Kramer Electronics, Ltd.

USER MANUAL

Model:

905

Power Amplifier

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KRAMER: SIMPLE CREATIVE TECHNOLOGY

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 **905** *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:

- **905** *Power Amplifier*
- Power cord[2]
- Windows®-based Kramer control software
- This user manual[3]

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[4]

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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
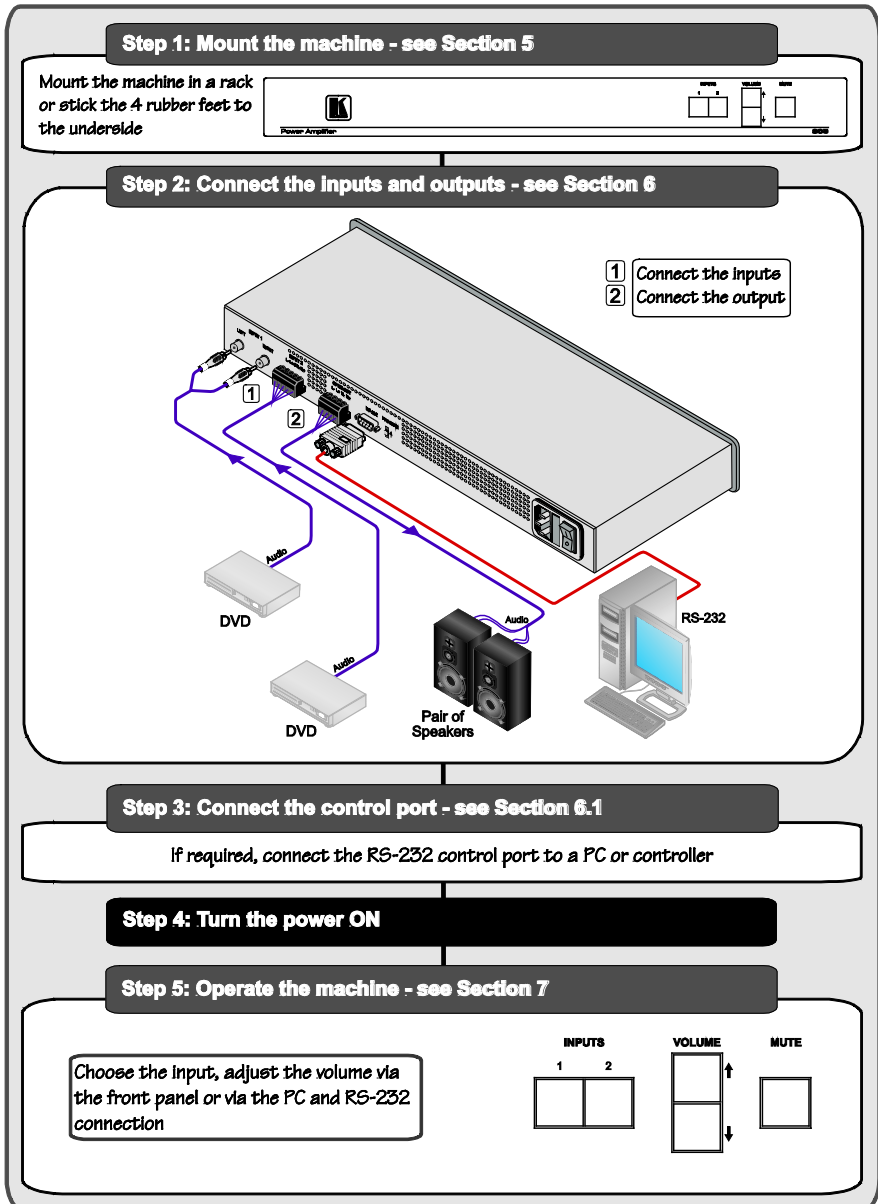
2 We recommend that you use only the power cord supplied with this device

3 Download up-to-date Kramer user manuals from our Web site at http://www.kramerelectronics.com

4 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 Kramer **905** 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 balanced stereo audio signal on a terminal block connector. It delivers a speaker output of 80 watts RMS per channel into a 4Ω load on a 10A 4-pin terminal block connector.

The **905** features:

- Two input selector buttons
- Two buttons for adjusting the volume and a mute button
- An unbalanced stereo input on RCA connectors and a balanced stereo input on a terminal block
- An RS-232 port

Control your **905**:

- Directly, via the front panel push buttons
- By RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller

The **905** is housed in a 19" 1U enclosure and is powered by a universal AC power supply.

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 **905** away from moisture, excessive sunlight and dust

4 Your 905 Power Amplifier

[Figure 1](#) and [Table 1](#) define the **905**.

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1 Available from Kramer Electronics on our Web site at http://www.kramerelectronics.com
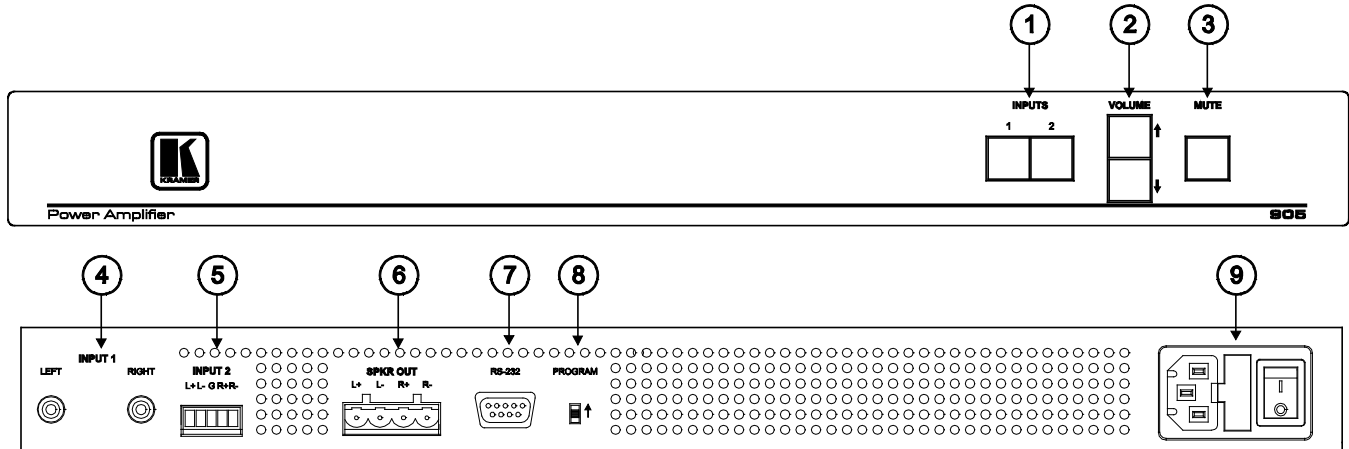
Figure 1: 905 Power Amplifier

Table 1: 905 Power Amplifier Functions

#	Feature	Function
1	*INPUT SELECTOR 1,2* Buttons	Press to select the input audio source 1 (unbalanced) or 2 (balanced)
2	*Volume* ↑↓ Buttons	Press to increase or decrease the output volume
3	*MUTE* Button	Press to turn off or turn on the audio output. The button illuminates when the audio output is disabled
4	*INPUT 1 Left and Right* RCA Connectors	Connect to the unbalanced stereo audio source
5	*INPUT 2* Terminal Block Connector	Connect to the balanced stereo audio source
6	*SPKR OUT L+ L- / R+ R-* Terminal Block Connector	Connect to a balanced stereo acceptor (speakers)
7	*RS-232* 9-pin D-sub Connector	Connects to a PC or serial controller
8	*PROGRAM* Switch	Switch up before performing a firmware upgrade, leave down for normal operation

5 Installing the 905 in a Rack

This section provides instructions for rack mounting the 1U unit.

Before Installing in a Rack

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

|	
Operating temperature range	+5º to +45º C (41º to 113º F)
Operating humidity range	10 to 90% RHL, non-condensing
Storage temperature range	-20º to +70º C (-4º to 158º F)
Storage humidity range	5 to 95% 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.

How to Rack Mount

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.
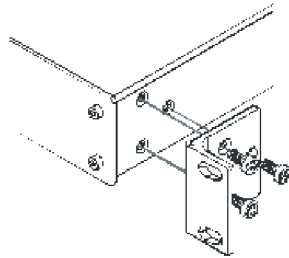
2. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.
Note:
● In some models, the front panel may feature built-in rack ears
● Detachable rack ears can be removed for desktop use
● Always mount the machine 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: http://www.kramerelectronics.com

6 Connecting the 905 Power Amplifier

To connect the **905**, as illustrated in the example in Figure 2, do the following:

1. Connect an unbalanced stereo audio source (for example, the unbalanced output of the DVD 1 player) to the L and R INPUT 1 RCA connectors.

2. Connect a balanced stereo audio source (for example, the balanced stereo audio output of the DVD 2 player) to the INPUT 2 terminal block connector.

3. Connect the OUTPUT 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 power cord to the power socket and connect the cord to the mains electricity (not shown in Figure 2).

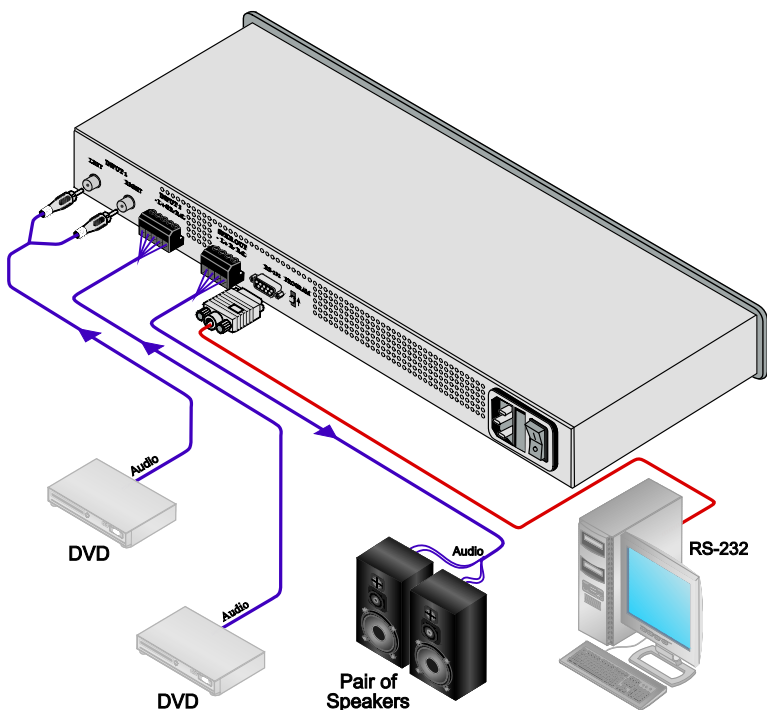5. If required connect a PC and/or controller to the RS-232 port, see section 6.1.

Figure 2: Connecting the 905 Power Amplifier

6.1 Connecting the 905 via RS-232

You can connect to the **905** via an RS-232 connection using, for example, a PC. Note that a null-modem adapter/connection is not required.

To connect to the **905** via RS-232:

- Connect the RS-232 9-pin D-sub rear panel port on the **905** unit via a 9-wire straight cable (only pin 2 to pin 2, pin 3 to pin 3, and pin 5 to pin 5 need to be connected) to the RS-232 9-pin D-sub port on your PC

7 Operating the 905 Power Amplifier

You can operate your **905** using:

- The front panel buttons (see section 7.1)
- The Audio Control program (see section 7.2)
- RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller (see section 7.3)

7.1 Using the Front Panel Buttons

The front panel buttons let you:

- Select an input, by pressing the INPUT 1 or INPUT 2 buttons
- Adjust the volume (see section 7.1.1)
- Mute the sound (see section 7.1.2)
- Mix the input signals (see section 7.1.3)

7.1.1 Adjusting the Volume

To adjust the volume of the output signal:

1. Press the up volume arrow (↑) to increase the volume.
2. Press the down volume arrow (↓) to decrease the volume.

7.1.2 Muting the Output

To temporarily turn off the output:

- Press the MUTE button. The button illuminates and the sound turns off

To turn on the output:

- Press the MUTE button. The illumination turns off and the sound turns on at the previous volume level

7.1.3 Mixing the Input Signals

You can mix the input signals using the two INPUT SELECTOR buttons.

To mix the signals, do the following:

1. Press the selected input twice.
   The other input button illuminates and both buttons enter the mixing mode.

2. Press and hold the selected input button for 2 or 3 seconds until it blinks.

3. Press the up and down arrows to adjust the mixing rate between the inputs.

To exit the mixing mode, press the selected input.

7.2 Using the Audio Control Program

The **905** Audio Control Program allows you to adjust the volume and to operate equalization controls for treble, mid-level and bass that cannot be adjusted from the front panel.

To use the Audio Control Program:

1. Download and install the program on your PC from the Kramer Web site.

2. Connect the PC to the **905** (see section 6.1).

3. Open the Audio Control program.
   The Audio Control window appears (see Figure 3).

4. Connect the **905** to the correct COM port of the PC.

5. Choose an input line (1 or 2).

6. Make volume, equalization and balance adjustments by operating the sliders in the window.

7. Turn loudness On and Off by checking or unchecking the Loudness checkbox.
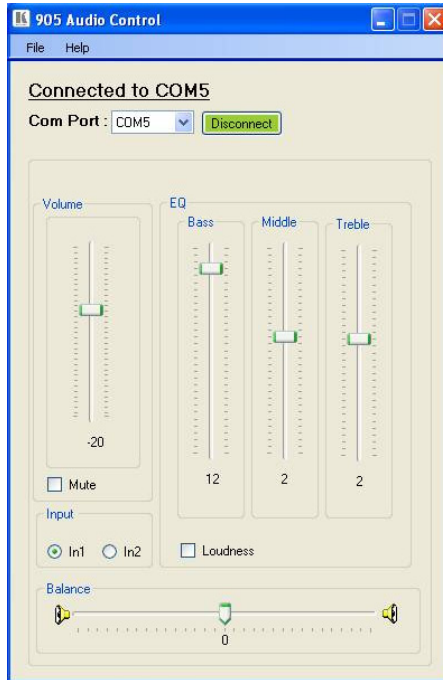
Figure 3: Audio Control Window

7.3 Using Serial Commands

To operate your device using serial commands, you need to install Kramer's control software that can be downloaded from the Kramer Electronics Web site[1].

For an explanation of all control commands, see section 9.

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

8 Technical Specifications

905 technical specifications are shown in <u>Table 2</u>:

Table 2: 905 Technical Specifications[1]

INPUTS:	1 unbalanced stereo audio input on RCA connectors 1 balanced stereo audio input on a 5-pin terminal block connector
OUTPUTS:	1 speaker stereo audio output on a 4-pin terminal block connector
INPUT SENSITIVITY:	8Ω: 320mVpp (unbalanced), 690mVpp (balanced) 4Ω: 220mVpp (unbalanced), 780mVpp (balanced)
OUTPUT POWER:	40 W per channel into 8Ω, 80W per channel into 4Ω
MAX. VOLTAGE GAIN:	8Ω: 44dB (unbalanced), 37dB (balanced) 4Ω: 46dB (unbalanced), 34dB (balanced)
OUTPUT MUSIC POWER:	300W per channel into 4Ω
BANDWIDTH (-3dB):	>20kHz
S/N RATIO:	93dB
CROSSTALK:	-55dB @1kHz, -43dB @20kHz
CONTROLS:	Bass: -8.5dB to 12.5dB @100Hz; mid: -9dB to 13dB @1kHz; treble: -8dB to 12.5dB @10kHz; balance: -12dB to 0dB; volume: <-35dB to 35dB @1kHz
ADDITIONAL CONTROLS:	Loudness: -9dB @500Hz, -9dB @1kHz, -8.5dB @15kHz
COUPLING:	DC
AUDIO THD + NOISE:	0.2% @1kHz, 1V
AUDIO 2nd HARMONIC:	0.15% @1kHz
AMPLIFIER TYPE:	Class D
POWER SOURCE:	100-240V AC, 2.1A
DIMENSIONS:	19" x 7" x 1U W, D, H
WEIGHT:	2.0kg (4.4lbs)
ACCESSORIES:	Power cord

Table 3: Communication Parameters

RS-232 Protocol 3000 (Default)	
Baud Rate:	9600
Data Bits:	8
Stop Bits:	1
Parity:	None
Command Format:	ASCII

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1 Specifications are subject to change without notice

9   905 Commands in Protocol 3000

This section describes all commands sent to the **905**. For an explanation of the syntax and use of Protocol 3000, see section 9.7.

9.1   Operating Commands

Following are the specific commands that the room controller (RC device) sends to the **905** to operate the external devices.

9.2   Help Commands

Command	Syntax	Response
Protocol handshaking	#CR	~OKCRLF

9.3   Device Initiated Messages

Command	Syntax
Start message	Kramer Electronics LTD. , Device Model Version Software Version
Switcher actions:	
Audio channel has switched (breakaway mode)	AUD IN>OUT

9.4   Result and Error Codes

	Syntax
Command ran successfully, no error.	COMMAND PARAMETERS OK
Protocol Errors:	
Syntax error	ERR001
Command not available for this device	ERR002
Parameter is out of range	ERR003
Unauthorized access (command run without the matching login).	ERR004

9.5   Basic Routing Commands

Command	Syntax	Response
Switch audio only	AUD IN>OUT, IN>OUT, … Short form: A IN>OUT, IN>OUT, …	AUD IN>OUT, IN>OUT, …RESULT
Switch audio only	AUD IN>OUT, IN>OUT, … Short form: A IN>OUT, IN>OUT, …	AUD IN>OUT, IN>OUT, …RESULT
Read audio connection	AUD? OUT Short form: A? OUT AUD? *	AUD IN>OUT AUD IN>1, IN>2, …

Parameter Description:

IN = Input number or '0' to disconnect output.

'>' = Connection character between in and out parameters.

OUT = Output number or '*' for all outputs.

9.6 Audio Parameters Commands

Command	Syntax	Response
Set simple audio volume	VOLUME VOLUME Short form: VOL VOLUME	VOLUME VOLUME RESULT
Increase/decrease simple audio volume	VOLUME +/- Short form: VOL +/-	VOLUME +/- RESULT
Read simple audio level	VOLUME? Short form: VOL?	VOLUME VOLUME

Advanced commands for controlling each stage of audio amplification:

Set audio bass level	BASS CHANNEL, BASS Short form: ADB CHANNEL, BASS	BASS CHANNEL, BASS RESULT
Read audio bass level	BASS? CHANNEL Short form: ADB? CHANNEL	BASS CHANNEL, BASS
Set audio treble level	TREBLE CHANNEL, TREBLE Short form: ADT CHANNEL, TREBLE	TREBLE CHANNEL, TREBLE RESULT
Read audio treble	TREBLE? CHANNEL Short form: ADT? CHANNEL	TREBLE CHANNEL, TREBLE
Set audio midrange	MIDRANGE CHANNEL, MID_RANGE Short form: ADM CHANNEL, MID_RANGE	MIDRANGE CHANNEL, MID_RANGE RESULT
Read audio midrange	MIDRANGE? CHANNEL Short form: ADM? CHANNEL	MIDRANGE CHANNEL, MID_RANGE
Set audio loudness	LOUDNESS CHANNEL, LOUDNESS Short form: ADS CHANNEL, LOUDNESS	LOUDNESS CHANNEL, LOUDNESS RESULT
Read audio loudness	LOUDNESS? CHANNEL Short form: ADS? CHANNEL	LOUDNESS CHANNEL, LOUDNESS
Mute audio	MUTE MUTE-MODE	MUTE MUTE-MODE RESULT
Read audio mute state	MUTE?	MUTE MUTE-MODE
Set balance mode	BALANCE OUT-CHANNEL, BALANCE-LEVEL	BALANCE OUT-CHANNEL, BALANCE-LEVEL RESULT
Read balance mode	BALANCE? OUT-CHANNEL	BALANCE OUT-CHANNEL, BALANCE-LEVEL

Parameter Description:

STAGE = 'IN, 'OUT'

or numeric value of present audio processing stage. For example: '0' for input level, '1' for pre-amplifier, '2' for amplifier (OUT) etc.

CHANNEL = Input or Output #

VOLUME / BASS / TREBLE / MID_RANGE = Audio parameter in Kramer units, minus sign precedes negative values.

         ++ increase current value,

         -- decrease current value.

MIX =

'0' or 'OFF'

'1' or 'ON'

9.7 Protocol 3000 Syntax

Protocol 3000 is used to control the **905** via an RS-232 connection using a PC, touch screen, other serial controller or RC type controller.

9.7.1 Host Message Format

Start	Address (optional)	Body	Delimiter
#	*Destination_id@*	**Message**	**CR**

9.7.1.1 Simple Command

Command string with only one command without addressing:

Start		Body	Delimiter
#		**Command SP** *Parameter_1,Parameter_2,…*	**CR**

9.7.1.2 Command String

Formal syntax with commands concatenation and addressing:

Start	Address	Body	Delimiter
#	*Destination_id@*	**Command_1** *Parameter1_1,Parameter1_2,…|* **Command_2** *Parameter2_1,Parameter2_2,…|* **Command_3** *Parameter3_1,Parameter3_2,…|…*	**CR**

9.7.1.3 Device Message Format

Start	Address (optional)	Body	delimiter
~	*Sender_id@*	**Message**	**CR LF**

9.7.1.4 Device Long Response

Echoing command:

Start	Address (optional)	Body	Delimiter
~	*Sender_id@*	**Command SP** *[Param1 ,Param2 …]* **result**	**CR LF**

CR = Carriage return (ASCII 13 = 0x0D)
LF = Line feed (ASCII 10 = 0x0A)
SP = Space (ASCII 32 = 0x20)

9.7.2 Command Terms

Command
A sequence of ASCII letters ('A'-'Z', 'a'-'z' and '-').
Command and parameters must be separated by at least one space.

Parameters
A sequence of alphameric ASCII characters ('0'-'9','A'-'Z','a'-'z' and some special characters for specific commands). Parameters are separated by commas.

Message string
Every command entered as part of a message string begins with a **message starting character** and ends with a **message closing character**.

Note: A string can contain more than one command. Commands are separated by a pipe ('|') character.

Message starting character
'#' – For host command/query
'~' – For machine response

Device address (Optional, for K-NET)
K-NET Device ID followed by '@'

Query sign
'?' follows some commands to define a query request.

All outputs sign
'*' defines all outputs.

Message closing character
CR – For host messages; carriage return (ASCII 13)
CRLF – For machine messages; carriage return (ASCII 13) + line-feed (ASCII 10)

Command chain separator character
When a message string contains more then one command, a pipe ('|') character separates each command.

Spaces between parameters or command terms are ignored.

9.7.3 Entering Commands

You can directly enter all commands using a terminal with ASCII communications software, such as HyperTerminal, Hercules, etc. Connect the terminal to the serial, Ethernet, or USB port on the Kramer device. To enter CR , press the Enter key.
(LF is also sent but is ignored by command parser).

For commands sent from some non-Kramer controllers like Crestron, some characters require special coding (such as, /X##). Refer to the controller manual.

9.7.4 Command Forms

Some commands have short name syntax in addition to long name syntax to allow faster typing. The response is always in long syntax.

9.7.5 Command Chaining

Multiple commands can be chained in the same string. Each command is delimited by a pipe character ('|'). When chaining commands, enter the **message starting character** and the **message closing character** only once, at the beginning of the string and at the end.

Commands in the string do not execute until the closing character is entered.

A separate response is sent for every command in the chain.

9.7.6 Maximum String Length

64 characters

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.

Caution

$C \in$