

USER MANUAL

MODEL:

FC-46H2

4K HDMI Audio De-Embedder



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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!

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.



Go to www.kramerav.com/downloads/FC-46H2 to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

Achieving the Best Performance

- Use only good quality connection cables (we recommend Kramer high-performance, high-resolution cables) to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables).
- Do not secure the cables in tight bundles or roll the slack into tight coils.
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality.
- Position your Kramer **FC-46H2** away from moisture, excessive sunlight and dust.

Safety Instructions



Caution:

- This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.
- For products with relay terminals and GPIO ports, please refer to the permitted rating for an external connection, located next to the terminal or in the User Manual.
- There are no operator serviceable parts inside the unit.



Warning:

- Use only the power cord that is supplied with the unit.
- To ensure continuous risk protection, replace fuses only according to the rating specified on the product label which located on the bottom of the unit.

Recycling Kramer Products

The Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC aims to reduce the amount of WEEE sent for disposal to landfill or incineration by requiring it to be collected and recycled. To comply with the WEEE Directive, Kramer Electronics has made arrangements with the European Advanced Recycling Network (EARN) and will cover any costs of treatment, recycling and recovery of waste Kramer Electronics branded equipment on arrival at the EARN facility. For details of Kramer's recycling arrangements in your particular country go to our recycling pages at www.kramerav.com/support/recycling.

Overview

Congratulations on purchasing your Kramer **FC-46H2 4K HDMI Audio De-Embedder**.

The **FC-46H2** is a professional HDMI™ audio de-embedder for HDMI signals up to 4K@60Hz (4:4:4) resolution. The unit de-embeds the audio signal from the HDMI input or from the HDMI output ARC (Audio Return Channel) and simultaneously outputs it to the S/PDIF and 5-pin balanced audio outputs.

The **FC-46H2** provides exceptional quality, advanced and user-friendly operation, and flexible control.

Exceptional Quality

- Professional HDMI Audio De-embedder – De-embeds the audio from HDMI signals with resolution up to 4K@60Hz (4:4:4) and data rate up to 18Gbps (6Gbps per graphic channel), supporting HDR and HDCP 2.2/1.4.
- Kramer re-Klocking™ and Equalization Technology – Rebuilds the digital signal to travel longer distances.

Advanced and User-friendly Operation

- Smart EDID Management – Select one of the EDID management modes using the DIP-switches: pass-through, lock or force 2 channel LPCM.
- Convenient Control and Maintenance – Audio Source front panel button enables local switching to either the HDMI input audio or the HDMI output ARC. Audio source, audio output, and power LED indicators enable easy local maintenance and troubleshooting. Local firmware upgrade via the mini USB port ensures lasting, field-proven deployment.
- Easy Installation – Compact DigTOOLS® fan-less enclosure for surface mounting or side-by-side mounting of 3 units in a 1U rack space with the recommended rack adapter.

Flexible Connectivity

- Flexible De-embedding – De-embed the audio from the HDMI input or from the HDMI output ARC (Audio Return Channel).
- Varied Output Options – De-embedded audio is simultaneously output to S/PDIF and 5-pin balanced audio outputs.

Typical Applications

FC-46H2 is ideal for the following typical applications:

- Presentation and multimedia.
- Projection systems in conference rooms, boardrooms, auditoriums, hotels and churches, production studios, rental and staging.
- Applications where an audio receiver is used for the HDMI soundtrack rather than playing it through the display itself.

Controlling your FC-46H2

Control your FC-46H2 directly via the select audio source button.

Defining FC-46H2 4K HDMI Audio De-Embedder

This section defines FC-46H2.

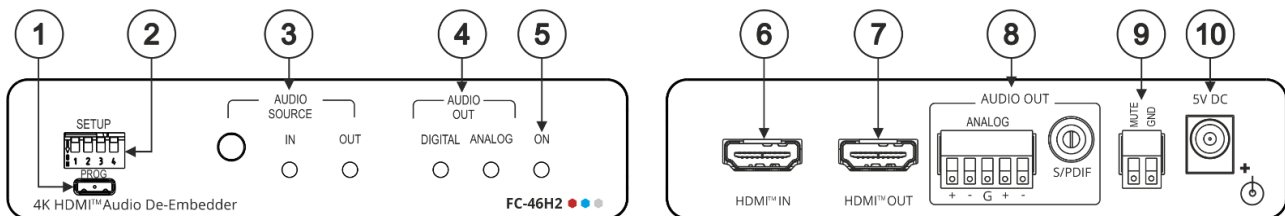


Figure 1: FC-46H2 4K HDMI Audio De-Embedder Front Panel

#	Feature	Function	
①	PROG Mini USB Port	Connect to a PC to perform firmware upgrades (via K-Upload) and work with the EDID Designer. K-Upload and EDID Designer can be downloaded from our web site at: www.kramerav.com/downloads/FC-46H2 . To use the mini USB port, you need to download the Kramer USB driver from our web site at: www.kramerav.com/support/product_downloads.asp and install it.	
②	SETUP 4-way DIP-switch	Set the device behavior (see Setting the DIP-Switches on page 7). All the DIP-switches are set to off (up) by default.	
③	AUDIO SOURCE	Selector Button	Press to route the audio source from HDMI IN or from HDMI OUT (ARC) to the audio outputs.
		IN LED	Lights green when HDMI IN is selected.
		OUT LED	Lights green when HDMI OUT is selected (ARC).
④	AUDIO OUT LEDs	DIGITAL	Lights green when a de-embedded audio signal is present on the S/PDIF output.
		ANALOG	Lights green when a de-embedded audio signal is present on the ANALOG audio output.
⑤	ON LED	Lights green when powered.	
⑥	HDMI™ IN Connector	Connect to an HDMI source.	
⑦	HDMI™ OUT Connector	Connect to an HDMI acceptor.	
⑧	AUDIO OUT Connectors	ANALOG 5-pin Terminal Block	Connect to an analog audio acceptor.
		S/PDIF RCA	Connect to a digital audio acceptor.
⑨	MUTE 2-pin Terminal Block Connector	Connect the MUTE pin to GND to mute the analog audio output.	
⑩	5V DC Power Connector	Connect to the Kramer power adapter.	

Mounting FC-46H2

This section provides instructions for mounting **FC-46H2**. Before installing, verify that the environment is within the recommended range:



- Operation temperature – 0° to 40°C (32 to 104°F).
- Storage temperature – -40° to +70°C (-40 to +158°F).
- Humidity – 10% to 90%, RHL non-condensing.

**Caution:**

- Mount **FC-46H2** before connecting any cables or power.

**Warning:**

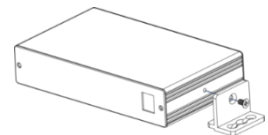
- Ensure that the environment (e.g., maximum ambient temperature & air flow) is compatible for the device.
- Avoid uneven mechanical loading.
- Appropriate consideration of equipment nameplate ratings should be used for avoiding overloading of the circuits.
- Reliable earthing of rack-mounted equipment should be maintained.
- Maximum mounting height for the device is 2 meters.

To mount the FC-46H2 on a rack

Mount the unit in a rack using the recommended rack adapter (see www.kramerav.com/product/FC-46H2)

To mount the FC-46H2 on a table or shelf

- Attach the rubber feet and place the unit on a flat surface.
- Fasten a bracket (included) on each side of the unit and attach it to a flat surface.



For more information go to www.kramerav.com/downloads/FC-46H2

Connecting the FC-46H2



Always switch off the power to each device before connecting it to your FC-46H2. After connecting your FC-46H2, connect its power and then switch on the power to each device.

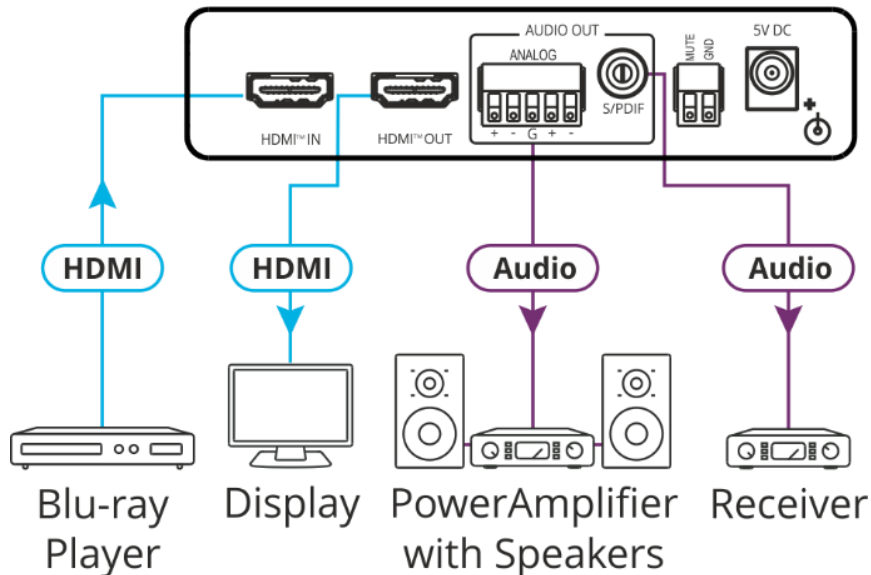


Figure 2: Connecting to the FC-46H2 Rear Panel

To connect the FC-46H2 as illustrated in the example in Figure 2:

1. Connect an HDMI source (for example, a Blu-ray player) to the HDMI™ IN connector (6).
2. Connect the HDMI™ OUT connector (7) to an HDMI acceptor (for example, a display).
3. Connect the AUDIO OUT:
 - The ANALOG 5-pin terminal block connector (8) to an analog audio acceptor (for example, a power amplifier with speakers).
 - The S/PDIF RCA connector (9) to a digital audio acceptor (for example, a receiver).
4. Connect the MUTE (8) 2-pin terminal block connector to a contact closure switch (for example, Kramer RC-21TB, not shown in [Figure 2](#)).
5. Set the SETUP DIP-switches (2) on the front panel (see [Setting the DIP-Switches](#) on page 7).
6. Connect the power adapter to the FC-46H2 and to the mains electricity (not shown in [Figure 2](#)).

Connecting the Output to a Balanced/Unbalanced Stereo Audio Acceptor

The following are the pinouts for connecting the output to a balanced or unbalanced stereo audio acceptor:

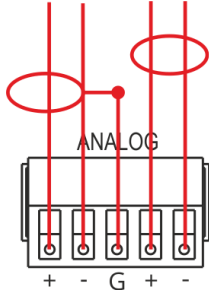


Figure 3: Connecting to a Balanced Stereo Audio Acceptor

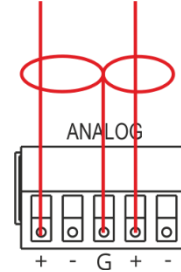


Figure 4: Connecting to an Unbalanced Stereo Audio Acceptor

Setting the DIP-Switches

The four DIP-switches located on the front panel are used for managing EDID, defining audio support and setting the amplification level. By default all DIP-switches are set to OFF (up).

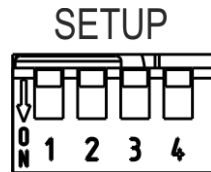


Figure 5: DIP-Switches

#	Feature	DIP-switch Settings								
1	EDID Mode	On (down) — EDID locked. Off (up) — EDID pass-through mode. When EDID is locked, the audio parameters are set as defined by DIP-switch 2. In pass-through mode, the DIP-switch 2 setup is ignored.								
2	Audio Support	On (down) — Limits the audio to 2-channel LPCM. Off (up) — Passes the audio signal. This setup is enabled only after DIP-switch 1 is set to On (down; EDID locked).								
3/4	Analog Audio Amplification Level	3	Off (up)	0dB	On (down)	6dB	Off (up)	12dB	On (down)	18dB
4		Off (up)		Off (up)		On (down)		On (down)		



The DIP-switch status is sampled when the device is reset. The unit must be powered off and on for the new settings to activate.

Operating and Controlling the FC-46H2

Using the Front Panel Buttons

The balanced analog audio and the S/PDIF Digital audio outputs work together to extract either the output HDMI audio (the same audio that will be heard on the display) or the ARC audio from the display.

Press the **FC-46H2** front panel buttons to select the audio source:

- IN – Both audio outputs take the audio from the HDMI input.
- OUT – Both audio outputs take audio from the ARC (HDMI output).

The selected IN/OUT source LED lights green.

The AUDIO OUT LEDs indicate the type of de-embedded signal present on the outputs. For example:

- When uncompressed multi-channel LPCM audio is used, the analog audio port only outputs the Front-left and Front-right audio. When compressed audio is used, the analog audio port is muted.
- When Dolby/DTS 5.1 is present, the analog output is muted so the ANALOG LED is off and the DIGITAL LED lights green.

Connecting the Remote Control Switches

Mute the analog output by connecting the MUTE pin to the GND.

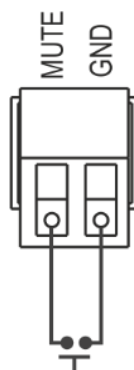


Figure 6: Muting the Analog Audio Output

Technical Specifications

Input	HDMI	On a female HDMI connector
Outputs	HDMI	On a female HDMI connector
	S/PDIF Digital Audio	On an RCA connector
	Balanced Stereo Analog Audio	On a 5-pin terminal block connector
Video	Bandwidth	Up to 18Gbps (6Gbps per graphic channel)
	Max. Resolution	Up to 4K@60 (4:4:4)
	Compliance	HDCP 2.2
Line Level Output	Frequency Response	20Hz - 20kHz @ +/-0.5dB
	S/N Ratio:	>89dB (THD + Noise)
	Audio THD + Noise:	0.004%
Controls	Front Panel	AUDIO SOURCE (IN and OUT), AUDIO OUTPUT (DIG and ANALOG), and ON LED indicators SETUP DIP-switches: EDID mode, audio settings, analog audio amplification
	Rear Panel	MUTE output contact closure pins
Power	Consumption	5V DC, 370mA
	Source	5.2V DC, 4A
Environmental Conditions	Operating Temperature	0° to +40°C (32° to 104°F)
	Storage Temperature	-40° to +70°C (-40° to 158°F)
	Humidity	10% to 90%, RHL non-condensing
Regulatory Compliance	Safety	CE,
	Environmental	RoHs, WEEE
Enclosure	Size	Tool
	Type	Aluminum
	Cooling	Convection ventilation
General	Net Dimensions (W, D, H), each	12cm x 7.2cm x 2.4cm (4.7" x 2.8" x 0.94")
	Shipping Dimensions (W, D, H)	15.7cm x 12cm x 8.7cm (6.2" x 4.7" x 3.4")
	Net Weight, each	0.2kg (0.44lbs) approx.
	Shipping Weight	0.7 kg (1.5lbs) approx.
Accessories	Included	1 Power adapter, 1 power cord and 1 bracket set
Specifications are subject to change without notice at www.kramerav.com		

Default EDID

Monitor

Model name..... FC-46H2
 Manufacturer..... KMR
 Plug and Play ID..... KMR1200
 Serial number..... 295-883450100
 Manufacture date..... 2018, ISO week 255
 Filter driver..... None

EDID revision..... 1.3
 Input signal type..... Digital
 Color bit depth..... Undefined
 Display type..... Monochrome/grayscale
 Screen size..... 520 x 320 mm (24.0 in)
 Power management..... Standby, Suspend, Active off/sleep
 Extension blocs..... 1 (CEA-EXT)

DDC/CI..... Not supported

Color characteristics

Default color space..... Non-sRGB
 Display gamma..... 2.20
 Red chromaticity..... Rx 0.674 - Ry 0.319
 Green chromaticity..... Gx 0.188 - Gy 0.706
 Blue chromaticity..... Bx 0.148 - By 0.064
 White point (default).... Wx 0.313 - Wy 0.329
 Additional descriptors... None

Timing characteristics

Horizontal scan range.... 30-83kHz
 Vertical scan range..... 56-76Hz
 Video bandwidth..... 170MHz
 CVT standard..... Not supported
 GTF standard..... Not supported
 Additional descriptors... None
 Preferred timing..... Yes
 Native/preferred timing.. 1920x1080p at 60Hz (16:9)
 Modeline..... "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync

Standard timings supported

720 x 400p at 70Hz - IBM VGA
 720 x 400p at 88Hz - IBM XGA2
 640 x 480p at 60Hz - IBM VGA
 640 x 480p at 67Hz - Apple Mac II
 640 x 480p at 72Hz - VESA
 640 x 480p at 75Hz - VESA
 800 x 600p at 56Hz - VESA
 800 x 600p at 60Hz - VESA
 800 x 600p at 72Hz - VESA
 800 x 600p at 75Hz - VESA
 832 x 624p at 75Hz - Apple Mac II
 1024 x 768i at 87Hz - IBM
 1024 x 768p at 60Hz - VESA
 1024 x 768p at 70Hz - VESA
 1024 x 768p at 75Hz - VESA
 1280 x 1024p at 75Hz - VESA
 1152 x 870p at 75Hz - Apple Mac II
 1280 x 1024p at 75Hz - VESA STD
 1280 x 1024p at 85Hz - VESA STD
 1600 x 1200p at 60Hz - VESA STD
 1024 x 768p at 85Hz - VESA STD
 800 x 600p at 85Hz - VESA STD
 640 x 480p at 85Hz - VESA STD
 1152 x 864p at 70Hz - VESA STD
 1280 x 960p at 60Hz - VESA STD

EIA/CEA-861 Information

Revision number..... 3
 IT underscan..... Supported
 Basic audio..... Supported
 YCbCr 4:4:4..... Not supported
 YCbCr 4:2:2..... Not supported
 Native formats..... 1
 Detailed timing #1..... 1920x1080p at 60Hz (16:10)
 Modeline..... "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync
 Detailed timing #2..... 1920x1080i at 60Hz (16:10)
 Modeline..... "1920x1080" 74.250 1920 2008 2052 2200 1080 1084 1094 1124 interlace +hsync +vsync
 Detailed timing #3..... 1280x720p at 60Hz (16:10)
 Modeline..... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
 Detailed timing #4..... 720x480p at 60Hz (16:10)
 Modeline..... "720x480" 27.000 720 736 798 858 480 489 495 525 -hsync -vsync

CE audio data (formats supported)

LPCM 2-channel, 16/20/24 bit depths at 32/44/48 kHz

CE video identifiers (VICs) - timing/formats supported

1920 x 1080p at 60Hz - HDTV (16:9, 1:1) [Native]
 1920 x 1080i at 60Hz - HDTV (16:9, 1:1)
 1280 x 720p at 60Hz - HDTV (16:9, 1:1)
 720 x 480p at 60Hz - EDTV (16:9, 32:27)
 720 x 480p at 60Hz - EDTV (4:3, 8:9)
 720 x 480i at 60Hz - Doublescan (16:9, 32:27)
 720 x 576i at 50Hz - Doublescan (16:9, 64:45)
 640 x 480p at 60Hz - Default (4:3, 1:1)
 NB: NTSC refresh rate = (Hz*1000)/1001

CE vendor specific data (VSDB)

IEEE registration number. 0x000C03
 CEC physical address..... 1.1.0.0
 Maximum TMDS clock..... 165MHz

CE speaker allocation data

The warranty obligations of Kramer Electronics Inc. ("Kramer Electronics") for this product are limited to the terms set forth below:

What is Covered

This limited warranty covers defects in materials and workmanship in this product.

What is Not Covered

This limited warranty does not cover any damage, deterioration or malfunction resulting from any alteration, modification, improper or unreasonable use or maintenance, misuse, abuse, accident, neglect, exposure to excess moisture, fire, improper packing and shipping (such claims must be presented to the carrier), lightning, power surges, or other acts of nature. This limited warranty does not cover any damage, deterioration or malfunction resulting from the installation or removal of this product from any installation, any unauthorized tampering with this product, any repairs attempted by anyone unauthorized by Kramer Electronics to make such repairs, or any other cause which does not relate directly to a defect in materials and/or workmanship of this product. This limited warranty does not cover cartons, equipment enclosures, cables or accessories used in conjunction with this product.

Without limiting any other exclusion herein, Kramer Electronics does not warrant that the product covered hereby, including, without limitation, the technology and/or integrated circuit(s) included in the product, will not become obsolete or that such items are or will remain compatible with any other product or technology with which the product may be used.

How Long this Coverage Lasts

The standard limited warranty for Kramer products is seven (7) years from the date of original purchase, with the following exceptions:

1. All Kramer VIA hardware products are covered by a standard three (3) year warranty for the VIA hardware and a standard three (3) year warranty for firmware and software updates; all Kramer VIA accessories, adapters, tags, and dongles are covered by a standard one (1) year warranty.
2. All Kramer fiber optic cables, adapter-size fiber optic extenders, pluggable optical modules, active cables, cable retractors, all ring mounted adapters, all Kramer speakers and Kramer touch panels are covered by a standard one (1) year warranty.
3. All Kramer Cobra products, all Kramer Calibre products, all Kramer Minicom digital signage products, all HighSecLabs products, all streaming, and all wireless products are covered by a standard three (3) year warranty.
4. All Sierra Video MultiViewers are covered by a standard five (5) year warranty.
5. Sierra switchers & control panels are covered by a standard seven (7) year warranty (excluding power supplies and fans that are covered for three (3) years).
6. K-Touch software is covered by a standard one (1) year warranty for software updates.
7. All Kramer passive cables are covered by a ten (10) year warranty.

Who is Covered

Only the original purchaser of this product is covered under this limited warranty. This limited warranty is not transferable to subsequent purchasers or owners of this product.

What Kramer Electronics Will Do

Kramer Electronics will, at its sole option, provide one of the following three remedies to whatever extent it shall deem necessary to satisfy a proper claim under this limited warranty:

1. Elect to repair or facilitate the repair of any defective parts within a reasonable period of time, free of any charge for the necessary parts and labor to complete the repair and restore this product to its proper operating condition. Kramer Electronics will also pay the shipping costs necessary to return this product once the repair is complete.
2. Replace this product with a direct replacement or with a similar product deemed by Kramer Electronics to perform substantially the same function as the original product.
3. Issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time remedy is sought under this limited warranty.

What Kramer Electronics Will Not Do Under This Limited Warranty

If this product is returned to Kramer Electronics or the authorized dealer from which it was purchased or any other party authorized to repair Kramer Electronics products, this product must be insured during shipment, with the insurance and shipping charges prepaid by you. If this product is returned uninsured, you assume all risks of loss or damage during shipment. Kramer Electronics will not be responsible for any costs related to the removal or re-installation of this product from or into any installation. Kramer Electronics will not be responsible for any costs related to any setting up this product, any adjustment of user controls or any programming required for a specific installation of this product.

How to Obtain a Remedy Under This Limited Warranty

To obtain a remedy under this limited warranty, you must contact either the authorized Kramer Electronics reseller from whom you purchased this product or the Kramer Electronics office nearest you. For a list of authorized Kramer Electronics resellers and/or Kramer Electronics authorized service providers, visit our web site at www.kramerav.com or contact the Kramer Electronics office nearest you.

In order to pursue any remedy under this limited warranty, you must possess an original, dated receipt as proof of purchase from an authorized Kramer Electronics reseller. If this product is returned under this limited warranty, a return authorization number, obtained from Kramer Electronics, will be required (RMA number). You may also be directed to an authorized reseller or a person authorized by Kramer Electronics to repair the product.

If it is decided that this product should be returned directly to Kramer Electronics, this product should be properly packed, preferably in the original carton, for shipping. Cartons not bearing a return authorization number will be refused.

Limitation of Liability

THE MAXIMUM LIABILITY OF KRAMER ELECTRONICS UNDER THIS LIMITED WARRANTY SHALL NOT EXCEED THE ACTUAL PURCHASE PRICE PAID FOR THE PRODUCT. TO THE MAXIMUM EXTENT PERMITTED BY LAW, KRAMER ELECTRONICS IS NOT RESPONSIBLE FOR DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY. Some countries, districts or states do not allow the exclusion or limitation of relief, special, incidental, consequential or indirect damages, or the limitation of liability to specified amounts, so the above limitations or exclusions may not apply to you.

Exclusive Remedy

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IF ANY PRODUCT TO WHICH THIS LIMITED WARRANTY APPLIES IS A "CONSUMER PRODUCT" UNDER THE MAGNUSON-MOSS WARRANTY ACT (15 U.S.C.A. §2301, ET SEQ.) OR OTHER APPLICABLE LAW, THE FOREGOING DISCLAIMER OF IMPLIED WARRANTIES SHALL NOT APPLY TO YOU, AND ALL IMPLIED WARRANTIES ON THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR THE PARTICULAR PURPOSE, SHALL APPLY AS PROVIDED UNDER APPLICABLE LAW.

Other Conditions

This limited warranty gives you specific legal rights, and you may have other rights which vary from country to country or state to state.

This limited warranty is void if (i) the label bearing the serial number of this product has been removed or defaced, (ii) the product is not distributed by Kramer Electronics or (iii) this product is not purchased from an authorized Kramer Electronics reseller. If you are unsure whether a reseller is an authorized Kramer Electronics reseller, visit our web site at www.kramerav.com or contact a Kramer Electronics office from the list at the end of this document.

Your rights under this limited warranty are not diminished if you do not complete and return the product registration form or complete and submit the online product registration form. Kramer Electronics thanks you for purchasing a Kramer Electronics product. We hope it will give you years of satisfaction.



SAFETY WARNING

Disconnect the unit from the power supply before opening and servicing

For the latest information on our products and a list of Kramer distributors, visit our Web site where updates to this user manual may be found.

We welcome your questions, comments, and feedback.

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