



KRAMER ELECTRONICS LTD.

USER MANUAL

MODEL:

VP-8x8

8x8 VGA/UXGA Matrix
Switcher

P/N: 2900-000054 Rev 5

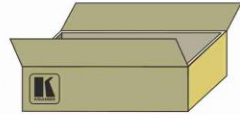


VP-8x8 Quick Start Guide

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

Step 1: Check what's in the box

- ☒ The **VP-8x8** Matrix Switcher
- ☒ Kramer **RC-IR3** Infrared Remote Control Transmitter (with battery and user manual)
- ☒ 1 Set of rack "ears"
- ☒ 1 Power cord
- ☒ 1 Null-modem adapter
- ☒ 1 Quick Start sheet
- ☒ 4 Rubber feet



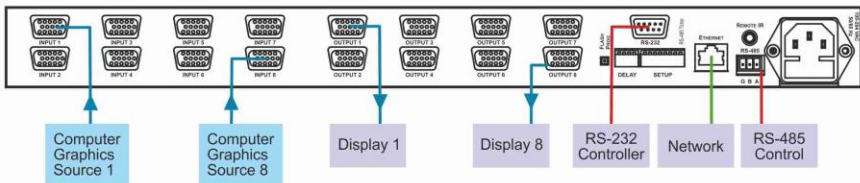
Save the original box and packaging materials in case you need to return your **VP-8x8** for service.

Step 2: Install the VP-8x8

Mount the **VP-8x8** 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 **VP-8x8**.



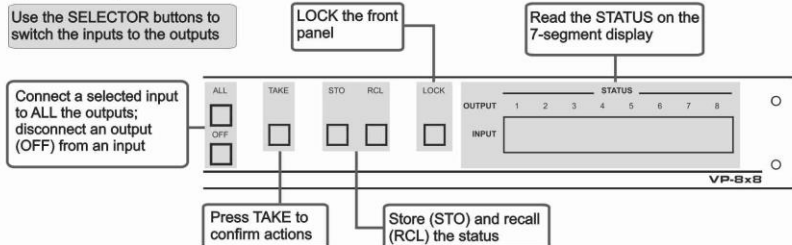
Always use Kramer high-performance cables for connecting AV equipment to the **VP-8x8**.

Step 4: Connect the power

Connect AC power to the rear of the **VP-8x8**, switch on its power and then switch on the power on each device.



Step 5: Operate the VP-8x8



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1 Introduction

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

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

Congratulations on purchasing your Kramer **VP-8x8** 8x8 VGA/UXGA *Matrix Switcher*, which is ideal for the following typical applications:

- Any professional display system requiring a true 8x8 computer graphics matrix operation
- Multimedia and presentation source, and acceptor selection

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 **VP-8x8** away from moisture, excessive sunlight and dust



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

2.2 Safety Instructions



Caution: There are no operator serviceable parts inside the unit

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

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

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

2.3 Recycling Kramer Products

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

3 Overview

The **VP-8x8** is a high performance *8x8 RGBHV Matrix Switcher* for high-resolution video. The **VP-8x8** lets you simultaneously route any or all of the 8 inputs to any or all of the 8 outputs.

The **VP-8x8** *8x8 VGA/UXGA Matrix Switcher* features:

- 400MHz video bandwidth that ensures transparent performance even in the most critical applications
- 16 preset memory locations for quick access to common configurations
- Delayed switching mode (ranging from 0 to 3.5sec in increments of 0.5 sec) for clean transitions (seamless switching) when switching between non-genlocked sources
- DC coupled inputs and outputs
- A TAKE button that allows you to place multiple switches in a queue and then activate them simultaneously with one touch of this button
- A LOCK button to prevent tampering with the front panel
- Automatic detection of connected input signals (respective button illuminates)

Control the **VP-8x8** using the front panel buttons, or remotely via:

- RS-485 or RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller
- The Kramer **RC-IR3** infrared remote control transmitter
- Ethernet

The **VP-8x8** is dependable, rugged, and fits into one vertical space (1U) of a standard 19" professional rack.

3.1 Defining the VP-8x8 8x8 VGA/UXGA Matrix Switcher

This section defines the **VP-8x8**.

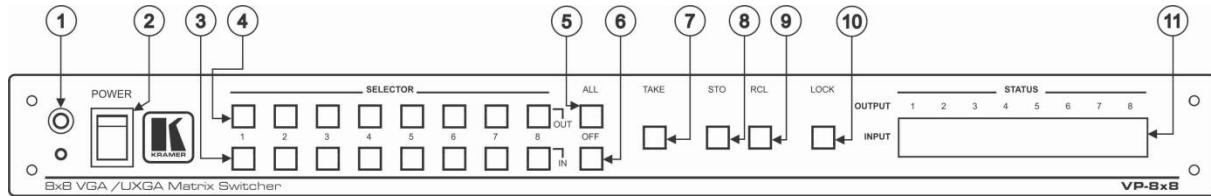


Figure 1: VP-8x8 User Manual Front Panel

#	Feature	Function
1	IR Receiver	The yellow LED is illuminated when receiving signals from the infrared remote control transmitter
2	POWER Switch	Illuminated switch for turning the unit ON or OFF
3	IN SELECTOR Buttons	Select the input to switch to the output. When a signal is detected, the input button illuminates in green
4	OUT SELECTOR Buttons	Select the output to which the input is switched
5	ALL Button	Pressing ALL followed by an INPUT button, connects that input to all outputs For example, press ALL and then Input button # 2 to connect input # 2 to all the outputs
6	OFF Button	Press an OUT SELECTOR button and then an OFF button to disconnect that output from the inputs Press the ALL button and then the OFF button to disconnect all the outputs
7	TAKE Button	Pressing TAKE toggles the mode between the Confirm mode and the At Once mode (user confirmation per action is unnecessary) When in the Confirm mode, the TAKE button illuminates
8	STO (Store) Button	Pressing STO followed by an input/output button stores the current setting For example, press STO and then the Output button # 3 to store in Setup # 3
9	RCL (Recall) Button	Pressing the RCL button and the corresponding IN/OUT button recalls a setup from the non-volatile memory. The stored status flashes. Pressing a different IN/OUT button lets you view another setup. After making your choice, pressing the RCL button again implements the new status
10	LOCK Button	Disengages the front panel switches
11	STATUS 7-segment Display	Displays the selected input switched to the output (marked above each input) Also displays the number of IN and OUT ports, the firmware version number, and the MACHINE #. Refer to Section 6.1

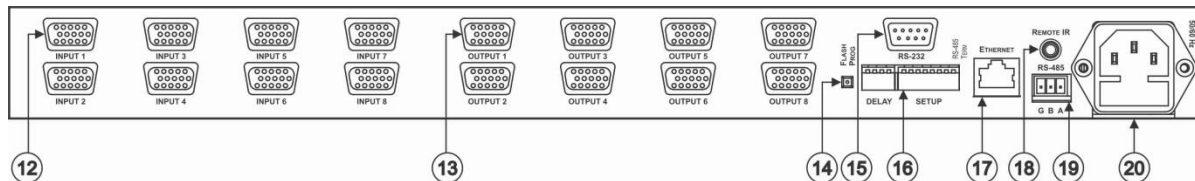


Figure 2: VP-8x8 User Manual Rear Panel

#	Feature	Function
12	15-pin HD <i>INPUT</i> Connectors	Connect to the video sources (from 1 to 8)
13	15-pin HD <i>OUTPUT</i> Connectors	Connect to the output acceptor (from 1 to 8)
14	<i>FLASH PROG</i> Button	Push in for "Program" to upgrade to the latest Kramer firmware, or release for Normal (the factory default) The <i>FLASH PROG</i> "Reset" button is located on the underside of the unit
15	<i>RS-232</i> 9-pin D-sub Port	Connects to the PC or the Remote Controller
16	<i>DELAY</i> and <i>SETUP</i> DIP-switches	DIP-switches for setup of the unit (<i>DELAY</i> dips 1, 2, 3 are for setting the delay time; <i>SETUP</i> dips 1, 2, 3, 4 are for setting machine #; 8 is for RS-485 Termination)
	<i>ETHERNET</i> Connector	Connects to the PC or other Serial Controller through computer networking
18	<i>REMOTE IR</i> 3.5mm Mini Jack	Connect to an external IR receiver unit for controlling the machine via an IR remote controller (instead of using the front panel IR receiver) Optional. Can be used instead of the front panel (built-in) IR receiver to remotely control the machine (only if the internal IR connection cable has been installed)
19	<i>RS-485</i> Terminal Block Port	Pin G is for Ground connection; Pins B (-) and A (+) are for RS-485
20	Power Connector with Fuse	AC connector enabling power supply to the unit



Figure 3: VP-8x8 Underside View

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 +40°C (32° to 104°F)
STORAGE TEMPERATURE:	-40° to +70°C (-40° to 158°F)
HUMIDITY:	10% to 90%, RHL non-condensing



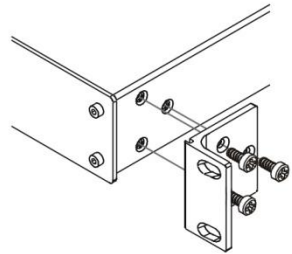
CAUTION!

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

4.1 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 (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.

5 Connecting the VP-8x8 8x8 VGA/UXGA Matrix Switcher



Always switch off the power to each device before connecting it to your **VP-8x8**. After connecting your **VP-8x8**, connect its power and then switch on the power to each device.

This section describes how to:

- Connect the **VP-8x8** rear panel (see [Section 5.1](#))
- Connect the **VP-8x8** to a controlling device via RS-232 (see [Section 5.2](#)), RS-485 (see [Section 5.3](#)) and/or the Ethernet (see [Section 5.4](#))
- Set the DIP-switches (see [Section 5.5](#))
- Connect several **VP-8x8** machines (see [Section 5.6](#))

5.1 Connecting the VP-8x8 Rear Panel

To connect the **VP-8x8**, do the following:

Switch OFF the power on each device before connecting it to your VP-8x8. After connecting your VP-8x8, switch on its power and then switch on the power on each device. DO NOT push in the rear panel Flash Program "Program" button (item 14 in [Figure 2](#)) and DO NOT push in the underside Flash Program "Reset" button. These are only used for upgrading to the latest Kramer firmware.

1. Connect up to 8 VGA/UXGA computer graphics sources to the input connectors (see the example in [Figure 4](#)).
2. Connect the 8 output connectors to up to 8 VGA/UXGA video acceptors.
When less than eight outputs are required, connect only those outputs of the VP-8x8 that are required, and leave the other outputs unconnected
3. Set the DIP-switches (see [Section 5.4](#)).
4. Connect a PC and/or controller (if required) to the RS-232 port (see [Section 5.2](#)) and/or RS-485 port (see [Section 5.2](#)).
5. Connect the power cord (not shown in [Figure 4](#)).

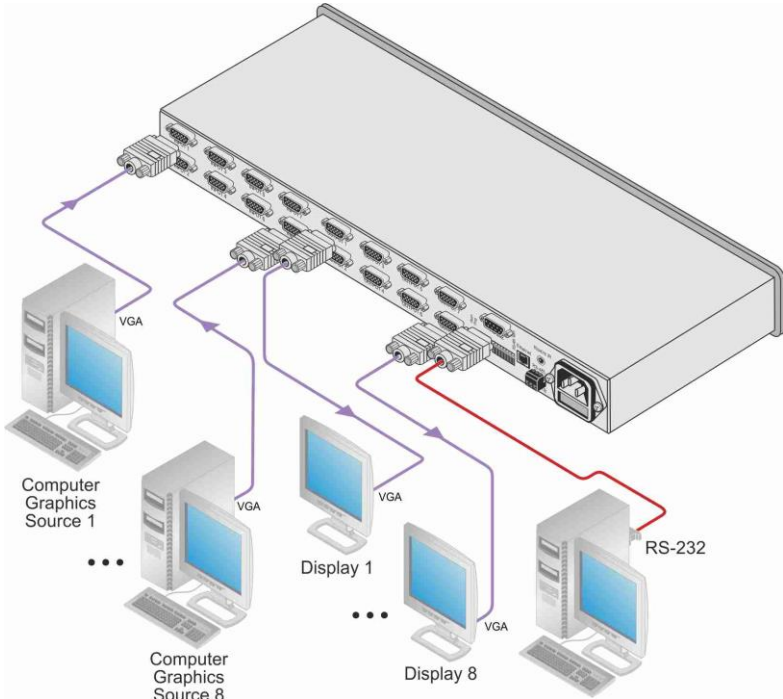


Figure 4: Connecting the VP-8x8 8x8 VGA / UXGA Matrix Switcher

5.2 Connecting to the VS-8x8 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.

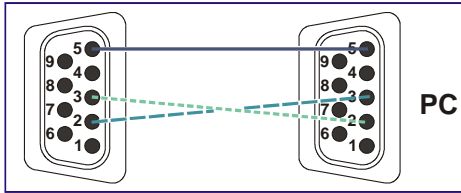


Figure 5: Crossed Cable RS-232 Connection

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.

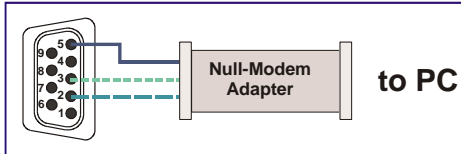


Figure 6: Straight Cable RS-232 Connection with a Null Modem Adapter

5.3 Controlling via RS-485

You can operate the **VP-8x8** via the RS-485 port from a distance of up to 1200m (3900ft) using any device equipped with an RS-485 port (for example, a PC). For successful communication, you must set the RS-485 machine number and bus termination.

To connect a device with a RS-485 port to the product:

- Connect the A (+) pin on the RS-485 port of the PC to the A (+) pin on the RS-485 port on the rear panel of the **VP-8x8**

- Connect the B (–) pin on the RS-485 port of the PC to the B (–) pin on the RS-485 port on the rear panel of the **VP-8x8**
- If needed, connect the G pin on the RS-485 port of the PC to the G pin on the RS-485 port on the rear panel of the **VP-8x8**
- Set the **VP-8x8** unit as Machine # 1, according to [Section 5.4](#) (that is, DIP 1, DIP 2, DIP 3, and DIP 4 OFF), and set the other DIP-switches on the **VP-8x8** unit, as follows:
 - Set DIP 5, DIP 6, and DIP 7 OFF
 - Set DIP 8 ON (for RS-485 line termination with 120Ω)

5.4 Control Configuration via the Ethernet Port

To connect and configure the **VP-8x8** via Ethernet, see the *Ethernet Configuration Guide (Lantronix)* available on the Kramer Web site at

http://www.kramerelectronics.com/support/product_downloads.asp.

5.5 Setting the DIP-Switches

By default, all DIP-switches are set to OFF. [Figure 7](#) illustrates the **VP-8x8** DIP-switches:

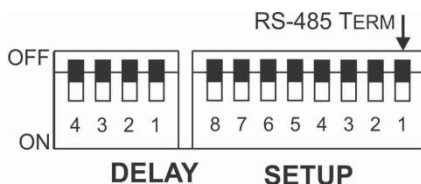


Figure 7: VP-8x8 DIP-switches

DIPS	Function	Description
DELAY		
1, 2, 3	DELAY	Determines switching delay time (see the table in Section 5.5.1)
4	Reserved	Set to OFF
SETUP		
1, 2, 3, 4	Machine #	Determines the number of the machine in the sequence (see the table in Section 5.5.2)
5, 6, 7	Reserved	Set to OFF
8	RS-485 TERM	ON for RS-485 Line Termination with 120Ω; OFF for no RS-485 Line Termination

5.5.1 Setting the Delay

You can achieve clean-looking transitions when switching between non-genlocked sources by setting the delay time—ranging from 0sec to 3.5sec (in increments of 0.5sec)—via the DELAY DIP-switches, as the next table defines. The **VP-8x8** unit is shipped (its factory default state) with no delay, that is, the DELAY DIP-switches are set up for a 0sec delay.

SEC	DIP 1	DIP 2	DIP 3
0	OFF	OFF	OFF
0.5	OFF	OFF	ON
1.0	OFF	ON	OFF
1.5	OFF	ON	ON
2.0	ON	OFF	OFF
2.5	ON	OFF	ON
3.0	ON	ON	OFF
3.5	ON	ON	ON

5.5.2 Setting the Machine # DIP-Switches

The Machine # determines the position of a **VP-8x8** unit, specifying which **VP-8x8** unit is being controlled when several **VP-8x8** units connect to a PC or serial controller. Set the Machine # on a **VP-8x8** unit via Setup DIPS 1, 2, 3 and 4, according to the next table.

When using a standalone **VP-8x8** unit, set the Machine # to 1. When connecting more than one **VP-8x8** unit, set the first machine (the Master) that is closest to the PC, as Machine # 1 (DIP-switches are set to OFF).

Mach #	DIP 1	DIP 2	DIP 3	DIP 4
1	OFF	OFF	OFF	OFF
2	OFF	OFF	OFF	ON
3	OFF	OFF	ON	OFF
4	OFF	OFF	ON	ON
5	OFF	ON	OFF	OFF
6	OFF	ON	OFF	ON
7	OFF	ON	ON	OFF
8	OFF	ON	ON	ON

Mach #	DIP 1	DIP 2	DIP 3	DIP 4
9	ON	OFF	OFF	OFF
10	ON	OFF	OFF	ON
11	ON	OFF	ON	OFF
12	ON	OFF	ON	ON
13	ON	ON	OFF	OFF
14	ON	ON	OFF	ON
15	ON	ON	ON	OFF
16	ON	ON	ON	ON

5.6 Cascading Machines

You can cascade up to 16 **VP-8x8** units with control from a PC or serial controller (see [Figure 8](#)).

To cascade up to 16 individual **VP-8x8** units via RS-485, do the following:

1. Connect the VGA/UXGA sources and acceptors, as [Section 5.1](#) describes.
2. Connect the RS-232 port onto the first **VP-8x8** unit to the PC using the null-modem adapter provided with the machine (recommended), as [Section 5.2](#) describes.

Alternatively, the RS-485 port could be used for PC control (instead of RS-232)

3. Connect the RS-485 terminal block port on the first unit to the RS-485 port on the second **VP-8x8** unit and so on, connecting all the RS-485 ports.
4. Set the DIP-switches, as [Section 5.4](#) describes:
 - Set the first **VP-8x8** unit as Machine # 1 and the following 15 **VP-8x8** units as Machine # 2 to Machine # 16
 - Set DIP 8 ON on the first and last **VP-8x8** units (terminating the RS-485 line at 120Ω). Set DIP 8 OFF on the other **VP-8x8** units
 - Set DIP 5, DIP 6 and DIP 7 OFF on all **VP-8x8** units

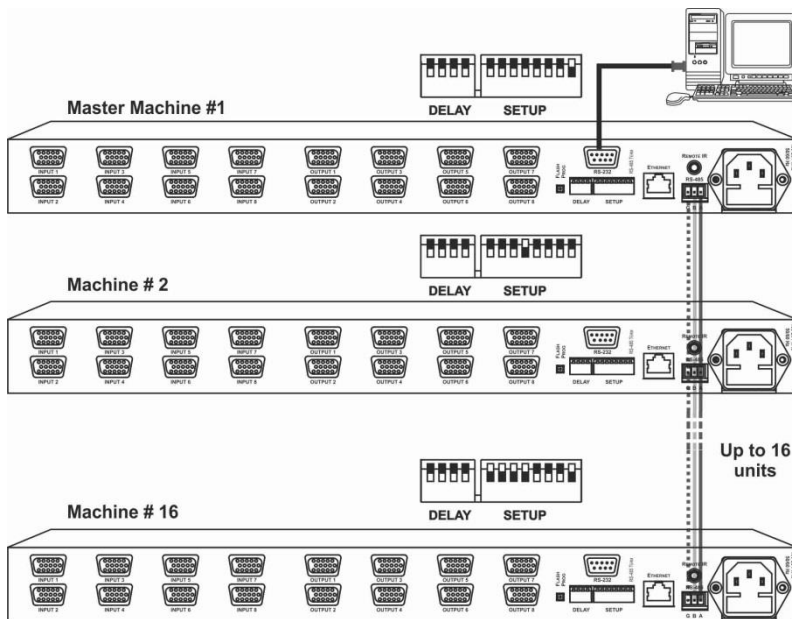


Figure 8: Control Configuration via RS-232 and RS-485

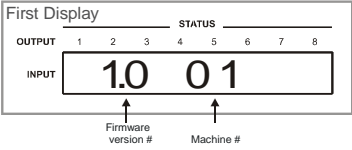
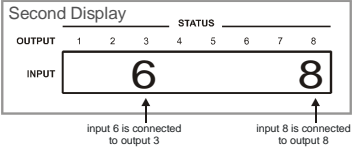
6 Operating the VP-8x8 8x8 VGA/UXGA Matrix Switcher

You can operate your **VP-8x8** via:

- The front panel buttons
- RS-232/RS-485 serial commands transmitted by a touch screen system, PC, or other serial controller
- The Kramer **RC-IR3** Infrared Remote Control Transmitter
- The Ethernet

6.1 Displaying Unit Characteristics

The STATUS 7-segment display shows two sets of information, as defined in the following table:

The STATUS Display	Shows:	When:
	Unit characteristics: Firmware version Machine number	Immediately (and automatically) after switching on the power When simultaneously pressing, for 3 seconds, the 3 "IN" buttons 1, 2 and 3
	Normal display: Inputs switched to the outputs	During normal operation, appears a few seconds after the first display The "First Display" appears initially, followed a few seconds later by the "Second Display"

6.2 Confirming Settings

You can choose to work in the At Once or the Confirm mode.

In the At Once mode (the TAKE button is not illuminated):

- Pressing an OUT-IN combination implements the switch immediately
- You save time as execution is immediate and actions require no user confirmation

- No protection is offered against changing an action in error

In the Confirm mode (TAKE button is illuminated):

- You can key-in several actions and then confirm them by pressing the TAKE button, to simultaneously activate the multiple switches
- Every action requires user confirmation, protecting against erroneous switching
- Execution is delayed until the user confirms the action

Failure to press the TAKE button within one minute (the Timeout) will abort the action

6.2.1 Toggling between the At Once and Confirm Modes

To toggle between the At Once and Confirm modes, do the following:

1. Press the dim TAKE button to toggle from the At Once mode (in which the TAKE button is dim) to the Confirm mode (in which the TAKE button illuminates).
Actions now require user confirmation and the TAKE button illuminates.
2. Press the illuminated TAKE button to toggle from the Confirm mode back to the At Once mode.
Actions no longer require user confirmation and the TAKE button no longer illuminates.

6.2.2 Confirming a Switching Action

To confirm a switching action (in the Confirm mode), do the following:

1. Press an OUT-IN combination.
The corresponding 7-segment display flashes. The TAKE button also flashes.
2. Press the flashing TAKE button to confirm the action.
The corresponding 7-segment display no longer flashes. The TAKE button illuminates.

To confirm several actions (in the Confirm mode), do the following:

1. Press each OUT-IN combination in sequence.
The corresponding 7-segment display flashes. The TAKE button also flashes.
2. Press the flashing TAKE button to confirm all the actions.
The corresponding 7-segment display no longer flashes. The TAKE button illuminates.

6.3 Storing/Recalling Input/Output Configurations

You can store and recall up to 16 input/output configurations using the 8 input buttons and the 8 output buttons, as [Figure 9](#) illustrates:

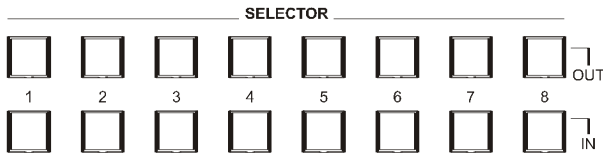


Figure 9: Storing and Recalling using the Input/Output Buttons

6.3.1 Storing an Input/Output Configuration

To store the current status in memory, do the following:

1. Press the STO button.
The STO button flashes.
2. Press one of the 16 INPUT/OUTPUT buttons (this will be the setup # in which the current status is stored). If in the Confirm mode, press the flashing TAKE button to confirm the action.
The memory stores the data at that reference.

6.3.2 Recalling an Input/Output Configuration

To recall an input/output configuration, do the following:

1. Press the RCL button.
The RCL button flashes.

2. Press the appropriate INPUT/OUTPUT button (the button # corresponding to the setup #). If in the Confirm mode, that setup configuration will flash in the 7-segment Display, together with the RCL button and the TAKE button, and will only be implemented after pressing the TAKE button.
The memory recalls the stored data from that reference.

Tip: If you cannot remember which of the 16 input/output configurations is the one that you want, set the **VP-8x8** to the Confirm mode and manually scan all the input/output configurations until you locate it.

6.3.3 Deleting an Input/Output Configuration

To delete an input/output configuration, do the following:

1. Press the STO and RCL buttons simultaneously.
Both the STO and RCL buttons flash.
2. Press the appropriate INPUT/OUTPUT button.
This erases that specific input/output configuration from the memory, leaving it empty and available.

Storing a new configuration over a previous configuration (without deleting it first) replaces the previous configuration

6.4 Locking the Front Panel

To prevent changing the settings accidentally or tampering with the unit via the front panel buttons, lock your **VP-8x8**. Unlocking releases the protection mechanism.

Nevertheless, even though the front panel is locked you can still operate via RS-232 or RS-485, as well as via the Kramer RC-IR3 Infrared Remote Control Transmitter

To lock the **VP-8x8**:

- Press the LOCK button for more than two seconds, until the LOCK button is illuminated. The front panel is locked. Pressing a button will have no effect other than causing the LOCK button to flash

Warning that you need to unlock to regain control via the front panel

To unlock the **VP-8x8**:

- Press the illuminated LOCK button for more than two seconds, until the LOCK button is no longer illuminated, the front panel unlocks

6.5 Updating the VP-8x8 Firmware

The **VP-8x8** functions by means of a device microcontroller that runs firmware located in FLASH memory.

If required, you can download and install the latest firmware version from the Kramer Web site:

http://www.kramerelectronics.com/support/product_downloads.asp.

7 Technical Specifications

INPUTS:	8 VGA on 15-pin HD connectors (VGA through UXGA)
OUTPUTS:	8 VGA on 15-pin HD connectors (VGA through UXGA)
MAX. OUTPUT LEVEL:	1.5Vpp
BANDWIDTH (-3dB):	400MHz
DIFF. GAIN:	0.04%
DIFF. PHASE:	0.04Deg.
K-FACTOR:	<0.05%
S/N RATIO:	75dB
CROSSTALK (all hostile):	-53dB
CONTROLS:	22 front panel buttons, RS-232, RS-485, Ethernet
COUPLING:	DC
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
POWER SOURCE:	100-264V AC, 50/60 Hz; 23VA
DIMENSIONS:	19" x 7" x 1U (W, D, H) rack-mountable
WEIGHT:	2.7kg (6lbs) approx.
ACCESSORIES:	Power cord, null modem adapter, Windows®-based Kramer control software, infrared remote control transmitter
OPTIONS:	External remote IR receiver cable P/N: C-A35M/IRR-50
Specifications are subject to change without notice. For the most updated resolution list, go to our Web site at http://www.kramerelectronics.com	

8 Default Communication Parameters

RS-232			
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			
IP Address	192.168.1.39	TCP Port	10001
Subnet Mask	255.255.255.0	UDP Port	50000

9 Table of Hex Codes for Serial Communication

The following table lists the Hex values for a single machine (*MACHINE # 1*):

Switching Video Channels								
	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5	OUT 6	OUT 7	OUT 8
IN 1	01	01	01	01	01	01	01	01
	81	81	81	81	81	81	81	81
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
IN 2	01	01	01	01	01	01	01	01
	82	82	82	82	82	82	82	82
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
IN 3	01	01	01	01	01	01	01	01
	83	83	83	83	83	83	83	83
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
IN 4	01	01	01	01	01	01	01	01
	84	84	84	84	84	84	84	84
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
IN 5	01	01	01	01	01	01	01	01
	85	85	85	85	85	85	85	85
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
IN 6	01	01	01	01	01	01	01	01
	86	86	86	86	86	86	86	86
	81	82	83	84	81	82	83	84
	81	81	81	81	81	81	81	81
IN 7	01	01	01	01	01	01	01	01
	87	87	87	87	87	87	87	87
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
IN 8	01	01	01	01	01	01	01	01
	88	88	88	88	88	88	88	88
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81

10 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.

10.1 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.

10.2 Instruction Codes

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

INSTRUCTION		DEFINITION FOR SPECIFIC INSTRUCTION		NOTE
#	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 required	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
16	ERROR / BUSY	For invalid / valid input (i.e. OUTPUT byte = 4 or OUTPUT byte = 5), this byte is set as the input #	0 - error 1 - invalid instruction 2 - out of range 3 - machine busy 4 - invalid input 5 - valid input	9, 25
17	RESERVED	----	----	10
20	RECALL AUDIO STATUS	Set as SETUP #	0	2, 3
30	LOCK FRONT PANEL	0 - Panel unlocked 1 - Panel locked	0	2
31	REQUEST WHETHER PANEL IS LOCKED	0	0	16
32 to 35	RESERVED	----	----	10
57	SET AUTO-SAVE	I3 - no save I4 - auto-save	0	12, 2
		(127 = load SETUP #)	or SETUP #	
61	IDENTIFY 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	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	14

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 will reset according to the present power-down settings.

NOTE 5 - For the OUTPUT byte set as 6, the VIS source is the input selected using the OUTPUT byte. Similarly, for the OUTPUT byte set as 7, the VIS source is the output selected using the OUTPUT byte. Note also, that on some machines the sync source is not software selectable, but is selected using switches, jumpers, etc!

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 9 - An error code is returned to the PC if an invalid instruction code was sent to the switcher, or if a parameter associated with the instruction is out of range (e.g. trying to save to a setup greater than the highest one, or trying to switch an input or output greater than the highest one defined). This code is also returned to the PC if an RS-232 instruction is sent while the machine is being programmed via the front panel. Reception of this code by the switcher is not valid.

NOTE 10 – This code is reserved for internal use.

NOTE 12 - Under normal conditions, the machine's present status is saved each time a change is made. The "power-down" save (auto-save) may be disabled using this code. Note that whenever the machine is turned on, the auto-save function is set.

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 will send 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. $128_{dec} + 22_{dec}$ for 2nd byte, and $128_{dec} + 16_{dec}$ for 3rd byte).

If the request for identification is sent with the INPUT set as 3 or 4, the appropriate machine will send 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. $128_{dec} + 3_{dec}$ for 2nd byte, $128_{dec} + 5_{dec}$ 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. $128_{dec} + \text{ASCII for "Y"}$; $128_{dec} + \text{ASCII for "C"}$).

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 (i.e. request the number of outputs)

would be HEX codes

7E 82 90 82

ie. 16 outputs

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.

NOTE 21 – To store data in the non-volatile memory of the unit, eg. the EEPROM for saving SETUPS. The EEPROM address is sent using the INPUT byte, and the data to be stored is sent using the OUTPUT byte. To use this instruction, it is necessary to understand the memory map, and memory structure of the particular machine.

NOTE 25 – For units which detect the validity of the video inputs, Instruction 16 will be sent whenever the unit detects a change in the state of an input (in real-time).

For example, if input 3 is detected as invalid, the unit will send the HEX codes

10 83 84 81

If input 7 is detected as valid, then the unit will send HEX codes

10 87 85 81.

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SAFETY WARNING

Disconnect the unit from the power supply before opening and servicing



P/N: 2900-000054



Rev: 5