KRAMER ELECTRONICS LTD.

USER MANUAL

MODEL:

VS-311H
Automatic HDMI/Audio Switcher

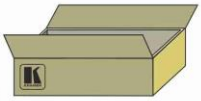
P/N: 2900-000666 Rev 3

VS-311H Quick Start Guide

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

Step 1: Check what's in the box

- **VS-311H** Automatic HDMI/Audio Switcher
- 1 Power supply (12V DC)
- 4 Rubber feet
- 1 Quick Start sheet
- Kramer **RC-IR3** Infrared Remote Control Transmitter with batteries and user manual



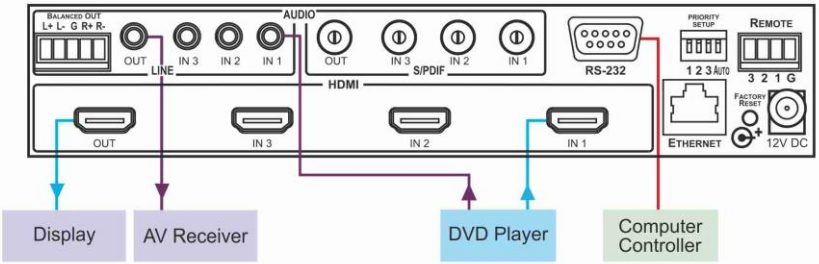
Save the original box and packaging materials in case you need to return your **VS-311H** for service.

Step 2: Install the VS-311H

Attach the rubber feet and place on a table or mount the **VS-311H** in a rack (using an optional **RK-1** rack mount).

Step 3: Connect the inputs and outputs

Always switch off the power on each device before connecting it to your **VS-311H**.



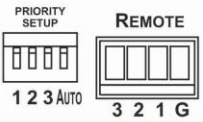
Always use Kramer high-performance cables for connecting AV equipment to the **VS-311H.**

Step 4: Connect the power

Connect the 12V DC power adapter to the **VS-311H** and plug the adapter into the mains electricity.

Step 5: Operate the VS-311H

1. Set the Priority Setup DIP-switches.
2. Connect the Remote control contact closure.
3. Operate via front panel buttons, IR remote control, RS-232, remote control contact closure 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 Products.

Congratulations on purchasing your Kramer **VS-311H** *Automatic HDMI/Audio Switcher*, which is ideal for the following typical applications:

- Systems requiring automatic HDMI routing
- Presentation and multimedia applications

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual

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

2.1 Achieving the Best Performance

To achieve the best performance:

- Use only good quality connection cables (we recommend Kramer high-performance, high-resolution cables) to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Do not secure the cables in tight bundles or roll the slack into tight coils
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality
- Position your Kramer **VS-311H** away from moisture, excessive sunlight and dust

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

2.2 Safety Instructions

Caution: There are no operator serviceable parts inside the unit

Warning: Use only the Kramer Electronics input power wall adapter that is provided with the unit

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

2.3 Recycling Kramer Products

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

2.4 Terminology Used in this User Manual

The following table defines some terms that are used in this user manual.

Term	Definition
802.3	The standard specification for ETHERNET that is maintained by the Institute of Electrical and Electronics Engineers (IEEE).
Dynamic Host Configuration Protocol (DHCP)	Allows the network administrator to distribute IP addresses from a central point and automatically send a new IP address when an Ethernet point is plugged into a different network location.
Gateway	A network position serving as an entry to another network. On the Internet, a node or stopping point can be either a gateway node or a host (end-point) node.
IP Address	A 32-binary digit number that identifies each sender or receiver (within a network via a particular server or workstation) of data (HTML pages or e-mails) that is sent in packets across the Internet. Every device connected to an IP network must have a unique IP address. This address is used to reference the specific unit.
Local Area Network (LAN)	Computers sharing a common communications line or wireless link, which often share a server within a defined geographic area.
Media Access Control (MAC) Address	A computer's unique hardware number (or address) in a LAN or other network. On an Ethernet LAN, the (MAC) address is identical to the Ethernet address.
Transmission Control Protocol/Internet Protocol (TCP/IP)	The basic communication language or protocol of the Internet that breaks the message into appropriately sized packets for the network, and can be used as a communications protocol in an intranet or an extranet.

3 Overview

The **VS-311H** is a high-performance 3x1 HDCP- compatible automatic switcher for HDMI signals, digital audio (S/PDIF) signals and stereo audio signals.

The **VS-311H** switches any one of three HDMI, HDCP compliant sources to a single display device, on HDMI connectors with the corresponding:

- Digital audio (S/PDIF) input signals switched to an S/PDIF output, on RCA connectors and/or
- Unbalanced stereo audio input signals on 3.5 mini-jack connectors switched to an unbalanced stereo audio output on a 3.5 mini-jack connector, as well as to a balanced stereo audio output on a 5-pin terminal block connector

The **VS-311H** can operate either in the manual mode or in the auto mode.

In the manual mode, the **VS-311H** acts as a regular switcher, switching the input video and audio signals to the output via the three front panel INPUT SELECT buttons.

In the auto mode, you can switch any input to the output via the three front panel INPUT SELECT buttons, but once the selected video signal is lost, the machine automatically switches to the highest priority input, according to the input priority setup. The **VS-311H** switches back to the primary input when an HDMI signal is detected on that input.

When selecting an INPUT SELECT button, via the manual or auto mode, that button lights. Pressing an illuminated button deselects that input and that button no longer lights.

The **VS-311H** is housed in a desktop-sized enclosure and is 12V DC fed.

Control the **VS-311H** using the front panel buttons, or remotely via:

- RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller
- The Kramer infrared remote control transmitter
- The ETHERNET
- Remote control contact closure

3.1 Defining the VS-311H Automatic HDMI/Audio Switcher

This section defines the **VS-311H**.

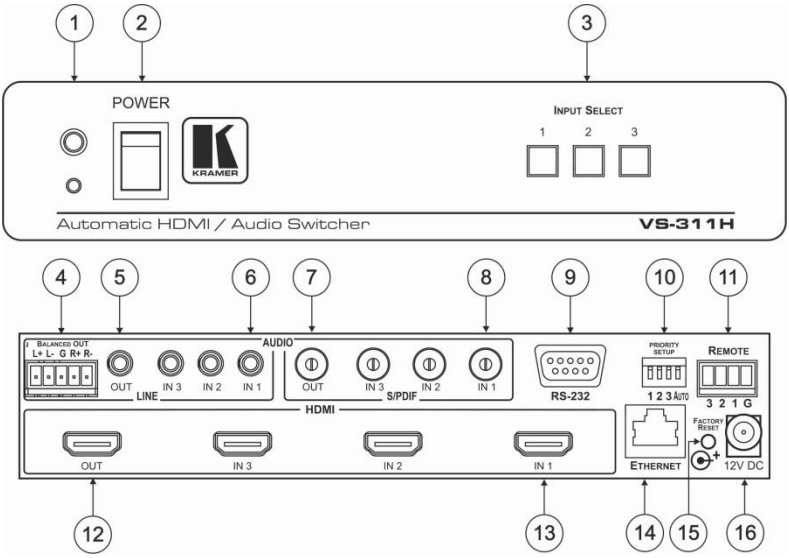

Figure 1: VS-311H Automatic HDMI/Audio Switcher

#	Feature		Function
1	IR Receiver		The red LED lights when receiving signals from the infrared remote control transmitter
2	*POWER* Switch		Illuminated switch for turning the unit ON or OFF
3	*INPUT SELECT* Buttons		Press the INPUT button to select the input to switch to the output (from 1 to 3). The selected input button illuminates
4	*Audio Line*	*BALANCED OUT* Terminal Block Connector	Connect the balanced stereo audio output to a balanced stereo audio acceptor
5		*OUT* 3.5mm Mini Jack	Connect to an unbalanced stereo audio output
6		*IN* 3.5mm Mini Jack	Connect to the unbalanced stereo audio inputs (from 1 to 3)
7	*Audio S/PDIF*	*OUT* RCA Connector	Connect to a digital audio (S/PDIF) output
8		*IN* RCA Connectors	Connect to the digital audio (S/PDIF) inputs (from 1 to 3)
9	*RS-232* 9-pin D-sub Connector		Connect to the PC or the Remote Controller
10	*PRIORITY SETUP* DIP-switches		DIP-switches for setup of the machine: DIPs 1, 2 and 3 are for setting the signal priorities; DIP 4 is for setting to the manual or the AUTO mode (see Section 4.1)
11	*REMOTE* Terminal Block		Connects to a contact closure switch (see Section 4.3)
12	*OUT* HDMI Connector		Connect to the HDMI acceptor

#	Feature	Function
13	*IN* HDMI Connectors	Connect to the HDMI sources (from 1 to 3)
14	*ETHERNET* Connector	Connect to the PC or other Serial Controller through computer networking
15	*FACTORY RESET* Button	Press the ETHERNET factory reset button to reset to the factory default definitions: IP number – 192.168.1.39 Mask – 255.255.255.0 Gateway – 192.168.1.1 First, disconnect the power and then connect it again while pressing the RESET button. The unit will power up and load its memory with the factory default definitions
16	12V DC	+12V DC connector for powering the unit

4 Connecting the VS-311H

Always switch off the power to each device before connecting it to your **VS-311H**. After connecting your **VS-311H**, connect its power and then switch on the power to each device.

To connect the **VS-311H** as illustrated in the example in Figure 2:

1. Connect an HDMI source (for example, an HDMI DVD player) to the IN 1 HDMI connector and connect the digital audio input to the IN 1 S/PDIF RCA connector.
   You can also connect a DVD player with a DVI connector, using a DVI-HDMI adapter to transfer video signals. Alternatively you can connect analog audio to the 3.5 mini-jack connector
2. Connect an HDMI source (for example, an HDMI set top box source) to the IN 3 HDMI connector and connect the digital audio input to the IN 3 3.5 mini-jack connector or you can connect it to the S/PDIF RCA connector.
3. Connect the OUT HDMI connector to the HDMI acceptor (for example, an HDMI plasma display).
4. Connect the AUDIO OUT S/PDIF RCA connector and the AUDIO OUT 3.5 mini-jack connector to a digital audio acceptor (for example, an AV receiver).
   If the inputs are connected only to the 3.5 mini-jack connectors, connect the AUDIO OUT 3.5 mini-jack connector and/or the BALANCED OUT terminal block connector only.
5. Set the PRIORITY SETUP DIP-switches (see Section 4.1)
6. If required, connect a PC and/or controller to the RS-232 port (see Section 4.4) and/or the ETHERNET port (see Section 4.5).
7. If required, connect the contact closure remote control PINs (see Section 4.3).
8. Connect the 12V DC power adapter to the power socket and connect the adapter to the mains electricity (not shown in Figure 2).

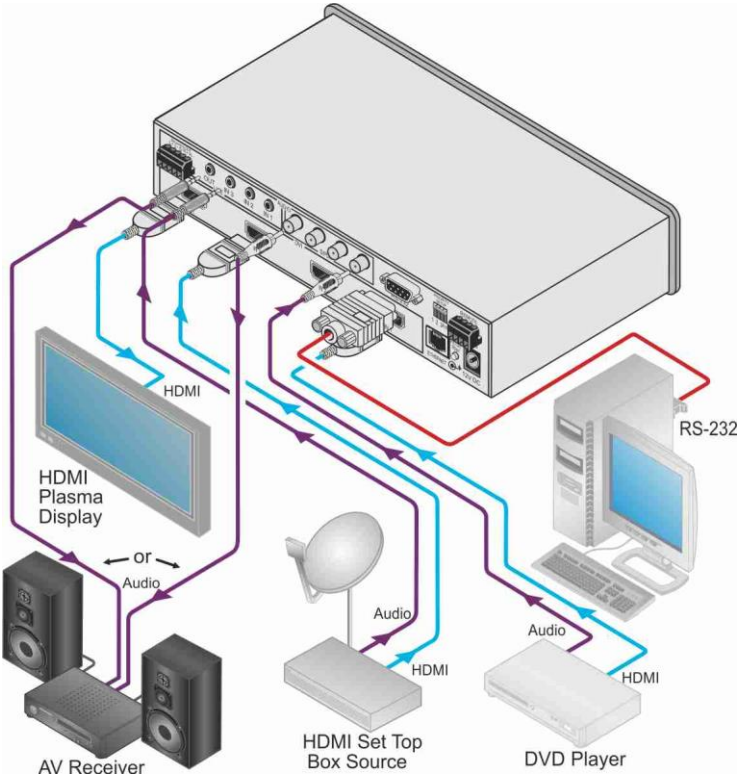

Figure 2: Connecting the VS-311H Automatic HDMI/Audio Switcher

4.1 Setting the DIP-Switches

This section describes the machine set-up and DIP-switch selection.

By default, all the **VS-311H** DIP-switches are set to OFF. Figure 3 describes the **VS-311H** unit DIP-switches.

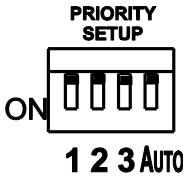

Figure 3: DIP-Switches

DIPS	Function	Description
1, 2, 3	Priority setup	Set the inputs priority
4	AUTO	OFF: manual mode, switch between channels manually; ON: automatic mode, inputs switch automatically to the output according to the priority setup

Inputs 1, 2 and 3 can be set in priority according to your needs. The **VS-311H** switches to the secondary input upon loss of the primary input signal, and back to the primary input when a signal is detected.

The following table describes the priority setup:

Priority	DIP Position		
1, 2, 3	OFF	OFF	OFF
3, 2, 1	OFF	OFF	ON
2, 3, 1	OFF	ON	OFF
1, 3, 2	ON	OFF	OFF
3, 1, 2	ON	OFF	ON
2, 1, 3	ON	ON	OFF

4.2 Priority Switching Applications

In the following example, DIP-switches 1, 2, and 3 are set to OFF, OFF and OFF respectively, meaning that the highest priority input is IN 1; IN 2 is the secondary input; and IN 3 the third. DIP-switch 4 is set ON, enabling AUTO mode operation.

If all the inputs are connected, you can, for example, press the INPUT SELECTOR 2 button to switch IN 2 to OUT. The plasma display shows the IN 2 signal.

If the HDMI signal on IN 2 is cut off, the switcher automatically switches IN 1 to the output, and if that fails too, IN 3 is automatically switched to the output. If, in the meantime, the IN 2 signal is restored, IN 2 will take priority once again.

4.3 Connecting the Contact Closure Remote Control PINs

The contact closure remote control pins operate in a similar way to the input buttons.

For example, you may override (equivalent to pressing a different input button) the presently routed input by using the remote control contact closure. To do so,

connect the appropriate input number (input 1, 2 or 3) pin on the REMOTE terminal block connector to the G (Ground) pin, as Figure 4 illustrates.

When in the manual mode (DIP-switch 4 set to OFF), you can switch an input to the output using the front panel INPUT SELECT button.

Note that unless the connection is permanent, the VS-311H will revert to an automatic switcher when the connection is removed.

DO NOT Connect more than one PIN to the Ground PIN at the same time.

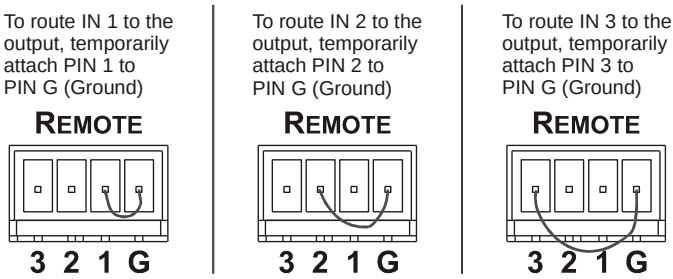

Figure 4: Connecting the Contact Closure Remote Control PINS

4.4 Connecting to the VS-311H via RS-232

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 5)—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.

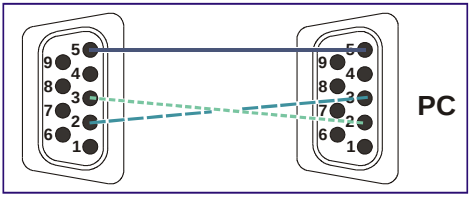

Figure 5: Crossed Cable RS-232 Connection

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 6)—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.

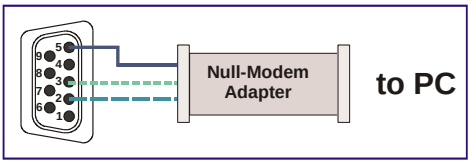

Figure 6: Straight Cable RS-232 Connection with a Null Modem Adapter

4.5 Controlling via ETHERNET

You can connect the **VS-311H** via the Ethernet, using a crossover cable (see Section 4.5.1) for direct connection to the PC or a straight-through cable (see Section 4.5.2) 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 on our Web site: http://www.kramerelectronics.com

4.5.1 Connecting the ETHERNET Port directly to a PC (Crossover Cable)

You can connect the Ethernet port of the **VS-311H** to the Ethernet port on your PC, via a crossover cable with RJ-45 connectors.

This type of connection is recommended for identifying the **VS-311H** with the factory configured default IP address

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

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 (see Figure 7).

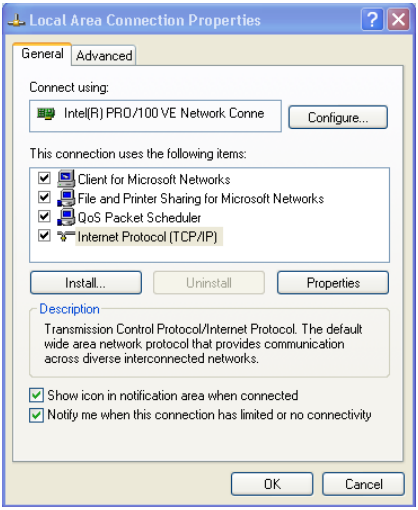

Figure 7: Local Area Connection Properties Window

6. Select Use the following IP Address, and fill in the details as shown in Figure 8.
7. Click **OK**.

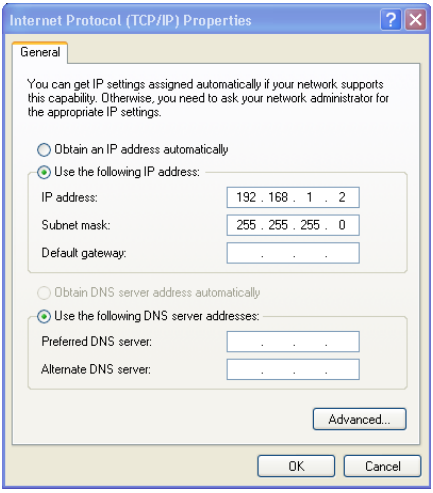

Figure 8: Internet Protocol (TCP/IP) Properties Window

4.5.2 Connecting the ETHERNET Port via a Network Hub (Straight-Through Cable)

You can connect the Ethernet port of the **VS-311H** to the Ethernet port on a network hub or network router, via a straight-through cable with RJ-45 connectors.

4.5.3 Control Configuration via the Ethernet Port

To control several units via the Ethernet, connect the unit via the Ethernet port to the LAN port of your PC. Use your PC initially to configure the settings (see Section 4.5).

5 Technical Specifications

INPUTS:	3 HDMI connectors 3 S/PDIF digital audio on RCA connectors 3 unbalanced stereo audio +4dBm on 3.5mm mini jacks
OUTPUT:	1HDMI connector 1 S/PDIF digital audio on an RCA connector 1 unbalanced stereo audio + 4dBm on a 3.5mm mini jack, with 1 balanced stereo audio on a 5-pin detachable terminal block
STANDARDS COMPLIANCE:	HDMI, HDCP
DATA RATE:	6.75Gbps (2.25Gbps per graphic channel)
CONTROLS:	Front panel buttons, infrared remote control transmitter, RS-232, Ethernet
POWER CONSUMPTION:	12V DC, 380mA
OPERATING TEMPERATURE:	0° to +40°C (32° to 104°F)
STORAGE TEMPERATURE:	-40° to +70°C (-40° to 158°F)
HUMIDITY:	10% to 90%, RHL non-condensing
DIMENSIONS:	21.6cm x 16.1cm x 4.4cm (8.5” x 6.3” x 1.7”, W, D, H)
WEIGHT:	1.2kg (2.6lbs) approx.
ACCESSORIES:	Power supply
OPTIONS:	Rack adapter RK-1
Specifications are subject to change without notice at http://www.kramerelectronics.com	

6 Protocol 2000

This RS-232/RS-485 communication protocol uses four bytes of information as defined below.

For RS-232, a null-modem connection between the machine and controller is used. The default data rate is 9600 baud, with no parity, 8 data bits and 1 stop bit.

6.1 Syntax

MSB **LSB**

1st Byte	DESTINATION	INSTRUCTION					
0	D	N5	N4	N3	N2	N1	N0
7	6	5	4	3	2	1	0

2nd Byte	INPUT						
1	I6	I5	I4	I3	I2	I1	I0
7	6	5	4	3	2	1	0

3rd Byte	OUTPUT						
1	O6	O5	O4	O3	O2	O1	O0
7	6	5	4	3	2	1	0

4th Byte			MACHINE NUMBER				
1	OVR	X	M4	M3	M2	M1	M0
7	6	5	4	3	2	1	0

1st Byte: Bit 7 – Defined as 0
D – DESTINATION:
0 – Sends information to the switchers (from the PC)
1 – Sends information to the PC (from the switcher)
N5…N0 – INSTRUCTION
The 6-bit INSTRUCTION defines the function performed by the switcher(s). If a function is performed using the machine's keyboard, these bits are set with the INSTRUCTION NO. performed. The instruction codes are defined according to the table below (INSTRUCTION NO. is the value set in N5…N0).

2nd Byte: Bit 7 – Defined as 1
I6…I0 – INPUT
When switching (i.e. instruction codes 1 and 2), the 7-bit INPUT is set as the input number to be switched. If switching is done using the machine's front panel, these bits are set with the INPUT NUMBER switched. For other operations, these bits are defined according to the table.

3rd Byte: Bit 7 – Defined as 1
O6…O0 – OUTPUT
When switching (i.e. instruction codes 1 and 2), the 7-bit OUTPUT is set as the output number to be switched. If switching is done using the machine's front panel, these bits are set with the OUTPUT NUMBER 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
This byte is used to address machines in a system by their machine numbers. When several machines are controlled from a single serial port, they are usually configured together and each machine has an individual machine number. If the OVR bit is set, then all machine numbers accept (implement) the command and the addressed machine replies. When a single machine is controlled over the serial port, always set M4…M0 to 1, and make sure that the machine itself is configured as MACHINE NUMBER = 1.

6.2 Instruction Codes

All the values in the table are decimal, unless otherwise stated

Instruction Codes for Protocol 2000				
Instruction		**Definition for Specific Instruction**		**Notes**
#	**Description**	**Input**	**Output**	
1	SWITCH VIDEO	Set equal to video input that is switched (0 = disconnect)	Set equal to video output that is switched (0 = to all the outputs)	2, 15

NOTES on the above table:

NOTE 2 – These are bi-directional definitions. If the switcher receives the code, it performs the instruction. If the instruction is performed (due to a keystroke operation on the front panel), then these codes are sent.
For example, if the PC sends HEX code:
01 85 88 83
then the switcher (machine 3) switches input 5 to output 8.
If the user switches input 1 to output 7 using the front panel buttons, the switcher sends HEX code:
41 81 87 83
to the PC.
When the PC sends one of the commands in this group to the switcher, if the instruction is valid, the switcher replies by sending the same four bytes to the PC that it received (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.

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SAFETY WARNING
Disconnect the unit from the power supply before opening and servicing

P/N: 2900-000666 Rev: 3