in Table 1 is not included in this machine

2 Items 10 and 15, which appear in Table 2 are not included in this machine

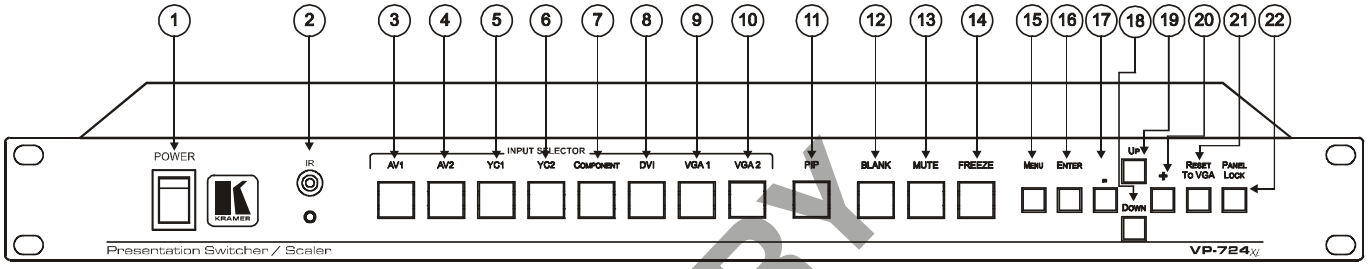

Figure 7: VP-724xl Presentation Switcher / Scaler Front Panel

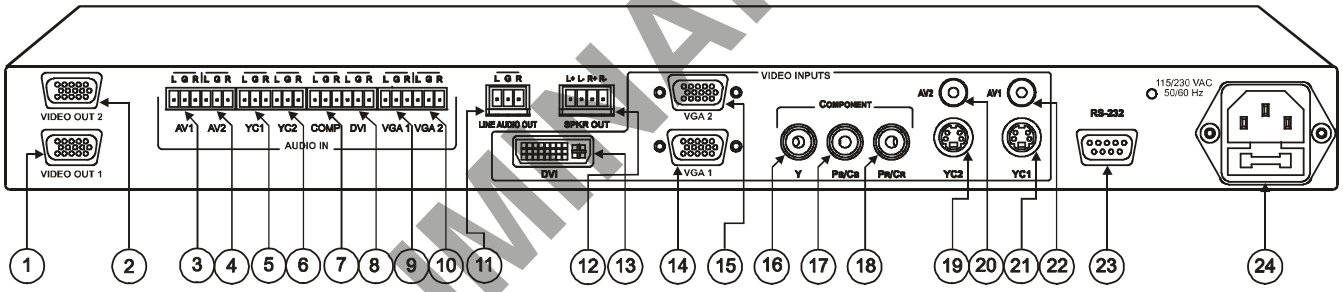

Figure 8: VP-724xl Presentation Switcher / Scaler Rear Panel

Table 1: Front Panel Presentation Switcher / Scaler Features

#	Feature		Function
1	*POWER* Switch		Illuminated switch for turning the machine ON or OFF
2	*IR* Receiver / LED		Red when the unit accepts IR remote commands
3	*INPUT SELECTOR* Buttons[1]	*AV1*	Press to select the composite video/audio source 1
4		*AV2*	Press to select the composite video/audio source 2
5		*YC1*	Press to select the s-Video (Y/C)/audio source 1
6		*YC2*	Press to select the s-Video (Y/C)/audio source 2
7		*COMPONENT*	Press to select the component video/audio source
8		*DVI*	Press to select the DVI/audio source
9		*VGA*[2] *1*	Press to select the VGA/audio source 1
10		*VGA*[2] *2*	Press to select the VGA/audio source 2
11	*PIP* Button[3]		Toggles the picture-in-picture function (see section 6.2)
12	*BLANK* Button		Press to toggle between a blank screen (blue or black screen)[4] and the display
13	*MUTE* Button		Press to toggle between muting (blocking out the sound) and enabling the audio output
14	*FREEZE* Button		Press to freeze/unfreeze the output video image[4]
15	*MENU* Button		Displays the OSD menu screen[5]
16	*ENTER* Button		Moves to the next level in the OSD screen
17	- Button		Decreases the range by one step in the OSD screen[6]
18	*DOWN* Button		Moves down one step (in the same level) in the OSD screen[6]
19	*UP* Button		Moves up one step (in the same level) in the OSD screen[6]
20	+ Button		Increases the range by one step in the OSD screen[6]
21	*RESET TO VGA* Button		Press and hold to reset the output resolution to the default (640x480 @60Hz)
22	*PANEL LOCK* Button		Press and hold to lock/unlock the front panel to prevent unintentional operation

1 When selected, button illuminates. See section 6.1 for details of how to program the INPUT SELECTOR buttons

2 Only the VP-724xl has 2 VGA INPUT SELECTOR buttons. The VP-719xl, VP-720xl and VP-723xl have just 1 VGA button

3 Not available on the VP-719xl

4 Also available via each INPUT SELECTOR button, when programmed accordingly (see section 6.1)

5 Or moves to the previous level in the OSD screen

6 When pressing the button continuously, you can speed up its response. For step-by-step response, press and release the button as many times as needed

Table 2: Rear Panel Presentation Switcher / Scaler Features

#	Feature			Function
1	*VIDEO OUT 1* HD15 Connector			Connects to the video acceptor (for example, a plasma display, projector or monitor) that displays the scaled output In the HDTV mode, the signal goes out via 3 PINS: PIN 1 is P_r, PIN 2 is Y, PIN 3 is P_b
2	*VIDEO OUT 2* HD15 Connector			Connects to the video acceptor (for example, a plasma display, projector or monitor) that displays the scaled output In the HDTV mode, the signal goes out via 3 PINS: PIN 1 is P_r, PIN 2 is Y, PIN 3 P_b
3	*AUDIO IN* Terminal Block Connectors	*AV1*		Connects to the stereo audio input from composite video source 1
4		*AV2*		Connects to the stereo audio input from composite video source 2
5		*YC1*		Connects to the stereo audio input from s-Video source 1
6		*YC2*		Connects to the stereo audio input from s-Video source 2
7		*COMP*		Connects to the stereo audio input from the component video source
8		*DVI*		Connects to the stereo audio input from the DVI graphics source
9		*VGA*[1] *1*		Connects to the stereo audio input from the VGA graphics source 1
10		*VGA*[1] *2*		Connects to the stereo audio input from the VGA graphics source 2
11	*LINE AUDIO OUT* Terminal Block Connector			Connects to the stereo audio acceptor
12	*SPKR OUT* Terminal Block Connector			Connects to the speakers
13	*VIDEO INPUTS*	*DVI* Connector		Connects to the DVI (digital video interface) graphics source
14		*VGA*[1] *1* HD15 Connector		Connects to the VGA (analog interface) graphics source 1
15		*VGA*[1] *2* HD15 Connector		Connects to the VGA (analog interface) graphics source 2
16		*COMPONENT*	*Y* RCA Connector	Connect to the component (Y, Pb/Cb, Pr/Cr) or RGB video source. If RGB colorspace is used, connect as follows: For video frequencies[2], connect: • The Green to the Y connector • The Blue to the Pb/Cb connector • The Red to the Pr/Cr connector For Graphics frequencies[3], connect: • The Red to the Y connector • The Green to the Pb/Cb connector • The Blue to the Pr/Cr connector
17			*Pb/Cb* RCA Connector	
18			*Pr/Cr* RCA Connector	
19		*YC2* 4p Connector		Connects to the s-Video source 2
20		*AV2* RCA Connector		Connects to the composite video source 2
21		*YC1* 4p Connector		Connects to the s-Video source 1
22		*AV1* RCA Connector		Connects to the composite video source 1
23	*RS-232* DB 9 Connector			Connects to PC or Serial Controller
24	Power Connector with *Fuse*			AC connector enabling power supply to the unit

1 Only the VP-724xl has 2 VGA connectors. The VP-719xl, VP-720xl and VP-723xl have just 1 VGA connector

2 50Hz or 60Hz interlaced video

3 Including HD (480p, 576p, 720p and 1080i)

5 Connecting your Presentation Switcher / Scaler

To connect the **VP-724xl** for example[1] (see Figure 9), do the following[2]:

1. Connect one or more of the following video sources:
   - 2 composite video sources: "AV Source 1" and "AV Source 2", to the RCA connectors AV1 and AV2, respectively
   - 2 s-Video sources: "s-Video Source 1" and "s-Video Source 2", to the 4p connectors, YC1 and YC2, respectively
   - A component video[3] source, for example, a "Betacam VCR", to the 3 RCA connectors, Y, P_b/C_b, and P_r/C_r[4]
   - 2 VGA graphics sources[5]: "VGA Graphics Source 1" and "VGA Graphics Source 2", to the HD15 connectors VGA 1 and VGA 2, respectively
   - A DVI graphics source, to the DVI connector
2. Connect the stereo audio sources[6] (not illustrated in Figure 9):
   - The audio of "CV Source 1" and "CV Source 2" to the AUDIO IN AV1 and AV2 terminal block connectors, respectively
   - The audio of "s-Video 1" and "s-Video 2" to the AUDIO IN YC1 and YC2 terminal block connectors, respectively
   - The audio of the component video source, the "Betacam VCR", to the AUDIO IN COMP terminal block connector
   - The audio of the "DVI Graphics Source " to the AUDIO IN DVI terminal block connector
   - The audio of "VGA Graphics Source 1" and "VGA Graphics Source 2" to the AUDIO IN VGA1 and VGA 2 terminal block connectors, respectively
3. Connect the "VIDEO OUT 1" and "VIDEO OUT 2" HD15F connectors[7] to the video acceptors, for example, a Plasma monitor and a VGA monitor.

1 From this section on, all the information is relevant to the VP-719xl, VP-720xl, VP-723xl and VP-724xl machines, unless noted otherwise

2 Switch OFF the power on each device before connecting it to your VP-724xl. After connecting your VP-724xl, switch on its power and then switch on the power on each device

3 Sometimes called YUV, or Y, B-Y, R-Y, or Y, Pb, Pr

4 Alternatively, you can connect an RGB signal (not shown in Figure 9), as follows: Red to the Y connector, Green to the Pb/Cb connector, and Blue to the Pr/Cr connector

5 Available only on the VP-724xl, other models in this series have only one VGA graphic source

6 As required. Not all devices need to be connected

7 In the HDTV mode, the signal goes out via 3 PINS: PIN 1 is Red or Pr, PIN 2 is Green or Y, PIN 3 is Blue or Pb

4. Connect the LINE AUDIO OUT terminal block connector to one of the audio acceptors, for example, speakers (not illustrated in Figure 9)
5. Connect the SPKR OUT terminal block to a pair of loud speakers.
6. The power cord[1] (the power connector is not illustrated in Figure 9).
7. A PC (optional), as section 5.1 describes.

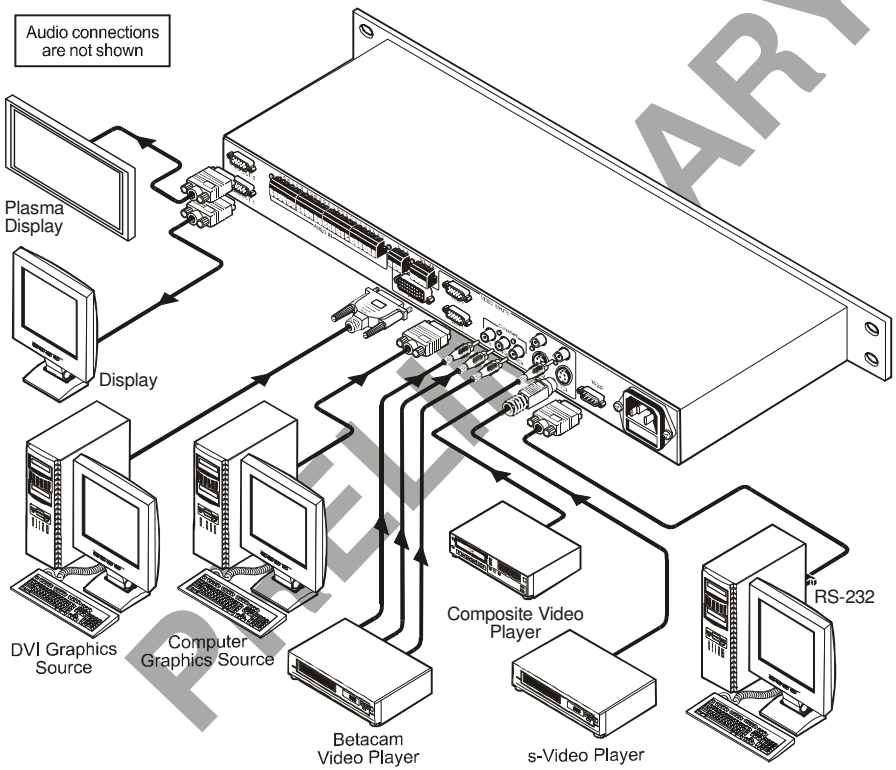

Figure 9: Connecting the VP-724xl Rear Panel

1 We recommend that you use only the power cord that is supplied with this machine

5.1 Connecting a PC

You can connect a PC (or other controller) to the **VP-724xl** via the RS-232 port for remote control, and for upgrading the firmware.

To connect a PC to a **VP-724xl** unit, using the Null-modem adapter provided with the machine (recommended):

- Connect the RS-232 DB9 rear panel port on the **VP-724xl** unit to the Null-modem adapter and connect the Null-modem adapter with a 9-wire flat cable to the RS-232 DB9 port on your PC

To connect a PC to a **VP-724xl** unit, without using a Null-modem adapter:

- Connect the RS-232 DB9 port on your PC to the RS-232 DB9 rear panel port on the **VP-724xl** unit, forming a cross-connection[1], as Figure 10 illustrates

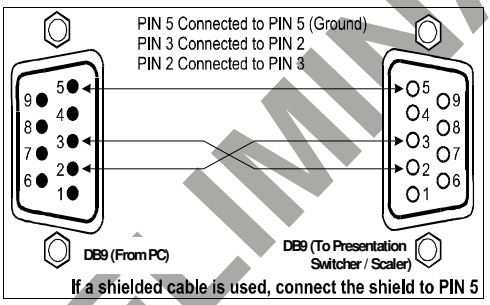

Figure 10: Connecting the PC

1 Also known as a Null-modem connection

6 Presentation Switcher / Scaler Buttons

The **VP-724xl** includes the following front panel buttons:

- 8 INPUT SELECTOR buttons[1], see section 6.1
- A PIP button[2], see section 6.2
- BLANK, MUTE and FREEZE buttons
- 6 OSD buttons
- A RESET TO VGA button
- A PANEL LOCK button, see section 6.3

6.1 Switching an Input

Each INPUT SELECTOR button can be used to select the source. It can also be programmed to freeze the image or display a blank screen when pressed again. Refer to section 7.5.9 for details.

You can switch seamlessly[3] between each input[4] that is connected to a source, by pressing the appropriate INPUT SELECTOR button. The OSD status appears superimposed over the top right corner of the screen for a few seconds, as Figure 11 illustrates:

Figure 11: OSD Input Status

1 The VP-719xl, VP-720xl and VP-723xl have 7

2 Not available on the VP-719xl

3 For glitchless transitions between inputs

4 To set the image transition speed (fast, safe or moderate), see section 7.5.5

6.2 The PIP Button Feature

The Picture-in-Picture inserter (PIP) is used to present video and graphic sources simultaneously. You can display:

- An inserted video source[1] PIP over a graphic source[2] display
- An inserted graphic source[2] PIP over a video source[1] display

6.2.1 Selecting the PIP Source

To use the PIP feature, set the PIP source via the OSD menu by using either the OSD front-panel buttons or the remote-transmitter keys.

To set the PIP source, do the following:

1. Select an input source[3].
2. Press the MENU button to enter the OSD menu.
3. Press the DOWN button to move to the Utility icon, and then press ENTER.
4. Scroll down to the PIP Setting icon and press ENTER.
5. Use the UP or DOWN buttons to select PIP Source, press ENTER and select a PIP source from the drop-down list box (see Table 3).
   The PIP source prompt appears on the display (see Figure 12).
6. To exit the OSD menu, press the MENU button several times, until the OSD disappears.

Figure 12: PIP Source

1 That is, composite, s-Video or component

2 That is, DVI or VGA

3 Either a graphic source (for a video PIP source) or a video source (for a graphic PIP source)

You can repeat the above procedure to change the current PIP source (compliant to Table 3)

When selecting one PIP source, your Presentation Switcher / Scaler automatically recognizes and displays the selected graphic PIP source on all the video displays[1] and the selected video source on all the graphic[1] displays, compliant to Table 3.

Table 3: PIP Source Appearance Availability[2]

The selected PIP source:	AV1, AV2, YC1, YC2, or component (video)	Component (graphics), DVI, VGA1, or VGA2
Appears on:	Component (graphics), DVI, VGA1, and VGA2	AV1, AV2, YC1, YC2, and component (video)
Does not appear on	AV1, AV2, YC1, YC2, and component (video)	Component (graphics), DVI, VGA1, and VGA2

6.2.2 Activating the PIP Feature

After setting the PIP source you can activate the PIP by:

- Pressing the PIP button
- Pressing the PIP key on the infra-red remote control transmitter (see section 6.4, Figure 16)
- Switching on the PIP functionality via the OSD Menu (see section 7.5.4, Figure 34)

6.2.3 The PIP Source (Orange) Frame

Whether the PIP source is enclosed by an orange frame or not, determines the functionality of the operation buttons (on the machine and remote control transmitter).

When pressing the PIP button while the PIP Frame is ON (see section 7.5.4):

- The PIP appears enclosed in an orange frame
- After a few seconds[3] the orange frame disappears
- When pressing the PIP button once again, the orange frame reappears

When pressing the PIP button while the PIP Frame is OFF (see section 7.5.4), the PIP source toggles between PIP and no PIP, with no orange frame.

1 Even if the input signal is not connected. In this case the PIP appears over a blank screen

2 Since the component input is compatible with both video and graphic sources, the type of component source (video or graphic) determines where it is positioned in the table

3 By default, 20 seconds. But you can reset the timeout (from 3 to 60 seconds), see section 7.5.6

6.2.4 Toggling between the PIP and the Screen Source (SWAP)

To toggle back and forth between the PIP Source and the main display, do the following:

- Press the SWAP key on the infra-red remote control transmitter (see Figure 16)
  The OSD SWAP status appears superimposed over the top right corner of the screen for a few seconds[1] only when the Source Prompt is ON, as Figure 13 illustrates.

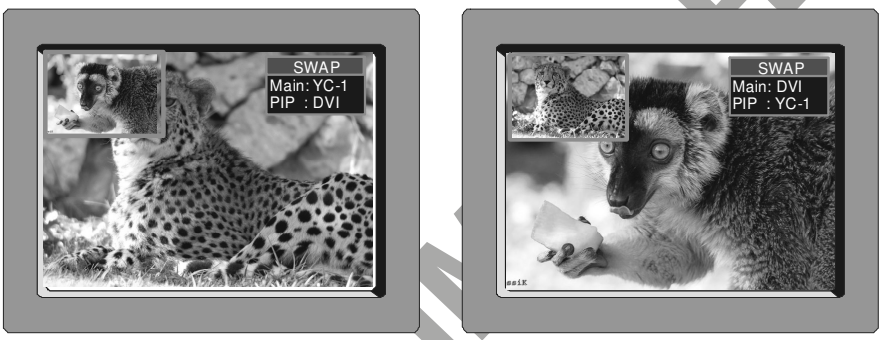

Figure 13: OSD SWAP Status

6.2.5 PIP Characteristics

You can determine the following PIP characteristics:

- The PIP Size (1/4, 1/9, 1/16, 1/25, Split or User Define)
- The Horizontal and Vertical position, letting you place the PIP anywhere on the screen

1 By default, 20 seconds. But you can reset the timeout (from 3 to 60 seconds), see section 7.5.6

6.2.5.1 Resizing the PIP

To resize the PIP (1/4, 1/9, 1/16, 1/25, User Define or Split – see the example in Figure 14):

- When the PIP is enclosed by an orange frame, use the UP and/or DOWN navigation control keys on the infra-red remote control transmitter (see Figure 16) or the UP and/or DOWN front panel OSD buttons; otherwise
- Use the OSD Menu buttons

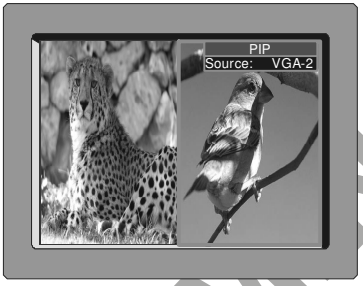

Figure 14: PIP Size – Split Screen

6.2.5.2 Moving the Position of the PIP

To move the position of the PIP, as illustrated in Figure 15, use the OSD menu (Utility>>PIP Setting>>H-Position; V-Position).

When the Source Prompt is ON, and the PIP Frame is ON, you can instantly position the PIP using the preset position control keys[1].

When there is no orange frame, use the +, -, Up and DOWN buttons[2].

Figure 15: Moving the Position of the PIP

1 On the infra-red remote control transmitter to instantly move the position of the PIP window to up to nine preset fixed locations (see Figure 16). For example, to move to the lower right corner of the image, press the ⑨ button

2 On the machine, or the navigation control keys on the infra-red remote control transmitter (see Figure 16)

6.3 Locking and Unlocking the Front Panel

You can lock the front panel[1] to safeguard the settings on the **VP-724xl**.

To lock the front panel:

- Press the PANEL LOCK button or the MENU key on the infra-red remote control transmitter (see Figure 16) for a few seconds, until the "Key Lock On" OSD status appears superimposed over the top right corner of the screen for a few seconds[2], and all button LEDs turn off

Pressing a button when the panel is locked, displays the "Key Lock On" message superimposed over the top right corner of the screen and the PANEL LOCK button blinks for a few seconds.

To unlock the front panel (releasing the protection mechanism):

- Press and hold the PANEL LOCK button or the MENU key on the infra-red remote control transmitter (see Figure 16) for a few seconds, until the "Key Lock Off" OSD status appears superimposed over the top right corner of the screen for a few seconds[2]

6.4 The Infra-Red Remote Control Transmitter

You can control the Presentation Switcher / Scaler remotely, from the infra-red remote control transmitter, which:

- Is a hand held instrument with a convenient keypad that receives its power from 2 AAA size 1.5V DC batteries
- Has a range of up to 15 meters
- Delivers instantaneous results

Figure 16 and Table 4 define[3] the infra-red Remote Control Transmitter:

1 However, operation via RS-232 serial commands (PC or remote controller) is still available

2 By default, 20 seconds. But you can reset the timeout (from 3 to 60 seconds), see section 7.5.6

3 The illustration in Figure 16 shows an enlarged view of 3 separate parts of the infra-red remote control transmitter

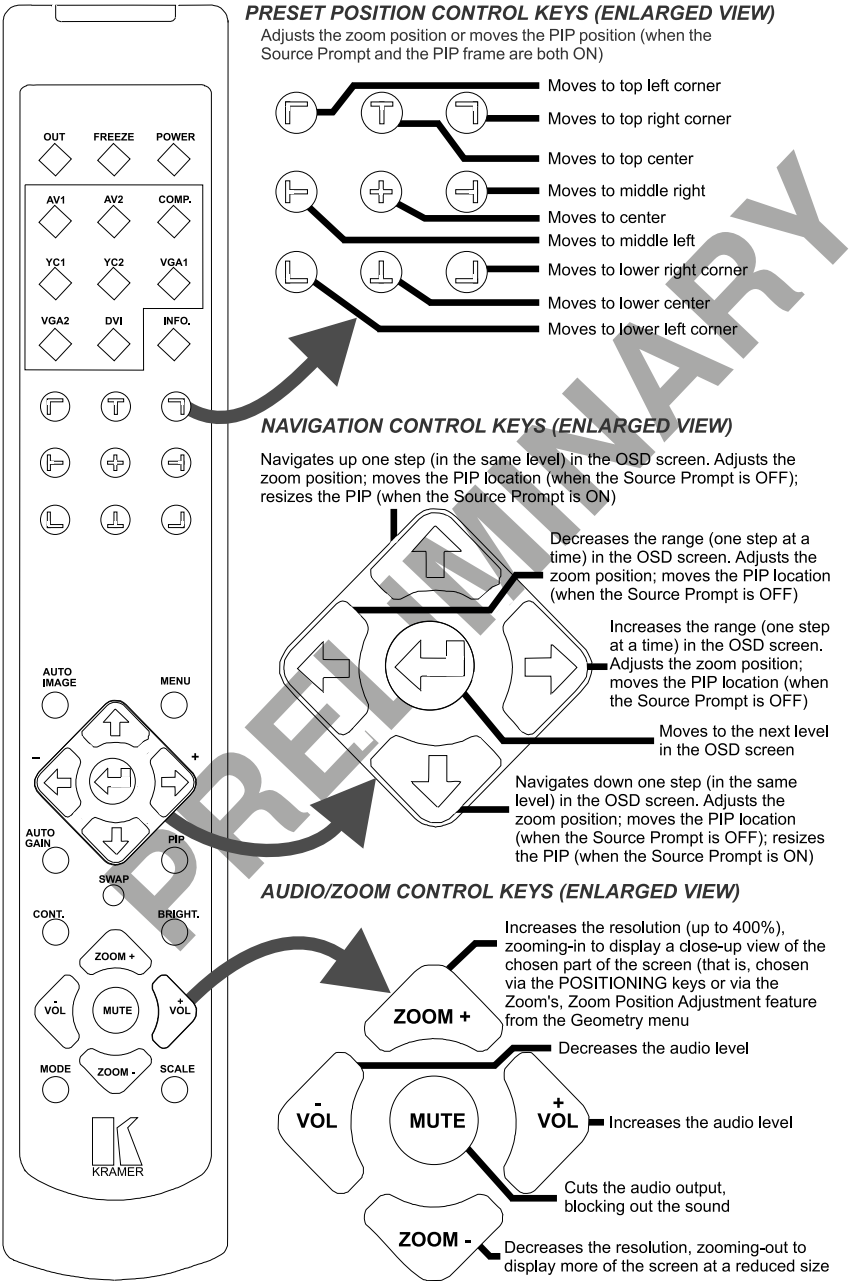

Figure 16: Infra-Red Remote Control Transmitter

Table 4: Infra-Red Remote Control Transmitter Functions

Keys	Function
OUT	Selects the output resolution
FREEZE	Pauses the output video
POWER	Cycles power
INPUT SELECTOR[1]	8 separate keys for selecting each of the following sources: AV1, AV2, COMP. (Component) YC1, YC2, VGA1, VGA2 and DVI
INFO.	Defines the main source, PIP source, whether mute is activated, output mode, as well as the firmware version number
PRESET POSITION CONTROL[2]	Adjusts the zoom[3] position[4] or moves the PIP position when the Source Prompt is ON
AUTO IMAGE	Assesses the image and improves the quality accordingly, by automatically adjusting the phase, frequency and position
MENU	Displays the OSD Menu screen[5] and locks/unlocks the front panel[6]
NAVIGATION CONTROL[7]	Allows maneuvering within an OSD screen (all keys); adjusts the zoom position (4 keys); moves the PIP location when the Source Prompt is OFF (4 keys); resizes the PIP when the Source Prompt is ON (2 keys)
AUTO GAIN	Automatically adjusts the brightness and contrast
SWAP[8]	Toggles between the PIP content and the screen source content
PIP[9]	Selects the picture-in-picture function and illuminates the PIP button[10]
CONT.	Displays the contrast status[11]
BRIGHT.	Displays the brightness status[11]
AUDIO/ZOOM CONTROL[7]	Allows volume and zoom control
MODE	Toggles between each of the following modes: Normal, Presentation, Cinema, Nature, User 1 and User 2
SCALE	Toggles between each of the following Aspect Ratios: Normal, Wide Screen, Pan & Scan, 4:3 Output, and 16:9 Output[12]

1 Press to select the source. Can be programmed (see section 7.5.9)

2 Consists of a set of 9 separate keys. See the illustration in Figure 16 which shows an enlarged view of this part of the infra-red remote control transmitter

3 A small rectangle inside a transparent pop-up OSD Enlarge status box appears at the top right corner of the screen showing the position of the zoom within a picture (see Figure 25)

4 For example, when enlarging the display, press this button: ⏎ to go to the lower right corner of the display area

5 As Figure 17 illustrates

6 See section 6.3

7 Consists of a set of 5 separate keys. See the illustration in Figure 16 which shows an enlarged view of this part of the infra-red remote control transmitter

8 See section 6.2.4

9 Not available on the VP-719xl

10 See section 6.2

11 Adjust using the +/- keys

12 See section 7.4.1

7 Configuring the VP-724xl via the OSD MENU Screens

The OSD superimposes a menu on the screen from which you can configure and control each input signal on your **VP-724xl**, using the MENU, ENTER, -, +, UP and DOWN OSD buttons on the front panel and the remote transmitter.

To use the OSD menus:

1. Select the desired input signal.
2. Use the menu buttons as follows:
   - Press the MENU front panel OSD button or the MENU key on the infra-red remote control transmitter (see Figure 16) to display the MENU screen (see Figure 17), which displays six interactive icons[1] (defined in Figure 18)
   - Press the MENU front panel OSD button or the MENU key on the infra-red remote control transmitter, to move to the previous level in the OSD screen (Esc)
   - Press the UP or DOWN buttons to select menu icons and then press ENTER
   - Use + and – buttons to increase and decrease the (numerical) rate respectively[2]

Figure 17: MENU Screen

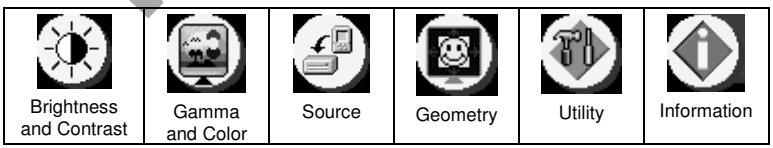

Figure 18: Menu Screen Icons

1 Each icon represents a Level 1 function. In addition to Level 1, the OSD structure includes Level 2 (a subset of level 1), Level 3 (a subset of level 2), Level 4 (a subset of level 3) and a numerical range

2 By pressing the +, -, UP and DOWN buttons continuously, you can speed up their response. For example, to roughly set the brightness to a higher level, open "Brightness and Contrast">Brightness, and press and hold the + button. For step-by-step response, press and release these buttons as many times as needed

7.1 Controlling the Brightness and Contrast

Figure 19 and Table 5 define the Brightness and Contrast screen.

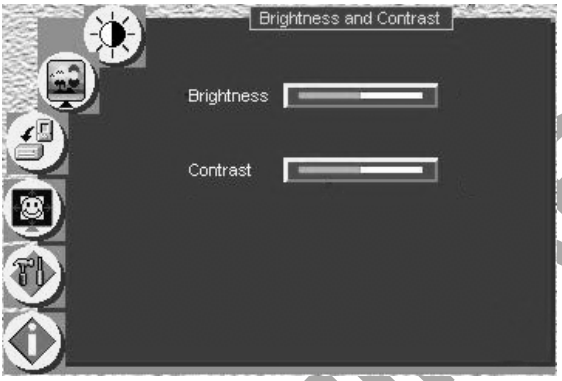

Figure 19: Brightness and Contrast Screen

Table 5: Brightness and Contrast Screen Functions

Setting	Function
Brightness	Press + and – buttons to increase or decrease the brightness and contrast
Contrast	

7.2 Controlling the Gamma and Color

Figure 20 and Table 6 define the Gamma and Color Screen.

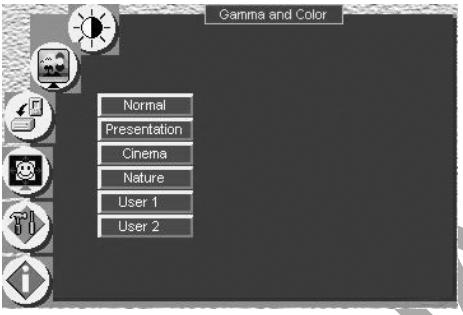

Figure 20: Gamma and Color Screen

Table 6: Gamma and Color Screen Functions

Button	Function
Normal	Average Setting
Presentation	Higher black level
Cinema	Higher white balance
Nature	Higher green level
User 1	Set to customize the Gamma (from –10 to 10), Color Temperature (red green and blue), Color Manager (red, green, blue and yellow). Save (press MENU) User 1 and User 2 to recall for later use
User 2	

7.3 Selecting the Source

Figure 21 illustrates the Source screen, displaying the active source[1] (main screen). Scroll up and down to change the source (same as selecting an INPUT with the remote transmitter or via the INPUT SELECTOR buttons).

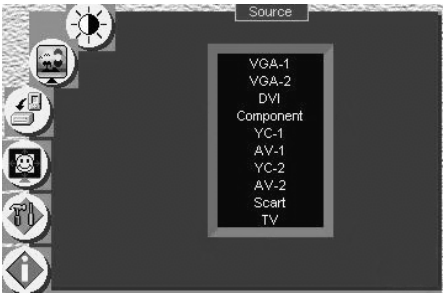

Figure 21: Source Selection Screen

1 Only VP-724xl has 2 VGA inputs; VP-719xl, VP-720xl and VP723xl have 1 VGA input

7.4 Controlling the Scale Geometry

Figure 22 illustrates the main Geometry Screen, from which you can scale and zoom.

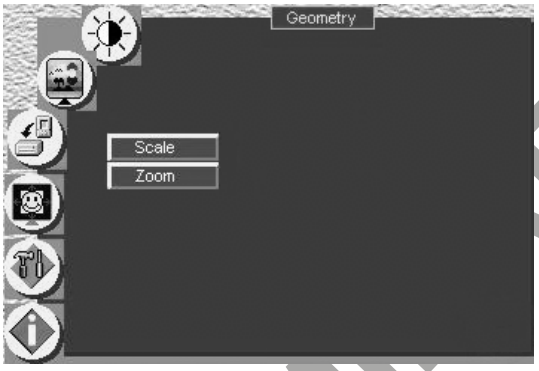

Figure 22: Geometry (Scale and Zoom) Screen

7.4.1 Setting the Scale Features

Figure 23 and Table 7 define the Scale feature on the main Geometry screen.

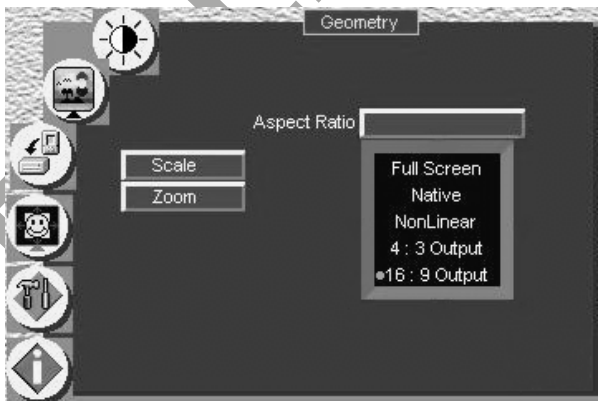

Figure 23: Geometry (Scale: Aspect Ratio) Screen

Table 7: Geometry Scale Functions

Button	Function
Aspect Ratio	Set the aspect ratio according to your specific requirements—the native resolution—that is, depending on the specifications of the Plasma screen or projector: When using a VGA, DVI and/or component video[1] source, you can choose an aspect ratio from the following: Full Screen, Native, 4:3 Output[2], and 16:9 Output[3]. When using a composite video source and/or an s-Video source and/or component video[1] source, you can choose an aspect ratio from the following: Normal, Wide Screen, Pan[4] & Scan, 4:3 Output[2], and 16:9 Output[3]

7.4.2 Adjusting the Zoom Ratio and Position

Figure 24 and Table 8 define the Geometry (Zoom) Screen.

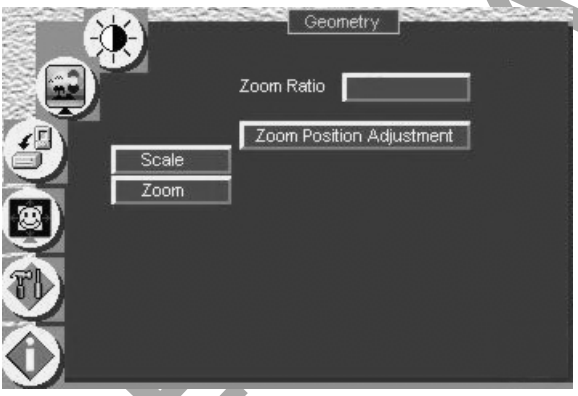

Figure 24: Geometry (Zoom) Screen

Table 8: Geometry Zoom Functions

Button	Function
Zoom Ratio	Set between 100% – 400%
Zoom Position Adjustment	Press right, left, up and down arrows to set the Zoom position

The zoom ratio and the zoom position are illustrated by a small rectangle inside a transparent pop-up OSD Enlarge status box that appears at the top right corner of the screen, as the example in Figure 25 illustrates:

1 Depending on the resolution of the component source

2 In this standard, the ratio between the length and height is 4:3

3 In this standard (a Cinema mode standard used for movies and DVDs), the ratio between the length and height is 16:9 (or sometimes 1:2.35)

4 Panning the picture refers to resizing and cropping it

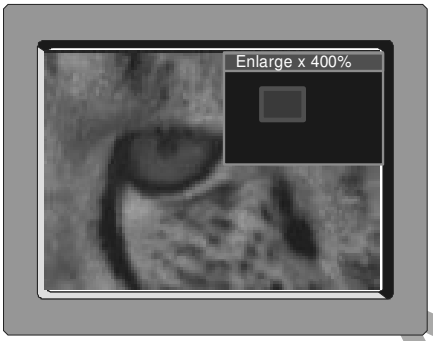

Figure 25: OSD Enlarge Status

When you change the zoom ratio or zoom position, the screen image is adjusted accordingly, and the change is reflected in the pop-up OSD Enlarge status box.

7.4.2.1 Adjusting the Zoom Ratio

You can adjust the zoom ratio to up to 400% via one or both of these methods:

- Using the Zoom + and/or the Zoom - control keys[1] on the infra-red remote control transmitter (see Figure 16). The pop-up OSD Enlarge status box continuously displays the zoom ratio and position, as Figure 25 illustrates
- Using the OSD Menu buttons, as Figure 26 illustrates

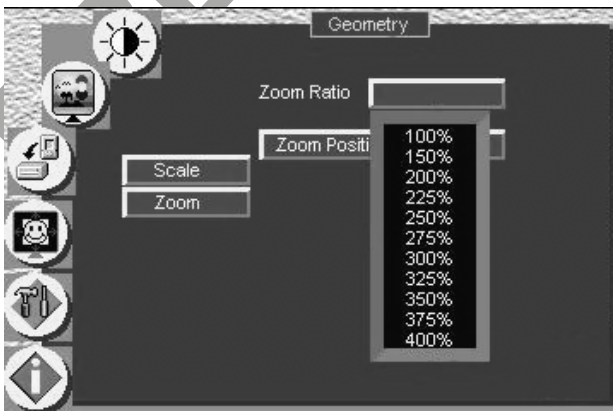

Figure 26: Geometry (Zoom Ratio) Screen

1 The and the buttons

7.4.2.2 Adjusting the Zoom Position

You can adjust the zoom position via one or more of the following methods:

- Using the preset position control keys (see Figure 27) on the infra-red remote control transmitter (see Figure 16), which instantly move the position of the zoom to up to nine preset fixed locations[1]

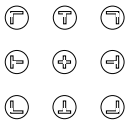

Figure 27: Preset Position Control Keys

- Using the navigation control keys on the infra-red remote control transmitter (see Figure 16), to fine tune the zoom position (that is, to slowly zoom-in at any location on the screen)[2], as Figure 28 illustrates

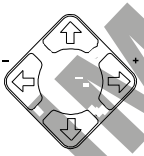

Figure 28: Navigation Control Keys

- Using the OSD Menu buttons (see Figure 29)[3]

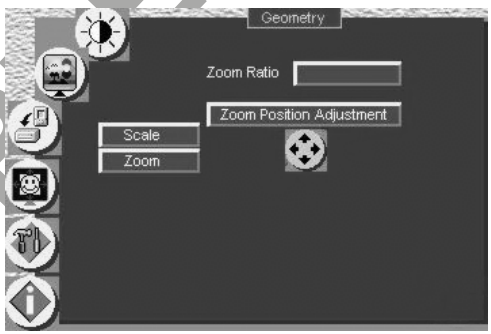

Figure 29: Geometry (Zoom Position Adjustment) Screen

1 For example, to zoom-in to the lower right corner of the image, press the button

2 For example, to zoom-in toward the lower right of the image, press the and the buttons separately, as required

3 For example, to zoom-in to the lower right part of the image instead of the top left part, press the + and DOWN OSD Menu buttons on the front panel separately, as required

7.5 Configuring via the Utility Screens

You can determine how your **VP-724xl** will function either generally or on a specific occasion, via the Utility screen settings (see Figure 30):

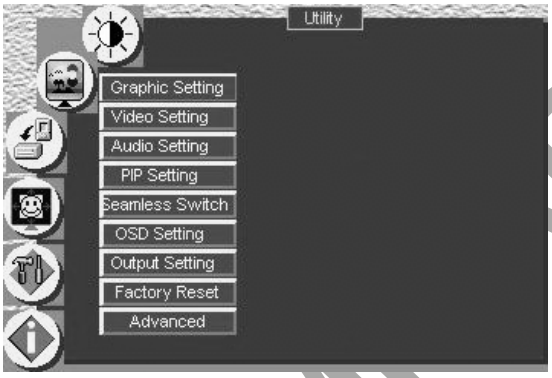

Figure 30: Utility Screen

7.5.1 Choosing the Graphic Utility Settings

From the Graphic[1] Setting Utility screen (see Figure 31), you can set the color format, position, saturation, hue, sharpness, frequency and phase, as well as auto image and auto gain (described in Table 9).

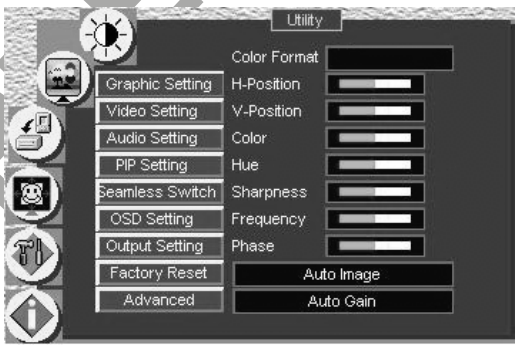

Figure 31: Graphic Setting Utility Screen

1 When a VGA source is selected, "Graphic Setting" will be shown. "HDTV Setting" (illustrated in Figure 39) will appear when an HDTV source is selected

Table 9: Graphic Setting Utility Screen Features

Button	Function
Color Format	Selecting the color format lets you select RGB or YUV[1] colorspace. When the Default setting is chosen, the colorspace is set according to the detected input resolution
H-Position	Set the horizontal position of the display
V-Position	Set the vertical position of the display
Saturation	Set saturation (the intensity of the color)
Hue	Set the hue
Sharpness	Set the sharpness
Frequency	Set the frequency
Phase	Set the phase
Auto Image	Assesses the image and improves the quality accordingly, by automatically adjusting the phase, frequency and position
Auto Gain	Automatically adjusts the brightness and contrast

7.5.2 Choosing the Video Utility Settings

From the Video Setting Utility screen (see Figure 32), you can set the video standard, color, hue, sharpness, and position.

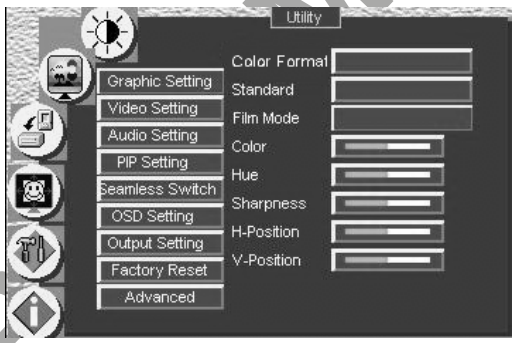

Figure 32: Video Setting Utility Screen

Table 10: Video Setting Utility Screen Features

Button	Function
Standard	Select the video standard: Auto (auto detects the standard), NTSC, NTSC4.43, PAL, PAL-N, PAL-M, SECAM
Color	Set the color
Hue	Set the hue
Sharpness	Set the sharpness
H-Position	Set the horizontal position of the display
V-Position	Set the vertical position of the display

1 That is Y, B-Y, R-Y colorspace, also known as Y, C_b, C_r or Y, P_b, P_r

7.5.3 Choosing the Audio Utility Settings

From the Audio Setting Utility screen (see Figure 33), you can set the volume, treble, bass, and choose between stereo and mono.

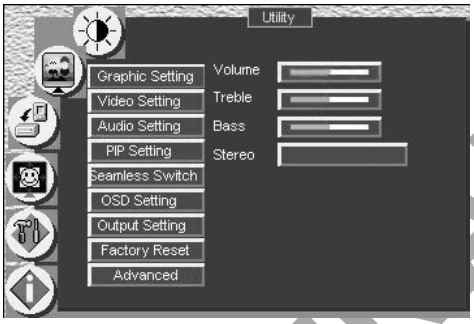

Figure 33: Audio Setting Utility Screen

7.5.4 Choosing the PIP Utility Settings

Figure 34 and Table 11 define the PIP Setting Utility screen.

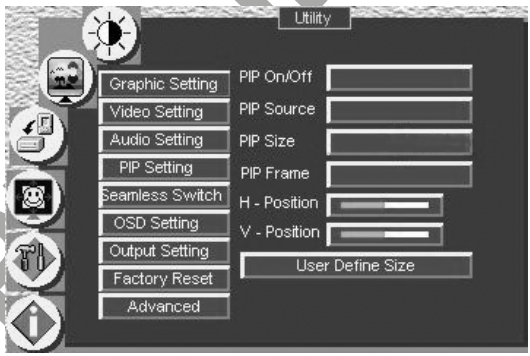

Figure 34: PIP Utility Screen

Table 11: PIP Setting Utility Screen Features

Button	Function
PIP On/Off	Activate or deactivate the PIP feature
PIP Source	Select the PIP source, as described in section 6.2.1
PIP Size	Select between: 1/25, 1/16, 1/9, ¼, Split or User Define
PIP Frame	Allows the PIP to appear with or without an orange frame
H - Position	Set the horizontal position of the PIP
V - Position	Set the vertical position of the PIP
User Define Size	After selecting the User Define PIP Size, set the PIP size (H-size and V-Size)

7.5.5 Choosing the Seamless Switch Utility Settings

From the Seamless Switch Utility screen (see Figure 35), you can choose the image transition speed Mode, set the Background screen color and activate the Auto Search, as described in Table 12:

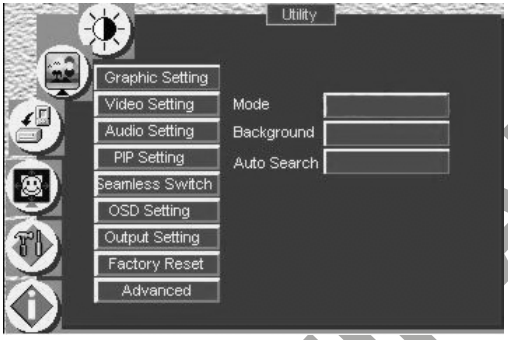

Figure 35: Seamless Switch Utility Screen

Table 12: Seamless Switch Utility Screen Features

Button	Function
Mode	Select image between: Fast – an immediate switch, without checking the resolution. However, the image transition may appear unstable Safe – a smooth image transition - the input resolution at the input is checked and outputted after a few seconds delay, but it takes longer than fast Moderate – between fast and safe
Background	Set the background screen color: You can select the screen color (black or blue) when there is no active source
Auto Search	Activate the Auto Search to find the active source or deactivate (displays the source selected prior to power down) the Auto Search

7.5.6 Choosing the OSD Utility Settings

Figure 36 and Table 13 define the OSD Setting Utility screen.

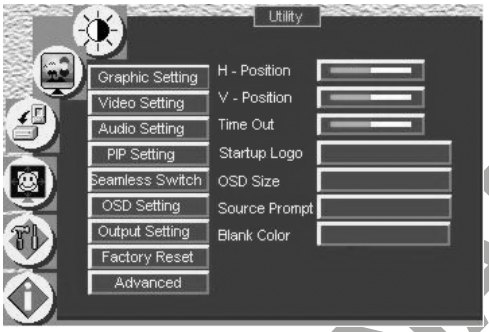

Figure 36: OSD Setting Utility Screen

Table 13: OSD Setting Utility Screen Features

Button	Function
H-Position	Set the OSD menu position
V-Position	
Time Out	Set the timeout for source prompts and OSD menu[1]
OSD Size	Set the OSD size to Normal or Double the normal size
Source Prompt	Set the Source Prompt[2]
Blank Color	Set the blank color, the color that appears on screen when the blank button is pressed

1 By default, 20 seconds. But you can reset the timeout (from 3 to 60 seconds)

2 We recommend that you set the source prompt ON, when adjusting the system. During a presentation, set the source prompt OFF to avoid the appearance of OSD screen labels

7.5.7 Choosing the Output Utility Settings

Figure 37 and Table 14 define the Output Utility settings. From the Output Setting Utility screen, you can set the Resolution, Refresh Rate, and a user definable output mode (see Figure 39 and Table 15).

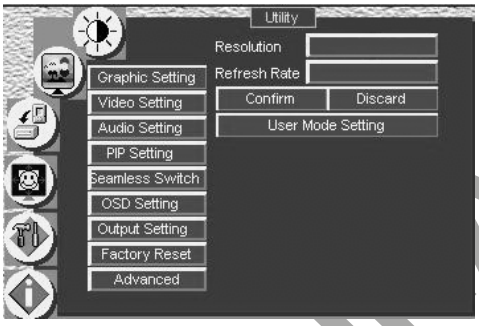

Figure 37: Output Setting Utility Screen

Table 14: Output Setting Utility Screen Features

Button	Function
Resolution	Select the desired resolution from the list, including the User Define resolution (for advanced users only) You can cycle the output resolutions (choosing the pixel resolution) by pressing the OUT key on the infra-red remote control transmitter (see Figure 16). The OSD status appears superimposed over the top right corner of the screen for a few seconds[1], as Figure 38 illustrates[2]
Refresh Rate	Select the refresh rate: 60Hz, 75Hz, 85Hz or 50Hz
Confirm / Discard	Select to confirm or reject Resolution and Refresh Rate selections
User Mode Setting	Set a user definable output mode[3] (see Figure 39)

Figure 38: OSD Output Status

1 By default, 20 seconds. But you can reset the timeout (from 3 to 60 seconds)

2 Adjusting the output resolution results in a corresponding adjustment to the size of the OSD status window

3 Recommended for advanced users only – non-standard settings may not be recognized by the display device

7.5.7.1 The User Mode Setting

Figure 39 and Table 15 define the User Mode Setting.

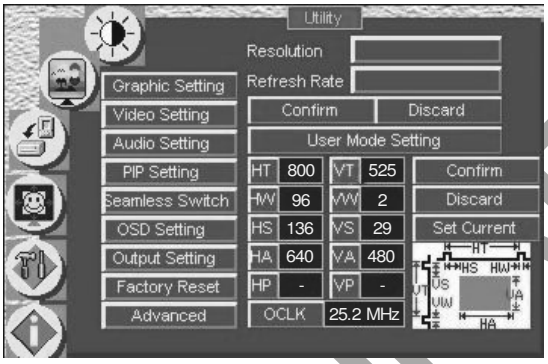

Figure 39: Output Setting User Mode Setting Utility Screen

Table 15: User Mode Setting Definitions

User Mode Setting Definitions	
HT:	Horizontal total
HW:	Horizontal sync pulse width
HS:	Horizontal active start point
HA:	Horizontal active region
HP:	Horizontal polarity
VT:	Vertical total
VW:	Vertical sync pulse width
VS:	Vertical active start point
VA:	Vertical active region
VP:	Vertical polarity
OCLK:	Output clock
Confirm:	Confirm the action
Discard:	Cancel the action
Set Current:	Set to current values by pressing ENTER

7.5.8 Choosing Factory Reset

From the Factory Reset Utility screen (see Figure 40), you can reset your **VP-724xl** to its preset default setting:

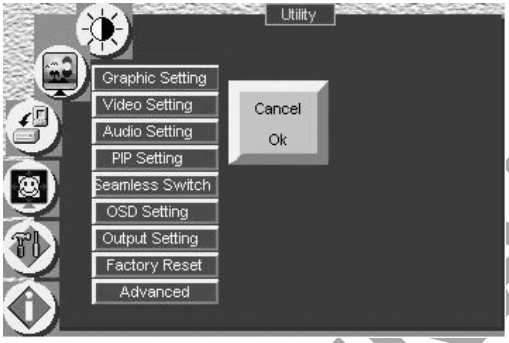

Figure 40: Factory Reset Utility Screen

7.5.9 Choosing Advanced Utility Settings

Figure 41 and Table 16 define the Advanced Utility screen.

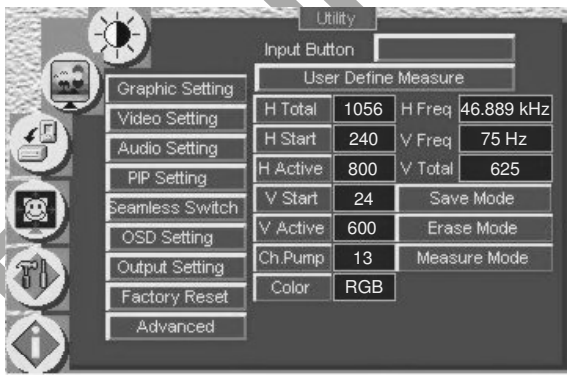

Figure 41: Advanced Utility Screen

Table 16: Advanced Utility Screen Features

Button	Function
Input Button	You can set the function of the input button besides selecting the input signal: Freeze/Blank (press selected input button once to freeze the frame, press again to create a blank screen and again to return to normal state); Freeze (press once to freeze the frame, press again to cancel freeze); Blank (Press once to insert blank screen, press again to return to display); Ignore (input button ignores freeze and blank – you can freeze the frame or insert a blank screen only via Freeze and Blank buttons respectively)
User Define Measure	Measures the input parameters

Table 17 describes the User Define Measure features.

Table 17: User Define Measure Features

User Mode Setting Definitions	
H Total	Horizontal Total
H Start	Horizontal active start point
H Active	Horizontal active region
V Start	Vertical active start point
V Active	Vertical active region
Ch. Pump	Charge pump current
Color	Color format
H Freq	Horizontal Frequency
V Freq	Vertical Frequency
Measure Mode	Select between Default and User Define

7.6 Verifying Configuration Details via the Information Screen

From the Information screen (see Figure 42), you can verify the main source, PIP source, whether mute is activated, output mode, as well as the firmware version number:

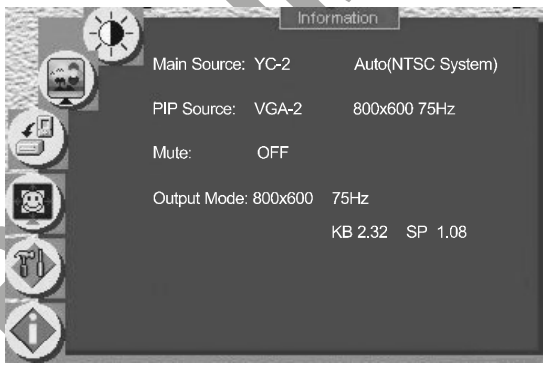

Figure 42: Information Screen

8 Technical Specifications

Table 18 includes the technical specifications:

Table 18: Technical Specifications[1] of the Presentation Switchers / Scalers

INPUTS:	2 x CV 1 Vpp/75 Ω on RCA connectors; 2 x Y/C (s-Video) 1 Vpp (Y), 0.3Vpp (C) / 75 Ω on 4 pin connectors; 1 x Component (Y, Pb/Cb, Pr/Cr) (both progressive and interlaced signals accepted) on RCA connectors; 1 x VGA (VGA/SVGA/XGA/UXGA + HDTV) on an HD15F connector (2 x VGA on the VP-724xl); and 1x DVI-D connector. For each video input there is a corresponding (unbalanced) audio stereo input on a terminal block connector
OUTPUTS:	2 x RGBHV (VGA) format on HD15 connectors; component HDTV on the same HD15 connectors for 480p, 720p and 1080i (on the VP-723xl and VP-724xl). One line-level stereo audio on terminal blocks. One stereo loudspeakers output on terminal blocks
OUTPUT RESOLUTIONS:	VGA (640x480), SVGA (800x600), XGA (1024x768), SXGA (1280x1024), UXGA (1600x1200), 1024x852, 1024x1024, 1366x768, 1365x1024, 1280x720, 720x483, 852x480, 1400x1050, 1280x768*, as well as a user definable output mode. Also supports 480p, 720p, and 1080i (on the VP-723xl and VP-724xl)
CONTROL:	Front panel buttons / OSD, IR remote control, RS-232 on a DB-9 connector, Picture-In-Picture (not available on the VP-719xl): Video in Graphics (or vice versa) in sizes up to quarter screen at any location, or Split Screen (2 images side-by-side)
ADDITIONAL CONTROLS:	Freeze, zoom, different selectable vertical refresh rates, Video and Audio ProcAmp control, output image scaling and aspect ratio change
POWER SOURCE:	100-240 VAC, 50/60 Hz, 30VA automatic power supply
DIMENSIONS:	19" (W), 9.3" (D) 1U (H) rack mountable[2]
ACCESSORIES:	Null modem adapter, IR remote control, power cord[3]
WEIGHT:	3 kg (6.6 lbs.) approx.

1 Specifications are subject to change without notice

2 When installing a Kramer machine on a closed or multi-unit rack assembly, be aware that the operating ambient temperature of the rack environment may be greater than room ambient. In particular, take care that there is sufficient air flow. (Refer to the "Operating Conditions.pdf" file on our Web site at http://www.kramerelectronics.com (click "FAQs" in the Technical Support section))

3 We recommend that you use only the power cord that is supplied with this machine

9 VP-724xl Communication Protocol

The Com port setting details are: Baud Rate: 9600/115200, Parity: none, Data Bits: 8 bits, Stop Bits: 1 bit, Set CTS Mode: Off, and Set XON/XOFF: Off.

Table 19: RS-232 Protocol

Field 1	Field 2	Field 3	Field 4	Field 5
"L"	" "	"Code"	"~Code"	0x0d
"L" ASCII Code, 1 byte	" " ASCII space, 1 byte	"xx" Code Str, 2 byte	"xx" is 1's complement of Code str, 2 byte	0x0d, 1 byte

Example: Menu On Command is"L 12ED" + Enter

Table 20: RS-232 Communication Code

Item	Code	Code(Hex)	~Code(Hex)	Function	Command
19	18	0x12	0xED	Menu On/Off	L 12ED
20	19	0x13	0xEC	Volume +	L 13EC
21	20	0x14	0xEB	Volume -	L 14EB
22	21	0x15	0xEA	Source	L 15EA
23	22	0x16	0xE9	VGA1	L 16E9
24	23	0x17	0xE8	VGA2	L 17E8
25	24	0x18	0xE7	DVI	L 18E7
26	25	0x19	0xE6	Component	L 19E6
27	26	0x1A	0xE5	Video 1	L 1AE5
28	27	0x1B	0xE4	Video 2	L 1BE4
29	28	0x1C	0xE3	Freeze	L 1CE3
30	29	0x1D	0xE2	PIP	L 1DE2
31	30	0x1E	0xE1	Auto Image	L 1EE1
32	31	0x1F	0xE0	Auto Gain	L 1FE0
33	32	0x20	0xDF	Zoom +	L 20DF
34	33	0x21	0xDE	Zoom -	L 21DE
35	34	0x22	0xDD	Mute	L 22DD
36	35	0x23	0xDC	Brightness	L 23DC
37	36	0x24	0xDB	Contrast	L 24DB
38	37	0x25	0xDA	Mode	L 25DA
39	38	0x26	0xD9	Normal	L 26D9
41	40	0x27	0xD8	Presentation	L 27D8
40	39	0x28	0xD7	Cinema	L 28D7
42	41	0x29	0xD6	Nature	L 29D6
43	42	0x2A	0xD5	USER 1	L 2AD5
44	43	0x2B	0xD4	USER 2	L 2BD4
45	44	0x2C	0xD3	SWAP	L 2CD3
46	45	0x2D	0xD2	Scale	L 2DD2
47	46	0x2E	0xD1	Normal	L 2ED1
48	47	0x2F	0xD0	WideScreen	L 2FD0
49	48	0x30	0xCF	Pan & Scan	L 30CF
50	49	0x31	0xCE	4:3	L 31CE
51	50	0x32	0xCD	Up	L 32CD
52	51	0x33	0xCC	Down	L 33CC
53	52	0x34	0xCB	Left	L 34CB
54	53	0x35	0xCA	Right	L 35CA
55	54	0x36	0xC9	Enter	L 36C9
56	55	0x37	0xC8	Status	L 37C8
57	56	0x38	0xC7	Enter+UP	L 38C7
58	57	0x39	0xC6	C-Video 1	L 39C6
59	58	0x3A	0xC5	C-Video 2	L 3AC5
60	59	0x3B	0xC4	S-Video 1	L 3BC4

Item	Code	Code(Hex)	~Code(Hex)	Function	Command	
61	60	0x3C	0xC3	S-Video 2	L 3CC3	
62	61	0x3D	0xC2	OUT	L 3DC2	
63	62	0x3E	0xC1	Blank	L 3EC1	
68	70	0x46	0xB9	Factory Reset	L 46B9	
69	71	0x47	0xB8	Key Lock	L 47B8	
70	72	0x48	0xB7	Wake up	L 48B7	
71	73	0x49	0xB6	Standby	L 49B6	
72	176	0xB0	0x4F	PIP On	L B04F	
73	177	0xB1	0x4E	PIP Off	L B14E	
74	178	0xB2	0x4D	Freeze On	L B24D	
75	179	0xB3	0x4C	Freeze Off	L B34C	
76	180	0xB4	0x4B	Mute On	L B44B	
77	181	0xB5	0x4A	Mute Off	L B54A	
78	182	0xB6	0x49	Blank On	L B649	
79	183	0xB7	0x48	Blank Off	L B748	
80	184	OxB8	0x47	Key Lock On	L B847	
81	185	0xB9	0x46	Key Lock Off	L B946	
82	186	0xBA	0x45	Output Resolution	L BA45 **	** is Resolution index
	VP-719xl/VP-720xl			VP-723xl/VP-724xl		
	640x480	L BA45 00		640x480	L BA45 00	
	800x600	L BA45 01		800x600	L BA45 01	
	1024x768	L BA45 02		1024x768	L BA45 02	
	1280x1024	L BA45 03		1280x1024	L BA45 03	
	1600x1200	L BA45 04		1600x1200	L BA45 04	
	852x1024i	L BA45 05		852x1024i	L BA45 05	
	1024x1024i	L BA45 06		1024x1024i	L BA45 06	
	1366x768	L BA45 07		1366x768	L BA45 07	
	1365x1024	L BA45 08		1365x1024	L BA45 08	
	1280x720	L BA45 09		1280x720	L BA45 09	
	720x483	L BA45 10		720x483	L BA45 10	
	852x480	L BA45 11		852x480	L BA45 11	
	1400x1050	L BA45 12		1400x1050	L BA45 12	
	User Define	L BA45 13		480P	L BA45 13	
				720P	L BA45 14	
				1080i	L BA45 15	
				User Define	L BA45 16	
81	227	0xE3	0x1C	PIP Size	L E31C **	** is PIP size index

Table 21: RS-232 Read Command

Command Sent		Return	
Source	K 15EA	VGA1	K 16E9
		VGA2	K 17E8
		DVI	K 18E7
		Component	K 19E6
		C-Video 1	K 39C6
		C-Video 2	K 3AC5
		S-Video 1	K 3BC4
		S-Video 2	K 3CC3
Freeze	K 1CE3	Freeze On	K B24D
		Freeze Off	K B34C
PIP	K 1DE2	PIP On	K B04F
		PIP Off	K B14E
Mute	K 22DD	Mute On	K B44B
		Mute Off	K B54A
Blank	K 3EC1	Blank On	K B649
		Blank Off	K B748
Key Lock	K 47B8	Key Lock On	K B847
		Key Lock Off	K B946
Output Resolution	K BA45		
		640x480	K 00FF
		800x600	K 01FE
		1024x768	K 02FD
		1280x1024	K 03FC
		1600x1200	K 04FB
		852x1024i	K 05FA
		1024x1024i	K 06F9
		1366x768	K 07F8
		1366x1024	K 08F7
		1280x720	K 09F6
		720x483	K 0AF5
		852x480	K 0BF4
		1400x1050	K 0CF3
		480P	K 0DF2
		720P	K 0EF1
		1080i	K 0FF0
		User Define	K 10EF
VGA/DVI Resolution	K E01F		
		640x480	K 00FF
		NTSC 60	K 01FE
		PAL 50	K 02FD
		720x400	K 03FC
		800x600	K 04FB
		832x624	K 05FA
		1024x768	K 06F9
		1024x800	K 07F8
		1152x870	K 08F7
		1280x960	K 09F6
		1280x1024	K 0AF5
		1600x1200	K 0BF4
		1280x720P	K 0CF3
		853x480P	K 0DF2
		1920x1080I	K 0EF1
		720x576P	K 0FF0
		1152x900	K 10EF
		1400x1050	K 11EE
		No Signal	K FF00

Command Sent		Return		
VGA/DVI Refresh rate	K E11E	Refresh rate(Hex)	K ##&&	## is Value,&& is ## invert
		No Signal	K FF00	
Video Standard	K E21D	NTSC	K 01FE	
		NTSC 4.43	K 02FD	
		PAL	K 03FC	
		PAL N	K 04FB	
		PAL M	K 05FA	
		SECAM	K 06F9	
		PAL 60	K 07F8	
		NTSC 4.43 50	K 08F7	
		No Signal	K FF00	
PIP Size	K E31C	1/25	K 00FF	
		1/16	K 01FE	
		1/9	K 02FD	
		1/4	K 03FC	
		Split	K 04FB	
PIP H position	K E41B	H position (Hex)	K ##&&	## is Value,&& is ## invert
PIP V position	K E51A	V position (Hex)	K ##&&	## is Value,&& is ## invert

LIMITED WARRANTY

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for three years from the date of the first customer purchase.

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the Web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed.
3. Damage, deterioration or malfunction resulting from:
   - i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
   - ii) Product modification, or failure to follow instructions supplied with the product
   - iii) Repair or attempted repair by anyone not authorized by Kramer
   - iv) Any shipment of the product (claims must be presented to the carrier)
   - v) Removal or installation of the product
   - vi) Any other cause, which does not relate to a product defect
   - vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.
NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.
This equipment has been tested to determine compliance with the requirements of:

EN-50081:	"Electromagnetic compatibility (EMC); generic emission standard. Part 1: Residential, commercial and light industry"
EN-50082:	"Electromagnetic compatibility (EMC) generic immunity standard. Part 1: Residential, commercial and light industry environment".
CFR-47:	FCC Rules and Regulations: Part 15: "Radio frequency devices Subpart B – Unintentional radiators"

CAUTION!

- Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- Use the supplied DC power supply to feed power to the machine.
- Please use recommended interconnection cables to connect the machine to other components.

For the latest information on our products and a list of Kramer distributors, visit our Web site: www.kramerelectronics.com, Where updates to this user manual may be found
We welcome your questions, comments and feedback.

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