KRAMER
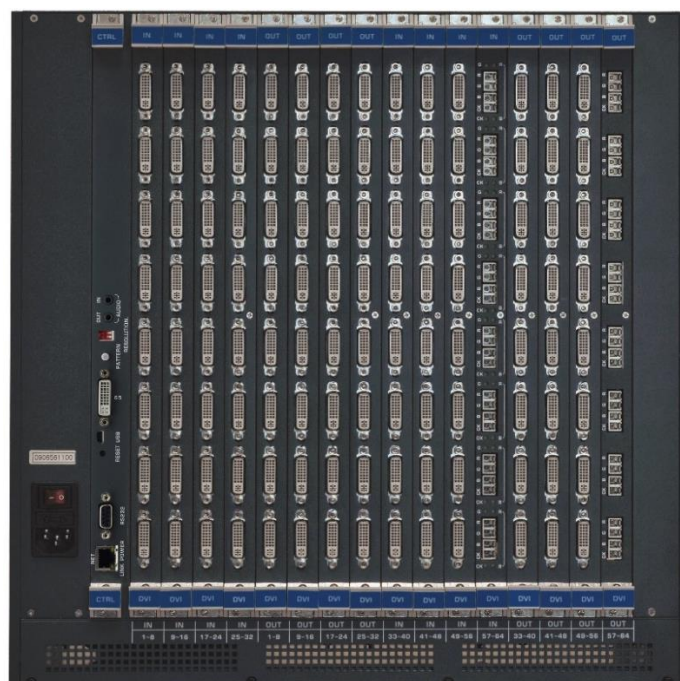
USER MANUAL
MODEL:

VS-6464DN-EM
8x8 to 64x64 Modular Multi-Format
Managed Digital Matrix Switcher

Contents

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!

Congratulations on purchasing your Kramer **VS-6464DN-EM 8x8 to 64x64 Modular Multi-Format Managed Digital Matrix Switcher**. This product, which incorporates HDMI™ technology, is ideal for:

- Professional display systems requiring video signal routing.
- Broadcast, presentation and production facilities, as well as monitoring in large duplication systems.
- Rental/staging applications.

ⓘ Throughout this user manual the chassis configuration is shown with 64 DVI inputs and 64 DVI outputs as a representation only.

The following cards are available and may be mixed in the same chassis:

- HDCP-IN8-F64 / HDCP-OUT8-F64
  (see Defining the HDCP-IN8-F64 / HDCP-OUT8-F64 on page 33)
- DGKat-IN8-F64 / DGKat-OUT8-F64
  (see Defining the DGKat-IN8-F64 / DGKat-OUT8-F64 on page 34)
- F670-IN8-F64 / F670-OUT8-F64
  (see Defining the F670-IN8-F64 / F670-OUT8-F64 on page 36)
- F610-IN8-F64 / F610-OUT8-F64
  (see Defining the F610-IN8-F64 / F610-OUT8-F64 on page 38)
- DVI-IN8-F64 / DVI-OUT8-F64
  (see Defining the DVI-IN8-F64 / DVI-OUT8-F64 on page 39)
- VGAA-IN8-F64 / VGAA-OUT8-F64
  (see Defining the VGAA-IN8-F64 / VGAA-OUT8-F64 on page 40)

ⓘ The F670-IN8/OUT8-F64 cards are fully compatible with the Kramer **670T/670R** and **671T/671R** HDMI/DVI transmitters and receivers for non-HDCP content.

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 www.kramerav.com/downloads/VS-6464DN-EM to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

Achieving the Best Performance

To achieve the best performance:

- Use only good quality connection cables (we recommend Kramer high-performance, high-resolution cables) to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables).

- Do not secure the cables in tight bundles or roll the slack into tight coils.

- Avoid interference from neighboring electrical appliances that may adversely influence signal quality.

- Position your **VS-6464DN-EM** 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.

Safety Instructions

Warning: Class 1 laser product

- Invisible laser radiation present.

- Avoid long-term viewing of laser.

- Avoid the use of magnifying viewing aids or instruments (such as binoculars, telescopes, microscopes and magnifying lenses, but not spectacles or contact lenses).

- Avoid placing optical devices in the emitted beam that could cause the concentration of the laser radiation to be increased.

Caution:

- This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.

- For products with relay terminals and GPI\O ports, please refer to the permitted rating for an external connection, located next to the terminal or in the User Manual.

- There are no operator serviceable parts inside the unit.

Warning:

- Use only the power cord that is supplied with the unit.

- Disconnect the power and unplug the unit from the wall before installing.

- Do not open the unit. High voltages can cause electrical shock! Servicing by qualified personnel only.

- To ensure continuous risk protection, replace fuses only according to the rating specified on the product label which located on the bottom of the unit.

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 www.kramerav.com/support/recycling/.

About Fast Switching

Older display devices require a longer time between the loss of one digital signal and the introduction of another, as well as a physical disconnection of the interconnecting cable in order to be able to detect and adjust to the new video attributes and parameters. Normal switching, therefore, introduced a 5V signal disconnection along with a delay in switching. Many newer display devices, however, are now capable of accepting "on-the-fly" switching.

Depending on the display device in use, the **VS-6464DN-EM** allows for fast switching (minor reset and the connection kept alive) and extra fast switching (no reset and the connection kept alive), see Config Menu—Setting Output Port Parameters on page 29. Using the fast and extra fast switching modes allows for fraction-of-a-second switching times when using high performance display devices or when using a scaler on the video output.

About Power Connect™

The Power Connect™ feature here means that the **VS-6464DN-EM** can supply power to the TP transmitters and receivers (for example, the **TP-573** and **TP-574**) as long as the devices are within 90m (270ft) of each other. The Power Connect™ feature applies as long as the cable can carry power and the distance does not exceed 90m on standard CAT 5 cable. For longer distances, a heavier gauge cable should be used (a TP cable is still suitable for the video/audio transmission, but not for feeding the power at these distances).

Overview

The Kramer **VS-6464DN-EM** is a high performance managed matrix switcher chassis for AV signals. The unit is modular and populated from 8 x 8 to 64 x 64 ports in increments of eight inputs and/or eight outputs. The unit supports various signals, depending on the type of cards installed, and includes two power supplies with an optional third for redundancy and a controller and testing module that can monitor and test any input or output in the matrix. It features a very high bandwidth of up to 3.4Gbps (for the chassis only, effective bandwidth of the system depends on the input / output cards, see Using the Input / Output Cards on page 33) that ensures transparent performance even in the most critical applications. The cards re-clock and equalize the signals and the chassis can route any or all inputs to any or all outputs simultaneously.

The **VS-6464DN-EM** is highly configurable – you can add or remove inputs and outputs independently in groups of eight and mix different types of input/output cards in the same chassis. For example, you can configure a device as an 8 x 24 or a 64 x 8 matrix switcher to exactly suit your needs.

The **VS-6464DN-EM** features:

- Full 64 x 64 non-blocking matrix array to switch any of the 64 input digital signals to any or all of the 64 outputs (see Connecting the VS-6464DN-EM on page 11).

- Easy access to 60 pre-set memory locations for quick access to user-defined setups.

- Fast switching on outputs to reduce or remove switching delay.

- Support for redundant, hot swappable power supplies.

- Simple firmware upgrade of compatible cards (see Upgrading VS-6464DN-EM and Input / Output Card Firmware on page 53).

- Seamless integration with Kramer Network for switching, card status, port status, firmware upgrades (of compatible cards), and more.

- A 40 character by 2 line LCD that shows the operational status or the configuration menu.

- A lock function to prevent tampering with the front panel.

- A default EDID (Extended Display Identification Data) for each input.

- EDID Capture – Copies and stores the EDID from a display device.

- Non-volatile EDID storage.

- Kramer Core™ – Flexible infrastructure conversion. Copper, fiber or Twisted Pair, all can be used at the same time according to input/output module selection. The matrix receives signals from compatible Kramer transmitters, automatically converts between available infrastructure options and sends the signals to compatible Kramer receivers.

- Max. Data Rate – 10.2Gbps (3.4Gbps per graphic channel) when using compatible cards.

- HDTV Compatible.

- HDCP Compliant – With DVI (HDCP), F670, and DGKat modules.

- HDMI Support.

- DGKat™ Signal Integration – Kramer's unique technology for converting TMDS as well as control and communication to signals that run over twisted pair cables. For optimum range and performance using, use recommended Kramer cables, available at www.kramerav.com/product/VS-6464DN-EM

- Kramer Equalization & re-Klocking™ Technology – Rebuilds the digital signal to travel longer distances.

- Optional Fast Switching Support – For fraction of a second switching.

- Modular & Easily Configurable Platform – Input or output module types can be mixed and added in increments of 8 from 8x8 up to 64x64.

- Versatile Selection of Modules – Including DVI, HDCP (HDMI over DVI connector), HDMI over Fiber, DVI over Fiber, VGA and DGKat (HDMI over twisted pair).

- Kramer Protocol 3000.

- Flexible Configuration – To disable HDCP support and convert between HDMI and DVI.

You can operate the **VS-6464DN-EM** via the front panel buttons or remotely via:

- RS-232 or USB (VCOM) serial commands transmitted by a touch screen system, PC or other serial controller.

- Ethernet over a LAN.

- Kramer Network enterprise management platform.

The **VS-6464DN-EM** is a sophisticated device but has nevertheless been designed to be simple to operate using an intuitive front panel keypad. For details of how to route inputs to outputs, see Switching Actions on page 19.

The **VS-6464DN-EM** is housed in a 19" rack-mountable enclosure.

Defining the VS-6464DN-EM 8x8 to 64x64 Modular Multi-Format Managed Digital Matrix Switcher

This section defines the front and rear panels of the **VS-6464DN-EM**.
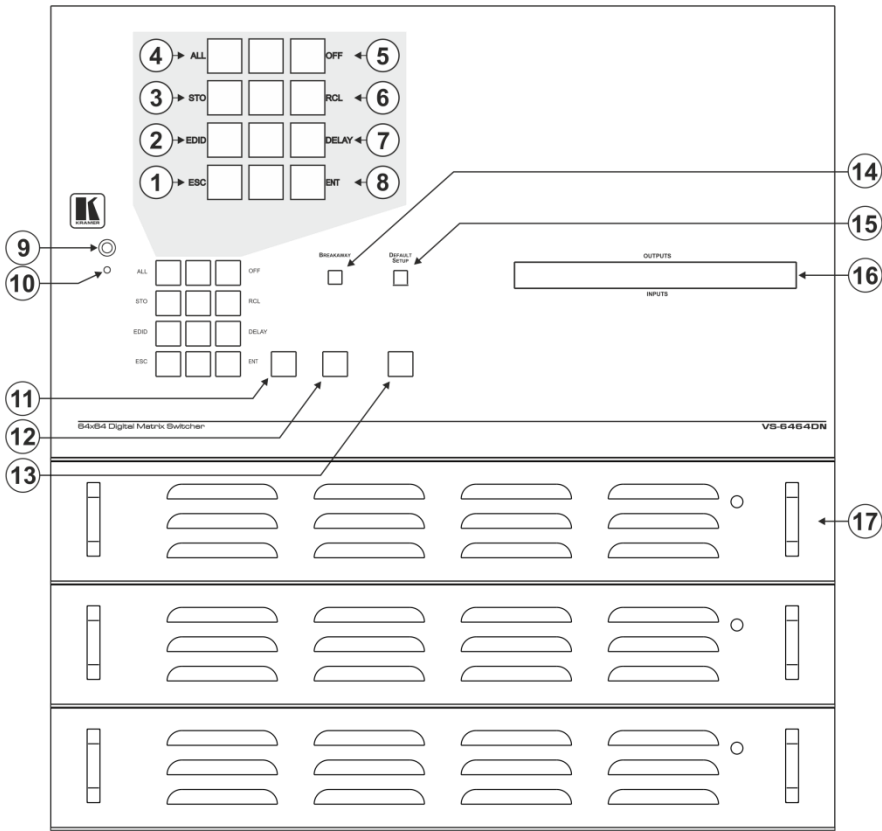
Figure 1: VS-6464DN-EM Front Panel

Buttons 11, 12 and 13 function as the TAKE, MENU and LOCK buttons respectively.

#	Feature			Function
1	Double-function Selector Buttons Area	Menu Button Functions	ESC	Press to exit the current operation.
2			EDID	Press to assign EDID channels.
3			STO	Press to store the current setup in a preset. After pressing the MENU button, this button lights and is enabled.
4			ALL	Press to connect an input to all outputs. After pressing the MENU button, this button lights and is enabled.
5			OFF	Press to turn off an output. After pressing the MENU button, this button lights and is enabled.
6			RCL	Press to recall a preset. After pressing the MENU button, this button lights and is enabled.
7			DELAY	Press to set the delay between confirming an action and the execution of the action.
8			ENT	Press to complete the input-output setup when using a one-digit number instead of two digits. For example, to enter input 5, you can press either 05 or 5, ENT. Press to enter the options in a setup menu.
9	IR Receiver			Infrared remote control sensor.
10	IR LED			Lights yellow when receiving commands from the IR remote control transmitter.

11	TAKE Button	Press to confirm actions (see Confirming a Switching Action on page 19).
12	MENU Button	Press once to enable the ALL, OFF, STO and RCL buttons (see Using the Configuration Menus on page 22). Press again to enter the configuration menu (see Using the Config Menu on page 26). When in a Menu, press to cycle through the menu items.
13	LOCK Button	Press and hold for approximately 2 sec to lock/unlock the front panel buttons (see Locking the Front Panel Buttons on page 21).
14	BREAKAWAY Button	Press to exit a Menu (see Using the Configuration Menus on page 22).
15	DEFAULT SETUP Button	Press to recall the default setup (see Recalling the Default Setup on page 21).
16	OUTPUTS/INPUTS LCD Display	Displays the outputs (upper row) switched to the selected inputs (lower row), (see Startup Display on page 17). Displays user interface messages and menus.
17	Power Supplies	Supply power to the device. The unit includes two power supplies. A third one can be installed.

Figure 2: VS-6464DN-EM Front Panel Numeric Keypad

#	Feature	Function
18	◄ (Backward)	Press to shift the sliding window to the right (the LCD display only shows 13 cross-points out of a total of 16).
19	1, 2, 3, 4, 5, 6, 7, 8, 9, 0	Numeric keypad, 1 to 0.
20	► (Forward)	Press to shift the sliding window to the left (the LCD display only shows 13 cross-points out of a total of 16).
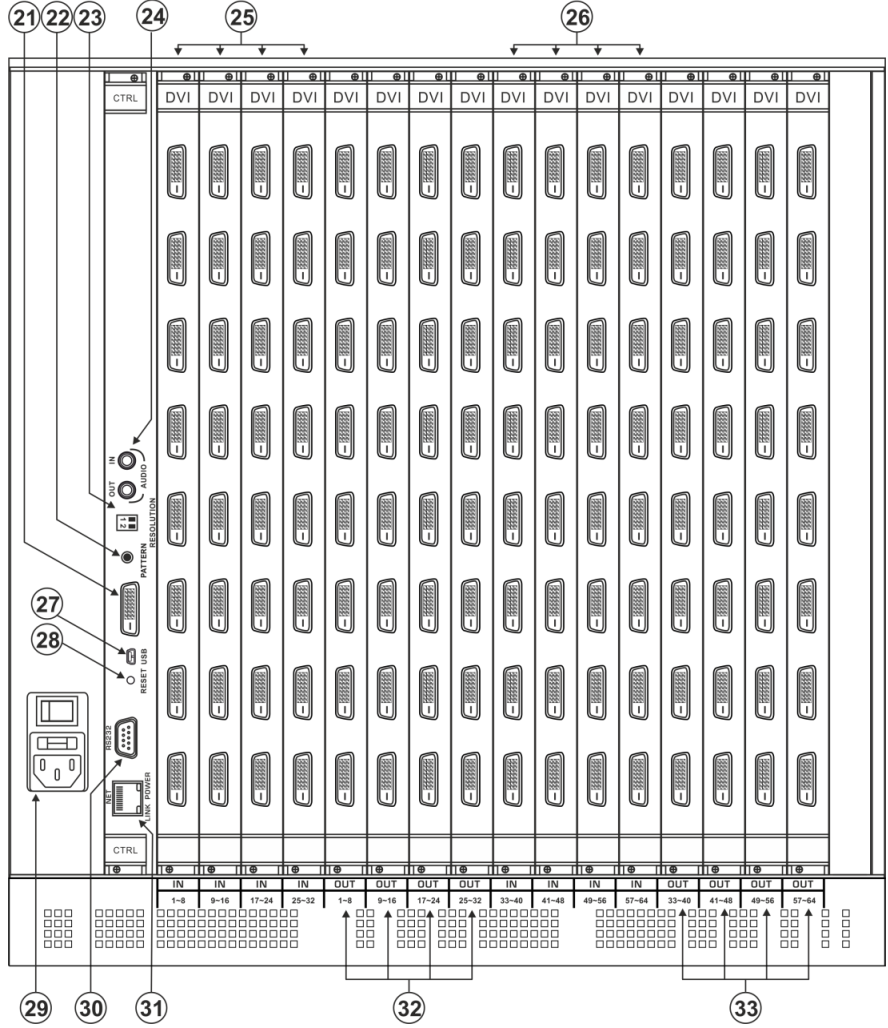
Figure 3: VS-6464DN-EM Rear Panel Showing DVI cards

#	Feature		Function
21	Test Module DVI Molex 24-pin Video Connector		Connect to one of the relevant video inputs/outputs to aid in troubleshooting (see Troubleshooting Video Problems on page 46).
22	PATTERN Button		Press the button repeatedly to change the video pattern generated by the Test module (see Setting the Pattern of the Generated Video on page 45).
23	RESOLUTION DIP-switches		Set the resolution for video generated by the Test module (see Setting the Resolution of the Generated Video on page 44).
24	Test Module 3.5mm Mini Jack Unbalanced Analog Audio Connector		Connect to one of the relevant audio inputs/outputs to aid in troubleshooting (see Troubleshooting Audio Problems on page 47).
25	IN 1~32 Connectors	INPUTS	Connect to the relevant video sources, depending on the cards installed (1 to 32, see Connecting the VS-6464DN-EM on page 11).
26	IN 33~64 Connectors		Connect to the relevant video sources, depending on the cards installed (33 to 64, see Connecting the VS-6464DN-EM on page 11).
27	USB Virtual COM Port USB Mini-B Connector		Connect to a PC or remote controller (see Connecting to the VS-6464DN-EM via USB (VCOM) on page 14) and perform firmware upgrade of the device and compatible input/output cards (see Upgrading VS-6464DN-EM and Input / Output Card Firmware on page 53).
28	RESET Button		For future use.

#	Feature		Function
29	AC Mains Power Module		Power supply 1: Fuse holder and power cord socket. Connect to the AC mains supply.
30	RS-232 9-pin D-sub Port		Connect to a PC or remote controller (see Connecting to the VS-6464DN-EM via RS-232 on page 14) and perform firmware upgrade of the device and compatible input/output cards (see Upgrading VS-6464DN-EM and Input / Output Card Firmware on page 53).
31	NET Ethernet RJ-45 Connector		Connect to a PC or controller via the Ethernet LAN (see Connecting to the VS-6464DN-EM via Ethernet on page 14) and perform firmware upgrade of the device and compatible input/output cards (see Upgrading VS-6464DN-EM and Input / Output Card Firmware on page 53). LINK LED flashes when communication is active. POWER LED lights when the interface receives power.
32	OUT 1~32 Connectors	OUTPUTS	Connect to the relevant video acceptors, depending on the cards installed (1 to 32, see Connecting the VS-6464DN-EM on page 11).
33	OUT 32~64 Connectors		Connect to the relevant video acceptors, depending on the cards installed (33 to 64, see Connecting the VS-6464DN-EM on page 11).

Mounting VS-6464DN-EM

This section provides instructions for mounting **VS-6464DN-EM**. Before installing, verify that the environment is within the recommended range:

- Operation 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.

- **VS-6464DN-EM** must be placed upright in the correct horizontal position.

Caution:
- Mount **VS-6464DN-EM** before connecting any cables or power.

Warning:
- Ensure that the environment (e.g., maximum ambient temperature & air flow) is compatible for the device.
- Avoid uneven mechanical loading.
- Appropriate consideration of equipment nameplate ratings should be used for avoiding overloading of the circuits.
- Reliable earthing of rack-mounted equipment should be maintained.

To mount the VS-6464DN-EM on a rack

Attach both ear brackets by removing the screws from each side of the machine and replacing those screws through the ear brackets or place the machine on a table.

For more information go to

Connecting the VS-6464DN-EM

⚠️ Always switch off the power to each device before connecting it to your **VS-6464DN-EM**. After connecting your **VS-6464DN-EM**, connect its power and then switch on the power to each device.

ⓘ You do not have to connect all the inputs and outputs, connect only those that are required. In the following example, only two inputs and two outputs are connected.

The configuration of DVI input/output cards shown in Figure 4 is merely a sample representation and different input / output cards may be mixed as required (for limitations, see Port Numbering on page 12). Exactly the same principles apply to installations using other card types.

To connect the **VS-6464DN-EM**, as illustrated in the example in Figure 4, do the following:

1. Connect up to 64 DVI video sources (for example, computer graphics sources).

2. Connect up to 64 DVI video acceptors, (for example, a plasma display and DVI LCD display).

3. If required, connect a PC or remote controller to the RS-232 port (see Connecting to the VS-6464DN-EM via RS-232 on page 14) and/or the Ethernet port (see Connecting to the VS-6464DN-EM via Ethernet on page 14).

4. Connect the power cord.

5. If necessary, review and set the system configuration using the Menu (see Using the Configuration Menus on page 22).

ⓘ Given an input signal that is HDCP encoded, the **VS-6464DN-EM** outputs a signal only if the output port to which it is switched supports HDCP.
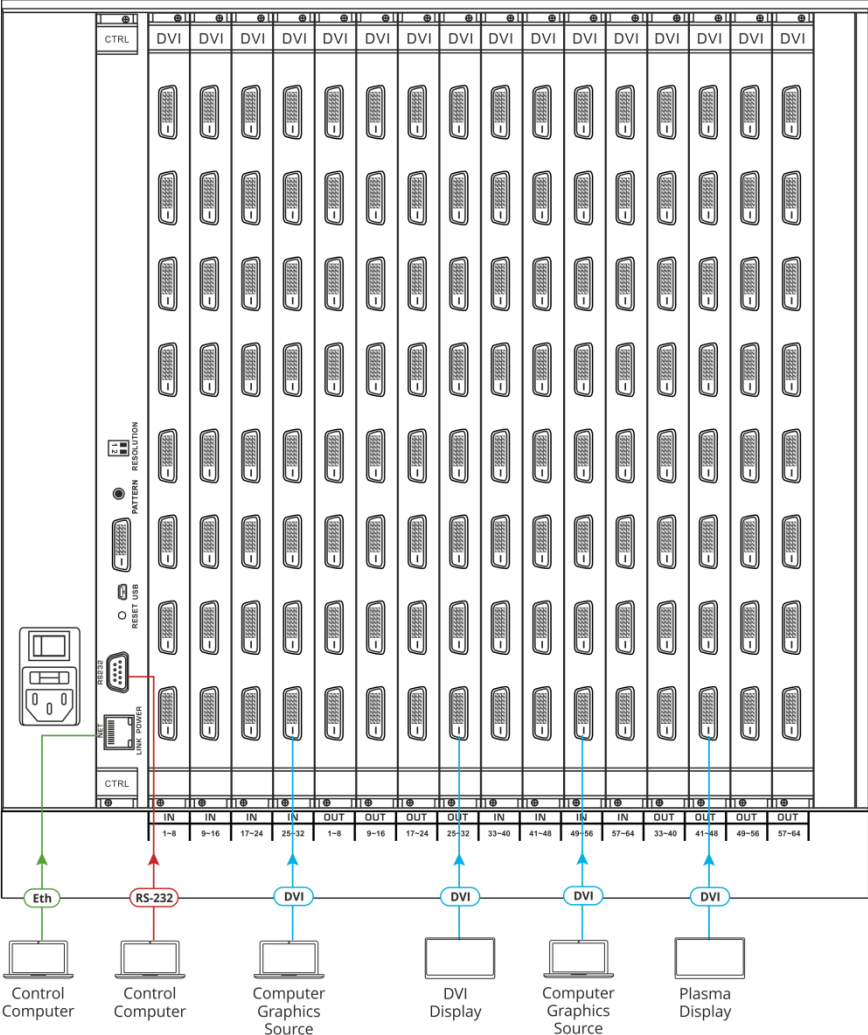
Figure 4: Connecting the VS-6464DN-EM

Port Numbering

On each card there are eight physical ports numbered sequentially from top to bottom and left to right. Figure 5 displays a sample numbering showing only the bottom of each card.
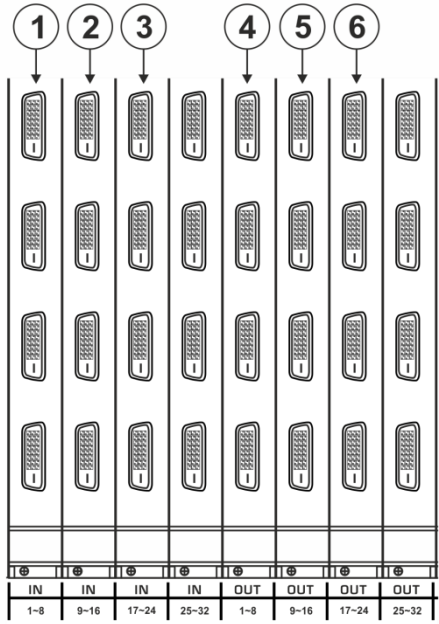
Figure 5: Sample Port Numbering

Diagram #	Actual Port Number
1	IN 1 – IN 8
2	IN 9 – IN 16
3	IN 17 – IN 24
4	OUT 1 – OUT 8
5	OUT 9 – OUT 16
6	OUT 17 – OUT 24

EDID Numbering Examples

The following EDID configuration is based on the port numbering shown in Figure 5 and lists requested switching configurations and their results.

EDID Request	EDID Sent
From OUT 21	Blank (256 bytes of 0xFF)
From IN 25	None (error message displayed)

AV data flow is: **source** > **VS-6464DN-EM** > **display**. EDID information flow is: **display** > **VS-6464DN-EM** > **source**, which means that the EDID input is the display side and the EDID output is the AV source side. This is the reverse of the AV data flow direction.

When assigning EDIDs, note that the top row of the LCD display labeled OUTPUTS relates to the ports connected to the sources (AV inputs), and the bottom row of the LCD display labeled INPUTS relates to the ports connected to displays (AV outputs).

In Figure 6, the EDID from EDID input 8 (**VS-6464DN-EM** Output port 8) has been assigned to all EDID outputs (**VS-6464DN-EM** Input ports).
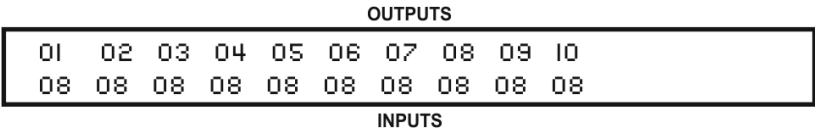
Figure 6: EDID Numbering Assignment

Connecting to the VS-6464DN-EM via RS-232

You can connect to the **VS-6464DN-EM** 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-6464DN-EM via RS-232:

- Connect the RS-232 9-pin D-sub rear panel port on the **VS-6464DN-EM** 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.

Connecting to the VS-6464DN-EM via USB (VCOM)

The device's USB port can work as a virtual COM (VCOM) port. Verify that the USB port on the PC that connects to the **VS-6464DN-EM** is configured as a VCOM port. You may need to install a driver to do this. You can use a tool such as Hercules or K-Config to use Protocol 3000 commands over USB (see Protocol 3000 on page 62). You can also use K-Upload to upgrade firmware over USB (see Upgrading Firmware Using K-Upload on page 53).

Connecting to the VS-6464DN-EM via Ethernet

You can connect to the **VS-6464DN-EM** via Ethernet using either of the following methods:

- Directly to the PC using a crossover cable (see Connecting the Ethernet Port Directly to a PC on page 14).
- Via a network hub, switch, or router, using a straight-through cable (see Connecting the Ethernet Port via a Network Hub or Switch on page 16).

ⓘ If you want to connect via a router and your IT system is based on IPv6, speak to your IT department for specific installation instructions.

Connecting the Ethernet Port Directly to a PC

You can connect the Ethernet port of the **VS-6464DN-EM** directly to the Ethernet port on your PC using a crossover cable with RJ-45 connectors.

ⓘ This type of connection is recommended for identifying the **VS-6464DN-EM** with the factory configured default IP address.

After connecting the **VS-6464DN-EM** to the Ethernet port, configure your PC as follows:

1. Click **Start** > **Control Panel** > **Network and Sharing Center**.

2. Click **Change Adapter Settings**.

3. Highlight the network adapter you want to use to connect to the device and click **Change settings of this connection**.
   The Local Area Connection Properties window for the selected network adapter appears as shown in Figure 7.
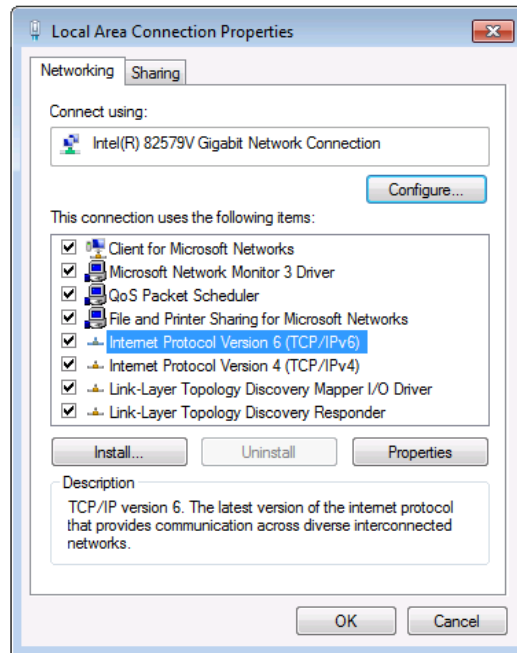
Figure 7: Local Area Connection Properties Window

4. Highlight either **Internet Protocol Version 6 (TCP/IPv6)** or **Internet Protocol Version 4 (TCP/IPv4)** depending on the requirements of your IT system.

5. Click **Properties**.
   The Internet Protocol Properties window relevant to your IT system appears as shown in Figure 8 or Figure 9.
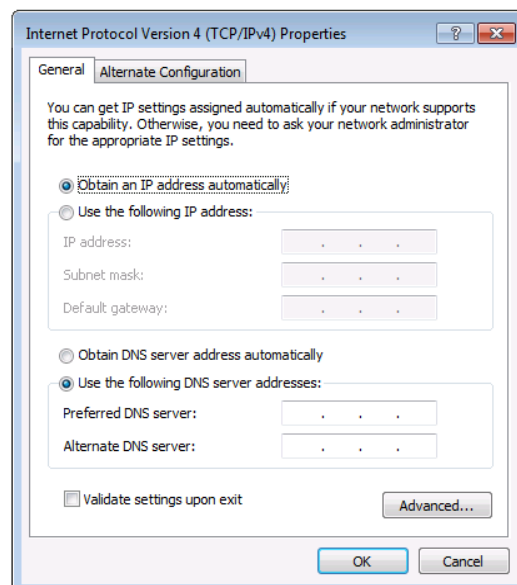
Figure 8: Internet Protocol Version 4 Properties Window
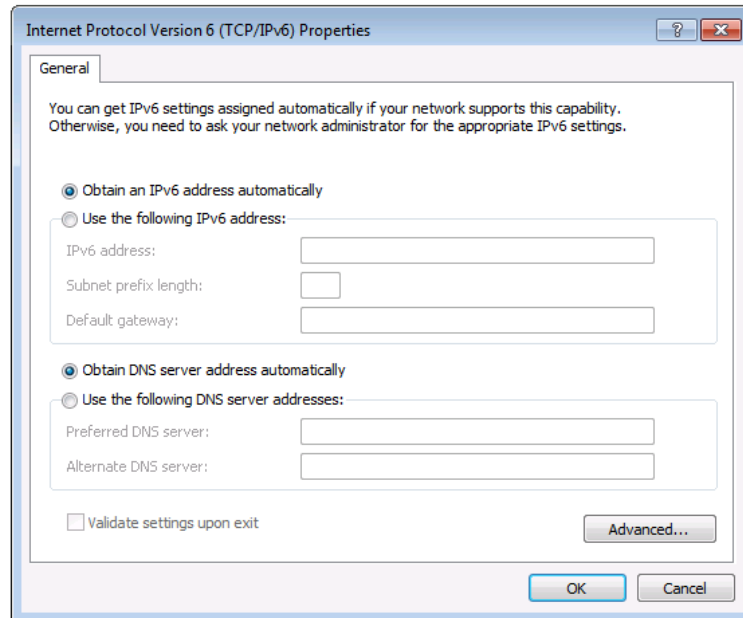
Figure 9: Internet Protocol Version 6 Properties Window

6. Select **Use the following IP Address** for static IP addressing and fill in the details as shown in Figure 10.

For TCP/IPv4 you can use any IP address in the range 192.168.1.1 to 192.168.1.255 (excluding 192.168.1.39) that is provided by your IT department.
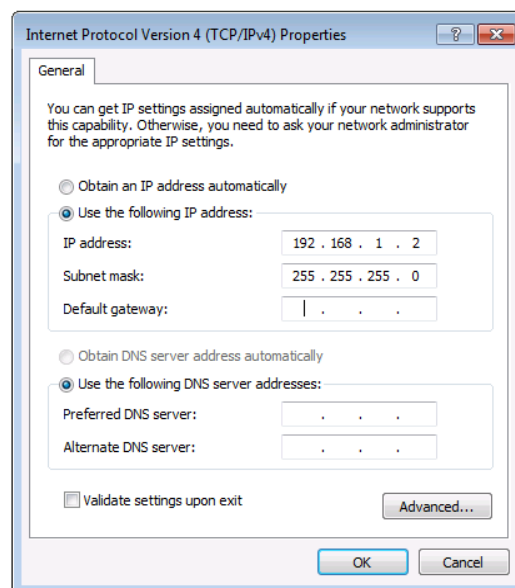
Figure 10: Internet Protocol Properties Window

7. Click **OK**.

8. Click **Close**.

Connecting the Ethernet Port via a Network Hub or Switch

You can connect the Ethernet port of the **VS-6464DN-EM** to the Ethernet port on a network hub or using a straight-through cable with RJ-45 connectors.

Operating Your Video Matrix Switcher

This section describes:

- The startup display (see Startup Display on page 17).

- Using the selector buttons (see Using the Selector Buttons on page 18).

- Confirming actions (see Confirming Actions on page 18).

- Switching options (see Switching Actions on page 19).

- Locking the front panel (see Locking the Front Panel Buttons on page 21).

Startup Display

After switching on the power, the LCD display shows the following screens in sequence (text in the LCD Display may vary according to machine settings).
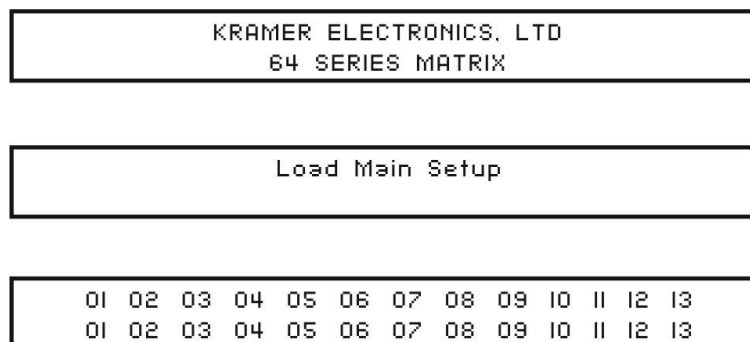
Figure 11: Default Startup Status Display Sequence

The **VS-6464DN-EM** does not have separate output and input buttons. Instead, the front panel includes a numeric keypad within the Selector Buttons area (see Defining the VS-6464DN-EM 8x8 to 64x64 Modular Multi-Format Managed Digital Matrix Switcher on page 6). This numeric keypad lets you enter both the output and input numbers as well as various numeric configuration values (see Using the Selector Buttons on page 18).

When the unit is powered-on, the last matrix setup that was used is loaded. Use either the setup recall (records a stored configuration from a preset, see Setup Menu—6: recall setup XX, Recalling a Preset on page 25) or default setup recall (for quick retrieval of a commonly used programmable default setup, see Recalling the Default Setup on page 21) functions to retrieve other setups.

Viewing the Display

Figure 11 shows the output-input matrix on the LCD display. The LCD display can show only 13 out of the 64 available matrix combinations at once. To view any of the matrix combinations use the ◄ or the ► buttons on the front panel to shift the sliding window to the right or left.

This sliding window functionality is enabled when:

- The switcher is in between operations (waiting for its next operation while all previous operations are complete or cancelled).

- Recalling a setup using the ◄ or ► buttons.

(i) When entering an output/input combination, the contents of the LCD display automatically shift to indicate the current status of the selected output.

Using the Selector Buttons

For numbers between 1 and 9, the **VS-6464DN-EM** can handle two digit numbers as well as single digit numbers. When entering a single digit number (for example 5), you can either press 0 followed by 5, or 5 followed by ENTER.

Pressing 00 (or 0, ENTER) is only relevant for an input and is used to disconnect the currently entered output number from the input.

For example, the following display indicates that outputs 8 and 12 are disconnected from any input (note that the corresponding inputs in the second line are blank):

```
06  07  08  09  10  11  12  13
12  08      10  14  13      06
```

The ESC button is used to cancel an operation without affecting the current status. For example, if you enter an incorrect number by mistake, press the ESC button to cancel the operation.

(i) At any stage, if no button is pressed within approximately 15 seconds, the automatic timeout causes the **VS-6464DN-EM** to exit the operation and revert to the output/input display.

Confirming Actions

You can choose to work in the At Once (default, for all actions except storing/recalling) or the Confirm mode.

In the At Once mode:

- The TAKE button does not light.

- Pressing an OUT-IN combination implements the switch without further user confirmation.

- You save time as execution is immediate and actions require no user confirmation.

- No protection is offered to correct an erroneous action.

In the Confirm mode:

- The TAKE button lights.

- You enter an action and then confirm it by pressing the TAKE button.

- Every action requires user confirmation, protecting against erroneous actions.

- Execution is postponed until you confirm the action.

(i) Failure to press the TAKE button within a few seconds results in the action timing out automatically.

Toggling Between the At Once and Confirm Modes

To toggle between the At Once and Confirm modes:

(i) If the TAKE button is flashing, you cannot toggle between the At Once and Confirm modes. A flashing TAKE button indicates that an action is currently pending confirmation.

1. Press TAKE to toggle between the At Once mode and the Confirm mode.
   The TAKE button lights and actions now require user confirmation.

2. Press the lit TAKE button to toggle from the Confirm mode back to the At Once mode.
   The TAKE button is no longer lit and actions no longer require user confirmation.

Confirming a Switching Action

Actions only require confirmation when the device is in the Confirm mode.

To confirm a switching action:

1. Using the numeric keypad, enter an output-input combination.
   The TAKE button flashes.

2. Press the flashing TAKE button to confirm the action.
   The action is confirmed and the TAKE button lights.

Switching Actions

This section describes how to:

- Switch one input to one output (see).

- Switch several inputs to several outputs (see).

- Turn off several outputs (see).

Switching One Input to One Output

To switch one input to one output:

1. Using the numeric keypad, enter the required output (in this example, 12).
   The following is displayed:

```
06  07  08  09  10  11  12  13
                        In__  => Out 12
```

The left-hand side of the display shows a section of the output/input display automatically sliding the content to include output 12.

2. Using the numeric keypad, enter the required input (in this example, 14):

- In the At Once mode, the switching takes place immediately and the LCD display shows a segment of the input-output status that includes the switched input and output (for example, 14-12).
  In the Confirm mode, the LCD display shows the following:
  ```
  In 14 => Out 12
  ```
  Incomplete actions time out after approximately 15 seconds.

- In the Confirm mode, press the flashing TAKE button to switch the input to the output.

Switching Several Inputs to Several Outputs

If you want to switch several inputs to several outputs, you must be in the Confirm mode.

In the Confirm mode you can enter a batch of several actions and then confirm the batch by pressing TAKE once (simultaneously switching several output-input combinations).

To switch several inputs to several outputs in the Confirm mode:

1. Using the numeric keypad, enter an output-input combination.
   The TAKE button flashes.

2. Enter additional output-input combinations.
   The LCD display can show up to five pending actions (although the batch is not limited to five actions), as follows:

   ```
   09 => 06   05 => 07
   ```

   In this example, input 9 is set to switch to output 6 and input 5 is set to switch to output 7.

3. After entering all output/input combinations, press the flashing TAKE button to confirm the actions.
   The inputs switch to the respective outputs as shown on the LCD display and the TAKE LED is lit.

Turning an Output Off

Turning off an output means that there is no input switched to this output. This is indicated on the display by the Input being blank underneath the relevant Output.

To turn an output off:

1. Press MENU.
   The Menu buttons light and are enabled.

2. Press OFF (3) on the numeric keypad (see Figure 2).
   The following message is displayed:
   ```
   out__ => OFF
   ```

3. Use the numeric keypad to turn the required output off.
   The output is turned off.

To turn an output off in the Confirm mode:

- Repeat the steps above and then press the flashing TAKE button to confirm the action.

  Alternatively, you can perform a switching operation (see Switching One Input to One Output on page 19) and set the input to 00.

Turning Off Several Outputs

To turn off several outputs in the Confirm mode, repeat the switching actions described in Switching Several Inputs to Several Outputs on page 20 but set the inputs to 00.

Recalling the Default Setup

You can store a commonly used setup as the default setup (see Config Menu—Store Default Setup on page 30) which can be recalled at any time.

ⓘ This is not the setup that is loaded when the unit is turned on. When the unit is turned on, the setup that was last used before the unit was turned off is loaded.

To recall the default setup:

1. Press DEFAULT SETUP.
   The DEFAULT SETUP button flashes and the following message is displayed:
   ```
   recall DEFAULT setup
   press FLASHING button to confirm
   ```

2. Press DEFAULT SETUP.
   The following message is displayed:
   ```
   all Setups and Connections change
   press TAKE to confirm
   ```

   The TAKE button flashes.

3. Press TAKE.
   The default setup is recalled and the display reverts to the output-input display.

Locking the Front Panel Buttons

You can lock the **VS-6464DN-EM** to prevent tampering with the unit or prevent the settings from being changed accidentally via the front panel buttons. When the front panel is locked, you can still remotely operate the **VS-6464DN-EM** via RS-232 or Ethernet.

To lock the front panel buttons:

- Press and hold LOCK until the button lights.
  The front panel buttons are locked.

To unlock the front panel buttons:

- Press and hold LOCK until the button is no longer lit.
  The front panel buttons are unlocked.

Using the Configuration Menus

The configuration menus let you configure the **VS-6464DN-EM** to best suit your needs. There are two configuration menus:

- Setup Menu—those that are accessed on a regular basis (for example, storing setups and setting the delay), see Using the Setup Menu on page 22.

- Config Menu—those that are accessed only occasionally (for example, setting the interface or communication protocol), see Using the Config Menu on page 26.

The following rules apply to the menu operation:

- If no selection is made within approximately 15 seconds, the operation times-out and the display reverts to the output/input display.

- At any point in the Menu, press ESC to move up one level or press BREAKAWAY to exit the Menu altogether.

- At any point in the Menu, only buttons that are active light or flash.

All of the procedures in this section assume that you are starting the procedure from the standard, operational output/input display.

Using the Setup Menu

The Setup Menu provides access to settings that are regularly changed and comprises the following options:

- **1: inXX=>ALL**, switching one input to all outputs (see Setup Menu—1: inXX=>ALL, Switching One Input to all Outputs on page 23).

- **3: outXX=OFF**, turning off an output (see Setup Menu—3: outXX=>OFF, Turning an Output Off on page 23).

- **7: EDID**, assignment to an output (see Setup Menu—7: EDID, Assignment to an Input on page 23).

- **9: Delay** setting for an output (see Setup Menu—9: Delay, Setting for an Output on page 24).

- **4: store setup XX**, storing the setup in a preset (see Setup Menu—4: store setup XX, Storing the Setup in a Preset on page 25).

- **6: recall setup XX**, recalling a preset (see Setup Menu—6: recall setup XX, Recalling a Preset on page 25).

Setup Menu—1: inXX=>ALL, Switching One Input to all Outputs

This option switches one input to all outputs.

To switch one input to all outputs:

1. Press MENU.
   The Setup Menu options are displayed.

2. Press 1 (ALL) on the numeric keypad (see Figure 2).
   The following is displayed:

   ```
   in__   => ALL
   ```

3. Using the numeric keys, enter the input to be switched to all outputs.
   The TAKE button flashes.

4. Press TAKE.
   The selected input is switched to all outputs. The display reverts to the output/input display showing that the selected input is switched to all outputs.

Setup Menu—3: outXX=>OFF, Turning an Output Off

This option turns an output off.

To turn an output off:

1. Press MENU.
   The Setup Menu options are displayed.

2. Press 3 (OFF) on the numeric keypad (see Figure 2).
   The following is displayed:

   ```
   out__   => OFF
   ```

3. Using the numeric keys, enter the output to be turned off.
   The TAKE button flashes.

4. Press TAKE.
   The selected output is turned off. The display reverts to the output/input display showing that the selected output is turned off with the input being blank.

Setup Menu—7: EDID, Assignment to an Input

This option assigns an EDID to between one and eight inputs in non-volatile storage. More than eight EDID assignments must be assigned in multiple batches.

Each input on the **VS-6464DN-EM** has a factory default EDID loaded (see Factory Default EDID on page 57). The EDID for each input can be changed independently via the menu (described below) or by uploading an EDID binary file to each input via the RS-232 port.

It is necessary to have a display/device connected to the output from which you want to read the EDID. Failure to do so results in the default EDID being written to storage.

To assign an EDID to between one and eight inputs:

1. Press MENU.
   The Setup Menu options are displayed.

2. Press 7 (EDID) on the numeric keypad (see [Figure 2](#)).
   The following is displayed:

   ```
   SETUP EDID
   ENTER to View EDID and Set EDID
   ```

3. Press ENT.
   The current EDID matrix configuration is displayed.

4. Using the numeric keys, enter the input in which to store the EDID (in this example, 08), and enter the output (in this example, 05) from which to read the EDID.
   The following is displayed:

   ```
        01  02  03  04  05  06  07  08
                             05  out05 => in08
   ```

   The TAKE button flashes.

5. Repeat Step 4 for up to eight inputs.

6. Press TAKE.
   The EDID is stored and passed through to the input.
   The display reverts to the output/input display.

To view the EDID assignments:

1. Press MENU.
   The Setup Menu options are displayed.

2. Press 7 (EDID) on the numeric keypad (see [Figure 2](#)).
   The following is displayed:

   ```
   SETUP EDID
   ENTER to View EDID and Set EDID
   ```

3. Press ENT.
   The current EDID matrix configuration is displayed. In this example, input 07 is assigned to output 05, all other EDID values are default.

   ```
   05  06  07  08  09  10
           05
   ```

Setup Menu—9: Delay, Setting for an Output

This option sets the time delay for an output which lapses between entering a switching action and the execution of the action. This delay can be set for each output independently. The delay is defined in units of 200ms and ranges from 0 to 15, providing delays of between 0 and 3 seconds (15 x 200ms = 3 seconds).

To set the execution delay for an output:

1. Press MENU.
   The Setup Menu options are displayed.

2. Press 9 (DELAY) on the numeric keypad (see [Figure 2](#)).
   The output/delay times display is shown.

3. Using the numeric keys, enter the output (in this example, 03).
   The following is displayed:

   ```
   01  02  03  04  05  06  07  08
                              DLY__  =>out03
   ```

4. Using the numeric keys, enter the number of delay units.

5. Press TAKE.
   The selected output delay is set. The display reverts to the output/input display.

Setup Menu—4: store setup XX, Storing the Setup in a Preset

This option stores the current setup in a preset (1 to 60).

To store the current setup in a preset:

1. Press MENU.
   The Setup Menu options are displayed.

2. Press 4 (STO) on the numeric keypad (see [Figure 2](#)).
   The following is displayed:

   ```
   store => __
   ```

3. Using the numeric keys, enter the preset (1 to 60) in which to store the current setup.
   The following is displayed:

   ```
   Wait …..
   ```

After a few seconds, if the preset is not empty, the following is displayed:

```
SETUP NOT EMPTY
CONFIRM
```

The TAKE button flashes.

4. Press TAKE.
   The setup is stored in the selected preset for subsequent recall. The display reverts to the output/input display.

Setup Menu—6: recall setup XX, Recalling a Preset

This option recalls a stored configuration from a preset (1 to 60).

To recall a stored configuration:

1. Press MENU.
   The Setup Menu options are displayed.

2. Press 6 (RCL) on the numeric keypad (see [Figure 2](#)).
   The following is displayed:

   ```
   recall <= __
   ```

3. Using the numeric keys, enter the preset (in this example, 02) to recall.
   The following is displayed:

   ```
   Wait …..
   ```

After a few seconds, the following is displayed on the right hand side:

```
CONFIRM
RECALL <= 02
```

The TAKE button flashes.

4. Press TAKE.
    The preset is recalled. The display reverts to the output/input display.

Using the Config Menu

The Config Menu provides access to configuration settings that are not regularly changed and comprises the following options:

- Input signal detection display (Config Menu—Input Signal Detection Display on page 27)

- Input port parameter setting (Config Menu—Setting Input Port Parameters on page 27).

- Output load detection display (see Config Menu—Output Load Detection Display on page 28).

- Output port parameter setting (Config Menu—Setting Output Port Parameters on page 29).

- Storing the default setup (Config Menu—Store Default Setup on page 30).

- Total matrix reset (Config Menu—Total Matrix Reset on page 30).

- Display firmware versions (Config Menu—Display Firmware Versions on page 31).

To enter the Config Menu:

- Press MENU twice. The MENU button lights and the following message is displayed:

```
Start configuration menu
MENU to view setups ENTER to change them
```

When browsing through the configuration menu, enabled buttons light or flash.

Use the Config Menu as follows:

1. Press the MENU button to cycle through the menu items.
    The LCD display shows the current status of the selected menu item.

2. Press the ENT button to enter a submenu.

3. After entering a submenu, you can select between several options.
    Select an option by pressing one of the illuminated buttons in the Selector Buttons area.

4. After selecting the desired option, a description of the desired change is displayed and the TAKE button flashes.

5. Press the flashing TAKE button to confirm the change.
    A description of the current state is displayed for about one second. The unit automatically switches to the next item in the menu.

Config Menu—Input Signal Detection Display

This option displays a list of inputs and indicates on which of them signals have been detected.

To display a list of inputs that have detected signals:

1. Press MENU twice.
   The following message is displayed:
   ```
   start configuration menu
   MENU to view setup ENTER to change them
   ```

2. Press MENU.
   The following is displayed:
   ```
   IN:    01  02  03  04  05  06  07  08  09  10  11
   OUT:   o   X   o   o   o   o   X   o   o   o   X
   ```

   o indicates that a signal is detected and X indicates that no signal is detected on the relevant input.

3. Do one of the following:

   - Press BREAKAWAY to exit the Config Menu.

   - Wait approximately 15 seconds for the operation to time out.

   - Press MENU to move to the next Config Menu option.

Config Menu—Setting Input Port Parameters

This option sets input port-specific parameters. Ports that show an X have no parameters available to modify. Ports that show an o have parameters available to modify. The parameters that are available, such as, audio balance, depend on the type of card installed and whether the card is an input or an output card (see Using the Input / Output Cards on page 33 for information on the input / output cards and their parameters).

To set parameters for a port:

1. Press MENU twice.
   The following message is displayed:
   ```
   start configuration menu
   MENU to view setup ENTER to change them
   ```

2. Press MENU until a display is shown similar to the following:
   ```
   IN:    01  02  03  04  05  06  07  08  09  10  11
   SET:   X   X   X   X   o   o   X   X   o   o   X
   ```

   X indicates that there are no modifiable parameters for the associated port and o indicates that there are modifiable parameters for the associated port.

3. Press TAKE to enter the list of ports.
   The cursor flashes on a selected port.

4. Select the required port using the left and right arrow buttons.

5. Press TAKE to enter the parameters list.
   A message similar to the following is displayed with the relevant port number in place of 06:

   ```
   IN:    06
   SET:   Reset Input
   ```

6. To select the next parameter press the right arrow button (see Using the Input / Output Cards on page 33 for available parameters).

Or:

7. To enter the selected parameter press TAKE.
   The parameter options are displayed.

8. Select the required action or number using the keypad numbers and arrows.

9. Press TAKE to save the change.

(i)   The parameter change is not implemented on the system until you press TAKE.

10. Repeat from Step 6 to modify additional parameters.

11. Do one of the following:

   ▪ Press BREAKAWAY to exit the Config Menu.

   ▪ Wait approximately 15 seconds for the operation to time out.

   ▪ Press MENU to exit to the parameter list.

Config Menu—Output Load Detection Display

This option displays a list of outputs and indicates which have loads attached to them.

To display a list of outputs and attached loads:

1. Press MENU twice.
   The following message is displayed:

   ```
   start configuration menu
   MENU to view setup ENTER to change them
   ```

2. Press MENU until the following is displayed:

   ```
   OUT:   01   02   03   04   05   06   07   08   09   10   11
   LOAD:  o    X    o    o    o    o    X    o    o    o    X
   ```

o indicates that a load is attached and X indicates that no load is detected on the relevant output.

3. Do one of the following:

   ▪ Press BREAKAWAY to exit the Config Menu.

   ▪ Wait approximately 15 seconds for the operation to time out.

   ▪ Press MENU to move to the next Config Menu option.

Config Menu—Setting Output Port Parameters

This option sets port-specific parameters. Ports that show an X have no parameters available to modify. Ports that show an o have parameters available to modify. The parameters that are available, such as, audio balance, depend on the type of card installed and whether the card is an input or an output card. Tables listing output cards and their parameters can be found at the end of this section.

To set parameters for a port:

1. Press MENU twice.
   The following message is displayed:
   ```
   start configuration menu
   MENU to view setup ENTER to change them
   ```

2. Press MENU until a display is shown similar to the following:
   ```
   OUT:   01   02   03   04   05   06   07   08   09   10   11
   SET:   o    o    X    X    o    o    o    o    X    X    X
   ```

   X indicates that there are no modifiable parameters for the associated port and o indicates that there are modifiable parameters for the associated port.

3. Press TAKE to enter the list of ports.
   The cursor flashes on a selected port.

4. Select the required port to modify using the left and right arrow buttons.

5. Press TAKE to enter the parameters list.
   A message similar to the following is displayed with the relevant port number in place of 06:
   ```
   OUT: 06
   SET: Reset SubBoard
   ```

6. To select the next parameter press the right arrow button (see Using the Input / Output Cards on page 33 for available parameters).

Or:

7. To enter the displayed parameter press TAKE.
   The parameter options are displayed.

8. Select the required action or number using the keypad numbers and arrows.

9. Press TAKE to save the change.

ⓘ The parameter change is not implemented on the system until you press TAKE.

10. Repeat from Step 6 to modify other parameters.

11. Do one of the following:
    ▪ Press BREAKAWAY to exit the Config Menu.
    ▪ Wait approximately 15 seconds for the operation to time out.
    ▪ Press MENU to exit to the parameter list.

Config Menu—Store Default Setup

This option lets you store the current setup as the default setup. The default setup can be recalled at any time using the DEFAULT SETUP button (see Recalling the Default Setup on page 21).

ⓘ This is not the setup that is loaded when the unit is switched on.

To store the current setup as the default setup:

1. Press MENU twice.
   The following message is displayed:

   ```
   start configuration menu
   MENU to view setup ENTER to change them
   ```

2. Press MENU until the following is displayed:

   ```
   store DEFAULT setup
   press ENTER to store
   ```

3. Press ENT to store the current configuration as the default configuration.
   The following is displayed:

   ```
   current matrix stage is OKAY?
   press TAKE to confirm
   ```

4. Press TAKE.
   The following is displayed:

   ```
   current matrix stage
   store as DEFAULT setup
   ```

   This indicates that the current setup is stored as the default setup. After a few seconds the next option on the Config Menu is displayed.

Config Menu—Total Matrix Reset

This option lets you turn all outputs off or reset the unit to its factory default settings.

To reset the matrix setup:

1. Press MENU twice.
   The following message is displayed:

   ```
   start configuration menu
   MENU to view setup ENTER to change them
   ```

2. Press MENU until the following is displayed:

   ```
   TOTAL MATRIX RESET
   ESC: exit     ENT: submenu
   ```

3. Press ENT to enter the Reset Submenu.
   The following is displayed:

   ```
   COMPLETELY MATRIX RESET
   1:ALL outputs OFF  2:Factory default
   ```

4. Press 1 to turn off all outputs or 2 to perform a factory reset of all options.

> ⚠️ Selecting option 2 to perform a factory default reset clears all setups, options and configuration.

5. Press TAKE and wait a few seconds.
   The following is displayed:

   ```
   Are you Absolutely sure !!!
   Once more TAKE to confirm
   ```

6. Press TAKE.
   The following is displayed:

   ```
   Matrix erased!!!
   Please, wait …
   ```

   The matrix and device configuration are erased. After a few seconds the next option on the Config Menu is displayed.

Config Menu—Display Firmware Versions

This option displays the main and front firmware versions.

To display the firmware versions:

1. Press MENU twice.
   The following message is displayed:

   ```
   start configuration menu
   MENU to view setup ENTER to change them
   ```

2. Press MENU until the following is displayed:

   ```
   Main Firmware Version:      5.0
   Front Firmware Version:     5.0
   ```

3. Either:

   - Press BREAKAWAY to exit the Config Menu.

   - Wait approximately 15 seconds for the operation to time out.

Configuring the Number of Installed Input and Output Ports

After installing or removing a module you can set the number of input and output ports so that the **VS-6464DN-EM** displays only the installed modules. Refer to for an explanation of port numbering before setting the number of input and output ports.

To set the number of input or output ports:

1. Press ESC, ENT and LOCK together.
   The following is displayed:

   ```
   Configuration Device
   ```

2. Press ENT.
   The following is displayed:

   ```
   Test Board: 1  MaxInput:65  MaxOutput:65
   ```

> The number of input and output ports can only be set in units of eight, for example, 8 x 8, 64 x 8 or 40 x 16, and not 5 x 4 or 12 x 17.

3. Using the numeric keys, enter the number of input and output ports installed.
   The TAKE button flashes.

4. Press TAKE.
   The number of installed ports is saved and the display reverts to the output/input display.

5. Reboot the device by turning the power off and then on again.

> If you customized the number of displayed ports before installing a new module, you may need to re-customize the displayed ports to reflect your hardware change.

Using the Input / Output Cards

This section defines the input / output cards and their relevant parameters.

ⓘ Not all options are displayed for every menu selection. Some parameters depend on the specific selection of other parameters.

The volume control provides only attenuation, not gain. Hence, setting volume to 100% provides 0 attenuation.

Defining the HDCP-IN8-F64 / HDCP-OUT8-F64

The **HDCP-IN8-F64** is an 8-Input DVI (HDCP) Card (F-64):

The **HDCP-OUT8-F64** is an 8-Output DVI (HDCP) Card (F-64):

HDCP-IN8-F64 / HDCP-OUT8-F64 Configuration

The **HDCP-IN8-F64** configuration table appears as follows:

HDCP-IN8-F64 Input Card		
Parameter	**Description**	**Default**
HDCP	Turn HDCP on and off. *1=EN, 0=DIS.	1

The **HDCP-OUT8-F64** configuration table appears as follows:

HDCP-OUT8-F64 Output Card		
Parameter	**Description**	**Default**
HDMI	Sets the output signal format (Display, DVI). Display—the output is set automatically based on the EDID of the connected display. DVI—Force the output to be DVI. **Note**: When selecting the DVI option and fast switching is enabled, you must ensure that the source is DVI compatible.	Display
Deep Color	Sets maximum color bit depth (Auto, 8 bit). Auto—Set the color depth automatically. 8 bit—Limit the color depth to 8 bits.	Auto
Switch Speed	When switching between different sources the switching time can be reduced by setting the fast switch level (Ex-fast Switch, Fast Switch or Normal Switch).	Ex-fast Switch

HDCP-IN8-F64 / HDCP-OUT8-F64 Technical Specifications

The following table defines the technical specifications.

PORTS:	8 DVI-D on a DVI Molex 24-pin (F) connector
BANDWIDTH PER CHANNEL:	2.25Gbps
TOTAL BANDWIDTH:	6.75Gbps
MAXIMUM RANGE:	15m (49ft)
3D PASS THROUGH:	Supported
POWER CONSUMPTION:	Input card: 20.5W Output card: 23W
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:	39.5cm x 18cm x 2cm (15.6" x 7.1" x 0.8") W, D, H
SHIPPING DIMENSIONS	47.7cm x 23.5cm x 4.8cm (18.8" x 9.3" x 1.9") W, D, H
PRODUCT WEIGHT:	0.65 kg (1.43 lbs) approx.
SHIPPING WEIGHT:	0.81 kg (1.79 lbs) approx.
STANDARD COMPLIANCE:	HDCP, HDMI
SAFETY REGULATORY COMPLIANCE:	CE, FCC
ENVIRONMENTAL REGULATORY COMPLIANCE:	Complies with appropriate requirements of RoHs and WEEE

Defining the DGKat-IN8-F64 / DGKat-OUT8-F64

The **DGKat-IN8-F64** is an 8-Input HDMI & RS-232 over DGKat Card (F-64):

The **DGKat-OUT8-F64** is an 8-Output HDMI & RS-232 over DGKat Card (F-64):

DGKat-IN8-F64 / DGKat-OUT8-F64 Configuration

The **DGKat-IN8-F64** configuration table appears as follows:

DGKat-IN8-F64 Input Card		
Parameter	**Description**	**Default**
HDCP	Turn HDCP on and off. *1=EN, 0=DIS.	1

The **DGKat-OUT8-F64** configuration table appears as follows:

DGKat-OUT8-F64 Output Card		
Parameter	**Description**	**Default**
Switch Speed	When switching between different sources the switching time can be reduced by setting the fast switch level (Ex-fast Switch, Fast Switch or Normal Switch).	Ex-fast Switch

DGKat-IN8-F64 / DGKat-OUT8-F64 Technical Specifications

ⓘ DGKat cards must be used with shielded twisted pair cables with RJ-45 connections, such as the Kramer **BC-UNIKAT**. For more information, see the *DGKat Installation Guide*. DGKat cards support Deep Color only at resolutions of 720p and lower.

The following table defines the technical specifications.

PORTS:	8 TP DGKat ports on RJ-45 8 Serial ports on 3-pin terminal blocks
BANDWIDTH PER CHANNEL:	Video: 1.65Gbps Serial Data: 19200
TOTAL BANDWIDTH:	Video: 4.95Gbps Serial Data: 19200
MAXIMUM RANGE:	90m (300ft) – 1080p @60Hz when using BC-UINIKat cable
3D PASS THROUGH:	Supported
POWER CONSUMPTION:	Input card: 12W Output card: 10W
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
NET DIMENSIONS:	39.5cm x 18cm x 2cm (15.6" x 7.1" x 0.8") W, D, H
SHIPPING DIMENSIONS	47.7cm x 23.5cm x 4.8cm (18.8" x 9.3" x 1.9") W, D, H
PRODUCT WEIGHT:	0.65 kg (1.43 lbs) approx.
SHIPPING WEIGHT:	0.81 kg (1.79 lbs) approx.
STANDARD COMPLIANCE:	HDCP 1.4
SAFETY REGULATORY COMPLIANCE:	CE
ENVIRONMENTAL REGULATORY COMPLIANCE:	Complies with appropriate requirements of RoHs and WEEE
INCLUDED ACCESSORIES:	Screw driver

About the Power Connect™ Feature

The Power Connect™ feature here means that the **VS-6464DN-EM** can supply power to the TP transmitters and receivers (for example, the **TP-573** and **TP-574**).

Serial Data Flow on DGKat Plus RS-232 Cards

Serial data present on the RS-232 port of a DGKat input /output card is not transmitted via the switcher. This data is transmitted over the TP cable of the same input / output card (see Figure 12).
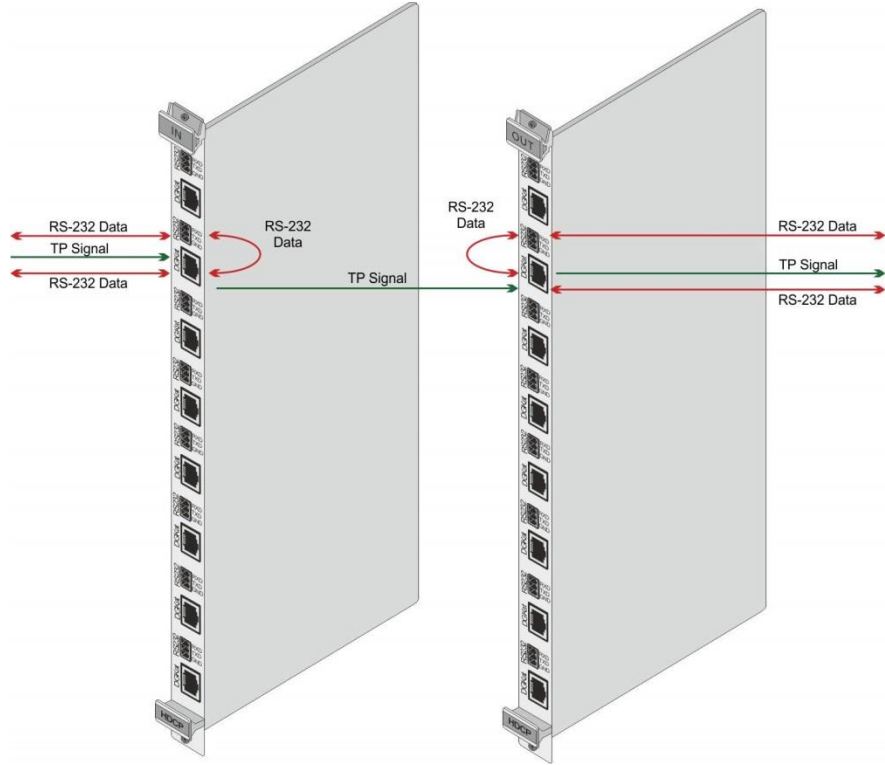
Figure 12: DGKat Card Serial Data Transmission

Defining the F670-IN8-F64 / F670-OUT8-F64

F670 cards are fully compatible with the Kramer **670T/670R** and **671T/671R** HDMI/DVI transmitters and receivers for non-HDCP content.

The **F670-IN8-F64** is an 8-Input HDMI over OM3 Fiber Card (F-64):

The **F670-OUT8-F64** is an 8-Output HDMI over OM3 Fiber Card (F-64):

F670-IN8-F64 / F670-OUT8-F64 Configuration

The **F670-IN8-F64** configuration table appears as follows:

F670-IN8-F64 Input Card		
Parameter	Description	Default
HDCP	Turn HDCP on and off. *1=EN, 0=DIS.	1

The **F670-OUT8-F64** configuration table appears as follows:

F670-OUT8-F64 Output Card		
Parameter	**Description**	**Default**
HDMI	Sets the output signal format (Display, DVI). Display—the output is set automatically based on the EDID of the connected display. DVI—Force the output to be DVI. **Note**: When selecting the DVI option and fast switching is enabled, you must ensure that the source is DVI compatible.	Display
Deep Color	Sets maximum color bit depth (Auto, 8 bit). Auto—Set the color depth automatically. 8 bit—Limit the color depth to 8 bits.	Auto
Switch Speed	When switching between different sources the switching time can be reduced by setting the fast switch level (Ex-fast Switch, Fast Switch or Normal Switch).	Ex-fast Switch

F670-IN8-F64 / F670-OUT8-F64 Technical Specifications

F670 cards must be used with multi-mode glass fiber cables with SC connections, such as the Kramer **C-SC/SC/OM3**.

The following table defines the technical specifications.

PORTS:	8 SC
BANDWIDTH PER CHANNEL:	2.25Gbps
TOTAL BANDWIDTH:	6.75Gbps
MAXIMUM RANGE:	1700m (5570ft) – 1080p/60Hz
3D PASS THROUGH:	Supported
POWER CONSUMPTION:	Input / output card: 27W
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:	39.5cm x 18cm x 2cm (15.6" x 7.1" x 0.8") W, D, H
SHIPPING DIMENSIONS	47.7cm x 23.5cm x 4.8cm (18.8" x 9.3" x 1.9") W, D, H)
PRODUCT WEIGHT:	0.65 kg (1.43 lbs) approx.
SHIPPING WEIGHT:	0.81 kg (1.79 lbs) approx.
STANDARD COMPLIANCE:	HDCP 1.4
SAFETY REGULATORY COMPLIANCE:	CE
ENVIRONMENTAL REGULATORY COMPLIANCE:	Complies with appropriate requirements of RoHs and WEEE

Defining the F610-IN8-F64 / F610-OUT8-F64

The **F610-IN8-F64** is an 8-Input DVI over 4LC Fiber Card (F-64):

The **F610-OUT8-F64** is an 8-Output DVI over 4LC Fiber Card (F-64):

F610-IN8-F64 / F610-OUT8-F64 Configuration

N/A

F610-IN8-F64 / F610-OUT8-F64 Technical Specifications

(i) F610 cards must be used with multi-mode glass fiber cables with LC connections, such as the Kramer **C-4LC/4LC**.

The following table defines the technical specifications.

PORTS:	8 4 LC ports
BANDWIDTH PER CHANNEL:	1.65Gbps
TOTAL BANDWIDTH:	6.75Gbps
MAXIMUM RANGE:	400m (1310ft) using Multi Mode OM2 fiber
3D PASS THROUGH:	Not supported
POWER CONSUMPTION:	Input card: 14W Output card: 13W
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:	39.5cm x 18cm x 2cm (15.6" x 7.1" x 0.8") W, D, H
SHIPPING DIMENSIONS	47.7cm x 23.5cm x 4.8cm (18.8" x 9.3" x 1.9") W, D, H
PRODUCT WEIGHT:	0.65 kg (1.43 lbs) approx.
SHIPPING WEIGHT:	0.81 kg (1.79 lbs) approx.
STANDARD COMPLIANCE:	DVI 1.0
SAFETY REGULATORY COMPLIANCE:	CE, FCC
ENVIRONMENTAL REGULATORY COMPLIANCE:	Complies with appropriate requirements of RoHs and WEEE

Defining the DVI-IN8-F64 / DVI-OUT8-F64

The **DVI-IN8-F64** is an 8-Input DVI Card (F-64):

The **DVI-OUT8-F64** is an 8-Output DVI Card (F-64):

DVI-IN8-F64 / DVI-OUT8-F64 Configuration

N/A

DVI-IN8-F64 / DVI-OUT8-F64 Technical Specifications

The following table defines the technical specifications.

PORTS:	8 DVI-D on DVI Molex 24-pin (F) connectors
BANDWIDTH PER CHANNEL:	1.65Gbps
TOTAL BANDWIDTH:	4.95Gbps
MAXIMUM RANGE:	15m (49ft)
3D PASS THROUGH:	Not supported
POWER CONSUMPTION:	Input card: 6W Output card: 9W
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:	39.5cm x 18cm x 2cm (15.6" x 7.1" x 0.8") W, D, H
SHIPPING DIMENSIONS	47.7cm x 23.5cm x 4.8cm (18.8" x 9.3" x 1.9") W, D, H
PRODUCT WEIGHT:	0.65 kg (1.43 lbs) approx.
SHIPPING WEIGHT:	0.81 kg (1.79 lbs) approx.
STANDARD COMPLIANCE:	DVI 1.0
SAFETY REGULATORY COMPLIANCE:	CE, FCC
ENVIRONMENTAL REGULATORY COMPLIANCE:	Complies with appropriate requirements of RoHs and WEEE

Defining the VGAA-IN8-F64 / VGAA-OUT8-F64

The **VGAA-IN8-F64** is an 8-Input VGA with Analog Audio Card (F-64):

The **VGAA-OUT8-F64** is an 8-Output VGA with Analog Audio Card (F-64):

(i) Audio output is accessed by connecting the two supplied Kramer **C-GF/GMAF-30** cables to each VGA port as illustrated in Figure 13.

When a multi-channel audio input signal is routed to a card with stereo analog audio outputs, the analog audio out connectors output the front right and front left audio channels only.
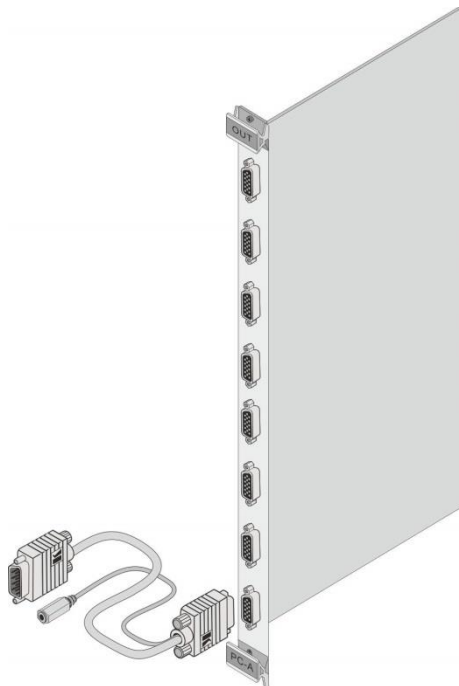
Figure 13: Accessing Audio over VGA

VGAA-IN8-F64 / VGAA-OUT8-F64 Configuration

The **VGAA-IN8-F64** configuration table appears as follows:

VGAA-IN8-F64 Input Card		
Parameter	**Description**	**Default**
Resolution Detect	Auto, User Defined, Auto Adjust, (see note below table).	Auto
Phase Mode	Auto, User Defined, Auto Adjust, (see note below table).	Auto
Brightness	(0–63)	32
Contrast	(0–63)	32
Phase adjustment	(0–63) **Note**: This adjustment is only valid when Phase Mode Is set to User Defined mode.	As detected
Reset Input	Re-power—Power cycles the port. Factory default—Performs a factory reset of the port to default values.	Re-power

VGAA-IN8-F64 Input Card		
Parameter	**Description**	**Default**
Hor-Total Pixels	Set the value for total horizontal pictures. (1–7000)	As detected
Horizontal-Start	Set the value for horizontal start. (1–600)	As detected
Horizontal-Active	Set the value for horizontal active pixels. (1–4000)	As detected
Vertical-Start	Set the value for vertical start. (1–255)	As detected
Vertical-Active	Set the value for vertical active pixels. (1–3000)	As detected
Save Timing Para	(0–31)	N/A
Recall Timing Para	(0–31)	N/A
Volume	Sets the audio output volume (0–70).	50
Audio Balance	Sets the audio output channel balance (0–100).	50
Audio Bass	Sets the audio output bass level (0–15).	7
Audio Treble	Sets the audio output treble level (0–15).	7
Audio Mute	MUTE—Mutes the audio input. Non-MUTE—Unmutes the audio input. **Note**: When set to Mute, any change to the audio parameters automatically sets this to unmute.	Non-MUTE
R-offset	(0–63)	32
G-offset	(0–63)	32
B-offset	(0–63)	32
R-gain	(0–63)	32
G-gain	(0–63)	32
B-gain	(0–63)	32

The Auto Adjust feature requires the device to recalculate the parameters based on the currently connected source. The result may be different from the standard parameters for the currently set resolution. The result is saved in non-volatile memory and is recalled when the same source is used again. In order to revert to auto predefined parameters, either reset to factory setting with the relevant source connected or connect a different source.

The **VGAA-OUT8-F64** configuration table appears as follows:

VGAA-OUT8-F64 Output Card		
Parameter	**Description**	**Default**
Reset Output	Re-power: power cycles the port. Factory default: performs a factory reset of the port to default values.	Re-power
Switch Speed	When switching between different sources the switching time can be reduced by setting the fast switch level (Ex-fast Switch, Fast Switch or Normal Switch).	Ex-fast Switch
Volume	Sets the audio output volume (0–70).	50
Audio Balance	Sets the audio output channel balance (0–100).	50
Audio Bass	Sets the audio output bass level (0–15).	7
Audio Treble	Sets the audio output treble level (0–15).	7
Audio Mute	MUTE: mutes the audio input. Non-MUTE: unmutes the audio input. **Note**: When set to Mute, any change to the audio parameters automatically sets this to unmute.	Non-MUTE

VGAA-OUT8-F64 Output Card		
Parameter	**Description**	**Default**
OUT_HSYNC_ INVERT	Sets the H_SYNC invert. (0, 1)	0
OUT_VSYNC_ INVERT	Sets the V_SYNC invert. (0, 1)	0

VGAA-IN8-F64 / VGAA-OUT8-F64 Technical Specifications

The following table defines the technical specifications.

PORTS:	8 VGA on 15-pin HD connectors 2 unbalanced analog audio on 3.5mm mini jack connectors (accessible via **C-GF/GMAF-30** cables)
BANDWIDTH:	450MHz
MAXIMUM RANGE:	10m (32ft)
POWER CONSUMPTION:	Input card: 35W Output card: 20W
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:	39.5cm x 18cm x 2cm (15.6" x 7.1" x 0.8") W, D, H
SHIPPING DIMENSIONS	54.8cm x 27.5cm x 10.6cm (21.6" x 10.8" x 4.2") W, D, H)
PRODUCT WEIGHT:	0.65 kg (1.43 lbs) approx.
SHIPPING WEIGHT:	0.81 kg (1.79 lbs) approx.
STANDARD COMPLIANCE:	-
SAFETY REGULATORY COMPLIANCE:	CE
ENVIRONMENTAL REGULATORY COMPLIANCE:	Complies with appropriate requirements of RoHs and WEEE
INCLUDED ACCESSORIES:	8 **C-GF/GMAF-30** cables

Troubleshooting Video and Audio Problems

The **VS-6464DN-EM** includes an AV signal generator that can be used to diagnose video and audio issues in an operating environment.

(i) The test module supports analog audio and can only be used for testing analog audio problems.

Defining the Controller and Test Card

The **Controller and Test** card is a 2-Input/Output DVI with Analog Audio Card (F-64), preinstalled in the **VS-6464DN-EM** for setup, troubleshooting, and management purposes (see Figure 3 for more information).

Controller and Test Card Configuration

The **Controller and Test** card configuration table appears as follows when configured as an input card:

Controller and Test Card		
Parameter	**Description**	**Default**
Reset Input	Re-power—Power cycles the port. Factory default—Performs a factory reset to default values of the port.	Re-power
Audio Select	Selects the audio source: Auto—Audio signal selection is controlled by the presence or absence of a plug in the 3.5mm mini jack. When present, AUD-Analog is selected, when absent, AUD-Embedded is selected. AUD-Embedded—HDMI audio is selected. AUD-Ex-Analog—Analog audio is selected.	Auto
Volume	Sets the audio output volume (0–70). **Note**: Not applicable when digital audio is selected.	50
Audio Balance	Sets the audio output channel balance (0–100). **Note**: Not applicable when digital audio is selected.	50
Audio Bass	Sets the audio output bass level (0–15). **Note**: Not applicable when digital audio is selected.	7
Audio Treble	Sets the audio output treble level (0–15). **Note**: Not applicable when digital audio is selected.	7
Audio Mute	MUTE—Mutes the audio input. Non-MUTE—Unmutes the audio input. **Note**: Not applicable when digital audio is selected.	Non-MUTE

The **Controller and Test** card configuration table appears as follows when configured as an output card:

Controller and Test Card		
Parameter	**Description**	**Default**
Reset Output	Re-power—Power cycles the port. Factory default—Performs a factory reset to default values of the port.	Re-power
HDMI	Sets the output signal format (Display, HDMI, DVI). Display—the output is set automatically based on the EDID of the connected display. HDMI—Force the output to be HDMI. DVI—Force the output to be DVI. **Note**: When selecting the DVI option and fast switching is enabled, you must ensure that the source is DVI compatible.	Display
Switch Speed	When switching between different sources the switching time can be reduced by setting the fast switch level (Ex-fast Switch, Fast Switch or Normal Switch).	Normal Switch
Audio Mute	MUTE—Mutes the audio input. Non-MUTE—Unmutes the audio input.	Non-MUTE
Volume	Sets the audio output volume (0–70).	50
Audio Balance	Sets the audio output channel balance (0–100).	50
Audio Bass	Sets the audio output bass level (0–15).	7
Audio Treble	Sets the audio output treble level (0–15).	7
Audio Mono	OFF— Analog output is stereo. MIX— Analog output is mono.	OFF

Setting the Resolution of the Generated Video

The video generator produces a range of both PC and HD resolutions which are selected by a combination of DIP-switches and an on-board jumper (labeled **B3**). Install the jumper to select HD resolutions or remove the jumper to select PC resolutions.

The Resolution DIP-switch is used to set the resolution of the generated video:

Available PC Resolutions for Generated Video (Jumper Off)		
DIP-switch Position		**Resolution**
1	**2**	
OFF	OFF	1024 x 768 @60Hz
ON	OFF	1280 x 1024 @60Hz
OFF	ON	1600 x 1200 @60Hz
ON	ON	1920 x 1200 @60Hz

Available HD Resolutions for Generated Video (Jumper On, Default)		
DIP-switch Position		**Resolution**
1	**2**	
OFF	OFF	480p (default)
ON	OFF	720p
OFF	ON	1080i
ON	ON	1080p

Figure 14 shows the Resolution DIP-switch with both switches off (up, default, 480p).

Figure 14: Resolution DIP-switch

Setting the Pattern of the Generated Video

The Pattern button is used to set the pattern of generated video. There are 32 available patterns. Press the button repeatedly to cycle through the patterns.

Installing the Test Module

By default, the controller and test card is installed in the configuration. If you uninstalled the test module in the configuration, it must be reinstalled before it can be used, that is, the number of configured inputs and outputs must be increased by one. For example:

- If your **VS-6464DN-EM** has eight inputs and eight outputs, you must configure the **VS-6464DN-EM** as 9 x 9

- If your **VS-6464DN-EM** has 64 inputs and 64 outputs, you must configure the **VS-6464DN-EM** as 65 x 65

To install the test module in the configuration:

1. Press ESC, ENT and LOCK together.
   The following is displayed:
   ```
   Configuration Device
   ```

2. Press ENT.
   The following is displayed:
   ```
   Test Board: 0  MaxInput:64  MaxOutput:64
   ```

   where 0 indicates that the test module is not installed.

3. Using the numeric keys, press 1 to indicate that the test module is installed.
   The TAKE button flashes.

4. Press TAKE.

5. Increase the number of configured inputs and outputs by one (see Configuring the Number of Installed Input and Output Ports on page 32).

6. Power cycle the device.
   The test module is now installed and may be used.

Troubleshooting Video Problems

The test module may be used in various ways to isolate video problems.

The following examples are based on the video signal paths shown in Figure 15 and a **VS-6464DN-EM** device installed as follows:

- 64 inputs and 64 outputs.

- The test module is configured (see Installing the Test Module on page 45).

- 65 configured inputs and 65 configured outputs (see Configuring the Number of Installed Input and Output Ports on page 32).
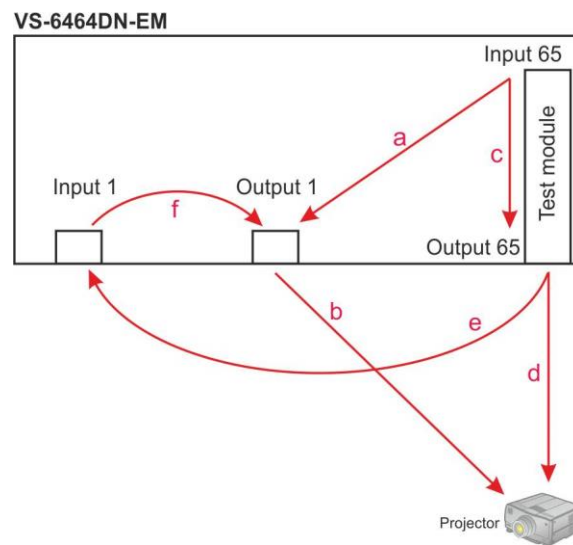
Figure 15: Signal Paths for Isolating Video Problems

Testing the Projector Output

Signal path: c to d; d to projector.

To test the projector output:

1. Configure Input 65 to Output 65 (see Switching Actions on page 19).

2. Connect Output 65 to the projector.

3. Set the generated video resolution (see Setting the Resolution of the Generated Video on page 44).

4. Set the pattern for the generated video (see Section 10.3).

5. Verify that the projector output is as expected.

Testing the Output Signal Path to the Projector

Signal path: a to b; b to projector

To test the output signal path to the projector:

1. Configure Input 65 to Output 1 (see Switching Actions on page 19).

2. Connect Output 1 to the projector.

3. Set the generated video resolution (see [Setting the Resolution of the Generated Video](#) on page [44](#)).

4. Set the pattern for the generated video (see [Setting the Pattern of the Generated Video](#) on page [45](#)).

5. Verify that the projector output is as expected.

Testing the Input and Output Signal Path to the Projector

Signal path: c to e; e to f; f to b; b to projector.

To test the input and output signal path to the projector:

1. Configure Input 65 to Output 65 (see [Switching Actions](#) on page [19](#)).

2. Connect Output 65 to Input 1.

3. Configure Input 1 to Output 1.

4. Connect Output 1 to the projector.

5. Set the generated video resolution (see [Setting the Resolution of the Generated Video](#) on page [44](#)).

6. Set the pattern for the generated video (see [Section](#) 10.3).

7. Verify that the projector output is as expected.

Troubleshooting Audio Problems

The test module may be used in various ways to isolate analog audio problems.

The following examples are based on the audio signal paths shown in [Figure 16](#) and a **VS-6464DN-EM** device installed as follows:

- 64 inputs and 64 outputs.

- The test module is configured (see [Installing the Test Module](#) on page [45](#)).

- 65 configured inputs and 65 configured outputs (see [Configuring the Number of Installed Input and Output Ports](#) on page [32](#)).
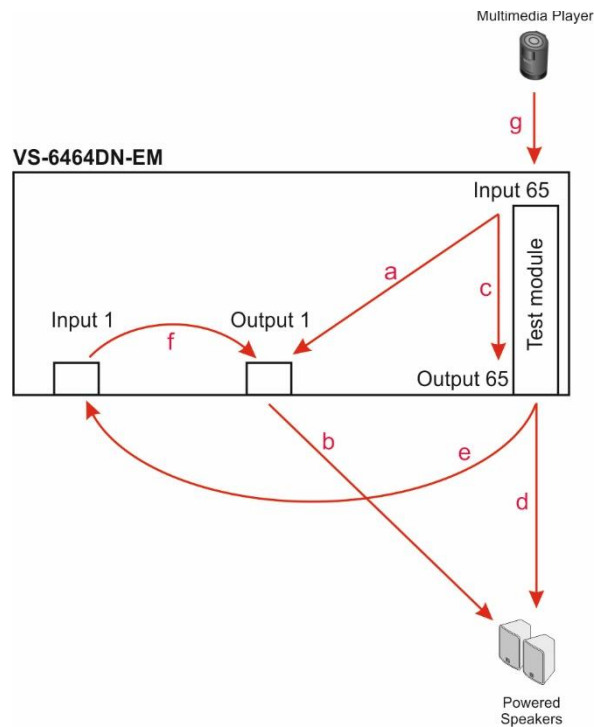
Figure 16: Signal Paths for Isolating Audio Problems

Testing the Audio Output

Signal path: g to c; c to d; d to an audio acceptor (for example, powered speakers).

To test the audio output:

1. Connect an analog audio source to Input 65.

2. Configure Input 65 to Output 65 (see Switching Actions on page 19).

3. Connect Output 65 to the audio acceptor.

4. Verify that the audio output is as expected.

Testing the Output Signal Path to the Audio Output

Signal path: g to a; a to b; b to an audio acceptor (for example, powered speakers)

To test the output signal path to the audio output:

1. Connect an analog audio source to Input 65.

2. Configure Input 65 to Output 1 (see Switching Actions on page 19).

3. Connect Output 1 to the audio acceptor.

4. Verify that the audio output is as expected.

Testing the Input and Output Signal Path to the Audio Output

Signal path: g to c; c to e; e to f; f to b; b to an audio acceptor (for example, powered speakers)

To test the input and output signal path to the audio output:

1. Connect an analog audio source to Input 65.
2. Configure Input 65 to Output 65 (see Switching Actions on page 19).
3. Connect Output 65 to Input 1.
4. Configure Input 1 to Output 1.
5. Connect Output 1 to the audio acceptor.
6. Verify that the audio output is as expected.

Input / Output Card Hardware Installation Instructions

The **VS-6464DN-EM** input / output cards mount in one of the 16 slots on the rear of the **VS-6464DN-EM** chassis. Slots are numbered from left to right (The process for inserting cards is the same for all cards / chassis and the figures below are for illustration purposes only.)

⚠️ An input card must only be mounted in a slot designated for input cards (slots IN 1 to 32 and IN 33 to 64) and an output card must only be mounted in a slot designated for output cards (slots OUT 1 to 32 and OUT 33 to 64).
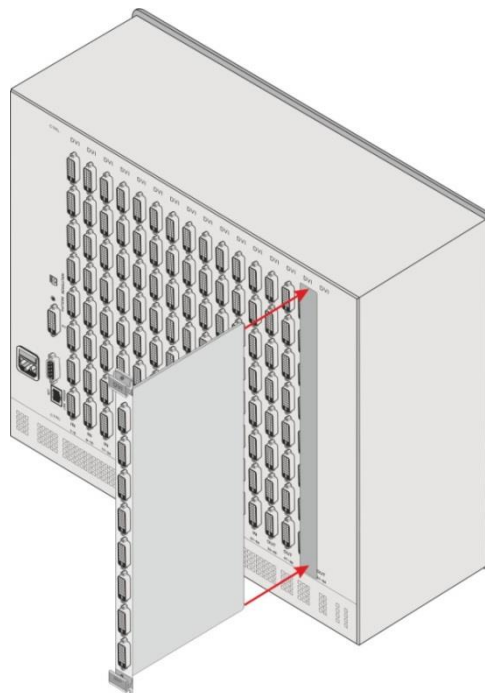
Figure 17: Inserting the Card into a Slot

To install an input / output card as shown in Figure 17:

1. Power off the **VS-6464DN-EM** and all devices connected to it.

2. Using a Phillips screwdriver, loosen the screws at the top and bottom of the blanking plate (see Figure 18).
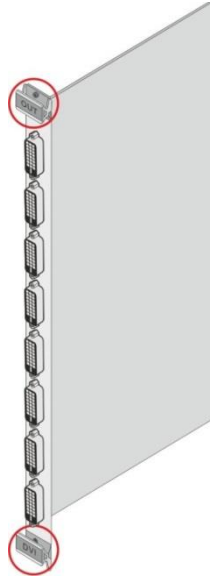
Figure 18: Card Handles

3. Remove the blanking plate from the slot and store it for possible future use.

4. Remove the new card from its shipping box and anti-ESD bag.

5. Holding the card by the lower handle, align the card with the plastic guide rails.

6. Slide the card into the chassis until the front of the card makes contact with the connector inside the chassis.

7. Press the card firmly into the slot until the connector plate is flush with the rear panel of the chassis and the connector is fully seated.

8. Using a Phillips screwdriver, tighten the retaining screws at the top and bottom of the card to secure it to the chassis.

9. Power on the **VS-6464DN-EM** and follow the procedure to configure the new card (see Configuring the Number of Installed Input and Output Ports on page 32).

10. Power on the peripheral devices.

Installing a PS-1DN Power Supply

The **VS-6464DN-EM** is equipped with two **PS-1DN** power supply units and includes an optional redundant power supply for mission critical installations. When three power supplies are installed, the **VS-6464DN-EM** distributes the load between the power supplies. Kramer recommends using three power supply units for extending power supply life-span.

ⓘ The device must have at least two working power supplies to operate correctly.

The **PS-1DN** is a hot-swappable power supply. It is not necessary to power down the chassis in order to install or replace a third power supply.

⚠ When installing/replacing a power supply, all normal static discharge precaution measures must be observed to prevent damage to the equipment.

For detailed instructions on installing/replacing a power supply in your **VS-6464DN-EM**, see the **PS-1DN** Power Supply Installation Instructions, available at www.kramerav.com.

The following table describes the behavior of the PS-1 / PS-2 LEDs:

Event	Green POWER LED	Red ERROR LED
Device power on	Lights and remains on	Lights for a few seconds and turns off
Device power off	Remains on for ~20 seconds and then turns off	Lights for ~20 seconds and then turns off

If no LEDs light, verify the following:

- The power supply connector at the rear of the device is connected to the mains power supply (see).

- The power switch is switched to the On position.

- The power supply is seated firmly in place – the front panel of the power supply is flush with the front panel of the chassis and the screws are tightly fastened.

If the problem persists, or if the red ERROR LED is always lit, contact Kramer technical support.

Upgrading VS-6464DN-EM and Input / Output Card Firmware

The **VS-6464DN-EM** enables upgrading both the device's firmware and that of the **VGAA-IN8/OUT8-F64** card. Upgrading the firmware of the remaining input / output cards can only be done by authorized service personnel.

The device and card firmware can be upgraded using:

- K-Upload via RS-232, USB (VCOM), or Ethernet (see Upgrading Firmware Using K-Upload on page 53).

- Kramer Network via Ethernet (see Upgrading Firmware Using Kramer Network on page 54).

Upgrading Firmware Using K-Upload

The **VS-6464DN-EM** enables upgrading device and card firmware via RS-232, USB (VCOM) or Ethernet using the K-Upload software application, available at www.kramerav.com/product/VS-6464DN-EM. For instructions on upgrading the firmware using K-Upload, see the *K-Upload User Manual*.

For information on connecting to the **VS-6464DN-EM** via RS-232, USB (VCOM), or Ethernet, see Connecting to the VS-6464DN-EM via RS-232 on page 14, Connecting to the VS-6464DN-EM via USB (VCOM) on page 14, or Connecting to the VS-6464DN-EM via Ethernet on page 14, respectively.

Firmware may be available for any of the following components:

ⓘ   The firmware files for each component have different suffixes to help with identification.

- **VS-6464DN-EM** Control Module – Control module firmware files end with `_0`, for example:
  `linux163264_[APP_X_xx.xx_xxxx]_0`

- **VS-6464DN-EM** Test Module – Test module firmware files end with `_200`, for example:
  `64testCard_[OUT8_47_xx.xx_xxxx]_200`

- **VS-6464DN-EM** Keypad – Keypad firmware files end with `_201`, for example:
  `VS-163264Keypad_[APP_X_xx.xx_xxxx]_201`

- **VGAA-IN8/OUT8-F64** Card – The suffix of card firmware files must be modified before use. Input and output card firmware files all end with `_N`, for example:
  `VGA VGAA_[OUT8_16&18_xx.xx_xxxx]_N`
  This suffix must be changed according to the slot number in which the card is installed (1-16). For example if the card is installed in slot 7, the firmware file's suffix must be changed to `_7`:
  `VGA VGAA_[OUT8_16&18_xx.xx_xxxx]_7`

Go to www.kramerav.com/downloads/VS-6464DN-EM to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

If necessary, you can downgrade the input/output card firmware by incrementing the previous firmware file's number to higher than the currently installed firmware. For example if you upgraded the card's firmware using the `VGA VGAA_[OUT8_16&18_01.00_0006]_7` file, to downgrade to the previously installed firmware, rename the previously installed firmware file to `VGA VGAA_[OUT8_16&18_01.00_0007]_7`.

Upgrading Firmware Using Kramer Network

The **VS-6464DN-EM** enables upgrading device and card firmware via Ethernet using the Kramer Network enterprise management platform, available at www.kramerav.com/product/VS-6464DN-EM. For instructions on upgrading the firmware using Kramer Network, see the *Kramer Network User Manual*.

For information on connecting to the **VS-6464DN-EM** via Ethernet, see .

Technical Specifications

VS-6464DN-EM Chassis

PORTS:	1 DVI-D on a DVI Molex 24-pin (F) connector 2 unbalanced analog audio on 3.5mm mini jack connectors 1 RS-232 on an 9-pin D-sub port 1 USB (VCOM) port on a USB Mini-B connector 1 Ethernet on an RJ-45 connector
BANDWIDTH:	Supports up to 3.4Gbps bandwidth per channel (limited by the card installed)
CONTROLS:	Front panel buttons, RS-232, Ethernet, USB *(*virtual COM)
SWITCHING:	Confirm or At Once for immediate switching
POWER CONSUMPTION:	100-240V AC, 50/60Hz, 4.7A
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
COOLING:	Forced air, fan
ENCLOSURE TYPE:	Aluminum
RACK MOUNT:	With supplied rack ears, attached
DIMENSIONS:	19" 10U (48.3cm x 36cm x 44cm W, D, H)
PRODUCT WEIGHT:	24kg (52.9lbs) approx.
SHIPPING WEIGHT:	25.8kg (56.9lbs) approx.
VIBRATION:	ISTA 1A in carton (International Safe Transit Association)
SAFETY REGULATORY COMPLIANCE:	CE
ENVIRONMENTAL REGULATORY COMPLIANCE:	Complies with appropriate requirements of RoHs and WEEE
INCLUDED ACCESSORIES:	Power cord.
Specifications are subject to change without notice at www.kramerav.com	

Quick VS-6464DN-EM Card Comparison

Card	Ports	BW per Channel	Max. Range	Compliance	3D Pass Thru
HDCP	8 DVI-D on a DVI Molex 24-pin (F) connector	2.25Gbps	15m (49ft)	HDCP, HDMI	Yes
DGKat	8 TP DGKat on RJ-45 8 Serial on 3-pin terminal blocks	Vid: 1.65Gbps Serial: 19200	90m (300ft) – 1080p @60Hz*	HDCP 1.4	Yes
F670	8 SC	2.25Gbps	1700m (5570ft) – 1080p/60Hz	HDCP 1.4	Yes
F610	8 4 LC	1.65Gbps	400m (1310ft) using MM OM2 fiber	DVI 1.0	No
DVI	8 DVI-D on DVI Molex 24-pin (F) connectors	1.65Gbps	15m (49ft)	DVI 1.0	No

Card	Ports	BW per Channel	Max. Range	Compliance	3D Pass Thru
VGAA	8 VGA on 15-pin HD connectors 8 unbalanced analog audio on 3.5mm mini jack connectors**	450MHz	10m (32ft)	-	-
* When using **BC-UNIKAT** cables. ** Accessible via **C-GF/GMAF-30** cables. Specifications are subject to change without notice at www.kramerav.com					

Default Settings

Default Communication Parameters

EDID	
EDID data is passed between Output 1 and Input 1	
RS-232 / Protocol 3000	
Baud Rate:	115200
Data Bits:	8
Stop Bits:	1
Parity:	None
Command Format:	HEX
Command Example to Switch Input 4 to Output 2:	#VID 4>2
Ethernet	
IP Address:	192.168.1.39
TCP Port #:	5000
UDP Port#:	50000
Concurrent TCP Connections:	32

Factory Default EDID

HDCP-IN8-F64 / HDCP-OUT8-F64

```
Monitor
  Model name............... VS-64HDCP
  Manufacturer............. KMR
  Plug and Play ID......... KMR0200
  Serial number............ 1
  Manufacture date......... 2014, ISO week 19
  Filter driver............ None
  -------------------------
  EDID revision............ 1.3
  Input signal type........ Digital (HDMI-a)
  Color bit depth.......... Undefined
  Display type............. RGB color
  Screen size.............. 700 x 390 mm (31.5 in)
  Power management......... Not supported
  Extension blocs.......... 1 (CEA-EXT)
  -------------------------
  DDC/CI................... Not supported
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.... 31-94kHz
  Vertical scan range...... 50-85Hz
  Video bandwidth.......... 170MHz
  CVT standard............. Not supported
  GTF standard............. Not supported
  Additional descriptors... None
  Preferred timing......... Yes
  Native/preferred timing.. 1280x720p at 60Hz
    Modeline............... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
  Detailed timing #1....... 1920x1080p at 60Hz (16:9)
    Modeline............... "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync
Standard timings supported
   720 x  400p at  70Hz - IBM VGA
   720 x  400p at  88Hz - IBM XGA2
   640 x  480p at  60Hz - IBM VGA
   640 x  480p at  67Hz - Apple Mac II
   640 x  480p at  72Hz - VESA
   640 x  480p at  75Hz - VESA
   800 x  600p at  56Hz - VESA
   800 x  600p at  60Hz - VESA
   800 x  600p at  72Hz - VESA
   800 x  600p at  75Hz - VESA
   832 x  624p at  75Hz - Apple Mac II
  1024 x  768i at  87Hz - IBM
  1024 x  768p at  60Hz - VESA
  1024 x  768p at  70Hz - VESA
```

```
    1024 x  768p at  75Hz - VESA
    1280 x 1024p at  75Hz - VESA
    1152 x  870p at  75Hz - Apple Mac II
    1280 x  720p at  60Hz - VESA STD
    1280 x  800p at  60Hz - VESA STD
    1440 x  900p at  60Hz - VESA STD
    1280 x  960p at  60Hz - VESA STD
    1280 x 1024p at  60Hz - VESA STD
    1400 x 1050p at  60Hz - VESA STD
    1680 x 1050p at  60Hz - VESA STD
    1600 x 1200p at  60Hz - VESA STD
EIA/CEA-861 Information
   Revision number.......... 3
   IT underscan............. Not supported
   Basic audio.............. Supported
   YCbCr 4:4:4.............. Supported
   YCbCr 4:2:2.............. Supported
   Native formats........... 1
   Detailed timing #1....... 720x480p at 60Hz (4:3)
     Modeline.............. "720x480" 27.000 720 736 798 858 480 489 495 525 -hsync -vsync
   Detailed timing #2....... 1920x1080i at 60Hz (16:9)
     Modeline.............. "1920x1080" 74.250 1920 2008 2052 2200 1080 1084 1094 1124 interlace +hsync +vsync
   Detailed timing #3....... 1920x1080i at 50Hz (16:9)
     Modeline.............. "1920x1080" 74.250 1920 2448 2492 2640 1080 1084 1094 1124 interlace +hsync +vsync
   Detailed timing #4....... 1280x720p at 60Hz (16:9)
     Modeline.............. "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
   Detailed timing #5....... 1280x720p at 50Hz (16:9)
     Modeline.............. "1280x720" 74.250 1280 1720 1760 1980 720 725 730 750 +hsync +vsync
   CE video identifiers (VICs) - timing/formats supported
     720 x  576p at  50Hz - EDTV (4:3, 16:15)
    1280 x  720p at  50Hz - HDTV (16:9, 1:1)
    1920 x 1080i at  60Hz - HDTV (16:9, 1:1)
    1920 x 1080i at  50Hz - HDTV (16:9, 1:1)
    1280 x  720p at  60Hz - HDTV (16:9, 1:1) [Native]
    1920 x 1080p at  60Hz - HDTV (16:9, 1:1)
    1920 x 1080p at  50Hz - HDTV (16:9, 1:1)
     NB: NTSC refresh rate = (Hz*1000)/1001
   CE audio data (formats supported)
     LPCM   3-channel, 24-bits        at 44/48 kHz
   CE speaker allocation data
     Channel configuration.... 3.0
     Front left/right......... Yes
     Front LFE................ No
     Front center............. Yes
     Rear left/right.......... No
     Rear center.............. No
     Front left/right center.. No
     Rear left/right center... No
     Rear LFE................. No
   CE vendor specific data (VSDB)
     IEEE registration number. 0x000C03
     CEC physical address..... 1.0.0.0
     Maximum TMDS clock....... 165MHz
   Report information
     Date generated........... 12/08/2015
     Software revision........ 2.70.0.989
     Data source.............. Real-time 0x0071
     Operating system......... 6.1.7601.2.Service Pack 1
   Raw data
   00,FF,FF,FF,FF,FF,FF,00,2D,B2,00,02,01,00,00,00,13,18,01,03,82,46,27,78,0A,D5,7C,A3,57,49,9C,25,
   11,48,4B,FF,FF,80,81,C0,81,00,95,00,81,40,81,80,90,40,B3,00,A9,40,01,1D,00,72,51,D0,1E,20,6E,28,
   55,00,7E,88,42,00,00,1E,02,3A,80,18,71,38,2D,40,58,2C,45,00,C4,8E,21,00,00,1E,00,00,00,FC,00,56,
   53,2D,36,34,48,44,43,50,0A,20,20,20,00,00,00,FD,00,32,55,1F,5E,11,00,0A,20,20,20,20,20,20,01,62,
   02,03,1A,71,47,11,13,05,14,84,10,1F,23,0A,06,04,83,05,00,00,65,03,0C,00,10,00,8C,0A,D0,8A,20,E0,
   2D,10,10,3E,96,00,58,C2,21,00,00,18,01,1D,80,18,71,1C,16,20,58,2C,25,00,C4,8E,21,00,00,9E,01,1D,
   80,D0,72,1C,16,20,10,2C,25,80,C4,8E,21,00,00,9E,01,1D,00,72,51,D0,1E,20,6E,28,55,00,C4,8E,21,00,
   00,1E,01,1D,00,BC,52,D0,1E,20,B8,28,55,40,C4,8E,21,00,00,1E,00,00,00,00,00,00,00,00,00,00,00,90
```

DGKat-IN8-F64 / DGKat-OUT8-F64

```
Monitor
   Model name............... VS-64HDGKat
   Manufacturer............. KMR
   Plug and Play ID......... KMR0200
   Serial number............ 1
   Manufacture date......... 2014, ISO week 19
   Filter driver............ None
   -----------------------
   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.......... 1 (CEA-EXT)
   -----------------------
   DDC/CI................... Not supported
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.... 31-94kHz
   Vertical scan range...... 50-85Hz
   Video bandwidth.......... 170MHz
   CVT standard............. Not supported
   GTF standard............. Not supported
   Additional descriptors... None
   Preferred timing......... Yes
   Native/preferred timing.. 1280x720p at 60Hz
```

```
      Modeline.............. "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
   Detailed timing #1....... 1920x1080p at 60Hz (16:9)
      Modeline.............. "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync
Standard timings supported
    720 x  400p at  70Hz - IBM VGA
    720 x  400p at  88Hz - IBM XGA2
    640 x  480p at  60Hz - IBM VGA
    640 x  480p at  67Hz - Apple Mac II
    640 x  480p at  72Hz - VESA
    640 x  480p at  75Hz - VESA
    800 x  600p at  56Hz - VESA
    800 x  600i at  60Hz - VESA
    800 x  600p at  72Hz - VESA
    800 x  600p at  75Hz - VESA
    832 x  624p at  75Hz - Apple Mac II
   1024 x  768i at  87Hz - IBM
   1024 x  768p at  60Hz - VESA
   1024 x  768p at  70Hz - VESA
   1024 x  768p at  75Hz - VESA
   1280 x 1024p at  75Hz - VESA
   1152 x  870p at  75Hz - Apple Mac II
   1280 x  720p at  60Hz - VESA STD
   1280 x  800p at  60Hz - VESA STD
   1440 x  900p at  60Hz - VESA STD
   1280 x  960p at  60Hz - VESA STD
   1280 x 1024p at  60Hz - VESA STD
   1400 x 1050p at  60Hz - VESA STD
   1680 x 1050p at  60Hz - VESA STD
   1600 x 1200p at  60Hz - VESA STD
EIA/CEA-861 Information
  Revision number.......... 3
  IT underscan............. Not supported
  Basic audio.............. Supported
  YCbCr 4:4:4.............. Not supported
  YCbCr 4:2:2.............. Not supported
  Native formats.......... 1
  Detailed timing #1....... 720x480p at 60Hz (4:3)
    Modeline.............. "720x480" 27.000 720 736 798 858 480 489 495 525 -hsync -vsync
  Detailed timing #2....... 1920x1080i at 60Hz (16:9)
    Modeline.............. "1920x1080" 74.250 1920 2008 2052 2200 1080 1084 1094 1124 interlace +hsync +vsync
  Detailed timing #3....... 1920x1080i at 50Hz (16:9)
    Modeline.............. "1920x1080" 74.250 1920 2448 2492 2640 1080 1084 1094 1124 interlace +hsync +vsync
  Detailed timing #4....... 1280x720p at 60Hz (16:9)
    Modeline.............. "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
  Detailed timing #5....... 1280x720p at 50Hz (16:9)
    Modeline.............. "1280x720" 74.250 1280 1720 1760 1980 720 725 730 750 +hsync +vsync
CE video identifiers (VICs) - timing/formats supported
    720 x  576p at  50Hz - EDTV (4:3, 16:15)
   1280 x  720p at  50Hz - HDTV (16:9, 1:1)
   1920 x 1080i at  60Hz - HDTV (16:9, 1:1)
   1920 x 1080i at  50Hz - HDTV (16:9, 1:1)
   1280 x  720p at  60Hz - HDTV (16:9, 1:1) [Native]
   1920 x 1080p at  60Hz - HDTV (16:9, 1:1)
   1920 x 1080p at  50Hz - HDTV (16:9, 1:1)
    NB: NTSC refresh rate = (Hz*1000)/1001
CE audio data (formats supported)
   LPCM    3-channel, 24-bits            at 44/48 kHz
CE speaker allocation data
  Channel configuration.... 3.0
  Front left/right......... Yes
  Front LFE................ No
  Front center............. Yes
  Rear left/right.......... No
  Rear center.............. No
  Front left/right center.. No
  Rear left/right center... No
  Rear LFE................. No
CE vendor specific data (VSDB)
  IEEE registration number. 0x000C03
  CEC physical address..... 1.0.0.0
  Maximum TMDS clock....... 165MHz
Report information
  Date generated........... 27/05/2015
  Software revision........ 2.90.0.1000
  Data source.............. Real-time 0x0061
  Operating system......... 6.1.7601.2.Service Pack 1
Raw data
  00,FF,FF,FF,FF,FF,FF,00,2D,B2,00,02,01,00,00,00,13,18,01,03,81,46,27,78,0A,D5,7C,A3,57,49,9C,25,
  11,48,4B,FF,FF,80,81,C0,81,00,95,00,81,40,81,80,90,40,B3,00,A9,40,01,1D,00,72,51,D0,1E,20,6E,28,
  55,00,7E,88,42,00,00,1E,02,3A,80,18,71,38,2D,40,58,2C,45,00,C4,8E,21,00,00,1E,00,00,00,FC,00,56,
  53,2D,36,34,48,44,47,4B,61,74,0A,20,00,00,00,FD,00,32,55,1F,5E,11,00,0A,20,20,20,20,20,20,01,CF,
  02,03,1A,41,47,11,13,05,14,84,10,1F,23,0A,06,04,83,05,00,00,65,03,0C,00,10,00,8C,0A,D0,8A,20,E0,
  2D,10,10,3E,96,00,58,C2,21,00,00,18,01,1D,80,18,71,1C,16,20,58,2C,25,00,C4,8E,21,00,00,9E,01,1D,
  80,D0,72,1C,16,20,10,2C,25,80,C4,8E,21,00,00,9E,01,1D,00,72,51,D0,1E,20,6E,28,55,00,C4,8E,21,00,
  00,1E,01,1D,00,BC,52,D0,1E,20,B8,28,55,40,C4,8E,21,00,00,1E,00,00,00,00,00,00,00,00,00,00,00,C0
```

F670-IN8-F64 / F670-OUT8-F64

```
Monitor
  Model name............... VS-64F670
  Manufacturer............. KMR
  Plug and Play ID......... KMR0200
  Serial number............ 1
  Manufacture date......... 2014, ISO week 19
  Filter driver............ None
  ------------------------
  EDID revision............ 1.3
  Input signal type........ Digital (HDMI-a)
  Color bit depth.......... Undefined
  Display type............. RGB color
  Screen size.............. 700 x 390 mm (31.5 in)
  Power management......... Not supported
  Extension blocs.......... 1 (CEA-EXT)
  ------------------------
```

```
DDC/CI.................. Not supported
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.... 31-94kHz
  Vertical scan range...... 50-85Hz
  Video bandwidth.......... 170MHz
  CVT standard............. Not supported
  GTF standard............. Not supported
  Additional descriptors... None
  Preferred timing......... Yes
  Native/preferred timing.. 1280x720p at 60Hz
    Modeline.............. "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
  Detailed timing #1....... 1920x1080p at 60Hz (16:9)
    Modeline.............. "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync
Standard timings supported
   720 x  400p at  70Hz - IBM VGA
   720 x  400p at  88Hz - IBM XGA2
   640 x  480p at  60Hz - IBM VGA
   640 x  480p at  67Hz - Apple Mac II
   640 x  480p at  72Hz - VESA
   640 x  480p at  75Hz - VESA
   800 x  600p at  56Hz - VESA
   800 x  600p at  60Hz - VESA
   800 x  600p at  72Hz - VESA
   800 x  600p at  75Hz - VESA
   832 x  624p at  75Hz - Apple Mac II
  1024 x  768i at  87Hz - IBM
  1024 x  768p at  60Hz - VESA
  1024 x  768p at  70Hz - VESA
  1024 x  768p at  75Hz - VESA
  1280 x 1024p at  75Hz - VESA
  1152 x  870p at  75Hz - Apple Mac II
  1280 x  720p at  60Hz - VESA STD
  1280 x  800p at  60Hz - VESA STD
  1440 x  900p at  60Hz - VESA STD
  1280 x  960p at  60Hz - VESA STD
  1280 x 1024p at  60Hz - VESA STD
  1400 x 1050p at  60Hz - VESA STD
  1680 x 1050p at  60Hz - VESA STD
  1600 x 1200p at  60Hz - VESA STD
EIA/CEA-861 Information
  Revision number.......... 3
  IT underscan............. Not supported
  Basic audio.............. Supported
  YCbCr 4:4:4.............. Supported
  YCbCr 4:2:2.............. Supported
  Native formats........... 1
  Detailed timing #1....... 720x480p at 60Hz (4:3)
    Modeline.............. "720x480" 27.000 720 736 798 858 480 489 495 525 -hsync -vsync
  Detailed timing #2....... 1920x1080i at 60Hz (16:9)
    Modeline.............. "1920x1080" 74.250 1920 2008 2052 2200 1080 1084 1094 1124 interlace +hsync +vsync
  Detailed timing #3....... 1920x1080i at 50Hz (16:9)
    Modeline.............. "1920x1080" 74.250 1920 2448 2492 2640 1080 1084 1094 1124 interlace +hsync +vsync
  Detailed timing #4....... 1280x720p at 60Hz (16:9)
    Modeline.............. "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
  Detailed timing #5....... 1280x720p at 50Hz (16:9)
    Modeline.............. "1280x720" 74.250 1280 1720 1760 1980 720 725 730 750 +hsync +vsync
CE video identifiers (VICs) - timing/formats supported
   720 x  576p at  50Hz - EDTV (4:3, 16:15)
  1280 x  720p at  50Hz - HDTV (16:9, 1:1)
  1920 x 1080i at  60Hz - HDTV (16:9, 1:1)
  1920 x 1080i at  50Hz - HDTV (16:9, 1:1)
  1280 x  720p at  60Hz - HDTV (16:9, 1:1) [Native]
  1920 x 1080p at  60Hz - HDTV (16:9, 1:1)
  1920 x 1080p at  50Hz - HDTV (16:9, 1:1)
  NB: NTSC refresh rate = (Hz*1000)/1001
CE audio data (formats supported)
  LPCM    3-channel, 24-bits         at 44/48 kHz
CE speaker allocation data
  Channel configuration.... 3.0
  Front left/right......... Yes
  Front LFE................ No
  Front center............. Yes
  Rear left/right.......... No
  Rear center.............. No
  Front left/right center.. No
  Rear left/right center... No
  Rear LFE................. No
CE vendor specific data (VSDB)
  IEEE registration number. 0x000C03
  CEC physical address..... 1.0.0.0
  Maximum TMDS clock....... 165MHz
Report information
  Date generated.......... 26/08/2015
  Software revision........ 2.70.0.989
  Data source.............. Real-time 0x0071
  Operating system......... 6.1.7601.2.Service Pack 1
Raw data
```

00,FF,FF,FF,FF,FF,FF,00,2D,B2,00,02,01,00,00,00,13,18,01,03,82,46,27,78,0A,D5,7C,A3,57,49,9C,25,
11,48,4B,FF,FF,80,81,C0,81,00,95,00,81,40,81,80,90,40,B3,00,A9,40,01,1D,00,72,51,D0,1E,20,6E,28,
55,00,7E,88,42,00,00,1E,02,3A,80,18,71,38,2D,40,58,2C,45,00,C4,8E,21,00,00,1E,00,00,00,FC,00,56,
53,2D,36,34,46,36,37,30,0A,20,20,20,00,00,00,FD,00,32,55,1F,5E,11,00,0A,20,20,20,20,20,20,01,9E,
02,03,1A,71,47,11,13,05,14,84,10,1F,23,0A,06,04,83,05,00,00,65,03,0C,00,10,00,8C,0A,D0,8A,20,E0,
2D,10,10,3E,96,00,58,C2,21,00,00,18,01,1D,80,18,71,1C,16,20,58,2C,25,00,C4,8E,21,00,00,9E,01,1D,
80,D0,72,1C,16,20,10,2C,25,80,C4,8E,21,00,00,9E,01,1D,00,72,51,D0,1E,20,6E,28,55,00,C4,8E,21,00,
00,1E,01,1D,00,BC,52,D0,1E,20,B8,28,55,40,C4,8E,21,00,00,1E,00,00,00,00,00,00,00,00,00,00,00,00,90

VGAA-IN8-F64 / VGAA-OUT8-F64

Monitor
  Model name............... VS-64VGAA
  Manufacturer............. KMR
  Plug and Play ID......... KMR03ED
  Serial number........... 1
  Manufacture date......... 2016, ISO week 20
  Filter driver............ None

  EDID revision............ 1.3
  Input signal type........ Analog 0.700,0.300 (1.0V p-p)
  Sync input support....... Not available
  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
  Range limits............. Not available
  GTF standard............. Supported
  Additional descriptors... None
  Preferred timing......... Yes
  Native/preferred timing.. 640x480p at 60Hz (4:3)
    Modeline............... "640x480" 25.180 640 656 752 800 480 490 492 525 -hsync -vsync
  Detailed timing #1....... 1920x1080p at 60Hz (16:9)
    Modeline............... "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync
  Detailed timing #2....... 1600x1200p at 60Hz (4:3)
    Modeline............... "1600x1200" 162.000 1600 1664 1856 2160 1200 1201 1204 1250 +hsync +vsync
Standard timings supported
   720 x 400p at 70Hz - IBM VGA
   720 x 400p at 88Hz - IBM XGA2
   640 x 480p at 60Hz - IBM VGA
   640 x 480p at 67Hz - Apple Mac II
   640 x 480p at 72Hz - VESA
   640 x 480p at 75Hz - VESA
   800 x 600p at 56Hz - VESA
   800 x 600p at 60Hz - VESA
   800 x 600p at 72Hz - VESA
   800 x 600p at 75Hz - VESA
   832 x 624p at 75Hz - Apple Mac II
  1024 x 768i at 87Hz - IBM
  1024 x 768p at 60Hz - VESA
  1024 x 768p at 70Hz - VESA
  1024 x 768p at 75Hz - VESA
  1280 x 1024p at 75Hz - VESA
  1152 x 870p at 75Hz - Apple Mac II
   640 x 480p at 60Hz - VESA STD
   800 x 600p at 60Hz - VESA STD
  1024 x 768p at 60Hz - VESA STD
  1152 x 864p at 75Hz - VESA STD
  1280 x 1024p at 75Hz - VESA STD
  1280 x 960p at 60Hz - VESA STD
  1280 x 1024p at 60Hz - VESA STD
  1360 x 765p at 60Hz - VESA STD
Report information
  Date generated........... 07/02/2018
  Software revision........ 2.60.0.972
  Data source.............. File
  Operating system......... 6.1.7601.2.Service Pack 1
Raw data
00,FF,FF,FF,FF,FF,FF,00,2D,B2,ED,03,01,00,00,00,14,1A,01,03,00,46,27,78,0B,D5,7C,A3,57,49,9C,25,
11,48,4B,FF,FF,80,31,40,45,40,61,40,71,4F,81,8F,81,40,81,80,8B,C0,D6,09,80,A0,20,E0,2D,10,10,60,
A2,00,04,03,00,00,00,18,02,3A,80,18,71,38,2D,40,58,2C,45,00,10,09,00,00,00,1E,00,00,00,FC,00,56,
53,2D,36,34,56,47,41,41,0A,20,20,20,48,3F,40,30,62,B0,32,40,40,C0,13,00,6F,13,11,00,00,1E,00,CE

Protocol 3000

The **VS-6464DN-EM 8x8 to 64x64 Modular Multi-Format Managed Digital Matrix Switcher** can be operated using the Kramer Protocol 3000 serial commands. The command framing varies according to how you interface with the **VS-6464DN-EM**. For example, a basic video input switching command that routes a layer 1 video signal to HDBT out 1 from HDMI input 2 (ROUTE 1,1,2), is entered as follows:

- Terminal communication software, such as Hercules:
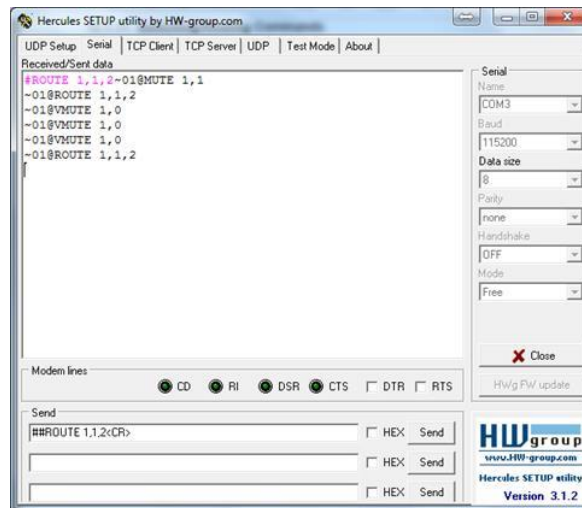
 The framing of the command varies according to the terminal communication software.

- K-Touch Builder (Kramer software):
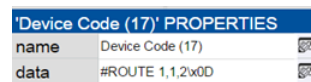
- K-Config (Kramer configuration software):
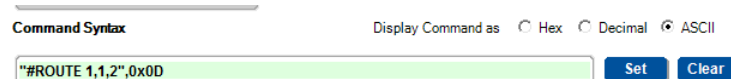
 All the examples provided in this section are based on using the K-Config software.

You can enter commands directly using terminal communication software (e.g., Hercules) by connecting a PC to the serial or Ethernet port on the **VS-6464DN-EM**. To enter CR press the Enter key (LF is also sent but is ignored by the command parser).

Commands sent from various non-Kramer controllers (e.g., Crestron) may require special coding for some characters (such as, /X##). For more information, refer to your controller's documentation.

For more information about:

- Understanding Protocol 3000 commands (see <u>Understanding Protocol 3000 Commands</u> on page <u>63</u>).

- General syntax used for Protocol 3000 commands (see <u>Protocol 3000 Syntax</u> on page <u>64</u>).

- Protocol 3000 commands available for the **VS-6464DN-EM** (see <u>Protocol 3000 Commands</u> on page <u>64</u>).

- Using the packet protocol (see <u>Using the Packet Protocol</u> on page <u>90</u>).

Understanding Protocol 3000 Commands

Protocol 3000 commands are structured according to the following:

- **Command** – A sequence of ASCII letters (`A-Z`, `a-z` and `-`). A command and its parameters must be separated by at least one space.

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

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

> A string can contain more than one command. Commands are separated by a pipe (`|`) character. The maximum string length is 64 characters.

- **Message starting character:**
    - `#` – For host command/query.
    - `~` – For device response.

- **Device address** – K-NET Device ID followed by @ (optional, K-NET only).

- **Query sign** – ? follows some commands to define a query request.

- **Message closing character:**
    - CR – Carriage return for host messages (ASCII 13).
    - CR LF – Carriage return for device messages (ASCII 13) and line-feed (ASCII 10).

- **Command chain separator character –** 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 at the beginning and end of the string.

> Spaces between parameters or command terms are ignored. Commands in the string do not execute until the closing character is entered. A separate response is sent for every command in the chain.

Protocol 3000 Syntax

The Kramer Protocol 3000 syntax uses the following delimiters:

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

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

The Protocol 3000 syntax is in the following format:

- **Host Message Format**:

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

- **Simple Command** – Command string with only one command without addressing:

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

- **Command String** – Formal syntax with commands concatenation and addressing:

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

- **Device Message Format**:

Start	Address (optional)	Body	Delimiter
~	*device_id@*	**Message**	CR LF

- **Device Long Response** – Echoing command:

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

Protocol 3000 Commands

This section includes the following commands:

System Mandatory Commands

Command	Description
#	Protocol handshaking
BUILD-DATE	Read device build date
FACTORY	Reset to factory default configuration
HELP	List of commands
MODEL	Read device model
PROT-VER	Read device protocol version
RESET	Reset device
SN	Read device serial number
VERSION	Read device firmware version

ⓘ   Not every command listed by the HELP command is relevant to every matrix configuration.

#

Functions		Permission	Transparency
Set	#	End User	Public
Get	-	-	-

Description		Syntax	
Set	Protocol handshaking	#CR	
Get	-	-	

Response
~nn@SP**OK**CR LF

Parameters

Response Trigger

Notes
Validates the Protocol 3000 connection and gets the machine number
K-Config Example
"#",0x0D

BUILD-DATE

Functions		Permission	Transparency
Set	-	-	-
Get	**BUILD-DATE?**	End User	Public
Description		**Syntax**	
Set	-	-	
Get	Get device build date	#**BUILD-DATE**CR	
Response			
~nn@**BUILD-DATE**SP*date*SP*time*CR LF			
Parameters			
date – Format: YYYY/MM/DD where YYYY = Year, MM = Month, DD = Day			
time – Format: hh:mm:ss where hh = hours, mm = minutes, ss = seconds			
Response Trigger			
Notes			
K-Config Example			
"#BUILD-DATE?",0x0D			

FACTORY

Functions		Permission	Transparency
Set	**FACTORY**	End User	Public
Get	-	-	-
Description		**Syntax**	
Set	Reset device to factory default configuration	#**FACTORY**CR	
Get	-	-	
Response			
~nn@**FACTORY**SP**OK**CR LF			
Parameters			
Response Trigger			
Notes			
This command deletes all user data from the device. The deletion can take some time.			
K-Config Example			
"#FACTORY?",0x0D			

HELP

Functions		Permission	Transparency
Set	**-**	-	-
Get	**HELP**	End User	Public
Description		**Syntax**	
Set	-	-	
Get	Get command list or help for specific command	#**HELP**CR	

Response
Multi-line: ~nn@**Device available protocol 3000 commands:**CR LF*command,*SP*command...*CR LF

Parameters

Response Trigger

Notes

K-Config Example
"#HELP",0x0D

MODEL

Functions		Permission	Transparency
Set	**-**	-	-
Get	**MODEL?**	End User	Public
Description		**Syntax**	
Set	-	-	
Get	Get device model	#**MODEL?**CR	

Response
~nn@**MODEL**SP*model_name*CR LF

Parameters
model_name – String of up to 19 printable ASCII chars

Response Trigger

Notes

K-Config Example
"#MODEL?",0x0D

PROT-VER

Functions		Permission	Transparency
Set	**-**	-	-
Get	**PROT-VER?**	End User	Public
Description		**Syntax**	
Set	-	-	
Get	Get device protocol version	#**PROT-VER?**CR	
Response			
~nn@**PROT-VER**SP3000:*version*CR LF			
Parameters			
Version – XX.XX where X is a decimal digit			
Response Trigger			
Notes			
K-Config Example			
"#PROT-VER?",0x0D			

RESET

Functions		Permission	Transparency
Set	**RESET**	Administrator	Public
Get	**-**	-	-
Description		**Syntax**	
Set	Reset device	#**RESET**CR	
Get	-	-	
Response			
~nn@**RESET**SP**OK**CR LF			
Parameters			
Response Trigger			
Notes			
To avoid locking the port due to a USB bug in Windows, disconnect USB connections immediately after running this command. If the port was locked, disconnect and reconnect the cable to reopen the port.			
K-Config Example			
"#RESET",0x0D			

SN

Functions		Permission	Transparency
Set	**-**	-	-
Get	**SN?**	End User	Public
Description		**Syntax**	
Set	-	-	
Get	Get device serial number	#**SN?**CR	
Response			
~nn@**SN**SP*serial_number*CR LF			
Parameters			
serial_number – 11 decimal digits, factory assigned			
Response Trigger			
Notes			
For new products with 14 digit serial numbers, use only the last 11 digits			
K-Config Example			
"#sn?",0x0D			

VERSION

Functions		Permission	Transparency
Set	**-**	-	-
Get	**VERSION?**	End User	Public
Description		**Syntax**	
Set	-	-	
Get	Get firmware version number	#**VERSION?**CR	
Response			
~nn@**VERSION**SP*firmware_version*CR LF			
Parameters			
firmware_version – XX.XX.XXXX where the digit groups are: major.minor.build version			
Response Trigger			
Notes			
K-Config Example			
"#VERSION?",0x0D			

System Commands

Command	Description
CPEDID	Copy EDID data from the output to the input EEPROM
GEDID	Read EDID data
GEDID-EXT	Read EDID data from external device connected to output
HDCP-MOD	Set/Get HDCP mode
HDCP-STAT	Get HDCP signal status
LDEDID	Load EDID data
LOCK-FP	Lock front panel
MODULE-INFO	Get module information
MODULE-TYPE	Set/Get module type, slot location, and status
MODULE-VER	Read module firmware version

CPEDID

Functions		Permission	Transparency
Set	**CPEDID**	End User	Public
Get	-	-	-
Description		**Syntax**	
Set	Copy EDID data from the output to the input EEPROM	#**CPEDID**SP*output_id,input_id*CR	
Get	-	-	
Response			
~nn@**CPEDID**SP*output_id,input_id*CR LF			
Parameters			
output_id – *video output ID:* 1-64 (varies according to installed output cards, see Port Numbering on page 12)			
input_id – video input ID: 1-64 (varies according to installed input cards, see Port Numbering on page 12)			
Response Trigger			
Response is sent to the com port from which the Set was received (before execution)			
Notes			
K-Config Example			
Copy the EDID data from output 8 to input 1: "#CPEDID 8,1,0x1",0x0D			

GEDID

Functions		Permission	Transparency
Set	**GEDID**	End User	Public
Get	-	-	-
Description		**Syntax**	
Set	Read EDID data from device	#**GEDID**SP*eeprom_id*CR	
Get	-	-	
Response			
Multi-line response: ~nn@**GEDID**SP*eeprom_id,size*CR LF Edid_dataCR LF ~nn@**GEDID**SP*eeprom_id*SP**OK**CR LF			
Parameters			
eeprom_id – Input port EEPROM ID from which to get the EDID: 1-64 (varies according to installed input cards, see Port Numbering on page 12) *size* - EDID data size sent from the device *Edid_data* – EDID data, as byte stream			
Response Trigger			
Response is sent to the com port from which the Set (before execution) command was received			
Notes			
K-Config Example			
Read EDID data from a device connected to Input 1: "#GEDID 1",0x0D			

GEDID-EXT

Functions		Permission	Transparency
Set	**GEDID-EXT**	End User	Public
Get	-	-	-
Description		**Syntax**	
Set	Read EDID data from external device connected to an output	#**GEDID**SPout_idCR	
Get	-	-	
Response			
Multi-line response: ~nn@**GEDID-EXT**SP*out_id,size*CR LF EDID_dataCR LF ~nn@**GEDID-EXT**SP*out_id*SP**OK**CR LF			
Parameters			
out_id – Output port EEPROM ID from which to get the EDID: 1-64 (varies according to installed output cards, see Port Numbering on page 12) *size* – EDID data size sent from the device *Edid_data* – EDID data, as byte stream)			
Response Trigger			
Response is sent to the com port from which the Set (before execution) command was received			
Notes			
K-Config Example			
Read EDID data from a device connected to Output 5: "#GEDID-EXT 5",0x0D			

HDCP-MOD

Functions		Permission	Transparency
Set	**HDCP-MOD**	Administrator	Public
Get	**HDCP-MOD?**	End User	Public
Description		**Syntax**	
Set	Set HDCP mode	#**HDCP-MOD** SP *inp_id,mode* CR	
Get	Get HDCP mode	#**HDCP-MOD?** SP *inp_id* CR	
Response			
Set / Get: ~ nn @**HDCP-MOD** SP *inp_id,mode* CR LF			
Parameters			
inp_id – input number: 1-64 (varies according to installed input cards, see Port Numbering on page 12) *mode* – HDCP mode: 0 (HDCP Off), 1 (HDCP On), 2 (Follow input), 3 (Mirror output – MAC mode)			
Response Trigger			
A response is sent to the com port from which the set (before execution) / get command was received A response is sent to all com ports after command execution if HDCP-MOD was set by any other external control device (device button, device menu or other) or if the HDCP mode changed			
Notes			
Set HDCP working mode on the device input: HDCP not supported - HDCP Off HDCP support changes following detected sink - MIRROR OUTPUT			
K-Config Example			
Disable HDCP mode on input 3: "#HDCP-MOD 3,0",0x0D			

HDCP-STAT

Functions		Permission	Transparency
Set	-	-	-
Get	**HDCP-STAT?**	End User	Public
Description		**Syntax**	
Set	-	-	
Get	Get HDCP signal status	#**HDCP-STAT?** SP *stage,stage_id* CR	
Response			
~ nn @**HDCP-STAT** SP *stage,stage_id,status* CR LF			
Parameters			
stage – 0 (input), 1 (output) *stage_id* – input/output number: 1-64 (varies according to installed input/output cards, see Port Numbering on page 12) *status* – signal encryption status: 0 (HDCP Off), 1 (HDCP On), 2 (Follow input), 3 (Mirror output – MAC mode)			
Response Trigger			
Response is sent to the com port from which the Get command was received			
Notes			
Output stage (1) – get the HDCP signal status of the sink device connected to the specified output Input stage (0) – get the HDCP signal status of the source device connected to the specified input			
K-Config Example			
Get the HDCP input signal status of the source device connected to input 9: "#HDCP-STAT? 0,9",0x0D			

LDEDID

Functions		Permission	Transparency
Set	**LDEDID**	End User	Public
Get	-	-	-
Description		**Syntax**	
Set	Write EDID data from external application to device	Multi-step syntax (see following steps)	
Get	-	-	

Response
Step 1: #**LDEDID**SP*eeprom_ID,size*CR
Response 1: ~nn@**LDEDID**SP*eeprom_id,size*SP**READY**CR LF or ~nn@**LDEDID**SP**ERRnn**CR LF
Step 2: If **READY** was received, send EDID_DATA
Response 2: ~nn@**LDEDID**SP*eeprom_id,size*SP**OK**CR LF

Parameters
eeprom_id – Input port EEPROM destination for the EDID data: 1-64 (varies according to installed input cards, see Port Numbering on page 12)
size – EDID data size
EDID_DATA – HEX or KFW file in protocol packets (see Using the Packet Protocol on page 90)

Response Trigger
Response is sent to the com port from which the Set (before execution) command was received

Notes
When the unit receives the **LDEDID** command it replies with **READY** and enters the special EDID packet wait mode. In this mode the unit can receive only packets and not regular protocol commands.
If the unit does not receive correct packets for 30 seconds or is interrupted for more than 30 seconds before receiving all packets, it sends timeout error ~nn@**LDEDID**SP**ERR01**CR LF and returns to the regular protocol mode. If the unit received data that is not a correct packet, it sends the corresponding error and returns to the regular protocol mode.

K-Config Example
Write EDID data from external application to Input 1:
"#LDEDID 1,256",0x0D

LOCK-FP

Functions		Permission	Transparency
Set	**LOCK-FP**	End User	Public
Get	**LOCK-FP?**	End User	Public
Description		**Syntax**	
Set	Lock front panel	#**LOCK-FP**SP*lock_mode*CR	
Get	Get front panel lock state	#**LOCK-FP?**CR	

Response
Set: ~nn@**LOCK-FP**SP*lock_mode*SP**OK**CR LF
Get: ~nn@**LOCK-FP**SP*lock_mode*CR LF

Parameters
lock_mode – 0/OFF (unlocks the front panel buttons), 1/ON (locks the front panel buttons)

Response Trigger

Notes

K-Config Example
Lock the front panel of the **VS-6464DN-EM**:
"#LOCK-FP 1",0x0D

MODULE-INFO

Functions		Permission	Transparency
Set	-	-	-
Get	**MODULE-INFO?**	End User	Public
Description		**Syntax**	
Set	-	-	
Get	Get module information	#**MODULE-INFO?**SP**slot_id**CR	

Response

~nn@MODULE-INFOSP*slot_id,m_direction,channel_start,channel_end,m_type,FW_ver,*
*upgradable_f,status*CR LF ?CR LF

Parameters

slot_id – Module ID (slot number): 0 (control module), 1-16 (I/O cards), 200 (test module),
       201 (keyboard software application), 202 (keyboard hardware)
m_direction – Transmission direction: 0 (input), 1 (output), 2 (unknown)
channel_start – Start ID of the port in the device: 1-65
channel_end – End ID of the port in the device: 1-65
m_type – Module type: 0 (DVI), 1 (HDCP), 09 (F610), 10 (F670), 12 (DGKat), 18 (VGAA),
      47 (control module)
FW_ver – Module firmware version: XX.XX.XXXX where the digit groups are: major.minor.build version
upgradable_f – Indicates whether the firmware can be upgraded: 0 (not upgradable), 1 (upgradable)
status – Module status: 0 (OK), 1 (unknown error), 2 (no communication), 3 (module missing)

Response Trigger

Notes

If m_direction is 2, the channel_start, channel_end and m_type values are irrelevant.

K-Config Example

"#MODULE-INFO? 14",0x0D

MODULE-TYPE

Functions		Permission	Transparency
Set	**MODULE-TYPE**	Admin	Public
Get	**MODULE-TYPE?**	End User	Public
Description		**Syntax**	
Set	Set module type and slot location	#**MODULE-TYPE**SP**m_id,m_type**CR	
Get	Get module type and status by slot location	#**MODULE-TYPE?**SP**m_id**CR	

Response

~nn@**MODULE-TYPE**SP*m_id,m_type,status*CR LF

Parameters

m_id – Module ID (slot number): 0 (control module), 1-16 (I/O cards), 200 (test module),
     201 (keyboard software application), 202 (keyboard hardware)
m_type – Module type: 0 (DVI), 1 (HDCP), 09 (F610), 10 (F670), 12 (DGKat), 18 (VGAA),
      47 (control module)
status – Module status: 0 (OK), 1 (unknown error), 2 (no communication), 3 (module missing)

Response Trigger

Notes

K-Config Example

Set the card (module) installed in slot 4 to VGAA:
"#MODULE-TYPE 04,18",0x0D

MODULE-VER

Functions		Permission	Transparency
Set	-	-	-
Get	**MODULE-VER?**	End User	Public

Description		Syntax	
Set	-	-	
Get	Get module firmware version	#**MODULE-VER?**SP**m_id**CR	

Response
~nn@**MODULE-VER**SP*m_id,FW_version*CR LF

Parameters
m_id – Module ID (slot number): 0 (control module), 1-16 (I/O cards), 200 (test module), 201 (keyboard software application), 202 (keyboard hardware)
FW_version – XX.XX.XXXX where the digit groups are: major.minor.build version

Response Trigger

Notes

K-Config Example
"#MODULE-VER? 15",0x0D

Routing Commands

Command	Description
DISPLAY	Get validity status of output
INFO-IO	Read in/out count
INFO-PRST	Read max preset count
PRST-LST	Read saved presets list
PRST-RCL	Recall saved preset
PRST-STO	Store current connections to preset
PRST-VID	Read video connections from saved preset
SIGNAL	Valid / Invalid input
VID	Switch Video only

DISPLAY

Functions		Permission	Transparency
Set	-	-	-
Get	**DISPLAY?**	End User	Public

Description		Syntax	
Set	-	-	
Get	Get validity status of output	#**DISPLAY?**SP*out_id*CR	

Response

~nn@**DISPLAY**SP*out_id,validity_flag*CR LF

Parameters

out_id – output number: 1-64 (varies according to installed output cards, see Port Numbering on page 12)

validity_flag – validity status of output: 0 (output is invalid – HPD off), 1 (output is valid – HPD on)

Response Trigger

A response is sent to the com port from which the Get was received, after command execution and:

After every change in output HPD status from on to off (0)

After every change in output HPD status from off to on (1)

Notes

K-Config Example

Get the validity status of output 8:

"#DISPLAY 8",0x0D

INFO-IO

Functions		Permission	Transparency
Set	**-**	-	-
Get	**INFO-IO?**	End User	Public
Description		Syntax	
Set	-	-	
Get	Get in/out count	#**INFO-IO?**CR	
Response			
~nn@**INFO-IO?**SPINSP*inputs_count*,OUTSP*outputs_count*CR LF			
Parameters			
inputs_count – number of inputs in the unit			
outputs_count – number of outputs in the unit			
Response Trigger			
Notes			
K-Config Example			
"#INFO-IO?",0x0D			

INFO-PRST

Functions		Permission	Transparency
Set	-	-	-
Get	**INFO-PRST?**	End User	Public
Description		Syntax	
Set	-	-	
Get	Get maximum preset count	#**INFO-PRST?**CR	
Response			
~nn@**INFO-PRST?**SPVIDSP*preset_video_count*,AUDSP*preset_audio_count*CR LF			
Parameters			
preset_video_count – maximum number of video presets in the unit			
preset_audio_count – maximum number of audio presets in the unit			
Response Trigger			
Notes			
In most units, video and audio presets with the same number are stored and recalled together by commands #PRST-STO and #PRST-RCL			
K-Config Example			
"#INFO-PRST?",0x0D			

PRST-LST

Functions		Permission	Transparency
Set	-	-	-
Get	**PRST-LST?**	End User	Public

Description		Syntax	
Set	-	-	
Get	Get list of saved presets	#**PRST-LST?**`CR`	

Response
~`nn`@**PRST-LST**`SP`*preset,preset,…*`CR LF`

Parameters
preset - preset number: `1-60`

Response Trigger

Notes
In most units, video and audio presets with the same number are stored and recalled together by commands #PRST-STO and #PRST-RCL

K-Config Example
"#PRST-LST?",0x0D

PRST-RCL

Functions		Permission	Transparency
Set	**PRST-RCL**	End User	Public
Get	-	-	-

Description		Syntax	
Set	Recall (load) a saved preset	#**PRST-RCL**`SP`*preset*`CR`	
Get	-	-	

Response
~`nn`@**PRST-RCL**`SP`*preset*`CR LF`

Parameters
preset – preset number: `1-60`

Response Trigger

Notes
In most units, video and audio presets with the same number are stored and recalled together by commands #PRST-STO and #PRST-RCL

K-Config Example
Recall previously saved connections, volumes, and modes (audio and video routing table) from preset 5: "#PRST-RCL 5",0x0D

PRST-STO

Functions		Permission	Transparency
Set	**PRST-STO**	End User	Public
Get	**-**	-	-
Description		**Syntax**	
Set	Store current connections, volumes and modes as a preset	#**PRST-STO**SP*preset*CR	
Get	-	-	
Response			
~nn@**PRST-STO**SP*preset*CR LF			
Parameters			
preset – preset number: 1-60			
Response Trigger			
Notes			
In most units, video and audio presets with the same number are stored and recalled together by commands #PRST-STO and #PRST-RCL			
K-Config Example			
Store the current connections, volumes, and modes (audio and video routing table) to preset 8: "#PRST-STO 8",0x0D			

PRST-VID

Functions		Permission	Transparency
Set	-	-	-
Get	**PRST-VID?**	End User	Public
Description		**Syntax**	
Set	-	-	
Get	Get video connections from saved preset	#**PRST-VID?**SP*preset,out*CR #**PRST-VID?**SP*preset,**CR	
Response			
~nn@**PRST-VID**SP*preset,in>out*CR LF or ~nn@**PRST-VID**SP*preset,in>1,in>2,in>3,…*CR LF			
Parameters			
preset - preset number: 1-60			
in – input number: 0 (if output disconnected), 1-64 (varies according to installed input cards, see Port Numbering on page 12)			
> – connection character between in and out parameters			
out – output number: 1-64 (varies according to installed output cards, see Port Numbering on page 12), * (all outputs)			
Response Trigger			
Notes			
In most units, video and audio presets with the same number are stored and recalled together by commands #PRST-STO and #PRST-RCL			
K-Config Example			
Get the source of video output 2 from preset 3: "#PRST-VID? 3,2",0x0D			

SIGNAL

Functions		Permission	Transparency
Set	-	-	-
Get	**SIGNAL?**	End User	Public
Description		**Syntax**	
Set	-	-	
Get	Get input signal validity status	#**SIGNAL?** SP *inp_id* CR	

Response

~nn@**SIGNAL** SP *inp_id,validity_flag* CR LF

Parameters

inp_id – input number: 1-64 (varies according to installed input cards, see <u>Port Numbering</u> on page <u>12</u>)

validity_flag – validity status according to signal validation: 0 (input is invalid), 1 (input is valid)

Response Trigger

After execution, a response is sent to the com port from which the Get was received

Response is sent after every change in input signal status valid to invalid, or invalid to valid

Notes

K-Config Example

Get the input signal lock status of input 2:

"#SIGNAL? 2",0x0D

VID

Functions		Permission	Transparency
Set	`VID`	End User	Public
Get	`VID?`	End User	Public

Description		Syntax
Set	Set video switch state	`#VID`SP`in>out,in>out,…`CR
Get	Get video switch state	`#VID?`SP`out`CR `#VID?`SP`*`CR

Response

Set: ~`nn`@**VID**SP`in>out`CR LF
    ~`nn`@**VID**SP`in>out`CR LF `…`
Get: ~`nn`@**VID**SP`in>out`CR LF
    ~`nn`@**VID**SP`in>1,in>2,…`CR LF

Parameters

`in` – input number: `0` (if output disconnected), `1-64` (varies according to installed input cards, see Port Numbering on page 12)
`>` – connection character between in and out parameters
`out` – output number: `1-64` (varies according to installed output cards, see Port Numbering on page 12), `*` (all outputs)

Response Trigger

Notes

When AFV switching mode is active, this command also switches audio and the unit replies with command ~AV.

Examples

Switch video input 2 to output 4	`#V 2>4`CR	`~01@VID 2>4`CRLF
Switch video input 4 to output 2 in machine 6	`#6@VID 4>2`CR	`~06@VID 4>2`CRLF
Switch video input 3 to all outputs	`#V 3>*`CR	`~01@VID 3>*`CRLF

Chaining multiple commands	`#AV 1>*` **|** `V 3>4,2>2,2>1,0>2` **|** `V 3>9`**|** `A 0>1` **|** `V? *`CR
	 1. Switch audio and video from input 1 to all outputs
	 2. Switch video input 3 to output 4,
	    video input 2 to output 2,
	    video input 2 to output 1 and
	    disconnect video output 2
	 3. Switch video input 3 to output 9 (non-existent)
	 4. Disconnect audio output 1
	 5. Get status of all video links
	 Command processing begins after entering CR
	 A response is sent for each command after processing
		`~AV 1>*`CRLF
		 `~VID 3>4` CRLF
		 `~VID 2>2` CRLF
		 `~VID 2>1` CRLF
		 `~VID 0>2` CRLF
		 `~VID ERR003` CRLF
		 `~AUD 0>1`CRLF
		 `~VID 2>1,0>2,1>3,3>4`CRLF

K-Config Example

Set the video switch state from input 4 to output 2:
`"#VID 4>2",0x0D`

Video Commands

Command	Description
BRIGHTNESS	Set/get brightness value
CONTRAST	Set/get contrast value
DETAIL-TIMING	Set/get detailed timing parameters
H-PHASE	Set/get H-Phase value

BRIGHTNESS

Functions		Permission	Transparency
Set	**BRIGHTNESS**	End User	Public
Get	**BRIGHTNESS?**	End User	Public
Description		**Syntax**	
Set	Set brightness value	#**BRIGHTNESS**SPstage,channel,valueCR	
Get	Get brightness value	#**BRIGHTNESS?**SPstage,channelCR	
Response			
~nn@**BRIGHTNESS**SPstage,channel,valueCR LF			
Parameters			
stage – 1/IN (input), 2/OUT (output) channel – input or output number: 1-64 (varies according to installed input / output cards, see Port Numbering on page 12) value – brightness in Kramer units: 0-63, ++ (increase current value), -- (decrease current value)			
Response Trigger			
Notes			
A minus sign precedes negative values This command is only valid for VGA cards			
K-Config Example			
Set the brightness value of output 8 to 60: "#BRIGHTNESS 2,8,60",0x0D Increase the brightness value of input 5 by 1 unit: "#BRIGHTNESS 1,5,++",0x0D			

CONTRAST

Functions		Permission	Transparency
Set	**CONTRAST**	End User	Public
Get	**CONTRAST?**	End User	Public
Description		**Syntax**	
Set	Set contrast value	#**CONTRAST**SPstage,channel,valueCR	
Get	Get contrast value	#**CONTRAST?**SPstage,channelCR	
Response			
~nn@**CONTRAST**SPstage,channel,valueCR LF			
Parameters			
stage – 1/IN (input), 2/OUT (output) channel – input or output number: 1-64 (varies according to installed input / output cards, see Port Numbering on page 12) value – contrast in Kramer units: 0-63, ++ (increase current value), -- (decrease current value)			
Response Trigger			
Notes			
A minus sign precedes negative values This command is only valid for VGA cards			
K-Config Example			
Set the contrast value of output 8 to 60: "#CONTRAST 2,8,60",0x0D Increase the contrast value of input 5 by 1 unit: "#CONTRAST 1,5,++",0x0D			

DETAIL-TIMING

Functions		Permission	Transparency
Set	**DETAIL-TIMING**	End User	Public
Get	**DETAIL-TIMING?**	End User	Public

Description		Syntax
Set	Set detailed timing parameters	#**DETAIL-TIMING**SPparam,channel,valueCR
Get	Get detailed timing parameters	#**DETAIL-TIMING?**SPparam,channelCR

Response

~nn@**DETAIL-TIMING**SPparam,channel,valueCR LF

Parameters

param – 1 (H-De-Start – horizontal start position of port video), 2 (H-De-Total – horizontal active pixels of port video), 3 (H-Total – total horizontal pixels of port video), 4 (V-De-Start – vertical start position of port video), 5 (V-De-Total – vertical active lines of port video), 6 (Auto-DE-Adjust – resolution detection mode), 7 (Auto-PHASE-Adjust – phase mode)

channel – input number: 1-64 (varies according to installed input cards, see Port Numbering on page 12)

value – video parameter value in Kramer units:

    for all param values: ++ (increase current value), -- (decrease current value)

    for 1 (H-De-Start): 1-600

    for 2 (H-De-Total): 1-4000

    for 3 (H-Total): 1-7000

    for 4 (V-De-Start): 1-255

    for 5 (V-De-Total): 1-3000

    for 6 (Auto-DE-Adjust): 0 (auto), 1 (user defined), 2 (auto adjust)

    for 7 (Auto-PHASE-Adjust): 0 (auto), 1 (user defined), 2 (auto adjust)

Response Trigger

Notes

A minus sign precedes negative values.

The auto adjust feature (in the Auto-DE-Adjust and Auto-PHASE-Adjust parameters) requires the device to recalculate the parameters based on the currently connected source. The result may be different from the standard parameters for the currently set resolution. The result is saved in non-volatile memory and is recalled when the same source is used again. In order to revert to auto pre-defined parameters, either reset to factory setting with the relevant source connected or connect a different source.

K-Config Example

Set the total horizontal pixels (H-Total parameter) of input 4 to 6000:

"#DETAIL-TIMING 3,4,6000",0x0D

Set the resolution detection mode (Auto-DE-Adjust parameter) of input 4 to auto adjust:

"#DETAIL-TIMING 6,4,2",0x0D

H-PHASE

Functions		Permission	Transparency
Set	**H-PHASE**	End User	Public
Get	**H-PHASE?**	End User	Public
Description		**Syntax**	
Set	Set H-Phase value	#**H-PHASE**SPstage,channel,valueCR	
Get	Get H-Phase value	#H-PHASE**?**SPstage,channelCR	
Response			
~nn@**H-PHASE**SPstage,channel,valueCR LF			
Parameters			
stage – 1/IN (input), 2/OUT (output) channel – input or output number: 1-64 (varies according to installed input / output cards, see Port Numbering on page 12) value – H-Phase value in Kramer units: 0-63, ++ (increase current value), -- (decrease current value)			
Response Trigger			
Notes			
A minus sign precedes negative values This command is only valid for VGA cards			
K-Config Example			
Set the H-Phase value of output 8 to 60: "#H-PHASE 2,8,60",0x0D Increase the H-Phase value of input 5 by 1 unit: "#H-PHASE 1,5,++",0x0D			

Audio Commands

Command	Description
AUD-LVL	Set/get audio level in specific amplifier stage
BALANCE	Set/get balance level
BASS	Set/get audio bass level
MIX	Set/get audio mix setting (stereo / mono)
MUTE	Set/get audio mute setting
TREBLE	Set/get audio treble level
VOLUME	Set/get simple audio volume

AUD-LVL

Functions		Permission	Transparency
Set	**AUD-LVL**	End User	Public
Get	**AUD-LVL?**	End User	Public
Description		**Syntax**	
Set	Set audio level in specific amplifier stage	#**AUD-LVL**SPstage,channel,volumeCR	
Get	Get audio level in specific amplifier stage	#**AUD-LVL?**SPstage,channelCR	
Response			
~nn@**AUD-LVL**SPstage,channel,volumeCR LF			
Parameters			
stage – 0/IN (input), 1/OUT (output) channel – input or output number: 1-64 (varies according to installed input / output cards, see Port Numbering on page 12) volume – audio level in Kramer units: 0-70, ++ (increase current value), -- (decrease current value)			
Response Trigger			
Notes			
The VOLUME command can also be used to set simple output audio volume. A minus sign precedes negative values.			
K-Config Example			
Set the audio level of output 8 to 30: "#AUD-LVL 2,8,30",0x0D Increase the audio level of input 3 by 1 unit: "#AUD-LVL 1,3,++",0x0D			

BALANCE

Functions		Permission	Transparency
Set	**BALANCE**	End User	Public
Get	**BALANCE?**	End User	Public
Description		**Syntax**	
Set	Set the balance level	#**BALANCE**SPout_channel,balance_levelCR	
Get	Get the current balance level	#**BALANCE?**SPout_channelCR	
Response			
~nn@**BALANCE**SPout_channel,balance_levelCR LF			
Parameters			
out_channel – output number: 1-64 (varies according to installed output cards, see Port Numbering on page 12) balance_level – balance level in Kramer units: 0-100, ++ (increase current value), -- (decrease current value)			
Response Trigger			
Notes			
A minus sign precedes negative values			
K-Config Example			
Set the balance level of output 5 to 50: "#BALANCE 5,50",0x0D Increase the balance level of output 5 by 1 unit: "#BALANCE 5,++",0x0D			

BASS

Functions		Permission	Transparency
Set	**BASS**	End User	Public
Get	**BASS?**	End User	Public
Description		**Syntax**	
Set	Set the audio bass level	#**BASS**SPchannel,bass_levelCR	
Get	Get the current audio bass level	#**BASS?**SPchannelCR	
Response			
~nn@**BASS**SPchannel,bass_levelCR LF			
Parameters			
channel – output number: 1-64 (varies according to installed output cards, see Port Numbering on page 12) bass_level – bass level in Kramer units: 0-15, ++ (increase current value), -- (decrease current value)			
Response Trigger			
Notes			
A minus sign precedes negative values			
K-Config Example			
Set the bass level of output 10 to 4: "#BASS 10,4",0x0D Decrease the bass level of output 5 by 1 unit: "#BASS 5,--",0x0D			

MIX

Functions		Permission	Transparency
Set	**MIX**	End User	Public
Get	**MIX?**	End User	Public
Description		**Syntax**	
Set	Set audio mix (stereo/mono)	#**MIX**[SP]channel,mix_mode[CR]	
Get	Get audio mix setting (stereo/mono)	#**MIX?**[SP]channel[CR]	
Response			
~[nn]@**MIX**[SP]channel,mix_mode[CR LF]			
Parameters			
channel – output number: 1-64 (varies according to installed output cards, see Port Numbering on page 12) mix_mode – mix mode setting: 0/OFF (analog audio output is stereo), 1/ON (analog audio output is mono)			
Response Trigger			
Notes			
Mix mode is an analog audio parameter used to set mono or stereo output			
K-Config Example			
Set the mix mode of output 3 to off (stereo output): "#MIX 3,0",0x0D			

MUTE

Functions		Permission	Transparency
Set	**MUTE**	End User	Public
Get	**MUTE?**	End User	Public
Description		**Syntax**	
Set	Mute the audio output	#**MUTE**[SP]channel,mute_mode[CR]	
Get	Get audio mute setting	#**MUTE?**[SP]channel[CR]	
Response			
~[nn]@**HUE**[SP]channel,mute_mode[CR LF]			
Parameters			
channel – output number: 1-64 (varies according to installed output cards, see Port Numbering on page 12) mute_mode – audio mute setting: 0/OFF (audio is enabled), 1/ON (audio is muted)			
Response Trigger			
Notes			
K-Config Example			
Mute the audio of output 8: "#MUTE 8,1",0x0D			

TREBLE

Functions		Permission	Transparency
Set	**TREBLE**	End User	Public
Get	**TREBLE?**	End User	Public
Description		Syntax	
Set	Set the audio treble value	#**TREBLE**SPchannel,treble_levelCR	
Get	Get the audio treble value	#**TREBLE?**SPchannelCR	
Response			
~nn@**TREBLE**SPchannel,treble_levelCR LF			
Parameters			
channel – output number: 1-64 (varies according to installed output cards, see Port Numbering on page 12) treble_level – treble level in Kramer units: 0-15, ++ (increase current value), -- (decrease current value)			
Response Trigger			
Notes			
A minus sign precedes negative values			
K-Config Example			
Set the audio treble level of output 8 to 7: "#TREBLE 8,7",0x0D Decrease the treble level of output 5 by 1 unit: "#TREBLE 5,--",0x0D			

VOLUME

Functions		Permission	Transparency
Set	**VOLUME**	End User	Public
Get	**VOLUME?**	End User	Public
Description		Syntax	
Set	Set simple audio volume	#**VOLUME**SPout_channel,volumeCR	
Get	Get simple audio volume	#**VOLUME?**SPout_channelCR	
Response			
~nn@**VOLUME**SPout_channel,volumeCR LF			
Parameters			
out_channel – output number: 1-64 (varies according to installed output cards, see Port Numbering on page 12) volume – volume in Kramer units: 0-70, ++ (increase current value), -- (decrease current value)			
Response Trigger			
Notes			
A minus sign precedes negative values Use the AUD-LVL command to set / get the input audio level or the audio level in the amplifier stage.			
K-Config Example			
Set the volume of output 8 to 25: "#VOLUME 8,25",0x0D Increase the volume of output 5 by 1 unit: "#VOLUME 5,++",0x0D			

Using the Packet Protocol

The packet protocol is designed to transfer large amounts of data, such as files, IR commands, EDID data, etc.

To use the packet protocol:

1. Send a command, for example LDEDID

2. Receive READY or ERR###

3. If READY:

   ▪ Send a packet

   ▪ Receive OK on the last packet

   ▪ Receive OK for the command

4. Packet structure:

   ▪ Packet ID (1, 2, 3…) (2 bytes in length)

   ▪ Length (data length + 2 for CRC) - (2 bytes in length)

   ▪ Data (data length -2 bytes)

   ▪ CRC - 2 bytes

01	02	03	04	05…	
Packet ID		Length		Data	CRC

5. Response:

   ~*NNNN*SP**OK**CR LF

Where NNNN is the received packet ID in ASCII hex digits.

When calculating the CRC, the polynomial for the 16-bit CRC is:
CRC-CCITT: $0x1021 = x^{16} + x^{12} + x^5 + 1$
Initial value: 0000
Final XOR Value: 0

For a code example, see: http://sanity-free.org/133/crc_16_ccitt_in_csharp.html

CRC example:
Data = "123456789"
Result => 0x31C3

The warranty obligations of Kramer Electronics Inc. ("Kramer Electronics") for this product are limited to the terms set forth below:

What is Covered

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

What is Not Covered

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

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How Long this Coverage Lasts

The standard limited warranty for Kramer products is seven (7) years from the date of original purchase, with the following exceptions:

1. All Kramer VIA hardware products are covered by a standard three (3) year warranty for the VIA hardware and a standard three (3) year warranty for firmware and software updates; all Kramer VIA accessories, adapters, tags, and dongles are covered by a standard one (1) year warranty.
2. Kramer fiber optic cables, adapter-size fiber optic extenders, pluggable optical modules, active cables, cable retractors, ring mounted adapters, portable power chargers, Kramer speakers, and Kramer touch panels are all covered by a standard one (1) year warranty.
3. All Kramer Cobra products, all Kramer Calibre products, all Kramer Minicom digital signage products, all HighSecLabs products, all streaming, and all wireless products are covered by a standard three (3) year warranty.
4. All Sierra Video MultiViewers are covered by a standard five (5) year warranty.
5. Sierra switchers & control panels are covered by a standard seven (7) year warranty (excluding power supplies and fans that are covered for three (3) years).
6. K-Touch software is covered by a standard one (1) year warranty for software updates.
7. All Kramer passive cables are covered by a ten (10) year warranty.

Who is Covered

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

What Kramer Electronics Will Do

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

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

What Kramer Electronics Will Not Do Under This Limited Warranty

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

How to Obtain a Remedy Under This Limited Warranty

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

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

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KRAMER

CE 22 PAP

P/N: 2900- 300902   Rev: 5

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

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

We welcome your questions, comments, and feedback.

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