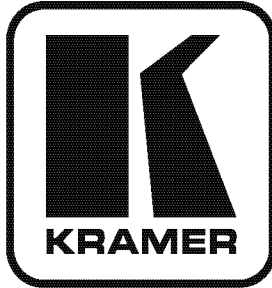


Kramer Electronics, Ltd.



USER MANUAL

Model:

VM-4DH

1:4 HDMI DisplayPort 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 groups¹ that are clearly defined by function.

Thank you for purchasing your Kramer **VM-4DH 1:4 HDMI DisplayPort Distributor**, which is ideal for:

- Multimedia applications
- PC showrooms

The package includes the following items:

- **VM-4DH 1:4 HDMI DisplayPort Distributor**
- Power cord
- 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

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 Sealers; 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>

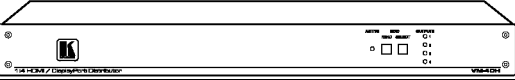
3 The complete list of Kramer cables is on our Web site at <http://www.kramerelectronics.com>

2.1 Quick Start

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

Step 1: Mount the machine - see section 5

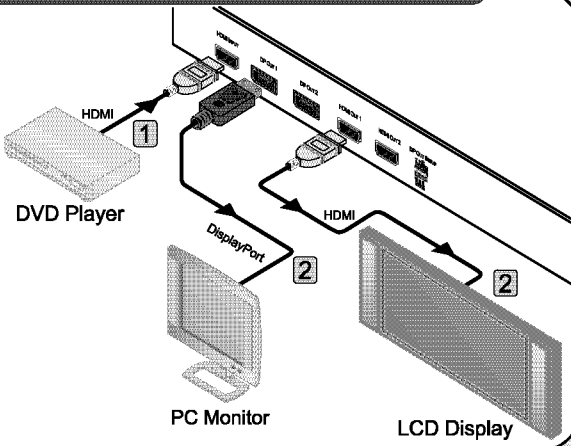
Mount the machine in a rack or stick the 4 rubber feet to the underside



Step 2: Connect the input and outputs - see section 6


1 Connect the Input

2 Connect the outputs



DP OUT SETUP

DP 1
DP 2
AUTO
NU



HDMI
HDMI
MANUAL

Set the Dipswitches

Step 3: Turn the power ON

Step 4: Acquire EDID - see section 6.3

To acquire the EDID:

- Press the SELECT button to reach the desired connected or disconnected output from which you want to acquire the EDID
- Press the READ button

ACTIVE	EDID	OUTPUTS
READ	SELECT	1
<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>
		<input type="radio"/>
		<input type="radio"/>
		<input type="radio"/>

3 Overview

The Kramer **VM-4DH** is a high-quality *1:4 HDMI DisplayPort Distributor* that accepts an HDMI input, equalizes and reclocks the data, and distributes the signal to two DisplayPort (DP) outputs and two HDMI outputs.

The **VM-4DH** features:

- One HDMI input, two HDMI outputs, two DisplayPort outputs, four output status LEDs, an active input status LED, as well as EDID read and select buttons
- Up to 2.7Gbps bandwidth per graphic channel
- A maximum resolution of 2560x1600 pixels and a total maximum bandwidth of 10.8Gbps over four lanes
- Kramer re-Klocking™ and Equalization Technology, which rebuilds the digital signal to travel longer distances
- HDMI Support – HDMI (V.1.4 with Deep Color, x.v.Color™, CEC)
- I-EDIDPro™ Kramer Intelligent EDID Processing™, an intelligent EDID handling and processing algorithm that ensures Plug and Play operation for HDMI systems
- Compliance to HDCP
- High-resolution and rich colors and transports audio and multiple video streams
- Worldwide Power Supply – 100-240V AC
- A standard 19" rack-mount size - 1U. Rack "ears" are included

3.1 About DisplayPort

DisplayPort (DP) is a new digital display interface standard for the PC industry. It delivers the highest resolutions and sound quality.

In addition, DisplayPort:

- Provides a simple interface between a PC and a display, projector or TV
- Supports 1 to 4 data pairs ("lanes") at a transfer rate of 1.62Gb or 2.7Gb per second
- Has a maximum length of 15 meters for video transmission, at a resolution of 1080p60Hz and 3 meters for full bandwidth transmission
- Video specs include a video path that supports 6 to 16 bits per color channel, a maximum resolution of 2560x1600 pixels and a total maximum bandwidth of 10.8Gbps over four lanes

- Is backward-compatible with HDMI, DVI (Digital Visual Interface) and VGA, via an appropriate adapter
- Version 1.1 supports HDCP (see section 3.3)
- Supports two-way communication over its auxiliary channel between the video source (for example, a PC) and the digital display, enabling new functionality such as automatic configuration and one-button play
- Replaces the interface needed between the PC and an external display, as well as the low voltage differential signaling (LVDS) interface in notebook computers, monitors, to connect to LCD panels

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 AV 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

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 AV systems is reduced

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

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

- Is backward-compatible with DVI (Digital Visual Interface)
- Supports two-way 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 1080p60), as well as standard definition formats such as NTSC or PAL

3.3 About HDCP

High-Bandwidth Digital Content Protection (HDCP) standard¹ protects digital video and audio signals transmitted over DisplayPort, HDMI or DVI 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, encrypted transmission of digital signals.

3.4 Defining EDID

The Extended Display Identification Data (EDID²) is a data-structure, provided by a display, to describe its capabilities to a graphics card (that is connected to the display's source). The EDID enables the **VM-4DH** 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.

3.5 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-4DH** away from moisture, excessive sunlight and dust

4 Your VM-4DH 1:4 HDMI DisplayPort Distributor

Figure 1 and Table 1 define the **VM-4DH 1:4 HDMI DisplayPort Distributor**:

¹ Developed by Intel

² Defined by a standard published by the Video Electronics Standards Association (VESA)

Your VM-4DH 1:4 HDMI DisplayPort Distributor

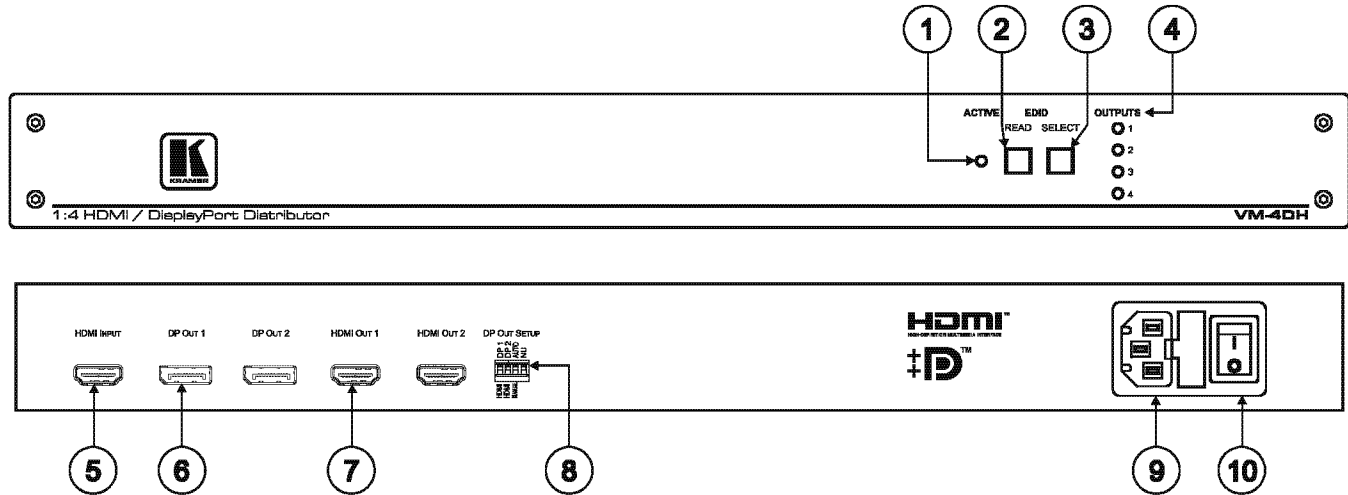


Figure 1: VM-4DH 1:4 HDMI DisplayPort Distributor

Table 1: VM-4DH 1:4 HDMI DisplayPort Distributor Features

#	Feature	Function
1	ACTIVE LED	Illuminates when the input is active
2	EDID READ Button	Press to read the EDID of the selected display
3		SELECT Button Select the desired output from which to acquire the EDID information
4	OUTPUTS LEDs	LEDs light when an output(s) is connected and active; LEDs blink when selecting EDID (see section 6.3)
5	HDMI INPUT Connector	Connects to the HDMI source
6	DP OUT DisplayPort Connectors	Connect to the DP acceptors (from 1 to 2)
7	HDMI OUT Connectors	Connect to the HDMI acceptors (from 1 to 2)
8	DP OUT SETUP DIP-switches	Setup DIP-switches (see section 6.2)
9	Power Connector with Fuse	AC connector enabling power supply to the unit
10	POWER Switch	Illuminated switch for turning the unit ON or OFF

5 Installing the VM-4DH 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!

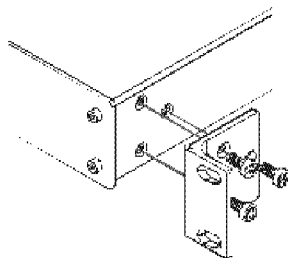
When installing on a 19" rack, avoid hazards by taking care that:

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 Using the VM-4DH 1:4 HDMI DisplayPort Distributor

This section describes how to:

- Connect the **VM-4DH**, see section [6.1](#)
- Set the DIP-switches, see section [6.2](#)
- Acquire the EDID information, see section [6.3](#)

6.1 Connecting the VM-4DH 1:4 HDMI DisplayPort Distributor

To connect the **VM-4DH**, as illustrated in [Figure 2](#), do the following:

1. Connect an HDMI source (for example, a DVD player) to the HDMI INPUT connector.
2. Connect the four output connectors¹, as follows:
 - DP OUT 1 DisplayPort connector to DP² acceptor 1 (for example, a PC monitor)
 - DP OUT 2 DisplayPort connector to DP² acceptor 2 (for example, a PC monitor)
 - HDMI OUT 1 connector to HDMI acceptor 1 (for example, a plasma display)
 - HDMI OUT 2 connector to HDMI acceptor 2 (for example, an LCD display)
3. Connect the power cord to the mains electricity (not shown in [Figure 2](#)).
4. Set the DIP-switches, see section [6.2](#).
5. Turn ON the POWER on the rear panel.
6. Acquire the EDID, see section [6.3](#).

¹ As required. Up to 4 outputs can be connected on the VM-4DH. Not all outputs need to be connected

² You can connect the DP output to an HDMI acceptor by using an appropriate adapter and setting the dipswitches

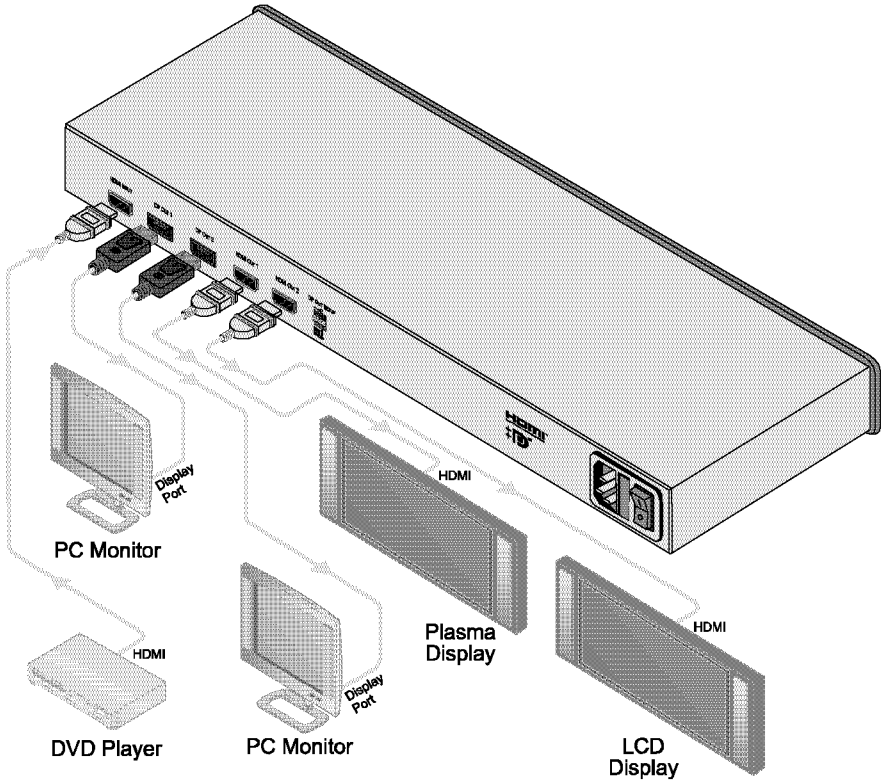


Figure 2: Connecting a VM-4HD 1:4 HDMI DisplayPort Distributor

6.2 Setting the DIP-Switches

[Figure 3](#) defines the DIP-switch factory default settings:

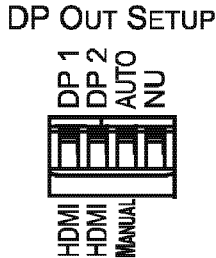


Figure 3: DIP-switch Settings

[Table 2](#) defines the DIP-switch settings:

Table 2: VM-4DH DIP-switch Settings

DIP-switch	Function
DP 1 HDMI	Set to DP 1 when connecting DP OUT 1 to a DP acceptor Set to HDMI when connecting DP OUT 1 to an HDMI acceptor via an adapter
DP 2 HDMI	Set to DP 2 when connecting DP OUT 2 to a DP acceptor Set to HDMI when connecting DP OUT 2 to an HDMI acceptor via an adapter
AUTO MANUAL	Set to AUTO ¹ to override the DP DIP-switch settings. Otherwise, set to MANUAL
NU	Not used

6.3 Acquiring EDID

The VM-4DH initially operates with the default EDID. This means that you can turn ON the power before connecting any of the acceptors or the source.

You can acquire the EDID from:

- The default EDID, see section [6.3.1](#)
- A connected output, see section [6.3.2](#)

6.3.1 Acquiring the Default EDID

To acquire the default EDID, do the following:

1. Press the SELECT button, as required, to reach a disconnected output.
The selected output LED blinks.
2. Press the READ button.
The READ button and the selected output blink.

¹ In the AUTO mode, the VM-4DH recognizes a DP connection via an adapter

The new EDID of the selected output is stored in the non-volatile memory¹ when the READ button no longer blinks as well as the selected output LED.

6.3.2 Acquiring the EDID from a Connected Output

To acquire the EDID, from a selected output, do the following:

1. Press the SELECT button, as required, to reach the desired connected output from which you want to acquire the EDID.

The selected output LED blinks.

If the EDID of that output is different from the EDID currently stored in the non-volatile memory, the READ button blinks.

2. Press the READ button.

The READ button and the selected output blink.

The new EDID of the selected output is stored in the non-volatile memory¹ when the READ button no longer blinks as well as the selected output LED.

7 Technical Specifications

Table 3 includes the technical specifications:

Table 3: Technical Specifications² of the VM-4DH 1:4 HDMI DisplayPort Distributor

INPUT:	HDMI Connector
OUTPUTS:	2 DisplayPort connectors, 2 HDMI connectors
BANDWIDTH:	Supports up to 2.7Gbps bandwidth per graphic channel
COMPLIANCE WITH HDMI STANDARD:	Supports: DisplayPort 1.1 and HDCP 1.3; HDMI and HDCP 1.2
CONTROLS:	SELECT and READ buttons for selecting and storing EDID information
INDICATOR LEDs:	OUTPUTS 1 to 4, and ACTIVE LED
POWER SOURCE:	100-240V AC, 5060Hz, 22VA
DIMENSIONS:	19" x 7" x 1U W, D, H rack mountable
WEIGHT:	2.5kg (5.5lbs) approx.
ACCESSORIES:	Power cord
OPTIONS:	HDMI to HDMI male-to-male cables, HDMI to DisplayPort male-to-male cables, DisplayPort to DisplayPort male-to-male cables, DisplayPort to HDMI adapters

¹ And passed to the input

² Specifications are subject to change without notice

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 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)



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.



Caution

Safety Warning:

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



Kramer Electronics, Ltd.

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PN: 2900-000410 REV 2