



KRAMER ELECTRONICS LTD.

USER MANUAL

MODEL:

VS-88DTP

8x8 DVI - Twisted Pair Matrix
Switcher

P/N: 2900-000749 Rev 2

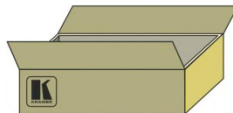


VS-88DTP Quick Start Guide

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-88DTP** 8x8 DVI-TP 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



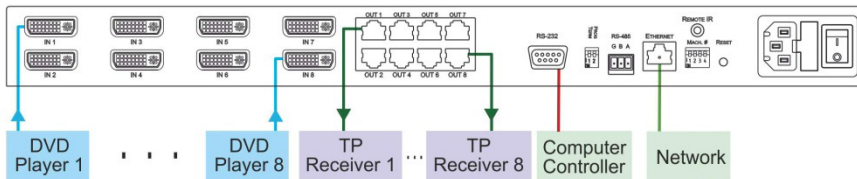
Save the original box and packaging in case you need to return your **VS-88DTP** to the factory for service.

Step 2: Install the VS-88DTP

Mount the machine 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-88DTP**.



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

Step 4: Connect the power

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



Step 5: Operate the VS-88DTP

Operate the switcher via the front panel buttons, RS-232, RS-485, Ethernet or the IR remote control.

Route an input to an output: Press an output button followed by an input button.

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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 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-88DTP 8x8 DVI - Twisted Pair Matrix Switcher**, which is ideal for the following typical applications:

- Conference room presentations
- Advertising
- 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
- Use Kramer high performance high resolution cables



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 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-88DTP** away from moisture, excessive sunlight and dust

2.2 Safety Instructions



Caution: There are no operator-serviceable parts inside the unit

Warning: You use only the power cord that is supplied with the unit. 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-88DTP** is a high-performance matrix switcher for DVI signals. The unit accepts up to eight DVI inputs, reclocks and equalizes the signals, and routes to any or all DGKat™ twisted pair outputs simultaneously for connection to compatible TP receivers, for example, the **PT-572HDCP+** or **TP-574**.

More specifically, the **VS-88DTP** features:

- A maximum data rate of 4.95Gbps (1.65Gbps per graphic channel)
- 8 DVI-D inputs on DVI-I connectors
- 8 DGKat twisted pair outputs on RJ-45 connectors
- HDTV compatibility (no HDCP compliance)
- DGKat™ Signal Integration that converts TMDS as well as control and communication to signals that run over twisted pair cables. Kramer strongly recommends using Kramer DGKat™ cables designed specifically for optimum performance
- 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
- A system range of up to 30m (98ft) at 1080p on shielded BC-DGKat524 cable; up to 70m (230ft) at 1080p on shielded BC-DGKat623 cable; up to 90m (295ft) at 1080p on shielded BC-DGKat7a23 cable
- Flexible control options including: front panel, IR remote (included), RS-232 (K-Router™ Windows®-based software is included), RS-485, Ethernet (Windows®-based Ethernet Configuration Manager & Virtual Serial Port Manager included)
- Output disconnect for each output
- Front panel lockout to prevent tampering with the front panel buttons
- 16 memory locations that store multiple switches as presets to be recalled and executed when needed

- A worldwide power supply of 100-240V AC
- A standard 19" rack mount size of 1U with included rack "ears"

Note: The **VS-88DTP** requires STP (shielded twisted pair) cable. For optimum range and performance, use Kramer's BC-DGKat524, BC-DGKat623 or BC-DGKat7a23 cables. The transmission range depends on the signal resolution, graphics card and display used. The distance using non-Kramer CAT 5, CAT 6, and CAT 7 cables may not reach these ranges. Use only shielded cable where both ends of the shield are soldered to ground.

3.1 Defining the VS-88DTP 8x8 DVI - Twisted Pair Matrix Switcher

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

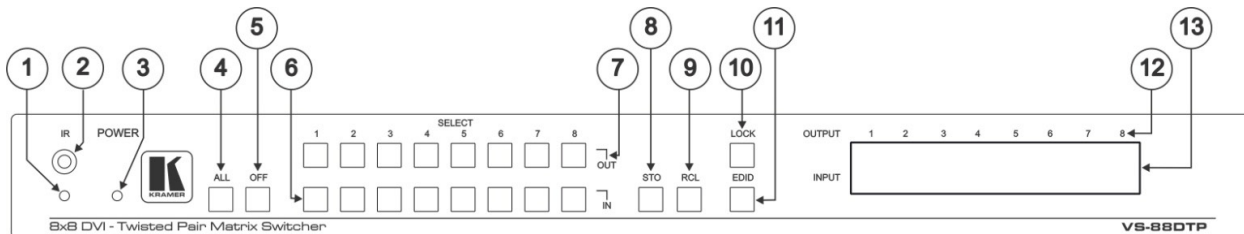


Figure 1: VS-88DTP 8x8 DVI - Twisted Pair Matrix Switcher Front Panel

#	Feature	Function
1	IR LED	Lights yellow when receiving a signal from an IR remote control
2	IR Sensor	IR remote control signal receiver
3	POWER LED	Lights green when the device is powered on
4	ALL Button	Press to select all outputs (see Section 6.1)
5	OFF Button	Press to disconnect one or all outputs (see Section 6.2)
6	SELECT IN Buttons	Press to select an input (1 to 8) following the selection of an output
7	SELECT OUT Buttons	Press to select an output (1 to 8) followed by the selection of an input
8	STO Button	Press to store a matrix configuration
9	RCL Button	Press to recall a matrix configuration
10	LOCK Button	Press and hold to toggle locking and unlocking the front panel buttons (see Section 7.2.4)
11	EDID Button	Press to acquire the EDID (see Section 6.5) (lights when configuring the EDID)
12	OUTPUT Numbers	Indicates the relevant output to which an input (1 to 8, shown on the 7-segment display) is currently switched
13	7-segment Display	Displays the selected video input switched to the output (marked above each input)

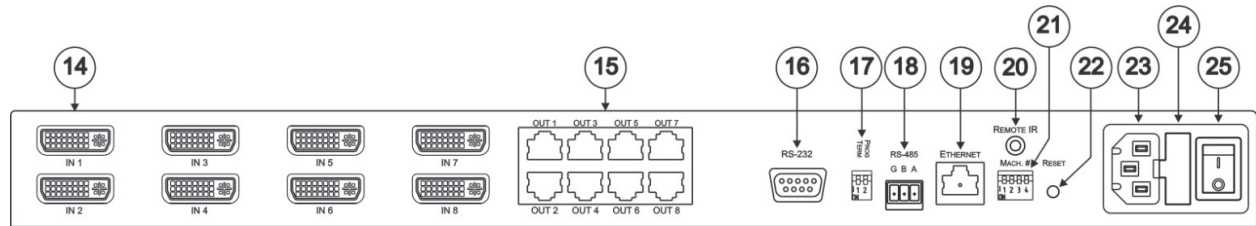


Figure 2: VS-88DTP 8x8 DVI - Twisted Pair Matrix Switcher Rear Panel

#	Feature	Function
14	IN 1 to IN 8 DVI Input Connectors	Connect to the DVI sources
15	OUT 1 to OUT 8 RJ-45 TP Output Connectors	Connect to the TP receivers (for example, PT-572HDCP+ and TP-574)
16	RS-232 9-pin D-sub (F)	Connect to a PC or other serial remote controller
17	PROG TERM 2-way DIP-switch	DIP-switch 1 Sets the RS-485 bus termination (see Section 5.2.2) Up = Off, Down = On. Default = On DIP-switch 2 Sets the Programming mode. Only for the use of Kramer service personnel. Default = Off
18	RS-485 3-pin Terminal Block	Connect to a serial controller or to another VS-88DTP unit. Connect G to Ground, B to B, and A to A (see Section 5.2)
19	ETHERNET RJ-45 TP Connector	Connect to a PC or LAN for remote control
20	REMOTE IR 3.5mm Mini Jack	Connect to an external IR receiver unit for controlling the device via an IR remote controller (instead of using the front panel IR receiver)
21	MACH # DIP-Switch	Sets the RS-485 bus machine number (see Section 5.2.1)
22	RESET Button	Press the reset button while turning the device on in order to reset the Ethernet factory default definitions (see Section 9)
23	AC Power Receptacle	Connect to the AC mains power supply
24	AC Mains Fuse	AC mains supply protection fuse
25	AC Mains Power Switch	Turns the AC mains power supply to the device on and 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 the VS-88DTP in a Rack

This section provides instructions for rack mounting the unit.

Before installing in a rack, be sure that the environment is within the recommended range:

OPERATING TEMPERATURE:	0° to +40°C (32° to 104°F)
STORAGE TEMPERATURE:	-40° to +70°C (-40° to 158°F)
HUMIDITY:	10% to 90%, RHL non-condensing



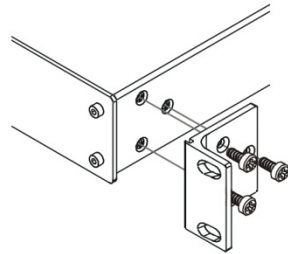
CAUTION!

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

1. It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi unit rack assembly may exceed the room ambient temperature.
2. Once rack mounted, enough air will still flow around the machine.
3. The machine is placed straight in the correct horizontal position.
4. You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.
5. The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to situations where electricity is supplied indirectly (when the power cord is not plugged directly into the socket in the wall), for example, when using an extension cable or a power strip, and that you use only the power cord that is supplied with the machine.

To rack-mount a machine:

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



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

Note:

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

5 Connecting the VS-88DTP



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

To connect the **VS-88DTP** as illustrated in the example in [Figure 3](#):

1. Connect up to eight DVI sources (for example, computer graphics sources) to the IN 1 to IN 8 DVI connectors.
You do not have to connect all the sources.
2. Connect the OUT 1 to OUT 8 TP connectors to up to eight TP receivers (for example, the **PT-572HDCP+** and **TP-574**).
You do not have to connect all the outputs.
3. If required, connect a controller to the RS-232 (see [Section 5.1](#)) and/or Ethernet port (see [Section 5.3](#)).
4. Connect the power cord (not shown in [Figure 3](#)).
5. If required, acquire the EDID (see [Section 6.5](#)).

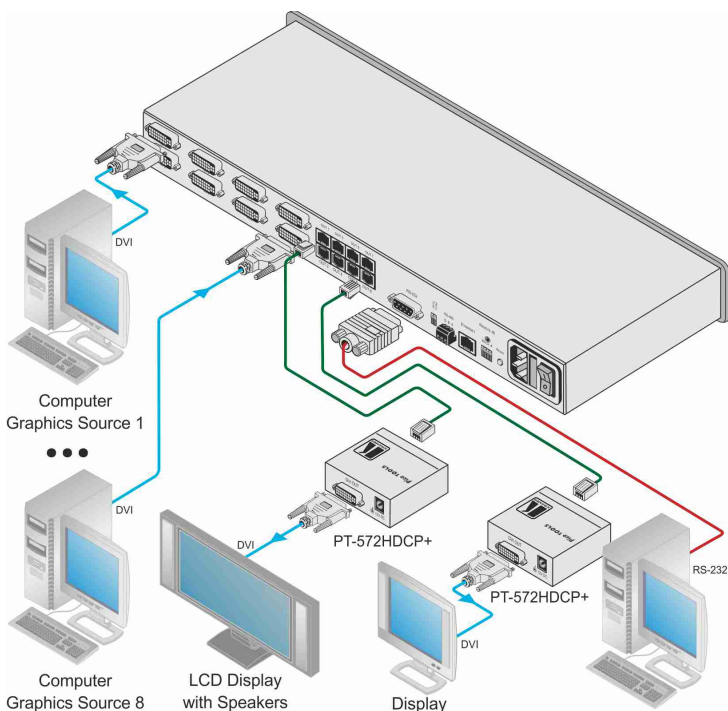


Figure 3: Connecting the VS-88DTP 8x8 DVI - Twisted Pair Matrix Switcher

5.1 Connecting to the VS-88DTP via RS-232

You can connect to the **VS-88DTP** 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-88DTP** via RS-232:

- Connect the RS-232 9-pin D-sub rear panel port on the **VS-88DTP** 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

5.2 Connecting a PC or Controller to the RS-485 Port

You can operate the **VS-88DTP** via the RS-485 port from a distance of up to 1200m (3900ft) using any device equipped with an RS-485 port (for example, a PC). For successful communication, you must set the RS-485 machine number and bus termination.

To connect a device with a RS-485 port to the VS-88DTP:

- Connect the A (+) pin on the RS-485 port of the PC to the A (+) pin on the RS-485 port on the rear panel of the **VS-88DTP**
- Connect the B (–) pin on the RS-485 port of the PC to the B (–) pin on the RS-485 port on the rear panel of the **VS-88DTP**
- Connect the G pin on the RS-485 port of the PC to the G pin on the RS-485 port on the rear panel of the **VS-88DTP**

5.2.1 Setting the RS-485 Machine Number

When several **VS-88DTP** units are connected, the machine number determines the unique identity of the **VS-88DTP** on the bus (see [Figure 6](#)).

Note:

- When using a stand-alone **VS-88DTP** unit, set the machine number to 1 (factory default)
- When connecting more than one **VS-88DTP**, set the first machine (connected via RS-232) to be machine number 1. The other **VS-88DTP** units must each be set to a unique machine number between 2 and 16

The machine number on the **VS-88DTP** is set using the DIP-switches on the rear panel.

To set the RS-485 machine number using the DIP-switches:

[Figure 4](#) illustrates the factory default MACH # DIP-switch settings.

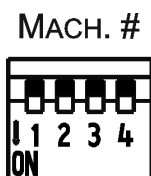


Figure 4: RS-485 DIP-switches

DIP-switches 1, 2, 3 and 4 determine the RS-485 machine number of the **VS-88DTP**.

Machine Number	SW1	SW2	SW3	SW4
1 (Default)	OFF	OFF	OFF	OFF
2	OFF	OFF	OFF	ON
3	OFF	OFF	ON	OFF
4	OFF	OFF	ON	ON
5	OFF	ON	OFF	OFF
6	OFF	ON	OFF	ON
7	OFF	ON	ON	OFF
8	OFF	ON	ON	ON
9	ON	OFF	OFF	OFF
10	ON	OFF	OFF	ON
11	ON	OFF	ON	OFF
12	ON	OFF	ON	ON
13	ON	ON	OFF	OFF
14	ON	ON	OFF	ON
15	ON	ON	ON	OFF
16	ON	ON	ON	ON

5.2.2 Setting the RS-485 Bus Termination

DIP-switch 1 sets the RS-485 bus termination of the **VS-88DTP**. Only the first and last physical units on the RS-485 bus must be terminated, all others must be unterminated. Moving the DIP-switch up turns the termination off (default), moving the switch down enables the termination.

[Figure 5](#) illustrates the factory default PROG TERM DIP-switch positions.



Figure 5: RS-485 Termination DIP-switch

5.2.3 Connecting and Controlling Multiple VS-88DTP Devices

You can daisy-chain up to 16 **VS-88DTP** devices with operation via RS-232 from a PC or serial controller (see [Figure 6](#)).

To daisy-chain up to 16 VS-88DTP devices:

1. Connect the RS-232-1 port on the first **VS-88DTP** device to the PC (see [Section 5.1](#)).
Alternatively, the RS-485 port could be used for PC control.
2. Connect the RS-485 terminal block port on the first device to the RS-485 port on the second device, and so on for all devices. (Connect A to A, B to B, and G to G.)
3. Set the machine number and termination as follows:
 - The first device is machine number 1 and the subsequent seven devices are machine numbers 2 to 16 (see [Section 5.2.1](#))
 - Terminate the first and last devices, that is, terminate machine numbers 1 and 16. Ensure that all other devices are unterminated (see [Section 5.2.2](#))

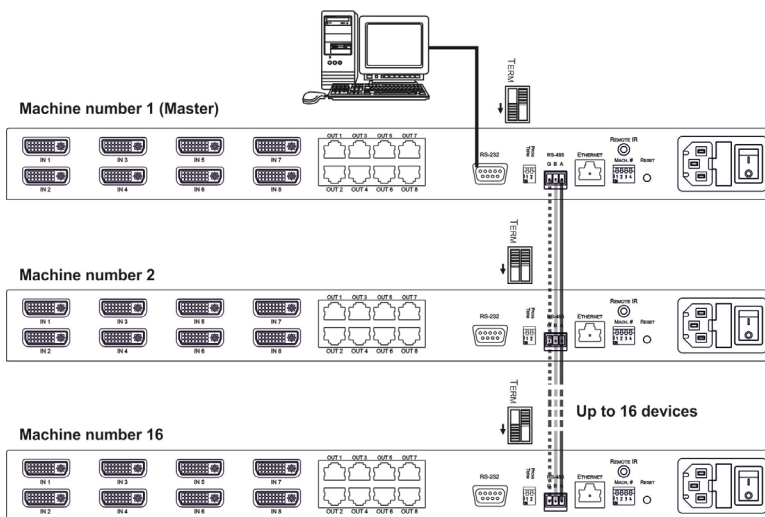


Figure 6: Control of Multiple VS-88DTP Devices via RS-232 and RS-485

5.3 Connecting the VS-88DTP via Ethernet

You can connect the **VS-88DTP** via Ethernet using a crossover cable (see [Section 5.3.1](#)) for direct connection to the PC, or a straight-through cable (see [Section 5.3.2](#)) 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 Configuration Guide in the technical support section on our Web site <http://www.kramerelectronics.com>.

5.3.1 Connecting to the Ethernet Port Directly to a PC

You can connect the Ethernet port of the **VS-88DTP** 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-88DTP** 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 7](#)).

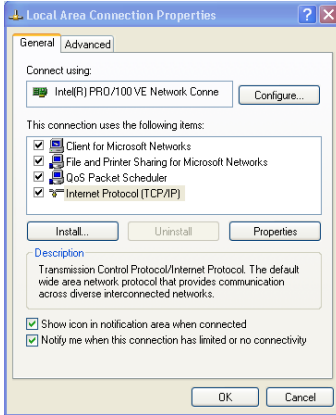


Figure 7: Local Area Connection Properties Window

6. Select Use the following IP Address, and fill in the details as shown in [Figure 8](#).

7. Click **OK**.

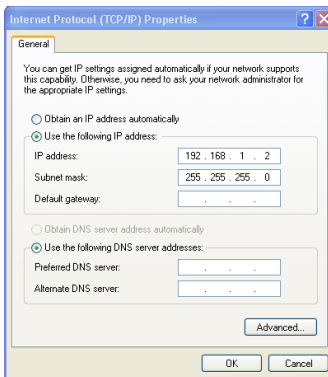


Figure 8: Internet Protocol (TCP/IP) Properties Window

5.3.2 Connecting to the Ethernet Port via a Network Hub

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

6 Operating the VS-88DTP

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](#))
- Switch between Protocol 2000 and Protocol 3000 (see [Section 6.4](#))
- Acquire the EDID (see [Section 6.5](#))

6.1 Routing Inputs to Outputs

To route an input to an output:

1. Press the required OUT key.
2. Press the required IN key.
The selected input is routed to the output.

To route one input to all outputs:

1. Press ALL.
2. Press the required IN button.
The selected input is routed to all outputs.

6.2 Disconnecting Outputs

To disconnect one output:

1. Press the required OUT button
2. Press OFF.
The selected output is disconnected.

To disconnect all outputs at once:

1. Press the ALL button.
2. Press OFF.
All outputs are disconnected.

6.3 Storing and Recalling Setups in Presets

You can use the STO and RCL buttons to store and recall up to 16 setups in presets. [Figure 9](#) illustrates the preset assignment numbers. Preset 1 is assigned to OUT 1 and preset 16 is assigned to IN 8.

Note: The preset numbers do not appear on the buttons.

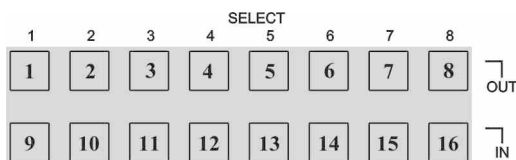


Figure 9: Preset Number Assignments using the Selector Buttons

To store a setup:

1. Route inputs and outputs as required.
2. Press the STO button.
The STO button flashes.
3. Select a preset number in which to store the current configuration (for example, for preset 13, press IN 5).

To recall a setup:

1. Press the RCL button.
The RCL button flashes.
2. Press the required preset button (for example, for preset 13, press IN 5).

6.4 Switching Between Protocol 2000 and Protocol 3000

To switch to Protocol 2000:

- Press the Output 1 and Output 2 buttons at the same time.
The device switches to Protocol 2000 and the display shows 2000

To switch to Protocol 3000:

- Press the Output 1 and Output 3 buttons at the same time.
The device switches to Protocol 3000 and the display shows 3000

6.5 Acquiring the EDID

You can acquire the EDID from:

- A single connected output (see [Section 6.5.1](#))
- Several outputs (see [Section 6.5.2](#))
- The default EDID (see [Section 6.5.3](#))

6.5.1 Acquiring an EDID from a Single Output

To acquire or change the EDID from a single output:

1. Connect the acceptor to the required output from which you want to acquire the EDID.
2. Press the EDID button.
The EDID button flashes.
3. Press the SELECT IN button to which the EDID will be copied.
The selected input number flashes on the display.
4. Select the SELECT OUT button from which the EDID will be acquired.
5. Press the EDID button.
The process is complete when the display returns to normal.

6.5.2 Acquiring an EDID from Several Outputs to Several Inputs

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

1. Connect the acceptors to the required outputs from which you want to acquire the EDIDs.
2. Press the EDID button.
The EDID buttons flashes.
3. Press the SELECT IN button to which the first EDID will be copied (for example, IN 1).
The selected input number flashes on the display.

4. Press the SELECT OUT button from which the first EDID will be acquired (for example, OUT 1).
The IN 1 button ceases to flash.
6. Press another SELECT IN to which the next EDID will be copied (for example, IN 3).
The selected input number flashes on the display.
7. Press the SELECT OUT button from which the next EDID will be acquired (for example, OUT 6).
8. Press the SELECT IN 3 button again.
The IN 3 button ceases to flash.
9. Press the SELECT IN buttons to which you want to copy the EDID (for example, IN 1 and IN 3).
10. Make sure that the relevant input numbers flash on the display.
11. Press the EDID button.
The process is complete when the display returns to normal.

6.5.3 Acquiring the Default EDID

To reset to the default EDID, do the following:

1. Press the EDID button.
The EDID button flashes.
2. Press the SELECT IN button to which the EDID will be copied.
The selected input number flashes on the display.
3. Press the OFF button until a “0” (zero) appears on the display.
4. Press the EDID button.
The process is complete when the display returns to normal.

6.6 Locking and Unlocking the Front Panel Buttons

To lock and unlock the front panel buttons:

1. Press and hold the LOCK button until the buttons lights.
The front panel buttons are locked.
2. Press and hold the LOCK button until the button no longer lights.
The front panel buttons are unlocked.

6.7 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 5.3](#)).

7 Controlling the VS-88DTP Remotely via Ethernet

You can remotely operate the **VS-88DTP** using a Web browser via the Ethernet connection (see [Section 7.1](#)). To be able to do so, you must use a supported Web browser; Microsoft (V6.0 and higher), Chrome, Firefox (V3.0 and higher).

To check that Java is installed and running, browse to:

<http://www.java.com/en/download/help/testvm.xml>

This page runs a test and displays a Java success (see [Figure 10](#)) or failure message.



Figure 10: Java Test Page Success Message

If you do not see the success message, follow the instructions on the page to:

- Load and enable Java
- Enable Javascript in your browser

7.1 Connecting to the VS-88DTP via your Browser

Make sure that your PC is connected via a network to the **VS-88DTP** and do the following:

1. Open your Internet browser.

2. Enter the unit's IP number (for the default IP address, see [Figure 11](#)) or name in the Address bar of your browser.
If you are using DHCP, you have to enter the name.



Figure 11: Entering the IP Number in the Address Bar

The Loading page appears.

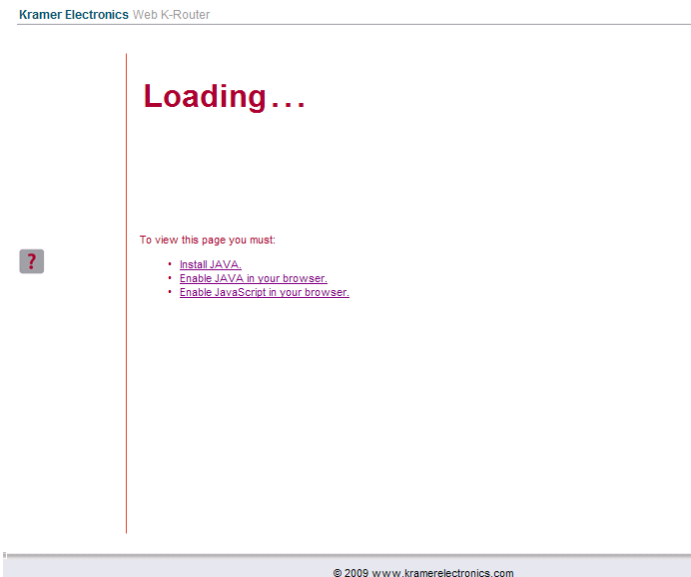


Figure 12: The Loading Page

The first time you run the Kramer applet the following security warning appears:



Figure 13: First Time Security Warning

3. Click **Run**.

The main switching control page is displayed which shows a graphical representation of the front panel (see [Figure 14](#)).

There are two remote operation Web pages:

- Main switching matrix (see [Section 7.2](#))
- Configuration (see [Section 7.3](#))

Select a page by clicking on the relevant link on the left hand side of the window.

7.2 The Main Switching Matrix Page

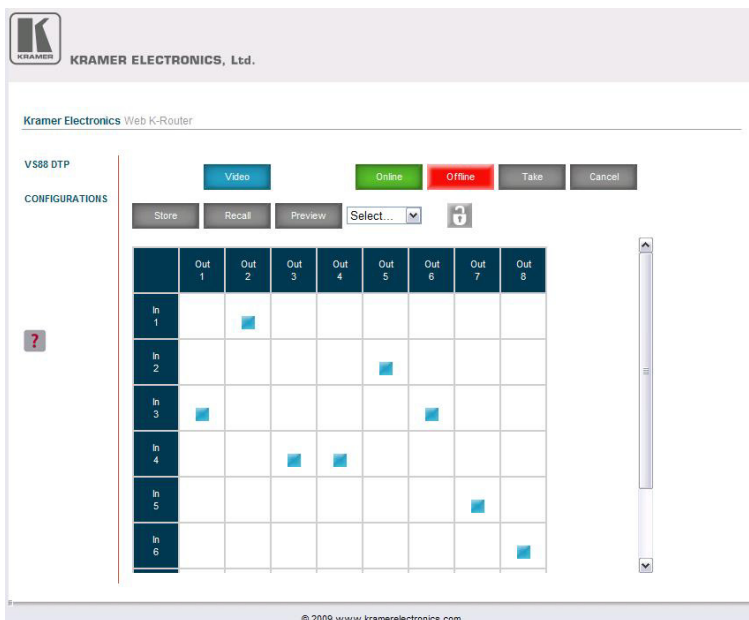


Figure 14: Main Switching Matrix Page

The main switching matrix page allows you to:

- Switch any input to any/all outputs independently (see [Section 7.2.1](#))
- Operate the unit in the Offline mode (see [Section 7.2.2](#))
- Use presets to store and recall switching configurations (see [Section 7.2.3](#))
- Lock or unlock the unit's front panel buttons (see [Section 7.2.4](#))

7.2.1 Switching an Input to an Output

To switch an input to an output, for example, input 1 to output 4:

1. Click the required point within the switching matrix grid (In 1, Out 4).







	Out 1	Out 2	Out 3	Out 4	Out 5	Out 6	Out 7	Out 8
In 1								
In 2								
In 3								
In 4								

Figure 15: Selecting a Switching Point on the Matrix


A blue switching icon  appears indicating that the channel is switched to In 1 and Out 4.

2. Repeat the above steps for each channel that you want to switch.

7.2.2 Operating in the Offline Mode

By default, the unit operates in the At-Once mode, meaning that any switching changes take effect immediately. In the Offline mode, changes only take effect when you press the **Take** button.

To operate in the Offline mode:

1. Click the red **Offline** button.
The button outline becomes dark.
2. Click the required point in the switching matrix grid (In 1, Out 5).
The switching icon outline  appears, and the **Take** and **Cancel** buttons change from gray to dark blue.

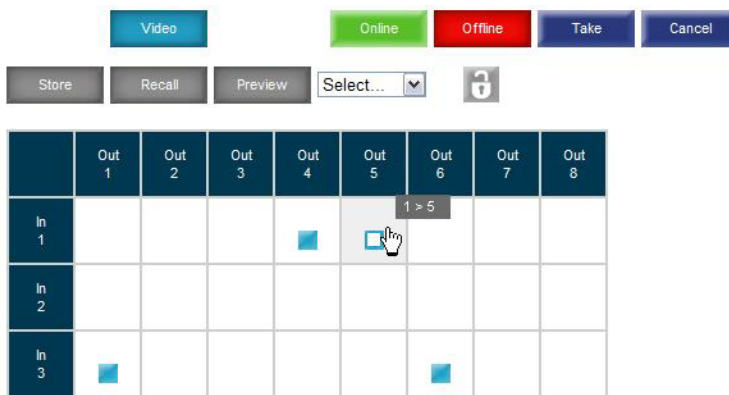


Figure 16: Switching in the Offline Mode

3. If required, repeat Step 2 for several channels.
4. Click either **Take** to accept the change or **Cancel**.
5. Click the **Online** button to exit the Offline mode.

7.2.3 Storing and Recalling Setups

You can store switching configurations in presets and recall them at any time.

To store a switching configuration:

1. From the Preset drop-down list, select a preset (in this example, Preset 07). Presets that contain a configuration are displayed with a blue background; presets with no configuration have a white background. When you select a preset, the **Store** button changes from gray to dark blue.

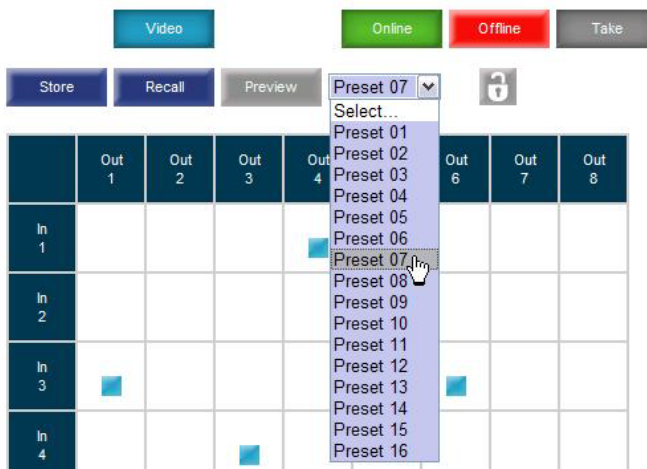


Figure 17: Selecting Preset 07

2. Click **Store**.

A confirmation message appears.

3. Click **OK**.

The configuration is stored in Preset 07.

To recall a setup:

1. From the Preset drop-down list, select a preset (in this example, Preset 03). Presets that contain a configuration are displayed with a blue background; presets with no configuration have a white background.
When you select a preset that contains a configuration, the **Recall** button changes from gray to dark blue.

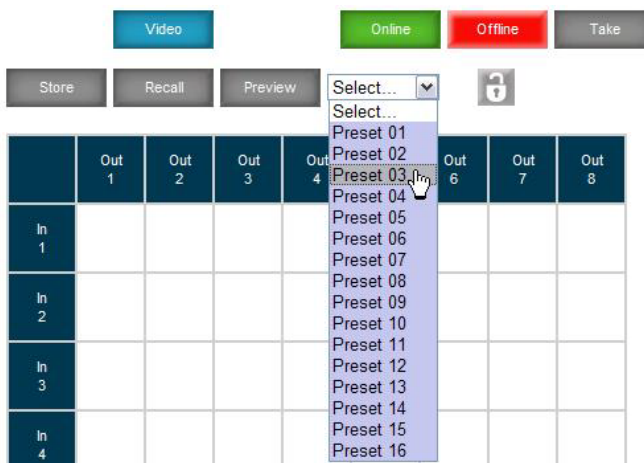


Figure 18: Selecting Preset 03

2. Click **Recall**.

A confirmation message appears.

3. Click **OK**.

The configuration from Preset 03 is loaded.

Note: You can also recall a preset in the Offline mode (see [Figure 19](#)) and make it active when you press the **Take** button (see [Section 7.2.2](#)).




Figure 19: Recalling a Preset in Offline Mode

7.2.4 Locking the Front Panel Buttons

You can lock the front panel buttons to prevent tampering.

To lock the front panel buttons:

- Click the padlock icon 

Note: Locking the front panel buttons does not disable remote operation of the unit via Ethernet, RS-232 or RS-485.

7.3 The Configuration Page

The Configuration page lets you edit the IP-related settings and only view the others. Editable fields have a white background.

Name:	<input type="text" value="KRAMER_0000"/>
Model:	<input type="text" value="VS-88DTP"/>
Serial Number:	<input type="text" value="0"/>
Firmware version:	<input type="text" value="00.09.00.4417"/>
MAC Address:	<input type="text" value="ff-ff-ff-ff-ff-ff"/>
IP Address:	<input type="text" value="192.168.001.039"/>
DHCP:	<input type="checkbox"/>
Gateway:	<input type="text" value="000.000.000.000"/>
Subnet Mask:	<input type="text" value="255.255.000.000"/>
<input type="button" value="Submit"/>	
<input type="button" value="Cancel"/>	

Figure 20: Configuration Page

The following IP-related settings can be edited:

- Machine name
- Fixed IP Address/DHCP
- Gateway
- Subnet Mask

The following fields can be viewed:

- Model
- Serial Number
- Firmware Version
- MAC Address

To edit the IP-related settings:

1. Edit the required field.
2. Click **Submit**.
The Network Settings confirmation message appears.
3. Click **OK**.
A message appears showing that the settings have been successfully changed.
4. If the IP address was changed or you selected DHCP, reload the Web page using the new name or IP address.

8 Technical Specifications

INPUTS:	8 DVI (not HDCP compliant), 1.2Vpp on DVI Molex 24-pin female connectors; DDC signal 5Vpp (TTL)
OUTPUTS:	8 DGKat twisted pair on RJ-45 connectors
MAX. DATA RATE:	6.75Gbps (2.25Gbps per graphic channel)
COMPLIANCE WITH STANDARDS:	Supports DVI 1.1
MAX RESOLUTION:	Up to UXGA; 1080p, 1920 x 1200
SYSTEM RANGE:	Up to 30m (98ft) at 1080p on shielded BC-DGKat524 cable; up to 70m (230ft) at 1080p on shielded BC-DGKat623 cable; up to 90m (295ft) at 1080p on shielded BC-DGKat7a23 cable
POWER SOURCE:	100–240VAC; 50/60Hz, 43VA
CONTROLS:	Front panel buttons, Infrared remote control transmitter, RS-232, RS-485, 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" x 1U (W, D, H)
WEIGHT:	2.5kg (5.5lbs) approx.
ACCESSORIES:	Power cord, IR transmitter, rack "ears"
OPTIONS:	External remote IR receiver cable
Specifications are subject to change without notice at http://www.kramerelectronics.com	

9 Default Communication Parameters

EDID			
EDID data is passed between Output 1 and Input 1			
RS-232			
Protocol 2000		Protocol 3000 (Default)	
Baud Rate:	9600	Baud Rate:	115,200
Data Bits:	8	Data Bits:	8
Stop Bits:	1	Stop Bits:	1
Parity:	None	Parity:	None
Command Format:	HEX	Command Format:	ASCII
Example (Output 1 to Input 1):	0x01, 0x81, 0x81, 0x81	Example (Output 1 to Input 1):	#AV 1>1<CR>
Switching Protocol			
P2000 -> P3000		P3000 -> P2000	
Command:	0x38, 0x80, 0x83, 0x81	Command:	#P2000<CR>
Ethernet			
Default Settings		Reset Settings	
IP Address: 192.168.1.39		Power cycle the unit while holding in the Factory Reset button, located on the rear panel of the unit.	
TCP Port #: 5000			
UDP Port #: 50000			



The Windows®-based Kramer control software (available for download the latest software from our Web site at <http://www.kramerelectronics.com>) operates with protocol 2000. If the **VS-88DTP** is set to protocol 3000, it is automatically switched to protocol 2000

10 Default EDID

Each input on the **VS-88DTP** is loaded with a factory default EDID.

Monitor:
Model name VS-88DTP
Manufacturer KRM
Plug and Play ID KRM0200
Serial number 1
Manufacture date 2006, ISO week 12

EDID revision 1.3
Input signal type Digital (DVI)
Color bit depth Undefined
Display type RGB color
Screen size 700 x 390 mm (31.5 in)
Power management Not supported
Extension blocs None

DDC/CI n/a

Color Characteristics:
Default color space Non-sRGB
Display gamma 2.20
Red chromaticity Rx 0.640 - Ry 0.341
Green chromaticity Gx 0.286 - Gy 0.610
Blue chromaticity Bx 0.146 - By 0.069
White point (default) Wx 0.284 - Wy 0.293
Additional descriptors None

Timing Characteristics:
Horizontal scan range 45-56kHz
Vertical scan range 86-83Hz
Video bandwidth 560MHz
CVT standard Not supported
GTF standard Not supported
Additional descriptors None
Preferred timing Yes
Native/preferred timing 1280x768p at 60Hz (4:3)
Modeline "1280x768" 79.500 1280 1344 1472 1664 768 771 778 798 +hsync +vsync
Detailed timing #1 1920x1200p at 60Hz (16:10)
Modeline "1920x1200" 154.000 1920 1968 2000 2080 1200 1203 1209 1235 +hsync -vsync

Standard timings supported:
720 x 400p @70Hz IBM VGA
720 x 400p @88Hz IBM XGA2
640 x 480p @60Hz IBM VGA
640 x 480p @67Hz Apple Mac II
640 x 480p @72Hz VESA
640 x 480p @75Hz VESA
800 x 600p @56Hz VESA
800 x 600p @60Hz VESA
800 x 600p @72Hz VESA
800 x 600p @75Hz VESA
832 x 624p @75Hz Apple Mac II
024 x 768i @87Hz IBM
024 x 768p @60Hz VESA
024 x 768p @70Hz VESA
024 x 768p @75Hz VESA
280 x 1024p @75Hz VESA
152 x 870p @75Hz Apple Mac II
360 x 765p @60Hz VESA STD
280 x 800p @60Hz VESA STD
440 x 900p @60Hz VESA STD
280 x 960p @60Hz VESA STD
280 x 1024p @60Hz VESA STD
400 x 1050p @60Hz VESA STD
680 x 1050p @60Hz VESA STD
600 x 1200p @60Hz VESA STD

Report Information:
Date generated 21-Jun-11
Software revision 2.53.0.861
Data source File
Operating system 5.1.2600.2.Service Pack 3

Raw Data:
00,FF,FF,FF,FF,FF,FF,00,2E,4D,00,02,01,00,00,00,0C,10,01,03,81,46,27,78,0A,D5,7C,A3,57,49,9C,25,
11,48,4B,FF,FF,80,8B,C0,81,00,95,00,81,40,81,80,90,40,B3,00,A9,40,0E,1F,00,80,51,00,1E,30,40,80,
37,00,6F,13,11,00,00,1E,28,3C,80,A0,70,B0,23,40,30,20,36,00,06,44,21,00,00,1A,00,00,00,FC,00,56,
53,2D,38,38,44,54,50,0A,20,20,20,20,00,00,00,FD,00,56,53,2D,38,38,44,54,50,0A,20,20,20,20,00,83

11 Updating the VS-88DTP Firmware

Instructions for upgrading the **VS-88DTP** firmware can be found at <http://www.kramerelectronics.com>.

12 Table of ASCII Codes for Serial Communication (Protocol 3000)

The following table lists the ASCII video signal codes that switch an input to an output for a single **VS-88DTP** machine in Protocol 3000. For more detailed information, see [Section 14.2](#).

	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5	OUT 6	OUT 7	OUT 8
IN 1	#V 1>1 <input type="checkbox"/>	#V 1>2 <input type="checkbox"/>	#V 1>3 <input type="checkbox"/>	#V 1>4 <input type="checkbox"/>	#V 1>5 <input type="checkbox"/>	#V 1>6 <input type="checkbox"/>	#V 1>7 <input type="checkbox"/>	#V 1>8 <input type="checkbox"/>
IN 2	#V 2>1 <input type="checkbox"/>	#V 2>2 <input type="checkbox"/>	#V 2>3 <input type="checkbox"/>	#V 2>4 <input type="checkbox"/>	#V 2>5 <input type="checkbox"/>	#V 2>6 <input type="checkbox"/>	#V 2>7 <input type="checkbox"/>	#V 2>8 <input type="checkbox"/>
IN 3	#V 3>1 <input type="checkbox"/>	#V 3>2 <input type="checkbox"/>	#V 3>3 <input type="checkbox"/>	#V 3>4 <input type="checkbox"/>	#V 3>5 <input type="checkbox"/>	#V 3>6 <input type="checkbox"/>	#V 3>7 <input type="checkbox"/>	#V 3>8 <input type="checkbox"/>
IN 4	#V 4>1 <input type="checkbox"/>	#V 4>2 <input type="checkbox"/>	#V 4>3 <input type="checkbox"/>	#V 4>4 <input type="checkbox"/>	#V 4>5 <input type="checkbox"/>	#V 4>6 <input type="checkbox"/>	#V 4>7 <input type="checkbox"/>	#V 4>8 <input type="checkbox"/>
IN 5	#V 5>1 <input type="checkbox"/>	#V 5>2 <input type="checkbox"/>	#V 5>3 <input type="checkbox"/>	#V 5>4 <input type="checkbox"/>	#V 5>5 <input type="checkbox"/>	#V 5>6 <input type="checkbox"/>	#V 5>7 <input type="checkbox"/>	#V 5>8 <input type="checkbox"/>
IN 6	#V 6>1 <input type="checkbox"/>	#V 6>2 <input type="checkbox"/>	#V 6>3 <input type="checkbox"/>	#V 6>4 <input type="checkbox"/>	#V 6>5 <input type="checkbox"/>	#V 6>6 <input type="checkbox"/>	#V 6>7 <input type="checkbox"/>	#V 6>8 <input type="checkbox"/>
IN 7	#V 7>1 <input type="checkbox"/>	#V 7>2 <input type="checkbox"/>	#V 7>3 <input type="checkbox"/>	#V 7>4 <input type="checkbox"/>	#V 7>5 <input type="checkbox"/>	#V 7>6 <input type="checkbox"/>	#V 7>7 <input type="checkbox"/>	#V 7>8 <input type="checkbox"/>
IN 8	#V 8>1 <input type="checkbox"/>	#V 8>2 <input type="checkbox"/>	#V 8>3 <input type="checkbox"/>	#V 8>4 <input type="checkbox"/>	#V 8>5 <input type="checkbox"/>	#V 8>6 <input type="checkbox"/>	#V 8>7 <input type="checkbox"/>	#V 8>8 <input type="checkbox"/>

13 Hex Codes for Serial Communication (Protocol 2000)

The Hex codes listed in this section are used to set video channels for a single machine (set as Machine 1) connected via either RS-232 or Ethernet. Similar hex codes are used when the **VS-88DTP** is connected via RS-485 and the machine is set to number 2.

The following table lists the Hex codes that switch video channels:

Video Channel Switching Codes								
	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 84 81	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 85 81	01 86 86 81	01 86 87 81	01 86 88 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

14 Kramer Protocol

By default, the **VS-88DTP** is set to protocol 3000 (see [Section 14.2](#)) but is also compatible with Kramer's Protocol 2000 (see [Section 14.3](#)).

You can download our user-friendly "Software for Calculating Hex Codes for Protocol 2000" from the technical support section on our Web site at: <http://www.kramerelectronics.com>
[Section 14.1](#) describes how to switch between protocol 3000 and protocol 2000.

14.1 Switching Protocols

You can switch protocols either via the front panel buttons (see [Section 14.1.1](#)) or the protocol commands.

14.1.1 Switching Protocols via the Front Panel Buttons

To switch from protocol 3000 to protocol 2000, press (not as part of a switching operation) and hold the OUT 1 and OUT 2 buttons for a few seconds.
The display shows 2000.

To switch from protocol 2000 to protocol 3000, press and hold the OUT 1 and OUT 3 buttons for a few seconds.
The display shows 3000.

14.2 Kramer Protocol 3000

This RS-232/RS-485 communication protocol lets you control the machine from any standard terminal software (for example, Windows® HyperTerminal).

14.2.1 Host Message Format

Start	Address (optional)	Body	Delimiter
#	<i>Destination_id@</i>	Message	[CR]

14.2.1.1 Simple Command

Command string with only one command without addressing:

Start	Body	Delimiter
#	Command [SP] <i>Parameter_1,Parameter_2,...</i>	[CR]

14.2.1.2 Command String

Formal syntax with commands concatenation and addressing:

Start	Address	Body	Delimiter
#	Destination_id@	Command_1 Parameter1_1,Parameter1_2,... Command_2 Parameter2_1,Parameter2_2,... Command_3 Parameter3_1,Parameter3_2,... ...	CR

14.2.2 Device Message Format

Start	Address (optional)	Body	delimiter
~	Sender_id@	Message	CR LF

14.2.2.1 Device Long Response

Echoing command:

Start	Address (optional)	Body	Delimiter
~	Sender_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)

14.2.3 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 alphameric 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 machine response

Device address (Optional when directly connected to the device)

K-NET Device ID or MACHINE NUMBER followed by '@'

(ex. #02@CRLF)

Query sign

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

All outputs sign

'*' defines all outputs.

Message closing character

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

CRLF – For machine 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.

14.2.4 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, Ethernet, or USB 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.

14.2.5 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.

14.2.6 Command Chaining

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.

14.2.7 Maximum String Length

64 characters

14.2.8 Backward Support

You can switch between protocols using a switch protocol command from either platform. The following tables list instruction codes for Protocol 3000.

Help commands		
Command	Syntax	Response
Protocol Handshaking	# CR	~OK CRLF
Device initiated messages		
Command	Syntax	
Start message	~Protocol start CRLF	
Switcher actions		
Video channel has switched (AFV mode)	AV IN>OUT	
Result codes (errors)		
	Syntax	
No error. Command running succeeded	COMMAND PARAMETERS OK	
Protocol Errors		
Syntax Error	ERR001	
Command not available for this device	ERR002	
Parameter is out of range	ERR003	
Unauthorized access (running command without the match login).	ERR004	
Basic routing commands		
Command	Syntax	Response
Switch video	AV IN>OUT , IN>OUT , ...	AV IN>OUT , IN>OUT ,... RESULT
OR		
Switch video only	VID IN>OUT , IN>OUT , ... Short form: V IN>OUT , IN>OUT , ...	AV IN>OUT , IN>OUT , ... RESULT
Note: When AFV mode is active, this command will switch also audio. If audio is breakaway – device display mode will change to show audio connections status.		

Basic routing commands

Note: When AFV mode is active, this command will switch also video.

Read video connection	VID? <u>OUT</u> Short form: V? <u>OUT</u> VID? *	VID <u>IN>OUT</u> VID <u>IN>1</u> , <u>IN>2</u> ...
-----------------------	-----------------------------------------------------------------------------	-----------------------------------------------------------------------------------

Parameter Description:

IN = Input number or '0' to disconnect output.

'>' = Connection character between in and out parameters.

OUT = Output number or '*' for all outputs.

Examples:

Switch Video and Audio input 3 to output 7	#AV 3>7 <u>CR</u>	~AV 3>7 OK <u>CRLF</u>
Switch Video input 2 to output 4	#V 2>4 <u>CR</u>	~AV 2>4 OK <u>CRLF</u>
Switch Video input 4 to output 2 in machine number 6	#6@VID 4>2 <u>CR</u>	~6@AV 4>2 OK <u>CRLF</u>
Disconnect Video and Audio Output 4	#AV 0>4 <u>CR</u>	~AV 0>4 OK <u>CRLF</u>
Switch Video Input 3 to All Outputs	#V 3>* <u>CR</u>	~AV 3>* OK <u>CRLF</u>

Chaining Multiple commands*	#AV 1>* V 3>4, 2>2, 82>1, 0>2 V 82>3 V? * <u>CR</u> First switch all Audio and video outputs from input 1, Then switch video input 3 to output 4, video input 2 to output 2, video input and disconnect video output 2. Then switch audio input 3 to output 2, Then disconnect audio output 1. Then get status of all links (assume this is 4x4 matrix). Commands processing start after entering <u>CR</u> , response will sent for each command after processing it.	~AV 1>* OK <u>CRLF</u> ~AV 1>2, 3>4 OK <u>CRLF</u> ~AV 82>3 <u>ERR###</u> <u>CRLF</u> ~AUD 0>1 OK <u>CRLF</u> ~AV 1>1, 0>2, 1>3, 3>4 <u>CRLF</u>
-----------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------

Preset commands

Command	Syntax	Response
Store current connections to preset	PRST-STO <u>PRESET</u> Short form: PSTO <u>PRESET</u>	PRST-STO <u>PRESET</u> <u>RESULT</u>
Recall saved preset	PRST-RCL <u>PRESET</u> Short form: PRCL <u>PRESET</u>	PRST-RCL <u>PRESET</u> <u>RESULT</u>
Read video connections from saved preset	PRST-VID? <u>PRESET</u> , <u>OUT</u> Short form: PVID? <u>PRESET</u> , <u>OUT</u> PRST-VID? <u>PRESET</u> , *	PRST-VID <u>PRESET</u> <u>IN>OUT</u> PRST-VID <u>PRESET</u> <u>IN>1</u> , <u>IN>2</u> , ...

Preset commands		
Command	Syntax	Response
Parameters Description: PRESET = Preset number. OUT = Output in preset to show for, "" for all.		

Examples:		
Store current Audio & Video connections to preset 5	#PRST-STR 5 CR	~PRST-STR 5 OK CRLF
Recall Audio & Video connections from preset 3	#PRCL 3 CR	~PRST-RCL 3 OK CRLF
Show source of video output 2 from preset 3	#PRST-VID? 3,2 CR	~PRST-VID 3: 4>2 CRLF

Operation commands		
Command	Syntax	Response
Lock front panel	LOCK-FP LOCK-MODE Short form: LCK LOCK-MODE	LOCK-FP LOCK-MODE RESULT
Get front panel locking state	LOCK-FP?	LOCK-FP LOCK-MODE
Parameters Description: LOCK-MODE = Front panel locking state: "0" or "off" to unlock front panel buttons. "1" or "on" to lock front panel buttons.		
Restart device	RESET	RESET OK
Switch to protocol 2000*	P2000	P2000 OK
* Protocol 2000 has command to switch back to ASCII protocol (like protocol 3000)		

Machine info commands		
Command	Syntax	Response
* Time settings commands require admin authorization		
Read in/out count	INFO-IO?	INFO-IO: IN INPUTS_COUNT , OUT OUTPUTS_COUNT
Read max presets count	INFO-PRST?	INFO-PRST: VID PRESET_VIDEO_COUNT , AUD PRESET_AUDIO_COUNT
Reset configuration to factory default	FACTORY	FACTORY RESULT

Identification commands		
Command	Syntax	Response
Protocol Handshaking	# CR	~OK CRLF
Read device model	MODEL?	MODEL MACHINE_MODEL
Read device serial number	SN?	SN SERIAL_NUMBER
Read device firmware version	VERSION?	VERSION MAJOR MINOR BUILD REVISION
Set machine name	NAME MACHINE_NAME	NAME MACHINE_NAME RESULT

Identification commands		
Command	Syntax	Response
Read machine name	NAME?	NAME <u>MACHINE_NAME</u>
Reset machine name to factory default*	NAME-RST	NAME-RST <u>MACHINE_FACTORY_NAME</u> <u>RESULT</u>
<p>*Note: machine name not equal to model name. This name relevance for site viewer identification of specific machine or for network using (with DNS feature on). <u>MACHINE_NAME</u> = Up to 14 Alfa-Numeric chars. * Machine factory name = Model name + last 4 digits from serial number.</p>		

Network Setting Commands		
Set IP Address	NET-IP <u>IP_ADDRESS</u> NTIP	NET-IP <u>IP_ADDRESS</u> <u>RESULT</u>
Read IP Address	NET-IP? NTIP?	NET-IP <u>IP_ADDRESS</u>
Read MAC Address	NET-MAC? NTMC	NET-MAC <u>MAC_ADDRESS</u>
Set subnet mask	NET-MASK <u>SUBNET_MASK</u> NTMSK	NET-MASK <u>SUBNET_MASK</u> <u>RESULT</u>
Read subnet mask	NET-MASK? NTMSK?	NET-MASK <u>SUBNET_MASK</u>
Set gateway address	NET-GATE <u>GATEWAY_ADDRESS</u> NTGT	NET-GATE <u>GATEWAY_ADDRESS</u> <u>RESULT</u>
Read subnet mask	NET-GATE? NTGT?	NET-GATE <u>GATEWAY_ADDRESS</u>
Set DHCP mode	NET-DHCP <u>DHCP_MODE</u> NTDH	NET-DHCP <u>DHCP_MODE</u> <u>RESULT</u>
Read subnet mask	NET-DHCP? NTDH?	NET-DHCP <u>DHCP_MODE</u>
<p><u>DHCP_MODE</u> = 0 – Don't use DHCP (Use IP set by factory or IP set command). 1 – Try to use DHCP, if unavailable use IP as above.</p>		
Change protocol ethernet port	ETH-PORT <u>PROTOCOL</u> , <u>PORT</u> ETHP	ETH-PORT <u>PROTOCOL</u> <u>PORT</u> <u>RESULT</u>
Read protocol ethernet port	ETH-PORT? <u>PROTOCOL</u> ETHP?	ETH-PORT <u>PROTOCOL</u> , <u>PORT</u>
<p><u>PROTOCOL</u> = TCP / UDP (transport layer protocol) <u>PORT</u> = ethernet port to enter protocol 3000 commands. 1-65535 = User defined port 0 - reset port to factory default (50000 for UDP, 5000 for TCP)</p>		

14.3 Kramer Protocol 2000

The Kramer Protocol 2000 RS-232/RS-485 communication uses four bytes of information as defined below.

MSB								LSB
		DESTINATION	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 (i.e. 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 (i.e. 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.



All the values in the table below 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 to be switched (0 = disconnect)	Set equal to video output which is to be switched (0 = to all the outputs)	2, 15
3	STORE VIDEO STATUS	Set as SETUP #	0 - to store 1 - to delete	2, 3, 15
4	RECALL VIDEO STATUS	Set as SETUP #	0	2, 3, 15
5	REQUEST STATUS OF A VIDEO OUTPUT	Set as SETUP #	Equal to output number whose status is required	4, 3
15	REQUEST WHETHER SETUP IS DEFINED / VALID INPUT IS DETECTED	SETUP # or Input #	0 - for checking if setup is defined 1 - for checking if input is valid	8
16	ERROR / BUSY	For invalid / valid input (i.e. OUTPUT byte = 4 or OUTPUT byte = 5), this byte is set as the input #	0 - error 1 - invalid instruction 2 - out of range 3 - machine busy 4 - invalid input 5 - valid input 6 - RX buffer overflow	9, 25
30	LOCK FRONT PANEL	0 - Panel unlocked 1 - Panel locked	0	2
31	REQUEST WHETHER PANEL IS LOCKED	0	0	16
56	CHANGE TO ASCII	0	Kramer protocol 3000	19
61	IDENTIFY MACHINE	1 - video machine name 2 - audio machine name 3 - video software version 4 - audio software version 5 - RS422 controller name 6 - RS422 controller version 7 - remote control name 8 - remote software version 9 - Protocol 2000 revision	0 - Request first 4 digits 1 - Request first suffix 2 - Request second suffix 3 - Request third suffix 10 - Request first prefix 11 - Request second prefix 12 - Request third prefix	13
62	DEFINE MACHINE	1 - number of inputs 2 - number of outputs 3 - number of setups	1 - for video 2 - for audio	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 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 as were sent are returned, and the OUTPUT is assigned the value of the requested parameter. The replies to instructions 10 and 11 are as per the definitions in instructions 7 and 8 respectively. For example, if the present status of machine number 5 is breakaway setting, then the reply to the HEX code

0B 80 85

would be HEX codes

4B 80 81 85

NOTE 6 – If INPUT is set to 127 for these instructions, then, if the function is defined on this machine, it replies with OUTPUT=1. If the function is not defined, then the machine replies with OUTPUT=0, or with an error (invalid instruction code).

If the INPUT is set to 126 for these instructions, then, if possible, the machine will return the current setting of this function, even for the case that the function is not defined. For example, for a video switcher which always switches during the VIS of input #1, (and its VIS setting cannot be programmed otherwise), the reply to the HEX code

0A	FE	80	81 (i.e. request VIS setting, with INPUT set as 126dec)
would be HEX codes			
4A	FE	81	81 (i.e. VIS setting = 1, which is defined as VIS from input #1).

NOTE 8 - The reply is as in TYPE 3 above, except that here the OUTPUT is assigned with the value 0 if the setup is not defined / no valid input is detected; or 1 if it is defined / valid input is detected.

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

NOTE 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 14 - The number of inputs and outputs refers to the specific machine which is being addressed, not to the system. For example, if six 16X16 matrices are configured to make a 48X32 system (48 inputs, 32 outputs), the reply to the HEX code

3E	82	81	82 (i.e. request the number of outputs)
----	----	----	-----------------------------------------

would be HEX codes

7E	82	90	82
----	----	----	----

i.e. 16 outputs

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

NOTE 19 – After this instruction is sent, the unit will respond to the ASCII command set defined by the OUTPUT byte. The ASCII command to operate with the HEX command set must be sent in order to return to working with HEX codes.

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

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

10	83	84	81
----	----	----	----

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

10	87	85	81.
----	----	----	-----

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