



KRAMER ELECTRONICS LTD.

# USER MANUAL

MODEL:

**VP-28**

Presentation Switcher

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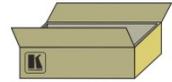
P/N: 2900-300080 Rev 3

# VP-28 Quick Start Guide

This page guides you through a basic installation and first-time use of your **VP-28**. For more detailed information see the **VP-28** user manual, the latest copy of which can be downloaded from <http://www.kramerelectronics.com>.

## Step 1: Check the contents of the box

- VP-28** Presentation Switcher
- IR Remote control transmitter with batteries
- Power cord
- 4 Rubber feet
- 2 "Rack ears"
- Kramer cable ADC-DM/DF+GF
- 1 Quick start guide



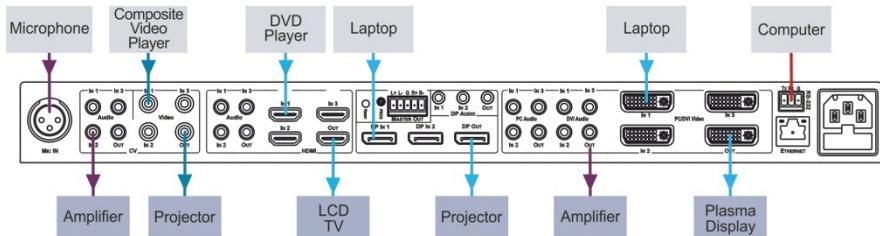
Save the original box and packaging materials in case your Kramer product needs to be returned to the factory for service.

## Step 2: Install the VP-28

Mount the device in a rack (using the "rack ears" supplied) or attach the rubber feet and place it on a shelf.

## Step 3: Connect the inputs and outputs

Switch off the power to all devices before connecting them to your **VP-28**.



For best results, we recommend that you always use Kramer high-performance cables when connecting AV equipment to the **VP-28**.

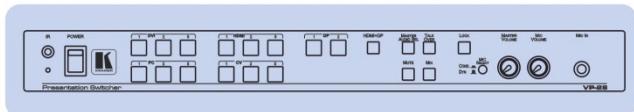
## Step 4: Connect the power

Using the power cord supplied, connect the **VP-28** to the mains supply.



## Step 5: Operate the device

Operate the device using the front panel controls, IR remote control transmitter, RS-232 and Ethernet



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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-28** *Presentation Switcher*, which is ideal for the following typical applications:

- Presentation and conference room systems
- Production studios, as well as rental and staging

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## 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
- Use only the power cord supplied with the device



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 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-28 Presentation Switcher** away from moisture, excessive sunlight and dust

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## 3 Overview

The **VP-28** is a high quality presentation switcher designed for a wide variety of presentation and multimedia applications. The **VP-28** combines the functions of a 3x1 switcher for composite video and audio, a 3x1 switcher for HDMI and audio, a 3x1 switcher for computer graphics video (PC, UXGA) type signals with audio, a 3x1 switcher for DVI and audio, and a 2x1 DisplayPort video and audio switcher. The device includes two microphone inputs mixing facilities. In addition to a 14x1 master audio switcher, the HDMI and DP switching groups can be combined to operate as a 5x1 video and audio switcher.

The **VP-28** is a one-box high performance solution for installations where you need to control each video/audio group independently and that would otherwise require several separate products.

The **VP-28** features:

- 23 selector switches and front panel control adjustments for master audio output level, and microphone level, mix, talk over and mute functions
- Support for up to 2.25Gbps bandwidth per graphic channel (HDMI, DVI)
- Supports 1 to 4 data pairs ("lanes") at a transfer rate of either 1.6Gbps or 2.7Gbps (device dependent) per channel (DP)
- I-EDIDPro™ Kramer Intelligent EDID Processing™ – Intelligent EDID handling & processing algorithm ensures Plug and Play operation for HDMI systems
- Support for HDCP signals
- Support for both digital and analog inputs (hybrid digital/analog presentation switcher)
- Equalization and reclocking of the data
- The ability to use a default EDID or acquire the EDID from one output or from all connected outputs (Auto-mix)
- A 19" 1U enclosure suitable for rack mounting using the supplied "rack ears"
- A lock button to prevent tampering with the front panel

You can control the **VP-28** via the front panel buttons, IR remote control using the Kramer infrared remote control transmitter (provided), over a LAN via Ethernet, or by RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller.

### 3.1 About HDMI—General Description

High-Definition Multimedia Interface (HDMI) is an uncompressed all-digital audio/video interface, widely supported in the entertainment and home cinema industry. HDMI ensures an all-digital rendering of video without the losses associated with analog interfaces and their unnecessary digital-to-analog conversions. It delivers the maximum high-definition image and sound quality in use today. Note that Kramer Electronics Limited is an HDMI Adopter and an HDCP Licensee.

HDMI, the HDMI logo and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI licensing LLC.

In particular, HDMI:

- Provides a simple interface between any audio/video source, such as a set-top box, DVD player, or A/V receiver and video monitor, such as a digital flat LCD / plasma television (DTV), over a single lengthy cable  
**SIMPLICITY** - With video and multi-channel audio combined into a single cable, the cost, complexity, and confusion of multiple cables currently used in A/V systems is reduced  
**LENGTHY CABLE** - HDMI technology has been designed to use standard copper cable construction at up to 15m
- Supports standard, enhanced, high-definition video, and multi-channel digital audio on a single cable  
**MULTI-CHANNEL DIGITAL AUDIO** - HDMI supports multiple audio formats, from standard stereo to multi-channel surround-sound. HDMI has the capacity to support Dolby 5.1 audio and high-resolution audio formats
- Transmits all ATSC HDTV standards and supports 8-channel digital audio, with bandwidth to spare to accommodate future enhancements and requirements
- Benefits consumers by providing superior, uncompressed digital video quality via a single cable, and user-friendly connector  
HDMI provides the quality and functionality of a digital interface while also supporting uncompressed video formats in a simple, cost-effective manner
- Is backward-compatible with DVI (Digital Visual Interface)

- Supports two-way CEC communication between the video source (such as a DVD player) and the digital television, enabling new functionality such as automatic configuration and one-button play
- Has the capacity to support existing high-definition video formats (720p, 1080i and 1080p, 2K and 4K), standard definition formats such as NTSC or PAL, as well as 480p and 576p

## 3.2 About DVI—General Description

The Digital Visual Interface (DVI) is a video interface standard covering the transmission of video between a source device (such as a personal computer) and a display device. DVI is designed to carry uncompressed digital video data to a display. It is partially compatible with the HDMI (High-Definition Multimedia Interface) standard in digital mode (DVI-D), and VGA in analog mode (DVI-A).

A single-link DVI connection consists of four TMDS links; each link transmits data from the source to the device over 1 twisted wire pair. Three of the links correspond to the RGB components of the video signal: red, green, blue (for a total of 24 bits per pixel.) The fourth link carries the pixel clock. Each TMDS link carries binary data at ten times the pixel clock reference frequency, for a maximum data rate of 1.65Gbps × 3 data pairs for single-link DVI.

The DVI specification mandates a maximum pixel clock frequency of 165MHz when running in single-link mode. With a single DVI link, the highest supported standard resolution is 2.75 megapixels (including blanking interval) at 60Hz refresh. For practical purposes, this allows a maximum screen resolution at 60Hz of 1,915×1,436 pixels (standard 4:3 ratio), 1,854×1,483 pixels (5:4 ratio), or 2,098×1,311 (widescreen 16:10 ratio). A dual link doubles the number of TMDS pairs, effectively doubling video bandwidth at a given pixel clock frequency.

The maximum length of DVI cables is not included in the specification since it is dependent on the video resolution and refresh rate. In general, cable lengths up to 4.5m (15ft) will work for displays at resolutions of 1,920×1,200. This resolution will work even up to 10m (33ft) if appropriate cable is used. Cable lengths up to 15m (50ft) can be used with displays at resolutions up to 1,280×1,024. For longer

distances, the use of a DVI booster is recommended to mitigate signal degradation. DVI boosters may use an external power supply.

### 3.3 About HDCP

The High-Bandwidth Digital Content Protection (HDCP) standard developed by Intel protects digital video and audio signals transmitted over DVI or HDMI connections between two HDCP-enabled devices to eliminate the reproduction of copyrighted material. To protect copyright holders (such as movie studios) from having their programs copied and shared, the HDCP standard provides for the secure and encrypted transmission of digital signals.

### 3.4 About DisplayPort—General Description

DisplayPort (DP) is a digital display interface standard for the PC industry. It delivers the highest resolutions and sound quality. In addition, DisplayPort:

- Provides a simple interface between a PC and a display, projector or TV
- Supports 1 to 4 data pairs ("lanes") at a transfer rate of either 1.6Gbps or 2.7Gbps (device dependent)
- Has a maximum length of 15m (49ft) for video transmission at a resolution of 1080p/60Hz and 3m (9.8ft) for full bandwidth transmission
- Video specs include a video path that supports 6 to 16 bits per color channel, a maximum resolution of 2560x1600 pixels and a total maximum bandwidth of 10.8Gbps over four lanes
- Is backward-compatible with HDMI, DVI (Digital Visual Interface) and VGA, via an appropriate adapter
- Version 1.1 supports HDCP
- Supports two-way communication over its auxiliary channel between the video source (for example, a PC) and the digital display, enabling new functionality such as automatic configuration and one-button play
- Replaces the interface needed between the PC and an external display, as well as the low voltage differential signaling (LVDS) interface in notebook computers, monitors, to connect to LCD panels

### 3.5 Defining EDID

The Extended Display Identification Data (EDID) is a data-structure provided by a display, to describe its capabilities to a graphics card (that is connected to the display's source). The EDID enables the **VP-28** to “know” what kind of monitor is connected to the output. The EDID includes the manufacturer's name, the product type, the timing data supported by the display, the display size, luminance data and (for digital displays only) the pixel mapping data.

EDID is defined by a standard published by the Video Electronics Standards Association (VESA).

### 3.6 Defining the VP-28 Presentation Switcher

[Figure 1](#) defines the front panel of the **VP-28**.

[Figure 2](#) defines the rear panel of the **VP-28**.

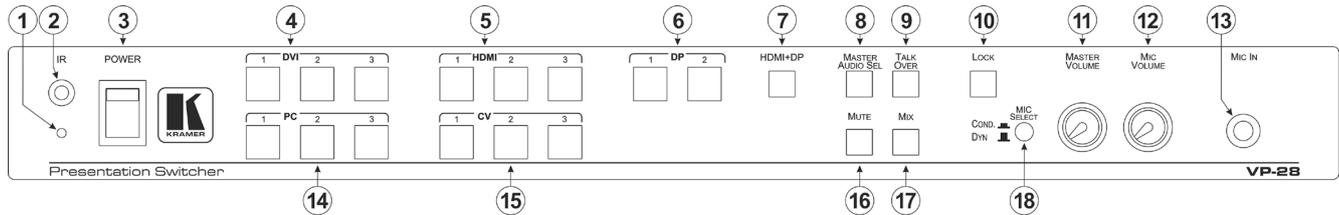


Figure 1: VP-28 Presentation Switcher Front Panel

#	Feature	Function
1	IR	LED Indicator
2		Sensor
3	POWER Switch	Illuminated switch for turning on the power to the device
4	DVI Input Selection Buttons	Press one of the three buttons to select the DVI input
5	HDMI Selection Buttons	Press one of the three buttons to select the HDMI input
6	DP Selection Buttons	Press one of the two buttons to select the DP input
7	HDMI+DP Button	Press to combine/separate the HDMI and DP inputs into a single group (see <a href="#">Section 6.1</a> )
8	MASTER AUDIO SEL Button	Press to select the Master audio channel (see <a href="#">Section 6.2</a> )
9	TALK OVER Button	Press to select the MIC input as the primary audio feed and to lower the background Master audio level (toggle)
10	LOCK Button	Press and hold to lock the front panel buttons. Press and hold again to unlock the buttons
11	MASTER VOLUME Knob	Turn to adjust the master audio level
12	MIC VOLUME Knob	Turn to adjust the microphone audio level
13	MIC IN 6.5mm Microphone Jack	Connect a microphone. <b>Note:</b> Only one microphone can be connected at a time
14	PC Selection Buttons	Press one of the three buttons to select the PC graphics input
15	CV Selection Buttons	Press one of the three buttons to select the CV input
16	MUTE Button	Press to mute/unmute the Master audio output
17	MIX Button	Press to mix the microphone and Master audio output (toggle)
18	MIC SELECT Button	COND
		DYN

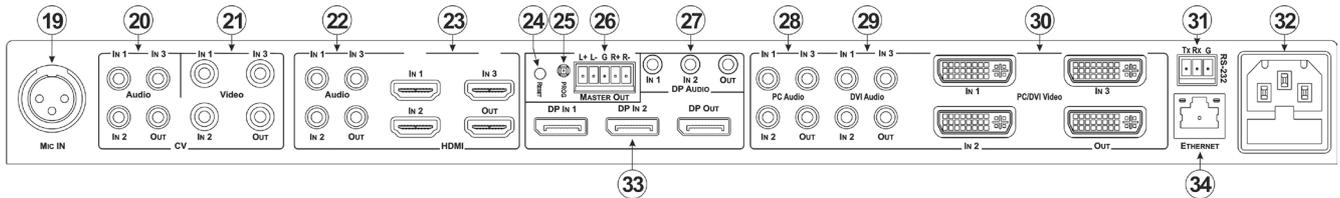


Figure 2: VP-28 Presentation Switcher Rear Panel

#	Feature	Function
19	MIC IN XLR Connector	Connect a microphone. <b>Note:</b> Only one microphone can be connected at a time
20	CV AUDIO 3.5mm Mini Jack Connectors	IN 1 ~ IN 3, OUT
21	CV VIDEO RCA Connectors	IN 1 ~ IN 3, OUT
22	HDMI AUDIO 3.5mm Mini Jack Connectors	IN 1 ~ IN 3, OUT
23	HDMI VIDEO Connectors	IN 1 ~ IN 3, OUT
24	RESET Button	Press and hold while turning on the power to the device to reset to factory default settings (see <a href="#">Section 6.4</a> )
25	PROG Button	For the use of Kramer service personnel only
26	MASTER OUT 5-pin Terminal Block Balanced Audio Output	Connect to the balanced, stereo master audio acceptor (see <a href="#">Section 5.3</a> )
27	DP AUDIO 3.5mm Mini Jack Connectors	IN 1, IN 2, OUT
28	PC AUDIO 3.5mm Mini Jack Connectors	IN 1 ~ IN 3, OUT
29	DVI AUDIO 3.5mm Mini Jack Connectors	IN 1 ~ IN 3, OUT
30	PC/DVI VIDEO DVI Connectors	IN 1 ~ IN 3, OUT
31	RS-232 Serial Port 3-pin Terminal Block	Connect to a serial controller (see <a href="#">Section 5.1</a> )
32	AC Power Mains Socket and Fuse Holder	Connect to the mains power supply
33	DP Connectors	DP IN 1, DP IN 2, DP OUT
34	ETHERNET LAN RJ-45 Connector	Connect via a LAN to an Ethernet controller (see <a href="#">Section 5.1</a> )

## 4 Installing the VP-28 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 +55°C (32° to 131°F)
STORAGE TEMPERATURE:	-45° to +72°C (-49° to 162°F)
HUMIDITY:	10% to 90%, RHL non-condensing



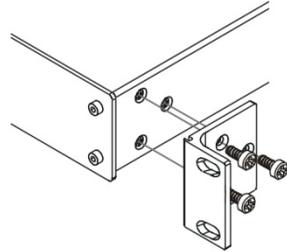
### CAUTION!

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-28



Always switch off the power to any device before connecting it to your **VP-28**. After connecting your **VP-28**, connect its power and then switch on the power to the other devices.

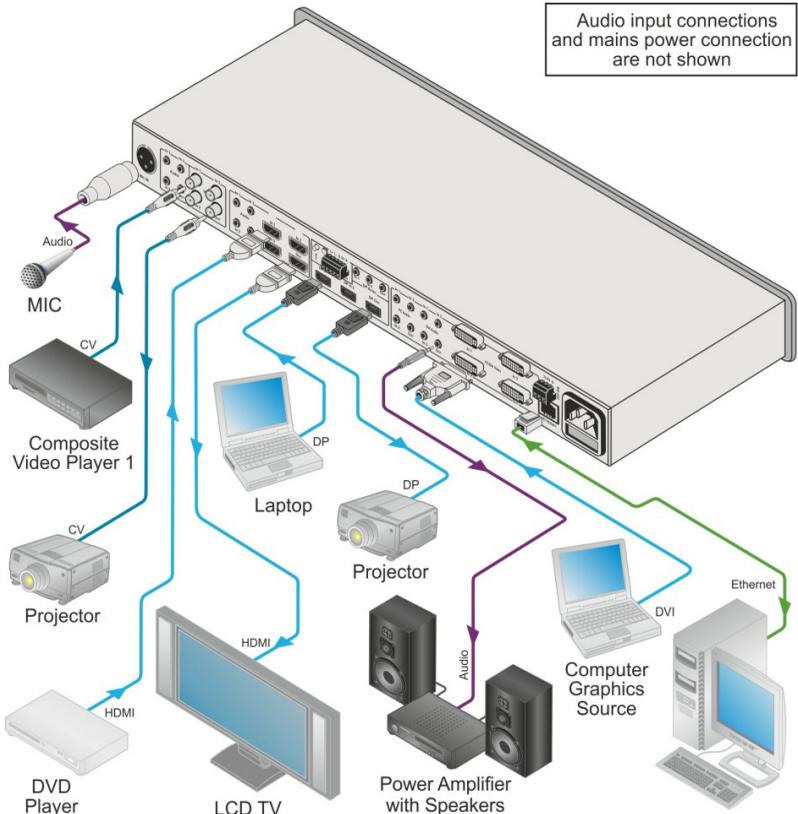


Figure 3: Connecting the VP-28 Presentation Switcher

To connect the VP-28 as illustrated in the example in [Figure 3](#):

1. Connect a microphone to the MIC IN XLR connector.
2. Connect a composite video source (for example, a composite video player) to the VIDEO IN 1 RCA connector.

3. Connect the composite VIDEO OUT RCA connector to a composite video acceptor (for example, a projector).
4. Connect an HDMI source (for example, a DVD player) to the HDMI IN 1 HDMI connector.
5. Connect the HDMI OUT connector to an HDMI acceptor (for example, an LCD TV).
6. Connect a DisplayPort video source (for example, a laptop) to the DP IN 1 DP connector.
7. Connect the DP OUT connector to a DisplayPort video acceptor (for example, a projector).
8. Connect the DVI AUDIO OUT 3.5mm mini jack connector to an unbalanced, stereo audio acceptor (for example, a power amplifier).
9. Connect a DVI source (for example, a computer) to the DVI IN 1 connector.

**Note:** Using the Kramer **ADC-DM/DF+GF** combined cable increases the input options available to you.

10. Optional—Connect a PC via Ethernet over a LAN to the Ethernet RJ-45 connector to control the **VP-28**.

## 5.1 Connecting a Serial Controller to the VP-28

You can connect to the **VP-28** via an RS-232 connection using, for example, a PC.

### To connect to the VP-28 via RS-232:

- Connect the 3-pin terminal block on the rear panel port of the **VP-28** (pin G to pin 5, pin Rx to pin 3, pin Tx to pin 2) to the RS 232 9-pin D-sub port on your PC

## 5.2 Connecting to the VP-28 via Ethernet

You can connect the **VP-28** via Ethernet via either of the following methods:

- A crossover cable (see [Section 5.2.1](#)) for direct connection to the PC
- A straight through cable (see [Section 5.2.2](#)) for connection via a network hub or network router

After connecting the Ethernet port, you have to install and configure your Ethernet Port. For detailed instructions, see the Ethernet Configuration Guide (Lantronix) in the technical support section on our Web site <http://www.kramerelectronics.com>.

### 5.2.1 Connecting the Ethernet Port directly to a PC

You can connect the Ethernet port on the **VP-28** to the Ethernet port on your PC via a crossover cable with RJ-45 connectors. This type of connection is recommended for identification of the factory default IP Address of the **VP-28** during the initial configuration.

**To configure your PC after connecting the Ethernet port:**

1. Right-click the **My Network Places** icon on your desktop.
2. Select **Properties**.
3. Right-click **Local Area Connection Properties**.
4. Select **Properties**.  
The **Local Area Connection Properties** window appears.
5. Select the **Internet Protocol (TCP/IP)** and click the **Properties** Button.

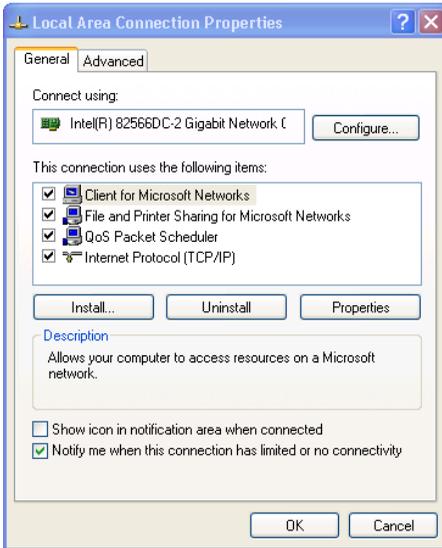


Figure 4: Local Area Connection Properties Window

6. Select **Use the following IP Address** and enter the details as shown in [Figure 5](#). You can use any IP address in the range 192.168.1.1 to 192.168.1.255 (excluding 192.168.1.39) that is provided by your IT department.

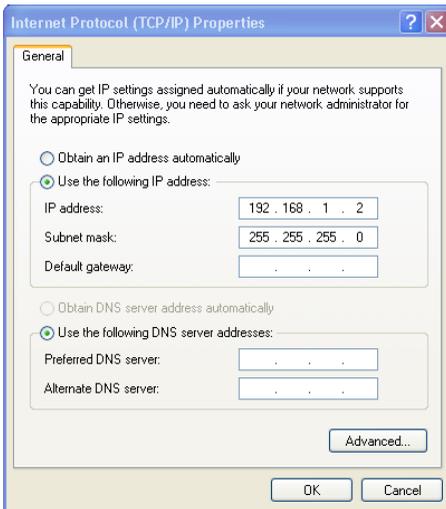


Figure 5: Internet Protocol (TCP/IP) Properties Window

7. Click **OK**.

## 5.2.2 Connecting to the Ethernet Port via a Network Switch/Hub

To connect to the Ethernet port on the VP-28 via a network switch/hub:

- Connect the PC to the Ethernet network switch/hub using a straight through cable

## 5.3 Connecting the Balanced/Unbalanced Stereo Audio Output

This section illustrates how to wire the devices to the balanced audio output:

- A balanced stereo output connection, see [Figure 6](#)
- An unbalanced stereo output connection, see [Figure 7](#)

L+ L- G R+ R-

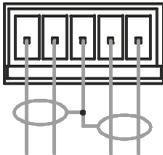


Figure 6: Balanced Stereo Audio Connection

L+ L- G R+ R-

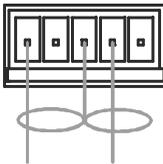


Figure 7: Unbalanced Stereo Audio Connection

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## 6 Operating the VP-28

The input/output button color indicates the current state of the channel as described in the following table.

Button Color	State
Red	Selected group input
Purple	Selected group input + active Master audio input
Green	Selected Master audio input

### 6.1 Operating the Combined 5 x 1 Switching Group

By default, the **VP-28** operates as a four 3 x 1 and one 2 x 1 switcher whereby the video and audio for each group is switched to the output of the same group. The **VP-28** can also combine the HDMI and DP inputs into a single 5-input group where any one of the five HDMI/DP inputs can be switched to the HDMI output.

**To operate the combined 5 x 1 switching group:**

1. Press the HDMI+DP button.  
The button lights red.
2. Press one of the three HDMI or two DP input buttons to select an input to switch to the HDMI output.  
The selected input button lights red and the input is switched to the HDMI video and audio outputs.
3. Press the HDMI+DP button to return the switching to separate HDMI and DP groups.  
The button no longer lights and switching is returned to separate groups.

### 6.2 Operating the Combined 14 x 1 Master Audio Switching Group

The **VP-28** operates in the audio-follow-video mode whereby the audio for each group is switched to the output of the same group. The **VP-28** also operates in a combined 14 x 1 mode whereby any one of 14 audio inputs can be switched to the master balanced audio output.

### **To operate the combined 14 x 1 Master audio switching group:**

1. Press the Master Audio Sel button.  
The button lights red.
2. Press one of the 14 input select buttons (three DVI, three PC, three HDMI, three CV and two DP) to switch the audio to the Master Out connector.  
The selected button lights green and the input is switched to the Master Audio output.  
*Note: If this is the same input as is selected for the audio group selection, the button lights purple.*
3. Press the Master Audio Sel button to exit the Master audio selection and return to the group selection.  
The button no longer lights but the last Master audio selection remains active.

## **6.3 Locking the Front Panel**

Lock your **VP-28** to prevent changing the settings accidentally or the front panel buttons being tampered with.

### **To lock the front panel of the VP-28:**

- Press and hold the LOCK button.  
The LOCK button lights and the front panel buttons are locked. Pressing any button has no effect but the LOCK button flashes briefly. The **VP-28** can be operated via the remote IR controller, RS-232 or Ethernet

### **To unlock the front panel of the VP-28:**

- Press and hold the LOCK button.  
The front panel buttons are unlocked and the LOCK button no longer lights

## 6.4 Resetting the VP-28 to the Factory Default

To reset the VP-28 to factory defaults:

1. Switch off the **VP-28**.
2. Press and hold the RESET button on the rear panel.
3. Switch on the **VP-28**.
4. Wait a few seconds and release the button.  
The parameters and configuration are reset to their factory defaults (see [Section 9](#)).

## 7 Operating the VP-28 Remotely

You can operate the **VP-28** remotely using the **VP-28 Controller Software** via either the RS-232 serial port or the Ethernet port.

The VP-28 Application Software can be downloaded from <http://www.kramerelectronics.com>.

The Controller Software requires the following:

- Windows™ XP, Vista or Windows™ 7
- Microsoft .Net Framework version 3.5

To install the Controller Software, download the software and run the setup file. After installation, running the Controller Software for the first time displays a window similar to that shown in [Figure 8](#).

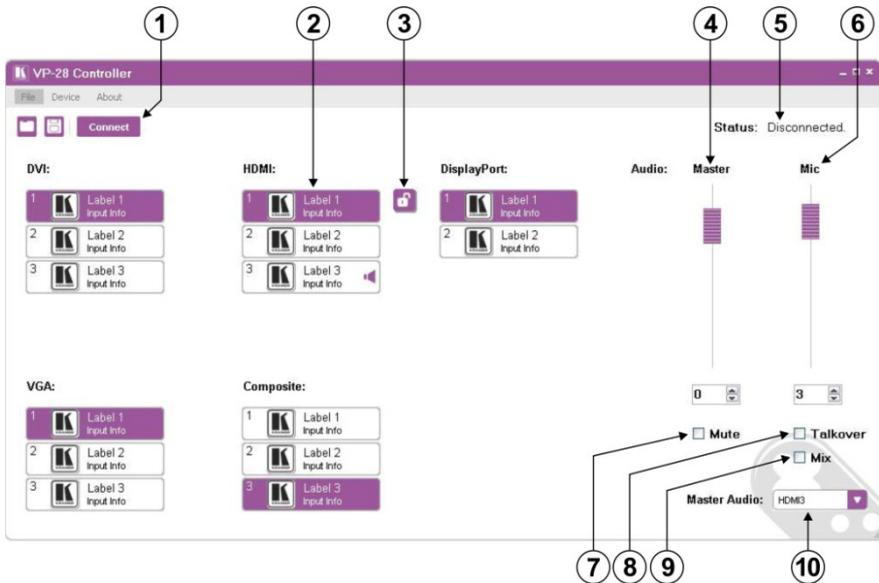


Figure 8: Controller Software Main Window

#	Feature	Function
1	Connect/Disconnect Button	Click to connect to or disconnect from the device (see <a href="#">Section 7.2</a> )
2	Select Input Buttons	Click one of the 14 input buttons to select an input. The selected input button is highlighted

#	Feature	Function
3	Combine Button	Click to combine the three HDMI and two DisplayPort inputs into five inputs
4	<i>Audio Master</i> Level Adjustment	Use either the slider or click on the up/down arrows to adjust the master audio level
5	<i>Status</i> Indicator	Indicates whether or not the application is connected to the device
6	<i>Audio Mic</i> Level Adjustment	Use either the slider or click on the up/down arrows to adjust the microphone audio level
7	<i>Mute</i> Check Box	Click to mute/unmute the master audio. Any microphone signal present is not affected
8	<i>Talkover</i> Check Box	Press to select the MIC input as the primary audio feed and to lower the background Master audio level (toggle)
9	<i>Mix</i> Check Box	Click to select/deselect the talkover audio signal to output
10	<i>Master Audio</i> Drop-down List	Click to select one of the audio inputs

**Note:** When a change is made on the device (for example, a different output is selected), the change is reflected almost immediately in the main window of the Controller Software, and visa versa.

Figure 9 shows a typical input button.

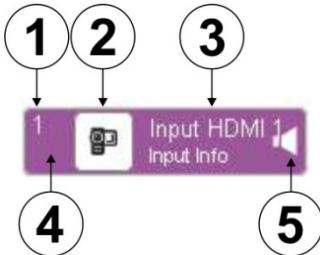


Figure 9: Typical Input Button

#	Feature	Description
1	1	Input or output number
2		User-selectable icon selected to be displayed on the button
3	<i>Input HDMI 1</i> Label	User-selectable button label
4	Background Color	Indicates the status of the input/output: Purple—active White—inactive
5	Audio Input	The symbol indicates that this is the selected audio input (see <a href="#">Section 7.3</a> )

## 7.1 The Controller Software Menu Bar

The following table describes the Controller Software menu bar options.

Menu Bar Options	Sub Menu	Description
File	Open	Open an existing project
	Save	Save the current project
	Exit	Exit the Controller software
Device	Connect/Disconnect	Connect or disconnect to the device
	Firmware Upgrade	Upgrade the device firmware using a new firmware file
	Device Details	Display the device details, such as, model, unit name, IP settings, and so on
ABOUT	NA	Displays the Controller Software and Kramer company details

## 7.2 Connecting to the Device

To connect to the device:

1. Click the **Connect** button.

The **Connection Method** window is displayed as shown in [Figure 10](#).

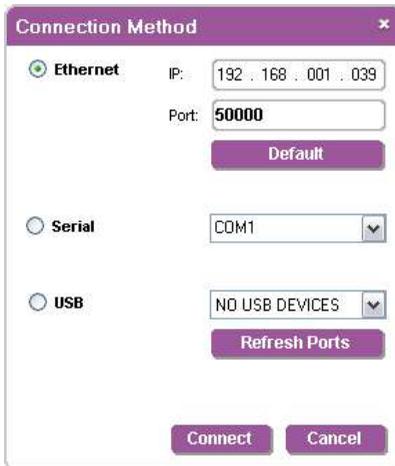


Figure 10: Connection Method Window

2. Select the connection method (via Ethernet over a LAN or serial connection) selecting the relevant option button.

3. For Ethernet, enter the IP address and Port number of the device and click **Connect**.

To set the default IP address and Port number, press the **Default** button.

4. For a serial connection, select the required Com port from the drop-down list.
5. Click **Connect**.

If the connection is successful, the window shown in [Figure 8](#) appears. If the connection is not successful, a Timeout error message appears.

## 7.3 Switching an Input to the Output of the Group

**To switch an input to the output of the group:**

- Click on the required input button to activate it.

The input is selected and the button changes to solid purple as shown in [Figure 11](#).



Figure 11: Input Selection

## 7.4 Selecting a Master Audio Input

**To select a master audio input:**

1. Click on the **Master Audio** drop-down list as shown in [Figure 12](#).



Figure 12: Master Audio Input Selection

2. Select the required audio input from the drop-down list.  
The audio input is selected to switch to the master audio output.

## 7.5 Operating the Combined 5 x 1 HDMI/DP Switching Group

The HDMI and DP inputs can be grouped together into a single 5 x 1 switching group.



Figure 13: Combine Button

**To combine the HDMI and DP inputs into a 5 x 1 switching group:**

1. Click on the **Combine** button as shown in [Figure 13](#).

The following changes occur:

- The button changes to a locked icon
- The heading changes to **HDMI & DisplayPort:**
- An outline appears around both the HDMI and DP input buttons
- The inputs are combined into a single switching group as shown in [Figure 14](#).

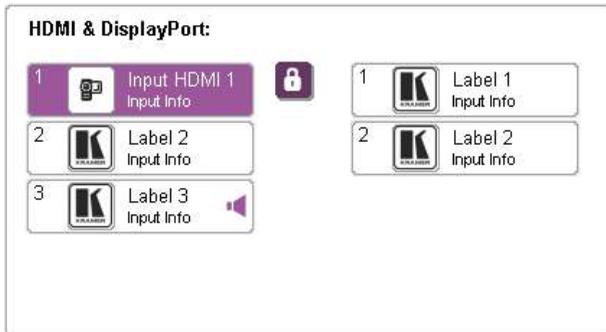


Figure 14: Combined HDMI and DP Inputs

2. To break the combined group into an HDMI and a DP group, press the **Combine** button.

The button changes to an unlocked icon, the heading changes to **HDMI:** and **DisplayPort:**, the outline disappears and the inputs are no longer grouped.

## 7.6 Changing the Audio Levels

To change the audio levels:

- Click, hold and slide on the required slider or click the up and down arrows as shown in [Figure 15](#).

The volume level changes accordingly.

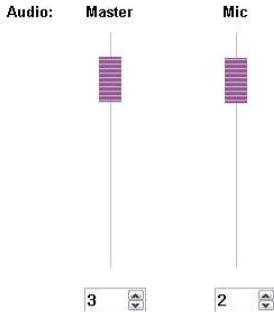


Figure 15: Changing the Audio Levels

## 7.7 Muting Audio and Selecting the Talkover or Mix Audio Modes



Figure 16: Muting Audio and Selecting the Talkover and Mix Modes

To mute the audio:

- Select the Mute check box.  
The Master audio is muted.

**Note:** The Mic input is not muted.

To select the Talkover and Mix audio modes:

1. Select the **Talkover** check box.  
The Talkover mode is selected and the presence of a microphone signal will reduce the level of the master audio temporarily.
2. Select the **Mix** check box.

The Mix mode is selected and the audio from the input and the microphone are mixed together and output.

## 7.8 Changing the Input Button Icons and Labels

To change an input button icon and label:

1. Right-click on the relevant input button.

The button properties window appears as shown in [Figure 17](#).

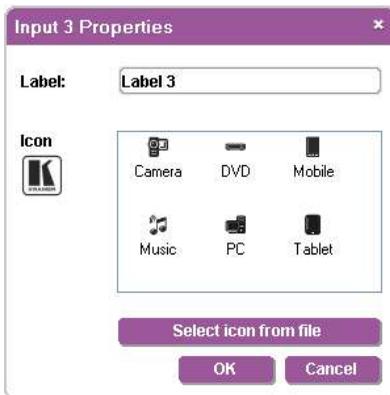


Figure 17: Input Button Properties Window

2. In the **Label** text field, enter the required button label.
3. Either:
  - Select the required icon from the list (you can save custom icons)  
OR
  - Click **Select icon from file** and browse to the icon directory
4. Click **OK**.  
The button characteristics are changed.

## 7.9 Upgrading the Firmware

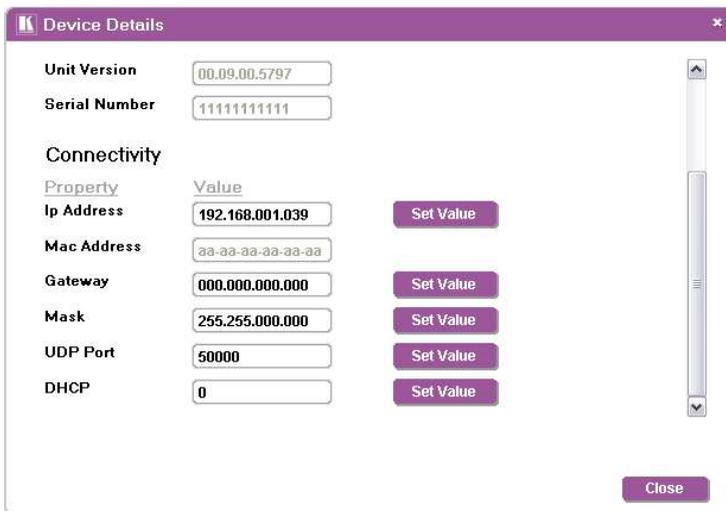
To upgrade the firmware:

1. Download the latest firmware file from <http://www.kramerelectronics.com>.
2. Click **Device > Firmware Upgrade**.
3. Browse to the firmware file that you downloaded.
4. Click **Open**.  
The device firmware is loaded.  
**Note:** Do not interrupt the uploading process or the device may be damaged.
5. When the process is complete power cycle the device.

## 7.10 Setting the IP Network Parameters

To set the IP network parameters:

1. Click **Device > Device Details**.
2. Under **Connectivity**, edit the required parameter as shown in [Figure 18](#).



The screenshot shows a web interface window titled "Device Details". It contains several input fields for device information and a section for network connectivity parameters. The connectivity section includes a table with columns for "Property" and "Value", and a "Set Value" button for each row.

Property	Value	Set Value
Unit Version	00.09.00.5797	
Serial Number	111111111111	
<b>Connectivity</b>		
Ip Address	192.168.001.039	Set Value
Mac Address	aa-aa-aa-aa-aa-aa	
Gateway	000.000.000.000	Set Value
Mask	255.255.000.000	Set Value
UDP Port	50000	Set Value
DHCP	0	Set Value

A "Close" button is located at the bottom right of the window.

Figure 18: Device Details Window

3. Click **Set Value**.  
A confirmation message appears.
4. Click **OK**.  
The parameter is set.
5. Power cycle the device.

## 8 Technical Specifications

INPUTS:	<p>Video:</p> <ul style="list-style-type: none"> <li>3 Composite video on RCA connectors</li> <li>3 HDMI on HDMI connectors</li> <li>2 DP on DisplayPort connectors</li> <li>3 PC/DVI on DVI connectors</li> </ul> <p>Audio:</p> <ul style="list-style-type: none"> <li>1 Microphone on an XLR connector</li> <li>1 Microphone on a 6.3mm phone jack connector (3mV / 10kΩ condenser/dynamic)</li> <li>3 Unbalanced stereo audio on 3.5mm mini jack connectors (for CV)</li> <li>3 Unbalanced stereo audio on 3.5 mini jack connectors (for HDMI)</li> <li>2 Unbalanced stereo audio on 3.5mm mini jack connectors (for DP)</li> <li>3 Unbalanced stereo audio on 3.5mm mini jack connectors (for PC audio)</li> <li>3 Unbalanced stereo audio on 3.5mm mini jack connectors (for DVI)</li> </ul>	
OUTPUTS:	<p>Video:</p> <ul style="list-style-type: none"> <li>1 Composite video on an RCA connector</li> <li>1 HDMI on an HDMI connector</li> <li>1 DP on a DisplayPort connector</li> <li>1 PC/DVI on a DVI connector</li> </ul> <p>Audio:</p> <ul style="list-style-type: none"> <li>1 Unbalanced stereo audio on a 3.5mm mini jack connector (for CV)</li> <li>1 Unbalanced stereo audio on a 3.5 mini jack connector (for HDMI)</li> <li>1 Unbalanced stereo audio on a 3.5mm mini jack connector (for DP)</li> <li>1 Unbalanced stereo audio on a 3.5mm mini jack connector (for PC audio)</li> <li>1 Unbalanced stereo audio on a 3.5mm mini jack connector (for DVI)</li> <li>1 Master balanced stereo audio on a 5-pin terminal block</li> </ul>	
	VIDEO	AUDIO
MAX. OUTPUT LEVEL:	CV: 1.7Vpp XGA: 2.3Vpp	Master: 17Vpp from Mic, 12.4Vpp from Line in Local Out: 8.8Vpp from line inputs
BANDWIDTH (-3dB):	CV: 680MHz XGA: 290MHz (-4dB 400MHz)	>25kHz
DIFF. GAIN:	CV: 2.5% XGA: 0.1%	
DIFF. PHASE:	CV: 0.4 Deg. XGA: 0.1 Deg.	
K-FACTOR:	CV: <0.05% XGA: <0.05%	
S/N RATIO:	CV: 74dB XGA: 71dB @5MHz	Master: 81dB from Mic (@20mVpp input, 17Vpp output diff, "A" weighting, XLR microphone) 90 to 95dB from Line in ("A" weighting) Local Outputs: 110dB ("A" weighting)
CROSSTALK @1kHz (all hostile):	CV: -54dB XGA: -56dB (5MHz)	Master: -70dB Local Outputs: -80dB from Line in
CONTROLS (Level Range):	MASTER: <-12 to 70dB from Mic, -79 to +15dB from Line in	
COUPLING:	CV: DC XGA: DC	AC

AUDIO THD + NOISE:		Master: 0.4% from Mic, 0.02% from Line in ("A" weighting) Local out: 0.04% from Line in
AUDIO 2nd HARMONIC:		Master: 0.0.3% from Mic, 0.01% from Line in Local out: 0.02% from Local output
COMPLIANCE WITH HDCP STANDARD:	Supports HDCP	
MAXIMUM BANDWIDTH DP TO HDM:	One or two lane (1.65Gbps per lane)	
INDICATOR LEDs:	IR	
POWER SOURCE:	90–264V AC, 23VA	
OPERATING TEMPERATURE:	0° to +55°C (32° to 131°F)	
STORAGE TEMPERATURE:	-45° to +72°C (-49° to 162°F)	
HUMIDITY:	10% to 90%, RHL non-condensing	
DIMENSIONS:	19" x 7.35" x 1U (W, D, H) rack mountable	
WEIGHT:	1.8kg (3.97lbs) approx.	
ACCESSORIES:	Power cord, rack "ears", Kramer infrared remote control transmitter, Kramer ADC-DM/DF+GF DVI to DVI and VGA breakout cable	
OPTIONS:	Kramer C-MDMA/MGMA DVI/VGA/audio breakout cable	
Specifications are subject to change without notice at <a href="http://www.kramerelectronics.com">http://www.kramerelectronics.com</a>		

## 9 Default Parameters

### 9.1 Default Communication Parameters

EDID	
EDID data is passed between connected outputs and inputs in the DVI, VGA, HDMI or DP groups	
RS-232	
Protocol 3000 (Default)	
Baud Rate	115,200
Data Bits	8
Stop Bits	1
Parity	None
Command Format	ASCII
Example (Output 1 to Input 1)	#AV 1>1<CR>
Ethernet	
To reset the IP settings to the factory reset values, power cycle the device while holding in the Factory Reset button, located on the rear panel of the unit	
IP Address	192.168.1.39
Subnet mask	255.255.255.0
Default gateway	192.168.1.1
TCP Port #	5000
UDP Port #	50000
Maximum UDP Ports	10
Maximum TCP Ports	4

### 9.2 Default Video/Audio Parameters

Item	Description
Switched input in all groups	1
Master audio gain	0dB
Mic audio gain	0dB

# 10 Protocol 3000 Control Commands

The following sections describe the ASCII values (which the protocol in [Section 11](#) describes in more detail).

## 10.1.1 The Switching Control ASCII Table

The following table lists the Protocol 3000 ASCII audio and video switching for the **VP-28**.

Inputs		Command	
Group	#		
DVI	In 1	#AV 1>1<CR>	
	In 2	#AV 2>1<CR>	
	In 3	#AV 3>1<CR>	
VGA	In 1	#AV 1>2<CR>	
	In 2	#AV 2>2<CR>	
	In 3	#AV 3>2<CR>	
HDMI	In 1	#AV 1>3<CR>	
	In 2	#AV 2>3<CR>	
	In 3	#AV 3>3<CR>	
	In 4	#AV 4>3<CR>	
	In 5	#AV 5>3<CR>	
CV	In 1	#AV 1>4<CR>	
	In 2	#AV 2>4<CR>	
	In 3	#AV 3>4<CR>	
DP	In 1	#AV 1>5<CR>	
	In 2	#AV 2>5<CR>	
Master Audio	In 1	DVI 1	#AUD 1>6<CR>
	In 2	DVI 2	#AUD 2>6<CR>
	In 3	DVI 3	#AUD 3>6<CR>
	In 4	VGA 1	#AUD 4>6<CR>
	In 5	VGA 2	#AUD 5>6<CR>
	In 6	VGA 3	#AUD 6>6<CR>
	In 7	HDMI 1	#AUD 7>6<CR>
	In 8	HDMI 2	#AUD 8>6<CR>
	In 9	HDMI 3	#AUD 9>6<CR>
	In 10	CV 1	#AUD 10>6<CR>
	In 11	CV 2	#AUD 11>6<CR>
	In 12	CV 3	#AUD 12>6<CR>
	In 13	DP 1	#AUD 13>6<CR>
	In 14	DP 2	#AUD 14>6<CR>

### 10.1.2 Audio Gain Control ASCII Tables

The following table sets the audio gain control for the groups.

Master Output	MIC Output	Gain
# AUD-LVL 2,6,-80<CR>	# AUD-LVL 2,7,-80<CR>	-80dB (mute)
⋮	⋮	⋮
# AUD-LVL 2,6,-50<CR>	# AUD-LVL 2,7,-50<CR>	-50dB (mute)
⋮	⋮	⋮
# AUD-LVL 2,6,0<CR>	# AUD-LVL 2,7,0<CR>	0dB (1:1)
⋮	⋮	⋮
# AUD-LVL 2,6,15<CR>	# AUD-LVL 2,7,15<CR>	15dB (max)

---

# 11 Kramer Protocol

The **VP-28** supports Kramer Protocol 3000.

## 11.1 Protocol Output Definitions

The protocol output definitions are:

- DVI video group defined as output 1
- VGA video group defined as output 2
- HDMI video group defined as output 3
- CV video group defined as output 4
- DP video group defined as output 5
- Master audio selector defined as output 6
- MIC audio defined as output 7

## 11.2 Kramer Protocol 3000

The Protocol 3000 RS-232 communication protocol lets you control the machine from any standard terminal software (for example, Windows® HyperTerminal Application).

### 11.2.1 Protocol 3000 Syntax

Host message format:

Start	Address (optional)	Body	Delimiter
#	<i>Destination_id@</i>	message	CR

Simple command (commands string with only one command without addressing):

start	body	delimiter
#	Command SP Parameter_1,Parameter_2,...	CR

Commands string (formal syntax with commands concatenation and addressing):

```
# Address@ Command_1 Parameter1_1,Parameter1_2,... |Command_2  
Parameter2_1,Parameter2_2,... |Command_3 Parameter3_1,Parameter3_2,...  
|...CR
```

Device message format:

Start	Address (optional)	Body	Delimiter
~	<i>Sender_id@</i>	message	<b>CR</b> <b>LF</b>

Device long response (Echoing command):

Start	Address (optional)	Body	Delimiter
~	<i>Sender_id@</i>	<b>command</b> <b>SP</b> [ <i>param1 ,param2 ...</i> ] <b>result</b>	<b>CR</b> <b>LF</b>

**CR** = Carriage return (ASCII 13 = 0x0D)

**LF** = Line feed (ASCII 10 = 0x0A)

**SP** = Space (ASCII 32 = 0x20)

## 11.2.2 Command Part Details

### Command:

Sequence of ASCII letters ('A'-'Z', 'a'-'z' and '-').  
Command will separate from parameters with at least single space.

### Parameters:

Sequence of Alfa-Numeric ASCII chars ('0'-'9','A'-'Z','a'-'z' and some special chars for specific commands), parameters will be separated by commas.

### Message string:

Every command must to be entered as part of message string that begin with **message starting char** and end with **message closing char**, note that string can contain more then one command separated by pipe ("|") char.

### Message starting char:

'#' for host command/query.  
'~' for machine response.

### Device address (Optional, for KNET):

KNET Device ID follow by '@' char.

**Query sign** = '?', will follow after some commands to define query request.

Message closing char =

Host messages - Carriage Return (ASCII 13), will be referred to by **CR** in this document.

Machine messages - Carriage Return (ASCII 13) + Line-Feed (ASCII 10), will be referred to by

**CRLF**.

Spaces between parameters or command parts will be ignored.

### Commands chain separator char:

When **message string** contains more than one command, commands will be separated by pipe ("|").

### Commands entering:

If terminal software used to connect over serial \ ethernet \ USB port, that possible to directly enter all commands characters (**CR**) will be entered by Enter key, that key send also **LF**, but this char will be ignored by commands parser).

Sending commands from some controllers (like Crestron) require coding some characters in special form (like \X##). Anyway, there is a way to enter all ASCII characters, so it is possible to send all commands also from controller.

(Similar way can use for URL \ Telnet support that maybe will be added in future).

### Commands forms:

Some commands have short name syntax beside the full name to allow faster typing, response is always in long syntax.

**Commands chaining:**

It is possible to enter multiple commands in same string by '|' char (pipe).  
 In this case the **message starting char** and the **message closing char** will be entered just one time, in the string beginning and at the end.  
 All the commands in string will not execute until the closing char will be entered.  
 Separate response will be sent for every command in the chain.

**Input string max length:**

64 characters.

The following table lists the instruction codes for Protocol 3000.

Help commands		
Command	Syntax	Response
Protocol Handshaking	# <b>CR</b>	~OK <b>CR</b> <b>LF</b>

Device initiated messages	
Command	Syntax
Start message	Kramer Electronics LTD. , <b>Device Model</b> Version <b>Software Version</b>

Switcher actions	
Audio-video channel has switched (AFV mode)	AV <b>IN&gt;OUT</b>
Video channel has switched (Breakaway mode)	VID <b>IN&gt;OUT</b>
Audio channel has switched (Breakaway mode)	AUD <b>IN&gt;OUT</b>

Result codes (errors)	
	Syntax
No error. Command running succeeded	<b>COMMAND</b> <b>PARAMETERS</b> OK
<b>Protocol Errors</b>	
Syntax Error	ERR001
Command not available for this device	ERR002
Parameter is out of range	ERR003
Unauthorized access (running command without the match login).	ERR004

Basic routing commands		
Command	Syntax	Response
Switch audio & video	AV <b>IN&gt;OUT</b> , <b>IN&gt;OUT</b> , ...	AV <b>IN&gt;OUT</b> , <b>IN&gt;OUT</b> , ... <b>RESULT</b>
Switch video only	VID <b>IN&gt;OUT</b> , <b>IN&gt;OUT</b> , ... Short form: V <b>IN&gt;OUT</b> , <b>IN&gt;OUT</b> , ...	VID <b>IN&gt;OUT</b> , <b>IN&gt;OUT</b> , ... <b>RESULT</b>
Note: When AFV mode is active, this command will switch also audio. If audio is breakaway – device display mode will change to show audio connections status.		
Switch audio only	AUD <b>IN&gt;OUT</b> , <b>IN&gt;OUT</b> , ... Short form: A <b>IN&gt;OUT</b> , <b>IN&gt;OUT</b> , ...	AUD <b>IN&gt;OUT</b> , <b>IN&gt;OUT</b> , ... <b>RESULT</b>
Note: When AFV mode is active, this command will switch also video.		
Read video connection	VID? <b>OUT</b> Short form: V? <b>OUT</b> VID? *	VID <b>IN&gt;OUT</b>  VID <b>IN&gt;1</b> , <b>IN&gt;2</b> , ...

Read audio connection	AUD? <u>OUT</u> Short form: A? <u>OUT</u> AUD? *	AUD <u>IN</u> <u>OUT</u> AUD <u>IN</u> > 1, <u>IN</u> > 2, ...
Parameters Description: <u>IN</u> = Input number or '0' to disconnect output. > = Connection character between in and out parameters. <u>OUT</u> = Output number or '*' for all outputs.		

<b>Examples:</b>		
Switch Video and Audio input 3 to output 7	#AV 3>7 <u>CR</u>	~AV 3>7 OK <u>CRLF</u>
Switch Video input 2 to output 4	#V 2>4 <u>CR</u>	~VID 2>4 OK <u>CRLF</u>
Switch Video input 4 to output 2 in machine number 6	#6@VID 4>2 <u>CR</u>	~6@VID 4>2 OK <u>CRLF</u>
Disconnect Video and Audio Output 4	#AV 0>4 <u>CR</u>	~AV 0>4 OK <u>CRLF</u>
Switch Video Input 3 to All Outputs	#V 3>* <u>CR</u>	~VID 3>* OK <u>CRLF</u>
Chaining Multiple commands*	#AV 1>*   V 3>4, 2>2, 82>1, 0>2   V 82>3   A 0>1   V? * <u>CR</u> First switch all Audio and video outputs from input 1, <b>Then switch video input 3 to output 4, video input 2 to output 2, video input and disconnect video output 2.</b> Then switch audio input 3 to output 2, Then disconnect audio output 1. Then get status of all links (assume this is 4x4 matrix). Commands processing start after entering <u>CR</u> , response will sent for each command after processing it.	~AV 1>* OK <u>CRLF</u> ~VID 1>2, 3>4 OK <u>CRLF</u> ~VID 82>3 <u>ERR###</u> <u>CRLF</u> ~AUD 0>1 OK <u>CRLF</u> ~V 1>1, 0>2, 1>3, 3>4 <u>CRLF</u>

Operation commands		
Command	Syntax	Response
Lock front panel	LOCK-FP <u>LOCK-MODE</u> Short form: LCK <u>LOCK-MODE</u>	LOCK-FP <u>LOCK-MODE</u> <u>RESULT</u>
Get front panel locking state	LOCK-FP?	LOCK-FP <u>LOCK-MODE</u>
Parameters Description: <u>LOCK-MODE</u> = Front panel locking state: "0" or "off" to unlock front panel buttons. "1" or "on" to lock front panel buttons.		
Restart device	RESET	RESET OK

Audio parameters commands		
Command	Syntax	Response
Set audio level in specific amplifier stage.	AUD-LVL <u>STAGE</u> <u>CHANNEL</u> <u>VOLUME</u> Short form: ADL <u>STAGE</u> <u>CHANNEL</u> <u>VOLUME</u>	AUD-LVL <u>STAGE</u> <u>CHANNEL</u> <u>VOLUME</u> <u>RESULT</u>
Read audio volume level	AUD-LVL? <u>STAGE</u> <u>CHANNEL</u> Short form: ADL? <u>STAGE</u>	AUD-LVL <u>STAGE</u> <u>CHANNEL</u> <u>VOLUME</u>
Mute audio	MUTE <u>MUTE-MODE</u>	MUTE <u>MUTE-MODE</u>

		<u>RESULT</u>
Read audio mute state	MUTE?	MUTE <u>MUTE-MODE</u>
Set talk over	TLK <u>TALKOVER MODE</u>	TLK <u>TALKOVER MODE</u> <u>RESULT</u>
Read talk over	TLK?	TLK <u>TALKOVER MODE</u>
Set audio mix	MIX <u>MIX-MODE</u>	MIX <u>MIX-MODE RESULT</u>
Read audio mix	MIX?	MIX <u>MIX-MODE</u>

Parameters Description:

**STAGE** =

"In","Out"

or

Numeric value (present audio processing stage). For example: "0" for Input level, "1" for Pre-Amplifier, "2" for Amplifier (Out) etc.

**CHANNEL** = Input or Output #

**VOLUME** = Audio parameter in Kramer units, precede minus sign for negative values.

++ increase current value,

-- decrease current value.

Machine info commands		
Command	Syntax	Response
* Time settings commands require admin authorization		
Read in/out count	INFO-IO?	INFO-IO: IN <u>INPUTS_COUNT</u> , OUT <u>OUTPUTS_COUNT</u>
Read max presets count	INFO-PRST?	INFO-PRST: VID <u>PRESET_VIDEO_COUNT</u> , AUD <u>PRESET_AUDIO_COUNT</u>
Reset configuration to factory default	FACTORY	FACTORY <u>RESULT</u>

Identification commands		
Command	Syntax	Response
Protocol Handshaking	# <u>CR</u>	~OK <u>CRLF</u>
Read device model	MODEL?	MODEL <u>MACHINE_MODEL</u>
Read device serial number	SN?	SN <u>SERIAL_NUMBER</u>
Read device firmware version	VERSION?	VERSION <u>MAJOR</u> <u>MINOR</u> <u>BUILD</u> <u>REVISION</u>
Set machine name	NAME <u>MACHINE_NAME</u>	NAME <u>MACHINE_NAME</u> <u>RESULT</u>
Read machine name	NAME?	NAME <u>MACHINE_NAME</u>
Reset machine name to factory default*	NAME-RST	NAME-RST <u>MACHINE_FACTORY_NAME</u> <u>RESULT</u>
*Note: machine name not equal to model name. This name relevance for site viewer identification of specific machine or for network using (with DNS feature on). <u>MACHINE_NAME</u> = Up to 14 Alfa-Numeric chars. * <b>Machine factory name</b> = Model name + last 4 digits from serial number.		

Identification commands		
Command	Syntax	Response
<b>Ethernet Commands</b>		
Set IP address	<b>NET-IP</b> <u>IP_ADDRESS</u> Short form: <b>NTIP</b>	<b>NET-IP</b> <u>IP_ADDRESS</u> <u>RESULT</u>
Read IP address	<b>NET-IP?</b> Short form: <b>NTIP?</b>	<b>NET-IP</b> <u>IP_ADDRESS</u>
Read MAC address	<b>NET-MAC?</b> Short form: <b>NTMC</b>	<b>NET-MAC</b> <u>MAC_ADDRESS</u>
Set subnet mask	<b>NET-MASK</b> <u>SUBNET_MASK</u> Short form: <b>NTMSK</b>	<b>NET-MASK</b> <u>SUBNET_MASK</u> <u>RESULT</u>
Read subnet mask	<b>NET-MASK?</b> Short form: <b>NTMSK?</b>	<b>NET-MASK</b> <u>SUBNET_MASK</u>
Set gateway address	<b>NET-GATE</b> <u>GATEWAY_ADDRESS</u> Short form: <b>NTGT</b>	<b>NET-GATE</b> <u>GATEWAY_ADDRESS</u> <u>RESULT</u>
Read subnet mask	<b>NET-GATE?</b> Short form: <b>NTGT?</b>	<b>NET-GATE</b> <u>GATEWAY_ADDRESS</u>
Set DHCP mode	<b>NET-DHCP</b> <u>DHCP_MODE</u> Short form: <b>NTDH</b>	<b>NET-DHCP</b> <u>DHCP_MODE</u> <u>RESULT</u>
Read subnet mask	<b>NET-DHCP?</b> Short form: <b>NTDH?</b>	<b>NET-DHCP</b> <u>DHCP_MODE</u>
<b>DHCP_MODE =</b> '0' – Don't use DHCP (Use IP set by factory or IP set command). '1' – Try to use DHCP, if unavailable use IP as above.		
Change protocol Ethernet port	<b>ETH-PORT</b> <u>PROTOCOL</u> , <u>PORT</u> Short form: <b>ETHP</b>	<b>ETH-PORT</b> <u>PROTOCOL</u> <u>PORT</u> <u>RESULT</u>
Read protocol Ethernet port	<b>ETH-PORT?</b> <u>PROTOCOL</u> Short form: <b>ETHP?</b>	<b>ETH-PORT</b> <u>PROTOCOL</u> , <u>PORT</u>
<b>PROTOCOL = TCP/UDP</b> (transport layer protocol) <b>PORT = Ethernet port</b> that accepts Protocol 3000 commands 1-65535 = User defined port 0 - Reset port to factory default (50000 for UDP, 5000 for TCP)		
<b>Factory Commands</b>		
Reset to factory default configuration	<b>FACTORY</b>	<b>FACTORY</b> <u>RESULT</u>

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The warranty obligations of Kramer Electronics for this product are limited to the terms set forth below:

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This limited warranty covers defects in materials and workmanship in this product.

### What is Not Covered

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**SAFETY WARNING**

Disconnect the unit from the power supply before opening and servicing



P/N: 2900-300680



Rev: 3