



KRAMER ELECTRONICS LTD.

USER MANUAL

MODEL:

VS-161H
16x1 HDMI Switcher

P/N: 2900-000665 Rev 6

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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 **VS-161H** *16x1 HDMI Switcher*. This product is ideal for:

- Conference room presentations
- Rental and staging

Note: The Kramer **VS-161H** is identical to the **VS-161HDMI**, just the name has changed by replacing the suffix “HDMI” by “H” (according to the HDMI Guideline).

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 device



Go to www.kramerav.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-161H** away from moisture, excessive sunlight and dust

3 Overview

The Kramer **VS-161H** is a high quality switcher for HDMI signals. It equalizes the signal and switches one of the 16 inputs to a single HDMI output.

In particular, the **VS-161H** features:

- Support for up to 1.65Gbps bandwidth per graphic channel
Suitable for resolutions up to UXGA at 60Hz, and for all HD resolutions
- HDCP support (High Definition Digital Content Protection)
- HDMI support (HDMI V1.3 with Lip Sync and CEC)
- EDID PassThru that passes EDID/HDCP signals from source to display
- A Mute button to disconnect the output
- A Panel Lock button to prevent unwanted tampering with the buttons on the front panel
- Installation in 1U of a standard 19" professional rack enclosure

You can control the **VS-161H** using the front panel buttons, or remotely via:

- RS-232/RS-485 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

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 CEC, 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 @60Hz), standard definition formats such as NTSC or PAL, as well as 480p and 576p

3.2 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.

3.3 Defining the VS-161H 16x1 HDMI Switcher

[Figure 1](#) defines the front and rear panels of the **VS-161H**.

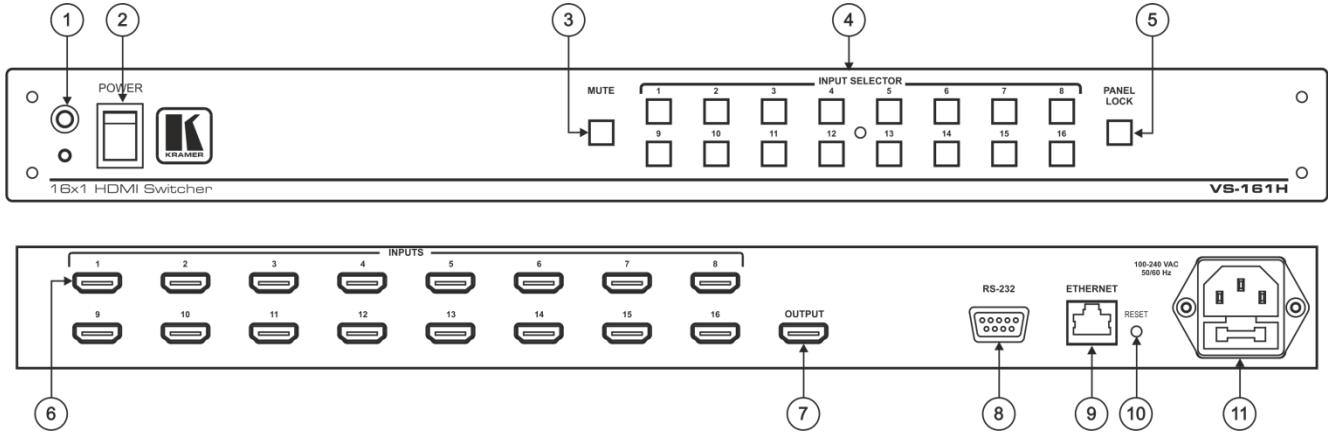


Figure 1: VS-161H 16x1 HDMI Switcher Front and Rear Panels

#	Feature	Function
1	IR Receiver	The red LED lights when receiving signals from the Infrared remote control transmitter
2	<i>POWER</i> Switch	Illuminated switch for turning the unit on or off
3	<i>MUTE</i> Button	Press to toggle disconnecting the output
4	<i>INPUT SELECTOR</i> Buttons	Press the <i>INPUT</i> button to select input (from 1 to 16)
5	<i>PANEL LOCK</i> Button	Press to toggle disengaging the front panel buttons, to acquire the EDID and to set to the PC/DVD mode
6	<i>INPUT</i> HDMI Connectors	Connect to the HDMI sources (from 1 to 16)
7	<i>OUTPUT</i> HDMI Connector	Connect to the HDMI acceptor
8	<i>RS-232</i> DB-9 (F) Port	Connect to a PC/serial controller (see Section 5.1)
9	<i>ETHERNET</i> Connector	Connect to a PC via a LAN (see Section 5.2)
10	<i>RESET</i> Button	Press while turning on the device to reset the device to factory default values (see Section 6.4 and Section 8)
11	Power Connector with Fuse	Plug in the power cord and switch the device on and off

4 Installing in a Rack

This section provides instructions for rack mounting the unit.

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

OPERATING TEMPERATURE:	0° to +55°C (32° to 131°F)
STORAGE TEMPERATURE:	-45° to +72°C (-49° to 162°F)
HUMIDITY:	10% to 90%, RHL non-condensing



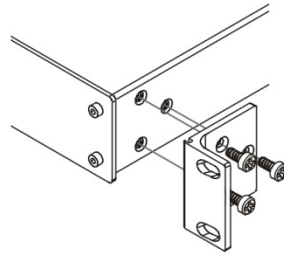
CAUTION!

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 VS-161H 16x1 HDMI Switcher



Always switch off the power to each device before connecting it to your **VS-161H**. After connecting your **VS-161H**, connect its power and then switch on the power to each device.

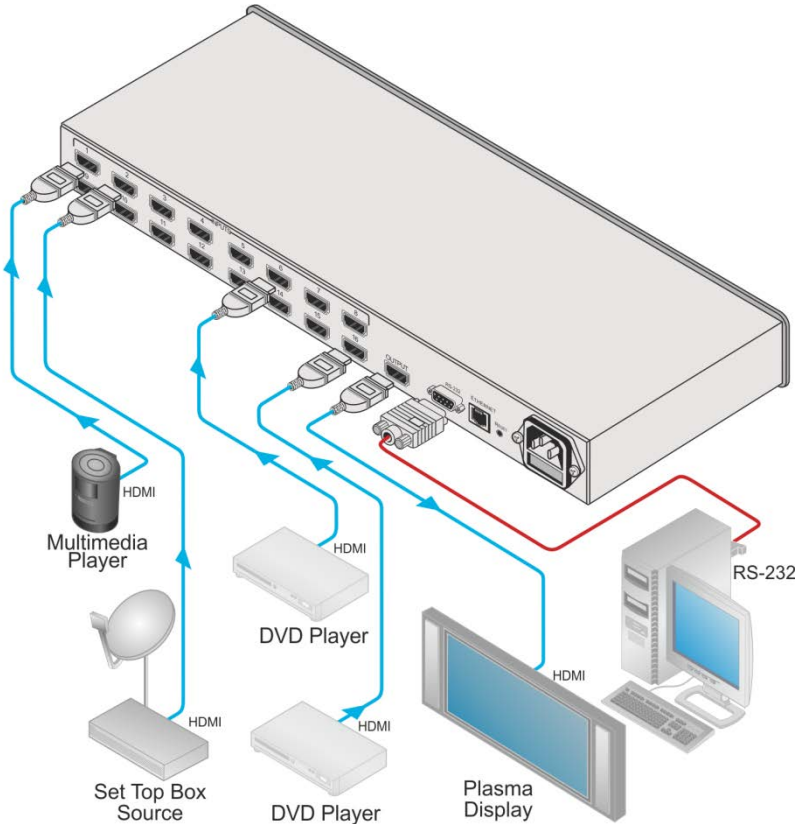


Figure 2: Connecting the VS-161H 16x1 HDMI Switcher

To connect the VS-161H 16x1 HDMI Switcher as illustrated in the example in [Figure 2](#):

1. If required:
 - Set the appropriate INPUTS to the DVD/PC mode
 - Acquire the EDID
2. Connect the HDMI sources as follows:
 - A multimedia player to INPUT 1
 - A set top box to INPUT 2
 - A DVD player to INPUT 6
 - A DVD player to INPUT 16
3. Connect the OUTPUT HDMI connector to an HDMI acceptor (for example, a plasma display).
4. If required, connect a PC and/or controller to the RS-232 port and/or the Ethernet port.
5. Connect the power cord and power the device on.

Note: The Mute button flashes if the EDID of the device connected to the output is different from the EDID which is currently stored.

5.1 Connecting to the VS-161H Using the RS-232 Connection

You can connect to the unit via a crossed RS-232 connection, using for example, a PC. A crossed cable or null-modem is required as shown in method A and B respectively. If a shielded cable is used, connect the shield to pin 5.

Method A ([Figure 3](#))—Connect the RS-232 9-pin D-sub port on the unit via a crossed cable (only pin 2 to pin 3, pin 3 to pin 2, and pin 5 to pin 5 need be connected) to the RS-232 9-pin D-sub port on the PC.

Note: There is no need to connect any other pins.

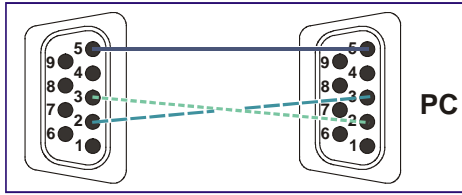


Figure 3: Crossed Cable RS-232 Connection

Hardware flow control is not required for this unit. In the rare case where a controller requires hardware flow control, short pin 1 to 7 and 8, and pin 4 to 6 on the controller side.

Method B (Figure 4)—Connect the RS-232 9-pin D-sub port on the unit via a straight (flat) cable to the null-modem adapter, and connect the null-modem adapter to the RS-232 9-pin D-sub port on the PC. The straight cable usually contains all nine wires for a full connection of the D-sub connector. Because the null-modem adapter (which already includes the flow control jumpering described in Method A above) only requires pins 2, 3 and 5 to be connected, you are free to decide whether to connect only these 3 pins or all 9 pins.

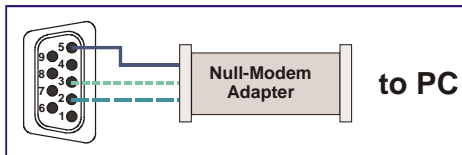


Figure 4: Straight Cable RS-232 Connection with a Null Modem Adapter

5.2 Connecting to the VS-161H Using Ethernet

You can connect the **VS-161H** via the Ethernet, using a crossover cable (see [Section 5.2.2](#)) for direct connection to the PC or a straight through cable (see [Section 5.2.3](#)) 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 www.kramerav.com.

5.2.1 Configuring the Ethernet Port

After connecting the Ethernet port, you have to install and configure it.

For detailed instructions on how to install and configure your Ethernet port, see the *Ethernet Configuration (FC-11) guide.pdf* on our Web site at www.kramerav.com.

5.2.2 Connecting the Ethernet Port directly to a PC

You can connect the Ethernet port of the **VS-161H** 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-161H** 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 5](#)).

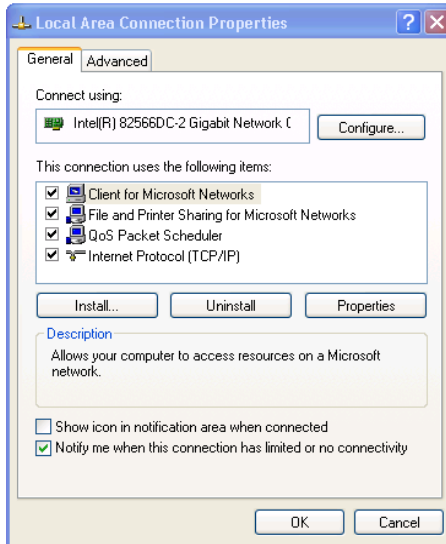


Figure 5: Local Area Connection Properties Window

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

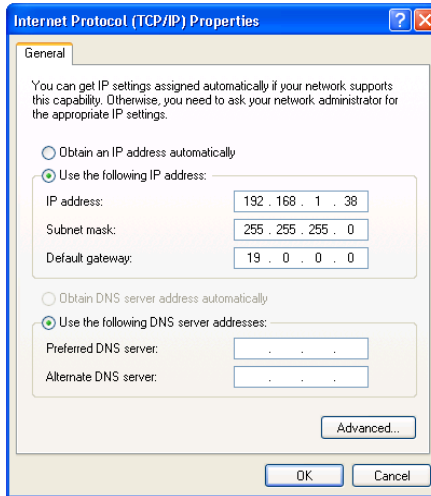


Figure 6: Internet Protocol (TCP/IP) Properties Window

5.2.3 Connecting the Ethernet Port via a Network Hub

You can connect the Ethernet port of the **VS-161H** to the Ethernet port on a network hub or network router, via a straight through cable with RJ-45 connectors.

6 Operating the VS-161H 16x1 HDMI Switcher

This section describes:

- The PC and DVD modes (see [Section 6.1](#))
- Acquiring the EDID (see [Section 6.2](#))
- Locking and unlocking the front panel buttons (see [Section 6.3](#))
- Resetting to the factory default values (see [Section 6.4](#))
- Upgrading the firmware (see [Section 6.5](#))

6.1 The PC and DVD Modes

The **VS-161H** has two operation modes that are specific per input: the PC mode and the DVD mode:

- The PC mode is used when connecting a computer or several computers to one or more of the inputs via a DVI-to-HDMI converter cable (for example, the Kramer HDMI-DVI Gold Plated Cable in various lengths). This is the default mode
- The DVD mode is used when connecting a DVD or several DVDs to the inputs

When in the PC mode, the input has access to the EDID (default or acquired) to prevent the computer from resetting if an output is not connected. In the DVD mode, the EDID of the connected output is available only when the input to which the DVD is connected, is switched to the output.

The PC mode and the DVD mode can be applied to a single input or to several inputs. For example, if you want to connect a computer to INPUT 1, another computer to INPUT 2, and DVD machines to all the other inputs (from INPUT 3 to INPUT 16), set INPUT 1 and INPUT 2 to the PC mode and all the other inputs to the DVD mode.

To set the inputs to either the PC or the DVD mode:

1. Turn the power off.

2. Press the PANEL LOCK button while turning the POWER on again.
The INPUT buttons flash simultaneously.
3. Keep pressing and holding the PANEL LOCK button for a few seconds and then release it.
The PANEL LOCK button flashes. If an input button lights this indicates that that input is set to the DVD mode. If no input button lights this indicates that that input is set to the PC mode.
4. Toggle between the PC mode (input button not lit) and the DVD mode (input button lights) by pressing that input.
5. Press the PANEL LOCK button to exit this mode.
6. You can connect a computer to the input(s) that is set to the PC mode and a DVD to the input(s) that is set to the DVD mode.

The following table summarizes the differences between the PC mode and the DVD mode.

PC Mode	DVD Mode
The input is connected to a computer	The input is connected to a multimedia application, such as a DVD, a set top box and so on
The EDID is available at all times (to prevent computer reset)	The EDID is available only when that input is connected to an output
The input EDID source is the default EDID or an acquired EDID (see Section 6.2)	The input EDID source is acquired directly from the connected output

6.2 Acquiring the EDID

The acquired EDID is used when an input is set to the PC mode.

To acquire the EDID:

1. Turn the POWER off.
2. Press the PANEL LOCK button and the INPUT 16 button while turning the POWER on again.
The INPUT buttons flash in sequence until the unit has completed reading the EDID.

3. Release the PANEL LOCK and INPUT 16 buttons.

If an output was connected, the output EDID is read to all the inputs. If an output was not connected to the machine, the default EDID is read to the inputs.

Note: The Mute button flashes if the EDID of the device connected to the output is different from the EDID which is currently stored.

6.3 Locking and Unlocking the Front Panel

To lock and unlock the front panel buttons:

1. Press and hold the Panel Lock button until the button lights.
The front panel buttons are locked.
2. Press and hold the Panel Lock button again until the button no longer lights.
The front panel buttons are unlocked.

6.4 Resetting the Device to Factory Default Values

To reset to factory default values:

1. Turn the **VS-161H** off.
2. Press and hold the Reset button on the rear panel while turning the device on.
3. After approximately five seconds release the Reset button.
The device is reset to its factory default values (see [Section 6.4](#)).

6.5 Upgrading the Firmware

For instructions on upgrading the firmware see “*Upgrading the VS-161H Firmware Using the K-Upload Software*”.

7 Technical Specifications

INPUTS:	16 HDMI connectors
OUTPUT:	1 HDMI connector
BANDWIDTH:	Supports up to 1.65Gbps bandwidth per graphic channel
COMPLIANCE WITH HDMI STANDARD:	Supports HDMI and HDCP
RESOLUTION:	Up to UXGA; 1080p
POWER CONSUMPTION:	90–240VAC; 50/60Hz, 22VA
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" x 1U (W, D, H)
WEIGHT:	2.5kg (5.5lbs) approx.
ACCESSORIES:	Power cord, null-modem adapter, rack "ears", IR remote control
OPTIONS:	Kramer HDMI cables (for example, the C-HM/HM series, the C-HM/DM series and/or our HDMI over fiber optics C-FOHM/FOHM series)
Specifications are subject to change without notice at www.kramerav.com	

8 Default Communication Parameters

RS-232	
Protocol 2000	
Baud Rate:	9600
Data Bits:	8
Stop Bits:	1
Parity:	None
Command Format:	Hex
Example (Output 1 to Input 1):	0x01, 0x81, 0x81, 0x81
Ethernet	
Default Settings	Reset Settings
IP Address: 192.168.1.39	Power cycle the device while holding in the Factory Reset button, located on the rear panel of the unit
TCP Port #: 5000	
UDP Port #: 50000	

9 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								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 – "INSTRUCTION"

The function that is to be performed by the switcher(s) is defined by the INSTRUCTION (6 bits). Similarly, if a function is performed via the machine's keyboard, then these bits are set with the INSTRUCTION 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 INPUT (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 MACHINE NUMBER = 1.

Instruction Codes for Protocol 2000				
Instruction		Definition for Specific Instruction		Notes
#	Description	Input	Output	
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
30	LOCK FRONT PANEL	0 - Panel unlocked 1 - Panel locked	0	2

NOTES on the above table:

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 DESTINATION bit is set high).

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.

LIMITED WARRANTY

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

What is Covered

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

What is Not Covered

This limited warranty does not cover any damage, deterioration or malfunction resulting from any alteration, modification, improper or unreasonable use or maintenance, misuse, abuse, accident, neglect, exposure to excess moisture, fire, improper packing and shipping (such claims must be presented to the carrier), lightning, power surges, or other acts of nature. This limited warranty does not cover any damage, deterioration or malfunction resulting from the installation or removal of this product from any installation, any unauthorized tampering with this product, any repairs attempted by anyone unauthorized by Kramer Electronics to make such repairs, or any other cause which does not relate directly to a defect in materials and/or workmanship of this product. This limited warranty does not cover cartons, equipment enclosures, cables or accessories used in conjunction with this product.

Without limiting any other exclusion herein, Kramer Electronics does not warrant that the product covered hereby, including, without limitation, the technology and/or integrated circuit(s) included in the product, will not become obsolete or that such items are or will remain compatible with any other product or technology with which the product may be used.

How Long Does this Coverage Last

Seven years as of this printing; please check our Web site for the most current and accurate warranty information.

Who is Covered

Only the original purchaser of this product is covered under this limited warranty. This limited warranty is not transferable to subsequent purchasers or owners of this product.

What Kramer Electronics will do

Kramer Electronics will, at its sole option, provide one of the following three remedies to whatever extent it shall deem necessary to satisfy a proper claim under this limited warranty:

1. Elect to repair or facilitate the repair of any defective parts within a reasonable period of time, free of any charge for the necessary parts and labor to complete the repair and restore this product to its proper operating condition. Kramer Electronics will also pay the shipping costs necessary to return this product once the repair is complete.
2. Replace this product with a direct replacement or with a similar product deemed by Kramer Electronics to perform substantially the same function as the original product.
3. Issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time remedy is sought under this limited warranty.

What Kramer Electronics will not do Under This Limited Warranty

If this product is returned to Kramer Electronics or the authorized dealer from which it was purchased or any other party authorized to repair Kramer Electronics products, this product must be insured during shipment, with the insurance and shipping charges prepaid by you. If this product is returned uninsured, you assume all risks of loss or damage during shipment. Kramer Electronics will not be responsible for any costs related to the removal or re-installation of this product from or into any installation. Kramer Electronics will not be responsible for any costs related to any setting up this product, any adjustment of user controls or any programming required for a specific installation of this product.

How to Obtain a Remedy under this Limited Warranty

To obtain a remedy under this limited warranty, you must contact either the authorized Kramer Electronics reseller from whom you purchased this product or the Kramer Electronics office nearest you. For a list of authorized Kramer Electronics resellers and/or Kramer Electronics authorized service providers, please visit our web site at www.kramerelectronics.com or contact the Kramer Electronics office nearest you.

In order to pursue any remedy under this limited warranty, you must possess an original, dated receipt as proof of purchase from an authorized Kramer Electronics reseller. If this product is returned under this limited warranty, a return authorization number, obtained from Kramer Electronics, will be required. You may also be directed to an authorized reseller or a person authorized by Kramer Electronics to repair the product.

If it is decided that this product should be returned directly to Kramer Electronics, this product should be properly packed, preferably in the original carton, for shipping. Cartons not bearing a return authorization number will be refused.

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CE



SAFETY WARNING

Disconnect the unit from the power supply before opening and servicing



P/N: 2900-000665



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