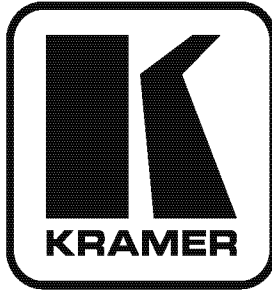


Kramer Electronics, Ltd.



USER MANUAL

Model:

VM-73

Multiformat 1:3 Distribution Amplifier

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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 the Kramer **VM-73** *Multiformat 1:3 Distribution Amplifier*, which is ideal for:

- Video reproduction in studios
- School and university presentations

Each package includes the following items:

- The **VM-73** *Multiformat 1:3 Distribution Amplifier*
- Power cord²
- This user manual³

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 cables⁴

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

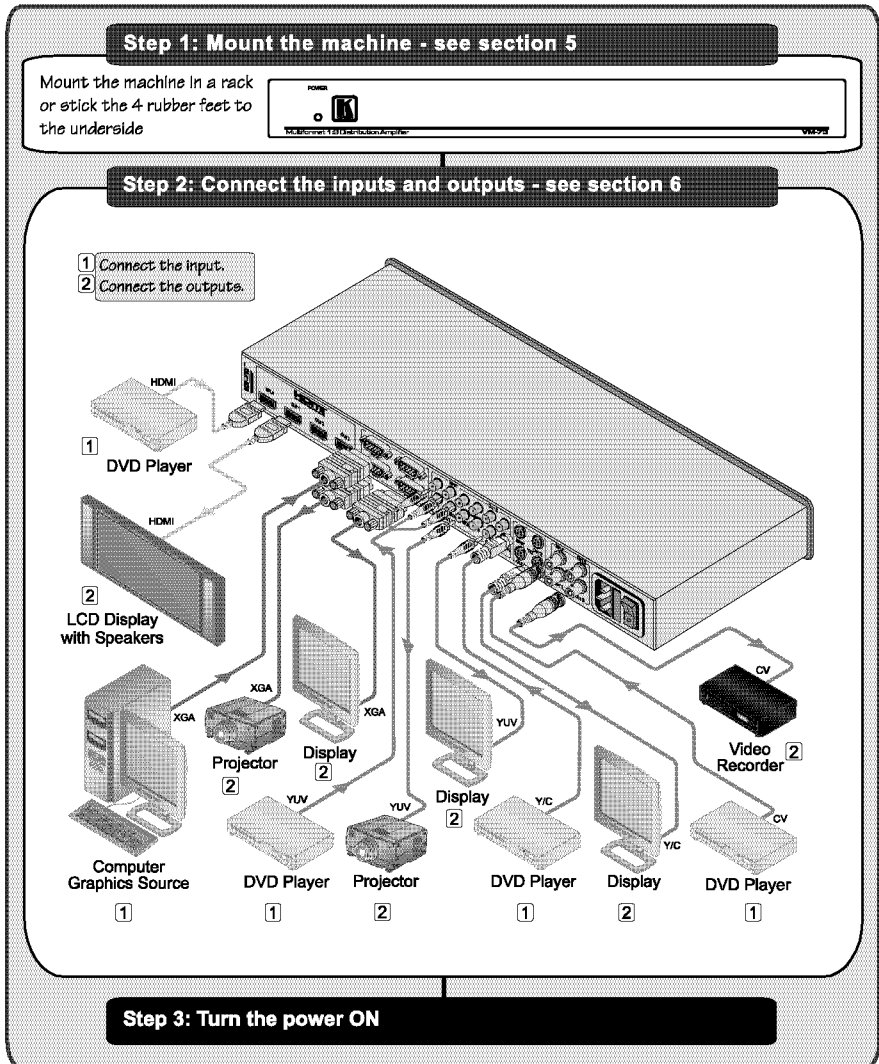
2 We recommend that you use only the power cord supplied with this device

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 steps.



3 Overview

The **VM-73** is a high-performance distribution amplifier for HDMI, computer graphics, component video, s-Video and composite video signals. The unit takes one input of each video format and distributes each input to three identical outputs.

Specifically, the **VM-73** features:

- Multiformat operation: composite, component, Y/C, XGA and HDMI
- High bandwidth (-3dB) of 430MHz for composite video, 440MHz for Y/C, 430MHz for component video, 405MHz for XGA and 2.25Gbps for HDMI
- HDTV compatibility
- HDMI 1.3 and HDCP compatibility
- The ability to pass PC OUT 1's EDID information to the PC input¹
- The option to acquire the EDID information from the highest priority connected HDMI output²
- Worldwide power supply 100-240V AC
- A standard 19" rack mount size, rack "ears" included

To achieve the best performance:

- Use only good quality connection cables³ to avoid 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 that may adversely influence signal quality and position your Kramer **VM-73** away from moisture, excessive sunlight and dust

3.1 About HDMI

High-Definition Multimedia Interface (HDMI) is an uncompressed all-digital⁴ audio/video interface, widely supported in the entertainment and home cinema industry. It delivers the highest high-definition image and sound quality. Note that Kramer Electronics Limited is an HDMI Adopter and an HDCP Licensee.

¹ See [Section 6.1](#)

² OUT 1 being the highest priority output and OUT 3 the lowest (see [Section 6.1](#))

³ Available from Kramer Electronics on our Web site at <http://www.kramerelectronics.com>

⁴ Ensuring an all-digital rendering of video without the losses associated with analog interfaces and their unnecessary digital-to-analog conversions

In particular, HDMI¹:

- Provides a simple² 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 lengthy³ cable
- Supports standard, enhanced, high-definition video, and multi-channel digital audio⁴ 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 cable⁵, and user-friendly connector
- 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 1080p/60), standard definition formats such as NTSC or PAL, as well as 480p and 576p.

3.2 Defining EDID

The Extended Display Identification Data (EDID⁶) is a data-structure, provided by a display, to describe its capabilities to the source. The EDID enables the **VM-73** 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.

4 Your VM-73 Multiformat 1:3 Distribution Amplifier

Figure 1 and Table 1 define the unit.

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

2 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

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

4 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

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

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

Your VM-73 Multiformat 1:3 Distribution Amplifier

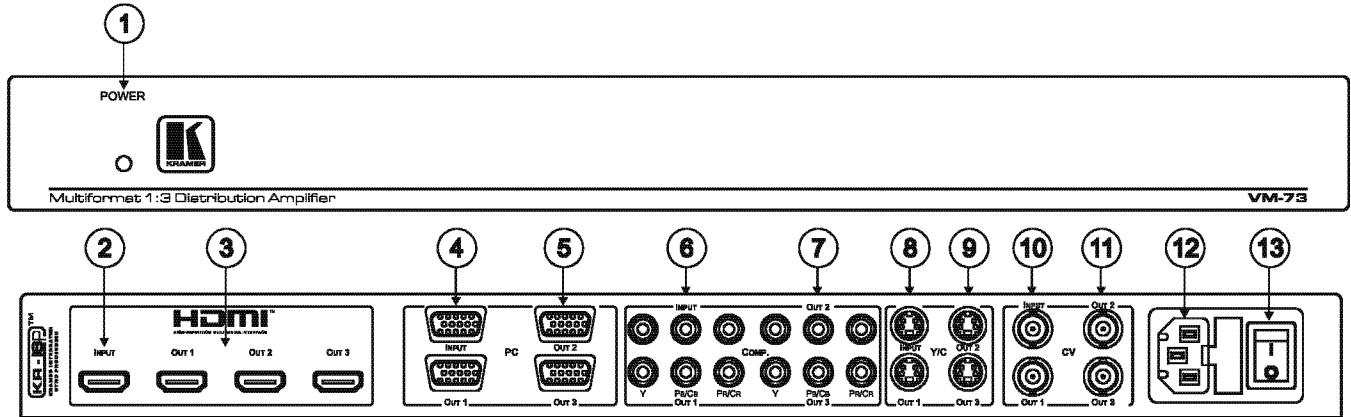


Figure 1: VM-73 Multiformat 1:3 Distribution Amplifier

Your VM-73 Multiformat 1:3 Distribution Amplifier

Table 1: VM-73 Multiformat 1:3 Distribution Amplifier Functions

#	Feature	Function
1	POWER LED	Illuminates green when receiving power
2	HDMI INPUT Connector	Connects to the HDMI source
3	HDMI OUT Connectors	Connect to the HDMI acceptors (1 to 3)
4	PC INPUT 15-pin HD Connector	Connects to the computer graphics source
5	PC OUT 15-pin HD Connectors	Connect to the computer graphic acceptors (1 to 3)
6	COMP. INPUT RCA Connectors	Connects to the component video source
7	COMP. OUT RCA Connectors	Connect to the component video (Y/Pr/Pb) acceptors (1 to 3)
8	Y/C INPUT s-Video Connector	Connects to the Y/C video source
9	Y/C OUT s-Video Connectors	Connect to the Y/C acceptors (1 to 3)
10	CV INPUT BNC Connector	Connects to the composite video source
11	CV OUT BNC Connectors	Connect to the composite video acceptors (1 to 3)
12	POWER IN with Fuse	AC connector and fuse enabling power supply to the VM-73
13	POWER Switch	Illuminated switch for turning the unit ON and OFF

5 Installing the VM-73 in a Rack

This section describes how to install the **VM-73** in a rack.

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!!

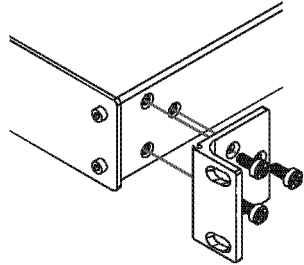
When installing on a 19" rack, avoid hazards by taking care that:

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 that:

- 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 (you can download it at: <http://www.kramerelectronics.com>)

6 Connecting the VM-73

To connect the **VM-73**, as shown in the example in [Figure 2](#), do the following¹:

1. Connect the HDMI input source (for example, a DVD player) to the HDMI INPUT connector.
2. Connect the three HDMI OUT connectors² to up to three HDMI acceptors, (for example, LCD televisions with speakers).
3. Connect a computer graphics input source (for example, a PC graphics card) to the PC INPUT 15-pin HD connector.
4. Connect the three PC OUT 15-pin HD connectors² to up to three PC acceptors (for example, VGA displays or projectors).
5. Connect the component input source (for example, a DVD player) to the COMP. INPUT RCA connectors (Y/Pb/Pr or Y/Cb/Cr).
6. Connect the three COMP. OUT connectors² to up to three component acceptors (for example, component displays or projectors).
7. Connect the Y/C input source (for example, a DVD player) to the Y/C INPUT s-Video connector.
8. Connect the three Y/C OUT connectors² to up to three Y/C acceptors (for example, displays).
9. Connect the composite video input source (for example, a DVD player) to the CV INPUT BNC connector.
10. Connect the three CV OUT connectors² to up to three CV acceptors, (for example, video recorders).
11. Connect the power cord to the mains electricity (not shown in [Figure 2](#)).
12. Turn ON the POWER.

1 Switch OFF the power on each device before connecting it to your VM-73. After connecting your VM-73, switch on its power and then switch on the power on each device

2 As required. Not all outputs need to be connected

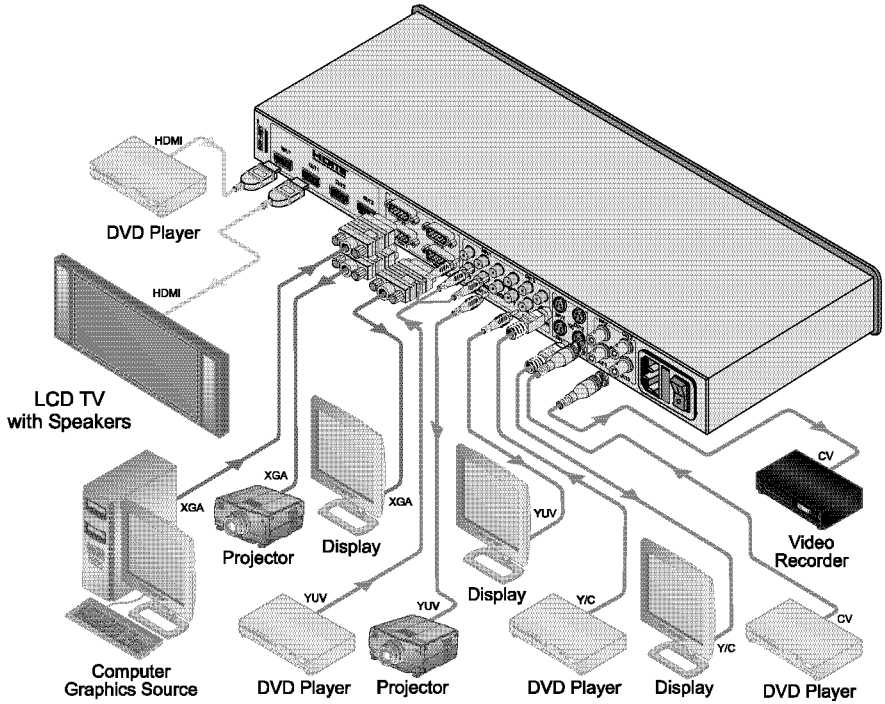


Figure 2: Connecting the VM-73 Multiformat 1:3 Distribution Amplifier

6.1 Reading EDID

The **VM-73** PC input directly reads the EDID from the PC OUT 1 output (see [Section 6.1.1](#)), and allows the HDMI input to read the EDID of the HDMI outputs (see [Section 6.1.2](#)).

6.1.1 Reading the EDID from PC OUT 1

The EDID information of the output connected to PC OUT 1 goes directly to the PC input via pins 12 and 15 of the 15-pin HD connectors.

6.1.2 Reading the EDID from the HDMI outputs

The EDID is always acquired from the highest priority output (OUT 1 being the highest and OUT 3 the lowest¹).

You can acquire the EDID by disconnecting (for 2 seconds) and then reconnecting the HDMI input.

To read the EDID (from OUT 2, for example), do the following:

1. Connect an acceptor to OUT 2 (OUT 3 can also be connected, but OUT 1 cannot).
2. Turn ON the POWER.
3. Disconnect the input for 2 seconds and then reconnect it.
The input reads the OUT 2 EDID information².

To acquire the default EDID, disconnect all the HDMI outputs, disconnect the HDMI input for 2 seconds and then reconnect it.

¹ For example, if all three outputs are connected, the EDID will be read from OUT 1. If OUT 2 and OUT 3 are connected, the EDID will be read from OUT 2.

² If you connect OUT 1, the EDID still remains that of OUT 2.

7 Technical Specifications

The VM-73 technical specifications are shown in *Table 2*:

Table 2: VM-73 Technical Specifications¹

	Composite	Y/C	Component	XGA	HDMI
INPUTS:	1 composite on a BNC connector	1 s-Video on a 4-pin connector	1 component (Y, Pb/Cb, Pr/Cr) on 3 RCA connectors	1 XGA on a 15-pin HD connector	1 HDMI on an HDMI connector
OUTPUTS:	3 composite on BNC connectors	3 s-Video on 4-pin connectors	3 component (Y, Pb/Cb, Pr/Cr) on 3 RCA connectors each	3 XGA on 15-pin HD connectors	3 HDMI on HDMI connectors
OUTPUT LEVEL:	1.8Vpp	1.9Vpp	2.0Vpp	2.0Vpp	
BANDWIDTH (-3dB):	430MHz	440MHz	430MHz	405MHz	2.25Gbps
DIFF. GAIN:	0.05%	0.06%	0.05%	0.05%	
DIFF. PHASE:	0.05Deg	0.02Deg	0.05Deg	0.03Deg	
S/N RATIO @5MHz:	62dB	62dB	74dB	69dB	
COUPLING:	DC	Y-DC, C-AC	DC	DC	
K-FACTOR:	<0.05%				
CROSSTALK (all hostile):	-60dB				
POWER SOURCE:	100-240V AC, 100mA				
DIMENSIONS	19" x 7" x 1U W, D, H				
WEIGHT:	2kg (4.4lbs)				
ACCESSORIES:	Power cord, rack "ears"				

¹ 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 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 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.



Caution

Safety Warning:

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



Kramer Electronics, Ltd.

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