KRAMER

USER MANUAL

MODEL:

FC-17
4K HDMI Converter Tool

Contents

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! [Content Text]

Our 1,000-plus different models now appear in 14 groups that are clearly defined by function: GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Routers; 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 Video Products; GROUP 12: Digital Signage; GROUP 13: Audio; and GROUP 14: Collaboration.

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-17 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 neighbouring electrical appliances that may adversely influence signal quality.

- Position your Kramer **FC-17** away from moisture, excessive sunlight and dust.

This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.

Safety Instructions

⚠ **Caution:** There are no operator serviceable parts inside the unit.

Warning: Use only the power cord that is supplied with the unit.

Warning: Do not open the unit. High voltages can cause electrical shock! Servicing by qualified personnel only.

Warning: Disconnect the power and unplug the unit from the wall before installing.

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-17** 4K HDMI Converter Tool.

FC-17 is a versatile HDMI 4K@60Hz (4:4:4/4:2:0) converter tool. **FC-17** can convert from 4:4:4 to 4:2:0 color sampling and offers EDID management via a user-friendly Windows application. It also enables inter-operability between HDCP 2.2 and HDCP 1.4 systems. **FC-17** acts as an HDMI extender that equalizes and recovers TMDS data before re-transmitting, thus increasing the HDMI cable range from the output.

Exceptional Quality

- Max. Resolution – 4K@60Hz (4:4:4).
- HDMI Support – Up to HDMI 2.0.
- HDCP 1.4 and 2.2 Compliant.
- HDMI Embedded Audio.
- Kramer Equalization and re-Klocking™ Technology – Rebuilds the digital signal integrity to travel longer distances.

Advanced and User-friendly Operation

- EDID Options – Via DIP-switch setup: default (internal), external (sink) or user-defined.
- LED status display that indicates input and output color sampling schemes and HDCP mechanisms.
- USB Port – For application control and upgrading firmware.

Typical Applications

The **FC-17** is ideal for the following typical applications:

- Compatibility between different HDMI and HDCP compliant devices.

- EDID management.

- Sending 4K signals over HDBaseT by Converting from 4K60 4:4:4 to 4K60 4:2:0, or 4K50 4:4:4 to 4K50 4:2:0.

- Sending 4K signals over lower bandwidth systems such as fiber optics and TCP/IP.

Controlling your FC-17

Control your **FC-17** via the DIP-switches on the rear panel, see Setting the DIP-Switches on page 6. Use the EDID Manager Application, to manage and modify the EDID, see Managing EDID on page 7.

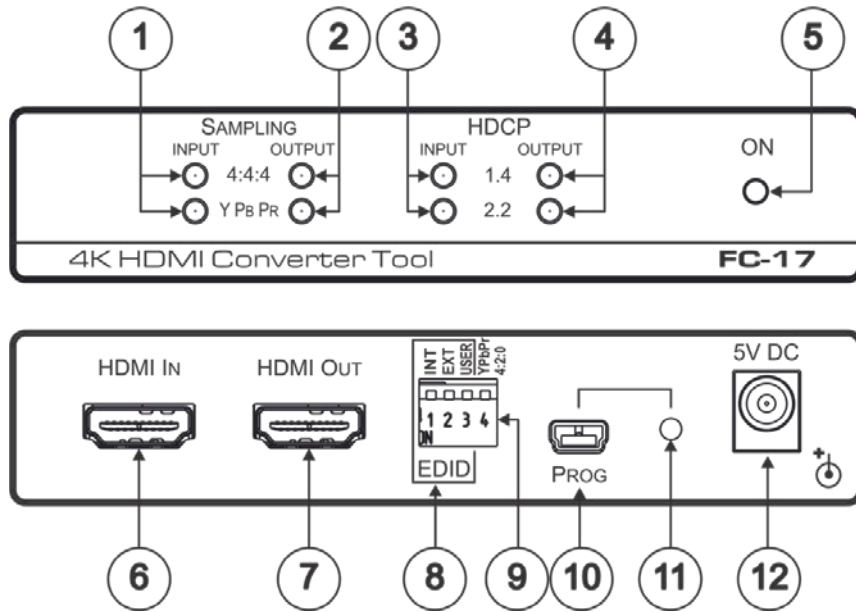# Defining the FC-17 4K HDMI Converter Tool

This section defines the **FC-17**.

Figure 1: FC-17 4K HDMI Converter Tool Front Panel

#	Feature	Function
1	SAMPLING INPUT LEDs	Indicate the input chroma sub-sampling and color space.
2	SAMPLING OUTPUT LEDs	Indicate the output chroma sub-sampling and color space.
3	HDCP INPUT LEDs	Indicate the input HDCP standard.
4	HDCP OUTPUT LEDs	Indicate the output HDCP standard.
5	ON LED	Lights green when the unit is powered on; changes to red to indicate that a successful USB LINK is established via the EDID Manager software.
6	HDMI IN Connector	Connect to an HDMI source.
7	HDMI OUT Connector	Connect to the HDMI acceptor.
8	EDID DIP-Switches	DIP 1 (INT): When ON (down), the source sees the internal default EDID. DIP 2 (EXT): When ON (down), the source reads the EDID of the acceptor that is connected to the HDMI output. DIP 3 (USER): When ON (down), the source reads a user-defined EDID. For normal operation, only one EDID DIP-switch should be set to ON (down).
9	YPbPr/420 DIP-Switch	When ON (down): 4K50/60 YPbPr 4:4:4 signals are converted to 4:2:0. 4K50/60 RGB signals are converted to YPbPr 4:2:0. Resolutions other than those above are bypassed.
10	PROG USB Port	Connect to a PC for programming use with the application software and for firmware upgrade.
11	PROG Recessed Push button	Use for the upgrade process.
12	5V DC	+5V DC connector for powering the unit.

Connecting the FC-17

ⓘ Always switch off the power to each device before connecting it to your **FC-17**. After connecting your **FC-17**, connect its power and then switch on the power to each device.

To connect the FC-17 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. Alternatively, you can connect the DVI connector on the DVD player to the HDMI connector on the **FC-17** via a DVI-HDMI adapter.

2. Connect the HDMI OUT connector ⑦ to an HDMI acceptor (for example, a projector).

3. Connect the 5V DC power adapter to the power socket ⑫ and then connect the adapter to the mains electricity.

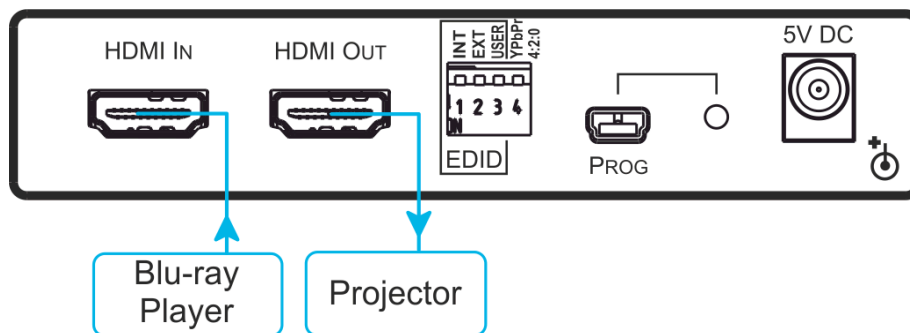4. If required, connect the PROG USB port ⑩ to a PC for using the application software or upgrading the firmware.

Figure 2: Connecting to the FC-17 Rear Panel

Setting the DIP-Switches

Figure 3 defines the DIP-switches:

Figure 3: FC-17 DIP-Switches

The setup is defined in the table below:

DIP-Switch #		Description
EDID	DIP 1 (INT)	When set to ON (down), the source sees the built-in default EDID.
	DIP 2 (EXT)	When set to ON (down), the source sees the EDID of the sink connected to the output.
	DIP 3 (USER)	When set to ON (down), the source sees the EDID programmed by the user.
Sampling	DIP 4 (YPbPr, 4:2:0)	When set to ON (down): 4K50/60 YPbPr 4:4:4 signals are converted to 4:2:0, 4K50/60 RGB 4:4:4 signals are converted to YPbPr 4:2:0. Resolutions other than those above are bypassed. When set to OFF (up), the signal is always bypassed.

Managing EDID

The EDID is managed via the EDID DIP-switches and the EDID management software.

Setting EDID via DIP-switches

The EDID DIP-switches determine the EDID that the source sees. For example:

- If DIP-switch 1 is set to ON (down) and the other EDID DIP-switches are set to off (up), the source reads the internal, default EDID.

- If DIP-switch 2 is set to ON (down) and the other EDID DIP-switches are set to off (up), the source reads the EDID from the currently connected acceptor.

- If DIP-switch 3 is set to ON (down) and the other EDID DIP-switches are set to off (up), the source reads the user-defined EDID.

To set the user-defined EDID:

1. Connect the HDMI OUT connector ⑦ to the output from which you want to read the EDID.

2. Disconnect the power to the device ⑫.

3. Set all three EDID DIP-switches to ON (down) ⑧.

4. Connect the power.
   The front panel LEDs blink briefly and the user-defined EDID is stored.

ⓘ As long as the three EDID DIP-switches remain set to ON (down), the **FC-17** stores the current EDID any time a new output is connected and the power is disconnected and reconnected.

To change the EDID DIP-switch settings during normal operation:

1. Set one of the DIP-switches (INT, EXT or USER) to ON (down).

2. Set the other DIP-switches to OFF (up).

Setting EDID via EDID Manager

To utilize EDID Manager:

1. Download the EDID Manager software to your PC.

2. Power the device.

3. Connect the PROG USB port ⑩ to your PC.

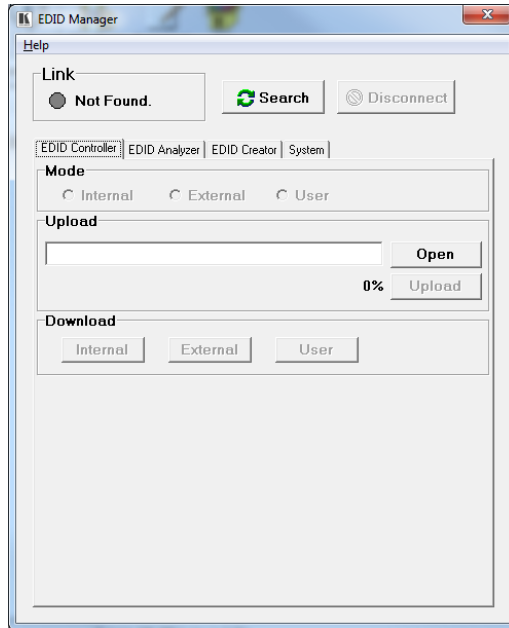4. Open EDID Manager. The following window appears:

Figure 4: EDID Manager

5. Click **Search**.
    The **FC-17** is connected and indicates the current EDID source (Internal, External or User).
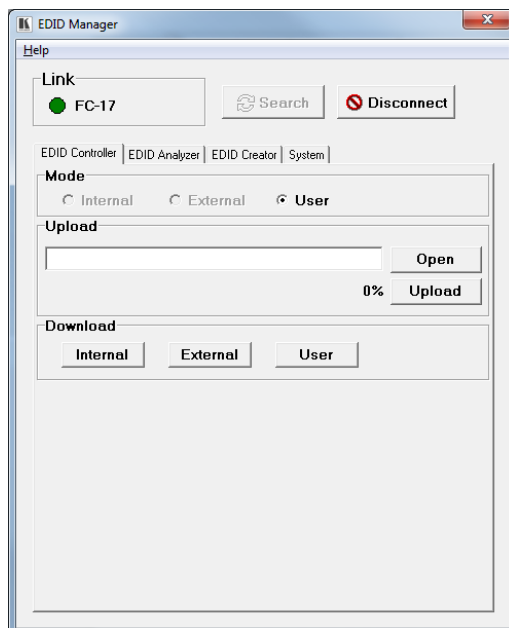

Figure 5: EDID Manager – FC-17 Connected

Use EDID Manager to:

- [Upload the EDID and Store to the Device](#), see page .

- [Download the EDID from FC-17 to the PC](#), see page .

- [Analyze EDID](#), see page .

- [Create or Modify an Existing EDID](#), see page .

- [View the Firmware Version](#), see page .

Upload the EDID and Store to the Device

To upload EDID from the PC and store to the device:

1. Open EDID Manager.

2. Select the **EDID Controller** tab.

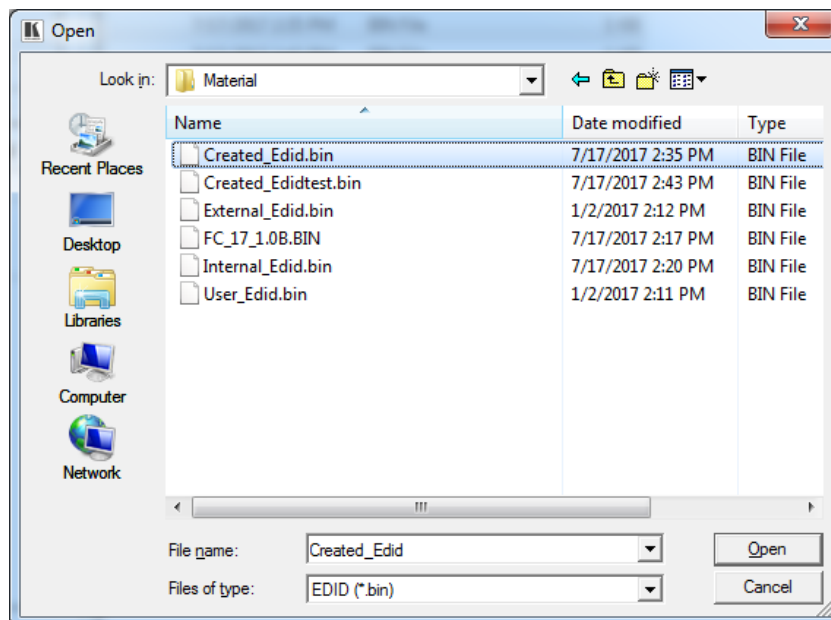3. Click **Open** in the Upload area.

Figure 6: EDID Manager – Selecting an EDID file

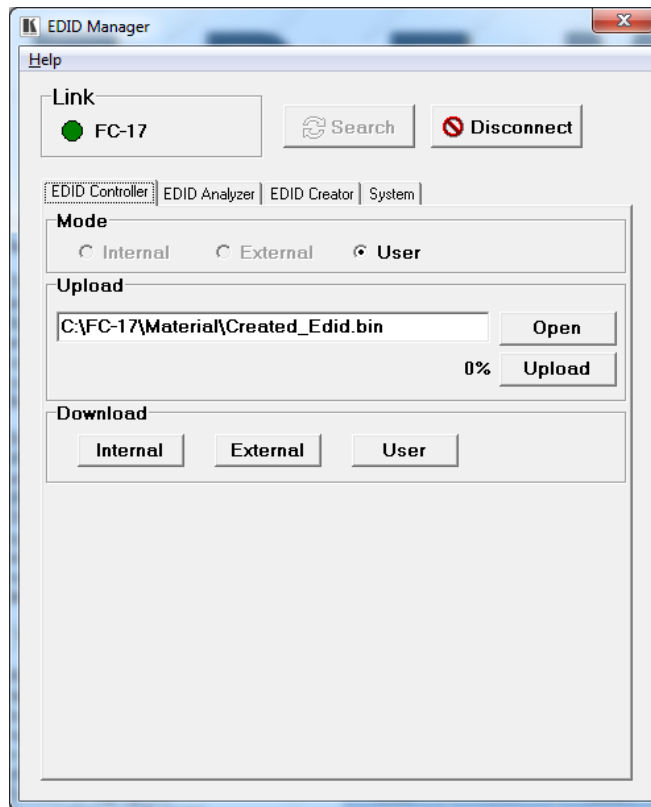4. Select an EDID file and click **Open**.

Figure 7: EDID Manager – EDID File Selected

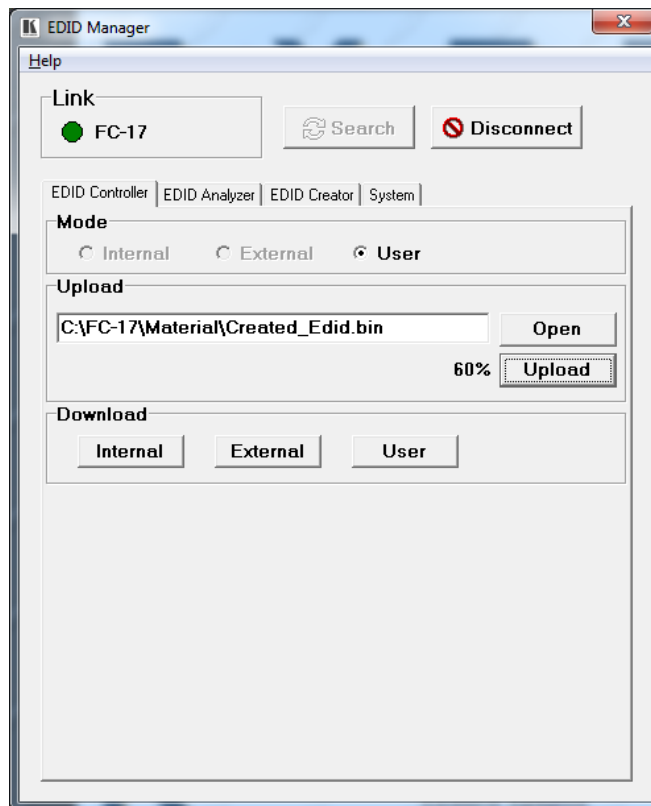5. Click **Upload**. The selected EDID file is uploaded to **User**.

Figure 8: EDID Manager – Uploading EDID

Download the EDID from FC-17 to the PC

To download EDID to your PC:

1. Open EDID Manager.

2. Select the **EDID Controller** tab.

3. Click an EDID source: **Internal**, **External** or **User**.
   The **Save As** window opens:
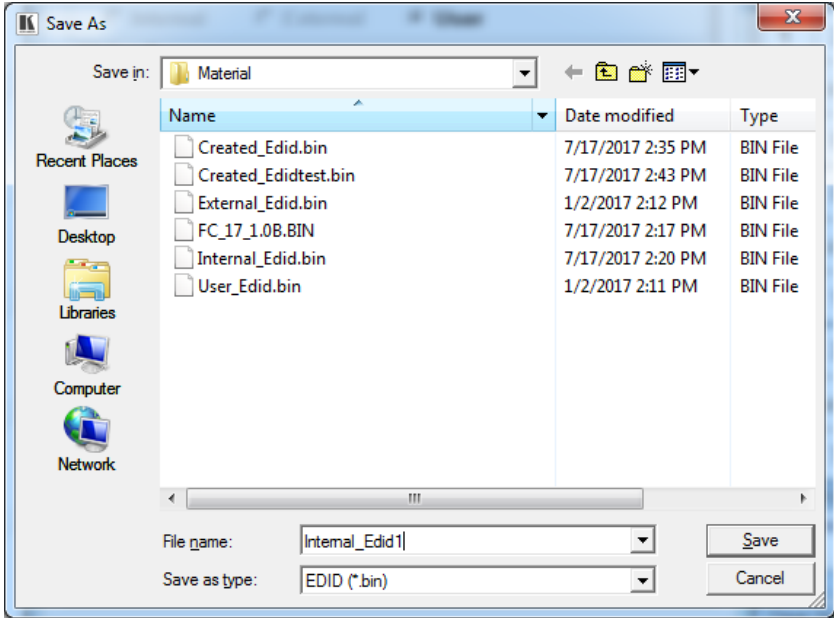

Figure 9: EDID Manager – Saving an EDID

4. Click **Save**.
   The selected EDID is saved to your PC.

Analyze EDID

To analyze EDID:

1. Open EDID Manager.
2. Select the **EDID Analyzer** tab.
3. View basic EDID details.

Figure 10: EDID Manager – EDID Analyzer Tab

Create or Modify an Existing EDID

1. Open EDID Manager.
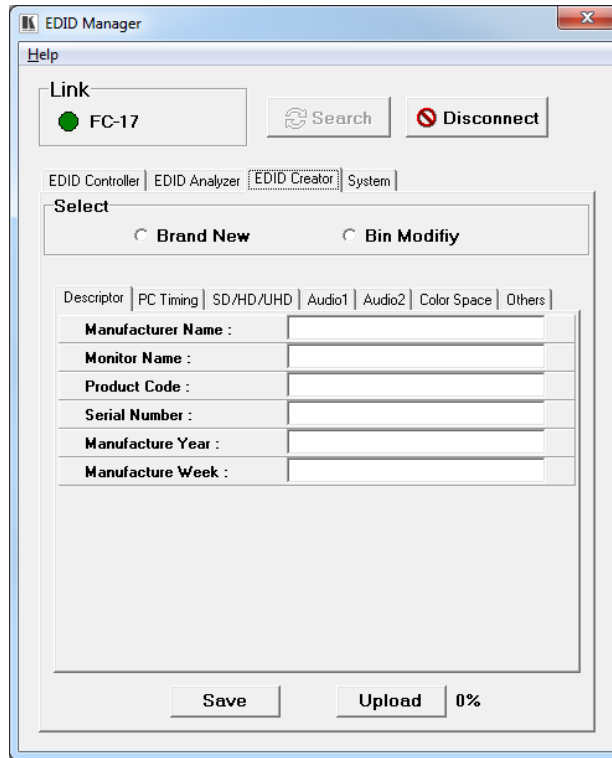2. Select the **EDID Creator** tab.

Figure 11: EDID Creator – FC-17 Connected

3. Check the TYPE of EDID:
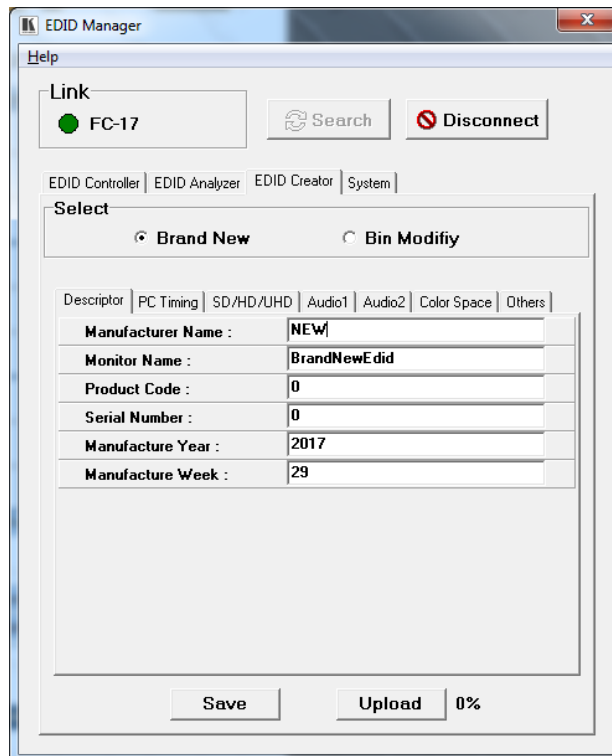
- **Brand New** – to create a new bin file.

Figure 12: EDID Manager – FC-17 Connected

- **Bin Modify** – to change an existing bin file.
  Open a file from the **Open** window and click **Open**.
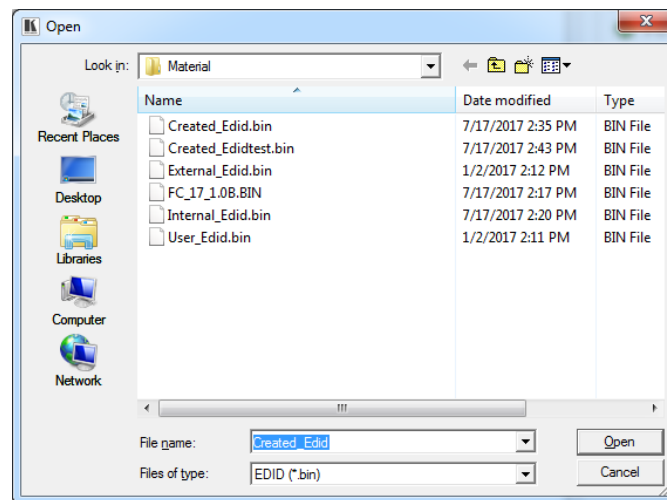
Figure 13: EDID Manager – Selecting a Bin File

4. Enter the EDID description and information fields and then enter the new data, as required, to each tab:

- PC Timing – EDID supported resolution and refresh rates.
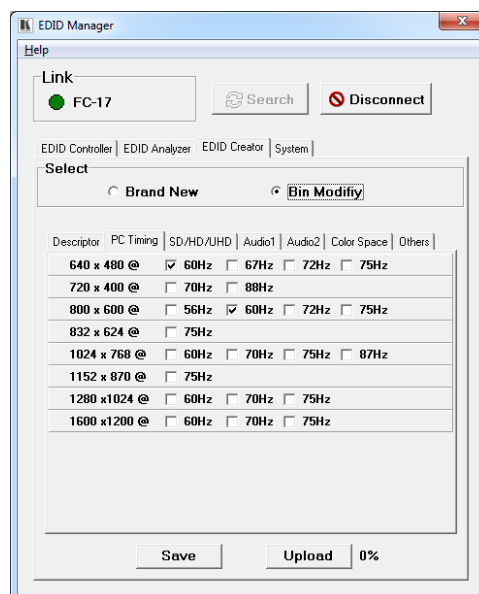
Figure 14: EDID Manager – EDID Creator Tab

- SD/HD/UHD – EDID supported resolution and refresh rates.

- Audio1 and Audio2 –EDID supported audio formats, audio frequencies, channels and speaker locations.

- Color Space – EDID supported color formats and bit depths.

- Other data – CEC Address.

5. Click **Save**.

6. Click **Upload** to upload the Bin file to USER.

View the Firmware Version

To view the firmware version:

1. Open EDID Manager.

2. Select the **System** tab.

3. View the Firmware Version.
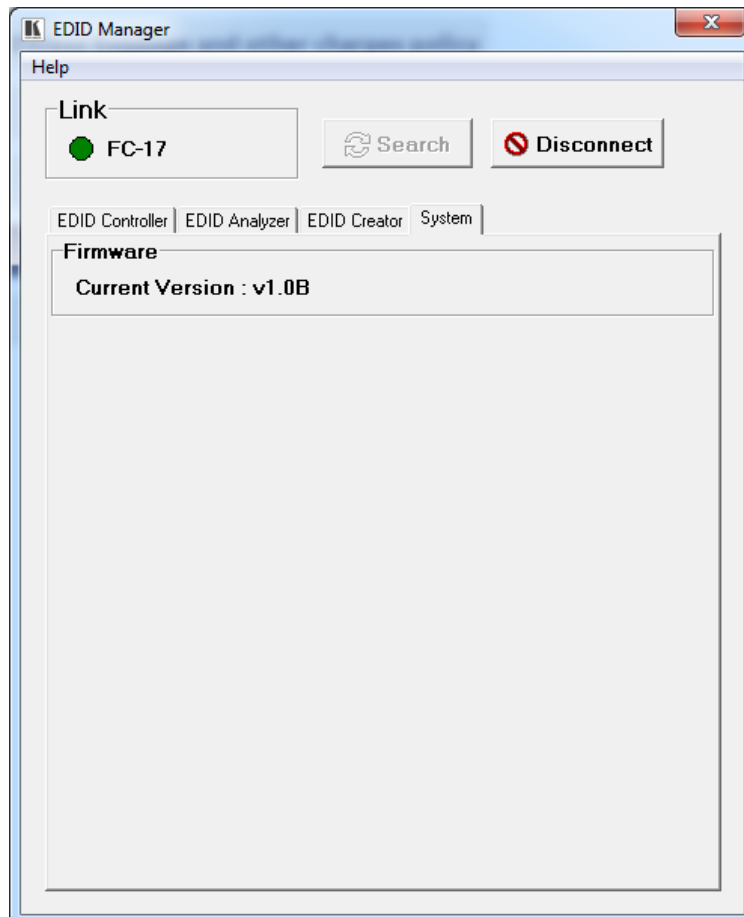
Figure 15: EDID Manager – System Tab

Upgrading the Firmware

You can upgrade the firmware via EDID Manager.

To upgrade the firmware:

1. Open EDID Manager on your PC.

2. Power the **FC-17** while pressing the recessed PROG push button ⑪.
   The Device enters the ISP (Program) Mode.

3. Connect to your PC via the PROG USB port.

4. Click **Search** to connect the device.
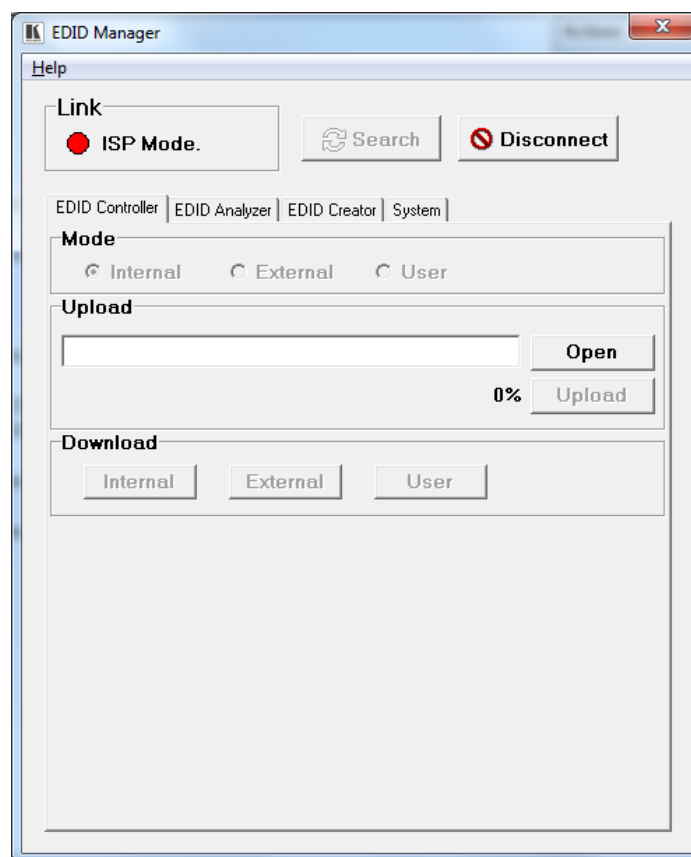
Figure 16: EDID Manager – ISP Mode

5. Select the **System** tab.
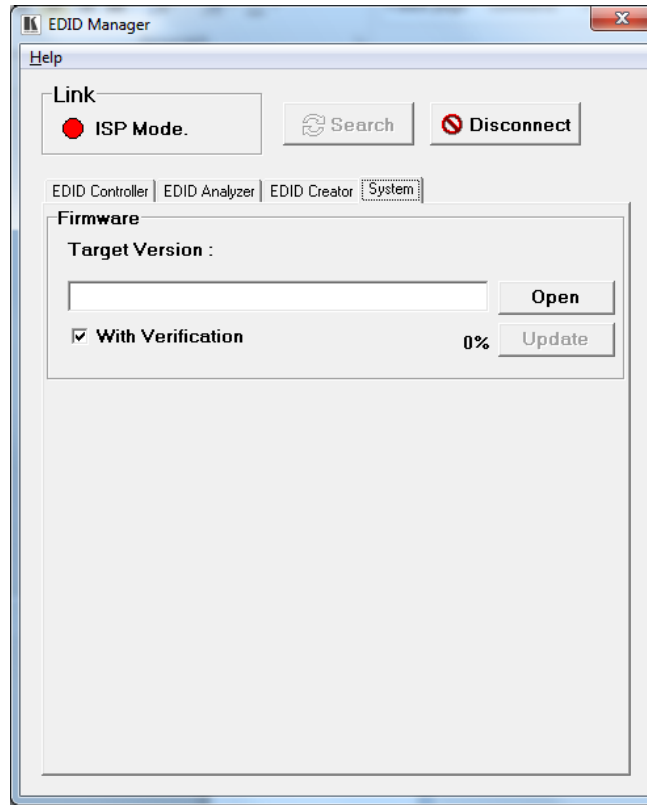
Figure 17: Firmware Upgrade – System Tab

6. Click **Open**.

7. Select the new firmware file and click **Open**.
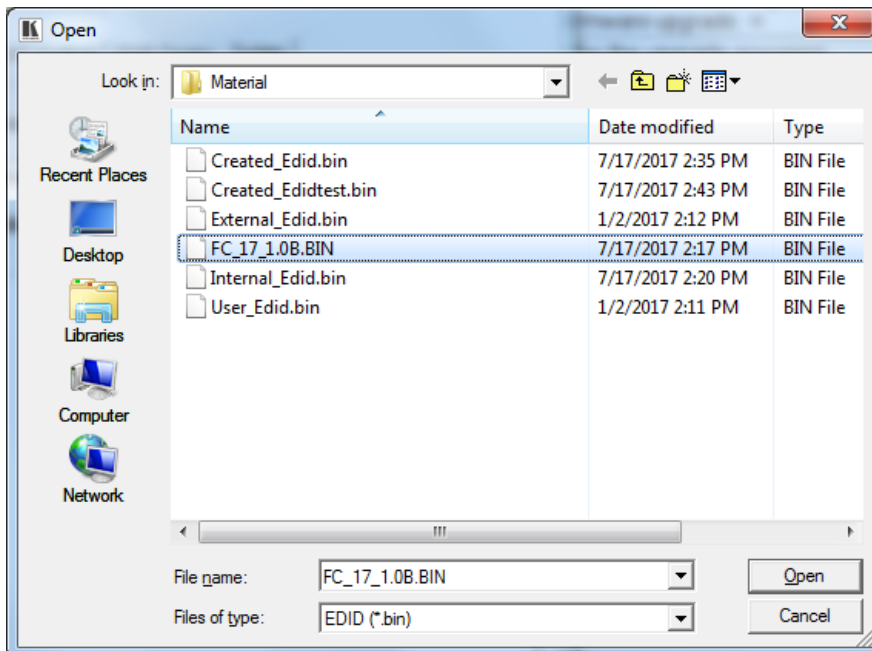
Figure 18: Firmware Upgrade – Opening the Firmware File

8. Click **Open**.
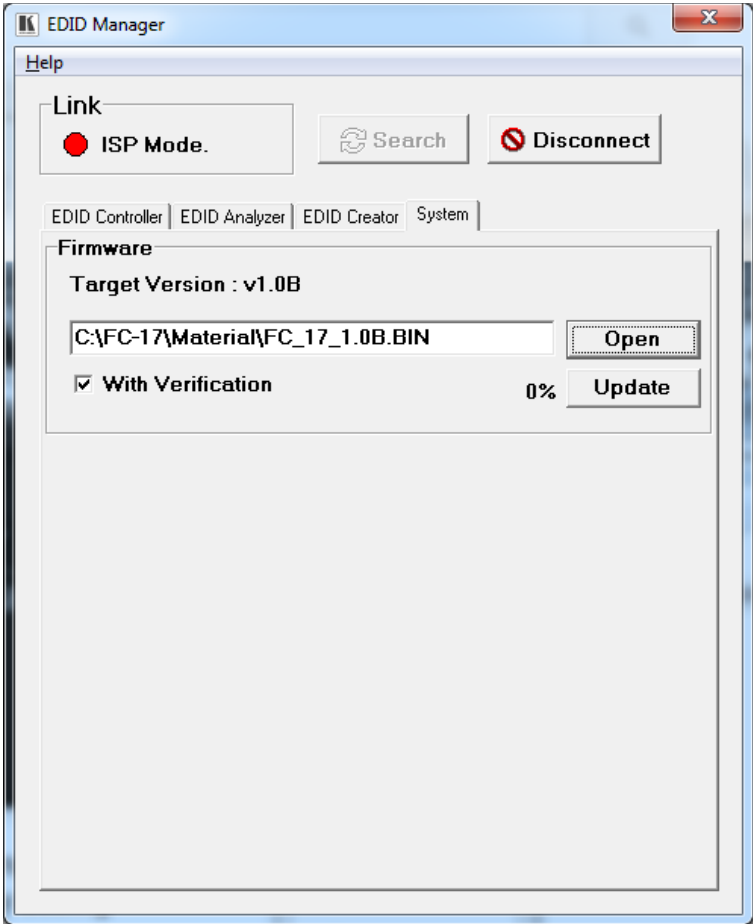
Figure 19: Firmware Upgrade – New Firmware Uploaded

9. Click **Update**.
Wait for update completion.

Figure 20: EDID Manager – FC-17 Connected

10. Upon completion, disconnect the power and reconnect for normal operation.

Technical Specifications

| Inputs:	1 HDMI connector
Outputs:	1 HDMI connector
Ports:	1 mini USB connector
HDMI Compliance:	1.4 / 2.0
HDCP Compliance:	1.4 / 2.2
Output Resolution:	Up to 4K@60Hz (4:4:4)
Control:	DIP-switches: EDID and color space selection LEDs: Sampling and HDCP indication for input and output; 　　　ON to indicate power to unit (green) or successful USB link (red)
Power Source:	5.2V DC/4A power supply unit
Power Consumption:	5VDC, 800mA
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
Dimensions:	12 cm x 7.15cm x 2.44cm (4.72" x 2.8" x 0.96") W, D, H
Shipping Dimensions:	15.7cm x 12cm x 8.7cm (6.18" x 4.72" x 3.43") W, D, H
Weight:	0.15kg (0.33lb)
Shipping Weight:	0.55kg (1.21lb)
Included Accessories:	Power supply
Specifications are subject to change without notice at www.kramerav.com	

Supported Resolutions

This section lists the supported input and output resolutions

Supported PC input and output resolutions

Supported PC Resolutions [Hz]
640×480@60/72/75/85
720×400@85
800×600@56/60/72/75/85
1024×768@60/70/75/85
1280×720@60
1280×768@60/75/85
1280×800@60
1360×768@60
1440×900@60
1600×900@60
1600×1200@60
1920×1080@60
1920×1200@60

Supported TV input and output resolutions

Supported PC Resolutions [Hz]
720×576i@50
720×480i@59.94/60
720×480p@59.94/60
720×576p@50
1280×720p@50/59.94/60
1920×1080i@50/59.94/60
1920×1080p@23.97/24/25/29.97/30/50/59.94/60
3840×2160p@24/25/30/50/60 (YUV 4:4:4)
4096×2160p@24/25/30/50/60 (YUV 4:4:4)
3840×2160p@50/60 (YUV 4:2:0)
4096×2160p@50/60 (YUV 4:2:0)

Supported 4K Color Space and Bit Depths

Resolutions [Hz]	Input		Output	
	Color Space	Bit Depth	Bypassed Output	YUV 4:2:0 Conversion
2160p@50/60	RGB 4:4:4	8-bit	Yes	Yes
		10-bit		
		12-bit		
	YUV 4:4:4	8-bit	Yes	Yes
		10-bit		
		12-bit		
	YUV 4:2:0	8-bit	Yes	
		10-bit	Yes	
		12-bit	Yes	
2160p@24/25/30	RGB 4:4:4	8-bit	Yes	
		10-bit	Yes	
		12-bit	Yes	
	YUV 4:4:4	8-bit	Yes	
		10-bit	Yes	
		12-bit	Yes	

Kramer Electronics Ltd.

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 products are covered by a standard three (3) year warranty for VIA hardware and a standard one (1) year warranty for firmware and software updates. (An extended software warranty plan for an additional 2 years can be purchased separately).
2. All Kramer fiber optic cables and 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
TO THE MAXIMUM EXTENT PERMITTED BY LAW, THIS LIMITED WARRANTY AND THE REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, REMEDIES AND CONDITIONS, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. TO THE MAXIMUM EXTENT PERMITTED BY LAW, KRAMER ELECTRONICS SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IF KRAMER ELECTRONICS CANNOT LAWFULLY DISCLAIM OR EXCLUDE IMPLIED WARRANTIES UNDER APPLICABLE LAW, THEN ALL IMPLIED WARRANTIES COVERING THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY TO THIS PRODUCT AS PROVIDED UNDER APPICABLE LAW.

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 APPICABLE 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.

KRAMER

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⚠ **SAFETY WARNING**

Disconnect the unit from the power supply before opening and servicing

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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.

www.KramerAV.com
info@KramerAV.com