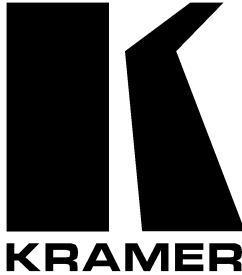


**Kramer Electronics, Ltd.**



# **USER MANUAL**

**Models:**

***VS-626, 6x6 Video / Audio Matrix Switcher***

***VS-828, 8x8 Video / Audio Matrix Switcher***

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## 1 Introduction

Welcome to Kramer Electronics (since 1981): a world of unique, creative and affordable solutions to the infinite range of problems that confront the video, audio and presentation professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 500-plus different models now appear in 8 Groups<sup>1</sup>, which are clearly defined by function.

Congratulations on purchasing your **VS-626** 6x6 Video / Audio Matrix Switcher and/or **VS-828** 8x8 Video / Audio Matrix Switcher, which are ideal for the following typical applications:

- Any professional system requiring outstanding value in a 6x6 (8x8) matrix
- Production and duplication facilities
- Security, CCTV, and home theater systems

The package includes the following items:

- **VS-626** 6x6 Video / Audio Matrix Switcher and/or **VS-828** 8x8 Video / Audio Matrix Switcher
- Power cord and Null-modem adapter
- Windows®-based Kramer control software
- This user manual<sup>2</sup>

## 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<sup>3</sup>

### 2.1 Quick Start

This quick start chart summarizes the basic setup and operation<sup>4</sup>:

---

1 GROUP 1: Distribution Amplifiers; GROUP 2: Video and Audio Switchers, Matrix Switchers and Controllers; GROUP 3: Video, Audio, VGA/XGA Processors; GROUP 4: Interfaces and Sync Processors; GROUP 5: Twisted Pair Interfaces; GROUP 6: Accessories and Rack Adapters; GROUP 7: Scan Converters and Sealers; and GROUP 8: Cables and Connectors

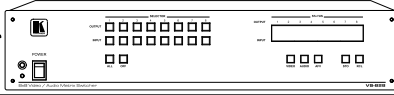
2 Download up-to-date Kramer user manuals from our Web site: <http://www.kramerelectronics.com>

3 The complete list of Kramer cables is on our Web site at <http://www.kramerelectronics.com>

4 This quick start applies both to the VS-626 and the VS-828

**Step 1: Mount the machine - see section 5**

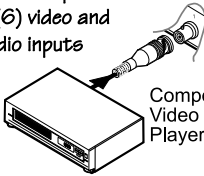
Mount the machine in a rack or stick the 4 rubber feet to the underside



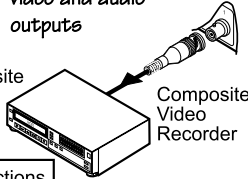
**Applies to: VS-828 (VS-626)**

**Step 2: Connect the inputs and outputs - see section 6**

Connect up to 8 (8) video and audio inputs



Connect up to 8 (8) video and audio outputs



Audio connections are not shown

Configure the SYNC input



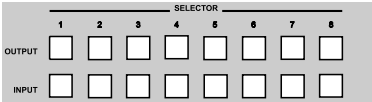
Set the dipswitches



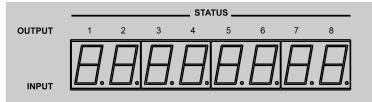
If required, connect an RS-232 Control Port, and/or an RS-485 port

**Step 3: Turn the power ON**

**Step 4: Set the machine - see section 7**



Use the SELECTOR buttons to switch the inputs to the outputs



Read the STATUS on the 7-segment display



Connect a selected input to ALL the outputs



Disconnect an output



VIDEO - Switching relates to the video signal  
AUDIO - Switching relates to the audio signal  
AFV - Audio follows video when switching



Store (STO) and recall (RCL) actions

**Step 5: Operate the machine**

Operate via the front panel buttons, IR remote control, RS-232 and RS-485

### 3 Overview

The high performance **VS-626 (VS-828)** is a true vertical interval Video / Audio Matrix Switcher, letting you route any input to any or all of the outputs simultaneously.

The **VS-626 (VS-828)** includes:

- A bandwidth of 100MHz that ensures transparency even in the most critical applications
- 6 (8) input and 6 (8) output button selectors
- 8 preset memory locations for quick access to common configurations<sup>1</sup>
- Audio-follow-video or audio breakaway option (to switch audio independently from video)
- A unique vertical and horizontal sync-pulse solution
- Glitch-free transitions, which are produced when sources share a common reference sync, as switching occurs during the vertical interval<sup>2</sup>
- An external Sync/Genlock input that may be programmed to switch according to the timing of either this input or of source number 1

You can use the **RC-IR2** IR transmitter to control the machine via the built-in IR receiver on the front panel or, instead, via an optional external IR receiver<sup>3</sup>. The external IR receiver can be located 15 meters away from the machine. This distance can be extended to up to 60 meters when used with three extension cables<sup>4</sup>.

Before using the external IR receiver, be sure to arrange for your Kramer dealer to insert an internal IR connection cable<sup>5</sup>, which is required so that the REMOTE IR 3.5mm connector can be used. Connect the external IR receiver to the REMOTE IR 3.5mm connector.

---

1 On the VS-626, 8 preset memory locations are available via RS-232

2 When one video signal replaces another video signal, the switching process causes a random interruption in the first video signal (in the middle of a frame) and a random entrance into the second video signal (also in the middle of a frame). The result is a visible jump in the edited tape. This deteriorates when the tape is copied, and the disturbance on playback is more serious. Avoid this by switching at a very specific point during the vertical interval, allowing smooth replacement of a whole frame by a second whole frame as long as the video sources are Genlocked to each other

3 P/N: 95-0104050

4 P/N: 95-0103050

5 P/N: 505-70434010-S

Control the **VS-626 (VS-828)** using the front panel buttons, or remotely via the Kramer **RC-IR2** Infra-Red Remote Control Transmitter, or via an external remote IR receiver (optional), or via RS-232 or RS-485 serial commands transmitted by a touch screen system, PC, or other serial controller

The **VS-626 (VS-828)** is dependable, rugged and fits into two vertical spaces (2U) of a standard 19" rack. To achieve the best performance:

- Connect only good quality connection cables, thus avoiding interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Avoid interference from neighboring electrical appliances and position your Kramer **VS-626 (VS-828)** away from moisture, excessive sunlight and dust

#### **4 Your VS-626 (VS-828) Video Audio Matrix Switcher**

Figure 1 illustrates the **VS-626** and Figure 2 illustrates the **VS-828**. Table 1 and Table 2 define the front and rear panels of the **VS-626 (VS-828)**, respectively.

# Your VS-626 (VS-828) Video Audio Matrix Switcher

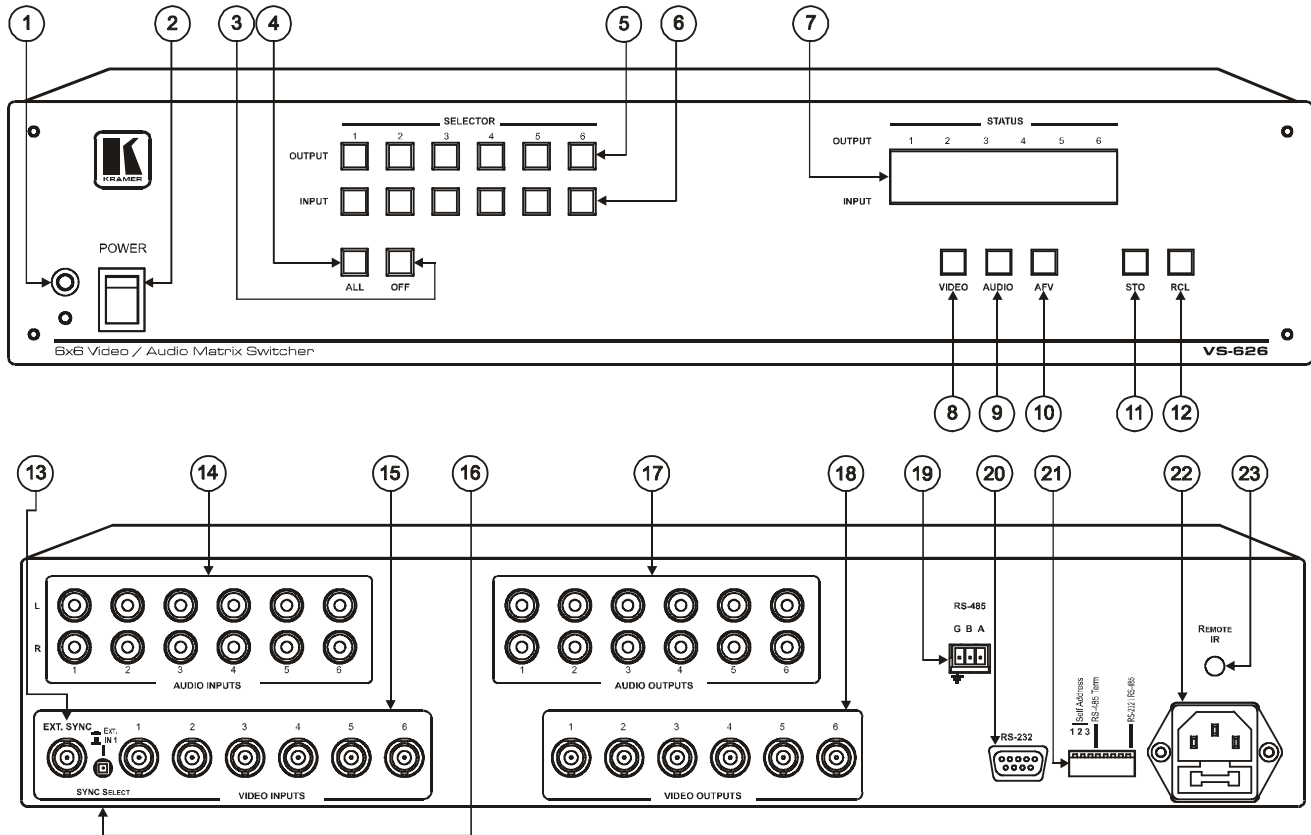


Figure 1: VS-626 6x6 Video / Audio Matrix Switcher





Your VS-626 (VS-828) Video Audio Matrix Switcher

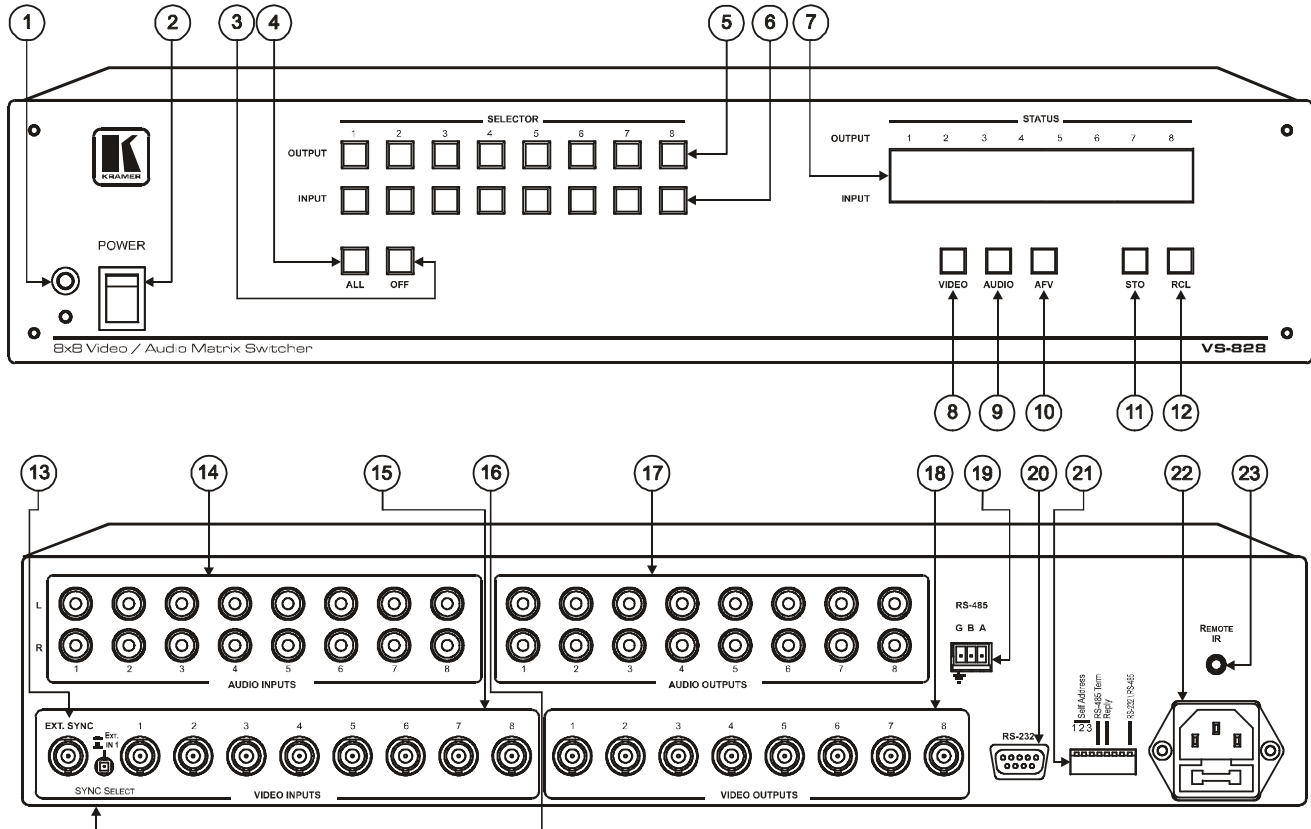


Figure 2: VS-828 8x8 Video / Audio Matrix Switcher

## Your VS-626 (VS-828) Video Audio Matrix Switcher

*Table 1: Front Panel VS-626 6x6 (VS-828 8x8) Video / Audio Matrix Switcher Features*

#	Feature	Function
1	IR Receiver	The red LED is illuminated when receiving signals from the infra-red remote control transmitter
2	<i>POWER</i> Switch	Illuminated switch for turning the unit ON or OFF
3	<i>OFF</i> Button	An OFF-OUT combination disconnects that output from the inputs; an OFF-ALL combination disconnects all the outputs
4	<i>ALL</i> Button	Pressing ALL followed by an INPUT button, connects that input to all outputs <sup>1</sup>
5	<i>OUTPUT</i> Buttons	Select the output to which the input is switched
6	<i>INPUT</i> Buttons	Select the input to switch to the output
7	7-segment Display	Displays the selected audio <sup>2</sup> or video <sup>3</sup> input switched to the output (marked above each input)
8	<i>VIDEO</i> Button	When pressed button is illuminated and all actions relate to video
9	<i>AUDIO</i> Button	When pressed button is illuminated and all actions relate to audio
10	<i>AFV</i> Button	When pressed button is illuminated and all actions relate to video and audio channels. Audio channels follow the video channels
11	<i>STO</i> (STORE) Button	Pressing STO followed by an output button stores the current setting <sup>4</sup>
12	<i>RCL</i> (RECALL) Button	Pressing the RCL button and the corresponding OUTPUT key recalls a setup from the non-volatile memory. The stored status blinks. Pressing a different OUTPUT button lets you view <sup>5</sup> another setup. After making your choice, pressing the RCL button again implements the new status

*Table 2: Rear Panel VS-626 6x6 (VS-828 8x8) Video / Audio Matrix Switcher Features*

#	Feature	Function
13	<i>EXT. SYNC</i> BNC Connector	Connects to the external SYNC source
14	<i>AUDIO INPUTS</i> RCA Connectors	Connect to the audio sources
15	<i>VIDEO INPUTS</i> BNC Connectors	Connect to the video sources (from 1 to 6 / 8)
16	<i>SYNC</i> Source Selector Button	Pushing in selects the (EXT) external sync source on the SYNC connector; releasing selects the (IN 1) internal sync on the VIDEO IN 1 connector
17	<i>AUDIO OUTPUTS</i> RCA Connectors	Connect to the audio acceptors
18	<i>VIDEO OUTPUTS</i> BNC Connectors <sup>6</sup>	Connect to the video acceptors (from 1 to 6 / 8)
19	<i>RS-485</i> Connector	RS-485 port on detachable terminal block
20	<i>RS-232 DB 9F</i> Connector	Connects to the PC or other Serial Controller
21	Setup Dipswitches	DIP 1, 2, and 3 for machine SELF ADDRESS #; DIP 4 for RS-485 termination, DIP 5 for reply from switcher to PC, DIP 8 for RS-232 / RS-485 communication
22	Power Connector with <i>Fuse</i>	AC connector enabling power supply to the unit
23	<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) <sup>7</sup>

1 For example, press ALL and then Input button # 2 to connect input # 2 to all the outputs

2 When the Audio button illuminates, that is, when the audio breakaway mode is selected

3 When the Video button illuminates, that is, when the video breakaway mode is selected

4 For example, press STO and then the Output button # 3 to store in Setup # 3

5 Only view, nothing is implemented at this stage

6 For RGBS applications, one of the sync channels (H or V) may be used for the S channel

7 Optional. Can be used instead of the front panel (built-in) IR receiver to remotely control the VS-626/VS-828 (only if the internal IR connection cable has been installed)

## 5 Installing on a Rack

This section describes what to do before installing on a rack and how to rack mount.

### Before Installing on a Rack

Before installing on a rack, be sure that the environment is within the recommended range:	
Operating temperature range	+5 to +45 Deg. Centigrade
Operating humidity range	5 to 65% RHL, non-condensing
Storage temperature range	-20 to +70 Deg. Centigrade
Storage humidity range	5 to 95% RHL, non-condensing



### CAUTION!!

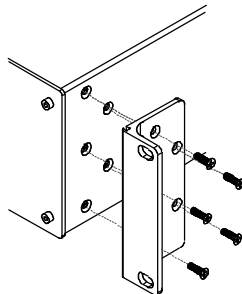
When installing on a 19" rack, avoid hazards by taking care that:

- 1 If 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.

### How to Rack Mount

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 (5 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 that:

- 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 (you can download it at: <http://www.kramerelectronics.com>)

## 6 Connecting<sup>1</sup> the VS-828 Video / Audio Matrix Switcher

To connect a single<sup>2</sup> VS-828 switcher, as illustrated in the example in Figure 3, do the following<sup>3</sup>:

1. Connect up to 8 (6) composite video sources (for example, composite video players) to the VIDEO INPUT BNC connectors and the AUDIO INPUT R and L RCA connectors<sup>4</sup>.
2. Connect the 8 (6) VIDEO OUTPUT BNC connectors and the AUDIO OUTPUT R and L RCA connectors<sup>4</sup> to up to 8 (6) composite video acceptors (for example, composite video recorders).
3. If required, connect to a PC or other controller via RS-232 (see section 6.2) or RS-232 and RS-485 (see section 6.3).
4. Connect the power cord to the mains electricity<sup>4</sup>.
5. Set the dipswitches (see section 6.1).

---

1 From this section on, all the information is relevant also to the VS-626, unless noted otherwise

2 Note that you can connect up to eight VS-828 units to a PC or other RS-232 or RS-485 controller

3 Switch OFF the power on each device before connecting it to your VS-828. After connecting your VS-828, switch on its power and then switch on the power on each device

4 Not illustrated in Figure 3

## Connecting the VS-828 Video / Audio Matrix Switcher

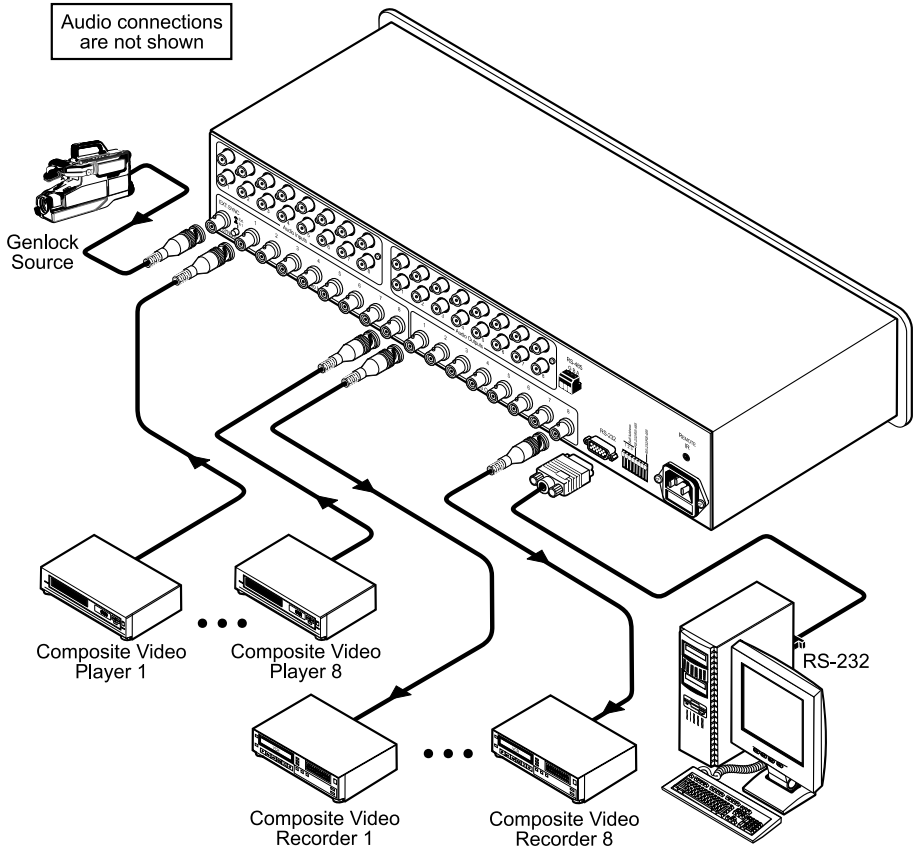


Figure 3: Connecting the Video Sources and Acceptors to the Rear Panel

## 6.1 Setting the Dipswitches

This section describes the machine set-up and dipswitch selection. Figure 4 and Table 3 describe the **VS-828** dipswitches.

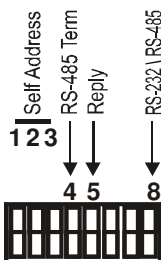


Figure 4: VS-626 (VS-828) Dipswitch Configuration

Table 3: Dipswitch Settings

DIPS	Function	Description
1, 2, 3	Self Address	Determines the machine number
4	RS-485 Term	ON for RS-485 Line Termination OFF for no RS-485 Line Termination
5	Reply	ON enables reply from the switcher to PC OFF disables reply from the switcher to PC
6, 7	Reserved	OFF
8	RS-232 RS-485	ON enables RS-232 communication between the switcher and PC OFF enables RS-485 communication between the switcher and PC

To set the dipswitches, use a small flathead screwdriver to move the dipswitches to the ON or OFF position as described in the following sections.

### 6.1.1 SELF ADDRESS Dipswitches

The Self Address dipswitch determines the position of a **VS-828** unit in the sequence, specifying which **VS-828** unit is being controlled, when several **VS-828** units are controlled by a PC or serial controller. Set the Self Address on a **VS-828** unit via dipswitches 1, 2, and 3, according to Table 4.

Table 4: Self Address Dipswitch Settings

Self Address	DIPs		
	3	2	1
1 Master	ON	ON	ON
2	ON	ON	OFF
3	ON	OFF	ON
4	ON	OFF	OFF
5	OFF	ON	ON
6	OFF	ON	OFF
7	OFF	OFF	ON
8	OFF	OFF	OFF

Up to 8 Matrix Switchers may be cascaded for control via a single port by configuring one Matrix Switcher as a Master (Self Address = 1)<sup>1</sup>, while all the others are assigned as Slave Matrix Switchers or an ID other than "1".

### 6.1.2 Setting Connection Dipswitches

When connecting a PC via the RS-232, set dipswitch # 8 to ON. When connecting a PC via the RS-485, set dipswitch # 8 to OFF.

Dipswitch # 5 enables or disables Reply from the Matrix Switcher to the PC. In some applications, it may be desirable for some machines not to reply to instructions received on the RS-232 and RS-485 ports. If so, set the Reply dipswitch to OFF.

In the case of interconnection between more than two RS-485 receivers-transmitters (including PC), the termination resistor must be disconnected on all the devices, except for the first (usually the PC) and last units on the communication line. Dipswitch # 4 connects or disconnects the termination resistor.

## 6.2 Controlling via RS-232 (for example, using a PC)

You can connect a PC (or other controller) to the **VS-828** via the RS-232 port.

To connect using the Null-modem adapter provided with the machine (recommended method):

- Connect the RS-232 DB9 rear panel port on the **VS-828** to the Null-modem adapter and connect the Null-modem adapter with a 9-wire flat cable to the RS-232 DB9 port on your PC

To connect without using a Null-modem adapter:

- Connect the RS-232 DB9 port on your PC to the RS-232 DB9 rear panel port on the **VS-828**, as Figure 5 illustrates

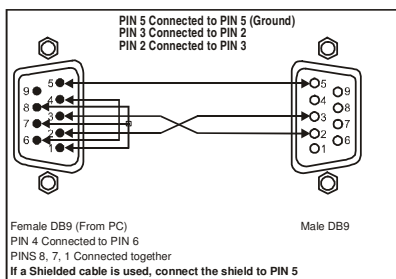


Figure 5: Connecting a PC without using a Null-modem Adapter

<sup>1</sup> The default is for Master (Self Address=1) and this is the recommended setting for a single machine

### 6.3 Controlling via RS-232 and RS-485

You can control up to eight single **VS-828** units with control from a PC via RS-232 (see section 6.2) and RS-485 as illustrated in Figure 6.

To control via RS-232 and RS-485, do as follows:

1. Connect the video sources and acceptors, the appropriate audio sources and acceptors, and the power cord to each **VS-828** unit.
2. On each **VS-828** unit, set the Self Address dipswitches, as required<sup>1</sup> (see Table 4).
3. Connect the RS-232 port on the first unit to the PC<sup>2</sup>.
4. Interconnect the RS-485 ports on all the **VS-828** units: from the RS-485 port on the first **VS-828** unit, to the RS-485 port on the second **VS-828** unit, and so on – up to the RS-485 port on the last unit.
5. Terminate the RS-485 line as described in section 6.1.2.

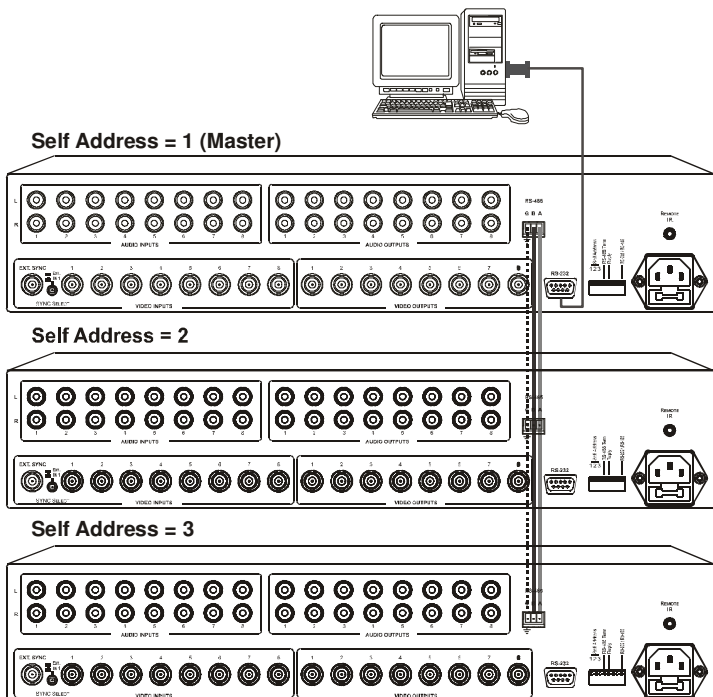


Figure 6: RS-232 and RS-485 Operation

<sup>1</sup> The first unit (the master) will be set to Self Address = 1

<sup>2</sup> As in section 6.2



## 6.4 RGB/YUV Switching with RS-232 (PC Control)

Figure 7 describes a typical component video/RGB setup where every video signal is composed of three sub signals (components), which should be switched together (also valid for YUV components).

For RS-232 control of the component matrix switcher, an additional piece of equipment would be required. Since RS-232 can only be used for control between 2 pieces of equipment (e.g. a PC and a switcher), we need a method of “distributing” the RS-232 to all 3 machines. The Kramer **VP-14** “RS-232 Port Extender” is designed for this purpose.

Perform the following steps (as necessary):

1. Connect the RGB sources to the **VIDEO INPUTS** connectors of the Matrix Switchers, connecting the “R” components to first Matrix Switcher, “G” to the second, and “B” to the third. Make sure that each component of a video source is connected to the same input number on all three switchers.
2. Similarly, connect the RGB acceptors to the **VIDEO OUTPUTS** connectors of the three Matrix Switchers.
3. If the video sources are synchronized, and vertical interval switching is desired, connect sync sources to all 3 machines, and select to work with “Ext. Sync” (selector switch pressed in).
4. Assign all 3 machines as Self Address # 1 (see Table 4).
5. Set dipswitch # 5 (Reply) of the first machine to ON. Set to OFF for the other machines.
6. Set dipswitch # 8 of all the machines to ON (RS-232 communication between switchers and external controller).
7. Connect the serial port of the PC to a port on the **VP-14**, and connect each switcher to a **VP-14** port. Configure the dipswitches of the **VP-14** for the 4 ports, which were connected.
8. Operate the Matrix Switchers, PC, **VP-14**, RGB sources and RGB acceptors.
9. The inputs can now be switched to the outputs. This is done via the front panel switches of the first switcher, and/or via the PC.

## Connecting the VS-828 Video / Audio Matrix Switcher

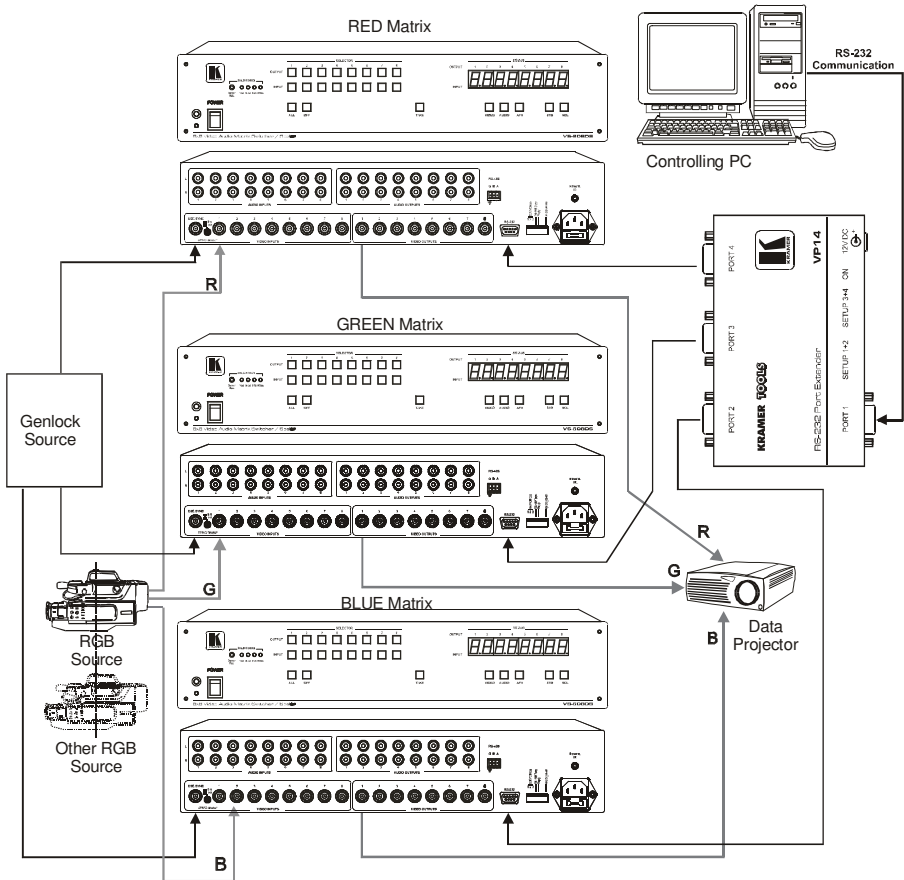


Figure 7: RGB Switching with RS-232 control via a PC

## 7 Operating VS-828 Matrix Switcher

Operate your **VS-828** via:

- The front panel buttons
- RS-232/ RS-485 serial commands transmitted by a touch screen system, PC or other serial controller

### 7.1 Displaying Unit Characteristics

The **VS-828** 7-segment Display shows the selected audio<sup>1</sup> or video<sup>2</sup> input switched to the marked output

The unit characteristics<sup>3</sup> are displayed in the following circumstances:

- Immediately (and automatically) after switching on the power; and
- When simultaneously pressing and holding for 3 seconds the “IN” buttons 1, 2 and 3

### 7.2 Selecting and Connecting an Output and/or Input

To select an output or input simply press the designated button on the front panel. These buttons correspond to output connections as marked on the rear panel.

- To connect a video / audio Input to a specific output, press the desired output button, followed by the desired input button
- To disconnect a video / audio Input from a specific output, press the desired output button followed by the OFF button. To disconnect all the outputs, press the ALL button, followed by the OFF button
- To connect a video / audio Input to all outputs, press the ALL button followed by the INPUT button corresponding to the input which is to be routed to all the outputs

---

<sup>1</sup> When the Audio button illuminates, that is, when the audio breakaway mode is selected

<sup>2</sup> When the Video button illuminates, that is, when the video breakaway mode is selected

<sup>3</sup> Machine model and software version

## 7.3 Choosing the Audio-Follow-Video or Breakaway Option

You can switch stereo audio signals in one of two ways, either:

- Audio-follow-video (AFV), in which all operations relate to both the video and the audio channels; or
- Breakaway, in which video and audio channels switch independently

### 7.3.1 Setting the Audio-Follow-Video Option

To set the Audio-follow-video (AFV) option, press the AFV button:

- If the AUDIO and VIDEO configurations are the same, then the AFV button illuminates. The audio will follow the video
- If the AUDIO differs from the VIDEO, then the AFV button will blink. Also, the audio outputs, that need to be changed, will blink<sup>1</sup> in the INPUT STATUS 7-segment display. Press the AFV button again<sup>2</sup>. The audio will follow the video, and the AFV illuminates.

### 7.3.2 Setting the Breakaway Option

To set the Breakaway option, press either the AUDIO (for audio control only) or the VIDEO (for video control only) button.

- If the AUDIO button illuminates, switching operations relate to Audio
- If the VIDEO button illuminates, switching operations relate to Video

## 7.4 Storing/Recalling Input/Output Configurations

You can store and recall up to 8 (6) input/output configurations (or setups) in non-volatile memory, using the INPUT SELECTOR buttons 1 to 8 (6). The 8 (6) input/output configurations also include the relevant audio-follow-video / breakaway option definition, the video configurations and the audio configurations.

### 7.4.1 Storing an Input/Output Configuration

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

1. Press the STO button.  
The STO button blinks.
2. Press one of the INPUT SELECTOR buttons from 1 to 8 (6). This will be the setup # in which the current status is stored.  
The memory stores the data at that reference.

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<sup>1</sup> Warning that you are about to modify the audio configuration for AFV operation

<sup>2</sup> Failure to press the AFV button within one minute (the Timeout) will abort the action

### **7.4.2 Recalling an Input/Output Configuration**

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

1. Press the RCL button.  
The RCL button blinks.
2. Press the appropriate INPUT SELECTOR button (the INPUT SELECTOR button # corresponding to the setup #). The memory recalls the stored data from that reference.

### **7.4.3 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 blink.
2. Press the appropriate INPUT SELECTOR button.  
This erases that specific input/output configuration from the memory, leaving it empty and available<sup>1</sup>.

## **7.5 Resetting the Machine**

To reset the machine, press INPUT buttons 1, 2 and 3 simultaneously. The machine resets itself and a 7-segment self-test is performed automatically.

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<sup>1</sup> Storing a new configuration over a previous configuration (without deleting it first) replaces the previous configuration

## 8 Technical Specifications

Table 5 details the **VS-626 (VS-828)** technical specifications<sup>1</sup>.

*Table 5: Technical Specifications of the VS-626 / VS828*

INPUTS:	VS-626	6 composite video 1Vpp/75Ω on BNC connectors 1 sync/video genlock with sync select switch 6 audio stereo up to +4dBm/62kΩ on RCA connectors	
	VS-828	8 composite video 1Vpp/75Ω on BNC connectors 1 sync/video genlock with sync select switch 8 audio stereo up to +4dBm/62kΩ on RCA connectors	
OUTPUTS:	VS-626	6 composite video 1Vpp/75Ω on BNC connectors 6 audio stereo +4dBm/50Ω on RCA connectors	
	VS-828	8 composite video 1Vpp/75Ω on BNC connectors 8 audio stereo +4dBm/50Ω on RCA connectors	
MAX. OUTPUT LEVEL:	VIDEO: 2Vpp	AUDIO: ±20Vpp	
BANDWIDTH (-3dB):	VIDEO: 100MHz	AUDIO: 100kHz	
DIFF. GAIN:	0.05%		
DIFF. PHASE:	0.03 Deg.		
K-FACTOR:	< 0.05%		
S/N RATIO:	VIDEO: 74dB	AUDIO: 88 dB unweighted (1Vpp)	
CROSSTALK (all hostile):	VIDEO: -50 dB @5MHz	AUDIO: -71.4dB@1kHz	
CONTROLS:	Manual, RS-232 or RS-485		
COUPLING:	VIDEO: DC	AUDIO: AC	
AUDIO THD + NOISE:	0.016% (1V, 1kHz)		
AUDIO 2nd HARMONIC:	0.012%		
POWER SOURCE:	230 VAC, 50/60Hz (115 VAC, USA)		
DIMENSIONS:	19 inch (W), 7 inch (D), 2U (H) rack mountable		
WEIGHT:	3.4kg. (7.5lbs.) approx.		
ACCESSORIES:	Power cord, Null modem adapter, Windows®-based control software		
OPTIONS:	External IR receiver <sup>2</sup> , extension cable <sup>3</sup>		

<sup>1</sup> Specifications are subject to change without notice

<sup>2</sup> 15 meters long, P/N: 95-0104050

<sup>3</sup> 15 meters long, P/N: 95-0103050

## 9 Communication Protocol

Communication with the Matrix Switchers described in this manual uses four bytes of information as defined in Table 6 Data is transferred at 9600 baud with no parity, 8 data bits and 1 stop bit.

Table 6: Protocol Definitions

MSB		INSTRUCTION						LSB
DESTINATION		INSTRUCTION						
N		N5	N4	N3	N2	N1	N0	
0	D	5	4	3	2	1	0	
7	6	5	4	3	2	1	0	
1st byte				INPUT				
1	0	0	0	I3				
7	6	5	4	3				
2nd byte				OUTPUT				
1	0	0	0	O3				
7	6	5	4	3				
3rd byte				MACHINE NUMBER				
1	0	0	0	0	M2	M1		
7	6	5	4	3	2	1		
4th byte								

1st BYTE: Bit 7 – Defined as 0.

D – “DESTINATION” This bit is always "low", when sending from the PC to the Matrix Switchers, and "high" for information sent to the PC.

N5...N0 – “INSTRUCTION”:

The function that is to be performed by the Matrix 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.

Bits 4 – 6 - Defined as 0.

I3... I0 – “INPUT”:

When switching via RS-232 for RS- 485 (for instruction codes 1 and 2), these bits set the input that 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 disconnect, set as 0. For other operations, these bits are defined according to the table.

3rd BYTE: Bit 7 – Defined as 1.

Bits 4 – 6 Defined as 0.

O3...O0 – “OUTPUT”:

When switching via RS-232 or RS-485 (for instruction codes 1 and 2), the output to switch is set by these bits. 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.

Bits 3 – 6 Defined as 0.

M2... M0 – “Machine Number”:

Machine Number = (DIP – Switch Code) + 1.

Table 7: Protocol Instruction Codes

Note: All values in the table are decimal, unless otherwise stated.

INSTRUCTION		DEFINITION FOR SPECIFIC INSTRUCTION		NOTE
#	DESCRIPTION	INPUT	OUTPUT	
0	RESET MACHINE	0	0	1
1	SWITCH VIDEO	Set equal to video input to be switched	Set equal to video output to be switched (0=to all the outputs)	2
2	SWITCH AUDIO	Set equal to audio input to be switched	Set equal to audio output to be switched (0=to all the outputs)	2
3	STORE STATUS	Set as SETUP # 1-6 (1-8) for the VS-626 (VS-828)	- To store parameters - to delete setup	2,7
4	RECALL STATUS	Set as SETUP # 1-6 (1-8) for the VS-626 (VS-828)	Don't care	2,7
5	REQUEST STATUS OF A VIDEO OUTPUT	Set as SETUP # 1-6 (1-8) for the VS-626 (VS-828)	Equal to output number whose status is read	3,7
6	REQUEST STATUS OF AN AUDIO OUTPUT	Set as SETUP # 1-6 (1-8) for the VS-626 (VS-828)	Equal to output number whose status is read	3,7
7	VIS SETTING	Don't care	- for immediate switching - for VIS switching	2
8	BREAKAWAY SETTING	Don't care	- for audio-follow-video - for breakaway	2
9	NOT USED			
10	REQUEST VIS SETTING	Set as SETUP # 1-6 (1-8) for the VS-626 (VS-828)	Don't care	3,7
11	REQUEST BREAKAWAY SETTING	Set as SETUP # 1-6 (1-8) for the VS-626 (VS-828)	Don't care	3,7
12 to 14	NOT USED			
15	REQUEST WHETHER SETUP IS DEFINED	Set as SETUP # 1-6 (1-8) for the VS-626 (VS-828)	Don't care	4
16	ERROR/BUSY	Don't care	Don't care	5
17	RESERVED			6
18	RESET MACHINE	0	0	1
19	STORE STATUS	Set as SETUP # 1-6 (1-8) for the VS-626 (VS-828)	0-to store parameters 1-to delete setup	2,7,9
20	RECALL STATUS	Set as SETUP # 1-6 (1-8) for the VS-626 (VS-828)	Don't care	2,7,10
21 to 56	NOT USED			
57	SET AUTO-SAVE	for auto save 0 – no save	Don't care	8,2
58 to 60	RESERVED			
61	IDENTIFY MACHINE	1or 2 – machine name 3 or 4 – version	Don't care	11

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 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 on the front panel), then these codes are sent. For example:

0000 0001  
1000 0101  
1000 1000  
0011

was sent from the PC, then the switcher (machine # 3) will switch input 5 to output 8. If the user switched input # 1 to output # 7 via the front panel keypad, then the switcher will send:

0100 0001  
1000 0001  
1000 0111  
1000 0011      ⇒ to the PC.



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## Communication Protocol

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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 sent (except for the first byte, where the DESTINATION bit is set "high").

**NOTE 3** - The reply to a "REQUEST" instruction is as follows: the same instruction and INPUT codes as were sent are returned, and the OUTPUT is assigned the value of the requested parameter. The replies to instructions 10 and 11 are as per the definitions in instructions 7 and 8 respectively. For example, if the present status of machine number # 5 is breakaway setting, then the reply to

0000 1011		0100 1100
1000 0001	Would be ⇒	1000 0001
1000 0000		1000 0001
1000 0101		1000 0101

**NOTE 4**-The reply to the "REQUEST WHETHER SETUP IS DEFINED" is as in TYPE 3 above, except that here the OUTPUT is assigned with the value 0 if the setup is not defined; or 1 if it is defined.

**NOTE 5**-An error code is returned to the PC if an invalid code was sent to the switcher (e.g. trying to save to a setup greater than 8, 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 6**-This code is reserved for internal use.

**NOTE 7**-SETUP # 0 is the present setting. SETUP # 1 to SETU P# 8 are the settings saved in the switcher's memory, (i.e. those used for Store and Recall).

**NOTE 8**-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, auto-save function is set.

**NOTE 9**-This is identical to instruction 3 (machine uses instruction 3, when sending to PC).

**NOTE 10**-This is identical to instruction 4 (machine uses instruction 4, when sending to PC).

**NOTE 11**-This is a request to identify the switcher/s in the system. If the INPUT is set as 1 or 2, the machine will send its name. The reply is the decimal value of the INPUT and OUTPUT. For example, the reply to the request to send machine name (for machine number 001) would be:

0111 1101	
1000 1000	(i.e. 128 + 8)
1000 1000	(i.e. 128 + 8)
1000 0001	

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 would be:

0111 1101	
1000 0011	(i.e. 128 + 3)
1000 0101	(i.e. 128 + 5)
1000 0001	

## 10 Table of Hex Codes for the Master VS-828

Table 8 shows the “HEX” codes for switching the Master **VS-828**.

**NOTE:** The table is also valid for the **VS-626** if the last two rows and columns are ignored

*Table 8: VS-828 Hex Codes for Switching the Master VS-828*

	OUT1	OUT 2	OUT 3	OUT 4	OUT 5	OUT 6	OUT 7	OUT 8
<b>IN 1</b>	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
<b>IN 2</b>	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
<b>IN 3</b>	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
<b>IN 4</b>	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
<b>IN 5</b>	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
<b>IN 6</b>	01	01	01	01	01	01	01	01
	86	86	86	86	86	86	86	86
	81	82	83	84	85	86	87	88
	81	81	81	81	81	81	81	81
<b>IN 7</b>	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
<b>IN 8</b>	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

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## LIMITED WARRANTY

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

### HOW LONG IS THE WARRANTY

Labor and parts are warranted for seven years from the date of the first customer purchase.

### WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

### WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the Web site [www.kramerelectronics.com](http://www.kramerelectronics.com).
2. Any product, on which the serial number has been defaced, modified or removed.
3. Damage, deterioration or malfunction resulting from:
  - i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
  - ii) Product modification, or failure to follow instructions supplied with the product
  - iii) Repair or attempted repair by anyone not authorized by Kramer
  - iv) Any shipment of the product (claims must be presented to the carrier)
  - v) Removal or installation of the product
  - vi) Any other cause, which does not relate to a product defect
  - vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

### WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

### HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on your product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

### LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

### EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

**NOTE:** All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

This equipment has been tested to determine compliance with the requirements of:

- EN-50081: "Electromagnetic compatibility (EMC);  
generic emission standard.  
Part 1: Residential, commercial and light industry"
- EN-50082: "Electromagnetic compatibility (EMC) generic immunity standard.  
Part 1: Residential, commercial and light industry environment".
- CFR-47: FCC Rules and Regulations:  
Part 15: "Radio frequency devices  
Subpart B Unintentional radiators"

### CAUTION!

- ⊗ Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- ⊗ Use the supplied DC power supply to feed power to the machine.
- ⊗ Please use recommended interconnection cables to connect the machine to other components.



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**For the latest information on our products and a list of Kramer distributors, visit our Web site: [www.kramerelectronics.com](http://www.kramerelectronics.com), where updates to this user manual may be found. We welcome your questions, comments and feedback.**



**Caution**

**Safety Warning:**

Disconnect the unit from the power supply before opening/servicing.



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**Kramer Electronics, Ltd.**

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