Kramer Electronics, Ltd.

USER MANUAL

Model:

VS-41HD

4x1 HD/SD-SDI Switcher / DA

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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 the video, audio, presentation, and broadcasting professional 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[1] that are clearly defined by function.

Congratulations on purchasing your Kramer **VS-41HD** *4x1 HD/SD-SDI Switcher / DA*. This product is ideal for:

- Professional broadcasting and production studios
- Post production

The package includes the following items:

- **VS-41HD** *4x1 HD/SD-SDI Switcher / DA*
- Null-modem adapter, infrared remote control transmitter and power cord
- This user manual[2]

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[3]

2.1 Quick Start

This quick start chart summarizes the basic setup and operation steps.

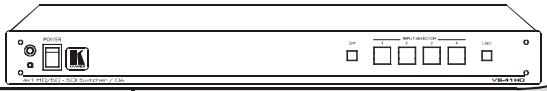
1 GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Matrix Switchers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters; GROUP 11: Sierra Products

2 Download up-to-date Kramer user manuals at http://www.kramerelectronics.com

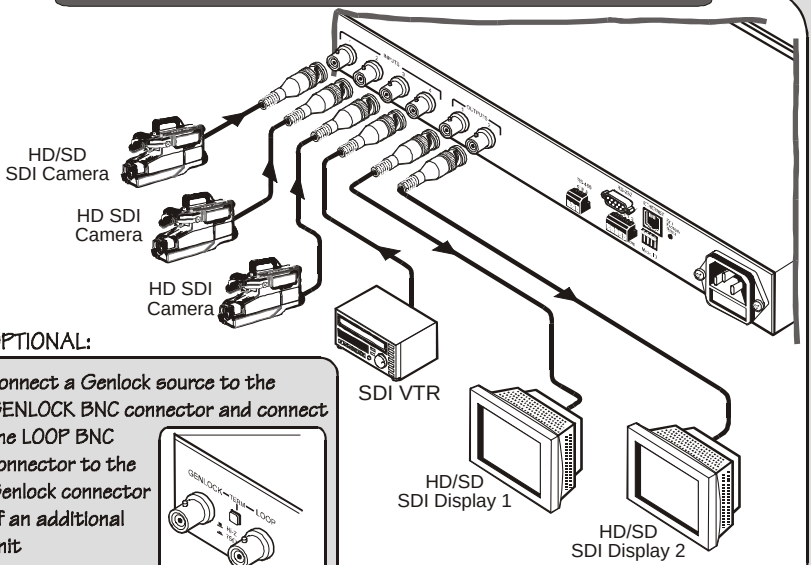
3 The complete list of Kramer cables is on our Web site at http://www.kramerelectronics.com

Step 1: Mount the machine - see section 5

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



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



OPTIONAL:

Connect a Genlock source to the GENLOCK BNC connector and connect the LOOP BNC connector to the Genlock connector of an additional unit

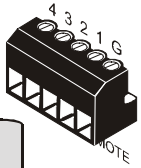
Step 3: Set the machine - see section 6

SET THE DIPSWITCHES

Set the machine ID number

CONNECT THE CONTACT CLOSURE REMOTE

Switch between inputs by connecting the appropriate input number PIN (1, 2, 3 or 4) to the G (Ground) PIN



DO NOT connect more than one PIN to the G PIN at the same time

Step 4: Turn the power ON

Step 5: Operate the machine

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

3 Overview

The Kramer **VS-41HD** is a true 4x1 switcher[1] for standard definition[2] / high definition[3] SDI signals that lets you distribute any one of the four inputs to two identical outputs. The **VS-41HD** features:

- Input and output signals on BNC connectors and selector buttons that automatically light up in different colors—red, when the **VS-41HD** detects a 'standard definition' signal, or blue, when it detects a 'high definition' signal
- Reclocking and equalization on each input
- Distribution of digital information (embedded audio, Teletext, time code and so on) during the vertical interval period
- The ability to switch genlocked video signals according to timing of the GENLOCK reference input. Switching according to the Bi-level or Tri-level Genlock input according to SMPTE RP-168[4]
- Front panel locking, and an OFF button to disconnect the output

The **VS-41HD** is housed in a 19" 1U rack mountable enclosure and is fed from a 100-240 VAC universal switching power supply. It can be controlled via the front panel buttons, infrared remote control transmitter, remotely, by RS-232 or RS-485 serial commands transmitted by a touch screen system, PC, or other serial controller, as well as via the ETHERNET and/or remote contact closure for forced operation.

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 that may adversely influence signal quality and position your Kramer **VS-41HD** away from moisture, excessive sunlight and dust

4 Your VS-41HD 4x1 HD/SD-SDI Switcher / DA

Figure 1, Table 1, and Table 2 define the **VS-41HD** *4x1 HD/SD-SDI Switcher / DA*.

1 Switching is implemented during the vertical interval period according to the SMPTE RP-168 standard, when using synchronized SDI sources

2 Standard Definition (SD) means an NTSC or PAL compatible video format, consisting of 480 (for NTSC) or 576 (for PAL) lines of interlaced video

3 High Definition (HD) in this case includes 480p, 576p, 720p and 1080i (all @ 50/60Hz); 1080p @ 24/25Hz; as well as the 1/1.0001 refresh rates

4 The sources must be genlocked to the GENLOCK input in order to switch cleanly

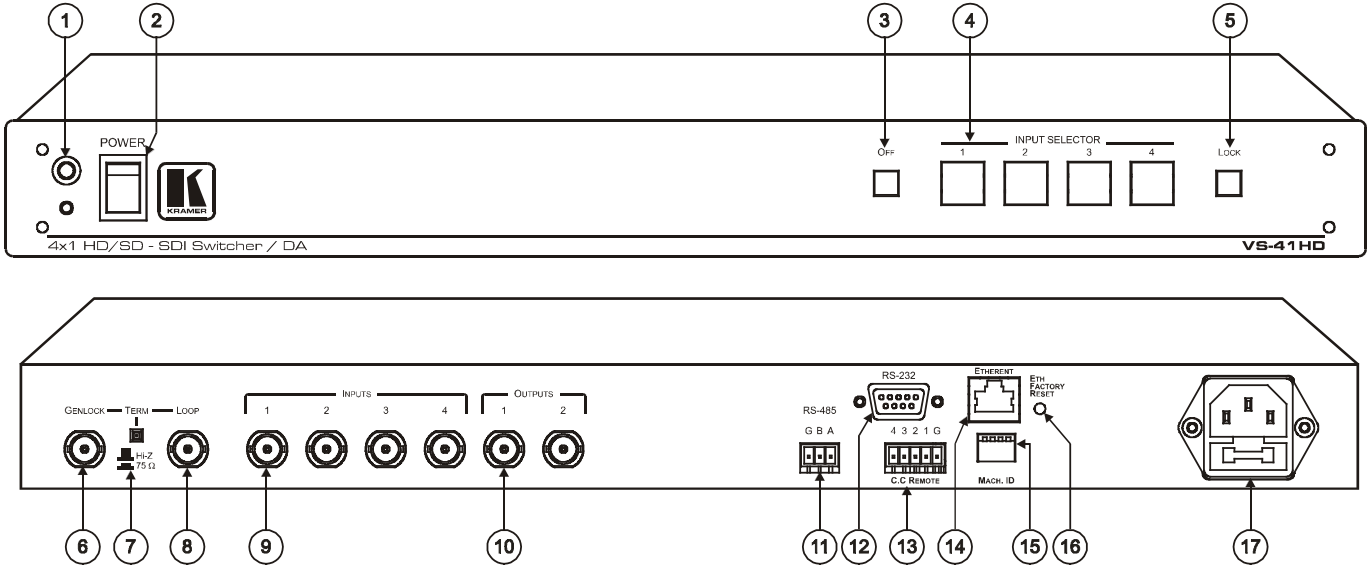


Figure 1: VS-41HD 4x1 HD/SD-SDI Switcher / DA

Table 1: Front Panel VS-41HD 4x1 HD/SD-SDI Switcher / DA

#	Feature	Function
1	IR Receiver	The red LED is illuminated when receiving signals from the infra-red remote control transmitter
2	*POWER* Switch	Illuminated switch for turning the unit ON or OFF
3	*OFF* Button	Press to disconnect the outputs
4	*INPUT SELECTOR* Buttons	Select the input to switch to the output Use to set the resolution when switching genlocked video signals (see section 6.4)
5	*LOCK* Button	Disengages the front panel buttons

Table 2: Rear Panel VS-41HD 4x1 HD/SD-SDI Switcher / DA

#	Feature	Function
6	*GENLOCK* BNC Connector	Connect to the Genlock source
7	*TERM* Button	Press to terminate the Genlock source (75Ω) or release for looping[1]
8	*LOOP* BNC Connector	Connect to the GENLOCK connector of the next unit in the line
9	*INPUTS* BNC Connectors	Connect to the serial digital video sources (from 1 to 4)
10	*OUTPUTS* BNC Connectors	Connect the two identical outputs to serial digital video acceptors (1 and 2)
11	*RS-485* Detachable Terminal Block Port	Pin G is for the Ground connection[2]; pins B (-) and A (+) are for RS-485
12	*RS-232* DB 9F Port	Connects to the PC or the Remote Controller[3]
13	*C.C. REMOTE* Terminal Block Connector	Connect to contact closure switches
14	*ETHERNET* Connector	Connects to the PC or other Serial Controller through computer networking
15	*MACH. ID* Dipswitches	Dipswitches for setting the machine ID number
16	*ETH FACTORY RESET* Button	Press to reset to factory default definitions[4]: IP number – 192.168.1.39 Mask – 255.255.255.0 Gateway – 192.168.1.1
17	Power Connector with Fuse	AC connector enabling power supply to the unit

1 Extending the input to another unit

2 The ground connection is sometimes connected to the shield of the RS-485 cable. In most applications, the ground is not connected

3 Via a null-modem connection

4 First disconnect the power cord and then connect it again while pressing the ETH Factory Reset button. The unit will power up and load its memory with the factory default definitions

5 Installing on a Rack

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

Before Installing in a Rack

Before installing in a rack, be sure that the environment is within the recommended range:	
Operating temperature range	+5° to +45° C (41° to 113° F)
Operating humidity range	10 to 90% RHL, non-condensing
Storage temperature range	-20° to +70° C (-4° to 158° F)
Storage humidity range	5 to 95% RHL, non-condensing

CAUTION!!

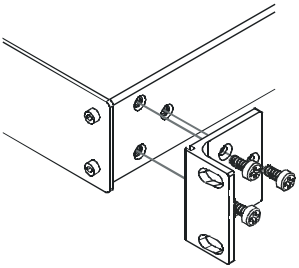
When installing on a 19" rack, avoid hazards by taking care that:

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.

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 (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 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 Your VS-41HD 4x1 HD/SD-SDI Switcher / DA

You can use your **VS-41HD** to switch one of the four standard definition / high definition SDI inputs to the two identical high definition / standard definition SDI outputs, as the illustration in Figure 2 shows.

To connect the **VS-41HD** *4x1 HD/SD-SDI Switcher / DA*, as shown in the example in Figure 2, do the following[1]:

1. Connect up to four SDI sources to the INPUTS BNC connectors:
   - An HD/SD SDI camera to INPUT 1
   - An HD SDI camera to INPUT 2
   - An HD SDI camera to INPUT 3
   - An SDI VTR to INPUT 4
2. Connect the SDI OUTPUT BNC connectors to up to[2] two SDI acceptors (for example, two HD/SD SDI displays).
3. Set the dipswitches (see section 6.1).
4. As an option[3], connect:
   - A Genlock source to the GENLOCK BNC connector
   - The LOOP BNC connector to the GENLOCK connector of the next unit in the line, and release the TERM button for looping[4]
5. Connect a PC and/or controller (if required), to the:
   - RS-232 port (see section 6.2), and/or
   - RS-485 port (see section 6.3), and/or
   - ETHERNET connector (see section 6.4)
6. If required[3], connect a remote contact closure switch (see section 6.6)
7. Connect the power cord[5].

1 Switch OFF the power on each device before connecting it to your VS-41HD. After connecting your VS-41HD, switch on its power and then switch on the power on each device

2 When only one output is required, connect that output, and leave the other output unconnected

3 Not illustrated in Figure 2

4 Pushed in terminates the input. Release when the input extends to another unit

5 We recommend that you use only the power cord that is supplied with this machine

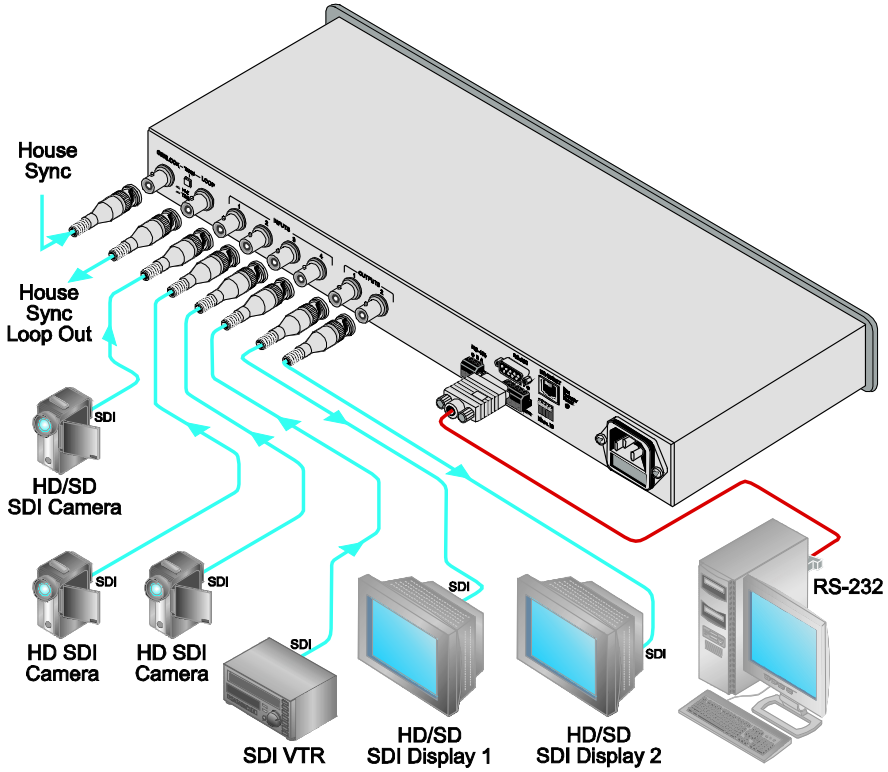
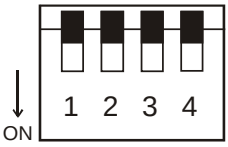


Figure 2: Connecting the VS-41HD 4x1 HD/SD-SDI Switcher / DA

6.1 Dipswitch Settings

By default, all dipswitches are set to OFF.

Figure 3 illustrates the **VS-41HD** dipswitches:



MACH. ID

Figure 3: VS-41HD SETUP Dipswitches

6.1.1 Setting the Machine ID Dipswitches

The Machine ID determines the position of a **VS-41HD** unit, specifying which **VS-41HD** unit is being controlled when several **VS-41HD** units connect to a PC or serial controller. Set the Machine number on a **VS-41HD** unit via MACH. ID DIPS 1, 2, 3 and 4, according to Table 3.

When using a standalone **VS-41HD** unit, set the Machine ID to 1. When connecting more than one **VS-41HD** unit, set the first machine (the Master) that is closest to the PC, as Machine ID 1 (dipswitches are set to OFF).

Table 3: Machine # DIP-switch Settings

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

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

To connect a PC to the **VS-41HD** unit, using the Null-modem adapter provided with the machine (recommended):

- Connect the RS-232 DB9 rear panel port on the **VS-41HD** unit 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 a PC to the **VS-41HD** unit, 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-41HD** unit, as Figure 4 illustrates

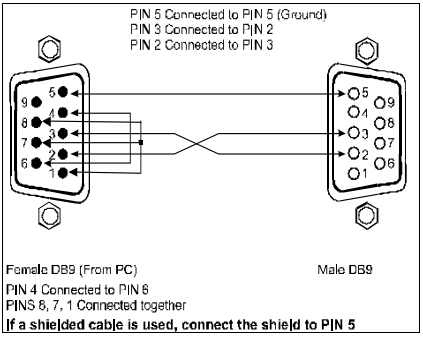


Figure 4: Connecting a PC without using a Null-modem Adapter

6.3 Controlling via the RS-485 Port

To cascade up to eight individual **VS-41HD** units, via RS-485 (with control via a Master Programmable Remote Control system such as the Kramer **RC-3000**), as Figure 5 illustrates, do the following:

1. Connect the "A" (+) and "B" (-) PINS on the RS-485 terminal block port of the **RC-3000** to the "A" (+) and "B" (-) PINS, respectively, on each of the eight **VS-41HD** units. (If using shielded twisted pair cable, the shield is usually connected to the "G" (Ground) PIN of the first unit).
2. Set the first **VS-41HD** unit as MACHINE # 1 and the following seven **VS-41HD** units as MACHINE # 2 to MACHINE # 8, according to Table 3.

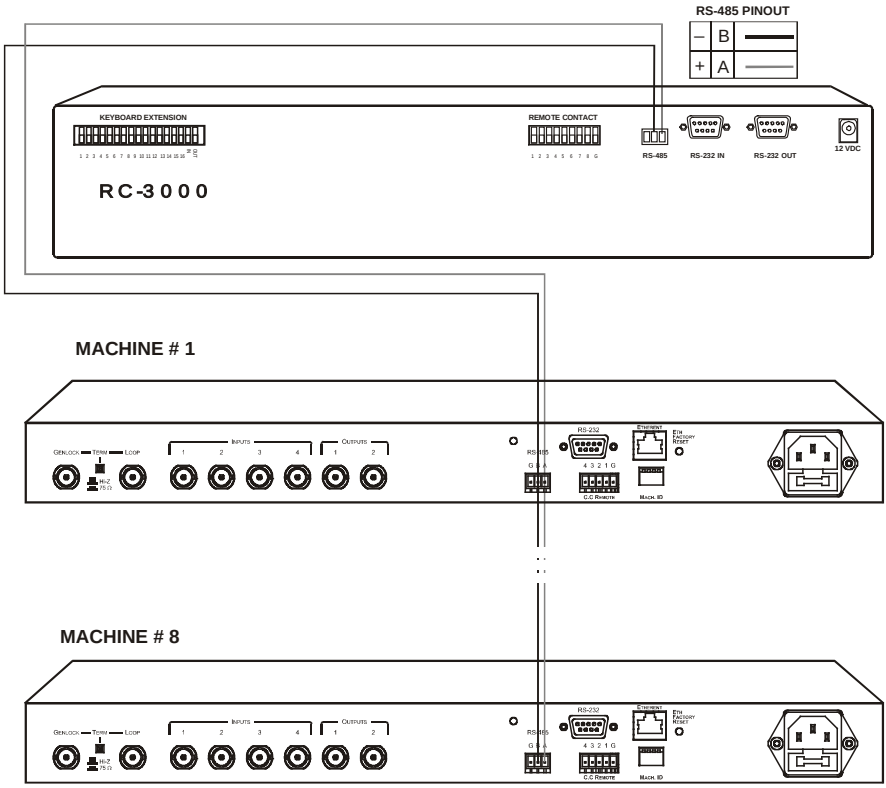


Figure 5: Controlling via RS-485 (for example, using an RC-3000)

6.4 Switching two Genlocked Video Signals

The genlock feature lets you switch genlocked video signals according to timing of the GENLOCK reference input[1].

Connect the GENLOCK cable.

If the HD input signal[2] that is connected is one of the following, it is necessary to set it up as follows:

- 1080i@60Hz: press and hold INPUT 1 button for 3 seconds. The button will flash[3] to indicate that the set up was completed
- 1080i@50Hz or 720p@50Hz: press and hold INPUT 2 button for 3 seconds.
  The button will flash[3] to indicate that the set up was completed
- 720p@60Hz: press and hold INPUT 3 button for 3 seconds.
  The button will flash[3] to indicate that the set up was completed

When turning the machine ON, the appropriate button will flash to indicate the latest setup (last setup is saved).

6.5 Controlling via ETHERNET

You can connect the **VS-41HD** via the Ethernet, using a crossover cable (see section 6.5.1) for direct connection to the PC or a straight through cable (see section 6.5.2) for connection via a network hub or network router.

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

You can connect the Ethernet port of the **VS-41HD** 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-41HD** during the initial configuration

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

1. Right-click the My Network Places icon on your desktop.
2. Select **Properties**.
3. Right-click Local Area Connection Properties.

1 According to SMPTE RP-168. The sources must be genlocked to the GENLOCK input in order to switch cleanly

2 The unit will detect automatically when SD-SDI inputs are used

3 If a change is made to the resolution or refresh rate. The button will not flash if the new timing is the same as that previously selected

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).

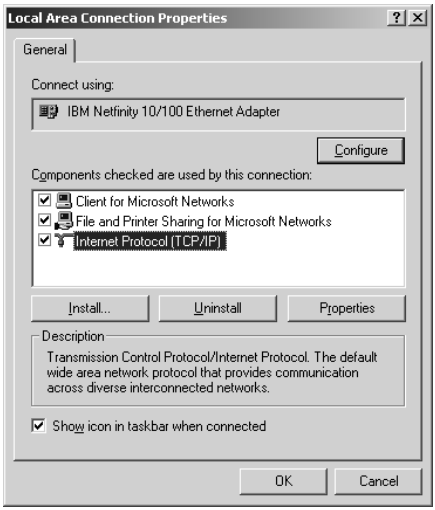


Figure 6: Local Area Connection Properties Window

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

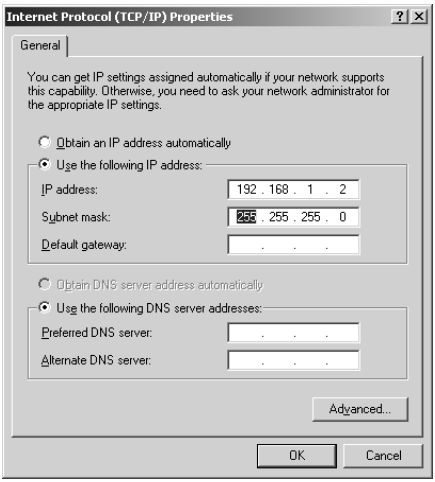


Figure 7: Internet Protocol (TCP/IP) Properties Window

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

You can connect the Ethernet port of the **VS-41HD** to the Ethernet port on a network hub or network router, via a straight-through cable with RJ-45 connectors.

6.5.3 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: http://www.kramerelectronics.com.

6.6 Controlling via the C.C REMOTE Connector

Connecting the C.C REMOTE terminal block connector to a contact closure switch lets you route an input to the output by remote control. For example, to route input 1 to the output, as the example in Figure 8 illustrates, momentarily touch input # 1 to the Ground (G).

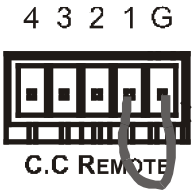


Figure 8: Using the C.C REMOTE Connector

7 Operating the VS-41HD

You can operate your **VS-41HD** via:

- The front panel buttons
- RS-232/RS-485 serial commands transmitted by a PC, touch screen system, or other serial controller
- The Kramer infrared remote control transmitter
- The ETHERNET

To switch an input to the outputs via the front panel buttons[1], press the desired input button.

When selecting an input that is not connected, that input button blinks.

7.1 Locking the Front Panel

To prevent changing the settings accidentally or tampering with the unit via the front panel buttons, lock[2] your **VS-41HD**. Unlocking releases the protection mechanism.

To lock the **VS-41HD**:

- Press the LOCK button for three seconds, until the LOCK button is illuminated
  The front panel is locked. Pressing a button will have no effect

To unlock the **VS-41HD**:

- Press the illuminated LOCK button until the LOCK button is no longer illuminated
  The front panel unlocks

1 For details of how to route an input to an output using the REMOTE connector, see section 6.6

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

8 Technical Specifications

Table 4 includes the technical specifications:

Table 4: Technical Specifications[1] of the VS-41HD 4x1 HD/SD-SDI Switcher / DA

INPUTS:	4 SDI SMPTE-259M, 292M, 344M serial video, 75 ohms on BNC connectors 1 GENLOCK 75Ω / Hi-Z on looping BNC connectors, bi level, Tri level inputs
OUTPUTS:	2 identical equalized and reclocked SMPTE-259M, 292M, 344M outputs 75 ohms on BNC connectors
MAX. OUTPUT LEVEL:	800mVpp /75 ohms
JITTER:	Better than 0.2UI
DATA RATE:	Up to 1.485Gbps
CONTROLS:	Front-panel, RS-232; RS-485, ETHERNET, infra-red remote, dry contact, and panel lock
POWER SOURCE:	Universal, 100-240VAC, 50/60Hz 22VA
DIMENSIONS:	19 inch (W), 7 inch (D), 1U (H) rack mountable
WEIGHT:	1.5kg. (3.3lbs.) approx.
ACCESSORIES:	Power cord, Null-modem Adapter

1 Specifications are subject to change without notice

9 Kramer Protocol 2000

The **VS-41HD** is compatible with Kramer's Protocol 2000 (version 0.46) (below). 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.

Table 5: Protocol Definitions

MSB							LSB
	DESTI-NATION	**INSTRUCTION**					
0	D	N5	N4	N3	N2	N1	N0
7	6	5	4	3	2	1	0
1st byte							
	INPUT						
1	I6	I5	I4	I3	I2	I1	I0
7	6	5	4	3	2	1	0
2nd byte							
	OUTPUT						
1	O6	O5	O4	O3	O2	O1	O0
7	6	5	4	3	2	1	0
3rd byte							
			MACHINE NUMBER				
1	OVR	X	M4	M3	M2	M1	M0
7	6	5	4	3	2	1	0
4th byte							

1st BYTE: Bit 7 – Defined as 0.
D – "DESTINATION": 0 - for sending information to the switchers (from the PC);
1 - for sending to the PC (from the switcher).
N5…N0 – "INSTRUCTION"
The function that is to be performed by the switcher(s) is defined by the INSTRUCTION (6 bits). Similarly, if a function is performed via the machine's keyboard, then these bits are set with the INSTRUCTION NO., which was performed. The instruction codes are defined according to the table below (INSTRUCTION NO. is the value to be set for N5…N0).

2nd BYTE: Bit 7 – Defined as 1.
I6…I0 – "INPUT".
When switching (ie. instruction codes 1 and 2), the INPUT (7 bits) is set as the input number which is to be switched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the INPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

3rd BYTE: Bit 7 – Defined as 1.
O6…O0 – "OUTPUT".
When switching (ie. instruction codes 1 and 2), the OUTPUT (7 bits) is set as the output number which is to be switched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the OUTPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

4th BYTE: Bit 7 – Defined as 1.
Bit 5 – Don't care.
OVR – Machine number override.
M4…M0 – MACHINE NUMBER.
Used to address machines in a system via their machine numbers. When several machines are controlled from a single serial port, they are usually configured together with each machine having an individual machine number. If the OVR bit is set, then all machine numbers will accept (implement) the command, and the addressed machine will reply.
For a single machine controlled via the serial port, always set M4…M0 = 1, and make sure that the machine itself is configured as MACHINE NUMBER = 1.

Table 6: Instruction Codes for Protocol 2000

Note: All 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,
5	REQUEST STATUS OF A VIDEO OUTPUT	0	Equal to output number whose status is read	4
16	ERROR / BUSY	0	0 - error 1 - invalid instruction 2 - out of range	9
30	LOCK FRONT PANEL	0 - Panel unlocked 1 - Panel locked	0	2
31	REQUEST WHETHER PANEL IS LOCKED	0	0	16
61	IDENTIFY MACHINE	1 - video machine name 3 - video software version	0 - Request first 4 digits 1 - Request first suffix 10 - Request first prefix	13
62	DEFINE MACHINE	1 - number of inputs 2 - number of outputs 3 - number of setups	1 - for video	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 2 - These are bi-directional definitions. That is, if the switcher receives the code, it will perform the instruction; and if the instruction is performed (due to a keystroke operation on the front panel), then these codes are sent. For example, if the HEX code

01 85 88 83

was sent from the PC, then the switcher (machine 3) 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 HEX codes:

41 81 87 83

to the PC.

When the PC sends one of the commands in this group to the switcher, then, if the instruction is valid, the switcher replies by sending to the PC the same four bytes that it was sent (except for the first byte, where the DESTINATION bit is set high).

NOTE 4 - 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. For example, if the present status of a Video Output 1 is 3, then the reply to the HEX code

05 80 81 81

would be HEX codes

45 80 83 81

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. 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 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. 128dec+ 22dec for 2nd byte, and 128dec+ 16dec 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. 128dec+ 3dec for 2nd byte, 128dec+ 5dec 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. 128dec+ ASCII for "Y"; 128dec+ ASCII for "C").

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.

LIMITED WARRANTY

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

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

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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.
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   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
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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.

* FCC and CE approved using STP cable (for twisted pair products)

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

Safety Warning:
Disconnect the unit from the power supply before opening/servicing.

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