Kramer Electronics, Ltd.

USER MANUAL

Model:

VM-2HDCPxl

1:2 DVI Distributor

Contents

Figures

Tables

1 Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront the video, audio, presentation, and broadcasting professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 1,000-plus different models now appear in 11 groups[1] that are clearly defined by function.

Thank you for purchasing your Kramer **DigiTOOLS® VM-2HDCPxl** *1:2 DVI Distributor*.

The **VM-2HDCPxl** is ideal for:

- Multiple screen applications
- Rental and staging

Each package includes the following items:

- **VM-2HDCPxl** *1:2 DVI Distributor*
- Power adapter (5V DC Input)
- This user manual[2]

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
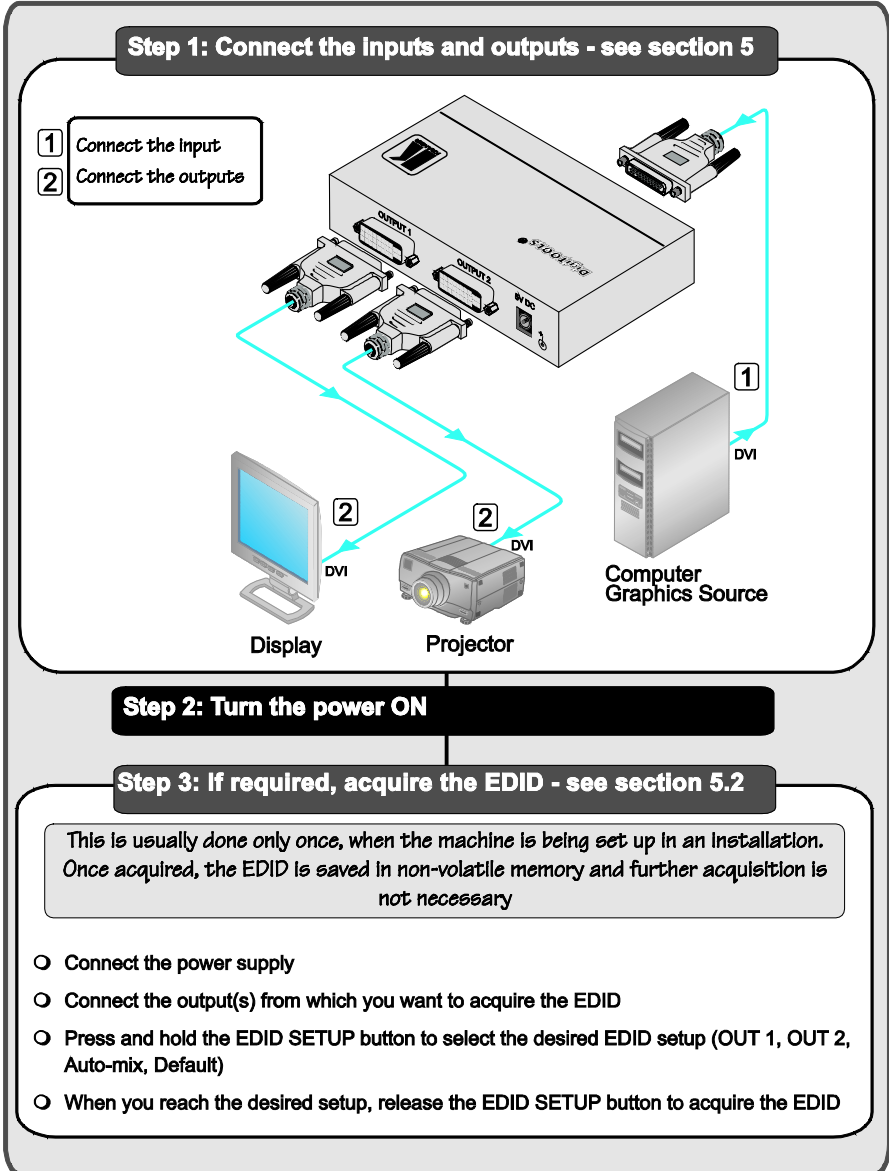- Use Kramer high performance high-resolution cables[3]

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

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

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

2.1 Quick Start

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

Step 1: Connect the inputs and outputs - see section 5

1 Connect the input
2 Connect the outputs

1

DVI

2

2

DVI

DVI

Display

Projector

Computer
Graphics Source

Step 2: Turn the power ON

Step 3: If required, acquire the EDID - see section 5.2

This is usually done only once, when the machine is being set up in an installation. Once acquired, the EDID is saved in non-volatile memory and further acquisition is not necessary

○ Connect the power supply

○ Connect the output(s) from which you want to acquire the EDID

○ Press and hold the EDID SETUP button to select the desired EDID setup (OUT 1, OUT 2, Auto-mix, Default)

○ When you reach the desired setup, release the EDID SETUP button to acquire the EDID

3 Overview

The Kramer **VM-2HDCPxl** is an HDCP (High-Bandwidth Digital Content Protection) compatible 1:2 distribution amplifier for DVI-D (Digital) signals. Since high-resolution DVI signals are very sensitive to cable quality and to PCB layout, the **VM-2HDCPxl** uses a uniquely designed PCB which includes all buffering, conditioning and amplifying circuitry to provide two high-level output signals.

In particular, the **VM-2HDCPxl**:

- Distributes signals having resolutions up to WUXGA, including all HDTV formats
- Has a bandwidth of 2.25Gbps
- Supports the DDWG DVI 1.0 standard
- Consists of a built-in re-clocking block that re-generates the DVI signal, so that several units may be cascaded
- Can read and store, in non-volatile memory, the EDID[1] block from one of the outputs, so it can then provide the EDID information to the DVI source even if the display device is not connected
- Has I-EDIDPro™ Kramer Intelligent EDID Processing™, an intelligent EDID handling and processing algorithm that ensures Plug and Play operation for HDMI systems
- Has three DVI-I connectors, which are compatible with all types of DVI cables
- Is a cost-effective solution for distributing the TMDS signals used for DVI, and uses state-of-the-art line drivers on both outputs

3.1 About HDCP

The High-Bandwidth Digital Content Protection (HDCP) standard[2], protects digital video and audio signals transmitted over DVI or HDMI connections between two HDCP-enabled devices to eliminate the reproduction of copyrighted material. To protect copyright holders (such as movie studios) from having their programs copied and shared, the HDCP standard provides for the secure and encrypted transmission of digital signals.

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1 EDID is Extended Display Identification Data

2 Developed by Intel

3.2 Defining EDID

The Extended Display Identification Data (EDID[1]) is a data-structure, provided by a display, to describe its capabilities to the source. The EDID enables the **VM-2HDCPxl** to "know" what kind of monitor is connected to the output. The EDID includes the manufacturer's name, the product type, the timing data supported by the display, the display size, luminance data and (for digital displays only) the pixel mapping data.

3.3 Recommendations for Best Performance

Achieving the best performance means:

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

- Avoiding interference from neighboring electrical appliances and positioning your **VM-2HDCPxl** away from moisture, excessive sunlight and dust

Caution:	No operator serviceable parts inside unit
Warning:	Use only the Kramer Electronics input power wall adapter that is provided with the unit
Warning:	Disconnect power and unplug unit from wall before installing or removing the device or servicing unit

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1 Defined by a standard published by the Video Electronics Standards Association (VESA)

4   Your VM-2HDCPxl 1:2 DVI Distributor
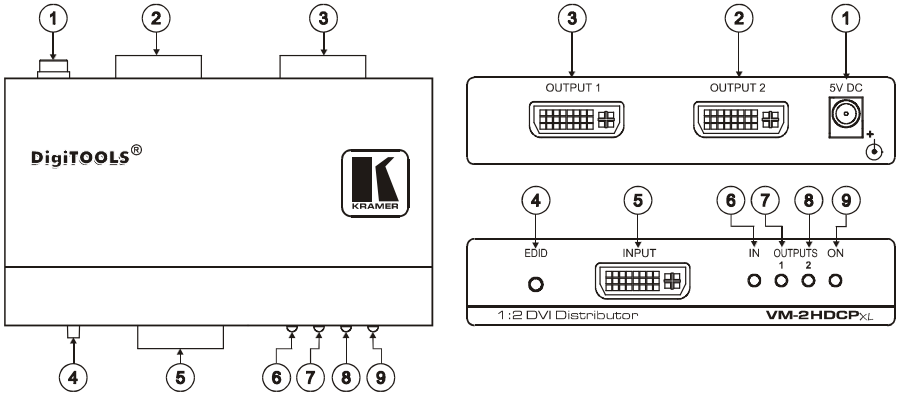
Figure 1 and Table 1 define the **VM-2HDCPxl**:

Figure 1: VM-2HDCPxl 1:2 DVI Distributor

Table 1: VM-2HDCPxl 1:2 DVI Distributor Features

#	Feature		Function
1	*5V DC*		+5V DC connector for powering the unit
2	*OUTPUT 2* DVI Connector		Connect to the DVI acceptor 2
3	*OUTPUT 1* DVI Connector		Connect to the DVI acceptor 1
4	*EDID* Button		Press to read the EDID of the selected display (see section 5.1)
5	*INPUT* DVI Connector		Connect to the DVI source
6	*IN* LED		Lights when the input is active; blinks when the input is not valid
7	*OUTPUT* LEDs	*1*	LED lights when OUTPUT 1 is connected and active; LED blinks when selecting the EDID (see section 5.1)
8		*2*	LED lights when OUTPUT 2 is connected and active; LED blinks when selecting the EDID (see section 5.1)
9	*ON* LED		Lights when the unit is powered

5 Connecting a VM-2HDCPxl 1:2 DVI Distributor

To connect the **VM-2HDCPxl** as illustrated in the example in Figure 2, do the following:

1. Connect a computer graphics source to the INPUT connector.
2. Connect the OUTPUT connectors[1] to one or both DVI acceptors, as follows:
   - OUTPUT 1 connector to DVI acceptor 1 (for example, a display)
   - OUTPUT 2 connector to DVI acceptor 2 (for example, a projector)
3. Connect the 5V DC power adapter (wall transformer) to the 5V DC socket and connect the transformer to the mains electricity.
4. Acquire the EDID (see section 5.1).

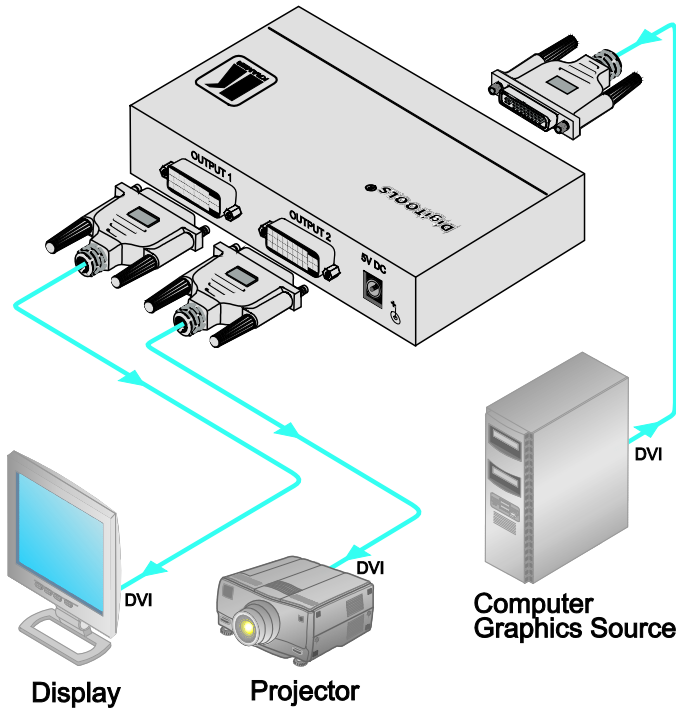*Figure 2: Connecting a VM-2HDCPxl 1:2 DVI Distributor*

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1 You do not have to connect both outputs

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5.1 Acquiring the EDID[1]

Initially, the **VM-2HDCPxl** operates with the factory default EDID[2]. This lets you connect the power before connecting one of the acceptors or the source.

You can acquire the EDID from:

- One output (the relevant output illuminates)
- The default EDID (both output LEDs blink)
- Two connected outputs, the auto-mix mode[3] (both output LEDs illuminate)

When pressing the EDID button briefly, the OUTPUT LEDs indicate which type of EDID was last acquired. If the:

- OUTPUT 1 LED illuminates, the OUTPUT 1 EDID was stored in the non-volatile memory
- OUTPUT 2 LED illuminates, the OUTPUT 2 EDID was stored in the non-volatile memory
- OUTPUT 1 and OUTPUT 2 LEDs illuminate, the Auto-Mix[3] EDID was stored in the non-volatile memory
- OUTPUT 1 and OUTPUT 2 LEDs blink, the Default EDID is stored in the non-volatile memory

To acquire the EDID, do the following:

1. Connect the power.
2. Connect the output or outputs from which you want to acquire the EDID.
3. Press and hold the EDID button to select the desired EDID. The OUTPUT LEDs illuminate in the following cycle: OUTPUT 1, OUTPUT 2, both illuminate (auto-mix[3]) and both blink (default).
4. Release the button when reaching the desired set up[4]. The EDID is now acquired.

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1 This is usually done only once, when the machine is being set up in an installation. Once acquired, the EDID is saved in non-volatile memory and further acquisition is not necessary

2 The VM-2HDCPxl reads the EDID, which is stored in the non-volatile memory

3 The EDID acquired is a weighted average of all the connected outputs. For example, if several displays with different resolutions are connected to the outputs, the acquired EDID supports all the resolutions, as well as other parameters included in the EDID

4 If you set the machine to acquire the EDID from an output that is not connected, the default EDID is acquired

6   Technical Specifications

Table 2 includes the technical specifications:

Table 2: Technical Specifications[1] of the VM-2HDCPxl 1:2 DVI Distributor

INPUT:	1 DVI, 1.2Vpp on a DVI Molex 24-pin female connector; DDC signal 5Vpp (TTL)
OUTPUTS:	2 DVI, 1.2Vpp on DVI Molex 24-pin female connectors; DDC signal 5Vpp (TTL)
COMPLIANCE WITH STANDARDS:	Supports DVI 1.1 and HDCP
MAX RESOLUTION:	Up to WUXGA (1920x1200), 1080p
BANDWIDTH:	2.25Gbps
CONTROLS:	EDID button for selecting and storing EDID information
POWER SOURCE:	5V DC 810mA
DIMENSIONS:	12cm x 7.2cm x 2.4cm (4.7" x 2.8" 1.0") W, D, H
WEIGHT:	0.3kg (0.67lbs) approx.
ACCESSORIES:	Power supply, mounting bracket
OPTIONS:	RK-3T 19" rack adapter, Kramer DVI cables[2]

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1 Specifications are subject to change without notice

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

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LIMITED WARRANTY

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

HOW LONG IS THE WARRANTY

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

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the Web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed, or on which the WARRANTY VOID IF TAMPERED sticker has been torn, reattached, removed or otherwise interfered with.
3. Damage, deterioration or malfunction resulting from:
   i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
   ii) Product modification, or failure to follow instructions supplied with the product
   iii) Repair or attempted repair by anyone not authorized by Kramer
   iv) Any shipment of the product (claims must be presented to the carrier)
   v) Removal or installation of the product
   vi) Any other cause, which does not relate to a product defect
   vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

This equipment has been tested to determine compliance with the requirements of:

EN-50081:	"Electromagnetic compatibility (EMC);
	generic emission standard.
	Part 1: Residential, commercial and light industry"
EN-50082:	"Electromagnetic compatibility (EMC) generic immunity standard.
	Part 1: Residential, commercial and light industry environment".
CFR-47:	FCC* Rules and Regulations:
	Part 15: "Radio frequency devices
	Subpart B Unintentional radiators"

CAUTION!

⊠ Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.

⊠ Use the supplied DC power supply to feed power to the machine.

⊠ Please use recommended interconnection cables to connect the machine to other components.

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

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

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

Caution