KRAMER ELECTRONICS LTD.

USER MANUAL

MODEL:

VP-443
Presentation Switcher/Scaler

P/N: 2900-300084 Rev 4

VP-443 Quick Start Guide

This guide helps you install and use your product for the first time. For more detailed information, go to http://www.kramerelectronics.com/support/product_downloads.asp to download the latest manual or scan the QR code on the left.

Step 1: Check what's in the box

☑ The **VP-443** Presentation Switcher/Scaler

☑ IR remote control transmitter with batteries

☑ 1 Power cord

☑ 4 Rubber feet

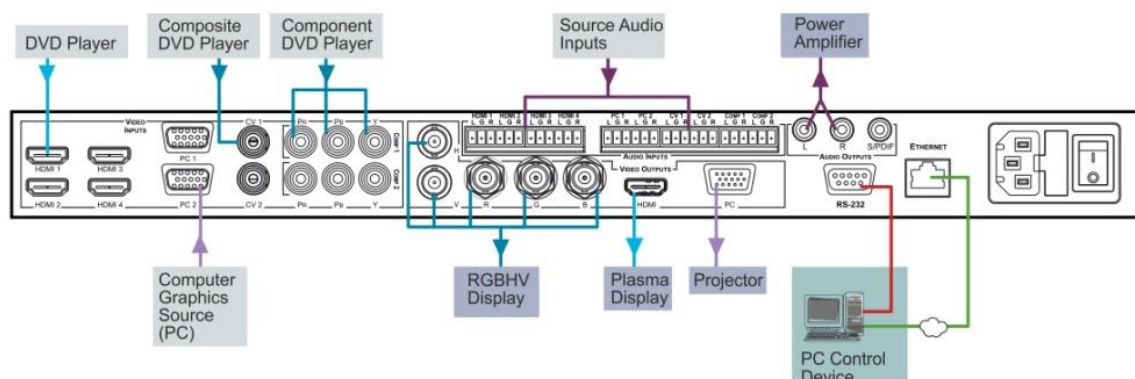☑ 1 Set of rack ears

☑ 1 Quick start guide
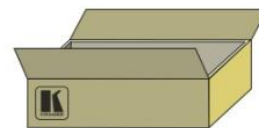
Save the original box and packaging materials in case you need to return your product for service.

Step 2: Install the VP-443

Mount the machine in a rack or place on a table.

Step 3: Connect inputs and outputs

Always switch OFF the power on each device before connecting it to your **VP-443**.

For best results, we recommend that you always use Kramer high-performance cables to connect AV equipment to the **VP-443**.
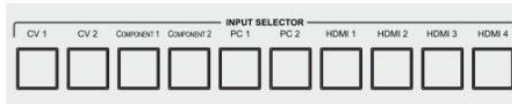
Step 4: Connect the power

Connect AC power to the rear of the **VP-443**, switch on its power and then switch on the power on each device.
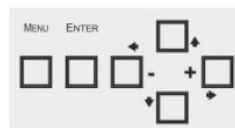
Step 5: Operate via the front panel buttons and the remote control transmitter

Push the MENU button to access the menu and show the main menu on your display.

Select an input

Press the MENU button to access the menu. The arrow buttons and ENTER (OK) button let you navigate within the OSD menu. Press EXIT to exit the menu.

Toggle between blank and display.
Toggle between mute and the audio output.
Freeze/unfreeze the output image.
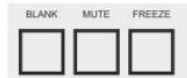
If you cannot see an image, verify that the output cable to your display, TV, or projector is in good working order and is connected to the **VP-443** and/or reset the output resolution.
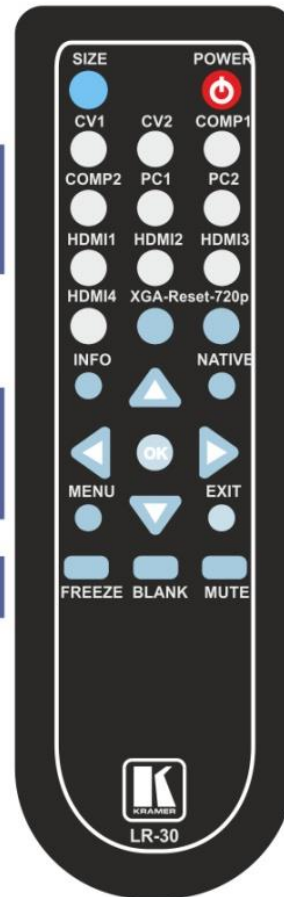
POWER
Cycles power

Reset the output resolution

Step 6: Configure the VP-443 via the OSD menu

Press the MENU button to open the OSD menu:
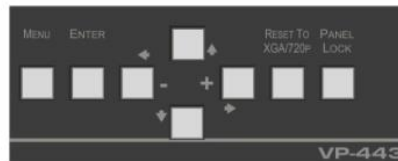
CONTRAST
BRIGHTNESS
FINETUNE
COLOR
SIZE
SOURCE
OUTPUT
AUDIO
OSD
HDCP ON INPUT
HDCP ON OUTPUT
FACTORY RESET
INFORMATION
AUTOSYNC OFF
EXIT

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1 Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront video, audio, presentation, and broadcasting professionals on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better!

Our 1,000-plus different models now appear in 11 groups that are clearly defined by function: GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Routers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters and GROUP 11: Sierra Video Products.

Congratulations on purchasing your Kramer **VP-443** Presentation Switcher/Scaler. This product, which incorporates HDMI™ technology, is ideal for:

- Projection systems in conference rooms, boardrooms, hotels and churches

- Home theater up-scaling

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

> Go to http://www.kramerelectronics.com to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

2.1 Achieving the Best Performance

To achieve the best performance:

- Use only good quality connection cables (we recommend Kramer high-performance, high-resolution cables) to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)

- Do not secure the cables in tight bundles or roll the slack into tight coils

- Avoid interference from neighboring electrical appliances that may adversely influence signal quality

- Position your Kramer **VP-443** away from moisture, excessive sunlight and dust

> This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.

2.2 Safety Instructions

Caution: There are no operator serviceable parts inside the unit

Warning: Use only the power cord that is supplied with the unit

Warning: Do not open the unit. High voltages can cause electrical shock! Servicing by qualified personnel only

Warning: Disconnect the power and unplug the unit from the wall before installing

2.3 Recycling Kramer Products

The Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC aims to reduce the amount of WEEE sent for disposal to landfill or incineration by requiring it to be collected and recycled. To comply with the WEEE Directive, Kramer Electronics has made arrangements with the European Advanced Recycling Network (EARN) and will cover any costs of treatment, recycling and recovery of waste Kramer Electronics branded equipment on arrival at the EARN facility. For details of Kramer's recycling arrangements in your particular country go to our recycling pages at *http://www.kramerelectronics.com/support/recycling/*.

3   Overview

The Kramer **VP-443** is a high quality presentation switcher and scaler. It accepts one of 10 inputs: four HDMI signals, two computer graphics signals on 15-pin HD connectors, two composite video signals on RCA connectors and two component video signals on RCA connectors. It scales the video, embeds the audio, and outputs the signal as follows: to the HDMI output, to the computer graphics output, and to the RGBHV video output together with a digital audio output and an analog stereo audio output.

Component video is also known as Y, Pb, Pr, or Y, Cb, Cr or YUV; compatible with both SD and HD component

The **VP-443** is HDTV compatible and the resolution can be up- or down-scaled as follows: VGA, SVGA, XGA, SXGA, UXGA, 480i, 480p, 720p60, 1080i60, 1080p60, 576i, 576p, 720p50, 1080i50, 1080p50, WXGA, WSXGA, WUXGA, 1280x800, WXGA+, SXGA+, 1600x900, 2K resolutions (2048x1080@50Hz and 2048x1080@60Hz), 480i59, 480p59, 720p59, 1080i59 and 1080p59.

The **VP-443** Presentation Switcher / Scaler:

- Features K-Storm™ Scaling Technology - Kramer's extremely high performance scaling technology. High-quality 3:2 and 2:2 pull down de-interlacing and full up and down scaling of computer graphics video input signals

- Has analog audio inputs and digital (S/PDIF) and analog stereo audio outputs as well as 5.1 analog audio bypass

  The **VP-443** converts digital audio information to Dolby 5.1 analog outputs, facilitating the routing of up to six analog audio inputs (left, center, right, left surround, right surround and subwoofer) directly to the output without being processed

- Automatically detects and selects the audio source for the HDMI input. Default selection is HDMI – if this is not present, the machine uses the audio from the analog input

- Comes with an On-Screen Display (OSD) for easy setup and adjustment, accessible via the IR remote control and via the front-panel buttons

- Is HDCP Compliant - The HDCP (High Definition Content Protection) license agreement allows copy-protected data on the HDMI input to pass only to the HDMI output

- Has a non-volatile memory that retains the last settings used

- Supports firmware upgrade via RS-232

Control your **VP-443**:

- Directly, via the front panel push buttons

- By RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller

- Remotely, from the infrared remote control transmitter

- Via the Ethernet

The **VP-443** is housed in a 19" 1U rack mountable enclosure, with rack "ears" included, and is fed from a 100-240 VAC universal switching power supply.

3.1   Defining the VP-443 Presentation Switcher/Scaler

This section defines the **VP-443**.
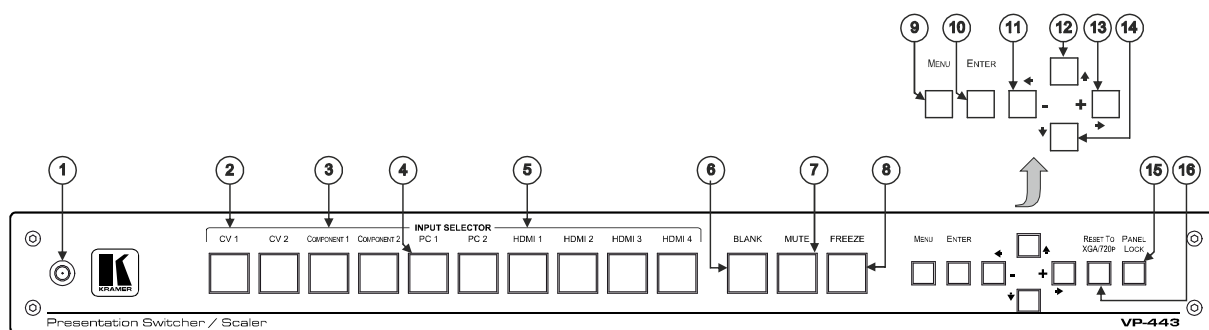
Figure 1: VP-443 Presentation Switcher/Scaler Front Panel

#	Feature		Function
1	IR Receiver		Receives signals from the remote control transmitter
2	INPUT Selector Buttons	CV	Press to select the composite video 1 input (from 1 to 2)
3		Component	Press to select the component video input (from 1 to 2)
4		PC	Press to select the computer graphics input (from 1 to 2)
5		HDMI	Press to select the HDMI input (from 1 to 4)
6	BLANK Button		Press to toggle between a blank screen and the display; can be programmed to follow MUTE (see Section 6.2.3)
7	MUTE Button		Press to toggle between muting (blocking out the sound) and enabling the audio output
8	FREEZE Button		Press to freeze/unfreeze the output video image; can be programmed to follow MUTE (see Section 6.2.3)
9	MENU Button		Displays the OSD menu (see Section 6.2)
10	ENTER Button		Press to accept changes and change the SETUP parameters (see Section 6.2)
11	Navigation Buttons	◀/- Button	Press to decrease numerical values or select from several definitions When not within the OSD menu mode, press to reduce volume (for embedded HDMI inputs, this does not affect the embedded output)
12		▲ Button	Press to move up the menu list values (see Section 6.2)
13		▶/+ Button	Press to increase numerical values or select from several definitions When not within the OSD menu mode, press to increase volume (for embedded HDMI inputs, this does not affect the embedded output)
14		▼ Button	Press to move down the menu list (see Section 6.2)
15	RESET TO XGA/720p Button		Press to reset the video resolution to XGA or 720p Press and hold for about 2 seconds to reset to XGA; or press and hold for about 5 seconds to reset to 720p
16	PANEL LOCK Button		Press and hold for about 2 seconds to lock/unlock the front panel buttons
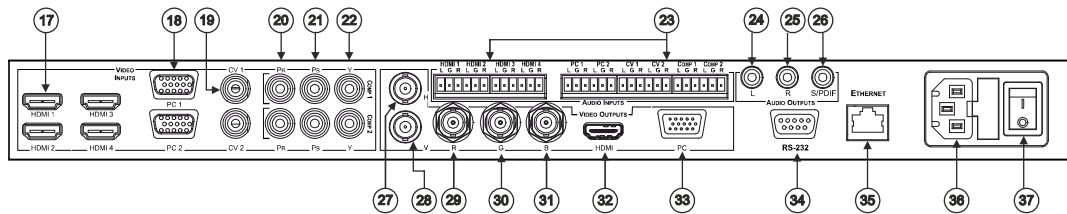
Figure 2: VP-443 Presentation Switcher/Scaler Rear Panel

#	Feature		Function
17	VIDEO INPUT Connectors	HDMI	Connect to the HDMI source (from 1 to 4)
18		PC 15-pin HD	Connect to the computer graphics source (from 1 to 2)
19		CV RCA	Connect to the composite video source (from 1 to 2)
20		COMP Pr RCA	Connect all three connectors to the component video source (from 1 to 2)
21		COMP Pb RCA	
22		COMP Y RCA	
23	AUDIO IN Unbalanced Stereo Terminal Block Connectors	HDMI	Connect to the analog audio HDMI source (from 1 to 4)
		PC	Connect to the analog audio computer graphics source (from 1 to 2)
		CV	Connect to the analog audio composite video source (from 1 to 2)
		COMP	Connect to the analog audio component video source (from 1 to 2)
24	OUT RCA Connectors	L	Connect to the left stereo analog audio acceptor
25		R	Connect to the right stereo analog audio acceptor
26		S/PDIF	Connect to a digital audio acceptor
27	VIDEO OUTPUT Connectors	H BNC	Connect to the RGBHV video acceptor
28		V BNC	
29		R BNC	
30		G BNC	
31		B BNC	
32		HDMI	Connect to the HDMI acceptor
33		PC 15-pin HD	Connect to a VGA acceptor
34	RS-232 9-pin D-sub Port		Connect to the PC or the remote controller
35	ETHERNET Connector		Connects to the PC or other Serial Controller through computer networking
36	Power Connector with Fuse		AC connector, enabling power supply to the unit
37	POWER Switch		Switch for turning the unit ON or OFF

4 Installing in a Rack

This section provides instructions for rack mounting the unit.

Before installing in a rack, be sure that the environment is within the recommended range:

OPERATING TEMPERATURE:	0° to +40ºC (32º to 104ºF)
STORAGE TEMPERATURE:	-40º to +70ºC (-40º to 158ºF)
HUMIDITY:	10% to 90%, RHL non-condensing

[!] CAUTION!

When installing on a 19" rack, avoid hazards by taking care that:

1. It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi unit rack assembly may exceed the room ambient temperature.
2. Once rack mounted, enough air will still flow around the machine.
3. The machine is placed straight in the correct horizontal position.
4. You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.
5. The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to situations where electricity is supplied indirectly (when the power cord is not plugged directly into the socket in the wall), for example, when using an extension cable or a power strip, and that you use only the power cord that is supplied with the machine.

To rack-mount a machine:

1. Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (3 on each side), and replace those screws through the ear brackets.
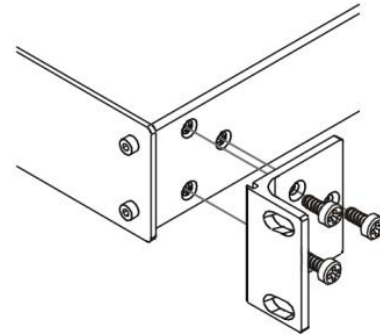
2. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

Note:
• In some models, the front panel may feature built-in rack ears
• Detachable rack ears can be removed for desktop use
• Always mount the machine in the rack before you attach any cables or connect the machine to the power
• If you are using a Kramer rack adapter kit (for a machine that is not 19"), see the Rack Adapters user manual for installation instructions available from our Web site

5 Connecting the VP-443

Always switch off the power to each device before connecting it to your **VP-443**. After connecting your **VP-443**, connect its power and then switch on the power to each device.

You do not have to connect all the inputs and outputs, connect only those that are required.

To connect the **VP-443**, as illustrated in the example in Figure 3, do the following:

1. Connect an HDMI source (for example, a DVD player) to the HDMI VIDEO INPUT connector (from 1 to 4).
   Alternatively, you can connect the DVI connector on the DVD player to the HDMI connector on the VP-443 via a DVI-HDMI adapter. When using this adapter, you can connect the audio signal via the terminal block connector

2. Connect a computer graphics source to the PC 1 15-pin HD VIDEO INPUT connector.

3. Connect a composite video source (for example, a composite video player) to the CV VIDEO INPUT RCA connector (from 1 to 2).

4. Connect a component video source (for example, a component video player) to the COMP 1 P$_R$, P$_B$ and Y, VIDEO INPUT RCA connectors.

5. Connect the audio input signals to the AUDIO IN terminal block connectors, as required (not shown in Figure 3).

6. Connect the RGBHV VIDEO OUTPUT BNC connectors to an RGBHV acceptor (for example, an RGBHV display).

7. Connect the HDMI VIDEO OUTPUT connector to an HDMI acceptor (for example, a plasma display).

8. Connect the VGA VIDEO OUTPUT 15-pin HD connector to a VGA acceptor (for example, a projector).

9. Connect the audio output signals to the OUT stereo analog audio acceptor and/or the digital audio acceptor, as required (not shown in Figure 3).

10. Connect the power cord (not shown in Figure 3).

11. If required, connect:

   ▪ A PC via RS-232, see Section 6.3

   ▪ The ETHERNET port, see Section 6.4
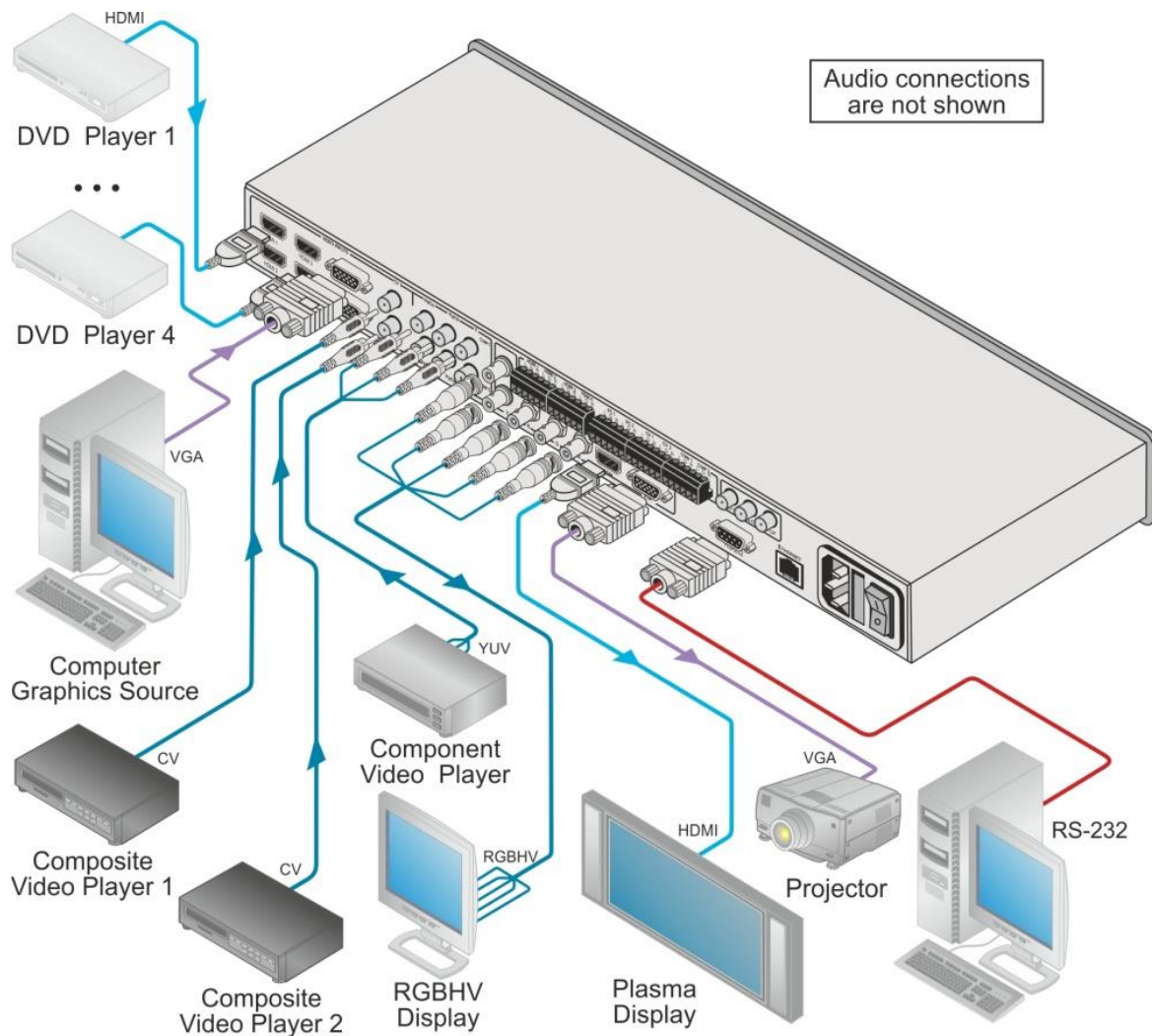
Figure 3: Connecting the VP-443 Presentation Switcher / Scaler

6 Controlling the VP-443

The **VP-443** can be controlled via:

- The front panel buttons (see Section 6.1)

- The OSD menu (see Section 6.2)

- RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller (see Section 6.3)

- The ETHERNET (see Section 6.4)

- The infrared remote control transmitter (see Section 6.5)

6.1 Controlling via the Front Panel Buttons

The **VP-443** includes the following front panel buttons:

- Input selector buttons for selecting the required input: CV (1 and 2), COMPONENT (1 and 2), PC (1 and 2), or HDMI (1 to 4)

- BLANK, MUTE and FREEZE buttons

- MENU, ENTER, and up, down, left and right arrow buttons

- RESET TO XGA/720p and PANEL LOCK buttons

6.1.1 The Auto Adjust Feature

The auto adjust feature (applies only to the PC input) automatically centers the image on the screen when pressing the ENTER front panel button or the OK button on the remote control transmitter (when not within the OSD menu).

You can also implement this feature every time the input is switched to VGA or when the input resolution changes, via the FINETUNE menu (see Section 6.2.2).

6.2 Using the OSD Menu

The control buttons let you control the **VP-443** via the OSD menu. Press the:

- MENU button to enter the menu
  The default timeout is set to 10 seconds

- ENTER button to accept changes and to change the menu settings

- Arrow buttons to move through the OSD menu, which is displayed on the video output

On the OSD menu, select EXIT to exit the menu.

6.2.1 The MAIN MENU

Mode	Function
CONTRAST	Set the contrast (the range and default values vary according to the input signal)
BRIGHTNESS	Set the brightness (the range and default values vary according to the input signal)
FINETUNE	Optimize the image quality (see Section 6.2.2)
COLOR	Set the red, green and blue shades (0 to 100, default 48, 48 and 52 respectively)
SIZE	Select the size of the display: FULL, PANSCAN, OVERSCAN, UNDER1, UNDER2, LETTER BOX, BEST FIT (default, FULL) **UNDER1** refers to an underscan of 6%; **UNDER2** refers to an underscan of 9%

Mode	Function			
SOURCE	Select the source: (default VGA)			
	Source input	Appears as:	Source input	Appears as:
	CV 1	CV1	VGA 2	PC2
	CV 2	CV2	HDMI 1	HDMI1
	COMP 1	YPBPR1	HDMI 2	HDMI2
	COMP 2	YPBPR2	HDMI 3	HDMI3
	VGA 1	PC1	HDMI 4	HDMI4

Mode	Function			
OUTPUT	Select the output resolution from the menu (default NATIVE):			
	Output resolution:	Appears as:	Output resolution:	Appears as:
	NATIVE		1080p @50Hz	1080P50
	640x480	VGA	1366x768	WXGA
	800x600	SVGA	1680x1050	WSXGA
	1024x768	XGA	1920x1200	WUXGA
	1280x1024	SXGA	1280x800	1280x800
	1600x1200	UXGA	1440x900	WSXGA+
	480i	480I	1400x1050	SXGA+
	480p	480P	1600x900	1600x900
	720p @60Hz	720P60	2048x1080 @50Hz	2048x1080/50Hz
	1080i @60Hz	1080I60	2048x1080 @60Hz	2048x1080/60Hz
	1080p @60Hz	1080P60	480i@59.94Hz	480I59
	576i	576I	480p@59.94 Hz	480P59
	576p	576P	720p@59.94Hz	720P59
	720p @50Hz	720P50	1080i@59.94Hz	1080I59
	1080i @50Hz	1080I50	1080p@59.94Hz	1080P59
	NATIVE - Select NATIVE to select the output resolution from the EDID of the connected HDMI monitor			

Mode	Function
AUDIO	Adjust audio parameters (see Section 6.2.3)
OSD	Set the OSD parameters: H POSITION, V POSITION, TIMER, BACKGROUND and DISPLAY (see Section 6.2.4)
HDCP ON INPUT	Select the HDCP option for the HDMI input: either ON (the default) or OFF. Setting HDCP support to enabled (ON) on the HDMI input allows the source to transmit a non-HDCP signal if required (for example, when working with a Mac computer)

Mode	Function
HDCP ON OUTPUT	Select FOLLOW INPUT or FOLLOW OUTPUT to define whether the HDCP will follow the input or the output When FOLLOW INPUT is selected, it changes its HDCP output setting (for the HDMI output) according to the HDCP of the input. This option is recommended when the HDMI output is connected to a splitter/switcher When FOLLOW OUTPUT is selected, the scaler matches its HDCP output to the HDCP setting of the HDMI acceptor to which it is connected
FACTORY RESET	Resets to the default parameters If you cannot see the display after factory reset, use the front panel Res. button to set the correct resolution: press continuously for 2 seconds to reset to XGA, or continuously for 5 seconds to reset to 720p
INFORMATION	Displays the source, the input resolution, the output resolution and the software version
AUTOSYNC OFF	Turn the auto sync ON/OFF. When ON, this de-activates the output after a few minutes if no input is present. This is useful, for example, when the output is connected to a projector, and the projector will automatically shut down when it has no input
EXIT	Select to exit the menu

6.2.2   The FINETUNE Menu

Input Signal	Parameter	Function
CV, COMPONENT	HUE	Set the color hue
	SATURATION	Set the color saturation
	SHARPNESS	Set the sharpness of the picture
	NOISE REDUCTION	Select the noise reduction: OFF, HI, LOW and MID (middle)
	COLOR FILTER	Set to ON to enable color filtering May improve the output image for certain graphic cards where color fringing is seen
VGA	PHASE	Set the clock phase
	CLOCK	Set the clock frequency
	H-POSITION	Set the horizontal position of the picture
	V-POSITION	Set the vertical position of the picture
	AUTO TUNE	When set to ON, auto adjusts the image (centers it correctly on the screen) every time the input is switched to VGA or when the input resolution changes Alternatively, you can auto adjust the image by pressing the ENTER button when not within the OSD menu
	COLOR FILTER	Set to ON to enable color filtering May improve the output image for certain graphic cards where color fringing is seen
HDMI	COLOR FILTER	Set to ON to enable color filtering May improve the output image for certain graphic cards where color fringing is seen
	DROP LINES	Set it to ON to eliminate the green line (default is OFF) With some sources (mostly Apple devices) a green line sometimes appears at the bottom of the display. By factory default this option is set to OFF.

6.2.3   The AUDIO Menu

Parameter	Function
OUTPUT VOLUME	Set the output volume (from 0 to 100) Not applicable for embedded HDMI inputs
INPUT VOLUME	Set the input volume (from 0 to 100) Not applicable for embedded HDMI inputs
DELAY	Select the audio delay time: OFF, 40ms, 110ms and 150ms
SOUND	Select the sound options: ON, MUTE
MUTE FOLLOWS	Select the action that will be followed by mute: **INDEPENDENT**: the audio muting is independent of the FREEZE and BLANK functions **FREEZE** **BLANK** **FREEZE/BLANK**: when freezing or blanking the video, the audio will be muted (the MUTE function follows the FREEZE and the BLANK functions)
HDMI AUDIO IN	Select: **AUTOMATIC**: the embedded audio on the HDMI input is selected for an HDMI signal, or the analog audio input is selected if the input is not HDMI (for example, for a DVI input signal) **EMBEDDED**: the embedded audio in the HDMI signal is selected **ANALOG**: the analog audio input is selected HDMI AUDIO IN is enabled only when one of the HDMI inputs is selected

6.2.4   The OSD Menu

Parameter	Function
H POSITION	Set the horizontal position of the OSD (from 0 to 100)
V POSITION	Set the vertical position of the OSD (from 0 to 100)
TIMER	Set the timeout period in seconds (from 5 to 100)
BACKGROUND	Set the OSD background between 0 (solid black) and 8 (transparent)
DISPLAY	Select the information shown on the screen during operation: **ON**: the information is shown permanently **OFF**: the information is not shown **INFO**: the information is shown for a few seconds

6.3   Connecting to the VP-443 via RS-232

You can connect to the **VP-443** via an RS-232 connection using, for example, a PC. Note that a null-modem adapter/connection is not required.

To connect to the **VP-443** via RS-232 Connect the RS-232 9-pin D-sub rear panel port on the product unit via a 9-wire straight cable (only pin 2 to pin 2, pin 3 to pin 3, and pin 5 to pin 5 need to be connected) to the RS-232 9-pin D-sub port on your PC

6.4   Connecting the VP-443 via the ETHERNET Port

To connect and configure the Ethernet port of the **VP-443**, refer to the ETHERNET Configuration (Lantronix) GUIDE on our Web site: http://www.kramerelectronics.com

6.5 Controlling via the Infrared Remote Control Transmitter

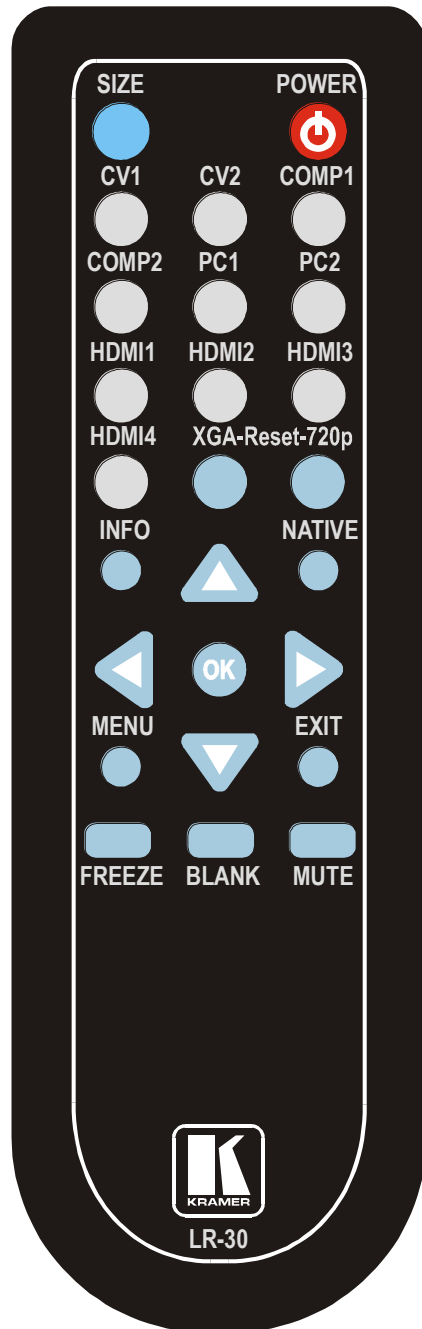You can control the **VP-443** from the infrared remote control transmitter:
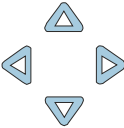
Figure 4: Infrared Remote Control Transmitter

Keys	Function
SIZE	Set the size of the image displayed
POWER	Turn the **VP-443** ON or OFF (OFF in this case means that the unit is in standby mode)
CV1	Select the composite video 1 input
CV2	Select the composite video 2 input
COMP1	Select the component video 1 input
COMP2	Select the component video 2 input
PC1	Select the UXGA 1 input
PC2	Select the UXGA 2 input
HDMI1	Select the HDMI 1 input
HDMI2	Select the HDMI 2 input
HDMI3	Select the HDMI 3 input
HDMI4	Select the HDMI 4 input
XGA Reset	Reset the resolution to XGA
720p Reset	Reset the resolution to 720p
INFO	Displays the selected input, the input and output resolutions and the firmware versions on the OSD
NATIVE	Select the output resolution via the EDID of the connected HDMI monitor
	Four navigation keys When not in the OSD, the left and right arrows also control the output volume for embedded HDMI inputs, this does not affect the embedded output
OK	Press to accept changes Press also to auto adjust the picture (see Section 6.1.1)
MENU	Enter the OSD menu
EXIT	EXIT the menu
FREEZE	Freeze/unfreeze the output video image
BLANK	Toggle between a blank screen and the display
MUTE	Toggle between muting (blocking out the sound) and enabling the audio output

7   Technical Specifications

INPUTS:	4 HDMI connectors (HDMI, HDCP version 1.1) 2 VGA on a 15-pin HD connector 2 composite video on an RCA connector 2 component video each on 3 RCA connectors Unbalanced stereo audio on 10 3-pin terminal block connectors
OUTPUTS:	1 RGBHV on 5 BNC connectors 1 HDMI connector (HDMI, HDCP version 1.1) VGA (RGBHV) on a 15-pin HD connector 1 S/PDIF on an RCA connector 1 analog stereo audio on 2 RCA connectors
H FREQUENCY:	15.63-90kHz
V FREQUENCY:	50-100Hz
RGB SYNCS:	H and V TTL separated syncs
RGB LEVEL:	1.2Vpp max, 75Ω load
XGA OUT LEVEL:	1.2Vpp max, 75Ω load
S/PDIF OUT LEVEL:	0.55Vpp constant
OUTPUT RESOLUTIONS:	NATIVE, VGA, SVGA, XGA, SXGA, UXGA, 480i, 480p, 720p60, 1080i60, 1080p60, 576i, 576p, 720p50, 1080i50, 1080p50, WXGA, WSXGA, WUXGA, 1280x800, WXGA+, SXGA+, 1600x900, 2048x1080/50Hz, 2048x1080/60Hz, 480i59, 480p59, 720p59, 1080i59, 1080p59
CONTROLS:	CV 1, CV 2, component 1, component 2, PC 1, PC 2, HDMI 1, HDMI 2, HDMI 3, HDMI 4, input selector buttons; blank, mute, freeze buttons; menu, enter, menu arrows, reset to XGA/720p, lock buttons, RS-232, IR, Ethernet
POWER SOURCE:	100-240V AC, 25VA max.
OPERATING TEMPERATURE:	0° to +40°C (32° to 104°F)
STORAGE TEMPERATURE:	-40° to +70°C (-40° to 158°F)
HUMIDITY:	10% to 90%, RHL non-condensing
DIMENSIONS:	19" x 7" x 1U (W, D, H) rack mountable
WEIGHT:	2.7kg (6lbs) approx
ACCESSORIES:	Power cord, rack ears, IR remote control
Specifications are subject to change without notice at http://www.kramerelectronics.com	

7.1 Input Resolutions

Resolution/Refresh Rate	CV	Component	VGA	HDMI
480I/576I (NTSC/PAL)	Yes	Yes	No	Yes
480P/576P	No	Yes	No	Yes
720P@(60/50)	No	Yes	No	Yes
1080I@(60/50)	No	Yes	No	Yes
1080P@(60/50)	No	Yes	No	Yes
1080P@(24/25/30)	No	Yes	No	Yes
480P/576P-RGB	No	No	Yes	Yes
720P@(60/50)-RGB	No	No	Yes	Yes
1080I@(60/50)-RGB	No	No	No	Yes
1080P@(60/50)-RGB	No	No	Yes	Yes
1080P@(24/25/30)-RGB	No	No	Yes	Yes
VGA@(60/67/72/75/85)	No	No	Yes	Yes
SVGA@(56/60/72/75)	No	No	Yes	Yes
XGA@(60/70/75)	No	No	Yes	Yes
SXGA@(60/75)	No	No	Yes	Yes
1280X960	No	No	Yes	Yes
1600X900@60	No	No	Yes	Yes
UXGA@60 (1600X1200)	No	No	Yes	Yes
WXGA@60(1280x800)	No	No	Yes	Yes
WXGA+@60(1440x900)	No	No	Yes	Yes
WXGA@60(1366x768)	No	No	Yes	Yes
SXGA+@60(1400x1050)	No	No	Yes	Yes
WSXGA@60(1680x1050)	No	No	Yes	Yes
WUXGA@60(1920x1200)	No	No	Yes	Yes
2K@50 (2048X1080)	No	No	Yes	Yes
2K@60 (2048X1080)	No	No	Yes	Yes

8   RS-232 Communication Protocol

The following is the COM port setting:

Baud Rate: 9600bps

Parity: None

Data Bits: 8bits

Stop Bits: 1bit

Set CTS Mode: Off

Set XON/XOFF: Off

Character Symbols Definitions	
Symbol	**Meaning**
☐	Space
[CR]	Carriage Return, ASCII code 0x0D
[LF] or >	Line Feed, ASCII code 0x0A

Set and Get Command

Set Command:

Type in: Y■Control_Type■Function■Param[CR]

Reply: Z■Control_Type■Function■Param[CR][LF]

Get Command:

Type in: Y■Control_Type■Function[CR]

Reply: Z■Control_Type■Function■Param[CR][LF]

When sending a command, a blank character may precede [CR] if desired

Example:

Example 1: set brightness value as 32

Send: Y■1■16■32[CR]

Reply: Z■1■16■32[CR][LF]

Example 2: get current output resolution. (2 = SVGA)

Send: Y■4■21[CR]

Reply: Z■4■21■2[CR][LF]

8.1 RS-232 Protocol Table

Control Type	Function	Param (for Set)	Function Description	Comment
0	0	N/A	SIZE button on remote control	
0	1	N/A	POWER button on remote control	
0	2	N/A	FREEZE button on remote control	
0	3	N/A	480p button on remote control	
0	4	N/A	576p button on remote control	
0	5	N/A	720p button on remote control	
0	6	N/A	1080i button on remote control	
0	7	N/A	1080p button on remote control	
0	8	N/A	VGA button on remote control	
0	9	N/A	SVGA button on remote control	
0	10	N/A	XGA button on remote control	
0	11	N/A	SXGA button on remote control	
0	12	N/A	WXGA button on remote control	
0	13	N/A	UXGA button on remote control	
0	14	N/A	INFO button on remote control	
0	15	N/A	UP button on remote control	
0	16	N/A	NATIVE button on remote control	
0	17	N/A	LEFT button on remote control/Volume down	Volume down when not in OSD
0	18	N/A	OK button on remote control	
0	19	N/A	RIGHT button on remote control/Volume up	Volume up when not in OSD
0	20	N/A	MENU button on remote control	
0	21	N/A	DOWN button on remote control	
0	22	N/A	EXIT button on remote control	
0	23	N/A	CV1 button on remote control	
0	25	N/A	COMP1 button on remote control	
0	26	N/A	HDMI1 button on remote control	
0	27	N/A	HDMI2 button on remote control	
0	28	N/A	COMP2 button on remote control	
0	29	N/A	PC 1 button on remote control	
0	30	N/A	BLANK button on remote control	
0	31	N/A	MUTE button on remote control	
0	33	N/A	Auto adjust	
0	34	N/A	CV2 button on remote control	
0	35	N/A	PC2 button on remote control	
0	36	N/A	HDMI3 button on remote control	
0	37	N/A	HDMI4 button on remote control	
1: Set 2: Get	4	0~100	Color: Red	
1: Set	5	0~100		

Control Type	Function	Param (for Set)	Function Description	Comment
2: Get			Color: Green	
1: Set 2: Get	6	0~100	Color: Blue	
1: Set 2: Get	16	0~100	Brightness	
1: Set 2: Get	17	0~100	Contrast	
1: Set 2: Get	25	0~100	Hue	
1: Set 2: Get	26	0~100	Sharpness	
1: Set 2: Get	29	0~100	Saturation	
1: Set 2: Get	33	0~100	Set an absolute volume for Output	for embedded HDMI inputs, this does not affect the embedded output
1: Set 2: Get	34	0~100	Set an absolute volume for Input	for embedded HDMI inputs, this does not affect the embedded output
1: Set 2: Get	41	0~100	OSD Setting :H-Position	
1: Set 2: Get	42	0~100	OSD Setting: V-Position	
1: Set 2: Get	43	0~100	OSD Timeout	
1: Set 2: Get	44	0~8	OSD Background	
1: Set 2: Get	50	0~3	NR (Noise Reduction)	0: Off 1: Low 2: Mid 3: High
1: Set 2: Get	51	0~3	Audio delay	0: Off 1: 40ms 2: 110ms 3: 150ms
1: Set 2: Get	52	0~2	HDMI AUDIO IN	0: AUTOMATIC 1: EMBEDDED 2: ANALOG
1: Set 2: Get	84	0~1	Auto Sync Off	0 : OFF (FW:6.14) 1 : ON
1: Set 2: Get	95	0 ~1	DROP LINE	0 : OFF 1 : ON
1: Set 2: Get	160	0 ~1	HDCP ON INPUT	0 : OFF 1 : ON
1: Set 2: Get	161	0 ~1	HDCP ON OUTPUT	0 : Follow input 1 : Follow output
3: Set 4: Get	0	1~10	Select Input Source	1: CV1 2: CV2

Control Type	Function	Param (for Set)	Function Description	Comment
				3: COMP1 4: COMP2 5: PC1 6:PC2 7: HDMI1 8: HDMI2 9: HDMI3 10: HDMI4
3: Set 4: Get	1	0~6	Size	0: Full 1: Panscan 2: Overscan 3: Underscan1 4: Letterbox 5: Underscan2 6: Best Fit
3: Set 4: Get	21	0~29	Output Resolution	0: Native 1: VGA 2: SVGA 3: XGA 4: SXGA 5: UXGA 6: 480i 7: 480p 8: 720p60 9: 1080i60 10: 1080p60 11: 576i 12: 576p 13: 720p50 14: 1080i50 15: 1080p50 16: WXGA 17: WSXGA 18: WUXGA 19: 1280x800 20: WXGA+ (1440X900) 21: SXGA+ (1400X1050) 22: 1600x900 23: 2048x1080/50 24: 2048x1080/60 25: 480i59 26: 480p59 27: 720p59 28: 1808i59 29: 1080p59
3: Set	23	1	Factory Reset	
4 : Get	24	0 ~ 24	INPUT Resolution (V1.42)	0: Unknown 1: VGA 2: SVGA 3: XGA 4: SXGA

Control Type	Function	Param (for Set)	Function Description	Comment
				5: UXGA 6: 480i 7: 480p 8: 720p60 9: 1080i60 10: 1080p60 11: 576i 12: 576p 13: 720p50 14: 1080i50 15: 1080p50 16: WXGA 17: WSXGA 18: WUXGA 19:1280x800 20: WXGA+ (1440X900) 21:SXGA+ (1400X1050) 22: 1600x900 23:2048x1080/50 24: 2048x1080/60
6: Set 7: Get	0	0~2	Power	0: Power Down 1: Power On 2: Firmware reset
6: Set 7: Get	1	0~1	Freeze	0: Off 1: On
6: Set 7: Get	2	0~1	Blank	0: Off 1: On
6: Set 7: Get	3	0~1	Mute	0: Off 1: On
6: Set 7: Get	4	0~1	Key lock	0: Off 1: On
6 : Set 7 : Get	140	0~1	Auto Tune (under fine tune)	0: Clear Auto Tune 1: Set Auto Tune

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