

**Kramer Electronics, Ltd.**



# **USER MANUAL**

**Model:**

**VM-4HDCPx1**

*1:4 DVI Distributor*

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## 1 Introduction

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

Thank you for purchasing your Kramer **VM-4HDCPx1 1:4 DVI Distributor**, which is ideal for:

- Home theater, presentation and multimedia applications
- Rental and staging

The package includes the following items:

- **VM-4HDCPx1 1:4 DVI Distributor**
- Power cord<sup>2</sup>
- This user manual<sup>3</sup>

## 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<sup>4</sup>

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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

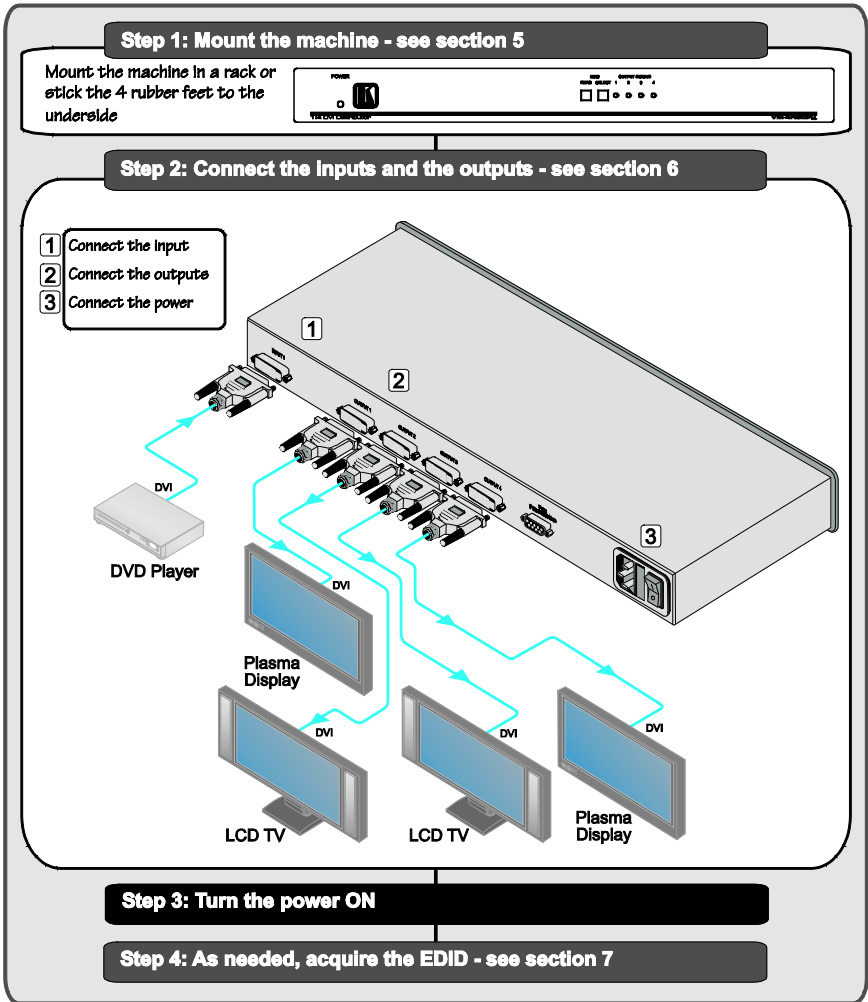
2 We recommend that you use only the power cord supplied with this device

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

4 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:



### 3 Overview

The **VM-4HDCPx1** is an HDCP compliant distribution amplifier for DVI-D signals. The unit inputs one DVI-D signal, and distributes it to four outputs.

The **VM-4HDCPx1** features:

- Up to 2.25Gbps bandwidth per graphic channel<sup>1</sup>
- HDTV compatibility and HDCP compliance
- I-EDIDPro™ Kramer Intelligent EDID Processing™, an intelligent EDID handling and processing algorithm that ensures Plug and Play operation for DVI systems
- Acquisition of the EDID from one output, from several connected outputs (auto-mix) or from the default<sup>2</sup> EDID for fast and efficient connection of the unit
- A 19" 1U rack mountable enclosure and is fed from a 100-240 V AC universal switching power supply

#### 3.1 About HDCP

The High-Bandwidth Digital Content Protection (HDCP) standard<sup>3</sup> 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.

#### 3.2 Defining EDID

The Extended Display Identification Data (EDID<sup>4</sup>) is a data-structure, provided by a display, to describe its capabilities to an HDCP source. The EDID enables the **VM-4HDCPx1** 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.

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<sup>1</sup> Suitable for resolutions up to UXGA at 60Hz, and for all HD resolutions

<sup>2</sup> Lets you use the EDID default value when no display from which to read the EDID is connected

<sup>3</sup> Developed by Intel

<sup>4</sup> Defined by a standard published by the Video Electronics Standards Association (VESA)

### 3.3 Recommendations for Best Performance

To achieve the best performance:

- Connect 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)
- Avoid interference from neighboring electrical appliances and position your **VM-4HDCPx1** away from moisture, excessive sunlight and dust

## 4 Your VM-4HDCPx1 1:4 DVI Distributor

[Table 1](#) and [Figure 1](#) define the **VM-4HDCPx1**.

*Table 1: VM-4HDCPx1 1:4 DVI Distributor Features*

#	Feature	Function
1	POWER LED	The green LED is illuminated when the unit is turned ON
2	EDID Buttons	READ <sup>1</sup> 1. To show the EDID status, press READ 2. To acquire the EDID, press the EDID SELECT button, then press READ
3		SELECT Press to select the EDID mode (One Output, Default or Auto-mix)
4	OUTPUT STATUS LEDs (from 1 to 4)	LEDs illuminate when an output(s) is connected and active; LEDs flash to indicate the type of EDID acquired (see section <a href="#">7</a> ) or when a non-HDCP display is connected while HDCP content is provided to the <b>VM-4HDCPx1</b>
5	INPUT DVI Connector	Connects to the DVI source
6	OUTPUT DVI Connectors	Connects to a DVI acceptor (from 1 to 4)
7	FOR PROGRAMMING 9-pin D-sub Port	For service use only (see section <a href="#">7.4</a> )
8	Power Connector with Fuse	AC connector enabling power supply to the unit
9	POWER Switch	Illuminated switch for turning the unit ON or OFF

<sup>1</sup> Illuminates when configuring the EDID

Your VM-4HDCPx1 1:4 DVI Distributor

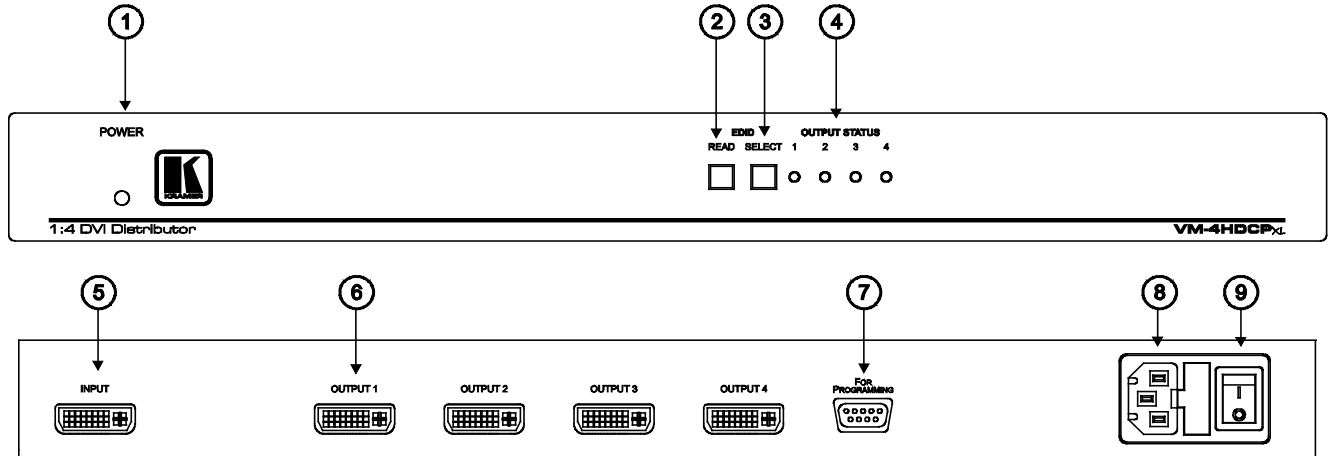


Figure 1: VM-4HDCPx1 1:4 DVI Distributor

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



### CAUTION!

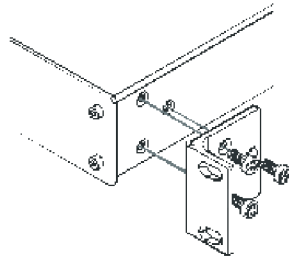
When installing on a 19" rack, avoid hazards by taking care that:

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 (3 on each side), and replace those screws through the ear brackets.



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

#### Note:

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



## 6 Connecting the VM-4HDCPx1

To connect the **VM-4HDCPx1**, as illustrated in the example in [Figure 2](#), do the following<sup>1</sup>:

1. Connect a source (for example, a DVD player) to the DVI INPUT connector.
2. Connect the DVI OUTPUT connectors to up to four DVI acceptors<sup>2</sup>, using Kramer DVI cables. In this example, connect the:
  - OUTPUT 1 connector to acceptor 1 (for example, plasma display 1)
  - OUTPUT 2 connector to acceptor 2 (for example, LCD TV 1)
  - OUTPUT 3 connector to acceptor 3 (for example, LCD TV 2)
  - OUTPUT 4 connector to acceptor 4 (for example, plasma display 2)
3. Connect the power cord to the mains electricity (not shown in [Figure 2](#)).
4. Turn on the power and as needed, acquire the EDID (see section [7](#)).

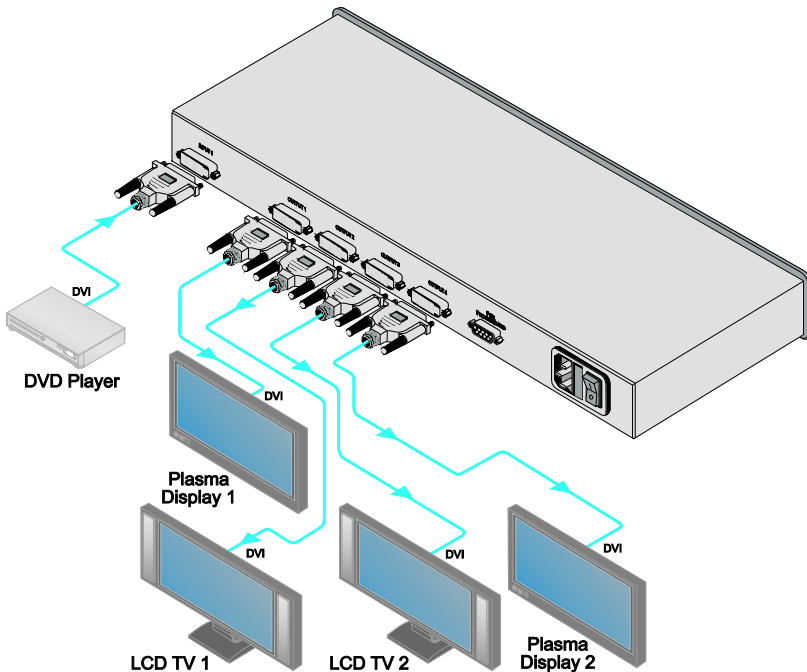


Figure 2: Connecting a VM-4HDCPx1 1:4 DVI Distributor

<sup>1</sup> Switch OFF the power on each device before connecting it to your VM-4HDCPx1. After connecting your VM-4HDCPx1, switch on its power and then switch on the power on each device

<sup>2</sup> Not all outputs need to be connected

## 7 Acquiring the EDID

You can acquire the EDID from:

- One output (the selected output LED flashes), see section [7.1](#)
- The default EDID (all the output LEDs flash), see section [7.2](#)
- Several connected outputs, the auto-mix mode<sup>1</sup> (the output LEDs illuminate), see section [7.3](#)

To cycle between the different modes, press the EDID SELECT button as shown in [Figure 3](#).

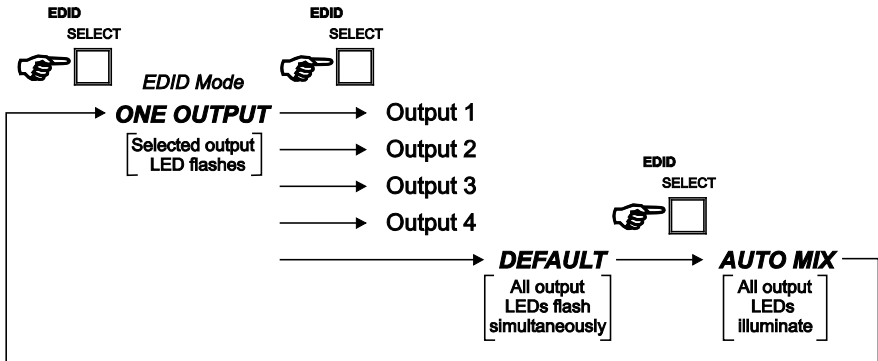


Figure 3: EDID Modes

### 7.1 Acquiring/Changing the EDID from One Output

To acquire or change the EDID of one new output display:

1. Turn on the VM-4HDCPx1.
2. Connect the new output display device.
3. Press the EDID SELECT button to enter the ONE OUTPUT mode as shown in [Figure 3](#).
4. Press EDID SELECT as needed to select the desired output. The appropriate OUTPUT STATUS LED flashes indicating that that output channel is selected.
5. Press the EDID READ button to copy the EDID of the selected OUTPUT to the input<sup>2</sup>.

<sup>1</sup> 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

<sup>2</sup> If you want to cancel the EDID modification, wait for a few seconds without touching any button

While the EDID is being copied, the EDID SELECT and READ buttons illuminate.

The new EDID is copied when both buttons no longer illuminate.

## 7.2 Acquiring the Default EDID

To reset to the default EDID, do the following:

1. Turn on the **VM-4HDCPxI**.
2. Press the EDID SELECT button and set it to the DEFAULT EDID mode. All the OUTPUT STATUS LEDs flash simultaneously.
3. Press the EDID READ button to copy the default EDID to the input<sup>2</sup>. While the EDID is being copied, the EDID SELECT and READ buttons illuminate. The new EDID is copied when both buttons no longer illuminate.

## 7.3 Acquiring the Auto-mix EDID from the Connected Outputs

To acquire the Auto-mix EDID:

1. Turn on the **VM-4HDCPxI**.
2. Connect the desired output display devices.
3. Enter the AUTO-MIX mode as shown in [Figure 3](#). The OUTPUT STATUS LEDs illuminate.
4. Press the READ button to copy the EDID of the selected OUTPUT to the input<sup>2</sup>. While the EDID is being copied, the EDID SELECT and READ buttons illuminate. The new EDID is copied when both buttons no longer illuminate.

## 7.4 Connecting a PC to the RS-232 Port for Programming

The RS-232 port is used for service.

This procedure should be performed by qualified personnel only.

To use the RS-232 port for programming<sup>1</sup>:

1. Turn off the power and disconnect the power cord from the **VM-4HDCPxI** and then open the cover.
2. Locate the 3-pin jumper on the board<sup>2</sup>.

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<sup>1</sup> For firmware upgrade procedure go to our Web site at <http://www.kramerelectronics.com>

<sup>2</sup> Connecting the middle pin and one of the side pins

3. Carefully move the jumper to the PROGRAMMING position (to the left when the front panel of the machine is facing towards you)<sup>1</sup>
4. Connect the RS-232 9-pin D-sub port on the unit via a crossed cable (pin 2 to pin 3, pin 3 to pin 2, and pin 5 to pin 5) to the RS-232 9-pin D-sub port on the PC. If a shielded cable is used, connect the shield to pin 5.

Note: There is no need to connect any other pins.

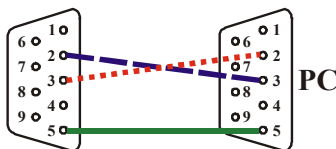


Figure 4: RS-232 Crossed Cable Connection

## 8 Technical Specifications

[Table 2](#) includes the technical specifications<sup>2</sup> of the **VM-4HDCPx1**:

Table 2: VM-4HDCPx1 Technical Specifications

INPUT:	1 DVI, 1.2Vpp on a DVI Molex 24-pin (F) connector; DDC signal 5Vpp (TTL)
OUTPUTS:	4 DVI, 1.2Vpp on DVI Molex 24-pin (F) connectors; DDC signal 5Vpp (TTL)
BANDWIDTH:	Supports up to 2.25Gbps bandwidth per graphic channel
CONTROLS:	EDID SELECT, EDID READ
INDICATOR LEDs:	OUTPUT STATUS LEDs
POWER SOURCE:	100-240V AC, 50/60Hz 17VA
DIMENSIONS:	19" x 7" x 1U W, D, H, rack mountable
WEIGHT:	2.5kg (5.5lbs) approx.
ACCESSORIES:	Power cord, rack ears
OPTIONS:	DVI/DVI male-to-male cables, Fiber Optic DVI Cable (C-FODM/FODM)

<sup>1</sup> Upon completion of firmware upgrade, move the jumper to the right side (to the NORMAL position)

<sup>2</sup> Specifications are subject to change without notice

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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](http://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 your 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)



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**For the latest information on our products and a list of Kramer distributors, visit our Web site: [www.kramerelectronics.com](http://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.



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Rev: 3

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**Kramer Electronics, Ltd.**

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