KRAMER ELECTRONICS LTD.

USER MANUAL

MODEL:

VS-88DVI
8x8 DVI Matrix Switcher

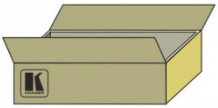
P/N: 2900-000592 Rev 3

VS-88DVI 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-88DVI** 8x8 DVI Matrix Switcher
- 1 Power cord
- 1 Set of rack "ears"
- 4 Rubber feet
- 1 Quick Start sheet
- Kramer RC-IR3 Infrared Remote Control Transmitter with batteries and user manual



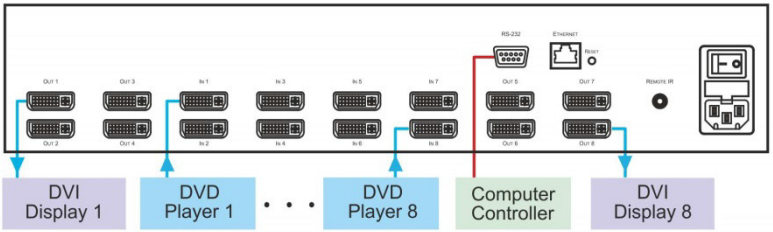
Save the original box and packaging materials in case you need to return your **VS-88DVI** for service.

Step 2: Install the VS-88DVI

Mount the **VS-88DVI** in a rack (using the included rack "ears") or attach the rubber feet and place on a table.

Step 3: Connect the inputs and outputs

Always switch off the power on each device before connecting it to your **VS-88DVI**.



Always use Kramer high-performance cables for connecting AV equipment to the **VS-88DVI.**

Step 4: Connect the power

Connect the power cord to the **VS-88DVI** and plug it into the mains electricity.

Step 5: Operate the VS-88DVI

Switch an Input to an Output

❒ Press an output button followed by an input button to switch the pair

Acquire the EDID from:

❒ A connected output
❒ Several outputs
❒ The default EDID

Store and Recall a Preset

To Store:
1. Set the device to the desired setting.
2. Press the STO button. The STO button flashes.
3. Select an IN or OUT button to store the device setting.
4. Press the LOCK button to store the current setup.

To Recall:
1. Press the RCL button. The RCL button flashes.
2. Press the relevant In or OUT button.

Operate the machine via the front panel buttons, IR remote control, RS-232, or the 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 Products.

Congratulations on purchasing your Kramer **VS-88DVI** *8x8 DVI Matrix Switcher*, which is ideal for the following typical applications:

- Projection systems in conference rooms, boardrooms, auditoriums, hotels and churches, production studios
- Rental and staging

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 Kramer **VS-88DVI** 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 **VS−88DVI** is a high−performance matrix switcher for DVI signals. The unit reclocks and equalizes the signal and can route any or all inputs to any or all outputs simultaneously.

DVI-D (Digital). Note that only the digital signal (DVI-D) is available on the DVI connector.

The **VS-88DVI** features:

- A maximum data rate of 6.75Gbps (2.25Gbps per graphic channel)
- HDTV compatibility
- Kramer Equalization & re-Klocking™ Technology that rebuilds the digital signal integrity to travel longer distances
- I-EDIDPro™ Kramer Intelligent EDID Processing™ an intelligent EDID handling & processing algorithm that ensures Plug and Play operation for DVI systems
- Flexible control options: front panel, IR remote, RS−232, Ethernet
- Output disconnect for each output
- Front panel lockout
- 16 memory locations that store multiple switches as presets
- A 100−240V AC worldwide power supply
- A standard 19” rack mount size, 2U with rack “ears” included

Control the **VS-88DVI** using the front panel buttons, or remotely via:

- RS-232 serial commands
- The Kramer infrared remote control transmitter
- The Ethernet
- An optional external remote IR receiver

3.1 Defining the VS-88DVI 8x8 DVI Matrix Switcher

This section defines the **VS-88DVI**.

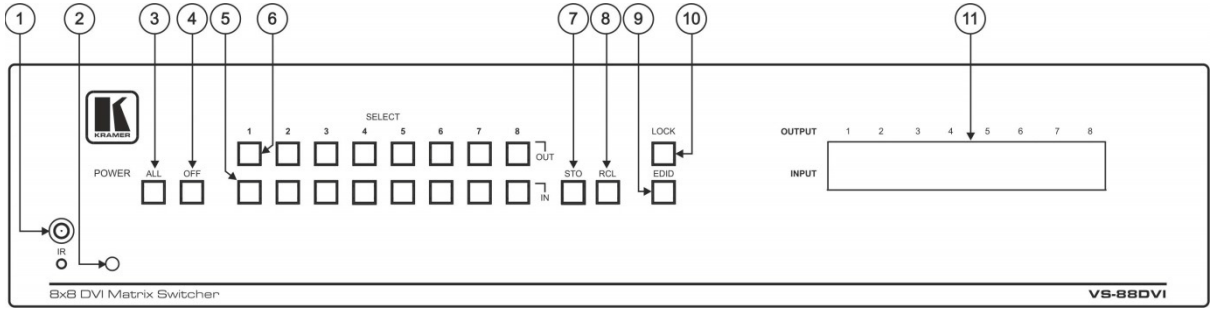


Figure 1: VS-88DVI 8x8 DVI Matrix Switcher Front Panel

#	Feature	Function
1	*IR* Receiver LED	The yellow LED is illuminated when receiving signals from the infrared remote control transmitter
2	*POWER* LED	Illuminates green when receiving power
3	*ALL* Button	Use ALL to select all outputs (see Section 6.1)
4	*OFF* Button	Use OFF to disconnect one or all outputs (see Section 6.2)
5	*SELECT IN*	Press an INPUT selector button to select an input (from 1 to 8)
6	*SELECT OUT*	Press an OUTPUT selector button to select an output (from 1 to 8)
7	*STO* Button	Press to store the present setup
8	*RCL* Button	Press to recall a saved setup
9	*EDID* Button	Press to acquire the EDID (see Section 6.4) (illuminates when configuring the EDID)
10	*LOCK* Button	Press to toggle disengaging the front panel buttons and to acquire the EDID
11	7-segment Display	Displays the status of the inputs switched to the outputs (marked above each input)

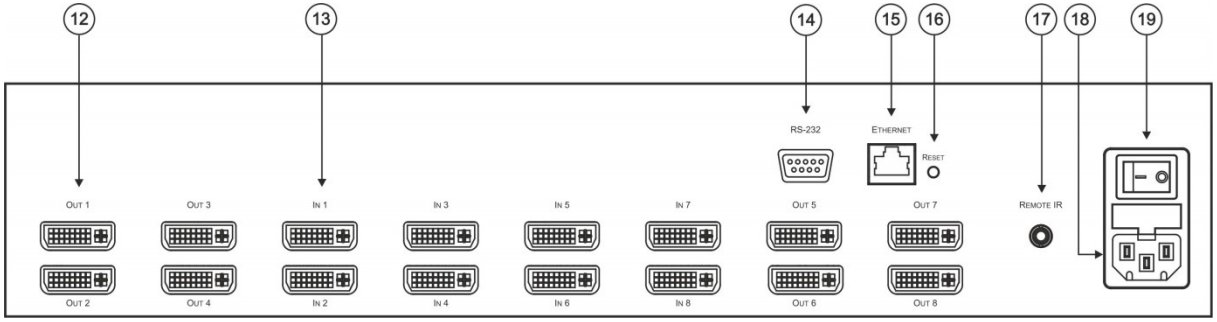


Figure 2: VS-88DVI 8x8 DVI Matrix Switcher Rear Panel

#	Feature	Function
12	*OUT* DVI Connectors	Connect to the DVI acceptors (from 1 to 8)
13	*IN* DVI Connectors	Connect to the DVI sources (from 1 to 8)
14	*RS-232* 9-pin D-sub Port	Connects to the PC or the RS-232 Remote Controller
15	*Ethernet* Connector	Connects to the PC or other Ethernet Controller
16	*RESET* Button	Press the reset button to reset to the Ethernet factory default definitions: IP number – 192.168.1.39 Mask – 255.255.255.0 Gateway – 192.168.1.1 First disconnect the power cord and then connect it again while pressing the RESET button. The unit powers up and loads its memory with the factory default definitions
17	*REMOTE IR* Opening	Connects to an external IR receiver unit for controlling the machine via an IR remote controller instead of using the front panel IR receiver Covered by a cap. The 3.5mm connector at the end of the internal IR connection cable fits through this opening Optional. Can be used instead of the front panel (built-in) IR receiver to remotely control the machine (only if the internal IR connection cable has been installed)
18	Power Connector with Fuse	AC connector enabling power supply to the unit
19	Power Switch	Switch for turning the unit ON or OFF

3.2 Using the IR Transmitter

You can use the **RC-IR3** IR transmitter to control the machine via the built-in IR receiver on the front panel or, instead, via an optional external IR receiver (Model: C-A35M/IRR-50). The external IR receiver can be located up to 15 meters away from the machine. This distance can be extended to up to 60 meters when used with three extension cables (Model: C-A35M/A35F-50).

Before using the external IR receiver, be sure to arrange for your Kramer dealer to insert the internal IR connection cable (P/N: 505-70434010-S) with the 3.5mm connector that fits into the REMOTE IR opening on the rear panel. Connect the external IR receiver to the REMOTE IR 3.5mm connector.

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.

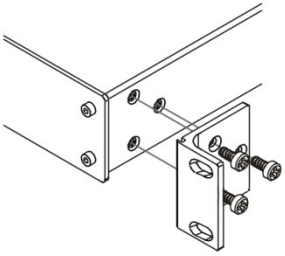
3. The machine is placed straight in the correct horizontal position.

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-88DVI

Always switch off the power to each device before connecting it to your **VS-88DVI**. After connecting your **VS-88DVI**, connect its power and then switch on the power to each device.

To connect the VS-88DVI, as the example in Figure 3 illustrates, do the following:

1. Connect up to eight DVI sources (for example, computer graphics sources) to the IN DVI connectors.
   You do not have to connect all the inputs and the outputs.
2. Connect the OUT DVI connectors to up to eight DVI acceptors (for example, DVI displays).
3. If required, connect a PC and/or controller to the RS-232 port (see Section 6.5) and/or the Ethernet port (see Section 6.6).
4. Connect the power cord (not shown in Figure 3).
5. If required, acquire the EDID (see Section 6.4).

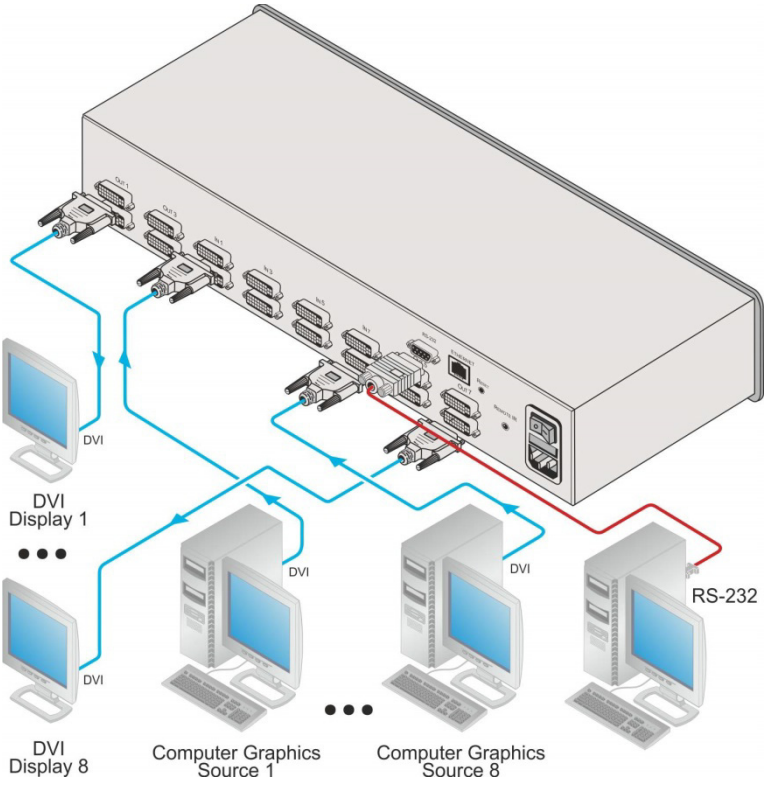


Figure 3: Connecting the VS-88DVI 8x8 DVI Matrix Switcher

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6 Operating the VS-88DVI

This section describes how to:

- Route inputs to outputs (see Section 6.1)
- Disconnect outputs (see Section 6.2)
- Store and recall a setup (see Section 6.3)
- Acquire the EDID (see Section 6.4)
- Control the machine via RS-232 (see Section 6.5)
- Control the machine via the Ethernet port (see Section 6.6)

6.1 Routing Inputs to Outputs

To route an input to an output:

- Press an OUT key, followed by an IN key to route this input to that output

To route one input to all outputs:

- Press ALL followed by an IN button. The input is routed to all outputs

6.2 Disconnecting the Outputs

To disconnect one output:

- Press the OUT button of the output to disconnect and press OFF

To disconnect all outputs at once:

- Press the ALL button and then press OFF. This disconnects all the outputs

6.3 Storing and Recalling a Setup

You can use the STO and RCL buttons to store up to 16 setups and then recall them, as Figure 4 illustrates:

IN 1 is used for setup # 1 and OUT 1 is used for setup # 9.

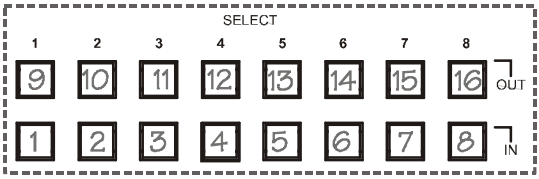

Figure 4: SELECTOR Buttons

The gray numbers (1 to 16) in Figure 4 that illustrate the corresponding store/recall configuration numbers, are for the purpose of illustration only and do not actually appear on the buttons

To store a setup:

1. Set the machine to the desired input/output connection setup.
2. Press the STO button.
   The STO button flashes.
3. Select an OUT or IN SELECT button to store the machine setup (for example, OUT 5).
4. Press the LOCK button to store the current setup.
   In this example, the OUT 5 button stores the setup.
   You have to press the LOCK button within 10 seconds, before the store operation times out.

To recall a setup:

1. Press the RCL button.
   The RCL button flashes.
2. Press the relevant OUT or IN button that stored the setup.
   In this example, press OUT 5.
3. Press the LOCK button to recall the stored setup.

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6.4 Acquiring the EDID

You can acquire the EDID from:

- A single connected output (see Section 6.4.1)
- Several sets of inputs and outputs (see Section 6.4.2)
- The default EDID (see Section 6.4.3)

6.4.1 Acquiring an EDID from a Single Connected Output

To acquire or change the EDID of a new output display:

1. Turn ON the **VS-88DVI**.
2. Connect the required acceptor to the output from which you want to acquire the EDID.
3. Press the EDID and STO buttons simultaneously and hold them for 3 seconds.
   Both buttons flash.
4. Press the IN SELECTOR button to which the EDID is copied.
   The selected input number flashes on the display.
5. Select the OUT SELECTOR button from which the EDID is acquired.
6. Press the EDID button.
   The process is complete when the display returns to normal.

6.4.2 Acquiring an EDID from Several Sets of Inputs and Outputs

To acquire the EDID from several sets of inputs and outputs (for example, OUT 1 to IN 1 and OUT 6 to IN 3), do the following:

1. Enter the EDID mode:
   - Turn ON the VS-88DVI
   - Connect the required acceptors to the outputs from which you want to acquire the EDID
   - Press the EDID and STO buttons simultaneously and hold them for 3 seconds.
     Both buttons flash.
2. Set the first input output pair (for example, OUT 1 to IN 1)
   - Press the SELECT IN 1 button to which the first EDID is copied
     The selected input number 1 flashes on the display
   - Press the SELECT OUT 1 button from which the EDID is acquired
   - Press the SELECT IN 1 button again.
     The IN 1 button ceases to flash
3. Set the second input output pair (for example, OUT 6 to IN 3)
   - Press the SELECT IN 3 button to which the next EDID is copied
     The selected input number 3 flashes on the display.
   - Press the SELECT OUT 6 button from which the second EDID is acquired
   - Press the SELECT IN 3 button again.
     The IN 3 button ceases to flash
4. Press the SELECT IN 1 and IN 3 buttons to which you want to copy the EDID.
5. Make sure that the relevant input numbers flash on the display.
6. Press the EDID button.
   The process is complete when the display returns to normal.

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6.4.3 Acquiring the Default EDID

To reset to the default EDID, do the following:

1. Turn ON the **VS-88DVI**.
2. Press the EDID and STO buttons simultaneously and hold them for 3 seconds.
   Both buttons flash.
3. Press the SELECT IN button to which the EDID is copied.
   The selected input number flashes on the display.
4. Press the OFF button until a "0" (zero) appears on the display.
5. Press the EDID button.
   The process is complete when the display returns to normal.

6.5 Connecting the VS-88DVI Using RS-232

You can connect to the unit via a crossed RS-232 connection, using for example, a PC. A crossed cable or null-modem is required as shown in method A and B respectively. If a shielded cable is used, connect the shield to pin 5.

Method A (Figure 5)—Connect the RS-232 9-pin D-sub port on the unit via a crossed cable (only pin 2 to pin 3, pin 3 to pin 2, and pin 5 to pin 5 need be connected) to the RS-232 9-pin D-sub port on the PC.
Note: There is no need to connect any other pins.

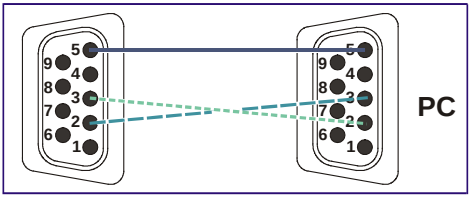

Figure 5: Crossed Cable RS-232 Connection

Hardware flow control is not required for this unit. In the rare case where a controller requires hardware flow control, short pin 1 to 7 and 8, and pin 4 to 6 on the controller side.

Method B—Connect the RS-232 9-pin D-sub port on the unit via a straight (flat) cable to the null-modem adapter, and connect the null-modem adapter to the RS-232 9-pin D-sub port on the PC. The straight cable usually contains all nine wires for a full connection of the D-sub connector. Because the null-modem adapter (which already includes the flow control jumpering described in Method A above) only requires pins 2, 3 and 5 to be connected, you are free to decide whether to connect only these 3 pins or all 9 pins.

6.6 Connecting the VS-88DVI Using Ethernet

You can connect the **VS-88DVI** via the Ethernet, using a crossover cable (see Section 6.6.1) for direct connection to the PC or a straight-through cable (see Section 6.6.2) for connection via a network hub or network router.

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

6.6.1 Connecting the Ethernet Port directly to a PC (Crossover Cable)

You can connect the Ethernet port of the **VS-88DVI** to the Ethernet port on your PC, via a crossover cable with RJ-45 connectors.

This type of connection is recommended for identifying the **VS-88DVI** with the factory configured default IP address.

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

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

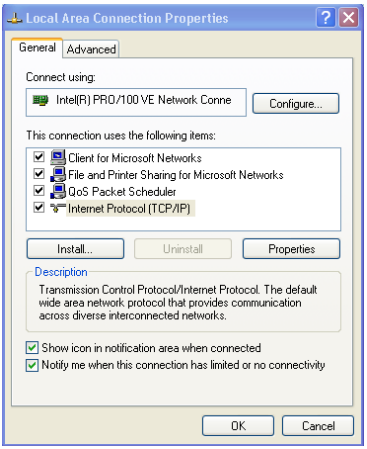

Figure 6: Local Area Connection Properties Window

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

7. Click **OK**.

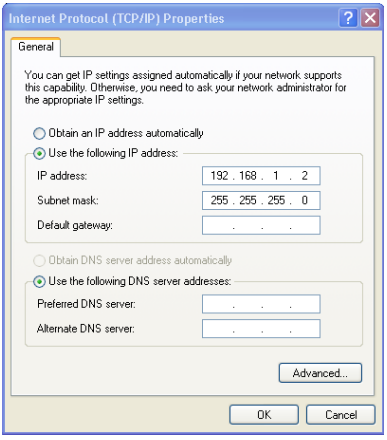

Figure 7: Internet Protocol (TCP/IP) Properties Window

6.6.2 Connecting the Ethernet Port via a Network Hub (Straight-Through Cable)

You can connect the Ethernet port of the **VS-88DVI** to the Ethernet port on a network hub or network router, via a straight through cable with RJ-45 connectors.

6.6.3 Control Configuration via the Ethernet Port

To control several units via the Ethernet, connect the Master unit (Machine # 1) via the Ethernet port to the LAN port of your PC. Use your PC initially to configure the settings (see Section 6.6).

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7 Technical Specifications

INPUTS:	8 DVI, 1.2Vpp on DVI Molex 24-pin female connectors; DDC signal 5Vpp (TTL)
OUTPUTS:	8 DVI, 1.2Vpp on DVI Molex 24-pin female connectors; DDC signal 5Vpp (TTL)
MAX. DATA RATE:	Supports up to 6.75Gbps (2.25Gbps per graphic channel)
COMPLIANCE WITH STANDARDS:	Supports DVI 1.1
MAX RESOLUTION:	Up to UXGA; 1080p, 1920x1200
CONTROLS:	Front panel buttons, Infrared remote control transmitter, RS-232, Ethernet
POWER CONSUMPTION:	100–240VAC; 50/60Hz, 43VA
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" x 2U W, D, H
WEIGHT:	2.5kg (5.5lbs) approx.
ACCESSORIES:	Power cord, infrared remote controller, null-modem adapter
Specifications are subject to change without notice at http://www.kramerelectronics.com	

8 Hex Table

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

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

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9 Protocol 2000

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

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

Note: Compatibility with Kramer's Protocol 2000 does not mean that a machine uses all of the commands below. Each machine uses a sub-set of Protocol 2000, according to its needs.

9.1 Syntax

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

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

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

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

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

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

3rd Byte: Bit 7 – Defined as 1
O6…O0 – OUTPUT
When switching (i.e. instruction codes 1 and 2), the 7-bit OUTPUT is set as the output number to be switched. If switching is done using the machine's front panel, these bits are set with the OUTPUT NUMBER switched. For other operations, these bits are defined according to the table.

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

9.2 Instruction Codes

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

Instruction Codes for Protocol 2000

Instruction		Definition for Specific Instruction		Notes
#	Description	Input	Output	
0	RESET VIDEO	0	0	1
1	SWITCH VIDEO	Set equal to video input that is switched (0 = disconnect)	Set equal to video output that is switched (0 = to all the outputs)	2, 15
3	STORE VIDEO STATUS	Set as SETUP #	To store To delete	2, 3, 15
4	RECALL VIDEO STATUS	Set as SETUP #	0	2, 3, 15
5	REQUEST STATUS OF A VIDEO OUTPUT	Set as SETUP #	Equal to output number whose status is required	4, 3
15	REQUEST WHETHER SETUP IS DEFINED / VALID INPUT IS DETECTED	SETUP # or Input # or Output #	0 – For checking if setup is defined 1 – For checking if input is valid 2 – For checking if output is valid 3 – For checking if EDID output is valid	8
30	LOCK FRONT PANEL	Unlock panel Lock panel	0	2
31	REQUEST WHETHER PANEL IS LOCKED	0	0	16
61	IDENTIFY MACHINE	1 – Video machine name 2 – Audio machine name 3 – Video software version 4 – Audio software version 5 – RS-422 controller name 6 – RS-422 controller version 7 – Remote control name 8 – Remote software version 9 – Protocol 2000 revision 10 – Control data machine name 11 – Control data software version	For names: 0 – Request first 4 digits 1 – Request first suffix 2 – Request second suffix 3 – Request third suffix 10 – Request first prefix 11 – Request second prefix 12 – Request third prefix For versions: 0 – main board or the number of external board	13
62	DEFINE MACHINE	1 – Number of inputs 2 – Number of outputs 3 – Number of setups	1 – For video 2 – For audio 3 – For SDI 4 – For remote panel 5 – For RS-422 controller 6 – For control data	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 a switcher, it resets according to the present power-down settings.

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

NOTE 3 – SETUP # 0 is the present setting. SETUP # 1 and higher are the settings saved in the switcher's memory, (i.e. those used for Store and Recall).

NOTE 4 – The reply to a REQUEST instruction is as follows: the same instruction and INPUT codes that were sent are returned, and the OUTPUT is assigned the value of the requested parameter. The replies to instructions 10 and 11 are according to 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 HEX code:
0B 80 80 85
is HEX code:
4B 80 81 85

NOTE 8 – The reply is as in NOTE 4 above, except that the OUTPUT is assigned with the value 0 if the setup is not defined / no valid input is detected; or 1 if it is defined / valid input is detected.

NOTE 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 sends 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 is HEX code:
7D 96 90 81 (i.e. 128_{dec}+ 22_{dec} for 2nd byte, and 128_{dec}+ 16_{dec} for 3rd byte).

If the request for identification is sent with the INPUT set as 3 or 4, the appropriate machine sends 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 code:
7D 83 85 81 (i.e. 128_{dec}+ 3_{dec} for 2nd byte, 128_{dec}+ 5_{dec} for 3rd byte).

If the OUTPUT is set as 1, then the ASCII coding of the lettering following the machine's name is sent.
For example, for the VS-7588YC, the reply to the request to send the first suffix would be HEX code:
7D D9 C3 81 (i.e. 128_{dec}+ ASCII for "Y"; 128_{dec}+ ASCII for "C").

NOTE 14 – The number of inputs and outputs refers to the specific machine being addressed, *not* to the system.
For example, if six 16x16 matrices are configured to make a 48x32 system (48 inputs, 32 outputs), the reply to the HEX code:
3E 82 81 82 (i.e. request the number of outputs)
would be HEX code:
7E 82 90 82 (i.e. 16 outputs).

NOTE 15 – When the OVR bit (4th byte) is set, then the video commands have universal meaning.
For example, instruction 1 (SWITCH VIDEO) causes all units (including audio, data, etc.) to switch. Similarly, if a machine is in FOLLOW mode, it performs any video instruction.

NOTE 16 – The reply to the REQUEST WHETHER PANEL IS LOCKED is the same as in NOTE 4 above, except that OUTPUT is assigned with the value 0 if the panel is unlocked, or 1 if it is locked.

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