Kramer Electronics, Ltd.

USER MANUAL

Model:

TP-219HD, ***XGA/HD Line Transmitter/Switcher***

TP-220HD, ***XGA/HD Line Receiver/DA***

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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.

Thank you for purchasing the Kramer TOOLS **TP-219HD** *XGA/HD Line Transmitter/Switcher* and Kramer TOOLS **TP-220HD** *XGA/HD Line Receiver/DA* which are ideal for:

- Presentation and multimedia applications
- Long range graphics distribution for schools, hospitals, security, and stores

The package includes the following:

- **TP-219HD** and/or **TP-220HD**
- 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]

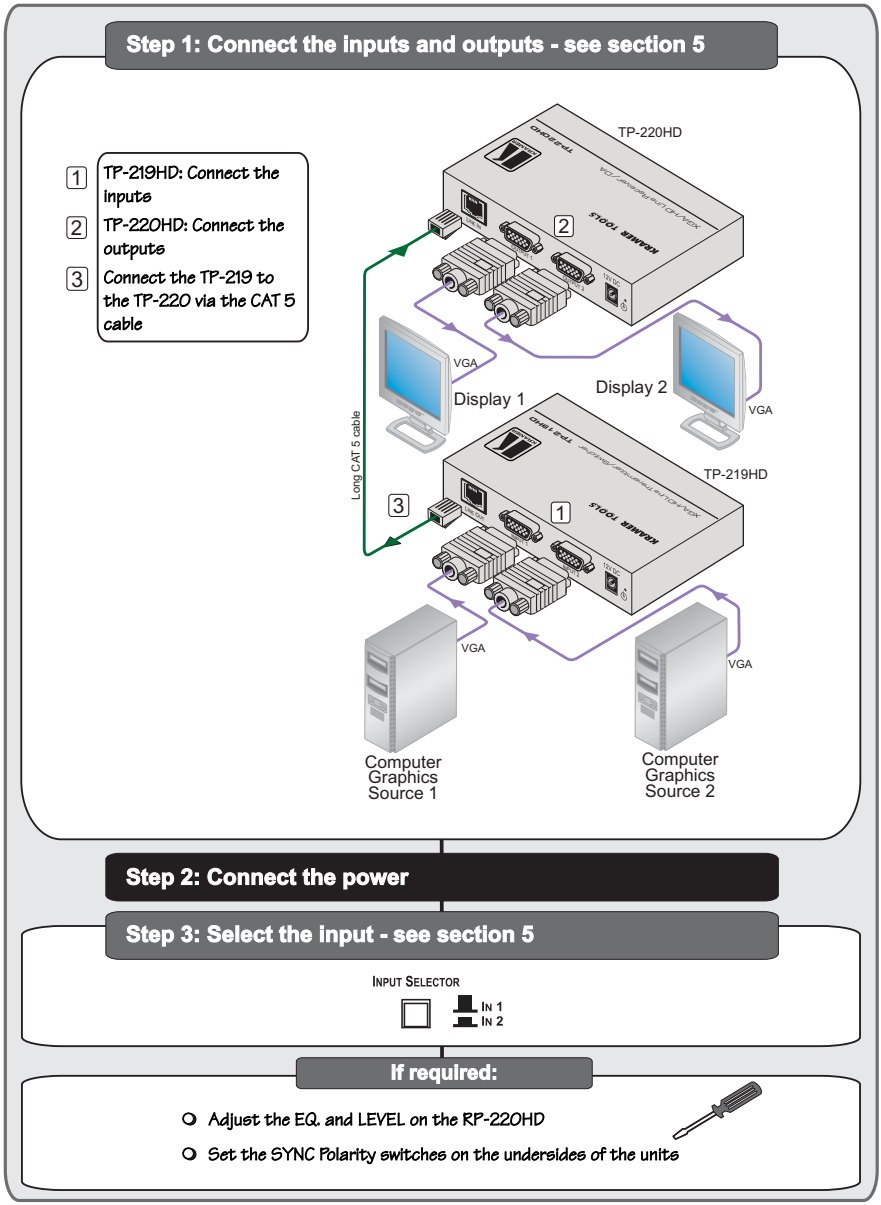
1 GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Matrix Switchers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters; GROUP 11: Sierra Products

2 Download up-to-date Kramer user manuals from our Web site at 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.



3 Overview

The **TP-219HD** is a high-performance twisted pair transmitter for computer graphics signals with resolutions ranging from VGA through UXGA and higher as well as HDTV signals up to 1080p. It takes one of two inputs as selected by the user and converts it to a twisted pair signal.

The **TP-220HD** is a high-performance twisted pair receiver for computer graphics signals with resolutions ranging from VGA through UXGA and higher as well as HDTV signals up to 1080p. It converts a twisted pair signal back into two identical signals in the original format.

The **TP-219HD** *XGA/HD Line Transmitter/Switcher*:

- Has a transmission range of more than 300 feet (more than 100 meters)
- Includes two XGA[1]/YUV[2] inputs on 15-pin HD connectors
- Features an INPUT SELECTOR button to select between INPUT 1 and INPUT 2
- Can change the polarity of encoding H and V Sync for XGA graphics
- Can power or be powered by the receiver over the same CAT 5 cable (see section 3.1)
- Is 12V DC fed

The **TP-220HD** *XGA/HD Line Receiver/DA*:

- Has two XGA/YUV[2] outputs on 15-pin HD connectors
- Can change the polarity of decoding H and V Sync for XGA graphics
- Includes EQ. and LEVEL controls
- Can power or be powered by the transmitter over the same CAT 5 cable (see section 3.1)
- Is 12V DC fed

3.1 About the Power Connect Feature

The Power Connect feature applies as long as the cable can carry power. This feature is available when using STP cable and the distance does not exceed 50m on standard CAT 5 cable. For longer distances, heavy gauge cable should be used[3]. For units which are connected via RJ-45 connectors, make sure that the shield of the STP cable is connected to the metal casing

1 The terminology XGA is used throughout this manual, where this implies any RGBHV signal on an HD15 connector having a resolution from VGA up to UXGA

2 Also known as Y, Cb, Cr, or Y, B-Y, R-Y, or Y, Pb, Pr

3 CAT 5 cable is still suitable for the video/audio transmission, but not for feeding the power at these distances

of the connectors on both ends of the cable. For units which are connected via terminal block connectors, the shield of the STP cable must be connected to a ground terminal on the units at both ends (use the ground terminal of the power supply connection if necessary).

For a CAT 5 cable exceeding a distance of 50m, separate power supplies should be connected to the transmitter and to the receiver simultaneously.

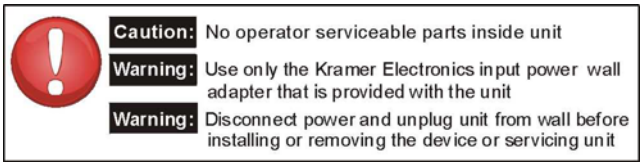
3.2 Shielded Twisted Pair (STP)/Unshielded Twisted Pair (UTP)

We recommend that you use Shielded Twisted Pair (STP) cable. There are different levels of STP cable available, and we advise you to use the best quality STP cable that you can afford. Our non-skew-free cable, Kramer **BC-STP** is intended for analog signals where skewing is not an issue. For cases where there is skewing, our UTP skew-free cable, Kramer **BC-XTP**, may be used. Bear in mind, though, that we advise using STP cables where possible, since the compliance to electromagnetic interference was tested using those cables.

Although Unshielded Twisted Pair (UTP) cable might be preferred for long range applications, the UTP cable should be installed far away from electric cables, motors and so on, which are prone to create electrical interference. However, since the use of UTP cable might cause inconformity to electromagnetic standards, Kramer does not commit to meeting the standard with UTP cable.

To achieve the best performance:

- Use only good quality connection cables[1] to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables).
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality and position your Kramer products away from moisture, excessive sunlight and dust



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

4 Your XGA/HD Line Transmitter/Switcher and Receiver/DA

This section describes the:

- **TP-219HD** *XGA/HD – Line Transmitter/Switcher*, see section 4.1
- **TP-220HD** *XGA/HD – Line Receiver/DA*, see section 4.2

4.1 Your TP-219HD

Figure 1 and Table 1 define the **TP-219HD**:

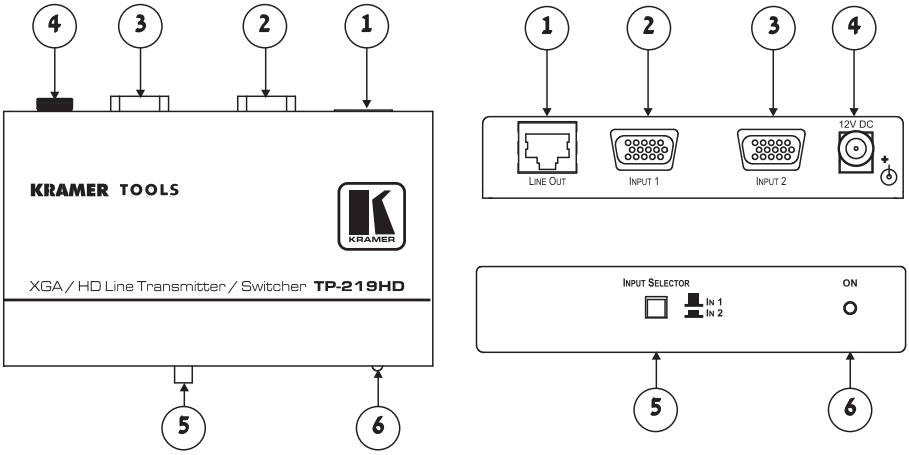


Figure 1: TP-219HD XGA/HD Line Transmitter/Switcher

Table 1: TP-219HD XGA/HD Line Transmitter/Switcher Features

#	Feature	Function
1	*LINE OUT* RJ-45 Connector	Connect[1] to the LINE IN RJ-45 connector on the **TP-220HD**
2	*INPUT 1* 15-pin HD Connector	Connect to the first XGA/HD source
3	*INPUT 2* 15-pin HD Connector	Connect to the second XGA/HD source
4	*12V DC*	+12V DC connector for powering the unit
5	*INPUT SELECTOR* button	Press to select IN 2; release to select IN 1
6	*ON* LED	Illuminates when receiving power

1 Using a UTP CAT5 cable with RJ-45 connectors at both ends (the PINOUT is defined in Table 5 and Figure 7)

Figure 2 and Table 2 define the **TP-219HD** underside panel:

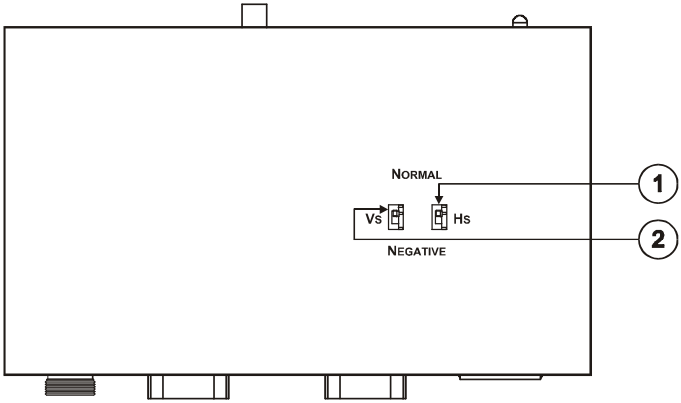


Figure 2: TP-219HD (Underside Panel)

Table 2: TP-219HD (Underside Panel) Features

#	Feature	Function
1	*HS* Switch	Slide the switch up (to NORMAL) to retain the polarity Slide the switch down[1] to change the HS polarity to NEGATIVE polarity[2]
2	*VS* Switch	Slide the switch up (to NORMAL) to retain the polarity Slide the switch down[1] to change the VS polarity to NEGATIVE polarity[2]

1 By default, both switches are set to NORMAL

2 Downgoing syncs

4.2 Your TP-220HD

Figure 3 and Table 3 define the **TP-220HD**:

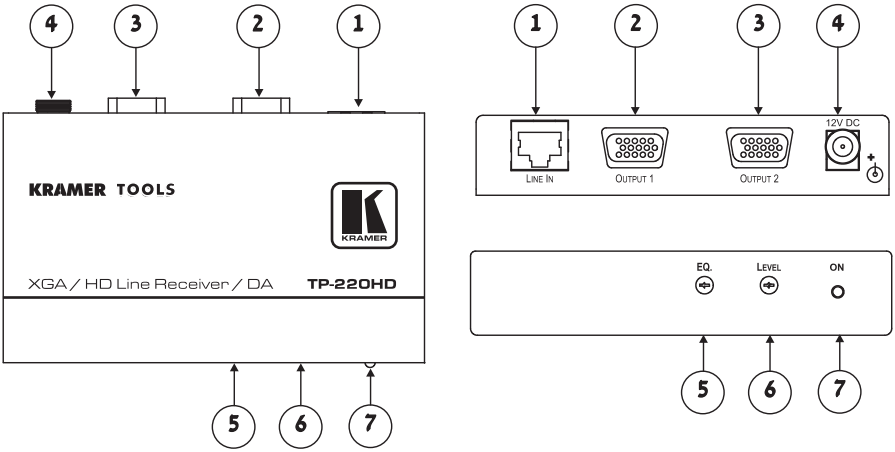


Figure 3: TP-220HD XGA/HD Line Receiver/DA

Table 3: TP-220HD XGA/HD Line Receiver/DA Features

#	Feature	Function
1	*LINE IN* RJ-45 Connector	Connect[1] to the LINE OUT RJ-45 connector on the **TP-219HD**
2	*OUTPUT 1* 15-pin HD Connector	Connect to the first XGA/HD acceptor
3	*OUTPUT 2* 15-pin HD Connector	Connect to the second XGA/HD acceptor
4	*12V DC*	+12V DC connector for powering the unit
5	*EQ.* Trimmer	Adjust[2] the cable compensation equalization level
6	*LEVEL* Trimmer	Adjust[2] the output signal level
7	*ON* LED	Illuminates when receiving power

1 Using a UTP CAT5 cable with RJ-45 connectors at both ends (the PINOUT is defined in Table 5 and Figure 7)

2 Insert a screwdriver into the small hole and carefully rotate it, to trim the appropriate level

Figure 4 and Table 4 define the **TP-220HD** underside panel:

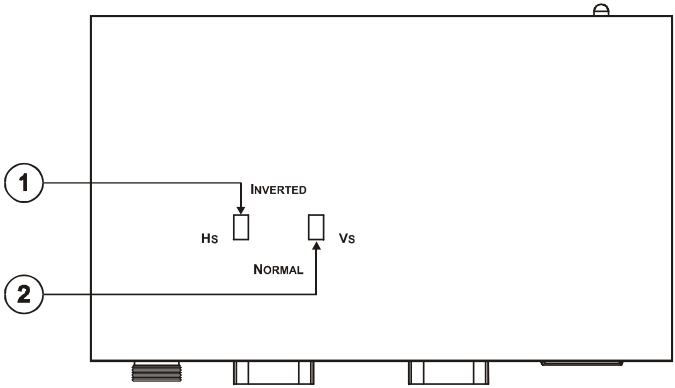


Figure 4: TP-220HD (Underside Panel)

Table 4: TP-220HD (Underside Panel) Features

#	Feature	Function
1	*HS* Switch	Slide the switch up[1] (to INVERTED) to invert the HS polarity Slide the switch down (to NORMAL) to retain the polarity
2	*VS* Switch	Slide the switch up[1] (to INVERTED) to invert the VS polarity Slide the switch down (to NORMAL) to retain the polarity

5 Connecting the TP-219HD and TP-220HD

You can use the **TP-219HD** *XGA/HD – Line Transmitter/Switcher* with the **TP-220HD** *XGA/HD – Line Receiver/DA* to configure an XGA/HD DA system. This will let you transmit one selected computer graphics/HD signal to two displays via long line CAT 5 UTP cabling.

To connect the **TP-219HD** to the **TP-220HD**, as the example in Figure 5 illustrates, do the following:

1. On the **TP-219HD**, connect[2]:
   - An XGA[3] source (for example, Computer Graphics Source 1) to the INPUT 1 15-pin HD connector
   - An XGA[3] source (for example, Computer Graphics Source 2) to the INPUT 2 15-pin HD connector
2. If necessary, set the HS and VS switches on the **TP-219HD** underside[4].

1 By default, both switches are set to NORMAL

2 You do not have to connect both inputs

3 Alternatively, you can connect an HD source, see section 5.1

4 By default, both switches are set to normal (see Figure 2 and Table 2)

3. On the **TP-220HD**, connect[1] the:
   - OUTPUT 1 15-pin HD connector to an XGA[2] acceptor (for example, Display 1)
   - OUTPUT 2 15-pin HD connector to an XGA[2] acceptor (for example, Display 2)
4. If necessary, set the HS and VS switches on the **TP-220HD** underside[3].
5. Connect the LINE OUT RJ-45 connector on the **TP-219HD** to the LINE IN RJ-45 connector on the **TP-220HD**, via CAT 5 cabling, see section 5.2.
6. Connect the 12V DC power adapter to the power socket and connect the adapter to the mains electricity on both[4] the **TP-219HD** and the **TP-220HD** (not shown in Figure 5).
   The selected signal from the XGA/HD source is transmitted via CAT 5 cable, decoded and converted at the OUTPUT 1 and OUTPUT 2 15-pin HD connectors to the XGA acceptors simultaneously.

1 You do not have to connect both outputs

2 Alternatively, you can connect an HD acceptor, see section 5.1

3 By default, both switches are set to normal (see Figure 4 and Table 4)

4 If you cannot connect the power to both the TP-219HD and TP-220HD, you can just connect the power to one of them

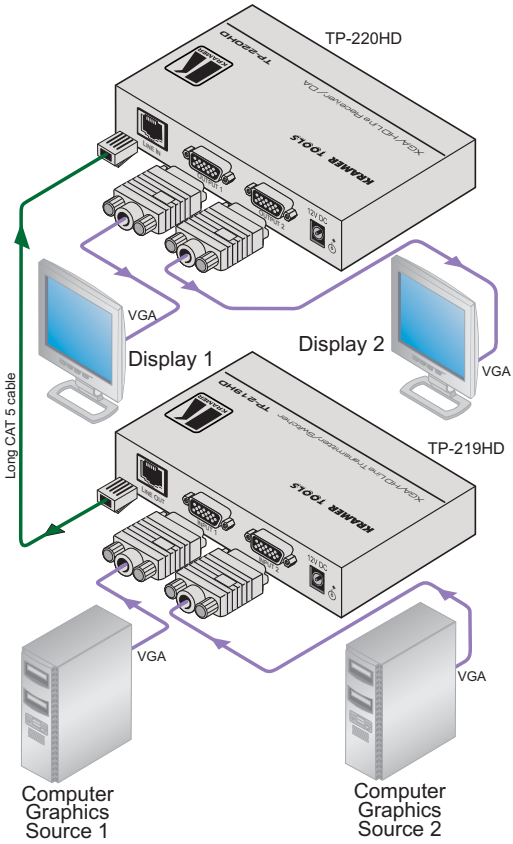


Figure 5: Connecting the TP-219HD/TP-220HD XGA System

5.1 Connecting an HD System

When connecting a high definition source, as illustrated in Figure 6, use a breakout cable such as the Kramer C-GM/3RVF. If you have a VGA to a 5BNC cable, use the RGB wires only.

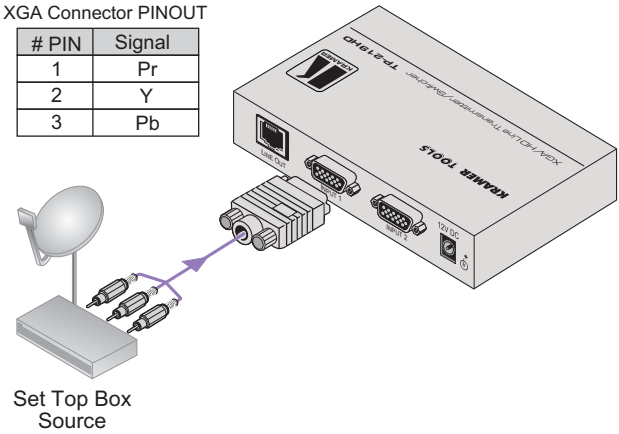


Figure 6: Connecting an HD Source

You can also connect an HD acceptor (for example, a plasma display) using the same PINOUT.

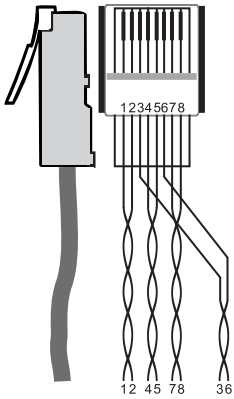
5.2 Wiring the CAT 5 LINE IN / LINE OUT RJ-45 Connectors

Table 5 and Figure 7 define the UTP CAT 5 PINOUT, using a straight pin to pin cable with RJ-45 connectors:

Table 5: 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

Figure 7: CAT 5 PINOUT



6 Technical Specifications

Table 6 includes the technical specifications[1].

Table 6: Technical Specifications of the TP-219HD and TP-220HD Setup

	TP-219HD	TP-220HD
INPUTS:	2 XGA/HD on 15-pin HD connectors	1 CAT 5 IN on an RJ-45 connector
OUTPUTS:	1 CAT 5 OUT on an RJ-45 connector	2 XGA/HD on 15-pin HD connectors
MAX. OUTPUT LEVEL:	1.5Vpp	
RESOLUTION:	Up to UXGA, up to 1080p	
DIFF. GAIN:	2.3%	
DIFF. PHASE:	0.2°	
K-FACTOR:	0.1%	
S/N RATIO:	70dB @5MHz	
CROSSTALK (all hostile):	-45dB	
CONTROLS:	Input selector button	Level: -9.2dB to +2.1dB EQ.: 0 to +29.5dB @50MHz
COUPLING:	AC	DC[2]
POWER SOURCE:	12V, 300mA, when feeding **TP-220HD**	12V, 300mA, when feeding **TP-219HD**
DIMENSIONS:	12.1cm x 7.18cm x 2.42cm (4.76" x 2.83" x 0.95") W, D, H	
WEIGHT:	0.3 kg. (0.67 lbs.) approx. each	
ACCESSORIES:	Power supply	

1 Specifications are subject to change without notice

2 The TP-219HD causes the setup to be AC

LIMITED WARRANTY

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

HOW LONG IS THE WARRANTY

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

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

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

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

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

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

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

HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

This equipment has been tested to determine compliance with the requirements of:

EN-50081:	"Electromagnetic compatibility (EMC); generic emission standard. Part 1: Residential, commercial and light industry"
EN-50082:	"Electromagnetic compatibility (EMC) generic immunity standard. Part 1: Residential, commercial and light industry environment".
CFR-47:	FCC* Rules and Regulations: Part 15: "Radio frequency devices Subpart B Unintentional radiators"

CAUTION!

- Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- Use the supplied DC power supply to feed power to the machine.
- Please use recommended interconnection cables to connect the machine to other components.

* FCC and CE approved using STP cable (for twisted pair products)

For the latest information on our products and a list of Kramer distributors, visit our Web site: www.kramerelectronics.com, where updates to this user manual may be found.
We welcome your questions, comments and feedback.

Safety Warning:
Disconnect the unit from the power supply before opening/servicing.

P/N: 2900- 000208 Rev: 2

Kramer Electronics, Ltd.
Web site: www.kramerelectronics.com
E-mail: info@kramerel.com
P/N: 2900-000208 REV 2