KRAMER ELECTRONICS LTD.

# USER MANUAL

MODEL:

**VS-82HDxl**
8x2 SD/HD-SDI Matrix Switcher

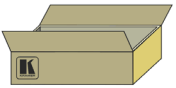
P/N: 2900-300186 Rev 3

# VS-82HDxl 8x2 SD/HD-SDI Matrix Switcher 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-82HDxl** 8x2 SD/HD-SDI Matrix Switcher
- **RC-IR3** Remote Transmitter
- Power cord
- 1 Quick Start Guide
- 2 Rack "ears"
- 4 Rubber feet



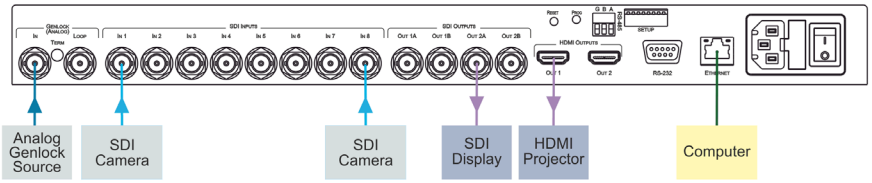
Save the original box and packaging materials in case your Kramer product needs to be returned to the factory for service.

## Step 2: Install the VS-82HDxl

Mount the device in a rack (using the supplied rack "ears") or place it on a shelf.

## Step 3: Connect the inputs and outputs

Switch off the power to all devices before connecting them to your **VS-82HDxl**.




When connecting AV equipment to the **VS-82HDxl** we recommend that you use Kramer high-performance cable for best results.

## Step 4: Connect the power

Connect the **VS-82HDxl** to the mains supply using the supplied power cord.

## Step 5: Operate the device

Operate the device using the front panel controls, RS-232, RS-485, IR remote control transmitter and Ethernet.

# Contents



# Figures

# 1 Introduction

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

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

Congratulations on purchasing your Kramer **VS-82HDxl** *8x2 SD/HD-SDI Matrix Switcher*. This product is ideal for:

- Professional broadcasting and production studios
- Post production editing

# 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 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 **VS-82HDxl** 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 Kramer **VS-82HDxl** is a true 8 x 2 matrix switcher for SDI signals that lets you switch any one of the eight SDI inputs to one or both sets of triple outputs (SDI and HDMI).

In particular, the **VS-82HDxl**:

- Features selector buttons that provide visual indication of the presence of a signal
- Provides up to 2.97Gbps of bandwidth allowing it to be used for SD, HD and 3G HD serial digital video signals
- Includes cable equalization of up to 350m for SD signals, 140m for 1.5GHz HD signals and 120m for 3GHz HD signals
- Features reclocking and equalization on each input
- Is SMPTE 259M, 292M, 344M, 424M and DVB-ASI compliant and supports data rates of 270Mbps, 1483.5Mbps, 1485Mbps and 2970Mbps
  Digital Video Broadcasting - Asynchronous Serial Interface
- Supports ANC data (embedded audio, Teletext, time code, and so on)
- Performs clean switching when the sources are genlocked to the selected genlock input with a difference of no more than two lines of video
- Can use either an analog signal or any of the SDI input signals for genlocking. If the selected genlock input signal is unavailable, the **VS-82HDxl** automatically selects the best available SDI input for the genlock signal
- Provides 16 presets for storing switching configurations
- Has a front panel lock button

The **VS-82HDxl** is housed in a 19" 1U rack-mountable enclosure and is fed from a 100-240 VAC universal switching power supply.

You can control the **VS-82HDxl** using the front panel buttons, or remotely via:

- RS-232/RS-485 serial commands transmitted by a PC, touch screen system or other serial controller
- The Kramer **RC-IR3** infrared remote control transmitter
- A PC connected to the Ethernet port on the device via a LAN

## 3.1 Defining the VS-82HDxl 8x2 SD/HD-SDI Matrix Switcher

Figure 1 and Figure 2 define the front and rear panel of the **VS-82HDxl** respectively.

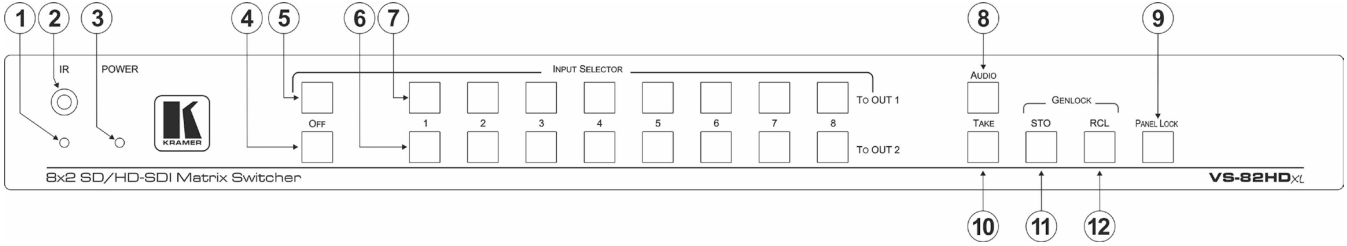



Figure 1: VS-82HDxl 8x2 SD/HD-SDI Matrix Switcher Front Panel

| # | Feature | Function |
|---|---|---|
| 1 | *IR* LED | Lights yellow when receiving an IR signal |
| 2 | *IR* Receiver | Signal receiver for the infrared remote control transmitter |
| 3 | *POWER* LED | Lights green when the device is powered on |
| 4 | *OFF* Button | Press to mute the signal on Output 2 (see Section 6.4) |
| 5 | *OFF* Button | Press to mute the signal on Output 1 |
| 6 | *INPUT SELECTOR To OUT 2 1~8* Buttons | Press one of the eight inputs to switch it to Output 2 (see Section 6.1) |
| 7 | *INPUT SELECTOR To OUT 1 1~8* Buttons | Press one of the eight inputs to switch it to Output 1 |
| 8 | *AUDIO* Button | Press to select which SDI audio group to transmit on the output (see Section 6.3) |
| 9 | *PANEL LOCK* Button | Press and hold to lock the front panel buttons. Press and hold again to unlock the front panel buttons |
| 10 | *TAKE* Button | Press to implement simultaneous switching actions (see Section 6.2) |
| 11 | *STO* Button | Press to store a switching configuration in a preset (see Section 6.7) Press together with the RCL button to select a genlock synchronization source (see Section 6.5) |
| 12 | *RCL* Button | Press to recall a preset configuration (see Section 6.7). Press together with the STO button to select a genlock synchronization source (see Section 6.5) |

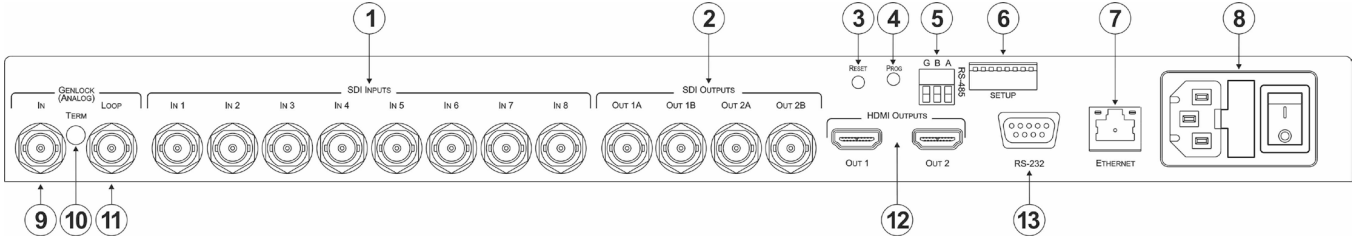



Figure 2: VS-82HDxl 8x2 SD/HD-SDI Matrix Switcher Rear Panel

| # | Feature | | Function |
|---|---|---|---|
| 1 | *SDI INPUTS IN 1 ~ IN 8* BNC Connectors | | Connect to the SDI video sources (from 1 to 8) |
| 2 | *SDI OUTPUTS* BNC Connectors | *OUT 1A* and *OUT 1B* | Connect to the SDI video acceptors (1 and 2).<br>**Note**: The same signal is present on both outputs as well as on the HDMI 1 output |
| | | *OUT 2A* and *OUT 2B* | Connect to the SDI video acceptors (3 and 4).<br>**Note**: The same signal is present on both outputs as well as on the HDMI 2 output |
| 3 | *RESET* Button | | Press while turning on the device to reset the device to factory default values (see Section 6.8 and Section 8) |
| 4 | *PROG* Button | | For the use of Kramer service personnel only |
| 5 | *RS-485* 3-pin Terminal Block | | Connect to an RS-485 serial controller (see Section 5.4) |
| 6 | *SETUP* DIP-switches Terminal Block | | Use to set the RS-485 bus device number and termination (see Section 5.1) |
| 7 | *ETHERNET* RJ-45 Connector | | Connect to a PC via a LAN (see Section 5.5) |
| 8 | Mains Power Connector, Fuse and Switch | | Plug in the power cord and switch the device on and off |
| 9 | *GENLOCK (ANALOG)* | *IN* BNC Connector | Connect to the genlock source (see Section 6.5) |
| 10 | | *TERM* Button | Press to terminate the genlock source (75Ω). Release for looping |
| 11 | | *LOOP* BNC Connector | Connect to the Genlock connector of the next device in the chain |
| 12 | *HDMI OUTPUTS* | *OUT 1* | Connect to the first HDMI acceptor.<br>**Note**: The same signal that is present on OUT 1A and OUT 1B is present on this HDMI output |
| | | *OUT 2* | Connect to the second HDMI acceptor.<br>**Note**: The same signal that is present on OUT 2A and OUT 2B is present on this HDMI output |
| 13 | *RS-232* 9-pin D-sub Serial Connector | | Connect to a PC/serial controller (see Section 5.3) |

# 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: | 0º to +40ºC (32º to 104ºF) |
| STORAGE TEMPERATURE: | -40º to +70ºC (-40º to 158ºF) |
| HUMIDITY: | 10% to 90%, RHL non-condensing |

**CAUTION!**

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

**1**. It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi unit rack assembly may exceed the room ambient temperature.

**2**. Once rack mounted, enough air will still flow around the machine.

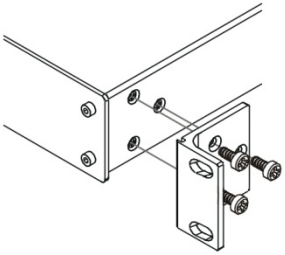
**3**. The machine is placed straight in the correct horizontal position.

**4**. You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.

**5**. The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to situations where electricity is supplied indirectly (when the power cord is not plugged directly into the socket in the wall), for example, when using an extension cable or a power strip, and that you use only the power cord that is supplied with the machine.

**To rack-mount a machine:**

**1**. Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (3 on each side), and replace those screws through the ear brackets.



**2**. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

Note:

- In some models, the front panel may feature built-in rack ears
- Detachable rack ears can be removed for desktop use
- Always mount the machine in the rack before you attach any cables or connect the machine to the power
- If you are using a Kramer rack adapter kit (for a machine that is not 19"), see the Rack Adapters user manual for installation instructions available from our Web site

# 5 Connecting the VS-82HDxl 8x2 SD/HD-SDI Matrix Switcher

You can use your **VS-82HDxl** to switch one of the eight HD/SD SDI inputs to either or both of the two pairs of SDI outputs and the HDMI outputs. The same output signal (selected using the To OUT 1 input buttons) is replicated on SDI OUT 1A, SDI OUT 1B and HDMI OUT 1. The same output signal (selected using the To OUT 2 input buttons) is replicated on SDI OUT 2A, SDI OUT 2B and HDMI OUT 2.

Always switch off the power to each device before connecting it to your **VS-82HDxl**. After connecting your **VS-82HDxl**, connect its power and then switch on the power to each device.

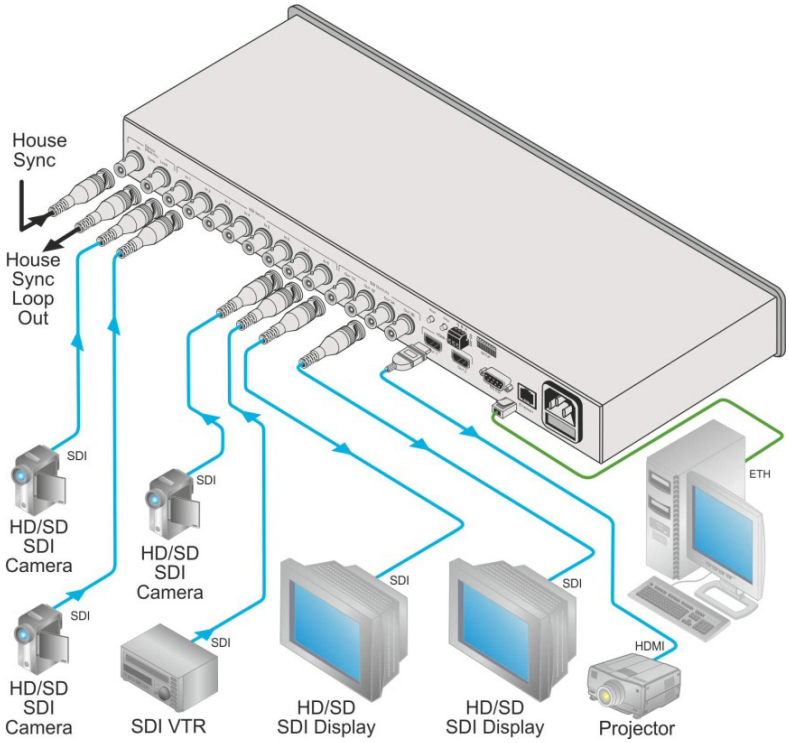



Figure 3: Connecting the VS-82HDxl 8x2 SD/HD-SDI Matrix Switcher

**To connect the VS-82HDxl 8x2 SD/HD-SDI Matrix Switcher as illustrated in the example in Figure 3:**

1. Connect up to eight SDI sources to the SDI Input BNC connectors, (for example, HD/SD SDI cameras to Input 1, 2 and 7, and an SDI VTR to Input 8).
2. Connect the SDI Output BNC connectors to up to four SDI acceptors (for example, HD/SD SDI displays to outputs 1A and 2A).
3. Connect the two HDMI output connectors to up to two HDMI acceptors (for example, a projector to HDMI OUT 1).
4. If required, set the DIP-switches (see Section 5.1).
5. If required, connect and set the genlocking source (see Section 5.2 and Section 6.5).
6. If required, connect a controller to the:
   - RS-232 port (see Section 5.3)
   - RS-485 port (see Section 5.4)
   - Ethernet connector (see Section 5.5)
7. Connect the power cord and power the device on.

## 5.1 Setting the Device Number and Termination DIP-Switches

When connecting more than one device using the RS-485 bus, you must set the device number and the bus termination on the Setup DIP-switches accordingly.

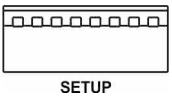



Figure 4: VS-82HDxl Setup DIP-Switches

The following table defines the functions of each switch.

| DIP-switch | Function |
|---|---|
| 1 | RS-485 termination |
| 2 | RS-485 device ID |
| 3 | RS-485 device ID |
| 4 | RS-485 device ID |
| 5 | RS-485 device ID |
| 6 | Not used |
| 7 | Not used |
| 8 | Not used |

Switches that are up are off and those that are down are on. By default, all DIP-switches are set to OFF (up).

### 5.1.1 Setting the Device ID

The device ID determines the position of a **VS-82HDxl** in the RS-485 bus. You can set the device ID using the Setup DIP-switches 2, 3, 4 and 5.

| Device ID | DIP-switch 2 | DIP-switch 3 | DIP-switch 4 | DIP-switch 5 |
|---|---|---|---|---|
| 1 (default) | Off | Off | Off | Off |
| 1 | On | Off | Off | Off |
| 2 | Off | On | Off | Off |
| 3 | On | On | Off | Off |
| 4 | Off | Off | On | Off |
| 5 | On | Off | On | Off |
| 6 | Off | On | On | Off |
| 7 | On | On | On | Off |
| 8 | Off | Off | Off | On |
| 9 | On | Off | Off | On |
| 10 | Off | On | Off | On |
| 11 | On | On | Off | On |
| 12 | Off | Off | On | On |
| 13 | On | Off | On | On |
| 14 | Off | On | On | On |
| 15 | On | On | On | On |

When using a standalone **VS-82HDxl** unit, set the device ID to 1. When connecting multiple devices to a PC using an RS-232 connection (as in Figure 5), set the first device that is closest to the PC (the master) to be device ID 1.

### 5.1.2 Setting the RS-485 Bus Termination

The devices at the ends of the RS-485 bus must be terminated, all others must be unterminated.

| DIP-switch 1 | Termination State |
|---|---|
| Off | Off |
| On | On |

## 5.2 Setting the Genlock Loop Termination

The genlock loop must be terminated if the loop ends at the **VS-82HDxI**.

**To terminate the Genlock loop**:

- Depress the Genlock Term button.
  The Genlock loop is terminated

## 5.3 Connecting to the VS-82HDxI Using the RS-232 Connection

You can connect to the **VS-82HDxI** via an RS-232 connection using, for example, a PC. Note that a null-modem adapter/connection is not required.

**To connect to the VS-82HDxI via RS-232**:

- Connect the RS-232 9-pin D-sub rear panel port on the **VS-82HDxI** unit via a 9-wire straight cable (only pin 2 to pin 2, pin 3 to pin 3, and pin 5 to pin 5 need to be connected) to the RS-232 9-pin D-sub port on your PC

## 5.4 Cascading Multiple VS-82HDxI Devices Using the RS-485 Connection

**To cascade up to eight individual VS-82HDxI units as shown in the example in** Figure 5:

1. Connect the “A” (+) and “B” (-) pins on the RS-485 terminal block port on each of the **VS-82HDxI** devices. (If using shielded twisted pair cable, the shield is connected to the “G” (Ground) pin of the first unit).

2. Connect the serial controller, (for example, a PC) to the first device (ID 1 or master) using an RS-232 connection (see Section 5.3).

3. Set the first **VS-82HDxl** unit as device ID 1 and the following seven **VS-82HDxl** units as device ID 2 to device ID 8.

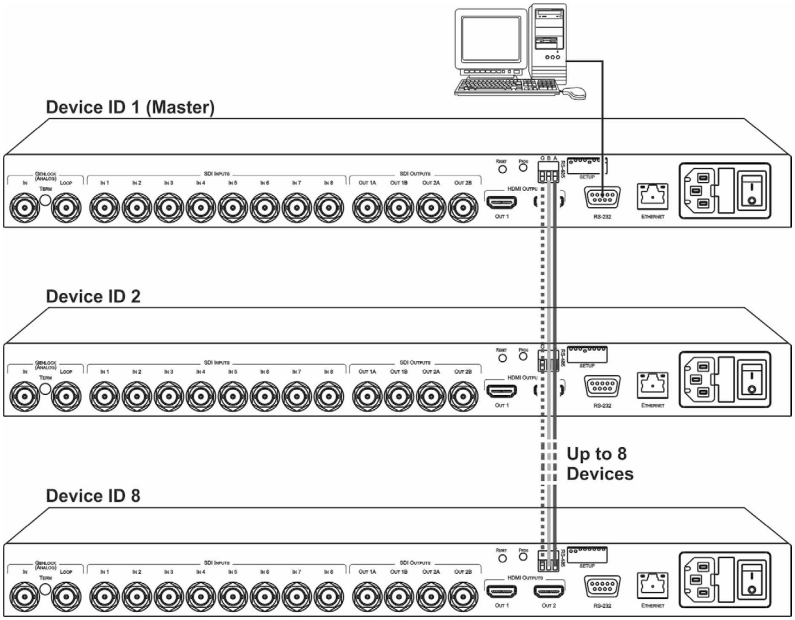



Figure 5: Controlling Multiple VS-82HDxl Devices using RS-485 Serial Communication

## 5.5 Connecting to the VS-82HDxl Using Ethernet

You can connect the **VS-82HDxl** via the Ethernet, using a crossover cable (see Section 5.5.2) for direct connection to the PC or a straight through cable (see Section 5.5.3) for connection via a network hub or network router.

After connecting the Ethernet port, you have to install and configure your Ethernet Port. For detailed instructions, see the "Ethernet Configuration (FC-11) guide.pdf" file in the technical support section at http://www.kramerelectronics.com.

### 5.5.1 Configuring the Ethernet Port

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

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

### 5.5.2 Connecting the Ethernet Port Directly to a PC

You can connect the Ethernet port of the **VS-82HDxl** to the Ethernet port on your PC via a crossover cable with RJ-45 connectors.

This type of connection is recommended for identification of the factory default IP Address of the **VS-82HDxl** during the initial configuration

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

1. On your desktop, right-click the **My Network Places** icon.
2. Select **Properties**.
3. Right-click Local Area Connection Properties.
4. Select **Properties**.
   The Local Area Connection Properties window appears.
5. Select the Internet Protocol (TCP/IP) and click the **Properties** Button (see Figure 6).

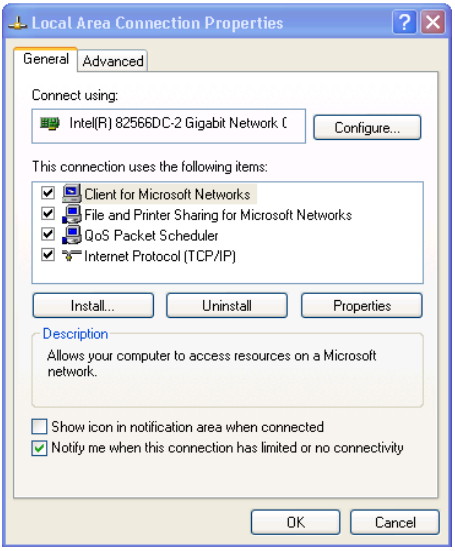



Figure 6: Local Area Connection Properties Window

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

7. Click **OK**.

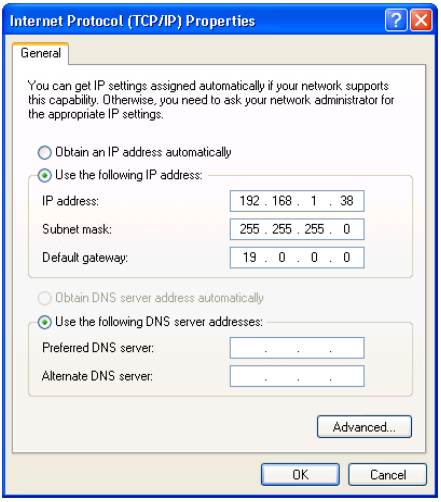



Figure 7: Internet Protocol (TCP/IP) Properties Window

### 5.5.3 Connecting the Ethernet Port via a Network Hub

You can connect the Ethernet port of the **VS-82HDxl** to the Ethernet port on a network hub or network router, via a straight through cable with RJ-45 connectors.

# 6 Operating the VS-82HDxl 8x2 SD/HD-SDI Matrix Switcher

This section describes:

- Switching inputs to outputs (see Section 6.1)
- Performing two switch selections simultaneously (see Section 6.2)
- Selecting audio channels (see Section 6.3)
- Muting and unmuting an output (see Section 6.4)
- Selecting a genlock signal (see Section 6.5)
- Storing and recalling a switch setting from a preset (see Section 6.6)
- Locking and unlocking the front panel buttons (see Section 6.7)
- Resetting to the factory default values (see Section 6.8)
- Upgrading the firmware (see Section 6.9)

## 6.1 Switching Inputs to Outputs

If there is a signal present on a selected input the relevant button lights solid. If a selected input or output has no signal present, the button flashes.

**To switch an input to an output, for example, Input 6 to Output 1, and Input 3 to Output 2**:

1. Press Input 6 on the top row (To Output 1).
   Input 6 is switched to Output 1.

2. Press Input 3 on the bottom row (To Output 2).
   Input 3 is switched to Output 2.

   **Note**: You can also perform two input selections and have them activated simultaneously by pressing the Take button (see Section 6.2).

## 6.2 Performing Two Switch Selections Simultaneously

You can activate two switch selections simultaneously using the Take button.

**To perform two switch selections simultaneously**:

1. Press the Take button.
   The Take button flashes.

2. Select an input on the top row to switch to Output 1.
   The selected Input button flashes.

3. Select an input on the bottom row to switch to Output 2.
   The selected Input button flashes.

4. Press the Take button.
   The Take button no longer flashes, the inputs that were selected light solid and the switching changes are performed.

## 6.3 Selecting Audio Channels

The **VS-82HDxl** can select two audio channels of the possible 16 present in the SDI signals and output them to either of the HDMI outputs, provided there is an appropriate HDMI output signal in which to embed them.

Under normal circumstances (the Audio button is not lit) AFV (audio-follows-video) switching is performed. When the Audio button is lit, the number 8 Input selector buttons allow you to select any one of eight stereo pairs (that is, two of 16 audio channels).

**Note**: This selection applies only to the HDMI outputs. All audio channels are always present in the SDI output signal. Muting an output mutes the audio on the HDMI only, not on the SDI outputs.

**To select a stereo audio pair to switch to an HDMI output, for example, stereo audio pair 5 to HDMI Output 2**:

1. Press the Audio button.
   The Audio button lights.

2. Press Input 5 on the bottom row.
   Stereo input pair 5 (that is, audio channels 9 and 10) is switched to HDMI Output 2.

3. Press the Audio button to return to AFV switching mode.
   The Audio button no longer lights.

## 6.4 Muting and Unmuting an Output

To mute and unmute the signal on Output 2:

1. Press the Off button on the bottom row.
   The Off button lights, the selected Input button is no longer lit and the signal is muted.

2. Press the Off button on the bottom row again.
   The Off button no longer lights, the selected Input button lights and the signal is unmuted.

## 6.5 Selecting a Genlock Signal

The genlock feature lets you switch genlocked video signals governed by the timing of the genlock reference input.

According to SMPTE RP-168, in order to switch cleanly, the sources must be precisely genlocked to the Genlock input. The **VS-82HDxl** provides clean switching only when there is an error of no more than two TV lines.

**To select a genlock signal**:

1. Connect the Genlock cable.

2. Press and hold STO and RCL simultaneously.
   Both buttons light.

3. Select the Genlock input:
   If you want to use one of the digital inputs, select the input that you want to use for the genlock.
   The selected input button lights and the input is selected,
   Or,
   If you want to use the analog genlock input, press the Off button.
   The Off button lights and the analog genlock signal is selected.

4. Press and hold the STO and RCL buttons simultaneously.
   Both buttons no longer light.

## 6.6 Storing and Recalling a Switch Setting from a Preset

You can use the store facility to remember up to 16 switch configurations and recall any of them at a later time using the RCL button.

**To store a setting**:

1. Select the switching configuration that you want to store by pressing the required Input buttons.

2. Press and hold the STO button.
   The STO button and the last selected preset button lights.

3. Press the number of the preset in which you want to store the configuration, where the top row of Input buttons represents preset numbers 1 to 8 (left to right), and the bottom row represents 9 to 16.
   The selected preset number lights.

4. Press and hold the STO button.
   The STO button no longer lights and the selected inputs flash.

**To recall a setup**:

1. Press and hold the RCL button.
   The RCL button lights as well as the last selected preset number.

2. Press the required preset number that you want to recall.
   The RCL button no longer lights and the retrieved configuration input buttons light.

## 6.7 Locking and Unlocking the Front Panel

**To lock and unlock the front panel buttons**:

1. Press and hold the Panel Lock button until the button lights.
   The front panel buttons are locked.

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

## 6.8 Resetting the Device to Factory Default Values

**To reset to factory default values**:

1. Turn the **VS-82HDxl** off.

2. Press and hold the Reset button on the rear panel while turning the device on.

3. After approximately five seconds release the Reset button.
   The device is reset to its factory default values (see Section 8).

## 6.9 Upgrading the Firmware

For instructions on upgrading the firmware see "*Upgrading the **VS-82HDxl** Firmware Using the K-Upload Software*".

**Note**: When updating the firmware, the device number must be set to 1, (see Section 5.1.1).

# 7 Technical Specifications

| | | | | | |
|---|---|---|---|---|---|
| INPUTS: | 8 SDI on BNC Connectors | SD | SMPTE-259M | SMPTE-125M | 480i-60 |
| | | | | ITU-R BT.656-5 | 576i-50 |
| | | HD | SMPTE-292 | SMPTE-296M | 720p-60/50/59.9 |
| | | | | SMPTE-274M | 1080i-60/50/59.9 |
| | | | | | 1080p-29.9/59.9/ 60/50/30/25/23.9/ 24 1808psf-23.9/24/ 25/29.9/30 |
| | | 3G | SMPTE-424M | SMPTE-296M | 1080p-59.94/60/50 |
| | 1 GENLOCK 75Ω/Hi-Z on looping BNC connectors, bi-level, tri-level inputs | | | | |
| OUTPUTS: | 4 SDI on BNC Connectors | HD | SMPTE-292 | SMPTE-296M | 720p-59.9/60/50 |
| | | 3G | SMPTE-424M | SMPTE-296M | 1080p-59.9/60/50 |
| | 2 HDMI Connectors<br>1 GENLOCK 75Ω/Hi-Z on looping BNC connectors, bi-level, tri-level inputs | | | | |
| DATA RATE: | Up to 2.97Gbps | | | | |
| POWER CONSUMPTION: | 100–240V AC, 50/60Hz, 23VA | | | | |
| CONTROLS: | Front panel buttons, infrared remote control transmitter, RS-232, Ethernet | | | | |
| 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: | 19” x 7.24” x 1U (W, D, H) | | | | |
| WEIGHT: | 1.6kg (3.53lbs) approx. | | | | |
| ACCESSORIES: | Power cord, IR transmitter, rack ”ears” | | | | |
| Specifications are subject to change without notice at http://www.kramerelectronics.com | | | | | |

# 8 Default Communication Parameters

| RS-232 | |
|---|---|
| **Protocol 3000** | |
| Baud Rate: | 115,200 |
| Data Bits: | 8 |
| Stop Bits: | 1 |
| Parity: | None |
| Command Format: | ASCII |
| Example (Output 1 to Input 1): | #AV 1>1<CR> |
| Ethernet | |
| IP Address: | 192.168.1.39 |
| TCP Port #: | 5000 |
| UDP Port #: | 50000 |

# 9 Kramer Protocol 3000

The **VS-82HDxl** can be operated using serial commands from a PC, remote controller or touch screen using the Kramer Protocol 3000.

This section describes the:

- Kramer Protocol 3000 syntax (see Section 9.1)
- Kramer Protocol 3000 commands (see Section 9.2)

## 9.1 Kramer Protocol 3000 Syntax

### 9.1.1 Host Message Format

| Start | Address (optional) | Body | Delimiter |
|---|---|---|---|
| # | *device_id*@ | **Message** | CR |

#### 9.1.1.1 Simple Command

Command string with only one command without addressing:

| Start | Body | Delimiter |
|---|---|---|
| # | **Command** SP *Parameter_1,Parameter_2,…* | CR |

#### 9.1.1.2 Command String

Formal syntax with commands concatenation and addressing:

| Start | Address | Body | Delimiter |
|---|---|---|---|
| # | *device_id*@ | **Command_1** *Parameter1_1,Parameter1_2,…*\|<br>**Command_2** *Parameter2_1,Parameter2_2,…*\|<br>**Command_3**<br>*Parameter3_1,Parameter3_2,…*\|… | CR |

### 9.1.2 Device Message Format

| Start | Address (optional) | Body | delimiter |
|---|---|---|---|
| ~ | *device_id*@ | **Message** | CR LF |

#### 9.1.2.1 Device Long Response

Echoing command:

| Start | Address (optional) | Body | Delimiter |
|---|---|---|---|
| ~ | *device_id*@ | **Command** SP [*Param1 ,Param2 …*] **result** | CR LF |

CR = Carriage return (ASCII 13 = 0x0D)
LF = Line feed (ASCII 10 = 0x0A)
SP = Space (ASCII 32 = 0x20)

### 9.1.3 Command Terms

**Command**

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

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

**Parameters**

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

**Message string**

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

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

**Message starting character**

'#' – For host command/query

'~' – For device response

**Device ID** (Optional, for K-NET)

K-NET Device ID followed by '@'

**Query sign**

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

**Message closing character**

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

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

**Command chain separator character**

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

Spaces between parameters or command terms are ignored.

### 9.1.4 Entering Commands

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

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

### 9.1.5 Command Forms

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

### 9.1.6 Chaining Commands

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

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

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

### 9.1.7 Maximum String Length

64 characters

## 9.2 Kramer Protocol 3000 Commands

| Command | Short Form | Description | Permission |
|---|---|---|---|
| # | | Protocol handshaking | End User |
| AUD | | Switch audio only | End User |
| AUD? | | Read audio connection | End User |
| AV | | Switch audio and video | Customer |
| BAUD | | Set protocol serial port baud rate | End User |
| BAUD? | | Get protocol serial port baud rate | End User |
| BUILD-DATE? | | Read device build date | End User |
| ETH-PORT | ETHP | Change protocol Ethernet port | Admin |
| ETH-PORT? | ETHP? | Query protocol Ethernet port | End User |
| FACTORY | | Reset to factory default configuration | |
| GNLCK | | Set Genlock State | End User |
| GNLCK? | | Get Genlock State | End User |
| LDFPGA | | Load new FPGA file | Admin |
| LDFW | | Load new firmware | User SW Internal |
| LOCK-FP | LCK | Lock front panel | Administrator |
| LOCK-FP? | LCK? | Read lock front panel | End User |
| LOGIN | | Login – Get protocol permission | No Secure |
| LOGIN? | | Get login level | No Secure |
| LOGOUT | | Logout | No Secure |
| MACH-NUM | | Set Machine number | Admin |
| MODEL? | | Read device model | End User |
| NAME | | Set machine (DNS) name | Admin |
| NAME? | | Query machine (DNS) name | End User |
| NAME-RST | | Reset machine name to factory default (DNS) | Admin |
| NET-DHCP | NTDH | Set DHCP mode | Admin |
| NET-DHCP? | NTDH? | Query DHCP mode | End User |
| NET-GATE | NTGT | Set Gateway | Admin |
| NET-GATE? | NTGT? | Query Gateway | End User |
| NET-IP | NTIP | Set IP address | Admin |
| NET-IP? | NTIP? | Query IP address | End User |
| NET-MAC? | NTMC? | Query MAC address | End User |
| NET-MASK | NTMSK | Set subnet mask | Admin |
| NET-MASK? | NTMSK? | Read subnet mask | End User |
| PASS | | Set Password | Admin |
| PASS? | | Get Password | Admin |
| PROT-VER? | | Read device protocol version | End User |
| PRST-RCL | | Recall saved preset | End User |
| PRST-STO | | Store current connections to preset | End User |
| RESET | | Reset device | Administrator |
| SECUR | | Start/Stop Security | Admin |
| SECUR? | | Get security state | No Secure |
| SN? | | Read device serial number | End User |

| Command | Short Form | Description | Permission |
|---|---|---|---|
| UPGRADE | | Execute firmware upgrade | Admin |
| VERSION? | | Read device firmware version | End User |
| VID | | Switch video only | End User |
| VID? | | Read video connection | End User |
| VID-RES? | | Get video switch state | End User |

## LIMITED WARRANTY

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

**What is Covered**

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

**What is Not Covered**

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

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

**How Long Does this Coverage Last**

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

**Who is Covered**

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

**What Kramer Electronics will do**

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

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

**What Kramer Electronics will not do Under This Limited Warranty**

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

**How to Obtain a Remedy under this Limited Warranty**

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

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

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

**Limitation on Liability**

THE MAXIMUM LIABILITY OF KRAMER ELECTRONICS UNDER THIS LIMITED WARRANTY SHALL NOT EXCEED THE ACTUAL PURCHASE PRICE PAID FOR THE PRODUCT. TO THE MAXIMUM EXTENT PERMITTED BY LAW, KRAMER ELECTRONICS IS NOT RESPONSIBLE FOR DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY. Some countries, districts or states do not allow the exclusion or limitation of relief, special, incidental, consequential or indirect damages, or the limitation of liability to specified amounts, so the above limitations or exclusions may not apply to you.

**Exclusive Remedy**

TO THE MAXIMUM EXTENT PERMITTED BY LAW, THIS LIMITED WARRANTY AND THE REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, REMEDIES AND CONDITIONS, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. TO THE MAXIMUM EXTENT PERMITTED BY LAW, KRAMER ELECTRONICS SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IF KRAMER ELECTRONICS CANNOT LAWFULLY DISCLAIM OR EXCLUDE IMPLIED WARRANTIES UNDER APPLICABLE LAW, THEN ALL IMPLIED WARRANTIES COVERING THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY TO THIS PRODUCT AS PROVIDED UNDER APPICABLE LAW.

IF ANY PRODUCT TO WHICH THIS LIMITED WARRANTY APPLIES IS A “CONSUMER PRODUCT” UNDER THE MAGNUSON-MOSS WARRANTY ACT (15 U.S.C.A. §2301, ET SEQ.) OR OTHER APPICABLE LAW, THE FOREGOING DISCLAIMER OF IMPLIED WARRANTIES SHALL NOT APPLY TO YOU, AND ALL IMPLIED WARRANTIES ON THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR THE PARTICULAR PURPOSE, SHALL APPLY AS PROVIDED UNDER APPLICABLE LAW.

**Other Conditions**

This limited warranty gives you specific legal rights, and you may have other rights which vary from country to country or state to state.

This limited warranty is void if (i) the label bearing the serial number of this product has been removed or defaced, (ii) the product is not distributed by Kramer Electronics or (iii) this product is not purchased from an authorized Kramer Electronics reseller. If you are unsure whether a reseller is an authorized Kramer Electronics reseller, please visit our Web site at www.kramerelectronics.com or contact a Kramer Electronics office from the list at the end of this document.

Your rights under this limited warranty are not diminished if you do not complete and return the product registration form or complete and submit the online product registration form. Kramer Electronics thanks you for purchasing a Kramer Electronics product. We hope it will give you years of satisfaction.

For the latest information on our products and a list of Kramer distributors, visit our Web site where updates to this user manual may be found.

**We welcome your questions, comments, and feedback.**
Web site: www.kramerelectronics.com
E-mail: info@kramerel.com

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

P/N: 2900-300186 Rev: 3