

Kramer Electronics, Ltd.



USER MANUAL

Model:

VM-2DH

DisplayPort to DVI/HDMI Converter

Contents

1	Introduction	1
2	Getting Started	1
2.1	Quick Start	1
3	Overview	3
3.1	About HDCP	3
3.2	About HDMI	4
3.3	Defining the EDID	4
3.4	Recommendations for Best Performance	5
4	Defining the VM-2DH DisplayPort to DVI/HDMI Converter	6
5	Connecting the VM-2DH DisplayPort to DVI/HDMI Converter	7
5.1	Acquiring the EDID	7
6	Technical Specifications	9

Figures

Figure 1:	VM-2DH DisplayPort to DVI/HDMI Converter Front Panel	6
Figure 2:	VM-2DH DisplayPort to DVI/HDMI Converter Rear Panel	6
Figure 3:	Connecting the VM-2DH DisplayPort to DVI/HDMI Converter	7

Tables

Table 1:	VM-2DH DisplayPort to DVI/HDMI Converter Front Panel Features	6
Table 2:	VM-2DH DisplayPort to DVI/HDMI Converter Rear Panel Features	6
Table 3:	Technical Specifications of the VM-2DH	9

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 groups¹ that are clearly defined by function.

Congratulations on purchasing your Kramer **DigiTOOLS**[®] **VM-2DH** *DisplayPort to DVI/HDMI Converter*.

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

- Multiple screen applications
- Rental and staging

Each package includes the following items:

- **VM-2DH** DisplayPort to DVI/HDMI Converter
- Power adapter (5V DC output)
- This user manual²

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 cables³

2.1 Quick Start

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

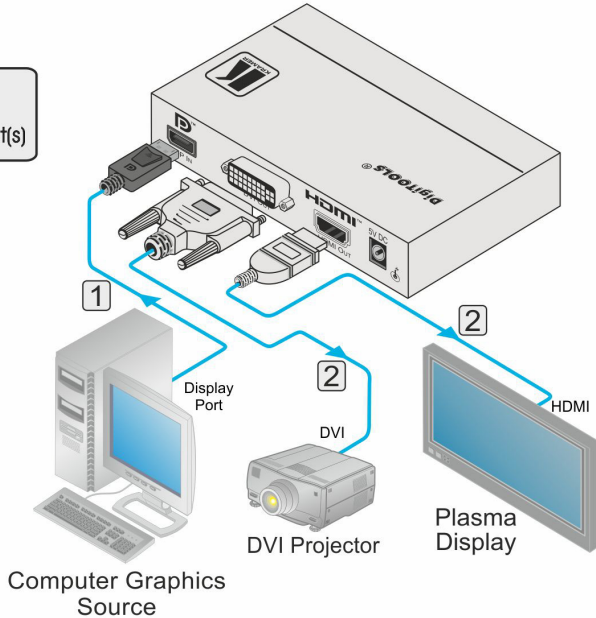
1 GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Matrix Switchers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity;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

2 Download up-to-date Kramer user manuals from <http://www.kramerelectronics.com>

3 The complete list of Kramer cables is available from <http://www.kramerelectronics.com>

Step 1: Connect the input and output(s) - see Section 5

- 1 Connect the input
- 2 Connect the output(s)



Step 2: Connect the power

Step 3: If required, acquire the EDID - see Section 5.1

This is usually only done once when the machine is being set up in an installation for the first time. Once acquired, the EDID is saved in non-volatile memory and further changes are unnecessary

- Connect the output(s) from which you want to acquire the EDID
- Select the required EDID by pressing and holding the EDID SETUP button to cycle through the options; HDMI OUT, DVI OUT, Auto-Mix and default
- When you reach the desired setup, release the EDID SETUP button to acquire the EDID

3 Overview

The Kramer **VM-2DH** is a DisplayPort to DVI/HDMI converter and distributor for digital signals that is HDCP (High-Bandwidth Digital Content Protection)¹ compatible. Since high-resolution DVI signals are very sensitive to cable quality and to PCB layout, the **VM-2DH** uses a uniquely designed PCB which includes all buffering, conditioning and amplifying circuitry to provide two high-level output signals.

In particular, the **VM-2DH** features:

- Support for resolutions up to WUXGA, including all HDTV formats
- A bandwidth of 1.65Gbps
- The DDWG² DVI 1.0 standard
- Support for up to eight embedded audio channels
- Built in re-clocking circuitry that regenerates the DVI/HDMI signal so that several units may be cascaded
- A non-volatile read and store memory for the EDID (Extended Display Identification Data) block from one of the outputs, so it can then provide the EDID information to the DisplayPort source even if the display device is not connected
- A default EDID for fast and efficient connection of the unit³
- I-EDIDPro™ Kramer Intelligent EDID Processing™—intelligent EDID handling and processing algorithm that ensures Plug and Play operation for DVI/HDMI systems
- A DVI-I connector which is compatible with all types of DVI cables
- State-of-the-art line drivers on both outputs to provide a cost-effective solution for distributing the TMDS⁴ signals used for DVI/HDMI

3.1 About HDCP

The High-Bandwidth Digital Content Protection (HDCP) standard⁵ protects digital video and audio signals transmitted over DVI or HDMI™ connections between two HDCP-enabled devices to prevent 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.

1 Note that Kramer Electronics Limited is an HDCP Licensee, see http://www.digital-cp.com/about_dcp/list

2 Digital Display Working Group (<http://www.ddwg.org>)

3 The default EDID feature lets you connect the VM-2DH without having to connect a display to the output

4 Transition Minimized Differential Signaling

5 Developed by Intel

3.2 About HDMI

High-Definition Multimedia Interface (HDMI) is an uncompressed all-digital¹ audio/video interface, widely supported in the entertainment and home cinema industry. It delivers the highest high-definition image and sound quality.

In particular, HDMI²:

- Provides a simple³ interface between any audio/video source, such as a set-top box, DVD player, or A/V receiver and video monitor, such as a digital flat LCD / plasma television (DTV), over a single lengthy⁴ cable
- Supports standard, enhanced, high-definition video, and multi-channel digital audio⁵ on a single cable
- Transmits all ATSC HDTV standards and supports 8-channel digital audio, with bandwidth to spare to accommodate future enhancements and requirements
- Benefits consumers by providing superior, uncompressed digital video quality via a single cable⁶, and user-friendly connector
- Is backward-compatible with DVI (Digital Visual Interface)
- Supports two-way CEC communication between the video source (such as a DVD player) and the digital television, enabling new functionality such as automatic configuration and one-button play

HDMI has the capacity to support:

Existing high-definition video formats (720p, 1080i and 1080p, 2K and 4K) as well as standard definition formats such as NTSC or PAL

3.3 Defining the EDID

The EDID⁷ is a data-structure provided by a display that describes its capabilities to the source. The EDID enables the **VM-2DH** 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.

1 Ensuring an all-digital rendering of video without the losses associated with analog interfaces and their unnecessary digital-to-analog conversions

2 HDMI, the HDMI logo and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI licensing LLC

3 With video and multi-channel audio combined into a single cable, the cost, complexity, and confusion of multiple cables currently used in A/V systems is reduced

4 HDMI technology has been designed to use standard copper cable construction at up to 15 m (49ft)

5 HDMI supports multiple audio formats, from standard stereo to multi-channel surround-sound. HDMI has the capacity to support Dolby 5.1 audio and high-resolution audio formats

6 HDMI provides the quality and functionality of a digital interface while also supporting uncompressed video formats in a simple, cost-effective manner

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

3.4 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-2DH** away from moisture, excessive sunlight and dust



Go to <http://www.kramerelectronics.com> to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).



Caution: 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

4 Defining the VM-2DH DisplayPort to DVI/HDMI Converter

[Figure 1](#) and [Table 1](#) define the front panel features of the VM-2DH.

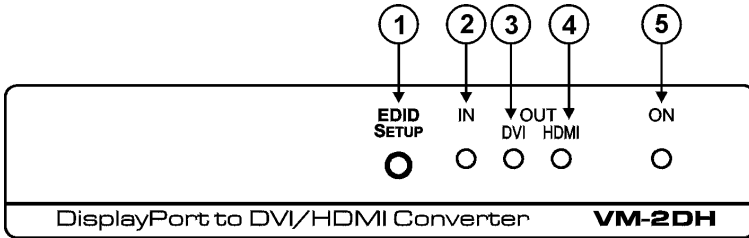


Figure 1: VM-2DH DisplayPort to DVI/HDMI Converter Front Panel

Table 1: VM-2DH DisplayPort to DVI/HDMI Converter Front Panel Features

#	Feature	Function
1	EDID SETUP Button	Press to cycle through the EDID sources and to read the EDID (see Section 5.1)
2	IN LED	Lights green when the input is active; blinks when the input is not valid
3	OUT LEDs	DVI LED Lights green when a DVI acceptor output is connected
4		HDMI LED Lights green when an HDMI acceptor is connected
5	ON LED	Lights green when the unit is powered on

[Figure 2](#) and [Table 2](#) define the rear panel features of the VM-2DH.

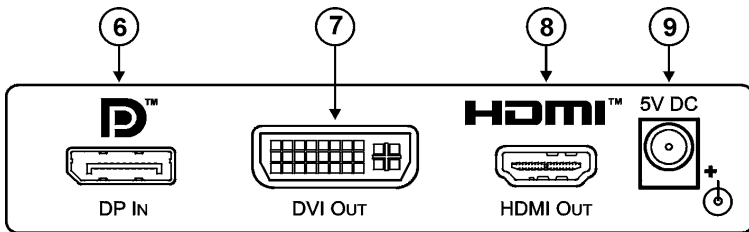


Figure 2: VM-2DH DisplayPort to DVI/HDMI Converter Rear Panel

Table 2: VM-2DH DisplayPort to DVI/HDMI Converter Rear Panel Features

#	Feature	Function
6	DP IN DisplayPort Connector	Connect to the DisplayPort digital source
7	DVI OUT Connector	Connect to the DVI acceptor
8	HDMI OUT Connector	Connect to the HDMI acceptor
9	5V DC	Connect to the 5V DC power adapter, center pin positive

5 Connecting the VM-2DH DisplayPort to DVI/HDMI Converter

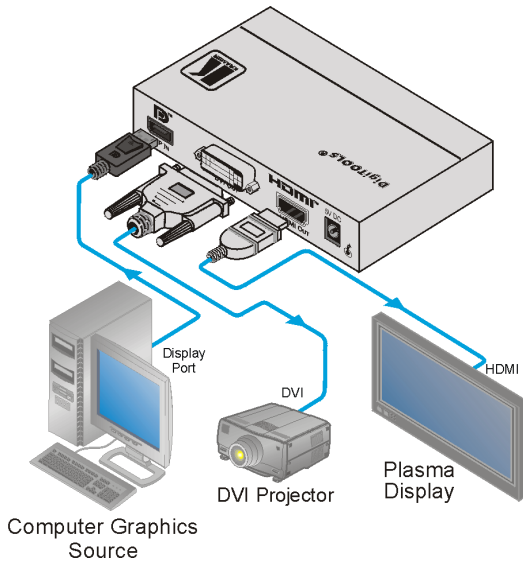


Figure 3: Connecting the VM-2DH DisplayPort to DVI/HDMI Converter

To connect the **VM-2DH** as illustrated in the example in [Figure 3](#):

1. Connect a computer graphics DisplayPort source to the DP IN connector.
2. Connect the DVI OUT connector to the DVI projector.
3. Connect the HDMI OUT connector to the plasma display¹.
4. Connect the supplied 5V DC power adapter to the **VM-2DH** and to the mains electricity.
5. Optional—Acquire the EDID (see [Section 5.1](#)).

5.1 Acquiring the EDID

Initially² the **VM-2DH** operates with the factory default EDID³ stored in the non-volatile memory. The source reads the EDID from the device when the device is plugged in or powered on.

¹ You do not have to connect both outputs

² This is usually done only once when the unit is being set up in an installation. Once acquired, the EDID is saved in non-volatile memory and further acquisition is not necessary

³ The VM-2DH reads the EDID, which is stored in the non-volatile memory

The **VM-2DH** provides the ability to acquire the EDID from:

- One output (the relevant output LED lights)
- Two connected outputs in Auto-Mix mode¹ (both output LEDs are lit)
- The initial, default EDID (both output LEDs blink)

Pressing the EDID button briefly causes the output LEDs to indicate the source of the EDID that was last acquired. If the:

- HDMI OUT LED lights, the HDMI OUT EDID was stored
- DVI OUT LED lights, the DVI OUT EDID was stored
- Both OUT LEDs light, the Auto-Mix¹ EDID was stored
- Both OUT LEDs blink, the default EDID is stored

To acquire the EDID:

1. Connect the power.
2. Connect the output(s) from which you want to acquire the EDID.
3. Press and hold the EDID button to select the desired EDID source.
The OUTPUT LEDs light in the following cycle:
 - HDMI OUT
 - DVI OUT
 - Both LEDs (Auto-Mix)
 - Both LEDs blink (default)
4. Release the button when reaching the desired EDID source².
The EDID is acquired.

¹ 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

² 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 3](#) lists the technical specifications of the **VM-2DH DisplayPort to DVI/HDMI Converter**.

Table 3: Technical Specifications¹ of the VM-2DH

INPUT:	1 DisplayPort connector
OUTPUTS:	1 DVI, 1.2Vpp on DVI Molex 24-pin female connector; DDC signal 5Vpp (TTL) 1 HDMI connector
STANDARDS COMPLIANCE:	Supports DVI 1.1, HDCP and HDMI
MAX RESOLUTION:	Up to WUXGA (1920x1200), 1080p
BANDWIDTH:	1.65Gbps
CONTROLS:	EDID button for selecting and storing EDID information
POWER SOURCE:	5V DC 720mA
OPERATING TEMPERATURE:	0° to +55°C (32° to 131°F)
STORAGE TEMPERATURE:	-45° to +72°C (-49° to 162°F)
HUMIDITY:	10% to 90%, RHL non-condensing
DIMENSIONS:	12cm x 7.2cm x 2.4cm (4.7" x 2.8" x 1.0") W, D, H
WEIGHT:	0.3kg (0.67lbs) approx.
ACCESSORIES:	Power supply, mounting bracket
OPTIONS:	Kramer DVI cables ² , RK-3T rack adapter

¹ Specifications are subject to change without notice

² The complete list of Kramer cables is available at <http://www.kramerelectronics.com>

LIMITED WARRANTY

We warrant this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for seven 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 us 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 www.kramerelectronics.com where updates to this user manual may be found. We welcome your questions, comments and feedback.



Caution

Safety Warning:

Disconnect the unit from the power supply before opening/servicing.



Kramer Electronics, Ltd.

Web site: www.kramerelectronics.com

E-mail: info@kramerel.com

P/N: 2900-000634 REV 1