KRAMER ELECTRONICS LTD.

USER MANUAL

MODEL:

VS-1616D-MD
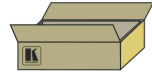16x16 Digital Matrix Switcher

P/N: 2900-300434 Rev 2

VS-1616D-MD Digital Matrix Switcher Quick Start Guide

This guide helps you install and use your product for the first time. For more detailed information, go to **http://www.kramerav.com/manual/VS-1616-MD** to download the latest manual or scan the QR code on the left.

Step 1: Check what's in the box

- ☑ **VS-1616D-MD** 16x16 Digital Matrix Switcher
- ☑ 1 Power cord
- ☑ 1 Set of rack "ears"
- ☑ 4 Rubber feet
- ☑ 1 Quick Start sheet
- ☑ Windows®-based Kramer control software
- ☑ Windows®-based Ethernet Configuration
- ☑ Manager and Virtual Serial Port Manager
- ☑ Kramer RC-IR3 Infrared Remote Control Transmitter with batteries and user manual

Step 2: Install the VS-1616D-MD

Mount the machine in a rack (using the included rack "ears") or attach the rubber feet and place on a table.

Step 3: Connect the inputs and outputs

Always switch off the power on each device before connecting it to your **VS-1616D-**
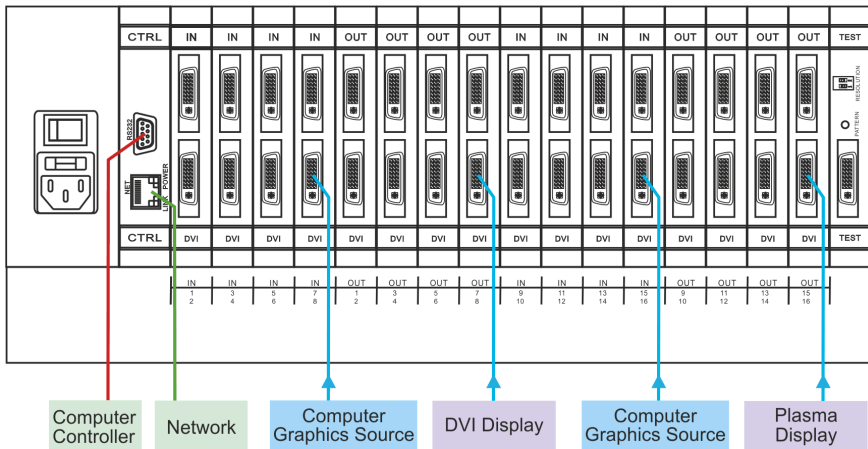
Always use Kramer high-performance cables for connecting AV equipment to the
VS-1616D-MD.

Step 4: Connect the power

Connect the power cord to the **VS-1616D-MD** and plug it into the mains electricity.

Step 5: Configure the VS-1616D-MD

Use the Setup and Config menus to set the device configuration.

Step 6: Operate the VS-1616D-MD

Operate the device using the front panel buttons, IR remote control, RS-232 or Ethernet.

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1 Introduction

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

Our 1,000-plus different models now appear in 14 groups that are clearly defined by function: GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Routers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters and GROUP 11: Sierra Video Products; GROUP 12: Digital Signage; and GROUP 13: Audio, and GROUP 14: Collaboration.

Congratulations on purchasing your Kramer **VS-1616D-MD** *16x16 Digital Matrix Switcher* which is ideal for the following typical applications:

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

Note: Throughout this user manual the chassis configuration is shown with 16 DVI inputs and 16 DVI outputs as a representation only. The following cards are available and may be mixed in the same chassis:

- Analog audio plus digital audio
- DGKat plus RS-232 (HDCP)
- DisplayPort plus analog audio
- DVI
- DVI (HDCP)
- DVI dual link

- HDMI (HDCP)

- HDMI (over 4LC fiber optic cable) with 610 module

- HDMI (over SC fiber optic cable) with 670 module (HDCP), see note below

- HDMI (over HDBaseT) plus IR, RS-232 and Ethernet (HDCP)

- HDMI plus analog audio (HDCP)

- HDMI UHD plus analog audio (HDCP)

- HDMI plus digital audio (HDCP)

- HDMI output scaler (HDCP)

- HDMI UHD (over HDBaseT 70m) plus IR and RS-232 (HDCP)

- SDI plus analog audio

- Test card plus analog audio embedding/de-embedding

- VGA

- VGA plus analog audio

Note: The HDMI over fiber optic with 670 module cards are fully compatible with the Kramer **670T/670R** and **671T/671R** HDMI/DVI transmitters and receivers for non-HDCP content.

2 Getting Started

The following symbols are used in this manual:

Warning: Indicates a possible hazard to life or serious injury to persons

Caution: Recommended procedure which if not followed may result in damage to the equipment or injury to persons

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment

- Review the contents of this user manual

Go to http://www.kramerav.com/downloads/VS-1616D-MD to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

2.1 Achieving the Best Performance

To achieve the best performance:

- Use only good quality connection cables to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)

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

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

- Position your Kramer **VS-1616D-MD** away from moisture, excessive sunlight and dust

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

2.2 Safety Instructions

Warning: No operator serviceable parts inside the unit

Warning: Use only the Kramer Electronics input power wall adapter that is provided with the unit.

Warning: Disconnect the power and unplug the unit from the wall before installing

Warning: To avoid risk of electric shock, this equipment must only be connected to a supply mains with protective earth

Warning: No modification of this equipment is allowed

Warning: Do not install this equipment in a patient environment

2.3 Safety Instructions (Laser)

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

2.4 Compliance with Leakage Current Requirements

To ensure compliance with leakage current requirements in medical systems, the following connections between input and output connectors are allowed:

- Non-optical communication—Medical to medical, non-medical to non-medical, where:
  - Medical—Device certified according to IEC 60601-1
  - Non-medical—Device certified according to other standard(s)

- Optical communication—No restrictions

2.5 Recycling Kramer Products

The Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC aims to reduce the amount of WEEE sent for disposal to landfill or incineration by requiring it to be collected and recycled. To comply with the WEEE Directive, Kramer Electronics has made arrangements with the European Advanced Recycling Network (EARN) and will cover any costs of treatment, recycling and recovery of waste Kramer Electronics branded equipment on arrival at the EARN facility. For details of Kramer's recycling arrangements in your particular country go to our recycling pages at *http://www.kramerelectronics.com/support/recycling/*.

2.6 Medical Electrical Equipment (IEC 60601-1)

In the modern medical environment remote access is essential, for example, to transfer clinical data between doctors and to train to medical students. The **VS-1616D-MD** is certified according to the IEC 60601-1, Clause 2.1.3, Medical Electrical Equipment, Part 1: General Requirements for EMC standard which is required when accessory devices are used at locations where medical personnel and patients are present.

The **VS-1616D-MD** constitutes an optional component that can be considered necessary and suitable as part of medical equipment or for use as part of a medical system to provide real time simultaneous video feeds to those present at the local medical environment and at remote locations. In this environment, the product can be added to the system ONLY if the connecting equipment has been evaluated and meets the IEC 60601-1 safety standards. Note, that when attaching accessory devices to a digital or analog interface, they must comply with the IEC standard for which they are used: Safety Standard (IEC 60601-1), Information Technology equipment (IEC 60950-1 (2ed)).

3　Overview

The Kramer **VS-1616D-MD** is a high performance matrix switcher chassis that supports up to 16 x 16 ports. It features a very high bandwidth of up to 3.2Gbps (for the chassis only, effective bandwidth of the system depends on the I/O cards) 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.

For maximum bandwidth supported by each type of card see the Technical Specifications in Section 13.

The **VS-1616D-MD** is highly configurable–you can add or remove inputs and outputs independently in groups of four and mix different types of input/output cards in the same chassis up to 16 x 16. For example, you can configure a device as a 4 x 12 or a 16 x 8 matrix switcher to exactly suit your needs.

The **VS-1616D-MD** features:

- Full 16 x 16 non-blocking matrix array to switch any of the 16 input digital signals to any or all outputs (with limitations, see Section 6)

- 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

- Fast switching on outputs to reduce or remove switching delay

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

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

- EDID PassThru – Passes EDID/HDCP signals from source to display

- 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

- Equalization and re-clocking on all card types

- Easy access to 59 preset memory locations for quick access to user-defined setups

- The Kramer 2000 Protocol for serial control

- A lock function to prevent tampering with the front panel

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

You can operate the **VS-1616D-MD** via the front panel buttons or remotely via:

- RS-232 serial commands transmitted by a touch screen system, PC or other serial controller

- Ethernet over a LAN

- The infrared remote control transmitter

- Kramer **K-Router Plus** software application

The **VS-1616D-MD** is a sophisticated device but has been designed to be as simple as possible to operate. Due to space limitations on the front panel a keypad substitutes for 64 individual input/output selector buttons. For details of how to route inputs to outputs, see Section 6. The **VS-1616D-MD** is housed in a 19" rack-mountable enclosure.

3.1   About Fast Switching

Older display devices required 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-1616D-MD** allows for fast switching (minor reset and the connection kept alive) and extra fast switching (no reset and the connection kept alive), see <u>Section 8.2.4</u>. 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.

3.2 About HDBaseT™ Technology

HDBaseT™ is an advanced all-in-one connectivity technology (supported by the HDBaseT Alliance). It is particularly suitable in the consumer home environment as a digital home networking alternative where it enables you to replace numerous cables and connectors by a single LAN cable used to transmit, for example, uncompressed full high definition video, audio, IR, as well as various control signals.

The HDBaseT products described in this user manual are HDBaseT certified.

3.3 About the Power Connect™ Feature

The Power Connect™ feature means that the **VS-1616D-MD** can supply power over the TP cable to compatible DGKat devices (for example, the **TP-573** or **TP-574**) when 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 TP cable. For longer distances, use heavier gauge cable (TP cable is still suitable for the video/audio transmission, but not for feeding power at these distances).

4 Defining the VS-1616D-MD 16x16 Digital Matrix Switcher

Figure 1, Figure 2 and Figure 3 define the **VS-1616D-MD**.
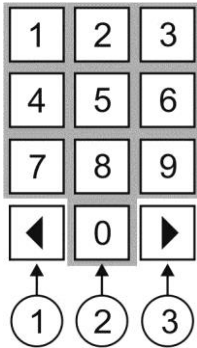
Figure 1: VS-1616D-MD Front Panel Numeric Keypad

\#	Feature	Function
Front Panel Numeric Keypad Labels		
1	◄ (Backwards)	Press to shift the sliding window to the right (The LCD display is large enough to show only 13 cross-points out of a total of 32)
2	*1, 2, 3, 4, 5, 6, 7, 8, 9, 0*	Numeric keypad, 1 to 0
3	► (Forward)	Press to shift the sliding window to the left
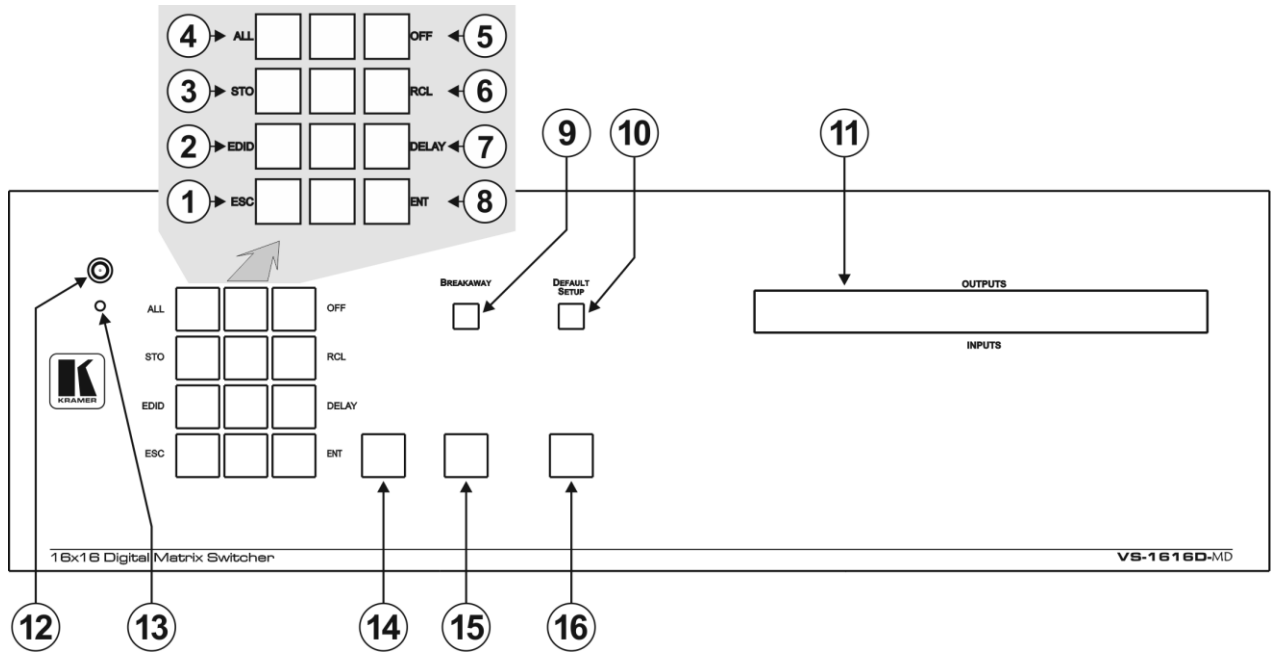
Figure 2: VS-1616D-MD 16x16 Digital Matrix Switcher Front Panel

#	Feature			Function
1	Double-function Selector Button 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. Press to enter the options in a setup menu. (For example, to enter input 5, you can either press 05 or 5, ENT)
9	BREAKAWAY Button			Press to exit a Menu (see Section 8)
10	DEFAULT SETUP Button			Press to recall the default setup (see Section 7.4.5)
11	OUTPUTS/INPUTS LCD Display			Displays the outputs (upper row) switched to the selected inputs (lower row), (see Section 7.1). Displays user interface messages and menus
12	IR Receiver			Infrared remote control sensor
13	IR LED			Lights yellow when receiving commands from the IR remote control transmitter
14	TAKE Button			Press to confirm actions (see Section 7.3.2)
15	MENU Button			Press once to enable the ALL, OFF STO and RCL buttons (see Section 8). Press again to enter the configuration menu (see Section 8.2). When in a Menu, press to cycle through the menu items
16	LOCK Button			Press and hold for approximately 2 sec to lock/unlock the front panel buttons (see Section 7.5)

Figure 3 shows DVI cards installed as an example.
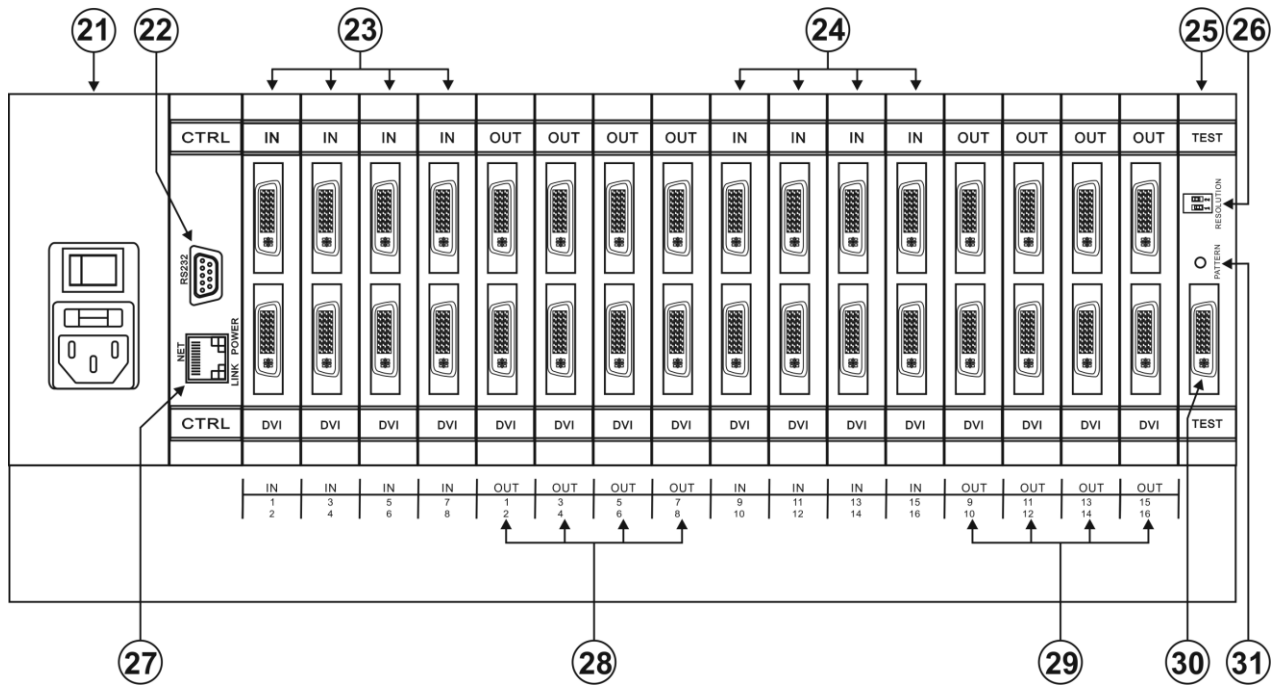
Figure 3: VS-1616D-MD 16x16 Digital Matrix Switcher Rear Panel

#	Feature	Function
21	AC Mains Power Module	Fuse holder and power cord socket. Connect to the AC mains supply
22	*IN 1~16* Connectors	Connect to the relevant video sources, depending on the cards installed (1 to 16, see Section 6)
23	*IN 17~32* Connectors	Connect to the relevant video sources, depending on the cards installed (17 to 32, see Section 6)
24	TEST Module	Signal generator module for testing video outputs (see Section 10)
25	RESOLUTION DIP-switches	Set the resolution for video generated by the Test module (see Section 10.2)
26	RS-232 9-pin D-sub Port	Connects to the remote operation PC or remote controller (see Section 6.2)
27	*NET* Ethernet RJ-45 Connector	Connect to a PC or controller via the Ethernet LAN (see Section 6.5). The *LINK* LED flashes when communication is active. The *POWER* LED lights when the interface receives power
28	OUT 1~16 Connectors	Connect to the relevant video acceptors, depending on the cards installed (1 to 16, see Section 6)
29	OUT 17~32 Connectors	Connect to the relevant video acceptors, depending on the cards installed (17 to 32, see Section 6)
30	PATTERN Button	Press the button repeatedly to change the video pattern generated by the Test module (see Section 10.3)
31	Test Module Output Connector	Connect to one of the relevant video inputs to aid in troubleshooting (see Section 10.4)

5 Installing in a Rack

This section provides instructions for rack mounting the unit.

Before Installing in a Rack

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

Operating temperature range	+5º to +45º C (41º to 113º F)
Operating humidity range	10 to 90% RHL, non-condensing
Storage temperature range	-20º to +70º C (-4º to 158º F)
Storage humidity range	5 to 95% RHL, non-condensing

CAUTION!

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

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

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

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

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

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

How to Rack Mount

To rack-mount a machine:

1. Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (5 on each side), and replace those screws through the ear brackets.
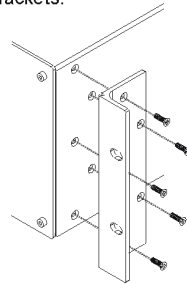
2. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

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

6 Connecting the VS-1616D-MD

The configuration of DVI input/output cards shown in Figure 4 is a sample representation and different I/O cards may be mixed as required (for limitations, see page 17). Exactly the same principles apply to installations using other card types.

> Always switch off the power to all devices before connecting them to your **VS-1616D-MD**. After connecting your **VS-1616D-MD**, connect its power and then switch on the power to each device.
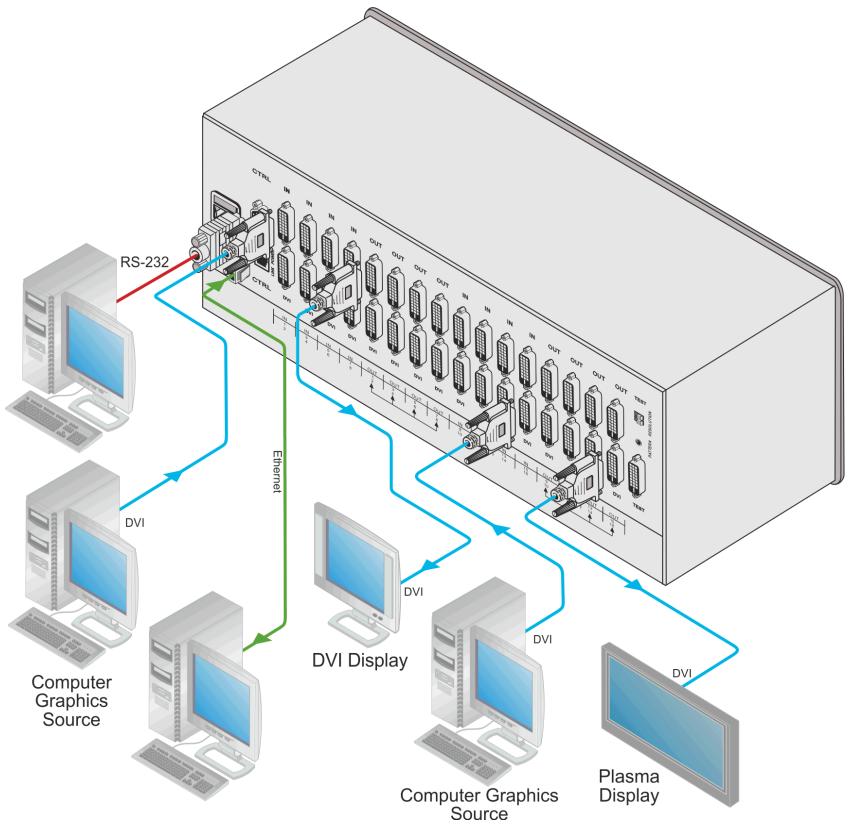
Figure 4: Connecting the VS-1616D-MD 16x16 Digital Matrix Switcher

> ⚠ **Warning:** To avoid risk of electric shock, this equipment must only be connected to a supply mains with protective earth

To install the VS-1616D-MD as illustrated in the example in Figure 4:

1. Connect up to 16 DVI video sources (for example, computer graphics sources).
   In this example only two inputs and two outputs are connected.

2. Connect up to 16 DVI video acceptors, (for example, a plasma display and a DVI LCD display).

3. If required, connect a PC or remote controller to the RS-232 port (see Section 6.2) and/or the Ethernet port (see Section 6.5).

4. Connect the power cord.
   We recommend that you use only the power cord that is supplied with the device (not shown in Figure 4).

5. If necessary, review and set the system configuration using the Menu (see Section 8).

Note: Given an input signal that is HDCP encoded, the **VS-1616D-MD** outputs a signal only if the output port supports HDCP, (for example, HDMI input and DVI with HDCP output).

6.1 Card Limitations

6.1.1 HDBT Input Cards

The chassis is limited to a maximum of three HDBT input cards due to thermal constraints. When installing these input cards they must occupy input slots IN 5~8, IN 9~12, and IN 13~16 (in that order, as needed). Input slot IN 1~4 must be left unpopulated and sealed with a blank cover. Contact Kramer Electronics for more information on installing a fourth HDBT input card.

There is no limit to the number or type of output cards that can be installed.

6.1.2   HDBT7 Input Cards

When using the HDBT7 Input card to support 4K video resolution, the chassis is limited to one input card.

6.2   Port Numbering

On all cards apart from the DVI dual link cards there are four physical ports. The numbering of ports is sequential from top to bottom and left to right. Each DVI dual link card provides two physical ports which causes the loss of two numbers in the numbering sequence of that card only. A sample numbering is shown in Figure 5.
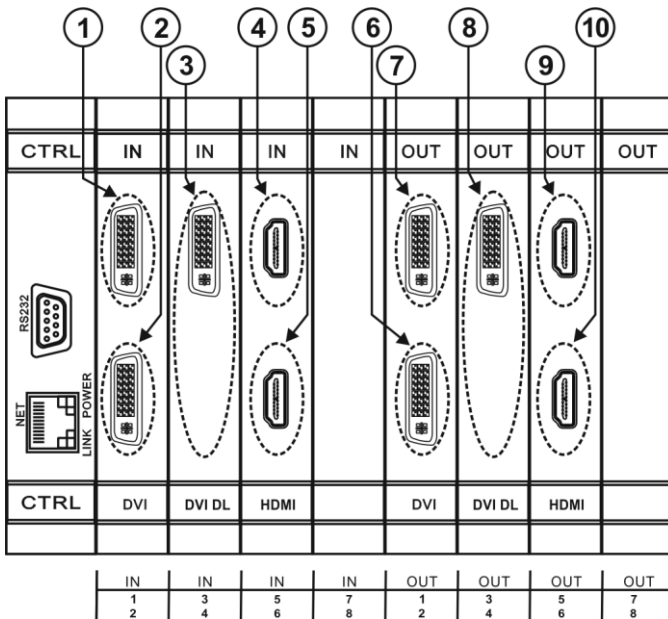
Figure 5: Sample Port Numbering

Diagram #	Actual Port Number	Diagram #	Actual Port Number
1	IN 1	6	OUT 2
2	IN 2	7	OUT 1
3	IN 3	8	OUT 3
4	IN 5	9	OUT 5
5	IN 6	10	OUT 6

Note: There is no IN 4 or OUT 4 because these slots contain DVI dual link cards.

On all cards apart from the DVI dual link cards, there are two physical ports on each card and numbering of ports is sequential from top to bottom and left to right. Each DVI dual link card provides one physical port which causes the loss of one number in the numbering sequence of that card only. A sample numbering is shown in Figure 5 and described in the table that follows it.

6.2.1   EDID Numbering Examples

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

EDID Request	EDID Sent
From OUT 4	Blank (256 bytes of 0xFF)
From IN 8	None (error message displayed)

Note: AV data flow is: **source** > **VS-1616D-MD** > **display**. EDID information flow is: **display** > **VS-1616D-MD** > **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-1616D-MD** Output port 8) has been assigned to all EDID outputs (**VS-1616D-MD** Input ports).

Figure 6: EDID Numbering Assignment

6.3   Serial Data on DGKat Plus RS-232 Cards

Serial data present on the RS-232 port of a DGKat input card is not transmitted via the switcher. This data is transmitted over the TP cable of the same input card (see Figure 7).

Serial data present on the RS-232 port of a DGKat output card are not transmitted via the switcher. This data are transmitted over the TP cable of the same output card.
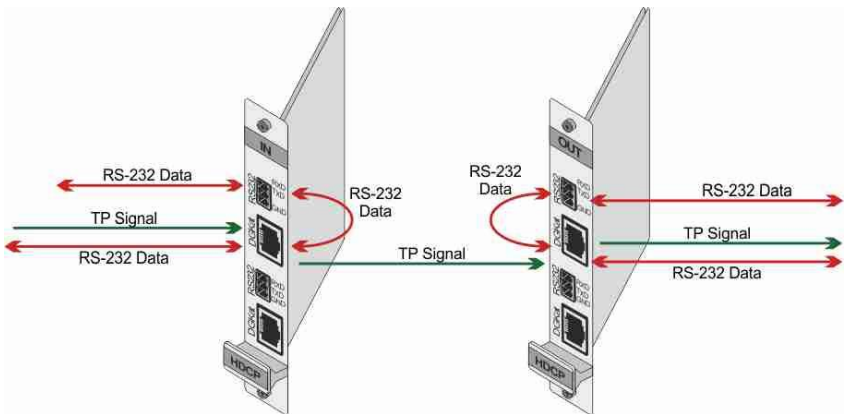
Figure 7: DGKat Card Serial Data Transmission

6.4 Connecting to the VS-1616D-MD via RS-232

You can connect to the **VS-1616D-MD** via an RS-232 connection using, for example, a PC. Note that a null-modem adapter/connection is not required.

Note: Some early devices require a null modem.

To connect to the VS-1616D-MD via RS-232:

- Connect the RS-232 9-pin D-sub rear panel port on the **VS-1616D-MD** 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

6.5 Connecting to the VS-1616D-MD via Ethernet

You can connect to the **VS-1616D-MD** via Ethernet using either of the following methods:

- Directly to the PC using a crossover cable (see Section 6.5.1)

- Via a network hub, switch, or router, using a straight-through cable (see Section 6.5.2)

Note: 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.

6.5.1 Connecting the Ethernet Port Directly to a PC

You can connect the Ethernet port of the **VS-1616D-MD** 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-1616D-MD** with the factory configured default IP address.

After connecting the **VS-1616D-MD** 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 8.
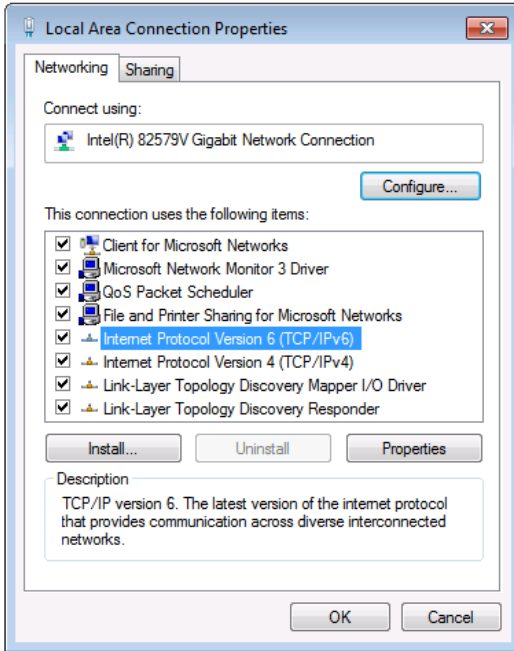
Figure 8: Local Area Connection Properties Window

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 9 or Figure 10.
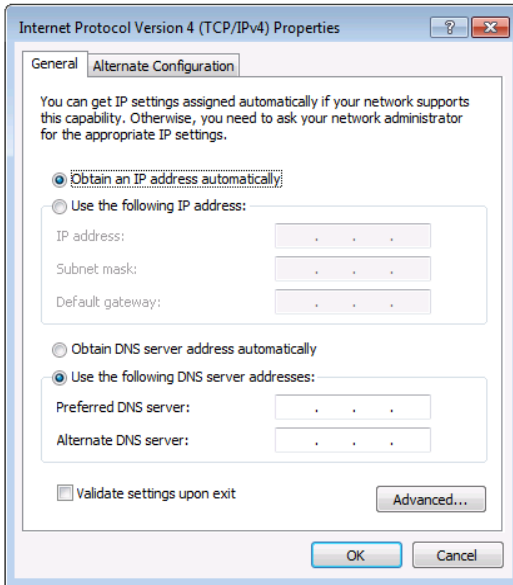
Figure 9: Internet Protocol Version 4 Properties Window
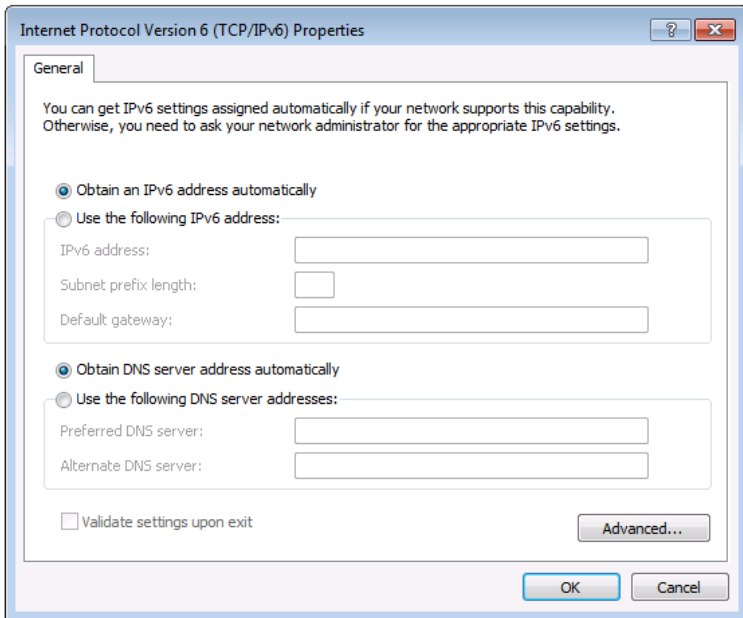
Figure 10: Internet Protocol Version 6 Properties Window

VS-1616D-MD - Connecting the VS-1616D-MD

6. Select **Use the following IP Address** for static IP addressing and fill in the details as shown in Figure 11.

   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.
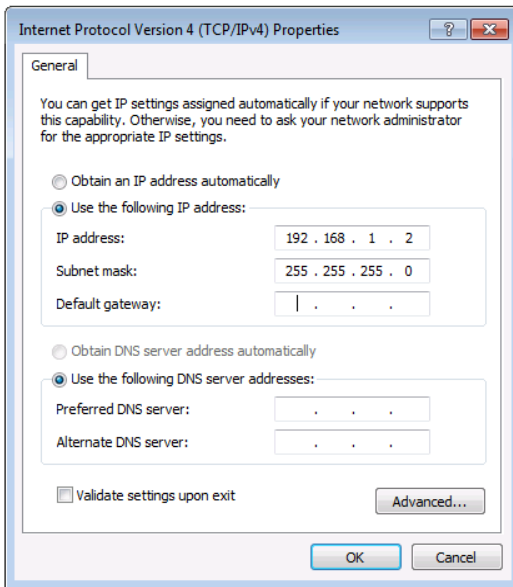
Figure 11: Internet Protocol Properties Window

7. Click **OK**.

8. Click **Close**.

6.5.2 Connecting the Ethernet Port via a Network Hub or Switch

You can connect the Ethernet port of the **VS-1616D-MD** to the Ethernet port on a network hub or using a straight-through cable with RJ-45 connectors.

7 Operating Your Video Matrix Switcher

This section describes:

- The startup display (see Section 7.1)

- Using the selector buttons (see Section 7.2)

- Confirming actions (see Section 7.3)

- Switching options (see Section 7.4)

- Locking the front panel (see Section 7.5)

7.1 Startup Display

After switching on the power, the LCD display shows the following screens in sequence.

The text in the LCD Display may vary (according to machine settings)

```
KRAMER ELECTRONICS, LTD
     16 SERIES MATRIX
```

```
       Load Main Setup
```

```
01 02 03 04 05 06 07 08 09 10 11 12 13
01 02 03 04 05 06 07 08 09 10 11 12 13
```
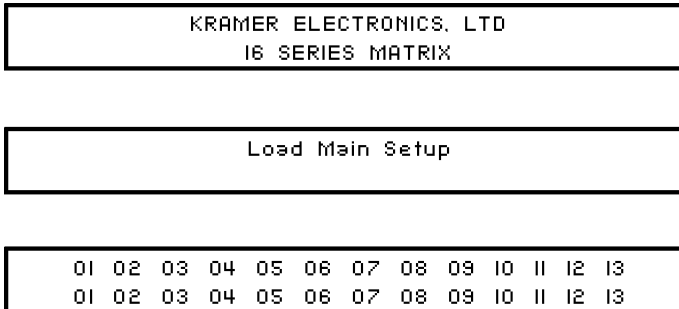
Figure 12: Default Startup Status Display Sequence

The front panel of the **VS-1616D-MD** includes a numeric keypad within the selector buttons area. This keypad lets you enter both the output and input numbers as well as various numeric configuration values (see Section 7.2).

When the unit is powered-on, the last matrix setup that was used is loaded. Use either the recall setup (see Section 8.1.6) or default setup recall (see Section 7.4.5) functions to retrieve other setups.

Records a stored configuration from a preset. For quick retrieval, you can program a default setup that is commonly used.

7.1.1   Viewing the Display

Figure 12 shows the output-input matrix on the LCD display. The LCD display can show 13 out of the 32 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

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

7.2   Using the Selector Buttons

For numbers between 1 and 9, the **VS-1616D-MD** 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 ENT.

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

For example, the following display indicates that inputs 8 and 12 are disconnected from any output (note that in the second line representing these inputs the display is 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.

Note: At any stage, if no button is pressed within approximately 15 seconds, the automatic timeout causes the **VS-1616D-MD** to exit the operation and revert to the output/input display.

7.3 Confirming Actions

You can choose to work in the At Once (default) or the Confirm mode.

For all actions except storing/recalling.

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

7.3.1 Switching between the At Once and Confirm Modes

To switching between the At Once and Confirm modes:

Note: If the TAKE button is flashing you cannot switch between the At Once and Confirm modes. A flashing TAKE button indicates that an action is currently pending confirmation.

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

7.3.2 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.

7.4 Switching Actions

This section describes how to:

- Switch one input to one output (see Section 7.4.1)

- Switch several inputs to several outputs (see Section 7.4.2)

- Turn off several outputs (see Section 7.4.3)

7.4.1 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

7.4.2 Switching Several Inputs to Several Outputs

If you want to switch several inputs to several outputs simultaneously 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):
   In this example, input 9 is set to switch to output 6 and input 5 is set to switch to output
   7.
   `09 => 06   05 => 07`

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.

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7.4.3 Turning an Output Off

Turning an output off 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 1).
   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 Section 7.4.1) and set the input to 00.

7.4.4 Turning Off Several Outputs

To turn off several outputs in the Confirm mode, repeat the switching actions described in Section 7.4.2 but set the inputs to 00.

7.4.5 Recalling the Default Setup

You can store a commonly used setup as the default setup (see Section 8.2.8) which can be recalled at any time.

Note: 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.

7.5   Locking the Front Panel Buttons

You can lock the **VS-1616D-MD** to prevent tampering with the unit or prevent the settings from being changed accidentally via the front panel buttons.

You can still remotely operate via RS-232 or Ethernet even when the front panel is locked

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

8   Using the Configuration Menus

The configuration menus let you configure the **VS-1616D-MD** 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 Section 8.1

- Config Menu—those that are accessed only occasionally (for example, setting the interface or communication protocol), see Section 8.2

- Figure 13 shows the navigation through the menu options.

```
press MENU ────────► Setup Menu ──────── select the option number ────────► 1: inXX=>ALL
                  ┌──── press MENU
                  │     ┌········· Config Menu ·················┐            ► 3: outXX=>OFF
                  │     ┊  IN SIG: Input Signal Detection       ┊
                  │     ┊         │                             ┊            ► 7: EDID
                  │     ┊  IN SET: Input Port Parameter Setting ┊
                  │     ┊         │                             ┊            ► 9: Delay
                  │     ┊  OUT LOAD: Output Load Detection       ┊
                  │     ┊         │                             ┊            ► 4: store setup XX
                  │     ┊  OUT SET: Output Port Parameter Setting┊
                  │     ┊         │                             ┊            ► 6: recall setup XX
                  │     ┊  INTERFACE configuration              ┊
                  │     ┊         │                             ┊
                  │     ┊  interface REPLY configuration        ┊
                  │     ┊         │                             ┊
                  │     ┊  PROTOCOL configuration               ┊
                  │     ┊         │                             ┊
                  │     ┊  store DEFAULT setup                  ┊
                  │     ┊         │                             ┊
                  │     ┊  TOTAL MATRIX RESET                   ┊
                  │     ┊         │                             ┊
                  │     ┊  Main & Front Firmware Versions       ┊
                  └─────┊·································          ┊
```

Figure 13: Menu Tree

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

8.1 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 Section 8.1.1)

- **3: outXX=OFF**, turning off an output (see Section 8.1.2)

- **7: EDID**, assignment to an output (see Section 8.1.3)

- **9: Delay** setting for an output (see Section 8.1.4)

- **4: store setup XX**, storing the setup in a preset (see Section 8.1.5)

- **6: recall setup XX**, recalling a preset (see Section 8.1.6)

8.1.1 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 1).
   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.

8.1.2 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 1).
   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.

8.1.3 Setup Menu—7: EDID, Assignment to an Input

This option assigns an EDID to between one and eight inputs which are stored in non-volatile memory. More than eight EDID assignments must be assigned in separate batches of eight.

Each input on the **VS-1616D-MD** has a factory default EDID loaded (see Section 16). The EDID for each input can be changed independently via the menu (described below).

Note: 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 1).
   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:
   ```
   00 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.

7. Repeat the above steps for the next batch of eight EDID assignments.

To view the EDID assignments:

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

2. Press 7 (EDID) on the numeric keypad (see <u>Figure 1</u>).
   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
   ```

8.1.4   Setup Menu—9: Delay, Setting for an Output

Some displays require a delay in the negotiation of data between the display and
the switcher for reliable negotiation of data between them. 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 <u>Figure 1</u>).
   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.

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

This option stores the current setup in a preset (1 to 59).

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 1).

The following is displayed:

```
store => __
```

3. Using the numeric keys, enter the preset (1 to 59) 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.

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

This option recalls a stored configuration from a preset (1 to 59).

To recall a stored configuration:

1. Press MENU.

The Setup Menu options are displayed.

2. Press 6 (RCL) on the numeric keypad (see Figure 1).

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.

8.2   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 (Section 8.2.1)

- Input port parameter setting (see Section 8.2.2)

- Output load detection (Section 8.2.3)

- Output port parameter setting (see Section 8.2.4)

- Interface configuration (Section 8.2.5)

- Interface Reply configuration (Section 8.2.6)

- Protocol configuration (Section 8.2.7)

- Storing the default setup (Section 8.2.8)

- Resetting the **VS-1616D-MD** (Section 8.2.9)

- Firmware revision display (Section 8.2.10)

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 ENT 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.

8.2.1 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 ENT to change them
   ```

2. Press MENU.

The following is displayed:

```
IN:   01 02 03 04 05 06 07 08 09 10 11
SIG:  Y  X  Y  Y  Y  Y  X  Y  Y  Y  X
```

Y 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

8.2.2 Config Menu—Input Port Parameter Setting

This option sets input port specific parameters. Ports that show an X have no parameters available to modify. Ports that show a 0 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 input 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 ENT to change them
```

2. Press MENU until a display similar to the following is shown:

```
IN:   01 02 03 04 05 06 07 08 09 10 11
SET:  X  X  X  X  0  0  0  0  X  X  X
```

X indicates that there are no modifiable parameters for the associated port and 0 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:

   ```
   IN:   06
   SET: 36.Reset SubBoard
   ```

6. To select the next parameter press the right arrow button. (See the table at the end of this section 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.

   Note: The parameter change is not implemented 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

The following tables list the input card types and their relevant parameters.

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

Note: The volume control provides only attenuation, no gain. Hence, setting volume to 100% provides no attenuation.

Analog Audio plus Digital Audio Input Card		
Parameter	**Description**	**Default**
Pattern	RGB Bar, Black	RGB Bar
Reset Input	Re-power: Power cycles the port. Factory Reset: Performs a factory reset of the port to default values	Re-power
Audio Select	Auto. AUD-Digital: Digital audio is selected. AUD-Analog: Analog audio from the 3.5mm mini jack is selected	Auto
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. **Note**: Not applicable when digital audio is selected	Non-MUTE
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. Applies to analog inputs and outputs only	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

DGKat plus RS-232 Input Card		
Parameter	**Description**	**Default**
HDCP	Turn HDCP on and off *0=EN, 1=DIS	0

DisplayPort plus Analog Audio Input 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
HDCP	Turn HDCP on and off . *0=EN, 1=DIS	0
Audio Select	Auto—Audio signal selection is controlled by the presence or absence of a plug in the 3.5mm mini jack. AUD-Embedded—HDMI audio is selected. AUD-Analog—Analog audio is selected	Auto
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

DVI (HDCP) Input Card		
Parameter	**Description**	**Default**
HDCP	Turn HDCP on and off. *0=EN, 1=DIS	0

HDMI (HDCP) Input Card		
Parameter	**Description**	**Default**
HDCP	Turn HDCP on and off. *0=EN, 1=DIS	0

HDMI (over fiber optic cable) with 670 module Input Card		
Parameter	**Description**	**Default**
HDCP	Turn HDCP on and off . *0=EN, 1=DIS	0

HDMI (over HDBT) plus IR, RS-232 and Ethernet Input Card		
Parameter	**Description**	**Default**
HDCP	Turn HDCP on and off. *0=EN, 1=DIS	0
XTRA	Enables range extender. Off for distances of up to 100m at 1080p @60Hz @36bpp; On for distances of up to 150m at 1080p @60Hz @24bpp *0:ON, 1:OFF **Note**: The range can be increased by approximately 30% by using Kramer high quality cables, such as, the BC-HDKat6a	1

HDMI plus Analog Audio Input Card		
Parameter	**Description**	**Default**
Reset Input	Re-power: Power cycles the port. Factory: Performs a factory reset to default values of the port	Re-power
HDCP	Turn HDCP on and off. *0=EN, 1=DIS **Note**: Analog audio is still transmitted when HDCP is disabled	0
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	Non-MUTE
Audio Select	AUD-Digital: Digital audio is selected. AUD-Analog: Analog audio from the 3.5mm mini jack is selected	AUD-Digital

HDMI UHD plus Analog Audio Input Card

Parameter	Description	Default
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	Non-MUTE
Audio Select	AUTO: If a plug is inserted into the 3.5mm mini jack, analog audio is selected. If no plug is inserted, digital audio is selected. AUD-Digital: Digital audio is selected. AUD-Analog: Analog audio from the 3.5mm mini jack is selected. **Note**: This parameter is not displayed when the ST parameter is set to either 1 or 2	AUTO
ST	Selects the manner in which the analog audio port functions. ST=0: Input. If an analog source is connected, the port acts as an input and embeds the audio into the HDMI signal that goes to the matrix. ST=1: Output. The audio is de-embedded from the HDMI source and is output as analog audio. (**Note**: The 3.5mm mini jack connector acts as an output in this case!) ST=2: ARC. The audio is taken from the 3.5mm mini jack connector and sent to the ARC device which is connected to the HDMI input	0
HDCP	Turn HDCP on and off. *0=EN, 1=DIS **Note**: Analog audio is still transmitted when HDCP is disabled	0
Reset Input	Re-power: Power cycles the port. Factory: Performs a factory reset to default values of the port	Re-power

HDMI plus S/PDIF Audio Input Card		
Parameter	Description	Default
Reset Input	Re-power: Power cycles the port. Factory: Performs a factory reset to default values of the port	Re-power
HDCP	Turn HDCP on and off. *0=EN, 1=DIS	0
Audio Select	Auto: Audio signal selection is controlled by the presence or absence of a plug in the 3.5mm mini jack. AUD-Embedded: HDMI audio is selected. AUD-Ex-Digital: S/PDIF audio is selected (only works on HDMI plus S/PDIF card)	Auto

HDMI UHD (over HDBaseT 70m) plus IR and RS-232 Input Card		
Parameter	**Description**	**Default**
HDCP	Turn HDCP on and off. *0=EN, 1=DIS	0

SDI plus Analog Audio Input Card		
Parameter	**Description**	**Default**
Color Space	RGB, YUV422, YUV444	RGB
Reset Input	Re-power: Power cycles the port. Factory default: Performs a factory reset to default values of the port	Re-power
Audio Select	Auto: Audio signal selection is controlled by the presence or absence of a plug in the 3.5mm mini jack. AUD-Embedded: HDMI audio is selected. AUD-Analog: Analog audio is selected	Auto
SDI_AUDIO_ SWITCH	Selects the SDI audio channel 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	0

Test Video plus Analog Audio Card Input		
Parameter	**Description**	**Default**
Reset Input	Re-power: Power cycles the port Factory: Performs a factory reset to default values of the port	Re-power
Audio Select	Auto: Audio signal selection is controlled by the presence or absence of a plug in the 3.5mm mini jack. AUD-Embedded: HDMI audio is selected. AUD-Analog: Analog audio is selected	Auto
Volume	Sets the audio output volume (0–70)	35
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	Non-MUTE

VGA plus Analog Audio Input Card		
Parameter	**Description**	**Default**
Resolution Detect	Auto, User Defined, Auto Adjust, (see note below table)	Auto
Phase Mode	Auto, User Define, 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: Performs a factory reset of the port to default values	Re-power
Hor-Total Pixels	Set the value for total horizontal pictures. (0–9999)	As detected
Horizontal-Start	Set the value for horizontal start. (0–16383)	As detected
Horizontal-Active	Set the value for horizontal active pixels. (0–16383)	As detected
Vertical-Start	Set the value for vertical start. (0–255)	As detected
Vertical-Active	Set the value for vertical active pixels. (0–16383)	As detected
Restore Setup	(1–36)	1
Recall Setup	(1–32)	1
Save Timing Para	(0–127)	0
Recall Timing Para	(0–127)	0
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

Note: The Auto Adjust feature requires the device to re-calculate 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, you should either reset to factory setting with the relevant source connected or connect a different source.

8.2.3 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, ENT to change them
   ```

2. Press MENU until the following is displayed:
   ```
   OUT:  01 02 03 04 05 06 07 08 09 10 11
   LOAD: Y  X  Y  Y   Y  Y  X  Y  Y  Y X
   ```

   Y 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

8.2.4 Config Menu—Output Port Parameter Setting

This option sets port specific parameters. Ports that show an X have no parameters available to modify. Ports that show a 0 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 ENT to change them
   ```

2. Press MENU until a display similar to the following is shown:
```
OUT:  01 02 03 04 05 06 07 08 09 10 11
SET:  X  X  X  X  0  0  0   0  X  X X
```

X indicates that there are no modifiable parameters for the associated port and 0 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: 36.Reset SubBoard
```

6. To select the next parameter press the right arrow button. (See the table at the end of this section 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.
Note: 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

The following tables list the output port types and their relevant parameters.

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

Analog Audio plus Digital Audio Output Card		
Parameter	**Description**	**Default**
Reset Output	Re-power: Power cycles the port Factory Reset: Performs a factory reset of the port to default values	Re-power
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 output Non-MUTE: Unmutes the audio output **Note**: When set to Mute, any change to the audio parameters automatically sets this to unmute **Note**: Not applicable when digital audio is selected	Non-MUTE
Audio MONO	OFF—Analog output is stereo MIX—Analog output is mono	OFF

DGKat plus RS-232 Output Card		
Parameter	**Description**	**Default**
HDMI	Sets the output signal format (Display, HDMI, DVI). Display—the output is set automatically based on the EDID of the connected display. DVI—Force the output to be DVI. HDMI—Force the output to be HDMI. **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. **Note**: Deep color on DGKat is not supported at higher resolutions (1080p @50/60Hz or WUXGA). When setting deep color to on, ensure that the resolution does not exceed the DGKat maximum data rate of 4.95Gbps (1.65Gbps per graphic channel)	Off
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) by reducing color depth to 8-bits	Normal Switch

DisplayPort plus Analog Audio Card Output		
Parameter	**Description**	**Default**
Reset Output	Re-power—Power cycles the port Factory—Performs a factory reset to default values of the port	Re-power
Audio Mute	MUTE—Mutes the audio input Non-MUTE—Unmutes the audio input	Non-MUTE
Volume	Sets the audio output volume (0–100)	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	MIX

DVI (HDCP) Output Card		
Parameter	**Description**	**Default**
HDMI	Sets the output signal format (Display, HDMI, DVI). Display—The output is set automatically based on the EDID of the connected display. DVI—Force the output to be DVI. HDMI—Force the output to be HDMI. **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) by reducing color depth to 8-bits	Normal Switch

HDMI (HDCP) Output Card		
Parameter	**Description**	**Default**
HDMI	Sets the output signal format (Follow input, HDMI, DVI). Display—The output is set automatically based on the EDID of the connected display. DVI—Force the output to be DVI. HDMI—Force the output to be HDMI. **Note**: When selecting the DVI option and fast switching is enabled, you must ensure that the source is DVI compatible	Follow
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) by reducing color depth to 8-bits	Normal Switch

HDMI (over fiber optic cable) with 670 module (HDCP) Output Card		
Parameter	**Description**	**Default**
HDMI	Sets the output signal format (Display, HDMI, DVI). Display—The output is set automatically based on the EDID of the connected display. DVI—Force the output to be DVI. HDMI—Force the output to be HDMI. **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) by reducing color depth to 8-bits	Normal Switch

HDMI (over HDBT) plus IR, RS-232 and Ethernet Output Card		
Parameter	**Description**	**Default**
HDMI	Sets the output signal format (Display, HDMI, DVI). Display—The output is set automatically based on the EDID of the connected display. DVI—Force the output to be DVI. HDMI—Force the output to be HDMI. **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) by reducing color depth to 8-bits	Normal Switch
XTRA	Enables range extender. Off for distances of up to 100m at 1080p @60Hz @36bpp; On for distances of up to 150m at 1080p @60Hz @24bpp *0:ON, 1:OFF **Note**: Using Kramer high quality cables such as the BC-HDKat6a can increase the range by approximately 30%	1

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HDMI UHD plus Analog Audio Output Card		
Parameter	**Description**	**Default**
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 output. Non-MUTE: Unmutes the audio output. **Note**: When set to Mute, any change to the audio parameters automatically sets this to unmute	Non-MUTE
Audio Mono	OFF—Analog output is stereo MIX—Analog output is mono	OFF
Audio Select	AUTO: If a plug is inserted into the 3.5mm mini jack, analog audio is selected. If no plug is inserted, digital audio is selected. AUD-Digital: Digital audio is selected. AUD-Analog: Analog audio from the 3.5mm mini jack is selected. **Note**: This parameter is not displayed when the ST parameter is set to either 1 or 2	AUTO
ST	Selects the manner in which the analog audio port functions. 0=Input. If an analog source is connected, the 3.5mm mini jack connector acts as an input and embeds the audio into the HDMI output signal. 1=Output. The audio is de-embedded from the HDMI signal routed to this card, and is output as analog audio with the 3.5mm mini jack connector acting as an output. 2=ARC. The audio is taken from the sink that supports ARC and is output as analog audio on the 3.5mm mini jack connector	1
Switch Speed	When switching between different sources the switching time can be reduced by setting the fast switch level (Fast Switch or Normal Switch) by reducing color depth to 8-bits	Normal Switch
Reset Output	Re-power: power cycle the port Factory default: perform a factory reset of the port to default values	Re-power

HDMI plus Analog Audio Output Card		
Parameter	**Description**	**Default**
Reset Output	Re-power: power cycle the port Factory default: perform a factory reset of the port to default values	Re-power
HDMI	Sets the output signal format (Follow input, HDMI, DVI). Display—the output is set automatically based on the EDID of the connected display. DVI—Force the output to be DVI. HDMI—Force the output to be HDMI. **Note**: When selecting the DVI option and fast switching is enabled, you must ensure that the source is DVI compatible	Follow
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) by reducing color depth to 8-bits	Normal 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 output Non-MUTE: unmutes the audio output **Note**: When set to Mute, any change to the audio parameters automatically sets this to unmute	Non-MUTE
Audio Mono	OFF—Analog output is stereo MIX—Analog output is mono	OFF

HDMI plus S/PDIF Audio Output Card		
Parameter	**Description**	**Default**
Reset Output	Re-power: power cycle the port Factory default: perform a factory reset to default values of the port	Re-power
HDMI	Sets the output signal format (Follow input, HDMI, DVI). Display—the output is set automatically based on the EDID of the connected display. DVI—Force the output to be DVI. HDMI—Force the output to be HDMI. **Note**: When selecting the DVI option and fast switching is enabled, you must ensure that the source is DVI compatible	Follow
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) by reducing color depth to 8-bits	Normal Switch

HDMI Scaler Output Card		
Parameter	**Description**	**Default**
HDMI	Sets the output signal format. 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	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
Reset Output	Re-power—Power cycle the port. Factory default—Perform a factory reset to default values of the port	Re-power
Video-Freeze	Freezes/unfreezes the output video. Off On	Off
Picture Aspect Ratio	Sets the picture aspect ratio. Full Crop Best-Fit	Best-Fit
Out Resolution	Sets the output video resolution. 640x480x60 1024x768x60 1280x1024x60 1600x1200x60 (see note below table) 1920x1080px60 1920x1080px50 1280x720px60 1280x720px50 720x480px60 800x600x60 1900x1200x60 (see note below table) 720x576px50 Native	1920x1080px 60
FPGA VER: 7D-03		
FW VER: 4.0_0006		
SPEC VER:0107		
DB: 21200025C30 00	0 1	0

Note: To ensure a stable output signal using either WUXGA (1920X1200) or UXGA (1600X1200), set the output to 8 bit color depth in the Deep Color menu.

HDMI UHD (over HDBaseT 70m) plus IR and RS-232 Output Card		
Parameter	**Description**	**Default**
Reset Output	Re-power: power cycle the port Factory default: perform 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. DVI—Force the output to be DVI. HDMI—Force the output to be HDMI. **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) by reducing color depth to 8-bits	Normal Switch

Test Video plus Analog Audio Card Output		
Parameter	**Description**	**Default**
Reset Input	Re-power: power cycles the port Factory: 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. DVI—Force the output to be DVI. HDMI—Force the output to be HDMI. **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) by reducing color depth to 8-bits	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

VGA 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) by reducing color depth to 8-bits	Normal Switch
Reset Output	Re-power: power cycle the port Factory default: perform a factory reset to default values of the port	Re-power

VGA plus Analog Audio Output Card		
Parameter	**Description**	**Default**
Reset Output	Re-power: power cycles the port Factory: 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) by reducing color depth to 8-bits	Normal Switch
Hor-Total Pixels	Set the value for total horizontal pictures. (0–9999)	As detected
Horizontal-Start	Set the value for horizontal start. (0–16383)	As detected
Horizontal-Active	Set the value for horizontal active pixels. (0–16383)	As detected
Vertical-Start	Set the value for vertical start. (0–255)	As detected
Vertical-Active	Set the value for vertical active pixels. (0–16383)	As detected
Save Timing Para	(0–127)	0
Recall Timing Para	(0–127)	0
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
OUT_HSYNC_ INVERT	Sets the H_SYNC invert. (0, 1)	0
OUT_VSYNC_ INVERT	Sets the V_SYNC invert. (0, 1)	0

8.2.5 Config Menu—Interface Configuration

This option lets you activate or deactivate the IR (infrared) and Ethernet interfaces.

To activate or deactivate the IR or Ethernet interfaces:

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

2. Press MENU until the following is displayed:
   ```
   INTERFACE configuration
   current:IR-ON      Ethernet-ON
   ```

   The current status of the IR and Ethernet interfaces is displayed.

3. Press ENT to select the Interface Submenu.

4. Select 1 to modify the status of the IR interface or 2 to modify that status of the Ethernet interface (in this example, 2).
   The following is displayed:
   ```
   Ethernet interface setup
   1:make it ACTIVE        2:turn it OFF
   ```

5. Press 1 to activate the interface or 2 to deactivate it.

6. Press TAKE to confirm the action.
   The interface status is changed. After a few seconds the next option on the Config Menu is displayed.

8.2.6 Config Menu—Interface Reply Configuration

This option lets you switch the Reply configuration on or off. Setting Reply to on causes all interfaces that are set to on to accept and execute commands, and also to reply. Setting Reply to off causes all interfaces that are set to on to accept and execute commands, but not to reply.

To switch the Reply configuration on or off:

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

2. Press MENU until the following is displayed:
   ```
   interface REPLY configuration
   current interface REPLY - ON
   ```

   This indicates the current Reply configuration status.

3. Press ENT to enter the Reply Submenu.
   The following is displayed:
   ```
   interface REPLY configuration
   1:turn REPLY ON        2:never REPLY
   ```

4. Press 1 to switch Reply on or 2 to switch it off.

5. Press TAKE to confirm the action.
   A message is displayed indicating the new status of the Reply configuration.
   After a few seconds the next option on the Config Menu is displayed.

8.2.7 Config Menu—Protocol Configuration

The **VS-1616D-MD** supports Kramer Protocol 2000 and Protocol 3000.

To switch from Protocol 3000 (default) to Protocol 2000:

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

2. Press MENU until the following is displayed:
   ```
   PROTOCOL configuration
   Current: Kramer-3000
   ```

   This indicates the current Protocol setting.

3. Press ENT to enter the Reply Submenu.

The following is displayed:
```
PROTOCOL configuration
1:KRAMER-2000    2:KRAMER-3000
```

4. Press 1 to switch to Protocol 2000.

The following is displayed:
```
Set PROTOCOL to KRAMER-2000?
press TAKE to confirm
```

5. Press TAKE to confirm the action.

A message is displayed indicating the new Protocol status. After a few seconds the next option on the Config Menu is displayed.

8.2.8 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 Section 7.4.5).

Note: 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 ENT 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.

8.2.9 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 ENT to change them
```

2. Press MENU until the following is displayed:

```
TOTAL MATRIX RESET
exit = ESC        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.

> **Warning:** 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.

8.2.10 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 ENT to change them
   ```

2. Press MENU until the following is displayed:
   ```
   Main Firmware Version:  1.0
   Front Firmware Version: 1.0
   ```

3. Either press BREAKAWAY to exit the Config Menu or wait approximately 15 seconds for the operation to time out.

9 Configuring the Number of Installed Input and Output Ports

After installing or removing a module you need to set the number of input and output ports so that the **VS-1616D-MD** recognizes the new configuration. Refer to Section 6.2 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: 0  MaxInput:32  MaxOutput:32
   ```

Note: The number of input and output ports can only be set in units of four, for example, 4 x 4, 32 x 4 or 12 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.

10 Installing and Using the Test Module to Troubleshoot Video Problems

The **VS-1616D-MD** includes a test module which acts as a signal generator and can be used to diagnose video/audio issues in an operating environment.

The test module must be installed in the configuration before it can be used. When installing the test module, the number of configured inputs and outputs must be increased by one. For example:

- If your **VS-1616D-MD** has four inputs and eight outputs, you must configure the **VS-1616D-MD** as 5 x 9

- If your **VS-1616D-MD** has 16 inputs and 16 outputs, you must configure the **VS-1616D-MD** as 17 x 17

10.1 Installing the Test Module

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:32  MaxOutput:32
   ```

   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).

6. Power cycle the device.

The test module is now installed and may be used.

10.2 Setting the Resolution of the Generated Video

The test module generates a range of both PC and HD resolutions which are selected by a combination of DIP-switches and an on-board jumper (labeled **#1**). 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 as listed in the tables below.

Available PC Resolutions for Generated Video (Jumper off)		
DIP-switch Position		Resolution
1	2	
OFF	OFF	1024 x 768 @60Hz (default)
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
ON	OFF	720p
OFF	ON	1080i
ON	ON	1080p

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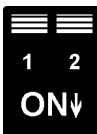
Figure 14: Resolution DIP-switch

10.3 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.

10.4 Using the Test Module to Troubleshoot Video Problems

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

The following examples are based on the signal paths shown in Figure 15 and a **VS-1616D-MD** device installed as follows:

- 16 inputs and 16 outputs

- The test module is installed and configured (see Section 10.1)

- 17 configured inputs and 17 configured outputs (see Section 9)
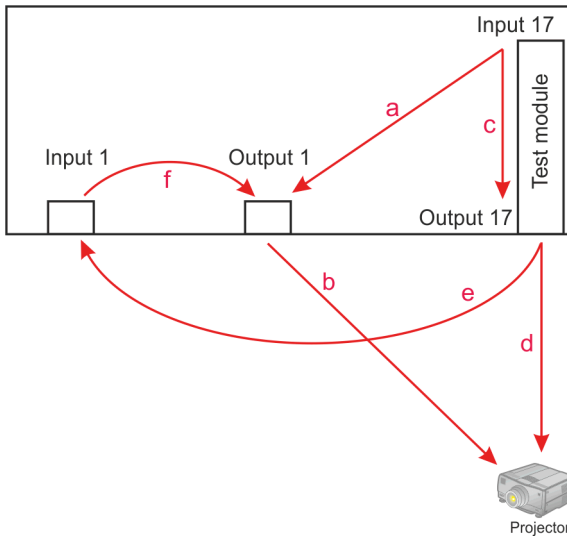
Figure 15: Signal Paths for Isolating Problems

10.4.1 Testing the Projector Output

Signal path: c to d; d to projector

To test the projector output:

1. Configure Input 17 to Output 17 (see [Section 7.4](#)).

2. Connect Output 17 to the projector.

3. Set the generated video resolution (see [Section 10.2](#)).

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

5. Verify that the projector output is as expected.

10.4.2 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 17 to Output 1 (see [Section 7.4](#)).

2. Connect Output 1 to the projector.

3. Set the generated video resolution (see [Section 10.2](#)).

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

5. Verify that the projector output is as expected.

10.4.3 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 17 to Output 33 (see [Section 7.4](#)).

2. Connect Output 17 to Input 1.

3. Configure Input 1 to Output 1.

4. Connect Output 1 to the projector.

5. Set the generated video resolution (see [Section 10.2](#)).

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

7. Verify that the projector output is as expected.

11 Hardware Installation Instructions

11.1 I/O Card Installation

The **VS-1616D-MD** I/O cards mount in one of the 16 slots on the rear of the **VS-1616D-MD** chassis. Slots are numbered from left to right and must be filled consecutively from left to right, **without leaving empty slots**.

WARNING: An input card must only be mounted in a slot designated for input cards (slots IN 1 to 4 and IN 9 to 12) and an output card must only be mounted in a slot designated for output cards (slots OUT 5 to 8 and OUT 13 to 16).
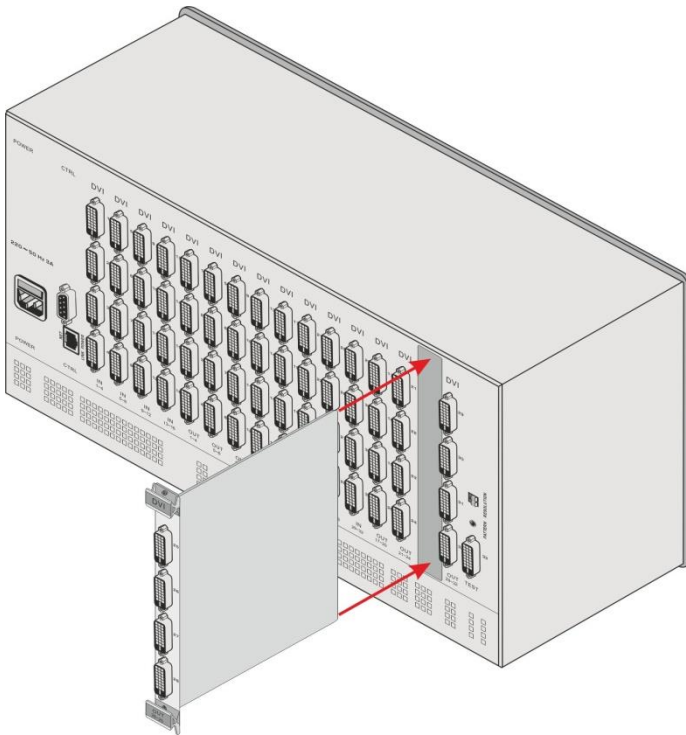
Figure 16: Inserting the Card into a Slot

To install an I/O card as shown in **:**

1. Power off the **VS-1616D-MD** and all devices connected to it.

2. Using a Phillips screwdriver, loosen the screws at the top and bottom of the blanking plate.

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 upper and lower handle, align the card with the plastic guide rails (see).

Figure 17: Card Handles

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-1616D-MD** and follow the procedure to configure the new card (see <u>Section 9</u>).

10. Power on the peripheral devices.

12 Upgrading the VS-1616D-MD Firmware

Upgrading the firmware on the **VS-1616D-MD** can only be done by authorized service personnel.

13   Technical Specifications

BANDWIDTH:	Supports up to 3.2Gbps bandwidth per channel (limited by the cards installed)
MAX RESOLUTION:	Up to UXGA; 1080p
CONTROLS:	Front panel buttons, Infrared remote control transmitter, RS-232, Ethernet
SWITCHING:	Confirm or At Once for immediate switching
POWER CONSUMPTION:	100-240V AC, 50/60Hz, 135VA
OPERATING TEMPERATURE:	0° to +50°C (32° to 122°F)
STORAGE TEMPERATURE:	–45° to +72°C (–49° to 162°F)
HUMIDITY:	10% to 90%, RHL non-condensing
COOLING:	Forced air, fan
ENCLOSURE TYPE:	Aluminium
RACK MOUNT:	With supplied rack "ears"
DIMENSIONS:	19" 4U (47.5cm x 37cm x 18cm W, D, H)
PRODUCT WEIGHT:	7.45kg (16.42lbs) approx.
SHIPPING WEIGHT:	8.75kg (19.29lbs) approx.
VIBRATION:	ISTA 1A in carton (International Safe Transit Association)
SAFETY REGULATORY COMPLIANCE:	CE, FCC
MTBF:	10 years
ENVIRONMENTAL REGULATORY COMPLIANCE:	Complies with appropriate requirements of RoHs and WEEE
INCLUDED ACCESSORIES:	Power cord, Infrared remote control transmitter
Specifications are subject to change without notice at http://www.kramerelectronics.com	

The following table lists the technical specifications of the cards that are compatible with the **VS-1616D-MD** chassis.

Card	Ports	Bandwidth per Channel	Total Bandwidth	Compliance	3D Pass Through
DVI	2 DVI-D on a DVI Molex 24-pin (F) connector	1.65Gbps	4.955Gbps	DVI 1.0	
DVI Dual Channel	1 DVI-D on a DVI Molex 24-pin (F) connector	3.3Gbps	9.9Gbps	DVI 1.0	
HDCP	2 DVI-D on a DVI Molex 24-pin (F) connector	2.25Gbps	6.75Gbps		
HDMI	2 HDMI	2.25Gbps	6.75Gbps		
HDMI plus Digital Audio	2 HDMI 2 Digital audio on an RCA connector	2.25Gbps	6.75Gbps	HDCP/HDMI	Yes
HDMI plus Analog Audio	2 HDMI 2 Analog audio on 3.5mm mini jacks	2.25Gbps	6.75Gbps		
HDMI (SC Fiber Optic)	2 SC	2.25Gbps	6.75Gbps		
DVI (4LC Fiber Optic1)	2 4 LC	1.65Gbps	4.95Gbps	DVI 1.0	
HDMI (F-6702)	2 SC	2.25Gbps	6.75Gbps	HDCP/HDMI	
DGKat3 plus RS-232	2 TP DGKat ports on RJ-45 2 Serial ports on 3-pin terminal blocks	Video: 1.65Gbps Serial Data: 19200	Video: 4.95Gbps (See note below table) Serial Data: 19200	HDCP/HDMI	
HDBaseT4	2 HDBaseT TP on RJ45 connectors 2 RS-232 Serial ports and 2 IR ports on a 10-pin terminal block 1 Ethernet port on an RJ-45 connector	Video: 2.25Gbps Serial Data: 115200	Video: 6.75Gbps Serial Data: 115200	HDCP/HDMI/ HDBaseT	Yes
HDBaseT Lite	2 HDBaseT TP on RJ45 connectors 2 RS-232 Serial ports and 2 IR ports on a 10-pin terminal block	Video: 2.97Gbps Serial Data: 115200	Video: 8.91Gbps Serial Data: 115200	HDCP/HDMI/ HDBaseT	
VGA	2 VGA on 15-pin HD connectors				

1 Multi-mode glass fiber cables with LC connections must be used, such as the Kramer C-4LC/4LC

2 Multi-mode glass fiber cables with SC connections must be used, such as the Kramer C-SC/SC/OM3

3 Twisted pair cables with RJ-45 connections must be used, such as the Kramer BC-DGKat623

4 Twisted pair cables with RJ-45 connections must be used, such as the Kramer BC-HDKat6a

Note: DGKat cards support Deep Color only at resolutions of 720p and lower.

For the DVI 4LC, multi-mode glass fiber cables with LC connections must be used, such as the Kramer **C-4LC/4LC**.

For the DVI SC, Multi-mode glass fiber cables with SC connections must be used, such as the Kramer **C-SC/SC/OM3**.

For the DGKat plus RS-232, shielded TP pair cables with RJ-45 connections must be used, such as the Kramer **BC-DGKat623** or **BC-DGKat7a23**.

For the HDBaseT, twisted pair cables with RJ-45 connections must be used, such as the Kramer **BC-HDKat6a**.

14   Default Communication Parameters

The following table lists the default communication parameters for the
VS-1616D-MD.

EDID	
EDID data is passed between Output 1 and Input 1	
RS-232	
Protocol 2000/3000	
Baud Rate:	9600
Data Bits:	8
Stop Bits:	1
Parity:	None
Command Format:	HEX
P2000, to switch Output 1 to Input 1:	0x01, 0x81, 0x81, 0x81
P3000, to switch Output 1 to Input 4:	#AV 4>1
Ethernet	
IP Address	192.168.1.39
TCP Port #	5000
UDP Port #	50000

15 Label Information
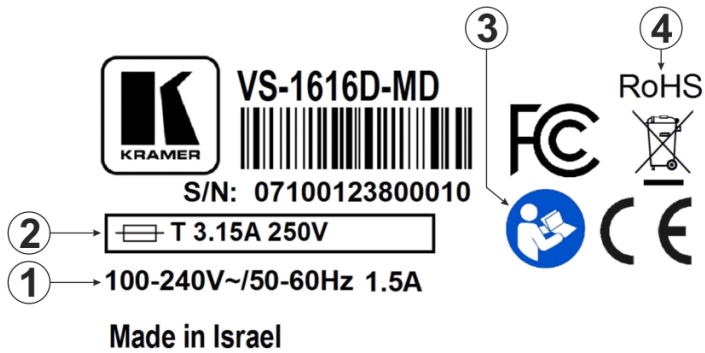
Figure 18: Device Label

Descriptions of the symbols are shown in the table below.

#	Description
1	Device power requirement—between 100 and 240V AC either 50 or 60Hz at 1.5A
2	Fuse—Rating 250V at 3.15A time lag
3	Important information included in the User Manual
4	Complies with the WEEE Restriction of Hazardous Substances Directive of the EU of 2006 for devices placed on the market after 2005

16 Factory Default EDID

16.1 DVI Input Card

```
Monitor
  Model name............... VS-16DVIS
  Manufacturer............. KMR
  Plug and Play ID......... KMR0200
  Serial number............ 1
  Manufacture date......... 2006, ISO week 12
  ------------------------
  EDID revision............ 1.3
  Input signal type........ Digital (DVI)
  Color bit depth.......... Undefined
  Display type............. RGB color
  Screen size.............. 700 x 390 mm (31.5 in)
  Power management......... Not supported
  Extension blocs.......... None
  ------------------------
  DDC/CI................... n/a

Color characteristics
  Default color space...... Non-sRGB
  Display gamma............ 2.20
  Red chromaticity......... Rx 0.640 - Ry 0.341
  Green chromaticity....... Gx 0.286 - Gy 0.610
  Blue chromaticity........ Bx 0.146 - By 0.069
  White point (default).... Wx 0.284 - Wy 0.293
  Additional descriptors... None
Timing characteristics
  Horizontal scan range.... 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.. 1280x768p at 60Hz (4:3)
  Modeline............... "1280x768" 79.500 1280 1344 1472 1664 768 771 778 798 +hsync +vsync
  Detailed timing #1....... 1920x1200p at 60Hz (16:10)
  Modeline............... "1920x1200" 154.000 1920 1968 2000 2080 1200 1203 1209 1235 +hsync -vsync

Standard timings supported
   720 x  400p 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
  1360 x  765p 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
```

Raw data

00,FF,FF,FF,FF,FF,FF,00,2E,4D,00,02,01,00,00,00,00,0C,10,01,03,81,46,27,78,0A,D5,7C,A3,57,49,9C,25,11,48,4B,
FF,FF,80,8B,C0,81,00,95,00,81,40,81,80,90,40,B3,00,A9,40,0E,1F,00,80,51,00,1E,30,40,80,
37,00,6F,13,11,00,00,1E,28,3C,80,A0, 70,B0,23,40, 30,20, 36, 00,06,44,21,00,00,1A,00,00,00,FC,00,56,
53,2D,33,32,44,56,49,53,0A,20,20,20,00,00, 00,FD,00,32,55,1F,5E,11,00,0A, 20,20,20, 20, 20,20,00,39

16.2 HDCP Input Card

Monitor
  Model name............... VS-16HDCP
  Manufacturer............. KMR
  Plug and Play ID......... KMR0200
  Serial number............ 1
  Manufacture date......... 2010, ISO week 24

  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................... n/a

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

Timing characteristics
  Horizontal scan range.... 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.. 1920x1080p at 60Hz (16:9)
    Modeline............... "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync
  Detailed timing #1....... 1920x1200p at 60Hz (16:10)
    Modeline............... "1920x1200" 154.000 1920 1968 2000 2080 1200 1203 1209 1235 +hsync -vsync

Standard timings supported
   720 x 400p 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.............. 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
```

Raw data

00,FF,FF,FF,FF,FF,FF,00,2E,4D,00,02,01,00,00,00,18,14,01,03,81,46,27,78,0A,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,A9,40,02,3A,80,18,71,38,2D,40,58,2C,
45,00,C4,8E,21,00,00,1E,28,3C,80,A0,70,B0,23,40,30,20,36,00,06,44,21,00,00,1A,00,00,00,FC,00,56,
53,2D,33,32,48,44,43,50,0A,20,20,20,00,00,00,FD,00,32,55,1F,5E,11,00,0A,20,20,20,20,20,20,01,F9,
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

# 16.3  HDMI Input Card

Monitor
  Model name............... VS-16HDCP
  Manufacturer............. KMR
  Plug and Play ID......... KMR0200
  Serial number............ 1
  Manufacture date......... 2006, ISO week 12
  ------------------------
  EDID revision............ 1.3
  Input signal type........ Digital (DVI)
  Color bit depth.......... Undefined
  Display type............. RGB color
  Screen size.............. 700 x 390 mm (31.5 in)
  Power management......... Not supported
  Extension blocs.......... 1 (CEA-EXT)
  ------------------------
  DDC/CI................... n/a

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

Timing characteristics
  Horizontal scan range.... 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.. 1280x768p at 60Hz (4:3)
    Modeline............... "1280x768" 79.500 1280 1344 1472 1664 768 771 778 798 +hsync +vsync
  Detailed timing #1....... 1920x1200p at 60Hz (16:10)
    Modeline............... "1920x1200" 154.000 1920 1968 2000 2080 1200 1203 1209 1235 +hsync -vsync

Standard timings supported
     720 x  400p 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
    1360 x  765p 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

Raw data
  00,FF,FF,FF,FF,FF,FF,00,2E,4D,00,02,01,00,00,00,0C,10,01,03,81,46,27,78,0A,D5,7C,A3,57,49,9C,25,
  11,48,4B,FF,FF,80,8B,C0,81,00,95,00,81,40,81,80,90,40,B3,00,A9,40,0E,1F,00,80,51,00,1E,30,40,80,
  37,00,6F,13,11,00,00,1E,28,3C,80,A0,70,B0,23,40,30,20,36,00,06,44,21,00,00,1A,00,00,00,FC,00,56,
  53,2D,31,36,48,44,43,50,0A,20,20,20,00,00,00,FD,00,32,55,1F,5E,11,00,0A,20,20,20,20,20,20,01,4D,
  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
Model name............... VS-16HDCP
Manufacturer............. KRM
Plug and Play ID......... KRM0200
Serial number............ 1
Manufacture date......... 2010, ISO week 24

## 16.4  HDMI plus Audio Input Card

Monitor
  Model name............... VS-16H+AUD
  Manufacturer............. KMR
  Plug and Play ID........ KMR0200
  Serial number............ 1
  Manufacture date........ 2012, ISO week 12
  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 (4:3)
    Modeline.............. "1280x720" 74.250 1280 1390 1430 1650 720 725 730 746 +hsync +vsync
  Detailed timing #1....... 1920x1080p at 60Hz (16:10)
    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
    1360 x  765p 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........... 11/10/2013
  Software revision........ 2.60.0.972
  Data source.............. Real-time 0x0051
  Operating system......... 5.1.2600.2.Service Pack 3

Raw data
00,FF,FF,FF,FF,FF,FF,00,2E,4D,00,02,01,00,00,00,0C,16,01,03,81,46,27,78,0A,D5,7C,A3,57,49,9C,25,
11,48,4B,FF,FF,80,8B,C0,81,00,95,00,81,40,81,80,90,40,B3,00,A9,40,01,1D,00,72,51,D0,1A,20,6E,28,
55,00,6F,13,11,00,00,1E,02,3A,80,18,71,38,2D,40,58,2C,45,00,06,44,21,00,00,1A,00,00,00,FC,00,56,
53,2D,31,36,48,2B,41,55,44,0A,20,20,00,00,00,FD,00,32,55,1F,5E,11,00,0A,20,20,20,20,20,20,01,80,
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

## 16.5 DVI Dual Channel Input Card

Monitor
  Model name............... VS-16DUAL
  Manufacturer............. KMR
  Plug and Play ID........ KMR0200
  Serial number............ 1
  Manufacture date......... 2006, ISO week 12
  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.......... None
  ------------------------
  DDC/CI.................. n/a

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

Timing characteristics
  Horizontal scan range.... 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.. 1024x768p at 60Hz (4:3)
    Modeline.............. "1024x768" 65.000 1024 1048 1184 1344 768 771 777 806 +hsync +vsync
  Detailed timing #1....... 1920x1200p at 60Hz (16:10)
    Modeline.............. "1920x1200" 154.000 1920 1968 2000 2080 1200 1203 1209 1235 +hsync -vsync

Standard timings supported
     720 x  400p 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
    1360 x  765p 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

Raw data
00,FF,FF,FF,FF,FF,FF,00,2E,4D,00,02,01,00,00,00,0C,10,01,03,81,46,27,78,0A,D5,7C,A3,57,49,9C,25,
11,48,4B,FF,FF,80,8B,C0,81,00,95,00,81,40,81,80,90,40,B3,00,A9,40,64,19,00,40,41,00,26,30,18,88,
36,00,6F,13,11,00,00,1E,28,3C,80,A0,70,B0,23,40,30,20,36,00,06,44,21,00,00,1A,00,00,00,FC,00,56,
53,2D,31,36,44,55,41,4C,0A,20,20,20,00,00,00,FD,00,32,55,1F,5E,11,00,0A,20,20,20,20,20,20,00,60,
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,00,00,00,00,00,00,00,00,00,00,00,00,C0

## 16.6 DGKat Input Card

Monitor
  Model name............... VS-16hCat5e
  Manufacturer............. KMR
  Plug and Play ID......... KMR0200
  Serial number............ 1
  Manufacture date......... 2006, ISO week 12
  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.................. n/a

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

Timing characteristics
  Horizontal scan range.... 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.. 1280x768p at 60Hz (4:3)
    Modeline............... "1280x768" 79.500 1280 1344 1472 1664 768 771 778 798 +hsync +vsync
  Detailed timing #1....... 1920x1200p at 60Hz (16:10)
    Modeline............... "1920x1200" 154.000 1920 1968 2000 2080 1200 1203 1209 1235 +hsync -vsync

Standard timings supported
     720 x  400p 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
    1360 x  765p 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

Raw data
  00,FF,FF,FF,FF,FF,FF,00,2E,4D,00,02,01,00,00,00,0C,10,01,03,81,46,27,78,0A,D5,7C,A3,57,49,9C,25,
  11,48,4B,FF,FF,80,8B,C0,81,00,95,00,81,40,81,80,90,40,B3,00,A9,40,0E,1F,00,80,51,00,1E,30,40,80,
  37,00,6F,13,11,00,00,1E,28,3C,80,A0,70,B0,23,40,30,20,36,00,06,44,21,00,00,1A,00,00,00,FC,00,56,
  53,2D,31,36,68,43,61,74,35,65,0A,20,00,00,00,FD,00,32,55,1F,5E,11,00,0A,20,20,20,20,20,20,01,92,
  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

## 16.7  HDBaseT Input Card

Monitor
  Model name............... VS-16HDBST
  Manufacturer............. KMR
  Plug and Play ID......... KMR0400
  Serial number............ 1
  Manufacture date......... 2006, ISO week 12
  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................... n/a

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

Timing characteristics
  Horizontal scan range.... 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 720 725 730 746 +hsync -vsync
  Detailed timing #1....... 1920x1200p at 60Hz (16:10)
    Modeline.............. "1920x1200" 154.000 1920 1968 2000 2080 1200 1203 1209 1235 +hsync -vsync

Standard timings supported
     720 x  400p 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
    1360 x  765p 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........... 14/07/2013
  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,00,2E,4D,00,02,01,00,00,00,0C,10,01,03,81,46,27,78,0A,D5,7C,A3,57,49,9C,25,
11,48,4B,FF,FF,80,8B,C0,81,00,95,00,81,40,81,80,90,40,B3,00,A9,40,01,1D,00,72,51,D0,1A,20,6E,28,
55,00,7E,88,42,00,00,1A,28,3C,80,A0,70,B0,23,40,30,20,36,00,06,44,21,00,00,1A,00,00,00,FC,00,56,
53,2D,31,36,48,44,42,53,54,0A,20,20,00,00,00,FD,00,32,55,1F,5E,11,00,0A,20,20,20,20,20,20,01,D3,
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

## 16.8 VGA Input Card

Monitor
  Model name............... VGA-IN2-F16
  Manufacturer............. KMR
  Plug and Play ID......... KMR040B
  Serial number............ 17056
  Manufacture date......... 2011, ISO week 48
  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........... 14/07/2013
  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,00,2E,4D,0B,04,A0,42,00,00,30,15,01,03,00,46,27,78,0B,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,
A2,00,04,03,00,00,00,00,18,02,3A,80,18,71,38,2D,40,58,2C,45,00,10,09,00,00,00,00,1E,00,00,00,FC,00,56,
47,41,2D,49,4E,32,2D,46,31,36,0A,20,48,3F,40,30,62,B0,32,40,40,C0,13,00,6F,13,11,00,00,1E,00,0C

**VS-1616D-MD - Factory Default EDID**

# 17 Communication Protocol 3000

The **VS-1616D-MD** can be operated using serial commands from a PC, remote controller or touch screen using the Kramer Protocol 3000.

This section describes the:

- Kramer Protocol 3000 syntax (see Section 17.1)
- Kramer Protocol 3000 commands (see Section 17.2)

## 17.1 Kramer Protocol 3000 Syntax

### 17.1.1 Host Message Format

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

### 17.1.2 Simple Command

Command string with only one command without addressing:

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

### 17.1.3 Command String

Formal syntax with commands concatenation and addressing:

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

### 17.1.4 Device Message Format

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

### 17.1.5 Device Long Response

Echoing command:

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

**CR** = Carriage return (ASCII 13 = 0x0D)
**LF** = Line feed (ASCII 10 = 0x0A)

$\boxed{\text{SP}}$ = Space (ASCII 32 = 0x20)

## 17.1.6  Command Terms

**Command**

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

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

**Parameters**

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

**Message string**

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

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

**Message starting character**

'#' – For host command/query

'~' – For device response

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

K-NET Device ID followed by '@'

**Query sign**

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

**Message closing character**

$\boxed{\text{CR}}$   – For host messages; carriage return (ASCII 13)

$\boxed{\text{CRLF}}$ – For device messages; carriage return (ASCII 13) + line-feed (ASCII 10)

**Command chain separator character**

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

Spaces between parameters or command terms are ignored.

### 17.1.7 Entering Commands

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

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

### 17.1.8 Command Forms

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

### 17.1.9 Chaining Commands

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

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

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

### 17.1.10 Maximum String Length

64 characters

## 17.2 Table of Protocol 3000 Commands

| Command | Description |
|---|---|
| # | Protocol handshaking |
| BUILD-DATE? | Read device build date |
| CPEDID | Copy EDID data from the output to the input EEPROM |
| DISPLAY | Valid / Invalid output |
| FACTORY | Reset to factory default configuration |
| GEDID | Read EDID data |
| GEDID-EXT | Read EDID data from external device connected to output |
| HELP | List of commands |
| IDV | Visual identify device |
| INFO-IO? | Read in/out count |
| INFO-PRST? | Read max preset count |
| LDEDID | Load EDID data |
| LDFW | Load new firmware |
| LOCK-FP | Lock front panel |
| MODEL? | Read device model |
| P2000 | Switch to protocol 2000 |
| PROT-VER? | Read device protocol version |
| 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 |
| RESET | Reset device |
| SIGNAL | Valid / Invalid input |
| SN? | Read device serial number |
| VERSION? | Read device firmware version |
| VID | Switch Video only |

**Note**: Not every command listed by the Help command is relevant to every matrix configuration.

# 18   Communication Protocol 2000

**Tables of HEX Codes for Serial Communication (Protocol 2000)**

The following table lists the Protocol 2000 hex codes for switching inputs 1 through 16 to outputs 1 through 16.

| | OUT 1 | OUT 2 | OUT 3 | OUT 4 | OUT 5 | OUT 6 | OUT 7 | OUT 8 | OUT 9 | OUT 10 | OUT 11 | OUT 12 | OUT 13 | OUT 14 | OUT 15 | OUT 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **IN 1** | 01<br>81<br>81<br>81 | 01<br>81<br>82<br>81 | 01<br>81<br>83<br>81 | 01<br>81<br>84<br>81 | 01<br>81<br>85<br>81 | 01<br>81<br>86<br>81 | 01<br>81<br>87<br>81 | 01<br>81<br>88<br>81 | 01<br>81<br>89<br>81 | 01<br>81<br>8A<br>81 | 01<br>81<br>8B<br>81 | 01<br>81<br>8C<br>81 | 01<br>81<br>8D<br>81 | 01<br>81<br>8E<br>81 | 01<br>81<br>8F<br>81 | 01<br>81<br>90<br>81 |
| **IN 2** | 01<br>82<br>81<br>81 | 01<br>82<br>82<br>81 | 01<br>82<br>83<br>81 | 01<br>82<br>84<br>81 | 01<br>82<br>85<br>81 | 01<br>82<br>86<br>81 | 01<br>82<br>87<br>81 | 01<br>82<br>88<br>81 | 01<br>82<br>89<br>81 | 01<br>82<br>8A<br>81 | 01<br>82<br>8B<br>81 | 01<br>82<br>8C<br>81 | 01<br>82<br>8D<br>81 | 01<br>82<br>8E<br>81 | 01<br>82<br>8F<br>81 | 01<br>82<br>90<br>81 |
| **IN 3** | 01<br>83<br>81<br>81 | 01<br>83<br>82<br>81 | 01<br>83<br>83<br>81 | 01<br>83<br>84<br>81 | 01<br>83<br>85<br>81 | 01<br>83<br>86<br>81 | 01<br>83<br>87<br>81 | 01<br>83<br>88<br>81 | 01<br>83<br>89<br>81 | 01<br>83<br>8A<br>81 | 01<br>83<br>8B<br>81 | 01<br>83<br>8C<br>81 | 01<br>83<br>8D<br>81 | 01<br>83<br>8E<br>81 | 01<br>83<br>8F<br>81 | 01<br>83<br>90<br>81 |
| **IN 4** | 01<br>84<br>81<br>81 | 01<br>84<br>82<br>81 | 01<br>84<br>83<br>81 | 01<br>84<br>84<br>81 | 01<br>84<br>85<br>81 | 01<br>84<br>86<br>81 | 01<br>84<br>87<br>81 | 01<br>84<br>88<br>81 | 01<br>84<br>89<br>81 | 01<br>84<br>8A<br>81 | 01<br>84<br>8B<br>81 | 01<br>84<br>8C<br>81 | 01<br>84<br>8D<br>81 | 01<br>84<br>8E<br>81 | 01<br>84<br>8F<br>81 | 01<br>84<br>90<br>81 |
| **IN 5** | 01<br>85<br>81<br>81 | 01<br>85<br>82<br>81 | 01<br>85<br>83<br>81 | 01<br>85<br>84<br>81 | 01<br>85<br>85<br>81 | 01<br>85<br>86<br>81 | 01<br>85<br>87<br>81 | 01<br>85<br>88<br>81 | 01<br>85<br>89<br>81 | 01<br>85<br>8A<br>81 | 01<br>85<br>8B<br>81 | 01<br>85<br>8C<br>81 | 01<br>85<br>8D<br>81 | 01<br>85<br>8E<br>81 | 01<br>85<br>8F<br>81 | 01<br>85<br>90<br>81 |
| **IN 6** | 01<br>86<br>81<br>81 | 01<br>86<br>82<br>81 | 01<br>86<br>83<br>81 | 01<br>86<br>84<br>81 | 01<br>86<br>85<br>81 | 01<br>86<br>86<br>81 | 01<br>86<br>87<br>81 | 01<br>86<br>88<br>81 | 01<br>86<br>89<br>81 | 01<br>86<br>8A<br>81 | 01<br>86<br>8B<br>81 | 01<br>86<br>8C<br>81 | 01<br>86<br>8D<br>81 | 01<br>86<br>8E<br>81 | 01<br>86<br>8F<br>81 | 01<br>86<br>90<br>81 |
| **IN 7** | 01<br>87<br>81<br>81 | 01<br>87<br>82<br>81 | 01<br>87<br>83<br>81 | 01<br>87<br>84<br>81 | 01<br>87<br>85<br>81 | 01<br>87<br>86<br>81 | 01<br>87<br>87<br>81 | 01<br>87<br>88<br>81 | 01<br>87<br>89<br>81 | 01<br>87<br>8A<br>81 | 01<br>87<br>8B<br>81 | 01<br>87<br>8C<br>81 | 01<br>87<br>8D<br>81 | 01<br>87<br>8E<br>81 | 01<br>87<br>8F<br>81 | 01<br>87<br>90<br>81 |
| **IN 8** | 01<br>88<br>81<br>81 | 01<br>88<br>82<br>81 | 01<br>88<br>83<br>81 | 01<br>88<br>84<br>81 | 01<br>88<br>85<br>81 | 01<br>88<br>86<br>81 | 01<br>88<br>87<br>81 | 01<br>88<br>88<br>81 | 01<br>88<br>89<br>81 | 01<br>88<br>8A<br>81 | 01<br>88<br>8B<br>81 | 01<br>88<br>8C<br>81 | 01<br>88<br>8D<br>81 | 01<br>88<br>8E<br>81 | 01<br>88<br>8F<br>81 | 01<br>88<br>90<br>81 |
| **IN 9** | 01<br>89<br>81<br>81 | 01<br>89<br>82<br>81 | 01<br>89<br>83<br>81 | 01<br>89<br>84<br>81 | 01<br>89<br>85<br>81 | 01<br>89<br>86<br>81 | 01<br>89<br>87<br>81 | 01<br>89<br>88<br>81 | 01<br>89<br>89<br>81 | 01<br>89<br>8A<br>81 | 01<br>89<br>8B<br>81 | 01<br>89<br>8C<br>81 | 01<br>89<br>8D<br>81 | 01<br>89<br>8E<br>81 | 01<br>89<br>8F<br>81 | 01<br>89<br>90<br>81 |
| **IN 10** | 01<br>8A<br>81<br>81 | 01<br>8A<br>82<br>81 | 01<br>8A<br>83<br>81 | 01<br>8A<br>84<br>81 | 01<br>8A<br>85<br>81 | 01<br>8A<br>86<br>81 | 01<br>8A<br>87<br>81 | 01<br>8A<br>88<br>81 | 01<br>8A<br>89<br>81 | 01<br>8A<br>8A<br>81 | 01<br>8A<br>8B<br>81 | 01<br>8A<br>8C<br>81 | 01<br>8A<br>8D<br>81 | 01<br>8A<br>8E<br>81 | 01<br>8A<br>8F<br>81 | 01<br>8A<br>90<br>81 |
| **IN 11** | 01<br>8B<br>81<br>81 | 01<br>8B<br>82<br>81 | 01<br>8B<br>83<br>81 | 01<br>8B<br>84<br>81 | 01<br>8B<br>85<br>81 | 01<br>8B<br>86<br>81 | 01<br>8B<br>87<br>81 | 01<br>8B<br>88<br>81 | 01<br>8B<br>89<br>81 | 01<br>8B<br>8A<br>81 | 01<br>8B<br>8B<br>81 | 01<br>8B<br>8C<br>81 | 01<br>8B<br>8D<br>81 | 01<br>8B<br>8E<br>81 | 01<br>8B<br>8F<br>81 | 01<br>8B<br>90<br>81 |
| **IN 12** | 01<br>8C<br>81<br>81 | 01<br>8C<br>82<br>81 | 01<br>8C<br>83<br>81 | 01<br>8C<br>84<br>81 | 01<br>8C<br>85<br>81 | 01<br>8C<br>86<br>81 | 01<br>8C<br>87<br>81 | 01<br>8C<br>88<br>81 | 01<br>8C<br>89<br>81 | 01<br>8C<br>8A<br>81 | 01<br>8C<br>8B<br>81 | 01<br>8C<br>8C<br>81 | 01<br>8C<br>8D<br>81 | 01<br>8C<br>8E<br>81 | 01<br>8C<br>8F<br>81 | 01<br>8C<br>90<br>81 |
| **IN 13** | 01<br>8D<br>81<br>81 | 01<br>8D<br>82<br>81 | 01<br>8D<br>83<br>81 | 01<br>8D<br>84<br>81 | 01<br>8D<br>85<br>81 | 01<br>8D<br>86<br>81 | 01<br>8D<br>87<br>81 | 01<br>8D<br>88<br>81 | 01<br>8D<br>89<br>81 | 01<br>8D<br>8A<br>81 | 01<br>8D<br>8B<br>81 | 01<br>8D<br>8C<br>81 | 01<br>8D<br>8D<br>81 | 01<br>8D<br>8E<br>81 | 01<br>8D<br>8F<br>81 | 01<br>8D<br>90<br>81 |

| | OUT 1 | OUT 2 | OUT 3 | OUT 4 | OUT 5 | OUT 6 | OUT 7 | OUT 8 | OUT 9 | OUT 10 | OUT 11 | OUT 12 | OUT 13 | OUT 14 | OUT 15 | OUT 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **IN 14** | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 |
| | 8E | 8E | 8E | 8E | 8E | 8E | 8E | 8E | 8E | 8E | 8E | 8E | 8E | 8E | 8E | 8E |
| | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 8A | 8B | 8C | 8D | 8E | 90 | 90 |
| | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 |
| **IN 15** | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 |
| | 8F | 8F | 8F | 8F | 8F | 8F | 8F | 8F | 8F | 8F | 8F | 8F | 8F | 8F | 8F | 8F |
| | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 8A | 8B | 8C | 8D | 8E | 8F | 90 |
| | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 |
| **IN 16** | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 | 01 |
| | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 8A | 8B | 8C | 8D | 8E | 8F | 90 |
| | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 |

VS-1616D-MD - Communication Protocol 2000

## LIMITED WARRANTY

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

### What is Covered

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

### What is Not Covered

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

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

### How Long Does this Coverage Last

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

### Who is Covered

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

### What Kramer Electronics will do

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

1. Elect to repair or facilitate the repair of any defective parts within a reasonable period of time, free of any charge for the necessary parts and labor to complete the repair and restore this product to its proper operating condition. Kramer Electronics will also pay the shipping costs necessary to return this product once the repair is complete.

2. Replace this product with a direct replacement or with a similar product deemed by Kramer Electronics to perform substantially the same function as the original product.

3. Issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time remedy is sought under this limited warranty.

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

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

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

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

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

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

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

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

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

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