



KRAMER ELECTRONICS LTD.

# USER MANUAL

MODEL:

**VS-42HN**  
4x2 HDMI Matrix Switcher

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P/N: 2900-300152 Rev 2

# VS-42HN Quick Start Guide

This page guides you through a basic installation and first-time use of your **VS-42HN**. For more detailed information, see the **VS-42HN** User Manual. You can download the latest manual at <http://www.kramerelectronics.com>.

## Step 1: Check what's in the box

- VS-42HN** 4x2 HDMI Matrix Switcher
- 1 Power cord
- 1 Set of rack "ears"
- 4 Rubber feet
- 1 Quick Start Guide
- 1 User Manual
- Kramer **RC-IR3** Infrared Remote Control Transmitter with batteries and user manual



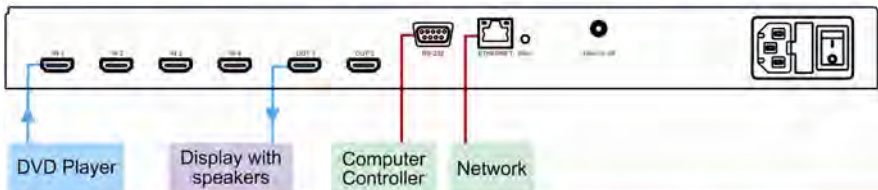
Save the original box and packaging in case your **VS-42HN** needs to be returned to the factory for service.

## Step 2: Install the VS-42HN

Mount the machine in a rack (using the included rack "ears") or attach the rubber feet and place on a table.

## Step 3: Connect the inputs and outputs

Always switch off the power on each device before connecting it to your **VS-42HN**.



Always use Kramer high-performance cables for connecting AV equipment to the **VS-42HN**.

## Step 4: Connect the power

Connect the power cord to the **VS-42HN** and plug it into the mains electricity.



## Step 5: Operate the VS-42HN

Switch an Input to an Output

- Press an output button followed by an input button

Acquire the EDID from:

- A connected output
- Several outputs
- The default EDID

Store and Recall a Preset

To Store:

1. Set the device to the desired setting.
2. Press the STO button. The STO button blinks.
3. Select an IN or OUT button to store the device setting.
4. Press the LOCK button to store the current setup.

To Recall:

1. Press the RCL button. The RCL button blinks.
2. Press the relevant IN or OUT button.
3. Press the LOCK button to recall the stored setting.

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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 the video, audio, presentation, and broadcasting professional 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 Products.

Congratulations on purchasing your Kramer **VS-42HN** *4x2 HDMI Matrix Switcher*, which is ideal for the following typical applications:

- Conference room presentations
- Advertising applications
- 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 that is supplied with this machine



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 **VS-42HN** away from moisture, excessive sunlight and dust

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## 3 Overview

The **VS-42HN** is a high quality 4x2 matrix switcher for HDMI signals. It reclocks and equalizes the signals and can route any input to any or all outputs simultaneously.

In particular, the **VS-42HN** features:

- Up to 6.75Gbps data rate (2.25Gbps per graphics channel)  
Suitable for resolutions up to UXGA and 1080p at 60Hz
- Support for HDCP (High Definition Digital Content Protection)
- HDMI support for 3D, Deep Color, x.v.Color™, Lip Sync
- 3D pass-through
- Support for up to 7.1 multi channel audio
- I-EDIDPro™ Kramer Intelligent EDID Processing™ – Intelligent EDID handling & processing algorithm ensures Plug and Play operation for HDMI systems
- Kramer reClocking™ & Equalization Technology that rebuilds the digital signal to travel longer distances
- A lock button to prevent unwanted tampering with the buttons on the front panel
- Preset memory locations for quick access to common configurations
- Support for Kramer Protocol 2000 and Protocol 3000

You can control the **VS-42HN** using the front panel buttons, or remotely via:

- RS-232 serial commands transmitted by a PC, touch screen system or other serial controller
- The Kramer **RC-IR3** infrared remote control transmitter
- A PC connected to the Ethernet port on the device via a LAN
- An external remote IR receiver (optional), see [Section 3.5](#)

## 3.1 Defining the 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 **VS-42HN** 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).

## 3.2 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 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), standard definition formats such as NTSC or PAL, as well as 480p and 576p

### 3.3 About HDCP—General Description

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 Defining the VS-42HN 4x2 HDMI Matrix Switcher

[Figure 1](#) and [Figure 2](#) define the **VS-42HN**.



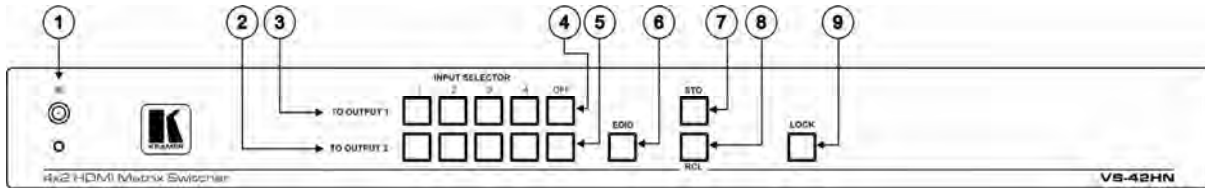


Figure 1: VS-42HN 4x2 HDMI Matrix Switcher Front Panel

#	Feature	Function
1	IR Receiver	Signal receiver for the infrared remote control transmitter
2	INPUT SELECTOR Buttons	TO OUTPUT 2
3		TO OUTPUT 1
4	OFF Button Output 1	Press to disconnect output 1 from the inputs
5	OFF Button Output 2	Press to disconnect output 2 from the inputs
6	EDID Button	Press to capture the EDID (see <a href="#">Section 6.1</a> )
7	STO Button	Press to store the current switching setting to a preset (see <a href="#">Section 6.3</a> )
8	RCL Button	Press to recall the switch setting from a preset (see <a href="#">Section 6.3</a> )
9	LOCK Button	Press and hold to toggle the locking/release of the front panel buttons. When storing or recalling presets, press to store or recall the preset (see <a href="#">Section 6.3</a> )

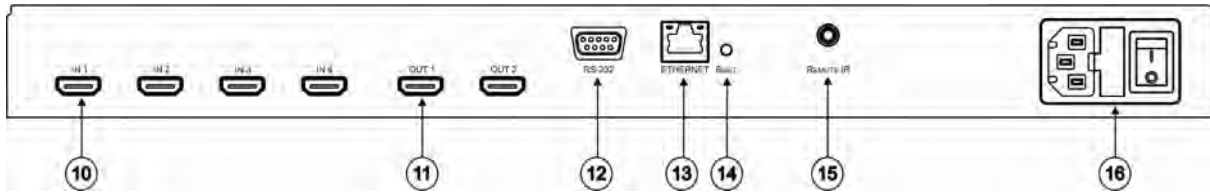


Figure 2: VS-42HN 4x2 HDMI Matrix Switcher Rear Panel

#	Feature	Function
10	IN HDMI Connectors (1 to 4)	Connect to up to 4 HDMI sources
11	OUT HDMI Connector (1 to 2)	Connect to the first and second HDMI acceptors
12	RS-232 9-pin D-sub Serial Port Connector	Connect to a PC/serial controller
13	ETHERNET RJ-45 Connector	Connect to a PC via a LAN
14	RESET Button	Press to reset to factory default definitions: IP number – 192.168.1.39, Mask – 255.255.0.0, Gateway – 0.0.0.0  First, disconnect the power cord and then connect it again while pressing the ETH Factory Reset button. The unit powers up and loads its memory with the factory default definitions and erases all stored preset
15	REMOTE IR Opening	Connect to an external IR receiver for controlling the device via an IR remote controller (see <a href="#">Section 3.5</a> )  Covered by a cap. The 3.5mm jack at the end of the internal IR connection cable fits into this opening
16	Mains Power Connector, Fuse and Illuminated Power Switch	Plug in the power cord and switch the device on and off

## 3.5 Using the IR Transmitter

You can use the **RC-IR3** IR transmitter to control the machine via the built-in IR receiver on the front panel or, instead, via an optional external IR receiver (Model: C-A35M/IRR-50). The external IR receiver can be located up to 15 meters away from the machine. This distance can be extended to up to 60 meters when used with three extension cables (Model: C-A35M/A35F-50).

Before using the external IR receiver, be sure to arrange for your Kramer dealer to insert the internal IR connection cable (for example, P/N: 505-70434010-S) with the 3.5mm connector that fits into the REMOTE IR opening on the rear panel.

Connect the external IR receiver to the REMOTE IR 3.5mm connector.

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



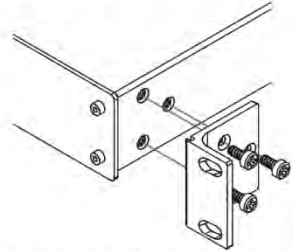
### CAUTION!

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

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## 5 Connecting the VS-42HN 4x2 HDMI Matrix Switcher



Always switch off the power to each device before connecting it to your **VS-42HN**. After connecting your **VS-42HN**, connect its power and then switch on the power to each device.

To connect the **VS-42HN 4x2 HDMI Matrix Switcher** as illustrated in the example in [Figure 3](#):

1. Connect up to four HDMI sources (for example, DVD players) to the IN HDMI connectors.  
You do not have to connect all the sources.
2. Connect the two OUT HDMI connectors to up to two HDMI acceptors (for example, LCD displays with built-in speakers).  
You do not have to connect all the outputs.
3. If required, connect a PC/controller to the RS-232 port (see [Section 6.4](#)) and/or the Ethernet port (see [Section 6.6](#)).
4. Connect the device to the mains electricity (not shown in [Figure 3](#)).
5. Power on the device.
6. If necessary, acquire the EDID (see [Section 6.1](#))

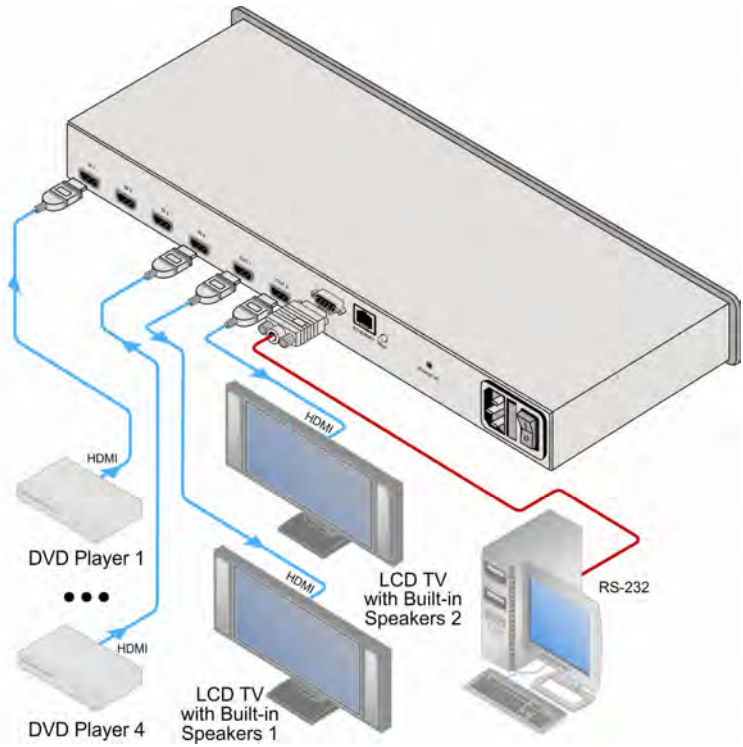


Figure 3: Connecting the VS-42HN 4x2 HDMI Matrix Switcher

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## 6 Operating the VS-42HN 4x2 HDMI Matrix Switcher

This section describes:

- Acquiring the EDID (see [Section 6.1](#))
- Storing and recalling switch settings (see [Section 6.3](#))
- Switching Between Protocol 2000 and Protocol 3000 (see [Section 6.4](#))
- Connecting to the **VS-42HN** via RS-232 (see [Section 6.5](#))
- Connecting to the **VS-42HN** via Ethernet (see [Section 6.6](#))

### 6.1 Acquiring the EDID

You can acquire the EDID from OUT 1 or OUT 2 and copy it to any of the four inputs, or reset to the default EDID. The EDID is acquired at once for all the inputs, according to the status of the selector buttons.

**To acquire or change the EDID of a new output display:**

1. Connect the required acceptor to the output from which you want to acquire the EDID.
2. Connect the power supply.
3. Press the EDID button and hold it for 3 seconds.  
The four buttons that switch to the output from which you are acquiring the EDID flash.
4. For each input, select the output from which it will acquire the EDID.  
For example, to copy the EDID of output 2 to input 3, press the INPUT SELECTOR button 3 on the TO OUTPUT 2 line.
5. Press the LOCK button.  
The INPUT buttons flash until the EDID is acquired.

## 6.2 Resetting to the Default EDID

To reset to the default EDID do either of the following:

- Disconnect the outputs and repeat the steps listed in [Section 6.1](#)

Or

- Turn off the input where the default EDID is to be stored

## 6.3 Storing and Recalling a Switching Setting from a Preset

You can use the STO and RCL buttons to store the current setup and then recall it.

**To store a setting:**

1. Set the machine to the desired setting.  
For example, press INPUT SELECTOR button 3 on the TO OUTPUT 1 line and INPUT SELECTOR button 1 on the TO OUTPUT 2 line.
2. Press the STO button.  
The STO button lights and the selected inputs flash (INPUT SELECTOR button 3 on the TO OUTPUT 1 line and INPUT SELECTOR button 1 on the TO OUTPUT 2 line).
3. Press the button where the configuration is to be stored.
4. Press the STO button again to store the current setup (You have to press the STO button within 10 seconds, before the store operation times-out).  
The STO button no longer lights and the current setting is stored in the non-volatile memory.

**To recall a setup:**

1. Press the RCL button.  
The RCL button illuminates as well as the current setting input buttons, and the input buttons of the stored setup flash.
2. Press the RCL button once again to recall the stored setting.



## 6.4 Switching Between Protocol 2000 and Protocol 3000

To switch from Protocol 2000 to Protocol 3000 and back again using the front panel buttons:

1. On the TO OUTPUT 1 row, press Output buttons 1 and 3 at the same time. Protocol 3000 is active.
2. On the TO OUTPUT 1 row, press Output buttons 1 and 2 at the same time. Protocol 2000 is active.

## 6.5 Connecting to the VS-42HN 4x2 HDMI Matrix Switcher via RS-232

You can connect to the **VS-42HN** via an RS-232 connection using, for example, a PC. Note that a null-modem adapter/connection is not required.

To connect to the VS-42HN via RS-232:

- Connect the RS-232 9-pin D-sub rear panel port on the **VS-42HN** 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

## 6.6 Connecting to the VS-42HN 4x2 HDMI Matrix Switcher via Ethernet

You can connect the **VS-42HN** via the Ethernet, using a crossover cable (see [Section 6.6.1](#)) for direct connection to the PC or a straight through cable (see [Section 6.6.2](#)) 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 (FC-11) guide.pdf" file in the technical support section at <http://www.kramerelectronics.com>.

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

You can connect the Ethernet port of the **VS-42HN** 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 **VS-42HN** during the initial configuration

**After connecting the Ethernet port, configure your PC as follows:**

1. On your desktop, right-click the **My Network Places** icon.
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 (see [Figure 4](#)).

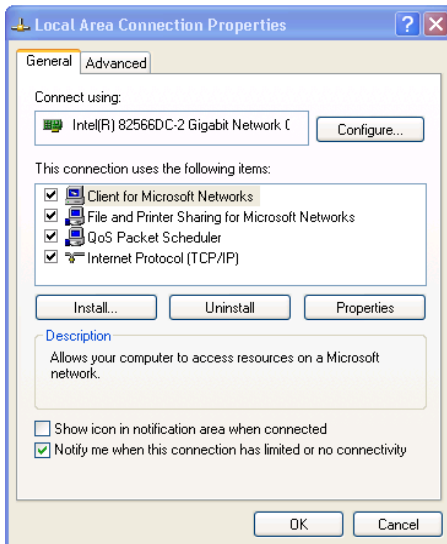


Figure 4: Local Area Connection Properties Window

6. Select Use the following IP Address, and fill in the details as shown in [Figure 5](#).
7. Click **OK**.

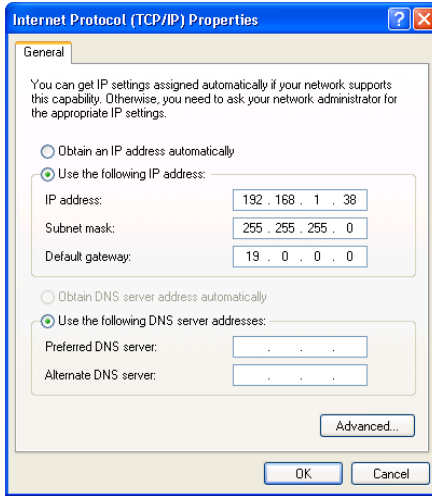


Figure 5: Internet Protocol (TCP/IP) Properties Window

## 6.6.2 Connecting the Ethernet Port via a Network Hub

You can connect the Ethernet port of the **VS-42HN** to the Ethernet port on a network hub or network router, via a straight through cable with RJ-45 connectors.

## 6.7 Upgrading the Firmware

For instructions on upgrading the firmware see “*Upgrading the VS-42HN Firmware Using the STC Software*”.

## 7 Technical Specifications

INPUTS:	4 HDMI Connectors
OUTPUTS:	2 HDMI Connectors
BANDWIDTH:	Up to 6.75Gbps data rate (2.25Gbps per graphic channel)
COMPLIANCE WITH HDMI STANDARD:	HDMI and HDCP
RESOLUTION:	Up to UXGA; 1080p
POWER CONSUMPTION:	100–240V AC, 50/60Hz, 21VA
CONTROLS:	Front panel buttons, infrared remote control transmitter, RS-232, Ethernet
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 7.24" x 1U (W, D, H)
WEIGHT:	1.6kg (3.53lbs) approx.
ACCESSORIES:	Power cord, IR transmitter, rack "ears"
OPTIONS:	External remote IR receiver cable
Specifications are subject to change without notice at <a href="http://www.kramerelectronics.com">http://www.kramerelectronics.com</a>	

## 8 Default Communication Parameters

RS-232			
Protocol 2000		Protocol 3000 (Default)	
Baud Rate:	9600	Baud Rate:	115,200
Data Bits:	8	Data Bits:	8
Stop Bits:	1	Stop Bits:	1
Parity:	None	Parity:	None
Command Format:	HEX	Command Format:	ASCII
Example (Output 1 to Input 1):	0x01, 0x81, 0x81, 0x81	Example (Output 1 to Input 1):	#AV 1>1<CR>
Switching Protocol			
P2000 -> P3000		P3000 -> P2000	
Command:	0x38, 0x80, 0x83, 0x81	Command:	#P2000<CR>
Front Panel:	Press and hold Output 1 and Output 3 simultaneously	Front Panel:	Press and hold Output 1 and Output 2 simultaneously
Ethernet			
Default Settings		Reset Settings	
IP Address: 192.168.1.39		Power cycle the unit while holding in the Factory Reset button, located on the rear panel of the unit.	
TCP Port #: 5000			
UDP Port #: 50000			

## 9 Default EDID

### Monitor

Model name..... VS-42HN  
Manufacturer..... KRM  
Plug and Play ID..... KRM0200  
Serial number..... 1  
Manufacture date..... 2010, ISO week 24  
Filter driver..... None

EDID revision..... 1.3  
Input signal type..... Digital (DVI)  
Color bit depth..... Undefined  
Display type..... RGB color  
Screen size..... 700 x 390 mm (31 5 in)  
Power management..... Not supported  
Extension blocs..... 1 (CEA-EXT)  
DDC/CI..... n/a

### Color characteristics

Default color space..... Non-sRGB  
Display gamma..... 2.20  
Red chromaticity..... Rx 0.640 - Ry 0.341  
Green chromaticity..... Gx 0.286 - Gy 0.610  
Blue chromaticity..... Bx 0.146 - By 0.069  
White point (default).... Wx 0.284 - Wy 0.293  
Additional descriptors... None

### Timing characteristics

Horizontal scan range.... 31-94kHz  
Vertical scan range..... 50-85Hz  
Video bandwidth..... 170MHz  
CVT standard..... Not supported  
GTF standard..... Not supported  
Additional descriptors... None  
Preferred timing..... Yes  
Native/preferred timing.. 1280x720p at 60Hz  
Modeline..... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 746 +hsync -vsync  
Detailed timing #1..... 1920x1080p at 60Hz (16:9)  
Modeline..... "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync

### Standard timings supported

720 x 400p at 70Hz - BM VGA  
720 x 400p at 88Hz - BM XGA2  
640 x 480p at 60Hz - BM VGA  
640 x 480p at 67Hz - Apple Mac II  
640 x 480p at 72Hz - VESA  
640 x 480p at 75Hz - VESA  
800 x 600p at 56Hz - VESA  
800 x 600p at 60Hz - VESA  
800 x 600p at 72Hz - VESA  
800 x 600p at 75Hz - VESA  
832 x 624p at 75Hz - Apple Mac II  
1024 x 768i at 87Hz - IBM  
1024 x 768p at 60Hz - VESA  
1024 x 768p at 70Hz - VESA  
1024 x 768p at 75Hz - VESA  
1280 x 1024p at 75Hz - VESA  
1152 x 870p at 75Hz - Apple Mac II  
1280 x 720p at 60Hz - VESA STD  
1280 x 800p at 60Hz - VESA STD  
1440 x 900p at 60Hz - VESA STD  
1280 x 960p at 60Hz - VESA STD  
1280 x 1024p at 60Hz - VESA STD  
1400 x 1050p at 60Hz - VESA STD  
1680 x 1050p at 60Hz - VESA STD  
1600 x 1200p at 60Hz - VESA STD

### EIA/CEA-861 Information

Revision number..... 3  
IT underscan..... Not supported  
Basic audio..... Supported  
YCbCr 4:4:4..... Supported  
YCbCr 4 2:2..... Supported  
Native formats..... 1

Detailed timing #1..... 720x480p at 60Hz (4 3)  
Modeline..... "720x480" 27.000 720 736 798 858 480 489 495 525 -hsync -vsync  
Detailed timing #2..... 1920x1080i at 60Hz (16:9)  
Modeline..... "1920x1080" 74.250 1920 2008 2052 2200 1080 1084 1094 1124 interlace +hsync +vsync  
Detailed timing #3..... 1920x1080i at 50Hz (16:9)  
Modeline..... "1920x1080" 74.250 1920 2448 2492 2640 1080 1084 1094 1124 interlace +hsync +vsync  
Detailed timing #4..... 1280x720p at 60Hz (16 9)  
Modeline..... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync  
Detailed timing #5..... 1280x720p at 50Hz (16 9)  
Modeline..... "1280x720" 74.250 1280 1720 1760 1980 720 725 730 750 +hsync +vsync

CE video identifiers (VICs) - timing/formats supported

720 x 576p at 50Hz - EDTV (4 3, 16:15)  
1280 x 720p at 50Hz - HDTV (16 9, 1:1)  
1920 x 1080i at 60Hz - HDTV (16:9, 1:1)  
1920 x 1080i at 50Hz - HDTV (16:9, 1:1)  
1280 x 720p at 60Hz - HDTV (16 9, 1:1) [Native]  
1920 x 1080p at 60Hz - HDTV (16:9, 1:1)  
1920 x 1080p at 50Hz - HDTV (16:9, 1:1)  
NB: NTSC refresh rate = (Hz\*1000)/1001

CE audio data (formats supported)

LPCM 3-channel, 24-bits at 44/48 kHz

CE speaker allocation data

Channel configuration.... 3 0  
Front left/right..... Yes  
Front LFE..... No  
Front center..... Yes  
Rear left/right..... No  
Rear center..... No  
Front left/right center.. No  
Rear left/right center... No  
Rear LFE..... No

CE vendor specific data (VSDB)

EEE registration number. 0x000C03  
CEC physical address..... 1 0.0.0  
Maximum TMDS clock..... 165MHz

Report information

Date generated..... 08-Jul-12  
Software revision..... 2 60.0 972  
Data source..... File  
Operating system..... 5.1 2600.2.Service Pack 3

Raw data

00,FF,FF,FF,FF,FF,FF,00,2E,4D,00,02,01,00,00,00,18,14,01,03,81,46,27,78,0A,D5,7C,A3,57,49,9C,25,  
11,48,4B,FF,FF,80,81,C0,81,00,95,00,81,40,81,80,90,40,B3,00,A9,40,01,1D,00,72,51,D0,1A,20,6E,28,  
55,00,7E,88,42,00,00,1A,02,3A,80,18,71,38,2D,40,58,2C,45,00,C4,8E,21,00,00,1E,00,00,00,FC,00,56,  
53,2D,34,32,48,4E,0A,20,20,00,00,00,00,00,FD,00,32,55,1F,5E,11,00,0A,20,20,20,20,20,01,7B,  
02,03,1A,71,47,11,13,05,14,84,10,1F,23,0A,06,04,83,05,00,65,03,0C,00,10,00,8C,0A,D0,8A,20,E0,  
2D,10,10,3E,96,00,58,C2,21,00,00,18,01,1D,80,18,71,1C,16,20,58,2C,25,00,C4,8E,21,00,00,9E,01,1D,  
80,D0,72,1C,16,20,10,2C,25,80,C4,8E,21,00,00,9E,01,1D,00,72,51,D0,1E,20,6E,28,55,00,C4,8E,21,00,  
00,1E,01,1D,00,BC,52,D0,1E,20,B8,28,55,40,C4,8E,21,00,00,1E,00,00,00,00,00,00,00,00,00,00,00,90

# 10 Kramer Protocol 2000

The Kramer Protocol 2-000 RS-232/RS-485 communication uses four bytes of information as defined below. All the values in the table are decimal, unless otherwise stated.

MSB		INSTRUCTION						LSB
DESTINATION		INSTRUCTION						
0	D	N5	N4	N3	N2	N1	N0	
7	6	5	4	3	2	1	0	
1st byte								
INPUT								
1	I6	I5	I4	I3	I2	I1	I0	
7	6	5	4	3	2	1	0	
2nd byte								
OUTPUT								
1	O6	O5	O4	O3	O2	O1	O0	
7	6	5	4	3	2	1	0	
3rd byte								
		MACHINE NUMBER						
1	OVR	X	M4	M3	M2	M1	M0	
7	6	5	4	3	2	1	0	
4th byte								

1st BYTE: Bit 7 – Defined as 0.

D – "DESTINATION": 0 - for sending information to the switchers (from the PC);

1 - for sending to the PC (from the switcher).

N5 N0 – "NSTRUCTION"

The function that is to be performed by the switcher(s) is defined by the NSTRUCTION (6 bits). Similarly, if a function is performed via the machine's keyboard, then these bits are set with the NSTRUCTION NO., which was performed. The instruction codes are defined according to the table below (INSTRUCTION NO. is the value to be set for N5 N0).

2nd BYTE: Bit 7 – Defined as 1.

I6 I0 – "INPUT".

When switching (ie. instruction codes 1 and 2), the NPUT (7 bits) is set as the input number which is to be switched.

Similarly, if switching is done via the machine's front-panel, then these bits are set with the INPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

3rd BYTE: Bit 7 – Defined as 1.

O6 O0 – "OUTPUT".

When switching (ie. instruction codes 1 and 2), the OUTPUT (7 bits) is set as the output number which is to be switched.

Similarly, if switching is done via the machine's front-panel, then these bits are set with the OUTPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

4th BYTE: Bit 7 – Defined as 1.

Bit 5 – Don't care.

OVR – Machine number override.

M4 M0 – MACHINE NUMBER.

Used to address machines in a system via their machine numbers. When several machines are controlled from a single serial port, they are usually configured together with each machine having an individual machine number. If the OVR bit is set, then all machine numbers accept (implement) the command, and the addressed machine replies. For a single machine controlled via the serial port, always set M4 M0 = 1, and make sure that the machine itself is configured as MACH NE NUMBER = 1.



Instruction Codes for Protocol 2000				
Instruction		Definition for Specific Instruction		Notes
#	Description	Input	Output	
0	RESET VIDEO	0	0	1
1	SWITCH VIDEO	Set equal to video input which is to be switched (0 = disconnect)	Set equal to video output which is to be switched (0 = to all the outputs)	2, 15
3	STORE VIDEO STATUS	Set as SETUP #	0 - to store 1 - to delete	2, 3, 15
4	RECALL VIDEO STATUS	Set as SETUP #	0	2, 3, 15
5	REQUEST STATUS OF A VIDEO OUTPUT	Set as SETUP #	Equal to output number whose status is reqd	4, 3
15	REQUEST WHETHER SETUP IS DEFINED / VALID INPUT IS DETECTED	SETUP # or Input #	0 - for checking if setup is defined 1 - for checking if input is valid	8
30	LOCK FRONT PANEL	0 - Panel unlocked 1 - Panel locked	0	2
31	REQUEST WHETHER PANEL IS LOCKED	0	0	16
61	DENTIFY MACHINE	1 - video machine name 2 - audio machine name 3 - video software version 4 - audio software version 5 - RS422 controller name 6 - RS422 controller version 7 - remote control name 8 - remote software version 9 - Protocol 2000 revision	0 - Request first 4 digits 1 - Request first suffix 2 - Request second suffix 3 - Request third suffix 10 - Request first prefix 11 - Request second prefix 12 - Request third prefix	13
62	62	DEFINE MACHINE	1 - number of inputs 2 - number of outputs 3 - number of setups	1 - for video 2 - for audio 3 - for SDI 4 - for remote panel 5 - for RS-422 controller

NOTES on the above table:

**NOTE 1** - When the master switcher is reset, (e.g. when it is turned on), the reset code is sent to the PC. If this code is sent to the switchers, it resets according to the present power-down settings.

**NOTE 2** - These are bi-directional definitions. That is, if the switcher receives the code, it performs the instruction; and if the instruction is performed (due to a keystroke operation on the front panel), then these codes are sent. For example, if the HEX code

01            85            88            83  
was sent from the PC, then the switcher (machine 3) switches input 5 to output 8. If the user switched input 1 to output 7 via the front panel keypad, then the switcher sends HEX codes:  
41            81            87            83  
to the PC.

When the PC sends one of the commands in this group to the switcher, then, if the instruction is valid, the switcher replies by sending to the PC the same four bytes that it was sent (except for the first byte, where the DEST NATION bit is set high).

**NOTE 3** - SETUP # 0 is the present setting. SETUP # 1 and higher are the settings saved in the switcher's memory, (i.e. those used for Store and Recall).

**NOTE 4** - The reply to a "REQUEST" instruction is as follows: the same instruction and INPUT codes as were sent are returned, and the OUTPUT is assigned the value of the requested parameter. The replies to instructions 10 and 11 are as per the definitions in instructions 7 and 8 respectively. For example, if the present status of machine number 5 is breakaway setting, then the reply to the HEX code

0B            80            80            85  
would be HEX codes  
4B            80            81            85

**NOTE 8** - The reply is as in TYPE 3 above, except that here the OUTPUT is assigned with the value 0 if the setup is not defined / no valid input is detected; or 1 if it is defined / valid input is detected.

**NOTE 13** - This is a request to identify the switcher/s in the system. If the OUTPUT is set as 0, and the INPUT is set as 1, 2, 5 or 7, the machine sends its name. The reply is the decimal value of the INPUT and OUTPUT. For example, for a 2216, the reply to the request to send the audio machine name would be (HEX codes):  
 7D            96            90            81 (i.e. 128dec+ 22dec for 2nd byte, and 128dec+ 16dec for 3rd byte).

If the request for identification is sent with the INPUT set as 3 or 4, the appropriate machine sends its software version number. Again, the reply would be the decimal value of the INPUT and OUTPUT - the INPUT representing the number in front of the decimal point, and the OUTPUT representing the number after it. For example, for version 3.5, the reply to the request to send the version number would be (HEX codes):  
 7D            83            85            81 (i.e. 128dec+ 3dec for 2nd byte, 128dec+ 5dec for 3rd byte).

If the OUTPUT is set as 1, then the ASCII coding of the lettering following the machine's name is sent. For example, for the VS-7588YC, the reply to the request to send the first suffix would be (HEX codes):  
 7D            D9            C3            81 (i.e. 128dec+ ASCII for "Y"; 128dec+ ASCII for "C").

**NOTE 14** - The number of inputs and outputs refers to the specific machine which is being addressed, not to the system. For example, if six 16X16 matrices are configured to make a 48X32 system (48 inputs, 32 outputs), the reply to the HEX code

3E            82            81            82 (ie. request the number of outputs)  
 would be HEX codes  
 7E            82            90            82  
 ie. 16 outputs

**NOTE 15** - When the OVR bit (4th byte) is set, then the "video" commands have universal meaning. For example, instruction 1 (SWITCH VIDEO) causes all units (including audio, data, etc.) to switch. Similarly, if a machine is in "FOLLOW" mode, it performs any "video" instruction.

**NOTE 16** - The reply to the "REQUEST WHETHER PANEL IS LOCKED" is as in NOTE 4 above, except that here the OUTPUT is assigned with the value 0 if the panel is unlocked, or 1 if it is locked.

# 11 Protocol 3000

The **VS-42HN** can be operated using serial commands from a PC, remote controller or touch screen using the Kramer Protocol 3000.

This section describes:

- Kramer Protocol 3000 syntax (see [Section 11.1](#))
- Kramer Protocol 3000 commands (see [Section 11.2](#))

## 11.1 Kramer Protocol 3000 Syntax

### 11.1.1 Host Message Format

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

#### 11.1.1.1 Simple Command

Command string with only one command without addressing:

Start	Body	Delimiter
#	<b>Command</b> <b>SP</b> <i>Parameter_1,Parameter_2,...</i>	<b>CR</b>

#### 11.1.1.2 Command String

Formal syntax with commands concatenation and addressing:

Start	Address	Body	Delimiter
#	<i>Destination_id@</i>	<b>Command_1</b> <i>Parameter1_1,Parameter1_2,... </i> <b>Command_2</b> <i>Parameter2_1,Parameter2_2,... </i> <b>Command_3</b> <i>Parameter3_1,Parameter3_2,... ...</i>	<b>CR</b>

### 11.1.2 Device Message Format

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

#### 11.1.2.1 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 LF</b>

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

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

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

### 11.1.3 Command Terms

#### Command

A sequence of ASCII letters ('A'-'Z', 'a'-'z' and '-').

Command and parameters must be separated by at least one space.

#### Parameters

A sequence of alphanumeric ASCII characters ('0'-'9','A'-'Z','a'-'z' and some special characters for specific commands). Parameters are separated by commas.

#### Message string

Every command entered as part of a message string begins with a **message starting character** and ends with a **message closing character**.

**Note:** A string can contain more than one command. Commands are separated by a pipe ( '|' ) character.

#### Message starting character

'#' – For host command/query

'~' – For device response

#### Device address (Optional, for K-NET)

K-NET Device ID followed by '@'

#### Query sign

'?' follows some commands to define a query request.

#### Message closing character

**CR** – For host messages; carriage return (ASCII 13)

**CRLF** – For device messages; carriage return (ASCII 13) + line-feed (ASCII 10)

#### Command chain separator character

When a message string contains more than one command, a pipe ( '|' ) character separates each command.

Spaces between parameters or command terms are ignored.

### 11.1.4 Entering Commands

You can directly enter all commands using a terminal with ASCII communications software, such as HyperTerminal, Hercules, etc. Connect the terminal to the serial or Ethernet port on the Kramer device. To enter **CR** press the Enter key. (**LF** is also sent but is ignored by command parser).

For commands sent from some non-Kramer controllers like Crestron, some characters require special coding (such as, /X##). Refer to the controller manual.

### 11.1.5 Command Forms

Some commands have short name syntax in addition to long name syntax to allow faster typing. The response is always in long syntax.

### 11.1.6 Chaining Commands

Multiple commands can be chained in the same string. Each command is delimited by a pipe character (“|”). When chaining commands, enter the **message starting character** and the **message closing character** only once, at the beginning of the string and at the end.

Commands in the string do not execute until the closing character is entered.

A separate response is sent for every command in the chain.

### 11.1.7 Maximum String Length

64 characters

## 11.2 Kramer Protocol 3000 Commands

Command	Short Form	Description	Permission
#		Protocol handshaking	End User
BUILD-DATE?		Read device build date	End User
CPEDID		Copy EDID data from the output to the input EEPROM	End User
DISPLAY?		Read if output is valid	End User
FACTORY		Reset to factory default configuration	
GETEDID		Read EDID data	User SW Internal
GETEDID-EXT		Read EDID data from external device connected to output	User SW Internal
HELP		List of commands	End User
IDV		Visual identify device	End User
INFO-IO?		Read in/out count	End User
INFO-PRST?		Read maximum preset count	End User
LOCK-FP	LCK	Lock front panel	Administrator
LOCK-FP?	LCK?	Read Lock front panel	End User
MODEL?		Read device model	End User
P2000		Switch to protocol 2000	End User
PROT-VER?		Read device protocol version	End User
PRST-LST?		Read saved presets list	End User
PRST-RCL		Recall saved preset	End User
PRST-STO		Store current connections to preset	End User
PRST-VID?		Read video connections from saved preset	End User
RESET		Reset device	Administrator
SIGNAL?		Read if input is valid	End User
SN?		Read device serial number	End User
VERSION?		Read device firmware version	End User
VID		Switch Video only	End User
VID?		Get Video switch state	End User

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