KRAMER ELECTRONICS LTD.

USER MANUAL

MODEL:

FC-42
Component to HD-SDI
Converter

FC-42 Quick Start Guide

This guide helps you install and use your product for the first time. For more detailed information, go to http://www.kramerelectronics.com/support/product_downloads.asp to download the latest manual or scan the QR code on the left.

Step 1: Check what's in the box

- ☑ **FC-42** Component to HD-SDI Converter
- ☑ 1 Power cord
- ☑ 1 Set of rack "ears"
- ☑ 4 Rubber feet
- ☑ 1 Quick Start sheet
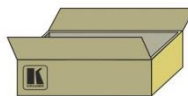
Save the original box and packaging materials in case you need to return your **FC-42** for service.

Step 2: Install the FC-42

Mount the **FC-42** in a rack (using the included rack "ears") or attach the rubber feet and place on a table.

Step 3: Connect the inputs and outputs

Always switch off the power on each device before connecting it to your **FC-42**.

HDTV Satellite Source — Non-Linear Editor — HD-SDI Display — Projector — Computer Controller
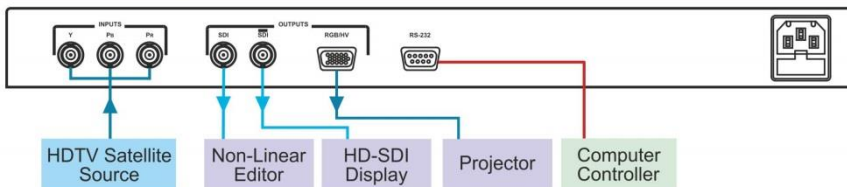
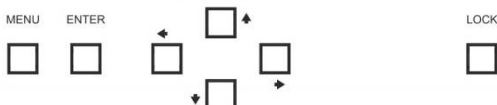Always use Kramer high-performance cables for connecting AV equipment to the **FC-42.**

Step 4: Connect the power

Connect the power cord to the **FC-42** and plug it into the mains electricity.

Step 5: Operate the FC-42

Operate the machine through the front panel buttons and/or the RS-232 controller.

MENU   ENTER   LOCK

Contents

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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 video, audio, presentation, and broadcasting professionals on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better!

Our 1,000-plus different models now appear in 11 groups 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 and GROUP 11: Sierra Products.

Congratulations on purchasing your Kramer **FC-42** *Component to HD-SDI Converter*, which is ideal for the following typical applications:

- Broadcast and production video studios
- Postproduction and duplication studios
- Non-linear editing

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

    Go to http://www.kramerelectronics.com to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

2.1 Achieving the Best Performance

To achieve 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-42** 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.

2.2 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

2.3 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 *http://www.kramerelectronics.com/support/recycling/*.

3 Overview

The Kramer **FC-42** is a high performance converter for high definition (HD) component video (Y, PB, PR). It converts the component video input (Y, PB, PR) to HD-SDI on two BNC output connectors. The signal is also converted to an RGB/HV signal on a 15-pin HD computer graphics video connector.

In addition, the **FC-42** features:

- HDTV compatibility

- Multi-standard operation: SDI (SMPTE 259M and SMPTE 344M) & HD−SDI (SMPTE 292M)

- HD resolutions of 720p and 1080i (up to 60Hz) & 1080p (up to 30Hz)

- Bi−level and tri−level sync input

- No resolution conversion

- ProcAmp control with memory for 16 setups

- A test pattern generator with eight patterns

- Control using the front panel with LCD display and RS−232

- A worldwide power supply - 100−240V AC

- Standard 19" rack mount size of 1U with included rack "ears"

3.1 Defining the FC-42 Component to HD-SDI Converter

This section defines the **FC-42**.
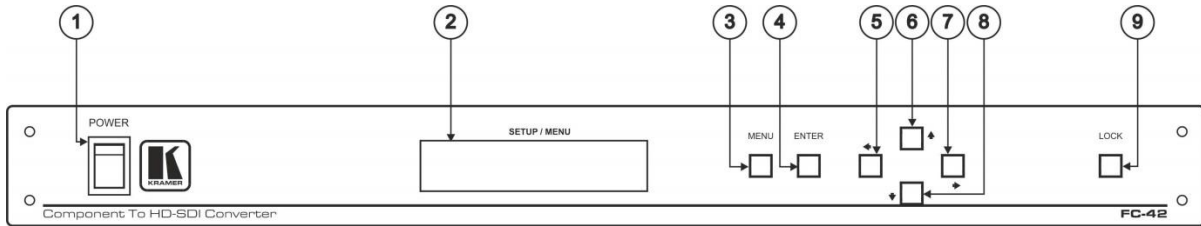
Figure 1: FC-42 Component to HD-SDI Converter Front Panel

#	Feature	Function
1	*POWER* Switch	Illuminated switch for turning the unit ON or OFF
2	*SETUP / MENU* LCD Display	Displays the setup and the menu
3	*MENU* Button	Press to open the menu (see Section 6.2)
4	*ENTER* Button	Press to load and save a set up, and to accept changes
5	← Button	Press to decrease numerical values or select from several definitions
6	↑ Button	Press to move up the menu list values
7	→ Button	Press to increase numerical values or select from several definitions
8	↓ Button	Press to move down the menu list
9	*LOCK* Button	Press and hold for about 3 seconds to lock/unlock the front panel buttons
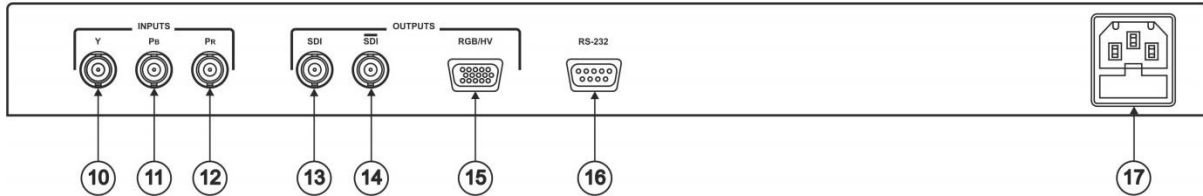
Figure 2: FC-42 Component to HD-SDI Converter Rear Panel

#	Feature		Function
10		*Y BNC Connector*	Connects to a component video source
11	*INPUTS*	*PB BNC Connector*	
12		*PR BNC Connector*	
13		*SDI* BNC Connector	Connects to an HD-SDI acceptor
14	*OUTPUTS*	*SDI* (bar) BNC Connector	Connects to an HD-SDI acceptor (reclocked and equalized)
15		*RGB/HV* 15-pin HD Connector	Connects to an RGB/HV acceptor
16	*RS-232* 9-pin D-sub Port		Connect to the PC or the remote controller
17	Power Connector with Fuse		AC connector, enabling power supply to the unit

4   Installing in a Rack

This section provides instructions for rack mounting the unit.

Before installing in a rack, be sure that the environment is within the recommended range:

| OPERATING TEMPERATURE:	0º to +40ºC (32º to 104ºF)
STORAGE TEMPERATURE:	-40º to +70ºC (-40º to 158ºF)
HUMIDITY:	10% to 90%, 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.

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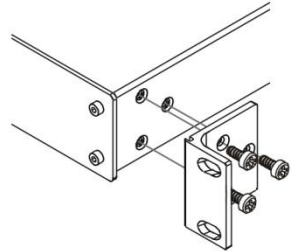
2. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

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 our Web site

5   Connecting the FC-42

> Always switch off the power to each device before connecting it to your **FC-42**. After connecting your **FC-42**, connect its power and then switch on the power to each device.

To connect the **FC-42**, as illustrated in the example in Figure 3, do the following:

1. Connect a component video source (for example, an HDTV Satellite receiver source) to the Y, PB, PR INPUT BNC connectors.

2. Connect the OUTPUTS:

   - Connect the SDI BNC connector to an HD-SDI acceptor (for example, a non-linear editor)

   - Connect the SDI BNC connector to an HD-SDI acceptor (for example, an HD-SDI display)

   - Connect the RGB/HV 15-pin HD computer graphics video connector to an RGBHV acceptor (for example, a projector)

3. Connect a PC or other controller, if required (see Section 5.1).

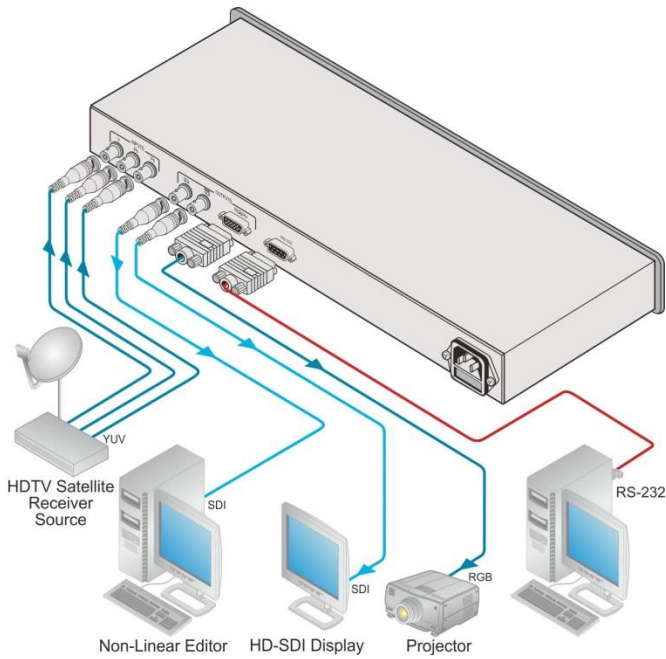4. Connect the power cord (not shown in Figure 3).

Figure 3: Connecting the FC-42 Component to HD-SDI Converter

5.1   Connecting to the FC-42 via RS-232

You can connect to the unit via a crossed RS-232 connection, using for example, a PC. A crossed cable or null-modem is required as shown in method A and B respectively. If a shielded cable is used, connect the shield to pin 5.

Method A (Figure 4)—Connect the RS-232 9-pin D-sub port on the unit via a crossed cable (only pin 2 to pin 3, pin 3 to pin 2, and pin 5 to pin 5 need be connected) to the RS-232 9-pin D-sub port on the PC.
Note: There is no need to connect any other pins.
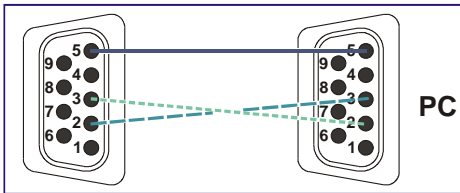
Figure 4: Crossed Cable RS-232 Connection

Hardware flow control is not required for this unit. In the rare case where a controller requires hardware flow control, short pin 1 to 7 and 8, and pin 4 to 6 on the controller side.

Method B (Figure 5)—Connect the RS-232 9-pin D-sub port on the unit via a straight (flat) cable to the null-modem adapter, and connect the null-modem adapter to the RS-232 9-pin D-sub port on the PC. The straight cable usually contains all nine wires for a full connection of the D-sub connector. Because the null-modem adapter (which already includes the flow control jumpering described in Method A above) only requires pins 2, 3 and 5 to be connected, you are free to decide whether to connect only these 3 pins or all 9 pins.

Figure 5: Straight Cable RS-232 Connection with a Null Modem Adapter

6 Using the FC-42 Component To HD-SDI Converter

This section describes how to:

- Lock/unlock the front panel button, see Section 6.1

- Operate the **FC-42**, see Section 6.2

6.1 Locking the Front Panel

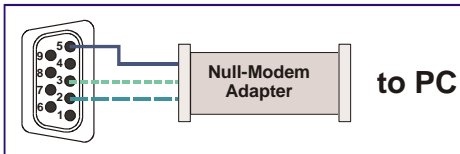To prevent changing the settings accidentally or tampering with the unit via the front panel buttons, lock your converter. Unlocking releases the protection mechanism.

Even though the front panel is locked you can still operate via RS-232.

To lock the converter:

- Press the LOCK button for more than three seconds, until the LOCK button is illuminated
  The front panel is locked. Pressing a button has no effect other than causing the LOCK button to flash
  Warning that you need to unlock to regain control via the front panel.

To unlock the converter:

- Press the illuminated LOCK button for more than three seconds, until the LOCK button is no longer illuminated
  The front panel unlocks

6.2 Operating the FC-42 HD-SDI to Component Converter

The converter can save and load up to 16 setups via the converter menu. To use the menu, press the:

- MENU button to start or exit the menu

- ENTER button to enter a submenu, load a setup, accept changes and reset to the default settings

- ⬆ and ⬇ buttons to scroll through the menu and sub-menus

- ➡ and ⬅ to increase or decrease numerical values or select from several definitions of a setup

The converter automatically converts the input signal according to the setup loaded from the menu. The setup is defined via the menu. To operate the converter, press the MENU button to enter the menu, and load the desired setup (from 1 to 16). The following table defines the menu items.

#	Menu Item	Submenu	Select	Notes
1	LOAD … SETUP		From 1 to 16	Refers to the setup number (from 1 to 16)
2	SAVE SETTING AS		From 1 to 16	
3	SET … STANDARD SELECT MODE		AUTO, FORCED	
4	SET … STANDARD		720p/59, 720p/50, 1080i/60, 1080i/59, 1080i/50, 1080p/30, 1080p/29, 1080p/25, 1080p/24, 1080p/23, 1080sf/30, 1080sf/29, 1080sf/25, 1080sf/24, 1080sf/23	
5	SET … SYNC TYPE		BILEVEL, TRILEVEL	
6	SET … IMAGE TUNING (enter submenu)	1 FACTORY RESET		Sets all the image tuning parameters to zero
		2 BLACK	From -32 to 31	
		3 Y-GAIN	From -64% to 63%	
		4 GAIN	From -64% to 63%	
		5 COLOR	From -64% to 63%	
		6 B-Y	From -64% to 63%	
		7 R-Y	From -64% to 63%	
		8 SHARPNESS	From 0 to 155%	In 5% steps
7	SET … Test signal	NO TEST SIGNAL		
		1 COLOR BARS 100%		
		2 Y-SWEEP 30MHZ		
		3 PULSE 2T AND BAR		
		4 Y RAMP		
		5 C-SWEEP 15MHZ		
		6 SPLIT BARS		
		7 GRID		
		8 GRID INVERSE		
8	SET … Free run mode		BLACK SCREEN, BLUE SCREEN	
9	SET … Address of machine		First, Second	

7 Technical Specifications

INPUT:	1 component video - Y, PB, PR, on 3 BNC connectors
OUTPUTS:	2 SDI on BNC connectors 1 RGB/HV on a 15-pin HD connector
OUTPUT LEVEL:	800mVpp
RESOLUTION:	Up to 1080p
S/N RATIO:	49dB unweighted
CONTROLS:	Front panel buttons: MENU, ENTER, menu arrows, LOCK; rear panel: RS-232
POWER CONSUMPTION:	100-240V, 50/60Hz, 200mA Max. 12VA
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:	19" x 7" x 1U (W, D, H) rack mountable
WEIGHT:	2.6kg (5.7lbs) approx.
ACCESSORIES:	Power cord, null-modem adapter
Specifications are subject to change without notice at http://www.kramerelectronics.com	

8   Communication Protocol

The **FC-42** is compatible with the protocol (ver 1.2) described below. For RS-232, a null-modem connection between the **FC-42** and controller is used. The default data rate is 9600 baud, with no parity, 8 data bits and 1 stop bit. All the values shown are hexadecimal.

Instruction	Byte 1	Byte 2	Byte 3	Byte 4	Notes:
RESET	00	80	80	98+Machine Addr	
REPLY TO RESET	40	80	80	98+Machine Addr	
READ LOCAL PARAMETER	20	80+Parameter Number	80	B8+Machine Addr	
REPLY TO READ LOCAL PARAMETER	60	80+Parameter Number	80+Parameter Data	B8+Machine Addr	
WRITE LOCAL PARAMETER	21	80+Parameter Number	80+Parameter Data	B8+Machine Addr	
REPLY TO WRITE LOCAL PARAMETER	61	80+Parameter Number	80+Parameter Data	B8+Machine Addr	1
READ GLOBAL PARAMETER	20	80+Parameter Number	80	98+Machine Addr	
REPLY TO READ GLOBAL PARAMETER	60	80+Parameter Number	80+Parameter Data	98+Machine Addr	
WRITE GLOBAL PARAMETER	21	80+Parameter Number	80+Parameter Data	98+Machine Addr	
REPLY TO WRITE GLOBAL PARAMETER	61	80+Parameter Number	80+Parameter Data	98+Machine Addr	1
SAVE	23	80 + Initial Setup Number	80+Destination Setup Number	98+Machine Addr	2
IDENTIFY MACHINE	3D	81	80	98+Machine Addr	3
IDENTIFY FIRMWARE VERS.	3D	83	80	98+Machine Addr	4

The following table defines the local parameter data:

Local Parameter Number		Local Parameter Data
Description	**#**	
Input Standard	01	0 - 720p/60
		1 - 720p/59
		2 - 720p/50
		3 - 1080i/60
		4 - 1080i/59
		5 - 1080i/50
		6 - 1080p/30
		7 - 1080p/29
		8 - 1080p/25
		9 - 1080p/24
		A - 1080p/23
		B - 1080sf/30
		C - 1080sf/29
		D - 1080sf/25
		E - 1080sf/24
		F - 1080sf/23
Mode Input Standard	02	0 - Auto
		1 - Forced
SYNC Type	04	0 - Bi-Level
		1 - Tri-Level
Test Signal	05	0 - NO TEST SIGNAL
		1 - COLOR BAR 100%
		2 - Y-SWEEP 30 MHZ
		3 - PULSE 2T AND BAR
		4 - Y-RAMP
		5 - C-SWEEP 15 MHZ
		6 - RAINBOW
		7 - GRID
		8 - GRID INVERSE
Black	08	-32% - +31% (1% step)
Y-gain	09	-64% - +63% (1% step)
Gain	0A	-64% - +63% (1% step)
Color	0B	-64% - +63% (1% step)
B-Y	0C	-64% - +63% (1% step)
R-Y	0D	-64% - +63% (1% step)
Sharpness	0E	0% - +150% (10% step)

The following table defines the global parameter data:

Global Parameter Number		Global Parameter Data
Description	**#**	
Panel Lock	00	0 - Off (Default)
		1 - On
Machine Address	01	0,1
Setup Number	02	0 - 15
Free Run Mode	03	0 - Black Screen (Default)
		1 - Blue Screen
Input Standard (Read Only) (AUTO Mode Only)	08	0 - 720p/60
		1 - 720p/59
		2 - 720p/50
		3 - 1080i/60
		4 - 1080i/59
		5 - 1080i/50
		6 - 1080p/30
		7 - 1080p/29
		8 - 1080p/25
		9 - 1080p/24
		A - 1080p/23
		B - 1080sf/30
		C - 1080sf/29
		D - 1080sf/25
		E - 1080sf/24
		F -1080sf/23
		10 - Not Identified
		11 - Not Identified
Presence of Input Signal (Read Only)	09	0 - Input Signal is Present
		1 - No Input Signal

NOTE 1: These commands are sent by the unit also when Local / Global parameters are changed via the front panel or as a result of execution of any other command.

NOTE 2: If it is necessary merely to save adjusted parameters in initial setup number (no setup number change), then the value of byte3 must be equal to the value of byte2 - initial setup number.

NOTE 3: The reply to the Identify Machine command shows the machine name
- 1st byte: 0x7d
- 2nd byte: 0x80 + 0x00 (0 dec)
- 3rd byte: 0x80 + 0x29 (41 dec) - for the unit FC-42
- 4th byte: 0x98

NOTE 4: The reply to the Identify Firmware command shows the firmware version as
- 1st byte: 0x7d
- 2nd byte: 0x80 + the version number prior to decimal point
- 3rd byte: 0x80 + the version number following the decimal point
- 4th byte: 0x98
For example, for version 3.5, the reply would be 0x7d, 0x83, 0x85, 0x98.

LIMITED WARRANTY

The warranty obligations of 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 Does this Coverage Last

Seven years as of this printing; please check our Web site for the most current and accurate warranty information.

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, please visit our web site at www.kramerelectronics.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. 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 on Liability

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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 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, please visit our Web site at www.kramerelectronics.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.

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.
Web site: www.kramerelectronics.com
E-mail: info@kramerel.com

CE

P/N: 2900-000384   Rev: 3