

Kramer Electronics, Ltd.



USER MANUAL

Model:

900xl

Power Amplifier



900xl Quick Start Guide

This guide helps you install and use your **900xl** for the first time. For more detailed information, go to <http://www.kramerav.com/manual/900xl> to download the latest manual or scan the QR code on the left.

Step 1: Check what's in the box

- ✓ **900xl** Power Amplifier
- ✓ 4 Rubber feet
- ✓ Bracket installation kit
- ✓ Power adapter (12V DC)
- ✓ 1 Quick start guide

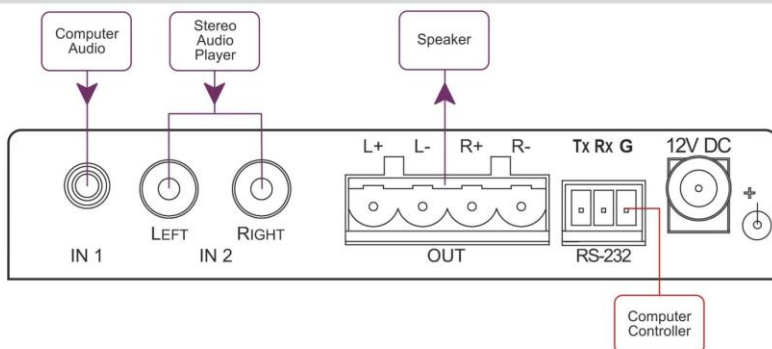
Step 2: Install the 900xl

To mount the **900xl** in a rack, use an **RK-3T** rack adapter. Alternatively, attach the rubber feet to the underside of the **900xl** and place it on a table.

A Kramer TOOLS™ can also be mounted on a desk top, wall or similar area. Fasten a bracket on each side of the TOOLS using the two M3x8 screws (supplied). Use the flat-head screws (supplied) to fix the TOOLS to the mounting surface or enable it to slide in place.

Step 3: Connect the inputs and output

After mounting the device, connect the inputs and output. Always switch off the power to each device before connecting it to your **900xl**.



Step 4: Connect the power

Connect the power adapter to the **900xl** and plug the adapter into the mains electricity.



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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 groups¹ that are clearly defined by function.

Thank you for purchasing the Kramer TOOLS **900xl** *Power Amplifier*, which is ideal for:

- Presentation rooms and multimedia applications for quick, local audio amplification
- Personal audio listening (for example, a PC and portable CD player)

The package includes the following items:

- **900xl** Power Amplifier
- 12V DC power supply

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 cables²

2.1 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

1 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 Products

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

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 **900xl** is a high-performance power amplifier for line-level stereo audio signals. It accepts either a stereo audio signal on an RCA connector or a stereo audio signal on a 3.5mm mini jack. It delivers a speaker output of 10 watts RMS per channel into a 4 Ω load on a 10A 4-pin terminal block connector.

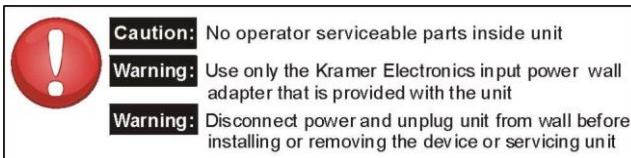
The **900xl** includes:

- Input selector buttons
- Audio gain buttons for volume control
- Overheating warning protection with LED indicator
- A 12V DC power adapter

The **900xl** is housed in a Kramer TOOLS enclosure.

To achieve the best performance:

- Use only good quality connection cables¹ 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 **900xl** away from moisture, excessive sunlight and dust



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

4 Your 900xl Power Amplifier

[Figure 1](#), [Figure 2](#), [Table 1](#), and [Table 2](#) define the unit.

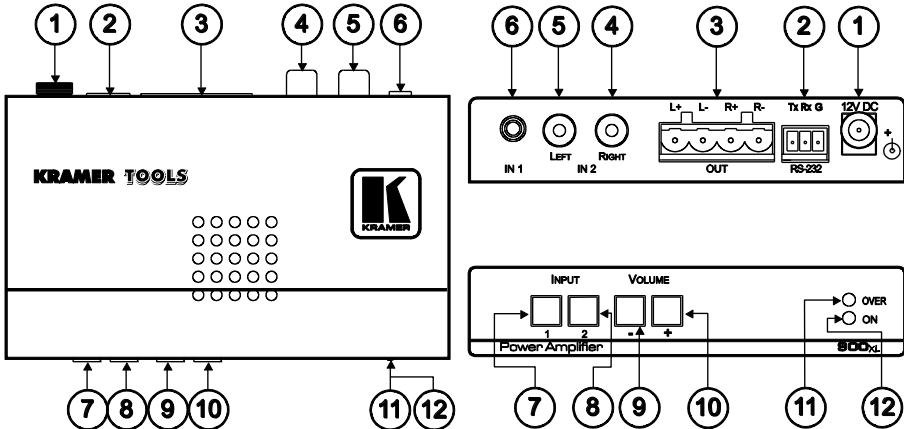


Figure 1: 900xl Power Amplifier – Top, Front, and Rear Views

Table 1: 900xl Power Amplifier Front, and Rear Functions

#	Feature	Function
1	12V DC Connector	+12V DC for powering the unit
2	RS-232 Tx Rx G Terminal Block Connector	Connect to PC
3	L+ L- R+ R- OUT Terminal Block Connector	Speaker output
4	IN 2 RIGHT RCA Connector	Connect to stereo audio right input of source 2
5	IN 2 LEFT RCA Connector	Connect to stereo audio left input of source 2
6	IN 1 3.5mm Mini-jack Connector	Connect to stereo audio input of source 1
7	INPUT 1 Button	Selects the input from audio source 1
8	INPUT 2 Button	Selects the input from audio source 2
9	VOLUME – Button	Decreases output volume
10	VOLUME + Button	Increases output volume
11	OVER LED	Illuminates red when device is overheating and mutes output
12	ON LED	Illuminates green when receiving power

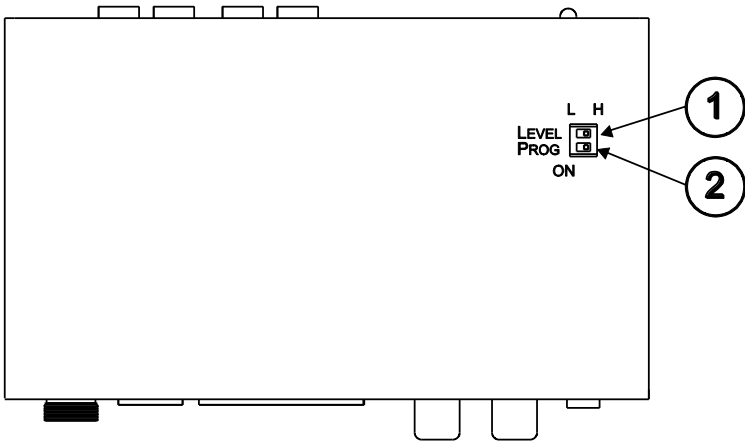


Figure 2: 900xl Power Amplifier – Underside View

Table 2: 900xl Power Amplifier Underside Functions

#	Feature	Function
1	LEVEL L/H Switch	Input level – low / high gain; set to low in case of distortion
2	PROG ON Switch	For use when upgrading device firmware

5 Connecting the 900xl Power Amplifier

To connect the **900xl**, as illustrated in [Figure 3](#), perform the following:

1. Connect an unbalanced stereo audio source (for example, a computer audio line out) to the IN 1 mini jack connector.
2. Connect an unbalanced stereo audio source (for example, an unbalanced stereo audio player) to the LEFT and RIGHT IN 2 RCA connectors.
3. Connect the SPKR OUT terminal block to a pair of loudspeakers: Connect the “L+” and the “L-” terminal block connectors to the left loudspeaker, and the “R+” and the “R-” terminal block connectors to the right loudspeaker. **Do not ground the loudspeakers.**
4. Connect the 12V DC power adapter to the power socket and connect the adapter to the mains electricity (not shown in [Figure 3](#)).

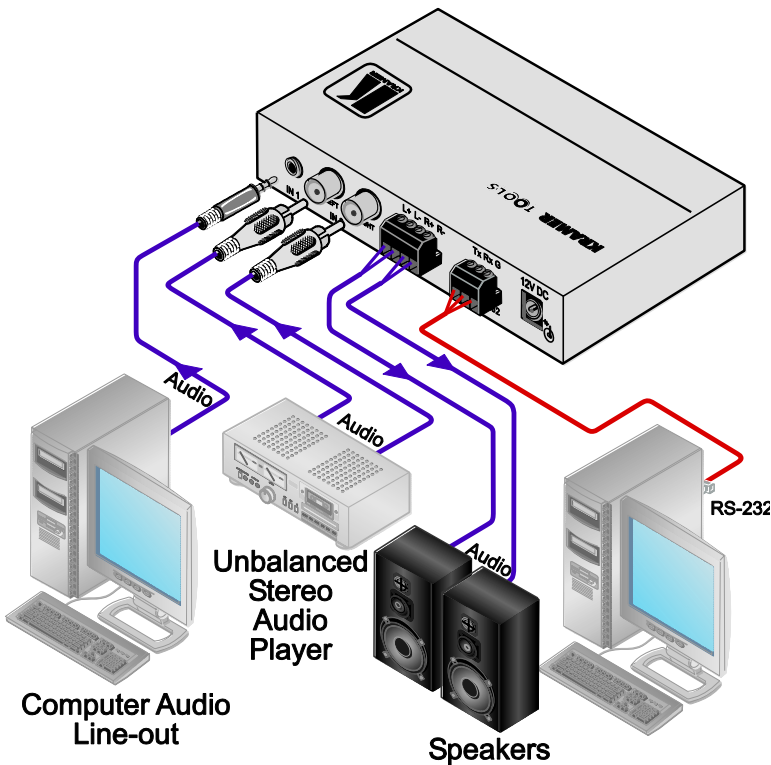


Figure 3: Connecting the 900xl Power Amplifier

5.1 Connecting a PC

You can control the **900xl** with a PC (or other controllers) via the RS-232 port using serial commands.

To connect a PC to the **900xl**:

- Connect the RS-232 9-pin D-sub port on your PC to the RS-232 rear panel port on the Master **900xl** using a cable as shown in [Figure 4](#):

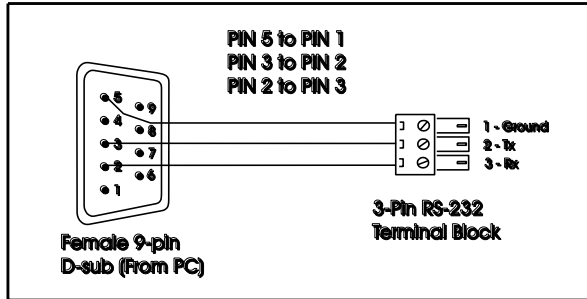


Figure 4: RS-232 Control Cable

6 Operating the 900xl Power Amplifier

You can operate your **900xl** using:

- The front panel buttons
- RS-232 serial commands transmitted by a PC, touch screen system, or other serial controller

6.1 Using the Front Panel Buttons

To operate the **900xl** using the front panel buttons:

- To choose audio input source 1 (the PC line-out as shown in [Figure 3](#)), press INPUT 1 button.
- To choose audio input source 2 (a stereo tape), press INPUT 2 button.

Adjust the output volume to the speakers using the VOLUME + and – buttons.

Note: In the case of output distortion that cannot be corrected using the volume controls, try switching the LEVEL switch on the underside of the unit (see [Figure 2](#)) from H to L and alter the output using the volume control.

6.2 Using Serial Commands

To operate your device using serial commands, you need to install Kramer's control software¹.

For an explanation of all control commands, see sections [8](#) and [9](#).

7 Technical Specifications

900xl technical specifications are shown in [Table 3](#):

Table 3: 900xl Technical Specifications²

INPUTS:	1 unbalanced stereo audio on a 3.5mm mini-jack connector; 1 unbalanced stereo audio on RCA connectors
OUTPUT:	1 stereo differential speaker output
OUTPUT POWER:	2x10W (4Ω)
INPUT SENSITIVITY:	460mV
OUTPUT MUSIC POWER:	2x40W (4Ω)
BANDWIDTH (-3dB):	25kHz
S/N RATIO:	85dB @1kHz, 0dBu output
CONTROLS:	Gain range: -14 to +32dB at high-gain; -21 to +20dB at low-gain
COUPLING:	Input: AC; output: DC
AUDIO THD + NOISE:	0.6% @0dBu output
AUDIO 2nd HARMONIC:	0.35% @0dBu output
POWER SOURCE:	12V DC, 2.0A
OPERATING TEMPERATURE:	0° to +40°C (32° to 104°F)
STORAGE TEMPERATURE:	-45° to +72°C (-49° to 162°F)
HUMIDITY:	10% to 90%, RHL non-condensing
DIMENSIONS:	12cm x 7.5cm x 2.5cm (4.7" x 3.0" x 1.0") W, D, H
WEIGHT:	0.2kg (0.4lbs) approx.
INCLUDED ACCESSORIES:	Power supply
OPTIONS:	RK-3T 19" rack adapter

¹ Download control software from our Web site at <http://www.kramerelectronics.com>

² Specifications are subject to change without notice

8 Hex Table

[Table 4](#) lists the Hex values (described in section [9](#)) for the **900xl**:

Table 4: 900xl Hex Table

Instruction #	Hex Code	Description
2. Switch Audio	02 81 81 81	Connect Input 1 to output
	02 82 81 81	Connect Input 2 to output
22. Gain Control	Output 1	
	16 81 80 81	Mute
	16 81 81 81	...
	16 81 82 81	
	...	
	16 81 FF 81	Maximum gain
24. Increase/Decrease Audio Parameter	18 81 80 81	Increase output
	18 81 81 81	Decrease output

9 Kramer Protocol 2000

The **900xl** is compatible with Kramer's Protocol 2000, version 0.50. This RS-232/RS-485 communication protocol uses four bytes of information as defined below. For RS-232, a null-modem connection between the machine and controller is used. The default data rate is 9600 baud, with no parity, 8 data bits, and 1 stop bit.

Note: Compatibility with Kramer's Protocol 2000 does not mean that a machine uses all of the commands below. Each machine uses a sub-set of Protocol 2000, according to its needs.

Table 5: Protocol Definitions

MSB		INSTRUCTION						LSB
DESTINATION								
0	D	N5	N4	N3	N2	N1	N0	
7	6	5	4	3	2	1	0	
1st byte								
		INPUT						
1	I6	I5	I4	I3	I2	I1	I0	
7	6	5	4	3	2	1	0	
2nd byte								
		OUTPUT						
1	O6	O5	O4	O3	O2	O1	O0	
7	6	5	4	3	2	1	0	
3rd byte								
		MACHINE NUMBER						
1	OVR	X	M4	M3	M2	M1	M0	
7	6	5	4	3	2	1	0	
4th byte								

Kramer Protocol 2000

1st BYTE: Bit 7 – Defined as 0.
D – “DESTINATION”: 0 - for sending information to the switchers (from the PC);
1 - for sending to the PC (from the switcher).
N5...N0 – “INSTRUCTION”

The function to be performed by the switcher(s) is defined by the INSTRUCTION (6 bits). Also, if a function is performed via the machine’s keyboard, then these bits are set with the INSTRUCTION NO. that was performed. The instruction codes are defined according to the table below (INSTRUCTION NO. is the value to be set for N5...N0).

2nd BYTE: Bit 7 – Defined as 1.
I6...I0 – “INPUT”.

When switching (i.e. instruction codes 1 and 2), the INPUT (7 bits) is set as the input number which is to be switched. Similarly, if switching is done via the machine’s front-panel, then these bits are set with the INPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

3rd BYTE: Bit 7 – Defined as 1.
O6...O0 – “OUTPUT”.

When switching (ie. instruction codes 1 and 2), the OUTPUT (7 bits) is set as the output number which is to be switched. Similarly, if switching is done via the machine’s front-panel, then these bits are set with the OUTPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

4th BYTE: Bit 7 – Defined as 1.
Bit 5 – Don’t care.
OVR – Machine number override.
M4...M0 – MACHINE NUMBER.

Used to address machines in a system via their machine numbers. When several machines are controlled from a single serial port, they are usually configured together with each machine having an individual machine number. If the OVR bit is set, then all machine numbers will accept (implement) the command, and the addressed machine will reply.

For a single machine controlled via the serial port, always set M4...M0 = 1, and make sure that the machine itself is configured as MACHINE NUMBER = 1.

Table 6: Instruction Codes for Protocol 2000

Note: All values in the table are decimal, unless otherwise stated.

INSTRUCTION		DEFINITION FOR SPECIFIC INSTRUCTION		NOTE
#	DESCRIPTION	INPUT	OUTPUT	
0	RESET MACHINE	0	0	1
2	SWITCH AUDIO	Set equal to audio input which is to be switched (0 = disconnect)	Set equal to audio output which is to be switched (0 = to all the outputs)	2
6	REQUEST STATUS OF AN AUDIO OUTPUT	Set as SETUP #	Equal to output number whose status is reqd	4, 3
12	REQUEST VIDEO / AUDIO TYPE SETTING	Set as SETUP #, or set to 126 or 127 to request if machine has this function	0 - for video 1 - for audio 2 - for VGA	3, 4, 6
22	SET AUDIO PARAMETER	Equal to output number whose parameter is to be set = 1	Set as parameter value 0–127	2, 11
24	INCREASE / DECREASE AUDIO PARAMETER	Equal to output number whose parameter is to be increased / decreased by 1	0 - increase output 1 - decrease output	24
25	REQUEST AUDIO PARAMETER	Equal to output number whose parameter is requested	0	6, 20, 24
57	SET AUTO-SAVE	I3 - no save I4 - auto-save	0	12, 2
61	IDENTIFY MACHINE	2 - audio machine name 4 - audio software version 6 - RS422 controller version 7 - remote control name 8 - remote software version 9 - Protocol 2000 revision	0 - Request first 4 digits 1 - Request first suffix	13
62	DEFINE MACHINE	1 - number of inputs 2 - number of outputs 3 - number of setups	2 - for audio	14

NOTES on the above table:

NOTE 1 – When the master switcher is reset, (e.g. when it is turned on), the reset code is sent to the PC. If this code is sent to the switchers, it will reset according to the present power-down settings.

NOTE 2 – These are bi-directional definitions. That is, if the switcher receives the code, it will perform the instruction; and if the instruction is performed (due to a keystroke operation on the front panel), then these codes are sent. For example, if the HEX code

02	82	81	81
----	----	----	----

was sent from the PC, then the switcher (machine 3) will switch input 1 to output 1. If the user switched input 1 to output 1 via the front panel keypad, then the switcher will send HEX codes:

42	81	81	81
----	----	----	----

to the PC.

When the PC sends one of the commands in this group to the switcher, then, if the instruction is valid, the switcher replies by sending to the PC the same four bytes that it was sent (except for the first byte, where the DESTINATION bit is set high).

NOTE 3 – SETUP # 0 is the present setting. SETUP # 1 and higher are the settings saved in the switcher's memory, (i.e. those used for Store and Recall).

NOTE 4 – The reply to a "REQUEST" instruction is as follows: the same instruction and INPUT codes as were sent are returned, and the OUTPUT is assigned the value of the requested parameter.

NOTE 6 – If INPUT is set to 127 for these instructions, then, if the function is defined on this machine, it replies with OUTPUT=1. If the function is not defined, then the machine replies with OUTPUT=0, or with an error (invalid instruction code).

If the INPUT is set to 126 for these instructions, then, if possible, the machine will return the current setting of this function, even for the case that the function is not defined.

NOTE 11 – For machines where the audio parameter is programmable.

NOTE 12 – Under normal conditions, the machine's present status is saved each time a change is made. The "power-down" save (auto-save) may be disabled using this code. Note that whenever the machine is turned on, the auto-save function is set.

NOTE 13 – This is a request to identify the switcher/s in the system. If the OUTPUT is set as 0, and the INPUT is set as 1, 2, 5 or 7, the machine will send its name. The reply is the decimal value of the INPUT and OUTPUT.

If the request for identification is sent with the INPUT set as 3 or 4, the appropriate machine will send its software version number. Again, the reply would be the decimal value of the INPUT and OUTPUT - the INPUT representing the number in front of the decimal point, and the OUTPUT representing the number after it. For example, for version 3.5, the reply to the request to send the version number would be (HEX codes):

7D	83	85	81 (i.e. 128dec+ 3dec for 2nd byte, 128dec+ 5dec for 3rd byte).
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NOTE 14 – The number of inputs and outputs refers to the specific machine which is being addressed, not to the system. For example, if six 16X16 matrices are configured to make a 48X32 system (48 inputs, 32 outputs), the reply to the HEX code

3E	82	81	82 (i.e. request the number of outputs)
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would be HEX codes

7E	82	90	82 i.e. 16 outputs
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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.

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

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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.

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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.

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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.

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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.

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**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.**



Caution

Safety Warning:

Disconnect the unit from the power supply before opening/servicing.



P/N: 2900-000344



Rev: 6



Kramer Electronics, Ltd.

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P/N: 2900-000344 REV 6