Kramer Electronics, Ltd.

USER MANUAL

Models:

TP-573, *HDMI/RS-232/IR Line Transmitter*

TP-574, *HDMI/RS-232/IR Line Receiver*

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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 groups[1] that are clearly defined by function.

Congratulations on purchasing your Kramer DigiTOOLS® **TP-573** *HDMI/RS-232/IR Line Transmitter* and **TP-574** *HDMI/RS-232/IR Line Receiver* which are ideal for:

- Home theater, presentation and multimedia applications
- Rental and staging

The package includes the following:

- **TP-573** and/or **TP-574**
- Power supply (12V DC)
- This user manual[2]

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 cables[3]

> **Note:** You must use shielded Twisted Pair (STP) cabling with the TP-573, TP-574 (refer to section 3.1 for further details).

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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 Download up-to-date Kramer user manuals from the Internet at this URL: http://www.kramerelectronics.com

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

2.1 Quick Start

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

Step 1: Connect the machine - see section 5

TP-573

HDMI

DVD Player

1. Connect the HDMI input
2. Connect the CAT 5 cable
3. Connect the IR emitter/sensor
4. Connect the RS-232
5. Connect the HDMI output

IR Sensor/ Emitter

RS-232

HDMI

TP-574

RS-232 Controllable Device

LCD Display with Speakers

IR Sensor/ Emitter

Step 2: Connect the power

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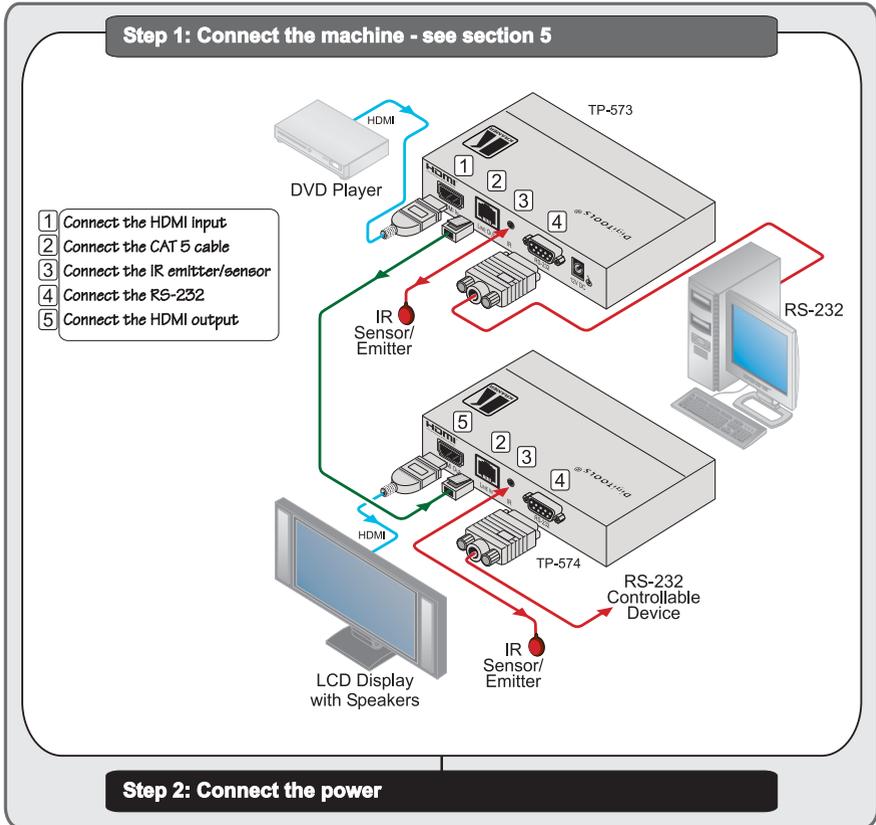
3 Overview

The **TP-573** and **TP-574** are a twisted pair transmitter and receiver for HDMI, bidirectional RS-232 and infrared signals. The **TP-573** converts the input signals to a twisted pair signal and the **TP-574** converts it back to HDMI, RS-232 and infrared signals.

Using the **TP-573** and **TP-574**, you can pass via the twisted pair cable:

- EDID (Extended Display Information Data) and HDCP signals between the **TP-573** and **TP-574**, and vice versa between the **TP-574** and **TP-573**
- HPD (Hot Plug Detect) signals from the display device to the source

The transmitter / receiver pair feature:

- A maximum data rate of 1.65Gbps
- Bidirectional RS-232 and IR interfaces. The IR input/output transmits and receives IR commands over CAT 5 cable[1]
- An RS-232 baud rate of up to 38400kbps
- HDTV compatibility
- A system range[2] of up to 90m (295ft) at 1080i, or up to 30m (98ft) at 1080p on shielded **BC-DGKat524** cable; 90m (295ft) at 1080i, or up to 70m (230ft) at 1080p on shielded **BC-DGKat623** cable; 100m (330ft) at 1080i or up to 90m (295ft) at 1080p on shielded **BC-DGKat7a23** cable. Note, use only shielded cables with the **TP-573 / TP-574**, in which the cable Ground shielding must be connected / soldered to the shield of both RJ-45 connectors
- Power save, the **TP-573 / TP-574** system goes into standby mode when the HDMI input is not connected
- The Power Connect System™ – a single connection to the transmitter powers both units
- A compact DigiTOOLS® enclosure where three units can be rack mounted side-by-side in a 1U rack space with the optional **RK-3T** rack adapter

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1 Compatible with a Kramer transmitter and via a Kramer external remote receiver: C-A35M/IRR or C-A35M/IRE or C-A35M/2IRE

2 Note that the transmission range depends on the signal resolution, graphics card and display used. The distance using non-Kramer CAT 5, CAT 6 and CAT 7a cables may not reach these ranges

3.1 Using Twisted Pair Cable

Kramer engineers have developed special twisted pair cables to best match our digital twisted pair products; the Kramer: **BC-DGKat524** (CAT 5 24 AWG), the Kramer: **BC-DGKat623** (CAT 6 23 AWG cable), and the Kramer: **BC-DGKat7a23** (CAT 7a 23 AWG cable). These specially built cables significantly outperform regular CAT 5 / CAT 6 / CAT 7a cables. Note: the **TP-573 / TP-574** cannot work with unshielded cables.

3.2 About HDCP

The High-Bandwidth Digital Content Protection (HDCP) standard (developed by Intel), protects digital video and audio signals transmitted over DVI or DVI connections between two HDCP-enabled devices to eliminate the reproduction of copyrighted material. To protect copyright holders (such as movie studios) from having their programs copied and shared, the HDCP standard provides for the secure and encrypted transmission of digital signals.

3.3 Defining EDID

The Extended Display Identification Data (EDID[1]) is a data-structure provided by a display to describe its capabilities to a graphics card (that is connected to the display's source). The EDID includes the manufacturer's name, product type, timing data supported by the display, display size, luminance data and (for digital displays only) the pixel mapping data.

3.4 About HDMI

High-Definition Multimedia Interface (HDMI) is an uncompressed all-digital[2] audio/video interface, widely supported in the entertainment and home cinema industry. It delivers the highest high-definition image and sound quality.

In particular, HDMI[3]:
- Provides a simple[4] 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 lengthy[5] cable

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

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

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

4 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

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

- Supports standard, enhanced, high-definition video, and multi-channel digital audio[1] 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 cable[2], 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
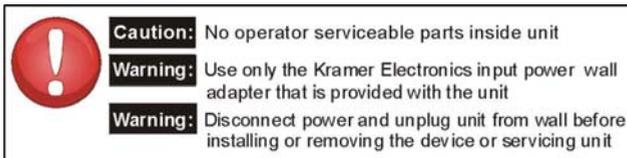
HDMI has the capacity to support:

- Existing high-definition video formats (720p, 1080i, and 1080p/60), as well as standard definition formats such as NTSC or PAL

3.5 Recommendations for Achieving the Best Performance

To achieve the best performance:

- Connect only good quality connection STP CAT 5 24 AWG cables, thus avoiding interference, deterioration in signal quality due to poor matching, and elevated noise-levels (often associated with low quality cables)
- Avoid interference from neighboring electrical appliances and position your **TP-573**/**TP-574** away from moisture, excessive sunlight and dust

Caution: No operator serviceable parts inside unit
Warning: Use only the Kramer Electronics input power wall adapter that is provided with the unit
Warning: Disconnect power and unplug unit from wall before installing or removing the device or servicing unit

4 Your HDMI/RS-232/IR Line Transmitter / Receiver

This section describes the:

- **TP-573** *HDMI/RS-232/IR Line Transmitter*, see section
- **TP-574** *HDMI/RS-232/IR Line Receiver*, see section

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1 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

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

4.1 Your TP-573 HDMI/RS-232/IR Line Transmitter

Figure 1 and Table 1 define the **TP-573**:

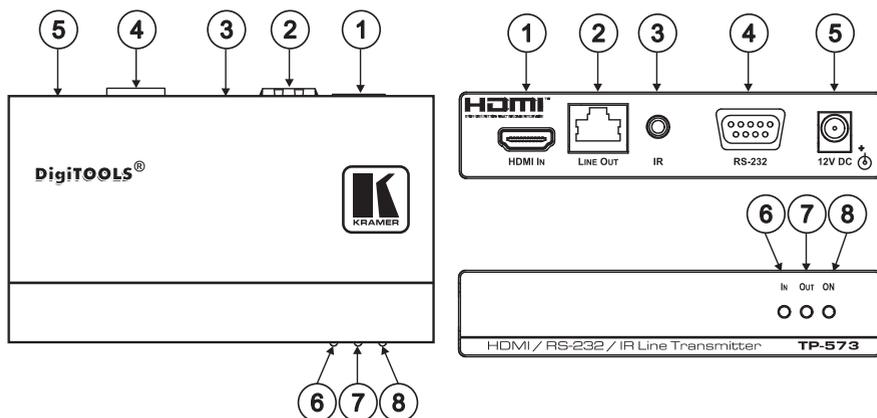*Figure 1: TP-573 HDMI/RS-232/IR Line Transmitter*

Table 1: TP-573 HDMI/RS-232/IR Line Transmitter Features

#	Feature	Function
1	*HDMI IN* Connector	Connects to the HDMI source
2	*LINE OUT* RJ-45 Connector	Connects to the CAT 5 IN RJ-45 connector on the **TP-574**
3	*IR* 3.5mm Mini Jack Connector	Connects to an infrared receiver/emitter[1]
4	*RS-232* 9-pin D-sub Connector	Connects to an RS-232 port
5	*12V DC*	+12V DC connector for powering the unit
6	*IN* LED	Lights when an HDMI input device is connected
7	*OUT* LED	Lights when an HDMI output device is detected
8	*ON* LED	Lights when receiving power

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1 Compatible with a Kramer transmitter and via a Kramer external remote IR receiver: C-A35M/IRR or C-A35M/IRE or C-A35M/2IRE

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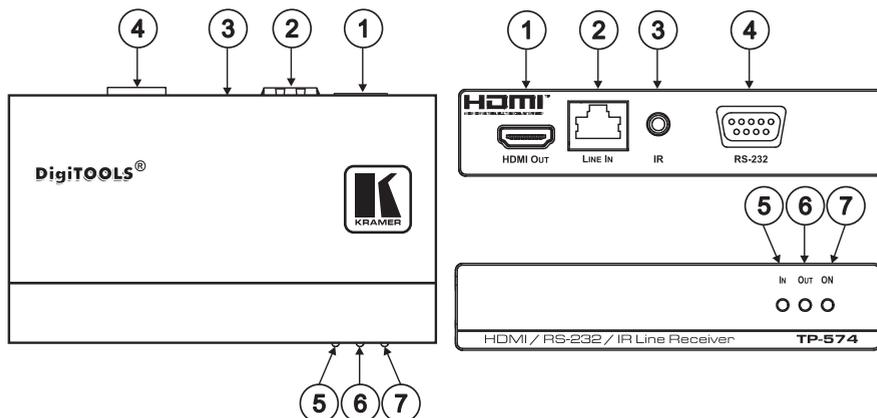## 4.2 Your TP-574 HDMI/RS-232/IR Line Receiver

Figure 2 and Table 2 define the **TP-574**:

Figure 2: TP-574 HDMI/RS-232/IR Line Receiver

Table 2: TP-574 HDMI/RS-232/IR Line Receiver Features

#	Feature	Function
1	*HDMI OUT* Connector	Connects to the HDMI acceptor
2	*LINE IN* RJ-45 Connector	Connects to the CAT 5 IN RJ-45 connector on the **TP-573**
3	*IR* 3.5mm Mini Jack Connector	Connects to an infrared emitter/receiver[1]
4	*RS-232* 9-pin D-sub Connector	Connects to an RS-232 port
5	*IN* LED	Lights when an HDMI input device is connected
6	*OUT* LED	Lights when an HDMI output device is detected
7	*ON* LED	Lights when receiving power

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1 Compatible with a Kramer transmitter and via a Kramer external remote IR receiver: C-A35M/IRR or C-A35M/IRE or C-A35M/2IRE

5 Connecting the TP-573 and TP-574

You can use the **TP-573** *HDMI/RS-232/IR Line Transmitter* with the **TP-574** *HDMI/RS-232/IR Line Receiver* to configure an HDMI transmitter/receiver system.

To connect the **TP-573** to the **TP-574**, as illustrated in the example in Figure 3, do the following:

On the **TP-573** connect:

1. An HDMI source (for example, a DVD player) to the HDMI IN connector.
2. An IR sensor or emitter to the IR 3.5mm mini jack connector.
3. An RS-232 source (for example, a computer) to the RS-232 9-pin D-sub connector[1].
4. A CAT 5[2] or CAT 6[2] cable to the LINE OUT RJ-45 twisted pair connector.

On the **TP-574** connect:

1. The HDMI OUT connector to an HDMI acceptor (for example, an LCD display with speakers).
2. An IR emitter or sensor to the IR 3.5mm mini jack connector.
3. The RS-232 9-pin D-sub connector to an RS-232 acceptor (for example, an RS-232 controllable device)[1].
4. The CAT 5[2] or CAT 6[2] cable from the **TP-573** to the LINE IN RJ-45 twisted pair connector.
5. The 12V DC power supply to the **TP-573** (not shown in Figure 3).

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1 See section 5.1

2 Using the Kramer BC-DGKat524 and BC-DGKat623 cables, respectively

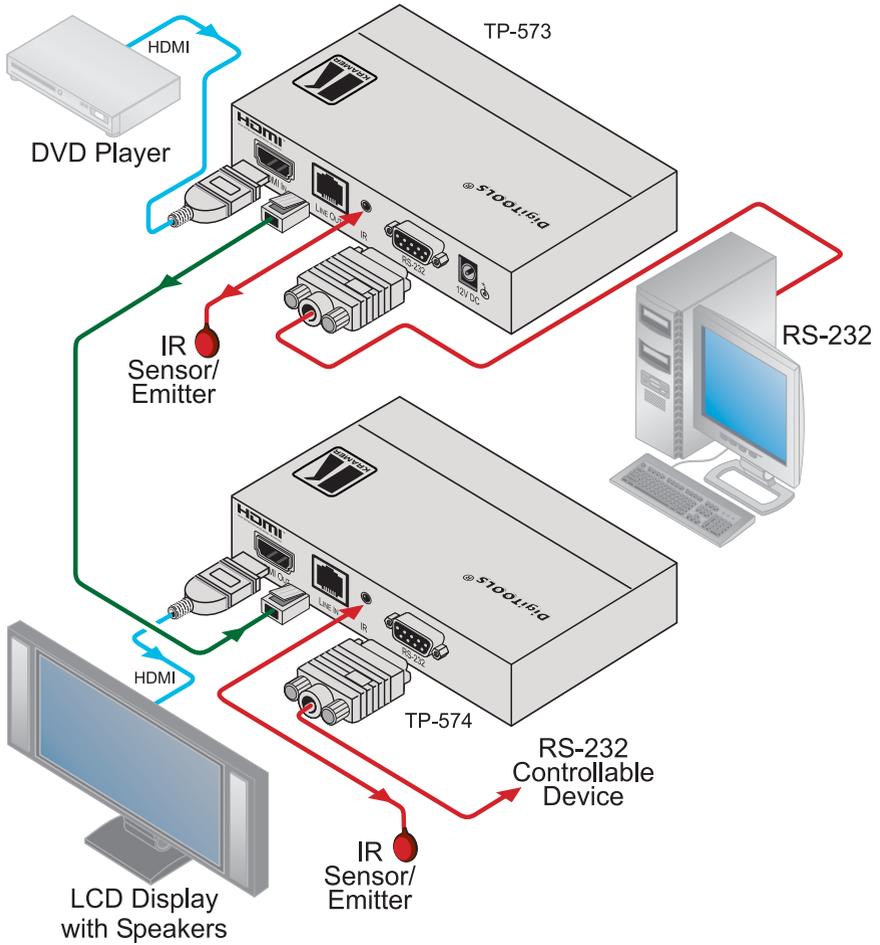**KRAMER: SIMPLE CREATIVE TECHNOLOGY**

Figure 3: Connecting the TP-573/TP-574 Transmitter/Receiver

5.1 Using the RS-232 ports to control a device via a PC

To use the RS-232 ports on the **TP-573** and **TP-574** to control an RS-232 device, follow these connecting rules:

If the controlled device requires a CROSSED connection:
- Use a straight cable[1] from the computer to the transmitter
- Use a straight cable[1] from the receiver to the device

If the controlled device requires a STRAIGHT connection:
- Use a straight cable[1] from the computer to the transmitter
- Use a crossed cable[2] from the receiver to the device


Never use a crossed connection to the transmitter

5.2 Wiring the CAT 5 LINE IN / LINE OUT RJ-45 Connectors

Table 3 and Figure 4 define the STP CAT 5 PINOUT[3], using a straight pin-to-pin cable with RJ-45 connectors (note, that the cable Ground shielding must be connected / soldered to the connector shield):

Table 3: CAT 5 PINOUT

Figure 4: CAT 5 PINOUT

EIA /TIA 568A		EIA /TIA 568B	
PIN	Wire Color	PIN	Wire Color
1	Green / White	1	Orange / White
2	Green	2	Orange
3	Orange / White	3	Green / White
4	Blue	4	Blue
5	Blue / White	5	Blue / White
6	Orange	6	Green
7	Brown / White	7	Brown / White
8	Brown	8	Brown
Pair 1	4 and 5	Pair 1	4 and 5
Pair 2	3 and 6	Pair 2	1 and 2
Pair 3	1 and 2	Pair 3	3 and 6
Pair 4	7 and 8	Pair 4	7 and 8

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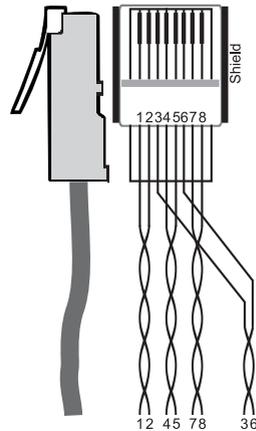
1 For a straight connection, connect pin 2 to pin 2, pin 3 to pin 3, and pin 5 to pin 5. If a shielded cable is used, connect the shield to pin 5

2 For a crossed connection, connect pin 2 to pin 3, pin 3 to pin 2, and pin 5 to pin 5. If a shielded cable is used, connect the shield to pin 5

3 CAT 6 or similar (heavier gauge) cabling can also be used

6   Technical Specifications

Table 4 includes the technical specifications[1].

Table 4: Technical Specifications of the TP-573 and TP-574

	TP-573	TP-574
INPUTS:	1 HDMI connector, 1 bidirectional IR port on a 3.5mm mini jack, 1 bidirectional RS-232 port on a 9-pin D-sub connector	1 CAT 5 IN on an RJ-45 connector
OUTPUTS:	1 CAT 5 OUT on an RJ-45 connector	1 HDMI connector, 1 bidirectional IR port on a 3.5mm mini jack, 1 bidirectional RS-232 port on a 9-pin D-sub connector
BANDWIDTH:	Supports up to 1.65Gbps bandwidth per graphic channel	
COMPLIANCE WITH HDMI STANDARD:	Supports HDMI and HDCP	
RS-232 BAUD RATE:	Up to 38400kbps	
POWER SOURCE:	12V DC, 510mA	12V DC from **TP-573**
DIMENSIONS:	12.1cm x 7.18cm x 2.42cm (4.76" x 2.83" x 0.95"), W, D, H	
WEIGHT:	0.3kg (0.67lbs) approx.	
ACCESSORIES:	12V DC power supply	
OPTIONS:	RK-3T 19" rack mount, Kramer remote external receiver[2], Kramer BC-DGKat524 (CAT 5 24AWG), BC-DGKat623 (CAT 6 23AWG) and BC-DGKat7a23 (CAT 7a 23 AWG) cables	

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1 Specifications are subject to change without notice

2 C-A35M/IRR or C-A35M/IRE or C-A35M/2IRE

LIMITED WARRANTY

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for three years from the date of the first customer purchase.

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the Web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed, or on which the WARRANTY VOID IF TAMPERED sticker has been torn, reattached, removed or otherwise interfered with.
3. Damage, deterioration or malfunction resulting from:
   i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
   ii) Product modification, or failure to follow instructions supplied with the product
   iii) Repair or attempted repair by anyone not authorized by Kramer
   iv) Any shipment of the product (claims must be presented to the carrier)
   v) Removal or installation of the product
   vi) Any other cause, which does not relate to a product defect
   vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on 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)

![Kramer logo]

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.

ISO 9001:2000
IQC
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Certified Quality System

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